

FLORA OF ARALAM WILD LIFE SANCTUARY

THESIS
submitted to the
University of Calicut
in partial-fulfilment of the
requirements for the degree of
DOCTOR OF PHILOSOPHY

By

DANTAS. K. J

Supervising Guide
Dr. N. Sasidharan

NTFP DEPARTMENT
KERALA FOREST RESEARCH INSTITUTE
PEECHI, THRISSUR, KERALA

AUGUST 2017

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Peechi, Thrissur, Kerala, INDIA

August 2017



Kerala Forest Research Institute

(An Institution of Kerala State Council for Science, Technology and Environment)

Peechi - 680 653, Thrissur, Kerala, India

16 August, 2017

CERTIFICATE

This is to certify that the thesis entitled **Flora of Aralam Wildlife Sanctuary** submitted by **Mr. Dantas. K. J** in partial-fulfilment of the requirements for the degree of Doctor of Philosophy of the University of Calicut, incorporates the results of the work done by him under my supervision. This thesis has not been submitted by him to any other University for the award of any other degree or diploma and it represents the original work done by him.

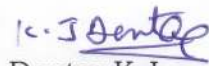
Dr. N. Sasidharan

Supervising guide

DECLARATION

I hereby declare that the thesis entitled **Flora of Aralam Wildlife Sanctuary** submitted by me in partial-fulfilment of the requirements for the degree of Doctor of Philosophy of the University of Calicut incorporates the results of the work done by me. This thesis has not been submitted by me to any other University for the award of any other degree or diploma, and it represents the original work done by me.

Peechi
16 August, 2017



Dantas K J

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Dedicated to my family

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Introduction

1. Introduction

The relationships between plants and human have began since time immemorial as the first and foremost source of food. Hence, people have been trying to understand the biodiversity for their need *i.e.* edible and non edible plant types. Human beings started their settled life for agriculture and slowly increased their other requirements like protection form the surroundings, aesthetic and cultural necessities. As civilization progressed, they started exploiting more natural resources like timber, other plant resources and animals for their better living. This utilization leads to better understandings of the knowledge on the neighboring biodiversity and there by covering the entire area. The intellectual progress of human society, progress of language and transcription made it possible to gain more knowledge about biodiversity. The acquaintance on various plants, especially medicinal plants opened up attractive and mysterious world to common man. The fascinating factors and features of plants paved first step in the way of documenting the plant resources.

Botanists were exploring the various regions of the world for several centuries. The efforts succeeded only to bring more realistic taxonomic account of the plants of Europe (Brummitt *et al.*, 2001). But the goal of cataloguing the vast diversity of the Earth is still far away from the finishing line. Tropical forests covering the seven per cent of the total land area harbors 60-70 per cent of the total life forms of the entire earth (Myers, 1988, McNeely 1992). While documenting the vast diversity of tropical forests, majority were located in the developing countries. As far as these countries are concerned, tropical forests represent important resources both from production and conservation point of view (Howard and Lanly, 1975). On an average, 12 per cent of the species have become threatened or endangered and some disappeared. The situation is grave in tropical regions. Concern about sustainability and loss of biodiversity are increasingly being voiced from all parts of the globe. Various aspects of the problem are being highlighted for the last three decades by authors like Raven, 1988; Reid and Miller, 1989; Mc Neely, 1992 and Mc Neely *et al.*, 1990.

1.1. Challenges of the tropical forest

Tropical forests pass through the awful changes in its natural habitat. The challenges like population explosion, poverty and developmental pressure lead to over exploitation of natural resources. Over exploitation ultimately ended in habitat reduction and corresponding biodiversity loss. It is estimated that two-thirds of all species occur in the 14-18 million sq. km. land area of tropical humid forests and the human destroy most species rich areas. Tropical rainforest reduction is recent, and clearing eliminates about 1 million sq. km. every 5 to 10 years. It is calculated that 5 per cent of the total area would protect 50 per cent of the all forests' species (Pimm & Raven, 2000). This concept led to the declaration of 'biodiversity hotspots' by Meyer *et al.* (2000) and identified 25 hotspots globally to protect biodiversity (Meyer *et al.*, 2000). Out of these 25 hotspots, 17 hotspots have only 12 per cent of original primary vegetation remaining. Habitat loss in the last few decades, extinction of species, number of endemics etc are the criteria for selection of hotspots. Tropical areas have the number of hotspots out of 25, 15 are confined to tropical areas. It is estimated that 18% of all species will eventually become extinct even if all of the remaining habitats within hotspots were quickly protected (Pimm & Raven, 2000). The millennium ecosystem assessment concluded that over the past 50 years 60 per cent of all ecosystem services like watershed protection, hazard protection, climatic regulation etc had declined as a direct result of the growth of agriculture, industry, forestry, fisheries etc (Kinzing *et al.* 2011). So the need of conservation of ecosystem has increased. Monitoring and management is a crucial element of nature conservation and is crucial in a rapidly changing world (Pertti Saurola 2008). Ecologists are trying to understand the role of biodiversity in ecosystem function (Pedroflom and Osvaldo 2012) the first and foremost step to understand the ecosystem is the identification of each group in the ecosystem.

1.2. Scenario of biodiversity in India

India is a tropical country with one of the richest biodiversity areas in the world. The country is geographically synonymous as Indian subcontinent, which

includes geographically different terrains i.e. elevation varies with sea level to world's highest mountain ranges, ice covered Himalaya to sand filled desert, alpine vegetation to mangrove vegetations. The varied topography of India and different climatic zones i.e. temperate, arid, alpine, and most diversified tropical climate and the different biogeographic junctions trigger the enchanted diversity. These richest biodiversity parameters lead India to become one of the Mega diversity country of the world.

According to the Forest Survey of India (FSI, 2015) the total forest cover of the country is 7,01,673 sq. km. which is 21.34 percent of the total geographical area. Globally it is calculated that one third of the land area (33%) must be preserved as forest for sustainable existence of the earth. But in India it is only 21.34 percent. But the population explosion, demand of forest land for industrial purposes, defense activities put pressure on the remaining forest area of the country. It is estimated that the country is also losing 47,500 hectares of forest cover every year (Govt. of India, 1990).

The richest plant diversity of India host 11.4 percent of total plant species of the globe (Singh *et al.*, 2015). The country also has different ecosystems and bear 42 vegetation types, 16 major forest types and 10 biogeographical zones (Gadgil and Meher-Homji, 1990). India has 103 National Parks, 543 Wildlife Sanctuaries, 45 community reserves and 73 conservation reserves. These 764 protected areas contribute 162024.69 sq. km. forest area, which is 4.93 percent of total land area of the country. The endemism of the country is remarkable with 24.28 percent of the total plant species being endemic.

1.3. Western Ghats

Western Ghats is one of the oldest mountains in the world. This mountain range lies parallel to the western coast of India. Mountain ranges starting north from Tapti River ends near Kanyakumari of South and is of 1600 km long. Western Ghats cover an area of 1, 60,000 sq. km. passing through the Indian States like Maharashtra, Goa, Karnataka, Tamil Nadu and Kerala. The western slopes of the

Ghats receive luxurious rainfall ranging from 2000-6000 mm per year mainly by Monsoon. Western Ghats play chief role in the regulation of country's monsoon. Western slopes is blessed with luxurious rain fall but in the eastward side of the Ghats amount of rainfall is decreasing even in most of the foothills coming under rain shadow areas. Principle rivers of Peninsular India like Godavari, Krishna and Cauvery are originate from the Western Ghats and remains as main watershed areas of the Region. The average height of Western Ghats is 1200 m msl and is the Southern region it reaches up to 2600 m msl. Anamudi with 2695 m msl is the highest peak of Western Ghats. Along the entire length, the hill ranges have only one total discontinuity, i.e. the Palakkad Gap in Kerala, where for more than 30 km there is a gap which has a floor height of less 100 m above sea level. The Western Ghats support evergreen and Semi-evergreen forests, moist deciduous forests, dry deciduous forests, subtropical forests, savannahs, montane forests, montane grasslands and riparian forests. The Western Ghats harbors more than 30 percent, nearly 5588 plant species in India. Endemism is also very high in the western Ghats 2116 species out of 5588 are endemic to this region.

Western Ghats and Sri Lanka has lost most of its primary vegetation and only 6.8 percent is remaining (Myer *et al.* 2000). Western Ghats and Sri Lanka hotspot also contribute 0.7 percent of world's total endemic flora and 1.3 percent of total endemic vertebrates (Meyer *et al.*, 2000). Primary habitat lose and Richness of diversity, concentration of endemism and lose of primary habitats are the main criteria for selection of biodiversity hotspots. Western Ghats and Sri Lanka together is considered as hottest hotspot of biodiversity (Meyer *et al.*, 2000).

The importance of Western Ghats in the biodiversity has grabbed the attention of the people and United Nations Education Scientific and Cultural Organization (UNESCO) has declared Western Ghats as world heritage site. The world heritage committee (WHC) identifies the uniqueness of the Western Ghats influence and high level of biodiversity and endemism, cultural and aesthetic values and declared it as world heritage site. These mountain ranges are older than Himalayan ranges and has a large scale influence on the biophysical and ecological processes over the entire Indian peninsula (UNESCO). Montane forests

of the Western Ghats regulate Indian monsoon weather pattern and directly influence Indian Agricultural system and indirectly the Indian economy. The heritage site is grouped in to 7 sub clusters and 39 component parts. Aralam wildlife sanctuary (Aralam WLS) confined to the Talacauvery sub cluster.

1.4. Aralam Wildlife Sanctuary

The Aralam Wildlife Sanctuary is the only protected area of Kannur district and northernmost protected area of Kerala State. The Sanctuary was constituted in the year 1984 [Gopinathan, (n.d.)]. Functionally, the Western Ghats comprised of three biogeographic regions Northern, Central and Southern Western Ghats. Southern Western Ghats comprising parts of South Karnataka, Kerala and Tamil Nadu is considered as the richest region with respect to species diversity and endemism. In the Kerala part of southern Western Ghats, three centers of endemism are recognised, viz. *Agasthyamala*, *Anamalai High Ranges* and *Nilgiri-Silent Valley-Wayanad-Kodagu*. The Aralam Wildlife Sanctuary falls within the *Nilgiri-Silent Valley-Wayanad-Kodagu* endemic centre. It is estimated that 150 endemic species are exclusive to this region (Nayar, 1996). Due to a variety of reasons, degradation of forests along the Western Ghats has taken place during the past few decades leading to the loss of biodiversity.

1.5. Importance of the documentation of flora of Protected Areas (PAs)

Among the flowering plants of Kerala, as many as 439 species are placed under various threatened categories as per the IUCN criteria (IUCN 2017). Some are presumed to be extinct. However, recent floristic studies in the Protected Areas (PAs) of Kerala (Sasidharan, 1997, 1998, 1999 & 2002) have been successful in relocating many rare and endangered species. Kerala is a densely populated State and the biotic pressure on nature and natural resources is relatively high. *In situ* conservation of Red listed category species is most effective if they are occurring in PAs. The Kerala Forest Department has initiated a programme for inventorising the biodiversity of the PAs with the overall objective of preparing the Management

plans. The Floras of PAs such as Neyyar, Shenduruny, Periyar Tiger Reserve, Thattekkad, Peechi-Vazhani, Chinnar and Parambikulam Tiger Reserve have already been completed.

1.6. Relevance of the studies

Aralam Wildlife Sanctuary has not been subjected to detailed floristic study to bring out the floristic wealth. Before the establishment of the Sanctuary, Ramachandran & Nair studied the Flora of Cannanore District (1988). However, collections from Aralam Sanctuary areas are scanty. In Kerala, most of the Protected Areas are located in the southern and central regions. Among the two Wildlife Sanctuaries of northern Kerala, the flora of Aralam Wild life Sanctuary is more significant because the vegetation is dominated by West coast tropical evergreen and West coast semi-evergreen forests as per the classification of Champion & Seth (1968). These forest types are the habitats of most of the rare, endangered as well as endemic species. In the present study it is envisaged to carry out detailed floristic exploration in the Aralam Wild life Sanctuary and to bring out the Flora with emphasis on endemic as well as Red listed category species.

Study area

2. Study area

2.1. Location

Aralam Wildlife Sanctuary situated in the Kannur revenue district of Kerala is along the northwest slopes of Western Ghats. It is contiguous with the forests of Coorg (Kodagu) district of Karnataka State and lies between 11.88° and 11.98° North latitude and 75.79° and 75.93° East longitudes. The altitude varies between 60 m to 1,500 m above sea level.

2.2. History of the study area

The Sanctuary was constituted in 1984 as per the Government notification on 15th October 1984. The 'Odanthode Malavaram' of Telichery Special Division and some part of Kottiyoor Reserve Forest comprise the present Sanctuary. The 'Odanthode Malavaram' was previously a private forest and it came under Government control by The Kerala Forest (vesting and assignment) Act 1971.

Three thousand and sixty hectares of 'Odanthode Malavaram' was clear felled for establishing the Central-State Farm. However, 178.16 ha of the clear felled area was not taken up by the Central State Farm. This area was later planted with eucalyptus and teak and became the part of the Sanctuary. Out of the remaining 3,500 ha of Odanthode Malavaram, 1782.16 ha was transferred to the Wildlife Wing. Later, the remaining portions were also handed over for the Sanctuary. Prior to the vesting in 1971, the area was subjected to irrational felling. Some area was subjected to selection felling before constituting the Sanctuary. Portion of the Kottiyoor Reserve Forests near Chavachithode, which was attached to the Sanctuary was also subjected to selection felling during 1941-49. The remaining 25 sq.km is undisturbed and this area is now in the core area of the Sanctuary.

2.3. Topography

The Aralam Wildlife Sanctuary has an undulated terrain. The altitude varies from 60 m (Valayamchal) to 1,500 m (Ambalappara) above sea level. Ambalappara (1,500 m), Pothurumi (1,397 m), Mullenpara (1,400 m), Kattikari (1,100 m), Chavachimala (825 m), Kannadivechakunnu (800 m) and Kurumbankallu (850

m) are the main peaks (Map 1). Cheenkannipuzha which is flowing in the west direction originates from Karnataka part of Bhramagiri. Chavachithode, the main tributary of Cheenkannipuzha originates from Pothrumi mala of the Sanctuary. Uruty puzha, originating from Karnataka part of Bhramagiri also flows along the Sanctuary. The rivers Cheenkannipuzha and Uruty puzha join Baveli puzha which flows to the Valapattanam River (Map 2).

2.4. Geology, rock and soil

Geologically the area can be grouped in to two main types:-

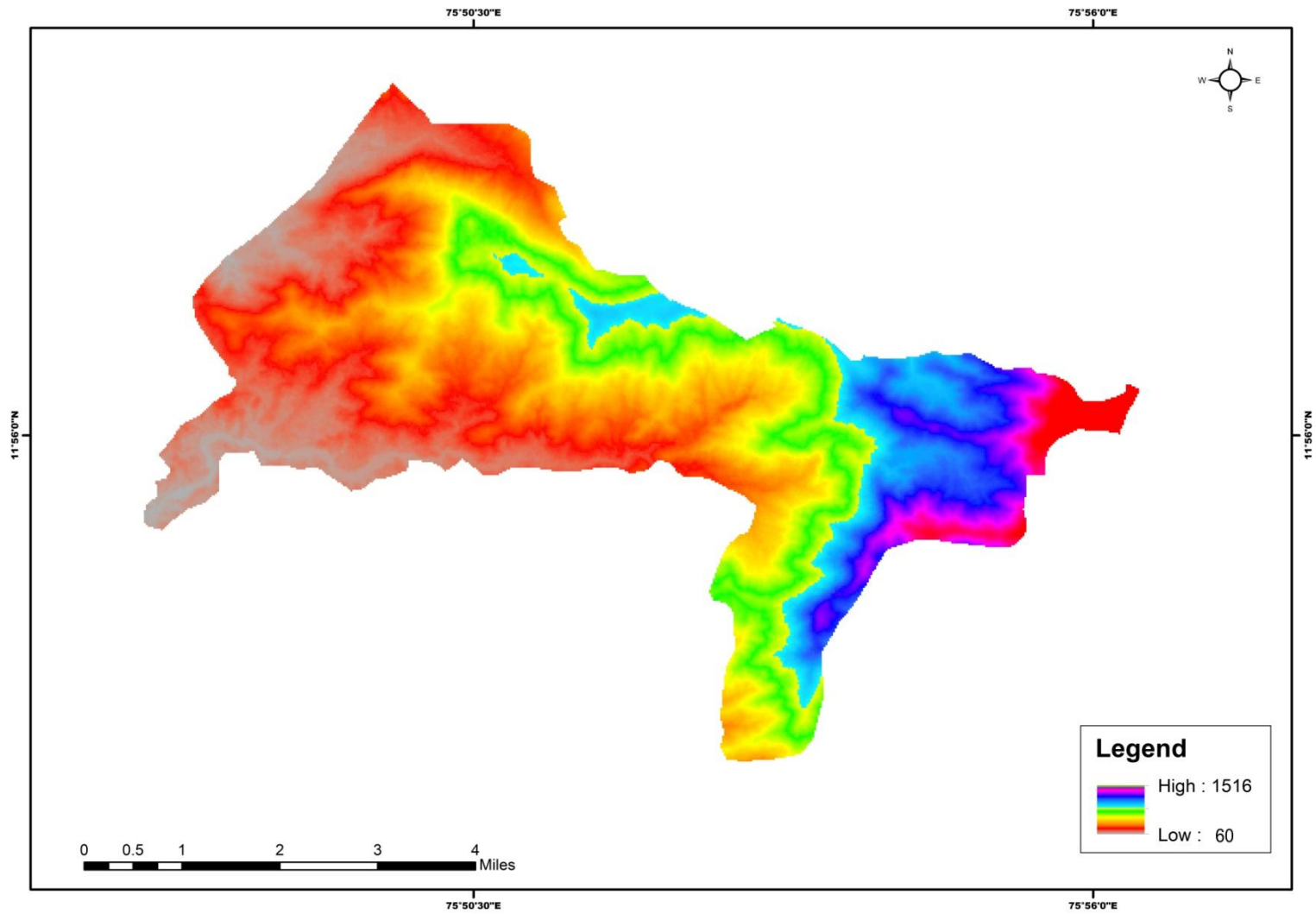
Laterite rock: - this is seen in the lower reaches. Laterite is ferruginous, reddish rocks with irregular galleries filled with yellow clay which hardens on expose to atmospheric genesis laterite formation is attributed to monsoon condition repeated through ages. Decomposition of genesis and partial rearrangement by the mechanical action of water give rise to laterite rocks. These rocks are seen at lower elevations of the Sanctuary.

Crystalline:- the mountains of Western Ghats are composed of ancient crystallins and metamorphic rocks of archean age, mainly quartz genesis the principal rock types are granite and their genesis variation the genesis rocks are biolate genesis their chief constituents being quartz, feldspar, biolate and granite.

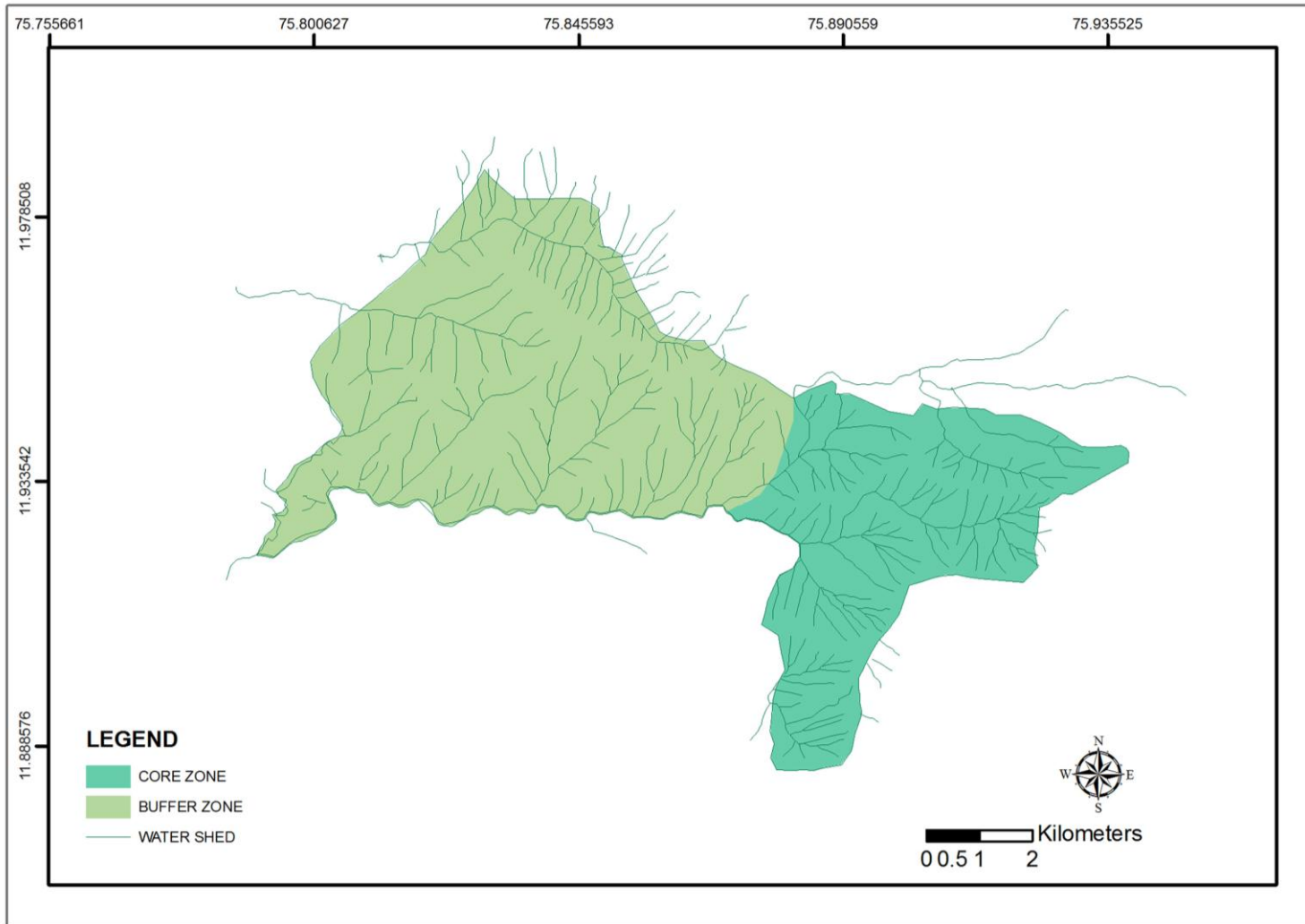
Soil: - The major soil type in the area is lateritic with moderate erosion and well drained clay soils. The alluvial soils are seen along the banks of river which is flowing gently and it is well drained.

2.5. Climate

The Sanctuary receives southwest and the northeast monsoons with a maximum annual rainfall of 5,052 mm and the minimum of 3,745 mm and the number of rainy days varies from 100-120 [Gopinathan, (n.d.)]. The rainfall even goes as high as over 6,000 mm in the mountain reaches. The dry season varies between 3 to 4 months when the monthly rainfall is below 50 mm. The temperature at the foothills varies from 11°C to 40°C and in the hills it is between 8°C and 25°C. The hottest months are April and May. At the foothills the humidity varies from 60 to 100%.



Map 1. Digital elevation model of Aralam Wildlife Sanctuary



Map 2. Study area showing buffer core zones and water shed

2.6. Vegetation

The major vegetation types met within this Sanctuary are West coast tropical evergreen forest, West coast tropical semi-evergreen forest, Southern hilltop evergreen forest, Southern moist mixed deciduous forest and grasslands (Champion & Seth 1986; Chandrasekharan 1962 Meher-Homji, 1967, 1978 & 1984). Abandoned plantations of Teak, Eucalyptus and Cashew is also seen in the Sanctuary (Plate 1).

West coast tropical evergreen forest

This vegetation type is characterised by the profuse growth of arborescent species. The trees have a three tier composition, the highest attaining a height up to 45 m. Many trees have buttresses at base and the boles are clean, cylindrical, un-branched at least up to two-thirds of their height and generally with a spreading or umbrella shaped crown. The middle stratum is more or less candle shaped and the lower is characteristically conical. Dense growth with orchids, aroids, mosses, ferns and lichens on trees are common. Cauliflory is not rare. The dominant upper storey consists chiefly of *Artocarpus heterophyllus*, *Bischofia javanica*, *Calophyllum polyanthum*, *Canarium strictum*, *Cullenia exarillata*, *Dipterocarpus indicus*, *Drypetes venusta*, *Dysoxylum malabaricum*, *Elaeocarpus tuberculatus*, *Mesua ferrea*, *Palaquium ellipticum*, *Machilus macrantha* and *Vateria indica*. The second storey, which is about 15-25 m high, is comprised of *Aglaia elaeagnoidea*, *Baccaurea courtallensis*, *Cinnamomum malabathrum*, *Dimocarpus longan*, *Elaeocarpus serratus*, *Garcinia talbotii*, *Holigarna grahamii*, *Litsea wightiana*, *Myristica beddomei*, *Polyalthia coffeoides* and others. The third storey which is of less than 15 m in height consists of small trees like *Cinnamomum* spp., *Syzygium laetum*, *Syzygium munronii*, *Memecylon* sp., *Xanthophyllum arnottianum*, and also shrubs like *Lasianthus* sp., *Psychotria* sp., *Strobilanthes* sp., *Thottea siliquosa et al.* Palms like *Arenga wightii*, *Calamus* sp., *Pinanga dicksonii* and reeds like *Ochlandra* sp., are common. The ground flora is sparse and represented by species like *Amomum* sp., *Hydrocotyle javanica*, *Elettaria cardamomum*, *Ophiorrhiza* spp, and species of *Begonia* and *Elatostemma*. Woody lianas are represented by *Caesalpinia cucullata*, *Entada rheedei*, *Gnetum edule*, *Derris scandens*, *Combretum malabarica*, *Combretum latifolium* etc. Epiphytes are

represented by *Fagraea ceylanica*, various species of orchids, aroids and pteridophytes. Common parasites are members of Loranthaceae and Viscaceae.

About 22 sq km (34 %) of the forest is fairly undisturbed belonging to this type. The forest from Chavachi to Ambalappara is a good west coast tropical evergreen forest. *Dipterocarpus*, *Calophyllum* and *Palaquium* species dominate in Uruppukunnu. A good population of *Dipterocarpus bourdillonii*, a critically endangered tree species of Western Ghats, is seen in the Chavachi area of the Sanctuary. The evergreen forest has good representation of endemic wild palms such as *Arenga wightii* and *Pinanga dicksonii* and very good growth of *Calamus* spp.

West coast tropical semi-evergreen forest

This forest type is found between 600 to 800 m elevation and in some areas descends up to 500 m. Although it is a closed forest, unlike the evergreen, it is not so dense and the evergreen and deciduous species are mingled in the top storey. While the preponderance of evergreen species are more when they merge towards the wet evergreen type. In most of the localities *Dipterocarpus indicus* predominates in the top storey making the forest *Dipterocarpus* dominant. This gives the forest the status of a subtype of the major semi evergreen type. Physiognomy of the top storey is a mixture of evergreen and deciduous species. The predominant evergreen species are *Artocarpus heterophyllus*, *Bischofia javanica*, *Calophyllum polyanthum*, *Hopea parviflora*, *Mangifera indica*, *Mesua ferrea*, *Myristica beddomei* etc. The deciduous ones are *Bombax ceiba*, *Dalbergia latifolia*, *Holigarna grahamii*, *Pterospermum diversifolium*, *Tetrameles nudiflora*, *Toona ciliata*, etc.

Areas like Valayamchal, Narikkadavu and Paripputhode, the forest is semi-evergreen type intermixed with a small patch of moist deciduous forests.

Southern moist mixed deciduous forest

This forest type is seen below 700 m altitude. During the rainy season due to the thick foliage, the canopy looks similar to that of evergreen forest. However, during



Ambalappara the Highest Peak of the Sanctuary



Inside of Evergreen forests



Undergrowth *Strobilanthes barbatus*



Plantation area infested with *Mikania*



Mud-puddling butterflies in the Sanctuary

dry season the moist deciduous forest reveal its true identity as the trees shed their leaves. The leafless period varies from two weeks to four months depending on the species. The principal species of this type of forest are: *Albizia odoratissima*, *A. lebeck*, *A. procera*, *Bombax ceiba*, *Bridelia retusa*, *Dalbergia latifolia*, *Grewia tiliifolia*, *Lagerstroemia microcarpa*, *L. speciosa*, *Schleichera oleosa*, *Terminalia paniculata*, *Terminalia bellirica*, *Tetrameles nudiflora* etc. The middle stratum trees are *Bauhinia malabarica*, *Cassia fistula*, *Careya arborea*, *Ficus exasperate*, *F. racemosa*, *Olea dioica*, *Phyllanthus emblica*, *Sapindus trifoliatus*, etc. The woody climbers are *Acacia caesia*, *Calycopteris floribunda*, *Cissus heyneana*, *Dalbergia horrida*, *Spatholobus parviflorus* etc. are very common. The lower story is composed of species like *Cipadessa baccifera*, *Chionanthus mala-elengi*, *Holarrhena pubescens*, *Narengi crenulata*, *Hydnocarpus pentandra*, etc.

Southern hill top evergreen forest

This forest type is seen at an elevation between 1,200 and 1,500 m. The trees in this forest type is characterised by short-boled and highly branched and seldom exceed 20 m. There will be dense growth of mosses, lichens, aroids, orchids and ferns. The principal species are *Litsea wightiana*, *Calophyllum austroindicum*, *Cinnamomum sulphuratum*, *Diospyros nilagirica*, *Elaeocarpus munronii*, *Gordonia obtusa*, *Garcinia* sp., *Ixora sivarajiana*, *Ligustrum robustum* subsp. *walkeri*, *Memecylon* sp., *Meliosma pinnata* subsp. *barbulata*, *Symplocos cochinchinensis* subsp. *laurina*, *Syzygium densiflorum*, *Pittosporum tetraspermum* *Atalantia wightii*, *Tarenna alpestris* etc.

Grasslands

The grasslands in the Sanctuary are along the fringe areas bordering the Brahmagiri Hills. The common grasses and sedges are *Chrysopogon hackelli*, *Cymbopogon* spp., *Garnotia arundinacea*, *Themeda triandra*, *Fimbristylis* spp., *Pycreus* spp., *Carex* spp., *Cyperus* spp. etc. are common grasses. Apart from the grasses and sedges, the grasslands support several herbaceous and shrubby species such as *Eriocaulon* spp., *Habenaria* spp., *Hedyotis* spp., *Heracleum rigens*,

Hypericum mysurense, Impatiens spp., Ipomoea barlerioides, Knoxia wightiana, Oldenlandia spp. Pimpinella heyneana, Phoenix loureiroi, Striga asiatica, S. angustifolia, Swertia spp., etc.

Plantations

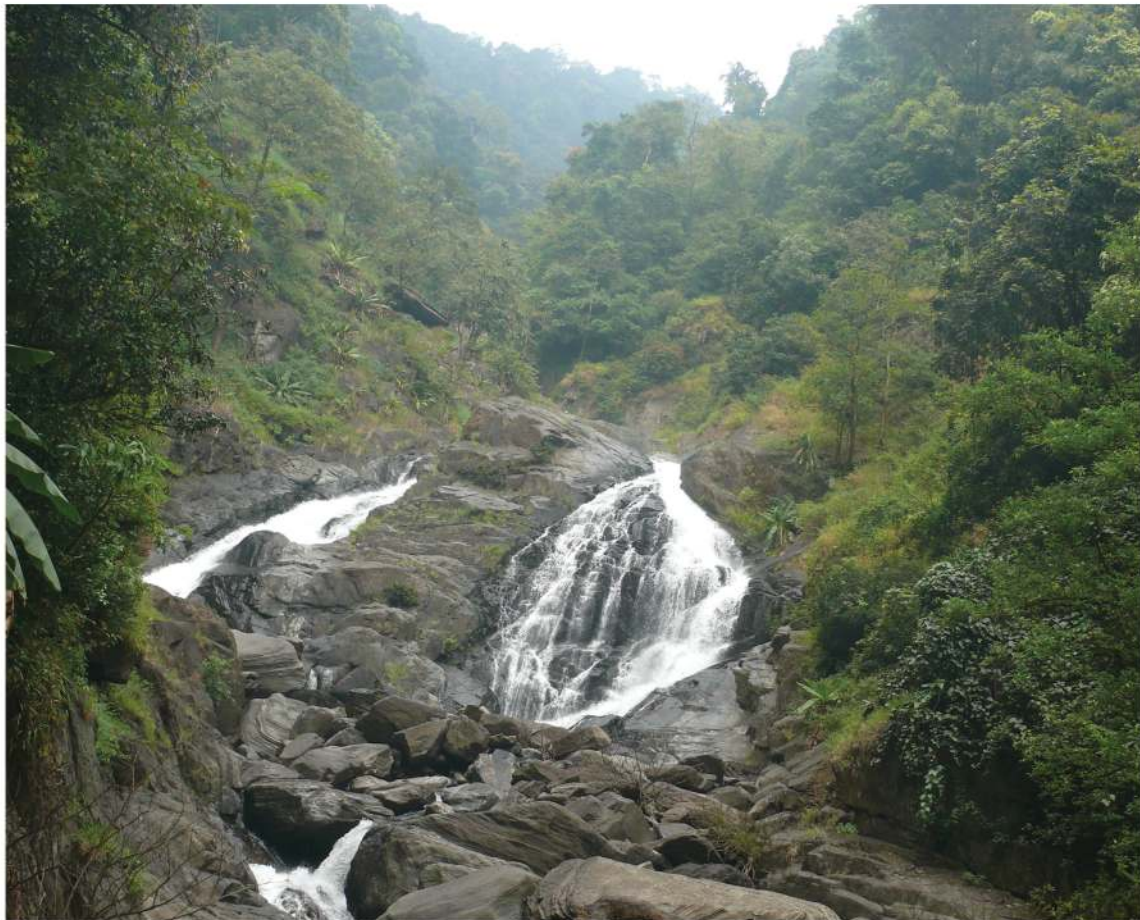
About 490 ha of area is covered by plantations, comprised of 291.30 ha teak, 167 ha Eucalyptus and 30 ha cashew. Eucalyptus and Cashew plantations are in an abandoned stage.

2.7. Significance of sanctuary

Though the Aralam is small Sanctuary compared to the other PAs of Kerala, it is continuous with the large forest area of Brahmagiri hills of Wayanad, which is adjacent to the Brahmagiri Wildlife Sanctuary of Karnataka. Continuous stretch of forest landscapes is advantageous from the conservation point and also the ecosystem services. Water harvesting is one of the major ecosystem services of Aralam WLS for the Kannur revenue district. Valapattanam River and Pazhassi projects are the important sources of drinking and irrigation water for the district. Cheenkannipuzha and Urittipuzha are important tributaries of Valapattanam River (Plate 2). These rivers being perennial, discharge water to Valapattanam River even in summer season. Cheenkannipuzha originates from upper the reaches of Karnataka part of Brahmagiris and flows down to the Aralam Sanctuary. The dense and luxuriant forest of Aralam and many perennial and seasonal rivulets and streams flow in to the Cheenkannipuzha. Meenmutty waterfall, an important tourist centre in the Sanctuary, is located along the Cheenkannipuzha. Chavachi thode, a major tributary enriching the flow of Cheenkannipuzha originates from the dense forests of Pothurummi, tumbling in a beautiful waterfall at Chavachi, before draining into Cheenkannipuzha. Urittipuzha originates from Upper reaches of Brahmagiris, another tributary to the Valapattanam River, also flows through the Sanctuary. Both the Rivers joins in to the Bavali Puzha, which originates from Wayanad Hills and flows towards the Valapattanam River. This river plays a very crucial role in the Agro-economy and Fishery-economy of the



Urutty Puzha flows in the forest area



Meenmutty waterfalls in the way of Cheenkanni puzha

district. Perennial nature of the river is very much dependent on the watershed of Aralam forests. Out of the total catchment of 546 sq. km of Valapattanam River in Kerala, the live catchment is only 100 sq km and a good portion of it is in the Aralam Wildlife Sanctuary.

Aralam Sanctuary with contiguous forest areas and is important in the management of fauna, especially larger mammals such as Gaur, Elephant, Tiger and primates including Lion-tailed Macaque (*Macaca silenus*) (LTM), Nilgiri Langur (*Semnopithecus johnii*) (NL), Black Footed Grey Langur (*Semnopithecus hypoleucos*) (BFGL), Common Langur or Hanuman Langur (*Semnopithecus entellus*) (CL) and Bonnet macaque (*Macaca radiata*) (BM) and one nocturnal primate i.e. Malabar Slender Loris (*Loris ledekkerianus malabaricus*). The abundant tree cover in the evergreen forests of the Sanctuary is ideal for most of the primates. Apart from the large mammals, the Sanctuary is blessed with a good number of lower group fauna like birds, reptiles, amphibians, arthropods etc. It is the one of the important location for Malabar Pied Hornbill, which is a threatened endemic bird in the Western Ghats. The butterfly migration of the Sanctuary is a phenomenal attraction after the rainy season and attains peak during January. Thousands of butterflies fly towards the lower reaches from the Nilgiris.

Forests of Aralam and adjacent areas represent the only compact protected patch of the unique vegetation sub-type viz. the *Dipterocarpus-Mesua-Palaquium* sub-type in Kerala. The present study has brought out the richness and diversity of the flora of the Sanctuary. The values of the Sanctuary in terms of biodiversity, ecological services, human dimension like economic benefits and aesthetic significance are very high and these favored to declare the Sanctuary as one of the component of World Heritage Site, Western Ghats.

Review of Literature

3. Review of literature

Plants have been studied in India from time immemorial, mainly with regards to medicinal properties. *Vrikshayurveda* is a branch of knowledge that is given importance in Sanskrit literature of ancient and medieval India. The word '*vrikshayurveda*' literally means the knowledge of tree life and deals with plant pathology and various methods of their treatments in general. Many books are written in India about this discipline. These books give knowledge about plants. *Charakasmhitha*, *Susruthasamhitha* (both of 2nd A D) and some Ayurveda texts have description of plants that used as medicines (Unithiri, 2000).

The systematic and scientific studies in this region were initiated by Europeans. During the Colonial period of India, Europeans started to study Indian plants, mainly in search of medicinal plants which are useful in the modern medicines. Gracia da Orta's 'Os Couloquios' published from Goa in 1565 is chronologically the first publication in India (Santapau, 1958). The author gave detailed account of some more striking Indian medicinal plants from firsthand knowledge. The first book of any real importance on the botany of India is '*Hortus malabaricus*' by Henry Van Rheed in 1678 (Santapau, 1958). Linnaeus mainly depends on this work while naming of Indian plants in '*Species plantarum*' in the year 1753.

The British botanists made major contributions to the floristic studies in India. Among the botanists, who worked on the peninsular India, the contribution of Robert Wight is the most outstanding. *Prodromus Florae Peninsulae Indiae Orientalis* by Wight and Walker-Arnott (1834) is an important work on the plants of peninsular India. Wight's major publications are '*illustrations of Indian Botany*' (1840) and '*Icons Plantarum Indiae Orientalis*' (1838-1853) in which several taxa were described, which contained many taxa found in Kerala. R. H. Beddome comes next to Wight regarding the floristic studies in Peninsular India. His publications are '*The Flora Sylvatica of South India*' (1869-1874) in which many south Indian trees are described, and '*Icones Plantarum India Orientalis*' (1868-1874). The seven volumes of '*Flora of British India*' by Joseph Dalton Hooker were published during 1872-1897, which covered phanerogams of erstwhile British India, include Kerala.

This was followed by many Indian detailed regional floras like *Flora of Upper Gangetic plains* (Duthie, 1903), *Flora of Bombay Presidency* (Cook, 1903-1908), *Flora of Bihar and Orissa* (H. H. Haines, 1921-1925), *Flora of Presidency of Madras* (J. S. Gamble in 1915 and completed by C.E.C Fisher in 1936), which cover most parts of Andhra Pradesh, Karnataka, Tamil Nadu, and Kerala. Publication like, *The forest trees of Travancore* (Bourdillon, 1908) and *Flowering Plants of Travancore* (Rama Rao, 1914), *Vernacular List of Trees, Shrubs and Climbers of Madras Presidency* (Lushington, 1915), *A Survey of the Flora of Anamalai Hills in the Coimbatore District, Madras Presidency* (Fischer, 1921) and *Flora of South Indian Hill Stations* (Fyson, 1932) are other major works on South Indian plants. Burkil (1965), in *The Chapters on the History of Botany in India* described all such contributions on Indian botany. With the view of preparing a comprehensive flora of India, the work on regional as well as local floras was undertaken by Botanical Survey of India. *Flora of Tamil Nadu, India* (Nair & Henry, 1983 and Henry *et al.*, 1987, 1989) and *Flora of Karnataka* (Sharma *et al.*, 1984) were published as a part of the aforementioned project. *The Flora of Tamil Nadu-Carnatic* (Matthew, 1982, 1983, 1988) has immense value and very relevant with regard to the deciduous floristic elements.

Floristic explorations have been going on in many parts of Kerala. These localized studies have resulted in publication of many new taxa and new records of taxa of Kerala. Some important publications are *Flora of Calicut* (Manilal and Sivarajan, 1982), *Flora of Cannanore* (Ramachandran and Nair, 1988), *Flora of Palghat* (Vajravellu, 1990), *Flora of Thiruvananthapuram District* (Mohanan and Henry, 1994), *Flowering Plants of Thrissur forest (Western Ghats, Kerala, India)* (Sasidharan and Sivarajan, 1996), *Flora of Pathanamthitta* (Anilkumar, Sivadasan and Ravi, 2005), *Flora of Alappuzha District* (Sunil and Sivadsan, 2009). Apart from this some of the floristic studies completed as research and PhD programs in which notable works are following: Studies on the *Flora of Quilon District* (Mohanan, 1984), *Studies on the Vascular Flora of Kasaragod division of Cannanore district* (Ansari, 1985), *Systematic studies on the Flora of Kottayam District, Kerala* (Antony, 1989), *Flora of Malappuram District (excluding Nilambur Forest Division)* (Babu, 1990).

So far notable floristic studies on protective areas have been completed in Kerala are *Flora of Silent Valley Tropical Rain forests of India* (Manilal, 1988), *Flora of Thenmala Division* (Subramaniyan, 1995), *Flora of Nilambur* (Sivarajan and Philip Mathew, 1996), *Studies on the Flora of Shenduruny Wildlife Sanctuary* (Sasidharan, 1997), *Studies on the Flora of Periyar Tiger Reserve* (Sasidharan, 1998), *Studies on the Flora of Chinnar Wildlife Sanctuary* (Sasidharan, 1999), *Floristic studies in Parambikulam Wildlife Sanctuary* (Sasidharan, 2002), *Flora of Agasthyamala* (Mohanan and Sivadasan, 2002). In Kerala many Ph.D programs come out with floristic studies like *Flora of Quilon District* (Mohanan, 1984), *Studies on the Vascular Flora of Kasaragod division of Cannanore district* (Ansari, 1985), *Systematic studies on the Flora of Kottayam District, Kerala* (Antony, 1989), *Flora of Malappuram District (excluding Nilambur Forest Division)* (Babu, 1990), *Vascular flora of Parambikulam Wildlife Sanctuary* (Sujanapal, 2005) and *Floristic studies of Wayanad district* (Ratheesh Narayanan, 2009).

Floristic explorations in the erstwhile Malabar region were carried out earlier by botanists like van Rheede, Robert Wight, R.H. Beddome, C.A. Barber, M.A. Lawson, J.S. Gamble, C.E.C. Fisher, *et. al.* Their floristic explorations resulted in the publications of several new plants from Kannur district, which is a part of Malabar region. There are 94 scientific names with specific epithets “*malabarica*, *malabaricus*, *malabathrum* and *malabaricum*”, denoting the Malabar region. The Flora of the erstwhile Kannur district was studied during 1980s by Ramachandran and Nair and published the *Flora of Cannanore District* during 1988. Many plants included in their flora are now in the Wayanad district which was established in 1980. Observations on the vegetation of Tellicherry division of Cannanore district was also done by Ramachandran in 1983. Apart from these detailed floristic explorations, number of new taxa was published from Kannur district by Ramachandran and Nair (1988), Madhu and Singh (1992), Ratheesh Narayanan *et. al.* (2012), Pramod and Pradeep (2011). Sujana *et. al.* (2012) and Prabhu Kumar *et. al.* (2015) had published new taxa from Aralam WLS. Ethnobotanical studies were also carried out by Ramachandran and Nair (1981 &

1987). Menon (1998) prepared the vegetation mapping of the Aralam Wildlife Sanctuary. Udayan *et al.*, (2004) published some additions to the flora of Kannur district based on their collections from Kottiyur reserve forests, which is adjacent to the Aralam Wildlife Sanctuary. Khaleel (2005) carried out some studies on Mangroves of Kannur districts. Rajith and Ramachandran (2010) published a list of plants used in the Ethno medicines of Kurichiyas of Kannur district. Jomy Augustine *et. al.* (2010) published some endemic and threatened plants of the Aralam WLS.

Materials and methods

4. Materials and method

4.1. Exploration and identification of plant species

Phanerogams from the Sanctuary were collected during August 2010 to January 2017. Field work carried out in all the habitats of the Sanctuary and specimens in flowering or fruiting stage were collected and prepared herbarium with standard procedure (Map 3). Being a forest flora, care is taken to make it useful to the Forest Department Staff and other users as possible. Emphasis were given to record field characters such as bole shape, bark colour, exudation etc. of tree species. These field characters are of great help in the identification of tree in the field. Classic floras like flora of Madras (Gamble 1915 to 1936), Flora of British India (Hooker 1872-1897), available monographs and revisions were used as literature. Authentic collections available in K, KFRI, CALI and MH are also used.

4.2. Identification keys

Dichotomous parallel keys were prepared giving more importance to generative as well as vegetative characters for the identification of families, genera under families and species under genera.

4.3. Status of Red listed category species

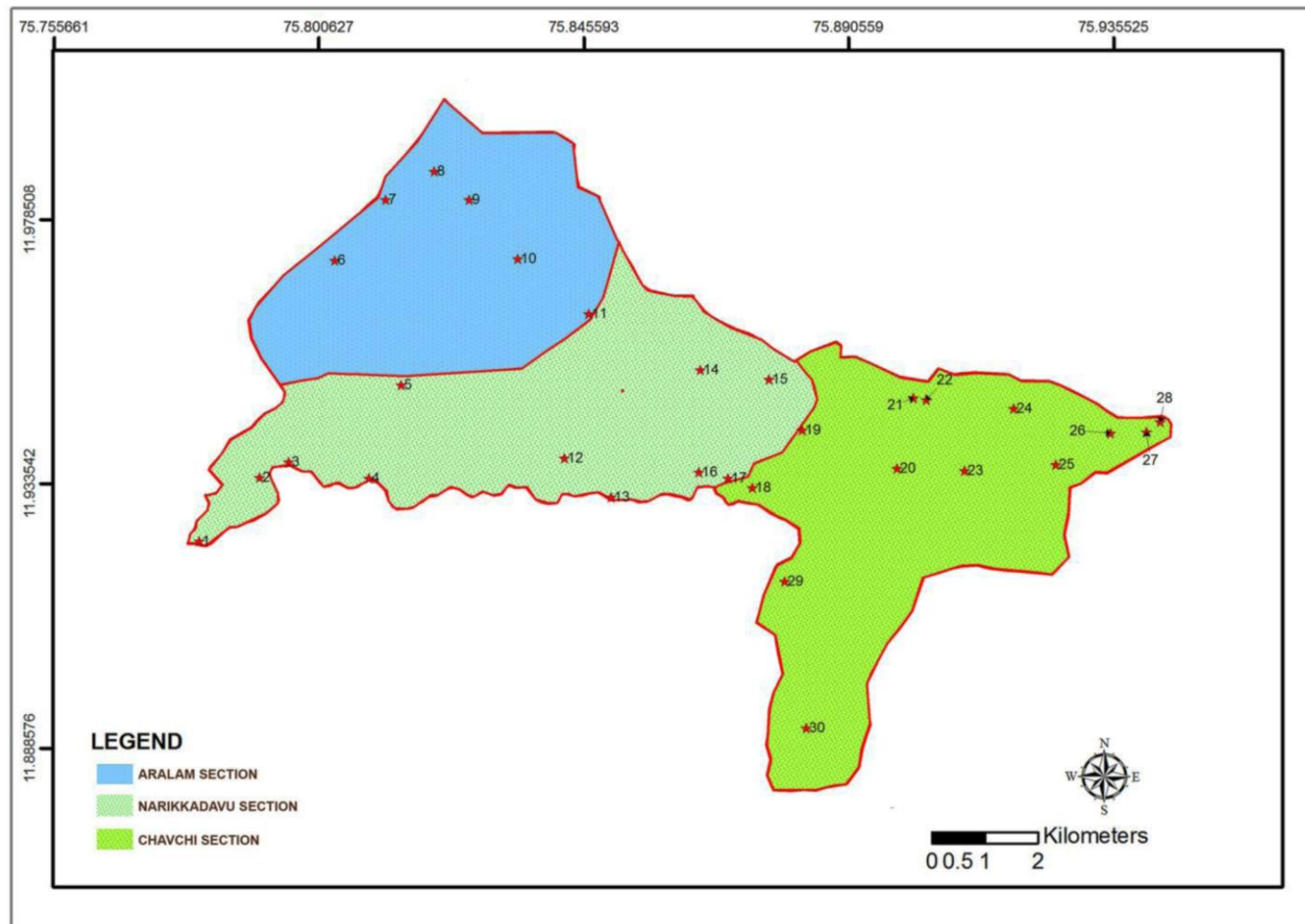
The population of Red listed category species was assessed and the status such as vulnerable, rare, endangered, critically endangered etc. ascertained as per IUCN criteria (IUCN 2017-1).

4.4. Herbarium preparation

Collection and preparation of Herbarium specimens were done as per standard procedure (Santapau, 1955). Reference herbarium specimens are maintained in the Kerala Forest Research Institute Herbarium (KFRI).

4.5. Format of the flora

Families are arranged according to the system of APG III classification, 2009 with necessary modifications in accordance with their current status. Latest nomenclatural changes incorporated according to Plant List, ILDS 2010, Kew Checklist, revisions and monographs. Families follow the orders according to APG III classification and subfamilies, genera and species follow alphabetical order. Valid name followed by basionym, if any and important and synonyms used in regionally is used (Sasidharan 1998). Exhaustive citations of floras have been avoided and restricted to Wight (1838-53), Hooker (1872-97), Gamble (1915-36) and regional floras of adjacent areas like Calicut (Manilal & Sivarajan 1982), Kasaragod (Ansari 1985), Cannanore (Ramachandran & V J Nair 1988), Wayanad (Ratheesh 2009) and recent revisions and monographs. A brief diagnostic description is followed by flowering, fruiting and distribution data (Sasidharan 1998). The collection number(s) of the specimens studied were also cited. All the specimens are lodged in KFRI Herbarium (KFRI), otherwise mentioned.



Map 3. Different Collection Localities and Sections. **1.** Valayamchal, **2.** Pookundu, **3.** Checkdam, Pookund, **4.** Narikadavu, **5.** Uruppukunnu, **6.** Paripode, **7.** 55_block, **8.** Pottichapara, **9.** Kurumbankallu, **10.** Kannadivechakunnu 1, **11.** Kannadivechakunnu2, **12.** Pothanplavu, **13.** Kariyankappu, **14.** Meenmutti, **15.** Meenmutti Vellachatam, **16.** Crossway, **17.** Chelachuvad, **18.** Chavachi 1, **19.** Moonamthode, **20.** Chavachi vellachatam, **21.** Kattikari 2, **22.** Kattikari 1, **23.** Chavachi 2, **24.** Mullenpara, **25.** Pothurumi, **26.** Astippara, **27.** Ambalappara Tower, **28.** Ambalappara, **29.** Kolithat, **30.** Santhagiri

Systematic treatment

5. Systematic treatment

Diagnostic key to the families

- 1a. Plants with fibrous root system; cotyledons one; leaves usually with parallel venation; if venation is reticulate plant with tendrils or tubers 2
- 1b. Plants with tap root system; cotyledons two; leaves with reticulate venation ... 21
- 2a. Leaf venation reticulate 3
- 2b. Leaf venation parallel 5
- 3a. Plants with tendrils; inflorescence umbellate **Smilacaceae**
- 3b. Plants without tendrils; inflorescence otherwise 4
- 4a. Inflorescence a spadix **Araceae**
- 4b. Inflorescence spikes **Dioscoreaceae**
- 5a. Ovary superior..... 6
- 5b. Ovary inferior 15
- 6a. Fruit a caryopsis **Poaceae**
- 6b. Fruit otherwise 7
- 7a. Inflorescence a spadix 8
- 7b. Inflorescence otherwise 9
- 8a. Leaves simple, margin spiny **Pandanaceae**
- 8b. Leaves compound, leaflet margins not spiny..... **Arecaceae**
- 9a. Inflorescence a head..... **Eriocaulaceae**
- 9b. Inflorescence spikelet, cymes, racemes, panicle, solitary or clusters 10
- 10a. Inflorescence spiklet, glumes presnt, fruit angled nut **Cyperaceae**
- 10b. Inflorescence cymes, racemes, panicle, solitary or clusters..... 11
- 11a. Inflorescence axillary, solitary or clusters, perianth tubular .. **Hydrocharitaceae**
- 11b. Inflorescence cymes, racemes or panicle, Perianth not tubular 12
- 12a. Grass like herb, leaves terete, hollow, perianth sepaloid..... **Juncaceae**
- 12b. Plants not grass like, leaves modified or not terete, Perianth petaloid 13
- 13a. Perianth lobe dissimilar, staminodes present **Commelinaceae**
- 13b. Perianth lobe similar, staminodes absent 14
- 14a. Leaves modified into cladodes, armed..... **Asparagaceae p.p.**
- 14b. Leaves simple and end in a tendril, unarmed **Colchicaceae**
- 15a. Inflorescence a spadix **Musaceae**
- 15b. Inflorescence otherwise 16

16a. Pollen grains collected in pollinia; seeds minute	Orchidaceae
16b. Pollen grains not collected in pollinia; seeds not minute	17
17a. Flowers zygomorphic	18
17b. Flowers actinomorphic	20
18a. Stamen with distinct filament, anther two celled	19
18b. Stamen sessile, anther one celled	Marantaceae
19a. Leaves arrangement distichous	Costaceae
19b. Leaves arrangement is not distichous	Zingiberaceae
20a. Stamens free	Hypoxidaceae
20b. Stamens united	Asparagaceae p.p.
21a. Flowers with two or more whorls of perianth	22
21b. Flowers without or with one whorl of perianth	114
22a. Inner whorl of perianth free; stamens free from petals	23
22b. Inner whorl of perianth united or connate below; stamens epipetalous	88
23a. Ovary inferior	24
23b. Ovary superior or half inferior	33
24a. Petiole sheathing at base	25
24b. Petiole not sheathing at base	26
25a. Herbs or subshrubs; fruit a cremocarp	Apiaceae
25b. Shrubs or trees; fruit a drupe	Araliaceae
26a. Flowers unisexual	27
26b. Flowers bisexual	29
27a. Tendril climbers	Cucurbitaceae
27b. Erect herbs, shrubs or trees	28
28a. Herbs or subshrubs	Begoniaceae
28b. Trees	Tetramelaceae
29a. Stamens more than 15	30
29b. Stamens less than 12	31
30a. Leaves opposite or subopposite with intramarginal nerves and pellucid glands	Myrtaceae
30b. Leaves alternate without intramarginal nerves and pellucid glands ..	Lecythidaceae
31a. Fruit linear or angular	Onagraceae
31b. Fruit otherwise	32
32a. Fruit a berry	Cornaceae
32b. Fruit a drupe	Combretaceae

33a. Carpels free or ovary one celled without hypanthium	34
33b. Ovary 2 or more celled rarely one celled with hypanthium	58
34a. Leaves with insectivorous sticky glands	Droseraceae
34b. Leaves without insectivorous sticky glands.....	35
35a. Fruit a legume	Fabaceae
35b. Fruit otherwise	36
36a. Leaves with sheathing petiolar base	Dilleniaceae
36b. Leaves without sheathing petiolar base.....	37
37a. Gynandrophore or gynophore present, sometimes gynophore reduced	38
37b. Gynandrophore or gynophore absent.....	40
38a. Tendril climbers	Passifloraceae
38b. Plants otherwise	39
39a. Ovary sessile, annuals, herbs.....	Cleomaceae
39b. Ovary stalked, perennial, shrubs or trees	Capparaceae
40a. Carpels free	41
40b. Carpels united or slightly connate below.....	44
41a. Trees or woody climbers; fruits aggregate of berries.....	Annonaceae
41b. Herbs, Shrubs or herbaceous climbers; fruits achenes or capsules	42
42a. Flowers grouped, fruits achenes; climbers	Ranunculaceae
42b. Flowers solitary, fruits capsules; herbs or shrubs	43
43a. Fruit indehiscent.....	Celastraceae p.p
43b. Capsules 3-valved	Violaceae
44a. Ovule one	45
44b. Ovules two or more	47
45a. Plants dioecious; flowers unisexual.....	Menispermaceae
45b. Plants monoecious; flowers bisexual, rarely unisexual	46
46a. Trees.....	Anacardiaceae
46b. Climbing shrubs.....	Ancistrocladaceae
47a. Fruit dehiscence circumscissile.....	Talinaceae
47b. Fruit dehiscence otherwise.....	48
48a. Leaves very fleshy.....	Crassulaceae
48b. Leaves otherwise	49
49a. Erect or prostrate herbs or bushy subshrubs	Hypericaceae
49b. Trees, shrubs or climbers.....	50

50a. Disc embracing the base of the ovary	Olacaceae
50b. Disc absent or not embracing the ovary, rarely cup shaped	51
51a. Disc lining the calyx tube or form a ring at its base	Rosaceae
51b. Disc neither lining the tube nor forming a ring at its base.....	52
52a. Leaves compound.....	Connaraceae
52b. Leaves simple	53
53a. Sepals free; fruit pungent smelling.....	Pittosporaceae
53b. Sepals absent or variously connate at base; fruit not pungent smelling	54
54a. Fruit a drupe	55
54b. Fruit a berry or capsule.....	57
55a. Climbers	Icacinaceae
55b. Trees or shrubs	56
56a. Flowers in terminal corymbose cymes, petals free	Metteniusaceae
56b. Flowers in axillary cymes, petals connate	Stemonuraceae
57a. Fruit hard rinded globose berry, over 4 cm across	Achariaceae
57b. Fruit fleshy berry or dehiscent capsule, 2 cm across	Salicaceae
58a. Lower sepal spurred	Balsaminaceae
58b. Lower sepal not spurred.....	59
59a. Leaves gland-dotted.....	Rutaceae
59b. Leaves not gland-dotted	60
60a. Petals laciniate	Elaeocarpaceae
60b. Petals not laciniate	61
61a. Seeds embedded in cottony wool.....	Malvaceae p.p.
61b. Seeds not embedded in cottony wool	62
62a. Climbers with axillary or leaf opposed tendrils	Vitaceae p.p.
62b. Plants without tendrils	63
63a. Sepals accrescent into wings or woody and reflexed in fruit	Dipterocarpaceae
63b. Sepals not accrescent into wings or woody reflexed in fruit	64
64a. Leaves opposite, subopposite or whorled, if alternate seeds red arillate	65
64b. Leaves alternate	74
65a. Petals absent, calyx free	Molluginaceae
65b. Petals present, rarely absent when calyx tubular	66
66a. Calyx tubular	67
66b. Calyx free or partially united	69

67a. Petals lacerate at apex.....	Rhizophoraceae
67b. Petals entire.....	68
68a. Calyx lobes imbricate	Melastomataceae
68b. Calyx lobes valvate	Lythraceae
69a. Disc absent or inconspicuous	70
69b. Disc very prominent	72
70a. Trees, fruits berry	71
70b. Woody climbers, Fruits capsule	Linaceae
71a. Ovary 1 celled, 1-4 ovuled; fruit capsule or drupe	Calophyllaceae
71b. Ovary more than 2 celled, 1-ovuled; fruit berry	Clusiaceae
72a. Stamens three	Celastraceae p.p.
72b. Stamens four or more.....	73
73a. Fruit a berry	Aquifoliaceae
73b. Fruit a capsule	Celastraceae p.p.
74a. Staminal filaments united into a staminal tube.....	75
74b. Staminal filaments free or partially united at base	79
75a. Stipule large, foliaceous.....	Vitaceae p.p.
75b. Stipule small, not foliaceous or absent.....	76
76a. Seeds carunculate	Polygalaceae
76b. Seeds not carunculate.....	77
77a. Anthers one celled	Malvaceae p.p.
77b. Anthers two celled	78
78a. Leaves simple; stipules present.....	Malvaceae p.p.
78b. Leaves compound rarely simple when stipules absent	Meliaceae
79a. Stigma punctiform.....	Sabiaceae
79b. Stigma otherwise	80
80a. Leaves simple or variously lobed	81
80b. Leaves compound.....	85
81a. Stamens to six.....	82
81b. Stamens ten or more	84
82a. Prostrate or erect herbs	Brassicaceae
82b. Shrubs, trees or woody climbers	83
83a. Stamens opposite to petals.....	Rhamnaceae
83b. Stamens alternate to petals.....	Dichapetalaceae

84a. Stamens inserted on torus	Malvaceae p.p.
84b. Stamens not inserted on torus, adnate to petals at base	Theaceae
85a. Flowers in peduncled umbels.....	Oxalidaceae
85b. Flowers in racemes or panicles	86
86a. Disc cupular	Burseraceae
86b. Disc tumid or annular	87
87a. Disc tumid; exstipulate	Sapindaceae
87b. Disc annular; stipulate.....	Staphyleaceae
88a. Petals connate at base only	Symplocaceae
88b. Petals united	89
89a. Scapigerous plants with insectivorous bladders	Lentibulariaceae
89b. Non-scapigerous plants without insectivorous bladders	90
90a. Root parasites, Leafless or leaves with filiform lobes	Orobanchaceae
90b. Plants otherwise	91
91a. Anthers connate with stigma; corona present.....	Apocynaceae p.p.
91b. Anthers connate; corona absent.....	92
92a. Ovary inferior	93
92b. Ovary superior or half inferior	97
93a. Inflorescence a head.....	Asteraceae
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Clade: **Magnoliids**

Order: **Piperales**

ARISTOLOCHACEAE

- 1a. Erect shrubs; capsule cylindrical..... *Thottea*
1b. Climbers; capsule globose *Aristolochia*

ARISTOLOCHIA L.

Sp. Pl. 960. 1753.

- 1a. Leaves deeply cordate at base..... *A. acuminata*
1b. Leaves round at base..... *A. indica*

Aristolochia acuminata Lam., Encycl. 1: 254. 1783; Bosser, *Adansonia* ser. 3, 19: 170. 1997. *Aristolochia tagala* Cham., *Linnaea* 7: 207. t. 5.f. 3. 1832; Gamble, *Fl. Madras* 1202(841)1202(841). 1925; Ansari, *Fl. Kasaragod Div.* 319. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 384. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 682. 2009. *Aristolochia roxburghiana* Klotzsch, *Monatsb. Akad. Berl.* 596. 1859; Hook.f., *Fl. Brit. India* 5: 75. 1886.

Twining, stem glabrous. Leaves alternate, 13-18 x 8-10 cm, ovate, apex acuminate, deeply cordate, base 5-7 ribbed, glabrous; petiole 4-5 cm long. Flowers 6.5 cm long, in axillary raceme; bracts 5 mm long, ovate. Perianth tube 1 cm long, hairy inside, glabrous outside; limb 4.5 cm long, 1 cm broad, brown, tomentose. Stamens 12, biseriate; connective broad; anthers oblong. Ovary 6-celled; ovules numerous; style 6-7-fid, short. Capsule obovoid, transversely rugose, stalked, 6-celled; seeds deltoid.

Poathanplavu, NS & KVB 31398

Fl. & Fr.: January-June

Distribution: Fairly common in semi-evergreen forests of Poathanplavu and evergreen forests of Chavachi and Crossway.

Aristolochia indica L., Sp. Pl. 960. 1753; Hook.f., *Fl. Brit. India* 5: 75. 1886; Gamble, *Fl. Madras* 1202(841)1202(841). 1925; Manilal & Sivar., *Fl. Calicut* 248. 1982; Ansari, *Fl. Kasaragod Div.* 318. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 383. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 682. 2009. *Aristolochia lanceolata* Wight, *Icon. Pl. Ind. Orient.* t. 1858. 1852.

Twining perennial herbs; branchlets slender. Leaves alternate, 3.5-8 x 2-3.5 cm, ovate-lanceolate or ovate-oblong, base truncate, apex acute to acuminate,

glabrous; 3-5-nerved at base; petiole to 2.5 cm long. Flowers in few-flowered axillary racemes; pedicels c. 7 mm long, elongate in fruits; Bracts c. 1.5 mm long, lanceolate. Perianth tube dull brown, 1-1.5 cm long, bulbous base 3-5 mm across, green; limb 2-2.5 cm long, linear-oblong, rounded at apex, greyish-green. Stamens 6. Ovary c. 2 mm long; stigmas 6, fleshy. Capsule 1.5-3 x 1.5-2 cm, globose-pyriform, 6-ridged, dehiscent from the base, after dehiscence parachute-like; seeds 4-6 mm across, broadly deltoid, flat, winged.

Paripode, KJD 18736

Fl. & Fr.: July-March

Distribution: Rare in semi-evergreen forests of Paripode.

THOTTEA Rottb.

in Nye, Dansk. Vidensk. Selsk. Skrift. 2: 529, t. 2. 1783.

Thottea siliquosa (Lam.) Ding Hou, Blumea 27: 327. 1981; Ansari, Fl. Kasaragod Div. 319. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 384. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 683. 2009. *Apama siliquosa* Lam., Encycl. 1: 91. 1783; Gamble, Fl. Madras 1200(840). 1925. *Bragantia wallichii* R.Br. ex Wight & Arn., Cat. Ind. Pl. 57. 1833; Hook.f., Fl. Brit. India 5: 73. 1886.

Shrubs, branchlets angled. Leaves alternate, 19-25 x 5-8 cm, elliptic-oblong, inequilateral, apex acuminate, tomentose below; nerves 5-8 pairs, basal pair rib-like, extending above the middle, nervules parallel; petiole 5 mm long. Flowers in axillary fascicles, 1-5 together, 1.5 cm across. Perianth lobed, united into a cup, acute, purplish-brown lined inside. Stamens 12, united in 3 groups. Ovary 4-celled; ovules numerous, 2-seriate; stigma peltate, many-lobed. Capsule to 12 cm x 5 mm, cylindrical, torulose; seeds 2 mm long, trigonous, rugose.

Paripode, KVB 31281

Fl. & Fr.: Throughout the year

Distribution: Common in semi-evergreen forests of Paripode, Kattikari, Chavachi and Pothanplavu.

PIPERACEAE

- 1a. Climbing shrubs or subshrubs; flowers unisexuals.....Piper
- 1b. Erect herbs; flowers bisexual..... Peperomia

PEPEROMIA Ruiz. & Pav.

Prodr. 8. 1794.

- 1a. Terrestrial herbs, occasionally epiphyte; leaves cordiform *P. pellucida*
- 1b. Epiphytic herbs; leaves obovate *P. tetraphylla*

Peperomia pellucida (L.) Kunth, Nov. Gen. Sp. 1: 64. 1815; Gamble, Fl. Madras 1210(847). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 320. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 386. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 685. 2009. *Piper pellucidum* L., Sp. Pl. 30.1753. *Peperomia exigua* (Blume) Miq., Syst. Piperac. 77. 1843; Hook.f., Fl. Brit. India 5: 97. 1886.

Delicate, glabrous annual herbs; stems erect, 5-30 cm tall, pellucid, branched when well developed. Leaves alternate throughout, 1-3 cm long and wide, triangular ovate, cordate at base with a sinus 1-2 mm deep, obtuse or shortly acuminate at apex, pellucid, palmately 5-7 nerved from the base; petiole 6-15 mm long, clasping decurrent along the stem. Spikes solitary, terminal but frequently leaf-opposed by overtopping, 2-5 cm long, slender, axis glabrous; peduncle 2-5 cm long, about as thick as spike axis; bracts 0.2-0.3 mm in diameter. Flowers scarcely immersed. Ovary with a fleshy, oblique, subapical stigma. Fruit sessile, about 0.8 mm long, globose-ellipsoid, with an apical stigma, longitudinally striate-undulate, blackish brown at maturity.

Narikkadavu, NS & KJD 25544

Fl. & Fr.: July-December

Distribution: Fairly common in semi-evergreen forests of Narikkadavu and evergreen forests of Chavachi and Pothanplavu.

Peperomia tetraphylla (G.Forst.) Hook. & Arn., Bot. Beechey Voy.97. 1841; Ramach. & V.J. Nair, Fl. Cannanore Dist. 386. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 686. 2009. *Piper tetraphyllum* G.Forst., Fl. Ins. Austr. 5. 1786. *Peperomia reflexa* (L.f.) Dietr., Sp. Pl. ed. 6 1: 180 1831, non Kunth 1815; Hook.f., Fl. Brit. India 5:99.1886; Gamble, Fl. Madras 1209 (847).1925.

Epiphytic herbs; branches diffuse to procumbent; stem and leaves thinly pubescent. Leaves whorled, 3-4 at each node, 7-10 x 5-7 mm, orbicular, obtuse. Inflorescence Spike 1.5 cm long, erect, stout; peduncle 0.8 cm long; bracts peltate, sessile, with white margins. Flowers densely arranged. Perianth 0. Stamens 2. Ovary 1 celled, ovules solitary; stigmas 3-toothed. Nutlets 0.8 x 0.4 mm, ovoid, beaked, brown, glabrous.

Kattikkari, KVB 31560

Fl. & Fr.: July-December

Distribution: Rare in evergreen forests of Kattikkari.

PIPER L.

Sp. Pl. 28. 1753.

- 1a. subshrubs; inflorescence axillary*P. umbellatum*
- 1b. Climbing shrubs; inflorescence opposite to the leaf axils2
- 2a. Spikes erect 3
- 2b. Spikes pendulous 4
- 3a. Leaves cordate at base, female spike more than 2 cm long..... *P. longum*
- 3b. Leaves acute at base, female spikes 1 cm long *P. mullesua*
- 4a. Branchelets and leaves pubescent..... *P. hymenophyllum*
- 4b. Branchelets and leaves glabrous 5
- 5a. Spikes more than 15 cm..... *P. argyrophyllum*
- 5b. Spikes less than 12 cm..... 6
- 6a. Bracts cupular..... *P. nigrum*
- 6b. Bracts curved and hooded at one side *P. wightii*

Piper argyrophyllum Miq., Syst. Piperac. 330.1844; Hook.f., Fl. Brit. India 5:93. 1886; Gamble, Fl. Madras 1207(845). 1925; Anil Kumar *et al.*, Fl. Pathanamthitta 418. 2005.

Climbing shrubs. Leaves alternate, 8-13 x 5-6 cm, ovate or elliptic, acuminate at apex, acute or rounded at base, oblique, lower side usually covered with white scales, glabrous, basely 7 nerved; petiole 1 cm long; stipule to 1.5 cm long, lanceolate. Spikes slender, leaf-opposed, drooping; peduncle 2-3 cm long; bracts oblong, adnate to the rachis with free margins, ciliate. Stamens 2. Berry 3 x 3 mm, globose, stigma 4, curved.

Asthipara, KJD 26080

Fl. & Fr.: July-February

Distribution: Fairly common at Asthipara, Mullaenpara, Kattikari, Pookundu, Paripode and Chavachi.

Piper hymenophyllum Miq., London J. Bot. 5: 554. 1846; Hook.f., Fl. Brit. India 5: 93. 1886; Gamble, Fl. Madras 1207(845). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 387. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 687. 2009.

Slender climbers. Leaves alternate, to 13 x 6 cm, ovate, acuminate at apex, rounded to subcordate at base, often unequal sided, 7-ribbed, membranous; petiole 1 cm long. Spike to 20 cm long, slender, drooping; male spike shorter;

bracts oblong, adnate to the rachis with free margins, hairy. Stamens 2 or 3. Ovary 1-celled, ovules solitary; stigma 3-lobed. Berry 5 mm long, ovoid, beaked.

Kattikkari State Boundary, *KJD 18718*

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests of Kattikkari. Endemic to Peninsular India.

Piper longum L., Sp. Pl. 29. 1753; Hook.f., Fl. Brit. India 5: 83. 1886; Gamble, Fl. Madras 1205(844). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 321. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 387. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 688. 2009. *Chavica roxburghii* Miq., Syst. Piperac. 239. 1843.

Scandent or straggling shrubs, sometimes ascending and climbing. Leaves alternate, 8 x 4 cm, ovate, acute at apex, cordate and strongly oblique at base, 7-nerved, membranous, shining above; nerves impressed; petiole 1-3 cm long. Female spike stout, erect; peduncle 1.5 cm long; bracts peltate, orbicular. Male spike to 7 cm long, erect, slender. Stamens 2. Ovary 1-celled, ovules solitary; stigma 3-lobed. Berry 2 mm across, glabrous, black or deep red.

Narikkadavu, *KJD 26283*

Fl. & Fr.: August-January

Distribution: Common in semi-evergreen forests of Paripode, Narikkadavu and Pookundu.

Piper mullesua Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 20. 1825; Ramach. & V.J. Nair, Fl. Cannanore Dist. 388. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 688. 2009. *Piper brachystachyum* Wall. ex Hook.f., Fl. Brit. India 5: 87. 1886; Gamble, Fl. Madras 1206(844). 1925; Manilal, Fl. Silent Valley 231. 1988.

Slender climbers; branches often clustered. Leaves alternate, to 9 x 4 cm, elliptic, acuminate at apex, acute at base, 3-5 ribbed from base, secondary nerves prominent, glabrous. Female spike to 7 x 4 mm, erect, oblong; peduncle 3 mm long; male spike to 4 cm long, erect, slender; bracts peltate, orbicular. Stamens 3. Ovary 1-celled, ovules solitary; stigma 3-lobed; stigmas 3, spreading. Berry 1.5 mm across, red.

Ambalappara, *KVB 31722*

Fl. & Fr.: December-April

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Chavachi, Chelachode, Moonamthode, Kattikari, Pothurumi and Ambalappara.

Piper nigrum L., Sp. Pl. 28. 1753; Hook.f., Fl. Brit. India 5: 90. 1886; Gamble, Fl. Madras 1206 (845). 1925; Manilal & Sivar., Fl. Calicut 248. 1982; Ansari, Fl. Kasaragod Div. 321. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 388. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 688. 2009.

Glabrous climbers. Leaves alternate, to 16 x 10 cm, ovate, acuminate at apex, acute, rounded or truncate at base, 7-nerved, nervules subparallel; petiole to 2.5 cm long. Spikes to 12 cm long, slender; peduncles to 2.5 cm long; bracts united forming a cup below the flower. Flowers closely placed. Stamens 2. Ovary 1-celled, ovules solitary; stigmas 3-5, recurved. Drupes 5 mm across, globose, smooth, deep red.

Kariyenkappu, *KJD 26264*

Fl. & Fr.: July-March

Distribution: Cultivated in settlements and also run wild.

Piper umbellatum L., Sp. Pl. 30. 1753. *Hackeria subpeltata* (Willd.) Kunth, Linnaea 13: 571. 1839; Gamble, Fl. Madras 1208(846). 1925. *Piper subpeltatum* Willd., Sp. Pl. 1: 166. 1797; Hook.f., Fl. Brit. India 5: 95. 1886. *Pothomorphe subpeltata* (Willd.) Miq., Comm. Phytogr. 37. 1840. *Lepianthes umbellata* (L.) Raf. ex Ramamoorthy in C.J.Saldanha & D.H. Nicolson, Fl. Hassan Distr. 52. 1976; Ansari, Fl. Kasaragod Div. 320. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 384. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 684. 2009.

Erect shrubs, to 1.5 m high; stems ridged. Leaves alternate, 20-40 x 20-40, orbicular, rounded at apex, cordate at base, entire, pubescent above and below; nerves palmately radiating from base; petiole sheathing at base, to 20 cm long. Spikes 8-15 x 0.3 cm, cylindrical, 3-7 together, umbellate, peduncled, axillary, bracts peltate, stalked, triangular, ciliate. Flowers densely packed. Stamens 3, filaments short. Ovary obovoid, truncate, stigmas 3, sessile, curved out. Berry trigonous, minute.

Moonamthode, *KJD 31845*

Fl. & Fr.: June-February

Distribution: Common in the evergreen and semi-evergreen forests of Moonamthode, Crossway, Chavachi, Kattikari and Meenmutty.

Piper wightii Miq., London J. Bot. 5: 552. 1846; Hook.f., Fl. Brit. India 5: 94. 1886; Gamble, Fl. Madras 1207(845). 1925.

Stout glabrous climbers. Leaves alternate, 14-17 x 6-8 cm, ovate, acuminate at apex, round to subcordate at base, 3-5-ribbed, coriaceous, midrib with 2-3 lateral nerves similar to ribs, nervules reticulate; petiole 2 cm long. Spike to 8 cm long stout, drooping; peduncle 2 cm long; bracts curved and hooded at one side. Flowers distantly arranged; stamens 2. Ovary 1-celled, ovules solitary; stigmatic lobes 3 or 4. Berry reddish, to 7 mm across, globose, smooth

Ambalappara, KVB 31746

Fl. & Fr.: July-February

Distribution: Common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Order: **Laurales**

LAURACEAE

- 1a. Leaves opposite or subopposite Cinnamomum
- 1b. Leaves alternate or verticillate 2
- 2a. Anthers 2-celled..... 3
- 2b. Anthers 4-celled..... 4
- 3a. Fruit not covered by perianth tube Beilschmiedia
- 3b. Fruit covered by perianth tube Cryptocarya
- 4a. Flowers bisexual..... 5
- 4b. Flowers dioecious 6
- 5a. Fruit supported by basal erect perianth lobe Phoebe
- 5b. Only basal rim of perianth lobe persistent in fruit Machilus
- 6a. Fertile stamens 6..... Neolitsea
- 6b. Fertile stamens 9-12..... 7
- 7a. Involucral bracts deciduous Actinodaphne
- 7b. Involucral bracts persistent in flowers Litsea

ACTINODAPHNE Nees

Pl. Asiat. Rar. 2: 68. 1831.

- 1a. Leaves 7-25 cm long, densely hairy below *A. wightiana*
- 1b. Leaves less than 10 cm long, not hairy..... *A. Salicina*

Actinodaphne wightiana (Kuntze) Noltie, *Regnum Veg.* 145: 495 2005.
Actinodaphne hirsuta Hook.f., *Fl. Brit. India* 5: 152. 1886, non Blume 1851;
 Gamble, *Fl. Madras* 1231(862). 1925. *Actinodaphne malabarica* Balakr., J.

Bombay Nat. Hist. Soc. 63: 329. 1967; Ramach. & V.J. Nair, Fl. Cannanore Dist. 392. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 694. 2009. *Jozoste wightiana* Kuntze, Revis. Gen. Pl. 2: 570 1891.

Trees, to 18 m high; bark dark grey. Leaves subverticillate, opposite or subopposite, 7-25 x 2.5-6 cm, elliptic or elliptic-lanceolate, apex acuminate, base acute or attenuate, villous beneath, chartaceous; lateral nerves 8-12 pairs, pinnate, slender, prominent, intercostae scalariform, obscure; petiole 7-20 mm long, stout, tomentose. Flowers unisexual, yellowish. Male flowers: in densely tomentose racemes to 2.5 cm long; bracts 10 x 7 mm, orbicular, densely silky brown tomentose. Tepals 6, subequal, oblong, obtuse, silky brown tomentose. Stamens 9, in 3 rows; filaments 2-glandular, densely hispid. Female flowers: staminodes 9, in 3 rows, those of row 3 with 2-glands. Ovary half inferior, ovoid, attenuate into the style; stigma dilated. Fruit a berry 7-10 mm across, globose, seated in a perianth cup, red.

Kattikari, NS & KVB 31335

Fl. & Fr.: August-January

Distribution: Fairly common in evergreen forests of Kattikari and Moonamthode. Endemic to southern Western Ghats.

Actinodaphne salicina Meisn. in DC. Prodr. 15: 212. 1864; Hook.f., Fl. Brit. India 5: 148. 1886; Gamble, Fl. Madras 1230(861). 1925; Mohanan & Sivadasan, Fl. Agasthyamala 563. 2002. *Jozoste salicina* Kuntze, Revis. Gen. Pl. 2: 570 1891 (Plate 3a).

Small trees or large shrubs. Leaves subverticillate, 8.5 x 2.5 cm, narrowly elliptic or oblanceolate, attenuate at the base, membranous, glaucous beneath; nerves 8-12 pairs, parallel; intercostae, densely and minutely reticulate; petiole to 6 mm long. Inflorescences lateral fasciculate, sessile, few flowered, silky-pubescent. *Male flowers*: 6 mm long, greenish, silky-pubescent. Tepals 6 in two whorls, 5x4 mm, ovate, apex acute, equal, margin ciliate. Stamens 9 in three whorls of 3; inner whorl with 2 glands at base of the filament. *Female flowers*: 6 mm long, densely silky-tomentose. Tepals 6 in two whorls of 3. Staminodes 9 in three whorls; ovary 2 mm long, ovoid; style 0.5 mm long, stigma lobed. Fruits berry, 7 mm long, depressed globose, styler remnants persistent, seated on enlarge perianth tube.

Ambalappara, KVB 31582

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Ambalappara, Pothurumi and Kattikari. Endemic to southern Western Ghats; Conservation status: Endangered.

BEILSCHMIEDIA Nees

Pl. Asiat. Rar. 2: 61, 69. 1831.

Beilschmiedia dalzellii (Meisn.) Kosterm., Reinwardtia. 6: 282. 1962; Sant., Rec. Bot. Surv. India 16(1): 230. 1967 (3rd Rev. ed.). *Beilschmiedia fagifolia* Nees var. *dalzellii* Meisn., in DC. Prodr. 15(1): 62. 1864; Hook.f., Fl. Brit. India 5: 122. 1886; Talbot, Syst. List Trees Bombay, 167. 1894 (Plate 3b).

Trees, to 15 m tall; bark grey. Leaves opposite or alternate; 5-15 × 2.5-6 cm, elliptic-ovate to ovate-lanceolate, base acute to obtuse, apex acute; lateral veins 10 pairs, slender; intercostae reticulately veined beneath; petioles 1-1.5 cm long. Inflorescence short axillary panicles. Flowers 3 mm long, greenish-brown, pubescent. Tepals 6, 3 × 2 mm, sub equal, elliptic, obtuse at apex, pubescent on both sides, gland-dotted. Stamens 9, in 3 whorls; outer introrse; middle whorl same as the outer; inner whorl extrorse, with 2 globose glands at the base of filaments. Staminodes 3, cordate or sagittate, stipitate, pubescent. Ovary 3 mm long, ovoid, pubescent; style slender, pubescent; stigma subcapitate. Fruit a berry, 2.5-4 cm long, ovoid to ellipsoid, dark brown to blue with white powdery bloom.

Chelachode, NS & KVB 31432

Fl. & Fr.: January-February

Distribution: Rare in semi-evergreen forests of Chelachode-Chavachi area. Endemic to Western Ghats.

Note: This plant is new report to flora of Kerala.

CINNAMOMUM Schaeff.

Bot. Exped. 74. 1760, *nom. cons.*

- 1a. Leaves tomentose or sparsely hairy below 2
- 1b. Leaves glabrous below 3
- 2a. Leaf base cuneate, more than 8 cm long..... *C. nicolsonianum*
- 2b. Leaf base acute, less than 5 cm long *C. perrottetii*
- 3a. Leaves linear..... 4
- 3b. Leaves broad..... 5
- 4a. Leaves more than 15 cm long; trees 12-15 m tall *C. macrocarpum*
- 4b. Leaves less than 10 cm long; shrubs 2-3 m tall..... *C. heyneanum*
- 5a. Leaf base acute; trees to 20 m or more tall *C. malabattrum*
- 5b. Leaf base cuneate, slightly decurrent; trees below 10 m tall *C. wightii*

Cinnamomum heyneanum Nees, Pl. Asiat. Rar. 2: 76. 1831. *Cinnamomum riparium* Ramach. & V.J. Nair, Fl. Cannanore Dist. 393. 1988 non Gamble, Ramach. *et al.*, J. Econ. Taxon. Bot. 1: 94. 1980 (Plate 3c).

Large shrub to small trees. Leaves opposite and sub-opposite, 5-13 x 1.3-2.5 cm, linear-oblong, apex attenuate-acuminate, base attenuate-acute; lateral nerves faint, obscurely, minutely, smoothly reticulate, midrib prominent; petiole very slender, sparsely, minutely tomentellous, 5-8 mm long, flattened above. Panicles few-flowered, lax; peduncles 3-4 cm long; pedicels slender, 0.8-1 cm long. Flowers 0.3-0.35 cm across. Tepals 6, c. 1 mm long. Stamens 9 in 3 whorls, Outer and middle whorl introrse; inner whorl extrorse. Staminodes present. Ovary ovate or triangular; style 1 mm long; stigma large. Inflorescences in the axils of terminal leaves with slender, glabrous, 5-8 cm long peduncle unbranched or with a single, apical, 1 cm long branch. Fruit ellipsoid, 7 x 12 mm; fruit pedicel obconical, 8-10 mm long, slender.

Valayamchal, *KJD 31475, 28028*

Fl. & Fr.: January-March

Distribution: River banks of Valayamchal. Endemic to Western Ghats; conservation status: endangered (Sasidharan 2017).

Cinnamomum malabattrum (Burm.f.) J.Presl, *Prir. Rostlin* 2: 36 1825; Ansari, *Fl. Kasaragod Div.* 324. 1985; Ratheesh, *Fl. Stud. Wayanad Dist.* 697. 2009. *Laurus malabattrum* Burm.f., *Fl. Ind.* 92. 1768. *Cinnamomum iners* sensu Gamble, *Fl. Madras* 1224(857). 1925, non Reinw. ex Blume, 1826.

Trees, to 20 m high; bark reddish-brown. Leaves opposite or subopposite, 10-30 x 3-9 cm, elliptic-oblong, oblong or oblong-lanceolate, apex acute or acuminate, base acute, margin entire, highly aromatic when bruised; 3-ribbed from at or a little above the base; petiole 10-20 mm long. Flowers in axillary and pseudo terminal paniculate cymes. Tepals 6, fleshy, with dense subadpressed pilose hairs. Stamens 9 perfect, in 3 rows, outer and middle row opposite tepals, introrse, inner opposite the first row, extrorse, glands adnate to the filaments. Staminodes of fourth row opposite the second. Ovary half inferior, 2 mm, ellipsoid; style thick, cylindrical; stigma small, peltate. Fruit a berry, to 8 x 10 mm, subtended by shallow fleshy cup; the rim with the persistent thickened, basal part of tepals rounded, pilose.

Meenmutty Road, *KVB 31512*

Fl. & Fr.: March-April

Distribution: Common in all areas except Kattikari-Ambalappara-Pothurumi region. Endemic to southern Western Ghats.

Cinnamomum nicolsonianum Manilal & Shylaja, Bull. Bot. Surv. India 28: 111. 1986 (Plate 3d).

Trees, 15 m high. Leaves opposite, 9-20 x 4-6 cm, elliptic, apex obtuse, base cuneate, sparsely hairy above, moderately hairy beneath; 3-ribbed from base, reaching the tip, intercostae scalariform, prominent. Flowers in axillary panicles. Tepals 6, 2-3 mm long, tomentose. Stamens 9 perfect, those of outer and middle rows opposite the tepals, introrse, inner opposite first row, bearing 2 large glands at the base. Staminodes 3, of the forth row opposite the second row. Ovary half inferior, sessile. Fruit a berry, up to 8 x 10 mm, subtended by shallow fleshy deep cup, the base conical; the rim with the persistent, thickened tepals, basal part rounded, pilose.

Kattikari, State Boundary, *KJD 26119*

Fl. & Fr.: February-July

Distribution: Rare in evergreen forests of Kattikari. Endemic to southern Western Ghats

Note: Earlier reported from plains and foot hills of Silentvalley. The present collection is the second locality at elevation of 1000 m.

Cinnamomum macrocarpum Hook.f., Fl. Brit. India 5: 133. 1886; Gamble, Fl. Madras 1225 (857). 1925; Ravikumar & Ved, Illustr. Field Guide 100 Red Listed Med. Pl. 87. 2000.

Trees, 12-15 m high. Leaves subopposite, 15-22 x 2.8-4.0 cm, narrow oblong-lanceolate to oblong-elliptic, apex ending to broad acumen, subequally acute at base, slightly decurrent to extreme base; lateral nerves of the central one sub-prominent and distant, that of accessories forming faint loops along margin; intercostae faintly reticulate above, obscure; petioles 1-1.5 cm long, puberulous. Inflorescences cymose-panicle, subterminal and axillary. Flowers *ca.* 7 mm long, greenish-yellow, densely silvery-sericeous. Tepals 6 in 2 whorls of 3, ellipticlanceolate, densely silky-sericeous. Stamens 9 in 3 whorls of 3 each. Staminodes 3, *ca.* 1.5 mm long, sagittate, stipitate, densely pilose. Ovary ovoid; style 1.5 mm long, stigma, lobed, peltate. Fruits berry, 2.5×1.5 cm; fruiting pedicels 6-8 mm long, slender; seed one, ellipsoid.

Paripode, *KVB 31267*

Fl. & Fr.: May-September

Distribution: Fairly common in semi-evergreen forests of Pothanplavu to Meenmutty and Paripode. Endemic to southern Western Ghats; conservation status: vulnerable (IUCN 2017).

Cinnamomum perrottetii Meisn., in DC. Prodr.15: 504. 1864; Hook.f., Fl. Brit. India 5: 134. 1886; Gamble, Fl. Madras 1225(857). 1925.

Trees, to 8 m high; bark brown. Leaves opposite or subopposite, 3.5-6 x 2.5-4 cm, ovate or ovate-elliptic, apex obtuse or acute, base acute, subtruncate or round, subglaucous and minutely tomentellous beneath; 3-5-ribbed from near the base, prominent; intercostae scalariform, faint; petiole 10-15 mm long, grooved above. Flowers up to 7 mm long, in axillary, few-flowered panicles. Tepals 6, 5 mm long, oblong-ovate, densely appressed pilose inside. Stamens 9 perfect, outer and middle opposite to tepals, introrse, inner extrorse, bearing 2 large glands attached to the middle of the filament. Staminodes of the fourth row opposite the second. Ovary half inferior, ellipsoid, as long as style; stigma small, peltate. Fruit a berry, ellipsoid, subtended by densely woolly tepals, base of cup fleshy, obconical.

Ambalappara, *KJD 18770*

Fl. & Fr.: February-May

Distribution: Fairly common in evergreen forests of Ambalappara and Pothurumi. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Cinnamomum wightii Meisn., in DC. Prodr.15: 11. 1864; Hook.f., Fl. Brit. India 5: 132. 1886; Gamble, Fl. Madras 1224(857). 1925; Ratheesh, Fl. Stud. Wayanad Dist. 698. 2009.

Trees, to 8 m high; bark grey. Leaves opposite or spirally arranged, 3.5-20 x 2.5-7.5 cm, elliptic, ovate, elliptic-ovate or elliptic-oblong, apex obtusely acute or obtusely shortly acuminate, base cuneate, slightly decurrent, subglaucous; 3-5 or sometimes 7-ribbed from at or a little above the base, very slender; intercostae scalariform, faint; petiole 10-20 mm long. Flowers densely fulvous-sericeous, in axillary and pseudo-terminal, short and compact peduncled panicle. Tepals 6, ovate to oblong-ovate, acute. Stamens 9 perfect, in 3 rows, outer and middle row opposite to tepals, introrse, inner row opposite the first, extrorse bearing large stipitate glands. Staminodes of fourth row opposite the second row. Ovary ellipsoid, half-inferior; stigma peltate. Fruit a berry, subtended by fleshy obconical pedicel, bearing basal remnants of the tepals.

Ambalappara, *KJD 22576*

Fl. & Fr.: April-June

Distribution: Fairly common in evergreen forests of Ambalappara and Asthippara. Endemic to southern Western Ghats; conservation status; endangered (IUCN 2017)

CRYPTOCARYA R.Br.

Prodr. Fl. Nov. Holland. 1: 402. 1810.

Cryptocarya beddomei Gamble, Bull. Misc. Inform. Kew 1925: 127. 1925 & in Gamble, Fl. Madras 1218(853). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 394. 1988.

Evergreen trees, to 8 m high; bark reddish-brown. Leaves alternate, 9.5-14 x 4-6.5 cm, elliptic, ovate or oblong-ovate apex obtuse or shortly obtusely acute, base round or truncate, glaucous beneath; lateral nerves 5-9 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole upto 10 mm long, pubescent. Flowers in axillary or lateral fulvous pubescent panicles; bracts oblong, upto 3 mm long. Perianth tube narrowed at the top; lobes 6, subequal, in 2 rows, pubescent. Stamens 9 perfect, in 3 rows, those of the 2 outer series introrse, inner series with 2 glandular filaments and extrorse; those of the fourth series replaced by 3 stipitate staminodes. Ovary sessile, half inferior, enclosed in the perianth tube; style short, exerted. Fruit a drupe enclosed in perianth tube, puberulous, perianth more or less free from pericarp.

Ambalappara, KVB 31744

Fl. & Fr.: March-April

Distribution: Fairly common in evergreen forests of Ambalappara and Pothurumi. Endemic to southern Western Ghats; Conservation status: Vulnerable (IUCN 2017).

LITSEA Lam.

Encycl. 3: 574. 1792, *nom. cons.*

- 1a. Leaves white-glaucous below 2
- 1b. Leaves not as above 3
- 2a. Inflorescence on fascicles..... *L. mysorensis*
- 2b. Inflorescence umbellules *L. stocksii*
- 3a. Leaves subverticillate; umbels solitary..... *L. ghatica*
- 3b. Leaves alternate; umbels not solitary 4
- 4a. Umbellules sessile *L. coriacea*
- 4b. Umbellules peduncled 5
- 5a. Leaf margins recurved *L. wightiana*
- 5b. Leaf margin not as above.....6
- 6a. Leaves rusty tomentose below *L. floribunda*
- 6b. leaves puberulent beneath.....*L. laevigata*

Litsea coriacea (B. Heyne ex Nees) Hook.f., Fl. Brit. India 5: 166. 1886; Gamble, Fl. Madras 1236(865). 1925; Manilal & Sivar., Fl. Calicut 251. 1982; Ansari, Fl.

Kasaragod Div. 325. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 395. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 700. 2009. *Tetranthera coriacea* B. Heyne ex Nees, Pl. Asiat. Rar. 2(8): 66. 1831.

Dioecious trees, to 12 m high; bark brown. Leaves alternate, 8.5-17.5 x 2.5-7.5 cm, elliptic-lanceolate or elliptic-ovate, apex acute or acuminate, base acute or cuneate; lateral nerves 6-9 pairs, pinnate, slender, prominent, intercostae reticulate; petiole 5-10 mm long, pubescent. Flowers unisexual, white, in 4-flowered axillary, subsessile, crowded umbels; bracts 4, silky. Perianth tube funnel shaped, finely silky, lobes 6. Stamens 12, in 4 rows; glands of those opposite to tepals very large. Stamminodes in female flowers as the stamens of males, inner rows subulate and 2-glandular. Ovary half inferior, ovoid; style slender; stigma small, erect. Fruit a berry, 10-12 mm long, ovoid, greenish-white, seated on a thickened perianth tube.

Meenmutty, KVB 31270, 31232; 'S' valavu, KVB 31535

Fl. & Fr.: November-February

Distribution: Common in all areas except places above 1000 m elevation. Endemic to Peninsular India.

Litsea floribunda (Blume) Gamble, Fl. Madras 1238(867). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 395. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 701. 2009. *Cylicodaphne floribunda* Blume, Mus. Bot. 1: 387 1852. *Litsea wightiana* Hook.f., Fl. Brit. India 5: 177. 1886, quoad descr.

Dioecious trees, to 15 high; bark brown. Leaves alternate, 7.5-28 x 3.7-10.5 cm, elliptic, obovate-oblong, elliptic-oblong or ovate-oblong, apex acute, or acuminate, base acute; lateral nerves 10-15 pairs, pinnate, prominent; intercostae subscalariform; petiole 10-15 mm long, pubescent. Flowers unisexual, in axillary racemose umbellule; peduncle upto 1 mm long, silky pubescent; bracts 4, orbicular, silky tomentose. Flowers 6-8 in an umbellule. Perianth tube turbinate, silky tomentose, lobes 6. Stamens 12, in 4 rows; filaments hairy 3 and 4 rows with 2-glands. Stamminodes in female flowers as the stamens of males but those of the outer rows clavate or linear, those of the inner rows subulate and 2 glandular. Ovary half inferior, stigma capitate. Fruit a berry, 12-18 mm long, oblong, seated on a turbinate perianth tube.

Ambalappara, KVB 31660; NS & KJD 31953

Fl. & Fr.: December-April

Distribution: Fairly common in evergreen forests of Chelachode to Moonamthode, Ambalappara and Chavachi. Endemic to Western Ghats.

Litsea ghatica Saldanha, Fl. Karnataka 1: 67. 1984; Subram. *et al.*, Indian For. 115: 117. 1989; Ratheesh, Fl. Stud. Wayanad Dist. 702. 2009 (Plate 3e).

Dioecious shrubs or small trees; young shoots tomentose, elongating through terminal scales. Leaves alternate, 10-20 x 4-9 cm, subverticillate, obovate, apex abruptly acute or obtuse, tapering to subacute or rounded base, glabrous except nerves above, more or less softly tomentose beneath; nerves 10-14 pairs, prominent beneath, looped; petiole to 1 cm long. Flowers unisexual, 4-5, in solitary umbels; peduncle 5-8 mm long, cauliferous; bracts ovate, usually in 2 pairs, tomentose without. Perianth 6-lobed; tube short or absent. Stamens 16, biseriate; filaments hairy; anthers 4-celled; staminodes with stalked glands. Fruits berry, 1 cm across, globose, greenish, seated on a non-acrescent perianth tube; fruiting pedicels 1 cm long, thick, terete.

Pookundu, *KJD 26198*

Fl. & Fr.: September-February

Distribution: Fairly common in semi-evergreen forests of Valayamchal to Narikkadavu. Endemic to Western Ghats.

Litsea laevigata (Nees) Gamble, Fl. Madras 2: 1236.1925; V.S. Ramach. & V.J. Nair, Fl. Cannanore Dist. 396. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 702. 2009. *Tetranthera attenuate* Wall. ex Nees var. *laevigata* Nees, Syst. Laur. 677. 1836.

Trees, 10-15 m tall; bark brown. Leaves alternate; 6.5-18x2.5-5 cm, oblong-lanceolate or elliptic-lanceolate, base slightly obliquely acute or attenuate, apex acuminate or acute; lateral veins 6-8 pairs, pinnate, prominent abaxially, fainting towards the margin, immersed or obscure adaxially; intercostae reticulate, faint; petioles 8-15 mm long, puberulent slightly grooved above. Inflorescence subsessile axillary or lateral, 10-12 umbels in a cluster; involucral bracts 4, orbicular. Flowers 5-6 in each umbel, yellowish. Perianth tube short, turbinate, 1.5 mm long, lobes 6 densely hairy elliptic or oblong. *Male flowers*: stamens 12, in 4 whorls, unequal, white, 3 and 4 rows with 2 glands. *Female flowers*: staminodes as many as stamens. Ovary ovoid, style straight; stigma papillose. Fruits berry, seated on the enlarged perianth cup.

Kariyenkappu, *KJD 26703*

Fl. & Fr.: March-June.

Distribution: Semi-evergreen forests of Kariyenkappu. Endemic to Southern Western Ghats.

Litsea mysorensis Gamble, Bull. Misc. Inform. Kew 1925: 130. 1925 & in Gamble, Fl. Madras 1236(865). 1925; Ratheesh, Fl. Stud. Wayanad Dist. 702. 2009.

Dioecious trees. Leaves alternate, 5-12 x 1-2.5 cm, lanceolate, oblong, linear-lanceolate or elliptic-oblong, apex acute or acuminate, base acute; lateral nerves 6-8 pairs, pinnate, slender, prominent, intercostae reticulate, obscure; petiole upto 5 mm long, stout, pubescent. Flowers unisexual, yellowish, in subsessile umbellules; bracts orbicular, 3 mm long, sericeous out and glabrous within; 5 flowers in each umbellule; perianth 6 lobbed, oblong, sericeous out. Stamens 9 perfect, in 3 rows, those of row 1 and 2 eglandular, those of 3 row glandular; filaments glabrous; staminodes 9, those of outer row subulate, those of inner row possess 2 glands at base. Ovary half inferior, ovate, glabrous; style thick; stigma capitate. Fruit a berry.

Pothurumi, NS & KJD 25547

Fl. & Fr.: September-January

Distribution: Fairly common in evergreen forests of Ambalappara and Pothurumi. Endemic to south India.

Litsea stocksii (Meisn.) Hook.f. var. **glabrescens** (Meisn.) Hook.f., Fl. Brit. India 5: 176. 1886; Gamble, Fl. Madras 1236(865). 1925. *Cylicodaphne wightiana* Nees var. *glabrescens* Meisn., in DC. Prodr. 15:201. 1864.

Dioecious trees, to 20 m high; bark brown. Leaves alternate, 6.5-17 x 3-7.5 cm, oblong, elliptic-oblong or elliptic-lanceolate, apex acute or obtuse, base acute, reddish-brown beneath when dry; lateral nerves 8-12 pairs, pinnate, obscure, intercostae obscure; petiole 10-30 mm long, stout, grooved above, glabrous. Flowers unisexual, yellowish, in umbellules, in axillary racemes upto 6 cm long; peduncles to 6 mm long; bracts orbicular, pubescent. Perianth short; lobes 6, 2.5 x 3 mm, ovate, obtuse, pubescent. Stamens 9, in 3 rows, all filaments with sessile glands at the base, filaments hairy. Staminodes 9, in 3-series, glandular at base. Ovary half inferior, papillose. Fruit a berry, 2-2.5 cm across, subtended by the cupular perianth, red with white spots.

Ambalappara, KVB 31598

Fl. & Fr.: December-February

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Peninsular India.

Litsea wightiana (Nees) Benth. & Hook.f., Gen. Pl. 3(1): 162. 1880,p.p; Gamble, Fl. Madras 1238(866). 1925. *Cylicodaphne wightiana* Nees Pl. Asiat. Rar. 2: 68. 1831.

Large trees. Leaves alternate, to 11 x 4 cm, elliptic-lanceolate, acute, cuneate at base, coriaceous, reddish brown beneath, tomentose, later becomes glabrous; nerves ca. 8 pairs, transverse nervules faint, margins thick; petiole to 2 cm. Racemes axillary, to 7 cm; umbellules 8 mm across, globose, ferrugineous, tomentose. Flowers 5 in each umbel, white; tepals 6, membranaceous, densely fulvous hairy, white. Male flowers: Stamens 12, in 3 whorls, unequal, white; filaments 5 mm long, slender, villous, white. Female flowers: number of staminodes is similar to the stamens of male. Ovary 1 mm long, ovoid; style 1 mm long, straight, stout, pale-yellow, glabrous, stigma capitate, papillose, white. Fruits berry, 1.5 cm long, ellipsoid, greenish.

Ambalappra, KVB 31656

Fl. & Fr.: March-November

Distribution: Rare in evergreen forests of Ambalappara and Pothurumi. Endemic to southern Western Ghats.

MACHILUS Nees

Pl. Asiat. Rar., 2. 70. 1831

Machilus macrantha Nees, Pl. Asiat. Rar. 2: 70. 1831; Hook.f., Fl. Brit. India 5: 140. 1886; Gamble, Fl. Madras 1227(859). 1925. *Persea macrantha* (Nees) Kosterm., Reinwardtia 6: 193. 1962; Ramach. & V.J. Nair, Fl. Cannanore Dist. 397. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 703. 2009.

Evergreen trees, to 30 m high; bark pale brown. Leaves alternate, clustered at the tip of branchlets, 6.5-20 x 3.7-10 cm, oblong, elliptic-oblong or ovate-oblong, apex obtuse or obtusely acute, base oblique or acute, glaucous beneath; lateral nerves 6-12 pairs, pinnate; intercostae reticulate; petiole 15-40 mm long, stout, grooved above. Flowers pale yellow, in panicles from upper axils and terminal. Perianth tube very short, lobe 6, subequal, in 2 series. Stamens 9 perfect, those of first and second row opposite the perianth lobes, introrse those of third row opposite the first row, extrorse with pair of stipitate glands at their base. Staminodes 3, in row 4 and opposite the row 2. Ovary half inferior, 1-celled; ovule 1, pendulous; style, slender; stigma discoid. Fruit berry green with white specks, aromatic, with persistent rim of perianth.

Valayamchal, KJD 26274

Fl. & Fr.: December-May

Distribution: Fairly common in semi-evergreen forests of Valayamchal to Pookundu.

NEOLITSEA (Benth.) Merr.

Phillip. J. Sci. 1 (Suppl.): 56. 1906, *nom. cons.*

- 1a. Leaves ovate, nerves 3-ribbed..... *N. scrobiculata*
1b. Leaves elliptic, penni-nerved..... *N. cassia*

Neolitsea cassia (L.) Kosterm., J. Sci. Res.(Jakarta) 1: 85. 1952; Ramach. & V.J. Nair, Fl. Cannanore Dist. 397. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 703. 2009. *Laurus cassia* L., Sp. Pl. 369. 1753. *Neolitsea zeylanica* (Nees & T. Nees) Merr., Philipp. J. Sci. Suppl. 1: 57. 1906; Gamble, Fl. Madras 1239(867). 1925. *Litsea zeylanica* Nees & T. Nees, Cinnam. Disp. (Amoen. Bot. Bonn. Fasc. 1:) 1: 58, pl. 5 1823; Hook.f., Fl. Brit. India 5: 178. 1886.

Deciduous trees, to 18; bark grey. Leaves alternate, opposite or in whorls areolate; 3-ribbed near the base, faint; lateral nerves 1-4 pairs, pinnate, very faint; intercostae scalariform, faint; petioles 5-18 mm long, channelled above. Flowers unisexual, yellowish-green, densely sericeous, in sessile umbels; bracts orbicular. Tepals 4, 2-3 mm long, narrowly ovate or oblong, acute. Stamens 6, in 3 rows inner row biglandular opposite the first row. Ovary half inferior, ovoid; style long; stigma large peltate; staminodes 6, in 3 rows. Fruit drupe, seated on disc like, crenate perianth cup of 5 mm diameter.

Ambalappara, KVB 31571

Fl. & Fr.: February-April

Distribution: Fairly common in evergreen forests of Ambalappara, Pothurumi and Kattikari.

Neolitsea scrobiculata (Meisn.) Gamble, Fl. Madras 1240(868). 1925; Swarup. *et al.*, Shola For. Kerala 56. 1998; Anil Kumar *et al.*, Fl. Pathanamthitta 426. 2005. *Litsea scrobiculata* Meisn., in DC. Prodr.15: 223. 1864. *Litsea zeylanica* sensu Hook.f., Fl. Brit. India 5: 178. 1886, p.p., non Nees 1823.

Evergreen trees, to 15 m high; bark grey. Leaves alternate, subopposite or in whorls, 5-11 x 2.5-6 cm, elliptic-ovate or ovate, base acute or attenuate, apex obtusely acute or acuminate; 3-ribbed from base; lateral nerves 2-3 pairs, pinnate, faint, intercostae scalariform; petiole 15-25 mm long. Flowers unisexual, 3-8 in axillary, subsessile umbellules; involucral bracts 4. Male flowers: Tepals 4. Stamens 6 in 3 whorls of 2 each, inner row biglandular opposite the first row. Pistillode linear. Female flowers: Tepals 4, free, lanceolate, 3 mm, acute. Staminodes 6, in 3 series. Ovary 7 x 5 mm, half inferior, globose; style 2 mm; stigma discoid. Fruit a drupe, 8 mm across, globose, with a basal rim of perianth

tube; epicarp fleshy, crinkled, brownish-black when dry; seed 6 mm across, globose.

Kannadivechakunnu, NS & KJD 25549

Fl. & Fr.: May-August

Distribution: Rare in evergreen forests of Kannadivechakunnu. Endemic to Western Ghats.

PHOEBE Nees

Syst. Laur. 98. 1836.

Phoebe lanceolata Nees, Syst. Laur. 109. 1836; Hook.f., Fl. Brit. India 5: 141. 1886; Gamble, Fl. Madras 1228(860). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 398. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 704. 2009 (Plate 3f).

Evergreen trees, to 12 m high; bark greyish-brown. Leaves alternate, clustered at the tip of branchlets, 8-25 x 2.5-4.5 cm, lanceolate, elliptic-obovate or elliptic-oblancheolate, base cuneate, apex long acuminate; lateral nerves 6-13 pairs, pinnate, prominent, intercostae scalariform, faint; petiole 5-20 mm long, slender, grooved above. Flowers yellowish-green, in axillary, slender panicles. Perianth tube short; lobes 6, ovate, tomentose, unequal, accrescent. Stamens 9 perfect, in 3 rows third row with 2 large stipitate glands at base. Staminodes of row 4 stipitate, cordate. Ovary half inferior, sessile, globose, pubescent; style slender; stigma discoid. Fruit a drupe, 10-12 mm long, ovoid or ellipsoid, glabrous, black; supported by erect perianth lobes.

Kattikari State Boundary, KJD 26018; way To Mullenpara, KJD 26067

Fl. & Fr.: January-March

Distribution: Fairly common in evergreen forests of Mullenpara-Kattikari Region.

Cinnamomum verum Presl is cultivated in the Chavachi by previous settlers.

Order: **Magnoliales**

ANNONACEAE

- 1a. Climbers 2
- 1b. Shrubs or trees 4
- 2a. Flowers on hooked peduncles Artabotrys
- 2b. Flowers not on hooked peduncles 3
- 3a. Petals less than 2 cm long Uvaria
- 3b. Petals more than 4 cm long Desmos

- 4a. Inner petals clawed, nectaries present..... Orophea
 4b. Inner petals not clawed, nectaries absent..... 5
 5a. Flowers sessile..... Meigyne
 5b. Flowers pedicelled..... 6
 6a. Petals dissimilar, outer much smaller than the inner Milusa
 6b. Petals subsimilar 7
 7a. Shrubs or small trees, outer petals clawed at base..... Goniolhamus
 7b. Medium trees, all petals alike, not clawed at base Monoon

ARTABOTRYS R.Br.

Edwards's Bot. Reg. 5: 423. 1820.

Artabotrys zeylanicus Hook.f. & Thomson, Fl. Ind. 128. 1855 & Hook.f., Fl. Brit. India 1: 54. 1872; Gamble, Fl. Madras 14(10). 1915; Manilal & Sivar., Fl. Calicut 26. 1982; Ansari, Fl. Kasaragod Div. 53. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 37. 1988; Debika Mitra, in B.D.Sharma et al.1: 253. 1993; M. Mohanan in P.Daniel Fl. Kerala 1: 139. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 92. 2009; I.M.Turner, Nordic J. Bot. 33: 261, 2015.

Woody climbers. Leaves simple, alternate, 13-18 x 5-7 cm, oblong, acute at both ends; nerves 10-12 pairs; petiole striate. Flowers a few; pedicels 1-2 cm long, stout with 4 bracts at base. Sepals 3, to 8 x 6 mm, broadly ovate, pubescent. Petals 6, 2.5-3 x 0.7 cm, oblong-lanceolate, concave at base inside, pubescent, yellow. Stamens many, anthers oblong, concealed by the flat and broad connectives. Carpels several, tomentose, ovules paired in each cell. Fruitlets sessile, 15-22 mm dia, globose, densely packed.

Paripode, KVB 31279

Fl. & Fr.: September-June

Distribution: Common in semi-evergreen forests of Pookundu, Narikkadavu, Kariyenkappu and Paripode.

DESMOS Lour.

Fl. Cochinch. 1: 352. 1790, 'Desmis'

Desmos lawii (Hook.f. & Thomson) Saff., Bull. Torrey Bot. Club 39: 506. 1912; Debika Mitra in B.D.Sharma et al.1: 261. 1993; Ramach. & V.J. Nair, Fl. Cannanore Dist. 38. 1988 M. Mohanan in P.Daniel Fl. Kerala 1: 143. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 93. 2009; I.M.Turner, Nordic J. Bot. 33: 265, 2015. *Unona lawii* Hook.f. & Thomson, Fl. Ind. 132. 1855 & Hook.f., Fl. Brit. India 1: 59. 1872; Gamble, Fl. Madras 15(10). 1915.

Scandent shrubs; young shoots sericeous tomentose. Leaves simple, alternate, 9-13 x 3-4 cm, ovate-oblong, apex acute, base rounded, glaucous below; nerves 8 pairs. Flowers solitary, axillary; pedicels 2-4 cm long, slender, bracteate. Sepals to 9 x 6 mm, obovate, pubescent, yellowish green. Petals biseriate, 5-7 x 0.5 cm, linear-oblong, pubescent. Stamens 1 mm long. Carpels many, densely hairy, stigma globose, red. Fruitlets to 7 x 6 mm, globose-oblong, stipitate, beaked; seeds globose; stipe 1 cm long, slender.

Chavachi, NS & KVB 31467

Fl. & Fr.: April-July

Distribution: Fairly common in the evergreen forests of Meenmutty and Chavachi.

GONIOTHALAMUS Hook.f. & Thomson

Fl. Ind. 105. 1855.

Goniothalamus cardiopetalus (Dalzell) Hook.f. & Thomson, Fl. Ind. 107. 1855 & Hook.f., Fl. Brit. India 1:75.1872; Gamble, Fl. Madras 18 (13). 1915; Ansari, Fl. Kasaragod Div. 54. 1985; Debika Mitra in B.D.Sharma et al.1: 232. 1993; Ramach. & V.J. Nair, Fl. Cannanore Dist. 38. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 93. 2009; I.M.Turner, Nordic J. Bot. 33: 268, 2015. *Polyalthia cardiopetala* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2:39.1850.

Shrubs or small trees, 3-5 m tall. Leaves alternate, 10-23 x 2.5-7.5 cm, oblong-lanceolate or oblanceolate, cuneate at base, abruptly acuminate at apex, slightly undulate along margins; lateral nerves 8-15 pairs, prominently raised beneath, looping near margins; petioles 5-10 mm long. Flowers solitary or a few in superposed clusters, axillary. Sepals 3, almost orbicular, connate upto middle, free at tips, ca 6 mm across, brownish pubescent. Petals 6 outer 3 cucullate, oblong-ovate, clawed at base, acute at apex, 10-15 x 4-6 mm, brown tomentose; inner ones triangular, united into a mitriform column, 6-9 x 5 mm. Stamens many, ca 2 mm long; connectives capitate at apex. Carpels many, linear-oblong, ca 3 mm long, brown-pubescent, 1-ovuled; styles 2-3 mm long, curved; stigma bilobed. Fruitlets ellipsoid; seed one.

Paripode, KVB 31675; Pothurumi, KVB 31727

Fl. & Fr.: January-August

Distribution: Common in the evergreen Forests of Chavachi, Kattikari, Moonamthode and Meenmutty, semi-evergreen forests of Paripode etc. Endemic to southern Western Ghats.

MEIOGYNE Miq.

Ann. Mus. Bot. Lugduno-Batav. 2: 12. 1865.

- 1a. Petals over 1 cm broad; fruit tomentose *M. pannosa*
1b. Petals less than 7 mm broad; fruit glabrous *M. ramarowii*

Meiogyne pannosa (Dalzell) J.Sinclair, Sarawak Mus. J. 5: 604. 1951; Debika Mitra, in B.D. Sharma *et al.* Fl. Ind. 1: 266. 1993; Ramach. & V.J. Nair, Fl. Cannanore Dist. 39. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 94. 2009; I.M.Turner, Nordic J. Bot. 33: 273, 2015. *Unona pannosa* Dalzell, Hooker's J. Bot. Kew Gard. Misc.3: 207. 1851; Hook.f., Fl. Brit. India 1: 58. 1872; Gamble, Fl. Madras 14(10). 1915. *Desmos pannosus* (Dalzell) Saff., Bull. Torrey Bot. Club 39: 506. 1912.

Small trees, 4-9 m tall; bark grayish. Leaves simple, alternate, distichous, 2.5-7 x 1.5-3 cm, elliptic ovate, or lanceolate, apex acuminate or caudate acuminate, base obtuse or rounded; lateral nerves prominent, pinnate, regular; intercostae reticulate; petiole 5-9 mm long, slender, pubescent. Flowers solitary, subsessile, axillary or terminal, dull yellowish-green or creamy white. Sepals 3, ovate, tomentose outside, connate at base. Petals 6 (3+3), outer spreading, clawed, inner erect and smaller, oblong-lanceolate or ovate-lanceolate, densely silky tomentose. Stamens numerous, cuneate, connective broad, concealing the anthers. Carpels many, sessile or subsessile, oblong, strigose; ovules 2-8 in one row, stigma capitate. Fruit aggregate, fruitlets yellowish, obovoid, fulvous tomentose, apiculate; seeds 1-3, globose, shiny.

Chavachi, *KVB 31523*; Paripode, *KVB 31677*; Ambalappara, *KVB 31716*

Fl. & Fr.: Through out the year

Distribution: Common in the evergreen forests of the Sanctuary. Endemic to Western Ghats

Meiogyne ramarowii (Dunn) Gandhi in C.J.Saldanha & D.H. Nicolson, Fl. Hassan Distr. 38. 1976; Ansari, Fl. Kasaragod Div. 54. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 39. 1988; Debika Mitra in B.D.Sharma *et al.* 1: 266. 1993; Ratheesh, Fl. Stud. Wayanad Dist. 95. 2009; I.M.Turner, Nordic J. Bot. 33: 273, 2015. *Unona ramarowii* Dunn, Bull. Misc. Inform. Kew 1914: 183. 1914; Gamble, Fl. Madras 15(10). 1915. *Desmos ramarowii* (Dunn) D. Das, Bull. Bot. Surv. India 5: 42. 1963.

Shrubs, bark grey; branchlets hirsute. Leaves simple, alternate, 5-11 x 2-4 cm, oblong, apex acuminate, base rounded, hirsute below; lateral nerves 5-8,

nervules parallel; petiole 8 mm long. Flowers axillary or from leafless nodes, yellow or greenish-yellow, sessile. Sepals ca 12 x 6 mm, ovate, acute, hispid. Petals subsimilar, 3-5 x 0.5-0.8 cm, outer spreading, inner erect and smaller, oblong-lanceolate, densely hispid. Stamens numerous, cuneate, connective broad, concealing the anthers. Carpels many, densely villous. Fruitlets to 2.5 x 1 cm, red, oblong, shortly stalked, tomentose, depressed between seeds; seeds 1-3, globose.

Chavachi, *KVB 31522; KJD 26174*

Fl. & Fr.: January-September

Distribution: Rare in the evergreen forests of Chavachi and Kattikari. Endemic to southern Western Ghats

MILIUSA Lesch. ex A.DC

Mem. Soc. Phys. Geneve 5:213. 1832.

Miliusa wayanadica Sujanapal, Ratheesh & Sasidh., J. Bot. Res. Inst. Texas 4: 64. 2010; I.M.Turner, Nordic J. Bot. 33: 277. 2015 (Plate 3g).

Shrubs. Leaves simple, alternate, 6-9 x 2-3 cm, lanceolate or elliptic-lanceolate, apex caudate acuminate, base rounded, slightly oblique; lateral nerves 5-8 pairs, intramarginal nerves sub-marginal, tomentose on both sides; petiole to 3 mm or subsessile, coriaceous. Flowers solitary, axillary or slightly above the axil, yellow or yellowish-green. Sepals 3, ca. 4 x 3 mm, broadly ovate. Outer petals 3, triangular, slightly curved on mature flower; inner petals 3, broadly ovate half out-curved, hairy on the mouth. Stamens 6+3, anthers in pairs, staminodes 3, arranged alternate with two stamens. Carpels 7-12, flask shaped; stigma club-shaped, with viscous exudation, ovules 1 or 2. Fruitlets 6-8, subglobose, glabrous, brownish or blackish when dry; seeds 1 or 2.

Ambalappara, *KVB 31592; 31712, 31790; Asthipara, KJD 26085*

Fl. & Fr.: December-August

Distribution: Fairly common in evergreen forests of Ambalappara and Asthipara. Endemic to southern Western Ghats.

MONOON Miq.

Ann. Mus. Bot. Lugduno-Batavi. 2. 15. 1865.

1a. Flowers solitary or in fascicles, often from the trunk *M. coffeoides*

1b. Flowers in cymes, axillary to leaves or from branchlets *M. fragrans*

Monoon coffeoides (Thwaites ex Hook f. & Thomson) B. Xue & R. M. K. Saunders, Taxon 61: 1030. 2012; I.M.Turner, Nordic J. Bot. 33: 279, 2015.

Guatteria coffeoides Thwaites ex Hook.f. & Thomson, Fl. Ind. 141. 1855. *Polyalthia coffeoides* (Thwaites ex Hook.f. & Thomson) Thwaites ex Bedd., Icon. Pl. Ind. Or. 11, t. 53. 1869; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 62. 1872; Gamble, Fl. Madras 16(11). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 41. 1988; Debika Mitra in B.D.Sharma et al. 1: 270. 1993; M. Mohanan in P.Daniel Fl. Kerala 1: 164. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 101. 2009.

Trees to m tall; bark dark green. Leaves simple, alternate, distichous, young leaves red at first, 10-27 x 3.5-8.5 cm oblong, oblong-lanceolate or elliptic-lanceolate, apex acute or acuminate, base obtuse, cuneate-round or acute; lateral nerves 8-14 pairs, prominent beneath, pinnate, ascending; intercostae scalariform, obscure; petiole 10-13 mm, stout, glabrous, grooved above. Flowers greenish-yellow, solitary, extra axillary or some times fascicled on woody tubercles on trunk. Sepals 3, suborbicular, tomentose. Petals 6 (3+3), greenish-yellow, flat and strap shaped. Stamens numerous connectives subglobose at top, concealing the anthers. Carpels numerous, densely pubescent, oblong; ovule one, basal and ascending; stigma capitate. Fruit aggregate of berries, dark purple; seed one, broadly ovoid, grooved.

Meenmutty road, KJD 26289

Fl. & Fr.: May-August

Distribution: Fairly common in evergreen forests of Meenmutty

Monoon fragrans (Dalzell) B. Xue & R. M. K. Saunders, Taxon 61: 1031. 2012; I.M.Turner, Nordic J. Bot. 33: 279, 2015. *Guatteria fragrans* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 200. 1851. *Polyalthia fragrans* (Dalzell) Bedd., Icon. Pl. Ind. Or. 11, t. 53. 1869; Hook.f., Fl. Brit. India 1: 63. 1872; Gamble, Fl. Madras 16(11). 1915; Debika Mitra in B.D.Sharma et al. Fl. Ind. 1: 271. 1993 M. Mohanan in P.Daniel Fl. Kerala 1: 164. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 102.2009.

Tall trees, to 30 m; bark blackish-grey. Leaves simple, alternate, distichous, 9-27 x 3-12 cm, elliptic to oblong-lanceolate, apex acute to shortly acuminate, base acute, obtuse or rounded; lateral veins 16-21 pairs, close, prominent beneath, intercostae subscalariform; petiole 10-15 mm long, stout, grooved above. Flowers greenish-yellow, fragrant, in few flowered cymes from the axils of fallen leaves or on tubercles. Sepals 3, orbicular pubescent. Petals 6 (3+3), subequal, linear-lanceolate, tomentose. Stamens numerous, connectives

concealing the anther cells. Carpels many, oblong-ovoid, slightly curved, stipitate; stigma broad, slightly bifid. Fruit aggregate of berries, obliquely ellipsoid to broadly ovoid, hoary puberulous; seed one, orbicular, ovoid.

Kattikari State Boundary, *KJD 26036*

Fl. & Fr.: January-May

Distribution: Rare in evergreen forests of Kattikari. Endemic to southern Western Ghats.

OROPHEA Blume

Bijdr. Fl. Ned. Ind. 18. 1825.

Orophea sivarajanii Sasidh., Nordic J. Bot. 19: 301. 1999; Ratheesh, Fl. Stud. Wayanad Dist. 99. 2009; I.M.Turner, Nordic J. Bot. 33: 282, 2015 (Plate 3h).

Shrubs, 2-3 m tall. Leaves alternate, 7-15 x 3-6 cm, oblong or elliptic-oblong, acuminate at apex, obtuse or rounded at base; lateral nerves 7-11 pairs, prominent below and faint above, intercostae widely reticulate, prominulous below and inconspicuous above; petiole 2-3 mm long, glabrous. Flowers in 2 or 3 flowered, racemes or solitary, axillary or lateral; bract 0.5 mm long, ovate-acute, towards the upper half of the pedicel. Sepals jointed at base, ovate-deltoid, acute, ciliolate along the margins. Outer petals 4 mm across, ovate-orbicular, tomentose along the margins; inner petals 7 mm long (with claw), greenish-yellow; nectaries 2, distinct, horizontal. Stamens 12 in 2 rows of 6 each. Carpels 6, glabrous; ovules 2; style hairy. Fruitlets globose, 8 mm across.

Pothurumi, *KVB 31616*

Fl. & Fr.: November-February.

Distribution: Fairly common in evergreen forests of Chavachi and Pothurumi. Endemic to southern Western Ghats of Kerala.

UVARIA L.

Sp. Pl. 1: 536. 1753.

Uvaria macropoda Hook.f. & Thomson, Fl. Ind. 101. 1855 & in Hook.f., Fl. Brit. India 1: 50. 1872; Gamble, Fl. Madras 13 (9). 1915; I.M.Turner, Nordic J. Bot. 33: 292, 2015. *Desmos zeylanicus* sensu Subramanian, Fl. Thenmala 1995, non (Hook.f. & Thomson) Saff. 1912 (Plate 3i).

Woody climbers; young shoots tomentose. Leaves alternate, 15 x 5 cm, narrowly elliptic or oblong, apex acute or acuminate, base obtuse or rounded, glabrous. Flowers solitary. Sepals 3, 8 x 5 mm, connate below, acuminate,

stellate tomentose. Petals 6, in two rows, 2 x 1 cm, dull-purple with yellow at base, elliptic or ovate, connate at base, stellate tomentose on both sides. Stamens numerous; top of connective, truncate; anthers concealed by connectives. Carpels numerous; style short thick. Fruitlets long-stipitate, seeds more than one; stalks to 5 cm long.

Chavachi, NS & KVB 31310

Fl. & Fr.: March-July

Distribution: Fairly common in semi-evergreen forests of Pookundu and Narikkadavu, evergreen forests of Chavachi.

MYRISTICACEAE

- 1a. Anthers attached by thier backs to a column formed of the connate filaments2
- 1b. Anthers attached by thier bases stellately to a peltate usually stiptate
column formed of the connate filaments.....Knema
- 2a. Anther-column sessile, the apices of the anthers free.....Gymnacranthera
- 2b. Anther-column stipitate and usually produced beyond the anthers which
are completely attached to it..... Myristica

GYMNACRANTHERA Warb.

Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68: 359 1897.

Gymnacranthera farquhariana (Hook.f. & Thomson) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68: 365. 1897; Ramach. & V.J. Nair, Fl. Cannanore Dist. 390. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 690. 2009. *Myristica farquhariana* Hook.f. & Thomson, Fl. Ind. 162. 1855, non Hook.f. 1886. *Myristica canarica* Bedd. ex King, Ann. Roy. Bot. Gard. (Calcutta) 3: 307, t. 138. 1891. *Gymnacranthera canarica* (Bedd. ex King) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68: 368. 1897; Gamble, Fl. Madras 1212(849). 1925; Manilal & Sivar., Fl. Calicut 249. 1982. *Gymnacranthera eugeniifolia* (A.DC.) J.Sinclair, Gard. Bull. Singapore 16: 447. 1958.

Evergreen trees, to 30 m high; bark dark-brown. Leaves alternate, 14.5-25 x 5-10 cm, oblong or elliptic-lanceolate, base obtuse or round, apex acuminate, glaucous beneath, margin entire; lateral nerves 8-17 pairs, pinnate, prominent, intercostae obscure; petiole 10-15 mm long, grooved above. Flowers unisexual, yellow; males in axillary and lateral, rusty pubescent, panicles; females 6-10 in axillary racemes. Perianth tubular; lobes [3]-4, pubescent. Stamens 6-12, united into a sessile column; connectives attached behind and from the base to about the middle only, anthers free at apex. Ovary superior, ovoid, 1-celled, ovule 1;

stigma sessile, capitate or slightly bilobed, fleshy. Fruit a capsule, 2.5-3 cm across, glabrous, rind thick; seed one, 16-18 mm across, globose, pale brown; aril laciniate, red, as long as seeds.

Paripode, *KJD 26704*

Fl. & Fr.: March-April

Distribution: Rare in marshy places of evergreen and semi-evergreen forests at Crossway and Paripode.

KNEMA Lour.

Fl. Cochinch. 604. 1790.

Knema attenuata (Hook.f. & Thomson) Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68: 590. 1897; Gamble, Fl. Madras 1215(851). 1925; Ansari, Fl. Kasaragod Div. 322. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 390. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 691. 2009. *Myristica attenuata* Wall. ex Hook.f. & Thomson, Fl. Ind. 157. 1855; Hook.f., Fl. Brit. India 5: 110. 1886. *Myristica corticosa* Bedd., Fl. Sylv. t. 278. 1872 (Plate 3j).

Trees, to 18 m high; bark greenish-black; exudation watery, red. Leaves alternate, distichous, 8-20 x 2.5-7.5 cm, oblong-lanceolate, oblong or ovate, apex acuminate, base round, or acute, glaucous beneath or rusty pubescent along costae beneath; lateral nerves 12-16 pairs, parallel; intercostae scalariform, slender, prominent; petiole 1-1.5 cm long, grooved above. Flowers unisexual, in rusty pubescent fascicles on thick peduncle from the axils of leaves or of the scars of fallen leaves; male 1-6 flowered, female 1-3 flowered. Perianth larger in female, rusty tomentose; lobes 3-[4]. Androecium usually stalked; filaments and connectives connate in a peltate disc. Ovary superior, ovoid, 1-celled, ovule-1; style short, thick, hairy; stigma 2, laciniate on the margin. Fruit a capsule 2-valved, rusty tomentose; seed one; aril brilliant crimson.

Crossroad, *KVB 31276*

Fl. & Fr.: February-April

Distribution: Common in evergreen and semi-evergreen forests at Crossway, Meenmutty and Pothanplavu.

MYRISTICA Gronov.

Fl. Orient. 141. 1755, *nom.cons.*

- 1a. Flowers fascicled; capsule glabrous *M. malabarica*
1b. Flowers panicled cymes; capsule tomentose *M. beddomei*

Myristica beddomei King, Ann. Roy. Bot. Gard. (Calcutta) 3: 291, t. 118.f.1-8, 1891; Gamble, Fl. Madras 1214(850). 1915; Ratheesh, Fl. Stud. Wayanad Dist. 692. 2009. *Myristica dactyloides* auct. non Gaertn. 1788; J.Sinclair, Gard. Bull. Singapore 23: 445. 1968; Ramach. & V.J. Nair, Fl. Cannanore Dist. 390. 1988. *Myristica laurifolia* auct. non Hook.f. & Thomson Fl. Ind. 1855; Hook.f., Fl. Brit. India 5: 103. 1886. *Myristica laurifolia* var. *lanceolata* Hook.f., Fl. Brit. India 5: 103. 1886. *Myristica contorta* Warb., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 68:5-7. 1897; Gamble, Fl. Madras 1214(850). 1925.

Evergreen trees, to 25 m high; bark blackish-green; exudation watery, red. Leaves alternate, distichous, 12-25 x 4-10 cm, oblong or elliptic-ovate, apex acute, base acute, round or rarely Cuneate, glaucous beneath; lateral nerves 10-25 pairs, pinnate, prominent, intercostae reticulate, faint; petiole 1-2.5 cm long, grooved above. Flowers unisexual, white. Male flowers 10-20 together in short axillary clusters. Perianth thin, fleshy, rusty tomentose, connate into an urceolate tube, constricted above, breaking into 3 ovate, spreading acute lobes. Staminal column narrow, ferruginous, produced beyond the anther. Female flowers as in male, generally 3-4 in the heads. Ovary superior, sessile, ovoid-globose, 1-celled, ovule 1; stigma oblique, 2-lobed. Fruit a capsule; seed one, ovoid; aril orange red.

Kariyenkappu, KVB 31216; Meenmutty, KVB 31277; Chelachode, KVB 31295
Fl. & Fr.: November-May

Distribution: Common in the evergreen of Meenmutty, Chelachode, Moonamthode, Kannadivechakunnu and Chavachi; semi-evergreen forests of Kariyenkappu, Pothanplavu, Paripode and 55 Block.

Myristica malabarica Lam., Mem. Acad. Sc. Par. 162. 1788 (1791); Hook.f., Fl. Brit. India 5: 103. 1886; Gamble, Fl. Madras 1213 (850). 1925; Manilal & Sivar., Fl. Calicut 249. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 692. 2009.

Dioecious trees, to 20 m tall; bark greenish-black; exudation deep red. Leaves alternate, distichous, 7-20 x 3-10 cm, elliptic or elliptic-oblong, apex acute, base acute or attenuate, or subacute, glaucous beneath; lateral nerves 8-14 pairs, pinnate, slender; petiole 10-15 mm long, grooved above. Flowers unisexual, white. Male flowers: cymes in axillary, more numerous than in female and smaller. Perianth urceolate, minutely puberulous outside, 3-4 cleft at apex. Staminal column stalked, slightly produces above the anthers. Female flowers: slightly larger than male; bracteole forming a narrow linear cup round the base of the perianth. Ovary superior, sessile, globose, hairy; stigma 2 clefted. Fruit a

capsule; seed one, oblong, obtuse, slightly flattened on one side, aril yellow, irregularly lobed.

Pothurumi, KVB 31655; Paripode, KVB 31678

Fl. & Fr.: January-September

Distribution: Rare in semi-evergreen forests of Paripode and evergreen forests of Chavachi and Pothurumi. Endemic to Western Ghats; Conservation status: Vulnerable (IUCN 2017).

Clade: **Monocots**

Order: **Alismatales**

ARACEAE

- 1a. Climbers2
- 1b. Erect herbs or shrubs..... 3
- 2a. Flowers unisexual; leaves pinnate Raphidophora
- 2b. Flowers biosexuals; leaves entire Pothos
- 3a. Leaves peltate 4
- 3b. Leaves not peltate6
- 4a. Leaves cordate at base, ovate..... 5
- 4b. Leaves not cordate at base, orbicular Ariopsis
- 5a. Plants leafless during flowering, mostly epiphytic or on rocks Remusatia
- 5b. Flowers produce on leafy plant, not epiphytic..... Colocasia
- 6a. Leaves entire..... 7
- 6b. Leaves divided or deeply lobed..... 8
- 7a. Leaves grass like; spadix spiral..... Cryptocoryne
- 7b. Leaves broad; spadix normal Lagenandra
- 8a. Flowers bisexual Anaphyllum
- 8b. Inflorescence produced on leafy shoots Arisaema
- 8b. Inflorescence produced from corm before leaf appears Amorphallus

AMORPHOPHALLUS Blume ex Decne.

Nouv. Ann. Mus. Hist. Nat. 3: 366. 1834 *nom. cons*

- 1a. Corms cylindric-oblong; spathes to 18 cm long *A. nicolsonianus*
- 1b. Corms depressed globose; spathes to 10 cm long.....*A. commutatus*

Amorphophallus commutatus (Schott) Engl. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 2: 319. 1879 2: 319. 1879; Hook.f., Fl. Brit. India 6:

515. 1893; Ratheesh, Fl. Stud. Wayanad Dist. 901. 2009; Jaleel *et. al.* Bangladesh J. Pl. Taxon. 19(2). 145. 2012. *Conophalus commutatus* Schott, Bonplandia 7: 28. 1859 & Prodr. Syst. Aroid. 128. 1860. *Amorphophallus commutatus* (Schott) Engl. var. *wayanadensis* Sivadasan & Jaleel, Rheedeia 12: 163. 2002.

Herbs with corms. Leaves tripartitely compound, to 50 m long, leaflets elliptic, caudate-acuminate, base acute, glabrous, membranous; petiole to 50 cm long, terete. Spathe ovate-acute, 17-18 cm long and 4-5 cm broad, differentiated into a basal tube and an upper limb separated by a slight constriction between the two; basal tube slightly compressed; limb expanded, erect, pale yellowish outside and pale brownish towards the margins. Spadix 23-25 cm long, sessile or stipitate. Male flowers pale yellowish, densely arranged, sessile; inconspicuously 2-lobed; dehiscence by apical slit-like pores. Female flowers ca. 2.5 mm long, ovary sub-globose, pale greenish, unilocular with a basal anatropous ovule; style very short; stigma ca. 1.5 mm diameter, narrower than the ovary, inconspicuously 3-lobed.

Kattikkari, KJD 25561

Fl. & Fr.: February-September

Distribution: Rare in evergreen forests of Kattikkari. Endemic to Western Ghats.

Amorphophallus nicolsonianus Sivadasan, Pl. Syst. Evol. 153: 165. 1986; Ratheesh, Fl. Stud. Wayanad Dist. 902. 2009; Jaleel *et. al.* Bangladesh J. Pl. Taxon. 19(2). 147. 2012.

Herbs, Corm oblong or subcylindrical. Leaves to 30 cm long; leaflets ovate or oblong, acum-inate, base acute or obtuse, glabrous, glossy above, to 15 x 5 cm; subsessile or shortly petiol-ulate. Spathe ovate-lanceolate, acuminate, to 10 x 3 cm, greenish brown to greenish purple with light green mottling and dark purple spots outside, basally convolute. Spadix sessile, slightly longer than the spathe, flowers confined towards the base 1/3 portion. Male flowers dense, sessile, cream-coloured, inconspicuously 2-lobed. Sterile appendix narrowly cylindrical, tapering to the apex. Female flowers loose or dense in sub-spirals, each with ovary sub-globose, unilocular; style very short greenish; stigma capitate, greenish. Fruits ellipsoid, dark red at maturity. Seeds ellipsoid

Kattikkari, KJD 25543

Fl. & Fr.: January-March

Distribution: Rare in evergreen forests of Kattikkari. Endemic to southern Western Ghats of Kerala; conservation status: Endangered (Sasidharan 2017).

ANAPHYLLUM Schott

Gen. Aroid. t. 83. 1858.

Anaphyllum wightii Schott, Gen. Aroid. t. 83. 1858; Hook.f., Fl. Brit. India 6: 551. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1589(1108). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 492. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 903. 2009; Sivadasan *et. al.*, Phytotaxa 243(1): 93. 2016 (Plate 3k).

Tall herbs, rhizome creeping. Leaves pinnatisect or pinnatipartite; lobes 3-8 pairs, 20-28 x 5-10 cm, usually narrower, elliptic to oblong, apex acute, sessile or petiolulate; petiole 60-150 cm long, erect, 5-10 cm thick, smooth or transversally rugose, brownish. Spadix 15-30 cm long, 5-8 cm broad; spathe open, deep brown, once or twice twisted; spikes 4.5 cm long, 8-10 mm thick. Flowers bisexual, densely arranged, 3-6 mm across. Perianth lobes 4, obovate, truncate. Stamens 6, free, filaments broad. Ovary 1-celled, ovule solitary, style short, stigma discoid. Fruit a globose achene.

Pothurumi, KVB 31668

Fl. & Fr.: January-July

Distribution: Rare in evergreen forests of Pothurumi, Kattikkari, Chavachi, etc. Endemic to Western Ghats.

ARISAEMA Mart.

Flora 14(2): 459. 1831

- 1a. Leaf one..... *A. barnesii*
1b. Leaves two..... *A. tortuosum*

Arisaema barnesii C.E.C.Fisch., Bull. Misc. Inform. Kew 1933: 342. 1933 & in Gamble, Fl. Madras 1891(1308). 1936 (Plate 3l).

Herbs, corm 1-2 cm across. Leaflets 6, 10-16 x 3 cm, elliptic-oblong, apex acuminate, base acute, glabrous; petiole 20-45 cm long, smooth, base sheathing; petiolule 1-2 cm long. Peduncle slender, smaller than the petiole; spathe 6-10 cm long, tube 1-1.5 cm broad, purple with white lines, glabrous; limb ovate, finely caudate-acuminate, horizontal, green with white lines. Spadix 6 cm long, straight, narrowed at apex into a short tail.

Ambalappara, NS & KVB 31343

Fl. & Fr.: April-May

Distribution: Rare in evergreen forests of Ambalappara and Mullenppara. Endemic to Southern Western Ghats.

Arisaema tortuosum (Wall.) Schott Melet. Bot. 1: 17. 1832; Hook.f., Fl. Brit. India 6: 502. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1584(1105). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 493. 1988; 755; Ratheesh, Fl. Stud. Wayanad Dist. 905. 2009. *Arum tortuosum* Wall., Pl. Asiat. Rar. 2: 10, t. 114. 1830.

Herbs, corms 2-3 cm across. Leaflets 8-10, 8-12 x 3-4 cm, oblanceolate, apex abruptly acuminate, base acute, sparsely hispid below, petiolulate; petiole to 35 cm long, 2-together. Peduncle usually shorter than the petiole. Spathe 8-12 cm long, green; limb ovate, acuminate, with white and purple streaks; tube 4-6 cm long. Spadix 12-18 cm long, sigmoidally curved, appendage narrow.

Ambalappara, *KJD 26146*

Fl. & Fr.: May-June

Distribution: Rare in grasslands of Ambalappara.

ARIOPSIS Nimmo

in J.Graham, Cat. Pl. Bombay 252.1839.

Ariopsis peltata Nimmo in J.Graham, Cat. Pl. Bombay 252. 1839; Hook.f., Fl. Brit. India 6: 519. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1580(1102). 1931; Manilal & Sivar., Fl. Calicut 304. 1982; Ansari, Fl. Kasaragod Div. 401. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 903. 2009.

Epiphytic or terrestrial annual herbs; rootstock globose, to 1 cm across. Leaves 1 or 2, peltate, lamina 5-9 cm across, orbicular, entire, membranous, glabrous; petiole to 8 cm long, slender. Peduncle 2-5 cm long, solitary. Spathe yellow or white, 3 cm long, cymbiform, open, tube absent. spike 2.5 cm long, cylindrical, 3 mm, thick. Male flowers sunken in upper fleshy part of spadix; stamens 3; anthers divaricate, pubescent. Female flowers 5-7, on one side of the spike towards the lower part; ovary ovoid, 1-celled, ovules many, on parietal placentas; stigma 4-lobed.

Kariyenkappu, *KJD 26172*

Fl. & Fr.: June-August

Distribution: Fairly common in plantations of Kariyenkappu, mostly on wet rocks and in evergreen forests.

COLOCASIA Schott

Melet. Bot. 18. 1832, *nom. cons.*

Colocasia esculenta (L.) Schott, Melet. Bot. 1: 18. 1832; Manilal & Sivar., Fl. Calicut 304. 1982; Ansari, Fl. Kasaragod Div. 402. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 493. 1988; Joseph, Aquatic Angiosp. Malabar 294. 1991;



a. *Actinodaphne salicina*



b. *Beilschmiedia dalzellii*



c. *Cinnamomum heyneanum*



d. *Cinnamomum nicolsonianum*



e. *Litsea ghatica*



f. *Phoebe lanceolata*



g. *Miliusa wayanadica*



h. *Orophea sivarajanii*



i. *Uvaria macropoda*



j. *Knema attenuata*



k. *Anaphyllum wightii*



l. *Arisaema barnesii*

Ratheesh, Fl. Stud. Wayanad Dist. 906. 2009. *Arum esculentum* L., Sp. Pl. 965. 1753. *Arum colocasia* L., Sp. Pl. 965. 1753. *Colocasia antiquorum* Schott, Melet. Bot. 1: 18. 1832; Hook.f., Fl. Brit. India 6: 523. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1580(1102). 1931.

Herbs, rhizome stoloniferous. Leaves few to many, peltate, 20-28 x 10-18 cm, ovate, cordate to sagittate at base, glabrous; nerves 6 pairs, united to form an intramarginal vein; lowest pair with lateral nerves of the basal lobes, intercostae curved; petiole 30-45 cm long, cylindrical, smooth. Peduncle solitary or few together, 10-20 cm long, stout. Spathe to 20 cm long, yellow, lanceolate, constricted above the base; limb acuminate. Spadix 10 cm long, cylindrical, appendages terete, obtuse. Male flowers above, to 5-6 cm of the spadix, stamens 6. Female flowers on lower, 2 cm of the spadix; ovary 1-celled, ovules many on 2-4 parietal placentas. Neutral flowers many, peltate, between the female and male flowers. Fruit an aggregate of berries, globose.

Kariyenkappu, *KJD 26145*

Fl. & Fr.: May-October

Distribution: Common in water-logged areas.

CRYPTOCORYNE Fischer ex Wydler

Linnaea 5: 428. 1830.

Cryptocoryne retrospiralis (Roxb.) Kunth, Enum. Pl. 3: 12. 1841; Hook.f., Fl. Brit. India 6: 493. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1575(1098). 1931; Ansari, Fl. Kasaragod Div. 403. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 906. 2009. *Ambrosina retrospiralis* Roxb., Hort. Bengal.. 65. 1814. *Cryptocoryne dalzellii* Schott, Bonplandia 5: 221. 1857. *Cryptocoryne roxburghii* Schott, Prodr. Syst. Aroid. 18. 1860; Hook.f., Fl. Brit. India 6: 494. 1893 (Plate 4a).

Stoloniferous marshy herbs. Leaves many, to 16 x 0.8 cm, linear-oblong, acute, glabrous; sheath white, closed. Peduncle 2-3 cm long, slender, solitary. Spathe 10-12 cm long, partitioned by a transverse diaphragm above the spadix; tube above the diaphragm 6 cm long, limb 3 cm long, spirally twisted, acuminate, pale brown with deep brown spots. Spadix 14 mm long, included in the chamber, slender at middle. Male flowers many, in terminal globose clusters. Stamens 1 or 2. Female flowers 4 or 5, one-whorled at the base. Ovaries connate, 1-celled, ovules many, on parietal placentas; style short, curved. Neutral flowers 4-6, above the female flowers as a whorl of appendages.

Kariyenkappu, *KJD 26148*

Fl. & Fr.: November-March

Distribution: Fairly common in semi-evergreen forests of Narikkadavu, Valayamchal near stream and plantations of Kariyenkappu.

LAGENANDRA Dalzell

Hook.'s J. Bot. Kew Gard. Misc. 4: 289. 1852.

Lagenandra ovata (L.) Thwaites, Enum. Pl. Zeyl. 334. 1864; C.E.C.Fisch. in Gamble, Fl. Madras 1576(1099). 1931; Ansari, Fl. Kasaragod Div. 403. 1985; Joseph, Aquatic Angiosp. Malabar 291. 1991. *Arum ovatum* L., Sp. Pl. 967. 1753. *Lagenandra insignis* Trimen, J. Bot. 23: 269. 1885; Hook.f., Fl. Brit. India 6: 496. 1893.

Perennial herbs; rhizome creeping, 4 cm thick, usually in mud, cylindrical. Leaves entire, to 40 x 13 cm, ovate-oblong, acute, at both ends; nerves many, erose; petiole 30-70 cm long. Peduncle axillary, erect, 15-20 cm long. Spathe 15-20 x 5-10 cm, broadly ellipsoid, closed, coarsely warted on both surface, deep brown, twisted and acuminate at apex. Spadix 3-5 cm long, included in the chamber. Male flowers many, in terminal globose head. Stamens 1 or 2. Female flowers many, basal, subglobose; ovary obovoid; ovule 1. Fruitlets obovoid, ridged; seed one, brown.

Kariyenkappu, *KJD 26149*

Fl. & Fr.: June-February

Distribution: Common along stream sides in the plantations of Kariyenkappu and evergreen forests of Kattikkari.

POTHOS L.

Sp. Pl. 968. 1753.

Pothos scandens L., Sp. Pl. 968. 1753; Hook.f., Fl. Brit. India 6: 551. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1592(1110). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; Ansari, Fl. Kasaragod Div. 404. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 494. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 909. 2009.

Climbers, stem angled, rooting at nodes. Leaves 5-9 x 2-3 cm, lanceolate, apex acuminate, nerves many, united to form 2-3 narrow ribs, glabrous; petiole 3-6 cm long, broadly winged, wing broaden above. Inflorescence axillary; peduncle to 0.5 cm long. Spathe 5 mm across, orbicular, obtuse, concave, brown. Spadix 3-5 mm across, globose. Flowers densely packed; bracts 3-5, orbicular. Stamens 6, free. Ovary obovoid, stigma 3-toothed. Berry oblong, 1-1.8 cm long.

Kariyenkappu, *KVB 31521*

Fl. & Fr.: October-November

Distribution: Common at plantations of Kariyenkappu and evergreen forests of Chavchi.

RAPHIDOPHORA Hassk.

Flora 25(2) Beibl. 1: 11. 1842.

Rhaphidophora pertusa (Roxb.) Schott, Bonplandia 5: 45. 1857; Hook.f., Fl. Brit. India 6: 546. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1598(1109). 1931; Manilal & Sivar., Fl. Calicut 302. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 494. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 910. 2009. *Pothos pertusus* Roxb., Fl. Ind. 1: 455. 1820. *Monstera pertusa* (Roxb.) Schott, Wiener Z. Kunst. 1830: 781. 1830. *Scindapsus pertusus* (Roxb.) Schott, Melet. Bot. 21. 1832.

Stout perennial climbers, stem cylindrical, 3-4 cm thick, fleshy. Leaves 25-35 x 25-30 cm, broadly ovate, pinnatisect or rarely entire, apex acute, base rounded; petiole 20-35 cm long, channelled. Inflorescence solitary, axillary. Spathe to 20 x 8 cm long, ovate-oblong, concave, acute, creamy white. Spadix 12 cm long, 2 cm thick. Flowers unisexual, densely packed. Male flowers above. Stamens 4-6, free. Female flowers basal. Ovary obconical, truncate, 1-celled; ovule solitary; stigma knob-like.

Chavachi, KVB 31291

Fl. & Fr.: August-September

Distribution: Fairly common in evergreen forests of Chavachi.

REMUSATIA Hassk.

in Schott & Endlicher, Melet. Bot. 18. 1832.

Remusatia vivipara (Roxb.) Schott, Melet. Bot. 18.1832; Hook.f., Fl. Brit. India 6:521.1893; C.E.C.Fisch. in Gamble, Fl. Madras 1583(1104). 1931; Ansari, Fl. Kasaragod Div. 405. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 495. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 909. 2009. *Arum viviparum* Roxb., Hort. Bengal. 65. 1814 (Plate 4b).

Epiphytic or lithophytic herbs with erect bulbiferous slender shoots. Leaves 20-30 cm across, ovate, apex acute, base cordate, glossy above; nerves prominent; petiole to 40 cm long. Inflorescence solitary, on erect, terminal peduncle, covered with large cataphylls. Spathes obovate to rhomboid, spreading, yellowish white; tube short, 5 cm long, ellipsoid, limb to 10 x 7 cm, acute. Spadix 5 cm long. Male flowers many, on clavate above part of the spadix. Stamens 6, united. Female flowers many. Ovary globose, 1-celled; ovules many, parietal, stigma 3-lobed, globose.

Kattikkari, NS & KVB 31336

Fl. & Fr.: February-April

Distribution: Rare in evergreen forests at Kattikkari, Mullenpara and Chahurumala.

HYDROCHAITACEAE

NAJAS L.

Sp. Pl. 1015. 1753.

Najas graminea Del., Descr. Egypte Hist. Nat. 2: 282, t. 50. 1813; C.E.C.Fisch. in Gamble, Fl. Madras 1604(1118). 1931; Manilal & Sivar., Fl. Calicut 307. 1982; Joseph, Aquatic Angiosp. Malabar 448. 1991.

Herbs, plants monoecious. Stems to 25 cm long, sparingly branched; internodes to 1.5 cm long. Leaves whorled, 1.2 x 0.2 cm, acicular, translucent, margins with 50-70 spiny teeth; sheaths 3-4.5 mm long, with 5-10 spines on the margins; auricles to 2 mm long, narrowly lanceolate, apex acute. Flowers 1-2 per axil, male flowers in the upper axils, female flowers throughout. Male flowers: pedicelled. Perianth-lobes 1.5-2 mm long, globose-oblong, hyaline. Anthers 4-celled, c. 1.5 mm long, elliptic. Female flowers: subsessile, to 3 mm long. Perianth-lobe closely appressed to ovary. Ovary c. 2 mm long, elliptic; stigma c. 1 mm long. Fruit to 2 x 1 mm, subterete or ellipsoid; seeds small.

Kariyenkappu, NS & KVB 31374

Fl. & Fr.: August-September

Distribution: Rare in ponds.

Order: **Dioscoreales**

DIOSCOREACEAE

DIOSCOREA L.

Sp. Pl. 1032. 1753.

- 1a. Leaves digitate-pinnate..... *D. pentaphylla*
1b. Leaves simple *D. oppositifolia*

Dioscorea oppositifolia L., Sp. Pl. 1033. 1753; Hook.f., Fl. Brit. India 6: 292. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1512(1056). 1928; Ansari, Fl. Kasaragod Div. 386. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 474. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 872. 2009. *Dioscorea oppositifolia* L. var. *linnaei* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 30. 1914; C.E.C.Fisch. in Gamble, Fl. Madras 1512(1056). 1928. *Dioscorea oppositifolia* L. var. *dukhunensis* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 30. 1914; C.E.C.Fisch. in Gamble, Fl. Madras 1512(1056). 1928; Hook.f., Fl. Brit. India 6: 292. 1892 (Plate 4c).

Climbers, stem terete, twining to right, glabrous. Leaves 8-15 x 2-5 cm, opposite, elliptic, ovate or oblong, rounded or acute at base, 3-5 nerved; margins coriaceous; petiole to 3 cm long. Spike 2-6 cm long, slender, 3-6 together along the peduncle; peduncle 15-20 cm long; bracts lanceolate. Male tepals ovate, obtuse. Stamens 6. Female flowers distant. Tepals 1mm long, orbicular, glabrous. Capsule 20 x 30 mm, glabrous.

Chavachi, *KVB 31287*

Fl. & Fr.: August-November

Distribution: Rare in evergreen forests of Chavachi.

Dioscorea pentaphylla L., Sp. Pl. 1032. 1753; Hook.f., Fl. Brit. India 6: 281. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1511(1056). 1928; Manilal & Sivar., Fl. Calicut 291. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 475. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 872. 2009. *Dioscorea pentaphylla* L. var. *communis* Prain & Burkill., J. Proc. Asiat. Soc. Bengal 10: 23. 1914; C.E.C.Fisch. in Gamble, Fl. Madras 1512(1056). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 474. 1988. *Dioscorea pentaphylla* L. var. *linnaei* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 23. 1914; C.E.C.Fisch. in Gamble, Fl. Madras 1511(1056). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 475. 1988. *Dioscorea pentaphylla* L. var. *rheedei* Prain & Burkill, J. Proc. Asiat. Soc. Bengal 10: 23. 1914; C.E.C.Fisch. in Gamble, Fl. Madras 1511(1056). 1928.

Tuberous climbers; stem terete, twining to left, usually armed with prickles. Leaves 3-5-foliolate, with bulbils in the axils; leaflets 3.5-8 x 2.5-5 cm, elliptic-ovate, base acute or attenuate, apex acute, glabrous or pubescent below; upper leaves much smaller; petiole to 8 cm long. Male flowers on slender spikes on axillary or terminal panicles, tomentose. Tepals 6, greyish; outer c. 1.5 mm long, ovate, tomentose, inner c. 1 mm long, lanceolate, glabrous. Stamens 3. Staminodes 3. Female spike solitary, tomentose. Tepals 6, biseriate, c. 1 mm long, ovate. Ovary c. 3 mm long, oblong, ribbed; stigma capitate. Capsule c. 2 cm long, oblong, 3-winged, glabrescent.

Kariyenkappu, *KJD 26359*

Fl. & Fr.: September-December

Distribution: Fairly common in plantations of Kariyenkappu and semi-evergreen forests of Paripode.

Order: **Pandanales**

PANDANACEAE

PANDANUS Park.

J. Voyage South Seas 46. 1773.

Pandanus odorifer (Forssk.) Kuntze, Revis. Gen. Pl. 2: 737. 1891. *Keura odorifera* Forssk., Fl. Aegypt.-Arab. 172. 1775. *Pandanus odoratissimus* L.f., Suppl. Pl. 424. 1782; Manilal & Sivar., Fl. Calicut 301. 1982; Ansari, Fl. Kasaragod Div. 399. 1985. *Pandanus fascicularis* Lam., Encycl. 1: 372. 1783; Hook.f., Fl. Brit. India 6: 485. 1893.

Branched shrubs or small trees; trunk greyish-brown, ringed by leaf-scars and with basal prop roots. Leaves spiralled in 3 rows, up to 200 cm long and 6 cm broad, linear-ensiform, apex gradually narrowed into an elongated triquetre flagella, the margins and dorsal midrib armed with white prickles, glaucous beneath. Male inflorescence of several spikes, with white or cream axillant bracts, 5-10 cm long, composed of numerous phalanges; anthers apiculate. Female inflorescence a solitary terminal cephalium, pendulous in fruit. Phalanges mostly 5-15-celled, the carpels concentrically arranged, their apices with U-or V-shaped stigmas. Fruit c. 20 x 10 cm oblong, red-orange.

Narikkadavu, *KJD 26269*

Fl. & Fr.: July-November

Distribution: Occasional in semi-evergreen forests of Narikkadavu near river side.

Order: **Liliales**

COLCHICACEAE

GLORIOSA L.

Sp. Pl. 305. 1753.

Gloriosa superba L., Sp. Pl. 305. 1753; Hook.f., Fl. Brit. India 6: 358. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1519(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Ansari, Fl. Kasaragod Div. 389. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 477. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 881. 2009.

Herbaceous climbers with tuberous roots. Leaves sessile, alternate, opposite or whorled, 5-13 x 1.5-4 cm, ovate-lanceolate, base cordate or amplexicaule, apex acuminate, ending in a tendril. Flowers showy, axillary, solitary or in few-flowered, terminal racemes; pedicel to 7 cm long. Perianth-lobes 6, free, 5-7 x 0.8-1.2 cm, linear-oblong, reflexed or spreading, base narrow,

margin undulate, apex acuminate, yellowish below and reddish above. Stamens 6; filaments 3-4 cm long; anthers oblong-linear, versatile. Ovary 1 x 0.5 cm, oblong, 3-locular; ovules numerous; style to 4 cm long, deflexed; stigmas 3. Capsule 3-5 x 1-2 cm, ellipsoid-oblong; seeds many, 3 mm, globose, warty.

Paripode, *KJD 26384*

Fl. & Fr.: July-December

Distribution: Semi-evergreen forests of Paripode near Farm.

SMILACACEAE

SMILAX L.

Sp. Pl. 1028. 1753.

- 1a. Leaves broad, 10-15 x 8-13 cm across; berry globose..... *S. wightii*
1b. Leaves narrow, 6-12 x 3-6 cm across; berry ovoid..... *S. zeylanica*

Smilax wightii A.DC. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 2: 319. 1879 1: 174. 1878; Hook.f., Fl. Brit. India 6: 310. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1519(1061). 1928; Swarup. *et al.*, Shola For. Kerala 85. 1998; Ratheesh, Fl. Stud. Wayanad Dist. 874. 2009.

Climbers, branchlets terete, armed with prickles. Leaves alternate, 10-15 x 8-13 cm, broadly ovate, apex obtuse, cuspidate, base cordate, 5-ribbed; petiole 1-3 cm long, sheath narrow, flagellate. Peduncle to 10 cm long; umbels alternate, 2 or 3. Flowers many; pedicels 1.5 cm long, elongate to 2 cm in fruit. Perianth 6-partite, free, greenish-yellow. Berry 7 x 7 mm, globose.

Kattikkari state Boundary, *KJD 26025*

Fl. & Fr.: November-May

Distribution: Rare in evergreen forests of Kattikkari. Endemic to southern Western Ghats.

Smilax zeylanica L., Sp. Pl. 1029. 1753; Hook.f., Fl. Brit. India 6: 309. 1892; C.E.C. Fisch. in Gamble, Fl. Madras 1518(1061). 1928; Manilal & Sivar., Fl. Calicut 292. 1982; Ansari, Fl. Kasaragod Div. 389. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 478. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 875. 2009. *Smilax macrophylla* Roxb., Fl. Ind. 3: 793. 1832; Hook.f., Fl. Brit. India 6: 310. 1892.

Climbing shrubs; stem prickly. Leaves alternate, 6-12 x 3-6.5 cm, ovate-oblong or ovate-lanceolate, base rounded, acute to shortly cuspidate at apex; 3-5-ribbed from base; petiole to 2 cm long, tendril from either sides of the petiole.

Umbels axillary, 1-3; peduncles 2-3 cm long. Flowers unisexual; pedicels 5-6 mm long; bracts oblong. Perianth 6-partite, free, greenish, c. 7 mm long, oblong. Stamens in male flowers 6, free; filaments flat, apex callose. Pistillode 0. Ovary in female flowers 3-lobed, 3-celled; ovules 1 or 2 per cell; style 3-fid. Staminodes 3-6. Berry 0.8-1 x 0.6-0.8 cm; seeds 1-3, 3-4 mm across, globose.

Chavachi, *KJD 26121*

Fl. & Fr.: July-January

Distribution: Fairly common in plantations of Kariyenkappu; evergreen forests of Kattikkari, Chavachi, Pothurumi, Narikkadavu, Paripode etc.

Order: **Asparagales**

ASPARAGACEAE

- 1a. Plants climbers, armed Asparagus
- 1b. Plants herbaceous, unarmed 2
- 2a. Leaves linear; anthers free, sagitate Ophiopogon
- 2b. Leaves elliptic, plicate; anthers united at base forming a ring Peliosanthes

ASPARAGUS L.

Sp. Pl. 1028. 1753.

Asparagus racemosus Willd., Sp. Pl. 2: 152. 1799; Hook.f., Fl. Brit. India 6: 316. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1517(1060). 1928; Manilal & Sivar., Fl. Calicut 293. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 880. 2009. *Protasparagus racemosus* (Willd.) Oberm., S. African J. Bot.2: 244. 1983.

Woody perennial climbers; stem often spinescent, terete, green; rootstock with fascicled elongated tuberous roots. Cladodes from the axils of scale leaves in clusters of 2-6, 0.8-1.5 x 0.1-0.3 cm, linear-falcate, slightly triquetrous, base narrow, apex acute. Racemes 2.5-5 cm long, slender, axillary, solitary or clustered. Flowers bisexual, 5-6 mm across; bracts triangular; pedicel c. 1 mm long. Perianth-lobes 6, white, c. 3 x 0.5 mm, oblong, acute. Stamens 6, adnate to the perianth lobes; filaments subulate. Ovary 2-3 mm long, globose to slightly 3-gonous, 3-celled; ovules 2 per cell; stigma 3, recurved. Berry 4-6 mm diam., globose, purple on ripening; seeds 2-5, c. 2 mm across, globose.

Ambalappara, *KJD 22574*

Fl. & Fr.: July-August

Distribution: Fairly common in evergreen forests of Ambalappara, Chavachi, Pothurumi and Kannadivechakunnu.

OPHIOPOGON Ker-Gawl.

Bot. Mag. t. 1063. 1807.

Ophiopogon intermedius D.Don, Prodr. Fl. Nepal. 48. 1825; Hook.f., Fl. Brit. India 6: 269. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1499(1048).1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 472. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 868. 2009. *Ophiopogon indicus* Wight, Icon. Pl. Ind. Orient. t. 2050. 1853.

Perennial herbs, densely tufted, scapigerous; rootstock rhizomatous. Leaves clustered, 25-40 x 0.7 cm, linear-oblong, ribbed, narrowed to the base into a petiole. Scape to 35 cm long. Flowers 4-10 in raceme, pedicel 5 mm long. Tepals 6, white with pink shades, 6 x 4 mm, oblong, obtuse. Stamens 6, filaments free, shorter than tepals; anthers sagittate at base. Ovary 3-celled, cell 1-ovuled. Berry 7 mm across, globose, glabrous, blue; seeds 1-3, globose or trigonous.

Ambalappara, *KJD 26132*

Fl. & Fr.: July-December

Distribution: Fairly common in evergreen forests of Ambalappara and Asthipara.

PELIOSANTHES Andr.

Bot. Repos. 10: t. 605. 1808.

Peliosanthes teta Andr. subsp. **humilis** (Andrews) Jessop ex Gandhi in C.J.Saldanha & D.H. Nicolson, Fl. Hassan Distr. 799. 1976; Ansari, Fl. Kasaragod Div. 383. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 472. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 869. 2009. *Peliosanthes humilis* Andr., Bot. Repos. 10, t. 634. 1808. *Peliosanthes neilgherrensis* Wight, Icon. Pl. Ind. Orient. t. 2052. 1853; Hook.f., Fl. Brit. India 6: 266. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1498(1047). 1928. *Peliosanthes courtallensis* Wight, Icon. Pl. Ind. Orient. t. 2051. 1853; Hook.f., Fl. Brit. India 6: 266. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1498(1047). 1928.

Perennial herbs, scapigerous, stem solitary or loosely tufted. Leaves few, clustered, 25-32 x 5-10 cm, elliptic, acute at both ends, plicate; petiole to 30 cm long. Racemes to 20 cm long, many-flowered; bracts 1 cm long, lanceolate. Flowers purple, many, 6-8 mm across, 1-few in each bract. Tepals 6, oblong, connate at base. Stamens 6, filaments shorter than tepals, united at base into a ring. Berry 8 x 8 mm, top-shaped, glabrous, bluish black; seeds 1-3, globose.

Kattikkari, *KVB 31634*

Fl. & Fr.: March-August

Distribution: Fairly common in evergreen forests of Kattikkari, Chavachi and Moonamthode.

HYPOXIDACEAE

- 1a. Leaves linear; fruit dehiscent circumscissile..... Hypoxis
1b. Leaves elliptic, fruits indehiscent..... Curculigo

CURCULIGO Gaertn.

Fruct. Sem. Pl. 1: 63, t. 16, f. 11. 1788.

Curculigo orchioides Gaertn., Fruct. Sem. Pl. 1: 63. t. 16.f.11. 1788; Hook.f., Fl. Brit. India 6: 279. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1502(1050). 1928; Manilal & Sivar., Fl. Calicut 290. 1982; Ansari, Fl. Kasaragod Div. 388. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 473. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 876. 2009. *Curculigo malabarica* Wight, Icon. Pl. Ind. Orient. t. 2043A.1853.

Small herbs, rhizome to 15 cm long, oblong, perennial. Leaves 10-15 x 2 cm, lanceolate, plicate, base sheathing, pilose, subsessile. Perianth yellow, 1.5 cm across; tube 3 cm long, narrow, sparsely pilose. Stamens 6, filaments erect. Ovary 3-celled; ovules many, villous. Fruit baccate; seeds subglobose.

Ambalappara, *KJD 26141*

Fl. & Fr.: May-August

Distribution: Rare in evergreen forests of Ambalappara.

HYPOXIS L.

Syst. ed. 10. 986. 1759.

Hypoxis aurea Lour., Fl. Cochinch. 200. 1790; Hook.f., Fl. Brit. India 6: 277. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1501(1049).

Small herbs, rhizome globose, 1 cm long, perennial, roots fleshy. Leaves 10-15 x 0.5 cm, linear, radical, sessile. Scapes 2 or 3, slender, to 10 cm long. Flowers 1 or 2. Perianth yellow, 1 cm long, pilose, lobes elliptic-lanceolate. Stamens 6. Ovary 3-celled, ovules many, stigma 3-lobed. Capsule 1 cm long, 3-veined, cylindrical-turbinate; seeds subglobose.

Ambalappara, *KVB 31701*

Fl. & Fr.: May-August

Distribution: Rare in grasslands and evergreen forests of Ambalappara.

ORCHIDACEAE

- 1a. Terrestrial plants..... 2
1b. Epiphytic or lithophytic plants 17
2a. Plants leaf less; saprophytes 3
2b. Plants with leaves; autophytes 4

3a.	Lip spurred, flowers white speckled with pink.....	Epipogium
3b.	Lip saccate, not spurred, flowers yellow	Aphyllorchis
4a.	Leaf develops after flowering.....	Nervilia
4b.	Leafy during flowering	5
5a.	Plants with pseudobulb.....	6
5b.	Plants without pseudobulbs.....	8
6a.	Flowers spurred	Calanthe
6b.	Flowers not spurred, lip sometimes saccate	7
7a.	Inflorescence originate from base of pseudobulb, decurved.....	Geodorum
7b.	Inflorescence originate from top of new pseudobulb	Acanthephippium
8a.	Plants without underground tubers or tuberoid roots.....	9
8b.	Plants with underground tubers; rhizome erect or creeping.....	12
9a.	Lip superior.....	10
9b.	Lip inferior.....	11
10a.	Column long, curved, winged towards apex	Liparis (p.p.)
10b.	Column short, not winged, mid lobe of lip dentate	Crepidium
11a.	Sepals free.....	Zeuxine
11b.	Sepals connate half way into a tube	Cheirostylis
12a.	Spurs 2 from back of the superior lip.....	Satyrium
12b.	Spur single or absent	13
13a.	Lip adnate to the whole face of the column, bearing an appendage which over-top the anther; lateral sepals connate	Disperis
13b.	Lip adnate only to the base of the column; lateral sepals free	14
14a.	Flowers pink; lip obcordate	Brachycorythis
14b.	Flowers white, yellow or yellowish green	15
15a.	Sepals subequal, Stigma lobes not free	Peristylus
15b.	Sepals unequal, stigma lobes free	16
16a.	Floral bracts large, foliaceous.....	Plectoglossa
16b.	Floral bracts small to medium.....	Habenaria
17a.	Leaves equitant	Oberonia
17b.	Leaves not equitant	18
18a.	Lip not spurred, sometimes saccate	19
18b.	Lip spurred.....	30
19a.	Flowers with a mentum.....	20
19b.	Flowers without a mentum	21
20a.	Mentum formed by the lateral sepals and foot of the column.....	Dendrobium
20b.	Mentum formed by the lip and the foot of the column.....	Phalaenopsis

21a. Column foot present.....	22
21b. Column foot absent.....	25
22a. Lip clawed, joined to the foot.....	Bulbophyllum
22b. Lip sessile.....	23
23a. Sepals connate at base to form a tube; usually one flowered	Porpax
23b. Sepals free; inflorescence one to many flowered	24
24a. Pseudobulbs inconspicuous, discoid.....	Conchidium
24b. Pseudobulbs conspicuous, ovoid or globose.....	Eria
25a. Bracts imbricating, convolute, almost concealing the flowers.....	Pholidota
25b. Bracts not imbricating, not concealing the flowers.....	26
26a. Leaves terete	Luisia
26b. Leaves flat	27
27a. Scapes terminal; column long, curved.....	Liparis (p.p.)
27b. Scapes lateral; column very short	28
28a. Pseudobulb absent.....	29
28b. Pseudobulb present, ovoid or subglobose.....	Coelogyne
29a. Robust plants; leaves keeled; flowers brownish.....	Cottonia
29b. Small plants, leaves not keeled, flowers white or pinkish	Sirhookera
30a. Plants leafless during flowering.....	Taeniophyllum
30b. Plants leafy during flowering	31
31a. Column foot distinct.....	Aerides
31b. Column foot absent.....	32
32a. Spur longitudinally septate almost to the mouth	Cleisostoma
32b. Spur not longitudinally septate	33
33a. Sepals and petals narrowed to the base,	34
33b. Sepals and petals not narrowed to the base, leaves terete	Seidenfadeniella
34a. Pollinia not divided.....	Gastrochilus
34b. Pollinia bipartite	Smithsonia

ACANTHEPHIPIUM Blume ex Lindl.

Bijdr. Fl. Ned. Ind. 353. 1825.

Acanthephippium bicolor Lindl., Edwards's Bot. Reg. 20. t.1730. 1835; Hook.f., Fl. Brit. India 5: 815. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1426(997). 1928; Abraham & Vatsala, Introd. Orchids 272. 1981; C.S.Kumar & Manilal, Orchid Memories 164. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 782. 2009 (Plate 4d).

Terrestrial herbs; pseudobulbs ovoid, 5-14 x 2-5 cm. Leaves 2 or 3, 20-40 x 6-12 cm, broadly lanceolate, acuminate. Flowers yellow with purplish red, 3.5 cm across, in 2-5-flowered racemes from the top of new pseudobulbs; bracts 3.5 x 3,

cymbiform. Sepals fused to form gibbous tube; dorsal sepals 3.2 x 1.1 cm, oblong, obtuse; lateral sepals as long as or broader than dorsal sepal, fused with the foot along their inner edges forming the base of the pitcher, obtuse, recurved at apex. Petals 3.1 x 1.5 cm, spathulate, obtuse. Lip 3-lobed, 1.5 x 2 cm, lateral lobes erect, rounded; midlob recurved, oblong-spathulate, obtuse, disc 3-lamellate.

Kattikkari, *KJD 26317*

Fl. & Fr.: March-April

Distribution: Rare in the evergreen forests.

AERIDES Lour.

Fl. Cochinch. 2: 525. 1790.

Aerides crispa Lindl., Gen. Sp. Orchid. Pl. 239. 1833; Hook.f., Fl. Brit. India 6: 45. 1890; C.E.C.Fisch. in C.E.C.Fisch. in Gamble, Fl. Madras 1442(1008). 1928; Abraham & Vatsala, Introd. Orchids 446. 1981; Ansari, Fl. Kasaragod Div. 367. 1985; C.S.Kumar & Manilal, Orchid Memories 165. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 783. 2009. *Aerides lindleyana* Wight, Icon. Pl. Ind. Orient. 5:9, t.1677. 1852 (Plate 4e).

Epiphytic herbs, sometimes lithophytic. Stem 20-30 cm high, 1-1.5 cm diam, older stem covered with persistent sheaths of petioles. Leaves 10-20 x 2-3 cm, linear-oblong, unequally 2-lobed at tip, sheathing at base, keeled along midrib, deciduous above sheathing petiole. Inflorescence simple or branched racemes; Peduncles 10-20 cm long; floral bracts minute, scaly. Flowers pink, 1.5-1.8 cm across. Sepals and petals 0.7-0.8 x 0.3-0.4 cm. Petals slightly smaller. Lip 1.5-1.8 x 0.3-0.4 cm, lobed; side lobes very small, mid-lobe ovate-crenulate. Pedicel and ovary 0.8-1.2 cm long.

Ambalappara, *NS & KVB 31417*

Fl. & Fr.: May-September

Distribution: Fairly common in the evergreen forests at Ambalappara. Endemic to Western Ghats; conservation status: vulnerable (Sasidharan 2017).

APHYLLORCHIS Blume

Tab. Pl. Jav. Orchid.: t. 16, f. 77. 1825.

Aphyllorchis montana Rchb.f., Linnaea 41: 57. 1877; Hook.f., Fl. Brit. India 6: 116. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1457(1019). 1928; Mohanan *et al.*, J. Bombay Nat. Hist. Soc. 79: 234. 1982; C.S.Kumar & Manilal, Orchid Memories 166. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 784. 2009. *Aphyllorchis prainii* Hook.f., Fl. Brit. India 6: 117. 1890; Ramach. & V.J. Nair, Fl. Cannanore Dist. 447. 1988; Vajr., Fl. Palghat Dist. 467. 1990 (Plate 4f).

Saprophytes, 50-60 cm tall. Flowers yellow, 3 x 1 cm, racemose; bracts 10 x 2 mm, linear lanceolate. Dorsal sepal 13 x 4 mm, oblong, obtuse; lateral sepals 11 x 3 mm, oblong, obtuse. Petals 11 x 3 mm, oblong, obtuse. Lip 9 x 5 mm, ovate, acute, 3-lobed, side lobes obliquely ovate-obtuse; midlobe ovate, acute.

Vellachatamkunnu, *KJD 31470*

Fl. & Fr.: August-September

Distribution: Rare in evergreen forests of Vellachatamkunnu and Kannadivechakunnu.

BRACHYCORYTHIS Lindl.

Gen. Sp. Orchid. Pl.: 363. 1838.

Brachycorythis iantha (Wight) Summerh., Kew Bull. 1955: 238. 1955; Abraham & Vatsala, *Introd. Orchids* 254. 1981; C.S.Kumar & Manilal, *Orchid Memories* 167. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 785. 2009. *Platanthera iantha* Wight, *Icon. Pl. Ind. Orient.* t. 1692. 1851. *Platanthera affinis* Wight, *Icon. Pl. Ind. Orient.* t. 1693. 1851. *Habenaria galeandra* Benth., Hook.f., *Fl. Brit. India* 6: 163. 1890.

Unbranched terrestrial herbs. Leaves 2.5-3 x 0.9-11 cm, elliptic-oblong, acute, 3-nerved, well spaced. Flowers pink, 1.5 x 1 cm. Dorsal sepal 4.5 x 2 mm, ovate-lanceolate, acute, 3-veined; lateral sepals 7 x 2.5 mm, falcate, ovate-oblong, acute, 3-veined. Petals 5 x 1.5 mm, lanceolate, obliquely acute at apex, 1 or 2-veined. Lip 14 x 12 mm, obcordate with a large sinus, sac ovate, obtuse, 2 x 2 mm, biparted.

Ambalappara, *KJD 26126*

Fl. & Fr.: July-August

Distribution: Fairly common in the grasslands of Ambalappara.

BULBOPHYLLUM Thouars

Hist. Orchid.: t. 3. 1822., *nom. cons.*

- 1a. Inflorescence umbellate *B. acutiflorum*
- 1b. Inflorescence racemose 2
- 2a. Side lobes of lip represented by 2 auricles *B. rosemarianum*
- 2b. Side lobes without auricles *B. sterile*

Bulbophyllum acutiflorum A.Rich., *Ann. Sci. Nat. Bot. ser.* 2, 15: 18. t. 7. 1841; Rao, *Cons. Wild. Orch. Kodagu W. Ghats* 193. 1998; C.S.Kumar & Manilal, *Orchid Memories* 167. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 786. 2009.

Cirrhopetalum acutiflorum (A.Rich.) Hook.f., Fl. Brit. India 5: 779. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1421(993). 1928. *Cirrhopetalum albidum* Wight, Icon. Pl. Ind. Orient. t. 1653. 1851. *Bulbophyllum albidum* (Wight) Hook.f., Fl. Brit. India 5: 757. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1418(992). 1928; C.S.Kumar & Manilal, Orchid Memories 168. 2004 (Plate 4g).

Epiphytic herbs; rhizome stout, pseudobulbs broadly ovoid, 1-1.5 cm long. Leaf elliptic-oblong, 2.5-6 cm long, obtuse, emarginate, narrowed into a short petiole. Scape rather stout, slender, as long as or longer than the leaf; sheaths 2-3. Flowers umbellate, 4-8, cream-coloured, speckled with pale-brown, 1.3-2 cm long; bracts 4 mm long, lanceolate; pedicel longer, slender. Sepals lanceolate, acuminate, dorsal 1/3 shorter. Petals broadly oblong 3-nerved, rounded, lip clawed, basal angles acute. Lip usually tongue-shaped, sessile or clawed, jointed on the foot, mobile, usually small and much recurved. Column short, often 2-aristate at the top. Anthers 2-celled, pollinia 4 (rarely 2).

Ambalappara, KJD 25441

Fl. & Fr.: March-July

Distribution: Rare in the evergreen forests of Ambalappara. Endemic to South India; conservation status: endangered (Sasidharan 2017).

Bulbophyllum rosemarianum C.S.Kumar, P.C.S.Kumar & Saleem, Rheedeia 11: 97. 2001; C.S.Kumar & Manilal, Orchid Memories 170. 2004 (Plate 4h).

Epiphytic herbs, rhizomes creeping; pseudobulbs quadrangular, pale yellowish green, arranged distantly. Leaves 5-18 x 1.6-3.2 cm, erect, oblong, thick and fleshy, deeply channeled in the middle region, narrowed at the base, obtuse at apex; petiole short. Inflorescence from the base of pseudo bulb, pale green, longer than leaf, scape bearing 4 cup-like sterile bracts and a short raceme (4-5 cm) of pale yellow flowers. Dorsal sepal 4-5 x 3-3.5 mm, ovate-elliptic, acute at apex; lateral sepals 8-9 x 4-4.5 mm, ovate-elliptic or boat-shaped. Petals 2-2.5 x 1.5-2 mm, broad-based, ovate-aristate, slightly oblique and erose at margins, gland-dotted. Lip 3-3.5 x 1.5-2 mm, thick, yellow with brown markings, 3-lobed. Column 2-3 mm long, thick with 2 erects. Column-foot about 2 mm long bearing lateral sepals. Fruits globose.

Kariyenkappu, NS & KJD 31986

Fl. & Fr.: January-March

Distribution: Fairly common on evergreen forest trees at Kariyenkappu, Crossway and Chavachi. Endemic to southern Western Ghats.

Bulbophyllum sterile (Lam.) Suresh in D. H. Nicolson, Suresh & Manilal, *Interpr. Van Rheedee's Hort. Malab.* 298. 1988; C.S.Kumar & Manilal, *Orchid Memories* 171. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 790. 2009. *Epidendrum sterile* Lam., *Encycl.* 1: 189. 1783. *Bulbophyllum neilgherrense* Wight, *Icon. Pl. Ind. Orient.* t. 1650. 1851; Hook.f., *Fl. Brit. India* 5: 761. 1890; C.E.C.Fisch. in Gamble, *Fl. Madras* 1418(992). 1928; Abraham & Vatsala, *Introd. Orchids* 334. 1981; Manilal & Sivar., *Fl. Calicut* 284. 1982; Ansari, *Fl. Kasaragod Div.* 367. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 447. 1988.

Epiphytes; rhizome creeping, stolon-like. Pseudobulbs fleshy, yellowish-green, 2-3 cm long, conical-ovoid, faintly 4-angled. Leaves single, apical, sessile, 4-12 x 1.5-3 cm, elliptic-oblong, apex obtuse, coriaceous. Racemes lateral, 6-10 cm long, sheathing at base. Flowers brownish, c. 1 cm long, dense; bracts small, oblong-lanceolate. Lateral sepals 1 cm long, ovate-acuminate; dorsal sepal c. 5 mm long. Petals small; lateral petals ovate-triangular, awned. Lip dark red, 3-lobed, spurred at base, mid-lobe thick, grooved dorsally, fleshy, laterals membranous. Column short, produced above into 2 teeth.

Kariyenkappu, NS & KJD 31563

Fl. & Fl.: December-January

Distribution: Fairly common on Riverside trees and plantations at Kariyenkappu and Chavachi. Endemic to Peninsular India.

CALANTHE R.Br.

Bot Reg. 7: sub t. 573. 1821, *nom. cons.*

Calanthe sylvatica (Thouars) Lindl., *Gen. Sp. Orchid. Pl.* 250. 1833; C.S.Kumar in Manoharan *et al.*, *Silent Valley-Whispers Reason* 197. 1999; C.S.Kumar & Manilal, *Orchid Memories* 171. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 791. 2009. *Centrosis sylvatica* Thouars, *Hist. Orchid.* t. 35,36. 1822. *Bletia masuca* D.Don, *Prodr. Fl. Nepal.* 30. 1825. *Calanthe masuca* (D.Don) Lindl., *Gen. Sp. Orchid. Pl.* 249. 1833; Hook.f., *Fl. Brit. India* 5: 850. 1890; C.E.C.Fisch. in Gamble, *Fl. Madras* 1432(1001). 1928; Abraham & Vatsala, *Introd. Orchids* 265. 1981; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 448. 1988.

Terrestrial herbs with pseudobulbs. Leaves many, 25-50 x 5-8 cm, ovate-lanceolate, acuminate at apex, attenuate at base to sheathing petiole, 10-15 cm long, 7-9 ribbed, plicate. Inflorescence terminal racemes, 30-60 cm high. Flowers towards tip of peduncle, basal portion with 2-3 tubular sheaths; floral bracts 1.5-2 cm long, 0.2-0.3 cm wide, clavate. Flowers 3-4 cm across. Sepals and petals

ovate, 1.5-2 x 0.8-1 cm, purple. Lip 1.5-2 cm long, 3-lobed, side lobes small, mid-lobe 2 fid, deep violet; spur 2-2.5 cm long, slender. Pollinia 8, grouped in groups of 4. Column short. Capsule 2.5-3 x 1-1.5 cm, broadly oblong.

Pothurumi, *KJD 18752*

Fl. & Fr.: August-December

Distribution: Rare in the evergreen forests of Ambalappara and Pothurumi.

CHEIROSTYLIS Blume

Bijdr. Fl. Ned. Ind. 413, t. 16. 1825.

- 1a. Leaves long petioled..... *C. parvifolia*
1b. Leaves sessile *C. flabellata*

Cheirostylis flabellata (A.Rich.) Wight, Icon. Pl. Ind. Orient. 16. 1851 (as *Monochilus flabellatum* t. 1727); Hook.f., Fl. Brit. India 6: 105. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1454(1017). 1928; Abraham & Vatsala, Introd. Orchids 194. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 448. 1988; C.S.Kumar & Manilal, Orchid Memories 172. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 791. 2009. *Goodyera flabellata* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 79. t. 12. 1841. *Monochilus flabellatum* Wight, Icon. Pl. Ind. Orient. t. 1727. 1851.

Slender terrestrial herbs, 5-10 cm high. Leaves 1-2.5 x 0.5-1 cm, ovate, acuminate at apex; petiole 1-1.5 cm long, sheathing on stem. Inflorescence terminal racemes, 5-6 cm high, with 2-3 subulate bracts on rachis; flowers at the top only. Floral bracts minute, subulate; pedicel twisted and flowers resupinate. Sepals connate to a tube, 0.25-0.3 cm long. Petals free. Lip 0.5-0.6 cm long; lateral lobes saccate; mid-lobe 2-fid, 3-sect on margins. Capsules subglobose, 0.45-0.5 cm diam.

Ambalappara, *KJD 25558*

Fl. & Fr.: October-May

Distribution: Rare in the evergreen forests of Ambalapparar and Pothurumi.

Cheirostylis parvifolia Lindl., Edwards's Bot. Reg. Misc. 25: 20. 1839; Av.Bhattacharjee, Candollea 32: 67. 2012. *Cheirostylis seidenfadeniana* C.S.Kumar & F.N.Rasm., Nordic J. Bot. 7: 409. 1987; C.S.Kumar & Manilal, Orchid Memories 172. 2004.

Terrestrial herbs, 10-20 cm high. Leaves 3-5, clustered towards apex, 1-2.5 x 0.6-0.9 cm, ovate, or ovate-lanceolate, acute, membranous, pinkish on drying, glabrous; petiole 1-2 cm long, sheathed. Flowers white, 6-8, in 10-12 cm long

terminal pubescent raceme. Sepals and petals united into a tube, 3 mm; dorsal sepal 1 x 0.9 mm, ovate, obtuse, 1-veined; lateral sepals 0.9 x 0.6 mm, ovate, subacute. Petals 0.6 x 0.5 mm, obliquely oblanceolate, obtuse, 1-veined. Lip, 3 x 1-4 mm, bilobed, trifold, lobules 3 each, lanceolate, subacute, base saccate with 3-lobed calli.

Kannadivechakunnu, *KJD 25562*

Fl. & Fr.: October-January

Distribution: Rare in the evergreen forests of Kannadivechakunnu.

CLEISOSTOMA Blume

Bijdr. Fl. Ned. Ind. 362. 1825.

Cleisostoma tenuifolium (L.) Garay, Bot. Mus. Leaflet. Harvard Univ. 23: 175. 1972; C.S.Kumar & Manilal, Orchid Memories 174. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 792. 2009. *Epidendrum tenuifolium* L., Sp. Pl. 952. 1753. *Sarcanthus peninsularis* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 343. 1851; Hook.f., Fl. Brit. India 6: 67. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1447(1012). 1928; *Sarcanthus pauciflorus* Wight, Icon. Pl. Ind. Orient. t. 1747. 1851; Abraham & Vatsala, Introd. Orchids 471. 1981; Ansari, Fl. Kasaragod Div. 375. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 462. 1988.

Pendulous epiphytic herbs, 20-30 cm long. Leaves 10-12 x 0.5 cm, linear, strongly keeled, acute. Flowers yellow, in 3-6 cm long, leaf-opposed racemes. Dorsal sepal 4.5 x 1.2 mm, obovate-oblong, lanceolate, acute, 3-veined; lateral sepals 3 x 1 mm, elliptic, acute, 3-veined. Petals 3 x 0.8 mm, falcately-oblong, truncate, 1-veined. Lip 2 x 4 mm, 3-lobed, side lobes 1.5 x 1 mm, ovate, apiculate, midlobe, 2 x 1 mm, ovate, with 2 fleshy calli; spur 3 x 1 mm, oblong-ovoid.

Chavachi, *NS & KVB 31404*

Fl. & Fr.: July-August

Distribution: Common in semi-evergreen and Moist deciduous forests of Valayamchal to Kariyenkappu, Meenmutty, Chavachi, Chelachode and Uruppukunnu.

COELOGYNE Lindl.

Coll. Bot. t. 33. 1822.

- 1a. Pseudobulb prominently corrugated; midlobe of the lip, ovate-acute *C. nervosa*
- 1b. Pseudobulb not corrugated; midlobe of the lip suborbicular *C. odoratissima*

Coelogyne nervosa A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 16. 1841; C.E.C.Fisch. in Gamble, Fl. Madras 1430(1000). 1928; Abraham & Vatsala, Introd. Orchids 285. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 449. 1988; C.S.Kumar & Manilal, Orchid Memories 175. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 794. 2009. *Coelogyne corrugata* Wight, Icon. Pl. Ind. Orient. t. 1639. 1851; Hook.f., Fl. Brit. India 5: 835. 1890.

Epiphytes with subglobose to ovoid wrinkled pseudobulbs. Leaves 2 per pseudobulb, 6-15 x 2-2.5 cm, oblong-lanceolate, acute; petiole 2-3 cm long. Flowers white, in 8-12 cm long, 3-4-flowered raceme from the middle of leaves; bracts 12 x 19 mm, ovate, acute. Dorsal sepal 26 x 9 mm, oblong or elliptic, acute, to apiculate, 9-veined; lateral sepals 29 x 9 mm, oblong-elliptic, acute, apiculate, 9-veined. Petals 27 x 9 mm, elliptic, acute at both ends, 5-veined. Lip 24 x 7-15 mm, ovate, acute, trilobed, side lobes, obliquely ovate.

Ambalappara, KVB 31726; KJD 25440

Fl. & Fr.: June-August

Distribution: Common in the evergreen forests of Ambalappara.

Endemic to Western Ghats; conservation status: Vulnerable (Sasidharan 2017).

Coelogyne odoratissima Lindl., Gen. Sp. Orchid. Pl. 41. 1830; Hook.f., Fl. Brit. India 5: 834. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1430(1000). 1928; Abraham & Vatsala, Introd. Orchids 277. 1981; C.S.Kumar & Manilal, Orchid Memories 175. 2004. *Coelogyne angustifolia* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: 16. 1841 (Plate 4i).

Epiphytes with pseudobulbous. Leaves 1 or 2 to each pseudobulb, small when flowering, becoming larger at fruiting, 3-10 x 0.8-1.3 cm, linear-lanceolate, acute, recurved beneath. Flowering shoot arising from the base of the pseudobulb, with five imbricate basal sheaths and two small foliage leaves; floral bracts 1.3-1.6 x 1.2 cm, orbicular-ovate, acute, membranous, persistent and about 12-veined. Flowers 3.5 cm across, very fragrant, white. Dorsal sepal oblong-lanceolate, subacute; lateral sepals oblong-lanceolate or oblong-ovate. Petals linear, acute, 3-veined. Lip 2.2 x 1.4 cm, 3-lobed; lateral lobes oblong, obtuse, erect; midlobe orbicular, apiculate, with three crisped ridges along the midline. Column winged, bending over at the apex, mentum inconspicuous. Anther terminal, 2-loculed, 2.4 x 2 mm. Ovary with pedicel 9 mm long.

Ambalappara, KVB 31738

Fl. & Fr.: February-May

Distribution: Common in the evergreen forests of Ambalappara.

CONCHIDIUM Griff.

Not. Pl. Asiat. 3: 321. 1851.

Conchidium microchilos (Dalzell) Rauschert, Feddes Repert. 94: 444. 1983; Ratheesh, Fl. Stud. Wayanad Dist. 796. 2009. *Dendrobium microchilos* Dalzell, Hooker's J.Bot. Kew Gard. Misc. 3: 34. 1851. *Eria microchilos* (Dalzell) Lindl., J. Proc. Linn. Soc. Bot. 3: 47. 1859; C.S.Kumar & Manilal, Orchid Memories 186. 2004 (Plate 4j).

Small pseudobulbus epiphytic herbs, Pseudobulbs discoid, aggregated. Leaves 2-5, sessile, oblong-lanceolate, single nerved. Scape slender often filiform, flowers in racemes. Flowers yellow or creamy yellow. Sepals and petals spreading, glabrous, 5-6 mm long. Lip narrowly oblong, crenulate, minutely puberulous, with 2 calli running throughout the length.

Ambalappara, KJD 25460

Fl. & Fr.: July-August

Distribution: Rare on wet rocks of Ambalappara.

COTTONIA Wight

Icon. Pl. Ind. Orient. t. 1755. 1852.

Cottonia peduncularis (Lindl.) Rchb.f., Cat. Orch. Schiller 52. 1857; Abraham & Vatsala, Introd. Orchids 456. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 450. 1988; C.S.Kumar & Manilal, Orchid Memories 176. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 797. 2009. *Vanda peduncularis* Lindl., Gen. Sp. Orchid. Pl. 216. 1833. *Cottonia macrostachya* Wight, Icon. Pl. Ind. Orient. t. 1755. 1851; Hook.f., Fl. Brit. India 6: 26. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1439(1006). 1928.

Epiphytes, 10-20 cm tall. Leaves few, spiral, closely packed, 8-10 x 1 cm, oblong, keeled, bilobed at apex. Flowers brown, in 20-40 cm long peduncle. Dorsal sepal 9 x 4 mm, obovate-oblong, obtuse, 7-veined; lateral sepals 8 x 4.5 mm, obovate-oblong, obtuse, 7-veined. Petals 8 x 3 mm, linear-oblong, obliquely truncate, 3-veined. Lip 1.2 x 10 mm, subpanduriformis, 2-auricled at base with interposed calli, lateral lobes orbicular, midlobe trifid, lateral lobules orbicular.

Chavachi, NS & KVB 31311

Fl. & Fr.: March-May

Distribution: Fairly common in the evergreen forests of Chavachi.

CREPIDIUM Blume

Bijdr. Fl. Ned. Ind. Fl. Ned. Ind. 8: 387. 1825.

- 1a. Side lobes of lip auricled *C. purpureum*
1b. Side lobes lacking, sides of lip lacinate *C. resupinatum*

Crepidium purpureum (Lindl.) Szlach., *Fragm. Florist. Geobot. Suppl.* 3: 131 1995; C.S.Kumar & Manilal, *Orchid Memories* 176. 2004. *Microstylis purpurea* Lindl., *Gen. Sp. Orchid. Pl.* 20. 1830. *Malaxis purpurea* (Lindl.) Kuntze, *Revis. Gen. Pl.* 2: 673. 1891; Ratheesh, *Fl. Stud. Wayanad Dist.* 826. 2009. *Malaxis acuminata* auct. non D.Don, 1825; Abraham & Vatsala, *Introd. Orchids* 396. 1981. *Microstylis wallichii* sensu Hook.f., *Fl. Brit. India* 5:686.1888,p.p. non Lindl. 1830; C.E.C.Fisch. in Gamble, *Fl. Madras* 1407 (985). 1928.

Terrestrial herbs, with swollen base. Leaves 7-8.5 x 2.5-3 cm, elliptic or ovate, acute. Scape about 20 cm; bracts 4 x 1 mm, lanceolate, acuminate, 1-veined. Flowers purple, 1 x 0.5 cm. Dorsal sepal obovate, obtuse, 5-veined; lateral sepals broadly ovate, obtuse, 5-veined. Petals linear, retuse at apex, 1-veined. Lip auricled, apex bilobulate, obtuse; margin with a constriction, subapically. Disc with purple oval fovea.

Ambalappara, *KJD 25447*

Fl. & Fr.: April-July

Distribution: Rare in evergreen forests of Ambalappara.

Crepidium resupinatum (G.Forst.) Szlach., *Fragm. Florist. Geobot. Suppl.* 3: 131 1995. *Epidendrum resupinatum* G.Forst., *Fl. Ins. Austr.* 61 1786. *Malaxis rheedei* Sw., *Kongl. Vetensk. Acad. Nya Handl.* 21: 235. 1800; Manilal & Sivar., *Fl. Calicut* 283. 1982; Ansari, *Fl. Kasaragod Div.* 371. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 457. 1988. *Microstylis rheedei* (Sw.) Lindl., *Gen. Sp. Orchid. Pl.* 21. 1830 p.p.; Hook.f., *Fl. Brit. India* 5: 690. 1890. *Seidenfia rheedei* (Sw.) Szlach., *Syst. Orch.* 3: 122. 1995; C.S.Kumar & Manilal, *Orchid Memories* 221. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 849. 2009.

Terrestrial herbs, 25-35 cm tall; stem swollen towards base, to 15 cm long. Leaves broadly ovate or elliptic, to 12 x 6cm, with purple shades. Scape to 18 cm long; bracts subulate, deflexed. Flowers orange yellow, 0.5 cm across. Dorsal sepal linear, obtuse, 3-veined; lateral sepals linear, obtuse, 3-veined. Petals lanceolate, obliquely truncate, 1-veined. Lip reniform, margin pectinate.

Kariyenkappu, *KJD 31469*

Fl. & Fr.: July-September

Distribution: Rare in evergreen forests of Kariyenkappu.

DENDROBIUM Sw.

Nova Acta Regiae Soc. Sci. Upsal. 6: 70. 1799.

- 1a. Flowers on leafless stems 2
- 1b. Flowers on leafy shoots..... 3
- 2a. Flowers bright yellow; stem not fully covered with leaf sheath.....*D. nutans*
- 2b. Flowers white or white with rose tinge; stem fully covered,
with leaf sheath *D. heyneanum*
- 3a. Flowers racemose *D. herbaceum*
- 3b. Flowers fascicled..... *D. aphyllum*

Dendrobium aphyllum (Roxb.) C.E.C.Fisch. in Gamble, Fl. Madras 1416(991). 1928; Ratheesh, Fl. Stud. Wayanad Dist. 799. 2009. *Limodorum aphyllum* Roxb., Pl. Coromandel: 34. 1795. *Dendrobium macrostachyum* Lindl., Gen. Sp. Orchid 78. 1830; Hook.f., Fl. Brit. India 5: 735. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orchids 355. 1981; Manilal & Sivar., Fl. Calicut 285. 1982; Ansari, Fl. Kasaragod Div. 369. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 452. 1988; C.S.Kumar & Manilal, Orchid Memories 180. 2004.

Epiphytic herbs; stem to 40 cm long, terete. Leaves oblong or ovate-lanceolate, acute, to 8 x 2.5 cm. Flowers dull yellow, 2.5 cm long, 2 or 3 on very short peduncles. Sepals and petals similar, oblong-lanceolate or obovate. Lip obscurely 3-lobed, lateral lobes enclosing the column, midlobe quadrately oblong, ovate, obtuse, with prominent red veins, margins crenulate.

Meenmutty, NS & KVB 31332

Fl. & Fr.: March-April

Distribution: Rare in the evergreen forests of Meenmutty.

Dendrobium herbaceum Lindl., Edwards's Bot. Reg.. 69.1840; Hook.f., Fl. Brit. India 5:719.1890; C.E.C.Fisch. in Gamble, Fl. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orchids 368. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 451. 1988; C.S.Kumar & Manilal, Orchid Memories 179. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 801. 2009. *Dendrobium ramosissimum* Wight, Icon. Pl. Ind. Orient. t. 1648. 1851.

Epiphytic herbs; stem 30-40 cm long, branched, terete, leafless when flowering. Leaves 3-8 cm long, narrowly linear. Flowers white, in 4-6-flowered, 1-1.5 cm long, slender racemes from nodes; pedicel 6-7 mm. Dorsal sepal 5 x 1.5 mm, oblong-lanceolate, acute, 3-veined; lateral sepals 4 x 1.5-2 mm, oblong,

subacute, apiculate, falcate, 3-veined. Petals 4 x 1 mm, subfalcately oblong, obtuse, apiculate, 1-veined. Lip 3 x 2 mm, side lobes ovate-orbicular; midlobe thick, orbicular, obtuse.

Chavachi, KVB 31671

Fl. & Fr.: December-January

Distribution: Fairly common in evergreen forests of Chavachi, Meenmutty; Moist Deciduous forests of Paripode and plantations of Kariyenkappu. Endemic to Peninsular India.

Dendrobium heyneanum Lindl., Gen. Sp. Orchid. Pl. 78. 1830; Hook.f., Fl. Brit. India 5: 718. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1415(990). 1928; Abraham & Vatsala, Introd. Orchids 358. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 452. 1988; C.S.Kumar & Manilal, Orchid Memories 179. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 802. 2009.

Epiphytic herbs; stem 15-20 cm long. Leaves 8-10 x 0.6-0.8 cm, linear, acute, sessile, sheathed at base. Flowers white or pinkish-white, in 8-10 cm long, 10-12 flowered, slender axillary or terminal racemes; pedicel 7 mm. Dorsal sepal 9 x 2 mm, oblong-lanceolate; acute, 5-veined; lateral sepals 9 x 2.5 x 3 mm, obliquely ovate-lanceolate, acute, 5-veined. Petals 9.5 x 1-1.5 mm, oblanceolate-linear, acute, 3-veined. Lip 12.5 x 4-6.5 mm, obovate, side lobes oblong-lanceolate, acute; midlobe, ovate, subacute, apiculate, margins dentate; disc with a fleshy callus.

Ambalappara, KVB 31737

Fl. & Fr.: August-December

Distribution: Fairly common in evergreen forests at Ambalappara and Kattikkari. Endemic to Peninsular India.

Dendrobium jerdonianum Wight, Icon. Pl. Ind. Orient. t. 1644. 1851; Hook.f., Fl. Brit. India 5: 734. 1888. *Dendrobium nutans* Lindl., Gen. Sp. Orchid. Pl. 90. 1830; Hook.f., Fl. Brit. India 5: 734. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1416(990). 1928; Abraham & Vatsala, Introd. Orchids 363. 1981; Ratheesh, Fl. Stud. Wayanad Dist. 803. 2009. *Callista nutans* (Lindl.) Kuntze, Revis. Gen. Pl. 2: 655. 1891.

Epiphytic herbs; stem 15-30 cm long, clavate, narrowed at base, swollen towards tip; internodes 1.5-1.8 cm long, yellow on drying, ridged, black hairy on ridges. Leaves only at the tip of stem, 4-6 x 1-1.5 cm, linear-lanceolate to linear-oblong, inequally 2-fid at tip, sheathing at base. Flowers 3-4 in short tubercle like

leaf opposed racemes; Peduncle 0.5-0.7 cm long; floral bracts scaly, c. 0.1 cm long. Flowers donot fully open. Sepals and petals 0.3-0.35 cm long, linear, lanceolate. Lip pink, fleshy, 1.5-1.25 cm long, 3-lobed; mentum stout, c. 0.5 m long. Pedicel and ovary 0.8-1.2 cm long. Pods 1.2-1.5 x 0.6-0.7 cm.

Ambalappara, KVB 31581

Fl. & Fr.: February-March

Distribution: Common in evergreen forests of Ambalappara.

DISPERIS Sw.

Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800.

Disperis neilgherrensis Wight, Icon. Pl. Ind. Orient. t. 1719. 1851; Hook.f., Fl. Brit. India 6: 169. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1478(1032). 1928; Abraham & Vatsala, Introd. Orchids 208. 1981; C.S.Kumar & Manilal, Orchid Memories 185. 2004; Kurzweil, Blumea 50: 145. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 806. 2009. *Disperis zeylanica* Trimen, J. Bot. 23: 245. 1885; Hook.f., Fl. Brit. India 6: 169. 1890.

Terrestrial herbs with a tuber; stem 10-15 cm tall. Leaves to 10 x 9 mm, ovate, cordate, acute, sessile. Flowers pale-pink or rose, one or two in terminal raceme; floral bracts, foliaceous, 9 x 6 mm, cordate, acute. Dorsal sepal and petals connated to form a hood over the column; dorsal sepal 9 x 2 mm, linear-lanceolate, 3-veined; lateral sepals 16 x 7 mm, obliquely obovate, obtuse, many-veined. Petals 10 x 6 mm, obliquely obovate or elliptic, subacute, 3-veined. Lip 5 x 5 mm, anchor shaped, bifid, with two long linear recurved arms with yellow papillae.

Ambalappara, KJD 26092

Fl. & Fr.: May-July

Distribution: Rare in evergreen forests of Ambalappara.

EPIPOGIUM Borkh.

Tent. Disp. Pl. German. 139. 1792.

Epipogium roseum (D.Don) Lindl., J. Proc. Linn. Soc. Bot. 1: 177. 1857; Ramach. & V.J. Nair, Fl. Cannanore Dist. 453. 1988; C.S.Kumar & Manilal, Orchid Memories 185. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 807. 2009. *Limodorum roseum* D.Don, Prodr. Fl. Nepal. 30. 1825. *Epipogium nutans* Rchb.f., Bonplandia 5: 36. 1836; Hook.f., Fl. Brit. India 6: 124. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1460(1021). 1928 'Epipogum'. *Podanthera pallida* Wight, Icon. Pl. Ind. Orient. t. 1759. 1851 (Plate 4k).

Saprophytic tuberous herbs, 15-25 cm tall; tuber 2-3 x 2 cm, ovoid or oblongoid. Flowers white, speckled with pink spots, racemose. Dorsal sepal 9 x 1.4 mm, linear, subacute, obtuse, 3-veined; lateral sepals 10 x 1 mm, linear, subacute, 3-veined. Petals 9.5 x 2 mm, oblong-lanceolate, obtuse. disc with 2 rows of tubercles; spur 3 x 2 mm, saccate; column 4 x 1.2 mm; ovary 3.5 x 1.2 mm.

Kattikkari, NS & KVB 31385

Fl. & Fr.: April-November

Distribution: Rare in evergreen forests of Kattikkari.

ERIA Lindl.

Edwards's Bot. Reg. 11: t. 904. 1825, *nom. cons.*

Eria albiflora Rolfe, Bull. Misc. Inform. Kew 1893: 170. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1425(996). 1928; C.S.Kumar & Manilal, Orchid Memories 185. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 807. 2009 (Plate 4l).

Small epiphytes, up to 5 cm. Pseudobulbs aggregate. Leaves 3-7 x 0.7-1.5 cm oblong-lanceolate, attenuate, abruptly narrowed into a short or long sheathing base leafy when flowering. Flowers ca.6, white in brown pubescent slender scape. pedicel brown pubescent; bracts 3-4 mm long, persistent, longer than the pedicel. Sepals obliquely lanceolate-ovate, gland dotted, trinerved. Petals linear-ovate, gland dotted, trinerved. Lip 3-4 mm long sub-orbicular, beaked at tip, sparsely gland-dotted, with 2 lateral papillae at base.

Ambalappara, KJD 25450

Fl. & Fr.: June-September

Distribution: Rare, once collected from evergreen forests of Ambalappara. Endemic to Southern Western Ghats; Conservation status:Vulnerable.

GASTROCHILUS D.Don

Prodr. Fl. Nepal. 32. 1825.

Gastrochilus acaulis (Lindl.) Kuntze, Revis. Gen. Pl. 2: 661. 1891; C.S.Kumar & Manilal, Orchid Memories 191. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 812. 2009. *Cleisostoma acaulis* Lindl., Gen. Sp. Orchid. Pl. 227. 1833. *Saccolabium acaule* (Lindl.) Hook.f., Fl. Brit. India 6: 61. 1890. *Vanda pulchella* Wight, Icon. Pl. Ind. Orient. t. 9. 1852. *Gastrochilus calceolare* (Buch.-Ham. ex Smith) D.Don, Prodr. Fl. Nepal. 32. 1825; Ramach. & V.J. Nair, Fl. Cannanore Dist. 455. 1988; *Saccolabium nilagiricum* Hook.f., Fl. Brit. India 6: 60. 1890. *Gastrochilus*

nilagiricus (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 661. 1891; Ansari, Fl. Kasaragod Div. 369. 1985. *Gastrochilus pulchellus* (Wight) Schltr., Feddes Repert. 12: 215. 1913; Abraham & Vatsala, Introd. Orchids 466. 1981. *Saccolabium pulchellum* (Wight) C.E.C.Fisch., in Gamble, Fl. Madras 1446(1011). 1928.

Epiphytic herbs; stem 2 cm high. Leaves 4-10 x 1 cm, oblong, obliquely bifid at apex. Flowers yellow, on 2 cm long, stout, lateral raceme. Dorsal sepal 8 x 3.5 mm, obovate, obtuse; lateral sepals 7.5 x 4 mm, elliptic, obtuse. Petals 7 x 3.5, obovate. Lip 7 x 8 mm, deeply saccate; epichile triangular, margins dentate with few papillae near centre.

Chavachi, NS & KVB 31403

Fl. & Fr.: October-January

Distribution: Fairly common in evergreen forests at Kariyenkappu and Chavachi, on stream side trees.

GEODORUM Andrews

Bot. Repos. 10: t. 626. 1811.

Geodorum densiflorum (Lam.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 259. 1919; C.E.C.Fisch. in Gamble, Fl. Madras 1437(1004). 1928; Abraham & Vatsala, Introd. Orchids 327. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; C.S.Kumar & Manilal, Orchid Memories 192. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 813. 2009. *Limodorum densiflorum* Lam., Encycl. 3: 516. 1792. *Geodorum purpureum* R.Br. in W.T.Aiton, Hortus Kew. (ed. 2) 5: 207. 1813; Hook.f., Fl. Brit. India 6: 16. 1890. *Geodorum dilatatum* sensu Wight, Icon. Pl. Ind. Orient. t. 612. 1844, non R.Br. 1810; Hook.f., Fl. Brit. India 6: 17. 1890.

Terrestrial herbs, 60-70 cm tall; pseudobulbs ovoid, 5 x 2.5 cm. Leaves 30-50 x 7-10 cm, elliptic-oblong or lanceolate, acuminate. Flowers white or pinkish, raceme 50-60 cm long, from the base of the pseudobulb; flower bearing portion about 5 cm long, strongly decurved. Floral bracts 15 x 4 mm, lanceolate, acuminate, 1-3-veined. Dorsal sepal 13 x 4.5 mm, oblanceolate-oblong, acute, apiculate at apex, 5-veined; lateral sepals 13 x 5.1 mm, elliptic-oblong, acute, 7-veined. Petals 12.5 x 6 mm, oblanceolate, obtuse. Lip cymbiform, side margins incurved, apex faintly bilobed. Disc with longitudinal callus.

Kariyenkappu, NS & KJD 25535

Fl. & Fr.: April-July

Distribution: Rare in the plantations at Kariyenkappu.



a. *Cryptocoryne retrospiralis*



b. *Remusatia vivipara*



c. *Dioscorea oppositifolia*



d. *Acanthephippium bicolor*



e. *Aerides crispata*



f. *Aphyllorchis montana*



g. *Bulbophyllum acutiflorum*



h. *Bulbophyllum rosemarianum*



i. *Coelogyne odoratissima*



j. *Conchidium microchilos*



k. *Epipogium roseum*



l. *Eria albiflora*

HABENARIA Willd.

Sp. Pl. 4(1): 5, 44. 1805.

- 1a. Petals 2-paritite *H. digitata*
1b. Petals entire..... 2
2a. Inflorescence second or subsecund, bracts cucullate *H. heyneana*
2b. Inflorescence not second, bracts not cucullate *H. longicornu*

Habenaria digitata Lindl., Gen. Sp. Orchid. Pl. 307. 1835; Hook.f., Fl. Brit. India 6: 134. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1469(1026). 1928; C.S.Kumar & Manilal, Orchid Memories 193. 2004. *Habenaria trinervia* Wight, Icon. Pl. Ind. Orient. t.1701. 1852. *Habenaria travancorica* Hook.f., Fl. Brit. India 6: 135. 1890. *Habenaria digitata* Lindl. var. *travancorica* (Hook.f.) C.E.C.Fisch. in Gamble, Fl. Madras 1469(1026). 1928.

Terrestrial herbs; plants up to 30 (-50) cm. Leaves 5-7, sessile, largest and crowded in the middle of stem, orbicular to oblong-lanceolate, acute to acuminate, up to 10 x 4 cm, margin some what undulate. Inflorescence dense flowered; lower bracts foliaceous. Sepals green, the dorsal sub-orbicular-concave, 6 mm; lateral sepals obliquely ovate-lanceolate. Petals 2-parted nearly to the base, posterior lobe greenish, curved backwards and upwards, linear-lanceolate, sickle-shaped, anterior lobe whitish, filiform, curved backwards, usually slightly longer than posterior. Lip deeply 3-parted, white at base, lobes subequal, narrow-linear, mid-lobe straight. Spur c.11 mm long, slightly shorter than ovary, inflated towards apex. Column 4-5 mm high. Anther canals short, curved upwards. Stigmatic processes clavate. Ovary glabrous.

Ambalappara, *KJD 25456*

Fl. & Fr.: August-November

Distribution: Rare in evergreen forests at Ambalappara.

Habenaria heyneana Lindl., Gen. Sp. Orchid. Pl. 320. 1835; Hook.f., Fl. Brit. India 6: 148. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orchids 231. 1981; C.S.Kumar & Manilal, Orchid Memories 194. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 817. 2009. *Habenaria subpubens* A.Rich., Ann. Sci. Nat. Bot. ser. 2, 15: t. 4C.1841; Hook.f., Fl. Brit. India 6: 148. 1890. *Habenaria candida* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 262. 1850.

Terrestrial herbs; stem 10-30 cm high. Leaves 4-6 x 0.5-0.9 mm, oblong-lanceolate, acute, cauline. Flowers white, on 3-5 cm long, secund spike; bracts 15 x 6 mm, ovate-lanceolate, acute, foliaceous. Dorsal sepal 9 x 4 mm, elliptic-oblong, acute, 5-veined; lateral sepals 10 x 3.5 mm, elliptic-oblong, obtuse-

apiculate, 5-veined. Petals 8.5 x 4.5 mm, obliquely ovate-lanceolate, obtuse, 3-veined. Lip 10 x 6 mm, 3-lobed; lobes subsimilar; lateral lobes, 7 x 1.5 mm, obliquely oblong-lanceolate, obtuse; midlobe 7.5 x 2.5 mm, oblong-lanceolate, obtuse. Spur, 13 x 1 mm, cylindric, subacute to obtuse.

Amabalappara, *KJD 25455*

Fl. & Fr.: August-October

Distribution: Common in the grasslands and rare in evergreen forests of Ambalappara. Endemic to Peninsular India.

Habenaria longicornu Lindl., Gen. Sp. Orchid. Pl. 322. 1835; Hook.f., Fl. Brit. India 6. 139. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1470(1027). 1928; Abraham & Vatsala, Introd. Orchids 229. 1981; C.S.Kumar & Manilal, Orchid Memories 195. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 818. 2009. *Habenaria montana* A.Rich., Ann. Sci. Nat. Bot. ser 2, 15: 73 t. 4A. 1841 (Plate 5a).

Terrestrial herbs; stem 10-40 cm high. Leaves to 12 x 2.5 cm, clustered towards the middle of the stem, linear-oblong, lanceolate, acute or acuminate. Scape to 25 cm tall. Flowers to 8, 2.5 cm across; bracts shorter than the 2.5 cm long ovary. Sepals ovate, acute. Petals linear-oblong, narrower. Lip 3-partite; side lobes 1.2 x 0.5 cm, cuneate, apex obliquely truncate, fimbriate; midlobe linear, shorter. Spur to 10 cm long, apex clavate.

Amabalappara, *KJD 25498*

Fl. & Fr.: August-October

Distribution: Rare at evergreen forests of Ambalappara. Endemic to Peninsular India.

LIPARIS Rich.

De Orchid. Eur.: 30. 1817., nom. cons.

- 1a. Epiphytic, leaves articulated 2
- 1b. Terrestrial, leaves not articulated *L. wightiana*
- 2a. Pseudo bulb compressed *L. elliptica*
- 2b. Pseudo bulb not compressed *L. viridiflora*

Liparis elliptica Wight, Icon. Pl. Ind. Orient. t. 1735. 1851; Abraham & Vatsala, Introd. Orchids 412. 1981; Sathish & Manilal, Orchid Memories 200. 2004; Ratheesh Narayanan, Fl. Stud. Wayanad Dist. 823. 2009. *Liparis viridiflora* sensu Hook.f., Fl. Brit. India 5: 704. 1890, non Lindl. 1830; Gamble, Fl. Madras 1411(987). 1928.

Pseudobulb 2 x 1.5 cm, ovoid, laterally compressed, 2-leaved. Leaves 10-11 x 2.5-3 cm, linear-elliptic, acute; petiole 1 cm long. Flowers white, in about 20 cm

long, terminal raceme; dorsal sepal elliptic, obtuse, 1-veined; lateral sepals elliptic-oblong, apiculate, 1-veined; petals linear, subacute; lip 3 x 2 mm, ovate, subacuminate, with an ear like folding subapically.

Ambalappara, *KJD 26907*

Fl. & Fr.: December-May

Distribution: Common in evergreen forests of Ambalappara.

Liparis viridiflora (Blume) Lindl., Gen. Sp. Orchid. Pl. 31. 1830; Abraham & Vatsala, Introd. Orchids 410. 1981; Ansari, Fl. Kasaragod Div. 370. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 456. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 823. 2009. *Malaxis viridiflora* Blume, Bijdr. Fl. Ned. Ind. 392. 1825. *Liparis longipes* Lindl., Gen. Sp. Orchid. Pl. 30. 1830; Hook.f., Fl. Brit. India 5: 703. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1411(987). 1928.

Epiphytic herbs; pseudobulb 8 x 2 cm, tapering towards apex. Leaves 2 per pseudobulb, 20-25 x 2 cm, linear, acuminate. Flowers creamy, in 20 mm long raceme. Dorsal sepal oblong acute, 1-veined; lateral sepals obliquely oblong, obtuse, 1-veined. Petals linear, acute, 1-veined. Lip 2.5 x 2 mm, oblong, acute, obtuse.

Kattikkari, *KJD 26037*

Fl. & Fr.: September-November

Distribution: Fairly common in Semi-Evergreen forests of Narikkadavu; plantations of Kariyenkappu and evergreen forests of Kattikkari.

Liparis wightiana Thwaites, Enum. Pl. Zeyl. 295. 1861; Hook.f., Fl. Brit. India 5: 695. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1410(986). 1928; Abraham & Vatsala, Introd. Orchids 405. 1981; C.S.Kumar & Manilal, Orchid Memories 201. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 824. 2009. *Liparis atropurpurea* sensu Wight, Icon. Pl. Ind. Orient. t. 904. 1844, non Lindl. 1830.

Terrestrial herbs to 15 cm, base bulbous. Leaves to 5.5 x 2 cm, ovate, acuminate. Flowers yellowish with pink tinge, in about 4-8 cm long racemes; bracts 9 x 3.5 mm, lanceolate, acuminate. Dorsal sepal lanceolate, obtuse, 3-veined; lateral sepals subfalcately lanceolate, acute, 3-veined. Petals linear, obtuse, 1-veined. Lip 7 x 6 mm, oblong-orbicular, auricled at base, disc with 2 tubercled calli, margins hairy.

Ambalappara, *KJD 25446*

Fl. & Fr.: August-September

Distribution: Rare near small streams in evergreen forests at Ambalappara.

LUISIA Gaudich.

Voy. Uranie 426. 1829.

Luisia tristis (G.Forst.) Hook.f., Fl. Brit. India 6: 25. 1890; Ratheesh, Fl. Stud. Wayanad Dist. 826. 2009. *Epidendrum triste* G.Forst., Fl. Ins. Austr. 60. 1786. *Luisia zeylanica* Lindl., Fol. Orch. Luisia 3. 1853; Abraham & Vatsala, Introd. Orchids 486. 1981; Manilal & Sivar., Fl. Calicut 284. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 456. 1988; C.S.Kumar & Manilal, Orchid Memories 202. 2004. *Luisia teretifolia* Gaudich., Voy. Uranie 426. 1829; Hook.f., Fl. Brit. India 6: 22. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1438(1005). 1928. *Luisia truncata* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 491. t. 9. 1932.

Erect, tufted, epiphytic herbs; stem to 20 cm long. Leaves 4-10 cm long, terete, acute at apex, fleshy, sheathing at base. Inflorescence condensed racemes, extra-axillary. Flowers 2-4, 5-6 mm long, greenish-yellow with purple tinge; bracts 1.5-2 x 1-2 mm, oblong, obtuse. Sepals c. 5 x 1.5 mm, oblong, obtuse, apex incurved. Petals similar to sepals. Lip 4-6 mm long, oblong, concave towards the base, trilobed with dark maroon horizontal bands; mid-lobe rhomboid, larger than side lobes. Ovary c. 2 mm long. Fruits 1.5-3.5 cm long, oblong.

Katikari, *KJD 25588*

Fl. & Fr.: March-August

Distribution: Evergreen forests of Kattikkari.

NERVILIA Comm. ex Gaudich.

Voy. Uranie 421. 1829, *nom. cons.*

Nervilia infundibulifolia Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 725. t. 3. 1932; Abraham & Vatsala, Introd. Orchids 435. 1981; C.S.Kumar & Manilal, Orchid Memories 203. 2004. *Nervilia hallbergii* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 726. 1932.

Terrestrial, tuberous herbs with a single leaf. Leaf flat on ground or slightly above surface, appearing after flowering; lamina 2-3 x 3-4 cm, broadly ovate, cordate to suborbicular; nerves 5-7. Scapes 6-15 cm long, 1-flowered; sheaths linear-oblong. Flowers greenish-purple; bracts 3-nerved, maroon. Sepals and petals light maroon-green. Sepals linear-lanceolate, acute. Petals linear-lanceolate, acute. Lip saccate at base, gland-dotted, 3 lobed; lateral lobes acute or subobtusate, midlobe broadly obovate to suborbicular, rounded, margin somewhat wavy, white or pink with deep patches of rose-maroon. Column broad at the top. Anthers white or faintly tinged with purple-maroon in front. Ovary 6-keeled with alternate low and high ridges. Fruits elliptic.

Crossway, *KJD 26042*

Fl. & Fr.: February-July

Distribution: Rare in evergreen forests at Crossway.

OBERONIA Lindl.

Gen. Sp. Orchid. Pl. 15. 1830, *nom. cons.*

- 1a. Leaves brownish; flowers compactly arranged..... *O.brunoniana*
1b. Leaves green; flowers loosely arranged..... *O. wynadensis*

Oberonia brunoniana Wight, Icon. Pl. Ind. Orient. t. 1622. 1851; Hook.f., Fl. Brit. India 5: 681. 1888; Gamble, Fl. Madras 1406(984). 1928; Abraham & Vatsala, Introd. Orchids 422. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 457. 1988; R. Ansari & Balakr., Orch. Monogr. 4: 16. 1990; Sathish in Manoharan *et al.*, Silent Valley-Whispers Reason 206. 1999; Sathish & Manilal, Orchid Memories 204. 2004; Ratheesh Narayanan, Fl. Stud. Wayanad Dist. 831. 2009.

Leaves brownish, to 28 x 2.5 cm, oblong-ensiform, acute. Scape flattened, adnate to upper most leaf. Spike to 18 cm long, with a distinct reflexed sterile tip. Flowers brick red, 4 x 2.5 mm, pedicelled, in close verticils; bracts 2 x 1.8 mm, ovate, acute, denticulate. Dorsal sepal oblong, obtuse; lateral sepals ovate, acute; petals lanceolate, acute; lip 2 x 2.5 mm, ovate in outline, 3-lobed; lateral lobes oblong, ear-like; midlobe 2-lobed; lobules oblong, truncate, diverging, with broad sinus; disc ovate, saccate.

Ambalappara, *KJD 26906*

Fl. & Fr.: December-January

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Southern Western Ghats.

Oberonia wynadensis Sivadasan & R.T.Balakr., Nordic J. Bot. 9: 395. 1989; C.S.Kumar & Manilal, Orchid Memories 209. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 837. 2009. *Oberonia pakshipadalensis* Muktesh & Stephen, J. Orchid. Soc. Ind. 12: 31. 1998 (Plate 5b).

Tufted pendulous acaulescent epiphytes. Leaves 1-17 x 0.5-1.6 cm, distichous, equitant, articulated at base. Scape adnate to the upper leaf, compressed, 12-15 x 0.3-0.7 cm, with few sterile bracts at apex. Inflorescence 25-33 cm long, floral axis rounded to subtetragonal. Flowers 4 in a whorl; maturation from tip of the inflorescence to the base; floral bracts ovate, oblong, acute at apex. Sepals and petals deflexed. Dorsal sepal ovate, oblong, obtuse;

lateral sepals broadly ovate. Petals linear oblong, acute at apex. Lip quadrate, 3-lobed, 3-nerved, lateral lobes entire margined, encircle and overlap behind the column; midlobe 2-lobulate, lobules orbicular with a quadrate sinus in between. Column ovate, oblong. Pollinia 2, ovoid. Ovary ca 1.5-1.75 x 0.75-1.0 mm.

Ambalappara, NS & KJD 25516

Fl. & Fr.: August-January

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats of Kerala; conservation status: Critically endangered (Sasidharan 2017).

PAPILIONANTHE Schitr.

Orchis 9: 78. 1915.

Papilionanthe subulata (Willd.) Garay, Bot. Mus. Leafl. 23: 372 1974. *Limodorum subulatum* Willd., Sp. Pl. 4: 126 1805. *Aerides cylindricum* Lindl., Gen. Sp. Orchid. Pl. 240. 1833; Hook.f., Fl. Brit. India 6: 44. 1840; C.E.C.Fisch. in Gamble, Fl. Madras 1442(1008). 1928; Abraham & Vatsala, Introd. Orchids 444. 1981. *Papilionanthe cylindrica* (Lindl.) Seidenf., Descr. Epidendr. Koing 1791: 33. 1995; C.S.Kumar & Manilal, Orchid Memories 210. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 838. 2009.

Epiphytic herbs. Leaves to 10 x 0.2 cm, terete. Racemes extra axillary, opposite to the leaves, 2-5-flowered; flowers white. Sepals 12 x 8 mm, ovate, obtuse at apex, fleshy. Petals 12 x 8 mm, broadly ovate, obtuse, fleshy. Lip yellow, 3-lobed, lobes equal, side lobes erect, middle lobes recurved; spur 8 mm, conical, obtuse at apex. Pedicels with ovary 1.5 cm. Fruit 4 cm long, slightly winged.

Amabalappara, KJD 26270

Fl. & Fr.: February-April

Distribution: Rare in evergreen forests of Ambalappara.

PERISTYLUS Blume

Bijdr. Fl. Ned. Ind. 404, t. 30. 1825, *nom. cons.*

- 1a. Leaves clustered near the base of the stem..... *P. aristatus*
1b. Leaves scattered throughout the stem..... *P. richardianus*

Peristylus aristatus Lindl., Gen. Sp. Orchid. Pl. 300. 1835; C.E.C.Fisch. in Gamble, Fl. Madras 1474(1030). 1928; Abraham & Vatsala, Introd. Orchids 246. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 459. 1988; C.S.Kumar & Manilal, Orchid Memories 211. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 839. 2009. *Habenaria aristata* (Lindl.) Hook.f. in Trimen, Cat. Ceylon Pl. 91. 1885; Hook.f., Fl. Brit. India 6: 158. 1890, non King & Pantl, 1898.

Terrestrial herbs. Leaves 4-7 x 2 cm, elliptic-lanceolate, subacuminate. Flowers white, in 10-18 cm long, lax spike, peduncle 12-15 cm long; bracts 11.5 x 4 mm, lanceolate, acuminate, margins finely erose, 1-veined. Dorsal sepal 5 x 1.8 mm, elliptic-oblong, obtuse, 1-veined; lateral sepals 4.1 x 1.8 mm, obliquely ovate-oblong, obtuse, 1-veined. Petals 5.5 x 2.1-2.5 mm, oblanceolate-oblong, obtuse, 1-veined. Lip 5 x 2 mm, 3-lobed; lobes very unequal; lateral lobes 7.5-8 x 0.5 mm, linear, acute, midlobe 2.5 x 0.9 mm, oblong, obtuse. Spur 3.2 x 1.5 mm, ellipsoid, acute, with cylindrical stalk.

Ambalappara, *KJD 25454, 25457, 25458, 26158*

Fl. & Fr.: July-August

Distribution: Fairly common in evergreen forests of Ambalappara and Asthippara.

Peristylus richardianus Wight, Icon. Pl. Ind. Orient. t. 1697.1851; C.E.C.Fisch. in Gamble, Fl. Madras 1474(1030). 1928; Abraham & Vatsala, Introd. Orchids 246. 1981; C.S.Kumar & Manilal, Orchid Memories 212. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 840. 2009. *Peristylus robustior* Wight, Icon. Pl. Ind. Orient. t. 1699. 1851. *Habenaria bicornuata* Hook.f., Fl. Brit. India 6: 150. 1890.

Terrestrial herbs, 20-50 cm high. Leaves 5 x 1-1.5 cm, lanceolate, acuminate. Flowers creamy, in about 15 cm long dense spike. Dorsal sepal oblong, obtuse, keeled, 1-veined; lateral sepals oblong, obtuse, keeled, 1-veined. Petals elliptic-lanceolate, obtuse, 1-veined with 2 lateral veins from the middle. Lip 6 x 18 mm, 3-lobed; lobes unequal; midlobe 3 x 1 mm, oblong, obtuse; lateral lobes 8 x 0.5 mm, linear, upcurved. Spur clavate, acute at apex.

Ambalappara, *NS & KJD 25512*

Fl. & Fr.: August-October

Distribution: Fairly common in evergreen forests of Ambalappara.

PHALAEOPSIS Blume

Bijdr. Fl. Ned. Ind. 7: 294. 1825

Phalaenopsis mysorensis C.J.Saldanha, Indian Forester 100: 571 1974.; Abraham & Vatsala, Introd. Orchids 464. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 460. 1988. *Kingidium mysorensis* (Saldanha) C.S.Kumar in C.S.Kumar & Manilal, Cat. Ind. Orchids 59.1994; Ratheesh, Fl. Stud. Wayanad Dist. 821. 2009. *Kingidium niveum* C.S.Kumar in C.S.Kumar & Manilal, Cat. Ind. Orchids 53. t.16. 1994; Ratheesh, Fl. Stud. Wayanad Dist. 821. 2009.

Epiphytic herbs. Leaves 10-15 x 3.4 cm, oblong, lanceolate, acute. Flowers white, 6-10, in 15-20 cm long racemes. Dorsal sepals 8 x 4 mm, obovate, obtuse;

lateral sepals 7 x 5 mm, ovate, acute. Petals 7.5 x 3 mm, obovate, obtuse. Lip 3-lobed, 6 x 5 mm; side lobes rounded; midlobe ovate, acute. Disc with a pair of antennae.

Paripode, *KJD 26187*

Fl. & Fr.: March-July

Distribution: Rare in plantations of Kariyenkappu and Moist deciduous forests of Paripode. Endemic to South India; conservation status: Critically endangered (Sasidharan 2017)

PHOLIDOTA Lindl. ex Hook.

Exot. Fl. 2: 138. 1825.

Pholidota imbricata Hook., Exot. Fl. t. 138. 1825; C.E.C.Fisch. in Gamble, Fl. Madras 1431(1000). 1928; Ansari, Fl. Kasaragod Div. 374. 1985; C.S.Kumar & Manilal, Orchid Memories 213. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 841. 2009. *Pholidota pallida* sensu Abraham & Vatsala, Intr. Orch. 288. 1981, non Lindl. 1836; Ramach. & V.J. Nair, Fl. Cannanore Dist. 460. 1988.

Epiphytes with crowded pseudobulbs and tufted roots. Pseudobulbs 4-6 cm long, oblong-conical, tetragonous, with large deciduous sheathing scales. Leaves 1-2 from the apex of pseudobulb, 14-25 x 3.2-5.5 cm, elliptic-oblong, base attenuate, apex acute or obtuse, coriaceous, strongly 3-nerved. Racemes drooping, axillary, 20-27 cm long. Flowers pinkish-white, hidden by imbricating, bifarious foliaceous persistent bracts; bracts to 6 x 5 mm, ovate-obtuse. Sepals subequal, to 7 x 5 mm, ovate, apex obtuse or acute, 3-nerved. Petals to 6 x 2.5 mm, linear-oblong. Lip to 8 x 8 mm, deeply saccate, sac longitudinally 3-ridged within, 3-lobed, mid-lobe bifid. Column orbicular-ovate, winged. Anthers 2-loculed, pollinia 4. Capsule ellipsoid, pendulous.

Narikkadavu, *KJD 26276*

Fl. & Fr.: September-March

Distribution: Fairly common in semi-evergreen and Moist deciduous forests of Valayamchal to Narikkadavu.

PLECTOGLOSSA (Hook.f.) K.Prasad & Venu

Rheedea. 25 (2). 88. 2015.

Plectoglossa perrottetiana (A.Rich.) K. Prasad & Venu, Rheedea. 25 (2). 88. 2015. *Habenaria perrottetiana* A.Rich., Ann. Sci. Nat. Bot. 15. 74. t.4B.1841; Hook.f., Fl. Brit. India 6: 164. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1471(1028). 1928; Abraham & Vatsala, Introd. Orchids 236. 1981; C.S.Kumar & Manilal, Orchid Memories 197. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 818. 2009. *Platanthera lutea* Wight, Icon. Pl. Ind. Orient. t. 919. 1845.

Terrestrial herbs; stem 20-50 cm high. Leaves to 7 x 3 cm, elliptic-oblong, acute. Flowers yellow, few, in about 15 cm long spike; bracts 3 x 1.7 cm, broadly elliptic, acute-apiculate, foliaceous, almost concealing the flowers. Dorsal sepal 15 x 9 mm, ovate-oblong, obtuse, 5-veined; lateral sepals 15 x 9 mm, elliptic, obtuse, 7-veined. Petals 15 x 4 mm, obliquely oblong, acute, 4-veined. Spur 15 mm long, clavate.

Ambalappara, *KJD 25499*

Fl. & Fr.: August-October

Distribution: Rare in the grasslands of Ambalappara. Endemic to South India; conservation status: Endangered (Sasidharan 2017).

PORPAX Lindl.

Edwards's Bot. Reg. 31: Misc. 66. 1845.

Porpax jerdoniana (Wight) Rolfe, *Orchid Rev.* 16: 18. 1908; C.E.C.Fisch. in Gamble, *Fl. Madras* 1422(995). 1928; Abraham & Vatsala, *Introd. Orchids* 387. 1981; C.S.Kumar & Manilal, *Orchid Memories* 214. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 844. 2009. *Lichenora jerdoniana* Wight, *Icon. Pl. Ind. Orient.* t. 1748. 1851. *Eria lichenora* Lindl., *Proc. J. Linn. Soc. Bot.* 3: 46. 1859; Hook.f., *Fl. Brit. India* 5: 787. 1890 (Plate 5c).

Small, epiphytic herbs; pseudobulbs 5-6 mm across, flat, discoid, covered by rigid net-like sheaths. Leaves 2, orbicular or ovate, yellowish-brown or green, tomentose on both sides, to 2 cm across, prominently veined. Flowers 1 or 2, between the leaves, pale-brown, sessile, terminal or lateral, 8 mm long. Calyx connate, tubular, up to 5 mm long. Petals free, included within the calyx tube. Lip with a short erect teeth at apex, 3-lobed, fleshy, articulated with the column foot. Pollinia 8, connate in two groups. Capsule 3 x 2 mm, trigonous or ovoid, tomentose, 1 or 2 from the pseudobulbs between leaves; stalk to 2 mm long.

Crossway, *KJD 26290*

Fl. & Fr.: July-August

Distribution: Rare in evergreen forests of Crossway and Narikkadavu. Endemic to Western Ghats.

PTEROCERAS Hasselt ex Hassk.

Flora 25(2 Beibl.): 6. 1842.; 6.1842.

Pteroceras leopardinum (E.C.Parish & Rchb.f.) Seidenf. & Smitinand, *Orch. Thail. (Prelim. List)* 535 1963.; Sathish., *Rheedea* 3: 173. 1993; C.S.Kumar & Manilal, *Orchid Memories* 215. 2004; Ratheesh, *Fl. Stud. Wayanad Dist.* 845. 2009. *Thrixspermum leopardinum* Parish & Rchb.f., *Trans. Linn. Soc. London*

30:145. 1874. *Sarcochilus leopardinum* (Parish & Rchb.f.) Hook.f., Fl. Brit. India 6:38. 1890. *Proteroceras holttumii* Joseph & Vajr., J. Indian Bot. Soc. 53:189. 1974 (Plate 5d).

Epiphytic herbs. Leaves 2-5, dorsoventral, 4-14.5 x 1-2 cm, linear-lanceolate to oblanceolate, sometimes slightly oblique; apex minutely bilobed. Inflorescence single or 2 superposed; bracts scale-like, broadly ovate. Flowers 3-12. Sepals and petals spreading, light orange-yellow to white with small brownish to violet dots on their adaxial side. Lateral sepals adnate to column foot, broadly ovate, oblique, sometimes slightly concave; median sepal ovate(-elliptic), often slightly concave. Petals oblong to linear-oblanceolate, apex rounded to obtuse. Lip subsessile; side lobes erect, pointing upwards or backwards; mid lobe represented by a transverse, ridge-like callus just above the spur; spur nearly cylindrical. Column subterete. Anther yellow; pollinia 4, closely appressed in two pairs. Ovary 3-keeled, glabrous. Capsule strongly 3-keeled

Kariyenkappu, *KVB 31594*

Fl. & Fr.: April-June

Distribution: Rare in evergreen forests of Kariyenkappu.

SEIDENFADENIELLA C.S.Kumar

Sathish Cat. India Orch. 47. 1994.

Seidenfadeniella sp. (Plate 5e)

Pendulous epiphytes, to 15 cm long, stem terete, green. Leaves terete, linear, acute. Flowers rosy-white, in 5-6 cm long, erect, axillary racemes. Dorsal sepal oblong, acute; lateral sepals falcately oblanceolate, 1-veined. Petals orbicular or broadly elliptic-oblong, rounded, 3-veined; lateral lobes rounded, orbicular; midlobe ovate, acute; spur rounded at base, slender; column short and broad; foot 0; pollinia 2, entire.

Pothurumi, *NS & KJD 25545*

Fl. & Fr.: December-January

Distribution: Rare in evergreen forests of Ambalappara-Pothurumi region. This species is closely allied to *S. filiformis* but differs by its flower size, colour, arrangement.

SATYRIUM Sw.

Kongl. Vetensk. Acad. Nya Handl. 21: 214. 1800, *nom. cons.*

Satyrium nepalense D.Don, Prodr. Fl. Nepal. 26: 1825; C.E.C.Fisch. in Gamble, Fl. Madras 1476(1032). 1928; Abraham & Vatsala, Introd. Orchids 210. 1981; C.S.

Kumar & Manilal, Orchid Memories 218. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 846. 2009. *Satyrium neilgherrensis* Wight ex Fyson, Fl. Ind. Hill. This 1876. 1932.

Terrestrial herbs, to 30 cm tall, with oblong tuber. Leaves 2 or 3, 5.5-14 x 3-6 cm, ovate or elliptic-lanceolate, acute or subacuminate. Flowers pink or white, in 10-35 cm long, dense terminal raceme. Dorsal sepal oblong-lanceolate, 3-veined; lateral sepals elliptic, obtuse, 5-veined. Petals oblong, obtuse, 3-veined. Lip, 21 x 6 mm, superior, concave, keeled, enclosing the column with two parallel spurs. Column erect; foot 0. Pollinia 2, with recurved caudicle.

Ambalappara, KJD 26316

Fl. & Fr.: July-September

Distribution: Fairly common in grasslands of Ambalappara.

SIRHOOKERA Kuntze

Revis. Gen. Pl. 2: 681. 1891.

Sirhookera latifolia (Wight) Kuntze, Revis. Gen. Pl. 2: 681. 1891; C.S.Kumar & Manilal, Orchid Memories 222. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 850. 2009. *Josephia latifolia* Wight, Icon. Pl. Ind. Orient. t. 1743. 1851; Hook.f., Fl. Brit. India 5: 823. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1428(999). 1928.

Epiphytes with very short stem and vermiform roots. Leaves 9-10 x 2-2.5 cm, including a petiole of 1-1.5 cm long, oblong, acute. Flowers white, in 15-20 cm long branched racemes; branches slender. Dorsal sepal obovate, obtuse, 3-veined; lateral sepals elliptic-oblong, obtuse, 3-veined. Petals oblong, obtuse, 1-veined. Lip 4 x 2 mm, 3-lobed; lateral lobes smaller, oblong, obtuse, incurved; midlobe ovate, obtuse or acute.

Ambalappara, KVB 31580

Fl. & Fr.: August-December

Distribution: Common on rocks in evergreen forests of Ambalappara.

SMITHSONIA Saldanha

J. Bombay Nat. Hist. Soc. 71: 73. 1974.

Smithsonia viridiflora (Dalz.) Saldanha, J. Bombay Nat. Hist. Soc. 71: 75. 1974 & in Saldanha & Nicolson, Fl. Hassan Dist. 851. 1976; Sathish & Manilal, Orchid Memories 223. 2004. *Micropera viridiflora* Dalz., Hooker's J. Bot. Kew. Gard. Misc. 3: 282. 1851. *Sarcochilus dalzellianus* Santapau, Kew Bull. 1949: 498. 1949. *Gastrochilus dalzellianus* (Santapau) Santapau & Kopadia, J. Bombay Nat. Hist. Soc. 59. 842. 1963. *Aerides dalzellianus* (Santapau) Garay, Bot. Mus. Leaflet. Harvard Univ. 23:158. 1972.

Epiphytes; stem very short, to 1 cm high. Leaves 3-10 x 6-15 cm, oblong or elliptic-oblong, obliquely bilobulate at apex. Flowers greenish, in 1-1.5 cm long lateral raceme. Sepals obovate, obtuse. Petals 5.5 x 2 mm, obovate, obtuse; lip 7 x 5 mm, 3-lobed; spurred; lateral lobes conical, obtuse; midlobe ovate, obtuse; spur conical, subacute.

Kattikkari, *KJD 31589*

Fl. & Fr.: October-January

Distribution: Rare in evergreen forests at Kattikkari and plantations of Kariyenkappu. Endemic to South Western Ghats; conservation status: endangered (Sasidharan 2017)

TAENIOPHYLLUM Blume

Bijdr. Fl. Ned. Ind. 6: t. 3, f. 70. 1825.

Taeniophyllum scaberulum Hook.f., Fl. Brit. India 6: 77. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1448(1013). 1928; Rajesh *et al.*, Rheedeia 7:43.1997; C.S.Kumar & Manilal, Orchid Memories 224. 2004.

Leafless epiphytic herbs, roots subterete, 5-8 x 0.1 cm. Flowers creamy white, 4 x 2 mm, in 1.5-2 cm long, flexuous spikes; bracts 0.9 x 1 mm, ovate, acute, persistent. Sepals and petals united into a 6 toothed tube; lobes ovate, acute; lip ovate, acute, tip recurved, base saccate.

Chavachi, *KJD 22527*

Fl. & Fr.: February-June

Distribution: Rare in evergreen forests of Chavachi. Endemic to southern Western Ghats.

ZEUXINE Lindl.

Coll. Bot., App. 18. 1825., *nom. cons.*

- 1a. Flowers large, 2 x 1 cm long *Z. affinis*
1b. Flowers small, 1 cm long *Z. gracilis*

Zeuxine affinis (Lindl.) Benth. ex Hook.f., Fl. Brit. India 6: 108. 1890; Sasidh. *et al.*, Rheedeia 9: 159. 1999; C.S.Kumar & Manilal, Orchid Memories 231. 2004. *Monochilus affinis* Lindl., Gen. Sp. Orchid. Pl. 487. 1840, p.p.

Terrestrial herbs, 20-30 cm tall, with a creeping rhizome, 10-15 cm long. Leaves 3-4.5 x 1-1.5 cm, ovate or elliptic, acute, with sheathing base. Flowers white, 2 x 1 cm, in about 15-25 cm long lax raceme including 10-18 cm long, hairy peduncle; bracts 6 x 1.5 mm, ovate, acuminate, pubescent outer. Dorsal

sepals and petals connated, sepals hairy dorsally; Dorsal sepal, 6 x 5 mm, ovate obtuse; lateral sepals 6 x 5mm, elliptic, obtuse. Petals 6-6.5 x 2.5 mm, falcate, oblong, obtuse. Lip 11 x 10 mm, saccate at base, with two cylindrical acute glands; epichile, 2 lobulate, lobules each 7 x 3.5-4 mm, obconical, truncate, wavy along margins. Column 5 x 2.5 mm; anther dorsal.

Ambalappara, *KJD 26339, KVB 31579*; Crossway, *NS & KJD 31915*

Fl. & Fr.: December-April

Distribution: Fairly common in evergreen forests of Ambalappara, Asthipara, Chavachi, Kattikkari and Crossway.

Zeuxine gracilis (Breda) Blume, Fl. Java, n.s. 56, t.18,f.2. t.23D.1858; Abraham & Vatsala, Introd. Orchids 205. 1981; C.S.Kumar & Manilal, Orchid Memories 231. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 856. 2009. *Psychechilos gracile* Breda., Gen. Sp. Orchid. & Asc. t. 9. 1827. *Zeuxine blatteri* C.E.C.Fisch., Bull. Misc. Inform. Kew 1928: 76. 1928; C.E.C.Fisch. in Gamble, Fl. Madras 1456(1018). 1928 (Plate 5f).

Slender terrestrial herbs. Rhizome creeping, rooting at nodes. Leaves 3-4, cauline, 2-4 x 1-1.5 cm, ovate-oblong, acute to obtuse at apex, round at base; petiole sheathing. Inflorescence terminal raceme, flowering to the upper part. Floral bracts 0.3-0.5 cm long, acuminate. Flowers 0.2-0.3 cm across, hardly opening. Sepals and petals 0.3-0.35 cm long. Lip 0.35-0.4 cm long; lateral lobes small, saccate; mid-lobe 2-fid, entire on margins. Pollinia 2. Pedicel and ovary 0.5-0.6 cm long. Capsule oblong, 0.8-1 x 0.2-0.3 cm.

Asthipara, *KJD 26087*

Fl. & Fr.: February-April

Distribution: Rare in evergreen forests of Asthippara.

ARECACEAE

- 1a. Climbing shrubs; fruits covered with scales..... Calamus
- 1b. Erect trees or shrubs; fruits not covered with scales 2
- 2a. Leaves bipinnate Caryota
- 2b. Leaves unipinnate3
- 3a. Leaflets with unequal auricle Arenga
- 3b. Leaflets with out auricle 4
- 4a. Lower leaflets modifeed in to spines; shrubs about 1m tall Phoenix
- 4b. Spines absent; shrubs more than 2 m tall..... Pinanga

ARENGA Labill.

Bull. Sci. Soc. Philom. Paris 2: 162. 1800., *nom. cons.*

Arenga wightii Griff., Calcutta J. Nat. Hist. 5: 475.1845; Becc. & Hook.f. in Hook.f., Fl. Brit. India 6:422.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1588(1087). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 489. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 894. 2009.

Monoecious palms; trunk to 6 m tall, covered with persistent leaf sheaths, caudex 10-15 m across. Leaves pinnatisect, to 8 m long; leaflets to 100 x 5 cm, linear, base auricled, glaucous below; petiole to 3 m long. Spadices to 1 m long, basipetal. Male flowers orbicular. Stamens many, free. Female flowers. Tepals 6, biseriate, similar, accrescent. Ovary 3-celled. Fruit globose.

Moonamthode, *KJD 18735*

Fl. & Fr.: July-September

Distribution: Rare in evergreen forests of Moonamthode. Endemic to Western Ghats; Conservation status: Vulnerable.

CALAMUS L.

Sp. Pl. 325. 1753.

- 1a. Culms solitary; fruits spherical, scales in 28 vertical series..... *C. tenuis*
1b. Culms clustered; fruits ovoid, scales in 12 vertical series..... *C. thwaitesii*

Calamus tenuis Roxb., Fl. Ind. ed. 1832, 3: 780. 1832; Becc. & Hook.f. in Hook.f., Fl. Brit. India 6: 447. 1894. *Calamus delessertianus* Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 276. 1908; Karthik. & Sharma, J. Bombay Nat. Hist. Soc. 80: 76. 1983; Renuka, Palms Kerala 22. 1999.

Solitary medium diameter canes; stem to 30 m or more long, 3 cm in diameter at base and 5-6 cm at the apex with sheath; 2-2.5 cm without sheaths. Leaves ca 2 m long, ecirrate; sheath dark green, spiny, spines bulbous based; petiole 50-60 cm long; rachis spiny; leaflets regular, to 55 x 2.5 cm, linear lanceolate; veins ciliated; cilia to 1.5 cm long, black tipped; leaf margins spinulose. Female inflorescence rather large; primary sheath coriaceous, tubular, closely sheathing at base, splits open slightly at the mouth, densely spiny; partial inflorescence to 30 cm long, attached inside the sheath, recurved, basal ones some times branched. Fruits spherical, 1.5 cm in diameter, stalk 3-10 mm long; scales straw yellow, spirally arranged, distinguished into 28 vertical series, deeply channelled in the middle; endosperm ruminant.

Meenmutty, *KJD 26332*

Fl. & Fr.: August-June

Distribution: Rare at evergreen forests of Meenmutty. Endemic to Western Ghats.

Calamus thwaitesii Becc. in Hook.f., Fl. Brit. India 6: 441. 1892; Ratheesh, Fl. Stud. Wayanad Dist. 896. 2009. *Calamus thwaitesii* Becc. var. *canaranus* Becc., Ann. Roy. Bot. Gard. (Calcutta) 11: 138. 1908; C.E.C.Fisch. in Gamble, Fl. Madras 1567(1093). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 490. 1988; Sivar. & Mathew, Fl. Nilambur 744. 1997 (Plate 5g).

Clustering and high climbing canes; stem to 20 m or more in length, with sheath to 6 cm in diam.; sheath armed with spines; spines arising from a raised rim-like surface, flat, black with yellow base; knee and ochrea absent; flagellum, petiole, rachis and sheath armed with stout spines in oblique whorls. Leaves 2 m long; leaflets grouped. Fruit ca. 2 x 1.3 cm, ovoid, scales in 12 vertical rows, with median grooves, yellow with brown margins.

Kariyenkappu, NS & KVB 31312

Fl. & Fr.: March-January

Distribution: Common in semi-evergreen forests of Valayamchal, Paricode and evergreen forests of Meenmutty.

CARYOTA L.

Sp. Pl. 1189. 1753.

Caryota urens L., Sp. Pl. 1189. 1753; Becc. & Hook.f. in Hook.f., Fl. Brit. India 6: 422. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1560(1089). 1931; Manilal & Sivar., Fl. Calicut 300. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 898. 2009.

Monoecious stout tall palms, 16-20 m tall, 30-50 cm diam., trunk smooth with prominent annular leaf-scars. Leaves bipinnate, 4-6 m long; pinnae 5-7 pairs, to 1.5 m long; leaflets broadly cuneate, fan-shaped, 12-20 cm long, 7-10 cm wide at wider portion, raemorse at apex, many ribbed. Spadix interfoliar, shortly peduncled, much branched, pendulous, to 4 m long; spathes few, 40-50 cm long. Flowers many, in triads with female flower in the middle. Sepals 3, rounded, imbricate. Petals linear-oblong, valvate. Stamens many. Ovary 3-celled, 3-gonous; ovule 1-per locule. Fruit c. 2 cm across, globose, reddish purple; seeds plano-convex, subreniform.

Meenmutty, KJD 22575

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Meenmutty and Chavachi.

PHOENIX L.

Sp. Pl. 1188. 1753.

Phoenix loureiroi Kunth var. **pedunculata** (Griff.) Govaerts in R.H.A.Govaerts & J.Dransfield, World Checklist Palms 171. 2005. *Phoenix pedunculata* Griff., Palms Brit. E. Ind. 139. 1850. *Phoenix humilis* Royle ex Becc. var. *pedunculata* (Griff.) Becc., J. Bot. Malesia 3: 379, 387, t. 44. ff. 13-15, 18-21. 1890; Becc. & Hook.f. in Hook.f., Fl. Brit. India 6: 427. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1560(1088). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 490. 1988. *Phoenix humilis* Becc. var. *typica* Becc., J. Bot. Malesia 3:379, 380, t. 44, 2.f. 22-24. 1890. *Phoenix robusta* Becc. & Hook.f. in Hook.f., Fl. Brit. India 6: 427. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1559(1088). 1931.

Shrub, trunk to 1 m tall. Leaves to 1.5 m long; leaflets linear-lanceolate, to 25 x 1.5 cm, lower ones modified into long spines. Male spadix to 40 cm long, branches crowded towards the apex of peduncle. Female spadix to 1 m long. Fruit oblong, orange-yellow, 1.2 x 0.7 cm.

Ambalappara, NS & KJD 25505

Fl. & Fr.: January-October

Distribution: Common in grasslands of Ambalappara.

PINANGA Blume

Rumphia 2: 76. 1839.

Pinanga dicksonii (Roxb.) Blume, Rumph. 2: 85. 1838; Becc. & Hook.f. in Hook.f., Fl. Brit. India 6:409.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1556(1086). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 491. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 899. 2009. *Areca dicksonii* Roxb., Fl. Ind. 3: 616. 1832.

Slender clustered palms, 4-6 m high, 6-8 cm diam. Leaves pinnate, 1-1.3 m long; leaflets 2-3 united, 30-50 cm long, 2-3 cm wide, toothed margins. Spadix small, at axil below the crown, 4-6 branched, deflexed and drooping. Spathe 1. Flowers unisexual, 3 at a node, middle female and side ones male. Male: Sepals keeled. Petals valvate, 0.2-0.3 cm, ovate lanceolate. Stamens 6. Female: sepals and petals orbicular, 0.1 cm; staminodes 6. Ovary 1-celled; ovule 1. Fruit 0.6-1 x 0.2-0.3 cm, ellipsoid; seed solitary, ellipsoid.

Kattikkari, KJD 31880

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Kattikkari. Endemic to Western Ghats.

Order: **Commelinales**

COMMELINACEAE

- 1a. Epiphytic herbs; branches prostrate Belosynapsis
- 1b. Terrestrial herbs, 2
- 2a. Petals united into a tube..... Cyanotis
- 2b. Petals free 3
- 3a. Cymes paniced 4
- 3b. Cymes enclosed in spathaceous bracts Commelina
- 4a. Fertile stamens 6 Floscopa
- 4b. Fertile stamens 2 or 3..... 5
- 5a. Cells of ovary 2-many ovuled Murdannia
- 5b. Cells of ovary 1-ovuled.....6
- 6a. Capsule pubescent; staminodes 2 Rhopalephora
- 6b. Capsule glabrous; staminodes absentDictyospermum

BELOSYNAPSIS Hassk.

Flora 4: 259. 1871.

Belosynapsis vivipara (Dalzell) C.E.C.Fisch., Bull. Misc. Inform. Kew 1928: 252. 1928 & Fl. Madras 1551(1082). 1931; Ratheesh, Fl. Stud. Wayanad Dist. 885. 2009. *Cyanotis vivipara* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 226. 1851; Hook.f., Fl. Brit. India 6: 388. 1892 (Plate 5h).

Epiphytic herbs with creeping branches; 5-15 cm high; stem hirtus. leaves basal and cauline, basal larger, to 10 x 1.5 cm, oblong-lanceolate, densely villous below, glabrous above; sheath tubular, densely hairy. Cymes sessile, few, along the creeping branches; bracteoles absent. Flowers few together. Sepals 3, free, 1.5 x 1.5 mm, elliptic, acute, hairy. Petals 3, free, 3 x 1.5 mm, obovate, acute, pink. Stamens 6, filaments beard. Ovary obovate, hairy, 3-celled, 2-ovules in each cell. Capsule 6-seeded.

Kattikkari, NS & KJD 31909; Ambalappara, KJD 25443

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Kattikkari, Mullenpara and Ambalappara. Endemic to Western Ghats; Conservation status: Vulnerable (Sasidharan 2017).

COMMELINA L.

Sp. Pl. 40. 1753.

- 1a. Capsule 3 celled *C. paludosa*
- 1b. Capsule 2 celled 2
- 2a. Spathe auricled at one side, hairy *C. benghalensis*
- 2b. Spathe not auricled, glabrous..... *C. clavata*

Commelina benghalensis L., Sp. Pl. 41. 1753; Hook.f., Fl. Brit. India 6: 370. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1539(1075). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 481. 1988; Manilal & Sivar., Fl. Calicut 297. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 886. 2009.

Diffuse herbs, rooting at lower nodes; rootstock with cleistogamous flowers. Leaves 3-5 x 2-3.5 cm, ovate or elliptic-ovate, base rounded or subtruncate, apex obtuse or acute, pubescent, margin ciliate; petiole to 8 mm long; sheath to 1.5 cm long, apex with rufous hairs. Spathe 1.5 cm across, funnel-shaped, truncate at apex, pubescent. Sepals subequal, c. 2.5 mm long; outer ones linear; inner ones orbicular. Petals blue, larger ones c. 4 x 4.5 mm, broadly ovate. Stamens 3; staminodes 2. Ovary to 1mm long. Capsule to 5 mm long, ellipsoid, 3-celled; seeds 5, pitted.

Paripode, *KJD 25575*

Fl. & Fr.: July-November

Distribution: Fairly common in semi-evergreen forests of Paripode.

Commelina clavata C.B.Clarke, Commelyn. Cyrtandr. Bengal. t. 5. 1874; Hook.f., Fl. Brit. India 6: 371. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1539(1074). 1931 (Plate 5i).

Herbs. Leaves to 9 x 1 cm, lanceolate, apex acute, base slightly cordate, sheath to 2 cm, open, long ciliate. Cymes axillary; peduncles to 5 cm, spathe 4.5 x 2 cm, broadly ovate, acuminate, base cordate. Sepals 5 mm, cucullate; inner 2, smaller. Petals 9 mm, obovate. Stamens 3, filaments 8 mm, hairy; staminodes 3. Ovary 2 mm, style 6 mm, stigma globose. Capsule 2-celled, constructed at the middle; seeds 4, 2 mm, pitted.

Ambalappara, *KJD 25434*

Fl. & Fr.: September-June

Distribution: Common in the grasslands of Ambalappara.

Commelina paludosa Blume, Enum. Pl. Jav. 1: 2. 1827; Ramach. & V.J. Nair, Fl. Cannanore Dist. 482. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 887. 2009. *Commelina obliqua* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 45. 1825, nom. illeg.; Hook.f., Fl. Brit. India 6: 372. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1539(1075). 1931. *Commelina polyspatha* Wight, Icon. Pl. Ind. Orient. Pl. Ind. Or. t. 2066. 1853.

Diffuse herbs. Leaves 8-13 x 3-4 cm, lanceolate, apex acute or acuminate, base narrowed, scabrous or softly villous; sheaths to 2 cm, mouth rufous haired. Spathes to 2 x 1.5 cm, infundibular, base cordate, solitary in terminal heads.

Flowers to 1 cm across, blue. Sepals unequal. Petals obovate. Stamens 3; staminodes 3. Ovary 3-celled, 3-ovuled. Capsule 4 mm, trigonous, 3-seeded.

Near Farm, KVB 31301; Meenmutty, KVB 31338

Fl. & Fr.: November-January

Distribution: Fairly common in evergreen forests of Meenmutty, Valayamchal, Kattikkari and plantations of Kariyenkappu.

CYANOTIS D.Don

Prodr. Fl. Nepal. 45. 1825, *nom. cons.*

- 1a. Plants with cottony or silky hairs *C. thwaitesii*
- 1b. Plants with out cottony or siky hairs 2
- 2a. Root stock woody..... *C. arachnoidea*
- 2b. Root stock not woody..... 3
- 3a. Cymes enclosed in leaf sheaths *C. axillaris*
- 3b. Cymes not enclosed in leaf sheaths 4
- 4a. Stem strongly hirsute or villous 5
- 4b. Stem glabrous or with spreading hairs or line hairs below internodes..... 6
- 5a. Stem hirsute, roots tuberous..... *C. tubrosa*
- 5b. Stem villous, roots not tuberous..... *C. villosa*
- 6a. Capsules puberulous at apex, seeds ovoid-ellipsoid *C. lanceolata*
- 6b. Capsules almost glabrous, seeds trigonus..... *C. cristata*

Cyanotis arachnoidea C.B.Clarke in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 250. 1881; Hook.f., Fl. Brit. India 6: 386. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1550(1081). 1931; Nandikar & Gurav, Taiwania, 59(4): 294. 2014. *Cyanotis obtusa* (Trim.) Trim., Handb. Fl. Ceylon 4: 812 1898. *Cyanotis arachnoidea* var. *obtusum* Trim., J. Bot. 23: 266 1885.

Herbs, perennial, creeping; rhizomes absent. Leaves alternate. Cincinni sessile, subtended by spathe-like involucral bracts; bracts imbricate, 2-seriate, falcate curved. Flowers actinomorphic. Sepals 3, free or connate only at the base. Petals 3, connate and tubular in the middle, free at both ends, purple, blue, or white, linear-lanceolate. Stamens 6, all fertile, equal; filaments lanate, rarely glabrous; anther locules longitudinally dehiscent. Ovary 3-loculed; ovules 2 per locule. Capsule 3-valved, obovoid-or broadly oblong, trigonous; seeds 1 or 2 hilum at adjoining end of 2 seeds.

Ambalappara, KJD 25481

Fl. & Fr.: July-November

Distribution: Rare in the grasslands of Ambalappara.

Cyanotis axillaris (L.) D.Don, Prodr. Fl. Nepal. 46.1825; Hook.f., Fl. Brit. India 6:388.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1550(1082). 1931; Ratheesh, Fl. Stud. Wayanad Dist. 888. 2009; Nandikar & Gurav, Taiwania, 59(4): 295. 2014. *Commelina axillaris* L., Sp. Pl. 42. 1753. *Tonningia axillaris* (L.) Kuntze, Revis. Gen. Pl. 2: 722. 1891; Ramach. & V.J. Nair, Fl. Cannanore Dist. 488. 1988; Joseph, Aquatic Angiosp. Malabar 299. 1991. *Amischophacelus axillaris* (L.) Rao & Kammathy, J. Linn. Soc. Bot. 59. 306. 966; Manilal & Sivar., Fl. Calicut 299. 1982; Ansari, Fl. Kasaragod Div. 393. 1985.

Fleshy decumbent, glabrous herbs, rooting at lower nodes, often purple-suffused. Leaves 3-7 x 0.5-0.8 cm, linear, apex acute or acuminate; sheath to 7 mm long, mouth ciliate. Inflorescence in axillary cymose clusters, enclosed within the leaf sheath; bracteoles 1-2 mm long, linear. Flowers 6-7 mm across. Sepals 3, lanceolate. Petals 3, connate at middle, blue; tube to 3 mm, ovate. Stamens 6; filaments pink with purple pilose hairs. Ovary c. 1.5 mm, woolly, 3-celled; ovules 2 per cell on axile placentae; style c.1.5 mm long, pilose; stigma 3-fid. Capsule 5-6 mm long, oblong, apex beaked; seeds 6, c. 2 mm, oblong, pitted.

Narikkadavu, *KJD 26111*

Fl. & Fr.: August-December

Distribution: Fairly common along streams in semi-evergreen forests of Narikkadavu and Pookundu.

Cyanotis cristata (L.) D.Don, Prodr. Fl. Nepal. 46. 1825; Hook.f., Fl. Brit. India 6: 385. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1549(1081). 1931; Manilal & Sivar., Fl. Calicut 298. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 483. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 889. 2009; Nandikar & Gurav, Taiwania, 59(4): 299. 2014. *Commelina cristata* L., Sp. Pl. 42. 1753.

Fleshy, robust herbs. Leaves 2-8 x 0.8-2.5 cm, ovate-oblong, base rounded or cordate, apex obtuse or acute, sparsely ciliate on margins; sheath loose, to 8 mm long, hispid. Cymes mostly terminal, recurved, 2-2.5 x 1-1.5 cm, solitary, peduncle 2-6 cm long; bracts 2.5-5 x 1-2.2 cm, leaf-like; bracteoles 0.7-1 cm long, falcately ovate, sparsely ciliate on margins. Flowers 6-7 mm across. Sepals 3, connate below 2-2.5 mm long, hirsute. Petals 3, often united at middle, pale blue to purple, 6 mm long. Stamens 6; staminal filaments bearded, violet. Ovary globose, hairy at apex. Capsule 2-3 mm long, subglobose; seeds c. 1 mm, trigonous, with 2 large pits on either side.

Pothurumi, *KVB 31631*

Fl. & Fr.: July-October

Distribution: Common in evergreen forests of Pothurumi, Chavachi, Kattikkari, Mullenpara, Kannadivechakunnu, Moonamthode and semi-evergreen forests of Paripode.

Cyanotis lanceolata Wight, Icon. Pl. Ind. Orient. 6: 33: t. 2085. 1853. *Cyanotis racemosa* Heyne ex Hassk., Commelin. Ind. 125. 1870; Santhosh Nampy & Joby Paul, Rheedeia 21: 8. 2011; Nandikar & Gurav, Taiwania, 59(4): 305. 2014.

Perennial herbs, rooting at lower nodes. Leaves distichous, 3.7-9.5 x 0.8-1.8 cm, cuneate at base, appressed ciliate at margins, acuminate at apex; sheaths to 1.5 cm long, densely sericeous or pilose; mouth long ciliate. Inflorescence clustered at the ends of shoots; bracteoles ovate to lanceolate, falcate, ciliate at margins, acuminate at apex. Sepals 3, oblanceolate. Petals 3, united at middle base, white. Stamens 6, exceeding the corolla; filaments swollen subapically, densely bearded. Ovary oblong, densely tomentose at apex; style glabrous with a fusiform subapical swelling. Capsules 3-loculed; two locules with 2 seeds, one with 1 seed.

Meenmutty, KJD 25401

Fl. & Fr.: December-March

Distribution: Rare in evergreen forests of Meenmutty.

Cyanotis thwaitesii Hassk., Commelin. Ind. 136 1870. *Cyanotis arachnoidea* var. *thwaitesii* (Hassk.) R.S.Rao & Kammathy, Bull. Bot. Surv. India 6: 2. 1964. *Cyanotis fasciculata* var. *thwaitesii* (Hassk.) C.B.Clarke, Monogr. Phan. 3: 254. 1881 (Plate 5j).

Perennial herbs, prostrate, densely covered with white-cottony hairs. Leaves ovate to linear-lanceolate, cottony hairy. Cymes terminal; peduncle 4 cm long; bracts 1.7 x 1 cm, ovate, acute, hairy; bracteoles curved, densely cottony hairy. Flowers densely packed. Sepals 3, 6 x 1.5 mm, united at the base, densely long hairy. Petals 3, united at middle, triangular, acute. Stamens 6, bearded with hairs filaments 12 mm long, bearded. Ovary densely hairy at apex; style bearded. Capsule 2.5 mm long, oblong, hairy; seeds transversally rugose, black.

Ambalappara, KJD 25506

Fl. & Fr.: July-November

Distribution: Common in evergreen forests of Ambalappara.

Note: The present collection from the Sanctuary is a new record of occurrence to Kerala.

Cyanotis tuberosa (Roxb.) Schult.f., Syst. Veg. 7:1153.1830; Hook.f., Fl. Brit. India 7:386.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1549(1081). 1931; Nandikar & Gurav, Taiwania, 59(4): 305. 2014. *Tradescantia tuberosa* Roxb., Pl. Coromandel t. 108. 1799. *Cyanotis concanensis* Hassk., Commelin. Ind. 114.

1870; Vajr., Fl. Palghat Dist. 519. 1990. *Cyanotis sahyadrica* Blatt., J. Bombay Nat. Hist. Soc. 33: 77. 1928.

Perennial herbs with tuberous roots; stem hairy on one side. Leaves basal, 20-35 x 1.5 cm, oblong, acute, margin white, serrulate, glabrous; cauline leaves much smaller. Cymes terminal, umbellate, 2-5 together, curved; bracts 2-2.5 x 0.7 cm, ovate, hairy; bracteoles numerous, 8 x 3 mm, falcate, hairy along the margins, many. Flowers many. Sepals 3, 7 x 2 mm, oblanceolate, hairy. Petals 3, united at middle, acute, violet. Stamens 6; staminal filaments bearded on upper part; style bearded and bulged below stigma. Capsule ovoid, pilose above; seeds faintly rugose, black.

Ambalappara, KJD 25509

Fl. & Fr.: October-December

Distribution: Fairly common in grasslands of Ambalappara. Endemic to Peninsular India.

Cyanotis villosa (Spreng.) Schult.f., Syst. Veg. 7: 1155. 1830; Hook.f., Fl. Brit. India 6: 387. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1540(1081). 1931; Nandikar & Gurav, Taiwania, 59(4): 308. 2014. *Tradescantia villosa* Spreng., Syst. Veg. 2: 116. 1825. *Cyanotis lanceolata* Wight, Icon. Pl. Ind. Orient. t. 2085. 1853 (Plate 5k).

Erect or procumbent herbs; stem terete, villous. Leaves 2-8 x 0.8-2 cm, ovate, cordate at base, villous above and below, sessile; sheath tubular, thickly villous. Cymes terminal and upper axillary, sessile; bracts 1.2 cm long, ovate-lanceolate, villous; bracteoles ovate, curved, ciliate along the margins. Flowers few. Sepals 3, 6-7 mm long, free, lanceolate, keel ciliate. Petals 3, united at middle and forms tube, tube 6-7 mm long, lobes 4 mm long, obtuse, blue with red glands. Stamens 6; filaments 11 mm long, bearded; style dilated below the stigma. Capsule 2-3 mm long, hairy at apex; seeds paired.

Meenmutty road, KJD 31514

Fl. & Fr.: November-January

Distribution: Rare in evergreen forests of Meenmutty and Kurumbankallu.

DICTYOSPERMUM Wight

Icon. Pl. Ind. Orient. 6: 29, t.t. 2069, 2071. 1853.

- 1a. Panicle longer than leaves *D. montanum*
1b. Panicle shorter than leaves..... *D. ovalifolium*

Dictyospermum montanum Wight, Icon. Pl. Ind. Orient. t. 2069. 1853; Ramach. & V.J.Nair, Fl. Cannanore Dist. 484. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 890. 2009. *Aneilema montanum* (Wight) Thwaites, Enum. Pl. Zeyl. 322. 1864; Hook.f., Fl. Brit. India 6:382.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1546(1079). 1931.

Herbs. Leaves clustered towards apex of stem, 5-13 x 2.5-5 cm, elliptic-lanceolate, base narrowed, apex acuminate; petiole to 1.5 cm long; sheath to 3 cm long. Panicles terminal, 8-17 cm long, covered with hooked hairs; bracts leafy. Flowers 8-10 mm across; pedicels 4-7 mm long. Sepals 3, 3-4 x 2-3 mm, obovate, obtuse, concave. Petals 3, white, 5-6 x 3-4 mm, ovate, obtuse. Stames 3; filaments 2-3 mm long; staminodes 0. Ovary 3-celled; c. 1.5 mm long; ovule 1 in each cell; style c.2 mm long. Capsule 2-3 mm across, globose, glabrous; seeds hemispheric, rugose.

Paripode, *KJD 25411*; Pothanplavu, *KJD 26185*

Fl. & Fr.: July-October

Distribution: Fairly common in semi-evergreen forests of Paripode and Pothanplavu. Endemic to Peninsular India.

Dictyospermum ovalifolium Wight, Icon. Pl. Ind. Orient. t. 2070. 1853; Ramach. & V.J. Nair, Fl. Cannanore Dist. 484. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 890. 2009. *Aneilema ovalifolium* (Wight) Bedd. in H.B.Grigg (ed.), Man. Nilagiri Distr.: 122. 1880; Hook.f., Fl. Brit. India 6: 328. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1546(1079). 1934 (Plate 5l).

Herbs; erect or decumbent at base. Leaves to 15 x 5 cm, scattered, upper ones verticillate, usually sessile, elliptic, acuminate, base acute, glabrous; sheath 2 cm long, glabrous; mouth oblique. Panicle pyramidal, congested; branches and pedicels recurved, puberulus. Flowers in a group of 3-6. Sepals 3, free, 3 x 2 mm, obovate, obtuse, glabrous. Petals 3, free, 3 x 2 mm, pale blue with red nerves. Stamens 3, filaments naked. Ovary 3-celled; style c. 2 mm long. Capsule 7 x 5 mm, globose.

Chavachi, *KJD 31802*

Fl. & Fr.: October-December

Distribution: Rare in evergreen forests of Chavachi. Endemic to Western Ghats; Conservation status: Vulnerable (Sasidharan 2017).

FLOSCOPA Lour.

Fl. Cochinch. 1: 192. 1790

Floscopa scandens Lour., Fl. Cochinch. 193. 1790; Hook.f., Fl. Brit. India 6: 390. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1552(1083). 1931; Ansari, Fl. Kasaragod Div. 394. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 485. 1988;

Ratheesh, Fl. Stud. Wayanad Dist. 890. 2009. *Dithyrocarpus rothii* Wight, Icon. Pl. Ind. Orient. t. 208. 1839.

Creeping or suberect marshy herbs; stem terete, pubescent along one line. Leaves scattered, 5-10 x 2-1.5 cm, elliptic-lanceolate, acuminate, acute at base, glabrous; sheath tubular, mouth oblique, hairy. Panicle 3-6 cm long; axis and branches pubescent. Flowers many, 3-5 mm across, regular, bisexual. Sepals 3, 3 x 2 mm, ovate, pubescent. Petals 3, 3 x 2 mm, obovate, glabrous, rose coloured. Stamens 6, filaments free, glabrous; anthers small, obtuse, with broad connective. Ovary 3-celled; ovule solitary in each cell. Capsule broadly ovoid; seeds elliptic, wrinkled, grey.

Ambalappara, KVB 31584

Fl. & Fr.: January-December

Distribution: Fairly common in evergreen forests of Ambalappara and plantations of Kariyenkappu near rivers or streams.

MURDANNIA Royle

Ill. Bot. Himal. Mts. t. 95. 1839, *nom. cons.*

- 1a. Seeds one seriate in each cell 2
- 1b. Seeds two seriate in each cell6
- 2a. Cells of the ovary 2 or 3 ovuled..... 3
- 2b. Cells of the ovary 3-many ovuled..... 4
- 3a. Fertile branches arise from base of vegetative leaves 4
- 3b. Fertile branches arise from terminal or axillary leaves..... *M. nudiflora*
- 4a. Fertile branches one or two, panicle cymose..... *M. simplex*
- 4b. Fertile branches two or more, panicle or subcapitate *M. loriformis*
- 5a. Inflorescence on leafy erect stems, dichotomously branched..... *M. japonica*
- 5b. Inflorescence axillary or terminal..... 5
- 6a. Inflorescence branched panicles *M. spirata*
- 6b. Inflorescence cymes..... *M. pauciflora*
- 7a. Flowers few, axillary, clustered *M. lanuginosa*
- 7b. Flowers in terminal panicle *M. semiteres*

Murdannia japonica (Thunb.) Faden, Taxon 26: 142. 1977; Ramach. & V.J. Nair, Fl. Cannanore Dist. 486. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 892. 2009. *Commelina japonica* Thunb., Trans. Linn. Soc. London 2: 332. 1794. *Aneilema lineolatum* Kunth, Enum. Pl. 4: 69. 1843; Hook.f., Fl. Brit. India 6: 370. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1544(1078). 1931. *Aneilema latifolium* Wight, Icon. Pl. Ind. Orient. t. 2072. 1853.



a. *Habenaria longicornu*



b. *Oberonia wynadensis*



c. *Porpax jerdoniana*



d. *Pteroceras leopardinum*



e. *Seidenfadeniella* sp.



f. *Zeuxine gracilis*



g. *Calamus thwaitesii*



h. *Belosynapsis vivipara*



i. *Commelina clavata*



j. *Cyanotis thwaitesii*



k. *Cyanotis villosa*



l. *Dictyospermum ovalifolium*

Obliquely erect stout herbs; roots tuberous; stem rounded, smooth. Leaves to 23 x 6 cm basal and cauline, ovate, acute at apex, cordate at base, glabrous, coriaceous, sessile; cauline leaves smaller. Panicle to 20 x 10 cm, terminal, lax. Flowers 12 mm across, solitary or 2-3 together, pedicelled. Sepals 3, 4-5 x 2 mm, oblong-obtuse, red-glandular. Petals 3, white, 6 x 4 mm, obovate, obtuse, pale blue or white. Stamens 3, filaments bearded; staminodes 2-lobed, bearded. Capsule globose, beaked; seeds 2 x 1 mm, trigonous, with two round markings, tuberculate or reticulate, dark brown.

Chullikandam, *KJD 26102*

Fl. & Fr.: May-September

Distribution: Rare in Moist deciduous forests of Chullikandam-Narikkadavu area.

Murdannia lanuginosa (Wall. ex C.B.Clarke) G.Brückn. in H.G.A.Engler, Nat. Pflanzenfam. ed. 2. 15a: 173. 1930; Ramach. & V.J. Nair, Fl. Cannanore Dist. 486. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 892. 2009. *Aneilema lanuginosum* Wall. ex C.B.Clarke in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 2: 319. 1879 3: 214. 1881; Hook.f., Fl. Brit. India 6: 380. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1545(1079). 1931.

Erect or suberect, branched herbs. Leaves 3-6 x 0.4-0.8 cm, cauline, alternate, oblong-lanceolate or lanceolate, margin undulate, apex acute or shortly acuminate, base rounded, more or less amplexicaule, prominently striate, hairy; sheath 8-12 mm long, hairy. Flowers 5-6 mm long, 1 or 2, axillary to the upper leaf-sheaths. Sepals 3, free, slightly unequal, 6 x 2 mm, elliptic-oblong, subacute, straw-coloured, persistent. Petals 3, free, orange-yellow, bluish when dry, obovate, slightly longer than calyx lobes. Fertile stamens 3; filaments bearded; anthers 2-celled; staminodes 3. Capsule 5-7 mm long, oblong, trigonous, cuspidate with persistent style, 3-celled; seeds 3 or more, angular, pitted.

Ambalappara, *KJD 25442*

Fl. & Fr.: August-December

Distribution: Rare in grasslands of Ambalappara. Endemic to Peninsular India; Conservation status: Vulnerable (Sasidharan 2017).

Murdannia loriformis (Hassk.) R.S.Rao & Kammathy, Bull. Bot. Surv. India 3: 393. 1961. *Aneilema loriformis* Hassk., Pl. Jung. 143. 1852. *Aneilema terminale* Wight, Icon. Pl. Ind. Orient. t. 2076. 1853.

Herbs perennial, roots fibrous. Main stem undeveloped, fertile stem 1-5, arising from below the main stem, glabrous or puberulent on 1 side. Basal leaves

linear, 5-15 x 0.5-1 cm. Inflorescence terminal on fertile branches, solitary or 2 to 5 forming a panicle or subcapitate; involucral bracts leaflike but smaller than leaves. Pedicels slightly curved 2.5-4 mm. Sepals 3, free, ovate elliptic, herbaceous. Petals 3, free, violet-blue, obovate-orbicular. Fertile stamens 2, staminodes 3. Capsules ovoid-globose, trigonous, seeds 2 per lobe.

Kariyenkappu, *KJD 31829*

Fl. & Fr.: September-December

Distribution: Rare in plantations of Kariyenkappu.

Murdannia nudiflora (L.) Brenan, Kew Bull. 1952: 189. 1952; Manilal & Sivar., Fl. Calicut 296. 1982; Ansari, Fl. Kasaragod Div. 395. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 486. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 893. 2009. *Commelina nudiflora* L., Sp. Pl. 41. 1753. *Aneilema nudiflorum* (L.) R.Br., Prodr. 271. 1810; Hook.f., Fl. Brit. India 6: 378. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1545(1078). 1931.

Procumbent herbs; rooting at lower nodes. Leaves sessile, 6-11 x 0.5-1.2 cm, linear or linear-lanceolate, base rounded, apex acute or acuminate; sheath to 1.2 cm long, margin ciliate. Flowers in terminal and axillary few-flowered, subglobose or subcorymbose panicles. Sepals 3, 2 mm long, oblong, obtuse. Petals 3, 2-2.5 mm long, oblong, acute, bluish-purple. Stamens 3; Staminal filaments bearded; staminodes 3 with filaments bearded or not. Ovules 2 in each cell. Capsule 2.5-3.7 mm across, globose; seeds 2-per locule, c.1 mm, cuboid, deeply pitted.

Kariyenkappu, *KJD 31830, 31865, 31803*

Fl. & Fr.: September-December

Distribution: Common in plantations of Kariyenkappu and semi-evergreen forests of Paripode.

Murdannia pauciflora (G.Brückn.) G.Brückn. in H.G.A.Engler, Nat. Pflanzenfam. ed. 2, 15a: 173. 1930; Ramach. & V.J. Nair, Fl. Cannanore Dist. 487. 1988. *Phaeneilema pauciflorum* G.Brückn., Notizbl. Bot. Gart. Berlin-Dahlem 10: 56. 1927. *Aneilema pauciflorum* Wight, Icon. Pl. Ind. Orient. t. 2077. 1853, *nom. illeg.*; Hook.f., Fl. Brit. India 6: 378. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1545(1078). 1931. *Murdannia wightii* R.S.Rao & Kammathy, Notes Roy. Bot. Gard. Edinb. 25: 184. 1964; Manilal & Sivar., Fl. Calicut 295.1982; Ansari, Fl. Kasaragod Div. 397. 1985.

Decumbent, spreading herbs; rooting at lower nodes. Leaves 2-3 x 1-1.5 cm, ovate-lanceolate, base rounded or cordate, apex acute; sheath 5 mm long, hairy.

Flowers 1-4 in axillary and terminal cymes, 4-5 mm across; pedicels to 1 cm long, usually deflexed in fruits. Sepals 3, c. 3 mm long, oblong, acute. Petals brownish-yellow, oblong, acute. Fertile stamens 3, filaments glabrous; staminodes 3. Capsule 4-5 mm long, oblong-fusiform, subtrigonus, acute; seeds 4-6 in each cell, 1-seriate, black, sparsely pitted.

Kariyenkappu, *KJD 31862*

Fl. & Fr.: September-November

Distribution: Rare in plantations of Kariyenkappu, near streams.

Murdannia semiteres (Dalzell) Santapau, Poona Agric. Coll. Mag. 41(4): 15. 1951; Manilal & Sivar., Fl. Calicut 296. 1982; Ansari, Fl. Kasaragod Div. 396. 1985. *Aneilema semiteres* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 138. 1851. *Aneilema paniculatum* Wall. ex C.B. Clarke, In A.L.P.P. de Candolle & A.C.P. de Candolle, Monogr. Phan. 2: 319. 1879 3: 215. 1881, *nom. illeg.*; C.E.C. Fisch. in Gamble, Fl. Madras 1546(1079). 1931. *Dichaespermum juncooides* Wight, Icon. Pl. Ind. Orient. t. 2073. 1853.

Erect tufted slender herbs. Leaves 4-13 x 0.1-0.3 cm, linear, filiform, semiterete, apex acuminate. Panicles terminal, lax, longer than leaves, branches capillary; peduncles reddish, 8-20 cm long. Flowers blue; pedicels filiform; bracts minute, ocreate. Sepals 3, obovate, acute. Petals 3, blue, 2-4 mm long, obovate, apex somewhat 3-lobed. Stamens 3, staminal filaments naked. Ovary glabrous; ovules 2-seriate in each cell. Capsule 2-3 mm long, subglobose or ovoid, angular; seeds 2-seriate, 6-8 in each cell, smooth, compressed.

Ambalappara, *KJD 25502*

Fl. & Fr.: October-December

Distribution: Fairly common in evergreen forests of Ambalappara, Kattikkari, Mullenpara and Asthippara. Endemic to Peninsular India.

Murdannia simplex (Vahl) Brenan, Kew Bull. 1952: 186. 1952. *Commelina simplex* Vahl, Enum. Pl. 2: 177. 1805. *Aneilema sinicum* Ker-Gawl. in Edgew., Edwards's Bot. Reg. t. 659. 1822; Hook.f., Fl. Brit. India 6:379. 1892; C.E.C. Fisch. in Gamble, Fl. Madras 1545(1078). 1931. *Aneilema secundum* Wight, Icon. Pl. Ind. Orient. t. 2075. 1853.

Suberect herbs; roots tuberous; stem 40-65 cm high, terete, glabrous. Leaves basal and cauline, 10-20 x 1-1.5 cm, linear-lanceolate, acute; cauline leaves smaller; sheath open, 2 cm long, ciliate. Cymes to 8 cm long, terminal, paniced; peduncle to 8 cm long. Flowers 5-20 in a cymes; pedicel 5-6 mm long. Sepals 3, 6

x 3 mm, elliptic, acute at apex. Petals 3, 8 x 5 mm, obovate, obtuse, narrow. Stamens 3; staminodes 3, yellow, 3-lobed. Capsule 6.5 x 3 mm, ellipsoid, acute, beaked; seeds 3 x 2 mm, ellipsoid, rugose, brown.

Ambalappara, KJD 25462

Fl. & Fr.: September-November

Distribution: Rare in grasslands of Ambalappara.

Murdannia spirata (L.) G.Brückn. in H.G.A.Engler, Nat. Pflanzenfam. ed. 2, 15a: 173. 1930; Manilal & Sivar., Fl. Calicut 296. 1982; Ansari, Fl. Kasaragod Div. 396. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 487. 1988. *Commelina spirata* L., Mant. Pl. 2: 176. 1771. *Aneilema spiratum* (L.) Sweet, Hort. Suburb. London 12: 1808; Hook.f., Fl. Brit. India 6: 377. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1546(1078). 1931.

Erect or diffuse herbs with fibrous roots. Leaves 1-4 x 0.5-1.2 cm, ovate-lanceolate, base cordate and semi-amplexicaule, apex acute; sheath c.1 cm long, ciliate at mouth. Flowers c. 6 mm across, in few-flowered terminal and axillary panicles; bracts to 2 mm long, ovate; pedicel 3-5 mm long, filiform. Sepals 3, 3-3.5 mm long, ovate-oblong. Petals 3, bluish or violet, 3-4 mm long, oblong. Fertile stamens 3, filaments bearded; staminodes 2. Ovules 3 in each cell. Capsule 4-5 mm long, oblong, trigonous; seeds 3 in each cell, c. 1 mm, angular, cuboid, rugose, light brown.

Kariyenkappu, KJD 31863, 31864

Fl. & Fr.: August-November

Distribution: Fairly common in plantations at Kariyenkappu.

RHOPALEPHORA Hassk.

Bot. Zeitung (Berlin) 22: 58. 1864.

Rhopalephora scaberrima (Blume) Faden, Phytologia 37: 480. 1977. *Commelina scaberrima* Blume, Enum. Pl. Jav. 1: 4. 1827. *Aneilema scaberrimum* (Blume) Kunth, Enum. Pl. 4:69.1843; Hook.f., Fl. Brit. India 6:382.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1546(1079). 1931; Ansari, Fl. Kasaragod Div. 393. 1985. *Dictyospermum scaberrimum* (Blume) Morton ex Panigrahi, Phytologia 29: 338. 1974 (1975). *Aneilema scaberrimum* var. *fruticosum* C.B.Clarke in Hook.f., Fl. Brit. India 6: 383. 1892.

Erect herbs, to 1 m tall. Leaves scattered, oblong-lanceolate, acuminate, base rounded, narrowed into a petiole, hispid above and glabrous below, to 15 x 3.5 cm, sheath hispid, to 2.5 cm long. Panicle terminal, glandular pubescent. Flowers blue, 0.8 cm across. Sepals 3, basally connate. Petals 3, hyaline. Stamens 3.

Ovary 3-celled; ovule 1 in each cell. Capsule globose, pubescent 3.5 mm across; seeds planoconvex, glandular.

Paripode, *KJD 25415*; Moonamthode, *KJD 31842*

Fl. & Fr.: July-September

Distribution: Common in semi-evergreen forests of Paripode; evergreen forests of Moonamthode, etc.

CYPERACEAE

- 1a. Florets unisexual 2
- 1b. Florets bisexual 4
- 2a. Nut enclosed in utricule..... Carex
- 2b. Nut not enclosed in utricule 3
- 3a. Spikelets bisexual, female flower terminal Hypolytrum
- 3b. Spikelet uni sexual, female flower basal Scleria
- 4a. Hypogynous bristles present Schoenoplectus
- 4b. Hypogynous bristles absent..... 5
- 5a. Style base not continuous with nut 6
- 5b. Style base continuous with nut 7
- 6a. Style base dilated and constricted above the nut..... Fimbristylis
- 6b. Style base deciduous, leaving a tumor on nut Bulbostylis
- 7a. Rachilla persistent 8
- 7b. Rachilla deciduous 9
- 8a. Nut trigonous, stigmas 3 Cyperus p.p
- 8b. Nut biconvex, stigmas 2 Pycurus
- 9a. Keels of nut bearing glumes usually winged Kyllingia
- 9b. Keels of nut bearing glumes not winged or serrulate Cyperus p.p.

BULBOSTYLIS DC.

Prodr. 5: 138. 1836.

Bulbostylis barbata (Rottb.) Kunth ex C.B.Clarke in Hook.f., Fl. Brit. India 6: 651. 1893; Gamble, Fl. Madras 1662(1153). 1931; Manilal & Sivar., Fl. Calicut 327. 1982; Ansari, Fl. Kasaragod Div. 413. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 499. 1988; Rejani, Cyperac. Kerala 80.1991; Ratheesh, Fl. Stud. Wayanad Dist. 920. 2009. *Scirpus barbatus* Rottb., Desc. Nov. Pl. 52. 1773. *Isolepis barbata* (Rottb.) R.Br., Prodr. 222. 1810. *Isolepis barbata* (Rottb.) R.Br. var. *capillaris* Nees in Wight Contr. Bot. India 109. 1834. *Stenophyllus barbatus* (Rottb.) Cooke., Fl. Pres. Bombay 2: 887. 1908.

Densely tufted annuals without rhizome; culms erect, slender, 6-20 cm tall. Leaves 4-7 cm long, upto 0.5 mm wide, capillary to filiform, acuminate, scabrid

towards apex; sheaths 0.5-1.5 cm long, brownish, with white long hairs at mouth. Inflorescence a terminal head, 6-12 mm across, brownish; bracts 1-3, 0.5-1.5 cm long, setaceous. Spikelets sessile, 3-7 x 1.5-2.5 mm, ovate-lanceolate, apex subacute. Glumes spiral, 2-4 x 1-2 mm, ovate-acute, strongly keeled, mucronate, keel scabrid, margins ciliolate, 1-2 basal ones empty. Stamen 1-3. Style linear, broader at base; stigmas 3. Nut upto 1 x 0.5 mm, obovate, triquetrous, stamineous.

Narikadvu, NS, KVB & KJD 26233

Fl. & Fr.: Throughout the year

Distribution: Common in all vegetation types.

CAREX L.

Gen. Pl. ed. 1, 280. 1737.

- 1a. Inflorescence paniculate *C. filicina*
- 1b. Inflorescence spicate..... 2
- 2a. Utricles distinctly beaked 3
- 2b. Utricles not or very shortly beaked *C. phacota*
- 3a. Spikelets androgynous *C. leucantha*
- 3b. Spikelets unisexual *C. breviculmis*

Carex breviculmis R.Br., Prodr. Fl. Nov. Holland. 242. 1810; C.B.Clarke in Hook.f., Fl. Brit. India 6: 746. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1686(1168). 1931; Rejani, Cyperac. Kerala 93. 1991.

Erect, tufted, rhizomatous perennials, 30-40 cm tall; rhizome short, woody; stem trigonous, smooth. Leaves basal and sub basal, exceeding the stem, 2-4 mm wide, scabrid on margins and keel; sheaths light brown, 3-8 cm long. Inflorescence simple, erect, with 3-7 spikelets, terminal one male, lateral ones female, sessile or sometime shortly peduncled; lower bract exceeding the inflorescence, upper reduced. Male spikelet linear, 10-20 x 2-3 mm; female spikelet cylindrical, 5-15 x 3-4 mm. Glumes ovate-acute, 2.5-3 x 1.5 mm, 3 nerved in the centre, midrib excurrent into a scabrid awn, brown with white hyaline margins. Stamens 2-3. Ovary enclosed in an urticle; style base thickened, persistent; stigmas 3. Utricle ellipsoid, trigonous, hispidulous, subabruptly beaked. Nut triquetrous, ellipsoid, 1.5-2 x 1 mm, apiculate, mitrate.

Ambalappara, KJD 26245

Fl. & Fr.: December-January

Distribution: Fairly common in evergreen forests of Ambalappara.

Carex filicina Nees in Wight Contr. Bot. India 123. 1834; C.B.Clarke in Hook.f., Fl. Brit. India 6: 717. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1686(1169). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 500. 1988; Rejani, Cyperac. Kerala 106. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 921. 2009. *Carex glaucina* Boeck., Linnaea 40: 353.1876; Rejani, Cyperac. Kerala 109. 1991; Ramach. & V.J. Nair, Fl. Cannanore Dist. 500. 1988. *Carex leptocarpa* C.B.Clarke in Hook.f., Fl. Brit. India 6: 719. 1893. *Carex filicina* Nees var. *leptocarpa* (C.B.Clarke) Kük. in H.G.A.Engler (ed.), Pflanzenr., IV, 20: 274. 1909.

Perennial herbs, culms to 120 cm tall, slender. Leaves 30-60 x 0.8 cm, scabrous. Sheath rounded, closed. Partial panicles 8-10 x 3 cm; bracts to 30 cm long; bracteoles filiform. Spikelets 1.5 cm long; male portion 3-4 mm long, narrower. Staminate glumes 3 x 1.5 mm, acute. Stamens 2-3. Pistillate glumes 2 mm long, reddish brown. Ovary enclosed with utricle. Utricle 3.5 mm long, scabrid, blotched with red spots; beak 1.5 mm long, deeply bifid..

Ambalappara, NS & KJD 26139

Fl. & Fr.: May-August

Distribution: Fairly common in evergreen forests of Ambalappara.

Carex leucantha Arn. ex Boott, Trans. Linn. Soc. London 20: 135. 1846; C.B.Clarke in Hook.f., Fl. Brit. India 6: 721. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1686(1168). 1931.

Herbs, culms 30-50 cm high, loosely tufted, triquetrous. Leaves 30-50 x 0.8-1 cm, flat; sheath 3-angled, closed, 6-7 cm long. Partial panicles distant, long-peduncled; branches scabrid. Spikelets 1-1.5 cm long; male and female parts equal. Staminate glume 4 x 1 mm, obtuse. Stamens 2; anthers 1.5 mm long. Pistillate glumes 2 x 1.5 mm, oblong, emarginate; cusp 3-4 mm long, scabrid. Utricle 2.2 x 1.2 mm, pale brown utricle 4-5 mm long, beaked.

Ambalappara, NS & KJD 25488, 25469

Fl. & Fr.: August-April

Distribution: Fairly common in evergreen forests of Ambalappara.

Carex phacota Spreng., Syst. Veg. 3: 826. 1826; C.B.Clarke in Hook.f., Fl. Brit. India 6: 708. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1686(1169). 1931; Rejani, Cyperac. Kerala 101. 1991.

Perennial herbs, culms 50-70 cm tall, triquetrous. Leaves cauline, 20-80 x 0.3-1 cm, linear, 3-costate; sheath keeled, open. Spikelets 5-7 in a terminal raceme, cylindrical; terminal one fully or partly male, others female, 5 cm long, 5

mm wide. Staminate glumes 3 x 1.5 mm, obovate, emarginate, aristate. Stamens 3. Pistillate glumes 2 x 1 mm, obovate, truncate at apex, aristate, blotched with red spots, hirtus. Utricle 3 x 1.5 mm, puberulus, deep brown.;

Kannadivechakunnu, NS & KJD 2553; Ambalappara, KVB 31661

Fl. & Fr.: October-April

Distribution: Common in evergreen forests and Grasslands.

CYPERUS L.

Sp. Pl. ed. 1, 1: 44. 1753.

- | | |
|--|-----------------------|
| 1a. Rhachilla deciduous | 2 |
| 1b. Rhachilla persistent..... | 5 |
| 2a. Roots producing stolons | <i>C. paniceus</i> |
| 2b. Roots not producing stolons | 3 |
| 3a. Spikelet spreading at right angles..... | <i>C. cyperoides</i> |
| 3b. Spikelet erect or suberect | 4 |
| 4a. Inflorescens head..... | <i>C. dubius</i> |
| 4b. Inflorescens umbel | <i>C. cyperinus</i> |
| 5a. Spikelets digitately arranged or inflorescence capitates | 6 |
| 5b. Spikelets spicately arranged on an elongated rhachis | 8 |
| 6a. Inflorescence head | <i>C. diffuses</i> |
| 6b. Inflorescence Umbel | 7 |
| 7a. Stolons absent, large perennial herb | <i>C. haspan</i> |
| 7b. Stolons present, small annual herb | <i>C. tenuispica</i> |
| 8a. Glumes not mucronate..... | 9 |
| 8b. Glumes mucronate | <i>C. sphacelatus</i> |
| 9a. Margin of glumes not hyaline | <i>C. distans</i> |
| 9b. Margin of glumes hyaline..... | <i>C. pilosus</i> |

Cyperus cyperinus (Retz.) Sur., Cyp. Mal. Arch. 154. t.6.f.10. 1898; Ansari, Fl. Kasaragod Div. 418. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 504. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 923. 2009. *Kyllinga cyperina* Retz., Observ. Bot. 6: 21. 1791. *Mariscus cyperinus* (Retz.) Vahl, Enum. Pl. 2: 377. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 621. 1893; C.E.C. Fisch. in Gamble, Fl. Madras 1644(1143). 1931; Manilal & Sivar., Fl. Calicut 312. 1982; Rejani, Cyperac. Kerala 354. 1991. *Mariscus pictus* Nees in Wight Contr. Bot. India 90. 1834; Hook.f., Fl. Brit. India 6:621.1893; C.E.C. Fisch. in Gamble, Fl. Madras 1645(1143). 1931. *Mariscus cyperinus* (Retz.) Vahl var. *pictus* (Nees) Karthik, Fl. Ind. Enum. 63. 1989; Sasidh., Fl. Chinnar WLS 332. 1999.

Erect, tufted perennials with short rhizome; culms 10-30 cm tall, triquetrous, smooth. Leaves many, basal, 5-20 x 0.2-0.5 cm, linear, long-acuminate, scabrid on margins; sheaths upto 4 cm long, basal reddish-brown. Inflorescence simple 1-1.5 x 1.5-2 cm, branches spicate, spike nearly capitate, subsessile; leafy bracts 4-7, the longest upto 15 cm long. Spikelets 3-5 x 1-1.5 mm, linear-lanceolate, subterete, greenish-straw coloured. Glumes distichous, 3-4 x 1.5-2 mm, elliptic, obtuse, muticous, inrolled. Stamens 3; anthers linear. Stigmas 3. Nuts 2-2.5 x 0.5-1 mm, oblong, trigonous, shortly apiculate, brown, slightly curved, minutely punctulate.

Ambalappara, NS & KVB 26232

Fl. & Fr.: May-August

Distribution: Common in all vegetation types.

Cyperus cyperoides (L.) Kuntze, Revis. Gen. Pl. 3: 333. 1898. *Scirpus cyperoides* L., Mant. Pl. 2: 181. 1771. *Kyllinga sumatrensis* Retz., Observ. Bot. 4: 13. 1786. *Mariscus concinnus* Schrad. ex Nees in Mart., Fl. Bras. 2:47. 1843. *Mariscus sieberianus* Nees ex C.B. Clarke in Hook.f., Fl. Brit. India 6:622.1893; C.E.C.Fisch. in Gamble, Fl. Madras 1645(1143). 1931. *Mariscus sumatrensis* (Retz.) Raynal, Adansonia 15: 110. 1975. Rejani, Cyperac. Kerala 366. 1991.

Stoloniferous herbs, stems covered with brown scales. Leaves to 3.5 x 0.5 cm. Umbels terminal, rays usually 9; bracts 4-8, 5-25 cm long; spikelets one flowered, deciduous above the 2 basal glumes, leaving a knob; basal glumes 1 and 0.75 mm, distichous, nut bearing glumes 3 mm, one nerved. Stamens 3. Ovary 1 mm, ovoid. Nut 2 mm, brown.

Chavachi, NS & KVB 26225

Fl. & Fr.: May-August

Distribution: Common in all vegetation types.

Cyperus diffusus Vahl, Enum. Pl. 2: 321. 1805; Hook.f., Fl. Brit. India 6: 603. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1639(1139). 1931; Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 197. 1985; Rejani, Cyperac. Kerala 157. 1991. *Cyperus pubisquama* Steud., Syn. Pl. Glumac. 2: 20. 1855; C.B. Clarke in Hook.f., Fl. Brit. India 6: 604. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1639(1139). 1931; Vajr., Fl. Palghat Dist. 547. 1990. *Cyperus diffusus* Vahl subsp. *macrostachyus* (Boeck.) Koyama, Gardner Bull. Singapore 30. 139. 1977 & Rev. Handb. Fl. Ceylon 5: 198. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 505. 1988; Rejani, Cyperac. Kerala 159. 1991.

Erect, single or tufted, perennials; rhizome short, corm-like, covered with brown scales; culms 45-100 cm tall, trigonous, triquetrous below the inflorescence. Leaves several, basal, 35-90 x 0.8-2 cm, linear, abruptly acute at apex, flattish margins scabrous, prominently 3-nerved; sheaths up to 10 cm long, purple-brown. Inflorescence compound to de-compound, 20-35 cm across, diffuse; primary rays many; leafy bracts 5-9, the longest up to 73 cm long and 2 cm wide. Spikelets sessile, 8-12 x 1.5-2 mm, linear-oblong, flattened, acute, 25-30-flowered. Glumes c. 1.5 x 1 mm, ovate-obtuse, closely imbricating, strongly keeled, keel excurrent into a mucro, margins white-hyaline. Stamens 2-3. Stigmas 3. Nut c. 1.5 x 0.5 mm, ellipsoid, triquetrous, apiculate, dark brown to black.

2nd Crossway, NS & KVB 26202

Fl. & Fr.: November-August

Distribution: Common in places below 1000 m altitude.

Cyperus distans L.f., Suppl. Pl. 103. 1781; C.B.Clarke in Hook.f., Fl. Brit. India 6: 607. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1640(1140). 1931; Manilal & Sivar., Fl. Calicut 315. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 505. 1988; Rejani, Cyperac. Kerala 161. 1991; Joseph, Aquatic Angiosp. Malabar 320. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 923. 2009. *Cyperus nutans* sensu C.B.Clarke in Hook.f., Fl. Brit. India 6: 607. 1893, p.p., non Vahl 1805. *Cyperus distans* L.f. var. *pseudonutans* Kukenth. in Engler's Das Pflanzenr. Heft 101, 140. 1936; Ansari, Fl. Kasaragod Div. 419. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 506. 1988.

Erect, rhizomatous perennials; rhizome short, knotty; culms solitary or few together, 27-80 cm tall, triquetrous, thickened at base. Leaves few, basal, 8-51 x 0.4-0.7 cm, linear, apex acuminate, scabrid on margins; sheaths 6-15 cm long, purple-brown. Inflorescence compound to de-compound; leafy bracts 4-6, the lowest up to 42 cm long; rays 5-12, very unequal. Spike loose, broadly ovate-pyramidal, distantly bearing 8 to 20 spikelets. Spikelets 0.8-2.2 x 0.1 cm, linear, subterete; rachilla flexuous, winged. Glumes distantly disposed on weakly zig-zag rachilla, 1.5-2 x 1 mm, ovate-oblong, obtuse, margins white-hyaline. Stamens 3; anthers oblong. Stigmas 3. Nut c. 1.5 x 0.5 mm, oblong, trigonous, apiculate, dark brown, minutely punctulate.

Astippara, NS & KJD 26165

Fl. & Fr.: July-November

Distribution: Common in all vegetation types.

Cyperus dubius Rottb., Desc. Nov. Pl. 20. t. 4, f.5. 1773; M. Mohanan & Henry, Fl. Thiruvanthapuram 507. 1994. *Mariscus dubius* (Rottb.) Kukenth. ex C.E.C.Fisch. in C.E.C.Fisch. in Gamble, Fl. Madras 1644(1142). 1931; Manilal & Sivar., Fl. Calicut 312. 1982; Rejani, Cyperac. Kerala 357. 1991.

Erect, tufted perennials with short rhizome; culms 15-38 cm tall, triquetrous, base bulbous, covered with brown membranous sheaths. Leaves many, basal, 16-30 x 0.2-0.4 cm, linear, gradually acuminate at apex, scabrid on margins towards the apex; sheaths 2-6 cm long, basal ones brown. Inflorescence simple, congested in a dense, hemispherical, ovoid, white, head, 1-2 cm long and wide; leafy bracts 3-5, the longest upto 20 cm long. Spikelets 5-8 x 1.5-2.5 mm, ovate-acute, turgid-flattened. Glumes 4-9, distichous, 2.5-3.5 x 2-3 mm, broadly ovate, apex subacute, whitish. Stamens 3; anthers c. 1.5 mm long, oblong. Stigma 3. Nuts 1.5-2 x 0.5 mm, oblong-ellipsoid, trigonous, light brownish.

Asthipara, NS & KJD 26161

Fl. & Fr.: July-August

Distribution: Rare in evergreen forests from Asthipara to Mullenpara.

Cyperus haspan L., Sp. Pl. 45. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 6: 600. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1640(1139). 1931; Manilal & Sivar., Fl. Calicut 315. 1982; Ansari, Fl. Kasaragod Div. 420. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 507. 1988; Rejani, Cyperac. Kerala 181. 1991; Joseph, Aquatic Angiosp. Malabar 324. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 924. 2009. *Cyperus juncooides* Lam., Illustr. Gen. 1: 147. 1791. *Cyperus haspan* L. var. *flaccidissimus* Kük., Repert. Spec. Nov. Regni Veg. 23: 184 1926. *Cyperus haspan* L. subsp. *juncooides* (Lam.) Kük., Repert. Spec. Nov. Regni Veg. 23: 184 1926; Manilal & Sivar., Fl. Calicut 315. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 507. 1988; Rejani, Cyperac. Kerala 182. 1991; Joseph, Aquatic Angiosp. Malabar 325. 1991.

Erect, spaced, rhizomatous perennials; rhizome long, creeping; roots red-purple; culms 15-35 cm tall, triquetrous. Leaves few, basal, 2-10 x 0.2-0.5 cm, linear, apex acute, sometimes reduced to lanceolate appendage of sheaths; sheaths upto 5 cm long, reddish brown. Inflorescence compound, many-rayed, 4-9 cm across, ultimate branches ending in digitately arranged clusters of spikelets; leafy bracts 2-3, the longest upto 6 cm long. Spikelets 5-10 x 1-2 mm, linear-lanceolate, compressed. Glumes 1.5-2 x 0.5-1 mm, oblong-ovate, mucronulate, keeled. Stamens 2-3; connective bristly at top. Stigmas 3. Nut c. 0.5 x 0.5 mm, obovoid, trigonous, broadly stipitate, cream-yellow, verruculose.

Narikkadavu, NS, KVB & KJD 26234

Fl. & Fr.: July-August

Distribution: Rare in stream sides of Semi evergreen forests from Valyamchal to Pookund.

Cyperus paniceus (Rottb.) Boeck., *Linnaea* 36:381.1870; Sedgwick in *J. Bomb. Nat. Hist. Soc.* 25:698.1918; Blatter & McCann in *J. Bomb. Nat. Hist. Soc.* 37:533.1934. *Schaenoides paniceus* Rottb. *Descr. Pl. Rar. Progr.* 15.1772. *nom. Provis. Kyllinga panacea* Rottb., *Descr. Icon. Rar. Pl.* 15. t.4.f.1.1773. *Mariscus paniceus* (Rottb.) Vahl, *Enum. Pl.* 2.373.1806; C.B. Clarke in *Hook.f., Fl. Brit. India* 6: 620.1893 et *Ill. Cypr. t.* 22.f. 1-2.1909; C.E.C. Fisch. in *Gamble, Fl. Madras* 1644. 1915.

Sedges 10-30 cm tall; rhizome Short, 2-3 mm thick, clothed with dark brown fibres; stolons long, slender, ca 0.6 mm thick, covered with reddish-brown scales, stems very slender, trigonous, not filiform ca 1-2 mm thick. Leaves Shorter or equaling the stem, 1-3 mm wide. Spikes. Sessile or subsessile, cylindrical, horizontally spreading, lanceolate, slightly curved, Glume 4; lower 2 ovate, ca 1 mm long; third glume nut bearing, ovate-lanceolate, acute, upto 3 mm long; fourth glume much reduced sterile. stamen 3; anther linear ca 1 mm long. Style 3-fid. Nut trigonous, oblong, slightly curved.

Poathanplavu, *KJD 26220*

Fl. & Fr.: Throughout the year

Distribution: Fairly common in evergreen and semi-evergreen forests of Paripode, Kannadivechakunnu, Poathanplavu, Chavachi, etc.

Cyperus pilosus Vahl, *Enum. Pl.* 2: 354. 1805; C.B. Clarke in *Hook.f., Fl. Brit. India* 6: 609. 1893; C.E.C. Fisch. in *Gamble, Fl. Madras* 1641(1140). 1931; Manilal & Sivar., *Fl. Calicut* 316. 1982; Ansari, *Fl. Kasaragod Div.* 422. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 509. 1988; Rejani, *Cyperac. Kerala* 201. 1991; Joseph, *Aquatic Angiosp. Malabar* 333. 1991; Ratheesh, *Fl. Stud. Wayanad Dist.* 927. 2009. *Cyperus marginellus* Nees in *Wight Contr. Bot. India* 83. 1834. *Cyperus obliquus* Nees in *Wight Contr. Bot. India* 86. 1834. *Cyperus pilosus* Vahl var. *obliquus* (Nees) C.B. Clarke, *J. Linn. Soc. Bot.* 21: 151 & *Hook.f., Fl. Brit. India* 6: 610. 1893; Manilal & Sivar., *Fl. Calicut* 316. 1982; Rejani, *Cyperac. Kerala* 203. 1991. *Cyperus pilosus* Vahl var. *polyanthus* C.B. Clarke, *J. Linn. Soc. Bot.* 21: 148. 1884 & in *Hook.f., Fl. Brit. India* 6: 610. 1893; Rejani, *Cyperac. Kerala* 204. 1991.

Stoloniferous perennials; culms 40-70 cm high, acutely 3-angled. Leaves 20-40 x 1 cm, linear-lanceolate; sheath keeled, closed. Umbel 7-20 cm long, compound; bracts 3-4, unequal, to 35 x 1.2 cm; rays 3-7, to 20 cm long; spikes sessile or peduncled. Spikelets linear-oblong, 15-30-flowered; glumes 2 x 1.5 mm,

broadly elliptic, obtuse, keel 5-nerved. Stamen 2. Nut 1.2 mm long, ellipsoid, dark brown, smooth.

Kariyankappu, NS, KVB & KJD 26227

Fl. & Fr.: July-August

Distribution: Rare in Semi evergreen forests from Kariyankappu to Chelachodu.

Cyperus sphacelatus Rottb., Descr. Icon. Rar. Pl. 26. 1773.

Erect annual herbs with brownish roots; culms tufted or solitary, 23-60 cm tall, triquetrous. Leaves few, 5-18 x 0.2-0.4 cm, linear, gradually acuminate, scabrid on upper margins; sheaths 2-7 cm long, pale straw-coloured. Inflorescence simple to compound, 6-17 cm across; primary rays 3-8, unequal, upto 10 cm long; leafy bracts 3-5, the longest upto 20 cm long. Spikelets 8-20 x 1.5-2 mm, linear-lanceolate, acute, flattened, straw-coloured with purple-brown flanks. Glumes 2-2.5 x 1.5-2 mm, elliptic to ovate, subacute, mucronate, straw-coloured with purple-brown stain on both sides of keel, keel greenish. Stamens 3. Style c. 1.5 mm long. Nut 1-1.5 x 0.5-1 mm, obovate, triquetrous with concave sides, brown.

Narikkadavu, NS & KVB 26240

Fl. & Fr.: November-May

Distribution: Fairly common along the sides of Cheenkannipuzha.

Cyperus tenuispica Steud., Syn. Pl. Glumac. 2: 11. 1855; C.E.C.Fisch. in Gamble, Fl. Madras 1640(1139). 1931; Manilal & Sivar., Fl. Calicut 318. 1982; Ansari, Fl. Kasaragod Div. 425. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 512. 1988; Rejani, Cyperac. Kerala 185. 1991; Joseph, Aquatic Angiosp. Malabar 340. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 927. 2009. *Cyperus flavidus* C.B.Clarke, J. Linn. Soc., Bot. 21: 22. 1884 & in Hook.f., Fl. Brit. India 6: 600. 1893, non Retz. 1789.

Erect, tufted, non-rhizomatous annual herbs; roots reddish-purple; culms 12-32 cm tall, triquetrous. Leaves few, basal, 5-20 x 0.2-0.3 cm, linear, flat, gradually acuminate, scabrid on upper margins; sheaths up to 5 cm long, reddish-brown. Inflorescence compound to de-compound 5-12 cm long and as wide; leafy bracts 1-3, the longest up to 12 cm long; primary rays 5-12. Spikelets digitate in clusters of 3-9, 3-7 x 1-1.5 mm, linear-oblong, flattened. Glumes 0.5-1 x 0.5 mm, ovate-oblong, obtuse, mucronate, straw-coloured. Stamens 1 or 2. Stigmas 3. Nut up to 0.5 mm long, obovate, trigonous, white, minutely tuberculate.

Fl. & Fr.: Throughout the year

Distribution: Common along the sides of Cheenkannipuzha.

FIMBRISTYLIS Vahl

Enum. Pl. 2: 285. 1806, *nom. cons.*

- 1a. Leaves absent *F. salbundia*
- 1b. Leaves present 2
- 2a. Style 2-fid; nut flattened 3
- 2a. Style 3-fid; nut trigonous *F. complanata*
- 3a. Spikelets solitary, margins of glumes white or hyaline *F. dichotoma*
- 3b. Spikelets clustered, margins of glumes white or hyaline *F. argentea*

Fimbristylis argentea (Rottb.) Vahl, Enum. Pl. 2: 294. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 640. 1893; C.E.C. Fisch. in Gamble, Fl. Madras 1659(1151). 1931; Manilal & Sivar., Fl. Calicut 325. 1982; Ansari, Fl. Kasaragod Div. 427. 1985; Rejani, Cyperac. Kerala 303. 1991. *Scirpus argenteus* Rottb., Desc. Nov. Pl. 51. t. 17, f. 6. 1773.

Annuals, 5-10 cm tall; culms tufted, compressed, trigonous, glabrous. Leaves basal, 3-10 x 0.1 cm, linear, flat, margins involute; sheaths 5-12 mm long, laterally compressed, straw-coloured, lower ones bladeless, mouth oblique, membranous with dark brown spots; ligule absent. Inflorescence terminal, capitate, 1-2 cm across; bracts 2-3, the largest to 4 cm long. Spikelets 5-8 x 1-1.5 mm, oblong-cylindric, obtuse, brown; rachilla narrowly winged. Glumes spiral, 1-1.5 mm long, ovate, concave, acute at apex, keeled, 3-nerved, yellowish, margins hyaline. Stamen 1; anthers c. 0.5 mm, oblong. Style c. 1 mm long, linear, thickened at base, sparsely ciliate at top; stigma 2. Nut c. 0.5 mm, obovoid, obscurely vertically striate, biconvex, yellowish.

Narikkadavu, NS & KVB 26237

Fl. & Fr.: November-May

Distribution: Along sides of streams and rivers.

Fimbristylis complanata (Retz.) Link, Enum. Hort. Berol. Alt. 1: 292. 1827; C.B. Clarke in Hook.f., Fl. Brit. India 6: 646. 1893; C.E.C. Fisch. in Gamble, Fl. Madras 1659(1151). 1931; Manilal & Sivar., Fl. Calicut 324. 1982; Rejani, Cyperac. Kerala 310. 1991. *Scirpus complanatus* Retz., Observ. Bot. 5: 14. 1788. *Trichelostylis complanata* (Retz.) Nees in Wight Contr. Bot. India 103. 1834.

Slender annuals; culms 10-20 cm high, tufted, trigonous at base, flat below the inflorescence, smooth. Leaves 8-12 x 0.2 cm, linear, flat, with recurved margins; sheath rounded; ligule a row of short hairs. Umbels 2.5 x 2 cm, contracted; rays 1-3, spreading. Spikelets 5 x 1.5 mm, lanceolate, solitary or 2-3 together, 15-flowered; glumes 2.2 x 1.5 mm, lanceolate, 3-nerved, dark brown. Nut 1 x 0.6 mm, obovate, sparsely tubercled, pale brown.

Ambalappara, KJD 25527

Fl. & Fr.: October-April

Distribution: Rare in grasslands of Ambalappara.

Fimbristylis dichotoma (L.) Vahl, Enum. Pl. 2: 287. 1805; C.E.C.Fisch. in Gamble, Fl. Madras 1658(1151). 1931; Manilal & Sivar., Fl. Calicut 326. 1982; Ansari, Fl. Kasaragod Div. 428. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 516. 1988; Rejani, Cyperac. Kerala 270. 1991; Joseph, Aquatic Angiosp. Malabar 362. 1991. *Scirpus dichotomous* L., Sp. Pl. 50. 1753. *Fimbristylis diphylla* (Retz.) Vahl, Enum. Pl. 2: 289. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 636. 1823. *Scirpus diphyllus* Retz., Observ. Bot. 5: 15. 1788.

Stem caespitose, to 70 cm, rigid, 2.5 mm wide. Leaves canaliculate, rarely flat, as long as the stem or shorter, scabrid, apex acute; ligule a fringe of short hairs; sheaths rusty or pinkish. Inflorescence simple or de-compound, 5-11 cm; involucre bracts 3-7, longest to 10 cm; primary rays 3-5, glabrous or pilose, 4-11 cm; secondary rays 3. Spikelet solitary, ovoid, oblong-ovoid, or terete, to 5 mm, acute; rachilla winged; glumes broadly ovate to suborbicular, to 2 mm, membranous, red-brown, glabrous, sides hyaline, nerveless, mucronulate, keel 3-nerved. Stamen 1; filament to 2 mm; anther linear, to 1 mm. Style 2-fid, basally glabrous; stigmas ciliate. Nut obovoid, biconvex, to 1 mm, glossy, vertical ribs 7-10, obscurely cross-barred, umbonulate, stipitate.

Narikkadavu, NS & KVB 26239

Fl. & Fr.: March-December

Distribution: Fairly common along the sides of Cheenkannipuzha.

Fimbristylis littoralis Gaud. in Fre. Voy. Bot. 413. 1826. S.T. Blake J. Arn. Arbor. 35: 217. 1954. *Fimbristylis miliaceus* Vahl var. *congesta* Trimen ex Trimen Handb. Fl. Ceylon 5: 56. 1900. *Trichostylis miliaceus* (L.) Nees in Wight Contr. Bot. India 104. 1834. *Fimbristylis miliacea* (L.) Vahl, Enum. Pl. 2: 287. 1806. C.B. Clarke in Hook.f., Fl. Brit. India 6: 644. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1655.

1915 Manilal & Sivarajan in Fl. Calicut, 325. 1982. Koyama in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 5:296.1985. *Scirpus miliaceus* L. Syst. Ed. 10: 868. 1759.

Sedges with small rhizomes, stems tufted, a culm 4-5 angled, 1-1 mm thick. Leaves Eligunate those of the stems reduced to sheaths which are laterally compressed. Inflorescence compound or decomposed with numerous spikelets; upto 10 cm long; involucral Bract 2-4, much shorter than inflorescence upto 3 cm. long. Spikelets, all solitary, globose or ellipsoid, terete, very obtuse, many fld. Glumes spiral, membranous, ovate, obtuse mucous, scarcely keeled, 3-nerved centrally with often a brown streak on both sides, narrowly hyaline margined ca 1.5 x 1 mm. Stames 1-2, anther Linear 0.5-0.8 mm long. Nuts trigonous, obovoid, verruculose, minutely transversely lineolate, whitish, 0.7-0.8 mm long.

Pothanplavu, KJD 26235

Fl. & Fr.: Throughout the year

Distribution: Fairly common in evergreen and semi-evergreen forests of Paripode, Kannadivechakunnu, Pothanplavu, Chavachi, etc.

Fimbristylis salbundia (Nees) Kunth, *Enum. Pl. 2: 230* 1837. *Trichelostylis salbundia* Nees in R.Wight, *Contr. Bot. India: 105*. 1834. *Fimbristylis salbundia* (Nees) Kunth subsp. *pentaptera* (Nees) Koyama, *Bot. Mag. (Tokyo)* 87: 317. 1974; Rejani, *Cyperac. Kerala* 285. 1991. *Trichelostylis pentaptera* Nees in Wight *Contr. Bot. India* 105. 1834. *Fimbristylis pentaptera* (Nees) Kunth, *Enum. Pl. 2:229*.1837; C.B.Clarke in Hook.f., *Fl. Brit. India*6:645.1893; C.E.C.Fisch. in Gamble, *Fl. Madras* 1659(1152). 1931.

Perennials, densely tufted; culms to 30-50 cm high; stem terete. Leaves bladeless. Corymbs compound. Spikelets many, 0.45-0.6 x 0.15-0.2 cm, ovoid-elliptic, subterete, subacute at apex, brownish. Flowers many, up to 60. Glumes 0.25-0.3 x 0.1-0.2 cm, boat-shaped, keeled, membranous. Stamens 3. Style 3-fid. Nuts 0.1-0.2 x 0.07-0.08 cm, orbicular-obovoid, trigonous, each side faintly canaliculate in 20-30 rows of transversely oblong cells.

Ambalappara, NS & KJD 26137

Fl. & Fr.: June-August

Distribution: Rare in grasslands of Ambalappara.

HYPOLYTRUM L.C. Rich.

in Pers., *Syn. Pl.* 1. 70. 1805.

Hypolytrum nemorum (Vahl) Spreng., *Syst. Veg.* 1:233.1825; Ansari, *Fl. Kasaragod Div.* 432. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 519; Rejani, *Cyperac. Kerala* 324. 1991. *Schoenus nemorum* Vahl, *Symb. Bot.* 3: 8. 1794.

Hypolytrum latifolium L.C.Rich. in Pers., Syn. Pl. 1: 70. 1805; C.B.Clarke in Hook.f., Fl. Brit. India6: 678. 1893; C.E.C.Fisch. in Gamble, Fl. Madras 1673(1161). 1931.

Erect, rhizomatous perennials, 60-110 cm tall; rhizome woody, short; culms triquetrous. Leaves basal and 1-3 upper on the culm, 60-95 x 1-2 cm, broadly linear, margins scabrid, apex acute, flattish-plicate, subcoriaceous, midnerve scabrid beneath; sheaths to 6 cm long, mouth truncate. Inflorescence terminal corymbose-panicle, compound to de-compound, 3.5-6 cm tall, 4-7 cm across; bracts 2-3, leaf-like, lowest much exceeding the inflorescence. Spikelets 4-6 x 3-4 mm, globose to ellipsoidal. Glumes spiral, 2-2.5 x 1.5-2 mm, ovate-orbicular, obtuse, membranous, light brown. Hypogynous scales 2, hyaline, c. 1 mm long. Stamens 2. Style short; stigmas 2. Nuts 2-3 x 1.5-2 mm, broadly ovate, broadest at slightly below the middle, yellowish-brown.

Kannadivechakunnu, NS & KJD 25567; Paripode, KVB 31674

Fl. & Fr.: Throughout the year

Distribution: Common in all vegetation types.

KYLLINGA Rottb.

Descript. Icon. Nov. Pl. 12. 1773, *nom. cons.*

Kyllinga nemoralis (J.R.Forst. & G.Forst.) Dandy ex Hutch. & Dalz., Fl. W. Trop. Africa 2: 486,487. 1936; Manilal & Sivar., Fl. Calicut 311. 1982; Rejani, Cyperac. Kerala 338. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 934. 2009. *Thryocephalon nemoralis* J.R.Forst. & G.Forst., Char. Gen. 129. t. 130. 1776. *Kyllinga monocephala* Rottb., Desc. Nov. Pl. 13. t. 4, f. 4. 1773, non Roxb. 1820; C.B. Clarke in Hook.f., Fl. Brit. India6: 588. 1893; Gamble, Fl. Madras 1624(1130). 1931. *Cyperus kyllinga* Endl., Cat. Hort. Acad. Vindob. 1: 94. 1842; Ansari, Fl. Kasaragod Div. 421. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 508. 1988. Erect, rhizomatous perennials; rhizome long-creeping covered with brown scales; culms triquetrous. Leaves many, 2-15 x 0.2-0.4 cm, linear, margins scabrid on the upper part; sheaths 1-3 cm long, purple-brown. Inflorescence a head of globose spikes, the central spike longer than the others, white; leafy bracts 3-4, exceeding the inflorescence, the lowest upto 14 cm long. Spikelets many, 2.5-3 x 1-1.5 mm, ovate-elliptic. Glumes distichous, 2-2.5 mm long, boat-shaped, keeled, lower 2 glumes smaller, empty. Stamens 3. Stigmas 2. Nut 1-1.5 mm long, obovate or oblong, biconvex, brownish.

Kariyenkappu, NS & KVB 26219

Fl. & Fr.: May-August

Distribution: Common in plantations at Kariyenkappu.

PYCREUS P.Beauv.

Fl. Oware 2: 48, t. 86. 1807.

- 1a. Stems tufted, nut apiculate2
1b. Stems solitary, nut truncate or retuse *P.puncticulatus*
2a. Rhachilla straight *P.flavidus*
2b. Rhachilla zig zig *P. polystachyos*

Pycreus flavidus (Retz.) Koyama, J. Jap. Bot. 51: 316. 1976 & in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 222. 1985; Rejani, Cyperac. Kerala 374. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 936. 2009. *Cyperus flavidus* Retz., Observ. Bot. 5: 13. 1788; Manilal & Sivar., Fl. Calicut 314. 1982. *Pycreus globosus* (All.) Rchb., Fl. Germ. Excurs. 1: 140. 1830; C.E.C.Fisch. in Gamble, Fl. Madras 1627(1132). 1931. *Cyperus globosus* All., Fl. Pedem. Auct. 49: 1789, *non illeg.*; Ramach. & V.J. Nair, Fl. Cannanore Dist. 506. 1988. *Pycreus capillaris* (J.Koenig ex Roxb.) Nees ex C.B.Clarke in Hook.f., Fl. Brit. India 6: 591. 1893.

Herbs; culms 30-45 cm tall. Leaves 10-20 x 0.1 cm, glabrous, mouth of sheath with two truncate flaps. Umbel 8 x 8 cm; bracts 2-3, to 18 cm long; rays spreading. Spikelets 12-16 x 2 mm oblong, obtuse, 12-15 in a spike. Glumes 2 x 1.2 mm, 30-40 in a spikelets, 3-5-nerved; keel curved, green. Nut 0.8-0.5 mm, biconvex, distinctly cuspidate, minutely muriculate, dark brown.

Ambalappara, KJD 26246

Fl. & Fr.: January-May

Distribution: Rare in evergreen forests of Ambalappara.

Pycreus polystachyos (Rottb.) P. Beauv., Pl. Oware Beinn. 2: 48. t.86.f.2. 1807; C.B.Clarke in Hook.f., Fl. Brit. India 6: 592. 1893; Rejani, Cyperac. Kerala 382. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 937. 2009. *Cyperus polystachyos* Rottb., Desc. Nov. Pl. 39. t. 11, f. 1. 1773; Ansari, Fl. Kasaragod Div. 423. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 510. 1988. *Pycreus odoratus* Urban, Symb. Antill. 2: 164. 1900; C.E.C.Fisch. in Gamble, Fl. Madras 1627(1132). 1931.

Erect tufted, annual herbs; culms 15-34 cm tall, trigonous. Leaves few, 2.5-15 x 0.2-0.4 cm, linear, flat, scabrid on margins in the upper part, gradually acuminate; sheaths 1.5-3.5 cm long, purple brown. Inflorescence compound with well developed rays, but often contracted in a subglobose or irregularly lobed head-like cluster of spikelets without rays; leafy bracts 3 to 5, upto 11 cm long. Spikelets 1-2 x 0.15-0.2 cm, linear or linear-lanceolate, strongly compressed, yellow to straw coloured. Glumes 1.5-2 x 1 mm, ovate, acute, distichous, keeled. Stamens 2, rarely 1. Stigmas 2. Nut c. 1 x 0.5 mm, oblong, biconvex, dark brown.

Narikkadavu, NS & KVB 26236

Fl. & Fr.: Throughout the year

Distribution: Rare along the River sides at Narikkadavu.

Pycreus puncticulatus (Vahl) Nees in Mart., Fl. Bras. 2: 10. 1842; C.B. Clarke in Hook.f., Fl. Brit. India 6: 593. 1893; C.E.C. Fisch. in Gamble, Fl. Madras 1628(1133). 1931; Rejani, Cyperac. Kerala 390. 1991; Joseph, Aquatic Angiosp. Malabar 390. 1991. *Cyperus puncticulatus* Vahl, Enum. Pl. 2: 348. 1805.

Erect, annual herbs with brownish fibrous roots; culms 23-50 cm tall, triquetrous, smooth. Leaves few, basal, 9-30 x 0.4-0.8 cm, linear, flat, gradually acuminate; sheaths 4-16 cm long, rusty brown. Inflorescence compound, lax, 8-20 cm long and wide, rays closely embraced by a two-lobed sheath; leafy bracts 3-5, the lowest upto 27 cm long. Spikelets spreading, 12-27 x 2-3.5 mm, linear-oblong to oblong-lanceolate, subacute, compressed, brown. Glumes distichous, 2-3 x 1.5-2 mm, ovate-orbicular, folded with green keel, notched at apex, brown, margins, broadly whitish-hyaline, 1-2 basal ones empty. Stamens 2. Style c. 1.5 mm long. Nut stipitate, 1-1.5 x 1-1.5, obovoid, biconvex, emarginate at apex, dark brown, densely punctulate.

Chavachi, NS & KVB 26227

Fl. & Fr.: November-May

Distribution: Fairly common in evergreen forests of Chavachi and Kattikkari.

SCHOENOPLECTUS (Reich.) Palla

Sitzber. Zool. Bot. Ges. Wein 38: 49. 1888, *nom. cons.*

Schoenoplectus mucronatus (L.) Palla in Engl., Bot. Jahrb. Syst. 10: 299. 1889; Rejani, Cyperac. Kerala 422. 1991; Joseph, Aquatic Angiosp. Malabar 400. 1991. *Scirpus mucronatus* L., Sp. Pl. 50. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 6: 657. 1893; C.E.C. Fisch. in Gamble, Fl. Madras 1666(1156). 1931; Manilal, Fl. Silent Valley 344. 1988.

Erect herbs; culms 40-60 cm high, few together, spongy below, mouth of sheath acute. Spikelets 0.6-1 x 0.6 cm, oblong, 10-25 in a cluster 2.5 cm below the tip of the stem; glumes 4 x 3 mm, obovate, shortly mucronate, pale brown. Nut 2 x 1.7 mm, plano-convex, truncate, apiculate, dark brown; bristles brown, equal to the nut.

Ambalappara, KJD 26248

Fl. & Fr.: October-January

Distribution: Rare in evergreen forests of Ambalappara near water-bodies.

SCLERIA P.J.Bergius

Kongl. Vetensk. Acad. Handl. 26: 142, 1765.

Scleria lithosperma (L.) Sw., Prodr. Veg. Ind. Occ.18. 1788; C.B.Clarke in Hook.f., Fl. Brit. India 6: 685. 1894; C.E.C.Fisch. in Gamble, Fl. Madras 1677(1163). 1934; Ansari, Fl. Kasaragod Div. 436. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 521. 1988; Verma & Veena, Bull. Bot. Surv. India 32: 61. 1990; Rejani, Cyperac. Kerala 432. 1991. *Scirpus lithosperma* L., Sp. Pl. 51. 1753.

Erect, tufted, rhizomatous perennial herbs; culms 40-60 cm tall; rhizome woody, short; culms trigonous, smooth. Leaves dense at the middle part, scattered all along the stem, 8-33 x 0.2-0.4 cm, linear, margins scabrous, apex obtuse; sheaths narrow, 4-6 cm long, not winged, 3-sided; contraligule short, 1-2 mm long, obtuse, ciliate. Inflorescence narrow, loose, terminal panicle and 2-3 distant lateral ones. Primary bracts leaf-like, much longer than the inflorescence; secondary bracts setaceous. Spikelets few, bisexual, with one female flower and a few males, 3-5 mm long. Glumes 3-4 mm long, ovate, acute, brown. Stamen 1; anthers 1-1.5 mm. Nut 2-3 x 2 mm, ovoid, obtusely trigonous, smooth, shining white; disk reduced to a narrow, brown ring.

Poathanplavu, *KJD 26186*

Fl. & Fr.: Throughout the year

Distribution: Fairly common in evergreen and semi-evergreen forests of Paripode, Kannadivechakunnu, Poathanplavu, Chavachi, etc.

ERIOCAULACEAE

ERIOCAULON L.

Sp. Pl. 87. 1753.

- 1a. Heads 2 cm across; leaves 2 cm broad *E. robusto-brownianum*
- 1b. Heads less than 1 cm across 2
- 2a. Seed coat ornamented *E. thwaitesii*
- 2b. Seed coat not ornamented 3
- 3a. Heads per plant 1 or 2 (3) *E. pectinatum*
- 3b. Heads per plant more than 3 *E. talbotii*

Eriocaulon pectinatum Ruhland in H.G.A.Engler (ed.), Pflanzenr., IV 85. 1903; C.E.C.Fisch. in Gamble, Fl. Madras 1620(1127). 1931; R. Ansari & N.P. Balakr., Eriocaul. India (Rev.) 139. 2009. *Eriocaulon geoffreyi* Fyson, Bull. Misc. Inform. Kew 1914: 330. 1914.

Leaves 2-3.5 x 0.15 cm, linear, acuminate, glabrous. Peduncles 1-3, 12 cm long; sheath 2 cm long, limb minute. Head globose; involucre bracts obovate, acute, glabrous, black; floral bracts 2.5 x 1 mm, deltoid, acute, hairy towards the apex, black. Petals hairy, one slightly larger, glandulose; anthers black. Female sepals 2 x 0.5 mm, densely hairy at apex, black. Petals oblanceolate, hairy at apex, glandular; seeds ovoid; epidermal cells transversely elongate. Male sepals united into a split sheath, densely hairy at apex, truncate, black. Seeds not ornamented

Ambalappara, *KJD 31973*

Fl. & Fr.: October-December

Distribution: Fairly common in open areas of evergreen forests at Ambalappara.

Eriocaulon robustobrownianum Ruhland in H.G.A.Engler (ed.), *Pflanzenr.*, IV 77. 1903; C.E.C.Fisch. in Gamble, *Fl. Madras* 1619(1127). 1931; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 497. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 918. 2009; R. Ansari & N.P. Balakr., *Eriocaul. India (Rev.)* 18. 2009. *Eriocaulon mysorensense* Fyson, *Bull. Misc. Inform. Kew* 1914: 331. 1914.

Acaulescent herbs. Leaves rosulate, oblong-ensiform, obtuse, up to 30 x 1.6 cm; sheaths up to 15 cm long; limb lanceolate, acuminate, entire. Heads ca 1 cm across; receptacles flat, villous; involucre bracts reflexed, obovate, obtuse; floral bracts oblanceolate, acuminate, hoary dorsally towards tip, black. Male flowers: Sepals obovate-cuneate, connate into a, 3-lobed at apex with truncate lobes, hoary at apex, black. Petals 3, similar, oblong, hoary, with a black gland. Anthers 6, oblong, black. Female flowers: Sepals 3, free, subsimilar, oblanceolate, hoary dorsally towards tip black. Petals 3, subequal, elliptic, not clawed, acute. Ovary sessile, ovoid-globose, style 3-fid. Seeds oblong-ellipsoid; cells of seed coat transversely elongated, aligned in vertical rows; appendages solitary from the centre of each transverse radial wall.

Ambalappara, *KVB 31639*

Fl. & Fr.: January-March

Distribution: Common in evergreen forests of Ambalappara. Endemic to Peninsular India.

Eriocaulon talbotii R. Ansari & N.P. Balakr., *Fam. Eriocaulac. in India* 172. 1994 & *Eriocaul. India (Rev.)* 163. 2009. *Eriocaulon horsleykunda* Fyson var. *megaloccephala* Fyson, *J. Indian Bot. Soc.* 3: 14. 1922.

Acaulescent herbs. Leaves to 6 x 0.5 cm, linear-ensiform, apex acuminate. Peduncles to 25 cm, virgate, sheath to 4 cm, limb incised. Head 1-1.3 cm across, spherical, grey; involucre bracts 2 mm across, ovate, obtuse; floral bracts ca 3 x 1 mm, oblanceolate, acute, apex hoary. Sepals 2 mm across, obovate, connate, apex hoary. Petals ca 2 mm across, spatulate, obtuse, free. Ovary sessile, globose, style trifid. Seed globose, purple, seed coat aligned in vertical rows.

Ambalappara, *KJD 25571; NS & KJD 25530*

Fl. & Fr.: August-March

Distribution: Comm in the evergreen forests of Ambalappara. Endemic to Western Ghats.

Eriocaulon thwaitesii Koernicke, *Linnaea* 27: 627. 1854; Hook.f., *Fl. Brit. India* 583. 1893; C.E.C.Fisch. in Gamble, *Fl. Madras* 1620(1128). 1931; R. Ansari & N.P. Balakr., *Eriocaul. India (Rev.)* 60. 2009. *Eriocaulon mariae* Fyson, *Bull. Misc. Inform. Kew* 1914: 331. 1914. *Eriocaulon gamblei* C.E.C.Fisch., *Bull. Misc. Inform. Kew* 1930: 160. 1930 & C.E.C.Fisch. in Gamble, *Fl. Madras* 1618(1128). 1931.

Acaulescent herbs. Leaves 6-8 x 0.5 cm, lanceolate, acuminate, glabrous. Peduncles several to many, 10-30 cm long; heads 2.5-4 x 4-6 mm, globose; receptacle pilose, involucre bracts 2 x 1.5 mm, oblong, rounded to truncate at apex, straw-coloured; floral bracts 2 x 1 mm, cuneate, acute, hairy at apex, brown. Female sepals 2, lanceolate, keeled, brown. Petals linear, hyaline; seed walls in vertical row. Male sepals 2, united at the base, glabrous, brownish. Petals equal, hairy, glandulose.

Ambalappara, *KVB 31640; NS & KJD 25531*

Fl. & Fr.: July-September

Distribution: Common in evergreen forests and grasslands of Ambalappara.

JUNCACEAE

JUNCUS L.

Sp. Pl. 325.1753.

Juncus prismatocarpus R.Br. subsp. **leschenaultii** (Gay ex Laharpe) Kirschner, *Preslia* 74: 249. 2002; Ratheesh, *Fl. Stud. Wayanad Dist.* 894. 2009. *Juncus leschenaultii* Gay ex Laharpe, *Essai Monogr. Jonc.* 49. 1825. *Juncus prismatocarpus* var. *leschenaultii* (Gay) Buchenau in Engl., *Bot. Jahrb. Syst.* 6: 205. 1885. *Juncus prismatocarpus* sensu Hook.f., *Fl. Brit. India* 6: 395. 1892 p.p.;

C.E.C.Fisch. in Gamble, Fl. Madras 1553(1084). 1931; Ramach. & V.J. Nair, Fl. Cannanore Dist. 489. 1988.

Tufted herbs, root stock creeping. Leaves both radical and cauline, to 6 x 0.3 cm, terete, hollow, septate; sheath to 2 cm, open, auricled. Cymes terminal, corymbose, 10-15 cm; bracts 1.5 mm, ovate, acuminate. Outer perianth lobes concave, 3 mm, lanceolate, acute, hyaline; filaments 1.5 mm. Ovary 0.8 mm, one celled, many ovuled, stigma 3-lobed, linear, twisted. Capsule 3 mm, prismatic.

Ambalappara, NS & KJD 25470

Fl. & Fr.: February-August

Distribution: Rare in evergreen forests of Ambalappara.

POACEAE

1a. Stamens 6 or more	2
1b. Stamens 3 or less	4
2a. Staminal filaments free	Bambusa
2b. Staminal filaments united at base in to a tube	3
3a. Stamens more than 16	Ochlandra
3b. Stamens 6	Oxytenanthera
4a. Glumes persistent, spikelets 1-many flowered	20
4b. Glumes decidous, spikelet 2-flowered	5
5a. Spikelets laterally compressed, dissimilar and awned	6
5b. Spikelets dorsally compressed, similar, awnless	12
6a. Inflorscence panicle	7
6b. Inflorscence 1-many digitate or subdigitate	10
7a. Spikelets in groups of 3, one sessile and 2-pedicelled	Chrysopogon
7b. Spikelets paired or rarely solitary	8
8a. Panicles of paired racemes, aromatic, fragrant grass	Cymbopogon
8b. Panicles not as above, not aromatic	9
9a. Panicle interrupted by spathes	Themeda
9b. Panicle not interrupted by spathes	Capillipedium
10a. Spikelets solitary, similar	Dimeria
10b. Spikelets paired, dissimilar or rarely similar	11
11a. Racemes solitary	Pogonatherum
11b. Racemes two or more	Ischaemum
12a. Spiklets awned or aristste	13
12b. Spikelet not as above	14

13a. Racemes arranged digitately, spikelets often paired	Alloteropsis
13b. Racemes arranged on central axia, spikelets crowded.....	Oplismenus
14a. Lower glumes absent or reduced to a minute scale	15
14b. Lower glumes well developed.....	17
15a. Lemma of upper floret crustaceous, spikelets solitary.....	16
15b. Lemma of upper floret thin with hyaline margins, spikelets usually paired..	Digitaria
16a. Spikelets oblong-lanceolate, lower glumes strictly absent	Axonopus
16b. Spikelets ovate or orbicular, lower glume a minute scale or absent	Paspalum
17a. Spikelets subtended by bristles.....	18
17b. Spikelets not subtended by bristles.....	19
18a. Bristles involucrate, deciduous	Cenchrus
18b. Bristles not as above, persistent.....	Setaria
19a. Spikelets gibbous and laterally compressed	Cyrtococcum
19b. Spikelets not as above	20
20a. Branches of panicles bifarious, spikelets crowded.....	Ottochloa
20b. Branches of panicle not bifarious, spikelets not crowded	Panicum
21a. Leaves tessellately nerved.....	Centotheca
21b. Leaves not tessellately nerved	22
22a. Spikletes awned	23
22b. Spikletes not awned.....	25
23a. Spikelets with one floret	Garnotia
23b. Spikelets with 2-many florets	24
24a. Spikelets with one fertile floret	Jansenella
24b. Spikelets 3-7 fertile florets.....	Tripogon
25a. Inflorescence a panicle	26
25b. Inflorescence of solitary, digitate or subdigitate.....	28
26a. Glumes equal to or longer than the spikelets	Isachne
26b. Glumes shorter than the spikelets	27
27a. Paleas 2-keeled, keels often hairy or scabrid	Eragrostis
27b. Paleas not 2-keeled, keels glabrous	Coelachne
28a. Spikelets with one floret	Cynodon
28b. Spikelets with 2-many florets	Eleusine

ALLOTEROPSIS J. S. Presl. ex. C. B. Presl.

Reliq. Haenk. 1. 343.1830.

Alloteropsis cimicina (L.) Stapf, Fl. Trop. Afr. 9: 487.1919; C.E.C.Fisch. in Gamble, Fl. Madras 1766(1223). 1934; Manilal & Sivar., Fl. Calicut 339. 1982; Ansari, Fl.

Kasaragod Div. 444. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 525. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 214. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 943. 2009. *Milium cimicinum* L., Mant. Pl. 2: 184. 1771. *Axonopus cimicinus* (L.) P. Beauv., Ess. Agrostogr. 154. 1812; Hook.f., Fl. Brit. India 7: 64. 1896.

Annual herbs; culms 15-100 cm high, decumbent, canaliculate. Leaves 2-4.5 x 0.7-1.2 cm, oblong-lanceolate or lanceolate, rounded or cordate at base, margins ciliate with tubercle-based hairs, apex abruptly acute; sheath 5-12 cm long, covered with tubercle-based hairs; ligule truncate, fimbriate. Racemes 3-8, digitate, umbellate or corymbose. Spikelets 2-flowered, broadly elliptic. Glumes unequal; lower glume 1.5-2 x 1 mm, ovate-lanceolate, shortly acuminate; upper glume 3-3.5 x 1 mm, broadly ovate, acuminate. Lower floret male. Upper floret bisexual. First lemma 2-3 x 1 mm, ovate; second lemma 2-3 x 1 mm, elliptic, margins ciliate, aristate; arista 1-3 mm long, erect, scaberulous; palea 1.5-3 x 0.5-1 mm, ovate or elliptic. Stamens 3, anthers yellow. Ovary c. 0.5 mm, oblong; stigmas 0.5-1 mm, violet. Grain c. 1.5 x 1 mm, ovate.

Chavachi, NS & KVB 26229

Fl. & Fr.: May-November

Distribution: Common in open areas in all vegetation types.

AXONOPUS P. Beauv.

Ess. Agrostogr. 111. 1812.

Axonopus compressus (Sw.) P. Beauv., Ess. Agrostogr. 12: 154. 1812; Ansari, Fl. Kasaragod Div. 449. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 527. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 216. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 952. 2009. *Milium compressum* Sw., Prodr. Veg. Ind. Occ. Veg. Ind. Occ. 24. 1788.

Perennial herbs; culms 10-100 cm long, creeping or stoloniferous, rooting at nodes. Leaves 2-5 x 0.3-1.5 cm, oblong to linear-lanceolate, base rounded or shallowly cordate, margins ciliate, apex acute; sheaths keeled; ligules membranous, fimbriate. Racemes 2-6, binate, digitate or alternate. Spikelets 2-2.5 x 0.5-1 mm, oblong-elliptic or elliptic-lanceolate, sessile or shortly pedicelled, green or purplish. Lower glume absent; upper glume 2-2.5 x 1 mm, ovate or elliptic-lanceolate. First lemma 2-2.5 x 1 mm, ovate, elliptic or elliptic-lanceolate, membranous, epaleate; second lemma 1.5-2 x 1 mm, ovate-oblong, crustaceous; palea 1.5-2 x 1 mm, oblong, margins infolded. Floret bisexual: stamens 3; anthers c. 0.5 mm long. Ovary 0.5 mm, oblong; styles 0.5 mm; stigmas white.

Kariyenkappu, NS & KVB 26222

Fl. & Fr.: Throughout the year

Distribution: Common along the river sides.

BAMBUSA Schreb.

Gen. Pl.: 236 (1789). *nom cons.*

Bambusa bambos (L.) Voss in Vilmorin, Blumengartn 1:1189.1896; Seethalakshmi & Muktesh, Bamboos of India 40. 1998; Ratheesh, Fl. Stud. Wayanad Dist. 953. 2009. *Arundo bambos* L., Sp. Pl. 81. 1753. *Bambusa bambos* (L.) var. *gigantea* (Bahadur & Jain) Bennet & Gaur, Thirty Seven Bamboos Inida 21. 1990. *Bambusa arundinacea* (Retz.) Willd., Sp. Pl. 2: 245. 1799; Hook.f., Fl. Brit. India 7: 395. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1859(1286). 1934.

Culms from a thick stoloniferous rhizome, erect, to 30 m tall and 10-20 cm across; culm sheaths broadly triangular, densely brownish-hairy within, and scattered hairy without. Leaves to 20 cm long; sheaths to 12 x 0.2 cm, linear, glabrous; ligule short, entire; petiole short. Inflorescence a compound panicle with the spikelets in heads. Spikelets 1-many-flowered, 0.8-2 cm long, oblong, terete; bracts glume-like. Glumes 1-3, to 5.5 mm, broadly ovate, mucronate. Lemmas to 6.5 mm, lanceolate, mucronate, coriaceous, glabrous. Paleas to 7 mm, 2-keeled, ciliate. Stamens 6. Style 1; stigmas 3. Caryopsis linearly cylindrical.

Chavachi, KJD 18706

Flowered during December-January in the Sanctuary.

Distribution: Evergreen forests of Kurukathode and Chavachi.

CAPILLIPEDIUM Stapf

Fl. Trop. Afr. 9: 169 (1917).

Capillipedium assimile (Steud.) A. Camus, Fl. Indo-Chine 7: 314. 1922; Sreek. & V.J. Nair, Fl. Kerala Grasses 55. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 956. 2009. *Andropogon assimilis* Steud., Syst. Verz. (Zollinger) 58. 1854; Hook.f., Fl. Brit. India 7: 179. 1896. *Capillipedium glaucopsis* Stapf, Hooker's Icon. Pl. t. 3085. 1922; C.E.C.Fisch. in Gamble, Fl. Madras 1730(1199). 1934.

Annuals, culms 30-60 cm high, nodes bearded. Leaves 5-20 x 0.5-1.2 cm, lanceolate, scabrid; sheath keeled, glabrous; ligule membranous, hairy around. Panicles 8-10 cm long, effuse; axils of racemes with long hairs; joints densely villous. Sessile spikelets 3 x 1.5 mm, oblong. Lower glume 3 x 1.5 mm, ovate, ciliate along margins; upper glume ovate, keeled, 3-nerved; lower floret empty, upper bisexual. First lemma 1.5 x 1 mm, ovate, obtuse; second lemma forms the base of the awn; paleas absent. Stamens 3. Styles 2, free; stigma plumose. Pedicelled spikelets 3 x 1.5 mm; pedicels glabrous.

Kariyenkappu, KJD 26371

Fl. & Fr.: October-November

Distribution: Plantations of Kariyenkappu

CENCHRUS L.

Sp. Pl.: 1049. 1753.

Cenchrus polystachios (L.) Morrone, Ann. Bot. (Oxford) 106: 129. 2010. *Panicum polystachyon* L., Syst. Nat. (ed. 10) 2: 870. 1759. *Cenchrus setosus* Sw., Prodr. Veg. Ind. Occ. 26. 1788. *Pennisetum setosum* (Sw.) L.C. Rich. in Pers., Syn. Pl. 1: 72. 1805; Hook.f., Fl. Brit. India 7: 87. 1896. *Pennisetum polystachyon* (L.) Schult., Syst. Veg. 2: 146. 1824; C.E.C.Fisch. in Gamble, Fl. Madras 1792(1241). 1934; Manilal & Sivar., Fl. Calicut 340. 1982; Ansari, Fl. Kasaragod Div. 475. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 551. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 291. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1006. 2009.

Stout annual herbs; culms to 1.5 m tall, erect. Leaves 10-30 x 0.4-1.3 cm, linear or linear-lanceolate, base rounded, apex acuminate, tubercle-based hairy or glabrous; sheaths to 22 cm long, keeled, villous at mouth; ligules membranous, fimbriate. Panicles 7-18 cm long, spiciform, creamy-yellow or reddish-purple; rhachis angular with sharp-edged decurrent wings. Involucre enclosing one sessile spikelet. Spikelets 3-4 mm long, lanceolate. Lower glume 0.5-1 mm long, ovate-acute; upper glume c. 3 x 1.5 mm, ovate-lanceolate. Lower floret male or barren. Upper floret bisexual. First lemma c. 3 x 1.5 mm, ovate-lanceolate; palea hyaline. Second lemma 2-3 x 1 mm, oblong-acute, coriaceous; palea c. 2 x 1 mm, oblong, coriaceous. Stamens 3; anthers yellow. Ovary c. 0.5 mm long; stigma golden-yellow. Grains cylindrical.

Chavachi, *KVB 31612*; Kariyenkappu, *NS & KVB 26203*

Fl. & Fr.: April-December

Distribution: Common in open areas, mostly along road side and Plantation.

CENTOTHECA Desv.

Nouv. Bull. Sci. Soc. Philom. Paris 2: 189. 1810.

Centotheca lappacea (L.) Desv., Nouv. Bull. Sci. Soc. Philom. Paris 2: 189. 1810; Hook.f., Fl. Brit. India 7: 332. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1848 (1279). 1934; Ansari, Fl. Kasaragod Div. 452. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 529. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 354. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 957. 2009. *Cenchrus lappaceus* L., Sp. Pl. (ed. 2) 1488. 1763. *Holcus latifolius* Osbeck, Dagb. Ostind. Resa 247. 1757. *Centotheca latifolia* (Osbeck) Trin., Fund. Agrost. 141. 1820; Sivar. & Mathew, Fl. Nilambur 821. 1997.

Perennial herbs; culms 30-80 cm high, tufted. Leaves 6-20 x 1.3-3.2 cm, elliptic-lanceolate, base oblique, apex acute or acuminate, with prominent transverse veins; sheaths to 8.5 cm long, ciliate along the margins; ligules membranous. Panicles 8-20 cm long, pyramidal, lax. Spikelets 5-8 mm long, elliptic-oblong, 2-3-flowered. Lower glume 2-3 x 1-1.5 mm, ovate-lanceolate; upper glume to 3.5 mm long, lanceolate. Lemmas 3-4 x 1-2 mm, oblong or the upper ones with reflexed, tubercle-based bristles along the margins; paleas c. 3 x 1 mm, elliptic, 2-keeled. Stamens 2 or 3. Stigmas pink. Grains to 1.5 mm long, obovoid.

Meanmutti, NS & KVB 26201

Fl. & Fr.: October-February

Distribution: Common in all vegetation types below 1,200 m.

CHRYSOPOGON Trin.

Fund. Agrost. 187. 1820, *nom. cons.*

Chrysopogon hackelii (Hook.f.) C.E.C.Fisch. in Gamble, Fl. Madras 1739(1205). 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 530. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 62. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 959. 2009. *Andropogon hackelii* Hook.f., Fl. Brit. India 7: 194. 1896.

Robust perennial herbs; culms 80-150 cm high, nodes glabrous. Leaves 15-40 x 0.4-1 cm, linear-lanceolate, glabrous; sheath strongly keeled; ligule a tuft of hairs. Panicle 10-20 cm long, pyramidal. Sessile spikelets 5 x 1.5 mm, lanceolate. Lower glume 5 x 1.5 mm, glabrous, aristate, arista 5 mm long; upper glume 5 mm long, linear-oblong; first lemma 3 x 1 mm, hyaline, ciliate along margins; second lemma oblong; awn 20 mm long; anther 2.5 mm long; pedicelled spikelets 4-5 mm long, acute, awnless.

Ambalappara, KVB 26210

Fl. & Fr.: October-January

Distribution: Common in grasslands of Ambalappara. Endemic to Peninsular India.

COELACHNE R.Br.

Prodr. Fl. Nov. Holland.1: 187. 1810.

Coelachne simpliciuscula (Steud.) Munro ex Benth., J. Linn. Soc., Bot. 19: 93. 1881; Ramach. & V.J. Nair, Fl. Cannanore Dist. 531. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 415. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 959. 2009. *Panicum simpliciusculum* Wight & Arn. ex Steud., Syn. Pl. Glumac. 1: 96. 1854.

Coelachne pulchella R.Br. var. *simpliciuscula* (Wight & Arn. ex Steud.) Hook.f., Fl. Brit. India 7: 271. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1804 (1249). 1934.

Aquatic or marshy annual herbs; culms 10-25 cm high, erect or decumbent; nodes bearded. Leaves 2-5 x 0.2-0.5 cm, ovate-lanceolate, glabrous, rounded at base; sheath keeled, glabrous, ligule a row of hairs. Panicle 2-7 cm long, contracted, cylindrical, glabrous. Spikelets similar, 2 x 1 mm, ovate, glabrous. Glumes similar, ovate-orbicular; florets 2; lower bisexual, upper barren or with a rudimentary ovary; first lemma 2 x 1 mm, ovate, acute, hyaline; palea 2 x 1 mm elliptic. Stamens 3, free. Ovary elliptic; stigma plumose. Upper floret exerted.

Ambalappara, KJD 26247

Fl. & Fr.: September-February

Distribution: Rare near streams in evergreen forests of Ambalappara.

CYMBOPOGON Spreng.

Pl. Min. Cogn. Pug. 2: 14. 1815.

Cymbopogon flexuosus (Nees ex Steud.) W.Watson, Gaz. N. W. Ind. 392. 1882; C.E.C.Fisch. in Gamble, Fl. Madras 1756(1216). 1934; Ansari, Fl. Kasaragod Div. 454. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 71. 1991; 809; Ratheesh, Fl. Stud. Wayanad Dist. 961. 2009. *Andropogon flexuosus* Nees ex Steud., Syn. Pl. Glumac. 1: 388. 1854. *Andropogon nardus* L. var. *flexuosus* (Nees ex Steud.) Hack. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 6: 603. 1889; Hook.f., Fl. Brit. India 7: 207. 1896.

Perennial herbs; culms 80-240 cm high. Leaves 20-80 x 1-2 cm, linear, rounded at base, flat; sheaths glabrous; ligule ovate, membranous. Inflorescence a large greyish panicle; branches flexuous, often drooping. Racemes paired, with a spatheole beneath. Spikelets binate, one sessile, other pedicelled. Sessile spikelets 4-5 mm long, elliptic-lanceolate; Pedicelled spikelets 3-4 mm long. Lower glume c. 3 x 1 mm, elliptic-lanceolate, keels winged; upper glume ovate-lanceolate, margins ciliate. Lower floret empty; Upper floret bisexual. First lemma 2.5-3 x 1 mm, lanceolate, purplish, epaleate; second lemma c. 2 x 0.4 mm, deeply 2-fid, awned, hyaline. Stamens 3. Ovary oblong; stigmas 1-1.5 mm long. Caryopsis c. 2 mm long, elliptic.

Chavachi, KJD 18702

Fl. & Fr.: October-January

Distribution: Common along the boundaries of evergreen forests at Chavachi and plantations of Kariyenkappu.

CYNODON Rich.

Syn. Pl. 1: 85. 1805, *nom. cons.*

Cynodon dactylon (L.) Pers., Syn. Pl. 1: 85. 1805; Hook.f., Fl. Brit. India 7:288.1896; C.E.C.Fisch. in Gamble, Fl. Madras 1835(1270).1934; Manilal & Sivar., Fl. Calicut 339. 1982; Ansari, Fl. Kasaragod Div. 455. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 532. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 360. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 963.2009. *Panicum dactylon* L., Sp. Pl. 58.1753.

Slender, stoloniferous creeping perennial herbs. Leaves 1-10 x 0.1-0.5 cm, linear-lanceolate, acuminate, glaucous; sheaths keeled; ligules fimbriate, membranous. Inflorescence of terminal, digitate 3-4 spikes; spikes 1-sided, oblong to 5 cm long. Spikelets sessile, 2-3 mm long, oblong-lanceolate, laterally compressed, 1-flowered. Lower glume 1.5-2 x 0.5 mm, lanceolate, chartaceous, 1-nerved; upper glume c. 2 x 0.5 mm, lanceolate, 1-nerved; lemma 2-3 x 1.5-2 mm, boat-shaped, ovate-oblong when spread, keeled; palea 2-2.5 x 0.5-1 mm, boat-shaped or oblong when spread, chartaceous. Stamens 3; anthers 1-1.5 mm long. Ovary c.0.5 mm long, oblong; stigmas 0.5-1 mm long, pink. Caryopsis 1 mm, linear.

Chathrumala, *KJD* 26207

Fl. & Fr.: March-October

Distribution: Occasional along the paths in open areas.

CYRTOCOCCUM Stapf

Fl. Trop. Afr. 9: 15. 1917.

Cyrtococcum longipes (Hook.f.) A. Camus, Bull. Mus. Natl. Hist. Nat. 27: 118. 1921; C.E.C.Fisch. in Gamble, Fl. Madras 1786(1237). 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 533. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 229. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 964. 2009. *Panicum longipes* Wight & Arn. ex Hook.f., Fl. Brit. India 7: 58. 1896.

Perennials; culms 50-120 cm long, geniculate or trailing; nodes glabrous. Leaves 10-25 x 0.7-1.5 cm, linear-lanceolate, narrowed to the base, membranous, glabrous; sheath keeled, glabrous; ligule membranous. Panicle 10-30 cm long, drooping; branches filiform, smooth. Spikelets 2 x 1 mm; glumes subequal, 1.2-1.5 x 0.7-1 mm; upper one cuspidate. First lemma 1.5 mm long, ovate, epaleate; second lemma 1.5 x 1 mm, concave, crustaceous, 3-nerved; palea oblong, 2-nerved.

Pothurumi, *KVB* 26205; Ambalappara, *NS* & *KJD* 26241

Fl. & Fr.: August-March

Distribution: Common in open areas in evergreen and semi-evergreen forests.

DIGITARIA Heist. ex Fabr.

Enum. [Fabr.]. 207. 1759.

- 1a. Racemes 2-3; rachis not serrate *D. longiflora*
1b. Racemes 3-7; rachis serrate *D. ciliaris*

Digitaria ciliaris (Retz.) Koeler, Descr. Gramin 27. 1802; Manilal & Sivar., Fl. Calicut 335. 1982; Ansari, Fl. Kasaragod Div. 458. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 535. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 237. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 968. 2009. *Panicum ciliare* Retz., Observ. Bot. 4. 16. 1786. *Digitaria marginata* Link, Enum. Hort. Berol. Alt. 1: 102. 1821; C.E.C.Fisch. in Gamble, Fl. Madras 1764(1222). 1934. *Paspalum sanguinale* (L.) Lam. var. *rottleri* Hook.f., Fl. Brit. India 7: 15. 1896.

Annual herbs; culms to 60 cm tall, erect or decumbent, rarely creeping. Leaves 3-8 x 0.3-1 cm, oblong-linear or linear-lanceolate, rounded or shallowly cordate at base, acuminate at apex, flat; sheaths slightly keeled, glabrous or pilose; ligules ovate or truncate, membranous. Racemes 3-7, digitate or subdigitate, to 15 cm long. Spikelets binate, 2.5-3.5 mm long, elliptic or elliptic-lanceolate. Lower glume 2-5 mm long, triangular; upper glume 2-2.5 mm long, lanceolate. Lower floret empty, epaleate. Upper floret bisexual. First lemma 2.5-3.5 x 0.5 mm, elliptic or elliptic-lanceolate; second lemma 2.5-3 x 1 mm, elliptic or elliptic-lanceolate, acuminate, crustaceous, brownish-yellow in fruit; palea 2.5-3 x 1 mm, elliptic-lanceolate, subcoriaceous, 2-keeled, 2-nerved. Stamens 3. Ovary c. 1 mm long; stigmas c. 1 mm long, pink.

Kariyenkappu, NS & KVB 26223

Fl. & Fr.: May-November

Distribution: Common in open areas near streams.

Digitaria longiflora (Retz.) Pers., Syn. Pl. 1: 85. 1805; C.E.C.Fisch. in Gamble, Fl. Madras 1765(1223). 1934; Manilal & Sivar., Fl. Calicut 335. 1982; Ansari, Fl. Kasaragod Div. 458. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 536. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 239. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 969. 2009. *Paspalum longiflorum* Retz., Observ. Bot. 4: 15. 1786; Hook.f., Fl. Brit. India 7: 17. 1896.

Annual herbs; culms 10-40 cm long, slender, creeping or geniculate. Leaves 2-7 x 0.3-0.7 cm, elliptic-lanceolate, rounded or shallowly cordate at base, apex acute; sheaths keeled; ligules ovate, membranous. Racemes 2 or 3, digitate, 2-7 cm long; rachis flat, c. 0.5 mm wide, winged. Spikelets solitary, 1-2 mm long,

ovate-elliptic, shortly hairy. Lower glume absent; upper glume 1-2 x 1 mm, ovate-elliptic, chartaceous, 5-9-nerved. Lower floret empty. Upper floret bisexual. First lemma similar to the upper glume; second lemma 1-1.5 x 1 mm, ovate-elliptic, crustaceous; Ppalea 1-1.5 x 0.5 mm, elliptic, 2-keeled, 2-nerved. Stamens 3; anthers c. 0.5 mm. Stigmas c. 1 mm long.

Narikkadavu, NS & KVB 26231

Fl. & Fr.: May-November

Distribution: Common in open areas

DIMERIA R.Br.

Prodr. Fl. Nov. Holland.204. 1810.

Dimeria thwaitesii Hack., In A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 6: 78. 1889; C.E.C.Fisch. in Gamble, Fl. Madras 1713(1188). 1934; Sreek. & V.J. Nair, Fl. Kerala Grasses 100. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 974. 2009. *Dimeria pusilla* Thwaites var. *pallida* Thwaites ex Hook.f., Fl. Brit. India 7: 103. 1896.

Culms 30-45 cm tall, tufted; nodes bearded. Leaves 3-6 x 0.3 cm, glabrous. Raceme 3-4.5 cm long, solitary or paired; rachis flat, straight; margins ciliate. Spikelets 4-5.5 mm long; callus hairs 1 mm long Lower glume 4 x 1 mm, hairy along the keel; upper glume 5 x 1.5 mm, aristate, keels with long hairs. First lemma 1.5 x 0.5 mm, 1-nerved; second lemma 3 x 1 mm, awned; awn 9-11 mm long; stamens 2.

Ambalappara, KJD 26244

Fl. & Fr.: January-February

Distribution: Rare in evergreen forests of Ambalappara.

ELEUSINE Gaertn.

Fruct. Sem. Pl. 1: 7. 1788.

Eleusine indica (L.) Gaertn., Fruct. Sem. Pl. 1: 8. 1789; Hook.f., Fl. Brit. India 7: 293. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1839(1273). 1934; Manilal & Sivar., Fl. Calicut 340. 1982; Ansari, Fl. Kasaragod Div. 459. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 538. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 371. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 976. 2009. *Cynosurus indicus* L., Sp. Pl. 72. 1753.

Annual herbs; culms tufted, 10-50 cm high. Leaves 5-25 x 0.4-0.6 cm, linear-lanceolate or linear, base rounded, blunt at apex, often folded; sheaths keeled, softly pilose; ligule truncate, membranous. Spikes digitate or subdigitate, 2-18,

each 3-8 cm long. Spikelets 4-6 mm long, ovate or oblong, 3-6-flowered. Lower glume 1.5-2.5 x 0.5-1 mm, lanceolate, keeled, chartaceous, 3-nerved; upper glume 2-3 x 1 mm, oblong, keeled, chartaceous, 5-nerved; lemmas 2-3 x 1.5-2 mm, ovate-oblong, chartaceous, 3-nerved, sub acute; paleas 2-2.5 x 1 mm, oblong-elliptic, 2-keeled, 2-nerved. Stamens 3; anthers c.0.5 mm long. Ovary c. 0.5 mm long, elliptic; stigmas c. 0.5 mm long, violet. Caryopsis subglobose, deeply grooved on one side, transversely rugose.

Kariyenkappu, NS & KVB 26224

Fl. & Fr.: Throughout the year

Distribution: Common in the plantation of Kariyenkappu and Semi-Evergreen forests of Narikkadavu and Paripode.

ERAGROSTIS Wolf

Gen. Pl. 23. 1776.

Eragrostis unioides (Retz.) Nees ex Steud., Syn. Pl. Glumac. 1:264.1854; C.E.C.Fisch. in Gamble, Fl. Madras 1826(1264). 1934; Hook.f., Fl. Brit. India 7: 317.1896; Manilal & Sivar., Fl. Calicut 347. 1982; Ansari, Fl. Kasaragod Div. 462. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 542. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 392.1991; Ratheesh, Fl. Stud. Wayanad Dist. 980. 2009. *Poa unioides* Retz., Observ. Bot. 5: 19. 1788. *Eragrostis amabilis* sensu Stapf in Hook.f., Fl. Brit. India 7: 317. 1896, non Wight & Arn. ex Nees 1838.

Annual herbs; culms tufted, 10-55 cm high, erect or geniculate. Leaves 3-18 x 0.2-0.5 cm, linear-lanceolate or lanceolate, base rounded or shallowly cordate, apex acuminate; sheaths to 5 cm long; ligules membranous. Panicles 5-15 cm long, lax. Spikelets 4-6 x 2-4 mm, broadly ovate or ovate-oblong, 10-32-flowered, purplish. Lower glume 1-1.5 x 0.5 mm, lanceolate, 1-nerved; upper glume 1-2 x 0.5-1 mm, ovate-lanceolate; lemmas 1.5-2.5 x 1-1.5 mm, broadly ovate, 3-nerved; paleas 1-2 x 1 mm, elliptic, 2-keeled. Stamens 3, violet. Stigmas white. Grains c. 1 mm long, ellipsoid, reddish-brown.

Kariyenkappu, NS & KVB 26221

Fl. & Fr.: Throughout the year

Distribution: Common in all vegetation types.

GARNOTIA Brongn.

in Duperrey, Voy. Coq. Bot. Phan. 2: 132, t. 21. 1832.

1a. Leaves rounded or cordate at base, lower glume equal to upper glume ... *G.arundinacea*

1b. Leaves narrowed to the base; lower glume longer than the upper glume..... *G. tenella*

Garnotia arundinacea Hook.f., Fl. Brit. India 7: 243. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1812(1255). 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 543. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 409. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 981. 2009.

Perennial herbs; culms 40-90 cm tall, robust, geniculate; nodes thickened and bearded. Leaves 10-18 x 1.5-2 cm, ovate-oblong, rounded at base, terminating into a filiform tip, ciliate along the margins; sheath rounded, ligule a membrane. Panicle 5-15 cm, congested, branches angled, scabrid. Spikelets 2.5 x 1 mm, pedicelled. Glumes equal, 2.5 x 1 mm, aristate, 3-nerved, scabrid along the nerves. Lemma similar to glumes, bifid at tip, awned; awn 7 mm long; palea 2 x 0.5 mm, oblong. Anthers 1.2 mm long.

Ambalappara, NS & KJD 26243; KVB 26209

Fl. & Fr.: July-December

Distribution: Common near water bodies in the evergreen forests of Ambalappara.

Garnotia tenella (Arn. ex Miq.) Janowsky, Repert. Spec. Nov. Regni Veg. 17:86.1921; Ansari, Fl. Kasaragod Div. 464. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 413. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 983. 2009. *Berghausia tenella* Arn. ex Miq., Anal. Bot. Ind. 3: 34. 1851. *Garnotia stricta* sensu Hook.f., Fl. Brit. India 7: 243. 1896, non Brongn. 1832; C.E.C.Fisch. in Gamble, Fl. Madras 1812(1255). 1934.

Annuals or perennial herbs; culms 10-50 cm high, tufted; nodes bearded. Leaves 10-18 x 0.2-0.6 cm, lanceolate, scabrid along the margins; sheath rounded, ligule membranous. Panicle 5-30 cm long, effuse, branches angled. Spikelets 3.5 x 1 mm, lanceolate, glabrous. Glumes subequal, 3-3.5 x 1 mm, aristate, 3-nerved. Lemma 2.5 x 1 mm, lanceolate, 3-nerved; palea 2 x 0.5 mm, hyaline. Stamens 3.

Ambalappara, KJD 25518

Fl. & Fr.: May-December

Distribution: Rare in evergreen forests of Ambalappara.

ISCHAEMUM L.

Sp. Pl. 2: 1049. 1753

Ischaemum indicum (Houtt.) Merr., J. Arnold Arbor. 19: 320. 1938; Ramach. & V.J. Nair, Fl. Cannanore Dist. 545. 1988; R. Kr. Singh & P.S.N. Rao, J. Econ. Taxon. Bot. 32: 812. 2008; Ratheesh, Fl. Stud. Wayanad Dist. 988. 2009. *Phleum indicum* Houtt., Nat. Hist. 3: 198, t.90. f.2. 1782. *Ischaemum aristatum*

C.E.C.Fisch. in C.E.C.Fisch. in Gamble, Fl. Madras 1721(1193). 1934, non L. 1753. *Ischaemum ciliare* Retz., Observ. Bot. 6: 36. 1791; Hook.f., Fl. Brit. India 7: 133. 1896.

Perennials; culms 20-100 cm high, tufted; nodes densely villous. Leaves linear-lanceolate, 4-20 x 0.3-1 cm, acuminate, narrowed and sometimes petiolate at bases, glabrous or densely villous; Sheaths keeled. Racemes 2, 3-8 cm long; joints turbinate, 2-2.5 mm long, densely ciliate. Sessile spikelets oblong or obovate, 5-6 mm long, awned; lower glume oblong or obovate, slightly notched at apex, winged on either side, 4.5-5.5 x 1-1.5 mm, chartaceous, 7-9 nerved, densely long pilose; upper glume, florets.

Kariyenkappu, *KJD 26233*

Fl. & Fr.: October-November.

Distribution. Common in plantations and Grasslands.

ISACHNE R.Br.

Prodr. Fl. Nov. Holland.196. 1810.

- 1a. Lemma ciliate, spikelet less than 3 mm..... *I. globosa*
1b. Lemma not ciliate, spikelet more than 3 mm..... *I. walkeri*

Isachne globosa (Thunb.) Kuntze, Revis. Gen. Pl. 2: 778. 1891; Sreek. & V.J. Nair, Fl. Kerala Grasses 421. 1991. *Milium globosum* Thunb., Fl. Japan 49. 1784. *Isachne australis* R.Br., Prodr. Fl. Nov. Holland.1: 196. 1810; Hook.f., Fl. Brit. India 7: 24. 1896. *Isachne dispar* Hook.f., Fl. Brit. India 7: 26. 1896p.p., non Trin. 1828.

Trailing perennial herbs; culms 30-60 cm high, trailing; nodes glabrous. Leaves 4-10 x 0.2-0.6 cm, ovate-lanceolate, base rounded, margin serrulate; sheath glabrous; ligule a tuft of hairs. Panicle 4-10 cm long, branches serrulate. Spikelets 2-2.5 x 1.5-2 mm, globose. Glumes similar, 1.5-2 x 1 mm, broadly ovate. First lemma 2 x 1 mm, obtuse, glabrous; palea 2-nerved; second lemma 1.25 x 1 mm, broadly ovate, obtuse, ciliate along the margin; palea 1 x 1 mm, 2-keeled. Stamens 3; anthers 1.5-2 mm long.

Ambalappara, *KVB 26216*

Fl. & Fr.: Throughout the year

Distribution: Common in evergreen forests of Ambalappara.

Isachne walkeri (Arn. ex Steud.) Wight & Arn. ex Thwaites, Enum. Pl. Zeyl. 361. 1864; Hook.f., Fl. Brit. India 7: 26. 1896; C.E.C.Fisch. in Gamble, Fl. Madras

1797(1244). 1934; Sreek. & V.J. Nair, Fl. Kerala Grasses 426. 1991. *Panicum walkeri* Arn. ex Steud., Syn. Pl. Glumac. 1: 97. 1854.

Stout perennial herbs; culms trailing or erect, 60-120 cm high, robust; nodes glabrous, rooting from lower ones. Leaves 15-25 x 1.5-2.5 cm, lanceolate, subcoriaceous, glabrous; margins cartilaginous; sheath rounded, ligule a tuft of hairs. Panicle lax; branches with glandular bands. Spikelets 3-4 mm long, pedicelled, ovate, acute. Glumes equal, 3 x 1 mm, ovate, obtuse, glabrous. Lemmas 3 x 1.5 mm, ovate, obtuse, coriaceous; palea 3 x 1 mm. Stamens 3; ovary elliptic, stigma plumose.

Ammayikallu, KVB 26217

Fl. & Fr.: August-March

Distribution: Common in open areas.

JANSENELLA Bor

Kew Bull. 10: 96. 1955.

Jansenella griffithiana (C. Muell.) Bor, Kew Bull. 1955: 98. 1955; Ramach. & V.J. Nair, Fl. Cannanore Dist. 546. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 348. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 991. 2009. *Danthonia griffithiana* C. Muell., Bot. 2. 14. 347. 1856. *Arundinella avenacea* Munro ex Thwaites, Enum. Pl. Zeyl. 362. 1864; Hook.f., Fl. Brit. India 7: 69. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1801(1246). 1934.

Annual herbs; culms 9-18 cm long, creeping and geniculate. Leaves 0.8-3.5 x 0.5-1 cm, elliptic-lanceolate, base amplexicaule, apex acuminate; sheaths slightly keeled; ligules ovate, membranous. Panicles densely compact, capitate, to 3.5 cm long. Spikelets 5-8 mm long, elliptic-lanceolate. Lower glume 4-5 mm long, lanceolate, acuminate; upper glume 5-8 x 1-1.5 mm, lanceolate, caudate-acuminate, 3-5-nerved. Lower floret male. Upper floret bisexual. First lemma 4-5 x 1-2 mm, oblong-lanceolate, acuminate; palea c. 3x1 mm, oblong, notched, hyaline, 2-keeled. Second lemma 3-4 x 1-1.5 mm, oblong, notched, 2-aristate, with tufted hairs on either side, awned; awn to 1 cm long; palea 2-3 mm long, linear-oblong, notched, 2-keeled, hairy on dorsal side. Stamens 3. Stigmas c.1 mm long.

Ambalappara, KJD 25525

Fl. & Fr.: October-December

Distribution: Rare in the grasslands of Ambalappara.

OXYTENANTHERA Munro

Trans. Linn. Soc. London 26: 126. 1868.

Oxytenanthera monadelpha (Thwaites) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) 342. 1931; C.E.C.Fisch. in Gamble, Fl. Madras 1861(1288). 1934; Ratheesh, Fl. Stud. Wayanad Dist. 997. 2009. *Dendrocalamus monadelphus* Thwaites, Enum. Pl. Zeyl. 376. 1864. *Pseudoxytenanthera monadelpha* (Thwaites) Sodestrom & Ellis, Smiths. Contrib. Bot. 72: 52. 1988. *Oxytenanthera thwaitesii* Munro, Trans. Linn. Soc. London 26: 129. 1868; Hook.f., Fl. Brit. India 7: 402. 1896.

Shrubby bamboo; culms, tufted. Leaves to 20 x 3 cm, ovate, lanceolate, long acute at apex, margins, minutely serrate. Panicles of spicate branches; spikelets in clusters, forming pseudo-panicles, to 1.5 cm long, with 1 fertile and 2 dormant florets. Lower glume 5 mm, obovate-triangular, mucronate, ciliate along the margins and upper part. Upper glume 9 mm, oblong-triangular. Lemma 12 mm, ovate-elongate, mucronate; palea little smaller. Stamens 6, filaments united.

Ambalappa, NS & KJD 31958; KJD 26348

Fl. & Fr.: September-January

Distribution: Common in evergreen forests of Ambalappara.

Endemic to Western Ghats.

OCHLANDRA Thwaites

Enum. Pl. Zeyl. 376. 1864.

Ochlandra travancorica (Bedd.) Benth. ex Gamble, Ann. Roy. Bot. Gardner (Calcutta) 7: 125. t.111. 1896 & Hook.f., Fl. Brit. India 7: 419. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1863(1289). 1934; Seethalakshmi & Muktesh, Bamboos India 191. 1998; Ratheesh, Fl. Stud. Wayanad Dist. 994. 2009. *Bheesha travancorica* Bedd., Fl. Sylv. t.324. 1891. *Ochlandra travancorica* Benth. ex Gamble var. *hirsuta* Gamble, Ann. Roy. Bot. Gardner (Calcutta) 7: 126. 1896 & C.E.C.Fisch. in Gamble, Fl. Madras 1863 (1290). 1934. *Ochlandra sivagiriana* (Gamble) E.G.Camus, Les Bambusees 181. 1913. *Ochlandra sodestromiana* Muktesh & Stephen, Rheedeia 9: 33. 1999.

Tall reed-like grasses; rootstock rhizomatous, branched; culms to 5 m tall, densely clumped, hollow, covered with culm sheaths; culm sheaths with small limbs. Leaves scattered, 20-40 x 5-10 cm, oblong-lanceolate, base truncate, or cuneate, glabrous; sheaths tubular, mouth with stiff bristles; ligule short. Panicles large, spicate. Spikelets in verticils, 3-9 together, sessile, 5-6 cm long. Glumes 2-5, unequal, to 5 cm long, lanceolate, mucronate, smooth; florets one,

bisexual. Lemmas 5 cm long, elliptic-oblong, muticous; palea membranous, stamens 20-40, filaments monadelphous; style long; stigma 4-6; fruit ovoid, 2-3 x 1.5 cm, beaked, smooth.

Kariyenkappu, *KJD 18710*

Fl. & Fr.: November-May

Distribution: Planted at Kariyenkappu and Chavachi.

OPLISMENUS P. Beauv.

Fl. Oware 2: 14, 1809, *nom. cons.*

Oplismenus compositus (L.) P. Beauv., Ess. Agrostogr. 54. 168. 1812; Hook.f., Fl. Brit. India 7: 66. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1778(1231). 1934; Manilal & Sivar., Fl. Calicut 341. 1982; Ansari, Fl. Kasaragod Div. 470. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 547. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 257. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 995. 2009. *Panicum compositum* L., Sp. Pl. 57. 1753.

Annual herbs; culms 25-80 cm long, trailing, creeping. Leaves 1.5-7 x 0.8-2 cm, elliptic-lanceolate or ovate-lanceolate, base oblique, margins wavy, apex acuminate, hispid; sheaths to 6 cm long; ligule a row of hairs. Inflorescence 8-20 cm long, lax; racemes 4-8, each 1.5-11 cm long; rachis triquetrous, pilose. Spikelets paired, 3-4 mm long, elliptic, distant, sessile. Lower glume 2-3 x 1 mm, lanceolate, awned; awn 4-6 mm long; upper glume 2-3 x 1 mm, ovate-elliptic, aristate. Lower floret barren. Upper floret bisexual. First lemma 3-4 x 1-2 mm, ovate; palea 1-2 mm long, lanceolate; second lemma 2-3 x 1 mm, elliptic, subcoriaceous; palea 2-3 x 1 mm, elliptic, subcoriaceous, 2-keeled. Stamens 3; anthers c. 1 mm long, purple. Stigma c 1 mm long, reddish. Grains c. 1mm long, ellipsoid.

Ammayikallu, *KVB 26218*

Fl. & Fr.: Throughout the year

Distribution: Rare in evergreen forests at Ammayikallu.

OTTOCHLOA Dandy

J. Bot. 69: 54. 1931.

Ottochloa nodosa (Kunth) Dandy, J. Bot. 69: 55. 1931; C.E.C.Fisch. in Gamble, Fl. Madras 1778(1232). 1934; Sreek. & V.J. Nair, Fl. Kerala Grasses 258. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 997. 2009. *Panicum nodosum* Kunth, Enum. Pl. 1: 97. 1833; Hook.f., Fl. Brit. India 7: 43. 1896.

Perennial herbs; culms 25-80 cm long, creeping, rooting at the lower nodes. Leaves 3-11 x 0.6-1.3 cm, elliptic-lanceolate, base rounded, apex acuminate; sheaths to 4 cm long, ciliate along one margin; ligules narrow, membranous. Panicles 6-14 cm long, lax; racemes 5-10, alternate, opposite, each 1-8 cm long. Spikelets 3-4 mm long, elliptic-lanceolate. Lower glume to 1.5 x 1 mm, ovate-lanceolate, 3-5-nerved; upper glume 1.5-2 x 1 mm, elliptic-lanceolate, 7-nerved. Lower floret barren, epaleate. Upper floret bisexual. First lemma 3-4 mm long, elliptic-lanceolate; second lemma c.3 x 1.5 mm, elliptic, subcoriaceous; palea 2-3 x 1 mm, elliptic, subcoriaceous, 2-keeled. Stamens 3; anthers yellow. Stigmas purple.

Kariyenkappu, NS & KJD 26115

Fl. & Fr.: June-December

Distribution: Common in open areas.

PANICUM L.

Sp. Pl. 55. 1753.

Panicum notatum Retz., *Observ. Bot.* 4: 18. 1786; Ansari, *Fl. Kasaragod Div.* 472. 1985; Sreek. & V.J. Nair, *Fl. Kerala Grasses* 267.1991; Ratheesh, *Fl. Stud. Wayanad Dist.* 999. 2009. *Panicum montanum* Roxb., *Fl. Ind.* 1: 315. 1820; Hook.f., *Fl. Brit. India* 7: 53. 1896; C.E.C.Fisch. in Gamble, *Fl. Madras* 1783(1235). 1934.

Perennial herbs; culms to 2 m tall, erect. Leaves 7-20 x 1-3.5 cm, lanceolate, base subcordate, apex acuminate, flat, midrib prominent; sheaths to 10 cm long, ciliate along one margin; ligules membranous with a few long hairs behind. Panicles 15-30 cm long, lax; branches to 21 cm long. Spikelets 2.5-3 mm long, ovate-oblong, acute; pedicels to 1.5 cm long. Lower glume c.2 x 1 mm, ovate-lanceolate, acute; upper glume c. 2 x 1 mm, ovate. Lower floret barren. Upper floret bisexual. First lemma c. 2.5 x 1 mm, ovate. Palea absent. Second lemma c. 2 x 1.5 mm, ovate. Palea absent. Second lemma c. 2 x 1.5 mm, ovate, subcoriaceous. Palea c. 2 x 1 mm, ovate, subcoriaceous. Stamens 3; anthers yellow. Ovary elliptic; stigmas c. 1 mm long, violet. Grains c. 1.5 mm long, ovate.

Amayikallu, KVB 31653

Fl. & Fr.: September-December

Distribution: Fairly common in the Moist deciduous forests of Amayikallu, Bhoothamkallu and also in plantations of Kariyenkappu.

PASPALUM L.

Syst. Nat. ed. 10, 2: 855. 1759.

- 1a. Spikelets 2 mm long, glumes glabrous *P. scrobiculatum*
- 1b. Spikelets 1.5 mm, glumes ciliate 2
- 2a. Racemes paired or rarely 3, rachis flat *P. conjugatum*
- 2b. Racemes 3 or more, alternate, rachis subtriquetrous *P. canarae*

Paspalum canarae (Steud.) Veldkamp, Blumea 21: 72. 1973; Sreek. & V.J. Nair, Fl. Kerala Grasses 282. 1991. *Panicum canarae* Steud., Syn. Pl. Glumac. 1: 58. 1853. *Paspalum compactum* sensu Hook.f., Fl. Brit. India 7: 12. 1896, non Roth ex Roem. & Schult. 1817; C.E.C.Fisch. in Gamble, Fl. Madras 1772(1228). 1934.

Annual herbs; culms 10-30 cm high, trailing; nodes hairy. Leaves 2-5 x 0.5-1.2 cm, ovate, acute, cordate and decurrent at base, densely hairy; sheath keeled, hairy; ligule a small ridge only. Racemes 8-15, rachis covered with bulbous based hairs. Spikelets 1.2 x 1 mm, usually paired at the basal part of the raceme; upper glume 1 x 0.5 mm, elliptic, 3-nerved, glabrous; first lemma 1.2 x 1 mm, 3-nerved; second lemma 1 x 0.9 mm, nerveless, crustaceous; palea similar to lemma.

Ambalappara, NS & KJD 26242

Fl. & Fr.: October-December

Distribution: Rare near small streams in evergreen forests of Ambalappara. Endemic to Peninsular India.

Paspalum conjugatum P.J.Bergius, Acta Helv. Phys.-Math. 7: 129. 1772; Hook.f., Fl. Brit. India 7: 11. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1772 (1228). 1934; Manilal & Sivar., Fl. Calicut 337. 1982; Ansari, Fl. Kasaragod Div. 474. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 550. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 285.1991; Ratheesh, Fl. Stud. Wayanad Dist. 1003.2009.

Perennial herbs; culms to 150 cm long, creeping or stoloniferous, rooting at the nodes. Leaves 3-18 x 0.4-1.3 cm, lanceolate, base rounded or narrowed, apex acuminate; sheaths to 6 cm long, keeled, ciliate along one margin; ligules membranous. Racemes 2, 4-11 cm long, conjugate. Spikelets 1.5-2 mm long, orbicular or broadly elliptic, creamy-yellow. Lower glume absent; upper glume 1-1.5 x 1 mm, orbicular or ovate, membranous, long ciliate along the margins. Lower floret barren. Upper floret bisexual. First lemma 1-1.5 x 1 mm, orbicular or ovate, membranous; second lemma c. 1 x 1 mm, ovate or orbicular, crustaceous, 2-keeled. Stamens 3; anthers yellow. Stigmas white.

Chavachi, NS & KVB 26228

Fl. & Fr.: Throughout the year

Distribution: Common in open areas near streams.

Paspalum scrobiculatum L., Mant. Pl. 1: 29. 1767; Hook.f., Fl. Brit. India 7: 10. 1896; C.E.C.Fisch. in Gamble, Fl. Madras 1772(1227). 1934; Manilal & Sivar., Fl. Calicut 337. 1982; Ansari, Fl. Kasaragod Div. 474. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 551. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 287. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1004. 2009. *Paspalum orbiculare* G.Forst., Fl. Ins. Austr. 7. 1786; C.E.C.Fisch. in Gamble, Fl. Madras 1772(1227). 1934.

Annual or perennial herbs; culms 15-80 cm high, tufted, erect or creeping and rooting at the lower nodes; nodes glabrous. Leaves 3.5-36 x 0.4-1 cm, lanceolate to linear, base rounded, apex acuminate; sheaths to 15 cm long; ligules membranous, ciliate. Racemes usually 2, rarely 3-5, 2.5-7 cm long; rachis flat. Spikelets 2-ranked or 3-ranked, 2-3.5 mm long, ovate-orbicular or obovate, obtuse. Lower glume absent. Upper glume 2-3.5 x 2-2.5 mm, ovate or orbicular, membranous. Lower floret barren. Upper floret bisexual. First lemma 2-3.5 x 2-2.5 mm, ovate or orbicular, crustaceous; palea 2-2.5 x 1.5-2 mm, ovate or orbicular, crustaceous, inflexed. Stamens 3; anthers yellow or brown. Ovary c. 0.5 mm long; stigmas creamy yellow or violet in colour.

Chavachi, NS & KVB 26230

Fl. & Fr.: Throughout the year

Distribution: Common in the evergreen forests of Chavachi and plantations of Kariyenkappu near streams.

POGONATHERUM P. Beauv.

Ess. Agrostogr. 56. 1812.

Pogonatherum crinitum (Thunb.) Kunth, Enum. Pl. 1: 476. 1833; Hook.f., Fl. Brit. India 7: 141. 1896; Sur, J. Econ. Taxon. Bot. 6: 665. 1985; Ansari, Fl. Kasaragod Div. 476. 1985; Sreek. & V.J. Nair, Fl. Kerala Grasses 176. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1007. 2009. *Andropogon crinitum* Thunb., Fl. Jap. 40. 1784. *Pogonatherum paniceum* sensu C.E.C.Fisch. in Gamble, Fl. Madras 1714(1188). 1934, non (Lam.) Hack. 1906.

Perennial herbs; culms densely tufted, 12-22 cm high; nodes sparsely villous. Leaves 1-4 x 0.1-0.4 cm, elliptic-lanceolate, base narrowed, apex acute; sheaths villous towards mouth; ligules membranous. Raceme solitary, 1-2.5 cm long, slender. Sessile spikelets 1.5-2 mm long, lanceolate, awned, yellow. Lower glume c. 1 mm long, oblong; upper glume 1.5-2 mm long, ovate-lanceolate, awned; awns

15-25 mm long. Lower floret empty; upper floret bisexual; first lemma c. 1 mm long, ovate-oblong, epaleate; second lemma c. 1.5 mm long, notched, awned; awn 2-3 cm long; palea c. 1 mm long, ovate-oblong, hyaline, 2-keeled. Stamen 1; anthers pale yellow. Stigmas cream coloured. Pedicelled spikelets similar.

Ambalappara, KVB 31689

Fl. & Fr.: December-March

Distribution: Fairly common in grasslands of Ambalappara.

PSEUDECHINOLAENA Stapf

Fl. Trop. Afr. 9: 494 (1919).

Pseudechinolaena polystachya (Kunth) Stapf in Oliver, Fl. Trop. Africa 9: 495. 1919; C.E.C.Fisch. in Gamble, Fl. Madras 1766(1224). 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 553. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 293. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1008. 2009. *Echinolaena polystachya* Kunth, Nov. Gen. Sp. 1: 119. 1816. *Panicum uncinatum* Raddi, Agrost. Bass. 41: 1823; Hook.f., Fl. Brit. India 7: 58. 1896.

Slender annuals; nodes appressed pubescent. Leaves ovate-lanceate, 1.5-4.5 by 0.5-1 cm, base oblique, apex acute, pilose. Inflorescences of distant racemes. Spikelet ovoid, solitary, dorsally compressed. Lower glume broadly ovate, 3-nerved, aristate; upper glume boat-shaped, 7-nerved, with rows of hooked bristles in between. Lower lemma ovate, 3-nerved; palea convolute. Upper lemma crustaceous, 5-nerved, paleate. Stamens 3. Grain oblong, gibbous on the back.

Kattikkari, KJD 26178

Fl. & Fr.: September-February

Distribution: Rare in Kattikkari near waterlogged area

SETARIA P. Beauv.

Ess. Agrostogr. 51, 178, t. 13, f. 3. 1812.

Setaria pumila (Poir.) Roem. & Schult., Syst. Veg. 2: 891. 1817; Ansari, Fl. Kasaragod Div. 479. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 554. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 309. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1014. 2009. *Panicum pumilum* Poir. in Lam., Encyc. Suppl. 4: 273. 1816. *Setaria pallida-fusca* (Schum.) Stapf & C.E. Hubb., Bull. Misc. Inform. Kew 1930: 259. 1930; C.E.C.Fisch. in Gamble, Fl. Madras 1789(1239). 1934; Manilal & Sivar., Fl. Calicut 340. 1982. *Panicum pallida-fusca* Schum., Beskr. Guin. Pl. 58.1827.

Annual herbs; culms 30-105 cm high, erect. Leaves 5-23 x 0.4-1 cm, linear or lanceolate, base rounded, apex acuminate, sparsely hairy; sheaths to 8 cm long, keeled; ligules membranous, ovate. Panicles 4-10 cm long, spiciform, cylindrical, yellowish; bristles 3-7 mm long, scabrid. Spikelets 2-2.5 mm long, ovate or subglobose. Lower glume 1-1.5 mm long, ovate-acute; upper glume 1-2 mm long, ovate or orbicular. Lower floret male or barren. Upper floret bisexual. First lemma 2-2.5 x 1-2 mm, ovate-elliptic; palea 1.5-2 x 1-1.5 mm, elliptic, hyaline, 2-keeled. Stamens 3. Second lemma 2-2.5 mm long, ovate, beaked, rugose; palea 1.5-2 x 1 mm, ovate-oblong, crustaceous, rugose, 2-keeled. Stamens 3. Ovary oblong. Grains c. 1.5 mm long, ellipsoid.

Karienkappu, *KJD 25526*

Fl. & Fr.: July-November

Distribution: Common in plantations and Moist deciduous forests.

THEMEDA Forssk.

Fl. Aegypt.-Arab. 178. 1775.

- 1a. Spikelets with dense white callus hairs *T. cymbaria*
1b. Spikelets with brown callus hairs *T. triandra*

Themeda cymbaria (Roxb.) Hack. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 6: 668. 1889; C.E.C.Fisch. in Gamble, Fl. Madras 1746(1210). 1934; Sreek. & V.J. Nair, Fl. Kerala Grasses 196. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1018. 2009. *Anthistiria cymbaria* Roxb., Fl. Ind. 1: 255. 1820.

Perennial herbs; culms 60-250 cm high, stout, densely tufted. Leaves up to 120 x 1 cm, linear-lanceolate, nerves and margins sharply scabrous; sheath acutely keeled, glabrous; ligule membranous. Panicle 30-80 cm long, lax, bracts brown, boat-shaped; racemes 5-8 mm long, clustered. Involucral spikelets 4 x 1 mm, at different levels. Glumes subequal, glabrous; containing a male florets. Sessile bisexual spikelets 4-5 x 1 mm, with dense white callus hairs; lower glumes 4 x 1 mm, lanceolate, hirtus, coriaceous; first lemma oblong, chartaceous; second lemma awned; awn to 20 mm long.

Ambalappara, *KVB 26226*

Fl. & Fr.: October-May

Distribution: Common in Grasslands. Endemic to Peninsular India.

Themeda triandra Forssk., Fl. Aegypt.-Arab. 178. 1775; C.E.C.Fisch. in Gamble, Fl. Madras 1746(1209). 1934; Manilal & Sivar., Fl. Calicut 336. 1982; Ramach. &

V.J. Nair, Fl. Cannanore Dist. 555. 1988; Sreek. & V.J. Nair, Fl. Kerala Grasses 202. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1019. 2009. *Anthistiria imberbis* Retz., Observ. Bot. 3: 11. 1783; Hook.f., Fl. Brit. India 7: 211. 1896.

Perennial herbs; culms 50-170 cm high, erect, tufted. Leaves 10-25 x 0.4-0.8 cm, lanceolate, base rounded, apex acute, glabrescent; sheaths to 8 cm long, keeled; ligules membranous, fimbriate. Panicles 20-45 cm long; racemes to 6 x 3 cm; spatheoles 3-8 cm long, tuberculate-pilose. Involucral spikelets 2 pairs, 7-11 mm long, elliptic-lanceolate. Lower glume 7-10 mm long, elliptic, 2-keeled; upper glume 7-10 x 1-2 mm, lanceolate. Lower floret empty. Upper floret male. First lemma elliptic-lanceolate; second lemma ovate-acute. Stamens 3. Sessile spikelets solitary in a raceme, 7-10 mm long, oblong. Glumes oblong-lanceolate. Lower floret empty. Upper floret bisexual. Lemmas 3-5 mm long, elliptic, awns 2-5 cm long. Stamens 3. Pedicelled spikelets 2 in a raceme; glumes and spikelets similar to involucral spikelets.

Asthippara, KVB 31632

Fl. & Fr.: October-January

Distribution: Common in open areas in evergreen forests from Mullenpara to Ambalappara.

TRIOGON Roem. & Schult.

Syst. Veg. 2: 34, 600. 1817.

Tripogon bromoides Roem. & Schult., Syst. Veg. 600. 1817; C.E.C.Fisch. in Gamble, Fl. Madras 1834(1269). 1934; Sreek. & V.J. Nair, Fl. Kerala Grasses 399. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 1020. 2009.

Densely tufted perennial herbs; culms 10-35 cm high; nodes glabrous. Leaves usually basal, 5-30 x 0.1-0.3 cm, linear, base rounded, sparsely hairy above; mouth of sheath with long hairs; ligule a rim only. Raceme 10-30 cm long. Spikelets 0.5-1 cm long, oblong, glabrous, sessile. Lower glume 3 x 0.5 mm, 1-nerved, keeled; upper glume 5-6 x 1 mm, notched below the apex on one side, 3-nerved. Flowers 10-16; lemma 3-4 x 1-2 mm, 4-lobed at apex, 3-awned; one median and two laterals; median one twice the length of laterals; palea 3 x 1 mm, scabrid along the keels. Anthers 1 mm long.

Ambalappara, KJD 25523

Fl. & Fr.: August-March

Distribution: Rare near small streams in evergreen forests of Ambalappara.

Order: Zingiberales

COSTACEAE

HELLENIA Retz.

Observ. Bot. 6: 18. 1791.

Hellenia speciosa (J.Koenig) S.R.Dutta, *Pleione* 7: 228. 2013. *Banksea speciosa* J.Koenig in Retz., *Observ. Bot.* 3: 75. 1783. *Costus speciosus* (J.Koenig) J.E. Smith, *Trans. Linn. Soc. London* 1: 249. 1791; Hook.f., *Fl. Brit. India* 6: 249. 1892; C.E.C.Fisch. in Gamble, *Fl. Madras* 1490(1041). 1928; Manilal & Sivar., *Fl. Calicut* 288. 1982; Ansari, *Fl. Kasaragod Div.* 380. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 467. 1988; Sabu, *Zingiberaceae and Costaceae of South India* 259. 2006; Ratheesh, *Fl. Stud. Wayanad Dist.* 860. 2009.

Herbs, rhizome tuberous. Leaves spirally arranged, 8-24 x 3-7 cm, oblong or oblanceolate-oblong, base tapering, apex abruptly acuminate, upper surface glabrous, lower surface sparsely hairy; ligule truncate, densely hairy; petiole 3-5 mm long. Spikes terminal, 4-9 x 2-5 cm, more or less globose; bracts ovate-acute, with a narrow subapical protruberance, reddish; bracteoles 1-1.5 cm long, oblong, reddish. Calyx 2-2.5 cm long, 3-lobed; lobes 3-5 mm long. Corolla white; lobes to 4 x 0.8 cm, elliptic-oblong. Labellum 5-8 cm wide, suborbicular, white with a creamy-yellow median band. Stamen median, on an oblong petaloid process. Ovary 5-8 mm long, globose, 3-lobed, 3-celled; ovules many; stigma crescent-shaped, ciliate. Capsule bright red, 2.5-3 x 2-2.5 cm, dehiscing loculicidally; seeds 6-8 x 3-4 mm, black with fleshy white aril.

Kariyenkappu, *KJD* 18726

Fl. & Fr.: July-September

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Chavachi and semi-evergreen forests of Paripode.

MARANTACEAE

- 1a. Inflorescence a large terminal panicle, large shrubs *Indianthus*
1b. Inflorescence a small spike from rhizome, herbs *Stachyphrynium*

INDIANTHUS Suksathan & Borchs.

Bot. J. Linn. Soc. 159: 393. 2009.

Indianthus virgatus (Roxb.) Suksathan & Borchs., *Bot. J. Linn. Soc.* 159: 393. 2009. *Phrynium virgatum* Roxb., *Asiat. Res.* 11: 324. 1810. *Maranta virgata* (Roxb.) Wall. ex Wight, *Icon. Pl. Ind. Orient.* t. 2015. 1853. *Clinogyne virgata* (Roxb.) Benth., *Gen. Pl.* 3: 651. 1883; Hook.f., *Fl. Brit. India* 6: 258. 1892. *Schumannianthus virgatus* (Roxb.) Rolfe, *J. Bot.* 14: 244. 1907; C.E.C.Fisch. in

Gamble, Fl. Madras 1494(1043). 1928; Ansari, Fl. Kasaragod Div. 381. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 471. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 867. 2009 (Plate 6a).

Erect herbs, to 4 m high; stem thickened at nodes. Leaves bifarious, to 40 x 18 cm, ovate-oblong, cuspidate at apex, rounded at base; petiole to 1 cm long; sheath to 20 cm long, open. Panicle to 50 cm long, branches slender, dichotomous; bracts 3-5 x 0.6 cm, lanceolate. Flowers paired in each bract. Sepals small. Corolla white, tube short; lobes oblong. Stamens 1, outer staminodes petaloid, white, to 1.5 cm long; inner staminodes smaller. Ovary densely hairy, 3-celled, solitary in each cell, basal. Berry obovoid, rugose.

Meenmutty, *KJD 31488*

Fl. & Fr.: June-April

Distribution: Fairly common in evergreen forests of Moonamkappu, Kattikkari; plantations of Kariyenkappu and semi-evergreen forests of paripode, in moist localities.

STACHYPHRINIUM K. Schumann.

in H.G.A.Engler (ed.) Pflanzenr., Marant. 45. 1902.

Stachyphrynium spicatum (Roxb.) Schum. in Engl., Pflanzenreich Marant. 46. 1902; C.E.C.Fisch. in Gamble, Fl. Madras 1494(1044). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 471. 1988; Vajr. & Bhargavan, J. Econ. Taxon. Bot. 3: 973. 1982. *Phrynium spicatum* Roxb., Fl. Ind. 1: 5. 1820.

Herbs, rhizome creeping, nodose. Leaves 2-5 together, lamina to 20 x 7 cm, ovate-oblong, abruptly acuminate at apex, rounded at base; nerves many; petiole to 30 cm long, sheathing at base. Spike 1 or 2, basal, 3-5 cm long, sessile or shortly peduncled. Flowers 3-8, sessile; bracts 15 x 7 mm, ovate. Sepals 5 mm long, narrow. Corolla dull white, 2.5 cm long; lobes oblong. Stamen 1, petaloid; anthers adnate on the margin; staminodes obovate, clawed. Ovary 3-celled; ovule solitary in each cell. Capsule 8 x 6 mm, ovoid; seeds wrinkled.

Kariyenkappu, *KJD 31489*

Fl. & Fr.: March-May

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Chavachi, Crossway and semi-evergreen forests of Pothanplavu, Paripode, etc.

MUSACEAE

- 1a. Rhizome stoloniferous, pseudostem cylindrical Musa
- 1b. Rhizome not stoloniferous, pseudostem conical Ensete

ENSETE Bruce ex Horan.

Prod. Monog. Scitam. 40. 1862.

Ensete superbum (Roxb.) Cheesman., Kew Bull. 1947: 100. 1948; Ansari, Fl. Kasaragod Div. 382. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 868. 2009. *Musa superba* Roxb., Pl. Coromandel 3: 17. 1811; Hook.f., Fl. Brit. India 6: 261.1892; C.E.C.Fisch. in Gamble, Fl. Madras 1497(1046).1928 (Plate 6b).

Erect herbs with globose leaf sheaths formed into a pseudostem of 50-100 cm diam. Leaves spirally arranged, to 3 x 0.8 m, oblong, entire with channelled midrib; lateral nerves many, parallel from midrib. Spadix 50-100 cm long, with 3-5 spathes at base; bracts several, to 20 x 14 cm, ovate, obtuse, brown. Flowers many on each bracts; unisexual, female flowers towards the base and male flowers above. sepals and 2 petals united into a sheath, 3.5 cm long, 5-lobed; third petals forms into a membranous sheath. Stamens 5, perfect, anthers 2.5 cm long, linear-oblong, filaments free. Ovary 3-celled, inferior; ovules several in each cell; style simple, stigma globose. Fruit oblong; seeds few, subglobose, black.

Meenmutty, *KJD 18784*

Fl. & Fr.: Throughout the year

Distribution: Occasional in evergreen forests of Meenmutty among rocks near streams.

MUSA L.

Sp. Pl. 1043. 1753.

Musa kattuvazhana K.C. Jacob, Monogr. Madras Bananas 129. 1952; A. Joe, P. E. Sreejith and M. Sabu, Webbia. 71(2): 204. 2016. *Musa acuminata* subsp. *burmanica* N.W.Simmonds, Kew Bull. 11: 468. 1956. *Musa acuminata* auct. non Colla 1820: N. Mohanan & Sivad., Fl. Agasthyamala 713. 2002.

Large cormous herbs, stoloniferous; pseudostem 3.5 m high, 15-25 cm diam. Leaves 2-2.5 m long, 30-50 cm wide; petiole 30-50 cm long. Spikes drooping. Peduncle and rachis hairy; bracts completely covering the flowers, 15-20 x 4.5-5 cm, ovate-lanceolate. Flowers 15-16 per bract in 2 rows. Perianth united into 2 cymbiform spathes, outer longer. Stamens 5. Ovary inferior, 3-celled; ovules many. Fruit bright yellow on ripening, 8-12 cm long, 1.5-3 cm diam; seeds many, angled.

Kattikkari, *KJD 26256*

Fl. & Fr.: Throughout the year

Distribution: Rare in evergreen forests of Kattikkari-Meenmutty area.

ZINGIBERACEAE

- 1a. Ovary 1-celled; placentation parietal..... Globba
- 1b. Ovary 3-celled; placentation axile 2
- 2a. Anthers spurred at base(except *C. aurantiaca*), bracts curved out Curcuma
- 2b. Anthers not spurred at base; bracts not as above 3
- 3a. Inflorescence lateral, usually arising directly from rhizome4
- 3b. Inflorescence terminal on leafy stem..... 6
- 4a. Flowers in lax trailing panicle Elettaria
- 4b. Flowers in dense strobilioid spike 5
- 5a. Anthers diverging towards the apex; connective broad, crest-like..... Amomum
- 5b. Anthers parallel, connective produced into a long tail at apex..... Zingiber
- 6a. Spike 1-sided; sheath saccate..... Boesenbergia
- 6b. Spike radiates; sheath otherwise Hedychium

AMOMUM Roxb.

Pl. Coromandel 3: 75. 1820. *nom. cons.*

- 1a. Rootstock running; flowers on creeping runners *A. hypoleucum*
- 1b. Rootstock not running; flowers produced on rhizomes 2
- 2a. Capsule ribbed..... *A. pterocarpum*
- 2b. Capsule echinate 3
- 3a. Lateral lobes of lip as large as middle lobe *A. muricatum*
- 3b. Lateral lobes of lip very short..... *A. aculeatum*

Amomum aculeatum Roxb., *Asiat. Res.* 11: 344. 1810. *Amomum cannicarpum* (Wight) Benth. ex Baker in Hook.f., *Fl. Brit. India* 240. 1892; C.E.C.Fisch. in Gamble, *Fl. Madras* 1487(1039). 1928; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 466. 1988; Sabu, *Zingiberaceae and Costaceae of South India* 81. 2006; Ratheesh, *Fl. Stud. Wayanad Dist.* 859. 2009. *Elettaria cannicarpa* Wight, *Icon. Pl. Ind. Orient.* t. 2007. 1853 (Plate 6c).

Herbs, leafy stem 2-3 m high, erect, straight, loosely clumped; rootstock horizontal, much branched, reddish outside, light pink inside. Leaves 50 x 8 cm, oblong-lanceolate, acuminate, glabrous, nearly sessile, lower leaves smaller; ligule 1 cm long, orbicular, reddish. Spike 1-few, to 16 cm long, obovoid; peduncles covered with imbricating bracts; basal empty bracts 3.5 cm long, ovate, obtuse, formed into sheath at base, reddish brown; bracteoles 2 cm long, tubular. Flowers one or two in a bract. Calyx lobes obtuse. Corolla lobes equal, 2 x 1 cm,

obtuse, glabrous. Style slender; stigma sub-globose; hairy Capsule 1.5 cm across, dark brown.

Way to Meenmutty, *KJD 26177*

Fl. & Fr.: March-June

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Crossway, Meenmutty, Moonamthode, etc. Endemic to Western Ghats.

Amomum hypoleucum Thwaites, Enum. Pl. Zeyl. 318. 1861; Hook.f., Fl. Brit. India 6: 240. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1487(1039). 1928; Sabu, Zingiberaceae and Costaceae of South India 84. 2006.

HerbS, rhizomes perennial, slender. Leafy shoots 2-3 50-100 cm tall. Leaves 30-45 x 5-10 cm, acuminate, silky pubescent below; petiolate, ligule short, 2-4 mm long, bilobed, glabrous. Spikes 2 or 3 flowered; bracts membranous, glabrous; bracteoles longer than bracts, tubular, glabrous. Calyx 3-lobed, glabrous. Corolla white, equal or slightly longer than calyx, lobes equal, glabrous. Labellum yellow with pink lines, hairy near throat. Lateral staminodes reduced to two small, teeth like projections. Anther 9 mm long, connective prolonged in to truncate crest. Ovary 5 mm long.

Kariyenkappu, *KJD 31485*

Fl. & Fr.: June-October

Distribution: Common in plantations of Kariyenkappu; semi-evergreen forests of Pothamplavu, Narikkadavu; evergreen forests of Meenmutty and Moist Deciduous Forests at Paripode.

Amomum muricatum Bedd., Madras J. Lit. Sci. ser. 3, 1: 59. 1864; C.E.C.Fisch. in Gamble, Fl. Madras 1487(1039). 1928; Ansari, Fl. Kasaragod Div. 376. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 466. 1988; Zingiberaceae and Costaceae of South India 88. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 860. 2009.

Herbs; leafy stem 1.5-3 m high, densely clumped, erect, straight. Leaves 30 x 7 cm, elliptic-oblong, acuminate, sessile, glabrous; ligule 3 mm long, truncate. Spikes 2-5-together, 14-15 cm long, shortly peduncled; floral bracts 3.5 x 1.5 cm, obovate, obtuse, ciliate; yellow with brown lines; bracteoles 2 cm long, lobes obtuse. Flowers densely packed. Calyx tube 2.5 cm long, lobes obtuse, cuspidate. Corolla tube 2.8 cm long, lobes unequal, to 3 x 1.8 cm, oblong, obtuse, yellow with red lines. Labellum 4 x 3 cm; middle lobes emarginate, yellow, with brown streaks. Anthers 9 mm long, crest, 15 mm broad, auriculate. Capsule 1.5-2 cm across, brown.

Kattikkari, *KJD 26075*

Fl. & Fr.: February-July

Distribution: Common in the plantations of Kariyenkappu; evergreen forests of Chelachode, Chavachi, Kattikkari and Mullenpara. Endemic to southern Western Ghats.

Amomum pterocarpum Thwaites, Enum. Pl. Zeyl. 317. 1861; Hook.f., Fl. Brit. India 6: 241. 1892; Sabu, Zingiberaceae and Costaceae of South India 89. 2006. *Amomum microstephanum* Baker in Hook.f., Fl. Brit. India 6: 239. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1487(1039). 1928.

Herbs, stem to 2 m high, clumped, erect; rhizome to 4 cm thick, old ones bluish inside. Leaves to 50 x 12 cm, elliptic-oblong, acute at either ends, glabrous, usually clustered towards the apex; petiole to 3 cm long; ligule 3 mm long, whitish. Spikes 5-15 cm long, 3-4 together; bracts 6-7 x 4 cm, broadly elliptic, obtuse, pale pink. Flowers solitary in a bract. Labellum 4 x 3 cm, obovate, white with yellow centre. Capsule 3 cm long, glabrous; wings 3-8 mm broad, entire.

Kariyenkappu, *KJD 26116; 55 Block, KJD 25420*

Fl. & Fr.: May-October

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Chavachi and Moist Deciduous Forests of Pothanplavu, Paripode, etc.

BOESENBERGIA Kuntze

Revis. Gen. Pl. 2: 685. 1891.

Boesenbergia pulcherrima (Wall.) Kuntze, Revis. Gen. Pl. 2: 685. 1891; Mangaly & Swarup., Bull. Bot. Surv. India 23: 235. 1981; Ansari, Fl. Kasaragod Div. 377. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 467. 1988; Sabu, Zingiberaceae and Costaceae of South India 121. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 860. 2009. *Gastrochilus pulcherrimus* Wall., Pl. Asiat. Rar. 1: 22, t. 24. 1829; Hook.f., Fl. Brit. India 6: 217. 1890.

Suberect herbs, 15-25 cm high. Leaves few, scattered, to 13 x 6 cm, broadly elliptic, acute at both ends, thinly tomentose beneath; petiole to 2 cm long; sheath saccate. Spikes to 5 cm long, terminal, one sided; bracts 20 x 8 mm, obovate, obtuse; bracteoles tubular, deeply cleft to the base. Flowers solitary in each bracts. Calyx tube short, truncate. Corolla tube 15 mm long; lobes equal, 10 x 4 mm, oblong. Labellum 20 x 15 mm, obovate, acute, white with brown spots.

Lateral staminodes 10 x 5 mm obovate. Filaments 2 mm long; anthers parallel, not crested. Ovary 3-celled, oblong; ovules few; style filiform. Fruit an oblong capsule.

Kattikkari, *KJD 31881*

Fl. & Fr.: June-October

Distribution: Common in the plantations of Kariyenkappu; evergreen forests of Crossway, Chelachode, Chavachi, Meenmutty, Kattikkari; semi-evergreen forests of Paripode and Pothanplavu.

CURCUMA L.

Sp. Pl.: 2. 1753. *nom. cons.*

- 1a. Anthers spurred 2
- 1b. Anthers not spurred *C. aurantiaca*
- 2a. Lower surface sparsely pubescent, midrib not coloured *C. neilgherrensis*
- 2b. Lower surface glabrous, midrib red coloured..... *C. aeruginosa*

Curcuma aeruginosa Roxb., *Asiat. Res.* 11: 335. 1810; Hook.f., *Fl. Brit. India* 6:212.1890; Sabu, *Zingiberaceae and Costaceae of South India* 132. 2006. *Curcuma caesia* auct. non Roxb; Mangaly & Sabu, *Rheedea* 3: 147. 1993. *Curcuma malabarica* Velay., Amalraj & Mural., *J. Econ. Taxon. Bot.* 14:189. 1990.

Rhizomatous herbs, leafy stem 70-100 cm high; sheaths green. Leaves distichous, 30-40 x 10-12 cm, oblong-lanceolate, tip acute, base acuminate, glabrous purple or reddish-brown patch along the sides of the distal half of the mid rib; petiole as long as lamina. Inflorescence lateral, 25-30 cm long; spike 12-15 x 5 cm; coma bracts, pink to violet; fertile bracts 18-20, lower half fused, tip rounded, green with a pink tip. Flowers 8-10 per bracts; bracteoles white with a median light green patch. Calyx truncate, 3-lobed at apex, split on one side. Corolla tube pink, lobes unequal; dorsal lobes concave; lateral lobes tip rounded, pink. Labellum tip emarginated. Lateral staminodes yellow; Anther spurred at base. Ovary 5 mm, long; style filiform; stigma bi-lipped, slightly exserted above the anther lobes.

Kariyenkappu, *KJD 26171*

Fl. & Fr.: April-May

Distribution: Occasional in plantations of Kariyenkappu.

Curcuma aurantiaca Zijp, *Recueil Trav. Bot. Néerl.* 12: 345. 1915. *Curcuma ecalcarata* Sivar. & Indu, *Notes Roy. Bot. Gardner Edinb.* 41: 321. 1983; Mangaly

& Sabu, *Rheedea* 3:151. 1993; Sabu, *Zingiberaceae and Costaceae of South India* 150. 2006.

Herbs, rhizome small. Leaves bifarious, 20-30 x 10-15 cm, broadly ovate, acuminate, slightly and often unequally cordate at base; pubescent below; petiole 20-25 cm, minutely pubescent. Inflorescence central. Spike 10-15 cm long, pubescent, with a distinct coma; coma bracts longer than the fertile ones; fertile bracts broadly rounded, tip recurved, green or rose. Flowers 5-6 cm long. Calyx truncate, 3-lobed at apex, deeply split on one side. Corolla tube 2.5-3 cm long, lobes unequal; dorsal lobe oblong, hooded and apiculate at tip; laterals oblong-obtuse, light yellow-orange. Labellum 3-lobed; lateral staminodes oblong-obtuse. Stamens yellow; anther thecae parallel, ecalcarate, glandular hairs on the back. Ovary pubescent, style long, filiform; stigma cup-like, hairy. Fruit obovoid, slightly trigonal, pubescent.

Way to Meenmutty, *KJD 26179*

Fl. & Fr.: June-November

Distribution: Common in Moist Deciduous Forests of Paripode, Nraikkadavu, Pookundu, Pothamplavu-Meenmutty area etc. Endemic to Western Ghats.

Curcuma neilgherrensis Wight, *Icon. Pl. Ind. Orient.* t. 2006. 1853; Hook.f., *Fl. Brit. India* 6: 210. 1892; C.E.C.Fisch. in Gamble, *Fl. Madras* 1482(1036). 1928; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 468. 1988; Sabu, *Zingiberaceae and Costaceae of South India* 169. 2006; Ratheesh, *Fl. Stud. Wayanad Dist.* 862. 2009. *Curcuma angustifolia* sensu Dalz. & Gibs., *Bombay Fl.* 274. 1861, non Roxb. (Plate 6d).

Rhizomatous small herbs; rhizome small, conical. Leafy shoots 20-30 cm high. Leaves 12-15 x 6-9 cm, lower surface sparsely pubescent, ligule small; petiole 10-15 cm green. Inflorescence lateral, with distinct coma. Coma bracts 6-7, pink or violet; fertile bracts 6-15, margin wavy, densely pubescent; bracteoles triangular. Flowers longer than bracts, light yellow. Calyx 3-lobbed, densely pubescent. Corolla light yellow, lobes unequal, pubescent, dorsal lobe hooded. Labellum with a median cleft. Staminode yellow. Anthers spurred, downwardly pointed. Ovary trilocular, ovules many, style long filliform; stigma bilipped.

Ambalappara, *KJD 26143; NS & KVB 31412*

Fl. & Fr.: April-October

Distribution: Fairly common in grasslands of Ambalappara. Endemic to Western Ghats.

ELETTARIA Maton

Trans. Linn. Soc. London 10(2): 250. 1811.

Elettaria cardamomum (L.) Maton, Trans. Linn. Soc. London 10: 254. 1811; Hook.f., Fl. Brit. India 6: 251. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1491(1041). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 471.1988; Sabu, Zingiberaceae and Costaceae of South India 101. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 867. 2009. *Amomum cardamomum* L., Sp. Pl. 1: 1. 1753. *Alpinia cardamomum* (L.) Roxb., Asiat. Res. 11:356. 1810 & Pl. Coromandel 3: 19. t. 226. 1819. *Elettaria cardamomum* (L.) Maton var. *minus* Watt, Econ. Prodr. India 512. 1908. *Elettaria cardamomum* (L.) Maton var. *minuscula* Burkill, Bull. Misc. Inform. Kew 1930:35.1930.

Herbs, rhizome branched, thick; leafy shoots to 2 m high, tufted. Leaves bifarious, to 60 x 10 cm, elliptic-lanceolate, acute at both ends. Flowers in prostrate or erect, 30-50 cm long, panicles from the rhizome; bracts scarious, 3-4 cm long, supporting 2-7 flowers. Calyx tubular, 1 cm long, split on one side. Corolla white, tube equal to the calyx, lobes unequal, to 2 cm long, oblong. Labellum 1 x 0.5 cm, obovate, white with red lines. Stamen 1, filaments short; anther cells parallel, shortly spurred; staminodes short. Ovary 3-celled, ovules many, style filiform, stigma funnel shaped. Capsule 8-13 x 5-8 mm, ellipsoid, striate; seeds many, angular, fragrant.

Kattikkari, *KJD 26366*

Fl. & Fr.: September-February

Distribution: Fairly common in evergreen forests of Kattikkari, Mullenpara and Chavachi.

GLOBBA L.

Mant. Pl. 143. 1771

Globba sessiliflora Sims, Bot. Mag. 35: t. 1428. 1811. *Globba careyana* Roxb., Fl. Ind. 1: 80. 1820. *Globba ophioglossa* Wight, Icon. Pl. Ind. Orient. 6: 16. t. 2002. 1853; Hook.f., Fl. Brit. India 6: 202. 1890; C.E.C.Fisch. in Gamble, Fl. Madras 1480(1035). 1928; Ansari, Fl. Kasaragod Div. 379. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 469. 1988; Sabu, Zingiberaceae and Costaceae of South India 109. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 864. 2009 (Plate 6e).

Rhizomatous herbs. Leaves 5-20 x 2-5 cm, oblong-lanceolate, tip acuminate pubescent; ligule 2-3 mm long, bipartite, densely pubescent. Inflorescence terminal, 10-20 cm long, erect, bearing few to many slender branches in the axils of bracts; bracts small, ovate, each fertile bracts subtends a cincinnus of 2 many flowers. Flowers 3.5-4 cm long. Calyx truncate, shortly 3-lobed, lobes equal.

Corolla tube 1.8-2 cm long, orange, densely pubescent; lobes unequal, spreading; dorsal lobe cup-shaped with an apical hood; lateral lobes ovate. Labellum much longer than the corolla lobes, linear, tip emarginate. Lateral staminodes linear, tip acuminate. Staminal filament 2 cm long, slender. Ovary smooth, unilocular, ovules numerous; Style long, exserted from the anther lobes, mouth of the stigma hairy. Fruit 2 x 1.5 cm, globose to ovoid.

Chelachode, *KJD 31812*

Fl. & Fr.: July-October

Distribution: Common in evergreen forests of Chelachode, Chavachi, Moonamthode, Meenmutty; Moist Deciduous Forests of Narikkadavu, Paripode, Pottichapara, Pothanplavu and plantations of Kariyenkappu.

HEDYCHIUM J.Koenig

in A.J.Retzius, *Observ. Bot.* 3: 61. 1783.

Hedychium coronarium J.Koenig in A.J.Retzius, *Observ. Bot.* 3: 73. 1783; Hook.f., *Fl. Brit. India* 6: 225. 1892; C.E.C.Fisch. in Gamble, *Fl. Madras* 1485(1039). 1928; Sabu, *Zingiberaceae and Costaceae of South India* 196. 2006; Ratheesh, *Fl. Stud. Wayanad Dist.* 867. 2009.

Herbs, leafy stem to 1.5 m high, robust, densely clumped; rhizome horizontal. Leaves to 30 x 10 cm, oblong, acuminate, glabrate; ligule 2 cm long, acuminate. Spike 15 x 7 cm, ovoid; bracts 5 x 2 cm, oblong, obtuse, glabrous. Flowers 2-4 in each bracts. Calyx 4 cm long, not split, glabrous. Corolla tube 9 cm long, narrow, glabrous, lobes 3.5 cm long, slender, glabrous. Lip 6 x 6 cm; lobes emarginate, white; anthers 1.5 cm long, filaments shorter than lip.

Kariyenkappu, *KJD 26159*

Fl. & Fr.: October-December

Distribution: In the old settlements.

ZINGIBER Mill.

Gardner *Dict. Abr. ed.* 4: s.p. 1754., *nom. cons.*

- 1a. Inflorescence peduncled 2
- 1b. Inflorescence not peduncled *Z. wightianum*
- 2a. Flowers produced on globose head of the spike *Z. zerumbet*
- 2b. Flowers produced on elongated spike *Z. neesatum*

Zingiber neesatum (Graham) Ramam. in C.J.Saldanha & D.H. Nicolson, *Fl. Hassan Distr.* 769. 1976; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 470. 1988;

Sabu, Zingiberaceae and Costaceae of South India 235. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 866. 2009. *Alpinia neesiana* Graham, Cat Pl. Bombay 2-7. 1839. *Zingiber macrostachyum* Dalzell in Hooker's J. Bot. Kew Gardner Misc. 4: 342. 1852; Hook.f., Fl. Brit. India 6: 247. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1490(1041). 1928.

Annual or perennial herbs; leafy stem 40-70 cm high, solitary or 2-4 together, erect. Leaves 25-35 x 3.5 cm, elliptic-oblong, acute at base, sessile; ligule 8 mm long, ovate. Spikes to 25 cm long, enlarging in fruit, terete on erect peduncle of 30-35 cm long; floral bracts 3 x 1.4 cm, obtuse, reddish. Flowers solitary in each bract. Calyx 2 cm long, glabrous. Corolla tube 2 cm long, lobes unequal, larger lobe 3.5 x 1.5 cm, elliptic, acute, glabrous. Labellum 3.5 x 3.5 cm, 3-lobed; lobes obtuse, glabrous, middle lobe emarginated. Ovary glabrous. Capsule 3-4 cm long, ellipsoid, smooth, red inside, 3-valved.

Pothurumi, *KJD 25461*

Fl. & Fr.: July-September

Distribution: Rare in evergreen forests of Ambalaappara. Endemic to Western Ghats.

Zingiber wightianum Thwaites, Enum. Pl. Zeyl. 315. 1861; Hook.f., Fl. Brit. India 6: 244. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1489(1040). 1928; Manilal & Sivar., Fl. Calicut 287. 1982; Sabu, Zingiberaceae and Costaceae of South India 245. 2006. *Zingiber squarrosum* Wight, Icon. Pl. Ind. Orient. t. 2004. 1853, non Roxb. 1832.

Herbs, rhizomes thick, fleshy. Leafy shoot to 1.3 m high. Leaves 15-30 X 5-6 cm, lower surface pubescent, upper surface glabrous, almost sessile, ligule bifid, membranous. Inflorescence produced separately on leafless short stock, peduncle 4-8 cm long; bracts greenish red pubescent; bracteoles shorter than bracts. Calyx 3-toothed, unilaterally split, sparsely pubescent. Corolla tube yellowish, 2.5 cm long, pubescent, lobes almost equal. Labellum yellow-orange, prominently marked with purple streaks. Staminodes acute. Stamens shorter than lip, almost sessile. Ovary trilobular.

55 Block, *KJD 25421*

Fl. & Fr.: July-October

Distribution: Rare at Moist Deciduous Forests of Paripode.

Zingiber zerumbet (L.) Roscoe ex Sm., Exot. Bot. 2: 105. t.112.1806; Hook.f., Fl. Brit. India 6:247. 1892; C.E.C.Fisch. in Gamble, Fl. Madras 1490(1040). 1928; Manilal & Sivar., Fl. Calicut 287. 1982; Ansari, Fl. Kasaragod Div. 380. 1985;

Sabu, Zingiberaceae and Costaceae of South India 247. 2006. *Amomum zerumbet* L., Sp. Pl. 1. 1753.

Rhizomatous herbs; leafy stem to 1.2 m high. Leaves 15-35 x 4-7.5 cm, oblong or oblong-lanceolate, base obtuse, apex acuminate, pubescent below; ligule to 2.5 cm long. Peduncle 20-35 cm long; sheath to 6 cm long, oblong, apex rounded. Spikes 5-8 x 3.5-6 cm, ovoid or oblong; bracts 2-3.5 x 1.5-2 cm, broadly ovate, rounded, margin membranous, green, turning blood-red on maturity. Flowers white. Calyx tube 1-1.5 cm long, 3-lobed. Corolla to 2.5 cm long, dorsal lobe ovate-acuminate. Labellum c. 2 x 2 cm, 3-lobed, mid-lobe suborbicular, lateral lobes ovate, c. 1.2 cm long. Capsule 2-2.5 x c. 1 cm, oblong; seeds 2-3 mm across, globose.

55 Block, KJD 25424

Fl. & Fr.: July-November

Distribution: Rare in Moist deciduous Forests of Paripode.

Alpinia galanga (L.) Willd. is seen in the previous settlements in the Sanctuary.

Clade: **Eudicots**

Order: **Ranunculales**

MENISPERMACEAE

- 1a. Leaves white hoary pubescent on the under surface; stem deep yellow inside *Coscinium*
- 1b. Leaves surface tomentose or glabrous; stem not deep yellow inside 2
- 2a. Petals absent *Anamirta*
- 2b. Petals present 3
- 3a. Stamens free, leaves not peltate *Diploclisia*
- 3b. Stamens united in to column with a peltate disc, leaves peltate 4
- 4a. Flowers in peduncled, solitary or umbellate heads, petals free *Stephania*
- 4b. Flowers in panicles, petals connate *Cyclea*

ANAMIRTA Colebr.

Trans. Linn. Soc. London 13: 52, 66. 1821.

Anamirta cocculus (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 446. 1834; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 93. 1872; Dunn in Gamble, Fl. Madras 28(19). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Ansari, Fl. Kasaragod Div.

57. 1985; A. Pramanik in B. D. Sharma *et al.*, Fl. Ind.1: 311. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 178. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 103. 2009. *Menispermum cocculus* L., Sp. Pl. 340. 1753. *Anamirta paniculata* Colebr., Trans. Linn. Soc. London 13: 66. 1822.

Woody climbers. Leaves simple, alternate, 20-25 x 15-19 cm, broadly ovate, apex acute, base truncate, margin entire; 5-ribbed, coriaceous; petiole 8-13 cm long. Flowers unisexual, many, in large drooping panicles on old branches. Sepals 6 in 2 rows, 3 x 2 mm, ovate, yellow. Petals absent. Stamens 9, combined into a globose staminal column, anthers sessile; staminodes 9 in female flowers, obovate, scaly. Carpels 3, free; style absent; stigma recurved. Fruit of 1-3 drupes, 1 cm across, obliquely ovoid, gibbous, black, smooth; seed one, black, glabrous.

Kariyenkappu, *KJD 31845*

Fl. & Fr.: August-December

Distribution: Fairly common in plantations of Kariyenkappu.

COSCINIUM Colebr.

Trans. Linn. Soc. London 13: 51. 1822.

Coscinium fenestratum (Gaertn.) Colebr., Trans. Linn. Soc. London 13: 65. 1822; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 99. 1872; Dunn in Gamble, Fl. Madras 27(19). 1915; A. Pramanik in B. D. Sharma *et al.*, Fl. Ind.1: 313. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 183. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 104. 2009. *Menispermum fenestratum* Gaertn., Fruct. Sem. Pl. 1: 219, t. 45, f.5. 1788 (Plate 6f).

Woody climbers; wood yellow, branchlets hoary pubescent. Leaves simple, alternate, deltoid, 15-18 x 13-15 cm, ovate, apex acuminate, base truncate, margin entire; 5-7 ribbed; petiole 10-12 cm long. Inflorescence supra-axillary or cauliflorous. Female flowers mostly from old wood. Sepals 6, sericeous. Petals 3. ovary densely pilose, staminodes 6. Fruit drupes, to 2 cm dia, globose, brown villous, endocarp bony, peduncle to 12 cm; seed one, black, glabrous.

Paripode, *KVB 31680*

Fl. & Fr.: August-December

Distribution: Rare in plantations of Kariyenkappu and evergreen forests of Chavachi and Meenmutty.

CYCLEA Arn. ex Wight

Ill. Ind. Bot. 1: 22. 1840.

- 1a. Leaves glabrous *C. fissicalyx*
1b. Leaves hairy *C. peltata*

Cyclea fissicalyx Dunn in Gamble, Fl. Madras 31(22). 1915 & Bull. Misc. Inform. Kew 1916: 60. 1916; Gangop. in B. D. Sharma *et al.*, Fl. Ind.1: 324. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 185. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 105. 2009. *Cyclea peltata* Miers, Contr. Bot. 3: 236. 1871, non (Lam.) Hook. f. & Thomson, 1855 (Plate 6g).

Climbers; Leaves simple, alternate, peltate, 8-10 x 4-5 cm, ovate, apex sharply acuminate, base truncate, margin entire; 5-ribbed, reticulate, glabrous; petiole 1.5-2.5 cm long. Panicle to 15 x 5 cm, flowers 2 mm across, glabrous, shortly pedicelled; peduncles slender; bracts foliar. Calyx campanulate, glabrous. Petals connate. Anthers in male flowers connate into a ring at the top of staminal column. Ovary in female flowers hairy; style trifold.

Kattikari Sate Boundary, KJD 26019

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests of Kattikari. Endemic to southern Western Ghats of Kerala; Conservation status: Endangered.

Cyclea peltata (Lam.) Hook. f. & Thomson, Fl. Ind. 201. 1855 & Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 104. 1872p.p; Dunn in Gamble, Fl. Madras 31(22). 1915; Manilal & Sivar., Fl. Calicut 29. 1982; Ansari, Fl. Kasaragod Div. 58. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 42. 1988; Gangop. in B. D. Sharma *et al.*, Fl. Ind. 1: 325. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 186. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 105. 2009. *Menispermum peltatum* Lam., Encycl. 4: 96. 1797. *Cyclea burmannii* (DC.) Hook. f. & Thomson, Fl. Ind. 201. 1855 & Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 104. 1872. *Clypea burmannii* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 14. 1834. *Cyclea amottii* Miers, Ann. Mag. Nat. Hist. ser. 3, 18:19.1866; Dunn in Gamble, Fl. Madras 31(22).1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 42. 1988; M. Mohanan in P. Daniel, Fl. Kerala 1:184.2005. *Cocculus burmanni* DC., Syst. Nat. 1: 517. 1817.

Climbing shrubs; Leaves simple, alternate, peltate, 8-10 x 6-7 cm, ovate, apex acute or acuminate, base cordate, margins entire; 4-8 ribbed, pubescent below. Panicles to 20 x 7 cm, rachis pubescent. Flowers densely packed towards the branch tips, sessile. Male flowers 1.5 mm across. Sepals hairy outside. Petals glabrous. Female flowers smaller. Sepal hairy. Petal hairy. Carpel one, densely hairy. Drupe 4 mm dia, subglobose, white, pilose.

Kariyenkappu, KJD 18790

Fl. & Fr.: April-May

Distribution: Fairly common in fringe areas of moist deciduous forests.

DIPLOCLISIA Miers

Ann. Mag. Nat. Hist. (ser. 2) 7: 37, 42. 1851.

Diploclisia glaucescens (Blume) Diels, Pflanzenr. (Engler) 225. 1910; Dunn in Gamble, Fl. Madras 28 (20). 1915; Manilal & Sivar., Fl. Calicut 28. 1982; Ansari, Fl. Kasaragod Div. 58. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 43. 1988; A. Pramanik in B. D. Sharma *et al.*, Fl. Ind.1: 327. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 187. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 106. 2009. *Cocculus glaucescens* Blume, Bijdr. Fl. Ned. Ind. 25. 1825. *Cocculus macrocarpus* Wight & Arn., Prodr. Fl. Ind. Orient. 13. 1834; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 101. 1872.

Woody climbers. Leaves simple, alternate, 6-8 cm across, broadly ovate to orbicular, apex obtuse, base truncate or some times slightly cordate, glaucous below, margin entire, membranous; petiole 1.5-3 cm long. Flowers unisexual, in large drooping panicles, bright yellow. Sepals 6 in two whorls, 3 mm long, obovate. Petals 6, smaller than sepals concave with incurved margins, 2 mm long, obovate, emarginated. Stamens 6 in male flowers, staminodes absent. Carpels 3, free in female flowers; style cylindrical. Drupe compressed, curved, tubercled.

Pothanplavu, NS & KVB 31322

Fl. & Fr.: March-August

Distribution: Rare in semi-evergreen forests of Pothanplavu and evergreen forests of Kurumbanpara.

STEPHANIA L.

Fl. Cochinch. 598, 608. 1790.

Stephania japonica (Thunb.) Miers, Ann. Mag. Nat. Hist. ser.3, 18: 14. 1866; Dunn in Gamble, Fl. Madras 29(21). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 43. 1988; Gangop. in B. D. Sharma *et al.*, Fl. Ind.1: 335. 1993; M. Mohanan in P. Daniel, Fl. Kerala 1: 190. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 106. 2009. *Menispermum japonicum* Thunb., Fl. Japan 193. 1784. *Cissampelos hernandifolia* Willd., Sp. Pl. 4: 861. 1806. *Stephania hernandifolia* (Willd.) Walp., Rep. 1: 96. 1842; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 103. 1872. *Cyclea hernandifolia* (Willd.) Wight & Arn., Prodr. Fl. Ind. Orient. 14. 1834.

Climbers. Leaves simple, alternate, peltate, 7-10 x 4-8 cm, ovate or suborbicular, acute or obtuse at apex, base cordate, puberulous beneath, margins entire; petioles 2.5-4.5 cm long. Male flowers in axillary 6-8 cm long

umbels, sessile or subsessile, greenish or white; sepals 8 in 2 whorls of 4 each, free, oblanceolate, ca. 1.5 mm long, glabrous or puberulous outside; petals 3-5, suborbicular, ca 0.8mm long, greenish; stamens 6-8, connate into a peltate synandrium; anthers dehiscing transversely. Female inflorescence similar to male ones; sepals 3-5, oblong or elliptic; petals 3-5, suborbicular; staminodes absent; carpel 1, ovoid; stigmas 3-lobed. Drupes globose or obovoid, ca 6 x 8 mm, with basal stylar scar, red; endocarp transversely ridged.

Pothurumi, NS &KJD 25542

Fl. & Fr.: December-September

Distribution: Fairly common in evergreen forests of Ambalappara-Pothurumi region.

RANUNCULACEAE

- 1a. Terminal leaflet modified in to tendrils Naravelia
- 1b. Terminal leaflet entire, not modified Clematis

CLEMATIS L.

Sp. Pl. 543. 1753.

- 1a. Sepals 4, 7 mm long, flowers numerous *C. gouriana*
- 1b. Sepals 5, above 10 mm long, flowers few *C. smilacifolia*

Clematis gouriana Roxb. ex DC., Syst. Nat. 1: 138. 1817; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1:4.1872; Dunn in Gamble, Fl. Madras 3(2).1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 35. 1988; M. A. Rau in B. D. Sharma *et al.*, Fl. Ind. 1:64.1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 113. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 87. 2009.

Climbing herbs; young branches pubescent. Leaves opposite; leaflets 3-7, 4-6 x 1.5-3 cm, ovate, acute at apex, rounded at base, nerves tomento sebelow. Inflorescence drooping panicles, terminal and axillary, tomentose. Flowers white, 1 cm across. Tepals 7 x 4 mm, oblong, obtuse, pubescent. Stamens many, filaments 8 mm long, glabrous. Carpels 10-15, pubescent ovules 1 in each. Fruits achenes, 3 x 1 mm, ovoid, hairy; style persistent, ca. 3 cm long.

Ambalappara, KVB 31587

Fl. & Fr.: November-March

Distribution: Common along the margins of grasslands at Ambalappara.

Clematis smilacifolia Wall., *Asiat. Res.* 13: 402. 1820; Hook.f. & Thomson in Hook.f., *Fl. Brit. India* 1: 3. 1872; M. A. Rau in B. D. Sharma *et al.*, *Fl. Ind.* 1: 75. 1993.

Climbers; branchlets glabrous. Leaves 1-3-foliolate; leaflets to 18 x 14 cm, broadly ovate, acute at apex, cordate at base, glabrous, purplish beneath; nerves 7-9; petioles 2-15 cm long, twining. Cymes 3-few flowered, trichotomous; peduncles 4-5 cm long, dark brownish hairy; bracts to 2 x 0.5 cm; pedicels to 15 cm long, ribbed. Flowers 35 mm across, creamy-white. Tepals ovate, greenish-brown. Achenes to 11 x 5 mm, hairy; stigma persistent, 7 cm long.

Ambalappara, KVB 22549

Fl. & Fr.: August-February

Distribution: Rare in evergreen forests of Ambalappara. Endemic to India.

NARAVELIA Adans.

Fam. Pl. (Adanson) 2: 460, 581. 1763. *nom.cons.*

Naravelia zeylanica (L.) DC., *Syst. Nat.* 1: 167. 1817; Hook.f. & Thomson in Hook.f., *Fl. Brit. India* 1: 7. 1872; Dunn in Gamble, *Fl. Madras* 3(3). 1915; Manilal & Sivar., *Fl. Calicut* 25. 1982; Ansari, *Fl. Kasaragod Div.* 52. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 35. 1988; M. A. Rau in B. D. Sharma *et al.*, *Fl. Ind.* 1: 106. 1993; N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 115. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 87. 2009. *Atragene zeylanica* L., *Sp. Pl.* 542. 1753.

Climbing shrubs. Leaves opposite, 2-3-foliolate; leaflets 4-12 x 3-8 cm, elliptic-ovate, apex acute or acuminate, base rounded, margins distantly dentate, pubescent beneath, glabrous above, basally 5-ribbed; terminal leaflet transformed into a 3-fid, hooked tendril, up to 9 cm long; petioles 5-10 cm long. Inflorescence terminal and axillary divaricately branched, up to 15 cm long panicles. Flowers greenish yellow, c. 1.5 cm across, bisexual. Sepals 4-5, greenish yellow, 0.8-1 cm long, elliptic, pubescent without. Petals 6-12, greenish yellow, 0.7-0.9 x 1-1.5 mm, linear to spatulate. Stamens many; filaments ligulate; staminodes 10-14, petaloid. Carpels many; ovule one per carpel; style 1.5-2 mm long; stigma clavate. Fruit achenes many; 0.8-1 cm long, linear, stalked, with spirally twisted, 3-4 cm long, feathery persistent style.

Crossway, KVB 31525

Fl. & Fr.: October-April

Distribution: Common throughout the Sanctuary.

Order: Not placed yet

SABIACEAE

MELIOSMA Blume

Cat. Gew. Buitenzorg (Blume) 10. 1823.

- 1a. Leaves simple *M. simplicifolia*
1b. Leaves imparipinnate *M. pinnata* subsp. *barbulata*

Meliosma pinnata (Roxb.) Maxim. subsp. **barbulata** (Cufod.) Beusekom ex Welzen, Thai Forest Bull., Bot. 32: 168. 2004; Ramach. & V.J. Nair, Fl. Cannanore Dist. 115. 1988; S.C. Majumdar in N.P. Singh *et al.*, Fl. Ind. 5: 423. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 792. 2005. *Meliosma rhoifolia* subsp. *barbulata* Cufod., Oesterr. Bot. Z. 88: 254–255. 1939. *Millingtonia pinnata* Roxb., Fl. Ind. 1: 103. 1820. *Millingtonia arnottiana* Wight, Illustr. 1: t.53. 1840. *Meliosma arnottiana* (Wight) Walp., Rep. 1: 423. 1842; Hook.f., Fl. Brit. India 2: 6. 1876, p.p.; Gamble, Fl. Madras 256(183). 1918. *Meliosma pinnata* (Roxb.) Maxim. subsp. *arnottiana* (Wight) Beusekom, Blumea 19: 499. 1971; Ratheesh, Fl. Stud. Wayanad Dist. 248. 2009. *Meliosma rhoifolia* Maxim. subsp. *barbulata* (Cufod.) Y.W.Law, Acta Phytotax. Sin. 20(4): 431. 1982.

Trees, to 18 m high; bark greyish-brown. Leaves imparipinnate, pinnate, alternate, estipulate; leaflets 9-15, opposite or subopposite, 3.5-12.5 x 1.5-4 cm, oblong, oblong-lanceolate, elliptic-oblong or elliptic-ovate; round or oblique, apex acuminate or acute, base obtuse, rusty tomentose beneath; rachis 6.5-18 cm long, stout, rusty pubescent; lateral nerves 3-15 pairs, pinnate, ascending, prominent, intercostae reticulate, domatia often present. Flowers yellowish-white in large terminal and axillary tomentose panicles; bracteoles sepaloid. Sepals 5, basally connate, triangular, ciliate. Petals 3+2; inner ones 2-fid; outer 3 suborbicular. Fertile stamens 2; filaments 1.5 mm; staminodes 3, scaly, to 1 mm. Ovary superior, tomentose, 2-celled, ovule 2 in each cell; style terminal, stigma simple. Fruit a drupe, 5-6 mm across, globose.

Ambalappara, NS & KVB 31368

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Ambalappara.

Meliosma simplicifolia (Roxb.) Walp., Repert. Bot. Syst. (Walpers) 1: 423. 1842; Hook.f., Fl. Brit. India 2: 5. 1876; Gamble, Fl. Madras 256(182). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 115. 1988; S.C. Majumdar in N.P. Singh *et al.*, Fl. Ind. 5: 423. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 794. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 249. 2009. *Millingtonia simplicifolia* Roxb., Pl. Coromandel 3: 50. t. 254. 1820, p.p.

Trees, to 15 m high; bark greyish-yellow. Leaves simple, alternate, 9-40 x 2.5-15 cm, obovate-oblong to obovate, lanceolate, oblanceolate or oblong-lanceolate, apex acute, base cuneate or acute, sometimes more or less dentate, often with domatia; lateral nerves 8-23 pairs, pinnate, ascending, intercostae reticulate, prominent; petiole 15-50 mm, stout, puberulent, grooved above. Flowers subsessile, yellowish-white, solitary or more less crowded in lax panicles of 10-45 cm, sparsely to densely pubescent. Sepals 4 or 5, ciliolate. Petals 3+2, yellow; inner petals bifid, lobes more or less divergent, narrow, sometimes slightly fimbriate or ciliolate. Ovary superior, glabrous, 2-celled, 2-ovuled; style short. Fruit a drupe, globose, purple-black.

Ambalappara, NS & KVB 31421

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Ambalappara.

Clade: **Core Eudicots**

Order: Not placed yet

DILLENACEAE

DILLENIA L.

Sp. Pl. 535. 1753.

- 1a. Inflorescence on leafy branches, flowers white *D. bracteata*
1b. Inflorescence on old branches without Leaves flowers yellow *D. pentagyna*

Dillenia bracteata Wight, Icon. Pl. Ind. Orient. t. 358. 1840-43; Hook. f., Fl. Brit. India 1: 37. 1872; Dunn in Gamble, Fl. Madras 7 (5). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 36. 1988; N. C. Majumdar in B. D. Sharma *et al.*, Fl. Ind. 1: 154. 1993; N.P. Balakr. & G.V.S. Murthy in P. Daniel, Fl. Kerala 1: 120. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 88. 2009 (Plate 6h).

Trees, to 20 m high; bark greyish-brown. Leaves alternate, spiral, 15-45 x 5-20 cm, obovate to elliptic-obovate, apex acute, acuminate or obtuse, base cuneate, acute, or obtuse, margin serrate; lateral nerves 12-20 pairs, parallel, prominent; intercostae subscalariform, faint stipules lateral, deciduous; petiole 10-50 mm long, pubescent, grooved above. Flowers in racemes or in 2-7 flowered clusters, white, 2.5-3 cm across; bracts lanceolate or spathulate, hirsute. Sepals 5, ovate, 8-12 x 5-9 mm, reddish, silky pubescent. Petals 5, obovate, 15-20 x 5-10 mm, white. Stamens numerous, cohering slightly at base, in 2 series, purple

blue. Carpels 5, cohering at the axis, ovules many; styles 5, free. Pseudocarp orange, subglobose, enclosed within sepals, 2.5-3 cm across. Fruits 8 x 5 mm; seeds 1 or 2, dark reddish-brown to black, arillate, glabrous.

Ambalappara, *KVB 31748*

Fl. & Fr.: December-February

Distribution: Common in evergreen forests of Kattikari and Ambalappara. Endemic to Western Ghats

Dillenia pentagyna Roxb., Pl. Coromandel t. 20. 1795; Hook. f., Fl. Brit. India 1: 38. 1872; Dunn in Gamble, Fl. Madras 8 (6). 1915; Manilal & Sivar., Fl. Calicut 25. 1982; Ansari, Fl. Kasaragod Div. 52. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 36. 1988; N. C. Majumdar in B. D. Sharma *et al.*, Fl. Ind. 1: 156. 1993; N.P. Balakr. & G.V.S. Murthy in P. Daniel, Fl. Kerala 1: 122. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 89. 2009.

Deciduous trees, to 25 m high; bark grey. Leaves alternate, spiral, clustered at the tip of branchlets, 15-60 x 10-25 cm, obovate to oblong-lanceolate, scarios, apex obtuse, base acute or attenuate, margin serrate, puberulent beneath; lateral nerves many, parallel, prominent, intercostae scalariform, faint; petiole 15-60 mm long, sheathing, winged. Flowers fascicled on old branches, 2.5-3 cm across, yellow, fragrant. Sepals 5, 8-12 mm long, obovate or elliptic, accrescent. Petals 5, 10-20 x 7-12 mm, obovate, obtuse, bright yellow. Stamens numerous, yellow in 2 series. Carpels 5-10, cohering at the axis, arranged on the narrow conical receptacle, unilocular, ovules many; styles free. Fruit an aggregate of berries, drooping, subglobose, 15 x 13 mm, indehiscent, fleshy, subtended by persistent sepals; seeds numerous.

Valayamchal, *KJD 26356*

Fl. & Fr.: February-June

Distribution: Common in semi-evergreen forests of Valayamchal.

Order: **Saxifragales**

CRASSULACEAE

KALANCHOE Adans.

Fam. Pl. (Adanson) 2: 248. 1763.

Kalanchoe lanceolata (Forssk.) Pers., Syn. Pl. 1: 446. 1805. *Cotyledon lanceolata* Forssk., Fl. Aegypt.-Arab. 89. 1775. *Kalanchoe floribunda* Wight & Arn., Prodr. Fl.

Ind. Orient. 359. 1834; Hook. f., Fl. Brit. India 2: 414. 1878; Gamble, Fl. Madras 450(319). 1919.

Large perennial, succulent, deciduous, glabrous herbs. Leaves opposite, fleshy, rounded or obtuse, crenate-serrate. Flowers yellow, in large trichotomous corymbose cymes; bracts linear-lanceolate. Calyx glabrous, divided nearly to the base; segments narrowly lanceolate, acute. Corolla yellowish-white, tube inflated, glabrous; lobes broadly lanceolate, acute. Stamens 8, in two series, adnate to the corolla tube. Carpels 4, adnate to the base of corolla tube, styles subulate, stigma oblique. Fruits with persistent shining white corolla tubes.

Ambalappara, KVB 31669

Fl. & Fr.: January-June

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Peninsular India.

DAPHNIPHYLLACEAE

DAPHNIPHYLLUM Blume

Bijdr. Fl. Ned. Ind. 17: 1152. 1826-27

Daphniphyllum neilgherrense (Wight) K. Rosenthal, Pflanzenr. (Engler) IV, 147a: 7. 1919; Gamble, Fl. Madras 1311(917). 1925; Ratheesh, Fl. Stud. Wayanad Dist. 733. 2009. *Goughia neilgherrensis* Wight, Icon. Pl. Ind. Orient. t. 1878 & 1879. 1852. *Daphniphyllum glaucescens* Müll. Arg. in DC. Prodr. 16: 3. 1866, non Blume 1826-1827; Hook. f., Fl. Brit. India 5: 353. 1887. *Daphniphyllum roxburghii* Baillon, Etude Euphorb. 565. 1858 (Plate 6i).

Trees, to 15 m, bark surface greyish-brown, smooth; exudation milky; branchlets stout. Leaves alternate, clustered at the tip of branchlets, 3.5-12 x 1.5-5 cm, obovate, elliptic-obovate or obovate-oblong, apex acute or obtuse, base acute, margin entire, revolute, glabrous above and glaucous beneath, coriaceous; lateral nerves 5-10 pairs, slender, faint, intercostae reticulate, faint; petiole 5-25 mm, slender, glabrous. Flowers unisexual, yellowish-green, in axillary racemes. Male flowers: bracts 3 x 3 mm, ovate, obtuse, ciliate. Tepals 5, minute. Stamens 5-12, free; anthers oblong; connective apiculate. Female flowers: bracteate, perianth similar to male flowers. Ovary superior, imperfectly 2-celled; ovules 2 in each cell; stigmas thick, recurved, undivided. Fruit a drupe, 10-12 mm long, ovoid, greenish-red.

Ambalappara, KVB 31573

Fl. & Fr.: January-June

Distribution: Rare in evergreen forests of Ambalappara.

Order: **Santalales**

BALANOPHORACEAE

BALANOPHORA J.R.Forst. & G.Forst.

Char. Gen. Pl., ed. 2. 99, 100. 1776.

1a. Plants monoecious; heads yellow *B. abbreviata*

1b. Plants dioecious; heads reddish-brown *B. fungosa* subsp. *indica*

Balanophora abbreviata Blume, Enum. Pl. Javae 1: 98. 1827; Sasidh. & Sivar., Fl. Pl. Thrissur For. 389. 1996 (Plate 6j).

Monoecious herbs. Rhizome finely warted with lenticels, cream coloured. Scale leaves 4-6, ovate, acute, stiff, yellow. Heads ovoid or lanceoid. Male flowers 20-40, sessile, synandrium with 15-25 anther-loculi. Female flowers fully covering the exposed part of head; pedicels obconical at apex. Spadicles obovoid with a narrow basal and upper portion.

Ambalappara, NS & KJD 31985

Fl. & Fr.: September-January

Distribution: Rare in evergreen forests of Ambalappara.

Balanophora fungosa J.R.Forst. & G.Forst., Char. Gen. Pl., ed. 2. 100. t. 50. 1776, subsp. **indica** (Arn.) Hansen, Dansk. Bot. Ark 28: 100. ff. 20 & 21. 1972; Ramach. & V.J. Nair, Fl. Cannanore Dist. 403. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 714. 2009. *Langsdorffia indica* Arn., Ann. Nat. Hist. 2:37. 1838. *Balanophora indica* (Arn.) Wall. ex Griff., Trans. Linn. Soc. London 20: 95. 1846; Hook. f., Fl. Brit. India 5: 237. 1886; Gamble, Fl. Madras 1263(885). 1925.

Dioecious, parasitic herbs, 10-25 cm high. Rootstock warted with lenticels. Stem stout, short, cylindrical, 1.5-2 cm diam. Scale leaves 2.5-3.5 x 1.5-2 cm, ovate to sub orbicular, obtuse at apex, purple. Male inflorescence obovoid, dense raceme, 5-10 cm long, 3-6 cm wide. Flowers small, 0.4-0.6 cm long. Perianth lobes 2-6, white. Stamens 2-6 or more; filaments united. Female inflorescence globose heads, 2-5 cm diam., bright red in colour. Perianth 0. Ovary ellipsoid, minute.

Kattikari, KJD 31895

Fl. & Fr.: November-March

Distribution: Rare in evergreen forests of Kattikari and Mullenpara.

LORANTHACEAE

- 1a. Flowers arise on subtended campanulate involcre Tolypanthus
- 1b. Flowers arise on stems, involcre not campanulate 2
- 2a. Petals 4..... 3
- 2b. Petals 5-6 4
- 3a. Corolla gamopetalis, lobes acute, flowers in fascicles or cymes Scurrula
- 3b. Corolla polypetalis, lobes obtuse, flowers in spikes or racemes Helixanthera
- 4a. Bracteoles present, calyx tubular Macrosolen
- 4b. Bracteoles absent, calyx cupular 5
- 5a. Flowers sessile..... Helicanthes
- 5b. Flowers pedicelled..... 5
- 6a. Flowers in elongated many flowered racemes Dendrophthoe
- 6b. Flowers solitary or in few flowered fascicles or short racemes Taxillus

DENDROPTHOE Mart.

Flora 13. 1830.

- 1a. Branches trigonus *D. trigona*
- 1b. Branches terete *D. falcata*

Dendrophthoe falcata (L. f.) Ettingsh., Denkschr. Kaiserl. Akad. Wiss., Wien. Math.-Naturwiss. Kl. 32: 52,53,58. t.13. 1871; Manilal & Sivar., Fl. Calicut 252. 1982; Ansari, Fl. Kasaragod Div. 326. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 399. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 707. 2009. *Loranthus falcatus* L. f., Suppl. Pl. 211. 1781. *Loranthus longiflorus* Desr. in Lam. Encycl. 3: 598. 1792; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Madras 1253(877). 1925. *Loranthus longiflorus* Desr. var. *falcata* (L. f.) Kurz, For. Fl. Burma 2: 321. 1877; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Madras 1253(877). 1925. *Loranthus longiflorus* Desv. var. *amplexifolia* (DC.) Thwaites, Enum. Pl. Zeyl. 134. 1859; Hook. f., Fl. Brit. India 5: 215. 1886; Gamble, Fl. Madras 1253(877). 1925.

Parasitic shrubs, stem woody, terete, lenticellate. Leaves subopposite, 5-10 x 3-4.5 cm, ovate-oblong to lanceolate, apex acute or obtuse, base truncate, obtuse or cordate, thickly coriaceous; petiole 2-3 mm long or absent. Inflorescence axillary and lateral, curved racemes, 3-5 cm long, many-flowered; pedicels c. 3 mm long. Calyx 2-3 mm long, truncate. Corolla tube pink, 2.5-3.5 cm long, curved, slender at base, widening to top; lobes green, 0.7-1 cm long, c. 2 mm

wide, linear, recurved. Filaments bright red, c. 4 mm long; anthers yellow, linear-oblong. Ovary 2-3 mm long. Berry 1-1.5 x 0.3-0.4 cm, oblong, crimson.

Ambalappara, KVB 31783

Fl. & Fr.: December-May

Distribution: Common in the Sanctuary.

Dendrophthoe trigona (Wight & Arn.) Danser ex Santapau, Rec. Bot. Surv. India 16:163. 1953; Ratheesh, Fl. Stud. Wayanad Dist. 708. 2009. *Loranthus trigonus* Wight & Arn., Prodr. Fl. Ind. Orient. 386. 1834; Hook. f., Fl. Brit. India 5: 219. 1886; Gamble, Fl. Madras 1253(877). 1925.

Parasitic shrubs; branches to 15 mm thick, rugose, glabrous; branchlets often acutely 3-angled. Leaves alternate, 20 x 13 cm, ovate, obtuse, acute at base, thickly coriaceous; petiole to 1.5 cm long, flattened or winged. Flowers in axillary, to 3 cm long racemes or cymes; bracts forming a shallow oblique cup. Calyx cupular, truncate, glabrous. Corolla 15-20 mm long, pink or yellow, tube split to the middle, lobes 5, linear. Berry 1 x 0.5 cm, obovoid, crowned by the cup-shaped calyx limb.

Chavachi, NS & KVB 31314

Fl. & Fr.: May-September

Distribution: Common in evergreen forests of Chavachi, Kattikari, Chelachode, Kariyenkappu and semi-evergreen forests of Narikkadavu, Pookundu and Paripode. Endemic to Western Ghats.

HELICANTHES Danser

Verh. Kon. Ned. Akad. Wet., Afd. Natuurk. Sect. 29(6): 5. 1933.

Helicanthes elastica (Desr.) Danser, Verh. Kon. Akad. Wet. Afd. Natuurk. Sect. 2. 29: 55. 1933; Manilal & Sivar., Fl. Calicut 253. 1982; Ansari, Fl. Kasaragod Div. 327. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 708. 2009. *Loranthus elasticus* Desr. in Lam. Encycl. 3: 599. 1792; Hook. f., Fl. Brit. India 5: 216. 1886; Gamble, Fl. Madras 1254(877). 1925. *Dendrophthoe elasticus* (Desr.) Danser, Bull. Jard. Bot. Buitenzorg ser. 3, 10: 308. 1929 (Plate 6k).

Semi-parasitic dichotomously branched subshrubs; branchlets woody, swollen at nodes, glabrous. Leaves opposite, 4-8 x 1.5-4 cm, ovate or elliptic-oblong, base obtuse or truncate, apex acute or obtuse, thickly coriaceous, glaucous beneath, basally 3-nerved; sessile or subsessile. Flowers aggregated in short axillary fascicles. Calyx minute, flask-shaped, margin truncate. Corolla white with green stripes, 2.5-3.5 cm long, split lengthwise into 5 linear, twisted

lobes. Stamens 5, exerted, filaments crimson. Ovary ca. 1.5 mm long; style 3-3.5 cm long; stigma ovoid. Berry 6-8 x 3-3.5 mm, obovoid, red.

Kannadivechakunnu, *KJD 26390*

Fl. & Fr.: December-March

Distribution: Common on Cashew, also seen in other trees. Endemic to Peninsular India.

HELIXANTHERA Lour.

Fl. Cochinch. 142. 1790.

- 1a. Bracts with a small appendage, corolla dark brown at apex; branches tomentose *H. obtusata*
- 1b. Bracts without appendages, corolla purplish at apex; branches glabrous 2
- 2a. Corolla 4-angled in buds *H. intermedia*
- 2b. Corolla terete in buds *H. wallichiana*

Helixanthera intermedia (Wight) Danser, Bull. Jard. Bot. Buitenzorg ser. 3, 10: 317. 1929; Ramach. & V.J. Nair, Fl. Cannanore Dist. 400. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 709. 2009. *Loranthus intermedius* Wight, Calcutta J. Nat. Hist. 6: 361. 1846; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Madras 1251(876). 1925.

Parasitic glabrous shrubs. Leaves alternate, 4-8 x 3-5 cm, ovate, obtuse, coriaceous, base obtuse, truncate, or sub-cordate; petiole 1 cm long. Racemes 7 cm long, axillary, many-flowered; pedicel 7 mm long, slender, glabrous. Flower buds 4-angled and curved. Calyx truncate. Corolla lobes 4, straight, purplish pink or yellowish green, free to the base. Stamens 4; filaments attached below the middle of the corolla; stigma globose.

Ambalappara, *NS & KVB 31355*

Fl. & Fr.: February-March

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Helixanthera obtusata (Schult.) Danser, Bull. Jard. Bot. Buitenzorg ser. 3, 10: 317. 1929; Ansari, Fl. Kasaragod Div. 327. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 709. 2009. *Loranthus obtusatus* Wall., Numer. List n. 566. 1826. Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Madras 1251(876). 1925.

Parasitic shrubs, branchlets terete, slender, ferrugineous-tomentose. Leaves alternate, to 14 x 8 cm, ovate, obtuse, base rounded, coriaceous, glabrous, young

leaves usually red; petiole 1 cm long. Flowers in many flowered axillary racemes which are solitary or 2-3 together, to 8 cm long, densely golden tomentose; bracts with a small appendage.; pedicel 5 mm long, reflexed; Calyx 3 mm long, cylindrical, slightly constricted at mouth, limb very short. Corolla dark pink, dark purple inside to 18 mm long, 4-angular and curved in bud, lobes 4, free, tomentose outside. Anthers dark brown. Style 4 angled, stigma capitate. Berry 4 mm long, ovoid, truncate at apex somewhat tuberculate.

Ambalappara, NS & KVB 31351; KJD 26029; Kattikari, NS & KVB 31383

Fl. & Fr.: April-July

Distribution: Rare in evergreen forests of Ambalappara, Asthiparaa and Kattikari. Endemic to Western Ghats.

Helixanthera wallichiana (Schult.) Danser, Bull. Jard. Bot. Buitenzorg ser. 3, 10: 319. 1929; Manilal & Sivar., Fl. Calicut 252. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 400. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 709. 2009. *Loranthus wallichianus* Schult. & Schult.f. Syst. Veg. 7: 100. 1829; Hook. f., Fl. Brit. India 5: 205. 1886; Gamble, Fl. Madras 1251(876). 1925.

Parasitic shrubs, branchlets terete, rugose or lenticellate. Leaves alternate and opposite, 5-10 x 3-6 cm, ovate, obtuse, base acute or rounded glabrous; lateral nerves 2 or 3 pairs; petiole 0.8-2 cm long. Flowers in slender to 3-6 cm long, glabrous racemes; pedicel 3 mm long; bract adenate to the pedicel, spoon-shaped, ciliate. Calyx globose, 2 mm long, limb annular, obscure. Corolla reddish, terete in bud, lobes 4, ovate, acute, glabrous. Berry 6 mm long, ovoid, rugose.

Ambalappara, KJD 26130

Fl. & Fr.: July-September

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Western Ghats.

MACROSOLEN (Blume) Rchb.

Repert. Herb. sive Nomencl. Gen. Pl. 73. 1841.

Macrosolen capitellatus (Wight & Arn.) Danser, Blumea 2: 36. 1936; Manilal & Sivar., Fl. Calicut 252. 1982; Ansari, Fl. Kasaragod Div. 327. 1985. *Loranthus capitellatus* Wight & Arn., Prodr. Fl. Ind. Orient. 382. 1834; Hook. f., Fl. Brit. India 5: 221. 1886. *Elytranthe capitellata* (Wight & Arn.) Engl., Nat. Pflanzenfam. 3(1): 189. 1889; Gamble, Fl. Madras 1255(879). 1925.

Parasitic shrubs, branches 2-angular, glabrous. Leaves 5-8 x 2-3 cm, elliptic-lanceolate, acute, cuneate at base, coriaceous; nerves 2 or 3 pairs, obscure;

petiole to 7 mm long. Flowers 2-4 together, nearly sessile, on very short peduncle; bracts and bracteoles similar, ovate to orbicular, keeled. C 5 mm long, cylindrical, apex truncate with short rounded lobes. Corolla to 2 cm long, yellow to white in the tubular part and scarlet green at apex, split below the middle; lobes 6, linear or linear spatulate. Stamens 6, anthers multilocellate. Berry 6 x 5 mm, purple-black when ripe, ellipsoid, beaked with persistent calyx tube.

Kariyenkappu, KJD 26001

Fl. & Fr.: April-July

Distribution: Fairly common in plantations of Kariyenkappu.

SCURRULA L.

Sp. Pl. 110. 1753.

Scurrula parasitica L., Sp. Pl. 110. 1753; Ramach. & V.J. Nair, Fl. Cannanore Dist. 401. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 710. 2009. *Loranthus buddleioides* Desr. in Lam. Encycl. 3: 660. 1792; Gamble, Fl. Madras 1251(876). 1925. *Loranthus scurrula* L., Sp. Pl. (ed. 2) 472. 1762; Hook. f., Fl. Brit. India 5: 208. 1886.

Parasitic shrubs; branches terete, rusty tomentose. Leaves opposite, 5-9 x 3-5 cm, ovate, rounded at base and apex, coriaceous, golden tomentose below; petiole to 1 cm long. Flowers in axillary fascicles or shortly peduncled cymes, 16-20 together; bract ovate, concave, densely tomentose. Calyx 2-3 mm long, cupular, grey tomentose, limb truncate, entire. Corolla 15 mm long, greenish-yellow, slender, densely tomentose; lobes 4, ovate, acute. Stamens 4, filaments flattened, glabrous. Stigma clavate. Berry 6-8 mm long, obovoid, densely hairy.

Kariyenkappu, KJD 31869

Fl. & Fr.: November-February

Distribution: Fairly common in plantations of Kariyenkappu.

TAXILLUS Tiegh.

Bull. Soc. Bot. France 42: 256. 1895.

1a. Corolla densely tomentose, inflated above *T. tomentosus*

1b. Corolla glabrescent, not inflated *T. cuneatus*

Taxillus cuneatus (Heyne ex Roth) Danser, Bull. Jard. Bot. Buitenzorg ser. 3, 10: 354. 1929. *Loranthus cuneatus* Heyne ex Roth, Nov. Pl. Sp. 193. 1821; Hook. f., Fl. Brit. India 5: 214. 1886; Gamble, Fl. Madras 1253(877). 1925 (Plate 61).

Parasitic shrubs, branches slender, rugulose, glabrous. Leaves alternate, to 3 x 1.5 cm, obovate, rounded or retuse at apex, base cuneate and decurrent to the petiole; nerves obscure; petiole 2-4 mm long. Flowers 2-5 in axillary sessile or pedunculate fascicles; bracts 2 mm long, obovate. Calyx 2 mm long, tube subcylindric, limb irregularly toothed, pubescent. Corolla 2-3 cm long, tube inflated at middle, curved, 5-ribbed, greenish-white; lobes linear, recurved or spreading. Stamens exerted beyond the corolla tube; filaments dark red. Berry 8 mm long, ovoid, crowned by the calyx teeth, crimson.

Ambalappara, NS & KVB 31420

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Ambalappara.

Taxillus tomentosus (Heyne ex Roth) Tiegh., Bull. Soc. Bot. France 42: 256. 1895; Ramach. & V.J. Nair, Fl. Cannanore Dist. 401. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 711. 2009. *Loranthus tomentosus* Heyne ex Roth, Nov. Pl. Sp. 191. 1821; Hook. f., Fl. Brit. India 5: 212. 1886; Gamble, Fl. Madras 1252(876). 1925.

Parasitic shrubs, branches lenticellate, young shoots fulvous tomentose. Leaves to 5 x 2.5 cm, obovate to oblong, obtuse, glabrous above; nerves 4-5 pairs; petiole 5 mm long. Flowers 3-8, fascicled; pedicels 2 mm long. Calyx 2 mm long, lobes triangular, acute, tomentose. Corolla 1.5 cm long, split to the middle, greenish-white, 5-angled, densely hairy, tube gibbous, lobes green spreading or recurved. Stamens 5; filaments red. Style bulbous at the middle, stigma hemispheric. Berry subglobose, tomentose.

Ambalappara, KVB 31775

Fl. & Fr.: December-January

Distribution: Rare in evergreen forests of Ambalappara.

TOLYPANTHUS Blume

Syst. Veg., ed. 15 bis 1731. 1830.

Tolypanthus lagenifer (Wight) Tiegh., Bull. Soc. Bot. France 42: 249. 1895; Ramach. & V.J. Nair, Fl. Cannanore Dist. 402. 1988; Vajr. *et al.*, J. Econ. Taxon. Bot. 5:424. 1984; Ratheesh, Fl. Stud. Wayanad Dist. 711. 2009. *Loranthus lageniferus* Wight, Icon. Pl. Ind. Orient. t. 306. 1840; Hook. f., Fl. Brit. India 5: 218. 1886; Gamble, Fl. Madras 1254(878). 1925 (Plate 7a).

Parasitic shrubs; stem stout, glabrous, lenticellate. Leaves opposite, 6-9 x 3-6 cm, reddish when young, ovate or ovate-oblong, apex obtuse or acute, base rounded; petiole 5-6 mm long. Flowers subsessile, fascicled on woody stem,



a. *Indianthus virgatus*



b. *Ensete superbum*



c. *Amomum aculeatum*



d. *Curcuma neilgherrensis*



e. *Globba sessiliflora*



f. *Coscinium fenestratum*



g. *Cyclea fissicalyx*



h. *Dillenia bracteata*



i. *Daphniphyllum neilgherrense*



j. *Balanophora abbreviata*



k. *Helixanthera obtusata*



l. *Taxillus cuneatus*

subtended by reddish or yellowish campanulate, 5-lobed, 2-3 cm long involucre. Calyx 2.5-3 mm long, united; lobes 5, triangular. Corolla 2-2.5 cm long, green or reddish; tube dilated above the middle; lobes 5, short, linear-oblong. Stamens 5; filaments short; anthers linear. Ovary inferior, 1-loculed; style erect; stigma capitate.

Narikadavu, NS & KVB 31442

Fl. & Fr.: August-November

Distribution: Common in the Sanctuary. Endemic to Western Ghats.

SANTALACEAE

- 1a. Epiphytic, stem parasites *Viscum*
- 1b. Terrestrial, not stem parasites 2
- 2a. Plants armed; inflorescence on drooping spikes *Scleropyrum*
- 2b. Plants unarmed; inflorescence cyme *Osyris*

OSYRIS L.

Sp. Pl. 2: 1022. 1753.

Osyris quadripartita Salzm. ex Decne., Ann. Sci. Nat. Bot. ser. 2, 6: 65. 1836; Sasidh., Fl. Chinnar WLS 276. 1999. *Osyris wightiana* Wall. ex Wight, Icon. Pl. Ind. Orient. t. 1853. 1852. *Osyris arborea* Wall. ex A.DC. in DC., Prodr. 14: 633. 1857; Hook. f., Fl. Brit. India 5: 232. 1886; Gamble, Fl. Madras 1262(883). 1925 (Plate 7b).

Shrubs glabrous shrubs; branchlets sharply triangular. Leaves alternate, to 4 x 2 cm, elliptic, mucronate, glaucous and pubescent below; petiole 1-3 mm. Flowers yellowish-green, small axillary. Male flowers in long peduncled shortly pedicelled 5-10 flowered umbels. Bisexual flowers 1-3 on peduncles. Flowers 3-merous. Tepals of male flowers basally connate, 2 mm, ovate, hairy inside, spreading. Stamens exerted. Ovary inferior sunk in the perianth tube; ovules 2-4, pendulous; style short, stigma 3-lobed. Drupe 5-8 mm long, yellow, subglobose.

Ambalappara, KJD 26131; NS & KVB 31345

Fl. & Fr.: January-July

Distribution: Margins of Grass lands and evergreen forests of Ambalappara.

SCLEROPYRUM Arn.

Mag. Bot. & Zool. 2: 549 1838, *nom. cons.*

Scleropyrum pentandrum (Dennst.) Mabb., Taxon 26: 533. 1977; Manilal & Sivar., Fl. Calicut 254. 1982; Ansari, Fl. Kasaragod Div. 329. 1985; Ramach. &

V.J. Nair, Fl. Cannanore Dist. 403. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 714. 2009. *Pothos pentandrus* Dennst., Schlüssel Hortus Malab. 16, 24, 33. 1818. *Scleropyrum wallichianum* (Wight & Arn.) Arn., Mag. Zool. Bot. 2: 550. 1838; Hook. f., Fl. Brit. India 5: 234. 1886; Gamble, Fl. Madras 1262(884). 1925. *Sphaerocarya wallichiana* Wight & Arn., Edinb. New Phil. J. 15:180.1833 (Plate 7c).

Small trees; trunk with sharp thorns. Leaves alternate, to 15 x 9 cm, ovate or oblong, acute or acuminate, base truncate or rounded, coriaceous; nerves 5 pairs, irregular; petiole 4 mm long, stout. Flowers polygamous on drooping spikes; bracts filiform, deciduous. Spikes unequal, solitary or fascicled, along mature stems, 5-10 cm long; bracts triangular, acuminate, 1.5 mm long, scarious. Perianth orange-yellow, adnated to the ovary in bisexual and female flowers and free in male flowers, 5-fid at apex. Stamens 4 or 5, anthers divaricate. Ovary inferior, 1-celled, 3-ovuled; style short; stigma peltate. Drupes pyriform, 2.5 x 2 cm; purple, crowned by the perianth tube; seed one.

Narikkadavu, KVB 31205

Fl. & Fr.: October-April

Distribution: Rare in semi-evergreen forests of Narikkadavu.

VISCUM L.

Sp. Pl. 1023. 1753.

Viscum angulatum Heyne ex DC., Prodr. 4: 283. 1830; Hook. f., Fl. Brit. India 5: 225. 1886; Gamble, Fl. Madras 1259(881). 1925; Sanjai & Balakr., Rheedeia 16: 88. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 712. 2009 (Plate 7d).

Parasitic leaf less shrubs, branches 4-angled, drooping, slightly broadened near the apex of the internode, smooth. Flowers solitary or 3-together, axillary, all female, all male or middle one female and laterals male. Perianth lobes in male flowers 4, triangular, connate below. Stamens 4, epiphyllous, anthers sessile. Ovary obovoid, style short or absent. Berry 5 x 5 mm, globose, yellowish.

Ambalappara, NS & KVB 31431

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Ambalappara.

OLACACEAE

- 1a. Climbers with tendrilsErythralum
- 1b. Trees.....Strombosia

ERYTHROPALUM Blume

Bijdr. Fl. Ned. Ind. 15: 921. 1826

Erythropalum scandens Blume, Bijdr. Fl. Ned. Ind. 922. 1826; Hook. f., Fl. Brit. India 1: 578. 1875; Uniyal in N.P. Singh *et al.*, Fl. Ind. 5: 5. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 674. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 218. 2009. *Mackaya populifolia* Arn., Mag. Zool. Bot. 2: 531. 1838. *Erythropalum populifolium* (Arn.) Mast. in Hook.f., Fl. Brit. India 1: 578. 1875; Gamble, Fl. Madras 191(137). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 92. 1988.

Tendrillate climbers. Leaves alternate, 11-15 x 7-10 cm, ovate to deltoid, apex acuminate, base truncate; 3-ribbed, glaucous below, membranous. Flowers in axillary peduncled cymes, drooping, pedicellate. Sepals cupular, 5-toothed. Petals 5, 6 x 2 mm, oblong, obtuse, yellow. Stamens 5, filaments very short, staminodes hairy; disk surrounds the ovary. Ovary 1-celled, 1-3 ovuled, style short, stigma 3-fid. Fruit ovoid, 8 x 6 mm, orange-red, glabrous; seed one, bluish-black, aril red.

Meenmutty, KVB 31524

Fl. & Fr.: December-March

Distribution: Common in evergreen forests of Meenmutty, Kattikari and Chavachi.

STROMBOSIA Blume

Bijdr. Fl. Ned. Ind. 1154. 1826.

Strombosia ceylanica Gardner, Calcutta J. Nat. Hist. 6: 350. 1846; Hook. f., Fl. Brit. India 1: 579. 1875; Gamble, Fl. Madras 191(137). 1915; Uniyal in N.P. Singh *et al.*, Fl. Ind. 5: 14. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 677. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 214. 2009 (Plate 7e).

Trees, to 25 m high; bark greenish-grey. Leaves alternate, estipulate, 8-18 x 3.5-6 cm, oblong-lanceolate, ovate-lanceolate, elliptic-oblong or lanceolate, acute or acuminate, base obtuse, acute or round, lower surface papillate; lateral nerves 4-6 pairs, prominent, intercostae subscalariform; petiole 10-15 mm, grooved above. Flowers 1.5-2 mm across, greenish-white, in axillary cymes; pedicels 1.5 mm long. Calyx 1 mm long, cupular, accrescent, 5-lobed. Petals 5, 2.5 x 1 mm, free, oblong, ovate, tomentose inside. Stamens 5, opposite the petals and adnate to them, anthers introrse. Ovary imperfectly 4-5-celled, surrounded by a lobed disk, ovules 4-5, pendulous; style short. Fruit a drupe 2.5 cm long, pyriform, deep purple rugose, surrounded by the remains of calyx lobes and style; stone crustaceous; seed one.

Ambalappara, KVB 31510

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests of Ambalappara.

Order: **Caryophyllales**

AMARANTHACEAE

- 1a. Leaves opposite.....2
- 1b. Leaves alternate.....4
- 2a. Flowers in sessile heads; anthers 1-celledAlternanthera
- 2b. Flowers in groups of 3-5, in spikes; anthers 2-celled3
- 3a. Flowers in groups of three, one fertile and two sterile..... Cyathula
- 3b. Flowers single in spikes, all fertileAchyranthes
- 4a. Flowers unisexual.....Amaranthus
- 4b. Flowers bisexual.....5
- 5a. Leaves pubescent, stamens interposed with staminodesAerva
- 5b. Leaves glabrous, staminodes absent6
- 6a. Flowers in paniced spikes, fruit indehiscent Indobanalia
- 6b. Flowers in globose heads, fruit circumscissile dehiscentAllmania

ACHYRANTHES L.

Sp. Pl. 204. 1753.

- 1a. Bracteoles wings completely adnate to the wings.....*A. aspera*
- 1b. Bracteoles wings adnate at the base only, free above.....*A. bidentata*

Achyranthes aspera L., Sp. Pl. 204. 1753; Hook. f., Fl. Brit. India 4: 730. 1885; Gamble, Fl. Madras 1176(823). 1925; Manilal & Sivar., Fl. Calicut 245. 1982; Ansari, Fl. Kasaragod Div. 311. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 375. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 667. 2009.

Large herbs; stem tomentose. Leaves opposite, 6-10 x 3-6 cm, broadly elliptic to obovate, apex abruptly acuminate, tomentose, nerves 6 pairs; Petiole 5 mm long. Spike to 20 cm long, hispid; bracts 6 mm long, lanceolate, aristate; bracteoles entire, aristate. Flowers deflexed. Tepals 7.5 x 2 mm, elliptic, acute, glabrous, equal. Staminal sheath truncate. Ovary truncate at apex. Achenes 3 mm long, ovoid, brown.

Pothurumi, *KJD 26312*

Fl. & Fr.: October-March

Distribution: Fairly common in evergreen forests of Pothurumi and plantations of Kariyenkappu.

Achyranthes bidentata Blume, Bijdr. Fl. Ned. Ind. 545. 1826; Gamble, Fl. Madras 1176(824). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 375. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 667. 2009.

Herbs; stem glabrous. Leaves opposite, 10-16 x 2-2.5 cm, linear-lanceolate, apex acuminate, thinly pubescent; nerves 7-9 pairs. Petiole 5 mm long. Spike axillary and terminal, 15-30 cm long, narrow, glabrous; bracts 4 x 1.5 mm, lanceolate, long-aristate; bracteoles 3 mm long, entire, aristate. Flowers distant. Tepals equal, 7 x 1.5 mm, lanceolate, acuminate, glabrous. Staminal sheath toothed. Ovary truncate. Achenes 3 x 1.5 mm, cylindrical, longitudinally striate, reddish-brown.

Pothurumi, KJD 25541

Fl. & Fr.: September-December

Distribution: Fairly common in evergreen forests of Pothurumi.

AERVA Forssk.

Fl. Aegypt.-Arab. 170, 122. 1775, *nom. cons.*

Aerva lanata (L.) Juss., Ann. Mus. Hist. Nat. 11: 131. 1808; Hook. f., Fl. Brit. India 4: 728. 1885; Gamble, Fl. Madras 1178(825). 1925; Manilal & Sivar., Fl. Calicut 244. 1982; Ansari, Fl. Kasaragod Div. 312. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 376. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 668. 2009. *Achyranthes lanata* L., Sp. Pl. 204. 1753. *Aerva floribunda* Wight, Icon. Pl. Ind. Orient. t. 723. 1840.

Herbs, white woolly tomentose. Leaves alternate, 3-4 x 3 cm, orbicular to ovate, apex obtuse, mucronate, pubescent above, densely woolly below, membranous; petiole ca. 1 cm. Spikes axillary, to 1 cm, densely tomentose; bracts and bracteoles 1 mm, ovate. Tepals 1.5 mm, oblong, woolly mucronate. Staminal filaments basally connate, 0.5 mm. Staminodes subulate. Ovary 0.4 mm. Seeds black.

Valayamchal, KJD 22561

Fl. & Fr.: September-April

Distribution: Rare in Semi-Evergreen forests of Valayamchal.

ALLMANIA R Brown ex Wight

J. Bot. (Hooker) 1: 226. 1834.

Allmania nodiflora (L.) R. Br. ex Wight, J. Bot. (Hooker) 1: 226. t. 128. 1834; Gamble, Fl. Madras 1167(817). 1925; Ratheesh, Fl. Stud. Wayanad Dist. 668. 2009. *Celosia nodiflora* L., Sp. Pl. 205. 1753. *Chamissoa aspera* Wight, Icon. Pl.

Ind. Orient. t. 1772. 1852. *Allmania nodiflora* (L.) R. Br. ex Wight var. *longipedunculata* Trimen, Handb. Fl. Ceylon 3: 394. 1895; M. Mohanan & Henry, Fl. Thiruvanthapuram 376. 1994. *Allmania longipedunculata* (Trimen) Gamble, Fl. Madras 1168(818). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 376. 1988.

Diffuse or erect herbs, stem puberulous. Leaves alternate, 2-6 x 1-1.5 cm, elliptic-oblong, apex acute, entire, glabrous. Flowers in terminal and axillary globose congested cymes, pedicelled; bracts and bracteoles 4 mm long, lanceolate, acuminate with filiform tips. Tepals 5, equal, 5 x 1 mm, lanceolate, acute, free to the base, 1-nerved, glabrous. Stamens 5, filaments united below into a membranous cup, glabrous. Ovary obovoid, 1-celled, 1-ovuled, style 1, slender, stigma 2-toothed. Achenes 3 x 2 mm, ellipsoid with a long beak, biconvex, black.

Paripode, KJD 22562

Fl. & Fr.: July-October

Distribution: Weed along the boundaries near Farm.

ALTERNANTHERA Forssk.

Fl. Aegypt.-Arab. 28. 1775.

Alternanthera sessilis (L.) R. Br. ex DC., Cat. Pl. Horti Monsp. 4: 77. 1813; Manilal & Sivar., Fl. Calicut 245. 1982; Ansari, Fl. Kasaragod Div. 312. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 377. 1988; Joseph, Aquatic Angiosp. Malabar 49. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 670. 2009. *Gomphrena sessilis* L., Sp. Pl. 225. 1753. *Alternanthera triandra* Lam., Encycl. 1: 95. 1785; Gamble, Fl. Madras 1179(825). 1925.

Decumbent herbs, stem glabrous. Leaves opposite, 3-4 x 1 cm, elliptic-oblong to oblanceolate, apex obtuse, base attenuate into a petiole, crenate, glabrous. Spike 7-12 x 5 mm, sessile, solitary or 2-3 together; bracts and bracteoles similar, 1 mm long, broadly ovate, acute. Flowers yellowish red. Tepals equal, 2.5 x 1.5 mm, ovate, acute, glabrous, 3-nerved at base. Stamens 3. Achenes 2 x 2 mm, obovoid, emarginate at apex; seed orbicular, compressed, brown.

Near farm, KJD 22563

Fl. & Fr.: Throughout the year

Distribution: Boundaries near Farm as weed.

AMARANTHUS L.

Sp. Pl. 989. 1753.

Amaranthus spinosus L., Sp. Pl. 991. 1753; Hook. f., Fl. Brit. India 4: 718. 1885; Gamble, Fl. Madras 1170(819). 1925; Manilal & Sivar., Fl. Calicut 243. 1982;

Ansari, Fl. Kasaragod Div. 313. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 378. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 671. 2009.

Erect glabrous herbs, profusely branched; branches grooved; spines divaricate, sharp, to 1.2 cm long. Leaves 3-8 x 2-4 cm, ovate or elliptic-lanceolate, apex obtuse or subacute, base attenuate; Petiole to 4 cm long. Flowers in terminal paniced spikes or in axillary, sessile clusters; bracts and bracteoles minute, ovate-lanceolate. Male flowers: 1-2 mm across. Tepals 5, calycine, unequal, ovate-lanceolate. Stamens 5; anthers sagittate. Female flowers: 1-2 mm across. Tepals 5, oblong, acute at apex. Ovary 1-celled; ovules solitary; stigmas 2-3. Utricle circumcissile; seeds minute, diskoid.

Near farm, *KJD 18786*

Fl. & Fr.: June-December

Distribution: Along road side.

CYATHULA Blume

Bijdr. Fl. Ned. Ind. 548. 1826, *nom. cons.*

Cyathula prostrata (L.) Blume, Bijdr. Fl. Ned. Ind. 549. 1826; Hook. f., Fl. Brit. India 4: 722. 1885; Gamble, Fl. Madras 1172(820). 1925; Manilal & Sivar., Fl. Calicut 243. 1982; Ansari, Fl. Kasaragod Div. 314. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 379. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 672. 2009. *Achyranthes prostrata* L., Sp. Pl. (ed. 2) 296. 1762.

Decumbent herbs. Leaves opposite, 5-7 x 2-3.5 cm, rhomboid, acute at both ends, thinly pubescent; petiole 5-15 mm long. Spike terminal, to 18 cm long, slender, solitary. Flowers in groups of 3-5 of which one perfect and others neuter; bracts and bracteoles similar, 1.5 mm long, lanceolate, acuminate, pubescent. Tepals 5, free, 3 x 1 mm, elliptic, acute, hooked awn like in neuter flowers. Stamens 5, filaments united into a membranous truncate cup; staminodes membranous, alternate with stamens, fimbriate. Ovary ovoid, style simple, stigma capitellate. Achenes 2 x 1 mm, obovoid, compressed, golden brown.

Mullenpara, *KJD 22571*

Fl. & Fr.: September-April

Distribution: Common in evergreen forests of Chavachi, Mullenpara, Kattikari, Kannadivechakuunu and Pothanplavu.

INDOBANALIA A.N.Henry & B. Roy

Bull. Bot. Surv. India 10: 274. 1969.

Indobanalia thyriflora (Moq.) A.N.Henry & B. Roy, Bull. Bot. Surv. India 10: 274. 1969; Ramach. & V.J. Nair, Fl. Cannanore Dist. 379. 1988; Ratheesh, Fl.

Stud. Wayanad Dist. 673. 2009. *Banalia thyrsiflora* Moq. in DC. Prodr. 13: 278. 1849; Gamble, Fl. Madras 1167(817) (Plate 7f).

Erect herbs, stem glabrous, ribbed. Leaves alternate, 7-10 x 3-5 cm, ovate, apex acuminate, base cuneate, hairy below; lateral nerves 8 pairs; Petiole 2 cm long. Spikes thyrsoid, panicles, narrow, terminal and axillary; bracts and bracteoles similar, broadly ovate. Flowers 2-3 together. Tepals free, equal, 3 x 1 mm, 3-nerved, glabrous. Stamens 5, filaments jointed into a tube. Ovary ellipsoid, compressed, 1-ovuled, style-1, slender; stigmas 2, linear, papillose. Achenes globose; seed orbicular, black.

Ambalappara, *KJD 26302*

Fl. & Fr.: December-March

Distribution: Rare in evergreen forests of Ambalappara and Pothurumi. Endemic to southern Western Ghats.

ANCISTROCLADACEAE

ANCISTROCLADUS Wall.

Num. List 1052. 1829, *nom. cons.*

Ancistrocladus heyneanus Wall. ex J.Graham, Cat. Pl. Bombay 28. 1839; Hook. f., Fl. Brit. India 1: 299. 1874; Dunn in Gamble, Fl. Madras 86(62). 1915; Silpi Das in B.D. Sharma & Sanjappa, Fl. Ind.3: 254. 1993; R. Chandra. in P. Daniel, Fl. Kerala 1: 374. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 143. 2009 (Plate 7g).

Climbing shrubs, branches hooked, branchlets glabrous. Leaves crowded at the apex of branchlets, sessile, 16-20 x 4-6 cm, oblanceolate, apex acute, base attenuate, margin entire. Flowers to 1 cm across, in terminal lax panicles, bisexual, sessile. Sepals 5, unequal, connate into a tube, adnate to the ovary, lobes 3 mm long. Petals 5, subequal, ca 6 mm long, oblong, obtuse, slightly connate at base, greenish yellow. Stamens 10, filaments connate at base, anthers orbicular. Ovary 1-celled; ovule solitary; styles 3, free. Fruit a nut covered by large wing like sepals; wings unequal, to 5 x 2 cm, obovate, obtuse, reticulate, glabrous.

Kattikari State Boundary, *KJD 26006*

Fl. & Fr.: February-April

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Moonamthode and Kattikari.

DROSERACEAE

DROSERA L.

Sp. Pl. 218. 1753.

- 1a. Leaves radical, spatulate*D. burmannii*
- 1b. Leaves cauline, not spatulate2
- 2a. Leaves peltate, semi-lunate; flowers white*D. peltata*
- 2b. Leaves linear, terete; flowers pink *D. indica*

Drosera burmannii Vahl, Symb. Bot. (Vahl) 3: 50. 1794; Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Madras 452(320). 1919; Manilal & Sivar., Fl. Calicut 103. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 174. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 346. 2009 (Plate 7h).

Acaulescent herbs. Leaves to 10 x 8 mm, obovate, obtuse, prostrate, densely covered with glandular hairs, greenish pink. Petiole absent. Flowers few in erect racemes; scape 6-8 cm high. Calyx glandular. Petals 3 mm across, white. Stamens 5. Ovary ovoid; style apically lobed. Capsule 6 x 4 mm, obovoid; seeds black.

Ambalappara, NS & KJD 31952

Fl. & Fr.: August-December

Distribution: Common along stream sides and moist areas in evergreen forests of Ambalappara.

Drosera indica L., Sp. Pl. 282. 1753; Hook. f., Fl. Brit. India 2: 424. 1878; Gamble, Fl. Madras 452(320). 1919; Manilal & Sivar., Fl. Calicut 103. 1982; Ansari, Fl. Kasaragod Div. 153. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 347. 2009.

Herbs with weak erect. Leaves many, cauline, alternate, narrowly linear, glandular hairy, about 2.5-6.0 cm long, hardly broader than the petiole; Petioles glabrous, about 1.5 cm long. Flowers mauve or pinky purple, usually over 1.5 cm across, 3-15 on axillary, terminal and leaf-opposed glandular racemes 5-10 cm long. Calyx segments oblong-ovate, subobtuse, entire, glandular-pubescent. Petals narrowly spatulate, obtuse. Styles 3. Capsule broadly oblong; seeds minute, ovoid, reticulate.

Chullikandam, KJD 22508

Fl. & Fr.: August-November

Distribution: Rare in semi-evergreen forests of Chullikandam.

Drosera peltata Thunb., *Drosera* 7 1797; Hook. f., *Fl. Brit. India* 2:424.1878; Gamble, *Fl. Madras* 452(320). 1919; Ratheesh, *Fl. Stud. Wayanad Dist.* 347. 2009 (Plate 7i).

Herbs with subterranean globose tuber; stems erect, to 15 cm high. Leaves alternate, many, along the whole length of the stem, with a very slender curved subcapillary; petiole 1.0-2.5 cm long; leaf blade peltately attached, semicircular, with the upper edge straight or slightly concave and prolonged at the corners into acuminate horns, thus giving the blade a semilunate outline, carrying on its adaxial surface numerous long, viscid stipitate glands. Inflorescens terminal or lateral, 1-5 cm long, usually 2-8 flowered. Flowers white, nearly 1.5 cm across; pedicels 0.8-1.5 cm long. Calyx segments ovate, glabrous but lacinate or ciliate at the margins. Petals white, spathulate-obovate. Ovary globose; styles 3, fimbriate towards the apex. Capsule 7 x 4 mm, ovoid; seeds oblong, black.

Ambalappara, NS & KJD 31968

Fl. & Fr.: December-March

Distribution: Common in grasslands as well as forests of Ambalappara.

MOLLUGINACEAE

GLINUS L.

Sp. Pl. 1: 463. 1753

Glinus oppositifolius (L.) Aug., DC. *Bull. Herb. Boissier ser. 2*, 1: 552. 1901; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 204. 1988. *Mollugo oppositifolia* L., Sp. Pl. 89. 1753; Gamble, *Fl. Madras* 552(390). 1919. *Mollugo spergula* L., *Syst. Nat.* (ed. 10) 881. 1759; Hook. f., *Fl. Brit. India* 2: 662. 1879.

Diffuse or prostrate, glabrous herbs. Leaves in whorls of 3-5, unequal, 7-20 x 3-8 mm, obovate-spathulate, base attenuate, apex obtuse or acute, subsucculent, subsessile. Flowers in axillary, 5-8-flowered fascicles; pedicel to 1.5 cm. Tepals 5, 5-6 x 2-3 mm, oblong, with green central stripe, broad thin hyaline margins, apex obtuse or acute, spreading at anthesis, closing again around fruit. Stamens 5, often alternating with linear, bifid staminodes; anthers oblong. Ovary ellipsoid, 3-celled; ovules many; styles 3, recurved; stigmas capitate. Capsule c. 3 mm long, oblong, loculicidal, enclosed in erect calyx. Seeds ovoid, curved, tubercled, dark reddish brown, with a pair of unequal white hilar appendages.

Narikadvu, KVB 31426

Fl. & Fr.: February-May

Distribution: Fairly common at Narikkadvu, Pookundu near stream side.

NYCTAGINACEAE

BOERHAVIA L.

Sp. Pl. 3. 1753.

Boerhavia diffusa L., Sp. Pl. 3. 1753; Gamble, Fl. Madras 1162(814). 1925; Manilal & Sivar., Fl. Calicut 242. 1982; Ansari, Fl. Kasaragod Div. 310. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 373. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 665. 2009. *Boerhavia repens* L., Sp. Pl. 3. 1753; Hook. f., Fl. Brit. India 4: 709. 1885. *Boerhavia procumbens* Banks ex Roxb., Fl. Ind. 1: 148. 1820.

Herbs with long trailing branches; stem reddish, tomentose. Leaves unequal, ovate, obtuse, undulate along margins, truncate to subcordate at base, tomentose, very variable in size; Petiole to 1 cm long. Flowers 4 mm long, 4-10 together, in axillary or terminal, peduncled umbels; bracts 5, ovate, glandular. Perianth pink. Stamens 3. Capsule 3 x 1 mm, clavate, 5-ribbed, glandular.

Paripode, *KJD 22569*

Fl. & Fr. August-December

Distribution: Along forest boundaries at Paripode.

POLYGONACEAE

PERSICARIA Mill.

Gard. Dict. Abr. Ed. 4. 1754.

- 1a. Scandent herbs; flowers in heads *P. chinensis*
- 1b. Erect or diffuse herbs; flowers in elongated spikes or racemes 2
- 2a. Erect herbs; ochrea mouth long barbellate *P. barbata*
- 2b. Diffuse herbs; ochrea truncate at mouth, glabrous *P. nepalensis*

Persicaria barbata (L.) Hara, Fl. E. Himalaya 1: 70. 1966; Joseph, Aquatic Angiosp. Malabar 198. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 676. 2009. *Polygonum barbatum* L., Sp. Pl. 362. 1753; Hook. f., Fl. Brit. India 5: 37. 1886; Gamble, Fl. Madras 1189(833). 1925; Subram., Indian Forester 96: 527. 1970; Manilal & Sivar., Fl. Calicut 247. 1982; Ansari, Fl. Kasaragod Div. 315. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 381. 1988.

Stout herbs, to 1.2 m tall, procumbent below. Leaves subsessile, 7-15 x 1.5-2.5 cm, lanceolate, apex acute or acuminate, base acute to cuneate, glabrous except the margins and midribs; ochrea tubular, 1.5-3 cm long, strigose without, mouth truncate, long barbellate. Spikes terminal, paniculate, 3.5-11 cm long;

bracts oblong-truncate, ciliate along margins. Perianth white; lobes 5, 2-3 mm long, oblong. Stamens 5. Style-arms 3. Nutlets 3-gonous, included within perianth tube, black on ripening.

Narikkadavu, NS & KJD 25559

Fl. & Fr.: August-March

Distribution: Fairly common along Riversides at Narikkadavu and to Pookundu.

Persicaria chinensis (L.) H.Gross, Bot. Jahrb. Syst. 49: 269,277,315. 1913; Sasidh., Fl. Parambikulam WLS 258. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 677. 2009. *Polygonum chinense* L., Sp. Pl. 363. 1753; Hook. f., Fl. Brit. India 5: 44. 1886; Gamble, Fl. Madras 1190(833). 1925; Ansari, Fl. Kasaragod Div. 315. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 381. 1988.

Scandent subshrubs, branches zig-zag. Leaves opposite, to 10 x 5 cm, broadly ovate or elliptic, shortly acuminate at apex, truncate at base, margins minutely crenulate; Petiole to 1 cm, auricled at base; ochrea 2.5 cm long, membranous, truncate. Heads glandular pubescent; peduncles to 5 cm; bracts 3 mm, ovate, acute. Perianth lobes 4 mm, white. Stamens included. Ovary 3-gonous, styles 3. Nutlets 4 mm, trigonous.

Ambalappara, KVB 31788

Fl. & Fr.: Throughout the year

Distribution: Common near water bodies in evergreen forests of Ambalappara, Pothurumi, Chavachi, Kattikari and Kurumbankallu.

Persicaria nepalensis (Meisn.) Miyabe, J. Fac. Agric. Hokkaido Imp. Univ. 26: 514 1934. *Polygonum nepalense* Meisn., Monogr. Polygon. 84. t.7. 1826. *Polygonum alatum* (D.Don) Buch.-Ham. ex Spreng., Syst. Veg., ed. 16 154. 1827; Hook. f., Fl. Brit. India 5: 41. 1886. *Polygonum punctatum* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 72. 1825, non Rafin. 1820; Gamble, Fl. Madras 1190(833). 1925.

Diffuse herbs, rooting from lower nodes. Leaves deltoid, acute at apex, cuneate at base, sparsely hairy along the nerves below, glandulose. Petiole 5-10 mm long; ochrea truncate at mouth, glabrous. Spike on the axils of terminal leaf, sessile, conical; bracts elliptic, acute, glabrous; flowers solitary or paired. Tepals white, 2 mm long, oblong, obtuse, glabrous. Stamens 5. Styles 2, joined below. Nut 1.5 x 1.5 mm, biconvex, apiculate, minutely puberulous, brown.

Ambalappara, NS & KJD 25503

Fl. & Fr.: October-December

Distribution: Rare in evergreen forests of Ambalappara.

TALINACEAE

TALINUM Adans.

Fam. Pl. (Adanson) 2: 245. 1763.

Talinum portulacifolium (Forssk.) Aschers & Schweinf, Weinf. is a cultivated species seen in the earlier settlements.

Order: **Vitales**

VITACEAE

- 1a. Shrubs or small treesLeea
- 1b. Climbers2
- 2a. Flowers polygamous 3
- 2b. Flowers hermaphrodite..... 4
- 3a. Leaves peduncle with tendrils..... Ampelocissus
- 3b. Leaves trifoliolate, peduncles without tendrils..... Tetrastigma
- 4a. Berry one seeded, leaves simple Cissus
- 4b. Berry 2-4 seeded, leaves 1-5 foliate Cayratia

AMPELOCISSUS Planch.

Vigne Amer. Vitic. Eur. 8: 371. 1884, *nom. cons.*

Ampelocissus indica (L.) Planch., Vigne Amer. Vitic. Eur. 8: 375. 1884; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 254. 2000 & in P. Daniel, Fl. Kerala 1: 738. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 231. 2009. *Vitis indica* L., Sp. Pl. 202. 1753; M.A.Lawson in Hook. f., Fl. Brit. India 1: 653. 1875. *Ampelocissus arnottiana* Planch in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 5: 379. 1887; Gamble, Fl. Madras 231(165). 1918; Manilal & Sivar., Fl. Calicut 68. 1982; M. Mohanan & Henry, Fl. Thiruvanthapuram 119. 1994.

Scandent shrubs; branches striate, ferruginous-wooly. Leaves alternate, broadly ovate, sometimes angled, acuminate at apex, cordate at base, dentate-serrate at margin with teeth hardened at tip, ferruginous-hairy beneath; petioles 2-8 cm long. Inflorescences dense racemes of umbels; primary branch ca 1 cm long; racemes 3-5 x ca 1 cm; peduncles to 5 cm long; tendrils simple, ca 10 cm long. Flowers reddish brown; pedicels ca 2 mm long. Calyx saucer-like, entire, glabrous. Petals oblong-ovate, ca 2 mm long, glabrous. Disk elongate, covering most of ovary, 5-furrowed. Berries globose; seeds suborbicular mucronate at base, longitudinal ridge and a broad groove on either side on adaxial surface and

an elliptic chalazal knot and very fine fissures radiating towards margin on abaxial surface.

Kariyenkappu, *KJD 18731*

Fl. & Fr.: March-September

Distribution: Fairly common in plantations of Kariyenkappu near stream side.

CAYRATIA A. Juss.

Dict. Sci. Nat.10: 103. 1818, *nom. cons.*

- 1a. Section of seed-albumen crescent shaped 2
- 1b. Section of seed-albumen t-shaped..... *C. sp.*
- 2a. Fruit nearly 1.5 cm diameter, plant softly villous *C. mollissima*
- 2b. Fruit less than 1 cm diameter, plant softly pubescent..... *C. pedata*

Cayratia mollissima (Planch.) Gagnep., Notul. Syst. (Paris) 1: 345. 1911; Gamble, Fl. Madras 237(169). 1918; Ansari, Fl. Kasaragod Div. 104. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 103. 1988; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 270. 2000 & in P. Daniel, Fl. Kerala 1: 743. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 232. 2009. *Vitis mollissima* Wall. in Roxb., Fl. Ind. 2: 482. 1824; M.A.Lawson in Hook. f., Fl. Brit. India 1: 656. 1875.

Weak climbers; stem scabrous. Leaves trifoliate, Leaflets 3, 8-12 x 4-7 cm, ovate, acuminate at apex, acute at base, distantly spineus-serrate; nerves 4 or 5 pairs, glabrous; petiole 4 cm long. Peduncle 1.5 cm long, extra-axillary, trichotomous cymes 2 x 3 cm. Flowers greenish-yellow. Calyx a membranous cup, 2 mm across, entire. Petals 2 x 1 mm, oblong. Berry 6 mm across, obovoid, glabrous; seeds pitted on sides

Kattikari, *KJD 26030*

Fl. & Fr.: June-December

Distribution: Rare in evergreen forests of Kattikari.

Cayratia pedata (Lam.) Gagnep., Notul. Syst. (Paris) 1: 346. 1911

- 1a. Leaves soft pubescent, Leaflets short acuminate..... var. *pedata*
- 1b. Leaves thin glabrous, Leaflets long acuminate..... var. *glabra*

Cayratia pedata (Lam.) Gagnep., Notul. Syst. (Paris) 1: 346. 1911 var. **pedata**; Gamble, Fl. Madras 236(169). 1915; Manilal & Sivar., Fl. Calicut 69. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 103. 1988; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 272. 2000 & in P. Daniel, Fl. Kerala 1: 744. 2005;

Ratheesh, Fl. Stud. Wayanad Dist. 233. 2009. *Cissus pedata* Lam., Encycl. 1: 31. 1783. *Vitis pedata* (Lam.) Wall. ex Wight, Cat. Ind. Pl. 26. 1833; M.A. Lawson in Hook. f., Fl. Brit. India 1: 661. 1875. *Vitis canarensis* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 123. 1851.

Weak climbers; stem minutely hispid. Leaves pedately 5-9-foliolate; leaflets 7-15 x 3-6 cm, ovate, acuminate, serrate, hispid; nerves 8-10 pairs, regular, prominent; rachis 9 cm long; petiolule 1 cm long, of terminal leaflet 3.5 cm long. Cymes 7 x 8 cm, hispid; peduncle 3 cm long. Flowers 6 mm across, greenish. Calyx cupular. Petals 4, 3 x 2 mm, ovate, acute; disk a fleshy rim. Stamens 4, attached to the disk. Ovary c. 1 mm, 2-celled; ovules 2 in each cell. Berry 1 x 1 cm, 2-4 lobed, rusty tomentose; seed 6 x 6 mm, faces rugose.

Pothurumi, NS & KVB 31419

Fl. & Fr.: June-July

Distribution: Fairly common in evergreen forests of Pothurumi and semi-evergreen forests of Narikkadavu and Paripode.

Cayratia pedata (Lam.) Gagnep., Notul. Syst. (Paris) 1: 346. 1911 var. **glabra** Gamble, Fl. Madras 236(169). 1918; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 272. 2000 & in P. Singh in P. Daniel, Fl. Kerala 1: 744. 2005 (Plate 7j).

Weak-stemmed vine; young stem, petioles, tendrils and peduncles densely pubescent. Leaves pedately 5-7-foliolate; leaflets 5-13 x 3-6 cm, lanceolate to obovate, base cuneate, that of laterals usually oblique, margin subentire or serrate, apex acuminate, pubescent, membranous; petiole to 9 cm long. Flowers in axillary dense corymbs; peduncles 2-3.5 cm long; pedicels 3-4 mm long. Calyx cupular, 1-2 mm long, margin irregularly 4-lobed. Petals 4, 1.5-2 mm long, ovate-acute, greenish white, reflexed, apices hooded. Disk creamy white. Stamens 4, attached to the disk. Ovary c. 1 mm, 2-celled; ovules 2 in each cell; style subulate. Berry 0.5-1 cm across, depressed-globose, creamy white; Seeds 1-4, hemispherical, flattened ventrally.

Ambalappara, KJD 26106

Fl. & Fr.: March-August

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Cayratia sp.

Woody climbers; stem scabrous. Leaflets 3, ovate, acuminate at apex, acute at base, distantly serrate; nerves 8-11 pairs, glabrous; petiole more than 4 cm long.

Peduncle 1.5 cm long. Berry 10-15 mm across, obovoid, glabrous; seeds 1-4, albumen t-shaped.

Chavachi, *KJD 26106*

Fl. & Fr.: March-May

Distribution: Rare in evergreen forests of Chavachi

CISSUS L.

Sp. Pl. 117. 1753.

- 1a. Stem 4-winged..... *C. glyptocarpa*
- 1b. Stem terete or angular2
- 2a. Branchlets 5 or 6 angled, under surface of leaf reddish.....*C. discolor*
- 2b. Branchletes terete, under surface of leaf greenish *C. repens*

Cissus discolor Blume, Cat. Gew. Buitenzorg (Blume) 39. 1823; Gamble, Fl. Madras 235(168). 1918; Ansari, Fl. Kasaragod Div. 105. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 104. 1988; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 282. 2000 & in P. Daniel, Fl. Kerala 1: 750. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 234. 2009. *Vitis diskolor* (Blume) Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 39. 1850; M.A.Lawson in Hook. f., Fl. Brit. India 1: 648. 1875. *Cissus javana* DC., Prodr. 1: 628. 1824.

Creeping or climbing shrubs; stem reddish, quadrangular. Leaves alternate, 6-13 x 3-7 cm, acuminate, cordate at base, spinous serrate, usually red beneath; petiole 1-3 cm long. Cymes 2 cm across, reddish; peduncle 1 cm long. Flowers pedicelled. Calyx 2 mm across, rim white. Petals reddish, 1.5 mm long; disk pubescent. Berry 4 x 3 mm, oblique-obovoid, smooth; seeds pitted.

Pookundu, *KVB 31207*

Fl. & Fr.: July-January

Distribution: Fairly common in semi-evergreen Forests of Pookundu.

Cissus glyptocarpa Thwaites, Enum. Pl. Zeyl. 62. 1858; Gamble, Fl. Madras 235(168). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 104. 1988; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 285. 2000 & in P. Daniel, Fl. Kerala 1: 751. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 234. 2009. *Vitis glyptocarpa* M.A.Lawson in Hook.f Fl. Brit. India 1: 645. 1875 (Plate 7k).

Climbers; branches with corky wings, glabrous. Leaves alternate, 10 x 7 cm, ovate, acuminate at apex, cordate at base, serrate, puberulus; nerves 4-7 pairs;

petiole to 3 cm long. Cymes 3 x 3 cm, extra-axillary, peduncled. Flowers many, 1.5 mm long, greenish; pedicels 10 mm long. Petals 2 mm long, oblong, green. Fruits pyriform, purple; seed one.

Mullenpara, KJD 18775

Fl. & Fr.: February-October

Distribution: Rare in evergreen forests of Mullenpara.

Cissus latifolia Lam., *Encycl.* 1: 30. 1783; Shetty & P. Singh in N.P. Singh *et al.*, *Fl. Ind.* 5: 287. 2000 & in P. Daniel, *Fl. Kerala* 1: 752. 2005. *Vitis glauca* sensu Wight & Arn., *Prodr. Fl. Ind. Orient.* 126.1834; M.A.Lawson in Hook. f., *Fl. Brit. India* 1:645.1875,p.p. *Vitis gigantea* Bedd., *Trans. Linn. Soc. London* 25: 212. 1866; M.A.Lawson in Hook. f., *Fl. Brit. India* 1:648.1875. *Cissus glauca* sensu Gamble, *Fl. Madras* 234(168). 1918, non Roxb. 1820.

Large, climbing shrubs; stem thick; branchlets glaucous; tendrils usually forked. Leaves alternate, 8-16 x 6-13 cm, broadly ovate-cordate or orbicular, acuminate at apex, margin serrate, serrations with bristly tip, glaucous below; petiole to 15 cm. Cymes leaf-opposed. Calyx cupular, ca. 2 mm long, fringed on margins. Petals 4, greenish-white, c. 2.5 mm long, hooded at apex. Stamens 4. Disk 4-lobed, adnate to ovary, yellow. Ovary tomentose; style thick; stigma truncate. Berry 1 cm across, ovoid, purplish, 1-seeded.

Chavachi, KVB 22580

Fl. & Fr.: June-September

Distribution: Fairly common along the boundaries of the Sanctuary.

LEE A D.Royen

Systema Naturae 2: 627. 1767. *nom. cons.*

- 1a. Flowers red..... *L. guineensis*
- 1b. Flowers greenish yellow or white 2
- 2a. Leaves crenate, glabrous *L. indica*
- 2b. Leaves serrate, pubescent..... *L. asiatica*

Leea asiatica (L.) Ridsdale, *Bot. Hist. Hort. Malabaricus* 189. 1980; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 107. 1988; B.D. Naithani in N.P. Singh *et al.*, *Fl. Ind.* 5: 330. 2000; W. Arisdason *et al.* in P. Daniel, *Fl. Kerala* 1: 765. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 237. 2009. *Phytolacca asiatica* L., *Sp. Pl.* 474. 1753. *Leea crispa* L., *Mant. Pl.* 1: 124. 1767; M.A.Lawson in Hook. f., *Fl. Brit. India* 1: 665. 1875; Gamble, *Fl. Madras* 240 (171). 1918. *Leea aspera* Edgw.,

Trans. Linn. Soc. London 20: 36. 1846; Gamble, Fl. Madras 240(171). 1918. *Leea herbacea* Ham., Trans. Linn. Soc. London 14: 228. 1823; Gamble, Fl. Madras 240(171). 1918. *Leea pumila* Kurz, J. Asiat. Soc. Bengal 41: 303. 1872; M.A. Lawson in Hook. f., Fl. Brit. India 606. 1875. *Leea edgeworthii* Santapau, Rec. Bot. Surv. India 19: 54. 1953.

Shrubs to small trees. Leaves alternate, 1 or 2-pinnate; leaflets 5-7, 10-20 x 4-9 cm, broadly ovate to elliptic or ovate-oblong to elliptic, acute, acuminate to caudate at apex, rounded to cordate at base, sharply serrate at margin, sparsely hairy above, densely hairy beneath with glands; lateral nerves 8-16 pairs; petioles 1-4 cm long; stipule narrowly winged. Inflorescences 2-12 cm long; bracts ovate to linear-lanceolate; bracteoles lanceolate. Flowers greenish white. Calyx 2 x 3 mm, pubescent, 5-lobed; lobes 3-angled. Corolla tube with staminal lobes 3-4 mm long, 5-lobed; lobes subulate. Staminal lobes deeply 2-fid; stamens free. Ovary globose-subglobose, less than 1 mm across, 4-8 loculed; style 1-2 mm long; stigma capitate. Fruits globose-depressed, 12 mm across, purple black; seeds usually 6, 5x 3 mm.

Ambalappara, KJD 31473

Fl. & Fr.: March-November

Distribution: Fairly common in evergreen forests of Chavachi and grasslands of Ambalappara.

Leea guineensis G. Don, Gen. Hist. 712. 1831; B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 336. 2000; W. Arisdason *et al.* in P. Daniel, Fl. Kerala 1: 766. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 238. 2009. *Leea wightii* Clarke, J. Bot. 19: 105. 1881; Gamble, Fl. Madras 239(171). 1918 (Plate 71).

Shrubs. Leaves bipinnate, leaflets 13-17 x 3-6 cm, ovate-lanceolate, apex caudate-acuminate, base truncate or acute, serrate; lateral nerves 7-10 pairs, intercostae sub-scalariform; rachis to 23 cm long; petiolule 5-7 mm long; stipules obovate, ca. 4 cm long. Cymes 2-6 cm across. Flowers crimson red, densely packed, 3-5 mm across. Calyx and corolla glabrous. Staminal tube shortly notched at apex. Berry 6-lobed, 6-7 mm across.

Chavachi, NS & KVB 31437

Fl. & Fr.: May-August

Distribution: Common in evergreen forests of Chavachi and Chathururmala.

Leea indica (Burm.f.) Merr., Philipp. J. Sci. 14. 245. 1919; Manilal & Sivar., Fl. Calicut 70. 1982; Ansari, Fl. Kasaragod Div. 106. 1985; Ramach. & V.J. Nair, Fl.



a. *Tolypanthus lagenifer*



b. *Osyris quadripartita*



c. *Scleropyrum pentandrum*



d. *Viscum angulatum*



e. *Strombosia ceylanica*



f. *Indobanalia thyrsoiflora*



g. *Ancistrocladus heyneanus*



h. *Drosera burmannii*



i. *Drosera peltata*



j. *Cayratia pedata* var. *glabra*



k. *Cissus glyptocarpa*



l. *Leea guineensis*

Cannanore Dist. 107. 1988; B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 337. 2000; W. Arisdason *et al.* in P. Daniel, Fl. Kerala 1: 767. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 238. 2009. *Staphylea indica* Burm.f., Fl. Ind. 75, t.23. f.2. 1768. *Leea sambucina* (L.) Willd., Sp. Pl. 1: 1177. 1798; M.A.Lawson in Hook. f., Fl. Brit. India 1: 666. 1875; Gamble, Fl. Madras 240(172). 1918.

Shrubs to small trees. Leaves 2 or 3-pinnate; leaflets 11-14 x 3-5 cm, oblong or elliptic-lanceolate, apex caudate-acuminate, serrate-dentate; lateral nerves 12-15 pairs, intercostae parallel, curved; stipules obovate-obtuse, to 5 x 4 cm. Young leaves bright-red. Cymes to 6 x 8 cm, peduncles 3-4 cm long, paired, axillary. Flowers greenish-white. Calyx funnel shaped, lobes 5. Petals 5, connate at base. Staminal tube shortly lobed at apex, anthers combined. Ovary inserted on disk, 3-6 celled; style short. Berry purple, ca. 6 mm across; seeds densely red-glandular.

Chelachode, KVB 31223

Fl. & Fr.: March-August

Distribution: Common in evergreen forests of Chelachode, Chavachi and Vellachatamkunnu.

TETRASTIGMA (Miq.) Planch

in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 5: 320, 423. 1887.

Tetrastigma leucostaphylum (Dennst.) Alston ex Mabb., Taxon 26: 539. 1977; Manilal & Sivar., Fl. Calicut 69. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 106. 1988; Shetty & P. Singh in N.P. Singh *et al.*, Fl. Ind. 5: 314. 2000 & in P. Daniel, Fl. Kerala 1: 761. 2005. *Cissus leucostaphyla* Dennst., Schlüssel Hortus Malab. 17, 19, 33. 1818. *Tetrastigma muricatum* (Wall. ex Wight & Arn.) Gamble, Fl. Madras 229(164). 1918. *Tetrastigma lanceolarium* (Roxb.) Planch in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 5: 423. 1887; Gamble, Fl. Madras 228(164). 1918. *Vitis muricata* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 128. 1834. *Vitis lanceolaria* sensu M.A.Lawson in Hook.f Fl. Brit. India 1: 660. 1875, p.p., non Wall. 1831-32.

Woody scandent shrubs. Leaves pedately 5-foliolate, trifoliolate or simple, sometimes all three types found on same plant; leaflets 4-13 x 2-6 cm, oblong-lanceolate, apex acute, base cuneate, margin coarsely serrate, especially distally, the laterals unequal sided; petiole to 8 cm long, warty-lenticellate, base swollen; petioles 5-14 mm long. Flowers c. 4 mm across, in short axillary cymes. Calyx lobes 4, 1 mm long, more or less ciliolate. Petals 4, white, 1-1.5 mm long, ovate, acute, apically thickened. Disk lobed. Stamens 4. Ovary subglobose; stigma

lobed. Berry 1.3 cm across, subglobose, creamy white; seeds 2-4, oblong, transversely rugose.

'S' Valavu, Moonamthode KVB 31538

Fl. & Fr.: February-August

Distribution: Fairly common in evergreen forests of Moonamthode.

Order : **Celastrales**

CELASTRACEAE

- 1a. Herbs, fruit indehiscent..... Parnassia
- 1b. Trees, climbers or shrubs, fruit capsule or berry2
- 2a. Trees or shrubs3
- 2b. Climbers 7
- 3a. Plants armed, branches zig-zag Maytenus
- 3b. Plants unarmed, branches not zig-zag.....4
- 4a. Fruits one seeded, flowers sessile Microtropis
- 4b. Fruits more than one seeded, flowers pedicelled.....5
- 5a. Flowers on many flowered dichasial cymes Lophopetalum
- 5b. Flowers on three flowered cymes 6
- 6a. Peduncles more than 10 cm long Glyptopetalum
- 6b. Peduncles less than 3 cm long..... Euonymus
- 7a. Fruits fleshy, berry Salacia
- 7b. Fruits not berry8
- 8a. Fruit samaroid; seeds winged.....9
- 8b. Fruit a capsule, seeds with aril.....Celastrus
- 9a. Flowers about 7-12 mm, petals clawed..... Loeseneriella
- 9b. Flowers less than 5 mm, petals not clawed Reissantia

CELASTRUS L.

Sp. Pl. 196. 1753.

Celastrus paniculatus Willd., Sp. Pl. 1: 1125. 1797; M.A.Lawson in Hook.f Fl. Brit. India 1: 617. 1875; Gamble, Fl. Madras 208(150). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 95. 1988; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 87. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 700. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 220. 2009.

Climbing shrubs; stem lenticellate. Leaves alternate, 7-12 x 4-7 cm, broadly ovate, apex abruptly acuminate, base rounded or acute, crenulate; petiole 6 mm

long. Panicle to 15 x 8 cm, terminal, axillary, oblong; pedicel 6 mm long. Flowers many, 6 mm across. Sepals 5, small, imbricate, ciliate. Petals 2.5 x 2 mm, white, ovate, obtuse. Stamens 5, erect, anthers sagitate at base. Ovary 3-celled, cell 2-ovuled, stigma 3, recurved. Capsule to 1 cm across, loculicidal, yellow; seeds 3, aril reddish.

Chavachi, *KJD 26099*; Pothurumi, *NS &KVB 31410*

Fl. & Fr.: December-June

Distribution: Rare in evergreen forests of Pothurumi and Chavachi.

EUONYMUS L.

Sp. Pl. 197. 1753, *orth. cons.*

Euonymus indicus Heyne ex Roxb., Fl. Ind. 2: 409. 1824; M.A.Lawson in Hook.f Fl. Brit. India 1: 608. 1875; Gamble, Fl. Madras 202(146). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 95. 1988; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 102. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 704. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 221. 2009. *Euonymus goughii* Wight, Icon. Pl. Ind. Orient. t. 215. 1839.

Trees, to 8 m high; bark greyish-brown. Leaves opposite, decussate, 7-11 x 2-4 cm, elliptic, lanceolate, elliptic-lanceolate, oblong-lanceolate, apex acuminate, base cuneate or acute; lateral nerves 4-5 pairs, pinnate, faint, intercostae reticulate, obscure; petiole 5-10 mm; stipules linear-subulate, cauducous. Flowers yellowish-red, 1 cm across, in 1-3 flowered axillary cymes. Calyx deeply divided; lobes 5, to 1.5 mm long, fleshy, glabrous. Petals 5, 4 mm long, orbicular-oblong, fimbriate. Stamens 5, inserted on the disk near its margin; filaments short; anthers broad; disk thick, cupular, 5-lobed, fleshy. Ovary angular, sunk in the disk, 5-celled, ovules 2 per cell; style short, thick; stigma minutely lobed. Fruit a capsule, obovoid, 5-angled, orange-yellow, loculicidal, valves deeply obcordate; seeds reddish, oblong with red aril; albumen copious.

Ambalappara, *KVB 31650*; Pothurumi, *KVB 31663*

Fl. & Fr.: September-March

Distribution: Common in evergreen Forests of Ambalappara. Endemic to Western Ghats.

GLYPTOPETALUM Thwaites

Hooker's J. Bot. Kew Gard. Misc. 8: t. 7B, 267. 1856.

Glyptopetalum grandiflorum Bedd., Icon. Pl. Ind. Or. t. 102. 1868-1874; M.A.Lawson in Hook.f Fl. Brit. India 1: 613. 1875; Gamble, Fl. Madras 204(147).

1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 96. 1988; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 111. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 705. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 222. 2009.

Shrubs; branchlets terete, angled when young. Leaves opposite, 10-15.5 x 5-6.5 cm, elliptic-oblong, acute or acuminate at apex, rounded or cuneate at base, entire, rarely obscurely serrate towards apex, coriaceous. Cymes 3-flowered; peduncles filiform, 10-16 cm long; pedicels ca 2.5 cm long, inserted with scale-like bracts. Calyx 4-lobed. Petals 4, obovate, 8-10 mm long, inconspicuously pitted or not, yellow. Stamens 4, sessile. Disk more or less rounded. Ovary within disk. Capsules globose, ca 2 cm, smooth, pale, 4-seeded; seeds ovate, 1.5 cm across, arillate.

Kannadivechakunnu, NS &KJD 25568

Fl. & Fr.: February-October

Distribution: Rare in evergreen forests of Kannadivechakunnu. Endemic to southern Western Ghats.

LOPHOPETALUM Wight ex Arn.

Ann. Nat. Hist. 3: 150. 1839.

Lophopetalum wightianum Arn., Ann. Nat. Hist. 3: 151. 1839; M.A. Lawson in Hook.f Fl. Brit. India 1: 615. 1875; Gamble, Fl. Madras 205(147). 1918; Ansari, Fl. Kasaragod Div. 100.1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 96. 1988; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 116. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 709. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 222. 2009.

Evergreen trees, to 30 m high; bark yellowish-brown. Leaves opposite or subopposite, 7.5-25 x 3.7-10 cm, elliptic, elliptic-oblong or ovate, apex obtuse or acute, base obtuse or round; lateral nerves 6-12 pairs, pinnate, arched towards the margin, prominent, intercostae reticulate, prominent; petiole 10-25 mm long, grooved above. Flowers 15-18 mm across, pinkish to dull red, in lax axillary or terminal dichasial cymes. Calyx broadly flattened at base; lobes 5, broad, obtuse, very short. Petals 5, 0.5-0.6 cm long, continuous with the disk, orbicular, clawed, crispate above. Stamens 5, inserted on the disk; filaments subulate. Ovary small, immersed in the disk, 3-celled, ovules 4 or more in each cell; style short, stigma capitate. Fruit a capsule, 3-angled, trigonous, 3 valved,; seeds thin, surrounded by long linear wing.

Chavachi, KVB 31602

Fl. & Fr.: December-July

Distribution: Common along Riverbanks at Chavachi, Kariyenkappu, Valayamchal and Narikkadavu.

LOESENERIELLA A.C.Sm.

J. Arnold Arbor. 28: 438. 1941

Loeseneriella arnottiana (Wight) A.C.Sm., J. Arnold Arbor. 16: 174. 1945; Manilal & Sivar., Fl. Calicut 66. 1982; Ansari, Fl. Kasaragod Div. 100. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 97. 1988; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 140. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 707. 2005. *Hippocratea arnottiana* Wight, Ill. Ind. Bot. 1: 133, t. 46. f. 47. 1840; M.A.Lawson in Hook.f Fl. Brit. India 1:624.1875; Gamble, Fl. Madras 213(153). 1918; Ratheesh, Fl. Stud. Wayanad Dist. 224. 2009.

Stragglers. Leaves 8-12 x 4-6 cm, coarsely coriaceous, elliptic, ovate, acuminate, stipules small. Panicles of cymes axillary or terminal. Calyx 5-lobbed, 1 x 1.5 mm, ovate. Petals 5, 3-4 x 3-4 mm, obovate, clawed. Stamens 3, inserted on disk. Ovary enclosed in the disk, 3-celled, ovule 2-10 in each cell. Fruit 7 x 2 cm, oblong, 3 winged.

Valayamchal, KJD 26902

Fl. & Fr.: February-March

Distribution: Rare in Moist deciduous forests of Valayamchal.

MAYTENUS Molina

Sag. Stor. Nat. Chili 177. 1782.

Maytenus wallichii (G.Don) Bennet & K.C.Sahni, Indian Forester 103: 387. 1977; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 128. 2000; K.Ramam. & P.Venu in P. Daniel, Fl. Kerala 1: 711. 2005. *Catha wallichii* G.Don, Gen. Hist. 2: 10. 1832. *Gymnosporia wallichiana* Spreng. ex Wight & Arn., Prodr. Fl. Ind. Orient. 159. 1834; M.A.Lawson in Hook.f Fl. Brit. India 1: 621. 1875.

Shrubs; branchlets zig-zag, terete, thorny. Leaves alternate, 2.5-4 x 2-3 cm, obovate, obtuse or emarginate at apex, cuneate at base; nerves distinct, reticulate. Flowers in cymes or fascicles, axillary. Sepals 5, 3-angled. Petals 5, oblong, thin. Stamens 5, interpetaloid, inserted below disk. Disk rounded and fleshy. Ovary within the disk; stigmas capitate. Fruits capsular, slightly obcordate, ca 12 mm long, 3-loculed, 6-seeded; seeds flat, arillate; aril attached only to the base of seed.

Ambalappara, KVB 31644

Fl. & Fr.: Through out the Year

Distribution: Common in evergreen forests of Ambalappara.

MICROTROPIS Wall. ex Meisn.

Pl. Vasc. Gen. 1: 68. 1837, *nom cons.*

- 1a. Leaf apex acute to acuminate, margins reflexed*M. stocksii*
- 1b. Leaf apex obtuse, margins not reflexed.....*M. latifolia*

Microtropis latifolia Wight ex M.A.Lawson in Hook.f Fl. Brit. India 1: 615. 1875; Gamble, Fl. Madras 205(148). 1918; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 130. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 713. 2005 (Plate 8a).

Small trees. Leaves subopposite, 7-15 x 2.5-6.5 cm, ovate-elliptic to oblong-lanceolate, x acuminate at apex, 7-15 x 2.5-6.5 cm, coriaceous, glabrous, rugulose above; lateral nerves obscure on both surfaces; petioles 6-7 mm long. Flowers sessile, clustered in axils of fallen leaves or solitary, yellowish white. Sepal 4-5, membranous at margin above, rugose outside. Petals 5, obovate-cuneate, connate at base forming a ring. Stamens 5, inserted at ring; filaments short. Ovary flask-shaped, furrowed. Capsules ellipsoid, narrow at base, 1.5-2 cm long, 1-seeded; seed oblong, rugose.

Chelachode, KVB 31686

Fl. & Fr.: October-April

Distribution: Common in evergreen forests of Chelachode, Moonamthode and Kattikari. Endemic to southern Western Ghats.

Microtropis stocksii Gamble, Bull. Misc. Inform. Kew 1916: 132. 1916 & in Fl. Madras 206(148). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 96. 1988; K. Ramam. in N.P. Singh *et al.*, Fl. Ind. 5: 131. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 714. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 223. 2009.

Large shrubs; branchlets reddish-brown. Leaves opposite, 7-10 x 3-5 cm, elliptic, apex obtusely acuminate, margins folding, green or yellow when dried; petiole to 8 mm long, yellow. Flowers 3 mm across, few in axillary clusters. Sepals 4, ovate, obtuse. Petals 4, 2 x 1 mm, ovate, obtuse, white, glabrous. Stamens 4. Capsule to 13 x 8 mm, brown, aril red.

Ambalappara, KVB 31705

Fl. & Fr.: February-July

Distribution: Common in evergreen forests of Kattikari and rare in evergreen forests of Ambalappara. Endemic to Western Ghats.

PARNASSIA L.

Sp. Pl. 1: 273. 1753.

Parnassia mysorensis Heyne ex Wight & Arn., Prodr. Fl. Ind. Orient. 35. 1834; C.B. Clarke in Hook. f., Fl. Brit. India 2: 402. 1878; Gamble, Fl. Madras 448(317). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 344. 2009 (Plate 8b).

Small scapigerous herbs. Leaves radical, orbicular to reniform, base cordate, 0.75-1.5 cm diam; petioles 1-4.5 cm long. Flowers solitary on scape, 6-12 cm

long. Scape with a leafy bract at middle. Calyx broadly campanulate, 0.3-0.35 cm long, lobes 5, broadly ovate. Petals 5, white, broadly ovate, 0.4-0.5 x 0.2-0.25 cm. Stamens 5; staminodes 5, alternating with stamens. Ovary 0.3-0.4 cm long, ovoid, 1-celled; ovules many; style short; stigma 3-4. Capsules ovoid, 0.4-0.5 x 0.2-0.25 cm, 3-4 valved; seeds minute, many.

Ambalappara, KJD 25439

Fl. & Fr.: September-December

Distribution: Fairly common on wet rocks in evergreen forests of Ambalappara.

REISSANTIA N.Hallé

Bull. Mus. Hist. Nat. (Paris) Ser. 2, 30: 466. 1958.

Reissantia indica (Willd.) N.Hallé, Bull. Mus. Hist. Nat. (Paris) Ser. 2, 30: 466. 1958; Manilal & Sivar., Fl. Calicut 66. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 97.1988; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5:149.2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 717. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 224. 2009. *Hippocratea indica* Willd., Sp. Pl. 1: 193. 1797; M.A. Lawson in Hook.f., Fl. Brit. India 1:625.1875; Gamble, Fl. Madras 213(153).1918.

Woody climbers with looping branchlets. Leaves opposite, 12 x 7 cm, obovate, obtusely acute, attenuate to the base; nerves 4 or 5 pairs, ascending; petiole 1 cm long. Flowers in axillary drooping panicles, pedicellate. Sepals 5, ovate, acute, glabrous. Petals 5, 3 x 1 mm, oblong, curved, glabrous. Stamens 3, filaments short curved out. Ovary 3-celled, sunken in the disk; ovules 2-10 in each cell. Fruit a winged samara.

Poathanplavu, KJD 26027

Fl. & Fr.: November-April

Distribution: Rare in semi-evergreen forests of Poathanplavu.

SALACIA L.

Mant. Pl. Altera 159. 1771, *nom. cons.*

- 1a. Flowers clustered in tubercles on branchlets.....2
- 1b. Flowers in short cymes; leaf apex obtusely acuminate *S. fruticosa*
- 2a. Pedicels 3-5 mm long, fruit surface rugose..... *S. malabarica*
- 2b. Flowers sessile or subsessile*S. oblonga*

Salacia fruticosa Wall. ex M.A.Lawson in Hook.f., Fl. Brit. India 1: 628. 1875; Gamble, Fl. Madras 215(155). 1918; Manilal & Sivar., Fl. Calicut 66. 1982;

Ansari, Fl. Kasaragod Div. 101. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 98. 1988; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 153. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 720. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 225. 2009.

Woody climbing shrubs; branchlets looped; young shoots puberulous. Leaves opposite, 3.8-7 x 2-4 cm, elliptic-ovate or elliptic-oblong, apex obtusely acuminate, base rounded or cuneate, coriaceous; petiole c. 5 mm long. Cymes axillary; pedicels 3-5 mm long. Calyx 5-lobed, minute; lobes minutely ciliate on margins. Petals 5, brownish-yellow, c. 2 mm across, orbicular. Disk fleshy. Stamens 3, inserted on the inner margin of the disk; filaments broad, curved. Ovary globose, minute, partially sunk in the disk, 3-celled; ovules 2-8 in each cell; style very short; stigma capitate, obscurely 3-lobed. Berry 2-2.5 cm across, globose, red; seeds 1-3.

Chavachi, NS & KVB 31405

Fl. & Fr.: January-August

Distribution: Fairly common in evergreen forests of Chavachi and Kanadevechakunnu. Endemic to Western Ghats.

Salacia malabarica Gamble, Bull. Misc. Inform. Kew 1916: 133. 1916 & in Fl. Madras 215(154). 1918; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 158. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 721. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 226. 2009 (Plate 8c).

Scandent shrubs; branchlets faintly muricate. Leaves opposite, 9-13 x 4.5-7 cm, elliptic-oblong, apex acuminate, base cuneate or rounded, coriaceous. Flowers in axillary fascicles; pedicel 2-3 cm long. Calyx 5 lobbed. Petals 5, greenish yellow, elliptic. Stamens 3, inserted on inner margin of disk. Ovary 3 celled; ovules 2-8. Berry hard, globose, c. 5 cm diam orange red.

Chavachi, KJD 22502

Fl. & Fr.: February-April

Distribution: Rare in evergreen forests of Chavachi. Endemic to Southern Western Ghats; Conservation status: Vulnerable.

Salacia oblonga Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 106.1834; M.A. Lawson in Hook.f Fl. Brit. India 1:628.1875; Gamble, Fl. Madras 215(155). 1918; K. Ramam. & B.D. Naithani in N.P. Singh *et al.*, Fl. Ind. 5: 160. 2000; K. Ramam. & P. Venu in P. Daniel, Fl. Kerala 1: 721. 2005.

Stout climbers, branchlets densely lenticellate, lenticels elongate. Leaves opposite to subopposite, 21 x 8 cm, oblong, acute or obtuse at apex, acute at base, green when dry; nerves 8-10 pairs; petiole 1 cm long. Peduncle short, stout, many-flowered. Flowers many, greenish yellow. Calyx 5 lobed, 1.5 mm across, orbicular. Petals 5, urceolate. 2.5 mm long, ovate. Stamens 3. Ovary 3 celled. Berry ca. 4 cm across, orange-red, smooth.

Mullenpara, KVB 31593

Fl. & Fr.: February-May

Distribution: Rare in evergreen forests of Mullenpara.

Order: **Oxiales**

CONNARACEAE

CONNARUS L.

Sp. Pl. 675. 1753.

- 1a. Leaflets with venation prominently reticulate, glabrous; follicles ovoid, slightly compressed *C. paniculatus*
- 1b. Leaflets faintly reticulate, tomentose along the nerves below; follicles, biconvex, stipitate *C. monocarpus*

Connarus monocarpus L., Sp. Pl. 675. 1753; Hook. f., Fl. Brit. India 2: 50. 1876; Gamble, Fl. Madras 272(194). 1918; Manilal & Sivar., Fl. Calicut 74. 1982; M.S. Mondal in N.P. Singh *et al.*, Fl. Ind. 5: 526. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 810. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 258. 2009.

Scandent shrubs; young parts ferruginous tomentose. Leaves imparipinnate; leaflets 3 or 5, 4-8 x 2.5-4 cm, elliptic or elliptic-ovate, base rounded, apex acuminate; young flush coppery brown; petiolule upto 4 mm long. Flowers in terminal, pyramidal paniculate cymes, ferruginous-tomentose. Sepals upto 3 mm long, narrowly triangular or oblong, puberulous without. Petals 6-8 mm long, linear-oblongate, creamy white. Stamens in 2 whorls; filaments with glandular appendages. Ovary subglobose, densely pubescent, brownish, 1-locular; ovules 2. Fruit a follicle, 2.5-4 x 1.5-2 cm, obovoid, fusiform, compressed, more or less falcate, scarlet red; seed single, c.1.5 cm long, ovoid, surrounded at base with a large, pulpy, bright yellow aril.

Moonamthode, NS & KVB 31395

Fl. & Fr.: April-December

Distribution: Rare in evergreen forests of Moonamthode, Kattikari and Pothurumi.

Connarus paniculatus Roxb., Fl. Ind. (Roxburgh) 3: 139. 1832; Hook. f., Fl. Brit. India 2:52.1876; Gamble, Fl. Madras 273(194). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 120. 1988; M.S.Mondal in N.P. Singh *et al.*, Fl. Ind. 5: 529. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 824. 2005 (Plate 8d).

Shrubs or lianas. Leaves alternate, imparipinnate; leaflets 3-7, 4-20 x 2.5-6.5 cm, elliptic-ovate or oblong to lanceolate, obtusely acuminate at apex, narrow to rounded or subpeltate at base, densely and distinctly areolate-reticulate beneath; lateral nerves 5-8 pairs, arcuate, ascending or patent; petiolules ca 5 mm long. Inflorescences terminal and axillary, paniced, 10-40 cm long; bracts scaly, minute. Sepals boat-shaped, obtuse, ca 3 mm long, rusty-tomentose and glandular-punctate on both sides. Petals narrowly spatulate, obtuse, ca 6 mm long, white. Stamens 10, all fertile; filaments connate at base. Ovary red. Follicles obovoid or oblong, laterally compressed-inflated, bright red turning brown when dry; seeds compressed, 2-2.5 x 1-1.5 cm, black with cupular yellow aril towards the base.

Ambalappara, KVB 31591

Fl. & Fr.: October-May

Distribution: Rare in evergreen forests of Ambalappara and Pothurumi.

ELAEOCARPACEAE

ELAEOCARPUS L.

Sp. Pl. 515. 1753.

- 1a. Pyrenes laterally compressed, prominently tubercled..... *E. tuberculatus*
- 1b. Pyrenes oblong or ovoid, tubercles not prominent2
- 2a. Anthers with awns, filaments glabrous.....*E. serratus*
- 2b. Anthers bristly, filaments tomentose4
- 3a. Petiole to 3 cm long, leaf base acute; fruit globose..... *E. variabilis*
- 3b. Petiole to 5 cm long, leaf base truncate; fruit oblong *E. munronii*

Elaeocarpus munronii (Wight) Mast. in Hook.f., Fl. Brit. India 1: 407. 1874; Gamble, Fl. Madras 124(88). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 73. 1988; S.K. Murti in B.D. Sharma & Sanjappa, Fl. Ind. 3: 546.1993; M. Reema *et al.* in P. Daniel, Fl. Kerala 1: 500. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 173. 2009. *Monocera munroii* Wight, Ill. Ind. Bot. 1: 83. 1840.

Trees, to 20 m high; bark dark grey. Leaves alternate, clustered to the tip of branchlets, 4-10 x 1.7-5 cm, ovate or ovate-lanceolate, apex acuminate or caudate-acuminate, base round or obtuse, margin crenate or serrate, revolute; lateral nerves 3-6 pairs, prominent, intercostae reticulate, prominent; petiole 25-50 mm, slightly swollen at tip and base; stipules free, lateral, cauducous. Flowers white, in short drooping axillary racemes. Sepals 5, 8 mm long, lanceolate, thinly

tomentose. Petals 5, white with reddish lines at base, ovate-lanceolate, densely silky on both sides, inserted round the base of glandular disk. Stamens numerous, inserted between the glands on the disk. Ovary densely silky hairy, placed on the torus, 2-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, blue; seeds 1 or 2.

Mullenppara State Boundary, *KJD 26057*

Fl. & Fr.: September-April

Distribution: Rare in evergreen forests of Mullenpara and Katikari. Endemic to southern Western Ghats.

Elaeocarpus serratus L., Sp. Pl. 515. 1753; Mast. in Hook. f., Fl. Brit. India 1:401.1874; Gamble, Fl. Madras 124(88). 1915; Ansari, Fl. Kasaragod Div. 86. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 74. 1988; S.K. Murti in B.D. Sharma & Sanjappa, Fl. Ind. 3: 553. 1993; Zmarzty, Kew Bull. 56: 434. 2001; M. Reema *et al.* in P. Daniel, Fl. Kerala 1: 502. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 174. 2009. *Elaeocarpus oblongus* Gaertn., Fruct. Sem. Pl. 1:202. t.43. 1788.

Trees, to 20 m high; bark brown. Leaves alternate, 5-14 x 2-6.2 cm, elliptic-obovate or elliptic ovate, apex acute, caudate-acuminate or obtusely acuminate, base acute or cuneate, margin crenate-serrate; lateral nerves 3-8 pairs, pinnate, prominent, intercostae reticulate, prominent, domatia glandular; petiole 15-40 mm, pubescent, swollen tipped, with 2 minute glands. Flowers white, in axillary racemes to 8 cm long. Sepals 5, ovate, pubescent on outside, densely glandulose. Petals 5, inserted round the base of glandular disk. Stamens many, inserted between the glands on the disk. Ovary superior, densely tomentose, raised on torus, 3-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, subglobose, green, style persistent; stone tubercled; seed one.

Near Farm, *KVB 31203*; Ambalasppara, *NS & KVB 31409*

Fl. & Fr.: April-November

Distribution: Common in semi-evergreen forests of Valayamchal, Narikkadavu and Kariyenkapu.

Elaeocarpus tuberculatus Roxb., Fl. Ind. (Roxburgh) 2: 594.1832; Mast. in Hook. f., Fl. Brit. India 1:404.1874; Gamble, Fl. Madras 124(88). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 74. 1988; S.K. Murti in B.D. Sharma & Sanjappa, Fl. Ind.3: 559. 1993; M. Reema *et al.* in P. Daniel, Fl. Kerala 1: 503. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 174. 2009. *Monocera tuberculata* (Roxb.) Wight & Arn., Prodr. Fl. Ind. Orient. 83. 1834.

Trees, to 25 m high; bark grey. Leaves alternate, clustered at the tip of branchlets, 8-24 x 4-15 cm, obovate, base cuneate or round, apex acute, obtuse

or retuse, margin distantly serrate or crenate or subentire, ferruginous pubescent beneath; lateral nerves 8-12 pairs, parallel, the margin prominent, intercostae scalariform, prominent, domatia present; petiole 15-30 mm, swollen tipped; stipules free, lateral. Flowers white, in axillary racemes. Sepals 5, lanceolate, tomentose outside. Petals 5, white, fimbriate, fulvous tomentose inserted round the base of glandular disk. Stamens numerous, inserted between the glands on the disk. Ovary superior, subglobose, densely tomentose, placed on raised torus, 2-celled, ovules 2 in each cell; style subulate, tomentose. Fruit a drupe, oblong or ellipsoid, green.

Kariyankappu, KVB 31799

Fl. & Fr.: December-August

Distribution: Common in semi-evergreen forests of Pookundu and Kariyankappu and evergreen forests of Chavachi near waterbodies.

Elaeocarpus variabilis Zmarzty, Kew Bull. 56: 429. 2001. *Elaeocarpus oblongus* sensu Mast. in Hook.f., Fl. Brit. India 1:403.1874, non Gaertn. 1788; Gamble, Fl. Madras 124(88). 1915. *Craspedum tectorium* Lour., Fl. Cochinch. 336. 1790. *Elaeocarpus tectorius* (Lour.) Poir. in Lam. Encycl. Suppl. 2: 704. 1812; S.K. Murti in B.D. Sharma & Sanjappa, Fl. Ind.3: 559. 1993. *Elaeocarpus glandulosus* sensu Ramach. & V.J. Nair, Fl. Cannanore Dist. 73. 1988; S.K. Murti in B.D. Sharma & Sanjappa, Fl. Ind. 3: 539. 1993; M. Reema *et al.* in P. Daniel, Fl. Kerala 1: 499. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 173. 2009.

Trees; bark greyish-brown. Leaves alternate, 5-12 x 2.3-6.5 cm elliptic-ovate, elliptic-obovate, elliptic-oblong or ovate, apex abruptly acuminate with emarginate tip, base cuneate or acute, margin distantly crenate or serrate, punctate, domatia glandular; lateral nerves 4-8 pairs, pinnate, prominent, intercostae reticulate; petiole 15-35 mm, swollen at base and tip, 2 minute glands; stipules lateral. Flowers white, in axillary and terminal racemes. Sepals 5, 4-5 mm, ovate-lanceolate, puberulous outside, glandular inside. Petals 5, white, 6-8 mm, glandular, inserted round the base of glandular disk. Stamens many, inserted between the glands on the disk. Ovary superior, subglobose, placed on a raised torus, densely hairy outside, 3-celled, ovules 2 in each cell; style subulate, entire. Fruit a drupe, 2.5 x 2.5 cm, oblong, stone one.

Ambalappara, NS &KVB 31306

Fl. & Fr.: May-October

Distribution: Fairly Common in evergreen forests of Ambalappara and Mullenpara. Endemic to Western Ghats.

OXALIDACEAE

- 1a. Leaves pinnate..... Biophytum
1b. Leaves trifoliate..... Oxalis

BIOPHYTUM DC.

Prodr. 1: 689. 1824.

Biophytum reinwardtii (Zucc.) Klotzsch Naturw. Reise Mossambique 1: 85. 1861; Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 437. 1874; Gamble, Fl. Madras 133(95). 1915; Manilal & Sivar., Fl. Calicut 55. 1982; Ansari, Fl. Kasaragod Div. 87. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 76. 1988; Manna in Hajra *et al.*, Fl. Ind. 4: 236. 1997; N.P. Balakr. & W. Arisdason in P. Daniel, Fl. Kerala 1: 573. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 178. 2009. *Oxalis reinwardtii* Zucc., Abh. Math.-Phys. Cl. Koenigl. Bayer. Akad. Wiss. 1: 274. 1829-1830.

Annual herbs up to 15 cm long. Leaves 12-17 jugate; rachis 4-7.5 cm, sparsely puberulous; leaflets overlapping, terminal largest, to 13 x 5 mm, asymmetric, obovate. Flowers umbellate in many flowered axillary peduncles; pedicels to 6 mm long; bracts ovate-attenuate, 1-1.5 mm long. Sepals 2-2.5 x 1-1.25 mm, ovate, acute-acuminate at apex, 7-nerved. Petals yellow, 3.5-4.5 mm long, elliptic to oblanceolate, emarginated at apex; claw greenish, limb yellow. Fruits 3-3.5 x 2-2.5 mm, glandular hairy on the ribs; seeds 1-2 per cell, to 1.2 x 0.8 mm, transversely ridged and tubercled.

Pukundu, KJD 26200

Fl. & Fr.: July-December

Distribution: Common along the boundaries of forests.

OXALIS L.

Sp. Pl. 433.1753.

Oxalis corniculata L., Sp. Pl. 435. 1753; Edgew. & Hook.f. in Hook.f., Fl. Brit. India 1: 436. 1874; Gamble, Fl. Madras 132(94). 1915; Manilal & Sivar., Fl. Calicut 55. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 77. 1988; Manna in Hajra *et al.*, Fl. Ind. 4: 242. 1997; N.P. Balakr. & W. Arisdason in P. Daniel, Fl. Kerala 1: 577. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 179. 2009. *Oxalis corniculata* L. var. *hispidula* Blatt., J. Bombay Nat. Hist. Soc. 34: 898. 1931.

Prostrate herbs with creeping stem, rooting at lower nodes. Leaves digitately 3-foliolate; leaflets 0.5-1.5 x 0.6-2 cm, broadly obcordate, apex emarginate, base cuneate; petioles 1.5-3 cm long. Flowers yellow, solitary or in axillary umbels;

peduncles 4-10 cm long; pedicels 0.5-1 cm long; bracts 2, 3-4 mm long, linear-lanceolate. Sepals 5, 2-3 mm long, ovate-lanceolate. Petals 5, 5-6 x 3-4 mm, ovate-lanceolate. Stamens 10, in two rows. Ovary 5-celled; ovules many; styles 5, distinct. Capsules 0.8-1.5 x 0.3-0.5 cm, linear, puberulous outside; seeds many, minute, brown.

Ambalappara, *KJD 26267*

Fl. & Fr.: March-December

Distribution: Fairly common in evergreen forests of Asthippara.

Order: **Malpighiales**

ACHARIACEAE

HYDNOCARPUS Gaertn.

Fruct. Sem. Pl. 1: 288, t. 60, 1788.

- 1a. Leaf margins entire; scale as long as the petal..... *H. alpina*
1b. Leaf margins serrate; scale half the length of petal..... *H. pentandra*

Hydnocarpus alpina Wight, Icon. Pl. Ind. Orient. t. 942. 1845; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 197. 1872; Gamble, Fl. Madras 52(37). 1915; Manilal & Sivar., Fl. Calicut 36. 1982; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 418. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 275. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 123. 2009.

Trees to 15 m; bark greyish-brown. Leaves alternate, drooping, 8-25 x 5-10 cm, ovate, elliptic-oblong or ovate-lanceolate, apex acute or acuminate, base oblique, round or acute; lateral nerves 7-10 pairs, pinnate, slender, prominent, intercostae reticulate, prominent; petiole 5-10 mm, swollen tipped, grooved above; stipules lateral. Flowers unisexual 22-25 mm across, yellowish-white, solitary or in stout axillary fascicles. Sepals 5, 8 mm long, oblong, pubescent, imbricate. Petals 5, 1 cm long, narrow, glabrous, with a scale at the base; scales linear, as long as petals, sparsely hairy. Stamens 5-15; filaments glabrous. Ovary 1-celled, tomentose; stigmas 5, free, radiating, recurved. Fruit a berry, 5-7 cm across, densely tomentose, dark brown.

Crossway, *KJD 26074*

Fl. & Fr.: January-July

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Crossway.

Hydnocarpus pentandrus (Buch.-Ham.) Oken, Allg. Naturgesch. 3: 1381. 1841; Ramach. & V.J. Nair, Fl. Cannanore Dist. 50. 1988; Ansari, Fl. Kasaragod Div. 65. 1985; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 422. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 276. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 124. 2009. *Chilmoria pentandra* Buch.-Ham., Trans. Linn. Soc. London 13. 501. 1822. *Hydnocarpus laurifolia* (Dennst.) Sleum., Bot. Jahrb. Syst. 69: 33. 1938. *Hydnocarpus wightiana* Blume, Rumph. 4: 22. 1848; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 196. 1872; Gamble, Fl. Madras 52(37). 1915.

Dioecious trees, to 25 m high; bark brown. Leaves alternate, 8-17 x 3-8 cm, elliptic, elliptic-lanceolate or elliptic-oblong, apex acuminate, base acute, obtuse or round, margin crenate, serrate or entire; lateral nerves 6-8 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole 8-10 mm, pubescent, grooved above; stipules small, lateral. Flowers unisexual, 5-10 mm across, greenish-yellow, solitary or in small fascicle. Sepals 5, broadly ovate, pubescent. Petals 5, broadly ovate, greenish-yellow, fringed with soft white hairs. Stamens 5-15; filaments subulate, hairy at the base; anthers of female flowers possess no pollen. Ovary globose, 1-celled, tomentose; stigma sessile and two lobbed. Fruit a berry 5-7 cm across, globose, rind thick, brown, rough with uneven surface; seeds numerous.

Chavachi, NS & KVB 31316

Fl. & Fr.: December-May

Distribution: Common at all forest types below 800 m altitude.

Endemic to Western Ghats.

CALOPHYLLACEAE

- 1a. Flowers axillary solitary or fascicled or in short spikes *Mesua*
- 1b. Flowers in racemes or panicles 2
- 2a. Lateral nerves indistinct; petals 5 or 6 *Poeciloneuron*
- 2b. Lateral nerves distinct; petals 4 *Calophyllum*

CALOPHYLLUM L.

Sp. Pl. 783. 1753.

- 1a. Perianth segments 4 only *C. calaba*
- 1b. Sepals and petals 4 each 2
- 2a. Fruit slightly beaked, young parts and inflorescence pubescent *C. austroindicum*
- 2b. Fruit not beaked, whole trees glabrous *C. polyanthum*

Calophyllum austroindicum Kosterm. ex P.F.Stevens, J. Arnold Arbor. 61: 250. 1980; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind.3: 90. 1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 330. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 133. 2009. *Calophyllum trapezifolium* sensu Anders. in Hook.f., Fl. Brit. India 1: 275. 1874, non Thwaites 1858; Dunn in Gamble, Fl. Madras 76 (55). 1915; Mahesh., Bull. Bot. Surv. India 2: 144. 1960.

Tree, 15-30 m tall; bark pale brown. Leaves opposite, 3-8.5 x 1.2-4.2 cm, elliptic, subrhomboid to obovate or oblanceolate, subacute or shortly and bluntly acuminate at apex, cuneate to acute at base, slightly undulate; lateral nerves 5-10 pairs, more or less prominent on both surfaces; petioles 5-8 mm long, channelled above. Racemes axillary, 3-8 cm long, 7-17 flowered. Flowers ca 2 cm across. Sepals 4, subequal; outer pair suborbicular, 3.7-5 x 3.5-6 mm; the inner broadly elliptic, ca 6 x 4 mm. Petals 4, rarely 6, elliptic or oblong to obovate, obtuse, 4-9 x 1.5-6 mm. Stamens 100-125; filaments ca 4.5 mm long. Ovary globose, 2-3 mm; styles 1.5-3.5 mm long; stigmas peltate, 3-radiate, 0.7-1 mm across. Berries ovoid, beaked at apex, 3-4.3 x 1.6-2.7 cm.

Ambalappara, NS &KVB 31362

Fl. & Fr.: November-June

Distribution: Common in evergreen forests of Pothurumi and Ambalappara.

Endemic to southern Western Ghats.

Calophyllum calaba L., Sp. Pl. 514. 1753; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 330. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 133. 2009. *Calophyllum apetalum* Willd., Mag. Neuesten Entdeck. Gesammten Naturk. Ges. Naturf. Freunde Berlin 5: 79. 1811; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind. 3:88.1993. *Calophyllum decipiens* Wight, Icon. Pl. Ind. Orient. t. 106. 1839; Dunn in Gamble, Fl. Madras 76(54). 1915. *Calophyllum wightianum* Wall. ex Planch. & Triana, Ann. Sci. Nat. Bot. ser. 4. 15: 256. 1862; Anders. in Hook.f., Fl. Brit. India 1: 274. 1874.

Trees, to 20 m high; bark yellowish-brown. Leaves opposite, decussate, 5-11 x 3-5 cm, obovate, ovate-oblong or oblong, apex retuse or obtuse, base acute, cuneate, cuneate-subacute or cuneate-round; lateral nerves many, parallel, very close, intercostae obscure; petiole 4-12 mm long, minutely tomentellous, canaliculated above. Flowers white, 10-12 mm across, in axillary panicles; peduncle densely rusty pubescent. Sepals 4, white, 8 x 5 mm oblong or obovate, concave. Petals absent. Stamens numerous, filaments 4-6 mm long, slender. Ovary superior, globose, 1-celled, ovule 1, erect; style slender, 3 m long; stigma

peltate, concave. Fruit a drupe, 10-12 mm, ovoid, bright orange or yellowish-orange; seed ovoid to ellipsoid, pale brown.

Valyamchal, *KJD 18754*

Fl. & Fr.: September-May

Distribution: Rare in semi-evergreen forests of Valayamchal near river banks.

Endemic to Western Ghats

Calophyllum polyanthum Wall. ex Choisy, Descr. Guttif. Inde. 43. 1849; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind.3: 94. 1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 333. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 134. 2009. *Calophyllum elatum* Bedd., Fl. Sylv. S. India: t. 2. 1869; Dunn in Gamble, Fl. Madras 76(54). 1915. *Calophyllum tomentosum* sensu Anders. in Hook.f., Fl. Brit. India 1: 274. 1874, non Wight 1839.

Lofty trees, to 35 m high; bark yellowish-brown. Leaves opposite, decussate, 8-12.5 x 3-8 cm, elliptic, elliptic-lanceolate, apex acute or acuminate, base acute; lateral nerves many, slender, parallel, close, prominent, intercostae obscure; petiole 12-25 mm long, grooved above. Flowers white, in panicles or racemes, terminal and from the axils of the upper leaves. Sepals 4, concave, elliptic, outer ones reflexed, ciliolate, inner 2 petaloid, 7.5 mm long. Petals 4, 5 mm across, white, orbicular, early cauducous, inner ones smaller. Stamens numerous, 4 mm long; filaments united at the base. Ovary superior, slender, 1-celled, ovule one, erect; style 2 mm long, flexuous; stigma peltate, concave, obscurely lobed. Fruit a drupe, 2-2.5 cm long, obliquely ovoid, dark purple, smooth.

Vellachatamkunnu, *KJD 22564*

Fl. & Fr.: June-September

Distribution: Common in evergreen forests of Vellachatamkunnu and Kattikari.

MESUA L.

Sp. Pl. 515. 1753.

Mesua ferrea L., Sp. Pl. 515. 1753; Anders. in Hook.f., Fl. Brit. India 1: 277. 1874; Dunn in Gamble, Fl. Madras 77(55). 1915; Ansari, Fl. Kasaragod Div. 71. 1985; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind.3:136.1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 349. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 137. 2009. *Mesua nagassarium* (Burm.f.) Kosterm., Ceylon J. Sci. 12, 1: 71. 1976; Ramach. & V.J. Nair, Fl. Cannanore Dist. 55. 1988.

Trees; bark ash or grey. Leaves red and pendulous when young, simple, opposite, 8-12 x 2-4.5 cm, elliptic to oblong-lanceolate, base broadly attenuate or

rounded, apex acuminate or cuspidate, glaucous beneath and generally covered with a wax-like white powder beneath; nerves many, close and parallel; petiole to 1 cm long. Flowers white, scented, solitary or in pairs at axils, 4.5-5.5 cm, across. Sepals 4 in two pairs, 1.3-1.6 cm long, broadly ovate, persistent. Petals 4, sometimes 5, white with brown veins, 2.5-3.5 x 1.3-1.5 cm, obovate or obcordate, margins curled. Stamens numerous. Ovary 4-6 mm long, ovoid; ovules 2 in each locule; stigma peltate. Fruits 2-2.5 x 1.5-2 cm, ovoid; seeds 1-4, pyriform, dark brown.

Meenmutty, *KJD 25598*

Fl. & Fr.: April-July

Distribution: Upper reaches of evergreen forests at Meenmutty.

POECILONEURON Bedd.

J. Linn. Soc. 8: 267. 1865.

Poeciloneuron indicum Bedd., J. Linn. Soc. Bot. 8: 267, t.17. 1865 & Fl. Sylv. S. India: t.3. 1869; Dyer in Hook. f., Fl. Brit. India 1: 278. 1874; Dunn in Gamble, Fl. Madras 77(56). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 55. 1988; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind.3: 146. 1993; Mohanan *et al.*, Ann. For. 7: 87. 1999; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 352. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 138. 2009.

Large evergreen trees to 30 m high; bark grey to brown; exudation milky yellow. Leaves opposite, 11-25 x 2.5-6.5 cm, elliptic, elliptic-oblong or linear-oblong, apex caudate acuminate, base acute or obtuse; lateral nerves many, close, parallel, slender, obscure; intercostae reticulate; petiole 10-30 mm. Flowers yellowish-white, fragrant, in axillary and terminal panicles; bracteoles triangular. Sepals 5, 3 mm long, ovate, puberulous without. Petals 5, 5-6 mm, elliptic to obovate. Stamens numerous, free or slightly connate; filaments 0.5 mm long. Ovary 1-2 mm, bilocular; ovules 2 in each locule; styles 2, subulate. Fruit a capsule, 2-2.5 cm across, globose, beaked; seed one, fleshy.

Pothurumi, *KJD 26287*

Fl. & Fr.: December-June

Distribution: Rare in evergreen forests of Pothurumi. Endemic to Western Ghats

CLUSIACEAE

GARCINIA L.

Sp. Pl. 1: 443. 1753

- 1a. Flowers 5-merous; stamens in 5 phalanges..... *G. talbotii*
 1a. Flowers 4-merous; stamens monodelphous 2

- 2a. Fruit smooth, less than 2 cm diameter *G. morella*
 2b. Fruit vertically grooved, over 3.5 cm diameter *G. gummi-gutta*

Garcinia gummi-gutta (L.) Robs., Brittonia 20: 103. 1968,

- 1a. Fruit apex papillate.....*G. gummi-gutta* var. *papilla*
 1b. Fruit apex obtuse*G.gummi-gutta* var.*gummi-gutta*

Garcinia gummi-gutta (L.) Robs., Brittonia 20: 103. 1968. var. ***gummi-gutta***; Ansari, Fl. Kasaragod Div. 70. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 54. 1988; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind. 3:110.1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 336. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 135. 2009. *Cambogia gummi-gutta* L., Gen. Pl. (ed.5) 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lam. Encycl. 3: 701. 1792; Anders. in Hook.f., Fl. Brit. India 1: 261. 1874; Dunn in Gamble, Fl. Madras 73(53). 1915. *Mangostana cambogia* Gaertn., Fruct. Sem. Pl. 2: 106. 1790. *Garcinia cambogia* (Gaertn.) Desr. var. *conicarpa* (Wight) Anders. in Hook.f., Fl. Brit. India 1: 262. 1874; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 336. 2005. *Garcinia conicarpa* Wight, Icon. Pl. Ind. Orient. t. 121. 1839.

Evergreen trees, to 20 m high; bark black; exudation pale yellow, sticky. Leaves opposite, decussate, 7-15 x 2-8 cm, elliptic or oblanceolate or lanceolate, base cuneate, or attenuate, apex acute or shortly obtusely acuminate; lateral 10-16 pairs, pinnate, ascending, intramarginal nerve present, intercostae reticulate; petiole 5-20 mm long, channelled above. Flowers polygamodioecious, yellowish-white; male flowers: 3-5 in short axillary fascicles. Sepals 4, ovate or obovate. Petals 4. Stamens 10-20 or more, inserted on a short convex receptacle, monadelphous. Female flowers: 1-3 in terminal and axillary fascicles, larger than male flowers. Sepals and petals as in male. Staminodes 10-20. Ovary superior, globular, 8-10 locular, ovule one in each locule; stigmatic rays 8-10, spreading. Fruit a berry, yellow, 8-10 grooved; seeds 6-8.

Chavachi, KVB 31599

Fl. & Fr.: January-September

Distribution: Common in all forest types below 1,000 m altitude

Garcinia gummi-gutta (L.) Robs. var. ***papilla*** (Wight) N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind. 3: 111. 1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 337. 2005. *Garcinia papilla* Wight, Icon. Pl. Ind. Orient. t. 96. 1839; Ansari, Fl. Kasaragod Div. 70. 1985. *Garcinia cambogia* (Gaertn.) Desr. var. *papilla* (Wight) Anders., Hook. f., Fl. Brit. India 1: 262 (Plate 8e).

Tree, to 25 m tall; bark grey or brown; exudate a yellow gum. Leaves opposite, 7-15 x 2-7 cm, oblong, elliptic or lanceolate, acute to short-acuminate at apex, cuneate at base; lateral nerves numerous, slender, prominent; petioles channelled. Male flowers 3-6 in short axillary fascicles, ca 1.2 cm across, yellow. Sepals 4, ovate or obovate, unequal. Petals 4, obovate or oblong, 8-10 mm long. Stamens 12-20 or more, inserted on receptacle; filaments ca 0.5 mm long. Bisexual flowers in fascicles of 1-3, terminal and axillary, 1-1.5 cm across. Sepals and petals as in male ones. Stamens 10-20. Ovary subglobose or ovoid, ca 1 mm long, 8-11 sulcate. Berries globose, to 7 cm, 6-8 grooved, mamillate at apex, thick; seeds 6-8, ovoid, compressed.

Ambalappara, *KJD 26303*

Fl. & Fr.: December-February

Distribution: Fairly common in evergreen forests of Ambalappara-Pothurumi region.

Garcinia morella (Gaertn.) Desv. in Lam. Encycl. 3: 701. 1792; Anders. in Hook.f., Fl. Brit. India 1: 264. 1874; Dunn in Gamble, Fl. Madras 74(52). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 55. 1988; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind.3: 119. 1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 338. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 136. 2009. *Mangostana morella* Gaertn., Fruct. Sem. Pl. 2: 106. 1790. *Garcinia pictoria* Roxb., Fl. Ind. 2:627. 1832; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 339. 2005. *Garcinia gutta* Wight, Icon. Pl. Ind. Orient. t. 44. 1840.

Evergreen trees, to 18 m high; bark brownish-grey; exudation dark yellow, sticky. Leaves opposite, decussate, 6-16 x 2.5-9 cm, elliptic-obovate or elliptic-oblong, apex obtuse, obtusely acuminate or caudate-acuminate, base acute or cuneate; lateral nerves 8-16 pairs, pinnate, intramarginal nerve present, intercostae reticulate; petiole 6-15 mm, grooved above. Flowers polygamodioecious, reddish, sessile: Male flowers: 2-4 in axillary fascicles or on old wood. Sepals 4 orbicular, decussate. Petals 4, little larger than sepals. Stamens 10-12, monadelphous. Female flowers: axillary, solitary, larger than male flowers. Staminodes 10-12 in a ring round the ovary. Ovary superior, greenish, 4-celled, ovule one in each cell; stigma peltate, sessile, irregularly lobed, tubercled, persistent. Fruit a berry, 1.5-2.5 cm long, subglobose; seeds 2-4.

Paripode, *KVB 31681*

Fl. & Fr.: February-August

Distribution: Common in evergreen forests of Katikari, Chavachi and Moonamthode and semi-evergreen forests of Paripode and Narikkadavu.

Garcinia talbotii Raiz. ex Santapau, Rec. Bot. Surv. Ind. 16:14. 1960; N.P. Singh in B.D. Sharma & Sanjappa, Fl. Ind. 3: 127. 1993; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 343. 2005. *Garcinia ovalifolius* (Roxb.) Hook.f. var. *macrantha* Anders. in Hook.f., Fl. Brit. India 1: 269. 1874. *Garcinia malabarica* Talbot, Journ. Bombay Nat. Hist. Soc. 11: 234. t. 1. 1897, non Desr. 1789; Dunn in Gamble, Fl. Madras 74(53). 1915. *Xanthochymus ovalifolius* J.Graham, Cat. Pl. Bombay 26. 1839, non Roxb. 1832 (Plate 8f).

Tree, to 15 m tall; latex brownish. Leaves opposite, 7-18 x 4-10 cm, elliptic-oblong or ovate, obtuse or retuse at apex, rounded at base; lateral nerves 16-18 pairs; petioles 12-18 mm long, rugose. Inflorescences congested. Flowers 1.8-2.7 cm across, creamy white or white to greenish yellow; bracteoles many, minute, at base of pedicel. Sepals 5, orbicular, ca 3 mm, green. Petals 5, orbicular to suborbicular, white. Male flowers: Stamens in 5 phalanges, opposite petals. Female flowers: Staminodes in 5 thin flat phalanges Ovary globose, 3 or 4 loculed; stigmatic lobes 3, thick, spreading. Fruit berries broadly oblong.

Paripode, KVB 31278

Fl. & Fr.: November-May

Distribution: Fairly common in evergreen forests of Katikari and semi-evergreen forests of Paripode. Endemic to Western Ghats

DICHAPETALACEAE

DICHAPETALUM Thouars

Gen. Nov. Madagasc. 23. 1806.

Dichapetalum gelonioides (Roxb.) Engl., Nat. Pflanzenfam. 3(4): 348. 1896; Gamble, Fl. Madras 188(134). 1915; Ansari, Fl. Kasaragod Div. 97. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 92. 1988; N.C. Nair in Hajra *et al.*, Fl. Ind. 4: 528. 1997; N.C. Nair in P. Daniel, Fl. Kerala 1: 670. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 213. 2009. *Moacurra gelonioides* Roxb., Fl. Ind. 2: 69. 1832. *Chailletia gelonioides* (Roxb.) Bedd., Fl. Sylv. S. India (Forest. Man.) lix, t. IX, f. I 1871; Hook. f., Fl. Brit. India 1: 570. 1875.

Shrubs, branchlets hairy. Leaves alternate, 7-10 x 3-4 cm, elliptic, apex caudate-acuminate, base acute, entire. Flowers unisexual, in axillary or extra-axillary, short peduncled cymes, densely villous; bracts lanceolate. Sepals 5, 1.5 mm long, ovate. Petals 1.5 mm long, obovate, bilobed at apex, glabrous. Stamens 5, filaments short, anthers ovoid, disk 4 lobed, scale like. Ovary 3-celled, cell 2-

ovuled, style 1, trifold above. Drupe 10 mm across, 2-lobed, compressed, rugose; seeds with orange-red aril.

Chelachode, *KVB 31298*; Chavachi, *NS &KVB 31406*

Fl. & Fr.: March-July

Distribution: Common under growth in evergreen and Semi-evergreen forests.

EUPHORBIACEAE

- 1a. Flowers without perianth, arranged in cyathia; stamen 1 Euphorbia
- 1b. Flowers with perianth either 1 or 2 whorled, not arranged in
cyathia; stamens 2 or more 2
- 2a. Perianth in male flowers 2-seriate 3
- 2b. Perianth in male flowers 1-seriate 7
- 3a. Leaves with stalked glands at the base of lamina; stamens inflexed
in the bud Croton
- 3b. Leaves without stalked glands; stamens erect in the bud 4
- 4a. Perianth in female flowers uniseriate Blachia
- 4b. Perianth in female flowers biseriate 5
- 5a. Fruiting perianth accrescent and enlarged Dimorphocalyx
- 5b. Fruiting perianth absent or not enlarged 6
- 6a. Petals smaller than the sepals Agrostistachys
- 6b. Petals longer than the sepals Paracroton
- 7a. Male and female flowers are borne in the same plant 8
- 7b. Male flowers and female flowers are borne in separate plants 14
- 8a. Twining herbs with stinging hairs Tragia
- 8b. Erect plants without stinging hair 9
- 9a. Stamens 2, 3 or 5 10
- 9b. Stamens 8 or more 12
- 10a. Perianth lobes 2; stamens 2; trees with milky latex Excoecaria
- 10b. Perianth lobes 3 or 5; stamens 3 or 5; herbs or shrubs without milky latex 11
- 11a. Perianth lobes in male 5; capsule coccus with 2 rows of spines Microstachys
- 11b. Perianth lobes in male 3; capsule without spines Micrococca
- 12a. Perianth lobes 5, linear lanceolate; disk present; style arms entire Baliospermum
- 12b. Perianth lobes 3 or 4; disk absent; style arms plumose or laciniate 13
- 13a. Stamens 4, filaments inflexed in the bud; trees Epiprinus
- 13b. Stamens 8, filaments erect in the bud; herbs Acalypha

- 14a. Leaves orbicular peltate; anthers 4-celled; ovary 1-celled Macaranga
 14b. Leaves not peltate; anthers 2-celled; ovary 2 or 3-celled..... 15
 15a. Staminal filaments branched; shrubsHomonoia
 15b. Staminal filaments not branched; trees..... 16
 16a. Fruit fleshy, indehiscent, smooth; leaves without glands beneath..... Trewia
 16b. Fruit a capsule with echinate process; leaves with minute gland beneath Mallotus

ACALYPHA L.

Sp. Pl. 1003. 1753.

- 1a. Male and female flowers in separate spikes, bracts minute, entire *A. paniculata*
 1b. Male and female flowers on same spikes, bracts deeply 3-5 lobed*A.brachystachya*

Acalypha brachystachya Hornem., Enum. Pl. Hort. Hafn. rev. 1: 992. 1809; Hook.f., Fl. Brit. India 5: 416. 1887; Gamble, Fl. Madras 1330(930). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 124. 2007.

Prostrate or procumbent herbs; stems striate, puberulus. Leaves alternate, ovate, acute, rounded to cordate at base, 3-5-nerved from base, sparsely hairy; petiole 0.5-2 cm long. Racemes to 1.5 cm long, axillary. Male flowers many, towards the upper part of raceme. Calyx lobes minute, glandular pubescent; stamens 8, free, on a dome-shaped receptacle. Female flowers 1-4 at the base of the raceme, sessile. Calyx 3-5 minute lobes, oblong, glandular-ciliate. Ovary 3-celled, ovule single; styles 3, bifid above. Capsule 2 x 2 mm, hispid; seeds ovoid with hilum at one end.

Paripode, *KJD 22559*

Fl. & Fr.: September-December

Distribution: Open areas in semi-evergreen forests.

Acalypha paniculata Miq., Fl. Ned. Ind. 1: 406. 1859; Hook.f., Fl. Brit. India 5: 415. 1887; Gamble, Fl. Madras 1330(930). 1925; Rani & Balakr., J. Econ. Taxon. Bot. 31: 96. 2007; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 126. 2007. *Acalypha racemosa* Wall. ex Baill., Etud. Gen. Euphorb.443. 1858, nom. nud.; Manilal & Sivar., Fl. Calicut 270. 1982; Ansari, Fl. Kasaragod Div. 331. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 407. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 689. 2009.

Erect herbs to 1 m tall; branchlets minutely pubescent. Leaves alternate, 4-8 x 2-5 cm, broadly ovate, apex acuminate, base rounded or subcordate, margin crenate-serrate, sparsely hispid, membranous, basally 3-(5) nerved; petiole to 7

cm long. Flowers monoecious. Male flowers in slender axillary spikes, 6-10 cm long, flowers very minute. Calyx 4; stamens 8 on a convex receptacle, anthers linear. Female flowers in terminal panicles; bracts minute, ovate. Calyx lobes 3-6. Ovary 3-lobed, 3-locular; ovule 1-per locule; styles filiform in 3 groups of 3 each. Capsules 1.5-2 mm across, with 3 cocci; seeds globose.

55 Block, *KJD 25412*

Fl. & Fr.: August-December

Distribution: Fairly common in semi-evergreen forests.

AGROSTISTACHYS Dalzell

Hooker's J. Bot. Kew Gard. Misc. 2: 41. 1850.

- 1a. Leaves entire; female flowers in racemes *A. borneensis*
- 1b. Leaves serrate; female flowers solitary or 2-3 together *A. indica*

Agrostistachys borneensis Becc., Nelle For. Borneo 331. 1902; Ramach. & V.J. Nair, Fl. Cannanore Dist. 407. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 718. 2009. *Agrostistachys longifolia* (Wight) Trimen, Syst. Cat. Fl. Pl. Ceylon 81. 1885, nom. illeg.; Hook.f., Fl. Brit. India 5: 407. 1887. *Sarcoclinium longifolium* Wight, Icon. Pl. Ind. Orient. tt. 1887, 1888. 1852. *Agrostistachys meeboldii* Pax & K.Hoffm., Pflanzenr. (Engler) Euphorb.-Chrozoph. 100. 1912; Gamble, Fl. Madras 1318(922). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 158. 2007.

Evergreen trees to 15 m, dioecious; bark blackish-grey. Leaves alternate, clustered at the tips of branchlets, 10-25 x 5-7.5 cm, oblanceolate or obovate-spathulate, apex acuminate, base long attenuate; lateral nerves 10-18 pairs, pinnate, prominent; petiole 5-10 mm long; stipules lateral, short, broad. Male flowers: in axillary lax spiciform racemes, much shorter than the leaves; bracts broadly ovate, ciliate. Calyx globose splitting into 2-5 valvate. Petals 5. Stamens 10. Pistillode 2-3 clefted. Female flowers: in axillary lax spiciform racemes much shorter than the leaves, solitary in each bract. Calyx and petals as like as male. Ovary superior, pubescent, 3-celled, ovules 1 in each cell; styles thick, short, spreading. Fruit a capsule 7-15 mm across, 3-lobed, cocci globose, reddish, crustaceous, smooth; seeds globose, smooth, shining.

Kattikkari, *KJD 31553*

Fl. & Fr.: December-April

Distribution: Rare in evergreen forests of Kattikkari.

Agrostistachys indica Dalzell, Hooker's J. Bot. Kew Gard. Misc.. 2: 41. 1850; Hook.f., Fl. Brit. India 5: 406. 1887; Gamble, Fl. Madras 1317(921). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 157. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 718. 2009.

Large shrubs to small trees. Leaves subopposite to alternate, to 21 x 9 cm, elliptic-oblong, acute, base attenuate, spineus serrate; nerves ca. 13 pairs, regular, prominent, nervules parallel; petiole 1 cm long. Male flowers in short axillary racemes; bracts broadly ovate, densely tomentose. Calyx white, lobes 4 x 2.5 mm, obovate, obtuse. Petals smaller than calyx white. Stamens 12, filaments united at base. Female flowers solitary or 2-3 together, axillary; bracts many, 3 x 3 mm, imbricating, ciliate; pedicel 7 mm long, stout. Calyx lobes hairy. Petals oblong, densely hairy. Capsule 15 mm across, cocci minutely hispid; seeds globose, glabrous.

Kattikkari, KVB 31620

Fl. & Fr.: February-March

Distribution: Common in evergreen forests of Kattikkari, Mullenpara and Asthipara. Endemic to Central and Peninsular India

BALIOSPERMUM Blume

Bijdr. Fl. Ned. Ind. 603. 1826.

Baliospermum solanifolium (Burm.) Suresh in D.H.Nicolson & al., Interpr. Van Rheede's Hort. Malab.: 106 (1988); Sivar. & Mathew, Fl. Nilambur 607. 1997. *Croton solanifolius* Burm., Fl. Malab. (Burman) 6.1769. *Jatropha montana* Willd., Sp. Pl. 4: 565. 1805. *Croton solanifolius* Geisl., Croton Monogr. 74. 1807. *Baliospermum axillare* Blume, Bijdr. Fl. Ned. Ind. 604. 1826; Hook.f., Fl. Brit. India 5: 461. 1887. *Baliospermum polyandrum* Wight, Icon. Pl. Ind. Orient. t. 1885. 1852. *Baliospermum montanum* (Willd.) Müll.Arg. in DC. Prodr. 15: 1125. 1866; Gamble, Fl. Madras 1342(939). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 410. 1988; Chakrab. & Balakr., Bull. Bot. Surv. India 32: 5. 1990; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 195. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 723. 2009.

Subshrubs. Leaves alternate, 10-15 x 6-10 cm, broadly ovate, often 3-lobed, apex acute or acuminate, base rounded, 3-5 ribbed, glabrous or sparsely hispid above and tomentose along the nerves beneath, inciso-crenate, with a pair of glands at base of lamina; petiole to 6 cm long. Inflorescence bisexual, born on leafy branch. Male flowers: Perianth 4 rarely 5 lobed, lobes orbicular concave, 1.5 mm long, pubescent. Stamens 14-20 on central receptacle; filaments stout. Female

flowers: Perianth 4 rarely 5 lobed, lobes deltoid. Ovary sub globose; style 3-fid; stigma prominent. Capsule 3-lobed, 1.2 cm long; seeds ovoid, caruncled.

Pottichapara, *KJD 18740*

Fl. & Fr.: August-March

Distribution: Rare in evergreen forests of Pottichapara.

BLACHIA Baill.

Étude Euphorb. 388. t. 19. 1858, *nom. cons.*

Blachia umbellata (Willd.) Baill., Étude Euphorb. 387. t.19. 1858; Hook.f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Madras 1338(936). 1925; Ansari, Fl. Kasaragod Div. 334. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 410. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 202. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 724. 2009. *Croton umbellatus* Willd., Sp. Pl. 4: 545. 1805. *Blachia reflexa* Benth., J. Linn. Soc. Bot. 17: 226. 1880; Hook.f., Fl. Brit. India 5: 402. 1887; Gamble, Fl. Madras 1338(936). 1925.

Glabrous shrubs; branchlets slender. Leaves alternate, to 5 x 5 cm, elliptic, acuminate at apex, base acute; lateral nerves 10-13 pairs, irregular, looping; petiole 1 cm long. Male flowers 5 mm across, 5-10 together in a terminal umbel; pedicel 1.5 cm long. Sepals 2.5 x 2 mm, ovate, acute, glabrous. Stamens 15-20. Female flowers 8 mm across; 3-5, on stout peduncle. Sepals 5, 4 x 2 mm, oblong, acute, glabrous. Ovary glabrous; styles 3, 8 mm long, bifid. Capsule 18 mm across, 3-lobed, glabrous.

Moonamthode, *NS & KVB 31357*

Fl. & Fr.: October-April

Distribution: Common in evergreen forests of Moonamthode, Kattikkari and Chavachi.

CROTON L.

Sp. Pl. 1004. 1753.

- 1a. Herbs, covered with yellow viscid glands *C. bonplandianus*
- 1b. Shrubs or small trees, without yellow viscid glands 2
- 2a. Leaves silvery white beneath *C. malabaricus*
- 2b. Leaves not silvery white beneath *C. klotzschianus*

Croton bonplandianus Baill., Adansonia 4: 339. 1864; Manilal & Sivar., Fl. Calicut 266. 1982; Ansari, Fl. Kasaragod Div. 336. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 412. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae

India 212. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 731. 2009. *Croton sparsiflorus* Morong. in Ann. New York Acad. Sci. 7: 221. 1893; Gamble, Fl. Madras 1316(920). 1925.

Herbs, young parts stellate-pubescent and viscous glandular. Leaves alternate, 2-5 x 1-2 cm, ovate-lanceolate, apex gradually acute, base attenuate, margin faintly serrulate, densely stellate scaly on both sides when young, sparsely so below and glabrous above on ageing; petiole to 1.5 cm long. Racemes to 10 cm long; pedicels glandular on either side. Male flowers 3-4 mm across. Calyx 5 partite. Petals 5 smaller than calyx. Stamens Many. Female flowers few, towards base, 2.5-3 mm across. Calyx 5 partite. Petals 5. Ovary subglobose, tomentose; style short; stigma 3, each forked to form 6 lobes. Capsule 5-6 mm across, ovoid, warty; seeds 3, globose, carunculate.

Paripode, *KJD 18785*

Fl. & Fr.: November-May

Distribution: Boundaries of Farm.

Croton klotzschianus Thwaites, Enum. Pl. Zeyl. 276. 1861; Hook.f., Fl. Brit. India 5:392.1886; Gamble, Fl. Madras 1315(920).1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 413. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 214. 2007. *Oxydectes klotzschianus* (Thwaites) Kuntze, Revis. Gen. Pl. 2: 612. 1891. *Croton thwaitesianus* Müll.Arg., Linnaea 34: 116. 1865.

Shrubs, often straggling. Leaves alternate, 7-9 x 2.5-4 cm, elliptic-ovate or oblong, base and apex acute, margin serrulate, membranous; 3-ribbed from the base, stellately hairy when young; petiole to 1 cm long. Racemes 3-6 cm long. Male flowers many for most of the parts of the raceme, pedicel to 1 cm long. Calyx 5-partite, Petals 5. Stamens many; disk-glands 5, large. Female flowers a few at the base of the racemes, pedicel short. Calyx 5-partite, Petals 5, ovate, inner ones subulate. Ovary densely stellately hairy. Capsule subglobose.

Kattikkari, *KVB 31558*; Pothurumi, *KVB 31625*

Fl. & Fr.: February-April

Distribution: Fairly common in evergreen forests of Chavachi, Kattikkari and Pothurumi.

Croton malabaricus Bedd., Fl. Sylv. S. India: 204. 1873; Hook.f., Fl. Brit. India 5: 386. 1887; Gamble, Fl. Madras 1314(919). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 214. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 732. 2009 (Plate 8g).

Trees, to 20 m high; bark greyish-white. Leaves alternate, 7-24 x 3-12 cm, rhombic-ovate, broadly ovate or elliptic, apex acuminate, base cuneate, obtuse or round, silvery stellate hairs and reddish glands beneath; lateral nerves 4-6 pairs, pinnate, intercostae scalariform, obscure; petiole 10-125 mm long; stipules 12-18 mm long. Flowers unisexual, 5-10 mm across, white, in erect terminal racemes of 5-12.7 cm long; bracts small. Calyx 5-partite, lobes ovate, obtuse, silky tomentose. Petals 5, smaller than sepals, obovate. Stamens 10-15, filaments bearded. Ovary stellate hairy, 3-celled, ovules one in each cell; styles long, slender, pistillode absent in males. Fruit a capsule 2.5 x 2 cm, obovoid, depressed above, brown tomentose; seeds 13 x 8 mm, oblong, mottled with brown.

Way to Meenmuttery, *KJD 18727*

Fl. & Fr.: April-November

Distribution: Fairly common at semi-evergreen forest of Pothanplavu to evergreen forest of Meenmuttery. Endemic in southern Western Ghats

DIMORPHOCALYX Thwaites

Enum. Pl. Zeyl. 278. 1861.

Dimorphocalyx glabellus Thwaites, Enum. Pl. Zeyl. 278. 1861; Hook.f., Fl. Brit. India 5: 403. 1887; Gamble, Fl. Madras 1336(935). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 205. 2007.

Small much branched trees; branchlets nearly white. Leaves alternate, 12 x 5 cm, elliptic or lanceolate, obtuse or acute, reddish brown when dry and rather thin; petiole 0.5-1 cm long. Male flowers shortly pedicelled; female long pedicelled; pedicels with few small obtuse bracts. Petals of the male longer than the sepals, of the female shorter. Stamens about 10. Ovary strigose. Capsule slightly hispid-villous, shortly lobed; seeds oblong, mottled. Fruiting calyx obovate, obtuse, with a glandular pit on back near the tip.

Kattikkari, *KJD 22598*

Fl. & Fr.: Throughout the year

Distribution: Rare in evergreen forests of Kattikkari.

EPIPRINUS Griffith

Notul. Pl. Asiat. 4: 487. 1854.

Epiprinus mallotiformis (Müll.Arg.) Croizat, J. Arnold Arbor. 23: 53. 1942; Ramach. & V.J. Nair, Fl. Cannanore Dist. 414. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 170. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 736. 2009. *Symphyllia mallotiformis* Müll.Arg., Linnaea 34: 156. 1865; Gamble, Fl.

Madras 1323(925). 1925. *Adenochlaena indica* (Bedd.) Bedd. ex Hook.f., Fl. Brit. India 5: 418. 1887. *Cephalocroton indicum* Bedd., Fl. Sylv. S. India: t. 261. 1872.

Trees, to 12 m. Leaves alternate, 7-20 x 1-8 cm, elliptic, elliptic-ovate or elliptic-obovate, apex acute or acuminate, base round, obtuse or acute; lateral nerves 6-10 pairs, pinnate, intercostae reticulate; petiole 4-20 mm long, stout, stellate-tomentose; stipules 2, minute. Flowers unisexual, pale green, in long axillary spikes. Male flowers: densely clustered along the upper part of the raceme; Perianth 4-6 lobed, ovate, acute, thinly tomentose. Stamens 4-6, free, inflexed in bud; pistillode columnar. Female flowers: Perianth 5-8 lobed, unequal, 2 mm, shortly connate, lanceolate. Ovary superior, 2 mm long, globose, pubescent, 3-locular; ovules one in each cell; styles 3, stout, 3 mm, twice forked, papillose. Fruit a capsule 2.5-3 cm across, 3-lobed, lobes globular, densely stellate hairy; seeds 3, globose.

Kattikkari, NS & KJD 31905

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Kattikkari and Chavachi. Endemic to Western Ghats.

EUPHORBIA L.

Sp. Pl. 450. 1753.

- 1a. Erect unbranched herbs; cyathia 20-40 together *E. hirta*
- 1b. Prostrate herbs; cyathia 1-5 together *E. thymifolia*

Euphorbia hirta L., Sp. Pl. 454. 1753; Gamble, Fl. Madras 1275(892). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Ansari, Fl. Kasaragod Div. 337. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 415. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 256. 2007. *Chamaesyce hirta* (L.) Millisp., Publ. Field Columb. Mus., Bot. Ser. 2: 303. 1909; Ratheesh, Fl. Stud. Wayanad Dist. 727. 2009.

Slender, erect, pubescent herbs about 20-35 cm tall. Leaves decussate, 1-2.5 x 0.7-1.5 cm, broadly oblong to elliptic-lanceolate, apex acute, base obliquely truncate, margin serrulate, hispid on both sides, basally 3-nerved; petiole to 3 mm long. Cyathia aggregated in single or paired axillary clusters. Involucre minute, c. 1 mm long; glands 5, red. Male flowers 4-6, ebracteolate. Female florets laterally pendulous; styles 2-fid from base. Capsule 1.5-2 mm across, pubescent; seeds minute, red, 4-angled, minutely furrowed.

Paripode, KJD 26251

Fl. & Fr.: Throughout the year

Distribution: Rare along the boundaries of Farm.

Euphorbia thymifolia L., Sp. Pl. 454. 1753; Hook.f., Fl. Brit. India 5: 252. 1887; Gamble, Fl. Madras 1276(893). 1925; Manilal & Sivar., Fl. Calicut 257. 1982; Ansari, Fl. Kasaragod Div. 338. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 416. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 261. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 728. 2009. *Chamaesyce thymifolia* (L.) Millsp., Publ. Field Columb. Mus., Bot. Ser. 2: 412. 1916.

Softly hispid prostrate herbs. Leaves opposite, distichous, 2-7 x 2-4 mm, oblong or suborbicular, apex obtuse, base obliquely cordate, margin serrulate, 1-nerved, subsessile. Cyathia in axillary clusters. Involucre campanulate, c. 8 mm long; glands 4. Male flowers 1-4, ebracteolate. Female laterally pendulous; ovary tomentose; style 3-forked from base. Capsule c. 2 mm across, obtusely angled, glabrescent; seeds 4-angular, minutely tuberculate, red.

Narikkadavu, *KJD 26375*

Fl. & Fr.: November-May

Distribution: Near stream side.

EXCOECARIA L.

Syst. Nat., ed. 10. 2: 1288. 1759.

Excoecaria oppositifolia Griff. var. **crenulata** (Wight) Chakrab. & Gangop., J. Econ. Taxon. Bot. 18: 208. 1994; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 291. 2007. *Excoecaria crenulata* Wight, Icon. Pl. Ind. Orient. t. 1865. 1852; Hook.f., Fl. Brit. India 5: 473. 1888; Gamble, Fl. Madras 1345(941). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 417. 1988. *Excoecaria robusta* Hook.f., Fl. Brit. India 5: 474. 1888; Gamble, Fl. Madras 1345(941). 1925.

Trees, up to 8 m high. Leaves opposite, 8-20 x 2-4.5 cm, oblong-lanceolate, elliptic or obovate, apex acuminate, apiculate or subacute, base acute or obtuse, margins shallowly crenate-serrate or entire; lateral nerves, 10-22 pairs, parallel, intercostae reticulate; petiole 5-30 mm long; stipules minute. Flowers unisexual, yellowish-green. Male flowers: in terminal and axillary spikes; bracts broadly ovate, deltoid, triangular, suborbicular. Tepals 3, 1-1.5 x 0.8-1.3 mm, broadly ovate or suborbicular, dentate or erose. Stamens 2 or 3. Female flowers: in axillary or terminal 1-3 flowered clusters; bracts broadly triangular to deltoid. Tepals 3, 2-3.5 x 1.5-3 mm, broadly ovate to triangular, lanceolate to entire.

Ovary superior, 1.5-2 mm across, subglobose, 3-celled, ovules 1 in each cell; styles 3. Fruit a capsule 1-3 cm across; seeds globose.

Mullenpara State Boundary, *KJD 26026*

Fl. & Fr.: February-April

Distribution: Fairly common in evergreen forests of Mullenpara and Kattikkari.

HOMONOIA Lour.

Fl. Cochinch. 637. 1790.

- 1a. Leaf margin serrate; inflorescence less than 5 cm long..... *H. retusa*
1b. Leaf margin entire; inflorescence over 6 cm long..... *H. riparia*

Homonoia retusa (J.Graham ex Wight) Müll.Arg., *Linnaea* 34: 200. 1865; Hook.f., *Fl. Brit. India* 5: 456.1887; Gamble, *Fl. Madras* 1333(933).1925; Ramach., *J. Econ. Taxon. Bot.* 3: 660. 1982; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 419. 1988; N.P. Balakr. & Chakrab., *Fam. Euphorbiaceae India* 137. 2007. *Adelia retusa* J.Graham ex Wight, *Icon. Pl. Ind. Orient.* t.1869. 1852 (Plate 8h).

Shrubs. Leaves alternate, 2-4 x 1-2 cm, oblong to spatulate, apex obtuse to retuse, margin serrate to dentate; lateral nerves ca. 4 pairs; petiole to 3 mm. Spikes to 1 cm long. Male 4 mm across. Tepals 3, glabrescent, 2.5 mm. Anthers 0.2 mm. Female flowers 3 mm across: Tepals 6-8, linear, 2 mm, acute. Ovary 3-lobed; styles 3 mm, recurved. Capsule ca. 3.5 mm across.

Valayamchal, *KJD 31477*

Fl. & Fr.: January-August

Distribution: Rare in semi-evergreen forests of Valayamchal. Endemic to Peninsular India.

Homonoia riparia Lour., *Fl. Cochinch.* 637. 1790; Hook.f., *Fl. Brit. India* 5: 455. 1887; Gamble, *Fl. Madras* 1333(933). 1925; Ansari, *Fl. Kasaragod Div.* 340. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 420. 1988; N.P.Balakr. & Chakrab., *Fam. Euphorbiaceae India* 137. 2007; Ratheesh, *Fl. Stud. Wayanad Dist.* 741. 2009. *Adelia nerifolia* Heyne ex Roth, *Nov. Pl. Sp.* 375. 1821.

Large shrubs; branchlets pubescent, reddish. Leaves spiral, closely packed, to 18 x 2 cm, linear-oblong, acute at either ends, penni-nerved, covered with yellow scales below and pubescent along nerves; petiole 1 cm long, tomentose; stipule filiform. Flowers dioecious in axillary 10-15 cm long racemes. Male flowers 3 mm across. Tepals 2-5, glabrous, ciliate along the margins, yellowish red. Stamens many, free. Female flowers sessile, densely packed; bracts ovate. Tepals

2 mm long, lanceolate, ciliate. Ovary densely hairy; styles 3, spreading, linear. Capsule 5 mm across, globose, hairy.

Chavachi, KVB 31608

Fl. & Fr.: December-May

Distribution: Along the banks of streams and Rivers.

MACARANGA Thouars

Gen. Nov. Madagasc. 26. 1806.

Macaranga peltata (Roxb.) Müll.Arg. in DC. Prodr. 15: 1010. 1866; Gamble, Fl. Madras 1326(928). 1925; Manilal & Sivar., Fl. Calicut 259. 1982; Ansari, Fl. Kasaragod Div. 341. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 421. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 142. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 742. 2009. *Osyris peltata* Roxb., Fl. Ind. 3: 755. 1832. *Mappa peltata* (Roxb.) Wight, Icon. Pl. Ind. Orient. t. 817. 1844-45. *Macaranga roxburghii* Wight, Icon. Pl. Ind. Orient. t. 1949, f.4. 1853; Hook.f., Fl. Brit. India 5: 448. 1887. *Macaranga tomentosa* Wight, Icon. Pl. Ind. Orient. t. 1949, f.1. 1853.

Dioecious trees, to 18 m high; bark greyish-brown; exudation red, gummy. Leaves alternate, 11-25 x 9-20 cm, ovate-orbicular, deltoid-ovate, ovate or orbicular, apex acute or acuminate, base peltate; lamina 8-10 ribs from base, palmate, prominent beneath; lateral nerves 7-8 pairs, parallel, regular, prominent, intercostae scalariform, much prominent; margin glandular; petiole 12-35 mm long. Flowers unisexual, greenish-yellow. Male flowers: in axillary branched, tomentose, panicles, concealed in large bracts; Tepals 3, minute, obovate, Cuneate. Stamens 2-8, free, connate below. Female flowers: in panicles simpler than in males, with larger bracts. Tepals 4, basally connate at base. Ovary 2-6-celled, densely glandular, ovule one in each cell; style lateral; stigma sessile. Fruit a capsule, hairy, glandular, black; seed one, black.

Kariyenkappu, KJD 25591

Fl. & Fr.: January-February

Distribution: Common in degraded forest areas and plantations.

MALLOTUS Lour.

Fl. Cochinch. 601. 1790.

- 1a. Capsule smooth with red gland..... *M. philippensis*
- 1b. Capsule echinate or muricate without red glands 2
- 2a. Leaves alternate, peltate..... *M. tetracoccus*
- 2b. Leaves opposite, not peltate..... 3

- 3a. Young capsule with dense long soft pubescent spines *M. resiosus* var. *muricatus*
 3b. Young capsule with short stiff spines *M. beddomei*

Mallotus beddomei Hook.f., Fl. Brit. India 5: 438. 1887; Gamble, Fl. Madras 1323(925). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 146. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 744. 2009.

Large shrubs. Leaves alternate, to 25 x 9 cm, elliptic to oblanceolate, long-acuminate at apex, base acute, dentate along the margins, glabrous; nerves 5 or 6 pairs, nervules parallel, prominent; petioles unequal, 0.5-3 cm long. Male racemes 5-10 cm long, shortly tomentose. Flowers many, clustered. Tepals 3 x 2 mm, ovate, glabrous. Stamens many. Ovary 2-4 celled Capsule 1.2 cm across, with soft echinate process.

Chavachi, *KJD 31805*

Fl. & Fr.: October-April

Distribution: Fairly common in evergreen forests of Chelachode, Chavachi, Kattikkari and Monnamthode; semi-evergreen forests of Paripode. Endemic to southern Western Ghats.

Mallotus philippensis (Lam.) Müll.Arg., Linnaea 34: 196. 1865; Hook.f., Fl. Brit. India 5: 442. 1887, "philippinensis"; Gamble, Fl. Madras 1322(924). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 342. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 422. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 150. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 744. 2009. *Croton philippensis* Lam., Encycl. 2: 206. 1786. *Mallotus philippensis* (Lam.) Müll.Arg. var. *tomentosus* Gamble, Fl. Madras 1322(924). 1925.

Dioecious trees, to 12 m high; bark pale brown. Leaves alternate, 5-20 x 2-8 cm, ovate or ovate-lanceolate, apex acuminate or acute, base acute or round, greyish pubescent to fulvous tomentose beneath; 3-ribbed from base, lateral nerves upto 6 pairs, pinnate, prominent, intercostae scalariform; petiole 7-60 mm long, fulvous-pubescent with 2 small sessile glands on each side of the submit; stipules lateral. Flowers unisexual, brick red, in rusty puberulous, terminal spicate panicles. Male flowers: 4.5 mm across. Tepals 4, lanceolate. Stamens many. Female flowers: 4 mm across. Tepals 3 or 4, thicker than in males, ovate-lanceolate. Ovary with red glands, superior, 3-celled, ovules one in each cell; styles 3, to 3.5 mm long, papillose. Fruit a capsule, 3-lobed, loculicidally 3 valved, densely red-glandular, pubescent; seeds 1-4.

Pookundu, *KJD 25468*

Fl. & Fr.: October-March

Distribution: Common in semi-evergreen forests of Pookundu to Pothanplavu and Paripode; evergreen forests of Meenmutty.

Mallotus resinus (Blanco) Merr. var. **muricatus** (Wight) Balakr. & Chakrab., Rheedia 1:39.1991; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 151.2007. *Claoxylon muricatus* Wight, Icon. Pl. Ind. Orient. t.1886.1852. *Mallotus subramanyamii* J.L.Ellis, Bull. Bot. Surv. India 25: 199. 1985. *Mallotus resinus* (Blanco) Merr. var. *subramanyamii* (J.L.Ellis) Chakrab., J. Econ. Taxon. Bot. 6: 704. 1985.

Shrubs or trees, up to 8 m tall; branchlets flattened. Leaves opposite, unequal, short-petioled, penninerved, glabrous, mostly cuneate-obovate to elliptic and distally repand-dentate with a few conspicuous macular glands near the base. Staminate inflorescences not branched; flowers clustered per bracteole; bracteoles with entire margin. Pistillate inflorescences not branched. Capsules with long, slender spines, glabrous.

Chelachode, KVB 31231

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Chavachi, Chelachode and Kannadivechakunnu.

Mallotus tetracoccus (Roxb.) Kurz, J. Asiat. Soc. Bengal Pt. 2, Nat. Hist. 41: 245. 1873; Ansari, Fl. Kasaragod Div. 342. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 423. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 745. 2009. *Rottlera tetracocca* Roxb., Fl. Ind. ed. 1832. 3: 826. 1832. *Rottlera ferruginea* Roxb., Fl. Ind. 3: 828. 1832. *Mallotus ferrugineus* (Roxb.) Müll.Arg. in DC. Prodr. 15: 982. 1866; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 146. 2007. *Rottlera albus* var. *occidentalis* Hook.f., Fl. Brit. India 5: 429. 1887; Gamble, Fl. Madras 1321(924). 1925.

Dioecious trees, to 20 m high; bark grey. Leaves alternate, 9-21 x 7.5-20 cm, orbicular or deltoid-ovate, apex acuminate, base truncate, peltate, subcordate or round tomentose below when matured; usually 5-ribbed from base, lateral nerves 6-8 pairs, pinnate, intercostae scalariform, prominent; petiole 4.5-10 cm long, with 2 large glands at the top, stellate tomentose; stipules lateral. Flowers unisexual, yellow, in terminal branching tomentose spicate panicles. Male flowers: 7 mm across. Tepals 4, 2 mm, ovate. Stamens many, crowded on a fleshy receptacle; filaments to 3 mm. Female flowers: 5 mm across. Tepals 4, 2 mm, connate at base. Ovary superior, 0.8 x 0.7 cm, 3-4 locular, densely stellate hairy,

ovule one in each cell; style 3; stigma acute. Fruit a capsule 7-8 mm across, loculicidal 3-4 valved, echinate; seeds angular, black.

Meenmutty, KVB 31289

Fl. & Fr.: July-April

Distribution: Fairly common in evergreen forests of Meenmutty and Chavachi.

MICROCOCCA Benth.

in Hook. Niger Fl. 503. 1849.

- 1a. Perennial shrubs; leaves to 15 cm long; racemes to 12 cm long.....*M. beddomei*
- 1b. Annual herbs; leaves under 4 cm long; racemes to 7 cm long.....*M. mercurialis*

Micrococca beddomei (Hook.f.) Prain, Ann. Bot. (London) 25: 630. 1911; Gamble, Fl. Madras 1328(929). 1925. *Claoxylon beddomei* Hook.f., Fl. Brit. India 5: 413. 1887; Susila Rani & Balakr., Rheedia 5: 128. 1995; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 130. 2007 (Plate 8i).

Herbs. Leaves alternate, 3-4 x 2.5 cm, ovate or ovate-lanceolate, apex acuminate, base acute, serrate, puberulous, lateral nerves ca. 4 pairs; petiole to 2 cm. Spikes lax, slender, to 5 cm long; bracts minute. Perianth lobes of male ovate; of female 3, lanceolate. Stamens many; filaments erect. Ovary 3-celled, ovules one; style free. Capsule 3-lobed, 5 mm across, glabrescent; seeds 1.2 mm across.

Kattikkari, KVB 31556

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests of Kattikkari and Kannadivechakunnu. Endemic to southern Western Ghats.

Micrococca mercurialis (L.) Benth. in Hook. Niger Fl. 503. 1849; Gamble, Fl. Madras 1328(929). 1925; Manilal & Sivar., Fl. Calicut 268. 1982; Ansari, Fl. Kasaragod Div. 344. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 746. 2009. *Tragia mercurialis* L., Sp. Pl. 980. 1753. *Claoxylon mercurialis* Thwaites, Enum. Pl. Zeyl. 271. 1861; Hook.f., Fl. Brit. India 5: 412. 1887; Susila *et al.*, Rheedia 5(2):131.1995; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 131. 2007.

Annual herbs. Leaves alternate, 2-4x 1-2.5 cm, ovate or ovate-lanceolate, apex acute or shortly acuminate, base rounded, serrate on margins, puberulous, membranous; petiole to 2.5 cm long. Flowers in interrupted clusters, on axillary racemes, often drooping; bracts minute. Male flowers minute, c. 1.5 mm across. Perianth 1-seriate, 3-lobed, lobes ovate. Stamens 3-5, free, with 6-8-ciliate

glandular scales between filaments. Female flowers ca 2 mm across. Perianth 3 lobbed, lanceolate, shortly connate. Ovary 3-lobed, sparsely pubescent, 3-locular; ovules 3; styles 3; stigma linear, plumose. Capsule 4-5 mm across, 3-lobed, glabrescent; seeds c. 1mm across, globose, minutely arillate.

Paripode, *KJD 25599*

Fl. & Fr.: June-December

Distribution: Along the boundaries near Farm.

MICROSTACHYS A.Juss.

Euphorb. Gen.: 48. 1824.

Microstachys chamaelea (L.) Müll.Arg., *Linnaea* 32: 95. 1863; N.P. Balakr. & Chakrab., *Fam. Euphorbiaceae India* 293. 2007; Ratheesh, *Fl. Stud. Wayanad Dist.* 747. 2009. *Tragia chamaelea* L., *Sp. Pl.* 981. 1753. *Sebastiana chamaelea* (L.) Müll.Arg. in DC. *Prodr.* 15: 1175. 1866; Hook.f., *Fl. Brit. India* 5: 475. 1888; Gamble, *Fl. Madras* 1344(940). 1925; Ansari, *Fl. Kasaragod Div.* 347. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 426. 1988.

Erect or diffuse herbs. Leaves alternate, 2-4.5 x 0.7-1 cm, oblong-lanceolate, apex obtuse or acute, base obtuse, margin minutely dentate; petiole to 3 mm long. Flowers in monoecious slender axillary spikes, 1.5-2.5 cm long. Male flowers minute, c. 1.5 mm across in clusters of 3. Tepals 5, connate. Stamens 2-4, anthers globose. Female flowers solitary at base of spike, c. 1 mm across. Tepals 3, ovate. Ovary 3-lobed, echinate without; ovule 1 in each cell; style 3, connate at base. Capsule 3-lobed each with two rows of soft prickles on the back, 4-6 mm across; seeds 1-1.5 mm long, oblong, carunculate.

Chavachi, *KJD 25600*

Fl. & Fr.: July-December

Distribution: Rare along the boundaries of forests at Chavachi.

PARACROTON Miq.

Fl. Ned. Ind. 1(2): 382. 1859.

Paracroton integrifolius (Airy Shaw.) N.P.Balakr. & Chakrab., *Kew Bull.* 48: 718. 1993; N.P. Balakr. & Chakrab., *Fam. Euphorbiaceae India* 218. 2007; Ratheesh, *Fl. Stud. Wayanad Dist.* 747. 2009. *Ostodes integrifolius* Airy Shaw, *Kew Bull.* 16: 362. 1963. *Ostodes zeylanicum* var. *minor* sensu Gamble, *Fl. Madras* 1336(935). 1925, non (Thwaites) Hook.f. 1887. *Fahrenheitia integrifolia* (Airy Shaw) Airy Shaw, *Kew Bull.* 20: 410. 1966; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 417. 1988.

Trees, to 18 m high; bark brown. Leaves alternate, 10-16 x 4-7 cm, elliptic or elliptic-obovate, apex shortly acuminate, base cuneate; lateral nerves 10-13 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole 10-25 mm long, with 4 glands at the apex of the petiole 2 on either sides; stipules lateral. Flowers unisexual, white, in terminal and axillary racemes. Tepals 10 in 2 series; outer 5 lobed, unequal; inner 5 petaloid, free. Stamens 10-20, free; connective broad. Ovary superior, glabrous, 3-celled, 4 mm across, strigose, ovules 1 in each cell; styles 3, short, bifid, disk of 5-10 glands. Fruit a capsule, 2 cm across, 6-ribbed, subglobose, tomentose, breaking into 3, 2-valved cocci; seeds mottled.

Pothurumi, *KVB 31615*; Kattikkari State Boundary, *KJD 26063*

Fl. & Fr.: November-December

Distribution: Fairly common in evergreen forests of Pothurumi, Kattikkari and Mullenpara.

TRAGIA L.

Sp. Pl. 980. 1753.

1a. Leaves cordate at base; fruiting perianth lobes sparsely hispid *T. montana*

1b. Leaves acute or rounded at base; fruiting perianth lobes densely hispid *T. involucrata*

Tragia involucrata L., Sp. Pl. 980. 1753; Hook.f., Fl. Brit. India 5: 465. 1888, p.p.; Gamble, Fl. Madras 1332(931). 1925; Manilal & Sivar., Fl. Calicut 267. 1982; Ansari, Fl. Kasaragod Div. 348. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 427. 1988; N.P. Balakr. & Chakrab., Rheedia 16: 19. 2006 & Fam. Euphorbiaceae India 181. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 755. 2009.

Slender, twining herbs with stinging hairs. Leaves alternate, 6-10 x 3-5.5 cm, ovate or elliptic, base acute or rounded, margin serrate, apex acuminate, hispidulous on both sides; petiole to 2.5 cm long. Spikes axillary, monoecious, to 2 cm long. Male flowers above, female flowers 1-2, at the base. Male flowers c. 1.5 mm across; bracts spatulate. Tepals 3, spreading. Stamens 3, anthers subsessile. Female flowers c. 3 mm across. Tepals 6, c. 1 mm long, ovate-lanceolate, enlarged and spreading in fruits; style 3, spreading. Capsule c. 0.6 x 1 cm, 3-lobed, hispid; seeds globose.

Chavachi, *KJD 22538*

Fl. & Fr.: July-December

Distribution: Rare in forest plantations and road side.

Tagia montana (Thwaites) Müll.Arg., Linnaea 34: 183. 1856 & in DC. Prodr. 15: 944. 1866; N.P. Balakr. & Chakrab., Rheedeia 16: 20. 2006 & Fam. Euphorbiaceae India 182. 2007. *Tagia involucrata* L. var. *montana* Thwaites, Enum. Pl. Zeyl. 270. 1861. *Tagia involucrata* L. var. *cordata* Müll.Arg. in DC. Prodr. 15: 943. 1866; Hook.f., Fl. Brit. India 5: 465. 1888. *Tagia muelleriana* Pax & K.Hoffm. in Engl., Pflanzenr. Euphorb.-Plukenetiiin.-Epiprin. -Ricin. 80. 1919; Gamble, Fl. Madras 1332(932). 1925.

Slender twiners; young shoots densely hirsute. Leaves alternate, 4-12 x 2-6, ovate-cordate to suborbicular, to ovate-elliptic, cordate to subcordate at base at base, acuminate at apex, dentate-serrate along the margins, hispid; 3-nerved at base; petiole 0.5-3 cm long; stipules lanceolate, 3-4 mm long. Racemes terminal and leaf opposed, 3-6 cm long with 1 or 2 female flowers at the base and several male towards the distal portion. Male flowers 2 mm across Tepals 3, ovate to suborbicular 1 mm long. Stamens 3. Female flowers 5 mm. Tepals 6, ovate, fimbriate. Ovary subglobose, 3-lobed, densely hispid. Capsule depressed globose, 5 x 10 mm, deeply 3-lobed, enclosed by the fruiting tepals; seeds 3, globose.

Ambalappara, NS & KJD 31959

Fl. & Fr.: August-January

Distribution: Fairly common in evergreen forests of Ambalappara and Mullenpara. Endemic to Western Ghats.

TREWIA L.

Sp. Pl. 1193. 1753.

Trewia nudiflora L., Sp. Pl. 1193.1753; Hook.f., Fl. Brit. India 5: 423. 1887; Gamble, Fl. Madras 1319(922). 1925; Manilal & Sivar., Fl. Calicut 271. 1982; Ansari, Fl. Kasaragod Div. 348. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 428. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 155. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 755. 2009. *Trewia polycarpa* Benth. in Benth. & Hook.f., Gen. Pl. 3:318.1880; Hook.f., Fl. Brit. India 5:424.1887; Gamble, Fl. Madras 1319 (923). 1925.

Dioecious trees to 20 m; bark greyish-brown. Leaves opposite, 6-20 x 9-15 cm, broadly ovate or deltoid, apex acuminate to cuspidate or caudate-acuminate, base truncate, subcordate or cordate, glaucous beneath; 3-ribbed from base, prominent, lateral nerves 3-6 pairs, intercostae scalariform; petiole 3-12 cm long; stipules inter petiolar. Flowers unisexual, pale green. Male flowers; 3-5 mm across, numerous on 10-20 cm long peduncle; bracts ovate-lanceolate. Tepals globose, ovate, splitting into 3-4 broad, 4-7 x 3-4 mm. Stamens many, clustered

on a convex receptacle. Female flowers; 5-9 mm across, 4-5 on axillary racemes. Tepals 3-5, 4-5 mm long, broadly ovate, densely tomentose beneath. Ovary superior, 2-4-loculed, ovule one in each cell; styles 3, connate below. Fruit a capsule, 3-4 loculed; seeds globose, ovoid.

Chavachi, *KVB 31610*; Pothanplavu, *NS & KVB 31330*

Fl. & Fr.: May-November

Distribution: Fairly common in evergreen forests of Chavachi, semi-evergreen forests of Pothanplavu and Paripode near River banks.

HYPERICACEAE

HYPERICUM L.

Sp. Pl. 783. 1753.

- 1a. Stout shrubs; style 5, flowers 5 cm across *H. mysurense*
- 1b. Slender herbs; style 3, flowers 1 cm across 2
- 2a. Leaves sagittate at base, ribbed from base *H. japonicum*
- 2b. Leaves rounded at base, penninerved *H. wightianum*

Hypericum japonicum Thunb. in J.A.Murray, Syst. Veg. ed. 14: 702. 1784; Hook.f., Fl. Brit. India 1: 256. 1874; Gamble, Fl. Madras 70(51). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 53. 1988; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. Ind. 3: 69. 1993; K.Vivek. in P. Daniel, Fl. Kerala 1: 326. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 132. 2009.

Erect herbs. Leaves, simple, opposite, decussate, 8-10 x 4 mm, lanceolate, apex acute, base auricled, 3-ribbed, glabrous. Flowers solitary axillary or in terminal cymes; yellow, pedicels 5 mm long. Sepals 3 x 1 mm, oblong, obtuse, many-ribbed. Petals yellow, 4 x 1.5 mm, oblong. Stamens many, free. Ovary 1-celled, ellipsoid, styles 3, 1 mm long. Capsule 3 x 2 mm, smooth; seeds many, 0.5 x 0.3 mm, oblong 7-ribbed.

Ambalappara, *KJD 31498*

Fl. & Fr.: December-July

Distribution: Fairly common in evergreen forests of Ambalappara near small streams and water bodies.

Hypericum mysurense Heyne ex Wight & Arn., Prodr. Fl. Ind. Orient. 99. 1834; Hook.f., Fl. Brit. India 1: 253. 1874; Gamble, Fl. Madras 70(50). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 53. 1988; S.N. Biswas in B.D. Sharma &

Sanjappa, Fl. Ind. 3: 71. 1993; K.Vivek. in P. Daniel, Fl. Kerala 1: 326. 2005.

Norisca mysurensis (Heyne ex Wight & Arn.) Wight, Icon. Pl. Ind. Orient. t. 56.1838.

Shrubs. Leaves opposite, decussate, 20-30 x 7 mm, lanceolate, acute at both ends, closely placed, sessile; nerves 2 or 3 pairs, glabrous. Flowers yellow, 5-6 cm across, in terminal cymes, 2-3 together. Sepals to 1 cm long, lanceolate. Petals yellow, 2-2.5 x 1 cm, obovate, obtuse, glabrous. Stamens arranged in 5 bundles, filaments 1 cm long. Ovary 5-celled, styles 5, 10 mm long. Capsule 15 mm long, glabrous.

Ambalappara, KVB 31749

Fl. & Fr.: Throughout the year

Distribution: Common in grasslands of Ambalappara.

Hypericum wightianum Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 99. 1834; Gamble, Fl. Madras 70(50). 1915; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. Ind. 3: 78. 1993; K.Vivek. in P. Daniel, Fl. Kerala 1: 327. 2005. *Hypericum napaulense* sensu Dyer in Hook.f., Fl. Brit. India 1: 256. 1874,p.p. non Choisy 1824. *Hypericum humifusum* sensu Dyer in Hook.f., Fl. Brit. India 1: 255. 1874,p.p. non L. 1753; Gamble, Fl. Madras 70(51). 1915; S.N. Biswas in B.D. Sharma & Sanjappa, Fl. Ind. 3: 67. 1993.

Diffuse herbs; stems reddish. Leaves opposite, spiral, 12 x 7 mm, oblong, obtuse at apex, rounded at base, purplish coloured; nerves 2-3 pairs. Flowers in terminal cymes, 2 or 3 together yellow. Sepals 4 x 2.5 mm, oblong, acute. Petals yellow, 5 mm long, obovate, obtuse. Stamens 3-adelphous. Ovary glabrous, styles 3, 3 mm long. Capsule 4.5 x 3 mm, ellipsoid; seeds 0.8 x 0.4 mm, oblong, not ribbed, epidermal cells transversally oblong in vertical rows.

Ambalappara, KJD 26321

Fl. & Fr.: Through out the year

Distribution: Fairly common in open areas in the evergreen forests of Ambalappara.

PUTRANJIVACEAE

DRYPETES Vahl

Eclog. Amer. 3: 49. 1807.

- 1a. Fruit sessile; leaves remotely serrate *D. confertiflora*
- 1b. Fruit distinctly pedicelled; leaves entire 2
- 2a. Fruit pedicel less than 1 cm long *D. wightii*
- 2b. Fruit pedicel over 1.5 cm long *D. venusta*

Drypetes confertiflora (Hook.f.) Pax & K.Hoffm., Pflanzenr. (Engler) Euphorb.-Phyllanthoid.-Phyllanth. 246. 1922; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 330. 2007. *Cyclostemon confertiflorus* Hook.f., Fl. Brit. India 5: 341. 1887; Gamble, Fl. Madras 1302(911). 1925 (Plate 8j).

Trees, to 25 m high; bark grayish. Leaves alternate, 6-22 x 2.5-7.5 cm, oblong or elliptic-oblong, apex obtusely acuminate, base oblique, margin entire or distantly serrate; lateral nerves 7-10 pairs, pinnate, prominent, intercostae reticulate, prominent; petiole 5-12 mm long; stipules lateral, small. Flowers unisexual, axillary but usually in clusters on old wood. Male flowers: Tepals 5-6, 4-6 x 3.5-5.5 mm, suborbicular, white, ciliate. Stamens 15-20, inserted around disk. Disk impressed, large, radiately ribbed with inflexed marginal lobe. Female flowers: nearly sessile. Ovary superior, brown tomentose, 2-celled, ovules 2. Fruit 3.5-5 cm across, subglobose, somewhat flattened, pubescent, 2-locular; endocarp fleshy.

Kariyenkappu, NS & KJD 31995

Fl. & Fr.: February-May

Distribution: Rare in plantations of Kariyenkappu, semi-evergreen forests of Chulikandam, Pothanplavu and Bhoothamkallu. Endemic in southern Western Ghats; Conservation status: Vulnerable.

Drypetes venusta (Wight) Pax & K.Hoffm., Pflanzenr. (Engler) Euphorb.-Phyllanthoid.-Phyllanth. 268. 1922; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 334. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 735. 2009. *Astylis venusta* Wight, Icon. Pl. Ind. Orient. t. 1992. 1853. *Hemicyclia venusta* (Wight) Thwaites, Hooker's J. Bot. Kew Gard. Misc.. 7: 272. 1855; Hook.f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Madras 1300(909). 1925. *Drypetes elata* (Bedd.) Pax. & K.Hoffm., Pflanzenr. (Engler) Euphorb.-Phyllanthoid.-Phyllanth. 268. 1922; Ramach. & V.J. Nair, Fl. Cannanore Dist. 413. 1988. *Hemicyclia elata* Bedd., Fl. Sylv. S. India: t. 279. 1872; Hook.f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Madras 1300(909). 1925.

Deciduous trees, to 30 m high; bark grayish. Leaves alternate, 6-15 x 2-6.4 cm, elliptic, elliptic-lanceolate or elliptic-oblong, apex obtusely acute, obtusely acuminate or acute, base oblique, acute; lateral nerves 7-15 pairs, pinnate, prominent, intercostae reticulate, prominent; petiole 3-20 mm long; stipules small. Flowers unisexual, greenish-yellow, 5-8 mm across. Male flowers: 3-6 in axillary clusters. Tepals 4, 4 x 2 mm, oblong, obtuse, hispid outside. Stamens 6-10; filaments 3 mm long, free, glabrous; disk lobulate, villous. Female flowers:

solitary or in pairs, axillary. Tepals 4, 4 x 2 mm, oblong, obtuse, hispid outside. Ovary ovoid, 1-celled; stigma mushroom shaped; ovules 2, pendulous. Fruit a drupe, obovoid, 1.5-2.5 cm long, greenish-yellow, drooping; seed solitary, covered with pulpy mucilage.

Meenmutty, KVB 31273

Fl. & Fr.: November-July

Distribution: Common in evergreen forests of Meenmutty, Moonamthode, Chavachi, Chelachode, Pothurumi, Ambalappara region, Kannadivehakunnu and; semi-evergreen forests of Narikkadavu and Paripode. Endemic to Western Ghats

Drypetes wightii (Hook.f.) Pax & K.Hoffm., Pflanzenr. (Engler) Euphorb.-Phyllanthoid.-Phyllanth. 273. 1922; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 334. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 735. 2009. *Hemicyclia wightii* Hook.f., Fl. Brit. India 5: 339. 1887; Gamble, Fl. Madras 1300(909). 1925.

Trees to 18 m tall; bark greyish-white. Leaves alternate, 4-10.5 x 1.5-3.5 cm, elliptic, elliptic-oblong or elliptic-lanceolate, apex acuminate, base oblique or acute; lateral nerves 6-9 pairs, pinnate, prominent; intercostae reticulate, prominent; petiole 2-8 mm long; stipules small. Flowers unisexual, yellowish, in axillary clusters or in the axils of fallen leaves. Male flowers: Tepals 4-5, 3 x 2-2.5 mm, broadly elliptic to suborbicular, tomentellous outside. Stamens 6-10, 1-1.5 mm long; filaments free. Female flowers: Tepals 4-5, 3-4 x 2.5-3.5 mm, suborbicular, tomentellous outside; disk annular. Ovary 2 x 1 mm, ellipsoid, 1-locular, ovules 2, sparsely puberulous to glabrous; stigma reniform. Fruit a capsule 17-20 x 15 mm, ovoid, ellipsoid or obovoid, smooth, glabrous; pedicels 10-12 mm long.

Way to Meenmutty, KJD 22599

Fl. & Fr.: October-March

Distribution: Fairly common in Deciduous forests of Pothanplavu to evergreen forests of Meenmutty. Endemic to Western Ghats.

LINACEAE

HUGONIA L.

Sp. Pl. 2: 675. 1753.

Hugonia bellii Sedgw., Indian Forester 46: 424. 1920; Ramach. & V.J. Nair, Fl. Cannanore Dist. 74. 1988; Hajra in B.D. Sharma & Sanjappa, Fl. Ind. 3: 574. 1993; J.L. Ellis & W. Arisdason in P. Daniel, Fl. Kerala 1: 506. 2005 (Plate 8k).

Scandent shrubs, densely tomentose. Leaves alternate, 7-20 x 2-7 cm, narrowly obtuse or acute at apex, tapering at base, ferruginous-tomentose; nerves conspicuous on both surfaces; petioles 6-11 mm long, tomentose; stipules linear, lacinate, ca 15 mm long. Flowers in axillary in groups of 2 or more. Lower peduncles modified into circinate hooks; upper ones ca 15 mm long; bracts ca. 1 cm long. Sepals ovate, acute, 6 x 5 mm. Petals ca. 15 mm long, yellow, withering quickly. Stamens 10, 10 mm long; filaments unequal. Ovary globose; styles filiform; stigma 2-lobed. Drupes globose, ca 2 mm, longitudinally striate, 10-loculed and dark brown; seeds compressed.

Chavachi, NS & KVB 31304

Fl. & Fr.: December-March

Distribution: Common in semi-evergreen forests of Narikadavu and Kariyenkappu and evergreen forests of Chavachi.

Endemic to southern Western Ghats.

PASSIFLORACEAE

- 1a. Flowers unisexual, in pedunculate cymes *Adenia*
1b. Flowers bisexuals, axillary, solitary *Passiflora*

ADENIA Forssk.

Fl. Aegypt.-Arab. 77. 1775.

Adenia hondala (Gaertn.) W.J.de Wilde, *Blumea* 15: 265. 1967; Ansari, *Fl. Kasaragod Div.* 172. 1985; Rao *et al.*, *J. Econ. Taxon. Bot.* 11: 243. 1987; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 197. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 386. 2009. *Granadilla hondala* Gaertn., *Fruct. Sem. Pl.* 2: 480. t.180.f.10. 1791. *Adenia palmata* (Lam.) Engl., *Bot. Jahrb. Syst.* 14: 375. 1892; Gamble, *Fl. Madras* 525(371). 1919. *Modecca palmata* Lam., *Encycl.* 4: 209. 1797; Hook.f., *Fl. Brit. India* 2: 603. 1879.

Climbers with tuberous roots, tendrils simple. Leaves palmately 3-5-lobed, lobes to 16 x 6 cm, oblong, membranous, with large circular sessile glands between lobes; petiole to 8 cm long. Flowers monoceous, in axillary cymes, 10 mm across. Calyx 13 mm long, lobes 5, ovate. Petals 5, 13 x 2 mm, linear-oblong, ciliate, attached at the rim of calyx tube. Stamens 5, free, staminodes in female flowers 5, free. Ovary stipitate, globular, superior, 1-celled; ovules many, parietal, style 1, 3-fid at apex. Capsule 5 cm across, globose, 3-valved.

Near Farm, KVB 31202; 'S' Valvu, NS & KVB 31397

Fl. & Fr.: March-August

Distribution: Common in semi-evergreen forests of Valayamchal and evergreen forests of Cross way, Chavachi and Moonamthode.

PASSIFLORA L.

Sp. Pl. 955. 1753.

Passiflora foetida L., Sp. Pl. 959. 1753; Gamble, Fl. Madras 524(370). 1919; Manilal & Sivar., Fl. Calicut 118. 1982; Ansari, Fl. Kasaragod Div. 172. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 197. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 387. 2009.

Herbaceous vines; stem, petioles and leaves glandular-hispid. Leaves roughly to deeply 3-5-lobed, 5-7 x 3-5 cm, suborbicular to ovate, cordate at base, lobes acuminate, adpressed glandular-pubescent. Petiole to 1.5 cm long; Stipules deeply dissected to glandular appendaged. Bracts and bracteoles deeply pinnatisect, glandular-pubescent. Flowers axillary, often solitary, 3-4 cm across. Calyx lobes 5, 1-1.5 x 0.6-0.8 cm, broadly ovate, apically spurred. Petals white, shorter than calyx lobes. Coronal segments in 2 whorls; outer coronal hairs many, 0.8-1 cm long; inner ones 2-3 mm long. Gynandrophore 5 mm long. Stamens 5. Ovary 1-celled; ovules many; styles 3; stigma capitate. Berries 1.5-2 cm diam., subglobose, subtended by the bracts and bracteoles; seeds many.

Near Farm, *KJD 26273*

Fl. & Fr.: July-December

Distribution: Near boundaries of Farm.

Passiflora edulis Sims in previous settlements.

PHYLLANTHACEAE

- | | |
|---|-------------|
| 1a. Leaves 3-foliolate..... | Bischofia |
| 1b. Leaves | 2 |
| 2a. Perianth uniseriate..... | 3 |
| 2b. Perianth 2-seriate..... | 9 |
| 3a. Branchlets phyllanthoid..... | 4 |
| 3b. Branchlets not phyllanthoid..... | 5 |
| 4a. Disk absent or indistinct | Breynia |
| 4b. Disk present..... | Phyllanthus |
| 5a. Male and female flowers in fascicles or solitary | 6 |
| 5b. Male flowers in elongated racemes or spikes, female in spikes racemes or cymes..... | 7 |
| 6a. Fruits dry, dehiscent | Glochidion |
| 6b. Fruit fleshy, indehiscent..... | Flueggea |
| 7a. Ovary 1-celled; disk annular, Fruit a drupe | Antidesma |
| 7b. Ovary 2-4 celled; disk absent, Fruit a capsule..... | 8 |

- 8a. Male flowers in catkins, female in short cymes Aporosa
- 8b. Male and female flowers in elongated racemes, often cauliflorous..... Baccaurea
- 9a. Ovary 2-celled; fruit a drupe with 1-2 pyrenes; lateral nerves of leaves close and parallel.....Bridelia
- 9b. Ovary 3-celled; fruit a capsule; lateral nerves of leaves not parallel..... Actephila

ACTEPHILA Blume

Bijdr. Fl. Ned. Ind. 581. 1826

Actephila excelsa (Dalzell) Müll.Arg., Linnaea 32: 78. 1863; Gamble, Fl. Madras 1283(898). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 397. 2007. *Anomospermum exsulsum* Dalzell, Hooker's J. Bot. Kew Gard. Misc.. 3: 228. 1851. *Actephila neilgherrensis* Wight, Icon. Pl. Ind. Orient. t. 1910. 1852.

Large shrubs to small trees; young stem, bracts and calyx lobes hispid without. Leaves opposite, 7-20 x 2-5 cm, lanceolate to oblanceolate, acute at apex, attenuate at base; petioles 0.5-1 cm long. Flowers in axillary clusters; male many, short-pedicelled; female 1-2, long-pedicelled. Male flowers: pedicels 0.3-0.4 cm long. Calyx lobes 5, hairy without Petals 5, smaller than calyx, white; disk lobed. Stamens 3-6, attached on the disk, filaments united to form a gonophore; pistillode within gonophore. Female flowers: pedicel 1-1.3 cm long. Ovary ovoid, 0.4-0.5 cm long, 0.3-0.4 cm across, 3-celled; ovules 2 in each cell; styles 3, each again 2-fid to form 6-stigmatic lobes, lobes papillate. Capsule depressed globose, 2-2.5 cm across, 6-lobed.

Kattikkari, NS & KVB 31339

Fl. & Fr.: April-May

Distribution: Rare in evergreen forests of Kattikkari.

ANTIDESMA L.

Sp. Pl. 1027. 1753.

- 1a. Stamens 2 *A. acidum*
- 1b. Stamens 3-5..... 2
- 2a. Female flowers sessile, closely arranged *A. alexiteria*
- 2b. Female flowers pedicelled, distantly arranged *A. montanum*

Antidesma acidum Retz., Observ. Bot. 5: 30. 1788; Ramach. & V.J. Nair, Fl. Cannanore Dist. 408. 1988; Chakrab. & Gangop., J. Econ. Taxon. Bot. 24: 8. 2000; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 303. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 719. 2009. *Stilago diandra* Roxb., Pl. Coromandel 2: 35,

t. 166. 1802 & Fl. Ind. 3: 759. 1832. *Antidesma diandrum* (Roxb.) Spreng., Syst. Veg. 1: 826.1825; Hook.f., Fl. Brit. India 5: 361. 1887; Gamble, Fl. Madras 1298(908). 1925. *Stilago lanceolaria* Roxb., Fl. Ind. 3: 760. 1832. *Antidesma lanceolarium* (Roxb.) Wall. ex Wight, Icon. Pl. Ind. Orient. t. 766. 1844.

Large shrubs; young stem, petioles and leaf below villous with curled hairs. Leaves alteranate, 3-9 x 2-4 cm, elliptic or obovate, base attenuate, apex shortly acuminate; petiole to 3 mm long. Spikes terminal, single or 2-branched, 2.5-3 cm long. Perianth greenish-yellow; lobes 4, c. 1.5 mm long, brown hairy within. Male flowers: Stamens 2, attached in depressions on the disk. Female flowers: Ovary obovoid, 1-loculed; ovules 2. Drupe 4-6 mm across, globose.

Paripode, KJD 22560

Fl. & Fr.: July-September

Distribution: Rare in semi-evergreen forests of Paripode.

Antidesma alexiteria L., Sp. Pl. 1027. 1753, Hook.f., Fl. Brit. India 5:359.1887; Chakrab. & Gangop., J. Econ. Taxon. Bot. 24:11.2000; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 304. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 720. 2009. *Antidesma zeylanicum* Lam., Encycl. 1: 207. 1792; Gamble, Fl. Madras 1297(908). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 409. 1988.

Trees, to 8 m high; bark pale brown. Leaves alternate, 3.5-15 x 1.5-4.5 cm, elliptic, elliptic-lanceolate, oblong or obovate, apex acuminate, base acute or rarely round; lateral nerves 5-12 pairs, pinnate, prominent, intercostae reticulate; petiole 1.5-5 mm long; stipules lateral subulate or triangular-acuminate. Male flowers: 2-3 together in terminal and axillary, lax flowered. Perianth 0.5-x 1.5 mm, cupular, scattered, lobes 4-5, orbicular to deltoid. Stamens 3, inserted in the excavation of the disk. Female flowers: 1-2 together in terminal and axillary spikes. Perianth cupular, 0.7 x 1 mm, sparsely puberulous; lobes 4, shallow, triangular or deltoid. Ovary superior, ovoid, 1-[2] loculed, ovule 2 in each cell; style stout, bifid. Fruit drupe, 4-6 x 3-5 mm, flattened, suborbicular or lenticellate or broadly obliquely ellipsoid.

Ambalappara, NS & KJD 25554; NS & KVB 31411; KVB 31654

Fl. & Fr.: March-May

Distribution: Common in evergreen forests of Ambalappara and Pothururumi.

Antidesma montanum Blume, Bijdr. Fl. Ned. Ind. 1124. 1826; Chakrab. & Gangop., J. Econ. Taxon. Bot. 24: 26. 2000; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 305. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 720. 2009.

Antidesma acuminatum Wight, Icon. Pl. Ind. Orient. t. 1991. 1853; Hook.f., Fl. Brit. India 5: 363. 1887. *Antidesma moritzii* (Tul.) Müll.Arg., Linnaea 34: 67. 1865 & in DC. Prodr. 15: 252. 1866; Hook.f., Fl. Brit. India 5: 362. 1887. *Antidesma menasu* (Tul.) Miq. ex Müll.Arg. in DC. Prodr. 15:257. 1866p.p., Hook.f., Fl. Brit. India 5: 364. 1887p.p.; Gamble, Fl. Madras 1297(908). 1925; Manilal & Sivar., Fl. Calicut 272. 1982; Ansari, Fl. Kasaragod Div. 332. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 408. 1988. *Antidesma menasu* (Tul.) Miq. ex Müll.Arg. var. *linearifolia* Hook.f., Fl. Brit. India 5: 364. 1887. *Antidesma montanum* Blume var. *microcarpum* Airy Shaw, Kew Bull. 36: 263. 1981.

Trees, to 15 m high; bark brown. Leaves alternate, 6-30 x 2-10 cm, elliptic-oblong, ovate-oblong or lanceolate, apex acuminate or caudate-acuminate, base acute, obtuse to round or often oblique; lateral nerves 4-12 pairs, pinnate, intercostae reticulate; petiole 3-10 mm, tomentose to glabrous; stipules lateral, linear, lanceolate or subulate. Male flowers: in axillary and terminal simple or paniculate racemes. Perianth cupular 0.6 x 1-1.5 mm; lobes 3-4, triangular, deltoid or ovate. Stamens 3-4; filaments inserted on the disk; pistillode knob like or capitate. Female flowers: in terminal and axillary, simple or one to few branched racemes. Perianth cupular, ca.1 x 1-2 mm, sparsely puberulous to glabrous; lobes 4-5, deep, triangular, deltoid or suborbicular. Ovary ovoid or subglobose, 1-[2] locular, ovules 2 in each cell; styles terminal. Fruit drupe 3-6 x 2.5-4 mm, ellipsoid to ovoid.

Poathanplavu, NS & KVB 31387

Fl. & Fr.: January-December

Distribution: Fairly common in Deciduous forests of Poathanplavu; evergreen forest of Chavachi, Moonamthode and Pothurumi.

APORUSA Blume

Bijdr. Fl. Ned. Ind. 514. 1824.

- 1a. Male spike to 5 cm long; lateral nerves 7-9 pairs *A. cardiosperma*
- 1b. Male spikes to 2.5 cm long; lateral nerves 5 or 6 pairs *A. fusiformis*

Aporosa cardiosperma (Gaertn.) Merr., J. Arnold Arbor. 35: 139. 1954; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 310. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 722. 2009. *Croton cardiospermus* Gaertn., Fruct. Sem. Pl. Sem. Pl. 2: 120. 1790. *Scepa lindleyana* Wight, Icon. Pl. Ind. Orient. t. 361. 1840. *Aporosa lindleyana* (Wight) Baill., Etud. Gen. Euphorb. 645. 1858; Hook.f., Fl. Brit. India 5: 349. 1887; Gamble, Fl. Madras 1309(916). 1925; Manilal & Sivar., Fl. Calicut

260. 1982; Ansari, Fl. Kasaragod Div. 333. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 409. 1988; Chakrab. & Gangop., J. Econ. Taxon. Bot. 17: 164. 1993.

Evergreen trees, to 15 m high; bark greyish-brown. Leaves attenuate, bifarious, 7.5-18 x 3-8 cm, elliptic-oblong or ovate-oblong, base acute, obtuse or round, apex acuminate or obtusely acuminate; lateral nerves 7-10 pairs, pinnate, intercostae reticulate; petiole 10-20 mm long; stipules lateral, lanceolate;. Male flowers: yellow, solitary or clustered in axillary spikes of 1-3.5 cm long; bracts ovate, ciliate, flowers 1-3 in each bract. Tepals 4, ovate, ciliate; stamens 2-3, from the centre of the flower; filaments free. Female flowers: pale green, 3-8 together, in densely tomentose small racemes; bracts concave, ciliate, imbricate. Tepals 4, larger than males. Ovary superior, flask-shaped, thinly hispid, 2-celled, ovules 2 in each cell; styles 2-3, connate into a column; stigmas 2. Fruit a capsule 10-12 mm across, yellow; seed one.

Kariyenkappu, NS & KJD 31996

Fl. & Fr.: December-June

Distribution: Fairly common in plantations of Kariyenkappu; evergreen forests of Moonamthode and Deciduous forests of Paripode.

Aporosa fusiformis Thwaites, Enum. Pl. Zeyl. 288. 1861; Hook.f., Fl. Brit. India 5: 351. 1887; Gamble, Fl. Madras 1309(916). 1925; Chakrab. & Gangop., J. Econ. Taxon. Bot. 17: 160. 1993; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 310. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 722. 2009.

Trees, to 8 m high; bark brown. Leaves alternate, 3-18 x 1.5-8 cm, obovate, suborbicular or broadly elliptic, apex apiculate or obtuse, round or retuse, base cuneate, acute, round or obtuse; lateral nerves 4-7 pairs, pinnate, intercostae reticulate; petiole 5-25 mm long; stipule 6 mm long, lateral. Male flowers: in 1-3 cm long axillary, dense flowered, catkin-like spikes; bracts broadly ovate, ciliate. Tepals 4-5, 1-1.2 x 0.4-0.6 mm, triangular to oblong, acute, shortly connate. Stamens 2-3, 2.5-3 mm long; filaments free. Female flowers: in axillary few flowered fascicles of 3 cm long. Tepals 4, ca.1.5 x 1.5 mm, suborbicular, ciliate. Ovary superior, ovoid-ellipsoid, densely tawny-puberulous, 2-locular; ovules 2 in each cell; style 2; stigma 2-lobed. Fruit a capsule 12-15 x 8-10 mm; seeds 1 or 2.

Chavachi, KVB 31798

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Chavachi and semi-evergreen forests of Paripode.

BACCAUREA Lour.

Fl. Cochinch. 2: 651. 1790.

Baccaurea courtallensis (Wight) Müll.Arg. in DC. Prodr. 15: 459. 1866; Hook.f., Fl. Brit. India 5: 367. 1887; Gamble, Fl. Madras 1310(916). 1925; Manilal & Sivar., Fl. Calicut 260. 1982; Ansari, Fl. Kasaragod Div. 333. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 409. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 313. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 722. 2009. *Pierardia courtallensis* Wight, Icon. Pl. Ind. Orient. t. 1912. 1852. *Baccaurea sapida* Bedd., Fl. Sylv. S. India: t. 280. 1872.

Evergreen trees to 15 m high; bark greyish-yellow. Leaves alternate, often clustered towards the tip of branchlets, 5.5-30 x 1.5-8.5 cm, oblanceolate or elliptic-oblanceolate, apex acuminate or caudate-acuminate, base acute, attenuate or cuneate; lateral nerves 4-7 pairs; intercostae reticulate, obscure; petiole 10-60 mm long; stipules 3-5 mm long, lateral, lanceolate. Flowers unisexual, dark crimson, in densely clustered slender racemes on mature stem. Male flowers: bracts lanceolate. Tepals 4-5, linear, oblong, elliptic or suborbicular. Stamens 4-8, free; pistillode clavate. Female flowers: bracts lanceolate. Tepals 4-5, linear, oblong or oblong-elliptic. Ovary superior, 3-locular, ovules 2 in each cell; stigmas 3. Fruit a capsule, subglobose, 3 locular, thick walled, with 6 longitudinal ribs; seeds 3, aril white.

Chavachi, *KJD 26325*

Fl. & Fr.: January-July

Distribution: Common in evergreen forests of Chavachi, Kattikkari, Kurumbankallu and Meenmutty; semi-evergreen forests of Pothanplavu. Endemic to Peninsular India.

BISCHOFIA Blume

Bijdr. Fl. Ned. Ind. Fl. Ned. Ind.: 1168. 1827.

Bischofia javanica Blume, Bijdr. Fl. Ned. Ind. 1169. 1826; Hook.f., Fl. Brit. India 5: 345. 1887; Gamble, Fl. Madras 1312c. 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 410. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 315. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 723. 2009.

Deciduous trees, to 30 m high; bark brown. Leaves 3-foliolate, alternate, 5.5-18 x 3-9 cm, elliptic, elliptic-ovate, ovate, obovate or orbicular, base acute or round, apex acuminate, margin serrate; lateral nerves 6-9 pairs, intercostae reticulate; petiolule of lateral leaflets 3-20 mm long; stipules lateral. Flowers unisexual, green, in axillary and lateral peduncled paniculate racemes. Male

flowers: 2-3 mm across. Tepals 5, obovate, concave, imbricate, concealing the anthers. Stamens 5, filaments short; pistillode short, broad. Female flowers: 2-35 mm across. Tepals 5, linear lanceolate. Ovary superior, globose, 3-celled, exserted, ovules 2, in each cell; style 3, linear; stigmatic throughout on the inner face. Fruit a berry, globose 7 mm across, reddish-brown; seeds 3, trigonus.

Ambalappara, KJD 18742

Fl. & Fr.: March-October

Distribution: Rare in evergreen forests of Ambalappara.

BREYNIA J.R.Forster & G.Forster

Char. Gen. Pl. 145. 1776, *nom. cons.*

- 1a. Perianth lobes of male flowers turbinate 2.
- 1b. Perianth lobes of male flowers spreading..... 3
- 2a. Fruit globose to 1.5 cm across, fruiting perianth much enlarged *B. retusa*
- 2b. Fruit to 0.7 cm across, fruiting perianth not enlarged..... *B. vitis-idaea*
- 3a. Leaves to 2.5 cm long, obtuse at apex; fruiting perianth enlarged...*B. quadrangularis*
- 3b. Leaves more than 5 cm long, acuminate at apex; fruiting perianth hardly enlarged *B. gour-maitii*

Breynia gour-maitii (Chakrab. & M.Gangop.) Chakrab. & N.P.Balacr., Bangladesh J. Pl. Taxon. 19(2): 121. 2012; Welzen, Pruesapan, I.Telford, Esser & J.J.Bruhl, Blumea 59: 91. 2014. *Sauropus gour-maitii* Chakrab. & M.Gangop., J. Econ. Taxon. Bot. 20: 529. 1996 (Plate 8l).

Shrubs, 2-4 m high, almost glabrous; leaf-bearing branchlets 15-30 cm long, pale greenish-brown to dark brown, terete, 1-3 mm thick, initially sparsely papillose-puberulous, soon glabrous. Leaves alternate, 6-13 x 1.5-5 cm, ovate-lanceolate, triangular-lanceolate, acute to acuminate at apex, obtuse, subtruncate or acute at base, membranous, green to brown above when dry, paler beneath; lateral nerves 7-8 pairs; petioles 1.5-2 x ca 1 mm; stipules linear-lanceolate, up to 5 mm long. Male flowers : pedicels 1.5-4 mm long; calyx concave-cupular, ca 1 x 1.5 mm, deeply 6-lobed; segments oblong-oblongeolate, ca 1.2 x 0.5 mm, incurved and shortly bifid at apex; staminal column ca 0.5 mm long; anthers narrowly ovoid, ca 0.8 mm long, erect when young, finally horizontal. Female flowers: pedicels 4-5 x ca 0.5 mm; calyx cupular, ca 3 x 3.5 mm; segments ovate, 2-2.5 x 1-1.5 mm, acute to subacute; ovary trigonous, ca 1 x 0.8 mm; styles ca 0.5 mm long, erect, shortly bifid at apex. Capsules somewhat



a. *Microtropis latifolia*



b. *Parnassia mysorens*



c. *Salacia malabarica*



d. *Connarus paniculatus*



e. *Garcinia gummi-gutta* var. *papilla*



f. *Garcinia talbotii*



g. *Croton malabaricus*



h. *Homonoia retusa*



i. *Micrococca beddomei*



j. *Drypetes confertiflora*



k. *Hugonia bellii*



l. *Breynia gour-maitii*

depressed, 8-10 x 13-15 mm, unlobed, thin-walled, brown when dry; pedicel 10-12 mm long, slender.

Pothurumi, NS & KJD 25551

Fl. & Fr.: December-July

Distribution: Rare in evergreen forests of Pothurumi. Endemic to Western Ghats.

Breynia quadrangularis (Willd.) Chakrab. & N.P.Balakr., Bangladesh J. Pl. Taxon. 19(2): 121. 2012; Welzen, Pruesapan, I.Telford, Esser & J.J.Brühl, Blumea 59: 90. 2014. *Phyllanthus quadrangularis* Willd., Sp. Pl. 4: 585. 1805. *Sauropus quadrangularis* (Willd.) Müll.Arg., Linnaea 32: 73. 1863; Hook.f., Fl. Brit. India 5: 335. 1887; Gamble, Fl. Madras 1303(911). 1925; Manilal & Sivar., Fl. Calicut 261. 1982; Ansari, Fl. Kasaragod Div. 347. 1985; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 534. 1996; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 395. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 754. 2009. *Sauropus compressus* Müll.Arg. in DC. Prodr. 15: 243. 1866; Hook.f., Fl. Brit. India 5: 336. 1887; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 526. 1996.

Glabrous shrubs. Leaves alternate, ovate-obtuse, emarginate at apex, glaucous below, black when dried; nerves 5 pairs, prominent; petiole 2 mm long; stipules cordate at base. Flowers solitary, axillary, pedicelled. Male flowers 3 mm across; sepals ovate, acute; stamens 3, anthers sessile on erect staminal column. Sepals of female flowers broadly ovate, obtuse, emarginate, united by the disk; styles 3, 2-fid at apex. Capsule 1.2 cm across, smooth, glabrous.

Paripode, KJD 22505

Fl. & Fr.: Throughout the Year

Distribution: Along Forest boundaries and plantations.

Breynia retusa (Dennst.) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 204. 1929; Ansari, Fl. Kasaragod Div. 334. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 411. 1988; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 505. 1996; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 340. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 725. 2009. *Phyllanthus retusus* Dennst., Schlüssel Hortus Malab. 24. 1818. *Breynia patens* (Roxb.) Rolfe, J. Bot. 11: 359. 1882; Hook.f., Fl. Brit. India 5: 329. 1887; Gamble, Fl. Madras 1304(912). 1925. *Phyllanthus patens* Roxb., Fl. Ind. 3: 667. 1832. *Melanthesa turbinata* Wight, Icon. Pl. Ind. Orient. t. 1897. 1852.

Shrubs, 1-1.5 m high. Leaves alternate, 1.3-2.5 x 0.7-1.3 cm, broadly elliptic or ovate, apex obtuse, base rounded or acute, glaucous below, black on drying;

petiole to 2 mm long. Flowers unisexual, solitary, axillary. Male flowers 3 mm across; pedicels 1 mm long. Perianth turbinate, 3-4 mm long, truncate; lobes 5-6. Stamens 3. Female flowers 5-6 mm across; pedicels 3-4 mm. Perianth campanulate, 3-4 mm long, 5-6-lobed. Ovary globose; stigma bifid. Capsule 1.2-1.5 cm across, depressed globose, orange-red on ripening, subtended by the enlarged fruiting perianth.

Chavachi, KJD 26367

Fl. & Fr.: February-September

Distribution: Fairly common in evergreen forests of Chavachi and Meenmutty.

Breynia vitis-idaea (Burm.f.) C.E.C.Fisch., Bull. Misc. Inform. Kew 1932: 65. 1932; Manilal & Sivar., Fl. Calicut 271. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 411. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 340. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 725. 2009. *Rhamnus vitis-idaea* Burm.f., Fl. Ind. 61. 1768. *Breynia rhamnoides* (Retz.) Müll.Arg. in DC. Prodr. 15:440. 1866; Hook.f., Fl. Brit. India 5: 330. 1887; Gamble, Fl. Madras 1304(912). 1925. *Phyllanthus rhamnoides* Retz., Observ. Bot. 5: 30. 1788. *Melanthesa rhamnoides* (Retz.) Wight, Icon. Pl. Ind. Orient. t. 1898, fig. 1. 1852.

Large shrubs. Leaves alternate, 2-3 x 1.5-2.5 cm, ovate or elliptic, apex acute, base acute or obtuse, glabrous, dark brown above and lighter below on drying; petiole to 2 mm long. Male flowers in axillary fascicles of 2-5; pedicels 3-5 mm long. Perianth turbinate, yellow, lobes 5. Stamens 3. Female flowers axillary, solitary, reddish, c. 1.5 mm across. Perianth campanulate, 5-6-lobed. Ovary 3-celled; style short; stigmas 3, sunk at top of ovary. Fruit 3-4 mm across; globose, red on ripening, changes to purple.

Paripode, KJD 18747

Fl. & Fr.: February-August

Distribution: Rare in semi-evergreen forests of Paripode.

BRIDELIA Willdenow

Sp. Pl. 4(2): 978. 1806.

- 1a. Trees; flowers in terminal paniculate spikes.....*B. retusa*
- 1b. Scandent shrubs; flowers in axillary fascicles *B. stipularis*

Bridelia retusa (L.) A.Juss., Euphorb. Gen. 109. 1824; Hook.f., Fl. Brit. India 5: 268. 1887p.p.; Gamble, Fl. Madras 1280(896). 1925; Manilal & Sivar., Fl. Calicut

273. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 319. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 726. 2009. *Clusia retusa* L., Sp. Pl. 1475. 1753. *Bridelia spinosa* (Roxb.) Willd., Sp. Pl. 4:979.1806. *Bridelia crenulata* Roxb., Fl. Ind. 3: 734. 1832. *Bridelia roxburghiana* (Müll.Arg.) Gehrm., Bot. Jahrb. Syst. 41. 95: 30. 1908; Gamble, Fl. Madras 1280(896). 1925; Manilal & Sivar., Fl. Calicut 273. 1982. *Bridelia airy-shawii* P.T.Li, Acta Phyt. Sin. 20: 117. 1982, nom. illeg.

Deciduous trees, to 20 m high; bark greyish-brown. Leaves alternate, 5-22 x 3-11 cm, broadly elliptic, oblong, elliptic-oblong, obovate or obovate-oblong, apex obtuse retuse or subacute, base round, obtuse, truncate, cordate or acute; lateral nerves 14-25 pairs, parallel, dichotomously forked near the margin; petiole 9-15 mm long; stipules 7 mm long, lateral. Flowers unisexual; greenish-yellow, sessile or shortly pedicellate axillary or terminal; bracts scaly. Male flowers: 7 mm across. Tepals 10, biseriate. Stamens 5, monadelphous, born on a gonophore, exerted; pistillode bifurcate. Female flowers: 6.5 mm across. Tepals 10, biseriate, lanceolate. Ovary half inferior, globose, ovules 2 in each cell; styles 2, forked; stigmatiferous. Fruit a drupe, 7-8 mm across, purplish-black, seated on enlarged calyx, pyrenes 2; seed one.

Kariyenkappu, KJD 22597

Fl. & Fr.: August-December

Distribution: Rare in plantations of Kariyenkappu; semi-evergreen forests of Narikkadavu and Pothanplavu.

Bridelia stipularis (L.) Blume, Bijdr. Fl. Ned. Ind. 597. 1825; Hook.f., Fl. Brit. India 5: 270. 1887; Gamble, Fl. Madras 1281(896). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 412. 1988; Chakrabarty *et al.*, J. Econ. Taxon. Bot. 26: 324. 2002; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 320. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 726. 2009. *Clusia stipularis* L., Mant. Pl. 1: 127. 1767. *Clusia scandens* Roxb., Pl. Coromandel t. 173. 1802. *Bridelia scandens* (Roxb.) Willd., Sp. Pl. 4: 979. 1805; Gamble, Fl. Madras 1281(896). 1925; Manilal & Sivar., Fl. Calicut 273. 1982; Ansari, Fl. Kasaragod Div. 335. 1985; Sunil & Sivadasan, Fl. Alappuzha Dist. 623. 2009.

Scandent shrubs with spines on older stem; branchlets brown tomentose. Leaves alternate, 4-8 x 2-6 cm, elliptic-oblong, apex obtuse, base subcordate or rounded, minutely tomentose below, those of flowering branches much smaller; petiole c. 5 mm long. Flowers greenish-yellow, sessile, in axillary fascicles. Male flowers 2-3 mm across. Female flowers 4-5 mm across. Tepals 10, biseriate,

ovate-acute, densely tomentose without. Stamens 5, monadelphous. Drupe 5-6 mm across, globose, black, calyx persistent.

Kariyenkappu, KJD 26076

Fl. & Fr.: December-February

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi. Endemic to Peninsular India.

FLUEGGEA Willd.

Sp. Pl. 4: 757. 1806.

Flueggea leucopyrus Willd., Sp. Pl. 4: 757. 1806; Hook.f., Fl. Brit. India 5: 328. 1887; Gamble, Fl. Madras 1296(907). 1925; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 342. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 738. 2009. *Securinega leucopyrus* (Willd.) Müll.Arg. in DC. Prodr. 15: 451. 1866.

Shrubs, branchlets angular, ending in spines. Leaves distichous, to 3.5 x 2 cm, obovate, apex emarginate, base cuneate, membranous, glaucous beneath; lateral nerves ca. 5 pairs, slender. Flowers greenish-white in axillary clusters; bracts many, minute, pedicels 2 mm. Male flowers: Tepals 0.7 mm, concave, obtuse. Stamens 5, filaments 1.5 mm, pistillode 1 mm. Capsule 5-8 mm across, globose, white.

Paripode, NS & KVB 31452

Fl. & Fr.: May-September

Distribution: Fairly common in semi-evergreen forests of Paripode.

GLOCHIDION J.R.Forst. & G.Forst.

Char. Gen. Pl. 113, t. 57. 1776, *nom. cons.*

- 1a. Style 5-toothed at apex; capsule with a stiff elongated style *G. candolleianum*
- 1b. Style 4 toothed at apex; capsule with a stiff elongated style 2
- 2a. Capsule tomentose, pinkish *G. hohanackeri* var. *johnstonei*
- 2b. Capsule smooth, greenish-yellow *G. ellipticum*

Glochidion candolleianum (Wight & Arn.) Chakrab. & Gangop., J. Econ. Taxon. Bot. 19: 191. 1995; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 347. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 740. 2009. *Lobocarpus candolleianus* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 7. 1834. *Glochidion neilgherrense* Wight, Icon. Pl. Ind. Orient. 5: 229. 1852; Hook.f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Madras 1307(914). 1925. *Glochidion arboreum* Wight, Icon. Pl. Ind. Orient. t.

1907.f.1. 1852; Hook.f., Fl. Brit. India 5: 316. 1887; Gamble, Fl. Madras 1307(914). 1925. *Glochidion sisparensense* Gamble, Fl. Madras 1307(914). 1926.

Small trees, branchlets tomentose. Leaves alternate, to 9 x 3.5 cm, oblong or ovate-oblong, acute, base obtuse, tomentose along veins below. Flowering branches slender, zig-zag. Flowers unisexual greenish-yellow. Male flowers: Calyx with 6 lobes, oblong elliptic, Spreading. Stamens 3. Female flowers: calyx 6 unequal lobes. Ovary 3-15 celled; Style elongated. Capsule 0.8 cm across, 6-lobed.

Ambalappara, KVB 31792, 31704

Fl. & Fr.: December-March

Distribution: Common in evergreen forests of Ambalappara.

Glochidion ellipticum Wight, Icon. Pl. Ind. Orient. t. 1906. 1852; Hook.f., Fl. Brit. India 5: 321. 1887; Gamble, Fl. Madras 1308(915). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 418. 1988; Chakrab. & Gangop., J. Econ. Taxon. Bot. 19: 199. 1995; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 348. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 740. 2009. *Phyllanthus malabaricus* Müll.Arg., Linnaea 34: 69. 1865. *Glochidion malabaricum* (Müll.Arg.) Bedd., Fl. Sylv. S. India: 193. 1872; Hook.f., Fl. Brit. India 5: 319. 1887; Gamble, Fl. Madras 1308(915). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 419. 1988.

Trees, to 15 m high; bark blackish-grey. Leaves alternate, distichous, 4-17 x 1.5-9 cm, elliptic, oblong, elliptic-oblong, lanceolate, subfalcate or obovate, apex apiculate to acuminate or obovate, base acute, attenuate, round or oblique; lateral nerves 5-12 pairs, intercostae scalariform; petiole 2-9 mm long; stipule lateral. Flowers unisexual, yellow, in dense clusters from leaf scars. Male flowers: sepals 3+3, 1.5-5 x 0.3-2 mm, ovate, elliptic, triangular. Stamens 3-4, 1-1.5 mm long. Female flowers: sessile or pedicels 1-5 mm long. Sepals 3+3, 1-3 x 0.5-1 mm, linear, oblong, elliptic or triangular. Ovary subglobose, usually 4 locular, ovules 2 in each cell; style columnar to conical. Fruit a capsule 3-10 x 6-15 mm, depressed, unlobed; seeds brown, glabrous.

Kariyenkappu, KJD 26051

Fl. & Fr.: January-July

Distribution: Fairly common in plantations of Kariyenkappu; evergreen forests of Chavachi and Moonamthode. Endemic to Western Ghats.

Glochidion hohenackeri (Müll.Arg.) Bedd. var. **johnstonei** (Hook.f.) Chakrab. & Gangop., J. Econ. Taxon. Bot. 19: 210. 1995; N.P. Balakr. & Chakrab., Fam.

Euphorbiaceae India 349. 2007. *Glochidion johnstonei* Hook.f., Fl. Brit. India 5: 314. 1887; Gamble, Fl. Madras 1307(914). 1925 (Plate 9a).

Trees, to 10 m high. Leaves alternate, distichous, 7-13 x 1.5-6.5 cm, oblong, elliptic, elliptic-oblong, oblong-lanceolate, oblong-ovate or subfalcate, apex acuminate, base oblique; lateral nerves 4-8 pairs, pinnate, prominent, intercostae reticulate, prominent; petiole 2-5 mm, slender, puberulous; stipules lateral. Flowers unisexual, yellow. Male flowers: in many flowered axillary clusters. Sepals 3+3, 3-4 x 0.8-15 mm, lanceolate or oblanceolate, puberulous. Stamens 3-4, connate by their connectives in a column; connectives produced. Female flowers: in few flowered axillary clusters; sessile. Sepals 1.2-3 x 1.5-3.5 mm, tomentellous to glabrescent, irregularly 4-6 toothed. Ovary subglobose, 4-6 locular, ovules 2 in each cell; styles 4-6. Fruit a capsule 2-5 x 6-12 mm, 4-6 locular, depressed, deeply lobed, puberulous to glabrous.

Moonamthode, KJD 26374

Fl. & Fr.: November-April

Distribution: Rare in evergreen forests of Moonamthode.

Endemic to Peninsular India; Conservation status: Vulnerable.

PHYLLANTHUS L.

Sp. Pl. 981. 1753.

- 1a. Fruits baccate; scandent shrubs *P. reticulatus*
- 1b. Fruits capsular 2
- 2a. Leaves reddish; capsules densely muricate *P. urinaria*
- 2b. Leaves green; capsules smooth 3
- 3a. Fruting perianth smaller than capsule *P. amarus*
- 3b. Fruting perianth as long as capsule *P. rheedei*

Phyllanthus amarus Schumach. & Thonn., Beskr. Guin. Pl. 421. 1827; Manilal & Sivar., Fl. Calicut 264. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 424. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 386. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 749. 2009. *Phyllanthus fraternus* auct. non Webster 1955; Ansari, Fl. Kasaragod Div. 345. 1985. *Phyllanthus niruri* sensu Hook.f., Fl. Brit. India 5: 298. 1887, non L. 1753; Gamble, Fl. Madras 1290(903). 1925.

Erect herbs to 30 cm tall. Leaves 6-8 x 3-4 mm, oblong, apex obtuse to acute, base unequal sided, lower surface glaucous; stipules lanceolate, scarious. Male flowers towards tip of branchlets, solitary, axillary. Tepals 5, ovate. Stamens 3, exserted; filaments connate; disk of 5 glands. Female flowers c. 1.5 mm across.

Tepals 5, oblong. Ovary globose; style erect, recurved; pedicel to 2 mm long. Capsule c. 2 mm across, globose; seeds 6, trigonous, vertically muriculate.

Kariyenkappu, *KJD 26278*

Fl. & Fr.: July-October

Distribution: Along the boundaries and open areas in the forests.

Phyllanthus reticulatus Poir. in Lam. Encycl. 5: 298. 1804; Hook.f., Fl. Brit. India 5: 288. 1887; Manilal & Sivar., Fl. Calicut 262. 1982; Ansari, Fl. Kasaragod Div. 345. 1985; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 382. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 751. 2009. *Kirganelia reticulata* (Poir.) Baill., Etud. Gen. Euphorb. 613. 1858; Gamble, Fl. Madras 1294(905). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 421. 1988. *Anisonema multiflora* Wight, Icon. Pl. Ind. Orient. t. 1899. 1852.

Scandent shrubs; branches pubescent. Leaves alternate, 1.5-2 x 1-1.5 cm, elliptic, apex acute or obtuse, base acute, glabrous; stipules lanceolate, often spinescent; petiole to 2 mm long. Male flowers in axillary fascicles. Tepals 5, unequal, obovate, imbricate. Stamens 5, outer 2-3 free, inner connate. Female flowers solitary. Tepals 5, shortly connate, obovate, valvate, margin scarious. Ovary globose, 5-12-locular; styles 3, bifid. Fruits 5-7 mm across, globose, black; seeds 8-10trigonous.

Kariyenkappu, *KJD 26279*

Fl. & Fr.: August-December

Distribution: Rare in plantations of Kariyenkappu.

Phyllanthus rheedei Wight, Icon. Pl. Ind. Orient. t. 1895.f. 1. 1852, 'rheedii'; Hook.f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Madras 1289(902). 1925; Ramach. & V.J. Nair, Fl. Cannanore Dist. 425. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 379. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 751. 2009. *Phyllanthus kozhikodianus* Sivar. & Manilal, J. Indian Bot. Soc. 56. 165. 1977; Manilal & Sivar., Fl. Calicut 264. 1982; Sasidh., Fl. Periyar Tiger Reserve 378. 1998.

Woody herbs, to 80 cm high; stems glabrous. Leaves alternate, 2.5 x 1.5 cm, obovate, obtusely acute, distant on lateral branchlets, glaucous beneath; nerves 7-9 pairs, stipules lanceolate, acuminate; petiole 2mm long. Flowers solitary or fascicled. Tepals 6, 4.5 x 2mm, obovate, obtuse, green with narrow white margins, glabrous. Ovary globose, styles 3, bifid, radiating. Capsule 5 mm across,

glabrous, smooth; seeds 2 x 1.5 mm, trigonous, longitudinally striate with minute cross bars.

Ambalappara, *KJD 26142; KVB 31700*

Fl. & Fr.: November-January

Distribution: Common in evergreen forests of Ambalappara, Asthipara and Mullenpara.

Phyllanthus urinaria L., Sp. Pl. 982. 1753; Hook.f., Fl. Brit. India 5: 293. 1887; Gamble, Fl. Madras 1289(902). 1925; Manilal & Sivar., Fl. Calicut 266. 1982; Ansari, Fl. Kasaragod Div. 345. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 425. 1988; N.P. Balakr. & Chakrab., Fam. Euphorbiaceae India 389. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 752. 2009. *Phyllanthus leprocarpus* Wight, Icon. Pl. Ind. Orient. t. 1895.f. 4. 1852.

Erect herbs to 40 cm tall; young stem and leaves reddish. Leaves alternate, 0.6-1.2 x 0.4-0.6 cm, oblong, apex acute to apiculate, base oblique, margin ciliate, glabrous; stipules c. 1mm long, linear to subulate. Male flowers in axillary clusters. Tepals 6, 1-seriate, orbicular. Stamens 5, filaments united; disk 6-lobed. Female flowers in lower axils, solitary. Tepals 6, obovate-oblong. Ovary warty without; stigma 3, each 2-fid; disk annular. Capsule 2-3 mm across, globose, 3-lobed, sessile, verrucose; seeds 6, trigonous, transversely ridged.

Kariyenkappu, *KJD 25402, 31872*

Fl. & Fr.: July-October

Distribution: Fairly common in plantations of Kariyenkappu near boundaries.

Breynia androgyna (L.) Chakrab. & N.P. Balakr. is planted in settlements.

Phyllanthus emblica L. planted by the forest department.

PODOSTEMACEAE

- 1a. Stem thread-like, free floatingIndotristicha
1b. Thallus crustaceous, adhering to rocks.....Zeylanidium

INDOTRISTICHA P.Royen

Acta Bot. Neerl. 8: 474. 1959.

Indotristicha ramosissima (Wight) P. Royen, Acta Bot. Neerl. 8: 474. 1959; Ansari, Fl. Kasaragod Div. 317. 1985; Joseph, Aquatic Angiosp. Malabar 184. 1991; Mathew & Satheesh, Aqua. Bot. 57: 246. 1997; Ratheesh, Fl. Stud.

Wayanad Dist. 680. 2009. *Dalzellia ramosissima* Wight, Icon. Pl. Ind. Orient. t.1920.f.1. 1852. *Terniola ramosissima* (Wight) Willis, Ann. Roy. Bot. Gard. (Peradeniya) 1: 208, 293, 306 tt. 5-9, f.29. 1902. *Tristicha ramosissima* (Wight) Willis, Ann. Roy. Bot. Gard. (Peradeniya) 1: 208. 1902 & 1:293-306. ff. 5-9. 1902; Gamble, Fl. Madras 1194(836). 1925 (Plate 9b).

Stem free floating, branched herbs, to 60 cm long, attached to rock by base, stem with 1.5-2.5 cm long ramuli and scale leaves. Flowers 1-6 mm long, axillary along the stem; pedicels 1-2.5 cm long, slender, erect. Perianth 3, free, 2 mm long, ovate. Stamens 3. Ovary 2.5 mm long, ellipsoid, stigma 3-lobed.

Kariyenkappu, *KJD 31492*

Fl. & Fr.: November-March

Distribution: Wet Rocks near Rivers in at Kariyenkappu to Valayamchal. Endemic to southern Western Ghats.

ZEYLANIDIUM Engl.

Nat. Pflanzenfam., ed. 2. 18a : 61. 1930.

Zeylanidium olivaceum (Gard.) Engl., Nat. Pflanzenfam. (ed. 2) 18a: 62. 1930; Nagendran & Arekal, Bull. Bot. Surv. India 23: 231. 1981; Joseph, Aquatic Angiosp. Malabar 195. 1991; Mathew & Satheesh, Aqua. Bot. 57: 271. 1997. *Podostemum olivaceum* Gard., Calcutta J. Nat. Hist. 7: 181. 1847; Hook.f., Fl. Brit. India 5: 66. 1886. *Hydrobryum olivaceum* (Gard.) Tul., Ann. Sci. Nat. Bot. ser. 3, 11: 104. 1849; Gamble, Fl. Madras 1198(839). 1925.

Thallus crustaceous, adhering to rocks, secondary sterile shoots and flowering shoots arise from thallus, sterile shoots 6 cm long, tubular. Leaves clustered at apex, hair-like, 5 cm long. Flowering shoots to 5-7 mm; pedicels to 2.5 mm; bracts 6-8; spathella to 3 mm long, splitting longitudinally. Tepals 2 mm. Stamens 2, monadelphous, 3 mm. Ovary 2 mm, ovoid; stigma 2-fid, lobes unequal, margins serrate. Capsule 2 mm long, ribbed; seeds many.

Meenmutty, *KJD 31495*

Fl. & Fr.: November-December

Distribution: On wet rocks along River sides at Meenmutty.

RHIZOPHORACEAE

- 1a. Bracteoles present; leaf margins entire, revolute Carallia
- 1b. Bracteoles absent; leaf margins crenate, not revolute Blepharistemma

BLEPHARISTEMMA Wall. ex Benth.

J. Proc. Linn. Soc., Bot. 3: 73. 1858

Blepharistemma serratum (Dennst.) Suresh in D.H. Nicolson, C.R. Suresh & K.S. Manilal, Interpret. Van Rheede's Hort. Malab. 214. 1988. *Rodschiedia serrata* Dennst., Schlüssel Hortus Malab. 16, 24, 31. 1818. *Gynotroches membranifolia* Miq., Anal. Bot. Ind. 3: 7. 1852. *Blepharistemma corymbosum* Benth., J. Proc. Linn. Soc. Bot. 3: 65, 78. 1858; Hook.f., Fl. Brit. India 2: 441. 1878; Gamble, Fl. Madras 460(326). 1919. *Blepharistemma membranifolia* (Miq.) Ding Hou in Fl. Males. 1, 5: 489. 1958; N.C. Nair & Mohanan, J. Econ. Taxon. Bot. 2:233.1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 175. 1988 (Plate 9c).

Bark yellowish-brown. Leaves opposite, decussate, 4.5-15 x 2-7 cm, elliptic, elliptic-oblong or oblong, base acute or attenuate; lateral nerves 5-9 pairs, pinnate, prominent, intercostae reticulate; petiole 6-10 mm long, pubescent; stipules interpetiolar. Flowers polygamodioecious, 4 mm across, white, in many flowered axillary cymes. Calyx tube campanulate, adnate to the base of the ovary, lobes 4, erect. Petals 4, clawed, spathulate, lacerate at apex, white, inserted around a 8-lobed disk. Stamens 8, inserted on the margin of the disk, small in female, filaments ciliate. Ovary 3-celled; ovules 2 in each cell; style short in males, longer in female; stigma shortly 3-lobed. Fruit a 3-valved capsule, 6 mm across, yellowish, subglobose, acute; seeds covered with yellow aril.

Kattikari, KJD 18743

Fl. & Fr.: February-July

Distribution: Rare in evergreen forests of Kattikari. Endemic to southern Western Ghats; Conservation status: Vulnerable.

CARALLIA Roxb.

Pl. Coromandel 3: 8. 1811, *nom. cons.*

Carallia brachiata (Lour.) Merr., Philipp. J. Sci. 15: 249. 1919; Manilal & Sivar., Fl. Calicut 104. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 175. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 347. 2009. *Diatoma brachiata* Lour., Fl. Cochinch. 296. 1790. *Carallia integerrima* DC. in DC. Prodr. 3: 33. 1828; Gamble, Fl. Madras 459(325). 1919.

Evergreen trees; to 25 m; bark dark grey. Leaves opposite, 4-11 x 2-7 cm, obovate, or obovate-oblong, apex acute or obtuse, base attenuate or acute; lateral nerves 6-10 pairs, slender, pinnate; intercostae reticulate, obscure; petiole 6-10 mm. Flowers cream coloured, sessile, small, in short, trichotomous axillary branching cymes. Calyx tube campanulate, lobes 5-8, ovate, acute. Petals 5-8,

clawed, orbicular-cordate, margin deeply lacerate, reddish, inserted on a crenulate disk. Stamens 10-16, inserted with them on the disk. Ovary half inferior, 3-5-celled; ovules 2 in each cell; style subulate; stigma 4-lobed. Fruit a drupe, 5-6 mm across, red, filiform; seed one, bright orange, subreniform.

Chavachi, *KJD 26050*

Fl. & Fr.: October-April

Distribution: Rare in evergreen forests of Chavachi.

SALICACEAE

- 1a. Petals present.....Scolopia
- 1b. Petals absent.....2
- 2a. Trunk unarmed; flowers bisexual; fruit dehiscent..... Casearia
- 2b. Trunk armed with thorns; flowers unisexual; fruit indehiscent..... Flacourtia

CASEARIA Jacq.

Enum. Syst. Pl. 4: 21. 1760.

- 1a. Leaves tomentose, margins crenate serrate*C. wayanadensis*
- 1b. Leaves glabrous, margins entire or subentire..... 2
- 2a. Branchlets often zig-zag; stamens 10 *C. ovata*
- 2b. Branchlets not zig-zag; stamens 8..... *C. thwaitesii*

Casearia ovata (Lam.) Willd., Sp. Pl. 2: 629. 1799; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 399. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 264. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 120. 2009. *Anavinga ovata* Lam., Encycl. 1: 148. 1789. *Casearia esculenta* Roxb., Fl. Ind. 2: 422. 1832; Hook.f., Fl. Brit. India 2:592. 1879,p.p; Gamble, Fl. Madras 521(367). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 49. 1988 (Plate 9d).

Trees, to 10 m; bark grey. Leaves alternate, distichous, 7-16 x 4-7 cm, elliptic-oblong, elliptic-obovate, elliptic-ovate, obovate or ovate, apex acuminate, base acute or rounded; lateral veins 6-8 pairs, pinnate, prominent, intercostae reticulate; petiole 6-20 mm; stipules small, scale-like, lateral. Flowers small, greenish, in axillary fascicles. Calyx 4-5 lobed, glabrous. Petals absent. Stamens 8-10, united into a short tube with alternating staminodes, forming a ring attached below to the calyx tube, tufted at their apex. Ovary ovoid, 1-celled; style simple. Fruit a succulent capsule to 1.5 cm long, orange yellow; seeds many.

Bhoothakkallu, *NS &KVB 31399*

Fl. & Fr.: January-May

Distribution: Fairly common in semi-evergreen forests of Narikkadavu, Valayamchal and Bhoothakallu.

Casearia thwaitesii Briq., *Annuaire Conserv. Jard. Bot. Genève* 62. 1898; R.L. Mitra in B.D. Sharma & N.P. Balakr., *Fl. Ind.* 2: 397. 1993; N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 266. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 122. 2009. *Casearia coriacea* Thwaites, *Enum. Pl. Zeyl.* 20. 1858; Gamble, *Fl. Madras* 521(368). 1919 non Vent. 1803.

Trees to 12 m tall; bark yellowish-white. Leaves alternate, distichous, 3.5-9 x 2-4.5 cm, obovate, apex obtuse or obtusely acute, base cuneate or attenuate, glaucous beneath; lateral veins 5-6 pairs, pinnate, intercostae reticulate, slender, prominent; petiole 5-15 mm, slender, red when young; stipules small. Flowers small, 5 mm across, greenish-yellow, 3-6 together in axillary fascicles. Calyx 4 lobed; lobes obovate, obtuse, persistent. Petals absent. Stamens 8, alternating with as many staminodes, forming a ring attached below to the calyx tube, tufted at their apex; filaments 1.5 mm long, subulate, pubescent. Ovary terete, 1-celled, ovules 4; style simple. Fruit a succulent capsule, ovoid, smooth, greenish-yellow; seeds many.

Ambalappara, *KJD 18764*

Fl. & Fr.: January-March

Distribution: Rare in evergreen forests of Ambalappara.

Casearia wynadensis Bedd., *Icon. Pl. Ind. Or.* t. 160. 1868-1874; Hook.f., *Fl. Brit. India* 2: 594. 1879; Gamble, *Fl. Madras* 521(368). 1919; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 49. 1988; R.L. Mitra in B.D. Sharma & N.P. Balakr., *Fl. Ind.* 2: 399. 1993; N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 267. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 121. 2009.

Small trees to 7 m. Leaves alternate, 7-18 x 3-5.5 cm, lanceolate or oblanceolate, apex acuminate, base acute, margin entire or serrate, tomentose, pellucid transparent glands; lateral nerves 7-10 pairs, slender, pinnate, puberulent; intercostae reticulate, rufous villous; petiole 4-10 mm, slender, tomentose; stipules small, lateral. Flowers bisexual, small, greenish, 6-8 fascicled on axils of older leaves; peduncle 4 mm long, pubescent. Calyx 3 mm long, lobes 4, ovate, glabrous within. Petals absent. Stamens 8, hairy, 2 mm long, alternating with staminodes, tufted at their apex, forming a ring attached below to the calyx tube. Ovary oblong, 1-celled, ovules many; style to 3 mm, simple, hairy; stigma 4 lobbed. Fruit a capsule, small, 2-2.5 x 1 cm, oblong, greenish-yellow, 3-valved.

Ambalappara, *NS &KVB 31425*

Fl. & Fr.: April-June

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Western Ghats; Conservation status: Vulnerable.

FLACOURTIA Comm. ex L'Hér.

Stirp. Nov. 59. 1786.

Flacourtia montana J.Graham, Cat. Pl. Bombay 10. 1839; Gamble, Fl. Madras 54(39). 1915; Ansari, Fl. Kasaragod Div. 65. 1985; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 406. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 271. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 122. 2009.

Thorny trees to 8 m, thorns about 5 cm long; bark grey. Leaves alternate, spiral, 12-22 x 6-8, ovate, elliptic, apex acute or acuminate, base acute or rounded, margin crenate-serrate; 3-5 nerves from the base, prominent, lateral veins 4-6 pairs, pinnate, prominent, intercostae scalariform, slender, prominent; petiole 5-10. Flowers unisexual, small, in axillary congested pubescent cymes. Sepals 4 or 5 tomentose, small, imbricate. Petals absent. Stamens many; anthers versatile. Ovary superior, urn shaped, glabrous, incompletely 2-5 locular, ovules 2 in each cell; styles 5, reflexed, notched at tip. Fruit a berry, globose, obtusely ribbed, 1-1.5 cm across, bright red, of an agreeable acidic flavour; seeds few, reddish.

Narikkadavu, *KJD 26381*

Fl. & Fr.: April-June

Distribution: Rare in semi-evergreen forests of Narikkadavu and Uruppukunnu. Endemic to India

SCOLOPIA Schreb.

Gen. Pl., ed. 8a. 335. 1789.

Scolopia crenata (Wight & Arn.) Clos, Ann. Sci. Nat. Bot. ser. 4, 8: 250. 1857; Hook.f., Fl. Brit. India 1: 191. 1872; Gamble, Fl. Madras 52(38). 1915; Sleumer, Blumea 20: 39. 1972; Ramach. & V.J. Nair, Fl. Cannanore Dist. 50. 1988; R.L. Mitra in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 430. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 278. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 124. 2009. *Phoberos crenatus* Wight & Arn., Prodr. Fl. Ind. Orient. 29. 1834 (Plate 9e).

Evergreen trees, to 15 m high, armed with thorns, spines often branched; bark greyish-brown. Leaves alternate, 5-14 x 2.5-6 cm, lanceolate, elliptic-lanceolate, ovate or obovate, apex abruptly acuminate, caudate-acuminate or acute, base rounded or acute, margin crenate or serrate; 3-5-ribbed from the base; lateral nerves 3-8 pairs, pinnate, faint, intercostae reticulate; petiole 8-15 mm. Flowers 1.5 cm across, white, in axillary racemes of 5-7 cm long. Sepals 4-6, 3 x 2 cm, ovate, ciliate. Petals 4-6, 1.5 mm long, oblong. Stamens numerous, free; anthers 1 mm long; connective produced into a reddish hood; disk extra-staminal, glandular pubescent. Ovary one celled, few ovuled; style 4 mm long,

thick; stigma 3-fid. Fruit a berry, globose, 10 x 8 mm across, with persistent style; seeds few.

Ambalappara, KVB 31717; NS & KVB 31370

Fl. & Fr.: October-May

Distribution: Fairly common in evergreen forests of Ambalappara.

VIOLACEAE

- 1a. Shrubs, flowers fascicled..... Rinorea
1b. Herbs, flowers solitary..... Viola

RINOREA Aubl.

Hist. Pl. Guiane 1: 235, t. 93. 1775.

Rinorea bengalensis (Wall.) Kuntze, Revis. Gen. Pl. 1: 42. 1891; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 5. 1983 & in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 348. 1993; K. Vivek. in P. Daniel, Fl. Kerala 1: 253. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 118. 2009. *Alsodeia bengalensis* Wall., Trans. Med. Soc. Calcutta 7: 224. 1835. *Rinorea zeylanica* (Arn.) Kuntze, Revis. Gen. Pl. 1: 42. 1891. *Pentaloba zeylanica* Arn., Mag. Zool. Bot. 2: 543. 1837. *Alsodeia zeylanica* (Arn.) Thwaites, Enum. Pl. Zeyl. 21.1858; Hook.f., Fl. Brit. India 1:187.1872; Gamble, Fl. Madras 49(35).1915 (Plate 9f).

Shrubs or small trees. Leaves alternate, 6-18 x 2-9 cm, elliptic-lanceolate or ovate, obtuse at apex, acute at base, crenate or serrate at margin; lateral nerves 10-12 pairs; petioles to 1 cm long; stipules appressed, linear-lanceolate to subulate. Flowers fascicled, ca 4 mm across; bracts basal, ovate, subacute, ca 1 mm long, brown. Sepals subequal, broadly ovate, ca 2 x 1 mm, ciliate. Petals subequal, oblong-ovate, ca 5 x 1 mm, fleshy, white. Stamens inserted on a thick 5-lobed disk, glabrous; filaments short, broad at base cohering into a tube. Ovary oblong, sometimes hairy, 3-ovuled; style short, straight, glabrous. Capsules globose, to 1 cm, glabrous, 3-valved, dehiscent longitudinally; seeds 3 or 4, globose.

Kariyankappu, KVB 31215

Fl. & Fr.: November-May

Distribution: Fairly common in plantations of Kariyankappu and evergreen forests of Meenmutty and Kattikari.

VIOLA L.

Sp. Pl. 933. 1753.

Viola pilosa Blume, Cat. Gew. Buitenzorg (Blume) 57. 1823; S.P. Banerjee & B.B. Pramanik, Fasc. Fl. Ind. 12: 30. 1983 & in B.D. Sharma & N.P. Balakr., Fl. Ind. 2:

371. 1993; K. Vivek. in P. Daniel, Fl. Kerala 1: 256. 2005. *Viola serpens* Wall. ex Ging. in DC. Prodr. 1: 296. 1824; Hook.f., Fl. Brit. India 1: 184. 1872; Gamble, Fl. Madras 48(35).1915. *Viola wightiana* Wall. ex Wight, Icon. Pl. Ind.Orient. t.943.1845.

Prostrate herbs, rooting at nodes. Leaves mostly alternate, 3.5-6 x 3.5-6 cm, ovate, apex acute, base deeply cordate, hirsute, margins crenate; petiole to 15 cm, hairy, stipules foliaceous, 1 cm. Flowers solitary, white; pedicels to 10 cm, hairy. Sepals 7 mm, lower lanceolate, hairy. Petals 1 cm, subequal, longer one obovate, spurred at the base, 6 mm. Anthers 2 mm, oblong, connective produced above. Ovary 2 mm, ovoid, puberulus, style 2 mm, stigma lateral.

Ambalappara, *KJD26341*; *NS &KVB 31347*

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Ambalappara.

Order: **Cucurbitales**

BEGONIACEAE

BEGONIA L.

Sp. Pl. 1056. 1753.

- 1a. Placenta divided, small plants with tuberous roots; capsules 2-celled2
- 1b. Placenta undivided, stem elongate, plants rather large; capsules 3-celled.3
- 2a. Stem succulent, 1 capsule wing broad..... *B. integrifolia*
- 2b. Stem slender, capsule wings subequal..... *B. crenata*
- 3a. Sepals in male flowers 4..... *B. fallax*
- 3b. Sepals in male flowers 2..... *B. malabarica*

Begonia crenata Dryand., Trans. Linn. Soc. London 1: 164, t.14. 1791; Hook.f., Fl. Brit. India 2: 651. 1879; Gamble, Fl. Madras 546(385). 1919; Manilal & Sivar., Fl. Calicut 124. 1982; Ansari, Fl. Kasaragod Div. 180. 1985; Kumar *et al.*, J. Econ. Taxon. Bot. 26: 140. 2002. *Begonia minima* Bedd., Madras J. Lit. Sci. ser. 3, 1: 48. 1864 & Icon. Pl. Ind. Or. t. 110. 1868-1874 (Plate 9g).

Small herbs. Leaves alternate, 2.5-6 x 1.5-5 cm, ovate or tri-lobed, acute at apex, cordate at base, doubly crenate at margins, hairy above and glabrous except the nerves beneath. Flowers pinkish, beautifully marked with glistening dots when fresh; peduncles slender. Male flowers: Tepals 4, outer one elliptic, 5-5.5 x 4-4.5 mm, cordate at base, obtuse at apex; inner one narrower than the outer, 5 x 2 mm, obtuse at apex. Stamens about 15, monadelphous. Female flowers: Tepals 5, the outer elliptic, 5-5.5 x 3.5-4 mm; inner one narrower 5 x 2 mm. Styles usually 3, connate to half way up; sigma reniform. Capsule 6-7 mm

long, crowned by accrescent perianth, 3-winged, one smaller than the other two, 2-celled; placenta divided.

Ambalappara *KJD 25430*

Fl. & Fr: August-November

Distribution: Rare in evergreen forests of Ambalappara on wet rocks. Endemic to Western Ghats.

Begonia fallax A.DC. in A.P.de Candolle, Prodr. 15:329. 1864; Hook. f., Fl. Brit. India 2: 643. 1879; R. Ansari *et al.*, Journ. Econ. Tax. Bot. 5: 125. 1985; Ratheesh Narayanan, Fl. Stud. Wayanad Dist. 398. 2009. *Diploclinium lindleyanum* Wight, Ic. t. 1817. 1852.

Large herbs; stem reddish, flaccid, sub-erect, hispid. Leaves alternate, 8 x 3 cm, ovate-oblong, acuminate, obliquely cordate at base, hirtus, membranous, 5-nerved from the base; petiole 1-3 cm long, hispid; stipule 6 x 2 mm, lanceolate. Cymes 2 cm across, lateral; peduncle 1-2 cm long, flowers 1-3 together. Male flowers: Tepals 4, outer 5 x 7 mm, hispid; inner smaller, curved, glabrous. Female flowers: Tepals 4 or 5, similar to male flowers. Ovary hispid, 3-locular, placenta single, styles 3, each divided in to two branches at apex. Capsule 1 x 2 cm obovate, truncate at apex, wings acute above, subequal; seeds minute, many, hexagonal.

Kattikari State Boundary, *KJD 26320*

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Kattikari and Kurumbankallu. Endemic to Western Ghats; Conservation status: Vulnerable.

Begonia integrifolia Dalzell, Hooker's J. Bot. Kew Gard. Misc.. 3: 230. 1851; Hook.f., Fl. Brit. India 2: 648. 1879; Gamble, Fl. Madras 546(385). 1919; Ansari, Fl. Kasaragod Div. 180. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 399. 2009 (Plate 9h).

Small, tuberous herbs; stem short, reddish, succulent. Leaves alternate, 13-25 x 6-11 cm, ovate, irregularly serrate-dentate, apex acute, base cordate, slightly oblique, sparsely hairy; petiole 4-15 cm long. Flowers pinkish, unequal, in axillary dichotomously branched cymes. Male flowers: Tepals 4 in 2 whorls; outer 2 orbicular, larger. Stamens many; filaments united at base. Female flowers: to 8 mm long. Tepals 5, free; inner 1 smaller. Ovary inferior; styles 2; stigma branched. Capsule with 3 unequal wings, 1 larger.

Moonamthode, *KJD 31883*

Fl. & Fr.: June-October.

Distribution: Common in evergreen forests of Chavachi, Chelachode, Moonamthodu and Pothanplavu. Endemic to Peninsular India.

Begonia malabarica Lam., *Encycl.* 1: 393. 1785; Gamble, *Fl. Madras* 546(386). 1919; R. Ansari *et al.*, *J. Econ. Taxon. Bot.* 5: 126. 1985; Ansari, *Fl. Kasaragod Div.* 180. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 203. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 399. 2009. *Diploclinium dipetala* Wight, *Icon. Pl. Ind. Orient.* t. 1813. 1852.

Small shrubs, to 2 m high; stem terete, glabrous. Leaves alternate, 15 x 8 cm, ovate, strongly unequal at base, toothed and serrate along the margins, hispid; petiole to 6 cm long; stipule 13 x 5 mm, lanceolate. Peduncles to 3 cm, axillary; cymes 5-10 cm across, dichotomous, flowers many. Male flowers: Tepals 2, 15 mm across, orbicular, pink; anthers 2 mm long, connective produced into an orbicular appendage. Female flowers: Tepals 7 x 13 mm, reniform. Capsule 2 x 1.5 cm, wings obtuse.

Kattikari, *KVB 31391*

Fl. & Fr. August-April

Distribution: Rare, undergrowth in Evergreen forests of Kattikari and Mullenpara.

CUCURBITACEAE

- 1a. Petals fimbriate *Trichosanthes*
- 1b. Petals not fimbriate 2
- 2a. Anther cells conduplicate or flexuous..... 3
- 2b. Anther cells erect, straight 5
- 3a. Calyx tube tubular, anthers included..... *Gymnopetalum*
- 3b. Calyx tube campanulate, anthers not included..... 4
- 4a. Male flowers with large bracts *Momordica*
- 4b. Male flowers without large bracts *Cucumis*
- 5a. Leaves ovate oblong; style not surrounded by annular disk *Cayaponia*
- 5b. Leaves lobbed or deltoied; style surrounded by annular disk 6
- 6a. Connective of anthers narrow, anther lobes straight *Mukia*
- 6b. Connective of anthers broad, anthers transverse or inclined..... 7
- 7a. Leaves amplexicaule..... *Solena*
- 7b. Leaves not amplexicule *Zehneria*

CAYAPONIA Silva Manso

Enum. Subst. Braz. 31. 1836.

Cayaponia laciniosa (L.) C.Jeffrey, *Kew Bull.* 15: 346. 1962; S.S.Renner & A.K.Pandey, *PhytoKeys* 20: 103. 2013. *Bryonia laciniosa* L., *Sp. Pl.* 1013.

1753,p.p. *Bryonopsis courtallensis* Arn., J. Bot. (Hooker) 3: 274. 1841. *Bryonopsis bennettii* Miq., Fl. Ned. Ind. 1: 657. 1855. *Aechmandra zeylanica* Thwaites, Enum. Pl. Zeyl. 125. 1859. *Cerasiocarpum zeylanicum* (Thwaites) Hook.f. in Benth. & Hook.f., Gen. Pl. 1: 832. 1862 & C.B.Clarke in Hook.f., Fl. Brit. India 2: 629. 1879. *Cerasiocarpum bennettii* (Miq.) Cogn.in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 729. 1881; Gamble, Fl. Madras 541(382). 1919; Chakrav., Fasc. Fl. Ind. 11: 18. 1982. *Kedrostis courtallensis* (Arn.) C. Jeffrey, Kew Bull. 15: 353. 1962; Ratheesh, Fl. Stud. Wayanad Dist. 391. 2009 (Plate 9i).

Scabrous creepers. Leaves opposite, 9-13 x 5-7 cm, ovate-oblong, apex acuminate, base cordate, distantly denticulate and coarsely scabrous. Flowers monoecious; male flowers in axillary racemes, female flowers axillary, solitary. Calyx tube campanulate. Petals 5, obovate, free. Stamens in male flowers 3, free, anthers straight. Ovary in female flowers globular, 1-celled; ovules 5-6, style columnar, stigma 3-fid. Berry 8 mm across, globose, smooth; seeds ovoid, marginate.

Kattikari, *KJD 31883*

Fl. & Fr.: August-November

Distribution: Common in evergreen forests of Kattikari, Pothurumi and Chavachi.

CUCUMIS L.

Sp. Pl. 2: 1011. 1753.

- 1a. Connective of anthers lacinate lobed *C. sativus f. hardwickii*
- 1b. Connective of anthers hooded, not lobed..... *C. silentvalleyi*

Cucumis silentvalleyi (Manilal, T.Sabu & P.Mathew) Ghebret. & Thulin, Novon 17: 178. 2007; S.S.Renner & A.K.Pandey, PhytoKeys 20: 112. 2013. *Cucumella silentvalleyii* Manilal, T.Sabu & P.Mathew, Acta. Bot. India 13: 283. 1985; Biju in Manoharan *et al.*, Silent Valley-Whispers Reason 172. 1999; Ratheesh, Fl. Stud. Wayanad Dist. 389. 2009.

Creepers, stems scabrid. Leaves alternate, 4.5 x 5.5 cm, obtusely 5-angular, cordate at base crenate, scabrid; petiole 6 cm long. Flowers monoecious, axillary, solitary, pedicellate. Calyx tube tubular; lobes ovate, acute. Petals 5, 10 x 6 mm, obovate, obtuse, yellow. Stamens 3, free, erect, connective produced into a hood; anthers flexuous, hispid. Ovary fusiform, hispid. Fruit 1.5 x 0.8 cm, ellipsoid, hispid; seeds 3.5 x 2 mm, obovate, compressed, smooth.

Mullenpara, *KJD 26160*

Fl. & Fr.: July-December

Distribution: Rare in evergreen forests of Mullenpara. Endemic to southern Western Ghats (Kerala)

Cucumis sativus L., Sp. Pl. 1012. 1753; S.S.Renner & A.K.Pandey, PhytoKeys 20: 112. 2013. *Cucumis sativus f. hardwickii* (Royle) W.J.de Wilde & Duyfjes, Sandakania 17: 58. 2008. *Cucumis hardwickii* Royle, Ill. Bot. Himal. Mts. 220. t. 47. 1835. *Cucumis prophetarum* sensu C.B.Clarke in Hook.f., Fl. Brit. India 2: 619. 1879; Gamble, Fl. Madras 535(378). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 390. 2009, non L. 1753.

Slender climbers; stems scabrid; tendril simple. Leaves entire or shallowly 5-lobed, alternate, 12 cm across; scabrous; petiole to 15 cm long. Male flowers in fascicles of 3-5; pedicel to 1 cm long. Calyx tube campanulate, hispid. Petals 7 mm long, obovate, yellow. Stamens 3, anthers flexuous, coherent, connective crested with laciniate lobes. Female flowers solitary, calyx corolla similar to male flowers. Ovary oblong, many-ovuled. Berry 3.5 x 2.5 cm, oblong, softly scattered-spinous, greenish-yellow with white stripes; seeds many, compressed.

Paripode, KJD 18787

Fl. & Fr.: September-March

Distribution: Rare in Deciduous forests of Paripode.

GYMNOPETALUM Arn.

in J. Bot. (Hooker) 3: 278. 1841.

Gymnopetalum tubiflorum (Wight & Arn.) Cogn.in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 388. 1881; W.J.de Wilde & Duyfjes, Blumea 51: 292. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 391. 2009. *Bryonia tubiflora* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 347. 1834. *Gymnopetalum wightii* Arn., Madras J. Lit. Sci. 8: 52. 1840; C.B.Clarke in Hook.f., Fl. Brit. India 2: 611. 1879; Gamble, Fl. Madras 530(374). 1919; Chakrav., Fasc. Fl. Ind. 11: 54. 1982; Ansari, Fl. Kasaragod Div. 175. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 199. 1988. *Gymnopetalum zeylanicum* Arn., J. Bot. (Hooker) 3:278.1841.

Stem hispid. Leaves ovate-acute, 5-angled or lobed, base cordate, dentate, hirsute, 8 x 5 cm; petiole to 3 cm. Male flowers in axillary umbels, pedicels to 1 cm long. Calyx tube 2.5 cm long. Corolla white, lobe 5. Stamens 3, inserted on calyx tube. In female flowers calyx and corolla same as male. Staminodes 3. Ovary ovoid, ovules numerous. Fruit ellipsoid, 2.5 cm long.

Pothurumi, NS & KJD 25540

Fl. & Fr.: October-January

Distribution: Rare in evergreen forests of Pothurumi.

MOMORDICA L.

in J. Bot. (Hooker) 3: 278. 1841.

Momordica sahyadrica Kattuk. & V.T.Antony, Nordic J. Bot. 24: 541. 2007; S.S.Renner & A.K.Pandey, PhytoKeys 20: 115. 2013. *Momordica subangulata* sensu Gamble, Fl. Madras 532(375). 1919; Chakrav., Fasc. Fl. Ind. 11: 95. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 393. 2009, non Blume 1826 (Plate 9j).

Perennial climbers; tendrils unbranched. Leaves alternate, entire or 3-5 lobed, 10-16 x 8-18 cm, ovate or broadly triangular in outline, sometimes hastate, apex acute or acuminate, base deeply cordate; lateral veins 5-7 pairs, hairs short, scattered; petiole 3-8 cm long, 1-1.5 mm thick. Male flowers axillary, solitary or a loose fascicle of 5-7 flowers; bract reniform. Sepals free, elliptic oblong. Petals free, obovate, ca 4 x 2.5 cm, bright yellow, three petals with a small tongue-like ciliate appendage near the base. Stamens 3, two of them with a pair of anthers, the other with a single anther. Female flowers solitary, axillary subtended either by a rudimentary bract. Sepals green, lanceolate. Petals greenish-yellow and ciliate at base. Staminodes 5. Ovary oblong-ovoid; style; stigma lobed. Fruits broadly ellipsoid or ovoid to fusiform; seeds black.

Chavachi, KJD 31814

Fl. & Fr.: June-October

Distribution: Rare in evergreen forests of Chavachi and Meenmutty.

Endemic to Western Ghats.

MUKIA Arn.

Madras J. Lit. Soc. 17 : 50. 1840.

Mukia maderaspatana (L.) M.Roem., Fam. Nat. Syn. Monogr. 2: 47. 1846; Manilal & Sivar., Fl. Calicut 123. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 200. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 393. 2009. *Cucumis maderaspatanus* L., Sp. Pl. 1012. 1753. *Bryonia cordifolia* L., Sp. Pl. Pl. 1012. 1753. *Bryonia scabrella* L.f., Suppl. Pl. 424. 1781. *Mukia scabrella* (L.f.) Arn., Hook.'s, J. Bot. 3: 276. 1841; C.B.Clarke in Hook.f., Fl. Brit. India 2: 623. 1879. *Melothria maderaspatana* (L.) Cogn. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 623. 1881; Gamble, Fl. Madras 539(381). 1919; Chakrav., Fasc. Fl. Ind. 11: 83. 1982; Ansari, Fl. Kasaragod Div. 177. 1985; Vajr., Fl. Palghat Dist. 213. 1990.

Stem coarsely scabrous. Leaves alternate, 8-9 x 6-7 cm, ovate, cordate at base; entire or shallowly 5-lobed; spineous serrate, densely scabrous; petiole 6-7 cm long. Male flowers 8-12 together, 4-6 mm across, yellow; pedicel 5-6 mm long.

Calyx densely hairy outside, lobes linear. Petals 2-2.5 mm long, obovate, yellow. Female flowers solitary or 2-3 together. Berry 1-1.5 cm across; seeds obovate, marginate, yellowish white, rugose.

Paripode, KJD 25465

Fl. & Fr.: Throughout the year

Distribution: Along the boundaries near Farm.

SOLENA Lour.

Lour. Fl. Cochinch. 2: 514. 1790.

Solena amplexicaulis (Lam.) Gandhi, Fl. Hassan Dist. 179. 1976; Manilal, Fl. Silent Valley 119. 1988; Ramach. & V.J. Nair, Fl. Cannanore Dist. 200. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 394. 2009; S.S.Renner & A.K.Pandey, PhytoKeys 20: 86. 2013; W.J.de Wilde & Duyfjes, Blumea 49: 71. 2004. *Bryonia amplexicaulis* Lam., Encycl. 1: 496. 1785. *Solena heterophylla* Lour., Fl. Cochinch. 514. 1790; Manilal & Sivar., Fl. Calicut 123. 1982. *Melothria amplexicaulis* (Lam.) Cogn. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 621. 1881; Gamble, Fl. Madras 539(380). 1919; Chakrav., Fasc. Fl. Ind. 11: 77. 1982.

Prostrate or climbing scabrid herbs; tendrils simple. Leaves alternate, very variable, angular or shallowly 3-5-lobed, 4-8 x 3-7 cm, ovate-deltoid, apex acuminate, base cordate, margin denticulate, mucronate, scabrid on both sides; petiole to 6 cm. Male flowers in axillary, sessile clusters. Calyx tube to 2 mm, villous; lobes subulate, erect. Petals 5, 3 mm long, ovate-oblong, obtuse, yellow. Stamens 3, free, inserted at base of calyx tube; anthers oblong, ciliate. Female flowers solitary or in clusters. Ovary villous. Berry 1.2 cm across, globose, red; seeds lenticular, rugose.

Paripode, KJD 26255

Fl. & Fr.: Throughout Year

Distribution: Fairly common in Deciduous forests at Paripode.

TRICHOSANTHES L.

Sp. Pl. 1008. 1753.

- 1a. Leaves unlobed, ovate *T. nervifolia*
- 1b. Leaves palmately lobed 2
- 2a. Lobes of leaf entire, glabrous *T. tricuspidata*
- 2b. Lobes of leaf denticulate, hairy *T. lobata*

Trichosanthes lobata Roxb., Fl. Ind. 3: 703. 1832; C.B.Clarke in Hook.f., Fl. Brit. India 2: 610. 1879; Chakrav., Fasc. Fl. Ind. 11: 117. 1982; S.S.Renner & A.K.Pandey, PhytoKeys 20: 94. 2013. *Trichosanthes perrottetiana* Cogn. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3: 362. 1881; Gamble, Fl. Madras 529(373). 1919. *Trichosanthes villosula* Cogn.in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 3:362. 1881; Gamble, Fl. Madras 529(374). 1919; Chakrav., Fasc. Fl. Ind. 11: 122. 1982. *Trichosanthes villosula* Cogn. var. *nīlgirensis* Kundu, J. Bombay Nat. Hist. Soc. 43: 375. 1943 (Plate 9k).

Climbers; stem glandular. Leaves alternate, 5-lobed, 10 cm across, lobes cuspidate, toothed, densely pubescent beneath. Male racemes to 17 cm long, glandular pubescent. Flowers up to 15 in a raceme; pedicel 2.5-4 cm long; bracts 5 mm long, oblanceolate. Calyx tube 2 cm long, puberulus; lobes linear. Petals 3 x 0.7 cm, white, deeply fimbriate into narrow lobes. Female flowers solitary, axillary. Berry 8 x 3 cm, glabrous, green with white lines; seeds 13 x 6 mm, oblong, rugose along margins.

Pothurumi, NS & KJD 25537

Fl. & Fr.: November-January

Distribution: Fairly common in evergreen forests of Pothurumi. Endemic to Peninsular India.

Trichosanthes nervifolia L., Sp. Pl. 1008. 1753; Gamble, Fl. Madras 529(373). 1919; Chakrav., Fasc. Fl. Ind. 11: 119. 1982; Manilal & Sivar., Fl. Calicut 120. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 395. 2009; S.S.Renner & A.K.Pandey, PhytoKeys 20: 94. 2013. *Trichosanthes cuspidata* Lam., Encycl. 1: 188. 1783; Gamble, Fl. Madras 529(373). 1919.

Scandant herbs; tendrils bifid. Leaves opposite, 6-14 x 5-7 cm, ovate-lanceolate, apex gradually acute, base cordate, margins distantly denticulate, basally 5-nerved, prominent on lower side, membranous; petiole to 3 cm long. Male flowers in racemes; pedicels slender. Calyx-tube c. 1.2 cm long, oblong, dilated above, 5-lobed; lobes filiform. Corolla white, 5-lobed; lobes oblong, fimbriate. Pistillodes 3. Female flowers solitary. Ovary 1-locular, ovoid; ovules many; style slender; stigma entire or lobed. Fruit 7-10 x 3-5 cm, ellipsoid, red on ripening; seeds semi-ellipsoid, compressed, rugulose.

Chavachi, KVB 31537

Fl. & Fr.: September-May

Distribution: Fairly common in evergreen forests of Chavachi and Paripode.

Trichosanthes tricuspidata Lour., Fl. Cochinch. 589. 1790; Ramach. & V.J. Nair, Fl. Cannanore Dist. 201. 1988; Subram., Fl. Thenmala Div. 150. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 395. 2009; S.S.Renner & A.K.Pandey, PhytoKeys 20: 97. 2013. *Trichosanthes bracteata* (Lam.) Voigt, Hort. Suburb. Calcutt. 58. 1845; Manilal & Sivar., Fl. Calicut 119. 1982; Ansari, Fl. Kasaragod Div. 179. 1985; Vajr., Fl. Palghat Dist. 215. 1990. *Modecca bracteata* Lam., Encycl. 4: 210. 1797. *Trichosanthes palmata* Roxb., Fl. Ind. 3: 704. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 2:606. 1879; Gamble, Fl. Madras 529(374). 1919.

Scabrid climbing herbs; tendrils 2-fid. Leaves up to 19 x 17.2 cm, orbicular-cordate, deeply or shallowly 3-5-lobed, margin dentate. Male flowers in axillary racemes; bracts ovate, often purple. Calyx tube to 6.2 cm, lobes lanceolate. Corolla lobes ovate, yellow, fimbriate. Stamens 3. Female flowers solitary. Berries c. 7 cm across, globose, red with orange streaks.

Cross way, KJD 26096

Fl. & Fr.: December-January

Distribution: Rare in evergreen forests of Cross Way.

ZEHNERIA Endl.

Prodr. Fl. Norfolk. 1: 69. 1833.

Zehneria maysorensis (Wight & Arn.) Arn., J. Bot. (Hooker) 3: 275. 1841; Ratheesh, Fl. Stud. Wayanad Dist. 397. 2009; W.J.de Wilde & Duyfjes, Blumea 51: 65. 2006; S.S.Renner & A.K.Pandey, PhytoKeys 20: 101. 2013. *Bryonia maysorensis* Wight & Arn., Prodr. Fl. Ind. Orient. 345. 1834. *Melothria mucronata* sensu Chakrav. Rec. Bot. Sur. India 17: 148. 1959, non (Blume) Cogn. 1881. *Melothria perpusilla* var. *subtruncata* Cogn. in A. & C. DC., Monogr. Phan 3: 606. 1881; Chakrav., Fasc. Fl. Ind. 11: 86. 1982. *Melothria perpusilla* sensu Gamble, Fl. Madras 538(380). 1919, non (Blume) Cogn. 1881.

Herbaceous climbers. Leaves shallowly 3-angled, alternate, 7-8 by 6.5-8 cm, broadly ovate, cordate at base, acute-acuminate at apex, serrate along margins, minutely and densely punctuate above; nerves usually sparsely hispid beneath; petiole 2-3 cm long; tendrils simple. Plants monoecious. Flowers cream-yellow. Male flowers subumbellate. Calyx tube campanulate, ca 3 mm long, glabrous outside, hairy inside; lobes minute, teeth-like. Corolla lobes ovate, acute at apex, ca 2.5 mm long. Stamens 3; filaments ca 3 mm long. Female flowers solitary, axillary or co-axillary to the male peduncle. Calyx oblong, ca 6 by 2 mm. Style ca 3.5 mm long; stigma spreading. Disk 3-lobed, ca 0.75 by 1.25 mm. Staminodes 3,

filiform, ca 3 mm long, hairy. Fruits oblong, finely reticulate rugose; seeds flattened, broadly obovate, smooth at faces.

Ambalappara, NS & KVB 31416

Fl. & Fr.: October-December

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Kattikari, Chavachi, Pothurumi and Ambalappara.

TETRAMELACEAE

TETRAMELES R.Br.

Observ. Pl. Denham & Clapperton 230. 1826.

Tetrameles nudiflora R.Br., Pl. Jav. Rar. (Bennett) 79. t.17. 1838; Hook.f., Fl. Brit. India 2: 627. 1879; Gamble, Fl. Madras 544(384). 1919; Ansari, Fl. Kasaragod Div. 181. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 400. 2009. *Tetrameles grahamiana* Wight, Icon. Pl. Ind. Orient. t. 1956. 1853.

Deciduous dioecious trees, to 45 m high, bole buttressed; bark greyish-white. Leaves alternate, crowded at the apex of branchlets 7.5-20 x 5-12 cm, orbicular-ovate or broadly ovate, apex acute-acuminate, base cordate, margin glandular-serrate; lateral nerves 4-9 pairs, intercostae scalariform, prominent; petiole 5-15 cm long, tomentose. Flowers unisexual, yellowish-green. Male flowers subsessile, in pubescent panicles. Calyx tube very short; lobes 4, ovate, united at base. Petals absent. Stamens 4, opposite the calyx lobes; pistillode rudimentary. Female flowers: calyx connate with the ovary, 4-gonous; lobes 4, short. Petals absent. Ovary inferior, 1-celled, ovules numerous on 4 parietal placentae; styles 4, subulate; stigmas club shaped. Fruit a capsule, urceolate, crowned by persistent calyx segments; seeds minute, brown.

Pookundu, KJD 22536

Fl. & Fr.: March-May

Distribution: Fairly common in Semi-evergreen forests of Valayamchal to Pothanplavu.

Order: **Fabales**

FABACEAE

The Legume Phylogeny Working Group (LPWG) classification 2017 is following here. Valid names here follows

- 1a. Flowers Papilionate, petals not free2
- 1b. Flowers never Papilionate, Petals free sometimes absent**Detarioideae**

- 2a. Leaves bilobed, petals 5 free more or less similar **Cercidoideae**
 2b. Levaes pinnately compund, Petals modified3
 3a. Staminal filaments connate in to sheath or tube..... **Papilionoidea**
 3b. Staminal filaments free or basally connate.....**Caesalpinioideae**

Subfamily CERCIDOIDEAE

BAUHINIA L.

Sp. Pl. 374. 1753.

- 1a. Flowers red, scandent shrubs *B. phoenicea*
 1b. Flowers creamy white, trees *B. malabarica*

Bauhinia malabarica Roxb., Fl. Ind. 2: 321. 1832; Hook.f., Fl. Brit. India 2: 227. 1878; Gamble, Fl. Madras 407(288). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 162. 1988; Sanjappa, Legumes Ind. 3. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 318. 2009. *Piliostigma malabaricum* (Roxb.) Benth. in Miq. Pl. Jungh. 261. 1852; Ansari, Fl. Kasaragod Div. 146. 1985.

Deciduous trees, to 15 m high; bark brown. Leaves bilobed, alternate, 5-10 x 7-12.5 cm, broader than long, suborbicular, apex obtuse, base cordate; 9-11 nerves from the base, palmate, prominent, intercostae reticulate; petiole 25-30 mm long, swollen at tip and base; stipules small. Flowers 6-8 mm across, cream coloured, in axillary corymbs; pedicels slender, upto 2.5 cm. Calyx tube long, thin, pubescent with 5 short lobes. Petals 5, oblong. Stamens 10, all fertile, alternate ones short; anthers versatile. Ovary half inferior, stipitate; ovules many; style filiform; stigma peltate. Pod, 25-30 x 1.8-2.5 cm, straight, flattened, beaked, longitudinally striate, glabrous; seeds 20-30, oblong.

Kanadivechakunnu, *KJD 18741*

Fl. & Fr.: September-March

Distribution: Rare in evergreen forests of Kannadivechakunnu.

Bauhinia phoenicea Wight & Arn., Prodr. Fl. Ind. Orient. 296. 1834; Hook.f., Fl. Brit. India 2: 283. 1878; Gamble, Fl. Madras 408(289). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 162. 1988; Sanjappa, Legumes Ind. 4. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 318. 2009. *Phanera phoenicea* (Wight & Arn.) Benth. in Miq. Pl. Jungh. 262. 1852. *Bauhinia benthamii* Bedd., Icon. Pl. Ind. Or. t. 107. 1868-1874.

Large climbing shrubs. Leaves to 10 cm across, orbicular, deeply bifid above, lobes acute, cordate at base; 9-ribbed from base, nervules parallel. Flowers in red, extra-axillary racemes, axis 10-20-flowered; pedicel 3 cm long. Calyx tube short, lobes 2 cm long, oblong, puberulus outside. Petals 5, 4 x 0.8 cm, long-clawed, spreading. Stamens 4 or 5, exserted, anthers linear, 6 mm long. Ovary stalked, many ovuled; style slender; stigma peltate. Pods to 16 x 2.5 cm, oblong, broaden above, densely rusty, pubescent; seeds many.

Chavachi, *KJD 22583*

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Chavachi and Moonamthode, plantations of Kariyenkappu and Seni-evergreen forests of Narikkadavu, Pookundu, Kurukathode and Paripode. Endemic to Western Ghats.

Subfamily DETARIOIDEAE

- 1a. Ovules 3-many, seeds usually more than one2
- 1b. Ovules 1-2, seeds oneKingiodendron
- 2a. Petals 3-5, stipule large foliaceous with basal appendages..... Humboldtia
- 2b. Petals 0, stipules otherwise Saraca

HUMBOLDTIA Vahl

Symb. Bot. (Vahl) 3: 106. 1794, *nom. cons.*

Humboldtia brunonis Wall., Pl. Asiat. Rar. (Wallich) 3: 17. t.233. 1832; Hook.f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Madras 411(291). 1919; Sanjappa, Blumea 31: 333. 1986 & Legumes Ind. 30. 1992; Ansari, Fl. Kasaragod Div. 145. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 166. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 326. 2009 (Plate 9l).

Trees, to 10 m high; bark brown to black. Leaves paripinnate, alternate, leaflets (2)-4, opposite, 7-20 x 2.2-8 cm, obovate oblong, oblong or elliptic, apex obtusely acuminate, base unequal; lateral nerves 7-13 pairs, pinnate, ascending, intercostae reticulate; rachis 20-40 mm long, obscurely winged; petiolules 3-5 mm long; stipules linear, depressed glandular. Flowers 2-3 cm long, white, in axillary pendulous, racemes; bracts ovate, acute, pubescent without, fugacious; bracteoles 2, connate below. Calyx tube 8-10 mm long, lined by the disk, pubescent without; lobes 4. Petals 3, white, pink or dull white, ovate, shortly clawed. Stamens 5, perfect, free, alternating with 5 minute staminodes. Ovary half inferior, stipitate; ovules 3-5, densely pubescent; style filiform; stigma capitate. Pod 5-10 x 2-4 cm, dolabriform; seeds 3-4.

Kattikari, *NS & KJD 31903*; Kariyenkappu *KVB 31213*; Pothurumi, *KVB 31617*



a. *Glochidion hohenackeri* var. *hohenackeri*



b. *Indotristicha ramosissima*



b. *Blepharistemma serratum*



d. *Casearia ovata*



e. *Scolopia crenata*



f. *Rinorea bengalensis*



g. *Begonia crenata*



h. *Begonia integrifolia*



i. *Cayaponia laciniosa*



j. *Momordica sahyadrica*



k. *Trichosanthes lobata*



l. *Humboldtia brunonis*

Fl. & Fr.: July-February

Distribution: Common in evergreen forests of Kariyenkappu, Chavachi, Chelachode, Moonamthode, Kattikari, Meenmutty, Kannadivechakunnu and Kurumbankallu. Endemic to southern Western Ghats.

KINGIODENDRON Harms

Nat. Pflanzenfam. Nachtr. 1: 194. 1897.

Kingiodendron pinnatum (Roxb. ex DC.) Harms, Nat. Pflanzenfam. 1(1): 194. 1897; Gamble, Fl. Madras 412(292). 1919; Sanjappa, Legumes Ind. 32. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 326. 2009. *Hardwickia pinnata* Roxb. ex DC. in DC. Prodr. 2:487.1825; Hook.f., Fl. Brit. India 2:270.1878 (Plate 10a).

Evergreen trees, to 30 m high; bark greyish-brown.; exuding a sticky resin. Leaves imparipinnate, alternate; leaflets 5-9, alternate, 4.5-10.5 x 2-4.5 cm, ovate-lanceolate or oblong, apex acuminate, falcate or oblique; lateral nerves 8-13, pinnate, secondary laterals present, intercostae reticulate; rachis 10-15.2 cm, pulvinate; petiolule 5-10 mm; stipules minute, lateral. Flowers 2-3 mm across, white, in axillary and terminal paniced racemes. Calyx tube almost wanting, lobes 5, broadly ovate, imbricate. Petals 0; disk very small. Stamens 10, equal, filaments filiform, villous at base; anthers versatile. Ovary half inferior, sessile, villous at base; ovules 2; style subulate; stigma minute, oblique. Fruit a pod, 4-5 x 2-2.5 cm, ovate-ellipsoid, turgid, obtusely beaked, prominently veined, dark brown, indehiscent; seed one, pendulous.

Chavachi, KVB 31533

Fl. & Fr.: January-December

Distribution: Rare in evergreen forests of Chavachi and Pothurumi. Endemic to southern Western Ghats; Conservation status: Endangered.

SARACA L.

Syst. Nat. (ed 12) 2: 469. 1767.

Saraca asoca (Roxb.) W.J.de Wilde, Blumea 15: 393. 1968; Manilal & Sivar., Fl. Calicut 94. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 167. 1988; Sanjappa, Legumes Ind. 35. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 327. 2009. *Jonesia asoca* Roxb., Asiat. Res. 4: 365. 1799. *Saraca indica* sensu Bedd., Fl. Sylv. S. India: t. 57. 1870; Hook.f., Fl. Brit. India 2: 271. 1878, non L. 1769; Gamble, Fl. Madras 409(289). 1919.

Trees, to 10 m high; bark brown. Leaves paripinnate, alternate; leaflets 6-12, opposite, 7-28.5 x 2-8.5 cm, narrowly oblong, oblong-ovate or lanceolate, round, cuneate or acute, apex acute or acuminate, base obtuse; lateral nerves 10-15

pairs, pinnate, arched towards the margin, intercostae reticulate; rachis 4-25 cm long, pulvinate; stipules intra petiolar, scarious. Flowers axillary to leaves of leaf scar, paniculate corymbs, yellow-orange or red; bracts ovate; bracteoles oblong-SPATHULATE. Calyx 4 cm long, petaloid, cylindric, enclosing a lobed disk; lobes 4, ovate-oblong, unequal. Petals 0. Stamens 7 or 8, much exserted; filaments long. Ovary half inferior, stipitate, the stipe adnate below to one side of the disk; style incurved, filiform; stigma small, capitate; ovules many. Pod 10-5 x 2-5 cm, flat, oblong; seeds 2-8, 3.8 cm long.

Chavachi, NS & KVB 31308

Fl. & Fr.: January-August

Distribution: Rare in evergreen forests of Meenmutty, Chavachi and Pottichapara.

Conservation status: Vulnerable.

Subfamily CAESALPINIOIDEAE

- 1a. Flowers actinomorphic; petals valvate in bud; stamens usually indefinite2
- 1b. Flowers zygomorphic; petals imbricate or zero; stamens 10 or fewer8
- 2a. Plants armed with spines3
- 2b. Plants unarmed.....4
- 3b. Fruit rugose, wrinkled Acacia
- 3b. Fruit neither rugose nor wrinkled Senegalia
- 4a. Pods bristly, to 3 x 0.5 cm or less Mimosa
- 4b. Pods not bristly, over 5 cm long5
- 5a. Leaves with 1 pair of pinnae.....6
- 5b. Leaves with 2 or more pairs of pinnae7
- 6a. Fruit obliquely oblong, seed without a funicle Xylia
- 6b. Fruit circinate, seed attached by a funicle..... Archidendron
- 7a. Climber, leaf rachis ending in tendril Entada
- 7b. Trees, leaves without tendril..... Albizia
- 8a. Leaves bipinnate, rachis armed9
- 8b. Leaves one-pinnate or simple, rachis unarmed 11
- 9a. Fruit winged; leaflets 3-5 pairs Caesalpinia p.p.
- 9b. Fruit not winged; leaflets 7 or more pairs 10
- 10a. Flowers sessile, orange red..... Moullava
- 10b. Flowers pedicelled, yellow..... Caesalpinia p.p.
- 11a. Fruit woody, terete, 30-40 cm long; flowers several in long drooping racemes... Cassia
- 11b. Fruit flat or four angled or winged, inflorescence otherwise 12
- 12a. Leaflets 15 or more pairs, less than 2 mm wide Chamaecrista
- 12b. Leaflets less than 7 pairs, more than 15mm wide Senna

ACACIA Mill.

Gard. Dict. ed. 4. 28. 1754.

Acacia sinuata (Lour.) Merr., Trans. Amer. Philos. Soc. n.s.24: 186. 1935; Ramach. & V.J. Nair, Fl. Cannanore Dist. 168. 1988; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 625. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 333. 2009. *Mimosa sinuata* Lour., Fl. Cochinch. 653. 1790. *Mimosa concinna* Willd., Sp. Pl. 4: 1039. 1806. *Acacia concinna* (Willd.) DC. in DC. Prodr. 2: 464. 1825; Hook.f., Fl. Brit. India 2: 296. 1878; Gamble, Fl. Madras 429(304). 1919; Sanjappa, Legumes Ind. 38. 1992. *Acacia concinna* (Willd.) DC. var. *rugata* (Benth.) Baker in Hook.f., Fl. Brit. India 2: 297. 1878. *Acacia rugata* (Lam.) J. Voigt, Hort. Suburb. Calcutt. 263. 1845, non Benth. 1842; Gamble, Fl. Madras 429(304). 1919.

Scandent shrubs with stout recurved prickles, stem with warty tubercles; branchlets pubescent, black. Leaves alternate, bipinnate, pinnae 8-10 pairs, to 5 cm long; leaflets sessile, 25-30 pairs, to 6 x 1 mm, oblong, truncate at base, pubescent; rachis to 4 cm long, prickled, gland near the base spherical, sessile. Heads axillary, solitary or paired, 1 cm across, in axillary and terminal racemes; peduncle 3 cm long. Calyx 3 mm long, dull red, 5-lobed. Petals white longer than the calyx. Stamens numerous; filaments 5 mm long, basally connate. Pods rugose and wrinkled, reddish-brown, 12 x 2 cm; seeds 7-12, transverse.

Kariyenkappu, *KJD 22515*

Fl. & Fr.: February-March

Distribution: Rare in plantations of Kariyenkappu.

ALBIZIA Durazz.

Mag. Tosc. 3(4): 13. 1772.

- 1a. Leaflets under 5 mm broad2
- 1b. Leaflets over 1.5 cm broad3
- 2a. Stipules large, foliaceous, pinnae 12-18 pairs, leaflets 5-7 mm long *A. chinensis*
- 2b. Stipules small, deciduous, piannae 4-6 pairs, leaflets 1.5-2 cm long . *A. odoratissima*
- 3a. Flower heads in axillary fascicles, flowers pedicelled *A. lebeck*
- 3b. Flower heads in terminal panicles, flowers sessile *A. procera*

Albizia chinensis (Osbeck) Merr., Amer. J. Bot. 3: 575. 1916; Manilal & Sivar., Fl. Calicut 100. 1982; Sanjappa, Legumes Ind. 54. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 584. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 336. 2009. *Mimosa chinensis* Osbeck, Dagbok. Ostind. Resa 233. 1757. *Acacia stipulata* DC.

in DC. Prodr. 2: 469. 1825. *Albizia stipulata* (Roxb.) Boivin, Encycl. 19:33. 1838; Hook.f., Fl. Brit. India 2: 300. 1878. *Mimosa stipulata* Roxb., Fl. Ind. 2: 549. 1832. *Albizia marginata* (Lam.) Merr., Philipp. J. Sci. 5: 23. 1910; Gamble, Fl. Madras 433(307). 1919. *Mimosa marginata* Lam., Encycl. 1:12.1783.

Deciduous trees, to 25 m high; bark brownish-grey. Leaves bipinnate, alternate, pinnae 4-20 pairs, 8-12.5 cm long; with a gland in between each pairs; leaflets 50-90, opposite, even pinnate, sessile, 3-6 x 15-18 mm, falcate-lanceolate or falcate, apex acute, base oblique, subtruncate or obtuse; lateral nerves obscure; rachis 18-35 cm, pulvinate, with a gland near its base on upper side; stipules 2.5-4 x 1 cm. Flowers white, in globose heads, 2-6 in axillary fascicles or arranged in terminal and axillary panicles; bracts stipular, persistent. Calyx 2.5-5 x 1-2 mm, funnel shaped, pubescent. Petals 5, connate, 6-10 mm long, funnel shaped, pubescent. Stamens many, yellowish, monadelphous at the base. Ovary ca. 1.5 mm long, sessile; style upto 3 cm long. Pod 15-20 x 2.5 cm, strap shaped, flat, reddish-brown, slightly bullate over the seeds; seeds 8-20, 6-10 x 5-8 mm, flat.

Bhoothamkallu, KJD 18715

Fl. & Fr.: March-July

Distribution: Rare in semi-evergreen forests of Bhoothamkallu.

Albizia lebbeck (L.) Benth., Hook.'s London J. Bot. 3: 87. 1844; Hook.f., Fl. Brit. India 2: 298. 1878; Gamble, Fl. Madras 432(306). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 170. 1988; Sanjappa, Legumes Ind. 56. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 589. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 336. 2009. *Mimosa lebbeck* L., Sp.Pl.516. 1753. *Mimosa sirissa* Roxb., Fl. Ind. 2: 544. 1832.

Deciduous trees, to 25 m high; bark yellowish-brown. Leaves bipinnate, alternate, pinnae 2-4 pairs, 5.5-12 cm long; leaflets 8-20, opposite, even pinnate, gland in between each leaflets, 2.7-5 x 1-2.5 cm, obliquely oblong, base of one half cuneate, other round, apex obtuse; lateral nerves 6-8 pairs, intercostae reticulate; rachis 7-9 cm long, with a gland at its base, pulvinate; stipules small. Flowers greenish-white, in subglobose heads, 3.5-3.7 cm long, solitary or 2-4 together in axillary corymbose racemes. Calyx tube funnel-shaped pubescent, 3-4.5x1.5-3 mm, teeth triangular. Corolla united infundibuliform, greenish, lobes 5, pubescent without. Stamens many, filament tube shorter. Ovary subsessile; style 2.5 cm, filiform; stigma minute. Fruit a pod 20-30 x 4-5 cm, flat, oblong, turgid above the seeded region; seeds ovate, flattened.

Paripode, KJD 18781

Fl. & Fr.: March-December

Distribution: Rare in plantations of Kariyenkappu.

Albizia odoratissima (L.f.) Benth., Hook.'s London J. Bot. 3: 88. 1844; Hook.f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Madras 431(306). 1919; Ansari, Fl. Kasaragod Div. 149. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 170. 1988; Sanjappa, Legumes Ind. 57. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 593. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 336. 2009. *Mimosa odoratissima* L.f., Suppl. Pl. 437. 1781. *Acacia odoratissima* (L.f.) Willd., Sp. Pl. 4: 1063. 1806.

Deciduous trees, to 30 m high; bark greyish-brown. Leaves bipinnate, 2-8 pairs, 5-13 cm long, puberulent, glands between the junctions of 1-2 distal pairs; leaflets 14-40, opposite, even pinnate, 1.8-2.5 x 0.5-1.2 cm, oblong, apex obtuse and apiculate, base oblique; lateral nerves 3-6 pairs; intercostae reticulate; rachis 20-30 cm long, pulvinate, with a gland at the base; stipule free. Flowers white, in globose heads forming terminal panicles, pubescent. Calyx tube cupular, 1-1.5 x 1-1.3 mm, teeth minute, deltoid. Petals connate, broadly funnel shaped, lobes 5, ovate-lanceolate. Stamens many, 1.2-2 cm long, monadelphous at base, tube as long as or shorter than the corolla tube. Ovary stipitate, glabrous or pilose; style filiform; stigma terminal. Pod 15-20 x 2.5-3.7 cm, flat, strap-shaped; seeds 6-12, oblong, orbicular, compressed.

Paripode, KJD 22565

Fl. & Fr.: April-January

Distribution: Rare in semi-evergreen forests of Paripode.

Albizia procera (Roxb.) Benth., Hook.'s London J. Bot. 3: 89. 1844; Hook.f., Fl. Brit. India 2: 299. 1878; Gamble, Fl. Madras 431(306). 1919; Sanjappa, Legumes Ind. 58. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 594. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 337. 2009. *Mimosa procera* Roxb., Pl. Coromandel t. 121. 1798.

Deciduous trees, to 30 m high; bark greenish-yellow. Leaves bipinnate, alternate, 2-5 (6) pairs, 9.7-27 cm long, puberulous; leaflets 4-20, opposite, even pinnate; 2.5-5 x 1.8-3 cm, obliquely oblong, ovate or oblong-ovate, apex round or subacute, base unequal; lateral nerves 6-10 pairs; intercostae reticulate; rachis 13-30 cm long, pulvinate, puberulous, with a prominent gland near its base; stipule free. Flowers yellowish-white, in globose heads, forming axillary or terminal panicles. Calyx tube narrowly obconic, 2.5-3 x 1.5-2 mm, glabrous,

teeth triangular. Petals connate, 5-7 mm long, 5-lobed; lobes oblong-elliptic, puberulous towards apex. Stamens many, 8-12 mm long, monadelphous at base, tube longer than the corolla tube. Pod 10-20 x 1.8-2.5 cm, strap-shaped, flat; seeds 5-12, ovate-elliptic, compressed, greenish-brown.

Pookundu, *KJD 18778*

Fl. & Fr.: July-August

Distribution: Rare in Semi-evergreen forests of Pookundu.

ARCHIDENDRON F.Muell.

Fragm. 5: 59. 1865.

- 1a. Large shrubs; staminal filament 1.5 cm long *A. monadelphum* var. *gracile*
1b. Trees; staminal filaments ca. 1 cm long *A. bigeminum*

Archidendron bigeminum (L.) I.C.Nielsen, *Opera Bot.* 76: 73. 1985; Ratheesh, *Fl. Stud. Wayanad Dist.* 338. 2009. *Mimosa bigemina* L., *Sp. Pl.* 517. 1753. *Archidendron monadelphum* (Roxb.) I.C.Nielsen, *Adansonia* 19: 21. 1979; Sanjappa, *Legumes Ind.* 61.1992. *Mimosa monadelpha* Roxb., *Fl. Ind.* 2:544.1832. *Pithecellobium bigeminum* (L.) Mart. ex Benth., *Hook.'s London J. Bot.* 3: 206. 1844; Hook.f., *Fl. Brit. India* 2: 303. 1878; Gamble, *Fl. Madras* 435(308). 1919. *Pithecellobium monadelphum* (Roxb.) Kosterm., *Reinwardtia* 3: 11. 1954; Manilal & Sivar., *Fl. Calicut* 100.1982; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 171.1988. *Abarema bigemina* (L.) Kosterm., *Bull. Org. Sci. Res. Indonesia* 51, f. 34,35. 1954.

Evergreen trees; to 12 m high; bark reddish-brown. Leaves bipinnate, alternate, pinnae 2, opposite, 11-13 cm long, slender; leaflets 4-8, opposite, with a gland in between every pair of leaflets, 6.5-12 x 2.5-5 cm, obovate, oblong or elliptic-acuminate, apex acuminate, base unequally acute; lateral nerves 8-14 pairs, pinnate; intercostae reticulate; rachis 10-11 cm long, slender, pulvinate, pubescent, with a gland near its base; stipules inconspicuous. Flowers white in terminal and axillary panicles; bracteoles lanceolate. Calyx campanulate, 1.5 mm long, lobes 4, minute, acute. Petals 4, basally connate, 4 mm long, lobes ovate, acute. Stamens 4, monadelphous, much exerted. Ovary sessile; style filiform; stigma minute; ovules many. Pod 10 x 1.5-2 cm, strap-shaped, dehiscent; seeds 3-8, ovoid, smooth, without aril, funicle filiform.

Chelachode, *KVB 31539*

Fl. & Fr.: March-April

Distribution: Common in evergreen forests of Chavachi, Kariyenkappu to Moonamthode, Asthippara and Paripode.

Archidendron monadelphum (Roxb.) I.C.Nielsen var. **gracile** (Bedd.) Sanjappa, Legumes India 62. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 338. 2009. *Pithecellobium gracile* Bedd., Madras J. Lit. Sci. ser. 3, 1: 44. 1864; Gamble, Fl. Madras 435(308). 1919; Ansari, Fl. Kasaragod Div. 151. 1985. *Abarema monadelpha* (Roxb.) Kosterm. var. *gracile* (Bedd.) Kosterm., Bull. Org. Natuur. Ord. Indonesia 20: 50. 1954.

Slender shrubs or small trees. Leaves bipinnate, alternate, pinnae 1, opposite, leaflets 2-6, opposite, 6.5-12 x 2.5-5 cm, ovate, caudate acuminate, base unequally acute, margin entire; lateral nerves 8-14 pairs, pinnate, prominent, secondary lateral also prominent; intercostae reticulate; stipules inconspicuous; rachis 10-11 cm long, slender, pulvinate, pubescent, with a gland near its base. Flowers white, in terminal panicles; bracteoles lanceolate. Calyx short campanulate, lobes 4. Petals 4, basally connate. Stamens 4, monadelphous, much exerted. Ovary sessile, style filiform, stigma minute, ovules many.

Moonamthode, *KJD 31843*

Fl. & Fr.: October-March

Distribution: Fairly common in evergreen forests of Moonamthode and Kattikari, Semi-evergreen forest of Paripode and Narikkadavu. Endemic to southern Western Ghats.

CAESALPINIA L.

Sp. Pl. 380. 1753.

Caesalpinia cucullata Roxb., Fl. Ind. 2: 358. 1832; Ramach. & V.J. Nair, Fl. Cannanore Dist. 163. 1988; Sanjappa, Legumes Ind. 10. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 320. 2009. *Mezoneurum cucullatum* (Roxb.) Wight & Arn., Prodr. Fl. Ind. Orient. 283. 1834; Hook.f., Fl. Brit. India 2: 258. 1878; Gamble, Fl. Madras 395(279). 1919; Sivar. & Mathew, Fl. Nilambur 236. 1997.

Stout climbers; old stem covered with strong thorns with clavate thick base. Leaves paripinnate, 45 cm long; pinnules 5 or 6 pairs; leaflets 3 pairs, 10 x 4 cm, ovate, acuminate, glabrous; rachis with strong curved thorns. Racemes to 25 cm long, clustered. Flowers yellow, 2 cm across, irregular, cucullate. Sepals unequal, lobes obtuse, glabrous. Petals unequal, orbicular. Stamens 10; filaments glabrate. Ovary sessile, 2-many ovuled; style filiform; stigma capitate. Pods 10 x 2.5 cm, flattened, oblong, obtuse, glabrous.

Paripode, *KJD 22585*

Fl. & Fr.: December-March

Distribution: Fairly common in plantations of Kariyenkappu, semi-evergreen forests of Kurukathode and Paripode.

Caesalpinia mimosoides Lam., Encycl. 1: 452.1785; Hook.f., Fl. Brit. India 2:256.1878; Gamble, Fl. Madras 394(279). 1919; Manilal & Sivar., Fl. Calicut 98. 1982; Ansari, Fl. Kasaragod Div. 141. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 163. 1988; Sanjappa, Legumes Ind. 12. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 321. 2009.

Straggling shrubs with tuberous root stock, prickly all over; twigs glandular hairy. Leaves to 40 cm long; pinnae 12-18 pairs; leaflets 10-15 pairs, c. 6 x 3 mm, oblong or elliptic, apex obtuse, base unequal; rachis prickly and glandular hairy. Flowers ca. 2.5 cm across, bright yellow, in terminal and leaf-opposed racemes up to 40 cm long. Calyx-tube 2 mm long; lobes 5, 0.9-1.2 cm long, oblong or obovate, glandular. Petals 5, yellow, c. 1.2 x 1 cm, orbicular; upper petal c. 1.2 x 0.5 cm, obovate, spathulate, clawed. Stamens 10; filaments subequal, hairy at base. Ovary stipitate, oblong, 2-4-ovuled; stigma entire. Pods c. 4.5 x 2.5 cm, oblong-obvoid, turgid; seeds 2.

Paripode, *KJD 22584*

Fl. & Fr.: February-September

Distribution: Fairly common along the boundaries of the Farm.

CASSIA L.

Sp. Pl. 376. 1753.

Cassia fistula L., Sp. Pl. 377. 1753; Hook.f., Fl. Brit. India 2: 201. 1878; Gamble, Fl. Madras 400(283). 1919; Manilal & Sivar., Fl. Calicut 96. 1982; Ansari, Fl. Kasaragod Div. 143. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 164. 1988; Sanjappa, Legumes Ind. 15. 1992; V. Singh, Monogr. Indian Subtribe Cassiinae 25. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 322. 2009. *Cassia rhombifolia* Roxb., Fl. Ind. 3: 334. 1832.

Deciduous trees, to 18 m high; bark dark grey. Leaves paripinnate, alternate, leaflets 6-16, opposite, 5-18.5 x 3-6.5 cm, ovate, ovate-lanceolate or oblong-ovate, apex acuminate, base obtuse, round or acute, glaucous and puberulent beneath; lateral nerves 9-25; intercostae reticulate; rachis 14.5-36 cm, pulvinate; stipules small, free. Flowers 3.7-5 cm across, yellow, in axillary drooping racemes. Calyx tube short, lobes 5, 1 x 0.6 cm, ovate, apex obtuse, reflexed. Petals 5, 2.5 x 1.5 cm, obovate, subequal, clawed. Stamens 10, all fertile; upper 3 short with erect filaments to 7.5 mm; lower 3 large with curved filaments; medium 4 with erect filaments. Ovary appressed-pubescent; ovules many; style to 5 mm; stigma punctiform. Pod 30-60 x 1.2-1.6 cm, cylindrical, black, indehiscent, transversely septate; seeds 25-100, pale brown.

Kariyenkappu, *KJD 18793*

Fl. & Fr.: February-September

Distribution: Earlier settlements at Kariyenkappu.

CHAMAECRISTA (L.) Moench

Methodus (Moench) 272. 1794.

Chamaecrista mimosoides (L.) Greene, Pittonia 4:27.1899; V. Singh, Monogr. Indian Subtribe Cassiinae 67. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 323. 2009. *Cassia mimosoides* L., Sp. Pl. 379. 1753; Hook.f., Fl. Brit. India 2: 266. 1878; Gamble, Fl. Madras 403(285). 1919; Manilal & Sivar., Fl. Calicut 95. 1982; Ansari, Fl. Kasaragod Div. 144. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 165. 1988; Sanjappa, Legumes Ind. 17. 1992; Sunil & Sivadasan, Fl. Alappuzha Dist. 255. 2009.

Shrubs or herbs, young stem, rachis often appressed hairy. Leaves spirally arranged or distichous, paripinnate, 4-8 cm long; leaflets opposite 24-50 pairs, 3-6 x 1-2 mm, linear-oblong, oblique at base, margins ciliate; rachis with a sessile gland near the base; stipules linear 5-8 mm long. Flowers solitary or many-flowered, racemes, axillary or supra axillary; peduncle 1-2 cm long; bracts ovate, 3-6 mm long; bracteoles scarious; pedicels 0.5-1.5 cm long. Sepals 5, lanceolate, 4-5 mm long. Petals 5, yellow, 5-8 mm long, obovate. Stamens 10, alternate short and long. Ovary linear, densely silky hairy, stigma truncate. Pods 3-6 x 0.4-0.5 cm. plano-compressed, thickened along sutures, elastically dehiscent; seeds c. 20, ellipsoid.

Ambalappara, KJD 26310; NS & KJD 25519

Fl. & Fr.: July-December

Distribution: Fairly common in grasslands of Ambalappara.

ENTADA Adans.

Fam. Pl. 2: 318, 554. 1763, *nom. cons.*

Entada rheedei Spreng., Syst. Veg. 2: 325. 1825 "rheedii"; Ramach. & V.J. Nair, Fl. Cannanore Dist. 170. 1988; Sanjappa, Legumes Ind. 66. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 339. 2009. *Mimosa entada* L., Sp. Pl. 518. 1753. *Entada pursaetha* DC. in DC. Prodr. 2: 425. 1825; Ansari, Fl. Kasaragod Div. 150. 1985. *Entada monostachya* DC. in DC. Prodr. 2: 425. 1825; *Entada scandens* sensu Hook.f., Fl. Brit. India 2: 86. 1878, non Benth. 1841; Gamble, Fl. Madras 417(296). 1919.

Lianas, tendrillate, stems glabrous. Leaves bipinnate, pinnae 2 or 3 pairs, the terminal pair modified into a tendril; leaflets 4-7 pairs, 5 x 2.5 cm, curved-oblong,

obtuse, inequilateral. Spikes to 35 x 0.8 cm, axillary, solitary or paired, erect. Flowers 3 mm long, densely packed, yellow. Calyx cupular, truncate. Petals 4, free, valvate. Stamens 10, free; filaments 6 mm long. Ovary many-ovuled; style slender; stigma concave. Pods to 1 m long, thick, woody, crenate on both sutures; seeds many, biconvex, 5 cm across, orbicular, smooth.

Kariyenkappu, *KJD 26369*

Fl. & Fr.: December-April

Distribution: Fairly common in Semi-evergreen forests of Kurukanthode, Kariyenkappu and Pothanplavu.

MIMOSA L.

Sp. Pl. 516. 1753.

- 1a. Pinnae 1 or 2 pairs; stamens 4.....*M. pudica*
1b. Pinnae 5 or 6 pairs; stamens 8.....*M. diplotricha*

Mimosa diplotricha Sauvalle, *Anales Acad. Ci. Med. Habana* 5: 405. 1868; Delin Wu & Ivan C. I. Nielsen, *Flora China* 10: 53. 2010. *Mimosa invisia* C. Mart., *Flora* 20: Biebl. 8: 121. 1837, non C. Mart. ex Colla 1834; Nair, *Journ. Bombay Nat. Hist. Soc.* 61:469.1964; Manilal & Sivar., *Fl. Calicut* 101. 1982; Sanjappa, *Legumes Ind.* 68. 1992.

Rambling shrubs, stem pubescent, prickles short, in 4-rows. Leaves to 10 cm long, pinnae opposite, to 5 cm long, leaflets to 35 pairs, to 5 x 1 mm, oblong, truncate at base, glabrous; rachis prickled. Head to 1.5 cm across, in terminal racemes, peduncled. Flowers many, 3 mm long, pink. Stamens 10, filaments 6 mm long. Pods 2-5 cm long, bristly, black when mature.

Paripode, *KJD 26250*

Fl. & Fr.: October-December

Distribution: Common near Farm as weed.

Mimosa pudica L., *Sp. Pl.* 518. 1753; Hook.f., *Fl. Brit. India* 2: 291. 1878; Gamble, *Fl. Madras* 421(298). 1919; Manilal & Sivar., *Fl. Calicut* 101. 1982; Ansari, *Fl. Kasaragod Div.* 150. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 171. 1988; Sanjappa, *Legumes Ind.* 69. 1992; Ratheesh, *Fl. Stud. Wayanad Dist.* 340. 2009.

Straggling herbs; stem 4-angular, without prickles. Leaves alternate to 12 cm long, pinnae 5-10 pairs; leaflets ca 20 pairs, oblong, 3-7 by 0.75-1 mm, overlapping, apex acute-mucronate, base oblique-truncate; rachis, tomentose;

Flowers pink. Calyx campanulate, 4 toothed. Petals 4, connate below. Stamens as many as petals. Ovary stiptate, many ovuled. Pod flat, margin with recurved prickles; seeds 3-5, subrhombic.

Narikkadavu, *KJD 26394*

Fl. & Fr.: July-January

Distribution: Along the boundaries of the Farm.

MOULLAVA Adans.

Fam. Pl. 2: 318. 1763.

Moullava spicata (Dalzell) Nicolson, Bot. Hist. Hort. Malabaricus 181. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 167. 1988; Ansari, Fl. Kasaragod Div. 146. 1985; Sanjappa, Legumes Ind. 33. 1992; Sivar. & Mathew, Fl. Nilambur 237. 1997. *Caesalpinia spicata* Dalzell, Hooker's J. Bot. Kew Gard. Misc.. 3: 90. 1851; Ratheesh, Fl. Stud. Wayanad Dist. 321. 2009. *Wagatea spicata* (Dalzell) Wight, Icon. Pl. Ind. Orient. t. 1995. 1853; Hook.f., Fl. Brit. India 2: 261. 1878; Gamble, Fl. Madras 397(281). 1919; Manilal & Sivar., Fl. Calicut 98. 1982.

Scandent shrubs with sharp scattered prickles. Leaves alternate, 30 cm long, pinnae 4 or 5 pairs; leaflets 5 or 6 pairs, to 4 x 2.5 cm, elliptic-oblong, obtuse or acute, base rounded or cordate, glabrous above, pale beneath. Racemes paniced, to 50 cm long; flowers subsessile. Calyx scarlet, lobes oblong, obtuse, densely puberulous. Petals ovate-spathulate, reticulately veined, orange-yellow, ca. 1 cm long. Alternate stamens long and short, filaments pilose at base. Ovary pubescent; ovules 4-6; stigma shortly 2-lobed. Pods linear-oblong, subtorulose, to 5 x 1.5 cm; seeds 3 or 4.

Meenmutty, *KVB 31268*

Fl. & Fr.: March-January

Distribution: Common in evergreen forests of Meenmutty, Kariyenkappu, Chavachi, Moonamthode and Kurukathode. Endemic to Western Ghats.

SENEGALIA Raf.

Sylva Tellur. 119. 1838

- 1a. Leaflets 1 mm wide, 40-60 pairs per pinna *S. pennata*
- 1b. Leaflets 2 mm or more wide, leaflets 12-30 pairs per pinna2
- 2a. Leaflets 3-4 mm wide; pods reddish brown*S. torta*
- 2b. Leaflets 2 mm wide; pods yellowish *S. caesia*

Senegalia caesia (L.) Maslin, Seigler & Ebinger, *Blumea* 58: 40. 2013. *Mimosa caesia* L., Sp. Pl. 522. 1753p.p. *Acacia caesia* (L.) Willd., Sp. Pl. 4: 1090. 1806; Gamble, Fl. Madras 428(304). 1919; Ansari, Fl. Kasaragod Div. 148. 1985; Sanjappa, Legumes Ind. 37. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 604. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 332. 2009. *Acacia intsia* Willd. var. *caesia* (L.) Baker in Hook.f., Fl. Brit. India 2: 297. 1878. *Acacia columnaris* Craib., Bull. Misc. Inf. Kew 1915: 410. 1915; Gamble, Fl. Madras 429(304). 1919.

Stout ramblers; old stem 4-6-angled; prickles strong, recurved, bark fibrous. Leaves 20-25 cm long, pinnae 5-8 pairs, to 7 cm long; leaflets 18-22 pairs, to 11 x 3.5 mm, oblong, apiculate at apex, truncate at base; thinly pubescent below, 3-nerved from base. Heads terminal, paniced. Pods to 13 x 2.2 cm, oblong, flat, acuminate at both ends, marginate.

Narikkadavu, NS & KVB 31456

Fl. & Fr.: October-May

Distribution: Common in plantations of Kariyenkappu, semi-evergreen forest of Paripode and Narikkadavu.

Senegalia pennata (L.) Maslin, *Nuytsia* 22(6): 466. 2012; Maslin, Seigler & Ebinger, *Blumea* 58: 40. 2013. *Acacia pennata* (L.) Willd., Sp. Pl. 4: 1090. 1806; Hook.f., Fl. Brit. India 2: 297. 1878p.p.; Gamble, Fl. Madras 429(304). 1919; Manilal & Sivar., Fl. Calicut 100. 1982; Ansari, Fl. Kasaragod Div. 148. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 168. 1988; Sanjappa, Legumes Ind. 42. 1992; Chakrab. & Gangop., J. Econ. Taxon. Bot. 20: 620. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 333. 2009. *Mimosa pennata* L., Sp. Pl. 522. 1753.

Woody climbers; the branches and the underside of the rachises with recurved, hooked prickles. Leaves bipinnate, alternate, pinnae 7-18 pairs, up to 4 cm long with slender, sparsely tomentellous rachillae without thorns; leaflets sessile, overlapping, very small, 30-50 pairs, linear, base oblique; rachis up to 15 cm long with 4 cm petiolar part which has scattered. Flower heads globose, 1-3 together in leaf axils and these combined into a terminal, many-umbelled panicles, up to 20 cm long. Heads 1-2 cm diameter. Flowers subsessile; bracts spatulate, apical part fimbriate. Calyx thin, campanulate, 1.5-2 mm long, the teeth distinct. Corolla hardly 1 mm longer than the calyx. Pod 15-20 x 2-3 cm, strap-shaped, flat with slightly raised sutures, smooth, reddish brown; seeds 6-12, flat, round.

Paripode, KJD 18717

Fl. & Fr.: October-January

Distribution: Rare in Deciduous forests of Paripode.

Senegalia torta (Roxb.) Maslin, Seigler & Ebinger, *Blumea* 58: 40. 2013. *Acacia torta* (Roxb.) Craib, *Bull. Misc. Inform. Kew* 1915: 410. 1915; Gamble, *Fl. Madras* 428(304). 1919; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 169. 1988; Sanjappa, *Legumes Ind.* 44. 1992; Ratheesh, *Fl. Stud. Wayanad Dist.* 334. 2009. *Mimosa torta* Roxb., *Fl. Ind.* 2: 566. 1832. *Acacia caesia* Wight & Arn., *Prodr. Fl. Ind. Orient.* 278. 1834, non Willd. 1806.

Rambling shrubs with recurved prickles; branchlets puberulus. Leaves alternate, to 24 cm long; bipinnate, pinnae 6-10 pairs; leaflets 25-30 pairs, 8 x 3 mm, oblong, obtuse at apex, subcordate at base, slightly pubescent, 1-nerved from base; petiole to 5 cm long with a basal globose gland. Heads 1.5 cm across, solitary or in groups of 2 or 3 in terminal panicles. Calyx 1 mm long, 5-lobed. Petals oblong 2 mm long. Staminal filaments 5.5 mm long, yellow. Pods 16 x 2.5 cm, flat, papery, yellowish-brown, densely glandular; seeds 6-8.

Kariyenkappu, *KJD 18719*

Fl. & Fr.: April-December

Distribution: Fairly common in plantations of Kariyenkappu.

SENNA Mill.

Gard. Dict. Abr. Ed. 4. 1754.

- 1a. Fruit winged.....*S. alata*
- 1b. Fruit not winged.....2
- 2a. Leaves not glandular at base or inbetween leaflets on rachis *S. montana*
- 2b. Leaves glandular at base or inbetween leaflets on rachis 3
- 3a. Branchlets and fruits hirsute*S. hirsuta*
- 3b. Branchlets and fruits glabrous.....4
- 4a. Leaflets 4 or 5 paired, ovate-lanceolate; seeds ovoid or ovoid-oblong.....*S. occidentalis*
- 4b. Leaflets 2-4 pairs, oblong, obtuse at apex; seeds oblong*S. tora*

Senna alata (L.) Roxb., *Fl. Ind.* 2: 349. 1832; V. Singh, *Monogr. Indian Subtribe Cassiinae* 99. 2001. *Cassia alata* L., *Sp. Pl.* 378. 1753; Hook.f., *Fl. Brit. India* 2: 264. 1878; Gamble, *Fl. Madras* 404(286). 1919; Manilal & Sivar., *Fl. Calicut* 96. 1982; Ansari, *Fl. Kasaragod Div.* 143. 1985; Sanjappa, *Legumes Ind.* 14. 1992.

Erect shrubs to 4 m tall. Leaves 28-60 cm long; leaflets 6-12 pairs, 4-13 x 2-6 cm, oblong to obovate-oblong, apex rounded, base rounded to subcordate; stipules 1-2 cm long, deltoid, base auriculate, apex acute to acuminate. Inflorescence terminal or axillary, many-flowered spicate raceme, 40-60 cm long. Flowers yellow; pedicels 4-8 mm long; bracts petaloid, yellow, 1-2 cm long, ovate-

elliptic, subacute. Sepals 1-1.5 cm long, yellow. Petals yellow, 1.5-2 cm long, obovate. Stamens 10, anthers 2 large, 5 medium-sized, and 3 small. Pods 9-14 x 1.5-2 cm, linear, 4-winged, septate, dehiscent; seeds many, 5-7 x 4-5 mm, rhomboid, compressed, dark brown.

Narikkadavu, *KJD 22507*

Fl. & Fr.: September-January

Distribution: Rare at riverbanks of Narikkadavu along boundaries.

Senna hirsuta (L.) Irwin & Barneby, *Phytologia* 44: 499. 1979; V. Singh, *Monogr. Indian Subtribe Cassiinae* 137. 2001; Ratheesh, *Fl. Stud. Wayanad Dist.* 328. 2009. *Cassia hirsuta* L., *Sp. Pl.* 378. 1753; Hook.f., *Fl. Brit. India* 2: 263. 1878; Gamble, *Fl. Madras* 401(284). 1919; Manilal & Sivar., *Fl. Calicut* 97. 1982; Ansari, *Fl. Kasaragod Div.* 143. 1985; Sanjappa, *Legumes Ind.* 15. 1992.

Erect undershrubs, densely hirsute all over. Leaves to 18 cm long, usually with 3-5 pairs of leaflets; leaflets 3.5-6 x 2-3.5 cm, ovate or elliptic, apex acuminate, base rounded, silky hairy on both sides; rachis 8-12 cm long, a large black gland on the rachis just below the lowest leaflets; stipules 5-8 mm long, linear-lanceolate. Flowers yellow, c.1.5 cm across, in axillary and terminal few-flowered racemes; pedicels 1-1.4 cm long; bracts linear. Sepals 5, 5-8 mm long, oblong, densely hairy without. Petals 5, 0.8-1 cm long, obovate, obtuse. Stamens 10, unequal, 6 or 7 fertile. Ovary 2-2.5 mm long, tomentose; ovules many; style glabrous. Pods 10-15 x 0.6-0.8 cm, linear, subterete, curved, densely hirsute; seeds many, c. 3 x 2.5 mm, orbicular, compressed, light brown.

Paripode, *KJD 26361*

Fl. & Fr.: September-December

Distribution: Rare along the boundaries near Farm.

Senna occidentalis (L.) Link, *Handbuch* 2: 140. 1831; V. Singh, *Monogr. Indian Subtribe Cassiinae* 170. 2001; Ratheesh, *Fl. Stud. Wayanad Dist.* 329. 2009. *Cassia occidentalis* L., *Sp. Pl.* 377. 1753; Hook.f., *Fl. Brit. India* 2: 262. 1878; Gamble, *Fl. Madras* 401(284). 1919; Manilal & Sivar., *Fl. Calicut* 97. 1982; Ansari, *Fl. Kasaragod Div.* 144. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 165. 1988; Sanjappa, *Legumes Ind.* 19. 1992.

Erect subshrubs up to 2 m tall. Leaves up to 22 cm long; leaflets 4-5 pairs, 2.5-7 x 1.5-3.5 cm, ovate-lanceolate, apex acute or acuminate, base rounded, glabrous or pubescent; rachis to 18 cm long with a sessile, hemispherical gland at base; stipules 4-7 mm long, linear-lanceolate, acuminate, caducous. Flowers c.

2 cm across, in terminal and axillary racemes, to 3 cm long; pedicels 0.8-1.2 cm long; bracts linear-lanceolate. Sepals 6-10 mm long, ovate, obtuse, mucronate. Petals 5, yellow, 1-1.5 cm long, obovate. Stamens 10, unequal, only 7 fertile. Pods 5-9 x 0.6-0.8 cm, linear, compressed; seeds 20-25, 4-5 x 3-4 mm, ovate or suborbicular, compressed, brown.

Valayamchal Near Farm, KJD 26376

Fl. & Fr.: July-December

Distribution: Seen along the boundaries of Farm.

Senna tora (L.) Roxb., Fl. Ind. 2:340.1832; V. Singh, Monogr. Indian Subtribe Cassiinae 222. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 330. 2009. *Cassia tora* L., Sp. Pl. 376. 1753; Hook.f., Fl. Brit. India 2: 263. 1878; Gamble, Fl. Madras 401(284). 1919; Manilal & Sivar., Fl. Calicut 96. 1982; Ansari, Fl. Kasaragod Div. 145. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 166. 1988; Sanjappa, Legumes Ind. 22. 1992.

Annual, glabrous subshrubs up to 1 m tall. Leaves to 15 cm long, bearing a slender cylindrical gland on the rachis between the leaflets of the lower 2 pairs; leaflets 2-4 pairs, 1.5-4.5 x 1.5-2.5 cm, obovate-oblong, apex obtuse, base somewhat oblique, pubescent below; stipules 1-1.5 x 0.1-0.2 cm, linear. Flowers c. 1.5 cm across, in few-flowered axillary racemes; pedicels 4-6 mm long; bracteoles 2, 2-3 mm long. Sepals 5, 5-6 mm long, obovate-obtuse. Petals 5, yellow, 8-12 mm long, obovate-obtuse. Stamens 10, unequal, only 7 fertile, 3 large, 4 medium, 3 staminodal. Ovary subsessile, pubescent; ovules numerous. Pods 8-14 x 0.3-0.6 cm, linear, subtetragonous, septate between seeds, indehiscent; seeds 20-30, 4-5 mm long, oblong, compressed, chestnut-brown.

Narikkadavu, KJD 22554

Fl. & Fr.: August-December

Distribution: Near stream sides of boundaries.

Senna montana (Heyne ex Roth) V. Singh, J. Econ. Taxon. Bot. 16: 600. 1992 & Monogr. Indian Subtribe Cassiinae 154. 2001. *Cassia montana* Heyne ex Roth, Nov. Pl. Sp. 214. 1821; Hook.f., Fl. Brit. India 2: 264. 1878; Gamble, Fl. Madras 402(284). 1919; Sanjappa, Legumes Ind. 18. 1992.

Large shrubs to small trees, young shoots yellow tomentose. Leaves to 18 cm long; leaflets oblong, obtuse mucronate, base rounded, to 3 x 1.2 cm. Flowers 2.5 cm across, yellow, in axillary and terminal short corymbose panicles. Calyx tube

5 lobed. Petals obovate. Stamens 10, upper 3 staminodes. Ovary sessile, Many ovuled. Pod compressed, beaked; seeds ca. 20, ovoid, longitudinal.

Chullikandam, *KJD 31494*

Fl. & Fr.: November-January

Distribution: Rare in evergreen forests of Chullikandam. Endemic to Peninsular India.

XYLIA Benth.

J. Bot. (Hooker) 4: 417. 1842.

Xylia xylocarpa (Roxb.) Taub., Bot. Centralbl. 47: 395. 1891; Gamble, Fl. Madras 417(295). 1919; Manilal & Sivar., Fl. Calicut 101. 1982; Ansari, Fl. Kasaragod Div. 152. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 172. 1988; Sanjappa, Legumes Ind. 73. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 341. 2009. *Mimosa xylocarpa* Roxb., Pl. Coromandel t. 100. 1798. *Xylia dolabriformis* sensu Bedd., Fl. Sylv. S. India: t. 186. 1872, non. Benth. 1842; Hook.f., Fl. Brit. India 2: 286. 1878 p.p.

Deciduous trees, to 20 m high; bark reddish-brown. Leaves bipinnate, pinnae 2, 8-30 cm; leaflets 4-18, opposite, with a gland between each pairs; 5-33.5 x 2.5-6 cm, oblong-acuminate, elliptic or elliptic-oblong, apex acute or acuminate, base obtuse or acute; lateral nerves 6-12 pairs; intercostae reticulate; rachis 4-18 cm long, pulvinate, with an orbicular gland at tip; stipules small. Flowers sessile, dull yellow, in axillary globose heads; bracteole club shaped. Calyx 4 mm long, tubular, 5-toothed. Petals 5, 1.5 cm long, linear, slightly connate at base. Stamens 10, free, exserted, filaments slender. Ovary sessile, style filiform; stigma terminal. Pod 10-15 x 5-6 cm, flat, broadly falcate, woody, compressed, dehiscent, septate between the seeds; seeds 4-10, oblong, compressed, brown, shining.

Narikkadavu, *KJD 22510*

Fl. & Fr.: February-December

Distribution: Fairly common in semi-evergreen forests of Narikkadavu to Bhoothamkallu.

Subfamily PAPILIONOIDEAE

- 1a. Leaves with 2 leaflets..... Zornia
- 1b. Leaves 1, 3 or many foliolate 2
- 2a. Leaves 5 or more foliolate3
- 2b. Leaves 1 or 3 foliolate12

3a.	Leaves paripinnate	4
3b.	Leaves imparipinnate	5
4a.	Climbers; stamens 9	Abrus
4b.	Herbs; stamens 5 + 5	Smithia
5a.	Trees	6
5b.	Climbers, shrubs or herbs.....	8
6a.	Leaflets opposite; pods woody	Pongamia
6b.	Leaflets alternate; pods not woody	7
7a.	Flowers white; pods linear, not winged	Dalbergia
7b.	Flowers yellow; pods orbicular, winged	Pterocarpus
8a.	Woody scandent shrubs or climbers	9
8b.	Shrubs or herbs	11
9a.	Pods winged on both the margins	Aganope
9b.	Pods not winged, if winged then on one margin only	10
10a.	Leaves rugose reticulate; flowers purple.....	Kunstleria
10b.	Leaves otherwise; flowers white	Derris
11a.	Leaflets parallel veined; anthers obtuse; pods continuous within	Tephrosia
11b.	Leaflets reticulately veined; anthers apiculate; pods septate between seeds...	Indigofera
12a.	Trees branches prickly; standard petal much longer than other petals.....	Erythrina
12b.	Branches not prickly; herbs, shrubs or climbers; standard petal equaling other petals	13
13a.	Herbs or shrubs	14
13b.	Climbers.....	19
14a.	Pods breaking at joints into 1-seeded articles	15
14b.	Pods not breaking at joints into 1-seeded articles, dehiscent along suture	16
15a.	Pod twisted, joints come face to face, enclosed in the calyx.....	Uraria
15b.	Pod not twisted and enclosed in calyx.....	27
16a.	Pod inflated, turgid.....	17
16b.	Pod flat, compressed	18
17a.	Stamens 10, monadelphous; anthers dimorphous; flowers usually yellow, sometimes blue or white; ovules 3 or more	Crotalaria
17b.	Stamens diadelphous, 9+1; anthers uniform; ovules 2	Flemingia
18a.	Fruit viscid pubescent; flowers pink or white	Pseudarthria
18b.	Fruit not viscid pubescent; flowers yellow	Cajanus
19a.	Alternate anthers short and long.....	20
19b.	All anthers uniform	21

20a. Flowers in pendulous racemes, flowers ca. 3.5 cm long, purple	Mucuna
20b. Flowers in erect racemes, flowers 4-5 mm long, pink	Teramnus
21a. Ovary 2 ovuled	Rhynchosia
21b. Ovary 3 or more ovuled	22
22a. Style bearded below the stigma	23
22b. Style not bearded below the stigma	24
23a. Standard appendaged at back; pods with 4 raised ribs near margins, apical horn to 1 cm long, pointed, calyx faintly spurred	Centrosema
23b. Standard appendaged within; pods without raised ribs near margins, apical horn absent or very short; calyx not spurred	Vigna
24a. Stamens 10, monadelphous	Neonotonia
24b. Stamens 9+1, diadelphous	25
25a. Nodes of raceme swollen; pods 1-seeded, indehiscent	Spatholobus
25b. Nodes of raceme not swollen; pods 2 or more seeded, dehiscent	26
26a. Calyx-lobes setaceous, all free; pod obscurely angled, straight	Calopogonium
26b. Calyx-lobes ovate, upper ones connate; pod linear, flat	Shuteria
27a. Stamens monadelphous	28
27b. Stamens diadelphous	30
28a. Petiole broadly winged	Tadehagi
28b. Petiole not winged	29
29a. Flowers in racemes, subtended by bifarious, orbicular, foliaceous bracts; pods 2-jointed	Phyllodium
29b. Flowers not subtended by foliaceous bracts; pods 4-9 jointed	Dendrolobium
30a. Leaves all simple	Desmodium p.p.
30b. Leaves 3-foliolate or upper unifoliolate	31
31a. Flowers orange-red; joints of pods crescent shaped	Hylodesmum
31b. Flowers blue, pink or white; joints of pods not crescent shaped	Desmodium p.p.

ABRUS Adans.

Fam. Pl. 2: 327, 511. 1763.

- | | |
|---|-----------------------|
| 1a. Seeds black or brown, compressed | <i>A. pulchellus</i> |
| 1b. Seeds red with a black top, globose | <i>A. precatorius</i> |

Abrus precatorius L., Syst. Nat. (ed. 12) 2: 472.1767; Hook.f., Fl. Brit. India 2:175.1876; Gamble, Fl. Madras 349(247). 1918; Ansari, Fl. Kasaragod Div. 115. 1985; Sanjappa, Legumes Ind. 74. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 263. 2009. *Glycine abrus* L., Sp. Pl. 753. 1753.

Woody perennial twining shrubs; young stems puberulent. Leaves even-pinnate; leaflets 12-16 pairs, 0.8-2.5 x 0.4-1 cm, oblong to elliptic, base and apex obtuse, lower surface sparsely pubescent. Flowers pink, in axillary racemes; bracts deltoid, minute; bracteoles c. 1mm across, suborbicular. Calyx 2-4 mm long, hispid. Petals 9-12 mm long. Stamens 9, monadelphous. Ovary sessile, many ovuled; style incurved. Pods 3-4 x 1-1.5 cm, oblong, slightly inflated, fulvo-puberulent; seeds many, 5-7 x 4-5 mm, subglobose, scarlet red with black eyes.

Paripoode, *KJD 22513*

Fl. & Fr.: October-May

Distribution: Along the boundaries near Paripoode.

Abrus pulchellus Wall. ex Thwaites, Enum. Pl. Zeyl. 91. 1859; Hook.f., Fl. Brit. India 2: 175. 1876; Gamble, Fl. Madras 350(247). 1918; Manilal & Sivar., Fl. Calicut 83. 1982; Ansari, Fl. Kasaragod Div. 116. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 124. 1988; Sanjappa, Legumes Ind. 74. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 263. 2009.

Twining herbs, glabrous. Leaves paripinnate, leaflets opposite, to 11 pairs, to 3 x 1 cm, oblong, obtuse, chartaceous, terminal leaflets larger; stipule lanceolate, deflexed. Flowers crowded in short tubercles, on long axillary racemes. Calyx cupular, truncate. Petals to 1 cm long, mauve; standard obovate; wings falcate, clawed; keel oblong. Stamens monadelphous. Ovary densely hairy. Pods 7 x 1 cm, oblong, slightly curved, compressed, glabrous; seeds many, 6 x 4 mm, dark brown or black.

Paripode, *KJD 18715*

Fl. & Fr.: October-March

Distribution: Along the boundaries near Paripoode.

AGANOPE Miq.

Fl. Ned. Ind. 1: 151. 1855.

Aganope thyrsoflora (Benth.) Polhill var. **eualata** (Bedd.) Thoth. & D.N.Das, Rheede 2: 63. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 264. 2009. *Derris thyrsoflora* Benth. var. *eualata* (Bedd.) Thoth., Bull. Bot. Surv. India 3: 195. 1961. *Derris eualata* Bedd., Icon. Pl. Ind. Or. t. 186. 1868-1874; Gamble, Fl. Madras 388(274). 1918. *Derris platyptera* Baker in Hook.f., Fl. Brit. India 2: 245. 1878. *Aganope thyrsoflora* (Benth.) Polhill, Kew Bull. 25: 270. 1971; Manilal & Sivar., Fl. Calicut 80. 1982; Ansari, Fl. Kasaragod Div. 116. 1985; Sanjappa, Legumes Ind. 76. 1992.

Large woody climbing shrubs. Leaflets 7-9, 4-10 x 2.5-4 cm, elliptic-ovate, apex acuminate, base rounded. Flowers in axillary and terminal large panicles of racemes; peduncles and pedicels densely pubescent. Calyx 2.5-3 mm long, campanulate, truncate, densely pubescent without. Corolla white, 5-7 mm long. Stamens with filaments 5-6 mm long, united half-way. Ovary 5-6 mm long, laterally compressed, densely hairy, winged on both sutures, reticulate without. Seeds 1-3, compressed.

Kurumbankallu *KJD 18722*

Fl. & Fr.: March-August

Distribution: Rare in evergreen forests of Kurumbankallu. Endemic to southern Western Ghats.

CAJANUS DC.

Cat. Pl. Horti Monsp.85. 1813, *nom. cons.*

- 1a. Erect shrubs; leaves glandular below *C. lineatus*
- 1b. Climbing herbs or shrubs 2
- 2a. Pods not constricted between seeds, seed without prominent strophiole *C. heynei*
- 2b. Pods constricted between seeds, seed with prominent strophiole..... *C. scarabaeoides*

Cajanus heynei (Wight & Arn.) Maesen, Agric. Univ. Wageningen Pap. 85-4:129. 1985; Sanjappa, Legumes Ind. 101. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 268. 2009. *Dunbaria heynei* Wight & Arn., Prodr. Fl. Ind. Orient. 258. 1834; Hook.f., Fl. Brit. India 2: 217. 1876; Gamble, Fl. Madras 370(261). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 142. 1988.

Twining herbs, stem patently hairy. Leaves alternate, trifoliolate; leaflets 7 x 4.5 cm, obovate, caudate-acuminate, lateral leaflets oblique, tomentose. Flowers 2 cm long, confined towards the tip of axillary racemes. Calyx red, pubescent. Petals yellow. Stanens diadelphous, 9+1. Ovary sessile; style filiform; stigma capitate. Pod villous, 3 cm long; seeds 4 or 5.

Kariyenkappu, *KJD 18748*

Fl. & Fr.: October-February

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi.

Cajanus lineatus (Wight & Arn.) Maesen, Agric. Univ. Wageningen Pap. 85-4:143. 1985; Sanjappa, Legumes Ind. 101. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 268. 2009. *Atylosia lineata* Wight & Arn., Prodr. Fl. Ind. Orient. 258. 1834;

Hook.f., Fl. Brit. India 2: 213. 1876; Gamble, Fl. Madras 368(260). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 126. 1988.

Erect shrubs, branchlets silky tomentose. Leaves alternate; leaflets 3-4 x 1.5 cm, obovate or rhomboid, apex mucronate, base acute, 3-ribbed, grey tomentose below, subsessile; petiole to 1.5 cm long. Flowers to 1.5 cm long, yellow, in axillary pairs. Calyx tomentose, lobes deltoid, acuminate. Petals yellow. Stamen diadelphous, 9+1. Ovary densely villous; style filiform; stigma capitate. Pods to 2 x 0.8 cm, densely hairy; seeds 3.

Ambalappara, *KJD 26305*; Ambalappara, *KVB 31797*

Fl. & Fr.: June-January

Distribution: Fairly common in grasslands of Ambalappara. Endemic to Western Ghats.

Cajanus scarabaeoides (L.) Thouars, Dict. Sci. Nat. 6: 617. 1817; Sanjappa, Legumes Ind. 100. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 269. 2009. *Dolichos scarabaeoides* L., Sp. Pl. 726. 1753. *Atylosia scarabaeoides* (L.) Benth. in Miq. Pl. Jungh. 242. 1852; Hook.f., Fl. Brit. India 2: 215. 1876; Gamble, Fl. Madras 369(261). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 127. 1988; Manilal & Sivar., Fl. Calicut 92. 1982.

Slender twining herbs; stem brown tomentose. Leaves 3-foliolate; leaflets to 4 x 2.5 cm, obovate or elliptic, obtuse, basally 3-nerved, reticulations prominent, often with resinous dots below, exstipellate. Flowers racemose or paniculate, pale-yellow, 0.8 cm long in axillary pairs; bracts large, caducous; bracteoles absent. Calyx persistent, tomentose, lobes linear, 0.5 cm long, upper 2-lobes connate. Standard petal with two inflexed auricles at base; keel petals slightly incurved. Stamens 9+1; anthers uniform. Ovary tomentose, sessile, 3 or more ovuled; style filiform, inflexed; stigma small, terminal. Pods brown tomentose, 2-2.5 cm long, obliquely deeply grooved between seeds; seeds strophiolate.

Kariyenkappu, *KJD 18750*

Fl. & Fr.: September-January

Distribution: Rare in plantations of Kariyenkappu.

CALOPOGONIUM Desv.

Ann. Sci. Nat. (Paris) 9: 423. 1826.

Calopogonium mucunoides Desv., Ann. Sci. Nat. (Paris) 9: 423. 1826; Ansari, Fl. Kasaragod Div. 118.1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 127.1988; Sanjappa, Legumes Ind. 104.1992; Ratheesh, Fl. Stud. Wayanad Dist. 269. 2009.

Slender creeping and climbing herbs, coarsely brown-tawny pubescent. Leaves alternate, 3-foliolate; leaflets 3-7 x 2-4 cm, elliptic-rhomboid, obtuse, base rounded or oblique, densely pubescent; lateral nerves 4 pairs; petioles 3-8 cm long; stipels 3 mm long, subulate. Flowers bluish, in axillary racemes; bracts and bracteoles small caducous; pedicels to 3 m long. Calyx lobes unequal, 4-6 mm long, upper 2 connate, other 3 lobes linear lanceolate. Standard petal obovate, appendaged with 2 inflexed auricles; keel petals shorter than wing petals. Stamens 9+1. Ovary densely villous, sessile; ovules many, style slender, stigma capitate. Pods coarsely pubescent, 2-3 cm long, compressed-convex, slightly constricted between the seeds; seeds 5-7.

Kariyenkappu, *KJD 31831*

Fl. & Fr.: August-December

Distribution: Along the boundaries of forests as weed.

CENTROSEMA (DC.) Benth.

Commentat. Legum. Gen. 53. 1837, *nom. cons.*

Centrosema molle Benth., Commentat. Legum. Gen. 55. 1837; Ratheesh, Fl. Stud. Wayanad Dist. 270. 2009. *Centrosema pubescens* auct. non Benth. 1837: Ansari, Fl. Kasaragod Div. 119. 1985; Sanjappa, Legumes Ind. 111. 1992. *Centrosema virginianum* auct. non (L.) Benth. 1838; Thoth. *et al.*, Curr. Sci. 39:353.1970; Manilal & Sivar., Fl. Calicut 89. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 128. 1988. *Clitoria virginiana* L., Sp. Pl. 753. 1753.

Pubescent twiners. Leaves 3-foliolate; leaflets 3-6.2 x 1.5-4 cm, ovate or elliptic, apex acuminate, base rounded, the terminal larger than the laterals, pubescent; petiole to 5 cm long; stipules persistent. Racemes axillary, 5-8-flowered; peduncles 4-5 cm long. Flowers 2.5-3.2 cm long; pedicels 7-10 mm long; bracts connate, 5-8 mm long, ovate-lanceolate, deciduous; bracteoles 6-8 mm long, ovate. Calyx-tube 3-4 mm long, campanulate, 2-lipped, upper lip emarginate, adpressed tomentose. Corolla violet; standard c. 3 cm long, ovate-suborbicular, gibbous at the back above the claw, emarginate, pubescent without; wings falcate, the auricle curved back. Stamens 9+1. Style basally pubescent. Pods 7-12 x 0.4-0.6 cm, linear, compressed with 4-raised ribs near sutures; seeds 15-18, 4-6 mm long, oblong, brown with dark mottling.

Kariyenkappu, *KJD 18768*

Fl. & Fr.: September-January

Distribution: Common weed in plantations.

CROTALARIA L.

Sp. Pl. 714.1753.

- 1a. Leaves2
- 1b. Leaves 3-foliolate..... *C. pallida*
- 2a. Flowers bluish-white *C. heyneana*
- 2b. Flowers yellow3
- 3a. Pods glabrous.....4
- 3b. Pods hirsute *C. obtecta*
- 4a. Leaves acute at apex; stipules minute..... *C. spectabilis*
- 4b. Leaves obtuse at apex; stipules ovate acuminate, reflexed*C. retusa*

Crotalaria heyneana J.Graham ex Wight & Arn., Prodr. Fl. Ind. Orient. 187. 1834; Hook.f., Fl. Brit. India 2: 78. 1876; Gamble, Fl. Madras 297(210). 1918; Ansari, Fl. Kasaragod Div. 120. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 131. 1988; Sanjappa, Legumes Ind. 121. 1992; A.A. Ansari, Crotalaria India 265. 2008; Ratheesh, Fl. Stud. Wayanad Dist. 273. 2009.

Erect shrubs; stem 3-angled, villous. Leaves alternate, 9 x 7 cm, ovate, obtuse, cuneate at base, minutely hairy below; stipule 7 mm broad, semi-lunar. Raceme to 20 cm long, terminal; bracts deflexed. Flowers numerous; pedicels 6-7 mm long, bracteolate at middle. Calyx 8 mm long, lobes ovate, acuminate, thinly hairy. Petals white or bluish white; standard 12 x 8 mm, glabrous; wings 10 x 6 mm; keel glabrous. Stamens monadelphous, connate in a sheath. Ovary sessile, 2-many ovuled; style curved; stigma oblique. Pods 35 x 13 mm, minutely hispid, clawed.

55 Block, KJD 26196

Fl. & Fr.: September-December

Distribution: Fairly common along the boundaries near Farm. Endemic to southern Western Ghats

Crotalaria obtecta J.Graham ex Wight & Arn., Prodr. Fl. Ind. Orient. 185. 1834; Hook.f., Fl. Brit. India 2: 79. 1876; Gamble, Fl. Madras 297(210). 1918; Sanjappa, Legumes Ind. 125. 1992; A.A. Ansari, Crotalaria India 119. 2008 (Plate 10b).

Shrubs. Leaves alternate, 3.5-7 x 2-4 cm, elliptic ovate to obovate, obtuse at apex, cuneate at base, velvety below when young, sparsely hairy on ageing. Stipules 0.5-0.7 cm long, subulate, deciduous. Racemes many-flowered. Calyx 2-2.5 cm long, lobes 5, densely brown hairy. Petals yellow, 2-2.5 cm long; standard

with few lines of brown hairs; wings with scaly folds; keels cottony on the inner margins. Stamens 10, linear, sagitate; sheath 0.8-1 cm long, filaments free, 0.8-1 cm long. Ovary 0.5-0.6 cm long, ovoid, densely brown hairy; style 2-2.3 cm long, incurved, brown silky; stigma hairy on inner side; ovules many. Pods 4-5 x 1.5-2 cm, oblong; seeds many, 0.4-0.5 cm diam., compressed.

Ambalappara, NS & KJD 31947; KVB 31715

Fl. & Fr.: December-March

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats

Crotalaria pallida Aiton, Hort. Kew. (ed. 1) 3: 20. 1789; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 121. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 132. 1988; Sanjappa, Legumes Ind. 126. 1992; A.A. Ansari, Crotalaria India 337. 2008; Ratheesh, Fl. Stud. Wayanad Dist. 274. 2009. *Crotalaria mucronata* Desv., J. Bot. 3: 76. 1814. *Crotalaria striata* DC. in DC. Prodr. 2: 131. 1825; Hook.f., Fl. Brit. India 2: 84. 1876; Gamble, Fl. Madras 301(212). 1918. *Crotalaria striata* DC. var. *acutifolia* Trimen, Handb. Fl. Ceylon 2: 19. 1984.

Erect undershrubs, up to 1.6 cm tall; branches puberulous. Leaves 3-foliolate; leaflets subequal, 3-7 x 1.8-4 cm, obovate or elliptic-ovate, apex obtuse or acute, base cuneate, membranous, glaucous below; petiole 3-7 cm long; stipules 1-3 mm long, setaceous, deciduous. Flowers c. 1.3 cm long, in terminal many-flowered racemes, up to 25 cm long; pedicels 3-4 mm long; bracts to 3 mm long, subulate. Calyx 5-7 mm long, upper 2-lobes united, other lobes lanceolate, adpressed tomentose. Petals yellow with prominent reddish veins; standard c. 1.2 cm long, broadly elliptic; keels curved and beaked. Stamens 10, monadelphous. Style abruptly incurved at the base; stigma oblique. Pods 3-4.2 x 0.6-0.8 cm, oblong-cylindrical; seeds 18-30, brown.

Pookundu, KJD 18800

Fl. & Fr.: September-January

Distribution: Fairly common near water bodies.

Crotalaria retusa L., Sp. Pl. 715. 1753; Hook.f., Fl. Brit. India 2: 75. 1876; Gamble, Fl. Madras 293(207). 1918; Manilal & Sivar., Fl. Calicut 78. 1982; Ansari, Fl. Kasaragod Div. 122. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 133. 1988; Sanjappa, Legumes Ind. 128. 1992; A.A. Ansari, Crotalaria India 275. 2008; Ratheesh, Fl. Stud. Wayanad Dist. 275. 2009.

Erects herbs or subshrubs up to 1.75 m tall; branches striate, minutely pubescent. Leaves alterenate, 2-8 x 1-3 cm, oblanceolate or obovate, apex obtuse or retuse, base cuneate, glabrous above, puberulent and glaucous below; stipules minute, subulate. Flowers in few to many-flowered terminal racemes; bracts 4-6 mm long, subulate. Calyx 0.8-1 cm long, puberulous without; lobes 5, broadly ovate, acuminate. Petals yellow with red striations; standard orbicular; wings with scaly folds; keels with a line of cottony hairs on inner margin. Staminal sheath 6-7 mm long; filaments 5-7 mm long. Ovary 0.8-1 cm long; ovules many; style 1-1.5 cm long; stigma pubescent. Pods 3-4 x 0.8-1 cm, oblong, cylindrical, slightly broader upwards; seeds 15-20, c. 3 mm long, light brown to black.

Uruppukunnu, *KJD 26368*

Fl. & Fr.: September-January

Distribution: Rare in Semi-Evergreen forests of Uruppukunnu.

Crotalaria spectabilis Roth, Nov. Pl. Sp. 341. 1821; Sanjappa, Legumes Ind. 130. 1992; A.A. Ansari, *Crotalaria India* 284. 2008. *Crotalaria sericea* Retz., *Observ. Bot.* 5: 26. 1788; Hook.f., *Fl. Brit. India* 2: 75. 1876; Gamble, *Fl. Madras* 293(207). 1918; Vajr., *Fl. Palghat Dist.* 153. 1990, non *Burm.f.* 1768. *Crotalaria leschenaultii* DC. in *DC. Prodr.* 2: 125. 1825; Hook.f., *Fl. Brit. India* 2: 76. 1876; Gamble, *Fl. Madras* 293(207). 1918; A.A. Ansari, *Crotalaria India* 270. 2008.

Erect biennial undershrubs up to 1.2 m tall with glabrous, furrowed branches. Leaves subopposite, 5-15 cm long and variable in width, oblong-lanceolate, apex acute or subacute, mucronate, base cuneate, glabrous above, fine-silky beneath; petioles 1.6-3 mm long; stipules large, ovate-lanceolate, leafy. Flowers yellow with a purple tinge, borne in elongated 16-50 flowered terminal racemes 25-30 cm long; bracts large foliaceous. Calyx 1.3 cm long, tube campanulate, upper teeth large, triangular, acute, c. 6 mm broad at the base, the lower 3 teeth smaller and less deeply cut, linear-lanceolate, acute. Petals yellow, standard broadly ovate with a strong midrib at the back. Stamens monadelphous, connate to sheath. Ovary sessile, stiptate; style elongate. Pod stalked, linear-oblong, 2.5-5 cm long glabrous; seeds 20-30.

Ambalappara, *KJD 26311; NS & KVB 31429*

Fl. & Fr.: November-January

Distribution: Fairly common in grasslands of Ambalappara.

DALBERGIA L.f.

Suppl. Pl. 52. 1781, *nom. cons.*

- 1a. Trees2
1b. Woody climbers with thorns *D. horrida*
2a. Stamens isodiadelphous, 5 + 5 *D. lanceolaria*
2b. Stamens monadelphous, 9 or 10 *D. sissoides*

Dalbergia horrida (Dennst.) Mabb., Taxon 26: 538. 1977; Ansari, Fl. Kasaragod Div. 123. 1985; Sanjappa, Legumes Ind. 136. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 278. 2009. *Amerimnon horridum* Dennst., Schlüssel Hortus Malab. 9, 18, 34. 1818. *Dalbergia spinosa* Roxb., Fl. Ind. 3: 234. 1832; Hook.f., Fl. Brit. India 2: 238. 1876; Gamble, Fl. Madras 381(269). 1918. *Dalbergia sympathetica* Nimmo ex J.Graham, Cat. Pl. Bombay 55. 1839; Hook.f., Fl. Brit. India 2:234. 1876; Manilal & Sivar., Fl. Calicut 82. 1982; Vajr., Fl. Palghat Dist. 154. 1990. *Dalbergia multiflora* Heyne ex Prain, Ann. Roy. Bot. Gard. (Calcutta) 10: 43, t. 18. 1905; Gamble, Fl. Madras 381(269). 1918.

Large woody climbers, stems with sharp thorns, climbing by means of hooked branchlets. Leaves 4-9 cm long; leaflets 11-15, 0.8-1.8 x 0.5-1.2 cm, ovate-oblong or elliptic-oblong, base cuneate, apex emarginate, subcoriaceous. Flowers in axillary cymose panicles. Calyx campanulate, short lobed. Petals white; wings oblong; keel obtuse. Stamens 9. Ovary linear. Pods 3-5 x 1.3-2 cm, broadly oblong or strap-shaped, 1-4-seeded.

Kariyenkappu, *KJD 18791*

Fl. & Fr.: January-December

Distribution: Occasional in Deciduous forests.

Dalbergia lanceolaria L.f., Suppl. Pl. 316. 1781; Hook.f., Fl. Brit. India 2: 235. 1876; Gamble, Fl. Madras 383(270). 1918; Ansari, Fl. Kasaragod Div. 123. 1985; Sanjappa, Legumes Ind. 136. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 278. 2009.

Large trees. Leaves imparipinnate, 15-25 cm long; leaflets 13 or 15, to 4 x 2 cm, oblong-elliptic, apex emarginate, slightly coriaceous; petiole to 2 cm; petiolule 3-5 mm, stipules small, deciduous. Panicles terminal and axillary, 5-15 cm long. Calyx campanulate, reddish-brown. Petals bluish-white. Stamens diadelphous, 5+5. Ovary stalked, ovules few. Pod 8 x 2 cm, oblong-lanceolate, glabrous, stipitate, coriaceous. acute at both ends; seeds one to three.

Kariyenkappu, *KJD 18791*

Fl. & Fr.: January-December

Distribution: Occasional in Deciduous forests.

Dalbergia latifolia Roxb., Pl. Coromandel 2: 7, t. 113. 1799; Hook.f., Fl. Brit. India 2: 231. 1876; Gamble, Fl. Madras 383(270). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 134. 1988; Sanjappa, Legumes Ind. 137. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 279. 2009. *Dalbergia emarginata* Roxb., Fl. Ind. 3: 224. 1832.

Deciduous trees, to 25 m high; bark grey. Leaves imparipinnate, rarely 1-foliolate, alternate; leaflets 3-9, alternate, lamina 2.5-10 x 2.5-10 cm, orbicular, base acute, apex obtuse or emarginate, glaucous beneath; lateral nerves 5-10 pairs, intercostae reticulate; rachis 7.5-20.5 cm, pulvinate; petiolule upto 10 mm; stipules small. Flowers 5-6 mm long, white, in short corymbose panicles from the axils of fallen leaves; bracteoles small. Calyx tube campanulate; lobes 5, subequal, upper 2 connate, lateral obtuse, lower acute. Petals 5, standard petal obovate, cuneate at base, reflexed, wings clawed, base auricled, keel hastate, clawed. Stamens 9, monadelphous; staminal tube 4 mm, split open one side. Ovary stipitate, 1-celled, ovules 1-few; style slender; stigma capitate. Pod oblong-lanceolate; seeds 1-4, reniform, brown.

Narikkadavu, *KJD 26358*

Fl. & Fr.: February-August

Distribution: Occasional in Deciduous forests.

DENDROLOBIUM (Wight & Arn.) Benth.

in Miq. Pl. Jungh. 2: 215. 1852

Dendrolobium triangulare (Retz.) Schindl., Repert. Spec. Nov. Regni Veg. 20: 279. 1924. *Desmodium triangulare* (Retz.) Merr., J. Arnold Arbor. 23: 170. 1942; Ansari, Fl. Kasaragod Div. 127. 1985; Sanjappa, Legumes Ind. 162. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 287. 2009. *Hedysarum triangulare* Retz., Observ. Bot. 3: 40. 1783. *Desmodium cephalotes* (Roxb.) Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 224. 1834; Hook.f., Fl. Brit. India 2: 161. 1876; Gamble, Fl. Madras 344(242). 1918. *Desmodium triangulare* (Retz.) Merr. var. *congestum* (Prain) Santapau, Kew Bull. 1948: 276. 1948; Ramach. & V.J. Nair, Fl. Cannanore Dist. 140. 1988.

Shrubs; branchlets triangular, adpressed hairy. Leaflets subequal, to 9 x 4 cm, elliptic, acuminate, hairy when young; nerves 8-10 pairs, regular; petiole 3 mm long; stipules 1 cm long, ovate, acuminate. Flowers many-together, in

axillary clusters. Upper calyx lobes united and longer than the others. Petals white; standard to 8 mm across, orbicular, glabrous; wings 6 mm long, obovate; keels glabrous. Pods to 2.5 cm long, curved, crenate; joints 4-6, adpressed tomentose.

Kariyenkappu, NS & KJD 31561

Fl. & Fr.: September-January

Distribution: Rare in plantations of Kariyenkappu.

DERRIS Lour.

Fl. Cochinch. 2: 432. 1790, *nom. cons.*

- 1a. Pods oblong, turgid, densely brown tomentose..... *D. brevipes*
1b. Pods narrow, not turgid, minutely tomentose*D. scandens*

Derris brevipes (Benth.) Baker, Hook.f., Fl. Brit. India 2: 244. 1878; Gamble, Fl. Madras 388(273). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 136. 1988; Sanjappa, Legumes Ind. 144. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 281. 2009. *Derris heyneana* Benth. var. *brevipes* Benth., J. Linn. Soc. 4 (Suppl.): 110. 1860.

Stout climbers; branchlets slender, glabrous. Leaves 3-9-foliolate; leaflets to 12 x 5 cm, obovate-oblong, abruptly acuminate at apex, retuse, acute at base. Panicles 10 x 10 cm, axillary, rusty tomentose. Flowers 14 mm long. Calyx cupular, 4 mm long, hispid, black, lobes obtuse. Standard petal 11 x 7 mm, obovate, emarginate, white, clawed; wing 9 x 3 mm, oblong; keel glabrate. Stamens monadelphous. Ovary densely hairy. Pods 5 x 2.5 cm, ovate, obtuse at either ends, densely dark brown-hispid; seeds 2.

Ambalappara, NS & KVB 31428

Fl. & Fr.: February-December

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Western Ghats.

Derris scandens (Roxb.) Benth., J. Linn. Soc. Bot. 4 (Suppl.) 103. 1860; Hook.f., Fl. Brit. India 2: 240. 1878; Gamble, Fl. Madras 387(273). 1918; Manilal & Sivar., Fl. Calicut 81. 1982; Ansari, Fl. Kasaragod Div. 125. 1985; Sanjappa, Legumes Ind. 148. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 281. 2009. *Dalbergia scandens* Roxb., Pl. Coromandel 2: 49, t. 192. 1805. *Brachypterum scandens* (Roxb.) Benth., Ann. Wiener Mus. Naturgesch. Vienna 2: 101. 1838; Sivar. & Mathew, Fl. Nilambur 223. 1997.

Large climbing shrubs; branchlets brown, lenticellate. Leaflets 5-11, 2-5 x 1-2.5 cm, elliptic, lanceolate or ovate-oblong, apex obtuse, acute, sometimes emarginate, base rounded to cuneate, subcoriaceous; lateral nerves 7-9 pairs, slender. Racemes axillary, 8-25 cm long, with flowers clustered on brown-pubescent rachis. Flowers 7-9 mm long; pedicels c. 4 mm long, slender. Calyx 2.5-3 mm long, shortly adpressed tomentose, lobes obscure. Petals pink or white; standard 7-8 mm long; ovate-orbicular. Stamens 10, alternate ones short. Pods 2.5-6.5 x 1-1.4 cm, oblong, narrowly winged on the upper suture, minutely adpressed tomentose; seeds 2-4 ca. 8 mm long, reniform, compressed, dark brown.

Kariyenkappu, KJD 18797

Fl. & Fr.: June-December

Distribution: Rare, near Stream side.

DESMODIUM Desv.

J. Bot. Agric. 1: 122. 1813, *nom. cons.*

- 1a. Leaves all simple2
- 1b. Leaves 3-foliolate or upper unifoliolate3
- 2a. Leaves ovate-lanceolate, acute, glabrescent; calyx-lobes twice as long as calyx tube.....*D. gangeticum*
- 2b. Leaves broadly ovate-deltoid, obtuse or subacute, softly tomentose; calyx lobes more or less equal to calyx tube *D. velutinum*
- 3a. Trailing or diffuse herbs; leaflets less than 1 cm long..... *D. triflorum*
- 3b. Erect herbs or shrubs; leaflets more than 2 cm long.....4
- 4a. Joints of pod with sticky, hooked hairs *D. laxiflorum*
- 4b. Joints of pod without sticky, hooked hairs9
- 5a. Joints of pods dehiscent along the lower suture..... *D. heterocarpon*
- 5b. Joints of pods indehiscent, breaking at joints *D. alysicarpoides*

Desmodium alysicarpoides Meeuwen, Reinwardtia 6: 246. 1962; Sanjappa, Legumes Ind. 149. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 283. 2009. *Alysicarpus parviflorus* Dalzell, Hooker's J. Bot. Kew Gard. Misc.. 3: 211. 1851; Gamble, Fl. Madras 339(240). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 125, non Mart. 1843. *Desmodium parviflorum* (Dalzell) Baker in Hook.f., Fl. Brit. India 2: 172. 1876, non Mart. & Galeotti 1843.

Erect or suberect herbs, to 30 cm high; stem villous. Leaflets 4.5 x 2 cm, elliptic acute at apex, rounded at base, tomentose below; laterals much smaller. Racemes to 30 cm long, terminal; pedicels 2 or 3-together. Flowers blue. Calyx

4.5 mm long, lobes linear-lanceolate, densely hairy. Standard petal 3 x 2.5 mm, glabrous. Stamens diadelphous, 9+1, anthers uniform. Ovary stipitate, many ovuled; style filiform; stigma capitate. Pods curved, 6-jointed, joint 2 x 1.5 mm, straight along one suture, glabrous.

Ambalappara, KJD 26322

Fl. & Fr.: September-January

Distribution: Rare in evergreen forests of Ambalappara.

Desmodium gangeticum (L.) DC. in DC. Prodr. 2: 327.1825; Hook.f., Fl. Brit. India 2:168.1876; Gamble, Fl. Madras 345(244). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 137. 1988; Sanjappa, Legumes Ind. 153. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 284. 2009. *Hedysarum gangeticum* L., Sp. Pl. 746. 1753. *Hedysarum collinum* Roxb., Fl. Ind. 3: 439. 1832.

Erect subshrubs, up to 1.2 m tall; stem angled, hairy when young, glabrescent on ageing. Leaves 1-foliolate, 5-10 x 1-5 cm, ovate to elliptic, apex acute, base rounded, glabrescent above, densely appressed hairy below, often blotched with grey; petiole to 2.5 cm long; stipules to 8 mm long; linear-lanceolate. Flowers white, fascicled in terminal and axillary, 15-25 cm long racemes; pedicels 3-4 mm long; bracts subulate. Calyx campanulate; lobes 1.5-2 mm long, triangular, tomentose without. Petals 4 mm across. Stamens diadelphous. Ovary 3-4 mm long, compressed, hairy without; stigma capitate. Pods 1.2-2.3 x 0.1-0.15 cm, moniliform, 4-7-jointed, reticulate, slightly pubescent with hooked hairs, constricted in ventral suture.

Valayamchal near Farm, KJD 18799

Fl. & Fr.: October-December

Distribution: Along the boundaries near Farm.

Desmodium heterocarpon (L.) DC. in DC. Prodr. 2: 337. 1825; Ansari, Fl. Kasaragod Div. 126. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 137. 1988; Sanjappa, Legumes Ind. 154. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 800284 2009. *Hedysarum heterocarpon* L., Sp. Pl. 747. 1753. *Hedysarum polycarpum* Poir. in Lam. Encycl. 6: 431. 1805. *Desmodium polycarpum* (Poir.) DC. in DC. Prodr. 2: 334. 1825; Hook.f., Fl. Brit. India 2: 171. 1876; Gamble, Fl. Madras 346(244).1918. *Desmodium patens* Wight, Icon. Pl. Ind. Orient. t. 407. 1840.

Ascending undershrubs; root stock creeping; branches adpressed hairy. Leaves 3-foliolate; leaflets 1.5-4 x 1-2.2 cm, obovate or broadly elliptic-oblong,

apex rounded or retuse, base obtuse, appressed-pubescent below; petiole to 2 cm long; stipules c. 5 mm long; subulate. Racemes terminal, paniced 2.5-4.5 cm long; densely covered with appressed straight hairs. Flowers 5-6 mm long, purple; bracts c. 3-4 mm long; lanceolate. Calyx-tube 2-2.5 mm long; 2 upper lobes connate, 3-lower narrower, acuminate, longer than tube. Standard petal 5-6 mm long; obovate-orbicular. Stamens diadelphous, 9+1. Ovary stipitate; style filiform; stigma capitate. Pods 1.2-2 x 0.3-0.4 cm, lower margin indented, upper straight, 5-7-jointed; joints about as broad as long.

Chelachode, NS & KJD 31910

Fl. & Fr.: October-December

Distribution: Fairly common in evergreen forests of Chelachode and also along boundaries near Farm.

Desmodium laxiflorum DC., Ann. Sci. Nat. (Paris) 4: 100. 1825 & in DC. Prodr. 2: 335. 1825; Hook.f., Fl. Brit. India 2: 164. 1876; Gamble, Fl. Madras 344(243). 1918; Manilal & Sivar., Fl. Calicut 85. 1982; Ansari, Fl. Kasaragod Div. 127. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 138. 1988; Sanjappa, Legumes Ind. 156. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 284. 2009. *Desmodium recurvatum* (Roxb.) J.Graham ex Wight & Arn., Prodr. Fl. Ind. Orient. 226. 1834. *Hedysarum recurvatum* Roxb., Fl. Ind. Fl. Ind. 3: 358. 1832.

Erect herbs, to 35 cm high; stems angled, adpressed-hairy. Terminal leaflet to 13 x 10 cm, ovate, acute at apex, rounded at base, densely hairy below, glabrate above; petiole 4 cm long; stipules 8 mm long, lanceolate; stipels filiform. Racemes to 35 cm long, axillary or terminal; rachis hairy. Flowers solitary or paired, pink. Calyx 2 mm long, hairy. Standard petal 6 x 3 mm, emarginate. Stamens diadelphous, 9+1. Ovary stipitate; style filiform; stigma capitate. Pods 6-9 jointed; joints 4 x 1.25 mm, oblong, longitudinally striate.

Narikkadavu, KJD 26386

Fl. & Fr.: September-January

Distribution: Rare in Semi-evergreen forests of Narikkadavu.

Desmodium triflorum (L.) DC. in DC. Prodr. 2: 334. 1825; Hook.f., Fl. Brit. India 2: 173. 1876; Gamble, Fl. Madras 347(245). 1918; Manilal & Sivar., Fl. Calicut 84. 1982; Ansari, Fl. Kasaragod Div. 128. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 140.1988; Sanjappa, Legumes Ind. 163.1992; Ratheesh, Fl.Stud. Wayanad Dist. 287. 2009. *Hedysarum triflorum* L., Sp. Pl. 249. 1753. *Desmodium triflorum* (L.) DC. var. *minus* Wight & Arn., Prodr. Fl. Ind. Orient. 229. 1834.

Much branched glabrescent prostrate herbs, rooting at nodes. Leaves 3-foliolate; leaflets 0.3-1.5 x 0.3-1.4 cm, obovate, base cuneate, apex truncate or emarginate, lateral leaflets smaller than the terminal one; petiole 1.5 cm long; stipule c. 5 mm long, ovate-lanceolate. Flowers 3-4 mm long, 1-4 together in the axils of leaves; pedicels 4-6 mm long, capillary; bracts c. 2 mm long, ovate, ciliate. Calyx c. 3 mm long, covered with long silky hairs; lobes unequal, lanceolate. Petals pink to violet; standard c. 3 mm long, obovate; wings c. 2 mm long; keels to 4 mm long. Pods 1-1.5 cm long, 3-5-jointed, lower margin deeply indented, upper entire; joints hairy or glabrous, reticulate-veined, longer than broad.

Valayamchal, *KJD 18724*

Fl. & Fr.: July-December

Distribution: Along boundaries near Farm.

Desmodium velutinum (Willd.) DC. in DC. Prodr. 2: 328. 1825; Sanjappa, Legumes Ind. 165. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 288. 2009. *Hedysarum velutinum* Willd., Sp. Pl. 3: 1174. 1802. *Desmodium latifolium* (Roxb. ex Ker.) DC. in DC. Prodr. 2: 328. 1825; Hook.f., Fl. Brit. India 2: 168. 1876; Gamble, Fl. Madras 346(244). 1918. *Hedysarum latifolium* Roxb. ex Ker., Bot. Reg. 5: t. 355. 1819.

Shrubs, to 1.5 m high; stem ferruginous-tomentose. Leaves to 13 x 10 cm, broadly ovate, acute or obtuse at apex, rounded at base, densely velutinus below; nerves 6-8 pairs, regular, prominent below; stipules 3 mm long, cordate at base, white; stipel minute, filiform. Raceme terminal, paniced, to 30 cm long. Flowers 4 mm across, pink. Calyx 1.5 mm long, lobes ovate, acute, hairy. Standard petal 3 x 3 mm. Pods 2 cm long, crenate along ventral suture; joints 8-10, each 3 x 3 mm, roundish, hirsute

Paripode, *KJD 26352*

Fl. & Fr.: October-February

Distribution: Along boundaries near Farm at Paripode.

ERYTHRINA L.

Sp. Pl. 706. 1753.

- 1a. Wing and keel petals about equal in length; keel petals free *E. variegata*
- 1b. Keel petal is larger than wing petals; keel petals combined *E. stricta*

Erythrina stricta Roxb., Fl. Ind. 3: 251. 1832; Hook.f., Fl. Brit. India 2: 189. 1876; Gamble, Fl. Madras 354(250). 1918; Sanjappa, Legumes Ind. 173. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 290. 2009.

Trees, to 15 m high; bark yellowish green, armed with bossed prickles. Leaves trifoliate, alternate, leaflets 5-12.5 x 3.7-10 cm, deltoid, truncate or obtuse, apex subacute or acuminate; nerves 3-7 from base, palmate, lateral nerves 5-7, intercostae reticulate; rachis 10-13 cm long, pulvinate, prickled or not; stipels gland-like; stipules small. Flowers 5 x 1.8 cm, red, clustered on the brown-tomentose rachis, in terminal racemes; bracts ovate; bracteole 3 mm. Calyx spathaceous, 1-1.5 cm, split half way down. Petals 5; standard 5 x 2.5 cm, oblong-lanceolate; wings 5.5 x 3 mm; keel 2 x 0.7 cm. Stamens 10, monadelphous; staminal sheath 2.5 cm; filaments 1 and 1.5 cm long. Ovary inferior, stipitate, 2 cm, pubescent, 1-celled, ovules many; style 1.5 cm, suberect; stigma capitate. Pod 5-10 cm long, lanceolate; seeds 3-6, black.

Kariyenkappu, KJD 26370

Fl. & Fr.: January-May

Distribution: Rare in plantations of Kariyenkappu and evergreen forests of Moonamthode.

Erythrina variegata L., Herb. Amboin. 10. 1754; Sanjappa, Legumes Ind. 173. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 291. 2009. *Erythrina variegata* L. var. *orientalis* (L.) Merr., Interpr. Herb. Amboin. 276. 1917; Manilal & Sivar., Fl. Calicut 90. 1982; Sanjappa, Legumes Ind. 173. 1992; Sunil & Sivadasan, Fl. Alappuzha Dist. 224. 2009. *Erythrina indica* Lam., Encycl. 2: 391. 1786; Hook.f., Fl. Brit. India 2: 188. 1876; Gamble, Fl. Madras 353(249). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 142. 1988.

Deciduous trees; bark yellowish or greenish-grey; prickles black on branches. Leaves trifoliate, leaflets 10-13.5 x 8.5-12.5 cm, widely ovate, rhomboid or deltoid-ovate, apex acuminate, base truncate or obtuse; stipels gland-like; lateral nerves 4-7 pairs, intercostae reticulate; rachis 17-21 cm, pulvinate; stipules small. Flowers bright red, in dense racemes. Calyx spathaceous, oblique, recurved, split to the base on one side, 5-toothed at the tip. Petals 5, sessile; standard 6.5 x 2.5 cm, oblong-elliptic; wings 1.5 x 1 cm, obovate; keel 1.5 x 1.7 cm, oblong-falcate. Stamens 10, monadelphous, alternately longer and shorter. Ovary stipitate, inferior, pubescent, 1-celled, ovules many; style curved, subulate at the apex, not bearded; stigma capitate. Pod 15-30.5 cm long, torulose, constricted between seeds, dehiscent; seeds 6-8.

Kariyenkappu, KJD 26387

Fl. & Fr.: January-May

Distribution: In earlier settlements at Kariyenkappu.

FLEMINGIA Roxb. ex W.T.Aiton

Hort. Kew., ed. 4: 349. 1812, *nom. cons.*

- 1a. Leaves unifoliolate; flowers within the persistent floral bracts..... *F. strobilifera*
1b. Leaves 3-foliolate; flowers exposed from the floral bracts *F. macrophylla*

Flemingia macrophylla (Willd.) Prain ex Merr., Philipp. J. Sci. 5: 130. 1910; Manilal & Sivar., Fl. Calicut 91. 1982; Sanjappa, Legumes Ind. 176. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 292. 2009. *Crotalaria macrophylla* Willd., Sp. Pl. 3: 982. 1802. *Flemingia congesta* Roxb. ex W.T. Aiton, Hort. Kew., ed. 2 4: 349. 1812; Hook.f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Madras 378(267). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 144. 1988. *Moghania macrophylla* (Willd.) Kuntze, Revis. Gen. Pl. 1: 199. 1891. *Flemingia semialata* Roxb., Fl. Ind. 3: 340. 1832; Gamble, Fl. Madras 378(267). 1918; Sanjappa, Legumes Ind. 178. 1992. *Flemingia congesta* Roxb. ex W.T. Aiton var. *semialata* (Roxb.) Baker in Hook.f., Fl. Brit. India 2: 229. 1876, p.p. *Moghania prostrata* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6: 19. 1953.

Erect shrubs; branchlets trigonous, adpressed tomentose. Leaflets subequal, 5-14 x 2-5 cm, elliptic-lanceolate, base cuneate to rounded, apex acute to acuminate, tomentose along the nerves on both surfaces or glabrescent above, basally 3-nerved; petiole to 7 cm long, narrowly winged. Racemes axillary, clustered or single, 2.5-5.5 cm long, villous. Flowers 7-10 mm long; pedicels c. 2 mm long; bracts 4-7 mm long, lanceolate. Calyx lobes linear-lanceolate, the lower longest, much exceeding the tube, pubescent. Petals reddish; standard 7-8 mm long, oblong-obovate; wings and keels long-clawed. Pods 0.8-1.2 x 0.4-0.6 cm, oblong, turgid, covered with powdery red coating.

Kannadivechakunnu, *KJD 26338*

Fl. & Fr.: November-January

Distribution: Fairly common in evergreen forests of Kannadivechakunnu.

Flemingia strobilifera (L.) R.Br. ex W.T.Aiton, Hort. Kew., ed. 2 4: 350. 1812; Hook.f., Fl. Brit. India 2: 227. 1876; Gamble, Fl. Madras 377(266). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 144. 1988; Sanjappa, Legumes Ind. 178. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 293. 2009. *Hedysarum strobiliferum* L., Sp. Pl. 746. 1753. *Hedysarum bracteatum* Roxb., Fl. Ind. 3: 351. 1832. *Flemingia bracteata* (Roxb.) Wight, Icon. Pl. Ind. Orient. t. 268. 1840; Gamble, Fl. Madras 378(266).1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 143. 1988; Anil Kumar *et al.*, Fl. Pathanamthitta 179. 2005. *Flemingia strobilifera* (L.) R.Br. ex Ait.f. var. *bracteata* (Roxb.) Baker in Hook.f., Fl. Brit. India 2:227.1876.

Erect shrubs, upto 1 m tall; branchlets tomentose. Leaves 1-foliolate, 6-15 x 2.5-7 cm, ovate, elliptic to broadly lanceolate, apex acute to acuminate, base broadly cuneate or rounded, glabrous above, pubescent or hairy on the nerves beneath; lateral nerves 5 or 6 pairs; petiole 1-1.5 cm long, tomentose; stipules to 1 cm long, linear-lanceolate, scarious. Racemes axillary and terminal, simple or branched, flexuous, tomentose; bracts to 2 x 2.5 cm, ovate-cordate, folded, membranous, each enclosing short few-flowered cymes. Flowers 1 cm long; pedicels c. 2 mm long. Calyx-tube c. 2 mm long; lobes 6-7 mm long, lanceolate. Petals white; standard 6-7 mm long, oblong-obovate; wings oblanceolate; keels obliquely oblong. Pods enclosed by the bracts. 6-10 x 4-0.6 cm, oblong, pubescent.

Kannadivechakuunu, *KJD 26332*

Fl. & Fr.: November-February

Distribution: Fairly common in evergreen forests of Kannadivechakuunu.

HYLODESMUM H.Ohashi & R.R.Mill

Edinburgh J. Bot. 57(2): 173. 2000

Hylodesmum repandum (Vahl) H.Ohashi & R.R.Mill, Edinburgh J. Bot. 57(2): 185. 2000. *Hedysarum repandum* Vahl, Symb. Bot. (Vahl) 2: 82.1791. *Desmodium repandum* (Vahl) DC. in DC. Prodr. 2: 334. 1825; Ramach. & V.J. Nair, Fl. Cannanore Dist. 140. 1988; Sanjappa, Legumes Ind. 161. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 286. 2009. *Desmodium scalpe* DC. in DC. Prodr. 2: 334. 1825; Hook.f., Fl. Brit. India 2: 165.1876; Gamble, Fl. Madras 345(243). 1918. *Desmodium strangulatum* Wight & Arn., Prodr. Fl. Ind. Orient. 228. 1834 (Plate 10c).

Undershrubs; branches slender. Leaves few; leaflets to 20 x 6 cm, ovate, acuminate, rounded at base, glabrous above, adpressed pubescent below; nerves finely reticulated below; stipules ovate, acuminate. Flowers in paniced racemes, terminal or axillary; rachis tomentose, to 25 cm long. Calyx 4-lobed, campanulate. Standard petal to 10 mm across, reddish, orbicular, retuse at apex. Joints of pod 2 or 3, to 1.5 x 0.6 cm, falcate, densely covered with hooked hairs.

Ambalappara, *KJD 26336*

Fl. & Fr.: December-April

Distribution: Common in evergreen forests of Ambalappara and Pothurumi.

INDIGOFERA L.

Sp. Pl. 751. 1753.

- 1a. Pods oblong or subglobose, 2 or 3 seeded *I. linnaei*
- 1b. Pods linear, more than 6 seeded *I. endecaphylla*

Indigofera endecaphylla Jacq. ex Poir., Icon. Pl. Rar. 3: t.570. 1789, "hendecaphylla"; Hook.f., Fl. Brit. India 2: 98. 1876; Gamble, Fl. Madras 311(220). 1918; Ratheesh, Fl. Stud. Wayanad Dist. 295. 2009. *Indigofera spicata* auct. non Forssk. 1775: Ramach. & V.J. Nair, Fl. Cannanore Dist. 147. 1988; Sanjappa, Legumes Ind. 195. 1992; Sanjappa in Hajra et. al., Fasc. Fl. India 21: 123. 1995.

Undershrubs. Leaves 4 cm long; leaflets 8-10 pairs, 20 x 6 mm, oblanceolate, obtuse, shortly mucronate, sessile; stipules 1 cm long, subulate. Racemes 12 cm long, slender. Flowers 6 mm long. Calyx lobes subulate; standard pink, hispid outside. Pods 20 x 2 mm, compressed, marginate, rugose, seeds 5-10.

Paripode, KJD 26400

Fl. & Fr.: September-January

Distribution: Rare along the boundaries of Farm.

Indigofera linnaei Ali, Bot. Not. 111: 549. 1958; Manilal & Sivar., Fl. Calicut 88. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 147. 1988; Sanjappa, Legumes Ind. 192. 1992 & in Hajra et. al., Fasc. Fl. India 21: 96. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 296. 2009. *Indigofera enneaphylla* L., Mant. Pl. 2: 272. 1771, *nom. illeg.*; Hook.f., Fl. Brit. India 2: 94. 1876; Gamble, Fl. Madras 309(218). 1918.

Trailing, branched, slender annual or perennial herbs with woody rootstock, sparsely grey-pubescent. Leaves imparipinnate; leaflets 5-9, subsessile, 3-8 x 2-4 mm, oblong-obovate, apex obtuse to emarginate, base cuneate, appressed pubescent on both surfaces; stipules c. 3 mm long, ovate, cuspidate, scarious. Flowers 3-4.5 mm long, in 10-15-flowered axillary subcapitate racemes, 1-1.5 cm long; bracts c. 2 mm long, deltoid, hyaline. Calyx-tube c.1 mm long; lobes 2-3 mm long, setaceous. Petals exerted, red; standard obovate; wings and keels oblong. Staminal sheath to 3 mm; style apically incurved. Pods 3-4 x 1.5-2.5 mm, oblong-cylindrical or subglobose, adpressed hairy; seeds 2.

Ambalappara, KJD 25572

Fl. & Fr.: September-December

Distribution: Rare in grasslands of Ambalappara.

KUNSTLERIA Prain

J. Asiat. Soc. Bengal Pt. 2. Nat. Hist. 66(2): 109. 1897.

Kunstleria keralensis C.N.Mohanan & N.C.Nair, Proc. Indian Acad. Sci. Pl. Sci. 90: 207. 1981; Sanjappa, Legumes Ind. 199. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 297. 2009.

Large climbers; stems slender. Leaves imparipinnate; leaflets opposite, 9-11 to 16 x 5 cm, ovate-oblong, acuminate, rounded at base, membranous; nerves 4 pairs, reticulate; rachis to 25 cm long. Flowers in terminal and axillary panicles, branches slender, rusty tomentose; bracts and bracteoles minute. Flowers distantly packed. Calyx 3 mm long, campanulate, rusty tomentose. Petals brownish, 5 mm across; standard orbicular, glabrous. Stamens 9 + 1; anthers uniform. Ovary sessile, few-ovuled. Pods 11 x 2 cm, flat, oblong obtuse, prominently reticulate; seed one, oblong.

Kattikari, *KJD 25581*

Fl. & Fr.: April-June

Distribution: Rare in evergreen forests of Kattikari and Moonamthode. Endemic to southern Western Ghats of Kerala. Conservation status: Vulnerablae.

MUCUNA Adans.

Fam. Pl. 2: 325, 579. 1763, *nom.cons.*

Mucuna pruriens (L.) DC. in DC. Prodr. 2: 405. 1825; Hook.f., Fl. Brit. India 2: 187. 1876; Manilal & Sivar., Fl. Calicut 92. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 149. 1988; Sanjappa, Legumes Ind. 217. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 298. 2009. *Dolichos pruriens* L., Herb. Amboin. 23. 1754 & Syst. Nat. (ed. 10) 1162. 1759. *Stizolobium pruriens* (L.) Medik., Vorels. Churpfalz. Phys.-Ocon. Ges. 2: 339. 1787; Ansari, Fl. Kasaragod Div. 134. 1985. *Mucuna prurita* Hook., Bot. Misc. 2: 348. 1831; Gamble, Fl. Madras 356(251). 1918.

Large climbers; branchlets densely clothed with rigid hairs. Leaves 3-foliolate; leaflets 5-13x 2.5-8 cm, the terminal leaflets ovate-rhomboid or elliptic, the lateral ones broadly ovate, apex obtuse or acute, base rounded or truncate, adpressed pubescent; petiole to 10 cm long; stipules c. 4 mm long, linear; stipels setaceous. Flowers c. 3.5 cm long, in axillary tomentose, pendulous racemes; pedicels 2-4 mm long. Calyx-tube 4-7 mm long, pubescent, 4-lobed. Petals dark purplish; standard 2-2.5 x 1.5-2 cm, ovate. Anthers dimorphous, alternately dorsifixed and basifixed. Pods 5-7.5 x 1.2-1.5 cm, linear-oblong, somewhat s-shaped, turgid, densely covered with shining irritant bristly hairs; seeds 4-6, to 8 x 7 mm, ovoid, brown or black.

Kariyenkappu, *KJD 26254*

Fl. & Fr.: October-February

Distribution: Fairly common in Plantations.

PHYLLODIUM Desv.

J. Bot. Agric. 1: 123, t. 5. 1813

Phyllodium pulchellum (L.) Desv., J. Bot. ser. 2, 1: 124. 1813. *Hedysarum pulchellum* L., Sp. Pl. 747. 1753. *Desmodium pulchellum* (L.) Benth., Fl. Hongk. 83. 1861; Hook.f., Fl. Brit. India 2: 162. 1876; Gamble, Fl. Madras 344(243). 1918; Sanjappa, Legumes Ind. 160. 1992; Ramach. & V.J. Nair, Fl. Cannanore Dist. 139. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 286. 2009.

Undershrubs or shrubs up to 2 m tall. Leaves 3-foliolate; leaflets 2.5-11 x 2-5 cm, ovate, elliptic or ovate-oblong, apex obtuse or subacute, base subacute, margins wavy and subrugose above, finely downy and pale beneath, thin-coriaceous, lateral less than half as long as the terminal, inequilateral; petiole to 2 cm long; stipules c. 5 mm long. Racemes terminal or axillary, 7-16 cm long; primary bracts 10-18, leafy, 1.2-1.5 x 1.2-1.5 cm, orbicular, each enclosing 1-5 flowers; secondary bracts c. 1 mm long, ovate; bracteoles to 2 mm long. Calyx c. 2 mm long, puberulous, teeth lanceolate. Petals yellowish; standard 4-5 mm long, obovate; wings c. 4 mm long, elliptic. Pods 4-6 x 3-4 mm, indented on both sutures, sessile; joints usually 2, slightly longer than broad, pubescent; seeds orbicular.

Kannadivechakunnu, *KJD 22501*

Fl. & Fr.: September-February

Distribution: Rare in evergreen forests of Kannadivechakunnu.

PSEUDARTHRIA Wight & Arn.

Prodr. Fl. Ind. Orient. 209. 1834

Pseudarthria viscida (L.) Wight & Arn., Prodr. Fl. Ind. Orient. 209. 1834; Hook.f., Fl. Brit. India 2: 154. 1876; Gamble, Fl. Madras 334(236). 1918; Ansari, Fl. Kasaragod Div. 131. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 151. 1988; Sanjappa, Legumes Ind. 230. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 301. 2009. *Hedysarum viscidum* L., Sp. Pl. 747. 1753.

Viscid pubescent subshrubs up to 75 cm tall. Leaves 3-foliolate; terminal leaflet 5-8 x 4-6 cm, ovate-rhomboid; laterals 3-4 x 2-3.5 cm, obliquely ovate, apex acute, base cuneate or obtuse, glabrescent above and densely woolly below; petioles 4-6 cm long; stipules 5-6 mm long, subulate. Flowers in axillary or terminal, often branched racemes; bracts and bracteoles 4-5 mm long, subulate, hairy. Calyx-tube 1-1.5 mm long; lobes 2-3 mm long, subulate, hairy. Corolla purplish; standard 4-5 mm long, ovate-obtuse. Stamens 9+1; staminal sheath c. 4 mm long. Ovary 3.5-4 mm long, terete, densely pubescent without; style

subulate, incurved; stigma capitate. Pods 1-2 x 0.4-0.5 cm, linear-oblong, compressed, pubescent with hooked hairs; seeds 4-6, reniform.

Paripode, *KJD 26291*

Fl. & Fr.: November-March

Distribution: Rare along the boundaries of Farm.

PTEROCARPUS N J Jacquin

Sel. Strip. Amer. Hist. 283. 1763, *nom. cons.*

Pterocarpus marsupium Roxb., Pl. Coromandel t. 116. 1799; Hook.f., Fl. Brit. India 2: 239. 1876; Gamble, Fl. Madras 385(271). 1918; Ansari, Fl. Kasaragod Div. 132. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 152. 1988; Sanjappa, Legumes Ind. 232. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 301. 2009.

Deciduous trees, to 30 m high; bark grey or greyish-black; exudation blood-red. Leaves imparipinnate, leaflets 5-7, alternate, 3.5-12.5 x 2-7 cm, elliptic-oblong, oblong-ovate or oblong, apex obtuse and emarginate, base obtuse or acute; lateral nerves 9-20 pairs, parallel; intercostae reticulate; rachis 6.5-11.1 cm long, pulvinate; stipules small. Flowers yellow, in terminal and axillary panicles; 10-12 mm long; bracts small; bracteoles 2. Calyx tube campanulate, lobes short, the upper 2 often connate. Petals 5, all long-clawed, crisped along the margins; standard orbicular, wings oblique, obovate, auricled; keel petals oblique, small, slightly connate. Stamens 10, monadelphous; filaments subequal. Ovary shortly stalked, 1-celled, ovules 2; style filiform; stigma capitate. Pod 2.5-5 cm across, orbicular-reniform; seed one.

Narikkadavu, *KJD 26295*

Fl. & Fr.: September-October

Distribution: Rare in Deciduous forests.

RHYNCHOSIA Lour.

Fl. Cochinch. 425, 460. 1790, *nom. cons.*

Rhynchosia rufescens (Willd.) DC. in DC. Prodr. 2: 387. 1825; Hook.f., Fl. Brit. India 2: 220. 1876; Gamble, Fl. Madras 373(263). 1918; Manilal & Sivar., Fl. Calicut 91. 1982; Sanjappa, Legumes Ind. 240. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 304. 2009. *Glycine rufescens* Willd., Ges. Naturf. Freunde Berlin Neue Schriften 4:222. 1803.

Subshrubs with trailing branches, glandular-hairy. Leaflets 6.5 x 2.5 cm, ovate, acute, rounded at base; petiole 4-5 cm long; stipules ovate. Flowers in short racemes. Calyx 8 mm long, lobes oblong, obtuse. Petals included, yellow;

standard 7 mm diam., orbicular, glabrous; wings 5 mm long, oblong. Pods 7 x 5 mm, ovoid, turgid, minutely hispid; seed-1, black.

Ambalappara, KJD 22581

Fl. & Fr.: October-December

Distribution: Rare in evergreen forests of Ambalappara.

SHUTERIA Wight & Arn.

Prodr. Fl. Ind. Orient. 207. 1834, *nom. cons.*

Shuteria involucrata (Wall.) Wight & Arn., Prodr. Fl. Ind. Orient. 207. 1834; Sanjappa, Legumes Ind. 245. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 305. 2009. *Glycine involucrata* Wall., Pl. Asiat. Rar. (Wallich) 3: 22. t. 241. 1832. *Glycine involucrata* Wall. var. *glabrata* (Wight & Arn.) Ohashi, J. Jap. Bot. 50: 305. 1975. *Shuteria glabrata* Wight & Arn., Prodr. Fl. Ind. Orient. 207. 1834. *Shuteria vestita* Wight & Arn., Prodr. Fl. Ind. Orient. 207. 1834; Hook.f., Fl. Brit. India 2: 181. 1876; Gamble, Fl. Madras 350(247). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 153. 1988; Sanjappa, Legumes Ind. 245. 1992.

Slender twiners, stem villous. Leaves 3-foliolate, leaflets unequal, 3-4.5 x 2-2.5 cm, ovate, apex obtuse, base rounded, villous; petiole to 6 cm long, stipules lanceolate, striate with a tuft of hairs at base. Racemes to 20 cm long, axillary; bracts and bracteoles similar. Flowers many, white, deflexed. Calyx 4 mm long, lobes acuminate. Petals white, standard 7 x 5 mm, orbicular, wings 8 mm long, spurred at base, keel 8 x 3 mm, oblong. Stamens 9 + 1. Ovary many-ovuled, densely hairy. Pods to 4 x 0.5 cm, oblong, flat, densely hispid; seeds many, cubical.

Moonamthode, KJD 22512

Fl. & Fr.: November-February

Distribution: Rare in evergreen forests of Moonamthode.

SMITHIA W.T. Aiton

Hort. Kew., ed. 2 3: 496. 1789, *nom. cons.*

Smithia gracilis Benth., Linnaea 24: 642. 1851; Hook.f., Fl. Brit. India 2: 150. 1876; Gamble, Fl. Madras 330(233). 1918; Sanjappa, Legumes Ind. 247. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 306. 2009.

Small prostrate herbs. Leaflets 3 pairs, 0.3-0.5 x 0.1-0.2 cm, elliptic ovate, ciliate on margins and midrib below. Racemes axillary and terminal, few-flowered; bracts minute, 0.2 cm long, membranous, ovate lanceolate. Calyx 0.4 cm long, 2-lipped, upper lip broad, lower 3-lobed, central lobe acuminate, ciliate on margins.

Petals yellow, 0.4 cm long. Ovary curled. Pod 3-4 jointed, joints 0.3-0.4 cm diameter, twisted; seeds 1 mm diameter.

Ambalappara, KJD 22518

Fl. & Fr.: December-March

Distribution: Rare in open areas in evergreen forests of Ambalappara.

Endemic to southern Western Ghats.

SPATHOLOBUS Hassk.

Flora 25(2): 52. 1842.

- 1a. Flowers buish-purple; pods sessile.....*S. purpureus*
1b. Flowers yellowish-pink; pods stalked. *S. parviflorus*

Spatholobus parviflorus (Roxb. ex DC.) Kuntze, Revis. Gen. Pl. 1: 205. 1891; Sanjappa, Legumes Ind. 251. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 308. 2009. *Butea parviflora* Roxb. ex DC. in DC. Prodr. 2: 415. 1825; Manilal & Sivar., Fl. Calicut 90. 1982; Anil Kumar *et al.*, Fl. Pathanamthitta 159. 2005. *Spatholobus roxburghii* Benth. in Miq. Pl. Jungh. 238. 1852; Hook.f., Fl. Brit. India 2: 193. 1876; Gamble, Fl. Madras 358(253). 1918.

Large climbers; branches puberulus. Leaflets ovate, obtusely acute at apex, rounded at base, densely hairy below; lateral nerves 8 pairs; nervules parallel; petiole 3-6 cm long. Panicles 20 x 15 cm, axillary, densely hispid. Flowers 9 mm long, 8 mm across. Calyx 4 mm long, densely villous inside. Standard petal 8 x 6 mm, labrous, pale-pink; wings 6 mm long, long-clawed; keel 9 mm long, obovoid. Pods 14 x 4.5 cm, stalked; stalk ca 3 cm long.

Paripode, KJD 22520

Fl. & Fr.: September-April

Distribution: Fairly common in Deciduous forests.

Spatholobus purpureus Benth. ex Baker in Hook.f., Fl. Brit. India 2: 194. 1876; Gamble, Fl. Madras 359(253). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 155. 1988; Sanjappa, Legumes Ind. 252. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 308. 2009. *Butea purpurea* (Benth. ex Baker) Blatt., J. Indian Bot. Soc. 8: 137. 1929.

Large climbers; stems puberulus. Leaflets ovate-oblong, abruptly acuminate, rounded at base, glabrous, lateral nerves 6 pairs, regular; petiole 7 cm long. Panicles 18 x 10 cm, terminal, rusty puberulus; pedicels 4 mm long, slender. Flowers many, light pink. Calyx 2.5 mm long, lobes obtuse. Standard petal 8 x 5

mm, obovate; wings 6 mm long, slightly pubescent; keel glabrous. Pods 10 x 2.5 cm, oblong, narrowed at both ends, compressed and thin.

Kariyenkappu, 31604

Fl. & Fr.: January-March

Distribution: Fairly common in plantations of Kariyenkappu and Semi-evergreen forests of Kurukathode. Endemic to Western Ghats.

TADEHAGI H.Ohashi

Ginkgoana 1: 280. 1973.

Tadehagi triquetrum (L.) Ohashi, Ginkgoana 1: 290. 1973. *Hedysarum triquetrum* L., Sp. Pl. 746. 1753. *Desmodium triquetrum* (L.) DC. in DC. Prodr. 2: 326. 1825; Hook.f., Fl. Brit. India 2: 163. 1876,p.p.; Gamble, Fl. Madras 345(244). 1918; Manilal & Sivar., Fl. Calicut 85. 1982; Ansari, Fl. Kasaragod Div. 128. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 141. 1988; Sanjappa, Legumes Ind. 163. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 288. 2009.

Erect subshrubs to 1 m tall; branches trigonous, ciliate with stiff hairs on angles. Leaves 1-foliolate, 5-15 x 1.5-4 cm, ovate-lanceolate or oblong, apex acuminate, base subcordate, glabrous above and tomentose below; petiole to 3.5 cm long; stipules 1-1.8 x 0.4-0.5 cm, subulate at apex, striated. Racemes terminal, 10-28 cm long; bracts 3-6 x 3-5 mm, subulate; pedicels 4-6 mm long. Calyx c. 4 mm long, campanulate; lobes lanceolate, acuminate. Petals pink. Stamens monadelphous. Ovary 3-4 mm long, pubescent without; style curved; stigma capitate. Pods 1.8-3.5 x 0.5-0.7 cm, laterally compressed, 5-7-jointed, loosely appressed hairy.

Paripode, KJD 26351

Fl. & Fr.: July-December

Distribution: Along boundaries near Farm at Paripode.

TEPHROSIA Pers.

Syn. Pl. 2: 328. 1807, *nom. cons.*

- 1a. Flowers orange-red; pod 6-7 cm long, shortly hirsute *T. tinctoria*
- 1b. Flowers pink-purple; pod 2.5-4 cm long, glabrous. *T. purpurea*

Tephrosia purpurea (L.) Pers., Syn. Pl. 2: 329. 1807; Hook.f., Fl. Brit. India 2: 112. 1876,p.p.; Gamble, Fl. Madras 320(226). 1918; Manilal & Sivar., Fl. Calicut 87. 1982; Ansari, Fl. Kasaragod Div. 135. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 156. 1988; Sanjappa, Legumes Ind. 258. 1992; Ratheesh, Fl.

Stud. Wayanad Dist. 310. 2009. *Cracca purpurea* L., Sp. Pl. 752. 1753. *Tephrosia hamiltonii* Drumm. ex Dunn in Gamble, Fl. Madras 320(226). 1918.

Perennial erect or decumbent herbs or subshrubs, up to 50 cm tall. Leaves imparipinnate; leaflets 7-15, 1-2.8 x 0.3-1 cm, oblanceolate or obovate, apex obtuse to emarginate or truncate, base cuneate, mucronate; stipules 3-6 mm long, lanceolate. Flowers ca. 7 mm long, in few-flowered, leaf-opposed, pseudoracemes; pedicels 3-4 mm long; bracts c. 2 mm long. Calyx 3-4 mm long, pubescent; lobes subulate. Petals pink to purplish; standard c. 4 mm broad, orbicular. Staminal tube to 4 mm long. Pods 2.5-4 x 0.3-0.4 cm, linear-oblong; seeds 5-7, ellipsoid, dark brown.

Paripode, KJD 22531

Fl. & Fr.: October-December

Distribution: Rare along the boundaries near Farm.

Tephrosia tinctoria Pers., Syn. Pl. 2: 329. 1807; Hook.f., Fl. Brit. India 2: 111. 1876; Gamble, Fl. Madras 319(225). 1918; Manilal & Sivar., Fl. Calicut 86. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 156. 1988; Sanjappa, Legumes Ind. 259. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 311. 2009.

Erect shrubs; stems densely retrorse-hairy. Leaflets to 4.5 x 1.3 cm, oblong, obtuse, mucronate, acute at base, glabrous above; densely white-tomentose below. Racemes axillary; peduncle 10 cm long; bracts 6 mm long, lanceolate. Flowers red. Calyx 6 mm long, lobes lanceolate. Standard petal glabrous, narrowed to the base; wings to 17 x 5 mm; keel 14 x 6 mm, obovate, glabrous. Pods 7 x 0.5 cm, oblong, slightly curved, minutely hirsute; seeds many.

Ambalappara, KVB 31778

Fl. & Fr.: September-December

Distribution: Fairly common in grasslands of Ambalappara.

TERAMNUS P. Browne

Civ. Nat. Hist. Jamaica 290. 1756.

- 1a. Leaflets glabrous; pod glabrous..... *T. labialis*
- 1b. Leaflets hairy; pod villous..... *T. mollis*

Teramnus labialis (L.f.) Spreng., Syst. Veg. 3: 235.1826; Hook.f., Fl. Brit. India 2:184.1876; Gamble, Fl. Madras 352(249). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 157. 1988; Sanjappa, Legumes Ind. 261. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 312. 2009. *Glycine labialis* L.f., Suppl. Pl. 325. 1782.

Slender climbers; branches appressed pubescent. Leaves 3-foliolate; leaflets 1.5-3.5 x 1.5-2.2 cm, ovate or elliptic, base rounded, apex acute, membranous, puberulent below; petiole to 4 cm long. Racemes axillary, up to 6 cm long, with distant clusters or solitary flowers in the axils of 2-3 mm long subulate bracts. Flowers 4 mm long; pedicels c. 2 mm long; bracts 2-3 mm long. Calyx-tube 2-3 mm long, campanulate; lobes acuminate, about equalling the tube, villous. Petals pink, clawed; standard c. 4 mm long, obovate; wings c.3 mm long, narrow-oblong; keels oblanceolate. Stamens monadelphous; anthers alternately fertile and sterile. Ovary tomentose; stigma capitate. Pods 3-4.2 x 0.25-0.3 cm, linear, compressed, thinly adpressed pubescent, ending in a hook formed by the persistent style; seeds dark brown.

Kariyenkappu, *KJD 22533*

Fl. & Fr.: October-December

Distribution: Rare in plantations of Kariyenkappu.

Teramnus mollis Benth., J. Linn. Soc. Bot. 8: 265. 1865; Gamble, Fl. Madras 352(249). 1918; Ansari, Fl. Kasaragod Div. 136. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 157. 1988; Sanjappa, Legumes Ind. 261. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 312. 2009. *Teramnus labialis* (L.f.) Spreng. var. *mollis* (Benth.) Baker in Hook.f., Fl. Brit. India 2: 184. 1876.

Slender twiners. Leaves 3-foliolate; leaflets unequal, terminal one rhombilanceate, c.9 by 4.5 cm, laterals oblong-lanceate, 7 by 3.5 cm, apex acute, base rounded to subcordate, lower surface densely greyish-tomentose, thin-coriaceous. Racemes axillary, c. 6 cm long, solitary or 2-3, in clusters. Flowers lax. about 2 mm long, pink. Calyx campanulate, lobes more or less 4, upper 2 connate. Petals little exerted, clawed. Stamens 10; monadelphous, anthers alternatively fertile and sterile. Ovary stipitate; style curved. Pods compressed, pubescent, apex hooked; seeds oblong.

Chavachi, *NS & KVB 31303*

Fl. & Fr.: October-March

Distribution: Fairly common in evergreen forests of Chavachi and Moonamthode.

URARIA Desv.

J. Bot. Agric. 1: 122. 1813.

Uraria rufescens (DC.) Schindl., Repert. Spec. Nov. Regni Veg. 21: 14. 1925 Ansari, Fl. Kasaragod Div. 136. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 158. 1988; Sanjappa, Legumes Ind. 268. 1992; Ratheesh, Fl. Stud. Wayanad

Dist. 313. 2009. *Desmodium rufescens* DC., Ann. Sci. Nat. (Paris) 4: 101. 1825. *Doodia hamosa* Roxb., Fl. Ind. 3: 367. 1832. *Uraria hamosa* (Roxb.) Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 222.1834; Hook.f., Fl. Brit. India 2: 150. 1876; Gamble, Fl. Madras 336(237). 1918.

Erect subshrubs; stems triquetrous, hispid. Leaflets to 8.5 x 4.5 cm, elliptic, acute or obtuse at apex and base, hispid below; petiole 1-2.5 cm long; stipules 12 mm long, acuminate; stipel subulate. Flowers distant; bracts 7 mm long, hispid. Calyx 3 mm long, glabrous. Standard petal 6 x 8 mm, orbicular, cuneate at base, pinkish; wings 5 x 3 mm, oblique, auricled at base; keel 6 x 3 mm, shortly spurred near the base. Joints of pods 6-8, each 2 x 2 mm, hispid, black.

Paripode, *KJD 22543*

Fl. & Fr.: November-January

Distribution: Rare in Semi-Evergreen forests of Paripode.

VIGNA Savi

Pisa Nuov. Giorn. Lett. 8: 113. 1824, *nom. cons.*

- 1a. Flowers reddish-purple; pods 5-7 cm long *V. vexillata*
- 1b. Flowers yellow 2
- 2a. Bracteoles broad; pods hirsute *V. radiata* var. *sublobata*
- 2b. Bracteoles linear; pods glabrous *V. umbellata*

Vigna radiata (L.) Wilczek var. **sublobata** (Roxb.) Verdc., Kew Bull. 24: 559. 1970; Manilal & Sivar., Fl. Calicut 92. 1982; Ansari, Fl. Kasaragod Div. 137. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 159. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 314. 2009. *Phaseolus sublobatus* Roxb., Fl. Ind. 3: 288. 1832; Gamble, Fl. Madras 363(256). 1918. *Phaseolus trinervius* Heyne ex Wight & Arn., Prodr. Fl. Ind. Orient. 245. 1834; Hook.f., Fl. Brit. India 2: 203. 1876. *Vigna sublobata* (Roxb.) Bairiganjan, Panda, Choudhury & Patnaik, J. Econ. Taxon. Bot. 7: 274. 1985; Babu & Sharma, Bull. Bot. Surv. India 27: 21. 1987; Sanjappa, Legumes Ind. 276. 1992.

Annual twining herbs; stems, petioles and peduncles clothed with ferruginous, deflexed hairs. Leaflets 3.5-7.5 x 2.8-5 cm, ovate-deltoid, apex obtuse, acute or acuminate, base cuneate to subtruncate, hirsute, the terminal leaflets sometimes lobed; stipules 5-8 x 3-4 mm, falcate-lanceolate or ovate-oblong, peltately fixed; stipels linear. Racemes axillary, capitate, long peduncled, 2-6-flowered. Calyx-lobes c. 2 mm long, ovate-triangular, hairy. Petals yellow.

Pods 2.5-5 cm long, linear-oblong, terete, clothed with ferruginous hairs; seeds 4-10, greyish brown, 2.5-3 mm long.

Kariyenkappu, *KJD 22548*

Fl. & Fr.: November-December

Distribution: Earlier settlements.

Vigna umbellata (Thunb.) Ohwi & H.Ohashi, Journ. Jap. Bot. 44: 31. 1969; Ramach. & V.J. Nair, Fl. Cannanore Dist. 159. 1988; Sanjappa, Legumes Ind. 276. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 315. 2009. *Dolichos umbellatus* Thunb., Trans. Linn. Soc. London 2: 339. 1794. *Phaseolus calcaratus* Roxb., Fl. Ind. 3: 289. 1832; Hook.f., Fl. Brit. India 2: 203. 1876; Gamble, Fl. Madras 363(256). 1918.

Slender twiners; stems reflexed hairy. Leaflets 10 x 5 cm, ovate, acuminate, hispid; petiole 10 cm long, slender, stipule 8 mm long, ovate, decurrent at base. Flowers 2-3-together, in short axillary racemes. Calyx 3 mm long, lobes ovate; petals yellow; standard 10 x 15 mm, strongly auricled at base; wings 8 x 6 mm, orbicular; keel 7 x 6 mm, incurved to one turn, spurred to one side. Pods 7 x 0.5 cm, compressed; seeds many.

Narikkadavu, *KJD 25586*

Fl. & Fr.: October-December

Distribution: Rare in Semi-Evergreen forests of Narikkadavu.

Vigna vexillata (L.) A. Rich., Hist. Fis. Cuba 11: 191. 1845; Hook.f., Fl. Brit. India 2:206. 1876; Gamble, Fl. Madras 364(257). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 160. 1988; Sanjappa, Legumes Ind. 277. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 316. 2009. *Phaseolus vexillatus* L., Sp. Pl. 724. 1753.

Slender climbers. Leaflets to 4.5 x 2 cm, ovate, acute at apex, rounded at base, strigose hairy; petiole 4 cm long; stipule cordate at base. Flowers solitary or 2-3 together. Calyx 9 mm long, strigose hairy; lobes lanceolate. Petals yellow; standard 3 x 3 cm, orbicular, wings 25 x 12 mm, auricled at base; keel 25-30 mm long, strongly spurred on lateral side. Pods 5.5 x 0.5 cm, densely brown-hispid.

Bhoothamkallu, *KJD 26355*

Fl. & Fr.: March-April

Distribution: Rare in semi-evergreen forests of Bhoothamkallu.

ZORNIA J.f. Gmel.

Syst. Nat. 2: 1076, 1096. 1792.

Zornia gibbosa Span., Linnaea 15:192. 1841; Manilal & Sivar., Fl. Calicut 76. 1982; Ansari, Fl. Kasaragod Div. 138. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 160. 1988; Sanjappa, Legumes Ind. 280. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 316. 2009.

Diffuse or prostrate annual herbs. Leaves 2-foliolate; leaflets 8-25 x 2-8 mm, ovate or lanceolate, apex acute, apiculate, base rounded, punctate; petiole to 1.5 cm long; stipules 5-8 mm long, lanceolate, peltate, acuminate at both ends, punctate. Inflorescence terminal or axillary, bracteate racemes, 4-8 cm long; bracts peltate, 5-11 x 3-4 mm, ovate-lanceolate, acute, ciliated along margin, gland-dotted. Calyx c. 3 mm long; lobes subequal, membranous. Petals yellow, sometimes with red stripes; standard orbicular-cordate; wings obovate-obtuse; keels curved, oblong-obtuse, connate at base. Stamens monadelphous; anthers dimorphic. Ovary pubescent. Pods with 4-6-articulate, c.1.3 cm long, strongly reticulate with retrorsely barbed bristles.

Valayamchal, *KJD 22582*

Fl. & Fr.: September-January

Distribution: Along the boundaries of Farm.

Pongamia pinnata (L.) Pierre, **Gliricidia sepium** (Jacq.) Kunth ex Walp., **Tamarindus indica** L., were planted by Department as a part of different afforestation programs and also by previous settlements.

POLYGALACEAE

- 1a. Trees, flowers in paniced racemes, fruit drupe *Xanthophyllum*
- 1b. Shrubs or herbs, flowers on racemes, fruit capsules *Polygala*

POLYGALA L.

Sp. Pl. 701. 1753.

- 1a. Shrubs, leaves more than 10 cm, flowers yellow *P. arillata*
- 1b. Herbs, leaves less than 5 cm, flower pink *P. persicariifolia*

Polygala arillata Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 199. 1825; Hook.f., Fl. Brit. India 1: 200. 1872; Gamble, Fl. Madras 58(41). 1915; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 457. 1993; R.N. Banerjee & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 291. 2005 (Plate 10d).

Shrubs to 1.5 m high. Leaves alternate, 17 x 5 cm, elliptic, acuminate at apex, acute at base; nerves to 15 pairs; petiole 1 cm long. Racemes to 10 cm long. Flowers yellow; pedicels 5 mm long. Outer sepals 5 x 4 mm, ovate, obtuse; inner 14 x 8 mm, oblong, emarginated. Petals 14 mm long, crest dichotomous; wings decurrent at base. Capsule 8 x 14 mm long, compressed, glabrous, striate; seeds oblong 7 x 4 mm, biconvex; caruncle reddish.

Ambalappara, KVB 31577

Fl. & Fr.: April-December

Distribution: Rare in evergreen forests of Ambalappara.

Polygala persicariifolia DC. in DC. Prodr. 1: 326. 1824; Hook.f., Fl. Brit. India 1: 202. 1872; Gamble, Fl. Madras 58(42). 1915; R.N. Banerjee in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 480. 1993; R.N. Banerjee & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 300. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 128. 2009. *Polygala wallichiana* Wight, Ill. Ind. Bot. t. 22A. 1840.

Erect herbs to 35 cm high. Leaves alternate, 5 x 0.8 cm, linear-lanceolate, acuminate, glabrous. Racemes to 5 cm long, slender, pubescent, many-flowered. Flowers pink. Inner sepals 6 x 6 mm, orbicular, white; outer 3 x 2 mm, ovate. Wing petals 2 mm long, cordate at base, hairy; dorsal petal 6 x 4 mm, obovate, glabrous, crest fimbriate, 2-lobed. Capsule 4 x 3 mm, glabrous; seeds 3 x 1 mm, pubescent, caruncle 1/2 as long as the seed.

Ambalappara, KVB 31758

Fl. & Fr.: August-January

Distribution: Fairly common in grasslands of Ambalappara.

XANTHOPHYLLUM Roxb.

Pl. Coromandel 3: 81. 1820, *nom. cons.*

Xanthophyllum arnottianum Wight, Ill. Ind. Bot. 1: 50. t.23. 1840; Ratheesh, Fl. Stud. Wayanad Dist. 129. 2009. *Xanthophyllum flavescens* sensu Bennett in Hook.f., Fl. Brit. India 1: 209. 1874, non Roxb. 1814; Gamble, Fl. Madras 59(42). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 51. 1988; R.N. Banerjee & N.P. Balakr. in B.D. Sharma & N.P. Balakr., Fl. Ind. 2:497.1993 & in P. Daniel, Fl. Kerala 1: 307. 2005. *Xanthophyllum angustifolium* Wight, Ill. 1:50. t. 23.1840; Mohanan, Fl. Quilon Dist. 75. 1984.

Trees, to 10 m high; bark greenish-grey. Leaves alternate, spiral, 5-15 x 2.5-7.5 cm, oblong, ovate-lanceolate or oblong-lanceolate, base acute or obtuse, apex acuminate; lateral nerves 5-7 pairs, pinnate, prominent, intercostae reticulate,

prominent; petiole 4-7 mm, slender. Flowers in terminal or axillary paniced racemes, yellowish-white. Sepals 5, subequal, suborbicular, finely tomentose. Petals 5, yellow, unequal, lower boat-shaped. Stamens 8; filament free, 2 hypogynous, to the base of petals in pairs, others adnate to the base of the petals; disk 5-lobed. Ovary superior, stipitate, globose, densely strigose, 1-celled, ovules 4, 2 erect and 2 pendulous; style curved. Fruit a drupe, 12-18 mm across, globose, green, rugose, 1-seeded.

Kariyenkappu, *KJD 31497*

Fl. & Fr.: Throughout the year

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Chavachi and Moonamthode. Endemic to Western Ghats.

Order: **Rosales**

ELAEAGNACEAE

ELAEAGNUS L.

Sp. Pl. 121. 1753.

Elaeagnus indica Servett., Bull. Herb. Boissier ser.2, 8: 393. 1908; Gamble, Fl. Madras 1246(872). 1925 (Plate 10e).

Woody climbers, densely covered with silvery scales, thorns axillary, straight, 1-2 cm long. Leaves alternate, 9-14 x 6-7.5 cm, ovate, apex acute, silvery-white below; lateral nerves 5-7 pairs, indistinct. Flowers 3-6 in axillary fascicles. Perianth greenish white, 1 cm long, urceolate, gamotepalous, lobes 4, ovate. Stamens 4, filaments free, broadened below, anthers transverse. Ovary 1-celled, inferior; ovule solitary; style filiform, stigma lateral. Nut 2.6 x 1.2 cm, covered with thickened perianth base, reddish, fleshy.

Kattikari, *KVB 31672*

Fl. & Fr.: December-April

Distribution: Rare in evergreen forests of Kattikari.

MORACEAE

- 1a. Flowers enclosed in syconia Ficus
- 1b. Flowers not enclosed in syconia 2
- 2a. Male flowers on disciform receptacles 3
- 2b. Male flowers on globose or oblong heads; fruit a sorosis Artocarpus
- 3a. Small herbs; female flowers aggregated, sunk in the fleshy receptacle Dorstenia
- 3b. Trees; female flowers solitary Antiaris

ANTIARIS Lesch.

Ann. Mus. Par. 16: 478, t. 22. 1810, *nom. cons.*

Antiaris toxicaria Lesch., Ann. Mus. Hist. Nat. 16: 478, t.22. 1820; Hook.f., Fl. Brit. India 5: 537. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1367(957). 1928; Ratheesh, Fl. Stud. Wayanad Dist. 766. 2009.

Lofty deciduous trees, to 40 m high; bole buttressed; bark greyish-white; exudation watery or milky. Leaves alternate, bifarious, 6.5-15 x 2.5-5 cm, elliptic-oblong or ovate-oblong, apex acuminate, base round, obtuse or cordate, margin entire or distantly crenulate; lateral nerves 6-11 pairs, parallel, looped near the margin, prominent, intercostae reticulate; petiole 3-8 mm long, velvety; stipule small. Flowers unisexual, greenish-yellow, minute, in spikes; male receptacle to 1.5 cm across, axillary, 3-4 together, tomentose. Tepals 3 or 4, spatulate, imbricate. Stamens 3-8; filaments erect; female flowers solitary in an involucre of few connate bracts. Tepals absent; ovary superior, adnate to the involucre, 1-celled, ovule 1, pendulous; style arms 2, subulate, recurved. Fruit a drupe, pyriform or obovoid; seed 10-16 mm long.

Meenmutty, *KJD 18732*

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests.

ARTOCARPUS J.R.Forst. & G.Forst.

Char. Gen. Pl. 101. 1776, *nom. cons.*

- 1a. Fruit smooth, 2-5 cm across *A. gomezianus* subsp. *zeylanicus*
- 1b. Fruit echinate, more than 7 cm across.....2
- 2a. Young shoots hirsute; male spike more than 8 cm long.....*A. hirsutus*
- 2b. Young shoots glabrous; male spike to 5 cm long.....*A. heterophyllus*

Artocarpus gomezianus Wall. ex Trecul subsp. **zeylanicus** Jarrett, J. Arnold Arbor. 41: 90. 1960; Ratheesh, Fl. Stud. Wayanad Dist. 767. 2009. *Artocarpus lakoocha* sensu C.E.C.Fisch. in Gamble, Fl. Madras 1369(958). 1928, non Roxb. 1832; Mohanan & Sivad., Fl. Agasthyamala 627. 2002.

Medium sized to large trees, bark brownish black, pinkish inside; twigs grey adpressed tomentose. Leaves alternate, to 16 x 8 cm, elliptic-oblong, acuminate, base truncate or subcordate, subscabrous below; lateral nerves 9-15 pairs, regularly arching below the margins, intercostae reticulate; petiole 1-2.5 cm long. Male spike globose, 8 mm across, peduncles 1 cm long. Syncarp subglobose, uneven, fleshy, greenish-yellow.

Paripode, *KJD 26319*

Fl. & Fr.: January-April

Distribution: Rare in semi-evergreen forests of Paripode

Artocarpus heterophyllus Lam., *Encycl.* 3: 209. 1789; Manilal & Sivar., *Fl. Calicut* 278. 1982; Ansari, *Fl. Kasaragod Div.* 350. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 430. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 767. 2009. *Artocarpus integrifolius* Wight, *Icon. Pl. Ind. Orient.* t. 678. 1840; Hook.f., *Fl. Brit. India* 5: 541. 1888, non L.f. 1781; C.E.C.Fisch. in Gamble, *Fl. Madras* 1369(957). 1928.

Evergreen trees to 25 m high; bark blackish-grey; exudation milky white latex. Leaves alternate, 8-23 x 3-13 cm, obovate, obovate-oblong, or elliptic-ovate, apex acute or obtuse, base acute, round or cuneate; lateral nerves 6-8 pairs, pinnate, prominent, arched, intercostae scalariform, prominent; petiole 20-40 mm long; stipules 3-5 cm long. Flowers unisexual, minute, yellowish-green, in spikes enclosed by spathe-like bracts, male from young branches, catkin narrow-cylindric. Perianth 2-lobed, puberulous. Stamen 1; filament somewhat flattened. Female catkins from the trunk and mature branches, more massive. Perianth with strongly projecting conical apex. Ovary 0.3 mm, superior, globose-obovoid; style exerted; stigma spathulate. Fruit a sorosis; seeds 10-12 x 8-10 mm, elliptic-oblong, smooth, glossy.

Kattikkari, *KJD* 18763

Fl. & Fr.: November-April

Distribution: Fairly common in evergreen forests of Kattikkari, Ambalappara, Moonamthode and Chavachi; plantations of Kariyenkappu.

Artocarpus hirsutus Lam., *Encycl.* 3: 210. 1789; Hook.f., *Fl. Brit. India* 5: 541. 1888; C.E.C.Fisch. in Gamble, *Fl. Madras* 1369(957). 1928; Manilal & Sivar., *Fl. Calicut* 278. 1982; Ansari, *Fl. Kasaragod Div.* 351. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 430. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 767. 2009.

Evergreen trees, to 45 m high; bark dull grey-brown; exudation milky white. Leaves alternate, 13-25 x 7.5-15 cm, broadly ovate, obovate or elliptic, apex subacute or very shortly acuminate, base acute, obtuse or round; lateral nerves 6-12 pairs, pinnate; intercostae scalariform; petiole 10-30 mm long, hirsute; stipules to 4 cm long, densely tawny strigose. Flowers unisexual, minute, yellowish-green; male in axillary, pendulous, narrowly cylindrical spikes upto 15 cm long. Tepals 2, united below. Stamen 1. Female flowers in axillary ovoid spikes. Perianth tubular, confluent below with the receptacle. Ovary superior,

straight, ovule pendulous; style exerted; stigma undivided. Fruit a sorosis, echinate; seeds 16-18 mm long, ovoid, white.

Kariyenkappu, *KJD 31874*

Fl. & Fr.: December-March

Distribution: Common in plantations of Kariyenkappu.

Endemic to Western Ghats.

DORSTENIA L.

Sp. Pl. 121. 1753.

Dorstenia indica Wall. ex Wight, Icon. Pl. Ind. Orient.t.1964. 1853; Hook.f., Fl. Brit. India 5: 494. 1988; C.E.C.Fisch. in Gamble, Fl. Madras 1370(958). 1928; Ratheesh, Fl. Stud. Wayanad Dist. 768. 2009 (Plate 10f).

Herbs. Leaves alternate, to 9 x 2.5 cm, obovate or oblanceolate, acute, base attenuate or cuneate, membranous, distantly toothed, sparsely hirsute along the nerves beneath, nerves 8-13 pairs; petiole 1 cm long. Flowers monoecious, many, on obconical receptacle. Receptacle axillary, solitary, discoid, 5-angled, to 1.5 cm across, marginal lobes to 0.5 cm long; peduncles to 2 cm long. Male flowers towards the periphery of the receptacle. Perianth connate and adnate with receptacle. Stamens 3. Female flowers grouped at the centre. Ovary sunken in the tissue of the receptacle; style lateral, stigmas 2. Fruit an achene, sunken in the receptacle.

Kattikkari, *KVB 31633*

Fl. & Fr.: February-April

Distribution: Fairly common in evergreen forests of Kattikkari.

FICUS L.

Sp. Pl. 1059. 1753.

- 1a. Leaves opposite; branchlets hollow inside *F. hispida*
- 1b. Leaves alternate; branchlets solid inside2
- 2a. Syconium on main trunk or often on leafless branches *F. racemosa*
- 2b. Syconium not on main trunk, axillary to leaves3
- 3a. Syconium sessile *F. drupacea* var. *pubscens*
- 3b. Syconium pedicelled4
- 4a. Syconium less than 6 mm across; peduncle less than 3 mm long *F. arnottiana*
- 4b. Syconium over 12 cm across; peduncle more than 6 mm long5
- 5a. Upper leaf surface very scabrous, lateral nerves 5-7 pairs *F. exasperata*
- 5b. Upper leaf surface glabrous or glabrescent, lateral nerves more than 8 pairs6
- 6a. Syconium with 3 persistent bracts at the base; stipules over 3 cm long.... *F. beddomei*
- 6b. Syconium without 3 persistent bracts; stipules less than 1.5 cm long..... *F. nervosa*

Ficus arnottiana (Miq.) Miq., Ann. Mus. Lugd.-Bat. 3: 287. 1867; Hook.f., Fl. Brit. India 5: 513. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1363(953). 1928; Ansari, Fl. Kasaragod Div. 353.1985; Ratheesh, Fl. Stud. Wayanad Dist. 769. 2009. *Urostigma arnottiana* Miq., Hook.'s London J. Bot. 6: 564. 1847.

Deciduous independent trees, to 10 m high; bark surface grey-brown; latex milky. Leaves alternate spiral, 6-20 x 5-13 cm, broadly ovate, apex caudate-acuminate, base deeply cordate; lateral nerves 5-8 pairs, pinnate, intercostae reticulate; petiole 3-10 cm long; stipules 3-5 cm long, leaving annular scars. Flowers unisexual; inflorescence a syconia, in axillary pairs or crowded near the apex; flowers of 4 kinds. Tepals red, more or less gamophyllous, 3-4 lobed. Male flowers sessile, around the orifice and sparsely scattered in the interior of the syconia. Stamens 1. Female flowers sessile, sparsely scattered in the interior of syconia, cream, somewhat reddish on stylar side. Ovary superior, depressed globose; style filiform; stigma flat gall flowered stalked. Neutar flowers few. Synconium yellowish-brown when ripe; 5-7 mm across.

Kariyenkappu, *KJD 26377*

Fl. & Fr.; December-April

Distribution: Rare in plantations of Kariyenkappu and evergreen forests of Meenmutty.

Ficus beddomei King, Ann. Roy. Bot. Gard. (Calcutta) 1: 26. tt. 24 & 81 M. 1887; Hook.f., Fl. Brit. India 5: 513. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1364(954). 1928; Ratheesh, Fl. Stud. Wayanad Dist. 770. 2009.

Evergreen trees, epiphytic or independent, to 30 m high; bark pale brown. Leaves alternate, 15-25 x 8-15 cm, broadly ovate, apex caudate acuminate, base acute, truncate or round; lateral nerves 10-15 pairs, parallel, looped near the margin, intercostae reticulate; petiole 5-10 cm long, glandular at apex below; stipules 5-10 cm long. Flowers unisexual; inflorescence a syconia, in axillary pairs, ovoid or obovoid, with several vertical ridges; basal bracts 3. Flowers of 4 kinds. Male flowers mixed with female through out the receptacle; pedicel short. Perianth cupular, 2-3 lobed, lobes unequal, brownish, glabrous. Stamen 1; filament twisted. Female and gall flowers similar. Tepals 4-5, lanceolate, unequal, brownish. Ovary globose obovoid, blackish-brown on stylar side; style straight or curved. Syconium green, spotted with yellow.

Chavachi, *KJD 26378*

Fl. & Fr.: July-February

Distribution: Rare in evergreen forests of Chavachi. Endemic to Western Ghats.

Ficus drupacea Thunb. var. **pubescens** (Roth) Corner, Gard. Bull. Singapore 17: 381. 1960 & 21: 13. 1965; Manilal & Sivar., Fl. Calicut 276. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 771. 2009. *Ficus mysorensis* Heyne ex Roth in M.Roem. & Schult., Syst. Veg. 1: 508. 1817; Hook.f., Fl. Brit. India 5: 500. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1361(952). 1928. *Ficus mysorensis* Heyne ex Roth var. *pubescens* Roth in M.Roem. & Schult., Syst. Veg. 1: 508. 1817; Hook.f., Fl. Brit. India 5: 500. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1361(952). 1928.

Trees to 25 m high; aerial roots numerous; bark greyish-brown; exudation milky. Leaves alternate, spiral, subdistichous, 10-22 x 6-15 cm, ovate or elliptic-ovate, apex abruptly acuminate, base round or subcordate; 3-5-ribbed from base, lateral nerves 9-13 pairs, parallel, intercostae reticulate; petiole 1.2-3.5 cm long, glandular at apex below, tomentose; stipule 10-25 mm long, broadly lanceolate, tomentose. Inflorescence a syconium. Flowers unisexual, sessile, in axillary pairs, ellipsoid-globose; basal bracts 3, orbicular. Flowers of 4 kinds. Male flowers disperse, numerous. Tepals 2-3, free, brown, acute. Stamen 1, exerted. Female flowers: tepals 3-4, free, brown, acute. Ovary superior, obovoid; style filiform 2 mm. Gall flowers pedicellate. Tepals 3, free. Ovary obovoid; style short, subterminal. Syconium, orange-red when ripe.

Pookundu, NS & KJD 25556

Fl. & Fr.: March-April

Distribution: Rare in semi-evergreen forests of Pookundu.

Ficus exasperata Vahl, Enum. Pl. 2: 197. 1805; Manilal & Sivar., Fl. Calicut 275. 1982; Ansari, Fl. Kasaragod Div. 355. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 432. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 772. 2009. *Ficus asperrima* Roxb., Fl. Ind. 3: 554. 1832; Hook.f., Fl. Brit. India 5: 522. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1366(955). 1928.

Deciduous trees, to 18 m high; bark greenish-white; exudation watery. Leaves laxly alternate opposite or subdistichous, 5.5-19 x 3-9 cm, elliptic, ovate or oblong-lanceolate, apex acute to shortly acuminate, basal acute, round or cuneate, margin denticulate or sinuate-crenate to serrate, scabrid on both surfaces; lateral nerves 3-6 pairs; petiole 1-6.5 cm long; stipules short. Flowers unisexual; inflorescence a syconia, axillary, solitary, harshly scabrid. Flowers of 4 kinds. Male flowers sessile, ostiolar. Tepals 3-6, oblong-spathulate, white hairy. Stamen 1. Female flowers sessile. Tepals 4-7, linear-spathulate, white hairy. Ovary superior, obovoid; style filiform, lateral, puberulous, stigma clavate. Gall

flowers sessile to pedicellate. Tepals 4-6. Ovary white, sessile, style terminal, puberulous, stigma dilated. Syconium yellow or purple.

Narikkadavu, NS & KVB 31457

Fl. & Fr.: February-May

Distribution: Fairly common in semi-evergreen forests of Pookundu and Narikkadavu.

Ficus hispida L.f., Suppl. Pl. 442. 1781; Hook.f., Fl. Brit. India 5: 522. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1367(956). 1928; Manilal & Sivar., Fl. Calicut 275. 1982; Ansari, Fl. Kasaragod Div. 356. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 432. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 749. 2009. *Ficus oppositifolia* Roxb., Pl. Coromandel t.124. 1799.

Trees, to 10 m high laxly branched; bark grey; exudation milky. Leaves opposite, 7-20 x 6-10 cm, oblong, obovate, elliptic-oblong or obovate-oblong, apex abruptly acute or acuminate or cuspidate, base round or cuneate, margin minutely dentate; 3-5-ribbed from base, lateral nerves 5-6 pairs; petiole 1-4 cm long, hispid; stipules 11-15 mm long, often in whorls of 4 with leafless branches. Inflorescence syconia. Flowers unisexual, dioecious; basal bracts 3, 1-1.5 mm long, subtriangular. Male flowers and gall flowers in same receptacle. Female flowers in separate. Male flowers ostiolar, in 2 rings. Tepals 3 broad. Stamen 1, subsessile. Female flowers sessile or stalked. Perianth short, tubular. Ovary depressed-globose, red-brown; style hairy; stigma clavate. Gall flowers same as female but larger. Syconium yellow.

Moonamthode, KJD 31873

Fl. & Fr.: September-May

Distribution: Fairly common in evergreen forests of Moonamthode and Chavachi.

Ficus nervosa Heyne ex Roth in M.Roem. & Schult., Syst. Veg. 1: 513. 1817; Hook.f., Fl. Brit. India 5:512.1888; C.E.C.Fisch. in Gamble, Fl. Madras 1364(954). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 432. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 773. 2009. *Ficus angustifolia* Roxb., Fl. Ind. 3: 554. 1832.

Evergreen trees, to 30 m high; bole buttressed; bark greyish-brown.; latex scanty, white. Leaves alternate, spiral, 6-17.5 x 4-8 cm, elliptic, oblong-lanceolate, or oblanceolate, apex acute or acuminate, base round or acute; 3-5-ribbed from base; lateral nerves 5-12 pairs, pinnate; petiole 10-25 mm long; stipule 10-12 mm long, leaving an annular scar. Inflorescence a syconia. Flowers unisexual, axillary and on twigs behind the leaves, flowers 4 kinds. Male flowers

few, only near the mouth of receptacle. Tepals 2-3, red. Stamen 1. Female flowers rarely pedicelled. Tepals 3, lanceolate, red. Style filiform; Stigma bifid. Gall flowers pedicellate. Tepals 3. Ovary ovoid; style short. Syconium depressed globose, red.

Chavachi, NS & KVB 31318

Fl. & Fr.: March-May

Distribution: Rare in evergreen forests of Chavachi.

Ficus racemosa L., Sp. Pl. 1060. 1753; Manilal & Sivar., Fl. Calicut 275. 1982; Ansari, Fl. Kasaragod Div. 357. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 433. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 774. 2009. *Ficus glomerata* Roxb., Pl. Coromandel t. 123. 1799; Hook.f., Fl. Brit. India 5: 535. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1364(954). 1928.

Deciduous trees, to 30 m high; bole buttressed; bark reddish-brown; latex milky. Leaves alternate, 6-15 x 3.5-6 cm, ovate, obovate, elliptic-oblong or oblong-ovate, apex narrowed, blunt or acute, base acute, obtuse or cuneate; 3-ribbed from base, laterals 4-8 pairs, intercostae reticulate; petiole 10-50 mm long; stipules pubescent. Inflorescence syconia. Flowers unisexual; basal bracts 3, persistent; flowers of unisexual, 4 kinds. Male flowers near the mouth of receptacles, in 2-3 rings. Tepals 3-4, dentate-lacerate. Stamens 2, exserted. Female flowers sessile or very shortly stalked among gall flowers. Tepals 3-4, dentate-lacerate. Ovary sessile or substipitate; style 2-3 mm long; stigma clavate. Gall flowers long stalked. Ovary dark red, rough; style short. Syconium orange, pink or dark crimson.

Kariyenkappu, KJD 31857

Fl. & Fr.: February-May

Distribution: Rare plantations of Kariyenkappu

RHAMNACEAE

- 1a. Plants armed with stipular spines *Ziziphus*
- 1b. Plants unarmed.....2
- 2a. Tendrils present; leaf base equal; fruit with 3 short wings *Gouania*
- 2b. Tendrils absent; leaf base unequal; fruit with one elongate wing *Symthea*

GOUANIA Jacq.

Sel. Strip. Amer. Hist. 263. 1763.

Gouania microcarpa DC., Prodr. 2: 40. 1825; Hook.f., Fl. Brit. India 1: 643. 1875; Gamble, Fl. Madras 225(161). 1918; Ansari, Fl. Kasaragod Div. 101. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 99. 1988; Bhandari & Bhansali in N.P.

Singh *et al.*, Fl. Ind. 5: 176. 2000; P.V. Sreekumar & A.N. Henry in P. Daniel, Fl. Kerala 1: 725. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 227. 2009.

Large tendrillate climbers; branchlets tomentose. Leaves alternate, 10-15 x 5 cm, ovate, acuminate, rounded or cordate at base, fulvous hairy below; nerves 5 pairs, prominent, regular. Inflorescence a terminal panicle, to 25 x 20 cm, tomentose. Flowers 4 mm across, 3-6 together; pedicels 1.5 mm long. Sepals 5, 1.5 x 1.5 mm, triangular, densely hairy. Petals 1.5 x 1 mm, obovate, curved, concave. Stamens 5, free, filaments 1 mm long. Ovary 3-celled, hairy; ovules one in each cell; style short; stigma capitate. Capsule 7 x 10 mm, 3-winged, yellowish, septicidal; seeds 3, 2.5 x 2.5 mm, obovoid, compressed, dark-brown.

Kattikari, KJD 26387

Fl. & Fr.: October-March

Distribution: Rare in evergreen forests of Kattikari.

SMYTHEA Seem.

Bonplandia 9: 255. 1861.

Smythea bombaiensis (Dalzell) Banerjee & P.K. Mukh., Indian Forester 96: 214. 1970; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. Ind. 5: 210. 2000. *Ventilago bombaiensis* Dalzell in Hooker's J. Bot. Kew Gard. Misc.. 3: 36. 1851; Hook.f., Fl. Brit. India 1: 631. 1875; Gamble, Fl. Madras 217(157). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 99. 1988; P.V. Sreekumar & A.N. Henry in P. Daniel, Fl. Kerala 1: 729. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 227. 2009.

Woody climbers, stem ribbed, branchlets looping. Leaves alternate, 6-9 x 3-4 cm, elliptic-oblong, acute at both ends, crenulate; nerves 6 pairs, nerve-axils hairy, nervules parallel. Flowers 4 mm across, 20-30 together, in axillary clusters; pedicels to 5 mm long. Sepals 5, triangular. Petals 5, obovate, emarginate to 2-lobed, glabrous. Stamens 5, disk cup-shaped. Ovary 2-celled, densely hairy. Fruit 1-seeded, winged, wing to 6 x 1.5 cm, flattened.

Mullenpara, KJD 22519

Fl. & Fr.: February-June

Distribution: Rare in evergreen forests of Mullenpara. Endemic to Western Ghats.

ZIZIPHUS Mill.

Gard. Dict. ed. 4. 1754.

- 1a. Flowers in paniculate cymes; petals absent *Z. rugosa*
- 1b. Flowers in condensed cymes; petals present 3
- 2a. Styles 2; drupe to 0.8 cm diameter *Z. oenoplia*
- 2b. Styles 3; drupe more than 1.2 cm diameter *Z. xylopyrus*

Ziziphus oenoplia (L.) Mill., Gard. Dict. (ed. 8). 3.1768; Hook.f., Fl. Brit. India 1:634.1875; Gamble, Fl. Madras 220(158).1918; Manilal & Sivar., Fl. Calicut 67. 1982; Ansari, Fl. Kasaragod Div. 102. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 101. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. Ind. 5: 238. 2000; P.V. Sreekumar & A.N. Henry in P. Daniel, Fl. Kerala 1: 734. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 229. 2009. *Rhamnus oenoplia* L., Sp. Pl. 194. 1753.

Scandent shrubs, thorns many, recurved, branchlets densely silky hairy. Leaves alternate, 4-6.5 x 2-3 cm, ovate, apex acuminate, base oblique, 3 or 4 ribbed, densely fulvous hairy, sessile or shortly petioled. Flowers 3 mm across, shortly pedicelled, 6-20 in axillary clusters. Sepals triangular, hispid outside. Petals clawed, concave, greenish yellow; disk flat, glabrous. Drupe 6 x 6 mm, globose, black.

Valayamchal, *KJD 22557*

Fl. & Fr.: November-March

Distribution: Along the boundaries of Moist deciduous forests.

Ziziphus rugosa Lam., Encycl. 3: 319. 1789; Hook.f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Madras 221(158). 1918; Manilal & Sivar., Fl. Calicut 67. 1982; Ansari, Fl. Kasaragod Div. 102. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 101. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. Ind. 5: 241. 2000; P.V. Sreekumar & A.N. Henry in P. Daniel, Fl. Kerala 1: 734. 2005.

Scandent shrubs, thorns, recurved. Leaves alternate, 9-12 x 4-7 cm, ovate-orbicular, apex acute, base unequally cordate, fulvous-tomentose beneath, coriaceous, crenulate; petiole to 1 cm long. Flowers 6-20 together; subsessile, 5 mm across. Sepals densely tomentose outside; disk flat, glabrous. Ovary densely tomentose, 2-celled; styles 2, curved. Drupe to 1.3 cm, globose, white, glabrous.

Paripode, *KJD 22511*

Fl. & Fr.: November-May

Distribution: Rare along the Forest boundaries at Paripode, near Farm.

Ziziphus xylopyrus (Retz.) Willd., Sp. Pl. 1: 1104. 1798; Hook.f., Fl. Brit. India 1: 636. 1875; Gamble, Fl. Madras 221(158). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 101. 1988; Bhandari & Bhansali in N.P. Singh *et al.*, Fl. Ind. 5: 243. 2000; P.V. Sreekumar & A.N. Henry in P. Daniel, Fl. Kerala 1: 735. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 230. 2009. *Rhamnus xylopyrus* Retz., Observ. Bot. 2: 11. 1781.

Trees, to 12 m high; bark brownish-grey.; branchlets sparsely armed. Leaves alternate, 5-8 x 3-5 cm, ovate-oblong or suborbicular, apex obtuse, apiculate, base rounded, margin serrulate, tomentose beneath, coriaceous, 3-5-ribbed from base; petiole 5-12 mm, tomentose, slender; lateral nerves many, puberulent beneath, intercostae reticulate, faint; stipulate. Flowers in axillary cymes, greenish-yellow, pubescent; peduncle 1.5 cm long. Calyx 5 lobed, 1.5 mm radiating. Petals 5, 2 mm, spatulate; disk 5 lobed. Stamens 5, filaments subulate. Ovary 3-celled, ovules solitary; styles 3; stigma trifid. Fruit a drupe, 1.5-2.5 cm across, globose, woody; seeds 3.

Near Farm, Valayamchal, *KJD 22579*

Fl. & Fr.: May-June

Distribution: Rare along forest boundaries near Farm.

ROSACEAE

- 1a. Scandent prickly shrubs; ovaries many, free..... Rubus
 1b. Erect unarmed trees; ovaries 1-3, united Prunus

PRUNUS L.

Sp. Pl. 473. 1753

Prunus ceylanica (Wight) Miq., Fl. Ind. Bot. 1: 366. 1855; Ansari, Fl. Kasaragod Div. 152. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 172. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 341. 2009. *Polydontia zeylanica* Wight, Ill. Ind. Bot. 1: 203. 1840, "Polyodontia". *Pygeum zeylanicum* Bedd., Fl. Sylv. S. India: t. 59. 1871. *Pygeum acuminatum* Colebr., Trans. Linn. Soc. London 12: 300. t.18. 1818; Hook.f., Fl. Brit. India 2: 318. 1878; Gamble, Fl. Madras 439(311). 1919, non *Prunus acuminata* (Wall.) Dietr. 1803. *Pygeum wightianum* Blume ex Muell. in Walp., Ann. 4: 642. 1857; Hook.f., Fl. Brit. India 2: 319. 1878; Gamble, Fl. Madras 439(311). 1919. *Pygeum gardneri* Hook.f., Fl. Brit. India 2: 321. 1878; Gamble, Fl. Madras 439(311). 1919. *Pygeum sisparsense* Gamble, Bull. Misc. Inform. Kew 1918: 238. 1918; Gamble, Fl. Madras 438(311). 1919.

Evergreen trees, to 25 m high; bark brownish-black. Leaves alternate, 10-21 x 4.5-8.5 cm, ovate, ovate-lanceolate, oblong-lanceolate, or elliptic-ovate, apex acuminate or obtusely acute, base acute, round or oblique; lateral nerves 5-9 pairs, pinnate, intercostae reticulate, 2 pitted glands at base on either side of the midrib; petiole 10-22 mm; stipules small, lateral. Flowers 5-6 mm across, white, in axillary racemes; bracts forming a cone in buds. Calyx tube campanulate; lobes 5-6, ovate, acute or obtuse, densely hairy. Petals 5-6, oblong, tomentose

without. Stamens 20-30; filaments slender, incurved. Ovary sessile, inferior, 1-celled, ovules 2, pendulous; style 1, subulate; stigma capitate. Fruit a drupe 20-25 x 35-37 mm, depressed, obscurely 2-lobed; seeds 2, globose.

Near Pottichapara, *KJD 26326*

Fl. & Fr.: September-April

Distribution: Rare along streamside at Pottichapara.

RUBUS L.

Sp. Pl. 492. 1753.

1a. Leaves 3-foliolate; bracts ovate, acute *R. ellipticus*

1b. Leaves; bracts divided into linear lobes *R. glomeratus*

Rubus ellipticus Sm., Rees' Cyclopaedia 30: Rubus. n.16. 1815; Hook.f., Fl. Brit. India 2: 336. 1878; Gamble, Fl. Madras 441(313). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 342. 2009. *Rubus gowreepful* Roxb., Fl. Ind. 2: 517. 1832. *Rubus wallichianus* Wight & Arn., Prodr. Fl. Ind. Orient. 298. 1834.

Ramblers; stems covered with red bristles; prickles recurved. Leaves alternate; leaflets 5 x 5 cm, obovate to orbicular, serrulate; hispid below; nerves 7 or 8 pairs, spiny below; petiolule 5 mm long. Panicle axillary or terminal, fulvous tomentose; bracts 5 mm long, ovate, acute. Flowers white; pedicels 1 cm long, villous. Sepals 6 x 4 mm, ovate, acute, united at base, pubescent. Petals 7-8 mm long, obovate; torus densely villous; ovaries glabrous. Drupes 1.5 mm across, glabrous, deep red.

Ambalappara, *NS & KVB 31369*

Fl. & Fr.: November-March

Distribution: Fairly common in evergreen forests of Ambalappara.

Rubus glomeratus Blume, Bijdr. Fl. Ned. Ind. 1111. 1826; Ratheesh, Fl. Stud. Wayanad Dist. 343. 2009. *Rubus fulvus* Focke, Biblioth. Bot. 17: 81. 1911, non Sudre 1902; Gamble, Fl. Madras 441(313). 1919. *Rubus moluccanus* sensu Hook.f., Fl. Brit. India 2: 330. 1878 p.p., non L. 1753 (Plate 10g).

Rambling shrubs, stem reddish, densely cottony hairy. Leaves alternate, to 8 x 8 cm, shallowly 5-lobed, cordate at base, rugose above, densely fulvous, cottony tomentose below; petiole 4 cm long. Flowers in terminal panicles, bracts 8 mm long, densely hairy; bracteole bifid, filiform; pedicels 7 mm long. Sepals 10 mm long, united below. Petals 4 x 2 mm, obovate. Ovaries glabrous. Drupe 2 mm across, ovoid, yellow.

Ambalappara, *KJD 25464*

Fl. & Fr.: October-January

Distribution: Rare in grasslands of Ambalappara. Endemic to Peninsular India.

ULMACEAE

- 1a. Leaves 3-ribbed from base; plants monoecious *Celtis*
1b. Leaves penni-nerved, plants dioecious *Trema*

CELTIS L.

Sp. Pl. 1043. 1753.

Celtis timorensis Span., *Linnaea* 15: 343. 1841; Manilal, *Fl. Silent Valley* 257. 1988; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 429. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 764. 2009. *Celtis cinnamomea* Lindl. ex Planch., *Ann. Sci. Nat. Bot. ser. 3*, 10: 303. 1848; Hook.f., *Fl. Brit. India* 5: 482. 1888; C.E.C.Fisch. in Gamble, *Fl. Madras* 1349(944). 1928. *Celtis trinervia* sensu Bedd., *Fl. Sylv. S. India: t. 312.* 1873, non Roxb. 1814.

Trees, to 15 m high; bark pale green. Leaves alternate, 8-13 x 3-5.8 cm, oblong, ovate, lanceolate, oblong-ovate or elliptic-lanceolate, apex acuminate, base acute, cuneate or oblique margin entire or serrate along the upper half; 3-ribbed from base, prominent; lateral nerves 1-2 pairs, puberulous, faint, intercostae reticulate; stipules lateral, lanceolate-subulate; petiole 3-5 mm long. Flowers polygamous. Male flowers in short axillary racemose cymes; female flowers in more slender axillary cymes. Tepals 4-5, linear, incurved, 1.7 mm, ciliate, acute. Stamens 4-5, inserted round a wooly torus; filaments 1 mm. Ovary 1 mm, superior, sessile, ellipsoid, 1-celled; style 4 mm. Fruit a drupe, 15 mm across, ovoid, narrowed towards tip, black.

Chavachi, *KVB 31516; KJD 26048*

Fl. & Fr.: January-March

Distribution: Rare in evergreen forests of Chavachi.

TREMA Lour.

Fl. Cochinch. 539, 562. 1790.

Trema orientalis (L.) Blume, *Mus. Bot. Lugd.-Bat.* 2: 62. 1856; Hook.f., *Fl. Brit. India* 5: 484. 1888; C.E.C.Fisch. in Gamble, *Fl. Madras* 1350(944). 1928; Manilal & Sivar., *Fl. Calicut* 274. 1982; Ansari, *Fl. Kasaragod Div.* 350. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 429. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 765. 2009. *Celtis orientalis* L., *Sp. Pl.* 1044. 1753. *Sponia wightii* Planch., *Ann. Sci. Nat. Bot. ser. 3*, 10: 322. 1848.

Dioecious trees, to 15 m high; bark greyish or bluish-green. Leaves alternate, 7.5-15 x 2.5-6 cm, ovate-lanceolate, ovate or oblong-lanceolate, apex acuminate, base obliquely cordate, margin serrulate, scabrid above, tomentose beneath, 3-5-ribbed from base; lateral nerves 3-4 pairs, intercostae reticulate; petiole 5-10 mm, grooved above; stipules lateral. Flowers unisexual, 3-4 mm across, greenish, in axillary fascicles or cymes. Male flowers usually sessile. Tepals 4 or 5, equal, 2 mm long, curved, ciliate. Stamens 5; pistillode oblong. Female flowers : tepals unequal, ciliate. Ovary superior, sessile, 1-celled, ovate; style bifid, villous; stigma plumose. Fruit a drupe, 4 x 3 mm, globose, black; style tip persistent; seed globose.

Paripode *KJD 22524*

Fl. & Fr.: September-December

Distribution: Along forest boundaries at Paripode.

URTICACEAE

- 1a. Trees or shrubs 2
- 1b. Herbs or subshrubs 5
- 2a. Plants with stinging hairs; inflorescence elongate cyme Dendrocnide
- 2b. Plants without stinging hairs; flowers on axillary fascicles or short peduncled spikes 3
- 3a. Leaves white tomentose below Debregeasia
- 3b. Leaves not white tomentose below 4
- 4a. Flowers sessile, leaves 3-ribbed at base Bohmeria
- 4b. Flowers short pedicelled, leaves penni-nerved Oreocnide
- 5a. Plants with stinging hairs 6
- 5b. Plants without stinging hairs 7
- 6a. Leaves 3-7 lobbed, female flowers usually aggregated on globose heads Girardinia
- 6b. Leaves not lobbed, flowers on elongated peduncle Laportea
- 7a. Female flowers aggregated on fleshy receptacle 8
- 7b. Female flowers not aggregated on fleshy receptacle 10
- 8a. Leaves opposite, receptacle long peduncled Lecanthes
- 8b. Leaves alternate, receptacle sessile or shortly peduncled 9
- 9a. Leaves 3-ribbed at base, male and female flowers on fleshy receptacle Elatostema
- 9b. Leaves penni-nerved, male flowers in cymes Procris
- 10a. Flowers in peduncled cymes 11
- 10a. Flowers sessile in cymose axillary clusters Pouzolzia
- 11a. Leaves opposite Pilea
- 11b. Leaves alternate Pellionia

BOEHMERIA Jacq.

Enum. Syst. Pl. 9. 1760.

Boehmeria glomerulifera Miq., Syst. Veg. Ind. Archip. 101,104. 1854; Manilal & Sivar., Fl. Calicut 280. 1982; Ansari, Fl. Kasaragod Div. 359. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 435. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 757. 2009. *Boehmeria malabarica* Wedd., Arch. Mus. Hist. Nat. 8: 355. 1855-56; Hook.f., Fl. Brit. India 5: 575. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1387(970). 1928.

Shrubs to 2 m high; stem pilose. Leaves alternate, to 15 x 8 cm, ovate, acuminate, serrulate, base rounded, pubescent below; lateral nerves 5-6 pairs, lowest pairs opposite, rib-like; petiole to 5 cm long. Flowers 10-20 together, axillary. Male flowers 2 mm across. Perianth lobes 4, united below, glabrous. Stamens 4, free. Female perianth lobes 4 or 5, hispid. Achenes 1.2 x 1 mm, obovoid, glabrous, stigma 2 mm long, persistent.

Moonamthode, *KJD 18744*

Fl. & Fr.: April-December

Distribution: Common in evergreen forests of Moonamthode, Kattikkari and Chavachi; semi-evergreen forests of Paripode.

DEBREGEASIA Gaud.

Voyage Bonite Bot. Atlas t. 90. 1844.

Debregeasia longifolia (Burm.f.) Wedd. in DC. Prodr. 16:235. 1869; Ramach. & V.J. Nair, Fl. Cannanore Dist. 436. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 757. 2009. *Urtica longifolia* Burm.f., Fl. Ind. 197. 1768. *Debregeasia velutina* Gaud., Voy. Bonite Bot. t. 90. 1844-46; Hook.f., Fl. Brit. India 5: 590. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1389(971). 1928; Anil Kumar *et al.*, Fl. Pathanamthitta 469. 2005. *Conocephalus niveus* Wight, Icon. Pl. Ind. Orient. t. 1959. 1853.

Shrubs; branchlets slender, densely shaggy-pubescent. Leaves alternate, to 6 x 5 cm, ovate to oblong-lanceolate, acuminate, base acute or obtuse, serrulate, 3-ribbed, midrib with 4 pairs of lateral nerves, nervules reticulate, densely white tomentose below, scabrous above; petiole 3 cm long; stipules linear-lanceolate. Spike 4 mm across; peduncles 5 mm long; bracts and bracteoles ovate, ciliate. Male perianth lobes 4, free, 1 mm long, ovate, densely woolly. Stamens 4, free. Fruits globose, 4-5 mm across, fruiting perianth orange-yellow.

Chelachode, *KVB 31222*

Fl. & Fr.: December-April

Distribution: Fairly common in evergreen forests of Moonamthode, Chelachode, Chavachi and Kattikkari.

DENDROCNIDE Miq.

Pl. Jungh. 29. 1851.

Dendrocniide sinuata (Blume) Chew, Gard. Bull. Singapore 21: 206. 1965; Ratheesh, Fl. Stud. Wayanad Dist. 758. 2009. *Urtica sinuata* Blume, Bijdr. Fl. Ned. Ind. 505. 1826. *Urtica crenulata* Roxb., Fl. Ind. 3: 591.1832. *Laportea crenulata* (Roxb.) Gaud. in Freye., Voy. Bont. Bot. 498. 1826; Hook.f., Fl. Brit. India 5: 550. 1888; C.E.C.Fisch. in Gamble, Fl. Madras1373(961). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 438. 1988.

Large shrubs to small trees; branchlets terete, white, covered with soft stinging hairs. Leaves alternate, to 20 x 10 cm, elliptic to oblong-lanceolate, acute at either ends, entire or crenate; lateral nerves 9 pairs; petiole to 6 cm long. Inflorescence axillary, peduncled cymes, branches dichotomous, to 20 x 20 cm. Flowers monoecious or dioecious. Male perianth lobes 4 or 5, ovate, copular. Female perianth lobes 4, ovate, free, pubescent. Stamens 4, free; pistillode clavate. Ovary 1-celled, ovules solitary; style 4 mm long, puberulous, persistent. Achenes 6 mm, ovoid, white, glabrous.

Meenmutty, KVB 31299

Fl. & Fr.: November-January

Distribution: Common in evergreen forests of Meenmutty, Chavachi, Chelachode, Kattikkari and Pothurumi.

ELATOSTEMA J.R.Forst. & G.Forst.

Char. Gen. 53. 1775, *nom. cons.*

- 1a. Receptacle shortly peduncled..... *E. wightii*
- 1b. Receptacle sessile..... 2
- 2a. Branchlets zig-zag..... *E. surculosum*
- 2b. Branchlets not zig-zag..... *E. lineolatum*

Elatostema lineolatum Wight, Icon. Pl. Ind. Orient. t. 1984. 1853; Hook.f., Fl. Brit. India 5: 565. 1888; C.E.C.Fisch. in Gamble, Fl. Madras1376(963). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 438. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 759. 2009.

Glabrous herbs with elongated stem. Leaves alternate, oblong-lanceolate, apex caudate-acuminate, base rounded, slightly oblique, coarsely crenate-toothed, lateral nerves 7-9 pairs, slender, archingly joining along margin. Receptacle sessile, solitary; bracts obovate-obtuse; bracteoles linear.

Pothurumi, NS & KJD 25538

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Pothurumi.

Elatostema surculosum Wight, Icon. Pl. Ind. Orient. t. 2091. 1853; Hook.f., Fl. Brit. India 5: 572. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1377(963). 1928.

Gregarious, subsucculent, herbs on moist rocks, rooting below; branchlets to 25 cm, zig-zag. Leaves alternate, obliquely lanceolate, to 6 x 2.5 cm, subtended by several very small leaves, margin deeply dentate, apex caudate; stipules lanceolate. Inflorescence axillary, 1.3 cm wide, subtended by bracts and bracteoles. Flowers unisexual. Male flowers: tepals 4, ovate, basally connate. Stamens 4. Female flowers: tepals 5; ovary 1-celled; ovule 1. Achene ovoid.

Pothurumi, KJD 22534

Fl. & Fr.: October-December

Distribution: Rare in evergreen forests of Pothurumi.

Elatostema wightii Hook.f., Fl. Brit. India 5: 570. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1377(963). 1928.

Small herbs; stems usually unbranched. Leaves alternate, 10 x 3.5 cm, ovate, inequilateral, acuminate at apex, rounded at base, widely crenate, sessile; cystolith scarce. Male receptacle 8 mm across, peduncles 4 cm long, slender; bracts ovate, cuspidate; bracteole lanceolate; flowers many. Tepals 4, free, 1.5 mm long, ovate, long-cuspidate. Stamens 4, free. Female receptacle 8 mm across, sessile; bracts obovate, cuspidate, fimbriate.

Amabalappara, KJD 26127

Fl. & Fr.: August-September

Distribution: Rare in evergreen forests of Ambalappara on moist tree trunks. Endemic to Western Ghats.

GIRARDINIA Gaud.

in Freycinet Voyage Monde, Bot. 498. 1830.

Girardinia diversifolia (Link) Friis, Kew Bull. 36: 145. 1981; Ansari, Fl. Kasaragod Div. 359. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 438. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 760. 2009. *Urtica diversifolia* Link, Enum. Hort. Berol. 2: 385. 1822. *Girardinia heterophylla* Decne. in Jacq., Voy. 4: 151. t.153. 1844; Hook.f., Fl. Brit. India 5: 551. 1888 incl. var. *palmata*. *Girardinia leschenaultiana* Decne. in Jacq., Voy. 4: 152. 1844; C.E.C.Fisch. in Gamble, Fl. Madras 1372(960). 1928. *Girardinia zeylanica* Decne. in Jacq., Voy. 4: 152. 1844;

C.E.C.Fisch. in Gamble, Fl. Madras 1373(960). 1928; Manilal & Sivar., Fl. Calicut 279. 1982. *Girardinia heterophylla* Decne. var. *zeylanica* (Decne.) Hook.f., Fl. Brit. India 5: 551. 1888.

Subshrubs with white stinging hairs. Leaves alternate, 3-7-lobed, 8-15 x 10-17 cm, base cordate, lobes margin inciso-serrate, densely strigose, 3-ribbed from base; stipules to 1.5 x 1 cm, broadly oblong, auricled, acute; petiole to 10 cm long, reddish. Male flowers in axillary, cylindrical branched or unbranched spikes, white. Tepals 4, 2 mm long, ovate, cucullate. Stamens 4; pistillode globose. Female flowers in subterminal heads. Tepals connate into a ventricose tube, 2-4-lobed; ovary flattened, ovate, style filiform. Achenes ca 3 mm across, compressed.

Kattikkari, NS & KJD 31967

Fl. & Fr.: October-January

Distribution: Fairly common in evergreen forests of Kattikkari, Chavachi and Moonamthode.

LAPOTRTEA Gaud.

in Freycinet Voyage Bot. 498. 1830. *nom. Cons.*

Laportea interrupta (L.) Chew, Gard. Bull. Singapore 21: 200. 1965; Manilal & Sivar., Fl. Calicut 279. 1982; Ansari, Fl. Kasaragod Div. 360. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 439. 1988; Subram., Fl. Thenmala Div. 357. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 761. 2009. *Urtica interrupta* L., Sp. Pl. 985. 1753. *Fleurya interrupta* (L.) Gaud., Voy. Uranie 12: 497. t.8. 1830; Hook.f., Fl. Brit. India 5: 548. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1372(959). 1928.

Erect monoecious annual herbs with stinging hairs. Leaves alternate, 4-10 x 3-5 cm, broadly ovate, apex acuminate, base rounded or subcordate, margin coarsely serrate, sparsely hairy, membranous, 3-nerved from base; petiole to 8 cm long. Flowers in short, cymose clusters aggregated in slender lax, axillary spikes to 13 cm long. Male flowers: tepals 4, c. 1 mm long, ovate, concave. Stamens 4, filaments unequal; pistillode linear, clavate. Female flowers: tepals 4, unequal, basally connate into a cup. Ovary obliquely attached, ovoid, style lateral, filiform. Achenes c. 2 mm across, ovoid,

Chavachi, KJD 22600

Fl. & Fr.: June-September

Distribution: Fairly common in evergreen forests of Chavachi and Kattikkari.

LECANTHUS Wedd.

Ann. Sci. Nat., Bot. sér. 4, 1: 187. 1854.

Lecanthus peduncularis (Wall. ex Royle) Wedd. in DC. Prodr. 16: 164. 1869; Ramach. & V.J. Nair, Fl. Cannanore Dist. 439. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 760. 2009. *Procris peduncularis* Wall. ex Royle, Illustr. Bot. Himal. t.83.f.2. 1836. *Lecanthus wightii* Wedd., Ann. Sci. Nat. Bot. ser. 4, 1: 187. 1854; Hook.f., Fl. Brit. India 5: 559. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1374(961). 1928.

Fleshy herbs, sometimes rooting at nodes. Leaves in unequal pairs, 4 x 1.5 cm and 1 x 0.5 cm, ovate, base oblique, serrate, membranous, pilose; petiole to 1 cm, slender. Receptacle to 1 cm across; peduncles to 1.5 cm. Female flowers: perianth of 3 unequal lobes, one hooded, to 2 mm and the rest small, flat. Achenes oblong, red, flat.

Crosway, *KJD 31875*; Ambalappara *NS & KJD 25504*

Fl. & Fr.: June-October

Distribution: Common in evergreen forests of Crosway, Monamthode, Pottichappara and Ambalappara.

OREOCNIDE Miq.

Pl. Jungh. 1. 39. 1851.

Oreocnide integrifolia (Gaud.) Miq., Ann. Mus. Lugd.-Bat. 4: 306. 1869; Ramach. & V.J. Nair, Fl. Cannanore Dist. 439. 1988. *Villebrunea integrifolia* Gaud., Voy. Bonite Bot. t. 91.1844; Hook.f., Fl. Brit. India 5: 589. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1388(971). 1928 (Plate 10h).

Small trees. Leaves alternate, to 17 x 6 cm, oblong-ob lanceolate, entire, acuminate, base acute; nerves 4-6 pairs, lowest pairs basal, punctate, glabrous; stipule 1 cm long, lanceolate. Flowers in axillary fascicles, monoecious or dioecious. Male perianth 1.5 mm long, 4-lobed, united below. Female perianth 2 mm long, tubular, narrowed above, toothed. Stamens 3-5; pistillode obovate. Ovary adnate to perianth tube, 1-celled, ovule basal; style absent; stigma discoid, fimbriate. Achenes adnate to the perianth, embraced by fleshy bracteoles, to 4 mm across.

Ambalappara, *KJD 26147*

Fl. & Fr.: June-August

Distribution: Rare in evergreen forests of Ambalappara.

PELLIONIA Gaud.

in Freycinet Voyage Bot. 494, t 119. 1826, *nom.cons.*

Pellionia heyneana Wedd., Monogr. Urtic. 287. t.5. 1856; Hook.f., Fl. Brit. India 5: 561. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1380(965). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 440. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 761. 2009. *Elatostema ovatum* Wight, Icon. Pl. Ind. Orient. t. 1985. 1853, 'ovata'.

Subshrubs; stem arched, angled, densely lineolate. Leaves distichous, 20 x 6 cm, falcate-elliptic, inequilateral, acuminate, acute at base, 3-ribbed; cystolith many, linear; petiole 1.5 cm long. Flowers in axillary peduncled cymes; peduncles stout, erect, to 15 cm long. Male flowers pedicelled. Perianth reddish, lobes 4, equal, 2 mm long, oblong. Stamens 4, free. Female flowers pedicelled, in short lateral congested cymes; peduncle to 1.5 cm long. Perianth reddish, lobes 5, unequal, oblong to 1.5 mm long. Achenes 0.6 x 0.5 mm, obovate, acute, biconvex, tubercled.

Pothurumi, NS & KVB 31415

Fl. & Fr.: May-September

Distribution: Fairly common in evergreen forests of Pothurumi, Chavachi and Kattikkari.

PILEA Lindl.

Collect. Bot. ad. t. 4. 1821, *nom. cons.*

- 1a. Leaves entire; plants below 15 cm high..... *P. microphylla*
- 1b. Leaves serrate; plants more than 20 cm high..... *P. melastomoides*

Pilea melastomoides (Poir.) Blume, Mus. Bot. Lugd.-Bat. 2: 54. 1856. *Urtica melastomoides* Poir. in Lam. Encycl. Suppl. 4: 223. 1816. *Pilea trinervia* (Roxb.) Wight, Icon. Pl. Ind. Orient. t. 1973. 1853; Hook.f., Fl. Brit. India 5: 557. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1379(964). 1928. *Urtica trinervia* Roxb., Fl. Ind. 3: 582. 1832.

Dioecious subshrubs, glabrous. Leaves opposite, to 19 x 9 cm, ovate, acuminate, rounded at base, serrate, 3-ribbed, nervules parallel, pubescent along nervules below; lineoles crowded; petiole unequal in opposite pairs, to 10 cm long. Male panicle 10 cm across, axillary; flowers sessile, 4 mm across. Perianth lobes 4, ovate, acute. Stamens 4. Female panicle 2 cm across, shortly peduncled. Flowers smaller than male flowers; perianth lobes 1 mm long. Stigmas 3-fid. Achenes 1 mm across,

Mullenpara, NS & KJD 31978

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Mullenpara and Kattikkari.

Pilea microphylla (L.) Liebm., Vidensk. Selsk. Skr. 5:296. 1851; C.E.C.Fisch. in Gamble, Fl. Madras 1379(965). 1928; Manilal & Sivar., Fl. Calicut 279. 1982; Ansari, Fl. Kasaragod Div. 360. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 440. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 762. 2009. *Parietaria microphylla* L., Syst. Nat. (ed.10):1308. 1759. *Pilea muscosa* (L.) Lindl., Coll. Bot. t. 4. 1821; Hook.f., Fl. Brit. India 5: 551. 1888.

Slender succulent herbs; branches and leaves bifarious; stem transparent. Leaves opposite, 4 x 3 mm, ovate-orbicular, apex obtuse, base attenuate, subsucculent, 1-nerved; raphides transverse; petiole to 1 mm long. Flowers monoecious in small umbellate clusters, 1-1.5 mm across. Male flowers: tepals 4, free, concave, obtuse. Stamens 4. Female flowers: tepals connate, 2-4-toothed. Ovary c. 0.5 mm long, ovoid, 1-celled; ovule 1. Achene c. 1 mm long, ellipsoid.

Kariyenkappu, NS & KJD 31998

Fl. & Fr.: August-November

Distribution: Fairly common in plantations of Kariyenkappu.

POUZOLZIA Gaud.

in Freycinet Voyage Bot. 503. 1826.

- 1a. Leaves petiolate; herbs *P. zeylanica*
1b. Leaves sessile; subshrubs *P. wightii*

Pouzolzia wightii Bennett, Pl. Jav. Rar. 1: 66. 1838; Wight, Icon. Pl. Ind. Orient. t. 2093.f. 8. 1853; Hook.f., Fl. Brit. India 5:584.1888; C.E.C.Fisch. in Gamble, Fl. Madras 1383(967). 1928; Ramach. & V.J. Nair, Fl. Cannanore Dist. 441. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 762. 2009.

Herbs; stem pilose. Leaves opposite, 6.5 x 2.5 cm, ovate to elliptic, acuminate, 3-ribbed, hispid; stipule 8 x 6 mm, ovate. Spike to 35 cm long, terminal; bracts 12 x 8 mm, ovate, cordate at base. Flowers 3-6 together in the axils of bracts. Male and female flowers mixed. Male flowers hemispherical, truncate above, shortly pedicelled. Perianth lobes 4, 2.5 mm long, ciliate; filaments puberulous. Female flowers sessile. Perianth tube striate, hispid. Achenes 1.5 x 1 mm, ovoid, wingless.

Kannadivechakunnu, NS & KJD 31999

Fl. & Fr.: December-March

Distribution: Rare in evergreen forests of Kannadivechakunnu. Endemic to Western Ghats.

Pouzolzia zeylanica (L.) Bennett, Pl. Jav. Rar. 1: 67. 1838; Manilal & Sivar., Fl. Calicut 280. 1982; Ansari, Fl. Kasaragod Div. 361. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 441. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 763. 2009. *Parietaria zeylanica* L., Sp. Pl. 1052. 1753. *Parietaria indica* L., Mant. Pl. 1: 128. 1767. *Pouzolzia indica* (L.) Gaud., Voy. Uranie 12: 503. 1830; Hook.f., Fl. Brit. India 5: 581. 1888; C.E.C.Fisch. in Gamble, Fl. Madras 1382(967). 1928.

Slender procumbent herbs. Leaves alternate, 1.5-3 x 1-2 cm, ovate-elliptic, base rounded, apex acute, sparsely strigose, membranous, lateral nerves 3 or 4 pairs, basal pair opposite; petiole to 2 cm long. Flowers in axillary, subsessile clusters. Male flowers: 3-4 mm across. Perianth lobes 4, 1.5-2 mm long, ovate-lanceolate, sparsely villous. Stamens 4, filaments c. 2 mm long. Female flowers: tepals connate. Style linear c. 2 mm long, thinly pubescent. Achenes 2-winged.

Ambalappara, KJD 26153

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Ambalappara.

PROCRIS Comm. ex. Juss.

Gen. Pl. 403. 1789

Procris crenata Robins., Philipp. J. Sci. 5: 507. 1911; Ratheesh, Fl. Stud. Wayanad Dist. 763. 2009. *Procris wightiana* Wall. ex Wedd., Monogr. Urtic. 336. 1856; C.E.C.Fisch. in Gamble, Fl. Madras 1378(963). 1928; Muktesh, Epiphytic Fl. Western Ghats 70. 1998. *Procris laevigata* sensu Hook.f., Fl. Brit. India 5: 575. 1888, non Blume 1825-1826.

Succulent herbs, usually epiphytic, stem erect or scandent. Leaves alternate, 8 x 2.5 cm, elliptic-lanceolate, crenate, penni-nerved, cystolith linear; petiole 3 mm long; lower part of the stem with small orbicular nanophylls. Flowers monoecious, in axils of leaf scars; male flowers in small cymes; female flowers in peduncled receptacle. Male perianth lobes 5, free, fleshy. Female perianth lobes 3-5, free, fleshy, cucullate. Stamens 5. Ovary 1-celled, ovoid; ovule 1, basal; stigma sessile, globose. Achenes 1 mm long, ovoid, apiculate, rugose.

Kattikkari, NS & KVB 31382

Fl. & Fr.: October-January

Distribution: Common in evergreen forests of Kattikkari, Pothurumi, Chavachi and Moonamthode.

Order: **Myrtales**

COMBRETACEAE

- 1a. Scandent or climbing shrubs 2
- 1b. Erect trees..... Terminalia
- 2a. Flowers in cymes, petals five Combretum p.p.
- 2b. Flowers in panicle, petals four or absent 3
- 3a. Flowers in pendulous panicle, petals four Combretum p.p.
- 3b. Flowers in erect or axillary panicle, petals absent Getonia

COMBRETUM Loefl.

Iter Hispan 308. 1758, *nom. cons.*

- 1a. Petals 4, panicles pendulous2
- 1b. Petals 5, Erect cymes3
- 2a. Petals white in colour *C. latifolium*
- 2b. Petals reddish or violet *C. razianum*
- 3a. Petals recurved..... *C. recurvatum*
- 3b. Petals not recurved..... *C. malabaricum*

Combretum latifolium Blume, Bijdr. Fl. Ned. Ind. 641. 1826; Manilal & Sivar., Fl. Calicut 105. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 177. 1988; Gangop. & Chakrab., J. Econ. Taxon. Bot. 21: 311. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 349. 2009. *Combretum extensum* Roxb. ex G. Don, Trans. Linn. Soc. London 15: 414. 1827; Hook.f., Fl. Brit. India 2: 458. 1878; Gamble, Fl. Madras 469(332). 1919.

Climbing shrubs; young branchlets pale-brown scaly mixed with minute rufous, globular glands, becoming glabrous. Leaves opposite or sub opposite, 7-12 x 3.5-6 cm, elliptic-obovate to oblong-elliptic, apex obtusely acuminate, base cuneate, subcoriaceous; petiole to 1.5 cm long. Inflorescence of long-peduncled axillary spikes, forming terminal pendulous panicles. Flowers 4-merous, subsessile, greenish-white, polygamo-dioecious. Receptacle 4-5 mm long, funnel-shaped from above the ovary. Sepals 4, c. 2 x 1.5 mm, triangular. Petals 4, c. 2 x 2 mm, rounded, greenish-yellow. Stamens 8; filaments c. 3 mm long. Ovary linear, 1-locular; ovules 2-3, pendulous. Drupe 3-3.5 cm long, with 4 membranous wings, c. 1 cm wide, transversely striate.

Kariyenkappu, KVB 31506

Fl. & Fr.: December-April

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Chavachi and Meenmutty.

Combretum malabaricum (Bedd.) Sujana, Ratheesh, & Anil, J. Bot. Res. Inst. Texas 6(2): 453. 2012. *Quisqualis malabarica* Bedd., Icon. Pl. Ind. Or. t. 155. 1868-1874; Hook.f., Fl. Brit. India 2: 460.1878; Gamble, Fl. Madras 469(332). 1919; Gangop. & Chakrab., J. Econ. Taxon. Bot. 21: 332. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 350. 2009.

Climbing shrubs. Leaves alternate or opposite, to 14 x 5 cm, oblong, acuminate at apex; nerves 8 pairs, looping below the margins, domatia hairy; petiole 5 mm long. Flowers in terminal cymes. Calyx tube 15 mm long, produced above the ovary, narrow, hispid outside, lobes 5, 3 x 1 mm. Petals 12 x 3 mm, oblong, reddish. Stamens 10, filaments short. Ovary 1-celled, ribbed, pubescent; ovules 3-4, pendulous; style adnate to the calyx tube. Fruit 5-winged.

Chavachi, KVB 31528

Fl. & Fr.: February-April

Distribution: Common in plantations of Kariyenkappu, evergreen forests of Chavachi, Chelachode and Monamthode, semi-evergreen forests of Paripode and Narikkadavu. Endemic to southern Western Ghats.

Combretum razianum K.G.Bhat, Indian J. Forest. 28(2):210. 2005. *Combretum pilosum* Roxb. subsp. *razianum* (K.G.Bhat) Chakrab. & P.G.Diwakar, Indian J. Forest. 34 (4):483-484. 2011. Sujana & A.Pramanik, Annals of Plant sciences 6(3): 1594. 2017 (Plate 10i).

Lianas. Leaves opposite, rarely subopposite or alternate, 8–25 × 3–9 cm, elliptic oblong or ovate-lanceolate, caudate-acuminate, rounded to subacute or narrowly cordate or slightly auriculate at base, margin fringed with hairs; lateral nerves 6-10 pairs, sparsely pubescent above; petioles 3–6 mm long, rusty tomentulose. Inflorescence axillary and terminal panicle. Flowers pinkish, 5-merous 2.0–2.5 × 0.8–1.2 cm on short pubescent pedicels. Calyx tube pale green, expanded portion campanulate, ferruginous tomentose and villous. Petals pinkish, oblanceolate, villosulous, recurved. Stamens 10. Ovary puberulous; style terete; stigma capitate. Fruits oblong to orbicular, 5-winged; Seeds solitary.

Poathanplavu, KJD 26903

Fl. & Fr.: January-March

Distribution: Rare in semi-evergreen forests of Poathanpalvu. Endemic to Western Ghats.

Combretum recurvatum Sujana, Ratheesh & Anil, J. Bot. Res. Inst. Texas 6(2): 453. 2012 (Plate 10j).

Woody climber. Leaves opposite, 4-15 × 4-7 cm, ovate to oblong; lateral veins 5-8 pairs. Inflorescence terminal, spicate, 18-26-flowered; bracteoles linear-lanceolate or triangular. Flowers 5-merous, 1.5-1.7 × 1.5-1.6 cm. Calyx tube pale green, narrowly infundibuliform, ridged, 0.9-1 cm long, puberulous. Petals pink, ovate or oblong, recurved with 3 distinct nerves. Stamens 5 + 5, inserted in the throat of the calyx tube; filaments ca. 1 mm long. Ovary tawny puberulous, ridged, 1-celled with 3 ovules; style 1-2 mm long; stigma capitate. Fruits chocolate brown, wings 5; Seed solitary, fusiform.

Chavachi, KVB 26104

Fl. & Fr.: January-May

Distribution: Evergreen forests of Chavachi, Chelachode and Monamthode. Endemic to southern Western Ghats.

GETONIA Roxb.

Pl. Coromandel t. 87. 1798.

Getonia floribunda (Lam.) Roxb., Pl. Coromandel t.87. 1798. *Calycopteris floribunda* Lam., Tabl. Encycl. 2: 485. t. 357.1793; Hook.f., Fl. Brit. India 2: 449.1878; Gamble, Fl. Madras 467(331). 1919; Manilal & Sivar., Fl. Calicut 105. 1982; Ansari, Fl. Kasaragod Div. 155. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 176. 1988; Gangop. & Chakrab., J. Econ. Taxon. Bot. 21: 294. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 349. 2009.

Scandent shrubs; young stem densely brown pubescent. Leaves 4-9 x 2-3 cm, ovate to elliptic, apex acute or acuminate-caudate, base rounded, densely pubescent on both sides, more below, punctate; petiole to 1 cm long. Flowers in dense axillary racemes, crowded in dense panicles at top of branches; bracts leafy, 0.6-1.2 x 0.3-0.4 cm. Calyx tube 4-5 mm long; lobes 5, to 5 mm long elliptic cream coloured, velvety, accrescent. Petals absent. Stamens 10, 5+5 in two rows. Ovary inferior, 3-4 mm long, 1-celled; ovules 3, pendulous; stigma simple. Drupe 6-8 mm long, with 5 spreading accrescent calyx lobes; seed single.

Paripode, KJD 22586

Fl. & Fr.: January-May

Distribution: Semi-evergreen forests of Paripode.

TERMINALIA L.

Syst. Nat. ed. 12, 2: 674. 1767, *nom. cons.*

- 1a. Fruits winged *T. paniculata*
- 1b. Fruits wingless *T. bellirica*

Terminalia bellirica (Gaertn.) Roxb., Pl. Coromandel t. 198. 1805; Hook.f., Fl. Brit. India 2: 445. 1878; Gamble, Fl. Madras 463(328). 1919; Manilal & Sivar., Fl. Calicut 105. 1982; Ansari, Fl. Kasaragod Div. 156. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 178. 1988; Gangop. & Chakrab., J. Econ. Taxon. Bot. 21: 338. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 351. 2009. *Myrobalanus bellirica* Gaertn., Fruct. Sem. Pl. 2: 90. t. 97. ff. a-d.1791, "bellerica".

Deciduous trees, to 35 m high; bole often buttressed; bark blackish-grey. Leaves opposite or alternate, clustered at the tip of branchlets, 9-35 x 5-16 cm, obovate, elliptic or obovate-elliptic, apex obtusely acuminate, base obliquely cuneate, attenuate or acute; lateral nerves 7-10 pairs; intercostae reticulate; petiole 15-80 mm. Flowers greenish-yellow, 5-6 mm across, in axillary spikes; bracteoles 0.5-2 mm long, linear-lanceolate. Calyx tube 2-2.5 x 1.3-2 mm, rusty pubescent, constricted above the ovary; lobes 5, cream, triangular, tomentose; disk 5-lobed, villous. Petals absent. Ovary 1.5 mm, inferior, tomentose, 1-celled; ovules 2 or 3, pendulous; style 4 mm, subulate; stigma small. Fruit a drupe 2-2.5 x 1.8 cm, obovoid, obscurely 5-ridged, yellowish-brown, honed, not winged, softly tomentose; seed one, ellipsoid.

Pothanplvu, KJD 22535

Fl. & Fr.: December-January

Distribution: Common in semi-evergreen forests of Valayamchal, Narikkadavu and Pothanplavu.

Terminalia paniculata Roth, Nov. Pl. Sp. 383.1821; Hook.f., Fl. Brit. India 2:448.1878; Gamble, Fl. Madras 465(329). 1919; Manilal & Sivar., Fl. Calicut 104. 1982; Ansari, Fl. Kasaragod Div. 157. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 179. 1988; Gangop. & Chakrab., J. Econ. Taxon. Bot. 21: 357. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 353. 2009. *Pentaptera paniculata* (Roth) Roxb., Fl. Ind. 2: 442. 1832.

Deciduous trees, to 30 m high; bark surface brown. Leaves lower leaves subopposite, upper alternate, 10-24 x 5-10 cm, elliptic, oblong, ovate, elliptic-oblong or ovate-oblong, apex acute or acuminate, base round, obtuse, cordate or oblique, 2 sessile glands beneath the base; lateral nerve 5-15 pairs, intercostae reticulate; petiole 12-15 mm long. Flowers bisexual, white, sessile, 6-12 mm across, in axillary and terminal panicles, tomentose; bracteoles linear-lanceolate. Calyx tube constricted above the ovary, pubescent, lobes 5, cream, triangular, villous within. Petals 0. Stamens 10 in 2 rows; filaments 3-4 mm; disk 5-lobed, villous. Ovary 1 mm, inferior, 1-celled; ovules 2 or 3, pendulous; style to 4 mm, subulate, stigma terminal. Fruit a drupe reddish-brown, rusty tomentose, with one large and 2 small wings; seed one.

Paripode, NS & KVB 31451

Fl. & Fr.: August-February

Distribution: Deciduous forests of Paripode.

LYTHRACEAE

- 1a. Herbs with small flowers, calyx membranous 2
- 1b. Trees, calyx not membranous Lagerstroemia
- 2a. Fruit dehiscent, opening in valves Rotala
- 2b. Fruit indehiscent, dehiscing irregularly Ammannia

AMMANNIA L.

Sp. Pl. 119. 1753.

Ammannia baccifera L., Sp. Pl. (ed.2) 175.1762; Koehne, Bot. Jahrb. Syst. 1:260. 1880; Hook.f., Fl. Brit. India 2: 569. 1879; Gamble, Fl. Madras 510(360). 1919; Manilal & Sivar., Fl. Calicut 111. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 191. 1988; Joseph, Aquatic Angiosp. Malabar 101. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 377. 2009. *Ammannia vesicatoria* Roxb., Fl. Ind. 1: 426. 1832.

Erect annual herbs to 40 cm tall; stem 4-angled or more or less winged. Leaves decussate, sessile, 2-6 x 0.5-0.8 cm, linear to elliptic, apex acute, base attenuate, chartaceous. Cymes dischasia, axillary. Flowers 4 or 5-merous, perigynous; pedicels c. 2 mm long. Calyx tube 1-2 mm long, campanulate; lobes 4, 1-1.5 mm long, triangular. Petals absent. Stamens 4; filaments c. 0.5 mm long. Ovary 1 mm in diam., globose, 4-5-locular; ovules many; stigma capitate. Capsule 1.5-2 mm across, globose, exceeding calyx tube; seeds brownish, concavo-convex.

Chullikandam, *KJD 22590*

Fl. & Fr.: September-December

Distribution: Rare along stream side.

LAGERSTROEMIA L.

Syst. Nat. ed. 10, 2: 1068.1759.

- 1a. Flowers 5 cm across, calyx tube ribbed..... *L. speciosa*
- 1b. Flowers 8 mm across, calyx tube smooth..... *L. microcarpa*

Lagerstroemia microcarpa Wight, Icon. Pl. Ind. Orient. t. 109. 1839; Ramach. & V.J. Nair, Fl. Cannanore Dist. 192. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 378. 2009. *Lagerstroemia lanceolata* Wall. ex Clarke in Hook.f., Fl. Brit. India 2: 576. 1879; Gamble, Fl. Madras 513(362). 1919. *Lagerstroemia thomsonii* Koehne in Engl., Pflanzenreich Lythrac. 257. 1903; Gamble, Fl. Madras 513(362). 1919.

Deciduous trees, to 30 m high; bark greyish or greyish-white. Leaves opposite, distichous, 4.5-10 x 3.7-6.5 cm, elliptic, ovate, elliptic-lanceolate or ovate-lanceolate, apex acute or acuminate, base attenuate or acute; lateral nerves 6-10 pairs, intercostae scalariform; petiole 6-15 mm long; stipules 2, intrapetiolar. Flowers 5-6 mm across, white, in axillary and terminal panicles. Calyx smooth, hoary, without a ring; lobes 6, triangular, persistent, reflexed. Petals 6, 3 mm long, obovate, white, clawed. Stamens numerous, inserted at the base of calyx tube; filaments long, exerted. Ovary half inferior, sessile, glabrous, 4-6-celled, ovules many; style long, curved; stigma capitate. Fruit a capsule, 8-12 mm long, ovoid, 4-6 valved, dehiscent; seeds many, elongate, falcately winged, brownish.

Kariyenkappu, NS & KVB 31367

Fl. & Fr.: June-February

Distribution: Rare in plantations of Kariyenkappu. Endemic to Western Ghats.

Lagerstroemia speciosa (L.) Pers., Syn. Pl. 2:72.1806; Manilal & Sivar., Fl. Calicut 114. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 192. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 379. 2009. *Munchausia speciosa* L., Hausvater 5: 257. 1770. *Adambea hirsuta* Lam., Encycl. 1: 39. 1783. *Lagerstroemia flos-reginae* Retz., Observ. Bot. 5: 25.1788; Hook.f., Fl. Brit. India 2:577.1879; Gamble, Fl. Madras 513(362). 1919. *Lagerstroemia reginae* Roxb., Pl. Coromandel t. 65. 1796; Ansari, Fl. Kasaragod Div. 166. 1985; Vajr., Fl. Palghat Dist. 205. 1990. *Lagerstroemia hirsuta* (Lam.) Willd., Sp. Pl. 2: 1178. 1799; Anil Kumar *et al.*, Fl. Pathanamthitta 227. 2005.

Deciduous trees, to 25 m high; bark yellowish-brown. Leaves opposite or subopposite, 7.5-25 x 3-10 cm, oblong, ovate-lanceolate, elliptic-lanceolate or elliptic-oblong, apex acute, base obtuse, round or acute; lateral nerves 11-19 pairs, parallel, intercostae reticulate; petiole 6-12 mm long; stipules intrapetiolar. Flowers 5-7 cm across, mauve or pink, in terminal panicles; inflorescence branches puberulous. Calyx tube 1 x 1.3 cm, hemispherical, puberulous, ribbed without; lobes 6, triangular, acute. Petals 6, 4 x 2.5 cm, obovate, clawed, margins crispate. Stamens many, inserted near the base of the calyx tube; filaments exerted. Ovary half inferior, sessile, glabrous, 6-celled, ovules many; style curved; stigma capitate. Fruit a capsule, 18-30 mm long, ovoid, brown, dehiscent; seeds 10-12 mm long, winged, pale brown.

Pothanplavu, NS & KVB 31321

Fl. & Fr.: March-November

Distribution: Common in semi-evergreen forests of Pothanplavu and Narikkadavu; evergreen forests of Chavachi.

ROTALA L.

Mant. Pl. Altera 143, 175. 1771.

- 1a. Bracts cordate; capsule 4-valved *R. rotundifolia*
1b. Bracts acute at base, falcately folded; capsule 2-valved *R. Indica*

Rotala indica (Willd.) Koehne, Bot. Jahrb. Syst. 1: 172. 1880; Gamble, Fl. Madras 508(359). 1919; Manilal & Sivar., Fl. Calicut 112. 1982; Joseph, Aquatic Angiosp. Malabar 112.1991; Ratheesh, Fl. Stud. Wayanad Dist. 381. 2009. *Peplis indica* Willd., Sp. Pl. 2: 244. 1799. *Ammannia peploides* Spreng., Syst. Veg. 1: 444. 1825; Hook.f., Fl. Brit. India 2: 566. 1879.

Amphibious annuals; stem erect or decumbent to 35 cm long, 4-angled or terete, rooting at the nodes. Leaves decussate, sessile or subsessile, 0.5-1.6 x 0.4-1 cm, obovate-spathulate or suborbicular, apex acute, obtuse or emarginate, base cuneate or obtuse, margins cartilaginous; bracts dimorphic, leaf like on major branches, much smaller elliptic-oblong on flowering branches which ultimately look like bracteate spikes. Flowers sessile, axillary, solitary. Calyx tube pink or red, turning brown, 1.5-2.5 mm long, campanulate; lobes 4, 1 mm long, triangular, appendages absent. Petals 4, pink, 0.5 mm long, elliptic. Stamens 4 or some times fewer, filaments inserted at about the middle of calyx tube. Ovary 1 mm long, ellipsoidal; style to 1 mm long; stigma capitate. Capsule 2 mm long, ellipsoid, 2-valved; seeds hemispherical.

Ambalappara, KJD 26327

Fl. & Fr.: July-February

Distribution: Fairly common near water bodies in evergreen forests of Ambalappara.

Rotala rotundifolia (Buch.-Ham. ex Roxb.) Koehne, Bot. Jahrb. Syst. 1: 175. 1880; Gamble, Fl. Madras 509(359). 1919; Manilal & Sivar., Fl. Calicut 113. 1982; Ansari, Fl. Kasaragod Div. 168. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 194. 1988; Joseph, Aquatic Angiosp. Malabar 124. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 383. 2009. *Ammannia rotundifolia* Buch.-Ham. ex Roxb., Fl. Ind. 1: 446. 1820; Hook.f., Fl. Brit. India 2: 566. 1879.

Erect herbs, to 15 cm high; stem reddish, 4-angled. Leaves opposite, 8 x 6 mm, oblong-orbicular, sessile, glabrous, 5-nerved. Racemes 1-1.5 cm long, bracteoles 2 mm long, lanceolate. Calyx tube 2.5 mm long, lobes triangular, acute; intersepalal appendages absent. Petals 1.5 x 1 mm, obovate. Staminal

filaments attached near the base of calyx tube. Ovary 1 x 1 mm, obovoid, truncate, obtuse, 4-angled; style 1 mm long.

Ambalappara KJD 26337, NS & KVB 31305

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Ambalappara.

Woodfordia fruticosa (L.) Kurz, is planted as medicinal plant.

MELASTOMATACEAE

- 1a. Leaves 3-9-ribbed from the base 2
- 1b. Leaves penninerved Memecylon
- 2a. Flowers 3-merous Sonerila
- 2b. Flowers 4 or 5-merous 3
- 3a. Epiphytic shrubs; leaves thick Medinilla
- 3b. Terrestrial plants; leaves not thick 4
- 4a. Stamens similar Osbeckia
- 4b. Stamens dimorphic Melastoma

MEDINILLA Gaud.

in Freyc., Voy. Uranie Bot. 484. 1830.

Medinilla beddomei Clarke in Hook.f., Fl. Brit. India 2: 548. 1879; Gamble, Fl. Madras 496(351). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 185. 1988; Sasidh. & Sujanalal, Rheedea 15: 105. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 366. 2009. *Medinilla radicans* sensu Bedd., Icon. Pl. Ind. Or. t. 184. 1868-1874, non Blume 1831 (Plate 10k).

Epiphytic shrubs; branches terete, pendulous. Leaves opposite, 2.5 cm across, obtuse at base and apex, very succulent, ribs indistinct; petiole 5 mm long. Cymes axillary, 1-3 flowered; pedicels 2 cm long, glabrous. Flowers white. Calyx tube 7 mm long, wavy along the rim. Petals white, 1.5 x 1.2 cm, obovate, spreading. Stamens 10, anthers 8 mm long, acuminate, spur at the base of the anther, 1.5 mm long, curved up.

Ambalappara, KJD 25594

Fl. & Fr.: May-June

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

MELASTOMA L.

Sp.Pl. 389. 1753.

Melastoma malabathricum L., Sp. Pl. 390. 1753; Hook.f., Fl. Brit. India 2: 523. 1879; Gamble, Fl. Madras 495(350). 1919; Manilal & Sivar., Fl. Calicut 110. 1982; Ansari, Fl. Kasaragod Div. 161. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 185. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 367. 2009.

Shrubs to 1.3 m tall; stem densely covered with paleaceous pectinate hairs. Leaves opposite, 4-11 x 1.5-4 cm, elliptic-oblong, apex acute, base attenuate, upper surface prominently lineolate, lower surface tomentose, 5-ribbed, drying dull-greenish; petiole to 1.5 cm long. Flowers solitary or few in rather dense clusters, c. 5 cm across; bracts 1.2-2 x 1-1.4 cm, boat-shaped, densely paleaceous hairy. Calyx tube 0.7-1 cm long, campanulate; lobes 5, 5-7 x 4-5 mm, ovate-lanceolate, densely paleaceous hairy. Petals 5, reddish purple, 1.5-2 x 0.7-1 cm, obovate. Stamens 10, alternating ones large and small; anthers dimorphic, dehiscence by apical pores. Ovary ovoid, 5-locular; ovules many; style simple. Capsules 1-1.5 x 0.8-1 cm, ovoid, irregularly dehiscent; seeds many, minute.

Paripode, NS & KJD 25570

Fl. & Fr.: Throughout the year

Distribution: Along the boundaries near Farm.

MEMECYLON L.

Sp. Pl. 349. 1753.

- 1a. Leaves rounded or cordate at base *M. randerianum*
- 1b. Leaves acute at base 2
- 2a. Flowers sessile *M. lawsonii*
- 2b. Flowers pedicelled *M. wightii*

Memecylon lawsonii Gamble, Bull. Misc. Inform. Kew 1919: 226. 1919 & Gamble, Fl. Madras 503(355). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 186. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 369. 2009.

Shrubs; branches few, terete. Leaves simple, opposite, 18 x 3.5 cm, lanceolate, acuminate; nerves 10-12 pairs, pale; petiole 1 cm long. Flowers 1-3, axillary. Calyx 1 mm long, lobes ovate, acute, pale pink. Petals 2.5 mm long, obovate-oblong, keeled, blue. Stamens 8, anthers 1 mm long, curved at base. Berry 8 x 9 mm; yellow, sessile.

Ambalappara, KVB 31739

Fl. & Fr.: September-March

Distribution: Common semi-evergreen forests of Chullikandam, Narikkadavu and Paripode, evergreen forests of Meenmutty and Ambalappara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Memecylon randerianum S.M.Almeida & M.R.Almeida, Journ. Bombay Nat. Hist. Soc. 85: 521. 1989; Ratheesh, Fl. Stud. Wayanad Dist. 370. 2009. *Memecylon malabaricum* (Clarke) Cogn. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 7: 1148. 1891; Gamble, Fl. Madras 505(356). 1919; Manilal & Sivar., Fl. Calicut 111. 1982. *Memecylon amplexicaule* Roxb. var. *malabarica* Clarke in Hook.f., Fl. Brit. India 2: 559. 1879 p.p.

Bushy shrubs. Leaves opposite, 5-12 x 1.5-4 cm, ovate, apex gradually acute, cordate at base, sessile; nerves obscure. Flowers fascicled in very dense many-flowered cymes; peduncles 1-2 mm long; pedicels short, 1-2 mm long. Calyx tube 1-2 mm long, campanulate, truncate at apex. Petals 1-2 mm long, obovate, blue. Style subulate, c. 3 mm long. Berry 4-5 mm across, globose.

Asthipara, KVB 31627; Kattikari, KJD 26052

Fl. & Fr.: February-June

Distribution: Common in evergreen forests of Asthipara, Pothurumi, Chavachi, Kattikari, Meenmutty and Kurumbankallu. Endemic to southern Western Ghats.

Memecylon wightii Thwaites, Enum. Pl. Zeyl. 113. 1859; Clarke in Hook.f., Fl. Brit. India 2: 554. 1879. *Memecylon wightii* Thwaites var. *cylindricum* Trimen, Handb. Fl. Ceylon 2: 213. 1894.

Shrubs or small trees; branchlets winged to acutely quadrangular or occasionally terete. Leaves opposite, 4-8 x 1.5-3.5 cm, elliptic-ovate, basally cordate and semiamplexicaul, subacute or shortly caudate and obtuse at the very apex, often with slightly revolute margins, with indistinct intramarginal and lateral veins, coriaceous, more or less shining above; foliar sclereids filiform; sessile or with a very short petiole. Inflorescence condensed; flowers many, congested in tufts at the nodes on the branches below the leaves. Pedicels 2-3 times the calyx length. Calyx 2.3-3 mm wide, smooth or shallowly striate inside, shallowly 4-lobed. Petals blue. Anthers 1.2-1.9 mm long; connective with a gland. Fruits globose.

Ambalappara, NS & KJD 31946; KVB 31740; KVB 31635; NS & KVB 31360

Fl. & Fr.: February-May

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Western Ghats.

OSBECKIA L.

Sp. Pl. 345. 1753.

- 1a. Flowers less than 1.5 cm across..... *O. muralis*
- 1b. Flowers more than 2 cm across..... 2
- 2a. Flowers solitary, herbs *O. aspera*
- 2b. Flowers terminal cymes, shrubs..... *O. gracilis*

Osbeckia aspera (L.) Blume, Bijdr. Fl. Ned. Ind. Natuurk. Wetensch. 6: 220. 1831; Hook.f., Fl. Brit. India 2: 519. 1879, p.p'; Gamble, Fl. Madras 492(347). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 372. 2009. *Melastoma asperum* L., Sp. Pl. 389. 1753. *Osbeckia kleinii* Wight & Arn., Prodr. Fl. Ind. Orient. 323. 1834; Gamble, Fl. Madras 492(348). 1919. *Osbeckia courtallensis* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Madras 492(348). 1919. *Osbeckia kewensis* C.E.C.Fisch., Bull. Misc. Inform. Kew 1938: 34. 1938. *Osbeckia lawsonii* Gamble, Bull. Misc. Inform. Kew 1918: 242. 1918 & Gamble, Fl. Madras 503(348). 1919

Erect shrubs; branchlets more or less pubescent with appressed to spreading hairs. Leaves opposite, 3.5-9 x 1.5-3.2 cm, elliptic-lanceolate, acute to shortly acuminate at apex, base attenuate, basally 5-ribbed, more or less pubescent with appressed short hairs on both sides, drying yellowish-green; petiole to 1 cm long. Flowers ca 2 cm across, in terminal cymes, sometimes elongated clusters, pentamerous. Calyx tube 6-8 mm long, ca 5 mm wide, cupular, with dense short bristle-like hairs; lobes 5, oblong, obtuse. Petals 5, pink, 1-1.5 x 0.8-1 cm, ovate, apex rounded. Stamens 10; anthers 5-6 mm long. Ovary hairy at apex; style exserted, 1.25-1.5 cm long; stigma curved, papillate. Capsules 0.8-1 x 0.6-0.7 cm, ovoid, ribbed; seeds many.

Ambalappara, KJD 31774

Fl. & Fr.: August-April

Distribution: Fairly common in grasslands and evergreen forests of Ambalappara.

Osbeckia gracilis Bedd., Madras J. Lit. Sci. ser. 3, 1: 45. 1864; Hook.f., Fl. Brit. India 2: 518. 1879; Gamble, Fl. Madras 494(349). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 373. 2009. *Osbeckia sublaevis* Cogn. in A.L.P.P.de Candolle & A.C.P.de Candolle, Monogr. Phan. 7:321.1891; Gamble, Fl. Madras 492(348). 1919. *Osbeckia lineolata* Gamble, Bull. Misc. Inform. Kew 1918: 241. 1918 & Gamble, Fl. Madras 492(347). 1919. *Osbeckia lineolata* Gamble var. *anamalayana* Giri & M.P.Nayar, Bull. Bot. Surv. India 25: 244. 1983 (Plate 10).

Stout shrubs; branches glaucous, glabrous. Leaves to 3.5 x 2 cm, elliptic-oblong, obtuse at apex and base, cuspidate, yellowish green, densely covered with half-adnate hairs spreading from midrib, 3-ribbed; petiole 3 mm long. Flowers in terminal cymes, pedicelled. Calyx tube 7 mm long, densely stellate hairy, lobes 4 x 3 mm, ovate-oblong, obtuse, ciliate. Petals 15 x 12 mm, obovate, ciliate, pink. Anthers 5 mm long.

Ambalappara, NS & KJD 31977; KVB 31707

Fl. & Fr.: August-September

Distribution: evergreen forests of Ambalappara.

Osbeckia muralis Naud., Ann. Sci. Nat. Bot. ser.3, 14: 456. 1850; Ansari, Fl. Kasaragod Div. 165. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 187. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 373. 2009. *Osbeckia truncata* D. Don ex Wight & Arn., Prodr. Fl. Ind. Orient. 322. 1834, p.p.; Hook.f., Fl. Brit. India 2: 514. 1879; Gamble, Fl. Madras 494(349). 1919. *Osbeckia truncata* var. *kurzii* Clarke in Hook.f., Fl. Brit. India 2: 514. 1879.

Erect herbs; stem 4-angled, laxly villous. Leaves opposite, 1-3.5 x 0.8-2 cm, elliptic to oblong, apex acute, base rounded to obtuse, chartaceous, densely pubescent with long hairs on both sides, 3-ribbed; petiole to 6 mm long. Flowers few in terminal cymose clusters, 4-merous, c. 1.5 cm across. Calyx tube 2-4 mm wide, cupular, ribbed, long-simple hairy; lobes 4, 2-4 mm long, triangular, stellately bristly at apex. Petals pink, 4-6 x 3-4 mm, ovate. Stamens 8; anthers 2-4 mm long, ovate-oblong, apex truncate. Ovary 4-locular, apically with many erect bristles. Capsule 4-6 mm long, globose; seeds many, minute.

Paripode, KJD 22588

Fl. & Fr.: September-January

Distribution: Fairly common along the boundaries of semi-evergreen forests of Paripode. Endemic to Western Ghats.

SONERILA Roxb.

Fl. Ind. (Carey & Wallich ed.) 1: 180. 1820, *nom. cons.*

- 1a. Plants scapigerous 2
- 1b. Plants cauline..... 3
- 2a. Leaves orbicular; peduncle red..... *S. rotundifolia*
- 2b. Leaves ovate; peduncle green *S. wallichii*
- 3a. Stem more than 10 cm long, woody *S. versicolor*
- 3b. Stem below 10 cm, Slender *S. rheedei*



a. *Kingiodendron pinnatum*



b. *Crotalaria obtecta*



c. *Hylodesmum repandum*



d. *Polygala arillata*



e. *Elaeagnus indica*



f. *Dorstenia indica*



g. *Rubus glomeratus*



h. *Oreocnide integrifolia*



i. *Combretum razianum*



j. *Combretum recurvatum*



k. *Medinilla beddomei*



l. *Osbeckia gracilis*

Sonerila rheedei Wight & Arn., Prodr. Fl. Ind. Orient. 321. 1834, 'rheedii'; Gamble, Fl. Madras 500(353). 1919; Manilal & Sivar., Fl. Calicut 109. 1982; Ansari, Fl. Kasaragod Div. 166. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 189. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 375. 2009. *Sonerila wallichii* sensu Clarke in Hook.f., Fl. Brit. India 2: 538. 1879 p.p., non Bennett 1844.

Stem to 15 cm high, quadrangular, hispid. Leaves to 12 x 6 cm, ovate, penninerved, acute at apex; rounded or cordate at base, hirtus, green; nerves 4 pairs; petiole 4 cm long, hispid. Peduncle terminal or upper axillary, 8-12-flowered. Flowers 1 cm across; pedicel 8 mm long. Sepals triangular, glandular hairy. Petals 4 x 3 mm, elliptic, with a hairy midrib; pink. Anthers 3 mm long, acute. Capsule 4 x 3 mm, glandular hairy; seeds obovoid, brown, glandular.

Chelachode, NS & KJD 31937

Fl. & Fr.: July-November

Distribution: Common in evergreen forests of Chelachode, Pothanplavu and Chavachi. Endemic to southern Western Ghats.

Sonerila rotundifolia Bedd., Madras J. Lit. Sci. ser. 3, 1: 74. 1861 & Ic. t. 169. 1868-1874; Hook.f., Fl. Brit. India 2: 538. 1879; Gamble, Fl. Madras 500(353). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 375. 2009 (Plate 11a).

Stemless herbs. Leaves few, simple, radical, 6.5-8 cm across, orbicular, deeply cordate at base, crenate, 9-ribbed from base, pilose along the nerves, reddish brown, petiole to 12 cm long. Peduncle to 15 cm long, 8-10 flowered. Flowers 2.5 cm across, confined to the apex of the scape in scorpioidal cyme; pedicel 1 cm long, pink. Sepals 1.5 x 3 mm, triangular. Petals 12 x 9 mm, obovate, pink. Anthers 6 mm long, acuminate, deeply cleft at base; filaments 7 mm long. Style 11 mm long.

Ambalappara, KJD 25429

Fl. & Fr.: July-October

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Sonerila versicolor Wight, Icon. Pl. Ind. Orient. t. 1057. 1846; Hook.f., Fl. Brit. India 2:535.1879, pro parte; Gamble, Fl. Madras 499(352). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 190.1988; Ratheesh, Fl. Stud. Wayanad Dist. 376.2009.

Erect woody undershrubs, whole plant violetish. Leaves opposite, 3-10 x 1-2.5 cm, ovate lanceolate, long acuminate at apex, broadly attenuate at base, oblique, serrate on margins with mucronate tip for serrations, penninerved.

Petioles 1-2.5 cm long. Cymes terminal. Peduncles 1.5-4 cm, sparsely glandular hairy. Pedicels 0.2-0.4 cm long. Calyx tube 3-angled, 0.4-0.5 cm, glandular hairy; lobes broadly triangular, glandular hairy. Petals 0.5-0.6 cm long, 0.3 cm wide, ovate-lanceolate. Anthers 0.4 cm, attenuate. Style 0.5-0.6 cm long; stigma capitate. Capsules turbinate, 1-1.2 x 0.4-0.5 cm, 6-ribbed; seeds elongate, tubercled; raphae forming a capitate appendage.

Ambalappara, *KJD 22589*

Fl. & Fr.: June-January

Distribution: Fairly common in evergreen forests of Ambalappara, Asthipara, Mullenpara and Pothurumi. Endemic to southern Western Ghats.

Sonerila wallichii Bennett, Pl. Jav. Rar. 215. 1844; Hook.f., Fl. Brit. India 2: 538. 1879, p.p.; Gamble, Fl. Madras 500(353). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 190. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 377. 2009 (Plate 11b).

Scapigerous herbs, leaves one or very few; 5 x 3 cm, ovate, acute, cordate at base, serrulate, crispate hairy above, 3 pairs of nerves from the base; petiole 1-3 cm long. Peduncles to 9 cm long, glandular hairy; 4-6 flowered. Flowers 10 mm across; pedicels 5 mm long. Sepals triangular, hairy. Petals 5 x 4 mm, elliptic, acute, pink. Anther 2 mm long, acute. Style 5 mm long, glabrous. Capsule 2.5 x 2.5 mm, hemispheric, glandular hairy.

Chelachode, *NS & KJD 31937*

Fl. & Fr.: July-November

Distribution: Common in evergreen forests of Chelachode, Pothanplavu and Chavachi. Endemic to southern Western Ghats.

MYRTACEAE

- 1a. Calyx tube produced above the ovary..... *Syzygium*
1b. Calyx tube not produced above the ovary..... *Eugenia*

EUGENIA L.

Sp. Pl. 470. 1753.

- 1a. Leaves lanceolate, long acuminate, silvery beneath *E. argentea*
1b. Leaves suborbicular, glabrous..... *E. codyensis*

Eugenia argentea Bedd., Fl. Sylv. S. India: Anal. Genp. 109. 1872; Hook.f., Fl. Brit. India 2: 503. 1879; Gamble, Fl. Madras 484(342). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 354. 2009; Narayanan *et al.*, J. Econ. Taxon. Bot. 34: 501. 2010 (Plate 11c).

Shrub or small trees. Leaves opposite, 10-12 x 1.5-3 cm, lanceolate, long-acuminate, rounded at base, silvery-pubescent beneath; lateral nerves prominent, rather distant, at right angles to midrib; short-petioled. Flowers fascicled in the leaf-axils or in very short cymes; bracteoles 2, filiform, conspicuous under the calyx-tube. Pedicels 1-2.5 cm long. Calyx-tube nearly globose, not produced beyond the ovary, the limb of 4, rarely 5, persistent lobes. Petals 4, rarely 5, distinct. Stamens numerous, distinct, staminal disk not enlarged. Ovary 2-celled, ovules several in each cell; style slender; stigma simple. Fruit globose, shortly appressed-pubescent about 1.5 cm in diameter.

Mullenpara, NS & KVB 31359; Pothurumi, KVB 31662;

Asthippara KVB 31623

Fl. & Fr.: January-March

Distribution: Common in evergreen forests of Mullenpara, Ambalappara, Pothurumi and Kattikari. Endemic to South India.

Eugenia codyensis Munro ex Wight, Ill. Ind. Bot. 2: 13 1841. *Eugenia cotinifolia* subsp. *codyensis* (Munro ex Wight) P.S.Ashton, Revised Handb. Fl. Ceyl. 2: 412. 1981. *Syzygium codyensis* (Munro ex Wight) Chandrash., Biol. Membr. Abstr. 2: 57. 1977 (Plate 11d).

Much branched small trees, bark rough silvery-grey; twigs terete, pale grey, rapidly becoming stout. Leaves opposite, 3-6 x 2-5 cm, broadly elliptic to suborbicular, thickly coriaceous, concave, drying chocolate-brown beneath, apex retuse, obtuse, or subacute, base broadly cuneate, margin prominently revolute; nerves ca 8 pairs, very slender, ascending, hardly elevated on either surface; intramarginal nerve ca 1 mm within margin, tertiary nerves obscure; midrib stoutly prominent beneath; petiole 5-10 mm long, stout. Flowers white to pale yellow, solitary, axillary; pedicels 3.5 cm long, very slender. Calyx 8 mm diam., 7 mm long, shallowly cup-shaped, puberulent, with 4, 7 mm long and broad, prominent segments forming a 20 mm diam. ring. Petals 15 x 10 mm, elliptic-spathulate, obtuse, very large. Stamens ca 10 mm long. Fruit 2.5 cm diam., globose, ripening green flushed with crimson, with prominent ca 12 mm terminal rim bearing the persistent calyx segments.

Ambalappara, KJD 26334; Pothurumi KVB 31665, 31618

Fl. & Fr.: December-June

Distribution: Common in evergreen forests of Mullenpara to Ambalappara and Pothurumi.

SYZYGIVM R.Br. ex Gaertn

Fruct. Sem. Pl. 1: 166. 1788.

- 1a. Flowers more than 1 cm..... 2
- 1b. Flowers less than 1 cm..... 4
- 2a. Leaves cordate at base *S. munronii*
- 2b. Leaves acute or acuminate at base..... 3
- 3a. Pedicels 2-2.5 cm, flowers 4-5 cm across *S. laetum*
- 3b. Pedicels less than 1 cm, flowers 3 cm across *S. hemisphericum*
- 4a. Shrubs or very small trees *S. salicifolium*
- 4b. Trees 5
- 5a. Mature fruits red, ovoid to turbinate *S. lanceolatum*
- 5b. Mature fruits black, oblong ovoid or globose 6
- 6a. Calyx funnel-shaped; fruit globose *S. caryophyllum*
- 6b. Calyx turbinate; fruit ovoid or oblong..... 7
- 7a. Inflorescence terminal only; lateral nerves close together..... 8
- 7b. Inflorescence terminal and axillary; lateral nerves not close together..... *S. gardneri*
- 8a. Fruit ellipsoidal in shape.....*S. densiflorum*
- 8b. Fruit globose in shape *S. benthamianum*

Syzygium benthamianum (Wight ex Duthie) Gamble, Fl. Madras 478(338). 1919. *Eugenia benthamiana* Wight ex Duthie in Hook.f., Fl. Brit. India 2: 484. 1878. *Eugenia arnottiana* (Walp.) Wight var. *benthamiana* Wight ex Duthie in Hook.f., Fl. Brit. India 2: 484. 1878 (Plate 11e).

Evergreen trees, to 10 m high; branchlets terete. Leaves opposite, 2.5-8 x 1.8-3.7 cm, elliptic, elliptic-lanceolate, apex acuminate, base attenuate or acute, margin entire, glabrous, glandular punctate, coriaceous, olive-green when dry; lateral nerves many, parallel, close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, prominent; petiole 3-25 mm long, slender, grooved above, glabrous. Flowers creamy, 10-12 mm long, sessile, in dense clusters forming compact, terminal trichotomous cymes. Calyx tube to 5 mm, turbinate; lobes 4; no thick disk. Petals free, deciduous. Stamens many free, bent inwards at the middle in bud. Ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, globose, purple, fleshy.

Ambalappara, KVB 31743

Fl. & Fr.: February-January

Distribution: Rare in evergreen forests of Ambalappara and Kattikari.

Syzygium caryophyllatum (L.) Alston in Trimen, Handb. Fl. Ceylon 6: (Suppl.) 116. 1931; Manilal & Sivar., Fl. Calicut 107. 1982; Ansari, Fl. Kasaragod Div. 158. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 181. 1988. *Myrtus caryophyllata* L., Sp. Pl. 472. 1753. *Syzygium caryophyllaeum* sensu Gamble, Fl. Madras 480(339).1919, non Gaertn. 1788. *Eugenia caryophyllaea* Wight, Icon. Pl. Ind. Orient. t. 540. 1842; Hook.f., Fl. Brit. India 2: 490. 1878.

Trees, to 6 m high; bark reddish-brown. Leaves opposite, 3-8 x 1.3-3.5 cm, obovate or obovate-oblong, apex obtuse, obtusely acute or emarginate, base attenuate or acute; lateral nerves many, close, prominent looped at the margin forming intramarginal nerve; intercostae reticulate; petiole upto 3 mm long. Flowers white, 5 mm across, in terminal corymbose cymes, inflorescence branches moderately thick, ascending. Calyx tube 2-2.5 mm long, turbinate, no thick disk. Petals calyptrate. Stamens numerous, bent inwards at the middle when in bud, 2.5-3.5 mm long. Ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, 5 mm across globose, black.

Ambalappara, KVB 31743

Fl. & Fr.: February-January

Distribution: Rare in evergreen forests of Ambalappara and Kattikari.

Syzygium densiflorum Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 329. 1834; Ratheesh, Fl. Stud. Wayanad Dist. 359. 2009. *Syzygium arnottianum* (Wight) Walp., Rep. 2:180.1843. nom. superfl.; Gamble, Fl. Madras 475(338). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 357. 2009. *Eugenia arnottiana* Wight, Ill. Ind. Bot. 2: 17. 1841; Hook.f., Fl. Brit. India 2: 483. 1878.

Evergreen trees, to 20 m high; bark surface blackish-grey, rough; branchlets terete. Leaves opposite, 3.5-9 x 1.8-3.7 cm, elliptic, elliptic-lanceolate or elliptic-oblong, apex acuminate or caudate acuminate, base attenuate or acute; lateral nerves many, parallel, close, prominent, looped at the margin forming intramarginal nerve, intercostae reticulate, prominent; petiole 3-20 mm long. Flowers creamy, 10-12 mm long, sessile, in dense clusters forming compact, terminal trichotomous cymes. Calyx tube to 5 mm, turbinate; lobes 4; no thick disk. Petals free, deciduous. Stamens many free, bent inwards at the middle in bud. Ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry, oblong-ovoid, dark purple, fleshy.

Ambalappara, NS & KJD 31955; KVB 31742, 31590; NS & KVB 31363

Fl. & Fr.: February-June

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats. Conservation status: Vulnerable.

Syzygium gardneri Thwaites, Enum. Pl. Zeyl. 117. 1859; Gamble, Fl. Madras 479(339). 1919; Ratheesh, Fl. Stud. Wayanad Dist. 359. 2009. *Eugenia gardneri* (Thwaites) Bedd., For. Man. Bot. 108. 1874; Hook.f., Fl. Brit. India 2: 489. 1878. *Eugenia cymosa* Lam. var. *rostrata* Duthie in Hook.f., Fl. Brit. India 2: 482. 1878 (Plate 11f).

Evergreen trees, to 30 m high; bark yellowish-white. Leaves opposite, 5-10 x 2.5-5 cm, elliptic, elliptic-ovate or ovate-lanceolate, apex caudate-acuminate, base acute; lateral nerves many, slender, parallel, very close, prominent, looped near the margin forming distinct intramarginal nerve, intercostae reticulate, prominent; petiole 10-15 mm long, pellucid-dotted. Flowers 4-5 mm across, white, in axillary and terminal trichotomous cymes, branches slender, divaricate nearly at right angles; pedicels 2-5 mm long. Calyx tube 2 x 3 mm, turbinate, lobes 4, obtuse, obscure; disk obscure. Petals calyprate. Stamens many, free, bent inwards at the middle when in bud; filaments 4 mm long. Ovary inferior, 2-celled, ovules many; style 1; stigma simple. Fruit a berry 5-8 mm across, ovoid, rarely globose, purple.

Way to Meenmutty, *KJD 26184*

Fl. & Fr.: March-June

Distribution: Fairly common in evergreen forests of Meenmutty.

Syzygium hemisphericum (Wight) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.):115. 1931; Ratheesh, Fl. Stud. Wayanad Dist. 360. 2009. *Eugenia hemispherica* Wight, Icon. Pl. Ind. Orient. t. 525. 1842; Hook.f., Fl. Brit. India 2: 477. 1878. *Jambosa hemispherica* (Wight) Walp., Rep. 2: 191. 1843; Gamble, Fl. Madras 474(335). 1919.

Trees, to 27 m high; bark dark-brown. Leaves opposite, 5.5-17.5 x 2-5 cm, elliptic, elliptic-lanceolate, elliptic-oblongate or ovate-lanceolate, base cuneate or acute, apex acute, acuminate or caudate-acuminate, pellucid-dotted; lateral nerves 8-16 pairs, looped near the margin forming intramarginal nerve, intercostae reticulate; petiole 10-20 mm. Flowers 3-4 cm across, white or rose, densely packed; pedicel 5 mm long. Calyx tube 6 mm long, shortly and stoutly obconic, lobes 4, 3 x 6 mm, obtuse; disk thick. Petals 4, 7 mm across, free. Stamens many, bent inwards in middle regularly when in bud; filaments 15 mm long. Ovary inferior, 2-celled, ovules many; style slender; stigma slightly acute. Fruit a berry, 23-25 mm across, globose, purple, crowned by calyx lobes.

Chavachi, *NS & KVB 31307*

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Chavachi.

Syzygium laetum (Buch.-Ham.) Gandhi, Fl. Hassan Dist. 282. 1976; Ramach. & V.J. Nair, Fl. Cannanore Dist. 182. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 361. 2009. *Eugenia laeta* Buch.-Ham., Mem. Wern., Nat. Hist. Soc. 5: 338. 1826; Hook.f., Fl. Brit. India 2: 479. 1878. *Jambosa laeta* (Buch.-Ham) Blume, Mus. Bot. Lugd.-Bat. 1:104.1849; Gamble, Fl. Madras 474(335). 1919. *Eugenia pauciflora* Wight, Icon. Pl. Ind. Orient. t. 526. 1842. *Jambosa pauciflora* (Wight) Wight, Ill. Ind. Bot. 2: 14. 1850.

Trees, to 10 m high; bark greyish-white. Leaves opposite, 6-15 x 2-6 cm, elliptic, ovate, elliptic-ovate, elliptic-oblong or elliptic-lanceolate, apex acuminate or obtusely acuminate, base cuneate, attenuate or acute, pellucid-punctate; lateral nerves 10-15 pairs, parallel, forming intramarginal nerve near the margin, intercostae reticulate; petiole 5-10 mm long. Flowers 4-5 cm across, crimson or lemon yellow, solitary or 2-5 together in axillary or terminal cymes. Calyx tube 1.5-2 cm long, slenderly funnel shaped below, suddenly broadening; lobes 4, 8 x 8 mm, orbicular; disk thick. Petals 4, 10 x 10 mm, orbicular, punctuate. Stamens numerous, 2-3 cm long, yellow or pink, bent inwards in the middle regularly in bud. Ovary inferior, 2-celled, ovules many; style longer than the stamens; stigma slightly acute. Fruit a berry, crowned by calyx.

Moonamthode, KVB 31619

Fl. & Fr.: November-July

Distribution: Common in evergreen forests of Moonamthode, Kattikari, Chavachi and Meenmutty. Endemic to southern Western Ghats.

Syzygium lanceolatum (Lam.) Wight & Arn., Prodr. Fl. Ind. Orient. 330. 1834; Ansari, Fl. Kasaragod Div. 159. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 361. 2009. *Eugenia lanceolata* Lam., Encycl. 3: 200. 1789. *Syzygium wightianum* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 330. 1834; Gamble, Fl. Madras 478(338). 1919. *Eugenia wightiana* (Wall. ex Wight & Arn.) Wight, Icon. Pl. Ind. Orient. t. 529. 1842; Hook.f., Fl. Brit. India 2: 485. 1878. *Syzygium claviflorum* sensu Shareef *et al.*, Rheedia 20: 52. 2010, non (Roxb.) Wall. ex A.M. Cowan & Cowan, 1929.

Trees, to 12 m high; bark greyish-brown. Leaves opposite, 7.5-12.5 x 2-3.7 cm, elliptic, elliptic-oblong, or elliptic-lanceolate, apex obliquely acuminate or acute, base cuneate or acute, pellucid-dotted; lateral nerves many, parallel, looped at the margin forming intramarginal nerve, intercostae reticulate; petiole 4-6 mm long. Flowers bisexual, white, 5 mm across, in axillary and terminal cymes; pedicel to 2 mm. Calyx tube 12 x 3 mm, elongate, funnel shaped, lobes 4,

short; disk obscure. Petal 4, often many, 3 x 3 mm, suborbicular. Stamens many, bent inwards at the middle in bud, 6 mm long. Ovary inferior, 2-celled; ovules many; style 1; stigma simple. Fruit a berry 10-12 mm long, ovoid-turbinate, bright scarlet.

Ambalappara, NS &KJD, 31941; KVB 31643

Fl. & Fr.: December-April

Distribution: Common in evergreen forests of Ambalappara, Asthipara and Pothurumi.

Syzygium munronii (Wight) Chandrab., Biol. Mem. 2:58. 1977; Ramach. & V.J. Nair, Fl. Cannanore Dist. 182. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 362. 2009. *Eugenia munronii* Wight, Icon. Pl. Ind. Orient. t. 546. 1842; Hook.f., Fl. Brit. India 2: 472. 1878. *Jambosa munronii* (Wight) Walp., Rep. 2: 191. 1843; Gamble, Fl. Madras 473(335). 1919.

Large shrubs or small trees; branchlets quadrangular. Leaves opposite, 22 x 7 cm, lanceolate, subsessile, glabrous; nerves and intramarginal veins prominent. Cymes 5-10 cm broad, terminal. Flowers few, 4 cm across; pedicels 1 cm long. Calyx 2.5 cm long, funnel-shaped; lobes 1 x 1 cm, orbicular. Petals orbicular, 15 x 15 mm, yellowish white. Stamens numerous; filaments 2.5 cm long, white. Berry 25 x 15 mm, ellipsoid, glabrous.

Pothurumi, KVB 31666

Fl. & Fr.: December-May

Distribution: Common in evergreen forests of Kattikari, Chavachi and Pothurumi. Endemic to Western Ghats.

Syzygium salicifolium (Wight) J.Graham, Cat. Pl. Bombay 73. 1839; Ratheesh, Fl. Stud. Wayanad Dist. 363. 2009. *Eugenia salicifolia* Wight, Ill. Ind. Bot. 2: 16. 1841. *Eugenia heyneana* Duthie in Hook.f., Fl. Brit. India 2: 500. 1879. *Syzygium heyneanum* (Duthie) Wall. ex Gamble, Fl. Madras 482(341). 1919; Ansari, Fl. Kasaragod Div. 158. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 181. 1988.

Trees, to 6 m high. Leaves opposite, 6-10 x 1.3-3 cm, oblong or elliptic, apex obtuse or retuse, base acute; lateral nerves many parallel, close, but slightly irregular, very slender, slightly prominent on both sides, looped at the margin forming intramarginal nerve, intercostae reticulate; petiole 4-5 mm long. Flowers, small, sessile, white, in lateral, terminal or rarely axillary cymes. Calyx tube 2 x

3.5 mm, turbinate, disk obscure. Petals calyptrate, 3 mm across. Stamens many, free, bent inwards at the middle when in bud; filaments 3 mm long. Ovary 2-celled; ovules many; style 1; stigma simple. Fruit a berry, obovoid, 1-1.5 x 0.5-0.7 cm, crowned with the cup-like calyx limb.

Valayamchal, *KJD 22570*

Fl. & Fr.: April-May

Distribution: Common along the river side in Semi-evergreen forests of Valayamchal and Pookundu. Endemic to India

Eucalyptus tereticornis Smith, **Psidium guajava** L. and **Syzygium aqueum** (Burm.f.) Alston are planted by forest department as part of afforestation programs.

ONAGRACEAE

LUDWIGIA L.

Sp. Pl. 118. 1753.

Ludwigia hyssopifolia (G.Don) Exell, Garcia de Orta 5: 471. 1957; Ansari, Fl. Kasaragod Div. 170. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 195. 1988; Joseph, Aquatic Angiosp. Malabar 161.1991; Ratheesh, Fl. Stud. Wayanad Dist. 384. 2009. *Jussiaea hyssopifolia* G. Don, Gen. Hist. 2: 693. 1832. *Jussiaea linifolia* Vahl, Ecolg. Amer. 2: 32. 1798, non *Ludwigia linifolia* Poir., 1813; Gamble, Fl. Madras 1875(1298). 1936. *Fissendocarpa linifolia* (Vahl) Bennet, Journ. Bombay Nat. Hist. Soc. 67: 126. 1970; Manilal & Sivar., Fl. Calicut 116. 1982.

Herbs; branchlets angled or winged. Leaves 2.5-5 x 1-2 cm, elliptic-lanceolate, apex gradually acute to acuminate, base cuneate, glabrous, membranous; petiole to 1 cm long. Flowers solitary, axillary. Calyx tube narrow; lobes 4, c. 3 mm long, lanceolate, persistent. Petals 4, obovate, yellow. Stamens 8; filaments unequal. Ovary 4-celled; ovules many; stigma 4-lobed. Capsule c. 2 cm long, linear, terete, 8-ribbed; seeds dimorphic, uniseriate and embedded in endocarp below and pluriseriate and free above.

Narikkadavu, *KJD 25587*

Fl. & Fr.: August-December

Distribution: Common along river sides.

Order: **Crossosomatales**

STAPHYLEACEAE

TURPINIA Raf.

Med. Repos. 5: 352. 1808.

Turpinia malabarica Gamble, Bull. Misc. Inform. Kew 1917: 135. 1916. & Fl. Madras 241(173). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 108. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 416. 2000; W. Arisdason & P. Daniel in P. Daniel, Fl. Kerala 1: 789. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 248. 2009.

Trees, to 20 m high, bole buttressed; bark greyish-brown. Leaves imparipinnate, opposite, stipulate; leaflets 3-7, opposite, stipellate; 5-12 x 1.5-5 cm, elliptic, elliptic-obovate, elliptic-ovate or elliptic-lanceolate, apex acuminate or obtusely acuminate, base acute or cuneate, margin serrate, glabrous, coriaceous; lateral nerves 4-7 pairs, pinnate, slender, prominent, intercostae reticulate, prominent; rachis 19-25 cm long, stout, swollen at base, glabrous. Flowers bisexual, yellowish-white, 8-10 mm across, in axillary and terminal panicles with opposite branches. Sepals 5, 3 mm long, ovate, slightly connate at base, obtuse, ciliate. Petals 5. Stamens 5; filaments shortly villous, inserted outside the disk; disk erect. Ovary sessile, superior, 3 lobed, 3-celled. Fruit a berry, subglobose, 1-3 pointed, but not lobed, glabrous; seeds complanate.

Meenmutty, *KJD 22542*

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Meenmutty.

Order: Brassicales

BRASSICACEAE

BRASSICA L.

Sp. Pl. 666. 1753.

Brassica juncea (L.) Czern. & Coss. in Czern., Consp. Pl. Chark. 8. n. 5. 1859; Hook.f., Fl. Brit. India 1: 157. 1872; Dunn in Gamble, Fl. Madras 38(28). 1915; Hajra *et al.* in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 134. 1993; A.N. Henry & T. Ravish. in P. Daniel, Fl. Kerala 1: 210. 2005. *Sinapis juncea* L., Sp. Pl. 668. 1753.

Annual erect herbs; densely long-branched especially above, glabrous, subglaucous. Leaves alternate, 20 x 10 cm, lower and basal petiolate with lamina irregularly dentate, with 1-3 pairs of lateral lobes, not auriculate; upper 5-10 x 1.5-3 cm, petiolate to subpetiolate, lanceolate or oblanceolate and acute, to

obovate and obtuse, coarsely dentate to subentire, not auriculate. Inflorescence 15-30 cm long in fruit; pedicels 5-12 mm long, ascending. Sepals 3.5-4 mm long, oblong. Petals bright yellow, 4.5-8(-10) mm long, clawed with obovate limb. Anthers 1.5-2 mm broad with conical beak 5-7 mm long, midvein prominently keeled. Fruit a linear capsule, seeds 12-20, c. 1 mm diameter, dark reddish-brown, globose, finely reticulate.

Ambalappara, KVB 31638

Fl. & Fr.: December-July

Distribution: In Evergreen forests of Ambalappara

Note: The plants established in the earlier settlement.

CAPPARACEAE

- 1a. Leaves simple, shrubs Capparis
1b. Leaves 3-foliolate, trees Crateva

CAPPARIS L.

Sp. Pl. 503. 1753.

Capparis moonii Wight, Ill. Ind. Bot. 1: 35. 1840; Hook.f., Fl. Brit. India 1:175. 1872; Dunn in Gamble, Fl. Madras 45(33). 1915; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. Ind. 2:277. 1993; R. Sundara. & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 232. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 114. 2009.

Scandent shrubs, branchlets glabrous. Leaves opposite to sub opposite, 9-12 x 3-5 cm, elliptic-oblong, acute at both ends, glabrous, shining above, margins entire; petiole to 1.5 cm long, slender. Corymb terminal or in axils of upper leaves, few flowered. Flowers to 8 cm across. Sepals to 1.8 cm across, orbicular, puberulus. Petals to 5 x 3 cm, obovate, white, cottony hairy. Stamens numerous; filaments to 7.5 cm long, glabrous. Berry 6-8 cm across, globose, glabrous.

Uruppukunnu, KJD 18758

Fl. & Fr.: February-October

Distribution: Rare in evergreen forests.

CRATEVA L.

Sp. Pl. 444. 1753.

Crateva magna (Lour.) DC., Prodr. 1: 243. 1824; Ansari, Fl. Kasaragod Div. 63. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 47. 1988; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 324. 1993; R. Sundara. & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 248. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 117. 2009.

Capparis magna Lour., Fl. Cochinch. 330. 1790. *Crateva nurvala* Buch.-Ham., Trans. Linn. Soc. London 15: 121. 1827; Manilal & Sivar., Fl. Calicut 32. 1982. *Crateva religiosa* var. *nurvala* (Buch.-Ham.) Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 172. 1872. *Crateva adansonii* DC. subsp. *odora* sensu Manilal & Sivar., Fl. Calicut 32. 1982, non (Buch.-Ham.) Jacobs, 1964 (Plate 11g).

Trees, to 10 m high. Leaves trifoliate; leaflets 10-20 x 3.5-6 cm, unequal, ovate, ovate-lanceolate or broadly elliptic, base acute, or subacute, apex acute or acuminate, margin entire, coriaceous; lateral nerves 9-15 pairs, slender, parallel, prominent, intercostae reticulate, faint; rachis 4-12 cm long, slender, grooved above, glabrous. Flowers in terminal corymbs; pedicel to 5 cm long. Sepals 4, 3 mm long, free, oblong, adnate disk. Petals 4, ca. 2 cm long, creamy white, long-clawed, orbicular. Stamens many, free, longer than the petals, inserted at the base of gynophore; anthers basifixed, filaments spreading. Gynophore 4-5 cm long at anthesis, slender; ovary superior, ellipsoid, 1-[2]-celled, ovules many; stigma sessile, capitate. Fruit a berry, globose or ovoid, yellowish-grey, rind woody, scurfy, 4-5 x 2.5-3.5 cm; seeds brown.

Valayamchal, *KJD 18783*

Fl. & Fr.: March-June

Distribution: River banks in semi-evergreen forests of Valayamchal to Odamthode.

CLEOMACEAE

CLEOME L.

Sp. Pl. 671. 1753.

- 1a. Leaves or 1-foliate, stamens 6 *C. monophylla*
- 1b. Leaves 3-5 foliate, stamens 12-18 *C. viscosa*

Cleome monophylla L., Sp. Pl. 672. 1753; Hook.f., Fl. Brit. India 1: 168. 1872; Dunn in Gamble, Fl. Madras 41(29). 1915; Manilal & Sivar., Fl. Calicut 34. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 46. 1988; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 312. 1993; R. Sundara. & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 242. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 116. 2009.

Erect annual herbs, up to 40 cm high, glandular-pubescent; stem branched, angled, striate. Leaves alternate, 1.5-5 x 1-2.5 cm, ovate-oblong, or linear-lanceolate, base truncate, margins ciliate, apex acute; petiole up to 3.5 cm long. Racemes terminal, lax, up to 15 cm long. Flowers 1-1.5 cm across; pedicel up to 8 mm long, glandular pubescent. Sepals 3-4 mm long, linear, acuminate. Petals

pink or light purple, 6-10 x 1.5-2 mm, obovate or spatulate, base clawed, apex rounded. Stamens 6; filaments 5-8 mm long, unequal. Ovary 5-8 mm long, linear. Capsule 7-10 cm long, linear, subcylindric, beaked, strongly ribbed, glandular, hairy; seeds c. 2 mm across, subobicular, ridged, dark brown.

Narikkadavu, *KJD 18796*

Fl. & Fr.: February-August

Distribution: Near stream sides and boundaries around Farm.

Cleome viscosa L., Sp. Pl. 672. 1753; Hook.f., Fl. Brit. India 1: 170. 1872; Dunn in Gamble, Fl. Madras 41(29). 1915; Manilal & Sivar., Fl. Calicut 34. 1982; Ansari, Fl. Kasaragod Div. 62. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 47. 1988; Sundararagh. in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 317. 1993; R. Sundara. & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 245. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 116. 2009.

Erect annual herbs, viscous with stalked glandular hairs. Leaves alternate, 3-5 foliolate; leaflets subsessile, 0.6-3.5 x 0.3-2 cm, elliptic-oblong or obovate to spatulate, apex obtuse, base cuneate, margins ciliate, membranous, glandular pubescent; petiole up to 5 cm long. Flowers axillary, solitary or few flowered racemes. Flowers 1-1.5 cm across; pedicels to 1 cm long, elongate during fruiting. Sepals 4, 4-8 x 2-3 mm, lanceolate, apex acute, glandular hairy without. Petals 4, yellow, 6-12 x 3-5 mm, obovate to oblong-spatulate, apex rounded. Stamens 12-18; filaments 6-8 mm long, broadened at tip; anthers linear. Ovary sessile, 5-7 mm long, oblong-cylindric, glandular-hairy; stigma capitate. Capsules 5-6.5 x 0.3-0.5 cm, linear-oblong, terete, striate, densely glandular hairy; seeds many, 1-1.5 mm across, reniform.

Valayamchal, *KJD 18794*

Fl. & Fr.: March-July

Distribution: Near boundaries with Farm.

Order: **Malvales**

DIPTEROCARPACEAE

- 1a. Stamens 15 or less Hopea
- 1b. Stamens numerous 2
- 2a. Sepals equal, not enlarged in to wings in fruits Vateria
- 2b. Sepals unequal, outer 2 enlarged in to wings in fruit Dipterocarpus

DIPTEROCARPUS Gaertn.

Suppl. Carp. 50. 1805.

- 1a. Calyx tube ribbed; young shoots yellowish-brown tomentose *D. bourdillonii*
1b. Calyx tube smooth; young shoots glabrous *D. indicus*

Dipterocarpus bourdillonii Brandis, Hooker's Icon. Pl. t. 25. 1895; Dunn in Gamble, Fl. Madras 81(58). 1915; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 210. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 360. 2005.

Evergreen trees, to 40 m high; bark grey. Leaves alternate, 20-45 x 12-25 cm, obovate, ovate or ovate-oblong, base obtuse, apex acute or acuminate, round or subcordate, margin entire or wavy, stellate hairy beneath; lateral nerves 12-15 pairs, parallel, prominent; petiole 38-55 mm long, swollen tipped, tomentose, stout; stipules large, lateral, amplexicaul, leaving an annular scar. Flowers bisexual, white, 4-5 x 3.7 cm, 3-5 in short axillary racemes. Calyx tubular, obconical; lobes 5, linear. Petals 5, 3.5-5 cm long, pubescent, valvate. Stamens 30; filaments of variable length, broad, compressed, connate at base, tapering gradually and filiform below the anther. Ovary superior, 3-celled, ovules 2 in each cell; style filiform, pubescent. Fruit a nut, 2.5 cm across, enclosed at the base of accrescent, calyx tube 5-winged.

Chavachi, *KJD 26360*

Fl. & Fr.: January-June

Distribution: Fairly common in evergreen forests of Chavachi. Endemic to Western Ghats; Conservation status: Critically Endangered

Dipterocarpus indicus Bedd., Conserv. For. Rep. 17 1864; Dunn in Gamble, Fl. Madras 81(58). 1915; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 214. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 361. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 140. 2009. *Dipterocarpus turbinatus* sensu Dyer in Hook.f., Fl. Brit. India 1: 295. 1874 p.p. non C.F.Gaertn. (Plate 11h).

Evergreen trees, to 35 m high; bark pale grey. Leaves alternate, 7-25 x 4-17.5 cm, ovate, apex acute or acuminate, base acute, obtuse or cordate, margin crenate, undulate; lateral nerves 10-15 pairs, parallel, prominent, intercostae scalariform, obscure; petiole 17-50 mm, slender, glabrous, swollen tipped; stipules large, lateral, leaving an annular scar, tomentose. Flowers bisexual, white, fragrant, 3-5 together in axillary racemes; pedicels 3 cm long. Calyx cupular at base, lobes 5, unequal. Petals 5, tinged with pink. Stamens 30;

filaments yellowish, often dilated at base; connective aristate. Ovary superior, slightly adherent to the calyx tube, 3-celled, ovules 2 in each cell. Fruit a nut, enclosed at the base of calyx tube, wings two.

Crossway, *KVB 31530*

Fl. & Fr.: February-July

Distribution: Common in evergreen forests of Chavachi and Crossway. Endemic to Western Ghats; Conservation status: Vulnerable

HOPEA Roxb.

Pl. Coromandel 3: 7. 1811, *nom. cons.*

- 1a. Sepals subequal; fruit sepals shorter than the 'nut' *H. erosa*
- 1b. Sepals unequal, 2 outer ones enlarges in to long wings in fruit..... 2
- 2a. Panicle glabrous; petiole tomentose..... *H. ponga*
- 2b. Panicle tomentose; petiole glabrous..... *H. parviflora*

Hopea erosa (Bedd.) Slooten, Reinwardtia 3: 318. 1956; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 222. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 363. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 141. 2009. *Balanocarpus erosa* Bedd., For. Man. Bot. 237. 1873; Dunn in Gamble, Fl. Madras 84(60). 1915 (Plate 11i).

Evergreen trees, to 25 m; bark pale brown. Leaves alternate, 10-20 x 3-7 cm, oblong or oblong-lanceolate, apex acute or acuminate, base unequally cordate; lateral nerves 10-17 pairs, pinnate, arched, prominent, intercostae reticulate, prominent; petiole 17-50 mm, slender, glabrous, swollen tipped; stipule minute, lateral, deciduous. Flowers 1 cm across, subsessile, in axillary racemed panicles. Calyx tube short, adnate to the torus, 5 lobed; lobes suborbicular, subequal, margin ciliate, reddish. Petals 5, bilobed, pilose outside, glabrous inside, pinkish-white. Stamens 15, rarely 10; filaments dilated at the base. Ovary superior, glabrous, 3-celled, ovules 2 in each cell; style short; stigma thick. Fruit a nut, ovoid or oblong, apiculate, calyx lobes persistent.

Chavachi, *KJD 26047*

Fl. & Fr.: October-March

Distribution: Rare in evergreen forests of Chavachi. Endemic to southern Western Ghats; Conservation status: Critically Endangered.

Hopea parviflora Bedd., Fl. Sylv. S. India t. 7. 1869; Dyer in Hook.f., Fl. Brit. India 1: 308. 1874; Dunn in Gamble, Fl. Madras 82(59). 1915; Ansari, Fl.

Kasaragod Div. 72. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 57. 1988; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 228. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 365. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 141. 2009.

Evergreen trees, to 35 m high, buttressed; bark light brown or grey. Leaves alternate, 8-11.5 x 3-5 cm, ovate, lanceolate or ovate-lanceolate, apex acute or glabrous, apiculate, base acute obtuse, cordate or subcordate; lateral nerves 8-12 pairs, pinnate, prominent, intercostae scalariform, faint, domatia present; petiole 10-12 mm, slender, pubescent when young, glabrous when matured, grooved above; stipules small, lateral, deciduous. Flowers 3-4 mm across, creamy yellow, in terminal and upper axillary racemose panicles, tomentose. Sepals 5, 3 mm long, tomentose outside. Petals 5, 6 mm long, oblong, glabrous, fimbriate at apex. Stamens 5, rarely 10, slightly connate. Ovary superior, glabrous, ovules 2 in each cell; style short, subulate. Fruit a nut, 5-6 mm long, terete, glabrous; wings 2, 6 x 1.8 cm, 8-10 nerved.

Kariyankappu, *KJD 26090*

Fl. & Fr.: January-June

Distribution: Common in semi-evergreen forests of Valayamchal, Narikkadavu and Pookundu, evergreen forests of Meenmutty and Urupukunnu and plantations of Kariyankappu. Endemic to southern Western Ghats; Conservation status: Vulnerable

Hopea ponga (Dennst.) Mabb., Taxon 28: 587. 1979; Manilal & Sivar., Fl. Calicut 42. 1982; Ansari, Fl. Kasaragod Div. 72. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 58. 1988; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 230. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 366. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 141. 2009. *Artocarpus ponga* Dennst., Schlüssel Hortus Malab. 15,18,30. 1818. *Hopea wightiana* Wall.ex Wight & Arn., Prodr. Fl. Ind. Orient. 85.1834; Dyer in Hook.f., Fl. Brit. India 1:309.1874; Dunn in Gamble, Fl. Madras 82(59). 1915.

Evergreen trees, to 20 m high; bark dark grey. Leaves alternate, 7.5-24 x 3-7 cm, ovate-lanceolate or ovate-oblong or ovate, base rounded, or obtuse, apex acute; lateral nerves 5-10 pairs, pinnate, prominent, intercostae scalariform, faint; petioles 5-15 mm long, stout, glabrous, grooved above; stipules small, lateral, deciduous. Flowers yellowish-pink, in axillary racemose panicles. Sepals 5, shortly united at base, ovate, glabrous, two outer sepals obtuse, larger than the 3 acute inner ones. Petals 5, 5-8 mm long, ovate-lanceolate, pubescent.

Stamens 10 or 15, alternate filaments with two anthers. Ovary superior, puberulous above, 3-celled, ovules 2 in each cell; style short, subulate. Fruit a nut, ovoid, 10-12 mm long; calyx lobes expanded to forms wings.

Narikadv, NS &KVB 31445

Fl. & Fr.: Mar-June

Distribution: Common in semi-evergreen forests of Valayamchal, Narikkadavu, Pookundu near waterbodies. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Note: One of the *Hopea* collections may be *H. glabra*. It has not flowered during the study period. Vegetative features and nature of galls are similar to *H. glabra*. In the absence of reproductive characters, the identity is not confirmed.

VATERIA L.

Sp. Pl. 515. 1753.

Vateria indica L., Sp. Pl. 513. 1753; Dyer in Hook.f., Fl. Brit. India 1: 313. 1874; Dunn in Gamble, Fl. Madras 85(61). 1915; Manilal & Sivar., Fl. Calicut 42. 1982; Ansari, Fl. Kasaragod Div. 73. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 58. 1988; K.P. Janardh. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 245. 1993; K.P. Janardh. & W. Arisdason in P. Daniel, Fl. Kerala 1: 370. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 142. 2009. *Vateria malabarica* Blume, Mus. Bot. 2: 29. 1852.

Evergreen trees, to 30 m high, bark grayish. Leaves alternate, 7-20 x 5-9 cm, oblong, apex acuminate or obtusely acute, base round, obtuse or cordate; lateral nerves 12-18 pairs, parallel, prominent, intercostae scalariform, prominent; petiole 25-40 mm, stout, stellate pubescent, swollen tipped; stipule narrow, lateral, deciduous. Flowers white, 2-3 cm across, fragrant, in terminal panicles, densely stellate puberulus. Sepals 5, free, lanceolate, covered with stellate hairs. Petals 5, white, obovate, spreading, shortly united at base. Stamens many, free; filaments hairy. Ovary superior, ovoid-oblong, tomentose, 3-celled, 2-ovules in each cell; style filiform, glabrous; stigma small. Fruit a capsule, 11-15 x 5-6 cm, pale brown, ovoid or oblong-ovoid, lanceolate, tip acuminate; seed one.

Kariyankapp, KJD 26091

Fl. & Fr.: February-August

Distribution: Common in evergreen forests of Chavachi near water bodies. Endemic to Western Ghats.

MALVACEAE

1a. Seeds embedded in cottony wool	Bombax
1b. Seeds not embedded in cottony wool	2
2a. Staminal filaments united into a staminal tube	3
2b. Staminal filaments free or partially united at base	15
3a. Anthers one celled	4
3b. Anthers two celled	10
4a. Cells of ovary 1-ovuled	5
4b. Cells of ovary 2-or more ovuled	6
5a. Fruit covered with prickles or echinate epicalyx present	Urena
5b. Fruit with out prickles, epicalyx absent	Sida
6a. Fruits echinate	Cullenia
6b. Fruits not echinate	7
7a. Style 1, unbranched	Thespesia
7b. Styles 5 or more branched	8
8a. Flowers without epicalyx	Abutilon
8b. Flowers with epicalyx	9
9a. Calyx spathaceous	Abelmoschus
9b. Calyx not spathaceous, lobes equal	Hibiscus
10a. Flowers bisexual; petals present	11
10b. Flowers unisexual; petals absent	13
11a. Stamens 5; herbs	Melochia
11b. Stamens 10 or more; shrubs or trees	12
12a. Fruit of 5 spirally twisted follicles, seeds not winged	Helicteres
12b. Fruit a 5-valved woody capsule, seeds winged	Pterospermum
13a. Seeds not winged	Sterculia
13b. Seeds or fruit winged	14
14a. Leaves shining below, covered with scales; fruit of winged 1-seeded follicles ...	Heritiera
14b. Leaves not scaly or shining below; fruit of woody many seeded follicles	Pterygota
15a. Fruits with bristle or prickles	Triumfetta
15b. Fruits without bristle or prickles	Grewia

ABELMOSCHUS Medik.

Malvenfam. 45. 1787.

Abelmoschus manihot (L.) Medik., Malvenfam. 46. 1787; Ansari, Fl. Kasaragod Div. 73. 1985; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 74. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:304. 1993; Sivar. & Pradeep, Malvac.

Southern Peninsular India 67. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 402. 2005. *Hibiscus manihot* L., Sp. Pl. 696. 1753; Mast. in Hook.f., Fl. Brit. India 1: 341. 1874; Dunn in Gamble, Fl. Madras 97(69). 1915. *Abelmoschus manihot* (L.) Medik. subsp. *tetraphyllus* (Hornem.) Borss., Blumea 14:97. 1996; Ramach. & V.J. Nair, Fl. Cannanore Dist. 59. 1988; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 75. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:306.1993. *Abelmoschus manihot* subsp. *tetraphyllus* var. *pungens* (Roxb.) Hochr., Candollea 1:87.1924; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 77. 1988.

Shrubs, to 2 m tall; whole plant hirtus with stiff hairs. Leaves alternate, 15 x 12 cm, 3-5 lobed, lobes acute, crenate-serrate; petiole to 15 cm long; stipule 1 cm long, lanceolate. Flowers in terminal raceme; pedicel 7 cm long; involucral bracts 30 x 17 mm, ovate, acute, densely hairy. Calyx membranous, glabrous. Petals white, changing to pink, to 6 x 4 cm, obovate, glabrous. Capsule 5-6 x 2 cm, oblong, acute, densely yellow hispid; seeds many, reniform, hispid along concentric lines.

Valyamchal, KJD 18721

Fl. & Fr.: July-December

Distribution: Rarely seen along the boundaries near Farm as weed.

ABUTILON Mill.

Gard. Dict. Abr. ed. 4. 23. 1754.

Abutilon persicum (Burm.f.) Merr., Philipp. J. Sci. 19: 364. 1921; Borss., Blumea 14: 163. 1966; Ansari, Fl. Kasaragod Div. 74. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 60. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 269. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 201. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 381. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 147. 2009. *Sida persica* Burm.f., Fl. Ind. 148. 1768. *Sida polyandra* Roxb., Fl. Ind. 3: 173. 1832. *Abutilon polyandrum* (Roxb.) Wight & Arn. ex Wight, Cat. Ind. Pl. 12. 1833, non G.Don 1831; Mast. in Hook.f., Fl. Brit. India 1: 325. 1874; Dunn in Gamble, Fl. Madras 91(65). 1915.

Pubescent herbs or subshrubs. Lower leaves ovate-cordate, to 15 cm long; upper ovate to lanceolate, crenate-dentate, velutinous below and glabrescent above, basally 5-9 nerved; petioles 2-10 cm long. Flowers 3.5-4.5 cm across. Calyx lobes ovatelanceolate, tomentose on both sides. Petals yellow, obovate. Upper part of staminal column stellately hairy. Mericarps 5, puberulus.

Valayamchal, KJD 18716

Fl. & Fr.: November-April

Distribution: Seen along the boundary of the Sanctuary.

BOMBAX L.

Sp. Pl. 511.1753.

Bombax ceiba L., Sp. Pl. 511. 1753; Nicolson, Taxon 28: 370. 1979; Manilal & Sivar., Fl. Calicut 50. 1982; Ansari, Fl. Kasaragod Div. 79. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 66. 1988; M.P. Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. Ind. 3: 398. 1993; S.K. Srivastava & K. Vivek. in P. Daniel, Fl. Kerala 1: 443. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 159. 2009. *Bombax malabaricum* DC., Prodr. 1: 479. 1824; Mast. in Hook.f., Fl. Brit. India 1: 349. 1874; Dunn in Gamble, Fl. Madras 99(71). 1915. *Salmalia malabarica* (DC.) Schott & Endl., Melet. Bot. 35. 1832.

Deciduous trees; to 45 m high, armed with conical prickles; bark grey mottled with white. Leaves digitately-compound, alternate; leaflets 5-7, whorled; 10-20 x 2-6 cm, elliptic, elliptic-ovate or elliptic-obovate, apex caudate-acuminate, base attenuate or cuneate; lateral nerves 8-14 pairs, parallel; petiolule 14-25 mm long, stout, glabrous; stipules small, lateral. Flowers dark crimson, 6-7 cm across, solitary or 2-5 together. Calyx campanulate, irregularly lobed, lobes 3-4 x 3 cm. Petals 5, 8.5-18 x 3.5-5 cm, obovate to elliptic-obovate, recurved. Stamens 65-80, 3-7.5 cm long in 5 bundles; staminal tube short. Ovary conical, tomentose, 5-celled; ovules many; style exceeding the stamens; stigma 5-fid. Capsule, 8-10 x 3 cm, cylindrical, blackish at maturity; seeds numerous, pyriform, dark brown, embedded in white cotton.

Moonamthode, KJD 18745

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Moonamthode and Crossyway.

CULLENIA Wight

Wight, Icon. Pl. Ind. Orient. tt.1761, 1762. 1852.

Cullenia exarillata A. Robyns, Bull. Jard. Bot. Natl. Belg. 40: 249. 1970; Ramach. & V.J. Nair, Fl. Cannanore Dist. 66. 1988; M.P. Nayar & Biswas in B.D. Sharma & Sanjappa, Fl. Ind. 3: 402. 1993; S.K. Srivastava & K. Vivek. in P. Daniel, Fl. Kerala 1: 448. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 161. 2009. *Cullenia excelsa* Wight, Icon. Pl. Ind. Orient. t. 1701, 1762.1851, p.p.; Mast. in Hook.f., Fl. Brit. India 1:350.1874; Dunn in Gamble, Fl. Madras 101(73).1915. *Cullenia rosayroana* Kosterm., Commun. Forest Res. Inst., Bogor 51: 4, f.2e & 3. 1956 & in Reinwardtia 4: 72. 1956, p.p.

Evergreen trees, to 40 m high, buttressed; bark grey. Leaves alternate, distichous, 7.5-16 x 2.5-6 cm, elliptic, oblong, oblong-lanceolate or elliptic-lanceolate, apex acute or acuminate, base rounded or obtuse; lateral nerves

many, parallel, slender, obscure, intercostae reticulate, faint; petiole 13-25 mm, stout, lepidote, grooved above. Flowers 3-3.5 cm long, brownish-yellow, densely clustered on tubercles on old branches, floral parts densely lepidote; epicalyx tubular, campanulate, 4-5 lobed at apex. Calyx tube 3-3.5 cm long, 5 lobed at apex. Corolla absent. Staminal tube 3-5 cm long, 5 lobed at apex with many stamens along the margin. Ovary pentangular, superior, syncarpous, 5 locular; ovules 2 in each locule; style woody; stigma capitate. Fruit a capsule, 12-20 cm across, almost globose with acute tip, spiny; seeds 2 in each locule, dark brown.

Pothurumi, *KJD 18788*

Fl. & Fr.: January-November

Distribution: Rare in evergreen forests of Pothurumi.

Endemic to southern Western Ghats.

GREWIA L.

Sp. Pl. 964. 1753.

- 1a. Flowers in terminal and axillary panicles; fruit entire *G. nervosa*
- 1b. Flowers in axillary cymes or umbels.....2
- 2a. Trees, stipules foliaceous, auricled; fruit ca 5 mm long..... *G. tiliifolia*
- 2b. Scandent shrubs, stipules lanceolate, not auricled; fruit 1 cm across.....3
- 3a. Leaves scabrous above; peduncle and pedicels densely tomentose *G. gamblei*
- 3b. Leaves subglabrous above; peduncle and pedicels pubescent..... *G. unbeliifera*

Grewia gamblei J.R.Drumm., Gamble, Fl. Madras 117(84). 1915; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 498. 1993; P. Daniel, Fl. Kerala 1: 487. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 169. 2009 (Plate 11j).

Scandent shrubs. Leaves alternate, 4-9 x 2-4 cm, ovate-elliptic to oblong, acute or short-acuminate at apex, rounded or subacute at base, crenate-serrulate at margin, scabrid above, tomentose beneath; 3-nerved; petioles to 9 mm long. Flowers in axillary or extra-axillary umbelled cymes; buds oblong to ovoid-oblong, 1-1.4 cm long, tomentose; peduncles to 2.5 cm long; pedicels to 1.3 cm long. Sepals oblong-lanceolate, 1-1.4 cm long, tomentose outside. Petals oblong-lanceolate, ca. 8 mm long; glands ovoid, ca 3 x 2 mm. Androgynophore well developed. Ovary subglobose, ca. 2 mm across, hirsute; stigma 4-lobed. Drupes deeply 4-lobed, ca. 2 cm across, subglabrous.

Ambalappara, *NS &KVB 31375*

Fl. & Fr.: April-November

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Endangered.

Grewia nervosa (Lour.) Panigrahi, Taxon 34: 702. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 71. 1988; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3:502.1993; P. Daniel, Fl. Kerala 1: 489. 2005. *Fallopia nervosa* Lour., Fl. Cochinch. 336. 1790. *Microcos paniculata* L., Sp. Pl. 514. 1753; Ansari, Fl. Kasaragod Div. 85. 1985. *Grewia microcos* L., Syst. Nat. (ed. 12) 2: 602. 1766; Mast. in Hook.f., Fl. Brit. India 1: 392. 1874; Gamble, Fl. Madras 116(83). 1915; Manilal & Sivar., Fl. Calicut 53. 1982. *Grewia ulmifolia* Roxb., Fl. Ind. 2:591.1832.

Erect bushy shrubs. Leaves alternate, 6-18 x 3-5.5 cm, elliptic-oblong or ovate-lanceolate, apex acute to acuminate, base rounded or cordate, margins subentire to serrulate, densely stellate hairy when young, glabrous on ageing except the nerve on both sides; 3-ribbed; petioles upto 1 cm long. Flowers in axillary and terminal panicles; bracts 5-6 mm long, linear-lanceolate. Sepals 5, free, 4-6 mm long, oblong-obovate, tomentose without. Petals 5, yellow, 2-3 mm long, ovate. Stamens many; filaments 3-4 mm long. Ovary c. 1 mm across, globose, 2-4-celled; ovules 2 in each cell. Drupe 6-10 mm across, globose, purple on ripening; seeds 1 or 2.

Valayamchal, KJD 26388

Fl. & Fr.: August-April

Distribution: Rare along the boundaries near Farm.

Grewia tiliifolia Vahl, Symb. Bot. 1: 35. 1790; Hook.f., Fl. Brit. India 1: 386. 1874, "tiliaefolia"; Gamble, Fl. Madras 118(84). 1915; Ansari, Fl. Kasaragod Div. 84. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 71. 1988; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 511. 1993; P. Daniel, Fl. Kerala 1: 493. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 171. 2009. *Grewia leptopetala* Brandis, Indian Trees 100. 1906. *Grewia tiliifolia* Vahl var. *leptopetala* (Brandis) T.Cooke, Fl. Bombay 142. 1901. *Grewia tiliifolia* Vahl var. *argentea* Burret, Notizbl. Bot. Gart. Berlin-Dahlem. 9: 659. 1926.

Large trees; bark brown. Leaves alternate, 6-36 x 3-24 cm, broadly ovate or obliquely ovate to round, base obliquely cordate or subcordate, apex acute, margin serrate, pubescent beneath; lateral nerves 3-6 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole 8-35 mm, stout, swollen tipped, pubescent; stipules 7-10 mm, lateral, auricled. Flowers yellow, in axillary umbels; peduncle 1.5-2 cm long. Sepals 5, pubescent. Petals 5, yellow, half the length of sepals, entire or notched, densely tomentose outside. Stamens many, free, inserted on a glandular torus, gland densely villous on the margin. Ovary

superior, globose, hirsute, 2-4-celled, ovules 2-many; style subulate; stigma obscurely lobed, recurved. Fruit a drupe, globose to subglobose, reddish-purple, 2-lobed, sparsely hairy.

Narikkadavu, NS & KVB 31448

Fl. & Fr.: February-June

Distribution: Fairly common in semi-evergreen forests of Narikkadavu.

Grewia umbellifera Bedd., Forester's Man. Bot. 37. 1871; Mast. in Hook.f., Fl. Brit. India 1: 393. 1874; Gamble, Fl. Madras 117(84). 1915; Manilal & Sivar., Fl. Calicut 53. 1982; Ansari, Fl. Kasaragod Div. 84. 1985; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 513. 1993; P. Daniel, Fl. Kerala 1: 494. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 171. 2009.

Large scandent woody shrubs; bark brown, rough. Leaves alternate, 7-12 x 3-6 cm, oblong or elliptic-oblong, acute or acuminate, base rounded or acute, dentate or serrulate, sparsely stellately hairy below when young; 3-nerved at base. Flowers in axillary and terminal umbels, peduncles longer than the petioles. Petals white, oblong, 1 cm long. Drupe yellowish-red, fleshy, 2-4 lobed, glabrous.

Chavachi, NS & KVB 31323

Fl. & Fr.: March-May

Distribution: Fairly common in evergreen forests of Chavachi and Moonamthode. Endemic to Western Ghats.

HELICTERES L.

Sp. Pl. 963. 1753.

Helicteres isora L., Sp. Pl. 963. 1753; Mast. in Hook.f., Fl. Brit. India 1: 365. 1874; Dunn in Gamble, Fl. Madras 107(77). 1915; Manilal & Sivar., Fl. Calicut 51. 1982; Ansari, Fl. Kasaragod Div. 80. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 67. 1988; K.C. Malick in B.D. Sharma & Sanjappa, Fl. Ind. 3: 426. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 456. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 162. 2009.

Large shrubs. Leaves alternate, 5-12 x 3-8 cm, obovate to suborbicular, apex acute or acuminate, base cordate, margin irregularly crenate-serrate; 3-5-nerved at the base, scabrous above and stellately tomentose below; petioles to 1.2 cm long. Flowers axillary, solitary or in few-flowered cymes; bracts 2-3 mm long, linear. Calyx slightly yellow, persistent, tubular, splitting in to 5 irregular lobes; tube 1.5-2 cm long. Petals 5, unequal, 2-2.5 cm long, obovate, clawed, crimson, fading to pale blue. Staminal column 3-3.5 cm long, cylindrical; stamens 10;

staminodes 5. Ovary 2-2.5 mm long, placed at tip of gynophore, 5-lobed, 5-celled; ovules many; style 5; stigma subulate. Follicles 5, 4-6 cm long, spirally twisted, stellate-tomentose, beaked; seeds 2-3 mm long, angular, black, wrinkled.

Paripode, *KJD 26391*

Fl. & Fr.: September-March

Distribution: Semi-evergreen forests and plantations.

HERITIERA J.F.Gmel.

Syst. Nat., ed. 13, 2(1): 113. 1791.

Heritiera papilio Bedd., Fl. Sylv. S. India t. 218. 1872; Mast. in Hook.f., Fl. Brit. India 1: 363. 1874; Dunn in Gamble, Fl. Madras 104(74). 1915; K.C. Malick in B.D. Sharma & Sanjappa, Fl. Ind. 3: 430. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 458. 2005.

Evergreen trees, to 25 m high; bark greyish-brown. Leaves alternate, 4-20 x 1.5-10 cm, ovate or ovate-lanceolate, apex acute, base obtuse or round, densely silvery lepidote scaly beneath; 3-ribbed from base, lateral nerves 2-7 pairs, pinnate, prominent, intercostae reticulate, obscure, petiole 10-37 mm, stout, peltate scaly, swollen tipped; stipules free, lateral, deciduous. Flowers small, bi or unisexual in axillary panicle, cream coloured. Calyx campanulate, 5-toothed or 5-fid. Petals absent. Anthers adnate in a regular ring on an androgynophore topped by sterile ovary in male flowers. Female flowers: carpels 5, subdistinct, superior, alternating at the base with pair of staminodes, ovules 1-2 in each carpel; styles short; stigmas 5, thick. Fruit of 1-6 samaroid, 5-6 cm long, red, wing membranous; seed one.

Asthippara, *KVB 31621*

Fl. & Fr.: December-May

Distribution: Rare in evergreen forests of Asthippara and Mullenpara.

HIBISCUS L.

Sp. Pl. 693. 1753, *nom. cons.*

- 1a. Prickly, climbing or scandent shrubs 2
- 1b. Shrubs without prickles *H. lunariifolius*
- 2a. Stipules foliaceous, lunulate, auriculate at base *H. surattensis*
- 2b. Stipules not foliaceous, ovate-lanceolate *H. hispidissimus*

Hibiscus hispidissimus Griff., Not. Pl. Asiat. 4: 521. 1854; Sivar. & Pradeep, Malvac. Southern Peninsular India 106. 1996; M. Mohanan & A.V.N. Rao in P.

Daniel, Fl. Kerala 1: 413. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 149. 2009. *Hibiscus aculeatus* Roxb., Fl. Ind. 3: 206. 1832; Ansari, Fl. Kasaragod Div. 75. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 60. 1988; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 123. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:323.1993, non Walter 1788. *Hibiscus furcatus* Roxb. ex DC., Prodr. 1: 448. 1824; Mast. in Hook.f., Fl. Brit. India 1: 335. 1874; Dunn in Gamble, Fl. Madras 97(70). 1915; Manilal & Sivar., Fl. Calicut 47, non Willd. 1809.

Rambling or climbing shrubs, armed with recurved prickles. Leaves entire to 3-5-angled or lobed, alternate, 4-8 x 3-7 cm, cordate or truncate at the base, margins coarsely serrate, apex acuminate, prickly on the nerves beneath; petiole 4-7 cm long, prickly; stipules c. 7 x 3 mm, lanceolate, ciliate. Flowers axillary, solitary; Involucral bracts 10-12, c. 15 x 3 mm, bifurcate. Calyx tube c. 1 cm long, nerves densely pubescent with long stellate and simple hairs; lobes 5, c. 10 x 4 mm, lanceolate. Corolla c. 8 cm across, yellow with deep purple center; petals 5, 4-5 x 3-4 cm, obovate. Staminal column up to 1.5 cm long; filaments c. 3 mm long, purplish. Ovary c. 5 mm long, ovoid, 5-celled, densely appressed hairy; stigma 5, capitate. Capsule c. 1.5 cm long, ovoid or conical, bristly hairy, seeds c. 4 mm long, 3-gonous, dark brown.

Kariyenkappu, *KJD 26373*

Fl. & Fr.: September-March

Distribution: Teak plantations of Kariyenkappu.

Hibiscus lunariifolius Willd., Sp. Pl. 3: 811. 1800; Mast. in Hook.f., Fl. Brit. India 1: 338. 1874; Dunn in Gamble, Fl. Madras 98 (70). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 61. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 334. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 138. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 415. 2005. *Hibiscus pruriens* Roxb. ex Hornem., Hort. Hafn. 1: 79. 1815.

Shrubs, densely covered with soft spreading hairs. Leaves shallowly 3-5-lobed, alternate, 7-16 x 6-18 cm, lobes acute to acuminate, cordate at base, serrate, stellate-hairy; petiole to 25 cm long. Flowers axillary or terminal, racemose; bracts 25 x 3 mm, linear-lanceolate. Calyx 15 mm long, campanulate, lobes acuminate. Corolla 7-10 cm across, yellow with brown eye. Capsule 2 x 1.5 cm, ovoid, obtuse, cuspidate, stellate-hairy; seeds 2.5 x 2 mm, rugose.

Kariyenkappu, *KJD 18798*

Fl. & Fr.: October-February

Distribution: Teak plantations.

Hibiscus surattensis L., Sp. Pl. 696. 1753; Mast. in Hook.f., Fl. Brit. India 1: 334. 1874; Dunn in Gamble, Fl. Madras 97(70). 1915; Manilal & Sivar., Fl. Calicut 47. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 61. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 327. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 119. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 422. 2005.

Scandent or trailing undershrubs, armed with recurved prickles. Leaves 3-5-palmately ilobed, 5-10 x 5-12 cm, ovate-suborbicular, lobes lanceolate, apex acute, shallowly cordate, margins coarsely serrate to dentate; basally 5-7-nerved, prickly below on the nerves; petiole 4-10 cm long; stipules 8-12 x 3-5 mm, foliaceous, auricled, margins ciliate. Flowers axillary, solitary; involucral bracts 10-12, bifurcate, spreading. Calyx tube to 6 mm long; lobes 5, 1-1.5 cm long, ovate, long-acuminate, prickly. Corolla c. 5 cm across, creamy-yellow with dark purplish center; petals 2.5-5 x 2-4 cm, obovate, apex rounded. Staminal column 1.5-2 cm long, glandular hairy; filaments 1-2 mm long. Ovary 3-4 mm long, subconical, densely appressed hairy; stigma capitate. Capsules c. 2 cm long, ovoid or conical; seeds c. 3 mm, brownish.

Kariyenkappu, *KJD 26396*

Fl. & Fr.: October-January

Distribution: Teak plantations.

MELOCHIA L.

Sp. Pl. 674. 1753.

Melochia corchorifolia L., Sp. Pl. 675. 1753; Mast. in Hook.f., Fl. Brit. India 1: 374. 1874; Dunn in Gamble, Fl. Madras 110(79). 1915; Manilal & Sivar., Fl. Calicut 51. 1982; Ansari, Fl. Kasaragod Div. 81. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 68. 1988; K.C. Malick in B.D. Sharma & Sanjappa, Fl. Ind. 3:441. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 462. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 163. 2009.

Erect branched herbs. Leaves varying in size and shape, simple, alternate, 2-5 x 1-2.5 cm, ovate-oblong acute at apex, cordate or attenuate at base, margin serrate, sparsely hairy on nerves on both sides; petioles to 1 cm long. Flowers in terminal, capitate cymes. Bracts 2-3 mm long, linear-lanceolate, ciliate on margins. Calyx 5-lobed, campanulate, 2-3 mm long; lobes lanceolate, ciliate, Corolla pink, 5, 2-4 mm, petals obovate, obtuse or retuse at apex. Stamens 5, filaments united at base. Ovary c. 1 mm long, ovoid, 5-celled; ovules 2 in each

cells; styles 5. Capsule 3-4 mm, sub-globose, 5-valved; seeds angular or plano-convex, dark brown or greyish.

Narikkadavu, *KJD 25595*

Fl. & Fr.: July-April

Distribution: Near river banks.

PTEROSPERMUM Schreb.

Gen. Pl. 2: 461. 1791, *nom.cons.*

1a. Leaves less than 5 cm wide, base unequal; petals smaller than sepals ...*P. rubiginosum*

1b. Leaves to 10 cm wide, base equal; petals as long as the sepals *P. diversifolium*

Pterospermum diversifolium Blume, Bijdr. Fl. Ned. Ind. 88. 1825; Mast. in Hook.f., Fl. Brit. India 1: 367. 1874; Dunn in Gamble, Fl. Madras 108 (78). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 68. 1988; Chandra in B.D. Sharma & Sanjappa, Fl. Ind. 3: 449. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 465. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 164. 2009. *Pterospermum glabrescens* Wight & Arn., Prodr. Fl. Ind. Orient. 69. 1834.

Trees, to 18 m high; bark brown. Leaves alternate, distichous, 15-30 x 12.5-25 cm, rectangular-oblong or oblong or rarely panduriform, apex acuminate, base cordate or truncate, silvery pubescent beneath; lateral nerves 5-9 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole 10-17 mm long, stout, furfuraceous; stipules lateral, cauducous. Flowers white, axillary, solitary or geminate. Calyx tubular, rusty tomentose out side, grey-pubescent within 5-fid; lobes linear-lanceolate, furfuraceous. Petals 5, oblong, white, deciduous. Staminal column adnate to the gynophore, bearing 5 groups of 3 stamens each between staminodes. Ovary superior, within the apex of column, 5-celled, ovules many; style entire. Fruit a capsule, 10-12.5 x 2-2.5 cm, oblong, 5-angled; seeds 8-11 in each cell, winged at one end.

Kariyankappu, *KJD 31855*

Fl. & Fr.: October-April

Distribution: Common in plantations of Kariyankappu and evergreen forests of Crossway.

Pterospermum rubiginosum B.Heyne ex G.Don, Gen. Hist. 1: 538. 1831; Wight & Arn., Prodr. Fl. Ind. Orient. 68. 1834; Mast. in Hook.f., Fl. Brit. India 1: 368. 1874; Dunn in Gamble, Fl. Madras 109(78). 1915; Chandra in B.D. Sharma & Sanjappa, Fl. Ind. 3: 451. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 467. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 165. 2009.

Evergreen trees, to 20 m high; bark brown. Leaves alternate, 4-8.5 x 2-3 cm, ovate or ovate-lanceolate or elliptic-ovate, apex acuminate, base oblique, densely white tomentose beneath; lateral nerves 4-6 pairs, pinnate, intercostae scalariform, slender, prominent; petiole 4-6 mm long, stout, pubescent; stipules lateral, filiform, oblique, densely pubescent, cauducous. Flowers white, solitary, axillary. Calyx tubular, cylindrical, brown-hoary outside, splitting into 5 linear lobes. Petals 5, white, linear-oblong. Staminal column adnate to the gynophore, bearing 5 groups of 3 stamens each between the staminodes. Ovary superior, cylindrical, ridged, tomentose, within the apex of the column, 5-celled, ovules many in each cell; style hairy at base; stigma simple. Fruit a capsule, 40-50 x 6-9 mm, acutely 5-angled, brown; seeds winged.

Kurukathode, *KJD 31493*

Fl. & Fr.: November-April

Distribution: Common in semi-evergreen forests of Kurukathode and Narikkadavu. Endemic to southern Western Ghats.

PTERYGOTA Schott & Endl.

Melet. Bot. 32. 1832.

Pterygota alata (Roxb.) R. Br., *Pterocymbium* 234. 1844; Dunn in Gamble, *Fl. Madras* 104(75). 1915; K.C. Malick in B.D. Sharma & Sanjappa, *Fl. Ind.* 3: 455. 1993; V. Chithra in P. Daniel, *Fl. Kerala* 1: 469. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 165. 2009. *Sterculia alata* Roxb., *Pl. Coromandel* t. 287. 1820; Mast. in Hook.f., *Fl. Brit. India* 1: 360. 1874. *Sterculia heynei* Bedd., *Fl. Sylv. S. India* t. 230.1874.

Deciduous trees, to 35 m high; bole buttressed; bark, grayish. Leaves alternate clustered towards the end of branches, 10-30 x 7.5-20 cm, ovate or orbicular, apex caudate-acuminate or acuminate, base cordate, subcordate; lateral nerves 3-6 pairs, pinnate, prominent, intercostae reticulate, slender, prominent; petiole 3.5-10 cm long, slender, glabrous; stipule free, lateral, cauducous. Flowers unisexual or polygamous, to 2 cm long, tomentose panicles from leafless nodes. Calyx 5-partite, lobes 1 cm long, curved out. Male flowers: staminal column cylindrical bearing 4-5 phalanges of about 5 anthers each. Female flowers: staminodes round the base of the ovary; carpels 5, free, superior, ovules many in each; style short, recurved; stigma 2-lobed. Fruit of 3-5 follicles, 10-12.5 cm long; seeds 25-30, 5-7.5 cm long, oblong, brown winged.

Meenmutty, *KJD 26296*

Fl. & Fr.: April-May

Distribution: Fairly common in semi-evergreen forests at Pothanplavu to Meenmutty.

SIDA L.

Sp. Pl. 683. 1753.

- 1a. Mericarps 5 2
- 1b. Mericarps 6-10 4
- 2a. Erect herbs or shrubs *S. mysorensis*
- 2b. Prostrate or trailing herbs 3
- 3a. Stem rooting at nodes; calyx lobes longer than the tube *S. beddomei*
- 3b. Stem not rooting at nodes; calyx lobes equal to the tube *S. cordata*
- 4a. Leaves velvety tomentose below; awns as long as the mericarps *S. cordifolia*
- 4b. Leaves not velvety tomentose; awns shorter than the mericarps 5
- 5a. Leaves linear oblong, stipules dissimilar, one subulate and other linear-lanceolate *S. acuta*
- 5b. Leaves usually obovate, stipules similar *S. alnifolia*

Sida acuta Burm.f., Fl. Ind. 147. 1768, Borss., Blumea 14:186.1966; Dunn in Gamble, Fl. Madras 90(64). 1915; Manilal & Sivar., Fl. Calicut 45. 1982; Ansari, Fl. Kasaragod Div. 76. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 63. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:281.1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 238. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 387. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 153. 2009. *Sida lanceolata* Retz., Observ. Bot. 4: 119. 1786. *Sida carpinifolia* sensu Mast. in Hook.f., Fl. Brit. India 1: 323. 1874 p.p. non L.f. 1781.

Erect subshrubs to 70 cm tall. Leaves alternate, 3-6 x 1-2 cm, lanceolate to ovate, apex acute or acuminate, base truncate, margins serrate, entire towards base, sparsely hirsute to glabrate on both surfaces; 3-nerved at base; petiole to 4 mm long; stipules 5-8 x 1-1.5 mm, unequal, one lanceolate, the other linear. Flowers solitary, axillary. Calyx 6-8 mm long, campanulate, ciliate on margins, divided to the middle. Petals creamy-yellow, 6-8 mm long, obliquely obovate. Staminal column c. 2 mm long; filaments to 1.5 mm long; anthers pale yellow. Ovary c. 1.5 mm long, ovoid; styles 6-8; stigma globose, yellow. Schizocarp to 5 mm long; mericarps 6-8, c. 3 x 2 mm, trigonous, reticulate, apically 2-awned; seeds c. 2 mm long, trigonous.

Kariyankappu, NS &KJD 25550; KJD 31859

Fl. & Fr.: August-November

Distribution: Common in Teak plantations.

Sida alnifolia L., Sp. Pl. 684. 1753; Sivar. & Pradeep, Malvac. Southern Peninsular India 241. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1:

388. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 153. 2009. *Sida retusa* L., Sp. Pl. (ed. 2) 961. 1763. *Sida rhombifolia* L. var. *retusa* (L.) Mast. in Hook.f., Fl. Brit. India 1: 324. 1874. *Sida rhombifolia* L. subsp. *retusa* (L.) Borss., Blumea 14: 198. 1966; Ramach. & V.J. Nair, Fl. Cannanore Dist. 64. 1988; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 216. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:289.1993. *Sida rhombifolia* L. subsp. *alnifolia* (L.) Ugborogho, Bol. Soc. Brot. ser. 54:70. 1980.

Subshrubs to 40 cm tall. Leaves alternate, 1-3 x 0.8-2.5 cm, obovate to elliptic-lanceolate, apex retuse, emarginate, rounded or subacute, base obtuse or rounded, margins irregularly serrate-dentate or crenate to the distal half, entire towards the proximal half, upper surface sparsely pubescent, lower surface densely greyish tomentose; petiole to 4 mm long, stellate-pubescent; stipules c. 3 mm long, linear. Flowers axillary, solitary. Calyx 5-6 mm long, c. 6 mm across, pubescent without, 5-lobed; lobes c. 2 mm long, ovate to triangular. Petals yellow, 6-7 x 5-6 mm, obliquely obovate. Staminal column to 3 mm long, antheriferous at apex. Ovary c. 1.5 mm across, depressed globose; styles 7-10; stigma capitate, creamy-yellow. Schizocarp to 4 mm long; mericarps 7-10, included in the calyx; seeds c. 2 mm long, black.

Kariyenkappu, *KJD 18725*

Fl. & Fr.: September-December

Distribution: Along road sides and plantations.

Sida beddomei Jacob, J. Bombay Nat. Hist. Soc. 47: 50. 1950; Ramach. & V.J. Nair, Fl. Cannanore Dist. 63. 1988; Sivar. & Pradeep, Malvac. Southern Peninsular India 266. 1996; Ratheesh, Fl. Stud. Wayanad Dist. 154. 2009. *Sida cordata* sensu T.K. Paul & M.P. Nayar, Fl. Ind. Fasc. 19: 206. 1988 & Fl. Ind. 3: 285. 1993, non (Burm.f.) Borss., 1966.

Slender prostrate herbs, rooting at lower nodes. Leaves alternate, 5 x 4 cm ovate, acute or acuminate, base cordate, crenate-serrate, sparsely tomentose, basally 5-7 nerved; petioles to 4.5 cm long. Flowers axillary, solitary, 1.5 cm across, yellow; pedicel to 4 cm long. Calyx lobes longer than the tube; lobes 5. Petals 5, yellow. Mericarps awnless.

Valayamchal, *KJD 22577*

Fl. & Fr.: January-March

Distribution: Rare in semi-evergreen forests of Valayamchal to Narikkadavu. Endemic to southern Western Ghats

Sida cordata (Burm.f.) Borss., *Blumea* 14: 182. 1966; Manilal & Sivar., *Fl. Calicut* 43. 1982; Sivar. & Pradeep, *Malvac. Southern Peninsular India* 266. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, *Fl. Kerala* 1: 389. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 154. 2009. *Melochia cordata* Burm.f., *Fl. Ind.* 143. 1768. *Sida veronicaefolia* Lam., *Encycl.* 1: 5. 1783; Gamble, *Fl. Madras* 89(64). 1915. *Sida humilis* Cav. var. *veronicaefolia* (Lam.) Mast. in Hook.f., *Fl. Brit. India* 1: 322. 1874.

Prostrate herbs. Leaves alternate, 2-5.5 x 1.5-4.5 cm, broadly ovate or orbicular, apex acute to acuminate, base cordate, margins serrate-crenate; basally 5-7-nerved, stellate-tomentose on both sides; petioles to 3 cm long; stipules 1-2 mm long, linear. Flowers axillary, solitary; pedicels to 2 cm long, filiform, articulated above the middle. Calyx c. 5 mm long, campanulate, divided to the middle, stellate-tomentose without; lobes 5, triangular. Petals to 6 x 5 mm, obovate, apex rounded or slightly emarginate. Staminal column c. 2 mm long; anthers numerous, yellow. Ovary c. 2 mm across, subglobose; styles 5; stigmas 5, globose, yellowish. Schizocarp to 2.5 mm long; mericarps 5, to 3 x 2 mm, trigonous with rounded angles, apex shortly 2-beaked, completely enclosed in calyx; seeds c. 2 mm long, reniform, brownish-black.

Valayamchal, *KJD* 26353

Fl. & Fr.: January-April

Distribution: Along road sides and plantations.

Sida cordifolia L., *Sp. Pl.* 684. 1753; Hook.f., *Fl. Brit. India* 1: 324. 1874; Gamble, *Fl. Madras* 89(64). 1915; Manilal & Sivar., *Fl. Calicut* 43. 1982; Ansari, *Fl. Kasaragod Div.* 76. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 63. 1988; T.K. Paul in B.D. Sharma & Sanjappa, *Fl. Ind.* 3: 285. 1993; Sivar. & Pradeep, *Malvac. Southern Peninsular India* 256. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, *Fl. Kerala* 1: 390. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 154. 2009.

Erect, branched subshrubs to 1.5 m tall. Leaves alternate, 1.5-5.5 x 1-3.5 cm, ovate, rarely suborbicular, apex subobtusate or acute, base cordate, margins serrate to the base; basally 3-5 nerved, densely stellate-tomentose beneath with simple hairs on nerves and soft tomentose above; petiole to 3.5 cm long, pubescent; Flowers solitary or in to congested corymbiform. Calyx 6-7 mm long, prominently 10-ribbed, densely tomentose without. Petals to 8 x 6 mm, yellow, obliquely obovate, apex truncate or slightly emarginate. Staminal column c. 3 mm long. Ovary subglobose, pubescent; styles 8-10; stigma capitate, yellow.

Schizocarp 6-7 mm diam., pubescent towards apex; mericarps 8-10, to 3 x 2 mm, trigonous with acute angles, apically 2-awned; seeds brownish or black.

Paripode, *KJD 22516*

Fl. & Fr.: Throughout the Year

Distribution: Along road sides and plantations.

Sida mysorensis Wight & Arn., Prodr. Fl. Ind. Orient. 59. 1834; Mast. in Hook.f., Fl. Brit. India 1: 322. 1874; Ansari, Fl. Kasaragod Div. 77. 1985; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 209. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3:286.1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 271. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 392. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 155. 2009. *Sida hirta* Wall., Cat. n. 1855, 1828, non Lam. 1783. *Sida glutinosa* Roxb., Fl. Ind. 3: 172. 1832, non Cav. 1785; Dunn in Gamble, Fl. Madras 89(64). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 64. 1988; Mohanan & Sivad., Fl. Agasthyamala 100. 2002. *Sida urticifolia* Wight & Arn., Prodr. Fl. Ind. Orient. 59. 1834, non St. Hill. 1828.

Erect subshrubs. Leaves alternate, 3-5 x 2-3.5 cm, broadly ovate, apex acute to acuminate, base cordate, margins serrate-crenate; 5-7-nerved at base, pubescent with stellate and simple hairs intermingled with gland-hairs on both surfaces; petioles to 3 cm long; stipules c. 5 mm long, linear, pubescent. Flowers axillary, solitary or often in 5-7-flowered, lax racemes. Calyx to 7 mm long, campanulate, divided to the middle; lobes 5, triangular, densely covered with both stellate and simple hairs externally. Corolla c. 8 mm across, orangish-yellow; petals c. 5 x 3 mm, obovate, emarginate or retuse at apex. Staminal column to 3 mm long; anthers 10-14, yellow. Ovary c. 2 mm across, subglobose; styles and stigmas 5, yellow. Schizocarp c. 3 mm long; mericarps 5, to 3 x 2 mm, trigonous; seeds c. 2 mm long, reniform, brownish-black.

Pottichapara, *KJD 22514*

Fl. & Fr.: October-January

Distribution: Along road sides and plantations.

STERCULIA L.

Sp. Pl. 1007. 1753.

- 1a. Leaves oblong, not lobed*S. guttata*
1b. Leaves palmately lobed..... *S. villosa*

Sterculia guttata Roxb. ex DC., Prodr. 1: 482.1824; Mast. in Hook.f., Fl. Brit. India 1:355.1874; Dunn in Gamble, Fl. Madras 106(76). 1915; Manilal & Sivar.,

Fl. Calicut 51. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 69. 1988; K.C. Malick in B.D. Sharma & Sanjappa, Fl. Ind. 3: 462. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 472. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 166. 2009.

Deciduous trees, to 20 m high; bark greyish-brownish. Leaves alternate, 12-25 x 6-15 cm, broadly ovate-oblong, ovate or broadly obovate-oblong, apex acuminate or caudate-acuminate, base obtuse, subcordate or truncate, stellate-tomentose beneath; lateral nerves 5-7 pairs, pinnate, intercostae scalariform; petiole 25-50 mm long stout, swollen at both ends, stellate-tomentose; stipules lateral, ensiform, cauducous. Flowers polygamous, white, dotted with pink, arranged in simple cymes of 3; bracts lanceolate. Calyx clothed with stellate hairs, united to middle; lobes 5, acute. Petals absent. Male flowers: staminal column recurved; bisexual flowers: ovary 5, free, superior, globose, strigose with stellate hairs; gynophore stout, round; style stout, deflexed. Fruit an aggregate of 1-5 radiating follicles, obovoid; seeds ovoid, black.

Kariyenkappu, *KJD 26031*

Fl. & Fr.: September-March

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chelachode.

Sterculia villosa Roxb. ex Sm. Cycl. 36: n.16. 1816; Mast. in Hook.f., Fl. Brit. India 1: 355. 1874; Gamble, Fl. Madras 106(76). 1915; K.C. Malick in B.D. Sharma & Sanjappa, Fl. Ind. 3: 472. 1993; V. Chithra in P. Daniel, Fl. Kerala 1: 474. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 167. 2009.

Deciduous trees, to 10 m high; bark pale-brown. Leaves palmately 5-7 lobed, alternate, crowded at the end of branchlets, 6.5-45 x 9-45 cm, lobes oblong-ovate or ovate, apex acuminate or caudate-acuminate, base cordate; 5-7-ribbed from the base, palmate, prominent; petioles 7-25 cm long, stout, swollen at base, pubescent; stipules free. Flowers polygamous, cream-coloured, 10-12 mm across, in long drooping panicles. Calyx campanulate, divided to the middle, lobes 5, oblong-lanceolate, acute. Petals absent. Male flowers: staminal column recurved; anthers 10, along the rim of staminal column; female flowers; carpels 5, free, strigose with stellate hairs; gynophore stout, cylindrical; style stout, hairy, deflexed; staminodes on a ring beneath the ovary. Fruit an aggregate of 2-7 follicles, brown, tomentose; seeds many, black.

Chavachi, *KJD 22522*

Fl. & Fr.: February-April

Distribution: Rare in evergreen forests of Chavachi.

THESPESIA Sol. ex Corrêa

Ann. Mus. Natl. Hist. Nat. 9: 290. 1807, *nom. cons.*

Thespesia lampas (Cav.) Dalzell, Bombay Fl. 19. 1861; Mast. in Hook.f., Fl. Brit. India 1: 345. 1874; Ansari, Fl. Kasaragod Div. 77. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 64. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 350. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 40. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 430. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 157. 2009. *Hibiscus lampas* Cav., Diss. 3: 154. t.56. 1787; Dunn in Gamble, Fl. Madras 98(71). 1915.

Shrubs, to 1.5 m tall; stems glabrous. Leaves to 15 x 14 cm; 3-5-lobed or entire, ovate, cordate or truncate at base, lobes acute, densely stellate pubescent beneath; petioles 3-8 cm long. Flowers axillary, solitary or in terminal racemes; pedicels 2-6 cm long jointed above the middle; involucellar bracts 4-7, subulate, deciduous. Calyx cupular, 12 mm across, stellate hairy. Corolla 6-8 cm across, rose-yellow. Capsule 25 x 20 mm, ellipsoid, glabrous, 5-valved; seeds many, 5 x 3 mm, trigonous, glabrous, brown.

Meenmutty, *KJD 22537*

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Meenmutty.

TRIUMFETTA L.

Sp. Pl. 444. 1753.

- 1a. Lower leaves 3-lobed; fruit 5 mm across *T. rhomboidea*
- 1b. All leaves entire; fruit 1 cm or more across 2
- 2a. Fruit 1 cm across, bristle glabrous *T. annua*
- 2b. Fruit 2-2.5 cm across, bristle hairy *T. pilosa*

Triumfetta annua L., Mant. Pl. 1: 73. 1767; Mast. in Hook.f., Fl. Brit. India 1: 396. 1874; Gamble, Fl. Madras 120(86). 1915; Manilal & Sivar., Fl. Calicut 52. 1982; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 518. 1993; P. Daniel, Fl. Kerala 1: 496. 2005.

Annual herbs, young shoots glabrescent. Leaves alternate, 10 x 5 cm, ovate, caudate-acuminate, base rounded or subcordate, membranous, serrate, sparsely hairy on both sides. Flowers in axillary fascicles. Sepals 5, 10 x 1 mm, hairy outside. Petals 5, yellow, 4 mm long. Stamens 10, filaments free. Ovary 5-celled; ovules 2 per cell; stigma 5-lobed. Capsule ca. 1 cm across, with bristles.

Ambalappara, *NS &KJD 25546*

Fl. & Fr.: August-March

Distribution: Common in evergreen forests of Pothurumi.

Triumfetta pilosa Roth, Nov. Pl. Sp. 223. 1821; Hook.f., Fl. Brit. India 1: 394. 1874; Gamble, Fl. Madras 120(86). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 72. 1988; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 519. 1993; P. Daniel, Fl. Kerala 1: 496. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 172. 2009. *Triumfetta cana* Blume, Bijdr. Fl. Ned. Ind. 113. 1825; Hook.f., Fl. Brit. India 1: 396. 1874.

Subshrubs. Leaves alternate, 12 x 4.5 cm, ovate-elliptic, apex acute, base obtuse, puberulus above, densely white tomentose below, crenate, basally 3-nerved, to slightly cordate; petiole to 2 cm, stipule lanceolate. Cymes axillary, leaf opposed, ca. 5-flowered, yellow; bracts and bracteoles linear. Sepals 5, 9 mm, oblong, acute, long hairy. Petals 5, 8 mm, obovate. Stamens 10, free, unequal, 7 mm; torus 1 mm, disk cupular, fimbriate. Ovary 0.5 mm, pubescent, style 2 mm, stigma capitate. Capsule 2.5 cm across, including recurved bristles, pubescent at base.

Ambalappara, KJD 26313

Fl. & Fr.: November-February

Distribution: Rare along the margins of grasslands and evergreen forests of Ambalappara.

Triumfetta rhomboidea Jacq., Enum. Syst. Pl. 22. 1760; Hook.f., Fl. Brit. India 1: 395. 1874; Gamble, Fl. Madras 120(86). 1915; Manilal & Sivar., Fl. Calicut 52. 1982; Ansari, Fl. Kasaragod Div. 85. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 72. 1988; P. Daniel & M. Chandra. in B.D. Sharma & Sanjappa, Fl. Ind. 3: 520. 1993; P. Daniel, Fl. Kerala 1: 497. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 172. 2009. *Triumfetta angulata* Lam., Encycl. 3: 421. 1789. *Triumfetta trilocularis* Roxb., Fl. Ind. 2: 462. 1832. *Triumfetta tungarensis* Billore, J. Econ. Taxon. Bot. 3: 621. 1982.

Erect, much-branched undershrubs. Leaves alternate, 2.5-7 x 2.5-6 cm, generally rhomboid-ovate, base rounded or cordate, margins irregularly serrate, apex acute or acuminate, stellate-pubescent to glabrescent; basal ones palmately 3-lobed; petioles up to 4 cm long; stipules 3-4 mm long, subulate. Flowers in terminal or leaf-opposed cymes, 5-6 mm across, shortly pedicellate. Sepals 5, 4-5 mm long, lanceolate, hairy without. Petals 5, yellow, 4-5 mm long, oblong-obovate. Stamens 8-15. Ovary c. 1.5 mm long, ovoid, setose. Capsules 4-

5 mm across, subglobose, stellate hairy outside, setose; setae c. 2 mm long, hooked at tip.

Paripode, *KJD 22541*

Fl. & Fr.: August-January

Distribution: Rare along the boundaries near Farm.

URENA L.

Sp. Pl. 692. 1753.

- 1a. Leaves undivided; epicalyx cup shaped in fruit *Urena lobata* subsp. *lobata*
- 1b. Leaves deeply lobed; epicalyx lobes reflexed in fruit *Urena lobata* subsp. *sinuata*

Urena lobata L., Sp. Pl. 692. 1753, subsp. **lobata**; Hook.f., Fl. Brit. India 1: 329. 1874; Gamble, Fl. Madras 92(66). 1915; Borss., Blumea 14: 140. 1966; Ramach. & V.J. Nair, Fl. Cannanore Dist. 65. 1988; T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 380. 1993; Sivar. & Pradeep, Malvac. Southern Peninsular India 180. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 440. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 158. 2009.

Erect subshrubs to 2 m tall. Leaves 3-5 lobed, alternate, 3-10 x 3-9 cm, broadly to narrowly ovate, upper most leaves sometimes lanceolate, 3-5 angular to shallowly lobulate, truncate or cordate at base, margin obscurely crenate-serrate; 5-7-nerved from base, pubescent, lobes generally acute or acuminate, varying in size; petioles 3-8 cm long, stellate-pubescent; stipules up to 4 mm long, linear. Flowers axillary, solitary or 2 to 3 in a cluster. Involucral bracts 5, connate at base. Calyx 5-9 mm long, campanulate, 5-parted; lobes ovate-elliptic. Corolla pink with dark center; petals to 15 x 9 mm, obovate with rounded apex. Staminal column 8-10 mm long. Ovary to 4 mm across, subglobose, stiff-hirsute; Stigmas capitate. Schizocarp 10-12 mm across; mericarps 5, to 8 x 5 mm, with many glochidate spines; seeds to 4 mm long, reniform.

Pothurumi, *KJD 22544*

Fl. & Fr.: August-December

Distribution: Commonly in plantations and open areas of evergreen forests at Kariyenkappu, Chavachi and Pothurumi.

Urena lobata L. subsp. **sinuata** (L.) Borss., Blumea 14: 142. 1966; Hook.f., Fl. Brit. India 1: 329. 1874; Manilal & Sivar., Fl. Calicut 46. 1982; Ansari, Fl. Kasaragod Div. 78. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 65. 1988; T.K. Paul & M.P. Nayar, Fasc. Fl. Ind. 19: 230. 1988; Paul in B.D. Sharma &

Sanjappa, Fl. Ind. 3:382.1993; Ratheesh, Fl. Stud. Wayanad Dist. 158. 2009. *Urena sinuata* L., Sp. Pl. 692. 1753; Hook.f., Fl. Brit. India 1: 329. 1874; Gamble, Fl. Madras 92(66). 1915; Sivar. & Pradeep, Malvac. Southern Peninsular India 184. 1996; M. Mohanan & A.V.N. Rao in P. Daniel, Fl. Kerala 1: 441. 2005.

Erect annual herbs. Leaves plametly deeply lobed, alternate, 6 x 7 cm, base truncate, velvety tomentose on both sides, to 7-ribbed at base. Flowers axillary, usually solitary or 2 to 3 in a cluster Involucral bracts 5, 5-6 x 1.5-2 mm, connate at base, clothed with rigid hairs. Calyx 5-9 mm long, campanulate, 5-parted; lobes ovate-elliptic, margins pubescent. Corolla pink with dark center; petals to 15 x 9 mm, obovate with rounded apex. Staminal column, pinkish; anthers pale pink. Ovary to 4 mm across, subglobose, stiff-hirsute; Stigmas capitate. Schizocarp 10-12 mm across, globose; mericarps 5, to 8 x 5 mm, with many glochidate spines; seeds to 4 mm long, reniform.

Pothurumi, *KJD 22545*

Fl. & Fr.: August-December

Distribution: Common in plantations of Kariyenkappu.

Order: **Sapindales**

ANACARDIACEAE

- 1a. Leaves with out petiolar appendages 2
- 1b. Leaves with petiolar appendages Holigarna
- 2a. Leaves compound..... Spondias
- 2b. Leaves simple 3
- 3a. Inflorescence axillary fasicles, racemes or paniced racemes, carpals 3..... Nothopegia
- 3b. Inflorescence panicles, carpal solitary Mangifera

HOLIGARNA Buch.-Ham. ex Roxb.

Pl. Coromandel 3: 79. 1820, *nom. cons.*

- 1a. Leaves brown tomentose beneath.....2
- 1b. Leaves glabrous beneath *H. arnottiana*
- 2a. Petiolar appendage 2 *H. beddomei*
- 2b. Petiolar appendage 4-6..... *H. grahamii*

Holigarna arnottiana Hook.f., Fl. Brit. India 2: 36. 1876; Gamble, Fl. Madras 268(191). 1918; Manilal & Sivar., Fl. Calicut 73. 1982; Ansari, Fl. Kasaragod Div. 110. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 116. 1988; D. Chandra &

S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 457. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 803. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 251. 2009.

Evergreen trees, to 20 m high; bole buttressed; bark 6-8 mm thick, pale brown; exudation milky, black on drying. Leaves alternate, crowded at the tips of branchlets, 8-25 x 2.5-7.5 cm, oblanceolate, apex obtusely acute, base cuneate or attenuate, margin entire, glabrous, coriaceous; lateral nerves 10-20 pairs, parallel, prominent, intercostae reticulate; petiole 7-15 mm, stout, tomentose; spur 1-2 pairs, tomentose. Flowers polygamous, yellowish-brown, 2-3 mm across, in axillary panicles. Calyx cupular, 5-fid. Petals 5, cohering at the base and with the edge of the disk, densely villous inside. Stamens 5, inserted outside the disk; filaments subulate. Ovary inferior, 1-celled, ovule pendulous; styles 3, divergent; stigmas capitate. Fruit a drupe, 2.5 cm long, obliquely-ovoid, almost entirely included within hypocarp; seed parietal.

Narikkadavu, KVB & KJD 31458

Fl. & Fr.: January-July

Distribution: in semi-evergreen forests of Narikkadavu, Pookundu, Valyamchal and River banks. Endemic to southern Western Ghats.

Holigarna beddomei Hook.f., Fl. Brit. India 2: 38. 1876; Gamble, Fl. Madras 269(192). 1918; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 459. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 804. 2005 (Plate 11k).

Large trees, to 24 m high; bark grey; exudation black on dryness. Leaves alternate, 25-38 x 14-17 cm, oblanceolate, suddenly broadened above the middle, apex acuminate, base cuneate, margin ciliate, pubescent beneath; lateral nerves 20-30 pairs, parallel, midrib on upper surface ciliate, intercostae reticulate; petiole 10-25 mm, villous; spur 2, slender, villous-pubescent. Flowers small, polygamous. Calyx small, cupular, 5 fid, rusty tomentose. Petals 5, oblong, cohering at the base, villous inside. Stamens 5, inserted outside the disk; filaments subulate. Ovary inferior, 1-celled, ovule pendulous from near the top of the cell; styles usually 3, divergent; stigmas capitate. Fruit a drupe, hypocarp enclosing about 2/3 or 3/4 of drupe; seeds parietal.

Kariyenkappu, KJD 26349

Fl. & Fr.: January-March

Distribution: Rare in plantations of Kariyenkappu. Endemic to southern Western Ghats; Conservation status: Endangered.

Holigarna grahamii (Wight) Kurz, J. Asiat. Soc. Bengal 42: 305. 1872; Hook.f., Fl. Brit. India 2: 37. 1876; Gamble, Fl. Madras 268(191). 1918; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 460. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 805. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 252. 2009. *Semecarpus grahamii* Wight, Icon. Pl. Ind. Orient. t. 235. 1839. *Holigarna wightii* N.P.Balacr., Journ. Bombay Nat. Hist. Soc. 63: 327. 1966.

Large evergreen trees, to 30 m high; bark yellowish-grey; exudation colourless, become black on drying. Leaves alternate, clustered at the tips of branchlets, 15-70 x 7-25 cm, oblanceolate, suddenly broad above the middle, apex acuminate, base cuneate or acute; lateral nerves many, parallel, prominent; intercostae reticulate; petiole 15-50 mm long, brown tomentose; spur 2 pairs, brown tomentose;. Flowers small, polygamous, terminal rusty tomentose panicles. Calyx cupular, shortly 5-toothed. Petals 5, cohering at the base and with the edge of the disk, villous within. Stamens 5, inserted outside the disk; filaments subulate. Ovary inferior, 1-celled, ovule pendulous; styles usually 3, divergent; stigmas capitate. Fruit a drupe, 2/3-3/4th included in hypocarp, vertically shallowly grooved, reddish-purple.

Kariyenkappu, KVB 31607

Fl. & Fr.: October-March

Distribution: Rare in plantations of Kariyenkappu. Endemic to Western Ghats; Conservation Status: Vulnerable.

MANGIFERA L.

Sp. Pl. 200. 1753.

Mangifera indica L., Sp. Pl. 200. 1753; Hook.f., Fl. Brit. India 2: 13. 1876; Gamble, Fl. Madras 259(185). 1918; Manilal & Sivar., Fl. Calicut 73. 1982; Ansari, Fl. Kasaragod Div. 111.1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 117.1988; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 466. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1:808.2005; Ratheesh, Fl. Stud. Wayanad Dist. 253.2009.

Evergreen trees, to 30 m high; bark dark grey; exudation yellowish, gummy. Leaves alternate, clustered at the tips of branchlets, 9.2-40 x 2.5-8 cm, elliptic, elliptic-lanceolate, linear-oblong, apex acuminate, acute or obtusely acute, base attenuate or acute; lateral nerves 14-28 pairs, pinnate, intercostae reticulate; petiole 10-75 mm long, pulvinate. Flowers polygamous, yellowish-green, in terminal panicles. Calyx 4-5 partite, ovate, imbricate, hairy without. Petals 4-5, oblong-obovate, subequal, nerves at base gland crested. Stamens 4-5, inserted

inside or on the disk, fertile stamens 1 or 2; filaments free; staminodes gland-tipped. Ovary sessile, superior, oblique, 1-celled, ovule pendulous; style lateral; stigma simple. Fruit a drupe, 5-15 cm long, oblong-reniform, mesocarp fleshy, endocarp fibrous; seed subreniform.

Moonamthode, *KJD 25593*

Fl. & Fr.: January-June

Distribution: Fairly common in evergreen forests of Meenmutty, Monamthode, also at earlier settlements.

NOTHOPEGIA Blume

Mus. Bot. 1: 203. 1850, *nom. cons.*

- 1a. Inflorescence axillary fascicles or in racemes less than 1 cm long..... *N. travancorica*
- 1b. Branchlets and inflorescens glabrous, inflorescens 2-4 cm long2
- 2a. Petiole twisted, lateral nerves obscure *N. racemosa*
- 2b. Petiole not twisted, lateral nerves prominent *N. beddomei*

Nothopegia beddomei Gamble, Bull. Misc. Inform. Kew 1918: 227. 1918 & Fl. Madras 265(189). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 118. 1988; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 473. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 811. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 254. 2009. *Nothopegia beddomei* Gamble var. *wynaadica* Ellis & Chandra., Bull. Bot. Surv. India 12: 257. 1970; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 473. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 811. 2005 (Plate 111).

Trees, to 15 m high; bark grey-brown; exudation scanty, white. Leaves alternate, 4-15 x 1.2-4.5 cm, elliptic or elliptic-oblong, acute at both ends; lateral nerves 10-25 pairs, parallel, prominent, intercostae subscalariform; petiole 3-10 cm grooved above. Flowers small, polygamous, in axillary racemes, some times subterminal. Calyx small, 4-lobed, margins ciliate with many dark longitudinal swellings on ventral surface, persistent, imbricate. Petals 4, oblong, glabrous, spreading, imbricate. Stamens 4, inserted under the margin of the disk; filaments subulate. Ovary ovoid, superior, 1-celled, style short; stigma capitate; ovule pendulous from near the top of the cell from a flattened funicle. Fruit a drupe, fleshy, ovoid, acute at apex, blue; pericarp thick filled with black resin cells; seed pendulous.

Mullenpara, *NS & KVB 31361; KVB 31596*; Asthipara, *KVB 31628*

Fl. & Fr.: January-June

Distribution: Fairly common in evergreen forests of Mullenpara and Asthipara.

Nothopegia racemosa (Dalzell) Ramamoorthy, Fl. Hassan Dist. 377. 1976; Ramach. & V.J. Nair, Fl. Cannanore Dist. 119. 1988; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 476. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 812. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 255. 2009. *Glycyarpus racemosus* Dalzell, J. Asiat. Soc. Bombay 3: 69. 1849. *Nothopegia dalzellii* Gamble, Fl. Madras 265(189). 1918. *Nothopegia colebrookeana* sensu Hook.f., Fl. Brit. India 2:40.1876 p.p., non (Wight) Blume 1850.

Trees, to 10 m high; bark greyish-brown. Leaves alternate, 12-20 x 3.5-6.5 cm, elliptic-oblong, oblong, oblanceolate or obovate, apex acuminate, base acute; lateral nerves 13-many, parallel; intercostae scalariform, prominent; petiole 8-20 mm. Flowers small, polygamous, white, bracteate, in axillary, rusty pubescent racemes. Calyx small, 4-lobed, persistent, imbricate; lobes broadly ovate, pubescent above. Petals 4, oblong, glabrous except ciliate hairs on the mid nerve. Stamens 4, inserted under the margin of the disk; filaments glabrous or slightly pubescent. Ovary sessile, superior, ovoid, 1-celled; ovule pendulous from near the top of the cell; style short; stigma capitate. Fruit a drupe, fleshy, globose, transversely oblong, striate, depressed at apex; pericarp thin; seed pendulous.

Mullenpara, KJD 26261

Fl. & Fr.: May-June

Distribution: Rare in evergreen forests of Mullenpara. Endemic to Western Ghats

Nothopegia travancorica Bedd. ex Hook.f., Fl. Brit. India 2: 40. 1876; Gamble, Fl. Madras 265(189). 1918; Ansari, Fl. Kasaragod Div. 111. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 119. 1988; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 477. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 813. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 256. 2009 (Plate 111).

Shrubs; branchlets lenticellate, ferruginous tomentose. Leaves alternate, 10-14 x 3-4 cm, elliptic-oblong, apex obtusely acuminate, nerves many, intercostae regular, closely parallel; petiole to 1 cm long, curved. Racemes condensed, axillary. Flowers few, white. Calyx 4-lobed, ferruginous tomentose. Petals 4, 1.5 mm long, ovate, acute, hairy inside, ciliate. Stamens 4, inserted under the margin of the disk. Ovary superior, ovoid, 1-celled; Fruits 8 mm across, depressed globose, reddish-purple.

Chelachode, KVB 31225

Fl. & Fr.: December-May

Distribution: Common in evergreen forests of Chelachode, Chavachi, Moonamthode and Kattikari. Endemic to southern Western Ghats.

SPONDIAS L.

Sp. Pl. 1: 371. 1753.

Spondias pinnata (L. f.) Kurz, Prelim. Rep. Forest Pegu Appendix A.44. & B.42. 1875; Manilal & Sivar., Fl. Calicut 72. 1982; Ansari, Fl. Kasaragod Div. 111. 1985; D. Chandra & S.K. Mukh. in N.P. Singh *et al.*, Fl. Ind. 5: 507. 2000; V. Chandra. in P. Daniel, Fl. Kerala 1: 819. 2005; Sunil Ratheesh, Fl. Stud. Wayanad Dist. 257. 2009. *Mangifera pinnata* L. f., Suppl. Pl. 156. 1781. *Spondias mangifera* Willd., Sp. Pl. 2: 751. 1799; Hook. f., Fl. Brit. India 2: 42. 1876; Gamble, Fl. Madras 261(186). 1918.

Deciduous trees, to 25 m high; bark grey to pale brown; exudation colourless, gummy. Leaves imparipinnate, alternate, clustered at the end of branches; leaflets 5-21, 4-23 x 2.5-10 cm, oblong, elliptic or elliptic-oblong, apex acuminate or obtusely acuminate, base obtuse, subacute, oblique or round, opposite or subopposite; lateral nerves many, parallel, close, slender, connected by an intramarginal nerve, intercostae reticulate; rachis 25-45 cm, swollen at base. Flowers polygamous, yellowish-white, in terminal spreading panicles; calyx small; lobes 5. Petals 5, oblong. Stamens 10, inserted below the disk. Ovary ovoid or subglobose, superior, immersed in the disk, 5-celled, 1 ovule in each cell, pendulous; styles 5; stigma spreading. Fruit a fleshy drupe, 3.8-5 cm long, yellow, endocarp woody; seeds 1-3, of which only one is perfect.

Chelachode, KJD 31291

Fl. & Fr.: March- December

Distribution: Common in Semi-Evergreen forests of Pothanplavu

BURSERACEAE

CANARIUM L.

Amoen. Acad., Linnaeus ed. 4: 121. 1759.

Canarium strictum Roxb., Fl. Ind. 3: 138. 1832; Hook.f., Fl. Brit. India 1: 534. 1875; Gamble, Fl. Madras 172(123). 1915; V. Chithra & A.N. Henry in Hajra *et al.*, Fl. Ind. 4: 440. 1997; A.N. Henry & V. Chithra in P. Daniel, Fl. Kerala 1: 629. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 202. 2009.

Trees, to 30 m high; bole buttressed; bark grey-brown; exudation brownish-black, resinous. Leaves imparipinnate, alternate; leaflets 7-11, opposite, 7-16 x 3.5-7 cm, ovate, ovate-lanceolate, oblong or elliptic, base acute or oblique, apex acuminate, margin serrulate or crenulate, rusty tomentose beneath; lateral nerves 10-20 pairs, parallel; rachis 22-36 cm long, tomentose, swollen at base;



a. *Sonerila rotundifolia*



b. *Sonerila wallichii*



c. *Eugenia argentea*



d. *Eugenia codyensis*



e. *Syzygium benthamianum*



f. *Syzygium gardneri*



g. *Crateva magna*



h. *Dipterocarpus indicus*



i. *Hopea erosa*



j. *Grewia gamblei*



k. *Holigarna beddomei*



l. *Nothopegia travancorica*

stipules obscure. Flowers polygamous, axillary panicles, bright yellow. Male flowers; calyx tube campanulate; lobes 3, 1 mm. Petals 3, oblong. Staminal tube to 3 mm; stamens 6, free from the disk. Bisexual flowers. Calyx urceolate, pubescent; lobes 3. Petals 3, white. staminal tube to 3 mm. Ovary superior, to 3.5 mm, 3-celled, ovules 1 in each cell; style 1, stout; stigma capitate, 2-3 lobed. Fruit a drupe, 3.5 x 1.5 cm, ellipsoid, dark blue; seeds 1-3.

Chavachi, *KJD 18756*

Fl. & Fr.: January-December

Distribution: Fairly common in evergreen forests of Chavachi and Chelachode.

MELIACEAE

- 1a. Petiole winged, herbs.....Naregamia
- 1b. Petiole not winged, trees or shrubs.....2
- 2a. Ovary many ovules; seeds winged Toona
- 2b. Ovary 1or 2 ovuled3
- 3a. Leaves simple *Aglaia pp.*
- 3b. Leaves 3 or more foliolate4
- 4a. Leaf margins serrate; fruit a drupe, less than 8 mm acrossCipadessa
- 4b. Leaf margins entire; fruit a capsule or berry, more than 1 cm across5
- 5a. Petals 3..... *Aphanamixis*
- 5b. Petals 4 or 56
- 6a. Staminal tube oblong; fruits to 4 x 3 cm *Dysoxylum*
- 6b. Staminal tube globose; fruits less than 3 x 2.5 cm.....7
- 7a. Anthers 4-7 *Aglaia pp.*
- 7b. Anthers 10... *Reinwardtiodendron*

AGLAIA Lour.

*Fl. Cochinch.*173. 1790, *nom. cons.*

- 1a. Leaves simple *A. simplicifolia*
- 1b. Leaves 5 or more foliolate2
- 2a. Sepals and petals 4 each..... *A. lawii*
- 2b. Sepals or calyx lobes and petals 5 each.....3
- 3a. Fruit depressed globose, to 2.5 m broad*A. barberi*
- 3b. Fruit ellipsoid, less than 1.5 cm broad *A. elaeagnoidea*

Aglaia barberi Gamble, Bull. Misc. Inform. Kew 1915: 346. 1915 & Gamble, Fl. Madras 180(129). 1915; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4:

457.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 638. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 204. 2009.

Trees, to 15 m; bark reddish-brown. Leaves imparipinnate, alternate; leaflets 5-7, opposite or subopposite, 4.5-12 x 1.5-4 cm, elliptic-oblong, elliptic-lanceolate or lanceolate apex acuminate, base acute or obliquely acute, reddish-brown scales present beneath; lateral nerves 12-15 pairs, parallel, slender, obscure, intercostae obscure; rachis slender, slightly swollen at base, covered with reddish-brown lepidote scales. Flowers polygamo-dioecious, axillary panicles, yellow. Calyx saucer shaped; lobes 5, acute, margin ciliate. Petals 5, orbicular, glabrous. Staminal tube 1 mm long, globose, not contracted at base, undulate along margins, anthers 5, included. Ovary superior, hairy, 1-2-celled; ovules 1-2 in each cell; style short; stigma capitate. Fruit a berry, depressed globose, brown puberulus, 2-3 cm across.

Amayikallu, KVB 31566

Fl. & Fr.: December-June

Distribution: Fairly common in evergreen forests of Amayikallu and Chavachi. Endemic to Western Ghats, Conservation Status: Vulnerable.

Aglaia elaeagnoidea (A. Juss.) Benth., Fl. Austral. 1: 383. 1863; Manilal & Sivar., Fl. Calicut 63. 1982; Ansari, Fl. Kasaragod Div. 95. 1985; Pannell, Kew Bull. Add. ser. 16, 143.1992; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 461.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 641. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 206. 2009. *Nemodra elaeagnoidea* A. Juss., Mém. Mus. Hist. Nat. Paris 19: 259, t. 14. 1830. *Aglaia roxburghiana* (Wight & Arn.) Miq., Ann. Mus. Bot. Lugduno-Batavi 4: 41. 1868; Gamble, Fl. Madras 180(128). 1915. *Aglaia wallichii* Hiern in Hook.f., Fl. Brit. India 1: 555. 1875. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *obtusa* DC., Monogr. Phan. 1: 605. 1878. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *beddomei* Gamble, Fl. Madras 180(129). 1915. *Aglaia roxburghiana* (Wight & Arn.) Miq. var. *courtallensis* Gamble, Fl. Madras 180(129). 1915. *Aglaia elaeagnoidea* (A. Juss.) Benth. var. *beddomei* (Gamble) K.K.N. Nair, Journ. Bombay Nat. Hist. Soc. 78: 426. 1981; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 462.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 640. 2005. *Aglaia elaeagnoidea* (A. Juss.) Benth. var. *courtallensis* (Gamble) K.K.N. Nair, Journ. Bombay Nat. Hist. Soc. 76: 476. 1981; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 465.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 641. 2005.

Trees, to 15 m high; bark reddish-brown. Leaves imparipinnate, alternate, estipulate; leaflets 5-7, opposite, leaflets 6-10 x 3-4.5 cm, elliptic, elliptic-obovate, lanceolate or oblanceolate, apex acute, acuminate or caudate-acuminate, base oblique, acute or attenuate, lepidote above and beneath; lateral nerves 5-12 pairs, parallel, prominent, secondary laterals present, intercostae obscure; rachis 60-80 mm long, stout, grooved above, swollen at base. Flowers polygamodioecious, yellow, in axillary branching panicles. Calyx 5 lobed, campanulate, scaly, margins ciliate. Petals 5, free, imbricate. Staminal tube entire at apex; anthers 5, included. Ovary small, superior, slightly depressed, 1-2-celled, ovules 1-2 in each cell. Fruit a berry, globose, 1-15. cm across, buff coloured; seeds 1 or 2.

Vellachatamkunnu, *KJD 18723*

Fl. & Fr.: November-August

Distribution: Fairly common in evergreen forests of Vellachatamkunnu.

Aglaia lawii (Wight) Saldanha, Fl. Hassan Dist. 392. 1976; Pannell, Kew Bull. Add. ser. 16, 97.1992; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 471.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 642. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 206. 2009. *Nimmonia lawii* Wight, Calcutta J. Nat. Hist. 7: 13. 1847. *Amoora lawii* (Wight) Bedd., Fl. Sylv. S. India t. 133. 1871; Hiern in Hook.f., Fl. Brit. India 1: 561. 1875; Gamble, Fl. Madras 181(130). 1915. *Aglaia andamanica* Hiern in Hook.f., Fl. Brit. India 1: 555. 1875. *Amoora canarana* (Turcz.) Hiern in Hook.f., Fl. Brit. India 1: 560.1875; Gamble, Fl. Madras 182(130). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 88. 1988; Manilal, Fl. Silent Valley 48. 1988. *Aglaia jainii* Viswan. & K. Ramach., Bull. Bot. Surv. India 24: 212. 1982(1983); S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 469.1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 642. 2005. *Aglaia tamilnadensis* N.C. Nair & Rajan in Nair & Henry, Fl. Tamil Nadu ser. 1, 1: 66. 1983.

Trees, to 15 m; bark brownish-grey. Leaves imparipinnate, alternate; leaflets 3-5, opposite or subopposite, 6-20 x 1.5-7 cm, asymmetrically broad ovate, elliptic-lanceolate or elliptic-obovate, apex acuminate, obtuse or obtusely acuminate, base obliquely acute or obtuse; lateral nerves 7-18 pairs, pinnate, prominent, inter costae obscure; rachis 3.2-20 cm long, swollen at base covered with yellowish-brown lepidote scales. Flowers polygamo-dioecious, white; females and bisexuals in spikes; males in panicles or racemes, axillary. Calyx truncate, short, 4 lobed; lobes obscure. Petals 4, orbicular, long, subentire at apex. Stamens 8-10; staminal tube slightly crenate at mouth. Ovary lepidote, 3-locular,

one ovule in each locule; stigma 3-lobed. Fruit capsule, 1.5-2 cm long, obovoid, obtuse, yellow; seeds surrounded by a fleshy aril.

Pothurumi, KVB 31728

Fl. & Fr.: December-February

Distribution: Fairly common in evergreen forests of Pothurumi, Chavachi and Kattikari.

Aglaia simplicifolia (Bedd.) Harms, *Naturl. Pflanzenfam.* (ed. 2) 196. 1: 146. 1940; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 87. 1988; Pannell, *Kew Bull. Addl. ser.* 16, 306.1992; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. Ind.* 4: 474.1997; N.C. Nair & N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 645. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 207. 2009. *Beddomea simplicifolia* Bedd., *Fl. Sylv. S. India* t. 135. 1871; Hiern in Hook.f., *Fl. Brit. India* 1: 566. 1875; Gamble, *Fl. Madras* 184(132). 1915. *Beddomea simplicifolia* var. *parviflora* Bedd., *Fl. Sylv. S. India* t. 135. 1871. *Beddomea simplicifolia* var. *racemosa* Bedd., *Fl. Sylv. S. India* t.135. 1871.

Small trees. Leaves alternate, 15-32 x 4.5-10 cm, acuminate or caudate at apex, cuneate at base, upper surface often minutely pitted, the lower surface with occasional stellate hairs or scales; lateral nerves 11-18 pairs, ascending; petiole up to 4 cm, with a swelling 0.5 cm long adjacent to the lamina. Inflorescence up to 15 cm long and 10 cm wide. Flowers subglobose. Calyx deeply divided into 5 subrotund lobes which are densely covered with stellate scales. Petals 5, yellow. Staminal tube nearly as long as the petals, obovoid, with a small aperture. Ovary subglobose, densely covered with stellate scales; stigma ovoid. Fruits up to 4 cm long, obovoid or subglobose; pericarp often longitudinally ridged; Loculi 1 or 2 (or sometimes 3, each containing 1 seed; aril transparent, gelatinous.

Kattikari, KJD 31500

Fl. & Fr.: November-June

Distribution: Fairly common in evergreen forests of Kattikari.

APHANAMIXIS Blume

Bijdr. Fl. Ned. Ind. 165. 1825.

Aphanamixis polystachya (Wall.) Parker, *Indian For.* 57: 486. 1931; Manilal & Sivar., *Fl. Calicut* 63. 1982; Ansari, *Fl. Kasaragod Div.* 95. 1985; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. Ind.* 4: 477. 1997; N.C. Nair & N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 646. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 208. 2009. *Aglaia polystachya* Wall., *Fl. Ind.* 2: 429. 1824. *Andersonia rohituka* Roxb., *Fl.*

Ind. 2: 213. 1832. *Amoora rohituka* (Roxb.) Wight & Arn., Cat. Ind. Pl. 24. 1833 & Prodr. Fl. Ind. Orient. 119. 1834; Hiern in Hook.f., Fl. Brit. India 1: 559. 1875; Gamble, Fl. Madras 181(130). 1915. *Amoora beddomei* Kosterm., Acta Bot. Neerl. 31: 133. 1982; Kamble & Sharma, J. Econ. Taxon. Bot. 5: 493.1984.

Evergreen trees, to 20 m high; bark reddish-brown. Leaves imparipinnate, alternate, crowded at the end of branchlets; leaflets 7-15, opposite, 4.5-25 x 2.5-6.5 cm, lowest pair smaller, ovate-oblong or oblanceolate, acute, apex acute or acuminate, base oblique; lateral nerves 7-13 pairs, pinnate, prominent; intercostae reticulate, prominent; rachis 12-44.6 cm long, pubescent, swollen at base. Inflorescence panicle; axillary, drooping. Flowers polygamodioecious, white. Sepals 5, orbicular, thick. Petals 3, white, orbicular. Staminal tube 4 mm long, globose. Ovary superior, ovoid, pubescent, 3-celled, ovules 2 in each cell; stigma 3-lobed, subsessile. Fruit a capsule 2.5-3.5 x 3 cm, 3-lobed, yellow or purplish; seeds 2 or 3, oblong, with a scarlet aril.

Chavachi, *KJD 18733*

Fl. & Fr.: June-December

Distribution: Rare in evergreen forests of Chavachi.

CIPADESSA Blume

Bijdr. Fl. Ned. Ind. 162. 1825.

Cipadessa baccifera (Roth) Miq., Ann. Mus. Bot. Lugduno-Batavi 4: 6. 1868; Gamble, Fl. Madras 176(126). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 88. 1988; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 482. 1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 650. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 209. 2009. *Melia baccifera* Roth, Nov. Pl. Sp. 215. 1821. *Cipadessa fruticosa* Blume, Bijdr. Fl. Ned. Ind. 162. 1825; Hiern in Hook.f., Fl. Brit. India 1: 545. 1875.

Shrubs to 3 m tall; branchlets tomentose. Leaves odd-pinnate; leaflets 3-5 pairs, opposite, 3-7 x 2-3.5 cm, narrowly oblong to ovate, apex acuminate, base acute or rounded, margins irregularly dentate towards apex; petiolule to 8 mm long. Panicles axillary, corymbose; peduncle to 7 cm long. Flowers white. Calyxlobes c. 1 mm long, triangular, spreading, pubescent. Petals 3.5-4 mm long, ovate, cream or c. 3 mm long; stamens 10; anthers yellow. Ovary 5-6-angular, ovules 2 per cell; stigma turbinate. Drupe c. 5 mm across, globose, longitudinally grooved, reddish brown.

Kannadivechakunnu, *KJD 18773*

Fl. & Fr.: November-July

Distribution: Rare in evergreen forests of Kannadivechakunnu.

DYSOXYLUM Blume

Bijdr. Fl. Ned. Ind. 4: 172. 1825.

Dysoxylum malabaricum Bedd. ex Hiern in Hook.f., Fl. Brit. India 1: 548. 1875; Gamble, Fl. Madras 178(128). 1915; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 489. 1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 653. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 209. 2009 (Plate 12a).

Trees, to 35 m high; bark greyish-yellow. Leaves imparipinnate, alternate; leaflets 7-11, opposite, subopposite or alternate, 9-23 x 3-5 cm, elliptic-oblong, ovate-oblong or lanceolate, apex acuminate, base oblique or acute; lateral nerves 6-20 pairs, parallel, ascending, intercostae reticulate; rachis 17-28 cm long, swollen at base, pubescent. Flowers bisexual, greenish-yellow, fragrant, 5-6 mm long. Calyx deeply 4 lobed, lobes more or less obtuse. Petals 4, linear-oblong, subacute, pubescent outside. Staminal tube urceolate, more or less 4-angled, with 8 deep emarginate crenatures. Ovary superior, densely pubescent, 4-celled, ovules 2 in each cell; tapering into style; stigma capitate, 4-lobed. Fruit a capsule, 5-7.5 cm long, pyriform, verrucose, bright yellow, with 4 longitudinal furrows; seeds 3-4, reddish-brown, bluntly trigonus.

Chavachi, KVB 31559

Fl. & Fr.: February-June

Distribution: Fairly common in evergreen forests of Chavachi, Chelachode and Crossway to Meenmutty. Endemic to southern Western Ghats.

NAREGAMIA Wight & Arn.

Prodr. Fl. Ind. Orient. 116. 1834, *nom. cons.*

Naregamia alata Wight & Arn., Prodr. Fl. Ind. Orient. 117. 1834; Hiern in Hook.f., Fl. Brit. India 1: 542. 1875; Gamble, Fl. Madras 175(125). 1915; Manilal & Sivar., Fl. Calicut 64. 1982; Ansari, Fl. Kasaragod Div. 96. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 90. 1988; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 498. 1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 657. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 211. 2009.

Prostrate woody herbs. Leaves 3-foliolate; leaflets 1.5-2.5 x 0.6-1.2 cm, obovate, laterals oblique, apex obtuse, base cuneate, margins entire to serrate; petioles 1.5-2.5 cm long, winged. Flowers axillary, solitary; pedicel short. Calyx 5-lobed; lobes 3-4 mm long, lanceolate. Petals 5, white, 1.5-1.8 cm long, spathulate. Disk annular. Staminal tube 1.8-2 cm long, cylindrical, inflated at top, white with 10 yellow teeth at margins; anthers 10, sessile at the apex of the tube. Ovary 3-

celled; ovules 2 in each cell; style filiform; stigma capitate. Capsule 4-5 mm diam., ovoid to subglobose, 3-valved; seeds c. 1 mm across, curved, truncate at both ends.

Paripode, *KJD 26259*

Fl. & Fr.: August-December

Distribution: Rare along the boundaries of the Sanctuary. Endemic to Peninsular India.

REINWARDTIODENDRON Koord.

Meded. Lands Plantentuin 19. 389. 1898.

Reinwardtiodendron anamalaiense (Bedd.) Mabb., *Malaysian For.* 45: 452. 1982; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, *Fl. Ind.* 4: 498.1997; N.C. Nair & N.P. Balakr. in P. Daniel, *Fl. Kerala* 1: 658. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 211. 2009. *Lansium anamalaiense* Bedd., *Madras J. Lit. Sci.* ser.3, 1: 40. 1864. *Lansium anamallayanum* Bedd., *Fl. Sylv. S. India* t. 131. 1871 & *Icon. Pl. Ind. Or.* t. 104. 1868-1874; Hook.f., *Fl. Brit. India* 1: 558. 1875; Gamble, *Fl. Madras* 182(130). 1915. *Aglaia anamallayana* (Bedd.) Kosterm., *Reinwardtia* 7: 257,t.10. 1966; Vajr., *Fl. Palghat Dist.* 109. 1990. *Reinwardtiodendron anamallayanum* (Bedd.) Saldanha, *Fl. Hassan Dist.* 392. 1976 (Plate 12b).

Trees, to 20 m high; bark greyish-brown. Leaves imparipinnate, attenuate; leaflets 5-9, alternate, 5-15 x 1.5-5.5 cm, elliptic, lanceolate, elliptic-lanceolate or elliptic-obovate, acute, apex acuminate obtusely acuminate or caudate-acuminate, base oblique, attenuate or cuneate; lateral nerves 8-10 pairs, pinnate, slender, prominent, intercostae reticulate, prominent; domatia present; rachis 4.2-11.5 cm long, swollen at base. Flowers polygamodioecious, 3-4 mm across, yellowish-white; males in axillary panicles; females in axillary spikes or racemes. Sepals 5, ovate-orbicular, ciliate, fused in lower half. Petals 5. Staminal tube globose, crenulate. Stamens 9-10 in 2 rows. Ovary superior, globose, 5-celled, ovules 2 in each cell; style short, thick, stigma 3-5 lobed, truncate. Fruit a berry, ovoid, white, scaly; seeds 1-2, embedded in a pulpy aril.

Pothurumi, *KVB 31735*

Fl. & Fr.: March-November

Distribution: Common in evergreen forests of Mullenpara and Pothurumi. Endemic to southern Western Ghats.

TOONA (Endl.) M.Roem.

Fam. Nat. Syn. Monogr. 1: 131. 1846.

Toona ciliata Roem., Fam. Nat. Syn. Monogr. 139. 1846; Ramach. & V.J. Nair, Fl. Cannanore Dist. 90. 1988; S.S. Jain & S.S.R. Bennet in Hajra *et al.*, Fl. Ind. 4: 504. 1997; N.C. Nair & N.P. Balakr. in P. Daniel, Fl. Kerala 1: 663. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 212. 2009. *Cedrela toona* Roxb. ex Rottl. & Willd., Ges. Naturf. Freunde Berlin Neue Schriften 2: 198. 1803; Hiern in Hook.f., Fl. Brit. India 1: 568. 1875; Gamble, Fl. Madras 186(133). 1915.

Trees, to 30 m high; bark reddish-brown. Leaves paripinnate, alternate, clustered at the tip; leaflets 12-30, opposite or subopposite 7-16 x 2-7 cm, ovate, ovate-lanceolate or oblong-lanceolate, apex acuminate, base oblique; lateral nerves 10-15 pairs, pinnate, prominent, intercostae reticulate; rachis 13-90 cm long, grooved above, swollen at base. Flowers bisexual, white, terminal or axillary drooping panicles. Calyx cupular; lobes 5, ovate, tomentose, margin ciliate. Petals 5, white, 5 x 3 mm, oblong, spreading, ciliate. Stamens 5, free, inserted on the top of disk; filaments subulate. Ovary superior, ovoid, 2 mm long, pubescent, 5-celled, ovules 8-12 per cell, pendulous; style short, stigma discoid. Fruit a capsule, 1.8-3 x 1.5 cm, 5-valved; seeds many, oblong, thin, winged at both ends.

Meenmutty, KVB 31274

Fl. & Fr.: February-May

Distribution: Fairly common in evergreen forests of Meenmutty.

RUTACEAE

- 1a. Leaves simple2
- 1b. Leaves 3 or more foliolate4
- 2a. Climbing shrubs; disk columnar Paramygnia
- 2b. Erect shrubs or trees.....3
- 3a. Flowers in corymbs; peduncles to 10 cm long Acronychia
- 3b. Flowers in short racemes or clusters Atalantia
- 4a. Leaf rachis winged.....5
- 4b. Leaf rachis not winged6
- 5a. Ovary many-ovuled, fruit over 5 cm across; leaf margins entire Aegle
- 5b. Ovary 4-ovuled, fruit less than 1 cm across; leaf margins crenate Naringi
- 6a. Leaves opposite Melicope
- 6b. Leaves alternate7
- 7a. Stamens 6 or less8
- 7b. Stamens 8 or more.....9

- 8a. Branches armed with prickles, leaflets without intramarginal nerves 10
- 8b. Plants unarmed, leaflets with intramarginal nerve Vepris
- 9a. Style 1, fruit a berry Toddalia
- 9b. Styles 4, free, fruit a capsule Zanthoxylum
- 10a. Plants armed with sharp thorns Luvunga
- 10b. Plants unarmed 11
- 11a. Petals 8-10 mm long, clawed Murraya
- 11b. Petals less than 5 mm long, not clawed 12
- 12a. Ovules 2 in each cell Clausena
- 12b. Ovule 1 in each cell Glycosmis

ACRONYCHIA J.R.Forst. & G.Forst.

Char. Gen. Pl. 53. 1776, *nom. cons.*

Acronychia pedunculata (L.) Miq., Fl. Ind. Bat. Suppl. 532. 1861; Ramach. & V.J. Nair, Fl. Cannanore Dist. 81. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 392. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 582. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 189. 2009. *Jambolifera pedunculata* L., Sp. Pl. 349. 1753. *Acronychia laurifolia* Blume, Cat. Gew. Buitenzorg 63. 1823; Hook.f., Fl. Brit. India 1: 498. 1875; Gamble, Fl. Madras 152(108). 1915. *Acronychia barberi* Gamble, Bull. Misc. Inform. Kew 1915: 345. 1915 & Fl. Madras 152(108). 1915.

Evergreen trees; bark greyish-yellow. Leaves unifoliolate, opposite, decussate, 4.3-15 x 1.8-7.5 cm, obovate, obovate-oblong or oblanceolate, apex obtusely acuminate, base acute or cuneate; lateral nerves 9-15 pairs, pinnate, slender, prominent, intercostae reticulate, prominent; rachis 10-30 mm long, slender, glabrous, grooved above. Flowers bisexual, yellowish-white, in trichotomous, corymbose, axillary cymes; peduncle slender 6-12 cm long. Sepals 4, lobes ovate, connate, margin ciliate. Petals 4, free, oblong, densely hairy within. Stamens 8, 2-seriate; filaments unequal, densely reflexed hairy. Ovary superior, conical, partly immersed in the disk, 4-angled densely silky outside, 4-celled, ovules 2 in each cell; style stout; stigma 4-grooved. Fruit a berry, subglobose, pale-brown, obscurely lobed; seeds black.

Mullenpara, KJD 18720

Fl. & Fr.: March-November

Distribution: Rare in evergreen forests.

ATALANTIA Corrêa

Ann. Mus. Natl. Hist. Nat. 6: 383. 1805, *nom. cons.*

- 1a. Staminal filaments united, tubular*A. racemosa*
1b. Staminal filaments free *A. wightii*

Atalantia racemosa Wight, Hooker's J. Bot. Kew Gard. Misc. 1: 64, t. 122. 1834; Hook.f., Fl. Brit. India 1:512.1875; Gamble, Fl. Madras 159(114). 1915; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 269. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 586. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 190. 2009. *Sclerostylis atalantioides* Wight, Icon. Pl. Ind. Orient. t. 71. 1838, non Wight & Arn. 1834. *Sclerostylis racemosa* (Wight) Wight, Ill. Ind. Bot. 1: 109. 1840.

Small trees. Leaves unfoliolate; 4.5-8-15 x 2-4.5 cm, ovate-oblong to oblong-elliptic or obovate, obtuse or shortly acuminate at apex with ca 5 mm long acumen, cuneate at base, crenulate or subentire margins; lateral nerves 8-12 pairs; petioles 5-10 mm long, articulate above at base of blade. Flowers in axillary racemes; bracteoles subulate, minute, ciliolate. Sepals 3-5, triangular to suborbicular, subacute, ca 1.5 mm long, scarious and ciliate along margins. Petals usually 4, broadly elliptic or linear-oblong to obovate, obtuse, 6-8 x 2-4 mm, glandular, white. Stamens 8, as long as petals; filaments usually connate into a partial basal tube, occasionally 1 or 2 free. Ovary eglandular, 2-celled; stigma capitate without stylar canals. Berry subglobose, 2 cm across.

Meenmutty, *KJD 31499*

Fl. & Fr.: October-January

Distribution: Common in semi-evergreen forests of Narikkadavu and Paripode and evergreen forests of Meenmutty.

Atalantia wightii Yu.Tanaka, Bull. Soc. Bot. France 75: 714. 1928; Gamble, Fl. Madras 160(114). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 81. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 274.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 587. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 191. 2009. *Atalantia ceylanica* (Arn.) Oliver, J. Linn. Soc. Bot. 5. Suppl. 2: 25. 1861, p.p. excl. basionym, quoad tantum specim. Nilgiri; Hook.f., Fl. Brit. India 1: 512. 1875 (Plate 12c).

Shrubs, branchlets minutely hispid. Leaves alternate, 8-11 x 3-5 cm, ovate, apex rounded or emarginate, base acute, glabrous. Raceme to 1 cm long, axillary, pedicels 5 mm long, hispid. Flowers to 12 mm across. Sepals 2 mm long, ovate, acute, ciliate. Petals white, to 9 x 2 mm, oblong, obtuse. Stamens 8, filaments 4

mm long, inner ones smaller. Ovary 2-celled; style 5 mm long. Berry ellipsoid, 1-1.5 cm across, smooth, glandular, yellowish; seeds 2-4, oblong-ellipsoid.

Ambalappara, KVB 31531

Fl. & Fr.: February-July

Distribution: Fairly common in evergreen forests of Ambalappara.

CLAUSENA Burm.f.

Fl. Ind. 87, t. 29, f. 2. 1768.

- 1a. Flowers 5-merous..... *C. indica*
1b. Flowers 4-merous..... *C. anisata*

Clausena anisata (Willd.) Hook.f. ex Benth., Niger Fl. 256. 1849; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 321.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 593. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 192. 2009. *Amyris anisata* Willd., Sp. Pl. 2: 337. 1799. *Amyris dentata* Willd., Sp. Pl. 2: 337. 1799. *Clausena dentata* (Willd.) Roem., Syn. Hesper. 1: 44. 1846. *Clausena willdenowii* Wight & Arn., Prodr. Fl. Ind. Orient. 96. 1834; Hook.f., Fl. Brit. India 1:506. 1875; Gamble, Fl. Madras 155(110). 1915. *Clausena willdenowii* Wight & Arn. var. *nana* (Roxb.) Balakr., Bull. Bot. Surv. India 22: 173. 1982. *Clausena willdenowii* Wight & Arn. var. *pubescens* (Wight & Arn.) Hook.f., Fl. Brit. India 1: 506. 1875. *Clausena willdenowii* Wight & Arn. var. *dulcis* (Bedd.) Bedd., Fl. Sylv. S. India S. India 45. 1871. *Clausena dentata* (Willd.) Roem. var. *dulcis* (Bedd.) Swingle, J. Wash. Acad. Sci. 28: 532. 1938. *Clausena dentata* (Willd.) Roem. var. *pubescens* (Wight & Arn.) Yu.Tanaka, J. Bot. 68:277.1930.

Small to medium trees; young branchlets pubescent. Leaves odd pinnate, to 15 cm; leaflets opposite, 5 x 2.5 cm, ovate, elliptic, acuminate, base oblique, dentate. Racemes axillary, to 9 cm; pedicels 0.5 cm; bracts 2 mm. Flowers white, 4-merous. Calyx lobes 1 mm, ovate, pubescent. Petals 4 x 2 mm, concave. Stamens 8, free, filaments dialated below, unequal; anthers 2 mm. Ovary 4 partite, style apical, furrowed, stigma 4-angled. Berry 8 mm across, globose.

Ambalappara, NS &KVB 31376

Fl. & Fr.: March-June

Distribution: Fairly common in evergreen forests of Ambalappara.

Clausena indica (Dalzell) Oliver, J. Linn. Soc. Bot. 5: 36. 1861; Hook.f., Fl. Brit. India 1: 505. 1875; Gamble, Fl. Madras 155(110). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 82. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 328.

1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 595. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 193. 2009. *Piptostylis indica* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 33. t.2. 1851.

Shrubs or small trees. Leaves pinnate, alternate, up to 25 cm long; leaflets 7-13, alternate and opposite, 3.5-7.5 x 2-3.5 cm, elliptic or elliptic-ovate to oblong, obtuse or abruptly acuminate at apex, oblique at base, subentire or crenulate and often with pubescent glands along margins; lateral nerves 5-8 pairs, faint above, rather prominent beneath, spreading, tertiaries indistinct; petiole and rachis slightly zig-zag. Inflorescence terminal, paniculate corymbose cymes. Flowers globose in buds, borne on short pedicels. Sepals deltate, acute or rounded, ca 0.5 mm long, ciliate. Petals oblong, acute, ca 3.5 x 1.2 mm, white, glandular. Stamens 10. Ovary subglobose, ca 15 mm long, papillate-glandular, 3-locular, each with one or two pendulous ovules; style very short; stigma capitate. Berries globose, ca 15 mm across; 1-seeded.

Mullenpara, KVB 31476

Fl. & Fr.: February-June

Distribution: Rare in evergreen forests of Mullenpara.

GLYCOSMIS Corrêa

Ann. Mus. Natl. Hist. Nat. 6: 384. 1805.

- 1a. Sepals glabrous, fruit to 1.5 cm across *G. macrocarpa*
1b. Sepals ciliate, fruit to 1 cm across *G. pentaphylla*

Glycosmis macrocarpa Wight, Ill. Ind. Bot. 1: 109. 1840; Ramach. & V.J. Nair, Fl. Cannanore Dist. 83. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 338. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 597. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 194. 2009. *Glycosmis pentaphylla* Hook.f. var. *macrocarpa* (Wight) Hook.f., Fl. Brit. India 1:500. 1875.

Shrubs, up to 2 m high. Leaves pinnate, alternate, 13-27 cm long; leaflets 3 or 5 or rarely 6, alternate, 7.5-16 x 3-7.5 cm, oblong-elliptic or ovate-lanceolate to oblanceolate, acuminate at apex, cuneate at base; lateral nerves 5 to 7 pairs, prominent beneath, faint above, oblique; petiolules 5-10 mm long. Inflorescence paniculate cymes, up to 3 cm long. Sepals 5, deltate, obtuse, less than 1 mm long, puberulous with ciliolate margins. Petals 5, oblong-elliptic, obtuse, ca 3 x 1.5 mm, white or pale yellowish, obscurely glandular. Stamens 10. Ovary ovoid-cylindric, ca 1 mm high, glandular 5-locular, each with one ovule; style continuous with ovary, not clearly distinct from it; stigma minute, depressed.

Berries subglobose, constricted at base, depressed above, ca 2 x 1.5 cm, punctuate; seed one.

Kurumbankallu, *KJD 26385*

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Kurumbankallu to Kannadivechakunnu.

Glycosmis pentaphylla (Retz.) DC., Prodr. 1:538. 1824, quoad basionym; Hook.f., Fl. Brit. India 1:499.1875, p.p; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4:343.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 599. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 194. 2009. *Limonia pentaphylla* Retz., Observ. Bot. 5: 24. 1788. *Limonia arborea* Roxb., Pl. Coromandel t.85. 1798. *Glycosmis arborea* (Roxb.)DC., Prodr. 1:538.1824; Manilal & Sivar., Fl. Calicut 60. 1982; Ansari, Fl. Kasaragod Div. 90. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 83. 1988; Vajr., Fl. Palghat Dist. 104. 1990. *Glycosmis cochinchinensis* Gamble, Fl. Madras 153(109). 1915p.p, non (Lour.) Pierre ex Engl. 1896.

Erect shrubs. Leaves 3-7-foliolate; leaflets subopposite, 7-15 x 2-5.5 cm, elliptic-lanceolate, acute to round at apex, attenuate at base, entire to minutely crenulate-serrate on the margins, glandular on both sides; rachis 6-10 cm long; petiolule c. 2 mm long. Flowers in terminal or axillary, spiciform panicles. Sepals 5(4), 1-1.5 mm long, ovate-acute, ciliate on margins. Petals 5(4), white, 4-5 x 2-2.5 mm, obovate, surface gland-dotted. Stamens 8-10, longer and shorter filaments of longer ones c. 3 mm long, shorter, c. 2 mm long. Disk prominent, annular. Ovary 2-2.5 mm across, ovoid, 5-celled; stigma flat or obscurely lobed. Berry 1-1.2 cm diam., ovoid, white turning pink, 1-2-seeded.

Paripode, *KJD 26315*

Fl. & Fr.: September-April

Distribution: Fairly common along the boundaries at Paripode, near Farm.

LUVUNGA Buch.-Ham. ex Wight & Arn.

Prodr. Fl. Ind. Orient. 90. 1834.

Luvunga eleutherandra Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 258. 1850; Hook.f., Fl. Brit. India 1: 509. 1875; Gamble, Fl. Madras 157(112). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 84. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 296.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 601. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 195. 2009. *Luvunga sarmentosa* auct. non (Blume) Kurz, 1870: Sivar. & Mathew, Fl. Nilambur 124. 1997.

Woody climbing shrubs, thorns axillary, to 2 cm long, recurved. Leaves 3-foliolate; leaflet 8-12 x 2-4 cm, oblong, apex acute or obtuse, base acute, shining above, nerves obscure; petiole to 6 cm long; petiolule 8 mm long, thick. Cymes to 3 cm across, axillary, sessile or shortly pedunculate. Flowers to 1 cm across, shortly pedicelled. Calyx cupular, shallowly 4-lobes. Petals 4, 8 x 3 mm, oblong. Stamens 8, filaments 4 mm long, anthers cleft at base, oblong. Ovary 4-celled, cell 2-ovuled, style stout, stigma terminal, capitate. Berry to 2.5 x 2 cm, globose-oblong, smooth; seeds 1-4, oblong, covered with mucilaginous pulp.

Kattikari, KJD 25589

Fl. & Fr.: December-April

Distribution: Rare in evergreen forests of Kattikari. Endemic to Western Ghats.

MELICOPE J.R.Forst. & G.Forst.

Char. Gen. Pl. 55. 1776.

Melicope lunu-ankenda (Gaertn.) Hartley, Sandakania 4: 61. 1994; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 369.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 603. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 196. 2009. *Fagara lunu-ankenda* Gaertn., Fruct. Sem. Pl. 334, t. 68.f. 9. 1778. *Euodia lunu-ankenda* (Gaertn.) Merr., Philipp. J. Sci. 7:378.1912; Gamble, Fl. Madras 148(105). 1915; Ansari, Fl. Kasaragod Div. 90. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 83. 1988. *Zanthoxylum roxburghianum* Cham., Linnaea 5: 58. 1830. *Euodia roxburghiana* (Cham.) Benth., Fl. Hongk. 59. 1861; Hook.f., Fl. Brit. India 1: 487. 1875. *Euodia lunu-ankenda* (Gaertn.) Merr. var. *tirunelwelica* Henry & Chandrab., Bull. Bot. Surv. India 15: 144. 1973; Mohanan *et al.*, J. Econ. Taxon. Bot. 24(1): 75. 2000.

Deciduous trees, to 18 m high; bark yellowish-grey. Leaves trifoliolate, opposite; leaflets 3-19.5 x 3-8 cm, elliptic, elliptic-oblongate or lanceolate grading to obovate; lateral nerves 8-20 pairs pinnate, slender, prominent, intercostae reticulate; rachis 40-80 mm long, pubescent, slightly grooved above. Flowers unisexual, white or greenish-yellow, in axillary paniculate cymes. Male flowers: ca. 3 mm long. Sepals 4, connate at base; ovate-orbicular. Petals 4, 2-3 mm long, white, glabrous. Stamens 4, inserted at the base of the disk, slightly longer than petals; pistillode of 4 rudimentary carpels. Female flowers: sepals and petals as in male flowers. Staminodes 4, inserted at the base of the disk. Ovary superior, subglobose, 4-lobed, 4-celled, ovules 2 in each cell; style short; stigma capitate. Fruit a capsule, of 4 cocci, brown; seeds oblong, black.

Ambalappara, NS & KVB 31430

Fl. & Fr.: May-October

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi and Ambalappara.

MURRAYA J.Koenig ex L.

Mant. Pl. Altera 2: 554, 563. 1771 *nom. cons.*

Murraya paniculata (L.) Jack., Malayan Misc. 1: 31. 1820; Manilal & Sivar., Fl. Calicut 60. 1982; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 352. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 605. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 200. 2009. *Chalcas paniculata* L., Mant. Pl. 1: 68. 1767. *Murraya exotica* L., Mant. Pl. 2: 563. 1771; Hook.f., Fl. Brit. India 1: 502. 1875; Gamble, Fl. Madras 155(111). 1915.

Shrubs or small trees; bark pale greyish to white. Leaves 3-7-foliolate; leaflets 3-5 x 1.5-3 cm, ovate to elliptic-ovate or rhomboid, shortly acuminate at apex, attenuate at base, glabrous. Panicles few-flowered, from the axils of upper leaves; peduncle 2-3 cm long. Calyx lobes 5, 2.5-3 mm long, ovate. Petals 5, 1-1.5 cm long, elliptic to ovate-elliptic, white. Stamens 10. Disk annular. Ovary c. 3 mm across, oblong, 2-celled; ovules 1 in each cell; stigma capitate. Berry 1-1.2 cm long, ellipsoid, acute, red.

Ambalappara, KVB 31572

Fl. & Fr.: February-September

Distribution: Rare in evergreen forests of Ambalappara.

NARINGI Adans.

Fam. Pl. 2: 341. 1763.

Naringi crenulata (Roxb.) Nicolson, Fl. Hassan Dist. 387. 1976; Manilal & Sivar., Fl. Calicut 58. 1982; Ansari, Fl. Kasaragod Div. 92. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 84. 1988; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 302. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 606. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 197. 2009. *Limonia crenulata* Roxb., Pl. Coromandel t. 86. 1798; Gamble, Fl. Madras 157(112). 1915. *Hesperethusa crenulata* (Roxb.) Roem., Syn. Monogr. 1: 38. 1846. *Limonia acidissima* sensu Hook.f., Fl. Brit. India 1: 507. 1875, non L.1762.

Trees, to 10 m, armed with sharp axillary spines; bark yellowish-grey. Leaves imparipinnate, alternate; leaflets 3-7, opposite, sessile, 1-6 x 0.7-2.4 cm, elliptic or elliptic-obovate, apex obtuse to emarginate, base acute or obliquely acute, margin crenate, profusely pellucid-gland dotted; glands dimorphic; lateral nerves

4-10 pairs, pinnate, slender, faint, intercostae reticulate; rachis 2.5-10 cm long, winged, wings obovate-oblong. Flowers bisexual, few flowered axillary racemes, white. Sepals 4, free or united at base, ovate-orbicular, glandular. Petals 4, free, elliptic or oblong, white, glandular. Stamens 8, subequal, free, inserted round the disk; filaments subulate. Ovary superior, globose, 4-celled, glabrous, glandular, ovule 1 in each cell.; style stout; stigma capitate; Fruit a berry, 6-8 mm across, subglobose; seeds 1-4, yellow.

Uruppukunnu, *KJD 26260*

Fl. & Fr.: June-December

Distribution: Common in semi-evergreen forests of Valayamchal, Narikkadavu and Uruppukunuu.

PARAMYGNIA Wight

Ill. Ind. Bot. 108. t. 42. 1838.

- 1a. Leaves elliptic, caudate acuminate; calyx 4-lobed*P. beddomei*
1b. Leaves oblong, acute; calyx 5-lobed.....*P. monophylla*

Paramignya beddomei Yu.Tanaka, J. Bot. 68: 230. 1930; Gamble, Fl. Madras 1872(1295). 1936; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 309. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 608. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 198. 2009. *Paramignya armata* Bedd., Icon. Pl. Ind. Or. t. 275. 1868-1874; Hook.f., Fl. Brit. India 1: 511. 1875; Gamble, Fl. Madras 158(113). 1915, non (Thwaites) Oliver 1861; Ramach. & V.J. Nair, Fl. Cannanore Dist. 85. 1988.

Woody climbers with axillary spines. Leaves alternate, 4-9.5 x 2-4.5 cm, ovate-lanceolate, acuminate at apex, obtuse at base; lateral nerves 5-10 pairs, reticulate; petioles slender, 10-20 mm long, puberulent. Flowers axillary, solitary, rarely paired, ca 12 mm long; bracteoles 2, oblong, minute; pedicels slender, 15-17 mm long, glabrous. Calyx cupular, 1.5-2 mm, glandular; lobes 5, auricled, ca 0.5 mm long, glabrous. Petals 5, oblong, glabrous, glandular and white. Stamens 10, subequal; filaments linear, 4-6 mm long, densely pubescent. Ovary subglobose, ca 2 x 1.5 mm, 5-lobed, glabrous, 5-loculed with 1 locule in each; style cylindrical, ca 6.5 mm long; stigma 5-lobed. Berries globose or pyriform, ca 2 cm, glandular, pinkish; seeds 3-5, compressed.

Ambalappara, *KVB 31576*

Fl. & Fr.: June-January

Distribution: Fairly common in evergreen forests of Ambalappara and Pothurumi.

Paramignya monophylla Wight, Ill. Ind. Bot. 1:109, t.42. 1840; Hook.f., Fl. Brit. India 1:510.1875; Gamble, Fl. Madras 158(113). 1915; Ansari, Fl. Kasaragod Div. 92. 1985; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4:312.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 608. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 198. 2009.

Climbing shrubs, branches with recurved axillary thorns. Leaves alternate, 5-10 x 3-5 cm, ovate-oblong or elliptic, apex obtuse or acute, mucronate, base rounded, coriaceous, glabrous, lateral nerves and reticulation not prominent. Flowers 1-3, axillary. Calyx cupular, 5-lobed, pubescent. Petals white, narrowly oblong, imbricate. Stamens 10. Ovary densely pubescent, style puberulent. Berry subglobose or obovoid, 2-2.5 cm across, 3-5 grooved, yellow when ripe, downy-pubescent; seeds 3-5, flat.

Paripode, *KJD 26318*

Fl. & Fr.: October-March

Distribution: Fairly common in semi-evergreen forests of Paripode and Kariyenkappu.

TODDALIA A.L. Jussieu

Gen. 371. 1789, *nom. cons.*

Toddalia asiatica (L.) Lam., Tabl. Encycl. 2: 116. 1797; Gamble, Fl. Madras 150(107). 1915; Manilal & Sivar., Fl. Calicut 59. 1982; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 403.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 610. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 199. 2009. *Paullinia asiatica* L., Sp. Pl. 365. 1753. *Toddalia aculeata* (Sm.) Pers., Syn. Pl. 1: 249. 1805; Hook.f., Fl. Brit. India 1: 497. 1875. *Toddalia floribunda* Wall., Pl. Asiat. Rar. 3: 17, t. 232. 1832. *Toddalia asiatica* (L.) Lam. var. *floribunda* (Wall.) Kurz, J. Asiat. Soc. Bengal pt.2, Nat. Hist. 44: 130. 1875; Gamble, Fl. Madras 151(107). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 85. 1988. *Toddalia asiatica* (L.) Lam., Tabl. Encycl. 2: 116. 1797, var. *obtusifolia* Gamble, Fl. Madras 151(107). 1915. *Toddalia asiatica* (L.) Lam. var. *gracilis* Gamble, Fl. Madras 151(107). 1915.

Stragglers, the stem scrambling by the sharp, recurved prickles. Leaves trifoliolate; leaflets sessile, 3-6 x 1.5-2.5 cm, ovate to oblong-lanceolate, apex obtuse or acute, base acute, margins shallowly crenulate, thin-coriaceous; petiole to 2.5 cm, often prickly beneath. Panicles axillary, to 5 cm long. Flowers c. 4 mm across. Sepals small, deltoid. Petals 3 x 1.5 cm, oblong, cream coloured, glandular. Stamens 3 mm long. Ovary in the pistillate flowers on a short

gynophore. Fruit ca. 5 mm across, subglobose, apiculate, glandular, orange colour when ripe; seeds 3 or 4, subreniform.

Kattikari State Boundary, *KJD 26005*

Fl. & Fr.: February-July

Distribution: Fairly common in evergreen forests of Kattikari and Meenmutty.

VEPRIS Comm. ex A.Juss.

Mém. Mus. Hist. Nat. 12: 509. 1825.

Vepris bilocularis (Wight & Arn.) Engl., *Naturl. Pflanzenfam.* 3(4): 178. 1896; Gamble, *Fl. Madras* 151(108). 1915; K.N. Nair & M.P. Nayar in Hajra *et al.*, *Fl. Ind.* 4: 405. 1997; R.K. Premanath in P. Daniel, *Fl. Kerala* 1: 613. 2005; Ratheesh, *Fl. Stud. Wayanad Dist.* 199. 2009. *Toddalia bilocularis* Wight & Arn., *Prodr. Fl. Ind. Orient.* 149. 1834; Hook.f., *Fl. Brit. India* 1: 497. 1875. *Dipetalum bioculare* (Wight & Arn.) Dalzell, *Hooker's J. Bot. Kew Gard. Misc.* 2: 138. 1850.

Evergreen dioecious trees, to 25 m high; bark yellowish-grey. Leaves trifoliolate, alternate, leaflets 7-25 x 3-10 cm, elliptic, oblong, elliptic-oblong, elliptic-obovate, apex acuminate, base acute, cuneate or rarely oblique, pellucid-gland dotted; lateral nerves parallel, close, intramarginal nerve present, slender, prominent, intercostae reticulate, prominent; rachis 2-10 cm long, swollen at base. Flowers unisexual, in axillary and terminal panicles, yellow. Male flowers: calyx small, saucer-shaped, 2-3 lobed. Petals 2-4, free, orbicular, glandular. Stamens 6, inserted under the disk. Pistillodes cylindric, 2-cleft above. Female flowers: sepals and petals as in male flowers. Stamines rudimentary. Ovary superior, globose, 2-4-celled, ovules 2 in each cell; stigma capitate. Fruit a berry, globose, 2-celled, fleshy; seeds 2.

Paripode, *KJD 22547*

Fl. & Fr.: February-March

Distribution: Fairly common in semi-evergreen forests of Paripode and evergreen forests of Kannadivechakunnu. Endemic to southern Western Ghats, *Conservation Status:* Endangered.

ZANTHOXYLUM L.

Sp. Pl. 270. 1753.

- 1a. Leaves 3-foliolate, shrubs..... *Z. ovalifolium*
- 1b. Leaves pinnate, leaflets 13-23, trees..... *Z. rhetsa*

Zanthoxylum ovalifolium Wight, *Ill. Ind. Bot.* 1: 169. 1839; Hook.f., *Fl. Brit. India* 1: 492. 1875; Gamble, *Fl. Madras* 150(107). 1915; K.N. Nair & M.P. Nayar

in Hajra *et al.*, Fl. Ind. 4: 384. 1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 614. 2005 (Plate 12d).

Shrubs or straggaling shrubs, stem brownish, smooth. Leaves trifoliate, alternate, leaflets 8-12 x 3-4.5 cm, elliptic-obovate, apex abruptly acuminate, glabrous; nerves 15-18 pairs with an irregular intramarginal vein; petiole 5-10 cm long. Panicle to 5 x 2 cm, axillary, puberulus. Flowers few. Male flowers: 2-3 mm long. Sepals 4, triangular. Petals 2-3 mm long, white. Stamens 4. Female flowers: Sepals and petals as like as male flower. Staminodes 4, filiform. Ovary superior, ovules 2 in each cell. Capsule 6 mm across, globose, dark brown; seed one, globose, shining.

Ambalappara, NS & KVB 31340

Fl. & Fr.: April-October

Distribution: Fairly common in evergreen forests of Ambalappara.

Zanthoxylum rhetsa (Roxb.) DC., Prodr. 1: 728. 1824; Hook.f., Fl. Brit. India 1: 495. 1875; Gamble, Fl. Madras 150(107). 1925; Manilal & Sivar., Fl. Calicut 59. 1982; Ansari, Fl. Kasaragod Div. 93. 1985; K.N. Nair & M.P. Nayar in Hajra *et al.*, Fl. Ind. 4: 387.1997; R.K. Premanath in P. Daniel, Fl. Kerala 1: 615. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 200. 2009. *Fagara rhetsa* Roxb., Fl. Ind. 1: 438. 1820. *Fagara budrunga* Roxb., Fl. Ind. 1:437.1820. *Zanthoxylum budrunga* (Roxb.) DC., Prodr. 1:728.1824; Hook.f., Fl. Brit. India 495.1875; Gamble, Fl. Madras 150(107). 1915.

Deciduous trees armed with conical prickles, to 20 m high; bark brown. Leaves imparipinnate, alternate, clustered at the tips of branchlets; leaflets 13-23, opposite or subopposite, 6-19 x 3-6.5 cm, oblong, elliptic-oblong, oblong-ovate, apex acuminate or caudate-acuminate, base oblique, margin entire or crenate; lateral nerves 6-12 pairs, slender, pinnate; intercostae reticulate; rachis 30-45 cm long slightly grooved above. Flowers polygamous, greenish-yellow, 2-3 mm across, in terminal cymose panicles; Male flowers: Sepals 4, ovate-triangular, fimbriate along margin, green. Petals 4, free, elliptic-oblong, white or creamy yellow. Stamens 4. pistillodes solitary. Female flowers: sepals & petals as in male flowers. Ovary superior, 4-celled, ovules 2; stigma truncate. Fruit a capsule, of 1-4 cocci, tubercled, aromatic; seeds globose, blue-black.

Crossway, KJD 22555

Fl. & Fr.: March-November

Distribution: Common in evergreen forests of Cross way and Chavachi.

SAPINDACEAE

- 1a. Herbaceous climbers with tendrils *Cardiospermum*
- 1b. Shrubs trees or scandent shrubs without tendrils 2
- 2a. Perianth of one series, petals absent 3
- 2b. Perianth of two series, both sepals and petals present 4
- 3a. Lower pair of leaflets reniform stipulate; fruit 2-3-lobed,
densely muricate *Ottonaphelium*
- 3b. Lower leaflets not as above; fruit undivided, sparsely muricate *Schleichera*
- 4a. Leaves 3-foliolate *Allophylus*
- 4b. Leaves 5 or more foliolate 5
- 5a. Ovules 2 in each cell, fruit inflated 2-lobed *Harpullia*
- 5b. Ovule solitary in each cell, fruit not inflated 6
- 6a. Fruit tubercled, seeds arillate *Dimocarpus*
- 6b. Fruit not tubercled, seeds without aril 7
- 7a. Petals clawed, scaly inside *Lepisanthes*
- 7b. Petals not clawed, scales absent or minute *Sapindus*

ALLOPHYLUS L.

Sp. Pl. 348. 1753.

- 1a. Scandent shrubs *A. concanicus*
- 1b. Erect shrubs 2
- 2a. Leaves glabrous *A. subfalcatus* var. *distachyus*
- 2b. Leaves tomentose 3
- 3a. Inflorescence branched *A. cobbe*
- 3b. Inflorescence unbranched *A. serratus*

Allophylus cobbe (L.) Raeusch., Nomencl. Bot. (ed. 3) 108. 1797; Hiern in Hook.f., Fl. Brit. India 1: 673. 1875p.p; Ramach. & V.J. Nair, Fl. Cannanore Dist. 109. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 346. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 771. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 240. 2009. *Rhus cobbe* L., Sp. Pl. 267. 1753. *Schmidelia rheedei* Wight, Icon. Pl. Ind. Orient. t. 964. 1845. *Allophylus rheedei* (Wight) Radlk., Naturl. Pflanzenfam. 3(5): 313. 1895; Gamble, Fl. Madras 246(176). 1918; Ansari, Fl. Kasaragod Div. 106. 1985.

Large shrubs to small trees; young stem and peduncles densely yellowish brown pubescent. Leaves trifoliolate; leaflets 8-12 x 5-7 cm, ovate or elliptic-ovate or rhomboid-ovate, acute at apex, cuneate at base, margins serrate towards the

distal half, tomentose on both sides, domatia present in the axils of nerves; terminal leaflet larger; petiole to 11 cm long. Thyrses axillary, branched, longer than leaves, 12-16 cm long. Sepals 4, 0.5-1 mm long, ovate-obtuse. Petals 4, unequal, 0.5-1 mm long, white. Male flowers: Stamens 8, inserted on disk. Pisitilloide present. Bisexual flowers: stamens 8, Ovary 2 celled and 2-ovuled. Fruits ca. 4 mm across, globose; seeds erect.

Meenmutty, *KJD 26181*

Fl. & Fr.: June-November

Distribution: Fairly common in evergreen forests of Meenmutty and semi-evergreen forests of Paripode.

Allophylus concanicus Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 20:230.1890; Gamble, Fl. Madras 246(176). 1918; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5:348.2000; Ratheesh, Fl. Stud. Wayanad Dist. 241. 2009. *Allophylus concanicus* Radlk. var. *lanceolatus* Gamble, Fl. Madras 246(176). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 110. 1988.

Scandent shrubs; branchlets brownish, lenticellate. Leaves trifoliate, leaflets to 13 x 6 cm, ovate, acuminate, cuspidate; 6-nerved, serrate towards the apex, black above when dried; midrib pubescent; domatia hairy. Raceme branched, hispid. Flowers solitary or paired, 2 mm across; pedicel 1 mm long. Sepals orbicular, ciliate. Petals 5 mm across, densely white hairy within. Male flowers: Stamens 8, inserted on disk; filaments hairy, reddish, connective broad; disk lobes 4, globular. Pisitilloide present. Bisexual flowers: stamens 8, filaments hairy, reddish, connective broad. Ovary 2 celled and 2-ovuled. Fruit subglobose, glabrous.

Narikkadavu, *KVB 31209*

Fl. & Fr.: October-April

Distribution: Common in semi-evergreen forests of Narikkadavu, Pothanplavu and Kariyenkappu. Endemic to Western Ghats; Conservation Status: Critically Endangered.

Allophylus serratus (Roxb.) Kurz, J. Asiat. Soc. Bengal 44: 185. 1876; Gamble, Fl. Madras 246(175). 1918; Manilal & Sivar., Fl. Calicut 71. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 111. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 349. 2000; Ratheesh, Fl. Stud. Wayanad Dist. 241. 2009. *Ornitrophe serrata* Roxb., Pl. Coromandel t. 61. 1796. *Schmidelia serrata* (Roxb.) DC., Prodr. 1: 610. 1824. *Allophylus cobbe* f. *serratus* (Roxb.) Hiern in Hook.f., Fl. Brit. India 1: 673. 1875, p.p.

Shrubs; branchlets lenticellate. Leaves trifoliolate, leaflets to 18 x 9 cm, ovate, acuminate at apex, attenuate at base; nerves ca. 13 pairs; petiolule 3-7 mm long; petiole 8-10 cm long. Flowers 3-5-together, 4 mm across; pedicel 3 mm long, jointed; sepals 1.5 mm diam., orbicular. Petals 2 x 1 mm, spatulate; lobes of disk orbicular. Male flowers: Stamens 8, inserted on disk. Pistilloide present. Bisexual flowers: stamens 8. Ovary 2 celled and 2-ovuled. Drupe 4 mm across, puberulus.

Paripode, *KJD 18729*

Fl. & Fr.: July-October

Distribution: Along forest boundaries near Farm.

Allophylus subfalcatus Radlk., Rec. Bot. Surv. India 3: 342. 1907, var. **distachyus** (DC.) Mukerjee, Indian For. 98: 493. 1972; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 351. 2000; Ratheesh, Fl. Stud. Wayanad Dist. 241. 2009. *Schmidelia distachya* DC., Prodr. 1: 610. 1824. *Allophylus cobbe* forma *distachya* (DC.) Hiern in Hook.f., Fl. Brit. India 1: 673. 1875. *Allophylus distachys* (DC.) Radlk. in Engl. & Prantl, Naturl. Pflanzenfam. 3:313. 1895; Gamble, Fl. Madras 246(176). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 110. 1988; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 25,33. 1996.

Large shrubs; bark lenticelled, greyish white. Leaves long petioled, 3-foliolate; leaflets ovate-lanceolate, 7-24 x 0.5-8 cm, long-acuminate, unequal at base, lateral ones usually smaller, glabrous to glossy, chartaceous, distantly serrate-dentate, repand crenate. Racemes dense flowered, unbranched. Sepals glabrescent. Petals cuneate; disk puberulous. Stamens 8, inserted and in bisexual flowers surrounding the ovary. Ovary usually 2-lobed, 2-loculed; in male flowers merely a pistillode; styles 2, ovule 1 in each cell. Fruits clavate-ellipsoid, glabrous, orange red, seeds with short aril.

Pothurumi, *KVB 31779*; Kattikari, *KJD 31899*

Fl. & Fr.: November-March

Distribution: Fairly common in evergreen forests of Kattikari and Pothurumi.

CARDIOSPERMUM L.

Sp. Pl. 366. 1753.

Cardiospermum halicacabum L., Sp. Pl. 366. 1753; Hiern in Hook.f., Fl. Brit. India 1: 670. 1875; Gamble, Fl. Madras 244(175). 1918; Manilal & Sivar., Fl. Calicut 70. 1982; Ansari, Fl. Kasaragod Div. 107. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 111. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 356. 2000;

P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 774. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 242. 2009.

Climbing or trailing herbs. Leaves alternate, bi-ternate; leaflets 2-4 x 1-2.5 cm, ovate-lanceolate, deeply dentate or lobed, apex acute to acuminate, membranous; petiole to 3 cm long. Flowers white, polygamous in 3-7-flowered axillary tendril-bearing peduncles; peduncle up to 5 cm long. Sepals 4, in 2-pairs, outer pair smaller. Petals 4, white, unequal, with basal scales. Stamens 8; filaments unequal, pilose. Ovary 3-locular; ovule 1-per locule; stigma 3-fid. Capsule papery, inflated, 3-lobed, winged. Seeds one in each chamber, black with a white eye.

Narikkadavu, KJD 18759

Fl. & Fr.: July-February

Distribution: Along road side and disturbed forest areas.

DIMOCARPUS Lour.

Fl. Cochinch. 233. 1790.

Dimocarpus longan Lour., Fl. Cochinch. 233. 1790; Ramach. & V.J. Nair, Fl. Cannanore Dist. 111. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 358. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 776. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 242. 2009. *Euphoria longan* (Lour.) Steud., Nomencl. Bot. 1: 328. 1821. *Euphoria longana* Lam., Encycl. 3: 574. 1792. *Nephelium longana* (Lam.) Camp., Mém. Mus. Hist. Nat. Paris 18: 30. 1829; Hiern in Hook.f., Fl. Brit. India 1: 688. 1875; Gamble, Fl. Madras 252(180). 1918. *Scytalia longan* (Lour.) Raeusch., Nomencl. Bot. (ed.3) 113. 1797.

Evergreen trees, to 18 m, high; bark greyish or reddish-brown. Leaves paripinnate, alternate; leaflets 8-20, subopposite or alternate, 5-20 x 2.5-6 cm, oblong, elliptic-oblong or oblong-lanceolate, apex acute or acuminate, base oblique or acute, glaucous beneath; lateral nerves 14-17 pairs, parallel, prominent, intercostae reticulate, faint; rachis 12-18 cm, stout, grooved above, swollen at base, glabrous. Flowers polygamous, in terminal and axillary panicles or racemes, 5-6 mm across, yellowish-white. Calyx cupular, tomentose; lobes 5 or 6, ovate, saccate at base. Petals 5 or 6, oblong, pilose at base, deflexed. Stamens 8 or 10, inserted within the disk. Ovary superior, ovoid, 2 lobed, pubescent, 2-celled, ovule 1 in each cell; style simple; stigma bifid. Fruit a schizocarp of 1-2 cocci, 1-1.5 x 1 cm, globose, reddish-brown, with round tubercles or sometimes nearly smooth; seed one, black, covered by fleshy aril.

Chavachi, KJD 26049

Fl. & Fr.: March-August

Distribution: Fairly common in evergreen forests of Chavachi and Meenmutty.

HARPULLIA Roxb.

Fl. Ind. 2: 441. 1824.

Harpullia arborea (Blanco) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 16: 404. 1890; Ramach. & V.J. Nair, Fl. Cannanore Dist. 112. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 365. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 779. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 244. 2009. *Ptelea arborea* Blanco, Fl. Filip. (ed. 1) 63. 1837. *Harpullia imbricata* (Blume) Thwaites, Enum. Pl. Zeyl. 56. 1858; Gamble, Fl. Madras 253(180). 1918. *Octonychium imbricatum* Blume, Rumphia 3: 180. 1849. *Harpullia cupanoides* sensu Hiern in Hook.f., Fl. Brit. India 1: 692. 1875p.p., non Roxb. 1832.

Trees, to 15 m high, bole fluted; bark pale grey. Leaves pari pinnate, alternate; leaflets 8-12, subopposite or alternate, 5-20 x 2.5-10 cm, lanceolate, oblong, elliptic-oblong or elliptic-lanceolate, apex acuminate, base oblique; lateral nerves 7-12 pairs, pinnate, slender, prominent; intercostae reticulate, prominent; rachis 9-31 cm, slender, pubescent, swollen at base. Flowers polygamo dioecious, axillary, or subterminal drooping panicles, 10-12 mm long, yellowish-green. Sepals 5, free. Petals 5, long clawed, oblong; disk small, 5 lobed. Stamens 5-8, inserted within the disk; filaments slender; anthers oblong. Ovary superior, ovoid, 2-celled, ovules 2 in each cell, super posed; style elongate; stigma linear, usually more or less twisted. Fruit a capsule, 20-25 x 30-35 mm, scarlet, 2 lobed, 2-celled, inflated, loculicidally 2 valved, coriaceous; seeds 2, ellipsoid, black, shining; aril orange.

Moonamthode, NS & KVB 31392

Fl. & Fr.: January-April

Distribution: Rare in evergreen forests of Moonamthode.

LEPISANTHES Blume

Bijdr. Fl. Ned. Ind. 5: 237. 1825.

- 1a. Drupes united only at the base *L. erecta*
- 1b. Drupes united through out *L. tetraphylla*

Lepisanthes erecta (Thwaites) Leenh., Blumea 17: 69. 1969; Ramach. & V.J. Nair, Fl. Cannanore Dist. 113. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 368. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 781. 2005; Ratheesh, Fl.

Stud. Wayanad Dist. 244. 2009. *Nephelium erectum* Thwaites, Enum. Pl. Zeyl. 57. 1858. *Sapindus erecta* (Thwaites) Hiern in Hook.f., Fl. Brit. India 1: 683. 1875, "*erectus*". *Thraulococcus erectus* (Thwaites) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 8: 300. 1878; Gamble, Fl. Madras 251(179). 1918.

Shrubs. Leaves 35-50 cm long; Leaves paripinnate, alternate, leaflets 4 pairs, 20-25 x 5-9 cm, oblong, acute at either ends, nerves 10-13 pairs; petiolule 5 mm long, smooth. Panicle 20 x 5 cm, terminal, erect. Flowers clustered, subsessile. Sepals 5 x 3 mm, ovate, obtuse, pubescent outside. Petals 6 x 4 mm, obovate, broadly clawed; scale oblong, not lobed, hairy. Staminal filaments hairy above. Ovary superior, 3-celled, ovules 1. Capsule 1.5 x 1 cm, oblong, obtuse, minutely fulvous-tomentose.

Moonamthode, KJD 25583

Fl. & Fr.: October-January

Distribution: Rare in evergreen forests of Moonamthode.

Lepisanthes tetraphylla (Vahl) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 8: 276. 1878; Gamble, Fl. Madras 247(176). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 113. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 372. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 781. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 245. 2009. *Sapindus tetraphylla* Vahl, Symb. Bot. 3: 1794. *Hemigyrosa canescens* (Roxb.) Blume, Rumphia 3: 166. 1849; Hook.f., Fl. Brit. India 1: 671. 1875. *Molinaea canescens* Roxb., Pl. Coromandel t. 60. 1796. *Lepisanthes deficiens* (Wight & Arn.) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 8: 276. 1878; Gamble, Fl. Madras 247(176). 1918. *Sapindus deficiens* Wight & Arn., Prodr. Fl. Ind. Orient. 111. 1834.

Evergreen trees, to 15 m high; bark reddish-brown. Leaves paripinnate, alternate; leaflets 4-8, opposite or subopposite, 6-22 x 2-6 cm, elliptic, oblong, elliptic-oblong, obovate-oblong or oblong lanceolate, apex obtuse, emarginate, acute or acuminate, base acute, unequal; lateral nerves 6-13 pairs, pinnate; intercostae reticulate, prominent; rachis 1.5-20 cm, swollen at base. Flowers polygamodioecious, in axillary or terminal panicles, creamy yellow, crowded. Sepals 5, hairy outside; outer 2 smaller than inner 3, in 2 rows. Petals 4-5, obovate, subequal, obtuse, 2-fid, fimbriate. Stamens 8; filaments free, pilose; anthers ovoid. Ovary superior, globose, trigonus, 3-celled, ovules 1 each cell; style

simple; stigma oblique. Fruit a drupe, 2 x 1.5 cm, subglobose or trigonus, orange-yellow, tomentose, apiculate; seed one, oblong, exarillate.

Moonamthode, *KJD 31811*

Fl. & Fr.: February-July

Distribution: Fairly common in evergreen forests of Moonamthode.

OTONEPHELIUM Radlk.

Sapind. Holland-Ind. Nachtr. 71. 1879.

Otonephelium stipulaceum (Bedd.) Radlk., Sapindac. Holl. Ind. 71. 1879; Gamble, Fl. Madras 252(180). 1918; Ramach. & V.J. Nair, Fl. Cannanore Dist. 113. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 378. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 783. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 245. 2009. *Nephegium stipulaceum* Bedd., Trans. Linn. Soc. London 25: 212. 1865 & Icon. Pl. Ind. Or. t. 103. 1868-1874; Hiern in Hook.f., Fl. Brit. India 1: 690. 1875; Gamble, Fl. Madras 252(180). 1918 (Plate 12e).

Trees, to 18 m high; bark pale brown. Leaves paripinnate, alternate; leaflets 4-8, opposite, subopposite or alternate, lower pair of leaflets stipule like, sessile, 1-2.5 x 1-2 cm, reniform, other leaflets 5.5-21 x 3-10 cm, obovate or elliptic, apex acuminate, base oblique, acute or Cuneate, glaucous beneath; lateral nerves 9-10 pairs, parallel, intercostae scalariform, domatia present; rachis 3-20 cm. Flowers polygamous, in axillary and terminal panicles, cream coloured. Calyx cupular; lobes 6, villous within. Petals 0. Stamens 8, filaments unequal, inserted within the disk. Ovary superior, 2-4 lobed, 2-4-celled, pubescent, ovules 1 in each cell; style terminal 3-fid. Fruit a drupe of 1-3 cocci, 16-18 mm long, oblong or ovoid, covered with soft prickles; seeds 1-2, brown.

Kattikari State Boundary, *KJD 26016*

Fl. & Fr.: February-July

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Chavachi and Kattikari. Endemic to southern Western Ghats.

SAPINDUS Tourn. ex L.

Sp. Pl. 367. 1753 .

Sapindus trifoliatus L., Sp. Pl. 367. 1753; Hiern in Hook.f., Fl. Brit. India 1: 682. 1875; Ansari, Fl. Kasaragod Div. 108. 1985; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 382. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 785. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 246. 2009. *Sapindus laurifolius* Vahl, Symb. Bot. 3: 54.

1794; Gamble, Fl. Madras 250(178). 1918; Manilal & Sivar., Fl. Calicut 71. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 114. 1988.

Trees, to 18 m high; bark greyish-brown. Leaves paripinnate, alternate; leaflets 4-6, opposite or subopposite, 6.5-25 x 2.5-11.5 cm, elliptic-oblong, elliptic-lanceolate, elliptic or lanceolate, apex acuminate, base oblique, round or acute; lateral nerves 6-17 pairs, pinnate; intercostae reticulate, prominent. rachis 4.5-10 cm, swollen at base. Flowers polygamous, in axillary or terminal panicles, greenish-white, densely pubescent. Sepals 5, pubescent outside, unequal, in 2 series. Petals 5, linear-lanceolate, softly woolly on the inner surface except the claw. Stamens 8, inserted within the disk; filaments free, pilose. Ovary superior, tomentose, 2-3-celled, ovule 1; style terminal, stigma 2-3 lobed. Fruit a drupe, 16-18 mm across, globose, greenish-yellow, fulvous hairy when young, wrinkled when ripe; seeds 2-3, globose, black.

Poathanplavu, *KJD 22503*

Fl. & Fr.: February-November

Distribution: Common in semi-evergreen forests of Poathanplavu.

SCHLEICHERA Willd.

Sp. Pl. 4: 1096. 1806, *nom. cons.*

Schleichera oleosa (Lour.) Oken, Allg. Naturgesch. 3:1341. 1841; Manilal & Sivar., Fl. Calicut 71. 1982; Ansari, Fl. Kasaragod Div. 108. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 114. 1988; P.C. Pant in N.P. Singh *et al.*, Fl. Ind. 5: 384. 2000; P. Singh & E. Vajr. in P. Daniel, Fl. Kerala 1: 786. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 246. 2009. *Pistacia oleosa* Lour., Fl. Cochinch. 615. 1790. *Schleichera trijuga* Willd., Sp. Pl. 4: 1096. 1805; Hiern in Hook.f., Fl. Brit. India 1: 681. 1875; Gamble, Fl. Madras 248(177). 1915.

Deciduous trees, to 20 m high, bole fluted; bark grey. Leaves paripinnate, alternate; leaflets 4-6, opposite or subopposite, 5-15 x 1.8-4.5 cm, elliptic-oblong, ovate or obovate, apex acute or obtuse, base oblique or rarely obtuse; lateral nerves 10-23, parallel, prominent, intercostae reticulate, faint; rachis 5.5-11.5 cm, swollen at base. Flowers polygamodioecious, in axillary spicate panicles, 5-6 mm across, greenish-yellow. Male flowers: calyx lobes 5; petals 0. Stamens 7 or 8, free, inserted within the disk; filaments 1.5 mm, pilose; anthers oblong; pistillode small. Bisexual flowers: ovary 2 mm, superior, 3-celled, ovule 1; style rigid; stigma 2 or 3 lobed. Fruit a drupe, 16-18 mm across, subcrustaceous, pointed, often echinate with stout rather blunt prickles; seed one or 2, enclosed in a pulpy aril.

Poathanpalvu, *KJD 22506*

Fl. & Fr.: March-June

Distribution: Fairly common in semi-evergreen forests of Pothanplavu.

Order: Cornales

CORNACEAE

ALANGIUM Lam.

Encycl. 1: 174. 1783; nom. cons.

Alangium salviifolium (L.f.) Wangerin subsp. **hexapetalum** (Lam.) Wangerin, Pflanzenr. (Engler) IV 9. 1910; Gamble, Fl. Madras 572(404). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Ansari, Fl. Kasaragod Div. 184. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 209. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 410. 2009. *Alangium hexapetalum* Lam., Encycl. 1: 175. 1783. *Alangium salviifolium* var. *hexapetalum* (Lam.) Gamble, Fl. Madras 3: 572(404). 1919. *Alangium glandulosum* Thwaites, Enum. Pl. Zeyl. 133. 1859. *Alangium salviifolium* (L.f.) Wangerin subsp. *sundanum* (Miq.) Bloem., Bull. Jard. Bot. Buitenz. Ill, 16: 156. 1939; Matthew in Nayar *et al.*, Fasc. Fl. Ind. 19: 5. 1988.

Straggling climbers. Leaves 13-18 x 5-7 cm, obovate-oblong, apex acuminate, base round to subcordate; nerves 5 pairs, lowest pair from the base, rib-like; nervules reticulate, subparallel; petiole to 1 cm long. Flowers 2 cm long, in axillary fascicles; pedicels 8 mm long pubescent. Calyx cupular, 5 mm across, 7-teethed, densely tomentose. Petals 7, each 17 x 2 mm, linear-oblong, tomentose. Stamens 14, filaments 8 mm long, ciliate below; anthers 7 mm long, linear. Ovary inferior, 1-celled, ovule solitary, style 1, elongate, stigma capitate. Berry 2 x 1.3 cm, ellipsoid, tomentose.

Kariyenkappu, KVB 31364

Fl. & Fr.: March-August

Distribution: Rare in semi-evergreen forests of Pothanplavu.

Order: Ericales

BALSAMINACEAE

IMPATIENS L.

Sp. Pl. 937. 1753.

- 1a. Plants scapigerous 2
- 1b. Plants epiphytic, herbs or small shrubs 5
- 2a. Lip not spurred 3
- 2b. Lip spurred..... 4

- 3a. Bract large, leafy, green *I. veerapazhasii*
- 3b. Bract small, not leafy *I. stocksii*
- 4a. spur smaller than wing petals, dorsal auricles present *I. lawsonii*
- 4b. Spur larger than wing petals, dorsal auricles absent *I. scapiflora*
- 5a. Epiphytic herbs *I. jerdoniae*
- 5b. Annual herbs or perennial small shrubs or herbs 6
- 6a. Dorsal auricles present *I. goughii*
- 6b. Dorsal auricles absent 7
- 7a. Leaves alternate, perennial *I. hensloviana*
- 7b. Leaves opposite, annual 8
- 8a. Spur absent or inconspicuous *I. herbicola*
- 8b. Spur present, conspicuous 9
- 9a. Spur equal to or smaller than wings *I. diversifolia*
- 9b. Spur longer than wings 10
- 10a. Spur not curved *I. chinensis*
- 10b. Spur curved 11
- 11a. Spur cylindrical, flower more than 2 cm across *I. fasciculata*
- 11b. Spur narrow, flowers less than 1.5 cm across *I. minor*

Impatiens chinensis L., Sp. Pl. 937. 1753; Gamble, Fl. Madras 139(99). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 78. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 131. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 182. 2009; Jyosna & Janarthanam, Rheedea 21: 40. 2011. *Impatiens chinensis* L. var. *brevicornis* E. Barnes, J. Indian Bot. Soc. 18: 99. 1939; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4:121.1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 534. 2005.

Annual herbs, up to 60-70 cm tall, stem terete, channeled. Leaves opposite, 2-6 cm long, breadth 1-4 mm, linear-oblong, acuminate, rounded or sub cordate, Sparsely hairy above, coriaceous, glaucous beneath; margin sparsely serrate, lateral nerves not prominent; stipules subulate; petiole absent or veryshort. Flowers axillary, solitary or fascicle of 2-3, 1.5-3 cm across, purple flowers, pedicels slender, longer than leaf, 3-4 in flowers. Sepals linear acute. Lip boat shaped; spur slender, straight, basal portion bulged and slightly curved; standard orbicular; wings 2-lobed. Capsules 1-2 cm long, ellipsoid, turgid in middle; Seeds many, oblong, black shiny.

Ambalappara KJD 25494

Fl. & Fr.: June-January

Distribution: Common in evergreen forests of Ambalappara and Mullenpara and also grasslands.

Note: *Impatiens chinensis* L. is with curved spur but forma *longicalcarata*, Bhaskar has 3.5-4 cm straight spur, not bulged in the middle. Our specimen has 3-4 cm spur with bulging in the middle.

Impatiens diversifolia Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 139. 1834; Hook.f., Fl. Brit. India 1: 446. 1874; Gamble, Fl. Madras 140(99). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 79. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 141. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 539. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 183. 2009; Jyosna & Janarthanam, Rheedia 21: 45. 2011.

Diffuse, flaccid herbs, 15-40 cm high; stems rooting at lower nodes. Leaves opposite, 1-8 x 0.8-1.2 cm; lower ones short-petioled, elliptic or oblong; the upper sessile, linear-oblong or ligulate, cordate at base; stipules obscure, glandular. Flowers ca. 2 cm across, axillary, solitary or 2-nate, pink or rose; Pedicels 1-2 cm long, pubescent, deflexed in fruit. Lateral sepals linear, acuminate; spur filiform, 1-1.5 cm long; standard small; wings semiobovate, ca 1.2 x 0.8 cm. Capsules ellipsoid, ca 8 mm long, turgid; seeds globose, smooth, shining, dark brownish.

Ambalappara, *KJD 25493*

Fl. & Fr.: June-November

Distribution: Common in grasslands of Ambalappara. Endemic to Western Ghats.

Impatiens fasciculata Lam. Encycl.Method. 1:363. 1785; Wt. & Arn. Prodr. Fl. Ind. Orient. 138.1834; Wight, Icon. Pl. Ind. Orient. t. 748.1844; Hook., Curtis Bot. Mag. 8: P. & t. 4631. *Impatiens vivekananthanii* J. Dessai & Janarth., Rheedia 21: 58. 2011 (Plate 12f).

Herbs, 60-70 cm high; stem quadrangular. Leaves opposite-decussate, sessile or subsessile, linear-oblong to spatulate, 3.5-7 X 0.5-1.2 cm, acute to apiculate at apex, truncate at base, distantly serrate at margins; petioles. Flowers 2 or 3 (4), pink with maroon throat. Lateral sepals linear to linear-oblong, pinkish white, 3-nerved. Standard petal reniform, concave, glabrous, white to pinkish white, dorsally keeled; keel mucronate at apex; wing petals, 2-lobed; basal lobe acute to rounded at apex; distal lobe much larger than basal lobe; lip conical, glabrous to sparsely minutely hairy, dark pink-nerved, pink; spur tubular, 2-4 cm long, notched at apex, glabrous to sparsely minutely

hairy. Anthers 10, yellow. Pistil ca. 5 mm long. Ovary asymmetrically oblongoid, glabrous.

Ambalappara, *KJD 26301, NS & KJD 26125*

Fl. & Fr.: July-January

Distribution: Common in grasslands of Ambalappara. Endemic to Western Ghats

Note: The present collection from the Sanctuary is a new record of occurrence for Kerala.

Impatiens goughii Wight, Ill. Ind. Bot. 1: 160. 1840; Hook.f., Fl. Brit. India 1: 452. 1874; Gamble, Fl. Madras 144(102). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 152. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 542. 2005. *Impatiens anamallayensis* Bedd., Icon. Pl. Ind. Or. t. 150. 1868-1874. *Impatiens microtheca* Hook.f., Hooker's Icon. Pl. 30: t. 2910. 1910 (Plate 12g).

Annual herbs, 5-30 cm high; stems simple or branched. Leaves opposite, 1.5-3.5 x 0.8-1.5 cm, ovate, subacute at apex, crenate-serrulate along margins; petioles up to 2 cm long. Flowers in terminal subumbels, pale pink; peduncles 2-5 cm long; pedicels up to 1.5 cm long; bracts persistent, minute, lanceolate. Lateral sepals falcate, ca. 2 mm long. Lip cymbiform; spur shorter than wings, straight. Standard obovate, mucronate at the reflex apex; wings bilobed; basal lobes oblong, rounded at apex; distal lobes longer than basal ones; dorsal auricle produced into the spur. Capsules ellipsoid, 3-5 mm long; seeds 6-12, almond-shaped, chestnut-coloured, granular with hairs.

Ambalappara, *KJD 25438*

Fl. & Fr.: July-December

Distribution: Common in evergreen forests of Ambalappara. Endemic to Western Ghats.

Impatiens henslowiana Arn., Compan. Bot. Mag. 1:322.1836; Hook.f., Fl. Brit. India 1:458.1874; Gamble, Fl. Madras 143(102). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 155. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 543. 2005. *Impatiens albida* Wight, Madras J. Lit. Sci. ser. 1, 5: 7. 1837 & Ic. t. 743. 1844.

Shrubs; stem with prominent leafscars. Leaves opposite decussate, 9 x 3 cm, lanceolate, acuminate, base cuneate, serrate, with stipitate glands at the base of the lamina, pubescent; petiole to 3 cm, ebracteate. Flowers solitary, white, pedicels to 9 cm. Lip to 2 cm, pubescent; spur to 1.5 cm. Lateral sepals ovate, mucronate. Petals 3.5 cm, white. Capsule ellipsoid, puberulus; seeds papillose.

Ambalappara, *NS & KJD 31942*

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Ambalappara.

Impatiens herbicola Hook.f., Bull. Misc. Inform. Kew 1911: 354. 1911; Gamble, Fl. Madras 141(100). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 156. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 544. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 184. 2009.

Branched glabrous herbs, 25 cm high, erect. Leaves opposite, to 4.5 x 0.5 cm, linear-oblong, nearly entire, young ones pubescent above. Flowers paired, axillary; pedicels 1.5 cm long, pubescent on one side along a line. Sepals 4.5 mm long, linear, pubescent. Lip 5 x 2 mm, boat-shaped, cuspidate, hairy; spur inconspicuous. Standard petal 3 x 3.5 mm, obovate; keel ciliate, produced into a short cusp; wings 5 x 2 mm, 2-lobed; basal lobe shorter, dorsal auricle minute. Capsule 7-10 mm long, glabrous; seeds many, glabrous, dark-brown.

Ambalappara, *KJD 25453*

Fl. & Fr.: August-October

Distribution: Rare in the grasslands and evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Impatiens jerdoniae Wight, Madras J. Lit. Sci. ser. 1, 5: 8. 1837; Hook.f., Fl. Brit. India 1: 460. 1874; Gamble, Fl. Madras 139(99). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 159. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 545. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 185. 2009 (Plate 12h).

Succulent epiphytic herbs, 8-16 cm high; stem tumid, green or yellow. Leaves a few, alternate, 5-7 cm long, elliptic, glandular-ciliate at base and on top of petiole, serrate at margin, few-nerved. Flowers solitary or 2-nate, 3.5-5 cm long; pedicels 2-7 cm long; bracts setaceous. Lateral sepals elliptic, green. Lip laterally compressed, scarlet; spur large, ventricose, wrinkled. Standard petal orbicular, apiculate, narrowly keeled on back, yellow; wings 2-lobed, concealed under lip, yellow; lobes rounded, overlapping. Capsule ellipsoid.

Ambalappara, *KJD 26157*

Fl. & Fr.: August-November

Distribution: Common epiphyte on trees in evergreen forests of Ambalappara. Endemic to Western Ghats.

Impatiens lawsonii Hook.f., Rec. Bot. Surv. India 4: 45. 1906; Gamble, Fl. Madras 139(99). 1915; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 170. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 185. 2009 (Plate 12i).

Epiphytic annual scapigerous tuberous herbs, up to 15 cm tall. Leaves radical, 2 x 1.2 cm, ovate, crenate, obtuse or rounded, sparsely hairy above; petioles up to 2 cm long. Flowers ca. 1 cm across, white, in 4-6-flowered straight scapes; bracts ca 1.5 mm long, persistent; pedicel filiform, in fruit ca 2 mm long, glabrous. Sepals ovate, acuminate, 3-4-nerved. Lip funnel-shaped, spur conical. Wing petals 3-lobed, ca 1.5 cm long, dorsal auricle short, spiniferous, pale pink with yellow tinge at centre, whitish outside; standard hook-like, enclosing the stamens. Capsules 5-7 mm long, ovate, raised in the centre, glabrous; seeds powdery, minute, hairy.

Ambalappara, KJD 25451

Fl. & Fr.: August-October

Distribution: Common in evergreen forests of Ambalappara on wet rocks and trees. Endemic to southern Western Ghats.

Impatiens minor (DC.) Bennet, Indian J. For. 2: 283. 1979; Ansari, Fl. Kasaragod Div. 89. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 80. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 181. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 550. 2005; Jyosna & Janarthanam, Rheedeia 21: 49. 2011. *Balsamina minor* DC., Prodr. 1: 686. 1824. *Impatiens kleinii* Wight & Arn., Prodr. Fl. Ind. Orient. 140.1834; Hook.f., Fl. Brit. India 1:445.1874; Gamble, Fl. Madras 140(100).1915; Vajr., Fl. Palghat Dist. 100.

Slender glabrous branched herbs. Leaves opposite, 5 x 2 cm elliptic-lanceolate, or oblong-obovate, acute or acuminate, base acute, serrulate, with a pair of stalked glands at the base; petiole to 5 mm long. Flowers pink-violet, 8 mm across; pedicels slender, 1-1.5 cm long, deflexed in fruits. Sepals linear-subulate. Standard petal orbicular; wings broadly ovate, entire, clawed. Spur slender, to 1.5 cm long. Capsule linear, 2 cm long; seeds black.

Kariyenkappu, KJD 26054

Fl. & Fr.: August-December

Distribution: Common along the boundaries of Forests and also in evergreen forest of Meenmutty. Endemic to Peninsular India.

Impatiens scapiflora B.Heyne ex Roxb., Fl. Ind. 2: 464. 1824; Hook.f., Fl. Brit. India 1:443. 1874; Gamble, Fl. Madras 138 (98). 1915; Ansari, Fl. Kasaragod Div.

89. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 80. 1988; Vivek. *et al.* in Hajra *et al.*, Fl. Ind. 4: 208. 1997; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 557. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 187. 2009; Jyosna & Janarthanam, Rheedia 21: 35. 2011. *Impatiens rivalis* Wight, Icon. Pl. Ind. Orient. t. 751. 1844.

Scapigerous epiphytic herbs. Leaves radical, 13 x 8 cm, ovate, obtuse, cordate at base, glabrous; petiole 10-20 cm long. Scape to 35 cm long; Flowers ca. 4 cm across, confined towards the apex of peduncle; bracts 5-8 mm long, ovate, acute; pedicels 4-5 cm long. Sepals 4 x 3 mm, ovate, acute. Lip ovate, obtuse, spur 4-5 cm long, glabrous. Standard petal concave at base, obtuse at apex; lobes of wing petals subequal, oblong, obtuse. Capsule 1.2 cm long, ellipsoid, glabrous; seeds glandular-hairy.

Ambalappara *KJD 26128*, Meenmuttytti *KJD 26176*

Fl. & Fr.: July-December

Distribution: Common in evergreen forests of Ambalappara, Meenmutty, Moonamthode and Chavachi on wet rocks. Endemic to Western Ghats.

Note: *I. scpiiflora* from Sanctuary shows variations with respect to altitude. The leaves of *I. scpiiflora* from high (+ 1,400 m) altitude show similarity with *I. levingei*.

Impatiens stocksii Hook.f. & Thomson, J. Linn. Soc. Bot. 4: 156. 1860; Hook.f., Fl. Brit. India 1: 442. 1874; Gamble, Fl. Madras 1879 (1294). 1936; Jyosna & Janarthanam, Rheedia 21:37.2011. *Impatiens crenata* sensu Ramach. & V.J. Nair, Fl. Cannanore Dist. 78. 1988; N.C. Rathakr. *et al.* in P. Daniel, Fl. Kerala 1: 537. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 183. 2009, non Bedd. 1859 (Plate 12j).

Slender scapigerous, epiphytic herbs, to 15 cm high. Leaves radical, 1.5-4.8 x 1.3-1.5 cm, variable, orbicular-reniform, cordate or oblong-ovate, crenate at margin, pubescent above, glabrous beneath; nerves flabellate. Scapes to 10 cm long; bracts ovate, small; pedicels stout, ca 1 cm long. Flowers 3-6 in a raceme, ca. 2 cm across, pink. Lateral sepals ovate, obtuse. Lip cymbiform; spur short or absent. Standard somewhat rhomboid, cucullate, crenate as broad as long or broader; wings 3-lobed; distal lobe longer. Capsules ellipsoid, acute; seeds linear-oblong, minute.

Ambalappara, *KJD 25452*

Fl. & Fr.: August-November

Distribution: Rare in evergreen forests of Ambalappara on trees and wet rocks. Endemic to southern Western Ghats.

Impatiens veerapazhasii Ratheesh, Sujanapal & Meera, J. Bot. Res. Inst. Texas 5: 155. 2011 (Plate 12k).

Epiphytic, scapigerous herbs. Leaves 2-4, simple, radical, 5-10 × 2-4 cm highly variable, broadly ovate or ovate-lanceolate, rounded or obtusely acute at apex, obliquely cordate or deeply cordate at base, margins distantly serrate, papillate on margins; nerves 5-7 pairs, pinkish below; petiole 2-3 cm long with pinkish stripes and spots. Inflorescence scapose, unbranched, 4-8 cm long, 3-many flowered, racemose. Flowers white with yellow center; 1.5-2 × 2-2.5 cm; bracts strongly hairy, persistent. Lateral sepals lanceolate. Dorsal petal reniform; lateral united petals 3-lobed, ca. 13 × 8 mm, white with yellow papillate base, dorsal auricle small, 1-2 mm, yellow. Stamens 5, short and broad. Ovary oblong, 5-celled; stigma sessile, 5-lobed. Capsule oblong, valves 5, many seeded; seeds tubercled.

Ambalappara, *KJD 25437*

Fl. & Fr.: July-September

Distribution: Common in evergreen forests of Ambalappara on wet rocks and trees. Endemic to southern Western Ghats.

Note: New collection locality after its type collection in 2011.

EBENACEAE

DIOSPYROS L.

Gen. Pl. ed. 6. 550. 1764.

- 1a. Mature leaves and branchlets shaggy-tomentose2
- 1b. Mature leaves and branchlets glabrous3
- 2a. Leaves less than 1.5 cm broad; fruits glabrous *D. buxifolia*
- 2b. Leaves over 2.5 cm broad; fruit densely tomentose*D. pruriens*
- 3a. Calyx 5-lobed4
- 3b. Calyx 4-lobed5
- 4a. Fruit sessile or subsessile, calyx adnate to the fruit, woody *D. bourdillonii*
- 4b. Fruit pedicelled, calyx free from the fruit, foliaceous *D. paniculata*
- 5a. Corolla salver shaped; stamens 36*D. assimilis*
- 5b. Corolla campanulate or urceolate; stamens 12-206
- 6a. Young shoots, pedicels and calyx rufous tomentose..... *D. nilagirica*
- 6b. Young shoots, pedicels and calyx glabrescent, not rufous tomentose*D. ovalifolia*

Diospyros assimilis Bedd., Rep. Forest. Madr. 20. t.1. 1866-1867; C.B. Clarke in Hook.f., Fl. Brit. India 3: 558. 1882; Gamble, Fl. Madras 775(545). 1923; V. Singh, Monogr. Indian Diospyros 44. 2005.

Evergreen dioecious trees, to 20 m high; bark black. Leaves alternate, 7-17.5 x 3.5-6.5 cm, ovate, obovate, oblong, elliptic-oblong or elliptic-obovate, apex acuminate, base acute or unequally round; lateral nerves 4-7 pairs, lowest pair usually opposite, pinnate, intercostae reticulate; petiole 5-10 mm long. Flowers unisexual, pale yellow, sessile; male flowers dense axillary cymes; female flowers larger. Calyx 2 mm long, cupular, densely tomentose in female; lobes 4, ovate, obtuse, glabrous, margin ciliate. Corolla 10 mm long, salver shaped, densely minutely tomentose; lobes 4, 6 x 4 mm, ovate, acute, tomentose outside. Stamens 36, in groups of 4; filaments glabrous, unequal; anthers shortly unequal, acute, connective thinly villous along the back. Ovary superior, 8-celled, ovule 1-in each cell. Fruit a berry, globose, green, smooth.

Chavachi, NS & KVB 31309

Fl. & Fr.: February-August

Distribution: Fairly common in evergreen forests of Chavachi, Chelachode and Meenmutty. Endemic to Western Ghats.

Diospyros bourdillonii Brandis, Indian Trees 435. 1906; Gamble, Fl. Madras 777(546). 1923; V. Singh, Monogr. Indian Diospyros 54. 2005.

Evergreen dioecious trees, to 25 m high, bole buttressed; bark black. Leaves alternate, 7-17 x 2.5-8 cm, oblong, ovate-oblong, oblong-obovate or oblong-lanceolate, apex acuminate, base round or obtuse; lateral nerves 6-8 pairs, pinnate, prominent, intercostae scalariform, prominent; petiole 5-10 mm long, stout, pubescent when young. Flowers unisexual, white; male flowers in rusty tomentose axillary cymes, 10-12 mm long, female flowers in brown tomentose compound cymes from old wood. Calyx 5-lobed, lobes 3 mm long, ovate, acute, brown tomentose. Corolla tube urceolate, hispid; lobes 5, white, orbicular, deflexed. Stamens 12-18, in 2 rows, equal; staminodes 10. Fruit a berry, 7.5 cm across, globose, dark green; persistent calyx cup-like, woody with short pointed lobes.

Chavachi, NS & KVB 31390

Fl. & Fr.: March-December

Distribution: Fairly common in plantations of Kariyenkappu; evergreen forests of Chavachi and Asthippara. Endemic to southern Western Ghats.

Diospyros buxifolia (Blume) Hiern, Trans. Cambridge Philos. Soc. 12: 218. 1873; V. Singh, Monogr. Indian Diospyros 56. 2005. *Leucoxyllum buxifolium* Blume, Bijdr. Fl. Ned. Ind. 1169. 1826. *Diospyros microphylla* Bedd., Icon. Pl. Ind. Or. t.

133. 1868-1874; C.B.Clarke in Hook.f., Fl. Brit. India 3: 559. 1882; Gamble, Fl. Madras 776(546). 1923.

Trees, to 30 m high, bole buttressed; bark blackish-grey. Leaves alternate, bifarious, 1-4.5 x 0.6-2 cm, elliptic-ovate, ovate, ovate-oblong or ovate-lanceolate, apex acute, base acute or cuneate; lateral nerves 2-3 pairs, pinnate, faint, intercostae obscure; petiole 2-3 mm, hispid. Flowers unisexual, white. Male flowers: 2-3 mm, 1-4 together in subsessile small axillary cymes. Calyx densely fulvous-hairy outside; lobes 4. Corolla campanulate, tube 0.1-0.15 cm long; lobes 4, orbicular. Stamens 16, in pairs, united by their filaments at base; anthers ovate, dehiscence by apical pores; pistillodes minute, hairy. Female flowers: 7-8 mm, solitary. Calyx and corolla as in males. Ovary superior, ovoid, pubescent, 4-celled, ovule 1; style short 2 partite. Fruit a berry, 15-18 x 10-12 mm, oblong, pointed, purple, glabrous; seeds 1-2.

Kannadivechakunnu, *KJD 18792*

Fl. & Fr.: January-May

Distribution: Fairly common in evergreen forests of Kannadivechakunnu.

Diospyros nilagirica Bedd., Icon. Pl. Ind. Or. t. 136. 1868-1874; C.B.Clarke in Hook.f., Fl. Brit. India 3: 566. 1882; Gamble, Fl. Madras 775(545). 1923; V. Singh, Monogr. Indian Diospyros 181. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 499. 2009.

Evergreen dioecious trees, to 18 m high; bark black.. Leaves alternate, 5-15 x 2-4 cm, elliptic, oblong-lanceolate or ovate, apex acuminate, base attenuate, margin entire, reflexed; lateral nerves 6-9 pairs, slender, pinnate, faint, intercostae reticulate; petiole 6-12 mm. Flowers unisexual, yellowish-white. Male flowers: 3-6, in axillary cymes. Calyx campanulate, deeply 4 lobed; lobes broadly ovate or orbicular, densely fulvous hairy. Corolla salver shaped; lobes 4, ovate, obtuse, hairy without, twisted. Stamens 16, in pairs of unequal length; filaments of each pairs connate at base. Pistillode globose. Female flowers : solitary, axillary calyx and corolla as in male. Staminodes 8. Ovary superior, sessile, globose, 8-celled, ovule 1, densely hairy; styles 4; stigma dilated. Fruit a berry 2.5 x 2.5 cm, globose; seeds 12 x 7 mm, compressed.

Ambalappara, *KVB 31714*; Asthipara, *KJD 26079*

Fl. & Fr.: February-May

Distribution: Fairly common in evergreen forests of Ambalappara and Asthipara. Endemic to southern Western Ghats.

Diospyros ovalifolia Wight, Icon. Pl. Ind. Orient. t. 1227. 1848; C.B. Clarke in Hook.f., Fl. Brit. India 3: 559. 1882; Gamble, Fl. Madras 777(546). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 265. 1988; V. Singh, Monogr. Indian Diospyros 185. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 500. 2009.

Dioecious trees, to 20 m high; bark dark brown. Leaves alternate, 6.5-15 x 2-7 cm, elliptic, oblanceolate, obovate or obovate-oblong, apex subacute, obtuse or round, base cuneate or acute; lateral nerves 5-8 pairs, pinnate, slender, prominent, intercostae reticulate; petiole 7-15 mm long, stout, grooved above. Flowers unisexual, in short fascicles. Male flowers: Calyx broadly campanulate, lobes 4-5, appressed-hairy, margin ciliate. Corolla tubular-campanulate, thin fleshy; tube 4 mm long; lobes 4. Stamens 14-20, paired, unequal. Female flowers: Calyx broadly campanulate; lobes 4-5, appressed hairy without, margin ciliate. Corolla tubular-campanulate, 4 mm long, thin fleshy; lobes 5. Staminodes 4. Ovary superior, 4-celled, ovule 1; stigma 4-lobed. Fruit a berry, 1-2 cm across, calyx strongly reflexed, tawny-pubescent.

Pothurumi, KVB 31732

Fl. & Fr.: March-August

Distribution: Rare in evergreen forests of Pothurumi.

Diospyros paniculata Dalzell, Hooker's J. Bot. Kew Gard. Misc. 4:109.1852; C.B. Clarke in Hook.f., Fl. Brit. India 3: 570. 1882; Gamble, Fl. Madras 775(544). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 265. 1988; V. Singh, Monogr. Indian Diospyros 189. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 500. 2009 (Plate 12l).

Dioecious trees, to 15 m high; bark black. Leaves alternate, 12-20 x 4-7 cm, oblong or oblong-lanceolate, base acute, round or cuneate, apex acute, acuminate or obtusely acuminate; lateral nerves 6-9 pairs, pinnate, prominent, intercostae reticulate, surface finely reticulate; petiole 7-10 mm long, stout, wrinkled. Flowers unisexual, greenish-yellow. Male flowers: 3-5 together in short paniced cymes with a pair of ovate-cordate bracts; bracts pubescent. Calyx 10 x 12 mm, globose, 5-angled, minutely hispid, deeply lobed; lobes-5. Corolla dull or creamy white, tube 12 mm long, pentagonal; lobes 5. Stamens 16-20 in pairs, equal. Female flowers; solitary, axillary. Calyx glabrescent. Staminodes 10. Ovary superior, 4-celled, ovule 1; stigma 4, unequal. Fruit a berry, 3-4 x 2-3 cm, obtusely 5-angled, yellowish-brown; seeds few.

Meenmutty, KVB 31509

Fl. & Fr.: January-April

Distribution: Common in evergreen forests of Chavachi, Kurumbankallu and Meenmutty; plantations of Kariyenkappu and semi-evergreen forests of Pothanplavu and Paripode. Endemic to Peninsular India.



a. *Dysoxylum malabaricum*



b. *Reinwardtiodendron anamalaiense*



c. *Atalantia wightii*



d. *Zanthoxylum ovalifolium*



e. *Otonephelium stipulaceum*



f. *Impatiens fasciculata*



g. *Impatiens goughii*



h. *Impatiens jerdoniae*



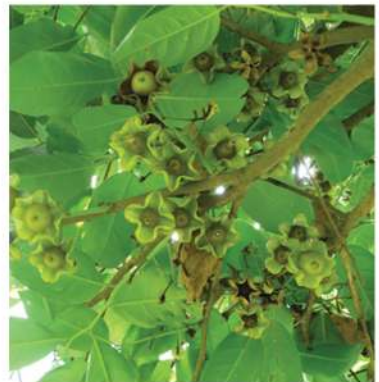
i. *Impatiens lawsonii*



j. *Impatiens stocksii*



k. *Impatiens veerapazhasii*



l. *Diospyros paniculata*

Diospyros pruriens Dalzell, Hooker's J. Bot. Kew Gard. Misc. 4: 110. 1852; C.B. Clarke in Hook.f., Fl. Brit. India 3: 553. 1882; Gamble, Fl. Madras 774(544). 1923; Ansari, Fl. Kasaragod Div. 222. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 265. 1988; V. Singh, Monogr. Indian Diospyros 207. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 501. 2009.

Dioecious trees, to 10 m high; bark black. Leaves alternate, 6-16 x 2-5 cm, elliptic or elliptic-oblong or oblong-lanceolate, apex acute or obtusely acuminate, base round or subcordate; lateral nerves 7-12 pairs, pinnate, slender, prominent, secondary laterals present, intercostae reticulate; petiole 3-5 mm long, stout, hirsute. Flowers unisexual, yellowish-white. Male flowers: 1-2 flowered axillary cymes; bracts small, ovate. Calyx fulvous hairy; lobes 4, linear-oblong. Corolla silky hairy outside; lobes 4, ovate-oblong. Stamens 12-14, unequal, connate at the base. Pistillode densely hairy. Female flowers: solitary, crowded in the upper axils. Calyx 4 partite; lobes oblong, hairy. Corolla 4-fid. Staminodes 4, small. Ovary superior, 4-celled, ovule 1; style 2, short, bifid at the apex. Fruit a berry 2.5 cm long, calyx lobes persistent.

Kattikkari, KVB 31568

Fl. & Fr.: March-August

Distribution: Fairly common in evergreen forests of Kattikkari and Moonamthode. Endemic to Western Ghats.

ERICACEAE

VACCINIUM L.

Sp. Pl. 349. 1753.

Vaccinium neilgherrense Wight, Calcutta J. Nat. Hist. 8:173.1847 & Icon. Pl. Ind. Orient. t. 1189. 1848; Hook.f., Fl. Brit. India 3: 454. 1882, "nilgherrense"; Gamble, Fl. Madras 741(521). 1921 (Plate 13a).

Small trees, branchlets drooping. Leaves alternate, 9 x 1.5 cm, lanceolate, acuminate, crenate-serrate; nerves very oblique. Flowers 10 mm long, in axillary racemes. Calyx tube globose, glabrous, lobes ovate, ciliate. Corolla 6-8 mm long, white with pink shades, glabrous, lobes ovate, spreading. Stamens 10, free, filaments tomentose. Ovary inferior, 5-celled; ovules many; style cylindrical. Berry globose, 8 mm across; seeds many.

Ambalappara, NS & KVB 31353, 31756

Fl. & Fr.: February-April

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

LECYTHIDACEAE

CAREYA Roxb.

Pl. Coromandel 3: 13. 1811, *nom. cons.*

Careya arborea Roxb., Pl. Coromandel t. 218. 1811; C.B. Clarke in Hook.f., Fl. Brit. India 2: 511. 1879; Gamble, Fl. Madras 488(345). 1919; Manilal & Sivar., Fl. Calicut 108. 1982; Ansari, Fl. Kasaragod Div. 160. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 184. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 365. 2009.

Deciduous trees, to 12 m high; bark brownish. Leaves alternate, clustered at the tips of branchlets, 15-30 x 5-15 cm, obovate, oblong-obovate, apex round or shortly acuminate, base cuneate or attenuate and decurrent on petiole, margin crenate-serrate; lateral nerves 10-12 pairs, parallel, prominent, intercostae reticulate; petiole 10 mm long, slender, pubescent. Flowers bisexual, greenish-white, 5-10 mm across, in terminal spikes; bracts 3, unequal. Calyx tube campanulate, glabrous, adnate to ovary; lobes 4, ovate. Petals 4, elliptic-oblong, revolute along margin. Stamens numerous in several rows, slightly connate at base; filaments subulate. Ovary inferior, 4-5-celled, ovules many in each cell; style long, filiform; stigma capitate. Fruit a berry, 5-7.5 cm across, globose, green, pericarp fibrous, crowned with sepals and style.

Paripode, KJD 18760

Fl. & Fr.: February-July

Distribution: Rare in Deciduous forests of Paripode.

PRIMULACEAE

- 1a. Ovary half inferior; berry many seeded..... Maesa
- 1b. Ovary superior; berry 1-seeded 2
- 2a. Climbing shrubs; flowers in terminal paniced racemes Embelia
- 2b. Erect shrubs or trees; flowers not in panicles..... 3
- 3a. Flowers densely clustered in fascicles Myrsine
- 3b. Flowers in umbels or racemes Ardisia

ARDISIA Gaertn.

Fruct. Sem. Pl. 2: 78. t. 94. 1790. *nom. cons.*

- 1a. Flowers 2 cm across, in simple racemes..... *A. solanacea*
- 1b. Flowers 1 cm across, in paniculate umbels *A. brahmagiriensis*

Ardisia solanacea Roxb., Pl. Coromandel t. 27. 1795 & Fl. Ind. 1:580.1832; Gamble, Fl. Madras 756(531).1921; Ramach. & V.J. Nair, Fl. Cannanore Dist.

262. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 491. 2009. *Ardisia humilis* sensu Wight, Icon. Pl. Ind. Orient.t.1212. 1848, non Vahl 1794; C.B.Clarke in Hook.f., Fl. Brit. India 3: 529. 1882.

Trees, to 6 m high; bark brown, smooth. Leaves alternate, 10-18 x 4-6 cm, obovate, elliptic-obovate or oblanceolate, apex acuminate or acute, base cuneate, margin entire or obscurely crenate, glaucous beneath, gland-dotted; lateral nerves 9-20 pairs, parallel, slender, obscure; petiole to 10 mm long. Flowers in axillary or lateral umbels, 1.3 cm across, bright pink; bracts 1.5-2 mm long. Calyx lobes 5, 3 x 1.5 mm, concave, ovate, obtuse, ciliate. Corolla 2.5 cm across; lobes 5, twisted to right, in bud, 10 x 7 mm, ovate, punctate. Stamens 5, connivent around style, exserted; filaments short; anthers sagittate, 7 mm. Ovary superior, globose 3 x 2 mm, 1-celled; ovules many; style elongate, as long as the corolla lobes; stigma terminal. Fruit a berry 8 mm across, globose, bright red.

Kannadivechakunnu, NS & KVB 31373

Fl. & Fr.: March-August

Distribution: Rare in evergreen forests of Kannadivechakunnu.

Ardisia brahmagiriensis Dantas, Sasidh. & Sujanapal *sp. nov.* (in ed.) (Plate 13b).

Large shrubs. Leaves alternate, 10-22 x 4-6 cm, ovate to elliptic, acute to acuminate at apex, acute at base, entire; nerves ca. 16 pairs, strongly punctate along the margins; petiole 5 mm long. Umbels terminal or axillary, 5 x 5 cm, peduncled; pedicels 5-6 mm long. Flowers 5-15 in an umbel, pale white. Calyx lobes 5, 3 x 1.5 mm, ovate, acute, hairy. Corolla lobes 5, 4 mm long, ovate, acute, punctate; anthers acute. Berry 6-7 mm across, black, glabrous.

Pothurumi, KVB 31664

Fl. & Fr.: November-June

Distribution: Common in evergreen forests of Kattikkari and Pothurumi.

Note: This species is allied to *A. sonchifolia*, but differs by its elliptic-ovate lanceolate leaf, acuminate base, glabrous, unbranched umbel, white corolla.

EMBELIA Burm.f.

Fl. Ind. 62. 1768. *nom. cons.*

Embelia ribes Burm.f., Fl. Ind. 62. t.23.1768; C.B.Clarke in Hook.f., Fl. Brit. India 3:513.1882; Gamble, Fl. Madras 752(529). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 262. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 492. 2009. *Embelia glandulifera* Wight, Icon. Pl. Ind. Orient. t. 1207. 1848 (Plate 13c).

Climbers; branchlets slender, white, without lenticellate. Leaves alternate, 7 x 3 cm, elliptic, acute at both ends; nerves many, parallel, faint; petiole 1 cm long. Panicles to 15 x 15 cm, glabrous, branches long, slender racemose; pedicels 1.5 cm long. Flowers small, white, many. Sepals 5, small, triangular, tomentose. Petals 5, 2 mm long, ovate, acute, densely tomentose on both sides. Stamens 5, filaments inserted on corolla. Ovary ovoid, ovules few. Fruit Berry, 3-4 mm across, globose, bluish-purple; seed one.

Pothanplavu, NS & KVB 31329

Fl. & Fr.: March-August

Distribution: Fairly common in evergreen forests of Pothanplavu and Moonamthode.

MAESA Forssk.

Fl. Aegypt.-Arab. 66. 1775.

Maesa indica (Roxb.) DC., Trans. Linn. Soc. London 17: 134. 1834; Ramach. & V.J. Nair, Fl. Cannanore Dist. 262. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 493. 2009. *Baeobotrys indica* Roxb., Fl. Ind. 2: 230. 1824. *Maesa dubia* (Wall.) DC., Trans. Linn. Soc. London 17: 134. 1834; C.B. Clarke in Hook.f., Fl. Brit. India 3: 510. 1882; Gamble, Fl. Madras 749(527). 1921. *Maesa perrottetiana* A. DC. in DC., Prodr. 8: 80. 1844; Gamble, Fl. Madras 749(527). 1921. *Maesa indica* (Roxb.) DC. var. *perrottetiana* (A. DC.) C.B. Clarke in Hook.f., Fl. Brit. India 3:509.

Large shrubs; branchlets glandular. Leaves alternate, 10-15 x 4-8 cm, ovate, acute at apex, rounded and cuneate at base, serrate, glandular, membranous, with many glandular lines; nerves 10 pairs, regular; petiole 1.5-3 cm long. Flowers in axillary branched 3-6 cm long racemes; pedicels 2 mm long; bracteoles 2, opposite, inserted, below the calyx. Calyx tube adnate to the ovary, lobes 5, orbicular, 0.5 mm long. Corolla white, 4 mm across, lobes obovate. Stamens 5; anthers orbicular. Ovary 1-celled, ovules many, immersed in globose placenta, stigma capitate. Fruit a fleshy berry, 4 mm across; seeds few, angular, black.

Ambalappara, KVB 31501; NS & KJD 31948

Fl. & Fr.: September-May

Distribution: Common in evergreen forests of Ambalappara and Pothurumi.

MYRSINE L.

Sp. Pl. 1: 196. 1753.

Myrsine striata (Mez) Ricketson & Pipoly, Novon 22(4):470. 2013. *Rapanea striata* Mez, in Engl., Pflanzenreich Myrsin.: 357. 1902; Gamble, Fl. Madras 750(528). 1921 (Plate 13d).

Trees, to 15 m high. Leaves alternate below, opposite above, 5-12 x 1-4.5 cm, elliptic, oblanceolate or obovate, apex acute or obtusely acute, base cuneate or attenuate; lateral nerves 6-8 pairs, pinnate, faint, intercostae obscure; petiole 5-7 mm long. Inflorescence axillary or axil of fallen leaf. Flowers umbellate; bracts minute. Calyx lobes with few resinous lines. Corolla 5 mm across; lobes 5, oblanceolate, 3.5 mm, valvate, gland-dotted. Stamens 5, inserted at base of corolla tube. Ovary superior, 1 mm, conical; ovules few; style 0.3 mm; stigmas 3, flat, spreading. Fruit a drupe, 4 mm across, globose, brownish-black; seed one, globose.

Ambalappara, NS & KJD 31951

Fl. & Fr.: January-May

Distribution: Common in evergreen forests of Ambalappara. Endemic to Western Ghats. Conservation status: Endangered (IUCN 2017).

SAPOTACEAE

- 1a. Stamens as many as the number of calyx lobes Mimusops
- 1b. Stamens twice or more the number of calyx lobes.....2
- 2a. Calyx lobes 6 Palaquium
- 2b. Calyx lobes 43
- 3a. Corolla lobes 4; stamens 8 Isonandra
- 3b. Corolla lobes 8 or 12; stamens more than 16..... Madhuca

ISONANDRA Wight

Icon. Pl. Ind. Orient. t. 359. 1840.

- 1a. Leaves oblong or oblong-lanceolate, caudate-acuminate, base cuneate ... *I. lanceolata*
- 1b. Leaves elliptic, acute, base acute or rounded *I. perrottetiana*

Isonandra lanceolata Wight, Icon. Pl. Ind. Orient. t. 359. 1840; C.B. Clarke in Hook.f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Madras 761(535). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 263. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 494. 2009. *Isonandra wightiana* A. DC., Prodr. 8: 187. 1844; Hook.f., Fl. Brit. India 3: 539. 1882. *Isonandra lanceolata* Wight var. *anfractuosa* C.B. Clarke in Hook.f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Madras 761(535). 1921. *Isonandra lanceolata* Wight forma *anfractuosa* (Clarke) Jeuken, Blumea 6: 560. 1952; Vajr., Fl. Palghat Dist. 266. 1990.

Trees, to 8 m high; bark brown; exudation white. Leaves alternate or alternate spiral, 8-20 x 3-8 cm, elliptic, elliptic-oblong, lanceolate or oblanceolate, apex acuminate, base cuneate, margin entire, glabrous, chartaceous; lateral nerves 8-13 pairs, pinnate, regular, prominent, raised beneath, slender, ascending; intercostae scalariform, prominent; petiole 7-15 mm, stout, pubescent when young. Flowers cream, in axillary, short pedicelled fascicles. Calyx lobes 4, 3 mm long, ovate-acute, hairy without. Corolla campanulate 2 mm long. Stamens 8, subequal, attached near the base of corolla; anther tip apiculate. Ovary superior, 1 mm long, 4-celled, brown hairy; style 2 mm long, subulate. Fruit a berry, 1.5 cm long, ellipsoid, orange-yellow.

Kattikkari, *KVB 31567*

Fl. & Fr.: August-October

Distribution: Fairly common in evergreen forests of Kattikkari and Ambalappara.

Isonandra perrottetiana A. DC., Prodr. 8: 188. 1844; C.B. Clarke in Hook.f., Fl. Brit. India 3:539.1882; Gamble, Fl. Madras 761(535). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 263. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 495. 2009. *Isonandra candolleana* Wight, Icon. Pl. Ind. Orient. t. 1220. 1850; C.B. Clarke in Hook.f., Fl. Brit. India 3: 539. 1882; Gamble, Fl. Madras 761(535). 1921.

Trees, to 10 m high; bark brown; exudation milky. Leaves alternate, spiral, 5-11 x 2.5-4 cm, elliptic, oblanceolate or obovate-oblong, apex obtuse, acuminate or obtusely acute, base acute; petiole 3-7 mm, stout, grooved above, glabrous; lateral nerves 10-12 pairs, pinnate, prominent, intercostae subscalariform. Flowers dull-white, in sessile densely packed, axillary fascicles; bracts and bracteoles obtuse. Calyx lobes 4, 2+2, broadly ovate, very unequal, the exterior much larger, hairy and ciliate. Corolla deeply 4-partite; lobes obovate-oblong, emarginate, longer than the tube. Stamens 8, subequal, attached at the base of the corolla, 1-seriate; anthers oblong-lanceolate, black-hairy at tip; staminodes absent. Ovary superior, densely hairy, 4-celled; style subulate. Fruit a berry, 17 x 10 mm, obovoid, cuspidate, glabrous.

Kannadivechakunnu, *KJD 25578*

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Ambalappara and Kannadivechakunnu. Endemic to southern Western Ghats.

MADHUCA J.F.Gmel.

Syst. Nat., ed. 13[bis]. 2: 773, 799. 1791.

Madhuca neriifolia (Moon) H. J. Lam, Bull. Jard. Bot. Buitenz. ser. 3, 7.182,265. 1925; Ansari, Fl. Kasaragod Div. 220. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 264.1988; Ratheesh, Fl. Stud. Wayanad Dist. 496.2009. *Bassia neriifolia* Moon, Cat. Pl. Ceylon 36. 1824. *Bassia malabarica* Bedd., For. Man. Bot. 140.1872; C.B. Clarke in Hook.f., Fl. Brit. India 3:544.1882; Gamble, Fl. Madras 763(537). 1921.

Evergreen trees, to 15 m high; bark dark brown to grey. Leaves alternate, crowded at the tip of branchlets, 8-15 x 2.5-5.5 cm, elliptic-lanceolate, linear-oblong, oblong-lanceolate, oblanceolate, elliptic-oblong or obovate, base acute or attenuate, apex obtuse or acute; lateral nerves 15-22 pairs, slender, parallel; intercostae reticulate, faint, slender; petiole 6-18 mm long, grooved above. Flowers yellowish-white, in axillary fascicles, 10-12 mm across. Calyx tube ovate-acute, 0.7 x 0.5 cm. Corolla lobes 8-10, campanulate, 1.5-2 cm long, tomentose outside. Stamens 16-20 in 2 rows, filaments short, villous. Ovary 0.5 cm long, oblong, superior, 6-8-celled; ovules 1; style slender 2-2.5 cm long. Fruit berry, 2-3 cm long, 1-1.5 cm wide ellipsoid, beaked; seed one, pale brown and shining, 2.5 cm long, compressed, acute at both ends.

Kariyenkappu, KVB 31290

Fl. & Fr.: November-March

Distribution: Common along the River banks of semi-evergreen forests at Valayamchal and Narikkadavu; evergreen forests of Chavachi and plantations of Kariyenkappu.

MIMUSOPS L.

Sp. Pl. 349. 1753.

Mimusops elengi L., Sp. Pl. 349. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 3: 548. 1882; Gamble, Fl. Madras 765(538). 1921; Manilal & Sivar., Fl. Calicut 157. 1982; Ansari, Fl. Kasaragod Div. 221. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 496. 2009.

Evergreen trees, to 20 m high; bark dark grey. Leaves alternate, spiral, 4-12 x 3.5-7.5 cm; elliptic or elliptic-oblong, apex obtuse to acuminate, base round or obtuse; lateral nerves many, slightly raised beneath, parallel, intramarginal nerves present; intercostae reticulate; petiole 15-40 mm long, grooved above, pubescent; stipules caducous. Flowers white, fragrant, 1-3 in axillary fascicles. Calyx lobes 8 in 2 series of 4 each. Corolla 1 cm across; lobes 24, 3 series of 8

each, with hairs on back. Stamens 8, alternating with pilose staminodes; filaments 1 mm; staminodes lanceolate, pilose. Ovary 0.1-0.15 cm long, void, hirsute without, 6-8-celled; ovule 1; style columnar; stigma minutely fimbriate. Fruit a berry, yellow, ovoid, 2.5 cm long, 1.5 cm across, fleshy, epicarp thin; seed usually 1, oblong-ellipsoid, laterally compressed.

Kariyenkappu, *KJD 26252*

Fl. & Fr.: December-August

Distribution: Earlier settlements.

PALAUQUUM Blanco

Fl. Filip. 403. 1837.

Palaquium ellipticum (Dalzell) Baill., *Traite, Bot. Med. Phan.* 1500.1884; Gamble, *Fl. Madras* 764(537). 1921; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 264. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 497. 2009. *Bassia elliptica* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 36. 1851. *Dichopsis elliptica* (Dalzell) Benth. in Benth. & Hook.f., *Gen. Pl.* 2: 658. 1876; C.B. Clarke in Hook.f., *Fl. Brit. India* 3: 542. 1882.

Evergreen trees, to 30 m high; bark dark brown. Leaves alternate, spiral, clustered towards the tip, 4-11 x 3-4.5 cm, elliptic, elliptic-obovate, apex obtusely acuminate, base acute; lateral nerves 7-12 pairs, pinnate, slender, prominent below; intercostae reticulate, slender; petiole 12-25 mm long, slightly pubescent. Flowers white, fragrant, in axillary fascicles. Calyx lobes 6 in 2 series, outer 3 valvate, inner 3 imbricate, densely villous, outer 3 ovate, inner 3 lanceolate. Corolla lobes 6, campanulate, tube shorter than lobes, lobes ovate-oblong. Stamens 12-20, extrorse; filaments short, hairy; anthers lanceolate, connective produced. Ovary tomentose, 6-celled, superior; style exerted, glabrous, subulate. Fruit a berry, 3-4 x 1.5 cm, fleshy, ellipsoid, smooth, green; seeds 1 or 2, large.

Way to Meenmutty, *KJD 26180*; Moonamthode *KVB 31540*

Fl. & Fr.: February-July

Distribution: Common in evergreen forests of Meenmutty, Moonamthode, Chelachode, Chavachi and Kattikkari. Endemic to Western Ghats.

SYMPLOCACEAE

SYMPLOCOS Jacq.

Enum. Pl. Carib. 5: 24. 1760.

- 1a. Fruit ampulliform..... *S. cochinchinensis* subsp. *laurina*
1b. Fruit not ampulliform..... 2

- 2a. Shrubs*S. wynadense*
- 2b. Trees 3
- 3a. Inflorescence branched *S. racemosa*
- 3b. Inflorescence unbranched 4
- 4a. Fruit hairy when mature5
- 4b. Fruit glabrous when mature *S. foliosa*
- 5a. Leaves entire *S. obtusa*
- 5b. Leaves serrate.....*S. macrophylla*

Symplocos cochinchinensis (Lour.) Moore subsp. **laurina** (Retz.) Noot., Rev. Symplocac. 156. 1975 & in Dassan & Fosb., Rev. Handb. Fl. Ceylon 3: 458. 1981; Ramach. & V.J. Nair, Fl. Cannanore Dist. 266. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 503. 2009. *Myrtus laurina* Retz., Observ. Bot. 4: 26. 1786. *Drupatris cochinchinensis* Lour., Fl. Cochinch. 314. 1790. *Symplocos spicata* Roxb., Fl. Ind. 2: 542. 1832; Hook.f., Fl. Brit. India 3: 573. 1882. *Symplocos spicata* Roxb. var. *laurina* (Retz.) C.B.Clarke in Hook.f., Fl. Brit. India 3: 573. 1882; Gamble, Fl. Madras 782(549). 1921. *Symplocos spicata* Roxb. var. *malasica* C.B.Clarke in Hook.f., Fl. Brit. India 3: 573. 1882. *Symplocos spicata* Roxb. var. *attenuata* (A.DC.) C.B.Clarke in Hook.f., Fl. Brit. India 3: 573. 1882. *Symplocos laurina* (Retz.) Wall. ex G.Don, Gen. Hist. 4: 3. 1837-1838.

Evergreen trees, to 15 m high; bark light grey. Leaves alternate, 5.5-15 x 2.5-6 cm, elliptic, elliptic-lanceolate or elliptic-oblong, apex acute or acuminate, base acute to attenuate, margin crenate-serrate, revolute; lateral nerves 7-8 pairs, pinnate; intercostae reticulate, faint; petiole 6-15 mm, grooved above. Flowers white, in axillary simple or branched spikes, 7 cm long, pubescent; bracts solitary at the base of each pedicel; bracteoles early cauducous. Calyx tube adnate to the ovary, lobes 5, minute, lobes 1 mm, triangular. Corolla 1 cm across, lobes 5, ovate, 3 mm, recurved. Stamens many, equal, arranged in 5 group. Ovary 1 mm, inferior, globose 2-3-celled; ovules 2 in each cell, pendulous from the inner angle; style 5 mm, simple; stigma capitate. Fruit drupe, 8 mm across, glabrous, ampulliform, globose ribbed, purple crowned by calyx lobes; seeds 1-3, oblong.

Ambalappara, KVB 31637

Fl. & Fr.: March-May

Distribution: Fairly Common in evergreen forests of Ambalappara and Meenmutty.

Symplocos foliosa Wight, Icon. Pl. Ind. Orient. t. 1234. 1848; C.B. Clarke in Hook.f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Madras 783(550). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 267. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 503. 2009. *Symplocos nervosa* Wight, Icon. Pl. Ind. Orient. t. 1235. 1848, non DC. 1844.

Trees, to 6 m high. Leaves alternate, 6-12 x 2-5 cm, elliptic or oblong, apex acuminate, base acute, margin serrate; lateral nerves 8-12 pairs, pinnate, prominent, midrib beneath hispid; intercostae reticulate, prominent; petiole 5-20 mm, long, stout, tomentose, grooved above. Flowers white, spikes unbranched, densely fulvous tomentose; bracts 4-6 x 2-2.5 mm, cauducous, brown tomentose; bracteoles early cauducous. Calyx tube adnate to the ovary, lobes 5, lobes 2-3 mm long, ovate, pubescent, tube 2-2.5 mm. Corolla lobes 5, 3.5-4 mm long, orbicular, ciliate. Stamens 30-40, unequal, many seriate, adnate to the corolla tube; anthers short. Ovary 2-2.5 mm long, inferior; ovules 2-3 in each cell, pendulous from the inner angle; style filiform; stigma capitate. Fruit a drupe, 10 x 5 mm, ovoid, yellow.

Ambalappara, KVB 31776

Fl. & Fr.: November-February

Distribution: Rare in evergreen forests of Ambalappara, Kattikkari and Mullenpara. Endemic to Southern Western Ghats.

Symplocos macrophylla Wall. ex DC. Prodr. 8: 257. 1844; C.B. Clarke in Hook.f., Fl. Brit. India 3: 578. 1882. *Symplocos gardneriana* Wight, Icon. Pl. Ind. Orient. t. 1231. 1848; Hook.f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Madras 782(550). 1921 (Plate 13e).

Trees, to 7 m high. Leaves alternate, 7.5-15 x 3.5-7.5 cm, elliptic, elliptic-ovate, base acute or rounded, apex acute to acuminate, margin crenulate, recurved when old, rusty villous beneath; lateral nerves 10-12 pairs, prominent, pinnate, villous, midrib raised beneath; intercostae reticulate, prominent; petiole 10-20 mm, stout, tomentose. Flowers bisexual, white, 0.85 cm across, sessile, in axillary spike, 5 cm, densely rusty villous; bracts small. Calyx tube adnate to the ovary, lobes 5, ovate, acute villous. Corolla deeply 5-lobed. Stamens numerous, many seriate, adnate to the corolla tube; anthers short. Ovary inferior; ovules 2 in each cells, pendulous; stigma slightly lobed. Fruit a drupe, 1.2 cm long, cylindrical densely hairy, purple.

Kattikkari State Boundary, KJD 26013

Fl. & Fr.: February-May

Distribution: Rare in evergreen forests of Kattikkari. Endemic to southern Western Ghats.

Symplocos obtusa Wall. ex G.Don, Gen. Hist. 4: 3. 1837-1838; Gamble, Fl. Pres. Madras 783(550). 1923; Sasidh. & Anto in Manoharan *et al.*, Silent Valley-Whispers Reason 144. 1999; Ratheesh Narayanan, Fl. Stud. Wayanad Dist. 505. 2009. *Symplocos laeta* var. *pedicellata* C.B.Clarke in Hook.f., Fl. Brit. India 3: 583. 1882. *Symplocos obtusa* Wall. ex G.Don var. *pedicellata* (C.B.Clarke) Nooteb., Rev. Symplocac. 244. 1975 & Rev. Handb. Fl. Ceylon 3: 467. 1981.

Small trees, to 10 m high. Leaves alternate, 6-11 x 4-6.5 cm, obovate, base cuneate, apex obtuse, margin entire; lateral nerves 5-8 pairs; intercostae reticulate; petiole 20-30 mm long. Flowers in unbranched 2-3 cm long racemes, axis hispid; bracts ovate; bracteoles early cauducous. Calyx tube adnate to the ovary, lobes 5, 1.5 x 1 mm, obtuse, hairy. Corolla lobes 5. Stamens numerous, unequal, many seriate, adnate to the corolla tube; anthers short. Ovary inferior, ovules 2-3 in each cell, pendulous from the inner angle. Fruit a drupe, 12 x 5 mm, terete, yellowish-green, minutely hispid towards apex; seeds 1-3, oblong.

Ambalappara, KJD 26908

Fl. & Fr.: May-November

Distribution: Rare in evergreen forests of Ambalappara.

Symplocos racemosa Roxb., Fl. Ind. 2: 539. 1832; C.B.Clarke in Hook.f., Fl. Brit. India 3: 576. 1882; Ramach. & V.J. Nair, Fl. Cannanore Dist. 269. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 505. 2009. *Symplocos beddomei* C.B.Clarke in Hook.f., Fl. Brit. India 3: 582. 1882; Gamble, Fl. Madras 783(551). 1921. *Symplocos candolleana* Brand., Pflanzenr. IV 49. 1901; Gamble, Fl. Madras 782(549). 1921.

Trees, to 10 m high; bark greyish. Leaves alternate, 7-15 x 3-6 cm, elliptic or elliptic-obovate, apex acute to acuminate, base acute, margin crenate-serrate, recurved; lateral nerves 6-12 pairs, glabrous, pinnate, slender; intercostae reticulate, prominent; petiole 6-15 mm long, grooved above. Flowers in spikes, to 12 cm long, fulvous tomentose, many flowered; bracts ovate, cauducous; bracteoles early cauducous. Calyx tube adnate to the ovary, lobes 5, triangular, acute, glabrous. Corolla deeply 5-lobed. Stamens numerous, unequal, many

seriate, adnate to the corolla tube; anthers short. Ovary inferior, ovules 2-3 in each cell, pendulous from the inner angle; style filiform. Fruit drupe 15 x 5 mm, ovoid, glabrous, shallowly furrowed, yellow; seeds 1-2, oblong.

Ambalappara, NS & KJD 25508

Fl. & Fr.: May-October

Distribution: Fairly common in evergreen forests of Ambalappara.

Symplocos wynadense (Kuntze) Noot., Leiden Bot. Ser.1 293. 1975; Ratheesh, Fl. Stud. Wayanad Dist. 505. 2009. *Eugeniodes wynadense* Kuntze, Rev. Gen. Pl. 2: 975. 1891. *Symplocos acuminata* Bedd., For. Man. Bot. 150. 1872. & Icon. Pl. Ind. Or. t. 117. 1868-74, non Miq. 1859; C.B. Clarke in Hook.f., Fl. Brit. India 3: 583. 1882; Gamble, Fl. Madras 783(550). 1921 (Plate 13f).

Small trees or large shrubs; branchlets glabrous. Leaves alternate, 8-11 x 4 cm, elliptic, acuminate at apex, rounded or acute at base, crenate-serrate, glabrous, nerves 5-7 pairs, slender; petiole 1 cm long, glabrous. Spikes axillary, to 6 cm long, unbranched; peduncle slender, densely hairy. Flowers few; pedicels 5 mm long. Calyx lobes ovate, obtuse, densely hairy. Corolla white, 8 mm across, lobes oblong, acute, glabrous. Stamens numerous, free. Ovary inferior, ovules 2-3 in each cell; style 5 mm long, hairy. Fruit Drupe to 1 cm long, glabrous, blue.

Ambalappara, KVB 31574

Fl. & Fr.: January-November

Distribution: Common in evergreen forests of Kattikkari, Mullenpara and Ambalappara. Endemic to southern Western Ghats.

THEACEAE

- 1a. Leaf tip acute; stamens to 10 Eurya
1b. Leaf tip obtuse; stamens numerous Gordonia

EURYA Thunb.

Nova Gen. Pl. 67. 1783.

Eurya nitida Korth., Verh. Nat. Gesch. Ned. Bezitt., Bot. 3: 115. t.17. 1840; Ramach. & V.J. Nair, Fl. Cannanore Dist. 56. 1988; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 184. 1993; K. Vivek. in P. Daniel, Fl. Kerala 1: 355. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 138. 2009. *Eurya japonica* Thunb. var. *thunbergii* Thwaites, Enum. Pl. Zeyl. 41. 1858; C.B. Clarke in Hook.f.,

Fl. Brit. India 1: 284. 1874. *Eurya japonica* Thunb. var. *nitida* (Korth.) Dyer in Hook.f., Fl. Brit. India 1: 284. 1874.

Evergreen trees, to 8 m high; bark brown. Leaves alternate, 2-7.5 x 1-3 cm, elliptic or elliptic-oblong, apex subacute, base acute or cuneate, margin serrate; lateral veins 4-9 pairs, pinnate, prominent, intercostae reticulate, prominent; petiole 1-7 mm, grooved above. Flowers unisexual, white or greenish-white, 2 or more in axillary fascicles, rarely solitary; pedicel 1-2.5 mm long; bracteoles 2 at the base of calyx. Calyx lobes 5, broadly ovate to orbicular, ciliate. Petals 5, broadly oblong to orbicular, connate at base, imbricate. Stamens 12-15, connate at base, adnate to the base of petals, anthers apiculate. Ovary superior, globose, glabrous, 3-celled, ovule many in each cell; styles 3, 1.5-2.5 mm long, united basally; stigmas 3-lobed. Fruit a berry, 3-5 mm across, globose, black; seeds small, many, dark brown, angular, reticulate.

Ambalappara, KVB 31768, 31569

Fl. & Fr.: Mar-February

Distribution: Fairly common along the marginal area of evergreen forests at Ambalappara.

GORDONIA J.Ellis

Philos. Trans. 60: 520. 1771, *nom. cons.*

Gordonia obtusa Wall.ex Wight & Arn., Prodr. Fl. Ind. Orient. 87. 1834; Dyer in Hook.f., Fl. Brit. India 1: 291. 1874; Gamble, Fl. Madras 79(57). 1915; Ramach. & V.J. Nair, Fl. Cannanore Dist. 56. 1988; A.S. Chauhan & T.K. Paul in B.D. Sharma & Sanjappa, Fl. Ind. 3: 162. 1993; K. Vivek. in P. Daniel, Fl. Kerala 1: 356. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 139. 2009. *Gordonia obtusifolia* Wight, Ill. Ind. Bot. 1: 99. 1838. *Gordonia parvifolia* Wight, Ill. Ind. Bot. 1: 99. 1838.

Trees, to 20 m high; bark greyish-white. Leaves alternate, 3.5-15 x 1.5-5 cm, elliptic, elliptic-oblong or elliptic-oblong, acute or attenuate, apex acute, acuminate or obtuse, base cuneate, margin crenate or serrate; lateral nerves 8-16 pairs, pinnate, prominent, intercostae reticulate; petiole 2-10 mm. Flowers white, solitary, terminal or upper axillary. Sepals 5, free, unequal, 3-8 x 6-10 mm, orbicular, pubescent outside. Petals 5, 1.5-2 x 0.8-1 cm, obovate, pubescent outside, notched at the tip, extreme base united. Stamens numerous, 4-8 mm long, unequal, adnate to the base of the petals. Ovary superior, ovoid, tomentose

5-celled, ovule 4-8; style 1, stout, ribbed; stigma 6-lobed. Fruit capsule, 2.5-3 × 1-1.25 cm, oblong with short acumen, 5-angled, valves deeply sulcate above; seeds winged, brownish.

Ambalappara, KVB 31741

Fl. & Fr.: October-May

Distribution: Fairly common in evergreen forests of Ambalappara and Katikari. Endemic to Western Ghats

Note: Trees in evergreen forests of Ambalappara are very dwarf, below 5 m high.

Order: Not placed yet

BORAGINACEAE

- 1a. Flowers in paniced cymes; trees Ehertia
- 1b. Flower solitary solitary or in racemes or scorpioid cymes; herbs or subshrubs 2
- 2a. Flowers solitary or 2-3 together 3
- 2b. Flowers racemes or scorpioid cymes 4
- 3a. Styles 2; prostrate herbs Coldenia
- 3b. Style 1; stout subshrubs Rotula
- 4a. Inflorescence racemose; nutlets glochidiate..... Cynoglossum
- 4b. Inflorescence scorpioid; nutlets smooth Heliotropium

COLDENIA L.

Sp. Pl. 1: 125. 1753.

Coldenia procumbens L., Sp. Pl. 125. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 144. 1883; Gamble, Fl. Madras 892(627). 1923; Manilal & Sivar., Fl. Calicut 178. 1982; Ansari, Fl. Kasaragod Div. 238. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 294. 1988.

Trailing herbs, stem and leaves softly white villous. Leaves alternate, 1.5-3 x 0.5-1.5 cm, obliquely obovate or subpinnatifid, apex emarginate, base cuneate, margin irregularly dentate; lateral veins impressed above. Inflorescence axillary few-flowered sessile cymes or some times solitary. Calyx 4-lobed; lobes ovate-acute, ciliate. Corolla white, 2 mm long, tube 1 mm long; lobes 4, imbricate in buds. Stamens 4, included. Ovary 4-lobed, 4-locular; ovule 1-per locule. Drupe of 4 subconnate pyrenes, 1.5-2 mm across, subglobose.

Narikkadavu, KJD 18779

Fl. & Fr.: March-May

Distribution: Rare along the boundaries of Farm.

CYNOGLOSSUM L.

Sp. Pl. 134. 1753.

Cynoglossum zeylanicum (Vahl) Brand, Pflanzenr. IV, 252: 134. 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 295. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 550. 2009. *Anchusa zeylanica* Vahl ex Hornem., Hort. Hafn. 3. 1807. *Cynoglossum denticulatum* A.DC. var. *zeylanicum* (Vahl ex Hornem.) C.B. Clarke in Hook.f., Fl. Brit. India 4: 157. 1883; Gamble, Fl. Madras 900(632). 1923. *Cynoglossum furcatum* Wall., Fl. Ind. 2: 6. 1824; C.B. Clarke in Hook.f., Fl. Brit. India 4: 155. 1883; Gamble, Fl. Madras 900(632). 1923.

Erect herbs, to 1 m tall, whole plant softly adpressed pubescent. Leaves alternate, 10-25 x 3-7 cm, oblong-lanceolate, acute at apex, cuneate at base; nerves to 5 pairs, prominent, arching, upper leaves smaller; petiole to 1 cm long, flat. Racemes 10-35 cm long, straight or arching; flowers many, sessile. Calyx 5 lobed, 2 mm long, spreading. Corolla 3-5 mm across, blue, campanulate. Stamens 5, inserted at the throat of the corolla tube. Ovary 4-celled, style gynobasic. Fruit of 4 nutlets, 3-5 mm across, glochidiate.

Ambalappara, KJD 26152

Fl. & Fr.: August-October

Distribution: Evergreen forests of lower parts of Ambalappara.

EHRETIA P. Browne

Civ. Nat. Hist. Jamaica 168. 1756.

Ehretia canarensis (C.B. Clarke) Gamble, Fl. Madras 891(626). 1923. *Ehretia laevis* Roxb. var. *canarensis* C.B. Clarke in Hook.f., Fl. Brit. India 4: 142. 1883. *Ehretia indica* (Dennst. ex Kostel.) M.R. & S.M. Almeida, J. Bombay Nat. Hist. Soc. 90. 424. 1993.

Small trees. Leaves alternate, 6-10 x 3-4 cm, elliptic, apex acuminate, base cuneate, thin coriaceous, glabrous; lateral nerves 5-7 pairs; petiole c. 2 cm long. Flowers 2.5-3 mm across, in axillary and terminal unilateral corymbose cymes. Calyx minute, 5-toothed. Corolla white, c. 2.5 mm long, lobes 5, oblong, obtuse. Stamens 5, exerted. Ovary minute, 2-celled; ovules 2 in each cell; style 2-fid above middle. Drupe 4-5 mm across, subglobose, red; seeds 4.

Near Farm, KVB 31204

Fl. & Fr.: September-January

Distribution: Fairly common in semi-evergreen forests of Valayamchal and evergreen forests of Chavachi. Endemic to Peninsular India.

HELIOTROPIUM L.

Sp. Pl. 130. 1753.

Heliotropium indicum L., Sp. Pl. 130. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 152. 1883; Gamble, Fl. Madras 896(630). 1923; Manilal & Sivar., Fl. Calicut 176. 1982; Ansari, Fl. Kasaragod Div. 239. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 295. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 550. 2009.

Erect, branched, pubescent herbs. Leaves opposite, 11 x 6 cm, sub-deltoid or broadly ovate, apex acute, base truncate, margin undulate, chartaceous; petiole 3-6 cm long. Flowers sessile, in terminal or leaf-opposed curved, to 20 cm long spikes. Calyx-lobes 5, 1.5-2 mm long, linear, acute. Corolla pale violet or pink, salver-form; tube 3-4 mm long, slightly constricted distally, 5-lobed; lobes c. 1 mm long, ovate. Stamens 5, subsessile, free. Ovary weakly 4-lobed; stigma conical. Nutlets connate in pairs, separating later, ribbed, each nutlet 2-3 mm long.

Narikkadavu, NS & KVB 31455

Fl. & Fr.: September-May

Distribution: Fairly common along river banks at Narikkadavu.

ROTULA Lour.

Fl. Cochinch. 121. 1790.

Rotula aquatica Lour., Fl. Cochinch. 121. 1790; Gamble, Fl. Madras 893(627). 1923; Ansari, Fl. Kasaragod Div. 240. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 295. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 551. 2009. *Rhabdia lycioides* Mart. & Zucc., Nov. Gen. Sp. 2:136.1827; C.B. Clarke in Hook.f., Fl. Brit. India 4:145. 1883. *Ehretia cuneata* Wight, Icon. Pl. Ind. Orient. t. 1385. 1848.

Stout branching shrubs; branches virgate, usually pinkish, glabrous. Leaves alternate or fascicled, 1-2 x 0.5 cm, oblong-oblongate, obtuse, sessile. Flowers solitary or in few flowered cymes axillary. Calyx 3.5 mm long 5-partite, lobes lanceolate. Corolla pink, 5 mm long, 7 mm across, campanulate, 5-lobed. Stamens 5, anthers sagitate at base. Ovary 4-celled, style filiform, stigma capitate. Drupe with 4, 1-seeded pyrenes, free, yellowish, smooth.

Narikkadavu, NS & KVB 31447

Fl. & Fr.: November-May

Distribution: Common in streams.

ICACINACEAE

- 1a. Leaf margin dentate; inflorescens long peduncled heads..... Miquelia
- 1b. Leaves entire; inflorescens elongate spikes..... Sarcostigma

MIQUELIA C.F. Meissner

Pl. Vasc. Gen. 1: 152. 1838, *nom. cons.*

Miquelia dentata Bedd., Madras J. Lit. Sci. ser. 3, 1: 38. 1864; Mast. in Hook.f., Fl. Brit. India 1: 593. 1875; Gamble, Fl. Madras 197(141). 1915; Ansari, Fl. Kasaragod Div. 98. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 93. 1988; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 29. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 686. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 216. 2009 (Plate 13g).

Glabrous climbers. Leaves alternate, 16 x 7 cm, ovate, apex acute, base rounded or truncate, dentate, more sharply near the base; petiole 3-4 cm long. Flowers unisexual, in peduncled globose spike; peduncle to 6 cm long. Calyx cupular, 4-toothed. Petals 4, 3 mm long, oblong. Stamens 4 or 5, in male flowers. Ovary 1-celled, 4-angled, style absent, stigma 4-angled, ovules 2, pendulous. Drupe to 2 x 1 cm, 3-8 together, ovoid, sessile, yellow; seeds 1.5 x 1 cm, stalked, pitted.

Kariyenkappu, *KJD 26122*

Fl. & Fr.: April-September

Distribution: Rare in semi-evergreen forests of Pothanplavu and plantations of Kariyenkappu. Endemic to southern Western Ghats, Conservation Status: Vulnerable.

SARCOSTIGMA Wight & Arn.

Edinb. N. Phil. Journ. 14: 299. 1833.

Sarcostigma kleinii Wight & Arn., Edinb. N. Phil. Journ. 14: 299. 1833; Mast. in Hook.f., Fl. Brit. India 1: 594. 1875; Gamble, Fl. Madras 199(142). 1915; Manilal & Sivar., Fl. Calicut 65. 1982; Ansari, Fl. Kasaragod Div. 99. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 94. 1988; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 35. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 690. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 217. 2009.

Woody climbers, branchlets glabrous. Leaves alternate, 17-22 x 8-12 cm, oblong-lanceolate, apex acuminate, base rounded or obtuse; lateral nerves 8 pairs, reticulate; petiole 5-12 cm long. Spikes to 35 cm long, slender, axillary or from tubercles. Flowers 3-6 together, yellow. Calyx cupular, 2 mm across, 5-toothed. Petals 3-5 mm long, oblong, recurved. Stamens 5, anthers versatile, staminodes 5. Female flowers mostly from old wood, ovary 1-celled, densely hairy; stigma sessile, discoid; pistillode in male flowers conical. Drupe to 3 x 1.5 cm, ovoid, orange-yellow, glabrous.

Kannadivechakunnu, *NS &KJD 25564*

Fl. & Fr.: February-July

Distribution: Fairly common in evergreen forests of Kannadivechakunnu.

METTENIUSACEAE

- 1a. Petals villous; flowers foul smelling Nothopodytes
1b. Petals glabrous; flowers not foul smelling... Apodytes

APODYTES E.Mey. ex Arn.

J. Bot. (Hooker) 3: 155. 1840.

Apodytes dimidiata E.Mey. ex Arn., J. Bot. (Hooker) 3: 155. 1840; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 18. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 683. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 214. 2009. *Apodytes benthamiana* Wight, Icon. Pl. Ind. Orient. t. 1153. 1846; Mast. in Hook.f., Fl. Brit. India 1: 588. 1875; Gamble, Fl. Madras 195(140). 1915. *Apodytes beddomei* Mast. in Hook.f., Fl. Brit. India 1: 588. 1875; Gamble, Fl. Madras 195(140). 1915.

Trees, to 20 m high; bark greyish-black.. Leaves alternate, 3.8-12.6 x 1.5-6 cm, ovate, elliptic-ovate, obovate, obovate-oblong or oblong, apex acuminate, base acute, obtuse or oblique; lateral nerves 4-9 pairs, slender, pinnate, prominent, intercostae reticulate, faint; petiole 8-26 mm long, grooved above. Flowers 5-8 mm long, white, in terminal or axillary corymbose cymes; pedicel short. Calyx small, 5 toothed, pubescent, persistent. Petals 5, free, oblong, acute. Stamens 5, filaments dilated; anthers oblong, bipartite at base, medifixed, longer than filaments. Ovary superior, oblique, gibbous at base, 1-celled, ovules 2, pendulous, superposed; style slender, eccentric, stigma oblique. Fruit a drupe 15-18 x 10-12 mm, obliquely appendaged; stone crustaceous; seed one, pendulous.

Mullenpara, KJD 18734

Fl. & Fr.: April-October

Distribution: Rare in evergreen forests of Mullenpara.

NOTHAPODYTES Blume

Mus. Bot. 1: 248. 1850.

Nothapodytes nimmoniana (J.Graham) Mabb., Bot. Hist. Hortus Malabaricus 88. 1980; Manilal & Sivar., Fl. Calicut 65. 1982; Ansari, Fl. Kasaragod Div. 99. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 94. 1988; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 31. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 688. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 216. 2009. *Premna nimmoniana*

J.Graham, Cat. Pl. Bombay 155. 1839. *Stemonurus foetidus* Wight, Icon. Pl. Ind. Orient. t. 955. 1845. *Mappia foetida* (Wight) Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 395. 1852; 1: 589. 1875; Gamble, Fl. Madras 196(141). 1915. *Nothapodytes foetida* (Wight) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem. 15: 247. 1940 & Blumea 17: 232. 1969. *Mappia wightiana* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Gamble, Fl. Madras 197(141). 1915. *Mappia tomentosa* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 397. 1852; Mast. in Hook.f., Fl. Brit. India 1: 589. 1875; Gamble, Fl. Madras 196(141). 1915. *Mappia ovata* Miers, Ann. Mag. Nat. Hist. ser. 2, 9: 396. 1852; Mast. in Hook.f., Fl. Brit. India 1: 589. 1852; Gamble, Fl. Madras 197(141). 1915 (Plate 13h).

Trees, to 10 m high; bark yellowish. Leaves alternate, 7-18 x 4-8 cm, broadly ovate, ovate-oblong or elliptic-oblong, apex acuminate, base oblique, round or acute, pubescent beneath; lateral nerves 6-10 pairs, pinnate, prominent, intercostae scalariform; domatia present; petiole 30-60 mm, pubescent, grooved above. Flowers creamy yellow, 5 mm across, in terminal pubescent corymbose cymes or panicles. Calyx cupular, 1 mm long, 5-toothed. Petals 5, 3 mm long, villous within, apically inflexed. Stamens 5, free; disk cupular; ovary ovoid, hairy, 1-celled, ovules 2; style angled; stigma stout. Fruit a drupe, 2 x 1 cm, ellipsoid, blackish-purple; seed glabrous.

Mullenpara, KJD 26150

Fl. & Fr.: June-September

Distribution: Rare in evergreen forests of Mullenpara.

Order: Gentianales

APOCYNACEAE

- 1a. Anthers connate with stigma; corona present9
- 1b. Anthers otherwise; corona absent2
- 2a. Erect herbs, shrubs or trees 4
- 2b. Climbers.....3
- 3a. Flowers large, 8 cm or more across Chonemorpha
- 3b. Flowers small 1.5 cm across Ichnocarpus
- 4a. Plants armed Carissa
- 4b. Plants unarmed.....5
- 5a. Leaves 3 or more at each node, whorled..... 6
- 5b. Leaves 2 at each node7
- 6a. Trees, fruits follicles Alstonia
- 6b. Herbs or shrubs, fruits drupes or capsules Rauvolfia

7a. Herbs	Catharanthus
7b. Shrubs or trees	8
8a. Fruit capsule, seeds arillate	Tabernaemontana
8b. Fruit follicle, seeds not arillate	Holarrhena
9a. Mouth of corolla tube with lobed corona	Wrightia
9b. Mouth of corolla without corona.....	10
10a. Pollen masses granular, contained in a spatulate appendices.....	11
10b. Pollen masses not granular, contained in a soft pollen carrier or pendulous	12
11a. Stamens inserted on the throat of the corolla; corona connate with stamens	Decalepis
11b. Stamens inserted on the base of the corolla; corona connate with corolla ..	Hemidesmus
12a. Erect shrubs or herbs	13
12b. Climbers or epiphytic plants	14
13a. Corolla pale purple to greenish white; gymnostegium violet	Calotropis
13b. Corolla crimson; gymnostegium yellow	Asclepias
14a. Epiphytes; leaves thick, fleshy.....	Hoya
14b. Terrestrial plants; leaves not thick	15
15a. Corolla tube elongate, more than 2 cm long.....	Ceropegia
15b. Corolla tube less than 1 cmlong.....	16
16a. Corolla tube urceolate	Marsdenia
16b. Corolla tube not urceolate	17
17a. Corolla lobe alternating with fleshy ridges within sinus	Gymnema
17b. Corolla lobes without ridges inside.....	18
18a. Corona lobes tubercle like, radiating from the base of the staminal column ..	Tylophora
18b. Corona lobes not tubercle like	Toxicarpus

ALSTONIA R.Br.

Mem. Wern. Soc. i. 1: 75. 1811, *nom. cons.*

Alstonia scholaris (L.) R.Br., Mem. Wern. Soc. i. 1: 76. 1811; Hook.f., Fl. Brit. India 3: 642. 1882; Gamble, Fl. Madras 810(569). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Ansari, Fl. Kasaragod Div. 226. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 274. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 515. 2009. *Echites scholaris* L., Mant. Pl. 1: 53.1767.

Large trees, to 30 m high; bark grey-brown. Leaves whorled, 5-20 x 3-7 cm, obovate, oblanceolate or obovate-oblong; apex obtuse or emarginated, base cuneate or attenuate; lateral nerves many, slender, prominent, parallel, looped near the margin forming intramarginal nerves; intercostae reticulate; petiole 5-12 mm long. Flower 10-12 mm long, greenish-white in terminal umbellate cymes.

Calyx cupular, lobes 5, ovate, unequal, obtuse, puberulous. Corolla salver shaped, 4 mm across, lobes 5, obovate to orbicular, creamy yellow, spreading. Stamens 5, included; anthers narrowly cordate. Carpels 2, free, ovules many; style filiform; stigma obconic. Fruit of two linear, narrow, pendulous follicular mericarps, green, 30-40 cm long; seeds 5-6 mm long, flat, commate at both ends.

Kariyenkappu, *KJD 18730*

Fl. & Fr.: October-February

Distribution: Fairly common in plantations of Kariyenkappu.

ASCLEPIAS L.

Sp. Pl. 214. 1753.

Asclepias curassavica L., Sp. Pl. 215. 1753; Hook.f., Fl. Brit. India 4: 18. 1883; Gamble, Fl. Madras 833(585). 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 282. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 527. 2009.

Herbs, stem terete, glaucous. Leaves opposite, 7-10 x 3-4 cm, lanceolate to linear-lanceolate, glabrous; lateral nerves 8-13 pairs, narrow; petiole 1 cm long. Flowers in axillary peduncled cymes; peduncle to 5 cm long, solitary, erect, dichotomous; pedicels 6-15 together, 1.5-2 cm long, slender. Calyx 5 lobed, 2.5 mm long, ovate. Corolla 5 lobed, ca. 1.2 cm across, orange-red, tube short, lobes oblong, deflexed. Coronal lobes yellow, 7 mm long. Ovary with two distinct carpels. Follicle to 7 x 1.5 cm, terete or fusiform; seeds many.

Chavachi, *KJD 31474*

Fl. & Fr.: February-November

Distribution: Run wild in evergreen forests at Chavachi.

CALOTROPIS R.Br.

Mem. Wern. Soc. i. 1: 39. 1811.

Calotropis gigantea (L.) Dryand., Hortus Kew. 2: 78. 1811; Hook.f., Fl. Brit. India 4: 17. 1883; Gamble, Fl. Madras 832(585). 1923; Manilal & Sivar., Fl. Calicut 170. 1982; Ansari, Fl. Kasaragod Div. 231. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 528. 2009. *Asclepias gigantea* L., Sp. Pl. 214. 1753.

Shrubs, stem rounded. Leaves opposite, 10-16 x 8-10 cm, smaller in branchlets, elliptic-ovate to obovate, apex acute or obtuse, base cordate; lateral nerves 5-7 pairs, adpressed pubescent when young, becoming glabrous on maturity. Flowers pale purple or greenish-white, 3 cm across; pedicels to 3 cm long, stout. Calyx lobes to 3 mm long. Corolla campanulate, tube short, lobes

ovate to oblong, recurved. staminal corona of 5 vertical lobes, 1 cm long. Carpels free. Fruit saccate, to 6 x 3 cm, ovoid; seeds many.

Near Farm, *KJD 18755*

Fl. & Fr.: Throughout the year

Distribution: Along the boundaries of Farm.

CARISSA L.

Syst. Nat. ed. 12, 2: 189. 1767. *nom. cons.*

Carissa inermis Vahl, *Symb. Bot.* 3: 43. 1794; Gamble, *Fl. Madras* 805(565). 1923; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 275. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 517. 2009. *Carissa macrophylla* Wall. ex DC., *Prodr.* 8:332. 1844; Hook.f., *Fl. Brit. India* 3:691. 1882.

Climbing shrubs, thorns 1-3 cm long. Leaves opposite, 5-8 x 3-4 cm, ovate, apex acuminate, base rounded, glabrous; lateral nerves 6 or 7 pairs; petiole 5 mm long. Flowers in sessile or peduncled terminal cymes; pedicel 3 mm long, stout. Calyx 5 lobed, 4 mm long, lanceolate, reddish, pubescent. Corolla 5 lobed, white, tube 2 cm long, cylindric, curved, bulged towards the apex, lobes 9 mm long, oblong, acute. Anthers lanceolate, inserted near the mouth of the corolla tube. Ovary 2 celled, 1-4 ovules; style filiform; stigma bifid. Berry 2 cm across, globose; seeds compressed.

Mullenpara, State Boundary, *KJD 18761*

Fl. & Fr.: January-June

Distribution: Rare in evergreen forests of Mullenpara.

CATHARANTHUS G. Don

Gen. Hist. 4: 71, 95. 1837.

Catharanthus roseus (L.) G. Don, *Gen. Hist.* 4: 95. 1837-1838; Manilal & Sivar., *Fl. Calicut* 165. 1982; Ansari, *Fl. Kasaragod Div.* 227. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 276. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 526. 2009. *Vinca rosea* L., *Syst. (ed. 10):* 944. 1759; Hook.f., *Fl. Brit. India* 3: 640. 1882. *Lochnera rosea* (L.) Rchb., *Consp. Reg. Veg.* 134. 1828.

Perennial herbs; young stems, leaves and calyx puberulous. Leaves simple, opposite, decussate, 3-6 x 1.5-2.5 cm, elliptic-obovate, apex obtuse or rounded, base cuneate, glabrous; lateral veins c. 10 pairs, chartaceous; petiole to 1.3 cm long. Flowers axillary, solitary or paired, shortly pedicellate. Calyx-lobes 5, subequal, 3-5 mm long, subulate. Corolla pink or white, tube 2-3 cm long, pubescent without; lobes 5, 1.5-2 x c. 1.5 cm, triangular-obovate, obtuse.

Stamens 5, included. Ovary ca 4 mm long; style to 3 cm long. Follicles 2-3 x 0.2-0.3 cm, linear, puberulous; seeds many, black.

Kariyenkappu, *KJD 18765*

Fl. & Fr.: August-February

Distribution: In old settlements at Kariyenkappu.

CEROPEGIA L.

Sp. Pl. 211. 1753.

- 1a. Mouth of the inflated part with inwardly directed hairs..... *C. manoharii*
1b. Mouth of the inflated part without hairs *C. metziana*

Ceropegia manoharii Sujanapal, P.M.Salim, Anil Kumar & Sasidh., J. Bot. Res. Inst. Texas 7: 342. 2013 (Plate 13i).

Twining herbs. Leaves decussate; lamina lanceolate, 5-10 × 2-3.5 cm, apex acuminate, base rounded or acute, margin hairy; petiole 0.8 - 1.5 cm long. Cymes axillary, mostly one or two flowered; bract solitary. Sepal 3 - 5 × 0.6 - 0.9 mm, linear, acuminate, glabrous. Corolla 3 - 4 cm long; corolla tube 1.4 - 1.8 cm long, greenish yellow, mouth of the inflated part with inwardly directed hairs inside; corolla lobes 1.6 - 2.2 cm long, corolla connate at tip forming an ovoid head; outer corona cupular, lobes 5, each lobe bifurcated, divergent to form horn like projection, ciliate on margin; inner corona of five linear, purple lobes. Pollen masses yellow, attached to the brown pollen carriers by short caudicles. Pollinarium 0.3 × 0.25 mm. Follicles in pair, larger one 15-18 × 0.3-0.4 cm, smaller 10-13 × 0.3-0.4 cm, slightly curved; seeds ca. 5 × 2 mm; coma white.

Ambalappara, *NS & KJD 31979*

Fl. & Fr.: November-February

Distribution: Fairly common in evergreen forests of Mullenpara, Kattikari and Ambalappara. Endemic to Southern Western Ghats; Conservation status: Vulnerable.

Ceropegia metziana Miq., Anal. Bot. Ind. 3: 11. 1852; M.Y. Ansari, Fasc. Fl. Ind. 16: 25. 1984; Sasidh. & Swarup., J. Econ. Taxon. Bot. 18: 633. 1994; Ratheesh, Fl. Stud. Wayanad Dist. 530. 2009. *Ceropegia gracilis* Bedd., Madras J. Lit. Sci. ser. 3, 1: 53. 1864. *Ceropegia brevicollis* Hook.f., Fl. Brit. India 4: 74. 1883, p. p.; Gamble, Fl. Madras 859(604). 1923, p.p. *Ceropegia stocksii* sensu Gamble, Fl. Madras 859(604). 1923, non Hook.f. 1883.

Twining, stem pubescent at nodes. Leaves opposite, 10-15 x 3-5 cm, ovate or ovate-oblong, apex acute or acuminate, mucronate, base acute; petiole 2-3 cm long. Peduncle to 2 cm long, glabrous or hairy; flowers few together rarely solitary; pedicels 2-2.5 cm long, stout. Sepals 7 mm long, linear. Corolla to 7.5 cm long, base inflated, funnel-shaped above, lobes to 3.5 cm long, ovate-deltoid, dull pink with purple dots. Outer corona 6 mm across, lobes deltoid, bifid, hairy; inner corona 2.5 mm long, glabrous. Follicle 23-28 cm long, 5 mm thick, terete, with a 5 cm long beak; seeds 10 x 3 mm, oblong; coma 15 mm long.

Ambalappara, *KVB 31658*; Kattikari, *NS & KJD 31979*

Fl. & Fr.: September-November

Distribution: Fairly common in evergreen forests of Mullenpara, Kattikari and Ambalappara. Endemic to Southern Western Ghats; Conservation status: Vulnerable.

CHONEMORPHA G. Don

Gen. Hist. 4: 76. 1836, *nom. cons.*

Chonemorpha fragrans (Moon) Alston, Ann. Roy. Bot. Gard. (Peradeniya) 11: 203. 1929; Manilal & Sivar., Fl. Calicut 162. 1982. *Echites fragrans* Moon, Cat. Pl. Ceylon 20.1824. *Echites grandiflora* Roth, Nov. Pl. Sp. 136. 1821. *Echites macrophylla* Roxb., Fl. Ind. 2:13.1832. *Chonemorpha macrophylla* (Roxb.) G. Don, Gen. Hist. 4: 76. 1837-1838; Hook.f., Fl. Brit. India 3: 661. 1882; Gamble, Fl. Madras 818(575). 1923. *Chonemorpha grandiflora* (Roth) M. R. & S. M. Almeida, J. Bombay Nat. Hist. Soc. 90: 427. 1993; Ratheesh, Fl. Stud. Wayanad Dist. 519. 2009.

Woody climbers, branchlets tomentose. Leaves opposite, 20-25 x 15-22 cm, broadly elliptic or ovate-orbicular, apex shortly acuminate, base cordate, pubescent above and tomentose beneath. Flowers 6-8 cm across, white, in terminal tomentose paniculate cymes. Calyx 1 cm long, glabrous, glandular within; lobes ovate, acute. Corolla fairly large, salver shaped, lobes longer than the tube, obovate, cuneate, rounded at apex. Stamens included, anthers lanceolate, sagittate. Disk cupular. Carpels distinct, ovules many, stigma bifid. Follicles to 30 x 2 cm, subtetragonous; seeds 2 cm long, coma 4.5 cm long, white.

Narikkadavu, *NS & KVB 31444*

Fl. & Fr.: April-December

Distribution: Common in semi-evergreen forests of Narikkadavu, Pookundu and Paripode.

DECALEPIS Wight & Arn.

Contr. Bot. India 64. 1834.

Decalepis nervosa (Wight & Arn.) Venter, Taxon. 46: 712. 1997. *Brachylepis nervosa* Wight & Arn., Contr. Bot. India 64. 1834; Hook.f., Fl. Brit. India 4: 7. 1883; Gamble, Fl. Madras 827(581). 1923. *Bacolepis nervosa* (Wight & Arn.) Decne. ex Moq. in DC., Prodr. 13: 216. 1849.

Climbing shrubs, stem purplish, pubescent; latex milky. Leaves opposite, 5-10 x 3-7 cm, elliptic or elliptic-oblong, acute to acuminate, base obtuse, upper surface glabrous and shining; lateral nerves 8-10 pairs, prominent below; petiole to 1 cm long. Flowers in axillary and terminal condensed cymes; peduncle pubescent to glabrescent. Calyx deeply lobed, lobes ovate, acute. Corolla rotate, lobes ovate greenish-purple; corona of 5 broad membranous scales. Stamens 5, attached to the throat of corolla; filaments short. Ovary glabrous; style apex capitate. Follicles narrowly lanceolate, 6-7 cm long.

Ambalappara, KVB 31703

Fl. & Fr.: December-April

Distribution: Rare in evergreen forests of Ambalappara.

Endemic to Western Ghats.

GYMNEMA R.Br.

Mem. Wern. Soc. i. 1: 33. 1811.

- 1a. Coronal ridges not produced beyond the sinus of corolla lobes *G. montanum*
- 1b. Coronal ridges produced beyond the sinus of corolla lobes *G. sylvestre*

Gymnema montanum (Roxb.) Hook.f., Fl. Brit. India 4: 31. 1883; Gamble, Fl. Madras 840(590). 1923; Manilal, Fl. Silent Valley 178. 1988. *Asclepias montana* Roxb., Fl. Ind. 2: 45. 1832. *Bidaria montana* (Roxb.) Rahman & Wilcock, Blumea 34: 99. 1989. *Gymnema tingens* (Roxb.) Wight & Arn. var. *ovalifolia* Wight, Icon. Pl. Ind. Orient. t. 592. 1842.

Glabrous twining shrubs; branchlets terete. Leaves opposite, to 16 x 10 cm, of branchlets much smaller, ovate or oblong, acute or acuminate, base truncate or rounded with few small glands; lateral nerves 5-7 pairs, reticulations prominent; petiole to 2-3.5 cm long. Peduncles to 0.5 cm long, stout; flowers 5-30 together; pedicels 6-7 mm long; slender, pubescent. Calyx lobes linear-oblong, ciliate, 2 mm long; corolla greenish white, glabrous, tube 3 mm long, globose, lobes 3 x 2 mm, oblong. Corolline corona 5 pairs of densely pubescent ridges. Gynostegium 4 x 2 mm, ridged.

Chavachi, KJD 26120; KVB 31515

Fl. & Fr.: April-May

Distribution: Common in evergreen forests of Chavachi and Chelachode; plantations of Kariyenkappu.

Gymnema sylvestre (Retz.) R.Br. ex Sm., Cycl. 17(1): no. 4. 1811; Hook.f., Fl. Brit. India 4: 29. 1883; Gamble, Fl. Madras 839(590). 1923; Manilal & Sivar., Fl. Calicut 169. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 283. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 530. 2009. *Periploca sylvestris* Retz., Observ. Bot. 2: 15. 1781.

Twining subshrubs, branchlets fulvous-tomentose. Leaves opposite, 4-7 x 3-5 cm, elliptic to ovate or obovate, apex obtusely acute, base truncate or obtuse, subcoriaceous, densely tomentose below, nerves 3 pairs; petiole 1-3 cm long. Flowers 4 mm across in umbellate cymes, many together; peduncle to 1 cm long, hispid; pedicels 6 mm long, slender. Sepals 2 mm long, ovate. Corolla campanulate, yellow, 2.5 mm long, tube globose, lobes triangular. Corolline corona 5 vertical pairs of pubescent ridges. Gynostegium 1.5 x 1 mm, cylindrical. Follicles 7.5 x 0.8 cm, lanceolate, seeds 10 x 5 mm, much compressed.

Chavachi, *KJD 26173*; Pothurumi, *NS & KVB 31427*

Fl. & Fr.: July-March

Distribution: Fairly common in evergreen forests of Chavachi and Pothurumi.

HEMIDESMUS R.Br.

Mem. Wern. Soc. i. 1: 56. 1811.

Hemidesmus indicus (L.) R.Br. ex Schult., Syst. Veg. 6: 126 1820; Hook.f., Fl. Brit. India 4: 5. 1883; Gamble, Fl. Madras 825(580). 1923; Manilal & Sivar., Fl. Calicut 171. 1982; Ansari, Fl. Kasaragod Div. 233. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 284. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 538. 2009. *Periploca indica* L., Sp. Pl. 211. 1753.

Slender twining undershrubs with woody rootstock; stem brownish. Leaves very variable, opposite or in whorls, often variegated, 3-7 x 0.7-3 cm, elliptic-oblong to linear-lanceolate, apex gradually acute-apiculate, base rounded, thin coriaceous, glabrous on both sides; petiole to 4 mm long. Flowers few, subsessile, in short, axillary cymes. Calyx 1-2 mm long, lobes 5, ovate, ciliolate along the margins. Corolla yellow, c. 8 mm across, 3-4 mm long, rotate, lobes 5, fleshy, triangular. Corona of 5 scales. Stamens 5, anthers jointed at apex, appendaged. Carpels 2, apocarpous; ovules many; styles 2; stylar apex flat, 5-angled. Follicles to 10 cm long, cylindrical; coma white.

Narikkadavu, *KJD 26392*

Fl. & Fr.: February-June

Distribution: Rare in Semi-Evergreen Forests of Narikkadavu and Paripode. Endemic to Peninsular India.

HOLARRHENA R.Br.

Mem. Wern. Soc. i. 1: 62. 1811.

Holarrhena pubescens Wall. ex G.Don, Gen. Hist. 4: 78. 1837-1838; Ansari, Fl. Kasaragod Div. 227. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 277. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 519. 2009. *Echites pubescens* Buch.-Ham., Trans. Linn. Soc. London 13: 521. 1821. *Echites antidysenterica* Roth in Roem. & Schult., Syst. Veg. 4: 394. 1819, non (L.) Roxb. ex Flem. 1810. *Holarrhena antidysenterica* (Roth) DC., Prodr. 8: 413. 1844; Hook.f., Fl. Brit. India 3: 644. 1882; Gamble, Fl. Madras 811(570). 1923; Manilal & Sivar., Fl. Calicut 165. 1982. *Holarrhena malaccensis* Wight, Icon. Pl. Ind. Orient. t. 1298. 1848.

Small deciduous trees; to 8 m high; bark pale brown. Leaves opposite, 7-18 x 3-12 cm, broadly ovate, ovate-oblong or ovate-lanceolate, apex acute or acuminate, base obtuse; lateral nerves 10-14 pairs, prominent, puberulous; intercostae reticulate; petiole 4-6 mm, pubescent, stout. Flowers creamy-white, slightly fragrant, in terminal and axillary corymbose cymes. Calyx lobes 5, 2.5 mm long, oblong-lanceolate, ciliate, glandular within at base. Corolla salver shaped, lobes 5, oblong, obtuse, as long as the tube, tube 1.3 cm long, puberulous, mouth with a ring of hairs. Stamens 5, included, attached towards the base of the corolla tube, anthers sagitate. Ovary 2 carpellary, apocarpous; ovules many; style 2 mm long; stigma bifid. Fruit of 2 terete elongated follicular mericarps connected at the tip, 25 x 1 cm; seeds with tuft of hairs at the apex.

Paripode, KJD 26397

Fl. & Fr.: April-October

Distribution: Rare in Moist deciduous forests and plantations.

HOYA R.Br.

Mem. Wern. Soc. i. 1: 26. 1811.

Hoya wightii Hook.f., Fl. Brit. India 459. 1883; Gamble, Fl. Madras 849(597). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 285. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 533. 2009 (Plate 13j).

Stout pendulous epiphytes. Leaves opposite, to 7 x 4 cm, elliptic, acuminate, base acute; nerves 6-8 pairs, horizontal; petiole to 2 cm long. Flowers yellowish white, 1.5 cm across, in lateral pedunculate umbels; peduncles to 1 cm long,

stout. Calyx deeply lobed to the base, lobes 2.5 mm long, ovate, ciliolate. Corolla ca. 2 cm across, lobes ovate, margins revolute. Corona of 5 fleshy lobes, deep purple, 6 x 6 mm, lobes 3 mm high, subglobose, stellately radiating from the column. Staminal column short arising from corolla. Ovary 2 carpellary; style 5-angled. Follicles 6-9 x 0.6 cm, slender, oblong, slightly tapering towards the ends; seeds 4 mm long, coma to 5 cm long.

Ambalappara, KVB 31759

Fl. & Fr.: March-April

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

ICHNOCARPUS R.Br.

Mem. Wern. Soc. i. 1: 61. 1811.

Ichnocarpus frutescens (L.) W.T.Aiton, Hortus Kew. (ed. 2) 2: 69. 1811; Hook.f., Fl. Brit. India 3: 669. 1882; Gamble, Fl. Madras 820(577). 1923; Manilal & Sivar., Fl. Calicut 162. 1982; Ansari, Fl. Kasaragod Div. 228. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 278. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 521. 2009. *Apocynum frutescens* L., Sp. Pl. 213. 1753.

Climbers, branchlets brown-tomentose. Leaves opposite, 4-6 x 3 cm, ovate, apex obtusely acute, base rounded, nerves 5 pairs, brown-pubescent below; petiole to 5 mm long. Flowers 3.5 mm long, in terminal or axillary paniced cymes; pedicels 3 mm long. Calyx 1 mm long, lobes ovate, acute, pubescent. Corolla white, salver shaped, contracted at mouth, tube 2 mm long, hairy inside, throat densely white-villous, lobes twisted, oblong, acuminate. Stamens included, anthers deeply sagitate at base, apiculate at apex. Carpels 2, free, stigma columnar. Mericarps follicular, to 15 cm long, slender, rusty puberulus; seeds many, compressed, crowned with long silky coma.

Chavachi, KJD 25585

Fl. & Fr.: August-March

Distribution: Fairly common in evergreen forests of Chavachi and semi-evergreen forests of Paripode.

MARSDENIA R.Br.

Mem. Wern. Soc. i. 1: 28. 1811, *nom cons.*

Marsdenia raziana Yoga. & Subram., Proc. Indian Acad. Sci. (Pl. Sci.) 83B: 147. 1976; Sasidh. & Anto, J. Econ. Taxon. Bot. 21: 247. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 533. 2009 (Plate 13k).

Climbing glabrous shrubs, stem striate, latex watery. Leaves opposite, 10-19 x 7-10 cm, oblong, acuminate, base rounded or acute, membranous, glabrous and glossy; lateral nerves 7-9 pairs, reticulations prominent beneath; petiole 1-3 cm long. Flowers brownish-pink, 1 x 1.2 cm, in 10-15 flowered umbellate racemes. Calyx ovate, acute, ciliate along the margins. Corolla tube urceolate, lobes ovate, acute, reflexed. Staminal column arising from corolla. Ovary 2 carpellary; style short. Fruit follicles; seeds flattened.

Kattikari, KVB 31548

Fl. & Fr.: January-March

Distribution: Fairly common in evergreen forests of Kattikari, Pothurumi, Chavachi and Mullenpara. Endemic to South India; Conservation status: Vulnerable.

RAUVOLFIA L.

Sp. Pl. 208. 1753.

- 1a. Herbs, corolla tube 1.5 cm long..... *R. serpentina*
1b. Shrubs, corolla tube less than 5 mm long..... *R. tetraphylla*

Rauvolfia serpentina (L.) Benth. ex Kurz, For. Fl. Burma 2: 171. 1877; Hook.f., Fl. Brit. India 3: 632. 1882; Gamble, Fl. Madras 807(567). 1923; Manilal & Sivar., Fl. Calicut 164. 1982; Ansari, Fl. Kasaragod Div. 229. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 279. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 523. 2009. *Ophioxylon serpentinum* L., Sp. Pl. 1043. 1753.

Subshrubs, rootstock thick, sap watery. Leaves whorled, 3-4 at each node, 7-10 x 3 cm, oblanceolate, acuminate at both ends, glabrous; lateral nerves to 12 pairs. Cymes axillary and terminal, densely flowered; peduncles to 5 cm long. Calyx lobes 5, 4 mm long, oblong, acute. Corolla white, tube 15 mm long, lobes 5 mm long, oblong, obtuse. Stamens 5, include. Ovary two celled, ovules 2; style filiform. Fruit drupe; seeds ovoid.

Narikkadavu, NS & KVB 31449

Fl. & Fr.: April-October

Distribution: Rare along the boundaries of Farm.

Rauvolfia tetraphylla L., Sp. Pl. 208. 1753; Manilal & Sivar., Fl. Calicut 165. 1982; Ansari, Fl. Kasaragod Div. 230. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 279. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 523. 2009. *Rauvolfia canescens* L., Sp. Pl. (ed. 2) 303. 1762; Gamble, Fl. Madras 808(568). 1923.

A small, much-branched woody shrub, 0.6-1.2 m high. Leaves whorled, 3-5 at each node, ovate-elliptic. Flowers greenish-white or creamy-white in umbellate cymes; peduncle to 2 cm long. Calyx lobes orbicular, ciliate. Corolla white, ca. 4 mm long, lobes ovate, throat villous. Stamens 5, included in the corolla. Ovary 2 celled; style filiform. Fruits drupe, 6-8 mm across, globose, deep red or purple when ripe; seeds oblong, rugose.

Kariyenkappu, KJD 26297

Fl. & Fr.: Throughout the year

Distribution: Rare in the plantations of Kariyenkappu.

TABERNAEMONNTANA L.

Sp. Pl. 210. 1753.

Tabernaemontana alternifolia L., Sp. Pl. 211.1753; Ratheesh, Fl. Stud. Wayanad Dist. 524. 2009. *Tabernaemontana heyneana* Wall., Bot. Reg. 15: t. 1273. 1829; Hook.f., Fl. Brit. India 3: 646. 1882; Manilal & Sivar., Fl. Calicut 166. 1982; Ansari, Fl. Kasaragod Div. 230. 1985. *Ervatamia heyneana* (Wall.) T.Cooke, Fl. Bombay 2:134.1904; Gamble, Fl. Madras 813(572).1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 277. 1988.

Small trees, to 8 m high; bark corky, latex milky. Leaves opposite, 13-18 x 4-7 cm, elliptic-oblong, apex acuminate, base acute; lateral nerves 12-15 pairs, intercostae reticulate; petiole 2 cm long. Cymes terminal or axillary; peduncles to 4 cm long. Flowers pedicellate. Calyx 4 mm long, lobes short, oblong, obtuse. Corolla white, tube cylindrical, 25 mm long, dilated at mouth, villous inside; lobes 15 mm long, oblong, obtuse, apex crisped. Stamens included; anthers sagittate at base, linear. Carpels distinct. Follicles yellow, 5 x 1.5 cm, beak acuminate; aril red.

Chelachode, KJD 22526

Fl. & Fr.: April-October

Distribution: Common in evergreen forests of Chelachode and Chavachi; semi-evergreen forests of Paripode and Pothanplavu. Endemic to Western Ghats.

TOXOCARPUS Wight & Arn.

Contr. Bot. India 61.1834.

Toxocarpus palghatensis Gamble, Bull. Misc. Inform. Kew 1922: 119. 1922 & Gamble, Fl. Madras 830(583). 1923 (Plate 131).

Climbing shrubs; stem pubescent. Leaves opposite, to 8 x 5 cm, smooth, elliptic-obovate, nearly glabrous, abruptly acuminate; main nerves 6-7 pairs. Flowers pale yellow, in axillary, villous racemose cymes. Calyx very small, 5-

lobed. Corolla 1 cm long, white, 5-lobed. Corona scales shorter than the stamens, acute. Stamens inserted at the base of the corolla; filaments connate; anthers small, minutely fimbriate at tip. Ovary of 2 carpels. Follicles 2, divaricate; seeds oblong, flattened, tipped with a silky coma.

Way to Meenmutty, KJD 31491

Fl. & Fr.: Throughout the year

Distribution: Fairly common at evergreen forests of Meenmutty. Endemic to southern Western Ghats; Conservation status: Vulnerable.

TYLOPHORA R.Br.

Mem. Wern. Soc. i. 1: 28. 1811.

- 1a. Glabrous twiners *T. capparidifolia*
1b. Pubescent twiners *T. indica*

Tylophora capparidifolia Wight & Arn., Contr. Bot. India 51.1834; Hook.f., Fl. Brit. India 4:41.1883; Gamble, Fl. Madras 843(592). 1923; Ratheesh, Fl. Stud. Wayanad Dist. 535. 2009.

Glabrous twiners; stem twining to the right, slender. Leaves opposite, 6 x 2 cm, elliptic or oblanceolate to obovate, apiculate, round to subcordate at base, coriaceous, with 4-6 pairs of prominent nerve, coarsely reticulate beneath; petiole to 1 cm long. Raceme axillary, solitary, umbellate, congested, to 4 cm long. Flowers few; pedicels 8-12 mm long, slender. Calyx 5 parted, 1.5 mm long, lanceolate. Corolla 4 mm across, lobes obovate, revolute above, glabrous. Corona brown, 1 mm across, lobes 5, uneven. Staminal column arising from base of corolla. Ovary twocarpellary; style 5 lobed. Follicle 3-4 cm long, 8-10 mm thick, ovoid, narrowed at apex into a beak.

Ambalappara, KVB 31708

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Ambalappara and Chavachi. Endemic to southern Western Ghats.

Tylophora indica (Burm.f.) Merr., Philipp. J. Sci. 19: 373. 1921; Manilal & Sivar., Fl. Calicut 169. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 535. 2009. *Cynanchum indicum* Burm.f., Fl. Ind. 70. 1768. *Tylophora asthmatica* (L.f.) Wight & Arn., Contr. Bot. India 51. 1834; Hook.f., Fl. Brit. India 4: 44. 1883; Gamble, Fl. Madras 843(593). 1923. *Asclepias asthmatica* L.f., Suppl. Pl. 171. 1781. *Asclepias prolifera* Rottl. ex Ainslie, Mat. Ind. 2: 225. 1826.

Slender, pubescent climbers. Leaves opposite, 4-10 x 2-5.5 cm, ovate to oblong, acute or acuminate apex, base subcordate, entire, slightly pubescent on both sides, petiole to 0.8 cm. Flowers greenish-purple or greenish-yellow, in umbellate cymes; pedicel to 1.3 cm; bracts filiform, hairy. Calyx hairy outside, divided nearly to the base, lobes linear-lanceolate, to 2 mm. Corolla 1 cm across, lobes to 4 mm long. Corona single, lobes acuminate at tip. Ovary ob-conical; style to 1 mm; follicle cylindrical, acute at both ends small, flat. Follicles 7-10 cm long, oblong, tapering towards the apex, glabrous; seeds 7 mm long, broadly ovate, coma 2-2.5 cm long.

Paripode, KVB 22594

Fl. & Fr.: February-July

Distribution: Rare in semi-evergreen forests of Paripode.

WRIGHTIA R.Br.

Mem. Wern. Soc. i. 1: 73. 1811.

Wrightia tinctoria (Roxb.) R.Br., Mem. Wern. Soc. i. 1: 47. 1811; Hook.f., Fl. Brit. India 3: 653. 1882; Gamble, Fl. Madras 815(573). 1923; Ansari, Fl. Kasaragod Div. 230. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 281. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 526. 2009. *Nerium tinctorium* Roxb., Orient. Repert. 1: 39. 1791.

Deciduous trees, to 15 m; bark grey. Leaves opposite, distichous, 3.5-11 x 2-4 cm, oblong-lanceolate or elliptic-ovate, apex acuminate or caudate acuminate, base acute glaucous beneath; lateral nerves 5-10 pairs, slender, arched, pinnate, prominent, intercostae reticulate; petiole 2-5 mm long. Flower white, scented, in terminal cymes; bracts 2, minute. Calyx lobes 5, with membranous margin, 2 mm, ovate, obtuse, ciliate, glandular inside. Corolla salver shaped, lobes 5, broad lobes 12 x 5 mm, oblong, obtuse, throat with 1-2 series of erect, fimbriate corona scales, tube 1.5-2 mm. Stamens 5, inserted on the mouth of the tube. Carpels 2, free; ovules many; style filiform, stigma ovoid, usually with a toothed basal ring. Fruit of 2 follicular mericarps, 15-45 cm long, green, cylindrical, cohering at the tip; seed 16 mm long, black.

Kariyenkappu, KJD 22552

Fl. & Fr.: February-November

Distribution: Occasional in Moist deciduous forests.

GENTIANACEAE

- 1a. Shrubs or epiphytic shrubs, Fruit berry..... Fagraea
- 1b. Herbs, fruit capsule.....2



a. *Vaccinium neilgherrense*



b. *Ardisia brahmagiriensis*



c. *Embelia ribes*



d. *Myrsine striata*



e. *Symplocos macrophylla*



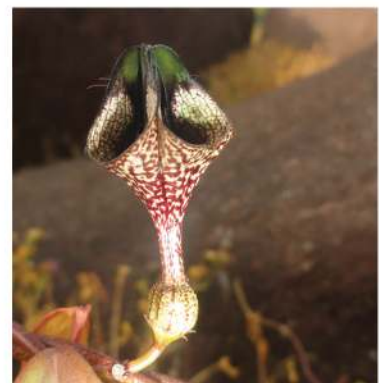
f. *Symplocos wynadense*



g. *Miquelia dentata*



h. *Nothapodytes nimmoniana*



i. *Ceropegia manoharii*



j. *Hoya wightii*



k. *Marsdenia raziana*



l. *Toxocarpus palghatensis*

- 2a. Flowers irregular Canscora
- 2b. Flowers regular 3
- 3a. Ovary one celled; calyx free; petals with nectary chambers at Base inside Swertia
- 3b. Ovary 2-celled; calyx united; petals with out nectery chambers Exacum

CANSCORA Lam.

Encycl. 1: 601. 1785.

- 1a. Pedicels terete *C. diffusa*
- 1b. Pedicels 4-angled..... *C. pauciflora*

Canscora diffusa (Vahl) R.Br. ex Roem. & Schult., Syst. Veg. 3: 301. 1820; Hook.f., Fl. Brit. India 4: 103. 1883; Gamble, Fl. Madras 878(617). 1923; Manilal & Sivar., Fl. Calicut 173. 1982; Ansari, Fl. Kasaragod Div. 235. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 290. 1988; Mike Thiv, Blumea 48: 11. 2003; Ratheesh, Fl. Stud. Wayanad Dist. 544. 2009; Shahina & Nampy, Phytotaxa 164 (4): 205. 2014. *Gentiana diffusa* Vahl, Symb. Bot. 3: 47. 1794. *Canscora decurrens* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2:136.1850; Gamble, Fl. Madras 878(617). 1923; Ansari, Fl. Kasaragod Div. 235. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 290. 1988. *Canscora lawii* Wight, Icon. Pl. Ind. Orient. t. 1327. 1848.

Small herbs, stem 4-angular. Leaves simple, opposite, lower leaves 2 x 1.5 cm, elliptic, petiolate, upper ones ovate, sessile, 3-ribbed, glabrous. Cymes terminal; bracts ovate. Flowers many; pedicel 1 cm long, filiform. Calyx 6 mm long, wingless, 5-toothed, glabrous. Corolla white, 9 mm long, tube cylindrical, lobes lanceolate, acute. Two stamens fertile, two sterile. Ovary 1-celled, ovules many. Capsule 5 mm long, linear-oblong.

Paripode, KVB 31683; Ambalappara, KVB 31698

Fl. & Fr.: October-January

Distribution: Common in evergreen forests of Ambalappara and Chavachi; Semi-Evergreen forests of Narikkadavu and Paripoode and plantations of Kariyenkappu.

Canscora pauciflora Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 136. 1850; Hook.f., Fl. Brit. India 4: 103. 1883; Gamble, Fl. Madras 878(617). 1923; Manilal & Sivar., Fl. Calicut 173. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 291. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 544. 2009; Shahina & Nampy, Phytotaxa 164 (4): 212. 2014.

Erect herbs; stem 4-angled, branches winged. Leaves opposite, sessile, to 4.5 x 1.5 cm, ovate-acute, base cuneate, 3-ribbed, membranous, glabrous. Flowers in terminal and axillary, dichotomously branched, lax cymes; bracts leafy; bracteoles lanceolate. Calyx tubular, ca 4 mm long, lobes lanceolate. Corolla rose, tube 5 mm long, limb zygomorphic. Stamens 4, one longer. Ovary 1-celled; ovules many, stigma bilobed. Capsule linear.

Ambalappara KVB 31782; NS & KJD 31988, 31962

Fl. & Fr.: October January

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Western Ghats.

EXACUM L.

Sp. Pl. 112. 1753.

Exacum tetragonum Roxb., Fl. Ind. 1: 413. 1820; Hook.f., Fl. Brit. India 4: 95. 1883; Gamble, Fl. Madras 873(613).1923; Agrawal, J. Econ. Taxon. Bot.3:984. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 292. 1988; Klackenberg, Opera Bot. 84:37.1985; Babu, Fl. Malappuram Dist. 449. 1990; Ratheesh, Fl. Stud. Wayanad Dist. 546. 2009. *Exacum bicolor* Roxb., Fl. Ind. 1: 413.1820; Hook.f., Fl. Brit. India 4: 96. 1883; Gamble, Fl. Madras 873(613). 1923; Agrawal, J. Econ. Taxon. Bot. 3: 983. 1982; Manilal & Sivar., Fl. Calicut 174. 1982; Ansari, Fl. Kasaragod Div. 236. 1985. *Exacum perrottetii* Griseb. in DC. Prodr. 9: 45. 1845.

Tall herbs, 50-120 cm high; stems quadrangular, not or narrowly winged. Leaves opposite, 7 x 1.5 cm, elliptic, narrowed to a broad petiole, acute at apex, 3-ribbed. Cymes terminal, in many flowered corymbs; bracts 7 mm long, linear. Calyx 9 mm long, 4-lobed, lobes ovate, abruptly cuspidate with a cuspidate 2 mm broad wings. Corolla blue or white with blue shades, tube short, lobes 4, to 20 x 8 mm, elliptic, acute. Stamens 4, anthers 8 mm long, slightly curved, filaments broaden at base. Ovary 2-celled, ovules many; stigma subcapitate. Capsule globose; seeds small, many.

Ambalappara, NS & KJD 25501

Fl. & Fr.: November-January

Distribution: Common in the grasslands of Ambalappara. Endemic to Peninsular India.

FAGRAEA Thunb.

Kongl. Vetensk. Acad. Nya Handl. 3:132. 1782.

Fagraea ceilanica Thunb., Kongl. Vetensk. Acad. Nya Handl. 3: 132. 1782; Hook.f., Fl. Brit. India 4: 83. 1883 "zeylanica"; Gamble, Fl. Madras 865(608).

1923; Manilal & Sivar., Fl. Calicut 172. 1982; Ansari, Fl. Kasaragod Div. 234. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 287. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 539. 2009. *Fagraea obovata* Wall., Fl. Ind. 2: 33. 1824; Hook.f., Fl. Brit. India 4: 83. 1883; Gamble, Fl. Madras 865(608). 1923. *Fagraea coromandelina* Wight, Icon. Pl. Ind. Orient. t. 1316. 1848. *Fagraea malabarica* Wight, Icon. Pl. Ind. Orient. t.1317. 1848.

Small trees, usually epiphytic on tree trunks; branchlets stout with prominent leaf-scars. Leaves opposite, 10-18 x 5-8 cm, obovate or oblanceolate, base cuneate, margin entire, apex obtuse, fleshy, shiny, glabrous; petiole to 2.5 cm long. Inflorescence terminal or axillary, few-flowered corymbose cymes. Flowers large, 6-8 cm across, creamy white. Calyx deeply 5-lobed; lobes ca 8 mm long, obovate, acute or obtuse. Corolla funnel-form; tube 4-5 cm long; lobes 5, broad, twisted to right. Stamens 5, adnate at base of corolla-tube. Ovary 2-celled; ovules many in each cell; stigma capitate. Berry 2-4 x 1.5-3 cm, ellipsoid, shiny; seeds many.

Mullenpara, NS & KJD 31986

Fl. & Fr.: March-December

Distribution: Fairly common in evergreen forests of Mullenpara and semi-evergreen forests of Paripode.

SWERTIA L.

Sp. Pl. 226. 1753.

- 1a. Inflorescence corymbose *S. beddomei*
 1b. Inflorescence lax panicles *S. lawii*

Swertia beddomei C.B.Clarke in Hook.f., Fl. Brit. India 4: 127. 1883; Gamble, Fl. Madras 881(619). 1923; Ratheesh, Fl. Stud. Wayanad Dist. 547. 2009; Nampy et.al., Phytotaxa 195 (1): 36. 2015 (Plate 14a).

Erect herbs, to 60 cm high; branchlets 4-angled and obscurely 4 winged. Leaves opposite-decussate, sessile, 1-3 x 0.8-2 cm, ovate-orbicular, obtuse at apex, subamplexicaule at base. Flowers blue lurid or white, 4-5 mm across, in flat topped terminal and axillary corymbs. Calyx 4-partite, ovate-oblong or rarely lanceolate, 4-5 x 1-1.5 mm, prominently 3-5 nerved, obtuse or acute at apex, revolute at margins. Corolla lobes 4, elliptic-obovate, 6-7 x 1-3.5 mm, obtuse at apex, often inflexed along margins, lobes with a nectary at base; nectaries with fringed margins. Stamens 4, inserted at base of corolla; filaments linear, ribbon-like. Ovary 1-celled, ellipsoid; ovules numerous; style short, 0.5-

0.8 mm long; stigma bifid, capitate. Fruit an oblong, sessile, 2-valved capsule; seeds many, small.

Ambalappara, KVB 31652; NS & KJD 31942

Fl. & Fr.: November-April

Distribution: Common in grasslands and evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Swertia lawii (Wight ex C.B.Clarke) Burkill, J. Asiat. Soc. Bengal 2: 379. 1906; Gamble, Fl. Madras 881(619). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 292. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 548. 2009 Nampy et.al., Phytotaxa 195 (1): 40. 2015. *Swertia corymbosa* Wight var. *lawii* Wight ex C.B.Clarke in Hook.f., Fl. Brit. India 4:126.1883 (Plate 14b).

Erect herbs, to 60 cm tall. Leaves opposite, deltoid-ovate, up to 3.5 x 1.3 cm, lanceolate, acuminate, rounded-truncate at base, 3-nerved. Flowers in terminal lax cymes, ca. 3.5 cm long, cymules at the ends of the inflorescence branches lax. Calyx deeply 4 or 5 partite, tube 0 or very short; lobes narrowly lanceolate. Corolla white with blue nerves, rotate; lobes 4 or 5, obovate, mucronate; nectary 1 near the base of each corolla-lobe, large, ciliate, covered with a fimbriate scale. Stamens 4 or 5, inserted at the base of the corolla, free or slightly jointed in a ring; filaments linear, often dilated downwards; anthers oblong, versatile. Ovary 1-celled; ovules many; style short or 0; stigma bilobed. Fruit a sessile, ovate or oblong, 2-valved capsule; seeds usually many, small, testa reticulate.

Ambalappara, KVB 31761

Fl. & Fr.: November-January

Distribution: Rare in grasslands of Ambalappara. Endemic to southern Western Ghats.

LOGANIACEAE

STRYCHNOS L.

Sp. Pl. 189. 1753.

- 1a. Trees *S. nux-vomica*
- 1b. Climbers..... 2
- 2a. Berries large, more than 8 cm across; flowers more than 1cm*S. colubrina*
- 2b. Berries rather small, less than 5 cm; flowers less than 1 cm 3
- 3a. Climbers with woody tendrils *S. minor*
- 3b. Climbers with out tendrils..... *S. dalzellii*

Strychnos colubrina L., Sp. Pl. 189. 1753; Hook.f., Fl. Brit. India 4: 87. 1883; Gamble, Fl. Madras 868(610).1923; Ratheesh, Fl. Stud. Wayanad Dist. 541. 2009. *Strychnos wallichiana* Steud. ex DC., Prodr. 9: 13. 1845; Ramach. & V.J. Nair, Fl. Cannanore Dist. 289. 1988. *Strychnos rheedei* C.B.Clarke in Hook.f., Fl. Brit. India 4: 87. 1883. *Strychnos cinnamomifolia* Thwaites, Enum. Pl. Zeyl. 201. 1860, var. *wightii* Hill, Bull. Misc. Inform. Kew 1917: 194. 1917; Gamble, Fl. Madras 869(610). 1923; Manilal & Sivar., Fl. Calicut 172. 1982.

Tendrillate climbers. Leaves opposite, 5-8 x 3-5 cm, broadly elliptic, abruptly acuminate, shining, green or black when dry; 3-ribbed, nervules prominent, irregular. Cymes axillary and terminal, peduncled, 5-6 cm across. Flowers many; pedicels 2 mm long. Calyx 1.5 mm long, lobes ovate, obtuse, ciliate. Corolla greenish yellow, tube 10 mm long, hairy inside, lobes 4 x 2 mm, oblong, obtuse. Anthers sessile. Ovary hirsute; ovules many; style 12 mm long, hirsute, stigmas bilobed, globose. Berry globose, 6-8 cm across, glabrous, greenish; seeds 2.5 cm long, ovoid, flattened.

Chelachode, *KJD 22523*

Fl. & Fr.: February-July

Distribution: Common in evergreen forests of Chelachode, Chavachi and Moonamthode and plantations of Kariyenkappu.

Strychnos dalzellii C.B.Clarke in Hook.f., Fl. Brit. India 4: 87. 1883; Gamble, Fl. Madras 868(610). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 288. 1988 (Plate 14c).

Climbers with ferruginous, pubescent tendrils. Leaves opposite, up to 10 x 4.5 cm, ovate, acute, rounded at base, 3-nerved. Flowers pale green, sparsely ciliate, in short and dense axillary cymes. Calyx 5 or 4-lobed. Corolla-tube and lobes about equal in length, the lobes with a line of erect hairs within. Stamens 5 or 4 adnate to the corolla-tube; filaments short; anthers bearded at the base. Ovary and style glabrous. Berries ca. 4 cm across, crustaceous, glabrous; seeds several, discoid.

Mullenpara, *NS & KJD 31929*

Fl. & Fr.: November-December

Distribution: Rare in evergreen forests of Mullenpara. Endemic to Western Ghats.

Strychnos minor Dennst., Schlüssel Hortus Malab. 15, 25, 33. 1818. *Strychnos colubrina* sensu C.B.Clarke in Hook.f., Fl. Brit. India 4:87.1883,p.p., non L. 1753.

Climbing shrubs; bark pale brown; tendrils 2-branched. Leaves opposite, 5.5-14 x 2.8-5.4 cm, ovate or elliptic-ovate, apex acute or acuminate, base obtuse or rounded, coriaceous, 3-ribbed from a little above the base; petiole to 1.2 cm

long. Flowers white in cymes up to 3 cm long. Calyx lobes ca 1 mm long. Corolla tube 2 mm long, throat woolly; lobes ovate-acute, as long as the tube. Ovary and style hirsute. Berry woody, 2-2.5 cm across; seeds 1-3, orbicular.

Kariyenkappu, *KJD 31490*

Fl. & Fr.: June-October

Distribution: Rare in plantations of Kariyenkappu.

Strychnos nux-vomica L., Sp. Pl. 189. 1753; Hook.f., Fl. Brit. India 4: 90. 1883; Gamble, Fl. Madras 868(610). 1923; Manilal & Sivar., Fl. Calicut 171. 1982; Ansari, Fl. Kasaragod Div. 234. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 289. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 542. 2009.

Trees, to 20 m high; bark blackish-grey. Leaves opposite, 14 x 2-9 cm, elliptic, broadly elliptic or elliptic-ovate, apex acute or obtuse, base acute to attenuate; petiole 5-13 mm; 3-5 nerved from base; intercostae reticulate. Flowers greenish-white, in terminal sessile cymes, sessile, tomentose; bract 5 mm; bracteole 1.5 mm long. Calyx lobes 4, 1 mm long, triangular, acute, pubescent. Corolla greenish-yellow, tube 10 mm long, longer than lobes, slightly hairy near the base within, lobes 4, 4 x 1.5 mm, oblong, acute. Stamens 4, anthers sessile inserted at the throat of corolla tube. Ovary 2-celled, ovules many in each cell. Fruit a berry, 3-5 cm across, globose, yellowish-red or orange, glabrous; seeds 3 or 4, orbicular, flat, shiny, greenish-white, 2-2.5 cm diameter.

Chavachi, *KJD 22539*

Fl. & Fr.: March-December

Distribution: Rare in Semi-Evergreen forests of Bhoothamkallu.

RUBIACEAE

- 1a. Flowers aggregated in globose heads..... 2
- 1b. Flowers not so 4
- 2a. Calyces of individual flowers connate at base..... Ochreinauclea
- 2b. Calyces of individual flowers free..... 3
- 3a. Flowers ebracteate, leaves broadly ovate, 30 cm or more Neolamarckia
- 3b. Flowers bracteate, leaves oblong, 10-20 cm Mitragyna
- 4a. Cells of ovary more than 2 ovuled 5
- 4b. Cells of ovary 1-ovuled 16
- 5a. Straggling climbers, shrubs or small trees 6
- 5b. Herbs or under shrubs..... 9
- 6a. Straggling climbers..... Mussaenda
- 6b. Shrubs or small trees 7

7a. Fruit capsular	Wendlandia
7b. Fruit berry.....	8
8a. Plants armed, spines long, solitary, axillary	Catunaregam
8b. Plants unarmed.....	Discospermum
9a. Corolla lobes dentate.....	Dentella
9b. Corolla lobes entire.....	10
10a. Ovary 5-6 cells	Mycetia
10b. Ovary 2-4 celled	11
11a. Anthers dehiscing by apical pores	12
11b. Anthers dehiscing laterally.....	13
12a. Stigma 1, inflorescence below 10 cm.....	Argostemma
12b. Stigma 2, inflorescence 10-15 cm	Neurocalyx
13a. Calyx lobes 5, fruits compressed, obcordate.....	Ophiorrhiza
13b. Calyx lobes 4, fruits subglobose or 4-angled	14
14a. Fruits few seeded. Seeds with ventral cavity.....	Neanotis
14b. Fruits many seeded, seeds with out a ventral cavity	15
15a. Perinial, woody large herbs or under shrubs	Hedyotis
15b. Annual, small herbs	Oldenlandia
16a. Herbs or undershrubs.....	17
16b. Climbers, shrubs or small trees	19
17a. Flowers 4-merous, erect herbs, climbers or undershrubs	18
17b. Flowers 5-merous, creeping herbs or shrubs	26
18a. Woody erect herbs or undershrubs, Inflorescence cymose	Knoxia
18b. Small herbs, inflorescence compressed at node	Spermaceo
19a. Climbers, stem 4-angled	Rubia
19b. Straggling or erect shrubs or small trees.....	20
20a. Thorny shrubs or straggling shrubs.....	Canthium
20b. Thron less shrubs or small trees	21
21a. Flowers in cymes.....	22
21b. Flowers few, clustered	25
22a. Flowers 4-merous.....	23
22b. Flowers 5-merous.....	24
23a. Stigma entire.....	Pavetta
23b. Stigma divided.....	Ixora
24a. Corolla tube stright, ovary 2-loculed	Psychotria
24b. Corolla tube curved, ovary 1-loculed	Chassalia
25a. Leaves sessile or sub sessile.....	Saprosma
25b. Leaves petioled	Lasianthus
26a. Creeping herbs, leaves cordate	Geophila
26b. Erect shrubs, leaves acute or Cuneate	Coffea

ARGOSTEMMA Wall.

Fl. Ind. 2: 324. 1824.

- 1a. Leaves broadly orbicular-ovate *A. courtallense*
1b. Leaves lanceolate or ovate-lanceolate..... *A. verticillatum*

Argostemma courtallense Arn., Ann. Nat. Hist. 3: 22. 1839; Hook.f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Madras 590(417). 1921; Manilal & Sivar., Fl. Calicut 139. 1982; Ansari, Fl. Kasaragod Div. 187. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 211. 1988; Sivar., J. Bombay Nat. Hist. Soc. 63: 462. 1984; Ratheesh, Fl. Stud. Wayanad Dist. 412. 2009.

Erect herbs with a tuberous root stock. Leaves opposite, 8 cm across, few, orbicular, cordate at base, villous above; petiole 0-2 cm; stipule 8 mm long, ovate, entire. Cymes terminal, 1-3 cm across; peduncle 3-6 cm long, 1-3 together. Flowers few, 10 mm long, pedicelled. Calyx tube turbinate, lobes 4, ovate. Corolla tube broad, glabrous; lobes 4, ovate, white. Stamens 4, included, anthers lanceolate. Ovary 2-celled; ovules many; style slender, stigma terminal, globose.

Kannadivechakunnu, *KJD 26191*

Fl. & Fr.: June-October

Distribution: Common in evergreen forests of Cross way, Chavachi, Moonamthode and Kannadivechakunnu. Endemic to Inadia.

Argostemma verticillatum Wall., Fl. Ind. 2: 325. 1824 & Pl. Asiat. Rar. 2. t.185. 1831; Hook.f., Fl. Brit. India 3: 43. 1880; Gamble, Fl. Madras 590(417). 1921.

Small herbs. Leaves in whorls of 3 or 4, mostly confined to the apex of stem, to 5 x 1 cm, linear-lanceolate, subsessile, membranous, glabrous; lateral nerves indistinct; stipules interpetiolar, entire or 0. Flowers 5-merous, 1.2 cm across, in terminal few flowered umbels, peduncles slender, shorter than the leaves. Calyx glabrous, lobes ovate-acute. Corolla white, lobes ovate-acuminate. Staminal filaments short, anthers connate, dehiscence by apical pores. Ovules many on projected placenta; style filiform; stigma capitate.

Kannadivechakunnu, *KJD 26192*

Fl. & Fr.: August-October

Distribution: Rare in evergreen forests of Kannadivechakunnu.

CANTHIUM Lam.

Encycl. 1: 602. 1785.

- 1a. Stems with supra axillary arms, flowers not or very short peduncled2
1b. Stems without or very rarely armed, flowers peduncled*C. travancoricum*

- 2a. Flowers 5-merous, leaves cordate at base *C. rheedei*
 2b. Flowers 4-merous, leaves not cordate *C. coromandelicum*

Canthium coromandelicum (Burm.f.) Alston, Handb. Fl. Ceylon 6(Suppl.): 152. 1931. *Gmelina coromandelica* Burm.f., Fl. Ind. 132. 1768. *Canthium parviflorum* Lam., Encycl. 1: 602. 1788; Hook.f., Fl. Brit. India 3: 136. 1880; Manilal & Sivar., Fl. Calicut 130. 1982; Ansari, Fl. Kasaragod Div. 187. 1985. *Plectronia parviflora* (Lam.) Bedd., Fl. Sylv. S. India 134/5. 1872; Gamble, Fl. Madras 625(441). 1921 (Plate 14d).

Armed shrubs; branchlets obtusely 4-angled; bark grey; spines 1-3.2 cm long, supra-axillary. Leaves opposite, 1.8-4.2 x 1.3-3 cm, ovate, elliptic-ovate to obovate, apex subacute, base rounded to attenuate; petiole c. 5 mm long; stipules subulate. Flowers greenish, 4-merous, in axillary, sessile cymes below spines. Calyx cupular, 4-toothed. Corolla 4-5 mm across, campanulate to globose, mouth villous; lobes 4, ovate, acute, spreading or reflexed. Stamens 4, subsessile, exerted. Stigma capitate, slightly 2-lobed. Fruit 1-1.4 cm across, subglobose, yellow.

Ambalappara, *KJD 31965*

Fl. & Fr.: April-June

Distribution: Fairly common in evergreen forests of Ambalappara.

Canthium rheedei DC., Prodr. 4: 474. 1830, 'rheedii'; Hook.f., Fl. Brit. India 3: 134. 1880; Ratheesh, Fl. Stud. Wayanad Dist. 414. 2009. *Plectronia rheedei* (DC.) Bedd., Fl. Sylv. S. India 134/5. 1872; Gamble, Fl. Madras 625(441). 1921.

Armed shrubs; spines supra-axillary. Leaves opposite, 2-5.5 x 1.5-3.5 cm, ovate, elliptic-ovate or lanceolate, apex acute to acuminate, base rounded or cordate, chartaceous; petiole to 3 mm long; stipules filiform. Flowers in a few-flowered, axillary fascicles. Calyx 1.5 mm long, cupular, 5-toothed. Corolla white, 5-6 mm across; tube 3-4 mm long, slightly constricted above, furnished with a curtain of stiff reflexed hairs within; lobes 5, lanceolate, acuminate, reflexed. Stamens 5; filaments c. 2 mm long. Ovary c. 1 x 1 mm, compressed; stigma acute. Drupe 7-10 mm across, obcordate, compressed; pyrenes rugose.

Cross Way, *KJD 31813*; Moonamthode; Ambalappara *31709*

Fl. & Fr.: March-June

Distribution: Common in evergreen forests of Cross way, Chelachode and Chavachi; plantions of Kariyenkappu. Endemic to Peninsular India

Canthium travancoricum (Bedd.) Hook.f., Fl. Brit. India 3: 134. 1880; Ramach. & V.J. Nair, Fl. Cannanore Dist. 212. 1988; Ratheesh, Fl. Stud. Wayanad Dist.

414. 2009. *Plectronia travancorica* Bedd., Icon. Pl. Ind. Or. t. 239. 1868-1874; Gamble, Fl. Madras 625(441). 1921.

Unarmed shrubs or small trees with scandent branches. Leaves opposite, 7 x 4.5 cm, ovate, acute, membranous; nerves 4-7 pairs; petiole 1-1.5 cm long; stipule orbicular, densely villous inside. Cymes 1-3 cm across, peduncled, with many slender villous branches. Flowers 6 mm long. Calyx 2 mm long, teeth acute, glabrous. Corolla white, tube densely villous near the mouth, lobes ovate, acute. Style glabrous, 4 mm long. Fruit flattened, orbicular, 1 cm across; pyrenes rugose.

Meenmutty, *KJD 31486*

Fl. & Fr.: March-August

Distribution: Rare in evergreen forests of Meenmutty. Endemic to southern Western Ghats.

CHASSALIA Comm. ex. Poir.

in Dict. Sc. Nat. 8: 198. 1817.

Chassalia curviflora (Wall. ex Kurz) Thwaites var. **ophioxyloides** (Wall.) Deb & Krishna, Bull. Bot. Surv. India 24:222. 1982(1983); Ratheesh, Fl. Stud. Wayanad Dist. 416. 2009. *Psychotria ophioxyloides* Wall., Fl. Ind. 2: 167. 1824. *Chassalia curviflora* (Wall. ex Kurz) Thwaites, Enum. Pl. Zeyl. 150.1859; Hook.f., Fl. Brit. India 3: 176. 1880 p.p; Gamble, Fl. Madras 643 (453). 1921. *Chassalia ophioxyloides* (Wall. ex Kurz) Craib, Gard. Bull. Straits Settlem. 6:474.1930; Ansari, Fl. Kasaragod Div. 188. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 213. 1988.

Shrubs, to 1.5 m tall. Leaves opposite, 22 x 8 cm, oblanceolate, abruptly acuminate; nerves 12 pairs, regular; petiole to 3 cm long, stipule connate, ovate, membranous, 2-fid. Cymes 7 x 4 cm, terminal, paniced, glabrous. Flowers 15 mm long, subsessile. Calyx 1.5 mm long, globose, lobes 5, ovate. Corolla 8 mm long, curved, tube purple with yellowish mouth, lobes ovate, obtuse. Stamens 5, included; anthers linear. Ovary 2-celled, ovule one in each cell; style 2-fid at apex. Fruit 6 mm across, globose, glabrous; seeds 2.

Chavachi, *KJD 26095; KVB 31313*

Fl. & Fr.: June-February

Distribution: Rare in evergreen forests of Chavachi and semi-evergreen forests of Paripode.

COFFEA L.

Sp. Pl. 172. 1753.

Coffea travancorensis Wight & Arn., Prodr. Fl. Ind. Orient. 433. 1834; Hook.f., Fl. Brit. India 3: 154. 1880; Gamble, Fl. Madras 637(449). 1921. *Psilanthus*

travancorensis (Wight & Arn.) J.-F.Leroy, Ass. Sci. Internat. Cafe Colloque 9: 482. 1980; Sivar., Biju & Mathew, Bot. Bull. Acad. Sinica 33: 219. 1992; Ratheesh, Fl. Stud. Wayanad Dist. 443. 2009.

Shrubs, to 1.5-2.5 m tall. Leaves opposite, variable in size and shape, to 12 x 6 cm, broadly ovate, elliptic or oblanceolate, entire, acute or shortly acuminate at apex, acute or cuneate at base, coriaceous; lateral nerves 5-8 pairs, faint above, raised below, without domatia; petiole 1-3 mm; stipules ovate. Inflorescence 1-5 flowered, mostly on terminal. Flowers white, fragrant, the central flower in 3-5 flowered; bracts ovate-cuspidate; bracteoles lanceolate. Calyx cup-shaped, to 1.2 mm long, glabrous, much shorter than the disk. Corolla glabrous, tube cylindric, 10-18 mm long, lobes 5, elliptic-obtuse, 8-12 x 3-7 mm. Stamens 5, inserted below the throat. Ovary stipitate, style glabrous; stigma 2-lobed, lobes acute, 1-1.4 mm. Fruits blue-black when ripe, depressed; seeds dark, ellipsoid, 5-7 x 4-5 mm, with a prominent ventral groove.

Kariyenkappu, *KJD 26294*

Fl. & Fr.: October-December

Distribution: Near people settled areas, rare, maybe grown earlier.

DENTELLA J.R.Forst. & G.Forst.

Char. Gen. Pl. 13. 1775.

Dentella repens (L.) J.R.Forst. & G.Forst., Char. Gen. Pl. 26. t.13. 1776; Hook.f., Fl. Brit. India 3: 42. 1880; Gamble, Fl. Madras 590(416). 1921; Manilal & Sivar., Fl. Calicut 139. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 214. 1988. *Oldenlandia repens* L., Mant. Pl. 1: 40. 1767.

Small prostrate herbs, rooting at nodes. Leaves subsessile, 4-5 x 1.5-2 mm, obovate, oblong to spatulate, base narrowed, apex acute; stipules connate. Flowers axillary, solitary, sessile. Calyx tube c. 1 mm long; lobes 5, subulate, curled hairy. Corolla white; tube 2-3 mm long, funnel-shaped, hairy within; lobes 5, ovate-acute, toothed. Stamens 5, included, attached in the middle of corolla tube. Ovary 2-celled; style filiform; stigma 2-lobed. Fruits c. 3 mm diam., globular, indehiscent, tomentose, crowned by the persistent calyx; seeds minute, angular, brown, rugose.

Narikkadvu, *KJD 18795*

Fl. & Fr.: March-April

Distribution: Rare in moist localities.

DISCOSPERMUM Dalzell

Hooker's J. Bot. Kew Gard. Misc. 2: 257. 1850.

Discospermum apiocarpum Dalzell ex Hook.f., Hooker's J. Bot. Kew Gard. Misc. 2: 257. 1850. *Tricalysia apiocarpa* (Dalzell ex Hook.f.) Gamble, Fl. Madras 620

(437). 1921. *Diplospora apiocarpa* (Dalzell ex Hook.f.) Bedd., Fl. Sylv. S. India t. 223. 1872; Hook.f., Fl. Brit. India 3: 123. 1880 (Plate 14e).

Small trees; branches very strong; young stem 4-angled. Leaves opposite, 6-10 x 2.5-6 cm, elliptic to ovate lanceolate, shortly acuminate at apex, attenuate at base; lateral nerves 4-5, venation prominent. Cymes sessile or shortly peduncled. Calyx tube 0.1 cm long, minutely 4-toothed. Corolla tube c. 0.1 cm long, 4-lobed; lobes 0.25-0.3 cm long, ovate. Stamens 4, exserted; filaments hairy at base. Ovary 2-celled, rarely 3-celled; ovules 2-5 in each cell; style short; stigma 2-lobed, linear. Berry 0.8-1 x 0.5-0.6 cm, ovoid; seeds 0.6-0.7 cm long, laterally compressed.

Ambalappara *KJD 26328; KVB 31352*

Fl. & Fr.: February-August

Distribution: Fairly common in evergreen forests of Ambalappara and Asthipara. Endemic to Western Ghats.

GEOPHILA D.Don

Prodr. Fl. Nepal. 136. 1825, *nom. cons.*

Geophila repens (L.) I.M.Johnst., Sargentia 8: 281. 1949; Ansari, Fl. Kasaragod Div. 189. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 214. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 416. 2009. *Rondeletia repens* L., Syst. Nat. (ed.10) 928. 1759. *Geophila reniformis* D.Don, Prodr. Fl. Nepal. 136. 1825; Hook.f., Fl. Brit. India 3:178.1880; Gamble, Fl. Madras 643(454). 1921. *Geophila herbacea* (Jacq.) K.Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(4): 199. 1891.

Prostrate herbs; stem slender, stolon-like. Leaves 1.5-2.5 x 1-2 cm, orbicular or broadly ovate to reniform, apex rounded or retuse, base cordate, basally 5-7-nerved; petiole to 5 cm long. Flowers solitary or in few-flowered umbels; peduncles to 4 cm long. Calyx tube short; lobes subulate, 3 mm long, persistent. Corolla 1-1.5 cm across, funnel-shaped, hairy within, white; lobes recurved, ovate-acute. Stamens 5, included. Ovary 2-locular; ovule 1-per locule. Berry c. 7 mm across, globose, scarlet; seeds plano-convex.

Pookundu, *KJD 26383*

Fl. & Fr.: August-April

Distribution: Fairly common in semi-evergreen forests of Narikkadvu and Pookundu.

HEDYOTIS L.

Sp. Pl. 101. 1753.

- 1a. Flowers in axillary sessile clusters, herbs..... 2
- 1b. Flowers in terminal or upper axillary panicles, shrubs.....*H. leschenaultiana*

- 2a. Flowers blue in colour *H. cyanantha*
 2b. Flowers white in colour *H. neesiana*

Hedyotis cyanantha Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 45: 136. 1876; Dutta & Deb, Taxonomic Revision Hedyotis 167. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 418. 2009. *Hedyotis caerulea* Wight & Arn., Prodr. Fl. Ind. Orient. 412. 1834, nom. illeg.; Hook.f., Fl. Brit. India 3: 60. 1880; Manilal & Sivar., Fl. Calicut 141. 1982; Ansari, Fl. Kasaragod Div. 191. 1985. *Oldenlandia caerulea* (Wight & Arn.) Gamble, Fl. Madras 597(421). 1921, nom. illeg.

Erect annual herb, branching below. Leaves sessile, opposite or verticillate, 1-1.5 x 0.2 cm, linear, aristate at apex; stipules membranous, with 3-4 bristles. Inflorescence axillary or terminal capitate cymes with 3-4 flowers. Flowers sessile or shortly pedicelled, 4-5 mm long. Hypanthium globose. Calyx limb 0.5-1 mm long, setaceous; lobes 4, 1-1.5 x 0.1-0.12 mm, triangular-lanceolate, aristate at apex. Corolla 3-4 mm long, blue; tube 1-1.5 mm long; lobes 4, 2.5-3 x 1 mm, lanceolate to linear-lanceolate, 3 nerved, minute puberulous inside, incurved at apex. Stamens 4, exserted, longer than corolla lobes. Ovary 0.5-0.8 mm long, ovules many; style slender; stigma bifid. Capsules globose or ovoid, with rigid calyx teeth; seeds 40-70, triangular, narrowly winged, reticulate, very often orbicular.

Ambalappara, KJD 26144

Fl. & Fr.: October-June

Distribution: Rare in grasslands of Ambalappara.

Hedyotis leschenaultiana DC., Prodr. 4: 422. 1830; Deb & Dutta, Taxon 34: 296. 1985; Dutta & Deb, Taxonomic Revision Hedyotis 75. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 418. 2009. *Hedyotis stylosa* R.Br. ex Wight & Arn., Prodr. Fl. Ind. Orient. 407. 1834; Hook.f., Fl. Brit. India 3: 51. 1880. *Oldenlandia stylosa* (R.Br. ex Wight & Arn.) Kuntze, Revis. Gen. Pl. 1: 292. 1891; Gamble, Fl. Madras 598(422). 1921. *Oldenlandia anamalayana* Gamble, Bull. Misc. Inform. Kew 1920: 67. 1920 & Gamble, Fl. Madras 599(422). 1921. *Hedyotis anamalayana* (Gamble) R.Rao & Hemadri, Indian For. 99: 378. 1973. *Oldenlandia sisparensis* (Gage) Gamble, Fl. Madras 599(422). 1921.

Stout shrubs, to 50 cm high; stem 4-angled, glabrous or pubescent along 4 lines. Leaves opposite, ovate, acute, rounded at base, glabrous, nerves 5 pairs; petiole 5 mm long; stipule ovate, laciniate, densely hirtus. Cymes terminal and upper axillary, 3-5 cm across, paniced; pedicel 5 mm long, stout, glabrous. Calyx limb 2 mm long, lobes obtuse, glabrous. Corolla pink, 8 mm long, tube slender,

villous within, lobes 4 mm long, oblong, obtuse, spreading. Anthers 1 mm long, sessile, adnated by the centre; style 6 mm long.

Ambalappara, KVB 31645; KJD 26330

Fl. & Fr.: November-March

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Hedyotis neesiana Arn., Nova Acta Acad. Caes. Leop.-Carol. German. Nat. Cur. 18: 341. 1836; Dutta & Deb, Taxonomic Revision Hedyotis 174. 2004; Ratheesh, Fl. Stud. Wayanad Dist. 419. 2009. *Hedyotis nitida* Wight & Arn., Prodr. Fl. Ind. Orient. 412. 1834, nom. illeg.; Hook.f., Fl. Brit. India 3: 61. 1880; Ansari, Fl. Kasaragod Div. 193. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 217. 1988. *Oldenlandia nitida* (Wight & Arn.) Gamble, Fl. Madras 597(421). 1921.

Prostrate woody herbs; stems 4-angled, coarsely scabrid. Leaves opposite, to 7 x 1 cm, linear-lanceolate to elliptic, coriaceous, pale below; stipule 8 mm long, ovate, rounded at apex, strongly long-toothed, villous. Flowers sessile in axillary clusters, 1-3 together. Calyx 4 mm long, lobes acute, ciliate. Corolla 4-5 mm long, lobes spreading, white. Capsule 3 x 2 mm, ovoid, glabrous; seeds angled, deep brown, ovoid, glabrous.

Chavachi, KVB 31468

Fl. & Fr.: September-December

Distribution: Fairly common in evergreen forests of Chavachi and plantations of Kariyenkappu.

IXORA L.

Sp. Pl. 110. 1753.

- 1a. Corolla tube more than 1.5 cm..... 2
- 1b. Corolla tube less than 1.2 cm..... 4
- 2a. Leaves cordate, sessile *I. coccinea*
- 2b. Leaves acute or rounded, petiolate 3
- 3a. Flowers greenish yellow or greenish; small shrubs..... *I. malabarica*
- 3b. Flowers white; large shrubs..... *I. polyantha*
- 4a. Small trees; cymes paniced *I. brachiata*
- 4b. Shrubs; cymes not in panicles 5
- 5a. Peduncles 10-15 cm long, cymes corymbose..... 6
- 5b. Peduncles less than 10 cm, cymes paniced..... *I. nigricans*
- 6a. Inflorescence pendent branched corymbose cymes..... *I. sivarajiana*
- 6b. Inflorescence on erect congested corymbs..... *I. elongata*

Ixora brachiata Roxb. ex DC., Prodr. 4: 488. 1830; Hook.f., Fl. Brit. India 3: 142. 1880; Gamble, Fl. Madras 631(445). 1921; Ansari, Fl. Kasaragod Div. 195. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 219.1988; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 161.1989; Ratheesh, Fl. Stud. Wayanad Dist. 421. 2009.

Evergreen trees, to 8 m high; bark greyish-brown. Leaves opposite, decussate, 7.5-20 x 3-7 cm, elliptic-oblong, obovate, elliptic or elliptic-oblong, apex obtuse, base attenuate, acute or cuneate; lateral nerves 6-20, pinnate; intercostae reticulate; stipule interpetiolar; petiole 5-20 mm long. Flowers white, fragrant, small, sessile, in terminal, long peduncle, paniced cyme; peduncles and pedicels puberulus. Calyx tube minute, 4 teathed, membranous. Corolla tube 6 mm long, slender, lobes 4, oblong, recurved. Stamens 4, attached to the mouth of corolla tube; anthers sagitate. Ovary 2-celled, inferior, ovules one in each cell; style filiform; stigma bifid. Fruit berry, red-purple, 5 mm across, globose, glabrous; pyrenes planoconvex.

Crossway, KVB 31532

Fl. & Fr.: January-May

Distribution: Fairly common in evergreen forests of Crossway and plantations of Kariyenkappu. Endemic to Western Ghats.

Ixora coccinea L., Sp. Pl. 110. 1753; Hook.f., Fl. Brit. India 3: 145. 1880; Gamble, Fl. Madras 631(445). 1921; Manilal & Sivar., Fl. Calicut 147. 1982; Ansari, Fl. Kasaragod Div. 195. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 220. 1988; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 83.1989; Ratheesh, Fl. Stud. Wayanad Dist. 421. 2009.

Bushy shrubs, spreading by root sprouts. Leaves opposite, 6-10 x 2.5-3 cm, elliptic to oblong, shortly acute at apex, round to slightly cordate at base, sessile, greenish on drying. Corymbs 5-8 cm across; peduncle and pedicels short. Calyx tube 0.18-0.2 cm long, puberulous without; lobes minute. Corolla scarlet; tube 3-3.5 cm long, puberulous without; lobes 0.8-1 x 0.4-0.5 cm. Stamens attached at throat; anthers 0.3-0.35 cm long. Ovary 0.1-0.2 cm across; style 3-3.5 cm long, exserted. Berry 0.6-0.8 cm diam., didymous; seeds 2, globose, 0.3-0.4 cm diam.

Kariyenkappu, KJD 25579

Fl. & Fr.: Throughout the year

Distribution: Grown as ornamental plant in earlier settlements.

Ixora elongata Heyne ex G.Don, Gen. Hist. 3: 571. 1834; Hook.f., Fl. Brit. India 3: 141. 1880; Gamble, Fl. Madras 630(445). 1921; Ramach. & V.J. Nair, Fl.

Cannanore Dist. 220. 1988; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 147.1989; Ratheesh, Fl. Stud. Wayanad Dist. 422. 2009.

Large shrubs, young shoots glabrous. Leaves opposite, 12-15 x 3-6 cm, elliptic-oblong or oblanceolate, acute at both ends, chartaceous, glabrous, lateral nerves 12-15 pairs; petiole 1.5 cm long. Flowers in densely congested corymbs, peduncle to 15 cm long, sparsely pubescent. Calyx tube and lobes pubescent, lobes lanceolate. Corolla tube 1 cm long, lobes reflexed. Stamens 4. Ovary 2 celled, ovules One. Fruit pyrene.

Meenmutty Road KVB 31513; Kattikari, KJD 31876

Fl. & Fr.: October-February

Distribution: Fairly common in evergreen forests of Meenmutty and Kattikari; plantations of Kariyenkappu. Endemic to India.

Ixora malabarica (Dennst.) Mabb., Taxon 26: 539. 1977; Manilal & Sivar., Fl. Calicut 146. 1982; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 144.1989. *Chiococca malabarica* Dennst., Schlüssel Hortus Malab. 12, 19 & 37. 1818.

Slender erect shrubs. Leaves opposite, 4-13 x 2-4.5 cm, lanceolate, apex acute to shortly acuminate, base broadly acute to rounded, thin-coriaceous; stipules 5-6 mm long, triangular with subulate tip. Cymes corymbiform, flacid, few-flowered. Bracts and bracteoles 2-2.5 mm long, subulate. Calyx campanulate; lobes 3-3.5 mm long. Corolla greenish yellow; tube 1.6-2 cm long; lobes 4-5 mm long, lanceolate, curled and recurved. Stamens attached between corolla lobes at throat of tube. Berry 1 cm across, subglobose.

Valayamchal, KJD 25560

Fl. & Fr.: October-March

Distribution: Rare in Semi-Evergreen forests of Valayamchal and plantations of Kariyenkappu. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Ixora nigricans R.Br. ex Wight & Arn., Prodr. Fl. Ind. Orient. 428. 1834; Hook.f., Fl. Brit. India 3: 148. 1880; Gamble, Fl. Madras 631(445). 1921; Ansari, Fl. Kasaragod Div. 195. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 221. 1988; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 111.1989; Ratheesh, Fl. Stud. Wayanad Dist. 423. 2009.

Shrubs, glabrous. Leaves opposite, 13 x 4 cm, elliptic to oblanceolate, long-acuminate, attenuate at base; nerves 8-10 pairs, reticulate; petiole 1 cm long;

stipule 7 mm long, ovate, acuminate. Cymes 10 cm across; peduncles 4-6 cm long. Flowers pedicelled, many. Calyx 2.5 mm long, lobes 1.5 mm long, acuminate. Corolla tube 11 mm long, slender; lobes 5 x 2 mm, ovate, acute. Stamens 4. Ovary 2 celled, ovules solitary; Style 16 mm long. Fruit a pyrene.

Pothanplavu, *KVB 31331*; Meenmutty, *KVB 31300*

Fl. & Fr.: December-March

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Kattikari and Chavachi; semi-evergreen forests of Paripode and Pothanplavu.

Ixora polyantha Wight, Icon. Pl. Ind. Orient. t. 1066. 1846; Hook.f., Fl. Brit. India 3: 140. 1880; Gamble, Fl. Madras 629(444). 1921; Ansari, Fl. Kasaragod Div. 196. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 222. 1988; Tariq Husain & Paul, J. Econ. Taxon. Bot. Addl. ser. 5, 137.1989; Ratheesh, Fl. Stud. Wayanad Dist. 424. 2009.

Stout undershrubs. Leaves opposite, 10-20 by 5-8 cm, obovate to broadly oblanceate, apex shortly acuminate, base cuneate, thin-coriaceous; lateral nerves 10-15 pairs; petiole 4-8 mm long. Cymes dense, shortly peduncled, 6-8 cm in diameter. Flowers numerous in trichasia, sessile; bracts 5-8 mm long, ovate, acute. Calyx densely hairy, lobes elliptic-lanceolate to oblong-lanceolate, ca 6 mm long, much longer than the ovary. Corolla white, tube 2.5-3 cm long, lobes narrowly obovate, obtuse or rounded, glabrous. Stamens 4. Ovary 2 celled, ovules solitary. Berry globose, c. 15 mm diam.

Chavachi, *KVB 31325*

Fl. & Fr.: February-May

Distribution: Common in semi-evergreen forests of Pothanplavu; evergreen forests of Meenmutty, Chavachi and Moonamthode; plantations of Kariyenkappu. Endemic to Western Ghats.

Ixora sivarajiana Pradeep, Nordic J. Bot. 17:315. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 424. 2009 (Plate 14f).

Small trees 5-8 m tall. Leaves in whorls of 3 or 4, crowded towards the apices of branchlets, narrowly elliptic-obovate or oblong, 9-16 x 2.5-6 cm; lateral nerves 12-15 pairs, conspicuous beneath; petiole 1-3 cm long; stipules broadly ovate. Inflorescence a dense pendant, corymbose trichotomously branched branchiate dichasial cyme. Flowers tetramerous; bracteoles. Calyx tube 1 mm long, lobes lanceolate. Corolla-lobes 4, oblong, flat and spreading at first, later margins recurved, 4-5 x 3-4 mm, rounded at apex. Stamens 4, attached to the throat by a

short filament. Ovary ellipsoid, 1 mm long, 2-celled with one ovule in each cell; style 12 mm long; stigma bifid. Fruit depressed globose with short persistent calyx teeth; seeds 2, hemispherical.

Ambalappara, KVB 31745; KJD 26324, 26333

Fl. & Fr.: December-May

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Southern Western Ghats of Kerala.

KNOXIA L.

Sp. Pl. 104. 1753.

Knoxia wightiana Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 440. 1834; Hook.f., Fl. Brit. India 3: 129. 1880; Gamble, Fl. Madras 622(439). 1921; Bhattacharjee & Deb, J. Econ. Taxon. Bot. 6: 81. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 223. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 425. 2009.

Glabrous woody herbs. Leaves opposite, 6 x 1 cm, linear-lanceolate, curved, folded, glabrous, sessile; stipules ovate, 6 mm long, acute with few glandular teeth. Cymes 5-6 cm across, peduncled. Flowers 5 mm long, sessile. Calyx 1.5 mm long, lobes obtuse. Corolla-tube densely villous within. Stamens 4 inserted with in the throat of corolla. Ovary 2 celled, ovules pendulous, solitary; style 4 mm long. Capsule 2.5 x 2.5 mm; mericarps compressed, glabrous.

Ambalappara, KVB 31354, 31760

Fl. & Fr.: November-March

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Peninsular India.

LASIANTHUS Jack

Trans. Linn. Soc. London 14: 125. 1823 *nom. cons.*

- 1a. Cymes sessile; leaf margin ciliate *L. jackianus*
- 1b. Cymes peduncled; leaf margin not ciliate *L. capitulatus*

Lasianthus capitulatus Wight, Calcutta J. Nat. Hist. 6:511.1846; Hook.f., Fl. Brit. India 3: 191. 1880; Gamble, Fl. Madras 648(457). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 223. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 426. 2009. *Litosanthes capitulata* (Wight) Deb & Gangop., Candollea 44:213.1989 (Plate 14g).

Large shrubs; young branches softly pubescent. Leaves opposite, 4-12 x 2.5-4 cm, oblanceolate, acute at both ends, glabrous above, sparsely pubescent beneath; petiole 3-5 mm long; stipules 2-7 mm broad, acuminate. Flowers white,

in axillary, 2-4 mm long peduncled, pubescent cymes. Calyx 2-3 mm long; lobes 3, each 2-3 mm long, ovate, obtuse at apex, often recurved. Corolla-tube 5-6 mm long, glabrous; lobes 3, each up to 5 x 4 mm, ovate, obtuse at apex, hairy. Stamens 3, each 1-2 mm long, inserted on the throat of the corolla-tube; anthers up to 2 mm long. Ovary 4-locular with solitary ovule in each locule; style up to 5 mm long with 4 stigmatic lobes.

Ambalappara, *KJD 25515; KVB 31624, 31719*

Fl. & Fr.: February-April

Distribution: Common in evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Endangered.

Lasianthus jackianus Wight, Calcutta J. Nat. Hist. 6: 502. 1846; Hook.f., Fl. Brit. India 3: 180. 1880; Gamble, Fl. Madras 646(456). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 224. 1988; Deb & Gangop., J. Econ. Taxon. Bot. 15: 286. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 427. 2009.

Shrubs 1-3 m high. Leaves opposite, 11-19 x 2-5 cm, oblong, elliptic-oblong, or ovate-oblong, acuminate or caudate-acuminate at apex, unequally-rounded or subacute at base; lateral nerves 6-8 pairs, opposite or subopposite; stipules ovate. Cymes axillary, sessile, 2-5 flowered; bracts foliaceous. Flowers 6-7 mm long, sessile. Hypanthium 1 mm long, obovoid, tomentose. Calyx tomentose, tube 0.5 x 0.5 mm; lobes 4, ovate-elliptic, acute. Corolla tube 3.5-4.5 mm long, puberulous beneath at throat; lobes 4, 2 mm long, ovate-elliptic, tomentose above, puberulous beneath. Stamens 4, subexserted; filaments 0.5 mm long thin, adnate at throat. Ovary 0.5 mm long, obovoid, 4-loculed; style flattened; stigma 4-lobed. Fruits globose, 4-ridged and grooved, crowned with persistent calyx lobes; seeds oblong, acute at both ends.

Kattikari, *KJD 31889; KVB 31543*

Fl. & Fr.: November-March

Distribution: Common in evergreen forests of Kattikari, Chavachi and Mullenpara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

MITRACARPUS Zucc.

in Schultes, Mant. 3: 210. 1827.

Mitracarpus hirtus (L.) DC., Prodr. 4: 572. 1830; Ansari, Fl. Kasaragod Div. 196. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 224. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 428. 2009. *Spermacoce hirta* L., Sp. Pl. ed. 2: 148. 1762. *Mitracarpus villosus* (Sw.) DC., Prodr. 4: 572. 1830. *Spermacoce villosa* Sw., Prodr.

29. 1788. *Mitracarpus verticillatus* (Schum. & Thonn.) Vatke, *Linnaea* 40: 196. 1876; Manilal & Sivar., *Fl. Calicut* 134. 1982.

Erect pubescent herbs. Leaves opposite, 2-4 x 1.5-2 cm, ovate or ovate-lanceolate, base obtuse, apex acute, membranous, sessile; stipule pectinate. Flowers white, verticillate in axillary fascicles, 4-merous; bracteoles filiform. Calyx-tube small, unequally 4-lobed, larger 2 lobes 1 mm long. Corolla 1.5 mm long, funnel-shaped; lobes 4. Stamens 4, attached at throat. Ovary 2-locular, ovule 1-per locule. Capsule 1 mm long, ovoid, dehiscence circumscissile; seeds 2, minute.

Ambalappara, *KJD 26151*; Asthipara *KJD 26156*; Chavachi, *KVB 31401*
Fl. & Fr.: July-December

Distribution: Common in evergreen forests of Ambalappara, Chavachi and Asthipara.

MITRAGYNA Korth.

Observ. *Naucl. Indic.* 19: 1839, *nom. cons.*

Mitragyna tubulosa (Arn.) Kuntze, *Revis. Gen. Pl.* 1: 288. 1891; Gamble, *Fl. Madras* 585(413). 1921; Manilal & Sivar., *Fl. Calicut* 133. 1982; Ansari, *Fl. Kasaragod Div.* 197. 1985; Ratheesh, *Fl. Stud. Wayanad Dist.* 429. 2009. *Nauclea tubulosa* Arn. in Thwaites, *Enum. Pl. Zeyl.* 137. 1859. *Stephegyne tubulosa* (Arn.) Hook.f. ex Bedd., *Fl. Sylv. S. India* t.29.f.1. 1869; Hook.f., *Fl. Brit. India* 3: 25. 1880.

Deciduous trees, to 15 m high; bark greyish-green. Leaves opposite, decussate, 10-20 x 3.5-12.5 cm, ovate, elliptic, elliptic-ovate or ovate-oblong, apex acute to acuminate, base truncate, obtuse or attenuate; lateral nerves 7-12 pairs, pinnate; intercostae scalariform; stipules interpetiolar; petiole 10-30 mm long. Flower purplish-pink, 10-12 mm long, in terminal heads; bracts 2, leafy, on the peduncle; receptacle hirsute; bracteoles many, paleaceous, ciliate on margin. Calyx tube truncate, elongate, obconic, glabrous. Corolla tube funnel shaped, lobes 5, reflexed. Stamens 5, attached at the throat of corolla tube, filaments short; anthers oblong, apiculate. Ovary 2-celled, inferior, ovules many; style filiform; stigma mitriform, hollow at base. Fruit a capsule, ovoid, ribbed, yellowish-brown, in globose heads ca. 2 cm across; seeds many, minute, winged.

Chavachi, *KJD 26353*

Fl. & Fr.: April-May

Distribution: Rare in evergreen forests of Chavachi. Endemic to Peninsular India.

MUSSAENDA L.

Sp. Pl. 177. 1753.

Mussaenda frondosa L., Syst. Nat. (ed.10) 2: 931.1759; Hook.f., Fl. Brit. India 3: 89. 1880; Gamble, Fl. Madras 610(430). 1921; Manilal & Sivar., Fl. Calicut 145. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 430.2009. *Mussaenda belilla* Buch.-Ham., Trans. Linn. Soc. London 14: 203. 1824; Ansari, Fl. Kasaragod Div. 198. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 225. 1988. *Mussaenda laxa* (Hook.f.) Hutch. ex Gamble, Fl. Madras 610(430). 1921; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 12.1996. *Mussaenda frondosa* L. var. *laxa* Hook.f., Fl. Brit. India 3:89.1880.

Straggling shrubs. Leaves opposite, 6-10 x 4-6 cm, broadly ovate, caudate acuminate at apex, base rounded, sparsely hairy on both surfaces; petiole to 1.5 cm long; stipules 3-4 mm long, ovate, bifid at apex. Cymes terminal, lax, tomentose. Flowers 5-merous; bracts and bracteoles linear, 1-1.5 cm, hairy. Calyx-lobes 5, 0.8-1 cm long, lanceolate, hairy, one of the calyx lobes transformed into a showy, white, pubescent, leaf-like structure, 8-12 x c. 4.5 cm. Corolla 2.5-3 cm long, funnel-shaped dilated above middle, orange-red or yellow, tomentose outside, villous at mouth; lobes 6-7 mm long, ovate-lanceolate. Stamens 5, included or exserted. Berry c. 1 cm across, globose.

Kariyenkappu, *KVB 31443*

Fl. & Fr.: September-March

Distribution: Common in plantations of Kariyenkappu, semi-evergreen forests of Narikkadvu, Kurukathode and Paripode. Endemic to Peninsular India.

MYCETIA Reinw.

Syll. Pl. Nov. II : 9. 1828.

Mycetia acuminata (Wight) Kuntze, Revis. Gen. Pl. 1: 289. 1891; Gamble, Fl. Madras 612(431). 1921. *Lawia acuminata* Wight, Icon. Pl. Ind. Orient. t. 1070. 1846. *Adenosacme lawii* Hook.f., Fl. Brit. India 3: 96. 1880.

Erect fleshy herbs. Leaves opposite, 27 x 10 cm, elliptic-oblong, acuminate at apex; nerves to 20 pairs, prominent, parallel; petiole 5-8 cm long, stipule 12 mm long, ovate, acute, membranous. Cymes 5-7 cm across, axillary, peduncled. Flowers 6 mm long, pedicelled. Calyx 6 mm long, lobes 5, acuminate. Corolla blue, spreading, tube short, lobes 5, ovate, spreading. Stamens adnate to the corolla tube, anthers linear. Ovules many on peltate placenta; style short; stigmas linear. Berry, 8 mm across, white, fleshy; seeds many, angular.

Meenmutty, *KJD 26357*

Fl. & Fr.: August-January

Distribution: Rare in evergreen forests of Meenmutty and Kattikari. Endemic to Western Ghats; Conservation status: Vulnerable.

NEANOTIS W.H.Lewis

Ann. Missouri Bot. Gard. 53: 34. 1966.

- 1a. Capsule dehiscing septicidally; flowers pedicelled*N. monosperma*
1b. Capsule dehiscing loculicidally; flowers sub sessile*N. decipiens*

Neanotis decipiens (Hook.f.) W.H.Lewis, Ann. Missouri Bot. Gard. 53: 37. 1966.
Anotis decipiens Hook.f., Fl. Brit. India 3: 72. 1880; Gamble, Fl. Madras 604(426).
1921.

Procumbent herbs, rooting at lower nodes; stems glabrous. Leaves opposite, ovate, acuminate, sparsely villous; nerves 7-9 pairs; petiole 3 cm long, hairy. Cymes 3-5 cm across, terminal; branches glabrous, slender. Flowers 5-6 mm long, blue or pink, subsessile. Calyx lobes ovate, ciliate. Corolla tube slender, shortly villous inside, lobes ovate, villous. Stamens 4 at mouth of corolla. Ovary 2, ovules few; style filiform. Fruit capsule; seeds 1-3 in each cell.

Mullenpara, *KJD 25436*

Fl. & Fr.: October-December

Distribution: Fairly common in evergreen forests of Mullenpara, Ambalappara and Pothurumi. Endemic to Westren Ghats.

Neanotis monosperma (Wall. ex Wight & Arn.) W.H.Lewis, Ann. Missouri Bot. Gard. 53: 39. 1966; Ratheesh, Fl. Stud. Wayanad Dist. 431. 2009. *Hedyotis monosperma* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 410. 1834. *Anotis monosperma* (Wall. ex Wight & Arn.) Hook.f., Fl. Brit. India 3: 75. 1880; Gamble, Fl. Madras 605(427). 1921 (Plate 14h).

Prostrate, sparsely strigose herbs; internodes to 4.5(6) cm. Leaves opposite, ovate, to 2.5 x 1.7 cm, apex acute, base truncate to attenuate; petiole to 1.5 cm; stipules 3 mm. Cymes corymbose, lax, 3 x 1.5 cm; peduncles of 1 order to 2 cm; those of II order to 0.5 cm; pedicel to 1.5 cm. Calyx-lobes 4, lanceolate, margin strigose. Corolla white, 3 mm wide; tube 2 mm; lobes 4, strigose at apex. Stamens 4. Capsules 2 mm wide, glabrous, dehiscence septicidal; seeds 2 or 3 per cell.

Mullenpara, *KJD 31936*

Fl. & Fr.: December-March

Distribution: Rare in evergreen forests of Mullenpara. Endemic to Peninsular India.

NEOLAMARCKIA Bosser

Bull. Mus. Natl. Hist. Nat., B, Adansonia 4, 6: 247. 1984.

Neolamarckia cadamba (Roxb.) Bosser, Bull. Mus. Natl. Hist. Nat., B, Adansonia 4. 6: 247. 1984; Ramach. & V.J. Nair, Fl. Cannanore Dist. 227. 1988; Ratheesh,

Fl. Stud. Wayanad Dist. 432. 2009. *Nauclea cadamba* Roxb., Fl. Ind. 2: 121. 1824. *Anthocephalus chinensis* sensu A.Rich. ex Walp., Rep. 2: 491. 1843, non *Cephalanthus chinensis* Lam. 1785; Manilal & Sivar., Fl. Calicut 133. 1982. *Anthocephalus cadamba* (Roxb.) Miq., Fl. Ind. Bat. 2: 135. 1850; Hook.f., Fl. Brit. India 3: 23. 1880. *Anthocephalus indicus* A.Rich., Mém. Rubiac. 157. 1830; Gamble, Fl. Madras 583(411). 1921.

Deciduous trees, to 20 m high, bark 6-8 mm, pale brown, vertically shallowly grooved, exfoliating in small rectangular flakes; branches horizontal. Leaves opposite, decussate, 10-25 x 6-12 cm, ovate or elliptic-oblong, apex acuminate, base truncate or obtuse; lateral nerves 10-14 pairs, pinnate, prominent; intercostae scalariform, prominent; petiole 20-45 mm; stipules interpetiolar. Flowers yellowish, in globose heads, 2-4.5 cm across. Calyx tube 2-3 mm in diameter, tube globose, lobes 5, 5-6 x 3-4 mm, membranous. Corolla tube 6-8 mm long, lobes 5, oblong, acute, 3-4 cm long, glabrous. Stamens 5, 3 mm long. Ovary 3-4 mm long, 2-celled at base, 4-celled above, inferior, ovules many; style exerted; stigma clavate. Fruit a capsule on a fleshy globose receptacle, orange yellow, capsule membranous; seeds many, angular, minute.

Chavachi, KVB 31433

Fl. & Fr.: April-August

Distribution: Fairly common in evergreen forests of Chavachi and Chelachode near streams.

NEUROCALYX Hook.

Hooker's Icon. Pl. 2: 174. 1837.

Neurocalyx calycinus (R.Br. ex Bennett) Robins., Proc. Amer. Acad. Arts 45:402. 1910; Ramach. & V.J. Nair, Fl. Cannanore Dist. 228. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 432. 2009. *Argostemma calycinum* R.Br. ex Bennett, Pl. Jav. Rar. 97. 1838. *Neurocalyx wightii* Arn., Ann. Nat. Hist. ser. 1. 3: 22. 1839; Hook.f., Fl. Brit. India 3: 47. 1880; Gamble, Fl. Madras 591(417). 1921.

Large herbs, pubescent. Leaves whorled at tip, 26 x 7 cm, oblanceolate, acute at apex, rusty puberulus; nerves to 18 pairs, prominent below; stipule 2 cm long, obovate, 2-fid at apex. Racemes 10-13 cm long, axillary, rarely branched; bracts lanceolate. Flowers white, pedicelled. Calyx tube hemispherical, lobes 5, 8 x 5 mm, ovate. Corolla tube absent, lobes 5 x 3 mm, ovate, twisted. Stamens 5, anthers connate into a conical tube. Ovary 2-celled, ovules many, style slender. Capsule irregularly bursting, 4 x 4 mm; seeds many, pitted.

Kattikari, KVB 31562

Fl. & Fr.: February-August

Distribution: Fairly common in evergreen forests of Kattikari and Chavachi.

OCHREINAUCLEA Ridsdale & Bakh.f.

Blumea 24: 331. 1978.

Ochreinauclea missionis (Wall. ex G.Don) Ridsdale, Blumea 24: 332. 1978; Ansari, Fl. Kasaragod Div. 200. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 433. 2009. *Nauclea missionis* Wall. ex G.Don, Gen. Hist. 3: 467. 1834; Hook.f., Fl. Brit. India 3: 27. 1880; Gamble, Fl. Madras 582(411). 1921. *Sarcocephalus missionis* (Wall. ex G.Don) Havil, J. Linn. Soc. Bot. 33: 32. 1897.

Evergreen trees, to 12 m high; bark greyish-brown. Leaves opposite, decussate, 8-14 x 3.5-6 cm, elliptic, elliptic-obovate or elliptic-oblong, apex acute or obtuse, base attenuate or decurrent; lateral nerves 10-13 pairs, pinnate, regular, intercostae reticulate; stipules obtuse; petiole 5-15 mm long. Flowers yellowish-white, 5-6 mm long, in terminal 2.5-3 cm diameter heads; hypanthia mutually connate at apex. Calyx tube short; lobes 4-5, 2-3 mm long, oblong to trigonal-oblong, pubescent below. Corolla infundibular, 8-10 mm long, greenish-yellow; lobes 4-5, 2-3 mm long, pubescent outside. Stamens 4-5, attached to the throat of corolla. Ovary 2-locular, inferior; placenta attached to the middle of the septum; ovules many; style; stigma spindle shaped. Fruit a drupe, globose, fleshy; seeds ovoid, few in each cell.

Valayamchal, KJD 26262

Fl. & Fr.: May-November

Distribution: Fairly common in semi-evergreen forests of Valayamchal, near River banks. Endemic to southern Western Ghats; Conservation status: Vulnerable.

OLDENLANDIA L.

Sp. Pl.: 119.1753.

- 1a. Flowers axillary, solitary or binate *O. herbacea*
1b. Flowers in axillary corymb *O. corymbosa*

Oldenlandia corymbosa L., Sp. Pl. 119.1753; Hook.f., Fl. Brit. India 3: 64. 1880,p.p.; Gamble, Fl. Madras 600(423). 1921; Ratheesh, Fl. Stud. Wayanad Dist. 434. 2009. *Hedyotis corymbosa* (L.) Lam., Encycl. 1: 272. 1792; Manilal & Sivar., Fl. Calicut 142. 1982; Ansari, Fl. Kasaragod Div. 192. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 216. 1988; Dutta & Deb, Taxonomic Revision Hedyotis 149. 2004.

Diffuse or spreading prostrate herbs; stem 4-angled. Leaves opposite, 1-2.5 x 0.2-0.4 cm, linear-lanceolate, acute at apex, base attenuate, scabrid on margins; stipules sheathing. Flowers 2-6 in a corymb; 4-merous; peduncles 4-8 mm long. Calyx tube c. 1 mm long, lobes minute. Corolla white; tube c. 1 mm long with a ring of hairs at throat. Stamens 4 inserted at corolla base. Capsules c. 2 mm across, subglobose, loculicidal, dehiscing at top only; seeds minute, trigonous.

Narikadvu, *KJD 26265*

Fl. & Fr.: April-September

Distribution: Along the boundaries of forests.

Oldenlandia herbacea (L.) Roxb., *Fl. Ind.* 1: 495. 1820; Gamble, *Fl. Madras* 601(424). 1921; Ratheesh, *Fl. Stud. Wayanad Dist.* 435. 2009. *Hedyotis herbacea* L., *Sp. Pl.* 102. 1753; Manilal & Sivar., *Fl. Calicut* 141. 1982; Ansari, *Fl. Kasaragod Div.* 192. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 217. 1988; Dutta & Deb, *Taxonomic Revision Hedyotis* 120. 2004. *Oldenlandia heynei* R.Br. ex G.Don, *Gen. Hist.* 3: 531. 1834; Hook.f., *Fl. Brit. India* 3: 65. 1880. *Hedyotis heynei* R.Br. ex Wight & Arn., *Prodr. Fl. Ind. Orient.* 416. 1834.

Much branched, erect herbs; stem 4-angled, narrowly winged along angles. Leaves opposite, sessile, 1.5-3 x 0.1-0.3 cm, linear-lanceolate, acute at apex, glabrous; stipules short, 3-4-setose on margins. Flowers solitary or 2-nate, axillary; peduncles filiform, 0.5-1 cm long. Calyx tube turbinate, to 2 mm, funnel-shaped; lobes triangular-subulate. Corolla white, 1-1.5 mm long, wider on mouth; lobes 5, minute. Stamens 4, included, subsessile. Stigma 2-fid. Capsule c. 2.5 mm across, subglobose, didymous, loculicidal; seeds minute, trigonous.

Ambalappara *KVB 31753*; Kariyenkappu *KJD 25496*

Fl. & Fr.: July-December

Distribution: Fairly common near water bodies of Kariyenkappu and Ambalappara.

OPHIORRHIZA L.

Sp. Pl. 150. 1753.

- 1a. Mature inflorescence above 8 cm long, lax cymes *O. barberi*
- 1b. Mature inflorescence below 5 cm long 2
- 2a. Capsules hairy *O. sp.*
- 2b. Capsules not so 3
- 3a. Bracteoles very short and deciduous *O. rugosa*
- 3b. Bracteoles linear and persistent *O. hirsutula*

Ophiorrhiza barberi Gamble, Bull. Misc. Inform. Kew 1919: 406. 1919 & Gamble, Fl. Madras 607(428). 1921; Deb & Mondal, Bull. Bot. Surv. India 39: 26. 1997 (Plate 14i).

Undershrubs. Leaves opposite, 4-10 x 2-3.5 cm, lanceolate to ovate lanceolate, acuminate at apex, round to broadly attenuate at base; petiole 5mm long. Cymes terminal, and axillary to upper leaves. Calyx tube 0.1-0.15 cm long; lobes c. 0.1 cm long. Corolla white; tube 0.4-0.5 cm long; lobes 5, 0.1-0.15 cm long, glabrous or sparsely hairy without. Stamens 5, inserted on corolla tube. Ovary 0.05-0.1 cm long, crowned by disk. Capsule 0.2-0.25 x 0.35-0.4 cm.

Meenmutty *KJD 26182*; Chavachi *KJD 26094*; Mullenpara *KJD 26170*

Fl. & Fr.: May-September

Distribution: Fairly common in evergreen forests of Meenmutty, Chavachi, Moonamthode, Mullenpara and Asthipara. Endemic to southern Western Ghats; Conservation status: Endangered.

Ophiorrhiza hirsutula Wight ex Hook.f., Fl. Brit. India 3: 81. 1880; Gamble, Fl. Madras 608(429). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 229. 1988; Deb & Mondal, Bull. Bot. Surv. India 39: 57. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 437. 2009.

Undershrubs; stem, peduncles, calyx and capsules rusty pubescent. Leaves opposite, 3-8 x 1.5-3 cm, ovate-lanceolate, acute to shortly acuminate at apex, round to broadly attenuate at base; petioles 0.8-2.5 cm long; stipules broadly ovate, caudately acuminate at apex, pubescent. Cymes terminal, 1.5-2.5 cm diam; bracteoles 4-5 mm long, filiform. Calyx tube ca 1 mm long; lobes minute. Corolla white; tube 4-5 mm long. Ovary ca 1 mm long. Stamens 5, inserted on corolla tube. Ovary two celled, ovules many. Capsule 15-.20 mm long, 3-4mm wide.

Ambalappara, *KJD 26155*

Fl. & Fr.: March-November

Distribution: Rare in evergreen forests of Ambalappara and Asthippara.

Ophiorrhiza rugosa Wall., Fl. Ind. 2: 546. 1824.

- 1a. Decumbent herb, below nodes rooted var. *decumbens*
- 1b. Erect herbs, nodes not rooted var. *prostrata*

Ophiorrhiza rugosa Wall. var. **decumbens** (Gardner ex Thwaites) Deb & Mondal, Bull. Bot. Surv. India 24: 228. 1982; Deb & Mondal, Bull. Bot. Surv. India 39: 111. 1997. *Ophiorrhiza decumbens* Gardner ex Thwaites, Enum. Pl. Zeyl. 419.

1864. *Ophiorrhiza harrisiana* Heyne var. *decumbens* (Gardner ex Thwaites) Hook.f., Fl. Brit. India 3: 78. 1880.

Herbs, 7-30 cm long. Leaves opposite, 2-8 x 1-2 cm, elliptic, or narrow elliptic, obtuse or acute at apex, narrowed at base; lateral nerves 6-9 on either side; petioles 0.5-1.5 cm long, puberulous; stipules triangular, 1-2-toothed. Inflorescence 1-1.5 cm across. Flowers 5-7 mm long. Hypanthium 0.8-1 x 0.6-0.8 mm. Calyx lobes 0.75-1 x 0.4-0.6 mm. Corolla 4.2-6 mm long, infundibuliform, puberulous outside, villous at the middle within. Filaments 0.8-1.25 mm long; anthers 1-1.25 mm long. Ovary 0.7-0.9 x 0.5-0.75 mm; disk 0.25-0.5 mm high; style 3-5 mm long, glabrous; stigma 2-lobbed, 0.75-1 mm long, lobes lanceolate. Capsule 2-2.5 x 4-4.5 mm, glabrous; seeds 0.2-0.3 x 0.25 mm, glabrous, brown.

Kariyenkappu, *KJD 26109*

Fl. & Fr.: February-October

Distribution: Rare in plantations of Kariyenkappu near streams.

Ophiorrhiza rugosa Wall. var. ***prostrata*** (D.Don) Deb & Mondal, Bull. Bot. Surv. India 24: 228. 1982; Ansari, Fl. Kasaragod Div. 201. 1985; Deb & Mondal, Bull. Bot. Surv. India 39: 114. 1997; Ratheesh, Fl. Stud. Wayanad Dist. 438. 2009. *Ophiorrhiza prostrata* D.Don, Prodr. Fl. Nepal. 136. 1825; Ramach. & V.J. Nair, Fl. Cannanore Dist. 229. 1988. *Ophiorrhiza harrisonii* G.Don, Gen. Hist. 3: 523. 1834. *Ophiorrhiza harrisiana* Heyne ex G.Don, Gen. Hist. 3: 523. 1834; Hook.f., Fl. Brit. India 3: 78. 1880; Gamble, Fl. Madras 607(428). 1921.

Procumbent herbs. Leaves ovate, obtusely acute at apex, rounded at base, pubescent along the nerves below, chartaceous; nerves 4-6 pairs; petiole 1-2 cm long; stipule triangular, hairy. Cymes 1-2 cm across, congested; peduncle 5 cm long. Flowers minute, white. Calyx 1 mm long, lobes ovate. Corolla 3 mm long, white. Stamens 5, inserted on corolla tube. Ovary 2 celled, ovules many; style filiform. Capsule 2.5 mm across, compressed; seeds 3-5, rugose, folded.

Chavachi, *KVB 31418*

Fl. & Fr.: June-October

Distribution: Fairly common in evergreen forests.

***Ophiorrhiza* sp.**

Annual herbs, up to 30 cm height, hairy. Leaves opposite, 6-15 x 2.5-4 cm, ovate, elliptic to lanceolate, acute to acuminate, base cuneate, sparsely hairy above, puberulous below; lateral nerves 10-15, prominent; stipules filiform, 3 mm long, persistent. Inflorescence corymbose cymes, peduncles 2.5-3 cm long,

elongating in fruit, slender; flowers white, hairy. Calyx lobes 5, ovate-lanceolate, acute. Corolla white, 5 lobed, 5-10 mm long, infundibuliform, lobes ovate, acute. Stamens 5, adnate to the lower portion of corolla, anthers linear oblong. Ovary obovoid, stigma 2-lobbed. Capsules 1.5-3 x 4-6 mm, puberulous.

Ambalappara, *KJD 26133*

Fl. & Fr.: June-October

Distribution: Boundaries of grasslands at Ambalappara.

Note: This species is closely allied to *O. chandrasekharanii* by the pubescent nature, shape of flowers, pubescent capsules etc. The novelty is to be confirmed by comparing the type specimen of *O. chandrasekharanii*.

PAVETTA L.

Sp. Pl. 110. 1753.

- 1a. Undersurface of leaves densely pubescent *P. brunonis*
- 1b. Undersurface glabrous or nearly so..... 2
- 2a. Inflorescence a compact corymb; corolla less than 1 cm long *P. breviflora*
- 2b. Inflorescence loosely arranged; corolla more than 1.5 cm long *P. indica*

Pavetta breviflora DC., Prodr. 4: 491. 1830; Hook.f., Fl. Brit. India 3: 151. 1880, p.p.; Gamble, Fl. Madras 633(447). 1921; Rout & Deb, Bull. Bot. Surv. India 41: 75. 1999. *Pavetta brevifolia* DC. var. *subcoriacea* Gamble, Fl. Madras 634(447). 1921; Sebastine & Vivek., Bull. Bot. Surv. India 9: 174. 1967.

Shrubs or small trees; bark yellowish. Leaves opposite, 5.5-13.0 x 1.6-5.5 cm, elliptic or elliptic-obovate, acute at apex and base; domatia few to many on secondary or tertiary nerves; lateral nerves 9-12 pairs, alternate or subopposite; petioles 0.5-1.5 cm; stipules interpetiolar. Inflorescence terminal, peduncled, trichotomously branched, corymbose cymes, 4-6 cm across. Flowers 40-50; bracts broadly triangular, membranous. Hypanthium ca 1 x 1 mm, obovoid. Calyx tube broader above, glabrous; teeth 0.4-0.5 x 0.2 mm, narrowly triangular or dentate; Corolla tube ca 8 mm long, ca 1.5 mm across, cylindrical, glabrous; lobes oblong, mucronulate at apex. Staminal filaments ca 0.8 mm. Ovary ca 0.8 x 1.0 mm, disk ca 0.5 x 1.0 mm; style ca 14 mm long, stout; stigma fusiform. Drupe 6-7 mm across, globose or subglobose one seeded.

Kannadivechakunnu, *KJD 25569*; Pothurumi, *KVB 31734*

Fl. & Fr.: March-December

Distribution: Rare in evergreen forests of Kannadivechakunnu, Chavachi and Pothurumi. Endemic to southern Western Ghats.

Pavetta brunonis G.Don, Gen. Hist. 3: 575. 1834; Hook.f., Fl. Brit. India 3: 152. 1880; Gamble, Fl. Madras 634 (447). 1921; Rout & Deb, Bull. Bot. Surv. India 41: 82. 1999; Ratheesh, Fl. Stud. Wayanad Dist. 440. 2009. *Ixora nilagirica* Kuntze, Revis. Gen. Pl. 1: 286. 1891.

Shrubs, 2-3 m high. Leaves opposite, 5.5-17.0 x 2.5-7.5 cm, elliptic-obovate, acute or acuminate at apex, cuneate, acute or attenuated at base; lateral nerves 10-12 pair, pubescent; stipules persistent. Inflorescence terminal, trichotomously branched, corymbose cymes, 7-8 cm across, pubescent; bracts cuspidate. Flowers ca 100. Hypanthium obovoid, pubescent. Calyx tube ca 0.5 x 1.0 mm, broader above, pubescent outside; teeth 1-2 x 0.3 mm, subulate, acute at apex pubescent outside. Corolla tube 9-12 mm long, cylindrical, glabrous outside, pilose within; lobes 4-5 x 2 mm, oblong, mucronulate at apex, glabrous. Staminal filaments 0.2-0.5 mm. Ovary ca 0.8 x 0.8 mm; style 20-25 mm long; stigma ca 2 mm, simple, fusiform, puberulous. Drupes 7-10 x 7-11 mm, subglobose with persistent calyx teeth; seeds one or two.

Pothurumi, KVB 31379; Pothanplavu, KVB 31389

Fl. & Fr.: April-June

Distribution: Fairly common in evergreen forests of Pothurumi and Chavachi; semi-evergreen forests of Paripode. Endemic to southern Western Ghats.

Pavetta indica L., Sp. Pl. 110. 1753; Hook.f., Fl. Brit. India 3: 150. 1880; Gamble, Fl. Madras 633(446). 1921; Manilal & Sivar., Fl. Calicut 146. 1982; Ansari, Fl. Kasaragod Div. 202. 1985; Rout & Deb, Bull. Bot. Surv. India 41: 118. 1999; Ratheesh, Fl. Stud. Wayanad Dist. 440. 2009.

Shrubs; branchlets glabrescent. Leaves opposite, 7-11 x 3-4 cm, ovate-elliptic or oblanceolate, apex acuminate, base acute-attenuate, chartaceous, glabrous; petiole to 1.8 cm long. Corymb terminal. Calyx minutely 4-toothed, to 3 mm long. Corolla white; tube c. 1.5 cm long, slender, sparsely pilose within; lobes obovate. Stamens 4, between the lobes, exserted; anthers linear-oblong. Ovule solitary; style slender, exserted; stigma fusiform. Berry 6-9 mm across, globose, black when ripe.

Pothanplavu, KVB 31337; Pothurumi, 31424

Fl. & Fr.: April-July

Distribution: Fairly common in semi-evergreen forests of Pothanplavu and evergreen forests of Chavachi and Pothurumi.

PSYCHOTRIA L.

Syst. Nat. ed. 10, 929. 1364. 1759, *nom. cons.*

- 1a. Seeds without ridges and furrows, albumen ruminant 2
- 1b. Seeds with ridges and furrows, albumen uniform 5
- 2a. Branches of inflorescence opposite *P. flavida*
- 2b. Branches of inflorescence whorled 3
- 3a. Bracteoles persistent *P. dalzellii*
- 3b. Bracteoles deciduous or absent 4
- 4a. Calyx 5-toothed; fruit ovoid-ellipsoid *P. nigra*
- 4b. Calyx entire or minutely toothed; fruit ellipsoid *P. macrocarpa*
- 5a. Seeds ventrally flat and dorsally 1-ridged *P. bisulcata*
- 5b. Seeds ventrally grooved, dorsally without ridges *P. sp.*

Psychotria bisulcata Wight & Arn., Prodr. Fl. Ind. Orient. 434. 1834; Hook.f., Fl. Brit. India 3: 171. 1880; Gamble, Fl. Madras 641(452). 1921; Deb & Gangop., J. Econ. Taxon. Bot. Addl. ser. 7, 116. 1989.

Subshrubs. Leaves opposite, 11 x 4.5 cm, elliptic, abruptly acuminate, cuneate at base, membranous; nerves 7 or 8 pairs, prominent below, reticulate; petiole 1 cm long; stipule 7 mm long, ovate, cuspidate, densely rufous-villous within. Cymes 3-4 cm across, villous at nodes. Flowers 4 mm long, sessile. Calyx 1.5 mm long, truncate, glabrous. Corolla tube 2.5 mm long densely villous inside, lobes acute, deflexed. Ovary two celled, ovule one; style 1.5 mm long, broaden up. Fruit ovoid, pyrenes plano-convex.

Mullenpara, *KJD 26163, 31932*

Fl. & Fr.: March-July

Distribution: Fairly common in evergreen forests of Mullenpara, Kattikari and Meenmutty.

Psychotria dalzellii Hook.f., Fl. Brit. India 3: 163. 1880; Gamble, Fl. Madras 640(451). 1921; Ansari, Fl. Kasaragod Div. 202. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 232. 1988; Deb & Gangop., J. Econ. Taxon. Bot. Addl. ser. 7, 68. 1989 (Plate 14k).

Shrubs or small trees, 4.5-6 m high. Leaves opposite, 7-25 x 4-10 cm, obovate, oblanceolate, obovate-oblong, obtuse, rounded or apiculate at apex, cuneate at base; lateral nerves 12-20 on either side, arcuate, without domatia; petiole 0.5-2 cm long; stipules 15-20 x 8-15 mm, ovate, oblong or orbicular, acute or acuminate at apex. Inflorescence terminal, brachiate

paniculate cymes; bracts persistent; bracteoles persistent. Flowers 8-10 mm long. Hypanthium oblong. Calyx broadly campanulate, 4-5 x 3-4 mm, oblong. Corolla tube 3-4.5 mm long, villous at throat within; lobes 5, 2-3 mm long, oblong or ovate-oblong. Stamens 5, exerted or inserted. Ovary 0.5 mm long; style 4-5 mm long; stigma 2-lobed, 0.4-0.6 mm long, ovate, papillose. Fruits sessile; mesocarp thick; pyrenes 2, rarely 1 immature.

Narikadvu, *KJD 26199*

Fl. & Fr.: March-November

Distribution: Fairly common in semi-evergreen forests of Narikadvu. Endemic to Western Ghats.

Psychotria flavida Talbot, Syst. List Trees Bombay 113. 1894; Gamble, Fl. Madras 641(452). 1921; Ansari, Fl. Kasaragod Div. 203. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 232. 1988; Deb & Gangop., J. Econ. Taxon. Bot. Addl. ser. 7, 89. 1989; Ratheesh, Fl. Stud. Wayanad Dist. 443. 2009.

Small shrubs; branchlets terete, glabrous. Leaves opposite, 10-18 x 3.5-8 cm, elliptic-oblong or obovate, acute at apex, attenuate at base, glabrous, yellowish green on drying; lateral nerves 9-12 pairs; petiole to 2.5 cm long; stipules 6-8 mm long, ovate, acute at apex, deciduous. Flowers in terminal corymbose cymes; bracteoles 5-7 mm long, lanceolate. Calyx tube 2-2.5 mm, campanulate, 5-toothed. Corolla white; tube c. 2 mm long, funnel-shaped, hairy at throat; lobes 5, oblong, acute. Stamens 5; anthers ovate. Stigma 2-lamellate. Fruit c. 5 mm across, globose, bluish-purple; fruiting peduncle and pedicels yellow; seeds 1-2, planoconvex.

Kattikari, *KVB 31546*

Fl. & Fr.: April-October

Distribution: Common in evergreen forests of Kattikari, Chelachode, and Chavachi; plantations of Kariyenkappu. Endemic to southern Western Ghats.

Psychotria macrocarpa Hook.f., Fl. Brit. India 3: 162. 1880; Gamble, Fl. Madras 641(452). 1921; Deb & Gangop., J. Econ. Taxon. Bot. Addl. ser. 7, 54. 1989.

Shrubs, to 2 m tall. Leaves opposite, 14-17 x 5-7 cm, obovate, abruptly acuminate, tip obtuse, cuneate at base; nerves 8-10 pairs, 2 cm apart; petiole to 3 cm. Panicle 4 x 10 cm, branches whorled, spreading, hirtus. Flowers 3-5 together. Calyx truncate, glabrous. Stamens included, connectives of anthers glandular. Ovary 2 celled, ovules solitary; style 4 mm long, bifid at apex. Fruit 7 x 7 mm, globose, smooth.

Mullenpara State Boundary, *KJD 26053*

Fl. & Fr.: November-March

Distribution: Rare in evergreen forests of Mullenpara. Endemic to southern Western Ghats.

Psychotria nigra (Gaertn.) Alston in H. Trimen, Handb. Fl. Ceylon 6(Suppl.): 152. 1931; Deb & Gangop., J. Econ. Taxon. Bot. Addl. ser. 7, 49. 1989; Ramach. & V.J. Nair, Fl. Cannanore Dist. 232. 1988. *Grumilea nigra* Gaertn., Fruct. Sem. Pl. 1: 138. t.28. 1788. *Psychotria thwaitesii* Hook.f., Fl. Brit. India 3: 162. 1880, p.p; Gamble, Fl. Madras 640(451). 1921.

Large shrubs, 2-3 m tall. Leaves opposite, 19 x 8.5 cm, obovate, obtuse, broadly apiculate, nerves to 16 pairs, regular, 8-10 mm apart, domatia glandular; stipule 12 mm long, ovate, strongly mucronate. Cymes 1-1.5 cm across, 3-6 together, globose, densely fulvous hairy; peduncle 2-3 cm long, stout. Flowers many, densely packed, 5 mm long. Calyx 1.5 mm long, campanulate, 5-toothed, ciliate. Corolla white, 3 mm long, tube hairy at mouth, lobes reflexed. Drupe 6 mm across, subglobose, pyrenes smooth.

Chavachi, KVB 31519, 31583; Pothanplavu 31328

Fl. & Fr.: March-October

Distribution: Fairly common in semi-evergreen forests of Pothanplavu and evergreen forests of Chavachi.

Psychotria sp. (Plate 14j)

Shrubs 2-3 m height. Leaves opposite to sub opposite, 6-12 X 2-4 cm, ovate-elliptic rarely narrow elliptic, glabrous, brownish when dry, acute, base cuneate, margin entire; petiolate; lateral nerves 6-12, subopposite to opposite; stipules not persistent. Flowers on cymes. Fruits stalked, drupe, ellipsoid, 9-15 x 2-3 mm, pyrenes palano convex, embryo T-shaped.

Narikadvu, KJD 26193

Fl. & Fr.: May-July

Distribution: Rare in semi-evergreen forests of Narikadvu.

Note: It is closely allied to *P. nudiflora* var *nudiflora* by its type of infrutescence, leaf nerves etc. but differs in the elliptic-acuminate leaves and ellipsoid fruits. In *P. nudiflora* var. *nudiflora* the leaves are obovate with acute-mucronate apex and the fruit is globose.

PSYDRAX Gaertn.

Fruct. Sem. Pl. 1: 125. 1788.

- 1a. Flowers in compact umbels *P. umbellata*
1b. Flowers in axillary cymes *P. dicoccus*

Psydrax dicoccus Gaertn., Fruct. Sem. Pl. 1: 125. t.26.f.2. 1788; Ratheesh, Fl. Stud. Wayanad Dist. 446. 2009. *Canthium didymum* (Brandis) Hook.f., Fl. Brit. India 3: 132. 1880, non Gaertn.f. 1806. *Plectronia didyma* Benth. & Hook.f. ex Brandis, For. Fl. 276.1874; Gamble, Fl. Madras 624(440). 1921. *Canthium dicoccum* (Gaertn.) Merr., Philipp. J. Sci. 35: 8. 1928.

Evergreen trees, to 12 m high; bark white. Leaves opposite, distichous, 7-12 x 2.4-4.5 cm, elliptic, elliptic-lanceolate, ovate or ovate-lanceolate, apex acuminate, base cuneate or acute; lateral nerves 2-4 pairs, pinnate; intercostae reticulate, domatia present; petiole 4-10 mm; stipules interpetiolar. Flowers pentamerous in axillary cymes, 10 mm long. Calyx tube short, lobes ciliate. Corolla lobes 5, oblong, reflexed, tube densely villous. Stamens 5; filaments short, disk round, cushion like. Ovary 2-celled, inferior; ovules one in each cell, pendulous; style 14 mm long, glabrous. Fruit a drupe, 0.8 cm long, globose, compressed, glabrous; pyrene rugose.

Ambalappara, KVB 31575, 31636

Fl. & Fr.: February-May

Distribution: Fairly common in evergreen forests of Ambalappara and Mullenpara.

Psydrax umbellata (Wight) Bridson, Kew Bull. 48: 762. 1993. *Canthium umbellatum* Wight, Icon. Pl. Ind. Orient. t. 1034. 1845; Hook.f., Fl. Brit. India 3: 132. 1880. *Plectronia didyma* (Gaertn.f.) Kurz var. *umbellata* (Wight) Gamble, Fl. Madras 624(440). 1921. *Canthium dicoccum* (Gaertn.) Teijsm. & Binn. var. *umbellatum* (Wight) Santapau & Merchant, Bull. Bot. Surv. India 3: 107. 1961; Ramach. & V.J. Nair, Fl. Cannanore Dist. 212. 1988.

Evergreen trees; bark yellowish-grey. Leaves opposite decussate, 8-15 x 3-6 cm, elliptic, lanceolate, elliptic-oblong, elliptic-obovate, oblong-lanceolate, ovate or ovate-lanceolate, apex acuminate, caudate-acuminate or obtusely acuminate, base acute or attenuate; lateral nerves 3-6 pairs, pinnate; intercostae reticulate; petiole 6-10 mm; stipules interpetiolar. Flowers white, in axillary, compact umbels; peduncle 5 mm long, stout. Calyx tube short, 5-toothed. Corolla tube campanulate; lobes 5, valvate, reflexed. Anthers 5, subsessile on the mouth of the

corolla. Ovary inferior, 2-celled, ovules one in each cell; style columnar; stigma capitate. Fruit a drupe, 1.2 cm long, ovoid, black; pyrenes 1-2.

Mullenpara state Boundary, *KJD 26070*

Fl. & Fr.: February-August

Distribution: Fairly common in evergreen forests of Mullenpara.

RUBIA L.

Sp. Pl. 109. 1753.

Rubia cordifolia L., Syst. Nat. (ed.12) 3: 229. 1768; Hook.f., Fl. Brit. India 3: 202. 1880; Gamble, Fl. Madras 655(462). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 234. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 446. 2009.

Scabrous climber, stem 4-angled, articulate. Leaves whorled, 4 in each node, equal or unequal, to 7 x 3 cm, ovate, acuminate at apex, cordate at base, 3-5-ribbed from base; petiole 2-5 cm long. Flowers 3 mm across; in axillary dichotomous cymes. Calyx tube turbinate, lobes 4, minute. Corolla lobes ovate, valvate, spreading, white. Anthers globose. Ovules solitary in each cell, styles 2, stigmas capitate. Fruit fleshy, globose, purple 4-5 mm across.

Ambalappara, *KVB 31381*

Fl. & Fr.: November-December

Distribution: Rare in Grasslands of Ambalappara.

SAPROSMA Blume

Bijdr. Fl. Ned. Ind. 956. 1826.

- 1a. Leaves sessile; flowers terminal, sessile..... *S. glomeratum*
1b. Leaves petiolate; flowers pedicelled..... *S. fragrans*

Saprosma fragrans (Bedd.) Bedd., Fl. Sylv. S. India 134/11. 1872; Hook.f., Fl. Brit. India 3: 193. 1880; Gamble, Fl. Madras 649(458). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 234. 1988; Gangop., J. Econ. Taxon. Bot. 15: 86. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 447. 2009. *Serissa fragrans* Bedd., Icon. Pl. Ind. Or. t. 14. 1868-1874.

Shubs 3-4 m high. Leaves opposite, 4-14 x 2-4 cm, elliptic oblong, long acuminate at apex, slightly unequally acute at base; lateral nerves 5-6 on either side, subopposite, arcuate, domatia present at axils; petioles 2-5 mm long; stipules ovate-oblong, 2 or 3-toothed. Inflorescence axillary or terminal cymes, few flowered, trichotomous; bracts, bracteoles minute. Flowers infundibuliform, 8-10 mm long, fragrant, white. Corolla tube 5-6 mm long, wider above, lobes 2-

2.5 mm long, ovate, minutely inflexed at apex, glabrous above, pubescent beneath. Disk ca 1 mm across, ovoid, smooth. Stamens included; filaments minute, adnate below throat; anthers ovate-oblong. Ovary ca 0.5 mm long; styles filiform. Drupes short stalked, ca 6 x 5 mm, ovoid, pericarp thin, glabrous; seed solitary, ellipsoid.

Kattikari, *KJD 31487*

Fl. & Fr.: June-April

Distribution: Fairly common in evergreen forests of Kattikari, Moonamkallu and Chavachi. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Saprosma glomerata (Gardner) Bedd., *Fl. Sylv. S. India* 134/11. 1874; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 235. 1988; Gangop., *J. Econ. Taxon. Bot.* 15: 86. 1991; Ratheesh, *Fl. Stud. Wayanad Dist.* 447. 2009. *Dysodidendron glomeratum* Gardner, *Calcutta J. Nat. Hist.* 7: 3. 1847. *Saprosma indicum* Dalzell, Hooker's *J. Bot. Kew Gardner Misc.* 3: 37. 1851; Hook.f., *Fl. Brit. India* 3: 192. 1880; Gamble, *Fl. Madras* 649(457). 1921. *Serissa glomerata* (Gardner) Bedd., *Icon. Pl. Ind. Or.* t.16. 1868-1874 (Plate 14l).

Shrubs, to 1.5 m tall. Leaves opposite, 12 x 5 cm, ovate-oblong, acute, subcordate at base; domatia glandular; nerves 10-15 pairs; sessile or subsessile. Flowers 3-6 together, in terminal clusters, 7 mm long, shortly pedicelled. Calyx 2 mm long, lobes 4, ovate, acute. Corolla white, densely hairy within. Stamens included; anthers sessile. Ovary ca 0.5 mm long; styles filiform Berry 1 cm across, globose, emarginate, deep blue; seed one, globose or ellipsoid.

Kattikari, *KJD 22591*

Fl. & Fr.: October-July

Distribution: Rare in evergreen forests of Kattikari. Endemic to Western Ghats.

SPERMACOCE L.

Sp. Pl. 102. 1753.

Spermacoce ocymoides Burm.f., *Fl. Ind.* 34 & 13.f.1. 1768; Hook.f., *Fl. Brit. India* 3: 200. 1881; Deb & Dutta, *J. Econ. Taxon. Bot.* 5: 1052. 1984; Sivar. *et al.*, *Proc. Indian Acad. Sci. (Plant. Sci.)* 97:356.1987; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 236. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 450. 2009. *Borreria ocymoides* (Burm.f.) DC., *Prodr.* 4: 544. 1830; Gamble, *Fl. Madras* 654(461). 1921; Manilal & Sivar., *Fl. Calicut* 136. 1982. *Borreria ocymoides* var. *thekkumalensis* Sivar. & Joseph, *New Botanist* 6:133. 1979.

Pubescent, erect herbs. Leaves decussate, 3.5 x 1.5 cm, sparsely scabrous, elliptic-oblong, apex acute, base cuneate to attenuate, (sub)sessile; stipules 1 x 0.8 cm; nerves 3 or 4 pairs. Flowers 40-50 per node. Calyx truncate, strigose without; lobes 4, unequal, linear-lanceolate, 2 short and 2 long. Corolla white, 2 mm wide; tube 2 mm, glabrous within; lobes 4. Stamens 4. Capsule truncate, 1.5 x 1 mm, dehiscing transversely.

Crossway, KJD 22521

Fl. & Fr.: November-July

Distribution: Common in plantations of Kariyenkappu and evergreen forests of Crossway.

TARENNA Gaertn.

Fruct. Sem. Pl. 1: 139. 1788.

- 1a. Corolla tube shorter than corolla lobes *T. alpestris*
- 1b. Corolla tube equal or longer than corolla lobes 2
- 2a. Cymes and corolla tube glabrous *T. canarica*
- 2b. Cymes and corolla tube pubescent..... *T. nilagirica*

Tarenna alpestris (Wight) N.P.Balakr., Bull. Bot. Surv. India 22: 175. 1980 (1982); Ratheesh, Fl. Stud. Wayanad Dist. 451. 2009. *Coffea alpestris* Wight, Icon. Pl. Ind. Orient. t. 1040. 1845. *Coffea grumelioides* Wight, Icon. Pl. Ind. Orient. t. 1041. 1845. *Webera leucens* Hook.f., Fl. Brit. India 3: 106. 1880. *Stylocoryne leucens* (Hook.f.) Gamble, Fl. Madras 635(448). 1921 (Plate 15a).

Shrubs to small trees. Leaves opposite, to 9 x 2 cm, elliptic or oblanceolate, acute, base cuneate. Flowers white, 1.5 cm long, in terminal corymbose cymes. Calyx glabrous, 5-toothed. Corolla lobes equal to the tube. Stamens 5, inserted on mouth of corolla tube. Ovary 2 celled, ovules one; style hairy, stigma fusiform. Berry ovoid; one or two seeded.

Ambalappara, KVB 31641; KJD 31945

Fl. & Fr.: November-December

Distribution: Common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Tarenna canarica (Bedd.) Bremek., Repert. Spec. Nov. Regni Veg. 37:208. 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 237. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 452. 2009. *Pavetta canarica* Bedd., Fl. Sylv. S. India 134/8. 1874. *Webera canarica* (Bedd.) Hook.f., Fl. Brit. India 3: 106. 1880. *Stylocoryne canarica* (Bedd.) Gamble, Fl. Madras 635(448). 1921.



a. *Swertia beddomei*



b. *Swertia lawii*



c. *Strychnos dalzellii*



d. *Canthium coromandelicum*



e. *Discospermum apiocarpum*



f. *Ixora sivarajiana*



g. *Lasianthus capitulatus*



h. *Neanotis monosperma*



i. *Ophiorrhiza barberi*



j. *Psychotria dalzellii*



k. *Psychotria* sp.



l. *Saprosma glomeratum*

Shrubs. Leaves opposite, 8-24 x 2-7 cm, narrowly attenuate at base; nerves 10-12, 1-1.5 cm apart. Flowers in lax terminal corymbs; bracts 0.15-0.25 cm long, subulate. Calyx tube 0.15-0.2 cm long. Corolla lobes 1-1.2 cm long, 0.4-0.6 cm wide, lanceolate. Stamens 5, inserted on mouth of corolla tube. Ovary 2 celled, ovules one. Berry subglobose, 1-1.2 cm diam., black on drying; seeds 2, subglobose, 0.5-0.8 cm diam.

Chavachi, KVB 31377

Fl. & Fr.: November-June

Distribution: Fairly common in evergreen forests of Chavachi. Endemic to southern Western Ghats.

Tarennia nilagirica (Bedd.) Bremek., Repert. Spec. Nov. Regni Veg. 37: 197. 1934; Ramach. & V.J. Nair, Fl. Cannanore Dist. 238. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 452. 2009. *Pavetta nilagirica* Bedd., Fl. Sylv. S. India 134/8. 1874. *Webera nilagirica* (Bedd.) Hook.f., Fl. Brit. India 3: 108. 1880. *Stylocoryne nilagirica* (Bedd.) Gamble, Fl. Madras 635(448). 1921.

Shrubs, 3-4 m tall; young parts resinous. Leaves opposite, 11-20 x 3.5-7.5 cm, elliptic-lanceolate, acuminate at apex, truncate at base, glabrous on both surfaces; petiole 1.2-1.6 cm long; stipules caducous. Flowers creamy-white, 4-5 cm long, in trichotomous, corymbose cymes; pedicels 4-5 mm long. Calyx-tube up to 3 mm long; lobes 5, up to 2 mm long, triangular. Corolla-tube to 1.5 cm long; lobes 5, to 1.2 cm long, oblong, obtuse. Stamens 5, inserted near the mouth of corolla; filaments very short; anthers to 1 cm long, linear. Ovary bilocular with two ovules per locule; style up to 2.1 cm long, hairy, stigma fusiform.

Ambalappara, KVB 31423

Fl. & Fr.: March-November

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

WENDLANDIA Bartl. ex. DC.

Prodr. 4: 411. 1830. *nom. cons.*

Wendlandia thyrsoides (Roth) Steud., Nomencl. Bot., ed. 2, 2: 786. 1841; Ramach. & V.J. Nair, Fl. Cannanore Dist. 238. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 453. 2009. *Canthium thyrsoides* Schult. in J.J. Roemer & J.A. Schultes, Syst. Veg., ed. 15 bis 6: 207. 1820. *Wendlandia notoniana* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 403. 1834; Hook.f., Fl. Brit. India 3: 40. 1880; Gamble, Fl. Madras 588(415). 1921.

Trees, to 8 m high. Leaves ternate whorled, 4-15 x 1.5-7 cm, elliptic, elliptic-lanceolate or elliptic-obovate, apex acute or acuminate, base cuneate or attenuate; lateral nerves 5-12 pairs, pinnate; intercostae reticulate; petiole 4-10 mm, pubescent; stipule interpetiolar, bifid, often recurved. Flowers pale yellow, fragrant, 6 mm long, in dense terminal panicles; bracts and bracteoles lanceolate. Calyx subglobose, pubescent, lobes 5, short. Corolla tube elongate, slender 2.5 mm, funnel shaped, sparsely hairy within, lobes 5. Stamens 5, exerted; anthers oblong, subsessile. Ovary depressed globose, 2-celled, inferior, ovules many on globose placenta; style filiform; stigma 2 fid. Fruit a capsule, globose, 2 valved; seeds small; testa membranous.

Ambalappara, *KVB 31356, 31796; KJD 26309*

Fl. & Fr.: December-April

Distribution: Common in evergreen forests of Ambalappara.

Order: **Lamiales**

ACANTHACEAE

- 1a. Staminal filaments monadelphous, decurrent in to sheath..... Strobilanthes
- 1b. Staminal filaments free or connate in pairs 2
- 2a. Fertile stamens 4..... 3
- 2b. Fertile stamens 2, with or with out staminodes..... 7
- 3a. Seeds supported on retinacula 4
- 3b. Seeds not supported on retinacula..... Thunbergia
- 4a. Corolla lobes equal or subequal, spreading 5
- 4b. Corolla 2-lipped..... 6
- 5a. Ovules 2 in each cell Aystasia
- 5b. Ovules 3 or more..... Dipteracanthus
- 6a. Bracteoles present, similar to bract, calyx lobes equal Lepidagathis
- 6b. Bracteoles absent, one of the calyx lobe bract like Phaulopsis
- 7a. Ovules 3-10 per locule. Seeds more than 4 per capsule 8
- 7b. Ovules 2 or 1 per locule, seeds 1-2 per capsule..... 10
- 8a. Capsule compressed, seeds ovoid or angular 9
- 8b. Capsule cylindric or terete, seeds compressed Gymnostachyum
- 9a. Flowers in whorls among axillary cladodes Haplanthodes
- 9b. Flowers in racemes, panicles or spikes..... Andrographis
- 10a. Corolla lobes 5, subequal 11
- 10b. Corolla lobes 5, 2-lipped..... 12

- 11a. Calyx lobes 4, outer pair larger enclosing the inner..... Barleria
 11b. Calyx lobes 5, all equal or subequal 13
 12a. Flowers axillary, solitary or 2-flowered racemes Dipteracanthus
 12b. Flowrers in linear spikes or heads Eranathemum
 13a. Anthers cells unequal, appendaged..... 14
 13b. Anther cells equal, not appendaged.....15
 14a. Both anther cells basically appendaged Justicia
 14b. Only lower anther cell appendaged Rungia
 15a. Corolla white, upper lip much narrower than other Rhinacanthus
 15b. Corolla pink, upper lip nearly as broad as lower 16
 16a. Anther cells rotund, decurrent Peristrophe
 16b. Anther cells reniform, distinct Dicliptera

ANDROGRAPHIS Wall. ex Nees

Pl. Asiat. Rar. 3: 77, 116. 1832.

- 1a. Staminal filaments glabrous, inflorescense congested *A. neesiana*
 1b. Staminal filaments hairy, panicle lax..... *A. paniculata*

Andrographis neesiana Wight, Icon. Pl. Ind. Orient. t. 1561. 1850; Hook.f., Fl. Brit. India 4: 504. 1884; Gamble, Fl. Madras 1049(735). 1924.

Herbs, branches strigose. Leaves opposite, 2-4 x 2 cm, ovate-elliptic, acute at both ends, glabrous, ciliate, nearly sessile; nerves 5 pairs. Panicle 2-5 x 4 cm, congested, terminal, strigose; flowers densely arranged. Calyx lobes 6 mm long, linear, acuminate, glandular hairy. Corolla 14 mm long, brownish-purple, tube not ventricose, upper lip emarginate; lobes of lower lip obtuse, hairy. Stamens 2, filaments broadened below; anthers attenuate at base; style hairy. Capsule 16 x 3 mm, oblong, acute, hairy; seeds 6, glabrous.

Ambalappara, NS & KJD 31975

Fl. & Fr.: September-February

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Andrographis paniculata (Burm.f.) Wall. ex Nees, Pl. Asiat. Rar. 3: 116. 1832; Hook.f., Fl. Brit. India 4: 501. 1884; Gamble, Fl. Madras 1048(734). 1924; Manilal & Sivar., Fl. Calicut 214. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 331. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 606. 2009. *Justicia paniculata*

Burm.f., Fl. Ind. 9. 1768. *Andrographis subspathulata* C.B.Clarke in Hook.f., Fl. Brit. India 4: 502. 1884.

Slender herbs; branches glabrous. Leaves opposite, 9 x 1.5 cm, elliptic, acuminate at apex, base acute, decussate, glabrous. Panicle terminal and upper axillary, glandular-hairy; flowers many, distant. Calyx lobes 3 mm long, linear, hairy, connate at base. Corolla 14 mm long, pink or white with purple dots, tube ventricose, hairy, upper lip entire, midlobe of lower lip broader than laterals, acute, glandular-hairy. Ovary puberulus, style hairy. Capsule 20-30 x 3 mm, oblong, acute, hairy; retinacula spoon shaped; seeds 8, glabrous.

Kariyenkappu, NS & KVB 31426

Fl. & Fr.: March-December

Distribution: Rare along the margins of forests.

ASYSTASIA Blume

Bijdr. Fl. Ned. Ind. 796. 1826.

Asystasia dalzelliana Santapau, Kew Bull. 1948: 276. 1948; Manilal & Sivar., Fl. Calicut 222. 1982; Ansari, Fl. Kasaragod Div. 275. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 332. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 606. 2009. *Asystasia violacea* Dalzell ex C.B.Clarke in Hook.f., Fl. Brit. India 4:494.1884; Gamble, Fl. Madras 1063(744). 1884, non Dalzell 1850. *Asystasia coromandelina* Curtis, Bot. Mag. t. 4248. 1846, non Wight.

Erect or diffuse herbs; branches 4-angled, tomentose. Leaves opposite, 2-3.5 x 1.5-2.2 cm, broadly ovate to elliptic, apex acuminate, base cuneate; lateral nerves close, pubescent; petiole to 1 cm long. Flowers in terminal or subterminal secund racemes. Calyx lobes 5, 5-6 mm long, lanceolate. Corolla lilac or blue; tube to 2.5 cm long, puberulous without; lobes 5, subequal, spreading, orbicular. Stamens 4; anthers c. 3 mm long. Style to 1.5 cm long, puberulous below. Capsule to 1.5 cm long, calvate, stalked, pubescent, beaked; seeds 2-4, 0.5 mm cross, orbicular or angular.

Pothurumi, NS & KJD 25511

Fl. & Fr.: September-January

Distribution: Common in evergreen forests.

BARLERIA L.

Sp. Pl. 636. 1753.

- 1a. Inflorescence terminal spike *B. courtallica*
1b. Inflorescence terminal or axillary cyme *B. involucrata*

Barleria courtallica Nees in DC. Prodr. 11: 226. 1847; Hook.f., Fl. Brit. India 4: 489. 1884; Gamble, Fl. Madras 1060(743). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 333. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 608. 2009.

Subshrubs, branchlets glabrous. Leaves opposite, 15-20 x 6-8 cm, elliptic, apex acuminate, base attenuate, glabrous; nerves 7-9 pairs; petiole 1-4 cm long. Spikes terminal, 3-10 cm long; bracts and bracteoles similar, 5 mm long, lanceolate; flowers closely arranged. Sepals unequal, outer 8-20 x 6.5 mm, elliptic, acuminate, pubescent; inner 15 mm long, linear, acuminate, hairy. Corolla 4-5 cm long, tube and throat yellow or white; lobes 1.5 cm long, obovate, blue. Stamens unequal, 2 larger and 2 smaller, staminal filaments villous at base. Capsule 2.3 x 0.9 cm, elliptic, glabrous; seeds 4, 5 x 5 mm, orbicular, hairy, brown.

Meenmutty road, KVB 31518

Fl. & Fr.: January-May

Distribution: Fairly common in evergreen forests of Meenmutty, Chavachi and Pothurumi also in semi-evergreen forests of Paripode. Endemic to Western Ghats.

Barleria involucrata Nees, Pl. Asiat. Rar. 3: 92. 1832 & in DC. Prodr. 11: 232. 1847; Hook.f., Fl. Brit. India 4: 485. 1884; Gamble, Fl. Madras 1060(742). 1924; Manilal & Sivar., Fl. Calicut 221. 1982.

Subshrubs; branches terete, appressed hairy. Leaves 8-15 x 2.5-7 cm, elliptic-lanceolate, acuminate, base tapering; lateral nerves 7-9 pairs; petiole 1-3 cm long. Flowers in axillary cymes, often forming large terminal panicles; bracteoles 2-3.5 cm long, linear lanceolate. Outer calyx lobes, ovate lanceolate, 3 cm long; inner 2 cm long, narrowly lanceolate, acute, pubescent out side. Corolla blue with reddish-purple tube, 2 cm long; lobes obovate, obtuse. Stamens 2 fertile. Capsules elliptic, 2.5 x 0.7 cm; seeds 4, broadly ellipsoid, obtuse, silky hairy.

Mullenpara, NS & KJD 31927

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Mullenpara.

DICLIPTERA Juss.

Ann. Mus. Natl. Hist. Nat. 9: 267. 1807. *nom. cons.*

- 1a. Inflorescence bracts in opposite pairs 2
- 1b. Inflorescence bracts not opposite, unequal *D. paniculata*
- 2a. Cymes peduncled, bracts acute *D. foetida*
- 2b. Cymes sessile, bracts obtuse *D. cuneata*

Dicliptera cuneata Nees, Pl. Asiat. Rar. 3: 111. 1832; Hook.f., Fl. Brit. India 4: 552. 1884; Gamble, Fl. Madras 1073(752). 1924.

Subshrubs. Leaves opposite, 5-7 x 3-5 cm, elliptic, apex acuminate, base rounded or cuneate, hispid; petiole 2-3 cm long. Flowers in sessile or shortly peduncled, subcapitate cymes; bracts 18 x 12 mm, obovate, obtuse, mucronate, hispid; bracteoles 5 mm long, lanceolate, subulate. Sepals 7 mm long, lanceolate, hispid. Corolla pink, 8 mm long, tube slender. Stamens 2, filaments hairy. Seeds glochidiate-papillose

Pookundu, KVB 31208

Fl. & Fr.: November-February

Distribution: Common in semi-evergreen forests of Pookundu. Endemic to Peninsular India.

Dicliptera foetida (Forssk.) Blatt., Rec. Bot. Surv. Ind. 8: 361. 1921. *Justicia foetida* Forssk., Fl. Aeg.-Arab. 5. 1775. *Dicliptera zeylanica* Nees in DC. Prodr. 11: 474. 1847; Hook.f., Fl. Brit. India 4: 552. 1884; Gamble, Fl. Madras 1073(752). 1924.

Shrubs, 1-2 m high; stems terete. Leaves opposite, 7 x 3.5 cm, elliptic, acute at both ends, glabrous except the nerves below; nerves 5 pairs; petiole 2.5 cm long. Flowers in peduncled axillary cymes; bracts 15 x 13 mm, deltoid, cuspidate. Calyx lobes 4 mm long, lanceolate, acuminate. Corolla pink, 20 mm long, bilabiate; lobes obtuse. Stamens 2, filaments hairy, anthers in two levels. Capsule clavate, widened above; seeds hirtus.

Pookundu, NS & KJD 25557

Fl. & Fr.: December-April

Distribution: Common in semi-evergreen forests of Pookundu to Narikkadavu.

Dicliptera paniculata (Forssk.) I. Darbysh., Kew Bull. 62: 122. 2007; Ratheesh, Fl. Stud. Wayanad Dist. 621. 2009. *Dianthera paniculata* Forssk., Fl. Aeg.-Arab. 7. 1775. *Dianthera malabarica* L.f., Suppl. Pl. 85. 1782, *nom illeg.* *Peristrophe bicalyculata* (Retz.) Nees, Pl. Asiat. Rar. 3: 113. 1832; Hook.f., Fl. Brit. India 4: 554. 1885; Gamble, Fl. Madras 1084(759). 1924; Manilal & Sivar., Fl. Calicut 215. 1982. *Peristrophe paniculata* (Forssk.) Brummitt, Kew Bull. 38: 451. 1984; Ansari, Fl. Kasaragod Div. 287. 1985.

Erect herbs, stem 6-angular, hispid. Leaves opposite, 4.5-6 x 2-3 cm, ovate, apex acute, base rounded or truncate, glabrescent above and tomentose below. Flowers in axillary trichotomous cymes; pedicels to 2 cm; bracts 2, unequal, 11 x

8 mm, bracteoles 4, 6 mm, linear, hirsute. Calyx deeply 5-partite, lobes 4 mm, linear. Corolla pink, tube 5 mm, hairy, 2-lipped, upper entire, lower 3-lobed, lobes 7 mm. Stamens 2, filaments 5 mm, hairy, anther cells short, muticous. Ovary 1 mm, oblong. Capsule ellipsoid, tomentose; seeds 4, glochidiate-papillose.

Kariyenkappu, KVB 31766

Fl. & Fr.: December-February

Distribution: Along the boundaries of forests.

DIPTERACANTHUS Nees

Pl. Asiat. Rar. 3: 75, 81. 1832.

Dipteracanthus prostratus (Poir.) Nees, Pl. Asiat. Rar. 3: 81. 1832; Manilal & Sivar., Fl. Calicut 225. 1982; Ansari, Fl. Kasaragod Div. 27. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 334. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 610. 2009. *Ruellia prostrata* Poir. in Lam., Encycl. 6: 349. 1804; Hook.f., Fl. Brit. India 4: 411. 1884; Gamble, Fl. Madras 1017(714). 1924. *Ruellia prostrata* Poir. var. *dejecta* (Nees) C.B. Clarke in Hook.f., Fl. Brit. India 4: 412. 1884. *Dipteracanthus dejectus* Nees, Pl. Asiat. Rar. 3: 82. 1832.

Diffuse herbs, rooting at lower nodes; stems villous. Leaves opposite, to 6 x 4 cm, ovate, acute, entire, base acute or obtuse; petiole 2-3 cm long. Flowers axillary, 2 or 3 together; bracts absent; bracteoles foliar, 1.5 x 1 cm, ovate. Calyx 5-partite, lobes 10 mm long, linear, ciliate. Corolla white or pinkish-white, tube 8 mm long, lobes subequal, 1 cm long, obovate. Stamens 4, didynamous, filaments connate below. Ovary glabrous, style densely hairy. Capsule 1.5 x 0.6 cm, linear oblong, slightly pubescent; seeds 16-20, orbicular, compressed, marginate, smooth.

Paripode, KVB 31570

Fl. & Fr.: October-April

Distribution: Along the boundaries of forests.

ERANTHEMUM L.

Sp. Pl. 9. 1753.

Eranthemum capense L., Sp. Pl. 9. 1753; Hook.f., Fl. Brit. India 4: 525. 1885; Gamble, Fl. Madras 1078(720). 1924; Manilal & Sivar., Fl. Calicut 216. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 335. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 610. 2009. *Eranthemum montanum* Roxb., Fl. Ind. 1: 100. 1820; Gamble, Fl. Madras 1025(720). 1924. *Justicia montana* Roxb., Pl. Coromandel t. 176.1798. *Daedalacanthus montanus* (Roxb.) Anders., Enum. Pl. Zeyl. 229. 1860.

Subshrubs, to 1 m high. Leaves opposite, 4-14 x 2-5 cm, broadly elliptic, attenuate, acuminate, entire or wavy, glabrous; lateral nerves 2-5 pairs; petioles 0.5-3 cm long. Inflorescence terminal or axillary, dense panicle of spikes; bracts linear-lanceolate, acuminate, 1-2 cm long, 2-4 mm wide, hirsute; bracteoles linear-lanceolate, 4-6 x ca 1 mm. Calyx-lobes 5, shortly connate, filamentous, 4-8 mm long, glandular hairy. Corolla blue; tube narrow, 2-2.5 cm long, pubescent; limb subequally 5-lobed, twisted to the left in bud, ovate, 1-1.5 cm across. Stamens 2, attached at the throat of the tube; filaments 2-5 mm long; anther-thecae oblong; 2-3 mm long. Ovary oblong, 2-4 mm across; style 2-3 cm long; stigma dilated. Capsules oblong, 1.5-2.5 cm long, 4-6 mm wide; seeds 4, compressed, 2-3 mm thick, hygroscopically hairy.

Paripode, KJD 26329

Fl. & Fr.: January-March

Distribution: In forest plantations and deciduous forests.

GYMNOSTACHYUM Nees

Pl. Asiat. Rar. 3: 76, 106. 1832.

- 1a. Plants scapigerous; flowers in terminal peduncled cymes *G. febrifugum*
- 1b. Plants cauline; flowers axillary
- 2a. Stem glabrous; anthers with glandular hairs *G. warrieranum*
- 2b. Stem Scabrous; anthers without glandular hairs *G. latifolium* var. *decurrens*

Gymnostachyum febrifugum Benth., Flora 32: 558. 1849; Hook.f., Fl. Brit. India 4: 508. 1884; Gamble, Fl. Madras 1053(738). 1924; Ansari, Fl. Kasaragod Div. 279. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 336. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 612. 2009. *Gymnostachyum alatum* Wight, Icon. Pl. Ind. Orient. t. 1525. 1850.

Scapigerous herbs; stems very short. Leaves radical, 7 x 4 cm, ovate, obtuse at apex, obtuse and decurrent at base; nerves 3-4 pairs, hirsute below; petiole 3-9 cm long. Scape to 30 cm long, solitary or few, simple or branched. Flowers solitary or 2-4 together; bracts and bracteoles minute. Calyx 5-partite, lobes 3 mm long, glabrous. Corolla pink, 2.5 cm long, yellow at mouth, lobes 5, subequal. Stamens 2, included; anthers pubescent. Capsule linear, 25 x 2 mm, glabrous; seeds 16-20, orbicular, golden brown.

Valayamchal, KJD 26335

Fl. & Fr.: September-December

Distribution: Common in semi-evergreen forests of Valayamchal to Kurukathode. Endemic to southern Western Ghats.

Gymnostachyum latifolium (Dalzell) Anders. var. **decurrens** Gamble, Fl. Madras 1053(738). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 337. 1988.

Subshrubs to 80 cm tall, stem erect subquadrangular. Leaves opposite, 7.5-18 x 5-15 cm. broadly ovate, acute at apex, acuminate at base and decurrent on the long petiole; lateral nerves 10-14 pairs, equally spaced. Flowers in axillary racemes or panicles; bracteoles 2 mm long, lanceolate. Calyx 6 mm long, lobes 5, linear, acute. Corolla 2.5 cm long, blue, yellow at the tip of lobes, 2-lipped, upper lip 8 mm long, 2-lobed; lower lip 3 partite to the base. Stamens 2, exserted, glabrous. Capsule 2 cm long, linear, striate; seeds ca. 24, suborbicular, hairy when wet.

Kannadivechakunnu, NS & KJD 25566

Fl. & Fr.: October-January

Distribution: Rare in evergreen forests of Kannadivechakunnu. Endemic to Western Ghats.

Gymnostachyum warrieranum K. M. P. Kumar, Balach. & V. B. Sreek., Kew Bull. 70 (40). 2015 (Plate 15b).

Subshrubs, stem with small warts. Leaves 9-12 x 5-6 cm, broadly elliptic, acuminate at apex; nerves 10-13 pairs, nervules parallel; petiole 5-6 cm long. Panicles axillary and terminal, minutely strigose; bracts and bracteoles similar, linear. Flowers densely packed, pedicelled. Sepals 5.5 mm long, lanceolate, basally united. Corolla 15 mm long, greenish-yellow, lobes oblong, obtuse. Filaments thinly hairy at base. Capsule 2 x 0.2 cm, linear-oblong, acute; seeds ovoid, golden brown, densely hairy.

Croosway, NS & KJD 31914

Fl. & Fr.: October-January

Distribution: Common in evergreen forests of Cross way, Chavachi. Endemic to Southern Western Ghats.

HAPLANTHODES Kuntze

Lex. Gen. Phan. 265. 1903.

Haplantodes tentaculatus (L.) Nees var. **neilgherryensis** (Wight) J.R.I.Wood, NOVON 23: 386. 2014. *Haplantus neilgherryensis* Wight, Icon. Pl. Ind. Orient. t. 1556. 1850; Hook.f., Fl. Brit. India 4: 507. 1884; Gamble, Fl. Madras 1052(737). 1924. *Haplantus tentaculatus* Nees. var. *neilgherryensis* (Wight) C.B.Clarke in Hook.f., Fl. Brit. India 4: 507. 1884. *Bremekampia neilgherryensis* (Wight) Sreem., Bull. Bot. Surv. India 6: 323. 1965. *Haplantodes neilgherryensis* (Wight)

Majumdar, Bull. Bot. Soc. Bengal 25: 76. 1971; Panigrahi & Das, Bull. Bot. Surv. India 23: 201. 1981; Ansari, Fl. Kasaragod Div. 280. 1985; Ratheesh, Fl. Stud. Wayanad Dist. 612. 2009 (Plate 15c).

Profusely branched herbs, branches quadrangular, glabrous. Leaves opposite, 4-7 x 2-3 cm, elliptic, acuminate at both ends, glabrous, attenuate and decurrent at base into a petiole of 4-9 cm long. Flowers whorled in terminal, to 5 cm long, cylindrical spikes, densely covered with hairy cladodes; bracts and bracteoles minute. Calyx 2 mm long, lobes filiform, hairy. Corolla 10 mm long, pink; upper lip 2-lobed and lower lip 3-lobed, hairy. Stamens 2, free, anthers unequal, appendaged. Ovary oblong, cells 4-6 ovuled, style slender, stigma linear. Capsule 7 mm long, oblong; seeds 6-12, thinly hairy.

Moonamthode, KVB 31542

Fl. & Fr.: January-March

Distribution: Fairly common in evergreen forests of Moonamthode, semi-evergreen forests of Paripode and plantations of Kariyenkappu.

JUSTICIA L.

Sp. Pl. 15. 1753.

- 1a. Calyx lobes 5 2
- 1b. Calyx lobes 4 5
- 2a. Corolla 2 cm or more long *J. santapau*
- 2b. Corolla less than 1.5 cm long 3
- 3a. Bracts white with green nerves; stem obtusely 4-angled 4
- 3b. Bracts green; stem terete *J. wynaadensis*
- 4a. Leaves petioled, elliptic, acuminate at apex *J. betonica*
- 4b. Leaves sessile, oblong-lanceolate, obtuse *J. nilgherrensis*
- 5a. Spikes to 2.5 cm long; bracts elliptic *J. procumbens*
- 5b. Spikes to 5 cm long; bracts linear-lanceolate *J. japonica*

Justicia betonica L., Sp. Pl. 15. 1753; Hook.f., Fl. Brit. India 4:525.1885; Gamble, Fl. Madras 1078(755).1924; Manilal & Sivar., Fl. Calicut 218. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 340.1988; Ratheesh, Fl. Stud. Wayanad Dist. 616. 2009. *Adhatoda betonica* (L.) Nees, Pl. Asiat. Rar. 3: 103. 1832.

Diffusely branched more or less decumbent subshrubs; stem cylindrical, striate, with swollen nodes. Leaves opposite, 5-10 x 3.5-4 cm, ovate, acuminate at apex, acute at base, entire at margins, glabrous; lateral nerves 4-6 pairs. Flowers

in terminal spikes; bracts ovate, acute, mucronate, white with green veins, glabrous; bracteoles lanceolate, unequal sided, white with green veins. Calyx 5-partite, to 5 mm long; segments linear-lanceolate. Corolla to 1.25 cm long, pubescent outside, dull white, 2-lipped; upper lip erect, emarginated; lower lip deflexed, 3-lobed. Stamens 4; filaments hairy at the base; lower anther cell with a long spur. Ovary 2-celled, ovules 2 in each cell; style pubescent. Capsule softly pubescent, broadly clavate; seeds 4, suborbicular, densely tuberculately rugose when wetted.

Paripode, KJD 25580

Fl. & Fr.: November-February

Distribution: Fairly common deciduous forests and plantations.

Justicia japonica Thunb., Fl. Jap. 20. 1784; Ramach. & V.J. Nair, Fl. Cannanore Dist. 234. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 616. 2009. *Rostellularia japonica* (Thunb.) Ellis, Bull. Bot. Surv. India 22: 196. 1980 (1982). *Justicia simplex* D.Don, Prodr. Fl. Nepal. 118. 1825; Hook.f., Fl. Brit. India 4: 539. 1885; Gamble, Fl. Madras 1080(756). 1924. *Rostellularia mollissima* (Nees) Nees in DC. Prodr. 11: 373. 1847. *Rostellaria mollissima* Nees, Pl. Asiat. Rar. 3: 101. 1832.

Erect or decumbent herbs, branchlets strigose-hispid. Leaves opposite, 2 x 1.5 cm, ovate or linear, apex acute, sparsely scabrous above and strigose below, lateral nerves 5-7 pairs; petiole to 2 mm long. Spike 4-8 cm, cylindric; bracts and bracteoles ovate, scarious-margined, softly hairy, 4 mm long. Calyx lobes linear, margins scarious, ciliate, 4 mm long. Corolla 4-5 mm long, pubescent out side; upper lip ovate, subtruncate or rounded, 2-fid; lower suborbicular with 3 short rounded lobes. Staminal filament hairy at the base. Capsule pubescent, 4 mm long; seeds 1 mm long, concentrically rugose.

Narikkadavu, NS & KVB 31459

Fl. & Fr.: August-February

Distribution: Common in the Sanctuary.

Justicia nilgherrensis (Nees) Wall. ex Anders., J. Linn. Soc. Bot. 7:118.1863; Gamble, Fl. Madras 1078(755). 1924; Ramach. *et al.*, J. Econ. Taxon. Bot. 5:140.1984; Ramach. & V.J. Nair, Fl. Cannanore Dist. 341. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 617. 2009. *Adhatoda nilgherrensis* Nees, Pl. Asiat. Rar. 3: 103. 1832 (Plate 15d).

Herbs with woody thick rootstock and long roots; stem often numerous, procumbent. Leaves opposite, 3-3.5 x 0.5-1 cm, sessile, oblong-lanceolate, obtuse, soft, greyish green in colour, glabrous, minutely punctuate, finely ciliate along the margin. Flowers in 4-10cm long spikes; bracts 1.5 x 0.7 cm, ovate, very acute, white but with large green nerves; bracteoles nearly as large. Calyx lobes five, 5 mm long, all equal, linear acute, jointed only near the base. Corolla tube slightly longer, broadening suddenly above the base: upper lip 8 mm long, very concave, notched: lower lip 1 cm broad, 3-fid; lobes spreading; middle lobe rounded, slightly broader than the laterals. Capsule 2 cm long, dark purple above, velvety tomentose, laterally contracted at the base; seeds 4 mm across, papillate.

Ambalappara, NS & KVB 313467; KJD 26314

Fl. & Fr.: January-March

Distribution: Fairly common in grasslands of Ambalappara. Endemic to southern Western Ghats.

Justicia procumbens L., Sp. Pl. 15. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 539. 1885; Gamble, Fl. Madras. 1080(756). 1924; Ratheesh, Fl. Stud. Wayanad Dist. 579. 2009. *Rostellularia procumbens* (L.) Nees in DC. Prodr. 11: 371. 1847.

Diffuse herbs, 20-25 cm high, profusely branched. Leaves 4-6 x 2-3 cm, ovate, acute at either ends, hispid; nerves 5-6 pairs; petioles ca. 1 cm long, hirtus. Spikes 1-2.5 x 0.8-1 cm, terminal, oblong; bracts oblanceolate, cuspidate, ciliate, with green midrib; bracteoles linear. Flowers many; calyx lobes lanceolate, ciliate. Corolla 6-8 mm long, hairy with pink lines; upper lip broadly ovate, narrowly subquadrate; lower slightly 3-lobed. Staminal filaments glabrous. Ovary glabrous. Capsule glabrous; seeds orbicular, brown, striately rugose.

Kariyenkappu, NS & KVB 31466

Flowering & Fruiting: June-November.

Distribution: Fairly common in plantations of Kariyenkappu.

Justicia santapau Bennet, J. Bombay Nat. Hist. Soc. 67: 358. 1970; Ramach. & V.J. Nair, Fl. Cannanore Dist. 341. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 618. 2009. *Justicia montana* (Nees) Wall. ex Anders., J. Linn. Soc. Bot. 9: 509. 1867, non Roxb. 1805; Gamble, Fl. Madras 1078(755). 1924. *Hemichoriste montana* Nees, Pl. Asiat. Rar. 3: 102. 1832. *Justicia andersonii* Ramamoorthy, Fl. Hassan Dist. 551. 1976.

Shrubs, branches terete or obtusely 4-angled, glabrous. Leaves opposite, 25-40 x 7-10 cm, oblanceolate, apex acute, base attenuate, glabrous, nerves 8 pairs, prominent; petiole 5-6 cm long. Flowers in axillary or terminal peduncled, simple or branched, to 20 cm long spikes; bracts and bracteoles similar, 5 x 1.5 mm, oblong, pubescent. Calyx lobes 6 mm long, lanceolate, puberulus. Corolla white with pink spots, villous at the base between the filaments; upper lip 1.5 cm long, oblong, notched; lower 3-lobed. Ovary densely hairy. Capsule 25 mm long, clavate, glabrous; seeds 4, suborbicular, 4 mm across, rugose, glabrous.

Pothurumi, KVB 31710

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Pothurumi and Kattikari. Endemic to southern Western Ghats

Justicia wynaadensis (Nees) Heyne ex Anders., J. Linn. Soc. Bot. 9: 515. 1867; Hook.f., Fl. Brit. India 4: 533. 1885; Gamble, Fl. Madras 1079(755). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 342. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 618. 2009. *Gendarussa wynaadensis* Nees, Pl. Asiat. Rar. 3: 105. 1832. *Adhatoda wynaadensis* (Nees) Nees in DC. Prodr. 11: 406. 1847.

Subshrubs, stem terete, smooth. Leaves opposite, 14-18 x 4-6 cm, lanceolate, acuminate at both ends, glabrous, lateral nerves 7 pairs; petiole 1-3.5 cm long. Spike 10 cm long, axillary and terminal, slender; rachis pubescent, sometimes branched. Flowers in distant pairs; bracts 3 x 1 mm, hairy. Calyx lobes 4 mm long, linear-lanceolate, glandular hairy. Corolla 12 mm long, throat hairy, rose coloured; upper lip 5 mm long, oblong, obtuse, slightly notched; lower 3-lobed. Ovary glabrous in the upper half. Capsule 15 mm long, pubescent; seeds 4, obovoid, oblique, minutely rugulose, dark brown.

Paripode, KJD 25500

Fl. & Fr.: November-March

Distribution: Fairly common in semi-evergreen forests of Paripode. Endemic to Western Ghats.

LEPIDAGATHIS Willd.

Sp. Pl. 3(1): 400. 1800.

- 1a. Root stock woody; calyx villous *L. keralensis*
- 1b. Root stock not woody; calyx apex glandular hairy *L. incurva*

Lepidagathis incurva Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 119. 1825; Manilal & Sivar., Fl. Calicut 223. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist.

343. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 619. 2009. *Lepidagathis hyalina* Nees, Pl. Asiat. Rar. 3: 95. 1832; Hook.f., Fl. Brit. India 4: 521. 1884; Gamble, Fl. Madras 1068(748). 1924.

Prostrate herbs, stem angular, strigose. Leaves 6-8 x 3 cm, ovate, apex acute, base cuneate, hispid, nerves to 7 pairs. Spikes terminal and axillary, clustered; bracts and bracteoles similar, 3.5 x 2 mm, lanceolate, ciliate, hyaline. Flowers densely packed. Sepals 5, 5 mm long, linear-lanceolate, ciliate, glandular-hairy at apex. Corolla 6 mm long, bilabiate, tube short, slender, upper lip entire, lower lip 3-lobed, hairy outside. Stamens 4, didynamous, anthers softly hairy. Ovary ovoid, thinly hairy, style curved, stigma capitate. Capsule 4 mm long, ellipsoid, hairy at apex; seeds 4, compressed, rugose, brown.

Paripode, KVB 31699

Fl. & Fr.: February-April

Distribution: Fairly common in semi-evergreen forests of Paripode and plantations of Kariyenkappu.

Lepidagathis keralensis Madhu. & Singh, Kew Bull. 47: 301. 1992 (Plate 15e).

Perennial, prostrate, much branched herbs with woody rootstock. Leaves opposite, 10 mm x 3 mm, narrowly oblong-lanceolate, acute or blunt-acuminate at apex, dark green with purple margins, rigid, plicate. Spikes 1-3, terminal, procumbent, 2 cm long. Flowers sessile, ca 1 cm long; sterile bracts many (5-8). Calyx villous, deeply 5-lobed, lobes unequal, persistent. Corolla 10 mm long, densely hairy in bud, tube cylindric below, suddenly expanded, 2-lipped, upper lip 2-lobed, erect or reflexed, pink, lower lip 3-lobed, pink with white to yellow palate. Stamens 4, didynamous, up to 6 mm long, sparsely hairy. Ovary compressed ovoid, 2-celled with one ovule in each; style slender, hairy at lower ventral region with glands; stigma capitate, slightly bifid. Fruit a compressed capsule, 6 mm long, glabrous; seeds 2, flat, softly hairy with white aril.

Near Uruppukunnu, KVB 31479

Fl. & Fr.: December-April

Distribution: Lateritic areas near semi-evergreen forests at Uruppukunnu. Endemic to South India (Kerala).

PHAULOPSIS Willd.

Sp. Pl. 3(1): 4, 342. 1800.

Phaulopsis imbricata (Forssk.) Sweet., Hort. Brit. (ed. 1) 327. 1827; Manilal & Sivar., Fl. Calicut 222. 1982; Ansari, Fl. Kasaragod Div. 287. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 347. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 704.

2009. *Ruellia imbricata* Forssk., Fl. Aeg.-Arab. 113. 1775. *Ruellia dorsiflora* Retz., Observ. Bot. 6:31.1791. *Micranthus oppositifolius* Wendl., Bot. Beobacht 39. 1798; Gamble, Fl. Madras 1022(718). 1924. *Phaulopsis dorsiflora* (Retz.) Santapau, Kew Bull. 1948: 276. 1948.

Diffuse herbs, branches glandular hairy. Leaves in unequal pairs, 3-5 x 2 cm, elliptic, acuminate at both ends, nerves 4 pairs; petiole 2.5 cm long. Spikes axillary, 2 x 1 cm, 1-sided; bracts paired, 6 x 7 mm, orbicular, hairy and long ciliate along the margins; bracteoles absent. Flowers small, scarcely seen above the bracts. Calyx lobes 5, unequal. Corolla 8 mm long, bilabiate, tube slender, lobes obtuse, white with pink spots. Stamens 4, filaments united into an adnated sheath below. Capsule 3 mm long, glabrous; seeds 4, compressed.

Paripode, KJD 26275

Fl. & Fr.: November-March

Distribution: Common in Plantations.

PSEUDERANTHEMUM Radlk. ex Lindau

Nat. Pflanzenfam. 4(3b): 330. 1895.

Pseuderanthemum malabaricum (C.B.Clarke) Gamble, Fl. Madras 1064(745). 1924; Manilal & Sivar., Fl. Calicut 217. 1982; Ansari, Fl. Kasaragod Div. 288. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 348. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 622. 2009. *Eranthemum malabaricum* C.B.Clarke in Hook.f., Fl. Brit. India 4: 497. 1884.

Subshrubs, stem terete, white, smooth. Leaves opposite, 7-10 x 4 cm, elliptic, acuminate at both ends, glabrous, glaucous below, nerves 5 pairs; petiole to 2 cm long. Spike 3-8 cm long, terminal, slender; bracts and bracteoles similar, 3 mm long, linear. Flowers in interrupted clusters of 1-3, on long slender interrupted to 23 cm long spikes. Calyx 6 mm long, lobes united at base, acuminate. Corolla white with pink or purple dots on the larger lobe; tube 30 mm long, slender; lobes 10 mm long, obovate, subequal. Stamens 2, free, anthers oblong; stigma bilobed. Capsule 18 x 5 mm, clavate, basal portion solid; seeds 5 x 3 mm, compressed, reticulate.

Paripode, KJD 26292

Fl. & Fr.: December-March

Distribution: Rare in semi-evergreen forests of Paripode.

RHINACANTHUS Nees

Pl. Asiat. Rar. 3: 76, 108. 1832.

Rhinacanthus nasutus (L.) Kurz, J. Asiat. Soc. Bengal 39: 79. 1870; Manilal & Sivar., Fl. Calicut 215. 1982; Ansari, Fl. Kasaragod Div. 288. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 348. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 622.

2009. *Justicia nasuta* L., Sp. Pl. 16. 1753. *Rhinacanthus communis* Nees, Pl. Asiat. Rar. 3: 109. 1832; Hook.f., Fl. Brit. India 4: 541. 1885; Gamble, Fl. Madras 1083(758). 1924.

Erect shrubs, stem terete, tomentose. Leaves opposite, 8-12 x 4-8 cm, elliptic, acute at both ends, crenulate, minutely pubescent; nerves 7-10 pairs. Flowers in terminal, paniced cymes; bracts and bracteoles similar, 2 mm long, hispid. Calyx lobes 5, 5 mm long, linear-lanceolate, hispid. Corolla white, tube 25 mm long, slender, hispid; upper lip entire, oblong, acuminate; lower lip broad, 3-lobed, obtuse. Stamens 2, inserted near the throat of the tube, equal; one anther lobe lower than other, glabrous. Ovary cell 2-ovuled, style slender. Capsule 2 cm long, clavate, with a lower solid slender stalk, glabrous; seeds 1 or 2 in each cell, rugose.

Paripode, *KJD 26298*

Fl. & Fr.: November-February

Distribution: Common in plantations.

RUNGIA Nees

Pl. Asiat. Rar. 3: 77, 109. 1832.

Rungia pectinata (L.) Nees in DC. Prodr. 11: 469. 1847; Manilal & Sivar., Fl. Calicut 216. 1982; Ansari, Fl. Kasaragod Div. 289. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 350. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 624. 2009. *Justicia pectinata* L., Amoen. Acad. 4: 299. 1759. *Rungia parviflora* (Retz.) Nees var. *pectinata* (L.) C.B. Clarke in Hook.f., Fl. Brit. India 4: 550. 1885; Gamble, Fl. Madras 1071(750). 1924.

Herbs, stem hairy. Leaves 4-6 x 2 cm, ovate to linear-oblong or obovate. Spikes 2 x 0.7 cm, 2-5 together, axillary, sessile; sterile bracts 4 x 2 mm, elliptic, narrowly winged on one side; fertile bracts 3 x 2 mm, obovate, broadly winged on either side, emarginate, pubescent; bracteoles similar to bracts. Flowers small, densely packed. Sepals linear, acuminate, hyaline, hairy. Corolla 4 mm long, upper lip entire, white. Stamens 2, filaments glabrous; cells of the lower anther with a white appendage. Capsule 2.5 mm long, glabrous; seeds orbicular, rugose, brown.

Paripode, *KVB 31773*

Fl. & Fr.: November-February

Distribution: Fairly common in Plantations.

STROBILANTHES Blume

Bijdr. Fl. Ned. Ind. 781, 796. 1826.

- 1a. Fertile stamens 2, free *S. cuspidatus*
- 1b. Fertile stamens 4, united into sheath, adnate to the corolla..... 2

2a.	Staminal sheath hairy or ciliate	3
2b.	Staminal sheath glabrous	<i>S. tristis</i>
3a.	Bracts and bracteoles glabrous in flowers	4
3b.	Bracts and bracteoles glandular hairy in flowers	7
4a.	Bracts decurrent along with axis.....	<i>S. decurrens</i>
4b.	Bracts not decurrent	5
5a.	Spikes solitary.....	<i>S. ciliates</i>
5b.	Spikes 2-5 together	6
6a.	Seeds winged; bracteoles glabrous in fruit	<i>S. heyneanus</i>
6b.	Seeds not winged; bracteoles hairy in fruit.....	<i>S. barbatus</i>
7a.	Spikes numerous, paniced	<i>S. rubicundus</i>
7b.	Spikes not paniced	8
8a.	Bracteoles linear.....	11
8b.	Bracteoles broad	9
9a.	Leaf sessile or subsessile.....	<i>S. sessilis</i>
9b.	Leaf petiolate	10
10a.	Spike solitary	<i>S. ixiocephalus</i>
10b.	Spikes 2 or 3 together	<i>S. lupulinus</i>
11a.	Margin of leaves ciliate hairy	<i>S. caudatus</i>
11b.	Margin of leaves glabrous.....	<i>S. aurita</i>

Strobilanthes aurita Wood, Kew Bull. 50: 12. 1994; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 64. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 628. 2009. *Strobilanthes caudatus* sensu Beed., Icon. Pl. Ind. Or. t. 213. 1868-1874, non Anders. 1860; Hook.f., Fl. Brit. India 4: 441. 1884; Gamble, Fl. Madras 1040(729). 1924. *Mackenzia caudata* (Anders.) Ramamoorthy in Saldanha & Nicolson, Fl. Hassan Dist. 553. 1976; Ramach. & V.J. Nair, Fl. Cannanore Dist. 343. 1988 (Plate 15f).

Subshrubs; branches terete, glabrous. Leaves opposite, 8-12 x 2-3 cm, elliptic, caudate acuminate, glabrous, margins entire; lateral nerves 8 pairs. Spikes 1.5 x 2 cm, axillary, solitary or 2-3 together, peduncled; peduncle to 3 cm long; involucre bracts smaller than floral bracts, linear; floral bracts 20 x 2 mm, linear, obtuse, glandular-hairy; bracteoles 3, linear; flowers few. Calyx 7 mm long, lobes linear-oblong, hairy. Corolla 22 mm long, blue, tube narrow at base, with two patches of hairs at throat. Staminal sheath hairy.

Paripode, KVB 31673

Fl. & Fr.: September-December

Distribution: Common in evergreen forests of Moonamthode, Kattikari, Chavachi, Chelachode and Meenmutty also in semi-evergreen forests of Paripode. Endemic to Western Ghats; Conservation status: Vulnerable.

Strobilanthes barbatus Nees, Pl. Asiat. Rar. 3: 85. 1832; Hook.f., Fl. Brit. India 4: 437. 1884; Gamble, Fl. Madras 1037(727). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 66. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 629. 2009. *Nilgirianthus barbatus* (Nees) Bremek., Mat. Monogr. Strob. 172. 1944. *Strobilanthes barbatus* Nees var. *bonaccordensis* Santhosh & Raj Vikraman, J. Econ. Taxon. Bot. 25: 742. 2001 (Plate 15g).

Gregarious shrubs. Leaves opposite in unequal pairs, ca 15 x 8 cm, elliptic-lanceolate, acute at apex, decurrent at base; lateral nerves 7-12 pairs, raised beneath; petioles winged. Inflorescences spikes, ca 5 cm long, 2-4-fascicled heads interrupted at base; bract orbicular; bracteoles ovate-lanceolate, ciliate. Calyx ca 1.2 cm long; lobes subequal, linear-lanceolate, minutely ciliate or not. Corolla tubular-campanulate, ca 2.5 cm long, glabrous outside, hairy inside, white; tubular base slightly shorter than upper campanulate portion; limb nearly erect; lobes 5, ovate-acute, ca 6 mm long, ciliate. Stamens 4, included or slightly exerted, didynamous, united; staminal sheath extending beyond the cylinder base. Ovary glandular-hairy above; ovules 2 in each locule; style slender. Capsules elliptic, ca 1.2 cm long, 2-seeded.

Meenmutty, *KVB 31284*

Fl. & Fr.: September-December

Distribution: Common in evergreen forests of Meenmutty, Monamthode, Kattikari and Chavachi. Endemic to Western Ghats.

Strobilanthes caudatus Anders., Enum. Pl. Zeyl. 228 1860 (Plate 15h).

Subshrubs; branches terete, glabrous. Leaves simple, opposite, 8-12 x 2-3 cm, elliptic, caudate acuminate, glabrous, margins entire; lateral nerves 8 pairs. Spikes 1.5 x 2 cm, axillary, solitary or 2-3 together, peduncled; peduncle to 3 cm long; involucre bracts smaller than floral bracts, linear; floral bracts 20 x 2 mm, linear, obtuse, glandular-hairy; bracteoles 3, linear; flowers few. Calyx 7 mm long, lobes linear-oblong, hairy. Corolla 22 mm long, blue, tube narrow at base, with two patches of hairs at throat. Staminal sheath hairy.

Amballapara, *KJD 26901*

Fl. & Fr.: January-March

Distribution: Common in evergreen forests of Amballapara and Pothurumi region.

Note: Thesis species confined to Sri Lanka collection from the Sanctuary is new distribution record for India.

Strobilanthes ciliatus Nees, Pl. Asiat. Rar. 3: 85. 1832; Hook.f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Madras 1039(728). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, *Strobilanthes* 82. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 629. 2009. *Nilgiranthus ciliatus* (Nees) Bremek., Verh. Acad. Wet. afd. Natuurk. Sect 2, 41: 172. 1944; Ansari, Fl. Kasaragod Div. 285. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 345. 1988. *Strobilanthes warreensis* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 341. 1850; Hook.f., Fl. Brit. India 4: 439. 1884; Gamble, Fl. Madras 1039(728). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, *Strobilanthes* 193. 2006. *Nilgiranthus warreensis* (Dalzell) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286. 1985.

Shrubs, branches terete, glabrous. Leaves opposite, 10-15 x 3-5 cm, acuminate at both ends, glabrous, nerves 5 pairs, raised above, scabrid; petiole 2 cm long. Spikes 1.5 cm long, axillary, solitary, peduncled; bracts 6 x 4 mm, obovate; bracteoles 5 x 1 mm, linear-oblong; flowers 5-15. Calyx 5 mm long, lobes oblong, connate below the middle. Corolla 15 mm long, white with violet or blue patches on lower lobes. Staminal sheath hairy.

Paripode, KJD 25471

Fl. & Fr.: December-May

Distribution: Common in semi-evergreen forests of Paripode. Endemic to southern Western Ghats.

Strobilanthes cuspidatus (Benth.) Anders., J. Linn. Soc. Bot. 9: 465. 1867; Hook.f., Fl. Brit. India 4: 435. 1884; Gamble, Fl. Madras 1036(726). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, *Strobilanthes* 89. 2006. *Endopogon cuspidatus* Benth., Linnaea 24: 646. 1851. *Endopogon versicolor* Wight, Icon. Pl. Ind. Orient. t. 1497. 1849. *Phlebophyllum versicolor* (Wight) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41:170.1944.

Large shrubs; stems terete; branchlets adpressed-white woolly. Leaves to 15 x 6 cm, ovate, acuminate, entire, base acute, glabrous; lateral nerves 7-10 pairs. Spikes 3-5 cm long, interrupted, on trichotomously branched peduncle; bracts 2-4, 2 x 0.5 cm, lanceolate, glandular-hairy. Flowers few. Calyx 7 mm long, lobes

subulate, glandular-hairy. Corolla 25 mm long, blue. Stamens 2, staminal filaments sparsely hairy; anthers 2mm. Ovary on a disk, ca.3 mm long; style hairy at base. Capsule 16 mm long, stalked, glabrous; seeds 4, orbicular, hairy.

Kannadivechakunnu, *KJD 26323*

Fl. & Fr.: October- December

Distribution: Common in evergreen forests of Kannadivechakunnu, Meenmutty and Pothanplavu. Endemic to southern Western Ghats.

Strobilanthes decurrens Nees in DC. Prodr. 11:189.1847; Hook.f., Fl. Brit. India 4:440.1884; Gamble, Fl. Madras 1040(729). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 93. 2006. *Goldfussia decurrens* (Nees) Wight, Icon. Pl. Ind. Orient. t. 1522. 1851. *Nilgirianthus decurrens* (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41: 173. 1944.

Subshrubs, branches obtusely quadrangular, glabrous. Leaves opposite, 15-17 x 5-7 cm, elliptic, shortly acuminate, decurrent at the base, glabrous; petiole 2-3 cm long. Spikes 4-8 x 2 cm, oblong, solitary, axillary; peduncle deflexed, with small basal bracts in the middle; bracts 2 x 1 cm, ovate, acute, decurrent along the axis; bracteoles minute; flowers few to many. Calyx 10 mm long; lobes acuminate, glabrous. Corolla 20 mm long, glabrous, white. Staminal filaments hairy. Capsule 14 x 8 mm, glabrous; seeds 8 x 5 mm, one in each chamber, flat, yellowish, glabrous.

Kattikari, *KJD 26081*

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Kattikari. Endemic to southern Western Ghats.

Strobilanthes heyneanus Nees, Pl. Asiat. Rar. 3: 85. 1832; Hook.f., Fl. Brit. India 4: 443. 1884; Gamble, Fl. Madras 1041(730). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 109. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 630. 2009. *Nilgirianthus heyneanus* (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286. 1985. *Nilgirianthus heyneanus* (Nees) Bremek. var. *neesii* Bremek., Mat. Monogr. Strob. 173. 1944; Ramach. & V.J. Nair, Fl. Cannanore Dist. 345. 1988. *Strobilanthes asperrimus* Nees in DC. Prodr. 11: 183. 1847; Hook.f., Fl. Brit. India 4: 443; 1884; Gamble, Fl. Madras 1041(730). 1924; Ratheesh, Fl. Stud. Wayanad Dist. 628. 2009.

Shrubs, branches hirsute. Leaves opposite, 6-10 x 4-7 cm, broadly elliptic, apex bluntly acuminate, base attenuate, crenate, covered with bulbous based

hairs; lateral nerves 8-9 pairs; petiole 3-4.5 cm long. Spikes 3-4 together, 2 x 1.5 cm, axillary, on trichotomous peduncles, ovoid; involucre bracts 8 x 6 mm, broadly ovate, obtuse; floral bracts 13 x 10 mm, ovate, concave, obtuse, glabrous; bracteoles absent; flowers few to many. Calyx divided nearly to the base, lobes 6 x 2.5 mm, oblong, emarginated. Corolla pale blue, 25 mm long; tube stout, with a patch of hairs inside above the stamens. Staminal filaments and sheath hairy. Ovary glabrous; style bulged below the stigma, hairy. Capsule 9 x 4 mm, glabrous; seeds 4, ovoid flattened, 3 mm long.

Pothurumi, *KVB 31629*; Chelachode, *KVB 31297*

Fl. & Fr.: October-December

Distribution: Common in evergreen forests of Moonamthode to Kattikari and Chelachode to Pothurumi.

Strobilanthes ixiocephalus Benth., *Flora* 33: 557. 1849; Hook.f., *Fl. Brit. India* 4: 444. 1884; Gamble, *Fl. Madras* 1041 (730). 1924; Venu in Daniel & Sanjappa (eds.), *Fl. India ser. 4, Strobilanthes* 123. 2006. *Strobilanthes neesiana* Wight, *Icon. Pl. Ind. Orient. t.* 1523. 1850. *Thelepaepale ixiocephala* (Benth.) Bremek., *Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2*, 41: 188. 1944.

Semierect shrubs. Leaves opposite, unequal, to 12 x 5 cm, elliptic-lanceolate, acuminate at apex, attenuate or cuneate at base, crenate at margin; lateral nerves 6-12 pairs, parallel; petioles ca 4 cm long, hairy. Inflorescence short spikes, ovoid, solitary or axillary or terminally clustered, branched cymes; bracts ovate; bracteoles linear-obovate, glandular-hairy. Calyx divided to the base, ca 1 cm long; lobes linear, equal, glandular-hairy. Corolla tubular-ventricose, ca 2 cm long, pubescent outside, hairy inside, pale blue or white; tubular portion short, ca 3 mm long; lobes obovate-oblong. Stamens 4, monadelphous, included; staminal sheath truncate, hairy. Ovary on a prominent disk; style glabrous; stigma slightly bulged above. Capsules obovoid, ca 1.2 cm long, narrowed at base, compressed; seeds 2, ovoid, flattened.

Mullenpara, *NS & KJD 31928*

Fl. & Fr.: November-January

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Strobilanthes lupulinus Nees, *Pl. Asiat. Rar.* 3: 85. 1832; Hook.f., *Fl. Brit. India* 4: 443. 1884; Gamble, *Fl. Madras* 1041(730). 1924; Venu in Daniel & Sanjappa (eds.), *Fl. India ser. 4, Strobilanthes* 138. 2006; Ratheesh, *Fl. Stud. Wayanad*

Dist. 630. 2009. *Nilgirianthus lupulinus* (Nees) Bremek., Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Sect. 2, 41: 173. 1944; Ansari, Fl. Kasaragod Div. 286.1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 345.1988.

Shrubs, branchlets glabrous. Leaves opposite, 8-13 x 6 cm, elliptic, apex acuminate, base attenuate, glabrous. Spikes 2 x 1.5 cm, axillary, 2-3 together on trichotomous peduncle, ovoid or globose; bracts 14 x 11 mm, orbicular or obovate, concave, glabrous; flowers 4-10 in each spike. Calyx divided to the middle, lobes 6 x 2 mm, glabrous. Corolla 2-2.5 cm long, white, hairy inside, tube very narrow at the base. Staminal sheath ciliate. Ovary glabrous; style glabrous or not. Capsule 10 x 5 mm, glabrous; seeds 3 mm, biconvex, hairy along the margins.

Kattikari, KJD 26015

Fl. & Fr.: October-December

Distribution: Fairly common in evergreen forests of Kannadivechakuunu and Kattikari. Endemic to Peninsular India.

Strobilanthes rubicundus (Nees) Anders., J. Linn. Soc. Bot. 9: 483. 1867; Hook.f., Fl. Brit. India 4: 475. 1885; Gamble, Fl. Madras 1044(732). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 169. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 632. 2009. *Leptacanthus rubicundus* Nees, Pl. Asiat. Rar. 3: 90. 1832; Manilal, Fl. Silent Valley 207. 1988. *Strobilanthes paniculatus* sensu Bedd., Icon. Pl. Ind. Or. t. 199. 1868-1874, non Anders., 1867.

Shrubs; branchlets terete, glabrous. Leaves 8-10 x 2-4 cm, elliptic, caudate at apex, attenuate at base, glabrous. Panicles terminal, densely hairy; basal bracts paired, 5-7 mm long, lanceolate, deflexed. Flowers many, distant. Calyx 7 mm long, lobes linear, glandular-hairy. Corolla 2 cm long, glabrous, pale pink, lobes with purple streaks. Capsule 17 mm long, linear, glabrous; seeds 2.5 x 2 mm, brown.

Ambalappara, KJD 31887

Fl. & Fr.: October-March

Distribution: Fairly common in the evergreen forests of Ambalappara to Pothurumi, Kattikari. Endemic to Western Ghats.

Strobilanthes sessilis Nees, Pl. Asiat. Rar. 3: 185. 1832; Hook.f., Fl. Brit. India 4: 452. 1884; Gamble, Fl. Madras 1042(731). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 178. 2006; Ratheesh, Fl. Stud. Wayanad Dist. 632. 2009. *Pleocaulus sessilis* (Nees) Bremek., Verh. Acad. Wet. afd.

Natuurk. Sect 2, 41: 185. 1944; Mohanan, Fl. Quilon Dist. 308 307; Ramach. & V.J. Nair, Fl. Cannanore Dist. 348. 1988 (Plate 15i).

Sparingly branched subshrubs; stems terete, strigose. Leaves opposite, 2-5 x 3 cm, ovate, acute, sessile, serrate, densely strigose, base cordate; nerves 6 pairs. Spikes 3-5 cm long, cylindrical, axillary and terminal; bracts 10 x 7 mm, acuminate, densely hairy; flowers many, densely arranged. Calyx 9 x 2 mm, divided nearly to the base, lobes subequal, lanceolate, hairy. Corolla 30 mm long, blue, hairy; lobes ovate. Stamens included, longer filaments hairy towards apex, shorter with few hairs at the base. Style hairy. Capsule 7-8 mm long, linear-oblong; seeds 2 mm across, suborbicular, brown.

Ambalappara, KVB 31752, 31784

Fl. & Fr.: November-December

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Western Ghats.

Strobilanthes tristis (Wight) Anders., J. Linn. Soc. Bot. 9: 470. 1867; Hook.f., Fl. Brit. India 4: 441. 1885; Gamble, Fl. Madras 1040(729). 1924; Venu in Daniel & Sanjappa (eds.), Fl. India ser. 4, Strobilanthes 182. 2006. *Goldfussia tristis* Wight, Icon. Pl. Ind. Orient. t. 1508. 1850.

Shrubs, branchlets glabrous. Leaves opposite, 15-25 x 4-10 cm, acuminate at both ends, glabrous; petiole 4-8 cm long. Spikes 2.5-4 cm long, lanceolate, acuminate, 1-2-flowered, deflexed, in axillary clusters, glabrous; bracts 2.5 x 0.5 cm, lanceolate, acuminate, crenate, ciliate along the margins. Sepals 17 x 2.5 mm, lanceolate, acuminate, hairy. Corolla ca 3 cm long, tube narrowed to the base, glabrous, white. Staminal sheath glabrous. Capsule 11 x 3 mm; seeds orbicular.

Kattikari, 31885

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Kattikari. Endemic to Southern Western Ghats.

THUNBERGIA Retz.

Physiogr. Salsk. Handl. 1(3): 163. 1780, *nom. cons.*

Thunbergia mysorensis (Wight) Anders., J. Linn. Soc. Bot. 9: 448. 1967; Hook.f., Fl. Brit. India 4: 393. 1884; Gamble, Fl. Madras 1008(708). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 352. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 635. 2009. *Hexacentris mysorensis* Wight, Icon. Pl. Ind. Orient. t. 871. 1844.

Climbers. Leaves 10-14 x 4-8 cm, ovate-lanceolate or oblong, apex acute to acuminate, base truncate or hastate, scabrid, coarsely nerved, dentate; petiole 1-5 cm long. Racemes axillary, to 50 cm long, drooping; flowers many; bracteoles 15-25 x 5-12 mm, ovate-oblong-lanceolate, pedicels 2-3 cm long, opposite. Calyx obscure. Corolla yellow, to 4 cm long, 6 cm across, tube ventricose, lobes obovate, glabrous. Filaments ciliate, anthers spurred. Capsule 3 cm long.

Pothurumi, *KVB 31614*

Fl. & Fr.: December-March

Distribution: Fairly common in evergreen forests of Moonamthode, Chavachi and Pothurumi.

BIGNONIACEAE

- 1a. Leaves bi or tri pinnate..... Oroxyllum
- 1b. Leaves pinnate 2
- 2a. Capsule tetragonus; flowers 1.5 cm across Stereospermum
- 2b. Capsule compressed, winged; flowers 5 cm across..... Pajanelia

OROXYLLUM Vent.

Dec. Gen. Nov. 8. 1808.

Oroxyllum indicum (L.) Benth. ex Kurz, For. Fl. Burma 2: 238. 1877; Hook.f., Fl. Brit. India 4: 378. 1884; Gamble, Fl. Madras 994(698). 1924; Manilal & Sivar., Fl. Calicut 210. 1982; Ansari, Fl. Kasaragod Div. 269. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 327. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 600. 2009. *Bignonia indica* L., Sp. Pl. 625. 1753.

Medium sized trees, to 12 m high; bark brownish-grey. Leaves compound, 2-3 pinnate, pinnae 5-9; imparipinnate; leaflets 3-5 in each pinnae, opposite, 7.5-15 x 4-9 cm, ovate, apex acuminate, base cordate, oblique or truncate; lateral nerves, 4-6 pairs, pinnate; intercostae reticulate; rachis 60-100 cm. Flowers in lax terminal racemes, reddish-purple outside, pinkish-yellow within, racemes to 30-50 cm long. Calyx 2.5 cm long, campanulate, coriaceous, glabrous, limb truncate or obscurely toothed. Corolla ca 10 cm long, fleshy, campanulate, 5-lobed, lobes 3 cm long. Stamens 5, perfect, filaments inserted below the base of the tube, filaments hairy at base. Ovary subsessile, contracted at the base; ovule many; style slender; stigma 2-lobed. Fruit a capsule, 40-75 x 5-8 cm, 2 valved; seeds thin, papery, 5-6 cm long, winged all around.

Kariyenkappu, *KJD 31832*

Fl. & Fr.: July-December

Distribution: Rare in Plantations.

PAJANELIA DC.

Biblioth. Universelle Genève 17: 130. 1838.

Pajanelia longifolia (Willd.) K.Schum. in Engl. & Prantl, Naturl. Pflanzenfam. 4(3b): 244. 1895; Manilal & Sivar., Fl. Calicut 210. 1982; Ansari, Fl. Kasaragod Div. 270. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 327. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 600. 2009. *Bignonia longifolia* Willd., Sp. Pl. 3: 306. 1800. *Pajanelia rheedei* Wight, Icon. Pl. Ind. Orient. t. 1343,1344. 1848; Hook.f., Fl. Brit. India 4: 384. 1884; Gamble, Fl. Madras 1000(702). 1924.

Deciduous trees, to 20 m high; bark grey. Leaves compound, imparipinnate, leaflets 7-17, opposite, 17-25 x 7-12 cm, ovate, apex acuminate, base oblique; lateral nerves 6-10 pairs, pinnate; intercostae reticulate; rachis to 100 cm; petiolule 3-7 mm, channelled above. Flowers crimson-purple, white within, in large terminal racemose panicles. Calyx 4.5 cm long, campanulate, lobes 5, rusty tomentose. Corolla 9 x 8 cm, tube 6-8 cm long, base narrow, broadly ventricose, lobes 5, subequal. Stamens 4, free, didyynamous with a rudimentary fifth, filaments arching. Ovary 0.5-1 cm long, 2-celled, oblong; ovules many; style 6 cm long; stigma 2 lobed. Fruit a capsule, 2 valved, 30-45 x 5-7.5 cm, brown, winged on both margins; seeds papery, winged.

Kariyenkappu, KVB 31578

Fl. & Fr.: January-June

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi.

STEREOSPERMUM Cham.

Linnaea 7: 720. 1833.

Stereospermum colais (Buch.-Ham. ex Dillw.) Mabb., Taxon 27: 553. 1979; Ansari, Fl. Kasaragod Div. 270. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 327. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 602. 2009. *Bignonia colais* Buch.-Ham. ex Dillw., Rev. Hort. Malab. 28. 1839. *Stereospermum tetragonum* DC., Prodr. 9: 210. 1845; Gamble, Fl. Madras 998(701). 1924. *Stereospermum chelonoides* sensu Wight, Icon. Pl. Ind. Orient. t. 1341. 1845, non (L.f.) DC.1838; Hook.f., Fl. Brit. India 4: 383. 1884.

Large trees, to 30 m high; bark pale greyish-brown. Leaves imparipinnate, opposite, leaflets 7-13, opposite, 4.5-13 x 2-4.5 cm, elliptic-lanceolate, elliptic-oblong, ovate or obovate, apex acuminate or caudate acuminate, base oblique, acute or obtuse; lateral nerves 6-10 pairs, pinnate, puberulent beneath; intercostae reticulate; rachis 10-21 cm long; petiolule 7-12 mm, grooved above.

Flowers in terminal lax panicles. Calyx 6 mm long, campanulate, shallowly lobed, lobes 3-5, dorsal lobe much larger than the others, puberulent. Corolla 2 x 1.5 cm across, yellow with red streaks, infundibuliform, pubescent inside, base glandular hairy, lobes 5, subequal, crisped. Stamens 4, didymous, divaricate; filaments unequal, staminodes present. Ovary sessile, oblong, 2-celled, many ovuled; style slender; stigma 2. Fruit a capsule, to 35 x 0.7 cm, subtetragonous; seeds 8 mm long, wings obtuse at both ends.

Chavachi, NS & KVB 31319

Fl. & Fr.: February-October

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi.

GESNERIACEAE

- | | | |
|-----|---|----------------|
| 1a. | Perfect stamens 4..... | 2 |
| 1b. | Perfect stamens 2..... | 5 |
| 2a. | Epiphytic subshrubs; seeds tipped with hairs..... | Aeschynanthus |
| 2b. | Terrestrial herbs; seeds without hairs..... | 3 |
| 3a. | Leaves equal at base; flowers white or pale yellow..... | 4 |
| 3b. | Leaves unequal at base; flowers blue..... | Rhynchoglossum |
| 4a. | Scapigerous plants, fruit a loculicidal capsule..... | Jerdonia |
| 4b. | Erect plants, fruit a berry..... | Rhynchotechum |
| 5a. | Fruit loculicidal; leaves radicle..... | Henckelia |
| 5b. | Fruit circumscissile; leaves cauline..... | Epithema |

AESCHYNANTHUS Jack

Trans. Linn. Soc. London 14: 42. 1823, *nom. cons.*

Aeschynanthus perrottetii DC., Prodr. 9: 261. 1845; C.B. Clarke in Hook.f., Fl. Brit. India 4: 339. 1884; Gamble, Fl. Madras. 985(692). 1924; Subram. & Henry, Bull. Bot. Surv. India 12:1. 1970; Manilal, Fl. Silent Valley 199. 1988; V. S. Ramach. & Nair, Fl. Cannanore 325. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 555. 2009 (Plate 15j).

Epiphytic scandent subshrubs; stem glabrous. Leaves opposite, 6-8 x 1.2-1.5 cm, elliptic, succulent, acute, rounded or acute at base. pale below; petiole ca 5 mm long; lateral nerves obscure. Flowers axillary, solitary or paired; pedicels 1-1.3 cm long. Sepals, 4-5 mm long, linear-lanceolate. Corolla scarlet, lobes streaked with white, 3.5-5 cm long, tubular, curved, widening above, oblique at mouth, lobes 5, subequal, ovate, obtuse, glandular-ciliate. Stamens 4, all perfect;

filaments 2-2.5 cm long, free, inserted at the middle of the corolla tube; upper stamens with smaller anthers, confluent in pairs. Ovary long-stipitate; linear, 1-celled, ovules many; style slender, stigma terminal. Capsule to 15-20 cm long, linear; seeds linear, many.

Ambalappara, *KJD 25490*

Flowering & Fruiting: November-January.

Distribution: Occasional in evergreen forests of Ambalappara.

EPITHEMA Blume

Bijdr. Fl. Ned. Ind. 737. 1826.

Epithema carnosum (G. Don) Benth. var. **hispida** C.B. Clarke in A. & C. DC., Monogr. Phan. 5: 178. 1883 & Hook. f., Fl. Brit. India 4: 369. 1884; Gamble, Fl. Madras 992(697). 1924; Ansari, Fl. Kasaragod Div. 267. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 325. 1988 (Plate 15k).

Erect herbs; stems succulent, pilose. Leaves opposite and alternate, 7-14 x 6-10 cm, ovate, obtuse at apex, rounded or cordate at base, upper ones sessile, hairy above and below; nerves 6-8 pairs. Flowers small, in terminal or axillary scorpioid cymes; pedicels 6 mm long, hairy. Calyx 5 mm long, campanulate, lobes 5, acuminate, united above the middle. Corolla 7 mm long, 2-lipped, lobes 5, subequal, white. Stamens 2, free; staminodes 3 or 4. Ovary ovoid, 1-celled, ovules many, placenta parietal, not intruded; style 1, stigma minute. Capsule 5 x 3 mm, ovoid, circumscissile; seeds brown, twisted, ridged.

Crossway, *NS & KJD 31922*

Fl. & Fr.: July-October

Distribution: Fairly common in evergreen forests of Moonamthode, Crossway and Chelachode; semi-evergreen forests of Paripode. Endemic to Peninsular India.

HENCKELIA Spreng.

Anleit. ii. 402. 1817.

Henckelia fischeri (Gamble) A. Weber & B.L. Burtt, Beitr. Biol. Pflanzen 70: 344. 1997-1998. *Didymocarpus fischeri* Gamble, Bull. Misc. Inform. Kew 1923: 117. 1923 & Fl. Madras 989(695). 1924 (Plate 15l).

Scapigerous herbs. Leaves 6-12 x 5-8 cm, broadly elliptic, acute, irregularly crenate; lateral nerves 5 or 6 pairs, prominently reticulate, densely bullate above with cluster of hairs, pubescent below, attenuate to the base; petiole 1-6 cm long, 7 mm broad; younger leaves sessile. Cymes dichotomous, glandular hairy, 8 cm across; pedicels ca. 13 mm long. Flowers several. Sepals 3 x 1 mm, oblong,

obtuse, basely united. Corolla blue, 15 mm long, curved, lobes orbicular, 7 mm across, glandular-hairy outside. Staminodes 2, linear, curved. Ovary glandular hairy; stigma spoon-shaped, papillose..

Ambalappara, *KJD 26056*

Fl. & Fr.: June-October

Distribution: Rare in evergreen forests of Ambalappara.

JERDONIA Wight

Icon. Pl. Ind. Orient. t. 1352. 1848.

Jerdonia indica Wight, Icon. Pl. Ind. Orient. t. 1352. 1848; Hook.f., Fl. Brit. India 4: 366. 1884; Gamble, Fl. Madras 991(696). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 325.1988; Ratheesh, Fl. Stud. Wayanad Dist. 597.2009 (Plate 16a).

Erect scapigerous herbs, to 25 cm tall. Leaves crowded at the base, up to 13 x 5.5 cm, elliptic-oblong, obtuse, subcordate at base, glabrous above, rusty villous beneath. Flowers ca. 2 cm long, pale lilac with red tinge, in scapes to 14 cm long; bracts small. Calyx 5-partite, the lobes lanceolate, long-pilose. Corolla-tube elongate, swollen upwards; limb oblique, 2-lipped, upper lip emarginate, lower 3-lobed. Stamens 4 perfect; filaments dilated, the lower pair with a descending spur; anthers 2-celled, cohering at their apices. Disk cup-shaped. Ovary ovoid; style linear; stigma peltate. Fruit an ovoid, loculicidal, 2-valved villous capsule with 4 many-seeded placentae; seeds funicled, ellipsoid, grooved at the sides.

Chavachi, *NS & KJD 31924*

Fl. & Fr.: March-October

Distribution: Common in evergreen forests of Chelachode, Chavachi and Kattikari. Endemic to southern Western Ghats.

RHYNCHOGLOSSUM Blume

Bijdr. Fl. Ned. Ind. 741. 1826.

- 1a. Corolla 1-2.5 cm..... *R. notonianum*
- 1b. Corolla 0.8-1 cm..... *R. obliquum* var. *parviflorum*

Rhynchoglossum notonianum (Wall.) Burttt, Notes Roy. Bot. Gard. Edinb. 24: 170. 1962 & Rev. Handb. Fl. Ceylon 3: 99. 1981; Manilal & Sivar., Fl. Calicut 209. 1982; Ansari, Fl. Kasaragod Div. 268. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 326. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 597. 2009. *Wulfenia notoniana* Wall., Tent. Fl. Nepal. 46. 1826. *Klugia notoniana* (Wall.) DC.,



a. *Tarenna alpestris*



b. *Gymnostachyum warrieranum*



c. *Haplanthodes tentaculatus* var. *neilgherryensis*



d. *Justicia nilgherrensis*



e. *Lepidagathis keralensis*



f. *Strobilanthes aurita*



g. *Strobilanthes barbatus*



h. *Strobilanthes caudatus*



i. *Strobilanthes sessilis*



j. *Aeschynanthus perrottetii*



k. *Epithema carnosum* var. *hispida*



l. *Henckelia fischeri*

Prodr. 9: 276. 1845; Hook.f., Fl. Brit. India 4: 366. 1889; Gamble, Fl. Madras 990(696). 1924.

Fleshy glabrous herbs; stems thick. Leaves alternate and opposite, to 17 x 11 cm, ovate, acute at apex, cordate at base, inequilateral, acute on one side; nerves 17-20 pairs, regular, prominent below. Flowers in terminal racemes; bracts ovate, acute; pedicels to 5 mm long. Calyx deeply 5-lobed, to 8 mm long, lanceolate, dorsally winged, wing of one sepal larger than others. Corolla blue, 1-2.5 cm long, bilabiate, tube white, upper lip smaller, 2-lobed, lower lip broad. Stamens 4, anthers connate in pairs. Ovary 1-celled, ovules many, on 2-parietal placentae; style slender; stigma oblique. Capsule 6 x 4 mm, ovoid, loculicidal; seeds many, reticulate.

Moonamthode, *KJD 31825*

Fl. & Fr.: July-December

Distribution: Common in evergreen forests of Moonamthode, Meenmutty, Chavachi and Pottichapara also in semi-evergreen forests of Paripode.

Rhynchoglossum obliquum Blume var. **parviflorum** C.B. Clarke in A. & C. DC., Monogr. Phan 5: 162. 1883; Hook.f., Fl. Brit. India 4: 367. 1884; Gamble, Fl. Madras 990(696). 1924; Ansari, Fl. Kasaragod Div. 268. 1985.

Erect, simple or branched, somewhat flaccid, annual herbs; stems terete, shortly hairy or subglabrous. Leaves alternate and opposite, 2-15 x 1-7 cm, ovate-elliptic to oblong, acute or acuminate at apex, obliquely subcordate at base, subentire-repand, glabrous, punctate beneath, sessile or on 0.5 cm long petioles, in equal pairs, opposite, seemingly alternate. Flowers in terminal, second racemes, 1 to 2-nate; bracts persistent; pedicels pendulous, pubescent with short hairs, 0.15-3 cm long. Calyx 0.4-0.6 cm long, divided halfway down, short-hairy, lobes ovate-triangular, acute, winged dorsally, ciliate, 0.2-0.3 x 0.08-0.1 cm. Corolla bluish-violet, 0.8-1 cm long, glabrous within. Staminal filaments 0.4-0.6 cm long. Capsule enclosed by the calyx, ovoid-ellipsoid, 0.4 cm across.

Moonamthode, *KJD 31596*

Fl. & Fr.: July-November

Distribution: Fairly common in evergreen forests of Moonamthode, Meenmutty and Chavachi.

RHYNCHOTECHUM Blume

Bijdr. Fl. Ned. Ind. 775. 1826.

Rhynchotechum permolle (Nees) Burt, Notes Roy. Bot. Gard. Edinb. 24: 39. 1962; Ramach. & V.J. Nair, Fl. Cannanore Dist. 326. 1988; Ratheesh, Fl. Stud.

Wayanad Dist. 598. 2009. *Isanthera permollis* Nees, Trans. Linn. Soc. London 17: 82. 1834; Hook.f., Fl. Brit. India 4:372.1884; Gamble, Fl. Madras 992(697). 1924.

Subshrubs, to 50 cm high, densely golden-brown tomentose. Leaves alternate, to 30 x 11 cm, oblanceolate, acute, attenuate at base, serrulate; nerves 17-20 pairs, regular. Flowers in axillary cymes, densely packed, shortly pedicelled; bracts ovate. Calyx 5-partite, lobes 7 mm long, lanceolate. Corolla white ca 12 mm across, tube short, lobes rotate, obovate, glabrous. Stamens 4, equal, adnate to the base of the corolla; filaments short, arcuate; anthers 1-celled. Ovary ovoid; ovules many; style stout, stigma capitate. Berry globose, 6 mm across, white; seeds numerous very small, ellipsoid.

Kariyenkappu, *KJD 31847*; Kattikari, *KJD 31890*

Fl. & Fr.: August-March

Distribution: Common in evergreen forests of Kattikari, Chavachi, Moonamthode and Meenmutty.

LAMIACEAE

- 1a. Ovary 4-partite or lobed; fruit nutlets.....2
- 1b. Ovary entire; fruit drupe or pyrenes 16
- 2a. Calyx deeply divided, lobes longer than the tube; leaves in whorls of three... Colebrookea
- 2b. Calyx lobed or toothed, lobes as long as the tube or shorter; leaves opposite.....3
- 3a. Calyx 8-10-toothed.....Leucas
- 3b. Calyx 5-toothed, lobed or 2-lipped..... 4
- 4a. Calyx 5-toothed or lobed, equal or subequal5
- 4b. Calyx 2-lipped, lobes unequal 10
- 5a. Nutlets fleshy; calyx with stalked stellate tomentum.....Gomphostemma
- 5b. Nutlets dry; calyx without stellate tomentum.....6
- 6a. Stamens spreading; corolla lobes 4Pogostemon
- 6b. Stamens declinate; corolla lobes 57
- 7a. Calyx aristately 5-toothed, throat villous.....Hyptis
- 7b. Calyx 5-lobed, throat naked8
- 8a. Calyx equally 5-lobed; lower lip of corolla 3-lobed Anisomeles
- 8b. Calyx subequally 5-lobed; lower lip of corolla 4-lobed9
- 9a. Cymes dichasial arranged in thyrses or false verticels Plectranthes
- 9b. Cymes paniculate..... Isodon
- 10a. Flowers in uninterrupted spikes forming oblong or ovoid heads 11
- 10b. Flowers in interrupted whorls forming lax spikes or thymes 12
- 11a. Staminal filaments free; lower lip of corolla declinate, flat..... Platostoma
- 11b. Staminal filaments paired; lower lip of corolla elongated, concave Anisochilus

- 12a. Upper lip of calyx 3-lobed, as broad as or nearly broad as the lobes of lower lip13
- 12b. Upper lip of calyx 1-lobed, much broader; lower lip narrowly toothed or linear aristate14
- 13a. Calyx lobes obscure; lip pouched; anthers of upper pair of stamens 2-celled and lower pair 1-celled Scutellaria
- 13b. Calyx lobes distinct; lip not pouched; all stamens 2-celled.....Teucrium
- 14a. Staminal filaments fused at the base forming a sheath around the style Coleus
- 14b. Staminal filaments free...15
- 15a. Corolla as long as the calyx; anthers 1-celled..... Ocimum
- 15b. Corolla much longer than the calyx; anthers 2-celledOrthosiphon
- 16a. Leaves digitate..... Vitex
- 16b. Leaves 17
- 17a. Corolla regular; young parts stellate hairy18
- 17b. Corolla irregular; young parts not stellate hairy 19
- 18a. Flowers 4-merous; fruit glabrous Callicarpa
- 18b. Flowers 6-merous; fruit densely hairy Tectona
- 19a. Flowers more than 2.5 cm broad..... Gmelina
- 19b. Flowers less than 2 cm broad..... 20
- 20a. Drupes with 1 pyrene..... Premna
- 20b. Drupes with 4 pyrenes 21
- 21a. Leaves whorled, acute at base; corolla blue..... Rotheca
- 21b. Leaves opposite, cordate or rounded at base; corolla not blue..... Clerodendrum

ANISOCHILUS Wall. ex Benth.

Edwards's Bot. Reg. 15: t. 1300. 1830.

Anisochilus carnosus (L.f.) Wall. ex Benth., Pl. Asiat. Rar. 2: 18. 1830; Hook.f., Fl. Brit. India 4: 627. 1885; Gamble, Fl. Madras 1127(788). 1924; Manilal & Sivar., Fl. Calicut 235. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 361. 1988; Suddee & Paton, Kew Bull. 64: 240. 2009; Ratheesh, Fl. Stud. Wayanad Dist. 648. 2009. *Lavandula carnosa* L.f., Suppl. Pl. 273. 1781.

Semisucculent annual herbs, branchlets pubescent. Leaves opposite, 2-5 x 2-3.5 cm, broadly ovate, apex obtuse, base truncate or cordate, margin crenate-serrate, verrucose above, pubescent below, subsucculent; petiole to 4 cm long. Flowers in terminal simple or paniced, 1.5-3 cm long, oblong spikes. Calyx 4 mm long, tubular, mouth oblique, 2-lipped, acute; upper lip pubescent without, deflexed in fruits. Corolla purple, 1 cm long, lobes 5, 2-lipped, upper lip entire,

lower 4-lobed. Stamens 4, exserted; filaments connate at base forming a sheath. Fruits of 4, ovoid nutlets; seeds orbicular, smooth.

Pothanplavu, *KJD 22566*

Fl. & Fr.: September-December

Distribution: Rare in semi-evergreen forests of Pothanplavu.

ANISOMELES R.Br.

Prodr. Fl. Nov. Holland. 503. 1810.

Anisomeles indica (L.) Kuntze, Revis. Gen. Pl. 2: 512. 1891; Gamble, Fl. Madras 1140(797). 1924; Manilal & Sivar., Fl. Calicut 240. 1982; Ansari, Fl. Kasaragod Div. 301. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 362. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 649. 2009. *Nepeta indica* L., Sp. Pl. 571. 1753. *Anisomeles ovata* R.Br., W.T.Aiton, Hortus Kew. (ed. 2) 3: 364. 1811; Hook.f., Fl. Brit. India 4: 672. 1885. *Anisomeles heyneana* Benth., Pl. Asiat. Rar. 1: 59. 1830; Hook.f., Fl. Brit. India 4: 672. 1885; Gamble, Fl. Madras 1140(797). 1924.

Erect, aromatic woody herbs, 1-1.5 m high, stem 4-angled, grooved on opposite sides, densely pubescent. Leaves opposite, 3-7 x 2.5-4.5 cm, broadly ovate to obovate, apex acute, base truncate, margin coarsely serrate-crenate, tomentose on both sides; petiole to 3 cm long. Flowers in axillary sessile clusters or in terminal interrupted spikes. Calyx campanulate; tube 4-5 mm long; lobes 5. ca. 2 mm long, ovate, ciliate on margin. Corolla pale pink, 1-1.4 cm long, 2-lipped. Stamens 4, didynamous, exserted; filaments hairy; anthers of upper pair 2-celled, of lower 1-celled. Ovary 4-partite; style slender; stigma 2-fid; disk subentire. Nutlets 4, lenticular, reddish-brown.

Paripode, *KJD 22567*

Fl. & Fr.: January-April

Distribution: Along the boundaries of Farm.

CALLICARPA L.

Sp. Pl. 111. 1753.

Callicarpa tomentosa (L.) L. in Murr., Syst. Veg. (ed. 13) 130. 1774; Manilal & Sivar., Fl. Calicut 227. 1982; Ansari, Fl. Kasaragod Div. 291. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 353. 1988; Rajendran & Daniel, Indian Verbenaceae 53. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 636. 2009. *Tomex tomentosa* L., Sp. Pl. 118. 1753. *Callicarpa lanata* L., Mant. Pl. 2: 331. 1771, nom. illeg.; Gamble, Fl. Madras 1092(764). 1924. *Callicarpa arborea* Miq. ex C.B. Clarke in Hook.f., Fl. Brit. India 4: 507. 1885, non Roxb. 1832.

Trees, to 10 m high; bark brown.. Leaves opposite, 13-30 x 8-20 cm, ovate or elliptic, apex acuminate, base truncate, acute or rounded, margin entire or dentate, densely white stellate tomentose beneath, glaucous, chartaceous; petiole 2.5-6 cm long, stout, tomentose; lateral nerves 6-8 pairs, pinnate, arched, prominent, raised beneath; intercostae scalariform, prominent. Flowers bisexual, pinkish-purple, in axillary corymbose cymes, densely tomentose. Calyx 2 mm long, campanulate, lobes 5. Corolla 4 mm long, 5 mm across, tube short, lobes 4, spreading. Stamens 4, exserted; filaments 6.5 mm, glandular; anthers sagitate. Ovary globose, pubescent, 2 locular, ovules 2 in each cell; style slender; stigma capitate. Fruit a drupe, globose, 3 mm across, glabrous, black; seeds 3-4, oblong, angular.

Kattikari, *KJD 18753*

Fl. & Fr.: November-April

Distribution: Fairly common in evergreen forests of Kattikari and semi-evergreen forests of Pothanplavu and Paripode.

CLERODENDRUM L.

Sp. Pl. 637. 1753.

- 1a. Flowers red; leaves shallowly 3-5-lobed, glabrous *C. paniculatum*
- 1b. Flowers white; leaves entire or shortly serrate, densely glandular-pubescent*C. infortunatum*

Clerodendrum infortunatum L., Sp. Pl. 637. 1753, non L. 1771; Hook.f., Fl. Brit. India 4: 594. 1885; Gamble, Fl. Madras 1100(770). 1924; Rajendran & Daniel, Indian Verbenaceae 116. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 637. 2009. *Clerodendrum viscosum* auct. non Vent. 1804: Manilal & Sivar., Fl. Calicut 232. 1982; Ansari, Fl. Kasaragod Div. 294. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 354. 1988.

Shrubs; young shoots tawny villous. Leaves opposite, 8-17 x 6-12 cm, ovate or orbicular, apex acuminate, base cordate, margin entire or denticulate, villous beneath and tomentose above; basally 5-7 nerved; petiole to 8 cm long. Panicle terminal, 14-20 cm long, villous; bracts foliaceous. Calyx cupular, 0.8-1 cm long; lobes lanceolate, 3-5-ribbed, acuminate at apex, tomentose. Corolla white, tubular; tube 1-1.5 cm long, villous without; lobes 6-10 mm long, oblong, hairy without. Stamens 4; filaments slender, purplish, 2-2.5 cm long; anthers oblong. Ovary globose; style slender; exserted, 2-2.5 cm long. Drupe 6-8 mm across,

globose, bluish-black on ripening; fruiting calyx enlarged, pink; seeds 2-4, globose, 2-3 mm across.

Moonamthode, KVB 31718

Fl. & Fr.: December-February

Distribution: Fairly common in evergreen forests of Kattikari and Moonamthode; semi-evergreen forests of Paripode and Pothanplavu.

Clerodendrum paniculatum L., Mant. Pl. 1: 90. 1767, "paniculata"; Hook.f., Fl. Brit. India 4: 593. 1885; Vivek., Bull. Bot. Surv. India 10: 240. 1969; Manilal & Sivar., Fl. Calicut 233. 1982; Ansari, Fl. Kasaragod Div. 293. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 354. 1988; Rajendran & Daniel, Indian Verbenaceae 128. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 638. 2009.

Erect subshrubs, to 2.5 m tall, stoloniferous; stem scarcely branched. Leaves opposite, 7-18 x 8-19 cm, orbicular, margin faintly lobed, denticulate, apex acute, base cordate, membranous; basally 7-nerved; petiole to 10 cm long. Flowers in terminal panicles of dichotomous cymes; pedicels reddish, 6-14 mm long. Calyx deeply 5-lobed, red, campanulate, 3-5 mm long; lobes oblong, obtuse. Corolla red, hypocrateriform; tube slender, 1.4-2 cm long; lobes 7-8 mm long, posterior pair shorter and narrower than the others. Stamens exserted; filaments 2-3 cm long. Ovary oblong.

Chatharurmala, NS & KVB 31440

Fl. & Fr.: July-May

Distribution: Fairly common along the forest boundaries at Chatharurmala.

COLEBROOKEA Sm.

Exot. Bot. 2: 111. 1806.

Colebrookea oppositifolia Sm., Exot. Bot. 2: 111, t.115. 1805; Hook.f., Fl. Brit. India 4: 642. 1885; Gamble, Fl. Madras 1138(796). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 363. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 649. 2009. *Colebrookea tenuifolia* Roxb., Pl. Coromandel t. 245. 1815.

Large shrubs; stem and leaves densely tomentose. Leaves opposite, to 20 x 6 cm, elliptic, acuminate, crenulate, base acute to acuminate, nerves ca. 10 pairs, oblique. Spikes to 10 x 0.5 cm, paniced, terminal, densely tomentose; flowers in close whorls. Calyx 1.5 mm long; tube very short, densely white-hairy, lobes subulate. Corolla 2 mm long, equally 4-lobed. Stamens 4, exserted in male flowers, included in female flowers, filaments glabrous; style 2-fid at tip. Nutlets hairy at apex; fruiting calyx enlarged.

Kannadivechakunnu, KVB 31504

Fl. & Fr.: January-May

Distribution: Fairly common in evergreen forests of Kannadivechakunnu.

GMELINA L.

Sp. Pl. 626. 1753.

Gmelina arborea Roxb., Pl. Coromandel t. 246. 1815; Hook.f., Fl. Brit. India 4: 581. 1885; Gamble, Fl. Madras 1097(768). 1924; Ansari, Fl. Kasaragod Div. 295. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 355. 1988; Rajendran & Daniel, Indian Verbenaceae 155. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 639. 2009.

Deciduous trees, to 20 m high; bark whitish-grey. Leaves opposite, 7.5-25 x 6-20 cm, broadly ovate or ovate, base cordate truncate or rounded, apex acute or acuminate; nerves 3-5 from base, lateral nerves 3-6, pinnate; intercostae scalariform, prominent; 2 glands on either side of the midrib at the base; petiole 5-12.5 cm long, tomentose. Flowers bisexual, 3-3.7 cm long, yellow with orange-pink shade, in terminal panicles. Calyx 6 mm long, campanulate, 5 toothed, tomentose. Corolla bilabiate, tube ventricose, lobes 5, subequal, obovate, obtuse, densely hairy. Stamens 4, didynamous; anthers 2 mm, divaricate. Ovary 4 mm, superior, syncarpous, glabrous, ovules 4; style 2 cm, slender, glabrous, unequally bifid. Fruit a drupe 2.5-3.5 x 1-1.5 cm, ovoid, pulpy, pyrene bonny, ovoid with a deep depression, yellow; seeds 2-4, elliptic.

Valayamchal, *KJD 31484*

Fl. & Fr.: January-June

Distribution: Planted in the Sanctuary.

GOMPHOSTEMMA Wall. ex Benth.

Pl. Asiat. Rar. 2: 12. 1831.

Gomphostemma heyneanum Benth., Pl. Asiat. Rar. 2: 12. 1830; Gamble, Fl. Madras 1167(808). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 364. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 650. 2009. *Gomphostemma strobilinum* Wall. ex Benth. var. *heyneanum* (Benth.) Hook.f., Fl. Brit. India 4:696.1885 (Plate 16b).

Subshrubs; stem obtusely 4-angular, densely covered with stellate hairs. Leaves opposite, to 25 x 15 cm, broadly elliptic, acute at both ends, thickly stellate hairy below, sparsely hairy above, crenate; nerves 5-7 pairs; petiole 4-6 cm long. Racemes to 18 x 2.5 cm; flowers 10 to 20 together, densely packed; bracts elliptic, acute. Calyx 12 mm long, lobed to the middle, lobes lanceolate. Corolla 15 mm long, tube 7 mm broad, cylindric, midlobe of lower lip obtuse, emarginate; filaments unequal, glabrous. Nutlets glabrous.

Near Ambalappara, *KJD 25475*

Fl. & Fr.: October-December

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

HYPTIS Jacq.

Collectanea 1: 101, 103. 1787.

Hyptis suaveolens (L.) Poit., Ann. Mus. Natl. Hist. Nat. Paris 7: 472. t.27.f.2. 1806; Hook.f., Fl. Brit. India 4: 630. 1885; Gamble, Fl. Madras 1129(789). 1924; Manilal & Sivar., Fl. Calicut 240. 1982; Ansari, Fl. Kasaragod Div. 304. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 364. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 650. 2009. *Ballota suaveolens* L., Syst. Nat. (ed. 10) 1100. 1759.

Shrubs, to 1.5 m high; stem obtusely 4-angular, viscous hairy. Leaves opposite, to 7 x 5 cm, ovate, acute, hispid below, glabrate above; lateral nerves 5-7 pairs; petiole to 3 cm long. Flowers in axillary short cymose racemes. Calyx tube 8 mm long, tubular, 10-ribbed, glandular hairy, teeth spinulose, 4 mm long. Corolla 5 mm long, lobes short, glabrous inside, blue. Stamens 4, declinate, filaments free, pubescent; anthers confluent. Ovary 4-partite; style subentire. Nutlets 4 x 2.5 mm, oblong, compressed, with a ridge on dorsal surface, pubescent, deep brown, mucilaginous when wet.

Paripode, KVB 31286

Fl. & Fr.: August-February

Distribution: Along the margins of semi-evergreen forests at Paripode.

ISODON (Schrad. ex Benth.) Spach

Hist. Nat. Vég. 9:162. 1840.

1a. Leaf base obtuse to cuneate, glabrescent; fruiting calyx teeth rounded ...*I. lophanthoides*

1b. Leaf base cordate or rounded, tomentose beneath; fruiting calyx teeth acute..... *I. wightii*

Isodon lophanthoides (Buch.-Ham. ex D.Don) H.Hara, J. Jap. Bot. 60: 235. 1985. *Hyssopus lophanthoides* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal. 110. 1825. *Plectranthus stocksii* Hook.f., Fl. Brit. India 4: 618. 1885; Gamble, Fl. Madras 1121(784). 1924.

Herbs, often decumbent at base; stem densely glandular-hairy. Leaves opposite, 6 x 5 cm, acute at apex, crenate-serrate, glabrous above, covered with red glands below; petiole 5-7 cm long. Flowers many in short cymes forming terminal panicles, 10-25 cm long, with slender branches. Calyx 3 mm long, 5-

ribbed, densely red-glandular, hirtus, upper lip 2-lobed. Corolla 7 mm long, lower lip concave, obtuse, white. Stamens 4, declinate, exerted.

Ambalappara, KVB 31565, 31684

Fl. & Fr.: July-January

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Western Ghats.

Isodon wightii (Benth.) Hara, J. Japan Bot. 60: 237.1985; Ratheesh, Fl. Stud. Wayanad Dist. 651. 2009. *Plectranthus wightii* Benth., Labiat. Gen. Spec. 41. 1832; Hook.f., Fl. Brit. India 4: 619. 1855; Gamble, Fl. Madras 1120(784). 1924. *Plectranthus pulneyensis* Hook.f., Fl. Brit. India 4: 617. 1855. *Plectranthus nepetaefolius* Benth. in DC. Prodr. 12: 57. 1848; Hook.f., Fl. Brit. India 4: 619. 1855. *Robdosia wightii* (Benth.) Hara, J. Jap. Bot. 47: 203. 1972; Sivar. & Mathew, Fl. Nilambur 555. 1997.

Subshrubs, branchlets glabrescent. Leaves opposite, ovate, acute, base cordate, deeply serrate, membranous, sparsely hispid, to 7.5 x 6 cm; lateral nerves ca. 5 pairs; petiole to 7 cm long. Thyrsus to 15 cm long. Calyx hirtellous, red gland-dotted. Corolla lobes glabrous. Stamens exerted.

Ambalappara, NS & KJD 31983; KVB 31648, 31649

Fl. & Fr.: September-December

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Peninsular India.

LEUCAS R.Br.

Prodr. Fl. Nov. Holland. 504. 1810.

- 1a. Mouth of the calyx oblique2
- 1b. Mouth of the calyx straight 3
- 2a. Calyx teeth minute, scabrous..... *L. lavandulifolia*
- 2b. Calyx teeth with bulbous based hairs *L. aspera*
- 3a. Throat of calyx tube glabrous *L. angularis*
- 3b. Throat of calyx tube villous4
- 4a. Calyx mouth with white hairs, teeth small; leaves linear-elliptic*L. eriostoma*
- 4b. Calyx mouth with brown hairs, teeth long; leaves elliptic or ovate-elliptic.....*L. ciliata*

Leucas angularis Benth., Pl. Asiat. Rar. 1: 62. 1830; Hook.f., Fl. Brit. India 4: 684. 1885; Gamble, Fl. Madras 1151(805). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 365. 1988; V. Singh, Monogr. Indian Leucas 38. 2001;

Ratheesh, Fl. Stud. Wayanad Dist. 652. 2009. *Leucas marrubioides* Desf. var. *pulneyensis* Hook.f., Fl. Brit. India 4: 684. 1885.

Prostrate branching herbs, pubescent. Leaves opposite, 3.5 x 1.5 cm, ovate, obtuse, base rounded or truncate, serrate, pubescent; petiole 0.5 cm. Verticils axillary, 4-6 flowered; bracts 3 mm, linear, ciliate. Calyx tube 8 mm, 10 toothed, unequal, to 2 mm, long, ciliate. Corolla tube 9 mm, subequal; filaments 5 and 7 mm, pubescent. Ovary 1 mm, style 1.3 mm.

Kariyenkappu, KJD 31867

Fl. & Fr.: March-July

Distribution: Rare in plantations of Kariyenkappu and evergreen forest of Chavachi.

Leucas aspera (Willd.) Link, Enum. Hort. Berol. Alt. 2: 113. 1822; Hook.f., Fl. Brit. India 4: 690. 1885; Gamble, Fl. Madras 1150(803). 1924; Manilal & Sivar., Fl. Calicut 239. 1982; Ansari, Fl. Kasaragod Div. 305. 1985; V. Singh, Monogr. Indian Leucas 43. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 653. 2009. *Phlomis aspera* Willd., Enum. Hort. Berol. 2: 621. 1809.

Erect hirsute herbs to 40 cm tall. Leaves opposite, 3-8 x 1-2 cm, linear-lanceolate, apex acute, base cuneate, margin distantly serrate, puberulous, petiole 3 mm long. Verticils terminal and axillary; bract linear, equalling calyx, hirsute. Calyx 6 mm long, tubular, 10-ribbed, upper half strigose without, glabrous below; mouth oblique, 10-toothed; teeth unequal, posterior the longer, linear, c.1 mm long. Corolla white; tube c. 6 mm long; upper lip c. 3 mm long, villous without; lower lip 7-8 mm long. Stamens 4. Style c. 8 mm long.

Paripode, KJD 25584

Fl. & Fr.: September-January

Distribution: Fairly common along riversides in semi-evergreen forests of Paripode, Narikkadavu and Pookundu.

Leucas ciliata Benth. ex Wall., Pl. Asiat. Rar. 1: 61. 1830; Hook.f., Fl. Brit. India 4: 687. 1885; Gamble, Fl. Madras 1153(806). 1924; Ansari, Fl. Kasaragod Div. 306. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 366. 1988; V. Singh, Monogr. Indian Leucas 61. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 654. 2009.

Subscandent hispid herbs with few branches. Leaves opposite, 8 x 3 cm, ovate, acute at both ends, densely hispid; petiole 1 cm long. Verticils terminal, 3 cm across, globose; bracts 15 x 1 mm, strongly ciliate; flowers 30-40 in a head, densely packed. Calyx tube 12 mm long, not ribbed, teeth 5 mm long, ciliate.

Corolla tube 10 mm long, upper lip obovate, concave, brown hairy, lower lip white, 10 x 8 mm, 3-lobed, midlobe orbicular, glabrous. Nutlets 3 x 1.5 mm, 3-angled brown, smooth.

Ambalappara, KVB 31503

Fl. & Fr.: September-March

Distribution: Rare in evergreen forests of Ambalappara.

Leucas eriostoma Hook.f., Fl. Brit. India 4: 686. 1885; Gamble, Fl. Madras 1154(806). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 366. 1988; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 31.1996; V. Singh, Monogr. Indian Leucas 82. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 654. 2009.

Stout, suffruticose undershrubs, to 1 m high. Leaves opposite, 5-10 x 0.5-4 cm, linear, linear-lanceolate; veins 5-7 pairs, very oblique, raised beneath, impressed above. Verticils 1-2.5 cm in diam., terminal and axillary; bracts 7-9 mm long, as long as calyx or longer. Calyx-tube 5-10 mm long, tubular-campanulate, straight, narrowed above the nutlets, ribbed and hispid in the upper part, glabrous in lower region; mouth truncate; teeth 10, about 1 mm long, equal, linear-subulate, sparsely hairy, ciliate, erect, not recurved. Corolla-tube included within the calyx, pilose annulate within towards base, hairy outside at the top; lips almost equal, upper one bearded with long white hairs, lower lip 3-lobed and pubescent on outer surface. Anthers glabrous. Nutlets ca 2 mm long, oblong.

Ambalappara, KVB 31642, 31647

Fl. & Fr.: November-March

Distribution: Common in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

Leucas lavandulifolia Sm. in A.Rees, Cycl. 20: n. 2. 1812; V. Singh, Monogr. Indian Leucas 104. 2001; Ratheesh, Fl. Stud. Wayanad Dist. 655. 2009. *Leonurus indicus* L., Syst. Nat. (ed.10) 1101. 1759. *Leucas indica* (L.) R.Br. ex Vatke in Oesterr., Bot. Zeits. 25: 95. 1875, *nom. illeg.*; Ansari, Fl. Kasaragod Div. 307. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 366. 1988. *Leucas malabarica* W.Theob. in F.Mason, Burmah ed. 3, 2: 296. 1883. *Phlomis linifolia* Roth, Nov. Pl. Sp. 260. 1821. *Leucas linifolia* (Roth) Spreng., Syst. Veg. 2: 743. 1825; Hook.f., Fl. Brit. India 4:690. 1885; Gamble, Fl. Madras 1149 (803). 1924. *Leucas linifolia* (Roth) Spreng. var. *decipiens* Hook.f., Fl. Brit. India 4: 691. 1885. *Leucas lavandulifolia* Rees var. *decipiens* (Hook.f.) Chandrab. & Sriniv., Bull. Bot.

Surv. India 17: 164. 1975. *Leucas indica* var. *decipiens* (Hook.f.) Bennet, J. Econ. Taxon. Bot. 5: 452. 1984.

Annual herbs, to 40 cm tall; branches puberulous. Leaves opposite, 4-7 x 0.6-1.3 cm, linear-lanceolate, apex acute, base attenuate, margin subentire, hairy on veins and on margins; petiole 4-5 mm long. Flowers in dense axillary verticals; bract 5-6 mm long, linear, hairy. Calyx tube 4-5 mm long, tubular, slightly curved, pubescent, shortly 8-toothed, one slightly longer, mouth oblique. Corolla white; tube 2-3 mm long, 2-lipped; upper lip 1-2 mm long, lower 5-6 mm long, 3-lobed. Stamens 4, didynamous; filaments sparsely hairy. Ovary 4-celled; ovules 4; stigma 2-fid. Nutlets 4, minute.

Paripode, KJD 31480

Fl. & Fr.: July-October

Distribution: Common along river sides of Paripode, Narikkadavu and Pookundu.

OCIMUM L.

Sp. Pl. 597. 1753.

- 1a. Small herbs; fruiting calyx villous inside; seeds smooth..... *O. americanum*
- 1b. Shrubs; fruiting calyx glabrous inside; seeds rugose..... *O. gratissimum*

Ocimum americanum L., Cent. Pl. 1: 15. 1755; Manilal & Sivar., Fl. Calicut 236. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 657. 2009. *Ocimum canum* Sims, Bot. Mag. 51: t.2452. 1823; Hook.f., Fl. Brit. India 4: 607. 1885; Gamble, Fl. Madras 1111(777). 1924; Ansari, Fl. Kasaragod Div. 308. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 368. 1988.

Woody herbs, stem hirtus. Leaves opposite, to 3 x 1.5 cm, elliptic, acute to acuminate, base truncate or obtuse, subentire, sparsely hairy or glabrous; petiole to 2 cm long. Racemes to 13 cm long, densely pubescent; flowers 5-7 in each whorl. Calyx 3 x 5 mm, upper lip 3 x 3 mm, orbicular, densely hairy. Corolla white, 5 mm long, glabrous. Staminal filaments glabrous. Nutlets 1.5 mm long, sub-trigonous, minutely pitted, dark brown.

Near Farm, KJD 26263

Fl. & Fr.: Through out the Year

Distribution: Along the boundaries near Farm.

Ocimum gratissimum L., Sp. Pl. 1197. 1753; Hook.f., Fl. Brit. India 4: 608. 1885; Gamble, Fl. Madras 1111(777). 1924; Manilal & Sivar., Fl. Calicut 236. 1982; Ansari, Fl. Kasaragod Div. 308. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 368. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 658. 2009.

Shrubs, to 2 m high; stem glandular-scabrid. Leaves opposite, to 12 x 6 cm, elliptic to obovate, acuminate at apex, base attenuate serrate; nerves 6-pairs; thinly tomentose below; petiole to 6 cm long. Racemes terminal, panicles; bracts oblanceolate; flowers 4-6 at each node; pedicel 4 mm long. Calyx 5 mm long, glabrous; upper lip ovate, obtuse, lobes of lower lip acuminate, glandular. Corolla white, tube 2-3 mm long, lobes obtuse. Staminal filaments glabrous or villous at base; anthers sagittate at base. Nutlets 1.5 x 1 mm, pitted, brown.

Near Farm, *KJD 22546*

Fl. & Fr.: August-December

Distribution: Along the boundaries near Farm.

ORTHOSIPHON Benth.

Edward's Bot. Reg. 15: t. 1300. 1830.

Orthosiphon aristatus (Blume) Miq., Fl. Ind. Bat. 2: 943. 1858. *Ocimum aristatum* Blume, Bijdr. Fl. Ned. Ind. 833. 1826. *Orthosiphon stamineus* Benth., Pl. Asiat. Rar. 2: 15. 1830; Hook.f., Fl. Brit. India 4: 615. 1885; Gamble, Fl. Madras 1115(780). 1924.

Diffusely branched perennial herbs. Leaves opposite, 3-6.5 x 1.2-3.5 cm, rhomboid to ovate-deltoid, apex acute, base cuneate, margins serrate from about the middle upwards, glandular-punctate beneath. Racemes 8-16 cm long; verticils lax; peduncle strigulose with purplish hairs; bracts c.1 x 2 mm, broadly ovate. Calyx tube to 3 mm long, 10-nerved; upper lip to 3 mm long, broadly ovate, purplish; lower lip longer. Corolla white, tomentose without; tube 1-1.5 cm long; upper lip orbicular; lower lip as long as upper, boat-shaped. Stamens exerted; filaments to 3 cm long. Nutlets c. 2 mm long, ovoid-oblong.

Kariyenkappu, *KJD 26110*

Fl. & Fr.: September-December

Distribution: Near streams at Kariyenkappu.

PLATOSTOMA P. Beauv.

Fl. Oware 2: 61, t. 95. 1818.

Platostoma hispidum (L.) Paton, Kew Bull. 52: 273. 1997. *Gomphrena hispida* L., Sp. Pl. 1: 326. 1762. *Acrocephalus hispidus* (L.) Nicolson & Sivad., Taxon 29: 324. 1980; Manilal & Sivar., Fl. Calicut 235. 1982; Ansari, Fl. Kasaragod Div. 300. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 361. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 647. 2009. *Prunella indica* Burm.f., Fl. Ind. 130. 1768. *Acrocephalus indicus* (Burm.f.) Kuntze, Revis. Gen. Pl. 2: 511. 1891; Gamble, Fl.

Madras 1115(780). 1924. *Acrocephalus capitatus* (Roth) Benth., Bot. Reg. 15. sub t. 1282. 1829; Hook.f., Fl. Brit. India 4: 611. 1885. *Ocimum capitatum* Roth, Nov. Pl. Sp. 276. 1821.

Erect annual herbs; stem 4-angled and ridged, villous along ridges. Leaves opposite, 1-2.5 x 0.5-1 cm, ovate-lanceolate or elliptic-lanceolate, apex acute, base narrowly attenuate, margins coarsely serrate, thinly pubescent on nerves beneath; petiole to 1 cm long. Flowers grouped in terminal globose, ovoid or short cylindrical heads, 0.5-1.5 cm long, subtended by a pair of floral leaves and many bracts. Calyx 2 mm long, tubular, 2-lipped, upper lip entire, lower usually 4-toothed. Corolla white turning brownish, c. 4 mm long, 2-lipped, upper lip subequally 4-lobed. Stamen 4, didynamous; anthers 1-celled. Ovary 4-partite; style slender; stigma shortly 2-fid; nutlets 4, minute, smooth.

Kariyenkappu, KJD 26286

Fl. & Fr.: September-December

Distribution: Along forest boundaries at Kariyenkappu and Chavachi.

PLECTRANTHUS L'Hér.

Stirp. Nov.: 84, verso 1788.

Plectranthus malabaricus (Benth.) Willemse, Blumea 25: 509. 1979; Ramach. & V.J. Nair, Fl. Cannanore Dist. 370. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 660. 2009. *Coleus malabaricus* Benth., Pl. Asiat. Rar. 2: 16. 1830; Hook.f., Fl. Brit. India 4: 626. 1885; Gamble, Fl. Madras 1124(786). 1924; Ansari, Fl. Kasaragod Div. 302. 1985.

Herbs, stem 4-angled, purplish. Leaves opposite, to 15 x 13 cm, ovate, obtuse or acute, base truncate or subcordate, puberulous; lateral nerves 4 or 5 pairs; petiole to 10 cm long. Panicles terminal, to 30 cm long. Calyx striate, upper lip broadly ovate, lower 3-lobed, lobes ovate-lanceolate. Corolla white with purple tinge, 1 cm long. Stamens exserted, filaments glabrous. Nutlets smooth.

Ambalappara, NS & KVB 31414

Fl. & Fr.: August-December

Distribution: Common in evergreen forests of Mullenpara, Asthippara and Ambalappara.

POGOSTEMON Desf.

Mém. Mus. Hist. Nat. 2: 154. 1815.

- 1a. Flowers yellow in few-flowered axillary cymose panicles..... *P. peethapushpam*
- 1b. Flowers clustered on simple or paniced spikes.....2

- 2a. Flowers clusters distant in terminal and axillary panicles.....3
- 2b. Flowers in uninterrupted spikes.....4
- 3b. Flower clusters 1-sided on the spikes; hairs on the filaments
few, white*P. paniculatus*
- 3b. Flowers clustered on all sides of the spikes; filaments densely bearded,
Purple.....*P. purpurascens*
- 4a. Leaves oblong or orbicular; corolla and staminal hairs white *P. mollis*
- 4b. Leaves ovate; staminal filaments purple.....5
- 5a. Staminal filaments hairy only at the base*P. gardneri*
- 5b. Staminal filaments hairy throughout *P. benghalensis*

Pogostemon benghalensis (Burm.f.) Kuntze, Revis. Gen. Pl. 2: 517. 1891; Ramach. & V.J. Nair, Fl. Cannanore Dist. 371. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 661. 2009. *Origanum benghalense* Burm.f., Fl. Ind. 128,t.38, f. 3. 1768. *Pogostemon plectranthoides* Desf., Mém. Mus. Hist. Nat. 2: t. 6, 155. 1815; Hook.f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Madras 1133(793). 1924.

Shrubs to 1.5 m tall, stem subterete, reddish-brown. Leaves opposite, 11 x 5 cm, ovate to ovate-lanceolate, acute, attenuate at base, irregularly serrate-dentate, chartaceous; lateral nerves ca 5 pairs; petiole to 3 cm. Spike to 15 cm, cylindrical, terminal; bracts ovate, bracteoles lanceolate; flowers many, densely packed. Calyx 4 mm long; lobes 5, equal. Corolla pale pink; lobes 4, equal, obtuse, villous at apex. Stamens 4, filaments unequal, bearded with moniliform hairs. Ovary glabrous, style slender; stigma 2-lobed. Nutlets glabrous, smooth, brown.

Crossway, 22573

Fl. & Fr.: January-March

Distribution: Fairly common along the margins of grasslands at Ambalappara.

Pogostemon gardneri Hook.f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Madras 1133(792). 1924; Ratheesh, Fl. Stud. Wayanad Dist. 662. 2009.

Erect herbs; stem villous, reddish. Leaves opposite, up to 12 x 8 cm, ovate, acute, cuneate at base, inciso-crenate, pubescent; petiole to 1 cm. Flowers small, in terminal paniced spikes; clusters usually close but occasionally interrupted, the floral leaves mostly reflexed; bracts oblong-lanceolate, ciliate, membranous, usually longer than the calyx. Calyx-teeth much shorter than the tube. Corolla pink. Stamens 4, exserted, subequal; filaments bearded; anther-cells confluent.

Disk subentire. Ovary 4-partite; style slender, 2-fid with slender stigmatic lobes; nutlets orbicular.

Ambalappara, KVB 31585

Fl. & Fr.: January-May

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Endangered.

Pogostemon mollis Benth., *Labiata. Gen. Spec.* 155. 1833; Hook.f., *Fl. Brit. India* 4: 635. 1885; Gamble, *Fl. Madras* 1134(793). 1924; M. Mohanan & Henry, *Fl. Thiruvanthapuram* 371. 1994.

Branched subshrub; branchlets several, hirsute, ascending. Leaves opposite, ovate-orbicular, to 3 x 1.5 cm, apex acute, base cuneate to obtuse, margin crenate, tomentose; petiole to 0.5 cm. Racemes spicate, uninterrupted, to 9 cm, mostly terminal; bracts linear. Calyx-lobes 5, subequal, 4.5 mm, tomentose. Corolla white, 3 mm wide; limb obscurely 2-lipped; lobes 6 mm, obtuse. Stamens 4; 3 filaments longer, to 5 mm.

Ambalappara, NS & KJD 25514; KVB 31750

Fl. & Fr.: October-February

Distribution: In grasslands of Ambalappara. Endemic to Western Ghats.

Pogostemon paniculatus (Willd.) Benth., *Pl. Asiat. Rar.* 1:30.1830; Hook.f., *Fl. Brit. India* 4: 631. 1885; Gamble, *Fl. Madras* 1132(792). 1924; Manilal & Sivar., *Fl. Calicut* 240. 1982; Ansari, *Fl. Kasaragod Div.* 309. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 372. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 662. 2009. *Elsholtzia paniculata* Willd., *Sp. Pl.* 3: 59. 1800.

Subshrubs. Leaves opposite, 8 x 4 cm, ovate, acuminate at either ends, irregularly dentate, densely hirtus-tomentose; lateral nerves 3-4 pairs; petiole 2 cm long, tomentose. Panicle large, terminal and from upper leaf axils, branches 5-10-flowered, 1-sided; bracteoles 5 x 3 mm, oblique, falcate, imbricating regularly. Flowers densely packed. Calyx 4 mm long, 5-ribbed; lobes acuminate, hirtus. Corolla white, 6 mm long; pubescent outside; filaments sparsely hairy.

Moonamthode, NS & KVB 31394

Fl. & Fr.: October-February

Distribution: Common in plantations of Kariyenkappu; evergreen forests of Crossway, Chavachi and Moonamthode.

Pogostemon peethapushpum Pradeep, *Candollea* 53: 419. 1998 (Plate 16c).

Subshrubs to ca 1.5 m tall. Leaves opposite, decussate, 6-12 x 5-7 cm, ovate, acute to acuminate at apex, truncate at base; 3-5-nerved, nerves prominent beneath; petiole 5-8 cm long. Inflorescence of few flowered axillary cymose panicles, 5-9 cm long; bracts subulate. Flowers erect. Calyx tubular, 8-10 mm long, tube 5-6 mm long, prominently 6-nerved, 5-toothed. Corolla yellow, funnel-shaped, 8-9 mm long, tube 6 mm long; upper lip 3-lobed, lobes subequal, rotund, 2 x 2 mm, glabrous inside and densely hispid outside; lower lip entire, ovate-lanceolate, 2.5 x 2 mm, subacute at apex, veins conspicuous. Stamens 4, exserted, didynamous. Ovary 4-partite, glandular and simple hairy dorsally and apically; style bifid at apex.

Ambalappara, KVB 31588

Fl. & Fr.: January-April

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats of Kerala.

Pogostemon pubescens Benth. in DC. Prodr. 12: 142. 1848; Gamble, Fl. Madras 1133(792). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 372. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 663. 2009. *Pogostemon parviflorus* Benth., Pl. Asiat. Rar. 1: 31. 1830, p.p.; Hook.f., Fl. Brit. India 4: 632. 1885.

Shrubs. Leaves opposite, ca. 8 x 4 cm, ovate, apex acute, base cuneate, doubly crenate, membranous, sparsely hirsute; petiole to 3.5 cm. Panicles axillary and terminal; bracts 5 x 1 mm, oblong, ciliate. Calyx tube 4 mm, tooth 1 mm, ovate-lanceolate, pubescent. Corolla white with purple shades; tube 3 mm, upper lip, 3-lobed, 5 mm, lower lip 5 mm. Staminal filaments 6 mm long, purple bearded.

Ambalappara, KJD 18757

Fl. & Fr.: November-January

Distribution: Rare in evergreen forests of Amabalappara.

Pogostemon purpurascens Dalzell, Hooker's J. Bot. Kew. Gard. Misc. 2: 337. 1850; Hook.f., Fl. Brit. India 4: 632. 1885; Gamble, Fl. Madras 1133(792). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 372. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 663. 2009.

Densely pubescent diffuse herbs. Leaves opposite, to 9 x 6 cm, ovate, acute at apex, oblique at base, irregularly dentate, nerves 4 pairs; petiole 1 cm long. Spikes 10-20-flowered, clustered, racemose or paniced; bracteoles 6 x 4 mm, ovate-falcate, regularly imbricating, hairy; flowers densely packed. Calyx 5 mm

long, lobes acute, villous. Corolla 6 mm long; upper lip purple, 6 mm long, lower lip white, lobes acute, hairy. Staminal filaments bearded with purple moniliform hairs. Nutlets trigonous, dark brown, smooth

Kariyenkappu, *KJD 18772*

Fl. & Fr.: January-April

Distribution: Fairly common in the plantations at Kariyenkappu.

PREMNA L.

Mant. 154, 252. 1771, *nom. cons.*

1a. Staminal filaments glabrous; leaves oblong *P. glaberrima*

1b. Staminal filaments hairy; leaves broadly ovate..... *P. coriacea*

Premna coriacea C.B. Clarke in Hook.f., Fl. Brit. India 4: 573. 1885; Gamble, Fl. Madras 1095(766). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 356. 1988; Rajendran & Daniel, Indian Verbenaceae 226. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 642. 2009.

Large climbing shrubs; branchlets pilose, lenticellate. Leaves opposite, 18 x 10 cm, ovate-oblong, abruptly acuminate at apex, cordate at base, entire, glabrous; nerves 4-5 pairs, very prominent beneath. Cymes to 15 cm across, corymbose, terminal; branches pilose; peduncles to 12 cm long, erect; bracts 3 mm long, ovate. Flowers many, creamy white; pedicels 1 mm long hispid. Calyx 1 mm long, truncate, pinkish brown, puberulus. Corolla 3.5 mm long, hairy.

Kariyenkappu, *NS & KVB 31371*

Fl. & Fr.: January-May

Distribution: Rare in plantations of Kariyenkappu and evergreen forests of Meenmutty.

Premna glaberrima Wight, Icon. Pl. Ind. Orient. t. 1484. 1849; Hook.f., Fl. Brit. India 4: 577. 1885; Gamble, Fl. Madras 1096(767). 1923; Pandura. & V.J. Nair, J. Econ. Taxon. Bot. 17: 180. 1993; 511; Rajendran & Daniel, Indian Verbenaceae 240. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 642. 2009.

Shrubs; branchlets scandent, puberulous. Leaves opposite, 15 x 6 cm, elliptic-oblong, abruptly acuminate, rounded at base, entire or distantly serrulate, glabrous; nerves 6-7 pairs; petiole 1.5 cm long. Cymes 5 x 5 cm, terminal, corymbose; pedicels 2 mm long, hairy. Calyx 2 mm long, shortly bilipped, hispid. Corolla greenish white or cream, 5 mm long, throat hairy. Drupes 3 x 3 mm, hispid; seed one, rugose, brown.

Kariyenkappu, *KJD 26113*

Fl. & Fr.: March-June

Distribution: Rare in plantations of Kariyenkappu and evergreen forests of Pothanplavu. Endemic to southern Western Ghats.

ROTHECA Raf.

Fl. Tellur. 4: 69. 1838.

Rothea serrata (L.) Steane & Mabb., Novon 8: 206. 1998. *Volkameria serrata* L., Mant. Pl. 1: 90. 1767. *Clerodendrum serratum* (L.) Moon, Cat. Pl. Ceylon 46. n.382. 1824; Hook.f., Fl. Brit. India 4:592.1885; Gamble, Fl. Madras 1100(770). 1924; Manilal & Sivar., Fl. Calicut 233. 1982; Ansari, Fl. Kasaragod Div. 293. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 354. 1988; Rajendran & Daniel, Indian Verbenaceae 139. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 638. 2009. *Cyclonema serratum* (L.) Hochst., Flora 25: 227. 1842.

Shrubs to 2 m tall; stems and branches purplish, obtusely tetragonous. Leaves opposite, or ternate. 8-22 x 5-14 cm, broadly elliptic-ovate or obovate, apex acuminate, base attenuate to acute, margin coarsely serrate, glabrous above and pubescent along the nerves below, thin-coriaceous; petiole to 1 cm long. Inflorescence elongate, terminal cymose panicles, 16-28 cm long, pubescent. Bracts ternate, 0.8-1.5 x 0.3-1 cm, ovate-lanceolate. Calyx 5-6 mm long, c. 5 mm across, cup-shaped, teeth ciliate. Corolla bluish; tube 0.8-1.2 cm long; lobes spreading, 2-lipped, 0.8-1 x 0.5-0.7 cm, unequal, oblong. Stamens 4; filaments 2-2.5 mm long, exserted. Ovary c. 2.5 mm across, globose. Drupe 4-lobed, 0.8-1.2 cm across, subglobose, dark-purple; seeds 2-4, 4-5 mm across, globose.

Valayamchal near Farm, 26300

Fl. & Fr.: August-December

Distribution: Moist deciduous forests and Plantations.

SCUTELLARIA L.

Sp. Pl. 598. 1753.

Scutellaria violacea Heyne ex Benth., Pl. Asiat. Rar. 1: 66. 1830; Hook.f., Fl. Brit. India 4: 668. 1885; Gamble, Fl. Madras 1142(798). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 373. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 664. 2009. *Scutellaria violacea* Heyne ex Benth. var. *sikkimensis* Hook.f., Fl. Brit. India 4: 668. 1885.

Erect herbs; stem hispid. Leaves opposite, 5 x 4 cm, deltoid, ovate, acute, crenate, base cordate, hispid; lateral nerves 5 or 6 pairs; petiole 1-2 cm long. Racemes to 15 cm long, glandular hispid; bracts ovate, 3 mm long; flowers

paired, long-pedicelled. Calyx glabrous, upper lobe 7 x 5 mm, saccate, lower lip 4 x 3 mm. Corolla pale blue, 15 mm long, lateral lobes of lower lip shorter, glabrous. Staminal filaments fimbriate at base; anthers bearded, confluent. Nutlets spherical, tuberculate.

Ambalappara, KVB 31586

Fl. & Fr.: February-March

Distribution: Rare in evergreen forests of Ambalappara.

TEUCRIUM L.

Sp. Pl. 562. 1753.

Teucrium tomentosum Heyne ex Benth., Pl. Asiat. Rar. 1: 58. 1830; Hook.f., Fl. Brit. India 4: 700. 1885; Gamble, Fl. Madras 1158(809). 1924 (Plate 16d).

Erect shrubs; branchlets tomentose. Leaves opposite, to 11 x 6 cm, ovate, acute at apex, rounded at base, crenate, hairy along nerves; petiole 1-3 cm long. Racemes paniced, terminal and axillary; bracts 3 mm long, ovate, small; flowers closely packed; pedicellate. Calyx 6 mm long, lobed near the apex, lobes equal, acute, hairy. Corolla yellow to white, 11 mm long, upper lip absent, lower lip 3-lobed, lateral lobes smaller. Stamens didynamous, filaments glabrous; anthers reniform. Style filiform, stigma bifid. Nutlets 4, basely united, globular, reticulately pitted, glandular.

Pothurumi, KJD 26307

Fl. & Fr.: September-December

Distribution: Rare in the lower reaches of evergreen forests of Ambalappara.

VITEX L.

Sp. Pl. 638. 1753.

- 1a. Leaves grey-pubescent beneath..... *V. negundo*
- 1b. Leaves glabrous..... 2
- 2a. Flowers in terminal tomentose panicles; petiole winged *V. altissima*
- 2b. Flowers in axillary corymbose dichasial cymes; petiole not winged *V. leucoxydon*

Vitex altissima L.f., Suppl. Pl. 294. 1781; Hook.f., Fl. Brit. India 4: 584. 1885; Gamble, Fl. Madras 1102(772). 1924; Ansari, Fl. Kasaragod Div. 299. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 359. 1988; Rajendran & Daniel, Indian Verbenaceae 344. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 645. 2009. *Vitex alata* Willd., Gen. Naturf. Fr. New Schr. 4: 203. 1803, non Heyne ex Roth 1821; Hook.f., Fl. Brit. India 4: 584. 1885. *Vitex altissima* L.f. var. *alata* (Willd.) Trimen, Handb. Fl. Ceylon 3: 358. 1895; Manilal & Sivar., Fl. Calicut 228. 1982.

Trees, to 30 m high; bark greyish-yellow. Leaves opposite, leaflets 3-5, sessile, 6-18 x 2-5 cm, lanceolate, elliptic-lanceolate, or oblanceolate, apex acuminate, base cuneate or acute; lateral nerves 10-16 pairs, pinnate, puberulent beneath; intercostae reticulate. Flowers white, tinged with blue, in terminal panicles; bracts lanceolate, 3 mm long, cauducous. Calyx densely tomentose, shortly 5 lobed, ovate. Corolla 5 mm long, 2 lipped, upper lip of 2 and lower lip of 3 lobes, obtuse, throat villous. Stamens 4, didynamous, exserted; filaments hairy at base. Ovary globose, 1 mm, superior, densely hairy, 2-4-celled, 4 ovuled; style filiform; stigmas bifid. Fruit a drupe, 5 x 5 mm, smooth, globose, glabrous, blue, supported by enlarged calyx; seeds 4, obovate.

Kannadivechakunnu, *KJD 26195*

Fl. & Fr.: March-July

Distribution: Fairly common in evergreen forests of Kannadivechakunnu and Meenmutty.

Vitex leucoxylo L.f., Suppl. Pl. 293. 1781; Hook.f., Fl. Brit. India 3: 587. 1885; Gamble, Fl. Madras 1103(772). 1923; Manilal & Sivar., Fl. Calicut 228. 1982; Rajendran & Daniel, Indian Verbenaceae 356. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 646. 2009. *Wallrothia leucoxylo* (L.f.) Roth, Nov. Pl. Sp. 391. 1821.

Deciduous trees, to 20 m high; bark yellowish-grey. Leaves opposite, decussate, leaflets 3-5, whorled, 2.5-16 x 1.5-4 cm, elliptic, elliptic-oblong or lanceolate, base acute or attenuate, apex acute or obtusely acuminate; rachis 5.5-8.5 cm; lateral nerves 5-14 pairs, pinnate, prominent, intercostae reticulate. Flowers in axillary corymbose cymes, to 17 cm long. Calyx cupular, sparsely appressed puberulent; tube 2 mm long, 5-toothed. Corolla white, bilipped, purplish-pubescent in the throat; lobes 5. Stamens 4, didynamous, inserted below the throat of the corolla tube, slightly exserted; filaments thickened and villous towards the base. Ovary globose; style filiform; stigma bifid. Fruit a drupe, 1.2-2 cm long, obovoid, purple-black, fleshy.

Valayamchal, *KJD 31483*

Fl. & Fr.: March-July

Distribution: Rare along river banks in semi-evergreen forests at Valayamchal.

Tectona grandis L.f. plantations raised by Forest Department is still in the Sanctuary. **Vitex negundo** L. also seen as cultivated Medicinal plants.

LINDERNIACEAE

- 1a. Calyx winged in fruit Torenia
- 1b. Calyx not winged Lindernia

LINDERNIA All.

Melanges Philos. Math. Soc. Roy. Turin. 3(1): 178. 1766.

- 1a. Perfect stamens 4, staminoides absent 2
- 1b. Perfect stamens 2, staminoides 2 3
- 2a. Calyx shortly toothed, glabrous *L. crustacea*
- 2b. Calyx deeply divided, hairy *L. caespitosa*
- 3a. Leaves penninerved 4
- 3b. Leaves 3-ribbed from base *L. parviflora*
- 4a. Leaves base truncate, margin aristate-entate *L. ciliata*
- 4b. Leaves base attenuate, sub entire to distantly serrate 5
- 5a. Prostrate herbs, bracts linear-lanceolate *L. antipoda*
- 5b. Erect herbs, bracts setaceous *L. oppositifolia*

Lindernia antipoda (L.) Alston, Fl. Ceylon 6: 214. 1931; Manilal & Sivar., Fl. Calicut 200. 1982; Ansari, Fl. Kasaragod Div. 258. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 316. 1988; Joseph, Aquatic Angiosp. Malabar 224. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 581. 2009. *Ruellia antipoda* L., Sp. Pl. 635. 1753. *Gratiola grandiflora* Roxb., Pl. Coromandel t. 179. 1805. *Gratiola veronicifolia* Retz., Observ. Bot. 4: 8. 1786. *Bonnaya grandiflora* (Roxb.) Spreng., Syst. Veg. 1: 41. 1824. *Bonnaya veronicifolia* (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Hook.f., Fl. Brit. India 4: 285. 1884. *Ilysanthes veronicifolia* (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Madras 962(675). 1923. *Lindernia anagallis* (Burm.f.) Pennell var. *grandiflora* (Retz.) Mukerjee, J. Indian Bot. Soc. 24. 133. 1945.

Prostrate or diffuse herbs, rooting at the nodes. Leaves opposite, variable 1.5-2.5 x 0.5-1 cm, elliptic-obovate, apex obtuse, base cuneate, margin subentire to serrate; penninerved, subsessile. Flowers solitary, axillary or in terminal racemes; bracts leafy; pedicle to 1 cm long. Calyx divided to the base; lobes c. 4 mm long, lanceolate, margin scarious. Corolla bluish with an yellow mouth, 6-8 mm long, internally short pilose between the staminodes. Stamens 2, fertile; staminodes 2, hooked. Capsule 1-1.4 cm long, linear-lanceolate; seeds yellow, ridged.

Narikkadavu, KVB 31435

Fl. & Fr.: June-February

Distribution: Common along River banks.

Lindernia caespitosa (Blume) Panigrahi, Taxon 33: 320. 1984; Ansari, Fl. Kasaragod Div. 259. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 317. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 582. 2009. *Diceros caespitosus* Blume, Bijdr. Fl. Ned. Ind. 753. 1826. *Lindernia pusilla* (Willd.) Boldingh, Zakfl. Java 165. 1916; Manilal & Sivar., Fl. Calicut 199. 1982. *Gratiola pusilla* Willd., Sp. Pl. 1: 105. 1797. *Vandellia scabra* Benth., Scroph. Ind. 36. 1835; Hook.f., Fl. Brit. India 4: 281. 1884; Gamble, Fl. Madras 959(673). 1923. *Lindernia hirta* (Cham. & Schltr.) Pennell, J. Arnold Arbor. 24: 250. 1943.

Prostrate or diffuse herbs, rooting at nodes, hirsute. Leaves opposite, 1-1.5 x 0.7-1 cm, ovate-orbicular, apex acute, base rounded, margin crenate-serrate, sub-glabrous to pubescent above, hirsute beneath, pinnately nerved, subsessile. Flowers axillary 2 per node; pedicel 1-1.5 cm, long, glabrous to sparsely glandular-pubescent. Calyx-lobes 5, divided to the base, c. 3 mm long, oblong-lanceolate, margin scarious. Corolla 5-8 mm long, tube white, yellow at mouth, upper lip pale brown or completely violet. Stamens 4, lower pair appendaged. Capsule c. 3 mm, subglobose, equalling or shorter than fruiting calyx; seeds yellow, short cylindric.

Narikkadavu, KVB 31438

Fl. & Fr.: May-October

Distribution: Common along Riverbanks at Narikkadavu.

Lindernia ciliata (Colsm.) Pennell, Brittonia 2: 182. 1936; Manilal & Sivar., Fl. Calicut 199. 1982; Ansari, Fl. Kasaragod Div. 259. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 317. 1988. *Gratiola ciliata* Colsm., Prodr. Desc. Grat. 14. 1793. *Gratiola serrata* Roxb., Fl. Ind. 1: 140. 1820. *Ilysanthes serrata* (Roxb.) Urban, Berl. Deutsch. Bot. Ges. 2: 436. 1884; Gamble, Fl. Madras 962(675). 1923. *Bonnaya brachiata* Link & Otto, Ic. Pl. Select. 25, t.11. 1820; Hook.f., Fl. Brit. India 4: 284. 1884.

Small erect annual herbs. Leaves opposite, 0.8-1.5 x 0.4-0.6 cm, elliptic-oblong, apex obtuse or acute, base rounded, margin aristate-dentate, penninerved, sessile. Flowers in lax terminal racemes; pedicels 1-2 mm long; bracts leafy, 2-3 mm long. Calyx-lobes 5, ca 5 mm long, linear. Corolla pink or bluish-pink, 8 mm long, tube curved, 2-lipped. Stamens 2; anthers unequal; staminodes with divergent hooks. Ovary 2-3 mm long, elongate. Capsule 1-1.5 cm long, linear, septum winged, exceeding the fruiting calyx; seeds black.

Kariyenkappu, KJD 26398

Fl. & Fr.: June-October

Distribution: Rare along Riversides at Kariyenkappu.

Lindernia crustacea (L.) F.Muell., Syst. Cens. Austral. Pl. 1: 97. 1882; Manilal & Sivar., Fl. Calicut 199. 1982; Ansari, Fl. Kasaragod Div. 260. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 317. 1988; Joseph, Aquatic Angiosp. Malabar 225. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 582. 2009. *Capraria crustacea* L., Mant. Pl. 1: 87. 1767. *Vandellia crustacea* (L.) Benth., Scroph. Ind. 35. 1835; Hook.f., Fl. Brit. India 4: 274. 1884; Gamble, Fl. Madras 959(673). 1923.

Prostrate, diffusely branched herbs, rooting at nodes; stem 4-angled, slightly winged on angles. Leaves opposite, 0.8-1.5 x 0.7-1.2 cm, ovate, apex subacute, base truncate, margin serrate, penninerved; petiole c. 5 mm long. Flowers axillary, solitary or 2-per node on terminal racemes; pedicel 1-1.2 cm long. Calyx 4 mm long, divided to 1/3, 5-ribbed, lobes elliptic-lanceolate, ciliate on margins. Corolla rose to purple, tube 5 mm long. Stamens 4, didynamous; lower pair of stamens with a subulate appendage at the middle of filament. Ovary globose. Capsule c. 5 mm long, 2-3 mm across, ovoid; seeds minute, many.

Narikkadavu, KVB 31463

Fl. & Fr.: August-November

Distribution: Common at Riverbanks of Narikkadavu, Kariyenkappu and Chavachi.

Lindernia oppositifolia (Retz.) Mukerjee, J. Indian Bot. Soc. 24: 134. 1945; Manilal & Sivar., Fl. Calicut 200. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 318. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 584. 2009. *Gratiola oppositifolia* Retz., Observ. Bot. 4: 8. 1786. *Bonnaya oppositifolia* (Retz.) Spreng., Syst. Veg. 1: 41. 1824; Hook.f., Fl. Brit. India 4: 286. 1884. *Vandellia oppositifolia* (Retz.) Haines, Bot. Bihar and Orissa 634. 1922. *Ilysanthes oppositifolia* (Retz.) Urban, Berl. Deutsch. Bot. Ges. 2: 435. 1884; Gamble, Fl. Madras 962(676). 1923.

Procumbent herbs; stems glabrous. Leaves opposite, 4 x 0.5 cm, linear-oblong, acute, distantly serrate, sessile. Racemes to 13 cm long, terminal; pedicels opposite, 2 cm long, slender, perpendicular to the axis; flowers paired. Sepals 7 mm long, linear lanceolate, free to the base. Corolla 12 mm long; upper lip entire or emarginate, lower lip equally 3-lobed. Anthers divaricate; staminodes linear, bulged at apex. Capsule 17 x 1.5 mm, terete; seeds 0.3 mm long, obovoid, minutely muriculate.

Narikkadavu, KVB 31462

Fl. & Fr.: July-October

Distribution: Rare along the riverbank at Narikkadavu. Endemic to Peninsular India.

Lindernia parviflora (Roxb.) Haines, Bot. Bihar and Orissa 645. 1922; Manilal & Sivar., Fl. Calicut 201. 1982; Ansari, Fl. Kasaragod Div. 260. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 318. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 584. 2009. *Gratiola parviflora* Roxb., Corom. Pl. 3: 3, t.204. 1811. *Ilysanthes parviflora* (Roxb.) Benth., Scroph. Ind. 34. 1835; Hook.f., Fl. Brit. India 4: 283. 1884; Gamble, Fl. Madras 961(675). 1923.

Decumbent herbs, 10-20 cm high; stems glabrous. Leaves opposite, 1.5 x 0.7 cm, ovate, acute, entire, sessile; nerves 3 pairs. Flowers in terminal racemes or upper axillary; bracts 5 x 3 mm, ovate; pedicel deflexed in fruit, 1.5 cm long. Sepals 3 mm long, connate at base. Corolla 6 mm long; upper lip bifurcated at apex; lower lip obtusely 3-lobed. Stamines with lateral vermiform appendages. Capsule 5 x 2.5 mm, ovoid, glabrous; seeds 0.3 mm long, obovoid, yellow, glabrous.

Ambalappara, KJD 26124

Fl. & Fr.: June-October

Distribution: Rare in evergreen forests of Ambalappara.

TORENIA L.

Sp. Pl. 619. 1753.

- 1a. Perfect stamens 4, staminoides absent *T. courtallensis*
1b. Perfect stamens 2, staminoides 2 *T. hirsuta*

Torenia courtallensis Gamble, Bull. Misc. Inform. Kew 1923: 116. 1923 & Gamble, Fl. Madras 956(671). 1923. *Torenia cordifolia* sensu Hook.f., Fl. Brit. India 4: 276. 1884 p.p., non Roxb. 1802.

Creeping herbs; stems slender, glabrous. Leaves opposite, 2.5 x 1.5 cm, ovate-deltoid, acute, rounded at base, sparsely hairy; petiole 0.5 cm long. Flowers axillary, solitary; pedicels to 7 cm long; hirtus. Calyx 0.8 cm long, broadly winged; wing ciliate. Corolla tube white; lobes obtuse, hairy, bluish violet. Appendage on staminal filaments 3 mm long, clavate. Capsule 8 mm long, ellipsoid, glabrous.

Kariyenkappu, KVB 31254; NS & KVB 31324; Ambalappara, KJD 31465

Fl. & Fr.: June-February

Distribution: Common in evergreen forests of Chavachi to Ambalappara, and Asthippara.

Torenia hirsuta Willd., Sp. Pl. 3: 266. 1800; DC., Prodr. 5: 410. 1836. *Torenia hirsuta* Willd. var. *hirsuta* Hook.f., Fl. Brit. India 4: 277. 1884 (Plate 16e).

Creeping herbs; stems slender, glabrous. Leaves opposite, 2.5 x 1.5 cm, ovate-deltoid, acute, rounded at base, sparsely hairy; petiole 0.5 cm long. Flowers axillary, solitary; pedicels to 7 cm long; hirtus. Calyx 0.8 cm long, broadly winged; wing ciliate. Corolla tube white; lobes obtuse, hairy, bluish violet. Appendage on staminal filaments 3 mm long, clavate. Capsule 8 mm long, ellipsoid, glabrous.

Ambalappara, KJD 31465

Fl. & Fr.: June-February

Distribution: Common in evergreen forests of Chavachi to Ambalappara, and Asthippara.

LENTIBULARIACEAE

UTRICULARIA L.

Sp. Pl. 18. 1753.

- 1a. Foliar organs orbicular, Lower lip of corolla 5 lobbed *U. striatula*
- 1b. Foliar organs linear, Lower lip 2-3 lobed 2
- 2a. Racemes twining, flowers more than 15 mm *U. reticulata*
- 2b. Racemes erect, flowers less than 12 mm *U. graminifolia*

Utricularia graminifolia Vahl, Enum. Pl. 1: 195. 1804; Gamble, Fl. Madras 981(690). 1924; Manilal & Sivar., Fl. Calicut 208. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 323. 1988; M.K. Janarth. & Henry, Bladderworts India 57. 1992; Joseph, Aquatic Angiosp. Malabar 87. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 593. 2009. *Utricularia smithiana* Wight, Hooker's J. Bot. Kew Gard. Misc. 1: 373. 1849; Gamble, Fl. Madras 982(690). 1924; M.K. Janarth. & Henry, Bladderworts India 101. 1992. *Utricularia conferta* Wight, Icon. Pl. Ind. Orient. t. 1575. 1850. *Utricularia caerulea* sensu C.B. Clarke in Hook.f., Fl. Brit. India 4: 331. 1884, non L. 1753 (Plate 16f).

Herbs; rhizoids up to 2.5 mm long. Foliar organs up to 10 x 1.5 mm, linear to strap-shaped, at base of scape and on stolons, 3-nerved, nerves branched further, rounded to obtuse or rarely retuse at apex. Traps 1-3 mm across, subglobose, slightly compressed, numerous on vegetative organs; those on leaves sessile or subsessile; appendages 2, subulate simple, glandular. Racemes up to 30 cm long, 1-1.5 mm thick, erect, rarely branched, 1-9 flowered. Flowers 7-12 mm long. Calyx-lobes ovate to lanceate; upper lobes 3-6 x 2-3.5 mm; lower 2.5-5.8 x 1.5-3 mm, 2-4 dentate at apex. Corolla blue to violet or pink; upper lip 4-6.5 x 2-3.5 mm, ciliate along lower margin; lower lip 4-7 x 3-7 mm, obovate, hairy

in throat; spur 4.5-7 mm long, curved, conical, acute at apex. Stamens 1.5-2 mm long; filaments strap-shaped. Pistil 1.5-2 mm long; ovary ovoid, compressed; style short; stigma 2-lipped. Capsules 3-4 mm long, ovoid, thickened along dehiscent margin.

Ambalappara, NS & KJD 31966

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Ambalappara.

Utricularia striatula Sm., Res. Cyclop. 37: n.17. 1819; Gamble, Fl. Madras 983(691). 1924; Subram., Indian For. 96: 528. 1970; Ramach. & V.J. Nair, Fl. Cannanore Dist. 324. 1988; M.K. Janarth. & Henry, Bladderworts India 106. 1992; Joseph, Aquatic Angiosp. Malabar 94. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 594. 2009. *Utricularia orbiculata* Wall. ex DC. in DC. Prodr. 8: 18. 1844; Hook.f., Fl. Brit. India 4: 334. 1884. *Utricularia glochidiata* Wight, Hooker's J. Bot. Kew Gard. Misc. 1: 373. 1849 & Ic. t. 1581. 1850.

Slender herbs; rhizoids up to 2.5 cm long. Foliar organs with pseudopetiole up to 15 mm long, orbicular to obovate. Traps up to 1.5 mm across, globose to obliquely ovoid; appendages glandular hairy, on expanded, divergent upper lip. Racemes up to 18 mm long, erect, often zigzag, glabrous, up to 10 flowered. Flowers up to 10 mm long. Calyx-lobes unequal, papillose; upper lobe 1.2-4 x 2-4 mm; lower lobe 0.6-2 x 0.4-2 mm. Corolla pink, lilac, violet, white to variously tinged, often yellow-blotched near base; upper lip 0.6-2 mm across, semiorbicular to deltoid; lower lip 3-7 x 3-10 mm, 3-or 5-lobed, throat hairy; spur 1-6 mm long, cylindrical or conical, rarely reduced to a mound, obtuse, acute or retuse at apex. Stamens up to 1.2 mm long; filaments strap-shaped, curved. Pistil up to 1.2 mm long; ovary obliquely ovoid, attached to base of upper calyx-lobe; style distinct; stigma 2-lipped. Capsules 1.5-3.5 mm long, obliquely ovoid, attached to upper calyx-lobe; seeds 0.3-0.4 mm long, clavate, cylindrical or oblongoid.

Kariyenkappu, KJD 26118

Fl. & Fr.: June-November

Distribution: Common in almost all areas on wet rocks.

Utricularia reticulata Sm., Exot. Bot. 2. t.119. 1805; Hook.f., Fl. Brit. India 4: 331. 1884; Gamble, Fl. Madras 982(690). 1924; Manilal & Sivar., Fl. Calicut 208. 1982; Ansari, Fl. Kasaragod Div. 266. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 324. 1988; M.K. Janarth. & Henry, Bladderworts India 91. 1992; Joseph, Aquatic Angiosp. Malabar 90.1991; Ratheesh, Fl. Stud. Wayanad Dist. 593.2009.

Terrestrial herbs; rhizoids up to 2 cm long, capillary; stolons upto 5 cm long, capillary, profusely branched. Foliar organs upto 1 cm long, narrowly linear, 1-nerved, attenuate at base, obtuse at apex. Traps numerous, 0.5-1 mm long, subglobose; appendages 2, subulate. Racemes up to 45 cm long, twining, rarely erect; scales similar to the bracts; bracts 2-3 x 1-1.5 mm, ovate to lanceolate, basifixed, apex acute; bracteoles subulate, about as long as bract. Flowers 1.5-2.5 cm long; pedicles 5-15 mm long, erect at anthesis, deflexed in fruit, narrowly winged. Calyx-lobes subequal, 4-8 x 3-7 mm, lanceolate to ovate, acute to acuminate at apex. Corolla violet, blue or white; upper lip 7-12 mm long, obovate or suborbicular; lower lip 10-15 x 8-11 mm, orbicular to obovate, apex rounded; spur subulate about as long as the limb, conical, slightly curved. Stamens 2-3 mm long. Ovary ovoid; stigma 2-lipped, truncate at apex. Capsules 4-6 x 3-4 mm, ovoid or discoid, compressed; seeds obovoid, testa reticulate.

Ambalappara, NS & KJD 31970

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Ambalappara .

OLEACEAE

- 1a. Climbers..... 2
- 1b. Trees or shrubs 3
- 2a. Stem quadrangular, leaves 3-ribbed from base Myxopyrum
- 2b. Stem terete, leaves penni-nerved Jasminum
- 3a. Petals united in pairs Chionanthus
- 3b. Petals united at base in to tube 5
- 4a. Flowers polygamous, panicle axillaryOlea
- 4b. Flowers all bisexuals, panicle terminal..... Ligustrum

CHIONANTHUS L.

Sp. Pl. 8. 1753.

Chionanthus mala-elengi (Dennst.) P. S. Green, Bull. Bot. Surv. India 26: 124 1984; Ramach. & V.J. Nair, Fl. Cannanore Dist. 269. 1988; Srivastava & Kapoor, J. Econ. Taxon. Bot. 15: 133. 1991; P. S. Green, Kew Bull. 58: 264. 2003; Ratheesh, Fl. Stud. Wayanad Dist. 507. 2009. *Forsythia mala-elengi* Dennst., Schlüssel Hortus Malab. 12,21, 31. 1818. *Linociera malabarica* Wall. ex G.Don, Gen. Hist. 4: 53. 1837-1838; Hook.f., Fl. Brit. India 3: 607. 1882; Gamble, Fl. Madras 794(558). 1923; Manilal & Sivar., Fl. Calicut 158. 1982; Ansari, Fl. Kasaragod Div. 223. 1985. *Chionanthus malabaricus* (Wall. ex G.Don) Bedd., Fl. Sylv. S. India t. 239. 1872.

Trees, to 12 m high, bark greyish-brown, covered with warty lenticels; branchlets thinly tomentose. Leaves opposite, 5-10 x 2.5-5.5 cm, obovate or elliptic-oblong, apex obtuse or suddenly narrowed to a small blunt acumen, base cuneate, margin entire, glabrous, glaucous beneath, coriaceous; petiole 4-10 mm, stout, glabrous, grooved above; lateral nerves 9-13 pairs, slender, pinnate; intercostae reticulate, faint. Flowers bisexual, yellowish-white, sessile, 6 mm long, in axillary clusters; peduncle 1.5 cm long. Calyx lobes 1.5 mm, ovate, obtuse, grey-pubescent. Corolla 7 mm long, lobes attached in pairs, linear acuminate, glabrous. Stamens 2, anthers sessile. Ovary densely hairy, stigma shortly bifid. Fruit a drupe, 10 x 5 mm, ellipsoid, slightly curved, acute, ridged.

Kariyenkappu, *KVB 31210*; *NS & KJD 31994*

Fl. & Fr.: December-April

Distribution: Common in plantations of Kariyenkappu; semi-evergreen forests of Pothanplavu and Paripode. Endemic to Peninsular India.

JASMINUM L.

Sp. Pl. 8. 1753.

- 1a. Leaves simple *J. coarctatum*
1b. Leaves trifoliate *J. flexile*

Jasminum coarctatum Roxb., Fl. Ind. 1: 91. 1820; P. S. Green, Kew Bull. 58: 289. 2003; Ratheesh, Fl. Stud. Wayanad Dist. 508. 2009. *Jasminum rottlerianum* Wall. ex DC., Prodr. 8: 305. 1844; Hook.f., Fl. Brit. India 3: 593. 1882; Gamble, Fl. Madras 789(555). 1923; Ansari, Fl. Kasaragod Div. 224. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 272. 1988; Seema & Narayanan, J. Econ. Taxon. Bot. 26: 129. 2002. *Jasminum rottlerianum* Wall. ex DC. var. *glabrior* C.B. Clarke in Hook.f., Fl. Brit. India 3:593. 1882; Manilal, Fl. Silent Valley 171. 1988.

Climbing shrubs, pubescent or tomentose. Leaves opposite, to 10 x 5 cm, ovate-lanceolate, apex acute to acuminate, villous or subglabrous; petiole 1 cm, pubescent. Cymes terminal and axillary, bracts ovate, bracteoles linear, tomentose. Calyx tube 2 mm, 7-lobed, 5 mm, linear, curled, pubescent. Corolla white, tube 2.5 cm long, lobes 5-7, oblong, obtuse, twisted, 1.5 cm. Ovary 1 mm across; style 7 mm, stigma clavate. Fruit didymous, subglobose, 1 cm across, purple.

Chavachi, *NS & KVB 31315*

Fl. & Fr.: January-June

Distribution: Common in evergreen forests of Chavachi; semi-evergreen forests of Paripode and plantation of Kariyenkappu.

Jasminum flexile Vahl, Symb. Bot. 3: 1. 1794 & Enum. Pl. 1: 31. 1804; Hook.f., Fl. Brit. India 3: 601. 1882; Gamble, Fl. Madras 791(555). 1923; P. S. Green, Kew Bull. 58: 280. 2003; Ratheesh, Fl. Stud. Wayanad Dist. 510. 2009. *Jasminum azoricum* sensu Mohanan, Fl. Quilon Dist. 248. 1984, non Burm.f., 1768; Ramach. & V.J. Nair, Fl. Cannanore Dist. 270. 1988. *Jasminum flexile* Vahl var. *travancorense* Gamble, Fl. Madras 791(556). 1921. *Jasminum azoricum* L. var. *travancorense* (Gamble) Mohanan, J. Econ. Taxon. Bot. 6: 480. 1985.

Climbing shrubs; stem glabrous. Leaves trifoliate, leaflets subequal, to 10 x 5 cm, ovate-lanceolate, apex acuminate, base rounded, glabrous, acumen curved; lateral nerves 7 pairs; petiolules unequal, middle petiolulate to 2.5 cm long, laterals smaller. Cymes to 15 cm long, terminal, corymbose, peduncled; bracts and bracteoles minute, subulate. Flowers many; pedicels 1.5 cm long. Calyx 3 mm long, truncate, glabrous. Corolla white with pink tinge, tube 3 cm long, lobes, 5 or 6, 13 x 6 mm, oblong, obtuse. Berry 10 x 5 mm, oblique-obovoid, black, glabrous.

Pothurumi, NS & KVB 31380

Fl. & Fr.: October-March

Distribution: Common in evergreen forests of Pothurumi, Kurumbankallu and Chavachi; semi-evergreen forests of Paripode and plantations of Kariyenkappu.

LIGUSTRUM L.

Sp. Pl. 7. 1753.

Ligustrum robustum (Roxb.) Blume subsp. **walkeri** (Decne.) P. S. Green, Kew Bull. 40: 130. 1985 & Rev. Handb. Fl. Ceylon 270. 1987; Ramach. & V.J. Nair, Fl. Cannanore Dist. 272. 1988; Srivastava, J. Econ. Taxon. Bot. 22: 625. 1998; P. S. Green, Kew Bull. 58: 267. 2003; Ratheesh, Fl. Stud. Wayanad Dist. 512. 2009. *Ligustrum walkeri* Decne., Nouv. Arch. Mus. Hist Nat. Paris 2: 27. 1879; Hook.f., Fl. Brit. India 3: 614. 1882; Gamble, Fl. Madras 797(560). 1923.

Large shrubs or small trees; branchlets with elliptical lenticels. Leaves opposite, 6-10 x 4-5 cm, ovate, acute, punctate; nerves indistinct; petiole 1 cm long. Panicle loose, branches puberulus; flowers distant; pedicel 2 mm long. Calyx tube 2 mm long, 5-toothed. Corolla 5 mm long; lobes longer than the tube, ovate, obtuse, white. Ovary truncate at apex; stigma spathulate. Berry 7 mm long, obovoid.

Ambalappara, KVB 31795

Fl. & Fr.: May-July

Distribution: Fairly common in evergreen forests of Ambalappara.

MYXOPYRUM Blume

Bijdr. Fl. Ned. Ind. 683. 1825.

Myxopyrum smilacifolium (Wall.) Blume, Mus. Bot. Ludg.-Bat. 1: 320. 1851; Hook.f., Fl. Brit. India 3: 618. 1882; Kiew, Blumea 29: 509. 1984; P. S. Green, Kew Bull. 58: 273. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 512. 2009. *Chionanthus smilacifolia* Wall., Fl. Ind. 1: 108. 1820. *Myxopyrum serratum* Hill., Bull. Misc. Inform. Kew 1910: 41. 1910; Gamble, Fl. Madras 798(561). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 272. 1988.

Twining shrubs; branches 4-angular. Leaves opposite, 7-13 x 3-5 cm, elliptic-ovate or oblong, base rounded to subcordate, margins serrulate from the middle towards apex, apex acuminate, basally 5-nerved, subcoriaceous; petiole to 1.2 cm long. Flowers in axillary trichotomous short panicles, 4-merous, bisexual. Calyx 1-1.5 cm long, lobes 4. Corolla yellowish, tube 1-2 mm long; lobes 4. Stamens 2, included. Ovary 2-locular; ovules 1-2-per locule; stigma 2-lobed. Berry 1-1.5 cm across, globose, black; seeds 2.

Kariyenkappu, *KJD 26258*

Fl. & Fr.: February-August

Distribution: Fairly common in plantations of Kariyenkappu and semi-evergreen forests of Pothanplavu.

OLEA L.

Sp. Pl. 8. 1753.

Olea dioica Roxb., Fl. Ind. 1: 105. 1820; Hook.f., Fl. Brit. India 3: 612. 1882; Gamble, Fl. Madras 796(559). 1923; Manilal & Sivar., Fl. Calicut 158. 1982; Ansari, Fl. Kasaragod Div. 224. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 273. 1988; P. S. Green, Kew Bull. 58: 259. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 513. 2009.

Trees, to 15 m high; bark grey or brown. Leaves opposite, 6-14.5 x 3-6 cm, elliptic, elliptic-oblong or elliptic lanceolate, apex acute to acuminate, base acute; petiole 7-10 mm; lateral nerves 8-12 pairs, pinnate; intercostae obscure. Flowers polygamo-dioecious, creamy-white, small, in panicles, axillary or from leafless nodes, pedicellate, 4 mm long, male panicles larger and denser than hermaphrodite. Calyx 1 mm, 4 toothed, campanulate, obtuse, ciliate. Corolla 2.5 mm long, lobes 4, shorter than the tube, triangular, obtuse, hairy within. Stamens 2, included, anthers sessile, 1 mm. Ovary 1.2 mm, 2-celled, superior, 4 ovuled; style 0.7 mm, short; stigma capitate. Fruit a drupe, 8 x 6 mm, ellipsoid, blue; seeds 6 x 4 mm, minutely muriculate.

Meenmutty, *KVB 31507*

Fl. & Fr.: November-April

Distribution: Common in evergreen forests of Meenmutty, semi-evergreen forests of Paripode and plantations at 55 Block. Endemic to India.

OROBANCHACEAE

- 1a. Plants leafless.....2
- 2a. Plants with leaves.....4
- 2a. Calyx spathaceous, split on one side..... Aeginetia
- 2b. Calyx tubular, 5-lobbed..... 3
- 3a. Anthers spurred; stigma peltate Christisonia
- 3b. Anthers not spurred; stigma not peltate..... Campbellia
- 4a. Leaves pinnatisect.....5
- 4b. Leaves Striga
- 5a. Calyx teeth linear, glabrous..... Parasopubia
- 5b. Calyx teeth ovate, woolly Spopubia

AEGINETIA L.

Sp. Pl. 632. 1753.

Aeginetia indica L., Sp. Pl. 632. 1753; Hook.f., Fl. Brit. India 4: 320. 1884; Gamble, Fl. Madras 974(685). 1924; Ramach. & V.J. Nair, Fl. Cannanore Dist. 323. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 590. 2009.

Parasitic leafless herbs, root stock short, horizontal; scapes many, erect, unbranched, naked, glabrous, deep pink or brown, 15-30 cm long. Flowers solitary; bracts and bracteoles absent. Calyx 2 cm long, glabrous, reddish. Corolla 3 cm long, dark purple, tube broad, lobes equal, rounded, glabrous. Upper stamens with one anther lobe; lower stamen with one sterile and one fertile lobes. Capsule 2 cm long, dehisce apically; seeds many, white, rugose.

Paripode, *KJD 25418*

Fl. & Fr.: August-September

Distribution: Rare in semi-evergreen forests of Paripode.

CAMPBELLIA Wight

Icon. Pl. Ind. Orient. t. 1424. 1849.

Campbellia neilgherrica (Gardner) Panigrahi & Das, Indian journal of Forestry, 5 (4): 323. 1982. *Christisonia neilgherrica* Gardner, Calcutta J. Nat. Hist. 8: 157. 1847; Hook.f., Fl. Brit. India 4: 322. 1884. *Campbellia cytinoides* Wight, Icon. Pl. Ind. Orient. t. 1425. 1849; Gamble, Fl. Madras 976(686). 1924. *Campbellia*

aurantiaca Wight, Icon. Pl. Ind. Orient. t. 1424. 1849 *Phelipaea cytinoides* Reuter in DC. Prodr. 11: 14. 1847 (Plate 16g).

Stout parasitic herbs; stems ca. 6 cm long, densely covered with thick scales; scales 10 x 8 mm, ovate, obtuse; whole plant yellow; leaves absent. Flowers in terminal clusters, sessile or shortly pedicelled; bracts 10 mm long, ovate, obtuse; bracteoles 2, each 8 mm long, ovate, boat shaped, acute, glandular hairy. Calyx 2 cm long, campanulate, lobes rounded, pubescent. Corolla 3 cm long, tube cylindrical, broad, lobes obovate, obtuse, glandular hairy. Anthers not spurred, filaments equal, to 17 mm long, glandular hairy at base. Ovary hemispherical, glabrous, style 20 mm long, hairy; stigma globose, papillose.

Ambalappa, *KJD 26123*

Fl. & Fr.: April-August

Distribution: Rare in evergreen forests of Ambalappara.

CHRISTISONIA Gardner

Calcutta J. Nat. Hist. 8: 153. 1897.

1a. Bracteoles present; whole plant glandular hairy, less than 15 cm tall *C. bicolor*

1b. Bracteoles absent; plants not glandular hairy, more than 25 cm tall *C. tubulosa*

Christisonia bicolor Gardner, Calcutta J. Nat. Hist. 8: 159. 1847; Hook.f., Fl. Brit. India 4: 322. 1884; Gamble, Fl. Madras 976(686). 1924. *Christisonia aurantiaca* Wight, Icon. Pl. Ind. Orient. t. 1486. 1849 (Plate 16h).

Parasitic leafless herbs, stem 8-12 cm long, pubescent; scales few, distant. Flowers peduncled and pedicellate; bracteoles 2, 8 x 3 mm, lanceolate, acute, pubescent. Calyx 18 mm long, brick-red, lobes short, triangular, acuminate, glandular pubescent. Corolla 6 cm long, tube narrow below, widening above, lobes yellow, orbicular, glandular hairy. Staminal filaments 25 mm long, sterile, anther lobes 3 mm long, spur-like, acuminate. Ovary 1-celled, placenta lobed, ovules many; style to 4.5 cm long, stigma peltate with a large pit at centre.

Kattikari, *KVB 31670*

Fl. & Fr.: August-February

Distribution: Rare in evergreen forests of Kattikari.

Christisonia tubulosa (Wight) Benth. ex Hook.f., Fl. Brit. India 4: 321. 1884; Gamble, Fl. Madras 975(685). 1924; Ratheesh, Fl. Stud. Wayanad Dist. 591. 2009. *Oligopholis tubulosa* Wight, Icon. Pl. Ind. Orient. t. 1422. 1849 (Plate 16i).

Fleshy leafless parasitic herbs, 15-26 cm high; stem scaly, simple or branched from the rootstock; scales 2-3 mm long, ovate-lanceolate. Inflorescence terminal, lax racemes; pedicels 1-2.5 cm long. Calyx tubular; tube 0.8-1.2 cm long; lobes obtuse. Corolla funnel-shaped, purplish white; tube 2.5-4 cm long, 2-lipped, 5-lobbed; lobes orbicular, subequal, lower lip yellowish at throat. Stamens 4, didynamous, connivent in pairs; anthers 2-celled, 1 cell perfect, other sterile, spurred. Ovary 1-celled, ovules many; style slender; stigma peltate. Capsule 0.8-1.2 cm long, ovoid, calyx tube persistent in fruits; seeds many, minute.

Ambalappara, *KVB 31413*; Vellachatam *KJD 31471*

Fl. & Fr.: July-August

Distribution: Rare in evergreen forests of Chavachi and Ambalappara. Endemic to southern Western Ghats.

PARASOPUBIA H.-P. Hofm. & Eb. Fisch.

Bot. Jahrb. Syst. 125: 357. 2004.

Parasopubia sp. (Plate 16j)

Suberect annual herbs, 10-25 cm height, stem terete. Leaves opposite, all 3-5 segmented, 1-1.5 cm long, lobes narrow, filiform, glabrous; margins entire. Flowers axillary, solitary; bracts 2, subulate, 2 mm long. Calyx 3-4 mm, lobbed, lobes 5, acuminate. Corolla purple, campanulate, tube up to 2 cm long, sparsely hairy, lobes 5, subequal, spreading, rounded; Anthers 4, pendent from apex of the filament. Ovary 2-celled. Capsules obovoid, 3 x 2 mm, calyx persistent.

Ambalappara, *KJD 26346*

Fl. & Fr.: October-January

Distribution: Rare in grasslands of Ambalappara.

This species is closely allied to *P. hofmannii* pradeep & Pramod (2013). But differed by Plant size, size and shape of leaf and lobes, flower size, colour, calyx, etc.

SOPUBIA Ham. ex D. Don

Prodr. Pl. Nepal. 88. 1825.

Sopubia trifida Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 88. 1825; Hook.f., Fl. Brit. India 4: 302. 1884; Gamble, Fl. Madras 970(682). 1924; Ratheesh, Fl. Stud. Wayanad Dist. 587. 2009 (Plate 16k).

Stout rigid herbs; stems hispid. Leaves 3-fid or upper ones entire; lobes 1-2 cm long, linear-oblong, coriaceous, covered with tubercle based hairs. Flowers axillary or in terminal racemes; pedicels 7 mm long. Calyx 3.5 mm long, campanulate, lobes triangular, glandular. Corolla 12 mm across, lobes rotate, subequal. Stamens 4, didynamous; anthers meeting in pairs, one anther cell

fertile and the other small and imperfect, bearded at base. Capsule 3 x 2.5 mm, emarginate at apex; seeds brown.

Ambalappara, *KJD 25459*

Fl. & Fr.: May-August

Distribution: Rare in evergreen forests of Ambalappara.

STRIGA Lour.

Fl. Cochinch. 17. 1790.

Striga asiatica (L.) Kuntze, Revis. Gen. Pl. 2: 466. 1981; Manilal & Sivar., Fl. Calicut 194. 1982; Ansari, Fl. Kasaragod Div. 263. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 321. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 588. 2009. *Buchnera asiatica* L., Sp. Pl. 1630. 1753. *Striga lutea* Lour., Fl. Cochinch. 22. 1790; Hook.f., Fl. Brit. India 4: 299. 1884; Gamble, Fl. Madras 968(680). 1924.

Herbs to 35 cm high, tubercled hairy. Leaves opposite, 4 x 0.5 cm, lanceolate to oblanceolate, thickly scabrid. Flowers sessile in terminal spike; bracts and bracteoles lanceolate. Calyx lobes 1 cm long, oblong, united to near the tip, tubercled hairy. Corolla to 14 mm long, tube slender; upper lip orbicular, entire. Capsule 4 x 3 mm, oblong, glabrous; seeds angular, pitted

Ambalappara, *KVB 31757; KJD 26347*

Fl. & Fr.: July-January

Distribution: Common in grasslands of Ambalappara.

PEDALIACEAE

SESAMUM L.

Sp. Pl. 2: 634. 1753.

Sesamum orientale L. is seen in the earlier settlements.

PLANTAGINACEAE

- 1a. Corolla regular Scoparia
1b. Corolla irregular Mecardonia

MECARDONIA Ruiz & Pav.

Fl. Peruv. Prodr. 95. 1794.

Mecardonia procumbens (Mill.) Small, Fl. Southeast. U.S. 1065 & 1338. 1903; Joseph *et al.*, Indian J. Botany 5: 126. 1982; Ansari, Fl. Kasaragod Div. 261. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 320. 1988; Ratheesh, Fl. Stud.

Wayanad Dist. 585. 2009. *Erinus procumbens* Mill., Prodr. Veg. Ind. Occ. 92. 1788. *Bacopa procumbens* (Mill.) Greenm., Publ. Field Columbian Mus. Bot. ser. Chicago 2: 261. 1907.

Diffuse herbs; stem 4-angled. Leaves opposite, 1-1.5 x 0.4-0.9 cm, ovate-lanceolate, apex acute, base acute, margin crenate-serrate, penninerved, subsessile. Flowers axillary, solitary; pedicles to 1 cm long, bractioles 2, c. 4 mm long, oblong. Calyx deeply 5-partite, lobes unequal; outer 3 c. 6 x 3 mm, ovate-lanceolate; inner 2 c. 4 x 1 mm, narrower. Corolla yellow, 5-7 mm long, obscurely 2-lipped, lobes unequal. Stamens 4, didynamous; anther cells stipitate. Stigma lamellate. Capsule to 6 x 2 mm, oblong-cylindric, 2-valved, included in the calyx; seeds with testa reticulate.

Kariyenkappu, *KVB 31436; NS & KJD 31987*

Fl. & Fr.: October-January

Distribution: Rare along the boundaries of plantations at Kariyenkappu.

SCOPARIA L.

Sp. Pl. 116. 1753.

Scoparia dulcis L., Sp. Pl. 116. 1753; Hook.f., Fl. Brit. India 4: 289. 1884; Gamble, Fl. Madras 964(678). 1924; Manilal & Sivar., Fl. Calicut 193. 1982; Ansari, Fl. Kasaragod Div. 262. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 320. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 586. 2009.

Erect annual or perennial herbs. Leaves decussate to whorled, 1-3 x 0.5-1.5 cm, obovate-oblong, apex acute, base attenuate, margin crenate-serrate, penninerved, punctate, chartaceous; petiole to 0.7 cm long. Flowers axillary, solitary or 2; pedicels slender 4-7 mm long. Calyx lobes 2-3 mm, ovate-oblong, ciliate along margin. Corolla white 4-6 mm long, rotate, throat densely hairy, lobes spatulate. Stamens 4, subequal, 3-4 mm long. Ovary globose, 2-celled; ovules many; stigma truncate. Capsules 1-2 mm across, globose; seeds 4-angled, reticulate.

Kariyenkappu, *KJD 31481*

Fl. & Fr.: Through out the year

Distribution: Fairly common along the forest boundaries.

VERBENACEAE

- 1a. Fertile stamens 2, flowers sunken in the cavities of spike Stachytarpheta
- 1b. Fertile stamens 4-6, flowers not as above..... 2
- 2a. Erect shrubs, stem prickly; calyx truncate or obscurely lobed Lantana
- 2b. Prostrate herbs, stem not prickly; calyx cupular, lobes 2 Phyla

LANTANA L.

Sp. Pl. 626. 1753.

Lantana camara L., Sp. Pl. 627.1757; Rajendran & Daniel, Indian Verbenaceae 181. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 640. 2009. *Lantana aculeata* L., Sp. Pl. 627. 1753; Gamble, Fl. Madras 1087(761). 1924. *Lantana camara* L. var. *aculeata* (L.) Moldenke, Torreya 34: 9. 1934; Hook.f., Fl. Brit. India 4: 562. 1885; Manilal & Sivar., Fl. Calicut 230. 1982; Ansari, Fl. Kasaragod Div. 295. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 355. 1988.

Much branched scandent shrubs; stem 4-angled, armed with short thorns. Leaves opposite, 3-6 x 2-4 cm, ovate or elliptic-ovate, apex acute to shortly acuminate, base subcordate or truncate, margin crenate-serrate, scabrous above, puberulous below, veins impressed above; petiole to 1.5 cm long. Inflorescence terminal and axillary condensed spikes; peduncle 3-4 cm long, shortly prickly. Flowers sessile, orange-red, changing to deep red on ageing; bracts closely imbricating. Calyx truncate. Corolla salver-shaped; tube 0.8-1 cm long, slender, cylindric, bent and inflated over stamens; lobes 5, obscurely 2-lipped. Stamens 4, included. Ovary 2-celled; ovules 1 in each cell; style slender; stigma subcapitate. Drupe 2-3 mm across, globose, purple on ripening; seeds reticulate.

Paripode, *KJD 25582*

Fl. & Fr.: April-June

Distribution: Weed in the disturbed forest areas.

PHYLA Lour.

Fl. Cochinch. 63, 66. 1790.

Phyla nodiflora (L.) Greene, Pittonia 4: 46. 1899; Manilal & Sivar., Fl. Calicut 231. 1982; Ansari, Fl. Kasaragod Div. 296. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 356. 1988; Rajendran & Daniel, Indian Verbenaceae 206. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 641. 2009. *Verbena nodiflora* L., Sp. Pl. 20.1753. *Lippia nodiflora* (L.) A.Rich. in Michx., Fl. Bor. Amer. 2: 15. 1803; Hook.f., Fl. Brit. India 4: 563. 1885; Gamble, Fl. Madras 1088(762). 1924.

Prostrate herbs, rooting at nodes. Leaves 1-3 x 0.8-1.5 cm, obovate-spathulate or oblanceolate, sometimes elliptic or cuneiform, apex rounded or obtuse, base cuneate, margin sharply serrate above the middle, fleshy, glabrescent to appressed pubescent; petiole to 8 mm long, decurrent. Flowers 5-merous, sessile, aggregated in axillary, globose-capitate or elongate, cylindric, stalked spikes, 1-2.5 cm long when mature and 6-9 mm across; peduncle solitary in each axil, 1.5-6 cm long; bracts small, closely imbricate, obovate. Calyx cupular, about equaling the corolla tube, deeply 2-cleft; lobes lanceolate. Corolla pink to white, 2-2.5 mm

long, salver-form, 2-lipped, upper lip 2-lobed, emarginate, lower 3-lobed. Stamens 4, included. Drupe ca 2 mm long, enclosing two, 1-celled pyrenes.

Paripode, *KJD 26277*

Fl. & Fr.: November-December

Distribution: In moist localities.

STACHYTARPHETA Vahl

Enum. Pl. 1: 205 1804.

Stachytarpheta cayennensis (Rich.) Vahl, Enum. Pl. Obs. 1: 208. 1804; N.C. Nair *et al.*, Journ. Bombay Nat. Hist. Soc. 79:230. 1982; Rajendran & Daniel, Indian Verbenaceae 303. 2002; Ratheesh, Fl. Stud. Wayanad Dist. 643. 2009. *Verbena cayennensis* Rich., Actes Soc. Hist. Nat. Paris 1: 105. 1792. *Stachytarpheta dichotoma* auct. non (Rich.) Vahl 1804: Pradeep & Sivar., J. Econ. Taxon. Bot. 14: 619. 1990.

Small shrub, 1-2.5 m tall, with subcylindrical, glabrous branches. Leaves opposite-decussate, ovate to elliptic, 3-6 cm long, 1.5-2.5 cm broad, serrate, cuneate, scabrous, shortly petiolate; petiole 1-1.5 cm long. Spikes elongated, up to 25 cm long, slender, glabrescent or sparsely pubescent. Flowers blue with whitish centre, c. 5 mm across, bracteate with linear-lanceolate acuminate bracts. Calyx-tube 4-5 mm long, 4-toothed, glabrous. Corolla-tube as long or slightly exceeding the calyx; limb 4-5-lobed, with lobes 1.5-2 mm long. Fruit with persistent style, splitting into two, 1-seeded pyrenes.

Kariyenkappu, *KJD 26705*

Fl. & Fr.: December-March

Distribution: along the fringes of Sanctuary

Order: **Solanales**

CONVOLVULACEAE

- 1a. Leafless parasitic climbers, petals with scales Cuscuta
- 1b. Leafy nonparasitic climbers or creepers, petals without scales 2
- 2a. Styles 2; flowers 0.8 cm across Evolvulus
- 2b. Style 1; flowers more than 1 cm across 3
- 3a. Fruit indehiscent Argyreia
- 3b. Fruit dehiscent 4
- 4a. Pollen grains spinulose Ipomoea
- 4b. Pollen grains smooth 5
- 5a. Ovary 1-celled, densely hairy Hewittia
- 5b. Ovary 4-celled, glabrous Merremia

ARGYREIA Lour.

Fl. Cochinch. 95, 134. 1790.

- 1a. Leaves acute at base *A. elliptica*
1b. Leaves cordate at base *A. hirsuta*

Argyreia elliptica (Roth) Choisy, Convolv. Orient. 35. 1834; Ramach. & V.J. Nair, Fl. Cannanore Dist. 297. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 554. 2009. *Ipomoea elliptica* Roth, Nov. Pl. Sp. 113. 1821. *Lettsomia elliptica* (Roth) Wight, Icon. Pl. Ind. Orient. t. 1356. 1848; Hook.f., Fl. Brit. India 4: 192. 1883; Gamble, Fl. Madras 911(640). 1923.

Twiners, branchlets sparsely pubescent. Leaves alternate, 5-9 x 3-5 cm, elliptic-ovate to obovate, apex acute, base rounded to truncate. Cymes lax, corymbose, to 8 cm; bracts deciduous. Sepals 5, subequal, 4 x 3 mm, ovate, obtuse. Corolla pink to rose, 3-4 cm across. Stamens 5, anthers 3mm. Ovary 1.5 mm, 2-loculare, cell 2-ovuled, style 1.5 cm. Berry 0.7 cm across, orange.

Ambalappara, *KJD 25480*

Fl. & Fr.: November-March

Distribution: Rare in evergreen forests of Ambalappara.

Argyreia hirsuta Wight & Arn., Nov. Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 18: 356. 1836; Hook.f., Fl. Brit. India 4: 189. 1883; Gamble, Fl. Madras 909(638). 1923; Ramach. & V.J. Nair, Fl. Cannanore Dist. 297. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 554. 2009. *Rivea hirsuta* (Wight & Arn.) Wight, Icon. Pl. Ind. Orient. t. 891. 1845. *Argyreia hirsuta* Wight & Arn. var. *coacta* C.B. Clarke in Hook.f., Fl. Brit. India 4: 189. 1883.

Climbing undershrubs; stem hirsute. Leaves alternate, 13-20 x 7-14 cm, broadly ovate, apex abruptly acuminate, base cordate, densely strigose above, tomentose beneath; nerves 7-13 pairs, prominent below; petiole 5-11 cm long, densely pubescent. Flowers in axillary few to many flowered cymes; bracts leafy, to 3 cm long, lanceolate, shortly petioled, persistent. Sepals 6-8 x 2-3 mm, oblong, obtuse, sparsely hairy, equal. Corolla 5-7 cm long, funnel-shaped, pale purple, hispid without. Stamens 5. Style filiform; stigma 2-globose. Berry 8-12 mm across, depressed-globose, yellow; seeds embedded in mealy pulp.

Chavachi, *KJD 22595*

Fl. & Fr.: August-December

Distribution: Fairly common in evergreen forests of Chelachode and Chavachi.

CUSCUTA L.

Sp. Pl. 124. 1753.

Cuscuta chinensis Lam., Encycl. 2: 229. 1786; Hook.f., Fl. Brit. India 4: 227. 1883; Gamble, Fl. Madras 931(654). 1923.

Slender yellow twiners. Leaves absent. Flowers sessile, 5-7, in lateral fascicles. Calyx-lobes 5, c. 2 x 1.5 mm, broadly ovate, scarious. Corolla pale yellow, c. 5 mm across, 3-3.5 mm long, widely funnel-form; lobes triangular-ovate, acute or obtuse, spreading. Stamens 5; filaments longer than the ovoid anthers. Corolla scales oblong, fimbriate above. Ovary c. 1.5 mm long, globose; styles 2, filiform; stigma rounded. Capsule c. 3 mm across, depressed-globose, irregularly dehiscent; seeds c. 1 mm long.

Valayamchal, KJD 18789

Fl. & Fr.: November-March

Distribution: Fairly common in semi-evergreen forests of Valayamchal.

EVOLVULUS L.

Sp. Pl. ed. 2, 391. 1762.

Evolvulus nummularius (L.) L., Sp. Pl. (ed.2) 391. 1762; Sivar. *et al.*, Bull. Bot. Surv. India 12: 279. 1970; Manilal & Sivar., Fl. Calicut 188. 1982; Ansari, Fl. Kasaragod Div. 242. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 299. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 557. 2009. *Convolvulus nummularius* L., Sp. Pl. 175. 1753. *Volvulopsis nummularia* (L.) Roberty, Candollea 14: 28. 1952.

Slender prostrate perennial herbs. Leaves subopposite to alternate, 5-15 x 4-10 mm, broadly ovate to orbicular, apex obtuse to emarginate, base subcordate, glabrous or sparsely hairy below; petiole to 5 mm long. Flowers 1-2, in leaf-axils; pedicels slender 2-5 mm long. Calyx lobes 5, free, 2-3.5 mm long, ovate-lanceolate, acute, ciliate on margins. Corolla white, 6-8 mm across, rotate. Stamens subexserted. Capsule 3-4 mm across, globose; seeds brown to black.

Near Farm, KJD 22509

Fl. & Fr.: Throughout the year

Distribution: Along the boundaries of Farm.

HEWITTIA Wight & Arn.

Madras J. Lit. Sci. 5: 17, 22. 1837.

Hewittia malabarica (L.) Suresh, Interpr. Van Rheede's Hort. Malab. 88. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 557. 2009. *Convolvulus malabaricus* L., Sp. Pl. 155. 1753. *Hewittia scandens* (J.König ex Milne) Mabb., Taxon 29: 606.

1980; Manilal & Sivar., Fl. Calicut 179. 1982; Ansari, Fl. Kasaragod Div. 243. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 300. 1988. *Convolvulus bicolor* Vahl, Symb. Bot. 3: 25. 1794, non Desr. 1792. *Hewittia bicolor* (Vahl) Wight & Arn., Madras J. Lit. Sci. 5: 22. 1837; Hook.f., Fl. Brit. India 4: 216. 1883; Gamble, Fl. Madras 924(649). 1923. *Hewittia sublobata* (L.f.) Kuntze, Revis. Gen. Pl. 2: 441. 1891.

Stem twining or prostrate, pubescent. Leaves alternate, 4-7 x 3-4 cm, ovate, apex acute, base cordate, margin entire or angled, puberulent, basally 3-nerved; petiole to 6 cm long. Flowers in axillary 1 to few-flowered peduncled cymes; bract linear-lanceolate, attached to little below the calyx. Sepals 5, outer 3 larger, accrescent, inner 2 smaller. Corolla yellowish or cream coloured with a purple centre, c. 3 cm across, campanulate, limb shallowly 5-lobed. Stamens included; filaments dilated at base. Ovary imperfectly 2-locular; ovules 2-per ocule; stigma 2. Capsule 4-valved, 8-10 mm across, subglobose; seeds 4 or less, 5-6 mm long, subtrigonus, black.

Near Farm, KJD 26393

Fl. & Fr.: October-January

Distribution: Along the boundaries of Farm.

IPOMOEA L.

Sp. Pl. 159. 1753.

- | | |
|---|------------------------|
| 1a. Leaves entire or slightly lobed | 2 |
| 1b. Leaves palmately lobed or pinnately dissected | 5 |
| 2a. Leaves and sepals hairy | <i>I. barlerioides</i> |
| 2b. Leaves and sepals not hairy | 3 |
| 3a. Corolla deep red | <i>I. hederifolia</i> |
| 3b. Corolla not red | 4 |
| 4a. Corolla salvar formed | <i>I. marginata</i> |
| 4b. Corolla campanulate | <i>I. obscura</i> |
| 5a. Leaves pinnately dissected, corolla red..... | <i>I. quamoclit</i> |
| 5b. Leaves palmately lobed..... | 6 |
| 6a. Corolla funnal shaped, 4 cm across, white..... | <i>I. pes-tigridis</i> |
| 6b. Corolla campanulate, 1.5 cm across, purple | <i>I. deccana</i> |

Ipomoea barlerioides (Choisy) Benth. ex C.B. Clarke in Hook.f., Fl. Brit. India 4: 201. 1883; Gamble, Fl. Madras 915(642). 1923. *Aniseia barlerioides* Choisy, Convolv. Orient. 102. 1834 (Plate 16l).

Hispid creepers or twiners. Leaves alternate, to 5 x 2 cm, ovate-oblong, obtuse, mucronate, cordate at base, densely strigose hairy, nerves 5-7 pairs; petiole 1 cm long. Flowers solitary; axillary; peduncle 10 mm long, pedicels short. Sepals 1.7 x 1 cm, outer ovate, inner lanceolate, acute to acuminate, densely pilose hairy, broaden in fruit. Corolla 6 cm long; 4-5 cm across, purple, hairy outside. Staminal filaments 2 cm long, hairy at base. Ovary glabrous, stigma biglobose. Capsule 12 x 10 mm, glabrous; seeds 6 x 5 mm, trigonous, densely hairy along the angles and faces.

Ambalappara, *KVB 31689; KJD 26308*

Fl. & Fr.: June-January

Distribution: Rare in grasslands of Ambalappara.

Ipomoea deccana Austin, Rev. Handb. Fl. Ceylon 1: 324. 1980; Ramach. & V.J. Nair, Fl. Cannanore Dist. 302.1988; Ratheesh, Fl. Stud. Wayanad Dist. 560.2009. *Ipomoea bracteata* Wight, Icon. Pl. Ind. Orient. t.1374.1848, non Cav. 1799; Hook.f., Fl. Brit. India 4: 203. 1883; Gamble, Fl. Madras 918(644). 1923. *Ipomoea deccana* var. *lobata* (C.B.Clarke) Johri, J. Econ. Taxon. Bot. 5: 432. 1984 (Plate 17a).

Hispid creepers. Leaves 3-5-lobed, alternate, ca. 4 x 4 cm, cordate at base; lobes rhomboid, acute; petiole 4-5 cm long. Peduncle 2.5-5 cm long; bracts 1.5 x 1 cm, ovate, obtuse, 2-5 together, forming a capitate head; flowers 3 together; sessile. Sepals unequal, to 9 x 3 mm, acute, hairy; inner smaller. Corolla purple, 15 mm long, campanulate, glabrous. Staminal filaments unequal, inserted near the base of corolla tube. Capsule 6 x 6 mm, globose, puberulus in vertical lines; seeds pubescent, black.

Mullenpara, *NS & KJD 31926*

Fl. & Fr.: November-January

Distribution: Rare in open areas in evergreen forests of Mullenpara.

Ipomoea hederifolia L., Syst. Nat. (ed. 10) 925. 1759; Manilal & Sivar., Fl. Calicut 184. 1982; Ansari, Fl. Kasaragod Div. 245. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 303. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 561. 2009. *Quamoclit phoenicea* (Roxb.) Choisy, Mem. Soc. Phys. Geneve 6: 433. 1834; Gamble, Fl. Madras 919(645). 1923. *Ipomoea phoenicea* Roxb., Fl. Ind. 2: 92. 1824. *Ipomoea coccinea* sensu C.B.Clarke in Hook.f., Fl. Brit. India 4: 199. 1883, non Rottl. 1803.

Slender twining herbs. Leaves or 3-5-angled, alternate, 4-8 x 3.5-7 cm, ovate to suborbicular, cordate at base, acute to shortly acuminate at apex, glabrous;



a. *Jerdonia indica*



b. *Gomphostemma heyneanum*



c. *Pogostemon peethapushpum*



d. *Teucrium tomentosum*



e. *Torenia hirsuta*



f. *Utricularia graminifolia*



g. *Campbellia neilgherrica*



h. *Christisonia bicolor*



i. *Christisonia tubulosa*



j. *Parasopubia sp.*



k. *Sopubia trifida*



l. *Ipomoea barlerioides*

petiole to 6 cm long. Cymes few-flowered, axillary; peduncles 5-8 cm long; pedicels 0.7-1 cm long. Sepals 5, 2-4 mm long, oblong or elliptic. Corolla deep red, salver-form, tube to 3.5 cm long, limb 1.5-2.5 cm across, subentire. Ovary 2-3 mm long, conical, 4-celled; ovule 1 in each cell. Capsule 5-6 mm across, subglobose; seeds 4, c. 3 mm long, pyriform, black.

Paripode, *KJD 25573*

Fl. & Fr.: October-December

Distribution: Along the boundaries of Farm at Paripode.

Ipomoea marginata (Desr.) Manitz, Feddes Repert. 85: 638. 1974, **f. *marginata***; Ratheesh, Fl. Stud. Wayanad Dist. 561. 2009. *Convolvulus marginatus* Desr., Encycl. 3: 558. 1792. *Ipomoea sepiaria* Roxb., Fl. Ind. 2: 90. 1824; Hook.f., Fl. Brit. India 4: 209. 1883; Manilal & Sivar., Fl. Calicut 181. 1982; Ansari, Fl. Kasaragod Div. 246. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 304. 1988.

Twining herbs. Leaves alternate, triangular-cordiform, 5-8 by 3-5 cm, apex acute-apiculate, base cordate, thinly pubescent, petiole 1-2 cm long. Cymes sub-umbellate. Sepals sub-equal, obovate, glabrous. Corolla pinkish-white, c. 3 cm across, salver-form. Stamens included. Capsule globose; seeds pubescent.

Paripode, *KJD 25574*

Fl. & Fr.: December-March

Distribution: Along the boundaries of Farm.

Ipomoea obscura (L.) Ker-Gawl., Bot. Reg. 3. t. 239. 1817; Hook.f., Fl. Brit. India 4: 207. 1883; Gamble, Fl. Madras 916(643). 1923; Manilal & Sivar., Fl. Calicut 183. 1982; Ansari, Fl. Kasaragod Div. 245. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 303. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 563. 2009. *Convolvulus obscurus* L., Sp. Pl. (ed. 2) 220. 1762.

Slender twining herbs. Leaves alternate, 2.5-6 x 2-4 cm, ovate to cordate, apex acuminate, base cordate, pubescent or glabrescent on both surfaces; petiole to 3 cm long. Flowers solitary or in subumbellate cymes; pedicel to 1-1.5 cm long. Sepals 4-8 mm long, ovate-lanceolate, apex acute-apiculate. Corolla yellowish, throat purplish, 1.5-2.5 cm long, c. 2.5 cm across, campanulate. Stamens 5, villous at base. Ovary c. 1.5 mm long, conical; stigma capitate. Capsule 6-8 mm across, subglobose, apically beaked; seeds c. 5 mm long, ovoid, black, thinly pubescent.

Near Farm, *KJD 18780*

Fl. & Fr.: October-March

Distribution: Along the boundaries of Farm.

Ipomoea pes-tigridis L., Sp. Pl. 162.1753; Hook.f., Fl. Brit. India 4: 204. 1883; Gamble, Fl. Madras 918(644). 1923; Manilal & Sivar., Fl. Calicut 184. 1982; Ramach. & V.J. Nair, Fl. Cannanore Dist. 304. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 563. 2009. *Ipomoea pes-tigridis* L. var. *hepaticifolia* (L.) C.B.Clarke in Hook.f., Fl. Brit. India 4: 204. 1883. *Ipomoea hepaticifolia* L., Sp. Pl. 161. 1753.

Densely hispid twiners. Leaves alternate, broadly orbicular, deeply 5-9-lobed; lobes obovate, apex acute to acuminate; petiole 3-7 cm long. Flowers subsessile in axillary, capitate clusters; peduncle to 7 cm long; bracts oblong, acute, villous. Calyx-lobes unequal, 8-12 mm long, ovate-acuminate, pubescent. Corolla white, 3-4 cm long, c. 4 cm across, funnel-form. Ovary ca 1 mm long, conical. Capsule 8-10 mm long, ovoid, brown; seeds 4 mm long, pubescent, black.

55 Block, KJD 26380

Fl. & Fr.: September-December

Distribution: Near Farm side of 55 block Plantation.

Ipomoea quamoclit L., Sp. Pl. 159. 1753; Hook.f., Fl. Brit. India 4: 199. 1883; Manilal & Sivar., Fl. Calicut 184. 1982; Ratheesh, Fl. Stud. Wayanad Dist. 564. 2009. *Quamoclit pinnata* (Desr.) Bojer, Hort. Maurit. 224. 1837; Gamble, Fl. Madras 919(645). 1923. *Convolvulus pinnatus* Desr., Encycl. 3: 567. 1792.

Slender twining herbs. Leaves alternate, pinnately dissected, 1.5-4.5 cm long, lobes many, 1-1.5 cm long, very narrowly linear, glabrous. Flowers solitary, axillary or in few flowered axillary cymes; peduncles 4-5 cm long; pedicels 1-2 cm long. Calyx lobes 0.4-0.5 cm long, lanceolate. Corolla red; lobes 0.4-0.6 x 0.25-0.3 cm, ovate. Filaments unequal, exserted. Ovary 0.2-0.3 cm long, 4-celled; ovule 1 in each cell; stigmas capitate. Capsule 0.8-1 x 0.5-0.6 cm, ovoid; seeds 4, 0.4-0.5 x 0.1-0.15 cm, compressed, conical, black on drying.

Kariyenkappu, KJD 25577

Fl. & Fr.: October-December

Distribution: Earlier settlements.

MERREMIA Dennst.ex Endl.

Gen. pl. 1403. 1841, *nom. cons.*

- 1a. Stem hairy, corolla 4-6 cm long..... 2
- 1b. Stem glabrous, corolla less than 2 cm long..... *M. tridentata*
- 2a. Leaves entire; flowers white..... *M. umbellata*
- 2b. Leaves lobed; flowers yellow *M. vitifolia*

Merremia tridentata (L.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Madras 928(652). 1923; Manilal & Sivar., Fl. Calicut 186. 1982; Ansari, Fl. Kasaragod Div. 247. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 306. 1988. *Convolvulus tridentatus* L., Sp. Pl. 157. 1753. *Ipomoea tridentata* (L.) Roth in Roem., Arab. Bot. 1: 38. 1797; Hook.f., Fl. Brit. India 4: 205. 1883. *Xenostegia tridentata* (L.) Austin & Staples, Brittonia 32: 533. 1980, subsp. *tridentata*; Ratheesh, Fl. Stud. Wayanad Dist. 567. 2009.

Trailing herbs with long slender branches and thick root-stock. Leaves alternate, simple, 2-4 x 0.5-1.2 cm, linear-lanceolate, base auricled and toothed, apex acute, mucronate, sessile to subsessile. Flowers axillary few-flowered cymes, sometimes solitary; peduncle 1-2 cm long. Sepals 5-6 x 2-3 mm, lanceolate, acuminate. Corolla campanulate, cream coloured or yellow with a purplish eye at centre; tube 1-1.5 cm long; limb spreading 1-1.5 cm across, subentire. Stamens 5. Ovary 2-celled; stigma 2-lobed. Capsules 5-8 mm across, subglobose; seeds 4, glabrous, brown.

Chavachi, KJD 22553

Fl. & Fr.: November-January

Distribution: Forests margins at Chavachi.

Merremia umbellata (L.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Madras 928(651). 1923; Manilal & Sivar., Fl. Calicut 186. 1982; Ansari, Fl. Kasaragod Div. 248. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 306. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 565. 2009. *Convolvulus umbellatus* L., Sp. Pl. 155. 1753. *Ipomoea cymosa* Roem. & Schult., Syst. Veg. 4: 241. 1819; Hook.f., Fl. Brit. India 4: 211. 1883.

Twining; young shoots puberulous. Leaves alternate, 4-7 x 1.5-3.5 cm, ovate-lanceolate, base cordate or rounded, apex acuminate, pubescent below; petiole 1.5-2.5 cm long. Inflorescence axillary umbelliform cymes; peduncle 1-3 cm long; pedicels 7-10 mm long. Sepals 6-8 mm long, ovate-lanceolate, apiculate, scarious on margins. Corolla white, campanulate; tube 2-3 cm long, pubescent without; limb 2.5-3 cm across. Stamens 5, unequal; anthers twisted. Ovary 2-celled, ovules 2 in each cell; stigma capitate. Capsule 8-10 x 5-6 mm, ovoid; seeds long hairy, black.

Kariyenkappu, KJD 25596

Fl. & Fr.: January-April

Distribution: Weed in plantations of Kariyenkappu and margins of evergreen forests at Chavachi.

Merremia vitifolia (Burm.f.) Hallier f., Bot. Jahrb. Syst. 16: 552. 1893; Gamble, Fl. Madras 928(651). 1923; Manilal & Sivar., Fl. Calicut 185. 1982; Ansari, Fl. Kasaragod Div. 249. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 307. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 565. 2009. *Convolvulus vitifolius* Burm.f., Fl. Ind. 45.t.18. 1768. *Ipomoea vitifolia* (Burm.f.) Blume, Bijdr. Fl. Ned. Ind. 709. 1826; Hook.f., Fl. Brit. India 4: 213. 1883.

Twining shrubs; stem brownish-black, young shoots patently hairy. Leaves alternate, lobed, 6-12 cm long, equally wide, base cordate, margin dentate-serrate, acute to acuminate at apex of lobation, sparsely fulvous hairy on both sides, basally 7-ribbed; petiole 3-8 cm long. Inflorescence axillary, 1-3-flowered cymes; peduncles 4-5 cm long. Sepals 10-15 x 6-8 mm, ovate-lanceolate, mucronate, outer hirsute, inner glabrescent. Corolla yellow, campanulate, 3.5-5 cm long, 4-6 cm across. Ovary 2-celled, ovules 2 in each cell. Capsule 1-1.2 cm across, globose, fruiting sepals much larger; seeds 4, 6-8 mm long ovoid.

Kariyenkappu, KVB 31520

Fl. & Fr.: November-February

Distribution: Weed in plantations at Kariyenkappu.

SOLANACEAE

- 1a. Fruit capsular, echinate; corolla trumpet shaped *Datura*
- 1b. Fruit berry; corolla rotate or campanulate..... 2
- 2a. Calyx in fruit completely enclosing the berry..... *Physalis*
- 2b. Calyx not completely enclosing the berry 3
- 3a. Calyx saucer-shaped in fruit, flowers fascicles *Lycianthes*
- 3b. Calyx distinctly lobed in fruit, flowers cymes or racemes *Solanum*

DATURA L.

Sp. Pl. 179. 1753.

Datura stramonium L., Sp. Pl. 179. 1753; Hook.f., Fl. Brit. India 4: 242. 1883; Gamble, Fl. Madras 941(660). 1923; Ratheesh, Fl. Stud. Wayanad Dist. 569. 2009. *Datura stramonium* L. var. *tatula* C.B. Clarke in Hook.f., Fl. Brit. India 4: 242. 1883. *Datura tatula* L., Sp. Pl. (ed. 2) 256. 1762. *Datura inermis* Jacq., Hort. Vindob. 3: 44. t. 82. 1776. *Datura laevis* L.f., Suppl. Pl. 146. 1781. *Datura bertolonii* Paxt. ex Guss, Fl. Sic. Sy. 1: 267. 1842. *Datura ferox* Nees, Trans. Linn. Soc. London 17: 75. 1837, non L. *Datura wallichii* Dunal in DC. Prodr. 13: 539. 1852. *Stramonium vulgatum* Gaertn., Fruct. Sem. Pl. 2: 243. t. 132.f. 4. 1791.

Subshrubs, 60-120 cm tall, branched, pubescent; the branches often purplish. Leaves alternate, simple, 8-17 x 4-13 cm, ovate or broadly so, sinuately dentate, minutely puberulous, cuneate; petiole 2-5 cm long. Flowers single or paired, axillary, white; Calyx 3.5-5.5 cm long, tubular, 5-dentate, puberulous, persistent; lobes 6-9 mm long, strongly reflexed in fruit, apiculate. Corolla 7-10 cm long, white or purplish suffused; limb up to 8 cm broad, shallowly 5-lobed, with the lobes, triangular-acuminate. Stamens 5; anthers 5 mm long, with the lobes narrow oblong, usually white. Capsule erect, 3-4 cm long, ovoid, spiny and densely pubescent, splitting by 4 valves; spines up to 5 mm long; seeds many, 3 mm long, reniform, reticulate-foveolate, and black.

Valayamchal, KJD 18794

Fl. & Fr.: July-September

Distribution: Margins of forest boundaries with Farm.

LYCIANTHES (Dunal) Hassl.

Annuaire Conserv. Jard. Bot. Geneve 20: 180. 1917.

Lycianthes laevis (Dunal) Bitter, Abh. Nat. Ver. Bremen 24: 484. 1920; Ratheesh, Fl. Stud. Wayanad Dist. 569. 2009. *Solanum laeve* Dunal, Solan. Synop. 22. 1816; Hook.f., Fl. Brit. India 4: 231.1883; Gamble, Fl. Madras 936(657). 1923 (Plate 17b).

Subshrubs, often scandent; branches zig-zag, angular. Upper leaves often paired and unequal, elliptic-lanceolate, acuminate, to 18 x 6 cm, membranous. Flowers 2-5 in axils; pedicels ca. 8 mm long, enlarges in fruit to 1.5 cm. Calyx truncate or with subulate lobes. Corolla white with pale purple shades, 1 cm across. Berry globose, red, to 1 cm across; seeds angular.

Kattikari, KJD 25590

Fl. & Fr.: December-June

Distribution: Fairly common in evergreen forests of Mullenpara and Kattikari.

PHYSALIS L.

Sp. Pl. 183. 1753.

Physalis angulata L., Sp. Pl. 183. 1753; Hook.f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Madras 939(659). 1923; Ratheesh, Fl. Stud. Wayanad Dist. 570. 2009. *Physalis minima* L., Sp. Pl. 183. 1753; Hook.f., Fl. Brit. India 4: 238. 1883; Gamble, Fl. Madras 939(659). 1923; Ansari, Fl. Kasaragod Div. 251. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 309. 1988.

Annual herbs; branches angular. Leaves alternate, 3-7 x 1.5-3 cm, ovate or elliptic-lanceolate, apex acute base cuneate, unequal sided, margins dentate or sinuate, sometimes entire, glabrous or sparsely pubescent; petiole to 4 cm long.

Flowers axillary, solitary; pedicels ca 8 mm long. Calyx campanulate, 5-toothed, inflated and to 2.5 cm across in fruit. Corolla pale-yellow with a purple base, campanulate, c. 8 mm across; limb plicate, shortly lobed. Stamens 5, unequal; anthers oblong. Ovary globose, glabrous; ovules many; style linear; stigma obscurely 2-lobed. Berry 6-8 mm across, globose, enclosed by the inflated calyx; seeds many, discoid, minutely rugose.

Kariyenkappu, *KJD 26281*

Fl. & Fr.: July-December

Distribution: Rare along the boundaries of Farm.

SOLANUM L.

Sp. Pl. 184. 1753.

- 1a. Corolla white..... *S. torvum*
- 1b. Corolla blue or violet. 2
- 2a. Lower surface of leaves fulvous tomentose; berry red..... *S. giganteum*
- 2b. Lower surface of leaves not fulvous yellow; berry orange-yellow *S. violaceum*

Solanum giganteum Jacq., *Collectanea* 4: 125. 1791; Hook.f., *Fl. Brit. India* 4: 233. 1883; Gamble, *Fl. Madras* 937(657). 1923; Ansari, *Fl. Kasaragod Div.* 251. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 311. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 572. 2009. *Solanum niveum* Vahl, *Symb. Bot.* 2: 41. 1791.

Large shrubs, 1-3.5 m high; stems and leaves covered with very minute stellate hairs of equal arms; prickles on stems only, small, stout, grouped. Leaves 20-25 x 5-7 cm, elliptic, acute at either ends, entire, membranous; petiole to 5 cm long. Cymes terminal or subterminal; peduncle 4-5 cm long. Flowers densely packed; pedicel 1 cm long, densely white-stellate hairy. Corolla blue, hairy outside. Berry 7 x 7 mm, red, glabrous; seeds smooth.

Ambalappara, *NS & KVB 31422*

Fl. & Fr.: June-March

Distribution: Rare in evergreen forests of Ambalappara.

Solanum torvum Sw., *Prodr.* 47. 1788; Hook.f., *Fl. Brit. India* 4: 234. 1883; Gamble, *Fl. Madras* 937(658). 1923; Manilal & Sivar., *Fl. Calicut* 189. 1982; Ansari, *Fl. Kasaragod Div.* 253. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 312. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 573. 2009.

Shrubs to 2 m tall; stem densely stellate-hairy when young; prickles few, scattered. Leaves 7-14 x 5-10 cm, ovate, usually coarsely 2-3-sinuate, apex acute, base obliquely subcordate, stellately pubescent on both sides, dense on

lower sides, chartaceous, scattered with a few prickles on midrib and on petiole; lateral nerves 4 or 5 pairs; petioles 1.5-3.5 cm long. Inflorescence supra-axillary, many-flowered corymbose cymes; peduncle to 5 cm long. Calyx tube 2-2.5 mm long, campanulate, lobes oblong. Corolla white, c. 2.5 cm across; lobes 5-6 mm long, ovate, pubescent outside. Berry 1-1.5 cm across, globose, pale green turning dull orange; seeds discoid, smooth.

Chavachi, *KJD 22596*

Fl. & Fr.: July-March

Distribution: Fairly common in disturbed forests areas at Chavachi.

Solanum violaceum Ortega, Nov. Pl. Descr. Dec. 56. 1798; Hepper in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 6: 378. 1987; Manilal & Sivar., Fl. Calicut 190. 1982; Matthew, Kew Bull. 46: 545. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 574. 2009. *Solanum anguivi* auct. non Lam.; Ramach. & V.J. Nair, Fl. Cannanore Dist. 310. 1988. *Solanum indicum* Hook.f., Fl. Brit. India 4: 234. 1883, non L. 1753; Gamble, Fl. Madras 938(658). 1923.

Armed undershrubs, up to 1.5 m tall; branches minutely stellate-hairy on young parts, glabrate when mature. Leaves 5-12 x 4-7 cm, ovate or ovate-oblong, sinuately to deeply lobed, apex subacute, base rounded or unequal, sparsely stellate-hairy above, stellate-woolly beneath, prickly on the nerves; petiole to 2.5 cm long. Flowers bluish-violet in extra-axillary racemes; peduncle c. 4 cm long; pedicel to 8 mm long. Calyx cupular; lobes 5, c. 5 mm long, triangular, prickly. Corolla to 2 cm across, campanulate. Stamens 5; anthers c. 5 mm long. Ovary 2 mm across, globose; stigma acute. Berry 0.8-1.3 cm across, globose; orange yellow when ripe.

Ambalappara, *KVB 31706*

Fl. & Fr.: August-December

Distribution: Fairly common in evergreen forests of Ambalappara.

Order: **Aquifoliales**

AQUIFOLIACEAE

ILEX L.

Sp. Pl. 125. 1753.

Ilex wightiana Wall. ex Wight, Icon. Pl. Ind. Orient. t. 1216. 1848; Hook.f., Fl. Brit. India 1: 603. 1875; Gamble, Fl. Madras 200(143). 1915; Swarup. *et al.*,

Shola For. Kerala 36. 1998; D. Basu in N.P. Singh *et al.*, Fl. Ind. 5: 73. 2000; M. Reema *et al.* in P. Daniel, Fl. Kerala 1: 695. 2005.

Trees to 15 m tall. Leaves alternate, elliptic, ovate, oblong or oblanceolate, acute to acuminate, mucronate-apiculate or rarely obtuse at apex, acute or rounded at base, subentire or serrulate at margin. Inflorescences in umbellules; peduncles of male inflorescences 0.8-1.25 cm long; flowers 5-merous, 5-6 mm across. Calyx cupular, 1-2 x 2-2.5 mm; lobes 5 or 6, acute-apiculate, puberulous. Petals 5 or 6, connate below, white; tube ca 1 mm long; lobes oblong, oblong-obovate or ovate-elliptic, obtuse at apex, 2-2.5 x 1.5-2 mm. Stamens 5 or 6, shorter than petals. Ovary rudimentary, puberulent; stigma 4-6 lobed. Female umbels lax; peduncles ca 1.2 cm long; calyx and petals as in male flowers. Ovary globose, ca 2 mm, 6-loculed; ovules 1 or 2 in each locule, pendulous; style ca 0.5 mm long; stigma capitate. Drupes globose, apiculate, smooth, dark red or blue; pyrenes 5 or 6, 3-gonous.

Asthippara, KJD 31478

Fl. & Fr.: February-August

Distribution: Rare in evergreen forests of Asthippara.

STEMONURACEAE

GOMPHANDRA Wall. ex Lind.

Intr. Nat. Syst. Bot. ed. 2, 439. 1876.

- 1a. Leaves coriaceous; cymes glabrous *G. coriacea*
1b. Leaves membranous; cymes puberulus *G. tetrandra*

Gomphandra coriacea Wight, Ill. Ind. Bot. 1: 103. 1840; Gamble, Fl. Madras 195(140). 1915; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 22. 2000; Ratheesh, Fl. Stud. Wayanad Dist. 215. 2009. *Gomphandra polymorpha* Wight, Ill. Ind. Bot. 1: 103. 1840 p.p. & Icon. Pl. Ind. Orient. t. 953,954. 1843; Hook.f., Fl. Brit. India 1: 586. 1875; Gamble, Fl. Madras 195(139). 1915.

Trees, to 7 m high; bark dark grey.. Leaves alternate, 3-12 x 1.8-5 cm, elliptic, obovate or elliptic-obovate, apex obtuse, obtusely acute, acute or acuminate, base acute; lateral nerves 3-7 pairs, pinnate, intercostae obscure; petiole 5-15 mm long. Flowers polygamo-dioecious, greenish-white, in leaf opposed cymes or rarely in axillary cymes. Calyx minute, cup-shaped; lobes 4-5. Corolla 4 mm long; lobes 4-5, acute, connate into a tube, lobes inflexed at apex; male flowers. Stamens 4-5, exserted, free; filaments thick, fleshy often connate

Female flowers. Ovary superior, oblong, 1-celled, ovules 2; style conic; stigma small or discoid. Fruit a drupe, 15 x 8 mm, pale yellow, oblong-terete, crowned with the remains of persistent stigmas; endocarp wrinkled; seed pendulous, longitudinally surrounded by raphe.

Ambalappara, *KJD 22578*

Fl. & Fr.: December-March

Distribution: Rare in evergreen forests of Ambalappara.

Gomphandra tetrandra (Wall.) Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem. 15: 238. 1940 & Blumea 17: 204. 1969; Ansari, Fl. Kasaragod Div. 98. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 93. 1988; R. Mathur in N.P. Singh *et al.*, Fl. Ind. 5: 25. 2000; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 685. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 215. 2009. *Lasianthera tetrandra* Wall., Fl. Ind. 2: 238. 1824. *Gomphandra axillaris* Wall. ex Bedd., Fl. Sylv. S. India t. 61. 1870; Hook.f., Fl. Brit. India 1: 586. 1875. *Gomphandra polymorpha* Wight, Ill. Ind. Bot. 1: 103. 1840 p.p.; Gamble, Fl. Madras 195(139). 1915.

Shrubs, branchlets yellowish green. Leaves alternate, 9-16 x 3-5 cm, oblong, apex acuminate, base acute, nerves to 9 pairs. Cymes peduncled; peduncle 10 mm long. Flowers 3-10 together. Calyx 1 mm long, copular. Corolla 6 mm long, lobes cuspidate. Staminal filaments 8 mm long, connate. Drupe to 13 x 6 mm, obovate, acute. Drupe 1-1.3 cm long, obovate.

Moonamthode, *NS & KVB 31393*; Ambalappara, *KVB 31720*; Chavachi, *KJD 31472, 26175*

Fl. & Fr.: September-December

Distribution: Common under growth at evergreen and semi-evergreen Forests.

Order: **Asterales**

ASTERACEAE

- 1a. Heads with similar flowers 2
- 1b. Heads with dissimilar flowers.....16
- 2a. Leaves opposite 3
- 2b. Leaves alternate 8
- 3a. Leaves with cordate base; climbers Mikania
- 3b. Leaves with out cordate base; prostrate or erect plants..... 4
- 4a. Receptacle spicate Spilanthes
- 4b. Receptacle not spicate 5

5a.	Pappus 2-3, bristle like	Adenostema
5b.	Pappus 5-many, setaceous.....	6
6a.	Anthers appendaged at apex	Ageratum
6b.	Anthers not appendaged	7
7a.	Outer involucral bracts pubescent; ovary glabrous	Ageratina
7b.	Outer involucral bracts glandular; ovary scaly	Chromolaena
8a.	All flowers ligulate	Launaea
8b.	All flowers tubular	9
9a.	Groups of heads supported by 3-4 spathes; leaves radical.....	Elephantopus
9b.	Heads not supported by spathes; leaves cauline	10
10a.	Bracts uniseriate	11
10b.	Bracts 2-3 seriate	12
11a.	Achens 10 ribbed, heads in racemes	Crassocephalum
11b.	Achens 5 ribbed, heads corymbose	Emilia
12a.	Pappus absent	Adenoon
12b.	Pappus present	13
13a.	Pappus in two series, outer smaller	26
13b.	Pappus uniseriate similar.....	14
14a.	Flowers yellow; bracts 1-2 seriate.....	Cissampleopsis
14b.	Flowers not yellow, blue or violate; bracts many seriate	15
15a.	Plants glabrous	Centratherum
15b.	Plants hairy	Phyllocephalum
16a.	Leaves opposite	17
16b.	Leaves alternate	21
17a.	Capitula axillary, sessile.....	Synedrella
17b.	Capitula terminal or axillary, peduncled	18
18a.	Leaves pinnately compound	Bidens
18b.	Leaves entire	19
19a.	Pappus absent or reduced in to minute teeth.....	Eclipta
19b.	Pappus developed.....	20
20a.	Achenes terete, pappus many	Tridax
20b.	Achenes 3-4 angled, pappus 3-4	Sphagneticola
21a.	Anther base tailed	22
21b.	Anther base not tailed	24
22a.	Plants woolly, not aromatic	23
22b.	Plants not woolly, usually aromatic.....	Blumea
23a.	Dioecious flowers sterile, female flowers many	Anaphalis
23b.	Dioecious flowers usually fertile, female flowers 1-2 rows	Helichrysum

- 24a. Anther base sagitate..... Laggera
 24b. Anthers base obtuse or entire 25
 25a. Pappus present Conyza
 25b. Pappus absent Dichrocephala
 26a. Achens not ribbed Cyanthillium
 26b. Achens ribbed 27
 27a. Achens usually glandular between ribs.....Acilepis
 27b. Achenes not glandular between ribs..... Vernonia

ACILEPIS D.Don

Prodr. Fl. Nepal. 169. 1825.

- 1a. Leaves white tomentose beneath..... *A. dendigulensis*
 1b. Leaves glabrous beneath 2
 2a. Achens glandular, pappus brown..... *A. divergens*
 2b. Achens glabrous or hairy, pappus reddish *A. ornata*

Acilepis dendigulensis (DC.) H.Rob., Proc. Biol. Soc. Washington 112(1): 226. 1999. *Decaneurum dendigulense* DC., Contr. Bot. India 7. 1834. *Vernonia indica* C.B.Clarke, Comp. Ind. 16. 1876; Hook.f., Fl. Brit. India 3: 238. 1881; Gamble, Fl. Madras 674(474). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 257. 1988; Uniyal in Hajra *et al.*, Fl. Ind. 13: 372. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 486. 2009 (Plate 17c).

Shrubs, 1-2 m high, usually not branching; stems white-wooly. Leaves alternate, 12 x 5 cm, elliptic, acute at base and apex, serrate, glabrous above, densely white-tomentose below; nerves 6-8 pairs, raised below, reticulate. Heads many, 8 x 5 mm, globose, in paniced cymes; bracts unequal, oblong, obtuse, cottony-hairy. Flowers 5-10; corolla to 7 mm long, pink, glabrous. Achenes 2 mm long, strongly ribbed, glandular; pappus outer setaceous or absent; inner 6 mm long, setaceous, yellow.

Ambalappara, KVB 31764, 31789; KJD 26343

Fl. & Fr.: October-January

Distribution: Common in grasslands of Ambalappara. Endemic to Western Ghats.

Acilepis divergens (Roxb.) H.Rob. & Skvarla, Proc. Biol. Soc. Wash. 122(2): 140. 2009. *Eupatorium divergens* Roxb., Fl. Ind. 3: 414. 1832. *Vernonia divergens* (Roxb.) Edgew., J. Asiat. Soc. Bengal 21: 172. 1853; Hook.f., Fl. Brit. India 3: 234. 1881; Gamble, Fl. Madras 673(473). 1921; Ramach. & V.J. Nair, Fl. Cannanore

Dist. 257. 1988; Uniyal in Hajra *et al.*, Fl. Ind. 13: 370. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 485. 2009.

Erect shrubs, stem reddish, grey-tomentose. Leaves alternate, 7-10 x 3-5 cm, elliptic, acute at both ends, serrate, scabrous above, pubescent beneath, nerves 6-8 pairs, regular; petiole 1-2 cm long. Heads 6 x 4 mm, globose; bracts oblong, acute, grey tomentose. Flowers few, corolla 12 mm long, glabrous. Achenes 2 mm long, glandular; pappus all setaceous, brown.

Ambalappara, *KVB 31791; KJD 26345*

Fl. & Fr.: November-March

Distribution: Common in evergreen forests of Ambalappara, Mullenpara and Kattikkari.

Acilepis ornata (Talbot) H. Rob. & Skvarla, Proc. Biol. Soc. Wash. 122(2): 141. 2009. *Vernonia ornata* Talbot, Journ. Bombay Nat. Hist. Soc. 11: 691. Pl. 13. 1898; Uniyal in Hajra *et al.*, Fl. Ind. 13: 376. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 486. 2009. *Vernonia dalzelliana* Drumm. & Hutch., Bull. Misc. Inform. Kew 1909: 261. 1909; Gamble, Fl. Madras 674(474). 1921; Ramach. & V.J. Nair, Fl. Cannanore Dist. 257. 1988; Manilal, Fl. Silent Valley 161. 1988 (Plate 17d).

Herbs or undershrubs, upto 1.25 m tall; stems ribbed, glandular pubescent above. Leaves alternate, 14 x 5 cm, elliptic, oblanceolate, ovate or obovate, acute or acuminate, membranous, sparsely pubescent above and on the nerves beneath, petioled. Inflorescence corymbose, axillary and terminal. Heads ca. 1.2 cm across, ca 15-flowered; peduncle slender, upto 6.8 cm long, with 1 or more subulate bracts. Involucral bracts many-seriate, decurrent on the peduncle, acute, obtuse, apiculate or mucronate, ciliate and darker near the tip; outer ca. 2.5 mm long; innermost ca. 6 mm long. Achenes 2 mm long, glabrous or hairy, 10-ribbed. Pappus hairs reddish, outer very short.

Mullenpara, *NS & KJD 31930, 31931*

Fl. & Fr.: October-March

Distribution: Common in evergreen forests of Kattikkari, Mullenpara and Kannadivechakunnu. Endemic to southern Western Ghats.

ADENOON Dazell

Hooker's J. Bot. Kew Gard. Misc. 2: 344. 1850.

Adenoon indicum Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2:344.1850; Hook.f., Fl. Brit. India 2: 229. 1881; Gamble, Fl. Madras 668(470). 1921; Uniyal in Hajra *et al.*, Fl. Ind. 13: 331.1995; Sivar. & Mathew, Fl. Nilambur 357. 1997 (Plate 17e).

Herbs, erect; stems terete, spreading hairy, angled. Leaves 8.5 x 4.5 cm, obovate-elliptic-rhomboid, margins irregularly serrate, serrations ending in mucro, thick, hairy on both the surfaces, prominently nerved beneath. Heads pedunculate, bracteate at the forks and below the heads; bracts linear-lanceolate, almost awned at the tip. Involucral bracts many-seriate, glandular-hairy on the back, aristate; outer elliptic, ovate-lanceolate, ca 5.5 mm long; inner oblong-elliptic, ca 8.5 mm long, ciliate on the margins in the upper half, thinner, distinctly nerved. Achenes ca 2.5 mm long, 10-ribbed, glandular between the ribs; pappus absent.

Ambalappara, NS & KJD 25510

Fl. & Fr.: September-December

Distribution: Rare in grasslands of Ambalappara. Endemic to Penninsular India

ADENOSTEMMA J.R.Forst. & G.Forst.

Charact. Gen. 89, t. 45. 1776.

Adenostemma lavenia (L.) Kuntze, Revis. Gen. Pl. 1:304. 1891; Gamble, Fl. Madras 677(476). 1921; Ansari, Fl. Kasaragod Div. 207. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 241. 1988; Uniyal in Hajra *et al.*, Fl. Ind. 12: 346. 1995. *Verbesina lavenia* L., Sp. Pl. 902. 1753. *Adenostemma latifolium* D.Don, Prodr. Fl. Nepal. 181. 1825. *Adenostemma viscosum* J.R.Forst. & G.Forst., Char. Gen. 90. t. 45. 1776. *Adenostemma viscosum* J.R.Forst. & G.Forst. var. *lavenia* Hook.f., Fl. Brit. India 3: 242. 1881, p.p.

Erect annual branched herbs to 60 cm tall. Leaves variable, lower opposite and upper often alternate, 15 x 7 cm, oblong or oblong-lanceolate, subacute, base cuneate, coarsely serrate; 3-nerved from base; petiole to 1.5 cm long. Heads in few to many in panicles, 6-7 mm across; bract linear. Involucral phyllaries linear-oblong, obtuse or subacute, glabrous. Corolla tube short, glandular hairy and viscous, lobes 5, acute. Style twice the length of the corolla, much exerted. Achenes 4-5 mm long, 5-angled, obtuse, nearly smooth; pappus of 4 or 5 glandular setae.

Mullenpara, NS & KJD 31933

Fl. & Fr.: October-December

Distribution: Fairly common in evergreen forests of Mullenpara and Kattikkari

AGERANTIA Spach.

Hist. Nat. Veg. Phan. 10. 286. 1841.

Ageratina adenophora (Spreng.) King & Robins., Phytologia 19: 211.1970; Ratheesh, Fl. Stud. Wayanad Dist. 457. 2009. *Eupatorium adenophorum* Spreng.,

Syst. Veg. 3: 420. 1826; Uniyal in Hajra *et al.*, Fl. Ind. 12: 350. 1995. *Eupatorium glandulosum* Kunth, Nov. Gen. Sp. 4: 122, t. 346. 1820, non Michx. 1803.

Subshrubs, glandular hairy, stem violet-blue. Leaves opposite, 5-8 x 2-4 cm, ovate, apex acute, serrate; petiole 2 cm long. Heads 7 mm across, 5 mm long, packed, in terminal corymbose panicle; bracts 3-seriate, 4 x 1 mm, lanceolate, strongly 3-ribbed. Outer florets bisexual. Corolla white, 5-lobed, hispid. Inner florets female. Achenes 2 mm long, curved, ellipsoid, 5-angled, brown, smooth; pappus 5-10, 4 mm long, white, barbed.

Meenmutty, KVB 31275; Ambalappa NS & KVB 31341, 31711

Fl. & Fr.: February-June

Distribution: Common weed in evergreen forests of Ambalappara, Kattikkari, Mullenpara and Meenmutty.

AGERATUM L.

Sp. Pl. 839. 1753.

Ageratum conyzoides L., Sp. Pl. 839. 1753; C.B. Clarke, Comp. Ind. 30. 1876; Hook.f., Fl. Brit. India 3: 243. 1881; Gamble, Fl. Madras 677(476). 1921; Manilal & Sivar., Fl. Calicut 151. 1982; Ansari, Fl. Kasaragod Div. 208. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 241. 1988; Uniyal in Hajra *et al.*, Fl. Ind. 12: 348. 1995; Sasidh. *et al.*, Bot. Stud. Med. Pl. Kerala 9, 21, 29; Ratheesh, Fl. Stud. Wayanad Dist. 457. 2009.

Herbs, viscid hairy. Leaves opposite, 5-7 x 3-5 cm, ovate, apex acute, crenate, base rounded; petiole 1-3 cm long. Heads white, to 7 mm across, in terminal corymbose panicle; bracts 1-3-seriate, 3-4 mm long, elliptic, toothed at apex, 3-ribbed. Flowers all similar, bisexual. Corolla 2.5 mm long, tubular, white, glabrous, 5-lobed at apex. Stamens 5, anthers linear. Achenes 2 mm long, linear, 5-angled, hirsute along the angles; pappus 3-4 mm long, many, setaceous.

Kariyenkappu, KJD 22592

Fl. & Fr.: August-December

Distribution: Common throughout the forest as weed.

ANAPHALIS DC.

Prodr. 6: 271. 1837.

- 1a. Vegetative and reproductive leafy shoots originate from a
Perennial root stock *A. neelgerryana*
- 1b. No root stock present 2
- 2a. Leaves scattered all over the stem, flowers yellow *A. leptophylla*
- 2b. Leaves congested at lower half of the stem, flowers red 3

- 3a. Leaves margin flat, base slightly decurrent *A. subdecurrens*
3b. Leaves margin recurved towards base *A. aristata*

Anaphalis aristata DC., Prodr. 6: 274. 1838; Hook.f., Fl. Brit. India 3: 285. 1881; Gamble, Fl. Madras 696(489). 1921; P.C. Pant in Hajra *et al.*, Fl. Ind. 13: 55. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 458. 2009.

Slender annual herbs; younger stems cottony wooly. Leaves 2-4 x 0.3 cm, acuminate at apex, narrowed from a broad amplexicaule or cordate base, 1-nerved, scabrous above. Heads 3 x 3 mm, hemispherical, collected in terminal dense clusters; bracts 4 mm long, spreading, elliptic, acute, wooly, solid at base. Bisexual flowers central, 5 or 6. Corolla 2.5 mm long, broader above. Female flowers many. Corolla 1.5 mm long, slender. Achenes cylindrical, brown, papillose; pappus 2 mm long, white.

Ambalappara, *KJD 25467*

Fl. & Fr.: July-April

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to Peninsular India.

Anaphalis leptophylla (DC.) DC., Prodr. 6: 273. 1838; Hook.f., Fl. Brit. India 3: 285. 1881; Gamble, Fl. Madras 696(490). 1921; P.C. Pant in Hajra *et al.*, Fl. Ind. 13: 67. 1995. *Helichrysum leptophyllum* DC. in Wight, Contrib. 20. 1834.

Slender herbs, profusely branched from base. Leaves 1.5-2.5 x 0.2-0.3 cm, linear lanceolate, mucronate at tip, sparsely cottony above, densely white cottony below; midrib prominent. Heads grouped into dense corymbs. Involucre bracts many seriate, scaly, cottony without, 0.3-0.4 cm long. Corolla tube slender, 0.3 cm long, 5-lobed, pale yellow. Stamens 5; anthers sagittate at base. Achenes 0.1 cm, angled and slightly compressed, minutely white papillose; pappus of many white barbellate hairs, 0.3-0.4 cm long.

Ambalappara, *KJD 26344*; *KVB 31767*

Fl. & Fr.: June-October

Distribution: Fairly common in the grasslands of Ambalappara. Endemic to southern Western Ghats.

Anaphalis neelgerryana (DC.) DC., Prodr. 6: 272. 1838; Hook.f., Fl. Brit. India 3: 287. 1881; Gamble, Fl. Madras 697(490). 1921; P.C. Pant in Hajra *et al.*, Fl. Ind. 13:69.1995. *Gnaphalium neelgerryanum* Sch.-Bip. ex DC.in Wight, Contrib. 21.1834.

Herbs, perennial, erect, ca 25 cm high, with woody root-stock; branches many, slender, whole plant clothed with white cottony tomentum. Leaves linear,

simple, 0.2-1 x 0.1-0.3 cm, acute at apex, base rounded and adhering to stem, margins recurved, surfaces densely white woolly 1-nerved, sessile. Heads densely crowded or solitary or in corymbose clusters, ca 0.3 cm across; peduncle ca 3 mm long, densely white woolly tomentose. Involucral bracts 4-5-seriate; outermost brown, ovate-elliptic, enveloped in woolly tomentum; inner bracts glistening white with brownish or darker base, oblanceolate. Ray florets with filiform corolla, ca 1.8 mm long, obscurely toothed. Corolla of disc florets tubular, ca 2 mm long, 5 or more toothed. Achenes ca 0.4 mm long, terete, minutely papillose; pappus hairs white, minutely plumose.

Ambalappara, KJD 25463

Fl. & Fr.: July-March

Distribution: Fairly common in evergreen forests of Ambalappara. Endemic to southern Western Ghats; Conservation status: Vulnerable.

Anaphalis subdecurrens (DC.) Gamble, Fl. Madras 695(489). 1921; P.C. Pant in Hajra *et al.*, Fl. Ind. 13: 75. 1995. *Gnaphalium subdecurrens* DC. in Wight, Contrib. 21. 1834. *Anaphalis oblonga* DC., Prodr. 6: 274. 1838; Hook.f., Fl. Brit. India 3: 283. 1881.

Erect herbs; stems densely covered with smocky wool. Leaves 3-6 x 0.6-1 cm, oblanceolate, acute, 1-veined, sessile. Heads 3 x 6 mm, sessile, collected in terminal congested cymes; bracts 3 mm long, elliptic, entire, acute with solid lower portion; outer ones wooly. Female flowers many; corolla yellow, slender, glabrous. Bisexual flowers 4-6, central; corolla broader. Achenes brown, papillose; pappus 2 mm long, white.

Ambalappara, KJD 25465

Fl. & Fr.: July-March

Distribution: Fairly common in the Grassland of Ambalappara.

BIDENS L.

Sp. Pl. 831. 1753.

Bidens pilosa L. var. **minor** (Blume) Sherff, Bot. Gaz. 80: 387. 1925; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 373. 1995. *Bidens sunndaica* var. *minor* Blume, Bijdr. Fl. Ned. Ind. 914. 1826. *Bidens pilosa* sensu Hook.f., Fl. Brit. India 3: 309. 1881; Gamble, Fl. Madras 709(499). 1921, p.p. non L. 1753.

Herbs, stem quadrangular. Leaves opposite, 12-18 cm, pinnate; lobes to 6 x 3 cm, ovate-lanceolate, apex acute, base truncate, serrate, hairy. Heads to 1 cm across; peduncles to 8 cm, flexuous involucral bracts biseriate, outer ca 3 x 1

mm, linear, spatulate, inner to 5 x 2 mm, ovate, obtuse. Rays florets 2-5. Corolla bilobed, yellow; disk many. Achenes ca 2.5 mm; setae 2-4, ca 3 mm long.

Chavachi, *KJD 26117*; Ambalappara, *KVB 26306*

Fl. & Fr.: January-October

Distribution: Fairly common in evergreen forests of Ambalappara and Chavachi.

BLUMEA DC.

Arch. Bot. 2: 514. 1883, *nom. cons.*

- 1a. Prostrate herbs *B. oxyodonta*
1b. Erect herbs or shrubs 2
2a. Leaves glabrous below *B. laevis*
2b. Leaves variously tomentose below *B. hieracifolia* var. *flexuosa*

Blumea hieracifolia (D.Don) DC. var. **flexuosa** (C.B.Clarke) Randeria, *Blumea* 10: 249. 1960; S. Kumar in Hajra *et al.*, *Fl. Ind.* 13: 126. 1995. *Blumea flexuosa* C.B.Clarke, *Comp. Ind.* 86. 1876; Gamble, *Fl. Madras* 688(484). 1921. *Blumea flexuosa* C.B.Clarke var. *peninsularis* Hook.f., *Fl. Brit. India* 3: 267. 1881.

Perennial herbs to 2 m tall. Leaves alternate, 4-15 x 1-5 cm, elliptic-oblong, apex acute or acuminate, attenuate and subpetiolate at the base, margin serrate-dentate, teeth indurated, pubescent on the upper surface, densely greyish cottony tomentose beneath. Heads 4-5 mm diameter, urceolate-campanulate, somewhat cernuous, in clusters of 4-12 on densely hirsute peduncles of axillary or terminal panicles. Involucre 4-seriate, phyllaries linear-lanceolate, 4-9 mm long. Flowers yellow or purple. Female corolla 4.5-5.75 mm long, glabrous; those of hermaphrodite flowers 4.5-6.0 mm long, the lobes papillate usually with a few white multicellular hairs. Receptacle c. 2.5 mm broad, glabrous. Achenes oblong, c. 1.25-1.5 mm long, pale brown, 10-ribbed, glabrous or sparsely pubescent; pappus 4.5-5 mm long, white.

Kattikkari, *KJD 22593*

Fl. & Fr.: February-June

Distribution: Fairly common in evergreen forests of Kattikkari.

Blumea laevis (Lour.) Merr., *Trans. Amer. Philos. Soc.* n.s. 24: 386. 1935. *Placus laevis* Lour., *Fl. Cochich.* 497. 1790. *Blumea virens* Wall. ex DC. in Wight, *Contrib.* 14. 1834; Hook.f., *Fl. Brit. India* 3: 264. 1881; Gamble, *Fl. Madras* 686(483). 1921; Ansari, *Fl. Kasaragod Div.* 210. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 245. 1988; S. Kumar in Hajra *et al.*, *Fl. Ind.* 13: 143. 1995; Ratheesh, *Fl. Stud. Wayanad Dist.* 464. 2009.

Erect glabrous shrubs, 1-1.5 m high. Leaves alternate, 5-10 x 3-5 cm, pinnatisect and serrate, glabrous; petiole 1-5 cm long. Heads 5 x 7 mm, many, in axillary and terminal large panicles, peduncles 1.5 cm long, glabrous; outer bracts 2 mm long, lanceolate, hairy at apex; inner larger, 6 mm long, linear-oblong. Bisexual florets 10, central; corolla 5 mm long, glandular. Female florets many; corolla 4 mm long, slender. Achenes 2 mm long, ribbed, oblong, hairy; pappus 4 mm long, white.

Chelachode, *KVB 31684*

Fl. & Fr.: December-June

Distribution: Fairly common in evergreen forests of Kattikkari and Chelachode.

Blumea oxydonta DC. in Wight, *Contrib.* 15.1834; Hook.f., *Fl. Brit. India* 3: 266. 1881; Gamble, *Fl. Madras* 686(482). 1921; Manilal & Sivar., *Fl. Calicut* 150. 1982; Ansari, *Fl. Kasaragod Div.* 210. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 245. 1988; S. Kumar in Hajra *et al.*, *Fl. Ind.* 13: 139. 1995; Ratheesh, *Fl. Stud. Wayanad Dist.* 463. 2009.

Prostrate herbs, stem slender, radiating from the root stock, pubescent. Radical Leaves 5-8 x 2-3 cm, oblanceolate, apex obtuse, dentate; cauline leaves sessile, smaller. Heads few, 8 mm long, globose, in terminal panicles; bracts densely tomentose; outer 3 x 0.3 mm, lanceolate; inner 6 x 0.3 mm, linear. Female flowers yellow, many; corolla 3 mm long, lobes glandular hairy. Bisexual flowers few; corolla 4 mm long, broad. Achenes 3 mm long, ribbed, pubescent.

Ambalappara, *NS & KJD 31981*

Fl. & Fr.: October-May

Distribution: Rare in evergreen forests of Ambalappara.

CHROMOLAENA DC.

Prodr. 5: 133. 1836.

Chromolaena odorata (L.) King & Robins., *Phytologia* 20: 204. 1970; Manilal & Sivar., *Fl. Calicut* 151. 1982; Ansari, *Fl. Kasaragod Div.* 210. 1985; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 247. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 464. 2009. *Eupatorium odoratum* L., *Syst. Nat.* (ed. 10) 1205. 1759; Hook.f., *Fl. Brit. India* 3: 244. 1881; Uniyal in Hajra *et al.*, *Fl. Ind.* 12: 354.1995.

Shrubs, glandular hairy. Leaves opposite, 8-12 x 5-8 cm, ovate, apex acute, base cuneate, crenate, hispid; petiole 2-3 cm long, cylindrical-oblong. Heads to 10 mm long, in terminal corymbose cymes; bracts 3-5-seriate, to 8 mm long, ovate,

obtuse; outer smaller, inner linear, acute, 3-ribbed. Flowers few to many, similar, bisexual; corolla 5 mm long, white, tubular, 5-lobed, pubescent at apex. Achenes 4 mm long, linear, 5-angled, scabrous, black; pappus many, 4-7 mm long, setaceous, yellowish.

Kariyenkappu, *KJD 18769*

Fl. & Fr.: November-May

Distribution: Common weed in the Sanctuary.

CISSAMPELOPSIS (DC.) Miq.

Fl. Ind. Batav. 2: 102. 1856.

Cissampelopsis corymbosa (Wall. ex DC.) Jeffrey & Chen., Kew Bull. 39: 341. 1984; R. Mathur in Hajra *et al.*, Fl. Ind. 13: 199.1995; Vanijajiva & Kadereit, Kew Bull. 63: 224. 2008; Ratheesh, Fl. Stud. Wayanad Dist. 465. 2009. *Senecio corymbosus* Wall. ex DC. in Wight, Contrib. 22. 1834; Hook.f., Fl. Brit. India 3: 351. 1881; Gamble, Fl. Madras 723(508). 1921.

Climbing shrubs, stem covered with fulvous-woolly hairs. Leaves alternate, 6-8 x 6-8 cm, broadly ovate, apex acuminate, base cordate, 5-7 ribbed, glabrous above, distantly serrulate; petiole 3-4 cm long. Heads 9 x 6 mm, in woolly panicles, axillary or terminal; bracts 1-seriate, 6 x 1.5 mm, oblong, with thick midrib, glabrous; corolla 7 mm long; lobes acute, yellow; anthers tailed at base. Achenes oblong, glabrous, brown; pappus 7 mm long.

Kurumbamkalu, *KJD 18774*

Fl. & Fr.: March-November

Distribution: Rare in evergreen forests of Kurumbankallu.

CONYZA Less

Syn. Gen. Comp. 203. 1832, *nom. cons.*

Conyza bonariensis (L.) Cronquist, Bull. Torrey Bot. Club 70. 632. 1943; Ramach. & V.J. Nair, Fl. Cannanore Dist. 247. 1988; Hajra in Hajra *et al.*, Fl. Ind. 12: 104. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 466. 2009. *Erigeron bonariensis* L., Sp. Pl. 863. 1753. *Erigeron linifolius* Willd., Sp. Pl. 3: 1955. 1803; Hook.f., Fl. Brit. India 3: 254. 1881. *Conyza ambigua* DC., Fl. Fr. 6:468.1815; Gamble, Fl. Madras 683(480).1921.

Erect herbs, stem ribbed, hispid. Leaves alternate, 8-20 x 1-3 cm, linear-elliptic to oblanceolate, apex acuminate, distantly serrate, hispid; petiole 1-2 cm long. Panicle 30-60 cm long, oblong, leafy. Heads 7 x 2 mm, oblong, cylindrical;

bracts oblong, obtuse, 4 x 0.5 mm, glabrous; outer bracts smaller, hispid; corolla of female flowers 3 mm long, slender. Bisexual flowers inner, few; corolla 4 mm long, widening upward. Achenes 1.5 mm long, biconvex, truncate, hairy, yellow; pappus 4 mm long, yellow.

Ambalappara, KVB 31765

Fl. & Fr.: June-January

Distribution: Fairly common in evergreen forests of Ambalappara.

CRASSOCEPHALUM Moench.

Meth. 516. 1794.

Crassocephalum crepidioides (Benth.) S. Moore, J. Bot. 1: 211. 1912; Manilal & Sivar., Fl. Calicut 150. 1982; Ansari, Fl. Kasaragod Div. 210. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 248. 1988; R. Mathur in Hajra *et al.*, Fl. Ind. 13: 201. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 468. 2009. *Gynura crepidioides* Benth. in Hook., Niger Fl. 438. 1849. *Erechtites valerianaefolia* sensu C.E.C. Fisch. in Gamble, Fl. Madras 1882(1302).1936, non (Wolf.) DC. 1838.

Tall herbs. Leaves 8-12 x 4-6 cm, lower ones lyrate pinnatifid, elliptic-oblong, apex acute, dentate, sparsely pubescent; petiole to 3 cm. Racemes terminal; phyllaries 1-seriate, 8 mm, lanceolate. Calyculus free at base of the phyllaries, to 3 mm. Flowers reddish, 9-10 mm long. Ovary 2 mm, oblong, style 9 mm, bifid at apex. Achenes 4 mm, brown; pappus numerous, 8 mm long, white.

Ambalappara, KVB 31781

Fl. & Fr.: August-December

Distribution: Fairly common in evergreen forests of Ambalappara, Chavachi and Kattikkari.

CYANTHILLIUM Blume

Bijdr. Fl. Ned. Ind. 15: 889. 1826.

Cyanthillium cinereum (L.) H. Rob., Proc. Biol. Soc. Wash. 103 252. 1990. *Conyza cinerea* L., Sp. Pl. 862. 1753. *Vernonia cinerea* (L.) Less., Linnaea 4: 291. 1829; Hook.f., Fl. Brit. India 3: 233. 1881; Gamble, Fl. Madras 676(475). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Ansari, Fl. Kasaragod Div. 218. 1985; Uniyal in Hajra *et al.*, Fl. Ind. 13: 367. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 484. 2009.

Annual or perennial herbs, stem ribbed, smooth or puberulus. Leaves variable, 2-8 x 1-3 cm, ovate, acute at both ends, thinly hairy below; petiole 1-2 cm long, slender. Heads 5 x 3 mm, in terminal corymbose cymes, peduncled;

outer bracts minute, inner oblong, acute, cuspidate, hairy. Flowers 5-10, similar; corolla 3 mm long, glabrous, bluish-purple. Achenes 1.5 mm long, hairy; outer pappus 1 mm long, setaceous, inner 3 mm long.

Chavachi, NS & KJD 25522

Fl. & Fr.: Throughout the year

Distribution: Common in evergreen forests of Chavachi, Semi-Evergreen forests of Paripode, Valayamchal and Narikkadavu.

DICHROCEPHALA L'Her. ex DC.

Arch. Bot. (Paris) 2: 517. 1833.

Dichrocephala integrifolia (L.f.) Kuntze, Revis. Gen. Pl. 1: 333. 1891; Ramach. & V.J. Nair, Fl. Cannanore Dist. 248. 1988; Hajra in Hajra *et al.*, Fl. Ind. 12: 114. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 469. 2009. *Hippia integrifolia* L.f., Suppl. Pl. 389. 1781. *Dichrocephala latifolia* (Pers.) DC. in Wight, Contrib. 11. 1834; Hook.f., Fl. Brit. India 3: 245. 1881; Gamble, Fl. Madras 679(477). 1921. *Cotula latifolia* Pers., Syn. 2: 464. 1805; Hook.f., Fl. Brit. India 3: 245. 1881.

Diffuse herbs, hispid. Leaves alternate, 3-4 x 2-3 cm, ovate, apex obtuse, irregularly lobed. Heads 3-4 mm across, globose, in terminal panicles; bracts 1-seriate, lanceolate, acute, ciliate. Flowers two types. Female flowers in several outer rows. Corolla tubular, 2-4-toothed at apex, glabrous. Bisexual flowers few, central. Corolla 4-lobed at apex, white; anthers 4, connate, included. Achenes 1 mm long, obovate, compressed, 4-ribbed, glabrous; pappus 4 deciduous bristles.

Ambalappara, KJD 26136

Fl. & Fr.: August-December

Distribution: Rare in evergreen forests of Ambalappara.

ECLIPTA L.

Mant. Pl. 12: 157, 286. 1771, *nom. cons.*

Eclipta prostrata (L.) L., Mant. Pl. 2: 286. 1771; Manilal & Sivar., Fl. Calicut 152. 1982; Ansari, Fl. Kasaragod Div. 211. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 249. 1988; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 381. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 469. 2009. *Verbesina prostrata* L., Sp. Pl. 902. 1753. *Eclipta alba* (L.) Hassk., Pl. Jav. Rar. 528. 1848; Hook.f., Fl. Brit. India 3: 304. 1881; Gamble, Fl. Madras 705(496). 1921. *Verbesina alba* L., Sp. Pl. 902. 1753. *Eclipta prostrata* (L.) L. var. *dixitii* Anand Kumar & Khanna, JETB 23: 713. 1999.

Herbs, caespitose, up to 25 cm high. Leaves opposite, 1-3 x 0.2-0.5 cm, oblong, oblong-lanceolate or oblong-elliptic, acute or subacuminate at apex,

cuneate at base, entire. Heads 4-5 mm across; peduncles appressed strigose, 2-4 mm long. Involucral bracts in 2 rows; outer bracts 5, ovate-elliptic, ca 3.5 x 2.5 mm, subacuminate at apex, cuneate at base, strigose outside; inner bracts 5, elliptic-obovate, ca 3 x 1.5 mm, subacuminate at apex, cuneate at base, sparsely strigose outside, glabrous inside. Ray florets 2-3-seriate, female, ca 4 mm long. Sepals minute, ovate, acute, membranous. Corolla ca 2.5 mm long; tube ca 0.8 mm long. Disc florets numerous, ca 3 mm long. Corolla campanulate, ca 1.6 mm long; lobes 4, ovate, ciliate on margin. Stamens 4 or 5, sagittate. Ovary hairy at apex; style branches 2, pubescent. Palea ca 2.2 mm long, hairy in the upper two-third portion. Achenes yellowish brown to brown, oblong-turbinate, dorsiventrally compressed and sharply angled, hairy at apex; pappus of partially or completely united scales forming a cone at the apex.

Valayamchal, *KJD 26363*

Fl. & Fr.: Throughout the Year

Distribution: Along road side in moist localities.

ELEPHANTOPUS L.

Sp. Pl. 814. 1753.

Elephantopus scaber L., Sp. Pl. 814. 1753; Hook.f., Fl. Brit. India 3: 242. 1881; Gamble, Fl. Madras 676(476). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Ansari, Fl. Kasaragod Div. 212. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 249. 1988; Uniyal in Hajra *et al.*, Fl. Ind. 13: 333. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 470. 2009.

Scapigerous herbs; whole plant scabrous. Leaves radical, rosetted at base, 6-18 x 2-5 cm, obovate to oblong or oblanceolate, base attenuate, margin crenate, apex obtuse or broadly acute, strigose above; cauline leaves small, narrow, sessile, base amplexicaule. Heads, homogamous, non-rayed, sessile, aggregated in dense, stalked glomerules, substened by 3 ovate, reduced leaves. Involucral bracts 2-seriate, scarious. Flowers 2-5, bisexual. Corolla purple; tube 5-6 mm long, lobes 5. Stamens 5, auricled at base. Ovary 3-4 mm, oblong; style arms subulate. Achenes 4-5 mm long, 10-ribbed; pappus of 4-6 spiny bristles, c. 5 mm long.

Kariyenkappu, *KJD 26365*

Fl. & Fr.: October-January

Distribution: Fairly common in plantations of Kariyenkappu and evergreen forests of Chavachi.

EMILIA Cass.

Bull. Sci. Soc. Philom. Paris 68. 1817.

Emilia sonchifolia (L.) DC. in Wight, Contrib. 24.1834; Hook.f., Fl. Brit. India 3: 336. 1881; Gamble, Fl. Madras 716(503). 1921; Manilal & Sivar., Fl. Calicut 149. 1982; Ansari, Fl. Kasaragod Div. 212. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 250. 1988; R. Mathur in Hajra *et al.*, Fl. Ind. 13: 212. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 471. 2009. *Cacalia sonchifolia* L., Sp. Pl. 835. 1753.

Erect or diffuse herbs. Leaves radical and cauline; radical leaves 4-10 x 1-3 cm, lyrate-pinnatifid with large terminal lobes, semi-orbicular; cauline leaves small, obovate to spathulate. Heads homogamous, not rayed, 1-3 on long slender peduncles. Involucral bracts cylindric, uniseriate, 6-8 mm long, oblong-lanceolate. Florets bisexual. Corolla pink, 3-3.5 mm long, wider to the mouth, lobes 5. Stamens 5; anthers 1-1.5 mm long. Ovary c. 1.5 mm long; style-arms acute. Achenes 1-2 mm long, 5-ribbed, hispid; pappus white, silky, 5-6 mm long.

Ambalappara, KJD 18746

Fl. & Fr.: July-December

Distribution: Common in evergreen forests of Ambalappara and Chavachi.

HELICHRYSUM Mill.

Gard. Dict. Abr., ed. 4. 462. 1754.

Helichrysum buddleioides DC. in Wight, Contrib. 20. 1834; Hook.f., Fl. Brit. India 3: 290. 1881; Gamble, Fl. Madras 699(491). 1921; P.C. Pant in Hajra *et al.*, Fl. Ind. 13:99.1995. *Hedysarum hookerianum* Wight & Arn., Prodr. Fl. Ind. Orient 6: 201. 1838. *Helichrysum buddleioides* var. *hookerianum* (Wight & Arn.) Hook.f., Fl. Brit. India 3: 291. 1881; Pant in Hajra *et al.*, Fl. Ind. 13: 99.1995 (Plate 17f).

Subshrubs, 50-70 cm high, densely cottony wooly. Leaves alternate, 5-10 x 1.5-2 cm, elliptic-oblong, acute at apex, narrowed and amplexicaule at base, sparsely cottony above, 5-7-ribbed. Heads 4 x 4 mm, globose, densely packed; bracts 3-4-seriate, 3.5 x 1 mm, oblanceolate, obtuse, yellow or hyaline, glabrous. Bisexual flowers 10-15; corolla 2 mm long, glabrous, yellow. Female flowers many; corolla 3 mm long. Achenes 3-angled, scabrid.

Ambalappara, KJD 31729

Fl. & Fr.: November-March

Distribution: Fairly common in evergreen forests of Ambalappara.

LAGGERA Sch.Bip. ex Benth.

Linnaea 19: 391. 1847.

Laggera alata (DC.) Sch.Bip. ex Oliv., Trans. Linn. Soc. London 29: 94. 1873; Hook.f., Fl. Brit. India 3: 271. 1881; Gamble, Fl. Madras 689(485).1921; Ramach.

& V.J. Nair, Fl. Cannanore Dist. 252. 1988; S. Kumar in Hajra *et al.*, Fl. Ind. 13: 148.1995. *Erigeron alatum* D.Don, Prodr. Fl. Nepal. 171. 1825. *Blumea alata* (D.Don) DC., Prodr. 5: 488. 1836; Ratheesh, Fl. Stud. Wayanad Dist. 460. 2009.

Subshrubs; stems winged, densely villous. Leaves alternate, to 8 x 2 cm, obovate-oblong, obtuse, sessile, decurrent at base along the stem. Heads 12 x 4 mm, in terminal leafy panicle; bracts many-seriate, to 8 x 1 mm, oblong-lanceolate, acute to acuminate. Female flowers outer several rows; corolla 4 mm long, slender, 4 toothed at apex. Bisexual flowers few, central; corolla 7 mm long, pink, lobes acute, glabrous. Achenes 2 mm long, ribbed, hispid; pappus 7 mm long, white.

Ambalappara, KVB 31786; KJD 26342

Fl. & Fr.: December-March

Distribution: Fairly common in evergreen forests of Ambalappara.

LAUNAEA Cass.

Dict. Sci. Nat. 25: 61, 321. 1822.

Launaea acaulis (Roxb.) Babc. ex Kerr. in Craib, Fl. Siam. 2: 299. 1936; Ramach. & V.J. Nair, Fl. Cannanore Dist. 252. 1988; Hajra in Hajra *et al.*, Fl. Ind. 12: 304. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 474. 2009. *Prenanthes acaulis* Roxb., Fl. Ind. 3: 403. 1832. *Crepis acaulis* (Roxb.) Hook.f., Fl. Brit. India 3: 396. 1881; Gamble, Fl. Madras 730(513). 1921.

Scapigerous perennial herbs with thick rootstock; juice milky. Leaves all basal, 8-15 x 1-3 cm, oblong, acute or obtuse, entire or finely toothed, glabrous. Heads 15 x 8 mm, cylindrical, 10-15 together, cymose, on elongated scapes. Scapes 3-5, 15-20 cm high, branched, glabrous. Bracts uniseriate, 10 x 2.5 mm, acute, oblong, margins white. Flowers all ligulate; corolla bright yellow, 18 mm long, glabrous, limb oblong; anthers sagittate at base. Achenes 5 x 1 mm, compressed, yellowish brown.

Ambalappara, NS & KVB 31350

Fl. & Fr.: March-September

Distribution: Rare in evergreen forests of Ambalappara.

MIKANIA Willd.

Sp. Pl. 3:1742.1803, *nom. cons.*

Mikania micrantha Kunth, Nov. Gen. Sp. 4: 134. 1820; Uniyal in Hajra *et al.*, Fl. Ind. 12: 357.1995; Ratheesh, Fl. Stud. Wayanad Dist. 475. 2009. *Mikania scandens* C.B.Clarke, Comp. Ind. 34. 1876, non L.; Hook.f., Fl. Brit. India 3: 144. 1881. *Mikania cordata* (Burm.f.) Robins., Contrib. Gray Herb. 104:65.1934;

Ramach. & V.J. Nair, Fl. Cannanore Dist. 253. 1988. *Eupatorium cordatum* Burm.f., Fl. Ind. 176. t. 58. 1768.

Climbers, stem glandular-hispid. Leaves opposite, 5-8 x 4-6 cm, ovate, apex acute, base cordate, crenate, glabrate; petiole 2-4 cm long. Heads 5 mm long, in axillary panicles; bracts biseriate, outer 2 smaller, inner 3-5, 4 x 1.5 mm, ovate, obtuse. Flowers 3-5, similar, bisexual; corolla 3 mm long, tubular, lobes 5, glandular, white; anthers linear. Achenes 2 mm long, 5-ribbed, black, glabrous; pappus 4 mm long, many, hispid.

Kariyenkappu, KJD 26249

Fl. & Fr.: February-April

Distribution: Common weed in the Sanctuary.

PHYLLOCEPHALUM Blume

Bijdr. Fl. Ned. Ind. 888. 1826.

Phyllocephalum scabridum (DC.) Kirkman, Rhodora 83: 10. 1981; Ansari, Fl. Kasaragod Div. 213. 1985; Uniyal in Hajra *et al.*, Fl. Ind. 13: 344. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 477. 2009. *Decaneurum scabridum* DC. in Wight, Contrib. 7. 1834. *Decaneurum molle* DC., Prodr. 5: 67. 1836. *Centratherum molle* (DC.) Benth. in Benth. & Hook.f., Gen. Pl. 2: 225. 1873; Hook.f., Fl. Brit. India 3: 227. 1881; Gamble, Fl. Madras 666(469). 1921; Vajr., Fl. Palghat Dist. 250.

Erect herbs. Leaves 12-15 x 4-6.5 cm, elliptic, acuminate at both ends, thinly scabrid above, deeply serrate. Peduncles 1.5 cm long, tomentose. Heads 1.3 x 1 cm, few; inner bracts 9 x 2 mm; outer bracts 8 x 4 mm, white-tomentose, ciliate along the margins. Flowers 12-15; corolla 8 mm long; lobes oblong, glabrous. Achenes 1.5 mm long; pappus few, 2.5 mm long.

Ambalappara, NS & KJD 31963

Fl. & Fr.: July-December

Distribution: Rare in evergreen forests of Ambalappara. Endemic to Western Ghats

SPILANTHES Jacq.

Enum. Syst. Pl. 8. 1760.

- 1a. Heads not rayed, white..... *S. radicans*
1b. Heads rayed, yellow..... *S. paniculata*

Spilanthes ciliata Kunth, Nov. Gen. & Sp. Pl. 4: 621. 1836; Sivar. *et al.*, Anci. Sci. of Life 3: 171. 1984; Sivar. & Remesan, J. Econ. Taxon. Bot. 10: 145. 1987; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 409. 1995; Joseph, Aquatic Angiosp. Malabar 52. 1991. *Acmella ciliata* (Kunth) Cass., Dict. Sc. Nat. 24: 331. 1822.

Diffuse herbs rooting at lower nodes; stem terete. Leaves opposite, 7 x 4 cm, ovate, base rounded or subcordate, margins serrate, apex acute; petiole 1-2.5 cm long. Heads rayed, axillary, usually solitary, rarely 2-3 in each axil, c. 1 cm across, subglobose, turning conical, yellow; peduncle 3-8 cm long. Involucral bracts 2-seriate, shorter than ray florets, inner series narrower and smaller, up to 6 x 2 mm, elliptic, subacute. Palea c. 3 mm long, boat-shaped, concave, obtuse, keeled. Ray florets 8-12, female, ligulate; corolla tube c. 1 mm long, limb 3-lobed; pappus of 3 awns, deciduous; achenes trigonous, black, strongly margined and ciliate along the margins. Disc florets many, bisexual; pappus of 2 unequal bristles; corolla tube c. 2 mm long, lobes much shorter than the tube. Achenes c. 2 x 0.5 mm, oblong, truncate at apex.

Chavachi, NS & KJD 31944

Fl. & Fr.: August-December

Distribution: Fairly common in evergreen forests of Chavachi, Mullenpara and Kattikkari.

Spilanthes radicans Jacq., Collect. Bot. Chen. Hist. Nat. 11: 1714. 1804; Sivar. & Matthew, Anci. Sci. of Life 3: 169. 1984; Sivar. & Remesan, J. Econ. Taxon. Bot. 10: 144. 1987; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 412. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 480. 2009.

Erect herbs, 30-70 cm high; stem glabrous. Leaves opposite, 7 x 4 cm, ovate, acute, crenulate along the margins, glabrous; petiole 1-2 cm long. Heads 7-12 x 6-8 mm, solitary or 2-3 together; peduncles 3-5 cm long, puberulus; bracts 4 x 1 mm, glabrous. Flowers similar; corolla 2 mm long, 3-lobed. Achenes 2 types, marginal ones 3-angled, central achenes laterally compressed, obovate, truncate, ciliate along the edges, cilia longer towards the apex.

Ambalappara, KVB 31651

Fl. & Fr.: October-March

Distribution: Common in evergreen forests of Ambalappara, Kattikkari and Mullenpara.

SYNEDRELLA Gaertn.

Fruct. Sem. Pl. 2: 456. 1791, *nom. cons.*

Synedrella nodiflora (L.) Gaertn., Fruct. Sem. Pl. 2: 456. t. 171. 1791; Hook.f., Fl. Brit. India 3: 308. 1881; Gamble, Fl. Madras 708(498). 1921; Manilal & Sivar., Fl. Calicut 152. 1982; Ansari, Fl. Kasaragod Div. 216. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 255. 1988; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12:

413. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 481. 2009. *Verbesina nodiflora* L., Cent. Pl. 1: 28. 1755 & Ameen. Acad. 4: 290. 1759.

Erect branched herbs; stem adpressed hairy. Leaves opposite, 4-8 x 2-4 cm, elliptic-ovate, apex acute, base cuneate to truncate, narrowly winged on the petiole, margin serrate, scabrous on both sides, basally 3-nerved; petiole to 3 cm. Heads solitary, axillary and terminal, few-flowered, 0.5-1 cm across, radiate. Phyllaries 2-seriate; outer foliaceous, inner paleaceous. Flowers heterogamous, yellow. Ray flowers: female; corolla tube 2-2.5 mm long; ligule 1-2 mm long, 2-3-lobed; ovary 3 mm long, oblong, winged; style-arms acute. Disc flowers; bisexual; corolla tube 2-3 mm long, lobes 5; stamens 5, included, ovary 2-3 mm long. Achenes 3-4 mm long, dimorphic: of ray florets dorsally compressed, with lacerate wings; of disc florets trigonous, not winged, with 2 or 3 rigid awns.

Chavachi, *KJD 22525*

Fl. & Fr.: Throughout the year

Distribution: Fairly common weed in evergreen forests of Kattikkari and Chavachi; plantations of Kariyenkappu.

TRIDAX L.

Sp. Pl. 900. 1753.

Tridax procumbens L., Sp. Pl. 900. 1753; Hook.f., Fl. Brit. India 3: 311. 1881; Gamble, Fl. Madras 711(500). 1921; Manilal & Sivar., Fl. Calicut 154. 1982; Ansari, Fl. Kasaragod Div. 217. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 255. 1988; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 418. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 482. 2009.

Procumbent herbs. Leaves opposite, 3-6 x 1.5-3 cm, ovate, apex acute, serrate, bulbous-based hairy; petiole 5-10 mm long. Heads 1.3 x 1.5 cm, solitary, on long peduncles; bracts in 3-series, lanceolate, hairy. Outer row of flowers ligulate, female, limb 3 x 2 mm, 3-toothed, white; inner flowers bisexual, tubular; corolla 6 mm long, 5-lobed at apex, yellow. Achenes 2 mm long, obovoid, densely hairy; pappus many, setaceous.

Paripode, *KJD 22540*

Fl. & Fr.: Throughout the year

Distribution: Along the boundaries of Farm at Paripode.

VERNONIA Schreb.

Gen. 2: 541. 1791, *nom. cons.*

Vernonia arborea Buch.-Ham., Trans. Linn. Soc. London 14: 218. 1824; Hook.f., Fl. Brit. India 3: 239. 1881; Ramach. & V.J. Nair, Fl. Cannanore Dist. 256. 1988;

Uniyal in Hajra *et al.*, Fl. Ind. 13: 359. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 484. 2009. *Monosis wightiana* DC. in Wight, Contrib. 1. 1834 & Icon. Pl. Ind. Orient. t. 1085. 1846. *Vernonia monosis* Benth. ex C.B. Clarke, Comp. Ind. 24. 1876p.p., non Sch.-Bip. 1847; Gamble, Fl. Madras 672(473). 1921. *Vernonia arborea* Buch.-Ham. var. *wightiana* (DC.) Hook.f., Fl. Brit. India 3: 239. 1881.

Trees; to 12 m high; bark grey.. Leaves alternate, 10-29 x 4-10 cm, obovate, elliptic-obovate or elliptic-oblong, apex acuminate, base acute, obtuse, cuneate or attenuate; lateral nerves 8-13 pairs, parallel; intercostae subscalariform; petiole 7-21 mm long. Flowers purple, in heads arranged in terminal tomentose panicles; capitula 1 flowered; involucre tubular 0.3 cm across; phyllaries thick scarious-outer orbicular-ovate 1.3-1 mm, pubescent without, obtuse, inner one oblong, 4.5 x 1.5 mm, thinly ciliate-glabrescent, 3-nerved, faint, ending abruptly in the middle. Calyx tube adnate to the ovary, pappus 1 seriate, to 7 mm, barbellate. Corolla 5 mm across; tube cylindrical 6.5 mm, lobes lanceolate, 3.5 mm. Stamens 5, inserted within the corolla tube. Ovary oblong, 1-celled, shortly beaked above, 2.2 x 1.5 mm, narrowed below ovule solitary, erect, style 1 cm, linearly 2 fid; stigma puberulous, recurved, acute. Achenes, 2 mm long, 10-ribbed with glands in between; pappus hairs white.

Ambalappara, KVB 31697

Fl. & Fr.: September-March

Distribution: Fairly common in evergreen forests of Ambalappara, Mullenpara and Kattikkari.

SPHAGNETICOLA O.Hoffm.

Notizbl. Königl. Bot. Gart. Berlin 3: 36. 1900.

Sphagneticola trilobata (L.) Pruski, Mem. New York Bot. Gard. 78 114. 1996. *Wedelia trilobata* (L.) Hitchc., Rep. Missouri Bot. Gard. 4: 99. 1898; Sivar. & Pradeep, Indian J. For. 11: 161. 1988; H.J. Chowdhery in Hajra *et al.*, Fl. Ind. 12: 426. 1995; Ratheesh, Fl. Stud. Wayanad Dist. 486. 2009. *Silphium trilobatum* L., Syst. (ed. 10) 1232. 1759.

Herbs, perennial, prostrate, diffuse, rooting at nodes; stems glabrous or pubescent. Leaves 3-10 x 3-7 cm, elliptic-obovate, usually with 3 angular lobes with toothed margins, acute at apex, basally cuneate, glabrous to sparingly pubescent; petiole short, upto 5 mm. Heads radiate, 2-2.5 cm across, solitary on ebracteate 4-15 cm long peduncles. Involucre green; bracts lanceolate, 1-1.5 cm long, ciliate; inner narrower. Ray florets 5-8; corolla bright yellow, 1.5-2.0 x 0.5-0.7 cm, 3-4 denticulate; tube short. Ovary trigonous; stigma bilobed. Pappus connate into a spathiform, fimbriate cup at the apex, devoid of awns. Disc florets many; corolla

yellow; tube 5-8 mm long, 5-lobed; lobes deltoid, densely pubescent within. Anthers black, syngeneious. Style branches flattened and marginally pubescent. Achenes blackish, warty, 4-6 mm long, crowned by the persistent pappus cup.

Kariyenkappu, KVB 31611

Fl. & Fr.: June-September

Distribution: A weed in old settlements.

CAMPANULACEAE

LOBELIA L., Sp. Pl. 929. 1753.

- 1a. Tall herbs, basal leave more than 10 cm long, flowers >3cm..... *L. nicotianifolia*
- 1b. Small herbs, basal leaves less than 3 cm, flowers <1 cm 2
- 2a. Seeds trigonous..... *L. alsinoides*
- 2b. Seeds ellipsoid..... *L. heyneana*

Lobelia alsinoides Lam., Encycl. 3: 588. 1792; Manilal & Sivar., Fl. Calicut 155. 1982; Haridasan & P.K. Mukh. in Nayar *et al.*, Fasc. Fl. Ind. 19: 42. 1988; Ramach. & V.J. Nair, Fl. Cannanore Dist. 259. 1988; Joseph, Aquatic Angiosp. Malabar 98. 1991; Ratheesh, Fl. Stud. Wayanad Dist. 487. 2009; Rajeev & Diwakar, Indian J. For. 33: 626. 2010. *Lobelia trigona* Roxb., Fl. Ind. 2: 111. 1824; Hook.f., Fl. Brit. India 3: 423. 1881; Gamble, Fl. Madras 736(518). 1921.

Decumbent herbs, rooting from lower nodes, stem 3-winged. Leaves alternate, 1-2 x 1-1.5 cm, ovate-orbicular, apex obtuse, crenate, petiolate; petiole 3 mm broad; upper leaves sessile, elliptic, acute, smaller. Flowers in terminal raceme. Sepals 5 mm long, lanceolate. Corolla blue, 10 mm long, upper 3 lobes obovate, lower 2 lobes narrower. Capsule 6 mm long, glabrous; seeds trigonous, brown.

Paripode, KJD 22550

Fl. & Fr.: August-October

Distribution: Fairly common along the boundaries of Farm at Paripode and plantations at Kariyenkappu.

Lobelia heyneana Schult., Syst. Veg. 5: 50. 1819; Haridasan & Mukh. in Nayar *et al.*, Fasc. Fl. Ind. 19: 51. 1988; Rajeev & Diwakar, Indian J. For. 33: 628. 2010. *Lobelia dichotoma* Miq., Fl. Ind. Bat. 2: 576. 1856; Haridasan & P.K. Mukh. in Nayar *et al.*, Fasc. Fl. Ind. 19: 47. 1988. *Lobelia trialata* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 157. 1825; Hook.f., Fl. Brit. India 3: 425. 1881, incl. var. *lamifolia*; Gamble, Fl. Madras 736(518). 1921; *Lobelia zeylanica* sensu C.B. Clarke in Hook.f., Fl. Brit. India 3: 425. 1881, incl. var. *walkeri*.

Diffuse herbs, stem 3-winged, glabrous. Leaves alternate, 3 x 1.5 cm, obovate, apex obtuse or acute, base narrowly winged on the petiole, crenate-serrate, nerves 4 pairs; upper leaves sessile. Flowers in terminal, short raceme. Sepals 4.5 x 1 mm, lanceolate, glabrous. Corolla blue, 10 mm long, ventral lobe broader; lateral and dorsal lobes lanceolate. Anthers 2.5 mm long, 2 anthers with penicillate black hairs at apex. Style stout, curved; stigma with a ring of hairs below.

Ambalappara, *KJD 25431*

Fl. & Fr.: August-November

Distribution: Rare in the Grasslands.

Lobelia nicotianifolia Roth ex Schult., Syst. Veg. 5: 47. 1819; Hook.f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Madras 736(518). 1921; Haridasan & Mukh. in Nayar *et al.*, Fasc. Fl. Ind. 19: 53. 1988; Ramach. & V.J. Nair, Fl. Cannanore Dist. 260. 1988; Ratheesh, Fl. Stud. Wayanad Dist. 488. 2009; Rajeev & Diwakar, Indian J. For. 33: 630. 2010. *Lobelia nicotianifolia* Roth ex Roem. & Schult. var. *trichandra* (Wight) C.B. Clarke in Hook.f., Fl. Brit. India 3: 427. 1881; Gamble, Fl. Madras 737(518). 1921. *Lobelia trichandra* Wight, Icon. Pl. Ind. Orient. t. 1171. 1848.

Shrubs. Leaves distant, simple, alternate, 17 x 4 cm, elliptic, base attenuate, tip acuminate, chartaceous, margin inconspicuously serrate. Racemes terminal or in upper axils, to 50 cm. Calyx tube 3 mm, lobes 12 x 2 mm, lanceolate. Corolla 3-3.5 cm long, tube 15 mm long, constricted below lobes, upper lobe 15 mm, lower 5 mm. Staminal filaments basally free; anthers puberulous. Capsule 0.8 x 0.6 cm, cupular; seeds broad-elliptic.

Kattikkari, *KVB 31557*

Fl. & Fr.: October-March

Distribution: Fairly common in evergreen forests of Ambalappara and Kattikkari.

Order: **Dipsacales**

CAPRIFOLIACEAE

VALERIANA L. Sp. Pl. 1: 31. 1753

Valeriana hardwickii Wall. var. **arnottiana** (Wight) C.B. Clarke in Hook.f., Fl. Brit. India 3: 213. 1880; Manilal, Fl. Silent Valley 145. 1988; Prakash, J. Econ. Taxon. Bot. 20:246.1996. *Valeriana arnottiana* Wight, Icon. Pl. Ind. Orient. t. 1045-6. 1845; Gamble, Fl. Madras 657(463). 1921 (Plate 17g).

Caulescent, erect herb; stem ribbed and hollow. Leaves cauline, decussate, pinnate, chartaceous; petiole to 4 cm; leaflets 5-9, lower ones alternate, ovate, to

6 x 4 cm, base cuneate-truncate, margin serrate-dentate, apex acuminate; petiolule to 15 mm. Cymes diffuse, 16 x 11 cm; peduncle to 15 cm; bracts to 10 mm. Calyx-limbs more than 10. Corolla white, 5 mm wide; lobes 5, broadly ovate. Stamens 3. Ovary 1-celled; ovule 1. Achene 3.5 mm.

Ambalappara, *KJD 26395*

Fl. & Fr.: June-December

Distribution: Rare at evergreen Forests of Ambalappara.

Order: **Apiales**

APIACEAE

- 1a. Prostrate herbs, rooting at nodes, simple umbels..... Centella
- 1b. Erect leaves, not rooting at nodes, compound umbels 2
- 2a. Fruit laterally compressed, not winged..... Pimpinella
- 2b. Fruit dorsally compressed, winged Heracleum

CENTELLA L.

Sp. Pl. ed. 2, 1393. 1763.

Centella asiatica (L.) Urban in Mart., Fl. Bras. 11:287. t.78.f. 1879; Gamble, Fl. Madras 556(392). 1919; Manilal & Sivar., Fl. Calicut 128. 1982; Ansari, Fl. Kasaragod Div. 183. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 205. 1988; P.K. Mukh. & Constance, Umbell. India 15. 1993; Ratheesh, Fl. Stud. Wayanad Dist. 402. 2009. *Hydrocotyle asiatica* L., Sp. Pl. 234. 1753.

Prostrate herbs, rooting at nodes. Leaves alternate, orbicular-reniform, 3-5 cm across, crenate or sub-entire, glabrous, nerves radiating; petiole to 12 cm long, sheathing at base. Flowers sessile, pink, in 2-5 flowered umbels; peduncles 1-2 cm long, axillary. Calyx tube 1 mm long, adnate to the ovary, lobes minute. Petals 4, 1 mm long, oblong, recurved at apex, pink. Stamens 5, filaments erect. Ovary 2-celled, cell 1-ovuled, style erect, bilobed at apex. Fruit ovoid, 3-4 mm long, reticulate-rugose, 7-9-ribbed.

Kariyenkappu, *KJD 18766*

Fl. & Fr.: Throughout the year

Distribution: In former settlements.

HERACLEUM L.

Sp. Pl. 249. 1753.

Heracleum candolleianum (Wight & Arn.) Gamble, Fl. Madras 565(399). 1919; P.K. Mukh. & Constance, Umbell. India 243. 1993; Ratheesh, Fl. Stud. Wayanad

Dist. 403. 2009. *Pastinaca candolleana* Wight & Arn., Prodr. Fl. Ind. Orient. 372. 1834. *Heracleum rigens* Wall. ex DC. var. *candolleana* (Wight & Arn.) C.B. Clarke in Hook.f., Fl. Brit. India 2: 715. 1879, p. p. *Heracleum rigens* var. *ligusticifolium* (Wight) C.B. Clarke in Hook.f., Fl. Brit. India 2: 716. 1879. *Heracleum courtallense* Gamble, Fl. Madras 565(399). 1919 (Plate 17h).

Shrubs, stem ridged. Leaves alternate, 35-45 x 20-25 cm, 1 or 2 pinnate; leaflets 7-9 or more, to 15 x 10 cm, lobed, apex acute, serrate, scabrous, coriaceous. Umbels compound, terminal, corymbose; secondary peduncles to 6 cm long; rays 13, each 3-5 cm long, spreading; pedicels 6-10 mm long, many-together, spreading. Flowers 5-merous, 2 mm across. Calyx 5-toothed. Petals 3, ovate, acuminate, with a strong midrib, glabrous. Stamens 5, free, anthers ovate. Ovary compressed. Fruit 7-10 x 4-7 mm, biconvex, dorsally compressed, winged, glabrous.

Ambalappara, KJD 25507

Fl. & Fr.: April-October

Distribution: Rare in evergreen forests of Ambalappara. Endemic to southern Western Ghats.

PIMPINELLA L.

Sp. Pl. 263. 1753.

Pimpinella heyneana (DC.) Kurz, J. Asiat. Soc. Bengal 46: 115. 1877; Gamble, Fl. Madras 560(395). 1919; Ansari, Fl. Kasaragod Div. 184. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 207. 1988; P.K. Mukh. & Constance, Umbell. India 145. 1993; Ratheesh, Fl. Stud. Wayanad Dist. 405. 2009. *Helosciadium heyneanum* DC., Prodr. 4: 106. 1830 (Plate 17i).

Erect or decumbent herbs, stem terete. Leaves alternate, 5-7 cm across, lower leaves orbicular, upper ones 3-lobed, base cordate, toothed; petiole 1-6 cm long, sheathing at base. Umbels terminal, paniced; rays 10; secondary rays many, each 3 cm long. Flowers 9-16 in an umbellule, 1.5 mm across, white; pedicels 5 mm long. Calyx shortly 5-toothed. Petals 5, 1 mm long, orbicular. Stamens 5. Fruit 3 x 2 mm, ovate, densely villous, rugose.

Ambalappara, KJD 26304; KVB 31785

Fl. & Fr.: August-February

Distribution: Fairly common in grasslands of Ambalappara.

ARALIACEAE

- 1a. Prostrate herbs..... Hydrocotyle
- 1b. Shrubs or Climbers Schefflera

HYDROCOTYLE L.

Sp. Pl. 234. 1753.

Hydrocotyle javanica Thunb., Diss. Hydroc. n. 17. t. 2. 1798; Gamble, Fl. Madras 556(392). 1919; Ramach. & V.J. Nair, Fl. Cannanore Dist. 206. 1988; P.K. Mukh. & Constance, Umbell. India 11. 1993; Ratheesh, Fl. Stud. Wayanad Dist. 404. 2009. *Hydrocotyle hispida* Buch.-Ham ex D.Don, Prodr. Fl. Nepal. 182. 1825. *Hydrocotyle polycephala* Wight & Arn., Prodr. Fl. Ind. Orient. 366. 1834.

Prostrate herbs, rooting at nodes; young stem, peduncle and pedicels densely pubescent with curled hairs. Leaves alternate, 1.5-3.5 x 2.5-6 cm, orbicular, broader than long, 7-9 lobed, 7-9 ribbed, sparsely hairy on both sides, variously serrate on margins. Flowers sessile in capitate clusters, umbelled on 1-6 cm long peduncles; pedicels 0.5-2 cm long; involucral bracts scaly. Calyx tube 0.5 cm long, 5-toothed. Petals 5, 0.05-0.1 cm long, lanceolate. Stamens 5. Ovary 0.05-0.1 cm long, 2-celled, laterally compressed; styles 2; stigma capitate. Fruit 0.1-0.15 x 0.05-0.2 cm, 3-ridged.

Pothurumi, KVB 31725

Fl. & Fr.: October-May

Distribution: Common in evergreen forests of Kattikari, Chavachi and Pothurumi.

SCHEFFLERA J.R.Forst. & G.Forst.

Charact. Gen. 45. 1776.

- 1a. Main nerves not prominent, shrubs, not straggling *S. wallichiana*
- 1b. Main nerves prominent, straggling shrubs 2
- 2a. Leaves chartaceous; panicles long *S. roxburghii*
- 2b. Leaves coriaceous; panicles short *S. venulosa*

Schefflera roxburghii Gamble, Fl. Madras 570(402). 1919; Subram., Indian For. 96: 529. 1970. *Schefflera venulosa* (Wight & Arn) Harmes var. *roxburghii* (Gamble) Khanna, J. Econ. Taxon. Bot. 26:144. 2002.

Large straggling or climbing shrubs. Leaves alternate, digitate, leaflets chartaceous, up to 15 x 6 cm, ovate-elliptic, apex acute, main nerves scarcely more prominent than the secondary and reticulations. Flowers in panicles of umbels or compound racemes, usually terminal; bracts usually deciduous; bracteoles 0 or few, sometimes united in a tube; pedicels, if present, not jointed. Calyx-mouth truncate or toothed. Petals 5 or 6 or many, valvate. Stamens as many as the petals. Ovary-cells as many as the petals; styles short, free. Drupes 5-6 angled; seeds compressed.

Ambalappara, KVB 31365; Chavachi KVB 31396

Fl. & Fr.: May-July

Distribution: Fairly common in evergreen forests of Chavachi and Ambalappara; plantations of Kariyenkappu. Endemic to southern Western Ghats.

Schefflera venulosa (Wight & Arn.) Harms, *Naturl. Pflanzenfam.* 3(8): 39. 1894; Gamble, *Fl. Madras* 570(403).1919; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 208. 1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 408. 2009. *Paratropia venulosa* Wight & Arn., *Prodr. Fl. Ind. Orient.* 377. 1834. *Heptapleurum venulosum* (Wight & Arn.) Seem., *J. Bot.* 3: 80. 1865; Hook.f., *Fl. Brit. India* 2: 729. 1879, p.p. (Plate 17j).

Small trees, branchlets 0.5-0.7 cm thick. Leaves 5 or 6 foliolate; leaflets 10-14 x 5-8 cm, ovate-oblong, apex abruptly acuminate, base rounded; nervules prominently reticulate; petiolule 7-10 cm long; stipule 5 mm broad, black. Panicles 20 cm across, glabrous; umbels 2 cm across, 3-12 flowered. Flowers brown; pedicel 8-12 mm long. Calyx truncate. Petals 2 x 2.5 mm, triangular. Drupe 4 x 4 mm, globose, 5-angled.

Ambalappara, KVB 31366

Fl. & Fr.: March-June

Distribution: Rare in evergreen forests of Ambalappara.

Schefflera wallichiana (Wight & Arn.) Harms in *Engl. & Prantl, Naturl. Pflanzenfam.* 3(8): 38. 1894; Gamble, *Fl. Madras* 570(403). 1919; Ramach. & V.J. Nair, *Fl. Cannanore Dist.* 209.1988; Ratheesh, *Fl. Stud. Wayanad Dist.* 409.2009. *Paratropia wallichiana* Wight & Arn., *Prodr. Fl. Ind. Orient.* 77.1834. *Heptapleurum wallichianum* (Wight & Arn.) C.B. Clarke in Hook.f., *Fl. Brit. India* 2: 730. 1879 (Plate 17k).

Trees, sometimes epiphytic on other trees; bark 5-8 mm thick, surface grey, rough. Leaves digitately, compound, alternate, leaflets 5-8, 14-24 x 5-8 cm, oblong or ovate, apex obtusely acuminate or acute, base subcordate, truncate or round margin entire; lateral nerves 10-21 pairs, very slender, nearly horizontal; intercostae obscure. Flowers pale green, 6-8 mm across, 12-20 together in umbels on elongate racemes arranged in panicles on short axis; pedicel 7 mm long. Calyx truncate. Petals 5, valvate, cohering in to a cap above the stamens. Stamens 5. Ovary inferior, syncarpus, cells as many as petals; style absent; stigma sessile. Fruit a berry, 5-6 mm across, globose, 5 angled, crowned with disk; pyrenes 5, 1-seeded.

Ambalappara, KVB 31364

Fl. & Fr.: April-May

Distribution: Rare in evergreen forests of Ambalappara.

PITTOSPORACEAE

PITTOSPORUM Banks ex Sol.

Fruct. Sem. Pl. 1: 286, t. 59. 1788.

Pittosporum tetraspermum Wight & Arn., Prodr. Fl. Ind. Orient. 154. 1834; Hook.f., Fl. Brit. India 1: 198. 1872; Gamble, Fl. Madras 55(40). 1915; M.P. Nayar & G.S. Giri in B.D. Sharma & N.P. Balakr., Fl. Ind. 2: 447. 1993; N.P. Balakr. in P. Daniel, Fl. Kerala 1: 286. 2005; Ratheesh, Fl. Stud. Wayanad Dist. 126. 2009 (Plate 171).

Large shrubs, to 2 m tall; bark rough, grey outside, pungent smelling when cut, granular. Leaves pseudovercillate towards the branch tips, 6-9 x 2-4 cm, elliptic, acute at either ends, 10-12-nerved; midrib tomentose above and below; petiole 1 cm long. Flowers in terminal sessile umbels, pedicels 5 mm long. Sepals 2.5 x 1.5 mm, ovate, obtuse, pubescent. Petals creamy-white, 12 x 3 mm, oblanceolate, clawed. Staminal filaments 6 mm long. Ovary densely hairy; style 4 mm long, glabrous. Capsule 8 x 8 mm, globose, smooth, black.

Ambalappara, NS & KJD 31950

Fl. & Fr.: December-April

Distribution: Common in evergreen forests of Ambalappara.

GNETACEAE

GNETUM L.

Mant. Pl. 18. 1767.

Gnetum edule (Willd.) Blume, Nov. Pl. Expos. 31. 1833. *Thoa edulis* Willd., Sp. Pl. 4: 477. 1805. *Gnetum ula* Brongn. in Duperr., Voy. Bot. 12. 1829; Gamble, Fl. Madras 1885(1304). 1936; Ansari, Fl. Kasaragod Div. 362. 1985; Ramach. & V.J. Nair, Fl. Cannanore Dist. 443. 1988.

Woody climbers. Leaves opposite, 10-18 x 5-9 cm, elliptic-ovate or oblong, coriaceous, acute, base rounded or acute; petiole to 1.5 cm. Panicles axillary arising from mature wood; bracts cupular; male strobilus to 5 cm long, bracteoles 2.5 mm; stamens 1, exserted; female strobilus to 7 cm long; ovary globose. Fruits ca 3 x 2 cm, globose.

Chavachi, KJD 18703

Fl. & Fr.: October-June

Distribution: Fairly common in evergreen forests of Chavachi, Kariyenkappu, etc.



a. *Ipomoea deccana*



b. *Lycianthes laevis*



c. *Acilepis dendigulensis*



d. *Acilepis ornata*



e. *Adenoon indicum*



f. *Helichrysum buddleioides*



g. *Valeriana hardwickii* var. *arnottiana*



h. *Heracleum candolleianum*



i. *Pimpinella heyneana*



j. *Schefflera venulosa*



k. *Schefflera wallichiana*



l. *Pittosporum tetraspermum*

Result and discussion

6. Result and discussion

6.1. Floristic analysis

6.1.1. General statistics

During the study, 993 taxa of phanerogams belonging to 586 genera under 123 families were collected and described. These include 2 varieties. In the present study, families are arranged as per the APG III classification system. This phylogenetic system recognises plants as different clades. Magnoliids, Monocots, Eudicots and Core eudicots are the major clades. In the clade Magnoliids there are 47 species belonging to 24 genera under 5 families; clade Monocots have 191 species belonging to 121 genera under 19 families; clade Eudicots have 11 species belonging to 8 genera under 3 families and clade Core eudicots have 741 species and 2 varieties belonging to 432 genera under 95 families. Gymnosperm is represented with a single family and single species (Table 1; Figure 1). Apart from these, 27 cultivated species were also collected from the Sanctuary. Fabaceae with 81 species under 44 genera is the largest family, followed by Rubiaceae 56 species and one variety under 29 genera; Orchidaceae 52 (36); Acanthaceae 38 (16); Lamiaceae 35 (20); Poaceae 36(30); Asteraceae 35 (25); Malvaceae 31 (16); Euphorbiaceae 28 (17) and Cyperaceae 26 (9) (Table 2; Figure 2).

Twenty four Angiosperm families and one Gymnosperm family are represented with only one species. The genus *Impatiens* has maximum number of species with 12 followed by *Strobilanthes* with 11 species. *Desmodium* and *Cyperus* with 10 species each and *Syzygium* with 9 species.

Table 1. General statistics of Flora (APG III)

Group	Subgroup	Families	Genera	Taxa	Varieties
Gymnosperms	Cycadales	1	1	1	
Angiosperms	Magnoliids	5	23	47	
	Monocotyledons	19	121	191	
	Eudicots	3	8	11	
	Core eudicots	95	439	741	2
Total		123	586	991	2

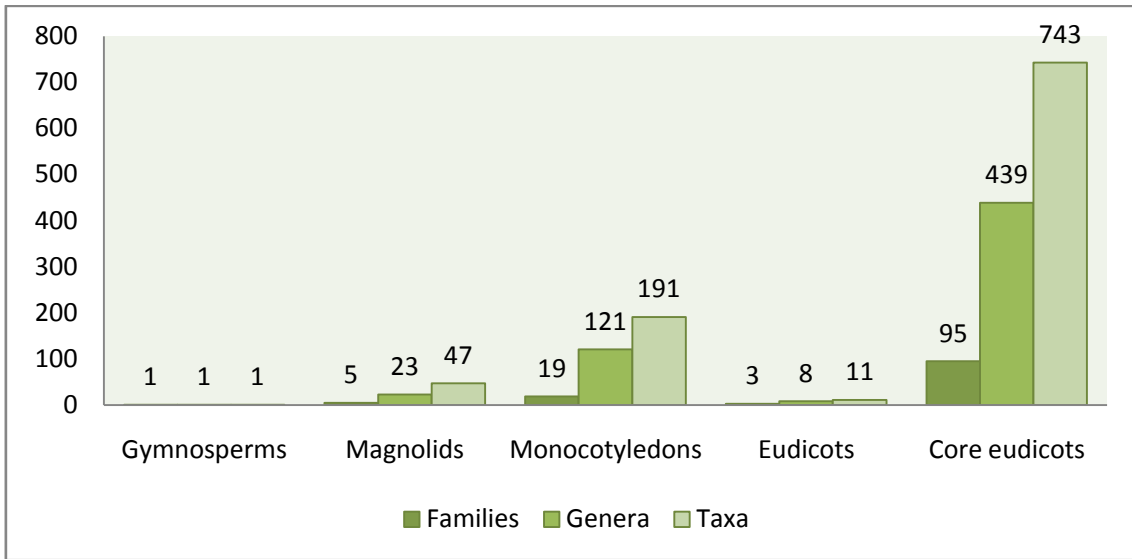


Figure 1. Chart showing Species distribution in Sanctuary

Table 2. Ten dominant families in the Sanctuary (APG III)

No	Family	Genera	Taxa	No	Family	Genera	Taxa
1	Fabaceae	49	81	6	Asteraceae	27	35
2	Rubiaceae	29	57	7	Lamiaceae	20	35
3	Orchidaceae	36	52	8	Malvaceae	16	31
4	Acanthaceae	16	38	9	Euphorbiaceae	17	28
5	Poaceae	30	36	10	Cyperaceae	9	26

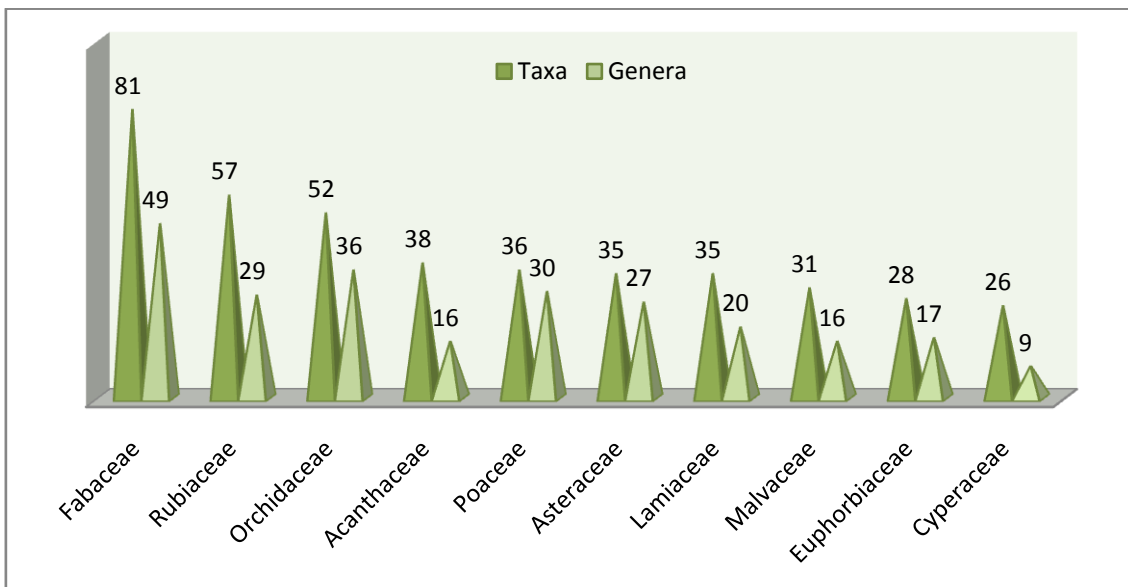


Figure 2. Chart showing 10 Major families in the Sanctuary

6.1. 2. Comparisons

In India, Bentham and Hooker's system of classification is mostly followed in the National, State and regional floras. Though APG III classification was followed in the present study, for the purpose of comparison with State flora and flora of the neighbouring Districts, analysis as per Bentham and Hooker System of classification was carried out and provided (Tables 3, 4 & 5).

Table 3. Dominant families according to Bentham and Hooker's classification

No	Family	Genera	Taxa
1	Fabaceae	44	81
2	Rubiaceae	29	57
3	Euphorbiaceae	29	53
4	Orchidaceae	36	52
5	Acanthaceae	16	38
6	Poaceae	30	36
7	Asteraceae	25	35
8	Cyperaceae	9	26
9	Lamiaceae	6	26
10	Commelinaceae	7	23

Table 4. Comparison of dominant families of Kerala Flora

No	Kerala (Sasidharan, 2012)	Aralam WLS
1	Fabaceae (444)	Fabaceae (81)
2	Poaceae (413)	Rubiaceae (57)
3	Orchidaceae (265)	Euphorbiaceae (53)
4	Rubiaceae (241)	Orchidaceae (52)
5	Asteraceae (216)	Acanthaceae (38)
6	Cyperaceae (210)	Poaceae (36)
7	Acanthaceae (202)	Asteraceae (35)
8	Euphorbiaceae (190)	Cyperaceae (26)
9	Lamiaceae (120)	Lamiaceae (26)
10	Asclepiadaceae (84)	Commelinaceae (23)

Table 5. Comparison of Dominant families with adjacent districts

No	Cannanore	Wayanad	Aralam WLS
1	Fabaceae (123)	Fabaceae (185)	Fabaceae (81)
2	Poaceae (80)	Orchidaceae (165)	Rubiaceae (57)
3	Rubiaceae (71)	Poaceae (163)	Euphorbiaceae (53)
4	Euphorbiaceae (60)	Rubiaceae (98)	Orchidaceae (52)
5	Cyperaceae (53)	Euphorbiaceae (87)	Acanthaceae (38)
6	Acanthaceae (52)	Asteraceae (71)	Poaceae (36)
7	Asteraceae (48)	Acanthaceae (67)	Asteraceae (35)
8	Orchidaceae (47)	Lamiaceae (44)	Cyperaceae (26)
9	Urticaceae (31)	Cyperaceae (38)	Lamiaceae (26)
10	Lamiaceae (30)	Myrtaceae (33)	Commelinaceae (23)

Fabaceae comprising three sub families is the largest family in the study area, followed by Rubiaceae, Euphorbiaceae, Orchidaceae, Acanthaceae, Poaceae, Asteraceae, Cyperaceae, Lamiaceae and Malvaceae. Compare with Kerala flora and district floras of Cannanore and Wayanad, the dominant families are almost same but the positions were changed. Poaceae is one of the largest families in the Kerala flora and district floras and occupies 2nd or 3rd but in the present study it occupies 6th position. This is because the Sanctuary has dense canopy cover and open areas are very few. The above observations show that the dominance of families and species pattern in the Sanctuary is more or less similar to the flora of the Kerala part of the Western Ghats. The evergreen forests harbour more diversity in the entire Western Ghats and the relatively high number of species within the small area of Sanctuary is due to the dominance evergreen forests.

6.1. 3. Life form analysis of flora

The forests are the climax community of ecosystem and the organisms spatially occupies different niches. In the forest flora different plants have diverse growth

habit to occupy and survive in the ecosystems. The more diverse habits are seen in the forests of Western Ghats. In the Sanctuary there is dominance of herbaceous taxa, a total of 487 species were recorded. The herbaceous flora include habit forms such as climbers, grasses, sedges, terrestrial autophytes, aquatics or semi-aquatics, epiphytes, parasites or hemi-parasites, insectivores and saprophytes. Out of 487 taxa, 6 are insectivores plants (3 species each of *Drosera* and *Utricularia*), 4 taxa of aquatic or semi-aquatic plants (members of Podostemaceae and Araceae), 2 saprophytes (*Aphyllorchis montana* and *Epipogium roseum*), 7 taxa of parasitic herbs (Mostly members of Orobanchaceae), 30 taxa of epiphytic herbs (members of Orchidaceae, Asclepiadaceae and Melastomataceae), 89 taxa of climbers and 351 taxa of terrestrial autophytes. The tree flora is represented with 234 taxa, and most of them are evergreen trees. This group includes 231 trees and 3 palmaceous trees. Shrubs are represented with 204 taxa, among them 188 are shrubs, the rest of them are stragglers or scandent shrubs. Parasitic shrubs are represented with 12 taxa (11 are belonging to Loranthaceae and *Viscum* sp.) and 2 of them are epiphytic shrubs (*Fagraea ceilanica* and *Aeschynanthus perrottetii*). *Bambusa bambos* and *Oxytenanthera monadelphica*, are treated as shrubs. Woody lianas are represented with 66 taxa (Figure 3 & Table 6).

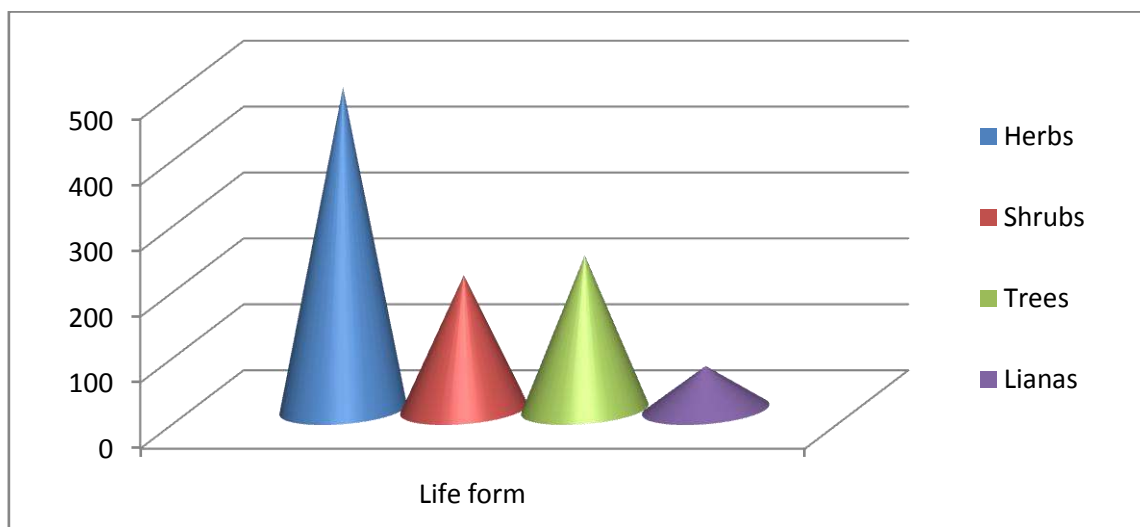


Figure 3. Showing the different life forms of the Sanctuary

Table 6. Life form analysis of Phanerogams

Life form	Angiosperms	Gymnosperms
Herbs		
Insectivores plants	6	
Aquatic or semiaquatic plants	4	
Saprophytes	2	
Parasitic herbs	7	
Epiphytic herbs	30	
Weak stemmed climbers	89	
Terrestrial autophytes	291	
Grasses	34	
Sedges	26	
Sub total	487	
Shrubs		
Shrubs (scandent and Stragglers)	187	
Parasitic Shrubs	12	
Epiphytic Shrubs	2	
Bamboos and reeds	3	
Sub total	204	
Lianas		
Woody Lianas	65	1
Sub total	65	1
Trees		
True trees	231	
Palmaceous tree	3	
Sub total	233	
Total	989	1

6.1. 4. Endemism and restricted distribution

Western Ghats is one of the global hot spot and well known for its high percentage of endemism. Nearly 5,588 species under 1,480 genera belonging to 210 families were recorded. Among the 5,588 species, 2,116 are endemic to this region (Singh *et al.* 2015, Nayar *et al.* 2014). Aralam Wildlife Sanctuary falls within the Nilgiri-Silent Valley-Wayanad-Kodagu endemic centre in the southern Western Ghats. Out of the 993 taxa recorded from the Sanctuary, 299 are endemic to the Peninsular India and 150 among them restricted to southern Western Ghats (Appendix 1).

With respect to endemic species, the family Rubiaceae with 29 species rank first, followed by Acanthaceae (19); Lauraceae (18); Orchidaceae (15) and Fabaceae (13). In India Poaceae, Orchidaceae, Fabaceae, Rubiaceae and Acanthaceae are

the largest families with respect to endemism. But in the Sanctuary, Poaceae is not well represented and the number of endemics is also less. In Kerala, Rubiaceae with 134 endemics rank 1st and is followed by Poaceae (128); Orchidaceae (106); Fabaceae (102) and Acanthaceae (101). Rubiaceae, the dominant endemic family in the Western Ghats is well represented in the Sanctuary. Rest the dominant families with endemic species in India and Kerala are also dominant in the Sanctuary. *Impatiens* is the Dominant genus in the Sanctuary with 11 taxa and *Strobilanthes* comes next with 8 taxa.

Ophiorrhiza barberi, an endemic species considered restricted to the Anamalais, Agasthyamala and Pulney Hills of southern Western Ghats, is now collected from the Sanctuary. *Campbellia neilgherrica*, *Christisonia bicolor*, *Discospermum apiocarpum*, *Eriocaulon thwaitesii*, *Impatiens goughii*, *I. hensloviana*, *Ipomoea barlerioides*, *Paspalum canarae*, *Piper argyrophyllum*, *P. wightii*, *Psychotria bisulcata*, *Symplocos macrophylla* and *Cinnamomum perrottetii* were reported from the Nilgiris by Gamble (1915-1936) and Hooker (1872-1897). But these species were not collected during the recent floristic studies in the Nilgiri region [Pradeep (2000), Ratheesh (2009)]. The present collection of these species from the Sanctuary is relocation in the Kerala part of Nilgiri Biosphere Reserve. *Psychotria dalzelli*, distributed in the Carnatic and northern and central Western Ghats, is also collected from the Sanctuary. *Impatiens lawsonii* and *I. stocksii*, two scapigerous species considered restricted to be Western Ghats of Karnataka (Bhaskar, 2012) are also collected from the Sanctuary.

In India there are 49 endemic genera and out of these, 37 genera are endemic to Western Ghats. Among the 37 genera, 30 are monotypic. *Adenoon*, *Blepharistemma*, *Helicanthes*, *Indobanalia*, *Jerdonia*, *Otonephidium* and *Poeciloneuron* are the monotypic genera present in the Aralam wildlife Sanctuary. Apart from these monotypic genera, *Anaphyllum*, *Decalepis* and *Haplanthodes* are also present in the Sanctuary. *Lepidagathis keralensis*, *Orophea sivarajanii*, *Amorphophallus nicolsonianus*, *Cucumis silentvalleyi*, *Kunstleria keralensis*, *Sida beddomei*, *Cyclea fissicalyx*, *Bulbophyllum rosemarianum*, *Oberonia wynadensis*, *Taeniophyllum scaberulum*, *Ixora sivarajiana*, *Combretum recurvatum*, *Ceropegia manoharii* and *Gymnostachyum warrieranum* are narrow endemics and so far known only from the Kerala part of Western Ghats.

Apart from these endemics, 130 species recorded during the present study are distributed in India and Sri Lanka only (appendix 2). Of which, 95 species occur in Peninsular India and Sri Lanka. Geographically, Sri Lanka is in close proximity with Indian Peninsula and the biodiversity shows high affinity to the Western Ghats. Further, out of 95 species distributed among Peninsular India and Sri Lanka, 56 species are so far known only from South India and Sri Lanka and majority of them seen in Western Ghats. (Figure 4).

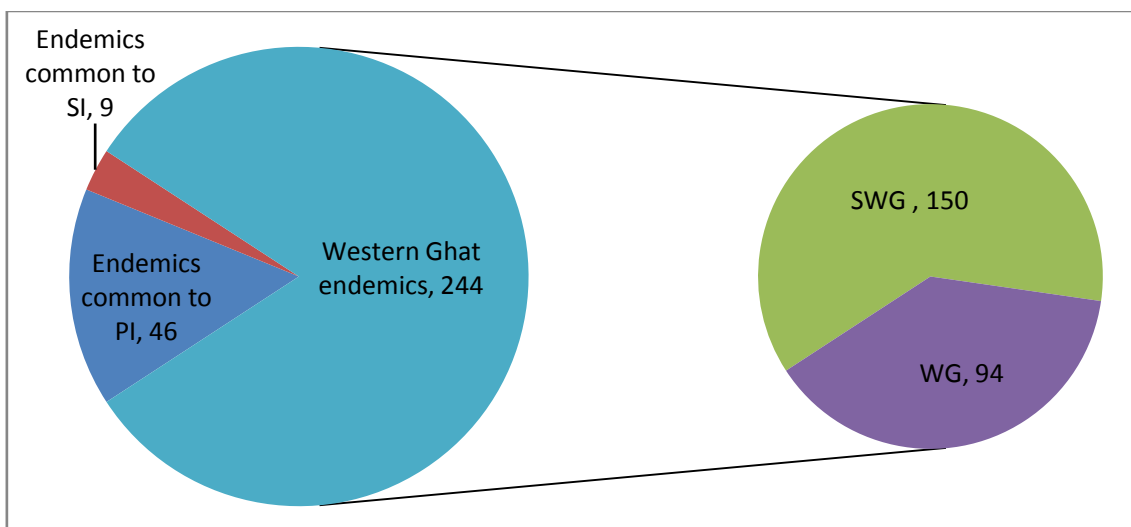


Figure 4. Showing distribution of Peninsular Indian Endemics

6.1. 5. New distribution Records from the Sanctuary

Detailed studies of regional floras generate information on the occurrence of taxa and the population status. Floristic studies in the Sanctuary resulted in the addition of one species to Indian flora and 9 taxa to the flora of Kerala. *Strobilanthes caudatus* is new report for India, which is confined to the Sri Lanka. *Decalepis nervosa*, *Impatiens stocksii*, *I. lawsonii*, *I. fasciculata*, *Beilschmiedia dalzelli*, *Cyanotis thwaitesii*, *Eugenia codyensis*, *Myrsine striata* and *Combretum razianum* are the new taxa added to the Kerala flora. *Beilschmiedia dalzelli*, *Combretum razianum*, *Impatiens stocksii*, *I. fasciculata*, *C. thwaitesii*, *Myrsine striata* and *Eugenia codyensis*, seen in the Karnataka part of Western Ghats are recorded during the present study. Apart from these taxa, 217 species collected during the present study are new additions to the flora of Kannur district (Appendix 3).

Lepidagathis keralensis Madhu. & Singh (1992), *Pogostemon peethapushpum* Pradeep (1998), *Orophea sivarajanii* Sasidh. (1999), *Miliusa wayanadica* Sujanapal, Ratheesh & Sasidh. (2010), *Impatiens veerapazhasii* Ratheesh, Sujanapal & Meera (2011) and *Ceropegia manoharii* Sujanapal, Salim, Anil. & Sasidh. (2013), new species recently described from northern Kerala are also collected from the Sanctuary.

New species and proposed taxa

Two new species viz. *Gymnostachyum warrierianum* and *Combretum recurvatum* were published from Sanctuary by K.M.P. Kumar *et al.* (2015) and Sujana *et al.* (2012). *Ardisia brahmagiriensis* is new species communicated for publication. *Parasopubia* sp., *Seidenfadeniella* sp. and *Psychotria* sp. are new species proposed and are in the process of publication.

6.1.6. Threatened Plants

Out of 993 taxa, 45 are coming under various threat categories (Appendix 4). *Dipterocarpus bourdillonii*, *Hopea erosa* and *Vateria indica* (Dipterocarpaceae); *Poeciloneuron indicum* (Calophyllaceae) and *Cayratia pedata* var. *glabra* (Vitaceae) are under the Critically Endangered category. Out of the 45 Red listed species, 5 are Critically Endangered; 11 Endangered; 26 Vulnerable and 3 Near Threatened.

Apart from these plants, many plants are regionally assessed as threatened plants. Regional plant collectors and phytogeographers treated many plants as threatened. Sasidharan (2017) assessed the conservation status of 552 endemic plants recorded from Kerala as per the IUCN criteria. The conservation status of plants assessed by Sasidharan (2017) which are occurring in the Sanctuary is provided in the Appendix 5.

Dipterocarpus bourdillonii, a fast growing magnificent tree had been irrationally extracted from the forests for plywood industry and railway sleeper. Due to the indiscriminate extraction, the population is fragmented and is restricted to a few localities in the Western Ghats. Though the Sanctuary has a good population of *Dipterocarpus bourdillonii*, the regeneration is very low. *Hopea erosa* is also seen

in a few populations in the southern Western Ghats. It has a fairly good population in the sanctuary. *Ceropegia manoharii*, *Impatiens lawsonii*, *Pogostemon peethapushpum*, *Oberonia wynadensis* and *Phalaenopsis mysorensis* are assessed as Critically Endangered by Sasidharan (2017). *Dysoxylum malabaricum*, an important medicinal tree and the timber is also preferred for furniture and paneling. Due to over extraction, the population became alarmingly low and its extraction is banned in Kerala. Fairly good population of this species is seen in the Sanctuary. *Kingiodendron pinnatum* has a fairly good population in the Sanctuary and its regeneration is promising. *Hopea parviflora*, *Dipterocarpus indicus*, *Hopea ponga*, *Actinodaphne salicina* and *Cinnamomum wightii*, belonging to the Endangered category are fairly well distributed in the Sanctuary. *Dipterocarpus indicus* is one of the most dominant upper canopy trees in Semi-evergreen forests.

6.1.7. Exotic plants of the Sanctuary

The biological invasion of alien species is a major threat to the global biodiversity. This ecological phenomenon is due to various reasons. Introduction of plants by humans intentionally or unintentionally and later turn in to alien species. Hence it is recognized as human induced. Alien species adapted to the local environment and some turned invasive and adversely affect the local flora. Invasion of alien species alter ecosystem patterns, resulting losses in biological diversity and corresponding ecosystem functioning (Elton, 1958; Lonsdale, 1999; Pimentel *et al.*, 2000; Meyerson & Mooney, 2007). The spread of alien species and corresponding local diversity reduction result the biotic homogeneity and declines the taxonomic heterogeneity (Sax *et al.*, 2002; Davis, 2003, McKinney & Lockwood, 2001; Olden & Poff). The process of invasion especially human mediated invasion is more dynamic and drastic than natural ones (Lockwood *et al.*, 2007).

The initial steps in the management of alien species are preparation of a comprehensive list of alien species and comparative study of naturalized flora (Pysek *et al.*, 2004). The distinction between native and alien species is important in this context. Alien species available in various databases (ISSG (2017), GRIIS

(2016)) were gathered. Relevant literature and field studies helps to identify the alien plants in the sanctuary. The terminology and definitions of alien species given by Pysek et al. (2004) with relevant modification done by Khuroo *et al.* (2012) is followed for the categorization. Casual (CS), naturalised (NT), invasive (IN) and cultivated (CT) by Pysek et al. (2004) and casual alien (C/N) and naturalised invasive (N/I) by Khuroo *et al.* (2012) are the six categories assign to the alien species of the Sanctuary. Definitions of each categories are given in Table 7.

Table 7. Alien categories and definitions

Category	Definition
Cultivated (CT)	Non native or native plant species that are under cultivation.
Casual (CS)	Alien plants that may flourish and even reproduce occasionally in an area, but which do not form self-replacing populations and which rely on repeated introductions for their persistence.
Naturalized (NT)	Alien plants that reproduce consistently and sustain populations over many life cycles without direct intervention by humans (or in spite of human intervention); they often recruit offspring freely, usually close to adult plants, and do not necessarily invade natural, semi natural or human-made ecosystems.
Invasive (IN)	Invasive plants are a subset of naturalized plants that produce reproductive offspring, often in very large numbers, at considerable distances from the parent plants, and thus have the potential to spread over a large area.
Casual or Naturalized (C/N)	Casual alien species for which the current evidence is insufficient to be recognized as naturalized but have the potential to become naturalized in near future
Naturalized or Invasive (N/I)	Naturalized alien species, for which the current evidence is insufficient to be recognised as invasive, but have the potential to become invasive in near future.

The plants which arrived due to human interactions are generally known as alien species and 62 such plants were identified from the sanctuary. According to Pysek et al. (2004) and Khuroo *et al.* (2012) 6 different categories of alien plants seen in the sanctuary. They are Cultivated (CT) 27, Casual (CS) 8, Naturalized (NT) 9, Invasive (IN) 7, Casual or Naturalized (C/N) 3 and Naturalized or Invasive (N/I) 35 (Appendix 6). Asteraceae is the largest family among the alien species; followed by Fabaceae with 9 species. Alien species with their status is given in the appendix (6). According to the nativity of alien species, South American plants are dominating with 28 plants Out of 7 invasive species, *Chromolaena odorata*, *Lantana camara*, *Mimosa diplotricha* and *Mikania micrantha* are the major invasive weeds. *Chromolaena odorata* and *Mikania micrantha* are mostly infested in the plantations and all are South American. Twenty six species in the sanctuary are under cultivated or planted (Appendix 7). They are usually seen in settlements or plantations. Some species are planted by Forest Department as a part of afforestation programs.

6.1.8. Phyto geography of flora

Adolf Engler (1903), Augustin de Candolle (1820), Schouw (1823), Alphonse de Candolle (1855), Drude (1890), Diels (1908), Good (1947) and Takhtajan (1978, 1986) are the main contributors to the phyto geographic classification. Among them, Takhtajan's classification is widely used by many workers. Cox (2001) reclassified the Takhtajan's classification and made relevant modifications. In the present work, Cox's phyto geographical classification is used to analyse the phyto geographical affinities of Indian flora. He recognized 5 major phyto geographical Kingdoms. They are Holartic, South American, African, Indo-Pacific and Australian Kingdoms. The Indian Regions are coming under the Indo-Pacific phyto geographical Kingdom. Indo-pacific Kingdom has two subkingdoms; Indo-Malesian Subkingdom and the Polynesian Subkingdom. Western Ghats of south India is included in the Indo-Malesian Subkingdom.

The floristic elements of Western Ghats show differential similarity in the distribution of families and genera with Malaysian Islands, Madagascar, Australia, South American and Africa due to the past cretaceous shield of the

Gondwana Kingdom. The Western Ghats flora shows similarity towards Sri Lankan and Malaysian floristic elements; both of them come under the Indo-Malayan subkingdom and Indo-Pacific phytogeographical kingdom (Table 8).

Table 8. Phytogeographical affinity of flora

Distributional Range	No of Species	Percent (%)
Indo-Pacific	625	62.9%
Indo-Pacific and Holarctic	120	12.1%
Indo-Pacific and Australian	24	2.4%
Indo-Pacific, Holarctic, and Australian	23	2.3%
Indo-Pacific, Australian and African	32	3.2%
Indo-Pacific and African	19	1.9%
Indo-Pacific, African, Australia and Holarctic	40	4.0%
Indo-Pacific, Holarctic and African	22	2.2%
Indo-Pacific, and African	16	1.6%
Pantropical	44	4.4%
South American (Exotics, naturalized)	28	2.8%
	993	

The flora shows high affinity towards the flora of Indo-Pacific kingdom, 62.7 % of the total taxa are confined to this region. Among the 625 taxa, 509 are confined to Indo-Malayan sub kingdom, among this 423 are restricted to Malabar, Deccan and Ceylon provinces. Study area is confined to Malabar province and 245 are strictly restricted to this province. The Western Ghats and Sri Lanka together considered as Hot spot of Biodiversity and 253 plants are strictly confined to this Region. Apart from the Indo-Pacific elements, 120 plants confined to Indo-Pacific and Holarctic region. Twelve per cent of the flora is confined to both Indo-Pacific and Holarctic region. *Brassica juncea*, a cultivated plant from Holarctic region which is naturalized in the high altitude areas of the Sanctuary due to anthropogenic interactions. Holarctic region is the adjacent phytogeographical kingdom, hence many plants share the common distribution. Pantropical distributed plants represent 4.4 percent of the flora. Paleotropical region include African, Indo-Pacific kingdoms and small areas of Holarctic and Australian Kingdoms has 4 percent taxa (Figure 5). Among the 37 weeds, 28 are from South American kingdom, these exotics are getting naturalized in the Western Ghats.

Invasive species like *Ageratina adenophora*, *Chromolaena odorata*, *Mikania micrantha*, *Sphagneticola trilobata*, *Mimosa diplotricha* and *Hyptis suaveolens* are from the South American kingdom. *Calopogonium mucunoides*, another invasive species is from Holarctic region.

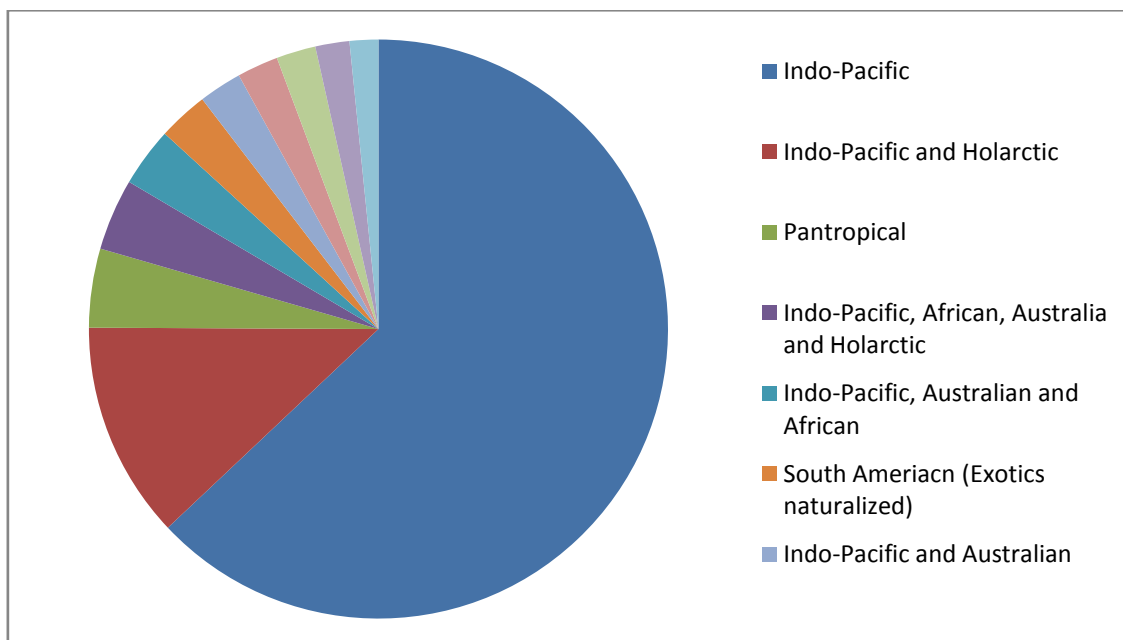


Figure 5. Showing phylogeographical distribution of flora

6.2. Economic importance of flora

The flora of the region shows richness of biodiversity, it plays a key role in the local climatic regulations and ecological stabilities. Forests act as reservoir of useful plants.

6.2.1. Medicinal plants

It is not known, when the human race start to use plants as medicines. The properties of medicinal plants known to each individual are vocally transfer to next. Ayurveda, Sidha, Unani are different type of indigenous treatment system mainly follows in India. Apart from these Homeopathy and Modern medicines also use some plants. An analysis based on published literatures out of 993 species recorded from the Sanctuary, 368 are used in different systems of medicines.

Medicinal plants in various systems of medicines

An analysis based on medicinal plants used in various systems of medicine shows that, 342 species out of 368 are used in folk medicine; Ayurveda uses 193 followed by Siddha with 170 taxa. Medicinal plants diversity with regard to Unani is represented by 119. Homeopathy with 30 and Modern Medicine uses 9. (Figure 6). Use of 6 species in Modern medicine and higher percentage Folk medicines indicates the need of further detailed photochemical and pharmacological studies, which may lead to the development of novel drugs.

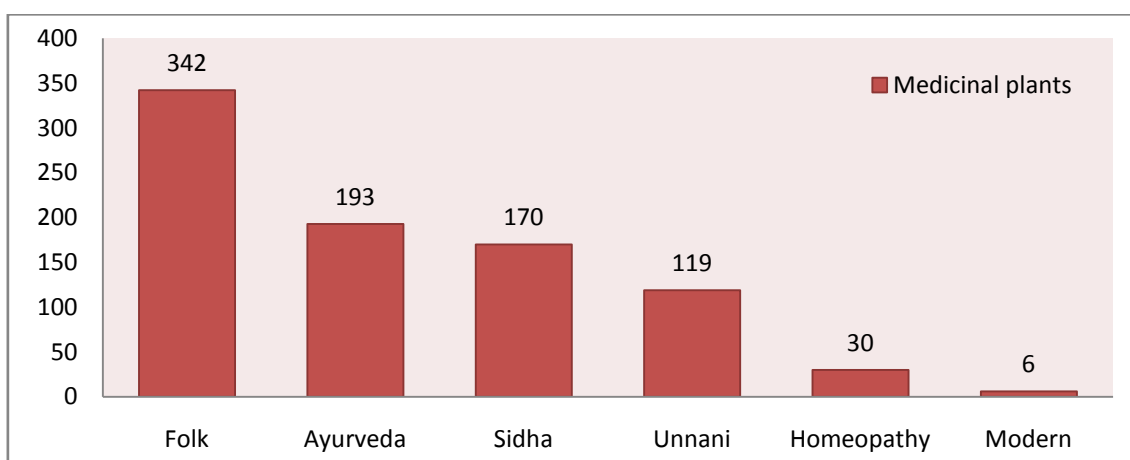


Figure 6. Medicinal plants used in various systems of medicines

Habit-wise assessment of medicinal plants diversity

Medicinal plants in Aralam are composed different life forms. Herbs are the major group with 103 true herbs and 47 herbaceous climber species followed by trees with 114. Shrubs are represented with 76 species and Lianas with 28 species (Figure 7).

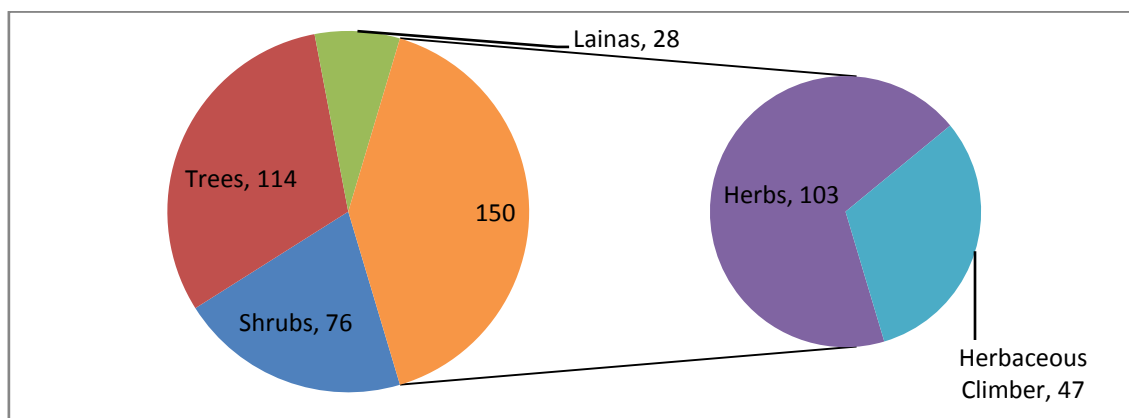


Figure 7. Habit-wise diversity of medicinal plants

Diversity in terms of useful parts

Among the 368 species, root of 122 and whole plant of 106 species are used in various systems. Number of medicinal plants in other categories are leaves with 125 species, fruits with 70, bark with 39, seeds with 42, rhizome/tuber with 18, flower with 22, stem and wood with 25, and exudates with 7 species (Figure 8).

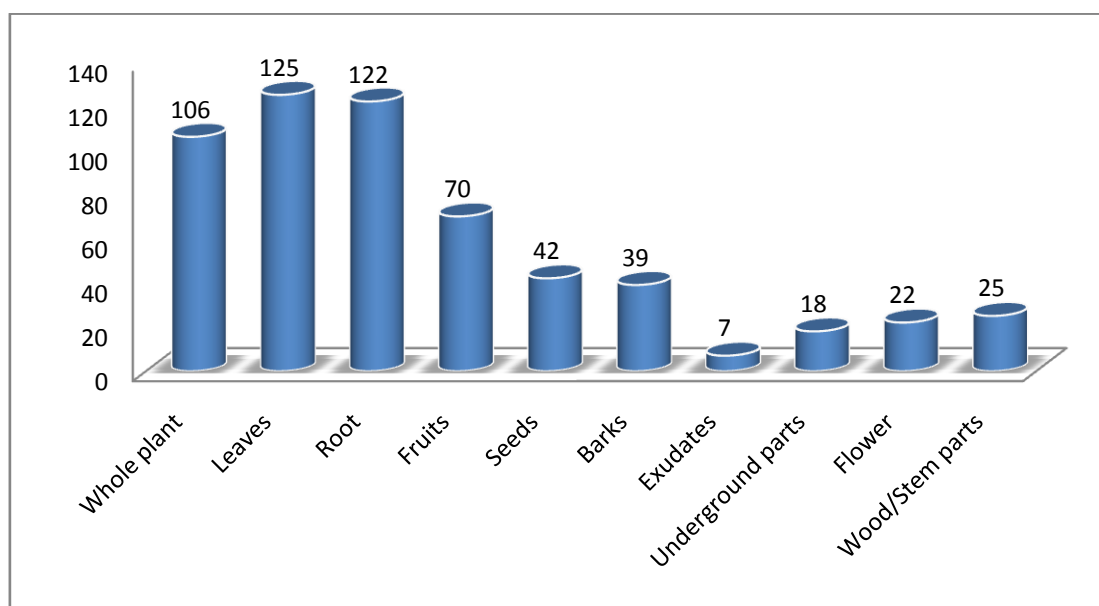


Figure 8. Diversity with respect to useful parts

In folk system, leaves and other aerial parts are mainly used for treatments, hence the highest value belongs to leaves as useful part. But in classical systems such as Ayurveda, Siddha and Unani, root and whole plant are the major components in the production of medicine.

Medicinal plants with special mentions

In the list of Medicinal plants some plants attain special mentions as their properties, chemical constituents promise for the future etc.

- 1) *Rauwolfia serpentina*:- the plants used in all the systems of medicines. Reserpine a phytochemical compound present in *R. serpentina*, which is commercially isolated from the roots of the plant.
- 2) *Nothapodytes nimmoniana*:- the plant is used in Folk, Ayurveda and Modern Medicines. Roots of the tree is the major source of camptothecin and commercially extracted from the plant, used as anti-cancer, anti-HIV, antimalarial medicine.

- 3) *Cosciniium fenestratum*:- the plant used in all different systems of medicines such as folk, Ayurveda, Sidha and Unani. Berberine is potential chemical compound isolated from the *C. fenestratum*, which is used in modern medicine.
- 4) *Cissampelos pareira* var. *hirsuta*: - The plant used as antimalarial and antiviral.
- 5) *Atalantia wightii*:- Leaves and roots possess anti-diabetic properties and used in the modern medicine.
- 6) *Ancistrocladus heyneanus*: - Alkaloid Ancistrocladine and terpenoid Betulinic acid is extracted from roots and used in the treatment of AIDS and Malaria.
- 7) *Anamirta cocculus*:- Alkaloid berberine is extracted from the stem and roots. Which is used in the modern medicine. Picrotoxin is poisonous alkaloid extracted from the seeds.

6.2.2. Edible plants of Aralam Wildlife Sanctuary

At present no ethnic group resides inside the Sanctuary but the local people uses many wild plants. Wild edible plants play a key role in meeting the nutrients requirement of the tribal as well as local communities. The Food and Agricultural Organization estimates around one billion people use wild foods in their diet (FAO 1999). However, there is no precise information about the nutritional potential of many wild edible plants.

During the present study 42 wild edible plants were identified in the Sanctuary. Among these wild plants, 31 are wild edible fruits; *Momordica sahyadrica* and *Solanum torvum* are used as vegetable. Fruits of *Mangifera indica*, *Spondias pinnata* and *Baccaurea courtallensis* are either directly or after cooking. Most of the wild fruits are used directly (Appendix 8). *Garcinia gummi-gutta* var. *gummi-gutta* and *G. gummi-gutta* var. *papilla* both are used as spices. *Colocasia esculenta* leaf petiole is used as vegetables. Leaves of *Cassia tora* and *Amaranthus spinosus* are also used. Tender leaves of *Lepisanthes tetraphylla* used as leafy vegetable and it is the first report of such a use. Tender leaf and inflorescence of *Adenia hondala* are used as vegetables. Tubers of *Dioscorea oppositifolia* and *Dioscorea pentaphylla* eaten after cooking. *Asparagus racemosus* tubers are used to prepare pickles.

6.2.3. Wild relatives of crop plants

Crop wild relative (CWR) is a wild plant closely related to a domesticated plant, whose geographic origins can be traced to regions known as Vavilov Centers. It may be a wild ancestor of the domesticated plant, or another closely related taxon. The improvements in the field of plant breeding is now able to utilize these wild genetic resources. So the knowledge on the wild relatives is useful in the field of Agriculture. The Western Ghats is one among the five centers of 'concentration of wild types' of crop plants in India (Arora and Roshini Nayar, 1983).

Vavilov in 1935 proposed eight main centers of origin of crop plants. According to him crop plants are evolved from wild species. The areas which show greatest diversity are termed as Primary centers of origin. Many crops were moved to other areas primarily for conservation and crop improvement. These areas generally lack the richness in variation found in primary centers of origin. But in some areas, certain crop species show considerable diversity of forms although they did not originate there. Such areas are known as secondary centers of origin of these species (Singh, 1983).

Vavilov proposed two main centers in India, Central Asiatic Center (Includes Northwest India (Punjab, Northwest Frontier Provinces and Kashmir), Afghanistan, Tadjikistan, Uzbekistan, and western Tian-Shan) and Indian Center. The Indian Center is divided in to two sub-centers, Indo-Burma and Siam-Malaya-Java. South India is included in the Indo-Burma Center and considered as the origin of 117 plants. Indian region is the primary center for *Cajanus cajan* (pigeon pea), *Vigna mungo* (black gram), *Vigna radiata* (mung bean), *Vigna umbellata* (rice bean), *Vigna unguiculata* (cow pea), *Solanum melongena* (egg plant), *Cucumis sativus* (cucumber), *Colocasia esculenta* (taro), *Mangifera indica* (mango), *Piper nigrum* (pepper), *Cinnamomum* spp. (cinnamon), *Momordica charantia* (bitter gourd) and secondary center for *Dioscorea* spp, and Bananas. Apart from these, Indian region is the center for spices like Gamboge, Ginger, Turmeric, Cardamom etc. Relatives of *Cajanus* spp., *Vigna* spp., *Solanum* spp., *Cucumis* spp., *Colocasia* sp., *Piper* spp., *Cinnamomum* spp., *Dioscorea* spp., *Zingiber* spp. are seen in the Sanctuary.

Spices are the main commodity in the Old world, for this many trade routes and relationships were developed. In India, mainly Malabar coast is the main spice and condiments supplier to the Old world. So most of the spices have origin in India especially Western Ghats, hence wild relatives and endemics species of relatives are seen in Western Ghats. In Aralam Sanctuary, relatives of spices and condiments are high compared to other groups. There are 25 species of relatives of Black pepper, Cinnamon, Turmeric, Ginger and Cardamom. Relatives of Cinnamon and Black pepper are with 6 numbers. *Cinnamomum malabattrum*, *C. macrocarpum*, *Myristica beddomei* and different species of genus *Piper* are widely collected from forests of Kerala and used. *Piper argyrophyllum*, and *P. hymenophyllum* are wild pepper with long spikes and *P. wightii* is with large fruits.

Relatives of fruit plants are also high. In addition to these some edible wild plants are also seen in the Sanctuary. Altogether there are 25 species of wild relatives. *Amaranthus spinosus* and *Momordica sahyadrica* are also edible, local people include these plants in their diet. [Appendix 9].

6.3. Species richness and life form spectra along altitudinal gradient

The eloquent diversity of the nature, the expedition for the diversity and its reason is an enthralling human population from the prehistoric times. The early settlers of the prehistoric period used their knowledge of spatial variation in the nature for their better living. These understandings help them to choose best places, which is to accomplish their daily needs (Lomolino, 2001). The perceptive information gathered is passed through the successive generations and refined by the time being. Civilization progresses day to day and it leads to documentation of natural histories. Many naturalist and geologist travel across the world and explore the miraculous beauty and diversity of the nature. The chapter of exploratory biology was opened by Alfred Von Humbolt during late eighteenth century and early nineteenth. He was followed by Charles Darwin and Alfred Wallace. Both are the seminal contributions to the field of evolutionary biology and biogeography of the world (Lomolino, 2001).

The exploration and studies by Von Humboldt (1799), Charles Darwin (1839, 1859) and Alfred Wallace (1876, 1878) on different habitats along spatial and altitudinal gradients draws the attention of naturalists and scientists. During the last two decades, a focus has been made on altitudinal gradients (Fischer et. al.

2011). The recent years the more pronounced global word ‘climate change’ made an influence on spatial distribution of species and made catastrophic consequences on ecosystems. Hence the perspective of such a studies changed and especially with influence of human impact (Fischer et. al. 2011). The main parameters of climate like temperature and precipitation are changing rapidly and it adversely affect many species rich areas of tropics (IPCC 2007). Global climate change will lead to species extinction; species range shift, change in compositions and phenologically driven mismatch (Walther et al. 2002, Parmesan 2006, Fischer et. al. 2011). The altitudinal gradients reflect the different climatic condition and easily identify the species response to the changes. It is helpful in deciphering the functional performance of the same species across different climatic conditions. Here attempted to classify the species richness data across altitudinal gradient to unravel the pattern of species distribution in Aralam Wildlife Sanctuary so that the future changes in species richness and distribution with the change in climate and time can be easily monitored.

To study the elevation gradient in the sanctuary, elevation grouped in to 7 classes of 200 m msl interval. The lowest elevation of the sanctuary is 60 m msl. The first class taken as <200 m msl. The highest elevation in the sanctuary is 1500 m msl, so the final class taken as >1400 m msl. The number of phanerogams at every elevation gradient is recorded and number of species plotted against elevation gradient. (Figure 9).

Species richness curve of Aralam WLS follows the general pattern of species richness in the tropics (Figure 9).

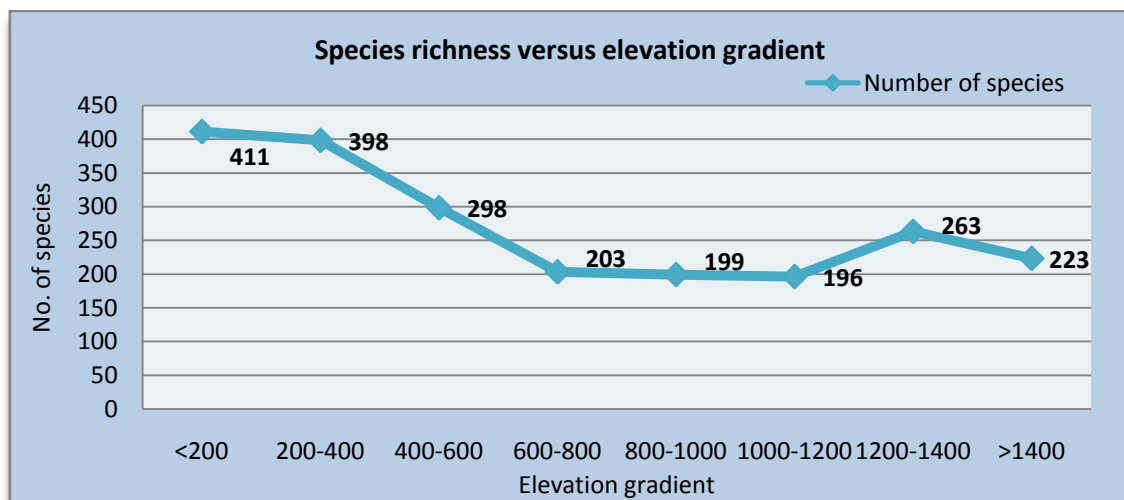


Figure 9. Species richness along elevation gradient

Total of 411 species occurs in the first class; below 200m altitudes. Species richness gradually declines with the increase in elevation. The declining trend of the curve broken at sixth class (1200-1400 m msl) and came back by the end.

Species richness pattern in different geographic region is mainly driven by climatic conditions and dispersal events. A plot of number of alien species versus elevation gradient has worked out. It is quite straight forward from the plot that the dispersal was very few at the higher elevations. Aralam WLS has just five alien species of angiosperms at its higher elevation above thousand meters while it has fifty-four the lower elevations. In the case of alien plant species dispersal is the prime cause of richness pattern (Figure 10).

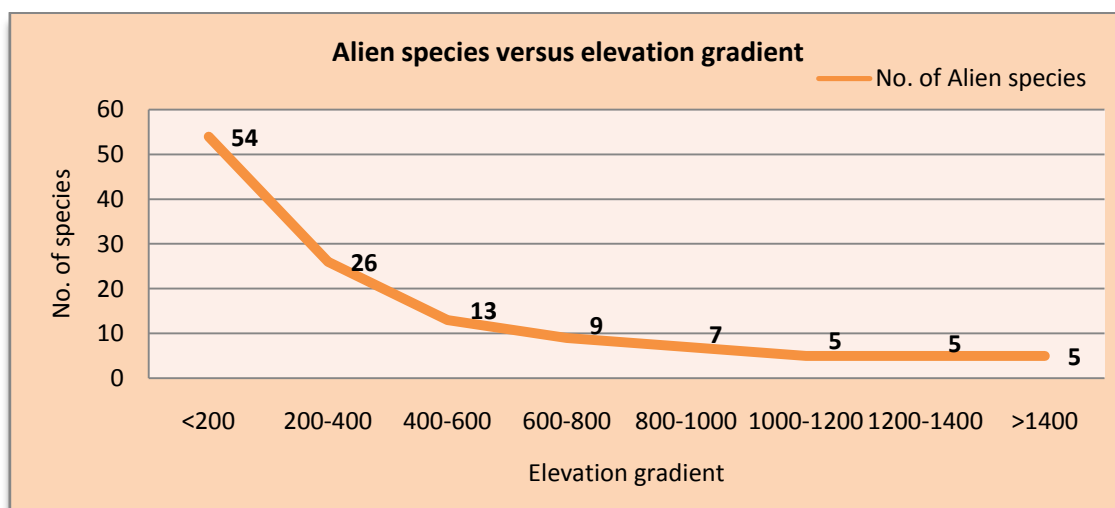


Figure 10. Alien species distribution along elevation gradient

Life forms pattern along elevation gradient

The life form spectrum of the Aralam sanctuary along elevation gradient is also support the general observation of species richness. Different life forms, like herbs, shrubs, tree, weak stemmed climbers, lianas and epiphytes are plotted against elevation gradient.

Herbs shows maximum diversity at low elevation and gradually declines with elevations but Sharpe increase in the number of herbs at high elevations of 1200-1400 m msl and >1400 m msl (Figure 11). This could possibly due to the increased availability of space and light at higher elevations than that of lower elevations of thick forest. Shrubs also show the same trend of species richness

(Figure 12). Low elevations shows maximum number and gradually declines with elevation and slight increase in the elevation 1200-1400 m msl.

Three life forms Trees, Weak stemmed climbers, Lianas show almost similar pattern of species distribution with maximum diversity at low elevations and gradually declining along increased elevations (Figure 13). The entire pattern show maximum richness at extreme low elevation but here in the case of trees and lianas it is not like the general pattern it shows maximum richness at second elevations (Figure 13).

Epiphytes shows entirely different pattern of richness in the sanctuary, here low elevation occupies with minimum number of species and increasing the richness with gradient (Figure 14). The maximum number of richness occurs at high elevation.

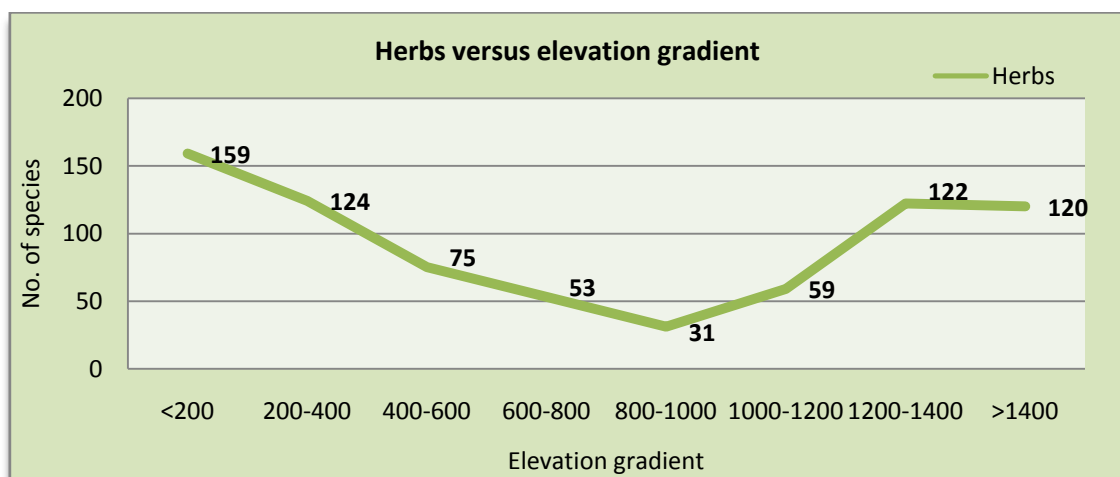


Figure 11. Distribution of Herbs along elevation gradient

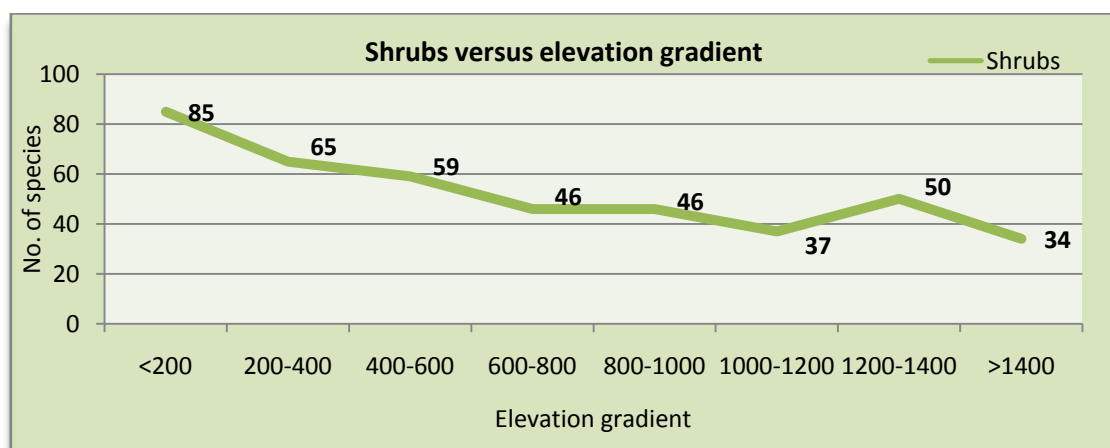


Figure 12. Distribution of Shrubs along elevation gradient

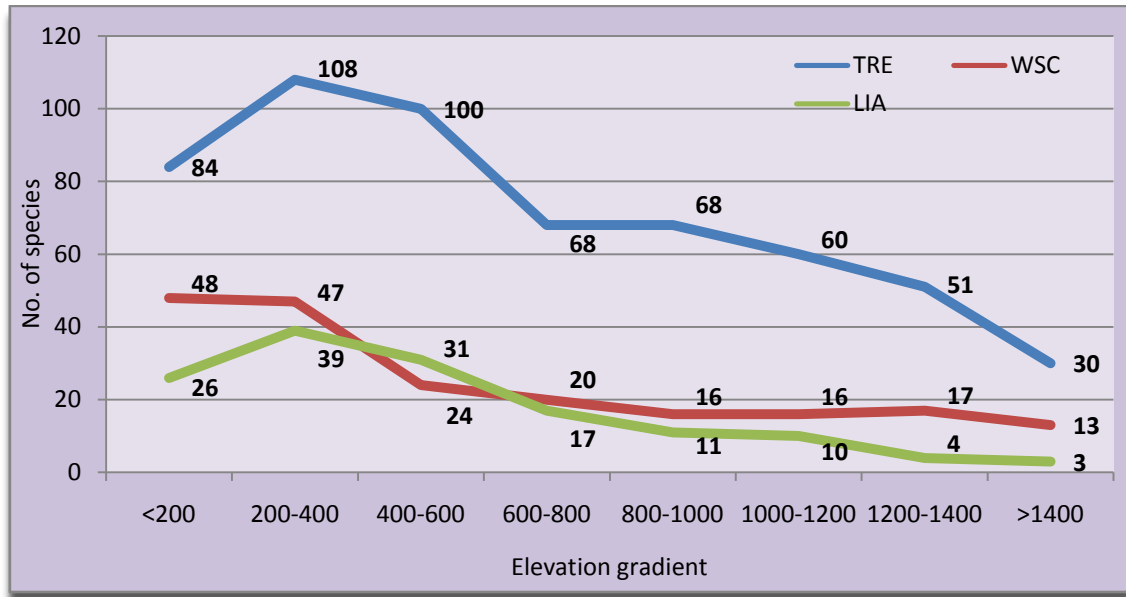


Figure 13. Distribution of Trees, Weak stemmed climbers (WSC) and Lianas along elevation gradient

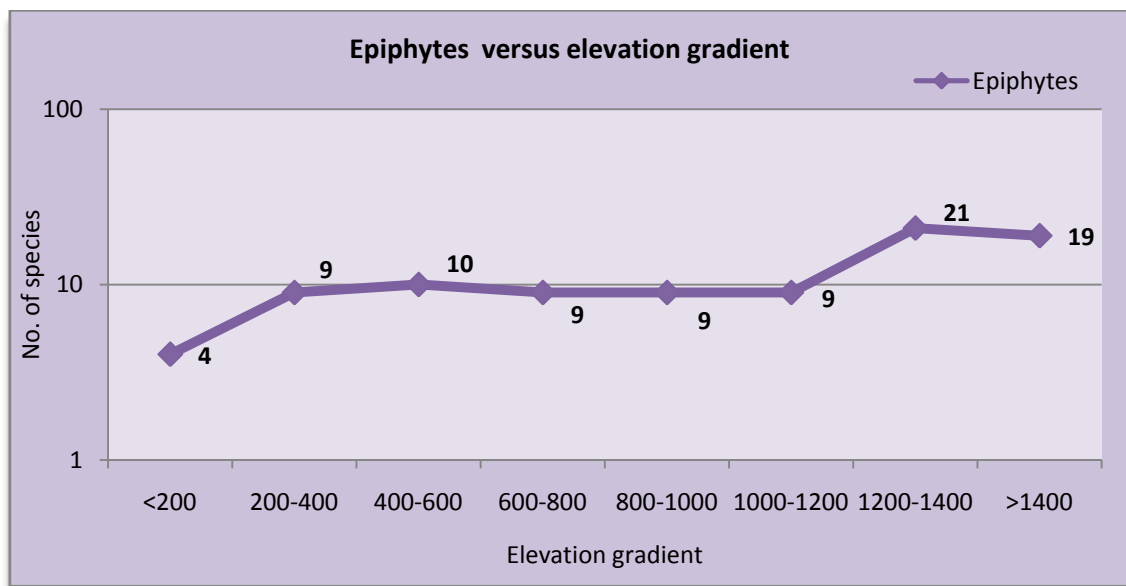


Figure 14. Distribution of Epiphytes along elevation gradient

Endemism shows different pattern from species richness. It shows two different peaks at 400-600 m msl and 1200-1400 m msl. Among the gradients minimum elevation shows the maximum diversity but in the case of endemism it is the lowest representation (Figure 15). The middle elevations show almost same number of endemics. The plot tells that there is no significant relation between endemic plant species distribution and elevation in our study area, *ie* Aralam WLS.

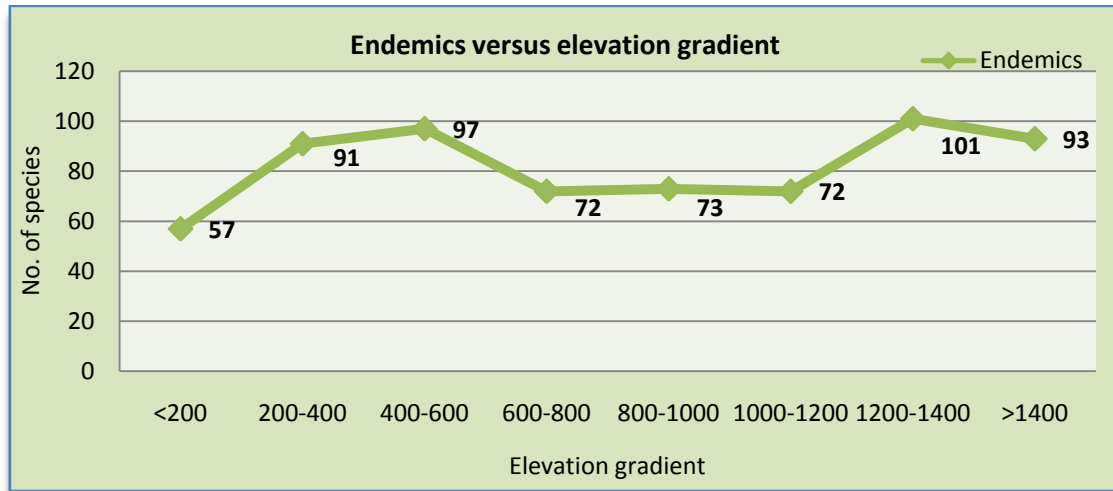


Figure 15. Endemism pattern along elevation gradient

The present recorded identified 993 species from the sanctuary. The pattern of distribution of species shows more or less similar pattern shown everywhere in the tropics (e.g. Vazquez & Givnish, 1998). It is generalized that lower elevation gradients shown maximum species richness and when increase in the elevation species richness declines. In the Aralam WLS species richness is high at low elevation and when increasing the elevation richness decreases (Figure 9). Different authors have developed different possibilities for this pattern. MacArthur & Wilson (1963) observed that this phenomenon is related to Island biogeography. In higher elevations has smaller area compared to lowlands and higher elevations are more isolated from similar habitats those of low elevation. Relatively large areas of low elevation forests support more number of species dispersal and in the mountain habitat smaller area and isolation supports a lower equilibrium number of species. Second reason is based on theory of equal species packing along gradients (Terborgh, 1973). This theory predicts that more species will evolve in low elevation gradients because this gradient occupies relatively more area. The first possibility is based on immigration and local extinction. Speciation in the nature is affected by various reasons; one of the reasons behind is mutation; temperature is one of the forces behind the mutation. In tropical area temperature is high compared to temperate regions. The temperature is decrease when elevation increases. Hence the species evolved in the high altitude is less than in low elevation hence more species are capable

to compete and occupy in low elevations. Due to these favorable conditions many immigrants known as alien species spread across the tropics which are mostly occupies the lowland areas.

Another reason for this richness pattern is related to nutrient availability, forest stratification and speciation. In low elevations has greater availability of nutrients (Vazquez & Givnish, 1998). Which is favorable to harbor more diversity but in higher elevation, slopes of mountains, presence of woody closed canopy etc reduce the diversity. In lowland areas rich nutrient availability, open canopy which favors the growth of herbs and shrubs. Fourth reason for decline in the forest diversity in higher elevation of tropical mountains is the rate of plant growth, forest turnover and allocation of anti-herbivore defense (Givnish 1999). At high elevation the rate of plant growth, competitive exclusion and mortality rate is very slow due to the effect of cooler temperature (Vazquez & Givnish, 1998).

In Aralam WLS follows the general pattern of species richness *ie*, richness is high at low elevation and decreases at higher elevations. But in the case of richness curve (Figure 9) reaches maximum elevation slight increase in the richness. At the elevation gradient 1200-1400 m msl third maximum point is obtained and the next level also has more number than middle elevations. This is due to the effect of microclimatic condition exist in the high elevation of the sanctuary. The wind from the lowland areas blows towards the peaks and rich in the moisture from the low elevation forest areas. This climate helps to the abundant growth of epiphytes. Apart from these, high elevation has more area than middle gradient and open spaces also occurs compared to middle elevations and it helps to occupy more herbs and shrubs. The patterns of alien species indicate that immigration of species takes place easily in the low elevations. The number of alien species contributes significantly to the richness of low elevation with 54 species. In the case of trees the maximum richness confined to the second low elevation and gradually declines with elevation. It could have been the first class or the lowest elevation if the disturbance from the human population pressure was not in play. Lianas and weak stemmed climbers follow almost same pattern, both dependent on trees for their support. Endemism pattern is irregular and it does not show any significant relation with elevation.

Conclusion

7. Conclusion

Aralam Wildlife Sanctuary is the northernmost protected area of Kerala State and situated in the southeast part of Kannur District with an area of only 55 sq. km. Among the two Wildlife Sanctuaries of northern Kerala, the flora of Aralam Wildlife Sanctuary is more significant because the vegetation is dominated by West coast tropical evergreen and West coast semi-evergreen forests. These forest types are the habitats of most of the rare, endangered as well as endemic species. In 1988, Ramachandran and V J Nair studied the Flora of Cannanore District. Their study area included some areas of the present Wayanad district and the total area covered was 3,670 sq. km. In the Flora of Cannanore District 1,132 species were described. The present study describes 993 species and 26 cultivated species. Among them, one is new report to India (*Strobilanthes caudatus*), 9 taxa new to the flora of Kerala and 217 species are new additions to Kannur district. Two new species viz. *Gymnostachyum warrierianum* and *Combretum recurvatum* were published from Sanctuary by different authors. *Ardisia brahmagiriensis* is new species communicated for publication. *Parasopubia* sp., *Seidenfadeniella* sp. and *Psychotria* sp. are new species proposed and are in the process of publication. This shows the diversity of study area. The Aralam Sanctuary has good diversity, particularly in the evergreen and semi-evergreen forests. The important association is *Dipterocarpus- Palaquium – Mesua*, this type of association is very rare in Kerala. Besides this, *Dipterocarpus - Calophyllum – Palaquium*; *Mesua – Artocarpus - Hopea* associations are also seen. The diversity of epiphytes is relatively very high, especially in the forests above 700 m elevation. Orchids, lichens, mosses are well distributed in the evergreen forests. The occurrence *Dipterocarpus bourdillonii*, a critically endangered tree in the Sanctuary is interesting. This is the only area with distribution of *D. bourdillonii* in Kerala north to Palakkad Gap.

Ambalappara is the highest peak of the Sanctuary. The vegetation is Hill-top tropical evergreen forests. There is dominance of members of the families Lauraceae and Myrtaceae, along with *Calophyllum austroindicum*, *Diospyros nilagirica*, *Elaeocarpus munronii*, *Gordonia obtusa*, *Garcinia gummi-gutta* var. *papilla*, *Ixora sivarajiana*, *Ligustrum gamblei*, *Memecylon* sp., *Meliosma pinnata*

subsp. *barbulata*, *Symplocos cochinchinensis* subsp. *laurina* etc. But the small area shows a distinctive growth pattern. Ambalappara - Pothurumi area has rich diversity of plants. Over 993 species collected, 190 are exclusive to this area of the Sanctuary.

An analysis of economically important plants of the Sanctuary reveals that there are 368 medicinal plants, 42 wild edible plants and 75 wild relatives of crop plants. These plants serve as natural resources for future use. Analysis according to the elevation gradient reveals that the richness of the species follows the general pattern with some variations usually met with tropical rain forests. Life form analysis according to the gradient is also support species richness curve. Endemism shows no specific relation to gradient but the high altitude has more number of endemics.

All the five arborescent primates of Kerala are occurring in the Sanctuary. Fruits of Anjili, Jack fruit, Mango, Mullenchaka, Mootilpazham, different species of *Garcinia*, *Syzygium*, *Eugenia*, *Palaquium*, *Ficus*, *Salacia*, Cucurbitaceae members etc are eaten by arborescent mammals and birds. Elephants are the large animals in the Sanctuary. The Sanctuary is well represented with good number of Reptiles and Amphibians. The avifauna of the Sanctuary is also very rich. Ambalappara (1,500 m) is the highest peak in the Sanctuary; many birds usually found above 1,800 m are seen here.

Aralam is the main watershed area of Cheenkanni puzha one of the main tributary of Valapatanam River which is the main water resource of Kannur revenue district. Cheenkanni puzha has a key role in enriching the water level in Valapatanam River.

Only Spermatophytes in the Sanctuary were subjected to detailed study. The diversity among lower groups of plants is much higher, so detailed studies are needed to know the richness of the plant diversity. Quantitative studies are needed to ascertain the population status of the 96 (including 45 IUCN Red Listed plants (2017) and another 51 threatened plant species as well as the 297 endemic plants for their conservation.

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Appendices

9. Appendices

Appendix 1. List of Peninsular Indian Endemics of the Sanctuary

No	Taxa	Family	Distribution
1.	<i>Actinodaphne salicina</i>	Lauraceae	SWG
2.	<i>Actinodaphne wightiana</i>	Lauraceae	SWG
3.	<i>Adenoon indicum</i>	Asteraceae	PI
4.	<i>Aerides crispa</i>	Orchidaceae	WG
5.	<i>Aeschynanthus perrottetii</i>	Gesneriaceae	WG
6.	<i>Aganope thyrsoflora</i> var. <i>eualata</i>	Fabaceae	SWG
7.	<i>Aglaia barberi</i>	Meliaceae	WG
8.	<i>Allophylus concanicus</i>	Sapindaceae	WG
9.	<i>Amomum muricatum</i>	Zingiberaceae	SWG
10.	<i>Amorphophallus commutatus</i> var. <i>commutatus</i>	Araceae	WG
11.	<i>Amorphophallus nicolsonianus</i>	Araceae	SWG
12.	<i>Anaphalis aristata</i>	Asteraceae	PI
13.	<i>Anaphalis leptophylla</i>	Asteraceae	SWG
14.	<i>Anaphalis neelgerryana</i>	Asteraceae	SWG
15.	<i>Anaphyllum wightii</i>	Araceae	SWG
16.	<i>Andrographis neesiana</i> var. <i>neesiana</i>	Acantaceae	SWG
17.	<i>Archidendron monadelphum</i> var. <i>gracile</i>	Fabaceae	SWG
18.	<i>Arenga wightii</i>	Arecaceae	WG
19.	<i>Arisaema barnesii</i>	Araceae	SWG
20.	<i>Artocarpus hirsutus</i>	Moraceae	SWG
21.	<i>Baccaurea courtallensis</i>	Phyllanthaceae	PI
22.	<i>Barleria courtallica</i>	Acantaceae	WG
23.	<i>Bauhinia phoenicea</i>	Fabaceae	WG
24.	<i>Begonia crenata</i>	Begoniaceae	WG
25.	<i>Begonia fallax</i>	Begoniaceae	WG
26.	<i>Begonia integrifolia</i>	Begoniaceae	PI
27.	<i>Beilschmiedia dalzelli</i>	Lauraceae	WG
28.	<i>Belosynapsis vivipara</i>	Commelinaceae	WG
29.	<i>Blepharistemma serratum</i>	Rhizophoraceae	SWG
30.	<i>Boesenbergia pulcherrima</i>	Zingiberaceae	SWG
31.	<i>Bridelia stipularis</i>	Phyllanthaceae	PI
32.	<i>Bulbophyllum acutiflorum</i>	Orchidaceae	SI
33.	<i>Bulbophyllum rosemarianum</i>	Orchidaceae	SWG
34.	<i>Cajanus lineatus</i>	Fabaceae	WG

35.	<i>Calamus delessertianus</i>	Arecaceae	WG
36.	<i>Calophyllum austroindicum</i>	calophyllaceae	SWG
37.	<i>Calophyllum calaba</i>	calophyllaceae	WG
38.	<i>Canscora pauciflora</i>	Gentianaceae	WG
39.	<i>Canthium rheedei</i>	Rubiaceae	PI
40.	<i>Canthium travancoricum</i>	Rubiaceae	SWG
41.	<i>Carissa inermis</i>	Apocynaceae	PI
42.	<i>Casearia wynadensis</i>	SALICACEAE	WG
43.	<i>Cayratia pedata</i> var. <i>glabra</i>	Vitaceae	SWG
44.	<i>Ceropegia manoharii</i>	Apocynaceae	SWG
45.	<i>Ceropegia metziana</i>	Apocynaceae	SWG
46.	<i>Ceropegis manoharii</i>	Apocynaceae	SWG
47.	<i>Chionanthus mala-elengi</i> subsp. <i>mala-elengi</i>	Oleaceae	PI
48.	<i>Christisonia tubulosa</i>	Orobanchaceae	SWG
49.	<i>Chrysopogon hackelii</i>	Poaceae	PI
50.	<i>Cinnamomum heyneanum</i>	Lauraceae	WG
51.	<i>Cinnamomum macrocarpum</i>	Lauraceae	SWG
52.	<i>Cinnamomum malabattrum</i>	Lauraceae	SWG
53.	<i>Cinnamomum nicolsonianum</i>	Lauraceae	SWG
54.	<i>Cinnamomum perrottetii</i>	Lauraceae	SWG
55.	<i>Cinnamomum wightii</i>	Lauraceae	SWG
56.	<i>Coelogyne nervosa</i>	Orchidaceae	SWG
57.	<i>Combretum malabaricum</i>	Combretaceae	SWG
58.	<i>Combretum razianum</i>	Combretaceae	WG
59.	<i>Combretum recurvatum</i>	Apocynaceae	SWG
60.	<i>Conchidium microchilos</i>	Orchidaceae	PI
61.	<i>Crotalaria heyneana</i>	Fabaceae	SWG
62.	<i>Crotalaria obtecta</i>	Fabaceae	SWG
63.	<i>Croton malabaricus</i>	Euphorbiaceae	SWG
64.	<i>Cryptocarya beddomei</i>	Araceae	SWG
65.	<i>Cucumis silentvalleyi</i>	Cucurbitaceae	SWG
66.	<i>Cullenia exarillata</i>	Malvaceae	SWG
67.	<i>Curcuma aurantiaca</i>	Zingiberaceae	WG
68.	<i>Curcuma neilgherrensis</i>	Zingiberaceae	WG
69.	<i>Cyanotis tuberosa</i>	Commelinaceae	PI
70.	<i>Cyclea fissicalyx</i>	Menispermaceae	SWG
71.	<i>Cyrtococcum longipes</i>	Poaceae	WG
72.	<i>Dalbergia horrida</i>	Fabaceae	SWG
73.	<i>Dendrobium heyneanum</i>	Commelinaceae	PI

74.	<i>Dendrophthoe trigona</i>	Loranthaceae	WG
75.	<i>Derris brevipes</i> var. <i>brevipes</i>	Fabaceae	WG
76.	<i>Dicliptera cuneata</i>	Acantaceae	PI
77.	<i>Dictyospermum montanum</i>	Commelinaceae	PI
78.	<i>Dictyospermum ovalifolium</i>	Commelinaceae	WG
79.	<i>Dillenia bracteata</i>	Dilleniaceae	WG
80.	<i>Diospyros assimilis</i>	Ebenaceae	WG
81.	<i>Diospyros bourdillonii</i>	Ebenaceae	SWG
82.	<i>Diospyros nilagirica</i>	Ebenaceae	SWG
83.	<i>Diospyros paniculata</i>	Ebenaceae	PI
84.	<i>Diospyros pruriens</i>	Ebenaceae	WG
85.	<i>Dipterocarpus bourdillonii</i>	Dipterocarpaceae	WG
86.	<i>Dipterocarpus indicus</i>	Dipterocarpaceae	WG
87.	<i>Discospermum apiocarpum</i>	Rubiaceae	WG
88.	<i>Drypetes confertiflora</i>	Putranjivaceae	SWG
89.	<i>Drypetes venusta</i>	Putranjivaceae	SWG
90.	<i>Drypetes wightii</i>	Putranjivaceae	SWG
91.	<i>Dysoxylum malabaricum</i>	Meliaceae	SWG
92.	<i>Ehretia canarensis</i>	Boraginaceae	PI
93.	<i>Elaeocarpus munronii</i>	Elaeocarpaceae	SWG
94.	<i>Elaeocarpus variabilis</i>	Elaeocarpaceae	WG
95.	<i>Elatostema wightii</i>	Urticaceae	SWG
96.	<i>Ensete superbum</i>	Musaceae	PI
97.	<i>Epiprinus mallotiformis</i>	Euphorbiaceae	SWG
98.	<i>Epithema carnosum</i> var. <i>hispida</i>	Gesneriaceae	WG
99.	<i>Eria albiflora</i>	Orchidaceae	SWG
100.	<i>Eriocaulon pectinatum</i>	Eriocaulaceae	WG
101.	<i>Eriocaulon robustobrownianum</i>	Eriocaulaceae	PI
102.	<i>Eriocaulon talbotii</i>	Eriocaulaceae	WG
103.	<i>Eugenia argentea</i>	Myrtaceae	SI
104.	<i>Euonymus indicus</i>	Celastraceae	WG
105.	<i>Exacum tetragonum</i>	Gentianaceae	PI
106.	<i>Ficus beddomei</i>	Moraceae	WG
107.	<i>Garcinia talbotii</i>	Clusiaceae	WG
108.	<i>Garnotia arundinacea</i>	Poaceae	SWG
109.	<i>Smithsonia viridiflora</i>	Orchidaceae	WG
110.	<i>Glochidion ellipticum</i>	Phyllanthaceae	WG
111.	<i>Glochidion hohenackeri</i> var. <i>johnstonei</i>	Phyllanthaceae	PI
112.	<i>Glyptopetalum grandiflorum</i>	Celastraceae	SWG
113.	<i>Gnetum edule</i>	Gnetaceae	PI

114.	<i>Gomphostemma heyneanum</i>	Lamiaceae	SWG
115.	<i>Goniothalamus cardiopetalus</i>	Annonaceae	SWG
116.	<i>Gordonia obtusa</i>	Theaceae	WG
117.	<i>Grewia gamblei</i>	Malvaceae	SWG
118.	<i>Grewia umbellifera</i>	Malvaceae	WG
119.	<i>Gymnostachyum febrifugum</i>	Acantaceae	SWG
120.	<i>Gymnostachyum latifolium</i> var. <i>decurrens</i>	Acantaceae	WG
121.	<i>Gymnostachyum warrieranum</i>	Acantaceae	SWG
122.	<i>Habenaria heyneana</i>	Orchidaceae	PI
123.	<i>Habenaria longicornu</i>	Orchidaceae	PI
124.	<i>Haplanthodes tentaculatus</i> var. <i>neilgherryensis</i>	Acantaceae	WG
125.	<i>Hedyotis leschenaultiana</i>	Rubiaceae	SWG
126.	<i>Helicanthes elastica</i>	Loranthaceae	WG
127.	<i>Helixanthera intermedia</i>	Loranthaceae	SWG
128.	<i>Helixanthera obtusata</i>	Loranthaceae	WG
129.	<i>Helixanthera wallichiana</i>	Loranthaceae	WG
130.	<i>Henckelia fischeri</i>	Gesneriaceae	SWG
131.	<i>Heracleum candolleanum</i>	Apiaceae	SWG
132.	<i>Holigarna arnottiana</i>	Anacardiaceae	SWG
133.	<i>Holigarna beddomei</i>	Anacardiaceae	SWG
134.	<i>Holigarna grahamii</i>	Anacardiaceae	WG
135.	<i>Homonoia retusa</i>	Euphorbiaceae	PI
136.	<i>Hopea erosa</i>	Dipterocarpaceae	SWG
137.	<i>Hopea glabra</i>	Dipterocarpaceae	WG
138.	<i>Hopea parviflora</i>	Dipterocarpaceae	SWG
139.	<i>Hopea ponga</i>	Dipterocarpaceae	SWG
140.	<i>Hoya wightii</i>	Apocynaceae	SWG
141.	<i>Hugonia bellii</i>	Linaceae	SWG
142.	<i>Humboldtia brunonis</i>	Fabaceae	SWG
143.	<i>Hydnocarpus pentandra</i>	Achariaceae	WG
144.	<i>Impatiens diversifolia</i>	Balsaminaceae	WG
145.	<i>Impatiens fasciculata</i>	Balsaminaceae	SWG
146.	<i>Impatiens goughii</i>	Balsaminaceae	WG
147.	<i>Impatiens herbicola</i>	Balsaminaceae	SWG
148.	<i>Impatiens jerdoniae</i>	Balsaminaceae	WG
149.	<i>Impatiens lawsonii</i>	Balsaminaceae	SWG
150.	<i>Impatiens minor</i>	Balsaminaceae	PI
151.	<i>Impatiens scapiflora</i>	Balsaminaceae	WG
152.	<i>Impatiens stocksii</i>	Balsaminaceae	WG

153.	<i>Impatiens veerapazhasii</i>	Balsaminaceae	SWG
154.	<i>Indobanalia thyrsoflora</i>	Amaranthaceae	SWG
155.	<i>Indotristicha ramosissima</i>	Podostemaceae	SWG
156.	<i>Isodon lophanthoides</i>	Sapotaceae	WG
157.	<i>Isodon wightii</i>	Sapotaceae	PI
158.	<i>Isonandra perrottetiana</i>	Sapotaceae	SWG
159.	<i>Ixora brachiata</i>	Rubiaceae	WG
160.	<i>Ixora malabarica</i>	Rubiaceae	SWG
161.	<i>Ixora polyantha</i>	Rubiaceae	WG
162.	<i>Ixora sivarajiana</i>	Rubiaceae	SWG
163.	<i>Jerdonia indica</i>	Gesneriaceae	SWG
164.	<i>Justicia nilgherrensis</i>	Acantaceae	SWG
165.	<i>Justicia santapau</i>	Acantaceae	WG
166.	<i>Kalanchoe lanceolata</i>	Crassulaceae	PI
167.	<i>Kingiodendron pinnatum</i>	Fabaceae	SWG
168.	<i>Knema attenuata</i>	Myristicaceae	WG
169.	<i>Knoxia wightiana</i>	Rubiaceae	PI
170.	<i>Kunstleria keralensis</i>	Rubiaceae	SWG
171.	<i>Lagerstroemia microcarpa</i>	Lythraceae	WG
172.	<i>Lasianthus capitulatus</i>	Rubiaceae	SWG
173.	<i>Lasianthus jackianus</i>	Rubiaceae	SWG
174.	<i>Lepidagathis keralensis</i>	Acantaceae	SI
175.	<i>Leucas eriostoma</i>	Lamiaceae	SWG
176.	<i>Lindernia oppositifolia</i>	Linderniaceae	PI
177.	<i>Litsea coriacea</i>	Lauraceae	PI
178.	<i>Litsea floribunda</i>	Lauraceae	WG
179.	<i>Litsea ghatica</i>	Lauraceae	WG
180.	<i>Litsea laevigata</i>	Lauraceae	SWG
181.	<i>Litsea mysorensis</i>	Lauraceae	SI
182.	<i>Litsea stocksii</i> var. <i>glabrescens</i>	Lauraceae	PI
183.	<i>Litsea wightiana</i>	Lauraceae	SWG
184.	<i>Luvunga eleutherandra</i>	Rutaceae	WG
185.	<i>Mallotus beddomei</i>	Euphorbiaceae	SWG
186.	<i>Mallotus resinusus</i> var. <i>muricatus</i>	Euphorbiaceae	PI
187.	<i>Marsdenia raziana</i>	Apocynaceae	SI
188.	<i>Medinilla beddomei</i>	Melastomataceae	SWG
189.	<i>Meiogyne pannosa</i>	Annonaceae	WG
190.	<i>Meiogyne ramarowii</i>	Annonaceae	SWG
191.	<i>Memecylon lawsonii</i>	Melastomataceae	SWG
192.	<i>Memecylon randerianum</i>	Melastomataceae	SWG

193.	<i>Micrococca beddomei</i>	Euphorbiaceae	SWG
194.	<i>Microtropis latifolia</i>	Celastraceae	SWG
195.	<i>Microtropis stocksii</i>	Celastraceae	WG
196.	<i>Miliusa wayanadica</i>	Annonaceae	SWG
197.	<i>Miquelia dentata</i>	Icacinaceae	SWG
198.	<i>Mitragyna tubulosa</i>	Rubiaceae	PI
199.	<i>Momordica sahyadrica</i>	Cucurbitaceae	WG
200.	<i>Monoon fragrans</i>	Annonaceae	SWG
201.	<i>Murdannia lanuginosa</i>	Commelinaceae	PI
202.	<i>Murdannia semiteres</i>	Commelinaceae	PI
203.	<i>Musa kattuvazhana</i>	Musaceae	WG
204.	<i>Mussaenda frondosa</i>	Rubiaceae	PI
205.	<i>Mycetia acuminata</i>	Rubiaceae	WG
206.	<i>Myristica malabarica</i>	Myristicaceae	WG
207.	<i>Myrsine striata</i>	Primulaceae	WG
208.	<i>Naregamia alata</i>	Meliaceae	PI
209.	<i>Neanotis decipiens</i>	Rubiaceae	WG
210.	<i>Neanotis monosperma</i>	Rubiaceae	PI
211.	<i>Neolitsea scrobiculata</i>	Lauraceae	WG
212.	<i>Neurocalyx calycinus</i>	Rubiaceae	SI
213.	<i>Nothopogia racemosa</i>	Anacardiaceae	WG
214.	<i>Nothopogia travancorica</i>	Anacardiaceae	SWG
215.	<i>Oberonia brunoniana</i>	Orchidaceae	SWG
216.	<i>Oberonia wynadensis</i>	Orchidaceae	SWG
217.	<i>Ochlandra travancorica</i>	Poaceae	SWG
218.	<i>Ochreinauclea missionis</i>	Rubiaceae	SWG
219.	<i>Ophiorrhiza barberi</i>	Rubiaceae	SWG
220.	<i>Orophea sivarajanii</i>	Annonaceae	SWG
221.	<i>Osbeckia gracilis</i>	Melastomataceae	SWG
222.	<i>Osbeckia muralis</i>	Melastomataceae	WG
223.	<i>Otonephelium stipulaceum</i>	Sapindaceae	SWG
224.	<i>Palaquium ellipticum</i>	Sapotaceae	WG
225.	<i>Paspalum canarae</i>	Poaceae	PI
226.	<i>Pavetta breviflora</i>	Rubiaceae	SWG
227.	<i>Pavetta brunonis</i>	Rubiaceae	SWG
228.	<i>Phyllocephalum scabridum</i>	Asteraceae	WG
229.	<i>Pinanga dicksonii</i>	Arecaceae	WG
230.	<i>Piper hymenophyllum</i>	Piperaceae	PI
231.	<i>Piper wightii</i>	Piperaceae	SWG
232.	<i>Plectoglossa perrottetiana</i>	Orchidaceae	SI

233.	<i>Poeciloneuron indicum</i>	calophyllaceae	WG
234.	<i>Pogostemon gardneri</i>	Lamiaceae	SWG
235.	<i>Pogostemon mollis</i>	Lamiaceae	WG
236.	<i>Pogostemon peethapushpum</i>	Lamiaceae	SWG
237.	<i>Pogostemon purpurascens</i>	Lamiaceae	SI
238.	<i>Porpax jerdoniana</i>	Orchidaceae	WG
239.	<i>Pouzolzia wightii</i>	Urticaceae	SWG
240.	<i>Premna coriacea</i>	Lamiaceae	SI
241.	<i>Premna glaberrima</i>	Lamiaceae	SWG
242.	<i>Psychotria dalzellii</i>	Rubiaceae	WG
243.	<i>Psychotria flavida</i>	Rubiaceae	SWG
244.	<i>Psychotria macrocarpa</i>	Rubiaceae	SWG
245.	<i>Pterospermum rubiginosum</i>	Malvaceae	SWG
246.	<i>Reinwardtiodendron anamalaiense</i>	Meliaceae	SWG
247.	<i>Rubus glomeratus</i>	Rosaceae	PI
248.	<i>Salacia fruticosa</i>	Celastraceae	WG
249.	<i>Salacia malabarica</i>	Celastraceae	SWG
250.	<i>Saprosma fragrans</i>	Rubiaceae	SWG
251.	<i>Saprosma glomeratum</i>	Rubiaceae	WG
252.	<i>Sauropus gour-maitii</i>	Phyllanthaceae	SWG
253.	<i>Senna montana</i>	Fabaceae	PI
254.	<i>Sida beddomei</i>	Malvaceae	SWG
255.	<i>Smilax wightii</i>	Smilacaceae	SWG
256.	<i>Smithia gracilis</i>	Fabaceae	SWG
257.	<i>Smythea bombaiensis</i>	Rhamnaceae	WG
258.	<i>Sonerila rheedei</i>	Melastomataceae	SWG
259.	<i>Sonerila rotundifolia</i>	Melastomataceae	SWG
260.	<i>Sonerila versicolor</i>	Melastomataceae	SWG
261.	<i>Sonerila wallichii</i>	Melastomataceae	SWG
262.	<i>Stachyphrynium spicatum</i>	Marantaceae	SWG
263.	<i>Strobilanthes barbatus</i>	Acantaceae	WG
264.	<i>Strobilanthes ciliatus</i>	Acantaceae	SWG
265.	<i>Strobilanthes cuspidatus</i>	Acantaceae	SWG
266.	<i>Strobilanthes decurrens</i>	Acantaceae	SWG
267.	<i>Strobilanthes ixiocephalus</i>	Acantaceae	SWG
268.	<i>Strobilanthes lupulinus</i>	Acantaceae	PI
269.	<i>Strobilanthes sessilis</i> var. <i>sessilis</i>	Acantaceae	SWG
270.	<i>Strobilanthes tristis</i>	Acantaceae	SWG
271.	<i>Strychnos dalzellii</i>	Loganiaceae	WG
272.	<i>Swertia beddomei</i>	Gentianaceae	SWG

273.	<i>Swertia lawii</i>	Gentianaceae	SWG
274.	<i>Symplocos foliosa</i>	Symplocaceae	SWG
275.	<i>Symplocos macrophylla</i> subsp. <i>macrophylla</i>	Symplocaceae	SWG
276.	<i>Symplocos wynadense</i>	Symplocaceae	SWG
277.	<i>Syzygium benthamianum</i>	Myrtaceae	SWG
278.	<i>Syzygium densiflorum</i>	Myrtaceae	SWG
279.	<i>Syzygium laetum</i>	Myrtaceae	SWG
280.	<i>Syzygium munronii</i>	Myrtaceae	WG
281.	<i>Tabernaemontana alternifolia</i>	Apocynaceae	SWG
282.	<i>Taeniophyllum scaberulum</i>	Orchidaceae	SWG
283.	<i>Tarenna alpestris</i>	Rubiaceae	SWG
284.	<i>Tarenna canarica</i>	Rubiaceae	SWG
285.	<i>Tarenna nilagirica</i>	Rubiaceae	SWG
286.	<i>Terminalia paniculata</i>	Combretaceae	PI
287.	<i>Themeda cymbaria</i>	Poaceae	PI
288.	<i>Thunbergia mysorensis</i>	Acantaceae	WG
289.	<i>Tolypanthus lagenifer</i>	Loranthaceae	WG
290.	<i>Toxocarpus palghatensis</i>	Apocynaceae	SWG
291.	<i>Trichosanthes lobata</i>	Cucurbitaceae	PI
292.	<i>Tylophora capparidifolia</i>	Apocynaceae	SWG
293.	<i>Vaccinium neilgherrense</i>	ERICACEAE	SWG
294.	<i>Vateria indica</i>	Dipterocarpaceae	WG
295.	<i>Vepris bilocularis</i>	Rutaceae	SWG
296.	<i>Vernonia indica</i>	Asteraceae	WG
297.	<i>Vernonia ornata</i>	Asteraceae	SWG
298.	<i>Xanthophyllum arnottianum</i>	Polygalaceae	WG
299.	<i>Zingiber neesanum</i>	Zingiberaceae	WG

SWG- Southern Western Ghats, WG- Western Ghats, SI- South India, PI- Peninsular India

Appendix 2. List plants distributed in India and Sri Lanka

No.	Taxa	Family	Distribution
1.	<i>Acanthephippium bicolor</i>	Orchidaceae	SI & SL
2.	<i>Actephila excelsa</i>	Phyllanthaceae	PI & SL
3.	<i>Adenia hondala</i>	Passifloraceae	WG & SL
4.	<i>Allophylus serratus</i>	Sapindaceae	I & SL
5.	<i>Amomum hypoleucum</i>	Zingiberaceae	SI & SL
6.	<i>Amomum pterocarpum</i>	Zingiberaceae	PI & SL
7.	<i>Ampelocissus indica</i>	Vitaceae	PI & SL
8.	<i>Anaphalis subdecurrens</i>	Asteraceae	I & SL

9.	<i>Ancistrocladus heyneanus</i>	Ancistrocladaceae	SI & SL
10.	<i>Andrographis paniculata</i>	Acanthaceae	PI & SL
11.	<i>Antidesma alexiteria</i>	Phyllanthaceae	SI & SL
12.	<i>Aporosa cardiosperma</i>	Phyllanthaceae	PI & SL
13.	<i>Aporosa fusiformis</i>	Phyllanthaceae	I & SL
14.	<i>Argyreia elliptica</i>	Convolvulaceae	SI & SL
15.	<i>Argyreia hirsuta</i>	Convolvulaceae	SI & SL
16.	<i>Artabotrys zeylanicus</i>	Annonaceae	PI & SL
17.	<i>Artocarpus gomezianus</i> subsp. <i>zeylanicus</i>	Moraceae	SI & SL
18.	<i>Atalantia racemosa</i>	Rutaceae	PI & SL
19.	<i>Bambusa bambos</i>	Poaceae	I & SL
20.	<i>Blachia umbellata</i>	Euphorbiaceae	SI & SL
21.	<i>Blumea hieracifolia</i> var. <i>flexuosa</i>	Asteraceae	I & SL
22.	<i>Calamus thwaitesii</i>	Arecaceae	I & SL
23.	<i>Callicarpa tomentosa</i>	Lamiaceae	PI & SL
24.	<i>Campbelia neilgherrica</i>	Orobanchaceae	SI & SL
25.	<i>Capparis moonii</i>	Capparaceae	I & SL
26.	<i>Casearia ovata</i>	Salicaceae	I & SL
27.	<i>Casearia thwaitesii</i>	Salicaceae	I & SL
28.	<i>Cheirostylis parvifolia</i>	Orchidaceae	SI & SL
29.	<i>Christisonia bicolor</i>	Orobanchaceae	SI & SL
30.	<i>Cissus glyptocarpa</i>	Vitaceae	PI & SL
31.	<i>Cissus latifolia</i>	Vitaceae	PI & SL
32.	<i>Clausena indica</i>	Rutaceae	PI & SL
33.	<i>Clematis smilacifolia</i>	Ranunculaceae	I & SL
34.	<i>Coelogyne odoratissima</i>	Orchidaceae	SI & SL
35.	<i>Connarus monocarpus</i>	Connaraceae	PI & SL
36.	<i>Cottonia peduncularis</i>	Orchidaceae	PI & SL
37.	<i>Croton klotzschianus</i>	Euphorbiaceae	PI & SL
38.	<i>Cyanotis arachnoidea</i>	Commelinaceae	PI & SL
39.	<i>Cyanotis villosa</i>	Commelinaceae	PI & SL
40.	<i>Cyclea peltata</i>	Menispermaceae	I & SL
41.	<i>Dendrobium nutans</i>	Orchidaceae	SI & SL
42.	<i>Dendrocnide sinuata</i>	Urticaceae	PI & SL
43.	<i>Desmos lawii</i>	Annonaceae	SI & SL
44.	<i>Dimeria thwaitesii</i>	Poaceae	I & SL
45.	<i>Dimorphocalyx glabellus</i>	Euphorbiaceae	PI & SL
46.	<i>Dorstenia indica</i>	Moraceae	SI & SL
47.	<i>Elatostema surculosum</i>	Urticaceae	I & SL
48.	<i>Eugenia codyensis</i>	Myrtaceae	SI & SL
49.	<i>Excoecaria oppositifolia</i> var. <i>crenulata</i>	Euphorbiaceae	PI & SL

50.	<i>Ficus arnottiana</i>	Moraceae	I & SL
51.	<i>Flacourtia montana</i>	Salicaceae	I & SL
52.	<i>Garcinia gummi-gutta</i> var. <i>gummi-gutta</i>	Clusiaceae	SI & SL
53.	<i>Garcinia gummi-gutta</i> var. <i>papilla</i>	Clusiaceae	SI & SL
54.	<i>Gastrochilus acaulis</i>	Orchidaceae	SI & SL
55.	<i>Glochidion candolleanum</i>	Phyllanthaceae	I & SL
56.	<i>Glycosmis macrocarpa</i>	Rutaceae	SI & SL
57.	<i>Gomphandra coriacea</i>	Stemonuraceae	SI & SL
58.	<i>Gymnopetalum tubiflorum</i>	Cucurbitaceae	PI & SL
59.	<i>Hedyotis cyanantha</i>	Rubiaceae	PI & SL
60.	<i>Hedyotis neesiana</i>	Rubiaceae	PI & SL
61.	<i>Helichrysum buddleioides</i>	Asteraceae	I & SL
62.	<i>Hydnocarpus alpina</i>	Achariaceae	SI & SL
63.	<i>Ilex wightiana</i> var. <i>wightiana</i>	Aquifoliaceae	PI & SL
64.	<i>Impatiens hensloviana</i>	Balsaminaceae	SI & SL
65.	<i>Indianthus virgatus</i>	Marantaceae	SI & SL
66.	<i>Ipomoea deccana</i>	Convolvulaceae	I & SL
67.	<i>Isachne 657ylind</i>	Poaceae	I & SL
68.	<i>Jansenella griffithiana</i>	Poaceae	I & SL
69.	<i>Jasminum coarctatum</i>	Oleaceae	PI & SL
70.	<i>Jasminum flexile</i> var. <i>flexile</i>	Oleaceae	PI & SL
71.	<i>Lagenandra ovata</i>	Araceae	I & SL
72.	<i>Ligustrum robustum</i> subsp.. <i>657ylind</i>	Oleaceae	PI & SL
73.	<i>Liparis wightiana</i>	Orchidaceae	SI & SL
74.	<i>Loeseneriella arnottiana</i>	Celastraceae	SI & SL
75.	<i>Machilus macrantha</i>	Lauraceae	PI & SL
76.	<i>Macrosolen capitellatus</i>	Loranthaceae	SI & SL
77.	<i>Madhuca nerifolia</i>	Sapotaceae	I & SL
78.	<i>Memecylon wightii</i>	Melastomataceae	WG & SL
79.	<i>Myristica beddomei</i>	Myristicaceae	SI & SL
80.	<i>Nothopegia beddomei</i>	Anacardiaceae	SI & SL
81.	<i>Ophiorrhiza rugosa</i> var. <i>decumbens</i>	Rubiaceae	SI & SL
82.	<i>Osbeckia aspera</i> var. <i>aspera</i>	Melastomataceae	PI & SL
83.	<i>Oxytenanthera monadelphae</i>	Poaceae	SI & SL
84.	<i>Papilionanthe cylindrica</i>	Orchidaceae	SI & SL
85.	<i>Paracroton integrifolius</i>	Euphorbiaceae	PI & SL
86.	<i>Paramignya beddomei</i>	Rutaceae	WG & SL
87.	<i>Pavetta indica</i> var. <i>indica</i>	Rubiaceae	I & SL
88.	<i>Pellionia heyneana</i>	Urticaceae	SI & SL
89.	<i>Phalaenopsis mysorensis</i>	Orchidaceae	SI & SL
90.	<i>Phyllanthus rheedei</i>	Phyllanthaceae	I & SL

91.	<i>Piper argyrophyllum</i>	Piperaceae	WG & SL
92.	<i>Pittosporum tetraspermum</i>	Pittosporaceae	SI & SL
93.	<i>Plectranthus malabaricus</i>	Lamiaceae	SI & SL
94.	<i>Pogostemon pubescens</i>	Lamiaceae	I & SL
95.	<i>Polyalthia coffeoides</i>	Annonaceae	SI & SL
96.	<i>Pseuderanthemum malabaricum</i>	Acanthaceae	PI & SL
97.	<i>Psilanthus travancorensis</i>	Rubiaceae	PI & SL
98.	<i>Psychotria bisulcata</i>	Rubiaceae	SI & SL
99.	<i>Psychotria nigra</i> var. <i>nigra</i>	Rubiaceae	PI & SL
100.	<i>Pterocarpus marsupium</i>	Fabaceae	I & SL
101.	<i>Rhaphidophora pertusa</i>	Araceae	I & SL
102.	<i>Rhynchoglossum notonianum</i>	Gesneriaceae	SI & SL
103.	<i>Rhynchotechum permolle</i>	Gesneriaceae	PI & SL
104.	<i>Salacia oblonga</i>	Celastraceae	I & SL
105.	<i>Schefflera wallichiana</i>	Araliaceae	SI & SL
106.	<i>Scleropyrum pentandrum</i>	Santalaceae	PI & SL
107.	<i>Scutellaria violacea</i>	Lamiaceae	SI & SL
108.	<i>Sirhookera latifolia</i>	Orchidaceae	SI & SL
109.	<i>Solanum giganteum</i>	Solanaceae	SI & SL
110.	<i>Strobilanthes aurita</i>	Acanthaceae	I & SL
111.	<i>Strobilanthes caudatus</i>	Acanthaceae	WG & SL
112.	<i>Strobilanthes heyneanus</i>	Acanthaceae	I & SL
113.	<i>Symplocos obtusa</i>	Symplocaceae	WG & SL
114.	<i>Syzygium caryophyllatum</i>	Myrtaceae	WG & SL
115.	<i>Syzygium gardneri</i>	Myrtaceae	WG & SL
116.	<i>Syzygium hemisphericum</i>	Myrtaceae	SI & SL
117.	<i>Syzygium lanceolatum</i>	Myrtaceae	SI & SL
118.	<i>Taxillus cuneatus</i>	Loranthaceae	PI & SL
119.	<i>Taxillus tomentosus</i>	Loranthaceae	SI & SL
120.	<i>Teucrium tomentosum</i>	Lamiaceae	PI & SL
121.	<i>Thottea siliquosa</i>	Aristolochiaceae	PI & SL
122.	<i>Trichosanthes nervifolia</i>	Cucurbitaceae	I & SL
123.	<i>Turpinia malabarica</i>	Staphyleaceae	SI & SL
124.	<i>Utricularia graminifolia</i>	Lentibulariaceae	I & SL
125.	<i>Utricularia reticulata</i>	Lentibulariaceae	I & SL
126.	<i>Uvaria macropoda</i>	Annonaceae	SI & SL
127.	<i>Vitex leucoxydon</i>	Lamiaceae	PI & SL
128.	<i>Wendlandia thyrsoides</i>	Rubiaceae	PI & SL
129.	<i>Zeylanidium olivaceum</i>	Podostemaceae	WG & SL
130.	<i>Zingiber wightianum</i>	Zingiberaceae	PI & SL

WG- Western Ghats, SI- South India, PI- Peninsular India, SL- Sri Lanka

Appendix 3. List plants Newly added to Kannur district

No.	Scientific Name	Family
1.	<i>Acanthephippium bicolor</i>	Orchidaceae
2.	<i>Actephila excelsa</i>	Phyllanthaceae
3.	<i>Adenoon indicum</i>	Asteraceae
4.	<i>Aerides crispa</i>	Orchidaceae
5.	<i>Aganope thyrsiflora</i> var. <i>eualata</i>	Fabaceae
6.	<i>Aglaia barberi</i>	Meliaceae
7.	<i>Agrostistachys indica</i>	Euphorbiaceae
8.	<i>Amomum hypoleucum</i>	Zingiberaceae
9.	<i>Amomum pterocarpum</i>	Zingiberaceae
10.	<i>Amorphophallus nicolsonianus</i>	Araceae
11.	<i>Ampelocissus indica</i>	Vitaceae
12.	<i>Anaphalis aristata</i>	Asteraceae
13.	<i>Anaphalis leptophylla</i>	Asteraceae
14.	<i>Anaphalis subdecurrens</i>	Asteraceae
15.	<i>Ancistrocladus heyneanus</i>	Ancistrocladaceae
16.	<i>Andrographis neesiana</i>	Acanthaceae
17.	<i>Aphyllorchis montana</i>	Orchidaceae
18.	<i>Apodytes dimidiata</i>	Metteniusaceae
19.	<i>Aporosa fusiformis</i>	Phyllanthaceae
20.	<i>Archidendron monadelphum</i> var. <i>gracile</i>	Fabaceae
21.	<i>Argostemma verticillatum</i>	Rubiaceae
22.	<i>Arisaema barnesii</i>	Araceae
23.	<i>Artocarpus gomezianus</i> subsp. <i>zeylanicus</i>	Moraceae
24.	<i>Atalantia wightii</i>	Rutaceae
25.	<i>Balanophora abbreviate</i>	Balanophoraceae
26.	<i>Barleria involucrata</i>	Acanthaceae
27.	<i>Begonia integrifolia</i>	Begoniaceae
28.	<i>Belosynapsis vivipara</i>	Commelinaceae
29.	<i>Brachycorythis iantha</i>	Orchidaceae
30.	<i>Bulbophyllum rosemarianum</i>	Orchidaceae
31.	<i>Calophyllum austroindicum</i>	Callophylaceae
32.	<i>Calophyllum calaba</i>	Callophylaceae
33.	<i>Calophyllum polyanthum</i>	Callophylaceae
34.	<i>Campbellia neilgherrica</i>	Orobanchaceae
35.	<i>Canthium coromandelicum</i>	Rubiaceae
36.	<i>Canthium rheedei</i>	Rubiaceae
37.	<i>Capparis moonii</i>	Menispermaceae
38.	<i>Casearia thwaitesii</i>	Salicaceae

39.	<i>Cayaponia laciniosa</i>	Cucurbitaceae
40.	<i>Ceropegia metziana</i>	Apocynaceae
41.	<i>Cheirostylis parvifolia</i>	Orchidaceae
42.	<i>Chonemorpha fragrans</i>	Apocynaceae
43.	<i>Christisonia bicolor</i>	Orobanchaceae
44.	<i>Cinnamomum heyneanum</i>	Lauraceae
45.	<i>Cinnamomum macrocarpum</i>	Lauraceae
46.	<i>Cinnamomum nicolsonianum</i>	Lauraceae
47.	<i>Cinnamomum perrottetii</i>	Lauraceae
48.	<i>Cinnamomum wightii</i>	Lauraceae
49.	<i>Cissampelopsis corymbosa</i>	Asteraceae
50.	<i>Coelogyne odoratissima</i>	Orchidaceae
51.	<i>Commelina clavata</i>	Commelinaceae
52.	<i>Commelina paludosa</i>	Commelinaceae
53.	<i>Conchidium microchilos</i>	Orchidaceae
54.	<i>Connarus monocarpus</i>	Connaraceae
55.	<i>Crotalaria obtecta</i>	Fabaceae
56.	<i>Crotalaria spectabilis</i>	Fabaceae
57.	<i>Croton malabaricus</i>	Euphorbiaceae
58.	<i>Cryptocoryne retrospiralis</i>	Araceae
59.	<i>Cucumis sativus hardwickii</i>	Cucurbitaceae
60.	<i>Cucumis silentvalleyi</i>	Cucurbitaceae
61.	<i>Cullenia exarillata</i>	Malvaceae
62.	<i>Curcuma ecalcarata</i>	Zingiberaceae
63.	<i>Cyanotis racemosa</i>	Commelinaceae
64.	<i>Cyanotis tuberosa</i>	Commelinaceae
65.	<i>Cyanotis villosa</i>	Commelinaceae
66.	<i>Cyclea fissicalyx</i>	Annonaceae
67.	<i>Cyperus sphacelatus</i>	Cyperaceae
68.	<i>Decalepis nervosa</i>	Apocynaceae
69.	<i>Dendrobium nutans</i>	Orchidaceae
70.	<i>Dendrophthoe trigona</i>	Loranthaceae
71.	<i>Desmodium repandum</i>	Fabaceae
72.	<i>Diospyros assimilis</i>	Ebenaceae
73.	<i>Diospyros bourdillonii</i>	Ebenaceae
74.	<i>Diospyros buxifolia</i>	Ebenaceae
75.	<i>Diospyros nilagirica</i>	Ebenaceae
76.	<i>Dipterocarpus bourdillonii</i>	Dipterocarpaceae
77.	<i>Dipterocarpus indicus</i>	Dipterocarpaceae
78.	<i>Discospermum apiocarpum</i>	Rubiaceae

79.	<i>Drypetes confertiflora</i>	Putranjivaceae
80.	<i>Dysoxylum malabaricum</i>	Meliaceae
81.	<i>Ehretia canarensis</i>	Boraginaceae
82.	<i>Elatostema wightii</i>	Urticaceae
83.	<i>Ensete superbum</i>	Musaceae
84.	<i>Eriocaulon pectinatum</i>	Eriocaulaceae
85.	<i>Eriocaulon robustobrownianum</i>	Eriocaulaceae
86.	<i>Eriocaulon talbotii</i>	Eriocaulaceae
87.	<i>Eriocaulon thwaitesii</i>	Eriocaulaceae
88.	<i>Eugenia argentea</i>	Myrtaceae
89.	<i>Eugenia codyensis</i>	Myrtaceae
90.	<i>Ficus beddomei</i>	Moraceae
91.	<i>Fimbristylis complanata</i>	Cyperaceae
92.	<i>Flacourtia montana</i>	Salicaceae
93.	<i>Garcinia gummi-gutta</i> var. <i>papilla</i>	Clusiaceae
94.	<i>Garcinia talbotii</i>	Clusiaceae
95.	<i>Smithsonia viridiflora</i>	Orchidaceae
96.	<i>Glochidion hohenackeri</i> var. <i>johnstonei</i>	Phyllanthaceae
97.	<i>Glycosmis macrocarpa</i>	Rutaceae
98.	<i>Gomphandra coriacea</i>	Stemonuraceae
99.	<i>Grewia umbellifera</i>	Malvaceae
100.	<i>Gymnema montanum</i>	Apocynaceae
101.	<i>Habenaria digitata</i>	Orchidaceae
102.	<i>Habenaria longicornu</i>	Orchidaceae
103.	<i>Haplanthodes tentaculatus</i> var. <i>neilgherryensis</i>	Acanthaceae
104.	<i>Hedyotis leschenaultiana</i>	Rubiaceae
105.	<i>Helichrysum buddleioides</i>	Asteraceae
106.	<i>Heracleum candolleanum</i>	Apiaceae
107.	<i>Holigarna beddomei</i>	Anacardiaceae
108.	<i>Hopea erosa</i>	Dipterocarpaceae
109.	<i>Hydnocarpus alpina</i>	Achariaceae
110.	<i>Hypericum wightianum</i>	Hypericaceae
111.	<i>Hypoxis aurea</i>	Amaryllidaceae
112.	<i>Ilex wightiana</i>	Aquifoliaceae
113.	<i>Impatiens goughii</i>	Balsaminaceae
114.	<i>Impatiens hensloviana</i>	Balsaminaceae
115.	<i>Impatiens jerdoniae</i>	Balsaminaceae
116.	<i>Impatiens lawsonii</i>	Balsaminaceae
117.	<i>Impatiens stocksii</i>	Balsaminaceae
118.	<i>Impatiens veerapazhasii</i>	Balsaminaceae

119.	<i>Ipomoea barlerioides</i>	Convolvulaceae
120.	<i>Isachne globosa</i>	Poaceae
121.	<i>Isachne walkeri</i>	poaceae
122.	<i>Jansenella griffithiana</i>	Poaceae
123.	<i>Kalanchoe lanceolate</i>	Crassulaceae
124.	<i>Kingidium mysorensis</i>	Orchidaceae
125.	<i>Kingiodendron pinnatum</i>	Fabaceae
126.	<i>Leea guineensis</i>	Vitaceae
127.	<i>Litsea ghatica</i>	Lauraceae
128.	<i>Litsea wightiana</i>	Lauraceae
129.	<i>Macrosolen capitellatus</i>	Loranthaceae
130.	<i>Malaxis purpurea</i>	Orchidaceae
131.	<i>Mallotus beddomei</i>	Euphorbiaceae
132.	<i>Marsdenia raziana</i>	Apocynaceae
133.	<i>Meliosma pinnata</i> subsp.. <i>barbulata</i>	Anacardiaceae
134.	<i>Memecylon randerianum</i>	Melastomataceae
135.	<i>Meyna laxiflora</i>	Rubiaceae
136.	<i>Micrococca beddomei</i>	Euphorbiaceae
137.	<i>Microtropis stocksii</i>	Celastraceae
138.	<i>Miliusa wayanadica</i>	Annonaceae
139.	<i>Momordica sahyadrica</i>	Cucurbitaceae
140.	<i>Moonon fragrans</i>	Annonaceae
141.	<i>Murdannia loriformis</i>	Commelinaceae
142.	<i>Murdannia semiteres</i>	Commelinaceae
143.	<i>Murdannia simplex</i>	Commelinaceae
144.	<i>Myristica malabarica</i>	Myristicaceae
145.	<i>Najas graminea</i>	Hydrocharitaceae
146.	<i>Neanotis monosperma</i>	Rubiaceae
147.	<i>Neolitsea scrobiculata</i>	Lauraceae
148.	<i>Oberonia wynadensis</i>	Orchidaceae
149.	<i>Ophiorrhiza barberi</i>	Rubiaceae
150.	<i>Ophiorrhiza rugosa</i> var. <i>decumbens</i>	Rubiaceae
151.	<i>Orophea sivarajanii</i>	Annonaceae
152.	<i>Osyris quadripartita</i>	Santalaceae
153.	<i>Parnassia mysorensis</i>	Celastraceae
154.	<i>Paspalum canarae</i>	Poaceae
155.	<i>Pavetta breviflora</i>	Rubiaceae
156.	<i>Pavetta brunonis</i>	Rubiaceae
157.	<i>Peristylus aristatus</i>	Orchidaceae
158.	<i>Peristylus richardianus</i>	Orchidaceae

159.	<i>Persicaria nepalensis</i>	Polygonaceae
160.	<i>Piper wightii</i>	Piperaceae
161.	<i>Pittosporum tetraspermum</i>	Pittosporaceae
162.	<i>Plectoglossa perrottetiana</i>	Orchidaceae
163.	<i>Pogostemon gardneri</i>	Lamiaceae
164.	<i>Pogostemon mollis</i>	Lamiaceae
165.	<i>Pogostemon peethapushpum</i>	Lamiaceae
166.	<i>Pogostemon pubescens</i>	Lamiaceae
167.	<i>Polygala arillata</i>	Polygalaceae
168.	<i>Polygala persicariifolia</i>	Polygalaceae
169.	<i>Premna glaberrima</i>	Lamiaceae
170.	<i>Psychotria bisulcata</i>	Rubiaceae
171.	<i>Psychotria macrocarpa</i>	Rubiaceae
172.	<i>Psydrax dicoccos</i>	Rubiaceae
173.	<i>Pteroceras leopardinum</i>	Orchidaceae
174.	<i>Rapanea capitellata</i>	Primulaceae
175.	<i>Reinwardtiodendron anamalaiense</i>	Meliaceae
176.	<i>Remusatia vivipara</i>	Araceae
177.	<i>Rhynchoglossum obliquum</i>	Gesniereaceae
178.	<i>Rotala indica</i>	Lythraceae
179.	<i>Rubus ellipticus</i>	Rosaceae
180.	<i>Rubus glomeratus</i>	Rosaceae
181.	<i>Salacia malabarica</i>	Celastraceae
182.	<i>Salacia oblonga</i>	Celastraceae
183.	<i>Satyrium nepalense</i>	Orchidaceae
184.	<i>Sauropus gour-maitii</i>	Phyllanthaceae
185.	<i>Schefflera roxburghii</i>	Araliaceae
186.	<i>Schoenoplectus mucronatus</i>	Cyperaceae
187.	<i>Smilax wightii</i>	Smilacaceae
188.	<i>Smithia gracilis</i>	Fabaceae
189.	<i>Sonerila rotundifolia</i>	Melastomataceae
190.	<i>Sopubia trifida</i>	Orobanchaceae
191.	<i>Strobilanthes barbatus</i>	Acanthaceae
192.	<i>Strobilanthes decurrens</i>	Acanthaceae
193.	<i>Strombosia ceylanica</i>	Olacaceae
194.	<i>Swertia beddomei</i>	Gentianaceae
195.	<i>Symplocos macrophylla</i>	Symplocaceae
196.	<i>Symplocos obtusa</i>	Symplocaceae
197.	<i>Symplocos racemosa</i>	Symplocaceae
198.	<i>Symplocos wynadense</i>	Symplocaceae

199.	<i>Syzygium densiflorum</i>	Myrtaceae
200.	<i>Syzygium gardneri</i>	Myrtaceae
201.	<i>Syzygium hemisphericum</i>	Myrtaceae
202.	<i>Syzygium lanceolatum</i>	Myrtaceae
203.	<i>Tagia montana</i>	Euphorbiaceae
204.	<i>Tarenna alpestris</i>	Rubiaceae
205.	<i>Themeda cymbaria</i>	Poaceae
206.	<i>Toxocarpus palghatensis</i>	Apocynaceae
207.	<i>Trichosanthes lobata</i>	Cucurbitaceae
208.	<i>Trichosanthes nervifolia</i>	Cucurbitaceae
209.	<i>Tripogon bromoides</i>	Poaceae
210.	<i>Tylophora capparidifolia</i>	Apocynaceae
211.	<i>Uvaria macropoda</i>	Annonaceae
212.	<i>Vaccinium neilgherrense</i>	Ericaceae
213.	<i>Vepris bilocularis</i>	Rutaceae
214.	<i>Zanthoxylum ovalifolium</i>	Rutaceae
215.	<i>Zehneria maysorensis</i>	Cucurbitaceae
216.	<i>Zeuxine gracilis</i>	Orchidaceae
217.	<i>Zingiber wightianum</i>	Zingiberaceae

Appendix 4. List of IUCN Redlisted Plants in the Sanctuary

No	Taxa	Family	Category
1	<i>Vateria indica</i>	Dipterocarpaceae	Critically Endangered A1c
2	<i>Dipterocarpus bourdilloni</i>	Dipterocarpaceae	Critically Endangered A1cd+2cd, B1+2c
3	<i>Hopea erosa</i>	Dipterocarpaceae	Critically Endangered A1d+2d, B1+2e, C1, D
4	<i>Poeciloneuron pauciflorum</i>	Calophyllaceae	Critically Endangered B1+2c
5	<i>Cayratia pedata</i> var. <i>glabra</i>	Vitaceae	Critically Endangered B2ab(ii,iii,v)
6	<i>Kingiodendron pinnatum</i>	Fabaceae	Endangered A1cd
7	<i>Hopea glabra</i>	Dipterocarpaceae	Endangered A1cd+2cd
8	<i>Dipterocarpus indicus</i>	Dipterocarpaceae	Endangered A1cd+2cd, B1+2c
9	<i>Hopea parviflora</i>	Dipterocarpaceae	Endangered A1cd+2cd, B1+2c

10	<i>Hopea ponga</i>	Dipterocarpaceae	Endangered A1cd+2cd, B1+2c
11	<i>Dysoxylum malabaricum</i>	Meliaceae	Endangered A2cd
12	<i>Actinodaphne salicina</i>	Lauraceae	Endangered B1+2c
13	<i>Psychotria macrocarpa</i>	Rubiaceae	Endangered B1+2c
14	<i>Melicope lunu-ankenda</i>	Rutaceae	Endangered B1+2c
15	<i>Cinnamomum wightii</i>	Lauraceae	Endangered B1ab(i,ii,iii,iv)
16	<i>Myrsine striata</i>	Primulaceae	Endangered B1+2c
17	<i>Dalbergia latifolia</i>	Fabaceae	Vulnerable A1cd
18	<i>Strobilanthes ciliatus</i>	Acanthaceae	Vulnerable A2cd
19	<i>Hydnocarpus pentandrus</i>	Achariaceae	Vulnerable A2cd
20	<i>Calophyllum calaba</i>	Calophyllaceae	Vulnerable A2cd
21	<i>Salacia oblonga</i>	Celastraceae	Vulnerable A2cd
22	<i>Diospyros paniculata</i>	Ebenaceae	Vulnerable A2cd
23	<i>Cinnamomum macrocarpum</i>	Lauraceae	Vulnerable A2cd
24	<i>Cayratia pedata</i> var. <i>pedata</i>	Vitaceae	Vulnerable A2cd
25	<i>Arenga wightii</i>	Arecaeae	Vulnerable B1+2c
26	<i>Saraca asoca</i>	Fabaceae	Vulnerable B1+2c
27	<i>Cinnamomum perrottetii</i>	Lauraceae	Vulnerable B1+2c
28	<i>Cryptocarya beddomei</i>	Lauraceae	Vulnerable B1+2c
29	<i>Memecylon lawsonii</i>	Melastomataceae	Vulnerable B1+2c
30	<i>Aglaiia bourdillonii</i>	Meliaceae	Vulnerable B1+2c
31	<i>Myristica malabarica</i>	Myristicaceae	Vulnerable B1+2c
32	<i>Syzygium benthamianum</i>	Myrtaceae	Vulnerable B1+2c
33	<i>Syzygium densiflorum</i>	Myrtaceae	Vulnerable B1+2c
34	<i>Glochidion johnstonei</i>	Phyllanthaceae	Vulnerable B1+2c
35	<i>Drypetes wightii</i>	Putranjivaceae	Vulnerable B1+2c
36	<i>Ixora malabarica</i>	Rubiaceae	Vulnerable B1+2c
37	<i>Ochreinauclea missionis</i>	Rubiaceae	Vulnerable B1+2c
38	<i>Saprosma fragrans</i>	Rubiaceae	Vulnerable B1+2c
39	<i>Tarenna nilagirica</i>	Rubiaceae	Vulnerable B1+2c
40	<i>Casearia wynadensis</i>	Salicaceae	Vulnerable B1+2c
41	<i>Anaphalis beddomei</i>	Asteraceae	Vulnerable B1ab(ii,iii)
42	<i>Anaphalis leptophylla</i>	Asteraceae	Vulnerable B2ab(ii,iii)
43	<i>Nothopogia heyneana</i>	Anacardiaceae	Lower Risk/near threatened
44	<i>Elaeocarpus munronii</i>	Elaeocarpaceae	Lower Risk/near threatened
45	<i>Aglaiia simplicifolia</i>	Meliaceae	Lower Risk/near threatened

Appendix 5. Redlisted plants in the Sanctuary after Sasidharan (2017)

No	Taxa	Family	Reason for Threat	Category
1	<i>Ceropegia manoharii</i>	Apocynaceae	Number of locations 2, Mature individuals > 50	Critically endangered B1+2a,C
2	<i>Impatiens lawsonii</i>	Balsaminaceae	Number of Locations > 3, Area of occupancy > 10 sq.km	Critically endangered B1+2a
3	<i>Pogostemon peethapushpum</i>	Lamiaceae	Number of Locations > 3	Critically endangered B1+2a
4	<i>Oberonia wynadensis</i>	Orchidaceae	Number of Locations > 4	Critically endangered B1+2a
5	<i>Phalaenopsis mysorensis</i>	Orchidaceae	Number of Locations > 5, Mature Individuals >250	Critically endangered B2a,C
6	<i>Strobilanthes sessilis</i>	Acanthaceae	number of Locations > 10	Endangered B1+2a
7	<i>Milium wayanadica</i>	Annonaceae	Number of Locations > 5, Conversion of Natural Habitat, Area of Occupancy > 25 sq. km	Endangered B1+2a
8	<i>Orophea sivarajanii</i>	Annonaceae	Nuber of locations > 5, fragmented populations	Endangered B1+2a
9	<i>Ceropegia metziana</i>	Apocynaceae	Number of Locations > 20, continous decline in Area of occupancy	Endangered B1+2b(i)(ii)
10	<i>Decalepis nervosa</i>	Apocynaceae	Number of Locations > 10, Number of Mature Individuals > 250	Endangered B1+2ab(i,ii,iii)
11	<i>Marsdenia raziana</i>	Apocynaceae	Number of locations < 10	Endangered B1+2a
12	<i>Toxocarpus palghatensis</i>	Apocynaceae	Number of Locations > 5, Severly Fragmented	Endangered B1+2a
13	<i>Amorphophallus nicolsonianus</i>	Araceae	Number of Locations > 10	Endangered B1+2a
14	<i>Impatiens herbicola</i>	Balsaminaceae	Number of Locations > 15	Endangered B1+2a
15	<i>Impatiens jerdoniae</i>	Balsaminaceae	Number of Locations > 5, Isolated populations	Endangered B1+2a
16	<i>Impatiens stocksii</i>	Balsaminaceae	Number of Locations > 10	Endangered B1+2a
17	<i>Salacia malabarica</i>	Celastraceae	Number of Locations > 10	Endangered B1+2a
18	<i>Henckelia fischeri</i>	Gesneriaceae	Number of Locations > 8	Endangered B1+2ab
19	<i>Cinnamomum heyneanum</i>	Lauraceae	Number of Locations > 3	Endangered B1+2a

20	<i>Grewia gamblei</i>	Malvaceae	Number of Locations > 5	Endangered B1+2a
21	<i>Eugenia argentea</i>	Myrtaceae	Number of Locations 20, Mature Individuals >250`	Endangered A2a,B1+2a
22	<i>Bulbophyllum acutiflorum</i>	Orchidaceae	Number of Locations > 10	Endangered B1+2ab,C
23	<i>Smithsonia viridiflora</i>	Orchidaceae	Number of Locations > 15, Mature individual < 350	Endangered B2ab,C
24	<i>Plectoglossa perrottetiana</i>	Orchidaceae	Number of Locations > 20	Endangered B2a,C
25	<i>Drypetes confertiflora</i>	Putranjivaceae	Number of Locations > 15, Mature individual < 700	Endangered B1+2a,C
26	<i>Ixora sivarajiana</i>	Rubiaceae	Number of Locations > 4, Severly Fragmented	Endangered B1+2a
27	<i>Lasianthus capitulatus</i>	Rubiaceae	Number of Locations > 10	Endangered B2a
28	<i>Lasianthus jackianus</i>	Rubiaceae	Number of Locations > 15	Endangered B1+2a
29	<i>Ophiorrhiza barberi</i>	Rubiaceae	Number of Locations > 10, Severly Fragmented	Endangered B1+2a
30	<i>Allophylus concanicus</i>	Sapindaceae	Number of Locations > 10	Endangered B1+2a
31	<i>Heracleum candolleianum</i>	Apiaceae	Population Fragmented, Exterem flatuations	Vulnerable B1+2ac
32	<i>Salacia fruticosa</i>	Celastraceae	Number of Locations > 30, Continous decline	Vulnerable B1+2b
33	<i>Belosynapsis vivipara</i>	Commelinaceae	Number of Locations > 30	Vulnerable B1+2a
34	<i>Dictyospermum ovalifolium</i>	Commelinaceae	Number of Locations > 20	Vulnerable B1+2a
35	<i>Murdannia lanuginosa</i>	Commelinaceae	Number of Locations > 15	Vulnerable B1+2ac (iii,iv)
36	<i>Diospyros bourdillonii</i>	Ebenaceae	Number of Locations > 20	Vulnerable B1+2a
37	<i>Elaeocarpus munronii</i>	Elaeocarpaceae	Number of Locations > 21	Vulnerable B1+2a
38	<i>Kunstleria keralensis</i>	Fabaceae	Number of Locations > 15	Vulnerable B1+2a
39	<i>Premna glaberrima</i>	Lamiaceae	Number of Locations > 30	Vulnerable B1+2,C
40	<i>Aglaiia barberi</i>	Meliaceae	Number of Locations > 20	Vulnerable B1+2a
41	<i>Myristica malabarica</i>	Myristicaceae	Number of Mature Individual 300	Vulnerable B1+2,C1

42	<i>Aerides crispa</i>	Orchidaceae	Number of Locations > 50	Vulnerable B2,C
43	<i>Coelogyne nervosa</i>	Orchidaceae	Number of Locations > 30	Vulnerable B1+2ab,C
44	<i>Blepharistemma serratum</i>	Rhizophoraceae	Number of Locations > 30	Vulnerable B1+2a
45	<i>Vepris bilocularis</i>	Rutaceae	Number of Locations > 30, Mature individual < 3000	Vulnerable B1+2b,C
46	<i>Smilax wightii</i>	Smilacaceae	Number of Locations > 15	Vulnerable B1+2a,C
47	<i>Amomum muricatum</i>	Zingiberaceae	Number of Locations > 10	Vulnerable B1+2a,C
48	<i>Strobilanthes cuspidatus</i>	Acanthaceae	Number of Locations > 30	Near threatened/ Lower risk
49	<i>Holigarna grahamii</i>	Anacardiaceae	Number of locations > 25, Number of Mature Individual >10000	Near threatened/ Lower risk
50	<i>Impatiens diversifolia</i>	Balsaminaceae	Area of occupancy > 2000 sq. km	Near threatened/ Lower risk
51	<i>Epithema carnosum</i> var. <i>hispida</i>	Gesneriaceae	Number of Locations > 50	Near threatened/ Lower risk

Appendix 6. List of exotic plants

No	Name of plant	Status	APG III	Nativity
1.	<i>Abelmoschus manihot</i>	C/N	Malvaceae	southeast Asia
2.	<i>Erythrina variegata</i>	C/N	Fabaceae	Africa & Asia
3.	<i>Hedychium coronarium</i>	C/N	Zingiberaceae	Easetern Himalaya
4.	<i>Ixora coccinea</i>	CS	Rubiaceae	India and Sri Lanka
5.	<i>Ludwigia hyssopifolia</i>	CS	Onagraceae	Pantropical
6.	<i>Mimusops elengi</i>	CS	Sapotaaceae	Indo-Malesia
7.	<i>Ocimum americanum</i>	CS	Lamiaceae	Africa & Asia
8.	<i>Ocimum gratissimum</i>	CS	Lamiaceae	Africa & Asia
9.	<i>Stachytarpheta cayennensis</i>	CS	Verbenaceae	Tropical America
10.	<i>Brassica juncea</i>	CS	Brassicaceae	Asia & Europe
11.	<i>Catharanthus roseus</i>	CS	Apocynaceae	Madagascar
12.	<i>Ageratina adenophora</i>	IN	Asteraceae	Mexico & Central America
13.	<i>Ageratum conyzoides</i>	IN	Asteraceae	South America
14.	<i>Chromolaena odorata</i>	IN	Asteraceae	South America
15.	<i>Lantana camara</i> var. <i>camara</i>	IN	Verbenaceae	South America

16.	<i>Mikania micrantha</i>	IN	Asteraceae	South America
17.	<i>Mimosa diplotricha</i>	IN	Fabaceae	South America
18.	<i>Sphagneticola trilobata</i>	IN	Asteraceae	Mexico & Central America
19.	<i>Merremia umbellata</i>	N/I	Convolvulaceae	Pantropical
20.	<i>Merremia vitifolia</i>	N/I	Convolvulaceae	Asia
21.	<i>Adenostemma lavenia</i>	N/I	Asteraceae	Paleotropics
22.	<i>Allmania nodiflora</i>	N/I	Amaranthaceae	Tropical Asia
23.	<i>Alternanthera sessilis</i>	N/I	Amaranthaceae	South America
24.	<i>Calopogonium mucunoides</i>	N/I	Fabaceae	Tropical Asia
25.	<i>Croton bonplandianus</i>	N/I	Euphorbiaceae	South America
26.	<i>Hyptis suaveolens</i>	N/I	Lamiaceae	America
27.	<i>Rauwolfia tetraphylla</i>	N/I	Apocynaceae	West Indies
28.	<i>Senna hirsuta</i>	N/I	Fabaceae	Tropical America
29.	<i>Asclepias curassavica</i>	N/I	Apocynaceae	Tropical America
30.	<i>Axonopus compressus</i>	N/I	Poaceae	Tropical America
31.	<i>Cleome monophylla</i>	N/I	Cleomaceae	Tropical Asia
32.	<i>Cleome viscosa</i>	N/I	Cleomaceae	Asia
33.	<i>Conyza bonariensis</i>	N/I	Asteraceae	America
34.	<i>Crassocephalum crepidioides</i>	N/I	Asteraceae	Africa & Asia
35.	<i>Cynodon dactylon</i>	N/I	Poaceae	Africa, Asia & Europe
36.	<i>Euphorbia hirta</i>	N/I	Euphorbiaceae	Tropical America
37.	<i>Evolvulus nummularius</i>	N/I	Convolvulaceae	Tropical America
38.	<i>Glinus oppositifolius</i>	N/I	Molluginaceae	Pantropical
39.	<i>Ipomoea hederifolia</i>	N/I	Convolvulaceae	Tropical America
40.	<i>Ipomoea quamoclit</i>	N/I	Convolvulaceae	Tropical America
41.	<i>Mecardonia procumbens</i>	N/I	Plantaginaceae	Tropical America
42.	<i>Oxalis corniculata</i>	N/I	Oxalidaceae	Cosmopolitan
43.	<i>Passiflora foetida</i>	N/I	Passifloraceae	South America
44.	<i>Pennisetum polystachyon</i>	N/I	Poaceae	Cosmopolitan
45.	<i>Peperomia pellucida</i>	N/I	Piperaceae	Tropical America
46.	<i>Pilea microphylla</i>	N/I	Urticaceae	South America
47.	<i>Scoparia dulcis</i>	N/I	Plantaginaceae	Tropical America
48.	<i>Senna alata</i>	N/I	Fabaceae	South America
49.	<i>Senna tora</i>	N/I	Fabaceae	South America

50.	<i>Sida acuta</i>	N/I	Malvaceae	South America
51.	<i>Synedrella nodiflora</i>	N/I	Asteraceae	West Indies
52.	<i>Tridax procumbens</i>	N/I	Asteraceae	Tropical America
53.	<i>Triumfetta rhomboidea</i>	N/I	Malvaceae	Africa
54.	<i>Amaranthus spinosus</i>	NT	Amaranthaceae	America
55.	<i>Centrosema molle</i>	NT	Fabaceae	America
56.	<i>Clerodendrum paniculatum</i>	NT	Lamiaceae	Indo-Malesia
57.	<i>Commelina paludosa</i>	NT	Commelinaceae	Himalayas
58.	<i>Cyperus sphacelatus</i>	NT	Cyperaceae	Tropical America
59.	<i>Mimosa pudica</i>	NT	Fabaceae	South America
60.	<i>Oplismenus compositus</i>	NT	Poaceae	Pantropical
61.	<i>Paspalum conjugatum</i>	NT	Poaceae	South America
62.	<i>Senna occidentalis</i>	NT	Fabaceae	South America

Appendix 7. List of cultivated plants in the Sanctuary

No	Name of species	Family	Status
1	<i>Justicia adhatoda</i>	Acanthaceae	CT
2	<i>Thunbergia erecta</i>	Acanthaceae	CT
3	<i>Anacardium occidentale</i>	Anacardiaceae	CT
4	<i>Centratherum intermedium</i>	Asteraceae	CT
5	<i>Gliricidia sepium</i>	Fabaceae	CT
6	<i>Pongamia pinnata</i>	Fabaceae	CT
7	<i>Tamarindus indica</i>	Fabaceae	CT
8	<i>Tectona grandis</i>	Lamiaceae	CT
9	<i>Vitex negundo</i>	Lamiaceae	CT
10	<i>Cinnamomum verum</i>	Lauraceae	CT
11	<i>Woodfordia fruticosa</i>	Lythraceae	CT
12	<i>Eucalyptus tereticornis</i>	Myrtaceae	CT
13	<i>Psidium guajava</i>	Myrtaceae	CT
14	<i>Syzygium aqueum</i>	Myrtaceae	CT
15	<i>Passiflora edulis</i>	Passifloraceae	CT
16	<i>Sesamum orientale</i>	Pedaliaceae	CT
17	<i>Sauropus androgynus</i>	Phyllanthaceae	CT
18	<i>Bacopa monnieri</i>	Plantaginaceae	CT
19	<i>Coffea arabica</i>	Rubiaceae	CT
20	<i>Aegle marmelos</i>	Rutaceae	CT
21	<i>Santalum album</i>	Santalaceae	CT
22	<i>Chrysophyllum cainito</i>	Sapotaceae	CT

23	<i>Capsicum annuum</i> var. <i>annuum</i>	Solanaceae	CT
24	<i>Talinum portulacifolium</i>	Talinaceae	CT
25	<i>Citharexylum spinosum</i>	verbeanaceae	CT
26	<i>Alpinia galanga</i>	Zingiberaceae	CT

Appendix 8. Wild edible plants

No	Name of species	Family	Useful part	Uses
1	<i>Adenia hondala</i>	Passifloraceae	Flowers and tender leaf	Used as vegetables
2	<i>Amaranthus spinosus</i>	Amaranthaceae	Leaf	Vegetables
3	<i>Ampelocissus indica</i>	Vitaceae	Young Fruits	Pickles
4	<i>Antidesma acidum</i>	Phyllanthaceae	Fruit	Eaten directly
5	<i>Antidesma bunius</i>	Phyllanthaceae	Fruit	Eaten directly
6	<i>Artocarpus gomezianus</i> subsp. <i>zeylanicus</i>	Moraceae	Fruit	Eaten directly
7	<i>Artocarpus heterophyllus</i>	Moraceae	Fruit and seeds	Fruits and seeds used to make dishes and eaten directly
8	<i>Artocarpus hirsutus</i>	Moraceae	Fruit and seeds	Fruits eaten directly and seeds roasted and eaten
9	<i>Asparagus racemosus</i>	Asparagaceae	Tuberous root	Pickles
10	<i>Baccaurea courtallensis</i>	Phyllanthaceae	Fruit	Eaten directly and used to prepare pickle
11	<i>Cassia tora</i>	Fabaceae	Leaf	Vegetables
12	<i>Colocasia esculenta</i>	Araceae	Petiole	Vegetables
13	<i>Dioscorea oppositifolia</i>	Dioscoreaceae	Tuber	Used to make dishes
14	<i>Dioscorea pentaphylla</i>	Dioscoreaceae	Tuber	Used to make dishes
15	<i>Eugenia codyensis</i>	Myrtaceae	Fruit	Eaten directly

16	<i>Flacourtia montana</i>	Salicaceae	Fruit	Eaten directly
17	<i>Garcinia gummi-gutta</i> var. <i>gummi-gutta</i>	Clusiaceae	Fruit	Spice
18	<i>Garcinia gummi-gutta</i> var. <i>papilla</i>	Clusiaceae	Fruit	Spice
19	<i>Glycosmis pentaphylla</i>	Rutaceae	Fruit	Eaten directly
20	<i>Grewia tillifolia</i>	Malvaceae	Fruit	Eaten directly
21	<i>Lepisanthes tetraphylla</i>	Sapindaceae	Tender leaf	Used to make curries
22	<i>Mangifera indica</i>	Anacardiaceae	Fruit	Eaten directly and used to prepare pickle
23	<i>Melastoma malabathricum</i>	Melastomataceae	Fruit	Eaten directly
24	<i>Momordica sahyadrica</i>	Cucurbitaceae	Fruit	Fruits used to make dishes
25	<i>Musa kattuvazhana</i>	Musaceae	Fruit	Eaten directly
26	<i>Passiflora foetida</i>	Passifloraceae	Fruit	Eaten directly
27	<i>Rubus ellipticus</i>	Rosaceae	Fruit	Eaten directly
28	<i>Rubus glomeratus</i>	Rosaceae	Fruit	Eaten directly
29	<i>Salacia fruticosa</i>	Celastaraceae	Fruits	Eaten directly
30	<i>Salacia malabarica</i>	Celastaraceae	Fruit wall and aril of seeds	Eaten directly
31	<i>Schleichera oleosa</i>	Sapindaceae	Fruit	Eaten directly
32	<i>Solanum torvum</i>	Solanaceae	Fruit	Fruits used to make dishes
33	<i>Spondias pinnata</i>	Anacardiaceae	Fruit	Eaten directly and used to prepare pickle
34	<i>Sterculia guttata</i>	Malvaceae	Seeds	Seeds roasted and used
35	<i>Syzygium densiflorum</i>	Myrtaceae	Fruit	Eaten directly
36	<i>Syzygium gardneri</i>	Myrtaceae	Fruit	Eaten directly
37	<i>Syzygium hemisphericum</i>	Myrtaceae	Fruit	Eaten directly
38	<i>Syzygium laetum</i>	Myrtaceae	Fruit	Eaten directly
39	<i>Syzygium munronii</i>	Myrtaceae	Fruit	Eaten directly
40	<i>Syzygium salicifolium</i>	Myrtaceae	Fruit	Eaten directly
41	<i>Ziziphus rugosa</i>	Rhamnaceae	Fruit	Eaten directly
42	<i>Ziziphus xylopyrus</i>	Rhamnaceae	Fruit	Eaten directly

Appendix 9. List of Wild relatives

Family	Name of Species
Wild relatives of vegetables	
Amaranthaceae	<i>Amaranthus spinosus</i>
Cucurbitaceae	<i>Cucumis silentvalleyi</i>
Cucurbitaceae	<i>Cucumis sativus</i>
Cucurbitaceae	<i>Momordica sahyadrica</i>
Cucurbitaceae	<i>Trichosanthes lobata</i>
Cucurbitaceae	<i>Trichosanthes nervifolia</i>
Cucurbitaceae	<i>Trichosanthes tricuspidata</i>
Musaceae	<i>Musa kattuvazhana</i>
Solanaceae	<i>Solanum giganteum</i>
Solanaceae	<i>Solanum torvum</i>
Solanaceae	<i>Solanum violaceum</i>
Wild relatives of spices and condiments	
Clusiaceae	<i>Garcinia gummi-gutta</i> var. <i>gummi-gutta</i>
Clusiaceae	<i>Garcinia gummi-gutta</i> var. <i>papilla</i>
Clusiaceae	<i>Garcinia talbotii</i>
Lauraceae	<i>Cinnamomum malabattrum</i>
Lauraceae	<i>Cinnamomum nicolsonianum</i>
Lauraceae	<i>Cinnamomum macrocarpum</i>
Lauraceae	<i>Cinnamomum perrottetii</i>
Lauraceae	<i>Cinnamomum riparium</i>
Lauraceae	<i>Cinnamomum wightii</i>
Myristicaceae	<i>Myristica beddomei</i>
Myristicaceae	<i>Myristica malabarica</i>
Piperaceae	<i>Piper argyrophyllum</i>
Piperaceae	<i>Piper hymenophyllum</i>
Piperaceae	<i>Piper longum</i>
Piperaceae	<i>Piper mullesua</i>
Piperaceae	<i>Piper nigrum</i>
Piperaceae	<i>Piper wightii</i>
Zingiberaceae	<i>Curcuma aeruginosa</i>
Zingiberaceae	<i>Curcuma aurantica</i>
Zingiberaceae	<i>Curcuma neilgherrensis</i>
Zingiberaceae	<i>Elettaria cardamomum</i>
Zingiberaceae	<i>Zingiber neesanum</i>
Zingiberaceae	<i>Zingiber wightianum</i>
Zingiberaceae	<i>Zingiber zerumbet</i>
Wild relatives of tubers	
Araceae	<i>Amorphophallus commutatus</i>
Araceae	<i>Amorphophallus nicolsonianus</i>

Araceae	<i>Colocasia esculenta</i>
Dioscoreaceae	<i>Dioscorea oppositifolia</i>
Dioscoreaceae	<i>Dioscorea pentaphylla</i>
Wild relatives of pulses	
Fabaceae	<i>Cajanus heynei</i>
Fabaceae	<i>Cajanus lineatus</i>
Fabaceae	<i>Cajanus scarabaeoides</i>
Fabaceae	<i>Rhynchosia rufescens</i>
Fabaceae	<i>Vigna radiata</i> var. <i>sublobata</i>
Fabaceae	<i>Vigna umbellata</i>
Fabaceae	<i>Vigna vexillata</i>
Wild relatives of cereals	
Poaceae	<i>Eleusine indica</i>
Poaceae	<i>Panicum notatum</i>
Wild relatives of fruit crops	
Anacardiaceae	<i>Mangifera indica</i>
Anacardiaceae	<i>Spondias pinnata</i>
Moraceae	<i>Artocarpus gomezianus</i> subsp. <i>zeylanicus</i>
Moraceae	<i>Artocarpus heterophyllus</i>
Moraceae	<i>Artocarpus hirsutus</i>
Myrtaceae	<i>Eugenia argentea</i>
Myrtaceae	<i>Eugenia codyensis</i>
Myrtaceae	<i>Syzygium caryophyllatum</i>
Myrtaceae	<i>Syzygium densiflorum</i>
Myrtaceae	<i>Syzygium gardneri</i>
Myrtaceae	<i>Syzygium hemisphericum</i>
Myrtaceae	<i>Syzygium laetum</i>
Myrtaceae	<i>Syzygium lanceolatum</i>
Myrtaceae	<i>Syzygium munronii</i>
Myrtaceae	<i>Syzygium salicifolium</i>
Rosaceae	<i>Prunus ceylanica</i>
Phyllanthaceae	<i>Antidesma acidum</i>
Phyllanthaceae	<i>Antidesma bunius</i>
Phyllanthaceae	<i>Baccaurea courtallensis</i>
Melastomataceae	<i>Melastoma malabathricum</i>
Rhamnaceae	<i>Ziziphus rugosa</i>
Rhamnaceae	<i>Ziziphus xylopyrus</i>
Rosaceae	<i>Rubus ellipticus</i>
Rosaceae	<i>Rubus glomeratus</i>
Salicaceae	<i>Flacourtia montana</i>

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List of Publications

- 1) **Dantas K.J.**, N. Sasidharan & K.V.Binu, 2016. Additions to the angiosperms of the flora of Kannur district, Kerala, India from Aralam Wildlife sanctuary, *Annals of Plant Sciences* 5(7): 1381-1388.
- 2) **Dantas K. J.**, N. Sasidharan & P. Sujanapal, 2015. Further additions to the Scapigerous Impatiens of Kerala with notes on its ecological peculiarities and conservation status. *IJPAES* 5(3): 134 - 139.
- 3) Prabhukumar K. M., Indira Balachandran, V. B. Sreekumar, K. S. Ramya, Satheesh George, **K. J. Dantas** & Suma Arun Dev, 2016. *Gymnostachyum warrieranum* (Acanthaceae), a new species from the Western Ghats of India, based on morphological and molecular data. *Kew Bulletin* 70: 40. doi:10.1007/s12225-015-9590-9 (online)
- 4) Hareesh V. S., V. B. Sreekumar, **K. J. Dantas** & P. Sujanapal, 2015. *Impatiens sahyadrica* sp. nov (Balsaminaceae) - a new species from southern Western Ghats, India. *Phytotaxa* 207(3): 291-296
- 5) Sasidharan N., P. Sujanapal, **K. J. Dantas** & A. J. Robi, 2016. An enigmatic new species, *Strobilanthes agasthyamalana* (Acanthaceae), from Agasthyamala Biosphere Reserve of Southern Western Ghats, India. *Kew Bulletin*. DOI 10.1007/S12225-016-9667-0.
- 6) Sujanapal P., A. J. Robi and **K. J. Dantas**, 2016. A new tuberous species of *Sonerila* Roxb. (Melastomataceae) from Malabar Wildlife Sanctuary, Kerala, India. *Webbia*. <http://dx.doi.org/10.1080/00837792.2016.1267432>.
- 7) Prabhukumar K. M., A. J. Robi, V. S. Hareesh, **K. J. Dantas**, P. Sujanapal & B. Indira, 2017. *Artabotrys sahyadricus* (Annonaceae), a new species from Western Ghats of India. <https://doi.org/10.1080/00837792.2017.1311471>
- 8) Sujanapal P., A.J. Robi, **K.J. Dantas**, M. Sumod & V.S.F.T. Merckx, 2017. *Thismia* (Thismiaceae): the first record of the mycoheterotrophic genus to the Flora of India with a new species revealing the phytogeographical significance of Western Ghats. *Blumea*. <https://doi.org/10.3767/blumea.2017.62.2.04>



Additions to the angiosperms of the flora of Kannur district, Kerala, India from Aralam wildlife sanctuary

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Abstract: A total of 216 species additions to the flora of Kannur district, Kerala, India from Aralam Wildlife Sanctuary is reported based on the floristic studies carried out. Out of 216 species, 161 are dicotyledons and 55 monocotyledons spread across 72 families. The list includes 109 Peninsular Indian endemics comprising 59 southern Western Ghats endemics.

Key words: Aralam Wildlife Sanctuary; Western Ghats; Additions; Kerala.

Introduction

The millennium ecosystem assessment concluded that over the past 50 years, 60 per cent of all ecosystem services like watershed protection, hazard protection, climatic regulation etc have declined as a direct result of the growth of agriculture, industry, forestry, fisheries etc (Kinzing *et al.*, 2011). So the need for conserving ecosystem has increased. The Protected areas (PAs) like Wildlife reserves and National Parks cover more than 12% of the Earth's surface. PAs are considered as the conservation tool and front line of global campaign of biodiversity (Wells & Mc Shane, 2004). The PAs are effective only when the effective management is take place (Khan & Bhagwat, 2010). Monitoring is a crucial element of nature conservation and management in a rapidly changing world (Pertti Saurola, 2008). Ecologists are trying to understand the role of biodiversity in ecosystem functions (Pedro Flombaum & Osvaldo, 2012). The first and foremost step to understand the ecosystem is the identification of each group in the ecosystem. In tropical countries like India, the biodiversity is not thoroughly explored. Biodiversity documentation of PAs resulted in the description of many new species, new records of distribution and relocation of many species.

Aralam Wildlife Sanctuary, one among the 22 protected areas in Kerala, is situated in the Kannur revenue district of Kerala, along the northwest slopes of Western Ghats. It is contiguous with the forests of Coorg (Kodagu) district of Karnataka State and lies between 11.88° and 11.98° North latitude and 75.79° and 75.93° East longitudes. The altitude varies between 60 m to 1,500 m above sea level (map 1). Aralam is small area compared to other protective areas of Kerala. It has only 55 km² area and half of the Sanctuary is vested forest and

was subjected to irrational felling earlier. Nearly 25 km² are of undisturbed forest. The Aralam Sanctuary has good diversity, particularly in the Evergreen and Semi- Evergreen forests. The important association is *Dipterocarpus- Palaquim - Mesua*, this type of association is very few in Kerala. Besides this, *Dipterocarpus - Calophyllum - Palaquim* and *Mesua - Artocarpus - Hopea* associations are also seen. The diversity of epiphytes is relatively very high, especially in the forests above 700 m elevation. Orchids, lichens, mosses are well distributed in the evergreen forests. The flora and fauna of the Sanctuary is predominant with tropical west coast evergreen forests.

The flora of the Kannur (*Cannanore*) district was prepared by Ramachandran and V J Nair (1988). But the Sanctuary has not been subjected to detailed floristic study and the collections from the Sanctuary were very scanty. The present study was carried out systematically for accessing the floristic wealth of the Sanctuary. During the floristic explorations in the Sanctuary, it was noted that many of the plants are not reported from the district. Hence here the additions to the flora of Kannur district are highlighted.

Materials and Methods

Repeated collection trips were carried out in different seasons to all habitats of the Sanctuary so as to collect all Phanerogams from the study area in flowering and fruiting stage (Map 2). The collected specimens were made in to herbarium. The specimens were identified with the help of relevant literature and authentic herbarium collections available in the KFRI herbarium and MH herbarium, Coimbatore. Voucher specimens are deposited in the herbarium of Kerala Forest Research Institute [KFRI] Peechi, Kerala.

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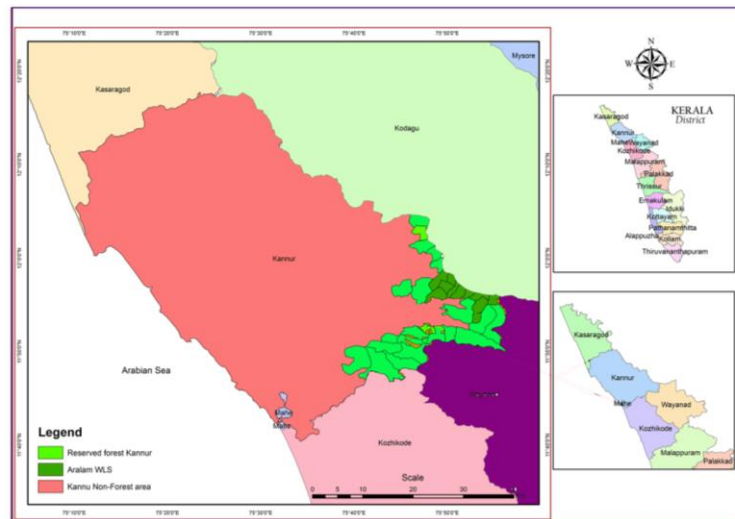
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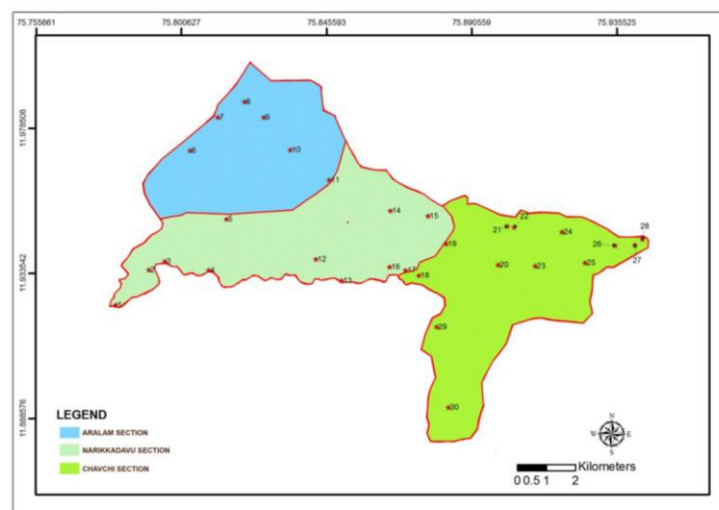
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Map.1. Location of Aralam Wildlife Sanctuary in Kannur district



Map 1. Different Collection Localities and Sections. **1.** Valayamchal, **2.** Pookundu, **3.** Checkdam, Pookund, **4.** Narikadavu, **5.** Uruppukunnu, **6.** Paripode, **7.** 55_block, **8.** Pottichapara, **9.** Kurumbankallu, **10.** Kannadivechakunnu 1, **11.** Kannadivechakunnu 2, **12.** Pothanplavu, **13.** Kariyankappu, **14.** Meenmutti, **15.** Meenmutti Vellachatam, **16.** Crossway, **17.** Chelachuvadu, **18.** Chavachi 1, **19.** Moonamthode, **20.** Chavachi vellachatam, **21.** Kattikari 2, **22.** Kattikari 1, **23.** Chavachi 2, **24.** Mullenpara, **25.** Pothurumi, **26.** Astippara, **27.** Ambalappara Tower, **28.** Ambalappara, **29.** Kolithat, **30.** Santhagiri

Discussions

During the study, 1,006 species of flowering plants belonging to 598 genera under 128 families and two sub families were collected and described. Dicotyledons have 819 species belonging to 477 genera under 108 families and 2 sub families. Monocotyledons are represented by 186 species in 120 genera under 19 families. Gymnosperm is represented with single family and single species. Ramachandran and V J Nair (1988) recorded 1,132 species from the Cannore district. Their study area included some areas of the present Wayanad district and the total area covered was 3,670 km². The area of Sanctuary is only 55 km².

Scrutiny of literature according to the distribution reveals that out of 1,006 species, 216 are new additions to the district flora of Kannur. Out of 216 taxa, 161 are dicotyledons and 55 monocotyledons spread across 72 families (Table 1). The Sanctuary is situated in the Talacauvery cluster of *Nilgiri-Silent Valley-Wayanad-Kodagu* subcentre of Western Ghats. This subcentre is one of the richest regions with respect to diversity and endemism in the entire Western Ghats region. It is estimated that 150 endemic species are exclusive to this region (Nayar, 1996). Among the 216 additions, 109 species are Peninsular Indian endemics and 59 are restricted to the southern Western Ghats.

Table 1: List of plants which are additions to the Flora of Kannur District, Kerala, India.

No.	Scientific Name	Habit	Habitat	Locality in the Sanctuary	KFRI collection Number	Endemism
Annonaceae						
1	<i>Milusa wayanadica</i> Sujanapal, Ratheesh & Sasidh.	Shrub	Evergreen forests	Ambalappara, Asthippara	KJD 26085	SWG
2	<i>Orophea sivarajanii</i> Sasidh.	Shrub	Evergreen forests	Kattikkari	KVB 31616	SWG
3	<i>Polyalthia fragrans</i> (Dalz.) Bedd.	Tree	Evergreen forests	Kattikkari	KJD 26036	SWG
4	<i>Uvaria macropoda</i> Hook. f. & Thoms.	Woody climber	Semi-evergreen forests	Pookund, Narikkadavu	NS & KVB 31310	
Menispermaceae						
5	<i>Cyclea fissicalyx</i> Dunn	Climber	Evergreen forests	Kattikkari	KJD 26019	SWG
Capparaceae						
6	<i>Capparis moonii</i> Wight	Scandent shrub	Evergreen forests	Paripode	KJD 18758	
Flacourtiaceae						
7	<i>Casearia thwaitesii</i> Briq.	Tree	Evergreen forests	Ambalappara, Asthippara	KJD 18764	
8	<i>Flacourtia montana</i> Graham	Tree	Semi-evergreen forests	Narikadavu	KJD 26381	India
9	<i>Hydnocarpus alpina</i> Wight	Tree	Evergreen forests	Kariyenkappu, Chavachi	KJD 26074	
Pittosporaceae						
10	<i>Pittosporum tetraspermum</i> Wight & Arn.	Tree	Evergreen forests	Ambalappara	NS & KJD 31950	
Polygalaceae						
11	<i>Polygala arillata</i> Buch. -Ham. ex D. Don	Shrub	Evergreen forests	Ambalappara	KVB 31577	
12	<i>Polygala persicariifolia</i> DC.	Herb	Grasslands	Ambalappara	KVB 31758	
Hypericaceae						
13	<i>Hypericum wightianum</i> Wall. ex Wight & Arn.	Herb	Evergreen forests	Ambalappara	KJD 26321	
Clusiaceae/ Guttiferae						
14	<i>Calophyllum austroindicum</i> Kosterm. ex Stevens	Tree	Evergreen forests	Pothurumi	NS & KVB 31362	SWG
15	<i>Calophyllum calaba</i> L.	Tree	Semi-evergreen forests	Valayamchal	KJD 18754	WG
16	<i>Calophyllum polyanthum</i> Wall. ex Choisy	Tree	Evergreen forests	Chavachi, Kattikkari	KJD 22564	
17	<i>Garcinia gummi-gutta</i> (L.) Robs. var. <i>papilla</i> (Wight) N.P. Singh	Tree	Evergreen forests	Ambalappara, Pothurumi	KJD 26303	
18	<i>Garcinia talbotii</i> Raij. ex Sant.,	Tree	Fairly common in Evergreen forests		KVB 31278	WG
Dipterocarpaceae						
19	<i>Dipterocarpus bourdillonii</i> Brandis	Tree	Evergreen forests	Chavachi	KJD 26360	SWG
20	<i>Dipterocarpus indicus</i> Bedd.	Tree	Evergreen and evergreen forests	Semi-Chavachi, Meenmutty, Kattikkari	KVB 31530	SWG
21	<i>Hopea erosa</i> (Bedd.) van Sloot.	Tree	Evergreen forests	Chavachi, Kappu	KJD 26047	SWG
Ancistrocladaceae						
22	<i>Ancistrocladus heyneanus</i> Wall. ex Graham	Woody climber	Evergreen forests	Kattikkari, Meenmutty, chavachi	KJD 26006	
Bombacaceae						
23	<i>Cullenia exarillata</i> Robyns	Tree	Evergreen forests	Pothurumi	KJD 18788	SWG
Tiliaceae						
24	<i>Grewia umbellifera</i> Bedd.	scandent shrubs	Evergreen forests	Moonamthode, Chavachi	NS & KVB 31323	WG
Balsaminaceae						
25	<i>Impatiens goughii</i> Wight	Herb	Evergreen forests	Ambalappara	KJD 25438	WG
26	<i>Impatiens bensloviana</i> Arn.	Herb	Evergreen forests	Ambalappara	NS & KJD 31942	
27	<i>Impatiens jerdoniae</i> Wight	Herb	Evergreen forests	Ambalappara	KJD 26157	WG
28	<i>Impatiens lawsonii</i> Hook. f.	Herb	Evergreen forests	Ambalappara	KJD 25451	SWG
29	<i>Impatiens stocksii</i> Hook. f. & Thoms.	Herb	Evergreen forests	Ambalappara	KJD 25452	WG
30	<i>Impatiens veerapazhasii</i> Ratheesh, Sujanapal & Meera	Herb	Evergreen forests	Ambalappara	KJD 25437	SWG
Rutaceae						
31	<i>Atalantia wightii</i> Tanaka	Shrub	Evergreen forests	Ambalappara	KVB 31531	
32	<i>Glycosmis macrocarpa</i> Wight	Shrub	Evergreen forests	Kannadivechkunnu	KJD 26385	
33	<i>Vepris bilocularis</i> (Wight & Arn.) Engl.	Tree	Evergreen forests and Semi-evergreen forests	Kannadivechkunnu, Ammayikallu	KJD 22547	SWG
34	<i>Zantoxylum ovalifolium</i> Wight	Scandent shrub	Evergreen forests	Ambalappara	NS & KVB 31340	
Meliaceae						
35	<i>Aglaiia barberi</i> Gamble	Tree	Evergreen forests	Chavachi, Ammayikallu	KVB 31566	WG
36	<i>Dysoxylum malabaricum</i> Bedd. ex Hiern	Tree	Evergreen forests	Chavachi, Paripode, Kattikkari, Meenmutty	KVB 31559	SWG
37	<i>Reinwardtiendendron anamalaiense</i> (Bedd.) Mabb.	Tree	Evergreen forests	Mullenpara	KVB 31735	WG
Olaceae						
38	<i>Strombosia ceylanica</i> Gard.	Tree	Evergreen forests	Ambalappara	KVB 31510	

Icacinaceae						
39	<i>Apodytes dimidiata</i> Meyer ex Arn.	Tree	Evergreen forests	Mullenpara	KJD 18734	
40	<i>Gomphandra coriacea</i> Wight	Tree	Evergreen forests	Amabalappara	KJD 22578	
Aquifoliaceae						
41	<i>Ilex wightiana</i> Wall. ex Wight	Tree	Evergreen forests	Amabalappara	KJD 31478	
Celastraceae						
42	<i>Microtropis stocksii</i> Gamble	Shrub	Evergreen forests	Kattikari, Amabalappara	KVB 31705	WG
Hippocrateaceae						
43	<i>Salacia malabarica</i> Gamble	Woody climber	Evergreen and evergreen forests	Semi-Chacachi, KariyenKappu, Meenmutty, Paripode	KJD 22502	SWG
44	<i>Salacia oblonga</i> Wall. ex Wight & Arn.	Woody climber	Evergreen forests	Mullenpara	KVB 31593	
Vitaceae						
45	<i>Ampelocissus indica</i> (L.) Planch.	Climber	Stream side	Kariyenkappu	KJD 18731	
Leeaceae						
46	<i>Lea guineensis</i> G. Don	Shrub	Evergreen forests	Chavachi	NS & KVB 31437	
Sabiaceae						
47	<i>Meliosma pinnata</i> (Roxb.) Maxim. ssp. <i>barbulata</i> (Cufod.) Bens.	Tree	Evergreen forests	Ambalappara	NS & KVB 31368	
Anacardiaceae						
48	<i>Holigarna beddomei</i> Hook. f.	Tree	Semi-evergreen forests	Kariyenkappu	KJD 26349	SWG
Connaraceae						
49	<i>Connarus monocarpus</i> L.	Scandent shrub	Evergreen forests	Pothurumi, Moonamthode	NS & KVB 31395	
Fabaceae/Leguminosae						
Subfamily Faboideae (Papilionoidea)						
50	<i>Aganope thyrsoflora</i> (Benth.) Polhill var. <i>eulata</i> (Bedd.) Thoth. & Das	Woody climber	Evergreen forests	Kurumbankallu	KJD 18722	SWG
51	<i>Crotalaria obtecta</i> Graham ex Wight & Arn.	Shrub	Evergreen Forests	Ambalappara	NS & KJD 31947; KVB 31715	SWG
52	<i>Crotalaria spectabilis</i> Roth	Shrub	Deciduous forests and grasslands	Ambalappara, Narikadvu	KJD 26311; NS & KVB 31429	
53	<i>Desmodium repandum</i> (Vahl) DC.	Undershubs	Evergreen forests	Ambalappara, Pothurumi	KJD 26336	
54	<i>Smithia gracilis</i> Benth.	Herb	Evergreen forests	Ambalappara	KJD 22518	SWG
Subfamily Caesalpinioideae						
55	<i>Kingiodendron pinnatum</i> (Roxb. ex DC.) Harms	Tree	Evergreen forests	Chavachi, Paripode	KVB 31533	SWG
Subfamily Mimosoideae						
56	<i>Archidendron monadelphum</i> (Roxb.) Nielson var. <i>gracile</i> (Bedd.) Sanjappa	Shrub	Evergreen and evergreen forests	Semi-Moonamthode	KJD 31843	SWG
Rosaceae						
57	<i>Rubus ellipticus</i> Smith	Climber	Evergreen forests	Ambalappara	NS & KVB 31369	
58	<i>Rubus glomeratus</i> Blume	Straggling shrub	Evergreen forests	Ambalappara	KJD 25464	PI
Parnassiaceae						
59	<i>Parnassia mysorensis</i> Heyne ex Wight & Arn.	Herb	Evergreen forests	Ambalappara	KJD 25439	
Crassulaceae						
60	<i>Kalanchoe lanceolata</i> (Forsk.) Pers.	Herb	Evergreen forests	Ambalappara	KVB 31669	PI
Myrtaceae						
61	<i>Eugenia argentea</i> Bedd.	Shrub	Evergreen forests	Kattikari, Mullenpara, Chavachi	31359, KVB 31662, 31623	SI
62	<i>Eugenia codyensis</i> Munro ex Wight	Shrub	Evergreen forests	Kattikari, Mullenpara, Ambalappara	KJD 26334, KVB 31665, 31618	
63	<i>Syzygium densiflorum</i> Wall. ex Wight & Arn.	Tree	Evergreen forests	Ambalappara	NS & KJD 31955, KVB 31742, 31590, NS & KVB 31363	SWG
64	<i>Syzygium gardneri</i> Thw.	Tree	Evergreen forests	Meenmutty, Chavchi	KJD 26184	
65	<i>Syzygium hemisphericum</i> (Wight) Alston	Tree	Evergreen forests	Pothurumi, Chavachi	NS & KVB 31307	
66	<i>Syzygium lanceolatum</i> (Lam.) Wight & Arn.	Tree	Evergreen forests	Ambalappara, Asthipara, Pothurumi	NS & KJD, 31941; KVB 31643	
Melastomataceae						
67	<i>Memecylon randerianum</i> SM & MR Almeida	Shrub	Evergreen forests	Pothurumi, Chavach, Kattikari, Kurumbakallu	KVB 31627, KJD 26052	SWG

68	<i>Sonerila rotundifolia</i> Bedd.	Herb	Evergreen forests	Ambalappara, Asthipara	KJD 25429	SWG
Lythraceae						
69	<i>Rotala indica</i> (Willd.) Koehne	Herb	Evergreen forests	Ambalappara, Asthipara	KJD 26327	
Cucurbitaceae						
70	<i>Cayaponia laciniosa</i> (L.) C. Jeffrey	Climber	Evergreen forests	Kattikari, Pothurumi	KJD 31883	
71	<i>Cucumis silentrivalleyi</i> (Manilal, Sabu & Mathen) Ghebret. & Thulin	Climber	Evergreen forests	Mullenpara	KJD 26160	SWG
72	<i>Cucumis sativus</i> L. f. <i>hardwickii</i> (Royle) W.J.de Wilde & Duyffes	Climber	Deciduous forests	Paripode	KJD 18787	
73	<i>Momordica sahyadrica</i> Kattuk. & V.T. Antony	Climber	Evergreen forests	Chavachi, Meenmutty	KJD 31814	WG
74	<i>Trichosanthes lobata</i> Roxb.	Climber	Evergreen forests	Pothurumi	NS & KJD 25537	PI
75	<i>Trichosanthes nervifolia</i> L.	Climber	Evergreen forests	Chavachi, Paripode	KVB 31537	
76	<i>Zehneria maysorensis</i> (Wight & Arn.) Arn.	Climber	Evergreen forests	Kattikari, Chavachi, Pothurumi, Ambalappara	KJD 25430	WG
Begoniaceae						
77	<i>Begonia integrifolia</i> Dalz.	Herb	Evergreen forests	Chavachi, Kattikkari, Pothanplavu, Meenmutty	KJD 31883	PI
Apiaceae/Umbelliferae						
78	<i>Heracleum candolleianum</i> (Wight & Arn.) Gamble	Herb	Evergreen forests	Ambalappara	KJD 25507	SWG
Araliaceae						
79	<i>Schefflera roxburghii</i> Gamble	Straggling shrub	Evergreen forests	Chavachi, Kariyenkappu, Ambalappara	KVB 31365, KVB 31396	SWG
Rubiaceae						
80	<i>Argostemma verticillatum</i> Wall.	Herb	Evergreen forests	Kannadivechakunnu	KJD 26192	
81	<i>Canthium coromandelicum</i> (Burm. f.) Alston	Shrub	Evergreen forests	Ambalappara	KJD 31965	
82	<i>Canthium rheedei</i> DC.	Shrub	Evergreen forests	Chelachuvadu, Crossway, Chavachi, Kariyenkappu	KJD 31813, 31709	PI
83	<i>Discospermum apiocarpum</i> Dalz. ex Hook.f.	Tree	Evergreen forests	Ambalappara, Asthipara	KJD 26328, KVB 31352	
84	<i>Hedyotis leschenaultiana</i> DC.	Shrub	Evergreen forests	Ambalappara	KVB 31645; KJD 26330	
85	<i>Meyna laxiflora</i> Robyns	Shrub to small tree	Evergreen forests	Paripode	KJD 26702	
86	<i>Neanotis monosperma</i> (Wall. ex Wight & Arn.) Lewis	Herb	Evergreen forests	Mullenpara	KJD 31936	PI
87	<i>Ophiorrhiza barberi</i> Gamble	Herb	Evergreen forests	Meenmutty, Chavachi, Moonamthode, Mullenpara and Asthipara	KJD 26182, 26094, 26170	SWG
88	<i>Ophiorrhiza rugosa</i> Wall. var. <i>decumbens</i> (Gard. ex Thw.) Deb & Mondal	Herb	Evergreen forests	Kariyenkappu	KJD 26109	
89	<i>Pavetta breviflora</i> DC.	Shrub	Evergreen forests	Kannadivechakunnu, Chavachi and Pothurumi	KJD 25569, KVB 31734	SWG
90	<i>Pavetta brunonis</i> G. Don	Shrub	Evergreen forests	Pothurumi, Chavachi	KVB 31379, KVB 31389	SWG
91	<i>Psychotria bisulcata</i> Wight & Arn.	Shrub	Evergreen forests	Mullenpara, Kattikari and Meenmutty	KJD 26163, 31932	
92	<i>Psychotria macrocarpa</i> Hook. f.	Shrub	Evergreen forests	Mullenpara	KJD 26053	SWG
93	<i>Psydrax dicocos</i> Gaertn.	Tree	Evergreen forests	Ambalappara and Mullenpara	KVB 31575, 31636	
94	<i>Tarenna alpestris</i> (Wight) Balakr.	Shrub	Evergreen forests	Ambalappara	KVB 31641; KJD 31945	SWG
Asteraceae/ Compositae						
95	<i>Adenoon indicum</i> Dalz.	Herb	Evergreen forests	Ambalappara	NS & KJD 25510	PI
96	<i>Anaphalis aristata</i> DC.	Herb	Evergreen forests	Ambalappara	KJD 25467	PI
97	<i>Anaphalis leptophylla</i> (DC.) DC.	Herb	Grasslands	Ambalappara	KJD 26344, KVB 31767	SWG
98	<i>Anaphalis subdecurrens</i> (DC.) Gamble	Herb	Grasslands	Ambalappara	KJD 25465	
99	<i>Cissampelopsis corymbosa</i> (Wall. ex DC.) Jeffrey & Chen.	Climber	Evergreen forests	Kurumbakallu	KJD 18774	
100	<i>Helicbrysum buddleioides</i> DC.	Shrub	Evergreen forests	Ambalappara	KJD 31729	
Vacciniaceae						
101	<i>Vaccinium neilgherrense</i> Wight	Tree	Evergreen forests	Ambalappara	NS & KVB 31353, 31756	SWG
Myrsinaceae						
102	<i>Rapanea capitellata</i> (Wall.) Mez	Tree	Evergreen forests	Ambalappara	NS & KJD 31951	

Ebenaceae						
103	<i>Diospyros assimilis</i> Bedd.	Tree	Evergreen forests	Chavachi, Chelachuvadu and Meenmutty	NS & KVB 31309	WG
104	<i>Diospyros bourdillonii</i> Brandis	Tree	Evergreen forests	Chavachi and Asthippara	NS & KVB 31390	SWG
105	<i>Diospyros buxifolia</i> (Blume) Hiern	Tree	Evergreen forests	Kannadivechakunnu	KJD 18792	
106	<i>Diospyros nilagirica</i> Bedd.	Tree	Evergreen forests	Asthippara, Amvalappara	KVB 31714, KJD 26079	SWG
Symplocaceae						
107	<i>Symplocos macrophylla</i> Wall. ex A. DC	Tree	Evergreen forests	Kattikkari	KJD 26013	SWG
108	<i>Symplocos racemosa</i> Roxb.	Tree	Evergreen forests	Ambalappara	NS & KJD 25508	
109	<i>Symplocos nynadense</i> (O. Ktze.) Nootb.	Tree	Evergreen forests	Kattikkari, Mullenpara and Ambalappara	KVB 31574	SWG
Apocynaceae						
110	<i>Chonemorpha fragrans</i> (Moon) Alston	Woody climber	Semi-evergreen forests	Narikkadavu, Pookund and Paripode	NS & KVB 31444	
Asclepiadaceae						
111	<i>Ceropegia metziana</i> Miq.	Climber	Evergreen forests	Mullenpara, Kattikari and Ambalappara	KVB 31658, NS & KJD 31979	SWG
112	<i>Gynemna montanum</i> (Roxb.) Hook. f.	Climber	Evergreen forests	Chavachi and Chelachuvadu	KJD 26120; KVB 31515	
113	<i>Marsdenia raziana</i> Yoga & Subram.	Climber	Evergreen forests	Kattikari, Pothurumi, Chavachi and Mullenpara	KVB 31548	SI
114	<i>Toxicarpus palghatensis</i> Gamble	Climber	Evergreen forests	of Meenmutty	KJD 31491	SWG
115	<i>Tylophora cappariifolia</i> Wight & Arn.	Climber	Evergreen forests	Ambalappara and Chavachi	KVB 31708	SWG
Periplocaceae						
116	<i>Decalepis nervosa</i> (Wight & Arn.) Venter	Climbing shrubs	Evergreen forests	Ambalappara	KVB 31703	WG
Gentianaceae						
117	<i>Svertia beddomei</i> Clarke	Herb	Evergreen forests	Ambalappara	KVB 31652; NS & KJD 31942	SWG
Boraginaceae						
118	<i>Ehretia canarensis</i> (Clarke) Gamble	Tree	Evergreen and evergreen forests	Semi-Valayamchal and Chavachi	KVB 31204	PI
Convolvulaceae						
119	<i>Ipomoea barlerioides</i> (Choisy) Benth. ex Clarke	creepers or twiners	Grasslands	Ambalappara	, KVB 31689; KJD 26308	
Scrophulariaceae						
120	<i>Sopubia trifida</i> Buch.-Ham. ex D. Don	Herb	Evergreen forests	Ambalappara	KJD 25459	
Orobanchaceae						
121	<i>Campbellia neilgherica</i> (Gardner) Panigrahi et Das	Herb	Evergreen forests	Evergreen forests	KJD 26123	
122	<i>Christisonia bicolor</i> Gard.	Herb	Evergreen forests	Kattikari	KVB 31670	
Gesneriaceae						
123	<i>Rhynchoglossum obliquum</i> Blume var. <i>parviflorum</i> Clarke	Herb	Evergreen forests	Moonamthode, Meenmutty and Chavachi	KJD 31596	
Acanthaceae						
124	<i>Andrographis neesiana</i> Wight	Herb	Evergreen forests	Evergreen forests	NS & KJD 31975	
125	<i>Barleria involucreata</i> Nees	Shrub	Evergreen forests	Mullenpara	NS & KJD 31927	
126	<i>Haplantodes neilgherryensis</i> (Wight) Majumdar	Herb	Evergreen and evergreen forests	Semi-Moonamthode, Paripode and Karienkappu Meenmutty, Monamthode, Kattikari and Chavachi	KVB 31542	
127	<i>Strobilanthes barbatus</i> Nees	Shrub	Evergreen forests	Mullenpara and Kattikari	KVB 31284	WG
128	<i>Strobilanthes decurrens</i> Nees	Shrub	Evergreen forests	Chavachi and Kattikari	KJD 26081	SWG
Verbenaceae						
129	<i>Premna glaberrima</i> Wight	Shrub	Evergreen forests	Pothanplavu and Karienkappu	KJD 26113	SWG
Lamiaceae/ Labiate						
130	<i>Pogostemon gardneri</i> Hook.f.	Herb	Evergreen forests	Ambalappara	KVB 31585	SWG
131	<i>Pogostemon mollis</i> Benth.	Shrub	Evergreen forests	Ambalappara	NS & KJD 25514; KVB 31750	WG
132	<i>Pogostemon peethapushpum</i> Pradeep	Shrub	Evergreen forests	Ambalappara	NS & KJD 25514; KVB 31750	WG
133	<i>Pogostemon pubescens</i> Benth.	Shrub	Evergreen forests	Ambalappara	KJD 18757	
Polygonaceae						
134	<i>Persicaria nepalensis</i> (Meisner) Gross	Herb	Evergreen forests	Ambalappara	NS & KJD 25503	

Piperaceae						
135	<i>Piper wightii</i> Miq.	Climber	Evergreen forests	Ambalappara	KVB 31746	WG
Myristicaceae						
136	<i>Myristica malabarica</i> Lam.	Tree	Evergreen and Semi-evergreen forests	Paripode, Chavachi and Valayamchal	KVB 31655, KVB 31678	WG
Lauraceae						
137	<i>Cinnamomum nicolsonianum</i> Manilal & Shylaja	Tree	Evergreen forests	Kattikari	KJD 26119	SWG
138	<i>Cinnamomum macrocarpum</i> Hook. f.	Tree	Semi-evergreen forests	Poathanplavu to Meenmutty and Paripode	KVB 31267	SWG
139	<i>Cinnamomum perrottetii</i> Meisner	Tree	Evergreen forests	Ambalappara and Pothurumi	KJD 18770	SWG
140	<i>Cinnamomum heyneanum</i> Nees	Tree	River banks	Valayamchal	KJD 31475	SWG
141	<i>Cinnamomum wightii</i> Meisner	Tree	Evergreen forests	Ambalappara and Asthippara	KJD 22576	SWG
142	<i>Litsea ghatica</i> Saldanha	Tree	Semi-Evergreen forests	Valayamchal to Narikkadavu	KJD 26198	WG
143	<i>Litsea wightiana</i> (Nees) Hook. f.	Tree	Evergreen forests	Ambalappara and Pothurumi	KVB 31656	SWG
144	<i>Neolitsea scrobiculata</i> (Meisner) Gamble	Tree	Evergreen forests	Kannadivechakunnu	NS & KJD 25549	WG
Loranthaceae						
145	<i>Dendrophthoe trigona</i> (Wight & Arn.) Danser ex Sant.	Shrub	Evergreen forests and Semi-evergreen forests	Chavachi, Kattikari, Chelachuvadu, Kariyenkappu, Pookund and Paripode	NS & KVB 31314	WG
146	<i>Macrosolen capitellatus</i> (Wight & Arn.) Danser	Shrub	Semi-Evergreen forests	Kariyenkappu	KJD 26001	
Santalaceae						
147	<i>Osyris quadripartita</i> Salzm. ex Decne.	Shrub	Margins of Grass lands and Evergreen forests	Ambalappara	KJD 26131, NS & KVB 31345	
Balanophoraceae						
148	<i>Balanophora abbreviata</i> Blume	Herb	Evergreen forests	Ambalappara	NS & KJD 31985	
Euphorbiaceae						
149	<i>Aetephila excelsa</i> (Dalz.) Muell.-Arg.	Tree	Evergreen forests	Kattikari	NS & KVB 31339	
150	<i>Agrostistachys indica</i> Dalz.	Shrub	Evergreen forests	Kattikari, Mullenpara and Asthipara	KVB 31620	PI
151	<i>Aporosa fusiformis</i> Thw.	Tree	Evergreen forests and Semi-evergreen forests	Chavachi and Paripode.	KVB 31798	
152	<i>Croton malabaricus</i> Bedd.	Tree	Evergreen forests and Semi-evergreen forests	Poathanplavu to Meenmutty	KJD 18727	SWG
153	<i>Drypetes confertiflora</i> (Hook.f.) Pax & Hoffm.	Tree	Semi-evergreen forests	Kariyenkappu, Chulikandam, Poathanplavu and Bhoothamkallu	NS & KJD 31995	SWG
154	<i>Glochidion bobenackeri</i> (Muell.-Arg.) Bedd. var. <i>johnstonei</i>	Tree	Evergreen forests	Moonamthode	KJD 26374	PI
155	<i>Mallotus beddomei</i> Hook. f.	Tree	Evergreen forests and Semi-evergreen forests	Chelachuvadu, Chavachi, Kattikari and Monnamthode and Paripode	KJD 31805	SWG
156	<i>Micrococca beddomei</i> (Hook.f.) Prain	Herb	Evergreen forests	Kattikari and Kannadivechakunnu	KVB 31556	SWG
157	<i>Sauropus gour-maitii</i> Chakerab. & M.Gangop.	Shrub	Evergreen forests	Pothurumi	NS & KJD 25551	WG
158	<i>Tagia montana</i> (Thw.) Muell.-Arg.	twiners	Evergreen forests	Ambalappara and Mullenpara	NS & KJD 31959	WG
Urticaceae						
159	<i>Elatostema wightii</i> Hook. f.	Herb	Evergreen forests	Ambalappara	KJD 26127	WG
Moraceae						
160	<i>Artocarpus gomezianus</i> Wall. ex Trecul sp. <i>zeylanicus</i> Jarrett	Tree	Semi-evergreen forests	Paripode	KJD 26319	
161	<i>Ficus beddomei</i> King	Tree	Evergreen forests	Chavachi	KJD 26378	WG
Orchidaceae						
162	<i>Acanthephippium bicolor</i> Lindl.	Herb	Evergreen forests	Kattikari	KJD 26317	
163	<i>Aerides crispa</i> Lindl.	Herb	Evergreen forests	Ambalappara	NS & KVB 31417	WG
164	<i>Aphyllorchis montana</i> Rehb.f.	Herb	Evergreen forests	Vellachatamkunnu and Kannadivechakunnu	KJD 31470	
165	<i>Brachycorythis iantha</i> (Wight) Summerh.	Herb	Grasslands	Ambalappara	KJD 26126	
166	<i>Bulbophyllum rosemarianum</i> Sathish & Saleem	Herb	Evergreen forest	Kariyenkappu, Crossway and Chavachi	NS & KJD 31986	SWG

167	<i>Cheirostylis parvifolia</i> Lindl.	Herb	Evergreen forests	Kannadivechakunnu	KJD 25562	
168	<i>Coelogyne odoratissima</i> Lindl.	Herb	Evergreen forests	Ambalappara	KVB 31738	
169	<i>Conchidium microchilos</i> (Dalz.) Rauschert	Herb	Evergreen forests	Ambalappara	KJD 25460	
170	<i>Dendrobium nutans</i> Lindl.	Herb	Evergreen forests	Ambalappara	KVB 31581	
171	<i>Gastrochilus flabelliformis</i> (Baltt. & McCann) Saldanha	Herb	Evergreen forests	Kattikkari Kariyenkappu	KJD 31589	WG
172	<i>Habenaria digitata</i> Lindl.	Herb	Evergreen forests	Ambalappara	KJD 25456	
173	<i>Habenaria longicornu</i> Lindl.	Herb	Evergreen forest	Ambalappara	KJD 25498	PI
174	<i>Habenaria perrottetiana</i> A. Rich.	Herb	Grasslands	Ambalappara	KJD 25499	SI
175	<i>Kingidium mysorensis</i> (Saldanha) Sathish	Herb	Moist deciduous forests	Paripode	KJD 26187	SI
176	<i>Malaxis purpurea</i> (Lindl.) O. Ktze.	Herb	Evergreen forests	Ambalappara	KJD 25447	
177	<i>Oberonia wynadensis</i> Sivad. & Balakr.	Herb	Evergreen forests	Ambalappara	NS & KJD 25516	SWG
178	<i>Peristylus aristatus</i> Lindl.	Herb	Evergreen forests	Ambalappara Asthippara	KJD 25454, 25457, 25458, 26158	
179	<i>Peristylus richardianus</i> Wight	Herb	Evergreen forests	Ambalappara	NS & KJD 25512	
180	<i>Pteroceras leopardinum</i> (Parish & Rehb.f.) Seidenf. & Smitin.	Herb	Evergreen forests	Kariyenkappu	KVB 31594	
181	<i>Satyrium nepalense</i> D. Don	Herb	Grasslands	Ambalappara	KJD 26316	
182	<i>Zeuxine gracilis</i> (Breda) Blume	Herb	Evergreen forests	Asthippara	KJD 26087	
Zingiberaceae						
183	<i>Amomum hypoleucum</i> Thw.	Herb	Evergreen forests Semi-evergreen forests and Moist deciduous forests	Kariyenkappu, Pothamplavu, Narikkadavu, Meenmutty and Paripode	KJD 31485	
184	<i>Amomum pterocarpum</i> Thw.	Herb	Evergreen forests Semi-evergreen forests and Moist deciduous forests	Kariyenkappu, Chavachi, Pothanplavu and Paripode,	KJD 26116, KJD 25420	
185	<i>Curcuma aurantiaca</i> Zipp	Herb	Moist Forests	Deciduous Nraikkadvu, Pookund	KJD 26179	WG
186	<i>Zingiber wightianum</i> Thw.	Herb	Moist Forests	Deciduous Paripode	KJD 25421	
Musaceae						
187	<i>Ensete superbum</i> (Roxb.) Cheesman.	Herb	Evergreen forests	Meenmutty	KJD 18784	
Hypoxiadaceae						
188	<i>Hypoxis aurea</i> Lour.	Herb	Grasslands Evergreen	and Ambalappara	KVB 31701	
Smilacaceae						
189	<i>Smilax wightii</i> A. DC.	Climbers	Evergreen forests	Kattikkari	KJD 26025	SWG
Commelinaceae						
190	<i>Belosynapsis vivipara</i> (Dalz.) C.E.C. Fisch.	Herb	Evergreen forests	Kattikkari, Mullenpara and Ambalappara	NS & KJD 31909, KJD 25443	WG
191	<i>Commelina clavata</i> Clarke	Herb	Grasslands	Ambalappara	KJD 25434	
192	<i>Commelina paludosa</i> Blume	Herb	Evergreen forests	Meenmutty, Valayamchal, Kattikkari and Kariyenkappu	KVB 31301, KVB 31338	
193	<i>Cyanotis racemosa</i> Heyne ex Hassk.	Herb	Evergreen forests	Meenmutty	KJD 25401	
194	<i>Cyanotis tuberosa</i> (Roxb.) Schult. f.	Herb	Grasslands	Ambalappara	KJD 25509	PI
195	<i>Cyanotis villosa</i> (Spreng.) Schult. f.	Herb	Evergreen forests	Meenmutty and Kurumbamkallu	KJD 31514	
196	<i>Murdannia loriformis</i> (Hassk.) Rao et Kammatly	Herb	Semi-evergreen forests	Kariyenkappu	KJD 31829	
197	<i>Murdannia semiteres</i> (Dalz.) Sant.	Herb	Evergreen forests	Ambalappara, Kattikkari, Mullenpara and Asthippara	KJD 25502	PI
198	<i>Murdannia simplex</i> (Vahl) Brenan	Herb	Grasslands	Ambalappara	KJD 25462	
Araceae						
199	<i>Amorphophallus nicolsonianus</i> Sivad.	Herb	Evergreen forests	Kattikkari	KJD 25543	SWG
200	<i>Arisaema barnesii</i> C.E.C. Fisch.	Herb	Evergreen forests	Ambalappara and Mullenpara	NS & KVB 31343	SWG
201	<i>Cryptocoryne retorspiralis</i> (Roxb.) Kuntb	Herb	Semi-evergreen forests	Kariyenkappu	KJD 26148	
202	<i>Remusatia vivipara</i> (Roxb.) Schott	Herb	Evergreen forests	Kattikkari and Mullenpara	NS & KVB 31336	
Najadaceae						
203	<i>Najas graminea</i> Del.	Herb	ponds	Kariyenkappu	NS & KVB 31374	
Eriocaulaceae						
204	<i>Eriocaulon pectinatum</i> Rubland	Herb	Evergreen forests	Ambalappara	KJD 31973	
205	<i>Eriocaulon robustobrownianum</i> Rubland	Herb	Evergreen forests	Ambalappara	KVB 31639	PI
206	<i>Eriocaulon talbotii</i> R. Ansari & N.P. Balakr.	Herb	Evergreen forests	Ambalappara	KJD 25571; NS & KJD 25530	WG

207	<i>Eriocaulon thwaitesii</i> Koernicke	Herb	Evergreen forests and Grasslands	Ambalappara	KVB 31640; NS & KJD825531
Cyperaceae					
208	<i>Cyperus sphacelatus</i> Rottb.	Herb	River side	Narikkadavu	NS & KVB 26240
209	<i>Fimbristylis complanata</i> (Retz.) Link	Herb	Grasslands	Ambalappara	KJD 25527
210	<i>Schoenoplectus mucronatus</i> (L.) Palla	Herb	Evergreen forests	Ambalappara	KJD 26248
Poaceae/ Graminae					
211	<i>Isachne globosa</i> (Thunb.) O. Ktze.	Herb	Evergreen forests	Ambalappara	KVB 26216
212	<i>Isachne walkeri</i> (Am. ex Steud.) Thw.	Herb	open areas	Ammayikallu	KVB 26217
213	<i>Jansenella griffithiana</i> (C. Muell.) Bor	Herb	Grasslands	Ambalappara	KJD 25525
214	<i>Paspalum canarae</i> (Steud.) Veldk.	Herb	Evergreen forests	Ambalappara	NS & KJD 26242
215	<i>Themeda cymbaria</i> (Roxb.) Hack.	Herb	Grasslands	Ambalappara	KVB 26226 PI
216	<i>Tripogon bromoides</i> Roem. & Schult.	Herb	Evergreen forests	Ambalappara	KJD 25523

NS N Sasidharan, KJD Dantas K J, KVB Binu K V, PI Peninsular India, SI South India, WG Western Ghats, SWG Southern Western Ghats

Pogostemon peethapushpam Pradeep, *Orophea sivarajanii* Sasidh., *Miliusa wayanadica* Sujanapal, Ratheesh & Sasidh. and *Impatiens veerapazhasii* Ratheesh, Sujanapal & Meera are new species recently described from northern Kerala and this is the first collection from the outside of the type locality. *Ophiorrhiza barberi* is endemic to the Anamalai, Agasthyamala and Puleeny Hills of southern Western Ghats. Collection from the Sanctuary is the first report from the Nilgiri region.

The study area has undisturbed forests like Chavachi, Vellachadamkunnu, Pothurumi, Mullenpara, Ambalappara and upper areas of Meenmutty. Nearly 190 species are reported from these areas. Ambalappara is the highest peak of the Sanctuary. Ambalappara- Pothurumi area shows the maximum diversity of plants.

The present investigation reveals that the undisturbed evergreen and semi evergreen forests harbour most of the diversity. Amabalappara, Asthippara, Mullenpara, Pothurumi, Chavachi and Kattikari are the areas with respect to the occurrence of endemic taxa.

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FURTHER ADDITIONS TO THE SCAPIGEROUS *IMPATIENS* OF KERALA WITH NOTES ON ITS ECOLOGICAL PECULIARITIES AND CONSERVATION STATUS

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ABSTRACT: The occurrence of three scapigerous *Impatiens*, *I. dendricola*, *I. stocksii* and *I. lawsonii* are reported for the first time from Kerala. *I. dendricola* and *I. stocksii* are so far known from the Karnataka part of Western Ghats and *I. lawsonii* from Nilgiris of Tamil Nadu. Conservation Status and intraspecific variations were reassessed based on the latest information.

Key words: Balasaminaceae, Scapigerous, *Impatiens*, Western Ghats, Kerala

INTRODUCTION

Impatiens is the largest genus of the family Balsaminaceae with more than 1,000 species distributed in the tropical and subtropical regions of the Old World as well as in the northern temperate regions [6, 9]. The genus has higher per cent of endemics, of which most of them are restricted to narrow geographic regions. According to Bhaskar, there are 107 species and 14 infraspecific taxa in South India [3]. As many as 28 species and one variety of scapigerous *Impatiens* are reported from south India. Among them, *I. acaulis* is the only species with extended distribution pattern up to Sri Lanka. Rest of the species are endemic to the rain forests of Western Ghats [3, 13, 14].

During the floristic explorations in Kannur and Wayanad Districts of Kerala, the authors have collected several specimens of scapigerous *Impatiens* from the evergreen forests above 750 m msl. Among the collections, three were not matching with any of the species so far reported from the Kerala part of Western Ghats. On critical study, it was found that these collections were *I. dendricola*, *I. lawsonii* and *I. stocksii*. Present collections from the areas are the first record of its occurrence in Kerala. The occurrence of these microhabitat specific ephemerals in this region indicates the climatic and edaphic peculiarities of the area. Brief description based on recent collection, relevant notes and images are provided for better understanding on the species.

Impatiens dendricola C.E.C. Fisch., *Bull. Misc. Inform. Kew* 1935: 157. 1935 & *Fl. Madras* 3: 1870.1936; Bhaskar and Razi, *Bull. Bot. Sur. India* 23(3-4): 191-196. 1981; Henry *et al.*, *J. Bombay Nat. Hist. Soc.* 75:686. 1979; Saldanha, *Fl. Karnataka* 2: 251. 1996; Vivek. *et al.* in Hajra *et al.*, *Fl. India* 4: 139. 1997; Ravi kumar *et al.*, *J. Econ. Taxon. Bot.* 24: 335.2000; Jyosna & Janarth., *Rheedea* 21(1): 33. 2011; Bhaskar, *Taxon. Monogr. Impatiens W. Ghats*: 64. 2012. [Images A, A1 & A2]

Epiphytic, scapigerous, tuberous herbs, to 15 cm high. Leaves radical, 4 or 5, 1-7 x 1-3 cm ovate, elliptic or lanceolate to oblong-lanceolate or obtuse at base, crenate along the margins, obtuse or retuse at apex, hairy above. Inflorescence racemose, scape 5 – 15 cm long, 2– 10-flowered. Flowers 1-2 cm across, white; bracts ovate, green; lateral sepals ovate, acute at apex; standard petal orbicular to reniform, 3-5 mm; wing petals 1-2 cm, unequally 3-lobed; basal lobe linear-oblong, retuse at apex; mid-lobe suborbicular, with a tuft of hairs at base; hairs yellow to orange; distal lobe linear-oblong, rounded at apex; lip broadly ovate, acute to acuminate at apex; spur basal, clavate. Column bent forward; filaments and anthers white. Capsule ellipsoid or oblongoid; seeds oblongoid, with tuft of hairs at ends; hairs spirally coiled.

Flowering & Fruiting: August – September

Habitat: On moss-covered tree trunks

Distribution: Endemic to Southern Western Ghats (Karnataka and Kerala)

Karnataka: Talacauvery and Thadiandamol of Coorg District

Kerala: Paithalmala of Kannur District

Specimens examined: India, Kerala, Kannur District, Paithalmala ± 1200 m asl, 15 August 2014, Dantas KJ and Vijith KT, 26779 [KFRI].

Conservation Status: This species was described by Fischer based on the collection of Barnes from Thadiandamol, Coorg, Karnataka [4]. Bhaskar relocated the species after a lapse of 40 years from its type locality, Thadiandamol [1]. Later, Ravikumar *et al.* reported this species from Talacauvery of Karnataka State [15]. Recently, Jyosna & Janarthanam also collected this species from Tadiandamol [9]. Present collections from Paithalmala, one of the important peaks in Kannur district of Kerala explicate its continuous distribution pattern in Bhrahmagiri hill ranges. It also indicates the phytogeographical peculiarities of windward Nilgiris of Western Ghats.

In Kerala, the distribution of this species is restricted to a small evergreen patch at Paithalmala region of Kannur district. Survey and analysis of data related to the distribution pattern revealed that the total Area of Occupancy (AOO) of this habitat specific species is less than 10 Km² in the entire Western Ghats. Anthropogenic disturbances due to tourism and related activities deteriorated the quality of its microhabitats in Kerala and Karnataka to a certain extent. Habitat fragmentations were also observed. Hence it is assessed that the species belongs to Critically Endangered-B2 (CR B2) category as per the criteria of IUCN (2014).

Impatiens lawsonii Hook. f., *Rec. Bot. Surv. India* 4: 45. 1906; Gamble, *Fl. Pres. Madras* 139(99). 1915; Vivek. *et al.* in Hajra *et al.*, *Fl. India* 4: 170. 1997; Bhaskar, *Taxon. Monogr. Impatiens W. Ghats*: 68. 2012. [Images B, B1 & B2]

Epiphytic annual scapigerous tuberous herbs, to 15 cm tall. Leaves radical, 1-3, 2 x 1.2 cm, ovate to suborbicular, crenate, obtuse or rounded, sparsely hairy above. Inflorescence racemose, scape 5 – 10 cm long, 2– 8-flowered. Flowers ca. 1 cm across, pink, in 4-6-flowered straight scapes; bracts ca 1.5 mm long, persistent; Sepals ovate, acuminate, 3-4- nerved; wing petals 3-lobed, ca 1.5 cm long, dorsal auricle short, spiniferous, pale pink with yellow tinge at centre, whitish outside, purple hairs present at mouth of throat of wing petals; standard hook-like, enclosing the stamens; lip funnel-shaped, spur conical. Column bent forward; filaments and anthers yellowish. Capsules 5-7 mm long, ellipsoid, glabrous; seeds powdery, minute, clothed with spiral hairs.

Flowering and fruiting: July – September, rarely to October based on regional climatic conditions.

Habitat: On moss covered tree trunks, also on wet rocks.

Distribution: Endemic to Nilgiri phytogeographical region of Southern Western Ghats (Tamil Nadu and Kerala).

Tamil Nadu: Kundalis and Bangi Tappal of Nilgiri District.

Kerala: Aralam Wildlife Sanctuary of Kannur and Hill Dale Reserve forests of Wayanad Districts.

Specimens examined: India, Kerala, Kannur District, Aralam Wildlife Sanctuary, ±1500 m asl, 25 August 2012, Dantas KJ, 25451; Wayanad District, Hill Dale Reserve, ± 1400 m asl, 27 August 13, Dantas KJ, 26701 [KFRI].

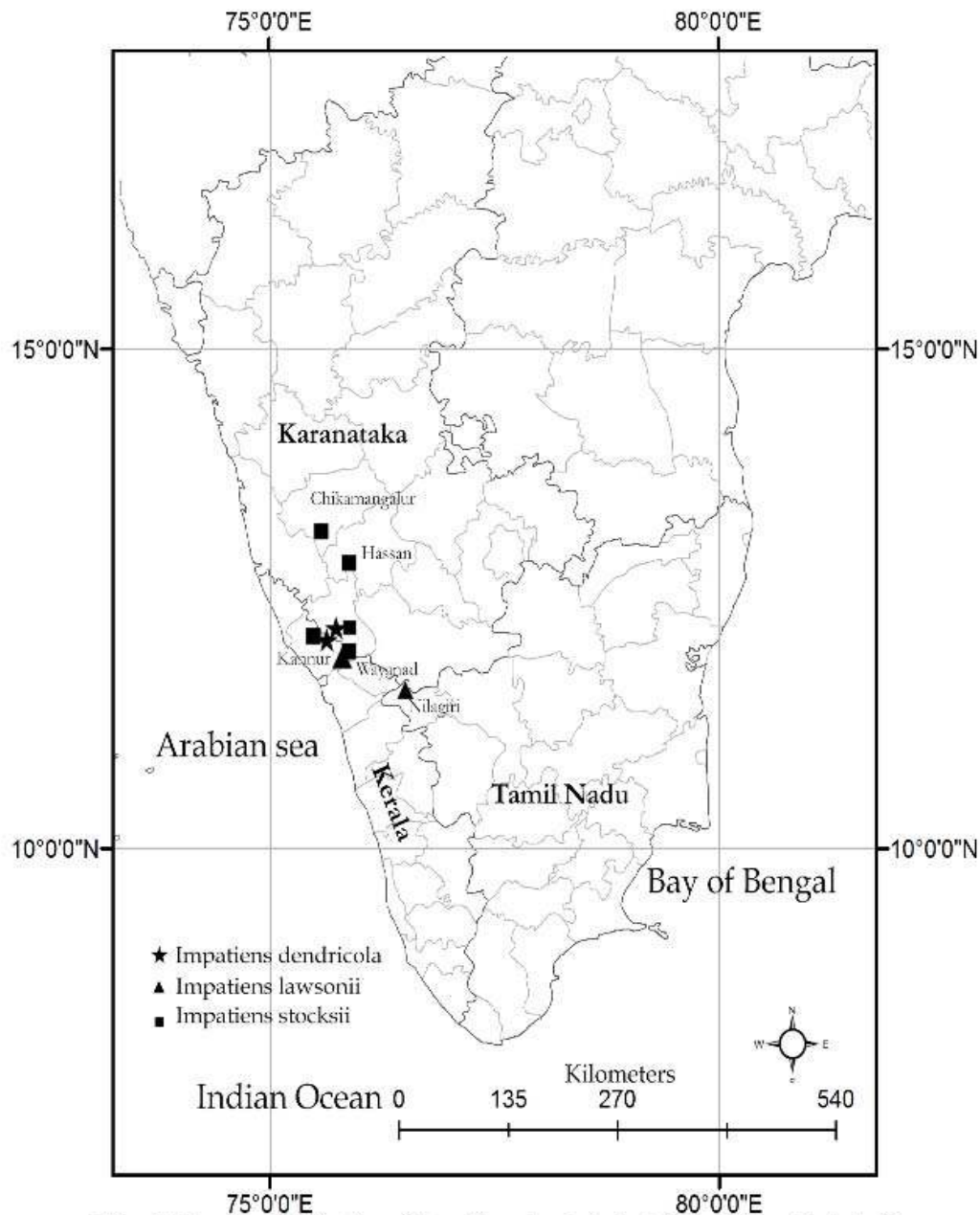
Notes: Fyson reported the occurrence of bulbils along the red veins on abaxial sides of the leaves [5]. According to Bhaskar, bulbils are gemmae bodies and are meant for vegetative reproduction. He also noted that *I. lawsonii* is the only known species with gemmae bodies [3]. However, Hooker did not mention anything about the bulbils on the leaves [7]. In the present collection, we could not find any bulbils or gemmae bodies on leaves.

Conservation Status: This species was described by Hooker from Nilgiris [7] without any indication on specific locality. Later, Barnes (1929) collected the species from Kundha hills ranges of Nilgiris of Tamil Nadu. In his herbarium, there is an indication of its distribution pattern in Nilgiri region. He mentioned that '*it is seen at several places between Bangi Tappal and North of 8510*'. According to Bhaskar this species is restricted to Kundalis of Tamil Nadu [3]. The present collection from Aralam Wildlife Sanctuary demonstrates its extended distribution up to Brahmagiri Hills of Kerala in the windward region of Nilgiris.

In Tamil Nadu, this species is restricted to a few shola patches in Nilgiris. In Kerala, the species is narrowly distributed in a few high altitude evergreen forests of Kannur and Wayanad districts. It is estimated that the total Area of Occupancy (AOO) of this habitat specific species is less than 10 Km² in the entire Western Ghats region. Habitat fragmentation due to various factors and anthropogenic interferences lead to habitat deterioration and population depletion. The distribution and other field data indicate that this species comes under Critically Endangered B2 (CR B2) category as per the IUCN criteria (2014).

Impatiens stocksii Hook.f. & Thomson, *J. Proc. Linn. Soc. Bot.* 4: 119. 1859; Hooker, *Fl. Brit. India* 1: 442.1874 & *Rec. Bot. Surv. India* 4: 45. 1906; Cooke, *Fl. Bombay* 1: 170. 1901; Blatter, *J. Bombay Nat. Hist.Soc.* 33: 310. 1933; Fischer, *Fl. Madras* 3: 1870. 1936; Henry *et al.*, *J. Bombay Nat. Hist. Soc.* 75: 686. 1979; Yoganarasimhan *et al.*, *Fl. Chikmagalur District*: 59. 1982; Murthy & Yoganarasimhan, *Fl. Coorg*: 88. 1990; Saldanha, *Fl. Karnataka* 2: 257, t. 100B. 1996; Jyosna & Janarth., *Rheede* 21(1): 37-40. 2011; Bhaskar, *Taxon. Monogr. Impatiens W. Ghats*: 85. 2012. [Images C, C1 & C2].

Epiphytic, scapigerous, tuberous herb, 5 – 10 cm high; tubers globose. Leaves radical, 2 – 5 per tuber, 1 – 8 X 0.8 – 2.5 cm, broadly ovate or elliptic to orbicular, obtuse to truncate at base, distantly apiculate-crenate at margins, notched to emarginate at apex, membranous, pubescent above. Inflorescence a racemose scape, 3 – 8.5 cm long, slender, glabrous, 2 – 10-flowered. Flowers 1 – 1.5 cm across, white; bracts ovate; Lateral sepals ovate, acute at apex, glabrous, hyaline, light green; standard petal suborbicular; wing petals with a tuft of yellow hairs at base of mid-lobe, 3-lobed; mid-lobe broader than distal and basal lobes; basal lobe oblong, acute to obtuse at apex; mid-lobe obtuse at apex; distal lobe oblong – oblanceolate, rounded to obtuse at apex; lip saccate, acute at apex, white with a yellow spot; spur absent. Column curved; filaments translucent; anthers white. Capsules broadly ellipsoid, 5 – 7 mm, glabrous; seeds oblongoid, with spirally coiled hairs.



Map. 1 Showing distribution of *Impatiens dendricola*, *I. lawsonii* and *I. stocksii* in South India

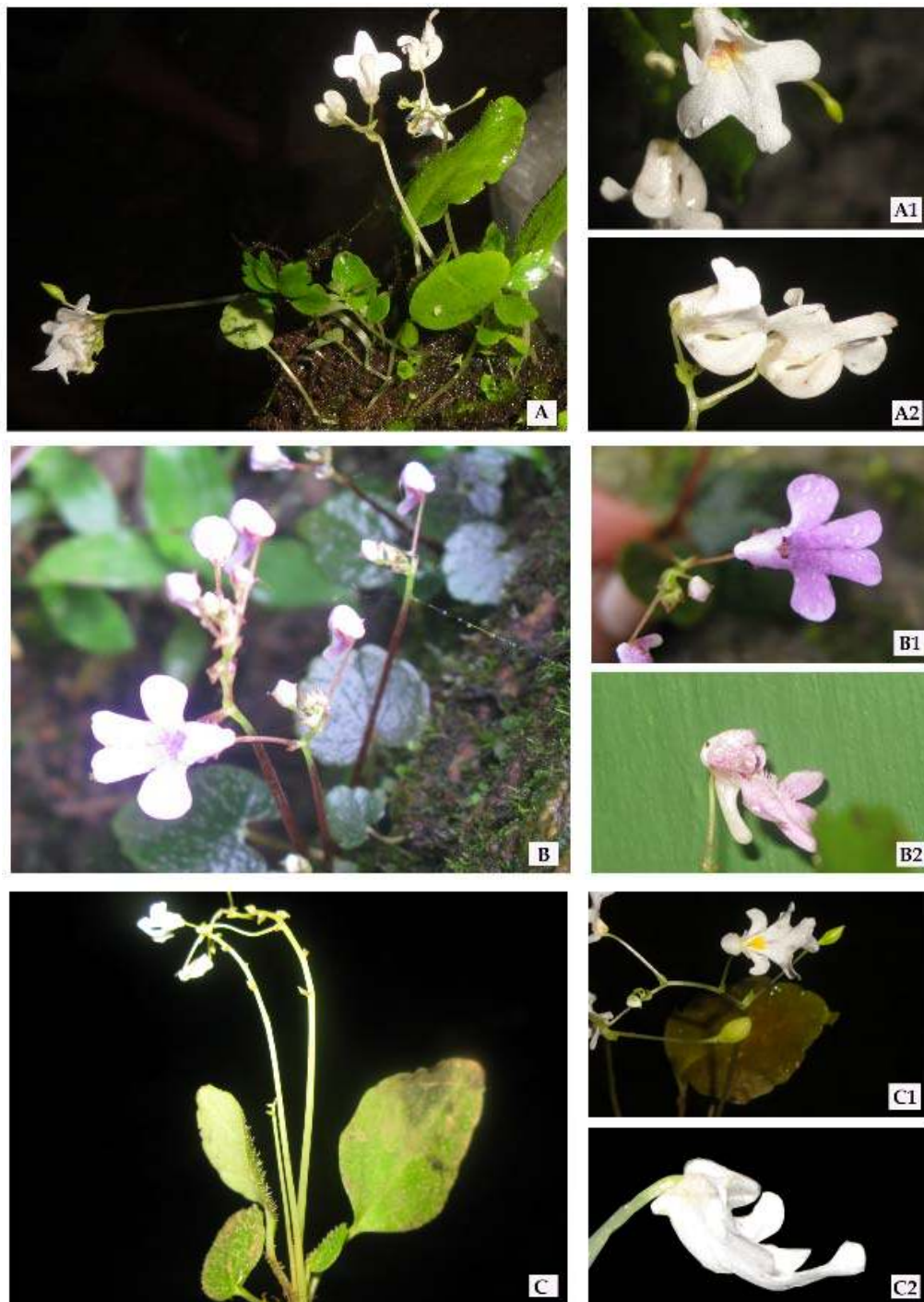


Fig. 1. A-A2 *Impatiens dendricola* C.E.C. Fisch., A. Habit, A1. flower-ventral view, A2. flower-dorsal view
 B-B2 *Impatiens laisonii* Hook. f., B. Habit, B1. flower-ventral view, B2. flower-dorsal view
 C-C2 *Impatiens stocksii* Hook.f. & Thomson, C. Habit, C1. flower-ventral view, C2. flower-dorsal view

Flowering & Fruiting: July – September

Habitat: Moss-covered tree trunks in evergreen forests, 700 – 1600 m.

Distribution: Endemic to the Western Ghats of Karnataka and Kerala

Karnataka: Bababudan and Kemmanagundi of Chikmagalur District, Mankanahalli and Bisle Ghat of Hassan District and Talacauvery of Kodagu District.

Kerala: Aralam Wildlife Sanctuary and Paithalmala of Kannur District and Hill Dale Reserve of Wayanad District.

Specimens examined: India, Kerala, Kannur District, Aralam Wildlife Sanctuary, ± 1500 m asl, 25 August 2012, *Dantas KJ*, 25452; Paithalmala, ± 1400 m asl, 15 August 2012, *Dantas KJ and Vijith KT*, 26778 [KFRI].

Conservation Status: This species was described by Hooker and Thomson based on the collection of Stocks and Law [8] from Cocan region of Karnataka. According to Bhaskar & Razi [2] and Ramachandran & Nair [12], *I. stocksii* is conspecific to *I. crenata* [9]. However Jyosna & Janarthanam [9] and Bhaskar [3] segregated the taxa. Dalzell & Gibson, Blatter and Cooke [9] reported this species from Maharashtra. Jyosna & Janarthanam and Bhaskar discussed about the occurrence of *I. stocksii* in Maharashtra and concluded that the distribution of these species in Maharashtra is doubtful as the specimens mentioned couldn't be traced in herbaria and relocated in specified locality [3, 9]. Ramachandran and Nair reported the occurrence of pink flowers in this species [12]. Literature and available collections shows that both the species, ie *I. stocksii* and *I. crenata* are having white flowers. Hence this report is probably an error. Panduragan and Nair reported the occurrence of *I. stocksii* in Meenmutty of Idukki district of Kerala [11]. However Jyosna & Janarthanam and Bhaskar questioned the identity of the collections from Idukki by Panduragan because the specimen was with distinct spur [3, 8], which is a prominent demarcating character of other subgroups of section scapigerae. They are of the opinion that *I. stocksii* is restricted to Western Ghats of Karnataka. The present collections confirm its occurrence in Kerala.

In Kerala, its distribution is restricted to high altitude evergreen forests at three locations ie., Aralam Wildlife Sanctuary and Paithalmala of Kannur district and Hill Dale Reserve of Wayanad district. It is estimated that, the total Area of Occupancy (AOO) is less than 100 Km², including Kerala and Karnataka. In all the localities, population size is very small. Severe habitat fragmentation and small population size leads to population depletion. Data shows that this species comes under Critically Endangered-B1 (CR B1) category as per IUCN criteria (2014). However, compared to other two species, number of populations and Area of Occupancy is large.

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