Flora of India
Series 3

FLORA OF PALGHAT DISTRICT

Including Silent Valley National Park,
KERALA

E. VAJRAVELU

BOTANICAL SURVEY OF INDIA

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FOREWORD

The Botanical Survey of India is publishing the Flora of India under four series of which the 'District Floras' is one among them. The Flora of Palghat District including Silent Valley National Park, Kerala is one such contribution to the Flora of India.

Silent Valley harbours one of the last remnants of rich tropical forest flora which is vast disappearing. The genetic resources it supports cover a vast spectrum of useful species, rice, pepper, banana, jackfruit, cardamom, cinnamomum, aroids, etc. The inventory of the species of this forest hold, are important for the *in situ* conservation of species.

The Malabar Coast was, since ancient times, the sole centre of the spices trade with Arabs and Europeans. van Rheede, the Dutch Governor of the Malabar during early part of 17th century, compiled the monumental *Hortus malabaricus* and published in 12 volumes containing 794 plates (1678-1703). In spite of several subsequent botanical expeditions to this area, information with regard to the plant resources of this state is still not fully available to the scientific world. For judicious exploitation of plant resources, an inventory of plants occurring in any given area is absolutely necessary. Hence this district flora including the Silent Valley R.F. was undertaken and worked out in detail. The flora of this district comprises 1400 species of flowering plants which constitute about 25% of the species reported in the *Flora of the Presidency of Madras*, for the then Presidency of Madras comprising present states of Andhra Pradesh, Tamil Nadu, Karnataka and Malabar of Kerala State.

The significant findings of this flora include two new genera, six new species, five new records, many endemics and rare plants, many relatives of cultivated plants - being the germ plasm resources and a variety of economically and medicinally important plants.

I hope the present flora would be very useful to the students and teachers of botany, conservationists, ecologists, agricultural scientists, foresters and others concerned with the utilization of plant resources. The flora would also be found useful by environmental biologists and taxonomists revising the Flora of India.

Botanical Survey of India,
Calcutta, 700001,
19 Jan. 1990.

M.P. NAYAR
Director

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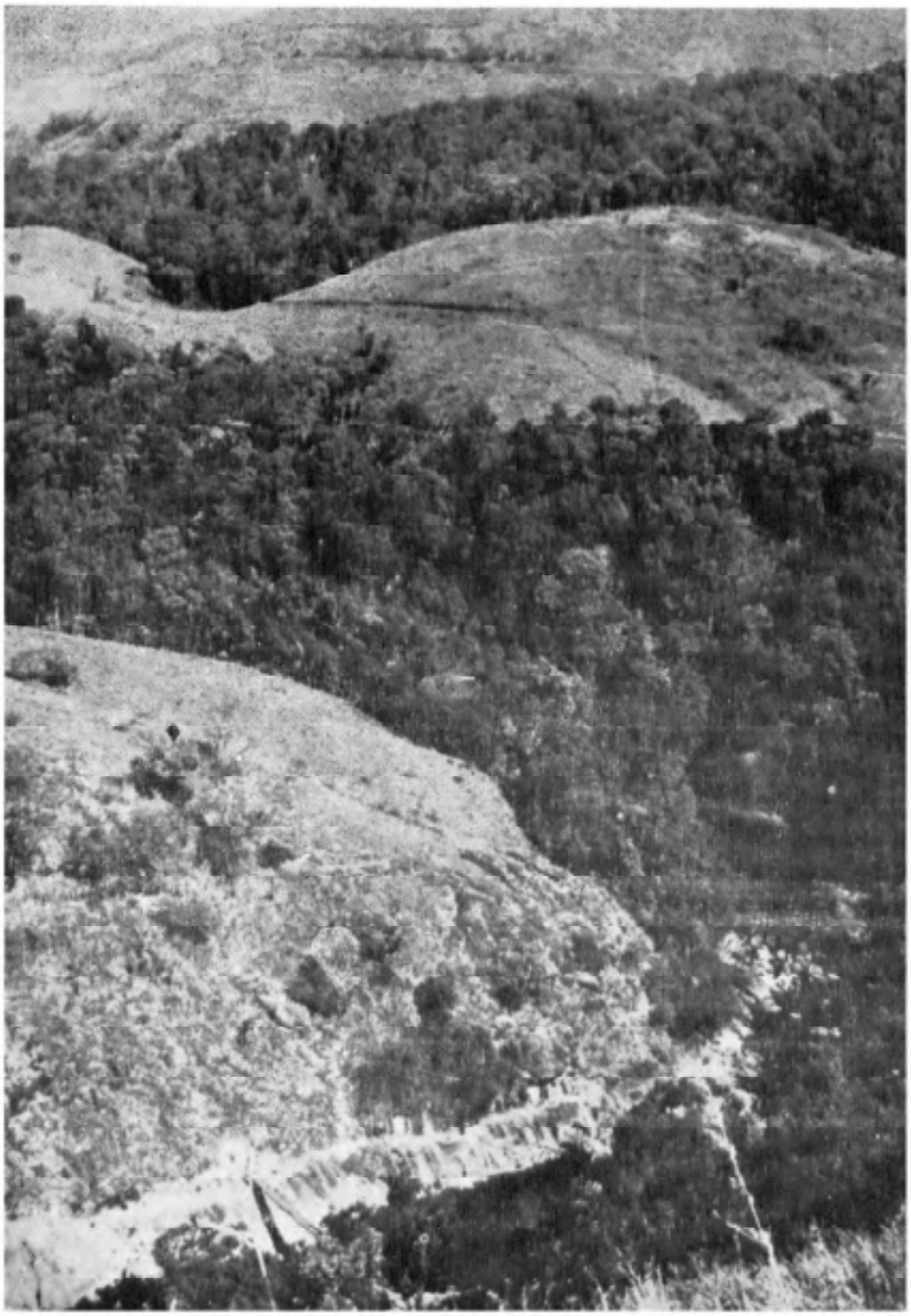

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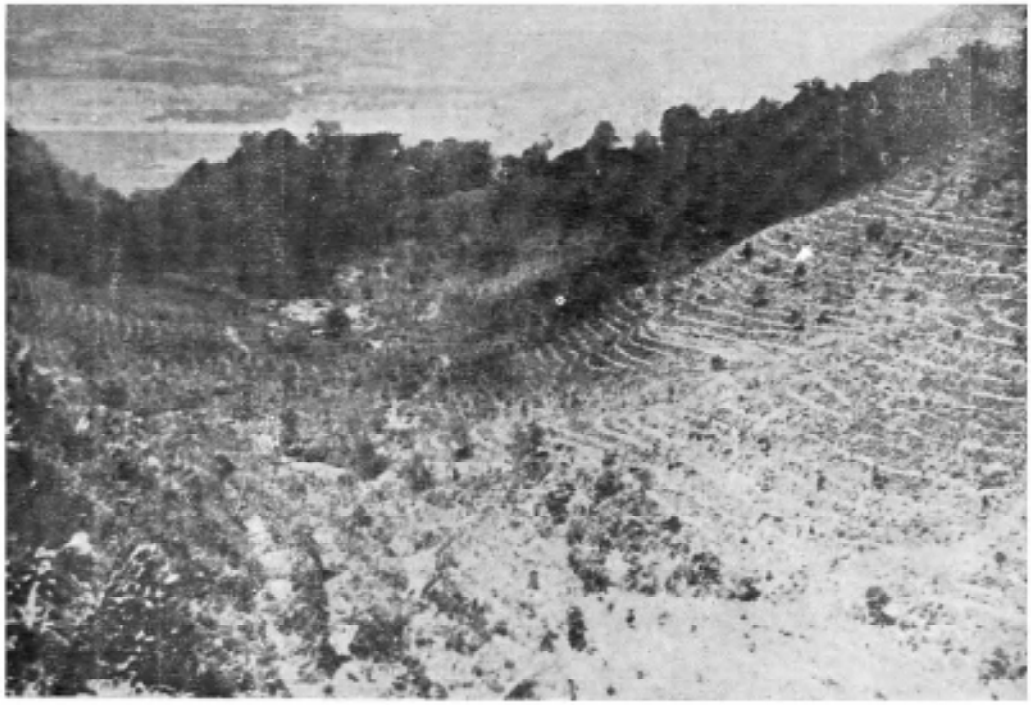

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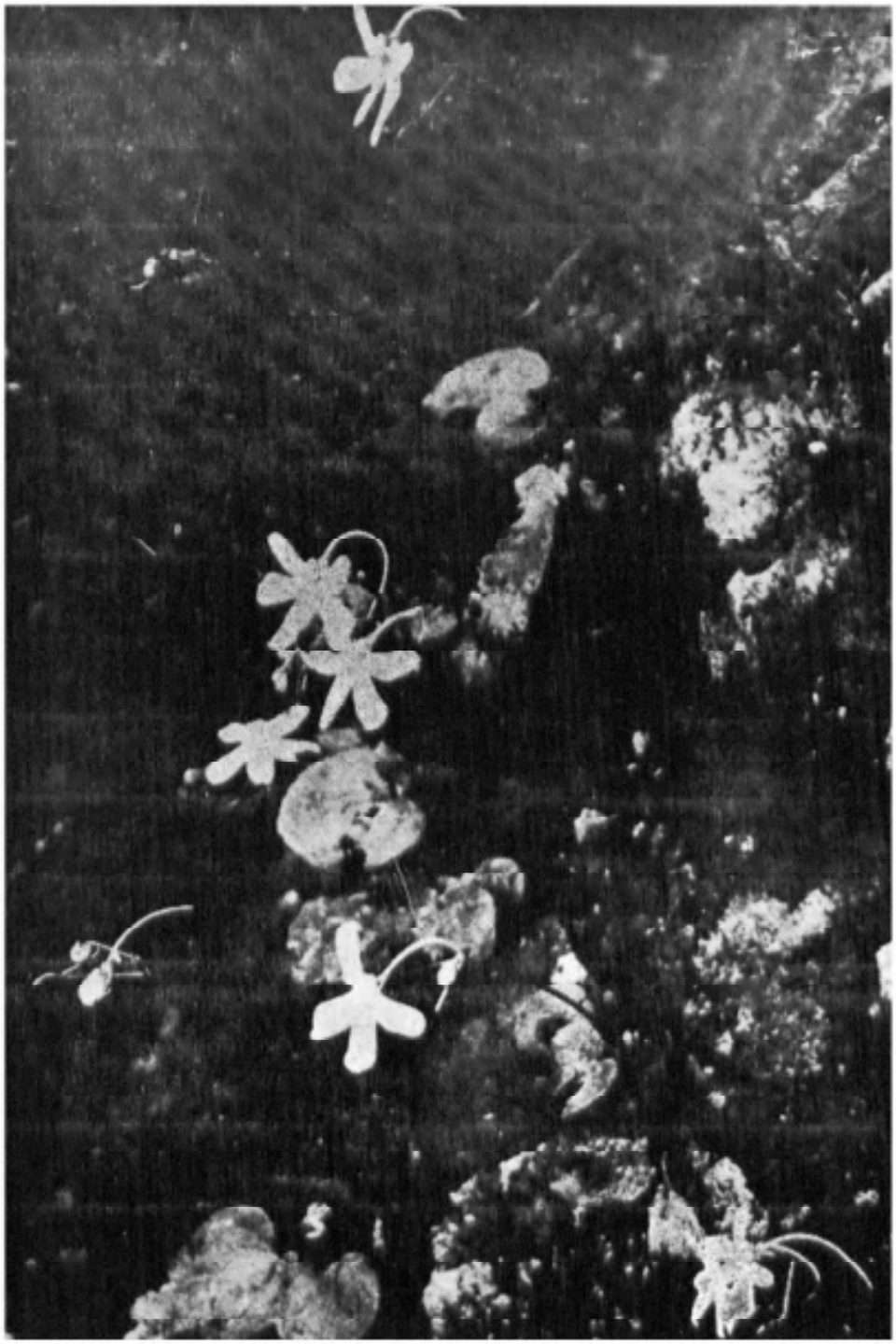

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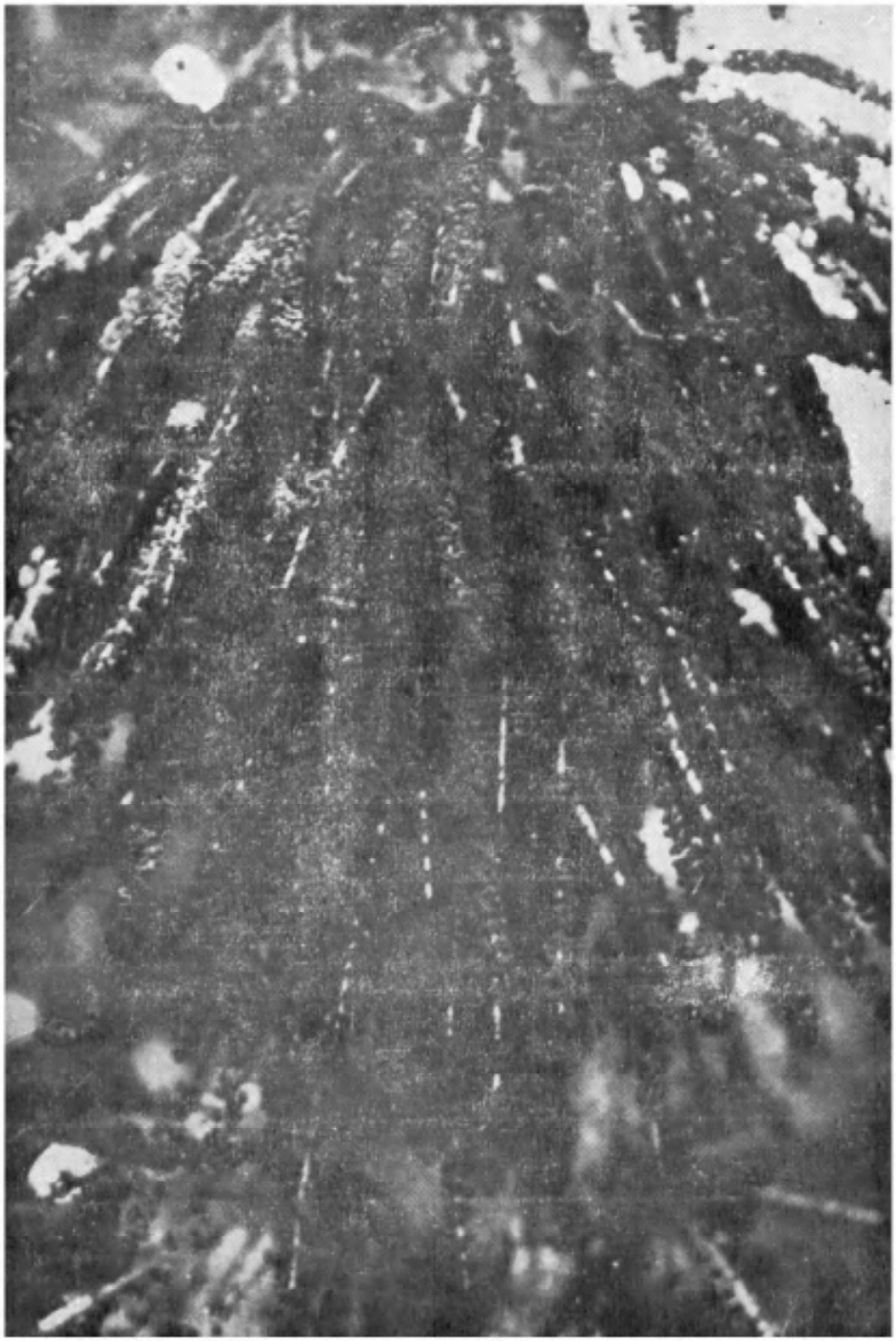

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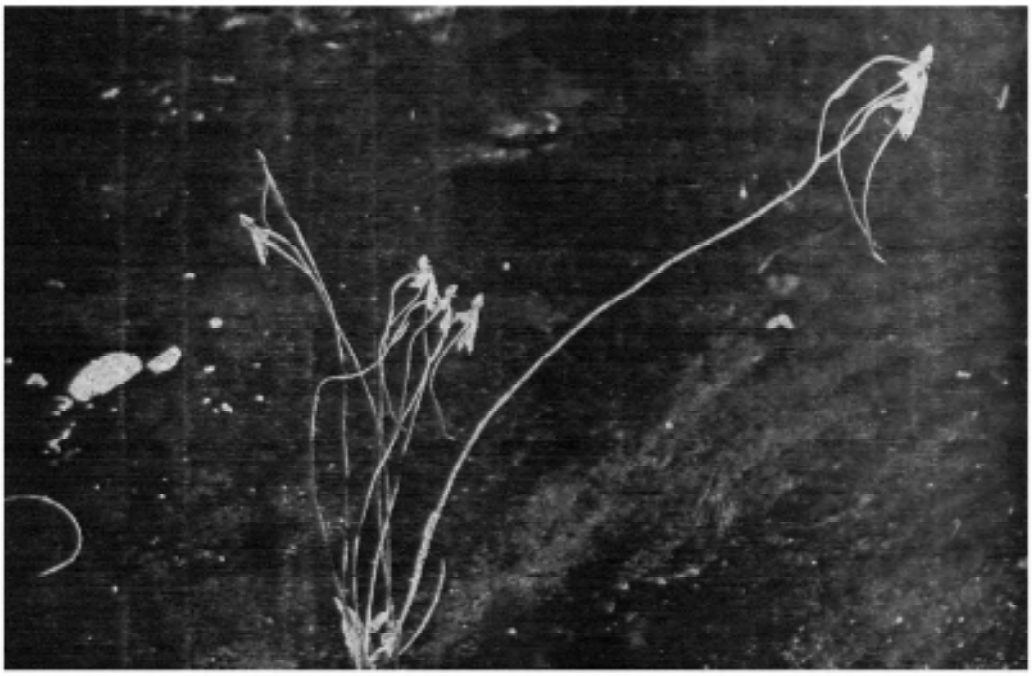

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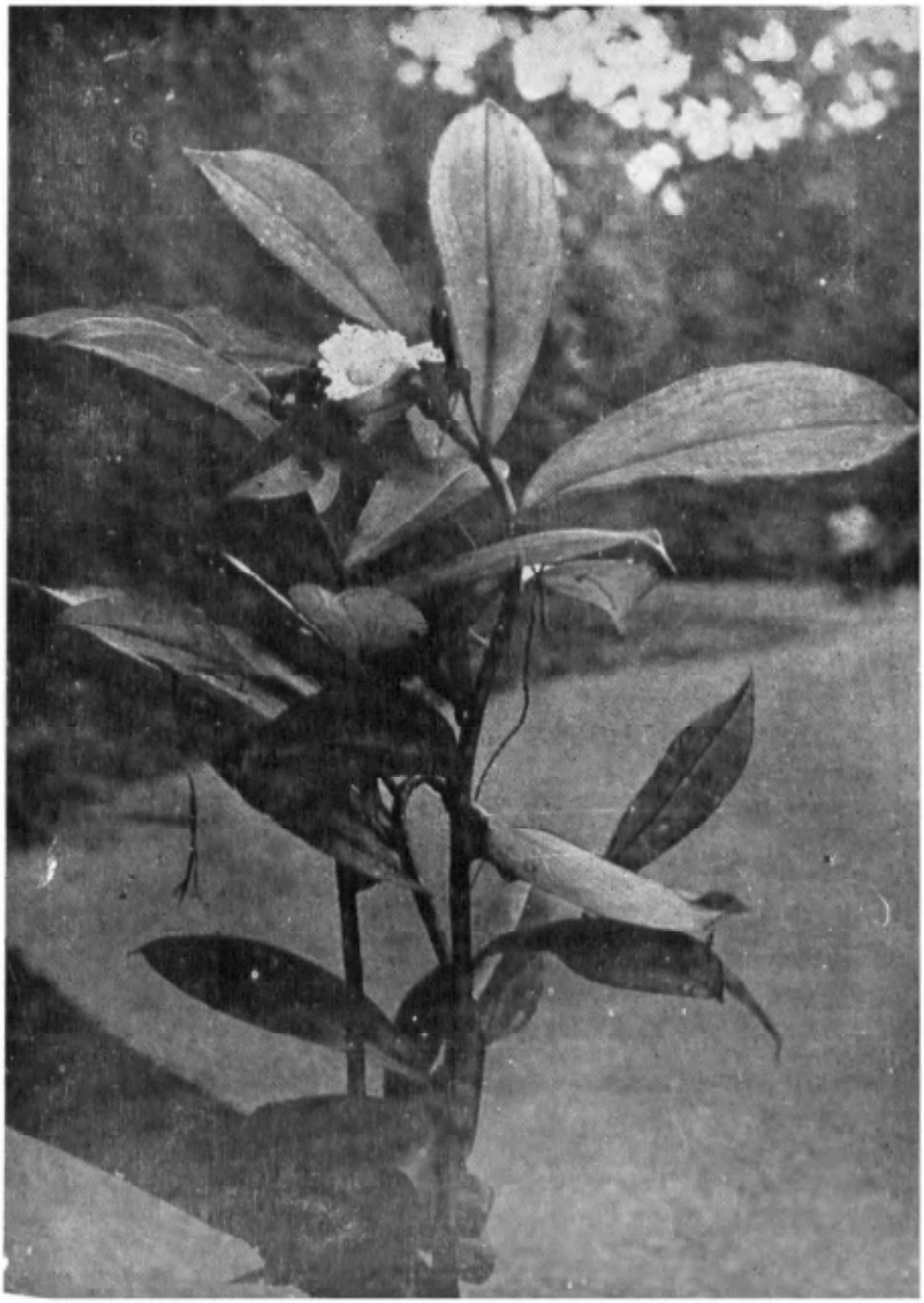

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INTRODUCTION

It has been pointed out in no uncertain terms that the tropical forests, by far the richest in species diversity and mostly confined to the developing countries are being destroyed at a rapid rate without adequate compensation in terms of conservation of representative vegetation types and genetic resources (Tomlinson & Raven, 1977). A similar opinion encompassing other related aspects as well that the diversity is being reduced before we have made a basic inventory let alone conducted modern biosystematic and population biology studies in the area and that even to understand the origin and dynamics of the temperate flora it is essential to have adequate knowledge of the tropical flora from which the temperate flora was derived has been expressed by Prance (1977). Raven (1977) has very justifiably emphasised the fact that destruction of habitats leads to the extinction of species even before they are discovered and described and that such a disappearing plant species can take with it 10 30 dependent species such as insects, higher animals and even other plant species. The importance of the forests in the Indian context has been stressed in the following passage by Sagreiya (1978) : 'The forests of our country are natural asset of immense value Directly forests meet the domestic needs of polewood, fuel, bamboos and a variety of other products, including providing grazing to livestock, which are the indispensable requirements of rural population... Forests also yield a number of products of commercial and industrial value, such as structural timbers, charcoal, raw materials for making paper, newsprint, panel products, beedi leaves, resins, gums, tanstuff and a host of other products of economic importance including medicinal plants. They also provide employment to a large population engaged in their protection, tending, harvesting, regenerating and management .. Indirectly, forests preserve the physical features, arrest soil run-off, mitigate floods and make the streams flow perennially and thus help agriculture. Forests also make the climate equable, reduce air pollution by absorbing the poisonous carbon dioxide and releasing the life giving oxygen. Wildlife is an integral part of the forests and is of recreational and scientific value'.

Population explosion and its consequent pressure on tropical forests resulting in over-exploitation has been identified as the prime factor leading to their destruction. It has been now realised that the long-held opinion that the tropical forests are an infinite source of natural resources is a fallacy and that unless exploited judiciously it would exacerbate the already worse situation resulting in very serious consequences. For such a

judicious exploitation of plant resources an inventory of plants occurring in any given area is absolutely necessary ; more so in a developing country like India with a telling effect of the impact of population explosion. Hence the objective of the present investigation is to present a comprehensive and consolidated account of the vegetation and flora of Palghat district, Kerala, a floristically very rich province which would enable the authorities concerned to assess the plant wealth of the area as and when required.

AREA OF STUDY

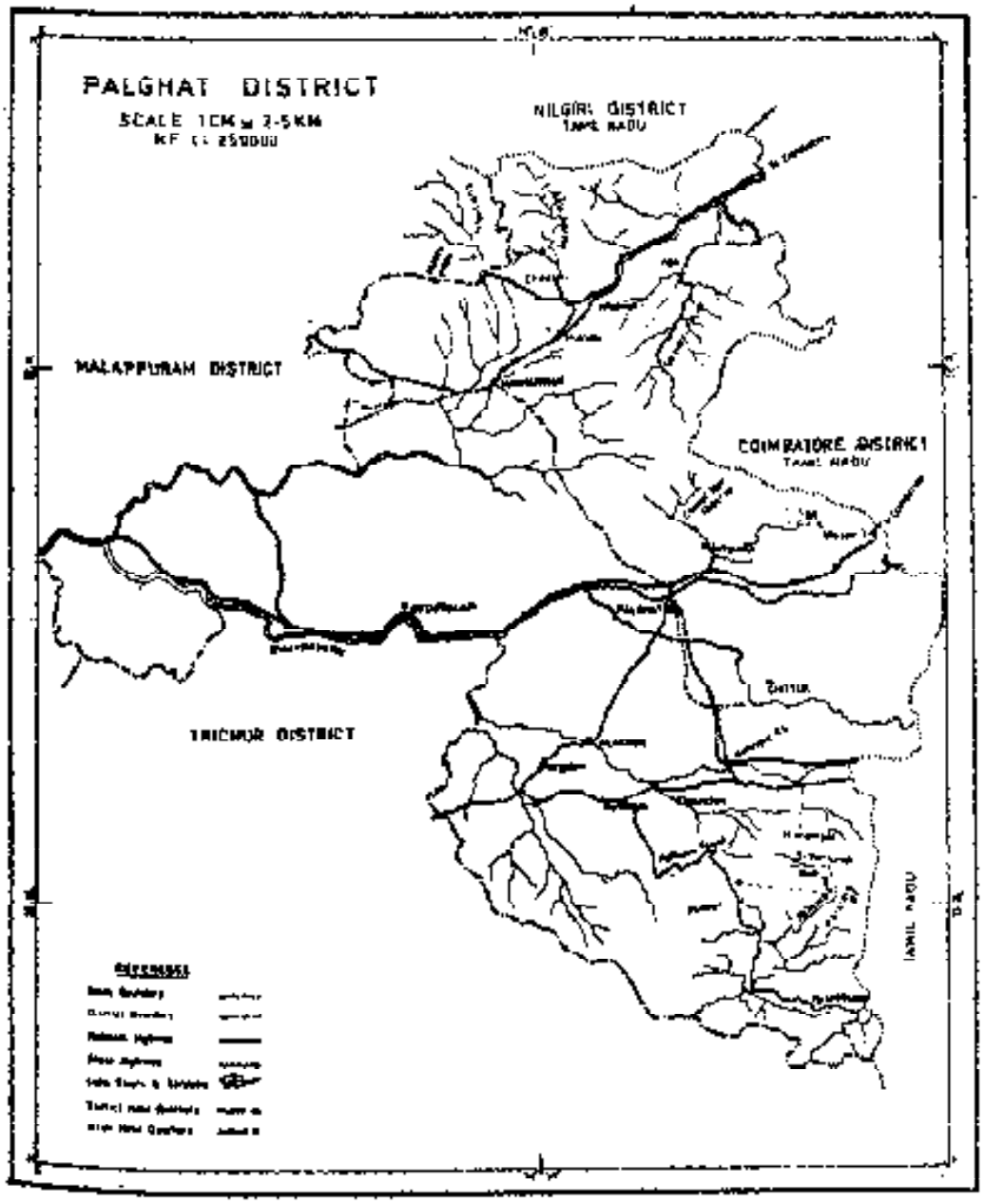
Origin of the name Palghat

There is no unanimous opinion as to the origin of the name 'Palghat'. It is said that the name is derived from the traditional Tamil classification of the land on the basis of soil formations and physical features. Accordingly places which "were for the most part desert regions hardly fit for raising food crops and were in many places barren and rocky were called 'PALA' or 'PALAI'. The presumption of a section of scholars therefore is that the name Palghat originated from the physiographic term 'Pala' or 'Palai' that denotes the barren and rocky regions combined with the word 'Kaadu' or forest, meaning thereby the land covered by rocky regions and forests. But considering the fertile plains of the district and other physical features of the place it seems that Palghat can never come under the traditional classification of the 'Pala' region.

A more convincing argument is that the whole of Palghat and its suburbs were once covered by thick forests of 'Pala' trees (*Alstonia scholaris*) hence the word 'Pala' plus 'Kaadu' came to be known as Palakkaadu, later anglicised as Palghat. In the East India Company's correspondence the place is referred to as 'Palghatcherry'. This name is also found on certain old herbarium sheets with plants collected from this district and housed in the Madras Herbarium (MH).

Location and boundaries

Palghat district is located between north latitude 10° 20′ and 11° 15′ and east longitude 76° 02′ and 76° 55′ It is bounded by Malappuram and Nilgiri (State of Tamil Nadu) districts on the north, Coimbatore district (Tamil Nadu) on the east, Trichur district on the south and Malappuram and Trichur districts on the west. The district has no coast-line.


PALGHAT DISTRICT
NILGIRI DISTRICT
MALAPPURAM DISTRICT
COIMBATORE DISTRICT
TRICHUR DISTRICT

Area and population

The area of this district is 4,400 sq km and ranks fourth in the state in area. The total population according to 1971 census is 16,85,342 The total male members is 8,19,571 whereas the number of females is 8,65,771.

History of the district

When the states of the Indian Union were formed on linguistic basis under the State Reorganization Act (Central Act 37 of 1956), the erstwhile Malabar district was separated from the then State of Madras (now Tamil Nadu) and integrated with the Travancore - Cochin state to form the new linguistic, Malayalam speaking State of Kerala. But due to the unwieldy nature of the district, the Malabar district was trifurcated into the revenue districts of Cannanore, Kozhikode and Palghat. At present Palghat district consists of 5 taluks *viz.*, Alathur, Chittur, Mannarghat, Ottapalam and Palghat.

Natural divisions

On the basis of physical features, the district can be divided into two major natural divisions, *viz.* midland and highland. The midland region includes the low laterite downs of the district having an attitude of up to 80 m above mean sea level. The highland region lies above 80 m. The unique feature of the highland is the great Palghat Gap which is a complete opening with a width of about 32.2 km.

The forests of Palghat district are under the administrative control of the Palghat and Nemmara forest divisions. The respective head-quarters of these two divisions are located at Olavakkot (Palghat) and Nemmara, controlled by Divisional Forest Officers. In addition there are Assistant Conservators of Forests for Plantations, Wildlife, Forest Utilization etc. with a band of other forest officers. The area of the Palghat division is about 372 sq km.

The Nemmara Forest Division was constituted on 1st July 1958, by amalgamating the Nelliampathy Range of Trichur Forest Division, Parambikulam Range of Chalakkudi Forest Division and Sungam Range of Coimbatore South Division of Tamil Nadu State which was transferred to Kerala State as a result of the reorganization of states. The forests of the Parambikulam Range and higher reaches of the Nelliampathy Range represent the evergreen forest types. The country reserves of Nelliampathy are of purely deciduous type with a high proportion of good quality of teak in its composition.

The major portion of the forests in this district form the catchment area of three major reservoirs (i) Parambikulam—Aliyar Project of Tamil Nadu State (ii) Mangalam and (iii) Pothundy Dams of Kerala State.

The Malampuzha Dam in the Palghat Division attracts many tourists since there is a well-organized park with a wide variety of ornamental plants and illumination facilities on holidays. The aquarium of rare, beautiful and colourful fishes is an added attraction.

TOPOGRAPHY AND SOIL

The topography varies with hills and valleys ; rivers, rivulets and streams making the vegetation very rich. Plains are restricted to the south-western portion only. The main ghats are situated at the northern extremity and extend up to the Nilgiris. The highest peak 'Anginda', about 2600 m is at the northeast corner of the Silent Valley. An extensive region of dense forest covering nearly 39,000 hectares clothe the northern slopes and this region is recognized for the sake of forest administration as constituting four blocks namely Attapadi (12,000 ha.) and Silent Valley (8,950 ha.) on the south and Kundha (10,000 ha.) and New Amarambalam (8,000 ha.) on the north. The Attapadi and Kundha blocks constitute the eastern half and cover a larger area (22,000 ha.) than the other two. The Silent Valley reserve lies on a plateau to the north of Mannarghat, the outer slopes of the hill forming a tableland. The ghats stretch southwestwards but an irregular north-south ridge through the middle divides the Silent Valley area into two, the ridge itself slopes southwards. The two rivers draining the area are Kunthipuzha on the west and Bhavani on the east of the ridge, both flowing down north to south. Kunthipuzha continues its southwardly course for several km after emerging from the forest areas till it meets the west-flowing Thuthupuzha river - a tributary of Bharathapuzha.

The Dhoni R.F., Sappal hill forest and the Eliwal block constitute 'The Chenat Nair Reserve' which is situated on the southern extremity ending at the Palghat Gap. The Walayar Reserve is situated on the northern side of the eastern end of the Palghat Gap, and at the foot of the Bolampatty hills. The Walayar river which forms almost the state boundary of Tamil Nadu and Kerala across the national highway, runs through the forests. The Nelliampathy Ghat in the Nemmara Division also extends up to Parambikulam bordering the Apamalai Hills in Tamil Nadu. The general configuration is undulating with hills, deep ravines and valleys, well-clothed with vegetation excepting the large grassy areas around Muthikulam and certain slopes of the Silent Valley along river Kunthipuzha.

The rock formation is of gneissic origin. Soil in the plains is sandy loam and clayeyhumus, whereas on the slopes of hillocks the substratum is gravelly and coarse. In certain places barren rocks are found. Rocky substratum is predominant along slopes of Pothundy and Malampuzha hills.

Rainfall

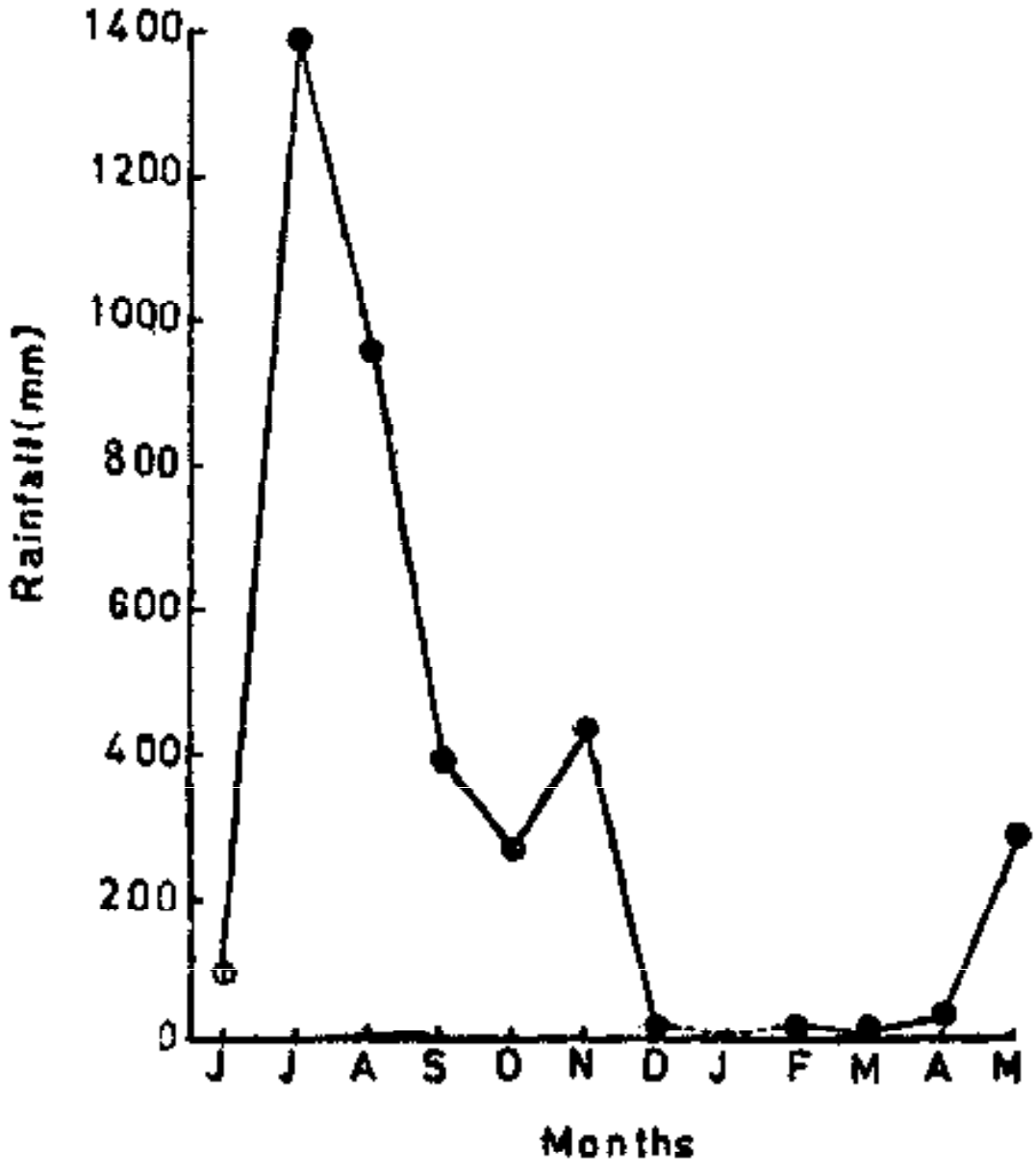
Monthly Rainfall Data of the Silent Valley-Attappadi Forest Regions During the Years 1958-1963 and 1977-1979.

Month	1958-59	1959-60	1960-61	1961-62	1962-63	1977-78	1978-79
			in mm				
June	1290	1890	450	1380	430	911	1036
July	1320	2150	1590	1760	2540	1452	1337
August	1110	870	850	1430	1150	584	1337
September	270	550	720	470	750	393	289
October	450	250	230	290	530	388	136
November	710	70	140	—	70	408	449
December	30	—	—	150	90	—	20
January	—	—	—	20	—	—	—
February	—	—	30	30	—	—	22
March	—	80	—	10	40	–	12
April	110	230	80	50	40	41	31
May	760	270	620	350	50	157	424
Total	6050	6360	4710	5940	5690	4334	5093

Average annual rainfall : 5454 mm.

The graph provided is based on the average rainfall of 1977-1979.

The average annual rainfall decreases from the west towards the east and varies from 4800 mm to 1100 mm. The southwest monsoon generally sets in during the last week of May. The rainfall during the southwest monsoon (June to September) constitutes about 70% of the annual rainfall. During October there is again an increase in the rainfall. The rainfall in April-May and October is mostly thundershowers. On an average there are 111 rainy days (days with a rainfall of 2.5-10 mm or more) in a year. The number varies from 122 at Mannarghat to 93 days at Chittur.



Rainfall of Palghat District based on the average of three years, 1977-79. (Data obtained from Kerala State Electricity Board).

Temperature

Temperature begins increasing after February. March is the hottest month with a mean daily maximum temperature of 37.1°C (98.8°F) and minimum of 24.6°C (76.3°F). The weather is oppressive throughout the hot season. After-noon thundershowers which are common in April and May bring a little relief to the otherwise sultry weather. The maximum temperature may go up to 41°C (105.8°F) on some days. With the onset of the southwest monsoon towards the end of May, the weather becomes appreciably cooler. After the withdrawal of the monsoon by the end of September, temperature increases again. The maximum and minimum temperatures during this time are 41.7°C (107.1°F) and 15.6°C (61.1°F) respectively.

Rivers

The 'Nilanathi' otherwise known as Bharathapuzha is the longest river in Kerala and flows into the Arabian sea. It is also called the Ponvani or Ponnani river. It is 215 km long but too shallow and rocky for navigation. It originates from the Anamalai hills and flows through Palghat and Ottapalam taluks. The important tributaries of Bharathapuzha are Gayathripuzha, Kannadi river, Korayar, Kalpathipuzha, Thuthupuzha and Kunthipuzha. Walayar and Malampuzha are also tributaries of the Bharathapuzha.

The Bhavani river springs from the Kundah mountains near Kudikadubetta in the Nilgiris. After entering Kerala it takes a right-angled turn and flows thereafter more or less northeastwards. Thus it takes a circuitous course through the Attapadi valley.

The Siruvani river originating from the Attapadi hills joins the Bhavani river at the boundary of Tamil Nadu. It flows into a deep legendary lake called Muthikulam at an elevation of about 1220 m At Muthikulam a diversion canal, takes off water for the consumption of the Coimbatore Corporation, about 45 km away, traversing the ridge through a tunnel.

The western slopes of the Silent Valley drain into Kunthipuzha in a series of parallel valleys running east to west and are characterised by the grassy banks. Kunthipuzha originating at an elevation of about 2200 m in the north and flowing southward reaches the Mannarghat plains after a course of about 30 km through the mountain ranges. It traverses the entire length of the Silent Valley, bisecting it into a narrow western sector and a broad eastern sector. There are five main tributaries to Kunthipuzha, originating from near the eastern border and flowing east-west.

The ridges are steep and the tributaries form gorges between the ridges. The crest of these ridges are mostly occupied by grasslands. Forests occur on the slopes on either side and valleys forming forest belts on either side of the tributaries. Along the narrow western sector grasslands predominate and the forest areas are restricted to patches. Before reaching the plains Kunthipuzha flows through a narrow valley strewn with huge boulders. In the Walayar reserve there is hardly any perennial water source though there are many swift-flowing temporary streams and rivulets traversing the forests in many places during the rainy season.

PREVIOUS WORK

The Malabar Coast was the sole centre of the spices trade, particularly pepper, ginger and cardamom right from ancient times. It appears that even the early Europeans who came to India, lured by the coveted spices, were much impressed by the rich and diverse tropical flora of the Western Ghats, unknown in their temperate lands. The vast amount of literature accumulated over the years may be cited as an evidence to this effect. Garcia de Orta, a Portuguese, enumerated a list of medicinal plants of India in 1565. Between 1678 and 1703 van Rheede, the then Dutch Governor of the Malabar Coast stationed at Cochin compiled the monumental *Hortus Malabaricus* with the help of the Carmelite monk Mathaeus and Itti Achuthan, a local physician, and several others and published the 12 volumes containing 794 copper plate engravings prepared at Amsterdam (1678 - 1703). It is one of the very important works in the history of taxonomic botany in that it formed a source material for Linnaeus to describe many Indian species and many of these plates are types of these Linnaean names. The utilitarian point of view of these forests of a European may be found in the statement of Buchanan (1807) when he observes that the most valuable production of these forests is their timber of which there are several good kinds but the teak is by far the most valuable. Robert Wight, a botanical prodigy, urged by his originality and far-sightedness, produced a series of books of illustrations on the South Indian plants in the mid 19th century (1830 1853). This was followed by the illustratious forester, Beddome who brought out similar books with illustrations (1868 - '74). Between 1872 - 1897, Hooker, yet another titan of taxonomy, assisted by many distinguished botanists published *The Flora of British India*, gathering all scattered works on Indian flora available till then. This flora was instrumental in accelerating further explorations and publication of provincial floras like (i) *Flora of the Presidency of Madras* by Gamble & Fischer (1915 1936) (ii) *Flora of the Presidency of Bombay* by Cooke (1901 - 1908) etc Other

workers like Blatter, Bourdillon, Dalzell, Fischer, Fyson, Rama Rao, Santapau and Talbot have made significant contributions to the knowledge of the flora of South India.

The exiguous information available on the flora of Palghat district is in the form of fragmentary publications. The Forest Department has periodically prepared the Working Plans for forest operation of timber extraction. The District Gazetteer also briefly deals with the flora and fauna. The sporadic collections made by Wight (1844 1848), Cleghorn (1852 1859), Beddome (1865 1873), Lawson (1883 1884), Barber (1898), Fischer (1914 1916), Rangachariar (1916), Jacob (1923 1925) and Raju & Rathinavelu (1929) are housed in the MH. As regards the publications with direct relevance to the flora of the district, mention may be made of Aiyar (1932) who has dealt with the sholas of the Palghat Division. Chandrasekharan (1962) has described the forest types of Kerala in general. Recently, Sebastine, Joseph, Ansari, Nair and Bhargavan have also made collections particularly from the Silent Valley and its environs.

MATERIALS AND METHODS

Several field trips, each ranging from 15 20 days, were undertaken from 1965 1980 to the various parts of the district covering all seasons and all types of forests of the two Forest Divisions *viz.*, Palghat and Nemmara. Collections were repeated till full data on flowering and fruiting were gathered. Detailed field notes were prepared for each species usually in the field itself. Characters and details that cannot be observed in a herbarium specimen such as height of the plant, nature of bark in case of trees, smell of the leaf/flower, colour of the flower/fruits, pubescence or secretions on the vegetative and reproductive parts, nature and position of flowers and inflorescences, characteristics of juvenile and senile leaves, associated plant species, nature of soil and other preference, if any, were noted down. Usually six specimens of the same plant were collected with a view of exchanging with other herbaria. For rare or otherwise interesting plants pickled flowers and fruits were also gathered. In instances like fruits, and plant parts of economic importance, specimens with the same field number were also collected for the museum. Live specimens particularly orchids and other plants of ornamental/biological interest were also gathered for introduction in the garden. After processing them in the conventional way (Fosberg & Sachet, 1965) like poisoning with alcohol saturated with mercuric chloride, pressing and repeated changes in blotters, all the specimens were got mounted, labelled and identified with the help of regional floras and old authentic herbarium

specimens in MH, CAL and a few at Kew. Most of the determinations were made using fresh plants. Critical studies of some of the species which posed difficulties were made with the help of a microscope in the laboratory. They were finally incorporated in the Madras Herbarium (MH), under the custody of the Botanical Survey of India, Southern Circle, Coimbatore. Data were also gathered from the old collections from this district after careful examination. Critical taxonomic notes were prepared as and when the species were identified and before incorporating them in the herbarium.

GENERAL ASPECTS OF THE VEGETATION

Champion and Seth (1968) have dealt with the many types of forests in Kerala. The following types are met with in Palghat district.

Tropical wet evergreen forests

This type of forest, the most magnificent among forests, occurs in the Silent Valley region and Karapara region of the Palghat and Nemmara Divisions respectively. All the characteristics that are attributed to the tropical wet evergreen forests (Richards, 1952) are observable here. Apart from other factors, the climatic factors such as heavy and prolonged rainfall, high relative humidity and good sunshine are responsible for the dense vegetation with a myriad plant species and their infraspecific categories. With their towering trees, twisting vines and dense undergrowth these forests are apparently impenetrable. The trees with various heights show stratification.

Top storey

The lofty trees of the top storey might reach a height of 45 m or more. Dominance of any one species is rarely met with. They may have a bole of 30 m high and 5 m or more in girth and the canopy is extremely dense. *Canarium strictum*, *Cullenia exarillata*, *Actinodaphne tadulingamii*, *Dipterocarpus indicus*, *Calophyllum apetalum*, *Palaquium ellipticum*, *Poeciloneuron indicum*, *Vateria indica*, etc. are some of the characteristic and common trees of this layer. Buttresses are seen in some of these giants such as *Dimocarpus longan*, *Elaeocarpus tuberculatus*, *Mesua nagassarium*, etc. However, the notion that the rain forest trees have pale, thin and smooth bark appears to be a fallacy as has been pointed out by Whitmore (1975). Members of the Dipterocarpaceae do exhibit a fissured bark. Cauliflory (ramiflory) is yet another feature exhibited by some of these trees, eg. *Baccaurea courtallensis*, *Artocarpus heterophyllus*, *Cullenia exarillata*, *Diospyros bourdillonii* etc. The leaves are broad, leathery, dark-green and generally with entire margins. The trees of the various layers are festooned by a variety of lianas. There are epiphytes of various kinds

on these trees, particularly orchids, ferns and aroids. Apart from these the stems and branches are often covered by lichens and mosses.

In the wake of the heavy showers of monsoon, due to the brightly coloured juvenile foliage, the landscape gradually takes on masses of variegated colour. The white and pink of *Mesua nagassarium*, the violet of *Poecilloneuron indicum* and *Mangifera indica*, the crimson of *Dimocarpus longan* (*Euphoria longan*), *Schleichera oleosa* and the yellow of *Canarium strictum*, *Diospyros bourdillonii*, *Polyalthia fragrans*, *P. cerasoides* are a striking feature of these forests.

The following are some of the more common species of this layer. *Aglaia anamallayanum*, *Artocarpus heterophyllus*, *A. hirsutus*, *Calophyllum austroindicum*, *Canarium strictum*, *Chrysophyllum roxburghii*, *Cinnamomum sulphuratum*, *C. wightii*, *Dimocarpus longan*, *Diospyros nilagiricum*, *Elaeocarpus munronii*, *E. tuberculatum*, *Garcinia gummi - gutta*, *Hopea ponga*, *Hydnocarpus alpina*, *Lophopetalum wightianum*, *Meiogyne ramarowii*, *Mesua nagassarium*, *Mangifera indica*, *Meliosma pinnata* ssp. *arnottiana*, *Myristica dactyloides*, *Persea macrantha* and *Polyalthia coffeiodes*.

Middle storey or Second storey

Though this layer consists of trees less in height than in the top storey, there may be overlapping of some of the species occurring in the top canopy. The usual components of this layer are : *Achronychia pedunculata*, *Actinodaphne malabarica*, *Antidesma menasu*, *Agrostistachya meeboldii*, *Baccaurea courtallensis*, *Bischofia javanica*, *Breynia patens*, *Canthium dicoccum* var. *umbellatum*, *Cinnamomum iners*, *C. macrocarpum*, *C. sulphuratum*, *Cryptocarya bourdillonii*, *Drypetes elata*, *Diospyros candolleana*, *Fahrenheitia zeylanica*, *Garcinia morella*, *Glochidion ellipticum*, *G. neilgherrense*, *G. malabaricum*, *Gomphandra tetrandra*, *Grewia tiliifolia*, *Holarrhena pubescens*, *Homallum zeylanicum*, *Ficus beddomei*, *F. drupacea* var. *pubescens*, *F. talbotii*, *Litsea floribunda*, *L. oleoides*, *Miliusa wightiana*, *Macaranga indica*, *Meliosma simplicifolia*, *Meiogyne ramarowii*, *Mallotus beddomei*, *Knema attenuata* etc.

Third storey

This layer usually consists of small trees and shrubs. The general composition of this layer are : *Alstonia venenata*, *Antidesma menasu*, *Ardisia solanacea*, *Boehmeria glomerata*, *Breynia retusa*, *B. scandens*, *B. vitis - idaea*, *Capparis baduca*, *Calamus ratang*, *Cayratia pedata*, *Clerodendrum viscosum*, *Grewia disperma*, *Helicteres isora*, *Indigofera colutea*, *Ixora cuneifolia*, *Isonandra lanceolata*, *Lasianthus jackianus*, *Laportea crenulata*, *Leea indica*, *Memecylon heyneanum*, *Mussaenda glabrata*, *Maesa*

indica, *Microtropis latifolia*, *Nilgirianthus heyneanus* var. *neesii*, *N. foliosus*, *Pavetta hispidula*, *P. tomentosa*, *Pogostemon benghalensis*, *Saprosma fragrans*, *Sauropus androgynus*, *Solanum stramonifolium*, *S. gigantium*, *Syzygium benthamianum*, *S. hemisphericum*, *S. laetum*, *Thottea siliquosa* and *Wendlandia thyrsoidea*.

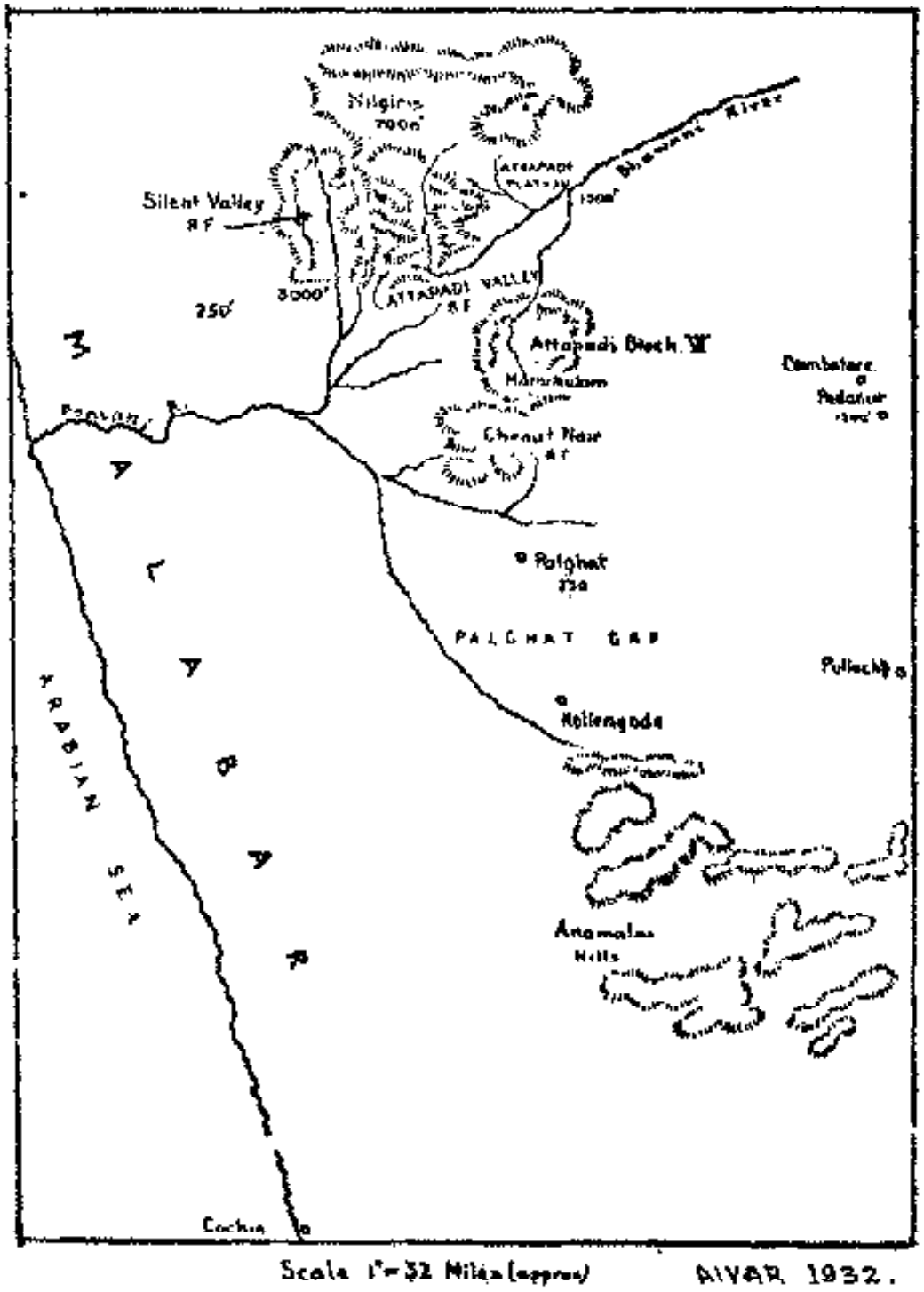
The ground flora is sparse, occurring in certain places where there is penetration of sunlight. However, where the canopy is extremely dense there may not be any undergrowth at all. The following are some of the common components of the ground cover : *Abelmoschus angulosus*, *Arisaema leschenaultii*, *Anaphyllum wightii*, *Begonia malabarica*, *Blumea belangeriana*, *Dichrocephala integrifolia*, *Impatiens kleinii*, *Laggera pterodenta*, *Lepianthus umbellata*, *Murdannia esculenta*, *M. lanuginosa*, *Neurocalyx calycina*, *Ophiorrhiza hirsuta*, *Pellionia heyneana*, *Pilea melastomoides*, *Rhynchotechum permolle*, *Sarcandra chloranthoides*, *Zingiber montanum* etc. There are also many species of ferns in the ground layer.

Aiyar (1932) mentions the following associations of tree species in the tropical rain forests : 1. The *Cullenia Palaquium* Association, 2. The *Palaquium Mesua* Association, 3. The *Poeciloneuron—Palaquium* Association, 4. The Reed—*Calophyllum* Association, 5. The Reed—*Poeciloneuron* Association, 6. The *Mesua—Calophyllum* Association, 7. The *Vateria—Cullenia* Association and 8. The *Vateria—Mesua* Association.

Most of these communities mentioned by Aiyar (1932) for the then Palghat Division are still observable to a limited extent in the present area of study. However, they are not that sharp and distinct as has been stated by Aiyar (1932). It might be the result of the degradation of these forests due to human interference in the past five decades. The association of reed with either *Calophyllum* or *Poeciloneuron*, if any, is not prominent.

Climbers

Gigantic climbers or lianas and twiners or climbers on the lofty trees of the evergreen forest, comprising one of the synusiae (Richards, 1952 ; Whitmore, 1975) is a common feature. They belong to diverse families. The curious gymnosperm *Gnetum ula* is of common occurrence. Some of the other common species are *Butea parviflora*, *Canavalia gladiata*, *Cayratia pedata*, *Cissus rèpanda*, *C. glauca*, *Connarus sclerocarpus*, *Combretum latifolium*, *Dioscorea oppositifolia*, *D. tomentosa*, *D. bulbifera*, *Entada rheedii*, *Glycine wightii*, *Gymnopetalum wightii*, *Jasminum rottlerianum*, *Loeseneriella arnottiana*, *Naravella zeylanica*, *Pothos scandens*, *Tetrastigma sulcatum*, *Tiliacora acuminata*, *Trichosanthes bracteata* and *Zanonia indica*.



Sholas of Palghat district

Epiphytes

These form a dependent synusia on the lofty trees. They perch on the branches and trunks of the trees. They mostly belong to the skiophytic or shade loving group, adapted to the cooler, darker and moister microclimates within the forest canopy. They also belong to diverse groups. Members of the Orchidaceae, ferns and some aroids are common. *Aeschynanthus perrottettii* with scarlet handsome flowers, *Belosynopsis vivipara* with radical and cauline leaves, *Medinilla beddomei* with fleshy leaves, *Remusatia vivipara* with bulbiferous shoots are notable among them apart from the many epiphytic orchids dealt with separately. A rather special group of the synusia of epiphytes are the hemiparasitic epiphytes which are attached to the host tree by haustoria. Most of the Loranthaceae belong here. Plants like *Dendrophthoe falcata, Helicanthes elasticus, Helixanthera intermedia, Macrosolen capitellatus, M. parasiticus, Scurrula cordifolia, S. parasitica, Viscum angulatum, V. nepalense* etc. are of common occurrence. However, root parasites like *Aeginetia indica, A. peduncularis, Balanophora fungosa* spp. *indica* and *Striga angustifolia* form part of the ground floor vegetation.

In certain places on the banks of the Kunthipuzha river, large populations of *Arenga wightii, Schumannianthus virgatus, Pinanga dicksonii* etc. are found. *Ochlandra* species also occurs in large patches in this area which was always found in vegetative condition.

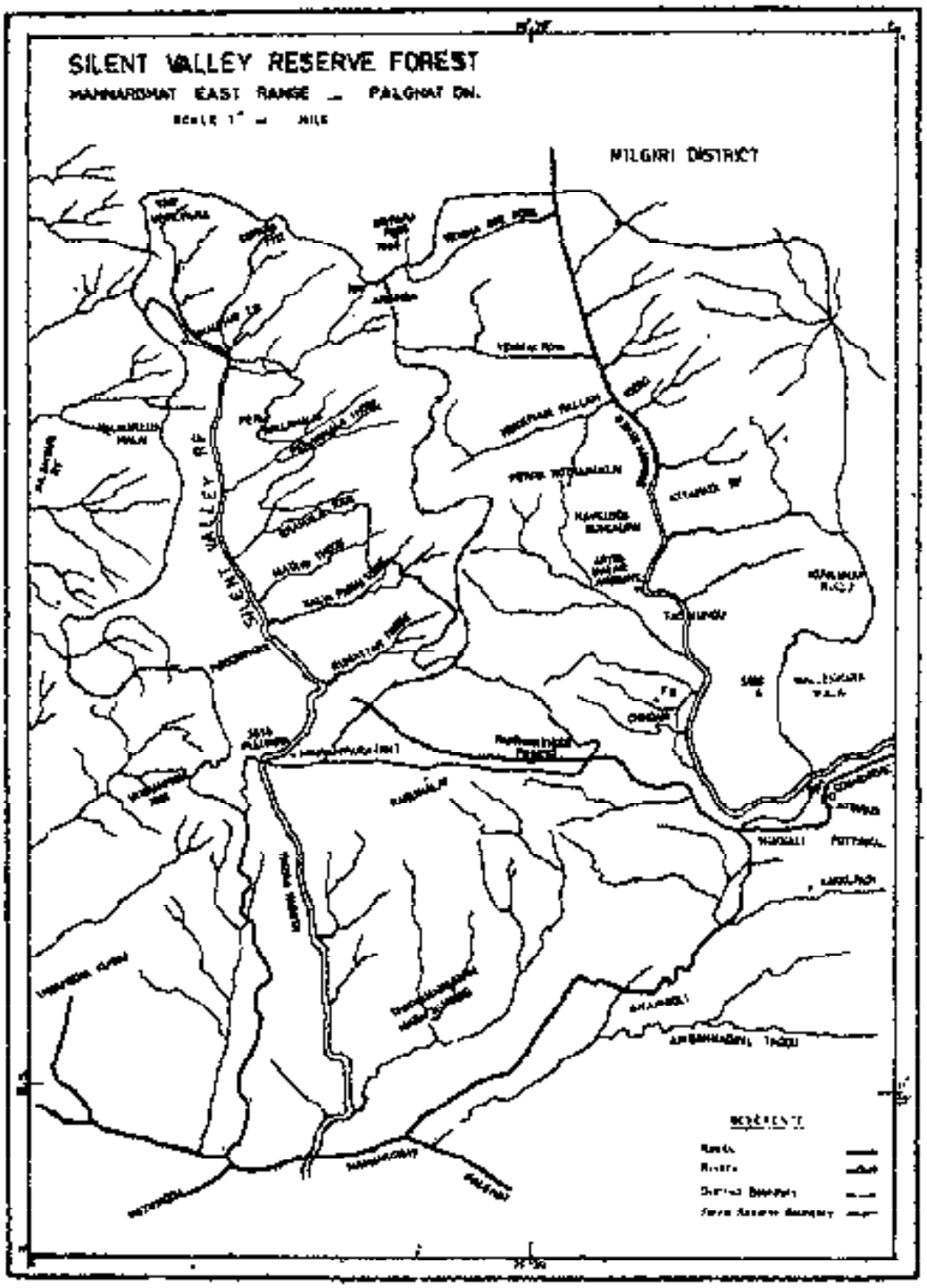
Herbaceous flora

Though the ground cover in the upper ghat is very sparse, it is very rich in other lower regions of the district. Common herbs that occur in the area are *Abelmoschus angulosus, Begonia malabarica, B. floccifera, Blumea belangeriana, B. mollis, Cassia mimosoides, Cleome monophylla, Crotalaria retusa, Canscora decurrens, Curculigo orchioides, Cyanotis cristata, Centella asiatica, Desmodium gangeticum, Erigeron canadensis, Exacum pumilum, Impatiens kleinii, I. scapiflora, I. viscosa, Kalanchoe florihunda, Laggera pterodonta, Neurocalyx calycina, Ophiorrhiza mungos, O. prostrata, Osbeckia aspera* var. *wightiana, Polygala elongata, P. rosmarinifolia* and *Sonerila rotundifolia.*

In the forest clearings weeds colonise as pioneers and are followed by shrubby species of *Wendlandia, Laportea* and other fast - growing species of *Acacia, Hypericum, Leea, Macaranga, Trema* and *Lantana.*

The Silent Valley

The Silent Valley is about 45 km north of Mannarghat, the nearest town. The entire forest is on a plateau. The extent of this reserve is


SILENT VALLEY RESERVE FOREST
NILGIRI DISTRICT
SILENT VALLEY R.F.

about 8,952 hectares. It is a unique tract of forest and is one of the few tropical rainforests that still remain relatively undisturbed by human interference. The tropical rainforests are the richest expressions of life that have evolved on this planet having a continuous history of several million years of evolution. It is important for the survival of certain rare and endangered species. It is unique in its flora and fauna. Its flora is so diverse and complex that plant breeders would find it an invaluable gene pool. The Silent Valley area remains in a near-virgin state for ages because of its inaccessible and impenetrable nature and lack of means of communication. In the Silent Valley and in Karapara river forests, the free flowing rivers have a natural shoreline vegetation which provides habitat for many species of wildlife. Shore line vegetation offers nesting sites for various species of birds. The importance of conservation of these forests has been repeatedly voiced by conservationsists.

Tropical moist deciduous forests

This type of forests rises from the plains to an elevation up to 250 m on the western or southern slopes. Depending on the moisture in the soil and the subjection of the forest to shifting cultivation in the past, it may be met with up to 600 m or more. This is a closed, high forest with trees commonly 20-30 m or more in height. However, the dominant species are mostly deciduous ones though often briefly so when compared with the dry deciduous forest. Although intimate mixture of species is the rule, relatively small number of species together form the greater part of the canopy and relatively pure associations are frequently met with. Some evergreen dominants may be intermixed but they are few. The evergreen habit is more developed in the lower storey giving the forest as a whole a more or less evergreen appearance round the year.

This type of forest occurs in Mukkali area and Siruvani western slopes of the Palghat Division and Ayyappankoil area and Seetharkandi area of the Nemmara Division. The components of this type are *Acacia torta, Alstonia scholaris, Anamirta cocculus, Bambusa arundinacea, Butea parviflora, Baccaurea courtallensis, Begonia floccifera, Cinnamomum macrocarpum, Celtis cinnamomea, Canthium rheedii, Connarus wightii, Cyathocalyx zeylanicus, Bischofia javanica, Cycas circinalis, Costus speciosus, Entada rheedii, Callicarpa tomentosa, Fahrenheitia zeylanica, Phyllanthus emblica (Emblica officinalis), Gardneria ovata, Grewia tiliifolia,, Helicteres isora, Holigarna grahamii, Impatiens viscosa, Jasminum azoricum, J. rottlerianum, Kydia calycina, Litsea glabrata, Miliusa tomentosa, Mallotus philippensis, Macaranga peltata, Oroxylum indicum, Pterygota alata, Pterospermum diversifolium, Scleropyrum pentandrum, Syzygium mundagam, Trewia nudiflora, Terminalia paniculata, T. bellirica* etc.

Some of the commoner climbers and epiphytes of the tropical wet evergreen forest are also found to occur here. As the canopy is not that dense and the consequent penetration of sunlight, the ground layer is very well developed when compared with the wet evergreen forest.

Dry deciduous forests

This type of forests is characterised by the species deciduous during the dry season usually for several months, though some for a short period. Most of the species also occur in the moist deciduous forest where they reach the maximum development. The height of the trees usually varies from 10 to 20 m. The number of species is much less than in the foregoing types. Bamboos are often present but are not luxuriant. Canes and palms are usually absent. Climbers are comparatively few but include large woody species.

This type of forests occurs in Walayar area, Agali - Kottathora area and Anamooly slopes of the Palghat Division and Pothundy slopes and Mangalam area of the Nemmara Division.

The most characteristic trees are *Anogeissus latifolia*, *Albizia chinensis*, *A. odoratissima*, *Butea monosperma*, *Cassia fistula*, *Cochlospermum religiosum*, *Dillenia pentagyna*, *Dalbergia lanceolaria*, *D. latifolia*, *D. sissoides*, *Garuga pinnata*, *Gmelina arborea*, *Givotia rottleriformis*, *Hymenodictyon obovatum*, *Lagerstroemia microcarpa*, *Lannea coromandelica*, *Melia dubia*, *Mitragyna parvifolia*, *Pterocarpus marsupium*, *Schleichera oleosa*, *Sterculia guttata*, *S. urens*, *Tectona grandis*, *Terminalia arjuna*, *T. paniculata*, *T. bellirica*, *T. crenulata* and *Xylia xylocarpa*.

Though the forests provide many useful things to man there are dangers that lurk in these forests mostly unknown to the unwary explorer. Apart from the danger from a variety of wild animals like the elephant and ferocious giant cats, poisonous snakes, blood sucking leeches and poisonous insects, scorpion etc., there are many plants with stinging hairs, acrid juice/latex, prickles and thorns which when come in contact would be painful or even fatal. The stinging hairs of *Laportea crenulata* are irritant, itching especially when the affected part comes in contact with water. It might develop fever with violent sneezing in certain individuals. Even the elephant avoids it hence the name the 'elephant nettle'. The acrid juice of *Holigarna grahamii* can develop fever and blisters on skin. Similarly the stinging hairs on the fruits of *Mucuna hirsuta*, *M. monosperma* *M. pruriens*, *Sterculia urens* and the hispid stinging hairs on the leaves and stems of *Tragia muelleriana* are irritant and itching. Latex of some plants especially of some members of the Asclepiadaceae and Euphorbiaceae can impair the eye sight. Some of the fruits with hooks, bristles and awns may stick to the clothes as well as the skin and could give a lot of dis-

comfort to the collectors. Hooked spines of some of the species of *Acacia*, *Zyziphus*, *Toddalia*, *Solanum* etc. if got into the flesh could indeed be painful and vexing.

Grasslands

In grassy slopes small trees stand apart singly or in small groups. Species of *Phoenix* and *Phyllanthus emblica* are usually seen. Other common components of these grassy slopes are *Aeginatia pedunculata*, *Canscora bicolor*, *Crotalaria nana*, *C. salvifolia*, *Desmodium motorium*, *Exacum sessile*, *Leucas mollissima* var. *scaberula*, *Pecteilis gigantea*, *Pleocaulus sessilis*, *Smithia blanda*, *Tephrosia pulcherrima*, *Polygala rosmarinifolia* etc. The common grasses found in these grasslands are *Arundinella ciliata*, *A. mesophylla*, *Capillipedium huegelii*, *Chrysopogon hackelii*, *Cymbopogon flexuosus*, *Eleusine indica*, *Eragrostis cilianensis*, *E. pilosa*, *E. tenuifolia*, *Garnotia schmidii*, *Isachne gracilis*, *I. nilagiricum*, *Oplismenus compositus*, *Panicum gardneri*, *Paspalum conjugatum*, *Pennisetum pedicellatum*, *Setaria palmifolia*, *Sporobolus piliferus*, *Tripogon bromoides* etc.

Orchids

The forests of this district with a heavy and prolonged rainfall both from the southwest and northeast monsoons coupled with bright sunlight almost throughout the year have been a haven for epiphytic orchids. High atmospheric humidity which is prevalent most of the year is a pre-requisite for the germination, growth and multiplication of these orchids. The inaccessibility of the forest, presence of wild animals, poisonous snakes and blood sucking leeches and the unreachable height of branches of lofty trees on which they usually perch have also enabled them to thrive well without any unwanted human interference. In spite of these hurdles every attempt was made to collect as far as possible the maximum number of terrestrial and epiphytic orchids. About 70 species of orchids belonging to 44 genera could be collected from this district and studied.

Eulophia hirsuta, a terrestrial orchid with lovely yellow flowers and inhabiting open grassy slopes, and *Porpax chandrasekharanii*, a pseudobulbous, epiphytic orchid with dull white flowers are the two new finds from this district.

Endemic or otherwise rare species

Orchids like *Bulbophyllum fischeri*, *Chrysoglossum maculatum*, *Cottonia peduncularis*, *Dendrobium heterocarpum*, *D. nanum*, *Didymoplexis pallens*, *Disperis zeylanica*, *Eria albiflora*, *Habenaria multicaudata*, *Malleola gracilis*, *Oberonia santapaui*, *Pachystoma senile*, *Porpax jerdaniana*, *Tropidia angulosa* have been collected from the forests of this district.

Species like *Oberonia brachyphylla*, so far known from North Canara only, *Smithsonia straminea* (from Hassan district, Karnataka), *Trias stocksii* (from North Canara), *Eulophia emilianae* (from Hassan district), *Aphyllorchis prainii* (from Naga hills, Eastern Himalayas), *Habenaria furcifera* (from Northern and Northeastern Bombay), etc. have also been gathered from the district and they are additions to the flora of the erstwhile Presidency of Madras.

Among the terrestrial orchids, species of *Habenaria* and among the epiphytic orchids, species of *Dendrobium* and *Oberonia* predominate. *Pectelis gigantea* (=*Platanthera sussannae*) an elegant, tall orchid of grassy slopes, having ivory white, large, showy flowers and *Acanthephippium bicolor*, another very robust orchid with gibbous, purple tipped yellow flowers on lateral short racemes, could be collected in the dense forests of the Silent Valley R.F. *Arundina graminifolia* is another pretty, terrestrial orchid which resembles a tall grass while in vegetative condition, but the large, mauve flowers in terminal racemes attract even an otherwise not so attentive collector from a long distance. This has been collected from the grassy rocky slopes near Ayyappankoil area in the Nemmara Division.

Acampe praemorsa with its fragrant yellow flowers in racemes, *Aerides cylindricum* with its terete leaves, *Bulbophyllum neilgherrense* with its yellow flowers in drooping racemes, *Calanthe masuca*, a stout terrestrial orchid preferring shady places, *Cymbidium aloifolium* with its pendulous, long racemes of dark, pinkish flowers, *Dendrobium barbatulum*, a tufted epiphyte leafless when in bloom, *Eulophia nuda*, a tall tuberous herb with purple as well as greenish flowers, *Habenaria crenifera*, with its snow-white flowers mimicking a butterfly, *Oberonia brunoniana*, a robust, epiphytic herb, *Rhynchostylis retusa*, with its pinkish, showy flowers in dense, pendulous racemes, *Tainia bicornis*, with its solitary leaves and yellow flowers in long racemes and *Vanda testacea* an epiphyte are the common orchids of this district.

Epipogium roseum, a curious orchid with a disjunct distribution, occurring both in the Himalayas and the Western Ghats, has been collected from the Silent Valley R.F. It is a leafless, tuberous saprophytic orchid producing long inflorescences with succulent axis and many creamy white, drooping flowers. The inflorescence lasts for a few days only within which time the dispersal of the seeds is effected.

Rare and interesting plants

The fact that many novelties and rare or otherwise interesting plants have been discovered indicates that the flora of the district is very rich and diverse. Some plants reported from elsewhere in the Western Ghats

have been collected only from the present area of study. For instance *Amorphophallus bulbifer* (Araceae) reported from the Rumpha hills (Orissa), the Nadugani Ghat (Wynaad) and South Malabar has been collected from the Mukkali forest of this district. *Kalanchoe glandulosa* (Crassulaceae), so far thought to be confined only to the Mysore hills and Kollegal in Karnataka, has been recorded from the Karasuryamalai forest of the Nemmara forest division. *Stachyphrynium spicatum* (Marantaceae) collected by Beddome (in the last century ; no specimen in MH) from the Malabar has not been traced from any other place in the Western Ghats so far except from Mukkali forest of the Palghat forest division. Likewise *Antistrophe serratifolia* (Myrsinaceae), considered to be endemic to the Anamalai Hills of Tamil Nadu and thought to have been lost for science in the past has been found to occur in this area especially in the Silent Valley region. Another plant, belonging to Caesalpiniaceae, *Cynometra travancorica* collected by Beddome from Wynaad in 1873 and 1880 and Barber from the same locality in 1903 could be located in Vattapara Inchikuzhi of Siruvani western slopes which is far away from the above regions. Following are some of the species whose occurrence is rare in this district : *Impatiens modesta*, *I. scabriuscula*, *Millusa velutina*, *Polyalthia fragrans*, *Euonymus dichotomus*, *Loesneriella bourdillonii*, *Salacia beddomei*, *Ventilago bombaiensis*, *Crotalaria multiflora*, *C. scabrella*, *Derris thothathrii*, *Desmodium motorium*, *D. triflorum*, *Goniogyna hirta*, *Rhynchosia rufescens*, *Tephrosia canarensis*, *T. wynaadensis*, *Vigna grahamiana*, *V. vexillata*, *Mezoneuron cucullatum*, *Cassia leschenaultiana*, *Kalanchoe laciniata*, *Eugenia indica*, *Syzygium lanceolatum*, *Medinilla beddomei*, *Sonerila rotundifolia*, *Begonia integrifolia*, *Solena amplexicaulis*, *Zanonia indica*, *Zehneria thwaitesii*, *Aralia malabarica*, *Polyscias acuminata*, *Geophila repens*, *Mycetia acuminata*, *Psychotria congesta*, *Saprosma fragrans*, *Tarenna nilagirica*, *Vernonia conyzoides*, *Antistrophe serratifolia*, *Ardisia pauciflora*, *Xantolis tomentosa* var. *elengioides*, *Diospyros buxifolia*, *D. paniculata*, *D. tomentosa*, *D. toposia*, *Symplocos foliosa*, *S. pulchra*, *Myxopyrum serratulum*, *Anodendrum rhinosporum*, *Chilocarpus atrovirens*, *Hunteria corymbosa* var. *roxburghiana*, *Ceropegia intermedia*, *C. thwaitesii*, *Hoya ovalifolia*, *Toxocarpus palghatensis*, *Strychnos wallichiana*, *Argyreia sericea*, *Ipomoea staphylina*, *I. wightii*, *Torenia hirsuta*, *T. travancorica*, *T. vagans*, *Utricularia bifida*, *Epithema carnosum* var. *hispida*, *Andrographis alata*, *Gymnostachyum canescens*, *Mackenziea caudata*, *Nilgirianthus asper*, *N. barbatus*, *N. beddomei*, *Xenacanthus pulneyensis*, *Lippia alba*, *Coleus malabaricus*, *Rabdosia wightii*, *Pogostemon purpurascens*, *Polypleurum dichotomum*, *Willisia selaginoides*, *Helicia nilagirica*, *Croton malabaricus*, *Glochidion neilgherrense*, *Dorstenia indica*, *Elatostema surculosum*, *Lagenandra ovata*, *Theriophonum fischeri*, *Cyperus compressus*, *Pycreus pumilus*, *Brachiaria milliformis*, *Eragrostis gangetica*, *E. pilosa*, *Eulalia trispicata*, *Garnotia tenella*, *Ischaemum nilagiricum*, *Jansenella griffithiana* and *Oryza rufipogon*.

Endemism

The species rich tropical forests of the Western Ghats exhibit a high degree of endemism. They also harbour many rare and interesting plants. In Palghat District, the rich tropical forests are well known for their endemic and rare species. Subramanyam and Nayar (1974) report about 90 characteristic species as endemic to the whole of the Western Ghats. The area of Palghat district when compared with the Western Ghats which stretch from Kanyakumari (Cape Comerin) in Tamil Nadu to the mouth of the river Tapti in Gujarat, is just a fragment. When viewed against this backdrop, the occurrence of 65 endemic species from the district might well testify the great significance of the flora of the district.

Some of the endemic species collected from the district are *Actinodaphne tadulingamii, Aglaia anamallayana, A. lawii, Antistrophe serratifolia, Apodytes dimidiata, Arenga wightii, Arundinella mesophylla, Baccaurea courtallensis, Bulbophyllum fischeri, B. neilgherrense, B. tremulum, Calophyllum apetalum, C. austroindicum, Chilocarpus atrovirens, Ceropegia intermedia, Cynometra travancorica, Dendrobium nanum, Elaeocarpus tuberculatus, Dipterocarpus indicus, Erythropalum populifolium, Garcinia gummi-gutta, Garnotia arundinacea, Ficus macrocarpa, Isonandra lanceolata, Ischaemum rangacharianum, Knema attenuata, Leucas prostrata, Chionanthes mala-elengi, Myxopyrum serratulum, Nothopodytes nimmoniana, Palaquium ellipticum, Pittosporum dasycaulon, Poeciloneuron indicum, Pouzolzia wightii* var. *caudata, Rapanea wightii, Thottea siliquosa, Vateria indica* and *V. macrocarpa*.

Aquatic plants

Rotula aquatica is abundant on Bhavani river bank. *Blyxa echinosperma* is abundant in still waters in paddy fields. *Hydrilla verticillata* and *Ottelia alismoides* are also commonly found in still waters. *Nelumbo nucifera* is cultivated in tanks near Nemmara for the sacred lotus flowers as well as for the leaves. Other species like *Nymphaea nouchali, N. pubescens, Eichhornia crassipes* are abundant in tanks near Kollenkode town. *Typha angustata* is found as pure formations along Walayar and Malampuzha canals. *Cryptocoryne retrospiralis*, with elongate spathes is found in abundance in the sandy beds of Bhavani river. *Lagenandra ovata, L. meeboldii* etc. are found along streams. *Spirodela polyrhiza* covering the water surface giving an appearance of a green mat over still waters, *Pistia stratiotes*, a floating herb and *Nymphoides cristata* are abundant in certain tanks in the plains.

HILL TRIBES

There are many tribal settlements in the hill forest areas of the Palghat Division. Anamooly, Anavayee, Chindaki, Agali, Attapadi, Karivara, Kakkupadi, Kadugumannu, Thadikkundu, Thodukki, Sholayur, Siruvani, Walayar and Dhoni are some of the tribal villages. Irulas, Mudugas and Kurumbas are the main subcastes among the tribal populations. Irulas and Mudugas are agricultural communities whereas Kurumbas are forest labourers. Kadars are another tribe, who inhabit the Sirunelli Estate areas, Seetharkandi and Minnampara, all about 10 km west of Parambikumam. Most of them are forest labourers and some of them are mahouts who are good at trapping and taming elephants. The Kerala State Government has provided permanent quarters in the above villages and they are engaged in forest operational works. They collect honey and other minor forest products for the contractors and eke out a living. There are a few schools in the above villages for the children of these tribal people.

ENVIRONMENTAL FACTORS

Due to the influence of man and domestic animals, the vegetation in general has been affected very much. Forests have been destroyed and eucalyptus, teak etc. are introduced in some of the forest areas by the Forest Department. Many hill tribe settlements have sprung up along the fringes of the forests. The tribal people used to practice shifting cultivation in the past by felling and burning vast areas of the forests and cultivating crops like ragi, redgram, sorghum etc. Now in many forest slopes terrace cultivation is being practised. Such terrace cultivation is found along the slopes of Agali, Kottathora, Thavalam area of the Attappadi blocks of the Palghat Division. In Sirunelli estate area of the Nemmara Division also this type of cultivation is in practice. But at present the forest department has allotted land to these tribal people with the hope of getting the forest protected without further depletion. Further, the Forest Department after removing the ground growths like shrubs, herbs and other climbers, raise cardamom, tea and coffee plantations, on a co - operative basis for the welfare of the tribal people in Mukkali, Chindaki, Karuvara, Thadikkundu and Anavayee areas of Mannarghat Range. Most of them are employed in the estate/plantation works. Further they are also engaged in cutting bamboos, canes etc. from the interior forests and bringing them to the point where transport facilities are available, and in operational works of forest plantations like digging pits, transporting the seedlings, manure, planting the seedlings, watering, weeding and finally harvesting the forest products. Human activities are on the increase day by day in these forests as could be seen during the explorations

of the author between 1965 and 1980, leading to reduction in the area of the forests. Thick primary forests have been reduced to secondary ones and even to barren lands at several places near Mukkali,. Panthanthode, Karivara and Chindaki area. The overall effects of such degradation and disappearance of forests, particularly on the inter dependent species, more so on the arboreal and other mammals are yet to be assessed by the experts concerned to focus the attention of the administrators to save the forests.

Grazing and browsing of domestic animals over forest areas has also of late increased much in Dhoni, Walayar, Thavalam and Kottathora area of the Palghat Division and Pothundi and Mangalam slopes of the Nemmara Division. Apart from this, livestock trampling of the seedlings adversely affect regeneration of forest species to a great extent.

Large scale collection of firewood by local villagers around Mukkali slopes near Anamooly village, Dhoni forest, Pothundy slopes and Mangalam dam area for selling in nearby towns is a common sight. This leads to a great depletion of forests. Setting fire to the undergrowths in summer by cattle owners to get a fresh flush of grass growth sometimes leads to the destruction of large forests and wildlife. But the Forest Department has been seeking the cooperation of the public to help in saving the forests from such devastations.

PLANTS OF ECONOMIC IMPORTANCE

Timber trees

The rich forests of this district provide many useful products. Many trees useful for construction, furniture, railway sleepers and several other purposes grow in the forests. Some of them which yield very good timber of commerce are *Artocarpus heterophyllus*, *A. hirsutus*, *Cullenia exarillata*, *Diospyros bourdillonii*, *Dipterocarpus indica*, *Elaeocarpus tuberculatus*, *Mesua nagassarium*, *Hopea ponga*, *Calophyllum apetalum*, *Palaquium ellipticum* and *Vateria indica*.

In addition to this there are several other economically important trees found in these forests. For example, *Albizia chinensis*, *A. odoratissima*, *Aphanamixis polystachya*, *Ceiba pentandra*, *Bombax insigne*, *Dalbergia lanceolaria*, *Haldina cordifolia*, and *Xylia xylocarpa* are common and these are very useful for match and plywood industries as well as for making packing cases (Dealwood cases) etc.

Fibres

Fibres used for making very durable ropes can be obtained from the species of *Aglaia, Abelmoschus, Agave, Acacia, Hibiscus, Sterculia, Kydia, Tetrastigma, Bauhinia* etc. Apart from the husks of coconuts which provide the well known coir, the petioles of palmyra leaves are also used to make ropes and other fibre products. Other fibre yielding plants include *Helicteres isora, Grewia tiliifolia* and *Rourea minor* which are not exploited properly.

Edible tubers and fruits

The hill tribes depend upon the wild tubers of *Dioscorea* species. Wild edible fruits are obtained from the following plants : *Antidesma menasu, A. diandrum, Alangium salvifolium, Artocarpus heterophyllus* (also cultivated), *Baccaurea courtallensis, Calamus rotang, Canthium travancoricum, Ficus racemosa, Flacourtia indica, Mangifera indica* (largely cultivated also), *Nymphaea pubescens* (seeds), *Phoenix humilis* var. *pedunculata, Phyllanthus emblica, Rubus micropetalus, R. wightii, Syzygium cuminii, Physalis minima, Solanum nigrum*, etc.

Medicinal plants

Though most of the plants are useful to mankind in one way or other, the following species are medicinally important whose curative properties have been well established : *Aegle marmelos, Adhatoda zeylanica, Acalypha racemosa, Alangium salvifolium, Anamirta cocculus, Aristolochia indica, Boerhavia diffusa, Bauhinia racemosa, Biophytum sensitivum, Buddleia asiatica, Cardiospermum helicacabum, Cassia fistula, Canarium strictum, Centella asiatica, Costus speciosus, Datura metel, Entada rheedii, Ficus asperrima, Gloriosa superba, Gmelina arborea, Gymnema sylvestre, Helicteres isora, Hemidesmus indica, Holarrhena pubescens, Iphigenia indica, Ichnocarpus frutescens, Jatropha curcas, Knema attenuata, Momordica dioica, Myristica dactyloides, Murraya paniculata, Naregamia alata, Physalis minima, Plumbago zeylanica, Rauvolfia serpentina, Solanum nigrum, S. torvum, Scilla indica, Tinospora cordifolia, Terminalia bellirica, T. chebula, Vitex negundo* etc.

Avenue trees and other cultivated plants

Some quick growing trees with spreading crowns are usually planted on either sides of the roads. The common avenue trees of this district are *Delonix regia, Syzygium cuminii, Ficus benghalensis, Mangifera indica, Azadirachta indica, Pongamia pinnata, Polyalthia longifolia, Samanea saman, Thespesia populnea* etc.

The Agricultural Research Station for fruits, vegetables and spices, commonly known as the Orange Farm at Padagiri in Nelliampathy Ghat is run by the Government of Kerala. Apart from oranges, a wide variety of vegetables are grown and sold to the public. Orange squash, jam etc. are the main products of the farm. Coffee, tea, cardamom and pepper are cultivated in large areas in the district. Groves of *Areca catechu*, *Cocos nucifera*, *Anacardium occidentale*, *Hevea brasiliensis* are commonly found in and around villages.

Tapioca (*Manihot esculenta*), many varieties of banana (*Musa* spp.), many kinds of vegetables, pulses, groundnut, tobacco, turmeric, ginger etc. are cultivated in many places in the district. Papaya is usually cultivated as a kitchen garden plant. Several varieties of paddy (*Oryza sativa*) and sugar cane (*Saccharum officinarum*) are the main crops in the plains. Ragi (*Eleusine coracana*), sorghum and redgram (*Cajanus cajan*) are the main crops of the hill tribes.

The Kerala State Forest Department has raised plantations of eucalyptus, teak (*Tectona grandis*), *Dalbergia paniculata*, bamboo (*Bambusa arundinacea*) etc. in Anavayee, Karivara, Chindaki, Panthanthode, Kakkupadi, Agali slopes, Sholaiyur slopes, (Palghat Division) and Pothundi slopes and Mangalam area (Nemmara Division).

STATISTICAL DATA

The data presented hereunder are based on the intensive and extensive explorations conducted in the district by the author as well as others. A total of about 1355 species belonging to 732 genera and spread over 146 families of flowering plants have been collected and studied. The following are the dominant families representing more than 20 species.

1.	Fabaceae	(132)	7.	Cyperaceae	(48)
2.	Poaceae	(81)	8.	Asteraceae	(38)
3.	Orchidaceae	(73)	9.	Lamiaceae	(32)
4.	Euphorbiaceae	(61)	10.	Commelinaceae	(29)
5.	Acanthaceae	(59)	11.	Convolvulaceae	(25)
6.	Rubiaceae	(52) and	12.	Asclepiadaceae	(24)

Likewise the dominant families having more than 20 genera are :

1.	Fabaceae	(58)	5.	Acanthaceae	(29)
2.	Poaceae	(53)	6.	Asteraceae	(28)
3.	Orchidaceae	(42) and	7.	Rubiaceae	(28)
4.	Euphorbiaceae	(32)			

A comparison of these dominant families with those of Gamble & Fischer for the Flora of the Presidency of Madras and Hooker for the Flora of British India bring out certain interesting aspects.

Palghat District (Present study)	Flora of the Presidency of Madras by Gamble & Fischer	Flora of British India by J.D. Hooker
1. Fabaceae	1. Fabaceae	1. Orchidaceae
2. Poaceae	2. Poaceae	2. Fabaceae
3. Orchidaceae	3. Rubiaceae	3. Poaceae
4. Euphorbiaceae	4. Acanthaceae	4. Rubiaceae
5. Acanthaceae	5. Euphorbiaceae	5. Euphorbiaceae
6. Rubiaceae	6. Orchidaceae	6. Acanthaceae
7. Cyperaceae	7. Asteraceae	7. Asteraceae
8. Asteraceae	8. Cyperaceae	8. Cyperaceae
9. Lamiaceae	9. Lamiaceae	9. Lamiaceae
10. Commelinaceae	10. Urticaceae	10. Urticaceae

It is evident from the above comparison that in dominance families like Fabaceae, Poaceae and Lamiaceae show similarity to that of Gamble's flora, while most of the families slightly vary in position of dominance with that of Hooker's flora. On the contrary only one family, viz., Lamiaceae resembles that of both the floras in order of dominance.

PLAN OF PRESENTATION

The classification of Bentham & Hooker (1862 83) has been followed since the Madras Herbarium is arranged according to this system. However, in the circumscription of certain families that have been recently split up, Hutchinson's concept (1959) has been adopted. An artificial key to the families has been provided. In the enumeration, key to the genera under each family and key to the species under each genus has been given. The genera under each family and species under each genus are arranged alphabetically While for the generic names only authorities are given, for each species the correct name with the original citation according to the International Code of Botanical Nomenclature followed by the basionym, if any, and some of the synonyms commonly used in Indian floras, are provided along with references to the Icones of Wight/ Beddome, *Flora of British India*, *Flora of the Presidency of Madras* and other monographs, revisions or otherwise related papers. Abbreviations of the periodicals are mainly according to Botanico Periodicum -

Huntianum (BPH 1968), except where conventional use demands otherwise. Vernacular names—(Tam.)=Tamil, (Mal.)=Malayalam—are furnished wherever available. The nomenclatural citation of each species is followed by a short description highlighting only the main diagnostic features. It is followed by flowering and fruiting periods, data on frequency, habitat, collector's name in certain cases, and rarity/endemism, if any. Two major floristic divisions of the Ghats (the upper and lower) are recognised for indicating the habitat. The division of the Ghats is done arbitrarily demarcating the lower Ghats as up to 900 m and the upper Ghats as above 900 m and the plains up to 200 m. Critical notes on taxonomy and nomenclature, medicinal or other economic uses are also given. Ornamentals, garden plants or other cultivated plants and introduced aliens (about 63 species) now found to have run wild in the district are mentioned under the genus or at the end of the family concerned.

CONCLUSIONS

The following are the important findings of the present investigation on the flora of Palghat District, Kerala.

A total of about 1355 species belonging to 732 genera spread over 146 families of flowering plants have been gathered and critically studied. Ferns and fern allies comprising about 120 species have been excluded from the present work. It may be emphasised that this total number of species of flowering plants which amounts to about 25% of the species dealt with by Gamble & Fischer (4516 species) in the Flora of the Presidency of Madras, might indicate that the flora is very rich as the area covered is only 4400 sq km. There is a wealth of timber trees belonging to diverse families particularly Dipterocarpaceae, Combretaceae, Clusiaceae, Sapotaceae, Ebenaceae, Lauraceae, Myrtaceae, Leguminosae etc. These forests particularly those of the Silent Valley are rich in germplasm resources, relatives of cultivated plants which might be indispensable in future plant breeding for disease and pest resistance and quality. Some of the plants of this kind are *Hedychium*, *Alpinia*, *Cissus*, *Myristica*, *Piper*, *Zingiber*, *Oryza*, *Curcuma* etc., which are common in the area. Besides, wild plants yielding edible fruits like *Antidesma menasu*, *A. diandrum*, *Alangium salvifolium*, *Baccaurea courtallensis*, *Calamus rotang*, *Canthium travancoricum*, *Ficus racemosa*, *Flacourtia indica*, *Mangifera indica*, *Phyllanthus emblica* and *Rubus micropetalus* are common. These can be fruitfully utilised by man in future. The present investigation also brings to light the fact that many wild plants of ornamental value particularly the orchids can be success-

fully introduced in gardens. Species of *Eulophia, Pecteilis, Rhynchostylis, Acanthephippium, Habenaria* etc. need special mention in this regard. There are about 70 species of orchids in the district.

New genus

Silentvalleya Nair, Sreekumar, Vajravelu & Bhargavan of the family Poaceae, which is a tufted perennial grass related to the very rare genus *Diplachne* was collected from the grassy slopes of the Silent Valley R.F.

New species

1. *Silentvalleya nairii*, the type species of the above genus, could be collected only twice from the above locality.

2. *Eulophia hirsuta* Joseph & Vajravelu, is a terrestrial tuberous orchid with tuberous stem base and the scape leafless when flowering, with beautiful golden yellow flowers. It was collected from the open grassy slopes in Anamada region of the Nemmara Division.

3. *Hedyotis silent-valleyensis* Vajravelu, Rathakrishnan & Bhargavan (Rubiaceae) is a handsome shrub with pale pink corolla and deep purple calyx. It was gathered from the open grassy slopes near the Silent Valley Dam site.

New genus and species discovered by other workers

1. *Kanjaram*, a new genus (Acanthaceae) described from the area of study by K. Ramamurthy in *Bull. Bot. Surv. India* 13 : 153-155. 1971, is a shrub, quite common in the moist deciduous forest in Mukkali area in the Palghat Division. *Kanjaram palghatense* which is the type species of the genus was collected by the author from the Silent Valley R.F., a little away from the type locality.

2. *Porpax chandrasekharanii* Bhargavan & Mohanan, of the Orchidaceae was published in *Curr. Sci.* 51 : 990 992. 1982. It is a small epiphyte collected from the Silent Valley R.F.

3. *Rotala malampuzhensis* Vasudevan Nair (in *J. Bombay Nat. Hist. Soc.* 72 : 56 60. 1975) ex Cooke in *Boissiera* 29 : 98. 1979, a small lythraceous plant of marshy localities has been collected from around the Malampuzha Dam in the Palghat Division.

4. *Oryza officinalis* Wall. ex Watt ssp. *malampuzhaensis* (Krishnas. & Chandrasek.) Tateoka in *Bot. Mag. Tokyo* 75 : 422. 1962. *O. malampuzhaensis* Krishnas. & Chandrasek. in *Madras Agri. J.* 45 : 471. 1958.

It is tufted annual plant in marshy places with small spikelets in lax spreading panicles. Reported from Malampuzha area but could not be collected.

It appears to be one of the potential germplasm plants for hybridization/plant breeding in the improvement of the commercial food crop, *viz.*, paddy—*Oryza sativa* L.

New reports

Aphyllorchis prainii, an erect, saprophytic, leafless member of the Orchidaceae, earlier recorded from the Naga hills (Upper Assam) and doubtfully included by Fischer in his work on 'A Survey of the Flora of Anamalai Hills, Coimbatore District' (*Rec. Bot. Surv. India* 9 : 218 1921), is an addition to the flora of South India. This has been collected from the Silent Valley R.F. and Mukkali forest.

Oberonia brachyphylla, another member of the Orchidaceae, 'apparently endemic to North Canara has been reported from Hassan district (Saldanha & Nicolson, 1976). It is a tiny epiphyte on moss - clad branchlets of small trees. It has been gathered from the Mukkali forest.

Smithsonia straminea, also of the Orchidaceae and described by Saldanha in *J. Bombay Nat. Hist. Soc.* 71 : 73. 1974, is also a small epiphyte. It has been located once in the Mukkali forest.

The earlier held opinion that the apocynaceous members *Anodendron rhinosporum* was endemic to Sri Lanka has been found to be incorrect in that it has been located in the Karapara river forest of the Nelliampathy R.F.

New report from the district by others

Burmannia championii (Burmanniaceae) was published as an addition to the flora of South India by Joseph *et al. in J. Bombay Nat. Hist. Soc.* 76 : 552 553. 1980. It is a small slender, flexuous, saprophyte, thought to be confined to Sri Lanka, China, Malaysia and Japan so far has been found to occur in abundance in the Mukkali and Panthanthode forest areas. This has also been reported from Great Nicobar Island in Andaman & Nicobar group by Balakrishnan (in *Bull. Bot. Surv. India* 18 : 230 - 231, ff. 1 10. 1976).

Additions to the Flora of the Presidency of Madras

Apart from the new genera and species and new reports from the district enumerated earlier, the following species that have not been reported by Gamble and Fischer in the *Flora of the Presidency of Madras* have been collected from this district. *Aneilema versicolor* (Commelina-

ceae), *Eulophia emilianae* (Orchidaceae), *Habenaria furcifera* also a member of Orchidaceae, *Polypleurum filifolium* (Podostemaceae), *Reissantia grahamii* (Celastraceae), *Trias stocksii* (Orchidaceae), *Tinospora sinensis* (Menispermaceae) and *Oryza rufipogon* (Poaceae) added by others have also been collected by the author in this distinct subsequently.

Following are some of the species reported elsewhere from the Western Ghats that have been collected from this district. *Antistrophe serratifolia* (Myrsinaceae) reported as endemic to the Anamalai hills of Tamil Nadu (Nayar & Giri, 1976) is found in abundance in the Silent Valley R.F., although it is rare in other localities. *Amorphophallus bulbifer* (Araceae) collected by Narayanaswamy from the Rumpha hills (Orissa) and Bourne from the Nadugani Ghat, South Malabar whose collections are not available in the MH has been gathered from certain moist localities of the Mukkali forest. However, it could not be re-collected during the subsequent visits to the same areas. *Kalanchoe glandulosa* (Crassulaceae) collected by Wight from the Mysore hills perhaps in the mid-nineteenth century (collection not available in the MH) and by Narayanaswamy from Kollegal, Karnataka, in 1930, has been re-collected in 1976 in Karasuryamalai area which is far away from the former two. Likewise *Lasianthus jackianus*, *Saprosma fragrans* and *Tarenna nilagirica*, all belonging to the Rubiaceae are some of the rare species which were earlier reported from other areas have been now collected from this district. *Toxocarpus palghatensis* (Asclepiadaceae), an endemic species described by Gamble, has been re-collected from the type locality 'Palghat hills' for the first time. Yet another interesting plant *Amomum microstephanum* (Zingiberaceae), so far reported from the Anamalai hills of Tamil Nadu and Karnataka, has been found to occur on the banks of Kunthipuzha. Likewise another endemic species, *Ficus travancorica* reported by Barber as 'on the hill tracts of Travancore and Anamalais in the Coimbatore district in evergreen forests' has been collected from the forest near Karapara river in Nelliampathy R.F. of the Nemmara Division. The parasitic shrub *Tolypanthus lagenifer* which is a rare species has been traced in the Karivara forest near Mukkali. *Poeciloneuron indicum*, a valuable timber tree of the Clusiaceae, reported to occur from South Canara to Travancore by Gamble is found in abundance in Valiyaparathode forest of the Silent Valley region.

There is a high degree of endemism in the district. A critical analysis shows that there are about 65 endemic species of flowering plants which constitute about 60% of the endemic flora (characteristic) of the Western Ghats.

SYSTEMATIC TREATMENT

ARTIFICIAL KEY TO THE FAMILIES

[A] DICOTYLEDONES

(a) Polypetalae

1a. Stamens hypogynous :

2a. Sepals usually imbricate in bud :

3a. Sepals usually free :

4a. Stamens numerous (more than 10) :

5a. Sepals 2 - 3 :

6a. Trees ; petals and sepals similar ... MAGNOLIACEAE 3

6b. Herbs ; petals and sepals not similar :

7a. Plants with yellow sap ; leaves spiny ... PAPAVERACEAE 7

7b. Plants with watery sap ; leaves not spiny ... PORTULACACEAE 15

5b. Sepals 4 or more :

8a. Aquatic plants :

9a. Carpels free, sunken in pits ... NELUMBONACEAE 6a

9b. Carpels not free, nor sunken ... NYMPHAEACEAE 6

8b. Terrestrial plants :

10a. Sepals persistent :

11a. Leaves with sheathing base ... DILLENIACEAE 2

11b. Leaves without sheathing base :

12a. Leaves alternate ... THEACEAE 18

12b. Leaves opposite, rarely verticillate :

13a. Shrubs ; leaves gland - dotted ... HYPERICACEAE 15

13b. Trees ; leaves not gland - dotted ... CLUSIACEAE 17

10b. Sepals deciduous :

14a. Shrubs, climbing ... RANUNCULACEAE 1

14b. Herbs, shrubs or trees, not climbing :

15a. Ovary usually stalked ... CAPPARACEAE 9

15b. Ovary not stalked :

16a. Leaves palmately lobed ; flowers more than 10 cm across ... COCHLOSPERMACEAE 10

16b. Leaves not lobed ; flowers less than 10 cm across ... FLACOURTIACEAE 11

4b. Stamens few (not more than 10) :

17a. Stamens 6 :

18a. Climbers ... MENISPERMACEAE 5

18b. Herbs ... BRASSICACEAE 8

17b. Stamens not 6 :

19a. Ovary 1 - celled :

20a. Herbs ; leaves opposite ... CARYOPHYLLACEAE 14

20b. Trees ; leaves alternate or fascicled ... PITTOSPORACEAE 12

19b. Ovary 2 - many - celled :

21a. Filaments free :

22a. Leaves stipulate :

24a. Herbs ; stamens 10 ... OXALIDACEAE 28

24b. Trees ; stamens 5 ... STAPHYLEACEAE 39

22b. Leaves exstipulate ... SAPINDACEAE 40

21b. Filaments united ;

25a. Flowers regular ; stipules present ... ERYTHROXYLACEAE 26

25b. Flowers irregular ; stipules absent... POLYGALACEAE 13

3b. Sepals usually united at base :

26a. Leaves gland - dotted ... RUTACEAE 30

26b. Leaves not gland dotted :

27a. Leaves opposite ... MALPIGHIACEAE 27

27b. Leaves alternate :

28a. Trees with resinous/acrid juice :

29a. Leaves simple/compound :

30a. Calyx accrescent or winged ... DIPTEROCARPACEAE 19

30b. Calyx not accrescent or winged ... ANACARDIACEAE 40

29b. Leaves compound :

31a. Petals 5, unequal ... MORINGACEAE 43

31b. Petals 3 - 6, equal ... MELIACEAE 32

28b. Trees without resinous/acrid juice :

32a. Stamens alternate with petals :

33a. Petals valvate ... ICACINACEAE 34

33b. Petals imbricate ... CELASTRACEAE 35

32b. Stamens opposite petals :

34a. Plants with hooked branches ... ANCISTROCLADACEAE 20

34b. Plants without hooked branches :

35a. Petals valvate :

36a. Leaves stipulate :

37a. Plants with tendrils ... VITACEAE 37

37b. Plants without tendrils ... LEEACEAE 38

36b. Leaves exstipulate ... ERYTHROPALACEAE 33

35b. Petals imbricate ... SABIACEAE 41

2b. Sepals usually valvate in bud :

38a. Sepals free ... ANNONACEAE 4

38b. Sepals usually united :

39a. Plants with stellate hairs ; filaments united :

40a. Stamens polyadelphous ... BOMBACACEAE 22

40b. Stamens monadelphous :

41a. Stamens usually more than 30 ... MALVACEAE 21

41b. Stamens usually less than 30 ... STERCULIACEAE 23

39b. Plants without stellate hairs ; filaments free ;

42a. Leaves simple :

43a. Stamens free from petals :

44a. Petals ciliate or laciniate ... ELAEOCARPACEAE 25

44b. Petals not as above ... TILIACEAE 24

43b. Stamens not free from petals ... RHAMNACEAE 36

42b. Leaves compound ... BURSERACEAE 31

1b. Stamens epi - or perigynous :

45a. Stems flat and fleshy ; leaves minute ... CACTACEAE 60

45b Stems herbaceous or woody ; not usually flat ; leaves patent :

46a. Ovary of 1 or more free carpels :

47a. Ovules attached to the inner angles or bases of the carpels :

48a. Leaves usually stipulate ; carpels solitary :

49a. Stipules adnate to the petioles ... ROSACEAE 48

49b. Stipules not adnate :

50a. Flowers regular ... MIMOSACEAE 47

50b. Flowers irregular :

51a. Stamens free ... CAESALPINIACEAE 46

51b. Stamens united ... PAPILIONACEAE 45

48b. Leaves usually exstipulate ; carpels usually many :

52a. Flowers bisexual :

53a. Carpels free, if united styles free :

54a. Fruits follicular :

55a. Trees or climbers ... CONNARACEAE 44

55b. Herbs (fleshy) ... CRASSULACEAE 49

54b. Fruits capsular ... AIZOACEAE 64

53b. Carpels and styles united :

56a. Calyx lobes valvate or fruits capsular :

57a. Ovary free from calyx tube ... LYTHRACEAE 57

57b. Ovary adnate to the calyx tube :

58a. Terrestrial/marshy plants ... ONAGRACEAE 58

58b. Aquatic floating herbs ... TRAPACEAE 58a

56b. Calyx lobes imbricate or fruits berry :

59a. Stamens more than 12 ;

60a. Leaves usually gland - dotted ... MYRTACEAE 54

60b. Leaves not gland - dotted... LECYTHIDACEAE 55

59b. Stamens less than 12 ... MELASTOMATACEAE 56

52b. Flowers unisexual :

61a. Climbers usually tendril bearing ... CUCURBITACEAE 60

61b. Herbs or shrubs not tendril bearing ... BEGONIACEAE 62

47b. Ovules pendulous :

62a. Ovules 2 or more in each cell :

63a. Ovary 2 - 6 - celled ... RHIZOPHORACEAE 52

63b. Ovary 1 - celled ... COMBRETACEAE 53

62b. Ovule 1 in each cell :

64a. Flowers unisexual ... HALORAGACEAE 51

64b. Flowers bisexual :

65a. Leaves usually compound :

66a. Herbs ... APIACEAE 65

66b. Trees or shrubs ... ARALIACEAE 66

65b. Leaves usually simple :

67a. Trees with thorns ... ALANGIACEAE 67

67b. Trees without thorns ... CORNACEAE 68

46b. Ovary syncarpous :

68a. Flowers unisexual ... DATISCACEAE 61

68b. Flowers bisexual :

69a. Herbs ... DROSERACEAE 50

69b. Climbers ... PASSIFLORACEAE 59

(b) Gamopetalae

1a. Ovary inferior (wholly or partly) :

2a. Inflorescence an involucrate head ... ASTERACEAE 70

2b. Inflorescence not a head :

3a. Stamens numerous ... SYMPLOCACEAE 78

3b. Stamens not numerous :

4a. Leaves opposite, stipulate ... RUBIACEAE 69

4b. Leaves alternate, exstipulate :

5a. Stamens opposite petals ... MYRSINACEAE 75

5b. Stamens alternate with petals ... CAMPANULACEAE 72

1b. Ovary superior :

6a. Stamens opposite petals :

7a. Ovary 2 - many celled :

8a. Corolla urceolate ; stamens free :

9a. Flowers usually in cymes and solitary ... EBENACEAE 77

9b. Flowers in racemes only ... VACCINIACEAE 73

8b. Corolla not urceolate ; stamens epipetalous ... SAPOTACEAE 76

7b. Ovary unicelled ... PLUMBAGINACEAE 74

6b. Stamens alternate with petals :

10a. Corolla irregular ; stamens 4 or 2 :

11a. Fruits elastically dehiscent ... ACANTHACEAE 96

11b. Fruits not elastically dehiscent :

12a. Seeds few :

13a. Plants aromatic : style gynobasic ... LAMIACEAE 98

13b. Plants not aromatic ; style terminal ... VERBENACEAE 97

12b. Seeds many :

14a. Leaves simple :

15a. Plants aquatic, insectivorous ... LENTIBULARIACEAE 92

15b. Plants neither aquatic nor insectivorous :

16a. Placentation axile ... SCROPHULARIACEAE 90

16b. Placentation parietal :

17a. Leafless parasites ... OROBANCHACEAE 91

17b. Leafy plants, not parasites :

18a. Plants viscid-pubescent ... PEDALIACEAE 95

18b. Plants not viscid-pubescent :

19a. Stamens not didynamous ... GENTIANACEAE 85

19b. Stamens didynamous ... GESNERIACEAE 93

10b. Corolla regular ; stamens 5 or as many as petals :

20a. Leaves alternate :

21a. Plants climbers ... CONVOLVULACEAE 88

21b. Plants not climbers :

22a. Fruits drupaceous ... BORAGINACEAE 87

22b. Fruits not drupaceous :

23a. Plants aquatic ... MENYANTHACEAE 84

23b. Plants terrestrial :

24a. Styles two ... HYDROPHYLLACEAE 86

24b. Style one ... SOLANACEAE 89

20b. Leaves opposite :

25a. Stamens 2 ... OLEACEAE 79

25b. Stamens 4 - 5 :

26a. Carpels free :

27a. Pollen aggregated into masses ... ASCLEPIADACEAE 81

27b. Pollen not aggregated into masses ... APOCYNACEAE 80

26b. Carpels united :

28a. Fruit a capsule ... BUDDLEJACEAE 82

28b. Fruit a berry ... LOGANIACEAE 83

(c) Monochlamydeae

1a. Ovary superior :

2a. Flowers bisexual :

3a. Perianth persistent :

4a. Anthers opening by lids ... LAURACEAE 108

4b. Anthers not opening by lids :

5a. Plants scaly ... ELAEAGNACEAE 110

5b. Plants not scaly :

6a. Plants submerged ... PODOSTEMACEAE 103

6b. Plants not submerged :

7a. Leaves with ochreate stipules ... POLYGONACEAE 102

7b. Leaves exstipulate :

8a. Trees

9a. Seeds enclosed in arils ... MYRISTICACEAE 107

9b. Seeds not enclosed in arils ... PROTEACEAE 109

8b. Herbs or undershrubs :

10a. Perianth petaloid ... NYCTAGINACEAE 99

10b. Perianth not petaloid :

11a. Perianth and bracts scarious ... AMARANTHACEAE 100

11b. Perianth and bracts not scarious ... CHENOPODIACEAE 101

3b. Perianth absent :

12a. Scandent shrubs/succulent herbs ... PIPERACEAE 105

12b. Erect shrubs ... CHLORANTHACEAE 106

2b. Flowers unisexual or polygamous :

13a. Plants fleshy root parasites ... BALANOPHORACEAE 113

13b. Plants neither fleshy nor parasites :

15a. Flowers in cyathia or variously arranged ... EUPHORBIACEAE 115

15b. Flowers in spikes or catkins :

16a. Calyx absent :

17a. Leaves reduced to scales ; stamen 1 ... CASUARINACEAE 119

17b. Leaves not reduced ; stamens 2 ... SALICACEAE 120

16b. Calyx present :

18a. Filaments inflexed in bud :

19a. Styles undivided ... URTICACEAE 118

19b. Styles 2-branched ... MORACEAE 117

18b. Filaments erect in bud ... ULMACEAE 116

1b. Ovary inferior :

20a. Parasitic shrubs or trees :

21a. Root - parasite ; trees ... SANTALACEAE 112

21b. Stem - parasites ; herbs, shrubs ... LORANTHACEAE 111

20b. Not parasites ; shrubs and climbers ....ARISTOLOCHIACEAE 104

(B) GYMNOSPERMS

1a. Climbers ; leaves simple ; perianths present ... GNETACEAE 121

1b. Trees ; leaves pinnate ; perianths absent ... CYCADACEAE 122

(C) MONOCOTYLEDONES

1a. Leaves fan - shaped or pinnate ... ARECACEAE 137

1b. Leaves not fan - shaped :

2a. Perianth not petaloid, reduced to scales or bristles or absent :

3a. Flowers subtended by glumaceous bracts:

4a. Flowers in spikes:

5a. Stems trigonous ; leaves 3-ranked ... CYPERACEAE 143

5b. Stems cylindric or flat ; leaves 2-ranked ... POACEAE 144

4b. Flowers in subglobose heads ... ERIOCAULACEAE 142

3b. Flowers not subtended by glumaceous bracts ;

6a. Leafmargins spinulose ... PANDANACEAE 138

6b. Leafmargins not spinulose :

7a. Plants floating ... LEMNACEAE 141

7b. Plants not floating :

8a. Aquatic or marsh plants ... TYPHACEAE 139

8b. Terrestrial plants ... ARACEAE 140

2b. Perianth petaloid :

9a. Ovary superior :

10a. Perianth with 3 petaloid tepals ... COMMELINACEAE 136

10b. Perianth with 6 petaloid tepals :

11a. Plants aquatic ... PONTEDERIACEAE 135

11b. Plants terrestrial :

12a. Leaves succulent or scaly :

13a. Fertile stamens 6 ... LILIACEAE 133

13b. Fertile stamens 3 ... BURMANNIACEAE 124

12b. Leaves coriaceous :

14a. Plants climbers ... SMILACACEAE 134

14b. Plants not climbers ... AGAVACEAE 131

9b. Ovary inferior :

15a. Flowers regular :

16a. Plants aquatic ... HYDROCHARITACEAE 123

16b. Plants terrestrial :

17a. Plants climbing ... DIOSCOREACEAE 132

17b. Plants not climbing :

18a. Plants with a pseudostem ... MUSACEAE 128

18b. Plants without a pseudostem :

19a. Flowers in umbels ... AMARYLLIDACEAE 130

19b. Flowers in racemes ... HAEMODORACEAE 129

15b. Flowers irregular :

20a. Stamens and style united ... ORCHIDACEAE 125

20b. Stamens and style not united :

21a. Outer tepals united below ... ZINGIBERACEAE 126

21b. Outer tepals free ... MARANTACEAE 127

ENUMERATION

(A) DICOTYLEDONES

(a) Polypetalae

I. RANUNCULACEAE

1a.	Petals present ; terminal leaflets modified into tendrils	...	NARAVELIA 2
1b.	Petals absent ; terminal leaflets not modified into tendrils	...	CLEMATIS 1

1. CLEMATIS L.

1a.	Leaves 1 - 3 - foliolate ; 7 - ribbed	...	*C. smilacifolia* 2
1b.	Leaves many - foliolate ; 3 - 5 - ribbed	...	*C. gouriana* 1

1. **Clematis gouriana** Roxb. ex DC. Syst. 1 : 138. 1817 ; Wight, Ic. tt. 933 & 934. 1845 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 4. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 3. 1915, Repr. ed. 1 : 2. 1957. *C. javana* DC. *l.c.* 152.

Climbing shrubs. Leaflets ovate, acuminate, entire, hairy beneath. Flowers white - yellow, many, small, in panicles. Sepals puberulous. Stamens glabrous. Achene - styles to 4 cm long.

Fl. & Fr. : December - March.

Not common : in hilly regions of Lower Ghats ; Panthanthode, Karivara slopes and Kakkupadi.

2. **Clematis smilacifolia** Wall. in Asiat. Res. 13 : 402. 1820 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 3. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 3. 1915, Repr. ed. 1 : 2. 1957.

Climbing shrubs. Leaflets entire, ovate, acuminate, thick ; petioles twining. Flowers *c* 1 cm across, in panicles. Perianth segments oblong, velvety outside, glabrous within. Stamens white, glabrous, connective produced beyond the anthers. Achene-styles 5 - 7 cm long.

Fl. & Fr. : August - February.

Not common ; in evergreen forests, Silent Valley Dam site.

2 NARAVELIA DC.

Naravelia zeylanica (L.) DC. Syst. 1 : 167. 1817 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 7. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 3. 1915, Repr. ed. 1 : 3. 1957. *Atragene zeylanica* L. Sp. Pl. 542. 1753.

Woody climbers; young parts downy. Leaves trifoliolate ; leaflets broadly ovate, abruptly acute at apex, rounded at base, downy beneath, glabrous above. Flowers yellow. Petals elongate. Achenes linear with feathery, twisting tails.

Fl. & Fr. : October April.

Common in moist forests ; in lower Ghats ; Mukkali slopes, Panthanthode forest, Pothundy Dam slopes.

2. DILLENIACEAE

DILLENIA L.

Dillenia pentagyna Roxb. Pl. Cor. t. 20. 1975 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 38. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 8. 1915, Repr. ed. 1 : 6. 1957 ; Hoogland in Blumea 7 : 117. 1952 ; Majumdar in Fasc. Fl. India 2 : 7. 1979. *D. pilosa* Roxb. Fl. Ind. 2 : 652. 1832 non Ham. 1827. '*Naithekku*' (Tam.) '*Kodda punna*' (Mal.).

Deciduous trees, 15 20 m. Leaves oblong - lanceolate, serrate, acute at tip, apiculate, densely hairy beneath. Flowers yellow, in fascicles, on old wood. Sepals 5, orbicular, brown, accrescent. Petals 5, obovate. Fruits globose, fleshy, yellow.

Fl. & Fr. : February - June.

Common in deciduous forests ; in lower Ghats ; Karivara forest, Marapalam - Pothundy forest, Mukkali slopes, Olipara forest.

Wood is a valuable timber ; leaves used as green manure.

3. MAGNOLIACEAE

MICHELIA L.

1a. Flowers yellow ; leaves more than 10 cm long	...	*M. champaca*	1
1b. Flowers white ; leaves less than 10 cm long	...	*M. nilagirica*	2

1. **Michelia champaca** L. Sp. Pl. 536. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 6. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 9. 1915, Repr. ed. 1 : 6. 1957. '*Shembuga*', '*Chembugam*' (Tam.).

Evergreen trees, 20 - 25 m. Leaves ovate - lanceolate, acute. Stipules connate, enveloping the buds. Flowers axillary, fragrant ; perianth segments 9 or more, fleshy. Follicles warty.

Fl. & Fr. : February - June.

Not common ; grown for the flowers ; in lower Ghats ; Karasuryamalai area.

2. **Michelia nilagirica** Zenk. Pl. Ind. 21. t. 20. 1835 ; Wight, Ic. t. 938. 1845 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 44. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 9 : 1915, Repr. ed. 1 : 7. 1957.

Handsome trees, 15 - 20 m. Leaves ovate - lanceolate, acuminate at apex. Flowers axillary, fragrant ; perianth segments oblong. Fruits in dense spikes.

Fl. & Fr. : January - June.

Not common ; in lower Ghats ; Aruvampara slopes.

4. ANNONACEAE

1a. Petals valvate :

2a. Anther cells concealed by connectives :

3a. Petals bent in at base :

4a. Peduncles hooked ... ARTABOTRYS 1

4b. Peduncles not hooked ... CYATHOCALYX 2

3b. Petals flat, spreading from base

5a. Flowers sessile ... MELODYNE 3

5b. Flowers pedunculate ... POLYALTHIA 6

2b. Anther cells not concealed by connectives :

6a. Outer petals shorter than inner ones ... MILIUSA 4

6b. Outer petals longer than inner ones ... ORIOPHRA 5

1b. Petals imbricate ... UVARIA 7

1. ARTABOTRYS R. Br.

Artabotrys zeylanicus Hook. f. & Thoms. Fl. Ind. 128. 1855 ; Bedd. Ic. t. 48. 1868 - 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 54. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 14. 1915, Repr. ed. 1 : 10. 1957.

Climbing shrubs. Leaves oblong lanceolate, abruptly acuminate, rounded at base. Flowers yellow, solitary or fascicled, leaf - opposed. Sepals 3, rusty tomentose. Petals 6, in 2 rows, densely tomentose. Fruits ovoid, mucronate.

Fl. & Fr. : September - June.

Common ; in lower Ghats ; Ayyappankoil area, Nelliyampathy forest, Silent Valley R.F.

2 CYATHOCALYX Champ.

Cyathocalyx zeylanica Champ. ex Hook. f. & Thoms. Fl. Ind. 1 : 127. 1855, '*zeylanicus*' ; Bedd. Ic. t. 47. 1868 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 53. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 13 : 1915, Repr. ed. 1 : 9. 1957.

Trees, 10-15 m. Leaves ovate, glabrous. Flowers in fascicles. Petals 6, in 2 rows, valvate. Fruits globose.

Fl. & Fr. : January - June.

Common ; on moist forest slopes : Pothundy - Kaikatty forests.

3. MEIOGYNE Miq.

Meiogyne ramarowii (Dunn) Gandhi in Saldanha & Nicolson, Fl. Hassan Dist. 38. 1976. *Unona ramarowii* Dunn in Bull. Misc. Inform. Kew 183. 1914 et in Gamble, Fl. Pres. Madr. 15. 1915, Repr. ed. 1 : 9. 1957. *Meiogyne ramarowii* (Dunn) Ellis in Biol. Mem. 2 : 11. 1977. *Desmos ramarowii* (Dunn) Das in Bull. Bot. Surv. India 5 : 42. 1963.

Trees, 25 30 m ; young parts black-tomentose. Leaves elliptic-oblong or ovate, acuminate, rounded at base, glabrous above. Flowers dull yellow, pointing downwards. Fruits apiculate.

Fl. & Fr. : April - June.

Common ; in Ghats ; Mukkali Forest.

4. MILIUSA Lesch. ex A.DC.

1a. Inner petals glabrous ;

2a. Peduncles 5 - 10 cm long ... *M. velutina*

2b. Peduncles 2 - 4 cm long ... *M. wightiana* 3

1b. Inner petals pubescent ... *M. tomentosa* 1

1. **Miliusa tomentosa** (Roxb.) Sinclair in Gard. Bull. Singapore 14 : 378. 1955. *Uvaria tomentosa* Roxb. Pl. Cor. t. 35. 1795. *Saccopetalum tomentosum* (Roxb.) Hook. f. & Thoms. Fl. Ind. 152. 1855 ; Bedd. Ic. t. 49. 1868 - 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 88. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 22. 1915, Repr. ed. 1 : 16. 1957.

Deciduous trees, 10 15 m ; young branches tomentose. Leaves ovate - oblong, acute, tomentose beneath. Flowers pink, in leaf - opposed and terminal cymes. Sepals minute. Outer petals linear ; inner ovate-oblong, saccate at base. Stamens many. Fruits subglobose, purple.

Fl. & Fr. : October - May.

Common ; in lower Ghats ; Kaikatty Pothundy, Mukkali slopes, Nemmara.

2. **Miliusa velutina** (Dunal) Hook. f. & Thoms. Fl. Ind. 151. 1855 ; Bedd. Ic. t. 87. 1868 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 187. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 21. 1915, Repr. ed. 1 : 15. 1957. *Uvaria velutina* Dunal, Anon. 91. 1817.

Deciduous trees, 10 15 m ; young branches densely tomentose. Leaves ovate, acute, rounded or cordate at base. Flowers yellow, in leaf - opposed cymes. Inner petals glabrous inside, tomentose outside. Fruits subglobose, purple, on woody stalks.

Fl. & Fr. : December - May.

Not common ; in lower Ghats ; Anamooly slopes, Mukkali forest.

3. **Miliusa wightiana** Hook. f. & Thoms. Fl. Ind. 149. 1855 ; Bedd. Ic. t. 86. 1868 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 87. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 21. 1915, Repr. ed. 1 : 15. 1957.

Small trees or large shrubs, 5 7 m. Leaves oblong - lanceolate, glabrous, acuminate, rounded at base. Flowers pale greenish. Sepals and outer petals ciliate. Inner petals oblong, glabrous. Fruits globose, apiculate.

Fl. & Fr. : September - December.

Common in evergreen forests ; Silent Valley R.F.

5. OROPHEA Bl.

Orophea uniflora Hook. f. & Thoms. Fl. Ind. 111. 1855 ; Bedd. Ic. t. 69. 1868 - 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 90. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 24. 1915, Repr. ed. 1 : 17. 1957.

Small trees, 5 - 7 m. Leaves ovate, acute. Flowers pale yellow with pinkish base inside. Petals 6, in 2 whorls ; outer ovate ; inner clawed. Stamens 12. Fruits globose.

Fl. & Fr. : February - June.

Common ; in lower Ghats ; Ayyappankoil area, Pothundy Kaikatty forests, Thuthamparai area.

6. POLYALTHIA Bl.

1a. Flowers solitary or 1 - 3, in fascicles :

2a. Leaves glabrous ; petals greenish - yellow ... *P. coffeoides* 2

2b. Leaves pubescent ; petals greenish ... *P. cerasoides* 1

1b. Flowers in cymes ... *P. fragrans* 3

1. **Polyalthia cerasoides** (Roxb.) Bedd. Fl. Sylv. t. 1. 1869 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 63. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 17. 1915, Repr. ed. 1 : 12. 1957. *Uvaria cerasoides* Roxb. Pl. Cor. t. 33. 1795. '*Nakulsi*' (Tam.).

Evergreen, small trees or shrubs, 5 7 m. Leaves membranous, oblong - lanceolate, acute, glabrous above. Flowers from woody tubercles. Pedicels tomentose. Sepals ovate, appressed-hairy. Petals fleshy, incurved. Fruits ovoid, apiculate, stalked.

Fl. & Fr. : March June.

Not common ; in lower Ghats ; Walayar forest.

2. **Polyalthia coffeoides** (Thw. ex Hook. f. & Thoms.) Thw. Enum. Pl. Zeyl. 399. 1864 ; Bedd. Ic. t. 53. 1868 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 62. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 16 : 1915, Repr. ed. 1 : 11. 1957. *Guatteria coffeoides* Thw. ex Hook. f. & Thoms. Fl. Ind. 141. 1855. '*Nedunarai*' (Tam.), '*Villa*' (Mal.).

Straight trees, 15 - 30 m. Leaves lanceolate - oblong, attenuate at base ; juvenile ones pink. Flowers on tubercles from wood. Petals fleshy. Fruits globose, 1 - seeded.

Fl. & Fr. : January - June.

Common, in lower Ghats ; Karapara estate way, Kudam - Siruvani forest, Thuthampara area.

3. **Polyalthia fragrans** (Dalz.) Bedd. Fl. Sylv. t. 74. 1871 & Ic. t. 54. 1868 - 74 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 63. 1872 ;

Dunn in Gamble, Fl. Pres. Madr. 16. 1915, Repr. ed. 1 : II. 1957. *Guatteria fragrans* Dalz. in Hook. Kew J. Bot. 3 : 206. 1851. '*Nadumar*' (Tam. & Mal.).

Tall, straight trees, 10 15 m ; young parts tomentose. Leaves oblong - lanceolate, abruptly acute, rounded at base. Flowers pale yellow, in tomentose cymes on old wood. Fruitlets ovoid, stalked, ashy.

Fl. & Fr. : November - May.

Not common ; in lower Ghats ; Cherunelli Estate area, Nelliyampathy forest.

Wood is used for building purposes.

Polyalthia longifolia (Sonn.) Thw., the fake Ashoka Tree, is cultivated in gardens and avenues.

7. UVARIA L.

Uvaria narum (Dunal) Bl. Fl. Java 5. 1828 ; Wight & Arn. Prodr. 9. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 50. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 13. 1915, Repr. ed. 1 ; 9. 1957 ; Mitra in Fasc. Fl. India 10 : 18. 1982. *Unona narum* Dunal, Anon. 99. 1817 *p.p.* '*Narampanal*' (Tam.).

Scandent shrubs ; branches zigzag. Leaves oblong - lanceolate, glabrous, acuminate. Flowers yellow, solitary. Petals 6, ovate, connate at base, inflexed. Stamens many. Fruitlets stalked, many, glabrous.

Fl. & Fr. : December.

Not common ; in lower Ghats ; Tiruvizhankunnu forest.

Annona squamosa L. and **A. reticulata** L. are cultivated near villages for the edible fruits ; sometimes selfsown in certain places.

5. MENISPERMACEAE

1a. Stamens connate :

2a. Flowers in panicles :

3a. Anthers in a ring :

4a. Sepals connate ... CYCLEA 4

4b. Sepals free ... CISSAMPELOS 2

3b. Anthers in a globular head ... ANAMIRTA 1

2b. Flowers in umbels or in solitary heads ... STEPHANIA 5

1b. Stamens free :

5a. Leaves obtuse or subcordate at base :

6a. Drupes pedicelled ... TILIACORA 6

6b. Drupes sessile ... COCCULUS 3

5b. Leaves deeply cordate at base ... TINOSPORA 7

1. ANAMIRTA Colebr.

Anamirta cocculus (L.) Wight & Arn. Prodr. 446. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 98. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 27. 1915, Repr. ed. 1 : 19. 1957. *Menispermum cocculus* L. Sp. Pl. 340. 1753.

Large lianes. Leaves broadly ovate, acute at apex, cordate at base, tufts of hairs in the axils of nerves beneath. Flowers pale greenish, in large, drooping panicles from old wood, foetid. Fruits white, smooth.

Fl. & Fr. : August March.

Common ; in lower Ghats ; Anamooly slopes, Mukkali forests, Olipara forests.

2. CISSAMPELOS L.

Cissampelos pareira L. var. **hirsuta** (Buch. - Ham. ex DC.) Forman in Kew Bull. 22 : 351. 1968. *C. hirsuta* Buch. - Ham. ex DC. Syst. 1 : 535. 1818. *C. orbiculata* DC. *l.c.* 537. *C. pareira* L. var. *orbiculata* (DC.) Miq. in Ann. Lugd. Bat. 4 : 85. 1868 ; Troupin in Bull. Jard. Bot. Brux. 25 : 140. 1955. *C. pareira* L. Sp. Pl. 1031. 1753 *p.p.* ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 103. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 30. 1915, Repr. ed. 1 : 21. 1957.

Tomentose, climbing shrubs. Leaves orbicular reniform, cordate, apiculate, densely hairy and glaucous beneath. Flowers minute, yellowish ; bracts densely imbricate, foliaceous. Drupes scarlet, tomentose.

Fl. & Fr. : October.

Common ; in lower Ghats ; Agali slopes.

3. COCCULUS DC. *nom. cons.*

Cocculus laurifolius DC. Syst. 1 : 530. 1818 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 101. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 29. 1915, Repr. ed. 1 : 21. 1957.

Small trees, 5 - 7 m. Leaves ovate, caudate - acuminate, 3 - ribbed. Flowers pale yellow, in axillary panicles. Petals 6, smaller than sepals. Peduncles glabrous. Drupes compressed.

Fl. & Fr. : April.

Not common ; in lower Ghats ; Anavayee forests.

4. CYCLEA Arn. ex Wight

Cyclea peltata (Lam.) Hook. f. & Thoms. Fl. Ind. 201. 1855 ; Dunn in Gamble, Fl. Pres. Madr. 31. 1915, Repr. ed. 1 : 22. 1957 ; Sant. & Janard. in Bull. Bot. Surv. Ind. 10 : 368. 1969. *Menispermum peltatum* Lam. Encycl. 4 : 96. 1797. *Cyclea burmanii* Hook. f. & Thoms. *l.c.* et in Hook. f. Fl. Brit. Ind. 1 : 104. 1872. *Cocculus burmanii* DC. Syst. 1 : 517. 1818. '*Padakizhangu*' (Mal.).

Herbaceous twiners. Leaves deltoid or ovate, peltate, acute, pubescent beneath, shining above. Flowers minute in axillary, slender, pubescent panicles. Calyx campanulate. Petals of pistillate flower orbicular. Fruits ovoid.

Fl. & Fr. : Almost throughout the year.

Common ; in lower Ghats ; Panthanthode forest, Karuvara slopes, Ayyappan Koil forest Neliyampathy R.F.

5. STEPHANIA Lour.

Stephania wightii (Arn.) Dunn in Gamble, Fl. Pres. Madr. 30. 1915, Repr. ed. 1 : 21. 1957. *Cyclea wightii* Arn. in Wight, Ill. 1 : 22. 1840. *Stephania rotunda* sensu Hook. f. & Thoms. Fl. Ind. 1957. 1855 et in Hook. f. Fl. Brit. Ind. 1 : 103. 1872 *p.p.* non Lour. 1790.

Climbing shrubs. Leaves ovate, peltate. Male flowers in solitary, axillary, stalked heads ; female flowers in condensed stalked - cymes. Petals fleshy. Drupes reniform, glabrous.

Fl. & Fr. : March - May.

Common ; in lower Ghats ; Kaikatty and Karapara forests.

6. TILIACORA Colebr.

Tiliacora acuminata (Lam.) Hook. f. & Thoms. Fl. Ind. 187. 1855; Dunn in Gamble, Fl. Pres. Madr. 28. 1915, Repr. ed. 1 : 20. 1957. *Menispermum acuminatum* Lam. Encycl. 4 : 101. 1797.

Large, woody climbers. Leaves ovate lanceolate, obtuse or cordate at base, glabrous. Flowers yellow, in lax, axillary panicles. Petals obovate. Drupes ovate, compressed.

Fl. : October.

Common ; in upper Ghats ; Dhoni R.F.

7. TINOSPORA Miers

1a. Leaves more than 10 cm long, tomentose beneath	...	*T. sinensis*	2
1b. Leaves less than 6.5 cm long, glabrous beneath	...	*T. cordifolia*	1

1. **Tinospora cordifolia** (Willd.) Miers ex Hook. f. & Thoms. Fl. Ind. 184. 1855 et in Hook. f. Fl. Brit. Ind. 1 : 97. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 26. 1915, Repr. ed. 1 : 19. 1957. *Menispermum cordifolium* Willd. Sp. Pl. 4 : 826. 1806. *Cocculus cordifolius* (Willd.) DC. Syst. 1 : 517. 1817 ; Wight, Ic. tt. 485 - 86. 1841. '*Cheenthal*' (Tam.).

Extensive, glabrous climbers ; bark papery and corky ; stems succulent. Leaves subdeltoid, cordate. Flowers yellow, in long racemes from old stems. Drupes red, sessile.

Fl. & Fr. : January - June.

Not common ; in deciduous forests ; Pothundy slopes and Olavakkot forest.

2. **Tinospora sinensis** (Lour.) Merr. in Sunyatsenia 1 : 193. 1934 ; Sant. & Janard. in Bull. Bot. Surv. Ind. 10 : 368. 1968. *Campylus sinensis* Lour. Fl. Cochinch. 113. 1790. *Menispermum malabaricum* Lam. Encycl. 4 : 96. 1797. *Tinospora malabarica* (Lam.) Hook. f. & Thoms. Fl. Ind. 183. 1855.

Large climbers ; bark papery. Leaves 10.5 - 12.5×9 - 12 cm, broadly ovate, cordate, acuminate. Petioles twisted at base. Flowers in racemose clusters, pale greenish. Sepals 6 ; inner large. Drupes ovoid, smooth.

Fl. & Fr. : February - April.

Not common ; in deciduous forests ; Pothundy.

It is an addition to the Flora of Presidency of Madras.

6. NYMPHAEACEAE

NYMPHAEA L. *nom. cons.*

1a. Leaves entire, glabrous	...	*N. nouchali*	1
1b. Leaves toothed, pubescent	...	*N. pubescens*	2

1. **Nymphaea nouchali** Burm. f. Fl. Ind. 120. 1768 ; Backer & Bakh. f. Fl. Java 1 : 149. 1963. *N. stellata* Willd. Sp. Pl. 2 : 1153. 1799 ; Wight, Ic. t. 178. 1839 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 44. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 33. 1915, Repr. ed. 1 : 24. 1957.

Large, aquatic herbs. Leaves orbicular or elliptic, green above, pale purple beneath. Flowers solitary, light purple or white. Petals linear. Stigmas bright orange. Fruits globular, spongy.

Fl. & Fr. : Almost throughout the year.

Common in ponds, Peringathukavu, Olavakkot.

van Royen (Nova Guinea 10 : 107 -110. 1962) states that *N. nouchali* is conspecific with *N. stellata*.

2. **Nymphaea pubescens** Willd. Sp. Pl. 2 : 1154. 1799 ; Dunn in Gamble, Fl. Pres. Madr. 34. 1915, Repr. ed. 1 : 24. 1957 ; Backer & Bakh. f. Fl. Java 1 : 148. 1963. *N. lotus* sensu Hook. f. & Thoms. non L. 1753 ; var. *pubescens* (Willd.) Hook. f. & Thoms. Fl. Ind. 241. 1855 et in Hook. f. Fl. Brit. Ind 1 ; 114. 1872. '*Neer aumbal*' (Tam.).

Aquatic herbs ; roots tuberous. Leaves peltate, orbicular, reniform, cordate, prominently veined, brown and short hairy beneath. Flowers white. Stamens yellow. Fruits spongy. Seeds many, arillate.

Fl. & Fr. : All seasons.

Common in ponds and tanks. Nemmara.

Rootstocks and seeds edible ; flowers used in religious ceremonies.

6 (a). NELUMBONACEAE

NELUMBO Adanson

Nelumbo nucifera Gaertn. Fruct. 1 : 73. 1786 ; Subramanyam, Aquat. Angiosp. 8. f. 4. 1962. *Nymphaea nelumbo* L. Sp. Pl. 511. 1753. *Nelumbium speciosum* Willd. Sp. Pl. 2 : 1253, 1799 ; Hook. f. & Thoms in Hook. f. Fl. Brit. Ind. 1 : 116. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 34. 1915,

Repr. ed. 1 : 24. 1957. *N. nelumbo* (L.) Druce, Bot. Exch. Cl. Soc. Brit. Isles 3 : 421. 1914. '*Thamarai*' (Tam.).

Large, aquatic herbs ; stems creeping. Leaves orbicular, peltate, glaucous beneath. Flowers white or rose. Petals many. Carpels ovoid, sunk in spongy torus.

Fl. & Fr. : All seasons.

Common ; in tanks in plains. Peringathukavu.

Roots and rhizomes edible ; flowers used in religious rituals.

7. PAPAVERACEAE

ARGEMONE L.

Argemone mexicana L. Sp. Pl. 508. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 117. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 35. 1915, Repr. ed. 1 : 25. 1957.

Woody, prickly herbs with yellow juice. Leaves pinnatifid, sessile, semi amplexicaule, spiny on the margins. Flowers yellow. Bracts leafy. Stamens many. Capsules prickly, glaucous. Seeds mustard like.

Fl. & Fr. : Throughout the year.

Introduced weed, now naturalised ; in waste places, Anaikkatty, Kathalakandy.

8. BRASSICACEAE (CRUCIFERAE)

RORIPPA Scop.

Rorippa indica (L.) Hiern, Cat. Afr. Pl. Welw. 26. 1896. *Sisymbrium indicum* L. Mant. 93. 1767. *Nasturtium indicum* (L.) DC. Prodr. 1 : 139. 1824 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind 1 : 134. 1872, *p.p.* ; Dunn in Gamble, Fl. Pres. Madr. 35. 1915, Repr. ed : 27. 1957.

Erect, annual herbs. Leaves ovate - lanceolate, dentate. Flowers yellow, in elongate racemes. Petals oblanceolate. Pods cylindric, erect.

Fl. : October.

Common ; in damp places ; Mukkali.

Brassica juncea (L.) Czern. (*Sinapis juncea* L.) is an escape from cultivation and selfsown. Panthanthode.

9. CAPPARACEAE

1a. Trees or shrubs ; fruits berry :

2a. Leaves simple ... CAPPARIS 1

2b. Leaves 3 - foliolate ... CRATEVA 3

1b. Herbs ; fruits capsule ... CLEOME 2

1. CAPPARIS L.

1a. Flowers solitary :

2a. Twigs brownish tomentose ; thorns hooked ... *C. grandiflora* 3

2b. Twigs red - brownish - hairy ; thorns not hooked ... *C. baducca* 1

1b. Flowers in racemos or corymbs :

3a. Young branches glabrous ; gynophore more than 5 cm long ... *C. moonii* 4

3b. Young branches hoary ; gynophore less than 5 cm long ... *C. cleghornii* 2

1. **Capparis baducca** L. Sp. Pl. 504. 1753 ; Jacobs in Blumea 12 : 435. 1965. *Baducca* Rheede, Hort. Malab. 6 : 105. t. 57. 1686. *Capparis rheedii* DC. Prodr. 1 : 246. 1824. *C. heyneana* Wall. ex Wight & Arn. Prodr. 25. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 174. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 45. 1915, Repr. ed. 1 : 32. 1957.

Large shrubs or small trees, 4 - 7 m, thorny. Leaves coriaceous, ovate, acute. Flowers white, in axils. Sepals tomentose. Petals obovate, glabrous. Fruits ovoid - oblong, beaked. Seeds black.

Fl. & Fr. : February June.

Common ; at lower elevations, Mukkali forest.

2. **Capparis cleghornii** Dunn in Gamble, Fl. Pres. Madr. : 46. 1915, Repr. ed. 1 : 33. 1957 et in Bull. Misc. Inform. Kew 61. 1916 ; Rao & Raghavan in Blumea 12 : 313. 1964 ; Jacobs in Blumea 12 : 445. 1965.

Straggling shrubs ; young branches thorny. Leaves pinkish when young, ovate, rounded at apex with abrupt acumens, puberulous beneath. Flowers white, in terminal corymbs. Sepals subequal. Petals oblong - obovate. Fruits globose, 1 4 - seeded.

Fl. & Fr. : February - May.

Common ; in outskirts of forests, Mukkali.

3. **Capparis grandiflora** Wall. ex Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 174. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 45. 1915, Repr. ed. 1 : 32. 1957; Jacobs in Blumea 12 : 455. 1965. *C. pyrifolia* auct. non Lam. 1785 ; Wight, Ic. t. 1047. 1846.

Small shrubs ; branches spreading, stellate - tomentose. Leaves subcoriaceous, ovate, acute - rounded, hairy beneath. Flowers white, axillary. Sepals 4, outer pair boat shaped ; inner ovate, villous outside. Petals obovate. Fruits ovoid.

Fl. & Fr. : April June.

Not common ; in lower Ghats, Nemmara slopes and Sholayur forest.

4. **Capparis moonii** Wight, Ill. 1 : 35. 1840 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 175. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 45. 1915 Repr. ed. 1 : 33. 1957. Jacobs in Blumea 12 : 472. 1965.

Large climbers ; thorns recurved. Leaves subcoriaceous, oblong, glabrous. Flowers white. Petals pubescent inside at base. Fruits subglobose to ellipsoid.

Fl. & Fr. : December - August.

Not common ; in lower Ghats, Karapara river slopes.

2. Cleome L.

1a. Plants not viscous ; flowers not yellow :

2a. Leaves 3 to 9 - foliolate :

3a. Stamens 6 ... *C. speciosa* 3

3b. Stamens many ... *C. chelidonii* 1

2b. Leaves simple ... *C. monophylla* 2

1b. Plants viscous ; flowers yellow ... *C. viscosa* 4

1. **Cleome chelidonii** L. f. Suppl. 300. 1781 ; Wight, Ic. t. 319. 1840 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 170. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 41. 1915, Repr. ed. 1 : 29. 1957.

Erect herbs. Leaflets oblong - ovate ; upper ones linear, pubescent. Flowers pinkish, in racemes. Capsules cylindric.

Fl. : October.

Common ; in moist places ; in lower Ghats, Walayar forest.

3. **Cleome monophylla** L. Sp. Pl. 672. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 168. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 41. 1915, Repr. ed. 1 : 29. 1957.

Small herbs, glandular - pubescent. Leaves ovate - lanceolate, acute - acuminate, rounded or cordate at base. Flowers pale purple, solitary and in long racemes. Sepals linear, ciliate. Petals clawed. Capsules linear. Seeds black, tubercled.

Fl. & Fr. : February - August.

Common along roadsides ; in lower Ghats, Bhavani river bank, Mukkali, Dhoni R.F.

3. **Cleome speciosa** Rafin. Fl. Ludoric. 86. 1817 ; Jacobs in Steenis, Fl. Males. ser. 1. 6 : 101. 1960. *Gynandropsis speciosa* (Rafin.) DC. Prodr. 1 : 238. 1824.

Erect, glabrous herbs. Leaflets lanceolate, attenuate at both ends. Flowers pinkish, in long racemes. Petals lanceolate. Stamens 6. Filaments filiform. Fruits cylindric.

Fl. & Fr. : March.

Not common ; in lower Ghats, Karapara river forest.

4. **Cleome viscosa** L. Sp. Pl. 672. 1753 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 170. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 41. 1915, Repr. ed. 1 : 29. 1957 ; Jacobs in Steenis, Fl. Males. ser. 1. 6 : 103. 1960.

Annual herbs, glandular hairy. Leaflets oblong. Flowers yellow, axillary and terminal. Sepals and petals oblong. Fruits erect, cylindric, glandular - pubescent. Seeds reddish brown.

Fl. & Fr. : All seasons.

Common along roadsides and waste places, Mukkali forest, Walayar forest.

3. CRATEVA L.

1a.	Rachis up to 10 cm long ; fruits red - brownish when dry	...	*C. adansonia* ssp. *odora* 1
1b.	Rachis 10 - 16 cm long ; fruits greenish when dry	...	*C. magna* 2

1. **Crateva adansonia** DC. ssp. **odora** (Buch. - Ham.) **Jacobs** in Blumea 12 : 198.1964. *C. odora* Buch. - Ham. in Trans. Linn. Soc. London

15 : 118. 1827. *C. roxburghii* R. Br. in Denh. & Clapp. Narr. Trav. Disc. Afr. App. 224. 1826; Dunn in Gamble, Fl. Pres. Madr. 47. 1915. Repr. ed. 1 : 34. 1957.

Small trees, 4 - 7 m. Leaflets greyish - green when dry, obtuse, abruptly acuminate. Flowers pale yellow or pinkish, axillary. Petals clawed. Fruits globose.

Fl. & Fr. : March August.

Not common ; in plains, Nemmara Kollenkode Road.

2. **Crateva magna** (Lour.) DC. Prodr. 1 : 243. 1824 ; Jacobs in Steenis, Fl. Males. ser. 1. 7 : 822. 1976 in addendum. *Capparis magna* Lour. Fl. Cochinch. 331. 1790. *Crateva nurvala* Buch. Ham. in Trans. Linn. Soc. London 15 : 121. 1827. *C. religiosa* auct. non Forst. f. 1786 ; Bedd. Fl. Sylv. t. 116. 1871 ; Dunn in Gamble, Fl. Pres. Madr. 47. 1915. Repr. ed. 1 : 34. 1957.

Deciduous trees, 15 20 m. Leaflets 3, lanceolate, dark green above, pale beneath, acuminate. Flowers white, many, in terminal racemes, yellow on withering. Petals clawed. Stamens red. Fruits ellipsoid.

Fl. : March.

Not common ; on banks of streams, Bhavani river bank, Dhoni R.F., Mukkali.

10. COCHLOSPERMACEAE

COCHLOSPERMUM Kunth *nom. cons.*

Cochlospermum religiosum (L.) Alston in Trimen, Handb. Fl. Ceylon 6 : 14. 1931. *Bombax religiosum* L. Sp. Pl. 552. 1753. *Cochlospermum gossypium* DC. Prodr. 1 : 527. 1824 ; Bedd. Fl. Sylv. t. 171. 1872 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 190. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 50. 1915, Repr. ed. 1 : 36. 1957. '*Tanaku*', '*Kongillum*' (Tam.), '*Appakudakka*' (Mal.).

Deciduous trees, 10 20 m. Leaves broadly ovate, 3 5 lobed, cordate at base, glaucous tomentose beneath. Flowers yellow, 6 10 cm across Sepals silky. Stamens numerous ; anthers linear. Capsules pear - shaped, striate, leathery. Seeds densely hairy.

Fl. : February March.

Common ; in hilly deciduous forests, Chitoor Agali area.

11. FLACOURTIACEAE

(incl. SAMYDACEAE)

1a. Flowers unisexual :

2a. Leaves less than 12 cm long ; fruits less than 2 cm across :

3a. Berries globose ... XYLOSMA 6

3b. Berries ovate, acuminate ... FLACOURTIA 2

2b. Leaves more than 12 cm long ; fruits more than 4 cm across ... HYDNOCARPUS 4

1b. Flowers bisexual :

4a. Trees or shrubs, not thorny :

5a. Petals absent ... CASEARIA 1

5b. Petals present ... HOMALIUM 3

4b. Trees, thorny ... SCOLOPIA 5

CASEARIA Jacq.

1a. Leaves hairy, acumen not twisted :

2a. Branchlets softly - tomentose ... *C. tomentosa* 2

2b. Branchlets rufous villous ... *C. wynadensis* 3

1b. Leaves glabrous, acumen twisted ... *C. esculenta* 1

1. **Casearia esculenta** Roxb. Fl. Ind. 2 : 422. 1832 ; Clarke in Hook. f. Fl. Brit. India 2 : 592. 1879 ; Gamble, Fl. Pres. Madr. 521. 1919, Repr. ed. 1 : 368. 1957.

Small trees, up to 5 m. Leaves narrowly elliptic oblong, attenuate at base, acute at apex, entire or serrate. Flowers in axillary fascicles. Sepals glabrous. Fruits orange.

Fr. : June.

Common ; at lower elevations, Mukkali forest.

2. **Casearia tomentosa** Roxb. Fl. Ind. 2 : 421. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 593. 1879; Gamble, Fl. Pres. Madr. 521. 1919, Repr. ed. 1 : 368. 1957 ; Mukherjee in Bull. Bot. Surv. Ind. 14 : 184. 1972 (1975). *Anavinga lanceolata* Lam. Encycl. 1 : 148. 1783 non *Casearia lanceolata* Miq. 1844. *C. elliptica* Willd. Sp. Pl. 2 : 628. 1799. *nom. superfl.* '*Kadichai*' (Tam.).

Bushy shrubs or small, deciduous trees, 5 - 6 m. Leaves subcoriaceous, oblong, brown tomentose, long acuminate, unequally rounded at base. Flowers pale yellow. Fruits yellow.

Fl. & Fr. : October - April.

Common ; in lower Ghats, Panangateri and Thavalam area, Malampuzha.

The specific epithet *lanceolata* from the earliest binomial *Anavinga lanceolata* Lam. (1783) cannot be brought under *Casearia* as it is preoccupied in *C. lanceolata* Miq. (1844). The substitute name *C. elliptica* Willd. (1799) too cannot be employed as it is a superfluous name since Willdenow cites *Anavinga lanceolata* Lam. as a synonym. Hence the next substitute name *C. tomentosa* Roxb. becomes the correct name.

3. **Casearia wynadensis** Bedd. Ic. t. 160. 1868 - 74 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 594. 1879 ; Gamble, Fl. Pres. Madr. 521. 1919, Repr. ed. 1 : 368. 1957.

Small trees, 4 8 m. Leaves oblanceolate, membranous, rufous-villous, long - acuminate, serrate. Flowers in axillary fascicles ; stigma trifid. Capsules orange.

Fl. & Fr. : November - May.

Common ; in hilly forest regions at lower elevations, Ayalur slopes, Silent Valley R.F. fringes.

2. FLACOURTIA L 'Herit.

Flacourtia indica (Burm. f.) Merr. Interpr. Rumph. Herb. Amb. 377. 1917 ; Sleumer in Steenis, Fl. Males. ser. 1. 5 : 76. f. 30. h i. 1958. *Gmelina indica* Burm. f. Fl. Ind. 132. t. 39. f. 5. 1768. *Flacourtia ramontchi* L'Herit. Stirp. Nov. 3 : 59. t. 30 & 30 - B. 1785 ; Wight, Ic. t. 85. 1838 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 193. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 54. 1915, Repr. ed. 39. 1957. *F. sepiaria* Roxb. Pl. Cor. 1 : 48. t. 68. 1796 ; Hook. f. *l.c.* 194 ; Dunn *l.c.* 54. '*Sotthai kala*', '*Kattukila*' (Tam.).

Deciduous, small trees, 5 - 7 m, with branched thorns. Leaves narrow, obovate, irregularly crenate towards apex. Racemes short, puberulous on the thorns, axillary and terminating the twigs. Flowers dull yellow. Tepals 4, united below. Berries globose, turning red on maturity.

Fl. & Fr. : March June.

Common ; in scrubs ; Ayyappankoil area, Karivara forest, Varadimalai area. Fruits edible.

3. HOMALIUM Jacq.

Homalium zeylanicum (Gardn.) Benth. in J. Linn. Soc. Bot. 4 : 35. 1860 ; Bedd. Fl. Sylv. t. 210. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 596. 1879 ; Gamble, Fl. Pres. Madr. 522. 1919. Repr. ed. 1 : 369. 1957. *Blackwellia zeylanica* Gardn. in Calcutta J. Nat. Hist. 7 : 452. 1847. *B. tetrandra* Wight, Ic. t. 1851. 1852.

Large, evergreen trees, 15 20 m. Leaves elliptic, abruptly acuminate at apex, narrowed at base, glabrous beneath, coarsely crenate, bright red when young. Flowers dull white or pale yellow, in long, pendulous racemes. Sepals 4, ciliate. Petals larger than sepals, glabrous. Stamens 4. Capsules many - seeded.

Fl. & Fr. : February April.

Common ; in lower Ghats, Marapalam area, Mukkali forest.

It emits a strong foetid smell when in full bloom, but Gamble *l.c.* says fragrant.

4. HYDNOCARPUS Gaertn.

1a. Leaves serrate ; petals glabrous ; scales as long as petals ... *C. pentandra* 2

1b. Leaves entire ; petals ciliate ; scales half as long as petals ... *C. alpina* 1

1. **Hydnocarpus alpina** Wight, Ic. t. 942. 1845 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 197. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 52. 1915, Repr. ed. 1 : 37. 1957.

Large, evergreen trees, 10 - 15 m. Leaves 14 - 21×5 9 cm, oblong - lanceolate. Stipules deciduous. Flowers pale yellow, solitary or in small fascicles. Petals ciliate. Scales ovate, woolly. Fruits globose, woody.

Fl. & Fr. : October February.

Common ; in evergreen forests, Pothundy slopes - Nelliyampathy R.F., Mukkali forests, Singampara Siruvani forest.

2. **Hydnocarpus pentandra** (Buch. Ham.) Oken, Allg. Naturgesch, 3. (2) : 1381. 1841 ; Mukherjee in Bull. Bot. Surv. Ind. 14 : 183, 1973 (1975). *Chilmoria pentandra* Buch. - Ham. in Trans. Linn. Soc. London 13 : 501. 1822. *Hydnocarpus wightiana* Bl. in Rumph. 4 : 22. 1848 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 196. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 52. 1915, Repr. ed. 1 : 37. 1957. *H. laurifolia* (Dennst.) Sleumer in Bot. Jahrb. 69 : 33. 1938 *nom. illeg. Munnicksia laurifolia* Dennst. Schluss. Hort. Ind. Malab. 13. t. 27. 1818 *nom. nud.*

Large, evergreen trees, 15 20 m with pale red, tender leaves. Leaves ovate oblong, acuminate, serrate, glabrous, rounded or acute at base. Flowers yellow, solitary or in small racemes. Sepals concave, rusty - tomentose. Petals broadly oblong, fringed with white hairs. Scales hairy. Ovary globose, hairy. Berries globose, tomentose.

Fl. & Fr. : March-December.

Common ; in evergreen forests, Dhoni R.F., Mukkali forest.

5. SCOLOPIA Schreb.

Scolopia crenata (Wight & Arn.) Clos. in Ann. Sci. Nat. Bot. ser. 4. 8 : 250. 1857 ; Bedd. Fl. Sylv. t. 78. 1871 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 191. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 52. 1915, Repr. ed. 1 : 38. 1957 ; Sleumer in Blumea 20 : 39. 1972. *Phoberos crenatus* Wight & Arn. Prodr. 29. 1834. '*Charalu*' (Tam.).

Small trees, 5 8 m ; spines on trunks, branched. Leaves elliptic - ovate, acute or acuminate, narrowed at base, glabrous. Flowers white, small, in axillary panicles. Sepals 5, ciliate. Petals smaller than sepals. Stamens numerous. Berries globose.

Fl. & Fr. : October - April.

Common in hilly forests ; in lower Ghats, Mukkali and Pothundy forests.

6. XYLOSMA G. Forst.

Xylosma latifolium Hook. f. & Thoms. in Hook. f. Fl. Brit. India 1 : 194. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 53. 1915, Repr. ed. 1 : 38. 1957.

Large, thorny trees, 10 - 15 m. Leaves ovate, obtuse or acute at apex, crenate. Flowers small, greenish. Sepals imbricate. Stamens many. Styles entire, short with sessile stigma. Berries globose.

Fl. : April June.

Not common ; in open forests, Oommala area - Mukkali.

12. PITTOSPORACEAE

PITTOSPORUM Banks ex Gaertn.

1a. Valves of capsules thin, coriaceous :

2a. Inflorescences more than 10 - flowered ... *P. wightii* 3

2b. Inflorescences less than 10 - flowered ... *P. tetraspermum* 2

1b. Valves of capsules thick, woody ... *C. dasycaulon* 1

1. **Pittosporum dasycaulon** Miq. in Anal. Bot. 3 : 5. 1852 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 199. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 55. 1915, Repr. ed. 1 : 40. 1957 ; Gowda in J. Arnold Arbor. 32 : 324. 1951 ; Nayar & Giri in Fasc. Fl. India 6 : 6. 1980.

Trees, up to 7 m ; shoots tomentose. Leaves elliptic, acuminate. Flowers yellowish, in umbels of short racemes. Sepals ovate, tomentose. Petals linear oblong, rounded. Ovary tomentose. Capsules pubescent, globose.

Fl. : March June.

Common ; in wet deciduous forests, Ayyappankoil area, Karapara river slopes.

Endemic to the Western Ghats.

2. **Pittosporum tetraspermum** Wight & Arn. Prodr. 154. 1834 ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 198. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 55. 1915, Repr. ed. 1 : 40. 1957; Gowda in J. Arnold Arbor. 32 : 337. 1951 ; Nayar & Giri in Fasc. Fl. India 6 : 11. 1980. '*Sunari*' (Tam.).

Small trees, up to 5 m. Leaves crowded at the end of branches, oblong - elliptic. Flowers yellowish, in umbellate cymes, fragrant. Sepals subulate, pubescent. Petals linear - oblong. Ovary densely tomentose. Fruits subglobose with persistent styles.

Fl. : October.

Common ; in open forests, Ayyappankoil slopes.

3. **Pittosporum wightii** A.K. Mukherjee in J. Econ. Tax. Bot. 5 (1) : 50. 1984 ; *P. floribundum* Wight & Arn. Prodr. 154. Oct. 1834 (non Wight & Arn. ex Royle, June 1834) ; Hook. f. & Thoms. in Hook. f. Fl. Brit. Ind. 1 : 199. 1872 *p p.* ; Dunn in Gamble, Fl. Pres. Madr. 55. 1915, Repr. ed. 1 : 40. 1957 ; Gowda in J. Arnold Arbor. 32 : 332. 1951. *P. napaulensis* sensu Blatter in J. Bombay Nat. Hist. Soc. 34 : 302. 1930 [non

(DC.) Rehder & Wilson 1916] ; Nayar & Giri in Fasc. Fl. Ind. 6 : 8. 1930 *p. p.* '*Kattusampangi*', '*Nangundai*' (Tam.).

Trees, 15 m. Leaves obovate, crenulate ; base cuneate. Flowers pale yellow, in short, terminal panicles. Sepals oblong, ciliate. Petals linear - oblong. Ovary brownish pubescent ; styles glabrous. Capsules globose, 4 seeded.

Fl. : January.

Not Common ; in lower Ghats, Kunthipuzha banks.

This is a variable species in the size and shape of leaves and inflorescences. The number of seeds in each capsule is also variable.

13. POLYGALACEAE

1a. Herbs or shrubs ; flowers irregular ; fruits 2 - seeded ...	POLYGALA	1
1b. Trees ; flowers regular ; fruits 1 - seeded ...	XANTHOPHYLLUM	2

1. POLYGALA L.

1a. Caruncles cup - shaped, truncate or with 3 distinct teeth :		
2a. Bracts caducous ; caruncles with 3, long appendages :	*S. sibrica*	5
2b. Bracts persistent ; caruncle appendages short or absent ;		
3a. Leaves linear ; racemes few - flowered ...	*P. rosmarinifolia*	4
3b. Leaves elliptic - oblong ; racemes many. flowered :		
4a. White bulbous based hairs present ...	*P. bolbothrix*	1
4b. White bulbous based hairs absent ...	*P. elongata*	3
1b. Caruncles 3 - fid to the base ...	*P. persicarifolia*	2

1. **Polygala bolbothrix** Dunn in Gamble, Fl. Pres. Madr. 58. 1915, Repr. ed. 1 : 42. 1957 et in Kew Bull. 1916 : 63. 1916 ; Mukh. in Bull. Bot. Soc. Bengal 12 : 37. 1958 ; Chandr. & Nair in Proc. Indian Acad. Sci. 90 : 120. 1981. *P. ciliata* sensu Wight & Arn. Prodr. 38. 1834 non L. 1753. *P. ramaswamiana* Mukh. in J. Bombay Nat. Hist. Soc. 53 : 55. 1955.

Procumbent herbs. Leaves elliptic, oblong obovate, mucronate at apex, base narrowed. Flowers pink, in lax, axillary racemes ; keel petals crested with filiform, forked appendages. Capsules suborbicular, ciliate at margins ; seeds black with hood-shaped and 3-toothed caruncles.

Fl. & Fr. : October January.

Common ; in open grasslands, way to Valiyaparathode, Malampuzha hill slopes.

2. **Polygala elongata** Klein ex Willd. Sp. Pl. 3 : 879. 1802 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 203. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 58. 1915, Repr. ed. 1 : 42. 1957 ; Mukh. in Bull. Bot. Soc. Bengal 12 : 36. 1958 ; Adema in Blumea 14 : 273. 1966 ; Chandr. & Nair in Proc. Indian Acad. Sci. 90 : 125. 1981.

Erect or prostrate herbs. Leaves oblong, linear to lanceolate, recurved, base cuneate. Flowers yellow, in lateral, leaf - opposed or terminal racemes. Bracts lanceolate, ciliate. Outer sepals subequal, ciliate ; wing sepals obliquely ovate elliptic. Keel petals crested with shortly forked and notched appendages. Style curved. Capsules rhomboid ; seeds ciliate ; caruncles hood shaped with 3-linear appendages.

Fl. & Fr. : September.

Common ; in plains, Anamooly slopes Mukkali.

3. **Polygala persicariifolia** DC. Prodr. 1 : 326. 1824 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 202. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 58. 1915, Repr. ed. 1 : 42. 1957 (*'persicariaefolia'*) ; Mukh. in Bull. Bot. Soc. Bengal 12 : 45. 1958 ; Adema in Blumea 14 : 265. 1966 ; Chandr. & Nair in Proc. Indian Acad. Sci. 90 : 115. 1981.

Erect herbs. Leaves linear lanceolate to oblong, acute. Flowers pink, in terminal racemes. Outer sepals elliptic - oblong ; wing sepals suborbicular. Keel petals crested with linear appendages. Styles curved and widened at middle. Capsules winged, ciliate. Seeds hirsute with hood-shaped, 3, blunt appendaged caruncles.

Fl. & Fr. : October November.

Common ; along road sides and grasslands, Mukkali slopes, Valiyaparathode way.

4. **Polygala rosmarinifolia** Wight & Arn. Prodr. 37. 1834 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 204. 1872 ; Dunn in Gamble, Fl. Pres. Madr. 58. 1915, Repr. ed. 1 : 42. 1957 ; Mukh. in Bull. Bot. Soc. Bengal 12 : 38. 1958 ; Chandr. & Nair in Proc. Indian Acad. Sci. 90 : 122. 1981.

Prostrate or erect herbs. Leaves linear, elliptic-oblong. Flowers yellow, in lateral racemes, rarely solitary. Outer sepals oavte-lanceolate ; wing sepals ovate elliptic, ciliate at margiffs. Styles curved, broadened at apex. Capsules rhomboid, ciliate. Seeds black, ciliate Caruncles hood shaped with 2, oblong appendages.

Fl. & Fr. : October.

In open grasslands ; common, in Ayyappankoil slopes.

5. **Polygala sibrica** L. Sp. Pl. 702. 1753 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 205, 1872 ; Dunn in Gamble, Fl. Pres. Madr. 58. 1915, Repr. ed. 1 : 42. 1957 ; Mukh. in Bull Bot. Soc. Bengal 12 : 43. 1958 ; Chandr. & Nair in Proc. Indian Acad. Sci. 90 : 113. 1981. *P. sibrica* var. *heyneana* (Wall. ex Wight & Arn.) Bennett in Hook. f. Fl. Brit. India 1 : 205. 1872 ; Mukh. *l.c.* 44. *P heyneana* Wall. ex Wight & Arn. Prodr. 38. 1834.

Prostrate or erect herbs. Leaves elliptic oblong to lanceolate, revolute. Flowers purple, in axillary racemes ; keel petals crested with filiform appendages. Carpels suborbicular with winged margin. Seeds sparingly hairy. Caruncles hood shaped, 3 winged.

Fl. & Fr. : December.

On grassy hilly slopes ; Kunthipuzha - Poochipara. Common.

This species is allied to *P. japonica* but differs by the following characters : mostly longer and narrower leaves, acute but not mucronate, ovary orbicular and ciliate, stigma closer together, fruits oblong with narrower wing, anthers shortly filamented. Bennett *l c.* reduced *P. japonica* to *P. sibrica*, but Chodat, in Monogr. 2 : 353. 1893 treated them separately which has been followed by Adema (Blumea 14 : 264. 1966) also. Further Bennett sunk many synonyms in *P. sibrica*.

2. XANTHOPHYLLUM Roxb.

Xanthophyllum flavescens Roxb. Pl. Cor. t. 248. 1815 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 209. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 59. 1915, Repr. ed. 1 : 42. 1957. '*Muttai*', *Karungali*' (Tam.).

Large trees, 15 20 m. Leaves coriaceous, oblong - lanceolate. Flowers white, in tomentose terminal panicles ; petals nearly equal ; the lower ones keeled, not crested. Stamens adnate to the petals except the 2, hypogynous ones. Fruits globular, woody, rugose, indehiscent.

Fl. & Fr. : All seasons.

In lower Ghats ; common, Kaikatty - Pothundy, Mukkali forest, Panthanthode, Silent Valley R.F.

14. CARYOPHYLLACEAE

1a. Stipules bristle - like ; petals 2 - 6 - fid ... DRYMARIA 1

1b. Stipules conspicuous, scarious ; petals entire or notched ... POLYCARPON 2

1. DRYMARIA Willd. ex Roem. & Schult.

Drymaria cordata (L.) Willd. ex Roem. & Schult. subsp. **diandra** (Bl.) Duke in Ann. Miss. Bot. Gard. 48 : 253. 1961. *D. diandra* Bl. Bijdr. 62. 1825. *D. cordata sensu* Edgew. & Hook. f. Fl. Brit. Ind. 1 : 244. 1874 *p.p.* ; Dunn in Gamble, Fl. Pres. Madr. 63. 1915, Repr. ed. 1 : 46. 1957. *Holosteum cordatum* L. Sp. Pl. 88. 1753.

Diffuse, glabrous herbs. Leaves orbicular ; stipular bristles many. Flowers yellow, in axillary and terminal cymes. Styles 3 fid. Fruits 3 valved.

Fl. : October.

Common ; in shady places, Ayyappankoil area Nelliyampathy Ghat.

2. POLYCARPON L.

Polycarpon prostratum (Forsk.) Asch. & Schweinf. in Osterr. Bot. Zeitschr. 39 : 128. 1889 ; Milne-Redhead in Kew Bull. 451. 1948. *Alsine prostrata* Forsk. Fl. Aeg. Arab. 207. 1775. *Loeflingia indica* Retz. Obs. Bot. 4 : 8. 1786. *Polycarpon indicum* (Retz.) Merr. in Philipp. J. Sci. Bot. 10 : 302. 1915. *P. loeflingiae* (Wall. ex Wight & Arn.) Benth. ex Edgew. & Hook. f. in Hook. f. Fl. Brit. Ind. 1 : 245. 1874 ; Dunn in Gamble. Fl. Pres. Madr. 64. 1915, Repr. ed. 1 : 46. 1957.

Small, diffuse, wiry, dichotomously branched, pubescent herbs. Leaves linear oblong or spathulate. Flowers white, in dense cymes. Sepals ovate - oblong, keeled. Petals shorter than the sepals, linear, toothed at apex. Capsules membranous, enclosed in sepals.

Fl. & Fr. : April June.

Common ; in waste places, Bhavani river bank, Attappadi R.F., Walayar.

15. PORTULACACEAE

PORTULACA L.

1a. Leaves flat, obovate to spathulate ... *P. oleracea* 1

1b. Leaves terete, linear to elliptic ... *P. pilosa* 2

Portulaca oleracea L. Sp. Pl. 445. 1753 ; Poelinitz in Fedde Repert. 37 : 240. 1934 ; Thiselton Dyer in Hook. f. Fl Brit. Ind. 1 : 246. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 66. 1915, Repr. ed. 1 : 47 1957.

Prostrate, succulent, glabrous herbs, swollen at nodes. Leaves cuneiform, rounded, truncate at apex. Flowers yellow, in sessile heads. Sepals unequal. Petals obovate. Stamens 8 12. Capsules ovoid. Seeds many, black, concentrically striate.

Fl. & Fr. : October - February.

Common ; in waste places, Malampuzha canal bund, Madheswar temple Chemmanur.

3. **Portulaca pilosa** L. Sp. Pl. 445. 1753 ; Geesink in Blumea 17 : 294. 1969. *P. tuberosa* Roxb. Fl. Ind. 2 : 464. 1832 ; Dunn in Gamble, Fl. Pres. Madr. 66. 1915, Repr. ed. 1 : 47. 1957.

Fleshy herbs with fusiform roots. Leaves alternate, linear terrete, stipules hairy. Flowers pink or white, usually solitary. Stamens 10 12 ; style 3 branched. Seeds red - brown.

Fl. & Fr. : July.

Common ; lower Ghats ; Walayar forest.

Talinum portulacifolium (Forsk.) Asch. & Schweinf. (*T. cuneifolium* Willd.) is a fleshy herb cultivated for the leaves used as greens.

16. HYPERICACEAE

HYPERICUM L.

Hypericum mysurense Heyne ex Wight & Arn. Prodr. 99. 1834 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 253. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 70. 1915, Repr. ed. 1 : 50. 1957. *Norisca mysurensis* (Heyne ex Wight & Arn.) Wight, Ic. t. 56. 1838.

Large, glabrous shrubs ; young branches 4 angled. Leaves decussate, elliptic - lanceolate, acute, attenuate at base. Flowers yellow, in terminal cymes. Sepals 5, unequal. Petals deciduous. Stamens in 5 phalanges. Ovary 5 locular. Styles longer than ovary.

Fl. : March.

Common ; in open dry forests, Karasuryamalai area.

17. CLUSIACEAE

(GUTTIFERAE)

1a. Veins of leaves parallel ; styles present, stigmas peltate or acute :

2a Style 1 ; stigma peltate :

3a. Leaves not glaucous ; flowers in racemes ... CALOPHYLLUM 1

3b. Leaves glaucous ; flowers solitary or in pairs ... MESUA 3

2b. Styles 2 ; stigma acute ... POECILONEURON 4

1b. Veins of leaves not parallel ; styles absent, stigmas radiate ... GARCINIA 2

1. CALOPHYLLUM L.

1a. Leaves rounded at base ; fruits less than 1.5 cm long ... *C. apetalum* 1

1b. Leaves cuneate at base ; fruits more than 2 cm long ... *C. austroindicum* 2

1. **Calophyllum apetalum** Willd. in Ges. Naturf. Fr. Berlin Mag. 5 : 79. 1811 ; Maheshwari in Bull. Bot. Surv. Ind. 2 : 143. 1960 ; Stevens in J. Arnold Arbor. 61 : 253. 1980. *C. decipiens* Wight, Ic. t. 106. 1839 ; Dunn in Gamble, Fl. Pres. Medr. 76. 1915, Repr. ed. 1 : 54 1957. *C. wightiana* Wall. ex Planch. & Triana in Ann. Sci. Bot. ser. 4. 15 : 256. 1816 ; Bedd. Fl. Sylv. t. 90. 1871 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 274. 1874. '*Cherupinnei*' (Mal.).

Large trees, 25 - 30 m, latex white ; branchlets 4 angled or slightly flattened. Leaves obovate to elliptic, rounded to retuse at apex, base rounded. Flowers white. Sepals 4, biseriate, petaloid. Petals absent. stamens many. Fruits ovoid to elliptic, red on maturity.

Fl. & Fr. : October - April.

Endemic ; rare ; on river banks, Karivara.

Timber is used in house building and for furnitures etc. and lamp oil is extracted from the seeds.

2. **Calophyllum austroindicum** Kosterm. ex Stevens in J. Arnold Arbor. 61 : 250. 1980. *C. trapezifolium* auct. non Thw. Enum. 51. 1858 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 275. 1874 ; Dunn in Gamble, Fl. Pres. Madr 76. 1915, Repr. ed. 1 : 55. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 2 : 144. 1960 *p.p.*

Trees, 20 25 m ; twigs flat. Leaves elliptic or trapeziform to obovate, cuneate to acute at base. Flowers white. Tepals 8 to 10, the outer pair suborbicular, inner ones oblong to obovate. Stamens numerous. Fruits ovoid, *ca.* 3 cm across.

Fl. & Fr. : March June.

Rare ; below Walghat forests.

Endemic to south Western Ghats.

2. GARCINIA L.

1a. Flowers 4 - merous :		
2a. Stigmas 4 ; fruits smooth	...	*G. morella* 3
2b. Stigmas 6 - 11 ; fruits grooved :		
3a. Fruits grooved to the middle	...	*G. gummi - gutta* 2
3b. Fruits grooved to the top	..	*G. cowa* 1
1b. Flowers 5 - merous	...	*G. spicata* 4

1. **Garcinia cowa** Roxb. ex DC. Prodr. 1 : 561. 1824 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 262. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 74. 1915, Repr. ed. 1 : 53. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 6 : 131. 1965.

Medium sized, dioecious trees, 7 - 12 m. Leaves broadly lanceolate, acute. Flowers small, yellow, in axillary or terminal fascicles. Sepals ovate, fleshy. Petals oblong. Stamens numerous. Ovary subglobose. Stigma sessile. Fruits globular, 4 8 grooved, yellow.

Fl. & Fr. : January - May.

In evergreen forests, Anavayee, Karivara forests ; common.

2. **Garcinia gummi - gutta** (L.) Robs. in Brittonia 20 (2) : 103. 1968 ; Kosterm. in Ceylon J. Sci. (Biol. Sci.) 12 : 55. 1976. *Cambogia gummi - gutta* L. Gen. Pl. ed. 5. 522. 1754. *Garcinia cambogia* (Gaertn.) Desr. in Lam. Encycl. 3 : 701. 1792 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 261. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 78. 1915, Repr. ed. 1 : 53. 1957 ; Maheshwari in Bull. Bot Surv. Ind. 6 : 128. 1965. '*Penampuli*', '*Kodukkapuli*' (Tam.).

Small or medium - sized trees, 7 10 m ; branches drooping. Leaves elliptic oblong, apex acute obtuse, base cuneate. Staminate flowers in fascicles (of 15 20) on leafy or leafless woods. Pistillate flowers solitary. Ovary 6 12 - locular. Berries elliptic -oblong with 6 - 8 grooves.

Fl. & Fr. : February June.

Common ; in evergreen forests, Karivara, Varadimalai estate area.

Cambogia gummi - gutta has been lectotypified by Kostermans *l.c.* on *Coddam - pulli* Rheede, Hort. Malab. 1 : 41. t. 24. 1678. While doing so he states that *Garcinia gummi - gutta* (L.) Robs. is the correct name of the South Indian species and not *G. cambogia* (Gaertn.) Desr.

3. **Garcinia morella** (Gaertn.) Desr. in Lam. Encycl. 3 : 701. t. 405. f. 2 1792 ; Bedd. Fl. Sylv. t. 86. 1871 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 264. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 73. 1915, Repr. ed. 1 : 52. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 6 : 182. 1965 ; Kosterm. in Dassanayake & Forberg. Revis. Handb. Fl Ceylon 1 : 77. 1980. *Mangostana morella* Gaertn. Fruct. 2 : 106. 1790. *Garcinia pictoria* Roxb. Fl. Ind. 2 : 627. 1832 ; Wight Ic. t. 102. 1839 ; Bedd. Fl. Sylv. t. 87. 1871. *'Makki'* (Tam.), *'Chigiri'* (Mal.).

Moderate sized trees, 7 12 m. Leaves elliptic ovate, bluntly acuminate at apex, base rounded or cuneate. Male flowers subsessile, in fascicles. Female solitary. Stamens in globular mass ; anthers peltate. Ovary 4 locular with sessile stigmas. Berries globose, smooth, pinkish.

Fl. & Fr. : October June.

In lower Ghats ; Mukkali, Silent Valley R.F., Siruvani Western slopes, common.

Maheshwari *l.c.* treats *G. pictoria* Roxb. separately but remarks "allied to *G. morella* (Gaertn.) Desr. and scarcely distinguishable except by the female flowers". Hence treated as a synonym here.

4. **Garcinia spicata** (Wight & Arn.) Hook. f. in J. Linn. Soc. Bot. 14 : 486. 1875 ; Dunn in Gamble, Fl. Pres. Madr. 74. 1915, Repr. ed. 1 : 53. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 6 : 112. 1965. *Xanthochymus spicatus* Wight & Arn. Prodr. 102. 1834. *Garcinia ovalifolia* Hook. f. var. *spicata* (Wight & Arn.) Anderson in Hook. f. Fl. Brit. Ind. 1 : 269. 1874. *'Kokattai'* (Tam.).

Medium sized trees, 7 12 m. Leaves ovate elliptic to oblong, emarginate, base rotundate. Staminate flowers in axillary fascicles. Sepals orbicular. Petals obovate, concave. Pistillate flowers with 5 staminodes. Ovary globose. Stigmas 5 - lobed. Berries oblong, smooth.

Fr. : March June.

At lower elevations in Ghats, Mukkali forests ; common.

Wood is used for implements.

3. MESUA L.

Mesua nagassarium (Burm. f.) Kosterm. in Ceylon J. Sci. (Biol. Sci.) 12 (1) : 71. 1976 et in Dassanayake, Revis. Handb. Fl. Ceylon 1 : 107. 1980. *Calophyllum nagassarium* Burm. f. Fl. Ind. 121. 1768. *Mesua ferrea* auct. non L. 1753 ; Wight, Ic. t. 118. 1839 ; Anderson in Hook. f. Fl. Brit. Ind. 1 : 277. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 77. 1915, Repr. ed. 1 : 55. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 6 : 336 1965. '*Naangu*', '*Nagacuram*' (Tam.).

Medium sized trees, 10 - 15 m ; buttressed at base. Leaves opposite - decussate, oblong - lanceolate, acute or acuminate, base rounded to attenuate, glaucous beneath. Flowers white, with light pinkish tinge, solitary or in pairs, fragrant. Sepals 4, orbicular. Petals 4, curled and erose at margins. Stamens yellow. Fruits ovoid, with conical point and enlarged persistent sepals.

Fl. & Fr. : October - April.

Common components of evergreen forests, Ayyappankoil forest, Kunthipuzha river bank, Silent Valley.

Wood is used for Railway sleepers, construction of bridges etc.

4. POECILONEURON Bedd.

Poeciloneuron indicum Bedd. in J. Linn. Soc. Bot. 8 : 267. t. 17. 1865 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 278. 1874 ; Dunn in Gamble, Fl. Pres. Madras 77. 1915, Repr. ed. 1 : 56. 1957. '*Vayila*' (Mal.), '*Vadinaangu*', '*Puthangkolli*' (Tam.).

Large, gregarious trees, 20 - 30 m. Leaves linear oblong to lanceolate. Flowers pinkish, in terminal panicles. Sepals 5, imbricate. Stamens numerous ; anthers elongate, lobulate on margins. Fruits ovoid.

Fl. & Fr. : February June.

Rare but abundant in evergreen forests, Singampara slopes - Siruvani forest, Valiaparathode Silent Valley R.F.

This rare species has been collected after a lapse of about seventy years. First collection by Beddome in the year 1866 and the last collection during 1908 by Barber from the Anamalais. All are at MH. Wood is a valuable timber.

18. THEACEAE

1a. Flowers solitary ; fruits capsular ... GORDONIA 2

1b. Flowers fascicled ; fruits berry ... EURYA 1

1. EURYA Thunb.

Eurya japonica Thunb. Fl. Jap. 191. t. 25. 1784 ; Bedd. Fl. Sylv. t. 92 1871 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 284. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 79. 1915. Repr. ed. 1 : 57. 1957.

Small trees, up to 7 m with sharply angular twigs. Leaves elliptic, glabrous, crenate serrate. Flowers white, in fascicles, 5 merous with orbicular sepals and petals. Stamens 5 15. Styles 3. Fruits globular berries.

Fl. : January.

In open forests in upper Ghats ; Dam site, Silent Valley.

2. GORDONIA Ellis *nom. cons.*

Gordonia obtusa Wall. ex Wight & Arn. Prodr. 87. 1834 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 291. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 79. 1915, Repr. ed. 1 : 57. 1957. '*Mavilai*' (Tam.).

Small trees, 5 10 m. Leaves oblong - lanceolate, crenate, glabrous. Flowers white, axillary, solitary, towards the ends of branches. Sepals rounded. Petals broadly orbicular. Stamens many, adnate to petal base. Fruits woody, oblong, 4 5 valved with persistent central axils. Seeds winged.

Fl. & Fr. : April.

Common ; in sholas and evergreen forests ; Dam site, Silent Valley R.F.

Camellia sinensis (L.) Kuntze, the 'TEA' plant is cultivated in many estates in the Nalliampathy Ghats.

19. DIPTEROCARPACEAE

1a. Stipules amplexicaul ; calyx tubular ... DIPTEROCARPUS 1

1b. Stipules not amplexicaul ; calyx not tubular :

2a. Petioles swollen, appressed tomentose	...	HOPEA	2
2b. Petioles not swollen, glabrous	...	VATERIA	3

1. DIPTEROCARPUS Gaertn.

Dipterocarpus indicus Bedd. Fl. Sylv. t. 94. 1871 ; Dunn in Gamble, Fl. Pres. Madr. 81. 1915, Repr. ed 1 : 58. 1957. '*Ennei*' (Tam.), '*Kalpayin*' (Mal.).

Lofty, evergreen trees, 20 30 m. Leaves ovate, acute, truncate to subcordate at base, glabrous, entire. Stipules encircling the stems. Flowers in racemes. Petals puberulous outside. Stamens numerous. Fruits nut-like with 2, accrescent calyx lobes.

Fr. : February - June.

In semievergreen forests, Ayyappankoil area ; common.

Valuable timber used for several purposes.

2. HOPEA Roxb. *nom. cons.*

1a. Panicles tomentose ; petals glabrous	...	*H. parviflora*	1
1b. Panicles glabrous ; petals pubescent	...	*H. ponga*	2

1. **Hopea parviflora** Bedd. Fl. Sylv. t. 7. 1869 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 308. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 82. 1915, Repr. ed. 1 : 59. 1957. '*Kongu*', '*Pongu*' (Tam.), '*Thambagam*' (Mal.).

Large trees, 15 20 m. Leaves ovate to oblong, entire. Flowers in unilateral, tomentose panicles. Sepals obtuse, imbricate, tomentose. Petals glabrous. Fruits enclosed in the accrescent sepals of which 2 become erect wings.

Fl. : February.

Common ; in the moist forests, Kaikatty - Pothundy forests.

Timber is used for several purposes including building constructions.

2. **Hopea ponga** (Dennst.) Mabberley in Taxon 28 : 587. 1979. *Artocarpus ponga* Dennst. Schluss. Hort. Ind. Malab. 15, 18, 30. 1818 et in Fortsetz. Allg. Teutsch. Gart. Mag. 3 : 33, 36, 79. 1818 ; Hassk. Hort. Malab. Rheed. Clav. 34. 1867. *Hopea wightiana* Wall. ex Wight & Arn.

Prodr. 85. 1834 ; Bedd. Fl. Sylv. t. 96. 1871 : Dunn in Gamble, Fl. Pres. Madr. 82. 1915, Repr. ed. 1 : 59. 1957. '*Ilapongu*' (Tam.), '*Pongu*' (Mal.).

Large trees, 15 20 m. Leaves lanceolate, abruptly acute. Flowers in unilateral, glabrous panicles. Sepals glabrous. Petals ovate lanceolate, pubescent, Stamens 15. Fruits enclosed by the accrescent calyx ; all 5 wings erect, oblong, reddish.

Fl. & Fr. : November May.

Common ; in Ghats, Mukkali forest, Karivara slopes.

Timber used for several purposes. Until recently the name *Hopea wightiana* Wall. ex Wight & Arn. was treated as the correct name for this species. But following the scrapping of Article 71 in the Leningrad Code (1978), Mabberley *l.c.* has revived the name *Artocarpus pongu* Dennst., a *nomen monstrositatis* and made the combination in *Hopea* as *ponga* is an earlier epithet.

3. VATERIA L.

1a. Inflorescences robust ; calyx less than half the length of corolla ... *V. macrocarpa* 2

1b. Inflorescences slender ; calyx more than half the length of corolla ... *V. indica* 1

1. **Vateria indica** L. Sp. Pl. 515. 1753 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 313. 1874 ; Dunn in Gamble, Fl. Press. Madr. 85. 1915, Repr. ed. 1 : 61. 1957. *V. malabarica* Bl. Mus. Bot. Ludg. Bat. 2 : 29. 1856 ; Bedd. Fl. Sylv. t. 84. 1871. '*Vellakuntricum*' (Tam.), '*Payin*' (Mal.).

Evergreen trees, 20 30 m. Leaves 9 22 × 5 11 cm. Flowers less than 2 cm across, white, fragrant, in terminal or axillary, drooping panicles. Calyx lobes equal, reflexed. Petals glabrous. Stamens 15. Fruits fleshy, large, ovoid, rough.

Fr. : April August.

Common ; in lower Ghats, Mukkali forest.

Wood used for furniture and as firewood. Resin used in making varnish.

2. **Vateria macrocarpa** B.L. Gupta in Indian Forester 55 : 231. 1929.

Large trees resembling the above species in all respects, but differs in the robust nature of inflorescences, large flowers (more than 2 cm across), calyx lobes less than half of the corolla length.

Fl. : March.

Rare ; in lower Ghats, Muthikulam forest, Siruvani slopes.

It is an addition to the Flora of Presidency of Madras.

20. ANCISTROCLADACEAE

ANCISTROCLADUS Wall. *nom. cons.*

Ancistrocladus heyneanus Wall. ex Grah. Cat. Pl. Bombay 28. 1839 ; Wight, Ic. tt. 1987 - 88. 1853 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 1 : 299. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 86. 1915, Repr. ed. 1 : 62. 1957.

Large, climbing shrubs ; branches hooked. Leaves alternate, sessile, oblanceolate, gland - pitted, entire, crowded. Flowers yellow, in dichotomously branched axillary panicles. Calyx enlarged in fruits. Petals 5, free. Stamens 10. Nuts adnate to calyx.

Fl. & Fr. : February May.

In moist evergreen forests at lower elevations, Mukkali, Pothundy forests ; not common.

21. MALVACEAE

1a. Panicles without peltate scales ;

2a. Carpels separating from the axis at maturity :

3a. Styles as many as the carpels :

4a. Bracteoles present ... MALVASTRUM 5

4b. Bracteoles absent :

5a. Carpels bursting irregularly ; points not spreading ... SIDA 7

5b. Carpels bursting by a regular central line ; points radiating ... ABUTILON 2

3b. Styles twice as many as the carpels :

6a. Leaves with a large gland at the base ; carpels glochidiate ... URENA 9

6b. Leaves without glands ; carpels not glochidiate ... PAVONIA 6

2b. Carpels not separating :

7a. Bracteoles persistent, forming spreading wings ... KYDIA 4

7b. Bracteoles not persistent :

8a. Calyx splitting on one side ... ABELMOSCHUS 1

8b. Calyx not splitting on one side ... HIBISCUS 3

1b. All herbaceous parts with peltate scales ... THESPESIA 8

1. ABELMOSCHUS Medik.

1a. Epicalyx segments 6 - 16, free ; stems usually solid ... *A. moschatus* 2

1b. Epicalyx segments 4 - 8, enveloping the buds ; stems usually hollow ... *A. angulosus* 1

1. **Abelmoschus angulosus** Wall. ex Wight & Arn. Prodr. 53. 1834 ; Borssum in Blumea 14 : 104. 1966. *Hibiscus angulosus* (Wall. ex Wight & Arn.) Steud. Nomen. Bot. ed. 2. 1 : 758. 1840 ; Wight, Ic. t. 951. 1845 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 341. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 97. 1915, Repr. ed. 1 : 70. 1957. *H. setinervis* Dunn in Bull. Misc Inform. Kew 324. 1914 ; Dunn *l.c.* 97, 69.

Stout, erect, perennial, rigid, hispid herbs. Leaves elliptic with 3 7 ovate - lanceolate segments, stellately hairy. Flowers yellow, large, solitary, axillary. Epicalyx large, hispid or stellate hairy. Calyx membranous. Petals broadly obovate, yellow with deep purple base. Capsules ovoid - oblong, densely hispid.

Fl. & Fr. : October February.

In forest edges in hilly regions ; Mukkali forest, Silent Valley R.F., common.

It is conspicuous by its angular, accrescent epicalyx.

2. **Abelmoschus moschatus** Medik. Malv. 46. 1787 ; Borssum in Blumea 14 : 90. 1966. *Hibiscus abelmoschus* L. Sp. Pl. 696. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 341. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 90. 1915, Repr. ed. 1 : 69. 1957. '*Vartilaikasturi*', '*Kattukasturi*' (Tam.).

Tuberous herbs with prickly stems, petioles and pedicels. Leaves variable, elliptic, orbicular, lobed, base cordate ; upper ones hastate with ovate - oblong segments. Flowers axillary, solitary. Calyx stellate tomentose outside, scarious inside. Petals obovate. Staminal column yellow, base dark purple, glabrous. Ovary ovoid, hirsute. Capsules ovoid - fusiform, hispid.

Fl. & Fr. : February - May.

In secondary forests and on road sides ; Malampuzha, Marapalam-Pothundy slopes ; common.

2. ABUTILON Mill.

1a. Styles and mericarps 5 ; seeds 4 - 6 in each mericarp ... *A. persicum* 2

1b. Styles and mericarps 10 ; seeds 2 - 3 in each mericarp ... *A. indicum* 1

1. **Abutilon indicum** (L.) Sweet, Hort. Brit. ed. 1. 54. 1826 ; Wight, Ic. t. 12. 1838 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 326. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 91. 1915, Repr. ed. 1 : 65. 1957 ; Borssum in Blumea 14 : 170. 1966. *Sida indica* L. in Torner Cent. Pl. 2 : 26. 1756. '*Panivarattuti*' (Tam.).

Stout, erect, annual undershrubs. Leaves ovate, crenate, base cordate. Stipules linear, acute. Flowers axillary, solitary ; pedicels long. Corolla yellow to orange, apex rounded.

Fl. & Fr. : October March.

In waste places and on road sides ; Thenkarai slopes ; common.

2. **Abutilon persicum** (Burm. f.) Merr. in Philip. J. Sci. 19 : 364. 1921 ; Borssum in Blumea 14 : 163. 1966. *Sida persica* Burm. f. Fl. Ind. 148. t. 47. f. 1. 1768. *Abutilon polyandrum* (Roxb.) Wight & Arn. Prodr. 55. 1834 non G. Don 1831 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 325. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 91. 1915, Repr. ed. 1 : 65. 1957. *Sida polyandra* Roxb. Fl. Ind. 3 : 173. 1832.

Stout, viscid undershrubs. Leaves orbicular to ovate lanceolate, cordate, coarsely serrate to crenate, stellate - hairy beneath, acuminate. Flowers solitary to terminal racemes. Calyx 5 parted, stellate tomentose. Petals yellow, hairy outside. Mericarps stellate hairy.

Fl. & Fr. : October February.

In hilly lowlands and teak plantations ; Karapara river bank, Mukkali, Panthanthode, Pottikkal area ; common.

3. HIBISCUS L. *nom. cons.*

1a. Stems and sepals prickly ; sepals not glandular ;

2a. Stipules foliaceous ... *H. surattensis* 4

2b. Stipules not foliaceous (linear) ... *H. aculeatus*

3b. Stems and sepals not prickly or with a few, small prickles ; sepals glandular :

3a. Seeds uniformly tubercled ; stipules 2 - 6 mm :

4a. Herbs with wingless capsules ... *H. lobatus* 2

4b. Shrubs with winged capsules ... *H. virifolius* 5

3b. Seeds smooth or with a few small tubercles ; stipules 1 - 2 mm ... *H. lunarifolius* 3

1. **Hibiscus aculeatus** Roxb. Fl. Ind. 3 : 206. 1832 ; Paul & Nayar in Bull. Bot. Surv. Ind. 22 : 195. 1980. *H. furcatus* Roxb. ex DC. Prodr. 1 : 449. 1824 non Willd. 1809 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 335. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 97. 1915, Repr. ed. 1 : 70. 1957 ; Rakshit & Kundu in Bull. Bot. Surv. Ind. 12 : 161. 1972.

Large, rambling undershrubs. Leaves 3 5 lobed, crenate - serrate with densely hairy nerves beneath. Epicalyx 8 - 12, hispid, each 2 - lobed. Calyx campanulate, hispid. Petals bright yellow with pinkish base. Capsules bristly hairy. Seeds black, smooth.

Fl. & Fr. : October March.

Common ; in forest edges in Ghats ; Kaikatty, Mukkali forest, Olavakkot, Panthanthode area.

2. **Hibiscus lobatus** (Murray) Kuntze, Rev. Gen. Pl. 3 : 19. 1898 ; Borssum in Blumea 14 : 77. 1966 ; Rakshit & Kundu in Bull. Bot. Surv. Ind. 12 : 169.1972. *Solandra lobata* Murray in Comm. Soc. Reg. Sci. Goett. 6 : 20. t. 1. 1785. *Hibiscus solandra* L'Herit. Stirp. Nov. 1 : 103. t. 49. 1788 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 336. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 98. 1915, Repr. ed. 1 : 70. 1957.

Erect, hairy herbs. Leaves ovate - lanceolate, rarely lyrate, base rounded or cordate, apex acute - acuminate or 3 lobed. Stipules linear, hairy. Flowers solitary to racemose. Calyx campanulate, 5 fid. Petals white, glabrous, obovate. Capsules ovate, stellate hairy.

Fl. & Fr. : October February.

In dry localities ; Pothundy - Kaikatty forest, Sappal hill Dhoni R.F., common.

3. **Hibiscus lunarifolius** Willd. Sp. Pl. 3 : 811. 1800 ; Wight, Ic. t. 6. 1838 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 338. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 98. 1915, Repr. ed. 1 : 70. 1957 ; Borssum in Blumea 14 : 80. 1966 ; Rakshit & Kundu in Bull. Bot. Surv. Ind. 12 : 173. 1972. '*Malamkuruparethi*' (Mal.).

Herbs or undershrubs with stiff stellate hairs. Leaves ovate lanceolate, base cordate or rounded, apex acute, 3 5 lobed, coarsely serrate. Flowers axillary, solitary to terminal racemes. Epicalyx 5 6, linear, lobed, free. Calyx campanulate, 5 parted. Corolla yellow with dark purple centre. Seeds reniform.

Fl. & Fr. : October - February.

Common ; in waste places and in secondary forests of dry localities ; Panthanthode and Pothundy forests.

4. **Hibiscus surattensis** L. Sp. Pl. 696. 1753 ; Wight, Ic. t. 197. 1839 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 334. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 97. 1915, Repr. ed. 1 : 70. 1957 ; Rakshit & Kundu in Bull. Bot. Surv. Ind. 12 : 160. 1972.

Trailing undershrubs ; rooting at nodes. Petioles and pedicels with densely recurved prickles. Leaves elliptic, base shallowly cordate ; lower ones 3 5 - palmilobed ; upper 5 - palmiparted with linear, serrate segments. Stipules leafy, auricled. Flowers solitary, axillary. Epicalyx segments spathulate, hairy. Calyx campanulate, accrescent, 5 fid. Corolla yellow with dark purple centre, stellate pubescent outside. Capsules ovoid to globose, stiff hairy.

Fl. & Fr. : October - January.

Common ; in waste places and in teak plantations ; Olavakkot, Thenkarai slopes, Thiruvizhankunnu forest.

5. **Hibiscus vitifolius** L. Sp. Pl. 696. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 338. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 98. 1915, Repr. ed. 1 : 70. 1957 ; Borssum in Blumea 14 : 82. 1966 ; Rakshit & Kundu in Bull. Bot. Surv. Ind. 12 : 166. 1972.

Herbs or undershrubs, prickly. Leaves (lower) 3 5 lobed ; lobes deltoid to triangular, acuminate ; (upper) ovate oblong, coarsely serrate. Flowers solitary to racemose. Epicalyx segments 8 - 12, linear, free, reflexed. Calyx glandular - hairy outside. Corolla yellow with dark purple centre, stellate - hairy outside, glandular - hairy inside. Capsules globular, depressed, beaked.

Fl. & Fr. : August December.

Not common ; in dry localities, waste places and forest edges ; Attapadi block Mukkali, Walayar forest.

Stem yields a fibre used in cordage.

4. KYDIA Roxb.

Kydia calycina Roxb. Pl. Cor. t. 215. 1811 ; Wight, Ic. tt. 879 - 80. 1844 - 45 ; Bedd. Fl. Sylv. t. 3. 1869 ; Dunn in Gamble, Fl. Pres. Madr. 93. 1915, Repr. ed. 1 : 67. 1957. *K. roxburghiana* Wight, Ic. t. 881. 1844 - 45. '*Nedunar*' (Mal.).

Trees 5 7 m, with stellate tomentum. Leaves ovate - orbicular, 7 - ribbed, stellate - pubescent above, glabrous below, crenate. Flowers white, in axillary and terminal panicles. Epicalyx segments 4-6, spathulate, persistent. Petals obovate, emarginate, fimbriate, clawed, hairy. Capsules depressed globose, woolly.

Fl. & Fr. : October - March.

Common ; in deciduous forests, Attappadi forest, Chindaki, Mukkali, Panthanthode area.

5. MALVASTRUM A. Gray *nom. cons.*

Malvastrum coromandelianum (L.) Garcke in Bonplandia 5 : 295. 1857 ; Dunn in Gamble, Fl. Pres. Madr. 88. 1915, Repr. ed. 1 : 64. 1957 ; Borssum in Blumea 14 : 152. 1966. *Malva coromandeliana* L. Sp. Pl. 687. 1753.

Annual, erect branched shrubs ; stems and branches covered with stiff appressed hairs. Leaves ovate oblong, truncate at base. Stipules linear lanceolate. Flowers yellow in axils. Bracteoles 3, narrow. Epicalyx segments linear lanceolate, hairy. Mericarps 10 - 14, curved.

Fl. & Fr. : May.

Common weed on roadsides and waste places ; Walayar dam area.

6. PAVONIA Cav. *nom. cons.*

1a.	Leaves lobed ; cocci glabrous	... *P. zeylanica*	2
1b.	Leaves not lobed ; cocci hairy	... *P. odorata*	1

1. **Pavonia odorata** Willd. Sp. Pl. 3 : 837. 1800 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 331. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 93. 1915, Repr. ed. 1 : 69. 1957. '*Peramutti*', '*Avibattum*' (Tam.).

Woody herbs. Leaves ovate, acute, base cordate, palmately 3 - 5 - veined. Epicalyx segments 12, free, subulate, hairy. Calyx campanulate, 5 - lobed. Corolla rotate, pink. Styles 10. Cocci 5, puberulous.

Fl. & Fr. : October - January.

Common ; in dry low lands ; in Ghats and plains ; Agali forest.

The stem fibre is used to make ropes.

2. **Pavonia zeylanica** (L.) Cav. Diss. 3 : 134. 1787 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 330. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 93. 1915, Repr. ed. 1 : 67. 1957. *Hibiscus zeylanicus* L. Sp. Pl. 697. 1753. '*Mammatti*' (Tam.).

Erect branching woody herbs. Leaves palmately lobed ; lobes 3 5, palmately veined. Epicalyx setaceous, hairy ; segments 8 - 10. Flowers white. Coccus keeled, flat at the back.

Fl. & Fr. : July.

Common in lower Ghats ; Walayar dam area.

7. SIDA L.

1a. Plant velvety ; awns of carpels longer than calyx ...	*S. cordifolia*	3
1b. Plant not velvety ; awns of carpels shorter than calyx:		
2a. Leaves cordate or truncate at base ;		
3a. Branches and leaves glutinous ...	*S. glutinosa*	4
3b. Branches and leaves not glutinous ...	*S. cordata*	2
2b. Leaves cuneate at base ;		
4a. Pedicels jointed below the middle and longer than the petiole ...	*S. rhombifolia*	5
4b. Pedicels jointed above the middle and equal to the petiole ...	*S. acuta*	1

1. **Sida acuta** Burm. f. Fl. Ind. 147. 1768 ; Wight, Ic. t. 95. 1838 ; Dunn in Gamble, Fl. Pres. Madr. 90. 1915, Repr. ed. 1 : 64. 1957 ; Borssum in Blumea 14 : 186. 1966. *S. carpinifolia* sensu Mast. in Hook. f. Fl. Brit. Ind. 1 : 323. 1874 *p.p.* non L. f. 1781. '*Malaitangi*', '*Arivamooku keerai*' (Tam.), '*Kurunthotti*' (Mal.).

Ascending or erect undershrubs. Leaves oblong - lanceolate, base unequal, serrate - dentate. Stipules dissimilar. Pedicels jointed above middle. Flowers axillary, solitary or in clusters of 2 - 3. Calyx campanulate ;

segments ovate triangular, ciliate. Corolla light yellow - white, ciliate. Mericarps 5, (rarely 7 8) with 2 awns, glabrous.

Fl. & Fr. : October.

Common ; in waste places, road sides etc. ; Madheswar temple area, Olavakkot,

Borssum *l.c.* distinguishes *S. acuta* ssp. *carpinifolia* from *S. acuta* ssp. *acuta* by ovate oblong leaves with a rounded base, indumentum of mostly simple hairs and flowers in clusters of 8 and the latter by lanceolate-linear leaves with an acute base and flowers in clusters of 2 3.

2. **Sida cordata** (Burm. f.) Borssum in Blumea 14 : 182. 1966. *Melochia cordata* Burm. f. Fl. Ind. 143. 1768. *Sida veronicifolia* Lam. Encycl. 1 : 5. 1783 ; Dunn in Gamble, Fl. Pres. Madr. 89. 1915, Repr. ed. 1 : 64. 1957 '*veronicaefolia*'.

Erect or ascending herbs ; branches tomentose. Leaves orbicular, crenate - serrate, sparsely hairy. Pedicels jointed near tip, longer than leaves. Flowers yellow, in axillary racemes. Mericarps 5, glabrous ; seeds ovoid.

Fl. & Fr. : October.

Common ; in lower Ghats ; Olavakkot.

3. **Sida cordifolia** L. Sp. Pl. 684. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 324. 1874 ; Dunn in Gamble, *Fl. Pres.* Madr. 89. 1915, Repr. ed. 1 : 64. 1957 ; Borssum in Blumea 14 : 199. 1966. '*Velluppan*' (Mal).

Much branched herbs. Leaves ovate acute. cordate at base, crenate-serrate. Flowers pale yellow to white, in axils. Mericarps 8 - 10, flattened - trigonous, aristate ; aristae retrosely ciliate.

Fl. & Fr : October.

Common ; in lower Ghats ; Walayar dam area.

4. **Sida glutinosa** Comm. ex Cav. Diss. 1 : 16. t. 2. f. 8. 1785 ; Dunn in Gamble, Fl. Pres. Madr. 89. 1915, Repr. ed. 1 : 64. 1957 ; Borssum in Blumea 14 : 190. 1966. *S. mysorensis sensu* Mast. in Hook. f. Fl. Brit. Ind. 1 : 322. 1874, *P.P.* non Wight & Arn. 1834.

Viscid, erect undershrubs. Leaves ovate to oblong ; upper ones lanceolate, base cordate, apex acute, crenate serrate, stellate-hairy. Flowers yellow, axillary, solitary to branched, lax panicles. Calyx 5 - lobed, glandular - hairy. Petals deeply emarginate. Mericarps 5, glandular hairy.

Fl. & Fr. : October February.

Common ; in waste places and on road sides ; Panthanthode forest.

Borssum *l.c.* treats *S. glutinosa* and *S. mysorensis* as separate species. Baker (J. Bot. 30 : 293. 1892) referred *S. mysorensis* to *S. glutinosa* which is followed here.

5. **Sida rhombifolia** L. Sp. Pl. 684. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 323. 1874 (incl. vars. *obovata, retusa & rhomboidea*); Dunn in Gamble, Fl. Pres. Madr. 90. 1915, Repr. ed. 1: 65. 1957; Borssum in Blumea 14 : 193. 1966. *S. rhomboidea* Roxb. ex Flem. in Asiat. Res. 6 ; 178. 1810 ; Gamble *l.c.* '*Chitramutti*', '*Athibalachedi*' (Tam.).

Annual undershrubs. Leaves (basal) entire, (apical) serrate, stellate hairy. Stipules filiform. Flowers axillary, solitary, rarely in clusters of 2 5. Sepals ovate, triangular with 5 costae, stellate-hairy. Corolla yellow to pale orange, emarginate. Mericarps flat trigonous.

Fl. & Fr. : October-February.

Common ; in waste places and teak plantations ; Silent Valley R.F

8. THESPESIA Sol. ex Correa *nom. cons.*

1a. Leaves lobed, with nectary on midrib beneath	...	*T. lampas* 1
1b. Leaves not lobed, without nectary	...	*T. populnea* 2

1. **Thespesia lampas** (Cav.) Dalz. in Dalz. & Gibs. Bombay Fl. 19. 1861 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 345. 1874 ; Borssum in Blumea 14 : 116. 1966. *Hibiscus lampas* Cav. Diss. 3 : 154. t. 56. f. 2. 1787 : Wight, Ic. t. 5. 1838 : Dunn in Gamble, Fl. Pres. Madr. 99. 1915, Repr. ed. 1: 77. 1957. *Azanza lampas* (Cav.) Alef. in Bot. Zeit. 19 : 298. 1861.

Shrubs. Lower leaves orbicular, deeply 3 - 5 - lobed, cordate ; upper ones smaller, broadly obovate to oblong, acuminate at apex. Flowers solitary to racemes by the reduction of leaves in size. Epicalyx free, caducous. Calyx cupular with 5 small segments. Corolla yellow with dark purple base. Capsules globose-ovoid.

Fl. & Fr. : October - January.

Common ; in waste dry regions and in secondary forests ; Chindaki forest, Pothundy slopes, Sappal hill Dhoni.

Many authors have included *T. lampas* in *Hibiscus*. Exell & Hillcoat (Contrib. Fl. Mocamb. 2 : 58. 1954) re-established it under the genus *Azanza* Alef. Borssum *l.c.* gives it a sectional status under *Thespesia* based on the characters like nectary on the midrib, the shape of the stipules and dehiscent capsules, which is followed here.

2. **Thespesia populnea** (L.) Sol. ex Correa in Ann. Mus. Paris 9 : 290. t. 8. f. 1807 ; Wight, Ic. t. 7. 1838 ; Bedd. Fl. Sylv. t. 63. 1870 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 345. 1874 : Dunn in Gamble, Fl. Pres. Madr. 101. 1915, Repr. ed. 1 : 72. 1957 ; Borssum in Blumea 14 :

106. 1966. *Hibiscus populneus* L. Sp. Pl. 694. 1753. '*Poovarasu*' (Tam.) & (Mal.).

Small or big trees, 10 15 m. Leaves ovate-oblong, deeply cordate at base, apex long - acuminate, entire. Flowers axillary, solitary. Calyx cupular, accrescent. Corolla campanulate, yellow with dark purple base, withering into dull red or purplish. Fruits globose, indehiscent.

Fl. & Fr. : All seasons.

Usually planted on road sides and near villages ; Olavakkot, Thenkarai village.

Leaves used as green manure ; easily propagated by stem cuttings.

9. URENA L.

Urena lobata L. Sp. Pl. 692. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 329. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 92. 1915, Repr. ed. 1 : 66. 1957 ; Borssum in Blumea 14 : 138. 1966.

1a. Leaves deeply lobed ; epicalyx reflexed or spreading in fruits ... ssp. *sinuata* 2

1b. Leaves unlobed or shallowly lobed ; epicalyx cupular in fruits ... ssp. *lobata* 1

1. ssp. **lobata**

Erect or ascending undershrubs, stellate-hairy. Leaves orbicular, palmilobed to ovate-oblong to lanceolate, serrate to crenate. Flowers axillary, mostly solitary, rarely 2-3 in clusters. Calyx tubular, 5-partite. Corolla pink with purple centre. Staminal column curved ; anthers purple. Mericarps stellate-hairy.

Fl. & Fr. : October February.

Common ; on road sides, in waste places and in teak plantations. Anamadai-Karasuryamalai area, Kaikatty forest, Panthanthode, Silent Valley R.F.

2. ssp. **sinuata** (L.) Borssum in Blumea 14 : 142. 1966. *Urena sinuata* L. Sp. Pl. 692. 1753 : Mast. in Hook. f. Fl. Brit. Ind. 1 : 329. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 92. 1915, Repr. ed. 1 : 66. 1957.

Woody annuals. Leaves (lower) angular or deeply palmilobed, each lobe further segmented, glaucous beneath. Epicalyx segments linear to lanceolate, acute. Corolla pink, rotate.

Fl. & Fr. : October - January.

A weed of woods and waste places ; Mukkali forest.

Stem fibre used for coarse rope.

Linnaeus had three species under *Urena* ; subsequent authors described numerous species and varieties. Hochreutiner (Ann. Cons. Jard. Bot. Genev. 5 : 131. 1901) distinguishes *U. lobata* with 14 varieties. Borssum *l.c.* agreeing with Hochreutiner, divided it into two subspecies based mainly on epicalyx and also on leaf shape. This is followed here.

22. BOMBACACEAE

1a. Trunks prickly ; leafless when flowering :

2a. Flowers clustered at the ends of branches ; capsules thick ... BOMBAX 1

2b. Flowers clustered in leaf axils ; capsules thin ... CEIBA 2

1b. Trunks not prickly ; leafy when flowering ... CULLENIA 3

1. BOMBAX L.

1a. Stamens less than 80 ; capsules hairy ... *B. ceiba* 1

1b. Stamens more than 80 ; capsules glabrous ... *B. insigne* 2

1. **Bombax ceiba** L. Sp. Pl. 511. 1753 ; Robyns in Taxon 10 : 257. 1961. *B. malabaricum* DC. Prodr. 1 : 479. 1824 ; Wight, Ill. t. 29. 1840 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 349. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 99. 1915, Repr. ed. 1 : 71. 1957. *Salmalia malabarica* (DC.) Schott & Endl. Melet. Bot. 35. 1832. '*Ilavu*' (Tam.).

Gigantic conspicuous trees, 20-25 m. Prickles hard, conical. Leaves elliptic, digitate with lanceolate, 5 - 7 leaflets. Flowers showy, dark red. Calyx woolly within. Stamens about 80 in 5 phalanges; filaments flat. Capsules velvety. Seeds imbodded in long white wool.

Fl. & Fr. : February - May.

Common ; in open deciduous forests and also cultivated, Chitoor - Agali forest, Mangalam Dam area.

Wood is used for boat making. Cotton is used for stuffing pillows.

Robyns *l.c.* concluded that *Bombax ceiba* L. the type of the genus *Bombax* must be typified on '*Moul - elavou*, (Rheede, Hort. Malab. 3 : t.

52. 1682) an Asiatic species. Hence this common and important Indian tree must be called as above and not *Salmalia malabarica*.

2. **Bombax insigne** Wall. Pl. Asiat. Rar. 1 : 71. 1830 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 349. 1874 ; Dunn in Gamble. Fl. Pres. Madr. 100, 1915, Repr. ed. 1 : 71. 1957. *Salmalia insignis* (Wall.) Schott & Endl. Melet. Bot. 35. 1832.

Large trees, 15 20 m. Leaflets 7-9, obovate, cuspidate, glaucous beneath. Flowers light red Petals hairy outside ; stamens numerous. Capsules glabrous.

Fl. & Fr. : December-June.

Common ; in secondary forests; Panthanthode forest.

2. Ceiba Mill. *emend.* Gaertn.

Ceiba pentandra (L.) Gaertn. Fruct. 2 : 244. t. 133. 1791. *Bombax pentandra* L. Sp. Pl. 989. 1753. *Eriodendron pentandrum* (L.) Kurz in J. Asiat. Soc. Bengal 43 : 113. 1874 ; Wight, Ic. t. 400. 1840 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 350. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 100. 1915, Repr. ed. 1 : 72. 1957. '*Ilavam panji*' (Tam.).

Tall trees, 20 25 m. with green, smooth stems and horizontal, whorled branches ; trunks prickly when young. Leaves digitate, deciduous. Flowers white or yellow, tufted in the leaf axils. Calyx 5-toothed. Petals oblanceolate. Fruits cylindric, woolly within. Seeds black, cottony.

Fl. & Fr. : February June.

Cultivated and naturalised ; Karivara area ; *ca* 675 m.

Cotton used for stuffing pillows and cushions.

3. Cullenia Wight

Cullenia exarillata Robyns in Bull. Jard. Nat. Belg. 40 : 249. 1970. *C. excelsa* Wight, Ic. tt. 1761 62. 1851 *p.p.* ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 350. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 101. 1915, Repr. ed. 1 : 73. 1957. '*Vedupla*' (Tam.), '*Karaini*' (Mal.) (Plate 6).

Tall, buttressed trees, 25 30 m with long, smooth, white fluted trunks. Leaves simple, oblong - lanceolate. Flowers fascicled on woods, brownish - white. Bracteoles 3 5, connate into tubes. Calyx tubular. Anthers clustered. Styles elongate, woolly. Fruits *ca.* 10 cm across, globose, spiny, 5-valved. Seeds large.

Fl. & Fr. : October - March.

Common ; in evergreen forests ; Aruvampara Silent Valley R.F., Ayyappankoil - Kaikatty area, Mukkali forest.

23. STERCULIACEAE

1a. Shrubs or trees :

2a. Petals present :

3a. Leaves entire ; stamens 10 - 15 :

4a. Fertile stamens 15 ... PTEROSPERMUM 5

4b. Fertile stamens 10 ... LEPTONYCHIA 3

3b. Leaves crenate - serrate ; stamens 10 ... HELICTERES 2

2b. Petals absent :

5a. Follicles membranous ... FIRMIANA 1

5b. Follicles woody :

6a. Seeds winged ... PTERYGOTA 6

6b. Seeds not winged ... STERCULIA 7

1b. Herbs :

7a. Petals clawed ; staminodes absent ... WALTHERIA 8

7b. Petals not clawed ; staminodes present ... MELHANIA 4

1. FIRMIANA Mars.

Firmiana colorata (Roxb.) R. Br. in Benn. & R. Br. Pl. Jav. Rar. 235. 1844 : Dunn in Gamble, Fl. Pres. Madr. 107. 1915, Repr. ed. 1 : 76. 1957 ; Kosterm. in Reinwardtia 5 : 386. 1961. *Sterculia colorata* Roxb. Pl. Cor. t. 25. 1795 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 359. 1874.

Deciduous trees, 10 - 15 m. Leaves palmately lobed, deeply cordate. Flowers orange red, in terminal panicles, stellate tomentose. Calyx funnel shaped. Petals absent. Staminal column slender ; anthers about 30, sessile, yellow. Styles recurved. Follicles open, papery. Seeds 2, ovoid, smooth.

Fl. & Fr. : January - May.

Fairly common ; in lower Ghats ; Karivara area, Mukkali - Anamooli forest.

2. HELICTERES L.

Helicteres isora L. Sp. Pl. 963. 1753; Wight, Ic. t. 180. 1839; Dunn in Gamble, Fl. Pres. Madr. 107. 1915, Repr. ed. 1 : 77. 1957. '*Valampiri*' (Tam.) & (Mal).

Large shrubs or small trees, 3 6 m, stellate - pubescent. Leaves obovate, obliquely cordate at base, serrate, scabrous above, pubescent beneath. Flowers red, in axillary clusters, fading to lead colour. Calyx tubular. Petals reflexed. Follicles 5, twisted.

Fl. & Fr. : July - November.

Abundant in hilly forests; in lower Ghats. Forest areas of Chindaki, Kaikatty, Mukkali and Siruvani, Erulankadu Malampuzha.

3. LEPTONYCHIA Turcz.

Leptonychia moacurroides Bedd. Fl. Sylv. t. 114. 1871; Mast. in Hook. f. Fl. Brit. Ind. 1 : 379. 1874; Dunn in Gamble, Fl. Pres. Madr. 112. 1915, Repr. ed. 1 : 80. 1957; Subr. & Henry in Bull. Bot. Surv. Ind. 12 : 3. 1970.

Small trees or large shrubs, 5 8 m. Leaves membranous, elliptic - lanceolate or oblanceolate, acuminate, glabrous. Flowers white, in axillary cymes. Sepals 5, valvate. Petals orbicular, concave. Stamens 10. Capsules tubercled.

Fl. & Fr. : September - March.

Rare : in lower Ghats. Mukkali forest, Thuthampara R.F.

Rao in J. Bombay Nat. Hist. Soc. 51 : 671. 1953 has incorrectly identified this species as *Paragrewia poilanei* (Tiliaceae).

4. MELHANIA Forsk.

Melhania incana Heyne ex Wight & Arn. Prodr. 68. 1834; Mast. in Hook. f. Fl. Brit. Ind. 1 : 372. 1874; Dunn in Gamble, Fl. Pres. Madr. 113. 1915, Repr. ed. 1 : 81. 1957.

Undershrubs; young branches stellate - tomentose. Leaves oblong, obtuse at apex, rounded at base, glabrous above, tomentose beneath. Bracteoles linear. Flowers axillary. Sepals lanceolate, tomentose. Petals obovate. Stamens 5; staminodes 5. Capsules globose, hairy.

Fl. & Fr. : December - March.

In dry open places; Attappadi block - Mukkali; not common.

5. PTEROSPERMUM Schreb. *nom. cons.*

1a. Branchlets horizontal ; leaves more than 10 cm long :

2a. Leaves more than 20 cm long ; flowers up to 15 cm long ... *P. diversifolium* 2

2b. Leaves less than 20 cm long ; flowers up to 8 cm long ... *P. acerifolium* 1

1b. Branchlets pendulous ; leaves less than 10 cm long ... *P. rubiginosum* 3

1. **Pterospermum acerifolium** Willd. Sp. Pl. 3 : 729. 1801 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 368. 1874.

Large trees. Leaves entire, to 18×10 cm, oblong - obovate, cordate at base, acute at apex, 3 - 5 - nerved, rusty - tomentose beneath. Flowers white, fascicled or solitary. Calyx brown outside. Petals thin, glabrous inside, stellate hairy outside. Capsules woody. Seeds flat, winged.

Fl. & Fl. : May - June.

Rare, once collected in Sappal hill—Dhoni R.F.

2. **Pterospermum diversifolium** Bl. Bijdr. 88. 1825 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 372. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 113. 1915, Repr. ed, 1 : 78. 1957. *P. glabrescens* Wight & Arn. Prodr. 69. 1834. '*Pambaram*' (Mal.), '*Vatta polavu*' (Tam.).

Trees, 5 10 m. Leaves up to 30×20 cm, obovate oblong, cordate at base, hoary beneath. Flowers up to 8 cm long, white, fragrant. Calyx linear, fleshy, rusty - tomentose outside, yellowish inside. Petals thin. Capsules acutely 5 - angled.

Fl. : October - November.

At lower elevations ; Marapalam - Pothundy forest ; common.

Leaves of young plants peltate and lobed and with age the leaves are simple and basifixed.

3. **Pterospermum rubiginosum** Heyne ex Wight & Arn. Prodr. 68. 1834 ; Bedd. Fl. Sylv. t. 106. 1871 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 368. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 109. 1915, Repr. ed. 1 : 78. 1957. '*Chittilaipolavu*' (Tam.).

Trees, up to 20 m. Leaves up to 8×2.5 cm, obliquely ovate lanceolate, cordate, rusty - pubescent beneath. Stipules laciniate. Flowers white, up to 4 cm long. Calyx linear, rusty tomentose outside. Capsules subclavate.

Fl. & Fr. : February - July.

In lower Ghats ; rare. Mukkali forest.

6. PTERYGOTA Endl.

Pterygota alata (Roxb.) R. Br. in Benn. & R. Br. Pl. Jav. Rar. 234. 1844 ; Dunn in Gamble, Fl. Pres. Madr. 104. 1915, Repr. ed. 1 : 75. 1957. *Sterculia alata* Roxb. Pl. Cor. t. 287. 1820 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 360. 1874. *S. haynii* Bedd. Fl. Sylv. t. 230. 1874. '*Anaittondi*', '*Kodaithoni*' (Mal.).

Evergreen trees, 20 30 m. Leaves ovate, cordate. Flowers reddish - brown in the axils of fallen leaves. Calyx deeply 5 partite. Petals absent. Fruits *ca.* 11 cm across, hard, woody, globose. Seeds winged.

Fl. & Fr. : September - March.

In evergreen forests ; Mandhampatti Mukkali forest, rare.

7. STERCULIA L.

1a. Leaves palmately lobed ; follicles stinging - hairy ... *S. urens* 2

1b. Leaves not lobed ; follicles not stinging hairy ... *S. guttata* 1

1. **Sterculia guttata** Roxb. ex. DC. Prodr. 1 : 482. 1824 ; Wight, Ic. t. 487. 1841 ; Bedd. Fl. Sylv. t. 105. 1871 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 355. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 106. 1915, Repr. ed. 1 : 76. 1957. '*Kavalam*' (Tam.), '*Kithondi*' (Mal.).

Trees, 20 30 m ; young shoots stellate - tomentose. Leaves ovate - oblong, glabrous above, stellate pubescent beneath. Flowers dull yellowish. Calyx densely tomentose outside ; segments broadly ovate, erect. Petals absent. Styles deflexed. Follicles obovate, deep orange or red, villous.

Fl. & Fr. : October May.

Common, in lower Ghats ; Mukkali forest, Panthanthode area, Pothundy slopes.

2. **Sterculia urens** Roxb. Pl. Cor. t. 24. 1795 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 355. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 106. 1915, Repr. ed. 1 : 79. 1957. '*Thondi*' (Mal.).

Deciduous trees, 20 30 m ; bark papery, smooth. Leaves 3 - 5 lobed, apex caudate - acuminate, cordate at base. Flowers yellow, in terminal panicles. Follicles ovoid - oblong, woody, densely pubescent.

Fl. & Fr. : October - April.

Common ; on dry rocky slopes, Agali forest, Panthanthode area. Walayar forest.

8. WALTHERIA L.

Waltheria indica L. Sp. Pl. 673. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 374. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 111. 1915, Repr. ed. 1 : 79. 1957 ; Adams, Fl. Pl. Jamaica 483. 1972.

Undershrubs. Leaves simple, soft, pubescent, crenate - serrate, ovate, cordate, apex rounded. Flowers yellow, in dense, axillary, globose heads. Petals spathulate, long - clawed. Fruits 2 valved.

Fl. & Fr. : October - January.

Common ; on road sides and in waste places ; Attappadi block - Mukkali.

24. TILIACEAE

1a. Herbs or undershrubs ; fruits capsular :

2a. Fruits echinate or bristly ... TRIUMFETTA 3

2b. Fruits not echinate or bristly ... CORCHORUS 1

1b. Trees or shrubs ; fruits drupaceous ... GREWIA 2

1. CORCHORUS L.

1a. Capsules 6 - angled, ending in 3 radiating points ... *C. aestuans* 1

1b. Capsules 3 - 5 - angled, ending in 1 point :

2a. Capsules less than 2 cm long ... *C. urticifolia* 3

2b. Capsules more than 2 cm long ... *B. trilocularis* 2

1. **Corchorus aestuans** L. Syst. Nat. ed. 10. 1079. 1759. *C. acutangulus* Lam. Encycl. 2 : 104. 1786 ; Wight, Ic. t. 739. 1844 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 398. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 121. 1915, Repr. ed. 1 : 86. 1957.

Pubescent annuals. Leaves ovate, crenate, subcordate at base, lower serratures produced into filiform appendages. Flowers yellow, in cymes. Sepals lanceolate. Petals obovate. Capsules 3 - wnige.d

Fl. & Fr. : October - February.

Common weed ; in waste places ; Mukkali slopes - Anamooly.

2. **Corchorus trilocularis** L. Mant. 77. 1767 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 397. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 122. 1915, Repr. ed. 1 : 87. 1957.

Erect annual herbs. Leaves elliptic - lanceolate, obtuse at both ends. Flowers yellow. Sepals lanceolate. Petals obovate hairy at base. Capsules *ca* 2 cm long.

Fl. & Fr. : July.

Common weed in the plains ; Walayar dam area.

3. **Corchorus urticifolius** Wight & Arn. Prodr. 73. 1834 ('*urticaefolius*') ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 397. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 122. 1915, Repr. ed. 1 : 87. 1957.

Erect, annual herbs. Leaves *ca* 6.0 × 3.5 cm, ovate, crenate - serrate, acute at apex, subcordate at base. Flowers minute, yellow. Sepals lanceolate. Petals obovate. Stamens 15. Capsules pubescent.

Fl. & Fr. : October - December.

Common weed ; at lower elevations ; Attappadi block Mukkali.

2. GREWIA L.

1a. Inflorescences terminal and axillary :

2a. Scandent shrubs ; drupes 2 - 4 - lobed :

3a. Leaves glabrous beneath ... *G. umbellifera* 6

3b. Leaves stellate - hairy ... *G. lawsoniana* 4

2b. Trees ; drupes 2 - lobed ... *G. disperma* 2

1b. Inflorescences axillary :

4a. Leaves hoary beneath ; stipules auricled : *G. tiliifolia* 5

4b. Leaves not hoary beneath ; stipules not auricled :

5a. Drupes with a crustaceous rind ... *G. villosa* 7

5b. Drupes fleshy :

6a. Flowers bisexual ; stipules lanceolate ... *G. abutilifolia* 1

6b. Flowers polygamous ; stipules linear ... *G. hirsuta* 3

1. **Grewia abutilifolia** Vent. ex Juss. in Ann. Mus. Paris. 4 : 92. 1804 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 390. 1874. *G. aspera* Roxb. Fl. Ind. 2 : 591. 1832 ; Dunn in Gamble, Fl. Pres. Madr. 119. 1915, Repr. ed. 1 : 85. 1957.

Straggling shrubs. Leaves ovate, acute acuminate at apex, serrate. Flowers yellow, in umbels. Petals villous. Drupes stellate hairy, 4 lobed.

Fl. & Fr. : April November.

Common ; in moist localities in lower Ghats ; Attappadi block-Mukkali, Thadikundu Anavayee forest.

2. **Grewia glabra** Bl. Bijdr. 115. 1825. *G. disperma* sensu Dunn in Gamble, Fl. Pres. Madr. 118. 1915, Repr. ed. 1 : 84. 1957 non Rottl. ex Spreng. 1825. *G. laevigata* auct. non Vahl 1790 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 389. 1874.

Trees, 3 5 m. Leaves lanceolate, serrate - dentate, 3 ribbed, base narrowed. Flowers white, in axillary cymes. Sepals lanceolate, pubescent outside. Drupes glabrous on maturity, drying black.

Fl. & Fr. : October April.

Common ; in lower Ghats ; Chindaki forest, Dhoni R.F. Kaikatty - Pothundy, Mukkali, Siruvani slopes.

3. **Grewia hirsuta** Vahl, Symb. Bot. 1 : 34. 1790 ; Wight, Ic. t. 76. 1838 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 391. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 119. 1915, Repr. ed. 1 : 95. 1957.

Large shrubs, 2 3 m. Leaves linear oblong, serrate, glaucous, hairy beneath, 4 5 ribbed, acute to acuminate at apex, cordate at base. Flowers white, in cymes. Sepals elliptic, densely hairy, acute. Petals shorter than sepals. Drupes slightly lobed.

Fl. & Fr. : August October.

Common ; in lower Ghats ; Agali forest - Mukkali.

4. **Grewia lawsoniana** Drumm. ex Gamble, Fl. Pres. Madr. 117. 1915, Repr. ed. 1 : 84. 1957.

Scandent shrubs. Leaves elliptic, tomentose beneath, crenate, 3 ribbed, acute at apex, cordate at base. Flowers white, in peduncled cymes. Buds oblong. Sepals linear - lanceolate, densely hairy. Petals elliptic, acute, Drupes 4 - lobed, black on maturity.

Fl. : February.

Not commom ; in upper Ghats ; Thuthampara R.F.

5. **Grewia tiliifolia** Vahl, Symb. Bot. 1 : 35. 1790 ; Bedd. Fl. Sylv. t. 108. 1871 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 386. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 118. 1915, Repr. ed. 1 : 84. 1957 ('*tiliaefolia*').

Trees, 5 10 m. Leaves ovate, acute, crenate dentate, oblique at base. Flowers yellow, in umbellate cymes. Sepals lanceolate, hairy outside. Petals densely villous. Drupes black, globose, glabrous.

Fl. & Fr. : February - June.

Common ; in dry deciduous forests ; Bhavani bank Mukkali, Malampuzha dam area, Pothundy slopes, Vattapara Suruvani forest.

6. **Grewia umbellifera** Bedd. For. Man. Bot. 37. 1871 ; Mast. in Hook. f Fl. Brit. Ind. 1 : 385. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 117. 1915, Repr. ed. 1 ; 84. 1957.

Scandent shrubs. Leaves elliptic oblong, acute at apex, rounded at base, 3 ribbed, serrulate. Flowers white, in umbellate cymes. Petals narrow. Sepals linear-lanceolate, hairy. Drupes stellate hairy, lobed.

Fl. & Fr. : June - December.

Common ; in lower Ghats ; Mukkali forest, Vattapara - Siruvani forest.

7. **Grewia villosa** Willd. in Ges. Nat. Freunde Berlin Neus Schr. 4 : 205. 1803 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 388. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 119. 1915, Repr. ed. 1 ; 85. 1957.

Large shrubs ; branches grey-puberulous. Leaves ovate, 5 ribbed, velvety beneath. Flowers yellow, in axillary or leaf - opposed cymes. Sepals lanceolate. Drupes globose, hairy.

Fl. & Fr. : October - February.

Common : in dry localities ; Pattimelam slopes Kottathurai forest.

3. TRIUMFETTA L.

1a. Capsules *ca* 2.5 cm across ; bristles hispid at base ... *T. pilosa* 1

1b. Capsules less than 1 cm across ; bristles glabrous ... *T. rhomboidea* 2

1. **Triumfetta pilosa** Roth, Nov. Pl. Sp. 223. 1821 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 394. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 120. 1915, Repr. ed. 1 : 86. 1957.

Perennial undershrubs, 1 - 2 m ; stems pilose. Leaves ovate - lanceolate, acuminate, subcordate at base, serrate, softly tomentose beneath. Flowers yellow. Sepals lanceolate, stellate - hairy. Petals clawed below. Stamens 10. Capsules tomentose, bristles hooked.

Fl. & Fr. : October - February.

Common ; in upper Ghats ; Karasuryamalai area, Panthanthode forest.

2. **Triumfetta rhomboidea** Jacq. Enum. Pl. Carib. 22. 1760 ; Mast. in Hook. f. Fl. Brit. Ind. 1 ; 395. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 120. 1915, Repr. ed. 1 : 860. 1957. *Bartramia indica* L. Sp. Pl. 378. 1753 non *Triumfetta indica* Lam. 1792.

Woody, tall herbs. Leaves ovate, acute ; lower leaves 3 - 5 - lobed; tomentose beneath. Flowers yellow. Petals clawed. Stamens 10. Capsules tomentose, bristles hooked.

Fl. & Fr. : October - December.

Common ; in upper Ghats ; Panthanthode forest, Pothundy slopes, Silent Valley R.F.

25. ELAEOCARPACEAE

ELAEOCARPUS L.

1a. Flowers *ca* 2 cm across ; anthers awned :

2a. Leaves ovate - lanceolate, long - acuminate, glabrous ... *E. munronii* 1

2b. Leaves obovate, obtuse, pubescent beneath ... *E. tuberculatus* 3

1b. Flowers less than 2 cm across ; anthers not awned ... *E. serratus* 2

1. **Elaeocarpus munronii** (Wight) Mast. in Hook. f. Fl. Brit. Ind. 1 : 47. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 124. 1915, Repr. ed. 1 : 83. 1957 (*'munroii'*). *Monocera munronii* Wight, Ill. 1 : 84. 1840 & Ic. t. 952. 1845. *'Narebikki'* (Tam.), *'Pungari'* (Mal.).

Large trees, 15 20 m. Leaves crowded at the end of branches, ovate - lanceolate, crenate-serrate, long - petioled. Flowers white, in racemes, drooping. Sepals narrowly lanceolate. Petals laciniate. Drupes elliptic, smooth.

Fl. & Fr. : October - April.

Common ; in shola forests ; Silent Valley R.F., Walayar forest.

"*Munronius* (genitive *munronii*) is a legitimate latinization of Munro, the original form", Ramamoorthy in Saldanha & Nicolson, Fl. Hassan Dist. 131. 1976.

2. **Elaeocarpus serratus** L. Sp. Pl. 515. 1753 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 401. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 123. 1915, Repr. ed. 1 : 88. 1957 ; Merrill in J. Arnold Arbor. 32 : 194. 1951. *E. oblongus* Gaertn. Fruct. 1 : 202. 1788. *'Ulang Karei'* (Tam.), *'Nallakara'* (Mal.).

Large trees, 15 20 m. Leaves 12.0 × 6.5 cm, elliptic, chartaceous, glabrous above, pubescent beneath. Flowers white, in axillary racemes. Sepals 4, acute. Petals 4, laciniate half way. Anthers bearded. Drupes oblong ; stones tubercled.

Fl. & Fr. : October April.

Common ; in upper Ghats ; Ayyappankoil Orange Farm area, Mukkali forest, Silent Valley R.F.

3. **Elaeocarpus tuberculatus** Roxb. Fl. Ind. 2 : 594. 1832 ; Bedd. Fl. Sylv. t. 113. 1871 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 404. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 124. 1915. Repr. ed. 1 : 88. 1957. '*Naggara*' (Mal.).

Trees, 20 30 m. Leaves subcoriaceous, obovate, rounded at base, ferruginous pubescent beneath ; petioles stout. Flowers white, in axillary racemes. Sepals 5, hairy. Petals laciniate. Anthers aristate. Drupes oblong ; stones compressed, tubercled.

Fl. & Fr. : December - July.

Common ; in Ghats ; Mukkali forest, Silent Valley R.F. Endemic.

26. ERYTHROXYLACEAE

ERYTHROXYLUM L.

Erythroxylum moonii Hochr. in Bull. Inst. Bot. Buitenz. 22 : 54. 1905 ; Henry & Roy in Bull. Bot. Surv. Ind. 10 : 276. 1976. *E. acuminatum* (Arn.) Walp. Repert. 1 : 407. 1842 non Ruiz & Pav. 1802 ; Dunn in Gamble, Fl. Pres. Madr. 127. 1915, Repr. ed. 1 : 91. 1957. *E. lucidum* Moon ex Hook. f. Fl. Brit. Ind. 1 : 415. 1874 non H.B.K. 1821. *Sethia acuminata* Arn. in Nov. Act. Acad. Nat. Cur. 18 : 324. 1836.

Trees, 7 10 m. Leaves alternate, lanceolate, caudate - acuminate, membranous. Flowers dull yellow, axillary, 5 merous. Drupes cylindric, smooth.

Fl. & Fr. : January October.

Not common ; in dry hilly places ; Silent Valley R.F.

27. MALPIGHIACEAE

HIPTAGE Gaertn.

Hiptage benghalensis (L.) Kurz in J. Asiat. Soc. Bengal 43 (2) : 136. 1874 ; Jacobs in Steenis, Fl. Males. ser. 1. 5 : 132. 1955. *Banisteria benghalensis* L. Sp. Pl. 427. 1753. *Hiptage madablota* Gaertn. Fruct. 2 : 169. t. 116. 1791 ; Hook. f. Fl. Brit. Ind. 1 : 418. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 128. 1915, Repr. ed. 1 : 91. 1957.

Large climbing shrubs. Leaves coriaceous, elliptic ovate, acute at base. Flowers white with yellowish tinge, fragrant, in tomentose racemes. Glands on calyx convex. Calyx densely pubescent. Petals reflexed, fringed along the margins, silky. Stamens 10, one much larger. Fruits 2 3 winged.

Fl. & Fr.: March October.

Common ; in plains and in lower Ghats ; Agali, Mukkali forest, Pothundy slopes.

28. OXALIDACEAE

1a. Leaves pinnately many - foliolate	...	BIOPHYTUM 1
1b. Leaves palmately 3 foliolate	...	OXALIS 2

1. BIOPHYTUM DC.

Biophytum reinwardtii (Zucc.) Klotzsch in Peters, Reise Mossamb. Bot. 1 : 85. 1862 ; Edgew. & Hook. f. in Hook. f. Fl. Brit. Ind. 1 : 437. 1874 ; Gamble, Fl. Pres. Madr. 133. 1915, Repr. ed. 1 : 95. 1957. *Oxalis reinwardtii* Zucc. Abh. Akad. Munch. 1 : 274. 1830.

Annual herbs with reflexed hairy stems. Leaflets 6 11, sparsely pubescent ; terminal leaflets largest, obovate, ciliate. Flowers yellow, in umbels, 5 - merous. Sepals lanceolate. Stamens 10 ; filaments ciliate. Fruits dehiscing loculicidally into 5 valves. Seeds ovoid, tubercled.

Fl. & Fr. : July - December.

Common ; in shady waste places ; Chindaki, Malampuzha dam area, Mukkali, Panthanthode forests.

2. OXALIS L.

Oxalis corniculata L. Sp. Pl. 435. 1753 ; Wight, Ic. t. 18. 1838 ; Edgew. & Hook. f. in Hook. f. Fl. Brit. Ind. 1 : 436. 1874 ; Dunn in Gamble, Fl. Pres. Madr. 132. 1915, Repr. ed. 1 : 94. 1957.

Erect or ascending perennial herbs, rooting at nodes. Leaflets obovate, emarginate, sparsely pubescent. Flowers yellow, in axillary umbels. Sepals lanceolate. Petals spathulate - oblong to lanceolate. Styles hairy. Fruits linear, cylindric, hairy.

Fl. & Fr. : June.

Common ; on road sides and grasslands ; Chindaki forest.

Averrhoa bilimbi L. cultivated for the acidic fruits used for pickles. Chemmannoor Mukkali.

29. BALSAMINACEAE

IMPATIENS L.

1a. Leaves radical :

2a. Lip with very long incurved spur :

3a. Wings 2 - lobed ... *I. acaulis* 1

3b. Wings 3 - lobed ... *I. scapiflora* 7

2b. Lip with short straight spur ... *I. modesta* 5

1b. Leaves not radical :

4a. Sepals elongate ; leaves opposite :

5a. Sepals linear or linear - lanceolate :

6a. Spur of lip long :

7a. Leaves elliptic - lanceolate ... *I. kleinii* 4

7b. Leaves ovate ... *I. viscosa* 8

6b. Spur of lip minute or absent ... *I. inconspicua* 3

5b. Sepals ovate or ovate - lanceolate ... *I. gardneriana* 2

4b. Sepals not elongate (small or minute) ; leaves alternate ... *I. scabriuscula* 6

1. **Impatiens acaulis** Arn. in Hook. Comp. Bot. Mag. 1 : 325. 1836 ; Hook. f. Fl. Brit. Ind. 1 : 443. 1874 ; Gamble, Fl. Pres. Madr. 138. 1915, Repr. ed. 1 : 98. 1957.

Scapigerous herbs, with tuberous rootstock. Leaves orbicular - ovate, palmately veined. Flowers large, pale pink in racemes. Sepals ovate ; spur saccate, long. Seeds minute, clothed with spiral hairs.

Fl. & Fr. : October.

Common in moist places ; in upper Ghats ; Dhoni R.F.

2. **Impatiens gardneriana** Wight, Ic. t. 1050. 1846 ; Hook. f. Fl. Brit. Ind. 1 : 445. 1874 ; Gamble, Fl. Pres. 141. 1915, Repr. ed. 1 : 101. 1957.

Slender, succulent annuals. Leaves ovate lanceolate, sparsely hairy. Flowers purple. Sepals ovate, hairy. Lip saccate. Spur reflexed. Standard obovate, mucronate, basal half keeled beneath. Capsules glabrous.

Fl. & Fr. : September November.

Common ; along water sources ; in lower Ghats ; Chindaki forest, Dhoni R.F., Mukkali.

3. **Impatiens inconspicua** Benth. ex Wight & Arn. Prodr. 139. 1834 ; Wight Ic. t. 970. 1845 ; Hook. f. Fl. Brit. Ind. 1 : 447. 1874. *I. filiformis* Wight & Arn. *l.c.* 140. *I. pusilla* Heyne ex Hook. f. & Thoms. in J. Linn. Soc. Bot. 4 : 122. 1839 ; Gamble, Fl. Pres. Madr. 140. 1915, Repr. ed. 1 : 100. 1957.

Slender, much - branched annuals. Leaves opposite, ovate oblong, or linear, glaucous beneath, serrate, glabrous. Flowers pink. Sepals linear. Lip saccate. Spur short ; standard ovate, mucronate. Wings obovate. Capsules ellipsoid.

Fl. & Fr. : September - November.

Rare ; among grasses and rocky crevices ; in lower Ghats ; Poochipara slopes.

4. **Impatiens kleinii** Wight & Arn. Prodr. 140. 1834 ; Wight, Ic. t. 884. 1845 ; Hook. f. Fl. Brit. Ind. 1 : 445. 1874 ; Gamble, Fl. Pres. Madr. 140. 1915, Repr. ed. 1 : 100. 1957.

Slender, branched annuals. Leaves opposite, ovate oblong, hairy ; petioles glandular. Flowers pink or white. Sepals subulate, linear. Standard orbicular, dorsally winged. Spur elongate, slender. Capsules narrow, glabrous.

Fl. & Fr. : July - October.

Common ; in upper Ghats ; Malampuzha, Mukkali forest, Silent Valley R.F.

5. **Impatiens modesta** Wight in Madras J. Lit. Sci. ser. 1. 5 : 13. 1837 & Ic. t. 968. 1845 ; Hook. f. Fl. Brit. Ind. 1 : 442. 1874 ; Barnes in J. Ind. Bot. Soc. 18 : 98. 1939; Gamble, Fl. Pres. Madr. 138. 1915, Repr. ed. 1 : 98. 1957.

Scapigerous herbs ; roots tuberous. Leaves radical. Flowers pink, in racemes. Spur short, straight. Standard entire. Wings 3 - lobed. Seeds minute with spiral hairs.

Fl. & Fr. : September - October.

Rare ; in upper Ghats ; Silent Valley R.F.

6. **Impatiens scabriuscula** Heyne ex Roxb. Fl. Ind. 2 : 464. 1824 ; Hook. f. Fl. Brit. Ind. 1 : 454. 1874 ; Bedd. Ic. t. 144. 1868 - 74 ; Gamble, Fl. Pres. Madr. 142. 1915, Repr. ed. 1 : 101. 1957.

Small, erect herbs. Leaves elliptic lanceolate or obovate, serrate, hairy on nerves beneath. Flowers dull pink, in axils. Sepals linear. Standard rhomboid, hairy outside. Lip boat - shaped, hairy. Capsules ellipsoid, villous.

Fl. & Fr. : October - December.

Not common ; in shady places ; Panthanthode, Aruvampara area.

7. **Impatiens scapiflora** Heyne ex Roxb. Fl. Ind. 2 : 464. 1824 ; Hook. f. Fl. Brit. Ind. 1 : 443. 1874 ; Gamble, Fl. Pres. Madr. 138. 1915, Repr. ed. 1 : 98. 1957. *I. rivalis* Wight, Ic. t. 751. 1844. (Plate 7).

Scapigerous herbs ; roots tuberous. Leaves palmately veined, orbicular - ovate, often reddish. Flowers pink, in racemes. Scapes very long. Sepals ovate. Lip saccate. Spur long. Wings 3 lobed. Standard rounded.

Fl. & Fr. : July October.

Common ; in crevices of wet rocks and moist places ; Mukkali forest, Pothundy slopes, Silent Valley R.F.

8. **Impatiens viscosa** Bedd. in Madras J. Lit. Sci. ser. 2. 10 : 66. t. 7. f. 7. 1859 ; Hook. f. Fl. Brit. Ind. 1 : 453. 1874 ; Gamble, Fl. Pres. Madr. 144. 1915, Repr. ed. 1 : 103. 1957.

Annual, succulent herbs. Leaves opposite and whorled, ovate. Flowers pinkish, in racemes. Dorsal auricle of wings filiform, enclosed in the spur of lip. Spur inflated.

Fl. & Fr. : October December.

Common ; on moist rocky slopes ; Aruvampara slopes, Mukkali forest, Pothundy slopes.

30. RUTACEAE

1a. Plants armed :

2a. Leaves 1 foliolate :

3a. Flowers solitary or fascicled ; stamens 8 - 10 ... PARAMIGNYA 9

3b. Flowers in short cymes; stamens 6 - 8 ... ATLANTIA 3

2b. Leaves 3 to many - foliolate :

4a. Leaflets 5 or more, pinnate :

5a. Wings of petiole conspicuous; stamens 8 - 10 ... NAMNGI 8

5b. Wings of petiole inconspicuous ; stamens 3 - 5 ... ZANTHOXYLUM 11

4b. Leaflets 3, digitate ;

6a. Shrubs prickly ; flowers unisexual ; stamens 4 - 5 ... TODDALIA 10

6b. Trees thorny ; flowers bisexual ; stamens 30 - 60 ... AEGLE 2

1b. Plants unarmed :

7a. Leaves 1 - foliolate ... ACRONYCHIA 1

7b. Leaves 3 to many - foliolate :

8a. Leaves digitate ; flowers unisexual ... EUODIA 5

8b. Leaves pinnate ; flowers bisexual :

9a. Anthers glandular ; style persistent ... GLYCOSMIS 6

9b. Antherse glandular ; style deciduous :

10a. Leaflets 3 - 7 ; filaments dilated below ... CLAUSENA 4

10b. Leaflets 7 - 17 ; filaments subulate. ... MURRAYA 7

1. ACRONYCHIA J.R. & G. Forst. *nom. cons.*

Acronychia pedunculata (L.) Miq. Fl. Ind. Bat. Suppl. 532. 1861. *Jambolifera pedunculata* L. Sp. Pl. 349. 1753. *Acronychia laurifolia* Bl. Cat. Gew. Buitenz. 63. 1823 ; Hook. f. Fl. Brit. Ind. 1 : 498. 1875 ; Gamble, Fl. Pres. Madr. 152. 1915. Repr. ed. 1 : 108. 1957. '*Mutta naari*' (Tam.).

Small, evergreen trees, 5 7 m. Leaves elliptic - lanceolate, entire, glabrous, base acute. Flowers greenish - yellow. Calyx lobes ciliate. Petals hairy within at base. Ovary pubescent. Drupes globose, apiculate.

Fl. & Fr. ; All seasons.

Common ; in upper Ghats ; Pothundy Kaikatty area, Silent Valley R.F.

Jambolifera L. is an earlier name for *Acronychia* J.R. & G. Forst. which has already been conserved against *Cunto* Adanson. Thomas Hartley of Australia recommended conservation of *Acronychia* against *Jambolifera* also.

2. AEGLE Correa *nom. cons.*

Aegle marmelos (L.) Corr. in Trans. Linn. Soc. London 5 : 223. 1800 ; Wight, Ic. t. 16. 1838 ; Bedd. Fl. Sylv. 161. 1871 ; Hook. f. Fl. Brit. Ind. 1 : 516. 1875 ; Gamble, Fl. Pres. Madr. 161. 1915, Repr. ed. 1 : 115. 1957. *Crateva marmelos* L. Sp. Pl. 444. 1753. '*Vilva*' (Tam.).

Small, deciduous trees, 7 - 10 m, with sharp spines. Leaves 3 foliolate ; leaflets ovate lanceolate, rounded at base. Flowers 5 - merous. Petals greenish white. Stamens numerous. Berries globose ; pulp sweet.

Fl. & Fr. : October.

Not common ; in dry deciduous plains ; Cheramangalam Dam area - Nemmara.

The fruit is valued for its aromatic pulp and its medicinal use. Leaves offered to Gods in worshipping ; hence cultivated near temples also.

3. ATALANTIA Correa *nom. cons.*

Atalantia wightii Tanaka in Bull. Soc. Bot. France 75 : 714. 1928 ; Fischer in Gamble, Fl. Pres. Madr. 1895. 1936, Repr. ed. 1 : 114. 1957.

Thorny trees or shrubs, 3 5 m. Leaves elliptic - lanceolate, base rounded. Flowers white, in cymes. Petals free. Stamens 8. Ovary glabrous. Berries globose.

Fl. : April.

Rare ; in upper Ghats ; Ayyappankoil forest Nelliyampathy Ghat.

4. CLAUSENA Burm. f.

1a. Leaflets membranous, black when dry	...	*C. indica*	2
1b. Leaflets chartaceous, yellow when dry	...	*C. heptaphylla*	1

1. **Clausena heptaphylla** (Roxb.) Wight & Arn. Prodr. 95. 1834 Hook. f. Fl. Brit. Ind. 1 : 504. 1875 ; Gamble, Fl. Pres. Madr. 155. 1915, Repr. ed. 1 : 110. 1957. *Amyris heptaphylla* Roxb. Fl. Ind. 2 : 248. 1832.

Strongly aromatic small trees or large shrubs, 3 - 5 m. Leaflets lanceolate to obovate, margins crenate. Flowers yellow, 5 - merous, in axillary panicles. Petals gland - dotted. Fruits oblong - globose.

Fl. : April.

Not common ; in lower Ghats ; Siruvani Estate Sholayur forest, Kudam Siruvani forest.

2. **Clausena indica** (Dalz.) Oliver in J. Linn. Soc. Bot. 5 (Suppl. 2) : 36. 1861 ; Hook. f. Fl. Brit. Ind. 1 : 505. 1875, Gamble, Fl. Pres. Madr. 155. 1915, Repr. ed. 1 : 110. 1957. *Piptostylis indica* Dalz. in Hook. Kew J. Bot. 3 : 33. t. 2. 1851.

Shrubs or small trees. Leaflets 7 13, elliptic - lanceolate, subacute at both ends. Flowers dull white, in terminal corymbs, foetid. Sepals ovate, ciliate. Fruits globular.

Fl. & Fr. : December April.

Common ; in evergreen forests ; Ayyappankoil area, Silent Valley R.F.

5. EUODIA J.R. & G. Forst.

Euodia lunu ankenda (Gaertn.) Merr. in Philipp. J. Sci. Bot. 7 : 378. 1913 ; Gamble, Fl. Pres. Madr. 148. 1915, Repr. ed. 1 : 105. 1957 ('*Evodia*'). *Fagara lunu ankenda* Gaertn. Fruct. 1 : 334. t. 68. f. 9. 1788. *Zanthoxylum triphyllum* Wight, Ic. t. 204. 1839 ('*Zanthoxylon*').

Small, soft wooded trees, 7 - 10 m. Leaves trifoliolate ; leaflets oblong, acute to acuminate. Flowers greenish - white, in cymes, 4 - merous. Fruit of 4, coriaceous, one seeded cocci.

Fl. : October.

Common ; in upper Ghats ; Panthanthode forest.

6. GLYCOSMIS Correa

1a. Leaflets crenate - serrate ; ovary ovoid, sessile	...	*G. arborea*	1
1b. Leaflets entire ; ovary fusiform, stalked	...	*G. mauritiana*	2

1. **Glycosmis arborea** (Roxb.) DC. Prodr. 1 : 538. 1824. *Limonia pentaphylla* Retz. Obs. Bot. 5 : 24. 1788. *L. arborea* Roxb. Pl. Cor. t. 85. 1798. *Glycosmis pentaphylla* auct. non (Roxb.) DC. 1824 ; Hook. f. Fl. Brit. Ind. 1 : 499. 1875 ; Gamble, Fl. Pres. Madr. 153. 1915, Repr. ed. 1 : 109. 1957. '*Panal*' (Mal.).

Glabrous shrubs. Leaves 3 to 5 - foliolate ; leaflets oblong - lanceolate. Flowers white, in axillary racemes. Berries sub-globose.

Fl. & Fr. : October - May.

Common ; in Ghats ; Mathur, Olavakot, Pottikkal forest Mukkali.

This has been incorrectly given as *G. arborea* (Roxb.) Corr. by Narayanaswamy in Rec. Bot. Surv. Ind. 14 : 20. 1941.

2. **Glycosmis mauritiana** (Lam.) Tanaka in Bull. Soc. Bot. France 75 : 708. 1928 ; Brizicky in J. Arnold Arbor. 18 : 90. 1962. *Limonia*

mauritiana Lam. Encycl. 3 : 517. 1792. *L. pentaphylla* DC. Prodr. 1 : 539. 1824. *Glycosmis triphylla* Wight in Bot. Misc. 3 : 298. t. 39. 1833 & Ic. t. 167. 1839.

Small trees, 3 - 5 m. Leaves 5 - or more foliolate ; leaflets ovate lanceolate, acuminate, rounded at base. Inflorescences brown - pubescent. Flowers white. Ovary glandular. Berries ovoid, yellow.

Fl. & Fr. : October - May.

Common ; in upper Ghats ; Attappadi forest Mukkali, Kunthipuzha dam site area.

This has also been incorrectly given by Narayanaswamy in Rec. Bot. Surv. Ind. 14 : 12. 1941.

Due to the confusion about the type species of *Glycosmis* Corr. (*Limonia arborea* Roxb.) Brizicky *l.c.* states "Tanaka's assumption of the conspecificity of *Limonia pentaphylla* Retz. (1788) with *L. arborea* Roxb. based on the presumed authentic type specimen of the former seems correct, since *G. pentaphylla* DC. based on *L. pentaphylla* sensu Roxb. 1798 non Retz. 1788, cannot be applied to *L. pentaphylla* Retz. The next available name for the latter species is *G. arborea* (Roxb.) DC. The correct name for *G. pentaphylla* DC. is *G. mauritiana* (Lam.) Tanaka. The third species involved in the nomenclatural confusion was *G. cochinchinensis* (Lour.) Pierre ex Engl. which was based on *Tolnifera cochinchinensis* Lour. (1790). Merrill's note on the latter species quoted by the present author suggests a close relationship of Loureiro's species with *G. parviflora* (Sims) Little (*G. citrifolia* (Willd.) Lindl.) rather than *G. arborea*". Further Correa did not make any combination in his genus.

7. MURRAYA L. *nom. cons.*

Murraya paniculata (L.) Jack. Mal. Misc. 1 (5) : 31. 1820. *Chalcas paniculata* L. Mant. 68. 1767. *Murraya exotica* L. Mant. 563. 1771 ('*Murraea*') ; Wight, Ic. t. 96. 1838 ; Hook. f. Fl. Brit. Ind. 1 : 502. 1875 ; Gamble, Fl. Pres. Madr. 155. 1915, Repr. ed. 1 : 111. 1957.

Large shrubs or small trees, 3 - 7 m. Leaflets 3 - 7, elliptic - ovate, acuminate, oblique at base. Flowers white, axillary, solitary or in terminal cymes, fragrant. Ovary hirsute. Berries elliptic, apiculate.

Fl. : April.

Not Common ; in ravines ; Karapara river bank.

8. NARINGI Adanson

Naringi crenulata (Roxb.) Nicol. in Sald. & Nicol. Fl. Hassan

Dist. 387. 1976 ; Panigrahi in Bull. Bot. Surv. Ind. 17 : 196. 1975 (1978). *Limonia crenulata* Roxb. Pl. Cor. t. 86. 1798 ; Gamble, Fl. Pres. Madr. 157. 1915, Repr. ed. 1 : 112. 1957. *Hesperethusa crenulata* (Roxb.) Roem. Syn. Monogr. 1 : 38. 1846. *Limonia acidissima* auct. non L. 1762 ; Hook. f. Fl. Brit. Ind. 1 : 507. 1875.

Small thorny trees, 5 7 m. Leaves imparipinnate ; leaflets 2 - 4 pairs, sessile, opposite, ovate oblong, acuminate ; rachis broadly winged. Flowers 4 merous, white, in racemes. Berries globose.

Fl. & Fr. : July October.

Not common ; in lower Ghats ; Dhoni R.F., Mukkali forest.

9. PARAMIGNYA Wight

Paramignya armata (Thw.) Oliver in J. Linn. Soc. Bot. 5 (Suppl. 2) : 48. 1861 ; Bedd. Ic. t. 275. 1868-74 ; Hook. f. Fl. Brit. Ind. 1 : 511. 1875 ; Gamble, Fl. Pres. Madr. 158. 1915, Repr. ed. 1 : 113. 1957. *Arthromitschus armatus* Thw. Enum. Pl. Zeyl. 47. 1858.

Straggling shrubs with hooked thorns. Leaflets ovate or ovate lanceolate, acuminate at apex, base rounded. Flowers axillary, white. Calyx teeth 4, minute, glabrous. Berries ovoid.

Fr. : April.

Rare ; in upper Ghats ; Silent Valley dam site area.

10. TODDALIA Juss. *nom. cons.*

Toddalia asiatica (L.) Lam. var. **floribunda** Gamble, Fl. Pres. Madr. 151. 1915, Repr. ed. 1 : 107. 1957.

Scandent shrubs ; branches stout ; stems prickly. Leaflets obovate, abruptly acuminate at apex. Flowers white. Calyx 5 - lobed. Berries fleshy, globular.

Fl. : April.

Not common ; in upper Ghats ; Panthanthode forest, Thuthampara R.F.

11. ZANTHOXYLUM L.

Zanthoxylum ovalifolium Wight, Ill. 1 : 169. 1840 ('*Zanthoxylon*') ; Hook. f. Fl. Brit. Ind. 1 : 492. 1875 ; Gamble, Fl. Pres. Madr. 150. 1915, Repr. ed. 1 : 107. 1957.

Small trees or large shrubs, 3 5 m. Leaves 3 foliolate ; leaflets elliptic - oblong, glabrous, crenulate. Flowers in slender panicles of cymes. Fruits globose.

Fr. : July November.

Common ; in lower Ghats ; Ayyappankoil area, Padagiri, Mukkali forest.

Citrus medica L. is a large shrub, cultivated for the fruits which are used for pickles ; Karivara.

31. BURSERACEAE

1a.	Flowers 3 - merous ; disk cup - shaped	...	GARUGA 2
1b.	Flowers 5 - merous ; disk annular	...	CANARIUM 1

1. CANARIUM L.

Canarium strictum Roxb. Fl. Ind. 3 : 138. 1832 ; Bedd. Fl. Sylv. t. 128. 1871 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 534. 1875 ; Gamble, Fl. Pres. Madr. 172. 1915, Repr. ed. 1 : 123. 1957. '*Karuppu kungiliam*' (Tam.).

Lofty, handsome trees, 30 40 m ; stems straight. Leaflets 7, elliptic - oblong to lanceolate, crenate-serrate, glabrous above, tomentose beneath. Flowers dull white or creamy, in elongated panicles. Filaments united. Drupes ovoid.

Fl. & Fr. : March - June.

Common ; in lower Ghats ; Ayyappankoil forest, Mukkali slopes.

The bright yellow young leaves, turning crimson would attract the explorer. The black, fragrant resin is used in medicine.

2. GARUGA Roxb.

Garuga pinnata Roxb. Pl. Cor. t. 208. 1811 ; Wight, Ic. t. 1594. 1850 ; Bedd. Fl. Sylv. t. 118. 1871 ; Bennett in Hook. f. Fl. Brit. Ind. 1 : 528. 1875 ; Gamble, Fl. Pres. Madr. 169. 1915, Repr. ed. 1 : 121. 1957. '*Karre Vembu*' (Tam.).

Deciduous trees, 20 - 30 m. Leaves crowded at the ends of branches. Leaflets crenate - serrate. Flowers yellow, in crowded panicles. Calyx pubescent, tube long, deciduous. Petals ovate, pubescent. Drupes globose, fleshy.

Fl. & Fr. : March-June.

Common ; in lower Ghats ; Ayyappankoil forest, Mukkali slopes, Karivara river banks.

32. MELIACEAE

1a. Filaments free ... TOONA 8

1b. Filaments united:

2a. Seeds winged ... CHUKRASIA 3

2b. Seeds not winged :

3a. Leaflets toothed :

4a. Petioles winged ... NARENGAMIA 7

4b. Petioles not winged:

5a. Leaves simple ... TURRAEA 10

5b. Leaves compound :

6a. Flowers elongate :

7a. Shrubs ; fruits capsules ... MUNRONIA 6

7b. Trees ; fruits drupes ... MELIA 5

6b. Flowers globose ... CIPADESSA 4

3b. Leaflets entire :

8a. Anthers included :

9a. Petals 4 - 5 ; anthers 5 - 10 ... AGLAIA 1

9b. Petals 3 ; anthers 3 - 6 ... AMHANAMIXIS 2

8b. Anthers exserted ... TRICHILIA 9

1. AGLAIA Lour. *nom. cons.*

1a. Stamens included in the tube : leaflets 5 or 7 :

2a. Leaflets 7, elliptic - lanceolate or oblanceolate ... *A. elaeagnoides* var. *beddomei* 2

2b. Leaflets 5, ovate - lanceolate. ... *A. lawii* 3.

1b. Stamens exserted from the tube ; leaflets 5 - 13 :

3a. Leaflets opposite ... *A. minutiflora* 4

3b. Leaflets alternate ... *A. anamallayana* 1

1. **Aglaia anamallayana** (Bedd.) Kosterm. in Reinwardtia 7 : 257. f. 10. 1966. *Lansium anamallayanum* Bedd. in Madras J. Lit. Sci. ser 3. 1 : 40. 1864 ('*anamalaiense*') ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 558. 1875 ; Gamble. Fl. Pres. Madr. 182. 1915. Repr. ed. 1 : 130. 1957. *Reinwardtiodendron anamallayanum* (Bedd.) Sald. in Sald. & Nicol. Fl. Hassan Dist. 392. 1976. '*Santhana viri*' (Tam.), '*Vandakamin*' (Mal.).

Handsome trees, 15 20 m. Leaflets 7, alternate, elliptic lanceolate. Flowers 5 - merous, in racemes. Calyx ciliate. Petals white. Stamens 10, in 2 rows. Ovary globose, villous. Berries fleshy.

Fl. & Fr. : February May.

Endemic ; common ; in upper Ghats ; Kaikatty Pothundy slopes, Mukkali forest, Silent Valley R.F., Kudam Siruvani forest.

2. **Aglaia elaeagnoides** (Juss.) Benth. var. **beddomei** (Gamble) K.K.N. Nair in J. Bombay Nat. Hist. Soc. 78 : 426. 1981. *A. roxburghiana* (Wight & Arn.) Miq. var. *beddomei* Gamble, Fl. Pres. Madr. 180. 1915, Repr. ed. 1 : 129. 1957. '*Chokkala*' (Tam.).

Trees, 10 15 m. Leaflets narrow, lanceolate, rarely oblanceolate, drying grey. Flowers dull yellow, in panicles. Berries globose.

Fl. & Fr. : November April.

Rare ; in lower Ghats ; Marapalam area Pothundy.

3. **Aglaia lawii** (Wight) Sald. in Sald. & Nicol. Fl. Hassan Dist. 392. 1976. *Nimmoia lawii* Wight in Calcutta J. Nat. Hist. 7 : 13. 1847. *Amoora lawii* (Wight) Bedd. Fl. Sylv. t. 133. 1871 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 561. 1875; Gamble, Fl. Pres. Madr. 182. 1915, Repr. ed. 1 : 130. 1957.

Trees, 7 10 m. Leaflets ovate lanceolate, rarely oblique. Male flowers white, in panicles of racemes. Female flowers in short spikes. Calyx lepidote. Petals 4, oblong. Stamens 9.

Fl. : April.

Endemic. Rare ; in lower Ghats ; Anamooly slopes.

4. **Aglaia minutiflora** Bedd. Ic. t. 193. 1868-74 ; Gamble, Fl. Pres. Madr. 181. 1915, Repr. ed. 1 : 129. 1957. *A. minutiflora* var. *travancorica* Hiern in Hook. f. Fl. Brit. Ind. 1 : 557. 1875.

Slender trees, 3 7 m. Leaflets conspicuously nerved, densely stellate - tomentose, acuminate. Flowers dull yellow, in large panicles. Pedicels slender.

Fl. : September November.

In lower Ghats ; common ; Ayyappankoil forest Nelliampathy Ghat.

2. APHANAMIXIS Bl.

Aphanamixis polystachya (Wall. ex Roxb.) Parker in Indian Forester 57 : 486. 1931. *Aglaia polystachya* Wall. ex Roxb. Fl. Ind. 2 : 429. 1824. *Andersonia rohituka* Roxb. *l.c.* 213. *Amoora rohituka* (Roxb.) Wight & Arn. Prodr. 119. 1834 ; Bedd. Fl. Sylv. t. 132. 1871 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 559. 1875 ; Gamble, Fl. Pres. Madr. 181. 1915, Repr. ed. 1 : 130. 1957. *A. polystachya* (Wall. ex Roxb.) Hook. f. & Jackson ex Craib. Fl. Siam. Enum. 1 : 260. 1926.

Evergreen trees, 12 15 m. Leaves up to 6.5 cm long, leaflets 7 11, oblong - lanceolate, glabrous. Inflorescence longer than leaves. Flowers polygamous, in racemes. Sepals 5. Stamens 6 7. Ovary villous. Fruits large, coriaceous.

Fl. & Fr. : October - April.

Common ; in upper Ghats ; Ayyappankoil area, Silent Valley R.F.

3. CHUKRASIA Juss.

Chukrasia tabularis Juss. in Mem. Hist. Nat. Paris 19 : 251. t. 22. 1830 ('*Chikrassia*') ; Bedd. Fl. Sylv. t. 9. 1869 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 568. 1875 ; Gamble, Fl. Pres. Madr. 186. 1915, Repr. ed. 1 : 133. 1957. '*Aglay*', '*Malai veppu*' (Tam.).

Graceful trees, 15 - 20 m. Leaves alternate, abruptly pinnate ; leaflets entire, unequal at base, acuminate. Flowers yellow, in large, terminal panicles. Petals oblong. Ovary cylindric.

Fl. : April June.

At lower elevations ; common ; Marapalam - Pothundy forest.

4. CIPADESSA Bl.

Cipadessa baccifera (Roth) Miq. in Ann. Mus. Lugd. Bat. 4 : 6. 1868 - 69 ; Gamble, Fl. Pres. Madr. 176. 1915, Repr. ed. 1 : 126. 1957. *Melia baccifera* Roth. Nov. Pl. Sp. 215. 1821. *Cipadessa fruticosa* Bl. Bijdr. 162. 1825 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 545. 1875. '*Pullipam chedi*' (Tam.).

Large shrubs or small trees, 4-7 m. Leaflets obovate, serrate, hairy on nerves beneath. Flowers white, in axillary panicles, 5 - merous. Sepals ciliate. Petals pubescent. Drupes 5 - ribbed.

Fl. & Fr. : April - November.

Common; in lower Ghats ; Dhoni R.F., Mukkali forest.

5. MELIA L.

Melia dubia Cav. Diss. 7 : 364. 1789; Hiern in Hook. f. Fl. Brit. Ind. 1 : 545. 1875 ; Backer & Bakh. f. Fl. Java 2 : 120. 1965. *M. composita* Willd. Sp. Pl. 2 : 554. 1799 ; Bedd. Fl. Sylv. t. 12. 1869 ; Gamble, Fl. Pres. Madr. 176. 1915, Repr. ed. 1 : 126. 1957. '*Malaivembu*' (Tam.).

Deciduous trees. 10 15 m. Leaves 2 3 pinnate ; leaflets ovate lanceolate, crenate. Flowers dull yellow or white. Sepals pilose. Petals erect, linear-oblong, rounded at apex. Anthers exceeding staminal column. Drupes ovoid-ellipsoid.

Fl. & Fr. : February August.

Common ; in lower Ghats ; Mukkali forest, way to Kathalakandi.

6. MUNRONIA Wight

Munronia pinnata (Wall.) Harms in Ber. Deutsch. Bot. Ges. 35 : 78. 1917 ; Rao in Bull. Bot. Surv. Ind. 5 : 255. 1964. *Turraea pinnata* Wall. Pl. Asiat. Rar. 2 : 21. t. 119. 1831. *Munronia wallichii* Wight, Ill. 1 : 147. t. 54. 1840 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 543. 1875 ; Gamble, Fl. Pres. Madr. 174. 1915, Repr. ed. 1 : 125. 1957.

Low shrubs. Leaves alternate, imparipinnate ; leaflets ovate-elliptic, acuminate, hairy on nerves below. Flowers conspicuously pink, 5 - merous. Petals united below, spathulate, pubescent. Capsules 5 lobed, pubescent.

Fl. : April.

Not common ; in lower Ghats ; Ayyappankoil forest - Nelliyampathi Ghat.

7. NAREGAMIA Wight & Arn.

Naregamia alata Wight & Arn. Prodr. 117. 1834 ; Wight, Ic. t. 90. 1838 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 542. 1875 ; Gamble, Fl. Pres. Madr. 175. 1915, Repr. ed. 1 : 125. 1957. '*Nilanaaragam*' (Mal.).

Undershrubs. Leaves alternate, 3 - foliolate, crenate ; petioles winged. Flowers large, solitary, axillary, white, 5 merous. Petals elongate, linear spathulate. Fruits ovoid, globose.

Fl. & Fr. : October December.

Common ; in forest undergrowths ; Malampuzha, Panangoteri, Thiruvizhankunnu forest.

8. TOONA Roem.

Toona ciliata Roem. Syn. Hesper. 139. 1846. *Cedrela toona* Roxb. ex Rottl. Ges. Naturf. Freunde Berlin Neus Schr. 2 : 198. 1803 ; Wight, Ic. t. 161. 1839 ; Bedd. Fl. Sylv. t. 10. 1869 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 568, 1875 ; Gamble, Fl. Pres. Madr. 186. 1915, Repr. ed. 1 : 133. 1957. '*Santhana vembu*' (Tam.), '*Mathagiri vembu*' (Mal.).

Large, evergreen trees, 15 - 20 m. Leaflets ovate oblong, acuminate. Flowers white, in panicles. Calyx 5 lobed. Petals 5. Capsules 5 - valved.

Fl. : December.

Rare ; once collected in Manalaru Estate Forests, Nelliyampathy Ghats.

9. TRICHILIA P. Br.

Trichilia connaroides (Wight & Arn.) Bentvelzen in Acta Bot. Neerl. 11 : 13. 1962. *Zanthoxylum connaroides* Wight & Arn. Prodr. 148. 1834 ('*Zanthoxylon*'). *Heynea trijuga* Roth ex Sims in Bot. Mag. 41. t. 1738. 1815 non *Trichilia trijuga* Vell. 1825 ; Gamble, Fl. Pres. Madr. 183. 1915, Repr. ed. 1 : 131. 1957. *H. affinis* A. Juss. in Mem. Hist. Nat. Paris 19 : 235. 275. 1830 non *Trichilia affinis* A. Juss. 1829 ; Bedd. Fl. Sylv. t. 134. 1871. '*Korakadi*' (Mal.).

Trees, 5 - 7 m. Leaves 7 foliolate ; leaflets ovate, oblique. Flowers small, in corymbose panicles. Sepals ciliate. Petals white. Filaments with 2, short, linear, tooth like appendages. Capsules globose.

Fl. & Fr. : February - October.

Common ; in upper Ghats ; Orange farm area Kaikatty, Silent Valley R.F.

10. TURRAEA L.

Turraea villosa Benn. in Benn. & R. Br. Pl. Jav. Rar. 2 : 182. 1840 ; Wight, Ic. t. 1593, 1850 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 542. 1875 ; Gamble, Fl. Pres. Madr. 174. 1915, Repr. ed. 1 : 124. 1957.

Large shrubs or small trees, 3 7 m. Leaves simple, ovate, attenuate Flowers large, white, fragrant. Staminal tube linear, spathulate. Disk annular.

Fl. : April.

Rare ; in upper Ghats ; Karapara forest.

Azadirachta indica A. Juss. (*Melia azadirachta* L.) is a very important and useful deciduous tree, commonly found and also cultivated. The leaves, flowers and oil extracted from seeds are of medicinal value.

Swietenia mahagoni (L.) Jacq., the Mahogany tree of the West Indies planted in Dhoni R.F., Mukkali, for its timber.

33. ERYTHROPALACEAE

ERYTHROPALUM Bl.

Erythropalum populifolium (Arn.) Mast. in Hook. f. Fl. Brit. India 2 : 578. 1875 ; Gamble, Fl. Pres. Madr. 191. 1915, Repr. ed. 1 : 137. 1957. *Mackaya populifolia* Arn. in Mag. Zool. Bot. 2 : 531. 1838.

Climbing shrubs. Leaves long - petioled, peltate, ovate, acuminate, glaucous beneath. Flowers yellow, in axillary, lax cymes. 5 - merous. Disk 5 - lobed. Drupes oblong, yellow.

Fl. & Fr. : October - April.

Endemic ; common ; in forest undergrowths ; Karapara forest, Mukkali slopes, Muthikulam forest, Silent valley R.F.

34. ICACINACEAE

1a. Climbing shrubs :

2a. Leaves entire ; flowers in spike ... SARCOSTIGMA 5

2b. Leaves dentate ; flowers in capitate racemes ... MIQUELIA 3

1b. Trees or shrubs :

3a. Petals glabrous within ;

4a. Petals connate ; filaments hairy ... GOMPHANDRA 2

4b. Petals free ; filaments glabrous ... APODYTES 1

3b. Petals villous within ... NOTHOPODYTES 4

1. APODYTES Meyer

Apodytes dimidiata E. Meyer ex Arn. in Hook. J. Bot. 3 : 155. 1840 ; Sleumer in Blumea 17 : 185. 1969. *A. beddomei* Mast. in Hook. f. Fl. Brit. Ind. 1 : 588. 1875. *A. benthamiana* Wight, Ic. t. 1153. 1846 ; Hook. f. *l.c.* ; Gamble, Fl. Pres. Madr. 195. 1915, Repr. ed. 1 : 140. 1957.

Trees, 15 20 m. Leaves ovate, acute - acuminate at apex, unequal at base. Flowers white, in branched, terminal panicles. Petals reflexed, oblong - elliptic. Ovary glabrous. Drupes obliquely ovoid.

Fl. & Fr. : April - October.

Endemic. Fairly common ; in upper Ghats ; Muthikulam slopes, Panthanthode forest, Silent Valley R.F.

Sleumer *l.c.* reduces *A. beddomei* Mast. and *A. benthamiana* Wight (treated separately by Gamble *l.c.*) to synonyms under the above species, which is followed here.

2. GOMPHANDRA Wall. ex Lindl.

1a. Inflorescences axillary ; filaments hairy	...	*G. tetrandra*	2
1b. Inflorescences leaf - opposed ; filaments not or sparsely hairy	...	*G. coriacea*	1

1. **Gomphandra coriacea** Wight, Ill. 1 : 103. 1840 ; Gamble, Fl. Pres. Madr. 195. 1915, Repr. ed. 1 : 140. 1957 ; Sleumer in Blumea 17 : 206. 1969. *Stemonurus coriaceus* (Wight) Miers in Ann. Mag. Nat. Hist. 2. 10 : 37. 1852.

Small trees, 5 7 m. Leaves coriaceous, obtuse or obtuse - acute, main nerves about 4. Calyx minute. Corolla campanulate, dull white ; lobes acuminate.

Fl. & Fr. : October - February.

Fairly common ; in Ghats ; Silent Valley R.F.

2. **Gomphandra tetrandra** (Wall.) Sleumer in Notizbl. Bot. Gart. Berlin - Dahlem 15 : 238. 1940 & in Blumea 17 : 204. 1969. *Lasianthera tetrandra* Wall. in Roxb. Fl. Ind. 2 : 328. 1824. *Gomphandra polymorpha* Wight, Ill. 1 : 103. 1840 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 586. 1875 *p.p.* ; Gamble, Fl. Pres. Madr. 195. 1915, Repr. ed. 1 : 139. 1957.

Small trees or large shrubs, *ca.* 5 m. Leaves elliptic oblong, membranous, acuminate, entire. Flowers white, in axillary racemes. Corolla lobed. Stamens exserted. Drupes oblong, smooth.

Fl. & Fr. : April - October.

Common ; in semievergreen forests ; Mukkali and Panthanthode forests.

3. MIQUELIA Meisn. *nom. cons.*

Miquelia dentata Bedd. in Madras J. Lit. Sci. ser. 3. 1 : 38. 1864 ;

Mast. in Hook. f. Fl. Brit. Ind. 1 : 593. 1875 ; Gamble, Fl. Pres. Madr. 197. 1915, Repr. ed. 1 : 141. 1957.

Climbing shrubs. Leaves broadly ovate - lanceolate, dentate, shortly acuminate at apex. Flowers 4 merous. Petals connate. Stamens alternate with petals. Fruits oblong, compressed.

Fr. : October.

Rare ; in upper Ghats ; Valiyaparathode forest.

4. NOTHOPODYTES Bl.

Nothopodytes nimmoniana (Grah.) Mabberley in Manilal, Bot. Hist. Hort. Malab. 88. 1980. *Premna nimmoniana* Grah. Cat. Pl. Bombay 155. 1839. *Nothopodytes foetida* (Wight) Sleumer in Notizbl. Bot. Gart. Berlin - Dahlem 15 : 247. 1940 & in Blumea 17 : 232. 1969. *Stemonurus foetidus* Wight, Ic. t. 955. 1845. *Mappia foetida* (Wight) Miers in Ann. Mag. Nat. Hist. 2 (9) : 395. 1852 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 589. 1875 ; Gamble, Fl. Pres. Madr. 196. 1915, Repr. ed. 1 : 141. 1957. *M. oblonga* Miers *l.c.* 396. *M. wightiana* Miers *l.c.* 397. *M. tomentosa* Miers *l.c.* 379. *M. ovata* Miers *l.c.* 396 ; Hook. f. *l.c.* Gamble, *l.c.* '*Arali*' (Tam.).

Small trees, 3 5 m. Leaves ovate - oblong, acuminate at apex, rounded and asymmetrical at base, hairy beneath. Flowers dull white, foetid. Petals villous. Drupes oblong, smooth.

Fl. : August.

Rare ; in Ghats ; Mukkali forest.

Sleumer *l.c.* reduces all the five species treated separately by Gamble, *l.c.* to *M. foetida* and Mabberley *l.c.* treats this name as synonym of *Nothopodytes nimmoniana* as given above.

5. SARCOSTIGMA Wight & Arn.

Sarcostigma kleinii Wight & Arn. in Edinburgh New Philos. J. 14 : 299. 1833 ; Wight, Ic. t. 1854. 1852 ; Mast. in Hook. f. Fl. Brit. Ind. 1 : 594. 1875 ; Gamble, Fl. Pres. Madr. 199. 1915, Repr. ed. 1 : 142. 1957 ; Sleumer in Blumea 17 : 254. 1969.

Climbing shrubs. Leaves oblong lanceolate, coriaceous, acute, rounded at base. Flowers creamy, in pendulous simple racemes. Females pedicelled. Petals united at base, reflexed. Fruits elliptic oblong, smooth, yellow on maturity.

Fl. & Fr. : December - April.

Common ; among undergrowths of lower Ghats ; Mukkali forest, Pothundy - Kaikatty slopes, Thiruvizhankunnu.

35. CELASTRACEAE

(incl. HIPPOCRATEACEAE)

1a. Stamens 4 - 5 (rarely 10) ; filaments incurved :
  2a. Leaves opposite :
    3a. Flowers sessile : petals erect, connate at base ... MICROTROPIS 7
    3b. Flowers pedicelled : petals spreading, free :
      4a. Petals cristate or pitted :
        5a. Calyx lobes 4 ... GLYPTOPETALUM 4
        5b. Calyx lobes 5 ... LOPHOPETALUM 6
      4b. Petals neither cristate nor pitted ... DIONYSIUS 3
  2b. Leaves alternate ... CELASTRUS 2
1b. Stamens 3 ; filaments recurved ;
  6a. Inflorescences sessile ; fruits berry ... SALACIA 8
  6b. Inflorescences peduncled ; fruits follicles :
    7a. Leaves crenulate ... ARNICRATEA 1
    7b. Leaves entire ... LOESENERIELLA 5

1. ARNICRATEA N. Halle

Arnicratea grahamii (Wight) N. Halle in Bull. Mus. Natl. Hist. Nat. Paris 4e ser. sect. B, Adansonia 6 (1) : 14. 1984. *Hippocratea grahamii* Wight, Ill. 1 : 134. 1840 & Ic. t. 380. 1840 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 624. 1875. *Reissantia grahamii* (Wight) Ding Hou in Blumea 12 : 33. 1963.

Large, climbing shrubs. Leaves ovate - elliptic, entire. Flowers dull white, in dense panicles. Calyx lobes orbicular. Petals oblong. Fruits 1 - 3, distinct, linear - oblong, up to 10 cm long.

Fl. : April.

Rare in lower Ghats ; Panthanthode forest. It is an addition to the Flora of the Presidency of Madras.

2. CELASTRUS L.

Celastrus paniculatus Willd. Sp. Pl. 1 : 1125. 1797 ; Wight. Ic. t. 158. 1839 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 617. 1875 ; Gamble, Fl. Pres. Madr. 208. 1918, Repr. ed. 1 : 150. 1957. *C. rothianus* Schultes in Roem. ex Schultes, Syst. Veg. 5 : 423. 1820. '*Valuluvai*' (Tam.).

Large, deciduous climbers. Leaves ovate or obovate, crenulate. Flowers small, white in pendulous panicles. Sepals fimbriate at tips. Fruits globose. Aril scarlet.

Fl. & Fr. : February April.

Common ; in deciduous forests ; Mukkali forests, Sholaiyur slopes, Walayar forest.

3. EUONYMUS L.

1a.	Branchlets terete ; leaves obscurely crenulate	... *E. dichotomus*	2
1b.	Branchlets quadrangular ; leaves entire	... *E. angulatus*	1

1. **Euonymus angulatus** Wight, Ic. t. 1053. 1846 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 610. 1875 ; Gamble, Fl. Pres. Madr. 203. 1918, Repr. ed. 1 : 146. 1957.

Small trees, 5 m. Leaves thick, ovate - lanceolate, acute, margins thickened. Flowers dull purple. Pedicel slender. Petals entire. Capsules elongate.

Fl. & Fr. : April.

Not common ; in upper Ghats ; Silent Valley R.F.

2. **Euonymus dichotomus** Heyne ex Roxb. Fl. Ind. 2 : 40. 1824 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 609. 1875 ; Gamble, Fl. Pres. Madr. 203. 1918, Repr. ed. 1 : 146. 1957. '*Vini*' (Tam.).

Evergreen trees, 5 7 m. Leaves thin, oblong - lanceolate, obtusely acuminate. Flowers pinkish, in cymes. Capsules 3 5 - angled.

Fl. : March - June.

Rare ; in upper Ghats ; Ayyappankoil forest, Karapara river forest, Muthikulam forest.

4. GLYPTOPETALUM Thw.

Glyptopetalum zeylanicum Thw. in Hook. Kew J. Bot. 8 : 267. t. 7 B. 1856 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 612. 1875 ; Gamble, Fl. Pres. Madr. 204. 1918, Repr. ed. 1 : 147. 1957.

Large shrubs or small trees, 3 - 5 m. Leaves membranous, ovate lanceolate, serrate, acute at apex, cuneate at base. Flowers in cymes. Petals oblong, pitted near apex. Capsules small, coriaceous.

Fr. : July.

Rare ; in lower Ghats ; Mukkali forest.

5. LOESENERIELLA A.C. Sm.

1a. Petals triangular lanceolate :

2a. Petals mucronate at back ... *L. bourdillonii* 2

2b. Petals not mucronate ... *L. obtusifolia* 3

1b. Petals orbicular ... *L. arnottiana* 1

1. **Loeseneriella arnottiana** (Wight) A.C. Sm. in J. Arnold Arbor. 16 : 174. 1945. *Hippocratea arnottiana* Wight, Ill. 1 : 133. t. 46. f. 47. 1840 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 624. 1875 ; Gamble. Fl. Pres. Madr. 213. 1918, Repr. ed. 1 : 153. 1957.

Large, climbing shrubs. Leaves coriaceous, elliptic - oblong, rounded at both ends. Buds globose. Petals imbricate, narrowly clawed, glabrous. Samaras narrow, oblanceolate, up to 7 cm long.

Fl. & Fr. : February - May.

Common in lower Ghats ; Bhavani river bank Mukkali.

2. **Loeseneriella bourdillonii** (Gamble) Ramam. in Sald. & Nicol. Fl. Hassan Dist. 315. 1976. *Hippocratea bourdillonii* Gamble, in Bull. Misc. Inform. Kew 132. 1916 & Fl. Pres. Madr. 213. 1918, Repr. ed. 1 : 153. 1957.

Climbing shrubs. Leaves coriaceous, oblong, rounded at base, margins recurved. Base of petioles twisting. Buds ovate, acute, puberulous. Petals puberulous within, not clawed.

Fl. : February.

Rare ; in lower Ghats ; Thuthampara R.F., Silent Valley R.F.

3. **Loeseneriella obtusifolia** (Roxb.) A.C. Sm. in Amer. J. Bot. 28 : 440. 1941. *Hippocratea obtusifolia* Roxb. Fl. Ind. 1 : 166. 1820 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 623. 1875 ; Gamble. Fl. Pres. Madr. 214. 1918, Repr. ed. 1 : 153. 1957.

Climbing shrubs. Leaves elliptic - ovate or obovate, attenuate at base. Flowers dull white. Petals glabrous within. Samaras obovate, striate.

Fl. & Fr. : October.

Common ; in lower Ghats ; Walayar forest.

6. LOPHOPETALUM Wight & Arn.

Lophopetalum wightianum Arn. in Ann. Nat. Hist. 3 : 151. 1839 ; Wight, Ic. t. 162. 1839 ; Bedd. Fl. Sylv. t. 142. 1871 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 615. 1875 ; Gamble, Fl. Pres. Madr. 205. 1918, Repr. ed. 1 : 147. 1957. '*Venkottai*' (Tam.), & (Mal.).

Lofty trees, 20 - 30 m. Leaves elliptic oblong, abruptly acuminate, entire. Flowers dull red, in cymes. Petals lamellate inside, crenulate at tip Capsule angular, woody with winged seeds.

Fl. & Fr. : April November.

Common ; in lower Ghats ; Mukkali, Panthanthode forests.

7. MICROTROPIS Wall. ex Meissn. *nom. cons.*

1a.	Leaf margins reflexed ; capsules oblong	...	*M. stocksii* 2
1b.	Leaf margins not reflexed ; capsules ellipsoid	...	*M. latifolia* 1

1. **Microtropis latifolia** Wight ex Lawson in Hook. f. Fl. Brit. India 1 : 613. 1875 ; Gamble, Fl. Pres. Madr. 206. 1918, Repr. ed. 1 : 148. 1957.

Large shrubs, 3 5 m. Leaves elliptic, glabrous, acute at base. Flowers sessile, dull greenish, in axillary clusters. Petals obovate, united at base Fruits oblong.

Fl. & Fr. : October - April.

Common ; in upper Ghats ; Silent Valley R.F.

2. **Microtropis stocksii** Gamble in Bull. Misc. Inform. Kew 132. 1916 & Fl. Pres. Madr. 206. 1918, Repr. ed. 1 : 148. 1957.

Small trees or large shrubs, 3 - 7 m ; branches blackish. Leaves coriaceous, elliptic to oblanceolate, cuneate at base. Flowers small, in clusters. Capsules oblong

Fr. : March.

Not common ; at lower elevations : Karasuryamalai estate area.

8. SALACIA L.

1a.	Branchlets lenticellate ; leaves up to 15 cm long		*S. beddomei* 1
1b.	Branchlets not lenticellate ; leaves up to 7 cm long	...	*S. chinensis* 2

1. **Salacia beddomei** Gamble in Bull. Misc. Inform. Kew 133. 1916 & Fl. Pres. Madr. 215. 1918, Repr. ed. 1 : 155. 1957.

Large, climbing shrubs ; branchlets twining at base. Leaves elliptic - oblong to ovate, coriaceous. Flowers greenish yellow. Calyx lobes fringed. Fruits 4 cm across, rind coriaceous.

Fl. & Fr. : December - July.

Endemic ; rare ; in lower Ghats ; Mukkali forest.

2. **Salacia chinensis** L. Mant. Alt. 293. 1771 ; Ding Hou in Steenis Fl. Males. ser. 1. 6 : 419. 1964. *S. prinoides* DC. Prodr. 1 : 571. 1824 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 626. 1875 ; Gamble, Fl. Pres. Madr, 215. 1918, Repr. ed. 1 : 154. 1957. '*Kadalanchi*' (Tam.).

Straggling shrubs. Leaves elliptic - lanceolate, crenate - serrate. Flowers small, red, in fascicles on axillary tubercles. Petals clawed at base. Fruits small.

Fl. & Fr. : April.

Common ; in lower Ghats ; Panthanthode forests.

36. RHAMNACEAE

1a. Plants without tendrils ; flowers bisexual :

2a. Plants armed ; leaves palmately veined	...	ZIZYPHUS	3
2b. plants unarmed ; leaves pinnately veined	...	VENTILAGO	2
1b. Plants with tendrils , flowers unisexual	...	GOUANIA	1

1. GOUANIA L.

Gouania microcarpa DC. Prodr. 2 : 40. 1825 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 643. 1875 ; Gamble, Fl. Pres. Madr. 223. 1918, Repr. ed. 1 : 161. 1957.

Large, climbing shrubs. Leaves elliptic - ovate, acuminate, base rounded. Inflorescences densely pubescent ; flowers white. Petals cucullate. Capsules with persistent calyx.

Fl. & Fr. : October - December.

Common ; in upper Ghats ; Marapalam Pothundy forest, Silent Valley R.F.

2. VENTILAGO Gaertn.

Ventilago bombaiensis Dalz. in Hook. Kew J. Bot. 3 : 36. 1851 ;

Lawson in Hook. f. Fl. Brit. Ind. 1 : 631. 1875 ; Gamble, Fl. Pres. Madr. 218. 1918, Repr. ed. 1 : 157. 1957. *Smythea bombaiensis* (Dalz.) Banerjee & Mukherjee in Indian Forester 96 : 206. 1970.

Large climbing shrubs, fulvous pubescent. Leaves lanceolate, acute, crenate. Flowers greenish yellow. Calyx lobes triangular, pubescent. Filaments and fruits flat.

Fl. & Fr. : March June.

Rare ; in the lower Ghats ; Kaikatty Ayyappankoil forest, Mukkali slopes, Singampara Siruvani forest.

3. ZIZYPHUS Mill.

1a. Petals absent	...	*Z. rugosa*	2
1b. Petals present ;			
2a. Leaves hairy beneath ; styles 2	...	*Z. oenoplia*	1
2b. Leaves glabrous, styles 3	...	*Z. xylopyrus*	3

1. **Zizyphus oenoplia** (L.) Mill. Gard, Dict. ed. 8. 3. 1768 : Lawson in Hook. f. Fl. Brit. Ind. 1 : 634; 1875 ; Gamble, Fl. Pres. Madr. 220. 1918, Repr. ed. 1 : 158. 1957. *Rhamnus oenoplia* L. Sp. Pl. 194. 1753. '*Kottai*, (Tam), '*Mulli*' (Mal).

Large, theory straggling climbers. Leaves oblique at base, 5 - ribbed, rufous hairy beneath. Flowers in panicles of cymes. Calyx hairy outside. Petals white. Drupes globose, edible.

Fl. & Fr. : October December.

Common ; in lower Ghats ; Marapalam Pothundy, Mukkali forests, Walayar forests.

2. **Zizyphus rugosa** Lam. Encycl. 3 : 319. 1789 ; Wight, Ic. t. 339. 1840 ; Lawson in Hook. f. Fl. Brit. Ind. 1. 636. 1875 ; Gamble, Fl. Pres. Madr. 221. 1918, Repr. ed. 1 : 158. 1957. '*Charal*' (Tam.) '*Thodali*' (Mal.).

Large, straggling, thorny shrubs or small trees, 3 - 7 m. Leaves pubescent beneath, subcordate at base. Flowers in tomentose cymes. Calyx lobes ovate. Ovary villous. Drupes oblong.

Fl. & Fr. : February - April.

Common ; in lower Ghats ; Ayyappankoil forest, Kolipara river bank, Karivara slopes.

3. **Zizyphus xylopyrus** (Retz.) Willd. Sp. Pl. 1 : 1104. 1798 ; Lawson in Hook. f. Fl. Brit. Ind. 1. 634. 1875 ; Gamble, Fl. Pres. Madr. 220.

1918, Repr. ed. 1 : 158. 1957. *Rhamnus xylopyrus* Retz. Obs. Bot. 2 : 11. 1781. '*Kottai*, (Tam.) & (Mal.).

Large straggling shrubs or tmall trees. Leaves orbicular, rounded, very woolly when young, glabrous on age. Flowers in cymes. Drupes globose, grey - tomentose.

Fl. & Fr. : May - October.

Common ; in deciduous forests ; Malampuzha forest.

37. VITACEAE

1a. Tendrils leaf - opposed			
2a. Stems and branches flat	...	TETRASTIGMA	4
2b. Stems and branches not flat :			
3a. Berries 1 - seeded	...	CISSUS	3
3b. Berries 2 - 4 - seeded	...	CAYRATIA	2
1b. Tendrils not leaf - opposed	...	AMPELOCISSUS	1

1. AMPELOCISSUS Planch *nom. cons.*

1a. Leaves cinnamomeous - tomentose	...	*A. tomentosa*	2
1b. Leaves glabrous	...	*A. latifolia*	1

1. **Ampelocissus latifolia** (Roxb.) Planch. in J. Vigne Amer. 374. 1883 ; Gamble, Fl. Pres. Madr. 230. 1918, Repr. ed. 1 : 165. 1957. *Vitis latifolia* Roxb. Fl. Ind. 1 : 661. 1820 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 652. 1875.

Climbers. Leaves orbicular, 3 - 5 lobed. Inflorescences small, compact, puberulous. Flowers pink. Disc thick, 5 furrowed. Seeds oblong, crenate.

Fl. : May.

Not common ; in lower Ghats ; Mukkali forest, Walayar forest.

2. **Ampelocissus tomentosa** (Heyne ex Roth) Planch. in J. Vigne Amer. 374. 1883 ; Gamble, Fl. Pres. Madr. 230. 1918, Repr. ed. 1 : 165. 1957. *Vitis tomentosa* Heyne ex Roth, Nov. Pl. Sp. 157. 1821 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 650. 1875. '*Noraikodi*' (Tam.).

Large, climbing vines. Leaves orbicular, cordate, 3 - 7 - lobed, tomentose beneath. Flowers scarlet, in thick, branched woolly cymes. Berries black.

Fr. : August.

Not common ; in lower Ghats ; Attappadi forest Mukkali, Walayar forest.

2. CAYRATIA A. Juss. *nom. cons.*

1a. Leaves pedately 3 - 5 - foliolate :

2a. Leaves 3 - foliolate ... *C. trifolia* 5

2b. Leaves 5 - foliolate :

3a. Leaflets sessile ... *C. tenuifolia* 4

3b. Leaflets stalked :

4a. Leaves glabrous ... *C. japonica* 2

4b. Leaves pubescent ... *C. auriculata* 1

1b. Leaves pedately 5 - 7 - foliolate ... *C. pedata* 3

1. **Cayratia auriculata**(Roxb.) Gamble, Fl. Pres. Madr. 237. 1918, Repr. ed. 1 : 170. 1957. *Cissus auriculata* Roxb. Fl. Ind. 1 : 130. 1820. *Vitis auriculata* (Roxb.) Wall. ex Wight & Arn: Prodr. 129. 1834 ; Wight, Ic. t. 145. 1839 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 658. 1875.

Large tendril - climbers ; stems spongy. Leaflets obovate, acuminate, serrate. Stipules falcate. Flowers 4 - merous in branched cymes. Petals hooded. Fruits globose, smooth.

Fr. : July.

In lower Ghats ; not common ; Attappadi forest Mukkali.

2. **Cayratia japonica** (Thunb.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1 : 349. 1911 ; Gamble, Fl. Pres. Madr. 237. 1918, Repr. ed. 1 : 169. 1957. *Vitis japonica* Thunb. Fl. Jap. 104. 1784.

Very slender climbers. Leaves 5 - foliolate ; leaflets sharply serrate, elliptic, glabrous, membranous. Flowers white. Petals reflexed. Berries globose.

Fl. & Fr. : July October.

Common ; in lower Ghats ; Mukkali forest.

3. **Cayratia pedata** (Lam.) Juss. ex Gagnep. in Lecomte, Notul. Syst. (Paris) 1 : 346. 1911; Gamble, Fl. Pres. Madr. 236. 1918, Repr. ed. 1 : 169. 1957. *Cissus pedata* Lam. Encycl. 1 : 31. 1783. *Columella pedata* (Lam.) Lour. Fl. Cochinch. 85. 1790.

Large, climbing shrubs. Leaves 7 - 9 - foliolate, softly villous ; leaflets lanceolate, acuminate. Flowers white, in axillary corymbose cymes. Berries globose.

Fl. & Fr. : April - October.

Common ; in Ghats ; Silent Valley R.F. : Walayar forest.

4. **Cayratia tenuifolia** (Wight & Arn.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1 : 343. 1911 ; Gamble, Fl. Pres. Madr. 237. 1918, Repr. ed. 1 : 170. 1957. *Vitis tenuifolia* Wight & Arn. Prodr. 129. 1834 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 660. 1875.

Slender climbers. Leaves 5 - foliolate ; leaflets small, sharply serrate. Flowers small with filiform pedicels. Fruits black.

Fr. : February.

Not common ; in lower Ghats ; Dhoni R.F., Thuthampara forest.

5. **Cayratia trifolia** (L.) Domin. in Biblioth. Bot. 86 : 371. 1927. *Vitis trifolia* L. Sp. Pl. 203. 1753. *Cayratia carnosa* (Lam.) Gagnep. in Lecomte, Notul. Syst. (Paris) 1 : 347. 1911 ; Gamble Fl. Pres. Madr. 237. 1918, Repr. ed. 1 : 169. 1957. *Cissus carnosa* Lam. Encycl. 1 : 31. 1783.

Slender, herbaceous climbers with wiry branched tendrils. Leaves 3 - foliolate on long petioles, pubescent ; leaflets ovate, serrate, acute at apex, rounded at base. Flowers pale yellow in umbellate cymes. Fruits turbinate, fleshy, 2 4 seeded.

Fl. : August.

Rare, in lower Ghats ; Attappadi block - Mukkali.

3. Cissus L.

1a. Erect shrubs :

2a. Fruiting pedicels thick, not recurved ... *C. pallida* 4

2b. Fruiting pedicels thin, recurved or erect :

3a. Plants tomentose ; pedicels recurved in fruit ... *C. vitiginea* 6

3b. Plants glabrous ; pedicels erect in fruit ... *C. glauca* 2

1b. Climbing shrubs :

4a. Stems wrinkled ... *C. repanda* 5

4b. Stems not wrinkled :

5a. Branchlets subangular ; leaves purple beneath ... *C. discolor* 1

5b. Branchlets 4 - angular ; leaves green beneath ... *C. glyptocarpa* 3

1. **Cissus discolor** Bl. Bijdr. 181. 1825 ; Gamble, Fl. Pres. Madr. 235. 1918, Repr. ed. 1 : 168. 1957. *Vitis discolor* (Bl.) Dalz. in Hook.

Kew. J. Bot. 2 : 39. 1850 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 647. 1875.

Slender climbers ; branches deep red. Leaves oblong - lanceolate, cordate - truncate, serrate. Flowers in umbellate cymes, 4-merous. Calyx glandular. Petals red outside. Fruits subglobose.

Fl. & Fr. : July - November.

Common ; in lower Ghats ; Mukkali, Kaikatty Pothundy forests, Sappal hill - Dhoni forest.

2. **Cissus glauca** Roxb. Fl. Ind. 1 : 406. 1820 ; Gamble, Fl. Pres. Madr. 234. 1918, Repr. ed. 1 : 168. 1957. *Vitis glauca* (Roxb.) Wight & Arn. Prodr. 126. 1834 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 648. 1875.

Stout shrubs ; stems glaucous. Leaves cordate, rounded with abrupt acumen at apex, serrate. Flowers yellow in leaf - opposed cymes.

Fl. & Fr. : May October.

Common ; in lower Ghats ; Mukkali forest, Vattappara - Siruvani forest.

3. **Cissus glyptocarpa** (Thw.) Planch. in DC. Monogr. Phan. 5 : 477. 1887 ; Gamble, Fl. Pres. Madr. 235. 1918, Repr. ed. 1 : 168. 1957. *Vitis glyptocarpa* Thw. Enum. Pl. Zeyl. 62. 1858 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 645. 1875.

Slender, climbing shrubs. Leaves ovate, truncate cordate at base. Flowers greenish. Berries black - purple, glabrous.

Fl. & Fr. : April October.

Common ; in upper Ghats ; Karapara river banks, Muthikudam forest, Silent Valley R.F.

4. **Cissus pallida** (Wight & Arn.) Planch. in DC. Monogr. Phan. 5 : 477. 1887 ; Gamble, Fl. Pres. Madr. 234. 1918, Repr. ed. 1 : 167. 1957. *Vitis pallida* Wight & Arn. Prodr. 125. 1834 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 647. 1875.

Erect shrubs ; stems glaucous. Leaves ovate - orbicular, cordate, acuminate, serratures incurved, glandular. Flowers white, in umbellate cymes. Peduncles fleshy. Calyx saucer - shaped. Petals 4, deciduous. Fruits globose.

Fr. : October.

Common ; in dry deciduous forests ; Agali forest.

5. **Cissus repanda** Vahl, Symb. Bot. 3 : 18. 1794 ; Gamble, Fl. Pres. Madr. 234. 1918, Repr. ed. 1: 167. 1957. *Vitis repanda* (Vahl) Wight & Arn. Prodr. 105. 1834 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 648. 1875.

Large, climbing shrubs ; young branches rufous - tomentose. Leaves ovate, cordate, acuminate, crenate - dentate, woolly tomentose. Flowers deep pinkish, in leaf - opposed umbellate cymes. Calyx hairy outside. Fruits pyriform.

Fl. : February - April.

Common ; in dry deciduous forests ; Agali - Chittoor forest, Olipara slopes.

6. **Cissus vitiginea** L. Sp. Pl. 117. 1753 ; Gamble, Fl. Pres. Madr. 234. 1918, Repr. ed. 1 : 167. 1957. *Vitis linnaei* Wall. ex Wight & Arn. Prodr. 126. 1834 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 649. 1875.

Small, erect, grey tomentose tendril climbers. Leaves broadly cordate, 5 angled or lobed, conspicuously blunt - serrate. Flowers white. Berries blue, glaucous.

Fl. : October.

Not common ; in lower Ghats ; Cheramangalam dam area - Nemmara, Olavakkot area.

4. TETRASTIGMA Planch.

1a. Stems tuberculate ; leaves not fleshy	...	*T. sulcatum*	2
1b. Stems little or not tuberculate ; leaves fleshy	...	*T. lanceolarium*	1

1. **Tetrastigma lanceolarium** (Roxb.) Planch. in DC. Monogr. Phan. 2 : 423. 1887 ; Gamble, Fl. Pres. Madr. 228. 1918, Repr. ed. 1 : 164. 1957. *Cissus lanceolaria* Roxb. Fl. Ind. 1 : 412. 1820. *Vitis lanceolaria* (Roxb.) Wall. Cat. n. 6013. 1831 - 32 ; Wight, Ic. t. 177. 1839 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 660. 1875 *p.p.*

Large, tendril climbers ; stems flat. Leaves pedately 5 - foliolate ; leaflets lanceolate or oblanceolate, acuminate, prominently serrate. Flowers greenish yellow, in axillary corymbose cymes. Berries 0.8 - 1.5 cm across.

Fl. : December.

Rare ; upper Ghats ; Silent Valley R.F.

2. **Tetrastigma sulcatum** (Lawson) Gamble, Fl. Pres. Madr. 229. 1918, Repr. ed. 1 : 164. 1957. *Vitis sulcata* Lawson in Hook. f. Fl. Brit. Ind. 1 : 661. 1875.

Large climbers ; stems thick. Leaves 5 - foliolate, acuminate crenate. Flowers greenish - yellow, in axillary cymes. Berries *ca* 2 cm across. Seeds pyriform, 2 - furrowed.

Fl. & Fr. : December March.

Common ; in lower Ghats ; Panthanthode forest, Sirunelli, estate area, Siruvani Vattapara forest.

The pendulous large bunches of fruits are attractive.

38. LEEACEAE

LEEA L. *nom. cons.*

1a. Leaves glabrous ... *L. indica* 1

1b. Leaves puberulous ... *L. macrophylla* 2

1. **Leea indica** (Burm. f.) Merr. in Philipp. J. Sci. 14 : 245. 1919 ; Ridsdale in Blumea 22 : 95. 1974. *Staphylea indica* Burm. f. Fl. Ind. 75. t. 33. f. 2. 1768. *Aquilicia sambucina* L. Mant. Alt. 211. 1771 *nom. illegit.* *Leea sambucina* (L.) Willd. Sp. Pl. 1 : 1177. 1798 *nom. illegit.* ; Wight, Ic. t. 78. 1838 ; Gamble, Fl. Pres. Madr. 240. 1918, Repr. ed. 1 : 172. 1957. '*Nyekki*', '*Otta naali*' (Tam.), *Maniporanda* (Mal.).

Large shrubs or small trees, 2 5 m. Leaves 2 3 pinnate, glabrous ; leaflets oblong or elliptic, acuminate, truncate cordate, dark brown when dry. Flowers pale greenish. Fruits black purple.

Fl. & Fr. : October - April.

Common ; in Ghats ; Kaikatty - Pothundy, Mukkali, Silent Valley R.F., Kudam - Siruvani forests, Olavakkot.

2. **Leea macrophylla** Roxb. ex Hornem. Hort. Hafn. 1 : 231. 1831 ; Wight, Ic. t. 1154. 1846 ; Lawson in Hook. f. Fl. Brit. Ind. 1 : 664. 1875 ; Gamble, Fl. Pres. Madr. 239. 1918, Repr. ed. 1 : 171. 1957 ; Ridsdale in Blumea 22 : 85. 1974. *L. robusta* Roxb. Fl. Ind. 2 : 468. 1824 ; Gamble, *l.c.* 240. *L. diffusa* Lawson in Hook. f. Fl. Brit. Ind. 1 : 664. 1875 ; Gamble, *l.c.* 240. *L. latifolia* Wall. ex Kurz in J. Asiat. Soc. Bengal 44 : 178. 1875 ; Gamble, *l.c.* 240. *L. venkobarowii* Gamble in Kew Misc. Inform. 26. 1917 & Fl. Pres. Madr. 240. 1918, Repr. ed. 1 : 172. 1957.

Large shrubs, up to 5 m ; young branches mealy - pubescent. Leaves tripinnate ; leaflets obovate, serrate. Flowers in branched, pubescent inflorescence, pale green. Corolla lobes greyish pubescent. Fruits globose.

Fr. : October.

Not common ; in lower Ghats ; Chindaki forest, Mukkali.

Some authors have recognised 3 to 4 infraspecific taxa and described in local floras but Ridsdale *l.c.* merges those with the above, since the floral structures are essentially the same in all cases though there are differences in the pinnate nature of the leaves.

39. STAPHYLIACEAE

TURPINIA Vent. *nom. cons.*

1a. Leaflets lanceolate ; drupes lobed ... *T. nepalensis* 2

1b. Leaflets elliptic ; drupes not lobed ... *T. malabarica* 1

1. **Turpinia malabarica** Gamble in Kew Misc. Inform. 135. 1916 & Fl. Pres. Madr. 241. 1918, Repr. ed. 1 : 173. 1957. '*Pambavetti*' (Mal.).

Large trees, 15 - 20 m. Leaflets 2 - 3 pairs, abruptly acuminate, glabrous. Flowers white, in axillary panicles. Filaments shortly villous. Drupes 1 - 3 pointed.

Fl. & Fr. : October April.

Common ; in lower Ghats ; Mukkali forest, Silent Valley R.F.

Easily recognised in the forests by the bright yellow young leaves.

2. **Turpinia nepalensis** Wall. ex Wight & Arn. Prodr. 156. 1834 ; Wight, Ic. t. 972. 1842 ; Gamble, Fl. Pres. Madr. 241. 1918, Repr. ed. 1 : 172. 1957. *T. pomifera* (Roxb.) DC. Prodr. 2 : 3. 1825 *p.p.* ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 698. 1875. *Dalrympelea pomifera* Roxb. Fl. Cor. t. 299. 1820.

Trees, 5 - 10 m. Leaflets long - acuminate. Stipules interpetiolar, triangular, caducous. Flowers small, fragrant, dull yellow in terminal and axillary panicles. Filaments glabrous. Drupes globose.

Fl. : February.

Not common ; in upper Ghats ; Kaikatty - Pothundy forest.

40. SAPINDACEAE

1a. Shrubs or trees ; leaves not biternate :

2a. Leaves digitately 3 - foliolate ... ALLOPHYLUS 1

2b. Leaves pinnate :

3a. Fruits inflated capsules ... HARPULIA 4

3b. Fruits not inflated capsules :

4a. Petals 0 ; fruits with pesistent style ... SCHLEICHERA 7

4b. Petals present ; fruits without style :

5a. Petals each with 2 scales ... LEPISANTHES 5

5b. Petals without any scales :

6a. Sepals free ; fruits smooth ... SAPINDUS 6

6b. Sepals connate ; fruits tubercled ... DIMOCARPUS 3

1b. Climbing herbaceous plants ; leaves biternate ... CARDIOSPERMUM 2

1. ALLOPHYLUS L.

1a. Leaflets glabrous ; bark of branches white or brown ;

2a. Bark of branches white ; thyrses single or in pairs ... *A. distachys* 3

2b. Bark of branches brown ; thyrses branched ... *A. concanicus* 2

1b. Leaflets ferruginous - tomentose ; branch bark yellowish - brown ... *A. cobbe* 1

1. **Allophylus cobbe (L.) Raeusch.** Nom. Bot. ed. 3. 108. 1797 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 673. 1875. Leenhouts in Blumea 15 : 322. 1968. *Rhus cobbe* L. Sp. Pl. 267. 1753. *Schmidelia rheedii* Wight, Ic. t. 964. 1845. *Allophylus rheedii* (Wight) Radlk. in Pflanzenf. 3 (5) : 313. 1895 ; Gamble, Fl. Pres. Madr. 246. 1918, Repr. ed. 1 : 176. 1957.

Large shrubs or small trees, 2 - 4 m. Lateral leaflets ovate, terminal ones obovate, acuminate. Flowers white, in a few branched thyrses. Styles connate below. Fruits globose, glabrous.

Fl. & Fr. : June - August.

Common ; in the Ghats ; Chindaki forest, Dhoni R.F., Silent Valley R.F.

2. **Allophylus concanicus** Radlk. in Sitz. Maths Phys. Cl. Koenigl. Bayer Akad. Wiss. Muench. 20 : 230. 1890 ; Gamble, Fl. Pres. Madr. 246. 1918, Repr. ed. 1 : 176. 1957.

Trees, 15 - 20 m ; branches brownish with conspicuous reddish lenticels. Leaves subcoriaceous, glabrous, broadly ovate lanceolate, acuminate, shorter than thyrses. Flowers pale - greenish.

Fl. : October.

Common ; at lower elevations ; Mukkali forest.

3. **Allophylus distachys** (DC.) Radlk. in Pflanzenf. 3 (5) : 313. 1895 et Monogr. 576. 1932 ; Gamble, Fl. Pres. Madr. 246. 1918, Repr. ed. 1 : 176. 1957. *Schmidelia distachya* DC. Prodr. 1 : 610. 1824.

Shrubs or small trees, 2 4 m. Leaflets ovate lanceolate, glabrous, long - acuminate. Flowers white, in axillary or terminal racemes. Fruits globose.

Fl. : September - October.

Common ; in upper Ghats ; Silent Valley R.F.

Leenhouts *l.c.* recognizes only one species under *Allophylus* viz. *A. cobbe*. However, Gamble (*l.c.*) considers the above species distinct from each other which has been followed here.

2. CARDIOSPERMUM L.

1a. Leaves glabrous ; capsules winged	...	*C. halicacabum*	2
1b. Leaves pubescent ; capsules not winged	...	*C. canescens*	1

1. **Cardiospermum canescens** Wall. Pl. Asiat. Rar. 1 : 14. t. 14. 1829 ; Wight, Ic. t. 74. 1838 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 670. 1875 ; Gamble, Fl. Pres. Madr. 245. 1918, Repr. ed. 1 : 175. 1957.

Tendril climbers. Stems furrowed, pubescent. Leaflets obtuse, terminal ones muronate. Flowers white, in axillary cymes. Lower pair of pedicels modified into spiral tendrils. Capsules globose.

Fl. : December.

Common ; in plains and in lower Ghats ; Attappadi block Mukkali.

2. **Cardiospermum halicacabum** L. Sp. Pl. 366. 1753 ; Wight, Ic. t. 508. 1841 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 670. 1875 ; Gamble, Fl. Pres. Madr. 244. 1918, Repr. ed. 1 : 175. 1957. '*Mudukottan*' (Tam.).

Climbers. Stems wiry. Leaves biternate ; leaflets lanceolate. Flowers white, in umbellate cymes ; lower pedicels modified into circinate tendrils. Capsules depressed, pyriform. Seeds black with a large heart shaped hilum.

Fl. & Fr. : October - December.

Common ; in lower Ghats and plains ; Agali, Kavundikal, Thiruvizhankunnu, Walayar forest.

The leaves are of medicinal value.

3. DIMOCARPUS Lour.

Dimocarpus longan Lour. Fl. Cochinch. 233. 1790 ; Leenhouts in Blumea 19 : 122. 1971. *Euphoria longan* (Lour.) Steud. Nom. Bot. 1 : 328. 1821. *E. longana* Lam. Encycl. 3 : 574. 1792 nom. illeg. ; Bedd. Fl. Sylv. t. 156. 1871. *Nephelium longana* (Lam.) Camb. in Mem. Mus. Hist. Nat. 18 : 30. 1829 ; Hiern in Hook. f. Fl Brit. Ind 1 : 688. 1875 ; Gamble, Fl. Pres. Madr. 252. 1918. Repr. ed 1 : 180. 1957. '*Puvatti*' (Tam.), '*Pasakotta*' (Mal.).

Large, buttressed, evergreen trees, 20 30 m Leaflets ovate - lanceolate, rounded at base, shining. Flowers white, in clusters of puberulous panicles. Calyx densely pubescent. Petals spathulate. Fruits globose, tubercled.

Fl. & Fr. : December April.

Common ; in lower Ghats ; Aravenu, Ayyappankoil area, Kallamalai, Mukkali forest.

The young leaves are red and conspicuous. Aril of the seed edible.

4. HARPULIA Roxb.

Harpulia arborea (Blanco) Radlk. in Sitz. Math. Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muench. 16 : 404. 1890. *Ptelea arborea* Blanco, Fl. Filip. 63. 1837. *Harpulia imbricata* Thw. Enum. Pl. Zeyl. 56. 1858 ; Gamble, Fl. Pres. Madr. 253. 1918, Repr. ed. 1 : 180. 1957. '*Nei kottai*' (Tam.).

Large trees, 15 20 m. Leaves with 3 - 4 membranous leaflets. Flowers in drooping panicles. Petals delicate. clawed, dull greenish. Capsules inflated, 2 lobed, orange scarlet.

Fr. : February - April.

Not common ; in Ghats ; Mandampatty forest (Mukkali).

5. LEPISANTHES Bl.

1a. Twigs glabrous ; leaflets 3 5 pairs	...	*L. erecta*	1
1b. Twigs hairy ; leaflets 2 - 7 pairs	...	*L. tetraphylla*	2

1. **Lepisanthes erecta** (Thw.) Leenhouts in Blumea 17 : 69. 1969. *Nephelium erectum* Thw. Enum. Pl. Zeyl. 57. 1858. *Sapindus erecta* (Thw.) Hiern in Hook. f. Fl. Brit. Ind. 1 : 683. 1875. *Thraulococcus erectus* (Thw.) Radlk. in Sitz. Math. Phys. Cl. Koenigl. Bayer. Akad. Wiss.

Muench. 8 : 300. 1878 ; Gamble, Fl. Pres. Madr. 251. 1918, Repr. ed. 1 : 179. 1957.

Large, erect shrubs, 2 5 m ; branches greyish to purplish brown. Leaflets oblong - lanceolate, glabrous. Flowers dense, white, in terminal, branched cymes. Petals clawed. Fruits 1 3 lobed, ellipsoid, wrinkled.

Fl. & Fr. : November - April.

Common ; in dense evergreen forests ; Mukkali forest, Silent Valley R.F.

While describing the seed, earlier workers mention the presence of a thin white fleshy aril. However, Radlkofer *l.c.* emphatically says 'Arillo nullo'. Leenhouts *l.c.* also says that he could not find a trace of an aril-like structure. The present investigation corroborates the findings of the latter two authors.

2. **Lepisanthes tetraphylla** (Vahl) Radlk. in Sitz. Math. Phys. Cl. Koenigl. Bayer. Akad. Wiss. Muench. 8 : 276. 1878 ; Gamble, Fl. Pres. Madr. 247. 1918, Repr. ed. 1 : 176. 1957. Leenhouts in Blumea 17 : 63. 1969. *Sapindus tetraphylla* Vahl, Symb. Bot. 3 : 54. 1794. *S. deficiens* Wight & Arn. Prodr. 111. 1834. *Hemigyrosa deficiens* (Wight & Arn.) Bedd. Fl. Sylv. t. 231. 1872. *Lepisanthes deficiens* (Wight & Arn.) Radlk. *l.c.* ; Gamble *l.c.*

Trees, about 10 m high. Leaflets elliptic-oblong, shining, coriaceous. Flowers white in pubescent, racemose panicles. Petals with 2 scales ; outer reflexed, inner laciniate. Fruits yellow, velvety, flat, depressed at apex.

Fl. : November April.

Common ; in lower Ghats ; Ayyappankoil area, Mukkali forest.

Leenhouts *l.c.* reduces many species under this species and also deals with the nomenclatural aspects.

6. SAPINDUS L.

Sapindus laurifolia Vahl, Symb. Bot. 3 : 54. 1794 ; Gamble, Fl. Pres. Madr. 250. 1918, Repr. ed. 1 : 178. 1957. *S. trifoliata* auct. non L. 1753 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 682. 1875. '*Manipungan*' (Tam.), '*Pasakotta*' (Mal.).

Stout trees, 10 m. Leaflets 2 - 3 pairs, lanceolate, acuminate, shining above. Flowers white. Sepals pubescent outside. Petals softly woolly inside. Drupes velvety.

Fl. & Fr. : December - February.

Common ; in lower Ghats ; Mukkali forest, Panthanthode forest, Pothundy slopes.

Fruit is used as a substitute for soap.

Hiern *l.c.* reduces *S. laurifolia* and *emarginata* Vahl to synonyms under *S. trifoliata* L. But Gamble *l.c.* and Santapau (in Fl. Khandala ed. 3. 49. 1967) treat these species separately. The latter view is accepted here.

7. SCHLEICHERA Willd. *nom. cons.*

Schleichera oleosa (Lour.). Oken, Allg. Naturgesch. 3 (2) : 1341. 1841. *Pistacia oleosa* Lour. Fl. Cochinch. 615. 1790. *Schleichera trifuga* Willd. Sp. Pl. 4 : 1096. 1805 ; Bedd. Fl. Sylv. t. 119 1871 ; Hiern in Hook. f. Fl. Brit. Ind. 1 : 681. 1875 ; Gamble, Fl. Pres. Madr. 248. 1918, Repr. ed. 1 : 177. 1957. '*Puvan*' (Tam.).

Deciduous trees, 20 - 25 m. Leaflets 3 pairs, sessile, entire, oblong-lanceolate, shining above. Flowers dull greenish, in interrupted slender racemes Calyx cupular. Fruits ovoid, crustaceous, echinate. Seeds, with fleshy aril.

Fl. & Fr. : February - May.

Common ; in lower Ghats ; Mukkali forest, Walayar forest.

Wood is durable and used for making implements. Young leaves bright red. Aril edible.

41. SABIACEAE

MELIOSMA Bl.

1a. Leaves simple ... *M. simplicifolia* 2

1b. Leaves pinnate ... *M. pinnata* 1

1. **Meliosma pinnata** (Roxb.) Maxim. ssp. **barbulata** (Cufod.) Beus. in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 3 : 384. 1981. *M. rhoifolia* ssp. *barbulata* Cufod. in Oesterr. Bot. Z. 88 : 254. 1939. *M. arnottiana* (Wight) Walp. Rep. 1 : 423. 1842 ; Hook. f. Fl. Brit. Ind. 2 : 6. 1876 ; Gamble, Fl. Pres. Madr. 256. 1918, Repr. ed. 1 : 183. 1957. *Millingtonia arnottiana* Wight, Ill. 1 : t. 53. 1840. '*Kusavi*' '*Thagari*' (Tam.).

Large trees, 15 - 20 m. Leaflets 7 - 15, lanceolate to oblanceolate, pubescent beneath. Flowers white, fragrant, crowded, in rusty pubescent panicles. Fruits smooth.

Fl. : November - March.

Not common ; in upper Ghats ; Karasuryamalai forest, Nelliyampathy R.F.

2a. **Meliosma simplicifolia** (Roxb.) Walp. Rep. 1 : 423. 1842 ; Hook. f. Fl. Brit. Ind. 2 : 5. 1876 ; Gamble, Fl. Pres. Madr. 256. 1918, Repr. ed. 1 : 182. 1957. *Millingtonia simplicifolia* Roxb. Pl. Cor. t. 254. 1820. ssp. **simplicifolia** ; Beus. in Blumea 19 : 476 ; 1971. *'Kallavi'* *'Cembaru'* (Tam.).

Small trees, 10 15 m. Leave simple, obovate or oblanceolate, cuneate at base, acute at apex, glabrous. Flowers many, crowded, sessile, in pubescent panicles. Sepals 4 5. Corolla white. Fruits deeply rugose.

Fl. & Fr. : April.

Common ; in Ghats ; Anamooly slopes—Mukkali, Hillton estate—Siruvani slopes.

2b. **Meliosma simplicifolia** (Roxb.) Walp. ssp. **pungens** (Wall. ex Wight & Arn.) Beus. in Blumea 19 : 466. 1971. *Millingtonia pungens* Wall. ex Wight & Arn. in Edinburgh New Philos. J. 15 : 178. 1833. *Meliosma pungens* (Wight & Arn.) Walp. Rep. 1 : 423. 1842. *M. wightii* Planch. ex Brandis, For. Fl. 116. 1874 ; Hook. f. Fl. Brit. Ind. 2 : 4. 1876 ; Gamble, Fl. Pres. Madr. 256. 1918, Repr. ed. 1 : 182. 1957.

Trees, 15 - 20 m. Leaves simple, coriaceous, elliptic - oblong or oblanceolate, pubescent beneath. Flowers large, white, in dense, ferruginous panicles. Sepals 6 - 13. Fruits slightly rugose.

Fl. : November.

Not common ; in lower Ghats ; Padagiri forests.

Brandis, in *For. Fl.* 116. 1874 in the original sense of Wallich, designated the epithet *'pungens'* to the Himalayan taxon and illegitimately renamed *M. pungens* Wight & Arn. as *M. wightii* Planch. ex Brandis. All authors followed Brandis. Hence Beusekom *l.c.* has chosen Wight Cat. no. 945 as the Lectotype of *Millingtonia pungens* Wall. ex Wight & Arn. and resorted *M. pungens* in its original sense by making the above combination.

Meliosma simplicifolia is a very variable species covering an enormous area. Hence Beusekom (*l.c.*) divided it into well - marked eight subspecies which are mutually isolated either geographically or ecologically.

42. ANACARDIACEAE

1a. Leaves simple :

2a. Petioles with 2 - 4 spur - like appendages ... HOLIGARNA 3

2b. Petioles without spur - like appendages :

3a. Styles 3 - 6 :

4a. Flowers unisexual ; stamens as many as petals ; styles 3 ... SEMECARPUS 8

4b. Flowers bisexual ; stamens twice as many as petals ; styles 5 - 6 ... BUCHANANIA 2

3b. Styles 1 :

5a. Stamens twice as many as petals ... ANACARDIUM 1

5b. Stamens as many as petals or fewer :

6a. Stamens all fertile ; stigma 3 - lobed ... NOTHOPEGIA 6

6b. Stamen 1 fertile ; stigma not lobed. ... MANGIFERA 5

1b. Leaves compound :

7a. Plants armed ; leaflets 3, serrate ... RHUS 7

7b. Plants unarmed ; leaflets 5 to many, entire :

8a. Plants glabrous ; petals valvate ... SPONDIAS 9

8b. Plants stellately pubescent ; petals imbricate ... LANNEA 4

1. ANACARDIUM L.

Anacardium occidentale L. Sp. Pl. 383. 1753 ; Bedd. Fl. Sylv. t. 163. 1871 ; Hook. f. Fl. Brit. Ind. 2 : 20. 1876 ; Gamble, Fl. Pres. Madr. 260. 1918, Repr. ed. 1 : 185. 1957. '*Munthiri*' (Tam.).

Trees with spreading branches, 7 - 10 m. Leaves simple, coriaceous, elliptic - obovate, emarginate, glabrous. Flowers white, turning red, in panicles. Calyx hairy. Petals deflexed. Pedicels and disc enlarged, fleshy, red or yellow. Nuts reniform.

Fl. & Fr. : November - April.

Commonly cultivated ; Agali, Dhoni R.F., Karivara, Mangalam dam area, Thiruvizhankunnu.

The nuts are roasted and the kernals eaten ; false - fruits are also eaten.

2. BUCHANANIA Spreng.

Buchanania lanzan Spreng. in J. Bot. (Schrader) 2 : 234. 1800 ; Gamble, Fl. Pres. Madr. 258. 1918, Repr. ed. 1 : 184. 1957. *B. latifolia* Roxb. Fl. Ind. 2 : 385. 1832 ; Bedd. Fl. Sylv. t. 165. 1871 ; Hook. f. Fl. Brit. Ind. 2 : 23. 1876.

Trees, 5 - 7 m ; young branches hairy. Leaves oblong, emarginate, glaucous, rusty - tomentose beneath. Petioles stout, tomentose. Flowers small, in pubescent panicles. Petals white, oblong. Drupes black.

Fl. & Fr. : January - March.

Common ; in dry deciduous forests ; Thavalam slopes.

3. HOLIGARNA Ham. ex Roxb. *nom. cons.*

1a. Leaves glabrous beneath ; petiole - spurs deciduous ;			
2a. Tomentum of inflorescence pale golden - brown	...	*H. arnottiana*	1
2b. Tomentum of inflorescence dark purple - brown	...	*H. nigra*	3
1b. Leaves pubescent beneath ; petiole spurs persistent	...	*H. grahamii*	2

1. **Holigarna arnottiana** Hook. f. Fl. Brit. Ind. 2 : 36. 1876 ; Gamble, Fl. Pres. Madr. 268. 1918, Repr. ed. 1 : 191. 1957. '*Karuncherai*' (Tam.).

Large trees with black caustic juice. Leaves oblanceolate, obtusely acute at apex ; main nerves 16 - 20 pairs. Calyx accrescent. Stamens 5. Drupes enclosed by calyx and disk (hypocarp).

Fr. : May - June.

Not common ; in lower Ghats ; Dhoni R.F. The caustic juice raises blisters on skin.

2. **Holigarna grahamii** (Wight) Kurz in J. Asiat. Soc. Bengal 42 (2) : 305. 1872 ; Hook. f. Fl. Brit. Ind. 2 : 37. 1876 ; Gamble, Fl. Pres. Madr. 268. 1918, Repr. ed. 1 : 191. 1957. *Semecorpus grahamii* Wight, Ic. t. 235. 1839. *Holigarna wightii* Balak. in J. Bombay Nat. Hist. Soc. 63 : 527. 1966 *nom. superfl.*

Large trees, to 20 m. Leaves large, oblanceolate, pubescent beneath, broadened above the middle, acute. Petiole - spurs short, golden tomentose. Flowers white, in brown tomentose panicles.

Fl. & Fr. : October March.

Common ; in lower Ghats ; Pothundy Kaikatty forests.

The acrid juice on contact with skin produces blisters and burns.

Ramamoorthy (in Saldanha & Nicolson, Fl. Hassan Dist. 375. 1976) remarks, "Wight's species is based on material from Peninsular India. Kurz *l.c.* made a new combination in *Holigarna* based on and citing Wight's species as a basionym and applied the new combination to specimens from Pegu. Hooker decided the Pegu material was a new species and correctly named Kurz's specimens as *Holigarna albicans sp. nov.* He used the combination *Holigarha grahamii* for the South Indian material but incorrectly attributed the combination to himself saying "Hook f. (not of Kurz)". Balakrishnan *l.c.* has renamed Wight's species as *Holigarna wightii* and adopted *Holigarna grahamii* Kurz for the material from Pegu. According to our understanding Kurz did not publish a new species but made a new combination which was misapplied to material of another species. Our nomenclature follows this understanding". This opinion is followed here.

3. **Holigarna nigra** Bourd. in Indian Forester 30 : 95. 1904 ; Gamble, Fl. Pres. Madr. 268. 1918, Repr. ed. 1 : 191. 1957.

Lofty trees with smooth grey bark. Leaves spathulate, usually black when dry ; main nerves 6 9 pairs. Flowers dull white. Calyx dark brown hairy. Petals acute.

Fl. : May.

Rare ; in upper Ghats ; Singampara Siruvani forest.

4. LANNEA Rich. *nom. cons.*

Lannea coromandelica (Houtt.) Merr. in J. Arnold Arbor. 19 : 353. 1939. *Dialium coromandelicum* Houtt. in Nat. Hist. ser. 2. 2 : 39. t. 5. f. 2. 1774. *Odina wodier* Roxb. Fl. Ind. 2 : 293. 1832 ; Wight, Ic. t. 60. 1838 ; Hook. f. Fl. Brit. Ind. 2 : 29. 1876 ; Gamble, Fl. Pres. Madr. 263. 1918, Repr. ed. 1 : 187. 1957. '*Wodien*' (Tam.).

Deciduous trees with soft branches, 10 - 15 m. Leaflets 3 - 4 pairs, ovate, long - acuminate, hairy, glabrous with age. Inflorescence stellate - hairy. Sepals ovate. Petals purplish. Drupes fleshy.

Fr. : April.

Common ; in lower Ghats and in plains ; Thadikundu area, Walayar forest.

Quick growing tree by stem cuttings and often planted as avenue trees.

5. MANGIFERA L.

Mangifera indica L. Sp. Pl. 200. 1753 ; Bedd. Fl. Sylv. t. 162. 1871 ; Hook. f. Fl. Brit. Ind. 2 : 13. 1876 ; Gamble, Fl. Pres. Madr. 259. 1918, Repr. ed. 1 : 185. 1957. '*Maa*' (Tam.).

Evergeen, lofty trees, 30 40 m. Leaves simple, crowded at the ends of branches, oblong - lanceolate. Flowers white in dense panicles. Petals reflexed. Style lateral. Drupes fleshy, resinous.

Fl. & Fr. : February - June.

Common ; in lower Ghats and in plains ; Pothundy - Kaikatty.

Cultivated for the edible fruits. Timber is used for implements. Leaves and dried twigs used in religious rituals etc.

6. NOTHOPEGIA Bl. *nom. cons.*

1a. Leaves oblong, acuminate ; filaments glabrous ...	*N. racemosa*	2
1b. Leaves lanceolate, caudate ; filaments villous ...	*N. beddomei*	1

1. **Nothopegia beddomei** Gamble, Fl. Pres. Madr. 265. 1918, Repr. ed. 1 : 189. 1957. *N. colebrookeana* auct. non (Wight) Blume 1851 ; Bedd. Fl. Sylv. t. 164. 1871 ; Hook. f. Fl. Brit. Ind. 2 : 40. 1876 *p.p.*

Trees, 5 10 m. Leaves alternate, with slender petioles. Flowers white, rusty - tomentose. Petals reflexed, spathulate. Fruits globose, depressed at tip, glabrous.

Fl. & Fr. : December - April.

Common ; in lower Ghats ; Mukkali forest, Pothundy slopes.

2. **Nothopegia racemosa** (Dalz.) Ramam. in Sald & Nicol. Fl. Hassan Dist. 377. 1976. *Glycycarpus racemosus* Dalz. in J. Asiat. Soc. Bombay 3 : 69. 1849. *Nothopegia dalzellii* Gamble, Fl. Pres. Madr. 265. 1918, Repr. ed. 1 : 189. 1957.

Small trees, 5 7 m. Leaves oblong, acuminate, base rounded. Flowers rusty - tomentose, in elongate racemes. Petals white. Filaments glabrous. Fruits purple.

Fl. : October.

Not common ; in upper Ghats ; Silent Valley dam site.

7. RHUS L.

Rhus mysorensis G. Don, Gen. Syst. 2 : 74. 1832 ; Hook. f. Fl.

Brit. Ind. 2 : 9. 1876 ; Gamble, Fl. Pres. Madr. 264. 1918, Repr. ed. 1 : 188. 1957. '*Mulluvedathi*' (Tam.).

Spinous shrubs. Leaves trifoliolate, obovate ; laterals smaller. Flowers yellow, in panicles. Sepals acute, hairy. Petals ovate. Stamens 5. Drupes compressed.

Fl. & Fr. : September December.

Common ; in dry scrubs ; Attapadi block Mukkali.

8. SEMECARPUS L. f.

Semecarpus anacardium L. f. Suppl. 182. 1781 ; Wight, Ic. t. 558. 1842 ; Hook. f. Fl. Brit. Ind. 2 : 30. 1876 ; Gamble, Fl. Pres. Madr. 266. 1918, Repr. ed. 1 : 190. 1957. '*Shenkottai*', '*Thembarai*' (Tam.).

Trees, 5 7 m. Leaves obovate oblong, glabrous above, silky pubescent beneath. Flowers greenish - yellow, in hairy panicles. Styles oblong. Fruits acrid juicy with fleshy receptacles.

Fl. : August.

Common ; in open forests in plains ; Attappadi block - Mukkali, Dhoni R.F.

The 'marking nut tree' used by dhobies.

9. SPONDIAS L.

1a. Drupes 1 - 5 - seeded ; pericarp fibrous	....	*S. pinnata*	2
1b. Drupes 1 - seeded ; pericarp oily	...	*S. indica*	1

1. **Spondias indica** (Wight & Arn.) Airy Shaw & Forman in Kew Bull. 21 : 16. 1967. *Solenocarpus indicus* Wight & Arn. Prodr. 172. 1834 '*indica*' ; Bedd. Fl. Sylv. t. 233. 1874 ; Hook. f. Fl. Brit. Ind. 2 : 27. 1876; Gamble, Fl. Pres. Madr. 262. 1918, Repr. ed. 1 : 187. 1957.

Trees, to 5 m. Leaves crowded at the ends of branches ; leaflets 5 7 pairs, oblong, acuminate. Flowers small, white, in conspicuous panicles. Petals recurved. Fruits small, compressed with oily pericarp.

Fl. & Fr. : October April.

Common ; in lower Ghats ; Pothundy - Kaikatti forest, Karapara river bank.

2. **Spondias pinnata** (L. f.) Kurz, Pegu Report A. 44. 1875. *Mangi-*

fera pinnata L.f. Suppl. 156. 1781. *Spondias mungifera* Willd. Sp. Pl. 2 : 751. 1799 ; Bedd. Fl. Sylv. t. 169. 1872 ; Hook. f. Fl. Brit. Ind. 2 : 42. 1876 ; Gamble, Fl. Pres. Madr. 261. 1918, Repr. ed. 1 : 186. 1957. *S. acuminata* Roxb. Fl. Ind. 2 : 453. 1832 ; Hook. f. *l.c.* ; Gamble *l.c.* '*Kattuma*' (Tam.).

Large, deciduous trees, *ca* 15 m. Leaves odd-pinnate ; leaflets elliptic, close parallel - veined. Flowers white, in terminal panicles. Calyx deciduous. Drupes fleshy, ovoid, yellow.

Fl. & Fr. : March October.

Common ; in lower Ghats ; Ayyappankoil area Nelliyampathy forest.

43. MORINGACEAE

MORINGA Lam.

Moringa pterygosperma Gaertn. Fruct. 2 : 314. 1791 ; Bedd. Fl. Sylv. t. 80. 1871 ; Hook. f. Fl. Brit. Ind. 2 : 45. 1876. *M. oleifera* auct. non Lam. 1785 ; Gamble, Fl. Pres. Madr. 269. 1918, Repr. ed. 1 : 192. 1957. '*Moringa*', '*Murungai*' (Tam.).

Soft trees with corky barks. Leaves imparipinnate ; leaflets elliptic - obovate, apex rounded. Flowers white, in panicles. Fruits elongate, 3 - valved, corky end pitted inside. Seeds winged.

Fl. & Fr. : November - March.

Commonly cultivated by stem cuttings ; Karivara slopes.

The leaves and fruits are used as vegetables ; bark used in medicine.

44. CONNARACEAE

1a. Panicles glabrous ; calyx accrescent ... RODREA 2

1b. Panicles rusty - pubescent ; calyx not accrescent ... CONNARUS 1

1. CONNARUS L.

1a. Valves of follicles glabrous within :

2a. Leaflets with 3 - 5 - pairs of main nerves ; pedicels not striate ... *C. monocarpus* 1

2b. Leaflets with 5 - 8 - pairs of main nerves ; pedicels striate ... *C. wightii* 3

1b. Valves of follicles velvety within ... *C. sclerocarpus* 2

1. **Connarus monocarpus** L. Sp. Pl. 675. 1753 ; Hook. f. Fl. Brit. Ind. 2 : 50. 1876 ; Gamble, Fl. Pres. Madr. 272. 1918, Repr. ed. 1 : 194. 1957.

Low, straggling shrubs. Leaflets elliptic, acuminate, rounded at base. Flowers white, in panicles, 5 merous. Follicles scarlet brown when dry.

Fl. : December.

In lower Ghats ; not common ; Thiruvizhankunnu forest.

2. **Connarus sclerocarpus** (Wight & Arn.) Schellenb. in Candollea 2 : 98. 1925 ; Gamble, Fl. Pres. Madr. 273. 1918, Repr. ed. 1 : 194. 1957. *Rourea sclerocarpa* Wight & Arn. Prodr. 262. 1834.

Large, climbing shrubs. Leaflets coriaceous, elliptic with 5 pairs of main nerves. Flowers in rusty pubescent panicles. Follicles obovoid, woody.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Ayyappankoil area, Karapara river bank, Thuthampara area.

3. **Connarus wightii** Hook. f. Fl. Brit. Ind. 2 : 51. 1876 ; Gamble, Fl. Pres. Madr. 272. 1918, Repr. ed. 1 : 194. 1957. *C. ritchiei* Hook. f. *l.c.*

Large, woody climbers. Leaflets oblong - lanceolate, cordate to rounded at base. Pedicels striate. Sepals ovate - oblong. Follicles turgidly inflated.

Fr. : October - February.

Common ; in lower Ghats ; Mukkali forest, Vattaparai - Siruvani forest.

2. ROUREA Aublet *nom. cons.*

Rourea minor (Gaertn.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) : 67. 1931 ('*minus*') ; Leenhouts in Steenis, Fl. Males. ser. 1. 5 : 514. 1958. *Aegiceros minus* Gaertn. Fruct. 1 : 216. t. 46. 1788. *Rourea santaloides* (Vahl) Wight & Arn. Prodr. 144. 1834 ; Hook. f. Fl. Brit. Ind. 2 : 47. 1876 ; Gamble, Fl. Pres. Madr. 271. 1918, Repr. ed. 1 : 193. 1957. *Connarus santaloides* Vahl, Symb. Bot. 1 : 87. 1794. '*Kuriel*' (Tam.).

Climbing shrubs. Leaflets 5 - 9 ; elliptic lanceolate, acuminate. Flowers white, in glabrous panicles. Sepals 5, orbicular. Petals 5, linear - oblong. Stamens 10. Follicles elliptic, curved.

Fl. & Fr. : October - April.

In lower Ghats ; not common ; Panthanthode forest.

45. PAPILIONACEAE

1a. Leaves odd pinnate, digitate or unifoliolate :

2a. Hairs medifixed ... INDIGOFERA 22

2b. Hairs basifixed :

3a. Venation reticulate :

4a. Leaflets 5 or more :

5a. Leaflets alternate :

6a. Pods flat, not winged ... DALBERGIA 10

6b. Pods turgid, winged ... PTEROCARPUS 29

5b. Leaflets opposite :

7a. Leaflets silky - pubescent ... MUNDULEA 26

7b. Leaflets not silky - pubescent :

8a. Leaflets less than 3 mm wide ... ASCHYNOMENE 2

8b. Leaflets over 1 cm wide :

9a. Herbs, twining ... CLITORIA 8

9b. Woody climbers or trees :

10a. Pods winged :

11a. Wing petals adherent to keel in lower half ... DERRIS 11

11b. Wing petals not adherent to keel in lower half ... AGANOPS 3

10b. Pods not winged ... PONGAMIA 27

4b. Leaflets 1 or 3 :

12a. Leaves unifoliolate or digitately 3-foliolate :

13a. Leaflets gland - dotted :

14a. Flowers in lax racemes :

15a. Pods depressed between seeds ... ATYLOSIA 5

15b. Pods not depressed between seeds ... DUNBARIA 15

14b. Flowers in dense racemes ... FLEMINGIA 17

13b. Leaflets not gland - dotted :

16a. Stamens monadelphous :

17a. Pods compressed :

18a. Leaves simple ... GONIOGYNA 21

18b. Leaves trifoliolate ... ROTHIA 33

17b. Pods turgid or inflated ... CROTALARIA 9

16b. Stamens diadelphous :

19a. Pods twisted ... URARIA 40

19b. Pods not twisted :

20a. Calyx scarious ; joints of pod turgid ... ALYSICARPUS 4

20b. Calyx not scarious ; joints of pod flat ... DESMODIUM 12

12b. Leaves pinnately 3 - foliolate ;

21a. Standard more than 2.5 cm long :

22a. Petals unequal :

23a. Trees ... ERYTHRINA 16

23b. Climbing shrubs ... MUCUNA 25

22b. Petals equal ;

24a. Stamens diadelphous :

25a. Herbs ; pods linear ... GALACTIA 18

25b. Trees or climbing shrubs ; pods with wing - like base ;

26a. Flowers large, in racemes ... BUTEA 6

26b. Flowers small, in panicles ... STYLOSANTHES 37

24b. Stamens monadelphous :

27a. Upper lip of calyx projecting ... CANAVALIA 7

27b. Upper lip of calyx not projecting ... PUERARIA 30

27b. Standard less than 2.5 cm long :

28a. Calyx deeply lobed ... RHYNCHOSIA 32

28b. Calyx not deeply lobed :

29a. Pods inflated ... PYCNOSPORA 31

29b. Pods flat :

30a. Calyx truncate ... DUMASIA 14

30b. Calyx not truncate (toothed)

31a. Styles hairy :

32a. Stigma oblique ... VIGNA 41

32b. Stigma terminal :

33a. Styles thickened upwards, bearded down on one side ... LABLAB 23

33b. Style filiform, bearded round the stigma ... DOLICHOS 13

31b. Styles glabrous :

34a. Pods viscid ... PSEUDARTHRIA 28

34b. Pods not viscid :

35a. Stamens diadelphous ... SHUTERIA 35

35b. Stamens monadelphous :

36a. Pods hooked at apex ... TERAMNUS 39

36b. Pods not hooked at apex ... GLYCINE 20

3b. Venation striate :

37a. Herbs or undershrubs :

38a. Inflorescence terminal or leaf - opposed ... TEPHROSIA 38

38b. Inflorescence axillary ... SESBANIA 34

37b. Climbing shrubs ... MILLETIA 24

1b. Leaves even - pinnate :

39a. Stamens monadelphous :

40a. Bracts covering flowers ... GHESSASPIS 19

40b. Bracts not covering flowers :

41a. Wiry herbs ... ZORNIA 42

41b. Climbing shrubs ... ABRUS 1

39b. Stamens diadelphous ... SMITHIA 36

1. ABRUS Adanson

Abrus precatorius L. Syst. Nat. ed. 12. 472. 1767 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 175. 1876 ; Gamble, Fl. Pres. Madr. 349. 1918, Repr. ed. 1 : 247. 1957, Verdc. in Kew Bull. 24 : 240. 1970. '*Kundumani*' (Tam.).

Conspicuous, wiry climbers on hedges and among bushes. Leaflets oblong, 12 16 pairs. Flowers pink, in racemes. Pods thick, wrinkled. Seeds hard, scarlet with a black spot.

Fl. & Fr. : October.

Common ; in plains ; Olavakkot area.

2. AESCHYNOMENE L.

Aeschynomene indica L. Sp. Pl. 713. 1753 ; Wight, Ic. t. 405. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 151. 1876 ; Gamble, Fl. Pres. Madr. 331. 1918, Repr. ed. 1 : 234. 1957 ; Rudd in Reinwardtia 5 : 30. 1959. '*Thakka poondu*' (Tam.).

Slender, woody herbs. Leaflets minute. Stipules setaceous. Flowers yellow, in viscid racemes. Calyx glabrous. Pods jointed, echinate.

Fl. & Fr. : November.

Not common ; in wetlands in lower Ghats ; Panangatri - Nemmara.

Rudd *l.c.* says 'TYPE LOCALITY' "India" Collector not Known. It appears that *A. indica* is a native of America and was introduced in the Old World'.

3. AGANOPE Miq.

Aganope thyrsiflora (Benth.) Polhill in Kew Bull . 25 : 270. 1971 ; Manilal & Sivarajan, Fl. Calicut 80. 1982. *Milletia thyrsiflora* Benth. in Miq. Pl. Jungh. 1 : 249. 1852. *Derris eualata* Bedd. Ic. t. 186. 1868 - 1874 ; Gamble, Fl. Pres. Madr. 388. 1918, Repr. ed. 1 : 274. 1957. *D. thyrsiflora* (Benth.) Benth. var. *eualata* (Bedd.) Thoth. in Bull. Bot. Surv. India 3 : 195. 1961.

Very large, climbing shrubs. Leaflets 9, oblong, entire, glabrous. Flowers white, in thyrsoid, lax panicles. Calyx brown - silky. Corolla glabrous. Stamens 10. Pods flat, oblong, winged.

Fl. & Fr. : February - May.

Fairly common ; in Ghats : Mukkali forest, Vattappara Inchikuzhi, Siruvani forest.

4. ALYSICARPUS *Desv. nom. cons.*

1a. Calyx less than 0.5 cm long ... *A. vaginalis* 3
1b. Calyx more than 0.5 cm long :
  2a. Joints of pods ribbed ... *A. rugosus* 2
  2b. Joints of pods not ribbed ... *A. bupleurifolius* 1

1. **Alysicarpus bupleurifolius** (L.) DC. Prodr. 2 : 352. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 158. 1876 ; Gamble, Fl. Pres. Madr. 338. 1928, Repr. ed. 1 : 239. 1957. *Hedysarum bupleurifolium* L. Sp. Pl. 745. 1753.

Slender, perennial herbs. Leaves (basal) elliptic suborbicular, upper ones linear - oblong, acute. Flowers pale white or dull pink. Calyx lobes imbricate in fruit. Pods slightly moniliform, joints 4 - 6, glabrous.

Fl. & Fr. : July.

Common ; in lower Ghats among grasses ; Olavakkot area.

2. **Alysicarpus rugosus** (Willd). DC. Prodr. 2 : 353. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 159. 1876 ; Gamble, Fl. Pres. Madr. 338. 1918, Repr. ed. 1 : 239. 1957. Verdc. in Kew Bull. 24 : 67. 1970. *Hedyotis rugosum* Willd. Sp. Pl. 3 : 1172. 1802.

Short herbs. Leaves 1 3 foliolate ; leaflets oblong - lanceolate. Flowers yellow, in dense racemes. Calyx lobes ciliate. Pods moniliform.

Fl. & Fr. : November.

Not common ; in lower Ghats ; Kaikatty Pothundy forest.

3. **Alysicarpus vaginalis** (L.) DC. Prodr. 2 : 353. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 158. 1876 ; Gamble, Fl. Pres. Madr. 338. 1918, Repr. ed. 1 : 238. 1957. *Hedysarum vaginalis* L. Sp. Pl. 746. 1753.

Suberect, branched herbs. Leaflets linear - oblong to orbicular, cordate at base. Flowers pink, in racemes. Calyx shorter than first joint of pod. Pods reticulate, glabrous.

Fr. & Fr. : October.

Common ; in lower Ghats ; Mukkali forest, Olavakkot area.

5. ATYLOSIA Wight & Arn.

1a. Erect shrubs ; pods 2 3 seeded ... *A. lineata* 2
1b. Climbing shrubs ; pods 4 6 seeded :
  2a. Flowers in stout racemes ; leaflets stipellate ... *A. goensis* 1
  2b. Flowers in slender racemes ; leaflets exstipellate ... *A. scarabaeoides* 3.

1. **Atylosia goensis** (Dalz.) Dalz. in J. Linn. Soc. Bot. 13 : 186. 1873 ; Gamble, Fl. Pres. Madr. 369. 1918, Repr. ed. 1 : 260. 1957. *Cajanus goensis* Dalz. in Hook. Kew J. Bot. 2 : 265. 1850. *Atylosia barbata* Baker in Hook. f. Fl. Brit. Ind. 2 : 216. 1876.

Woody, grey pubescent, climbing shrubs. Leaves 3 - foliolate ; leaflets ovate oblong, pubescent beneath. Flowers yellow, in short racemes. Bracts ovate cuspidate. Petals included. Pods depressed between seeds.

Fl. & Fr. : February.

Common ; in lower Ghats ; Sirunelli estate area - Pothundy.

2. **Atylosia lineata** Wight & Arn. Prodr. 258. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 213. 1876 ; Gamble, Fl. Pres. Madr. 368. 1918, Repr. ed. 1 : 260. 1957. *A. lawii* Wight, Ic. t. 93. 1838.

Erect, ashy grey shrubs. Leaflets obovate or oblanceolate, slightly hirsute. Flowers yellow, solitary or in pairs. Calyx hairy. Pods linear oblong, grey silky.

Fl. & Fr. : January.

Not common ; in upper Ghats ; Valiyaparathode way.

3. **Atylosia scarabaeoides** (L.) Benth. in Miq. Pl. Jungh. 242. 1852 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 215. 1876 ; Gamble, Fl. Pres. Madr. 369. 1918, Repr. ed. 1 : 261. 1957. *Dolichos scarabaeoides* L. Sp. Pl. 726. 1753.

Slender twining shrubs. Leaflets obovate - oblong, slightly grey - canescent beneath. Flowers yellow, in short racemes. Pods with golden spreading hairs.

Fl. & Fr. : October.

Common ; in lower Ghats ; Dhoni R.F.

6. BUTEA Roxb. ex Willd. *nom. cons.*

Butea monosperma (Lam.) Taub. in Engler & Prantl, Pflanzenfam. 3 (3) : 368. 1894 ; Santapau in Bull. Bot Surv. Ind. 3 : 12. 1961. *Erythrina monosperma* Lam. Encycl. 1 : 391. 1785. *Butea frondosa* Koen. ex Roxb. in Asiat. Res. 3 : 369. 1792 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 194. 1876 ; Gamble, Fl. Pres. Madr. 357. 1918, Repr. ed. 1 : 252. 1957. *Plaso monosperma* (Lam.) Kuntze, Rev. Gen. Pl. 1 : 202. 1891. '*Porasu*' (Tam.).

Deciduous, tomentose trees. Leaves trifoliolate ; leaflets broadly ovate, base rounded. Flowers orange-scarlet. Calyx dark velvety. Pods long-stalked, pubescent.

Fl. & Fr. : December April.

Common ; in lower Ghats ; Mangalam dam area, Mukkali forest.

Very conspicuous when in flower, before leaves appear. Hence known as 'Flame of the Forests'. A few leaves stitched together and used as plates occasionally.

7. CANAVALIA Adanson *nom. cons.*

Canavalia gladiata (Jacq.) DC. Prodr. 2 : 404. 1825 ; Wight, Ic. t. 753. 1844. *Dolichos gladiatus* Jacq. Coll. Bot. 2 : 276. 1788. *Canavalia ensiformis* sensu Baker in Hook. f. Fl. Brit. Ind. 2 : 195. 1876 non DC. 1825 ; Gamble, Fl. Pres. Madr. 359. 1918, Repr. ed. 1 : 253. 1957.

Large climbers. Leaflets 3, ovate, acute. Flowers pink, in long-peduncled, erect racemes. Standard reflexed. Pods 15-25 cm long, flat.

Fl. & Fr. : July-December.

Common ; in lower Ghats ; Attappadi R.F.—Mukkali, Olavakkot area, Pothundi-Kaikatty forest.

8. CLITORIA L.

Clitoria ternatea L. Sp. Pl. 753. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 208. 1876 ; Gamble, Fl. Pres. Madr. 365. 1918, Repr. ed. 1 : 258. 1957. '*Sangupushpa*' (Mal.), (Tam.).

Glabrescent, slender twiners. Leaflets 5-7, elliptic, obtuse, rounded at base. Flowers large, bright blue, prominently bracteolate ; standard with orange centre. Calyx tubular. Stamens diadelphous. Pods linear-oblong, compressed or turged; many seeded.

Fl. & Fr. : July-October.

Common ; in lower Ghats ; Walayar forest.

9. CROTALARIA L.

1a. Leaves simple :

2a. Stipules decurrent ... *C. scabrella* 15

2b. Stipules not decurrent :

3a. Racemes axillary, lateral or leaf - opposed :

4a. Pods glabrous :

5a. Stipules minute, subulate ; leaves cuneate at base ... *C. humifusa* 5

5b. Stipules lanceolate ; leaves subcordate at base ... *C. acicularis* 1

4b. Pods hairy :

6a. Flowers less than 2 cm long :

7a. Racemes 3-8-flowered ; pods softly hairy ... *C. evolvuloides* 2

7b Racemes 2-3-flowered ; pods strigose-hirsute ... *C. hirsuta* 4

6b. Flowers more than 2 cm long ... *C. multiflora* 8

3b. Racemes terminal :

8a. Pods glabrous :

9a. Pods longer than calyx :

10a. Leaves glabrous above :

11a. Stipules and bracts minute, filiform ... *C. retusa* 13

11b. Stipules and bracts ovate, acute, reflexed ... *C. sericea* 16

10b. Leaves pubescent above ... *C. salicifolia* 14

9b. Pods shorter than calyx :

12a. Plants prostrate ; upper calyx lobes connate ... *C. nana* 10

12b. Plants erect ; upper calyx lobes not connate ... *C. mysorensis* 9

8b. Pods hairy :

13a. Plants less than 20 cm high ... *C. pusilla* 12

13b. Plants more than 20 cm high :

14a. Stipules semi-lunate :

15a. Stems and branches angular ... *C. verrucosa* 17

15b. Stems and branches terete .. *C. heyneana* 3

14b. Stipules subulate ... *C. juncea* 6

1b. Leaves trifoliolate :

16a. Pods oblong ; seeds less than 10 ... *C. laevigata* 7

16b. Pods cylindric-falcate ; seeds more than 10 ... *C. pallida* 11

1. **Crotalaria acicularis** Ham. ex Benth. in Hook. London J. Bot. 2 : 476. 1843 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 68. 1876 ; Gamble, Fl. Pres. Madr. 292. 1918, Repr. ed. 1 : 206. 1957 ; de Munk in Reinwardtia 6 : 199. 1962.

Small, prostrate herbs. Leaves orbicular-oblong, subcordate and unequal at base, glaucous beneath. Flowers yellow, in dense racemes. Pods many-seeded.

Fl. & Fr. : November.

Rare ; in lower Ghats ; Ayalur slopes-Nemmara.

2. **Crotalaria evolvuloides** Wight ex Wight & Arn. Prodr. 188. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 68. 1876 ; Gamble, Fl. Pres. Madr. 292. 1918, Repr. ed. 1 : 206. 1957.

Copiously branched herbs. Leaves membranous, orbicular to oblong or oblong-lanceolate, obtuse. Flowers yellow, in racemes. Corolla longer than calyx. Pods reflexed.

Fl. & Fr. : October-February.

Common ; in lower Ghats ; Agali-Chittoor area.

3. **Crotalaria heyneana** Grah. ex Wight & Arn. Prodr. 187. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 78. 1876 ; Gamble, Fl. Pres. Madr. 297. 1918, Repr. ed. 1 : 210. 1957.

Low undershrubs ; branches terete. Leaves membranous, lanceolate, acute, stipulate. Flowers blue ; standard pale yellow or white. Pods hairy. Seeds 10.

Fl. & Fr. : September-December.

Common ; in lower Ghats ; Chindaki forest, Panthanthode area, Pothundy-Kaikatty forest, Sappal hill-Dhoni.

4. **Crotalaria hirsuta** Willd. Sp. Pl. 3 : 978. 1802 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 68. 1876 ; Gamble, Fl. Pres. Madr. 293. 1918, Repr. ed. 1 : 207. 1957.

Hairy shrubs. Leaves membranous, ovate, acute. Flowers yellow, in slender racemes. Bracts recurved. Pods obovoid, strigosely hirsute.

Fl. & Fr. : March.

Not common ; in lower Ghats ; forest near Palgapandi estate.

5. **Crotalaria humifusa** Grah. ex Benth. in Hook. London J. Bot. 2 : 476. 1843 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 67. 1876 ; Gamble, Fl. Pres. Madr. 292. 1918, Repr. ed. 1 : 206. 1957.

Slender, decumbent, hairy herbs. Leaves orbicular, base cuneate, glaucous beneath. Stipules minute, subulate. Flowers yellow, in slender racemes. Pods many-seeded.

Fl. & Fr. : December.

Not common ; in dry forest undergrowths ; Valiyaparathode.

6. **Crotalaria juncea** L. Sp. Pl. 714. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 79. 1876 ; Gamble, Fl. Pres. Madr. 297. 1918, Repr. ed. 1 : 210. 1957 ; de Munk in Reinwardtia 6 : 206. 1962.

Tall, brown-silky pubescent shrubs, 2-3 m. Leaves linear-lanceolate or oblong, acute. Flowers bright yellow, in terminal racemes. Corolla exserted. Pods velvety.

Fl. : January.

Not common ; in lower Ghats ; Mukkali.

7. **Crotalaria laevigata** Lam. Encycl. 2 : 198. 1786 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 83. 1876 ; Gamble, Fl. Pres. Madr. 300. 1918, Repr. ed. 1 : 212. 1957.

Erect shrubs. Leaves trifoliolate ; leaflets obovate. Flowers yellow ; keels long-beaked, narrow. Pods oblong, narrowed at both ends, beaked at apex.

Fl. & Fr. : December-January.

Common ; in lower Ghats ; Panthanthode forest.

8. **Crotalaria multiflora** Benth. in Hook. London J. Bot. 2 : 478. 1843 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 69. 1876 ; Gamble, Fl. Pres. Madr. 293. 1918, Repr. ed. 1 : 207. 1957.

Spreading shrubs. Leaves ovate, acute, mucronate. Stipules long-tailed, reflexed. Flowers yellow, in long, stout racemes ; standard purple-veined. Pods strigose-hairy.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Ayyappankoil area-Nelliyampathy R.F.

9. **Crotalaria mysorensis** Roth, Nov. Pl. Sp. 338. 1821 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 70. 1876, Gamble, Fl. Pres. Madr. 295. 1918, Repr. ed. 1 : 208. 1957 ; de Munk in Reinwardtia 6 : 210. 1962. *C. stipulacea* Roxb. Fl. Ind. 3 : 264. 1832.

Erect, densely silky herbs. Leaves linear oblong, rounded at both ends, apiculate, silky hairy beneath. Stipules linear-lanceolate. Flowers yellow, in lax, erect racemes. Calyx hairy. Pods glabrous, oblong ; seeds 20-30.

Fl. & Fr. : December.

Not common ; in lower Ghats ; Panthanthode, Walayar dam-area.

10. **Crotalaria nana** Burm. f. Fl. Ind. 156. t. 48. f. 2. 1768 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 71. 1876 *p.p.* ; Gamble, Fl. Pres. Madr. 294. 1918, Repr. ed. 1 : 208. 1957 ; de Munk in Reinwardtia 6 : 210. 1962. *C. biflora* Willd. Sp. Pl. 3 : 978. 1802 non L. 1753.

Prostrate herbs with erect branches. Leaves oblong, obtuse. Flowers small, yellow, in umbels. Upper calyx lobes connate. Corolla shorter than calyx. Pods oblong. Seeds 10-12.

Fl. & Fr. : October.

Common ; on grassy slopes ; Anamadai area, Panthanthode, Silent Valley dam-site, Walayar forest.

11. **Crotalaria pallida** Dryand. in Aiton, Hort. Kew. 3 : 20. 1789 ; Polhill in Kew Bull. 22 : 262. 1969. *C. mucronata* Desv. in J. Bot. 3 : 76. 1814 ; de Munk in Reinwardtia 6 : 200. 1962 *C. striata* DC. Prodr. 2 : 131. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 84. 1876 ; Gamble, Fl. Pres. Madr. 301. 1918, Repr. ed. 1: 212. 1957.

Glabrous undershrubs. Leaflets elliptic, acute, mucronate, membranous. Flowers many, yellow, glabrous. Sepals lanceolate. Petals striped with red. Pods cylindric, glabrous.

Fl. & Fr. : November-May.

Very common ; in lower Ghats ; Ayalur slopes-Nemmara, Panthanthode forest, Mukkali forest.

12. **Crotalaria pusilla** Heyne ex Roth, Nov. Pl. Sp. 335. 1821 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 70. 1876 ; Gamble, Fl. Pres. Madr. 296. 1918, Repr. ed. 1 : 209. 1957.

Diffuse pubescent herbs. Leaves linear-lanceolate, membranous. Flowers in terminal racemes. Corolla glabrous, exserted. Pods oblong, silky villous, 4-6-seeded.

Fl. & Fr. : July.

Common ; in lower Ghats ; Walayar forest.

13. **Crotalaria retusa** L. Sp. Pl. 715. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 75. 1876 ; Gamble, Fl. Pres. Madr. 293. 1918, Repr. ed. 1 : 207. 1957 ; de Munk in Reinwardtia 6 : 212. 1962.

Erect, pubescent undershrubs. Leaves oblanceolate, glabrous. Flowers yellow, in elongate racemes. Pods narrow at base, many-seeded.

Fl. & Fr. : October-February.

Common ; in lower Ghats, Kaikatty-Pothundy, Karasuryamalai area.

14. **Crotalaria salicifolia** Heyne ex Wight & Arn. Prodr. 182. 1834; Baker in Hook. f. Fl. Brit. Ind. 2 : 77. 1876 ; Gamble, Fl. Pres. Madr. 294. 1918, Repr. ed. 1 : 208. 1957.

Erect undershrubs. Leaves oblong-lanceolate, obtuse or acute, golden-brownhairy. Flowers yellow, in racemes. Pods oblong, many-seeded.

Fl. & Fr. : October-February.

Common ; on grassy slopes ; Mukkali forest, Pothundy slopes.

15. **Crotalaria scabrella** Wight & Arn. Prodr. 181. 1834 ; Gamble, Fl. Pres. Madr. 291. 1918, Repr. ed. 1 : 205. 1957. *C. rubiginosa* Willd. var. *scabrella* (Wight & Arn.) Baker in Hook. f. Fl. Brit. Ind. 2 : 70. 1876.

Bushy shrubs. Leaves densely rusty-velvety-pubescent, ovate acute, mucronate. Stipular wings widened upwards into broad recurved points. Flowers yellow. Pods glabrous.

Fl. & Fr. : February.

Rare ; in lower Ghats ; Minnampara-Anamadai area.

16. **Crotalaria sericea** Retz. Obs. Bot. 5 : 26. 1789 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 75. 1876 ; Gamble, Fl. Pres. Madr. 293. 1918, Repr. ed. 1 : 207. 1957 ; de Munk in Reinwardtia 6 : 214. 1962. *C. juncea* Willd. Sp. Pl. 3 : 974. 1802 non L. 1753. *C. leschenaultii* DC. Prodr. 2 : 125. 1825 ; Hook. f. *l.c.* 76 ; Gamble *l.c.*

Erect undershrubs. Leaves oblanceolate, acute at apex, softly grey-pubescent beneath. Flowers yellow, in elongate racemes. Pods longer than calyx, glabrous.

Fl. : December.

Not common ; in upper Ghats ; Silent Valley R.F.

17. **Crotalaria verrucosa** L. Sp. Pl. 715. 1753 ; Wight, Ic. t. 200. 1839 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 77. 1876; Gamble, Fl. Pres. Madr. 297. 1918, Repr. ed. 1 : 210. 1957.

Much branched, herbaceous plants. Leaves ovate rhomboid or deltoid, glabrous. Flowers white or bluish-purple, in long racemes. Pods oblong-cylindric, pubescent. Seeds 10-15.

Fl. & Fr. : October.

Common ; in lower Ghats ; Dhoni R.F.

10. DALBERGIA L.f. *nom. cons.*

1a. Standard petal reflexed :

2a. Stamens 9, monadelphous :

3a. Leaves (juvenile green) orbicular, obtuse ... *D. latifolia* 2

3b. Leaves (juvenile yellow) obovate, acute ... *D. sissoides* 3

2b. Stamens 5+5, isodiadelphous :

4a. Trees ; flowers in loose panicles ... *D. lanceolaria* 1

4b. Climbing shrubs ; flowers in dense panicles ... *D. volubilis* 5

1b. Standard petal erect ... *D. sympethetica* 4

1. **Dalbergia lanceolaria** L.f. Suppl. 316. 1781 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 235. 1876 ; Gamble, Fl. Pres. Madr. 383. 1918, Repr. ed. 1 : 270. 1957. *D. frondosa* Roxb. Fl. Ind. 3 : 226. 1832 ; Wight, Ic. t. 266 1840. '*Ertgei*' (Tam.)

Deciduous trees, 20-30 m. Leaflets ovate-oblong, emarginate. Flowers white, in loose panicles. Petals clawed at base. Pods tapering at ends, 1-3-seeded.

Fl. & Fr. : March-October.

Common ; in lower Ghats ; Ayyappankoil forest-Pothundy, Chindaki forest, Walayar forest.

2. **Dalbergia latifolia** Roxb. Pl. Cor. t. 113. 1799 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 231. 1876 ; Gamble, Fl. Pres. Madr. 383. 1918, Repr. ed. 1 : 270. 1957. '*Etti*', '*Eravadi*' (Tam.).

Deciduous trees, 10-15 m. Leaflets orbicular, obtuse or emarginate, cuneate at base. Flowers dull yellow, in corymbose panicles. Pods obtuse at apex, glabrous.

Fl. & Fr. : April October.

Common ; in lower Ghats ; Agali forest, Mangalam dam area, Mukkali forest.

Wood is used for building purposes. The 'Rose wood' of commerce.

3. **Dalbergia sissoides** Grah. ex Wight & Arn. Prodr. 265. 1834; Gamble, Fl. Pres. Madr. 383. 1918, Repr. ed. 1 : 270. 1957. *D. latifolia* auct. non Roxb. 1799 ; Wight, Ic. t. 1156. 1846 ; Bedd. Fl. Sylv. t. 24. 1869. '*Etti*' ; (Mal.) & (Tam.).

Deciduous trees, 15-20 m. Leaflets 7-9, elliptic-ovate to obovate, acute, chartaceous, shining above, cuneate at base. Flowers white, in loose panicles. Wing and keel petals clawed at base. Pods acute at apex, glabrous.

Fl. & Fr. : February - August.

Common ; in lower Ghats ; Attappadi forest-Mukkali, Chindaki forest, Walayar forest.

Wood is used for building and implements.

4. **Dalbergia sympathetica** Nimmo in Grah. Cat. Pl. Bombay 55. 1839 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 234. 1876. *D. multiflora* Heyne

ex Prain in Ann. Roy. Bot. Gard. Calc. 10(1) : 43. t. 18. 1905 ; Gamble, Fl. Pres. Madr. 381. 1918, Repr. ed. 1 : 269. 1957.

Large, climbing shrubs with curiously twisted branches bearing spines. Leaflets oblong or obovate, 11-15, emerginate, pubescent. Flowers white, in axillary, cymose panicles. Wing and keel petals clawed. Pods pubescent, 1-2-seeded.

Fl. January.

Not common, in lower Ghats ; Mukkali forest.

5. **Dalbergia volubilis** Roxb. Pl. Cor. t. 191. 1805 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 235. 1876 ; Gamble, Fl. Pres. Madr. 384. 1918, Repr. ed. 1 : 270. 1957.

Large, woody climbers. Leaflets 7-13, oblong-obovate. Flowers pale pink. Standard broad, obovate. Pods oblong, obtuse, glabrous, 1 or 2-seeded.

Fl. & Fr. : February - June.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Olipara area.

11. DERRIS Lour. *nom. cons.*

1a. Pods winged along upper (dorsal) sutures ;			
2a. Leaflets 7 ; pods pubescent	...	*D. brevipes* var. *coriacea*	1
2b. Leaflets 9-15 ; pods glabrous	...	*D. scandens*	2
1b. Pods winged on both the sutures	...	*D. thothathrii*	3

1. **Derris brevipes** (Benth.) Baker var. **coriacea** Baker in Hook. f. Fl. Brit. Ind. 2 : 244. 1878 ; Thothathri in Fasc. Fl. India 8 : 12. 1982.

Large, climbing shrubs. Leaflets coriaceous, elliptic-oblong. Flowers red, rusty-tomentose. Calyx campanulate. standard ovate to orbicular, densely silky on back. Pods turgid.

Fl. : October.

Rare ; in upper Ghats ; forest near Ayyappankoil-Padagiri, Muthikulam-Siruvani forest.

2. **Derris scandens** (Roxb.) Benth. in J. Linn. Soc. Bot. 4 (Suppl.) : 103. 1860 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 240. 1876 ; Gamble, Fl. Pres. Madr. 387. 1918, Repr. ed. 1 : 291. 1957. *Dalbergia scandens* Roxb. Pl. Corom. 2 : 49. t. 192. 1805. '*Anaikattu*', '*Kodipongu*', '*Tekil*', '*Thirudankodi*' (Tam.), '*Ponnamvalli*' (Mal.).

Woody climbers ; stem 30-40 cm in diam. Leaflets oblong to obovate-oblong, glabrous above, puberulous below. Flowers white or pink, in axillary and terminal racemes. Pods narrowly oblong, adpressed with minute silky hairs. Seeds 1-5, reddish - brown.

Fr. : October.

Common ; in lower Ghats ; Walayar forest.

3. **Derris thothathrii** Bennet in Indian J. Forestry 1 : 23. 1978. *D. heyneana* sensu Baker in Hook. f. Fl. Brit. Ind. 2 : 244. 1878 non (Wight & Arn.) Benth. 1852 ; Gamble, Fl. Pres. Madr. 388. 1918, Repr. ed. 1 : 273. 1957 ; Thothathri in Bull. Bot. Surv. Ind. 3 : 186. 1961 & Fasc. Fl. India 8 : 19. 1982.

Large climbers. Leaflets 5 9, ovate, elliptic - oblong, glabrous, apex obtuse. Flowers dull pink, in much branched panicles. Calyx campanulate, puberulous outside. Standard ovate to oblong. Pods falcately oblong, flat, glabrous. Seed 1.

Fl. : March.

Endemic, rare ; in Ghats ; Mukkali forest.

The main differences between *D. heyneana* (Wight & Arn.) Benth. (Wight's plant) and *Pongamia heyneana* Grah. (Wallichian plant) are inflorescence lax, pedicels 5-7 mm long and all the petals glabrous in the former whereas in the latter inflorescence compact, pedicels 3 4 mm long and back of the keel petals slightly silky at the top. As no valid name was available for the Wallichian plant, it was given a new name and described by Bennet *l.c.* which is followed here.

12. DESMODIUM Desv.

1a. Leaves 3-foliolate :

2a. Flowers hidden in persistent, orbicular bracts ... *D. pulchellum* 6

2b. Flowers not hidden in bracts :

3a. Flowers in racemes or in fascicles ; stamens diadelphous :

4a. Trailing herbs ; flowers 1-3 :

5a. Stems sparcely hairy ; pedicels less than 1 cm long ... *D. triflorum* 8

5b. Stems densely hairy ; pedicels over 1 cm long ... *D. heterophyllum* 3

4b. Erect herbs or shrubs ; flowers many :

6a. Lateral leaflets smaller than terminal ones ... *D. motorium* 5

6b. Lateral leaflets subequal :

7a. Leaves ovate-lanceolate ; joints of pods indehiscent ... *D. laxiflorum* 4

7b. Leaves elliptic-ovate ; joints of pods dehiscent ... *D. heterocarpon* 2

3b. Flowers in dense umbels ; stamens monadelphous ... *D. triangulare* 6

1b. Leaves 1-foliolate :

8a. Petioles winged ; stamens monadelphous ... *D. triquetrum* 9

8b. Petioles not winged ; stamens diadelphous :

9a. Stems angular ; leaflets glabrous on upper surface ... *D. gangeticum* 1

9b. Stems terete ; leaflets densely pubescent ... *D. velutinum* 10

1. **Desmodium gangeticum** (L.) DC. Prodr. 2 : 327. 1825; Wight Ic t. 271. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 168. 1876 ; Gamble, Fl. Pres. Madr. 345. 1918, Repr. ed. 1 : 244. 1957 ; Meeuwen in Reinwardtia 6 : 249. 1962 ; Schubert in J. Arnold Arbor. 44 : 294. 1963. *Hedysarum gangeticum* L. Sp. Pl. 746. 1753. *H. collinum* Roxb. Fl. Ind. 3 : 439. 1832.

Erect undershrubs ; stems angular. Leaflet 1, ovate lanceolate, acute, glabrous on upper surface, membranous. Flowers pale pinkish, in racemes. Calyx lobes short, triangular. Pods with hooked hairs.

Fr. : November.

Common ; in lower Ghats ; Mukkali forests.

2. **Desmodium heterocarpon** (L.) DC. Prodr. 2 : 337. 1825 ; Meeuwen in Reinwardtia 6 : 251. 1962. *Hedysarum heterocarpon* L. Sp. Pl. 747. 1753. *Desmodium polycarpum* (Poir.) DC. *l.c.* 334 ; Wight, Ic. t. 406. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 171. 1876 ; Gamble, Fl. Pres. Madr. 346. 1918, Repr. ed. 1 : 244. 1957.

Erect undershrubs. Leaflets elliptic - obovate, obtuse, pubescent beneath. Flowers purple blue, in racemes. Pods linear, ciliate on sutures.

Fl. : December.

Rare ; in upper Ghats ; Silent Valley R.F.

3. **Desmodium heterophyllum** (Willd.) DC. Prodr. 2 : 334. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 173. 1876 ; Gamble, Fl. Pres. Madr. 347. 1918, Repr. ed. 1 : 245. 1957. *Hedysarum heterophyllum* Willd. Sp. Pl. 3 : 1201. 1802.

Procumbent herbs. Leaflets subsimilar, elliptic - obovate truncate with appressed hairs beneath, rounded at apex. Flowers pink, in lax racemes. Pods 4 5 jointed, oblong, indented on the ventral suture, sparsely pubescent.

Fl. & Fr. : October.

Common ; in lower Ghats ; Olavakkot area.

4. **Desmodium laxiflorum** DC. in Ann. Sci. Nat. (Paris) ser. 1. 4 : 100. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 164. 1876 ; Gamble, Fl. Pres. Madr. 344. 1918, Repr. ed 1 : 243. 1957; Meeuwen in Reinwardtia 6 : 252. 1962. *D. recurvatum* (Roxb.) Grah. ex Wight & Arn. Prodr. 226. 1834 ; Wight, Ic. t. 374. 1840. *D. diffusum* DC. l.c. non (Willd.) DC. Nov. 1825.

Erect, pubescent undershrubs ; branches angular. Leaves 3-foliolate ; leaflets ovate - lanceolate, silky hairy beneath. Flowers pale pink. Calyx viscid-glandular. Pods linear, joints with sticky, hooked hairs.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Panthanthode forest, Pothundi - Kaikatty forest.

5. **Desmodium motorium** (Houtt.) Merr. in J. Arnold Arbor. 19 : 345. 1938 ; Meeuwen in Reinwardtia 6 : 254. 1962. *Hedysarum motorium* Houtt. in Nat. Hist. 10 : 246. 1779. *H. gyrans* L.f. Suppl. 332. 1781. *Desmodium gyrans* (L.f.) DC. Prodr. 2 : 326. 1825 ; Wight, Ic. t. 294. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 174. 1876 ; Gamble, Fl. Pres. Madr. 345 1918, Repr. ed. 1 : 245. 1957.

Erect undershrubs. Leaflets 3 ; end one larger, oblong lanceolate ; side ones very small, moving in jerks, hairy beneath. Flowers pink, large. Stamens diadelphous. Pods oblong, pubescent.

Fl. & Fr. : December.

Rare ; in lower Ghats ; Panthanthode forest.

6. **Desmodium pulchellum** (L.) Benth. Fl. Hongk. 83. 1861 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 162. 1876 ; Gamble, Fl. Pres. Madr. 344. 1918, Repr. ed. 1 : 243. 1957; Meeuwen in Reinwardtia 6 : 256. 1962. *Hedysarum pulchellum* L. Sp. Pl. 747. 1753. *Dicerma pulchellum* (L.) DC. Prodr. 2 : 339. 1825 ; Wight, Ic. t. 418. 1841.

Large shrubs, 2 - 3 m. Leaflets elliptic - ovate, membranous, repand. Flowers pale yellow, in fascicles, hidden in the axils of conspicuous, bifarious, round leafy bracts. Pods glabrous.

Fl. & Fr. : November - February.

Not common ; in lower Ghats ; Agali - chittoor area, Mathur - Kollenkode area.

7. **Desmodium triangulare** (Retz.) Merr. var. **congestum** (Wall. ex Wight & Arn.) Sant. in Kew Bull. 2 : 276. 1948. *D. congestum* Wall. ex Wight & Arn. Prodr. 224. 1834 ; Wight, Ic. t. 209. 1839. *D. cephalotes* var. *congestum* (Wight & Arn.) Prain in J. Asiat. Soc. Bengal 66 : 389. 1898 ; Gamble, Fl. Pres. Madr. 344. 1918, Repr. ed. 1 : 242. 1957.

Shrubs with white silky triquetrous branches. Leaves 3 foliolate ; leaflets ovate oblong, acuminate, cuneate at base, shining above, silky beneath. Flowers white, in short, dense umbels. Pods oblong, pubescent.

Fl. & Fr. : September - October.

Common; in Ghats ; Panthanthode, Pothundy Kaikatty forest, Sappal hill Dhoni R.F., Silent Valley R.F.

8. **Desmodium trifforum** (L.) DC. Prodr. 2 ; 334. 1825 ; Baker in Hook. f Fl. Brit. Ind 2 : 173. 1876 ; Gamble, Fl. Pres. Madr. 347. 1918, Repr. ed. 1 : 245. 1957. *Hedysarum triflorum* L. Sp. Pl. 749. 1753 ; Meeuwen in Reinwardtia 6 : 261. 1962 ; Schubert in J. Arnold Arbor. 44 : 193. 1963.

Much-branched, wiry, trailing herbs. Leaflets 3, small, obovate, cuneate, truncate or emerginate at apex, white-hairy beneath. Flowers blue ; standard pinkish. Pods linear.

Fl. : October.

Rare ; in lower Ghats ; Attappadi R.F., Mukkali, Olavakkot area.

9. **Desmodium triquetrum** (L.) DC. Prodr. 2 : 326. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 163. 1876 ; Gamble, Fl. Pres. Madr. 345. 1918, Repr. ed. 1 : 244. 1957 ; Meeuwen in Reinwardtia 6 : 262. 1962. *Hedysarum triquetrum* L. Sp. Pl. 746. 1753.

Erect shrubs with angular stems. Leaflet 1, lanceolate, cordate ; petioles broadly winged. Flowers purple, 1 5, in racemes. Pods oblong, appressed - pubescent.

Fl. & Fr. : September October.

Common ; in Ghats ; Muthikulam forest, Panthanthode forest, Sappal hill Dhoni.

10. **Desmodium velutinum** (Willd.) DC. Prodr. 2 : 228. 1825 ; Meeuwen in Reinwardtia 6 : 264. 1962 ; Schubert in J. Arnold Arbor. 44 : 292. 1963. *Hedysarum velutinum* Willd. Sp. Pl. 3(2) : 117. 1802. *Desmodium latifolium* DC. *l.c.* 328 ; Wight, Ic. t. 270. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 168. 1876 ; Gamble, Fl. Pres. Madr. 346. 1918, Repr. ed. 1 : 244. 1957. *D. lasiocarpum* (Beauv.) DC. *l.c.* 328.

Slender, erect undershrubs. Leaflet 1, broadly ovate or deltoid, coriaceous, obtuse or subacute, densely pubescent. Flowers pinkish. Joints of pod densely pubescent with hooked hairs.

Fl. & Fr. : October - November.

Common ; in lower Ghats ; Mukkali forest, Pothundy dam area.

13. DOLICHOS L.

Dolichos trilobus L. Sp. Pl. 726. 1753 ; Verdc. in Kew Bull. 24 : 422. 1970. *D. falcatus* Klein ex Willd. Sp. Pl. 3 : 1047. 1802 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 211. 1876; Gamble, Fl. Pres. Madr. 366. 1918, Repr. ed. 1 : 259. 1957.

Slender, glabrous twiners. Leaflets triangular ovate ; end ones often 3 - lobed. Flowers blue, in racemes. Calyx teeth short. Pods linear, glabrous, 6 8 seeded.

Fl. & Fr. : January.

Not common ; in Ghats ; Olavakkot area, Valiyaparathode forest.

14. DUMASIA DC.

Dumasia villosa DC. in Ann. Sci. Nat. (Paris) ser. 1. 4 : 96. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 183. 1876 ; Gamble, Fl. Pres. Madr. 351. 1918, Repr. ed. 1 : 247. 1957. *D. congesta* Grah. ex Wight & Arn. Prodr. 206. 1834 ; Wight, Ic. t. 445. 1841.

Slender climbers with short spreading hairs. Leaflets ovate obtuse, apiculate, velvety. Flowers yellow, in racemes. Calyx glabrous. Corolla exserted. Pods linear, compressed.

Fl. & Fr. : December.

Not common ; in upper Ghats ; Silent Valley R.F.

15. DUNBARIA Wight & Arn.

Dunbaria ferruginea Wight & Arn. Prodr. 258. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 217. 1876 ; Gamble, Fl. Pres. Madr. 370. 1918, Repr. ed. 1 : 261. 1957.

Stout twiners with slender, tawny pubescent branches. Leaflets thick, broadly ovate, acuminate. Flowers yellow. Calyx lobes lanceolate. Standard emarginate. Pods softly tawny pubescent.

Fl. : January.

Not common ; in lower Ghats ; Bhavani river bank Mukkali.

16. ERYTHRINA L.

Erythrina variegata L. Herb. Amboin. 10. 1754 ; Krukoff in J. Arnold Arbor. 52 : 132. 1972. *E. indica* Lam. Encycl. 2 : 391. 1786 ; Wight, Ic. t. 58. 1838 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 188. 1876 ; Gamble, Fl. Pres. Madr. 353. 1918, Repr. ed. 1 : 249. 1957. '*Kalyana Murungai*' (Tam.).

Soft-wooded, quick growing, deciduous trees ; stems prickly. Leaflets broadly deltoid, membranous, acute. Flowers large, crimson. Calyx split to the base, recurved. Keels and wings subequal. Pods thick, torulose.

Fl. : February.

Not common ; in lower Ghats, Kaikatty Pothundy forest.

17. FLEMINGIA Roxb. ex Ait. *nom. cons.*

1a. Leaves unifoliolate ; branches angular	...	*F. bracteata*	1
1b. Leaves 3 foliolate ; branches terete	...	*F. semialata*	2

1. **Flemingia bracteata** (Roxb.) Wight, Ic. t. 268. 1840 ; Gamble, Fl. Pres. Madr. 378. 1918, Repr. ed. 266. 1957. *Hedysarum bracteatum* Roxb Fl. Ind. 3 : 340. 1832. *Moghania bracteata* (Roxb.) Li in Amer. J. Bot. 31 : 224. 1944.

Erect branching shrubs. Leaves lanceolate. Flowers purple, in racemes. Bracts softly hirsute, cordate at base. Calyx hirsute. Pods oblong, turgid, 2 seeded.

Fl. : January.

Not common ; in upper Ghats ; forest on the way to Valiyaparathode.

2. **Flemingia semialata** Roxb. Fl. Ind. 3 : 340. 1832 ; Wight, Ic. t. 326. 1840 ; Gamble, Fl. Pres. Madr. 378. 1918, Repr. ed. 1 : 267. 1957.

Erect shrubs. Leaves villous on nerves beneath. Petioles winged. Flowers pinkish, in long racemes. Calyx lobes tawny silky.

Fl. & Fr. : October December.

Common ; in upper Ghats ; Panthanthode forest, Silent Valley R.F.

18. GALACTIA R. Br.

Galactia tenuiflora (Klein ex Willd.) Wight & Arn. Prodr. 206. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 192. 1876 ; Gamble, Fl. Pres. Madr. 356. 1918, Repr. ed. 1 : 251. 1957. *Glycine tenuiflora* Klein ex Willd. Sp. Pl. 3 : 1059. 1802.

Slender, wiry climbers. Leaflets elliptic - lanceolate, mucronate, grey - silky beneath. Flowers pink. Calyx lobes lanceolate, glabrous. Pods thinly grey - silky.

Fl. & Fr. : October.

Rare ; in lower Ghats ; Agali forest.

19. GEISSASPIS Wight & Arn.

Geissaspis cristata Wight & Arn. Prodr. 218. 1834 ; Bedd. Ic. t. 293. 1868 74 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 141. 1876 ; Gamble, Fl. Pres. Madr 324. 1918, Repr. ed. 1 : 229. 1957.

Procumbent, trailing annuals. Leaves pinnate ; leaflets 4, obovate, obtuse, glabrous. Stipules long spurred. Flowers purple, in dense heads, Bracts orbicular, stiff - hairy. Pods 1 2 - jointed, shorter than bracts.

Fl. & Fr. ; December.

Rare ; in plains ; Olavakkot area, Thiruvizhankunnu forest.

The beautiful long - ciliate imbricate bracts make it conspicuous.

20. GLYCINE Willd. *nom. cons.*

Glycine wightii (Wall. ex Wight & Arn.) Verdc. in Taxon 15 : 35. 1966. *Notonia wightii* Wall. ex Wight & Arn. Prodr. 208 1834. *Johnia wightii* Wight & Arn. *l.c.* 449. *Glycine javanica* auct. non L. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 183. 1876 ; Gamble, Fl. Pres. Madr. 351. 1918, Repr. ed. 1 : 248. 1957.

Extensive, pubescent herbs. Leaves 3 foliolate ; terminals rhomboid ; laterals ovate, oblique. Flowers white. Calyx teeth very villous. Pods densely villous, deflexed.

Fl. & Fr. : November - December.

Common ; in lower Ghats ; Pothundy Kaikatty forest.

21. GONIOGYNA DC.

Goniogyna hirta (Willd.) Ali in Taxon 16 : 463. 1967. *Hallia hirta* Willd. Sp. Pl. 3 : 1169. 1802. *Heylandia latebrosa* DC. Mem. Leg. 4 : 201. 1826 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 65. 1876 ; Gamble, Fl. Pres. Madr. 280. 1918, Repr. ed. 1 : 199. 1957.

Prostrate, silky hairy branched herbs. Leaves simple, entire, cordate - ovate. Flowers yellow ; standard orbicular, wings obovate - oblong. Pods flat, oblong, 1 2 seeded.

Fl. : February.

Rare ; in lower Ghats ; Agali - Chittoor forest.

22. INDIGOFERA L.

1a. Flowers in racemes :			
2a. Leaves trifoliolate	...	*I. prostrata*	4
2b. Leaves (7 - 13) pinnate :			
3a. Side leaflets alternate	...	*I. spicata*	5
3b. Side leaflets opposite :			
4a. Racemes 6 - 12 - flowered	...	*I. colutea*	2
4b. Racemes more than 12 - flowered :			
5a. Pods cylindric	...	*I. tinctoria*	6
5b. Pods tetragonous	...	*I. hirsuta*	3
1b. Flowers solitary :			
6a. Prostrate herbs	...	*I. uniflora*	7
6b. Erect undershrubs	...	*aspalathoides*	1

1. **Indigofera aspalathoides** Vahl ex DC. Prodr. 2 : 231. 1825 ; Wight, Ic. t. 332. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 94. 1876 ; Gamble, Fl. Pres. Madr. 309. 1918, Repr. ed. 1 : 218. 1957.

Stiff, silver hoary undershrubs. Leaves imparipinnate ; leaflets oblanceolate, folded. Flowers red, solitary. Calyx teeth linear. Pods glabrous, 6 8 seeded.

Fl. & Fr. : November.

Not common ; in plains ; Panangoteri - Kollenkode.

2. **Indigofera colutea** (Burm. f.) Merr. in Philipp. J. Sci. 19 : 355. 1921 ; Gillett in Kew Bull. 24 : 484. 1970. *Galea colutea* Burm. f. Fl. Ind.

172. 1768. *Indigofera viscosa* Lam. Encycl. 3 : 247. 1789 ; Wight, Ic. t. 404. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 95. 1876 ; Gamble, Fl. Pres. Madr. 311. 1918, Repr. ed. 1 ; 220. 1957.

Annual, small, erect, viscous pubescent subshrubs, 60 80 cm. Leaflets 7 11, opposite, elliptic - oblong, obtuse or cuneate at base, obtuse and mucronate at apex, adpressed pubescent with gland tipped hairs on midrib and margins. Flowers red, in glandular hairy racemes. Calyx adpressed hairy, lobes linear, acuminate. Standard obovate. Pods subcylindric, hirsute, 8 12 seeded.

Fl. : February.

Not common ; in lower Ghats ; Agali Chittoor forest, Walayar dam area.

3. **Indigofera hirsuta** L. Sp. Pl. 751. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 98. 1876 ; Gamble, Fl. Pres. Madr. 312. 1918, Repr. ed. 1 : 221. 1957.

Erect, densely pubescent annuals. Leaflets elliptic oblong. Stipules filiform, conspicuous. Flowers brick red, in dense racemes. Calyx densely hairy. Corolla included. Pods densely hairy, deflexed.

Fl. & Fr. : October February.

Common ; in lower Ghats, Mukkali forest, Neelipara Vaniyam para, Olavakkot, Olipara area.

4. **Indigofera prostrata** Willd. Sp. Pl. 3 : 1226. 1802 ; Gamble, Fl. Pres. Madr. 310. 1918, Repr. ed. 1 : 219. 1957. *I. trifoliata* auct. non L. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 96. 1876 *p.p.*

Prostrate, long - branched herbs. Leaflets ovate - acute, apiculate. Flowers red, in short racemes. Pods sparsely hairy. Seeds 6 8.

Fl. : October.

Rare ; in lower Ghats ; Mukkali forest.

5. **Indigofera spicata** Forsk. Fl. Aegyp. Arab. 138. 1775. *I. endecaphylla* Jacq. Ic. Pl. Rar. 3(3) : t. 570. 1789 ('*hendecaphylla*') & 3(16) : 14. 1795 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 98. 1876 ; Gamble, Fl. Pres. Madr. 311. 1918, Repr. ed. 1 ; 220. 1957.

Prostrate or procumbent, branched herbs ; branches reddish. Leaflets 5 - 7, alternate, obovate - oblanceolate, cuneate at base, obtuse and mucronate at apex, adpressed pubescent beneath. Stipules lanceolate, deflexed. Flowers red in long racemes. Calyx lobes linear. Standard broadly ovate, puberulous. Wings glabrous. Pods subangular, strigose, deflexed, 6 - 19 seeded.

Fl. : September.

Not common ; lower Ghats ; Kudam Siruvani forest, Panthanthode forest.

6. **Indigofera tinctoria** L. Sp. Pl. 751. 1753 ; Wight, Ic. t. 365. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 79. 1876 ; Gamble, Fl. Pres. Madr. 312. 1918, Repr. ed. I : 220. 1957. *I. sumatrana* Gaertn. Fruct. 2 : 317. t. 148. f. 4. 1791 ; Gamble *l.c.* '*Avuri*' (Tam.), '*Amari*' (Mal.).

Erect, branching shrubs, *c.* 120 cm. Leaflets 7 13, opposite, ovate or ovate oblong, obtuse at base, adpressed pubescent beneath. Flowers brick red, in short racemes. Calyx adpressed puberulous ; lobes triangular. Standard petal ovate, rounded at apex. Pods, linear, cylindrical, slightly curved, glabrous, 6 9 seeded.

Fl & Fr. : October.

Common ; on roadside and in waste places : Mukkali forest.

7. **Indigofera uniflora** Buch. Ham. ex Roxb. Fl. Ind. 3 : 374. 1832 ; Wight, Ic. t. 333. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 94. 1876 ; Gamble, Fl. Pres. Madr. 309. 1918. Repr. ed. I : 218. 1957.

Slenderly branched prostrate perennials ; branches reddish. Leaflets usually 5, oblanceolate. Flowers minute, red with filiform pedicels. Pods slender, cylindric.

Fl. & Fr. : October.

Common ; in plains and lower Ghats ; Malampuzha area.

23. Lablab Adanson

Lablab purpureus (L.) Sweet, Hort. Brit. ed. 1. 481. 1827. *Dolichos lablab* L. Sp. Pl. 725. 1753 ; Gamble, Fl. Pres. Madr. 367. 1918, Repr. ed. 1 : 259. 1957. *Dolichos purpureus* L. Sp. Pl. ed. 2. 1021. 1763 ; '*Avarai*' (Tam.).

Large twiners. Leaves trifoliolate, ovate oblong. Flowers white, in axillary racemes. Pods 2 4 - seeded.

Fl. & Fr. : February.

Escape from cultivation. Not common ; Pothundy Kaikatty.

24. Milletia Wight & Arn.

1a.	Leaflets 7 - 9, oblanceolate ; pods flat	...	*M. splendens* 2
1b.	Leaflets 5 - 7, obovate ; pods oblong, turgid	...	*M. rubiginosa* 1

1. **Millettia rubiginosa** Wight & Arn. Prodr. 263. 1834 ; Wight, Ic. t. 207. 1839 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 104. 1876 ; Gamble, Fl. Pres. Madr. 322. 1918, Repr. ed. 1 : 227. 1957.

Large, climbing shrubs. Leaflets obovate, acute, ferruginous - pubescent beneath. Flowers red, in racemes. Pods thick, oblong or trapezoid.

Fl. & Fr. : October - November

Not common ; in upper Ghats : Ayyappankoil area Kaikatty forest.

2. **Millettia splendens** Wight & Arn. Prodr. 263 1834 ; Bedd. Ic. t 295. 1868 - 74 ; Baker in Hook. f. Fl. Brit Ind. 2 : 104 1876 ; Gamble, Fl. Pres. Madr. 321. 1918, Repr. ed. 1 : 227. 1957.

Very large, climbing shrubs. Leaflets oblanceolate, obtuse, silky pubescent beneath. Flowers red. Calyx toothed. Pods flat, velvety.

Fl. & Fr. : April.

Not common ; in lower Ghats ; Karivara forest - Mukkali.

25. MUCUNA Adanson *nom. cons.*

1a. Perennial woody climbers ; pods ribbed ... *M. monosperma* 2

1b. Annual herbaceous climbers ; pods not ribbed :

2a. Leaflets densely golden silky tomentose beneath ... *M. hirsuta* 1

2b. Leaflets short appressed white hairy beneath ... *M. pruriens* 3

1. **Mucuna hirsuta** Wight & Arn. Prodr. 254. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 187. 1876 ; Gamble, Fl. Pres. Madr. 355. 1918, Repr. ed. 1 : 251. 1957.

Gregarious climbers. Leaflts 3. Flowers black-purplish. Corolla exserted. Pods curved, dark silvery brown hairy.

Fl. & Fr. : November December.

Common ; in lower Ghats ; Mathur, Panthonthode forest.

2. **Mucuna monosperma** DC. ex Wight, in Hook. Bot. Misc. 2 : 346. Suppl. t. 12. 1831 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 185. 1876 ; Gamble, Fl. Pres. Madr. 355. 1918, Repr. ed. 1 : 251. 1957. *Carpopogon monosperma* (DC. ex Wight) Roxb. Fl. Ind. 3 : 283. 1832.

Woody, pubescent, large climbing shrubs. Leaflets 3, pubescent beneath. Flowers purplish, bristly. Pods winged with brown stinging hairs, 1 - seeded.

Fr. : January.

Not common ; in lower Ghats ; Mukkali forest.

3. **Mucuna pruriens** (L.) DC. Prodr. 2 : 405. 1825. *Dolichos pruriens* L. Herb. Amboin. 23 1754. *Mucuna prurita* Hook. Bot. Mis. 2 : 348. 1831 ; Gamble, Fl. Pres. Madr. 356 1918, Repr. ed. 1 : 251. 1957. '*Poonakali*' (Tam.).

Slender, pubescent climbers. Leaflets 3. Flowers deep purple, in pendulous racemes Pods curved, irritant hairy.

Fl : January.

Rare ; in lower Ghats ; Dhoni R.F., Panthanthode forest.

26. MUNDULEA Benth.

Mundulea sericea (Willd.) Cheval. in Compt. Rend. 180 : 1521. 1925. Gandhi in Sald. & Nicol. Fl. Hassan Dist. 260. 1976. *Cytisus sericeus* Willd Sp. Pl. 3 : 1121. 1802. *Mundulea suberosa* (DC.) Benth. in Miq. Pl. Jungh. 248. 1852 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 110. 1876 ; Gamble, Fl. Pres. Madr. 314. 1918, Repr. ed. 1 : 222. 1957. *Tephrosia suberosa* DC. Prodr. 2 : 249. 1825. '*Pil avaram*' (Tam.).

Small trees, with thick, corky bark, 3 5 m. Leaves imparipinnate ; leaflets ovate, glabrous above, silky beneath, shining Flowers violet. Standard large. Keels incurved. Pods large, velvety.

Fl & Fr. : October April.

Common ; in dry forests on rocky slopes ; Agali forest.

27. PONGAMIA Vent. *nom. cons.*

Pongamia pinnata (L.) Pierre, Fl. For. Cochinch. Sub. t. 385. 1899 ; Thothathri in Bull. Bot. Surv. Ind. 3 : 418. 1962. *Cytisus pinnata* L. Sp. Pl. 741. 1753. *Pongamia glabra* Vent. Jard. Malm. t. 28. 1803 ; Wight, Ic. t. 59. 1838 ; Bedd. Fl. Sylv. t. 177. 1872 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 240. 1876 ; Gamble, Fl. Pres. Madr. 385. 1918, Repr. ed. 1 : 272. 1957. *Derris indica* (Lam.) Bennet in J. Bombay Nat. Hist. Soc. 68 : 303. 1971. *Galadupa indica* Lam. Encycl. 2 : 594. 1788. '*Pungan*' (Tam.).

Evergreen trees. Leaflets opposite, ovate, acuminate. Flowers white, with pinkish tinge. Calyx deep pinkish. Standard sub orbicular. Pods obliquely oblong, thick, woody.

Fl. & Fr. : February - April.

Common ; in plains along streams ; Mukkali, Walayar forest.

Cultivated as an avenue tree and for shade purposes. Fruits used in medicine.

Pongamia Vent. is usually treated as a distinct genus from *Derris* Lour. mainly based on its woody pods without wings. Bennet *l.c.* reduced *Pongamia* as a section under *Derris*—*Derris* sect. *Pongamia* (Adans.) Bennet as the differentiating characters are not distinct ; but it is being kept here as a distinct genus since the name *Pongamia* is conserved with *P. pinnata* as its type species.

28. PSEUDARTHRIA Wight & Arn.

Pseudarthria viscida (L.) Wight & Arn. Prodr. 209. 1834 ; Wight, Ic. t. 286. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 154. 1876 ; Gamble, Fl. Pres. Madr. 334. 1918. Repr. ed. 1 : 234. 1957. *Hedysarum viscidum* L. Sp. Pl. 747. 1753.

Viscid, pubescent, climbing undershrubs. Leaflets rhomboid, ovate, sinuate on margins. Flowers pinkish, in racemes. Corolla exserted. Pods linear, viscid, sticky and adherent.

Fl. & Fr. : October.

Common ; in lower Ghats ; Mukkali forest, Olavakkot area.

29. PTEROCARPUS Jacq. *nom. cons.*

Pterocarpus marsupium Roxb. Pl. Cor. t. 116. 1799 ; Bedd. Fl. Sylv. t. 21. 1869 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 239. 1876, Gamble, Fl. Pres. Madr. 385. 1918, Repr. ed. 1 : 271. 1957. '*Vengai*' (Tam.), '*Venga*' (Mal.).

Large, deciduous trees, 15 20 m. Leaflets 5 7, elliptic ovate, obtuse, emerginate, shining above. Flowers yellow, fragrant, in terminal panicles. Calyx dark brown. Pods orbicular, winged.

Fl. & Fr. : October April.

Common ; in lower Ghats and in deciduous forests ; Attappadi Chindaki forest, Mukkali forest.

Timber is used for building and for making agricultural implements.

30. PUERARIA DC.

Pueraria tuberosa (Roxb. ex Willd.) DC. Prodr. 2 : 240. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 197. 1876 ; Gamble, Fl. Pres. Madr. 360.

1918, Repr. ed. 1 : 254. 1957. *Hedysarum tuberosum* Roxb. ex Willd. Sp. Pl. 3 : 1197. 1803.

Large, climbing shrubs with huge tuberous roots. Leaflets 3, ovate rhomboid. Stipules cordate, peltate. Flowers blue in compound racemes when leafless. Standards orbicular with auricles above claw. Pods linear, reddish, bristly.

Fl. & Fr. : March April.

Common ; in lower Ghats ; Anamooly slopes and Ayyappankoil area.

31. PYCNOSPORA R. Br. ex Wight & Arn.

Pycnospora lutescens (Poir.) Schindl. in J. Bot. 64 : 145. 1926. *Hedysarum lutescens* Poir. in Lam. Encycl. 6 : 417. 1805. *Pycnospora hedysaroides* R. Br. ex Baker in Hook. f. Fl. Brit. Ind. 2 : 153. 1876 ; Gamble, Fl. Pres. Madr. 333. 1918. Repr. ed. 1 : 235. 1957.

Slender, trailing shrubs. Leaves trifoliolate ; leaflets obovate, truncate, cuneate. Flowers blue, in racemes. Pods oblong, inflated ; seeds 6 10.

Fl. & Fr. : September.

Not common ; in lower Ghats ; Panthanthode forest.

It resembles *Desmodium* in habit and *Crotalaria* in its pods.

32. RHYNCHOSIA Lour. *nom. cons.*

1a. Calyx accrescent ; pods 1 seeded	...	*R. rufescens*	3
1b. Calyx not accrescent ; pods 2 - seeded :			
2a. Calyx lobes foliaceous	...	*R. hirta*	2
2b. Calyx lobes not foliaceous :			
3a. Pods with transverse wrinkles	...	*R. aurea*	1
3b. Pods without wrinkles	...	*R. viscosa*	4

1. Rhynchosia aurea (Willd.) DC. Prodr. 2 : 386. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 221. 1876 *p.p.* ; Gamble, Fl. Pres. Madr. 374. 1918, Repr. ed. 1 : 264. 1957. *Glycine aurea* Willd. in Ges. Naturf. Freunde Berlin Neue Schriften 4 : 218. 1803.

Slender trailing herbs. Leaflets suborbicular, deltoid. Flowers yellow,

few, in racemes. Standards striped with purple Pods oblong, compressed.

Fr. & Fr. : October.

Common ; in lower Ghats ; Dhoni R.F.

2. **Rhynchosia hirta** (Andr.) Meikle & Verdc. in Taxon 16 : 462. 1967. *Dolichos hirtus* Andr. Bot. Repos. 7 : t. 446. 1807. *Cylista tomentosa* Roxb. Pl. Cor. t. 221. 1811. *Rhynchosia cyanosperma* Benth. ex Baker in Oliver, Fl. Trop. Africa 2 : 218 1871 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 222. 1876 ; Gamble, Fl. Pres. Madr. 375. 1918, Repr. ed. 1 : 264 1957.

Stout, brown hairy, woody climbers. Leaflets 3, ovate, cuspidate. Flowers large, in long racemes. Bracts ovate, cuspidate. Corolla pink marcescent. Pods enclosed in calyx.

Fl. & Fr. : December February.

Common ; in lower Ghats ; Mukkali forest.

3. **Rhynchosia rufescens** (Willd.) DC. Prodr. 2 : 387. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 220. 1876 ; Gamble, Fl Pres. Madr. 373. 1918, Repr. ed 1 : 263. 1957. *Glycine rufescens* Willd. in Ges. Naturf. Freunde Berlin Neue Schriften 4 : 222. 1803.

Erect shrubs with slender, trailing branches. Leaflets ovate, acute Flowers yellow, in lax racemes. Calyx conspicuous, hiding the flowers and fruits ; lobes oblong, obtuse. Bracts ovate. Pods pointed.

Fl. : December.

Not common ; in dry hilly regions ; Attappadi forest Mukkali.

4. **Rhynchosia viscosa** (Roth) DC. Prodr. 2 : 387. 1825 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 225. 1876 ; Gamble, Fl. Pres. Madr. 375. 1918, Repr. ed. 1 : 265. 1957. *Glycine viscosa* Roth, Nov. Pl. Sp. 349. 1821.

Slender climbers, branchlets glandular. Leaflets 3, broadly deltoid, shortly acuminate. Bracts minute, deciduous. Flowers yellowish - brown, in lax racemes, glandular - pubescent. Pods sparsely pubescent.

Fl. & Fr. : August October.

Common ; in lower Ghats ; Agali forest, Attappadi area - Mukkali, Walayar dam area.

33. ROTHIA Pers. *nom. cons.*

Rothia indica (L.) Druce in Bot. Exch. Club Soc. Brit. Isles 3 : 423. 1914. *Trigonella indica* L. Sp. Pl. 778. 1753. *Rothia trifoliata* Pers. Syn.

Pl 2 : 302. 1807 ; Wight, Ic. t. 199. 1839 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 63. 1876 ; Gamble, Fl. Pres. Madr. 279. 1918, Repr. ed. 1 : 199. 1957.

Much branched, villous, annual herbs. Leaflets oblanceolate, membranous. Flowers yellow Calyx lobes narrow, subequal ; upper two broader and falcate. Stamens monadelphous. Pods linear appressed villous, many seeded.

Fl. & Fr. : October.

Common weed in plains ; Walayar dam area.

34. SESBANIA Scop.

Sesbania bispinosa (Jacq.) W.F. Wight in U.S. Dept. Agr. Bur. Pl. Ind. Bull. 137 : 15. 1909 ; Gillet in Kew Bull. 17 : 129. 1963. *Aeschynomene bispinosa* Jacq. Ic. Pl. Rar. 3 : 13, t. 564. 1793. *Sesbania aculeata* (Willd.) Poir. in Lam. Encycl. 7 : 128. 1806 ; Gamble, Fl. Pres. Madr. 323. 1918. Repr. ed. 1 : 228. 1957. *Coronilla aculeata* Willd. Sp. Pl. 3 : 1147. 1803.

Erect, soft, prickly shrubs. Leaflets many, linear-oblong, mucronate. Flowers pale yellow. Pods straight, long, slightly torulose.

Fl. & Fr. : November.

Not common ; at lower elevations in moist places ; Karivara forest.

35. SHUTERIA Wight & Arn. *nom. cons.*

Shuteria vestita Wight & Arn. Prodr. 207. 1834 ; Wight, Ic. t. 165. 1839 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 181. 1876 ; Gamble, Fl. Pres. Madr. 350. 1918, Repr. ed. 1 : 247. 1957.

Sparsely hirsute, slender climbers. Leaflets 3, ovate, acute, mucronate ; end one sub-rhomboid. Stipules, stipels, bracts and bracteoles pink. Flowers purplish, in racemes. Pods pink, pubescent.

Fl. : January.

Not common ; in lower elevations ; forest after Panthanthode area.

36. SMITHIA Ait. *nom. cons.*

1a. Flowers in racemes or corymbs :

2a. Leaflets 2 pairs : upper calyx lip truncate ... *S. bigemina* 1

2b. Leaflets 4-5 pairs ; upper calyx lip emarginate ... *S. blanda* 2

1b. Flowers in axillary pairs ... *S. conferta* 3

1. **Smithia bigemina** Dalz. in Hook. Kew J. Bot. 3 : 208. 1851 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 149. 1876 ; Gamble, Fl. Pres. Madr. 329. 1918, Repr. ed. 1 : 233. 1957.

Slender, wiry annuals. Flowers yellow in loose racemes. Pedicels filiform. Calyx lips equal ; lower 3-lobed. Lomentum joints reticulate, papillose.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Aruvampara slopes.

2. **Smithia blanda** Wall. ex. Wight & Arn. Prodr. 221. 1834 ; Wight, Ic. t. 986. 1845 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 151. 1876 ; Gamble, Fl. Pres. Madr. 330. 1918, Repr. ed. 1 : 233. 1957.

Tall, shrubby plants, 60-90 cm. Leaflets 4-5 pairs, very bristly. Flowers large, bright yellow, in terminal racemes. Calyx lips obtuse, softly yellow-hairy. Lomentum joints reticulate.

On grassy slopes; not common ; below Ayyappankoil area.

3. **Smithia conferta** J.E. Sm. in Rees, Cyclop. 33. n. 2. 1819 ; Gamble, Fl. Pres. Madr. 329. 1918, Repr. ed. 1 : 232. 1957 ; Steenis in Reinwardtia 5 : 445. 1961. *S. geminiflora* Roth, Nov. Pl. Sp. 352. 1821 ; Gamble *l.c.*

Much branched undershrubs. Leaflets 4-6 pairs, bristly, crowded at ends of branches. Flowers yellow. Lower calyx lips bristly. Joints of lomentum turgid, papillose.

Fl. & Fr. : November-February.

Common ; in lower Ghats ; Anamooly-Mukkali, Kallamalai area, Olavakkot area.

37. SPATHOLOBUS Hassk.

1a. Leaflets silky pubescent beneath ; pods tomentose ... *S. parviflorus* 1

1b. Leaflets glabrous beneath ; pods glabrous ... *S. purpureus* 2

1. **Spatholobus parviflorus** (Roxb. ex DC.) Kuntze, Rev. Gen. 205. 1891 ; Ridder - Numan *et al* in Reinwardtia 10 (2) : 187. 1985. *Butea parviflora* Roxb. ex DC. Prodr. 2 : 415. 1825 ; Wight, Ic. t. 210. 1839.

Spatholobus roxburghii Benth. in Miq. Fl. Jungh. 238. 1852 (nom. superfl.) ; Baker in Hook. f. Fl. Brit. Ind. 2 : 193. 1876 ; Gamble, Fl. Pres. Madr. 358. 1918, Repr. ed. 1 : 253. 1957.

Gigantic climbers with large tuberous roots. Leaves coriaceous ; terminal ones elliptic ovate to elliptic-obovate, acute to acuminate at apex ; lateral ones strongly asymmetric, narrowly elliptic-obovate. Flowers creamy in fascicles in densely pubescent compound panicles. Calyx puberulous. Standard, ovate, apex emarginate, clawed. Wing petals with dorsal auricle and a lateral pocket. Pods stalked, ferruginous.

Fl. & Fr. : September-April.

Very common on forest trees in lower Ghats ; Malampuzha hill slopes, Mukkali forest, Karivara-Panthanthode forest.

It is very damaging to forest trees, hence is destroyed often.

2. **Spatholobus purpureus** Benth. ex Baker in Hook. f. Fl. Brit. Ind. 2 : 194. 1876 ; Gamble, Fl. Pres. Madr. 359. 1918, Repr. ed. 1 : 253.1957; Ridder-Numen *et al.* in Reinwardtia 10 (2) : 192. 1985. *Butea purpurea* (Benth. ex Prain) Blatter in J. Ind. Bot. Soc. 8 : 137. 1929.

Gregarious, climbing shrubs. Leaves coriaceous, glabrous. Terminal leaflets elliptic, lateral ones asymmetric. Stipules deciduous. Flowers purple in pendulous panicles, fascicled. Calyx puberulous, dark coloured spots in the basal half are very remarkable. Petals clawed. Standard elliptic to orbicular. Pods sessile, glabrous, papery, narrowly winged, crimson when young.

Fl. : February.

Rare ; endemic. Once collected from Mukkali forest.

38. TEPHROSIA Pers. *nom. cons.*

1a. Calyx teeth lanceolate ;
- 2a. Pods densely villous ... *T. villosa* 5
- 2b. Pods not densely villous :
  - 3a. Racemes axillary ; styles bearded :
    - 4a. Stipules broadly ovate - deltoid ... *T. pulcherrima* 2
    - 4b. Stipules linear - lanceolate :
      - 5a. Standards more than 1 cm long ... *T. conkanensis* 1
      - 5b. Standards less than 1 cm long ... *T. tinctoria* 4
  - 3b. Racemes extra - axillary ; styles not bearded ... *T. purpurea* 3

1b. Calyx teeth broadly deltoid ... *T. wynaadensis* 6

1. **Tephrosia canarensis** Drumm. in Gamble, Fl. Pres. Madr. 319. 1918, Repr. ed. 1 : 225. 1957.

Erect undershrubs. Leaflets obovate, oblong-elliptic, cuneate. Bracts and bracteoles subulate. Flowers large, reddish. Pods sparsely white hairy. Seeds mottled.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Mukkali forest.

2. **Tephrosia pulcherrima** (Wight ex Baker) Drumm. in Gamble, Fl. Pres. Madr. 319. 1918, Repr. ed. 1 : 225. 1957. *T. tinctoria* Pers. var. *pulcherrima* Wight ex Baker in Hook. f. Fl. Brit. Ind. 2 : 112. 1876.

Erect undershrubs, tomentose with angular branches. Leaflets 3 or 5, obovate, cuneate ; terminal ones larger ; stipules conspicuously carinate-striate. Flowers red, in racemes. Pods densely fulvous-hairy.

Fl. & Fr. : September-December.

Common among grasses ; in upper Ghats ; Silent Valley R.F.

3. **Tephrosia purpurea** (L.) Pers. Syn. 2 : 329. 1807 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 112. 1876, *p.p.* ; Gamble, Fl. Pres. Madr. 320. 1918, Repr. ed. 1 : 226. 1957. *Cracca purpurea* L. Sp. Pl. 752. 1753. '*Kattu-kolingi*' (Tam.).

Erect, perennial undershrubs. Leaflets acute, lanceolate. Flowers dark pinkish, in racemes. Pods slightly curved, glabrous.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Mukkali forest, Muthikulam forest-Siruvani.

4. **Tephrosia tinctoria** Pers. Syn. 2 : 329. 1807 ; Wight, Ic. t. 388. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 111. 1876 ; Gamble, Fl. Pres. Madr. 319. 1918, Repr. ed. 1 : 225. 1957.

Procumbent undershrubs with golden brown pubescence. Leaflets 1 to 13, the end ones longest. Bracts and bracteoles subulate. Flowers red in axillary racemes.

Fl. & Fr. : July.

Common ; in lower Ghats ; Dhoni R.F.

5. **Tephrosia villosa** (L.) Pers. Syn. 2 : 329. 1807 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 113. 1876. *Cracca villosa* L. Sp. Pl. 752. 1753. *Tephrosia hirta* (Buch. - Ham.) Gamble, Fl. Pres. Madr. 318. 1918, Repr. ed. 1 : 225. 1957. *Galega hirta* Buch. Ham. in Trans. Linn. Soc. London 13 : 546. 1822.

Erect, silky villous undershrubs. Leaflets 13-15, obovate, obtuse or retuse. Flowers pale red, lax in fascicles on long rachis. Calyx villous. Pods woolly tomentose, curved.

Fl. & Fr. : July.

Common ; in plains and lower Ghats : Walayar forest.

5. **Tephrosia wynaadensis** Drumm. in Gamble, Fl. Pres. Madr. 319. 1918, Repr. ed. 1 : 124. 1957.

Erect undershrubs. Terminal leaflets large, white silky beneath. Stipules and bracts deltoid-lanceolate. Flowers brick-red. Pods golden-tomentose. Seeds oblong-reniform.

Fl. & Fr. : October.

Rare ; in lower Ghats ; Aruvampara forest.

39. TERAMNUS Sw.

Teramnus labialis (L. f.) Spreng. Syst. Veg. 3 : 235. 1826 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 184. 1876 ; Gamble, Fl. Pres. Madr. 352. 1918, Repr. ed. 1 : 249. 1957 ; Verdc. in Kew Bull. 24 : 266. 1970 & 37 : 132. 1982. *Glycine labialis* L.f. Suppl. 325. 1781 ; Wight, Ic. t. 168. 1840.

Twining herbs. Leaflets ovate, acute, glabrous. Flowers pinkish, in slender, glabrous racemes. Pods narrow, elongate with hooked, persistent style.

Fl. & Fr. : November-February.

Common ; in lower Ghats ; Anamooly, Mathur area.

40. URARIA Desv.

Uraria rufescens (DC.) Schindl. in Feddes Repert. 21 : 14. 1925 ; Meeuwen in Reinwardtia 5 : 453. 1961. *Desmodium rufescens* DC. in Ann. Sci. Nat. (Paris) 4 : 101. 1825. *Uraria hamosa* Wall. ex Wight & Arn. Prodr. 222. 1834 ; Wight, Ic. t. 284. 1840 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 156. 1876 ; Gamble, Fl. Pres. Madr. 336. 1918, Repr. ed. 1 : 237. 1957.

Straggling undershrubs. Leaflets 3 ; terminal ones largest, oblong-ovate, subacute. Stipules lanceolate, acute. Flowers pink, in elongate racemes, distant. Calyx teeth deltoid, cuspidate. Pods glandular-hairy.

Fl. & Fr. : November-December.

In lower Ghats ; common ; Karivara-Panthanthode forest.

41. VIGNA Savi

1a. Stipules basifixed ; flowers reddish-purple or bluish-pink :		
2a. Flowers bluish-pink ; leaflets deltoid	...	*V. grahamiana* 1
2b. Flowers reddish-purple ; leaflets ovate-lanceolate	...	*V. vexillata* 5
1b. Stipules peltate ; flowers yellow :		
3a. Bracteoles linear ; pods glabrous :		
4a. Leaflets distinctly lobed ; pods cylindric	...	*V. trilobata* 3
4b. Leaflets entire or obscurely lobed ; pods compressed	...	*V. umbellata* 4
3b. Bracteoles broad ; pods hairy	...	*V. radiata* var. *sublobata* 2

1. **Vigna grahamiana** (Wight & Arn.) Verdc. in Kew Bull. 24 : 562. 1970. *Phaseolus grahamianus* Wight & Arn. Prodr. 244. 1834 ; Baker in Hook. f. Fl. Brit Ind. 2 : 201. 1876 ; Gamble, Fl. Pres. Madr. 362. 1918, Repr. ed. 1 : 256. 1957.

Slender climbers. Leaflets small, deltoid, entire. Flowers medium-sized, violet-purple, in lax racemes. Pods very narrow, flat, bordered, recurved, many-seeded.

Fl. & Fr. : December.

Rare ; in lower Ghats ; Attappadi-block, Mukkali.

2. **Vigna radiata** (L.) Wilczek var. **sublobata** (Roxb.) Verdc. in Kew Bull. 24 : 559. 1970. *Phaseolus sublobatus* Roxb. Fl. Ind. 3 : 288. 1832 ; Gamble, Fl. Pres. Madr. 363. 1918, Repr. ed. 1 : 256. 1957. *P. trinervius* Heyne ex Wight & Arn. Prodr. 245. 1834 : Baker in Hook. f. Fl. Brit. Ind. 2 : 203. 1876.

Very hairy, slender climbers. Leaflets small, obtuse, acute, scabrous ; side ones lobed. Stipules large, prominent. Flowers yellow, in close racemes. Pods compressed, densely silky at first, 10-12-seeded.

Fl. & Fr. : October.

Not common ; in lower Ghats ; forest below Ayyappankoil-Pothundy.

3. **Vigna trilobata** (L.) Verdc. in Taxon 17 : 172. 1968 & in Kew Bull. 24 : 560. 1970. *Dolichos trilobus* L. Mant. 101. 1767. *Phaseolus trilobus* sensu Aiton excl. basionym *D. trilobus*. Baker in Hook. f. Fl. Brit. Ind. 2 : 201. 1876 ; Gamble, Fl. Pres. Madr. 362. 1918, Repr. ed. 1 : 256. 1957.

Diffuse, trailing pubescent herbs. Leaflets 3-lobed ; lobes vary in shape. Bracteoles ovate. Flowers yellow in axillary racemes. Staminal tube cordate. Pods cylindric, up to 5 cm long.

Fl. & Fr. : July.

Common ; in plains and wastelands ; Walayar dam area.

4. **Vigna umbellata** (Thunb.) Ohwi & Ohashi in J. Jap. Bot. 44 : 31. 1969 ; Verdc. in Kew Bull. 24 : 960. 1970. *Dolichos umbellatus* Thunb. in Trans. Linn. Soc. London 2 : 339. 1794. *Phaseolus calcaratus* Roxb. Fl. Ind. 3 : 289. 1832 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 203. 1876 ; Gamble, Fl. Pres. Madr. 363. 1918, Repr. ed. 1 : 256. 1957.

Slender climbers, hairy. Stipules lanceolate, hispid. Leaflets ovate, membranous, acuminate. Flowers yellow in racemes. Petals long-clawed. Staminal tube cordate at base. Pod glabrous, recurved, 8-12-seeded.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Silent Valley R.F.

5. **Vigna vexillata** (L.) A. Rich. in Sagra Hist. Fis. Polit. Nat. I. 11 : 191. 1845 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 206. 1876 ; Gamble, Fl. Pres. Madr. 364. 1918, Repr. ed. 1 : 257. 1957 ; Verdc. in Kew Bull. 24 : 553. 1970. *Phaseolus vexillatus* L. Sp. Pl. 724. 1753. *P. pulniensis* Wight, Ic. t. 202. 1839.

Pubescent twiners. Stipules basifixed, lanceolate, shortly bilobed. Leaflets ovate, acuminate, hairy. Flowers reddish-purple. Calyx strigosely hirsute. Petals clawed. Pods compressed, black, 10-15-seeded.

Fl. & Fr. : October-November.

Rare ; in lower Ghats ; Kaikatty-Pothundy forest, Dam site area-Silent Valley.

Cajanus cajan (L.) Mills., **Vigna mungo** (L.) Hepper (*Phaseolus mungo* L.) and **V. unguiculata** (L.) Walp. (*Dolichos unguiculatus* L.) are escapes from cultivation.

42. ZORNIA Gmel.

Zornia gibbosa Span in Linnaea 15 : 192. 1841 ; Mohlenbrock in Webbia 16 : 112. 1961. *Z. diphylla* auct. non (L.) Pers. 1807 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 147. 1876 ; Gamble, Fl. Pres. Madr. 325. 1918, Repr. ed. 1 : 229. 1957.

Much branched wiry, annual herbs. Leaflets lanceolate, acuminate, black glandular. Stipules lanceolate. Flowers yellow, in spikes. Bracts

ovate, acute, hiding the flower and pod. Standards cordate. Pods prickly, scabrid.

Fl. & Fr. : October.

Common ; in lower Ghats among grasses ; Ayyappankoil area, Mukkali forest, Olavakot area.

Calopogonium mucunoides Desv. and **Centrosema pubescens** Benth. are introduced plants, found occasionally in the forests. **Gliricidia sepium** (Jacq.) Kunth ex Walp. is grown as a hedge plant.

46. CAESALPINIACEAE

1a. Branchlets and leaf rachis unarmed ; leaves simple or pinnate :
- 2a. Leaves simple, 2-lobed ... BAUHINIA 1
- 2b. Leaves pinnate :
  - 3a. Petals absent ; stamens 7 ... SARACA 6
  - 3b. Petals present ; stamens 3-10 :
    - 4a. Petals 3 ; stamens 3 ... TAMARINDUS 8
    - 4b. Petals 5 ; stamens 10 :
      - 5a. Leaflets 1 pair ... CYNOMETRA 3
      - 5b. Leaflets 3 or more pairs ... CASSIA 2

1b. Branchlets and leaf rachis armed ; leaves bipinnate :
- 6a. Pedicels less than 0.5 cm long ... MOULLUVA 5
- 6b. Pedicels over 1.0 cm long :
  - 7a. Pedicels jointed ; pods winged on upper suture ... MEZONEURON 4
  - 7b. Pedicels not jointed ; pods winged at apex ... PTEROLOBIUM 6

1. BAUHINIA L.

1a. Fertile stamens 10 :
- 2a. Calyx spathaceous ; flowers in racemes ... *B. racemosa* 4
- 2b. Calyx divided into 5 segments ; flowers in corymbs ... *B. malabarica* 1

1b. Fertile stamens 3-5 :
- 3a. Trees ; stamens 3-4 ... *B. purpurea* 3
- 3b. Climbers ; stamens 5 ... *B. phoenicea* 2

1. **Bauhinia malabarica** Roxb. Fl. Ind. 2 : 321. 1832 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 277. 1878 ; Gamble, Fl. Pres. Madr. 407. 1919, Repr. ed. 1 : 288. 1957. *Piliostigma malabaricum* (Roxb.) Benth. in Miq. Pl. Jungh. 261. 1852 ; de Wit in Reinwardtia 3 : 531. 1956.

Tall, low branching, deciduous trees, 7-10 m. Leaves coriaceous, suborbicular, broadly rounded at apex, glaucous beneath. Flowers creamy in axillary corymbs. Petals oblong-spathulate. Ovary densely tomentose. Pods strap-shaped, turgid, many seeded.

Fl. & Fr. : August-November.

Common ; in lower Ghats ; Chindaki forest, Pothundy-Kaikatty forest.

2. **Bauhinia phoenicea** Heyne ex Wight & Arn. Prodr. 296. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 283. 1878 ; Gamble, Fl. Pres. Madr. 408. 1919, Repr. ed. 1 : 289. 1957. *Phanera phoenicea* (Wight & Arn.) Benth. in Miq. Pl. Jungh. 262. 1852. *Bauhinia benthamii* Bedd. Ic. t. 107. 1868-1874 (*benthami*').

Large climbers without tendrils. Leaflets oblong, ferruginous beneath. Flowers red, large, in corymbose panicles. Petals oblanceolate, clawed. Pods flat, sparsely pubescent, ridged along the upper suture.

Fl. & Fr. : October-February.

Not common ; in lower Ghats ; Mukkali forest.

3. **Bauhinia purpurea** L. Sp. Pl. 375. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 284. 1878 ; Gamble, Fl. Pres. Madr. 407. 1919, Repr. ed. 1 : 288. 1957 ; de Wit in Reinwardtia 3 : 406. 1956. *B. coromondeliana* DC. Prodr. 2 : 515. 1825. *Phanera purpurea* (L.) Benth. in Miq. Pl. Jungh. 262. 1852. '*Mandarai*' (Tam.).

Bushy evergreen trees, 5-7 m. Leaves ovate, cordate at base, obtuse or subacute at apex. Flowers pale purple with dark pinkish veins ; buds fusiform. Calyx spathaceous. Petals oblong-lanceolate. Pods strap-shaped, flat.

Fl. & Fr. : September-December.

Common ; in lower Ghats ; Anakatti area and Mukkali forest.

It is also cultivated on road sides.

4. **Bauhinia racemosa** Lam. Encycl. 1 : 390. 1785 ; Bedd. Fl. Sylv. t. 172. 1872 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 276. 1878 ; Gamble, Fl. Pres. Madr. 406. 1919, Repr. ed. 1 : 288. 1957 ; de Wit in Reinwardtia 3 : 537. 1956. *Piliostigma racemosa* (Lam.) Benth. in Miq. Pl. Jungh. 262. 1852. '*Archi*', '*Athi*' (Tam.).

Small deciduous trees, 7-10 m. Leaves deeply cleft, grey-pubescent beneath, rounded at apex. Flowers dull yellow in lax racemes. Stamens hairy. Pods glabrous, thick, falcate.

Fl. & Fr. : March-October.

Common ; in lower Ghats ; Chindaki, Dhoni R.F., Mukkali, Thadikundu forests.

Bauhinia L. is maintained here in its broad sense, though de Wit *l.c.* regards the subgenera as genera.

2. CASSIA L.

1a. Leaflets more than 16 pairs ; sepals narrow :

2a. Leaflets 16-24 pairs ; pods 8-16-seeded ... *C. teschenaultiana* 4

2b. Leaflets 40-60 pairs ; pods 15-25-seeded ... *C. mimosoides* 5

1b. Leaflets less than 16 pairs ; sepals broad :

3a. Leaves with 1 or more glands on petiole or rachis :

4a. Petioles with a single gland at base ; rachis eglandular :

5a. Leaflets glabous ... *C. occidentalis* 6

5b. Leaflets pubescent ... *C. hirsuta* 3

4b. Petioles eglandular ; rachis glandular :

6a. Stipules large, cordate ; leaflets more than 8 pairs ... *C. auriculata* 1

6b. Stipules linear ; leaflets less than 6 pairs ... *C. tora* 7

3b. Leaves without gland on petiole or rachis ... *C. fistula* 2

1. **Cassia auriculata** L. Sp. Pl. 379. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 263. 1878 ; Gamble, Fl. Pres. Madr. 402. 1919, Repr. ed. 1: 284. 1957. '*Avaram*' (Tam.).

Handsome shrubs. Stipules foliaceous, reflexed, reniform. Leaflets 8-12 pairs, elliptic oblong, obtuse, apiculate with subulate glands in between. Flowers large, bright yellow in corymbose panicles ; bracts ovate - acuminate. Stamens 2 larger. Pods flat.

Fl. & Fr. : All seasons.

Commom ; in plains on gravelly soil ; Walayar dam area.

Barks used for tanning purposes.

2. **Cassia fistula** L. Sp. Pl. 377. 1753 ; Baker in Hook. f. Fl. Brit. Ind 2 : 261. 1878 ; Gamble, Fl. Pres. Madr. 400. 1919, Repr. ed. 1 : 283. 1957. *C. rhombifolia* Roxb. Fl. Ind. 3 : 334. 1832 ; Wight, Ic. t. 269. 1840. '*Konnai*' (Tam.) & (Mal.).

Deciduous trees, 10-15 m. Leaflets 4-8 pairs, ovate. Stipules linear. Flowers bright yellow, in long, pendulous racemes. Pods cylindric, indehiscent, 40-60 cm

Fl. & Fr. : June October.

Common ; in lower Ghats and in plains ; Chindaki forest, Mukkali forest, Walayar dam area.

A very showy tree when in flower.

3. **Cassia hirsuta** L. Sp. Pl. 378. 1753 ; Gamble, Fl. Pres. Madr. 401. 1919, Repr. ed. 1 : 284. 1957.

Diffuse, pubescent undershrubs. Leaflets 4 pairs, lanceolate, acuminate, hirsute. Flowers yellow in pairs, axillary. Stamens 6-7. Pods slender, flat, hirsute.

Fl. & Fr. : March.

Common ; in lower Ghats ; Olavakkot area, Palakapandi estate area.

Introduced and run wild in plains and in lower Ghats.

4. **Cassia leschenaultiana** DC. in Mem. Soc. Phys. Hist. Nat. Geneve 2 : 132. 1824 ; Gamble, Fl. Pres. Madr. 403. 1919, Repr. ed. 1 : 286. 1957 ; de Wit in Webbia 11 : 280. 1956.

Erect undershrubs. Glands on petiole sessile. Leaflets 16-24 pairs, subfalcate. Stamens 10. Stipules conspicuous. Flowers yellow, supraaxillary. Pod 8-16 - seeded.

Fl. & Fr. : November.

Rare ; in lower Ghats; Pothundy slopes.

5. **Cassia mimosoides** L. Sp. Pl. 379. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 266. 1878 ; Gamble. Fl. Pres. Madr. 403. 1919, Repr. ed. 1 : 285. 1957 ; de Wit in Webbia 11 : 283. 1956. *C. angustissima* Lam. Encycl. 1 : 650. 1785.

Erect or decumbent, annual herbs with slender branches. Leaflets small, 40-60 pairs, pubescent ; gland at the tip of petiole. Flowers solitary, yellow. Stamens 10, long and short. Pods flat, dehiscent, 16-25 - seeded.

Fl. & Fr. : September-October.

Common ; in moist places in lower Ghats ; Panthanthode forest, Sappal hill-Dhoni R.F.

6. **Cassia occidentalis** L. Sp. Pl. 377. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 262. 1878 ; Gamble, Fl. Pres. Madr. 401. 1919, Repr. ed. 1 : 284. 1957.

Diffuse undershrubs. Leaflets 3-5 pairs, ovate, acuminate with one gland at base of petiole. Bracts ovate. Flowers yellow. Stamens 6-7. Pods linear, flat, turgid, compressed.

Fl. & Fr. : May-October.

Common ; in lower Ghats ; Bhavani river bank-Mukkali, Walayar dam area.

7. **Cassia tora** L. Sp. Pl. 376. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 265. 1878, *p.p.*, Gamble, Fl. Pres. Madr. 401. 1919, Repr. ed. 1 : 284. 1957. '*Tagarai*' (Tam.).

Small annual herbs. Leaves with subulate glands between leaflets ; leaflets 3 pairs, obovate, obtuse, mucronate. Flowers 5-6, yellow, small in axillary pairs. Pods 10-20 cm long, curved. Seeds many.

Fl. & Fr. : October.

Occasional ; in lower Ghats ; near Mukkali forest shed, Olavakkot area.

3. Cynometra L.

Cynometra travancorica Bedd. Fl. Sylv. t. 316. 1873 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 267. 1878 ; Gamble, Fl. Pres. Madr. 413. 1919, Repr. ed. 1 : 293. 1957 ; Meeuwen in Blumea 18 : 29. 1970.

Lofty trees, 15-20 m. Leaflets 1-pair, thin, lanceolate, falcate, acuminate, very unequal-sided, creamy pink in colour when young. Flowers pale pink. Pods flat, semicircular, rugose, orange when dry.

Fl. & Fr. : January-May.

Very rare, twice collected from the Siruvani western slopes only. Endemic.

4. Mezoneuron Desf.

Mezoneuron cucullatum (Roxb.) Wight & Arn. Prodr. 283. 1834 ; Baker in Hook. f. Fl. Brit. Ind. 22 : 258. 1878 ; Gamble, Fl. Pres. Madr. 395. 1919, Repr. ed. 1 : 280. 1957 (*Mezoneurum*). *Caesalpinia cucullata* Roxb, Fl. Ind. 358. 1832.

Large climbing shrubs ; stems with corky protuberances, bearing a

pair of hooked thorns. Leaflets 3-6 pairs, elliptic-ovate, acute, glabrous. Flowers yellow in long panicles of racemes. Upper petals 2-lobed. Pods oblong-lanceolate, winged.

Fl. & Fr. : March-June.

Rare ; in Ghats ; Karapara estate area, Mukkali forest.

Hattink in *Reinwardtia* 9 : 22. 1974 merged *Mezoneuron* with *Caesalpinia* but Gandhi in Saldanha & Nicolson, Flora Hassan Dist. has reinstated the above name which is followed here.

5. MOULLUVA Adanson

Moulluva spicata (Dalz.) Nicols. in Manilal, Bot. Hist. Hort. Malab. 184. 1980. *Almeloveenia spinosa* Dennst. Schluss. Hort. Malab. 1 : 13 ; 2 : 18 ; 3 : 32. 1818, *nom. nud. Caesalpinia spicata* Dalz. in Hook. J. Bot. 3 : 90. 1851. *Wagatea spicata* (Dalz.) Wight, Ic. t. 1995. 1853 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 261. 1878 ; Gamble, Fl. Pres. Madr. 397. 1919, Repr. ed. 1 : 281. 1957.

Prickly climbing shrubs. Leaves bipinnate ; pinnae 4-6 pairs ; Leaflets 5-7 pairs, obliquely oblong, subacute or rounded at apex. Flowers orange in subspicate long (40-50 cm) racemes. Calyx red. Pods oblong, 2-4 - seeded.

Fl. & Fr. : July.

Not common ; in lower Ghats ; Sappal hill-Dhoni R F.

6 PTEROLOBIUM R. Br. ex Wight & Arn. *nom. cons.*

Pterolobium hexapetalum (Roth) Sant. & Wagh in Bull Bot. Surv. Ind. 5 : 108. 1964. *Reichardia hexapetala* Roth, Nov. Pl. Sp. 210. 1821. *Caesalpinia lacerans* Roxb. Fl. Ind. 2 : 367. 1832. *Pterolobium indicum* A. Rich. Fl. Abyss. 1 : 247. 1847 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 259. 1878 ; Gamble, Fl. Pres. Madr. 395. 1919, Repr. ed. 1 : 280. 1957. *P. lacerans* auct. non R. Br. ex Wight & Arn. 1834 ; Wight, Ic. t. 196. 1839 '*Karindu*' (Tam.).

Woody armed shrubs, often climbing. Leaf rachis pubescent with short prickles ; pinnae 6-8 pairs. Leaflets 4-6 pairs, oblong, obtuse or retuse at apex. Flowers yellowish-white. Calyx rose. Pods pinkish-red.

Fl. & Fr. : May.

Common in scrubs jungles ; Walayar forest.

7. SARACA L.

Saraca asoca (Roxb.) de Wilde in Blumea 15 : 393. 1968 ; Zuijderhoudt in Blumea 15 : 422. 1968. *Jonesia asoca* Roxb. in Asiat. Res. 4 : 365. 1795 ; Wight, Ic. t. 1839. 1852. *Saraca indica* auct. non L. 1753 ; Bedd. Fl. Sylv. t. 57. 1870 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 271. 1878 ; Gamble, Fl. Pres. Madr. 409. 1919, Repr. ed. 1 : 289. 1957. '*Asoka*' (Tam.).

Small trees, 7-10 m. Leaflets 4 pairs, oblong-lanceolate, acuminate. Stipules connate. Flowers orange-scarlet, showy ; bracteoles erect, embracing the calyx tube, longer than bracts Calyx petaloid ; lobes 4. Petals absent Stamens 7, fertile. Pods flat, oblong, woody.

Fl. & Fr. : February-April.

Rare ; in lower Ghats ; Marapalam-Pothundy forest.

de Wilde *l.c.* separates *S. asoca* from *S. indica* based on clasping and spreading nature of bracteoles.

8. TAMARINDUS L.

Tamarindus indica L. Sp. Pl. 34. 1753 ; Bedd. Fl. Sylv. t. 184. 1872 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 273. 1878 ; Gamble. Fl. Pres. Madr. 409. 1919, Repr. ed. 1 : 290. 1957. '*Puli*' (Tam.).

Large evergreen trees, 20-30 m. Leaflets many, opposite, oblong-obtuse. Flowers pink with yellow stripes. Pods linear - oblong, incurved with pulpy mesocarp.

Fl. & Fr. : September-April.

Common ; in lower Ghats and in plains ; Karivara river bank. Mukkali, Walayar forest.

Economically important tree for the timber and fruits ; also cultivated as avenue trees on road sides.

47. MIMOSACEAE

1a. Stamens definite :

2a. Flowers in globose heads ;

3a. Small herbs or undershrubs ; pods thin ;

4a. Plants prickly ... MIMOSA 5

4b. Plants not prickly ... NEPTUNIA 6

3b. Large trees ; pods woody ... XYLIA 8

2b. Flowers in elongate spikes :

5a. Large tendril climbers ... ENTADA 4

5b. Shrubs or small trees ... DICHROSTACHYS 3

1b. Stamens indefinite :

6a. Stamens free ... ACACIA 1

6b. Stamens united below :

7a. Pods straight ... ALBIZIA 2

7b. Pods curved or twisted ... PITHECELLOBIUM 7

1. ACACIA Mill.

1a. Erect trees or shrubs without prickles and with stipular spines :

2a. Flowers in globose heads ; spines straight ... *A. nilotica* 2

2b. Flowers in elongate spikes ; spines hooked ... *A. chundra* 1

1b. Climbing shrubs with prickles and without stipular spines :

3a. Pods thin, flat ; stipules and bracts lanceolate :

4a. Flowers sessile ; petiole gland conical ... *A. torta* 5

4b. Flowers pedicelled ; petiole gland oblong ... *A. pennata* 3

3b. Pods thick, fleshy ; stipules and bracts ovate-cordate ... *A. sinuata* 4

1. Acacia chundra (Roxb. ex Rottl.) Willd. Sp. Pl. 4 : 1078. 1806 ; Bedd. Fl. Sylv. t. 50. 1870 ('*sundra*') ; Baker in Hook. f. Fl. Brit. Ind. 2 : 295. 1878 ; Gamble, Fl. Pres. Madr. 428. 1919, Repr. ed. 1 : 303. 1957 ('*sundra*'). *Mimosa chundra* Roxb. ex Rottl. Ges. Naturf. Freunde Berlin Neue Shriften 4 : 207. 1803. '*Karungali*' (Tam.). '*Karinali*' (Mal.).

Small trees with red branchlets. Pinnae 10-20 pairs ; rachis with small gland between the upper pinnae ; petiole gland at the base of first pairs of pinnae. Leaflets 30-40 pairs, linear-oblong, glabrous. Spike 5-8 cm long. Flowers white. Calyx and petals white - villous. Pods brown, 3-4-seeded.

Fl. & Fr. : July-August.

Common in lower Ghats ; Walayar forest.

2. Acacia nilotica (L.) Willd. ex Del. ssp. **indica** (Benth.) Brenan in Kew Bull. 12 : 84. 1957 ; Sant. Fl. Khandala 83. 1967. *A. arabica* auct non (Lam.) Willd. 1808 ; Bedd. Fl. Sylv. t. 47. 1870 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 293. 1878 ; Gamble, Fl. Pres. Madr. 425. 1919, Repr. ed. 1 :

301. 1957. *A. arabica* var. *indica* Benth. in Hook. London J. Bot. 1 : 500. 1842 '*Karuvelam*' (Tam.).

Trees 5-10 m. Rachis grey pubescent. Pinnae 7 pairs ; leaflets 18-25 pairs. Flowers golden yellow. Petals thrice as long as calyx. Pods torulose, white tomentose, 10-12-seeded.

Fl. & Fr. : July.

Common in plains and in lower Ghats ; Walayar dam area.

Wood is valuable for agricultural implements and a commercial gum is obtained from wood. Tender branches are used as tooth brush.

3. **Acacia pennata** (L.) Willd. Sp. Pl. 4 : 1090. 1806 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 297. 1878 *p.p.* ; Gamble, Fl. Pres. Madr. 429. 1919, Repr. ed. 1 : 304. 1957. *Mimosa pennata* L. Sp. Pl. 522. 1753.

Large prickly, climbing shrubs. Leaflets 50-60 pairs, linear oblong, overlapping, semitruncate at base. Flowers white, in paniculate heads. Pods strap-shaped, with thick sutures.

Fl. & Fr. : July-October.

Common ; in Ghats ; Agali forest, Malampuzha area, Mukkali forest, Silent Valley R.F.

4. **Acacia sinuata** (Lour.) Merr. in Trans. Amer. Philos. Soc. 24 (2) : 186. 1935. *Mimosa sinuata* Lour. Fl. Cochinch. 653. 1790. *M. concinna* Willd. Sp. Pl. 4 : 1039. 1806. *Acacia concinna* (Willd.) DC. Prodr. 2 : 464. 1825 : Baker in Hook. f. Fl. Brit. Ind. 2 : 296. 1878 ; Gamble, Fl. Pres. Madr. 429. 1919, Repr. ed. 1 : 304. 1957. '*Shivakai*' (Tam.). & (Mal.).

Stout, very prickly climbing shrubs. Leaflets 20-25 pairs. Stipules and bracts ovate-cordate. Flowers white. Calyx red. Pods rugose, fleshy, wrinkled when dry.

Fl. & Fr. : January-February.

Common ; in lower Ghats ; Ayyappankoil area, Mukkali forest.

Pods are collected as a Minor forest product ; powdered and used as soapnut powder.

5. **Acacia torta** (Roxb.) Craib in Kew Bull. 410. 1915 ; Gamble, Fl. Pres. Madr. 428. 1919, Repr. ed. 1 : 304. 1957. *Mimosa torta* Roxb. Fl. Ind. 2 : 566. 1832. *Acacia caesia* Wight & Arn. Prodr. 278. 1834. *quod descr.* non (L.) Willd. 1806. '*Ingi*' (Tam.).

Large prickly climbing shrubs or small trees. Pinnae 10-14 pairs ; leaflets 25-40 pairs, oblong-falcate, truncate, pubescent beneath. Flowers white, sessile. Pods brown-velvety when young.

Fr. : October.

Common ; in lower Ghats ; Chindaki forest, Walayar forest.

2. ALBIZIA Durazz.

1a.	Leaflets more than 1 cm long ; calyx glabrous	... *A. odoratissima*	2
1b.	Leaflets less than 1 cm long ; calyx pubescent	... *A. chinensis*	1

1. **Albizia chinensis** (Osb.) Merr. in Amer. J. Bot. 3 : 575. 1916. *Mimosa chinensis* Osb. Dag. Ostind. Resa 233. 1757. *M. marginata* Lam. Encycl. 1 : 2 1783. *Albizia marginata* (Lam.) Merr. in Philipp. J. Sci. Bot. 5 : 23 1910 ; Gamble, Fl. Pres. Madr. 433. 1919, Repr. ed. 1 : 307. 1957. '*Pilivagai*' (Tam.).

Deciduous trees, 20-25 m. Leaflets 30-40 pairs, falcate, acute at apex, ciliate on margins. Rachis with several glands. Flowers pale pinkish, in globose heads. Calyx funnel-shaped. Filaments pinkish. Pods thin, pale brown.

Fl. : March.

In lower Ghats ; not common ; Bhavani river bank-Mukkali.

2. **Albizia odoratissima** (L. f.) Benth. in Hook. London. J. Bot. 3 : 88. 1844 ; Bedd. Fl. Sylv. t. 54. 1870 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 299 1878 ; Gamble, Fl. Pres. Madr. 431. 1919, Repr. ed. 1 : 306. 1957. *Mimosa odoratissima* L.f. Suppl. 437. 1781. '*Karuvagai*' (Tam.), '*Pulivaga*' (Mal.).

Deciduous trees, 20-25 m. Pinnae 4 pairs ; Leaflets 12-18 pairs, obliquely oblong, pubescent. Flowers white, in large panicles, fragrant. Calyx campanulate, glabrous. Pods thick, brown.

Fl. : August-November.

Common ; in lower Ghats ; Chindaki forest, Malampuzha hill slopes, Mukkali forest, Pothundy dam area.

Timber is used for various implements.

3. DICHROSTACHYS (DC.) Wight & Arn.

Dichrostachys cinerea (L.) Wight & Arn. Prodr. 271. 1834 ; Bedd. Fl. Sylv. t. 185. 1872 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 288. 1878 ; Gamble, Fl. Pres. 419. 1919, Repr. ed. 1 : 297. 1957. *Mimosa cinerea* L. Sp. Pl. 526. 1753 non L. 517. 1753. '*Viduthalan*' '*Vedatalla*' (Tam.).

Thorny small trees or shrubs ; branchlets ending in spines. Leaves bipinnate ; pinnae 8-14 pairs, paripinnate. Leaflets 10-12 pairs, minute, sessile, linear-oblique. Flowers crowded in spikes ; stamens of perfect

flowers in the upper half of the spike yellow. Staminodes in the lower half of the spikes pink, filiform. Petals 5. Pods linear, twisted.

Fl. & Fr. : October.

Common in dry scrubs on gravelly soils ; Walayar forest.

4. ENTADA Adanson *nom. cons.*

Entada rheedii Spreng Syst. Veg. 325. 1825. Britto in Matthew, Fl. Tamilnadu Carnatic 3 (1) : 542. 543. 1983. *E. pursaetha* DC. Prodr. 2 : 425. 1825 ; Wight & Arn. Prodr. 267. 1834 ; Sant. in Bull Bot. Surv. Ind. 3 : 16. 1962 ; Brenan in Kew Bull. 20 : 363. 1967. *E. scandens* auct. non Benth 1841 ; Baker in Hook. f. Brit. Ind. 2 : 286. 1878 ; Gamble, Fl. Pres. Madr. 417. 1919. Repr. ed. 1 : 296. 1957 '*Cilu*', '*Irikki*', '*Kakkavalli*', '*Yanaikozhinchi*' (Tam.).

Large woody climbing shrubs. Leaflets 3-4 pairs, oblong-obovate, shining. Rachis sometimes ending in 2 tendrils. Flowers small, yellow, in large panicles. Pods up to 60 cm long. Seeds flat, round, shining.

Fl. & Fr. : February-October.

Common ; in Ghats ; Mukkali forest.

5. MIMOSA L.

Mimosa pudica L. Sp. Pl. 518. 1753 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 291. 1878 ; Gamble, Fl. Pres. Madr. 421. 1919, Repr. ed. 1 : 298. 1957. '*Thottavadi*' (Tam.) & (Mal.).

Prickly undershrubs. Pinnae 1-2 pairs ; leaflets sensitive, 12-14 pairs, linear. Bracteoles stiff ; bristly. Flowers pink, in globose heads. Petals 4. Pods distinctly bristly.

Fl. & Fr. : All seasons.

Common in moist localities ; Walayar dam area.

6. NEPTUNIA Lour.

Neptunia oleracea Lour. Fl. Cochinch. 654. 1790 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 285. 1878 ; Gamble, Fl. Pres. Madr. 416. 1919, Repr. ed. 1 : 295. 1957. *N. prostrata* (Lam.) Baill. Bull. Mens. Soc. Linn. Paris 1 : 356. 1883. *Mimosa prostrata* Lam. Encycl. 1 : 10. 1783, *nom. illeg.* '*Sundakeerai*' (Tam.).

Branching, floating aquatic herbs with white spongy float on the nodes Leaves bipinnate ; pinnae 2-3 pairs ; leaflets 10-14 pairs. Flowers yellow in oblong heads. Calyx 5-lobed. Stamens 10, free. Pods stipitate, flat. Seeds 6.

Fl. & Fr. : October.

Common in ponds and tanks ; Olavakkot area.

7. PITHECELLOBIUM Mart.

1a. Plants armed with stipular spines	...	*P. dulce*	1
1b. Plants unarmed :			
2a. Leaflets unequal at base ; corolla lobes recurved	...	*P. monadelphum*	3
2b. Leaflets equal at base ; corolla lobes not recurved	...	*P. gracile*	2

1. **Pithecellobium dulce** (Roxb.) Benth. in Hook. London J. Bot. 3 : 199. 1844 ; Bedd. Fl. Sylv. t. 188. 1872 ; Baker in Hook. f. Fl. Brit. Ind. 2 : 302. 1878 ; Gamble, Fl. Pres. Madr. 434. 1919, Repr. ed. 1: 308. 1957. *Mimosa dulcis* Roxb. Fl. Ind. 2 : 556. 1832. *Inga dulcis* (Roxb.) Willd. Sp. Pl. 4 : 1005. 1806 ; Wight, Ic. t. 198. 1839. '*Kodukkapuli*' (Tam.).

Large trees, armed with stipular spines. Leaves bipinnate ; pinnae 2 pairs ; leaflets paired, oblong, oblanceolate. Flowers white in panicled spikes, tomentose. Pods spiral, moniliform, turgd. Seeds orbicular with whitish aril.

Fl. & Fr. : July.

Common in plains ; Walayar forest.

Aril of seeds edible.

2. **Pithecellobium gracile** Bedd. in Madras J. Lit. Sci. ser. 3. 1 : 44. 1864 ; Gamble, Fl. Pres. Madr. 425. 1919, Repr. ed. 1 : 308. 1957 ('*Pithecolobium*').

Slender, unarmed shrubs, 1-2 m. Leaflets 1-3 pairs, ovate, abruptly caudate-acuminate, glabrous. Flowers white. Calyx campanulate. Corolla-lobes spreading. Pods strap-shaped.

Fl. & Fr. : September-October.

Common ; in lower Ghats ; Bhavani river bank-Mukkali.

3. **Pithecellobium monadelphum** (Roxb.) Kosterm. in Reinwardtia 3 : 11. 1954. *Mimosa monadelpha* Roxb. Fl. Ind. 2 : 544. 1832. *Pithecel-*

lobium bigeminum auct. non (L.) Mart. ex Benth. 1844 : Baker in Hook. f. Fl. Brit. Ind. 2 : 303. 1878 ; Gamble, Fl. Pres. Madr. 435. 1919, Repr. ed. 1 : 308. 1957. '*Kalpokku*' (Tam.).

Unarmed trees, 5-15 m ; branchlets pubescent. Leaflets elliptic-ovate, rounded at base. Flowers white, densely rusty pubescent. Pods flat, curved in a ring, orange-red inside with black seeds.

Fl. & Fr. : October-May.

Common ; in Ghats ; Mukkali forest, Pothundy-Kaikatty forest, Silent Valley R.F., Siruvani slopes.

Bentham in *Trans. Linn. Soc. London* 30 : 634. 1875 confused *Abarema bigemina* (L.) Kosterm. (*P. bigeminum* (L.) Mart.) an endemic species from Ceylon and referred often with the above species which was kept separately by Roxburgh *l.c.*

8. XYLIA Benth.

Xylia xylocarpa (Roxb.) Taub. in Bot. Centralbl. 47 : 397. 1891 ; Gamble, Fl. Pres. Madr. 417. 1919, Repr. ed. 1 : 295. 1957. *Mimosa xylocarpa* Roxb. Pl. Cor. t. 100. 1798. *Xylia dolabriformis* Benth. in J. Bot. 4 : 417. 1842 ; Bedd. Pl. Sylv. t. 186. 1872. '*Irul*' (Tam.). '*Kadamaram*' (Mal.).

Deciduous trees, 5-15 m. Leaflets 3-5 pairs, oblong-lanceolate, acuminate. Flowers white, in globose heads, fragrant. Stamens 10. Pods dolabriform, flat, woody, brown-pubescent.

Fl. & Fr. : February-October.

Common ; in lower Ghats ; Adiperanda area, Dhoni R.F., Mukkali forest.

Wood is used for railway sleepers and building purposes.

Albizia moluccana Miq., **Leucaena latisiliqua** (L.) Gills. (*L. leucocephala* (Lam.) de Wit), **Mimosa invisa** Mart var. **inermis** Adelb. etc, are introduced plants, occasionally found in this district.

48. ROSACEAE

1a. Plants unarmed ; carpel one	...	PRUNUS 1
1b. Plants armed ; carpels many	...	RUBUS 2

1. PRUNUS L.

Prunus ceylanica (Wight) Miq. Fl. Ind. Bat. ser. 1. 1 : 366. 1855 ;

Kalkman in Blumea 13 : 52. 1965. *Polydontia ceylanica* Wight, Ill. 1 : 203. 1840. *Pygeum zeylanicum* auct. non Gaertn. 1788 ; Bedd. Fl. Sylv. t. 59. 1870 ; Hook. f. Fl. Brit. Ind. 2 : 321. 1878 ; Gamble, Fl. Pres. Madr. 439. 1919, Repr. ed. 1 : 311. 1957. *P. acuminatum* Colebr. in Trans. Linn. Soc. London 12 : 360. t. 18. 1818 non Michx. 1803 ; Hook. f. *l.c.* 2 : 318 ; Gamble *l.c.* *P. wightiana* Bl. ex C. Muell. in Walp. Ann. 4 : 642. 1857 ; Hook. f. *l.c.* 319 ; Gamble *l.c.* *P. gardneri* Hook. f. Fl. Brit. Ind. 2 : 321. 1878 ; Gamble *l.c.* *P. sisparense* Gamble in Bull. Misc. Inform. Kew 238. 1918.

Lofty trees, 25-40 m. Leaves simple, alternate, entire, oblong-lanceolate, acuminate, glabrous. Flowers white, in racemes. Sepals small. Petals villous. Stamens many. Drupes oblong.

Fl. & Fr. : October-July.

Common ; in Ghats ; Karasuryamalai area, Silent Valley R.F.

Kalkaman *l.c.* merged many species of *Pygeum* under the above species but Gamble *l.c.* treated them separately.

2. RUBUS L.

1a. Bracts boat-shaped, entire or dentate at apex	...	*R. wightii*	2
1b. Bracts pectinately laciniate	...	*R. micropetalus*	1

1. **Rubus micropetalus** Gardn. in Calcutta J. Nat. Hist. 8 : 6. 1847 ; Gamble, Fl. Pres. Madr. 441. 1919, Repr. ed. 1 : 312. 1957.

Small climbers with recurved prickles. Leaves simple, deeply 5-lobed, cordate, rusty-tomentose, rugose with small areoles. Flowers white, in short panicles. Calyx lobes large. Petals small. Fruits red.

Fl. & Fr. : July-October.

Common ; in upper Ghats ; Silent Valley R.F.

2. **Rubus wightii** Gamble, Fl. Pres. Madr. 440. 1919, Repr. ed. 1 : 312. 1957.

Small, prickly, fulvous-tomentose shrubs. Leaves simple, lobed. Flowers dull white, in panicles. Bracts obovate. Calyx persistent. Fruits red.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Aruvampara slopes-Silent Valley R.F.

49. CRASSULACEAE

KALANCHOE Adanson

1a. Calyx divided to the base :

2a. Leaves simple, obovate-spathulate ... *K. floribunda* 1

2b. Leaves pinnatifid ; segments linear ... *K. laciniata* 3

1b. Calyx divided only half way down ... *K. glandulosa* 2

1. **Kalanchoe floribunda** Wight & Arn. Prodr. 359. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 414. 1878 ; Gamble, Fl. Pres. Madr. 450. 1919, Repr. ed. 1 : 319. 1957.

Large perennial, succulent, deciduous, glabrous herbs. Leaves fleshy, rounded or obtuse, crenate-serrate. Bracts linear lanceolate. Flowers yellow, in large trichotomous corymbose cymes. Calyx glabrous ; segments narrowly lanceolate, acute. Corolla tube inflated, glabrous ; lobes broadly lanceolate, acute. Fruits with shining white corolla tubes.

Fl. & Fr. : March-June.

Abundant ; on dry rocky slopes ; Karasuryamalai area.

2. **Kalanchoe glandulosa** Hochst. ex A. Rich. Fl. Abyss. 1 : 312. 1847 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 414. 1878 ; Gamble, Fl. Pres. Madr. 450. 1919, Repr. ed. 1 : 319. 1957.

Stout, succulent herbs, glandular hairy. Leaves fleshy, obovate-lanceolate, glabrous, narrowed at base ; upper leaves densely glandular-pubescent, lanceolate, obtuse, amplexicaul. Flowers yellow, in dense paniculate glandular-pubescent cymes. Calyx densely glandular-pubescent ; teeth triangular-ovate, acute. Corolla tube glandular-pubescent ; segments ovate oblong, acuminate. Fruits glabrous.

Fl. & Fr. : February-March.

Rare ; but abundant on dry rocky slopes ; Karasuryamlai area.

3. **Kalanchoe laciniata** (L.) Pers. Syn. 446. 1805 ; Wight, Ic. t. 1158. 1846 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 415. 1878 ; Gamble, Fl. Pres. Madr. 451. 1919, Repr. ed. 1 : 319. 1957. *Cotyledon laciniata* L. Sp. Pl. 430. 1753.

Large, succulent herbs, glandular-pubescent. Leaves fleshy ; segments narrow-oblong to linear-lanceolate, glaucous, acute, dentate ; petioles amplexicaul. Bracts linear. Flowers yellow in erect compact panicles of cymes. Corolla lobes oblong-lanceolate, glabrous-pubescent, acute, mucronate. Fruits glabrous.

Fl. & Fr. : February.

Rare ; but abundant on dry slopes ; Kathalakandi area-Kollenkode.

50. DROSERACEAE

DROSERA L.

1a. Rootstock bulbous ; leaves cauline, peltate ... *D. peltata* 3

1b. Rootstock not bulbous ; leaves cauline or radical :

2a. Leaves radical, round-spathulate ... *D. burmannii* 1

2b. Leaves cauline, linear ... *D. indica* 2

1. **Drosera burmannii** Vahl, Symb. Bot. 3 : 50. 1794 ; Wight, Ic. t. 944. 1845 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 424. 1878 ; Gamble, Fl. Pres. Madr. 452. 1919, Repr. ed. 1 : 320. 1957.

Rosulate herbs. Leaves red, fleshy, appressed on the ground, obovate to orbicular, glandular-hairy. Flowers on leafless erect scapes. Sepals oblong. Petals white, obovate. Styles 5.

Fl. & Fr. : October.

Common ; in grassy moist places ; Aruvampara area-Silent Valley R.F.

2. **Drosera indica** L. Sp. Pl. 282. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 424. 1878 ; Gamble, Fl. Pres. Madr. 452. 1919, Repr. ed. 1 : 320. 1957.

Slender, glandular-hairy herbs. Leaves (lower) recurved, upper ones erect, filiform, glandular-hairy. Flowers pink, in leaf-opposed racemes. Sepals lanceolate, acute. Petals obovate. Capsules oblong.

Fl. & Fr. : October.

Common ; on wet grassy slopes ; Aruvampara area, Ayyappankoil forest area, Malampuzha.

3. **Drosera peltata** J.E. Smith in Willd. Sp. Pl. 1 : 1546. 1797 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 424. 1878 ; Gamble, Fl. Pres. Madr. 452. 1919, Repr. ed. 1 : 320. 1957.

Tuberous, slender, erect herbs. Leaves peltate with upturned cups ; basal leaves rosulate, glandular. Flowers white. Sepals ovate. Petals spathulate - obovate. Styles 3, brush-like.

Fl. & Fr. : October.

Common ; on open wet grassy slopes ; Karasuryamalai area.

51. HALORAGACEAE

MYRIOPHYLLUM L.

Myriophyllum oliganthum (Wight & Arn.) F.v. Mueil. Fragm. Phyt. Austr. 10 : 54. 1876 ; Meijden in Blumea 17 : 308. 1969. *Haloragis oligantha* Wight & Arn. Prodr. 338. 1834. *Myriophyllum intermedium* auct. non DC. 1828 ; Wight, Ic. t. 102. 1839 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 433. 1878 ; Gamble, Fl. Pres. Madr. 454. 1919. Repr. ed. 1 : 321. 1957.

Aquatic herbs. Leaves opposite or whorled ; floating ones linear, serrate ; submerged ones pectinately pinnatifid. Flowers axillary, minute, 4-merous. Petals caducous. Stamens 4. Fruits tuberculate, separating into 4 cocci.

Fl. & Fr. : December.

Rare ; in stagnant water ; Karapara river-Padagiri.

This species is often referred to as *M. intermedium* DC. which is *M. indicum* Willd. On the examination of the holotype at Geneva van der Meijden *l.c.* differentiated many species including the above species.

52. RHIZOPHORACEAE

CARALLIA Roxb. *nom. cons.*

Carallia brachiata (Lour.) Merr. in Philipp. J. Sci. Bot. 15 : 249. 1919. *Distoma brachiata* Lour. Fl. Cochinch. 296. 1790. *Carallia integerrima* DC. Prodr. 3 : 33. 1828 ; Bedd. Fl. Sylv. t. 193. 1879 ; Gamble, Fl. Pres. Madr. 459. 1919, Repr. ed. 1 : 325. 1957. '*Varanga*' (Mal.).

Pretty, evergreen trees, 5-7 m. Leaves opposite, simple, entire, obovate, glabrous. Flowers small, yellowish-green, in small heads. Calyx 8-lobed, glabrous. Petals orbicular, clawed. Stamens 16. Berries globose.

Fl. & Fr. : November-April.

Common ; in lower Ghats ; Karivara forest, Mukkali forest.

53. COMBRETACEAE

1a. Petals absent :

2a. Trees or shrubs :

3a. Flowers in spikes or racemes ... TERMINALIA 4

3b. Flowers in globose heads ... ANOGEISSUS 1

2b. Straggling shrubs or climbers ... CALYCOPTERIS 2

1b. Petals 4-5 ... COMBRETUM 3

1. ANOGEISSUS (DC.) Guill. & Perr.

Anogeissus latifolia (Roxb. ex DC.) Wall. ex Guill. & Perr. Fl. Seneg. Tent. 1 : 280 1832 ; Bedd. Fl. Sylv. t. 15. 1869 ; Gamble, Fl. Pres Madr. 466. 1919, Repr. ed. 1 : 330. 1957. *Conocarpus latifolia* Roxb. ex DC. Prodr. 3 : 17. 1828 ; Wight, Ic. t. 994. 1846. '*Vella naga*' (Tam.), '*Marukanchiram*' (Mal.).

Deciduous trees with smooth bark, 15-20 m. Leaves elliptic-ovate, rounded-cordate, glabrous, turning red before falling. Flowers small creamy, in dense heads. Calyx yellow ; lobes reflexed. Fruits broadly winged ; wings entire.

Fl. & Fr. : September-October.

Common ; in deciduous forests ; Agali forest, Panthanthode area, Sappal hill-Dhoni R.F.

2. CALYCOPTERIS Lam.

Calycopteris floribunda (Roxb.) Poir. in Lam. Encycl. 2 : 485. t. 357. 1793 & Suppl. 2 : 41. 1811 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 449. 1878 ; Gamble, Fl. Pres. Madr. 467. 1919, Repr. ed. 1 : 331. 1957. *Getonia floribunda* Roxb. Pl. Cor. t. 87. 1798.

Straggling shrubs, often climbing. Leaves opposite, ovate, tomentose, base rounded. Flowers in dense panicles at ends of branches. Calyx white; tube elongate ; lobes 5, recurved. Fruits narrow ovoidwith enlarged persistent calyx.

Fl. & Fr. : November-April.

Common ; in Ghats ; Anamooly, Malampuzha dam area ; Silent Valley dam site, Olipara river bank.

3. COMBRETUM Loefl. *nom. cons.*

1a. Calyx tube campanulate ; leaves pale when dry ... *C. ovalifolium* 2

1b. Calyx tube funnel-shaped ; leaves shining when dry ... *C. latifolium* 1

1. **Combretum latifolium** Bl. Bijdr. 641. 1825, non G. Don 1827. *C. extensum* Roxb. ex G. Don in Trans. Linn. Soc. London 15 : 414. 422. 1827 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 458. 1878 ; Gamble, Fl. Pres. Madr. 469. 1919, Repr. ed. 1 : 332. 1957.

Large climbing shrubs. Leaves opposite, elliptic oblong to orbicular, acuminate. Flowers white, in spikes. Calyx puberulous. Petals 4, glabrous, red when falling. Fruits with 4 thin striate wings.

Fl. : December.

Common ; in lower Ghats ; Mukkali forest.

2. **Combretum ovalifolium** Roxb. Fl. Ind. 2 : 226. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 458. 1878 ; Gamble, Fl. Pres. Madr. 469. 1919, Repr. ed. 1 : 232. 1957. '*Verragay*' (Tam.).

Large, climbing, deciduous shrubs. Leaves ovate to lanceolate. Flowers yellow, in large panicles. Calyx lobes 4. Fruits winged ; wings 4, papery.

Fl. & Fr. : March October.

Not common ; in lower Ghats ; Walayar forest.

4. TERMINALIA L.

1a. Leaves not clustered at ends of branches ; fruits winged :			
2a. Fruits with 5 equal wings :			
3a. Veins of wings curved upwards	...	*T. arjuna*	1
3b. Veins of wings straight, horizontal	...	*T. crenulata*	3
2b. Fruits with 3 unequal wings	...	*T. paniculata*	4
1b. Leaves clustered at ends of branches ; fruits not winged	...	*T. bellirica*	2

1. **Terminalia arjuna** (Roxb. ex DC.) Wight & Arn. Prodr. 314. 1834 ; Bedd. Fl. Sylv. t. 28. 1869 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 447. 1878 ; Gamble, Fl. Pres. Madr. 465. 1919, Repr. ed. 1 : 329. 1957. *Pentaptera arjuna* Roxb. ex DC. Prodr. 3 : 114. 1828. '*Vella maruda*', '*Kula marutha*' (Tam.).

Large, buttressed, deciduous trees, 20-30 m. Leaves oblong-elliptic, crenulate. Flowers sessile, in axillary spikes or terminal panicles. Calyx glabrous. Fruits notched at top.

Fr. : November.

Common near banks of rivers ; Mukkali forest.

Wood is used for implements.

2. **Terminalia bellirica** (Gaertn.) Roxb. Pl. Cor. t. 198. 1805 ('*belleric*a') ; Wight, Ic. t. 91. 1838 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 445. 1878 ; Gamble, Fl. Pres. Madr. 463. 1919, Repr. ed. 1 : 328. 1957. *Myro-*

balanus bellirica Gaertn. Fruct. 2 : 90. t. 97. 1791. ('*bellirina*'). '*Thani*' (Mal.) & (Tam.).

Deciduous trees, 20-30 m. Leaves broadly elliptic, base cuneate ; petioles long. Flowers pale greenish-yellow, in simple spikes, pubescent. Fruits ovoid, brown-pubescent.

Fl. & Fr. : March-December.

Common ; in dry deciduous forests ; Chindaki, Karivara, Mukkali, Malampuzha hill slopes, Panthanthode, Thavalam.

3. **Terminalia crenulata** Roth, Nov. Pl. Sp. 330. 1821 ; Gamble, Fl. Pres. Madr. 465. 1919, Repr. ed. 1 : 329. 1957. '*Thembava*' (Mal.).

Trees, 20-25 m. Leaves elliptic-obovate, glabrous, with 2 stalked glands near lower midrib. Flowers pale yellow, in lax panicles. Calyx glabrous outside. Fruits glabrous.

Fl. & Fr. : April June.

Common ; in dry deciduous forests ; Dhoni R.F., Mukkali forest.

Wood is used for implements and for building purposes.

4. **Terminalia paniculata** Roth, Nov. Pl. Sp. 383. 1821 ; Bedd. Fl. Sylv. t. 20. 1869 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 448. 1878 ; Gamble, Fl. Pres. Madr. 465. 1919, Repr. ed. 1 : 329. 1957. '*Pelkadukkal*', '*Ven maruthu*' (Tam.), '*Pillamaruthu*' (Mal.).

Deciduous trees, 20-30 m ; young parts silky pubescent. Leaves oblong-lanceolate, rounded-cordate at base, glands at base beneath sessile. Flowers white, in branched panicles. Fruits with 2 short and one long wings.

Fl. & Fr. : October-February.

Common ; in dry deciduous forests ; Mukkali, Peringathukavu, Panthanthode, Thiruvizhankunnu, Walayar forest.

Wood is used for building purposes.

Quisqualis indica L. is an ornamental climber.

54. MYRTACEAE

1a. Calyx tube produced beyond the ovary	...	SYZYGIUM	2
1b. Calyx tube not produced beyond the ovary	...	EUGENIA	1

1. EUGENIA L.

Eugenia indica (Wight) Chithra in Nair & Henry, Fl. Tamilnadu

ser. I. 1 : 153. 1983. *Jossinia indica* Wight, Ic. t. 523. 1842. *Eugenia jossinia* Duthie in Hook. f. Fl. Brit. Ind. 2 : 500. 1879 ; Gamble, Fl. Pres. Madr. 484. 1919, Repr. ed. 1 : 342. 1957.

Trees, 5-8 m. Leaves opposite, oblanceolate, obtuse 3-5 × 1-2 m. Flowers white, in fascicles. Stamens numerous. Fruits globose with persistent calyx lobes.

Fl. & Fr. : March.

Rare ; in upper Ghats ; Ayyappankoil area-Pothundy.

2. SYZYGIUM Gaertn. *nom. cons.*

1a. Flowers over 0.5 mm across ; staminal disc present :

2a. Leaves rounded or cordate at base, up to 25 cm long :

3a. Leaves lanceolate, long-acuminate at apex ... *S. munronii* 9

3b. Leaves elliptic-oblong, acute or obtuse at apex ... *S. mundagam* 8

2b. Leaves narrowed at base, up to 20 cm long :

4a. Leaves elliptic or ovate; fruits less than 3 cm across :

5a. Leaves elliptic, acute to caudate-acuminate at apex ... *S. hemisphericum* 4

5b. Leaves ovate, bluntly acuminate ... *S. laetum* 6

4b. Leaves linear-lanceolate ; fruits more than 3 cm across ... *S. jambos* 5

1b. Flowers less than 0.5 mm across ; staminal disc absent :

6a. Petals free ; leaves less than 12 cm long :

7a. Calyx tube less than 1 cm long ; branchlets tetragonous :

8a. Leaves petioled, elliptic, acute at base ... *S. densiflorum* 3

8b. Leaves sessile, ovate, cordate at base ... *S. benthamianum* 1

7b. Calyx tube more than 1 (-3) cm long ; branchlets terete ... *S. lanceolatum* 7

6b. Petals united, calyptrate ; leaves more than 12 cm long ... *S. cumini* 2

1. **Syzygium benthamianum** (Wight ex Duthie) Gamble, Fl. Pres. Madr. 478. 1919, Repr. ed. 1 : 338. 1957. *Eugenia arnottiana* Wight var. *benthamiana* Wight ex Duthie in Hook. f. Fl. Brit. Ind. 2 : 484. 1878.

Large shrubs or small trees, *ca.* 7 m. Leaves obtuse, acute at apex, black when dry. Flowers dull white, in corymbs of umbels. Petals deciduous. Fruits globose.

Fl. & Fr. : December-March.

Not common ; in upper Ghats ; Valiyaparathode banks.

2. **Syzygium cumini** (L.) Skeels in U.S. Dept. Agr. Bur. Pl. Ind. Bull. 248 : 25. 1912. *Myrtus cumini* L. Sp. Pl 471. 1753. *Syzygium jambolanum* (Lam.) DC. Prodr. 3 : 259. 1828 ; Gamble, Fl. Pres. Madr. 481. 1919, Repr. ed. 1 : 340. 1957. *Eugenia jambolana* Lam. Encycl. 3 : 198. 1789 ; Wight, Ic. t. 535. 1842 ; Duthie in Hook. f. Fl. Brit. Ind. 2 : 494. 1879. '*Naaval*' (Tam.).

Trees, 20-25 m. Leaves ovate-lanceolate, obtuse-acuminate. Flowers white, in cymose panicles. Calyx obscurely lobed. Petals yellow at throat. Berries globose, purple.

Fl. & Fr. : March-May.

Common ; in lower Ghats along river banks ; Bhavani river side, Dhoni R.F., Karapara river, Kunthipuzha.

Fruits edible ; cultivated as avenue trees ; wood is used for building purposes.

3. **Syzygium densiflorum** Wall. ex Wight & Arn. Prodr. 329. 1834. *S. arnottianum* Walp. Repert. 2 : 180. 1843 ; Gamble, Fl. Pres. Madr. 478. 1919, Repr. ed. 1 : 338. 1957. '*Naaval*' (Tam.).

Trees, 15-20 m. Leaves when young pale red, olive green when dry. Flowers pale yellow, in dense cymes. Petals deciduous. Berries dark purple.

Fl. : April.

Not common ; in lower Ghats ; Minnampara forest.

Wood is used for building purposes and as fuel.

4. **Syzygium hemisphericum** (Walp.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) : 115. 1931. *Jambosa hemispherica* Walp. Repert. 2 : 191. 1843 ; Gamble, Fl. Pres. Madr. 474. 1919, Repr. ed. 1 : 335. 1957. '*Vella naaval*' (Tam.).

Trees, 10-15 m. Flowers white, in cymes. Calyx funnel-shaped. Petals suborbicular, concave. Berries hemispherical with calyx segments.

Fr. : January.

Common ; in Ghats ; Dhoni R.F.

5. **Syzygium jambos** (L.) Alston in Trimen Handb. Fl. Ceylon 6 (Suppl.) : 115. 1931. *Eugenia jambosa* L. Sp. Pl. 470. 1753 ; Duthie in Hook. f. Fl. Brit. Ind. 2 : 474. 1878. *Jambosa vulgaris* DC. Prodr. 3 : 286. 1828 ; Wight, Ic. t. 435. 1841 ; Gamble, Fl. Pres. Madr. 474. 1919, Repr. ed. 1 : 336. 1957.

Trees, 3-5 m. Leaves linear-lanceolate, acuminate at both ends. Flowers greenish-white, in branched cymes. Calyx tube funnel-shaped. Berries globose, pinkish, edible.

Fl. & Fr. : January-March.

Fairly common ; in Ghats ; Kunthipuzha dam site area.

6. **Syzygium laetum** (Buch. Ham.) Gandhi in Said. & Nicol. Fl. Hassan Dist. 282. 1976. *Eugenia laeta* Buch.-Ham. in Mem. Wern. Nat. Hist. Soc. 5 : 338. 1826 ; Duthie in Hook. f. Fl. Brit. Ind. 2 : 479. 1878. *Jambosa laeta* (Buch. - Ham.) Bl. in Mus. Bot. 1 : 104. 1849 ; Gamble, Fl. Pres. Madr. 474. 1919, Repr. ed. 1 : 335. 1957.

Trees, up to 5 m. Leaves shortly petiolate, cuneate at base. Flowers white. Calyx tube funnel-shaped below, and broader above. Stamens crimson. Berries ovoid.

Fl. & Fr. : October-June.

Common ; in Ghats ; Mukkali forest, Silent Valley R.F.

7. **Syzygium lanceolatum** (Lam.) Wight & Arn. Prodr. 330 1834. *Eugenia lanceolata* Lam. Encycl. 3 : 200. 1789 ; Wight, Ic. t. 530. 1842. *Syzygium wightianum* Wall. ex Wight & Arn. Prodr. 330. 1834 ; Gamble, Fl. Pres. Madr. 478. 1919, Repr. ed. 1 : 338. 1957.

Trees, up to 15 m. Leaves elliptic-lanceolate, subacute at base, long-acuminate at apex. Flowers white, in axillary short racemes. Calyx tube elongate, funnel-shaped. Berries scarlet.

Fl. : March.

Rare ; in upper Ghats ; Karapara river banks.

The tree is attractive when in full bloom.

8. **Syzygium mundagam** (Bourd.) Chitra in Nair & Henry, Fl. Tamilnadu ser. I. 1 : 157. 1983. *Eugenia mundagam* Bourd. For. Trees Travancore 182. 1908. *Jambosa mundagam* (Bourd.) Gamble, Fl. Pres. Madr. 473. 1919, Repr. ed. 1 : 335. 1957. '*Katta vamba*' (Tam.).

Trees, 7-10 m. Leaves 15-20 × 4-6 cm, cordate at base. Flowers white or pink, fragrant, in terminal corymbose cymes. Berries globose.

Fl. & Fr. : February-June.

Fairly common ; in lower Ghats ; Kaikatty - Pothundy forest, Mukkali forest, Vattapara-Siruvani forest.

9. **Syzygium munronii** (Wight) Chandr. in Biol. Mem. 2 : 58. 1977. *Eugenia munronii* Wight, Ic. t. 546. 1842 ; Duthie in Hook. f. Fl. Brit. Ind. 2 : 472. 1878. *Jambosa munronii* (Wight) Walp. Repert. 2 : 191. 1843; Gamble, Fl. Pres. Madr. 473. 1919, Repr . ed. 1 : 335. 1957. '*Ilambili*' (Tam.).

Trees, 5-7 m. Leaves cordate at base. Flowers pale pink to white, pedicellate, in terminal, corymbose cymes. Berries fleshy, dull pinkish.

Fl. & Fr. : December-May.

Fairly common ; in Ghats ; Silent Valley R.F.

Psidium guajava L. is commonly cultivated for the edible fruits.

55. LECYTHIDACEAE

CAREYA Roxb. *nom. cons.*

Careya arborea Roxb. Pl. Cor. t. 218. 1811 ; Bedd. Fl. Sylv. t. 205. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 511. 1879 ; Gamble, Fl. Pres. Madr. 1919, Repr. ed. 1 : 345. 1957. '*Ayama*' (Tam.), '*Pezha*' (Mal.).

Deciduous trees, 5-10 m. Leaves obovate, crenate, acute at apex, cuneate at base. Flowers yellowish-white, in spikes. Peduncles woody. Calyx lobes ovate, obtuse at apex. Petals elliptic-oblong. Stamens many. Fruits large, up to 10 cm across, globose with persistent calyx lobes.

Fl. & Fr. : February-May.

Common ; on dry open slopes ; Pothundy-Ayyappankoil area, Mangalam dam area, Kunthipuzha dam site area.

56. MELASTOMATACEAE

1a. Venation palmate ; fruits many-seeded :

2a. Inflorescences not scorpioid ; petals 4-5 :

3a. Plants epiphytic ; flowers not showy ... MEDINILLA 1

3b. Plants not epiphytic ; flowers showy ... OSBECKIA 3

2b. Inflorescences scorpioid ; petals 3 ... SONERILA 4

1b. Venation pinnate : fruits 1-2-seeded ... MEMECYLON 2

1. MEDINILLA Gaudich.

Medinilla beddomei Clarke in Hook. f. Fl. Brit. Ind. 2 : 548. 1879 ; Gamble, Fl. Pres. Madr. 496. 1919, Repr. ed. 1 : 351. 1957. *M. radicans* sensu Bedd. Ic. t. 184. 1868-74 non Bl. 1831.

Epiphytic, ivy-like, fleshy climbers on trunks and branches of trees, rooting from the joints of the stems. Leaves orbicular, 3-ribbed, very fleshy. Flowers axillary, pink. Stamens with curved, acuminate anthers ; the tubercles and spur prominent.

Fl. : April.

Rare ; in dense evergreen forests ; Valiyaparathode bank.

2. MEMECYLON L.

1a. Leaves petioled :

2a. Flowers sessile in fascicles ... *M. heyneanum* 2

2b. Flowers pedicelled in umbellate - cymes ... *M. umbellata* 3

1b. Leaves sessile ... *M. depressum* 1

1. **Memecylon depressum** Benth. ex Triana in Trans. Linn. Soc. London 25 : 158. 1865-66 ; Gamble, Fl. Pres. Madr. 505. 1919, Repr. ed. 1 ; 357. 1957. *M. amplexicaule* Roxb. var. *malabarica* Clarke in Hook. f. Fl. Brit. Ind. 2 : 559. 1879 *p.p.* excl. type.

Large shrubs or small trees. Leaves lanceolate, cordate. Flowers in axillary clusters. Calyx tube saucer - shaped above ovary. Berries pinkish-black.

Fl. & Fr. : April.

Common ; in Ghats ; Kudam-Siruvani forests.

2. **Memecylon heyneanum** Benth. ex Wight & Arn. Prodr. 319. 1834; Clarke in Hook. f. Fl. Brit. Ind. 2 : 560. 1879 ; Gamble, Fl. Pres. Madr. 503. 1919, Repr. ed. 1 : 355. 1957. *M. jambosoides* Wight, Ic. t. 277. 1840. '*Kanalai*' '*Kaya*' ((Tam.).

Shrubs or small trees, 3-5 m. Leaves lanceolate, acuminate, prominently nerved. Flowers blue, in axillary fascicles. Calyx-tube campanulate. Berries globose with persistent calyx limbs.

Fl. & Fr. : November-February.

Fairly common ; in Ghats ; Mukkali forest, Silent Valley R.F.

3. **Memecylon umbellatum** Burm. f. Fl. Ind. 87. 1768 ; Sant. Fl. Khandala ed 3. 95. 1967. *M. edule* Roxb. Pl. Cor. t. 82. 1798 ; Gamble, Fl. Pres. Madr. 504. 1919, Repr. ed. 1 : 355. 1957.

Large shrubs or small trees, 2-5 m. Leaves ovate-oblong, glabrous, acute-acuminate, emarginate, drying yellowish. Flowers bluish, in compact umbels. Calyx lobes 4. Petals 4, orbicular, acute. Stamens 8. Berries globose, yellow.

Fl. : March ; *Fr.* : October.

Common ; in lower Ghats ; Ayyappankoil Pothundy forest, Karasuryamalai area.

3. Osbeckia L.

1a. Slender undershrubs, 1-2 m.	...	*O. aspera* var. *aspera* 1
1b. Much branched shrubs, 2-3 m.	...	*O. aspera* var. *wightiana* 2

1. **Osbeckia aspera** (L.) Bl. Bijdr. Natuurk. Wetensch. 6 : 220. 1831; Clarke in Hook. f. Fl. Brit. Ind. 2 : 519. 1879 ; Hansen in Ginkgoana 4 : 82. 1977. *Melastoma asperum* L. Sp. Pl. 389. 1753. *Osbeckia kleinii* Wight & Arn. Prodr. 323. 1834. *O. courtallensis* Gamble in Bull. Misc. Inform. Kew 242. 1918 et Fl. Pres. Madr. 492. 1919, Repr. ed. 1 : 347. 1957.

var. **aspera.**

Leaves 3-7 ribbed, lanceolate, acuminate, base narrowed, sparsely bristly above. Flowers purplish-red. Calyx with simple bristles below, tufted above, ciliate on margins ; lobes ovate-oblong, rounded at apex.

Fl. & Fr. : January.

Not common ; in upper Ghats ; Silent Valley eastern slopes.

2. **Osbeckia aspera** (L.) Bl. var. **wightiana** (Benth. ex Wight & Arn.) Trimen, Handb. Fl. Ceylon 2 : 196. 1894. *O. wightiana* Benth. ex Wight & Arn. Prodr. 323. 1834 ; Wight, Ic. t. 998. 1845 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 519. 1879 ; Gamble, Fl. Pres. Madr. 493. 1919, Repr. ed. 1 : 348. 1957.

Stems reddish. Leaves elliptic, acute with dense velvety bristles on upper surface, whitish beneath. Flowers purple. Calyx with dense, tufted bristles ; lobes emarginate at apex.

Fl. & Fr. : October-December.

Fairly common ; in upper Ghats ; Silent Valley R.F.

4. Sonerila Roxb. *nom. cons.*

1a. Stems elongate ; leaves not orbicular	...	*S. versicolor* 2
1b. Stemless plants ; leaves orbicular	...	*S. rotundifolia* 1

1. **Sonerila rotundifolia** Bedd. in Madras J. Lit. Sci. ser. 2. 22 : 74. 1861 & Ic. t. 169. 1868-74 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 538. 1879; Gamble, Fl. Pres. Madr. 500. 1919, Repr. ed. 1353. 1957.

Small fleshy herbs. Leaves deeply cordate at base with 2-3 pairs of nerves from the base, minutely serrate, pinkish beneath, green above. Flowers purple, few (2-4), in racemes. Peduncles bright red. Petals 3.

Fr. & Fr. : September.

Rare ; on wet rocks in upper Ghats ; Silent Valley R.F.

2. **Sonerila versicolor** Wight, Ic. t. 1057. 1846 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 535. 1879, *p.p.* ; Gamble, Fl. Pres. Madr. 499. 1919, Repr. ed. 1 : 352. 1957.

var. **versicolor**.

Annual under shrubs. Leaves opposite, penninerved with 8-10 pairs of nerves, ovate-lanceolate, long, acuminate, base unequal, sharply serrate. Flowers rose coloured, in terminal racemes. Capsules glabrous.

Fl. & Fr. : January-April.

Not common ; in Ghats in moist shady places ; Kudam-Siruvani forest, Valiyaparathode forest.

2a. **Sonerila versicolor** Wight var. **axillaris** (Wight) Gamble, Fl. Pres. Madr. 499. 1919, Repr. ed. 1: 352. 1957. *S. axillaris* Wight, Ic. t. 1058. 1846.

It can be distinguished by the racemes being axillary.

Fl. & Fr. : October-November.

Rare ; in Ghats ; Kunthipuzha dam site area ; Silent Valley R.F.

57. LYTHRACEAE

1a. Herbs ; stamens 3-6 :

- 2a. Flowers in axillary cymes ; petals absent ... AMMANNIA 1
- 2b. Flowers solitary in leaf axils or in racemes ; petals present ... ROYALA 4

1b. Trees or shrubs ; stamens more than 6 :

- 3a. Flowers 6-merous ; seeds flat, winged ... LAGERSTROEMIA 2
- 3b. Flowers 4-merous ; seeds pyramidal, not winged ... LAWSONIA 3

1. AMMANNIA L.

Ammannia baccifera L. Sp. Pl. 120. 1753 ; Clarke in Hook. f. Fl.

Brit. Ind. 2 : 569. 1879 ; Gamble, Fl. Pres. Madr. 570. 1919, Repr. ed. 1 : 360. 1957. '*Neermael Neruppu*', '*Kalluruvi*' (Tam.).

var. **baccifera**

Erect herbs. Leaves oblong-elliptic or oblanceolate, base cuneate. Flowers dark red, in subsessile cymes. Calyx without appendages. Stamens 4 Style thick. Capsules brownish-red. Seeds minute, red.

Fl. & Fr. : October.

Common in marshy places in plains ; Walayar area.

Ammannia baccifera L. var. **aegyptiaca** (Willd.) Koehne in Engl. Bot. Jahrb. Syst. 1 : 260. 1880 ; Gamble, Fl. Pres. Madr. 510. 1919, Repr. ed. 1 : 360. 1957. *A. aegyptiaca* Willd. Enum. Hort. Berol. 167. 1809.

Similar to the species proper but almost robust, subshrubby with profuse branching and leaf base being sub-cordate-amplexicaul.

Fl. & Fr. : July.

Common in marshes ; Walayar dam area.

2. LAGERSTROEMIA L.

1a. Calyx tube smooth ; petals up to 1 cm long	...	*L. microcarpa*	1
1b. Calyx tube ribbed ; petals up to 5 cm long	...	*L. reginae*	2

1. **Lagerstroemia microcarpa** Wight, Ic. t. 109. 1839 ; Furtado & Srisuko in Gard. Bull. Straits Settlem. 24 : 192. 1969. *L. lanceolata* Wall. ex Clarke in Hook. f. Fl. Brit. Ind. 2 : 576. 1879 ; Gamble, Fl. Pres. Madr. 513. 1919, Repr. ed. 1 : 362. 1957. *L. thomsonii* Koehne in Pflanzenr. 17 : 257. 1903 : Gamble *l.c.*

Deciduous trees, 25 m ; bark white, smooth, peeling off in flakes. Leaves elliptic-ovate, glaucous and hairy beneath. Flowers white with pink calyx. Calyx lobes reflexed in fruit. Capsules ellipsoid.

Fl. & Fr. : April-December.

Common; in lower Ghats ; forests of Chindaki, Mukkali, Panthonthode.

Timber is used for building purposes.

2. **Lagerstroemia reginae** Roxb. Pl. Cor. t. 65. 1796 ; Wight Ic. t. 413. 1841 ; Furtado & Srisuko in Gard. Bull. Straits Settlem. 24 : 261. 1969. *L. flos-reginae* Retz. Obs. Bot. 5 : 25. 1786 *p.p.* ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 577. 1879 ; Gamble, Fl. Pres. Madr. 513. 1919, Repr. ed. 1 : 362. 1957. '*Kadali*', '*Punaruthu*' (Tam.).

Deciduous trees, 5-10 m. Leaves elliptic-oblong, rounded at base, *ca.* 20×10 cm, glabrous. Flowers purple, showy. Calyx lobes persistent. Stamens subequal. Capsules subglobose.

Fl. & Fr. : April-November.

Common ; at lower elevations ; Mukkali forest, Dhoni R.F., Pothundy dam area.

Ornamental trees ; cultivated in parks and gardens ; wood is used for furnitures.

3. LAWSONIA L.

Lawsonia inermis L. Sp. Pl. 349. 1753 ; Roxb. Fl. Ind. 2 : 258. 1832 ; Gamble, Fl. Pres. Madr. 514. 1919, Repr. ed. 1 : 363. 1957. *L. alba* Lam. Encycl. 3 : 106. 1789 ; Wight, Ill. Ind. Bot. t. 87. 1840 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 573. 1879. '*Marudhani*', "*Mayilanchee*' (Tam.).

Shrubs with branchlets ending in spines. Leaves obovate-elliptic. Flowers white in cymose panicles, fragrant. Petals 4. Stamens 8. Capsules globose with numerous seeds.

Fl. & Fr. : April.

Commonly cultivated as hedge plants. Leaves are used as nail polish by children and ladies.

4. ROTALA L.

1a. Flowers axillary or numerous in leafy spikes ;

2a. Flowers axillary, solitary :

3a. Flowers 5-merous ... *R. rosea* 4

3b. Flowers 3-merous ... *R. malampuzhensis* 3

2b. Flowers axillary spicate ... *R. indica* 1

1b. Flowers in terminal spikes ... *R. macrandra* 2

1. **Rotala indica** (Willd.) Koehne in Engl. Bot. Jahrb. Syst. 1 : 172. 1880 ; Gamble, Fl. Pres. Madr. 508. 1919, Repr. ed. 1 : 359. 1957 ; Cook in Boissiera 29 : 108. 1979. *Peplis indica* Willd. Sp. Pl. 2 : 244. 1799. *Ameiatia indica* (Willd.) DC. Prodr. 3 : 76. 1828 ; Wight, Ic. t. 257 A. 1840.

Erect or decumbent herbs. Leaves thick, opposite-decussate, elliptic-lanceolate with cuneate or obtuse base. Flowers pink. Bracteoles shorter than calyx. Calyx campanulate without appendages, lobes 4, acuminate. Petals 4, obovate. Stamens 4, included. Capsules ellipsoid, 2-valved with numerous seeds.

Fl. & Fr. : October-December.

Not common but abundant in marshy places ; Anamooly slopes and Thiruvizhankunnu forest.

2. **Rotala macrandra** Koehne in Engl. Bot. Jahrb. Syst. 1 : 176. 1880 ; Gamble, Fl. Pres. Madr. 509. 1919, Repr. ed. 1 : 359. 1957.

Much branched, flaccid herbs, creeping and rooting at base. Leaves orbicular, sessile. Flowers white with cordate floral leaves in close terminal spikes. Petals small, narrowly obovate. Stamens exserted. Capsules 4 valved.

Fl. & Fr. : November.

Not common, in lower Ghats ; Peringatukavu-Kollenkode.

3. **Rotala malampuzhensis** R. Vasudevan Nair ex Cook in Boissiera 29 : 98. 1979.

Profusely branching, tufted, deep green herbs, rooting at nodes. Leaves opposite decussate, angustate. Flowers crimson. Bracteoles 2, subulate. Sepals triangular, acute, crimson. Petals linear-oblong. Stamens 3. Staminodes 3. Capsules subspherial, crimson with 10-15 obovoid, crimson seeds.

Fl. & Fr. : July-September.

Endemic ; in shallow waters in lower Ghats ; Malampuzha.

4. **Rotala rosea** (Poir.) Cook in Boissiera 29 : 86. 1979 ; Matthew, Ill. Fl. Tamilnadu Carnatic t. 283. 1982. *Ammannia rosea* Poir. in Lam. Encycl. 1 : 329. 1810. *Rotala leptopetala* (Bl.) Koehne in Engl. Bot Jahrb. Syst. 1 : 162. 1880 ; Gamble, Fl. Pres. Madr. 508. 1919, Repr. ed. 1 : 358. 1957. *Ammannia leptopetala* Bl. Mus. Bot. 2 : 134. 1850.

Erect herbs. Leaves decussate, linear-lanceolate. Flowers sessile, pink. Bracteoles shorter than calyx. Calyx lobes 5, short, acute, alternating with minute appendages. Petals 5, elliptic. Stamens exserted. Capsules globose, 3-valved. Seeds 20-25, compressed.

Fl. & Fr. : October.

Common in marshy places ; Olavakkot.

58. ONAGRACEAE

LUDWIGIA L.

1a. Flowers more than 2 cm across :

2a. Capsules terete, more than 4 cm long. ... *L. octovalvis* 2

2b. Capsules angular, less than 2 cm long ... *L. peruviana* 4

1b. Flowers less than 1 cm across :

3a. Petals elliptic ; stamens 4 ... *L. perennis* 3

3b. Petals obovate ; stamens 8 ... *L. hyssopifolia* 1

1. **Ludwigia hyssopifolia** (G. Don) Exell in Garcia de Orta 5 : 471. 1957. *Jussiaea hyssopifolia* G. Don, Gen. Syst. 2 : 693. 1832. *J. linifolia* Vahl, Ecolog. Amer. 2 : 32. 1798 non *Ludwigia linifolia* Poir. 1813 ; Fischer in Gamble, Fl. Pres. Madr. 1875. 1936, Repr. ed. 3 : 1298. 1957. *Fissendocarpa linifolia* (Vahl) Bennet in J. Bombay Nat. Hist. Soc. 67 : 126. 1970.

Herbs with slender, glabrous branches to 1 m. Leaves oblong - elliptic, acuminate. Flowers yellow. Calyx-lobes 4, lanceolate. Petals rounded at apex. Stamens epipetalous. Capsules linear, 8-ribbed, puberulous. Seeds free and one seriate at apex, embedded in endocarp at base.

Fl. & Fr. : February October.

Common ; in moist places in plains ; Ayalur slopes, Chindaki, Olavakkot, Vaniyampara area.

2. **Ludwigia octovalvis** (Jacq.) Raven ssp. **sessiliflora** (Micheli) Raven in Kew Bull. 15 : 476. 1962. *Jussiaea octonervia* var. *sessiliflora* Micheli in Mart Fl. Bras. 13 : 171. 1875. *J. suffruticosa* L. Sp. Pl. 388. 1753 ; Gamble, Fl. Pres. Madr. 516. 1919, Repr. ed. 1 : 365. 1957. *J. villosa* Lam. Encycl. 3 : 331. 1789 ; Gamble *l.c.* 3 : 1297. 1957 "*Sevangachedi*" (Tam.).

Subshrubs to 3 m ; branchlets densely tomentose. Leaves elliptic-lanceolate, acute, cuneate at base. Flowers solitary, yellow, 4-merous. Calyx-lobes hairy. Stamens 8. Capsules 8-ribbed, pubescent.

Fl. & Fr. : October February.

Not Common ; in marshy places ; Chindaki forest, Ommala area, Walayar forest.

3 **Ludwigia perennis** L. Sp. Pl. 119. 1753 ; Raven in Steenis, Fl. Males. I. 8 : 103. 1977. *L. parviflora* Roxb. Fl. Ind. 1 : 419. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 588. 1879 ; Gamble, Fl. Pres. Madr. 517. 1919, Repr. ed. 1 : 365. 1957.

Herbs. Leaves linear - lanceolate, glabrous. Flowers yellow, solitary, 4-merous. Calyx lobes acute. Petals elliptic. Capsules narrowed below, 4-ribbed, glabrous ; seeds multiseriate.

Fl. & Fr. : May.

Common in moist places ; Malampuzha canal banks.

4. **Ludwigia peruviana** (L.) Hara in J. Jap. Bot. 28 : 293. 1953. *Jussiaea peruviana* L. Sp. Pl. 388. 1753. *J. speciosa* Ridley in J. Bot. London 59 : 259. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1875. 1936, Repr. ed. 3 : 1298. 1957.

Erect, hairy shrubs. Leaves broadly oblong-lanceolate. Flowers golden yellow. Calyx tube hirsute ; lobes 4, lanceolate. Petals 4, obovate. Stamens 8. Capsules 4-angled, 4-ribbed.

Fl. & Fr. : July November.

Common in marshy places ; Attappadi forest-Mukkali, Karivara forest.

58a. TRAPACEAE

TRAPA L.

Trapa natans L. Sp. Pl. 120. 1753 ; Daniel, Vajravelu & Thiagaraj in J. Econ. Tax. Bot. 4 (2) : 596. 1983. *T. natans* L. var. *bispinosa* (Roxb.) Makino in Inuma Somoku-Dzusezii ed. 3. 1 : 137. 1907 ; Brenan Fl. Trop. E. Africa (Trapac.) 3. 1953 ; Sant. & Wagh in Bull. Bot. Surv. India 5 : 109. 1963. *T. bispinosa* Roxb. Pl. Cor. t. 234. 1815 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 590. 1879 ; Gamble, Fl. Pres. Madr. 518. 1919, Repr. ed. 1 : 366. 1957. *T. quadrispinosa* Roxb. Fl. Ind. 1 : 430. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 590. 1879 pro syn. ; *T. natans* L. var. *quadrispinosa* (Roxb.) Makino in Inuma Somoku-Dzusetsu ed. 3. 1 : 137. 1907. '*Mullikai*' (Tam.).

Aquatic, branched, floating herbs. Leaves dimorphic ; submerged leaves opposite, pectinate ; floating leaves mostly rosulate, crenulate, ovate-rhomboid, broadly cuneate, glabrous above, tomentose beneath with a dark purple or 2-5 spots near the base of blade ; petioles pubescent with a fusiform swelling just below the blade. Flowers axillary, solitary, white. Calyx gomosepalous, accrescent, 4-lobed, developing into 2, 3, or 4 spines in fruit. Petals 4, free, obovate, crenate. Stamens 4 or 5 with white filiform filaments. Fruits green to purple, tetrahedral, tipped by the conical hardened style. Spines slender, slightly winged, straight or slightly bent, barbed up to 2/3 from tip. Barbs *ca* 7 pairs.

Fl. & Fr. : September - May.

Not common ; in tanks. Olavakkot.

Fruits (kernals) are eaten raw, boiled or roasted.

59. PASSIFLORACEAE

1a. Flowers unisexual ; tendrils on inflorescence	...	ADENIA	1
1b. Flowers bisexual ; tendrils in leaf axils	...	PASSIFLORA	2

1. ADENIA Forsk.

1a. Leaves glandular at the top of the petiole	...	*A. wightiana*	2
1b. Leaves glandular at the sinuses and base	...	*A. heudelotii*	1

1. **Adenia hondala** (Gaertn.) de Wilde in Blumea 15 : 265. 1967. *Granadilla hondala* Gaertn. Fruct. 2 : 480. 1791. *Adenia palmata* (Lam.) Engler in Bot. Jahrb. 14 : 375. 1892 ; Gamble, Fl. Pres. Madr. 525. 1919, Repr. ed. 1 : 371. 1957. *Modecca palmata* Lam. Encycl. 4 : 209. 1797 ; Mast. in Hook. f. Fl. Brit. Ind. 2 : 603. 1879.

Large, tuberous, woody climbers ; stems thickened at nodes. Leaves palmately 3-5-lobed, glandular. Flowers greenish with pinkish tinge ; pedicels with circular bracteoles. Petals linear-lanceolate, pilose on margin. Filaments connate below. Capsules globose, red on maturity.

Fl. & Fr. : Almost throughout the year.

Common ; in moist hilly places at low elevations ; Karapara river slopes, Pothundy-Kaikatty.

2. **Adenia wightiana** (Wall. ex Wight & Arn.) Engler in Bot. Jahrb. 15 : 573. 1893. Gamble, Fl. Pres. Madr. 525. 1919, Repr. ed. 1: 371. 1957. *Modecca wightiana* Wall. ex Wight & Arn. Prodr. 353. 1834 ; Wight, Ic. t. 179. 1839 ; Mast. in Hook. f. Fl. Brit. Ind. 2 : 601. 1879.

Slender climbers with tuberous roots. Leaves broadly ovate, lobed or not. Petioles twisted. Stipules triangular. Flowers white. Petals attached to the base of calyx tube. Corona a fringe of short hairs at base of petals. Filaments combined in a tube. Capsules globose.

Fl. & Fr. : July.

Not common ; in lower Ghats ; Malampuzha.

2. PASSIFLORA L.

1a. Leaves hairy ; bracts deeply divided	...	*P. foetida*	1
1b. Leaves glabrous ; bracts not divided	...	*P. subpeltata*	2

1. **Passiflora foetida** L. Sp. Pl. 959. 1753 ; Gamble, Fl. Pres. Madr. 524. 1919, Repr. ed. 1 : 370. 1957 ; Chakravarty in Bull. Bot. Soc. Beng. 3 : 57. 1949. '*Mosukkatan*' (Tam.).

Silky pubescent, tendril climbers. Leaves ovate, 3-lobed, terminal lobes larger ; stipules divided into filiform segments. Flowers solitary, white, fragrant with moss-like pectinate involucres. Berries globose, smooth, with pectinate involucral bracts.

Fl. & Fr. : Almost all seasons.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Pothundy-Kaikatty area, Malampuzha, Walayar forest.

A tropical American species running wild in the forests.

2. **Passiflora subpeltata** Ortega, Nov. Rar. Pl. Hort. Matrit. 6 : 78. 1798 ; Green in Kew Bull. 26 : 557. 1972. *P. calcarata* Mast. in Trans. Linn. Soc. London 27 : 638. 1871 ; Gamble, Fl. Pres. Madr. 524. 1919, Repr. ed. 1 : 370. 1957. '*Thorupattankai*' (Tam.).

Glabrous climbers. Leaves palmately 3-lobed, truncate at base, glaucous beneath. Flowers large, white, violet inside ; bracteoles ovate, acute. Berries elliptic, smooth.

Fl. & Fr. : February May.

Common ; in lower Ghats ; Anavayee-Thadikundu area, Attapadi-Mukkali forest.

Introduced from Madagascar and running wild.

Carica papaya L. (CARICACEAE) cultivated for the edible fruits.

60. CUCURBITACEAE

1a. Petals fimbriate ... TRICHOSANTHES 9
1b. Petals entire :
2a. Corolla 5-partite to the base :
3a. Anther cells flexuose or conduplicate :
4a. Calyx tube of male flowers elongate ... GYMNOPETALUM 4
4b. Calyx tube of male flowers short :
5a. Stamens inserted at the calyx mouth ; anthers free ... LUFFA 5
5b. Stamens inserted below the calyx mouth : anthers cohering :
6a. Calyx with 2-3 scales ; male flowers bracteate ... MOMORDICA 7
6b. Calyx without scales ; male flowers ebracteate ... CUCUMIS 2
3b. Anther cells straight or curved :
7a. Style disk present :
8a. Stamens 3, all dithecous ... ZEHNERIA 11
8b. Stamens 3, two dithecous and one monothecous ; -
9a. Anther thecae triplicate ... SOLENA 8
9b. Anther thecae arcuate ... MELOTHRIA 6
7b. Style disk absent :
10a. Stamens 3 ... DIPLOCYCLOS 3
10b. Stamens 5 ... ZANONIA 10
2b. Corolla 5-lobed to the middle ... COCCINIA 1

1. COCCINIA Wight & Arn.

Coccinia grandis (L.) Voigt, Hort. Sub. Calc. 59. 1845. *Bryonia grandis* L. Mant. 126. 1767. *Coccinia indica* Wight & Arn. Prodr. 347. 1834 ; Gamble, Fl. Pres. Madr. 537. 1919. Repr. ed. 1 : 379. 1957. *Cephalandra indica* (Wight & Arn.) Naud. in Ann. Sci. Nat. Bot. ser. 5. 5 : 16. 1866 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 621. 1879 '*Kovai*' (Tam.).

Scandent herbs. Leaves entire to palmately lobed. Tendrils slender. Flowers white. Calyx tube campanulate. Staminodes 3. Stigma densely papillose. Fruits oblong, scarlet, edible with velvety seeds.

Fl. & Fr. : June.

Common on hedges in plains ; Olavakkot area.

2. CUCUMIS L.

Cucumis callosus (Rottl.) Cogn. ex Cogn. & Harms in Pflanzenr. 88 : 129. 1924 ; Chakravarty in Fasc. Fl. India 11 : 31. 1982. *Bryonia callosa* Rottl. in Ges. Naturf. Freunde Berlin Neue Schriften 4 : 210. 1803. *Cucumis trigonus* Roxb. Fl. Ind. 3 : 722. 1832 ; Wight, Ic. t. 497. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 619. 1879 *p.p.* ; Gamble, Fl. Pres. Madr. 535. 1919, Repr. ed. 1 : 378. 1957. '*Sukkankai*' (Tam.).

Scabrous, prostrate herbs. Leaves palmately 5-lobed. Flowers yellow ; segments ovate-oblong. Calyx hirsute. Berries ellipsoid-globose glabrescent.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Ayyappankoil area, Walayar dam area.

3. DIPLOCYCLOS (Endl.) Post & Kuntze

Diplocyclos palmatus (L.) Jeffrey in Kew Bull. 15 : 352. 1962 ; Chakravarty in Fasc. Fl. India 11 : 48. 1982. *Bryonia palmata* L. Sp. Pl. 1012. 1753 excl. syn. *B. laciniosa* sensu Wight, Ic. t. 500. 1841 non L. 1753 ; Clarke in Hook. f. Fl. Brit. Ind 2 : 622. 1879. *Bryonopsis laciniosa* auct non (L.) Naud. 1859 ; Gamble, Fl. Pres. Madr. 534. 1919, Repr ed. 1 : 377. 1957.

Slender, tuberous herbs. Leaves *ca.* 15×10 cm, palmately lobed. Flowers dull yellow, in fascicles. Stamens 3, free. Berries ovoid, brick-red, white - lined.

Fl. & Fr. : October - January.

Fairly common ; in upper Ghats ; Pothundy-Kaikatty forest, Valiyaparathode-Silent Valley R.F.

Jeffrey *l.c.* says "The Linnaean epithet has been erroneously applied to a widespread plant of the Old World tropics in the combination *Bryonopsis laciniosa* (L.) Naud. for which the correct name appears to be *Diplocyclos palmatus* (L.) Jeffrey.

4. GYMNOPETALUM Arn.

Gymnopetalum wightii Arn. in Hook. London J. Bot. 3 : 278. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 611. 1879 ; Gamble, Fl. Pres. Madr. 530. 1919, Repr. ed. 1 : 374. 1957 ; Jeffrey in Kew Bull. 34 : 798. 1980 ; Chakaravarty in Fasc. Fl. India 11 : 54. 1982.

Slender, hiruste climbers. Petiole, densely villose - hirsute. Leaves 3 - 5 lobed, cordate. Flowers yellow. Calyx tube elongate. Corolla rotate, 5 lobed. Fruits oblong.

Fl. & Fr. : October - December.

Fairly common ; in upper Ghats ; Pothundy Kaikatty forest, Silent Valley R.F.

5. LUFFA Mill.

Luffa cylindrica (L.) Roem. Fam. 2 : 63. 1846 ; Chakravarty in Fasc. Fl. India 11 : 70. 1982. *Momordica cylindrica* L. Sp. Pl. 1009. 1753. *Luffa aegyptiaca* Mill. Gard. Dict. ed. 4. 500. 1754 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 614. 1879 ; Gamble, Fl. Pres. Madr. 533. 1919, Repr. ed. 1 : 376. 1957. *L. pentandra* Roxb. Fl. Ind. 3 : 712. 1832. '*Nurai Peerkku*' (Tam.).

Large, climbing shrubs. Leaves orbicular reniform, palmately 5 lobed, scabrous, punctate. Flowers bright yellow. Stamens 3. Fruits fusiform, cylindrical, fibrous inside.

Fl. & Fr. : October March.

Fairly common ; in lower Ghats ; Bhavani river bank Mukkali, Neelipara - Vaniyampara.

6. MELOTHRIA L.

Melothria maderaspatana (L.) Cogn. in DC. Monogr. Phan. 3 : 623. 1881 ; Gamble, Fl. Pres. Madr. 539. 1919, Repr. ed. 1 : 380. 1957 ; Chakravarty in Fasc. Fl. India 11 : 83. 1982. *Cucumis maderaspatana* L. Sp. Pl. 1012. 1753. *Mukia scabrella* (L. f.) Arn. in Hook. London J. Bot.

3 : 276. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 623. 1879, *excl. syn.* '*Musa Musukkai*' (Tam.).

Scabrous climbers with simple tendrils. Leaves ovate, 3 - 5 - lobed, acute. Flowers yellow ; calyx tube hirsute. Corolla lobes ovate - oblong. Staminal filaments pilose. Fruits small, globose, red when ripe.

Fl. & Fr. : August - October.

Common ; in lower Ghats ; Chindaki, Mukkali area, Olavakkot.

7. MOMORDICA L.

1a.	Flowers monoecious ; bracts at middle or at the base of peduncles	... *M. charantia*	1
1b.	Flowers dioecious ; bracts near the top of peduncles	... *M. dioica*	2

1. **Momordica charantia** L. Sp. Pl. 1009. 1753 ; Wight, Ic. t. 504. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 616. 1879 ; Gamble, Fl. Pres. Madr. 532. 1919, Repr. ed. 1 : 375. 1957. Jeffrey in Kew Bull. 34 : 789. 1980 ; Chakravarty in Fasc. Fl. India 11 : 89. 1982. '*Paavakai*' (Tam.) & (Mal.).

Slender twiners. Leaves orbicular - reniform, deeply pedately 5 - 7 - lobed ; lobes dentate. Flowers yellow, male solitary ; bracts foliaceous. Fruits large, oblong, muricate - tuberculate.

Fl. & Fr. : October - January.

Fairly common ; in lower Ghats ; Anamooly slopes, Pothundy - Kaikatty forest.

It is cultivated for the fruits used as vegetable and running wild also.

2. **Momordica dioica** Roxb. ex Willd. Sp. Pl. 4 : 605. 1805 ; Wight, Ic. t. 505 & 506. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 617. 1879 ; Gamble, Fl. Pres. Madr. 532. 1919, Repr. ed. 1 : 375. 1957 ; Jeffrey in Kew Bull. 34 : 790. 1980 ; Chakravarthy in Fasc. Fl. India 11 : 94. 1982. '*Kaattupaavai*' (Tam.).

Tuberous, dioecious, perennial climbers. Leaves ovate, mucronate, cordate, acute. Flowers yellow ; male solitary ; bracts spathaceous at apex of peduncles. Calyx lobes linear - lanceolate, densely villous. Fruits ovoid, muricate, many - seeded.

Fl. & Fr. : August - October.

Fairly common ; in lower Ghats ; Ayyappankoil area, Mukkali forest.

Fruits are used as vegetable and tubers are of medicinal value.

8. SOLENA Lour.

Solena amplexicaulis (Lam.) Gandhi in Sald. & Nicol. Fl. Hassan Dist. 179. 1976; Jeffrey in Kew Bull. 34 : 801. 1980. *Bryonia amplexicaulis* Lam. Encycl. 1 : 496. 1785; Wight, Ic. t. 502. 1841. *Melothria amplexicaulis* (Lam.) Cogn. in DC. Monogr. Phan. 3 : 621. 1881; Gamble, Fl. Pres. Madr 539. 1919, Repr. ed. 1 : 380. 1957; Chakravarthy in Fasc. Fl. India 11 : 77. 1982.

Slender climbers. Leaves ovate - oblong, cordate, denticulate, clasping at base. Pistillate flowers solitary, white; filaments glabrous, connective produced. Berries oblong, ribbed, 3 - 4 - seeded.

Fl. & Fr. : September - February.

Rare; in lower Ghats; Mukkali forest, Pothundy - Kaikatty forest.

9. TRICHOSANTHES L.

1a. Male racemes with large bracts; calyx lobes dentate	.	*T. bracteata* 1
1b. Male racemes without bracts; calyx lobes not dentate	...	*T. cucumerina* 2

1. **Trichosanthes bracteata** (Lam.) Voigt, Cat. Hort. Calc. 58. 1845; Chakravarthy in Fasc. Fl. India 11 : 109. 1982. *Modecca bracteata* Lam. Encycl. 4 : 210. 1797. *Trichosanthes palmata* Roxb. Fl. Ind. 3 : 704. 1832; Clarke in Hook. f. Fl. Brit. Ind. 2 : 606. 1879; Gamble, Fl. Pres. Madr. 529. 1919, Repr. ed. 1 : 374. 1957. '*Anacorathy*' (Tam.).

Large, sturdy climbers. Leaves palmately lobed, broadly ovate, cordate, scabrid above; lobes acute - acuminate. Bracts laciniate, spathaceous. Flowers white, in racemes. Calyx lobes deeply laciniate. Berries globose, streaked.

Fl. & Fr. : December - February.

Fairly common; in lower Ghats; Attappadi block, Malampuzha, Mukkali, Muthikulam forest, Kathalakandi area.

2. **Trichosanthes cucumerina** L. Sp. Pl. 1008. 1753; Clarke in Hook. f. Fl. Brit. Ind. 2 : 609. 1879; Gamble, Fl. Pres. Madr. 529. 1919, Repr. ed. 1 : 373. 1957; Jeffrey in Kew Bull. 34 : 796. 1980; Chakravarthy in Fasc. Fl. India 11 : 112. 1882. "*Peippudal*' (Tam.).

Slender climbers. Leaves broadly ovate, deeply 5 7 lobed acute - rounded. Tendrils 2 3 fid. Flowers white. Calyx tube dilated at apex. Petals laciniate. Fruits ovoid fusiform, striped.

Fl. : February.

Rare ; in upper Ghats ; once collected from Karasuryamalai area - Nemmara division.

10. ZANONIA L.

Zanonia indica L. Sp. Pl. ed. 2. 1457. 1763 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 633. 1879 ; Gamble, Fl. Pres. Madr. 543. 1919, Repr. ed. 1 : 383. 1957 ; Jeffrey in Kew Bull. 34 : 800. 1980 ; Chakravarthy in Fasc. Fl. India 11 : 124. 1982.

Scandent shrubs with bifid tendrils. Leaves ovate-oblong, up to 20 cm long. Male flowers dull yellow. Petals broad at base. Fruits cylindric, truncate, 3 valved.

Fl. & Fr. : October November.

Not common ; in lower Ghats ; Marapalam Pothundy forest, Mukkali forest.

11. ZEHNERIA Endl.

1a. Male flowers in racemes ; leaves deltoid	...	*Z. thwaitesii* 3
1b. Male flowers in umbels ; leaves not deltoid ;		
2a. Leaves rufous - villous beneath	...	*Z. scabra* 2
2b. Leaves glabrous beneath	...	*Z. maysorensis* 1

1. **Zehneria maysorensis** (Wight & Arn.) Arn. in Hook. J. Bot. 3 : 275. 1841 ; Jeffrey in Kew Bull. 15 : 366. 1962 & 34 : 795. 1980. *Bryonia maysorensis* Wight & Arn. Prodr. 345. 1834. *Melothria mucronata* auct. non (Bl.) Cogn. 1881 ; Gamble, Fl. Pres. Madr. 538. 1919, Repr. ed. 1 : 380. 1957 ; Chakravarthy in Fasc. Fl. India 11 : 84. 1982.

Slender, monoecious climbers. Leaves ovate, somewhat 3 - 5 - lobed, scabrous, denticulate. Flowers white ; pistillate solitary. Corolla puberulous. Stamens inserted below mouth of calyx. Berries ovoid, mucronate at apex.

Fl. : October.

Not common ; in upper Ghats ; Dam site - Silent Valley R.F.

2. **Zehneria scabra** (L. f.) Sond. in Harv. & Sond. Fl. Cap. 2 : 486. 1862 ; Jeffrey in Kew Bull. 15 : 369. 1962. *Bryonia scabra* L.f. Suppl. 423. 1781. *Zehneria hookeriana* Arn. in Hook. J. Bot. 3 : 275. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 624. 1879. *Melothria perpusilla* (Bl.) Cogn. in DC. Monogr. Phan. 3 : 607. 1881 ; Gamble, Fl. Pres. Madr. 538. 1919, Repr. ed. 1 : 380. 1957 ; Chakravarthy in Fasc. Fl. India 11 : 85. 1982. *Cucurbita perpusilla* Bl. Cat. Hort. Buitenz. 105. 1823.

Slender climbers. Leaves ovate cordate, rarely 3 5 - lobed, mucronate, pubescent beneath. Flowers pale yellow. Calyx teeth recurved. Corolla villous at apex. Berries globose.

Fl. & Fr. : October - December.

Fairly common ; in Ghats ; Anavayee, Panthanthode, Silent Valley R.F.

Jeffrey *l.c.* comments that the above species has been much confused with *Z. mucronata* (Bl.) Miq. and *Z. maysorensis* (Wight & Arn.) Arn. but these three species have distinct features and geographical distributions. *Z. mucronata* (Bl.) Miq. does not occur in India while the other two species occur in India.

3. **Zehneria thwaitesii** (Schweinf.) Jeffrey in Kew Bull. 15 : 371. 1962. *Melothria thwaitesii* Schweinf. Relique. Kotschy 44. t. 29. 1868. *M. zeylanica* Clarke in Hook. f. Fl. Brit. Ind. 2 : 626. 1879 ; Gamble, Fl. Pres. Madr. 538, 1919, Repr. ed. 1 : 380. 1957 ; Chakravarthy in Fasc. Fl. India 11 : 87. 1982.

Very slender climbers. Leaves acute to acuminate, punctate, scabrous above. Flowers monoecious, white ; pistillate flowers solitary. Fruits fusiform.

Fl. & Fr. : September October.

Not common ; in Ghats ; Panthanthode area, Valiyaparathode forest.

Citrullus lanatus (Thunb.) Mansf. 'The Water melon', **Cucurbita maxima** Duch. ex Lam. 'The Squash gourd', **C. pepo** DC. 'The Pumpkin', **Lagenaria siceraria**, (Molina) Standley (*L. vulgaris* Ser.) 'The Bottle gourd', **Luffa acutangula** (L.) Roxb. 'The Ridged gourd', **Trichosanthes anguina** L. 'The Snake gourd' etc. are cultivated for the fruits used as vegetable in the district.

61. DATISCACEAE

TETRAMELES R. Br.

Tetrameles nudiflora R. Br. in Benn. Pl. Jav. Rar. 79. t. 17. 1838 ; Bedd. Fl. Sylv. t. 212. 1872 ; Clarke in Hook. f. Fl. Brit. Ind 2 : 657.

1879 ; Gamble, Fl. Pres. Madr. 544. 1919, Repr. ed. 1 : 384. 1957. *T. grahamiana* Wight, Ic. t. 1956. 1853. (Plate-8)

Large, buttressed, deciduous trees, 30 m. Leaves ovate, acuminate, coarsely dentate, pubescent beneath. Flowers small, fragrant, crowded in dense panicles. Calyx of male flowers 4 - lobed ; calyx of female fusiform. Capsules globose, coriander - like, in pendulous panicles.

Fr. : April.

Not common ; in lower Ghats ; Marapalam - Pothundy forest, Anamooly area.

62. BEGONIACEAE

BEGONIA L.

1a. Stout or elongate - stemmed plants :

2a. Sepals (male) 4 ; wings of capsule unequal ... *B. integrifolia* 2

2b. Sepals (male) 2 ; wings of capsule subequal ... *B. malabarica* 3

1b. Stemless, scapigerous herbs ... *B. floccifera* 1

1. **Begonia floccifera** Bedd. Ic. t. 111. 1868 - 74 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 654. 1879 ; Gamble, Fl. Pres. Madr. 546. 1919, Repr. ed. 1 : 386. 1957.

Robust herbs. Leaves thick, orbicular, broader than long, dentate, white tomentose beneath. Scapes 30 - 40 cm long. Flowers pink, many. Sepals 2 (male). Capsules winged.

Fl. & Fr. : November - February.

Not common ; in lower Ghats ; Pothundy - Kaikatty forest, Nelliyampathy Ghat.

2. **Begonia integrifolia** Dalz. in Hook. Kew J. Bot. 3 : 230. 1851 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 648. 1879 ; Gamble, Fl. Pres. Madr. 546. 1919, Repr. ed. 1 : 385. 1957.

Succulent herbs with short stems. Leaves ovate, unequal, acute at apex, cordate and oblique at base, glabrous. Flowers white. Perianth 4 in male, 6 in female. Capsules with large dorsal wings.

Fl. & Fr. : July - August.

Rare ; in lower Ghats on wet rocks ; Mukkali forest.

3. **Begonia malabarica** Lam. Encycl. 1: 393. 1785 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 655. 1879 ; Gamble, Fl. Pres. Madr. 546. 1919, Repr. ed. 1 : 386. 1957. *Diploclinium lindleyanum* Wight, Ic. t. 1817. 1852.

Much branched succulent shrubs. Leaves lanceolate, acuminate, serrate, very unequally cordate at base, pinkish beneath. Flowers many, pink. Sepals orbicular. Capsules winged.

Fl. & Fr. : October - April.

Common ; in moist places in Ghats ; Anavayee way, Pothundy - Kaikatty, Silent Valley R.F.

63. CACTACEAE

OPUNTIA L.

Opuntia dillenii (Ker - Gawl.) Haw. Suppl. Pl. Succ. 79. 1819 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 657. 1879 ; Gamble, Fl. Pres. Madr. 548. 1919, Repr. ed. 1 : 387. 1957. *Cactus dillenii* Ker - Gawl. in Edwards, Bot. Reg. 3 : t. 255. 1818.

Woody shrubs with fleshy, flattened, ovate, spiny, jointed branches. Leaves scale - like, deciduous. Flowers yellow, showy. Fruits fleshy, purple, spiny, tubercled.

Fl. & Fr. : All seasons.

Common ; in waste open places ; Panangateri - Kollengode area.

Cereus pterogonus Lam. is a fleshy, angled, thorny, erect shrub, 2 - 5 m with white large showy flowers. It is an introduced cactus found in big clumps in a few places like Thadikkundu near Mukkali.

64. AIZOACEAE

(MOLLUGINACEAE)

1a. Calyx tube elongate ; capsules 1 - 2 - celled ... TRIANTHEMA 3

1b. Calyx deeply 5 - partite ; capsules 3 - 5 - celled :

2a. Flowers in terminal cymes or umbels ... MOLLUGO 2

2b. Flowers in axillary fascicles ... GLINUS 1

1. GLINUS L.

1a. Branchlets and leaves densely stellate - hairy. ... *G. lotoides* 1

1b. Branchlets and leaves glabrous ... *G. oppositifolius* 2

1. **Glinus lotoides** L. Sp. Pl. 463. 1753 ; Wight & Arn. Prodr. 362. 1834 ; Backer in Steenis, Fl. Males. I. 4 : 269. 1951. *Mollugo lotoides* (L.) Kuntze, Rev. Gen. Pl. 264. 1891 ; Gamble, Fl. Pres. Madr. 552. 1919, Repr. ed. 1 : 390. 1957. *M. hirta* Thunb. Prodr. Fl. Cap. 24. 1794 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 662. 1879. *Glinus dictamnoides* L. Mant. 243. 1771.

Spreading herbs. Leaves 3 5 in a cluster, orbicular obovate or spathulate, apiculate. Stipules linear, acute. Flowers white in axillary clusters of 5 10. Sepals (Tepals) 5, densely - stellate tomentose. Stamens 5, subequal. Capsules globose-oblong. Seeds many, ovoid-subreniform.

Fl. & Fr. : February - May.

Common in river beds and plains ; Walayar.

2. **Glinus oppositifolius** (L.) DC. in Bull. Herb. Boiss. ser. 2. 1 : 559. 1901 ; Backer in Steenis, Fl. Males. I. 4 : 270. 1951. *Mollugo oppositifolia* L. Sp. Pl. 89. 1753 ; Gamble, Fl. Pres. Madr. 552. 1919, Repr. ed. 1 : 390. 1957. *M. spercula* L. Syst. Nat. ed. 10. 881. 1759 ; Wight & Arn. Prodr. 44. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 662. 1879. '*Theruppoondu*' (Tam.).

Prostrate slender herbs. Leaves 3 5 in fascicles, oblong or elliptic-obovate. Flowers white, 5 7 in clusters. Sepals (Tepals) 5, oblong - lanceolate, glabrous. Stamens 5. Capsules oblong. Seeds many, subreniform, reddish.

Fl. & Fr. : February - May.

Common in dry sandy wastelands ; Neelipara Vaniyampara area, Walayar forest.

2. MOLLUGO L.

1a. Branchlets filiform ; leaves linear ... *M. cerviana* 1

1b. Branchlets quadrangular ; leaves lanceolate obovate ... *M. pentaphylla* 2

1. **Mollugo cerviana** (L.) Ser. in DC. Prodr. 1 : 392. 1824 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 663. 1879 ; Gamble, Fl. Pres. Madr. 553. 1919, Repr. ed. 1 : 390. 1957 ; Backer in Steenis, Fl. Males. I. 4 : 268. 1951.

Very slender, much branched herbs. Leaves in fascicles, glaucous, narrowly linear. Flowers minute with filiform pedicel. Sepals (Tepals) 5. Stamens 5. Capsules ellipsoid. Seeds many, golden brown, reticulate.

Fl. & Fr. : October.

Common weed in waste places ; Walayar area.

2. **Mollugo pentaphylla** L. Sp. Pl. 89. 1753 ; Gamble, Fl. Pres. Madr. 553. 1919, Repr. ed. 1 : 390. 1957 ; Backer in Steenis, Fl. Males. I, 4 : 268. 1951. *M. stricta* L. Sp. Pl. ed. 2. 131. 1762 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 663. 1879. "*Seeragappoondu*" (Tam.).

Slender, erect herbs with ascending branches. Leaves ovate or elliptic in whorls, apiculate. Flowers dull white, leaf - opposed or in terminal cymes. Sepals 5, ovate oblong. Stamens 3. Capsules oblong. Seeds reddish brown, tubercled.

Fl. & Fr. : July.

Common in open places ; Walayar.

3. TRIANTHEMA L.

Trianthema portulacastrum L. Sp. Pl. 223. 1753 ; Gamble, Fl. Pres. Madr. 550. 1919, Repr. ed. 1 : 389. 1957. *T. monogyna* L. Mant. 69. 1767 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 660. 1879. *T. obcordata* Roxb. Fl. Ind. 2 : 445. 1832 ; Wight, Ic. t. 288. 1840.

Prostrate herbs. Leaves very unequal, orbicular-obovate ; smaller ones oblong. Petioles connate with leaf base into a pouch. Flowers pinkish - white, solitary in the pouches. Stamens many (*ca.* 20). Capsules turbinate, 2 lobed. Seeds 2 in the operculam, 7 in the lower part, white papilose.

Fl. & Fr. : July.

Common in low lying areas ; Walayar dam area.

65. APIACEAE

(UMBELLIFERAE)

1a. Erect herbs ; leaves and umbels compound :

2a. Inflorescences glabrescent ; mericarps not winged ... PIMPINELLA 4

2b. Inflorescences puberulous ; mericarps winged ... PEUCEDANUM 3

1b. Prostrate herbs ; leaves and umbels simple :

3a. Flowers white ; fruits 3 - ribbed ... HYDROCOTYLE 2

3b. Flowers red ; fruits 7 - 9 - ribbed ... CENTELLA 1

1. CENTELLA L.

Centella asiatica (L.) Urban in Mart. Fl. Bras. 11 : 287. 1879 ; Gamble, Fl. Pres. Madr. 556. 1919, Repr. ed. 1 : 392. 1957 ; Buwalda in Blumea 2 : 134. 1946 et in Steenis, Fl. Males. ser. I. 4 : 117. 1949. *Hydrocotyle asiatica* L. Sp. Pl. 234. 1753 : Wight, Ic. t. 565. 1842 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 669. 1879.

Trailing herbs, rooting at nodes. Leaves orbicular reniform, crenate, cordate at base. Flowers dull reddish, in umbels. Fruits compressed.

Fl. & Fr. : July - August.

Common ; in marshy places ; Mukkali forest, Malampuzha canal.

2. HYDROCOTYLE L.

Hydrocotyle javanica Thunb. Dissert. Hydroc. p. 3. no. 17. p. 6. t. 2. 1789 et Dissert. Acad. 2 : 415. t. 3. 1800 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 667. 1879 ; Gamble, Fl. Pres. Madr. 556. 1919, Repr. ed. 1 : 392. 1957. Buwalda in Steenis, Fl. Males. ser. I. 4 : 115. 1949. *H. polycephala* Wight & Arn. Prodr. 366. 1834 ; Wight, Ic. t. 1003. 1845.

Trailing, pubescent herbs with ascending branches. Leaves 7 - 9 - lobed, cordate at base, long-petioled. Flowers white, in clustered umbels. Capsules compressed.

Fl. & Fr. : September - October.

Common ; in moist places in upper Ghats ; Panthanthode forest, Silent Valley R.F.

3. PEUCEDANUM L.

Peucedanum anamallyense Clarke in Hook. f. Fl. Brit. Ind. 2 : 710. 1879 ; Gamble, Fl. Pres. Madr. 563. 1919, Repr. ed. 1 : 399. 1957 ; Fischer in Rec. Bot. Surv. India 9 : 89. 1921 ('*anamallayanum*').

Tall herbs with fistular fluted stems. Leaflets linear - lanceolate, serrate, inflexed at tips. Capsules compressed, oblong.

Fl. & Fr. : October.

Rare ; on grassy slopes ; Silent Valley R.F.

4. PIMPINELLA L.

Pimpinella heyneana (Wall. ex DC.) Kurz in J. Asiat. Soc. Bengal 46 : 115. 1877 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 684. 1879 ; Gamble, Fl. Pres. Madr. 560. 1919, Repr. ed. 1. 395. 1957. *Helosciadium heyneanum* Wall. ex DC. Prodr. 4 : 106. 1830.

Erect, annual herbs. Leaves trifoliolate, membranous ; leaflets ovate, serrate, glabrescent. Flowers white, in compound umbels. Calyx teeth lanceolate. Styles very short. Fruits glabrous, ovoid.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Chindaki forest, Panthanthode forest, Sappal hill Dhoni R.F.

Coriandrum sativum *L.* with aromatic leaves, white flowers and subglobose fruits is cultivated for the fruits and leaves and also found as an escape.

66. ARALIACEAE

1a. Shrubs or small trees ; leaves compound :

2a. Armed shrubs ; leaves bipinnate	...	ARALIA 1
2b. Unarmed trees ; leaves pinnate	...	POLYSCIAS 2
1b. Climbing shrubs ; leaves digitate	...	SCHEFFLERA 3

1. ARALIA L.

Aralia malabarica Bedd. Fl. Sylv. t. 15. 1869 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 722. 1879 ; Gamble, Fl. Pres. Madr. 567. 1919, Repr. ed. 1 : 400. 1957.

Large shrubs, 2 m. Leaflets lanceolate, serrate. Stipules small. Flowers in spreading panicles of umbels, bracteate. Calyx 5 - lobed. Petals 5, ovate. Fruits subglobose, angled.

Fr. : October - May.

Rare ; in upper Ghats ; Karapara R.F., Forest near E.B. Quarters - Siruvani.

2. POLYSCIAS J.R. & G. Forst.

Polyscias acuminata (Wight) Seem. in J. Bot. London 3 : 181. 1865 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 727. 1879 ; Gamble, Fl. Pres. Madr.

568. 1919, Repr. ed. 1 : 401. 1957. *Hedera acuminata* Wight, Ic. t. 1062. 1846.

Glabrous trees, 3 5 m. Leaves alternate ; leaflets oblong lanceolate, acuminate, entire. Flowers greenish, in axillary, branched panicles. Petals 5, free. Berries subglobose, 5 angled.

Fl. : April.

Not common ; in upper Ghats ; Silent Valley R.F.

3. SCHEFFLERA J.R. & G. Forst. *nom. cons.*

Schefflera venulosa (Wight & Arn.) Harms in Pflanzenfam. 3 (8) : 39. 1894 ; Gamble, Fl. Pres. Madr. 570. 1919, Repr, ed. 1 : 403. 1957 ; Maheshwari in Bull. Bot. Surv. Ind. 2 : 376. 1960. *Paratropis venulosa* Wight & Arn. Prodr. 377. 1834. *Heptapleurum venulosum* (Wight & Arn.) Seem. in J. Bot. London 3 : 80. 1865 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 729. 1879.

Straggling shrubs. Leaflets elliptic ovate, acute at apex, coriaceous. Flowers greenish yellow, in panicles of umbels, 5 merous. Drupes subglobose.

Fl. & Fr. : May - July.

Fairly common ; in Ghats ; Mukkali forest, Silent Valley R.F., Vattapara Siruvani forest.

67. ALANGIACEAE

ALANGIUM Lam.

Alangium salvifolium (L. f.) Wang. in Pflanzenr. 41 : 9. 1910 ; Gamble, Fl. Pres. Madr. 572. 1919, Repr. ed. 1 ; 404. 1957. *Grewia salvifolia* L.f. Suppl. 409. 1781. *Alangium lamarckii* Thw. Enum. Pl. Zeyl. 133. 1859 ; Clarke in Hook. f. Fl. Brit. Ind. 2 : 741. 1879. '*Alingi*' (Tam.).

Deciduous, spinous trees, 5 7 m. Leaves oblong - elliptic, lanceolate, 3 - 5 nerved at base. Flowers white, fragrant. Petals reflexed. Stamens many. Fruits globose, pubescent, with fleshy edible albumen.

Fl. & Fr. : November - April.

Common ; in plains and in deciduous forests ; Mukkali forest, Nemmara area, Walayar forest.

69. CORNACEAE

MASTIXIA Bl.

Mastixia arborea (Wight) Bedd. ssp. **meziana** (Wang.) Matthew in Blumea 23 : 89. 1976. *M. meziana* Wang. in Feddes Repert. 4 : 336. 1907 ; Gamble, Fl. Pres. Madr. 573. 1919, Repr. ed. 1 : 405 1957.

Trees, 10 - 15 m. Leaves elliptic, abruptly acuminate at apex, pubescent. Flowers white, turning blue, in pubescent corymbs. Bracts ovate, acuminate. Calyx 5 - lobed, hairy outside. Drupes ellipsoid.

Fl. & Fr. : February October.

Fairly common ; in upper Ghats ; Panthanthode forest, Silent Valley R.F.

(b) GAMOPETALAE

69. RUBIACEAE

1a. Flowers in globose heads :

2a. Calyx tube nearly connate ; fruit a syncarpium ... MORINDA 17

2b. Calyx tube free ; fruit not a syncarpium :

3a. Leaves cordate at base ; calyx 5 - lobed ... HALDINA 9

3b. Leaves acute - rounded at base ; calyx truncate ... MITRAGYNA 16

1b. Flowers not in globose heads :

4a. One of the calyx lobes petaloid ... MUSSAENDA 18

4b. All calyx lobes normal :

5a. Plants climbers, scabrid ... RUBIA 25

5b. Plants erect or diffuse, if climbers not scabrid :

6a. Stems with spongy cork ... MYCETIA 19

6b. Stems without spongy cork :

7a. Herbaceous plants :

8a. Inflorescences scorpioid ; fruits compressed ... OPHIORRHIZA 22

8b. Inflorescences not scorpioid ; fruits not compressed ;

9a. Stipules entire :

10a. Leaves over 15 cm long, glaucous beneath ... NEUROCALYX 20

10b. Leaves less than 15 cm long, not glaucous :

11a. Stems woody ; inflorescences corymbose ... KNOXIA 13

11b. Stems slender ; inflorescences not corymbose :

12a. Corolla lobes dentate ; anthers free ... DENTELLA 6

12b. Corolla lobes not dentate ; anthers connate ... ARGOSTEMMA 1

9b. Stipules lobed or pectinate :

13a. Seeds many per locule :

14a. Undershrubs or shrubs ... HEDYOTIS 10

14b. Herbs ... OLDENLANDIA 21

13b. Seed 1 per locule ;

15a. Capsules septicidally dehiscing at apex ... BORRERIA 2

15b. Capsules circumscissile ... MITRACARPUS 15

7b. Shrubs or trees, rarely climbers :

16a. Flowers in spikes ; bracts leafy ... HYMENODICTYON 11

16b. Flowers not in spikes ; bracts not leafy :

17a. Ovules 2 or more per locule :

18a. Stipules amplexicaul ... GARDENIA 7

18b. Stipules not amplexicaul :

19a. Inflorescences axillary or at apex of thorns ... CATUNAREGAM 4

19b. Inflorescences terminal on normal shoots :

20a. Inflorescences panicled ; fruits capsule ... WENDLANDIA 28

20b. Inflorescences not panicled ; fruits drupe ... TARENNA 27

17b. Ovule 1 per locule :

21a. Style branches 3 - 9 ... LASIANTHUS 14

21b. Style branches 2 :

22a. Inflorescences axillary ... CANTHIUM 3

22b. Inflorescences terminal :

23a. Plants foetid ; bracts corky :

24a. Trees or shrubs ... SAPROSMA 26

24b. Slender creeping herbs ... GEOPHILA 8

23b. Plants not foetid ; bracts not corky :

25a. Corolla lobes valvate :

26a. Corolla tube erect ... PSYCHOTRIA 24

26b. Corolla tube curved ... CHASALIA 5

25b. Corolla lobes contorted :

27a. Flowers 4 - merous ; styles glabrous :

28a. Styles 2 - branched ... IXORA 12

28b. Styles entire ... PAVETTA 23

27b. Flowers 5 - merous ; styles hairy ... TARENNA 27

1. ARGOSTEMMA Wall.

Argostemma courtallense Arn. in Ann. Nat. Hist. 3 : 22. 1839 ; Wight, Ic. t. 1160. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 42. 1880 ; Gamble, Fl. Pres. Madr. 590 1921, Repr. ed. 2 : 417. 1957.

Small herbs, up to 15 cm with tuberous roots. Leaves in unequal pairs, broadly orbicular ovate, cuneate at base. Flowers white, in cymes, 4 - merous. Fruits with persistent calyx limbs.

Fl. & Fr. : July - August.

Fairly common ; in moist places ; Dhoni R.F., Mukkali forest, Silent Valley R.F.

2. BORRERIA G.F.W. Mey. *nom. cons.*

1a. Stems erect ;

2a. Leaves ovate to obovate ; corolla lobes hairy ... *B. ocymoides* 2

2b. Leaves linear - lanceolate ; corolla lobes glabrous ... *B. pusilla* 3

1b. Stems procumbent ... *B. articularis* 1

1. **Borreria articularis** (L. f.) F.N. Will. in Bull. Herb. Boiss. ser. 2. 5 : 956. 1905 ; Sant. & Merch. in Bull. Bot. Surv. Ind. 3 : 107. 1962. *Spermacoce articularis* L.f. Suppl. 119. 1781. *Borreria hispida* (L.) K. Schum. in Pflanzentam. 4(4) : 144. 1891, non Spruce ex K. Schum.

1880 ; Gamble, Fl. Pres. Madr. 654. 1921, Repr. ed. 2 : 461. 1957. *Spermacoce hispida* L. Sp. Pl. 102. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 200. 1880. '*Natha choori*' (Tam.).

Scabrid herbs ; branches slender. Leaves elliptic - lanceolate. Flowers pale pink, in fascicles. Calyx 4 lobed. Corolla tubes long. Mericarps densely hispid, dehiscing ventrally ; septum persistent. Seeds oblong - ellipsoid.

Fl. & Fr. : October - December.

Fairly common ; in lower Ghats ; Attappadi block Mukkali, Walayar dam area.

2. **Borreria ocymoides** (Burm. f.) DC. Prodr. 4 : 544. 1830 ; Gamble, Fl. Pres. Madr. 654. 1921, Repr. ed. 2 : 461 1957. *Spermacoce ocymoides* Burm. f. Fl. Ind. 34. t. 13. f. 1. 1768 ; Hook. f. Fl. Brit. Ind. 3 : 200. 1881.

Erect branching herbs. Leaves subacute. Flowers white. Calyx lobes 4, unequal. Mericarps thinly crustaceous, dehiscing ventrally.

Fl. & Fr. : October - May.

Fairly common ; in Ghats ; Bhavani bank Mukkali, Silent Valley R.F.

3. **Borreria pusilla** (Wall.) DC. Prodr. 4 : 543. 1830. *Spermacoce pusilla* Wall. in Roxb. Fl. Ind. 1 : 379. 1820. *Borreria stricta* (L. f.) K. Schum. in Pflanzenfam. 4 (4) : 143. 1891, non Meyer 1818 ; Gamble, Fl. Pres. Madr. 654. 1921, Repr. ed. 2 : 461, 1957. *Spermacoce stricta* L. f. Suppl. 120. 1781 ; Hook. f. Fl. Brit. Ind. 3 : 200. 1881.

Erect, slender, scabrid herbs. Flowers white. Calyx 4 lobed. Corolla 4 - lobed. Mericarps dehiscing ventrally.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Aruvampara slopes, Malampuzha hills.

In the older Indian floras only *Spermacoce* is recognised as the correct name ; in modern works our plants are placed under *Borreria*. Both generic names are valid, according to K. Schumann *l.c.* who separated them on the following basis ; both cocci of the fruit dehiscent at the apex : *Borreria* ; one coccus indehiscent and adhering to the axis of septum, the other opening away from the axis : *Spermacoce*.

3. CANTHIUM Lam.

1a. Unarmed trees ; flowers 4- or 5-merous :

2a. Flowers in fascicles of cymes ... *C. travancoricum* 3

2b. Flowers in umbels	...	*C. dicoccum* var. *umbellatum* 1
1b. Armed shrubs ; flowers 5 - merous	...	*C. rheedii* 2

1. **Canthium dicoccum** (Gaertn.) Teys. & Binn. var. **umbellatum** (Wight) Sant. & Merch. in Bull. Bot. Surv. Ind 3 : 107. 1962. *C. umbellatum* Wight, Ic. t. 1034. 1845 ; Hook. f. Fl. Brit. Ind. 3 ; 132. 1880. *Plectronia didyma* (Gaertn.) Kurz var. *umbellatum* (Wight) Gamble, Fl. Pres. Madr. 624. 1921, Repr. ed. 2 ; 440. 1957. '*Nallamantharam*' (Tam.).

Trees, 15 m. Leaves elliptic - lanceolate, thick, acuminate. Flowers white, on thick peduncle, 5 merous, Corolla lobes reflexed. Drupes obovoid.

Fr. : December.

Rare ; in upper Ghats ; Karapara forest.

2. **Canthium rheedii** DC. Prodr. 4 : 474. 1830 ; Hook. f. Fl. Brit. Ind. 3 : 134. 1880. *Plectronia rheedii* (DC.) Bedd. For. Man. Bot. 134. 1872 ; Gamble, Fl. Pres. Madr 625. 1921, Repr. ed. 2 : 441. 1957.

Scandent shrubs. Leaves ovate lanceolate, hirsute, cordate at base, acuminate at apex. Flowers pale yellow to dull greenish. Corolla reflexed, hairy within. Fruits obcordate.

Fl. & Fr. ; December March.

Common ; in lower Ghats ; Ayyappankoil area, Mukkali, Thiruvizhankunnu.

3 **Canthium travancoricum** (Bedd.) Hook. f. Fl. Brit, Ind. 3 : 134. 1880. *Plectronia travancorica* Bedd Ic. t. 239. 1868 74 ; Gamble, Fl. Pres. Madr. 625. 1921, Repr. ed. 2 : 441. 1957.

Trees, 7 10 m. Leaves ovate, thin, acuminate. Stipules filiform. Flowers white with long, slender pedicels. Corolla reflexed. Fruits flat, orbicular.

Fl. & Fr. : April July.

Common ; at lower elevations ; Ayyappankoil forest, Mukkali forest.

"*Canthium* was described by Lamarck in 1785, based on Burmann's figure. De Candolle in 1830 referred both *Plectronia* and *Canthium* and kept them distinct, but other authors have united them under the older Linnaean name *Plectronia*. It seems that the name *Plectronia* as applied to Burmann's figure is based on wrong identity ; the earliest legitimate name for the plant represented by Burmann's figure is *Canthium*". Santapau & Merchant *l.c.*

4. CATUNAREGAM Adanson ex Wolf

Catunaregam spinosa (Thunb.) Tirvengadam in Taxon 27 : 515 1978. *Gardenia spinosa* Thunb. Diss. Gard. 7 : 16. t. 2. f. 4. 1780. *Randia dumetorum* (Retz.) Poir. in Lam. Encycl. 2 : 829. 1811 ; Wight, Ic. t. 580. 1842 ; Hook. f. Fl. Brit. Ind. 3 : 110. 1880 ; Gamble, Fl. Pres. Madr. 615. 1921, Repr. ed. 2 : 434. 1957. *R. spinosa* (Thunb.) Poir. *l.c.* ; Hook. f. *l.c.* *R. longispinosa* DC. Prodr. 4 : 386. 1830 ; Wight, Ic. t. 582. 1842 ; Gamble, *l.c.* 616. *R. brandisii* Gamble, Fl. Pres. Madr. 616. 1921. *Xeromphis spinosa* (Thunb.) Kaey in Bull. Jard. Bot. Etat. 28 : 37. 1958.

Large shrubs or small trees, 3 5 m ; spines axillary. Leaves elliptic obovate, subacute. Flowers white to pale yellow, solitary or in fasicles, 5 merous. Calyx densely hairy. Corolla fragrant. Berries ellipsoid.

Fl. & Fr. : November May.

Very common ; at lower elevations ; Bhavani bank Mukkali, Kaikatty Pothundy, Olipara forest, Walayar forest.

5. CHASALLIA Comm. ex Poir.

Chasallia ophioxyloides (Wall.) Craib in Gard. Bull. Straits Settlem. 6 : 474. 1930 ; Sant. & Merch. in Bull. Bot. Surv. Ind. 3 : 108. 1962. *Psychotria ophioxyloides* Wall. in Roxb. Fl. Ind. 2 : 168. 1824. *Chasallia curviflora* auct. non. (Wall.) Thw. 1859 ; Hook. f. Fl. Brit. Ind. 3 : 176. 1880 ; Gamble, Fl. Pres. Madr. 643. 1921, Repr. ed. 2 : 453. 1957.

Erect shrubs. Leaves elliptic - lanceolate or oblanceolate, acuminate at apex, attenuate at base Flowers pale pinkish, in terminal cymes. Fruits globose, pinkish black.

Fl. & Fr. : March - October.

Common ; in Ghats ; Dhoni R.F., Karasuryamalai area, Mukkali forest, Silent Valley R.F.

6. DENTELLA J.R. & G. Forst.

Dentella repens (L.) Forst. Charact. 26. t. 13. 1776 ; Hook. f. Fl. Brit. Ind. 3 : 42. 1880 ; Gamble, Fl. Pres. Madr. 590. 1921, Repr. ed. 2 : 416. 1957 ; Subr. & Sharma in Bull. Bot. Surv. Ind. 10 : 386. 1969. *Oldenlandia repens* L. Mant. 50. 1767.

Slender prostrate, herbs, rooting at nodes. Leaves lanceolate. Flowers solitary, white. Calyx hyaline, hairy. Corolla tube hairy within. Fruits

dry, densely villous, crowned by persistent calyx limbs. Seeds numerous, minute, angular.

Fl. & Fr. : August.

Common in moist places ; in lower Ghats ; Anamooly slopes Mukkali, Walayar canal.

7. GARDENIA Ellis *nom. cons.*

Gardenia resinifera Roth, Nov. Pl. Sp. 150. 1821. *G. lucida* Roxb. Fl. Ind. 2 : 553. 1824 ; Wight, Ic. t. 575 1842 ; Hook. f. Fl. Brit. Ind. 3 : 115. 1880 : Gamble, Fl. Pres. Madr. 618. 1921, Repr. ed. 2 : 436. 1957.

Small trees, 3 5 m ; young parts covered with yellow resin. Leaves elliptic obovate, obtuse ; nervules parallel. Flowers yellow.- Calyx lobes lanceolate. Corolla 5 lobed. Berries elliptic.

Fr. : December.

Not common ; in lower Ghats ; Attappadi block Mukkali.

8. GEOPHILA D. Don.

Geophila repens (L.) Johnston in Sargentia 8 : 281. 1949 ; Verdc. in Kew Bull. 28 : 321. 1973. *Rondelatia repens* L. Syst. ed. 10. 928. 1758. *Geophila reniformis* D. Don, Prodr. Fl. Nepal. 136. 1825 ; Hook. f. Fl. Brit. Ind. 3 : 178. 1880 ; Gamble, Fl. Pres. Madr. 643. 1921, Repr. ed. 2 : 454. 1957. *G. herbacea* (Jacq.) K. Schum. in Pflanzenfam. 4(4) : 199. 1891 ; Sant. & Merch. in Bull. Bot. Surv. Ind. 3 : 108. 1962. *Psychotria herbacea* Jacq. Enum. Pl. Carib. 16. 1760.

Prostrate herbs, rooting at nodes. Leaves long petioled, orbicular cordate. Flowers white. Calyx lobes persistent. Corolla throat hairy. Fruits globose, purple.

Fl. & Fr. : December.

Rare ; in lower Ghats and in plains ; once collected from Thiruvizhankunnu area.

9. HALDINA Ridsdale

Haldina cordifolia (Roxb.) Ridsdale in Blumea 24 : 361. 1978 *Nauclea cordifolia* Roxb. Pl. Cor. t. 53. 1796 ; Bedd. Fl. Sylv. t. 33. 1869.

Adina cordifolia (Roxb.) Hook. f. ex Brandis, For. Fl. t. 33. 1874 ; Hook. f. Fl. Brit. Ind. 3 : 25. 1880 ; Gamble, Fl. Pres. Madr. 584. 1921, Repr. ed. 2 : 412. 1957. '*Manja kadambu*' (Tam.).

Deciduous trees, 10 12 m. Leaves ovate orbicular, pubescent, abruptly acuminate. Flowers yellow, in small heads. Calyx 5 angled. Fruit a globose head of many capsules.

Fl. : October.

Not common ; in lower Ghats : Mangalam dam area—Nemmara, Walayar forest.

10. HEDYOTIS L.

Hedyotis silent - valleyensis Vajravelu et al. in J. Bombay Nat. Hist. Soc. 80 : 402. 1983 (1984). (Plate- 9).

Woody shrubs, 1 - 3 m, branching profusely towards the end of branches. Leaves opposite decussate, elliptic lanceolate, puberulous beneath. Stipules ovate - triangular, 5 - 12 - toothed, pubescent. Inflorescence branching trichotomously. Flowers bluish purple in paniculate cymes ; middle ones sessile. Calyx pinkish, pubescent ; lobes 4, rarely 5. Corolla lobes reflexed. Stamens 4, epipetalous, exserted ; anthers blue. Capsule elliptic obovoid, crowned by the calyx limbs.

Fl. & Fr. : May - November.

Endemic, rare ; in upper Ghats ; Silent Valley dam site. *Vajravelu* 27674, 48857-Types.

11. HYMENODICTYON Wall. *nom. cons.*

1a. Flowers pedicelled ; capsules pendulous	...	*H. erixensis*	2
1b. Flowers sessile ; capsules erect	...	*H. obovatum*	1

1. **Hymenodictyon obovatum** Wall. in Roxb. Fl. Ind. 2 : 153. 1824 ; Wight, Ic. t. 1159. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 36. 1880 ; Gamble, Fl. Pres. Madr. 589. 1921, Repr. ed. 2 : 416. 1957.

Deciduous trees, 15 20 m. Leaves obovate or elliptic, acuminate, cuneate at base, with long petioles. Flowers white, in spikes ; bracts conspicuous, creamy, bullate. Calyx pubescent. Seeds narrowly winged.

Fr. : October November.

Common ; in lower Ghats ; Ayyappankoil forest—Pothundi, Mukkali forest, Dhoni R.F.

Hymenodictyon orixensis (Roxb.) Mabberley in Taxon 31 : 66. 1982. *Cinchona orixensis* Roxb. Bot. Descr. Swietenia 21. 1793 & in Med. Facts Obs. 6 : 152. 1795. *Hymenodictyon excelsum* (Roxb.) Roxb Fl. Ind. 2 : 149. 1824 ; Hook. f. Fl. Brit. Ind. 3 : 35. 1880 ; Gamble, Fl. Pres. Madr. 589. 1921, Repr. ed. 2 : 416. 1957. *Cinchona excelsa* Roxb. Pl. Cor. t. 106. 1799. '*Vellai kadambu*' (Tam.).

Deciduous trees, 10 15 m. Leaves ovate, acuminate, pubescent, narrowed at base. Flowers pale greenish yellow, in fascicles ; bracts leafy, reticulate, conspicuous. Corolla pubescent. Capsules ellipsoid ; pedicels recurved. Seeds broadly winged.

Fr. : October.

Not common ; in deciduous forests ; Mangalam dam area - Nemmara, Walayar forest.

12. IXORA L.

1a. Calyx lobes equal to tube :

2a. peduncles over 10 cm long ... *I. elongata* 4

2b. Peduncles less than 2 cm long :

3a. Leaves over 10 cm long ... *T. cuneifolia* 3

3b. Leaves less than 10 cm long ... *T. monticola* 5

1b. Calyx lobes shorter than tube :

4a. Corolla tubes over 1 cm long :

5a. Flowers white ... *T. nigricans* 6

5b. Flowers scarlet ... *T. coccinea* 2

4b. Corolla tubes less than 1 mm long ... *T. brachiata* 1

1. Ixora brachiata Roxb. Fl. Ind. 1 : 391. 1820 ; Wight, Ic. t. 710. 1843 ; Hook. f. Fl. Brit. Ind. 3 : 142. 1880 ; Gamble, Fl. Pres. Madr. 631. 1921, Repr. ed. 2 : 445. 1957.

Trees, 5 10 m. Leaves elliptic - oblong or oblanceolate, obtuse at apex, cuneate at base. Flowers white, fragrant, bracteate. Calyx lobes filiform. Corolla lobes recurved. Fruits globose.

Fl. & Fr. : December February.

Common ; at lower elevations ; Mukkali forest, Pothundy - Kaikatty area.

2. Ixora coccinea L. Sp. Pl. 110. 1753 ; Roxb. Fl. Ind. 1 : 375. 1832 ; Wight, Ic. t. 152. 1839 ; Hook. f. Fl. Brit. Ind. 3 : 145. 1880 ; Gamble, Fl.

Pres. Madr. 631. 1921, Repr. ed. 2 : 445. 1957. *'Koran Poo'*, *'Vedchi'* (Tam.), *'Thechi'* (Mal.).

Large shrubs, 3 - 4 m. Leaves elliptic ovate, olivegreen when dry, acute at apex, rounded or cordate at base. Flowers in dense sessile corymbiform cymes. Calyx 4 - toothed. Corolla tube 2 4 cm long. Stamens 4.

Fl. & Fr. : October.

Common in plains, often cultivated for the flowers ; Olavakkot.

3. **Ixora cuneifolia** Roxb. Fl. Ind. 1 : 380. 1820 ; Hook. f. Fl. Brit. Ind. 3 : 144. 1880 ; Gamble, Fl. Pres. Madr. 631. 1921, Repr. ed. 2 : 445. 1957.

Shrubs. Leaves lanceolate or oblanceolate, acuminate. Flowers pink with yellowish tinge, in spreading corymbs. Calyx pubescent. Corolla lobes glabrous.

Fl. & Fr. : January May.

Fairly common ; in Ghats ; Pottikkal area - Mukkali, Silent Valley R.F.

4. **Ixora elongata** Heyne ex G. Don, Gen. Syst. 2 : 371. 1832 ; Hook. f. Fl. Brit. Ind. 3 : 141. 1880 ; Gamble, Fl. Pres. Madr. 630. 1921, Repr. ed. 2 ; 445. 1957.

Shrubs, up to 4 m. Leaves elliptic obovate or oblanceolate, obtuse, cuneate at base. Flowers in elongated corymbs. Peduncles 10 12 cm long. Calyx pubescent. Corolla lobes reflexed. Drupes black.

Fl. & Fr. : March April.

Fairly common ; in lower Ghats ; Mukkali forest.

5. **Ixora monticola** Gamble in Bull. Misc. Inform. Kew 247. 1920 & Fl. Pres. Madr. 631. 1921, Repr. ed. 2 : 445. 1957.

Shrubs. Leaves *ca.* 8 × 3 cm, oblanceolate, acuminate, pubescent beneath. Flowers pinkish, in dense corymbs. Corolla lobes reflexed, puberulous. Drupes globose.

Fl. &. Fr. : March - April.

Rare ; in upper Ghats ; Karapara river bank. Silent Valley R.F.

6. **Ixora nigricans** R. Br. ex Wight & Arn. Prodr. 428. 1834 ; Wight, Ic. t. 318. 1840 ; Hook. f. Fl. Brit. Ind. 3 : 148. 1880 ; Gamble, Fl. Pres. Madr. 631. 1921, Repr. ed. 2 : 445. 1957.

Shrubs. Leaves lanceolate or elliptic - oblong, acuminate, turning black when dry. Flowers white, in cymes. Calyx lobes glabrous. Drupes dark brown.

Fl. & Fr. : All seasons.

Common ; at lower elevations ; Karapara river bank Manalaru estate, Mukkali forest.

13. KNOXIA L.

1a.	Leaves linear - lanceolate to oblanceolate ; cymes lax ...	*K. sumatrensis*	2
1b.	Leaves elliptic - ovate ; cymes dense ...	*K. mollis*	1

1. **Knoxia mollis** R. Br. ex Wight & Arn. Prodr. 439. 1834 ; Hook. f. Fl. Brit. Ind. 3 : 129. 1880 ; Gamble, Fl. Pres. Madr. 622. 1921, Repr. ed. 2 : 439. 1957.

Straggling herbs. Leaves densely rufous - pubescent, acuminate at both ends. Flowers white to purple, unpleasently scented. Calyx lobes 4, acute. Corolla lobes 4. Stamens 4. Capsule of 2 semiterete mericarps splitting vertically.

Fl. & Fr. : July.

Common on hilly slopes, Erulankadu Malampuzha.

2. **Knoxia sumatrensis** (Retz.) DC. Prodr. 4 : 569. 1830. *Spermacoce sumatrensis* Retz. Obs. Bot. 4 : 23. 1786. *Knoxia corymbosa* auct. non Willd. 1797 ; Hook. f. Fl. Brit. Ind. 3 : 128. 1880 ; Gamble, Fl. Pres. Madr. 622. 1921, Repr. ed. 2 : 439. 1957.

Erect, woody herbs. Leaves grey pubescent. Stipules with subulate, hirsute bristles. Flowers blue or pale purple in corymbose cymes. Calyx lobes 4, acute. Corolla lobes 4. Stamens 4. Mericarps connate.

Fl. & Fr. : October.

Rare ; at lower elevations ; once collected from Attappadi R.F. - Mukkali.

14. LASIANTHUS Jack *nom. cons.*

Lasianthus jacklanus Wight in Calcutta J. Nat. Hist. 6 : 502. 1845 : Bedd. Ic. t. 12. 1868 - 74 ; Hook. f. Fl. Brit. Ind. 3 : 180. 1880 ; Gamble, Fl. Pres. Madr. 646. 1921, Repr. ed. 2 : 456. 1957.

Evergreen shrubs with bulbous based strigose hairs. Leaves 10 - 15×3 6 cm, oblanceolate, caudate acuminate, rounded at base. Bracts lanceolate, longer than flowers. Flowers white, in sessile cymes. Calyx teeth triangular. Drupes subglobose.

Fl. & Fr. : Almost all seasons.

Common ; in Ghats ; Silent Valley R.F., Siruvani Vattapara ferest.

15. MITRACARPUS Zucc.

Mitracarpus hirtus (L.) DC. Prodr. 4 : 572. 1830 ; Dyer in Ann. Miss. Bot. Gard. 67 ; 284. 1980. *Spermacoce hirta* L. Sp. Pl. ed. 2. 148. 1762. *S. villosus* Sw. Prodr. 29. 1781. *Staurospermum verticillatum* Schum. & Thonn. Berskr. Guin. Pl. 73. 1827. *Mitracarpus villosus* (Sw.) DC. Prodr. 4 : 572. 1830 ; Verdc. in Kew Bull. 30 : 317. 1975. *M. verticillatus* (K. Schum. & Thonn.) Vatke in Linnaea 40 : 196. 1876 ; Seb. & Ramam. in Bull. Bot. Surv. Ind. 9 : 291. 1967.

Erect, branched, pubescent herbs. Leaves sessile, ovate lanceolate ; stipule segments linear, ciliate. Flowers white, in axillary fascicles. Calyx unequally 4-lobed. Corolla 4-lobed. Fruits circumscissile.

Fl. & Fr. : April December.

Fairly common ; at lower elevations ; Ayalur slopes, Mukkali forest, Silent Valley dam site.

Sebastine & Ramamurthy *l.c.* recorded it as an addition to the Flora of India.

16. MITRAGYNA Korth. *nom. cons.*

1a. Calyx limbs short ; corolla yellow	...	*M. parvifolia*	1
1b. Calyx limbs long ; corolla purple	...	*M. tubulosa*	2

1. **Mitragyna parvifolia** (Roxb.) Korth. Obs. Naucl. Ind. 19. 1839 ; Gamble, Fl. Pres. Madr. 585. 1921, Repr. ed. 2 : 413. 1957. *Nauclea parvifolia* Roxb. Pl. Cor. t. 52. 1796 ; Bedd. Fl. Sylv. t. 34. 1869. *Stephegyne parvifolia* Korth. in Verh. Gesch. Nat. Bot. 161. 1842 ; Hook. f. Fl. Brit. Ind. 3 : 25. 1880. '*China kadambu*' (Tam.).

Deciduous trees, 20 25 m. Leaves suborbicular ovate, acute at apex. Flowers yellow, in globose heads, foetid. Corolla sparsely pilose within. Stamens 5, epipetalous. Capsules in globose heads.

Fl. & Fr. : March - October.

Fairly common ; at lower elevations ; Mukkali forest, Walayar forest.

Wood is used for furniture, garden implements etc.

2. **Mitragyna tubulosa** (Arn.) Hav. in J. Linn. Soc. Bot. 33 : 70. 1897 ; Gamble, Fl. Pres. Madr. 585. 1921, Repr. ed. 2 : 413. 1957. *Nauclea tubulosa* Arn. in Thw. Enum. Pl. Zeyl. 137. 1859 ; Bedd. Ic. t. 18. 1868-74. *Stephegyne tubulosa* (Arn.) Hook. f. in Benth. & Hook. f. Gen. Pl. 2 : 31. 1879 ; Hook. f. Fl. Brit. Ind. 3 : 26. 1880.

Deciduous trees, 15 20 m. Leaves ovate lanceolate, acuminate ; stipules large, obovate. Flowers purple, in globose heads. Calyx limbs triangular. Corolla 5 lobed. Capsules ribbed.

Fr. : December.

Rare ; in lower Ghats ; once collected from Thiruvizhankunnu forest.

17. MORINDA L.

Morinda pubescens J. E. Smith in Rees, Cyclop. 24 : n. 3. 1813 ; Verdc. in Kew Bull. 37 : 543. 1983. *M. tinctoria* Roxb. Fl. Ind. 2 : 197. 1824 & 1 : 543. 1832, non Noronha 1790 ; Hook. f. Fl. Brit. Ind. 3 : 156. 1880 ; Gamble, Fl. Pres. Madr. 652. 1921, Repr. ed. 2 : 459. 1957. *M. tinctoria* Roxb. var. *tomentosa* (Heyne ex Roth) Hook. f. Fl. Brit. Ind. 3 : 156. 1880 ; Gamble *l.c.* *M. tomentosa* Heyne ex Roth, Nov. Pl. Sp. 147. 1821. '*Manjanathi*', '*Nuna*' (Tam.).

Deciduous trees. Leaves elliptic - lanceolate, acuminate, hairy. Stipules bifid. Flowers white, in panicled heads. Calyx tube cohering. Corolla funnel shaped. Stamens inserted in the corolla throat. Fruit a fleshy syncarp.

Fl. & Fr. : October.

Common in plains ; Olavakkot.

18. MUSSAENDA L.

1a. Leaves glabrous above ; berries glabrous	...	*M. glabrata*	2
1b. Leaves hairy ; berries hirsute	...	*M. belilla*	1

1. **Mussaenda belilla** Buch. Ham. in Trans. Linn. Soc. London 14 : 203. 1824 ; Ridsdale in Manilal, Bot. Hist. Hort. Malab. 131. 1980. *M. laxa* (Hook. f.) Hutch. ex Gamble, Fl. Pres. Madr. 610. 1921, Repr. ed. 2 : 430. 1957. *M. frondosa* L. var. *laxa* Hook. f. Fl. Brit. Ind. 3 : 89. 1880. '*Parathole*' (Mal.).

Climbing shrubs. Leaves broadly ovate, abruptly acuminate at apex. Stipules hairy outside, bifid ; teeth curved. Flowers reddish - yellow,

in densely hirsute cymes. One calyx lobe transformed into a showy petaloid bract. Berries obovoid.

Fl. & Fr. : July.

Common ; at lower elevations ; Malampuzha, Vattapara - Siruvani forests.

2. **Mussaenda glabrata** (Hook. f.) Hutch ex Gamble, Fl. Pres. Madr. 610. 1921, Repr. ed. 2 : 430. 1957 ; Jayaweera in J. Arnold Arbor. 44 : 241. 1962. *M. frondosa* L. var. *glabrata* Hook. f. Fl. Brit. Ind. 3 : 90. 1880.

Glabrous, climbing shrubs. Leaves elliptic, minutely villous on nerves beneath ; nerves conspicuous. Stipules bifid at top. Flowers pale orange, in cymes. One calyx lobe enlarged. Corolla tube villous. Berries obovoid.

Fl. & Fr. : July - October.

Fairly common ; in Ghats ; Dhoni R.F., Mukkali forest.

19. MYCETIA Reinw.

Mycetia acuminata (Wight) Kuntze, Rev. Gen. Pl. 289. 1891 ; Gamble, Fl. Pres. Madr. 612. 1921, Repr. ed. 2 : 431. 1957. *Adenosacme lawii* Hook. f. Fl. Brit. Ind. 3 : 96. 1880. *Lawia acuminata* Wight, Ic. t. 1070. 1846.

Small shrubs, 2 - 3 m. Leaves membranous, long - petioled, elliptic - lanceolate, acuminate, cuneate. Bracts glandular. Flowers pale yellow, in lax cymes. Calyx lobes persistent. Berries white, globose.

Fl. & Fr. : October - December.

Rare ; in upper Ghats ; Silent Valley R.F.

20. NEUROCALYX Hook.

Neurocalyx calycinus (R. Br. ex Benn.) Robinson in Proc. Amer. Acad. Arts 45 : 402. 1910 ; Henry in Bull. Bot. Surv. Ind. 9 : 290. 1967. *Argostemma calycinum* R. Br. ex Benn. Pl. Jav. Rar. 97. 1838. *Neurocalyx hookerianus* Wight, Ic. t. 52. 1838 ('*hookeriana*'). *N. wightii* Arn. in Ann. Nat. Hist. ser. 1. 3 : 32. 1839 ; Hook. f. Fl. Brit Ind. 3 : 47. 1880 ; Gamble, Fl. Pres. Madr. 591. 1921, Repr. ed. 2 : 417. 1957.

Woody herbs. Leaves oblanceolate, shortly acuminate, cuneate, glaucous beneath. Stipules bract like. Flowers pale purple to creamy - white, in pendulous racemes. Fruits fleshy.

Fl. : April.

Rare in shady places ; in upper Ghats ; Silent Valley dam site.

21. OLDENLANDIA L.

1a. Prostrate herbs :

2a. Leaves more than 8 mm broad ; flowers more than 3 ;

3a. Flowers pedicelled ; fruits indehiscent ... *O. auricularia* 1

3b. Flowers sessile ; fruits dehiscent ... *O. mitida* 4

2b. Leaves less than 8 mm broad ; flowers 2 or 3 ... *O. corymbosa* 2

1b. Erect herbs :

4a. Flowers white ; stamens included . *O. herbacea* 3

4b. Flowers pinkish ; stamens exserted ... *O. umbellata* 5

1. **Oldenlandia auricularia** (L.) K. Schum. in Pflanzenfam. 4 : 25. 1891 ; Gamble, Fl. Pres. Madr. 597. 1921, Repr. ed. 2 : 421. 1957. *Hedyotis auricularia* L. Sp. Pl. 101. 1753 ; Bedd. Ic. t. 27. 1868 - 74 ; Hook. f. Fl. Brit. Ind. 3 : 58. 1880. *Exallage auricularia* (L.) Bremek. in Verh. Kon. Ned. Akad. Wet. 48 (2) : 142. 1952 ; Sant. & Merch. in Bull. Bot. Surv. Ind. 3 : 108. 1962.

Trailing, annual herbs. Leaves ovate - lanceolate. Flowers white, in axillary, sessile cymes. Capsules globose.

Fl. & Fr. : April - May.

Fairly common ; in open places ; Bhavani bank - Mukkali, Panthanthode area.

2. **Oldenlandia corymbosa** L. Sp. Pl. 119. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 64. 1880 ; Gamble, Fl. Pres. Madr. 600. 1921, Repr. ed. 2 : 423. 1957. *Hedyotis corymbosa* (L.) Lam. Tab. Encycl. 1 : 272. 1792.

Prostrate, annual herbs, rooting at nodes. Leaves sessile, linear - lanceolate. Flowers white, axillary. Stamens included. Capsules loculicidal, crowned by the calyx limbs. Seeds minute, numerous.

Fl. & Fr. : May - July.

Fairly common ; in lower Ghats ; Bhavani bank-Mukkali.

3. **Oldenlandia herbacea** (L.) Roxb. Fl. Ind. 1 : 445. 1820 ; Hook. f. Fl. Brit. Ind. 3 : 64. 1880 ; Gamble, Fl. Pres. Madr. 601. 1921, Repr. ed. 2 : 424. 1957. *Hedyotis herbacea* L. Sp. Pl. 102. 1753.

Bushy herbs ; stems 4 angled. Leaves linear lanceolate. Flowers white ; corolla tube slender. Capsules loculicidal.

Fl. & Fr. : October - December.

Common ; at lower elevations ; Aruvampara, Anamooly slopes, Dhoni R.F., Nemmara, Thiruvizhankunnu.

4. **Oldenlandia nitida** (Wight & Arn.) Gamble, Fl. Pres. Madr. 597. 1921, Repr. ed. 2 : 421. 1957. *Hedyotis nitida* Wight & Arn. Prodr. 412. 1834. *H. glabella* R. Br. ex Bedd. Ic. t. 36. 1868-74.

Trailing, annual herbs. Leaves ovate lanceolate, rigid. Flowers white, in axillary cymes. Stamens exserted. Capsules ovoid, hard.

Fl. & Fr. : October.

Fairly common ; in lower Ghats ; Dhoni R.F., Malleswar temple area - Mukkali.

5. **Oldenlandia umbellata** L. Sp. Pl. 119. 1753 ; Roxb. Fl. Ind. 1 : 442. 1820 ; Hook. f. Fl. Brit. Ind. 3 : 66. 1880 ; Gamble, Fl. Pres. Madr. 601. 1921, Repr. ed. 2 : 424. 1957. *Hedyotis umbellata* (L.) Lam. Tab. Encycl. 1 : 272. 1792, non Wall. 1788. '*Sayaver*' (Tam.).

Erect herbs. Leaves linear lanceolate, appearing clustered, scabrous. Flowers pedicelled, in umbels. Calyx lobes 4, puberulous. Corolla lobes 4. Stamens 4. Capsules loculicidal.

Fl. & Fr. : July.

Common in plains ; Walayar forest.

22. Ophiorrhiza L.

1a. Bracteoles present :

2a. Cymes up to 3 cm across	...	*O. prostrata*	3
2b. Cymes more than 3 cm across	...	*O. hirsutula*	1
1b. Bracteoles absent	...	*O. mungos*	2

1. **Ophiorrhiza hirsutula** Wight ex Hook. f. Fl. Brit. Ind. 3 : 81. 1880 ; Gamble, Fl. Pres. Madr. 608. 1921, Repr. ed. 2 : 429. 1957.

Undershrube, rooting below. Leaves ovate lanceolate, acute at apex, attenuate at base. Stipules very villous. Flowers white, in rusty pubescent cymes. Corolla hirsute, winged at back. Capsules pubescent.

Fl. & Fr. : April December.

Common ; in shady places in Ghats ; Panthanthode forest, Silent Valley R.F.

2. **Ophiorrhiza mungos** L. Sp. Pl. 150. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 77. 1880 : Gamble. Fl. Pres. Madr. 607. 1921. Repr. ed. 2 : 428. 1957.

Herbs. Leaves *ca.* 15 cm long, elliptic lanceolate, acuminate at apex, attenuate at base. Stipules 2 toothed. Flowers white, in subumbellate cymes, rusty puberulous. Capsules glabrous.

Fl. & Fr. : November February.

Common ; at lower elevations in evergreen forests ; Kaikatty forests, Kunthipuzha bank.

3. **Ophiorrhiza prostrata** D. Don, Prodr. Fl. Nepal. 136. 1825. *O. harrisonii* G. Don, Gen. Syst. 3 : 523. 1834 ; Wight, Ic. t. 1162. 1846. *O. harrisiana* Heyne ex Hook. f. Fl. Brit. Ind. 3 : 78. 1880 ; Gamble, Fl. Pres. Madr. 607. 1921, Repr. ed. 2 : 428. 1957.

Low soft herbs, rooting at nodes. Leaves elliptic, obtuse or acute, rounded at base. Bracteoles deciduous. Flowers pale pink or white, in cymes. Capsules glabrous, obcordate, compressed.

Fl. & Fr. : July October.

Common ; among forest undergrowth ; Silent Valley R.F.

23. PAVETTA L.

1a. Leaves pubescent ;

2a. Flowering shoots green .. *P. hispidula* 1

2b. Flowering shoots not green (corky) .. *P. tomentosa* 3

1b. Leaves glabrous ... *P. indica* 2

1. **Pavetta hispidula** Wight & Arn. Prodr. 431. 1834 ; Hook. f. Fl. Brit. Ind. 3 : 151. 1880 ; Gamble, Fl. Pres. Madr. 633. 1921, Repr. ed. 2 : 447. 1957.

Shrubs. Leaves lanceolate to oblanceolate, pubescent beneath. Flowers white, in corymbose cymes. Calyx grey villous. Corolla lobes rounded at apex. Berries fleshy, globose.

Fl. & Fr. : March October.

Common ; in evergreen forests ; Panthanthode forest, Silent Valley R.F.

2. **Pavetta indica** L. Sp. Pl. 110. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 150. 1880 : Gamble. Fl. Pres. Madr. 633. 1921. Repr. ed. 2 : 446. 1957.

Small trees or large shrubs, 3 5 m. Leaves elliptic obovate or oblanceolate, membranous. Flowers white, in corymbs. Calyx teeth minute. Corolla sparsely pilose within. Drupes globose.

Fl. & Fr. : February April.

Not common ; in lower Ghats ; Mukkali forest.

This species may be confused with *Pavetta crassicaulis* Bremek. but Bremekamp in Feddes, Repert. 37 : 112. 1934 states that the true *P. indica* L. is found only in South India and Ceylon.

3. **Pavetta tomentosa** Roxb. ex J.E. Smith in Rees, Cyclop. 26 : 2. 1819 ; Fischer in Gamble, Fl. Pres. Madr. 1879. 1936, Repr. ed. 3 : 1301. 1957. *Pavetta indica* L. var. *tomentosa* (J.E. Smith) Hook. f. Fl. Brit. Ind. 3 : 150. 1880 ; Gamble, Fl. Pres. Madr. 633. 1921, Repr. ed. 2 : 446. 1957 *p.p.*

Shrubs ; young parts tomentose. Leaves elliptic lanceolate. Flowers white, on elongate peduncles. Calyx teeth minute. Corolla pilose within. Drupes subglobose.

Fl. & Fr. : February - July.

Common ; in lower Ghats ; Attappadi forest - Mukkali, Malampuzha. Pothundy Kaikatty forest, Walayar forest.

24. PSYCHOTRIA L. *nom. cons.*

1a. Leaves more than 15 cm long	...	*P. nigra*	2
1b. Leaves less than 15 cm long	...	*P. congesta*	1

1. **Psychotria congesta** (Wight & Arn.) Hook. f. Fl. Brit. Ind. 3 : 162. 1880 ; Gamble, Fl. Pres. Madr. 640. 1921, Repr. ed. 2 : 451. 1957. *Grumilea congesta* Wight & Arn. Prodr. 432. 1834 ; Wight Ic. t. 1037. 1845.

Large shrubs or small trees, 3 5 m. Leaves elliptic - obovate, acute at apex, cuneate at base ; stipules woolly within. Flowers white, in congested cymes. Calyx teeth ciliate. Drupes purplish black.

Fl. : March.

Rare ; in upper Ghats ; only once collected from Karasuryamalai area.

2. **Psychotria nigra** (Gaertn.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) : 152. 1931. *Grumilea nigra* Gaertn. Fruct. 1 : 138. t. 28. 1788. *Psychotria thwaitesii* Hook. f. Fl. Brit. Ind. 3 : 162. 1880 ; Gamble, Fl. Pres. Madr. 640. 1921, Repr. ed. 2 : 451. 1957.

Glabrous shrubs. Leaves obovate - oblanceolate, acuminate, greenish when dry. Stipules hairy within. Branches of peduncle whorled. Flowers white, in capitate cymes. Calyx lobes triangular. Drupes smooth.

Fl. & Fr. : April October.

Common ; in damp places, in Ghats ; Mukkali forest, Silent Valley R. F.

25. RUBIA L.

Rubia cordifolia L. Mant. 197. 1771 ; Hook. f. Fl. Brit. Ind. 3 : 202. 1881 ; Gamble, Fl. Pres. Madr. 655. 1921, Repr. ed. 2 : 462. 1957 ; Deb in Bull. Bot. Surv. Ind. 10 : 6. 1968. *R. munjista* Roxb. Fl. Ind. 1 : 383. 1820 ; Wight, Ic. t. 187. 1839. '*Manjiti*' (Tam.), '*Manjishta*' (Mal.).

Scabrous, climbing herbs ; stems tetragonous. Leaves 4 - 8, in whorls, ovate - cordate. Flowers dull yellow, in cymes. Berries purple.

Fl. & Fr. : November - January.

Common ; in lower Ghats ; Kaikatty - Orange Farm area, Panthanthode forest.

26. SAPROSMA Bl.

1a. Leaves sessile	...	*S. glomerata*	2
1b. Leaves petioled	...	*S. fragrans*	1

1. **Saprosma fragrans** Bedd. For. Man. Bot. 134. 1872 ; Hook. f. Fl. Brit. Ind. 3 : 193. 1881 ; Gamble, Fl. Pres. Madr. 649. 1921, Repr. ed. 2 : 458. 1957. *Serissa fragrans* (Bedd.) Bedd. Ic. t. 14. 1868-74.

Shrubs, 3 - 5 m. Leaves opposite, equal, obovate, abruptly acuminate, attenuate at base. Flowers white, fragrant, in terminal cymes. Corolla funnel shaped ; throat villous. Drupes blue.

Fl. & Fr. : July March.

Rare ; in upper Ghats ; Silent Valley R.F.

2. **Saprosma glomerata** (Gardn.) Bedd. For. Man. Bot. 134. 1872 ; Sant. & Merch. in Bull. Bot. Surv. Ind. 3 : 110. 1962. *Dysodidendron glomeratum* Gardn. in Calcutta J. Nat. Hist. 7 : 3. 1847. *Serissa glome-*

rata (Gardn.) Bedd. Ic. t. 16. 1868 74. *Soprosma indica* Dalz. in Hook. Kew J. Bot. 3 : 37. 1851 ; Hook. f. Fl. Brit Ind. 3 : 192. 1880 ; Gamble, Fl. Pres. Madr. 649. 1921, Repr. ed. 2 : 457. 1957.

Shrubs, 1 2 m. Leaves opposite, unequal, elliptic - ovate or obovate. Flowers white, in fascicles in upper axils, subtended by involucral bracts. Calyx teeth triangular. Drupes blue with calyx limbs.

Fl. & Fr. : January.

Rare ; in upper Ghats ; Komatanthode Silent Valley R.F.

27. TARENNA Gaertn.

1a. Corolla tube shorter than lobes	...	*T. asiatica* 1
1b. Corolla tube longer than lobes	...	*T. nilagirica* 2

1. **Tarenna asiatica** (L.) Kuntze ex K. Schum. in Bot. Tidsskr. 24 : 332. 1902. *Rondeletia asiatica* L. Sp. Pl. 172. 1753. *Chomelia asiatica* (L.) Kuntze, Rev. Gen. Pl. 1 : 278. 1891 ; Gamble. Fl. Pres. Madr. 613. 1921, Repr. ed. 2 : 432. 1957.

Evergreen shrubs ; young parts resinous. Leaves elliptic - lanceolate, acuminate, rounded at base. Flowers white, in terminal corymbs. Calyx lobes long, persistent. Corolla funnel shaped. Berries globose.

Fr. : December.

Rare ; in lower Ghats ; Attappadi forest Mukkali.

Santapau & Merchant also made this combination in Bull. Bot. Surv. Ind. 3 : 1962 but Schumann's (1902) is much earlier.

2. **Tarenna nilagirica** (Bedd.) Bremek. in Feddes, Repert. 37 : 197. 1934. *Pavetta nilagirica* Bedd. For. Man. Bot. 134. 1872. *Stylocoryne nilagirica* (Bedd.) Gamble, Fl. Pres. Madr. 635. 1921, Repr. ed. 2 : 448. 1957. *Webera nilagirica* (Bedd.) Hook. f. Fl. Brit. Ind. 3 : 107. 1880.

Shrubs. Leaves oblanceolate, caudate acuminate, olive green when dry. Flowers white, in terminal cymes. Calyx shortly lobed, pubescent. Corolla tube longer than lobes (up to 3 cm long). Berries globose.

Rare ; once collected in Silent Valley R.F. in October 1965.

28. WENDLANDIA Bartl. ex DC. *nom. cons.*

Wendlandia thyrsoidea (Roem. & Schult.) Steud. Nom. Bot. ed. 2. 2 : 786. 1841. *Canthium thyrsoideum* Roem. & Schult. Syst. 6 : 207. 1820.

Wendlandia notoniana Wall. ex Wight & Arn. Prodr. 403. 1834 ; Wight, Ic. t. 1033. 1845 ; Hook. f. Fl. Brit. Ind. 3 : 40. 1880 ; Gamble. Fl. Pres. Madr. 588. 1921, Repr. ed. 2 : 415. 1957.

Shrubs or small trees, 3 5 m. Leaves 3 nate, elliptic - lanceolate, acute, pubescent. Stipules bifid, recurved. Flowers white to dull yellow. Calyx shortly lobed. Corolla tube longer than lobes, villous within.

Fl. & Fr. : January May.

Frequent ; in upper Ghats ; Ayyappankoil Pothundy area, Karasuryamalai area, Silent Valley R.F.

Coffea arabica L. and **C. robusta** Linden ex de Wildem. are cultivated for their seeds.

70. ASTERACEAE

(COMPOSITAE)

1a. Corolla tubular (all) :.

2a. Leaves opposite (upper ones rarely alternate) :

3a. Heads uniflorate ... LAGASCEA 18

3b. Heads multiflorate :

4a. Anthers with apical appendages :

5a. Pappus of 5 scales ... AGERATUM 3

5b. Pappus of 2 to many hairs ... CHROMOLAENA 8

4b. Anthers without apical appendages :

6a. Style arms clavate ... ADENOSTEMMA 2

6b. Style arms subulate :

7a. Heads with foliaceous bracts ... CENTRATHERUM 7

7b. Heads without foliaceous bracts ... VERNONIA 26

2b. Leaves alternate :

8a. Achenes glochidiate spiny ... XANTHIUM 28

8b. Achenes not glochidiate - spiny :

9a. Flowers yellow :

10a. Anther bases tailed ... BLUMEA 6

10b. Anther bases not tailed :

11a. Outer and inner florets bisexual ... GYNURA 17

11b. Outer florets female, inner ones bisexual :

12a. Stems winged ... LAGGERA 19

12b. Stems not winged :

13a. Erect herbs ... CONYZA 9

13b. Prostrate herbs :

14a. Leaves pinnatisect ... GRANGEA 16

14b. Leaves not pinnatisect ... DICHROCEPHALA 11

9b. Flowers not yellow :

15a. Leaves ashy - tomentose beneath ... ARTEMISIA 4

15b. Leaves not ashy - tomentose beneath :

16a. Involucral bracts 1 seriate ... EMILIA 14

16b. Involucral bracts 2 3 seriate :

17a. Plants aromatic ; stems winged ... SPHAERANTHUS 22

17b. Plants not aromatic ; stems not winged :

18a. Style arms subulate ... ELEPHANTOPUS 13

18b. Style arms truncate ... CRASSOCEPHALUM 10

1b. Corolla ligulate (all or only the outer) :

19a. Sap milky ; leaves radical .... SONCHUS 21

19b. Sap not milky ; leaves not radical ;

20a. Leaves opposite :

21a. Involucral bracts free ... ACANTHOSPERMUM 1

21b. Involucral bracts connate :

22a. Leaves deeply lobed ... BIDENS 5

22b. Leaves not lobed :

23a. Pappus of 1 - 4 bristly awns or cup like or O :

24a. Achenes all thick or of female 3 - cornered :

25a. Involucral bracts embracing the achenes ... SIEGESBECKIA 20

25b. Involucral bracts not embracing the achenes ... ECLIPTA 12

24b. Achens depressed :

26a. Heads sessile ... SYNEDRELLA 24

26b. Heads peduncled ... SPILANTHES 23

23b. Pappus of numerous scales/bristles ... TRIDAX 25

20b. Leaves alternate :

27a. Leaves linear lanceolate, not amplexicaul ... ERIGERON 15

27b. Leaves oblong - lanceolate, semiamplexicaul ... PENTANEMA 27

1. ACANTHOSPERMUM Schrank

Acanthospermum hispidum DC. Prodr. 5 : 522. 1836 ; Gamble, Fl. Pres. Madr. 704. 1921, Repr. ed. 2 : 495. 1957.

Erect, branched, hispid - hairy herbs. Leaves obovate spathulate, palmately veined. Heads solitary, sessile, yellow. Involucral bracts (outer) ciliate. Achenes with many, hooked, lateral spinules and 2 straight apical spines.

Fl. & Fr. : August.

Not common ; in lower Ghats ; Mukkali forest, Watayar forest.

Introduced weed from Brazil ; now naturalised.

2. ADENOSTEMMA J. R. & G. Forst.

Adenostemma lavenia (L.) Kuntze, Rev. Gen. Pl. 1 : 304. 1891 ; Kosterm. in Blumea 1 : 470. 1935 ; Gamble, Fl. Pres. Madr. 677. 1921, Repr. ed. 2 : 476. 1957. *Verbesina lavenia* L. Sp. Pl. 902. 1753. *Adenostemma latifolium* D. Don. Prodr. Fl. Nepal. 181. 1825 ; Wight, Ic. t. 1087. 1846.

Erect, sticky, annual herbs. Leaves ovate lanceolate, crenate - serrate or dentate, acute, glabrous. Heads few to many. Involucral bracts glandular hairy. Flowers white. Anthers cordate below, truncate at apex. Achenes trigonous, tuberculate.

Fl. & Fr. : October.

Common ; in damp shady places in upper Ghats ; Silent Valley R. F.

3. AGERATUM L.

Ageratum conyzoides L. Sp. Pl. 839. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 243. 1881 ; Gamble, Fl. Pres. Madr. 677. 1921, Repr. ed. 2 : 476. 1957.

Erect, soft hairy annuals. Leaves opposite, ovate or rhomboid - ovate, crenate, palmately 3 nerved. Flowers pink, in heads. Bracts acute, linear, hairy. Achenes 5 angled, glabrous or hairy. Pappus free.

Fl. & Fr. : August October.

Common weed ; in lower Ghats and plains ; Chindaki forest, Panthanthode forest.

4. ARTEMISIA L.

Artemisia nilagirica (clarke) Pamp. in Nuov. Giorn. Bot. Ital. 33 : 452. 1926. *A. vulgaris* L. var. *nilagirica* clarke Comp. Ind. 162. 1876. *A. vulgaris* auct. non L. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 325. 1881 ; Gamble Fl. Pres. Madr. 713. 1921, Repr. ed. 2 : 502. 1957.

Erect, aromatic, branched, perennial undershrubs. Leaves deeply lobed, cuneate at base, densely hairy ; lobes lanceolate - oblong, entire. Involucral bracts ovate oblong. Ligules glandular. Flowers white in small heads. Achenes glabrous.

Fl. & Fr. : April.

Common ; in plains and in lower Ghats ; Sappal hill Dhoni R.F., Thadikundu area.

5. BIDENS L.

Bidens pilosa L. Sp. Pl. 832. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 309. 1881 ; Gamble, Fl. Pres. Madr. 309. 1921, Repr. ed. 2 : 499. 1957.

Erect, much branched, annual herbs. Leaves opposite, imparipinnate ; leaflets ovate - lanceolate to oblong, glabrous. Ray florets white, disk florets yellow. Outer involucral bracts spathulate, mucronate, glabrous. Heads broader than long. Achenes glabrous.

Fl. & Fr. : October.

Common ; in lower Ghats ; Chindaki forest.

6. BLUMEA DC. *nom. cons.*

1a. Florets purple	...	*B. mollis*	3
1b. Florets yellow :			
2a. Heads peduncled	...	*B. barbata*	1
2b. Heads sessile	...	*B. belangeriana*	2

1. **Blumea barbata** DC. in Wight, Contrib. Bot. Ind. 14. 1834; Hook. f. Fl. Brit. Ind. 3 : 262. 1881 ; Gamble, Fl. Pres. Madr. 687. 1921, Repr. ed. 2 : 483. 1957 ; Randeria in Blumea 10 : 267. 1960.

Erect herbs ; stems reddish brown. Leaves obovate oblanceolate, densely white - silky beneath, serrate. Heads small, lax in corymbose panicles. Corolla lobes glandular. Achenes ribbed, brown. Pappus white.

Fl. & Fr. : November.

Common in cool places ; Pothundy Kaikatty forest.

2. **Blumea belangeriana** DC. Prodr. 5 : 444. 1836 ; Hook. f. Fl. Brit. Ind. 3 : 266. 1881 ; Gamble, Fl. Pres. Madr. 686. 1921, Repr. ed. 2 : 482. 1957 ; Randeria in Blumea 10 : 277. 1960.

Erect herbs ; stems glabrous at base, densely silky above. Leaves thick, ovate obovate, densely white - silky beneath, serrate - dentate. Heads in leafy clusters. Flowers yellow. Corolla lobes pubescent in bud. Achenes terete, oblong, pubescent.

Fl. & Fr. : December.

Endemic ; rare ; in upper Ghats ; Panthanthode forest.

3. **Blumea mollis** (D. Don) Merr. in Philipp. J. Sci. Bot. 5 : 395. 1910 ; Randeria in Blumea 10 : 261. 1960. *Erigeron molle* D. Don, Prodr. Fl. Nepal. 172. 1825. *Blumea wightiana* DC. in Wight, Contrib. Bot. Ind. 14. 1834 ; Hook. f. Fl. Brit. Ind. 3 : 261. 1881 ; Gamble, Fl. Pres. Madr. 686. 1921, Repr. ed. 2 : 483. 1957. *B. neilgherriensis* Hook. f. Fl. Brit. Ind. 3 : 261. 1881 ; Gamble *l.c.*

Aromatic, viscid, soft hairy, erect annuals. Leaves elliptic - oblong, dentate - serrate, densely villous, acute at apex, cuneate. Heads in spiciform panicles. Involucral bracts linear. Flowers purple. Achenes hairy, angled.

Fl. & Fr. : April.

Common ; in lower Ghats ; Panthanthode forest.

7. CENTRATHERUM Cass.

1a. Leaves white woolly beneath, pappus yellow ... *C. molle* 2

1b. Leaves green beneath, hairy ; pappus reddish ... *C. anthelminticum* 1

1. **Centratherum anthelminticum** (L.) Kuntze, Rev. Gen. Pl. 1 : 320. 1891 ; Gamble, Fl. Pres. Madr. 667. 1921, Repr. ed. 2 : 469. 1957. *Conyza anthelmintica* L. Sp. Pl. ed. 2. 1207. 1762. *Vernonia anthelmintica* (L.) Willd. Sp. Pl. 3 : 1634. 1803 ; Hook. f. Fl. Brit. Ind. 3 : 236. 1881.

Erect herbs ; stems grooved, hairy. Leaves elliptic obovate, serrate, glandular - pubescent, acute. Heads leaf - opposed, solitary. Involucral bracts hairy, 4 5 - seriate. Flowers purple. Achenes ribbed. Outer pappus short.

Fl. & Fr. : October November.

Common ; in lower Ghats ; Karivara slopes - Mukkali.

2. **Centratherum molle** Benth. in Benth. & Hook. f. Gen. Pl. 2 : 225. 1873 ; Hook. f. Fl. Brit. Ind. 3 : 227. 1881 ; Gamble, Fl. Pres. Madr. 666. 1921, Repr. ed. 2 : 469. 1957.

Erect annuals. Leaves elliptic - ovate, deeply serrate. Peduncles slender. Outer bracts thickly white felted, acute. Flowers violet or blue. Achenes hairy.

Fl. & Fr. : October November.

Fairly common ; in lower Ghats in shady places ; Attappadi R.F. Mukkali, Kaikatty forest.

8. CHROMOLAENA DC.

Chromolaena odorata (L.) King & Robinson in Phytologia 20 : 204. 1970. *Eupatorium odoratum* L. Syst. ed. 10. 2 : 1205. 1759. *E. conyzoides* Vahl, Symb. Bot. 3 : 96. 1794.

Erect or scrambling herbs ; branches glandular - pubescent. Leaves opposite, ovate lanceolate, entire or serrate, acute. Heads in terminal corymbs. Flowers light pink. Achenes 5 angled, glabrous.

Fl. & Fr. : December - February.

Common ; in lower Ghats ; Panthanthode area, Vaniyampara area.

9. CONYZA Less. *nom. cons.*

1a. Heads in corymbs ; leaves viscid - pubescent ... *C. leucantha* 2

1b. Heads in racemose panicles ; leaves not viscid ... *C. bonariensis* 1

1. **Conyza bonariensis** (L.) Cronq. in Bull. Torrey Bot. Club 70 : 632. 1943. *Erigeron bonariensis* L. Sp. Pl. 863. 1753. *E. linifolius* Willd. Sp. Pl. 3 : 1955. 1804 ; Hook. f. Fl. Brit. Ind. 3 : 254. 1881. *Conyza ambigua* DC. Fl. Franc. Suppl. 6 : 468. 1815 ; Gamble, Fl. Pres. Madr. 683. 1921, Repr. ed. 2 : 480. 1957.

Erect herbs ; stems appressed - hairy. Leaves linear - lanceolate, hispidly villous. Involucral bracts 3 seriate, linear, pilose. Ray florets filiform. Achenes sparsely silky hairy.

Fl. & Fr. : July.

Common ; in lower Ghats ; Bhavani river side - Mukkali.

2. **Conyza leucantha** (D. Don) Ludlow & Raven in Kew Bull. 17 : 71. 1963. *Erigeron leucanthum* D. Don, Prodr. Fl. Nepal. 171. 1825. *E. falcatum* D. Don *l.c.* 172. *Conyza viscidula* Wall. ex DC. Prodr. 5 : 383. 1836 ; Hook. f. Fl. Brit. Ind. 3 : 258. 1881 ; Gamble, Fl. Pres. Madr. 683. 1921, Repr. ed. 2 : 480. 1957.

Much branched, erect, viscid herbs. Leaves oblong lanceolate, glandular pubescent, acute, narrowed at both ends. Flowers pale pink in cymose heads. Achenes compressed, glabrous.

Fl. & Fr. : January.

Not common ; in upper Ghats ; Valiyaparathode forest.

10. CRASSOCEPHALUM Moench

Crassocephalum crepidioides (Benth.) Moore in J. Bot. 50 : 211. 1912 ; Grierson in Dassanayake & Fosberg, Rev. Handb. Fl. Ceylon 1 : 248. 1980 *Gynura crepidioides* Benth. in Hook. Niger Fl. 438. 1849. *Erechthites valerianifolia* sensu Fischer in Rec. Bot. Surv. Ind. 9 : 98. 1921 & Gamble, Fl. Pres. Madr. 1882. 1936 non (Wolf.) DC. 1838.

Slender, erect herbs. Leaves alternate, elliptic - lanceolate, acute. Florets red, in terminal heads. Involucral bracts 1 - 2 - seriate. Achenes ribbed. Pappus many, silky.

Fl. & Fr. : October.

Not common ; once collected at Chindaki forest.

11. DICHROCEPHALA L' Herit. ex DC.

Dichrocephala integrifolia (L.f.) Kuntze, Rev. Gen. Pl. 1 : 333. 1891 ; Hara, Fl. East. Himal. 338. 1966. *Hippia integrifolia* L.f. Suppl. 389

1781. *Grangea latifolia* Lam. Tab. Encycl. t. 699. 1823. *Dichrocephala latifolia* (Lam.) DC. in Wight, Contrib. Bot. Ind. 11. 1834 ; Wight, Ic. t. 1096. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 245. 1881 ; Gamble, Fl. Pres. Madr. 679. 1921, Repr. ed. 2 : 477. 1957.

Erect or decumbent herbs. Leaves ovate oblong to lyrate, crenate, sparsely hairy. Ray florets white ; disk ones yellow. Achenes glandular at tip.

Fl. & Fr. : August.

Common ; in upper Ghats ; Silent Valley R.F.

12. ECLIPTA L. *nom. cons.*

Eclipta alba (L.) Hassk. Pl. Jav. Rar. 528. 1848 ; Hook. f. Fl. Brit. Ind. 3 : 304. 1881 ; Gamble, Fl. Pres. Madr. 705. 1921, Repr. ed. 2 : 496. 1957. *Verbesina alba* L. Sp. Pl. 902. 1753. *V. prostrata* L. Sp. Pl 902. 1753. *Eclipta prostrata* (L.) L. Mant. 286. 1771. '*Karisalankanni*' (Tam.).

Annual, creeping and ascending strigosely hirsute herbs. Leaves opposite, sessile, lanceolate oblong, with thick based white hairs. Flowers white. Style armed, longer in female. Achenes in female florets 3-angled, in bisexual 4 angled.

Fl. & Fr. : All seasons.

Common ; in plains and Ghats in wet places ; Mukkali forest, Walayar dam area.

13. ELEPHANTOPUS L.

Elephantopus scaber L. Sp. Pl. 814. 1753 ; Wight, Ic. t. 1086. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 242. 1881 ; Gamble, Fl. Pres. Madr. 676. 1921, Repr. ed. 2 : 476. 1957.

Stiff, appressed pubescent, subscapigerous herbs. Leaves (basal) obovate - oblong, ciliate, densely hairy, obtuse. Flowers purple, in clustered heads. Achenes ribbed, cuneate below ; pappus bristles 5, hairy.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Mukkali forest, Thiruvizhankunnu forest.

14. EMILIA Cass.

Emilia sonchifolia (L.) DC. ex Wight, Contrib. Bot. Ind. 24. 1834 ; Hook. f. Fl. Brit. Ind. 3 : 336. 1881 ; Gamble, Fl. Pres. Madr. 716. 1921, Repr. ed. 2 : 503. 1957.

Erect, branched herbs. Leaves (lower) lyrate with ovate triangular to orbicular terminal segments ; upper ones sagitate, dentate, acute. Involucres 1 10, lanceolate. Flowers purple. Achenes ribbed, hairy.

Fl. & Fr. : October.

Common ; in Ghats ; Mukkali forest, Silent Valley dam site area.

15. ERIGERON L.

Erigeron canadensis L. Sp. Pl. 863. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 254. 1881 ; Gamble, Fl. Pres. Madr. 681. 1921, Repr. ed. 2 : 479. 1957.

Erect, hairy herbs. Leaves linear lanceolate, acute, apiculate. Heads peduncled ; ray florets white ; disk florets yellow. Achenes hairy ; pappus dull white.

Fl. & Fr. : October.

Common ; in lower Ghats ; Chindaki forest.

16. GRANGEA Adanson

Grangea maderaspatana (L.) Poir. in Lam. Encycl. Suppl. 2 : 825. 1811 ; Wight, Ic. t. 1097. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 247. 1881 ; Gamble, Fl. Pres. Madr. 680. 1921, Repr. ed. 2 : 478. 1957. *Artemisia maderaspatana* L. Sp. Pl. 849. 1753.

Prostrate, ascending, villous herbs. Leaves sessile, alternate, pinnatifid with opposite lobes. Florets yellow, in solitary, globose heads. Bracts 2 3 seriate, elliptic - oblong. Outer florets female, 2 - 3 -seriate. Ligules 2 - lobed. Stamens 4 5. Achenes glandular - tipped by hairy, tubular pappus.

Fl. & Fr. : July.

Common ; in plains and marshy places ; Mukkali forest, Walayar forest

17. GYNURA Cass. *nom. cons.*

Gynura nitida DC. in Wight, Contrib. Bot. Ind. 24. 1834 ; Wight Ic. t. 1121. 1846 ; Hook. f. Fl. Brit. Ind. 3 : 333. 1881 ; Gamble, Fl. Pres. Madr. 714. 1921, Repr. ed. 2 : 502. 1957.

Erect, stout herbs. Leaves alternate ; lower oblanceolate ; upper ones cordate, crenate, acute, amplexicaul at base. Florets yellow. Achenes ribbed, hairy ; pappus hairs soft.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Panthanthode forest.

18. LAGASCEA Cav. *nom. cons.*

Lagascea mollis Cav. Anal. Cienc. Nat. 6 : 331. t. 44. 1803 ; Hook. f. Fl. Brit. Ind. 3 : 302. 1881 ; Gamble, Fl. Pres. Madr. 703. 1921, Repr. ed. 2 : 494. 1957.

Procumbent, annual herbs ; stems grooved. Leaves ovate, grey - pubescent, acute. Heads 1 flowered ; florets white. Bracts 5, connate. Achenes cuneate, angled.

Fl. & Fr. : August.

Common weed in waste places ; in lower Ghats ; Attappadi block Mukkali, Walayar dam area.

19. LAGGERA Sch. ex Oliv.

Laggera pterodenta (DC.) Benth. ex Clarke, Comp. Ind. 92. 1876 ; Hook. f. Fl. Brit. Ind. 3 : 271. 1881 ; Gamble, Fl. Pres. Madr. 689. 1921, Repr. ed. 2 : 485. 1957. *Blumea pterodenta* DC. in Wight, Contrib. Bot. Ind. 16. 1834 ; Wight, Ic. t. 1100. 1846.

Erect, slender branched, viscid, aromatic herbs ; stems winged by the decurrent leaf bases. Leaves ovate or oblong, apiculate. Heads many, solitary ; flowers purple. Achenes long - hairy, ribbed.

Fl. & Fr. : March - April.

Common ; in Ghats ; Forest below dam site - Silent Valley, Bhavani bank - Mukkali.

20. SIGESBECKIA L.

Sigesbeckia orientalis L. Sp. Pl. 900. 1753 ; Wight, Ic. t. 1103. 1846; Hook. f. Fl. Brit. Ind. 3 : 304. 1881 ; Gamble, Fl. Pres. Madr. 704. 1921, Repr. ed. 2 : 495. 1957.

Erect, viscid annuals. Leaves opposite, crenate, hairy, ovate - triangular. Heads yellow ; involucres campanulate. Achenes curved, obovoid, viscid.

Fl. & Fr. : October - February.

Common ; in plains and in lower Ghats ; Kathalakandi area, Panthanthode forest.

Linnaeus spelt the generic name as above in *Species Plantarum* 1753 and in Genera Plantarum 1754, but most of the Floras give the spelling as '*Siegesbeckia*'.

21. SONCHUS L.

1a. Leaves with acute auricles ; bracts glabrous	...	*S. oleraceus* 1
1b. Leaves with obtuse auricles ; bracts glandular - hispid	...	*S. wightianus* 2

1. **Sonchus oleraceus** L. Sp. Pl. 794. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 414. 1881 ; Gamble, Fl. Pres. Madr. 732. 1921, Repr. ed. 2 : 514. 1957. *S. ciliatus* Lam. & DC. Fl. Franc. ed. 3. 287. 1805 ; Wight, Ic. t. 1141. 1846.

Annuals 40 - 60 cm. Leaves oblong or obovate - oblanceolate, deeply pinnately lobed, glaucous beneath, amplexicaul at base. Heads few. Bracts lanceolate, glabrous. Flowers yellow. Achenes 3 - ribbed ; pappus white.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Panthanthode forest.

2. **Sonchus wightianus** DC. Prodr. 7 : 187. 1838 : Wight, Ic. t. 1412. 1849. *S. arvensis* auct. non L. 1753 : Hook. f. Fl. Brit. Ind. 3 : 414. 1881 ; Gamble, Fl. Pres . Madr. 732. 1921, Repr. ed. 2 : 515. 1957.

Erect, glabrous herbs, *ca.* 1 m. Stems grooved. Leaves oblong - lanceolate, cordate, glaucous beneath, acute, amplexicaul at base. Heads yellow. Bracts lanceolate, glandular hairy. Achenes linear - oblong, curved.

Fl. & Fr. : April.

Fairly common ; in lower Ghats ; Ayyappankoil shola.

S. arvensis L. referred to in our Floras is an exclusively European species, but this can be recognised by the shorter, narrower, faintly rugose achenes, shorter involucres, corolla, heads and pappus hairs.

22. SPHAERANTHUS L.

Sphaeranthus indicus L. Sp. Pl. 1314. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 275. 1881 ; Gamble, Fl. Pres. Madr. 692. 1921, Repr. ed. 2 : 487. 1957. *S. hirtus* Willd. Sp. Pl. 3 : 1395. 1802 ; Wight, Ic. t. 1094. 1846.

Prostrate, aromatic herbs ; stems glandular hairy, winged. Leaves alternate, decurrent on the stem, ovate to obovate, glandular - villous, acute. Heads globose, ellipsoid, purplish ; outer florets female. Corolla tubular. Achenes oblong, angular.

Fl. & Fr. : November December.

Abundant in paddy fields ; Thiruvizhankunnu, Panangateri area, Walayar forest.

23. SPILANTHES Jacq.

Spilanthes calva DC. in Wight, Contrib. Bot. Ind 19. 1834 ; Kosterm. & Philipson in Blumea 6 : 354. 1950 ; Grierson in Ceylon J. Sci. (Biol. Sci.) 10 : 56. 1972. *S. acmella* auct. non (L.) Murr. 1774 ; Hook. f. Fl. Brit. Ind. 3 : 307. 1881 ; Gamble, Fl. Pres. Madr. 708. 1921, Repr. ed. 2 : 498. 1957.

Erect, hairy herbs. Leaves ovate - lanceolate, acute, cuneate at base. Heads solitary. Bracts ovate to oblong or lanceolate, ciliate. Florets yellow or white. Achenes glabrous.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Mandhampatty (Mukkali), Pothundy - Kaikatty area.

24. SYNEDRELLA Gaertn. *nom. cons.*

Synedrella nodiflora (L.) Gaertn. Fruct. 2 : 456. 1791 ; Hook. f. Fl. Brit. Ind. 3 : 308. 1881 ; Gamble, Fl. Pres. Madr. 708. 1921, Repr. ed. 2 : 498. 1957. *Verbesina nodiflora* L. Cent. Pl. 28. 1755.

Annual, dichotomously branching hairy herbs ; stems grooved. Leaves opposite, ovate elliptic, serrate, 3 nerved, acute. Florets yellow. Outer achenes winged and spinous on the wings ; the inner black, slender, muricate.

Fl. & Fr. : July - October.

Not common ; in lower Ghats ; Dhoni R.F., Malleswar temple area—Chemmanur, Silent Valley R.F.

25. TRIDAX L.

Tridax procumbens L. Sp. Pl. 900. 1753 ; Hook. f. Fl. Brit. Ind. 3 : 311. 1881 ; Gamble, Fl. Pres. Madr. 711. 1921, Repr. ed. 2 : 500. 1957.

Procumbent herbs, creeping and ascending. Leaves ovate, acute, deeply incisodentate or pinnatisect, hairy. Flowers yellow, in solitary, pedunculate heads. Bracts 2 - 3 - seriate, outer herbaceous, inner scarious, pinkish. Achenes turbinate, silky - villous ; pappus bristles plumose.

Fl. & Fr. : All seasons.

Common weed ; in plains ; Muthikulam - Siruvani forest, Walayar dam area.

26. VERNONIA Schreber *nom. cons.*

1a. Herbs or shrubs :

2a. Achenes 10 - ribbed, glandular ;

3a. Involucral bracts obtuse ; pappus brownish ... *V. divergens* 4

3b. Involucral bracts sharply acuminate ; pappus reddish ... *V. saligna* var. *nilghirensis* 5

2b. Achenes 2 - 5 - angular, silky - hairy :

4a. Leaves single ; outer pappus hairs rather long ... *V. cinerea* 2

4b. Leaves appearing fascicled ; outer pappus hairs extremely short ... *V. conyzoides* 3

1b. Trees ... *V. arborea* 1

1. **Vernonia arborea** Ham. in Trans. Linn. Soc. London 14 : 218. 1824. *Monosis wightiana* DC. in Wight, Contrib. Bot. Ind. 1. 1834 ; Wight, Ic. t. 1085. 1846. *Vernonia monosis* Benth. ex Clarke, Comp. Ind. 24. 1876, non Sch. Bip. 1847 ; Gamble, Fl. Pres. Madr. 672. 1921, Repr. ed. 2 : 473. 1957. *V. arborea* var. *wightiana* (DC.) Hook. f. Fl. Brit. Ind. 3 : 239. 1881. '*Shutthai*', '*Sadagai*' (Tam.), '*Kadavari*' (Mal.).

Trees, 7 - 15 m with terete, pubescent twigs. Leaves broadly elliptic, abruptly acute at both ends, hairy beneath, glabrous above. Florets purple, fragrant, in dense panicles of heads. Bracts acute. Achenes ribbed, glandular. Pappus uniseriate.

Fl. & Fr. : January - April.

Common ; in Ghats ; Anavayee slopes, Ayyappankoil - Kaikatty forest.

2. **Vernonia cinerea** (L.) Less. in Linnaea 4 : 291. 1829 ; Clarke, Comp. Ind. 20. 1876 ; Hook. f. Fl. Brit. Ind. 3 : 233. 1881 ; Gamble, Fl. Pres. Madr. 676. 1921, Repr. ed. 2 : 475. 1957. *Conyza cinerea* L. Sp. Pl. 862. 1753.

Annual herbs, 50 75 cm. Leaves ovate - elliptic, base decurrent into petiole, crenate, hairy. Bracts ovate - lanceolate, hairy. Flowers pink, in lax corymbose panicles. Achenes 2 - 3 - angled, villous. Pappus biseriate.

Fl. & Fr. : October - January.

Common weed ; in open places, roadsides ; Chindaki forest.

3. **Vernonia conyzoides** DC. in Wight, Contrib. Bot. Ind. 6. 1834 ; Gamble, Fl. Pres. Madr. 676. 1921, Repr. ed. 2 : 475. 1957.

Tall, annual herbs, 1.0 - 1.5 m. Leaves thin, ovate - lanceolate, crenate - serrate, pubescent, acute. Bracts ovate - lanceolate, acute - acuminate, hairy. Flowers purple. Achenes 2 3 - angled, densely hairy. Pappus biseriate.

Fl. & Fr. : December.

Rare ; once collected in Silent Valley R.F. at 900 m.

4. **Vernonia divergens** (Roxb.) Edgew. in J. Asiat. Soc. Bengal 2 : 172. 1853 ; Hook. f. Fl. Brit. Ind. 3 : 234. 1881 ; Gamble, Fl. Pres. Madr. 673. 1921, Repr. ed. 2 : 473. 1957. *Eupatorium divergens* Roxb. Fl. Ind. 3 : 414. 1832. *Decaneurum divergens* (Roxb.) DC. Prodr. 5 : 68. 1836 ; Wight, Ic. t. 1084. 1846. *Vernonia nilgheryensis* DC. *l.c.* 32 ; Wight *l.c.* 1078.

Shrubs. 2 - 3 m. Leaves elliptic - ovate, scabrous above, pubescent beneath. Bracts elliptic, acute, mucronate, glabrous. Flowers purple, in dense corymbose cymes of heads. Stamens 5. Achenes minutely hairy.

Fl. & Fr. : December - January.

Common ; in upper Ghats ; Muthikulam - Siruvani forest, Panthanthode forest.

5. **Vernonia salicina** DC. var. **nilghireensis** Hook. f. Fl. Brit. Ind. 3 : 235. 1881 ; Gamble, Fl. Pres. Madr. 674. 1921, Repr. ed. 2 : 474. 1957.

Erect undershrubs. Leaves elliptic - lanceolate, scabrous, crenate - serrate ; main nerves 7 8 pairs. Flowers purple, in small heads of corymbose panicles. Outer bracts reflexed, aristate. Achenes glandular.

Fl. & Fr. : January.

Endemic and rare ; once collected in Valiyaparathode forest.

27. PENTANEMA Cass.

Pentanema indicum (L.) Ling, Acta Phytotax. Sinica 10 : 179. 1965 ; K.H. Roch. Fl. Iranica 145 : 97. 1980 ; Shetty & Pandey, Fl. Tonk Dist. 102. 1983. *Inula indica* L. Sp. Pl. ed. 2. 1237. 1763. *Vicoa indica*

(L.) DC. in Wight. Contrib. Bot. Ind. 10. 1834 ; Wight, Ic. t. 1148. 1846. Gamble, Fl. Pres. Madr. 701. 1921, Repr. ed. 2 : 493. 1957. *V. auriculata* Cass. in Ann. Sci. Nat. Paris 17 : 418. 1829 ; Hook. f. Fl. Brit. Ind. 3 : 297. 1881.

Tall herbs ; stems grooved. Leaves ovate - lanceolate, entire, pubescent, acute, cordate - hastate and amplexicaul at base. Heads solitary. Bracts lanceolate, acute, hairy. Flowers bright yellow. Achenes glabrous.

Fl. & Fr. : December - February.

Fairly common ; in lower Ghats ; Olavakkot, Panthanthode forest, Vaniyampara area.

28. Xanthium L.

Xanthium strumarium L. Sp. Pl. 987. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 303. 1881 ; Gamble, Fl. Pres. Madr. 702. 1921, Repr. ed. 2 : 494. 1957. *X. indicum* Koen. ex Roxb. Fl. Ind. 3 : 601. 1832 ; Wight, Ic. t. 1104. 1846.

Annual herbs. Leaves alternate, broadly ovate, 3 - lobed, scabrid, crenate, cordate. Heads solitary or fascicled, globose. Bracts 2 - 3 - seriate, brown. Flowers yellow. Achenes 2, enclosed within hardened spinescent involucre.

Fl. & Fr. : September - April.

Common ; in plains and in lower Ghats ; Chindaki area, Walayar dam area.

Cosmos sulphureus Cav. is a Mexican plant. Cultivated in gardens and found as an escape at times. **Parthenium hysterophorus** L. is an American weed, spreading rapidly.

71. LOBELIACEAE

Lobelia L.

1a. Herbs, more than 45 cm high :

2a. Leaves glabrous ; anthers villous on back ... *L. nicotianifolia* 3

2b. Leaves villous ; anthers glabrous on back ... *L. leschenaultiana* 2

1b. Herbs, less than 45 cm high ... *L. alsinoides*

1. **Lobelia alsinoides** Lam. Encycl. 3 : 588. 1792 ; Moeliono & Tuyn in Steenis, Fl. Males. ser. 1. 6 : 127. 1960. *L. trigona* Roxb. Fl. Ind. 2 : 111. 1824 ; Wight, Ic. t. 1170. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 423. 1881 ; Gamble, Fl. Pres. Madr. 736. 1921, Repr. ed. 2 : 518. 1957.

Erect, much branched herbs ; stems triangular. Leaves ovate, oblong, rounded or elliptic, crenate. Flowers axillary, solitary, blue. Anthers bearded at apex.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Bhavani river bank, Olavakkot, Mukkali forest, Thiruvizhankunnu.

2. **Lobelia leschenaultiana** (Presl) Scottsb. in Acta Hort. Gothobury 4 : 4. 1928. *Rapuntium leschenaultianum* Presl, Prodr. Lobel. 24. 1836. *L. excelsa* Lesch. in Roxb. Fl. Ind. 2 : 114. 1824 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 427. 1881 ; Gamble, Fl. Pres. Madr. 737. 1921, Repr. ed. 2 : 518. 1957.

Tall herbs. Leaves ovate - lanceolate, thick, softly tawny - villous. Flowers dull white, in dense racemes, softly villous. Anthers glabrous.

Fl. & Fr. : March.

Not common ; in lower Ghats ; Karasuryamalai.

3. **Lobelia nicotianifolia** Roth ex Roem. & Schult. Syst. Veg. 5 : 47. 1819 ('*nicotianaefolia*') ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 427. 1881 ; Gamble, Fl. Pres. Madr. 736. 1921, Repr. ed. 2 : 518. 1957. *Kaartupokala*' (Mal. & Tam.).

var. nicotianifolia

Erect herbs. Leaves lanceolate - ovate , acuminate, crenate - serrate. Flowers white, in cylindric racemes. Anthers long - hairy at tip. Capsules many - seeded.

Fl. & Fr. : December.

Not common ; in upper Ghats ; Silent Valley R.F.

3(i) **Lobelia nicotianifolia** var. **trichandra** (Wight) Clarke in Hook. f. Fl. Brit. Ind. 3 : 427. 1881 ; Gamble, Fl. Pres. Madr. 737. 1921, Repr. ed. 2 : 518. 1957. *L. trichandra* Wight, Ic. t. 1171. 1848.

More slender, more branching and lax, more glabrous, and with thinner racemes than the var. proper. Anthers with many white hairs spreading from their backs.

Fl. & Fr. : April.

Common ; in lower Ghats ; Anavayee slopes, Panthanthode, Muthikulam forest.

72. CAMPANULACEAE

1a. Capsules dehiscing loculicidally ; flowers lax ... WAHLENBERGIA

1b. Capsules dehiscing circumscissily ; flowers dense ... SPHENOCLEA

SPHENOCLEA Gaertn. *nom. cons.*

Sphenoclea zeylanica Gaertn. Fruct. 1 : 113. t. 24. f. 5. 1788 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 438. 1881 ; Gamble, Fl. Pres. Madr. 739. 1921, Repr. ed. 2 : 520. 1957.

Erect herbs ; stems fistular. Leaves lanceolate - oblong, attenuate at both ends. Flowers greenish, in dense cylindric, terminal spikes. Corolla caducous, lobes ovate triangular. Capsules globose.

Fl. & Fr. : August.

Very common ; in swampy and marshy localities in plains ; Walayar forest.

WAHLENBERGIA Schrad. ex Roth *nom. cons.*

Wahlenbergia erecta (Roth ex Roem. & Schult.) Tuyn in Steenis, Fl. Malay ser. 1. 6 : 113. 1960. *Dentella erecta* Roth ex Roem. & Schult. Syst. Veg. 5 : 25. 1819. *Cephalostigma schimperi* Hochst. ex Rich. Tent. Fl. Abyss. 2 : 2. 1851 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 428. 1881 ; Gamble, Fl. Pres. Madr. 738. 1921, Repr. ed. 2 : 519. 1957. *Wahlenbergia perotifolia* Wight & Arn. ex DC. Prodr. 7 : 434. 1839 ; Wight, Ic. t. 842. 1845.

Erect, slender herbs. Leaves oblong - linear, acute. Flowers pale bluish, solitary, axillary. Petals free. Capsules 3 valved.

Fl. & Fr. : December.

Not common ; in upper Ghats ; Silent Valley R.F.

73. VACCINIACEAE

VACCINIUM L.

Vaccinium neilgherrense Wight, Ic. t. 1189. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 454. 1882 ; Gamble, Fl. Pres. Madr. 741. 1921, Repr. ed. 2 : 521. 1957. '*Kalavu*' (Tam.).

Small trees, 3 - 10 m. Leaves alternate, elliptic - lanceolate, crenate - serrate, acuminate. Flowers light pinkish, fragrant, in lax racemes. Calyx persistent. Corolla lobes reflexed. Berries globular.

Fl. & Fr. : September.

Not common : in upper Ghats ; Kunthipuzha river side—Dam site.

74. PLUMBAGINACEAE

PLUMBAGO L.

Plumbago zeylanica L. Sp. Pl. 151. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 480. 1882 ; Gamble, Fl. Pres. Madr. 744. 1921, Repr. ed. 2 : 524. 1957. Steenis, Fl. Males. ser. 1. 4 : 109. 1949. '*Vellakoduveli*' (*Mal.*).

Straggling undershrubs. Leaves alternate, ovate - lanceolate, glabrous, acute. Flowers white, in racemes. Calyx glandular - hairy, persistent.

Fl. & Fr. : September - February.

Common ; in lower Ghats ; Dhoni R.F., Kavandikal - Mukkali. Root is of medicinal value.

75. MYRSINACEAE

1a. Calyx tube adnate to ovary ; fruits many - seeded.		MAESA 4
1b. Calyx tube not adnate to ovary ; fruits 1 - seeded ;		
2a. Petals imbricate :		
3a. Flowers in fascicles	...	RAPANEA 5
3b. Flowers in racemes or panicles	...	EMBELIA 3
2b. Petals contorted :		
4a. Anthers sagitate ; corolla lobes over - lapping to right	...	ARDISIA 2
4b. Anthers lanceolate ; corolla lobes overlapping to left	.	ANTISTROPHE 1

1. ANTISTROPHE A. DC.

Antistrophe serratifolia (Bedd.) Hook. f. in Benth. & Hook. f. Gen. Pl. 2 : 647. 1876 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 532. 1882 ; Mez in

Pflanzenr. 9 : 118. 1902 ; Gamble, Fl. Pres. Madr. 756. 1921, Repr. ed. 2 : 532. 1957 ; Nayar & Giri in Bull. Bot. Surv. Ind. 18 : 81. 1976 (1979). *Ardisia serratifolia* Bedd. Ic. t. 113. 1868 - 74.

Slender, erect herbs ; branches rusty - villous. Leaves alternate, lanceolate, serrate, acuminate. Flowers white, in axillary umbels. Calyx 5 - lobed. Corolla lobes lanceolate. Stamens 5. Fruits globose, red.

Fl. & Fr. : April - October.

Endemic, rare ; in upper Ghats ; Silent Valley R.F.

Previously thought to be endemic to Anamalai hills, Tamil Nadu ; but could be collected in Silent Valley R.F., Kerala.

2. ARDISIA Sw. *nom. cons.*

1a. Flowers white ; berries red	...	*A. pauciflora*	1
1b. Flowers pink ; berries black	...	*A. solanacea*	2

1. **Ardisia pauciflora** Heyne ex Roxb. Fl. Ind. 2 : 279. 1824 ; Wight Ic. t. 1214. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 529. 1882 ; Gamble, Fl. Pres. Madr. 755. 1921, Repr. ed. 2 : 531. 1957.

Small trees, 5 m. Leaves lanceolate, glabrous, acuminate. Flowers in cymes. Calyx and corolla lobes punctate. Anthers apiculate. Berries globose with persistent style.

Fl. & Fr. : April.

Rare ; once collected in Silent Valley R.F. at 850 m.

2. **Ardisia solanacea** Roxb. Pl. Cor. t. 27. 1795 ; Gamble, Fl. Pres. Madr. 756. 1921, Repr. ed. 2 : 531. 1957. *A. humilis* sensu Wight, Ic. t. 1212. 1848, non Vahl 1794.

Small trees or large shrubs, 3 5 m. Leaves obovate - oblong, coriaceous, gland - dotted, acute - acuminate, cuneate at base. Flowers in axillary racemes of corymbs. Sepals 5, free. Corolla 5 - lobed, gland - dotted ; lobes ovate, reflexed. Drupes globose.

Fl. & Fr. : October - May.

Common ; in lower Ghats : Bhavani river bank - Mukkali, Kariyam slopes, Muthikulam forest.

3. EMBELIA Burm. f. *nom. cons.*

1a. Climbing shrubs ; leaves glandular	...	*E. ribes*	2
1b. Erect shrubs or small trees ; leaves glabrous	...	*E. acutipetalum*	1

1. **Embelia acutipetalum** (Lam. ex Hassk.) S.M. Almeida & M.R. Almeida in J. Bombay Nat. Hist. Soc. 81 : 741. 1984 (85). *Basal acutipetalum* Lam. ex Hassk. Hort. Malab. Rheede Clavis. 40. 1876. *Embelia tsjarium - cottam* (Roem. & Schult.) A. DC. in Trans. Linn. Soc. London 17 : 131. 1834 ; Wight, Ic. t. 1209. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 515. 1882 ; Gamble, Fl. Pres. Madr. 753. 1921, Repr. ed. 2 : 529. 1957. *Ardisia tsjarium cottam* Roem & Schult. Syst. Veg. 4 : 518. 1819.

Large deciduous shrubs or small trees, 3 5 m. Leaves elliptic obovate, cuneate, abruptly acuminate, glaucous beneath. Flowers greenish white, in dense long racemes. Sepals glabrous. Petals papillose inside. Berries globose, red.

Fl. & Fr. : May - August.

Common ; in lower Ghats ; Karivara forest, Mukkali forest, Walayar forest.

J. Bombay Nat. Hist. Soc. 81 : 741 - 43. 1984 (85) may be referred to for a discussion on nomenclature.

2. **Embelia ribes** Burm. f. Fl. Ind. 62. t. 23. 1768 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 513 : 1882 ; Gamble, Fl. Pres. Madr. 752. 1921, Repr. ed. 2 : 529. 1957. *E. glandulifera* Wight, Ic. t. 1207. 1848.

Stems tubercled. Leaves elliptic lanceolate, resinous - glandular on either side of midrib below, acute. Flowers white, in panicles or racemes. Petals 5, villous. Berries globose.

Fl. & Fr. : February.

Not common ; in lower Ghats ; Farm area Kaikatty.

4. MAESA Forsk.

Maesa indica (Roxb.) DC. in Trans. Linn. Soc. London 17 : 134. 1834. *Baeobotrys indica* Roxb. Fl. Ind. 2 : 230. 1824. *B. dubia* Wall in Roxb. Fl. Ind. 2 : 235. 1824. *Maesa dubia* (Wall.) DC. *l.c.* ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 510. 1882 ; Gamble, Fl. Pres. Madr. 749. 1921, Repr. ed. 2 : 527. 1957. *M. perrottetiana* DC. Prodr. 8 : 80. 1844 ; Gamble *l.c.*

Large shrubs or small trees, 3 5 m. Leaves ovate - lanceolate, crenate serrate, acuminate. Flowers white, in racemes. Sepals 5, ciliate. Petals 5. Berries fleshy with persistent calyx.

Fl. & Fr. : July December.

Common ; in Ghats ; Padagiri Kaikatty, Silent Valley R.F., Mukkali forest.

5. RAPANEA Aublet

Rapanea wightiana (Wall. ex DC.) Mez in Monogr. Myrsin. 360. 1902 ; Gamble, Fl. Pres. Madr. 751. 1921, Repr. ed. 2 : 528. 1957. *Myrsine wightiana* Wall. ex DC. Prodr. 8 : 94. 1844.

Small trees, 5 10 m. Leaves oblanceolate, obtuse. Petiples slender. Flowers shortly pedicelled, in fascicles. Calyx lobes resinous - dotted. Corolla lobes gland - dotted. Berries globose.

Fl. & Fr. : December.

Not common ; in upper Ghats ; Bank of Valiyaparathode.

76. SAPOTACEAE

1a. Calyx lobes 1 - seriate ; stamens 5 - 6 :

2a. Staminodes absent ; leaf veins parallel ... CHRYSOPHYLLUM 1

2b. Staminodes present ; leaf veins not parallel ... XANTOLIS 5

1b. Calyx lobes 2 - seriate ; stamens 8 or more :

3a. Calyx lobes 4 :

4a Stamens 8 ... ISONANDRA 2

4b. Stamens more than 16 ... MADHUCA 3

3b. Calyx lobes 6 - 8 ... PALAQUIUM 4

1. CHRYSOPHYLLUM L.

Chrysophyllum roxburghii G. Don, Gen. Syst. 4 : 33. 1838 ; Bedd. Fl. Sylv. t. 236. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 535. 1882 ; Gamble , Fl. Pres. Madr. 758. 1921, Repr. ed. 2 : 533. 1957. '*Kappalei*' (Tam.) ; '*Atha*' (Mal.).

Lofty evergreen trees, 20 - 30 m ; young parts brown - tomentose. Leaves lanceolate, shining, dull white, in axillary fascicles. Sepals fleshy, orbicular. Petals orbicular. Berries yellowish green.

Fl. & Fr. : October - March.

Fairly common ; in upper Ghats ; Ayyappankoil shola, shola near Ranimedu estate.

2. ISONANDRA Wight

Isonandra lanceolata Wight, Ic. t. 359. 1840 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 539. 1882 ; Gamble, Fl. Pres. Madr. 761. 1921, Repr. ed. 2 : 535. 1957 ; Jeuken in Blumea 6 : 557. 1952.

forma **lanceolata**

Large shrubs or small trees, 3 5 m. Leaves lanceolate oblanceolate, abruptly acuminate at apex, cuneate at base. Flowers creamy - white. Corolla lobes 4. Fruits elongate, orange - scarlet.

Fl. & Fr. : August - October.

Fairly common ; in upper Ghats ; Silent Valley R.F.

Isonandra lanceolata Wight forma **anfractuosa** (clarke) Jeuken in Blumea 6 : 560. 1952. *I. lanceolata* Wight var. *anfructuosa* Clarke in Hook. f. Fl. Brit. Ind. 3 : 539. 1882 ; Gamble, Fl. Pres. Madr. 761. 1921, Repr. ed. 2 : 535. 1957.

It differs from the forma proper by the following characters. Leaves larger, more prominently obovate and acuminate, the transverse nervules usually curved to cross the main nerves ; calyx and corolla lobes more acute.

Fl. & Fr. : February - April.

Common in lower Ghats ; Ayyappankoil - Kaikatty forest, Walayar forest.

3. MADHUCA Gmelin

1a. Pedicels glabrous ; anthers cordate at base.	...	*Madhuca longifolia* var. *longifolia* 1
1b. Pedicels tomentose ; anthers obtuse at base.	...	*Madhuca longifolia* var. *latifolia* 2

1. **Madhuca longifolia** (Koen.) J.F. Macbr. in Contrib. Gray Herb. Harv. Univ. (NS) 53 : 17. 1918 ; Royen in Blumea 10 : 53. 1960. *Bassia longifolia* Koen. in L. Mant. Fl. 563. 1771 ; Bedd. Fl. Sylv. t. 42. 1870 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 544. 1882 ; Gamble, Fl. Pres. Madr. 763. 1921, Repr. ed. 2 : 537. 1957. *Madhuca indica* Gmelin, Syst. 799. 1791. '*Illupei*' (Tam.).

var. **longifolia**

Trees with slender branches, 25 30 m. Leaves crowded at ends of branches, broadly elliptic, acuminate. Flowers dull yellow, many, in axillary clusters, pendulous with age. Sepals ovate. Corrolla lobes ovate - elliptic. Fruits ellipsoid.

Fl. & Fr. : February May.

Fairly common ; in lower Ghats : Bhavani river bank - Mukkali.

2. **Madhuca longifolia** var. **latifolia** (Roxb.) Chev. in Rev. Bot. Appl. 23 : 149. 1943 ; Royen in Blumea 10 : 55. 1960. *Bassia latifolia* Roxb. Pl. Cor. t. 19. 1795 ; Bedd. Fl. Sylv. t. 41. 1870 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 544. 1882 : Gamble, Fl. Pres. Madr. 763. 1921, Repr. ed. 2 : 536. 1957. *Madhuca latifolia* (Roxb.) J.F. Macbr. in Contrib. Gray. Herb. Harv. Univ. (NS) 53 : 17. 1918. '*Illupei*, (Tam.).

Large deciduous trees, with milky latex, 30 - 35 m. Leaves coriaceous, elliptic, obtusely acuminate at apex, secondary nerves 8 - 12 pairs. Flowers 3 - 5, in axillary clusters. Calyx lobes fulvous tomentose. Fruits fleshy, oblong.

Fl. : November.

Rare ; in plains ; Kadampadi Mangalam area.

An edible oil is extracted from the seeds. Flowers roasted and eaten.

4. PALAQUIUM Blanco

Palaquium ellipticum (Dalz.) Baill. Traite Bot. Med. Phan. 1500. 1884 ; Gamble, Fl. Pres. Madr. 764. 1921, Repr. ed. 2 : 535. 1957 ; Royen in Blumea 10 : 509. 1960. *Bassia elliptica* Dalz. in Hook. Kew J. Bot. 3 : 38. 1851 ; Bedd. Fl. Sylv. t. 43. 1870. *Dichopsis elliptica* (Dalz.) Benth. in Benth. & Hook. f. Gen. Pl. 2 : 658. 1878 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 542. 1882. '*Kat illepei*', '*Pala*' (Tam.).

Lofty trees with milky latex, 30 - 40 m. Leaves elliptic - obovate, obtusely acute, the apex twisted. Flowers white, fragrant. Anthers long - apiculate, hairy at tip. Fruits fleshy, ovoid - ellipsoid.

Fl. & Fr. : February - April.

Common ; in upper Ghats, Kunthipuzha dam site forest, Kudam area - Siruvani R.F.

Wood used for building purposes.

5. XANTOLIS Rafin.

Xantolis tomentosa (Roxb.) Rafin. var. **elongioides** (DC.) Vajravelu in Biol. Mem. 20 : 86. 1977. *Sideroxylon tomentosa* Roxb. var. *elongioides*

(DC.) Gamble, Fl. Pres. Madr. 759. 1923. Repr. ed. 2 : 534. 1957. *Sapota elengioides* DC. Prodr. 8 : 176. 1844. *Achras elengioides* (DC.) Bedd. Fl. Sylv. t. 235. 1872.

Small, thorny trees, 7 m. Leaves bright red when young, elliptic, glabrous, subacute. Flowers dull white, pointing downwards. Berries subglobose, pubescent.

Fl. & Fr. : October March.

Rare ; in upper Ghats ; Karapara river shola, Karasuryamalai area.

Manilkara zapota (L.) Royen (*Achras zapota* L.) is cultivated for the edible fruits.

77. EBENACEAE

DIOSPYROS L.

1a. Flowers 4 - 5 - merous :			
2a. Calyx lobes reflexed :			
3a. Flowers yellow :			
4a. Calyx spathaceous	...	*D. racemosa*	8
4b. Calyx not spathaceous	...	*D. nilagirica*	4
3b. Flowers not yellow	...	*D. sylvatica*	6
2b. Calyx lobes not reflexed :			
5a. Leaves rounded at base	...	*D. tomentosa*	7
5b. Leaves acute at base	...	*D. buxifolia*	2
1b. Flowers 5 - merous :			
6a. Flowers in (axillary) fascicles (sessile)	...	*D. candollegna*	3
6b. Flowers not in fascicles (peduncled) :			
7a. Female flowers solitary	...	*D. paniculata*	5
7b. Female flowers in cymes	...	*D. bourdillonii*	1

1. **Diospyros bourdillonii** Brandis, Ind. Trees 435. 1906 ; Gamble, Fl. Pres. Madr. 777. 1923. Repr. ed. 2 : 547. 1957. '*Kari*', '*Karum chatthi*' (Tam.).

Large trees, 25 - 30 m. Leaves drooping, oblong - lanceolate, cuneate at base, glaucous. Male flowers in short axillary cymes ; female in short thick peduncled dense cymes on old wood. Stamens up to 18. Fruiting calyx cup - like, lobes pointed, thick. Fruits globose, dull reddish - tomentose (Plate 5).

Fl. & Fr. : May - October.

Rare ; in lower Ghats; Vattapara - Inchikuzhi forest, Siruvani R.F., Mukkali forest.

2. **Diospyros buxifolia** (Bl.) Hiern in Trans. Camb. Phil. Soc. 12 : 218. 1873 ; *Leucoxylum buxifolium* Bl. Bijdr. 1169. 1827. *Diospyros microphylla* Bedd. Ic. t. 133. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 559. 1882 ; Gamble, Fl. Pres. Madr. 776. 1923, Repr. ed. 2 : 546. 1957. '*Chinna thuvarai*' (Tam.).

Trees 10 - 15 m ; twigs hirsute. Leaves elliptic - ovate, coriaceous, glabrous above, pubescent beneath, acute. Flowers 1 - 3, white, minute, in the axils. Female solitary. Calyx 4 - lobed, glabrous. Stamens 16. Fruits oblong.

Fl. & Fr. : January February.

Rare ; in lower Ghats ; Mukkali forest.

3. **Diospyros candolleana** Wight, Ic. tt. 1221 & 1222. 1848 ; Clarke in Hook. f. Fl Brit. Ind. 3 : 566. 1882 ; Gamble, Fl. Pres. Madr. 773. 1923, Repr. ed. 2 : 543. 1957. *D canarica* Bedd. Ic. t 134. 1868-74.

Trees, 10 m ; branches drooping. Leaves elliptic - oblong, coriaceous, glabrous, acute. Flowers dull yellowish - white, densely tawny - tomentose. Sepals round in male, acuminate in female. Petals reflexed. Ovary globose, hairy. Fruits ovoid, with accrescent reflexed calyx lobes.

Fl. & Fr. : March - April.

Fairly common ; in lower Ghats ; Panthanthode forest.

4. **Diospyros nilagirica** Bedd. Ic. t. 136. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 566. 1882 ; Gamble, Fl. Pres. Madr. 775. 1923, Repr. ed. 2 : 545. 1957. '*Karu*' (Tam.).

Trees, 15 - 26 m. Leaves lanceolate to oblanceolate, margins reflexed, coriaceous, acuminate. Flowers yellowish - white, 4 - merous, in peduncled cymes. Calyx lobes brownish, hairy. Stamens 16, in pairs. Fruits greenish, globose.

Fl. & Fr. : March - April.

Fairly common ; in lower Ghats ; Karapara river forest, Kudam area - Siruvani R.F.

5. **Diospyros paniculata** Dalz. in Hook. Kew J. Bot. 4 : 109. 1852 ; Hiern Monogr. Eben. 190. 1873 ; Bedd. Ic. t. 125. 1868-74 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 570. 1882 ; Gamble, Fl. Pres. Madr. 775. 1923, Repr. ed. 2 : 544. 1957. '*Karunthuvarai*', '*Kari*' (Tam.).

Trees, 15 m. Leaves oblong to oblong-lanceolate, subcoriaceous, acuminate. Flowers dull white to light pinkish, tawny-villous ; male in short curved cymes, bracteate. Stamens 20, linear, in pairs, Fruits ovoid, green.

Fl. & Fr. : February May.

Rare ; in lower Ghats ; Kaikatty forest - Nelliampathy Ghat, Vattaparai - Inchikuzhi - Siruvani R.F.

6. **Diospyros sylvatica** Roxb. Pl. Cor. t. 47. 1795 ; Bedd. Ic. t. 121. 1868-74 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 559. 1882 ; Gamble, Fl. Pres. Madr. 773. 1923, Repr. ed. 2 : 543. 1957.

Trees, 20 m. Leaves elliptic, shining, coriaceous, acute, black when dry. Male flowers in cymes. Female flowers solitary Calyx lobes rounded, accrescent in fruit. Fruits globose.

Fl. & Fr. : March - June.

Rare ; in lower Ghats ; Dhoni R.F., shola near Ranimade estate.

7. **Diospyros tomentosa** Roxb. Fl. Ind. 2 : 532. 1832 ; Wight, Ic. tt. 182 & 183. 1839 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 564. 1882 ; Gamble, Fl. Pres. Madr. 772. 1923, Repr. ed. 2 : 543. 1957.

Trees, 20 m. Leaves broadly ovate, acute at apex. Male flowers in short cymes, densely tawny - tomentose. Females solitary. Calyx lobes cordate. Fruits globose, glabrous.

Fr. : November.

Rare ; in plains (only one tree found) : Peringathukavu-way to Kollenkode.

8. **Diospyros racemosa** Roxb. Fl. Ind. 2 : 536. 1832 ; Wight, Ic. t. 416. 1840. *D. toposia* Buch. - Ham. in Trans. Linn. Soc. London 15 : 115. 1827 ; Bedd. Ic. t. 122. 1868-74 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 556. 1882 ; Gamble, Fl. Pres. Madr. 778. 1923, Repr. ed. 2 : 547. 1957.

Trees, 20 - 30 m. Leaves oblong - lanceolate, coriaceous, glabrous, acuminate. Male flowers in cymes. Calyx irregularly lobed. Corolla urceolate. Fruits ovoid, rusty brown - pubescent, 1 - 4 - seeded.

Fr. : February.

Rare ; once collected in Mukkali forest. *Vajravelu* 60628.

Diospyros discolor Willd., a native of the Philippine Islands is cultivated for the large, globose, brown - hairy, edible fruits.

78. SYMPLOCACEAE

SYMPLOCOS Jacq.

1a. Drupes ovoid - oblong :

2a. Inflorescence 4 - many flowered :

3a. Drupes more than 2 cm long ; leaves green when dry ... *S. macrocarpa* ssp. *kanarana* 3

3b. Drupes less than 2 cm long ; leaves yellow when dry :

4a. Drupes villous ... *S. macrophylla* ssp. *macrophylla* 4

4b. Drupes glabrous :

5a. Leaves membranous ; inflorescence less than 3 cm long ... *S. macrophylla* ssp. *rosea* 5

5b. Leaves coriaceous ; inflorescence more than 3 cm long ... *S. foliosa* 2

2b. Inflorescence 3 - or less - flowered ... *S. pulchra* 6

1b. Drupes globose ... *S. cochinchinensis* ssp. *laurina* 1

1. **Symplocos cochinchinensis** (Lour.) Moore ssp. **laurina** (Retz.) Nooteb. Revis. Symploc. Old World 156. 1975. *Myrtus laurina* Retz. Obs. Bot. 4 : 26. 1786. *Symplocos spicata* Roxb. var. *laurina* (Retz.) Clarke in Hook. f. Fl. Brit. Ind. 3 : 573. 1882 ; Gamble, Fl. Pres. Madr. 782. 1923, Repr. ed. 2 : 549. 1957.

Trees, 5 - 15 m. Leaves elliptic - lanceolate, crenate or serrate, acute to acuminate. Flowers white, in axillary, branched spikes. Drupes ampulliform, ribbed, 2 - 3 - seeded.

Fl. & Fr. : November - March.

Common ; in Ghats ; Karasuryamalai forest, Kunthipuzha dam site, Orange farm - Kaikatty, Poochipara forest.

It differs from ssp. *cochinchinensis* with calyx lobes being glabrous, often ciliate, not enlarged in fruit.

2. **Symplocos foliosa** Wight, Ic. t. 1234. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 582. 1882 ; Gamble, Fl. Pres. Madr. 783. 1923, Repr. ed. 2 : 550. 1957 ; Nooteb. Revis. Symploc. Old World 194. 1975. *S. nervosa* Wight *l.c.* 1235. '*Pal velloday*' (Tam.).

Trees, 10 - 15 m ; young twigs hairy. Leaves elliptic oblong, serrate, acuminate. Flowers white, in fulvous - villous spikes. Bracts caducous. Stamens 60 90. Drupes cylindric, truncate at both ends.

Fl. : February.

Endemic ; rare ; once collected in Aruvanpara slopes - Silent Valley R.F.

3. **Symplocos macrocarpa** Wight ex Clarke ssp. **kanarana** (Talbot) Nooteb. Revis. Symploc. Old World 221. 1975. *S. kanarana* Talbot in J. Bombay Nat. Hist. Soc. 11 : 238 1897 ; Gamble, Fl. Pres. Madr. 782. 1923, Repr. ed. 2 : 550. 1957.

Trees, 10 15 m. Leaves elliptic - ovate or obovate, crenate serrate, acuminate, green when dry ; stamens 5 8 pairs. Drupes 2 3 cm long.

Fr. : January.

Rare ; in lower Ghats ; Mandhampatty (Mukkali).

4. **Symplocos macrophylla** Wall. ex DC. Prodr. 8 : 257. 1844 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 578. 1882 ; Nooteb. Revis. Symploc. Old World 229. 1975. ssp. **macrophylla** : Nooteb. Revis. Symploc. Old World 226. 1975. var. **kurgensis** (Clarke) Nooteb. *l.c.* 229. *S. kurgensis* Clarke in Hook. f. Fl. Brit. Ind. 3 : 576. 1882. *S. gardneriana* Wight var. *hohanackeri* (Clarke) Gamble, Fl. Pres. Madr. 782. 1923, Repr. ed. 2 : 550. 1957. *S. hohanackeri* Clarke *l.c.* 582.

Trees 10 m ; young branches tomentose. Leaves elliptic, glandular, dentate, cuneate to rounded at base, acuminate. Flowers white, in densely hairy racemes. Calyx tube glabrous ; lobes densely appressed silk-hairy. Corolla glabrous. Stamens 60 - 80.

Fl. : December.

Rare ; once collected from Kunthipuzha bank, Silent Valley R.F.

5. **Symplocos macrophylla** Wall. ex DC. ssp. **rosea** (Bedd.) Nooteb. Revis. Symploc. Old World 229. 1975. *S. rosea* Bedd. in Trans. Linn. Soc. London 25 : 219. 1866. *S. rosea* var. *glabrior* Clarke in Hook. f. Fl. Brit. Ind. 3 : 583. 1882 ; Gamble, Fl. Pres. Madr. 783. 1923, Repr. ed. 2 : 550. 1957.

Shrubs, 3 5 m. Leaves elliptic - obovate, glabrous, denticular, acuminate. Flowers in elongate racemes. Calyx lobes appressed pubescent. Stamens shorter than corolla. Drupes ovoid.

Fl. : February.

Endemic ; rare ; once collected in Silent Valley dam site forests at 900 m. *Vajravelu* 60610.

6. **Symplocos pulchra** Wight, Ic. t. 1230. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 583. 1882 ; Gamble, Fl. Pres. Madr. 784. 1923, Repr. ed. 2 ; 551. 1957 ; Nooteb. Revis. Symploc. Old World 266. 1975 *Lodhra pulchra* (Wight) Miers in J. Linn. Soc. Bot. 17 : 300. 1879 *Symplocos villosa* Brand in Pflanzenr. 6 : 63. 1901 ; Brandis, Ind. Trees 437. 1906 ; Gamble *l.c.*

Shrubs with densely hairy twigs. Leaves ovate elliptic, ciliate, cuneate cordate, acuminate at apex. Flowers white, in spikes. Calyx tube glabrous or densely hairy. Fruits hairy.

Fl. & Fr. : December.

Rare ; once collected from Madirithode, Silent Valley R.F. *Nair* 69521.

79. OLEACEAE

1a. Climbing shrubs :

2a. Petals imbricate ... JASMINUM 2

2b. Petals valvate ... MYXOPYRUM 4

1b. Erect trees :

3a. Inflorescence terminal ... LIGUSTRUM 3

3b. Inflorescence axillary :

4a. Corolla free or connate (by pairs) ... CHIONANTHUS 1

4b. Corolla connate (all) ... OLEA 5

1. CHIONANTHUS L.

Chionanthus mala - elengi (Dennst.) P.S. Green in Bull. Bot. Surv. Ind. 26 : 126. 1984 (1985). *Forsythia mala - elengi* Dennst. Schluss. Hort. Malab. 12. 21 & 31. 1818. *Chionanthus malabaricus* (Wall. ex G. Don) Bedd. Fl. Sylv. t. 239. 1872. *Linociera malabarica* Wall. ex G. Don, Gen. Syst. 4 : 53. 1837-38 ; Wight, Ic. t. 1246. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 607. 1882 ; Gamble, Fl. Pres. Madr. 794. 1923, Repr. ed. 2 : 558. 1957.

Trees, 10 - 15 m. Leaves elliptic oblong, obtuse, cuneate at base. Main nerves joining in loops. Flowers sessile, white in clusters, in branched cymes. Calyx lobes ovate, grey pubescent. Drupes ellipsoid.

Fl. & Fr. : October February.

Common in lower Ghats ; Mukkali forest, Pothundi forest.

Stearn (*Ann. Miss. Bot. Gard.* 63 : 355 - 57. 1976) has found that the genus *Linociera* Sw. (1791) cannot be conceptually differentiated from the Linnaeun genus *Chionanthus* (1753), hence he has subordinated the former to a synonym under the latter. This opinion has been followed by recent workers like Scott (*Kew Bull.* 23 : 570. 1979), Bennet & Raizada and Bahadur & Gaur (*Indian J. For.* 4 : 68. 1981 ; 4 : 77. 1981 respectively).

2. JASMINUM L.

1a. Leaves simple :

2a. Bracts ovate, green ... *J. multiflorum* 3

2b. Bracts lanceolate, white ... *J. rottlerianum* 4

1b. Leaves trifoliolate :

3a. Lower leaflets very small, often wanting ... *J. auriculatum* 1

3b. Lower leaflets similar to terminal ones ... *J. azoricum* 2

1. **Jasminum auriculatum** Vahl, Symb. Bot. 3 : 1. 1794 ; Wight, Ic. t. 700. 1843 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 600. 1882 ; Gamble, Fl. Pres. Madr. 790. 1923, Repr. ed. 2 : 555. 1957.

Climbing shrubs. Leaves ovate, mucronate, grey - pubescent, rounded at base. Flowers white, fragrant, in trichotomous panicles of compound cymes. Calyx lobes ovate. Corolla lobes elliptic. Berries globose, black when ripe.

Fl. & Fr. : July.

Common in lower Ghats ; Walayar forest.

2. **Jasminum azoricum** L. Sp. Pl. 7. 1753 ; Backer & Bakh. f. Fl. Java 2 : 217. 1965. *J. flexile* Vahl, Symb. Bot. 3 : 1. 1794 ; Wight, Ic. t. 1253. 1848 ; Clarke in Hook. f. Fl. Brit Ind. 3 : 601. 1882 ; Gamble, Fl. Pres. Madr. 791. 1923, Repr. ed. 2 : 556. 1957.

var. azoricum

Climbing shrubs. Leaves opposite, glabrous ; leaflets elliptic or ovate, acute to caudate - acuminate at apex, obtuse or truncate at base, terminal ones longer than laterals. Flowers white in lax, elongate paniculate cymes. Corolla lobes elliptic. Anthers apiculate. Berries ellipsoid.

Fl. & Fr. : October - February.

Fairly common in lower Ghats ; Dhoni R.F., Marapalam forest - Nelliyampathy Ghats.

2 (a) **Jasminum azoricum** L. var. **travancorense** (Klein ex Gamble) Mohanan in J. Econ. Tax. Bot. 6 : 480. 1985. *J. flexile* Vahl var. *travancorense* Klein ex Gamble, Fl. Pres. Madr. 791. 1923, Repr. ed. 2 : 556. 1957.

This variety can be distinguished by leaves being elliptic oblong, rounded at base, long acuminate at apex, shining terminal leaflets and nerves more prominent.

Fl. & Fr. : October - February.

Common ; in lower Ghats ; Mukkali forest, Pothundy - Kaikatty forest, Silent Valley R.F.

3. **Jasminum multiflorum** (Burm. f.) Andr. Bot. Repos. 8 : t. 496. 1807. *Nyctanthes multiflorum* Burm. f. Fl. Ind. 5, t. 3. f. 1. 1768. *Jasminum pubescens* Willd. Sp. Pl. 1 : 37. 1797 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 592. 1882 ; Gamble, Fl. Pres. Madr. 789. 1923, Repr. ed. 2 : 554. 1957. *J. hirsutum* Willd. Sp. Pl. 1 : 36. 1797 ; Wight, Ic. t. 702. 1843.

Scandent shrubs ; young branches velvety - tomentose. Leaves ovate, acute, cordate at base, pubescent. Flowers white, in terminal cymes. Corolla lobes elliptic oblong, acute.

Fl. & Fr. : February.

Occasional ; in lower Ghats ; Karivara slopes.

4. **Jasminum rottlerianum** Wall. ex DC. Prodr. 8 : 305. 1844 ; Wight, Ic. t. 1248. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 593. 1882 ; Gamble, Fl. Pres. Madr. 789. 1923, Repr. ed. 2 : 554. 1957.

Large, tawny - villous, climbing shrubs. Leaves elliptic - lanceolate, pubescent, acuminate, rounded at base. Bracts ovate - lanceolate. Flowers white, in terminal, dense cymes. Calyx lobes 5, subulate, hairy. Corolla lobes 6, acute.

Fl. & Fr. : April - July.

Common ; in Ghats ; Mukkali forest, Silent Valley R.F., Vattappara - Inchikuzhi in Siruvani R.F.

3. LIGUSTRUM L.

Ligustrum gamblei Ramam. in Sald. & Nicol. Fl. Hassan Dist. 515. 1976. *L. roxburghii* Clarke in Hook. f. Fl. Brit. Ind. 3 : 615. 1882 non Bl. 1850, nec Hort. ex Decne. 1877 ; Gamble, Fl. Pres. Madr. 799. 1923, Repr. ed. 2 : 560. 1957. *Visinia robusta* (Roxb.) DC. Prodr. 8 :

305. 1844. *Ligustrum robustum* (Roxb.) Bedd. For. Man. Bot. 154. 1873 non Bl. 1850, nec Thw. 1860. *Phillyrea robusta* Roxb. Fl. Ind. 1 : 101. 1820.

Trees, 5 - 10 m. Leaves ovate - lanceolate, acuminate. Flowers white, in large, pubescent panicles. Styles elongate. Drupes oblong, curved.

Fl. & Fr. : February.

Not common ; in lower Ghats ; Minnampara, Muthikulam forest.

4. Myxopyrum L.

Myxopyrum serratulum Hill in Bull. Misc. Inform. Kew 41. 1910 ; Gamble, Fl. Pres. Madr. 798. 1923, Repr. ed. 2 : 561. 1957. *M. smilacifolium* (Wall.) Bl. in Mus. Bot. Lugd. Bat. 320. 1849 *p.p.* ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 618. 1882. *Chionanthus smilacifolia* Wall. in Roxb. Fl. Ind. 1 : 108. 1820.

Scandent shrubs. Leaves opposite, lanceolate, serrulate, acuminate. Flowers yellowish, in axillary trichotomous panicles. Calyx lobes 4. Corolla lobes 4. Stamens 2. Fruits subglobose.

Fl. & Fr. : July.

Rare ; in lower Ghats ; Mukkali forest.

5. Olea L.

Olea dioica Roxb. Fl. Ind. 1 : 105. 1820 ; Clarke in Hook. f. Fl. Brit. Ind. 3 : 612. 1882 ; Gamble, Fl. Pres. Madr. 796. 1923, Repr. ed. 2 : 559. 1957. '*Koli*' (Tam.).

Trees, glabrous, 10 - 15 m. Leaves elliptic - lanceolate, acute or acuminate at apex, acute at base. Flowers creamy - white, in terminal and axillary panicles. Calyx campanulate. Corolla campanulate ; lobes valvate. Drupes ellipsoid, 1 - seeded.

Fl. & Fr. : October - February.

Common ; in lower Ghats ; Dhoni R. F., Panthanthode forest, Kilikkiry - Pothundy forest.

80. APOCYNACEAE

1a. Anthers free from stigma :

2a. Plants armed ... CARISSA 4

2b. Plants unarmed :

3a. Leaves alternate ... PLUMERIA

3b. Leaves whorled or opposite :

4a. Calyx glandular within :

5a. Follicles linear ... HOLARRHENA 7

5b. Follicles baccate ... TABERNAEMONTANA 12

4b. Calyx eglandular within :

6a. Fruits indehiscent :

7a. Erect shrubs ; leaves whorled ... RAUVOLFIA 11

7b. Trees or climbing shrubs ; leaves opposite :

8a. Trees ... HUNTERIA 8

8b. Climbing shrubs ... CHILOCARPUS 6

6b. Fruits dehiscent :

9a. Herbs ; leaves opposite ... CATHARANTHUS 5

9b. Trees or shrubs ; leaves whorled ... ALSTONIA 2

1b. Anthers adherent to stigma :

10a. Anthers exserted :

11a. Climbing shrubs ; coma terminal ... PARSONIA 10

11b. Erect trees ; coma basal ... WRIGHTIA 13

10b. Anthers included :

12a. Calyx divided to the base ... AGANOSMA 1

12b. Calyx not divided to the base :

13a. Follicles stout, tapering ... ANODENDRON 3

13b. Follicles slender, cylindric ... ICHNOCARPUS 9

1. AGANOSMA G. Don

Aganosma cymosa (Roxb.) G. Don, Gen. Syst. 4 : 77. 1837 - 38 ; Wight, Ic. t. 1304. 1848 ; Hook. f. Fl. Brit. Ind. 3 : 665. 1882 ; Gamble, Fl. Pres. Madr. 819. 1923, Repr. ed. 2 : 576. 1957. *Echites cymosa* Roxb. Fl. Ind. 2 : 16. 1832 ; Wight, Ic. t. 395. 1840.

Large rambling climbers. Leaves elliptic - ovate or obovate, base acute, acuminate at apex. Flowers whitish - yellow, in terminal corymbs. Calyx lobes linear. Corolla lobes ovate, acuminate. Follicles 15 25 cm long, cylindric.

Fl. & Fr. : April July.

Fairly common ; in lower Ghats, Karapara river forest, Mukkali forest.

2. ALSTONIA R. Br. *nom. cons.*

1a.	Trees ; flowers in umbellate cymes	...	*A. scholaris* 1
1b.	Shrubs ; flowers in corymbose cymes	...	*A. venenata* 2

1. **Alstonia scholaris** (L.) R. Br. in Mem. Wern. Nat. Hist. Soc. 1 : 76. 1811 ; Wight, Ic. t. 422. 1841 ; Hook. f. Fl. Brit. Ind. 3 : 642. 1882 ; Gamble, Fl. Pres. Madr. 810. 1923, Repr. ed. 2 : 569. 1957 ; Markgraf in Blumea 22 : 23. 1974. *Echites scholaris* L. Mant. 53. 1767. '*Mukampalei*' (Tam.), '*Pala*' (Mal.).

Large trees, 20 25 m ; branches whorled. Leaves coriaceous, elliptic-oblong, glabrous, white bloom beneath, obtuse at apex. Flowers pale yellowish-white, in pubescent cymes. Corolla tube pubescent, pilose at mouth. Follicles cylindric, pendulous, 35 - 65 cm long.

Fairly common ; in lower Ghats ; Mukkali forest, Olavakkot area, Thiruvizhankunnu forest.

2. **Alstonia venenata** R. Br. in Mem. Wern. Nat. Hist. Soc. 1 : 77. 1811 ; Wight, Ic. t. 436. 1841 ; Hook. f. Fl. Brit. Ind. 3 : 642. 1882 ; Gamble, Fl. Pres. Madr. 810. 1923, Repr. ed. 2 : 569. 1957.

Shrubs, 2-3 m ; branches opposite or whorled. Leaves membranous, narrowly oblong - lanceolate, acuminate at apex, in whorles. Flowers white. Follicles 5 - 20 cm long, fusiform, beaked.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Anavayee area, Padagiri - Kaikatty forest, Walayar forest.

3. ANODENDRON A. DC.

1a.	Woody shrubs ; leaf nerves prominent	...	*A. paniculatum* 1
1b.	Slender shrubs ; leaf nerves not prominent	...	*A. rhinogarum* 2

1. **Anodendron paniculatum** (Roxb.) DC. Prodr. 8 : 444. 1844 ; Hook. f. Fl. Brit. Ind. 3 : 668. 1882 ; Gamble, Fl. Pres. Madr. 820. 1923, Repr. ed. 2 : 576. 1957. *Echites paniculata* Roxb. Fl. Ind. 2 : 17. 1824.

Large, twining shrubs. Leaves 10 16 × 5 - 9 cm, elliptic-oblong, abruptly acuminate ; nerves parallel, 12 15 pairs. Flowers yellow, small in large lax trichotomously branched paniculate cymes. Calyx globose. Corolla lobes linear, overlapping to right. Follicles woody, 2, diverging, tapering ; coma up to 10 cm long.

Fl. & Fr. : February Ottober.

Occasional ; in lower Ghats ; Karivara slopes, Mukkali forest.

2. **Anodendron rhinosporum** Thw. Enum. 194. 1860 ; Hook. f. Fl. Brit. Ind. 3 : 669. 1882 ; Trimen, Handb. Fl. Ceylon 3 : 141. 1974 (Repr. ed.) ; Vajravelu & Bhargavan in J. Econ. Tax. Bot. 5 : 423. 1984.

Glabrous, twining shrubs. Leaves 6 - 9 × 2 - 4 cm, oblong-lanceolate, glabrous, acute at base, obtuse at apex, nerves inconspicuous. Flowers small, in lax, trichotomously branched cymes. Calyx lobes acute. Corolla lobes linear, falcate. Follicles linear - oblong, tapering, coma up to 8 cm long.

Fl. & Fr. : March - November.

Rare ; in lower Ghats ; Karapara river forest, Mukkali forest.

It is an addition to the Flora of India. So far known only from Sri Lanka. The present discovery shows that it is a species with disjunct distribution.

4. Carissa L. *nom. cons.*

Carissa inermis Vahl, Symb. Bot. 3 : 43. 1794 ; Gamble, Fl. Pres. Madr. 805. 1923, Repr. ed. 2 : 565. 1957.

Large, scandent shrubs ; thorns 2, recurved. Leaves ovate to elliptic - lanceolate, acute to acuminate. Flowers white, in sessile cymes. Calyx pubescent. Corolla lobes linear lanceolate. Berries ellipsoid, 4 - seeded.

Fl. & Fr. : March.

Occassional ; in lower Ghats ; once collected from Karapara river bank.

5. Catharanthus G. Don

Catharanthus pusillus (Murr.) G. Don, Gen. Syst. 4 : 5. 1837 - 38

Sant. in Bull. Bot. Surv. Ind. 3 : 15. 1962. *Vinca pusilla* Murr. in Comm. Soc. Reg. Gotting. 3 : 66. t. 2. f. 1. 1773 ; Hook. f. Fl. Brit. Ind. 3 : 640. 1882. *Lochnera pusilla* (Murr.) K. Schum. in Pflanzenfam. 4 (2) : 145. 1895 ; Gamble, Fl. Pres. Madr. 809. 1923, Repr. ed. 569. 1957.

Erect, glabrous, annual herbs. Leaves lanceolate, base attenuate, acuminate at apex. Flowers white, solitary or in pairs. Corolla throat hairy ; lobes obovate. Follicles slender, straight, glabrous.

Fl. & Fr. : February.

Catharanthus roseus (L.) G. Don (*Vinca rosea* L.) a native of the West Indies, is often cultivated as ornamental and for medicinal purposes. Also found as an escape.

6. CHILOCARPUS Bl.

Chilocarpus atrovirens (G. Don) Bl. Mus. Bot. Lugd. - Bat. 1 : 153. 1850 (*'atroviridis'*) ; Hook. f. Fl. Brit. Ind. 3 : 626. 1882 ; Gamble, Fl. Pres. Madr. 803. 1923, Repr. ed. 2 : 564. 1957. *Hunteria atrovirens* G. Don, Gen Syst 4 : 105. 1837-38 (*'atroviridi'*). *Chilocarpus malabaricus* Bedd. Ic. t. 175. 1868 74 ; Raghavan in Bull. Bot. Surv. Ind. 6 : 309. 1965.

Large, climbing shrubs with milky juice. Leaves elliptic-oblong, glossy, abruptly acuminate, cuspidate, rounded at base. Flowers creamy, in axillary cymes. Corolla inflated above the middle ; lobes rounded. Berries fleshy, elliptic-oblong, brownish.

Fl. & Fr. : March August.

Endemic. Rare in lower Ghats ; Mukkali forest, Karapara river forest.

It is likely to be mistaken for a species of the genus *Anodendron* as it has a close resemblance to that. However, it can be easily distinguished by the hypocrateriform corolla contracted at throat and the number of parallel veins (more than 20 pairs). Raghavan *l.c.* differentiates *C. malabaricus* from *atroviridis* but Stevens (in Saldanha & Nicolson, Fl. Hassan Dist. 432 - 433. 1976) treats them as conspecific and reduces *C. malabaricus* to a synonym as the latter is priorable.

7. HOLARRHENA R. Br.

Holarrhena pubescens (Buch. - Ham.) Wall. ex G. Don, Gen. Syst. 4 : 78. 1837-38. Panigrahi in Taxon 36 (2) : 466. 1987. *Echites pubescens* Buch. - Ham. in Trans. Linn. Soc. London 13 : 524. 1821. *Nerium antidysentricum* L. Sp. Pl. 209. 1753 *nom. ambig. Echites antidysentrica* (L.) Roxb. ex Fleming in Asiat. Res. 2 : 166. 1810 ; Roth, Nov. Pl. Sp. 138.

1821. *Holarrhena antidysenterica* Wall. ex A. DC. in DC. Prodr. 8 : 413. 1844 ; Bedd. Fl. Sylv. 20. f. 6. 1869 ; Hook. f. Fl. Brit. Ind. 3 : 644. 1882 ; Gamble, Fl. Pres. Madr. 811. 1923, Repr. ed. 2 : 570. 1957. *Chonemorpha antidysenterica* (Roth) G. Don, Gen. Syst. 4 : 76. 1837-38 ; Wight, Ic. t. 439. 1841. *Holorrhena codaga* G. Don, *l. c.* 78. Wight, Ic. t. 1297 1848. *H. malaccensis* Wight, Ic t. 1298. 1848. '*Kuttupalai*', *Veppalai* (Tam.).

Shrubs or small trees, 3 5 m. Leaves ovate oblong or elliptic, pubescent, base rounded to obtuse, acuminate at apex. Flowers white, in corymbose cymes. Corolla tube pubescent ; lobes oblong, overlapping to right. Follicles narrow, 35 - 45 cm, pendulous.

Fl. & Fr. : March November.

Common ; in lower Ghats ; Chathamangalam area, Mangalam dam area, Nemmara.

8. HUNTERIA Roxb.

Hunteria corymbosa Roxb. var. **roxburghiana** (Wight) Trimen, Handb. Fl. Ceylon 3 : 128. 1895 ; Gamble, Fl. Pres. Madr. 808. 1923, Repr. ed. 2 : 568. 1957. *H. roxburghiana* Wight, Ic. t. 1294. 1848.

Trees, up to 10 m. Leaves linear lanceolate, shining, attenuate at base ; nerves many, parallel. Flowers pale yellow, in short cymes. Corolla salver shaped. Fruits 2, stalked, fleshy, ovoid.

Fr. : April.

Rare ; once collected in Ayyappankoil area Nelliyampathy Ghat at 750 m ; *Vajravelu* 49707.

9. ICHNOCARPUS R. Br. *nom. cons.*

Ichnocarpus frutescens (L.) R. Br. in Aiton, Hort. Kew. ed. 2. 2 : 69. 1811 ; Wight, Ic. t. 430. 1841 ; Hook. f. Fl. Brit. Ind. 3 : 669. 1882 ; Gamble, Fl. Pres. Madr. 820. 1923, Repr. ed. 2 : 577. 1957.

Woody, rusty - villous, climbing shrubs. Leaves lanceolate - ovate, acute at both ends. Flowers dull white, in cymes. Calyx eglandular. Corolla lobes pubescent, reflexed. Follicles 2, thin, divergent.

Fl. & Fr. : October December.

Common : in lower Ghats : Malampuzha, Mathur area, Mukkali forest, Thiruvizhankunnu forest.

10. PARSONSIA R. Br. *nom. cons.*

Parsonsia alboflavescens (Dennst.) Mabberley in Taxon 26 : 532. 1977. *Periploca alboflavescens* Dennst. Schluss. Hort. Malab. 23, 35. 1818. *Parsonsia spiralis* Wall. ex G. Don, Gen. Syst. 4 : 80. 1837 - 38 ; Hook. f. Fl. Brit. Ind. 3 : 650. 1882 ; Gamble, Fl. Pres. Madr. 814. 1923, Repr. ed. 2 : 572. 1957. *P. laevigata* (Moon) Alston in Ann. Roy. Bot. Gard. (Peradeniya) 11 : 203. 1929. *Echites laevigata* Moon, Cat. Pl. Ceylon 20. 1824.

Woody, glabrous, climbing shrubs. Leaves elliptic - ovate or lanceolate, acute, rounded to slightly cordate at base. Flowers pale yellowish - white, in dichotomous cymes. Calyx 5 - lobed. Corolla salver-shaped : lobes overlapping to right. Follicles 2, 10 - 20 cm long.

Fl. & Fr. : All seasons.

Common ; in Ghats ; Mukkali forest, Kunthipuzha dam site forest, Valiyaparathode forest.

11. RAUVOLFIA L.

Rauvolfia serpentina (L.) Benth. ex Kurz, For. Fl. Burma 2 : 171. 1877 ; Hook. f. Fl. Brit. Ind. 3 : 632. 1882 ; Gamble, Fl. Pres Madr. 807. 1923, Repr. ed. 2 : 567. 1957. *Ophioxylon serpentinum* L. Sp. Pl. 1043. 1753 ; Wight, Ic. t. 849. 1845. '*Chivanamelpodi*' (Tam.).

Glabrous undershrubs. Leaves 3 to 4 - nately whorled, lanceolate or oblanceolate, acuminate. Pedicles red. Flowers white, in corymbose cymes. Calyx red. Corolla lobes elliptic oblong. Drupes purplish - black.

Fl. & Fr. : October - May.

Not common ; but cultivated ; Mukkali forest camp shed area, Walayar forest.

Root is used in medicine.

12. TABERNAEMONTANA L.

1a. Corolla tubes dilated in middle ; follicle beaks not curved ... *T. heyneana* 2

1b Corolla tubes dilated at top ; follicle beaks curved ... *T. gamblei* 1

1. **Tabernaemontana gamblei** Subr. & Henry in Bull. Bot. Surv. India 12 : 5. 1970 (1972). *Ervatamia caudata* Gamble, in Bull. Misc. Inform. Kew 310. 1921 & Fl. Pres. Madr. 813. 1923, Repr. ed. 571. 1957 non *Tabernaemontana caudata* Merr. 1909.

Shrubs, 3 m. Leaves elliptic obovate, abruptly caudate acuminate at apex. Flowers white, in cymes. Calyx lobes unequal, oblong, ciliate. Corolla tube slender. Follicles ovate.

Fl. & Fr. : February - April.

Rare in lower Ghats ; Ayyappankoil - Kaikatty forest.

2. **Tabernaemontana heyneana** Wall. ex DC. Prodr. 8 : 376. 1844 ; Hook. f. Fl. Brit. Ind. 3 : 646. 1882. *Ervatamia heyneana* (Wall. ex DC.) Cooke, Fl. Bombay Pres. 2 : 134. 1904 ; Gamble, Fl. Pres. Madr. 813. 1923, Repr. ed. 2 : 572. 1957.

Small trees, 3 - 5 m. Leaves coriaceous, oblong or oblong - lanceolate, acuminate. Flowers white, in cymes, glabrous. Corolla lobes obtuse, crispate. Follicles yellow at maturity.

Fl. & Fr. : June.

Rare ; once collected in Mukkali forest at 525 m, *Vajravelu* 27788.

Subramanyam & Henry *l.c.* say 'The genus *Ervatamia* Stapf is included in *Tabernaemontana* L. Stapf in Thiselton - Dyer, Fl. Trop. Africa 4 : 25. 1902 has split the genus *Tabernaemontana* into several new genera, with the result that the genus *Tabernaemontana* proper has been entirely excluded from the Old World ; subsequently most of the Indian species of *Tabernaemontana* were transferred to the new genus *Ervatamia* Stapf. Merril (Contrib. Arnold. Arbor. 8 : 139 - 144. 1934) expressed doubt about the generic distinction of *Ervatamia* ; the calyx lobed to about middle and the glands within few, do not warrant the separation of *Ervatamia* from *Tabernaemontana*.

13. WRIGHTIA R. Br.

Wrightia tinctoria R. Br. in Mem. Wern. Nat. Hist. Soc. 1 : 47. 1811 ; Wight, Ic. t. 444. 1841 ; Hook. f. Fl. Brit. Ind. 3 : 653. 1882 ; Gamble, Fl. Pres. Madr. 815. 1923, Repr. ed. 2 : 573. 1957. '*Nila palai*' (Tam.).

Small, deciduous trees, 3 - 5 m. Leaves elliptic - lanceolate or oblong - lanceolate, acuminate. Flowers white, fragrant, in lax cymes. Corolla lobes oblong. Follicles 2, pendulous, cylindric, cohering at tip.

Fl. & Fr. : March - October.

Common ; in lower Ghats ; Ayyappankoil forest, Chindaki - Mukkali forest, Walayar forest.

Plumeria alba L. (*P. acutifolia* Poir.), **P. rubra** L. forma **acuminata** Sant. & Irani ex Shah and **Thevetia peruviana** (Pers.) Schum. are cultivated usually near temples, also run wild.

81. ASCLEPIADACEAE

1a. Filaments free :
- 2a. Corolla lobes valvate ... HEMIDESMUS 7
- 2b. Corolla lobes imbricate ... CRYPTOLEPIS 4

1b. Filaments connate :
- 3a. Anthers with membranous appendages :
  - 4a. Pollen masses 2 in each anther cell ... TOXOCARPUS 12
  - 4b. Pollen masses 1 in each anther cell :
    - 5a. Pollen masses pendulous :
      - 6a. Stem erect ; corolla valvate in bud ... CALOTROPIS 1
      - 6b. Stem twining ; corolla overlapping in bud :
        - 7a. Flowers large ; corolla thick ... HOLOSTEMMA 8
        - 7b. Flowers small ; corolla thin ... CYNANCHUM 5
    - 5b. Pollen masses erect :
      - 8a. Corona corolline ... GYMNEMA 6
      - 8b. Corona staminal :
        - 9a. Corolla lobes overlapping :
          - 10a. Corona lobes wholly adnate ... TYLOPHORA 13
          - 10b. Corona lobes partly adnate :
            - 11a. Corolla lobes with subulate processes inside ... PERGULARIA 11
            - 11b. Corolla lobes without subulate processes inside ... WATTAKAKA 14
        - 9b. Corolla lobes valvate ... HOYA 9
- 3b. Anthers without membranous appendages :
  - 12a. Corona corolline and staminal ... LEPTADENIA 10
  - 12b. Corona staminal only :

13a. Leafy herbs with terete stems and branches ... CEROPEGIA 3

13b. Leafless herbs with fleshy 4 - angled stems and branches ... CARALLUMA 2

1. CALOTROPIS R. Br.

Calotropis gigantea (L.) R. Br. in Aiton Hort. Kew. ed. 2. 2 : 78. 1811 ; Hook. f. Fl. Brit. Ind. 4 : 17. 1883 ; Gamble, Fl. Pres. Madr. 832. 1923, Repr. ed. 2 : 585. 1957. *Asclepias gigantea* L. Sp. Pl. 214. 1753. '*Yerukku*' (Tam.).

Large, milky shrubs. Branches, leaves and inflorescences covered with loose soft white wool. Leaves ovate or obovate ; base clasping - cordate. Flowers purple to white, in subumbellate cymes. Corona of 5 keel shaped lobes adnate to the gynostegium each with a recurved vescicle at the base and a pair of auricles at the apex Pollina pendent from dark horny corpuscula, 2 per anther, waxy. Follicles fleshy, ventricose. Seeds with abundant milky coma.

Fl. & Fr. : December - June.

Common in plains ; Walayar dam area.

All parts are used for many purposes including medicine.

2. CARALLUMA R. Br.

Caralluma campanulata (Wight) N. E. Br. in Gard. Chron. 2 : 369. 1892 ; Gamble, Fl. Pres. Madr. 861. 1923, Repr. ed. 2 : 606. 1957. *Boucerosia campanulata* Wight, Ic. t. 1287. 1848. *B. umbellata* Wight & Arn. var. *campanulata* Hook. f. Fl. Brit. Ind. 4 : 77. 1883.

Erect, branching, succulent herbs. Flowers many, in terminal umbels ; corolla glabrous, dark red inside, greenish outside, not streaked. Follicles straight, slender, smooth.

Fl. & Fr. : July.

Rare ; lower Ghats ; Walayar forest.

3. CEROPEGIA L.

1a. Corolla lobes narrow, shorter than the neck of tube :

2a. Crown in bud beaked :

3a. Crown of corolla lobes shortly beaked	...	*C. candelabrum*	1
3b. Crown of corolla lobes elongate, spathulate	...	*C. tuberosa*	6
2b. Crown in bud not beaked :			
4a. Corolla less than 3 cm long	...	*C. intermedia*	4
4b. Corolla more than 3 cm long	...	*C. thwaitesii*	5
1b. Corolla lobes as long as or longer the neck of tube :			
5a. Corolla tubes much inflated at base	...	*C. decaisneana*	3
5b. Corolla tubes not or little inflated	...	*C. ciliata* ssp. *ensifolia*	2

1. **Ceropegia candelabrum** L. Sp. Pl. 211. 1753 ; Hook. f. Fl. Brit. Ind. 4 : 70. 1883 ; Gamble, Fl. Pres. Madr. 857. 1923, Repr. ed. 2 : 603. 1957. *C. elliotii* Hook. f. *l. c.* '*Nota - nodhem valli*' (Mal.).

Glabrous twiners. Leaves linear to orbicular or lanceolate, acuminate, apiculate. Cymes many flowered, pendulous. Corolla green below, tips purplish, inflated in lower half. Outer corona of 5 entire or truncate hairy lobes ; inner erect, linear - subspathulate.

Fl. & Fr. : September - December.

Common ; in upper Ghats ; Panthanthode area, Silent Valley R.F.

2. **Ceropegia ciliata** Wight ssp. **ensifolia** (Bedd.) Huber in Mem. Soc. Brot. 12 : 69. 1957. *C. ensifolia* Bedd. in Madras J. Lit. Sci. ser. 3. 1 : 52. 1864 *et* Ic. t. 173. 1868 1874 ; Hook. f. Fl. Brit. Ind. 4 : 75. 1883; Gamble, Fl. Pres. Madr. 859. 1923, Repr. ed. 2 : 604. 1957.

Slender twiners with subglobose, tuberous roots. Leaves more or less 15 × 1 cm, linear - lanceolate. Flowers pale greenish. Corolla small, pale greenish with pinkish spots ; outer corona lobes short, obtuse, ciliate ; inner erect. Follicles slender, narrow.

Fl. & Fr. : October.

Endemic ; fairly common ; in upper Ghats ; Karasuryamalai forest, Valiyaparathode forest.

3. **Ceropegia decaisneana** Wight, Ic. t. 1259. 1848 ; Hook. f. Fl. Brit. Ind. 4 : 73. 1883 ; Gamble, Fl. Pres. Madr. 859. 1923, Repr. ed. 2 : 604. 1957 ; Huber in Mem. Soc. Brot. 12 : 62. 1957.

Slender twiners with tuberous roots. Leaves linear - lanceolate, acuminate. Flowers green with purple spots. Corolla curved. Corona orange, ciliate, tips purple. Follicles slender.

Fl. & Fr. : October - December.

Common ; in upper Ghats ; Mukkali forest, Silent Valley R.F.

4. **Ceropegia intermedia** Wight, Ic. t. 1263. 1848, *emend.* Huber in Mem. Soc. Brot. 12 : 61. 1957 ; Hook. f. Fl. Brit. Ind. 4 : 71. 1883, *p. p.* ; Gamble, Fl. Pres. Madr. 858. 1923, Repr. ed. 2 : 603. 1957.

Slender twiners ; rootstocks fibrous. Leaves elliptic - lanceolate to linear - lanceolate, acuminate. Flowers white with bluish tinge. Corolla tube curved, pink, inflated at base ; lobes yellow. Follicles slender, straight.

Fl. & Fr. : November.

Endemic ; rare ; in lower Ghats ; way to Anavayee forest.

5. **Ceropegia thwaitesii** Hook. Bot. Mag. t. 4758. 1854 ; Hook. f. Fl. Brit. Ind. 4 : 71. 1883 ; Gamble, Fl. Pres. Madr. 858. 1923, Repr. ed. 2 : 603. 1957 ; Huber in Mem. Soc. Brot. 12 : 71. 1957.

Stout twiners. Leaves elliptic to ovate - lanceolate, acuminate. Flowers large, base swollen, green ; neck narrow ; lobes with pinkish dots, connate at tip. Follicles slender, 25 - 30 cm long, tips hooked.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Aruvampara slopes - Silent Valley R.F.

6. **Ceropegia tuberosa** Roxb. Pl. Cor. t. 9. 1795 ; Wight, Ic. t. 353. 1840 ; Hook. f. Fl. Brit. Ind. 4 : 70. 1883 ; Gamble, Fl. Pres. Madr. 857. 1923, Repr. ed. 2 : 603. 1957. *C. candelabrum* auct. non L. 1753 ; Huber in Mem. Soc. Brot. 12 : 58. 1957, *p. p.*

Twiners with tuberous roots. Leaves ovate - orbicular to lanceolate, apiculate. Flowers pale green, yellowish inside, purple at tips of lobes ; inner corona spathulate. Follicles very slender.

Fl. & Fr. : November.

Common ; in Ghats : Karivara slopes, Olavakkot area.

Huber *l.c.* has reduced *C. tuberosa* Roxb. to *C. candelabrum* L. The two species are however quite distinct especially with regard to the corolla lobes. The crown of the corolla lobes is shortly beaked in the latter and elongate-spathulate in the former.

4. CRYPTOLEPIS R. Br.

1a. Leaf nerves horizontal and parallel	...	*C. buchananii*	1
1b. Leaf nerves not horizontal and parallel	...	*C. grandiflora*	2

1. **Cryptolepis buchananii** Roem. & Schult. Syst. Veg. 4 : 409. 1818 ; Wight, Ic. t. 494. 1841 ; Hook. f. Fl. Brit. Ind. 4 : 3. 1883 ; Gamble, Fl. Pres. Madr. 826. 1923, Repr. ed. 2 : 580. 1957.

Large, much branched climbers. Leaves elliptic - oblong, apiculate, glabrous. Flowers pale yellow, in lateral cymose panicles. Corolla lobes glabrous. Filaments free. Follicles stout, 2, divaricate.

Fl. & Fr. : Almost all seasons.

Common ; in lower Ghats ; Chindaki forest, Panthanthode area, Sappal hill - Dhoni R.F., Walayar forest.

2. **Cryptolepis grandiflora** R. Br. in Bot. Reg. 5 : t. 435. 1819 ; Wight, Ic. t. 831. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 5. 1883 ; Gamble, Fl. Pres. Madr. 826. 1923, Repr. ed. 2 : 580. 1957 ; Sant. & Irani in Bot. Mem. Univ. Bombay No. 4. 93. 1962.

Slender, climbing shrubs. Leaves ovate elliptic to oblong, acute, apiculate. Flowers large, yellow, in cymes. Calyx lobes lanceolate, puberulous. Corolla glabrous. Corona lobes filiform. Follicles divaricate, thin, narrow.

Fl. : December.

Rare ; in lower Ghats ; Attappadi block - Mukkali.

5. CYNANCHUM L.

1a. Follicles winged, acute or acuminate ; leaves shallowly cordate	...	*C. callialata* 1
1b. Follicles not winged, long - beaked ; leaves broadly cordate	...	*C. tunicatum* 2

1. **Cynanchum callialata** Ham. ex Wight, Contrib. Ind. Bot. 56. 1834 et Ic. t. 1279. 1848 ; Hook. f. Fl. Brit. Ind. 4 : 24. 1883 ; Gamble, Fl. Pres. Madr. 836. 1923, Repr. ed. 2 : 588. 1957 ; Sant. & Irani in Bot. Mem. Univ. Bombay No. 4. 39. 1962.

Trailing or climbing undershrubs. Leaves linear - oblong, apiculate, glaucous beneath. Flowers white, in corymbose cymes. Calyx lobes glabrous. Corolla lobes erect, oblong. Corona tubular, plicate, 5 - lobed. Follicles solitary or in pairs, glabrous.

Fl. & Fr. ; November - January.

Common ; in upper Ghats ; Kunthipuzha dam site.

2. **Cynanchum tunicatum** (Retz.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) : 194. 1931 ; Sant. & Irani in Bot. Mem. Univ. Bombay

No. 4. 40. 1962. *Periploca tunicata* Retz. Obs. Bot. 2 : 15. 1781. *Cynanchum pauciflorum* R. Br. in Mem. Wern. Nat. Hist. Soc. 1 : 45. 1811 ; Wight, Ic. t. 354. 1840 ; Hook. f. Fl. Brit. Ind. 4 : 23. 1883 ; Gamble, Fl. Pres. Madr. 836. 1923, Repr. ed. 2 : 587. 1957.

Twining undershrubs. Leaves ovate oblong or subhastate, base cordate with rounded lobes and broad sinus. Flowers greenish with pinkish tinge. Calyx lobes ciliate. Corona plicate ; lobes 5, contorted.

Fl. & Fr. : November - February.

Fairly common ; in lower Ghats ; Panthanthode forest, Pothundy - Kaikatty forest.

6. GYMNEMA R. Br.

1a. Leaves membranous ; corolla less than 3 mm long ... *G. sylvestre* 2

1b. Leaves subcoriaceous ; corolla more than 3 mm long ... *G. montanum* var. *beddomei* 1

1. **Gymnema montanum** Hook. f. var. **beddomei** Hook. f. Fl. Brit. Ind. 4 : 31. 1883.

Climbers. Leaves ovate oblong to lanceolate, acuminate, rounded at base. Flowers creamy, in umbels. Follicles up to 15 cm long.

Fl. & Fr. : June - December.

Endemic ; rare ; in Ghats ; Mukkali forest, Silent Valley R.F.

Gamble in Fl. Pres. Madras does not enumerate this variety.

2. **Gymnema sylvestre** (Retz.) R. Br. ex Schult. in Roem. & Schult. Syst. 6 : 57. 1820 ; Wight, Ic. t. 349. 1840 ; Hook. f. Fl. Brit. Ind. 4 : 29. 1883 ; Gamble, Fl. Pres. Madr. 839. 1923, Repr. ed. 2 : 490. 1957. *Periploca sylvestris* Retz. Obs. Bot. 2 : 15. 1781.

Large climbers. Leaves ovate - oblong, pubescent, acute at apex, base rounded to cordate. Flowers small, yellow, in cymes. Calyx lobes ovate, pubescent. Corolla lobes recurved, glabrous. Follicles lanceolate, glabrous.

Fl. : November.

Common ; in lower Ghats ; Panangatri area, Walayar forest.

Leaves used in medicine.

7. HEMIDESMUS R. Br.

Hemidesmus indicus (L.) R. Br. in Aiton, Hort. Kew. ed. 2. 2 : 75. 1811 ; Wight, Ic. t. 594. 1842 ; Hook. f. Fl. Brit. Ind. 4 : 4. 1883 ; Gamble, Fl. Pres. Madr. 825. 1923, Repr. ed. 2 : 580. 1957 ; Sant. & Irani Bot. Mem. Univ. Bombay No. 4. 96. 1962. *Periploca indica* L. Sp. Pl. 211. 1753. '*Nannari*' (Tam.), '*Narunanti*' (Mal.).

Perennial, prostrate or twining undershrubs ; rootstocks aromatic. Leaves linear - lanceolate to elliptic, very variable, apiculate, mottled with white above. Flowers yellowish with pinkish tinge. Calyx glabrous. Corolla lobes ovate acute, thick. Follicles 2, divaricate, slender.

Fl. & Fr. : September - December.

Common ; in lower Ghats ; Chindaki forest, Dhoni R.F., Pothundy-Kaikatty forest.

Roots are tonic and are said to be an excellent substitute for Sarsaparilla.

8. HOLOSTEMMA R. Br.

Holostemma ada-Kodien Schult. in Roem. & Schult. Syst. Veg. 6 : 95. 1820. *H. annulare* (Roxb.) K. Schum. in Engl. & Prantl. Pflanzenfam. 4 (2) : 250. 1895 ; Gamble, Fl. Pres. Madr. 834. 1923, Repr. ed. 2 : 586. 1957. *Asclepias annulare* Roxb. Hort. Beng. 20. 1814 ('annularia'). *Holostemma rheedii* Wall. Pl. As. Rar. 2 : 51. 1831 ; Wight, Ic. t. 597. 1842.

Large, glabrous, twining shrubs. Leaves ovate, cordate. Flowers conspicous, purple within, in lateral cymes. Follicles thick. Seeds ovoid winged, ending in a white silky coma.

Fl. : July.

Rare ; in lower Ghats ; Olavakkot area.

9. HOYA R. Br.

Hoya ovalifolia Wight & Arn. in Wight, Contrib. Ind. Bot. 37. 1834 ; Wight, Ic. t. 847. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 60. 1883 ; Gamble, Fl. Pres. Madr. 848. 1923, Repr. ed. 2 : 597. 1957.

Epiphytic, pendulous shrubs. Leaves elliptic - ovate to lanceolate, glabrous, apex obtuse. Flowers dull white, in drooping umbels. Calyx glabrous. Corolla rotate. Corona lobes concave. Follicles slender.

Fl. : January.

Rare ; in lower Ghats ; Karivara forest.

10. LEPTADENIA R. BR.

Leptadenia reticulata (Retz.) Wight & Arn. in Wight, Contrib. Ind. Bot. 47. 1834 ; Wight, Ic. t. 350. 1840 ; Hook. f. Fl. Brit. Ind. 4 : 63. 1883 ; Gamble, Fl. Pres. Madr. 850. 1923, Repr. ed. 2 : 598. 1957 ; Bullock in Kew Bull. 10 : 291. 1955. *Cynanchum reticulatum* Retz. Obs. Bot. 2 : 15. 1781.

Climbing shrubs. Leaves ovate lanceolate, acute, rounded at base. Flowers dull white to pale yellow, in umbellate cymes. Calyx densely pubescent. Corolla rotate, pubescent. Follicles subwoody with curved beaks.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Agali forest.

11. PERGULARIA L.

Pergularia daemia (Forsk.) Chiov. in Result. Sci. Misc. Stafn. Paoli Somal. Ital. 1 : 115. 1916 ; Sant. & Irani in Bot. Mem. Univ. Bombay No. 4. 74. 1962. *Asclepias daemia* Forsk. Fl. Aegypt. Arab. 51. 1775. *Cynanchum extensum* Jacq. Misc. 2 : 353. 1782. *Daemia extensa* (Jacq.) R. Br. in Aiton, Hort. Kew. ed. 2. 2 : 76. 1811 ; Hook. f. Fl. Brit. Ind. 4 : 20. 1883. *Pergularia extensa* (Jacq.) N.E. Br. in Thiselton Dyer, Fl. Cap. 4 : 758. 1908 ; Gamble, Fl. Pres. Madr. 836. 1923, Repr. ed. 2 : 588. 1957. '*Velliparti*' (Tam.).

Slender, foetid, milky, hispid climbers. Leaves ovate, acuminate, hispid below, cordate at base. Flowers pale yellow, in pedunculate cymes. Calyx villous. Corolla pubescent inside. Follicles 2, reflexed, softly echinate.

Fl. & Fr. : December - June.

Common ; in lower Ghats ; Attappadi block Mukkali, Walayar forest.

12. TOXOCARPUS Wight & Arn.

1a. Leaves nearly glabrous ; corona scales shorter than the stamens ... *T. malabaricus*

1b. Leaves usually glandular pubescent ; corona scales longer than the stamens ... *T. kleinii* 1

1. **Toxocarpus kleinii** Wight & Arn. in Wight, Contrib. Ind. Bot. 61. 1834 ; Wight, Ic. t. 886. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 14. 1883 ; Gamble, Fl. Pres. Madr. 830. 1923, Repr. ed. 2 : 584. 1957.

Slender, rufous - villous climbing shrubs. Leaves elliptic to obovate, acuminate at apex. Flowers dull yellow, in lateral cymes. Calyx densely tomentose. Corolla glabrous within. Follicles curved, long - beaked.

Fl. & Fr. : July.

Rare ; in lower Ghats ; Dhoni R.F.

2. **Toxocarpus palghatensis** Gamble in Bull. Misc. Inform. Kew 119. 1922 & Fl. Pres. Madr. 830. 1923, Repr. ed. 2 : 583. 1957. (Plate-10)

Slender climbers ; young parts black tomentose. Leaves elliptic obovate, glabrous, abruptly acuminate. Flowers pale yellow, in axillary cymes. Calyx 5 lobed. Corolla 5 lobed. Follicles 2, divaricate.

Fr. : December.

Endemic ; rare ; once collected in Silent Valley R.F. at 925 m ; *Vajravelu* 33255.

13. TYLOPHORA R. Br.

1a. Flowers minute ; pedicels glabrous ... *T. tenuis* 2

1b. Flowers rather large ; pedicels pilose ... *T. indica* 1

1. **Tylophora indica** (Burm. f.) Merr. in Philipp. J. Sci. Bot. 19 : 373. 1921 ; Sant. & Irani in Bot. Mem. Univ. Bombay No. 4. 88. 1962. *Cynanchum indicum* Burm. f. Fl. Ind. 70. 1768. *Tylophora asthmatica* (L.f.) Wight & Arn. in Wight, Contrib. Ind. Bot. 51. 1834 ; Wight, Ic. t. 1277. 1848 ; Hook. f. Fl. Brit. Ind. 4 : 44. 1883 ; Gamble, Fl. Pres. Madr. 830. 1923, Repr. ed. 2 : 593. 1957. *Asclepias asthmatica* L. f. Suppl. Pl. 171. 1781.

Twining, pubescent undershrubs. Leaves elliptic - oblong, pubescent, apiculate, rounded at base. Flowers pale pinkish, in lateral cymes. Calyx lobes spreading, pilose. Corolla pilose. Corona gibbous below. Follicles lanceolate, sharp-pointed.

Fl. & Fr. : March.

Common ; in lower Ghats ; Bhavani river bank - Mukkali.

Leaves are of medicinal value.

2. **Tylophora tenuis** Bl. Bijdr. 1062. 1827 ; Hook. f. Fl. Brit. Ind. 4 : 42. 1883 ; Gamble, Fl. Pres. Madr. 843. 1923, Repr. ed. 2 : 592. 1957. *Asclepias tenuissima* Roxb. Fl. Ind. 2 : 41. 1832 ; Wight, Ic. t. 351. 1840. *Tylophora tenuissima* (Roxb.) Wight & Arn. in Wight, Contrib. Ind. Bot. 49. 1834 ; Wight, Ic. t. 588. 1842.

Slender, twining undershrubs. Leaves linear-lanceolate, puberulous on midrib above, base rounded, apex acute. Flowers pink, in lateral cymes. Corolla lobes glabrous.

Fl. & Fr. : May - June.

Rare in lower Ghats ; Dhoni R.F.

14. WATTAKAKA Hassk.

Wattakaka volubilis (L. f.) Stapf in Curtis, Bot. Mag. sub. t. 8976. 1923 ; Huber in Abeywickrama, Fl. Ceylon 1 : 50. 1973. *Asclepias volubilis* L. f. Suppl. Pl. 170. 1781. *Hoya viridiflora* R. Br. in Mem. Wern. Nat. Hist. Soc. 1 : 27. 1811 ; Wight, Ic. t. 586. 1842. *Dregea volubilis* (L. f.) Benth. ex Hook. f. Fl. Brit. Ind. 4 : 46. 1883. *Marsdenia volubilis* (L. f.) Cooke, Fl. Pres. Bombay 2 : 166. 1904 ; Gamble, Fl. Pres. Madr. 846. 1923, Repr. ed. 2 : 595. 1957. '*Kurincha*' (Tam.).

Large, climbing shrubs. Leaves ovate suborbicular, abruptly acuminate, cordate at base. Flowers pale green, in lateral, umbellate cymes. Corolla rotate, glabrous. Corona lobes fleshy, rounded. Follicles 2, lanceolate.

Fl. & Fr. : March May.

Common ; in lower Ghats ; Mukkali forest, Walayar forest.

Asclepias curassavica L., a native of the West Indies is found occasionally in this district.

82. BUDDLEJACEAE

BUDDLEJA L.

Buddleja asiatica Lour. Fl. Cochinch. 72. 1790 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 82. 1883 ; Gamble, Fl. Pres. Madr. 865. 1923, Repr. ed. 2 : 608. 1957. *B. discolor* Roth, Nov. Pl. Sp. 82. 1821 ; Wight, Ic. t. 894. 1845.

Large, evergreen shrubs, 1 - 3 m ; young parts and leaves white - tomentose. Leaves opposite, oblong - lanceolate, cuneate at base. Flowers

white, in panicles, fragrant. Calyx densely tomentose. Corolla hairy. Capsules ovate oblong, apiculate.

Fl. & Fr. : October April.

Common ; in Ghats ; Ayyappankoil forest, Chindaki forest, Muthikulam Siruvani forest, Silent Valley R.F., Valiyaparathode area.

83. LOGANIACEAE

1a. Leaves succulent ; flowers showy, 50 - 80 mm long ... FAGRAEA 1

1b. Leaves not succulent ; flowers not showy, 5 - 10 mm long :

2a. Woody twiners ; corolla rotate ... GARDNERIA 2

2b. Trees or climbing shrubs ; corolla valvate ... STRYCHNOS 3

1. FAGRAEA Thunb.

Fagraea ceilanica Thunb. in Kongl. Vetensk. Acad. Nya Handl. 3 : 132. 1782 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 83. 1883 ; Gamble, Fl. Pres. Madr. 865. 1923, Repr. ed. 2 : 608. 1957 ('*zeylanica*'). *F. obovata* Wall. in Roxb. Fl. Ind. 2 : 33. 1824; Clarke *l.c.* ; Gamble *l.c.* *F. coromandelina* Wight, Ic. t. 1316 *et F. malabarica* Wight, Ic. t. 1317. 1848. '*Vallerai*', '*Omal*'. (Tam.).

Epiphytic when young, small trees at maturity. Leaves opposite, coriaceous, obovate spathulate, base acute, apex obtuse or rounded. Flowers large, white, in corymbose cymes. Calyx lobes rounded, glabrous. Corolla tube long ; lobes rounded. Berries ellipsoid - globose.

Fl. & Fr. : July - January.

Common ; in lower Ghats ; Anamooly - Mukkali forest, Marapalam Pothundy forest.

2. GARDNERIA *Wall.*

Gardneria ovata Wall. in Roxb. Fl. Ind. 1 : 400. 1820 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 93. 1883 ; Gamble, Fl. Pres. Madr. 869. 1923, Repr. ed. 2 : 611. 1957. *G. wallichii* Wight, Ic. t. 1313. 1848.

Large climbers ; stems spirally twisting. Leaves ovate to elliptic, opposite, acute to obtuse at base, acuminate at apex. Flowers yellow, in trichotomous cymes. Calyx lobes ciliate. Corolla lobes reflexed. Berries scarlet, globose, 2 - seeded.

Fl. & Fr. : April - December.

Common ; in Ghats ; Anavayee forest, Karapara river banks, Silent Valley R.F.

3. STRYCHNOS L.

1a. Climbing shrubs with tendrils :

2a. Tendrils bifid :

3a. Leaves ovate lanceolate ; corolla tube shorter than lobes ... *S. aenea* 1

3b. Leaves ovate - elliptic ; corolla tube equal to lobes ... *S. lenticellata* 2

2b. Tendrils simple ... *S. wallichiana* 5

1b. Erect trees without tendrils :

4a. Transverse nerves of leaves irregular ; fruits more than 3 cm across ... *S. nux - vomica* 3

4b. Transverse nerves of leaves parallel ; fruits less than 3 cm across ... *S. potatorum* 4

1. **Strychnos aenea** Hill in Bull. Misc. Inform. Kew 138. 1917 ; Gamble, Fl. Pres. Madr. 867. 1923, Repr. ed. 2 : 610. 1957.

Large, climbing shrubs. Leaves ovate lanceolate, chartaceous, glabrous, acuminate, 3 ribbed. Flowers in axillary cymes. Corolla lobes tufted - hairy inside. Fruits spherical, about 3 cm across.

Fl. & Fr. : October March.

Not common ; in lower Ghats ; Karapara river forest, Orange farm-Kaikatty area.

Gamble *l.c.* remarks that the fruit 'said to be spherical about 2" in diam.' Though spherical, they are about 3 cm across, yellow when ripe.

2. **Strychnos lenticellata** Hill in Bull. Misc. Inform. Kew 159. 1917 ; Gamble, Fl. Pres. Madr. 868. 1923, Repr. ed. 2 : 610. 1957. '*Charu mulagu*' (Tam.).

Climbing shrubs. Leaves elliptic - ovate, shining, subcoriaceous, 3 - ribbed. Flowers yellow, in axillary cymes. Corolla throat woolly - tomentose. Styles hirsute.

Fr. : October.

Rare ; in lower Ghats ; once collected in Mukkali (Mandham - patty) forest.

3. **Strychnos nux-vomica** L. Sp. Pl. 189. 1753 ; Bedd. Fl. Sylv. t. 243. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 90. 1883 ; Gamble, Fl. Pres. Madr. 868. 1923, Repr. ed. 2 : 610. 1957. '*Yetti*' (Tam.). '*Kanjaram*' (Mal.).

Deciduous trees, 5 10 m. Leaves ovate orbicular, obtuse, coriaceous, glabrous, 5 - ribbed. Flowers pale yellow to dull white, in terminal cymes. Corolla tube hairy within. Fruits globose, 3 7 cm across, orange red when ripe, bitter and poisonous.

Fl. & Fr. : November - June.

Common ; in lower Ghats and plains ; Olavakkot area, Panangatri area.

4. **Strychnos potatorum** L. f. Suppl. Pl. 148. 1781 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 90. 1883 ; Gamble, Fl. Pres. Madr. 868. 1923, Repr. ed. 2 : 610. 1957. '*Thethankottai*' (Tam.).

Deciduous trees, 5 - 10 m. Leaves elliptic, acute, transverse nerves conspicuous. Flowers dull white, in cymes on old wood. Corolla tube woolly tomentose at throat. Fruits 1 - 2 cm across. Seeds 1 2, orbicular.

Fl. & Fr. : June.

Common ; in plains and foot hills ; Walayar forest.

Seeds are used to clear muddy water ; juvenile leaves coppery.

5. **Strychnos wallichiana** Steud. ex DC. Prodr. 9 : 13. 1845 ; Bisset & Philcox in Taxon 20 : 543. 1971. *S. cinnamomifolia* Thw. var. *wightii* Hill in Bull. Misc. Inform. Kew 194. 1917 ; Gamble, Fl. Pres. Madr. 869. 1923, Repr. ed. 2 : 611. 1957.

Very large, climbing shrubs. Leaves elliptic or ovate, abruptly acuminate, shining, coriaceous, glabrous. Flowers yellow, in terminal cymes. Corolla tube pilose within. Berries large, spherical, 5 - 9 cm across.

Fl. : February ; *Fr.* : November.

Rare ; located in Mukkali forest only at *ca.* 525 m.

84. MENYANTHACEAE

NYMPHOIDES Seguier

1a.	**Corolla white with entire margin**	... *N. hydrophylla*	1
1b.	**Corolla white with yellow centre and fimbriate margin**	... *N. indica*	2

1. **Nymphoides hydroyhylla** (Lour.) Kuntze, Rev. Gen. Pl. 429. 1891 ; Cramer in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 3 : 208. 1981. *Menyanthes hydrophylla* Lour. Fl. Cochinch. 129. 1790. *Nympholdes cristata* (Roxb.) Kuntze, Rev. Gen. Pl. 429. 1891. *Menyanthes cristata* Roxb. Pl. Corom. t. 105. 1799 & Fl. Ind. 2 : 29. 1824. *Limnanthemum cristatum* (Roxb.) Griseb. Gen. Sp. Gent. 342. 1839 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 131. 1883 ; Gamble, Fl. Pres. Madr. 883. 1923, Repr. ed. 2 : 620. 1957.

Aquatic herbs. Stems simulating petioles. Leaves simple, orbicular, deeply cordate, floating, purplish beneath. Flowers white, in clusters. Calyx lobes with longitudinal folds along margin and the centre, glandular below fold. Stamens 5. Capsules broadly ovoid ; seeds tuberculate.

Fl. & Fr. : November April.

Common in ponds and tanks : Elavanchery Nemmara, Palghat town area, Olavakkot.

2. **Nymphoides indica** (L.) Kuntze, Rev. Gen. Pl. 429. 1891 ; Cramer in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 3 : 207. 1981. *Menyanthes indica* L. Sp. Pl. 145. 1753. *Limnanthemum indicum* (L.) Griseb. emend. Thw. Enum. 205. 1860 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 131. 1883 ; Gamble, Fl. Pres. Madr. 883. 1923, Repr. ed. 2 : 621. 1957.

Aquatic herbs. Leaves orbicular, deeply cordate. Flowers white with yellow centre, in umbellate clusters. Calyx lobes ovate, acute. Corolla ovate - lanceolate, eglandular, densely fimbriate. Capsules ellipsoid ; seeds smooth.

Fl. & Fr. : All seasons.

Common in ponds and tanks ; Nemmara.

It is stouter than the previous species.

85. GENTIANACEAE

1a. Corolla lobes unequal :

2a. Flowers yellow, sessile ; stamen 1 ... HOPPEA 3

2b. Flowers pink or white, stalked ; stamens 4 ... CANSCORA 1

1b. Corolla lobes equal :

3a. Petals glandular ... SWERTIA 4

3b. Petals not glandular ... EXACUM 2

1. CANSCORA Lam.

1a. Calyx winged ; bracts perfoliate	...	*C. perfoliata*	3
1b. Calyx not winged ; bracts not perfoliate :			
2a. Stems 4 - winged	...	*C. decurrens*	1
2b. Stems not winged (but angled)	...	*C. diffusa*	2

1. **Canscora decurrens** Dalz. in Hook. Kew J. Bot. 2 : 136. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 103. 1883 ; Gamble, Fl. Pres. Madr. 878. 1923, Repr. ed. 2 : 617. 1957.

Slender, erect herbs. Leaves oblong lanceolate to ovate - lanceolate, attenuate at base. Flowers pale pinkish, in lax paniculate cymes. Calyx teeth 4, lanceolate. Capsules cylindric.

Fl. & Fr. : September February.

Common ; in lower Ghats ; Mukkali forest, Sappal hill, Dhoni R.F.

2. **Canscora diffusa** (Vahl) R. Br. ex Roem. & Schult. Syst. Veg. 3 : 301. 1820 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 103. 1883 ; Gamble, Fl. Pres. Madr. 878. 1923, Repr. ed. 2 : 617. 1957. *Gentiana diffusa* Vahl, Symb. Bot. 3 : 47. 1794. *Canscora lawii* Wight, Ic. t. 1327. 1848.

Slender, annual herbs. Lower leaves elliptic, petioled ; upper ovate - lanceolate, acute, sessile, membranous. Bracts leafy, at the forks of branches of panicles. Flowers pink with filiform pedicels. Calyx teeth setaceous. Capsules oblong.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Mukkali forest, Panthanthode forest.

3. **Canscora perfoliata** Lam. Encycl. 1 : 601. 1785 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 104. 1883 ; Gamble, Fl. Pres. Madr. 879. 1923, Repr. ed. 2 : 618. 1957. *C. grandiflora* Wight, Ic. t. 1326. 1848.

Erect herbs ; stems winged. Leaves sessile, lanceolate, acute to acuminate. Bracts united. Flowers pale pink to dull white, in fascicles or solitary. Pedicels winged. Corolla lobes obovate.

Fl. & Fr. : October.

Common ; in marshy places in lower Ghats ; Marapalam - Pothundy forest.

2. EXACUM L.

1a. Leaves sessile :

2a. Calyx winged :

3a. Herbs up to 15 cm high ... *E. pumilum* 4

3b. Herbs more than 15 cm high:

4a. Corolla less than 1 cm long ... *E. pedunculatum* 3

4b. Corolla more than 1 cm long ... *E. bicolor* 1

2b. Calyx not winged ... *E. sessile* 5

1b. Leaves petioled ... *E. carinatum* 2

1. **Exacum bicolor** Roxb. Fl. Ind. 1 : 413. 1820 ; Wight, Ic. t. 1312. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 96. 1883 ; Gamble, Fl. Pres. Madr. 873. 1923, Repr. ed. 2 : 613. 1957.

Erect herbs, 30 50 cm. Leaves ovate to oblong - lanceolate, acuminate, 5 ribbed. Bracts lanceolate, acuminate. Flowers white with deep purple tips, in dense cymes. Calyx 4 - lobed, winged on back. Corolla showy, 4 lobed.

Fl. & Fr. : September October.

Common ; among grasses in upper Ghats ; Silent Valley R.F.

2. **Exacum carinatum** Roxb. Fl. Ind. 1 : 415. 1820. *E. petiolare* Griseb. in DC. Prodr. 9 : 46. 1845 ; Wight, Ic. t. 1324 (2). 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 ; 98. 1883 ; Gamble, Fl. Pres. Madr. 874. 1923, Repr. ed. 2 : 614. 1957.

Erect, slender, annual herbs ; stems angled, 20 - 30 cm. Leaves elliptic - ovate, acute, 3 - 5 ribbed. Flowers pale purple, in lax cymes. Calyx 4 - lobed, dorsally winged ; wings cordate at base, nerves prominent. Corolla 4 - lobed ; lobes lanceolate.

Fl. & Fr. : October.

Occasional ; in lower Ghats ; Mukkali forest.

3. **Exacum pedunculatum** L. Sp. Pl. 111. 1753 ; Wight, Ic. t. 366. 1840 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 97. 1883 ; Gamble, Fl. Pres. Madr. 874. 1923, Repr. ed. 2 : 614. 1957.

Much branched, erect herbs, 30 40 cm. Leaves elliptic to lanceolate, 3 ribbed. Flowers pink or blue, pedicelled, in cymes. Calyx 4 - lobed, winged. Corolla lobes 4, elliptic, acute.

Fl. & Fr. : October.

Common ; in lower Ghats in sandy places ; Walayar dam area.

4. **Exacum pumilum** Griseb. in DC. Prodr. 9 : 46. 1845 ; Wight, Ic. t. 1324 (3). 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 98. 1883 ; Gamble, Fl. Pres. Madr. 875. 1923, Repr. ed. 2 : 615. 1957.

Small, erect herbs, 10 15 cm. Leaves sessile, ovate lanceolate, 3 ribbed. Flowers bluish, in lax cymes, with slender pedicel. Calyx 4 - lobed. Corolla 4 lobed.

Fl. & Fr. : September - October.

Fairly common ; in lower Ghats ; Anamooly slopes, Ayyappan koil - Pothundy forest.

Gamble *l.c.* doubtfully included this species in his Flora.

5. **Exacum sessile** L. Sp. Pl. 112. 1753 ; Wight, Ic. t. 1324 (1). 1848; Clarke in Hook. f. Fl. Brit. Ind. 4 : 98. 1883 ; Gamble, Fl. Pres. Madr. 874. 1923, Repr. ed. 2 : 614. 1957.

Slender, annual herbs, 10 15 cm. Leaves broadly ovate, 3 ribbed. Flowers blue to dull violet, in cymes. Calyx lobes 4, ovate, acute, obscurely 3 ribbed. Corolla 4 lobed, ovate.

Fl. & Fr. : October.

Occasional ; in moist grassy slopes ; Aruvampara slopes - Silent Valley.

3. HOPPEA Willd.

Hoppea fastigiata (Griseb.) Clarke in Hook. f. Fl. Brit. Ind. 4 : 100. 1883 ; Gamble, Fl. Pres. Madr. 877. 1923, Repr. ed. 2 : 616. 1957. *Cicendia fastigiata* Griseb. Gen. Sp. Gentian. 158. 1839.

Much branched, small herbs ; stems 4 winged. Leaves sessile, ovate. Flowers dull white to pale yellow, in dicho - trichotomous cymes. Calyx lobes scarious. Corolla tubular ; lobes oblong, longer than calyx. Capsules ellipsoid.

Fl. & Fr. : December.

Not common ; in marshy places ; Aruvampara slopes - Silent Valley, Dhoni R.F.

4. SWERTIA L.

Swertia angustifolia Buch.-Ham. var. **pulchella** (Buch-Ham. ex Clarke Burkill in J. Asiat. Soc. Bengal (N.S.) 2 (8) : 375. 1906 ; Gamble, Fl.

Pres. Madr. 880. 1923, Repr. ed. 2 : 619. 1957. *S. pulchella* Buch.-Ham. ex Clarke in Hook. f. Fl. Brit. Ind. 4 : 125. 1883.

Erect herbs, 70 90 cm ; stems 4 angled. Leaves lanceolate to linear lanceolate, acute. Flowers white with pinkish dots, in corymbose panicles. Corolla lobes obtuse, nectary pit basal, covered with large ciliate scales. Style absent. Fruits sessile.

Fl. & Fr. : October.

Rare ; once collected from Karasuryamalai area at *ca.* 900 m ; *Vajravelu* 48771.

86. HYDROPHYLLACEAE

HYDROLEA L.

Hydrolea zeylanica (L.) Vahl, Symb. Bot. 2 : 46. 1791 ; Wight, Ic. t. 601. 1842 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 133. 1883 ; Gamble, Fl. Pres. Madr. 884. 1923, Repr. ed. 2 : 621. 1957. *Nama zeylanica* L. Sp. Pl. 226. 1753.

Much branched, perennial herbs, rooting at nodes. Leaves narrowly lanceolate or oblong - elliptic, entire, acute. Flowers lilac, in lax or dense racemes. Calyx glandular - hairy, 5 - lobed. Corolla tube white. Capsules ellipsoid.

Fl. & Fr. : December.

Occasional but abundant ; in plains ; Thiruvizhankunnu.

87. BORAGINACEAE

1a. Woody shrubs or trees :

2a. Styles branched :

3a. Styles once - branched ... CARMONA 1

3b. Styles twice - branched ... CORDIA 3

2b. Styles unbranched ... ROTULA 6

1b. Prostrate or erect herbs :

4a. Leaves crenate ... COLDENIA 2

4b. Leaves entire :

5a. Flowers pedicelled ... TRICHODESMA 7

5b. Flowers sessile or subsessile :

6a. Flowers in racemes ; nutlets glochidiate ... CYNOGLOSSUM 4

6b. Flowers in spikes ; nutlets smooth ... HELIOTROPIUM 5

CARMONA CAV.

Carmona retusa (Vahl) Masamune in Trans. Nat. Hist. Soc. Taiwan 30 : 61. 1940. *Cordia retusa* Vahl, Symb. Bot. 2 : 42. 1791. *Ehretia microphylla* Lam. Ill. 1 : 425. 1792 ; Gamble, Fl. Pres. Madr. 891. 1923, Repr. ed. 2 : 626. 1957. *Carmona microphylla* (Lam.) G. Don, Gen. Syst. 4 : 391. 1837 ; Johnston in J. Arnold Arbor. 32 : 16. 1951. '*Kurangu Vethilai*' (Tam.).

Small, branching shrubs, 1.0-1.5 m. Leaves fascicled, coriaceous, obovate, cuneate at base, 2 - 3 crenations at apex, bulbous - based - hairy. Flowers white, solitary. Calyx lobes spathulate, hairy. Corolla campanulate ; lobes spreading. Drupes globose, scarlet, 4 - seeded.

Fl. & Fr. : November - December.

Common ; in dry localities ; Attappadi block - Mukkali, Panangateri - Kollenkode.

Fruits edible.

2. COLDENIA L.

Coldenia procumbens L. Sp. Pl. 125. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 144. 1883 ; Gamble, Fl. Pres. Madr. 892. 1923, Repr. ed. 2 : 627. 1957. '*Seruppadai*' (Tam.).

Prostrate, scabrid herbs. Leaves alternate, obovate - oblong, oblique, cuneate, crisped. Flowers minute, white, 4 - merous. Calyx lobes ovate, persistent. Corolla tubes short. Drupes dry, 4 seeded pubescent.

Fl. & Fr. : February - July.

Abundant ; in fields and dry tanks ; Kollenkode, Walayar forest.

3. CORDIA L.

Cordia wallichii G. Don, Gen. Syst. 4 : 379. 1837-38 ; Bedd. Fl. Sylv. t. 249. 1872 ; Gamble, Fl. Pres. Madr. 887. 1923, Repr. ed. 2 : 624. 1957. *C. tomentosa* Wall. in Roxb. Fl. Ind. 2 : 339. 1824 non Roem. & Schult. 1819. *C. obliqua* auct. non Willd. 1798 ; Wight, Ic. t. 1378. 1848. *C. obliqua* var. *wallichii* (G. Don) Clarke in Hook. f. Fl. Brit. Ind. 4 : 137. 1883.

Deciduous trees, 5 - 7 m. Leaves ovate - orbicular, cordate, stellately brown - tomentose beneath ; palmately 3 - ribbed from base. Flowers white, fragrant, in lax peduncled cymes. Calyx smooth. Corolla lobes small. Drupes ovoid.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Kavandikal, Mukkali, Thavalam, Thiruvizhankunnu.

Kazmi in J. Arnold Arbor. 51 : 140. 1970 reduces the above species to a variety *viz.* var. *tomentosa* (Wall.) Kazmi under *C. obliqua*.

4. Cynoglossum L.

Cynoglossum zeylanicum (Vahl ex Hornem.) Thunb. ex Lehm. Neue Schriften Naturf. Ges. Halle 3 (2) : 20. 1817 ; Kazmi in J. Arnold Arbor. 52. 344. 1971. *Anchusa zeylanica* Vahl ex Hornem. Enum. Hafn. 3. 1807. *Cynoglossum denticulatum* DC. var. *zeylanicum* (Vahl ex Hornem.) Clarke in Hook. f. Fl. Brit. Ind. 4 : 157. 1883 ; Gamble, Fl. Pres. Madr. 900. 1923, Repr. ed. 2 : 632. 1957. *C. furcatum* Wall. in Roxb. Fl. Ind. 2 : 6. 1824 ; Gamble *l.c. C. meeboldii* Brand in Fedde, Repert. 14 : 323. 1916. '*Pisin ottarai*' (Tam.).

Erect annuals. Leaves oblong - lanceolate, acute at both ends. Flowers white with blue tinge, in branched, paniculate racemes. Calyx lobes ovate, bristly hairy. Corolla lobes rounded ; throat glandular. Fruits depressed pyramids of 4 nutlets, adnate to a conical carpophore, glochidiate on outer face.

Fl. & Fr. : October.

Common in open places ; Attappadi block - Mukkali.

5. Heliotropium L.

1a. Anthers connivent by their tips ; nutlets free	...	*H. scabrum* 2
1b. Anthers not connivent by their tips ; nutlets connate in pairs	...	*H. indicum* 1

1. **Heliotropium indicum** L. Sp. Pl. 130. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 151. 1883 ; Gamble, Fl. Pres. Madr. 896. 1923, Repr. ed. 2 : 630. 1957. *Tiardium indicum* Lehm. Pl. Fam. Asperif. 14. 1818 ; Wight, Ill. t. 171. 1850. '*Thelkodukku poondu*' (Tam.).

Erect herbs ; young parts hirsute. Leaves broadly ovate - elliptic, sparsely strigose on nerves, narrowed or cordate at base, decurrent on petiole. Flowers bluish - white, in scorpioid cymes. Calyx lobes 5, linear - lanceolate. Corolla lobes 5, broadly ovate. Nutlets beaked above.

Fl. & Fr. : November - February.

Common ; in plains ; Mukkali forest, Vaniyampara, Walayar forest.

2. **Heliotropium scabrum** Retz. Obs. Bot. 2 : 8. 1781 ; Wight, Ic. t. 1389. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 152. 1883 ; Gamble, Fl. Pres. Madr. 897. 1923, Repr. ed. 2 : 630. 1957. *H. marifolium* Retz. *l.c.* ; Clarke *l.c. p.p.* ; Kazmi in J. Arnold Arbor. 51 : 154. 1970.

Branching, procumbent herbs. Leaves elliptic oblong or linear lanceolate, acute at apex, strigosely hirsute. Flowers white in racemes. Calyx lobes 5, strigose. Corolla salverform ; lobes 5, strigose - hirsute without. Nutlets subglobose, bristly.

Fl. & Fr. : July.

Common in waste places ; Walayar forest.

6. Rotula Lour.

Rotula aquatica Lour. Fl. Cochinch. 121. 1790 ; Gamble, Fl. Pres. Madr. 893. 1923, Repr. ed. 2 : 627. 1957. *Ehretia cuneata* Wight, Ic. t. 1385. 1848.

Branching, villous shrubs. Leaves oblong - oblanceolate or spathulate, tomentose beneath, apiculate. Flowers pink, in lax cymes. Calyx 5 - lobed, lanceolate. Corolla 5 lobed, oblong. Drupes globose with persistent style.

Fl. & Fr. : August - November.

Abundant on Bhavani river bed at Mukkali.

7. Trichodesma R. Br. *nom. cons.*

1a. Calyx lobes hastate at base	...	*T. indicum*	1
1b. Calyx lobes not hastate at base	...	*T. zeylanicum*	2

1. **Trichodesma indicum** (L.) Lehm. Pl. Fam. Asperif. 193. 1818 ('*indica*') ; Wight, Ill. t. 172. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 153. 1883 ; Gamble, Fl. Pres. Madr. 899. 1923, Repr. ed. 2 : 631. 1957. *Borago indica* L. Sp. Pl. 137. 1753. '*Kalithambal*' (Tam.).

Hispid, erect herbs, 30 - 50 cm. Leaves opposite, sessile, amplexicaul, oblong - lanceolate. Flowers white, solitary. Calyx lobes ovate, 1 - nerved, strigose. Corolla lobes rounded ; throat with yellow or brownish glandular spots. Anthers bearded below, connective produced and twisted. Nutlets smooth.

Fl. & Fr. : July.

Common ; in plains ; Walayar dam area.

2. **Trichodesma zeylanicum** (Burm. f.) R. Br. Prodr. 946. 1810 ('*zeylanica*') ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 154. 1883 ; Gamble, Fl. Pres. Madr. 899. 1923, Repr. ed. 2 : 632. 1957. *Borago zeylanica* Burm. f. Fl. Ind. 41. 1768. '*Kazhuthaikali*' (Tam.).

Erect, hispid herbs. Leaves opposite, oblong - lanceolate with bulbous based hairs. Flowers pale blue, solitary, drooping ; upper ones in leafy racemes. Calyx lobes ovate, 3 - ribbed, acuminate. Corolla lobes rounded, apiculate. Anthers bearded below ; connectives twisted. Nutlets smooth.

Fl. & Fr. : December - May.

Common ; in lower Ghats ; Bhavani river bank - Mukkali, Sholaiyur, Walayar dam area.

88. CONVOLVULACEAE

1a. Pollen grains spinulose :
- 2a. Stigmas linear - oblong ... RIVEA 8
- 2b. Stigmas biglobose or capitate :
  - 3a. Fruits fleshy or leathery ... ARGYREIA 1
  - 3b. Fruits thin - walled ... IPOMOEA 5

1b. Pollen grains not spinulose :
- 4a. Style absent ... ERYCIBE 2
- 4b. Styles present :
  - 5a. Styles 2 ... EVOLVULUS 3
  - 5b. Style 1 :
    - 6a. Outer sepals much larger than inner ones ... HEWITTIA 4
    - 6b. Outer sepals equal or smaller than inner ones :
      - 7a. Capsules Circumscissile ... OPERCULINA 7
      - 7b. Capsules opening irregular or by 4 valves ... MERREMIA 6

1. ARGYREIA Lour.

1a. Climbing shrubs :
- 2a. Leaves glabrous on upper surface ; bracts oblong - lanceolate ... *A. brantianii* ♀

2b. Leaves hairy on upper surface ; bracts linear oblong :

3a. Sepals unequal ; leaves longer than broad ... *A. sericea* 4

3b. Sepals equal ; leaves broader than long ... *A. hirsuta* 3

1b. Erect shrubs ... *A. cuneata* 2

1. **Argyreia bracteata** Choisy in Mem. Soc. Phys. Genève 6 : 39. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 188. 1883 ; Gamble, Fl. Pres. Madr. 907. 1923, Repr. ed. 2 : 638. 1957. '*Kanvalipoo*' (Tam.).

Climbing shrubs. Leaves ovate, densely tomentose beneath, obtuse or emarginate at apex, truncate at base. Bracts tawny villous, persistent. Flowers purple, in lax cymes. Sepals strigose with scarious margins. Stamens 5.

Fl. & Fr. : April.

Occasional ; in lower Ghats ; Sholayur area.

2. **Argyreia cuneata** (Willd.) Ker-Gawl. in Bot. Reg. t. 661. 1822 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 191. 1883 ; Gamble, Fl. Pres. Madr. 909. 1923, Repr. ed. 2 : 638. 1957. *Convolvulus cuneatus* Willd. Sp. Pl. 1 : 873. 1798. *Rivea cuneata* (Willd.) Wight, Ic. t. 890. 1844 - 45.

Erect, silky shrubs. Leaves elliptic obovate, grey - silky - villous beneath, obtuse, apiculate at apex, cuneate at base. Flowers bright purple, in lax cymes. Sepals ovate, hirsute. Corolla funnel - shaped. Stamens 5, included, unequal. Berries leathery, yellowish brown.

Fl. & Fr. : October - February.

Occasional ; in lower Ghats ; Anaikatty.

3. **Argyreia hirsuta** Arn. in Pugill. Nov. Nat. Cur. 18 (1) : 356. 1836 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 189. 1883 ; Gamble, Fl. Pres. Madr. 909. 1923, Repr. ed. 2. 638. 1957. *Rivea hirsuta* (Arn.) Wight, Ic. t. 891. 1844 - 45.

Large climbers. Leaves ovate, densely strigose above, tomentose beneath, abruptly acuminate, cordate at base. Bracts linear - oblong, stalked, persistent. Flowers pale purple, in cymes. Sepals ovate. Corolla funnel - shaped. Berries yellow when ripe.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Chiadaki forest, Panthanthode forest.

4. **Argyreia sericea** Dalz. in Dalz. & Gibs. Bombay Fl. 169. 1861 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 188. 1883 ; Gamble, Fl. Pres. Madr. 908. 1923, Repr. ed. 2 : 638. 1957.

Large, silky pubescent twiners. Leaves ovate, hispid above, densely silky beneath, acuminate, rounded or slightly cordate. Bracts tawny - silky. Flowers purple, in capitate cymes. Sepals linear - oblong, densely hairy. Corolla funnel - shaped ; tube and bands hairy. Berries orange when ripe.

Fl. : July.

Rare ; in lower Ghats ; once collected in Attappadi forest Mukkali at *ca* 575 m ; *Vajravelu* 32189.

2. ERYCIBE Roxb.

Erycibe paniculata Roxb. Pl. Cor. t. 159. 1798 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 180. 1883 ; Gamble, Fl. Pres. Madr. 930. 1923, Repr. ed. 2 : 653. 1957 ; Hoogland in Blumea 7 (2) : 352. 1953. *E. wightiana* Grah. Cat. Pl. Bombay 137. 1839 ; Gamble *l.c.*

Large, woody, rusty tomentose climbers. Leaves elliptic oblong, sharply acuminate, attenuate at base. Flowers white, in rusty - tomentose panicles, fragrant. Sepals suborbicular. Anthers apiculate. Berries ovoid, violet.

Fl. & Fr. : November April.

Common ; in lower Ghats ; Kaikatty Pothundy forest, Mukkali forest.

3. EVOLVULUS L.

Evolvulus nummularius (L.) L. Sp. Pl. ed. 2. 391. 1762 ; Ooststr. in Steenis, Fl. Males. ser. 1. 5 : 558. 1958 ; Stearn in Taxon 21 : 649. 1972. *Convolvulus nummularius* L. Sp. Pl. 157. 1753. *Volvulopsis nummularius* (L.) Roberty in Candollea 14 : 28. 1952.

Prostrate, spreading herbs. Leaves simple, quadrate to suborbicular, glabrous, truncate at base. Flowers creamy at nodes. Calyx lobes 5, ciliate. Corolla lobes 5. Capsules one celled.

Fl. & Fr. : October.

Common weed ; in lower Ghats ; Olavakkot.

4. HEWITTIA Wight & Arn.

Hewittia scandens (Milne) Mabberley in Manilal, Bot. Hist. Hort. Malab. 84. 1980. *Convolvulus scandens* Milne, Deser. Cat. : 2. 1773 non

Del. 1847. *Hewittia sublobata* (L. f.) Kuntze, Rev. Gen. Pl. 441. 1891; Ooststr. in Steenis, Fl. Malea. ser. 1. 4 : 438. 1953. *Convolvulus sublobatus* L. f. Suppl. 135. 1781. *C. bicolor* Vahl, Symb. Bot. 3 : 25. 1794. *Hewittia bicolor* (Vahl) Wight & Arn. in Madras J. Lit. Sci. 5 : 22. 1837; Wight, Ic. t. 835. 1844-45; Clarke in Hook. f. Fl. Brit. Ind. 4 : 216. 1883; Gamble, Fl. Pres. Madr. 924. 1923. Repr. ed. 2 : 649. 1957.

Pubescent, twining herbs. Leaves ovate, acuminate, cordate, palmately lobed. Flowers pale yellow. Bracts 2, linear - lanceolate. Sepals ovate, acute, outer 3 large, decurrent, conspicuous. Corolla purplish at throat. Capsules thin - walled. Seeds 3.

Fl. & Fr. : November - March.

Common ; in lower Ghats ; Attappadi - Mukkali forest. Ayyappan-koil - Bathuado forest Vaniyampara area.

5. IPOMOEA L.

1a. Aquatic plants ... *I. aquatica* 2

1b. Terrestrial plants :

2a. Prostrate plants ... *I. azurifolia* 3

2b. Twiners :

3a. Corolla - lobes triangular :

4a. Corolla more than 3 cm across :

5a. Corolla white ; seeds yellow ... *I. alba* 1

5b. Corolla rose - purple ; seeds black ... *I. muricata* 8

4b. Corolla less than 3 cm across :

6a. Leaves pinnatifid ... *I. quamoclit* 10

6b. Leaves not pinnatifid ... *I. hederifolia* 7

3b. Corolla lobes indistinct :

7a. Leaves divided to below the middle :

8a. Flowers in corymbose cymes ... *I. campanulata* 4

8b. Flowers in capitate heads :

9a. Outer sepals spathulate ... *I. deccana* 5

9b. Outer sepals oblong lanceolate ... *I. pes - tigridis* 9

7b. Leaves entire or divided from above the middle :

10a. Flowers in capitate heads :

11a. Corolla less than 2 cm long ... *I. eriocarpa* 6

11b. Corolla more than 2 cm long ... *I. wightii* 13

10b. Flowers in cymes or in panicles :

12a. Slender climbers ; sepals unequal ... *I. sepiaria* 11

12b. Stout climbers ; sepals equal ... *I. staphylina* 12

1. **Ipomoea alba** L. Sp. Pl. 161. 1753 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 480. 1953. *I. bona - nox* L. Sp. Pl. ed. 2. 288. 1762 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 197. 1883. *Convolvulus aculeatus* L. Sp. Pl. 155. 1753. *Calonyction bona - nox* (L.) Boj. Hort. Maurit. 227. 1837 ; Gamble, Fl. Pres. Madr. 920. 1923, Repr. ed. 2 : 648. 1957.

Large, glabrous climbers ; stems warted. Leaves ovate - acuminate, apiculate, cordate, entire to angled. Flowers dull white, large, in cymes. Outer sepals smaller. Corolla salverform ; limb slightly lobed. Stamens exserted. Capsules ovoid - globose, glabrous. Seeds yellow.

Fl. & Fr. : November April.

Common ; in lower Ghats ; Mukkali forest, Pothundy - Kaikatty forest.

2. **Ipomoea aquatica** Forssk. Fl. Aegypt. - Arab. 44. 1775 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 210. 1883 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 473. 1953. *Ipomoea reptans* Poir. in Lam. Encycl. Suppl. 3 : 460. 1814 ; Gamble, Fl. Pres. Madr. 916. 1923, Repr. ed. 2 : 643. 1957. *I. repens* auct. excl. *Convolvulus repens* L. : Roth, Nov. Pl. Sp. 110. 1821 non *I. repens* Lam. 1791.

Subsucculent, branched creepers ; rooting at nodes. Leaves ovate - cordate or hastate, subobtuse to emarginate. Flowers light pinkish, in dense cymes. Outer sepals shorter than the inner, wrinkled, ovate, obtuse. Corolla funnel - shaped. Stamens 5, villous at base. Seeds glabrous.

Fl. & Fr. : December.

Occasional ; in wet places or in stagnant ponds ; Thiruvizhan - kunnu.

3. **Ipomoea asarifolia** (Desv.) Roem. & Schult. Syst. Veg. 4 : 251. 1819. Ooststr. in Steenis Fl. Males. ser. 1. 4 : 477. 1953. *Convolvulus asarifolius* Desv. in Lam. Encycl. 3 : 562. 1792. *Ipomoea repens*

Lam. Encycl. 1 : 467. 1791 non Roth 1821 ; Gamble, Fl. Pres. Madr. 2 : 916. 1923, Repr. ed. 2 : 643. 1957.

Thick glabrous plants. Leaves simple, cordiform to reniform, truncate - cordate at base, obtuse at apex ; basal lobes obtuse. Flowers white to pale pinkish, in lax cymes. Calyx lobes 5, broadly ovate. Corolla funnel - shaped. Stamens 5, pilose below. Capsules globose.

Fl. & Fr. : June.

Common near ponds in plains ; near Olavakkot railway station.

4. **Ipomoea campanulata** L. Sp. Pl. 160. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 211. 1883 ; Trimen, Handb. Fl. Ceylon 3 : 221. 1895 ; Gamble, Fl. Pres. Madr. 917. 1923, Repr. ed. 2 : 643. 1957 ; Austin in Dassan. & Fosb. Revis. Handb. Fl. Ceylon 1 : 327. 1980. *I. illustris* (Clarke) Prain, Beng. Pl. 2 : 735. 1903 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 485. 1953. *I. campanulata* var. *illustris* Clarke in Hook. f. Fl. Brit. Ind. 4 : 211. 1883.

Large climbers. Leaves ovate - orbicular to oblong, cordate - truncate, acuminate. Flowers white to lilac, pink at throat, in corymbose cymes. Sepals ovate - orbicular, enlarged in fruits. Capsules globose, glabrous.

Fl. & Fr. : February.

Occasional ; in lower Ghats and plains ; Neelipara - Vaniyampara area.

5. **Ipomoea deccana** Austin in Dassan. & Fosb. Revis. Handb. Fl. Ceylon 1 : 324. 1980. *I. bracteata* Wight, Ic. t. 1374. 1848 non Cav. 1799 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 203. 1883 ; Gamble, Fl. Pres. Madr. 918. 1923, Repr. ed. 2 : 644. 1957.

Slender climbers. Leaves ovate cordate, entire to 3 - 7 - lobed ; lobes ovate, acute, narrowed at base. Bracts ovate, cordate, strigose. Flowers pink to bluish - purple with a dark centre, in pedunculate, capitate heads. Calyx and corolla campanulate.

Fl. & Fr. : November.

Occasional ; in lower Ghats ; Ayyappankoil area-Nelliyampathi Ghat.

6. **Ipomoea eriocarpa** R. Br. Prodr. 484. 1810 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 204. 1883 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 462. f. 35. 1953. *Convolvulus hispidus* Vahl, Symb. Bot. 3 : 29. 1794. *Ipomoea hispida* (Vahl) Roem. & Schult. Syst. Veg. 4 : 238. 1819 non Zuec. 1809 ; Gamble, Fl. Pres. Madr. 915. 1923, Repr. ed. 2 : 643. 1957. *I. sessiliflora* Roth, Nov. Pl. Sp. 116. 1821 ; Wight, Ic. t. 169. 1839.

Slender, hispid twiners. Leaves ovate - triangular, villous, acute, apiculate, hastate or cordate at base. Bracts linear. Flowers pink, in sessile heads. Sepals narrowly ovate, acuminate, outer ones larger. Corolla campanulate, pilose outside. Capsules globose.

Fl. & Fr. : April.

Occasional ; once collected from Panthanthode forest at *ca* 850 m.

7. **Ipomoea hederifolia** Linn. Syst. Nat. ed. 10. 925. 1759 ; Austin in Dassan. & Fosb. Revis Handb. Fl. Ceylon 1 : 325. 1980. *I. angulata* Lam. Encycl. 1 : 464. 1793. *I. phoenicea* Roxb. Fl. Ind. 2 : 92. 1824. *Quamoclit phoenicea* (Roxb.) Choisy, Mem. Soc. Phys. Geneve 6 : 433. 1834 ; Gamble, Fl. Pres. Madr. 919. 1923, Repr. ed. 2 : 645. 1957. *Konvalikodi'* (Tam.).

Slender, glabrous plants ; branchlets pubescent. Leaves broadly ovate - cordiform, glaucous beneath, cordate at base, acuminate at apex. Flowers scarlet, in lax cymes. Calyx lobes 5 ; sepals distinctly awned on the back. Corolla salverform. Stamens exserted. Capsules globose.

Fl. & Fr. : October.

Introduced and run wild ; Olavakkot.

8. **Ipomoea muricata** (L.) Jacq. Hort. Schoenbr. 3 : 40. t. 323. 1798 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 197. 1883 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 481. 1953. *Convolvulus muricatus* L. Mant. 44. 1767. *Calonyction muricatum* (L.) G. Don, Gen. Syst. 4 : 264. 1838 ; Gamble, Fl. Pres. Madr. 920. 1923, Repr. ed. 2 : 646. 1957.

Slender twiners ; stems warted. Leaves broadly ovate, entire, shortly acuminate, cordate. Flowers pale purple, in peduncled cymes. Sepals awned. Corolla salverform, pubescent outside. Capsules ellipsoid, shortly beaked.

Fl. & Fr. : October.

Occasional ; in lower Ghats ; Mandampatty - Mukkali forest.

9. **Ipomoea pes - tigridis** L. Sp. Pl. 162. 1753 ; Wight, Ic. t. 836. 1844 - 45 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 204. 1883 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 467. 1953 ; Gamble, Fl. Pres. Madr. 918. 1923, Repr. ed. 2 : 644. 1957.

Hairy climbers. Leaves palmately 7 - 9 - lobed ; lobes obovate, pubescent. Flowers pinkish, in bracteate heads. Bracts ovate - oblong, hirsute. Outer sepals oblong - lanceolate, strigose. Corolla tubular - campanulate. Capsules ovoid.

Fl. & Fr. : December.

Occasional ; once collected from Aruvampara slopes - Silent Valley R.F.

10. **Ipomoea quamoclit** L. Sp. Pl. 159. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 199. 1883 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 482. 1953. *Quamoclit pinnata* Boj. Hort. Maurit. 224. 1837 ; Gamble, Fl. Pres. Madr. 919. 1923, Repr. ed. 2 : 645. 1957. '*Mayil Manickam*' (Tam.).

Slender, twiners. Leaves pinnatifid ; lobes linear acute. Flowers deep red, solitary or in cymes. Calyx lobes 5, free. Corolla salverform ; tube inflated above ; lobes broadly ovate. Stamens 5, exserted.

Fl. & Fr. : All seasons.

Usually cultivated but found as an escape and run wild ; Olavakkot.

11. **Ipomoea sepiaria** Koen. ex Roxb. Fl. Ind. 2 : 90. 1824 ; Wight, Ic. t. 838. 1844 - 45 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 209. 1883 ; Gamble, Fl. Pres. Madr. 916. 1923, Repr. ed. 2 : 643. 1957.

Twining perennials ; stems villous. Leaves triangular - cordiform, cordate, acute, apiculate ; basal lobes triangular. Flowers creamy with purple throat, in cymes. Sepals 5, subequal, obovate. Corolla salverform. Stamens 5. Capsules globose with white velvety seeds.

Fl. & Fr. : July.

Common in plains ; Walayar dam area.

12. **Ipomoea staphylina** Roem. & Schult. Syst. Veg. 4 : 249. 1819 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 210. 1883 ; Gamble, Fl. Pres. Madr. 917. 1923, Repr. ed. 2 : 643. 1957. '*Onankodi*' (Tam.).

Stout, straggling or climbing shrubs. Leaves ovate or ovate - deltoid, obtusely acute, shallowly cordate. Flowers white with purple tube, in lax panicles. Sepals orbicular. Corolla tubular - campanulate. Capsules ovoid, glabrous.

Fl. & Fr. : January.

Rare ; in plains ; profusely flowering ; Pattimelam slopes near Kottathorai.

13. **Ipomoea wightii** (Wall.) Choisy in Mem. Soc. Phys. Geneve 6 : 470. 1834 ; Wight, Ic. t. 1364. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 203. 1883 ; Gamble, Fl. Pres. Madr. 917. 1923, Repr. ed. 2 : 644. 1957 ; Austin in Dassan. & Fosb. Revis. Handb. Fl. Ceylon 1 : 343. 1980. *Convolvulus wightii* Wall. Pl. Asiat. Rar. 2 : 55. 1831.

Strigose climbers. Leaves ovate - cordate, white - woolly beneath, green above. Flowers pale violet, in peduncled, yellow - strigose, capitate

heads. Sepals linear - lanceolate, fulvous - hirsute. Corolla funnel - shaped. Stamens 5, villous below. Fruits globose, pubescent.

Fl. & Fr. : January.

Rare ; in lower Ghats ; Panthanthode forest.

6. MERREMIA Dennst. ex Endl. *nom. cons.*

1a. Leaves entire, crenate or 3 - lobed ;

2a. Leaves auricled at base ; cymes 1 - 3 - flowered ... *M. tridentata* 1

2b. Leaves not auricled at base ; cymes many - flowered ... *M. umbellata* 2

1b. Leaves palmately 5 - 7 - lobed ... *M. vitifolia* 3

1. **Merremia tridentata** (L.) Hall. f. in Bot. Jahrb. Syst. 16 : 552. 1893 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 445. 1953 ; Gamble, Fl. Pres. Madr. 928. 1923, Repr. ed. 2 : 652. 1957 ; Austin in Dassan. & Fosb. Revis. Handb. Fl. Ceylon 1 : 351. 1980. *Convolvulus tridentata* L. Sp. Pl. 157. 1753. *Merremia hastata* (Desr.) Hall. f. *l.c.* ; Gamble *l.c.* *M. tridentata* ssp. *hastata* (Desr.) Ooststr. in Blumea 3 : 317. 1939.

Trailing, slender herbs ; rootstocks thick. Leaves linear - lanceolate to oblong, truncate to hastate, lobes toothed. Flowers white, in pedunculate cymes. Sepals lanceolate, apiculate. Corolla tubular. Capsules globose, glabrous.

Fl. & Fr. : October.

Rare ; in lower Ghats ; Ayyappankoil - Pothundy forest, Olavakkot.

Ooststroom *l.c.* reduces *M. hastata* to a ssp. of *M. tridentata* which is treated as a separate species by Gamble *l.c.*, but Austin *l.c.* treats both as synonyms of *M. tridentata*.

2. **Merremia umbellata** (L.) Hall. f. in Bot. Jahrb. Syst. 16 : 552. 1893 ; Ooststr. in Steenis Fl. Males. ser. 1. 4 : 449. 1953 ; Gamble, Fl. Pres. Madr. 928. 1923, Repr. ed. 2 : 651. 1957. *Convolvulus umbellatus* L. Sp. Pl. 155. 1753. *Ipomoea cymosa* (Desr.) Roem. & Schult. Syst. Veg. 4 : 241. 1819 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 211. 1883.

Woody, prostrate or twining herbs. Leaves ovate or oblong - lanceolate, acuminate, rounded, cordate or hastate at base. Flowers white, pedicellate. Sepals ovate - lanceolate, obtuse, apiculate. Corolla campanulate. Capsules ovoid, mucronate.

Fl. & Fr. : February.

Common ; on road sides and plains ; Karivara slopes, Vadakkan - cherry area.

3. **Merremia vitifolia** (Burm. f.) Hall. f. in Bot. Jahrb. Syst. 16 : 552. 1893 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 448. 1953 ; Gamble, Fl. Pres. Madr. 928. 1923, Repr. ed. 2 : 651. 1957. *Convolvulus vitifolius* Burm. f. Fl. Ind. 45. t. 18. f. 1. 1768.

Twiners ; stems bristly long - hairy. Leaves ovate, cordate, digitately 5 - 7 - lobed ; lobes dentate, ovate, acuminate. Flowers yellow, in cymes. Sepals ovate - lanceolate, obtuse, mucronate, hairy. Corolla campanulate, glabrescent. Capsules globose, yellow.

Fl. & Fr. : October - February.

Common ; in lower Ghats ; Aruvampara - Silent Valley R.F., Karivara forest, Neelippara - Vaniyampara area.

7. Operculina S. Manso

Operculina turpethum (L.) S. Manso, Enum. Subst. Bras. 16. 1836 ; Ooststr. in Steenis, Fl. Males. ser. 1. 4 : 456. 1953 ; Gamble, Fl. Pres. Madr. 929. 1923, Repr. ed. 2 : 653, 1957. *Convolvulus turpethum* L. Sp. Pl. 155. 1753. *Ipomoea turpethum* (L.) R. Br. Prodr. 485. 1810 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 212. 1883.

Stout climbers ; young parts densely grey ; stems winged. Leaves ovate - oblong, pubescent beneath, acute to obtuse at apex, cordate at base. Flowers white with yelllow base, in peduncled cymes. Sepals ovate. Corolla tube with 5 vertical bands. Capsules globose.

Fl. & Fr. : November.

Occasional ; once collected in Mukkali forest at *ca* 625 m. *Vajravelu* 48940.

8. Rivea Choisy

Rivea hypocrateriformis (Desr.) Choisy in Mem. Soc. Phys. Geneve 6 : 408. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 184. 1883 ; Gamble, Fl. Pres. Madr. 908. 1923, Repr. ed. 2 : 635. 1957. *Convolvulus hypocrateriformis* Desr. in Lam. Encycl. 3 : 561. 1792.

Climbing, grey - tomentose shrubs. Leaves reniform - ovate, cordate, acuminate, silky beneath. Flowers fragrant, white, in cymes. Sepals ovate, obtuse. Corolla glabrous. Fruits ovoid, brown.

Fl. & Fr. : December.

Rare ; once collected in Attappady block at *ca* 525 m ; *Vajravelu* 33188.

89. SOLANACEAE

1a. Fruits berry :

2a. Anthers connivent into a cone, dehiscing by pores :

3a. Flowers in cymes ... SOLANUM 5

3b. Flowers in fascicles ... LYCIANTHES 2

2b. Anthers not connivent, dehiscing longitudinally :

4a. Calyx inflated in fruits ... PHYSALIS 4

4b. Calyx not inflated in fruits ... NICANDRA 3

1b. Fruits capsule ... DATURA 1

1. DATURA L.

Datura metel L. Sp. Pl. 179. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 242. 1883 ; Gamble, Fl. Pres. Madr. 941. 1923, Repr. ed. 2 : 660. 1957. *D. fastuosa* L. Syst. Nat. ed. 10, 2 : 932. 1759 ; Wight, Ic. t. 1396. 1848 ; Gamble *l.c.* *D. alba* Nees in Trans. Linn. Soc. London 17 : 73. 1837 ; Wight, Ic. t. 852. 1844-45. *D. fastuosa* var. *alba* (Nees) Clarke in Hook. f. Fl. Brit. Ind. 4 : 243. 1883 ; Gamble *l.c.*

Large undershrubs. Leaves ovate - triangular to elliptic, toothed, oblique at base. Flowers white. Calyx long - tubular. Corolla funnel - shaped, 15 - 20 cm long, glandular - hairy. Capsules with deltoid spines, recurved pedicels and enlarged calyx base.

Fl. & Fr. : All seasons.

Common ; on roadsides and in plains : Attappadi - Mukkali, Olavakkot, Thenkara area.

A very poisonous plant but used in medicines.

2. LYCIANTHES Hassler *nom. cons.*

Lycianthes laevis (Dunal) Bitter, Abh. Nat. Ver. Bremen 24 : 484.

1920. *Solanum laeve* Dunal, Solanac. Synop. 22. 1816 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 231. 1883 ; Gamble, Fl. Pres. Madr. 936. 1923, Repr. ed. 2 : 657. 1957. *S. bigeminatum* Nees in Trans. Linn. Soc. London 17 : 42. 1837. *Lycianthes bigeminata* (Nees) Bitter *l.c.* 480.

Straggling undershrubs. Leaves in unequal pairs, membranous, elliptic - lanceolate, long - acuminate. Flowers white. Calyx glabrous, saucer - shaped in fruits. Corolla rotate. Stamens 5. Berries yellowish.

Fl. & Fr. : July-October.

Common ; in upper Ghats ; Silent Valley R.F.

3. NICANDRA Adanson *nom. cons.*

Nicandra physalodes (L.) Gaertn. Fruct. 2 : 237. t. 141. f. 2. 1791 ('*physaloides*') ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 240. 1883 ; Gamble, Fl. Pres. Madr. 941. 1923. Repr. ed. 2 : 661. 1957. *Atropa physalodes* L. Sp. Pl. 181. 1753.

Erect herbs ; stems angular. Leaves ovate, serrate, oblique at base, narrowed into a petiole. Flowers blue, solitary, axillary, 5 - merous. Calyx lobes cordate to ovate, acute, winged at base. Corolla campanulate. Barries globose, enclosed in calyx lobes.

Fl. & Fr. : October - February

Common ; in lower Ghats ; Anamadai, Kathalakandi, Mukkali forests.

Introduced American plant, now running wild.

4. PHYSALIS L.

1a. Corolla less than 1 cm long	...	*P. minima* 1
1b. Corolla more than 1 cm long	...	*P. peruviana* 2

1. **Physalis minima** L. Sp. Pl. 183. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 238. 1883 ; Gamble, Fl. Pres. Madr. 939. 1923. Repr. ed. 2 : 659. 1957.

Erect, glabrous herbs. Leaves ovate, acute, sinuate or toothed, rounded at base. Flowers yellow, solitary, nodding. Calyx hairy ; lobes triangular, acute. Filaments hairy at base. Berries enclosed in the bladder - like calyx.

Fl. & Fr. : July.

Common ; in lower Ghats ; Dhoni R.F., Mukkali forest.

2. **Physalis peruviana** L. Sp. Pl. ed. 2. 1670. 1763 ; Clarke in **Hook. f. Fl.** Brit. Ind. 4 : 236. 1883 ; Gamble, Fl. Pres. Madr. 939. 1923, **Repr.** ed. 2 : 659. 1957 ; Waterfall in Rhodora 60 : 141. 1958.

Erect or rambling, viscid glandular-pubescent herbs. Leaves ovate-cordate, sinuate or angular. Flowers yellow with 5 purple spots near base within. Calyx lobes ovate, acuminate. Corolla lobes ovate-triangular, obtuse. Berries orange-yellow, enclosed in 5 - angled calyx.

Fl. & Fr. : May.

Occasional ; in lower Ghats ; Bhavani river bank - Mukkali.

Introduced from America ; run wild.

5. SOLANUM L.

1a. Plants armed ;

2a. Leaves entire ... *S. giganteum* 3

2b. Leaves pinnatifidly lobed :

3a. Leaves shallowly lobed :

4a. Flowers white ; styles glabrous ;

5a. Berries densely hairy, more than 2 cm across ... *S. stramonifolium* 7

5b. Berries not densely hairy, less than 2 cm across ... *S. torvum* 9

4b. Flowers blue ; styles stellately - villous :

6a. Calyx lobes enlarged in fruit ; racemes few - flowered ... *S. melongena var. insanum* 5

6b. Calyx lobes not enlarged in fruit ; racemes many - flowered :

7a. Flowers bisexual ... *S. anguivi* 1

7b. Flowers unisexual ... *S. incanum* 4

3b. Leaves deeply lobed ... *S. surattense* 8

1b. Plants unarmed :

8a. Annual herbs ; leaves glabrous ... *S. nigrum* 6

8b. Perennial shrubs ; leaves tomentose ... *S. erianthum* 2

1. **Solanum anguivi** Lam. Encycl. 2 : 23. 1794 ; Hebber in Bot. J. Linn. Soc. 76 : 290. 1978. *S. indicum* auct. non L. 1753 ; Wight, Ic. t. 346. 1840 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 234. 1883 ; Gamble, Fl. Pres. Madr. 938. 1923, Repr. ed. 2 : 658. 1957 ; Sald. & Nicol. Fl. Hassan 462 & 872. 1978. '*Nai Mulli*, '*Mullunundai*' (*Tam.*).

var. **anguivi**

Branched, prickly undershrubs, up to 2 m. Leaves simple, ovate - oblong ; lobes shallow, base oblique, prickly along the midribs. Flowers 8 - 10, blue - purple in extra-axillary cymose corymbs. Calyx lobes 5, triangular, stellate pubescent. Stamens 5. Berries globose, glabrous, yellow.

Fl. & Fr. : July - December.

Fairly common ; in lower Ghats ; Anavayee, Attappadi block Mukkali, Muthukulam forest - Siruvani.

1a. **Solanum anguivi** Lam. var. **multiflorum** (Roth ex Roem. & Schult.) Vajr. comb. nov. *S. indicum* var. *multiflorum* (Roth ex Roem & Schult.) Clarke in Hook. f. Fl. Brit. Ind. 4 : 235. 1883 ; Gamble, Fl. Pres. Madr. 938. 1923, Repr. ed. 2 : 658. 1957. *S. multiflorum* Roth ex Roem. ex Schult. Syst. Veg. 4 : 669. 1819.

It is a larger form with very stellate - tomentose leaves. Racemes long with many flowers. Fruits small shining with recurved pedicels.

Fl. & Fr. : October.

Fairly common ; in upper Ghats ; Silent Valley R.F., Valiya - parathode forests.

2. **Solanum erianthum** D. Don, Prodr. Fl. Nepal. 96. 1825 ; Rao in Brittonia 24 : 251. 1972. *S. verbascifolium* auct. non. L. 1753 ; Wight, Ic. t. 1398. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 230. 1883 ; Gamble, Fl. Pres. Madr. 936. 1923, Repr. ed. 2 : 657. 1957. *Aanai Sundai*' (Tam.), '*Chunda*' (Mal.).

Large shrubs or small trees with fulvous tomentose branchlets. Leaves elliptic - lanceolate, acuminate. Flowers white, in corymbose cymes. Calyx cup - shaped ; lobes deltoid. Corolla stellately-tomentose outside. Berries globose, yellow.

Fl. & Fr. : October.

Common ; in shady places ; Panthanthode forest.

3. **Solanum giganteum** Jacq. Coll. 4 : 125. 1790 ; Wight, Ic. t. 893. 1844-45 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 233. 1883 : Gamble Fl.

Pres. Madr. 937. 1923, Repr. ed. 2 : 657. 1957. *'Sambal kilurai'* (Tam.), *'Cheruchunda'* (Mal.).

Large shrubs or small trees, up to 5 m. densely stellate-white - tomentose all over, Leaves oblong - oblanceolate, abruptly acuminate, glabrous above, fulvous - tomentose below. Flowers pale bluish purple, in woolly, corymbose cymes. Calyx lobes 5, unequal, triangular, stellate - pubescent. Berries glabrous, red.

Fl. & Fr. : December - April.

Fairly common ; in Silent Valley R.F. at *ca* 925 m, Ammunition store house forest - Siruvani.

4. **Solanum incanum** L. Sp. Pl. 188. 1753 ; Cooke, Fl. Pres. Bombay 2 : 337. 1958 (repr. ed.). *S. coagulans* Forsk. Fl. Arab. 47. 1775 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 236. 1883.

Prickly, stellate hairy, erect herbs. Leaves ovate - elliptic, stellate - pubescent. Flowers violet, in axillary cymes. Calyx lobes triangular. Corolla woolly outside. Berries ovoid, glabrous.

Fl. & Fr. : August - March.

Fairly common ; in lower Ghats ; Attapadi - Mukkali, Thavalam area.

This species has not been recorded by Gamble in the Flora of the Presidency of Madras.

5. **Solanum melongena** L. var. **insanum** (L.) Prain, Bengal Pl. 555. 1903 ; Gamble, Fl. Pres. Madr. 937. 1923, Repr. ed. 2 : 658. 1957. *S. insanum* L. Mant. 46. 1767.

Prickly herbs, grey - tomentose. Leaves ovate - oblong, pinnatifid, stellate-pubescent. Flowers violet, in extra - axillary racemes. Calyx lobes 5, lanceolate. Corolla stellate - pubescent. Berries globose, yellow.

Fl. & Fr. : August.

Rare ; once collected in Attappadi forest - Mukkali at *ca* 450 m ; *Vajravelu* 27849.

6. **Solanum nigrum** L. Sp. Pl. 186. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 229. 1883 ; Gamble, Fl. Pres. Madr. 936. 1923, Repr. ed. 2 : 657. 1957. *S. rubrum* Mill. Gard. Dict. ed. 8. n. 4. 1768 non L. 1767 ; Wight, Ic. t. 344. 1840. *'Manathakkali'*, *'Sukkattikeerai'* (Tam.).

Branching, rambling herbs. Leaves ovate - lanceolate, membranous, sinuate - toothed. Flowers white, in umbellate cymes. Corolla lobes oblong, subacute. Berries globose, glabrous, purple to black.

Fl. & Fr. : All seasons.

Common ; in lower Ghats and plains ; Panthanthode forest, Pothundy - Kalkatty forest.

Leaves and fruits used as vegetable and of medicinal value.

7. **Solanum stramonifolium** Jacq. Misc. 2 : 298. 1781 ('*stramonifolium*') ; Kerr in Craib. Fl. Siam. Enum. 3 (2) : 42. 1954 ; Raizada in Indian Forester 94 : 450.1968. *S. ferox* auct . non L. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 233. 1883 ; Gamble, Fl. Pres. Madr. 937. 1923, Repr. ed. 2 : 658. 1957.

Stout, straggling, densely stellate - tomentose, spiny undershrubs, up to 2 m. Leaves ovate - lanceolate with shallow lobes. Calyx and corolla densely stellate - tomentose. Berries globose, with needle - like hairs.

Fl. & Fr. : October - December.

Common ; in upper Ghats ; Silent Valley R.F.

According to Kerr *l.c.* there is little doubt that this species is distinct and that it can be distinguished by its non aculeate calyx, hardly enlarged in fruits.

8. **Solanum surattense** Burm. f. Fl. Ind. 57. 1968. *S. xanthocarpum* Schr. & Wendl. Sert. Hannov. 1 : 8. t. 2. 1795 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 236. 1883 ; Gamble, Fl. Pres. Madr. 938. 1923, Repr. ed. 2 : 658. 1957. *S. jacquini* Willd. Sp. Pl. 1 : 1041. 1798 ; Wight, Ic. t. 1401. 1848. *S. diffusum* Roxb. Fl. Ind. 1 : 568. 1832 '*Kandankathiri*' (Tam.).

Diffuse, perennial, conspicuous herbs ; prickles many straight. Leaves lacerate, prickles. Flowers purple in extra - axillary cymes. Calyx lobes obovate, prickly. Corolla lobes broadly ovate - triangular. Berries globose.

Fl. & Fr. : May.

Common ; in lower Ghats ; Walayar river bed.

9. **Solanum torvum** Sw. Prodr. 47. 1788 ; Wight, Ic. t. 345. 1840 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 243. 1883 ; Gamble, Fl. Pres. Madr. 937. 1923, Repr. ed. 2 : 658. 1957. '*Sundai*' (Tam.).

Large, stellate - hairy, prickly shrubs, 2 - 4 m. Leaves ovate - lanceolate with shallow triangular lobes, cordate - oblique at base. Flowers white, in lateral, corymbose cymes. Calyx glandular - hairy. Corolla stellate - pubescent outside. Berries globose, glabrous.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Silent Valley R.F., Walayar forest.

90. SCROPHULARIACEAE

1a. Corolla bilabiate :

2a. Stamens 4, included in corolla tube :

3a. All stamens perfect :

4a. Calyx lobes equal ; anther cells stipitate ... LIMNOPHILA 5

4b. Calyx lobes unequal ; anther cells not stipitate ... BACOPA 2

3b. Two stamens perfect and 2 reduced to staminodes ... DOPATRIUM 4

2b. Stamens 4, 2 attached to throat, 2 inserted within tube :

5a. Stamens 4, all perfect ;

6a. Stout, erect herbs ... ARTANEMA 1

6b. Slender, erect or trailing herbs ... TORENIA 11

5b. Stamens only 2 perfect ... LINDERNIA 6

1b. Corolla not bilabiate :

7a. Stamens 4, subequal ... SCOPARIA 8

7b. Stamens 4, didynamous :

8a. Anthers 1 - celled :

9a. Calyx tubular :

10a. Corolla tube straight ... BUCHNERA 3

10b. Corolla tube incurved ... STRIGA 10

9b. Calyx campanulate ... RHAMPHICARPA 7

8b. Anthers 2 - celled ... SOPUBIA 9

1. ARTANEMA D. Don

1. Artanema longifolia (L.) Vatke in Linnaea 43 : 307. 1882. ***Columnea longifolia*** **L. Mant. 90. 1767.** ***Artanema sesamoides*** **Benth. Scroph. Ind. 39. 1835 ; Wight, Ic. t. 1410. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 274. 1884 ; Gamble, Fl. Pres. Madr. 955. 1923, Repr. ed. 2 : 670. 1957.**

Scabrid herbs ; stems tetragonal. Leaves opposite, lanceolate, serrate. Flowers violet - purple, in racemes. Calyx lobes broad, acuminate. Fruits globose.

Fl. & Fr. : July - August.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest.

2. BACOPA Aublet, *nom. cons.*

Bacopa monnieri (L.) Watts. in Pflanzenfam. 4 (3b) : 77. 1891 ('*monniera*') ; Pennel in Proc. Acad. Nat. Sci. Philadelphia 98 : 94. 1946. *Lysimachia monnieri* L. Cent. Pl. 2 : 9. 1756. *Gratiola monnieri* (L.) L. Syst. Nat. ed. 10. 851. 1759 ('*monnieria*'). *Moniera cuneifolia* Mich. Fl. Bor. Am. 2 : 22. 1803 ; Gamble, Fl. Pres. Madr. 953. 1923. Repr. ed. 2 : 669. 1957. *Herpestis monnieria* (L.) H.B.K. Nov. Gen. Sp. 2 : 366. 1818 nom. illeg ; Hook. f. Fl. Brit. Ind. 4 : 272. 1884. '*Neerpirami*' (Tam.).

Prostrate herbs with ascending branches. Leaves decussate, simple, sessile, ovate - oblong, entire. Flowers blue, solitary, pedicellate. Calyx 5 - partite. Corolla campanulate. Capsules ovoid, apiculate.

Fl. & Fr. : September.

Common ; near water sources in lower Ghats ; Anaikatty area.

3. BUCHNERA L.

Buchnera hispida Ham. ex D. Don, Prodr. Fl. Nepal. 91. 1825 ; Wight, Ic. t. 1413. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 298. 1884 ; Gamble, Fl. Pres. Madr. 966. 1924, Repr. ed. 2 : 679. 1957.

Erect, hispid herbs. Lower leaves opposite, toothed, obovate - oblong ; upper alternate, linear - lanceolate. Flowers pale violet. Calyx tubular, 10 - ribbed. Corolla slender, 5 - lobed, subequal. Stamens 4. Capsules oblong, loculicidal.

Fl. & Fr. : December.

Rare ; once collected along Poochipara way.

4. DOPATRIUM Buch. - Ham. ex Benth.

Dopatrium junceum (Roxb.) Buch. - Ham ex Benth. Scroph. Ind. 31.

1835 ; Hook. f. Fl. Brit. Ind. 4 : 274. 1884 ; Gamble, Fl. Pres. Madr. 954. 1923, Repr. ed. 2 : 670. 1957. *Gratiola juncea* Roxb. Pl. Cor. t 129. 1800.

Fleshy, branching herbs. Radical leaves elliptic - obovate ; cauline leaves ovate - lanceolate. Flowers violet ; lower sessile, upper ones pedicelled. Calyx deeply 5 - partite. Stamens bearded. Capsules globose.

Fl. & Fr. : May.

Common ; in lower Ghats ; Malampuzha Canal bunds.

5. LIMNOPHILA R. Br. *nom. cons.*

Limnophila indica (L.) Druce in Bot. Exch. Club Soc. Brit. Isles 3 : 420. 1914 ; Philcox in Kew Bull. 24 : 115. 1970. *Hottonia indica* L. Syst. Nat. ed. 10. 919. 1759. *Cyrilla aquatica* Roxb. Pl. Cor. t. 189. 1805. *Limnophila gratioloides* R. Br. Prodr. 442. 1810 ; Hook. f. Fl. Brit. Ind. 4 : 271. 1884 ; Gamble, Fl. Pres. Madr. 952. 1923. Repr. ed. 2 : 668. 1957. *L. aquatica* (Roxb.) Alston in Ann. Roy. Bot. Gard. (Peradeniya) 11 : 205. 1929 ; Philcox *l.c.* 129.

Much - branched, puberulous or glabrous aquatic herbs ; rooting from lower nodes. Leaves linear - oblong ; middle ones whorled, laciniate. Flowers white with pinkish tinge. Calyx lobes ovate, pubescent. Capsules 4 - valved.

Fl. & Fr. : November.

Occasional ; in marshy places ; Nemmara, Olavakkot.

6. LINDERNIA All.

1a. Leaves penninerved :

2a. Stamens 4, didynamous :

3a. Calyx divided to the base :

4a. Calyx glabrous ; anthers not spurred ... *L. pusilla* 6

4b Calyx glabrous ; anthers spurred ... *L. anagallis* 1

3b. Calyx divided to the middle ... *L. crustacea* 4

2b. Stamens 2 ; staminodes 2 :

5a. Erect herbs ; leaves sessile ... *L. ciliata* 3

5b. Decumbent herbs ; leaves petioled to sessile ... *L. antipoda* 2

1b. Leaves palmately 3 - 5 - nerved ... *L. hyssopoides* 5

1. **Lindernia anagallis** (Burm. f.) Pennell in J. Arnold Arbor. 24 : 252. 1943 ; Philcox in Kew Bull. 17 : 486. 1964. *Ruellia anagallis* Burm. f. Fl. Ind. 135. 1768. *Vandellia pedunculata* Benth. Scroph. Ind. 37. 1835 ; Hook. f. Fl. Brit. Ind. 4 : 282. 1884 ; Gamble, Fl. Pres. Madr. 959. 1923, Repr. ed. 2 : 673. 1957. *Lindernia cordifolia* (Colsm.) Merr. Enum. Philipp. Fl. Pl. 3 : 437. 1923 ; Mukherjee in J. Ind. Bot. Soc. 24 : 132. 1945. *Gratiola cordifolia* Colsm. Prodr. Descrip. Grat. 15. 1793.

Decumbent herbs. Leaves elliptic deltoid, obscurely serrate, truncate - cordate. Flowers pink, axillary, solitary or rarely 2. Calyx lobes oblanceolate. Stamens 4 ; anterior filaments appendiculate. Capsules lanceolate.

Fl. & Fr. : July.

Common in moist places ; Walayar forest.

2. **Lindernia antipoda** (L.) Alston in Trimen, Handb. Fl. Ceylon 6 (Suppl.) : 214. 1931 ; Philcox in Kew Bull. 17 : 484. 1964. *Ruellia antipoda* L. Sp. Pl. 635. 1753. *Gratiola veronicifolia* Retz. Obs. Bot. 4 : 8. 1786. *Ilysanthes veronicifolia* (Retz.) Urban in Berl. Deutsch. Bot. Ges. 2 : 436. 1884 ('*veronicaefolia*') ; Gamble, Fl. Pres. Madr. 962. 1923, Repr. ed. 2 : 675. 1957.

Decumbent herbs, rooting at nodes ; branches ascending. Leaves oblong, obovate - lanceolate. Flowers violet, solitary or in racemes. Bracts and calyx segments linear lanceolate. Capsules cylindric, more than twice the length of calyx.

Fl. & Fr. : May - October.

Common ; in marshy places in Ghats ; Anamooly slopes, Bhavani river bank Mukkali.

3. **Lindernia ciliata** (Colsm.) Pennell in Brittonia 2 : 182. 1936 ; Philcox in Kew Bull. 22 : 51. 1968. *Gratiola ciliata* Colsm. Prodr. Descript. Grat. 14. 1793. *G. serrata* Roxb. Fl. Ind. 1 : 140. 1820. *Ilysanthes serrata* (Roxb.) Urban in Berl. Deutsch. Bot. Ges. 2 : 436. 1884 ; Gamble, Fl. Pres. Madr. 962. 1923, Repr. ed. 2 : 675. 1957. *Bonnaya brachiata* Link & Otto, Ic. Pl. Select. 25. t. 11. 1820 ; Hook. f. Fl. Brit. Ind. 4 : 284. 1884.

Stiff, erect herbs ; stems 4 - angular. Leaves oblong - obtuse, glabrous, aristate - dentate. Flowers pale pink, in lax racemes. Calyx lobes linear - lanceolate, ciliate. Stamens 2. Capsules linear - oblong.

Fl. & Fr. : August - October.

Fairly common ; in lower Ghats ; Anamooly slopes, Sappal hill Dhoni R.F.

4. **Lindernia crustacea** (L.) F. v. Muell. Syst. Cens. Austr. Pl. 97.

1882 ; Pennell in Brittonia 2 : 181. 1936 ; Philcox in Kew Bull. 22 : 17. 1968. *Capraria crustacea* L. Mant. 87. 1767. *Vandellia crustacea* (L.) Benth. Scroph. Ind. 35. 1835 ; Hook. f. Fl. Brit. Ind. 4 : 279. 1884 ; Gamble, Fl. Pres. Madr. 959. 1923, Repr. ed. 2 : 673. 1957.

Diffuse, branched herbs. Leaves ovate suborbicular, serrate, acute at apex. Flowers purple, axillary, solitary, pedicelled. Calyx lobes acute. Stamens 4 ; anterior filaments appendiculate. Capsules ellipsoid oblong, apiculate.

Fl. & Fr. : August.

Fairly common ; in lower Ghats ; Anamooly slopes - Mukkali.

5. **Lindernia hyssopoides** (L.) Haines, Bot. Bihar & Orissa 635. 1922 ('*hyssopioides*'). *Gratiola hyssopoides* L. Mant. 174. 1771. *Ilysanthes hyssopoides* (L.) Benth. in DC. Prodr. 10 : 419. 1846 ('*hyssopioides*') ; Wight, Ic. t. 857. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 283. 1884 ; Gamble, Fl. Pres. Madr. 961. 1923, Repr. ed. 2 : 675. 1957.

Straggling, slender herbs. Leaves linear - lanceolate ; upper ones oblong - lanceolate. Flowers pale blue, solitary, axillary. Pedicels filiform, deflexed in fruit. Staminodes glandular, clavate. Capsules ovoid-oblong.

Fl. & Fr. : August October.

Common ; in marshy places, in lower Ghats ; Anamooly slopes - Mukkali, Olavakkot.

6. **Lindernia pusilla** (Willd.) Boldingh, Zakfl. Landbouwater Java 165. 1916 ; Philcox in Kew Bull. 22 : 41. 1968. *Gratiola pusilla* Willd. Sp. Pl. 1 : 105. 1797. *Selago pusilla* (Willd.) Thunb. Prodr. Pl. Cap. 99. 1800. *Torenia hirta* Cham. & Schlect. in Linnaea 2 : 571. 1827. *Vendellia scabra* Benth. Scroph. Ind. 36. 1835 ; Hook. f. Fl. Brit. Ind. 4 : 281. 1884 ; Gamble, Fl. Pres. Madr. 959. 1923, Repr. ed. 2 : 673. 1957.

Diffuse, hirsute herbs. Leaves ovate, cordate, crenate. Flowers white, axillary, solitary or in pairs. Calyx lobes strigosely hispid. Stamens 4. Capsules globose, equalling calyx.

Fl. & Fr. : August.

Fairly common ; in lower Ghats ; Anamooly slopes - Mukkali.

7. RHAMPHICARPA Benth.

Rhamphicarpa longiflora (Arn.) Benth. in Hook. Comp. Bot. Mag. 1 : 368. 1836 ; Wight, Ic. t. 1415. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 300. 1884 ; Gamble, Fl. Pres. Madr. 969. 1924, Repr. ed. 2 : 681. 1957. *Buchnera longiflora* Arn. Pugill. 36. 1836.

Erect herbs. Leaves opposite (lower), alternate (upper), pinnatifid ; segments filiform. Flowers white. Calyx lobes 5, acuminate. Corolla 5 - lobed, spreading. Stamens 4, didynamous. Capsules compressed, beaked.

Fl. & Fr. : October.

Occasional ; in moist localities ; Malampuzha.

8. SCOPARIA L.

Scoparia dulcis L. Sp. Pl. 116. 1753 ; Hook. f. Fl. Brit. Ind. 4 : 289. 1884 ; Gamble, Fl. Pres. Madr. 964. 1924, Repr. ed. 2 : 678. 1957.

Erect, branched herbs. Leaves opposite or whorled, elliptic - lanceolate, serrate. Flowers small, white, axillary. Calyx deeply 4 - partite. Corolla rotate, 4 - lobed, throat bearded. Stamens 4. Capsules globose, enclosed in the calyx. Seeds scrobiculate.

Fl. & Fr. : May - November.

Common ; on road sides and in waste places ; Bhavani river bank, Chindaki, Mukkali forest, Neelipara - Vaniyampara, Walayar forest.

9. SOPUBIA Ham. ex D. Don

1a.	Lower leaves pinnatisect ; calyx lobes glabrous within	... *S. delphinifolia*	1
1b.	Lower leaves trifid ; calyx lobes woolly within	... *S. trifida*	2

1. **Sopubia delphinifolia** (L.) G. Don, Gen. Syst. 4 : 560. 1837 - 38 ('*delphinifolia*') ; Hook. f. Fl. Brit. Ind. 4 : 302. 1884 ; Gamble, Fl. Pres. Madr. 970. 1924, Repr. ed. 2 : 682. 1957.

Erect herbs, up to 1 m high. Leaves pinnatisect with filiform segments passing into trifid to simple floral bracts. Flowers pinkish. Calyx lobes linear, longer than tube. Corolla lobes spreading. Capsules oblong.

Fl. & Fr. : September - December.

Common ; on open grassy slopes ; Attappadi R.F. - Mukkali, Kaikatty - Pothundy forest, Olavakkot, Panthanthode area.

2. **Sopubia trifida** Ham. ex D. Don, Prodr. Fl. Nepal. 88. 1825 ; Hook. f. Fl. Brit. Ind. 4 : 302. 1884 ; Gamble, Fl. Pres. Madr. 970. 1924, Repr. ed. 2 : 682. 1957.

Erect herbs. Leaves trifid with linear segments, passing into floral

bracts. Flowers yellow with purple centre. Calyx lobes deltoid - ovate, acute. Corolla limbs rotate. Capsules emarginate, with oblong seeds.

Fl. & Fr. : November.

Fairly common ; on open grassy slopes ; Kunthipuzha dam site Silent Valley R.F.

10. STRIGA Lour.

Striga angustifolia (D. Don) Sald. in Bull. Bot. Surv. India 5 : 70. 1963. *Buchnera angustifolia* D. Don, Prodr. Fl. Nepal. 91. 1825. *Striga euphrasioides* Benth. in Hook. Comp. Bot. Mag. 1 : 364. 1836 ; Wight, Ic. t. 855. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 299. 1884 ; Gamble, Fl. Pres. Madr. 968. 1924, Repr. ed. 2 : 680. 1957.

Parasitic herbs. Leaves linear, scabrid. Flowers white. Calyx 15 - ribbed, crustaceous, glandular. Corolla exceeding calyx. Capsules oblong.

Fl. & Fr. : October.

Fairly common ; on grassy slopes ; Aruvampara slopes - Silent Valley R.F., Olavakkot.

11. TORENIA L.

1a. Calyx in fruit winged :			
2a. Calyx lobes decurrent	...	*T. travancorica*	3
2b. Calyx lobes not decurrent	...	*T. vagans*	4
1b. Calyx in fruit not winged :			
3a. Calyx glabrous	...	*T. bicolor*	1
3b. Calyx hirsute	...	*T. hirsuta*	2

1. **Torenia bicolor** Dalz. in Hook. Kew J. Bot. 3 : 38. 1851 ; Hook. f. Fl. Brit. Ind. 4 : 278. 1884 ; Gamble, Fl. Pres. Madr. 957. 1923, Repr. ed. 2 : 672. 1957.

Trailing herbs, rooting at nodes. Leaves deltoid - ovate, crenate, sparsely hirsute, subcordate. Flowers dark-violet, solitary, pedicellate. Calyx tubular, keeled, decurrent on pedicels. Corolla bilipped ; upper purple, lower white. Capsules oblong, included in calyx.

Fl. & Fr. : September.

Not common ; in moist localities, Dhoni R.F., Panthanthode forest.

2. **Torenia hirsuta** Willd. Sp. Pl. 3 : 2661. 1800 ; Gamble, Fl. Pres. Madr. 957. 1923, Repr. ed. 2 : 672. 1957. *T. asiatica* L. var. *hirsuta* (Willd.) Hook. f. Fl. Brit. Ind. 4 : 277. 1884.

Stout, hirsute, diffuse herbs. Leaves deltoid - ovate, serrate, pubescent, acute, truncate - cordate at base. Flowers white. Calyx hirsute. Corolla white on the midlobe of lower lip, deep blue on side lobes, pale blue on the upper lip.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R.F. ; *Vajravelu* 26099.

3. **Torenia travancorica** Gamble. Fl. Pres. Madr. 957. 1923, Repr. ed. 2 : 671. 1957. *T. asiatica* auct. non. L. Sp. Pl. 619. 1753 ; Wight, Ic. t. 862. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 277. 1884 *p.p.*

Trailing herbs, rooting at nodes. Leaves ovate lanceolate, serrate, acuminate, obtuse at base. Flowers deep violet with pale white throat. Calyx oblong ; lobes acuminate. Lower filaments subulate, appendaged. Pedicels thick, deflexed in fruits.

Fl. & Fr. : October.

Common ; in moist places in upper Ghats ; Komatanthode - Silent Valley R.F.

4. **Torenia vagans** Roxb. Fl. Ind. 2 : 96. 1824 ; Hook. f. Fl. Brit. Ind. 4 : 277. 1884 ; Gamble, Fl. Pres. Madr. 957. 1923, Repr. ed. 2 : 671. 1957.

Diffuse herbs, rooting at nodes. Leaves ovate - oblong, serrate, truncate to subcordate at base. Calyx hirsute, ciliate. Corolla pale blue with dark blotches on lobes of lower lip. Pedicels thickened, deflexed in fruit.

Fl. & Fr. : October.

Rare ; once collected in Komattanthode forest - Silent Valley R.F. ; *Nair & Vajravelu* 64329.

91. OROBANCHACEAE

AEGINETIA L.

1a. Corolla deep purple - red	...	*A. indica*	1
1b. Corolla tube yellow, mouth blue	...	*A. pedunculata*	2

1. **Aeginetia indica** L. Sp. Pl. 632. 1753 ; Wight, Ic. t. 895. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 320. 1884 ; Gamble, Fl. Pres. Madr. 974. 1924, Repr. ed. 2 : 685. 1957.

Parasitic, slender herbs, purplish red with subterranean stems and interlaced fleshy fibrous roots. Flowers solitary, glabrous, decurved. Calyx spathaceous, pinkish. Corolla lobes suborbicular to reniform. Stamens 4, included. Stigma peltate. Capsules ovoid, globose, 2 - valved.

Fl. & Fr. : July - November.

Common ; in shady moist undergrowths ; Chindaki and Mukkali forests.

2. **Aeginetia pedunculata** (Roxb.) Wall. Pl. Asiat. Rar. 3 : 13. t. 219. 1832 ; Wight, Ic. t. 1421. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 320. 1884 ; Gamble, Fl. Pres. Madr. 974. 1924, Repr. ed. 2 : 685. 1957. *Orobanche pedunculata* Roxb. Fl. Ind. 3 : 29. 1832.

Parasitic, leafless, fleshy herbs, with short stems. Scapes stout, short. Flowers on long peduncles, bracteate. Calyx fleshy, spathaceous, red, then yellow. Corolla 5 - lobed ; limbs bright violet ; lobes crenate, erose. Stamens 4. Capsules ovoid oblong.

Fl. & Fr. : September December.

Common root parasite ; on open grassy slopes in upper Ghats ; Kunthipuzha dam site - Silent Valley R.F.

94. LENTIBULARIACEAE

UTRICULARIA L.

1a. Terrestrial plants ; leaves not in whorls :

2a. Leaves orbicular or reniform ... *U. striatula* 6

2b. Leaves linear or linear - spathulate :

3a. Scapes and bracts basifixed :

4a. Flowers blue or purple :

5a. Plants erect ; calyx equaling or longer than pedicel ... *U. aliginosa* 7

5b. Plants erect or twining ; calyx shorter than pedicel ... *U. graminifolia* 4

4b. Flowers yellow :

6a. Scapes erect ; pedicels recurved in fruit ... *U. bifida* 2

6b. Scapes twining ; pedicels suberect in fruit ... *U. scandens* 5

3b. Scapes and bracts peltate ... *U. caerulea* 3

1b. Aquatic herbs ; leaves whorled ... *U. aurea* 1

1. **Utricularia aurea** Lour. Fl. Cochinch. 26. 1790 Taylor in Steenis Fl. Males. ser. 1. 8 : 296. 1977. *U. flexuosa* Vahl, Enum. 1 : 198. 1804 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 329. 1884 ; Gamble, Fl. Pres. Madr. 980. 1924, Repr. ed. 2 : 689. 1957. *U. fasciculata* Roxb. Fl. Ind. 1 : 143. 1820 ; Wight, Ic. t. 1568. 1850.

Submerged, aquatic herbs ; stolon much branched. Leaves in whorls of 4 ; segments filiform - pectinate. Traps subglobose. Scapes 3 - 8 - flowered. Bracts ovate. Flowers yellow ; pedicels deflexed in fruit. Calyx segments subequal, ovate, obtuse ; spur slightly curved. Stamens 2. Capsules subglobose.

Fl. : November.

Abundant in tanks at Peringathukavu and Olavakkot.

It looks as if the whole tank is covered with yellow flowers, giving a very attractive sight when in full bloom.

2. **Utricularia bifida** L. Sp. Pl. 18. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 322. 1884 ; Gamble, Fl. Pres. Madr. 982. 1924, Repr. ed. 2 : 690. 1957 ; Taylor in Steenis Fl. Males. 1. 8 : 281. 1977.

Rigid, slender herbs. Leaves linear, 1 - nerved. Traps simple, reniform, appendaged. Scapes filiform. Flowers yellow, 2 - 5. Pedicels normally winged in fruit. Calyx lobes 2, unequal, brown, rounded to obtuse at apex. Upper lip of corolla oblong, obtuse. Spur slightly curved. Capsules depressed - globose.

Fl. : December.

Rare ; once collected in marshy places in Valiaparathode ; *Nair & Vajravelu* 69564.

3. **Utricularia caerulea** L. Sp. Pl. 18. 1753 ; Wight, Ic. t. 1583. 1850 ; Gamble, Fl. Pres. Madr. 983. 1924, Repr. ed. 2 : 691. 1957 ; Taylor in Steenis, Fl. Males. ser. 1. 8 : 287. 1977. *U. racemosa* Wall. ex DC. Prodr. 8 : 21. 1844 ; Wight, Ic. t. 1584. f. 1. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 333. 1884.

Slender, terrestrial herbs. Leaves spathulate. Traps minute. Scapes slender. Flowers 5 - 7, bluish - purple. Calyx lobes 2, subequal, obtuse to subacute. Upper lip of corolla 2 - lobed, oblong or obovate ; lower lip crenulate. Spur curved upward. Capsules globose.

Fl. : October.

Rare ; in upper Ghats on rocks on mud patches ; Aruvampara slopes - Silent Valley R.F.

2. **Utricularia graminifolia** Vahl, Enum. 1 : 195. 1804 ; Gamble, Fl. Pres. Madr. 981. 1924, Repr. ed. 2 : 690. 1957. *U. pedicellata* Wight, Ic. t. 1578. f. 2. 1850. *U. uliginoides* Wight *l.c.* 1573. *U. conferta* Wight *l.c.* 1575. *U. caerulea* sensu Hook. f. Fl. Brit. Ind. 4 : 331. 1884 non L. 1753.

Slender, small herbs. Leaves linear, 3 - nerved. Pedicels longer than

calyx. Flowers bluish purple. Calyx lobes 2, subequal, acute. Upper lip of corolla obovate ; lower lip ovate - orbicular, truncate. Spur conical, curved. Capsules depressed - globose.

Fl. & Fr. : December.

Rare ; in marshy localities in upper Ghats ; Karapara river bed.

5. **Utricularia scandens** Benj. in Linnaea 20 : 309. 1847 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 332. 1884 ; Gamble, Fl. Pres. Madr. 982. 1924, Repr. ed. 2 : 690. 1957 ; Taylor in Kew Bull. 18 : 46. 1964. *U. wallichiana* Wight, Ic. t. 1572. f. 1. 1850 ; Clarke *l.c.* ; Gamble *l.c.*

Very slender, twining herbs. Stolons branched with traps and leaves. Leaves alternate, linear oblanceolate, subacute. 1 - nerved. Scapes flexuous. Flowers yellow, 1 8. Bracts basifixed, ovate, acute. Calyx lobes subequal ; lower lip 2 3 fid. Lower lip of corolla orbicular. Spur straight. Capsules compressed, oblong-ovoid.

Fl. & Fr. : October.

Abundant ; in marshy, grassy localities ; Karapara river bed.

6. **Utricularia striatula** J.E. Smith in Rees, Cyclop. 37 : no. 17. 1819 ; Gamble, Fl. Pres. Madr. 983. 1924, Repr. ed. 2 : 691. 1957 ; Taylor in Kew Bull. 18 : 91. 1964. *U. orbiculata* Wall. ex DC. Prodr. 8 : 18. 1844 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 334. 1884. *U. glochidiata* Wight, Ic. t. 1851. 1850.

Herbs ; stolons filiform with traps and leaves. Leaves in rosette, orbicular - reniform, long - petioled. Upper lip of traps with 2 appendages, covered with glandular hairs. Flowers 1 - 5, white to pink, in filiform, erect scapes. Calyx lobes unequal, accrescent. Lower lip of corolla suborbicular, 5 - lobed ; throat yellow. Spur curved under lower lip of corolla. Capsules globose, reddish.

Fl. & Fr. : September.

Common ; on wet rocks in upper Ghats ; Mukkali forest, Panthanthode, Silent Valley dam site.

7. **Utricularia uliginosa** Vahl, Enum. Pl. 1 : 203. 1804 ; Gamble, Fl. Pres. Madr. 981. 1924, Repr. ed. 2 : 689. 1957. *U. affinis* Wight, Ic. t. 1580. f. 1. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 330. 1884.

Small, erect herbs. Leaves linear - oblong, 1 - 3 - nerved. Flowers 3 - 6, blue, in simple or branched scapes. Pedicels erect in fruit. Calyx lobes subequal ; lower lobes bifid. Lower lip of corolla obovate, 2 - 3 - crenulate at apex. Spur slightly deflexed. Capsules depressed - globose.

Fl. & Fr. : November - May.

Not common ; in marshy places ; Kaikatty - Pothundy, Water tank - Hillock—Malampuzha.

93. GESNERIACEAE

1a. Plants epiphytic ; seeds tipped with long hairs ... AESCHYNANTHUS 1

1b. Plants not epiphytic ; seeds not tipped with long hairs :

2a. Fertile stamens 2 :

3a. Leaves oblique at base ... RHYNCHOGLOSSUM 4

3b. Leaves not oblique at base :

4a. Capsules globose, circumscissile ... EPITHEMA 3

4b. Capsules linear, loculicidal ... DIDYMOCARPUS 2

2b. Fertile stamens 4 ... RHYNCHOTECHUM 5

1. AESCHYNANTHUS Jack *nom. cons.*

Aeschynanthus perrottetii DC. Prodr. 9 : 261. 1845 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 339. 1884 ; Gamble, Fl. Pres. Madr. 985. 1924, Repr. ed. 2 : 692. 1957.

Epiphytic climbers, rooting at swollen nodes. Leaves fleshy, linear - lanceolate, acuminate, acute at base. Flowers scarlet with purple lines, glabrous. Calyx lobes linear. Corolla glabrous, curved ; lobes rounded, ciliate. Stamens 4. Capsules long, papery, linear, 2 - valved. Seeds with long hairs at ends.

Fl. & Fr. : September - March.

Common on tree trunks in upper Ghats ; Pataka pandi estate area, Silent Valley R.F.

2. DIDYMOCARPUS Wall.

Didymocarpus tomentosa Wight, Ic. t. 1349. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 353. 1884 ; Gamble, Fl. Pres. Madr. 989. 1924, Repr. ed. 2 : 695. 1957.

Scapigerous herbs. Leaves in rosette, thick, ovate or orbicular, decurrent on petiole, white silky hairy. Flowers bluish - purple, in dichotomously

branched corymbs. Calyx lobes, lanceolate, tomentose. Corolla curved. Capsules villous.

Fl. & Fr. : July.

Common ; in rocky crevices in lower Ghats ; Walayar forest.

3. EPITHEMA Bl.

Epithema carnosum Benth var. **hispida** Clarke in Hook. f. Fl. Brit. Ind. 4 : 369. 1884 ; Gamble, Fl. Pres. Madr. 992. 1924, Repr. ed. 2 : 697. 1957. *E. ceylanicum* auct. non Gardner 1846 ; Wight, Ic. t. 1354. 1848 ('*ceylanica*').

Slender, succulent, pubescent herbs. Leaves palmately veined, ovate - rounded, cordate, crenate ; upper ones smaller, opposite, subcordate. Flowers bluish, irregular. Stamens 2 ; staminodes 2. Capsules globose, included in calyx.

Fl. & Fr. : August.

Rare ; once collected in Silent Valley R.F. at *ca* 875 m ; *Vajravelu* 27556.

4. RHYNCHOGLOSSUM Bl.

Rhynchoglossum notonianum (Wall.) Burtt in Notes Roy. Bot. Gard. Edinburgh 24 : 170. 1962. *Wulfenia notoniana* Wall. Tent. Fl. Nepal. 46. 1826. *Klugia notoniana* (Wall.) DC. Prodr. 9 : 276. 1845 ; Wight, Ic. t. 1353. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 366. 1884 ; Gamble, Fl. Pres. Madr. 990. 1924, Repr. ed. 2 : 696. 1957.

Succulent herbs, 30 45 cm. Leaves entire, scabrid, pubescent, oblique at base. Flowers pedicelled. Calyx winged. Corolla tube white ; lower lip bright blue with yellow near the cavities at base, bilabiate. Stamens 4. Capsules ovoid, 2 valved.

Fl. & Fr. : September.

Common ; in shady moist localities in lower Ghats ; Chindaki forest, Dhoni R.F., Karivara slopes, Mukkali, Panthanthode, Pothundy Kaikatty.

5. RHYNCHOTECHUM Bl.

Rhynchotechum permolle (Nees) Burtt in Notes Roy. Bot. Gard.

Edinburgh 24 : 39. 1962. *Isanthera permollis* Nees in Trans. Linn. Soc. London 17 : 82. 1834 ; Wight, Ic. t. 1355. 1848 ; Clarke in Hook f. Fl. Brit. Ind. 4 : 372. 1884 ; Gamble, Fl. Pres. Madr. 992. 1924, Repr. ed. 2 : 697. 1957.

Erect, woolly undershrubs. Leaves oblanceolate, glaucous white beneath, tawny villous, decurrent on petiole. Nerves about 20 pairs, parallel, conspicuous. Flowers white, in cymes. Sepals linear - lanceolate. Corolla 5 lobed ; lobes obovate. Berries fleshy, ovoid.

Fl. & Fr. : July December.

Common ; in moist places in upper Ghats ; Silent Valley R.F.

94. BIGNONIACEAE

1a. Leaves simple pinnate ; perfect stamens 4 :

2a. Capsules winged ... PAJANELIA 3

2b. Capsules not winged :

3a. Calyx spathaceous ... DOLICHANDRONE 1

3b. Calyx not spathaceous :

4a. Seeds trigonous ... STEREOSPERMUM 5

4b. Seeds flat ... RADERMACHERA 4

1b. Leaves 2 - 3 - pinnate ; perfect stamens 5 ... OROXYLUM 2

1. DOLICHANDRONE (Fenzl) Seem. *nom. cons.*

Dolichandrone arcuata (Wight) Clarke in Hook. f. Fl. Brit. Ind. 4 : 380. 1884 ; Gamble, Fl. Pres. Madr. 996. 1924, Repr. ed. 2 : 708. 1957. *Spathodea arcuata* Wight, Ic. t. 1340. 1848.

Moderate - sized trees, 6 10 m. Leaflets 5 - 7, ovate orbicular ; end ones larger. Flowers white, large, in terminal panicles. Calyx spathaceous. Corolla 5 lobed ; tube long. Stamens 4. Fruits long, compressed.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Walayar forest.

Fresh foliage red in colour.

2. OROXYLUM Vent

Oroxylum indicum (L.) Vent. Dec. Gen. Nov. 8. 1808 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 378. 1884 ; Gamble, Fl. Pres. Madr. 994. 1924, Repr. ed. 2 : 698. 1957. *Bignonia indica* L. Sp. Pl. 625. 1753. *Spathodea indica* (L.) Pers. Syn. Pl. 2 : 173. 1806. *Calosanthus indica* (L.) Bl. Bijdr. 761. 1826 ; Wight, Ic. t. 1337. 1848. *Achi - pana*' (Tam.), '*Palaga palyani*' (Mal.).

Small trees, 3 5 m with large corky lenticels. Leaves pinnate ; leaflets-elliptic. Flowers reddish on stout peduncled racemes. Calyx blackish, leathery. Corolla campanulate. Petals large, fleshy. Fruits flat, sword like, 70 90 cm long.

Fl. & Fr. : June October.

Fairly common ; in lower Ghats ; Dhoni R.F., Mukkali forest.

3. PAJANELIA DC.

Pajanelia longifolia (Willd.) K. Schum. in Pflanzenfam. 4 (3b) : 244. 1895. *Bignonia longifolia* Willd. Sp. Pl. 3 : 306. 1800. *Pajanelia rheedii* Wight, Ic. tt. 1343 & 1844. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 384. 1884 ; Gamble, Fl. Pres. Madr. 1000. 1924, Repr. ed. 2 : 702. 1957. '*Aranthal*' (Tam.), '*Aralantha*', '*Puyani*' (Mal.).

Deciduous trees, 20 30 m. Leaves imparipinnate with large, 12 15 pairs of leaflets. Flowers in large panicles. Calyx ovoid, 5 lobed. Corolla tube white : lobes crimson purple, woolly ciliate. Capsules 40 50 × 6 10 cm with broad papery wings.

Fl. & Fr. : April.

Common ; in lower Ghats ; Mukkali Mandhampatti forest.

Wood is used for making canoes and catamarans.

4. RADERMACHERA Zoll. & Mor.

Radermachera xylocarpa (Roxb.) K. Schum. in Pflanzenfam. 4 (3b) : 243. 1895 ; Gamble, Fl. Pres. Madr. 999. 1924, Repr. ed. 2 : 702. 1957. *Bignonia xylocarpa* Roxb. Fl. Ind. 3 : 108. 1832 ; Wight, Ic. tt. 1335 & 1336. 1848 ; Bedd. Fl. Sylv. t. 70. 1870. '*Vedancurni*', '*Pathiri*' (Tam.), '*Vedeng- konnai*' (Mal.).

Deciduous trees, 15 20 m. Leaves bipinnate ; pinnae 1 3 pairs. Flowers white with pale yellow tinge, in densely tomentose corymbs.

Calyx truncate. Corolla glabrous. Capsules 40 60 cm long, woody, cylindric, prominently tubercled ; seeds winged on either side.

Fl. & Fr. : March October.

Common ; in open forests, in lower Ghats ; Easwara estate Siruvani West, Mangalam dam area.

5. STEREOSPERMUM Cham.

Stereospermum colais (Buch. Ham. ex Dillw.) Mabberley in Taxon 27 : 553. 1978. *Bignonia colais* Buch. Ham. ex Dillw. Rev. Ref. Hort. Mal. 28. 1839. *Stereospermum personatum* (Hassk.) Chatterjee in Bull. Bot. Soc. Beng. 2(1) : 70. 1948 ; Santisuk in Kew Bull. 28 : 178. 1973. *Dipterosperma personatum* Hassk. Flora 25(2) : 28. 1842. *Sterospermum tetragonum* A. DC. in DC. Prodr. 9 : 210. 1845 ; Gamble, Fl. Pres. Madr. 998. 1924, Repr. ed. 2 : 701. 1957. *S. chelonoides* auct. non (L. f.) DC. 1845 ; Wight, Ic. t. 1341. 1848. Clarke in Hook. f. Fl Brit. Ind. 4 : 382. 1884 ; '*Pathiri*' '*Karinkura*' (Mal.) ; '*Vela pathiri*', '*Poompathiri*' (Tam.).

Trees, 10 15 m. Leaflets 7 - 9, elliptic, glabrous, caudate - acuminate at apex. Flowers yellow with pinkish shade, in glabrous panicles. Sepals unequal, shortly lobed. Corolla bell shaped, sparsely pubescent. Stamens 4. Capsules elongated, 4 angled.

Fl. & Fr. : April June.

Common ; in lower Ghats ; Chindaki forest, Anavayee slopes, Walayar forest.

Tecoma stans (L.) H.B.K. a garden ornamental, occasionally found along forest edges. **Millingtonia hortensis** L.f. a tall tree with white, fragrant flowers is also found in gardens.

95. PEDALIACEAE

1a. Flowers solitary :

2a. Fruits spinous, indehiscent	...	PEDALIUM	2
2b. Fruits not spinous, dehiscent	...	SESAMUM	3
1b. Flowers in racemes	...	MARTYNIA	1

1. MARTYNIA L.

Martynia annua L. Sp. Pl. 618. 1753 ; Backer in Steenis, Fl. Malea.

ser. 1. 4 : 221. 1953 ; Gamble, Fl. Pres. Madr. 1003. 1924, Repr. ed. 2 : 705. 1957. *M. diandra* Gloxin, Obs. 14. t. 1. 1785 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 386. 1884. '*Thael kodukkukai*' (Tam.).

Erect, viscid, densely glandular hairy herbs. Leaves opposite, broadly ovate, dentate, cordate at base. Flowers showy, purple outside, yellow and purple dotted inside. Calyx and corolla glandular pubescent. Stamens 2. Drupes ovoid with an upturned beak.

Fl. & Fr. : November.

Common ; in waste places and on roadsides ; Panangateri, Walayar forest.

In certain Floras, it is treated under a separate family Martyniaceae.

2. PEDALIUM Royen ex L.

Pedalium murex L. Syst. Nat. ed. 10. 1123. 1759 ; Wight, Ic. t. 1615. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 386. 1884 ; Gamble, Fl. Pres. Madr. 1001. 1924, Repr. ed. 2 : 704. 1957. '*Anai nerinji*' (Tam.). '*Kaaka mullu*' (Mal.).

Subfleshy, foetid herbs. Leaves broadly ovate elliptic, glaucous, long petioled, lobed. Flowers yellow. Calyx 5 toothed, linear. Corolla funnel shaped, glabrous. Stamens 4. Capsules hard, with 5 spines.

Fl. & Fr. : October.

Common ; in waste places ; Walayar dam area.

3. SESAMUM L.

1a. Erect herbs ; leaves sparsely hairy	...	*S. orientale*	1
1b. Prostrate herbs ; leaves densely tomentose	...	*S. prostratum*	2

1. **Sesamum orientale** L. Sp. Pl. 634. 1753 ; Backer & Bakh. f. Fl. Java 2 : 544. 1965. *S. indicum* L. *l.c.* ; Wight, Ill. t. 163. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 387. 1884 ; Gamble, Fl. Pres. Madr. 1002. 1924, Repr. ed. 2 : 704. 1957. '*Yellu chedi*' (Tam.).

Much branched, glandular pubescent herbs ; stems 4 angular. Leaves opposite, lobed, sparsely hairy. Pedicels with a pair of yellow glands at base. Flowers white, pointing downwards. Calyx glandular-

pubescent. Corolla glandular hairy. Capsules glandular pubescent, beaked, erect.

Fl. & Fr. : October.

Common ; on road sides and in waste places as an escape, Dhoni R.F.

Cultivated for the seeds which yield the gingelly oil of commerce. It is commonly known as *S. indicum* L. According to Backer & Bakhuizen, the first author to unite these equally priorable names is Graham (1839) and he adopted the name *S. orientale*. De Candolle in his *Prodromus* 9 : 250. 1845 reduced *S. orientale* to *S. indicum* which has been followed by many workers which is contrary to the Code.

2. **Sesamum prostratum** Retz. Obs. Bot. 4 : 28. 1786 ; Wight, Ic. t. 1346. 1848 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 369. 1884 ; Gamble, Fl. Pres. Madr. 1002. 1924, Repr. ed. 2 : 704. 1957.

Villous, herbs with trailing branches. Leaves orbicular or obovate, crenate, densely white tomentose beneath. Flowers purple. Capsules ovoid, compressed.

Fl. & Fr. : October.

Abundant on Malampuzha hill slopes ; but uncommon elsewhere.

96. ACANTHACEAE

1a. Erect or prostrate herbs or shrubs :

2a. Calyx 4 - lobed :

3a. Bracteoles one pair or absent :

4a. Calyx lobes equal :

5a. Flowers clustered ... HYGROPHILA 14

5b. Flowers not clustered ... JUSTICIA 15

4b. Calyx lobes unequal ... BARLERIA 4

3b. Bracteoles more than 3 pairs ... BLEPHARIS 5

2b. Calyx 5 - lobed :

6a. Stamens 4 :

7a. Spikes or racemes secund ... ASYSTASIA 3

7b. Spikes or racemes not secund :

8a. Inflorescences terminal ; staminodes present :

9a. Leaves sessile ... PLEOCAULUS 22

9b. Leaves petioled :

10a. Corolla limbs 2 - lipped ... STAUROGYNE 26

10b. Corolla limbs not lipped ... LEPTACANTHUS 17

8b. Inflorescences terminal and axillary ; staminodes absent :

11a. Inflorescence 1 - 2 - flowered ... DIPTERACANTHUS 8

11b. Inflorescence more than 2 - flowered :

12a. Bracts subtending 2 - 3 flowers ; bracteoles absent :

13a. Shrubs ... KANJARAM 16

13b. Herbs ... PHAULOPSIS 21

12b. Bracts subtending 1 flower ; bracteoles present :

14a. Seeds 6 ... HYMIGRAPHIS 13

14b. Seeds 2 - 4 :

15a. Bracts foliaceous, white - hairy ... XENACANTHUS 29

15b. Bracts foliaceous, not white - hairy :

16a. Bracts and bracteoles spathulate ... MACKENZIEA 18

16b. Bracts and bracteoles not spathulate :

17a. Flowers from the old wood ; bracts glandular - hairy... DIDYFLOSANDRA 7

17b. Flowers not from old wood (on branches) ; bracts not glandular - hairy ... NEOGEIANTHUS 19

6b. Stamens 2 :

18a. Anther cells not parallel :

19a. Anther cells spurred :

20a. Bracts linear ; both the anther cells spurred ... STROBILANTHES 27

20b. Bracts lanceolate to ovate ; only one anther cell spurred ... RUELLIA 25

19b. Anther cells not spurred :

21a. Bracts flat, orbicular ... DICLIPTERA 6

21b. Bracts not flat, linear :

22a. Corolla longer than bracts ... ADHATODA 1

22b. Corolla shorter than bracts ... PERISTROPHE 20

18b. Anther cells parallel :

23a. Ovules 3 - 10 in each locule :

24a. Capsules subterete ; seeds compressed ... GYMNOSTACHYUM 11

24b. Capsules compressed ; seeds ovoid :

25a. Flowers clustered in the midst of cladodes ... HAPLANTHUS 12

25b. Flowers in panicles without cladodes ... ANDROGRAPHIS 2

23b. Ovules 2 or rarely 1 in each locule :

26a. Corolla 2 - lipped :

27a. Bracts more than 1 cm long, leafy... ECBOLIUM 9

27b. Bracts less than 1 cm long, not leafy ... RHINACANTHUS 24

26b. Corolla 5 - lobed :

28a. Corolla lobes contorted in bud ... PSEUDERANTHEMUM 23

28b. Corolla lobes not contorted in bud ... ERANTHEMUM 10

1b. Climbers ... THUNBERGIA 28

1. ADHATODA Mill.

Adhatoda zeylanica Medik. Hist. Commentat. Acad. Elect. Sci. Theod. - Palat. 6 : 393. 1790. *Justicia adhatoda* L. Sp. Pl. 15. 1753. *Adhatoda vasica* Nees in Wall. Pl. Asiat. Rar. 3 : 103. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 540. 1885 ; Gamble, Fl. Pres. Madr. 1082. 1924, Repr. ed. 2 : 758. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 92. 1951. '*Adathodai*' (Tam.).

Dense, erect shrubs, 1 3 m ; branches grey pubescent. Leaves ovate lanceolate, acuminate at both ends. Bracts broadly elliptic, acute, pubescent ; bracteoles narrow. Flowers white with yellow throat, in

peduncled spikes. Calyx hairy ; lobes lanceolate, acute. Corolla 2 lipped ; lower lip 3 lobed.

Fl. & Fr. : October.

Commonly planted as a hedge plant ; Olavakkot area.

Leaves used in medicines.

Sometimes considered congeneric with *Justicia* L. Bentham & Hooker (Gen. Pl. 2 : 112. 1876) say that *Adhatoda* differs from *Justicia* in its habit and the structure of its calyx. Clarke (in Thiselton Dyer, Fl. Trop. Afr. 1900) kept *Adhatoda* separately from *Justicia* with the remark, "*Adhatoda* though not well separable from *justicia* by any one character is here understood to comprise certain charactar like shrubs 4 12 feet high with large leaves and shaggy ovaries and anthers in which the lower of the 2 anther cells is not remote nor very long tailed, as it is in *Justicia*".

2. ANDROGRAPHIS Wall. ex Nees

1a. Capsules linear - oblong :

2a. Flowers distant in racemes :

3a. Filaments hirsute ; anthers bearded at base ... *A. macrobotrys* 3

3b. Filaments not hirsute ; anther not bearded... *A. alata* 1

2b. Flowers close in racemes ... *A. neesiana* 4

1b. Capsules elliptic ... *A. echioides* 2

1. **Andrographis alata** (Vahl) Nees in DC. Prodr. 11 : 516. 1847 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 502. 1884 ; Gamble, Fl. Pres. Madr. 1049. 1924, Repr. ed. 2 : 735. 1957. *Justicia alata* Vahl, Enum. Pl. 1 : 139. 1804.

Erect herbs ; branches long, divaricate. Leaves ovate elliptic to linear, glabrous, acute at both ends. Bracts ovate, acute. Flowers white with pinkish tinge. Calyx lobes glandular hispid. Corolla obscurely 2 lipped. Anthers glabrous ; filaments flattened. Capsules linear, glandular hairy.

Fl. & Fr. : November.

Rare ; in shades at the base of slopes ; Pothundy Kaikatty forest.

2. **Andrographis echioides** (L.) Nees in Wall. Pl. Asiat. Rar. 3 : 117. 1832 : Wight, Ic. t. 476. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 505.

1884 ; Gamble, Fl. Pres. Madr. 1051. 1924, Repr. ed. 2 : 736. 1957. *Justicia echioides* L. Sp. Pl. 16. 1753.

Erect, villous herbs. Leaves sessile, oblong or elliptic, cuneate at base. Flowers pink, erect, in axillary unilateral racemes. Calyx glandular - hairy. Corolla hairy without. Anthers bearded at base. Capsules hairy. Seeds large, dark, deeply pitted.

Fl. & Fr. : October.

Rare ; in dry localities ; Walayar forest.

3. **Andrographis macrobotrys** Nees in DC. Prodr. 11 : 516. 1847 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 503. 1884 ; Gamble, Fl. Pres. Madr. 1048. 1924, Repr. ed. 2 : 735. 1957.

Stout, pubescent herbs. Leaves oblong lanceolate, acute, cuneate at base, slightly pubescent. Flowers pink with dark purple red blotches on the lower lip. Calyx lobes glandular pubescent. Capsules linear.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Ayyappankoil forest Nelliyampathy Ghat.

4. **Andrographis neesiana** Wight, Ic. t. 1561. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 504. 1884 ; Gamble, Fl. Pres. Madr. 1049. 1924, Repr. ed. 2 : 735. 1957.

Erect herbs, up to 1 m. Leaves elliptic, strigose above, acute at both ends, glabrous, drying black. Flowers pinkish with brownish tinge, in heads. Calyx lobes linear. Corolla ventricose. Capsules glandular - strigose.

Fl. & Fr. : October.

Fairly common ; on the banks of streams ; Minnampara, Silent Valley R.F.

3. ASYSTASIA Bl.

1a. Branchlets and leaves glabrous or slightly pubescent :

2a. Flowers blue or violet :

3a. Leaves ovate, decurrent (on petiole) ... *A. delzelliana* 2

3b. Leaves linear - lanceolate, not decurrent ... *A. travancorica* 4

2b. Flowers white or pale purple ... *A. chelonoides* var. *quadrangularis* 1

1b. Branchlets and leaves grey - pubescent ... *A. gangetica* 3

1. **Asystasia cheloneides** Nees var. **quadrangularis** Clarke in Hook. f. Fl. Brit. Ind. 4 : 494. 1884 ; Gamble, Fl. Pres. Madr. 1063. 1924, Repr. ed. 2 ; 744. 1957.

Straggling herbs. Leaves elliptic ovate or lanceolate, membranous, narrowed at base. Flowers pale purple, in panicles. Corolla small.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Valiyaparathode forest Silent Valley.

2. **Asystasia dalzelliana** Sant. in Kew Bull. 2 : 276. 1948. *A. violacea* Dalz. ex Clarke in Hook. f. Fl. Brit. Ind. 4 : 494. 1884 non Dalz. 1850 ; Gamble, Fl. Pres. Madr. 1063. 1924, Repr. ed. 2 : 745. 1957. *Ruellia filiformis* Heyne ex Clarke *l c. Pro syn.*

Erect glabrescent herbs. Leaves membranous, long petioled, ovate oblanceolate, acute, cuneate at base. Flowers blue, in racemes. Bracts and bracteoles ovate. Calyx and capsules hairy.

Fl. & Fr. : August September.

Fairly common ; in Ghats ; Panthanthode forest, Silent Valley R.F.

A. violacea Dalz. ex Clarke 1884 is an illegitimate one since it is a later homonym of *A. violacea* Dalz. 1850

3. **Asystasia gangetica** (L.) T. And. in Thw. Enum. 235. 1860 ; Gamble, Fl. Pres. Madr. 1063. 1924, Repr. ed. 2 : 744. 1957. *Justicia gangetica* L. Cent. Pl. 2 : 3. 1756. *Asystasia coromandeliana* Wight ex Nees in Wall. Pl. Asiat. Rar. 3 : 89. 1832 ; Wight, Ic. t. 1506. 1850.

Straggling, perennial herbs. Leaves ovate, acute, rounded or subcordate or narrow at base. Flowers white yellow, in lax secund racemes. Calyx lobes linear, hirsute. Corolla tubes cylindric. Capsules elliptic.

Fl. & Fr. : October.

Common ; in plains ; Walayar dam area.

4. **Asystasia travancorica** Bedd. Ic. t. 178. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 495. 1884 ; Gamble, Fl. Pres. Madr. 1063. 1924, Repr. ed. 2 : 745. 1957.

Large shrubs up to 2 m ; branches sparsely pubescent. Leaves sparsely pubescent, cuneate rhomboid at base. Flowers blue purple, secund, in pubescent racemes.

Fl. & Fr. : October.

Endemic ; rare ; once collected in Silent Valley R.F. ; *Vajravelu* 26136.

4. BARLERIA L.

1a. Plants spiny :

2a. Bracts present ; capsules 2 - seeded ... *B. prionitis* 7

2b. Bracts absent ; capsules 4 - seeded ... *B. buxifolia* 1

1b. Plants not spiny :

3a. Flowers solitary in upper axils ... *B. prattensis* 6

3b. Flowers not solitary in upper axils :

4a. Flowers in panicles of racemes :

5a. Outer calyx lobes oblong ... *B. involucrata* var. *elata* 4

5b. Outer calyx lobes lanceolate ... *A. paniculata* 5

4b. Flowers in spikes :

6a. Outer calyx lobes spinous, ciliate ... *B. cristata* 3

6b. Outer calyx lobes not spinous, not ciliate ... *B. courtallica* 2

1. **Barleria buxifolia** L. Sp. Pl. 636. 1753 ; Wight, Ic. t. 870. 1845 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 483. 1884 ; Gamble, Fl. Pres. Madr. 1059. 1924, Repr. ed. 2 : 742. 1957.

Very prickly, erect, hairy shrubs. Leaves sessile, orbicular to ovate, spinous - mucronate. Flowers white, solitary. Outer calyx lobes oblong or obovate, enlarged in fruit, scarious. Corolla lobes rounded. Stamens 2. Capsules oblong.

Fl. & Fr. : October April.

Fairly common ; in waste places in lower Ghats ; Sholayur area, Walayar dam area.

2. **Barleria courtallica** Nees in DC. Prodr. 11 : 226. 1847 ; Wight, Ic. t. 1529. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 489. 1884 ; Gamble, Fl. Pres. Madr. 1060. 1924, Repr. ed. 2 : 743. 1957.

Erect, woody shrubs, up to 2 m. Leaves lanceolate or elliptic, glabrous, acuminate at both ends. Flowers blue with yellowish throat, in glandular hairy tawny spikes. Bracts linear. Outer calyx lobes ovate

lanceolate ; inner ones linear. Corolla lobes obovate ; tubes cylindric. Stamens 2.

Fl. & Fr. : December January.

Fairly common ; in open places in evergreen forests at lower elevations ; Mukkali forest, Silent Valley R.F.

3. **Barleria cristata** L. Sp. Pl. 636. 1753 ; Wight, Ic. t. 453. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 488. 1884 ; Gamble, Fl. Pres. Madr. 1060. 1924, Repr. ed. 2 : 743. 1957.

Hairy undershrubs. Leaves variable, ovate or lanceolate or linear oblong. Flowers violet, in dense strigosely hairy spikes. Bracts linear, reflexed, spinous, ciliate. Outer calyx lobes ovate lanceolate, hairy, mucronate. Corolla lobes ovate.

Fl. & Fr. : October.

Common ; in dry plains and deciduous forests ; sometimes cultivated for the flowers ; Walayar Rest House area.

4. **Barleria involucrata** Nees var. **elata** (Dalz.) Clarke in Hook. f. Fl. Brit. Ind. 4 : 486. 1884 ; Gamble, Fl. Pres. Madr. 1060. 1924, Repr. ed. 2 : 742. 1957. *B. elata* Dalz. in Hook. Kew J. Bot. 3 : 227. 1851.

Unarmed, appressed hairy shrubs, about 2 m. Leaves elliptic, sparsely pubescent, acuminate, cuneate at base. Flowers blue with pinkish throat. Bracts and bracteoles linear oblong. Outer calyx lobes acuminate with yellow hairs ; inner ones narrow. Corolla lobes oblong obovate ; tube cylindric. Stamens 2. Capsules 4 seeded.

Fl. & Fr. : October.

Fairly common ; in upper Ghats ; Ayyappankoil forest, Silent Valley R.F.

5. **Barleria paniculata** Wall. ex Nees in Wall. Pl. Asiat. Rar. 3 : 92. 1832 ; Gamble, Fl. Pres. Madr. 1060. 1924, Repr. ed. 2 : 742. 1957.

Erect shrubs. Leaves membranous, elliptic, pilose, long acuminate at both ends. Flowers pale blue, in racemes, throat deep pinkish. Bracts linear. Outer calyx lobes (one) deeply bifid ; inner ones ovate, long apiculate. Corolla lobes suborbicular, emarginate. Capsules 4 seeded.

Fl. & Fr. : November.

Not common ; in lower Ghats ; Pothundy Kaikatty forest.

6. **Barleria prattensis** Sant. in Kew Bull. 3 : 487. 1949 et in Bot. Mem. Univ. Bombay No. 2. 62. 1951. *B. gibsonii* sensu Gamble, Fl. Pres.

Madr. 1061. 1924, Repr. ed. 2 : 743. 1957 *p.p.* non. Dalz. 1850. *B. montana* sensu Bedd. Ic. t. 257. 1868 74 non Nees 1832.

Glabrous undershrubs. Leaves membranous, ovate or lanceolate, glaucous beneath, acute. Flowers pale pinkish. Bracteoles linear. Corolla lobes obovate ; tube funnel shaped.

Fl. & Fr. : November.

Rare ; in lower Ghats ; Pothundy Kaikatty forest.

It is very similar to *B. montana* from which it differs by its much shorter bracteoles and its smaller and glabrous seeds. Similar also to *B. gibsonii* from which it differs by its smaller seeds ; its inflorescence which is axillary and only very shortly spicate or racemose and by the structure of the leaves.

7. **Barleria prionitis** L. Sp. Pl. 636. 1753 ; Wight, Ic. t. 452. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 482. 1884 ; Gamble, Fl. Pres. Madr. 1058. 1924, Repr. ed. 2 : 741. 1957. '*Chemmullu*' (Tam.).

Prickly, bushy, glabrous undershrubs. Leaves elliptic, acuminate, mucronate. Flowers orange, sessile, solitary in lower axils, spicate above. Bracts foliaceous, linear spathulate. Outer calyx lobes oblong - lanceolate, spine tipped ; inner ones linear lanceolate, mucronate. Corolla 2 lipped.

Fl. & Fr. : February.

Common ; along hedges and waste places ; Anaikatty Kathalkandy area.

5. BLEPHARIS Juss.

Blepharis maderaspatensis (L.) Roth, Nov. Pl. Sp. 320. 1821 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 15. 1951. *Acanthus maderaspatensis* L. Sp. Pl. 639. 1753. *Blepharis boerhaviifolia* Pers. Syn. Pl. 2 : 180. 1806; Wight, Ic. t. 458. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 478. 1884 ; Gamble, Fl. Pres. Madr. 1013. 1924. Repr. ed. 2 : 712. 1957 ('*boerhaviaefolia*').

Prostrate, hairy, wiry herbs. Leaves whorled, sessile to shortly petioled, oblong - lanceolate, glaucous beneath, acute, coarsely toothed, membranous. Flowers white with pinkish tinge and yellow spot on lip. Bracts with glochidiate spinous teeth. Outer calyx lobes oblong ; inner smaller. Capsules ellipsoid.

Fl. & Fr. : December.

Common ; in dry gravelly terrain, Attappady block Mukkali, Olavakkot area.

6. DICLIPTERA Juss. *nom. cons.*

Dicliptera zeylanica Nees in DC. Prodr. 11 : 474. 1847 ; Clarke in Hook. f. Fl Brit. Ind. 4 : 552. 1884 ; Gamble, Fl. Pres. Madr. 1073. 1924, Repr. ed. 2 : 752. 1957. *D. bivalvis* Nees *l.c.* : Wight, Ic. t. 1551. 1850.

Subscandent herbs. Leaves ovate to lanceolate, acuminate at both ends, membranous, long petioled. Flowers violet, in clusters of axillary umbels. Bracts below the umbels small, linear or spathulate ; those below the clusters ovate, mucronate reticulate. Bracteoles linear subulate, hairy. Calyx lobes ciliate, scarious. Corolla 2 lipped ; lobes oblong rounded. Capsules obovoid.

Fl. & Fr. : December.

In lower Ghats ; not common ; Karapara estate area.

7. DIDYPLOSANDRA Wight ex Brem.

Didyplosandra lurida (Wight) Bremek. var. **bourneae** (Gamble) Ellis in Biol. Mem. 2 : 106. 1977. *Strobilanthes luridus* Wight var. *bourneae* Gamble in Bull. Misc. Inform. Kew 374. 1923 & Fl. Pres. Madr. 1042. 1924, Repr. ed. 2 : 731. 1957.

Gregarious shrubs. Leaves ovate, crenulate, caudate acuminate. Inflorescences from leafless axils of old wood. Bracts orbicular, *ca.* 2.5 × 1.5 cm with prominent nerves. Bracteoles and calyx lobes very glandular hairy.

Fl. : April.

Endemic ; very rare ; once collected on the rocky slopes of Minnampatai in Nelliyampathy Ghats at *ca* 1800 m ; *Vajravelu* 49729.

8. DIPTERACANTHUS Nees emend. Bremek.

Dipteracanthus prostratus (Poir.) Nees in Wall. Pl. Asiat. Rar. 3 : 81. 1832. *Ruellia prostrata* Poir. in Lam. Encycl. 6 : 349. 1804 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 411. 1884 ; Gamble, Fl. Pres. Madr. 1017. 1924, Repr. ed. 2 : 714. 1957. '*Vedichchedi*' (Tam.).

Prostrate herbs. Leaves ovate elliptic to deltoid, strigose. Petioles hairy. Flowers violet, pale cream, solitary, axillary, subsessile ; bracts foliaceous, ovate. Calyx lobes lanceolate, acute, hairy. Corolla hairy outside ; lobes semi orbicular. Stamens 4. Capsules sparcely pubescent. Seeds flat, discoid.

Fl. & Fr. : October.

Common in sandy soil ; Olavakkot.

9. Echolium Kurz

Echolium viride (Forssk.) Alston var. **laetevirens** (Vahl) Raiz. in Indian Forester 84 : 482. 1952. *E. linneanum* Kurz var. *laetevirens* (Vahl) Clarke in Hook. f. Fl. Brit. Ind. 4 : 545. 1885 ; Gamble, Fl. Pres. Madr. 1074. 1924, Repr. ed. 2 : 752. 1957. *Justicia laetevirens* Vahl, Enum. Pl. 1 : 118. 1804.

Glabrous herbs. Leaves lanceolate, acuminate; nerves prominent. Flowers bluish, in long spikes. Bracts broadly lanceolate, aristate. Corolla lobes reflexed. Capsules pubescent.

Fl. & Fr. : February.

Not common ; in lower Ghats ; Thuthampara forest.

10. Eranthemum L.

Eranthemum capense L. Sp. Pl. 9. 1753 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 33. 1951. *E. montanum* (Roxb.) Roxb. Fl. Ind. 1 : 100. 1824 ; Wight, Ic. t. 466. 1841 ; Gamble, Fl. Pres. Madr. 1025. 1924, Repr. ed. 2 : 720. 1957. *Justicia montana* Roxb. Pl. Cor. t. 176. 1798. *Daedalacanthus montana* (Roxb.) T. And. in Thw. Enum. 229. 1860 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 421. 1884. '*Kurungu*' (Tam.).

Small shrubs, about 1 m. Leaves elliptic, acuminate, attenuate at base, long petioled. Flowers pale blue, in slender spikes. Bracts lanceolate to linear, viscid glandular hispid. Calyx glandular. Corolla lobes obovate. Stamens 2. Capsules oblong with 4 discoid seeds.

Fl. & Fr. : January.

On rocky slopes at lower elevations ; not common ; Pottikkal - Mukkali.

11. GYMNOSTACHYUM Nees *emend.* Benth.

Gymnostachyum canescens (Nees) T. And. in J. Linn. Soc. Bot. London 9 : 505. 1867 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 509. 1884 ; Gamble, Fl. Pres. Madr. 1053. 1924, Repr. ed. 2 : 738. 1957. Sant. in Bot. Mem. Univ. Bombay No. 2. 55. 1951. *Cryptophragmium canescens* Nees in Wall. Pl. Asiat. Rar. 3 : 100. 1832 ; Wight, Ic. t. 1495. 1849.

Glandular hairy shrubs. Leaves ovate, serrulate, acute, decurrent at base, lineolate. Flowers dull yellow, in branched racemose panicles. Calyx lobes linear lanceolate. Corolla pubescent. Anthers puberulous.

Fl. & Fr. : December.

Rare ; once collected in Silent Valley R.F. at *ca.* 900 m ; *Vajravelu* 33223.

12. HAPLANTHUS Nees

Haplanthus neilgherryensis Wight, Ic. t. 1556. 1850 ; Gamble, Fl. Pres. Madr. 1052. 1924, Repr. ed. 2 : 737. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 52. 1951. *H. tentaculatus* Nees var. *neilgherryensis* (Wight) Clarke in Hook. f. Fl. Brit. Ind. 4 : 507. 1884. *Bremekampia neilgherryensis* (Wight) Sreem. in Bull. Bot. Surv. Ind. 6 : 323. 1965. *Haplanthodes neilgherrensis* (Wight) Majumdar in Bull. Bot. Soc. Bengal 25 : 76. 1971.

Erect, tall herbs. Leaves ovate, rounded and decurrent on long petioles. Flowers pale pink to blue, in conspicuous, soft terminal spikes. Cladodes (abortive branchlets) slender, ending in 2 or more teeth, villous. Calyx lobes linear, hairy on the back. Capsules pubescent.

Fl. & Fr. : December.

Not common : once collected in Thiruvizhankunnu at *ca* 100 m ; *Vajravelu* 33369.

13. HEMIGRAPHIS Nees

Hemigraphis latebrosa (Heyne ex Roth) Nees in DC. Prodr. 11 : 723. 1847 ; Wight, Ic. t. 1504. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 423. 1884 ; Gamble, Fl. Pres. Madr. 1018. 1924, Repr. ed. 2 : 715. 1957. *Ruellia latebrosa* Heyne ex Roth. Nov. Pl. Sp. 307. 1821.

Straggling, pubescent undershrubs. Leaves ovate, crenate serrate, acuminate. Flowers blue with yellow tube, in heads. Bracts foliaceous, ovate lanceolate. Calyx lobes linear ; one longer. Corolla funnel shaped. Filaments hairy. Capsules oblong, pubescent, 4 angled.

Fl. & Fr. : December.

In lower Ghats, in shades ; not common ; Panthanthode forest.

14. HYGROPHILA R. Br.

1a. Plants with spines	...	*H. auriculata*	1
1b. Plants without spines	...	*H. salicifolia*	2

1. **Hygrophila auriculata** (Schum.) Heine in Kew Bull. 16 : 172. 1962. *Barleria auriculata* Schum. in Beskr. Guin. Pl. 285. 1827. *B. longifalia* L. in Cent. Pl. 2 : 22. 1756 (non *Hygrophila longifolia* Nees 1847). *Asteracantha longifolia* (L.) Nees in Wall. Pl. Asiat. Rar. 3 : 90. 1832 ; Wight, Ic. t. 449. 1841 ; Gamble, Fl. Pres. Madr. 1015. 1924, Repr. ed. 712. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 17. 1951. '*Neermulli*' (Tam.).

Tall, hispid herbs with generally 8 leaves and 6 spines at each node. Stem pinkish. Leaves lanceolate, hairy, in spurious whorls ; outermost ones longer, dentate. Spines curved or straight. Flowers blue in axillary whorls surrounded by thorns. Bracts leafy, lanceolate, hispid. Bracteoles linear lanceolate. Calyx 4 partite, unequal. Corolla lobes 5, rounded to acute, glabrous. Stamens 4, didynamous. Capsules oblong, 4 8 seeded.

Fl. & Fr. : October November.

In marshy places ; common ; Mukkali, Anamooly area, Olavakkot.

2. **Hygrophila salicifolia** (Vahl) Nees in Wall. Pl. Asiat. Rar. 3 : 81. 1832 ; Wight, Ic. t. 1490. 1849 : Clarke in Hook. f. Fl. Brit. Ind. 4 : 407. 1884 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 20. 1951. *Ruellia salicifolia* Vahl, Symb. Bot. 3 : 84. 1794. *Hygrophila angustifolia* auct. non R. Br. 1810 ; Gamble, Fl. Pres. Madr. 1016. 1924, Repr. ed. 2 : 713. 1957.

Erect herbs with angular stems. Leaves linear lanceolate. Flowers pale pink. Bracts and bracteoles lanceolate, hispid ciliate. Calyx 5 partite, hispid - ciliate. Corolla sparsely hairy.

Fl. & Fr. : October November.

Fairly common in marshy places, in lower Ghats ; Anamada Nelliyampathy R.F., Karivara forest.

15. JUSTICIA L.

1a. Calyx 4 - lobed :

2a. Sepals scarious, aristate ... *J. neesii* 3

2b. Sepals not scarious, not aristate :

3a. Bracts and bracteoles shorter than calyx ... *J. diffusa* 2

3b. Bracts and bracteoles longer than calyx ... *J. simplex* 5

1b. Calyx 5 lobed :

4a. Erect or decumbent shrubs ;

5a. Stems erect ; flowers more than 2.5 cm across ... *J. santapaui* 4

5b. Stems decumbent ; flowers less than 1.5 cm across :

6a. Bracts more than 1 cm long ... *J. betonica* 1

6b. Bracts less than 1 cm long ... *J. trinervia* 6

4b. Erect herbs or undershrubs ... *J. wynaadensis* 7

With regard to the delimitation of the genus *Justicia*, Santapau (in Bot. Mem. Univ. Bombay No. 2. 83. 1951) observes that Bremekamp (in Verh. Nederl. Akad. Wet. 45 (2) : 61. 1948) has separated the species of Sect. 6 of Clarke *Rostellularia* and treated as a separate genus ; the whole group of species under the genus *Justicia* requires a thorough revision. Hence he treated the species under *Justicia* only until such a revision is published. The same is followed here.

1. **Justicia betonica** L. Sp. Pl. 15. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 525. 1885 ; Gamble, Fl. Pres. Madr. 1078. 1924, Repr. ed. 2 : 755. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 85. 1951. *Adhatoda betonica* (L.) Nees in Wall. Pl. Asiat. Rar. 3 : 103. 1832.

Diffusely branched shrubs. Leaves petioled, ovate lanceolate, acuminate, attenuate at base. Spikes short or long with white, foliaceous, membranous, ovate lanceolate, acuminate, veined bracts and bracteoles. Flowers white with pink patches, in spikes. Calyx pubescent, lobes 5. Corolla 2 lipped ; upper erect, lower deflexed, nerves of corolla hairy. Capsules pubescent. Seeds spinulose when wet.

Fl. & Fr. : October February.

In upper Ghats ; fairly common ; Karivara slopes, Valiyaparathode forest.

2. **Justicia diffusa** Willd. Sp. Pl. 1 : 87. 1797 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 538. 1885 ; Gamble, Fl. Pres. Madr. 1081. 1924, Repr. ed. 2 : 757. 1957. *Rostellularia diffusa* (Willd.) Nees in Wall. Pl. Asiat. Rar. 3 : 100. 1832.

var. **diffusa**

Woody herbs. Leaves membranous, broadly elliptic ovate, obtuse ; raphides irregular. Bracts and bracteoles ovate, scarious. Flowers pale pink, in slender spikes. Calyx lobes glabrous. Stamens 2. Capsules glabrous, pointed.

Fl. & Fr. : May July.

In lower Ghats ; not common ; Dhoni river bank, Panthanthode forest.

2a. **Justicia diffusa** Willd. var. **hedyotidifolia** (Nees) Clarke in Hook. f. Fl. Brit. Ind. 4 : 538. 1885. *Rostellularia hedyotidifolia* Nees in Wall. Pl. Asiat. Rar. 3 : 100. 1832 ; Wight, Ic. t. 1540. 1850.

It differs from var. *diffusa* by thicker leaves, broader and denser spikes with long peduncles.

Fl. & Fr. : October.

Not common ; in lower Ghats ; Chindaki forest.

3. **Justicia neesii** Ramam. in Sald. & Nicol. Fl. Hassan Dist. 551. 1976. *J. micrantha* Wall. ex Clarke in Hook. f. Fl. Brit. Ind. 4 : 536. 1885 non Pohl ex Nees 1847 ; Gamble, Fl. Pres. Madr. 1080. 1924, Repr. ed. 2 : 756. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 87. 1951. *Rostellularia crinita* Nees in Wall. Pl. Asiat. Rar. 3 : 101. 1832 non *Justicia crinita* Thunb. 1784.

Erect, branched herbs. Leaves thin, ovate or elliptic with irregular raphides. Bracts and bracteoles linear spathulate, scarious, bulbous-based hairy. Flowers pinkish, in cylindric, linear spikes. Calyx lobes unequal, scarious. Capsules oblong, pubescent.

Fl. & Fr. : October.

In lower Ghats ; fairly common ; Anamooly slopes.

4. **Justicia santapaui** Bennet in J. Bombay Nat. Hist. Soc. 67 : 358. 1970. *J. montana* (Nees) Wall. ex T. And. in J. Linn. Soc. Bot. 9 :

509. 1867 non Roxb. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 525. 1885 ; Gamble, Fl. Pres. Madr. 1078. 1924, Repr. ed. 2 : 755. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2: 85. 1951. *Hemichorista montana* Nees in Wall. Pl. Asiat. Rar. 3 : 102. 1832 ; Wight, Ic. t. 1538. 1850. *Justicia andersonii* Ramam. in Sald. & Nicol. Fl. Hassan Dist. 551. 1976 *nom. superfl.*

Shrubs, 2 m. Leaves oblong - lanceolate, glabrous, acuminate at apex. Flowers white, in opposite clusters, in elongate spikes. Bracts and bracteoles ovate, acute. Calyx 5 lobed, lanceolate, acuminate. Capsules clavate, 4 seeded.

Fl. & Fr. : December April.

In lower Ghats ; common ; Karapara river forests, Silent Valley R. F.

5. **Justicia simplex** D. Don, Prodr. Fl. Nepal. 118. 1825 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 539. 1885 ; Gamble, Fl. Pres. Madr. 1080. 1924. Repr. ed. 2 : 756. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 89. 1951.

Diffuse, branched herbs. Leaves ovate oblong to linear. Raphides irregularly scattered. Bracts broad, scarious along margin ; bracteoles linear. Flowers pink, in long spikes. Calyx lobes 4, scarious at margin, white hairy. Stamens 2. Capsules papery, villous at apex.

Fl. & Fr. : November.

Common ; in lower Ghats ; Attappadi R.F.—Mukkali, Kaikatty Pothundy, Malampuzha.

6. **Justicia trinervia** Vahl, Enum. Pl. 1 : 156. 1804 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 562. 1885 ; Gamble, Fl. Pres. Madr. 1079. 1924, Repr. ed. 2 : 755. 1957. *Adhatoda trinervia* (Vahl) Nees in Wall. Pl. Asiat. Rar. 3 : 103. 1832.

Low procumbent herbs, branching from the woody root stock. Leaves ovate oblong, rarely linear. Bracts imbricate, narrow. Flowers pale pinkish in slender spikes. Capsules pubescent. Seeds softly tuberculate when wet.

Fl. & Fr. : May.

Common in lower Ghats ; Walayar forest.

7. **Justicia wynaadensis** (Nees) T. And. in J. Linn. Soc. Bot. London 9 : 515. 1867 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 87. 1951. *Genda-*

russa wynaadensis Nees in Wall. Pl. Asiat. Rar. 3 : 104. 1832. *Adhatoda wynaadensis* (Nees) Nees in DC. Prodr. 11 : 406. 1847 ; Wight, Ic. t. 1545. 1850.

Erect undershrubs. Leaves elliptic, acuminate at both ends. Bracts and bracteoles linear - lanceolate. Flowers pink with brown tinge, in slender, long spikes. Calyx lobes linear lanceolate. Corolla pubescent outside. Capsules clavate, densely hairy.

Fl. & Fr. : January.

In lower Ghats ; not common ; Pottikkal forest.

16. KANJARAM Ramam.

Kanjaram palghatense Ramam. in Bull. Bot. Surv. Ind. 13 : 153. 1971. (Plate-10).

Erect shrubs, 1 2 m. Leaves ovate, cuspidate, crenate, pilose. Flowers white, in dense spikes. Bracts leafy, ovate orbicular. Calyx 5 - partite ; segments linear, white- hairy. Corolla lobes rounded ovate. Stamens 4.

Fl. & Fr. : August - October.

Common ; in lower Ghats ; Aruvampara Silent Valley R.F., Ayyappankoil Kaikatty forest, Mukkali forest.

It is an addition to the Flora of India.

17. LEPTACANTHUS Nees

Leptacanthus rubicundus Nees in Wall. Pl. Asiat. Rar. 3 : 90. 1832 ; Bremek. in Mat. Mon. Strobilanth. 184. 1944. *Strobilanthes rubicunda* (Nees) T. And. in Thw. Enum. 229. 1860 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 475. 1884 ; Gamble, Fl. Pres. Madr. 1044. 1924, Repr. ed. 2 : 732. 1957.

Delicate, slender shrubs. Leaves lanceolate, caudate acuminate, undulate, glabrous. Flowers pinkish, in branched panicles. Bracts ovate. Calyx lobes linear. Corolla funnel - shaped. Capsules oblanceolate.

Fl. & Fr. : December.

Not common ; in upper Ghats ; Karapara forest.

18. MACKENZIEA Nees

Mackenziea caudata (T. And.) Ramam. in Sald. & Nicol. Fl. Hassan Dist. 553. 1976. *Strobilanthes caudatus* T. And. in Thw. Enum. 228. 1860 ; Bedd. Ic. t. 213. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 441. 1884 ; Gamble Fl. Pres. Madr. 1040. 1924, Repr. ed. 2 : 729. 1957.

Erect shrubs, 2 3 m. Leaves lanceolate, caudate acuminate, tawny - pubescent ; cystolish lineolate. Bracts linear - oblong, spathulate, densely glandular hairy. Flowers white tinged with red, in peduncled, villous heads. Capsules 2 seeded.

Fl. & Fr. : November.

Rare ; once collected in Mukkali forests at *ca* 675 m ; *Vajravelu* 44830.

19. NILGIRIANTHUS Bremek.

1a. Stamens 4 ; flowers in heads or spikes ;

2a Flowers in capitate heads ;

3a. Seeds glabrous :

4a. Stems winged — *N. barbatus* 2

4b. Stems not winged :

5a. Leaves ovate, rounded at base ... *N. neilgherrensis* 6

5b. Leaves narrowly lanceolate, attenuate at base ... *N. beddomei* 3

3b. Seeds hairy ... *N. asper* 1

2b. Flowers in strobilate spikes ... *N. heyneanus* 5

1b. Stamens 2 ; flowers in heads ... *N. foliosa* 4

1. **Nilgirianthus asper** Sant. in Bot. Mem. Univ. Bombay No. 2. 42. 1951. *Strobilanthes asper* Wight, Ic. t 1518. 1850 non Decne. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 452. 1884 ; Gamble, Fl. Pres. Madr. 1041. 1924, Repr. ed. 2 : 750. 1957.

Erect shrubs, 1 2 m. Leaves elliptic ovate, crenate, membranous, densely hairy, glaucous beneath, acuminate, decurrent at base. Flowers purple, in spikes, fragrant. Bracts ovate, decurrent on stalk, reddish glandular - hairy. Corolla hairy. Capsules 6 8 mm long. Seeds elastically hairy when wet.

Fl. & Fr. : April.

Rare ; once collected in Karasuryamalai forest at *ca* 1200 m ; *Vajravelu* 49720.

Bremekamp (Mat. Mon. Strobilanth. 270. 1944) says that the identity of Wight's plant is still uncertain ; he suggests that it is possibly the same plant as *N. warrensis* (Dalz.) Bremek. (*S. warrensis* Dalz.). Hence Santapau *l.c.* after examining both the type of specimens at Kew Herbarium, named Wight's plant as above which is followed here.

2. **Nilgirianthus barbatus** (Nees) Bremek. Mat. Mon. Strobilanth. 172. 1944 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 39. 1951. *Strobilanthes barbatus* Nees in Wall. Pl. Asiat. Rar. 3 : 85. 1832 ; Bedd. Ic. t. 212. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 437. 1884 ; Gamble, Fl. Pres. Madr. 1037. 1924, Repr. ed. 2 : 727. 1957.

Gregarious shrubs. Leaves 8 14 × 3 6 cm, elliptic lanceolate, glabrous, decurrent at base. Base of petioles swollen, often auricled. Flowers white, in dense spikes. Bracts ovate, cuspidate, with recurved tips. Calyx lobes acuminate. Corolla lobes ovate. Filaments bearded, ciliate.

Fl. & Fr. : October.

Rare ; collected in Dhoni R.F. and in Silent valley R.F. ; *Vajravelu* 26143.

The inflorescence of this plant is typical with small spikes and bracts ending in long filiform appendages.

3. **Nilgirianthus beddomei** Bremek. Mat. Mon. Strobilanth. 172. 1944. *Strobilanthes adenophora* auct. non Nees 1847 ; Bedd. Ic. t. 225. 1868 74 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 440. 1884 ; Gamble, Fl. Pres. Madr. 1040. 1924, Repr. ed. 2 : 729. 1957.

Erect shrubs, 1 2 m. Leaves 3 9 × 1 3 cm, narrowly lanceolate, glabrous, acuminate at both ends. Flowers pale pink, in spikes. Corolla funnel - shaped. Stamens included ; filaments sparsely hairy.

Fl. & Fr. : October.

Rare ; once collected in Ayyappankoil area, Nelliyampathy Ghat ; *Vajravelu* 48693.

4. **Nilgirianthus foliosus** (Wight) Bremek. Mat. Mon. Strobilanth. 173. 1944. *Endopogon foliosus* Wight, Ic. t. 1501. 1849. *Strobilanthes foliosa* (Wight) T. And. in J. Linn. Soc. Bot. London 9 : 467. 1867 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 433. 1884 ; Gamble, Fl. Pres. Madr. 1035. 1924, Repr. ed. 2 : 726. 1957.

Gregarious, woody shrubs. Leaves ovate, acuminate, serrulate. Flowers bluish pink in ovoid, dense heads ; outer bracts 4, leafy, inner lanceolate, glabrous, 7 ribbed. Corolla tube cylindric ; lobes spreading.

Fl. & Fr. : January.

Rare ; once collected from Kunthipuzha bank, Silent Valley R.F.

5. **Nilgirianthus heyneanus** (Nees) Bremek. var. **neesii** Bremek. Mat. Mon. Strobilanth. 173. 1944 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 40. 1951. *Strobilanthes heyneanus* Nees in Wall. Pl. Asiat. Rar. 3 : 85 1932 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 443. 1884 ; Gamble, Fl. Pres. Madr. 1041. 1924, Repr. ed. 2 : 730. 1957. *S. rugosus* Wight, Ic. t. 1619. 1850.

Erect, gregarious, perennial shrubs. Leaves 8 - 16 × 3 - 8 cm, ovate elliptic, acuminate, soft hairy. Flowers white, in spikes of trichotomous cymes. Bracts pink, concave, orbicular. Calyx lobes emarginate. Corolla lobes acute.

Fl. & Fr. : October November.

Fairly common ; in upper Ghats ; Ayyappankoil Kaikatty forest, Karivara forest, Silent Valley R.F.

Typical features of this plant are the absence of bracteoles, the glabrous bracts and stiff bulbous based hairs on the upper surface of the leaves.

6. **Nilgiranthus neilgherrensis** (Bedd.) Bremek. Mat. Mon. Strobilanth. 173. 1944. *Strobilanthes neilgherrensis* Bedd. Ic. t. 196 1868 1874 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 438. 1884 ; Gamble, Fl. Pres. Madr. 1038. 1924, Repr. ed. 2 : 728. 1957.

Gregarious shrubs. Leaves 5 11 × 3 7 cm, crenate, acuminate. Flowers light blue, in densely hirsute heads. Bracts oblong. Bracteoles setaceous, bristly. Calyx lobes lanceolate, margins scarious. Corolla tube cylindric. Filaments pilose at base.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R.F., *Vajravelu* 26152.

20. Peristrophe Nees

Peristrophe montana Nees in Wall. Pl. Asiat. Rar. 3 : 113. 1832 ; Wight, Ic. t. 1553. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 556. 1885 ; Gamble, Fl. Pres. Madr. 1084. 1924, Repr. ed. 2 : 759. 1957.

Erect herbs. Leaves elliptic, long - acuminate, crowded at top. Flowers pale pink, clustered in branched cymes. Bracts 2, conspicuous, leafy, elliptic, glabrous or sparcely villous. Calyx lobes linear. Corolla tube twisted, villous. Filaments pubescent.

Fl. & Fr. : November December.

Fairly common ; at lower elevations ; Mukkali forest.

21. PHAULOPSIS Willd. emend. Spreng. *nom. cons.*

Phaulopsis dorsiflora (Retz.) Sant. in Kew Bull. 2 : 276. 1948 et in Bot. Mem. Univ. Bombay No. 2. 30. 1951. *Ruellia dorsiflora* Retz. Obs. Bot. 6 : 31. 1791. *Micranthus oppositifolius* Wendl. Bot. Beobacht. t. 39. 1798 ; Gamble, Fl. Pres. Madr. 1022. 1924, Repr. ed. 2 : 718. 1957.

Erect, branched, viscid herbs. Leaves 4 6 × 2 3 cm, ovate, sparsely hairy, in unequal pairs, long petioled. Bracts orbicular, membranous, hairy. Flowers white, in dense one - sided spikes. Calyx lobes unequal, hairy. Corolla lobes rounded. Stamens 4, didynamous. Capsules clavate, 4 seeded.

Fl. & Fr. : December - February.

Common ; in forest undergrowths ; Panthanthode, Thuthampara, Valiyaparathode, Walayar forest.

22. PLEOCAULUS Bremek.

1. **Pleocaulus sessilis** (Nees) Bremek. Mat. Mon. Strobilanth. 185. 1944. *Strobilanthes sessilis* Nees in Wall. Pl. Asiat. Rar. 3 : 85. 1832 ; Wight, Ic. t. 1511. 1850 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 452. 1884 ; Gamble, Fl. Pres. Madr. 1042. 1924, Repr. ed. 2 : 731. 1957.

var. **sessilis**

Small herbs. Leaves ovate, subcordate, crenate, rugose or bullate, glandular - hairy, acute. Flowers blue, in cylindric one sided spikes. Bracts ovate, hairy. Corolla funnel - shaped. Seeds hairy when wet.

Fl. & Fr. : October November.

Endemic ; common on grassy slopes in upper Ghats ; Kunthipuzha dam site - Silent Valley R.F.

1a. **Pleocaulus sessilis** (Nees) Bremek. var. **sessiloides** (Wight) Vajravelu comb. nov. *Strobilanthes sessiloides* Wight, Ic. t. 512. 1850.

S. sessilis Nees var. *sessiloides* (Wight) Clarke in Hook. f. Fl. Brit. Ind. 4 : 452. 1884 ; Gamble, Fl. Pres. Madr. 1043. 1924, Repr. ed. 2 : 731. 1957.

This variety can be distinguished from the variety proper by the presence of leaves being thicker, very rugose or bullate with prominent nerves and the spikes longer.

Fl. & Fr. : December.

Rare ; on upper Ghats ; Silent Valley R.F.

23. PSEUDERANTHEMUM Radlk.

Pseuderanthemum malabaricum (Clarke) Gamble, Fl. Pres. Madr. 1064. 1924, Repr. ed. 2 : 745. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 70. 1951. *Eranthemum malabaricum* Clarke in Hook. f. Fl. Brit. Ind. 4 : 497. 1884.

Herbs. Leaves ovate or elliptic, acuminate ; petioles drying black. Flowers white, in interrupted spikes. Bracts ovate, ciliate. Calyx lobes lanceolate, hairy, longer than bracts. Corolla sparsely hairy ; lobes oblong. Capsule walls springing back. Seeds rugose.

Fl. & Fr. : December February.

Fairly common ; at lower elevations, Karivara slopes, Thiruvizhankunnu.

Daedalacanthus T. And. is congeneric with *Eranthemum* L. which is different from *Eranthemum* sensu T. And. for which Radlkofer (Sitzung. K. Bayer. Akad. 13 : 285. 1883) proposed *Pseuderanthemum* Radlk. which can be distinguished by corolla segments being contorted in bud.

24. RHINACANTHUS Nees

Rhinacanthus nasutus (L.) Kurz in J. Asiat. Soc. Bengal 39 : 79. 1870 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 92. 1951 ('*nasuta*'). *Justicia nasuta* L. Sp. Pl. 16. 1753. *Rhinacanthus communis* Nees in Wall. Pl. Asiat. Rar. 3 : 109. 1832 ; Wight, Ic. t. 464. 1841 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 541. 1885 ; Gamble, Fl. Pres. Madr. 1083. 1924, Repr. ed. 2 : 758. 1957. '*Nagamalli*', *Sirukurungu*' (Tam.).

Suffruticose herbs, up to 2 m. Leaves elliptic, acute. Flowers white, in cymes. Bracts and bracteoles linear lanceolate, glandular - pubescent.

Calyx lobes linear. Corolla bilabiate, hairy outside. Stamens 2. Filaments glabrous. Capsules pubescent.

Fl. & Fr. : October April.

Common ; in lower Ghats ; Agali forest, Anavayee Tribal Settlement slopes, Panthanthode, Pothundy - Kaikatty.

25. RUNGIA Nees

1a. Barren bracts decurrent	...	*R. sisparensis* 3
1b. Barren bracts not decurrent :		
2a. Fertile bracts glabrous	...	*R. parviflora* 1
2b. Fertile bracts villous	...	*R. pectinata* 2

1. **Rungia parviflora** Nees in Wall. Pl. Asiat. Rar. 3 : 110. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 550. 1885 ; Gamble, Fl. Pres. Madr. 1071. 1924, Repr. ed. 2 : 750. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 76. 1951.

Prostrate herbs. Leaves membranous, ovate lanceolate or linear - spathulate. Flowers white, in spikes. Bracts dimorphic ; barren ones elliptic or oblong, mucronate ; fertile ones obovate, hyaline margined, ciliate. Capsules oblong.

Fl. & Fr. : November February.

Fairly common ; in lower Ghats ; Panthanthode, Pothundy Kaikatty forest.

2. **Rungia pectinata** (L.) Nees in DC. Prodr. 11 : 469. 1847 ; Wight, Ic. t. 1547. 1850 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 77. 1951. *Justicia pectinata* L. Cent. Pl. 2 : 3. 1756. *Rungia parviflora* Nees var. *pectinata* (L.) Clarke in Hook. f. Fl. Brit. Ind. 4 : 550. 1885. Gamble, Fl. Pres. Madr. 1071. 1924, Repr. ed. 2 : 750. 1957.

Small herbs. Leaves elliptic lanceolate. Flowers bluish, in short spikes. Fertile bracts ovate, hyaline - margined, hairy on back and margins. Calyx lobes linear lanceolate. Corolla hairy.

Fl. & Fr. : January.

Not common ; in lower Ghats ; Silent Valley R. F., Walayar forest.

3. **Rungia sisparensis** T. And. in J. Linn. Soc. Bot. London 9 : 518. 1867 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 546. 1885 ; Gamble, Fl. Pres. Madr. 1071. 1924. Repr. ed. 2 : 750. 1957.

Herbs. Leaves elliptic, glabrous, acuminate at both ends. Flowers white, in spikes. Barren bracts narrow, bifarious on one side, decurrent, fertile bracts bifarious, shining on the other side, not mucronate. Calyx lobes linear lanceolate. Fruits ovoid, 4 seeded.

Fl. & Fr. : October May.

Endemic ; common ; in upper Ghats ; Silent Valley R.F.

26. Staurogyne Wall.

Staurogyne zeylanica (Nees) Kuntze. Rev. Gen. Pl. 2 : 497. 1891 ; Gamble, Fl. Pres. Madr. 1011. 1924, Repr. ed. 2 : 710. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 13. 1951. *Ebermatera zeylanica* Nees in DC. Prodr. 11 : 74. 1847 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 397. 1884.

Trailing, hispid herbs. Leaves opposite, elliptic oblong, decurrent at base. Flowers pale pink, in spikes. Bracts leafy, broad, obovate ; bracteoles 2, linear lanceolate. Calyx deeply 5 - partite. Corolla glabrous. Capsules fusiform.

Fl. & Fr. : December April.

Fairly common in wet places ; in lower Ghats ; Mukkali forest.

27. Strobilanthes Bl.

Strobilanthes tristis (Wight) T. And. in. J. Linn. Soc. Bot. London 9 : 470. 1867 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 441. 1884 ; Gamble, Fl. Pres. Madr. 1040. 1924, Repr. ed. 2 : 729. 1957. *Goldfussia tristis* Wight, Ic. t. 1508. 1850.

Erect shrubs. Leaves 9 16 × 1.5 9 cm, elliptic, glabrous, long acuminate at both ends, crenate. Flowers pale blue, in panicles of deflexed lanceolate heads. Bracts lanceolate, long - acuminate, ciliate. Corolla tube cylindric. Capsules ellipsoid. Seeds. 2, appressed - villous, oblong with large areole.

Fl. & Fr. : October.

Endemic ; rare ; once collected in Silent Valley R.F. ; *Vajravelu* 26076.

Bremekamp (Mat. Mon. Strobilanth. 286. 1944) is doubtful of the status of the above species, hence treats under *Strobilanthes* which is followed here.

28. THUNBERGIA Retz. *nom. cons.*

1a. Flowers white ; calyx 10 16 toothed :

2a. Petioles winged ... *T. alata* 1

2b. Petioles not winged ... *T. fragrans* 2

1b. Flowers yellow ; calyx entire or crenulate-ringed ... *T. mysorensis* 3

1. **Thunbergia alata** Bojer ex Sims in Bot. Mag. t. 2591. 1825 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 391. 1884 ; Gamble, Fl. Pres. Madr. 1008. 1924, Repr. ed. 2 : 708. 1957 ; Sant. in Bot. Mem. Univ. Bombay No. 2. 10. 1951.

Slender, hairy climbers. Leaves ovate, cordate or hastate, villous, 5 nerved, tawny pubescent, base with 1 or 2 broad teeth on either side. Flowers yellow with purple black throat. Bracts leafy. Calyx lobes about 15, villous. Stamens 4. Capsules pubescent with slender beak.

Fl. & Fr. : April.

Fairly common ; cultivated or escape in lower Ghats ; Siruvani estate area.

2. **Thunbergia fragrans** Roxb. var. laevis (Nees) Clarke in Hook. f. Fl. Brit. Ind. 4 : 391. 1884 ; Gamble, Fl. Pres. Madr. 1007. 1924, Repr. ed. 2 : 707. 1957. *T. laevis* Nees in Wall. Pl. Asiat. Rar. 3 : 77. 1832.

Slender, herbaceous twiners. Leaves thin, reticulate, ovate lanceolate to oblong, subcordate at base. Pedicels thick. Flowers solitary. Calyx appressed hairy ; tube long, stiff. Corolla hairy without ; lobes dentate. Capsules hairy.

Fl. & Fr. : September February.

Fairly common ; in lower Ghats ; Kathalakandi area.

3. **Thunbergia mysorensis** (Wight) T. And. in J. Linn. Soc. Bot. London 9 : 448. 1867 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 393. 1884 ; Gamble, Fl. Pres. Madr. 1008. 1924, Repr. ed. 2 : 708. 1957. *Hexacentris mysorensis* Wight, Ic. t. 871. 1844-45.

Slender climbers. Leaves lanceolate, palmately 3-nerved, base rounded-truncate, glabrous, acuminate. Flowers showy in pendant, long

racemes. Bracts linear-lanceolate ; bracteoles ovate-oblong. Anthers 4, spurred at base, bearded. Capsules glabrous.

Fl. & Fr. : December January.

Common ; in upper Ghats ; Silent Valley R.F.

29. XENACANTHUS Bremek.

Xenacanthus pulneyensis (Clarke) Bremek. Mat. Mon. Strobilanth. 176. 1944. *Strobilanthes pulneyensis* Clarke in Hook. f. Fl. Brit. Ind. 4 : 438. 1884 ; Gamble, Fl. Pres. Madr. 1038. 1924, Repr. ed. 2 : 727. 1957.

Shrubs up to 2 m with densely hispid tender parts. Leaves ovate, serrate, rugose - hirsute, acute at both ends. Flowers pale blue, in flat hairy heads. Bracts leafy, suborbicular. Calyx lobes linear, hairy. Corolla lobes ovate. Stamens included.

Fl. & Fr. : October.

Endemic ; rare ; once collected in Karapara R.F. at *ca* 900 m ; *Vajravelu* 48744.

97. VERBENACEAE

1a. Leaves simple :

2a. Flowers sessile or subsessile :

3a. Inflorescences cymose :

4a. Flowers 4 - merous ... CALLICARPA 1

4b. Flowers 4 - 6 - merous ... TECTONA 10

3b. Inflorescences cylindric or capitate spikes :

5a. Spikes more than 15 cm :

6a. Flowers embedded in cavities ... STACHYTARPHETA 9

6b. Flowers not embedded in cavities ... PRIVA 8

5b. Spikes less than 10 cm :

7a. Creeping herbs ... PHYLA 6

7b. Erect shrubs :

8a. Calyx truncate or obscurely lobed ; drupes fleshy ... LANTANA 4

8b. Calyx 2 - 4 lobed ; drupes dry ... LIPPIA 5

2b. Flowers pedicelled :

9a. Calyx with 2 - 7 glands ... GMELINA 3

9b. Calyx without glands :

10a. Pyrenes 1 4, each 1 - seeded ... CLERODENDRUM 2

10b. Pyrenes 1, 4 - seeded ... PREMNA 7

1b. Leaves digitately 3 - 7 - foliolate ... VITEX 11

1. CALLICARPA L.

Callicarpa tomentosa (L.) Murray, Syst. Veg. ed. 13. 130. 1774. *Tomex tomentosa* L. Sp. Pl. 118. 1753. *Callicarpa lanata* L. Mant. 331. 1771 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 567. 1885 ; Gamble, Fl. Pres. Madr. 1092. 1924, Repr. ed. 2 : 764. 1957. *C. wallichiana* Walp. Repert. 4 : 125. 1845 ; Wight, Ic. t. 1480. 1844. '*Vettilai patta*' (Tam.).

Small trees, 5 7 m. Leaves ovate or elliptic, densely tomentose beneath, acuminate caudate, rounded to acute at base. Flowers purple, in umbellate cymes. Calyx 4 lobed. Corolla tube short ; lobes obtuse. Drupes globular, black.

Fl. & Fr. : All seasons.

Common ; in Ghats ; Dhoni R.F., Mukkali forest, Panthanthode forest, Silent Valley R.F., Thadikundu.

2. CLERODENDRUM L.

1a. Inflorescences axillary cymes ... *C. inerme* 1

1b. Inflorescences terminal panicles :

2a. Calyx truncate *C. serratum* 2

2b. Calyx deeply divided ... *C. viscosum* 3

1. **Clerodendrum inerme** (L.) Gaertn. Fruct. 1 : 271. 1788 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 589. 1885 ; Gamble, Fl. Pres. Madr. 1099. 1924, Repr. ed. 2 : 769. 1957. *Volkameria inermis* L. Sp. Pl. 637. 1753. '*Peenari Sangu*' (Tam.).

Straggling shrubs. Leaves obovate or elliptic, cuneate at base, glandular. Flowers white. Calyx dentate. Corolla 5 lobed, spreading. Stamens 4. Drupes dry, brown.

Fl. & Fr. : October.

Occasional ; in lower Ghats ; Thenkara area.

2. **Clerodendrum serratum** (L.) Moon, Cat. Pl. Ceylon 46. No. 382. 1824 ; Spreng. Syst. Veg. 2 : 758. 1825 ; Wight, Ic. t. 1472. 1849 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 592. 1885 ; Gamble, Fl. Pres. Madr. 1100. 1924, Repr. ed. 2 : 770. 1957. *Volkameria serrata* L. Mant. 90. 1767. '*Chiru thekku*' (Tam.).

Woody shrubs with 4 angled stems. Leaves elliptic or oblong, serrate. Flowers blue in pubescent panicles. Bracts lanceolate. Calyx campanulate. Corolla lobes subequal. Stamens 4. Drupes purple, 4 lobed.

Fl. & Fr. : August November.

Common ; in lower Ghats ; Agali forest, Aruvampara slopes, Dhoni R.F., Muthikulam forest, Pothundy Kaikatty forest.

3. **Clerodendrum viscosum** Vent. Jard. Malm. 1 : t. 25. 1803. *Clerodendrum infortunatum* auct. non L. 1753 ; Wight, Ic. t. 1471. 1849 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 594. 1885 ; Gamble. Fl. Pres. Madr. 1100. 1924, Repr. ed. 2 : 770. 1957. '*Perugilai*' (Tam.) : '*Paragu*', '*Vatta perivelam*' (Mal.).

Large, tomentose shrubs or small trees, 5 7 m ; branchlets 4 - angled. Leaves ovate, tomentose, acuminate, cordate, 5 ribbed. Flowers pinkish white, in lax panicles. Lobes of calyx and corolla lanceolate. Drupe black in enlarged pink calyx.

Fl. & Fr. : July February.

Common ; in Ghats ; Silent Valley R.F., Mathur Kollenkode.

Clerodendrum philippinum Schauer (*C. fragrans* Willd.) '*Mysore malli*' '*Kudai malli*' (Tam.) is a garden plant with fragrant white flowers and reddish calyx in showy umbels like heads.

3. GMELINA L.

Gmelina arborea Roxb. Pl. Cor. t. 246. 1815 ; Wight, Ic. t. 1470. 1849 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 581. 1885 ; Gamble, Fl. Pres. Madr. 1097. 1924, Repr. ed. 2 : 768. 1957. '*Kumbla*' (Tam.).

Deciduous, unarmed trees, 10 15 m with fulvous tomentose tender parts. Leaves deltoid ovate, tomentose beneath, acuminate, cordate, slightly decurrent at base. Flowers brownish yellow, in panicles. Calyx 5 lobed. Corolla pubescent. Drupes fleshy.

Fl. & Fr. : February April.

Common ; in deciduous forests in lower Ghats ; Karivara, Malampuzha, Mangalam dam area, Siruvani estate area.

4. LANTANA L.

1a. Plants prickly ; bracts 3 5 nerved	...	*L. camara* var. *aculeata* 1
1b. Plants not prickly ; bracts 5 - 7 - nerved	...	*L. indica* var. *albiflora* 2

1. **Lantana camara** L. var. **aculeata** (L.) Moldenke in Torreya 34 : 9. 1934. *L. aculeata* L. Sp. Pl. 627. 1953 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 562. 1885. Gamble, Fl. Pres. Madr. 1087. 1924, Repr. ed. 2 : 761. 1957. ; '*Unnichedi*' (Tam.).

Straggling. aggressive shrubs. Leaves ovate, acute, cuneate, rounded or cordate. Flowers orange, red or pink in spikes. Bracts lanceolate. Corolla pubescent. Drupes globose, bluish black.

Fl. & Fr. : All seasons.

Very common ; in lower Ghats ; Agali forest.

2. **Lantana indica** Roxb. var. **albiflora** Wight ex Clarke in Hook. f. Fl. Brit. Ind. 4 : 562. 1885. *L. wightiana* Wall. ex Gamble, Fl. Pres. Madr. 1087. 1924, Repr. ed. 2 : 760. 1957.

Woody shrubs. Leaves ovate orbicular, crenulate, villous. Flowers white, in spikes. Bracts ovate, villous. Corolla tubes short.

Fl. & Fr. : October.

Common ; in lower Ghats ; Agali forest.

5. LIPPIA L.

Lippia alba (Mill.) N.E. Br. ex Britton & Wilson in Sci. Surv. Porto Rico 6 : 141. 1925 ; Sant. & Wagh in Bull. Bot. Surv. Ind. 5 : 107. 1963. *Lantana alba* Mill. Gard. Dict. ed. 8. No. 4. 1768. *Lippia javanica* (Burm. f.) Spreng. Syst. Veg. 2 : 752. 1825 ; Meeuse in Blumea 5 : 68. 1942. *L. unica* Ramakr. in J. Bombay Nat. Hist. Soc. 54. 925. 1957. *L. geminata* H.B.K. Nov. Gen. Sp. Pl. 2 : 214. 1817 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 563. 1885 ; Gamble, Fl. Pres. Madr. 1088. 1924, Repr. ed. 2 : 762. 1957. *Verbena javanica* Burm. f. Fl. Ind. 12. t. 6. f. 2. 1768.

Aromatic, erect shrubs. Leaves ovate, obtuse at base, rugose. Flowers white to pale pink, in dense cylindric spikes. Bracts ovate. Calyx cupular ; lobes 2, lanceolate, concave. Corolla salver - shaped ; lower lobes deflexed. Drupes pyriform, one seeded.

Fl. & Fr. : December.

Rare ; in wet places ; Attappadi block Mukkali.

6. PHYLA Lour.

Phyla nodiflora (L.) Greene in Pittonia 4 : 46. 1899 ; Meeuse in Blumea 5 : 69. 1942. *Verbena nodiflora* L. Sp. Pl. 20. 1753. *Lippia nodiflora* (L.) Michaux, Fl. Bor. Amer. 2 : 15. 1803 ; Wight, Ic t. 1463. 1849 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 563. 1885 ; Gamble, Fl. Pres. Madr. 1088. 1924, Repr. ed. 2 : 762. 1957. '*Poduthalai*' (Tam.).

Slender, diffuse herbs, rooting at nodes. Leaves obovate, thick, coarsely serrate towards apex. Flowers white, tinged with purple in elongate cylindric stalked spikes. Calyx 2 lobed. Corolla salver form ; lobes 5. Stamens 4. Drupes enclosed by calyx.

Fl. & Fr. : All seasons.

Common in plains, river banks ; Walayar dam area.

Used in medicines.

7. PREMNA L. *nom. cons.*

1a. Erect trees or shrubs ; calyx lipped :			
2a. Cymes in panicles ; trees	..	*P. tomentosa*	3
2b. Cymes in corymbs ; shrubs	...	*P. glaberrima*	2
1b. Climbing shrubs ; calyx truncate	...	*P. coriacea*	1

1. **Premna coriacea** Clarke in Hook. f. Fl. Brit. Ind. 4 : 573. 1885 ; Gamble, Fl. Pres. Madr. 1095. 1924, Repr. ed. 2 : 766. 1957.

Branches with corky lenticels. Leaves entire, elliptic -ovate, abruptly acuminate, rounded or cordate at base, pubescent on nerves beneath. Flowers white with pinkish tinge, in corymbs, foetid. Calyx 5 toothed. Drupes ovoid.

Fl. & Fr. : April.

Fairly common ; in lower Ghats ; Ayyappankoil forest, Karivara river bank.

2. **Premna glaberrima** Wight, Ic. t. 1844. 1852 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 577. 1885 ; (*sphalm.* '*integerrima*') ; Gamble, Fl. Pres. Madr. 1095. 1924, Repr. ed. 2 : 767. 1957.

Shrubs, up to 3 m. Leaves oblanceolate, distinctly nerved, acuminate, rounded at base. Flowers dull white, in terminal corymbs. Calyx lobes sub entire. Corolla 2 lobbed. Drupes globose.

Fl. & Fr. : June.

Rare ; once collected in Mukkali forest at *ca* 525 m ; *Vajravelu* 27771.

3. **Premna tomentosa** Willd. Sp. Pl. 3 : 314. 1800 ; Wight, Ic. t. 1468. 1849 ; Bedd. Fl. Sylv. t. 251. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 576. 1885 ; Gamble, Fl. Pres. Madr. 1095, 1924, Repr. ed. 2 : 767. 1957. *Cornuria corymbosa* Lam. Encycl. 1 : 54. 1783, non Burm. f. 1768. '*Malaithekku*' (Tam.).

Trees, deciduous. Leaves broadly ovate cordate, stellately yellow tomentose on nerves, thickly chartaceous. Flowers white outside, yellow within, in pyramidal panicles. Calyx 5 toothed, stellate pubescent. Corolla throat hairy. Stamens 4. Drupes enclosed by calyx, 4 seeded.

Fl. & Fr. : May.

Common ; in lower Ghats ; Malampuzha hill slopes.

8. PRIVA Adans

Priva cordifolia (L.f.) Druce in Bot. Exch. Club Soc. Brit. Isles 4 : 641. 1917. *Buchnera cordifolia* L.f. Suppl. Pl. 287. 1781. *Priva leptostachya* A. Juss. in Ann. Mus. Natl. Hist. Nat. 7 : 70. 1806 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 565. 1883 ; Gamble Fl. Pres. Madr. 1091. 1924, Repr. ed. 2 : 764. 1957. *Streptium asperum* Roxb. Pl. Cor. t. 146. 1800.

Sticky pubescent herbs with 4 angled branches. Leaves broadly ovate elliptic, appressed - pubescent, serrate. Flowers ivory white, in elongate spikes. Bracts lanceolate. Calyx 5 ribbed, tubular, hirsute. Corolla salver form ; tube cylindric, twisted, curved ; lobes 5, orbicular. Stamens 4. Drupes 2, two-seeded, sticky pubescent.

Fl. & Fr. : December.

Common ; in waste places and roadsides ; Attappady - Mukkali.

9. STACHYTARPHETA Vahl *nom. cons.*

1a. Spikes glabrous ; bracts not recurved	...	*S. jamaicensis*	1
1b. Spikes very villous ; bracts recurved	...	*S. mutabilis*	2

1. **Stachytarpheta jamaicensis** (L.) Vahl, Enum. Pl. 1 : 206. 1804. *Verbena jamaicensis* L. Sp. Pl. 19. 1753. *Stachytarpheta indica* (L.) Vahl, var. *jamaicensis* (L.) Trimen, Handb. Fl. Ceylon 3 : 348. 1895. Gamble, Fl. Pres. Madr. 1098. 1924, Repr. ed. 2 : 763. 1957. *S. indica* auct. non (L.) Vahl 1804 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 564. 1885. '*Seemainayuruvi*' (Tam.).

Tall herbs, 25 60 cm. Leaves obovate elliptic, gradually narrowed and decurrent, serrate. Flowers violet, in long slender spikes Bracts ovate lanceolate, scarious. Calyx teeth 4. Corolla lobes 5. Stamens 2. Drupes oblong cylindric.

Fl. & Fr. : October.

Common ; in plains and in wastelands. Mandhampatty (Mukkali) forest, Walayar forest.

2. **Stachytarpheta mutabilis** (Jacq.) Vahl, Enum. Pl. 1 : 209. 1804 ; Gamble, Fl. Pres. Madr. 1090. 1924, Repr. ed. 2 : 763. 1957. *Verbena mutabilis* Jacq. Coll. 2 : 334. 1788.

Subshrubs, 1.0 2.5 m ; tender parts softly white - pubescent. Leaves ovate elliptic, appressed hirsute above, densely pubescent below, decurrent along the petiole, crenate. Flowers pink red, in long arched pubescent spikes. Bracts obovate lanceolate. Calyx scabrid, pubescent ; teeth 4. Corolla lobes 5. Stamens 2. Drupes linear oblong.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Olavakkot area.

10. TECTONA L.f. *nom. cons.*

Tectona grandis L.f. Suppl. 151. 1781 ; Bedd. Fl. Sylv. t. 250. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 570. 1885 ; Gamble, Fl. Pres. Madr. 1092. 1924, Repr. ed. 2 : 765. 1957. '*Thekku*', (Tam.).

Large, deciduous trees, 20 30 m, branches angled. Leaves elliptic ovate, coriaceous, stellate tomentose beneath. Flowers white, in paniculate cymes. Calyx lobes accrescent. Fruits subglobose, with very prominent calyx.

Fl. & Fr. : June October.

Largely cultivated in deciduous forests by the Forest Department for the valuable timber ; Silent Valley R.F.

11. VITEX L.

1a. Shrubs or small trees ; petioles not winged	...	*V. negundo* 2
1b. Trees ; petioles winged	...	*V. altissima* 1

1. **Vitex altissima** L.f. Suppl. 294. 1781 ; Wight, Ic. t. 1466. 1849 ; Bedd. Fl. Sylv. t. 252. 1872 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 584. 1885 ; Gamble, Fl. Pres. Madr. 1102. 1924, Repr. ed. 2 : 772. 1957. '*Mayilai*' '*Nochi*' (Tam.).

Trees, 15 20 m. Leaflets 3, rarely 5, sessile, oblanceolate, sparsely pubescent beneath, acuminate. Flowers white tinged with blue, in panicles. Calyx villous. Corolla lobes small, triangular. Drupes globular.

Fl. & Fr. : April May.

Fairly common ; in lower Ghats ; Malampuzha, Mukkali forest.

Wood is used for buildings, furniture etc.

2. **Vitex negundo** L. Sp. Pl. 638. 1753 ; Wight, Ic. t. 519. 1842 ; Clarke in Hook. f. Fl. Brit. Ind. 4 : 583. 1885 ; Gamble, Fl. Pres. Madr. 1102. 1924, Repr. ed. 2 : 771. 1957. '*Nochi*' (Tam.).

Large, silvery tomentose shrubs, 2 3 m. Leaflets 3 5, petiolate, lanceolate, entire, acuminate. Flowers blue to dull pink, in panicles. Calyx tomentose. Corolla tomentose outside. Drupes globular, black when dry.

Fl. & Fr. : October.

Commonly cultivated as a hedge plant in plains ; Thenkara village, Walayar dam area.

Citharexylum fruticosum L. (*C. subserratum* Sw.) a tree with white fragrant flowers in pendulous racemes is cultivated as an ornamental.

98. LAMIACEAE

(LABIATAE)

1a. Whorls of flowers not capitate :

2a. Calyx 6 - 10 - toothed :

3a. Calyx teeth spinescent ... LEONOTIS 9

3b. Calyx teeth not spinescent ... LEUCAS 10

2b. Calyx 5 - toothed :

4a. Filaments free :

5a. Stamens lying upon or enclosed in the lower lip :

6a. Lower lip of corolla longer than upper lip ... RABDOSIA 14

6b. Lower lip of corolla equalling or shorter than upper lip :

7a. Calyx 2 - lipped (upper lip larger) :

8a. Thyrses less than 1 cm across ... BASILICUM 4

8b. Thyrses more than 1 cm across :

9a. Corolla tubes exserted ; stigma capitate ... ORTHOSIPHON 12

9b. Corolla tubes not exserted ; stigma not capitate ... OCIMUM 11

7b. Calyx 5 toothed ... HYPTIS 8

5b. Stamens erect, ascending or spreading :

10a. Corolla distinctly 2 - lipped :

11a. Upper lip of corolla hooded, villous ... GOMPHOSTEMMA 7

11b. Upper lip of corolla not hooded ; not villous ... ANISOMELES 3

10b. Corolla not 2 lipped :

12a. Corolla lobes equal ... COLEBROOKEA 5

12b. Corolla lobes unequal ... POGOSTEMON 13

4b. Filaments united	...	COLEUS 6
1b. Whorls of flowers capitate :		
13a. Leaves cordate at base	...	ANISOCHILUS 2
13b. Leaves acute at base	...	ACROCEPHALUS 1

1. ACROCEPHALUS Benth.

Acrocephalus hispidus (L.) Nicol. & Sivadasan in Taxon 29 : 24. 1980. *Gomphrena hispida* L. Sp. Pl. ed. 2. 326. 1762. *Acrocephalus indicus* (Burm. f.) Kuntze, Rev. Gen. Pl. 511. 1891 ; Gamble, Fl. Pres. Madr. 1115. 1924, Repr. ed. 2 : 780. 1957. Mukerjee in Rec. Bot. Surv. Ind. 14 : 29. 1940 ; Keng in Gard. Bull. Straits Settlem. 24 : 26. 1969. *Prunella indica* Burm. f. Fl. Ind. 130. 1768.

Erect, pubescent herbs, 20 30 cm. Leaves ovate lanceolate, cuneate, membranous. Flowers white, in heads. Bracts obovate rhomboid. Calyx pubescent. Corolla sparsely pubescent. Nutlets oblong.

Fl. & Fr. : November.

Fairly common among grasses ; in lower Ghats ; Mukkali Thenkara area, Pothundy Kaikatty forest.

2. ANISOCHILUS Wall.

1a. Leaves cordate at base, more than 5 cm long	...	*A. carnosus* 1
1b. Leaves acute at base, less than 5 cm long	...	*A. scaber* 2

1. **Anisochilus carnosus** (L. f.) Wall. Pl. Asiat. Rar. 2 : 18. 1830 ; Wight, Ill. t. 176. 1850 ; Hook. f. Fl. Brit. Ind. 4 : 627. 1885 ; Gamble, Fl. Pres. Madr. 1126. 1924, Repr. ed. 2 : 788. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 58. 1940. *Lavandula carnosa* L. f. Suppl. 273. 1781. '*Sethupunthazai*' (Tam.).

Perennial, erect herbs with tetragonous stems. Leaves ovate, crenate, villous, obtuse, cordate. Flowers purple in strobiloid spikes. Calyx tubes pubescent ; lobes 4+1 ; upper lip depressed, closing the mouth in fruiting.

Fl. & Fr. : November.

Rare ; in rocky places ; once collected in Pothundy slopes at *ca* 600 m ; *Vajravelu* 44705.

2. **Anisochilus scaber** Benth. in DC. Prodr. 12 : 81. 1848 ; Hook. f. Fl. Brit. Ind. 4 : 627. 1885 ; Gamble, Fl. Pres. Madr. 1127. 1924, Repr. ed. 2 : 788. 1957.

Woody herbs, rooting at nodes with ascending branches. Leaves thick, ovate, crenulate, densely softly hoary tomentose. Flowers white with pinkish tinge in spikes. Calyx lobes 1+4. Corolla lobes 5, bilabiate, 4+1 ; upper lip entire. Stamens 4. Fruits dry with ovoid nutlets.

Fl. & Fr. : October.

Common ; on rocky slopes ; Sappal hill Dhoni R.F.

3. ANISOMELES R. Br.

1a. Branchlets greyish tomentose	.. *A. indica*	1
1b. Branchlets white - tomentose	... *A. malabaricus*	2

1. **Anisomeles indicus** (L.) Kuntze, Rev. Gen. Pl. 2 : 512. 1891 ; Gamble, Fl. Pres. Madr. 1140. 1924, Repr. ed. 2 : 797. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 152. 1940 ; Keng in Gard. Bull. Straits Settlem. 24 : 34. 1969. *Nepeta indica* L. Sp. Pl. 571. 1753. *Anisomeles ovata* Aiton, Hort. Kew. ed. 2. 2 : 364. 1811 ; Wight, Ic. t. 865. 1845 ; Hook. f. Fl. Brit. Ind. 4 : 672. 1885. *Epimeredi indicus* (L.) Rothm. Fedde Repert. 53 : 12. 1944. '*Peymiratti*' (Tam.), '*Karithumba*' (Mal.).

Erect, aromatic herbs with tetragonous stems. Leaves ovate lanceolate, deeply crenate serrate, acute at apex, truncate - cordate at base. Flowers white bluish or pink, in sessile cymes. Calyx lobes 5 caudate. Filaments bearded.

Fl. & Fr. : December - February.

Common ; on road sides and wastelands ; Panthanthode, Thiruvizhankunnu, Vadakkancherry.

2. **Anisomeles malabaricus** (L.) R. Br. ex. Sims in Bot. Mag. 46 : t. 2071. 1819 ; Wight, Ic. t. 846. 1844 45 ; Hook. f. Fl. Brit. Ind. 4 : 673. 1885 ; Gamble, Fl. Pres. Madr. 1140. 1924, Repr. ed. 2 : 797. 1957. *Nepeta malabarica* L. Mant. 566. 1771. *Epimeredi malabarica* (L.) Rothm. in Fedde Repert 53 : 12. 1944. '*Aruvachadachi*' (Tam.).

Silvery tomentose undershrubs ; stems obtusely tetragonous. Leaves lanceolate, acute to rounded at base. Flowers purple, in spikes. Foliar bracts large. Floral bracts in pairs linear - lanceolate. Calyx accrescent. Corolla lobes 5, bilabiate, 4+1. Nutlets erect.

Fl. & Fr. : May.

Common in plains ; Malampuzha Canal bunds.

4. BASILICUM Moench

Basilicum polystachyon (L.) Moench, Suppl. Meth. 143. 1802 ; **Keng** in Steenis, Fl. Males. ser. 1. 8 : 366. 1978. *Ocimum polystachyon* L. Mant. Pl. 567. 1771. *Moschosma polystacyum* (L.) Benth. in Wall. Pl. Asiat. Rar. 2 : 13. 1830 31 ; Hook. f. Fl. Brit. Ind. 4 : 612. 1885 ; Gamble, Fl. Pres. Madr. 1117. 1921. Repr. ed. 2 : 782. 1957.

Slender, annual erect, herbs ; stems sharply quandrangular. Leaves ovate - deltoid, acuminate, truncate at base, crenate. Flowers pale pink, small, in very slender racemes. Floral bracts ovate. Calyx tubular ; lobes 5. Stamens 4, didynamous. Nutlets ellipsoid.

Fl. & Fr. : October.

Common in plains ; Thenkara area Mannarghat.

5. COLEBROOKEA Smith

Colebrookea oppositifolia Smith Exot. Bot. 2 : 111. t. 115. 1805 ('*Colebrookia*') ; Hook. f. Fl. Brit. Ind. 4 : 642. 1885 ; Gamble, Fl. Pres. Madr. 1138. 1924, Repr. ed. 2 : 796. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 84. 1940. *C. ternifolia* Roxb. Pl. Cor. t. 245. 1815.

Erect, much branched, tomentose shrubs, 2 - 3 m. Leaves elliptic, densely tomentose beneath, acuminate. Flowers white, in panicles. Calyx tomentose. Corolla lobes flat. Nutlets hairy at top.

Fl. & Fr. : December - April.

Common ; in waste places and forest clearings ; Panthanthode, Silent Valley R.F.

6. COLEUS Lour.

1a. Leaves and calyx throat glabrous	...	*C. malabaricus*	2
1b. Leaves and calyx throat villous	...	*C. forskohlii*	1

1. **Coleus forskohlii** (Willd.) Briq. in Pflanzenfam. 4. (3a) : 359. 1897 ; **Mukerjee** in Rec. Bot. Surv. Ind. 14 : 53. 1940. *Plectranthus forskohlii* Willd. Sp. Pl. 3 : 169. 1800. *Coleus barbatus* Benth. in Wall. Pl. Asiat.

Rar. 2 : 15. 1830-31 ; Wight, Ic. t. 1432. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 625. 1885 ; Gamble, Fl. Pres. Madr. 1124. 1924, Repr. ed. 2 : 786. 1957.

Stout, aromatic herbs. Leaves ovate, villous, crenate, obtuse. Flowers blue, in interrupted racemes. Upper calyx lip rounded ovate, acute. Stamens exserted. Nutlets brown.

Fl. & Fr. : October December.

Fairly common ; in rocky places ; Attappadi block Mukkali, Karasuryamalai area.

2. **Coleus malabaricus** Benth. in Wall. Pl. Asiat. Rar. 2 : 16. 1830-31 ; Hook. f. Fl. Brit. Ind. 4 : 626. 1885 ; Gamble, Fl. Pres. Madr. 1124. 1924. Repr. ed. 2 : 786. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 53. 1940.

Large, erect herbs ; stems purple. Leaves membranous, ovate, acute, cordate at base. Flowers white, tinged with purple, in short cymose panicles. Upper lip of calyx mucronate, reflexed when fruiting.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R.F. ; *Vajravelu* 26077.

7. GOMPHOSTEMMA Wall. ex Benth.

1a. Whorls of cymes axillary and terminal	...	*G. heyneanum*	2
1b. Whorls of cymes axillary only	...	*G. eriocarpon*	1

1. **Gomphostemma eriocarpon** Benth. in Wall. Pl. Asiat. Rar. 2 : 12. 1830-31 ; Hook. f. Fl. Brit. Ind. 4 : 698. 1885 ; Gamble, Fl. Pres. Madr. 1157. 1924, Repr. ed. 2 : 809. 1957. *G. oblongum* Wight, Ic. t. 1457. 1849.

Slender, erect, tomentose herbs. Leaves elliptic - oblong or lanceolate, acute, sharply dentate, softly tomentose beneath. Flowers yellow, in small sessile whorls. Floral leaves ovate. Bracts lanceolate. Calyx teeth filiform. Corolla puberulous. Nutlets globose, tomentose.

Fl. & Fr. : October.

Common ; in upper Ghats in evergreen forest, Valiyaparathode forest.

2. **Gomphostemma heyneanum** Wall. ex Benth. in Wall. Pl. Asiat. Rar. 2 : 12. 1830-31 ; Wight, Ic. t. 1456. 1849 ; Gamble, Fl. Pres. Madr.

1157. 1921, Repr. ed. 2 : 808. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 206. 1940.

Stellately - tomentose, shrubby herbs. Leaves elliptic ovate, serrate, decurrent on petiole, woolly beneath. Flowers yellow, in whorls of cymes. Calyx lobes lanceolate. Corolla hairy. Nutlets smooth.

Fl. & Fr. : October November.

Common ; in lower Ghats ; Attappadi R.F. —Mukkali, Thadikundu area.

8. HYPTIS Jacq. *nom. cons.*

Hyptis suaveolens (L.) Poir. in Ann. Mus. Paris 7 : 472. t. 29. f. 2. 1806 ; Hook. f. Fl. Brit. Ind. 4 : 630. 1885 ; Gamble, Fl. Pres. Madr. 1129. 1924, Repr. ed. 2 : 789. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 63. 1940. *Ballota suaveolens* L. Syst. Nat. ed. 10. 1100. 1759.

Aromatic, glandular hairy herbs. Leaves ovate, obtuse serrulate, softly densely hirsute beneath, cordate at base. Flowers blue, in verticils of cymes. Calyx 10 ribbed ; lobes 5, hairy. Corolla lobes 2+3. Stamens 4, didynamous. Filaments pilose. Nutlets oblong.

Fl. & Fr. : October November.

Common ; in waste places and on road sides ; in lower Ghats ; Chindaki forest, Thenkara area, Walayar.

Native of Tropical America ; now naturalised.

9. LEONOTIS (Pers.) R. Br.

Leonotis nepetifolia (L.) R. Br. Prodr. 504. 1810 ; Wight, Ic. t. 867. 1844-45 ; Hook. f. Fl. Brit. Ind. 4 : 691. 1885 ; Gamble, Fl. Pres. Madr. 1155. 1924, Repr. ed. 2 : 807. 1957 ('*nepetaefolia*') ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 185. 1940. *Phlomis nepetifolia* L. Sp. Pl. 586. 1753.

Erect, glabrous herbs. Leaves ovate lanceolate, membranous, crenate serrate, acute. Flowers orange brown, in dense spikes. Calyx hairy ; tubes incurved. Corolla bilipped ; upper lip hooded ; lower lip 3 lobed. Nutlets obliquely truncate.

Fl. & Fr. : November.

Rare ; once collected in Mathur at *ca* 325 m and also collected from Walayar forest once.

10. LEUCAS R. BR.

1a. Flowers not aggregated in verticils	...	*L. biflora* 2
1b. Flowers aggregated in false verticils :		
2a. Mouth of calyx oblique :		
3a. Verticils single ; bracts as long as calyx	...	*L. aspera* 1
3b. Verticils 2 or 3 ; bracts shorter than calyx	...	*L. indica* 5
2b. Mouth of calyx not oblique :		
4a. Verticils terminal, compact		
5a. Leaves ovate or elliptic ovate :		
6a. Leaves less than 2 cm broad, rounded at base	...	*L. prostrata* 7
6b. Leaves more than 2 cm broad, narrowed at base	...	*L. ciliata* 3
5b. Leaves oblong	...	*L. hirta* 4
4b. Verticils axillary, lax	...	*L. mollissima* var. *scaberula* 6

1. **Leucas aspera** (Willd.) Spreng. Syst. Veg. 2 : 743. 1825 ; Hook. f. Fl. Brit. Ind. 4 : 690. 1885 ; Gamble, Fl. Pres. Madr. 1150. 1924. Repr. ed. 2 : 803. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 166. 1940. *Phlomis aspera* Willd. Enum. Pl. Hort. Berol. 621. 1809.

Erect, diffusely branched, scabrid herbs. Leaves linear - oblong, pubescent, obtuse. Flowers white. Bracts lanceolate. Calyx tube hairy in the upper half. Corolla bilipped ; upper lip densely woolly. Stamens 4.

Fl. & Fr. : December.

Common ; in lower Ghats ; Attappadi block Mukkali, Walayar forest.

All parts used in medicine.

2. **Leucas biflora** (Vahl) R. Br. Prodr. 504. 1810 ; Wight, Ic. t. 866. 1844-45 ; Hook. f. Fl. Brit. Ind. 4 : 683. 1885 ; Gamble, Fl. Pres. Madr. 1150. 1924. Repr. ed. 2 : 804. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14: 180. 1940. *Phlomis biflora* Vahl, Symb. Bot. 3 : 77. 1794.

Slender, procumbent herbs with deflexed hairs. Leaves ovate elliptic, obtuse or acute, serrate. Flowers 1 4 per node, white. Bracts

linear, ciliate. Calyx pubescent, ciliate. Corolla tube villous. Nutlets oblong, trigonous.

Fl. & Fr. : July December.

Common ; in Ghats ; Mukkali forest, Panthanthode, Dam site Silent Valley R.F., Singapara forest - Siruvani.

3. **Leucas ciliata** Benth. in Wall. Pl. Asiat. Rar. 1 : 61. 1830 ; Hook. f. Fl. Brit. Ind. 4 : 687. 1885 ; Gamble, Fl. Pres. Madr. 1153. 1924, Repr. ed. 2 : 806. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 174. 1940.

Aromatic, straggling herbs. Leaves membranous, ovate, villous, acute. Flowers white, in terminal, large whorls. Calyx throat glabrous. Upper lip of corolla densely bearded ; lower lip longer.

Fl. & Fr. : March.

Rare ; once collected in Kunthipuzha dam area at *ca* 1000 m ; *Vajravelu* 46259.

4. **Leucas hirta** (Roth) Spreng. Syst. Veg. 2 : 743. 1825 ; Hook. f. Fl. Brit. Ind. 4 : 687. 1885 ; Gamble, Fl. Pres. Madr. 1153. 1924, Repr. ed. 2 : 806. 1957. *Phlomis hirta* Heyne ex Roth, Nov. Pl. Sp. 264. 1821. '*Malai thumbai*' (Tam.).

Subshrubby branching herbs with stout root stock. Leaves oblong-lanceolate, tawny pubescent. Flowers white, many, in verticils. Calyx throat villous within ; villi shorter than mouth ; teeth 10. Corolla upper lip shorter than lower, villous without.

Fl. & Fr. : September.

Common ; in lower Ghats. Way to Silent Valley R.F.

5. **Leucas indica** (L.) R. Br. ex Vatke in Oester. Bot. Z. 25 : 95. 1875. *Leonurus indicus* L. Syst. Nat. ed. 10. 1101. 1759. *Leucas lavandulifolia* Smith in Rees, Cyclop. 20 : no. 2. 1812. *L. linifolia* (Roth) Spreng. Syst. Veg. 2 : 743. 1825 ; Hook. f. Fl. Brit. Ind. 4 : 690. 1885 ; Gamble, Fl. Pres. Madr. 2 : 1149. 1924, Repr. ed. 2 : 803. 1957. *Phlomis linifolia* Roth, Nov. Sp. Pl. 260. 1821. '*Mosuppillu*' (Tam.).

Puberulous herbs. Leaves linear lanceolate, subserrate, membranous. Flowers white. Calyx tube curved ; mouth oblique, 8 toothed. Corolla annulate within ; upper lip shorter than lower.

Fl. & Fr. : May.

Common ; in plains and lower Ghats, Aruvampara slopes, Dhoni R. F.

6. **Leucas mollissima** Wall. ex Benth. var. **scaberula** Hook. f. Fl. Brit. Ind. 4 : 682. 1885 ; Gamble, Fl. Pres. Madr. 1151. 1924, Repr. ed. 2 : 805. 1957. '*Kattuthumbai*' (Tam.).

Slender herbs among bushes. Leaves membranous, ovate lanceolate, serrate, tomentose beneath, acute, cuneate. Flowers white. Calyx teeth 12 15 ; throat glabrous. Corolla glabrous within ; lower lip of corolla obovate.

Fl. & Fr. : October November.

Fairly common ; among grasses ; Chindaki forest, Pothundy Kaikatty forest.

7. **Leucas prostrata** (Hook. f.) Gamble, Fl. Pres. Madr. 1154. 1924, Repr. ed. 2 : 807. 1957. *L. hirta* Spreng. var. *prostrata* Hook. f. Fl. Brit. Ind. 4 : 687. 1885.

Hispid herbs. Leaves ovate, crenate, hispid pubescent, obtuse. Flowers white, in terminal heads. Bracts ciliate. Calyx densely hairy, mouth straight, 10 - toothed. Corolla annulate below the middle within.

Fl. & Fr. : October.

Endemic ; rare ; once collected in Karasuryamalai forests at *ca* 1100 m ; *Vajravelu* 48770.

11. OCIMUM L.

1a. Lower calyx teeth longer than upper lip :

2a. Calyx tube hairy within ... *O. americanum* 2

2b. Calyx tube glabrous within ... *O. adscendens* 1

1b. Lower calyx teeth shorter than upper lip ... *O. gratissimum* 3

1. **Ocimum adscendens** Willd. Sp. Pl. 3 : 166. 1800 ; Hook. f. Fl. Brit. Ind. 4 : 609. 1885 ; Gamble, Fl. Pres. Madr. 1112. 1924, Repr. ed. 2 : 778. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 21. 1940.

Erect herbs with ascending branches. Leaves ovate, membranous, obtuse, cuneate at base. Flowers pale pink, in lax whorls. Calyx glabrous, papery ; upper lip obovate. Nutlets mucilaginous when wet.

Fl. & Fr. : May June.

Common ; in lower Ghats ; Mukkali slopes, Walayar dam area.

2. **Ocimum americanum** L. Cent. Pl. 1 : 15. 1755 ; Keng in Gard. Bull. Straits Settlem. 24 : 126. 1969. *O. canum* Sims in Curtis, Bot. Mag. 51 : t. 2452. 1823 ; Hook. f. Fl. Brit. Ind. 4 : 607. 1885 ; Gamble, Fl. Pres. Madr. 1111. 1924, Repr. ed. 2 : 777. 1957. '*Noalthulasi*' (Tam.).

Erect, much branched herbs. Leaves elliptic lanceolate, pubescent, sparingly serrate, acute at both ends. Flowers white pink, in long racemes. Calyx lobes 5, villous within. Corolla bilipped. Stamens 4. Nutlets ellipsoid, mucilaginous when wet.

Fl. & Fr. : May June.

Common ; in lower Ghats and in plains ; Walayar dam area.

3. **Ocimum gratissimum** L. Sp. Pl. 1197. 1753 ; Hook. f. Fl. Brit. Ind. 4 : 608. 1885 ; Gamble, Fl. Pres. Madr. 1111. 1924, Repr. ed. 2 : 777. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 20. 1940. '*Ehumichanthulasi*' (Tam.).

Aromatic, large herbs. Leaves ovate, serrate, cuneate and decurrent at base. Flowers pale yellow - white, in long racemes. Calyx and corolla pubescent. Stamens exserted. Calyx enlarged in fruit.

Fl. & Fr. : October November.

Common ; in lower Ghats : Anamooly, Panangateri.

Ocimum tenuiflorum L. (*O. sanctum L.*), '*The Sacred Thulasi*', a strongly aromatic herb is cultivated in Hindu houses and temples.

12. ORTHOSIPHON Benth.

Orthosiphon thymiflorus (Roth) Sleesen in Reinwardtia 5 : 42. 1959. *Ocimum thymiflorum* Roth, Nov. Pl. Sp. 269. 1821. *Orthosiphon glabratus* Benth. in Wall. Pl. Asiat. Rar. 2 : 14. 1830-31 ; Gamble, Fl. Pres. Madr. 1114. 1924, Repr. ed 2 : 779. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 23. 1940. *O. tomentosus* Benth. var. *glabratus* (Benth.) Hook. f. Fl. Brit. Ind. 4 : 614. 1885. *O. viscosus* Benth. *l.c.* ; Gamble *l.c.*

Erect herbs. Leaves ovate elliptic, serrate, acute, cuneate at base. Flowers white, in whorls of 6, on racemes. Floral bracts ovate, acuminate. Calyx purple tinged bilipped. ; lobes 5. Corolla pubescent. Nutlets ellipsoid, enclosed in enlarged persistent calyx.

Fl. & Fr. : December.

Common ; in open forests ; Attappadi block Mukkali, Bhavani river bank Mukkali, Pothundi Kaikatty forest.

13. POGOSTEMON Desf.

1a. Inflorescence a panicle :

2a. Whorls close on spikes :

3a. Floral leaves reflexed ; leaves membranous ... *P. purpurascens* 6

3b. Floral leaves not reflexed ; leaves chartaceous :

4a. Floral leaves glabrous ... *P. pubescens* 5

4b. Floral leaves tawny pubescent ... *P. benghalensis* 1

2b. Whorls not close on spikes :

5a. Leaves in unequal pairs ; clusters secund ... *P. paniculatus* 4

5b Leaves not in equal pairs ; clusters not secund ... *P. heyneanus* 2

1b. Inflorescence a simple raceme ... *P. mollis* 3

1. **Pogostemon benghalensis** (Burm. f.) Kuntze, Rev. Gen. Pl. 2 : 529. 1891. *Origanum benghalense* Burm. f. Fl. Ind. 128. t. 38. f. 3. 1768. *Pogostemon plectranthoides* Desf. in Ann. Mus. Paris 2 : 156. t. 6. 1808 ; Hook. f. Fl. Brit. Ind. 4 : 632. 1885 ; Gamble, Fl. Pres. Madr. 1133. 1924, Repr. ed. 2 : 793. 1957 ; Mukerjee in Rec. Bot. Surv. Ind. 14 : 69. 1940.

Erect, aromatic shrubs, 2 3 m. Leaves ovate lanceolate, doubly serrate, hairy pubescent beneath, acute, rounded at base. Flowers pink, in white tomentose dense panicles. Bracts lanceolate, leafy, tawny - pubescent. Calyx teeth 5, shorter than tube. Stamens 4, unequal.

Fl. & Fr. : February April.

Occasional ; in upper Ghats ; Karasuryamalai area, Muthikulam forest, Silent Valley R.F.

2. **Pogostemon heyneanus** Benth. in Wall. Pl. Asiat. Rar. 1 : 31. 1830 ; Wight, Ic. t. 1440. 1849. Gamble, Fl. Pres. Madr. 1133. 1924, Repr. ed. 2 : 792. 1957. *P. patchouli* Hook. f. Fl. Brit. Ind. 4 : 633. 1885 non Pellet. 1844.

Aromatic, tomentose herbs. Leaves membranous, ovate, crenate serrate, acute. Flowers pale pink white, in globose clusters of spicate racemes. Bracts ovate, ciliate. Calyx lobes 5, pubescent ; teeth ciliate. Corolla lobes 4.

Fl. & Fr. : October November.

Common ; in Ghats ; Mukkali forest, Valiyaparathode forest.

3. **Pogostemon mollis** Benth. Labiat. Gen. Sp. 155. 1833 ; Hook. f. Fl. Brit. Ind. 4 : 635. 1885 ; Gamble, Fl. Pres. Madr. 1134. 1924, Repr. ed. 2 : 793. 1957.

Woody, tomentose, aromatic, densely branched undershrubs. Leaves ovate orbicular, crenate, obtuse. Flowers white, in hispid compact racemes. Calyx longer than bracts, villous, lobes 5, subequal. Corolla 4 lobed.

Fl. & Fr. : January.

Occasional ; once collected in Silent Valley eastern slopes.

4. **Pogostemon paniculatus** (Willd.) Benth. in Wall. Pl. Asiat. Rar. 1 : 30. 1830 ; Hook. f. Fl. Brit. Ind. 4 : 631. 1885 ; Gamble, Fl. Pres. Madr. 1132. 1924, Repr. ed. 2 : 792. 1957. *Elsholtzia paniculata* Willd. Sp. Pl. 3 : 59. 1800.

Robust herbs. Leaves unequal, ovate, appressed pubescent, acuminate, cuneate at base. Flowers pinkish, in secund panicles. Bracts oblique, leafy. Calyx longer than bracts ; lobes 5. Corolla lobes 4, ciliate. Filaments bearded.

Fl. & Fr. : December February.

Common ; in plains ; Thiruvizhankunnu, Thuthampara area.

5. **Pogostemon pubescens** Benth. in DC. Prodr. 12 : 152. 1848 ; Gamble, Fl. Pres. Madr. 1133. 1924, Repr. ed. 2 : 792. 1957. *P. parviflorus* Benth. in Wall. Pl. Asiat. Rar. 1 : 31. 1830 *p.p.* ; Hook. f. Fl. Brit. Ind. 4 : 632. 1885.

Stout herbs. Leaves ovate lanceolate , serrate, tomentose beneath, acuminate, long - petioled. Flowers pink, in greyish - tomentose panicles. Whorls close, sessile. Calyx shorter than bracts. Corolla upper lip 3 lobed ; lower lip entire.

Fl. & Fr. : January March.

Common ; in Ghats ; Karasuryamalai area, Valiyaparathode forest.

6. **Pogostemon purpurascens** Dalz. in Hook. Kew J. Bot. 2 : 337. 1850 ; Hook. f. Fl. Brit. Ind. 4 : 632. 1885 ; Gamble, Fl. Pres. Madr. 1133. 1924, Repr. ed. 2 : 792. 1957.

Erect, hairy herbs. Leaves membranous, in unequal pairs, softly hairy, serrate crenate, ovate lanceolate. Flowers white with purple

upper lip, in close sessile whorls of panicles. Bracts ovate lanceolate, ciliate. Calyx teeth equal to tube. Stamens bearded.

Fl. & Fr. : January.

Rare ; once collected in Valiyaparathode forest.

14. RABDOSIA (Bl.) Hassk.

Rabdosia wightii (Benth.) Hara in J. Jap. Bot. 47 : 203. 1972. *Plectranthus wightii* Benth. Labiat. Gen. Sp. 41. 1832 ; Wight, Ic. t. 1429. 1849 ; Hook. f. Fl. Brit. Ind. 4 : 619. 1885 : Gamble, Fl. Pres. Madr. 1120. 1924, Repr. ed. 2 : 784. 1957.

Tall herbs. Leaves broadly ovate, crenate, acute, cordate at base. Flowers pale purple speckled with red points, in large panicles. Calyx curved when fruiting. Lower lip of corolla concave ; tube campanulate.

Fl. & Fr. : November.

Rare ; once collected in Kaikatty forests at *ca* 1100 m ; *Vajravelu* 44756.

(C) MONOCHLAMYDEAE

99. NYCTAGINACEAE

BOERHAVIA L.

1a. Erect herbs ; fruits glabrous	...	*B. erecta*	2
1b. Diffuse herbs ; fruits glandular hairy	...	*B. diffusa*	1

1. **Boerhavia diffusa** L. Sp. Pl. 3. 1753 ; Gamble, Fl. Pres. Madr. 1162. 1925, Repr. ed. 2 : 814. 1957 ; Stemmerik in Steenis, Fl. Males. ser. 1. 6 ; 454. 1964. *B. procumbens* Banks ex Roxb. Fl. Ind. 1 : 148. 1820 *nom. superfl.* ; Wight Ic. t. 874. 1844-45. '*Mookkarattai*' (Tam.).

Diffuse, ascending herbs. Leaves thick, in unequal pairs, undulate, ovate oblong, rounded subcordate at base, white beneath. Flowers bright pink, in panicles of subcapitate umbels. Perianth urceolate, 5 ribbed. Stamens 1 3. Fruits clavate, glandular viscid along the 5 ribs.

Fl. & Fr. : October.

Common weed ; in open dry places ; Dhoni R.F., Mukkali forest.

2. **Boerhavia erecta** L. Sp. Pl. 3. 1753 ; Stemmerik in Steenis **Fl.** Malcs. ser. 1. 6 : 454. 1964. *B. punarnava* Saha & Krishnamurthy in J. Sci. Indust. Res. C. Biol. Sci. 21 : 254. 1961 ; Nair in Bull. Bot. Surv. Ind. 9 : 283. 1967.

Erect herbs, 15 50 cm. Leaves elliptic ovate, rounded acute at base. Flowers pinkish, in slender panicles. Stamens 3. Fruits obconic, top truncate.

Fl. & Fr. : All seasons.

Common weed in plains ; Walayar forest.

Bougainvillea spp. climbing shrubs are cultivated for the showy 'flowers' (coloured bracts adnate to pedicels of flowers). **Mirabilis jalapa** L. a Mexican plant usually cultivated for the brilliant coloured flowers, is also found as an escape.

100. AMARANTHACEAE

1a. Leaves alternate :

2a. Seeds many ... CELOSIA 6

2b. Seed single :

3a. Flowers bisexual :

4a. Flowers spicate or capitate :

5a. Fertile flowers subtended by sterile ones ... DIGERA 7

5b. Fertile flowers not subtended by sterile one ... ALLMANIA 3

4b. Flowers panicled ... INDOBANALIA 9

3b. Flowers unisexual ... AMARANTHUS 5

1b. Leaves opposite :

6a. Perfect flowers surrounded by imperfect ones ... PUPALIA 10

6b. Perfect flowers not surrounded by imperfect ones :

7a. Stamens with interposed staminodes :

8a. Spikes less than 1 cm across ... ACHYRANTHES 1

8b. Spikes more than 1 cm across ... ALTERNANTHERA 2

7b. Stamens without interposed staminodes :

9a. Prostrate herbs ... ALTERNANTHERA 4

9b. Ascending or erect herbs ... GOMPHRENA 8

ACHYRANTHES L.

1a. Wings of bracteoles free above, adnate below ... *A. bidentata* 2

1b. Wings of bracteoles entirely adnate ... *A. aspera* 1

1. **Achyranthes aspera** L. Sp. Pl. 204. 1753 ; Wight, Ic. t. 1772. 1852 ; Hook. f. Fl. Brit. Ind. 4 : 730. 1885 ; Gamble, Fl. Pres. Madr. 1176. 1925, Repr. ed. 2 : 823. 1957. '*Naayuruvi*' (Tam.), '*Kadaladi*' (Mal.).

Erect herbs, 70 150 cm. Leaves elliptic or obovate orbicular, velvety tomentose, thick. Flowers pale greenish, in slender long spikes. Bracts broadly ovate. Bracteoles ovate, concave, midribs spiny. Perianth lobes 5, lanceolate. Stamens 5. Staminodes fimbriate, prominently appendaged within. Fruits easily adhering to animals or clothings.

Fl. & Fr. : All seasons.

Common in plains ; weeds of wastelands. Walayar forest.

2. **Achyranthes bidentata** Bl. Bijdr. 545. 1826 ; Wight, Ic. t. 1779. 1852 ; Hook. f. Fl. Brit. Ind. 4 : 730. 1885 ; Gamble, Fl. Pres. Madr. 1176. 1925, Repr. ed. 2 : 824. 1957. '*Sigappu Naayuruvi*' (Tam.).

Woody, erect herbs, 75 150 cm. Leaves oblanceolate to elliptic ovate, acute. Flowers dull reddish, in slender spikes. Bracts lanceolate, awned. Bracteoles obovate. Perianth lobes 5, lanceolate. Stamens 5.

Fl. & Fr. : October.

Rare, in upper Ghats ; Silent Valley R.F.

2. AERVA Forsk.

1a. Leaves linear ; perianth lobes 4 ... *A. monsoniae* 2

1b. Leaves obovate ; perianth lobes 5 ... *A. lanata* 1

1. **Aerva lanata** (L.) Juss. in Arn. Mus. Nat. Hist. Paris 11 : 131. 1808 ; Wight, Ic. t. 723. 1840 ; Hook. f. Fl. Brit. Ind. 4 : 728. 1885 ; Gamble, Fl. Pres. Madr. 1178. 1925, Repr. ed. 2 : 825. 1957. *Achyranthes lanata* L. Sp. Pl. 205. 1753. '*Poolaippoo*' (Tam.).

Tomentose herbs branching from rootstock. Leaves obovate orbicular, entire. Flowers white, 5 merous, in axillary spikes. Bracts and bracteoles ovate, ciliate. Perianth lobes thin, 5, oblong. Filaments connate below. Utricles compressed.

Fl. & Fr. : July.

Common weed in plains ; Walayar dam area.

2. **Aerva monsoniae** (L. f.) Mart. Nov. Actorum Acad. Caes. Leop. Carol. Nat. Cur. 13 : 291. 1826 ; Wight, Ic. t. 725. 1843 ; Hook. f. Fl. Brit. Ind. 4 : 728. 1885 ; Gamble, Fl. Pres. Madr. 1178. 1925, Repr. ed. 2 : 825. 1957. *Illecebrum monsoniae* L.f. Suppl. 161. 1781.

Hardy, tomentose herbs with ascending and prostrate branches. Leaves linear, opposite and fascicled at nodes Flowers pink, 4'- merous, in cylindrical spikes. Stamens 4. Utricles circumscissile.

Fl. & Fr. : October.

Common ; in plains ; Walayar forest.

3. ALLMANIA R. Br. ex Wight

Allmania nodiflora (L.) R. Br. ex Wight var. **dichotoma** (Heyne ex Roth) Hook. f. Fl. Brit. Ind. 4 : 717. 1885 ; Gamble, Fl. Pres Madr. 1168. 1925, Repr. ed. 2 : 818. 1957. *Celosia dichotoma* Heyne ex Roth, Nov. Pl. Sp. 172. 1821. *Allmania dichotoma* (Heyne ex Roth) Wight, Ic. t. 1771. 1852.

Erect herbs. Leaves elliptic or ovate, apiculate, glabrous. Flowers pale reddish, in sessile, globose heads. Perianth lobes red, oblong lanceolate. Stamens 5.

Fl. & Fr. : July.

Occasional ; in plains ; Mukkali forest, Walayar forest.

4. ALTERNANTHERA Forsk.

Alternanthera sessilis (L.) R. Br. ex DC. in Cat. Hort. Monspel. 4 : 77. 1813 ; Wight, Ic. t. 727. 1843 ; Hook. f. Fl. Brit. Ind. 4 : 731. 1885 ; Sant. in Bull. Bot. Surv. Ind. 3 : 11. 1962. *Gomphrena sessilis* L. Sp. Pl. 225. 1753. *Alternanthera triandra* Lam. Encycl. 1 : 95. 1783 ; Gamble, Fl. Pres. Madr. 1179. 1925, Repr. ed. 2 : 825. 1957. '*Ponnangkannikeeral*' (Tam.).

Branched prostrate herbs. Leaves lanceolate or linear oblong, cuneate at base. Flowers white, in globose or elongate heads. Perianth lobes 5 glabrous, 1 nerved Stamens 3 5, alternate with staminodes.

Fl. & Fr. : All seasons.

Common ; in wet places ; Anamadai, Dhoni R.F.

5. AMARANTHUS L.

1a. Leaf axils with spines ; perianth lobes 5	...	*A. spinosus*	1
1b. Leaf axils without spines ; perianth lobes 3	...	*A. viridis*	2

1. **Amaranthus spinosus** L. Sp. Pl. 991. 1753 ; Wight, Ic. t. 513. 1841 ; Hook. f. Fl. Brit. Ind. 4 : 718. 1885 ; Gamble, Fl. Pres. Madr. 1170. 1925. Repr. ed. 2 : 819. 1957. '*Mullu keerai*' (Tam.).

Erect, branched herbs. Leaves entire, ovate or oblong, acute, emarginate at apex. Bracts bristle-tipped. Perianth lobes 5, unequal, oblong. Stamens 5. Stigmas 3. Seeds dark brown.

Fl. & Fr. : All seasons.

Common ; in waste places ; Malleswara temple area-Mukkali, Walayar dam area.

Leaves used as a vegetable.

2. **Amaranthus viridis** L. Sp. Pl. ed. 2. 1405. 1763 ; Hook. f. Fl. Brit. Ind. 4 : 720. 1885 ; Gamble, Fl. Pres. Madr. 1171. 1925, Repr. ed. 2 : 820. 1957. *A. fasciatus* Roxb. Fl. Ind. 3 : 609. 1832 ; Wight, Ic. t. 717. 1840. *A. gracilis* Desf. Tabl. Hort. Par. 43. 1804. '*Kuppai keerai*' (Tam.).

Slender, unarmed herbs ; stems green or pink. Leaves entire, ovate to rhomboid, emarginate. Flowers pale greenish, in panicles. Bracts and bracteoles ovate lanceolate. Perianth lobes 3, oblong-lanceolate. Stamens 3, free. Utricles rugose, brownish.

Fl. & Fr. : July.

Common weed ; in plains ; Walayar dam area.

6. CELOSIA L.

Celosia argentea L. Sp. Pl. 205. 1753 ; Wight, Ic. t. 1767. 1852 ; Hook. f. Fl. Brit. Ind. 4 : 714. 1885 ; Gamble, Fl. Pres. Madr. 1116. 1925, Repr. ed. 2 : 816. 1957. '*Pannaikeerai*' (Tam.), '*Kozhipullu*' (Mal.).

Erect, glabrous herbs ; stems angular. Leaves linear or lanceolate, 1-nerved. Flowers white-pink in dense cylindric spikes. Bracts lanceolate, aristate. Perianth lobes 5, obovate-lanceolate, free. Utricles thin. Seeds black.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Bhavani river bank, Chemmannur, Olavakkot, Panangateri.

7. DIGERA Forsk.

Digera muricata (L.) Mart. Beitr. Amarantac. 77. 1825 ; Backer in Steenis, Fl. Males. ser. 1. 4 : 80. 1949. *Achyranthes muricata* L. Sp. Pl. ed. 2. 295. 1762. *Digera arvensis* Forsk. Fl. Aegypt. Arab. 65. 1775 ; Hook. f. Fl. Brit. Ind. 4 : 717 1885 ; Gamble, Fl. Pres. Madr. 1169. 1925, Repr. ed. 2 : 818. 1957. '*Sunnambukkeerai*' (Tam.).

Erect or ascending herbs. Leaves deltoid to elliptic-ovate or lanceolate. Flowers rose, in slender lax thyrsiform spike Bracts ovate. Bracteoles 2, lanceolate. Perianth lobes 5, unequal. Stamens 5, with sheathing base. Fruits verrucose nutlets.

Fl. & Fr. : July.

Common ; in plains near water sources ; Walayar dam area.

8. GOMPHRENA L.

Gomphrena celosioides Mart. Beitr. Amarantac. 93. 1825 ; Backer in Steenis Fl. Males. ser. 1. 4 : 96. 1949. *G. decumbens* auct. non Jacq. 1805 ; Gamble, Fl. Pres. Madr. 1179. 1925, Repr. ed. 2 : 825. 1957.

Ascending or erect herbs. Leaves lanceolate-spathulate. Flowers white, in globose heads. Bracts concave. Perianth lobes 5, one nerved. Stamens 5, with staminal sheath. Utricles falling with perianth lobes.

Fl. & Fr. : July.

Common ; in plains ; Walayar dam area.

9. INDOBANALIA HENRY & ROY

Indobanalia thyrsiflora (Moq.) Henry & Roy in Bull. Bot. Surv. India 10 : 274. 1968. *Banalia thyrsiflora* Moq. in DC. Prodr. 13 : 278.

1849 ; Wight, Ic. t. 1774. 1852 ; Hook. f. Fl. Brit. Ind. 4 : 716. 1885 ; Gamble, Fl. Pres. Madr. 1167. 1925, Repr. ed. 2 : 817. 1957.

Erect, branched, glabrous herbs. Leaves ovate-lanceolate, membranous, acuminate. Flowers dull white, clustered, in thyrsoid panicles. Perianth lobes 5, free, lanceolate. Stamens 5 ; filaments fused below.

Fl. & Fr. : April.

Common ; in lower Ghats : Anavayee forest, Store house E. B. Quarters forest—Siruvani.

10. PUPALIA Juss. *nom. cons.*

Pupalia lappacea (L.) Juss. in Ann. Mus. Paris 2 : 132. 1803 ; Hook. f. Fl. Brit. Ind. 4 : 724. 1885 ; Gamble, Fl. Pres. Madr. 1173. 1925, Repr. ed. 2 : 821. 1957. *Achyranthes lappacea* L. Sp. Pl. 204. 1753. *Pupalia atropurpurea* (Lam.) Moq. in DC. Prodr. 13 (2) : 331. 1849 ; Hook. f *l.c.* ; Gamble *l.c.* *Achyranthes atropurpurea* Lam. Encycl. 1 : 546. 1785.

Slender, erect herbs. Leaves ovate-oblong to lanceolate, appressed-pubescent, acute. Flowers pale pink, in lax spikes ; imperfect flowers reduced to hooked-bristles. Perianth lobes 5, lanceolate-oblong, mucronate. Stamens 5 ; anthers purplish. Capsules depressed globose.

Fl. & Fr. : September-November.

Common ; along road sides and in waste places : Dhoni R.F., Mathur, Panangateri.

101. CHENOPODIACEAE

CHENOPODIUM L.

Chenopodium ambrosioides L. Sp. Pl. 219. 1753 ; Wight, Ic. t. 1786. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 4. 1886 ; Gamble, Fl. Pres. Madr. 1181. 1925, Repr. ed. 2 : 827. 1957. '*Kattayamodagum*' (Mal.).

Glabrous, branched, aromatic herbs. Leaves oblong lanceolate, gland-dotted, sinuate-dentate. Flowers pale greenish, sessile, clustered in panicled spikes. Perianth lobes 2 5 lobed, broadly ovate. Stigmas 5. Seeds reddish brown.

Fl. & Fr. : October February.

Common ; in lower Ghats ; Agali forest, Sholayur forest.

Introduced and now naturalized.

102. POLYGONACEAE

POLYGONUM L.

1a. Leaves less than 1.0 cm long ... *P. plebeium* 5

1b. Leaves more than 1.0 cm long :

2a. Flowers in branched spikes or racemes :

3a. Racemes slender :

4a. Ochreae strigosely - hispid ... *P. hydropiper* ssp. *microcarpum* var. *triquetrum* 4

4b. Ochreae glabrous ... *P. glabrum* 3

3b. Racemes stout ... *P. barbatum* 1

2b. Flowers in panicles of heads ... *P. chinense* 2

1. **Polygonum barbatum** L. Sp. Pl. 362. 1753 ; Wight, Ic. t. 1798. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 37. 1886 ; Gamble, Fl. Pres. Madr. 1189. 1925 ; Repr. ed 2 : 833. 1957. *Persicaria barbata* (L.) Hara, Fl. E. Himal. 1 : 70. 1966.

Erect, gregarious herbs. Leaves linear - lanceolate, acuminate, cuneate, glabrous. Ochreae tubular, strigose, coarsely long ciliate at mouth. Bracts imbricate, oblong, ciliate. Flowers white, in long racemes. Perianth lobes 5. Styles 3. Nuts trigonous.

Fl. & Fr. : August-November.

Common ; in marshy places in lower Ghats ; Anamooly, Dhoni R. F., Mukkali slopes.

2. **Polygonum chinense** L. Sp. Pl. 363. 1753 ; Wight, Ic. t. 1806. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 44. 1886 ; Gamble, Fl. Pres. Madr. 1190. 1925, Repr. ed. 2 : 833. 1957. *Persicaria chinensis* (L.) Gross in Bot. Jahrb. Syst. 49 : 269, 277 & 315. 1913. '*Yerumainakkuchedi*' (Tam.).

Scandent, glabrous undershrubs. Leaves elliptic or ovate, crenulate, pubescent beneath, acute, truncate at base. Ochreae membranous, obliquely cleft. Bracts ovate, acute, glabrous. Flowers white, in corymbose panicles. Perianth lobes 5, ovate, concave. Styles 3. Nutlets trigonous.

Fl. & Fr. : October - April.

Common ; in lower Ghats ; Chindaki forest, Panthanthode, Pothundy Kaikatty forest, Silent Valley R. F., Siruvani forest.

3. **Polygonum glabrum** Willd. Sp Pl. 2 : 447. 1799 ; Wight, Ic. t. 1797. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 34. 1886 ; Gamble, Fl. Pres. Madr. 1189. 1925, Repr. ed. 2 : 832. 1957. *Persicaria glabra* (Willd.) Gomez. in Ann. Inst. Segunda Ensef. Habana 2 : 278. 1896.

Glabrous, erect herbs rooting from lower nodes, up to 1.5 m. Leaves linear-lanceolate, long-acuminate, gland-dotted. Ochreae tubular, glabrous. Bracts oblong, glabrous. Flowers pink, in terminal racemes. Perianth lobes 5, oblong. Stamens 5. Styles 2. Nuts biconvex, orbicular.

Fl. & Fr. : October March.

Very common in wet places ; in lower Ghats ; Bhavani bank, Chindaki, Karapara river bank, Karivara slopes, Kakkupadi area.

4. **Polygonum hydropiper** L. ssp. **microcarpum** Danser var. **triquetrum** Danser in Bull. Jard. Bot. Buit. ser. 3. 8 : 189. 1927. *P. flaccidum* Meisn. in DC. Prodr. 14 : 106. 1856 non Roxb. 1832 ; Hook. f. Fl. Brit. Ind. 5 : 39. 1886 ; Gamble, Fl. Pres. Madr. 1190. 1925, Repr. ed. 2 : 833. 1957. *P. hydropiper* L. var. *flaccidum* (Meisn.) Steward in Contrib. Gray Herb. 5 (88) : 59. 1930 *nom. illeg* ; Sant. & Wagh in Bull. Bot. Surv. Ind. 5 : 108. 1963. *P. glandulosum* Rao in Bull. Bot. Surv. Ind. 5 : 257. 1963 non R. Br. 1810. *P. sarbhangenicum* Rao *l.c.* 6 : 106. 1964.

Slender, glabrous herbs. Leaves elliptic-lanceolate, acuminate, hairy on midrib beneath. Ocreae long-ciliate at mouth. Flowers pink, in slender racemes. Perianth lobes glandular ; segments ovate. Stamens 8. Nutlets trigonous.

Fl. & Fr. : February.

Not common ; in marshy places ; Minnampara area, Karapara river bank.

5. **Polygonum plebeium** R. Br. Prodr. 420. 1810 (*plebejum*') ; Hook. f. Fl. Brit. Ind. 5 : 27. 1886 ; Gamble, Fl. Pres. Madr. 1188. 1925, Repr. ed. 2 : 832. 1957 ; Sant. Fl. Khandala ed. 3. 226. 1967. *P. indicum* Heyne ex Roth. Nov. Pl. Sp. 208. 1821 ; Wight, Ic. t. 1808. 1852.

Prostrate herbs. Leaves oblong, thick. Stipules hyaline, scarious, lacerate. Flowers pink, in axillary and terminal clusters. Perianth lobes 5, unequal. Stamens 5. Nutlets trigonous.

Fl. & Fr. : July.

Common ; in plains ; Walayar forest.

Antigonon leptopus Hook. & Arn., a garden plant with rose flowers is found as an escape.

103. PODOSTEMACEAE

1a. Flowers zygomorphic ; thalli fucoid or crustaceous :

2a. Thalli fucoid ; fruits ribbed ... POLYPLEURUM 1

2b. Thalli crustaceous ; fruits smooth ... WILLISIA 3

1b. Flowers regular ; thalli thread - like ... TERNIOLA 2

1. POLYPLEURUM (Taylor ex Tul.) Warm.

1a. Thalli narrow ; secondary shoots less than 30 cm :

2a. Secondary shoots very long (30 cm) ... *P. dichotomum* 1

2b. Secondary shoots very short (20 mm) ... *P. filifolium* 2

1b. Thalli broad ; secondary shoots more than 30 cm ... *P. stylosum* 3

1. **Polypleurum dichotomum** (Gardn.) Hall in Kew Bull. 26 : 131. 1972. *Padostamon dichotomum* Gardn. in Calcutta J. Nat. Hist. 7 : 185. 1846 ; Hook. f. Fl. Brit. Ind. 5 : 64. 1886. ('*dichotomus*'). *Dicraea dichotoma* (Gardn.) Tul. in Ann. Sci. Nat. Bot. ser. 3. 2 : 101. 1849 ; Wight, Ic. t. 1916. 1852 ; Gamble, Fl. Pres. Madr. 1196. 1925, Repr. ed. 2 : 837. 1957.

Submerged herbs. Thalli ribbon-like, zigzag, flattended, attached at base, free-floating above. Flowers pinkish, enclosed in spathes, subtended by 4, fleshy, scaly bracts.

Fl. & Fr. : November January

Rare ; on rocks in swiftly flowing fresh water streams. Bhavani river bed-Mukkali, Kunthipuzha river bed-dam site area.

2. **Polypleurum filifolium** (Ramam. & Joseph) Nagendran *et al.* in Pl. Syst. Evol. 128. 217. 1977. *Dicraea filifolia* Ramam. & Joseph in Bull. Bot. Surv. India 6 : 333. 1964.

Minute herbs. Thalli membranous, appressed to rocks. Secondary shoots floriferous. Leaves decussate, spathulate, fleshy. Flowers solitary. Stamens 2. Fruits ellipsoid.

Fl. & Fr. : November.

Rare ; on rocks in swiftly flowing streams ; Pothundy Kaikatty forest.

It is an addition to the Flora of the Presidency of Madras.

3. **Polypleurum stylosum** (Wight) Hall in Kew Bull. 26 : 131. 1972. *Dicraeia stylosa* Wight, Ic. t. 1917 1852 ; Gamble, Fl. Pres. Madr. 1196. 1925, Repr. ed. 2 : 837. 1957. ('*Dicraea*'). *Podostemon stylosus* (Wight) Benth. ex Hook. f. Fl. Brit. Ind. 5 : 64. 1886.

Submerged herbs. Thalli algiform, freely branched, creeping and floating from an attached base. Flowers enclosed in spathes ; bracts helmet shaped, scaly, fleshy. Fruits many seeded.

Fl. & Fr. : October - November.

Rare ; on wet rocks ; Kaikatty Pothundy and Ayyappankoil shola.

2. TERNIOLA Tul.

Terniola zeylanica Tul. Podost. Monogr. 190. t. 13. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 62. 1886. *Lawia zeylanica* Tul. var. *zeylanica* (Tul.) Willis, Podost. India & Ceylon 215. 1901 1902 ; Gamble, Fl. Pres. Madr. 1193. 1925, Repr. ed. 2 : 857. 1957.

Herbs with frondose thalli. Thalli adhering to rock, much branched. Leaves simple, entire, whorled, in rosette. Flowers pale yellow, stalked. Tepals 3. Stamens 3. Stigmas 3. Capsules ellipsoid, 5 valved, ribbed.

Fl. & Fr. : November December.

Fairly common : on rocks in swiftly flowing streams ; Mukkali forest, Pothundy Kaikatty.

3. WILLISIA Warm.

Willisia selaginoides (Bedd.) Warm. ex Willis in Ann. Roy. Bot. Gard. (Peradeniya) 1 : 370. 1902 ; Gamble, Fl. Pres. Madr. 1198. 1925, Repr. ed. 2 : 838. 1957. *Mniopsis selaginoides* Bedd. in Madras J. Lit. Sci. ser. 3. 1 : 54. 1864. *Podostemon selaginoides* Benth. in Benth. & Hook. f. Gen. Pl. 3 : 113. 1880 ; Hook. f. Fl. Brit. Ind. 5 : 68. 1886.

Tufted, small herbs with erect shoots. Thalli crustaceous, fleshy, attached to rocks ; secondary shoots crowded. Floriferous leaves decussate. Flowers naked, white. Stamens 2. Stigmas 2, smooth. Capsules smooth.

Fl. & Fr. : December.

Endemic ; rare ; on rocks in running water. Anakkayam Silent Valley R.F.

104. ARISTOLOCHIACEAE

1a. Perianth lobes regular ; fruits elongate	...	THOTTEA	2
1b. Perianth lobes irregular ; fruits globose	...	ARISTOLOCHIA	1

ARISTOLOCHIA L.

1a. Leaves deeply cordate ; stigmatic lobes on a cone	...	*A. tagala*	2
1b. Leaves not deeply cordate ; stigmatic lobes incurved	...	*A. indica*	1

1. **Aristolochia indica** L. Sp. Pl. 960. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 75. 1886 ; Gamble, Fl. Pres. Madr. 1202. 1925, Repr. ed. 2 : 841. 1957. *A. lanceolata* Wight, Ic. t. 1858. 1852. '*Urikkal chedi*' (Tam.), '*Karandavalli*' (Mal.).

Perennial, profusely branching twiners. Leaves linear to obovate oblong, rounded or truncate at base. Flowers dark - brown with greenish-white, inflated tube, in racemes. Perianth lobes rolled back. Stamens 6. Capsules 6 valved.

Fl. & Fr. : November December.

Common ; in lower Ghats ; Pothundy Kaikatty forest, Sappal hill Dhoni, Thiruvizhankunnu forest.

Used in medicines as an antitode for snake bites.

2. **Aristolochia tagala** Cham. in Linnaea 7 : 207. 1832 ; Gamble, Fl. Pres. Madr. 1202. 1925, Repr. ed. 2 : 841. 1957. *A. acuminata* Roxb. Fl. Ind. 3 : 489. 1832 non Lam. 1783 ; Wight, Ic. t. 771. 1844.

Climbing shrubs. Leaves ovate, 7 ribbed, acute or acuminate, deeply cordate ; upper leaves lanceolate. Flowers purple with greenish - yellow tube, in racemes. Bracts lanceolate, ciliate. Stamens 6. Capsules long - stalked, winged.

Fl. & Fr. : All seasons.

Common ; in Ghats ; Mukkali, Kaikatty Pothundy, Kudam Siruvani, Silent Valley R.F.

THOTTEA Rottb.

Thottea siliquosa (Lam.) Ding Hou in Blumea 27 (2) : 327. 1981 *Apama siliquosa* Lam. Encycl. 1 : 91. 1783 ; Gamble, Fl. Pres. Madr. 1200. 1925, Repr. ed. 2 : 840. 1957. '*Kottashari*' (Mal.).

Subscandent undershrubs. Leaves elliptic to lanceolate, acute, cuneate at base. Flowers dark purple. Perianth lobes suborbicular, fleshy, hairy outside. Stamens 5, in 3 groups, adnate to style. Anthers hairy. Fruits cylindric tetragonous. Seeds trigonous.

Fl. & Fr. : All seasons.

Very common ; in Ghats ; Mukkali forest, Muthikulam Siruvani, Silent Valley R.F.

105. PIPERACEAE

1a. Erect undershrubs or root climbers ; leaves alternate :

2a. Spikes solitary ; fruits globose ... PIPER 3

2b. Spikes 3 7 together in umbels ; fruits trigonous ... LEPIANTHES 1

1b. Succulent herbs ; leaves opposite or whorled ... PEPEROMIA 2

1. LEPIANTHES Rafin.

Lepianthes umbellata (L.) Rafin. Sylva Tellur 84. 1838. *Piper umbellatum* L. Sp. Pl. 30. 1753. *P. subpeltatum* Willd. Sp Pl. 1 : 166. 1797 ; Hook. f. Fl. Brit. Ind. 5 : 95. 1886. *Heckeria subpeltata* (Willd.) Kunth in Linnaea 13 : 171. 1839 ; Gamble, Fl. Pres. Madr. 1208. 1925, Repr. ed. 2 : 846. 1957. *Pothomorpha subpeltata* (Willd.) Miq. Syst. Piperac 213. 1843 ; Wight, Ic. t. 1925. 1853. Henry & Roy in Bull. Bot. Surv. Ind. 10 : 294. 1968. '*Attanaari*' (Mal.).

Large undershrubs, 1 2 m. Leaves large, suborbicular, peltate, cordate at base, pubescent on nerves, long petioled. Flowers sessile, pale greenish, in spikes. Perianth absent. Stamens 2 3. Styles 3. Berries cuneiform, trigonous.

Fl. & Fr. : October - January.

Common ; in evergreen forests in Ghats ; Kaikatty Padagiri, Silent Valley R.F. ; Siruvani dam area.

Lepianthes Rafin. (1838) has priority over *Pothomorphe* Miq. (1839) and *Heckeria* Kunth (1839).

2. PEPEROMIA Ruiz & Pav.

1a. Ribs and nerves of leaves invisible ... *P. reflexa* 4

1b. Ribs and nerves of leaves visible :

2a. Leaves fleshy, 3 - 5 - ribbed :

3a. Leaves and stems glabrous ; spikes less than 6 cm long ... *P. portulacoides* 3

3b. Leaves and stems pubescent ; spikes more than 6 cm long ... *P. dindigulensis* 1

2b. Leaves not fleshy, 5 - 7 - ribbed ... *P. pellucida* 2

1. **Peperomia dindigulensis** Miq. Syst. Piperac. 122. 1848 ; Wight, Ic. t. 1921. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 98. 1886 ; Gamble, Fl. Pres. Madr. 1210. 1925, Repr. ed. 2 : 847. 1957. *P. heyneana* Wight, Ic. t. 1922. f. 1. 1853 non Miq. 1848. '*Musthakkuchedi*' (Tam.).

Erect, large herbs ; stems with crisped hairs, 20 - 40 cm. Leaves elliptic - ovate or obovate, acute. Flowers greenish. Bracts ovate, fleshy. Stamens 2. Nutlets minute, punctate.

Fl. & Fr. : November.

Occasional ; on wet rocks and tree trunks ; Karivara forest.

2. **Peperomia pellucida** (L.) H.B.K. Nov. Gen. Sp. 1 : 64. 1816 ; Gamble Fl. Pres. Madr. 1210. 1925, Repr. ed. 2 : 847. 1957. *Piper pellucidum* L. Sp. Pl. 30. 1753.

Slender succulent herbs. Leaves membranous, thin, ovate - deltoid, acute, rounded or cordate at base, opposite and alternate Flowers in slender, leaf - opposed spikes. Bracts ovate. Stamens 2. Nutlets globose, ribbed, reticulate.

Fl. & Fr. : July - October.

Common ; on tree trunks and rocks ; Anamooly, Dhoni R. F., Mukkali forest.

3. **Peperomia portulacoides** (Lam.) A. Dietr. Sp. Pl. 1 : 172. 1831 ; Wight, Ic. t. 1922. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 98. 1886 ; Gamble, Fl. Pres. Madr. 1211. 1925, Repr. ed. 2 : 847. 1957. *Piper portulacoides* Lam. Encycl. 1 : 82. 1791.

Erect, glabrous, tufted, perennial succulent herbs. Leaves petiolate, opposite and whorled, obovate, obtuse, emarginate, cuneate at base, 3 ribbed. Flowers pale greenish, in stout, glabrous simple or compound spikes. Bracts larger with brown dots. Nutlets ovoid, minutely scaly.

Fl. & Fr. : October November.

Fairly common ; on tree trunks and rocks ; Karivara forest, Silent Valley R.F.

4. **Peperomia tetraphylla** (Forst. f.) Hook. & Arn. Bot. Beech. Voy. 96. 1832. *P. reflexa* (L.f.) A. Dietr. Sp. Pl. 180. 1831 ; Wight, Ic. t. 1923. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 99. 1886 ; Gamble, Fl. Pres. Madr. 1209. 1925, Repr. ed. 2 : 847. 1957. *Piper tetraphylla* Forst. f. Fl. Ins. Austr. 5. 1786. *P. reflexum* L.f. Suppl. 91. 1781.

Succulent, tufted, slender epiphytes. Leaves coriaceous, small, orbicular, nearly sessile, glabrous, in whorls of 4, pale when dry. Flowers greenish, in simple or compound hairy spikes. Nutlets ovoid.

Fl. & Fr. : December.

Occasional ; in upper Ghats ; Madirithode bank.

3. PIPER L.

1a. Flowers enclosed in connate bracts :

- 2a. Receptacles stalked ; spikes glabrous ... *P. galeatum* 1
- 2b. Receptacles sessile ; spikes pubescent ... *P. trichostachyon* 5

1b. Flowers not enclosed in connate bracts :

- 3a. Bracts peltate (orbicular) ; fruiting spikes less than 3 cm ... *P. longum* 3
- 3b. Bracts not peltate ; fruiting spikes more than 3 cm :
  - 4a. Branchlets and leaves glabrous :
    - 5a. Bracts imbricating to cover flower ... *P. trioicum* 6
    - 5b. Bracts not imbricating ; flowers exposed ... *P. nigrum* 4
  - 4b. Branchlets and leaves pubescent ... *P. hymenophyllum* 2

1. **Piper galeatum** DC. Prodr. 16 : 242. 1869 ; Hook. f. Fl. Brit. Ind. 5 : 80. 1886 ; Gamble. Fl. Pres. Madr. 1205. 1925, Repr. ed. 2 : 843. 1957. *Muldera wightiana* Wight, Ic. t. 1943. 1853 (right hand figure only).

Woody climbers ; branches corky ; nodes thickened. Leaves elliptic to ovate, cordate and 3 ribbed at base. Spikes greenish. Flowers in cups formed of bracts. Receptacles stalked, distant, recurved. Male spikes long. Berries deep yellow when ripe.

Fl. & Fr. : January.

Rare ; once collected in dense forest at Valiyaparathode.

2. **Piper hymenophyllum** Miq. in Hook. London J. Bot. 5 : 554. 1846 ; Wight, Ic. t. 1942. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 93. 1886 ; Gamble, Fl. Pres. Madr. 1207. 1925, Repr. ed. 2 : 845. 1957. '*Kaattumilagu*' (Tam.).

Slender climbers. Leaves elliptic ovate, often linear, crisped hairy beneath, membranous, 5 7 ribbed, acuminate, rounded or cordate at base. Bracts orbicular ovate, adnate, hairy. Stamens in groups of 3. Bracteoles confluent with bracts. Berries ellipsoid.

Fl. & Fr. : November May.

Common ; in Ghats ; evergreen forests ; Orange Farm—Kaikkatty, Silent Valley R.F.

3. **Piper longum** L. Sp. Pl. 29. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 83. 1886, Gamble, Fl. Pres. Madr. 1205. 1925, Repr. ed 2 : 844. 1957. *Chavica roxburghii* Miq. Syst. Piperac. 239. 1844 ; Wight, Ic. t. 1928. 1853. '*Kattu Vethilai*' (Tam.), '*Tippili*' (Mal.).

Slender undershrubs with downy young shoots ; branches creeping and rooting below. Leaves upper ones sessile ; lower petioled, 7 ribbed, ovate cordate, glabrous. Flowering shoots erect. Male spikes 2 7 cm long. Spikes greenish yellow, fleshy. Berries sunken, red when ripe.

Fl. & Fr. : October November.

Common ; in lower Ghats ; Chindaki forest, Mukkali Anamooly, Kudam - Siruvani, Sappal hill Dhoni R.F., Thiruvizhankunnu.

Berries used in medicines.

4. **Piper nigrum** L. Sp. Pl. 28. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 90. 1886 ; Gamble, Fl. Pres. Madr. 1206, 1925, Repr. ed. 2 : 845. 1957. '*Milagu*' (Tam.).

Stout, glabrous, climbing shrubs. Leaves ovate, coriaceous, acuminate, 5 9 - ribbed. Bracts concave, embedded partly in peduncle. Male spikes slender, up to 12 cm long. Female spikes up to 15 cm long. Stamens 2 ; filaments flat. Berries large, globose, black when dry.

Fl. & Fr. : December July.

Common on tree trunks ; mostly cultivated ; Minnampara, Mukkali forest, Panthanthode, Silent Valley dam site.

Largely cultivated as a commercial crop for the spice, "Black pepper".

5. **Piper trichostachyon** (Miq.) DC. Prodr. 16 : 242. 1869 ; Hook. f. Fl. Brit. Ind. 5 : 80. 1886 ; Gamble, Fl Pres. Madr. 1205. 1925, Repr. ed. 2 : 844. 1957. *Muldera trichostachyon* Miq. in Hook. London J. Bot. 5 : 556. 1846 ; Wight Ic. t. 1944. 1853.

Large, woody climbers. Leaves elliptic lanceolate, 5 ribbed, acuminate. Flowers in cups, in lax stout pubescent leaf - opposed spikes. Bracts of male flowers wavy, white. Male receptacles globose, diandrous. Berry globose, yellow when ripe.

Fl. & Fr. : April May.

Rare : Muthikulam Siruvani forest, Silent Valley R.F.

6. **Piper trioicum** Roxb. Fl. Ind. 1 : 151. 1820 ; Wight, Ic. tt. 1935 36. 1853 ; Subr. & Henry in Bull. Bot. Surv. Ind. 12 : 4. 1972. *Piper attenuatum* Buch. Ham. ex Miq Syst. Piperac. 306. 1843 ; Hook. f. Fl. Brit. Ind. 5 : 92. 1886 ; Gamble, Fl. Pres. Madr. 1207. 1925, Repr. ed. 2 : 845. 1957. *P. sylvestre* sensu Wight, Ic. t. 1937. 1853 non Lam. 1791, nec Lour. 1790.

Slender, glabrous climbers : branches zigzag. Leaves 5 7 ribbed, elliptic lanceolate to suborbicular, membranous, cordate at base, acuminate. Bracts adnate. Flowers dull white. Spikes slender, leaf - opposed. Berries globose, small.

Fl. & Fr. : July.

Rare ; Sappal hill Dhoni R.F., Silent Valley R.F.

106. CHLORANTHACEAE

SARCANDRA Gardn.

Sarcandra chloranthoides Gardn. in Calcutta J. Nat. Hist. 6 : 348. 1846 ; Wight, Ic. t. 1946. 1853 ; Verdc. in Kew Bull. 39(1) : 66. 1984. *Chloranthus grandifolius* Miq. Fl. Ind. Bat. 1(1) : 802. 1856. *C. brachystachys* sensu Hook. f. Fl. Brit. Ind. 5 : 100. 1886 *p.p.* non Bl. 1829 ; Gamble, Fl. Pres. Madr. 1211. 1925, Repr. ed. 2 : 846. 1957. *Sarcandra irvingboileyi* Swamy in Proc. Nat. Inst. Sci. Ind. B. 19 : 303. 1953. *S. grandifolia* (Miq.) Subr. & Henry in Bull. Bot. Surv. Ind. 12 : 5. 1970 (1972).

Erect, branched undershrubs or shrubs, 1 2 m. Leaves elliptic, ovate or oblanceolate, glabrous, serrate, acuminate, cuneate at base. Flowers greenish, in terminal paniculate spikes. Perianth absent. Stamen 1. Filaments thick. Drupes subglobose, glabrous, purplish black.

Fl. & Fr. : December - February.

Common ; in upper Ghats ; Silent Valley R.F., Siruvani forest.

A vesselless angiosperm.

107. MYRISTICACEAE

1a. Staminal column elongate ; aril laciniate to the base ...	MYRISTICA	2
1b. Staminal column reltate ; aril laciniate at top ...	KNEMA	1

1. KNEMA Lour.

Knema attenuata (Wall. ex Hook. f. & Thoms.) Warb. Monogr. Myristic. 590. 1897 ; Gamble, Fl. Pres. Madr. 1215. 1925, Repr. ed. 2 : 851. 1957. *Myristica attenuata* Wall. ex Hook. f. & Thoms. Fl. Ind. 157. 1855 ; Hook. f. Fl. Brit. Ind. 5 : 110. 1886. *M. corticosa* Bedd. Fl. Sylv. t. 271. 1872 non Hook. f. & Thoms. 1855. '*Chora pathiri*' (Tam.), '*Chennelli*' (Mal.).

Trees, 10 20 m. Leaves oblong - lanceolate, stellate - pubescent when young, subcoriaceous, glaucous beneath, abruptly acuminate at apex, rounded at base. Flowers in stellately pubescent umbels. Perianth brown - tomentose outside, glabrous and pink inside. Anthers sessile. Stigmas 2 - 4 lobed, free. Fruits brown tomentose ; aril crimson.

Fl. & Fr. : November May.

Endemic ; very common ; in Ghats ; Ayyappankoil forest, Kaikatty forest, Mukkali forest, Silent Valley R.F.

2. MYRISTICA Gronov. *nom. cons.*

1a Flowers urceolate ; fruits cylindrical ...	*M. malabarica*	2
1b. Flowers ovoid ; fruits globose ...	*M. dactiloides*	1

1. **Myristica dactyloides** Gaertn. Fruct. 1 : 195. t. 41. 1788 ; Sinclair in Gard. Bull. Singapore 23 : 445. 1968. *M. beddomei* King in Ann. Roy. Bot. Gard. Calcutta 3 : 291. t. 118. 1891. *M. contorta* Warb. Monogr. Myrist. 507. 1897 ; Gamble, Fl. Pres. Madr. 1214. 1925, Repr. ed. 2 : 850. 1957. '*Kattu jathikai*' (Tam.), '*Adakkapayin*' (Mal.).

Lofty trees, 20 30 m. Leaves *ca.* 30×10 cm, oblong lanceolate, shining above, glaucous beneath, acute at apex. Nerves *ca.* 18 pairs. Flowers yellow, in rusty tomentose umbels. Perianth lobes tomentose. Fruits 1 3 together, *ca.* 6×4 cm, arils orange red.

Fl. & Fr. : October June.

Very common ; in Ghats ; Pothundy forest, Silent Valley R.F., Mandhampatty forest.

2. **Myristica malabarica** Lam. in Hist. Acad. Roy. Sci. (Paris) 162. 1788 (1791) ; Bedd. Fl. Sylv. t. 269. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 103. 1886 ; Gamble, Fl. Pres. Madr. 1213. 1925, Repr. ed. 2 : 850. 1957 ; Sinclair in Gard. Bull. Singapore 23 : 168. 1968 ; Manilal & Suresh in J. Econ. Tax. Bot. 7(1) : 207. 1985. '*Panampalka*' (Mal.).

Trees, 15 20 m. Leaves elliptic oblong, 8 14×3 4 cm, brown beneath ; nerves 10 pairs, reticulation more obvious on upper surface. Flowers yellow, in dichasial cymes. Perianth lobes subglabrous. Fruits densely tomentose, yellow, 6 10 × 4 6 cm, tomentum deciduous.

Fl. & Fr. : January May.

Common ; in lower Ghats ; Mukkali forest, Vattapara Inchikuzhi forest, Siruvani.

108. LAURACEAE

1a. Flowers unisexual :

2a. Flowers in umbellules :

3a. Leaves penninerved ; stamens 9 or more ... LITSEA 4

3b. Leaves 3 ribbed ; stamens 6 ... NEOLITSEA 5

2b. Flowers not in umbellules (clustered) ... ACTINODAPHNE 1

1b. Flowers bisexual :

4a. Anthers 4 - celled :

5a. Leaves opposite, 3 - or more ribbed ... CINNAMOMUM 2

5b. Leaves alternate, penninerved :

6a. Perianth lobes in fruit reflexed ... PERSEA 6

6b. Perianth lobes in fruit not reflexed ... PHOEBE 7

4b. Anthers 2 - celled ... CRYPTOCARYA 3

1. ACTINODAPHNE Nees

1a. Leaf nerves and nervules very prominent	...	*A. tadulingami*	2
1b. Leaf nerves and nervules not prominent	...	*A. malabarica*	1

1. **Actinodaphne malabarica** Balak. in J. Bombay Nat. Hist. Soc. 63: 329. 1967. *A. hirsuta* Hook. f. Fl. Brit. Ind. 5 : 152. 1886 non Bl. 1851 ; Gamble, Fl. Pres. Madr. 1231. 1925, Repr. ed. 2 : 862. 1957.

Trees, 10 - 15 m. Leaves crowded at the end of branches, elliptic - lanceolate, fulvous - villous beneath, acuminate, cuneate at base. Flowers pale yellow, sessile, from leafless branches. Peduncles hirsute. Perianth lobes 6. Stamens 9 in 3 whorls. Berries globose, on concave perianth tube.

Fl. & Fr. : August - April.

Fairly common ; in lower Ghats ; Mukkali forest, Panthanthode forest.

2. **Actinodaphne tadulingami** Gamble in Bull. Misc. Inform. Kew 130. 1925 & Fl. Pres. Madr. 1231. 1925, Repr. ed. 2 : 862. 1957.

Trees, 10 15 m. Leaves elliptic lanceolate, sparsely villous beneath, acuminate ; nerves and nervules very prominent. Flowers yellow, from leafless branches. Perianth tubes cupular. Berries globose.

Fl. & Fr. : October - December.

Endemic ; fairly common ; in Ghats ; Panthanthode forest, Silent Valley R.F.

2. CINNAMOMUM Schaeffer

1a. Basal lateral nerves reaching the leaf tip :			
2a. Leaves glabrous beneath	...	*C. malabatrum*	2
2b. Leaves tomentose beneath	...	*C. sulphuratum*	3
1b. Basal lateral nerves not reaching the leaf tip :			
3a. Panicles more than 10 cm long	...	*C. macrocarpum*	1
3b. Panicles less than 10 cm long	...	*C. wightii*	4

1. **Cinnamomum macrocarpum** Hook. f. Fl. Brit. Ind. 5 : 133. 1886 ; Gamble, Fl. Pres. Madr. 1225. 1925, Repr. ed. 2 : 857. 1957 ; Kostermans in Bull. Bot. Surv. Ind. 25 : 100. 1983 (1985). *C. zeylanicum* auct. non Bl. 1826 ; Nees in Wall. Pl. Asiat. Rar. 2 : 74. 1831.

Trees, *ca.* 10 m with thick angular branchlets. Leaves elliptic - oblong, obtuse to acuminate at apex, attenuate at base, 3 5 - ribbed, aromatic. Flowers yellow ; buds globose, in grey - pubescent panicles. Perianth lobes ovate - oblong, fleshy. Berries ovoid-ellipsoid.

Fl. & Fr. : February March.

Common ; in lower Ghats ; Mukkali forest, Kallamalai, Kaikatty Pothundy.

2. **Cinnamomum malabatrum** (Burm. f.) Bl. Rumphia 1 : 38. t. 13, ff. 3 - 4. 1836 ('*malabathrum*') ; Hassk. in Flora 35 : 648. 1861 ; Kostermans in Bull. Bot. Surv. Ind. 25 : 102. 1983 (1985). *Laurus malabatrum* Burm. f. Fl. Ind. 92. 1768 *p.p. Cinnamomum iners* auct. non Reinw. ex Bl. 1826. ; Wight Ic. t. 122. 1839 ; Gamble, Fl. Pres. Madr. 1224. 1925, Repr. ed. 2 : 857. 1957. '*Kattu karuvapatai*' (Mal.).

Trees, 15 - 20 m. Leaves opposite or subopposite, elliptic - oblong, acuminate caudate at apex, acute at base. Flowers yellow in lax panicles. Perianth lobes fleshy, ovate. Staminodes hastate, cordate. Fruits ellipsoid, on fleshy cup.

Fl. & Fr. : December May.

Common : in Ghats ; Mukkali forest, Ommala area, Panthanthode forest, Vattapara Siruvani forest.

3. **Cinnamomum sulphuratum** Nees in Wall. Pl. Asiat. Rar. 2 : 74. 1831 ; Hook. f. Fl. Brit. Ind. 5 : 132. 1886 ; Gamble, Fl. Pres. Madr. 1225. 1925, Repr. ed. 2 : 857. 1957 ; Kostermans in Bull. Bot. Surv. Ind. 25 : 114. 1983 (1985).

Large trees, 15 20 m ; young branches slender, angular, pale yellow. Leaves opposite, elliptic - oblong, glabrous, 3 ribbed ; young ones yellowish pubescent, glaucous, acute, rounded at base. Flowers yellow, in tomentose panicles. Perianth lobes thick, ovate, densely pilose inside. Berries with persistent perianth lobes, ellipsoid.

Fl. & Fr. : March.

Occasional ; once collected in Karasuryamalai forest at *ca* 1150 m ; *Vajravelu* 46202.

4. **Cinnamomum wightii** Meisn. in DC. Prodr. 15 : 11. 1864 ; Hook. f. Fl. Brit. Ind. 5 : 132. 1886 ; Gamble, Fl. Pres. Madr. 1224. 1925, Repr. ed. 2 : 857. 1957 ; Kostermans in Bull. Bot. Surv. Ind. 25 : 122. 1983 (1985).

Trees, 15 20 m, with glabrous branchlets. Leaves opposite thickly coriaceous, broadly ovate - elliptic, glaucous beneath, obtuse or acute, rounded at base, fragrant when crushed. Flowers yellow, in tomentose panicles. Perianths thick, ovate. Berries ovate - oblong, with truncate cup.

Fl. & Fr. : April.

Endemic ; rare ; once collected in Silent Valley dam site forest at *ca* 1100 m.

3. CRYPTOCARYA R. Br.

Cryptocarya bourdillonii Gamble in Bull. Misc. Inform. Kew 127. 1925 & Fl. Pres. Madr. 1218. 1925, Repr. ed. 2 : 853. 1957. *C. wightiana* Hook. f. Fl. Brit. Ind. 5 : 120. 1886 *p.p.* non Thw. 1861.

Tall trees, up to 20 m. Leaves elliptic - oblong, glaucous and nerves prominent beneath, acuminate, rounded at base. Flowers yellow, in panicles. Berries globose, smooth.

Fl. & Fr. : November - May.

Rare ; once collected in Orange Farm — Kaikatty forest at *ca* 975 m ; and another from Singampara - Siruvani.

4. LITSEA Lam. *nom. cons.*

1a. Leaves glabrous beneath :

2a. Umbellules in racemes :

3a. Petioles and pedicels very thick :

4a. Leaf nerves prominent ; berries ellipsoid ... *L. stocksii* 5

4b. Leaf nerves not prominent ; berries globose ... *L. oleoides* 4

3b. Petioles and pedicels thin ... *L. glabrata* 3

2b. Umbellules in clusters *L. coriacea* 1

1b. Leaves tomentose beneath ... *L. floribunda* 2

1. **Litsea coriacea** (Heyne ex Meisn.) Hook. f. Fl. Brit. Ind. 5 : 166. 1886 ; Gamble, Fl. Pres. Madr. 1236. 1925, Repr. ed. 2 : 865. 1957. *Tetranthera coriacea* Heyne ex Meisn. in DC. Prodr. 15 : 186. 1864. '*Panni thalai*' (Tam.). '*Maravetti thalai*' (Mal.).

Trees, 5 7 m. Leaves elliptic ovate, acute, narrowed at base, dull grey beneath when dry. Flowers yellow, in subsessile grey silky umbellules. Berries oblong, seated on cup shaped perianth lobes.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Mukkali forest, Pothundy Ayyappankoil forest, Panthanthode forest, Siruvani forest.

2. **Litsea floribunda** (Bl.) Gamble, Fl. Pres. Madr. 1238. 1925, Repr. ed. 2 : 867. 1957. *Cylicodaphne floribunda* Bl. Mus. Bot. 1 : 387. 1857. *Tetranthera wightiana* sensu Bedd. Fl. Sylv. t. 293. 1873 excl. basionym ; *Litsea wightiana* sensu Hook. f. Fl. Brit. Ind. 5 : 177. 1886 excl. *basionym*.

Trees, 10 20 m, young parts tomentose. Leaves elliptic oblong, densely brown tomentose beneath, glabrous above, coriaceous, abruptly acuminate at apex. Flowers pale yellow. Berries oblong, seated on the turbinate perianth - tube, with thick pedicels.

Fl. & Fr. : All seasons.

Common ; in Ghats ; Mukkali forest, Karasuryamalai, Padagiri forest, Silent Valley dam site.

3. **Litsea glabrata** (Wall. ex Nees) Hook. f. Fl. Brit. Ind. 5 : 174. 1886 ; Gamble, Fl. Pres. Madr. 1237. 1925, Repr. ed. 2 : 866. 1957. *Tetranthera glabrata* Wall. ex Nees in Wall. Pl. Asiat. Rar. 2 : 67. 1831.

Trees, 5 7 m. Leaves coriaceous, glabrous, red beneath, elliptic or linear oblong, acute at both ends. Nerves 10 12 pairs. Flowers pale yellow. Berries ellipsoid with cupular perianth tube.

Fl. & Fr. : December.

Rare ; once collected in Silent Valley R.F. at *ca* 925 m ; *Vajravelu* 33263.

4. **Litsea oleoides** (Meisn.) Hook. f. Fl. Brit. Ind. 5 : 175. 1886 ; Gamble, Fl. Pres. Madr. 1236. 1925, Repr. ed. 2 : 865. 1957. *Tetranthera oleoides* Meisn. in DC. Prodr. 15 : 195. 1864. '*Arambamaram*' (Tam.).

Large trees, 20 30 m. Leaves elliptic - oblong, coriaceous, glabrous, acute, rounded or narrowed at base. Pedicels thick. Flowers yellow, in fulvous pubescent, racemose umbels. Berries depressed globose, on enlarged perianth.

Fl. & Fr. : December - April.

Common ; in Ghats ; in evergreen forest ; Anamooly - Mukkali Kaikatty - Padagiri, Silent Valley R.F.

5. **Litsea stocksii** Hook. f. Fl. Brit. Ind. 5 : 176. 1886 ; Gamble, Fl. Pres. Madr. 1236. 1925, Repr. ed. 2 : 865. 1957.

Trees, 10 - 15 m, with stout branches. Leaves coriaceous oblong lanceolate or elliptic, acute or acuminate, glaucous beneath. Nerves 8 - 12 pairs. Flowers dull yellow, in silky tomentose racemes. Perianth tube oblong - turbinate. Berries seated on the cup - shaped perianth tube.

Fl. & Fr. : October - April.

Common ; in evergreen forest ; Silent Valley R.F.

5. NEOLITSEA (Benth.) MERR. *nom. cons.*

1a. Leaves pitted ; berries oblong	...	*N. scrobiculata*	1
1b. Leaves not pitted ; berries globose	...	*N. zeylanica*	2

1. **Neolitsea scrobiculata** (Meisn.) Gamble, Fl. Pres. Madr. 1240. 1925, Repr. ed. 2 : 868. 1957. *Litsea scrobiculata* Meisn. in DC. Prodr. 15 : 223. 1864. '*Vegana*' (Tam.).

Trees, 10 15 m. Leaves elliptic ovate, coriaceous, glabrous, glaucous beneath, acuminate at apex, acute at base. Petioles 3 6 cm. Flowers in subsessile umbels. Perianth lobes 4, greenish, glabrous. Staminodes 6, in 3 series. Fruiting perianth cupular, entire.

Fl. & Fr. : February - April.

Fairly common ; in lower Ghats ; Karasuryamalai Anamadai forest, Panthanthode forest.

2. **Neolitsea zeylanica** (Nees) Merr. in Philipp. J. Sci. Suppl. 1 : 57. 1906 ; Gamble, Fl. Pres. Madr. 1239. 1925, Repr. ed. 2 : 867. 1957. *Litsea zeylanica* Nees in Amoen. Bot. Bonn. Fasc. 1 : 58. t. 5. 1823 ; Hook. f. Fl. Brit. Ind. 5 : 178. 1886 *p.p.*

Tree, 5 10 m. Leaves elliptic or oblong - lanceolate, glaucous beneath, caudate acuminate - acute. Flowers yellow, in umbellules. Perianth lobes glabrous. Berries with crenate perianth tube.

Fl. & Fr. : January.

Fairly common ; in Ghats ; Silent Valley R.F.

6. PERSEA Mill.

Persea macrantha (Nees) Kostermans in Reinwardtia 6 : 193. 1962. *Machilus macrantha* Nees in Wall. Pl. Asiat. Rar. 2 : 70. 1831 ; Wight, Ic. t. 1824. 1852 ; Bedd. Fl. Sylv. t. 264. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 140. 1886 ; Gamble, Fl. Pres. Madr. 1227. 1925, Repr. ed. 2 : 859. 1957. *M. glaucescens* Wight, Ic. t. 1825. 1852. '*Kularmavu*' (Tam.). & (Mal.).

Large, evergreen trees, 10 15 m. Leaves elliptic - oblong, subcoriaceous, glaucous beneath, acute at apex. Flowers greenish yellow, in copiously branched panicles. Peduncles reddish. Perianth lobes 6, obovate, pubescent. Fertile stamens 9. Berries globose, blue black, *ca.* 2 cm across.

Fl. & Fr. : December February.

Fairly common ; in lower Ghats ; Karivara slopes, Mukkali forest, Orange farm Kaikatty.

7. PHOEBE Nees

Phoebe lanceolata (Nees) Nees, Syst. Laurin. 109. 1836 ; Wight, Ic. t. 1821. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 141. 1886 ; Gamble, Fl. Pres. Madr. 1228. 1925, Repr. ed. 2 : 860. 1957. *Ocotea lanceolata* Nees in Wall. Pl. Asiat. Rar. 2 : 71. 1831.

Trees, 10 15 m ; young branches yellowish. Leaves lanceolate, glabrous, caudate acuminate, cuneate at base. Flowers pale yellow, in panicles. Perianth lobes pubescent. Berries ellipsoid, black, with cupular perianth, glabrous.

Fl. & Fr. : January March.

Fairly common ; in lower Ghats ; Karapara river forest, Panthanthode forest.

109. PROTEACEAE

HELICIA Lour.

Helicia nilagirica Bedd. in Madras J. Lit. Sci. ser. 3. 1 : 56. 1864 ; Hook. f. Fl. Brit. Ind. 5 : 190. 1886 ; Gamble, Fl. Pres. Madr. 1243. 1925, Repr. ed. 2 : 870. 1957 ; Sleumer in Blumea 8 : 69. 1955.

Trees, 7 10 m. Leaves elliptic - oblanceolate, coriaceous, coarsely dentate, glabrous, acuminate. Flowers white, in pairs, in axillary racemes. Tepals 4, revolute. Stamens 4, connectives produced. Ovary superior, sessile. Styles thick at tip. Drupes fleshy, subglobose, purple.

Fl. & Fr. : December.

Rare ; once collected in Valiyaparathode R.F. in December 1980.

Grevillea robusta A. Cunn. ex R. Br., the Australian Silver Oak, is commonly cultivated in tea estates.

110. ELAEAGNACEAE

ELAEAGNUS L.

1a. Leaves less than 7 cm long, coriaceous	...	*E. kologa*	2
1b. Leaves more than 7 cm long, membranous	...	*E. conferta*	1

1. **Elaeagnus conferta** Roxb. Fl. Ind. 1 : 460. 1820 ; Gamble, Fl. Pres. Madr. 1246. 1925, Repr. ed. 2 : 873. 1957. *E. latifolia* L. Sp. Pl. 121. 1753 *p.p.* ; Hook. f. Fl. Brit. Ind. 2 : 202. 1886.

Scandent shrubs. Leaves elliptic - oblong or obovate, chartaceous, acute, cuneate at base with silvery and rusty scales beneath. Flowers dull white, in fascicles. Perianth tubes silvery. Drupes red, oblong.

Fl. & Fr. : February.

Common ; in lower Ghats ; Kaikatty Ayyappankoil forest.

2. **Elaeagnus kologa** Schlecht. in DC. Prodr. 14 : 611. 1857 ; Gamble, Fl. Pres. Madr. 1246. 1925, Repr. ed. 2 : 873. 1957. *E. latifolia* L. Sp. Pl. 121. 1753 *p.p.* ; Wight, Ic. t. 1856, 1852 ; Hook. f. Fl. Brit. Ind. 5 : 202. 1886. '*Kolungi*' (Tam.). '*Kaattumunthringa*' (Mal.).

Scandent shrubs with arching branches. Leaves ovate oblong or orbicular, obtuse, rounded at base ; scales peltate, silvery and coppery. Flowers dull white, in fascicles of 5 7. Perianth tubes campanulate ; lobes 4. Stamens 4. Drupes oblong - ellipsoid.

Rare ; once collected in Ayyappankoil forests Nelliyampathy Ghat at *ca* 760 m in April 1977 ; *Vajravelu* 48960.

111. LORANTHACEAE

1a. Flowers bisexual :

2a. Bracts involucrate ... TOLYPANTHUS 7

2b. Bracts not involucrate :

3a. Flowers subtended by 3 bracts :

4a. Flowers 6 - merous ... MACROSOLEN 4

4b. Flowers 5 - merous ... HELICANTHES 2

3b. Flowers subtended by a single bract :

5a. Corolla lobed :

6a. Flowers zygomorphic ; corolla split on one side :

7a. Leaves opposite ... SCURRULA 5

7b. Leaves alternate ... TAXILLUS 6

6b. Flowers actinomorphic ; corolla not split on one side ... DENDROPHTHOE 1

5b. Corolla not lobed ... HELIXANTHERA 3

1b. Flowers unisexual ... VISCUM 8

1. DENDROPHTHOE Mart.

Dendrophthoe falcata (L. f.) Etting in Denkschr. Akad. Wiss. Math. Nat. 32 : 52. 1872 ; Danser in Bull. Jard. Bot. Buit. ser. 3. 16 : 30. 1938. *Loranthus falcatus* L. f. Suppl. 211. 1781. *L. longiflorus* Desr. in Lam. Encycl. 3 : 598. 1789 ; Hook. f. Fl. Brit. Ind. 5 : 214. 1886 ; Gamble, Fl. Pres. Madr. 1253. 1925, Repr. ed. 2 : 877. 1957. L. *longiflorus* var. *falcatus* (L.f.) Kurz, For. Fl. 2 : 321. 1877 ; Gamble *l.c.* *L. longiflorus* var. *amplexifolia* (DC.) Thw. Enum. 134. 1859 ; Gamble *l.c.*

Large, bushy herbs ; stems terete. Leaves ovate lanceolate, acute, cordate amplexicaul or cuneate at base. Flowers yellow - scarlet, in racemes. Corolla lobes 5, oblong, reflexed. Fruits ovoid.

Fl. & Fr. : All seasons.

Common parasite on branches of trees. Attappadi forest - Mukkali, Bhavani river bank, Mangalam dam area.

2. HELICANTHES Danser

Helicanthes elastica (Desr.) Danser in Verh. Kon. Akad. Wet. Amsterdam sec. 2. 19 : 55. 1933. *Loranthus elasticus* Desr. in Lam. Encycl. 3 : 599. 1789 ; Wight, Ic. t. 343. 1840 ; Hook. f. Fl. Brit. Ind. 5 : 216. 1886 ; Gamble, Fl. Pres. Madr. 1254. 1925, Repr. ed. 2 : 878. 1957. *L. euphorbiae* Wight. Ic. t. 1063. 1846.

Dichotomously branched, parasitic woody shrubs. Leaves opposite-decussate, sessile, ovate elliptic, 3 - nerved from base, coriaceous, acute. Flowers green with white stripes, sessile, in fascicles. Calyx cupular. Corolla lobes 5, spirally twisted. Stamens 5. Berries globose, pink.

Fl. & Fr. : January.

Common ; on **Mangifera indica** and other trees ; Mannarghat town area, Olavakkot area.

3. HELIXANTHERA Lour.

1a. Flower buds terete, in slender racemes	...	*H. wallichiana*	2
1b. Flower buds angular, in stout racemes	...	*H. intermedia*	1

1. **Helixanthera intermedia** (Wight ex Hook. f.) Danser in Bull. Jard. Bot. Buit. ser. 3. 10 : 317. 1929. *Loranthus intermedius* Wight ex Hook. f. Fl. Brit. Ind. 5 : 205. 1886 ; Gamble, Fl. Pres. Madr. 1251. 1925, Repr. ed. 2 : 876. 1957.

Stout, parasitic shrubs. Leaves 7 15 × 4 6 cm, shortly petioled, elliptic or broadly ovate, rounded cordate or auricled at base. Flowers pink, 4 merous, glabrous. Petals linear, spathulate.

Rare ; *Cleghorn* (45153) collected from Walayar forest in 1858.

2. **Helixanthera wallichiana** (Schult.) Danser in Bull. Jard. Bot. Buit. ser. 3. 10 : 319. 1929. *Loranthus wallichianus* Schult. in Roem. & Schult. Syst. Nat. 7 : 100. 1829 ; Wight, Ic. t. 143. 1839 ; Hook. f. Fl. Brit. Ind. 5 : 205. 1886 ; Gamble, Fl. Pres. Madr. 1251. 1925, Repr. ed. 2 : 876. 1957.

Stout, parasitic shrubs. Leaves sessile, elliptic - ovate or orbicular, obtuse. Flowers scarlet, in slender racemes. Petals 4, free.

Fl. & Fr. : April - October.

Common on branches of trees ; in lower Ghats ; Chindaki forest, Mukkali forest, Panthanthode.

4. MACROSOLEN (Bl.) Reichb.

1a. Corolla curved, more than 2.5 cm long ... *M. parasiticus* 2

1b. Corolla not curved, less than 2.5 cm long ... *M. capitellatus* 1

1. **Macrosolen capitellatus** (Wight & Arn.) Danser in Blumea 3 : 36. 1936 ; Weins in Abeywick. Fl. Ceylon 1 : 64. 1973. *Loranthus capitellatus* Wight & Arn. Prodr. 382. 1834 ; Hook. f. Fl. Brit. Ind. 5 : 221. 1886. *Elytranthe capitellata* (Wight & Arn.) Engl. in Pflanzenf. 3 (1) : 189. 1889 ; Gamble, Fl. Pres. Madr. 1255. 1925, Repr. ed. 2 : 879. 1957.

Parasitic shrubs ; stems slightly winged. Leaves opposite, elliptic - lanceolate, acute, cuneate at base. Flowers red with green limbs ; lobes spathulate, reflexed.

Fl. & Fr. : April.

Not common ; once collected in Karivara forests at *ca* 675 m.

2. **Macrosolen parasiticus** (L.) Danser in Blumea 3 : 36. 1936. *Lonicera parasitica* L. Sp. Pl. 175. 1753. *Elytranthe loniceroides* (L.) G. Don, Gen. Syst. 3 : 427. 1834 ; Gamble, Fl. Pres. Madr. 1255. 1925, Repr. ed. 2 : 879. 1957. *Loranthus loniceroides* L. Sp. Pl. ed. 2. 473. 1762 ; Wight, Ic. t. 203. 1839 ; Hook. f. Fl. Brit. Ind. 5 : 221. 1886.

Large, parasitic shrubs. Leaves ovate - oblong or lanceolate, falcate acuminate. Flowers scarlet, curved with green lobes, in peduncled cymes. Corolla lobes reflexed ; tube yellow below. Berries green.

Fl. & Fr. : July October.

Fairly common on forest trees and shrubs ; Mukkali forest.

5. SCURRULA L.

1a. Leaves glabrous above ; petals less than 1.5 cm long ... *S. parasitica* 2

1b. Leaves tawny tomentose above ; petals more than 1.5 cm long ... *S. cordifolia* 1

1. **Scurrula cordifolia** (Wall.) G. Don, Gen. Syst. 3 : 423. 1834. *Loranthus cordifolius* Wall. in Roxb. Fl. Ind. 2 : 222. 1824 ; Hook. f. Fl. Brit. Ind. 5 : 209. 1886 ; Gamble, Fl. Pres. Madr. 1252. 1925, Repr. ed. 2 : 876. 1957.

Large, parasitic shrubs. Leaves coriaceous, elliptic, obtuse or acute at apex, cordate at base. Flowers orange, tawny in axillary fascicles. Corolla 4 lobed ; lobes reflexed.

Rare ; old collection from Walayar forest (45227) made in 1885.

2. **Scurrula parasitica** L. Sp. Pl. 110. 1753 ; Weins in Abeywick. Fl. Ceylon 1 : 73. 1973. *Loranthus buddlejoides* Desr. in Lam. Encycl. 3 : 600. 1792 ; Gamble, Fl. Pres. Madr. 1251. 1925, Repr. ed. 2 : 876. 1957 ('*buddleioides*').

Parasitic shrubs. Leaves ovate orbicular or elliptic, rusty tomentose beneath. Flowers greenish yellow, in axillary racemes. Corolla 4 lobed ; tube inflated below. Stamens 4.

Fl. & Fr. : October March.

Common on *Mallotus* spp. and other trees ; Chindaki forest, Mukkali forest, Karasuryamalai area, Sappal hill - Dhoni R.F.

6. TAXILLUS van Tiegh.

Taxillus tomentosus (Roth) van Tiegh. in Bull. Soc. Bot. France 42 : 256. 1895. *Loranthus tomentosus* Roth, Nov. Pl. Sp. 191. 1821 ; Hook. f. Fl. Brit. Ind. 5 : 212. 1886 ; Gamble, Fl. Pres. Madr. 1252. 1925, Repr. ed. 2 : 876. 1957.

Parasitic herbs ; branchlets black. Leaves alternate, obovate, rusty - tomentose beneath, obtuse, cuneate at base, black when dry. Bracts shorter than calyx, ovate. Flowers greenish with red base. Calyx regular ; teeth triangular. Corolla tubes curved, rusty - tomentose ; lobes 5.

Fl. & Fr. : December.

Rare ; once collected in Panthanthode forests at *ca* 825 m ; *Vajravelu* 33093.

7. TOLYPANTHUS (Bl.) Reichb.

Tolypanthus lageniferus (Wight) van Tiegh. in Bull. Soc. Bot. France 42 : 249. 1895 ; Danser in Bull. Jard. Bot. Buit. ser. 3. 10 : 355. 1929. *Loranthus lageniferus* Wight, Ic. t. 306. 1840 ; Hook. f. Fl. Brit. Ind. 5 : 218. 1886 ; Gamble, Fl. Pres. Madr. 1254. 1925, Repr. ed. 2 : 878. 1957.

Large, parasitic shrubs. Leaves 3 nate, broadly elliptic to orbicular - oblong, acute, rounded at base. Flowers in groups of 3 5, red. Involucral

bracts bell shaped, foliaceous, red. Calyx tubes tomentose. Corolla 5 lobed, constricted. Fruits ovate.

Fl. & Fr. : November.

Rare ; once collected in Karivara forests at *ca* 700 m ; *Vajravelu* 48914.

8. VISCUM L.

1a. Internodes flat ; leaves present (scaly)	...	*V. nepalense*	2
1b. Internodes tetragonous ; leaves absent	...	*V. angulatum*	1

1. **Viscum angulatum** Heyne ex DC. Prodr. 4 : 283. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 225. 1886 ; Gamble, Fl. Pres. Madr. 1260. 1925, Repr. ed. 2 : 881. 1957. *V. ramosissimum* Wall. ex Wight, Ic. t. 1017. 1845 ; Hook. *l.c.* ; Gamble *l.c.*

Pendulous, slender branched, parasitic shrubs. Flowers sessile, minute, in triads. Female flowers central. Berries minute, globose.

Fl. & Fr. : February.

Rare ; once collected in Ayyappan temple area.

2. **Viscum nepalense** Spreng. Syst. Veg. 4 : 47. 1827 ; Danser in Blumea 4 : 283. 1936. *V. articulatum* auct. non Burm. f. 1768 ; Hook. f. Fl. Brit. Ind. 5 : 226. 1886 ; Gamble, Fl. Pres. Madr. 1260. 1925, Repr. ed. 2 : 881. 1957.

Pendulous, branched, parasitic shrubs ; branchlets flat, decussate. Leaves 0.5 0.75 mm, erect, obtuse. Flowers in fascicles ; female terminal and male lateral. Fruits globose.

Fl. & Fr. : February October.

Common on forest trees. Chindaki forest, Chitoor - Agali, Mukkali.

Danser *l.c.* considers *V. nepalense* Spreng. to be distinct from *V. articulatum* Burm. f. Rao (in J. Indian Bot. Soc. 36 : 113 - 168. 1957) on the contrary considers the Burman species to be conspecific with that of Sprengel's. Danser's view is followed here.

112. SANTALACEAE

SCLEROPYRUM Arn. *nom. cons.*

Scleropyrum pentandrum (Dennst.) Mabberley in Taxon 26 : 533. 1977. *Pothos pentandrum* Dennst. Schluess. Hort. Ind. Malab. 33. 1818. *Scleropyrum wallichiana* (Wight & Arn.) Arn. in Mag. Zool. Bot. 2 : 550. 1838 ; Wight. Ic. t. 241. 1839 ; Hook. f. Fl. Brit. Ind. 5 : 234. 1886 ; Gamble, Fl. Pres. Madr. 1262. 1925, Repr. ed. 2 : 884. 1957.

Small trees, 5 7 m, with thick, sharp spines. Leaves oavte - oblong, glabrous. Flowers red, in catkin like spikes, from leafless axils. Perianth lobes 5, tufted within. Drupes red, pyriform, with thick pedicels.

Fl. & Fr. : October - Aril.

Common ; in lower Ghats ; Mukkali forest, Kudam - Siruvani forest.

Santalum album L. is found in dry deciduous forests and also cultivated by the Forest Department for the scented heartwood. '*Sandhanam*' (Tam.) & (Mal.).

113. BALANOPHORACEAE

BALANOPHORA J.R. & G. Forst.

Balanophora fungosa Forst. ssp. **indica** (Arn.) Hassen in Dansk Bot. Ark. 28 : 100. 1972. *Langsdorffia indica* Arn. in Ann. Nat. Hist. 2 : 37. 1838. *Balanophora indica* (Arn.) Wall. ex Griff. in Trans. Linn. Soc. London 20 : 95. 1846 ; Hook. f. Fl. Brit. Ind. 5 : 237. 1886 ; Gamble, Fl. Pres. Madr. 1263. 1925. Repr. ed. 2 : 885. 1957.

Fleshy, glabrous, root parasites. Tubers crowded, reddish - brown. Leaf scales spiral. Male heads obovoid. Female heads globose. Flowers bracteate. Tepals 4 or 5, reflexed. Stamens free to connate into synandrium. Fruits minute, 1 - seeded.

Fl. & Fr. : December January.

Common ; in shady and wet places ; Mukkali forest.

114. BUXACEAE

SARCOCOCCA Lindl.

Sarcococca trinervia Wight, Ic. t. 1877. 1852 ; Gamble, Fl. Pres. Madr. 1265. 1925 ; Repr. ed. 2 : 885. 1957.

Large, evergreen shrubs, 3 - 5 m. Leaves 3 - nerved, lanceolate, long - acuminate at apex, acute at base. Flowers yellow, in short racemes. Tepals 4 in male and 6 in female. Stamens 4. Styles 2. Berries fleshy, green, 1 2 seeded.

Fl. & Fr. : December - January.

Not common ; in upper Ghats ; Valiyaparathode forest.

115. EUPHORBIACEAE

1a. Flowers without perianth ... EUPHORBIA 16

1b. Flowers with perianth :

2a. Stamens of outer series opposite sepals :

3a. Leaves 3 foliolate ... BISCHOFIA 7

3b. Leaves simple :

4a. Male flowers in fascicles :

5a. Petals present :

6a. Fruit a drupe ... BRIDELIA 9

6b. Fruit a capsule :

7a. Stamens 5 ... CHROZOPHORA 10

7b. Stamens 12 15 ... CLEISTANTHUS 12

5b. Petals absent :

8a. Styles connate ... GLOCHIDION 20

8b. Styles free :

9a. Styles dilated ... DRYPETES 14

9b. Styles not dilated :

10a. Pistillode present :

11a. Fruits berry, fleshy ... KIRGANELIA 23

11b. Fruits capsular, dry or fleshy ... SECURINEGA 30

10b. Pistillode absent :

12a. Disk absent :

13a. Leaves more than 5 cm long ... SAUROPUS 28

13b. Leaves less than 5 cm long ... BREYNIA 8

12b. Disk present ... PHYLLANTHUS 26

4b. Male flowers in spikes :

14a. Seeds without aril :

15a. Disk present ... ANTIDESMA 3

15b. Disk absent ... APORUSA 4

14b. Seeds with aril ... BACCAUREA 5

2b. Stamens of outer series alternate with sepal :

16a. Petals present :

17a. Leaves digitately lobed ... JATROPHA 22

17b. Leaves not digitately lobed :

18a. Leaves opposite ... TREWIA 32

18b. Leaves alternate :

19a. Leaves lepidote scaly beneath ... CROTON 13

19b. Leaves not lepidote scaley beneath :

20a. Sepals of male flowers imbricate :

21a. Leaves peltate ; fruit a capsule ... MALLOTUS 25

21b. Leaves not peltate ; fruit a drupe :

22a. Branchlets white tomentose GIVOTIA 19

22b. Branchlets not white-tomentose ... FAHRENHEITIA 18

20b. Sepals of male flowers valvate ... AGROSTISTACHYS 2

16b. Petals absent :

23a. Sepals of male flowers imbricate ... BALIOSPERMUM 6

23b. Sepals of male flowers valvate :

24a. Calyx of male flowers closed in bud :

25a. Styles not connate :

26a. Filaments free :

27a. Anthers with connectives :

28a. Styles entire ... MACARANGA 24

28b. Styles not entire ... CLEIDION 11

27b. Anthers without connectives ... ACALYPHA 1

26b. Filaments connate :

29a. Trees ... EPIPRINUS 15

29b. Shrubs ... HOMONOIA 21

25b. Styles connate ... TRAGIA 31

24b. Calyx of male flowers open in bud :

30a. Trees or shrubs :

31a. Calyx 3 - 5 - lobed ... SAPIUM 27

31b. Calyx 5 - partite ... ENCOLCARIA 17

30b. Herbs ... SEBASTIANIA 29

1. ACALYPHA L.

1a. Male and female flowers on separate spikes :

2a. Female spikes branched ; styles more than 3 ... *A. racemosa* 4

2b. Female spikes unbranched ; styles 3 ... *A. alnifolia* 1

1b. Male and female flowers on same spikes :

3a. Petioles shorter than leaf blade ... *A. fruticosa* 8

3b. Petioles as long as or longer than leaf blade ... *A. ciliata* 2

1. **Acalypha alnifolia** Klein ex Willd. Sp. Pl. 4 : 525. 1805 ; Hook. f. Fl. Brit. Ind. 5 : 415. 1887 ; Gamble, Fl. Pres. Madr. 1330. 1925, Repr. ed. 2 : 930. 1957.

Small shrubs with densely hispid branchlets. Leaves elliptic ovate, acute, rounded at base, crenate - serrate. Male flowers in elongate slender cylindric spikes. Female spikes short. Bracts dentate, cupular, enclosing the ovary.

Fl. & Fr. : October.

Common ; in lower Ghats ; hill near Malampuzha dam.

2. **Acalypha ciliata** Forsk. Fl. Aegypt. Arab. 162. 1775 ; Hook. f. Fl. Brit. Ind. 5 : 417. 1887 ; Gamble, Fl. Pres. Madr. 1330. 1925, Repr. ed. 2 : 930. 1957.

Erect, much - branched, annual herbs. Leaves membranous, ovate, serrate, glandular, cuspidate, acuminate. Bracts campanulate with long, subulate, hispid teeth. Flowers greenish, in spikes. Female flowers few, crowded at the lower half. Capsules 3 - lobed, glabrous.

Fl. & Fr. : July August.

Fairly common ; in lower Ghats ; Bhavani bank Mukkali, Chindaki forest.

3. **Acalypha fruticosa** Forsk. Fl. Aegypt. Arab. 161. 1775 ; Hook. f. Fl. Brit. Ind. 5 : 415. 1887 ; Gamble, Fl. Pres. Madr. 1331. 1925, Repr. ed. 2 : 931. 1957. '*Aathathazhai*' (Tam.).

Much, branched, strong smelling shrubs. Leaves ovate, acute acuminate, glandular beneath, crenate - dentate. Glands waxy, yellow. Flowers pale yellow, in axillary spikes ; female few, at the base of many - flowered male spikes. Bracts folded, crenate, villous, glandular.

Fl. & Fr. : October.

Common ; in lower Ghats ; Mukkali forest.

4. **Acalypha racemosa** Heyne ex Baill. Etud. Gen. Euphorb. 443. 1858. *A. paniculata* Miq. Fl. Ind. Bat. 1 : 406. 1859 ; Hook. f. Fl. Brit. Ind. 5 : 415. 1887 ; Gamble, Fl. Pres. Madr. 1330. 1925, Repr. ed. 2 : 930. 1957. '*Vaila - kuppameni*' (Mal.).

Slender, branched herbs. Leaves 3.0 7.5 × 2 4 cm, membranous, long - petioled, ovate, serrate, acuminate, rounded - cordate at base, hairy. Male flowers in axillary spikes. Female in lax terminal panicles. Bracts minute, subtending 3 female flowers. Styles *ca* 9.

Fl. & Fr. : July November.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Pothundy - Kaikatty forest, Walayar forest.

2. AGROSTISTACHYS Dalz.

1a. Leaves serrate ; female flowers solitary ... *A. indica* 2

1b. Leaves entire ; female flowers in racemes ... *A. borneensis* 1

1. **Agrostistachys borneensis** Becc. Nelle For. Born. 331. 1902. *A. longifolia* (Wight) Trimen, Cat. Pl. Ceylon 81. 1885 non (Muell. - Arg.) Kurz 1875 ; Hook. f. Fl. Brit. Ind. 5 : 407. 1887 ; Airy Shaw Euphorb. Borneo 27. 1975. *A. meeboldii* Pax & Hoffm. in Engl. Pflanzenr. 57 : 100. 1912 ; Gamble, Fl. Pres. Madr. 1318. 1925, Repr. ed. 2 : 922. 1957 ; Balakrishnan in J. Bombay Nat. Hist. Soc. 67 : 304. 1970. *Sarcoclinum longifolium* Wight, Ic. tt. 1887 & 1888. 1852. '*Mancherai*' (Tam.), '*Mulimpala*' (Mal.).

Evergreen, small trees, 7 12 m. Leaves 20 - 36 × 4 - 7 cm, thick - coriaceous, obovate oblanceolate, spathulate, crowded at the ends of branches. Flowers yellow, in elongate, spiciform axillary racemes. Bracts ovate, denticulate. Male flowers 3 5 in each bract. Sepals 2 3, entire or lobed. Petals 5 ovate. Stamens 10. Female flowers solitary in each bract. Sepals 5, free. Petals 5, ovate. Capsules of 3, bivalved, depressed, red cocci.

Fl. & Fr. : December March.

Common in Ghats ; Silent Valley R.F., Thuthampara forest, Vazhakundu estate area.

2. **Agrostistachys indica** Dalz. in Hook. Kew J. Bot. 2 : 41. 1850 ; Bedd. Ic. t. 241. 1968 - 74 ; Hook. f. Fl. Brit. Ind. 5 : 406. 1887 ; Gamble, Fl. Pres. Madr. 1317. 1925, Repr. ed. 2 : 929. 1957 ; Balakrishnan in J. Bombay Nat. Hist. Soc. 67 : 301. 1970.

Shrubs or small trees, 5 - 7 m. Leaves alternate, elliptic oblong or lanceolate spathulate, acute at both ends. Flowers white ; males in catkin like racemes, in axillary clusters, shorter than petioles. Sepals 5, membranous, ovate. Petals rounded. Capsules woody, globose.

Fr. : December.

Not common ; in upper Ghats ; in Poochipara sholas.

3. ANTIDESMA L.

1a. Stamens 5	...	*A. menasu* 2
1b. Stamens 2	...	*A. acidum* 1

1. **Antidesma acidum** Retz. Obs. Bot. 5 : 30. 1788. *A. diandrum* (Roxb.) Roth. Nov. Pl. Sp. 369. 1821 ; Hook. f. Fl. Brit. Ind. 5 : 361. 1887 *p.p.* ; Gamble, Fl. Pres. Madr. 1298. 1925, Repr. ed. 2 : 908. 1957. *A. lanceolarium* Wall. ex Wight, Ic. t. 766. 1844. *Stilago diandra* Roxb. Pl. Cor. t. 166. 1802. '*Asaripuli*' (Tam.).

Deciduous shrubs, 3 5 m. Leaves thin, elliptic or obovate, acute. Flowers greenish, in slender racemes. Bracts ovate. Perianth lobes 4 5. Fruits red, ellipsoid.

Fl. & Fr. : July October.

Common ; in Ghats ; Anavayee forest, Chindaki, Dhoni R.F., Mukkali forest.

Fruits acidic, edible.

2. **Antidesma menasu** Miq. ex Tul. in Ann. Sci. Nat. Bot. ser. 3. 15 : 215. 1851 : Hook. f. Fl. Brit. Ind. 5 : 364. 1887 ; Gamble, Fl. Pres. Madr. 1297. 1925, Repr. ed. 2 : 908. 1957.

Trees, 10 - 15 m ; young twigs pubescent. Leaves 12 - 20 × 5 - 7 cm, elliptic - oblong, glabrous, acuminate - mucronate, rounded at base. Stipules ovate - lanceolate. Flowers yellow, pedicelled, in racemes. Calyx 4 lobed, hairy. Stamens 5. Drupes red, tipped by stigmas, 1 - seeded.

Fl. & Fr. : April - July.

Common ; in Ghats ; Kaikatty forest, Kudam - Siruvani forest, Silent Valley R.F.

Fruits edible.

The genus *Antidesma* is treated under the family Stilaginaceae (Airy Shaw in Willis, A Dictionary of the flowering plants and ferns ed. 8. 1105. 1973).

4. APORUSA BL.

1a. Male catkins less than 2 cm long ; capsules villous	...	*A. acuminata* 1
1b. Male catkins more than 2 cm long ; capsules glabrous	...	*A. lindleyana* 2

1. **Aporusa acuminata** Thw. Enum. 288. 1861 ; Hook. f. Fl. Brit. Ind. 5 : 348. 1887 ; Gamble, Fl. Pres. Madr. 1309. 1925, Repr. ed. 2 : 916. 1957 (*'Aporosa'*).

Large shrubs or small trees, 3 5 m. Leaves lanceolate, caudate acuminate, acute at base. Female flowers sessile, hirsute. Sepals ciliate. Fruits ovoid, sparsely villous.

Rare ; once collected in Karapara river forests at *ca* 900 m in April 1977 ; *Vajravelu* 48975.

2. **Aporusa lindleyana** (Wight) Baill. Etud. Gen. Euphorb. 645. 1858 ; Bedd. Fl. Sylv. t. 286. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 349. 1887 ; Gamble, Fl. Pres. Madr. 1309. 1925, Repr. ed. 2 : 916. 1957. *Scopa lindleyana* Wight, Ic. t. 361. 1840. *'Vittil'* (Tam.), *'Vetti'* (Mal.).

Small trees, 7 10 m. Leaves elliptic oblong, glabrous, acuminate, acute at base. Stipules ovate, ciliate. Flowers dioecious. Calyx 4 lobed. Stamens 3 or 4. Capsules smooth, globose, stalked, in axillary clusters.

Rare ; once collected in Mukkali forest at *ca* 300 m in May 1966 ; *Vajravelu* 27716.

5. Baccaurea Lour.

Baccaurea courtallensis (Wight) Muell. - Arg. in DC. Prodr. 14 : 459. 1856 ; Hook. f. Fl. Brit. Ind. 5 : 367. 1887 ; Gamble, Fl. Pres. Madr. 1310. 1925, Repr. ed. 2 : 916. 1957. *B. sapida* Bedd. Fl. Sylv. t. 280. 1872 *p.p.* *Pierardia courtallensis* Wight, Ic. t. 1912. 1852. *'Muttathuri'* (Mal.). (Plate-11).

Evergreen trees, 5 10 m. Leaves shining, oblanceolate, acuminate. Flowers crimson, in long, pendulous racemes on trunks in great profusion. Calyx 4 5 lobed. Petals absent. Stamens 4 8. Capsules ovoid.

Fl. & Fr. : March July.

Common ; in lower Ghats ; Marapalam forest Pothundy, Mukkali forest, Vattapara - Siruvani forest.

When in full bloom the whole trunk appears as a crimson mass. Fruit edible.

6. Baliospermum Bl.

Baliospermum montanum (Willd.) Muell. Arg. in DC. Prodr. 15 : 1125. 1866 ; Gamble, Fl. Pres. Madr. 1342. 1925, Repr. ed. 2 : 939. 1957.

Jatropha montana Willd. Sp. Pl. 4 : 563. 1805. *Baliospermum axillare* Bl. Bijdr. 604. 1826 ; Hook. f. Fl. Brit. Ind. 5 : 461. 1887. '*Naaga danti*' (Mal.).

Stout undershrubs. Leaves alternate, 10 15 × 5 7 cm, ovate oblong to lanceolate ; petioles long with a pair of stipular glands at base. Flowers pale yellow in racemes. Perianth lobes orbicular, erose. Stamens 15 20. Styles stout, 2 fid. Capsules obovoid, crustaceous.

Fl. & Fr. : November - December.

Fairly common ; in lower Ghats ; Chindaki forest, Panthanthode forest.

Seeds are of medicinal value.

7. Bischofia Bl.

Bischofia javanica Bl. Bijdr. 1168. 1827 ; Bedd. Fl. Sylv. t. 259. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 345. 1887 ; Gamble, Fl. Pres. Madr. 1312. 1925, Repr. ed. 2 : 918. 1957. *Microelus roeperianus* Wight & Arn. in Edinburgh New Philos. J. 14 : 298. 1838 ; Wight, Ic. t. 1880. 1852. '*Thondi*' (Tam.), '*Thirippu*', '*Cholavengai*' (Mal.).

Large, deciduous trees, 20 - 30 m. Leaves 3 foliolate ; leaflets broadly elliptic ovate, crenate, acute, oblique below. Flowers greenish. Calyx lobes 5, white, reflexed in male, lanceolate in female. Petals absent. Berries fleshy, green, smooth, 6 8 seeded.

Fl. & Fr. : February August.

Common ; in Ghats ; Attappadi forest Mukkali, Muthikulam forest Siruvani, Silent Valley.

8. Breynia J.R. & G. Forst.

1a. Calyx enlarged in fruit ; styles bifid ... *B. retusa* 1

1b. Calyx not enlarged in fruit ; styles not bifid ... *B. vitis idaea* 2

1. **Breynia retusa** (Dennst.) Alston in Ann. Roy. Bot. Garden (Peradeniya) 11 : 204. 1929 ; Airy Shaw in Kew Bull. 26 : 227. 1972. *Phyllanthus retusa* Dennst. Schluess. Hort. Malab. 31. 1818. *P. patens* Roxb. Fl. Ind. 3 : 667. 1832. *Melanthesa retusa* (Dennst.) Kostel. in Allg. Med. Pharm. Flora 5 : 1771. 1835. *Breynia patens* (Roxb.) Rolfe in J.

Bot. 11 : 359. 1882 ; Hook. f. Fl. Brit. Ind. 5 : 329. 1887 ; Gamble, Fl. Pres. Madr. 1304. 1925, Repr. ed. 2 : 912. 1957.

Shrubs. Leaves alternate, membranous, elliptic, glaucous beneath, obtuse. Flowers brownish yellow, pendulous. Perianth accrescent in fruit. Calyx saucer - like, red in fruit. Styles slender, bifid. Fruits depressed globose, orange.

Fl. & Fr. : April May.

Not common ; in open forests in Ghats ; Karivara slopes, Kudam - Siruvani forest, Malampuzha, Silent Valley R.F.

2. **Breynia vitis idaea** (Burm. f.) Fischer in Bull. Misc. Inform. Kew 65. 1932 ; Airy Shaw in Kew Bull. 26 : 227. 1972. *Rhamnus vitis idaea* Burm. f. Fl. Ind. 61. 1768. *Breynia rhamnoides* (Retz.) Muell. Arg. in DC. Prodr. 15 : 440. 1866 ; Hook. f. Fl. Brit. Ind. 5 : 330. 1887 ; Gamble, Fl. Pres. Madr. 1304. 1925, Repr. ed. 2 : 912. 1957. *Phyllanthus rhamnoides* Retz. Obs. Bot. 5 : 30. 1788. *Melanthesa rhamnoides* (Retz.) Bl. Bijdr. 591. 1826 ; Wight Ic. t. 1898. f. 1. 1852. '*Manipullanti*' (Tam.).

Large shrubs, 3 5 m. Leaves membranous, elliptic or ovate, obtuse. Female flowers reddish ; male flowers pedicellate, yellow. Perianth lobes 6. Fruits globose, shining, red.

Fl. & Fr. : July February.

Common ; in open evergreen forests ; Dhoni R.F., Karivara slopes, Mukkali forest, Panthanthode.

9. BRIDELIA Willd.

1a. Trees ; leaf base obtuse	...	*B. retusa*	1
1b. Scandent shrubs ; leaf base cordate	...	*B. scandens*	2

1. **Bridelia retusa** (L.) Spreng. Syst. Veg. 3 : 48. 1826 ; Bedd. Fl. Sylv. t. 260. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 268. 1887 *p.p.* ; Gamble, Fl. Pres. Madr. 1280. 1925, Repr. ed. 2 : 896. 1957 ; Airy Shaw in Kew Bull. 26 : 230. 1972. *Clutia retusa* L. Sp. Pl. 1042. 1753. '*Mullu maruthu*' (Tam.), '*Mukkayini*' (Mal.).

Small trees, *ca* 7 m ; stems thorny when young. Leaves alternate, elliptic oblong, glabrous, chartaceous, retuse at apex, obtuse at base. Flowers yellow, in clusters in spikes ; females larger than males. Drupes globose, black.

Fl. & Fr. : July December.

Common ; in deciduous forests ; Attappadi forest - Mukkali, Chindaki forest, Panthanthode, Pothundy forest, Walayar forest.

2. **Bridelia scandens** (Roxb.) Willd. Sp. Pl. 4 : 979. 1806 ; Gamble, Fl. Pres. Madr. 1281. 1925. Repr. ed. 2 : 896. 1957. *Clutia scandens* Roxb. Pl. Cor. t. 173. 1802 (*Cluytia*).

Scandent shrubs ; stems thorny. Leaves alternate elliptic, fulvous - pubescent beneath, glabrous above, obtuse at apex, rounded or cordate at base. Flowers greenish - yellow, in distichous spikes with small leaves. Disc without bristles. Fruits globose, black.

Fl. & Fr. : October - February.

Common ; in Ghats ; Mukkali forest, Olipara, Pothundy Kaikatty forest.

10. CHROZOPHORA Juss. *nom. cons.*

Chrozophora rottleri (Geiseler) Spreng. Syst. 3 : 850. 1826 ; Pax & Hoffm. in Engl. Pflanzenr. 57 : 19. 1912 ; Gamble, Fl. Pres. Madr. 1317. 1925. Repr. ed. 2 : 921. 1957. *Croton rottleri* Geiseler, Croton Monogr. 54. 1807.

Tall herbs with fulvous tomentose branchlets. Leaves alternate, broadly ovate, sinuate undulate. Flowers (male) crowded in racemes in upper axils ; female ones in lower axils, pedicelled. Perianth lobes 10 ; outer ovate concave ; inner petaloid, free. Styles 3, red, dilated. Capsules depressed, 3 lobed, tomentose.

Fl. & Fr. : May.

Common ; in plains ; Walayar river bed.

11. CLEIDION Bl.

Cleidion spiciflorum (Burm. f.) Merr. Interpr. Rumph. Herb. Ambion. 322. 1917 ; Airy Shaw in Kew Bull. 26 : 234. 1972. *Acalypha spiciflora* Burm. f. Fl. Ind. 203. 1768. *Cleidion javanicum* Bl. Bijdr. 613. 1826 ; Hook. f. Fl. Brit. Ind. 5 : 444. 1887 ; Gamble, Fl. Pres. Madr. 1325. 1925, Repr. ed. 2 : 927. 1957. '*Yellari*' (Mal.).

Trees, 10 15 m. Leaves alternate, 9 15 × 3.5 5.5 cm, elliptic, acuminate, long - petioled. Flowers greenish - yellow, in axillary racemes.

Calyx 3 - 5 lobed in female. Stamens numerous. Capsules 1 3, 2 valved, long pedicelled.

Fl. & Fr. : January March.

Fairly common ; in lower Ghats ; Dhoni R.F., Mukkali forest.

12. CLEISTANTHUS Hook. f. ex Planch.

Cleistanthus collinus (Roxb.) Benth. in Benth. & Hook. f. Gen. Pl. 3 : 268. 1880 ; Hook. f. Fl. Brit. Ind. 5 : 274. 1887 ; Gamble, Fl. Pres. Madr. 1282. 1925, Repr. ed. 2 : 897. 1957. *Clutia collina* Roxb. Pl. Cor. t. 169. 1802. '*Wodayu*', '*Oduvan*' (Tam.).

Small, deciduous trees, 5 - 7 m. Leaves alternate, coriaceous, elliptic - obovate to orbicular, retuse at apex. Flowers greenish yellow, in axillary clusters, villous. Calyx lobes lanceolate. Petals linear. Capsules hard, dark brown, shining.

Fl. & Fr. : February - April.

Fairly common ; in lower Ghats ; Mangalam dam area, Olipara, Walayar forest.

Tender leaves glaucous glabrous, and deadly poisonous.

13. CROTON L.

1a. Inflorescences scaly :
- 2a. Stamens more than 12 ; filaments glabrous ... *C. zeylanicus* 4
- 2b. Stamens less than 12 ; filaments villous ... *C. malabaricus* 3

1b. Inflorescences glandular :
- 3a. Perianth lobes (female) 10 ... *C. aromaticus* 1
- 3b. Perianth lobes (female) 5 ... *C. bonplandianus* 2

1. **Croton aromaticus** L. Sp. Pl. 1005. 1753 ('*aromaticum*') ; Gieseler, Croton. Monogr. 21. 1807 ; Bedd. Fl. Sylv. t. 283 A. 1872 ; Chakraborty & Balakrishnan in Bull. Bot. Surv. Ind. 26 : 200. 1984. *C. laccifer* L. Sp. Pl. 1005. 1753 ('*lacciferum*') ; Wight, Ic. t. 1915. 1852 ; Gamble, Fl. Pres. Madr. 1315. 1925, Repr. ed. 2 : 920. 1957 ; Airy Shaw in Kew Bull. 26 : 248. 1972. '*Teppadai*' (Tam.).

Small trees, 5 7 m, with tomentose branchlets. Leaves ovate or lanceolate, fulvous - stellate tomentose beneath, acuminate, rounded at base. Flowers white, in tomentose racemes. Petals 5, oblong, recurved, smaller than the ovate ciliate sepals. Capsules scabrid.

Fl. & Fr. : April.

Common ; in lower Ghats ; Anavayee area ; Ayyappankoil Kaikatty forest.

2. **Croton bonplandianus** Baill. in Adansonia 4 : 339. 1864 ; Croizat in J. Bombay Nat. Hist. Soc. 41 ; 573. 1940 ('*bonplandianum*'). *C. sparciflorus* Morong in Ann. New York Acad. Sci. 7 : 221. 1893 ; Gamble, Fl. Pres. Madr. 1316. 1925, Repr. ed. 2 : 920. 1957. '*Reilpoondu*' (Tam.).

Herbs with white warty outgrowths on tender parts. Leaves ovate - lanceolate, serrate, acute. Flowers pale greenish yellow, in racemes. Perianth lobes 10, outer ones ovate, inner oblong, villous. Female ones lanceolate. Ovary white scaly. Capsules with warty epicarps.

Fl. & Fr. : All seasons.

Common weed in plains ; Walayar dam area.

3. **Croton malabaricus** Bedd. Ic. t. 181. 1868 74 ; Hook. f. Fl. Brit. Ind. 5 : 386. 1887 ; Gamble, Fl. Pres. Madr. 1314. 1925, Repr. ed. 2 : 919. 1957. '*Thavattu polavu*' (Tam.).

Small trees, 5 8 m. Leaves rhomboid ovate, silver - scaly below, acuminate, cuneate at base. Flowers in terminal racemes. Calyx 5 - lobed. Stamens 10 ; filaments villous. Capsules 3 valved.

Rare ; once collected in Mukkali forest at *ca* 600 m in July 1969. *Vajravelu* 32058.

4. **Croton zeylanicus** Muell. Arg. in Linnaea 34 : 107. 1865. *C. reticulatus* Heyne ex Muell. Arg. in DC. Prodr. 15 : 580. 1866 ; Bedd. Ic. t. 386. 1868 74 ; Hook. f. Fl. Brit. Ind. 5 : 386. 1887 ; Gamble, Fl. Pres. Madr. 1314. 1925, Repr. ed. 2 : 919. 1957.

Shrubs. Leaves alternate or opposite, elliptic ovate or linear - lanceolate, glabrous above, acuminate, acute or rounded at base ; basal glands stalked. Flowers dull white. Sepals of male woolly. Petals oblong, woolly. Capsules oblong, stellately lepidote.

Fl. & Fr. : October - March.

Common ; in Ghats. Palagapandy estate area, Silent Valley R.F.

Croton tiglium L. '*Neervaalam*' (Tam.), is cultivated in gardens as an ornamental.

14. DRYPETES Vahl

1a. Flowers pedicellate ; leaves entire ... *D. elata* 1

1b. Flowers sessile ; leaves serrate ... *D. oblongifolia* 2

1. **Drypetes elata** (Bedd.) Pax & Hoffm. in Engl. Pflanzenr. 81 : 268. 1922. *Hemicyclia elata* Bedd. Fl. Sylv. t. 279. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 339. 1887 ; Gamble, Fl. Pres. Madr. 1300. 1925, Repr. ed. 2 : 909. 1957.

Trees, 20 25 m with lofty straight poles. Leaves elliptic, abruptly acuminate, shining ; nerves 10 - 12 pairs. Flowers pale greenish, in clusters. Calyx 4 lobed, fulvous tomentose, inner larger. Petals absent. Stamens 12. Fruits obovoid, with elongate pedicels.

Fl. & Fr. : January April.

Common ; in Ghats ; Mukkali, Panthanthode.

Wood is durable ; used for building purposes.

2. **Drypetes oblongifolia** (Bedd.) Airy Shaw in Kew Bull. 23 : 57. 1969. *Laneasagum oblongifolium* Bedd. in Madras J. Lit. Sci. n.s. 6 : 71. 1861. *Cyclostemon macrophyllus* Bl. var. *sessiliflora* Bedd. Fl. Sylv. t. 278. 1872. *C. macrophyllus* auct. non Bl. 1825 ; Hook. f. Fl. Brit. Ind. 5 : 340. 1887 ; Gamble, Fl. Pres. Madr. 1302. 1925, Repr. ed. 2 : 911. 1957. *C. macrophyllus* Bl. var. *peninsularis* Hook. f. *l.c.* 341. '*Malapayin*' (Mal.).

Trees, 15 - 20 m with fluted stems. Leaves 7 20 × 3 9 cm, oblong, coriaceous, glabrous, abruptly acuminate at apex ; nerves *ca* 10 pairs. Flowers yellowish white, in clusters on old wood. Calyx lobes hairy. Stamens many. Stigmas fleshy. Drupes hirsute, yellow.

Fl. & Fr. : December May.

Common ; in Ghats : Ayyappankoil Kaikatty forest, Mukkali forest, Silent Valley R.F.

15. EPIPRINUS Griff.

Epiprinus mallotiformis (Muell. Arg.) Croizat in J. Arnold Arbor. 23 : 52. 1942. *Symphyllia mallotiformis* Muell. - Arg. in Linnaea 34 : 156. 1865 ; Gamble, Fl. Pres. Madr. 1323. 1925, Repr. ed. 2 : 925. 1957. *Cephalocroton indicum* Bedd. Fl. Sylv. t. 261. 1872. *Adenochlaena indica* (Bedd.) Bedd. ex Hook. f. Fl. Brit. Ind. 5 : 418. 1887.

Evergreen trees, 5 10 m ; branchlets puberulous. Leaves 5 12 × 3 6 cm, elliptic, coriaceous, entire. Flowers yellow, small, in spikes. Calyx 4 lobed in male, glabrous ; 5 lobed in female, hairy. Stamens 5. Capsules 3 - lobed, depressed.

Fl. & Fr. : September March.

Common ; in Ghats ; forest near Palagapandi estate, Panthanthode, Silent Valley R.F.

16. EUPHORBIA L.

1a. Prostrate herbs ; leaves less than 1 cm long :

2a. Involucres campanulate ... *E. thymifolia* 3

2b. Involucres tubular ... *E. prostrata* 2

1b. Procumbent herbs : leaves more than 2 cm long ... *E. hirta* 1

1. **Euphorbia hirta** L. Sp. Pl. 454. 1753 ; Gamble. Fl. Pres. Madr. 1275. 1925, Repr. ed. 2 : 892. 1957. *E. pilulifera* auct. non L. 1753. Hook. f. Fl. Brit. Ind. 5 : 250. 1887 ; Smith in Kew Bull. 26 : 264. 1972. *Ammanpacharisi'* (Tam.).

Low, diffuse, milky herbs, with yellowish hairy stems. Leaves obliquely elliptic lanceolate, serrulate, acute, hairy. Flowers pale greenish, in capitate cymes of pairs. Limb of glands minute. Female pendulous. Cocci appressed pubescent.

Fl. & Fr. : All seasons.

Common ; in waste places ; Mukkali forest, Walayar dam area.

2. **Euphorbia prostrata** Ait. Hort. Kew. 2 : 139. 1789 ; Hook. f. Fl. Brit. Ind. 5 : 266. 1887 ; Gamble, Fl. Pres. Madr. 1276. 1925, Repr. ed. 2 : 893. 1957.

Spreading, purple stemmed herbs. Leaves opposite, distichous, elliptic - obovate, crenulate, oblique at base, *ca* 6 × 4 mm. Cyathia axillary ; glands 4. Male florets 1 4 ; female pendulous. Style 3 - fid. Capsules beaked, with stiff spreading hairs on the angles.

Fl. & Fr. : June.

Common in plains ; Olavakkot.

3. **Euphorbia thymifolia** L. Sp. Pl. 454. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 232. 1887 ; Gamble, Fl. Pres. Madr. 1276. 1925, Repr. ed. 2 : 893. 1957 ; Airy Shaw in Kew Bull. Addl. Ser. 4 : 112. 1975. *Chamaesyce thymifolia* (L.) Millspaugh, Publ. Field Mus. Nat. Hist. Bot. ser. 2 : 412. 1909.

Annual, hispid herbs. Leaves opposite, oblong or ovate, crenulate at tip, obliquely subcordate at base. Cyathia solitary, axillary, appressed - hairy ; gland minute. Male florets 1 4. Female one pendulous. Cocci appressed stiff hairy. Seeds 4 angled.

Fl. & Fr. : All seasons.

Common weed ; in waste places : Malampuzha canal, Nemmara.

17. EXCOECARIA L.

Excoecaria crenulata Wight, Ic. t. 1865. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 473. 1888 ; Gamble, Fl. Pres. Madr. 1345. 1925, Repr. ed. 2 : 941. 1957. *E. robusta* Hook. f. *l.c.* ; Gamble *l.c.*

Small trees, 5 - 7 m. Leaves lanceolate or oblanceolate, serrate, acuminate, oblique at base. Male flowers greenish, in elongate spikes ; females in short spikes. Calyx 3 - lobed. Stamens 3. Schizocarp fleshy, 3 lobed, pendulous.

Rare ; once collected in Kaikatty forest in Nelliyampathy Ghats at *ca* 950 m in April 1977, *Vajravelu* 48950.

18. FAHRENHEITIA Reichb. & Zoll.

Fahrenheitia zeylanica (Thw.) Airy Shaw in Kew Bull. 20 : 410. 1966. *Desmostemon zeylanicum* Thw. Enum. 278. 1861. *Ostodes zeylanicus* (Thw.) Muell. Arg. in Linnaea 34 : 214. 1865 ; Bedd. Fl. Sylv. t. 274. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 400. 1887 ; Gamble, Fl. Pres. Madr. 1336. 1925, Repr. ed. 2 : 934. 1957.

Large, evergeen trees, 20 25 m. Leaves 15 - 28 × 5 9 cm, oblong - lanceolate, serrate, long - petioled. Flowers pale yellow, in long, pendulous racemes. Calyx lobes orbicular. Petals oblong. Stamens 20. Fruits sub-globose, 6 - ribbed, brown stellate - tomentose.

Fl. & Fr. : October June.

Common ; in lower Ghats ; Ayyappankoil forest - Pothundy, Mukkali, Kudam Siruvani forest.

19. GIVOTIA Griff.

Givotia rottleriformis Griff. in Calcutta J. Nat. Hist. 4 : 388. 1844 ; Wight, Ic. t. 1889. 1852 ; Bedd. Fl. Sylv. t. 285. 1873 ; Hook. f. Fl. Brit. Ind. 5 : 395. 1887 ; Gamble, Fl. Pres. Madr. 1342. 1925. Repr. ed. 2 : 938. 1957 ; Smith in Kew Bull. 22 : 504. 1968. '*Vendalai*', '*Kottaithanakku*' (Tam.).

Deciduous trees, 7 - 10 m. Leaves alternate, 9 - 11 cm across, ovate - orbicular, cordate, white - tomentose beneath, toothed. Petioles with black glands. Flowers white, in lax panicles. Calyx lobes obovate, stellate - pubescent. Petals obovate, glabrous. Stamens 8 - 20, exserted. Drupes subglobose, fulvous - tomentose.

Fl. & Fr. : October - February.

Common ; in lower Ghats ; Agali - Chitoor forest.

20. GLOCHIDION J.R. & G. Forst.

1a. Flower clusters in zigzag branches ; styles truncate ... *G. neilgherrense* 2

1b. Flower clusters not in zigzag branches ; styles conical ... *G. ellipticum* 1

1. **Glochidion ellipticum** Wight, Ic. t. 1906. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 321. 1887 ; Gamble, Fl. Pres. Madr. 2 : 1308. 1925, Repr. ed. 2 : 915. 1957. *G. hohenackeri* Bedd. Fl. Sylv. t. 193. 1873 ; Hook. f. *l. c.* 314.

Trees, 5 - 10 m. Leaves ovate - lanceolate, membranous, glabrous, acuminate at both ends, unequal at base. Male flowers pedicelled ; perianth lobes 3+3, oblong. Stamens 3. Female flowers sessile. Styles conical. Perianth lobes 6, unequal, linear - oblong. Schizocarp depressed at tip.

Fl. & Fr. : September - May.

Common ; in Ghats ; Kaikatty - Pothundy forest, Silent Valley R.F., Panthanthode.

2. **Glochidion neilgherrense** Wight, Ic. t. 1907. 1852 ; Bedd. Fl. Sylv. t. 277. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 316. 1887 ; Gamble, Fl. Pres. Madr. 1307. 1925. Repr. ed. 2 : 914. 1957.

Trees, 5 - 10 m. Leaves elliptic - oblong, chartaceous, glabrous, obtuse or acute, base unequal. Flowers yellow, many, in clusters. Perianth lobes 3+3. Stamens 3. Schizocarp with short thick style.

Rare : once collected in Silent Valley R.F. at *ca* 925 m in December, 1969. *Vajravelu* 33269

21. HOMONOIA Lour.

Homonoia riparia Lour. Fl. Cochinch. 637. 1790 ; Hook. f. Fl. Brit. Ind. 5 : 455. 1887 ; Gamble, Fl. Pres. Madr. 1333. 1925, Repr. ed. 2 : 932. 1957 ; Airy Shaw in Kew Bull. Addl. Ser. 4 : 136. 1975. *Adelia nereifolia* Roth, Nov. Pl. Sp. 375. 1821 ; Wight, Ic. t. 1868. 1852. '*Katallari*' '*Kalloorvanchi*' (Mal.).

Rheophytic shrubs, 2 3 m ; shoots pubescent. Leaves linear - oblong, glandular - scaly beneath, acute, entire. Flowers reddish in elongate spikes. Male flowers pedicelled. Perianth lobes 3. Stamens many. Females sessile. Perianth lobes 5, ovate. Capsules globose, tomentose.

Fl. & Fr. : October - May.

Common on river banks and rocky stream beds ; in Ghats ; Bhavani and Karivara river bed, Dhoni R.F., Mukkali forest, Olipara river side.

22. JATROPHA L.

1a. Leaf margin glandular-hairy	...	*J. gossypiifolia* 2
1b. Leaf margin eglandular	...	*J. curcas* 1

1. **Jatropha curcas** L. Sp. Pl. 1006. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 383. 1887 ; Gamble, Fl. Pres. Madr. 1340. 1925, Repr. ed. 2 : 937. 1957 ; Airy Shaw in Kew Bull. Addl. Ser. 4 : 137. 1975. '*Kaattamanaku*' (Tam.) & (Mal.).

Erect shrubs, 2 - 3 m. Leaves orbicular - ovate, or 3 - 5 - lobed, cordate at base, acute, entire. Flowers yellowish - green. Calyx 5 lobed. Petals hairy inside. Stamens 10. Capsules subglobose, rugose.

Fl. & Fr. : August.

Commonly grown as a hedge plant ; Chindaki - Karivarai, Attappadi - Mukkali, Walayar canal.

Seeds are of medicinal value, oil is extracted ; also grown as hedge plants.

2. **Jatropha gossypiifolia** L. Sp. Pl. 1006. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 383. 1887 ; Gamble, Fl. Pres. Madr. 1340. 1925, Repr. ed. 2 : 937. 1957. '*Atalai*' (Tam.).

Shrubs with dark pinkish stems. Leaves 3 - 5 - lobed, acute. Petioles and stipules with long branched viscid glands. Flowers reddish, in cymes. Calyx glandular hairy. Petals free. Stamens 8. Capsules 3 - lobed, reticulate - rugose.

Fl. & Fr. : All seasons.

Common ; in plains ; Walayar forest.

23. KIRGANELIA JUSS.

Kirganelia reticulata (Poir.) Baill. Etud. Gen. Euphorb. 614. 1858 ; Gamble, Fl. Pres. Madr. 1294. 1925, Repr. ed. 2 : 905. 1957. *Phyllanthus reticulatus* Poir. in Lam. Encycl. 5 : 298. 1804 ; Hook. f. Fl. Brit. Ind. 5 : 288. 1887. '*Poola*', '*Pullanti*' (Tam.).

Straggling shrubs or small trees, up to 5 m, branching profusely. Leaves elliptic, obovate or spathulate, thin. Flowers pale pinkish, in fascicles. Perianth lobes 5, oblong ; outer 2 larger ; inner 3 smaller. Stamens 5. Berris fleshy, globose, purple.

Fl. & Fr. : November - February.

Common ; in plains ; Mathur, Vaniyampara, Olavakkot.

24. MACARANGA Thouars

1a. Panicle branches zigzag ; stamens 6 - 8	...	*M. indica*	1
1b. Panicle branches not zigzag ; Stamens 2 - 3	...	*M. peltata*	2

1. **Macaranga indica** Wight, Ic. t. 1883. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 446. 1887 ; Gamble, Fl. Pres. Madr. 1326. 1925, Repr. ed. 2 : 927. 1957. Airy Shaw in Kew Bull. 26 : 290. 1972.

Trees, 5 - 15 m ; branchlets glaucous. Leaves orbicular, ovate, peltate, yellow glandular beneath, acuminate, 2 glandular near petiole. Stipules large Flowers greenish yellow. Bracts, subulate with petaliform glands. Styles lateral. Capsules glandular.

Fl. & Fr. : October - December.

Common ; in Ghats ; Kaikatty - Padagiri, Silent Valley R.F.

2. **Macaranga peltata** (Roxb.) Muell. - Arg. in DC. Prodr. 15 : 1010. 1866 ; Gamble, Fl. Pres. Madr. 1326. 1925, Repr. ed. 2 : 928. 1957. *Osyris peltata* Roxb. Fl. Ind. 3 : 855. 1832. *Mappa peltata* (Roxb.) Wight, Ic. t.

817. 1844. *Macaranga roxburghii* Wight, Ic. t. 1949 f. 4. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 448. 1887. *M. tomentosa* Wight, Ic. t. 1949 f. 1. 1853 ; Bedd. Fl. Sylv. t. 287. 1872. '*Vatta*' (Mal.), '*Vattakanni*' (Tam.).

Trees, 5 10 m ; branchlets glaucous. Leaves orbicular, entire, red - glandular and villous beneath. Flowers in panicles. Bracts cupular, close, enclosing the flowers. Calyx pubescent. Stamens 2 3. Capsules glandular, muricate.

Rare ; once collected in Mandhampatti (Mukkali) forests at *ca* 500 m in April 1978 ; *N.C. Nair* 56831.

25. MALLOTUS Lour.

1a. Leaves alternate :

2a. Capsules with soft villous spines ... *M. tetracoccus* 5

2b. Capsules with red glands ... *M. philippensis* 2

1b. Leaves opposite :

3a. Mature capsules with hard spines :

4a. Male spikes more than 3 cm long ; stamens more than 20 ... *M. resinosus* 3

4b. Male spikes less than 3 cm long ; stamens less than 20 ... *M. stananthus* 4

3b. Mature capsules with soft villous processes .. *M. beddomei* 1

1. **Mallotus beddomei** Hook. f. Fl. Brit. Ind. 5 : 438. 1887 ; Gamble, Fl. Pres. Madr. 1323. 1925, Repr. ed. 2 : 925. 1957.

Shrubs, 2 3 m ; branchlets compressed. Leaves 5 - 15 × 3 - 6 cm, ovate or oblong, undulate, caudate - acuminate, attenuate at base. Flowers yellow, in slender racemes. Sepals 3 in male flowers, 6 in female ones membranous. Stamens many. Capsules glandular - pubescent.

Fl. & Fr. : August - April.

Common ; in Ghats ; Mukkali forest, Silent Valley R.F.

2. **Mallotus philippensis** (Lam.) Muell. - Arg. in Linnaea 34 : 196. 1865 ; Bedd. Fl. Sylv. t. 289. 1873 ('*philippinensis*') ; Hook. f. Fl. Brit. Ind. 5 : 442. 1887 ; Gamble, Fl. Pres. Madr. 1322. 1925, Repr. ed. 2 : 924. 1957 ; Airy Shaw, Euphor. Borneo 168. 1975. *Croton philippense* Lam, Encycl. 2 : 206. 1786. '*Kapili*' (Tam.) '*Kuramadakku*', '*Manjana*' (Mal.).

Trees, 7 15 m. Leaves 5 - 15 × 2 9 cm, ovate - lanceolate, serrate, red glandular beneath, acuminate. Flowers pale yellow, in racemes.

Perianth lobes 4 in male, 3 in female. Stamens many. Capsules globose, 3 - valved, red - glandular.

Fl. & Fr. : July - December.

Very common ; along streams in lower Ghats ; Kaikatty, Mukkali forest, Panthanthode, Thiruvizhankunnu.

3. **Mallotus resinosus** (Blanco.) Merr. Sp. Blanco. 222. 1918 & Enum. Philipp. Fl. Pl. 2 : 436. 1923 ; Airy Shaw in Kew Bull. 26 : 294. 1972. *Adella resinosa* Blanco. Fl. Filip. ed. 2. 562. 1845. *Claoxylon muricatum* Wight; Ic. t. 1886. 1852. *Axenfeldia intermedia* Baill. Etud. Gen. Euphorb. 419. 1858. *Rottlera muricata* (Wight) Thw. Enum. Pl. Zeyl. 273. 1864. *Mallotus muricatus* (Wight) Muell. Arg. in Linnaea 34 : 191. 1865 *p.p.* ; Hook. f. Fl. Brit. Ind. 5 : 436. 1887 ; Gamble, Fl. Pres. Madr. 1322. 1925, Repr. ed. 2 : 925. 1957. *M. intermedius* (Baill.) Balakr. in Bull. Bot. Surv. Ind. 10 : 245. 1968.

Trees, 5 7 m ; branchlets often flattened. Leaves opposite, 8 - 20 × 3 - 9 cm, rhombic lanceolate repand dentate to entire, acuminate. Flowers few in male spikes. Perianth lobes 4 in male, obovate, reflexed ; 4 6 in female, lanceolate. Stamens many. Capsules with echinate processes, yellow - glandular.

Fl. & Fr. : February - July.

Rare ; in lower Ghats ; Mukkali forest, Pothundy - Kaikatty forest.

4. **Mallotus stenanthus** Muell. - Arg. in Linnaea 34 : 191. 1865 ; Hook. f. Fl. Brit. Ind. 5 : 437. 1887 ; Gamble, Fl. Pres. Madr. 1322. 1925, Repr. ed. 2 : 925. 1957.

Trees, 7 - 10 m ; branchlets flat. Leaves elliptic - ovate, sinuate, narrowed at both ends. Flowers pale yellow, in clusters. Perianth lobes 3 in male, 4 - 5 in female. Female flowers solitary. Capsules yellow glandular, tubercled.

Rare ; once collected in Mukkali forests in October 1965 ; *Vajravelu* 26220.

5. **Mallotus tetracoccus** (Roxb.) Kurz in J. Asiat. Soc. Bengal 16 : 245. 1873 & For. Fl. Brit. Burma 2 : 382. 1877 ; Croizat in J. Arnold Arbor. 21 : 503. 1940 ; Airy Shaw in Kew Bull. 26 : 298. 1972. *Rottlera tetracocca* Roxb. Fl. Ind. 3 : 827. 1832. *Mallotus albus* Muell. Arg. var. *occidentalis* Hook. f. Fl. Brit. India 5 : 429. 1887 ; Gamble, Fl. Pres. Madr. 1321. 1925, Repr. ed. 2 : 924. 1957. '*Vetta kumbil*' (Mal.), '*Mullu polavu*' (Tam.).

Trees, 10 - 15 m ; branchlets grey-tomentose. Leaves 11 - 15 × 9 - 17 cm, peltate, ovate-orbicular, rusty - tomentose, acuminate. Flowers dull yellow, in panicles. Perianth lobes 4, ovate, acute. Capsules 3 - 4 - valved, echinate with soft spines, white - tomentose.

Fl. & Fr. : All seasons.

Common ; in Ghats ; Chindaki forest, Mukkali forest, Padagiri, Silent Valley R.F.

26. PHYLLANTHUS L. emend. Gaertn.

1a. Fruit a fleshy berry	...	*P. emblica*	2
1b. Fruit a dry capsule :			
2a. Anthers erect, dehising vertically :			
3a. Capsules smooth :			
4a. Stipules peltate	...	*P. moderaspatensis*	4
4b. Stipules decurrent	...	*P. rheedii*	5
3b. Capsules verrucose	...	*P. urinaria*	6
2b. Anthers subglobose, dehiscing transversely :			
5a. Stipules peltate :			
6a. Leaves glaucous beneath; male flowers many	...	*P. gardnerianus*	3
6b. Leaves not glaucous ; male flowers few	...	*P. virgatus*	7
5b. Stipules not peltate	...	*P. amarus*	1

1. **Phyllanthus amarus** Schum. & Thonn. Kongl. Danske Vidensk. Selsk. Skr. 4 : 195. 1829 ; Airy Shaw, Euphorb. Borneo 182. 1975. *P. fraternus* Webster in Contr. Gray Herb. 176 : 53. 1955. *P. niruri* auct. non L. 1753 ; Wight, Ic. t. 1894. 1852; Hook. f. Fl. Brit. Ind. 5 : 298. 1887 ; Gamble, Fl. Pres. Madr. 1290. 1925, Repr. ed. 2 : 903. 1957. *P. asperulatus* Hutch. in Kew Bull. 1920 : 27. 1920 ; Sant. in Rec. Bot. Surv. Ind. 16 (1) : 245. 1967. '*Keezha nelli*' (Tam.).

Herbs with slender branches. Leaves oblong, glaucous, obtuse. Stipules lanceolate, scarious. Male flowers few, terminal. Perianth lobes 5, ovate. Stamens 3 ; filaments connate. Female flowers many ; perianth lobes 5, oblong. Capsules glabrous with brownish, tuberculate seeds.

Fl. & Fr. : All seasons.

Common in plains, fallow lands ; Dhoni R.F.

Used in medicines especially for jaundice.

2. **Phyllanthus emblica** L. Sp. Pl. 982. 1753 ; Bedd. Fl. Sylv. t. 258. 1872 ; Hook. f. Fl. Brit. Ind. 5 : 289. 1887 ; Airy Shaw, Euphorb. Borneo 183. 1975. *Emblica officinalis* Gaertn. Fruct. 2 : 122. 1791 ; Wight, Ic. t. 1896. 1852 ; Gamble, Fl. Pres. Madr. 1295. 1925, Repr. ed. 2 : 906. 1957. '*Nelli*' (Tam.).

Small, deciduous trees, 5 - 7 m. Leaves linear-oblong, apiculate. Flowers pale pinkish, in fascicles. Perianth lobes 6. Stamens 6. Styles 3. Fruits globose, fleshy, juicy, indehiscent.

Fl. & Fr. : July March.

Common ; in Ghats ; Ayyappankoil forest, Mukkali forest, Sappal hill-Dhoni R.F., Silent Valley R.F.

Fruits edible as also pickled and of medicinal value.

3. **Phyllanthus gardnerianus** (Wight) Baill. Etud. Gen. Euphorb. 628. 1858 ; Gamble, Fl. Pres. Madr. 1290. 1925, Repr. ed. 2 : 902. 1957. *Macraea gardneriana* Wight, Ic. t. 1902 f. 3. 1852.

Slender undershrubs with woody rootstock and long branches. Leaves elliptic, glaucous beneath, obtuse. Stipules scarious, peltate. Flowers solitary or fascicled. Pedicels filiform. Perianth lobes 6. Stamens free. Capsules smooth.

Fl. & Fr. : September.

Not common ; once collected in Panthanthode R.F. at *ca* 900 m.

4. **Phyllanthus maderaspatensis** L. Sp. Pl. 982. 1753 ; Wight, Ic. t. 1895 f. 3. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 292. 1887 ; Gamble, Fl. Pres. Madr. 1289. 1925, Repr. ed. 2 : 902. 1957.

Erect or decumbent herbs. Leaves linear - obovate, cuneate. Stipules lanceolate. Flowers solitary or fascicled. Perianth lobes 6. Stamens 3 ; filaments connate. Capsules globose, 3 lobed.

Fl. & Fr. : All seasons.

Common in plains ; Walayar dam area.

5. **Phyllanthus rheedii** Wight, Ic. t. 1895 f. 1. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 283. 1887 ; Gamble, Fl. Pres. Madr. 1289. 1925, Repr. ed. 2 : 902. 1957.

Slender, erect herbs. Leaves membranous, elliptic or ovate, glabrous, acute. Stipules decurrent. Male flowers minute, in fascicles.

Female solitary ; pedicels thick. Perianth lobes scarious. Capsules smooth.

Fl. & Fr. : December February.

Common ; in Ghats ; Padagiri forest, Pothundy forest, Silent Valley R.F.

6. **Phyllanthus urinaria** L. Sp. Pl. 982. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 293. 1887 : Gamble, Fl. Pres. Madr. 1289. 1925, Repr. ed. 2 : 902. 1957 ; Webster in J. Arnold Arbor. 38 : 194. 1958 : Airy Shaw in Kew Bull. Addl. Ser. 4 : 185. 1975. *P. leprocarpus* Wight, Ic. t. 1895 f. 4. 1852.

Erect herbs. Leaves oblong elliptic, apiculate, glabrous, rounded, pink when young. Male flowers minute, in fascicles. Female solitary, sessile. Perianth lobes 6. Stamens 3. Capsules verrucose, globose. Seeds ridged.

Fl. & Fr. : All seasons.

Common ; in lower Ghats ; Anamooly Mukkali forest, Malampuzha area.

7. **Phyllanthus virgatus** Forst. f. Fl. Ins. Austr. Prodr. 65. 1786 ; Backer & Bakh. f. Fl. Java 1 : 469. 1963 ; Airy Shaw in Kew Bull. 26 : 325. 1972 *P. simplex* Retz. Obs. Bot. 5 : 29. 1788 ; Gamble, Fl. Pres. Madr. 1289. 1925, Repr. ed. 2 : 902. 1957. *Macraea oblongifolia* Wight, Ic. t. 1902 f. 1. 1852.

Woody, stiff herbs with flat long branches. Leaves oblong - lanceolate, mucronate, glaucous beneath. Stipules ovate, sagitate, reddish - brown. Perianth lobes 6, oblong, mucronate. Stamens 3, free. Capsules globose, 3 lobed, long - stalked. Seeds red tubercled.

Fl. & Fr. : All seasons.

Common in plains ; Walayar forest.

27. Sapium P. Br.

Sapium insigne (Royle) Benth. in Benth. & Hook. f. Gen. Pl. 3 : 335. 1880 ; Hook. f. Fl. Brit. Ind. 5 : 471. 1887 ; Gamble, Fl. Pres. Madr. 1346. 1925, Repr. ed. 2 : 941. 1957 ; Airy Shaw in Kew Bull. 26 : 330. 1972. *Falconeria insignis* Royle, Ill Bot. Himal. Mount. 354. t. 98 f. 2. 1839. *F. malabarica* Wight, Ic. t. 1866. 1852. '*Sakkarakalli*' (Tam.).

Erect, deciduous trees, 8 12 m. Leaves elliptic - ovate, 10 - 20 × 5 7 cm, closely crenulate, acute attenuate at base, crowded at the end of

branches. Petioles biglandular at apex. Flowers pale greenish, in elongate simple spikes. Female flowers on separate spikes. Fruits small, baccate, fleshy.

Fl. & Fr. : December - February.

Common ; in rocky places in Ghats ; Ayyappankoil forest, Silent Valley R.F.

Latex poisonous.

28. SAUROPUS Bl.

1a. Stems angled or compressed	...	*S. quadrangularis*	2
1b. Stems terete	...	*S. androgynus*	1

1. **Sauropus androgynus** (L.) Merr. in Philip. Bur. For. Bull. 1 : 30. 1903 ; Gamble, Fl. Pres. Madr. 1303. 1925, Repr. ed. 2 : 911. 1957 ; Airy Shaw in Kew Bull. 26 : 333. 1972. *Clutia androgyna* L. Mant. 128. 1767. *Sauropus albicans* Bl. Bijdr. 596. 1825 ; Hook. f. Fl. Brit. Ind. 5 : 332. 1887.

Erect shrubs 2 m, with weak glabrous stems. Leaves ovate or lanceolate, glaucous beneath, obtuse. Flowers minute, in clusters ; male disc shaped. Perianth lobes 6, obovate, imbricate. Capsules white, large, inflated.

Fl. & Fr. : September October.

Common ; in upper Ghats in evergreen forests ; Silent Valley R. F.

2. **Sauropus quadrangularis** (Willd.) Muell.-Arg. in Linnaea 32 : 73. 1863 ; Hook. f. Fl. Brit. Ind. 5 : 335. 1887 ; Gamble, Fl. Pres. Madr. 1303. 1925, Repr. ed. 2 : 911. 1957 ; Airy Shaw in Kew Bull. 26 : 337. 1972. *Phyllanthus quadrangularis* Willd. Sp. Pl. 4 : 585. 1805.

Small shrubs with many twiggy branchlets. Leaves ovate or elliptic or suborbicular, membranous, glabrous. Flowers solitary or in racemes. Perianth lobes tongue - shaped in male, rounded in female. Fruits globose.

Fl. & Fr. : July.

Common in deciduous forests ; in crevices of rocks, Dhoni R.F.

29. SEBASTIANIA Spreng.

Sebastiania chamaelea (L.) Muell. - Arg. in DC. Prodr. 15 : 1175. 1866 ; Hook. f. Fl. Brit. Ind. 5 : 475. 1887 ; Gamble, Fl. Pres. Madr.

1344. 1925. Repr. ed. 2 : 940. 1957 ; Airy Shaw in Kew Bull. Addl. Ser. 4 : 195. 1975. *Tragia chamaelea* L. Sp. Pl. 981. 1753.

Woody herbs. Leaves linear oblong, serrate, glabrous. Stipules ovate, fimbriate. Flowers pale yellow. Calyx 3 partite in female, fimbriate. Stamens 3, free, exserted. Capsules red, 3 - lobed, with two rows of short spines down the back of each coccus.

Fl. & Fr. : All seasons.

Common ; in waste places in lower Ghats ; Mukkali forest, Kaikatty forest, Thiruvizhankunnu forest.

30. SECURINEGA Comm. ex Juss. *nom. cons.*

Securinega virosa (Roxb. ex Willd.) Baill. in Adansonia 6 : 334. 1866 ; Airy Shaw in Kew Bull. Addl. Ser. 4 : 196. 1975. *Phyllanthus virosus* Roxb. ex Willd. Sp. Pl. 4 : 578. 1805. *Flueggea virosa* (Roxb. ex Willd.) Baill. Etud. Gen. Euphorb. 593. 1858 ; Gamble, Fl. Pres. Madr. 1296. 1925, Repr. ed. 2 : 907. 1957. *F. microcarpa* Bl. Bijdr. 580. 1826 ; Hook. f. Fl. Brit. Ind. 5 : 328. 1887. '*Karumpoolachedi*' (Tam.).

Unarmed. large, deciduous shrubs. Leaves elliptic or obovate, emarginate, coppery when young. Flowers greenish-yellow, in clusters. Perianth lobes 5, ovate - concave. Stamens 5. Pistillodes 3, connate below. Fruits fleshy, white when ripe.

Fl. & Fr. : March May.

Common ; in lower Ghats ; Bhavani bank - Mukkali, Kaikatty forest, Malampuzha hill slopes.

31. TRAGIA L.

Tragia muelleriana Pax & Hoffm. in Pflanzenr. 55 : 80. 1919 ; Gamble, Fl. Pres. Madr. 1332. 1925, Repr. ed. 2 : 932. 1957. *T. involucrata* L. var. *cordata* Muell. Arg. in DC. Prodr. 15 : 943. 1866 ; Hook. f. Fl. Brit. Ind. 5 : 465. 1887.

Slender, stinging, climbing herbs. Leaves membranous, ovate, cordate, glabrous, coarsely serrate, acuminate. Flowers greenish. Fruiting calyx lobes 6, ovate, toothed, densely white strigose on margins.

Fl. & Fr. : October-December.

Fairly common ; in upper Ghats ; Silent Valley R.F.

32. TREWIA L.

1a. Branchlets cottony-tomentose	...	*T. nudiflora*	1
1b. Branchlets glabrous	...	*T. polycarpa*	2

1. **Trewia nudiflora** L. Sp. Pl. 1193. 1753 ('*Treyia*') ; Wight, Ic. t. 1870. 1852 ; Hook. f. Fl. Brit. Ind. 5 : 423. 1887 ; Gamble, Fl. Pres. Madr. 1319. 1925, Repr. ed. 2 : 922. 1957 ; Airy Shaw in Kew Bull. 26 : 343. 1972.

Deciduous trees, 10 - 15 m. Leaves 5 20 × 4 13 cm, broadly ovate, 3 - ribbed, glabrous, acuminate, cordate at base. Flowers yellowish, in long racemes ; female few. Perianth lobes ovate, concave, reflexed. Drupes globose.

Fl. & Fr. : February May.

Common ; in lower Ghats ; Karivara slopes, Mukkali forest, Olipara area.

2. **Trewia polycarpa** Benth. in Benth. & Hook. f. Gen. Pl. 3 : 318. 1880 ; Hook. f. Fl. Brit. Ind. 5 : 424. 1887 ; Gamble, Fl. Pres. Madr. 1319. 1925, Repr. ed. 2 : 923. 1957. *T. nudiflora* wight, Ic. t. 1871. 1852 non L. 1753. '*Anathuvarai*' ; '*Kaanji*' (Tam.).

Trees, 10 15 m. Leaves broadly ovate to digitate, glaucous beneath, truncate at base, acuminate. Flowers greenish yellow, males in drooping racemes. Perianth lobes oblanceolate to lanceolate. Drupes with thin pericarp.

Fl. & Fr. : Jaunary.

Common ; in lower Ghats ; Mukkali forest.

Hevea braziliensis Muell. Arg., **Manihot esculanta** Crantz., **M. gloziovii** Muell. - Arg. and **Ricinus communis** L. are cultivated for rubber, edible tubers, ceara rubber and oil seeds respectively and also found as escapes in certain places.

116. ULMACEAE

1a. Leaves pinnately veined ; flowering when leafless ; fruit a samara	...	HOLOPTELEA	2
1b. Leaves palmately veined ; flowering when leafy ; fruit a drupe :			
2a Flowers polygamous	...	CELTIS	1
2b. Flowers dioecious	...	TREMA	3

1. CELTIS L.

1a. Leaves oblique at base, primary nerves above the base strong ... *C. tetrandra* 1

1b. Leaves equal at base, primary nerves above the base not strong ... *C. timorensis* 2

1. **Celtis tetrandra** Roxb. Fl. Ind. 2 : 63 1832 ; Hook. f. Fl. Brit. Ind. 5 : 482. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1348. 1928, Repr. ed. 3 : 944. 1957. *C. serotina* Planch. in Ann. Sci. Nat. Bot. ser. 3. 10 : 300. 1848 ; Wight, Ic. t. 1970 1853. '*Murungan*' (Tam.).

Trees, 7 12 m ; twigs grey - pubescent. Leaves ovate, serrate, acute, distinctly oblique at base. Flowers greenish with pinkish tinge, in racemes. Sepals 4, ovoid lanceolate, concave, ciliate. Stamens 4. Fruits slender pedicelled, globose.

Fl. & Fr. : February.

Fairly common ; in lower Ghats ; Kaikatty forest.

2 **Celtis timorensis** Span. in Linnaea 15 : 343. 1841 ; Soep in Steenis, Fl. Males. ser. 1. 8 : 65. 1977 ; Hook. f. Fl. Brit. Ind 5 : 482. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1349. 1928, Repr. ed. 3 : 944. 1957. *C. trinervia* Bedd. Fl. Sylv. t. 312. 1873 non Roxb. 1832. '*Kalluviri*', '*Pinari*' (Tam.).

Trees, 10 15 m ; branches tomentose, lenticellate. Leaves alternate, oblong - lanceolate, subcoriaceous, 3 nerved. Flowers greenish yellow, in paniculate cymes. Sepals 5, linear, ciliate Petals absent. Stamens 5. Drupes pisiform, beaked.

Fl. & Fr. : November April.

Common ; in lower Ghats ; Panthanthode forest, Pothundy Kaikatty forest.

2. HOLOPTELEA Planch.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. Bot. ser. 3. 10 : 269. 1848 ; Wight, Ic. t. 1968. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 481. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1348. 1928, Repr. ed. 3 : 943. 1957. *Ulmus integrifolia* Roxb. Pl. Cor. t. 78. 1798 ; Bedd. Fl. Sylv. t. 310. 1873. '*Ava*', '*Ayil*', '*Tambachi*' (Tam) ; '*Aval*' (Mal.).

Deciduous trees, 20 25 m. Leaves elliptic - oblong, glabrous, acute. Flowers brownish, in fascicles. Perianth lobes 4, concave, ciliate. Anthers hairy. Fruits samaroid, flat, winged, crowned by persistent styles.

Fl. & Fr. : October - February.

Common ; in plains and in lower Ghats ; Agali forest, Pothundy slopes, Walayar forest.

3. TREMA Lour.

Trema orientalis (L.) Bl. Mus. Bot. Lugd. Bat 2 : 61. 1856 ; Hook. f. Fl. Brit. Ind. 5 : 484. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1350. 1928, Repr. ed. 3 : 945. 1957. *Celtis orientalis* L. Sp. Pl. 1044. 1753 ; Wight, Ic. tt. 602 & 603. 1842. *Sponia wightii* Planch. in Ann. Sci Nat. Bot. ser. 3. 10 : 322. 1848 ; Wight, Ic. t. 1971. 1853 ; Bedd. Fl. Sylv. t. 311. 1873. '*Ambaratthi*' (Tam.).

Fast-growing evergreen trees, 7 10 m ; young parts pubescent. Leaves ovate lanceolate, serrate, pubescent beneath, scabrid above, acuminate. Flowers greenish. Sepals 5, free hirsute, elliptic. Stamens 5. Ovary sessile. Drupes ovoid with persistent styles, black when dry.

Fl. & Fr. : April November.

Common along roads and forest clearings in lower Ghats ; Dhoni R. F., Mukkali forest, Kaikatty Pothundy forest.

Charcoal of the wood said to be excellent for gun powder.

117 MORACEAE

1a. Trees ; flowers in heads or on interior or exterior surfaces of receptacles :

2a. Flowers hidden in hollow receptacles ... FICUS 3

2b. Flowers not hidden:

3a. Fruits simple ; pistillate flowers solitary ... STRELUS 4

3b. Fruits multiple ; pistillate flowers in heads ... ARTOCARPUS 1

1b. Herbs ; flowers on the upper surface of flat receptacles ... DORSTENIA 2

1. ARTOCARPUS J. R. & G. Forst. *nom. cons.*

1a. Plants hairy ;

2a. Trees evergreen ; fruits spinous ... *A. hirsutus* 3

2b. Trees deciduous ; fruits smooth ... *A. gomezianus* ssp. *zeylanicus* 1

1b. Plants glabrous ... *A. heterophyllus* 2

1. **Artocarpus gomezianus** Wall. ex Trec. ssp. **zeylanicus** Jarrett in J. Arnold Arbor. 41 : 90. 1960. *A. lakoocha* sensu Fischer in Gamble, Fl. Pres. Madr. 1369. 1928, Repr. ed. 3 : 948. 1957 non Roxb. 1832.

Lofty, deciduous trees, 25 30 m. Latex milky. Leaves ovate lanceolate, 28 × 10 cm, entire, grey - pubescent beneath. Syncarps smooth, somewhat irregularly lobed with a long peduncle.

Fr. : April.

Only one tree seen in the Panthanthode forest at *ca* 850 m.

"**A. gomezianus** ssp. **zeylanicus** which is described here from the Western Ghats and Ceylon has not previously been distinguished from *A. lakoocha*. However within the Indian subcontinent the latter appears to be restricted as an indigenous tree to the north and east. The new entity is differentiated by smaller, globose heads and the larger peduncles of the male inflorescence, by the smooth surface of the female heads at anthesis and the shorter exsertion of the style and apparently by the smaller size and smoother surface of the mature syncarp. In addition the collections seen from India have rather distinctive ovate lanceolate leaves, which are densely greyish-pubescent. ." Jarrett *l. c.*

2. **Artocarpus heterophyllus** Lam. Encycl. 3 : 210. 1789 ; Corner in Gard. Bull. Straits Settlem. 10 : 56. 1934 ; Jarrett in J. Arnold Arbor. 40 : 334. 1959 ; Sant. in Bull. Bot. Surv. Ind. 3 : 12. 1962. *A. integrifolius* auct. non L. f. 1781 ; Wight, Ic. t. 678. 1840 ; Hook. f. Fl. Brit. Ind. 5 : 541. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1369. 1928, Repr. ed. 3 : 957. 1957. '*Pala*' (Tam.) ; '*Chakka*', '*Pilavu*' (Mal.).

Large, evergreen trees, 25 30 m ; latex milky. Leaves oblong to obovate oblong, entire, glossy above, acute. Lateral nerves 7 - 8 pairs. Stipules spathaceous, 5 8 cm long. Syncarps large, oblong or cylindrical, tubercled, 30 - 60 × 10 40 cm.

Fl. & Fr. : October June.

Common in Ghats and commonly cultivated in plains ; Silent Valley R. F.

The fleshy golden yellow fragrant perianth and the seeds are edible. Wood is used for implements and for building purpose.

3. **Artocarpus hirsutus** Lam. Encycl. 3 : 210. 1789 ; Jarrett in J. Arnold Arbor. 40 : 358. 1959 ; Wight, Ic. t. 1957. 1853 ; Hook. f. Fl.

Brit. Ind. 5 : 541. 1888 ; Fischer in Gamble, Fl. Pres Madr. 1639. 1928, Repr. ed. 3 ; 957. 1957. '*Anjili*' (Mal.).

Evergreen trees, 15 - 20 m ; young parts strigose with tawny hairs. Leaves broadly ovate, obovate or elliptic, tawny hairy on midrib above and nerves below. base rounded, shortly acuminate. Stipules yellow - hairy. Syncarps 6 10 × 3 8 cm, oblong or cylindric, echinate with long, soft processes, dull yellow when ripe.

Fl. & Fr. : February March.

Fairly common ; in lower Ghats ; Kallamalai area ; Kalkatty Pothundy forest. Thiruvizhankunnu forest.

"Lamarck's description of *Artocarpus hirsutus* was based on Rheede's account under the vernacular name 'Anajeli' (Hort. Ind. Malab. 25. t. 32. 1682) which may be identified with certainity as referring to this species" Jarrett *l. c.* 359.

2. DORSTENIA L.

Dorstenia indica Wall. ex Wight, Ic. t. 1964. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 494. 1888 ; Fischer in Gamble. Fl Pres. Madr. 1370. 1928. Repr. ed. 3 : 958. 1957.

Succulent herbs, 10 40 cm. Leaves alternate, lanceolate, undulate to serrate, crowded at top of branches. Flowers minute, monoecious, crowded on receptacles. Receptacles axillary, peltate, obconic, with 5 12 linear teeth. Perianth lobes 2. Stamens 1 3. Achenes minute.

Fl. & Fr. : April.

Not common ; once collected in damp places on Karapara river bank at *ca* 900 m ; *Vajravelu* 48972.

3. FICUS L.

1a. Leaves alternate :

2a. Leaves scabrid or hispid above :

3a. Receptacles (figs) in pairs ... *F. tinctoria* 13

3b. Receptacles (figs) solitary ... *F. exasperata* 6

2b. Leaves not scabrid or hispid above :

4a. Erect trees :

5a. Receptacles sessile or shortly peduncled :

6a. Leaves not caudate :

7a. Leaves tomentose :

8a. Leaf base rounded or cordate ... *F. drupacea* 5

8b. Leaf base cuneate ... *F. microcarpa* 9

7b. Leaves glabrous :

9a. Basal bracts scarious ; receptacles in pairs ... *F. amplissima* 1

9b. Basal bracts not scarious ; receptacles 2 - 6 ... *F. tsjahela* 14

6b. Leaves caudate ... *F. talboti* 12

5b. Receptacles peduncled :

10a. Receptacles axillary on twigs :

11a. Petioles less than 2 cm long ; receptacles in pairs ... *F. nervosa* 10

11b. Petioles more than 2 cm long ; receptacles solitary or in pairs :

12a. Receptacles solitary ; leaves scabrid ... *F. callosa* 3

12b. Receptacles in pairs ; leaves not scabrid :

13a. Leaves pubescent beneath ... *F. dalhousiae* 4

13b. Leaves glabrous beneath ... *F. beddomei* 2

10b. Receptacles on short leafless branches ... *F. racemosa* 11

4b. Scandent shrubs :

14a. Leaves lanceolate ; receptacles in axillary pairs ... *F. rigida* var. *bracteata* 11a

14b. Leaves broadly ovate ; receptacles on branches below the leaves ... *F. macrocarpa* 8

1b. Leaves opposite ... *F. hispida* 7

1. **Ficus amplissima** Sm. in Rees, Cyclop. 14 : n 1. 1810 ; Corner in Gard. Bull. Straits Settlem. 21 : 11. 1965. *F. tsiela* Roxb. ex Ham. in Trans. Linn. Soc. London 15 (1) : 149. 1826 ; Wight, Ic. t. 668. 1840 Hook. f. Fl. Brit. Ind. 5 : 515. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1362. 1928. Repr. ed. 3 : 953. 1957. '*Kal - ichchi*' (Tam.).

Spreading trees, 10 - 15 m. Leaves alternate, coriaceous, glabrous, ovate, acute or bluntly cuspidate at apex, 3 ribbed ; lateral nerves up to 12 pairs. Receptacles in axillary pairs, sessile, glabrous, globose ; basal bracts 3, broadly ovate.

Fl. & Fr. : February.

Rare ; in plains. Kathalakandi Kottathurai area.

2. **Ficus beddomei** King in Ann. Roy. Bot. Gard. Calcutta 1 : 26. t. 24. 1888 ; Hook. f. Fl. Brit. Ind. 5 : 502. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1364. 1928, Repr. ed. 3 : 954. 1957 '*Thavattaal*' (Tam.)

Epiphytic when young, large trees, 10 - 15 m. Leaves alternate, ovate, abruptly acuminate, base truncate to rounded, 3 - ribbed ; nerves up to 12 pairs. Receptacles in pairs, ovoid with vertical ridges, peduncled.

Fl. & Fr. : October June.

Common ; in evergreen forests of lower Ghats ; Ayyappankoil Kaikatty forest, Karapara area, Mukkali forest.

3. **Ficus callosa** Willd. in Mem. Acad. Roy. Sci. Hist. (Berlin) 102. 1798 ; Hook. f. Fl. Brit. Ind. 5 : 516. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1364. 1928, Repr. ed. 3 : 1965. 1957 ; Corner in Gard. Bull. Straits Settlem. 21 : 29. 1965. '*Koli - aal*' (Tam.).

Large trees up to 25 m. Leaves elliptic ovate, coriaceous, slightly scabrid beneath, rounded at base, 3 5 ribbed. Receptacles axillary, peduncled, globular, rugose, yellow.

Fl. & Fr. : March.

Not common ; in lower Ghats ; Ayyappankoil forest, Kaikatty.

4. **Ficus dalhousiae** Miq. in Hook. London J. Bot. 4 : 571. 1845 ; Hook. f. Fl. Brit. Ind. 5 : 499. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1364. 1928, Repr. ed. 3 : 954. 1957. '*Pei - aal*', '*Kal - aal*' (Tam.).

Trees, 10 15 m. Leaves 30 - 30 × 12 18 cm, ovate elliptic, minutely pubescent, acute at apex, deeply cordate at base, 3 7 ribbed ; petioles up to 7 cm. Receptacles in pairs, obovoid, pubescent ; basal bracts 3, triangular, densely hairy.

Fl. & Fr. : April.

Not common ; in rock crevices of lower Ghats ; Mukkali forest, Thiravizhankunnu forest.

5. **Ficus drupacea** Thunb. var. **pubescens** (Roth) Corner in Gard Bull. Straits Settlem. 17 : 381. 1960 & 21 : 13. 1965. *F. mysorensis* Heyne ex Roth var. *pubescens* Roth in Roem. & Schult. Syst. Veg. 1 : 508. 1817. *F. mysorensis* Heyne ex Roth in Roem. & Schult. *l.c.* ; Hook. f. Fl. Brit. Ind. 5 : 500. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1361. 1928, Repr ed. 3 : 952. 1957. '*Kal - aalan*', '*Sonnal - aalan*' (Tam.).

Large trees with aerial roots, 30 - 35 m ; young parts brownish hairy. Leaves 10 - 13 × 6.0 - 7.5 cm, alternate, coriaceous, ovate to ovate elliptic, tomentose beneath, abruptly acuminate, cordate at base, 3 5 ribbed. Receptacles in axillary pairs, yellow or red when ripe ; basal bracts ovate, woolly.

Fl. & Fr. : April.

Fairly common ; in Ghats ; Mukkali forest (Mandhampatty).

6. **Ficus exasperata** Vahl, Enum. 2 : 197. 1806 ; Corner in Gard. Bull. Straits Settlem. 21 : 74. 1965. *F. asperrima* Roxb. Fl. Ind. 3 : 554. 1832 ; Wight, Ic. t. 633. 1840 ; Hook. f. Fl. Brit. Ind. 5 : 522. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1366. 1928, Repr. ed. 3 : 955. 1957.

Trees, 10 - 15 m ; young parts scabrid. Leaves 8 - 10 × 4 - 5 cm, alternate, upper opposite, rough, elliptic ovate, scabrid above, hispid beneath, 3 - ribbed, abruptly acuminate, cuneate, often unequal at base. Receptacles axillary, solitary, peduncled, globular, scabrous hispid, yellow or purple when ripe.

Fl. & Fr. : November May.

Common ; in lower Ghats ; Bhavani river bank - Mukkali, Marapalam - Pothundy, Orange farm - Kaikatty, Sappal hill - Dhoni R. F.

7. **Ficus hispida** L. f. Suppl. 422. 1781 ; Hook. f. Fl. Brit. Ind. 5 : 522. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1367. 1928, Repr. ed. 3 : 956. 1957 ; Corner in Gard. Bull. Straits Settlem. 21 : 89. 1965. *F. oppositifolia* Roxb. Pl. Cor. t. 124. 1798 ; Wight, Ic. t. 638. 1840. *F. daemona* Koen. ex Vahl, Enum. 2 : 198. 1806 ; Wight *l.c.* 641. '*Pety-Athi*' (Tam.), '*Eruma - naakku*' (Mal.).

Shrubs or small trees, 3 - 5 m, all parts hispid : internodes hollow. Leaves 12 18 × 7 10 cm, decussate - opposite, elliptic - ovate oblong, 3 5 ribbed, truncate - cordate at base, abruptly acuminate at apex. Stipules caducous Receptacles peduncled, clustered on tubercles on stem or on separate leafless drooping branches forming racemes, obovoid, pubescent, pale yellow when ripe.

Fl. & Fr. : July - October.

Common ; in Ghats ; Mukkali forest, Silent Valley R. F., Sappal hill Dhoni forest.

8. **Ficus macrocarpa** Wight ex Miq. in Hook. London J. Bot. 7 : 74. 1848 ; Hook. f. Fl. Brit. Ind. 5 : 534. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1365. 1928, Repr. ed. 3 : 955. 1957.

Scandent shrubs ; stems woody. Leaves 10 12 × 5 - 7 cm, alternate, broadly ovate, pubescent, acuminate at apex, rounded or sub cordate at base, 3 - 5 - ribbed. Receptacles fascicled, on naked branches, globose, pubescent, spotted when ripe.

Fl. & Fr. : October.

Endemic ; rare ; in upper Ghats ; Silent Valley R. F.

9. **Ficus microcarpa** L. f. Suppl. 442. 1781 ; Corner in Gard. Bull. Straits Settlem. 21 : 22. 1965. *F. retusa* auct. non L. 1753 ; Hook. f. Fl. Brit. Ind. 5 : 511. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1362. 1928. Repr. ed. 3 : 952. 1957. '*Pon - ichchi*', '*Kal - ichchi*' (Tam.).

Evergreen trees, 10 - 15 m, with aerial roots. Leaves elliptic ovate to obovate, glabrous, shining, 3 - ribbed, obtuse at apex, cuneate at base. Receptacles in axillary pairs, sessile, globose, glabrous, yellow or purple when ripe ; basal bracts 3, broadly ovate.

Fl. & Fr. : December.

Not common ; in Ghats ; Kunthipuzha bank dam site forest.

10. **Ficus nervosa** Henye ex Roth, Nov. Pl. Sp. 338. 1821 ; Hook. f. Fl. Brit. Ind. 5 : 512. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1364. 1928. Repr. ed. 3 : 954. 1957 ; Corner in Gard. Bull. Straits Settlem. 21 : 31. 1965. *F. angustifolia* Roxb. Fl. Ind. 3 : 554. 1832 ; Wight, Ic. t. 660. 1843. '*Neer - Aal*' (Tam.).

Trees, 15 20 m ; young parts pubescent. Leaves 5 12 × 2.5 5.5 cm, elliptic oblong to oblanceolate, glabrous, shining, abruptly acuminate, truncate or rounded at base, 3 5 nerved ; lateral nerves about 12 pairs, arching upwards, distinct. Receptacles in axillary pairs, glabrous, yellow or red when ripe.

Fl. & Fr. : December - May.

Fairly common ; in Ghats ; Mukkali forest, Silent Valley dam site, Sappal hill Dhoni R. F.

11. **Ficus racemosa** L. Sp. Pl. 1060. 1753 ; Corner in Gard. Bull. Straits Settlem. 21 : 34. 1965. *F glomerata* Roxb. Pl. Cor. t. 123. 1798 ; Wight, Ic. t. 667. 1843 ; Hook. f. Fl. Brit. Ind. 5 : 535. 1888 ; Fischer in Gamble. Fl. Pres. Madr. 1364. 1928. Repr. ed. 3 : 954. 1957. '*Atthi*' (Tam.).

Deciduous trees, 10 20 m. Leaves 10 14 × 5 6 cm, elliptic lanceolate, ovate or obovate oblong, glabrous, acute at apex, narrowed at base, 3 - ribbed ; lateral nerves 5 - 10 pairs. Receptacels subglobose, smooth, on tubercled warted leafless branchlets, red when ripe.

Fl. & Fr. July October.

Common ; in plains near water sources ; Dhoni R. F., Mukkali forest.

The fruits 'the figs' are edible.

11a. **Ficus rigida** Jack, var. **bracteata** (Corner) Bennet in Indian J. Forestry 5(4) : 326. 1982 ; Vajravelu & Bhargavan in J. Econ. Tax. Bot. 5 : 424. 1984. *F. glaberrima* Bl. var. *bracteata* Corner in Gard. Bull. Straits Settlem. 17 : 388. 1960. *F. travancorica* King in Ann. Roy. Bot. Gard. Calcutta 1 : 28. t. 26. 1887 ; Hook. f. Fl. Brit. Ind. 5 : 503. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1365. 1928, Repr. ed. 3 : 955. 1957.

Scandent shrubs with terete stems. Leaves alternate, 10 - 15 × 3 - 4 cm, lanceolate, acuminate at apex, acute at base, 3 - ribbed ; lateral nerves 10 12 pairs. Petioles 1 2 cm long. Receptacles globose, glabrous, in axillary pairs ; basal bracts 3, deciduous, broadly triangular, obtuse.

Fl. & Fr. : March.

Rare ; in lower Ghats ; Karapara river bank - Nelliyampathy R.F.

12. **Ficus talboti** King in Ann. Roy. Bot. Gard. Calcutta 1 : 51. t. 63. & 84. 1887 88 ; Hook. f. Fl. Brit. Ind. 5 : 512. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1363. 1928, Repr. ed. 3 : 953. 1957 ; Corner in Gard. Bull. Straits Settlem. 21 : 19. 1965. '*Itchchi*', '*Kal - atthi*' (Tam.).

Trees, 20 25 m. Leaves 7 9 × 3.0 - 4.5 cm, alternate, elliptic oblong, glabrous, caudaate - acuminate, 3 - 5 - ribbed ; lateral nerves 8 10 pairs. Receptacles in axillary clusters of 2 or 3, ovoid, glabrous. Basal bracts distinct, persistent.

Fl. & Fr. : November.

Occasional ; at lower elevations ; Mukkali forest.

13. **Ficus tinctoria** Forst. f. ssp. **parasitica** (Willd.) Corner in Gard. Bull. Straits Settlem. 17 : 476. 1960 & in Dassan. & Fosb. Rev. Handb. Fl. Ceylon 3 : 276. 1981. *F. parasitica* Willd. Mem. Acad. Roy. Sci. Hist. (Berlin) 102. 1798. *F gibbosa* Bl. var. *parasitica* (Willd.) King Ann. Roy. Bot. Gard. (Calcutta) 1 : t. 2a - b. 1887 ; Hook. f. Fl. Brit. Ind. 5 : 497. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1365. 1928, Repr. ed. 3 : 955. 1957. *F. gibbosa* Bl. var. *tuberculata* (Roxb.) King *l. c.* 6 ; Ramam. & Gandhi in Sald. & Nicol. Fl. Hassan Dist. 83. 1976. *F. gibbosa* Bl. var. *cuspidifera* (Miq.) Fischer in Gamble, Fl. Pres. Madr. 1366. 1928, Repr. ed. 3 : 955. 1957. *F. cuspidifera* Miq. in Hook. London J. Bot. 7 : 434. 1848. '*Kallathi*' (Tam.).

Trees, 15 20 m with aerial roots. Leaves up to 8 × 3 cm, elliptic - oblong or rhomboid - lanceolate, entire or shallowly lobed, acute or acuminate, sparsely hairy or glabrous. Receptacles usually paired, or fascicled, subglobose, shortly peduncled, yellow. Bracts ovate.

Fl. & Fr. : October - April.

Very common ; in plains and lower Ghats ; Agali forest, Ayyappankoil area, Kallamalai, Varadimalai area, Vattapara - Siruvani forest.

14. **Ficus tsjahela** Burm f. Fl. Ind. 227. 1768 : King in Ann Roy. Bot. Gard. Calcutta 1 : 57. t. 70. 1887 88 ; Hook f. Fl. Brit. Ind. 5 : 514. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1362. 1928, Repr ed. 3 : 953. 1957 (*tjakela*') ; Corner in Gard. Bull. Straits Settlem. 21 : 7. 1965. '*Kal - aal*' (Tam.).

Trees, 25 30 m Leaves 10 - 18 × 5 9 cm, ovate lanceolate, glabrous, glossy above, abruptly acuminate at apex, base rounded, 3 - 5 - ribbed ; lateral nerves 8 - 12 pairs. Receptacles fascicled, on tubercles, axillary, sessile, depressed - globose, yellow when ripe. Basal bracts bifid, distinct.

Fl. & Fr. : October May.

Common ; in lower Ghats ; Anamadai, Bhavani Bank — Mukkali.

Ficus benghalensis L. and **F. religiosa** L. are commonly found as avenue trees and the latter is also cultivated near temples.

4. STREBLUS Lour. *emend.* Corner

Streblus asper Lour. Fl. Cochinch. 615. 1790 ; Hook. f. Fl. Brit. Ind. 5 : 498. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1353. 1928, Repr. ed. 3 : 947. 1957 ; Corner in Gard. Bull. Straits Settlem. 19 : 228. 1962. '*Pura*', '*Pirasu*', '*Kuttipila*' (Tam.).

Unarmed, stiff shrubs or small trees, 5 7 m ; latex milky. Leaves rough, alternate, elliptic - oblong, entire or minutely denticulate. Female flowers solitary. Males in peduncled heads or spikes. Perianth 4 in females ; 3 - 5 in males. Stamens 4. Fruits subglobose, drupaceous.

Fl. & Fr. : February.

Common ; in plains and in lower Ghats ; Anamooly slopes, Olipara river side.

The milky latex has the property of solidifying milk.

118. URTICACEAE

1a. Plants with stinging hairs :

2a. Stipules large, foliaceous ... GIRARDINIA 4

2b. Stipules small, not foliaceous ... LAPORTEA 5

1b. Plants without stinging hairs :

3a. Herbs or undershrubs :

4a. Flowers clustered on fleshy receptacles :

5a. Leaves opposite ... LECANTHUS 6

5b. Leaves alternate ... ELATOSTEMA 3

4b. Flowers not clustered on fleshy receptacles :

6a. Flowers cymose :

7a. Leaves opposite, serrate ... PILEA 9

7b. Leaves alternate, entire ... PELLIONIA 8

6b. Flowers in sessile clusters ... POUZOLZIA 10

3b. Small trees or large shrubs :

8a. Inflorescences long spikes ... BOEHMERIA 1

8b. Inflorescences short cymes :

9a. Leaves white-tomentose beneath ... DEBREGEASIA 2

9b. Leaves not white-tomentose beneath ... OREOCNIDE 7

1. BOEHMERIA Jacq.

Boehmeria glomerulifera Miq. in Zoll. Syst. Verz. Ind. Archip. 101, 104. 1854 ; Backer & Bakh. f. Fl. Java 2 : 45. 1965. *B. malabarica* Wedd. in Arch. Mus. Hist. Nat. 8 : 350. 1855 56 ; Hook. f. Fl. Brit. Ind. 5 : 575. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1387. 1928, Repr. ed. 3 : 90. 1957.

Large shrubs or small trees, 3 7 m. Leaves alternate, ovate, acuminate at apex, crenulate or entire, rounded or sub cordate at base. Flowers dull white, in clusters of interrupted long spikes.

Fl. & Fr. : August - February.

Very common ; in lower Ghats ; Kaikatty forest, Silent Valley R. F., Thiruvizhankunnu forest.

2. DEBREGEASIA Gaudich.

Debregeasia longifolia (Burm. f.) Wedd. in DC. Prodr. 16 : 235. 1869 ; Backer & Bakh. f. Fl. Java 2 : 49. 1965. *Urtica longifolia* Burm. f. Fl. Ind. 297. 1768. *Debregeasia velutina* Gaudich. Bot. Bonite Voy. t. 90. 1844 - 46 ; Hook. f. Fl. Brit. Ind. 5 : 590. 1880 ; Fischer in Gamble, Fl. Pres. Madr. 1389. 1928, Repr. ed. 3 : 971. 1957. "*Kaatunochi*" (Tam.).

Small trees, 15 20 m. Leaves alternate, linear to oblanceolate, serrulate, scabrid above, ashy tomentose beneath, base rounded. Flowers greenish yellow, in small heads. Tepals 4, ovate, concave. Stamens 4. Berries bright red, with fleshy perianth.

Fl. & Fr. : November - March.

Common ; in Ghats ; Silent Valley R.F.

3. ELATOSTEMA J. R. & G. Forst. *nom. cons.*

1a. Normal leaves not subtended by small filiform or linear leaves :

2a. Leaves with large conspicuous cystoliths ... *E. lineolatum* 2

2b. Leaves without or minute cystoliths ... *E. acuminatum* 1

1b. Normal leaves subtended by small filiform or linear leaves ... *E. surculosum* 3

1. **Elatostema acuminatum** Brongn. in Duperr. Voy. Bot. 211. 1834 ; Hook. f. Fl. Brit. Ind. 5 : 566. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1377. 1928, Repr. ed. 3 : 963. 1957.

Much branched, weak, glabrous undershrubs. Leaves membranous, oblong or oblong lanceolate, crenate serrate in upper two thirds, glabrous, caudate at apex, cuneate at base. Receptacles dull greenish, small, sessile, solitary.

Fl. & Fr. : July October.

Fairly common ; in upper Ghats ; Silent Valley R. F.

2. **Elatostema lineolatum** Wight, Ic. t. 1984. 1853 ('*lineata*') ; Hook. f. Fl. Brit. Ind. 5 : 565. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1376. 1928, Repr. ed. 3 : 963. 1957.

Very variable creeping herbs. Leaves alternate, 3 - nerved, linear lanceolate or obliquely lanceolate, crenate, caudate - acuminate at apex, cuneate at base. Cystoliths linear, crowded. Stipules lanceolate, hairy. Bracts ovate, rarely spurred. Receptacles sessile, crowded in axils. Tepals 4. Stamens 4.

Fl. & Fr. : April.

Fairly common ; in upper Ghats ; Silent Valley R. F.

3. **Elatostema surculosum** Wight, Ic. t. 2091 f. 4. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 572. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1377. 1928, Repr. ed. 3 : 963. 1957.

Succulent herbs, up to 25 cm. Leaves lanceolate ovate, crenate - serrate in the upper half, or with only 2 teeth on either side of apical one, glabrous, acuminate. Cystoliths numerous above. Male receptacles peduncled. Outer bracts horned. Females sessile.

Fl. & Fr. : October.

Rare ; in upper Ghats on tree trunks or on rocks in shade ; Silent Valley R. F.

4. GIRARDINIA Gaudich.

Girardinia diversifolia (Link) Friis in Kew Bull. 36 : 145. 1981. *Urtica diversifolia* Link, Enum. Pl. Hort. Bot. Berol. Alt. 2 : 385. 1822 non Bl. 1825. *Girardinia leschenaultiana* Decne. in Jacq. Voy. Inde 4. Bot. 152. 1844. *G. heterophylla* Decne. var. *palmata* Hook. f. Fl. Brit. Ind. 5 : 551. 1881. *G. zeylanica* Decne. *l. c.* ; Fischer in Gamble, Fl. Pres. Madr. 1373. 1928, Repr. ed. 3 : 960. 1957. *Urtica heterophylla* Willd. Sp. Pl. 4 : 362. 1805 non Vahl 1790 ; Wight, Ic. t. 687. 1843.

Suffruticose herbs with stinging hairs. Leaves alternate, 3 - 5 lobed, crenate - serrate, appressed hairy with stinging hairs, truncate or cordate at base. Cystoliths punctate. Stipules foliaceous, connate. Flowers dull white, in simple spikes. Tepals 4 5, free united in female. Stamens 4. Achenes with persistent styles.

Fl. & Fr. : November - December.

Common ; in upper Ghats ; Panthanthode forest, Pothundy - Kaikatty forest.

5. LAPORTEA Gaudich. *nom. cons.*

1a. Herbs ; leaves coarsely toothed	...	*L. interrupta*	2
1b. Shrubs or small trees ; leaves crenulate	...	*L. crenulata*	1

1. **Laportea crenulata** Gaudich. in Freyc. Voy. Bot. 498. 1830 ; Bedd. Fl. Sylv. t. 306. 1873 ; Hook. f. Fl. Brit. Ind. 5 : 550. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1373. 1928, Repr. ed. 3 : 961. 1957. *Urtica crenulata* (Gaudich.) Roxb. Fl. Ind. 3 : 591. 1832 ; Wight, Ic. t. 686. 1843. '*Ana choriyan*' (Mal.).

Tall shrubs or small trees, 3 5 m ; stems soft. Leaves lanceolate elliptic, crenate in upper half, glabrous, acuminate at apex, narrow at base. Petioles with stinging hairs. Flowers pale greenish - yellow, in large paniculate cymes. Achenes fleshy.

Fl. & Fr. : October - February.

Common ; in upper Ghats ; Silent Valley R. F.

The Elephant nettle or fever nettle plant. The stings of the hairs is very painful and lasting especially when the affected parts come in contact with water. It may cause violent sneezing, fever and itching.

2. **Laportea interrupta** (L.) Chew, in Gard. Bull. Straits Settlem. 21 : 200. 1965. *Urtica interrupta* L. Sp. Pl. 985. 1753. *Fleurya interrupta* (L.)

Gaudich. in Freyc. Voy. Bot. 497. t. 8. 1830 ; Wight, Ic. t. 1975. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 548. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1372. 1928, Repr. ed. 3 : 959. 1957.

Succulent herbs with stinging hairs ; stems furrowed. Leaves alternate, ovate, acuminate, 3 nerved, base truncate cordate. Stipules connate, in pairs. Flowers greenish, in long, slender racemes. Tepals 4 ovate. Stamens 4. Achens ovoid, compressed.

Fl. & Fr. : October - November.

Fairly common ; in Ghats ; Anamooly, Chindaki forest, Pothund y Kaikatty forest.

6. Lecanthus Wedd.

Lecanthus peduncularis (Wall. ex Royle) Wedd. in DC. Prodr. 16 : 164. 1869 ; Sant. in Rec. Bot. Surv. India ed. 3. 16 : 254. 1967. *Procris peduncularis* Wall. ex Royle, Ill. Bot. Himal. Mount. t. 53 f. 2. 1839. *Lecanthus wightii* Wedd. in Ann. Sci. Nat. Bot. ser. 4. 1 : 187. 1854 ; Hook. f. Fl. Brit. Ind. 5 : 559. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1374. 1928, Repr. ed. 3 : 961. 1957. *Elatostema ovatum* Wight, Ic. t. 1985. 1853 ('*ovata*').

Slender, decumbent, succulent herbs. Leaves membranous, opposite, in unequal pairs, obliquely ovate to elliptic, acute, or acuminate, serrate or crenate at base, 3 nerved. Flowers dioecious in peduncled heads. Sepals in male flowers 4 5, hooded, in female 3 Stamens 4 - 5. Achenes flat, ellipsoid.

Fl. & Fr. : July.

In moist shady places ; not common ; Mukkali forest.

7. Oreocnide Miq.

Oreocnide integrifolia (Gaudich.) Miq. in Ann. Mus. Bot. Lugd. - Bat. 4 : 306. 1869 ; Sharma et al. in Biolog. Mem. 2 : 135. 1977. *Villebrunea integrifolia* Gaudich. in Frayc. Voy. Bonite t. 91. 1829 ; Hook. f. Fl. Brit. Ind. 5 : 589. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1388. 1928, Repr. ed. 3 : 971. 1957.

Small, evergreen trees, 5 10 m ; tender parts grey - pubescent. Leaves alternate, lanceolate to obalceolate, glabrous above, pubescent below, acuminate, narrowed at base. Flowers rusty - brown, in globose clusters of hispid cymes, in the axils of fallen leaves. Tepals 3 5, but usually 4. Achenes with fleshy bracteoles.

Fl. & Fr. : July December.

Common ; in upper Ghats ; Padagiri - Kaikatty forest, Panthanthode forest, Silent Valley Valiyaparathode forest.

8. PELLIONIA Gaudich. *nom. cons.*

Pellionia heyneana Wedd. Monogr. 287. t. 5. 1856 ; Hook. f. Fl. Brit. Ind. 5 : 561. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1380. 1928, Repr. ed. 3 : 965. 1957.

Woody, creeping perennial herbs. Leaves alternate or sub opposite, in unequal pairs, linear lanceolate, falcate, glabrous, acuminate, 3 ribbed, unequally subcordate at base. Cystoliths many. Flowers dull pink, in long peduncled cymes. Tepals 5, free, but deeply partite in female with dorsal sub apical horn. Stamens 5.

Fl. & Fr. : May - July.

Fairly common ; in upper Ghats ; Silent Valley R. F.

9. PILEA Lindl. *nom. cons.*

Pilea melastomoides (Poir.) Wedd. in Ann. Sci. Nat. Bot. ser. 4. 1 : 186. 1854 ; Henry & Roy in Bull. Bot. Surv. Ind. 10 : 276. 1968. *Urtica melastomoides* Poir. in Lam. Encycl. Suppl. 4 : 223. 1816. *Pilea trinervia* Wight, Ic. t. 1973. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 557. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1379. 1928, Repr. ed. 3 : 94. 1957.

Robust, succulent herbs, up to 2 m, with swollen internodes. Leaves 2 or 3 per node, ovate - lanceolate, falcate, serrate, acuminate, 3 - nerved. Petioles up to 10 cm long, hairy. Flowers dull white, in peduncled - cymes. Tepals 4, ovate. Stamens 4. Achenes granular, biconvex.

Fl. & Fr. : October - November.

Common ; in Ghats ; Pothundy - Kaikatty, Silent Valley R. F.

10. POUZOLZIA Gaudich.

1a. Buds rounded or acute ; perianth lobes of male convex or gibbous ;

2a. Leaves opposite or alternate ; male flowers 4 - merous ... *P. zeylanica* 5

2b. Leaves alternate ; male flowers 5 - merous ... *P. auriculata* 1

1b. Buds truncate ; perianth lobes of male plicate :

3a. Stems running out into spikes ; upper leaves reduced to bracts :

4a. Spikes all axillary ; male flowers 4 - merous ... *P. meeboldii* 3

4b. Spikes terminal, few in upper axils ; male flowers 3 - 4 - merous ... *P. wightii* 4

3b. Stems not running out into spikes ; upper leaves not reduced to bracts ... *P. bennettiana* var. *mysorensis* 2

1. **Pouzolzia auriculata** Wight, Ic. t. 1980 f. 2. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 582. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1383. 1928. Repr. ed. 3 : 967. 1957.

Flaccid herbs, to 2 m ; tender parts white - hairy. Leaves alternate, ovate lanceolate to rotund ovate, villous beneath, acuminate, rounded at base. Flowers pale green, in sessile axillary clusters, strigose. Tepals 5, ovate, concave. Stamens 5. Fruits strigose, winged or not.

Fl. & Fr. : November.

On rocky slopes in lower Ghats ; not common ; Ayyappankoil forest - Padagiri way, Walayar forest.

2. **Pouzolzia bennettiana** Wight var. **mysorensis** (Wight) Hook. f. Fl. Brit. Ind. 5 : 586. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1385. 1928, Repr. ed. 3 : 969. 1957. *P. mysorensis* Wight, Ic. t. 2092 f. 4. 1853.

Herbs with 4 - angled stems. Leaves whorled, flaccid, long - petioled, ovate - lanceolate, tomentose, with prominent ribs. Fowers in axillary sessile or peduncled clusters ; male sepals 5, glabrous. Stamens 5. Fruits winged.

Fl. & Fr. : October December.

Fairly common ; in upper Ghats ; Silent Valley R. F.

3. **Pouzolzia meeboldii** W. W. Smith & Ramas. in Rec. Bot. Surv. Ind. 6: 40. 1913 ; Fischer in Gamble, Fl. Pres. Madr. 1383. 1928, Repr. ed. 3 : 967. 1957.

Erect, semisucculent undershrubs. Leaves sessile, lanceolate, glabrous, acuminate, base rounded or cordate. Flowers in sessile clusters, in long, axillary, bracteolate, scabrid pubescent spikes. Tepals 4, glabrous, plicate, inflexed. Fruits winged or not.

Fl. & Fr. : November.

Endemic ; rare ; in lower Ghats ; **Kaikatty forest.**

4. **Pouzolzia wightii** Benn. Pl. Jav. Rar. 66. 1838 ; Wight Ic. t. 2093 f. 8. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 584. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1383. 1928, Repr. ed. 3 : 967. 1957.

var. **wightii**

Robust herbs. Leaves oblong lanceolate, acuminate ; lower ones opposite ; upper alternate, reduced to bracts. Flowers white, sessile, in axillary clusters. Fruits winged.

Fl. & Fr. : August October.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Sappal hill Dhoni R. F.

4a. **Pouzolzia wightii** Benn. var. **caudata** (Benn.) Fischer in Gamble, Fl. Pres. Madr. 1384. 1928, Repr. ed. 3 : 968. 1957. *P. caudata* Benn. Pl. Jav. Rar. 66. 1838 ; Wight, Ic. t. 2097 f. 27. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 585. 1888.

Slender, glabrous herbs. Cauline leaves up to 15 × 4 cm, lanceolate ovate or lanceolate, sessile, pubescent, acuminate. Bracts cordate, glabrous. Flowers dull white with pinkish tinge, in slender long pubescent spikes. Bracts cordate, glabrous. Male sepals glabrous.

Fl. & Fr. : November.

Endemic ; in lower Ghats ; not common ; Pothundy Kaikatty forest.

5. **Pouzolzia zeylanica** (L.) Benn. Pl. Jav. Rar. 67. 1838 ; Sant. in Rec. Bot. Surv. India ed. 3. 16 : 255. 1967. *Parietaria zeylanica* L. Sp. Pl. 1052. 1753. *P. indica* L. Mant. 128. 1767. *Pouzolzia indica* (L.) Gaudich. in Freyc. Voy. Bot. 503. 1830 ; Wight, Ic. tt. 1980 f. 1, 2100 f. 40. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 581. 1888 ; Fischer in Gamble, Fl. Pres. Madr 1382. 1928, Repr. ed. 3 : 967. 1957.

Slender, erect or procumbent, hirsute herbs. Leaves linear lanceolate to ovate lanceolate, hoary pubescent, hirsute or glabrous, acute, base rounded. Flowers pale pinkish green, strigose. Tepals 4, ovate lanceolate, concave. Bracts 2, concave. Stamens 4. Fruits ovoid, 2 4 winged.

Fl. & Fr. : July December.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Panthanthode.

Broussonetia papyrifera Vent. is a quick growing tree. Male spikes cylindric. Fruits fleshy, red, shining. Probably introduced, but found in Dhoni R. F. only.

119. CASUARINACEAE

CASUARINA Adanson

Casuarina equisetifolia L. Amoen. Acad. 4 : 143. 1759 ; Forst. Char. Gen. 104. t. 52. 1776 ; Hook. f. Fl. Brit. Ind. 5 : 598. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1389. 1928, Repr. ed. 3 : 972. 1957. '*Chauka*', '*Chavukkai*' (Tam.) ; '*Saampirani*' (Mal.).

Erect trees, 10 - 15 m. Leaves reduced to subulate scales, connate at base. Flowers dioecious, minute. Male flowers in slender, terminal spikes. Tepals 2, lanceolate, ciliate. Stamen 1. Females in ovoid, bracteate heads. Tepals 0. Achenes in cones. Bracteoles woody, enlarged.

Fl. & Fr. : October.

Commonly cultivated. Used as poles and fuel wood. Malampuzha dam area, Mangalam dam area.

120. SALICACEAE

SALIX L.

Salix tetrasperma Roxb. Pl. Cor. t. 97. 1798 ; Wight, Ic. t. 1954. 1853 ; Bedd. Fl. Sylv. t. 302. 1873 ; Hook. f. Fl. Brit. Ind. 5 : 626. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1390. 1928. Repr. ed. 3 : 973. 1957. '*Vanji*' (Mal.), '*Neer nochi*' (Tam.).

Deciduous trees, 10 15 m. Leaves linear - ovate to lanceolate, glandular, serrate, glaucous beneath, acuminate, narrowed at base. Flowers yellow, dense, in pubescent catkins. Bracts one - flowered, ovate, elliptic, densely white - hairy. Perianth absent. Stamens 4 12, free, villous at base. Capsules ovoid, 2 - valved, pubescent.

Fl. & Fr. : October January.

Occasional ; in lower Ghats ; near water sources ; Karapara river bank, Karivara slopes.

[B] GYMNOSPERMAE

121. GNETACEAE

GNETUM L.

Gnetum ula Brongn. in Duperr. Voy. Bot. 12. 1829 ; Fischer in Gamble, Fl. Pres. Madr. 1392. 1928, Repr. ed. 3 : 1304. 1957. *G. scandens* auct. non Roxb. 1832 ; *G. funiculare* Smith ex Wight, Ic. t. 1955. 1853 non Brongn. 1829. '*Ana - pendu*' (Tam.).

Large, robust, woody climbers. Leaves opposite, ovate - oblong or elliptic, coriaceous, shining above, acute. Flowers monoecious, whorled in axils of cupular bracts, in panicled spikes. Fruits ellipsoid.

Fl. & Fr. : February July.

Occasional ; in lower Ghats ; Karivara forest, Mukkali forest.

122. CYCADACEAE

CYCAS L.

Cycas circinalis L. Sp. Pl. 1188. 1753 ; Thiselton Dyer in Hook. f. Fl. Brit. Ind. 5 : 656. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1394. 1928, Repr. ed. 3 : 957. 1957. '*Madana kaman*' (Tam.), '*Intha*' (Mal.).

Evergreen, palm like trees, 2 3 m, branched or unbranched. Leaves spirally arranged, pinnate : leaflets linear, flat, entire. Petioles spiny. Male cones terminal, antheriferous scales upturned. Blades of carpophylls ovate - lanceolate, pectinate. Ovules 3 5 on each side.

Fl. & Fr : February - August.

Common ; in lower Ghats ; Attappadi Mukkali, Karivara, Panthanthode forest

Tender leaves are used as vegetable by the hill tribes and leaves used as festoons in religious and other functions.

[C] MONOCOTYLEDONES

123. HYDROCHARITACEAE

1a. Stems absent ; leaves radical :

2a. Leaves sessile, linear ... BLYXA 1

2b. Leaves petioled, ovate ... OTTELIA 3

1b. Stems present ; leaves cauline, whorled ... HYDRILLA 2

1. BLYXA Thouars ex Rich.

1a. Seeds echinate, long - tailed at both ends ... *B. echinosperma* 2

1b. Seeds tubercled, obtuse or apiculate at ends ... *B. aubertii* 1

1. **Blyxa aubertii** Rich. in Mem. Cl. Sci. Math. Inst. Natl France 12 (2) : 77. t. 4. 1812 ; Hartog in Steenis, Fl. Males. ser. 1. 5 : 390. 1959 ; Rao & Verma in Bull. Bot. Surv. Ind. 12 : 141. 1970. *B. ceylanica* Hook. f. Fl. Brit. Ind. 5 : 661. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1379. 1921, Repr. ed. 3 : 978. 1957.

Submerged, stemless, tufted herbs. Leaves radical with sheathing base, membranous linear, acute, 20 30 × 0.5 1.0 cm. Flowers bisexual. Spathes tubular. Sepals 3, oblong, 1 nerved. Petals linear. Stamens 3. Capsules cylindric. Seeds ovate elliptic, many, obscurely tubercled.

Fl. & Fr. : November.

Common ; in still waters and paddy fields ; Mukkali forest.

2. **Blyxa echinosperma** (Clarke) Hook. f. Fl. Brit. Ind. 5 : 661. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1397. 1928, Repr. ed. 3 : 978. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 12 : 140. 1970. *Hydrotrophus echinospermus* Clarke in J. Linn. Soc. Bot. 14 : 8. t. 1. 1875. *Blyxa lancifolia* Hook. f. *l. c.* *B. talboti* Hook. f. *l. c.* ; Fischer *l. c.*

Stemless, submerged herbs. Leaves 10 15 × 0.3 0.5 cm. 5 - 7 nerved, base broad, apex tapering. Scapes one or more. Spathes 1 flowered. Flowers bisexual, pale pinkish. Sepals 3, oblong, 1 3 nerved. Petals 3. Stamens 3. Styles compressed. Fruits torulose, ribbed. Seeds many, ovate elliptic, with 8 rows of blunt spines and with filiform tail at both ends.

Fl. & Fr. : October.

Abundant in still waters, Thenkara plains.

2. HYDRILLA Rich.

Hydrilla verticillata (L. f.) Royle, Ill. Bot. Himal. Mount. 376. 1839 ; Hook. f. Fl. Brit. Ind. 5 : 659. 1888 ; Fischer in Gamble, Fl. Pres.

Madr. 1369. 1928, Repr. ed. 3 : 977. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 12 : 140. 1970. *Serpicula verticillata* L. f. Suppl. 416. 1781.

Profusely branched, submerged, tuberous, slender herbs, rooting at nodes. Leaves opposite or whorled, linear oblong, entire or serrulate. Spathes solitary, axillary. Flowers unisexual, solitary, minute with 3 ovate sepals and 3 oblong petals. Stamens 3. Female flowers sessile. Stigma fimbriate. Fruits subcylindric with 2 6 minute oblong elliptic seeds.

Fl. & Fr. : November.

Abundant in still waters, Peringathukavu Kollenkode.

3. OTTELIA Pers.

Ottelia alismoides (L.) Pers. Syn. Pl. 1 : 400. 1807 ; Hook. f. Fl. Brit. Ind. 5 : 662. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1398. 1928, Repr. ed. 3 : 978. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 12 : 141. 1970. *Stratiotes alismoides* L. Sp. Pl. 535. 1753.

Flaccid, submerged, annual herbs. Submerged leaves narrow - oblong, tapering at base. Floating leaves oblong, obtuse, cordate at base ; margin undulate. Spathes ovate - elliptic, with 5 - 10 wavy wings. Flowers solitary, sessile, white. Sepals 3, oblong - lanceolate. Petals 3, obovate with yellow base. Stamens 6 9. Filaments hairy. Fruits fleshy, oblong with many seeds crowned by sepals.

Fl. & Fr. : November.

Abundant in streams ; Peringathukavu - Kollenkode.

'Fruits edible ; leaves used as vegetables' Rao & Verma *l. c.*

124. BURMANNIACEAE

BURMANNIA L.

1a. Saprophytic white, herbs ; flowers white with yellow tinge ... *B. championii* 1

1b. Non - saprophytic (autotrophic) green herbs ; flowers blue or purple ... *B. coelestis* 2

1. **Burmannia championii** Thw. Enum. Pl. Zeyl. 325. 1864 ; Hook. f. Fl. Brit. Ind. 5 : 666. 1888 ; Joseph *et al.* in J. Bombay Nat. Hist. Soc. 76 (3) : 552. 1980. *B. dalzielii* Rendle in J. Bot. 40 : 311. 1902.

Slender herbs, 6 - 10 cm. Flowers 2 - 7, trimerous ; outer perianth lobes triangular ; inner spathulate. Style 3 branched. Stigma 3, funnel shaped.

Fl. & Fr. : October.

Abundant in humus soil of shady places ; Mukkali (Mandhampatti) forest, Panthanthode.

It is an addition to the flora of South India.

2. **Burmannia coelestis** D. Don, Prodr. Fl. Nepal. 44 1825 ; Hook. f. Fl. Brit. Ind. 5 : 665. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1399. 1928, Repr. ed. 3 : 979. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 12 : 142. 1970. *Gonyanthes pusilla* Wall. ex Miers in Trans. Linn. Soc. London 18 : 537. t. 38 f. 3. 1841. *Burmannia pusilla* (Miers) Thw. Enum. Pl. Zeyl. 325. 1864. *B. coelestis* var. *pusilla* (Miers) Trimen, Handb. Fl. Ceylon 4 : 138, 1898.

Slender herbs, 10 - 15 cm. Basal leaves scale like ; cauline leaves reduced or linear ensiform. Flowers solitary or 2 6, in clusters. Perianth lobes 3 (outer) larger, winged, tubular ; inner ones 3, inconspicuous. Stamens 3. Stigma shortly 3 lobed. Capsules many seeded.

Fl. & Fr. : October November.

On exposed hill tops and slopes ; common ; Aruvampara, Kaikatty Pothundy forest.

Rao & Verma *l. c.* treat *B. coelestis* and *B. pusilla* as distinct species based on the length of the flowers but Ramamoorthy in Saldanha & Nicolson Fl. Hassan Dist. 809. 1976 treats *B. pusilla* as synonym of *B. coelestis* which is followed here.

125. ORCHIDACEAE

1a. Epiphytic plants :

2a. Leaves equitant ... OBERONIA 26

2b. Leaves not equitant :

3a. Lip not spurred but base saccate :

4a. Flowers with a mentum :

5a. Rhizomes long ; pseudobulbs uninodal ... EPHEMERANTHA 16

5b. Rhizomes short ; pseudobulbs plurinodal ... DENDROBIUM 13

4b. Flowers without a mentum :

6a. Column with a foot :

7a. Lip clawed, articulate :

8a. Scapes lateral ... BULBOPHYLLUM 7

8b. Scapes terminal ... POLYSTACHYA 32

7b. Lip not clawed, not articulate :

9a. Pseudobulbs discoid ; sepals united ... PORPAX 33

9b. Pseudobulbs not discoid ; sepals free :

10a. Pollinia 4 ... TRIAS 39

10b. Pollinia 8 ... ERIA 18

6b. Column without a foot :

11a. Bracts imbricate, concealing the flowers ... PHOLIDOTA 37

11b. Bracts not imbricate, not concealing the flowers :

12a. Lip not lobed ... LIPARIS 22

12b. Lip 3 - lobed ;

13a. Stems very short ;

14a. Flowers in panicles ... SIRHOOKERIA 36

14b. Flowers in racemes :

15a. Leaf apex entire ... COELOGYNE 10

15b. Leaf apex 2 - lobed ;

16a. Inflorescence pendulous ... CYMBIDIUM 12

16b. Inflorescence not pendulous... GASTROCHILUS 20

13b. Stems elongate ... COTTONIA 11

3b. Lip spurred :

17a. Foot of column present, long :

18a. Leaves terete ; rostellum elongate ... PAPILIONANTHE 28

18b. Leaves lorate ; rostellum porrect ... AERIDES 3

17b. Foot of column absent, or very short :

19a. Spur distant from the base of the lip ... RHYNCHOSTYLIS 34

19b. Spur at the base of lip :

20a. Sepals and petals narrowed to the base :

21a. Midlobe of lip transverse on spur ... SMITHSONIA 37

21b. Midlobe of lip not transverse on spur ... VANDA 41

20b. Sepals and petals not narrowed to the base :

22a. Slender plants ... SACCOLABIUM 35

22b. Robust plants :

23a. Inflorescence longer than leaves ... MALLEOLA 24

23b. Inflorescence shorter than leaves. ... ACAMPE 1

1b. Terrestrial plants :

24a. Leafy plants :

25a. Flowers without a spur or mentum :

26a. Inflorescence lateral from the stem ... ACANTHEPHIPPIUM 2

26b. Inflorescence terminal on the stem or rhizome or pseudobulbs :

27a. Lip superior :

28a. Column long, margined or winged ... LIPARIS 22

28b. Column very short, entire ... MALAXIS 23

27b. Lip inferior :

29a. Leaf single, appearing after flowering :

30a. Leaves narrow ; flowers glandular - pubescent ... PACHYSTOMA 27

30b. Leaves cordate ; flowers glabrous ... NERVILIA 25

29b. Leaves 2 or more, appearing with flowering :

31a. Flowers large ; leaves grass - like ... ARUNDINA 5

31b. Flowers small ; leaves not grass - like :

32a. Lip saccate ... ZEUXINE 42

32b. Lip not saccate ... DISPERIS 15

25b. Flowers with spur or mentum :

33a. Scapes lateral or terminal :

34a. Spur longer than sepals ... CALANTHE 8

34b. Spur shorter than sepals :

35a. Lateral sepals not free (connate) :

36a. Column auricled or lobed ... CHRYSOGLOSSUM 9

36b. Column not auricled or lobed ... TAINIA 38

35b. Lateral sepals free (not connate). ... EULOPHIA 19

33b. Scapes terminal :

37a. Lip lobed :

38a. Sepals subequal ... PERISTYLUS 30

38b. Sepals unequal :

39a. Stigma stalked ... HABENARIA 21

39b. Stigma sessile ... PECTEILIS 29

37b. Lip entire :

40a. Stems unbranched ... BRACHYCORYTHIS 6

40b. Stems branched ... TROPIDIA 40

24b. Leafless plants :

41a. Lip sessile :

42a. Lateral sepals connate ... DIDYMOPLEXIS 14

42b. Lateral sepals free ... EPIPOGIUM 17

41b. Lip clawed ... APHYLLORCHIS 4

1. ACAMPE Lindl.

Acampe praemorsa (Roxb.) Blatt. & McCann in J. Bombay Nat. Hist. Soc. 35 : 495. 1932 ; Abraham & Vatsala, Introd. Orchids 450. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 133. 1982. *Epidendrum praemorsum*

Roxb. Pl. Cor. t. 43. 1795. *Acampe wightiana* (Lindl. ex Wight) Lindl. Fol. Orch 2 : 95. 1853 ; Fischer in Gamble, Fl. Pres. Madr. 1447. 1928, Repr. ed. 3 : 1011. 1957. *Vanda wightiana* Lindl. ex Wight, Ic. t. 1670. 1852. *Saccolabium wightianum* (Lindl. ex Wight) Hook. f. Fl. Brit. Ind. 6 : 62. 1890.

Epiphytic herbs, *ca.* 30 cm. Leaves alternate, lorate, unequally bilobed at apex. Flowers yellow, fragrant, on short racemes arising opposite leaves. Bracts ovate, persistent. Sepals and petals fleshy, mottled - pink. Lip fleshy, 3 - lobed, saccate ; sidelobes blunt, erect small ; midlobe thick, ligulate, ovate, reflexed, white, irregularly dentate. Fruits fusiform, erect, longitudinally ribbed.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Karivara, Peringathukavu - Kollenkode, Thiruvizhankunnu, Walayar forest.

2. ACANTHEPHIPPIUM Bl.

Acanthephippium bicolor Lindl. in Bot. Reg. 20 : t. 1730. 1835 ; Hook. f. Fl. Brit. Ind. 5 : 815. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1426. 1928, Repr. ed. 3 : 997. 1957 ; Abraham & Vatsala, Introd. Orchid. 272. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 29. 1982. (Plate 12)

Large, robust, terestrial, pseudobulbous herbs, 40 - 90 cm. Leaves 2 - 3, elliptic, ovate oblong or lanceolate, acuminate. Floral bracts large, ovate lanceolate. Flowers fleshy, large. Petals and sepals yellow with purplish red tips. Sepals united, gibbously inflated. Petals erect, narrow, fleshy. Lip 3 - lobed, sidelobes erect, rounded ; midlobe thick, recurved, oblong - spathulate. Fruits ellipsoid, ridged.

Fl. & Fr. : March - April.

Common ; in dense shade of evergreen forests ; forest near dam site Silent Valley R. F.

3. AERIDES Lour.

Aerides maculosum Lindl. in Bot. Reg. 31 : t. 58. 1845 & Gard. Chron. 691. 1845 ; Hook. f. Fl. Brit. Ind. 6 : 45. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1442. 1928, Repr. ed. 3 : 1008. 1957 ; Sant. & Kap. Orch. Bombay 120. 1966 ; Abraham & Vatsala, Introd. Orchid. 444. 1981 ; Joseph in Rec. Bot. Surv. Ind. 6 : 78. 1982. *Saccolabium speciosum* Wight, Ic. tt. 1674 - 75. 1851.

Woody, stout herbs. Leaves 15 - 28 × 2 - 3 cm, linear - oblong, channelled, coriaceous. Flowers deep pink, fragrant. Petals and sepals mottled. Lip deep pinkish, 3 lobed ; sidelobes small, midlobe deep rose - pink. Spur inflexed.

Fl. & Fr. : July.

Not common : in lower Ghats : Attappadi - Mukkali forest, Walayar forest.

4. APHYLLORCHIS Bl.

Aphyllorchis prainii Hook. f. Fl. Brit. Ind. 6 : 117. 1890 ; Seidenf. & Smitin. Orch. Thailand 62. 1959 ; Vajravelu & Rathak. in. Bull. Bot. Surv. Ind. 10 : 99. 1968.

Leafless, unbranched, slender, erect saprophytes. Flowers brownish - purple, in lax racemes. Sepals and petals linear oblong. Lip broader, oblong. Claws with 2 short, triangular, erect, acute auricles.

Fl. & Fr. : April August.

Rare ; on wet humus in shade at lower elevations ; Mukkali forest, Silent Valley R. F.

It is allied to *A. montana* Reichb. f. but can be distinguished by the winged - claw of the lip. It is an addition to the Flora of the Presidency of Madras.

5. ARUNDINA Bl.

Arundina graminifolia (D. Don) Hochr. in Bull. New York Bot. Gard. 6 : 270. 1910 ; Fischer in Gamble, Fl. Pres. Madr 1432. 1928, Repr. ed. 3 : 1002. 1957 ; Abraham & Vatsala, Introd. Orchid. 497. 1981. *Bletia graminifolia* D. Don, Prodr Fl. Nepal. 29. 1825. *Arundina bambusifolia* Lindl. Gen. Sp. Orch. 125. 1831 ; Wight, Ic. t. 1661. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 857. 1890.

Stout, woody, reed like, tufted herbs. Leaves up to 20 cm long, linear lanceolate. Flowers showy, rose purple, in terminal racemes. Sepals linear lanceolate. Petals oblong lanceolate to rhomboid elliptic. Lip 3 lobed ; sidelobes round ; midlobe subrotund, deeply bifid, margin curled.

Fl. & Fr. : October.

Not common ; on grassy rocky slopes ; Ayyappankoil slopes - Nelliyampathy Ghat.

6. BRACHYCORYTHIS Lindl.

Brachycorythis iantha (Wight) Summerh. in Kew Bull. 10 : 238. 1955 ; Abraham & Vatsala, Introd. Orchid. 254. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 47. 1982. *Platanthera iantha* Wight, Ic. t. 1692. 1851. *Phyllomphax obcordata* (D. Don) Schltr. in Feddes Repert. 16 : 119. 1919 ; Fischer in Gamble, Fl. Pres. Madr. 1476. 1928, Repr. ed. 3 : 1031. 1957.

Robust, tuberous herbs. Leaves ovate - lanceolate, acute - mucronate at tip, amplexicul. Bracts ovate, leafy. Flowers sessile, white to pale pink, puberulous. Sepals and petals lanceolate, acute, erect. Lip deep pink, flabellate obcordate, emarginate, crenulate at margins, clawed at base. Claw 2 ridged. Spur conical, cleft at base.

Fl. & Fr. : September - October.

Rare ; in upper Ghats ; Karasuryamalai slopes.

7. BULBOPHYLLUM Thouars *nom. cons.*

1a. Flowers in umbels ; lip recurved	...	*B. fischeri* 1
1b. Flowers in racemes ; lip not recurved :		
2a. Pseudobulbs angled ; lip with 2 auricles	...	*B. neilgherrense* 2
2b. Pseudobulbs depressed ; lip without auricles	...	*B. tremulum* 3

1. **Bulbophyllum fischeri** Seidenf. in Dansk. Bot. Ark. 29 : 202. 1973 ; Abraham & Vatsala, Introd. Orchid. 341. 1981. *Cirrhopetalum wightii* Thw. Enum. Pl. Zeyl. 229. 1861 (non *Bulbophyllum wightii* Reich. f. 1861). *C. gamblei* Hook. f. Fl. Brit. Ind. 5 : 778. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1420. 1928, Repr. ed. 3 : 993. 1957. *C. thomsonii* Hook. f. *l. c.* (non *Bulbophyllum thomsonii* Hook. f. 1890). *B. gamblei* (Hook. f.) J.J. Smith in Bull. Jard. Bot. Buit. ser. 2. 8 : 24. 1912 non Hook. f. 1891. *Cirrhopetalum macraei* auct. non Lindl. 1820 ; Wight, Ic. t. 1652. 1851.

Epiphytic herbs. Pseudobulbs brownish, globose. Leaves *ca.* 2.0 × 0.65 cm, linear - oblong. Scapes longer than leaves. Flowers 4 8, light yellow, in umbels. Lateral sepals adherent, linear, spreading, pubescent near base. Petals oblong. Lip spathulate, dark purple, fleshy.

Fl. & Fr. : October January.

Rare ; in upper Ghats ; Minnamparai area, Ayyappankoil area.

2. **Bulbophyllum neilgherrense** Wight, Ic. t. 1650. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 761. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1418.

1928, Repr. ed. 3 : 992. 1957 ; Seidenf. & Smitin. Orch. Thailand 436. 1961 ; Joseph in Rec. Bot. Surv. Ind. 22 : 92. 1982.

Robust, epiphytic herbs. Pseudobulbs smooth, 4 - angled. Leaf one, 4 — 10 × 1.5 - 2.5 cm, elliptic oblong. Scapes shorter than leaves, drooping or erect. Flowers 6 - 8, yellow with pinkish shade. Sepals ovate - subfalcate, subequal, 5 nerved. Petals triangular - ovate. Lips deep - purple, with entire or toothed auricles.

Fl. & Fr. : November February.

Endemic ; common. in Ghats ; Karivara forest, Pottikkal - Mukkali forest.

3. **Bulbophyllum tremulum** Wight, Ic. t. 1749. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 763. 1980 ; Fischer in Gamble, Fl. Pres. Madr. 1418. 1928, Repr. ed. 3 : 992. 1957 ; Abraham & Vatsala, Introd. Orchid. 331. 1981 ; Joseph in Rec. Rot. Surv. Ind. 22 : 92. 1982.

Epiphytic herbs ; pseudobulbs ovoid conical to subglobose. Leaves solitary, sessile, ovate lanceolate, acute. Scapes longer than leaves. Flowers yellow pinkish, in racemes. Sepals linear lanceolate, 3 - nerved, subequal, ciliate. Petals fringed with hairs, very small. Lip linear - oblong, fringed with long, pendulous, mobile hairs on sides. Fruits ellipsoid with marcescent perianths.

Fl. & Fr. : February.

Endemic ; not common ; in lower Ghats ; Kaikatty forest - Nelli - yampathy Ghats.

8. CALANTHE R. Br.

1a. Racemes dense ; spur equal or slightly longer than sepal ; lip yellow ... *C. triplicata* 2

1b. Racemes lax ; spur much longer than sepals ; lip deep violet ... *C. masuca* 1

1. **Calanthe masuca** (D. Don) Lindl. Gen. Sp. Orch. 249. 1833 ; Hook. f. Fl. Brit. Ind. 5 : 850. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1432. 1928, Repr. ed. 3 : 1001. 1957 ; Seidenf. & Smitin. Orch. Thailand 337. 1961 ; Abraham & Vatsala, Introd. Orchid. 1981. *Bletia masuca* D. Don, Prodr. Fl. Nepal. 30. 1825.

Stout herbs. Leaves petioled, elliptic - obovate to lanceolate, glabrous beneath. Flowers white with pinkish tinge, puberulous. Sepals and petals ovate. Lip 3 - lobed, deep violet ; sidelobes falcate - oblong ; midlobe reniform. Spur subulate, inflexed.

Fl. & Fr. : September October.

Common ; in shades in Ghats ; Silent Valley R. F.

2. **Calanthe triplicata** (Willem.) Ames in Phillip. J. Sci. Bot. 2 : 326. 1907 ; Seidenf. in Dansk. Bot. Ark. 29 : 15. 1975. *Orchis triplicata* Willem. in Usteri Ann. Bot. 18 : 52. 1796. *Calanthe veratrifolia* (Willd.) Ker - Gawl. in Bot. Reg. 9. t. 720. 1823 ; Hook. f. Fl. Brit. Ind. 5 : 851. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1432. 1828, Repr. ed. 3 : 1001. 1957. *Limodorum veratrifolium* Willd. Sp. Pl. 4 : 122. 1805.

Large, terrestrial herbs, 30 70 cm. Leaves 30 50 × 5 12 cm, elliptic lanceolate, acuminate, plicate. Flowers pale lilac - white, in terminal long - peduncled racemes. Bracts ovate lanceolate, foliaceous, dorsal sepal lanceolate, 3 nerved. Lateral ones obliquely oblong. Petals obovate oblanceolate. Lip spurred, trilobed ; side lobes erect, midlobe tripartite.

Fl. & Fr. : October.

Occasional ; in shades in upper Ghats ; Karimalathode forest.

9. Chrysoglossum Bl.

Chrysoglossum maculatum (Thw.) Hook. f. Fl. Brit. Ind. 5 : 784. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1421. 1928, Repr. ed. 3 : 994. 1957 ; Abraham & Vatsala, Introd. Orchid. 292. 1981. *Ania maculata* Thw. Enum. Pl. Zeyl. 301. 1861.

Erect, terrestrial herbs with stout, creeping rootstocks. Leaves 18 - 32 × 4 - 8 cm, ovate oblong, obtuse, glabrous. Flowers pale - greenish, in lax racemes. Sepals and petals oblong - falcate. Lip 3 lobed, white, auricled at base ; sidelobes oblong ; midlobe concave. Spur purple - spotted. Fruits pendulous, ribbed.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Silent Valley R. F.

10. Coelogyne Lindl.

Coelogyne breviscapa Lindl. Fol. Orchid. 4. 1853 ; Hook. f. Fl. Brit. Ind. 5 : 833. 1893 *p. p.* ; Fischer in Gamble, Fl. Pres. Madr. 1430. 1928, Repr. ed. 3 : 1000. 1957 ; Das & Jain in Fasc. Fl. India 5 : 7. 1980 ; Abraham & Vatsala, Introd. Orchid. 277. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 118. 1982.

Epiphytic herbs. Rhizomes creeping with rigid, dark brown scales. Pseudobulbs narrowly ovoid oblong. Leaves 2, linear to linear oblong, acute. Bracts large, brownish, persistent. Flowers 4 8, white fragrant in racemes. Lip white, with 2 yellow ridges, 3 lobed with 2 erect crisped lamellae on either side of the median nerve ; sidelobes auricular, small ; midlobe obovate, retuse at tip. Fruits ellipsoid.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Silent Valley dam site area.

11. COTTONIA Wight

Cottonia peduncularis (Lindl.) Reich. f. Cat. Orch. Schiller. 52 1857 ; Thw. Enum. Pl. Zeyl. 303. 1864 ; Abraham & Vatsala, Introd. Orchid. 456. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 126. 1982. *Vanda peduncularis* Lindl. Gen. Sp. Orch. 216. 1833. *Cottonia macrostachys* Wight, Ic. t. 1755. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 26. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1439. 1928, Repr. ed. 3 : 1006. 1957.

Epiphytes ; stems woody, elongate, leafy. Roots long, stout, vermiform. Leaves up to 15 cm long, strap shaped, unequal at apex. Scapes 40 - 50 cm. Flowers lax, pinkish or yellow with maroon shade. Sepals and petals inflexed, dull yellowish brown, obovate oblong ; petals spathulate. Lip conspicuous, fleshy, porrect, deep velvety purple, pubescent ; sidelobes yellow ; midlobe with a broad sinus and a triangular macro in the centre. Fruits narrow, ridged.

Fl. & Fr. : March July.

Not common ; in lower Ghats ; Mukkali blind bridge area.

12. CYMBIDIUM Sw.

Cymbidium aloifolium (L.) Sw. in Novn Acta Regias Soc. Sci. Upsal. 6 : 73. 1799 ; Lindl. Gen. Sp. Orch. 165. 1833 ; Wight. Ic. tt. 1687 & 1688. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 10. 1890 ; Fischer in Gamble. Fl. Pres. Madr. 1436. 1928, Repr. ed. 3 : 1004. 1957 ; Abraham & Vatsala, Introd. Orchid. 305. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 120. 1982. *Epidendrum aloifolium* L. Sp. Pl. 1350. 1753. *Cymbidium erectum* Wight, Ic. t. 1753. 1851.

Robust epiphytes in massive clusters. Leaves coriaceous, keeled, linear - lanceolate, alternate distichous. Flowers many, yellow with dark purple tinge, in lax pendulous racemes. Floral bracts fleshy, broadly ovate.

Sepals linear - oblong. Petals lanceolate. Lip 3 lobed ; sidelobes erect, narrow, lanceolate ; midlobe broadly oblong, reflexed, hairy. Fruits pyriform.

Fl. & Fr. : May November.

Common on trunks of trees : in wet evergreen forests and on road side trees ; Bhavani river bank Mukkaly forest.

13. DENDROBIUM Sw. *nom. cons.*

1a. Stems elongate ; leaves from nodes of plurinodal pseudobulbs or stems :

2a. Flowers from leafless nodes :

3a. Flowers in racemes :

4a. Stems pendulous, many - branched :

5a. Flowers less than 1 cm long ... *D. herbaceum* 3

5b. Flowers more than 1 cm long ... *D. macrostachyum* 6

4b. Stems not pendulous, few - branched :

6a. Midlobe of lips bearded with yellow hairs ... *D. barbatulum* 2

6b. Midlobe of lips not beared ... *D. ovatum* 8

3b. Flowers in fascicles ... *D. heterocarpum* 4

2b. Flowers from leafy nodes :

7a. Stems flexuous ; flowers less than 2 cm long ... *D. heyneanum* 5

7b. Stems compressed, thick ; flowers more than 2 cm long ... *D. aqueum* 1

1b. Stems short ; leaves from top of uninodal pseudobulbs ... *D. nanum* 7

1. **Dendrobium aqueum** Lindl. in Bot. Reg. 29 : 6. t. 54. 1843 ; Hook. f. Fl. Brit. Ind. 5 : 739. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1417. 1928, Repr. ed. 3 : 991. 1957 ; Sant. & Kap. Orch. Bombany 99. 1966 ; Abraham & Vatsala, Introd. Orchid. 349. 1981. *D. album* Wight, Ic. t. 1645. 1851. *Callista aquea* (Lindl.) Kuntze, Rev. Gen. Pl. 2 : 654. 1891.

Decumbent, tufted herbs, 30 - 45 cm long with pendulous branches. Leaves membranous, ovate - lanceolate, wavy, acuminate. Flowers 1 - 2, showy, white. Sepals ovate, apiculate, glabrous. Petals obovate, glabrous.

Lips rhomboid pubescent, 3 lobed, yellow ; sidelobes incurved ; midlobe triangular, ciliate. Fruits obovate pyriform.

Fl. & Fr. : November April.

Not common ; in upper Ghats ; Kunthipuzha dam site forests.

2. **Dendrobium barbatulum** Lindl. Gen. Sp. Orch. 84. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 719. 1890 ; Fischer in Gamle, Fl. Pres. Madr. 1416. 1928, Repr. ed. 3 : 990. 1957 ; Sant. & Kap. Orch. Bombay 93. 1966 ; Joseph in Rec. Bot. Surv. Ind. 22 : 106. 1982.

Caespitose herbs with slender plurinodal stems, leafless when flowering. Leaves distichous, lanceolate - ovate. Flowers white with pinkish tinge in racemes. Sepals oblong to oblong lanceolate. Lip 3 lobed ; sidelobes ovate oblong, purple ; midlobe rhomboid ovate, larger than sidelobes.

Fl. & Fr. : January April.

Common ; in upper Ghats : Mukkali forest, Valiyaparathode forest.

3. **Dendrobium herbaceum** Lindl. in Edward's Bot. Reg. 26 : 69. 1840. ; Hook. f. Fl. Brit. Ind. 5 : 719. 1890 ; Fischer in Gamble. Fl. Pres. Madr. 1416. 1928, Repr. ed. 3 : 990. 1957 ; Sant. & Kap. Orch. Bombay 82. 1966 ; Abraham & Vatsala, Introd. Orchid. 368. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 104. 1982. *D. ramosissimum* Wight, Ic. t. 1648. 1851.

Large, epiphytic herbs ; stems yellow, shining, to 90 cm long. Leaves linear lanceolate, leafless when flowering Flowers small, 2 - 5, creamy white - yellow, in short racemes at nodes. Sepals oblong lanceolate. Petals spathulate. Lip pale yellow, oblong ; sidelobes obscure ; midlobe ovate.

Fl. & Fr. : February - March.

Common ; in upper Ghats ; Kaikatty forest Nelliyampathy Ghat.

4. **Dendrobium heterocarpum** Wall. ex Lindl. Gen. Sp. Orch. 78. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 737. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1416. 1928, Repr. ed. 3 : 991. 1957 ; Seidenf. & Smitin. Orch. Thailand 199. 1960 ; Abraham & Vatsala, Introd. Orchid. 361. 1981. *D. aureum* Lindl. *l. c.* 77 ; Wight, Ic. t. 1646. 1851.

Robust, tufted herbs with clavate stems, leafless when flowering. Leaves membranous, oblong - lanceolate. Flowers white, fragrant, 1 - 3, in short racemes. Sepals linear - oblong. Petals ovate - lanceolate. Lip 3 - lobed, orange red, hairy, incurved at base.

Fl. & Fr. : March.

Rare ; in upper Ghats ; Karasuryamalai area.

5. **Dendrobium heyneanum** Lindl. Gen. Sp. Orch. 78. 1830 ; Wight, Ic. t. 909. 1844 45 ; Hook. f. Fl. Brit. Ind. 5 : 718. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1415. 1928, Repr. ed. 3 : 990. 1957 ; Abraham & Vatsala, Introd. Orchid. 358. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 104. 1982.

Small, tufted herbs, up to 20 cm. Stems stout, clavate. Leaves bifarious, linear - lanceolate with large sheathing base. Flowers many, white with slender pedicels, in leaf - opposed racemes. Sepals lanceolate. Petals oblanceolate spathulate. Lip 3 lobed ; sidelobes erect ; midlobe orbicular - oblong, crenate, pink. Fruits ovoid.

Fl. & Fr. : August October.

Fairly common ; in upper Ghats ; Silent Valley R. F.

6. **Dendrobium macrostachyum** Lindl. Gen. Sp. Orch. 78. 1830 ; Wight. Ic. t. 1647. 1851 ; Hook. f. Fl. Brit. Ind 5 : 735. 1890 ; Fischer in Gamble, Fl, Pres. Madr. 1416. 1928, Repr. ed. 3 : 990 1957 ; Sant. & Kap. Orch. Bombay 96. 1966 ; Abraham & Vatsala, Introd. Orchid. 355. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 106. 1982.

Drooping epiphytes, leafless when flowering. Leaves alternate. distichous, linear to ovate lanceolate. Flowers yellow, with pinkish tinge, in panicles. Sepals lanceolate. Petals linear - lanceolate. Lip panduriform or ovate oblong, minutely fimbriate, puberulous.

Fl. & Fr. : April - October.

Fairly common ; in lower Ghats ; Anamooly slopes, Easwaran estate Sholaiyur slopes.

7. **Dendrobium nanum** Hook. f. in Hooker's Ic. Pl. 19 : t. 1853. 1889 & Fl. Brit. Ind. 5 : 717. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1415. 1928, Repr. ed. 3 : 990. 1957 ; Joseph in Rec. Bot. Surv. Ind. 22 : 132. 1982.

Small herbs ; pseudobulbs *ca* 2 cm long. Leaves 2 4, elliptic lanceolate. Peduncles slender, filiform, zigzag. Flowers pale pink. Sepals lanceolate. Petals spathulate. Lip trilobed ; sidelobes small, erect, incurved ; midlobe suborbicular, crenate.

Fl. & Fr. : April.

Endemic ; rare ; collected once at Ayyappankoil area at *ca* 900 m ; *Vajravelu* 49712.

8. **Dendrobium ovatum** (Willd.) Kranz in Pflanzenr. 45 : 71. 1910 ;

Fischer in Gamble, Fl. Pres. Madr. 1416. 1928, Repr. ed. 3 : 990. 1957 ; Sant. & Kap Orch. Bombay 91. 1966 ; Abraham & Vatsala, Introd. Orchid. 353. 1981. *Cymbidium ovatum* Willd. Sp. Pl. 4 : 101. 1805. *D. barbatulum* auct. non Lindl. 1830 ; Wight, Ic. t. 910. 1944 - 45.

Tufted epsphytes, leafless when flowering. Leaves oblong - lanceolate. Flowers white, with a creamy centre. Petals obovate oblong. Lip 3 lobed ; sidelobes erect, oblong rounded ; midlobe subquadrate, glabrous, curved downwards. Fruits oblong - ovoid.

Fl. & Fr. : February March.

Fairly common ; in lower Ghats ; Ayyappankoil forest Nelliyam pathy Ghats.

14. DIDYMOPLEXIS Griff.

Didymoplexis pallens Griff. in Calcutta J. Nat. Hist. 4 : 383. t. 17. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 122. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1459, 1928, Repr. ed. 3 : 1021. 1957 ; Sant. & Kap. Orch. Bombay 162. 1966. *Apetalon minutum* Wight, Ic. t. 1758. 1851.

Saprophytic, leafless, terrestrial herbs with elongate tuberous roots. Scapes simple, flexuous. Flowers dull yellow. Sepals and petals connate into a 2 - lipped tube. Lip shortly clawed, oblong. Column erect, winged above. Pedicels elongate in fruit.

Fr : December.

Rare ; once collected in Silent Valley R. F. ; *Vajravelu* 33227.

15. DISPERIS Sw.

Disperis zeylanica Trimen in J. Bot. 23 : 245. 1885 ; Sald in Sald. & Nicol. Fl. Hassan Dist. 824. 1976. *D. tripetaloides* sensu Lindl. Gen. Sp. Orch. 361. 1839 ('*tribetaloidea*') (excl. basionym *Dryopeia tripetaloides* Thouars 1822) ; Wight. Ic. t. 930. 1844 45. *Disperis nellgherrensis* auct. non Wight, 1852 ; Hook. f. Fl. Brit. Ind. 6 : 169. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1477. 1928, Repr. ed. 3 : 1032. 1957.

Unbranched, slender terrestrial, tuberous herbs. Leaves 1 - 2, ovate, entire, acute, cordate, amplexicaul. Flowers white with pinkish tinge. Lip 'T' or 'Y' shaped , arms recurved, yellow, papillose. Column lateral, papillose. Capsules elliptic, ribbed.

Fl : May.

Rare ; once collected in Silent Valley R. F. ; *Vajravelu* 27707.

Trimen *l. c.* segregated the Indo Ceylon plants as *D. zeylanica*. Fischer *l. c.* reduced it to a synonym under *D. neilgherrensis* Wight, a distinct species, well illustrated in Wight, Ic. t. 1719. 1851. which has serrate leaves and erect cornus as against entire leaves in *D. zeylanica*.

16. EPHEMERANTHA Hunt & Summerh.

Ephemerantha macraei (Lindl.) Hunt & Summerh. in Taxon 10 : 105. 1961 ; Abraham & Vatsala, Introd. Orchid. 370. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 88. 1982. *Dendrobium macraei* Lindl. Gen. Sp. Orch. 75. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 714. 1890. *Desmotrichum fimbriatum* auct. non Bl. 1825 ; Fischer in Gamble, Fl. Pres. Madr. 1412. 1928, Repr. ed. 3 : 987. 1957.

Tufted epiphytes. Rhizomes creeping ; branches smooth, pendulous, polished, ending in pseudobulbs. Leaves sessile, solitary, linear oblong. Flowers solitary, fragrant, white speckled with red. Lip 3 lobed ; sidelobes erect, oblong ; midlobes dull yellow, erose at margins, expanding into a winged apex.

Fl. : July.

Not common ; once collected in Silent Valley R.F. at *ca* 975 m ; *Vajravelu* 32129.

17. EPIPOGIUM R. Br.

Epipogium roseum (D. Don) Lindl. in J. Linn. Soc. Bot. 1 : 177. 1857 ; Sant. & Kap. Orch. Bombay 237. 1966 ; Joseph in Rec. Bot. Surv. Ind. 22 : 17. 1982. *Limodorum roseum* D. Don. Prodr. Fl. Nepal. 30. 1825. *Epipogium nutans* Reich. f. in Bonplandia 5 : 36. 1836 ; Hook. f. Fl. Brit. Ind. 6 : 124. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1460. 1928, Repr. ed. 3 : 1021. 1957 (*Epipogum*). *Podanthera pallida* Wight, Ic. t. 1759. 1851.

Leafless, saprophytic, fleshy herbs. Rhizomes fleshy, tuberous. Flowers many, ivory white with purple tinge. Sepals and petals similar, linear oblong, free. Lip 3 lobed, spurred at base, undulate, erose at margins, with 2 crested lamellae one on each side of the median nerve. Spur scrotiform.

Fl. & Fr. : January.

Fairly common ; on humus soil in damp, shady places ; Silent Valley R. F.

18. ERIA Lindl. *nom. cons.*

1a. Flowers in racemes :

2a. Pseudobulbs ovoid or globose ; flowers not secund ; lip rhomboid, subarticulate ... *E. albiflora* 1

2b. Pseudobulbs depressed - ovoid ; flowers secund ; lip ovate - lanceolate ... *E. dalzellii* 2

1b. Flowers solitary ... *E. reticosa* 3

1. **Eria albiflora** Rolfe in Bull. Misc. Inform. Kew 170. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1425. 1928, Repr. ed. 3 : 996. 1957 ; Joseph in Rec. Bot. Surv. Ind. 22 : 111. 1982.

Small epiphytes, up to 10 cm. Pseudobulbs aggregate. Leaves oblong lanceolate, attenuate, leafy when flowering. Flowers many, white in brown pubescent slender scape. Sepals obliquely lanceolate - ovate. Petals linear - ovate. Lip sub - orbicular, beaked at tip, sparsely gland dotted, with 2 lateral papillae at base.

Fl. & Fr. : August.

Rare ; once collected in Silent Valley R.F. at *ca* 950 m ; *Varjavelu* 27550.

2. **Eria dalzellii** (Hook. ex Dalz.) Lindl. in J. Linn. Soc. Bot. 3 : 47. 1858. (excl. descr.). *Dendrobium dalzellii* Hook. ex Dalz. in Hook. Kew J. Bot. 4 : 292. 1852 ('*Dalzeli*') ; Hook. f. Fl. Brit. Ind. 5 : 789. 1890 ; Fischer in Gamble. Fl. Pres. Madr. 1425. 1928. Rep. ed. 3 : 996. 1957 ; Sant. & Kap. Orch. Bombay 151. 1966 ; Abraham & Vatsala, Introd. Orchid. 375. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 111. 1982.

Robust herbs with clustered pseudobulbs. Leaves oblong to oblong lanceolate, mucronate. Flowers yellow, in racemes. Sepals triangular, ovate to lanceolate. Petals subsimilar. Lip ovate lanceolate, margins incurved with 2 yellow ridges from base.

Fl. & Fr. : September November.

Not common ; in shade on tree trunks ; Kunthipuzha dam site area.

3. **Eria reticosa** Wight, Ic. t. 1637. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 787. 1890 ; Sant. & Kap. Orch. Bombay 146. 1966. *E. bracteata* Dalz. &

Gibs. Bombay Fl. 262. 1861 non Lindl. 1859 ; Hook. f. *l.c.* ; Fischer in Gamble, Fl. Pres. Madr. 1425. 1928, Repr. ed. 3 : 996. 1957.

Epiphytes ; pseudobulbs covered with net like sheaths. Leaves 2, oblong or elliptic - lanceolate. Flowers white, solitary. Lateral sepals and petals falcate. Lip 3 lobed ; sidelobes auricular, yellow ; midlobe ovate with 2 orange - yellow crests from base of lip to end.

Fl. & Fr. : July - August.

Fairly common ; in lower Ghats ; Ayyappankoil forest, Panthanthode forest.

19. EULOPHIA R. Br. ex Lindl. *nom. cons.*

1a. Pseudobulbs present ; leafy when flowering ... *E. graminea* 2

1b. Pseudobulbs absent ; leafless when flowering :

2a. Inflorescences hirsute ; flowers yellow ... *E. hirsuta* 3

2b. Inflorescences not hirsute ; flowers not yellow :

3a. Lip as long as broad ; disc with 2 fleshy ridges ... *E. emilianae* 1

3b. Lip twice as long as broad ; disc with many tubercled nerves ... *E. nuda* 4

1. **Eulophia emilianae** Sald. in Indian Forester 100 : 506. t. 1. 1974 ; Nair & Bhargavan in J. Econ. Tax. Bot. 3 : 299. 1982.

Terrestrial, robust, tuberous herbs. Scapes lateral, greenish - white. Flowers reddish brown suffused with grey. Dorsal sepal ovate - lanceolate ; lateral sepals obliquely ovate. Petals obovate. Lip 3 - lobed, recurved, with *ca* 7 hairy veins ; base produced into a foot.

Fl. : April.

Rare ; on humus soil in open places ; Panthanthode forest.

It is an addition to the Flora of the Presidency of Madras.

2. **Eulophia graminea** Lindl. Gen. Sp. Orch. 182. 1833 ; Hook. f. Fl. Brit. Ind. 6 : 2. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1435. 1928, Repr. ed. 3 : 1003. 1957 ; Abraham & Vatsala, Introd. Orchid. 296. 1981.

Terrestrial herbs ; pseudobulbs epigeal, conical. Leaves 12 15 cm long, grass- like. Scapes 20 - 40 cm long. Sepals and petals greenish with

brownish veins. Lip white with purple veins ; sidelobes erect ; midlobe subquadrate. Spur short, incurved.

Fl. : March.

Not common ; in lower Ghats ; Mukkali forest.

3. **Eulophia hirsuta** Joseph et Vajravelu in Bull. Bot. Surv. Ind. 17 : 192. 1975 (1978). *Pachystoma hirsuta* (Joseph & Vajravelu) Sathish Kumar & Manilal in Kew Bull. 42 (4) : 942. 1987.

Terrestrial, tuberous herbs, leafless when flowering. Leaves 1 - 3, grass - like. Racemes up to 20 cm high, hirsute. Flowers bright yellow, hirsute. Sepals ovate oblong, hirsute outside. Petals oblanceolate, hirsute outside. Lips 3 lobed ; sidelobes auricular ; midlobe reflexed.

Fl. & Fr. : December - February.

Rare ; on open grassy slopes ; Karasuryamalai grassy slopes.

It has close resemblence to *Ipsea malabarica* (Reichb. f.) Hook. f. but it can be distinguished by the hirsute nature all over, mature tubers being forked as against the depressed conical tubers.

4. **Eulophia nuda** Lindl. Gen. Sp. Orch. 180. 1833 ; Hook. f. Fl. Brit. Ind. 6 : 5. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1435. 1928, Repr. ed. 3 : 1003. 1957 ; Sant. & Kap. Orch. Bombay 115. 1966 ; Abraham & Vatsala, Introd. Orchid. 300. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 23. 1982. *Cyrtopera fusca* Wight, Ic. t. 1690. 1851.

Large, tuberous herbs, up to 70 cm high. Leaves alternate, linear lanceolate, plaited. Flowers greenish or purplish. Lateral sepals attached to foot of column. Petals oblong. Lip spurred, obovate oblong, 3 lobed ; sidelobes erect, auricular ; midlobe elongate, crenulate, recurved.

Fl. & Fr. : April.

Fairly common in open places ; Panthanthode forest.

Hook. f. (in *Ann. Roy. Bot. Gard. Calcutta* 5 : 32. 1895) distinguished 4 divergent varieties based on colour and size variations but Santapau & Kapadia *l. c.* consider them as mere formae.

20. Gastrochilus D. Don

Gastrochilus pulchellus (Wight) Schltr. in Feddes Repert. 12 : 315. 1913 ; Abraham & Vatsala, Introd. Orchid. 466. 1981. *Vanda pulchellia*

Wight, Ic. t. 1671. 1851. *Saccolabium pulchellum* (Wight) Fischer in Gamble, Fl. Pres. Madr. 1446. 1928, Repr. ed. 3 : 1011. 1957. *Gastrochilus dasypogon* auct. non (Rees) Kuntze 1891 ; Sant. & Kap. Orch. Bombay 226. 1966.

Epiphytes. Leaves linear oblong, unequally 2 lobed at apex. Racemes lateral. Flowers yellowish with pinkish dots. Sepals and petals obovate - oblong. Lip white with a raised yellow central portion. Sacs of spur yellow tinged.

Fl. & Fr. : October - April.

Fairly common ; in lower Ghats ; Ayyappankoil forest, Mukkali forest.

21. HABENARIA Willd.

1. Petals entire :

  2a. Midlobe of lip entire ; lobes not tailed :

    3a. Sidelobes of lip broader than midlobes :

      4a. Leaves flat on ground ... *H. plantaginea* 8

      4b. Leaves clustered near base :

        5a. Flowers 1 - 3 ; petals linear oblong, puberulous ... *H. longicorniculata* 5

        5b. Flowers 3 - 9 ; petals lanceolate, glabrous ... *H. longicornu* 6

    3b. Sidelobes of lip not broader than midlobes :

      6a. Leaves clustered above the middle of the stem ; sidelobes of lip shorter than midlobe ... *H. heyneana* 4

      6b. Leaves clustered about the middle ; sidelobes of lip longer than midlobe ... *H. furcifera* 3

  2b. Midlobe of lip 2 - lobed ; all lobes with a long filiform tail ... *H. crinifera* 1

1b. Petals 2 - partite :

  7a. Lower segments of petal about as long as the upper ... *H. digitata* 2

  7b. Lower segments of petal about twice as long as the upper ... *H. multicaudata* 7

1. **Habenaria crinifera** Lindl. Gen. Sp. Orch. 323. 1835 ; Wight, Ic. t. 926. 1845 ; Hook. f. Fl. Brit. Ind. 6 : 142. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1471. 1928, Repr. ed. 3 : 1028. 1957 ; Sant. & Kap. Orch. Bombay 26. 1966 ; Abraham & Vatsala, Introd. Orchid. 241. 1981.

Tuberous herbs. Leaves elliptic lanceolate, clustered at base. Flowers white, in lax racemes. Sepals subequal. Petals linear - oblong. Lip clawed, 3 - lobed ; sidelobes cuneate, curved outwards ; margins dentate ; midlobe cuneate, bifid. Spur slender, curved.

Fl. : October.

Occasional ; in lower Ghats ; Mukkali forest.

When in bloom, it is very conspicuous and attractive.

2. **Habenaria digitata** Lindl. Gen. Sp. Orch. 307. 1835 ; Hook. f. Fl. Brit. Ind. 6 : 134. 1890 *p.p.* ; Fischer in Gamble, Fl. Pres. Madr. 1469. 1928, Repr. ed. 3 : 1026. 1957. *H. trinervia* Wight, Ic. t. 1701. 1851 ; Sant. in Rec. Bot. Surv. Ind. ed. 3. 16 (1) : 269. 1967 ; Joseph in Rec. Bot. Surv. Ind. 22 : 58. 1982.

Tall herbs, 20 - 35 cm with 1 or 2 globose - ovoid tubers. Leaves alternate, elliptic - lanceolate, sheathing at base. Flowers greenish, in racemes. Sepals ovate - lanceolate. Petals bipartite ; upper lobes subulate, lower filiform. Lips 3 - lobed ; midlobe longer than the sidelobes, spurred.

Fl. & Fr. : July.

Common in moist hilly slopes ; Dhoni R. F.

3. **Habenaria furcifera** Lindl. Gen. Sp. Orch. 319. 1835 ; Hook. f. Fl. Brit. Ind. 6 : 149. 1890 ; Sant. & Kap. Orch. Bombay 39. 1966 ; Joseph in Rec. Bot. Surv. Ind. 22 : 59. 1982 ; Balakr. in Bull. Bot. Surv. Ind. 6 : 91. 1964.

Tuberous herbs, 30 - 60 cm. Leaves oblanceolate or obovate. Flowers greenish. Sepals subequal, ovate - lanceolate. Petals broadly lanceolate. Lip 3 lobed, lateral lobes filiform, diverging, curved ; midlobe blunt. Spur slender, *ca* 1.5 cm.

Fl. : November.

Not common ; in lower Ghats ; Chindaki forest.

It is an addition to the Flora of the Presidency of Madras.

4. **Habenaria heyneana** Lindl. Gen. Sp. Orch. 320. 1835 ; Wight, Ic. t. 923. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 148. 1890 ; Fischer in Gamble.

Fl. Pres. Madr. 1471. 1928. Repr. ed. 3: 1028. 1957 ; Sant. & Kap. Orch. Bombay 32. 1966 ; Abraham & Vatsala, Introd. Orchid. 231. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 62. 1982.

Tuberous, terrestrial herbs. Leaves 4 - 6, oblong - lanceolate, distichous. Flowers 5 - 10, creamy white. Sepals ovate - oblong, subequal. Petals falcate, erect, entire. Lip 3 - lobed ; lobes deflexed ; sidelobes curved, shorter than midlobe. Spur linear.

Fl. & Fr. : October.

Not common ; on grassy open slopes ; Aruvampapa slopes - Silent Valley.

5. **Habenaria longicornicalata** Grah. Cat. Pl. Bombay 202. 1839 ; Sant. & Kap. Orch. Bombay 29. 1966 ; Abraham & Vatsala, Introd. Orchid. 238. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 66. 1982. *H. longicalcarata* A. Rich. in Ann. Sci. Nat. Bot. ser. 2. 15 : 71. t. 38. 1841 ; Wight, Ic. t. 925. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 141. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1470. 1928, Repr. ed. 3 : 1027. 1957. (Plate - 13)

Terrestrial herbs, 25 - 75 cm. Tubers 1 - 2, unequal. Leaves 4 - 6, oblong to oblong - lanceolate. Flowers 1 - 4, white, towards the tip of long scape. Sepals ovate - lanceolate, unequal. Petals sub - falcate. Lip 3 - lobed ; midlobe narrow. Spur 10 - 15 cm long. Capsules fusiform.

Fl. & Fr. : October.

Rare ; upper Ghats on grassy slopes ; Aruvampara slopes - Silent Valley.

6. **Habenaria longicornu** Lindl. Gen. Sp. Orch. 322. 1835 ; Hook. f. Fl. Brit. Ind. 6 : 139. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1470. 1928, Repr. ed. 3 : 1027. 1957 ; Abraham & Vatsala, Introd. Orchid. 229. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 68. 1982. *H. montana* A. Rich. in Ann. Sci. Nat. Bot. ser. 2. 15 : 73. t. 4A. 1841 ; Wight, Ic. t. 927. 1844.

Terrestrial, tuberous herbs, 10 - 30 cm. Leaves oblong - lanceolate to linear. Flowers white. Sepals ovate - lanceolate. Petals oblanceolate. Lip 3 - lobed ; sidelobes recurved, oblique, praemorse ; midlobe lanceolate, obtuse. Spur stout.

Fl. & Fr. : September - October.

Common on exposed grounds ; in lower Ghats ; Mukkali forest.

7. **Habenaria multicaudata** Sedgw. in Rec. Bot. Surv. Ind. 6 : 352. 1914 ; Fischer in Gamble, Fl. Pres. Madr. 1469. 1928. Repr. ed. 3 : 1026.

1957 ; Sant. & Kap. Orch. Bombay 14. 1966 ; Abraham & Vatsala, Introd. Orchid. 216. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 56. 1982.

Tuberous herbs, 30 - 60 cm. Leaves elliptic - oblong, clustered in the middle. Flowers greenish with brown tinge. Sepals ovate oblong. Petals bipartite, filiform. Lip 3 partite ; lobes linear - filiform, elongate. Spur curved, swollen towards tip.

Fl. : July.

Endemic ; rare ; in lower Ghats ; Mukkali forest.

Flowers look like a spider.

8. **Habenaria plantaginea** Lindl. Gen. Sp. Orch. 323. 1835 ; Wight, Ic. t. 1710. 1852 ; Hook. f. Fl. Brit. Ind. 6 : 141. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1470. 1928, Repr. ed. 3 : 1027. 1957 ; Sant. & Kap. Orch. Bombay 28. 1966 ; Abraham & Vatsala, Introd. Orchid. 238. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 69. 1982.

Tuberous, small herbs, up to 25 cm. Leaves oblong or oblong - lanceolate. Flowers lax, white. Sepals ovate lanceolate. Petals elliptic, falcate, erect. Lips 3 lobed ; sidelobes semi ovate ; midlobe linear, ligulate. Spur slender.

Fl. & Fr. : September October.

Fairly common ; in lower Ghats on open slopes ; Anamooly - Mukkali forest.

22. LIPARIS L.C. Rich. *nom. cons.*

Liparis viridiflora (Bl.) Lindl. Gen. Sp. Orch. 31. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 704. 1890 ; Seidenf. in Dansk. Bot. Ark. 31 : 82. 1976 ; Abraham & Vatsala, Introd. Orchid. 410. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 37. 1982. *Malaxis viridiflora* Bl. Bijdr. 392. t. 54. 1825. *Liparis longipes* Lindl. in Wall. Pl. Asiat. Rar. 1 : 31. t. 35. 1830 ; Wight, Ic. t. 906. 1844 ; Hook. f. *l. c.* 703 ; Fischer in Gamble, Fl. Pres. Madr. 1411. 1928, Repr. ed. 3 : 987. 1957.

Pseudobulbous epiphytes. Leaves 2, opposite, erect, narrowly obovate - oblong. Flowers greenish yellow, in terminal racemes. Sepals lanceolate oblong. Petals linear, acute. Lip ovate, entire, folded, recurved.

Fl. & Fr. : September - October.

Common on trees ; in upper Ghats ; Silent Valley R. F.

Fischer *l. c.* treats *L. longipes* and *L. viridiflora* as separate species but Seidenfaden *l.c.* reduces *L. longipes* to a synonym under *L. viridiflora*.

23. MALAXIS Soland. ex Sw.

1a. Leaves with purple shade ; sides of lip not auricular, apex pectinate ... *M. versicolor* 2

1b. Leaves without purple shade ; sides of lip auricular, apex notched ... *M. acuminata* 1

1. **Malaxis acuminata** D. Don, Prodr. Fl. Nepal. 29. 1825 ; Abraham & Vatsala, Introd. Orch. 396. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 33. 1982. *Microstylis wallichii* Lindl. Gen. Sp. Orch. 20. 1830 ; Hook. f. Fl. Brit. Ind. 5 : 686. 1890 ; Fischer in Gamble. Fl. Pres. Madr. 1407. 1928, Repr. ed. 3 : 985. 1957. *M. wallichii* Lindl. var. *biloba* King & Prantl. in Ann. Roy. Bot. Gard. Calcutta 8 : 17. t. 18. 1898. *Malaxis wallichii* (Lindl.) Deb in Bull. Bot. Surv. Ind. 3 : 128. 1961.

Terrestrial herbs. Leaves 3 or 4, elliptic - lanceolate, acute. Bracts deflexed. Flowers dull purple, crowded. Sepals oblong - lanceolate. Petals linear. Lip broad at base, erect, sagitate, deeply forked at tip.

Fl. : July.

Not common ; in upper Ghats ; Silent Valley R. F.

2. **Malaxis versicolor** (Lindl.) Abeywickr. in Ceylon J. Sci. (Biol. Sci.) 2 : 147. 1959 ; Abraham & Vatsala, Introd. Orchid. 399. 1981. *Microstylis versicolor* Lindl. Gen. Sp. Orch. 21. 1830 ; Fischer in Gamble, Fl. Pres. Madr. 1407. 1928, Repr. ed. 3 : 985. 1957. *M. rheedii* Wight, Ic. t. 902. 1844 - 45 ; Hook. f. Fl. Brit. Ind. 5 : 690. 1890.

Terrestrial, tufted herbs ; stems 20 30 cm, erect, swollen at base. Leaves 3 or 5, ovate - elliptic, green - purple. Bracts deflexed. Flowers greenish yellow to purple. Sepals oblong - lanceolate. Petals linear. Lip reniform, dentate.

Fl. : December.

Rare ; in upper Ghats ; Silent Valley R.F., *Vajravelu* 33199.

24. MALLEOLA J.J. Smith & Schltr.

Malleola gracilis (Lindl.) Schltr. in Feddes Repert. 1 : 981. 1913 ; Abraham & Vatsala, Introd. Orchid. 491. 1981. *Saccolabium gracile* Lindl. Gen. Sp. Orch. 225. 1833 ; Hook. f. Fl. Brit. Ind. 6 : 57. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1446. 1928, Repr. ed. 3 : 1011. 1957.

Pendulous epiphytes. Leaves thick, fleshy, speckled with brown, linear - lanceolate. Flowers white, in slender racemes. Sepals oblong ; dorsal concave. Spur straight, tubular ; midlobe of lip minute.

Fl. : December.

Rare ; once collected from Silent Valley R.F. at *ca* 900 m ; *Vajravelu* 33225.

25. NERVILIA Comm. ex Gaudich. *nom. cons.*

Nervilia plicata (Andr.) Schltr. in Bot. Jahrb. 45 : 403. 1911 ; Seidenf. in Dansk. Bot. Ark. 32 : 157. 1978 ; Fischer in Gamble. Fl. Pres. Madr. 1458. 1928, Repr. ed. 3 : 1020. 1957 ; Joseph in Rec. Bot. Surv. Ind. 22 : 21. 1982. *Arethusa plicata* Andr. Bot Rep. t. 321. 1802. *Nervilia discolor* (Bl.) Schltr. *l. c.* ; Sant. & Kap. Orch. Bombay 131. 1966. *Pogonia discolor* Bl. Mus. Bot. Lugd. Bat. 1 : 128. t. 57. 1858. *P. biflora* Wight, Ic. t. 1758. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 119. 1890. *Nervilia biflora* (Wight) Schltr. *l. c.* ; Fischer *l. c.* 1459.

Tuberous herbs ; leafless when flowering. Leaves orbicular, solitary, flat on ground, broadly dentate, cordate, white setaceous - hairy, purple - nerved. Flowers 2 or 3, creamy - white. Sepals and petals oblong - lanceolate. Lips obovate - oblong, embracing the column, violet streaked, saccate at base.

Rare but abundant ; once collected in dense forests at Parambikulam in July 1976 in vegetative condition ; flowered during April 1978 in BSI garden.

26. OBERONIA Lindl. *nom. cons.*

1a. Petals and lobes of lip divided :

2a. Leaves pale brownish - yellow ; sepals and petals not deflexed ... *O. brachyphylla* 1

2b. Leaves pale green ; sepals and petals deflexed ... *O. iridifolia* var. *denticulata* 4

1b. Petals and lobes of lip entire :

3a. Inflorescences shorter than leaves ... *O. ensiformis* 3

3b. Inflorescences equal or longer than leaves :

4a. Spikes stout with sterile tips ; midlobe of lip inconspicuous ... *O. brunoniana* 2

4b. Spikes without sterile tips ; midlobe of lip conspicuous ... *O. santapoui* 5

1. **Oberonia brachyphylla** Blatt. & McCann in J. Bombay Nat. Hist. Soc. 35 : 257. 1931 ; Joseph & Vajravelu in Bull. Bot. Surv. Ind. 20 : 169. 1978 ; Abraham & Vatsala, Introd. Orchid. 416. 1981 ; Ansari *et al.* in J. Econ. Tax. Bot. 3 : 114. 1982.

Very small, pendulous epiphytes. Leaves fleshy, up to 4 cm long, ovate - oblong. Flowers orange or yellow. Sepals gland dotted. Petals oblong - obovate, dentate. Lip 3 - lobed, gland - dotted ; midlobe 2 - lobulate.

Fl. & Fr. : April.

Endemic ; rare ; on branches of trees like *Cyclostemon macrophyllus* in lower Ghats ; Mukkali forest.

It is an addition to the Flora of the Presidency of Madras.

2. **Oberonia brunoniana** Wight. Ic. t. 1622. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 681. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1406. 1928, Repr. ed. 3 : 984. 1957 ; Sant. & Kap. Orch. Bombay 69. 1966 ; Abraham & Vatsala, Introd. Orchid. 422. 1981 ; Ansari *et al.* in J. Econ. Tax. Bot. 3 : 115. 1982 ; Joseph in Rec. Bot. Surv. Ind. 22 : 85. 1982.

Robust, pendulous epiphytes. Leaves obovate to linear oblong, subfalcate. Spikes recurved, stiff. Flowers dense, brownish. Sepals ovate, subequal, glabrous. Petals linear. Lip oblong, 3 lobed ; midlobe 2 - lobulate ; lateral lobes oblong, auricular. Capsules oblong.

Fl. & Fr. : April.

Fairly common ; in upper Ghats ; Varadimalai Agric. Farm area.

3. **Oberonia ensiformis** (J.E. Smith) Lindl. Fol. Orch. 4. 1859 ; Hook. f. Fl. Brit. Ind. 5 : 679. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1405. 1928, Repr. ed. 3 : 984. 1957 ; Seidenf. & Smitin. Orch. Thailand 159. 1959 ; Abraham & Vatsala, Introd. Orchid. 419. 1981 ; Ansari *et al.* in J. Econ. Tax. Bot. 3 : 115. 1982. *Malaxis ensiformis* J.E. Smith in Rees, Cycl. 22 : 14. 1812.

Large, pendulous epiphytes. Leaves 5 7, thick, glaucous. Flowers greenish - yellow in decurved spikes. Bracts hyaline. Sepals and petals reflexed, pubescent. Lip 3 - lobed, pubescent.

Fl. & Fr. : August September.

Fairly common ; in Ghats ; Bhavani bank - Mukkali, Silent Valley R. F.

4. **Oberonia denticulata** Wight, Ic. t. 1625. 1851. *O. iridifolia* Lindl. var. *denticulata* (Wight) Hook. f. Fl. Brit. Ind. 5 : 676. 1890 ; Fischer in Gamble, Fl Pres. Madr. 1406. 1928, Repr ed. 3 : 983. 1957 ; Seidenf. & Smitin. Orch. Thailand 160. 1959 ; Sant. & Kap. Orch. Bombay 58. 1966 ; Abraham & Vatsala, Introd. Orchid. 416. 1981 ; Ansari *et al.* in J. Econ. Tax. Bot. 3 : 115. 1982.

Erect epiphytes. Leaves fleshy, jointed, ensiform, ovate - oblong, up to 14 cm long. Flowers greenish - yellow, in long drooping spikes. Sepals equal, ovate, deflexed. Petals ovate, irregularly serrate, deflexed. Lips 3 - lobed ; sidelobes pectinately erose.

Fl. : March.

Rare ; in lower Ghats ; Palakapandi estate forest.

"This variety differs from var. *iridifolia* by the much dentate petals and sidelobes of the lip and the vegetative parts being longer and stouter" Seidenfaden & Smitinand *l. c.* *O. iridifolia* Lindl. is a very variable species and is widely distributed all over India ; but var. *denticulata* Hook. f. is restricted to South India.

5. **Oberonia santapaui** Kap. in J. Bombay Nat. Hist. Soc. 57 : 265. 1960 ; Sant. & Kap. Orch. Bombay 72. 1966 ; Abraham & Vatsala, Introd. Orchid. 429. 1981 ; Ansari *et al.* in J. Econ. Tax. Bot. 3 : 116. 1982. *O. lindleyana* Wight, Ic. t. 1624. 1851 non Brongn. ex Duper. 1834 ; Hook. f. Fl. Brit. Ind. 5 : 681. 1888 ; Fischer in Gamble, Fl. Pres. Madr. 1407. 1928, Repr. ed. 3 : 984. 1957.

Epiphytes. Leaves ensiform, very succulent. Flowers dense, brownish yellow. Sepals ovate. Petals linear, recurved. Lip oblong, cordate at base, 3 - lobed ; midlobe broadly bilobulate ; lobules overlapping.

Fl. & Fr. : December - February.

Rare ; in upper Ghats ; Silent Valley dam site forest.

Index Kewensis lists a binomial *Oberonia lindleyana* A. Brongn. in. Duperr. Voy. Coq. Bot. 200. t. 40. f. a. 1834. (*O. lindleyi* on the figure)

The binomial *O. lindleyana* Wight (1851) is therefore a later homonym and must be rejected.

27. PACHYSTOMA Bl.

Pachystoma senile (Lindl.) Reichb. f. in Bonplandia 3 : 250. 1858 ; Hook. f Fl. Brit. Ind. 5 : 812. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1426. 1928. Repr. ed. 3 : 997. 1957 ; Seidenf. & Smitin. Orch. Thailand 346. 1961 ; Sant. & Kap. Orch. Bombay 191. 1966 ; Abraham & Vatsala, Introd. Orchid. 270. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 19. 1982. *Apaturia senilis* Lindl. Gen. Sp. Orch. 130. 1831. *A. lindleyana* Wight, Ic. t. 1662. 1851.

Terrestrial, tuberous herbs, leafless when flowering. Leaf one, up to 25 cm long, oblong - lanceolate. Flowers pinkish, glandular - pubescent, in pendulous racemes. Sepals oblong - lanceolate. Petals spathulate. Lips 3 - lobed, saccate at base, sparsely pubescent ; sidelobes erect, ovate, glandular - pubescent, purple ; midlobe oblong, 5 lamellate.

Fl. & Fr. : March May.

Rare ; in upper Ghats ; Kunthipuzha dam site forest.

28. PAPILIONANTHE Schltr.

Papilionanthe subulata (Koen.) Garay in Bot. Mus. Leafl. 23 : 372. 1972 ; Jayaw. in Dassan. & Fosberg, Rev. Handb. Fl. Ceylon 2 : 202. 1981. *Epidendrum subulatum* Koen. in Retz. Obs. Bot. 6 : 51. 1791. *Aerides cylindrica* Lindl. Gen. Sp. Orch. 240. 1833 ; Wight, Ic. t. 1744. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 44. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1442. 1928, Repr. ed. 3 : 1008. 1957 ; Joseph in Rec. Bot. Surv. Ind. 22 : 78. 1982.

Slender, elongate epiphytes with long velamen roots. Leaves cylindrical. Flowers 2 or 3, pinkish - white, showy, fragrant, opposite leaves, pedicellate. Sepals ovate - oblong to lanceolate. Petals broadly lanceolate. Lip 3 - lobed ; sidelobes erect, ovate ; midlobe thick, fleshy with ridges. Spur conical. Fruits long - stalked, sub - cylidric with narrow wings.

Fl. & Fr. : March - April.

Common on trees in upper Ghats ; Kaikatty - Pothundy, Karapara river forest, Karasuryamalai forest.

This will resemble *Luisia* in vegetative condition but easily distinguished when in flower.

29. PECTEILIS Rafin.

Pecteilis gigantea (J. E. Smith) Rafin. Fl. Tell. 2 : 38. 1837 ; Seidenf. & Smitin. Orch. Thailand 52. 1959 ; Seidenf. in Dansk. Bot. Ark. 31 : 22 & 23. t. 8. 1977 ; Joseph in Rec. Bot. Surv. Ind. 22 : 51. 1982. *Orchis gigantea* J. E. Smith Exot. Bot. 2 : 79. t. 100. 1805. *Platanthera susannae* auct. non (L.) Lindl. 1835 ; Wight, Ic. t. 920. 1844 ; Fischer in Gamble, Fl. Pres. Madr. 1475. 1928, Repr. ed. 3 : 1031. 1957. *Habenaria susannae* auct. non (L.) R. Br. ex Spr. 1828 ; Hook. f. Fl. Brit. Ind. 6 : 137. 1890.

Tall, robust herbs, 50 120 cm. Leaves sessile, sheathing at base, glaucous, ovate - oblong. Flowers showy, fragrant, white, in racemes. Dorsal sepals rhomboid, revolute on the margins. Lateral sepals obliquely subquadrately oblong. Petals linear - oblong. Lips flabellate, tripartite; sidelobes pectinate ; midlobe elliptic. Spur longer than ovary with broad mouth.

Fl. & Fr. : September - October.

Common ; on grassy slopes in upper Ghats ; Kunthipuzha dam site, Valiyaparathode forest.

This beautiful orchid does deserve a place in our gardens and it is one of the easiest plants to grow under artificial conditions. Flowers are showy, the largest among the wild orchids, sweetly and strongly scented

30. PERISTYLUS Bl.

1a. Spur equal to sepals ; lip larger than sepals	...	*P. aristatus* 1
1b. Spur shorter than sepals ; lip as long as sepals	...	*P. goodyeroides* 2

1. **Peristylus aristatus** Lindl. Gen. Sp. Orch. 300. 1835 ; Fischer in Gamble, Fl. Pres. Madr. 1474. 1928, Repr. ed. 3 ; 1030. 1957 ; Abraham & Vatsala, Introd. Orchid. 246. 1981. *P. exilis* Wight, Ic. t. 1698. 1851. *Habenaria aristata* (Lindl.) Hook. f. Fl. Brit. Ind. 6 : 158. 1890.

Tuberous, terrestrial herbs. Leaves 3 5, clustered about middle of stem, membranous, elliptic - ovoid to narrowly lanceolate. Flowers greenish - yellow. Sepals linear - oblong. Petals oblong. Lip 3 - lobed; sidelobes filiform ; midlobe ligulate. Spur clavate.

Fl. : August.

Rare ; once collected in Silent Valley R. F. at *ca* 960 m ; *Vajravelu* 27555.

2. **Peristylus goodyeroides** (D. Don) Lindl. Gen. Sp. Orch. 299. 1835 ; Fischer in Gamble, Fl. Pres. Madr. 1474. 1928. Repr. ed. 3 : 1030. 1957 ; Seidenf. & Smitin. Orch. Thailand 51. 1959 ; Sant. & Kap. Orch. Bombay 52. 1966 ; Abraham & Vatsala, Introd. Orchid. 249. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 71. 1982. *Habenaria goodyeroides* D. Don, Prodr. Fl. Nepal. 25. 1825.

Robust, terrestrial, tuberous herbs, up to 90 cm. Leaves 3 - 5, about middle of the stem, oblong - lanceolate. Flowers pale greenish - yellow, fragrant, in dense spikes. Sepals ovate oblong. Petals obliquely orbicular, Lip 3 - lobed ; sidelobes short. Spur globose.

Fl. & Fr. : July - December.

Common in shady places ; in lower Ghats ; Chindaki forest, Mukkali slopes, Panthanthode forest.

31. PHOLIDOTA Lindl.

Pholidota pallida Lindl. in Bot. Reg. t. 1777. 1835 ; Seidenf. & Smitin. Orch. Thailand 137. 1959 ; Summerh Rep. III World Orch. Conf. 311. 1960 ; Abraham & Vatsala, Introd. Orchid. 288. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 90. 1982. *P. imbricata* sensu Lindl. in Bot. Reg. t. 1213. 1829 non Lindl. 1825 ; Wight, Ic. t. 907. 1844 ; Hook. f. Fl. Brit. Ind. 5 : 845. 1890 ; Fischer in Gamble, Fl. Pres Madr. 1431. 1928, Repr. ed. 3 : 1000. 1957 ; Sant. & Kap. Orch. Bombay 175. 1966.

Pseudobulbous, tufted epiphytes. Leaf single, oblong - lanceolate, entire. Flowers dull pink or white, in two rows, bracteate. Bracts ovate - concave, creamy white turning dark brown. Sepals concave. Petals linear - oblong. Lip deeply saccate ; sidelobes triangular, erect ; midlobe 2 - lobulate. Fruits ellipsoid.

Fl. & Fr. : June - August.

Fairly common ; in lower Ghats ; Mukkali forest.

32. POLYSTACHYA Hook. *nom. cons.*

Polystachya flavescens (Bl.) J.J. Smith Fl. Buit. 6 : 284. f. 218. 1905 ; Seidenf. & Smitin. Orch. Thailand 326. 1960 ; Sant. & Kap. Orch. Bombay

186. 1966 ; Abraham & Vatsala, Introd. Orchid. 392.1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 122. 1982. *Onychium flavescens* Bl. Bijdr. 325. 1825. *Polystachya purpurea* Wight Ic. t. 1679 1851 ; Fischer in Gamble, Fl. Pres Madr. 1437. 1928, Repr. ed. 3 : 1005. 1957. *P. wightii* Reichb. f. in Walp. Ann. Bot. Syst. 6 : 640. 1861 ; Hook. f. Fl. Brit. Ind. 6 : 21. 1890 ; Fischer *l. c.*

Pspeudobulbous epiphytes. Leaves alternate, oblong - lanceolate, glabrous. Flowers greenish - yellow. Lateral sepals ovate. Petals linear - oblong. Lip 3 lobed, pale yellow ; sidelobes erect ; midlobe oblong - suborbicular, reflexed at top.

Fl. & Fr. : August - November.

Occasional ; in lower Ghats ; Attappadi R. F. Mukkali, Karivara forest.

33. PORPAX Lindl.

1a. Scapes distinct	...	*P. chandrasekharanii*	1
1b. Scapes not distinct :			
2a. Leafless when flowering	...	*P. reticulata*	3
2b. Leafy when flowering	...	*P. jerdoniana*	2

1. **Porpax chandrasekharanii** Bhargavan & Mohanan in Curr. Sci. 51 (20) : 2. 1982.

Pseudobulbous epiphytes. Leaves deciduous, ovate - oblong. Flowers dull white, in short racemes. Sepals united, glabrous. Petals ovate - elliptic, shorter than sepals. Lip falcate.

Fl. : January.

Rare ; in upper Ghats ; Panthanthode forest.

2. **Porpax jerdoniana** (Wight) Rolfe in Orch. Rev. 16 : 18. 1908 ; Fischer in Gamble, Fl. Pres. Madr. 1422. 1928, Repr. ed. 3 : 995. 1957 ; Abraham & Vatsala, Introd. Orchid. 387. 1981. *Lichenora jerdoniana* Wight, Ic. t. 1748. 1851. *Eria lichenora* Lindl. in J. Linn. Soc. Bot. 3 : 46. 1859 ; Hook. f. Fl. Brit. Ind. 5 : 787. 1890.

Epiphytes ; pseudobulbs subdiscoid, covered with reticulate sheaths. Leaves 2, ovate, ciliate along margins, glossy green with dark brown patches. Flowers 1 - 3, pubescent, reddish - purple. Dorsal sepals free ; lateral sepals united, boat - shaped. Lip included.

Fl. & Fr. : July - September.

Rare ; on *Diospyros* trees in lower Ghats ; Mukkali forest.

3. **Porpax reticulata** Lindl. in Bot. Reg. 31 : Misc. 66. 1845 ; Fischer in Gamble, Fl. Pres. Madr. 1422. 1928, Repr. ed. 3 : 994. 1957 ; Sant. & Kap. Orch. Bombay 157. 1966 ; Abraham & Vatsala, Introd. Orchid. 385. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 99. 1982. *Aggeianthus marchantioides* Wight, Ic. t. 1737. 1851. *Erla reticulata* (Lindl.) Benth. in Gen. Pl. 3 : 509. 1883.

Pseudobulbs aggregated. Leaves obovate, sessile, green, deciduous. Flowers solitary, brick - red. Sepals united, 3 - lobed at apex. Petals spathulate, hidden. Lip glabrous outside, papillose inside, 3 - lobed, panduriform, with a tongue - like projection at base.

Fl. & Fr. : February - April.

Rare ; in lower Ghats ; Panthanthode forest.

34. RHYNCHOSTYLIS Bl. *emend.* Hassk.

Rhynchostylis retusa (L.) Bl. Bijdr. 286. t. 49. 1825 ; Hook. f. Fl. Brit. Ind. 6 : 32. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1440. 1928, Repr. ed. 3 : 1007. 1957 ; Seidenf. & Smitin Orch. Thailand 555. 1963 ; Sant. & Kap. Orch. Bombay 211. 1966 ; Abraham & Vatsala, Introd. Orchid. 454. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 133. 1982. *Epidendrum retusum* L. Sp. Pl. 953. 1753. *Saccolabium guttatum* Lindl. Gen. Sp. Orch. 220. 1833 ; Wight. Ic. tt. 1745. & 1746. 1852.

Woody epiphytes. Leaves alternate, articulate, distichous, dense, linear, keeled. Flowers pinkish, showy, in dense, pendulous racemes. Sepals ovate. Petals ovate - elliptic. Lip pink, curved upwards, deeply cleft at tip, spurred. Fruits oblong - ovoid, ridged.

Fl. & Fr. : October - September.

Common ; in lower Ghats : Attappadi R. F. - Mukkali, Tiruvizhankunnu forest.

35. SHCOENORCHIS Bl.

Schoenorchis jerdoniana (Wight) Garay in Bot. Mus. Leafl. 23 : 202. 1972. *Saccolabium gemmatum* Lindl. in Bot. Reg. 24 : 50. 1838 ; Abraham & Vatsala, Introd. Orchid. 478. 1981. *S. jerdonianum* (Wight) Reich. f. in Walp. Ann. Bot. Syst. 6 : 886. 1861. ; Hook. f. Fl. Brit. Ind. 6 : 59.

1890 ; Fischer in Gamble, Fl. Pres. Madr. 1446. 1928, Repr. ed. 3 : 1011. 1957. *Taeniophyllum jerdonianum* Wight, Ic. t. 1756. 1852.

Slender epiphytes. Leaves linear, speckled with purple. Flowers white, small, in branched racemes. Sepals ovate. Petals linear. Sidelobes of lip rounded ; midlobe oblong. Spur saccate.

Fl. & Fr. : October March.

Fairly common ; in lower Ghats ; Karapara river banks.

36. SIRHOOKERA Kuntze

Sirhookera latifolia (Wight) Kuntze, Rev. Gen. Pl. 681. 1891. *Josephia latifolia* Wight, Ic. t. 1743. 1851 ; Hook. f. Fl. Brit. Ind. 5 : 823. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1428. 1928, Repr. ed. 3 : 999. 1957.

Epiphytic herbs. Leaves radical, broadly oblong. Flowers yellow with purple stripes, in branched panicles. Sepals subequal. Lip boat shaped. Column white.

Fl. & Fr. : August - April.

Common ; in Ghats ; Silent Valley R.F.

37. SMITHSONIA Sald.

Smithsonia straminea Sald. in J. Bombay Nat. Hist. Soc. 71 : 73. 1974 ; Joseph & Vajravelu in Bull. Bot. Surv. Ind. 20. 169. 1978.

Small epiphytes. Leaves 2 - 3, oblong - elliptic. Flowers pale yellow, in short racemes. Sepals and petals with red spots. Lip white with pink spur ; midlobe with short lateral wings.

Fl. & Fr. : November - April.

Common ; in lower Ghats ; Mukkali forest.

It is an addition to the Flora of the Presidency of Madras.

38. TAINIA Bl.

Tainia bicornis (Lindl.) Reichb. f. in Bonplandia 5 : 54. 1857 ; Hook. f. Fl. Brit. Ind. 5 : 820. 1888 ; Fischer in Gamble, Fl. Pres. Madr.

1427. 1928, Repr. ed. 3 : 998. 1957 ; Seidenf. & Smitin. Orch. Thailand 743. t. 553. 1965 ; Abraham & Vatsala, Introd. Orchid. 290. 1981. *Ania bicornis* Lindl. in Bot. Reg. 28 : 37. 1842 ; Wight, Ic. t. 914. 1845.

Terrestrial, pseudobulbous herbs. Leaves solitary, oblong - lanceolate, coriaceous with long petiole. Flowers yellow, in lax racemes. Sepals linear lanceolate. Petals subequal. Lip 3 lobed ; sidelobes short, with red striation ; midlobe emarginate. Column spotted with red.

Fl. & Fr. : January - March.

Common ; in patches in shady, moist localities ; Kunthipuzha dam site area.

39. TRIAS Lindl.

Trias stocksii Benth. ex Hook. f. Fl. Brit. Ind. 5 : 781. 1890 ; Vivekan. in Bull. Bot. Surv. Ind. 10 (2) : 241. 1968 ; Abraham & Vatsala, Introd. Orchid. 346. 1981.

Small, pseudobulbous epiphytes. Leaf solitary, coriaceous, elliptic, acute. Flowers pale purple - white. Lateral sepals adnate to column. Petals linear - oblong, gland dotted. Lip clawed, articulate with tip of foot, deep chocolate. Fruits ovoid.

Fl. & Fr. : January.

Rare ; in upper Ghats ; on tree trunks ; Silent Valley R. F.

It is an addition to the Flora of the Presidency of Madras.

40. TROPIDIA Lindl.

Tropidia angulosa (Lindl.) Bl. Orch. Arch. Ind. 122. 1858 ; Hook. f. Fl. Brit. Ind. 6 : 92. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1452. 1928, Repr. ed. 3 : 1015. 1957 ; Sant. & Kap. Orch. Bombay 165. 1966. *Cnemidia angulosa* Lindl. Gen. Sp. Orch. 463. 1840. *Govindooia nervosa* Wight, Ic. t. 2090. 1853.

Terrestrial herbs, 20 - 30 cm. Leaves 10 - 14 × 5 8 cm, elliptic to broadly ovate. Flowers white, crowded in spikes. Sepals oblong - lanceolate. Petals smaller. Lip oblanceolate oblong, entire, spurred. Fruits clavate - cylindric, ridged.

Fl. & Fr. : July.

Rare ; once collected in Mukkali forests at *ca* 500 m ; *Vajravelu* 32160.

41. VANDA R. Br.

Vanda testacea (Lindl.) Reichb. f. in Gard. Chron. 2 : 166. 1877 ; Sant. & Kap. Orch. Bombay 219. 1966 ; Abraham & Vatsala, Introd. Orchid. 436. 1981 ; Joseph in Rec. Bot. Surv. Ind. 22 : 130. 1982. *Aerides testaceum* Lindl. Gen. Sp. Orch. 238. 1835. *Vanda parviflora* Lindl. in Bot. Reg. 30 : 45. 1844 ; Wight, Ic. t. 1669. 1852 ; Hook. f. Fl. Brit. Ind. 6 : 50. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1444. 1928, Repr. ed. 3 : 1010. 1957.

Epiphytic herbs, up to 20 cm. Leaves channelled, linear, apex 2 - lobed. Flowers yellow, pedicellate, in racemes. Sepals obovate - oblong. Petals spathulate - oblong. Lip spotted with pink, 3 - lobed ; sidelobes erect, falcately ovate lanceolate ; midlobe oblong ligulate. Spur conical.

Fl. & Fr. : February - October.

Common ; in lower Ghats ; Agali forest, Sholaiyur forest.

42. ZEUXINE Lindl. *nom. cons.*

1a. Dorsal sepal and petals more than 5 mm long ; lip irregularly toothed ... *Z. longilabris* 2

1b. Dorsal sepal and petals less than 5 mm long ; lip entire ... *Z. gracilis* 1

1. **Zeuxine gracilis** (Breda) Bl. Fl. Jav. n.s. 56. t. & 18. f. 2. t. 23D. 1858 ; Abraham & Vatsala, Introd. Orchid. 205. 1981. *Psychechilos gracile* Breda, Gen. Sp. Orch. t. 9. 1827. *Monochilus affine* Lindl. Gen. Sp. Orch. 487. 1840. *Zeuxine blatteri* Fischer in Bull. Misc. Inform. Kew 76. 1928 & in Gamble, Fl. Pres. Madr. 1456. 1928, Repr. ed. 3 : 1018. 1957.

Terrestrial, succulent herbs. Leaves ovate or ovate - lanceolate, acute at apex, rounded and sheathing at base. Flowers dull white, sessile, scarsely opening, in glandular - pubescent spikes. Dorsal sepal saccate at base. Lip clawed, limbs of lip 2, orbicular, white.

Fl. & Fr. : January.

Rare ; in damp humus soil in Ghats ; Panthanthode forest.

2. **Zeuxine longilabris** (Lindl.) Benth. ex Hook. f. Fl. Brit. Ind. 6 : 107. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1456. 1928, Repr. ed. 3 :

1018. 1957 ; Sant. & Kap. Orch. Bombay 169. 1966 ; Abraham & Vatsala, Introd. Orchid. 202. 1981 : Joseph in Rec. Bot. Surv. Ind. 22 : 48. 1982. *Monochilus longilabris* Lindl. Gen. Sp. Orch. 487. 1840. *M. affine* Wight, Ic. t. 1728. 1851 non Lindl. 1840.

Succulent, terrestrial herbs. Leaves 3 or 4, membranous, ovate or ovate - oblong, base sheathing, pinkish on drying. Flowers white, in glandular - pubescent racemes. Sepals ovate oblong, pubescent. Petals falcate. Lip porrect, saccate at base, narrowed into a claw, deep cleft, 2 - horned within. Lobes of lip irregularly toothed.

Fl. & Fr. : December - April.

Common ; in lower Ghats in shady, humus soil ; Karapara riverside, Kaikatty Pothundy forest, Mukkali forest.

The genera *Cheirostylis* and *Zeuxine* resemble each other but the lateral sepals are connate in the former and free in the latter.

126. ZINGIBERACEAE

1a. Inflorescences on leafy shoots or leaves appearing after flowering :

2a. Inflorescences racemose to paniculate ;

3a. Plants glabrous, less than 2 m tall ... GLOBBA 1

3b. Plants pubescent, 2 - 3 m tall ... ALPINIA 7

2b. Inflorescences spicate ;

4a. Leafy stem spirally twisted ... COSTUS 4

4b. Leafy stem not twisted ;

5a. Corolla tube exserted ... HEDYCHIUM 8

5b. Corolla tube included :

6a. Flowers secund, white ... BOESENBERGIA 3

6b. Flowers not secund, yellow ... CURCUMA 5

1b. Inflorescences on separate leafless shoots ; associated with leafy stems :

7a. Flowers in dense cone - like spikes :

8a. Anther connectives crested, not produced into beaks ... AMOMUM 2

8b. Anther connectives not crested, produced into beaks ... ZINGIBER 9

7b. Flowers in lax panicles ... ELETTARIA 6

1. ALPINIA Roxb. *nom. cons.*

Alpinia malaccensis (Burm. f.) Rosc. in Trans. Linn. Soc. London 8 : 345. 1807 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 255. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1493. 1928. Repr. ed. 3 : 1043. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 14 : 140. 1972 (1975). *Maranta maluccensis* Burm. f. Fl. Ind. 2. 1768. *Catimbium malaccensis* (Burm. f.) Holtt. in Gard. Bull. Straits Settlem 13 : 152. 1950.

Large herbs, 2 3 m. Leaves up to 65 × 14 cm, oblong to oblong - lanceolate, acuminate, pubescent beneath. Buds enclosed in large membranous bracteoles. Flowers white, in racemes. Corolla oblong. Lips ovate, emarginate, yellow, variegated with red. Capsules globose, stalked, pubescent.

Fl. & Fr. : November February.

Rare ; in upper Ghats near water sources ; Orange farm area Kaikatty.

B.L. Burtt & R. M. Smith in Notes Roy. Bot. Gard. Edinburgh 31 ; 205. 1972, have given a historical review of the problem about the generic name *Catimbium* Juss.

2. AMOMUM Roxb. *nom. cons.*

1a. Leaves silky - tomentose beneath ... *A. microstephanum* 2

1b. Leaves glabrous beneath ... *A. cannicarpum* 1

1. **Amomum cannicarpum** (Wight) Benth. ex Baker in Hook. f. Fl. Brit. India 6 : 240. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1487. 1928. Repr. ed. 3 : 1039. 1957 ('*cannaecarpum*'). *Elettaria cannicarpum* Wight, Ic. t. 2007. 1853.

Aromatic, large herbs ; stem hairy, swollen at base, 3 - 5 m. Leaves *ca.* 40 × 8 cm, lanceolate Flowers bright yellow, in dense spikes ; bracts ovate, pink. Lip obovate, entire, emarginate, pubescent. Corolla lobes oblong. Capsules globose - echinate.

Fl. & Fr. : April.

Rare ; once collected in Silent Vally R. F. at *ca* 900 m.

2. **Amomum microstephanum** Baker in Hook. f. Fl. Brit. Ind. 6 : 239. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1487. 1928, Repr. ed. 3 : 1039. 1957.

Tall herbs, up to 2 m. Leaves 60 - 75 × 10 18 cm, lanceolate, acuminate, attenuate at base. Ligules linear, subulate. Bracts oblong, glabrous. Flowers white, many in basal spikes. Corolla lobes linear oblong. Lip obovate. Capsules with 9 undulating ribs or wings.

Fl. & Fr. : November.

Very rare ; in shady moist localities. Once collected in the forest below Kunthipuzha dam site ; *Vajravelu* 48865.

3. Boesenbergia Kuntze

Boesenbergia pulcherrima (Wall.) Kuntze, Rev. Gen. Pl. 2 : 685. 1891 ; Holtt. in Gard. Bull. Straits Settlem. 13 : 109. 1950. *Gastrochilus pulcherrima* Wall. Pl. Asiat. Rar. 1 : 22. t. 24. 1829 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 217. 1890 ; Burtt & Smith in Notes Roy. Bot. Gard. Edinburgh 31 : 215. 1972.

Leafy herbs, *ca.* 30 cm ; roots tuberous. Leaves glabrous, elliptic, broadly sheathing at base, ending in auricles, unequal at base. Ligules hyaline. Spikes included in upper leaf sheaths. Flowers white. Calyx truncate. Lip white with pink at centre, concave.

Fl. & Fr. : July - October.

Rare ; in wet shady places ; at lower elevations ; Mukkali forest.

4. Costus L.

Costus speciosus (Koen.) Smith in Trans. Linn. Soc. London 1 : 249. 1791 ; Wight, Ic. t. 2014. 1853 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 249. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1490. 1928. Repr. ed. 3 : 1041. 1957 ; Burtt & Smith in Notes Roy. Bot. Gard. Edinburgh 31 : 200. 1972. *Banksea speciosa* Koen. in Retz. Obs. Bot. 3 : 75. 1783. '*Kottam*' (Tam.), '*Chinnakoova*' (Mal.).

Tall herbs, 1 2 m, with twisting stems and tuberous rootstocks. Leaves elliptic - obovate, glabrous above, silky pubescent beneath. Bracts oblong - ovate, bright red. Flowers white, in very dense spikes. Calyx red ; lobes ovate, ending in hardened prickles Lip suborbicular, hairy at base, white outside, yellow at centre. Fruits globose.

Fl. & Fr. : October - November.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest, Pothundy - Kaikatty, Sappal hill, Dhoni R. F.

Much exploited for medicinal uses.

5. CURCUMA Roxb. *nom. cons.*

1a. Rootstocks small ; tubers white inside ... *C. pseudomontana* 2

1b. Rootstocks large ; tubers yellow inside ... *C. amada* 1

1. **Curcuma amada** Roxb. in Asiat. Res. 11 : 341. 1810 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 213. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1483. 1928, Repr. ed. 3 : 1036. 1957.

Leafy, tufted herbs with thick, cylindric, sessile root stocks. Leaves oblong - lanceolate with long petioles. Flowers pale yellow, in spikes ; bracts of coma pinkish. Calyx 3 toothed. Lip obovate, 3 lobed ; midlobe emarginate.

Fl. & Fr. : October.

Rare ; once collected in Mukkali forest at *ca* 500 m.

2. **Curcuma pseudomontana** Grah. Cat. Pl. Bombay 210. 1839 ; Fischer in Gamble, Fl. Pres. Madr. 1483. 1928, Repr. ed. 3 : 1036. 1957.

Herbs ; rootstocks with almond - like tubers. Leaves *ca.* 45 × 9 cm, lanceolate oblong, acuminate. Flowers yellow, in spikes. Fertile bracts obovate - lanceolate, green with pink tips. Coma oblong - lanceolate, purple.

Fl. & Fr. : July October.

Fairly common ; in lower Ghats ; Ayyappankoil Kaikatty forest, Mukkali forest, Walayar forest.

Santapau in J. Bombay Nat. Hist. Soc. 51 : 35 - 39. 1952 points out that the position of inflorescences *viz.* lateral or central, used by Cooke & Fischer as a key character, is not a reliable character as he has shown seasonal gradation in the position.

6. ELETTARIA Maton

Elettaria cardamomum (L.) Maton in Trans. Linn. Soc. London 10 : 254. 1811 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 251. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1491. 1928, Repr. ed 3 : 1041. 1957 ; Burtt & Smith in Notes Roy. Bot. Gard. Edinburgh 31 : 182. 1972. *Amomum*

cardamomum L. Sp. Pl. 1. 1753. *Alpinia cardamomum* (L.) Roxb. in Asiat. Res. 11 : 355, 1810. '*Elam*'. '*Aelakkaai*' (Tam.).

Perennial herbs ; rootstocks thick, horizontal ; leafy stems *ca* 2 m. Leaves 20 40 × 3 5 cm, linear - lanceolate, pubescent beneath, glabrous above, acuminate. Flowers white, with pinkish striations, in elongate, flexuose panicles arising from rootstocks. Calyx 3 lobed. Corolla lobes oblong. Lip white with a purple centre. Fruits subtrigonous.

Extensively cultivated as a cash crop for the valuable spice 'Cardamom'. *Fl. & Fr.* : Throughout the year ; found as an escape in Silent Valley R.F.

7. Globba L.

1a. Anthers with bifid wings ; bracts persistent. ... *G. bulbifera* 1

1b. Anthers without wings ; bracts deciduous ... *G. ophioglossa* 2

1. **Globba bulbifera** Roxb. in Asiat. Res. 11 : 358. 1810 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 206. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1481. 1928, Repr. ed. 3 : 1035. 1957.

Erect herbs ; stems up to 50 cm. Leaves 10 15 × 3 5 cm, oblong to elliptic - lanceolate, caudate, rounded at base, pubescent below. Flowers yellow, in spikes ; bracts oblong. Calyx funnel shaped, 3 lobed. Calyx and corolla with globose, dark grands. Lips bifid, auricled.

Fl. & Fr. : November.

Fairly common ; in lower Ghats ; Chindaki forest, Pothundy - Kaikatty forest.

2. **Globba ophioglossa** Wight, Ic. t. 2002. 1853 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 202. 1890 ; Fischer in Gamble, Fl. Pres. Madr. 1040. 1928, Repr. ed. 3 : 1035. 1957.

Erect herbs ; stem 2 3 m. Leaves 10 - 25 × 3 5 cm, elliptic or oblong lanceolate, caudate, pubescent below. Flowers yellow, in panicles. Calyx and corolla dark - glandular. Petals ovate. Lip deeply bifid.

Fl. & Fr. : July - October.

Fairly common ; in lower Ghats ; Dhoni R. F., Mukkali forest.

8. HEDYCHIUM Koen.

Hedychium flavescens Lodd. Bot. Cat. t. 723. 1820 ; Wight, Ic. tt. 2008. 9. 1853 ; Fischer in Gamble, Fl. Pres. Madr. 1485. 1928, Repr. ed. 3 : 1038. 1957.

Robust herbs, 1 - 2 m ; rootstocks tuberous. Leaves lanceolate, caudate, pubescent on midrib beneath. Flowers yellow, in dense spikes ; bracts oblong, obtuse, villous at tips. Lip obcordate, base clawed.

Fl. & Fr. : April.

Rare ; once collected in Anavayee forest at *ca* 1000 m.

9. ZINGIBER Boehm. *nom. cons.*

1a. Peduncles of spikes short or absent	...	*Z. roseum*	2
1b. Peduncles of spikes elongate	...	*Z. montanum*	1

1. **Zingiber montanum** (Koen.) Link ex Dietrich Sp. Pl. ed. 6. 1 : 52. 1831 ; Burtt & Smith in Notes Roy. Bot. Gard. Edinburgh 31 : 194. 1972. *Amomum montanum* Koen. in Retz. Obs. Bot. 3 : 51. 1783. *Zingiber cassumunar* Roxb. in Asiat. Res. 11 : 347. t. 5. 1810 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 248. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1490. 1928, Repr. ed. 3 : 1041. 1957 ; Rao & Verma in Bull. Bot. Surv. Ind. 14 : 137. 1972 (1975). '*Kaattu - Inchi*' (Mal.).

Herbs with tuberous rootstocks. Leaves *ca.* 30 × 5 cm, oblong - lanceolate, hairy beneath, acute. Bracts broadly ovate, bright - red, pubescent. Flowers white, in dense spikes (10 - 15 cm). Lip 3 - lobed ; midlobe suborbicular, deeply 2 lobed, margin crisped ; sidelobes oblong. Capsules subglobose ; seeds purplish.

Fl. & Fr. : October - November.

Occasional ; in lower Ghats ; Kaikatty - Pothundy forest, Thadikndu forest.

2. **Zingiber roseum** (Roxb.) Rosc. in Trans. Linn. Soc. London 8 : 348. 1807 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 244. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1489. 1928, Repr. ed. 3 : 1040. 1957. *Amomum roseum* Roxb. Pl. Cor. t. 126. 1800.

Erect, perennial herbs, 1 - 2 m, with creeping, rhizomatous rootstocks. Leaves *ca.* 35 × 8 cm, sessile, oblong - lanceolate, acuminate, pubescent below. Bracts red ; exterior ones broadly ovate ; interior linear -

lanceolate, hairy. Flowers in dense, short spikes. Lip white, 3 - lobed ; midlobe oblong cuneate, 3 lobulate, margin recurved.

Fl. & Fr. : November.

Occasional ; in lower Ghats ; Anavayee way, Dhoni R. F., Pothundy - Kaikatty forest.

127. MARANTACEAE

1a. Plants with stems ; flowers in panicles ... SCHUMANNIANTHUS 1

1b. Plants without stems ; flowers in spikes ... STACHYPHRYNIUM 2

1. SCHUMANNIANTHUS Gagnep.

Schumannianthus virgatus (Roxb.) Rolfe in J. Bot. 14 : 224. 1907 ; Fischer in Gamble, Fl Pres. Madr. 1494. 1928, Repr. ed. 3 : 1043. 1957. *Phrynium virgatum* Roxb. in Asiat. Res. 11 : 324. 1810. *Maranta virgata* (Roxb.) Wall. ex Wight. Ic. t. 2015. 1853. '*Periya kuhai - vazai*' (Tam.).

Bamboo - like large herbs ; stems erect, 3 - 4 m, jointed. Leaves 20 - 30 × 5 - 7 cm, oblong or oblong - lanceolate, base rounded - cuneate. Flowers white, in long, slender, dichotomously branched panicles. Sepals deciduous. Corolla shorter than sepals. Staminodes petaloid, 2. Ovary villous.

Fl. & Fr. : October - March.

Common ; in marshy places in upper Ghats ; Panthanthode forest, Silent Valley R. F.

2. STACHYPHRYNIUM K. Schum.

Stachyphrynium spicatum (Roxb.) K. Schum. in Pflanzenr. 11 : 46. 1902 ; Fischer in Gamble, Fl. Pres. Madr. 1494. 1928, Repr. ed. 3 : 1044. 1957. Vajravelu & Bhargavan in J. Econ. Tax. Bot. 3 : 973. 1982. *Phrynium spicatum* Roxb. Fl. Ind. 1 : 5. 1832 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 259. 1892.

Herbs ; rootstocks creeping. Leaves 2 - 4, petioled, oblong, caudate - acuminate or cuspidate, base rounded. Bracts ovate. Flowers white. Sepals narrow. Corolla lobes oblong - lanceolate. Stamens petaloid. Petaloid staminodes obovate, clawed. Capsules 3 - seeded.

Fl. & Fr. : November.

Rare ; once collected near Blind bridge, Mukkali Forest at *ca* 600 m.

128. MUSACEAE

ENSETE Bruce ex Horaninow

Ensete superbum (Roxb.) Cheesman in Kew Bull. 3 : 100. 1948 ; Sant. in Rec. Bot. Surv. India ed. 3. 16 : 277. 1967. *Musa superba* Roxb. Pl. Cor. t. 223. 1811 & Fl. Ind. 2 : 489. 1824 ; Wight, Ic. tt. 2017 - 18. 1853 ; Baker in Hook. f. Fl. Brit. Ind. 6 : 261. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1497. 1928, Repr. ed. 3 : 1046. 1957.

Erect, tree - like herbs ; pseudostems purple - brown, swollen at base. Leaves large, 2 - 3 × 0.5 - 1.0 m. oblong - lanceolate, alternate, petioled, glabrous with pale red midrib beneath. Bracts maroon. Flowers 20 - 30 in each bract, yellowish, in spikes, irregular. Perianth with 3 outer tepals and 2 inner. Berries trigonous. Seeds brown, subangular.

Fl. & Fr. : August - October.

Rare ; but abundant on steep rocky slopes (in certain places) in lower Ghats ; Mukkali slopes.

In *Ensete* the stem is swollen at base, without offsets and in *Musa* the pseudostem is cylindric with offsets. Many local varieties of *Musa* species are cultivated for the edible fruits.

129. HAEMODORACEAE

1a.	Leaves plicately folded ; filaments united into a ring	...	PELIOSANTHES 2
1b.	Leaves flat, not folded ; filaments free	...	OPHIOPOGON 1

OPHIOPOGON Ker - Gawl.

Ophiopogon intermedius D. Don, Prodr. Fl. Nepal. 48. 1825 ; Hook. f. Fl. Brit. Ind. 6 : 269. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1499. 1928, Repr. ed. 3 : 1048. 1957. *O. indicus* Wight, Ic. t. 2050. 1853.

Scapigerous herbs. Leaves radical, tufted, sessile, linear - lanceolate, acute, glabrous, base narrowed. Flowers white, in dense racemes. Perianth campanulate. Stamens at the base of perianth segments.

Fl. & Fr. : July - October.

Occasional ; collected twice in Silent Valley R. F. at *ca* 975 m.

PELIOSANTHES Andr.

Peliosanthes teta Andr. ssp. **humilis** (Andr.) Jessop in Blumea 23 : 155. 1976. *P. humilis* Andr. Bot. Rep. 634. 1811. *P. neilgherrensis* Wight, Ic. t. 2052. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 266. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1498. 1928. Repr. ed. 3 : 1047. 1957. *P. courtallensis* Wight, Ic. t. 2051. 1853 ; Hook. f. *l.c.* ; Fischer *l.c.*

Scapigerous herbs with creeping rootstocks. Leaves *ca.* 18 × 5 cm, membranous, plicately folded, elliptic - lanceolate, acute at apex. Flowers many, greenish - purple, in dense, basal racemes. Perianth campanulate, petaloid ; lobes 6. Stamens 6 ; anthers white. Berries blue.

Fl. & Fr. : September - April.

Common ; in upper Ghats ; Silent Valley R. F.

130. AMARYLLIDACEAE

1a. Leaves rigid, plicate ; flowers yellow :

2a. Perianth tube produced above ovary ; stamens perigynous ... CURCULIGO 2

2b. Perianth tube not produced above ovary ; stamens epigynous ... MOLINERIA 3

1b. Leaves flat, not plicate ; flowers not yellow :

3a. Stamens united by a membranous coma ... PANCRATIUM 4

3b. Stamens not united by a membranous coma ... CRINUM 1

1. CRINUM L.

Crinum latifolium L. Sp. Pl. 291. 1753 ; Wight, Ic. tt. 2019 - 20. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 283. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1504. 1928, Repr. ed. 3 : 1051. 1957.

Stout, tuberous, perennial herbs. Leaves lorate, coriaceous, 40 - 70 × 8 - 15 cm, linear - oblong. Flowers white, fragrant, with pinkish lines, in umbels ; perianth funnel - shaped, drooping ; lobes lanceolate to oblanceolate. Capsules globose.

Fl. & Fr. : April.

Occasional ; in open rocky places in lower Ghats ; Ayyappankoil forest - Kaikatty.

2. CURCULIGO Gaertn.

Curculigo orchioides Gaertn. Fruct. 1 : 63. t. 16. 1788 ; Hook. f. Fl. Brit. Ind. 6 : 279. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1502. 1928, Repr. ed. 3 : 1050. 1957. *C. malabarica* Wight, Ic. t. 2043 A. 1853. '*Nilapana*' (Tam.).

Small herbs with elongate rootstocks. Leaves linear - lanceolate, glabrous. Flowers bright yellow ; perianth to elliptic - oblong, hairy in hidden scapes (appearing above ground from hidden leaf bases). Stamens 6. Stigmas 3. Ovary produced into a filamentous rostrum. Capsules 1 4 - seeded.

Fl. & Fr. : October.

Common ; in exposed places ; Malleswaram temple area.

3. MOLINERIA Colla

Molineria trichocarpa (Wight) Balak. in J. Bombay Nat. Hist. Soc. 63 : 330. 1966. *Hypoxis trichocarpa* Wight, Ic. t. 2045. 1853. *Molineria finlaysoniana* Baker in J. Linn. Soc. Bot. 17 : 121. 1878 ; Fischer in Gamble, Fl. Pres. Madr. 1502. 1928, Repr. ed. 3 : 1049. 1957.

Tuberous herbs, *ca* 30 cm. Leaves 10 - 40 × 1 - 3 cm, lanceolate, acuminate at apex, tapering at base. Flowers 5 8, yellow, in bracteate racemes. Perianth lobes 6, obtuse. Anthers 6, linear, hastate. Berries cylindric.

Fl. & Fr. : June - November.

Fairly common ; in lower Ghats ; Mukkali forest.

4. PANCRATIUM L.

Pancratium triflorum Roxb. Fl. Ind. 2 : 126. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 285. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1505. 1928, Repr. ed. 3 : 1051. 1957. *P. verecundum* Wight, Ic. t. 2023. 1853.

Bulbous, scapigerous herbs. Leaves 15 30 × 1.0 - 1.5 cm, glabrous, linear - lanceolate. Flowers white, fragrant, in terminal umbels. Spathes 2. Perianth lobes 6, linear. Staminal cup with bifid teeth between long filaments.

Fl. & Fr. : March - April.

Common ; in rocky crevices ; Karivara river area, Olipara area.

Zephyranthes grandiflora Lindl. (*Z. carinata* Herb.) The 'pink lily' is an escape from gardens.

131. AGAVACEAE

1a. Leaves armed ; peduncles more than 4 m long ... FURCRAEA 2

1b. Leaves unarmed ; peduncles less than 1 m long ... DRACAENA 1

1. DRACAENA L.

Dracaena terniflora Roxb. Fl. Ind. 2 : 159. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 328. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1521. 1928, Repr. ed. 3 : 1062. 1957. *D. terminalia* Wight. Ic. t. 2054. 1853.

Straggling, slender shrubs. Leaves elliptic lanceolate, acuminate. Petioles amplexicauled. Flowers dull yellow white, in racemes. Pedicels jointed. Perianth cleft into 6 lobes. Stamens 6. Berries globose, red.

Fl. : April.

Rare ; once collected in Pottikkal forest (near Mukkali) at *ca* 550 m.

2. FURCRAEA Vent.

Furcraea foetida (L.) Haworth, Syn. Pl Succ. 73. 1819. *Agave foetida* L. Sp. Pl. 323 1753. *Furcraea gigantea* Vent in Bull. Soc. Philom. Paris 1 : 65. 1793 ; Fischer in Gamble, Fl. Pres. Madr. 1506. 1928, Repr. ed. 3 : 1052. 1957. '*Seemai kathalai*' (Tam.).

Perennial shrubs with rhizomatous stems. Leaves *ca.* 150 × 15 cm, in rosette. Flowers dull white ; perianths broad, free. Staminal filaments flattened. Style swollen below. Floral buds transformed into bulbils.

Fl. : February.

Occasional ; in plains as hedge plants ; Kathalakandi way.

Agave sisalana Perr. ex Engelm. and **A. americana** L. are found in hedges on road sides.

132. DIOSCOREACEAE

DIOSCOREA L.

1a. Mature leaves simple :

2a. Stems twining to left ; tepals lanceolate ; capsules reflexed, longer than broad ; seeds winged on one side ... *D. bulbifera* 1

2b. Stems twining to right ; tepals ovate to broadly ovate ; capsules erect to ascending, broader than long ; seeds winged all around ;

3a. Leaves cuneate or rounded at base ... *D. oppositifolia* 3

3b. Leaves cordate at base ... *D. wallichii* 6

1b. Mature leaves palmately compound ;

4a. Fertile stamens 6 ... *D. hispida* 2

4b. Fertile stamens 3 :

5a. Tertiary veins of leaves prominent ; torus of staminate flowers expanded into a flat base ... *D. pentaphylla* 4

5b. Tertiary veins of leaves not prominent ; torus of staminate flowers expanded into a cuneiform base ... *D. tomentosa* 5

1. **Dioscorea bulbifera** L. Sp. Pl. 1033. 1753 ; Wight, Ic. t. 878. 1844 ; Fischer in Gamble, Fl. Pres. Madr. 1511. 1928, Repr. ed. 3 : 1055. 1927 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calcutta 14 (1) : 188. t. 77. 1936. *D. sativa* Thunb. Fl. Jap. 15. 1784 non L. 1753 ; Hook. f. Fl. Brit. Ind. 6 : 296. 1802. '*Pannu kizhangu*' (Tam.) ; *Kaatukachil* (Mal.).

Slender tuberous twiners ; stems 4 - angular, ribbed, unarmed. Leaves alternate, ovate to suborbicular, cordate at base, caudate or acuminate at apex. Bulbils common in leaf axils. Flowers white, in pendulous spikes. Tepals linear. Female spikes 1 - 3 together. Stamens 6. Staminodes 6. Capsules quadrately oblong.

Fl. & Fr. : September November.

Common ; in lower Ghats ; Chindaki forest, Panthanthode forest.

2. **Dioscorea hispida** Dennsted. Schluss. Hort. Ind. Malab. 15. 1818 ; Fischer in Gamble, Fl. Pres. Madr. 1511. 1928, Repr. ed. 3 : 1055. 1957 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calcutta 14 : 188 t. 77. 1936. *D. daemona* auct. non Roxb. 1832 ; Wight, Ic. t. 811. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 289. 1892.

Hirsute, prickly, tuberous climbers. Leaves 3 - foliolate Leaflets obovate, pubescent cuspidately caudate acuminate ; laterals oblique. Male flowers in dense cylindric prickly long spikes. Females in solitary distant spikes. Capsules oblong, truncately round at ends.

Fl. & Fr. : July.

Fairly common ; in lower Ghats ; Erulankadu Malampuzha dam area.

3. **Dioscorea oppositifolia** L. Sp. Pl. 1033. 1753 ; Wight, Ic. t. 813. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 289. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1512. 1828, Repr. ed. 3 : 1056. 1957 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calcutta 14 (2) : 392. t. 139. 1938. '*Kavalakodi*', '*Thavaikachchu*' (Tam.).

Large, slender, glabrous tuberous climbers. Leaves 7 11 × 3 0 6.5 cm, 5 lobed, lanceolate to elliptic - oblong, acuminate, acute at base. Flowers pale green, in brownish - pubescent spikes. Female racemes axillary, solitary. Tepals ovate. Stamens 6. Capsules suborbicular, pendulous, retuse or sub bilobed.

Fl. & Fr. : October November.

Common ; in lower Ghats ; Agali forest, Mukkali foroest, Pothundy - Kaikatty forest.

4. **Dioscorea pentaphylla** L. Sp. Pl. 1032. 1753 ; Wight, Ic. t. 814. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 285. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1511. 1928, Repr. ed. 3 : 1056. 1957 ; Prain & Burkill in Ann. Roy. Bot. Gard. Calcutta 14 (1) : 160. 1936. '*Vallai - kodai*' (Tam.).

var. **pentaphylla**

Tuberous climbers ; stems twining to left. Leaves 3 5 foliolate (simple at apex), rusty - pubescent beneath, elliptic - lanceolate. ovate or obovate, abruptly cuspidate. Male flowers in long, simple racemes, white tomentose. Female racemes 2 - 3 - nate. Tepals ovate. Capsules longer than broad, oblong, glabrous, winged.

Fl. & Fr. : December.

Rare ; once collected in Panthanthode R. F. at *ca* 700 m.

4a. **Dioscorea pentaphylla** L. var. **rheedii** Prain & Burkill in J. & Proc. Asiat. Soc. Bengal 10 : 23. 1914 ; Fischer in Gamble, Fl. Pres. Madr. 1511. 1928. Repr. ed. 3 : 1056. 1957.

It differs from var. *pentaphylla* by the white, elongate tubers ; leaves dark when dry and much elongate bulbils.

Fl. : October.

Rare ; once collected at Chindaki Forest at *ca* 500 m.

5. **Dioscorea tomentosa** Koen. ex Spreng. Pugill. 2 : 292. 1815 ; Hook. f. Fl. Brit. Ind. 6 : 286. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1511. 1928, Repr. ed. 3 : 1055. 1957. '*Nalvallikilangu*' (Tam.).

Prickly, tuberous climbers ; stems twining to left. Leaflets 3, terminal ones elliptic, obovate ; lateral ones glabrous, acuminate ; upper leaves simple, white - tomentose, ovate or orbicular. Flowers pale greenish, in short spikes. Female flowers in long (30 - 35 cm) racemes. Tepals ovate. Capsules oblong, 3 - winged.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Chindaki forest, Panthanthode forest.

6. **Dioscorea wallichii** Hook. f. Fl. Brit. Ind. 6 : 295. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1512. 1928, Repr. ed. 3 : 1056. 1957.

Prickly, woody, tuberous climbers. Leaves simple, 10 - 15 × 8 10 cm, suborbicular, or broadly ovate, abruptly acuminate. Male spikes panicled. Capsules broadly obovate, emarginate.

Rare ; once collected in Panthanthode forest at *ca* 700 m in December.

133. LILIACEAE

1a. Leaves reduced (to spinescent scales) ; plants with needle - like cladodes ... ASPARAGUS 1

1b. Leaves not reduced ; plants without cladodes :

2a. Leaves ending in tendril ... GLORIOSA 3

2b. Leaves not ending in tendril :

3a. Leaves with purplish blotches ... SCILLA 4

3b. Leaves without purplish blotches ... CHLOROPHYTUM 2

1. ASPARAGUS L.

Asparagus gonoclados Baker in J. Linn. Soc. Bot. 14 : 627. 1875 ; Hook. f. Fl. Brit. Ind. 6 : 318. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1517. 1928, Repr. ed. 3 : 1060. 1957.

Spiny, woody climbers ; branches angled ; cladodes 3 5 m, stout, flat, falcate, ensiform, 2 6 nate, spinous tipped. Flowers white, fragrant, in fascicled racemes. Pedicels jointed in middle.

Fl. & Fr. : August October.

Common ; in lower Ghats ; Chemmannoor - Mukkali, Panthanthode forest.

2. CHLOROPHYTUM Ker - Gawl.

Chlorophytum attenuatum (Wight) Baker in J. Linn. Soc. Bot. 15 : 322. 1876 ; Hook. f. Fl. Brit. Ind. 6 : 335. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1526. 1928, Repr. ed. 3 : 1066. 1957. *Phalangium attenuatum* Wight, Ic. t. 2037. 1853.

Tufted, tuberous herbs. Leaves 15 30 × 1 3 cm, linear, narrowed at base. Flowers white, in racemes. Tepals 3 5 nerved. Pedicels jointed about middle. Capsules obcordate. Seeds 3 - 4.

Fl. & Fr. : October.

Fairly common ; in rocky crevices ; Aruvampara area, Kara suryamalai area.

3. GLORIOSA L.

Gloriosa superba L. Sp. Pl. 305. 1753 ; Wight, Ic. t. 2047. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 358. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1519. 1928, Repr. ed. 3 : 1061. 1957. '*Kalappai - kilangu*', '*Kannuvalikodi*' (Tam.). *Mendonni*, '*Mettonni*' (Mal.).

Climbing robust herbs ; tubers cylindric, forked. Leaves linear to ovate lanceolate, base rounded, apex tapering into a coiled tendril. Flowers solitary. Tepals 6, red and yellow, undulate. Stamens 6. Stigma introrse. Capsules linear - oblong, smooth.

Fl. & Fr. : September October.

Common ; in lower Ghats and plains ; Anamooly - Mukkali, Mathur area.

Tubers used in medicine ; becoming rare due to over exploitation for medicinal purposes. "Perianth segments greenish, then yellow, passing through orange and scarlet to crimson" Fischer *l.c.*

4. SCILLA L.

Scilla hyacinthina (Roth) Macbr. in Contr. Gray Herb. 56 : 14. 1918. Deb & Dasgupta in Bull. Bot. Surv. Ind. 17 : 46. 1978. *Ledebouria hyacinthina* Roth, Nov. Pl. Sp. 195. 1821 ; Wight, Ic. t. 2040. 1853 ; *Barnardia indica* Wight, Ic. t. 2041. 1853. *Scilla indica* (Wight) Baker in Saunders Refug. Bot. 3 : 12. 1870 non Roxb. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 348. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1527. 1928, Repr. ed. 3 : 1067. 1957. '*Narivengayam*' (Tam.).

Bulbous, slender herbs ; bulbs tunicate, 2 - 3 cm across. Leaves radical, lorate. Flowers pinkish - green, in racemes. Perianth deeply 6 lobed. Stamens 6. Capsule globose.

Fl. & Fr. : July.

Common in plains and hills, on grassy slopes ; Walayar forest.

134. SMILACACEAE

SMILAX L.

1a. Petiole sheaths auricled	...	*S. perfoliata*	1
1b. Petiole sheaths not auricled	...	*S. zeylanica*	2

1. **Smilax perfoliata** Lour. Fl. Cochinch. 622. 1790 ; Koyama in Advanc. Front. Pl. Sci. 4 : 59. 1966. *S. prolifera* Roxb. Fl. Ind. 3 : 795. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 312. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1519. 1928, Repr. ed. 3 : 1061. 1957.

Woody climbers ; stems prickly. Leaves elliptic, ovate or oblong, retuse at apex, rounded or subcordate at base, 3 - 7 ribbed. Umbels many. Flowers dull white. Tepals 6, free. Stamens 6. Berries globose.

Fl. : May.

Rare ; once collected in Mukkali forest at *ca* 250 m.

2. **Smilax zeylanica** L. Sp. Pl. 1029. 1753 ; Hook. f. Fl. Brit. Ind. 6 : 309. 1952 ; Fischer in Gamble, Fl. Pres. Madr. 1518. 1928, Repr. ed. 3 :

1061. 1957 ; Koyama in Advanc. Front. Pl. Sci. 4 : 50. 1966. *S. ovalifolia* Roxb. Fl. Ind. 3 : 794. 1832. *S. macrophylla* Roxb. *l. c.* 793. '*Kattukodi*' (Tam.).

Climbing shrubs ; stems prickly. Leaves 5 16 × 3 7 cm, lanceolate - elliptic, broadly oblong or ovate, acute or cuspidate at apex, base narrowed or cordate, 3 - 7 - ribbed. Umbels 1 3, on axillary peduncles. Flowers light green. Stamens 6. Berries globose, smooth, glabrous.

Fl. & Fr. : October - May.

Very common ; in Ghats ; Chitoor - Siruvani river, Mukkali forest, Panthanthode forest, Silent Valley R. F.

A very variable species.

135. PONTEDERIACEAE

1a. Petioles swollen ; tepals united	...	EICHHORNIA	1
1b. Petioles not swollen ; tepals free	...	MONOCHORIA	2

1. EICHHORNIA Kunth

Eichhornia crassipes (Mart.) Solms - Laub. in DC. Monogr. Phan 4 : 527. 1883 ; Fischer in Gamble, Fl. Pres. Madr. 1530. 1928, Repr. ed. 3 : 1069. 1957. *Pontederia crassipes* Mart. Nov. Gen. Sp. 9. t. 4. 1823. '*Vengayathamarai*' (Tam), '*Kulavazha*' (Mal.).

Aquatic, floating herbs. Leaves radical, rosulate, erect, obovate - rotund. Petioles elongate, spongy with fusiform bulbous portion about the middle. Flowers bluish - violet, in erect scapes. Perianth funnel - shaped ; limbs irregular. Stamens 6, at the throat corolla, 3 longer , 3 shorter. Fruit ovoid - oblong with many seeds.

Once collected in Pannangoteri tank at 150 m in November and earlier collection from Kalpathi river - Olavakkot.

2. MONOCHORIA Presl

Monochoria vaginalis (Burm. f.) Presl, Reliq. Haenk. 1 : 128. 1827 ; Hook. f. Fl. Brit. Ind. 6 : 363. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1529. 1928, Repr. ed. 3 : 1068. 1957. *Pontedria vaginalis* Burm. f. Fl. Ind. 80. 1768. *P. plantaginea* Roxb. Fl. Ind. 2 : 123. 1832. '*Kaakapola*' (Mal.).

Erect herbs, 10 - 20 cm. Leaves ovate to ovate - oblong, acute - acuminate at apex ; base rounded or cordate. Flowers 6 - 10, lilac - blue, in deflexed racemes. Tepls 6, petaloid, linear - obovate. Stamens 6. Capsules ellipsoid, with tiny oblong brown seeds.

Fl. & Fr. : October - April.

Common ; in marshy localities ; in lower Ghats ; Bhavani river bank - Mukkali. Walayar river bed.

136. COMMELINACEAE

1a. Inflorescences not exceeding leaf - sheaths ... TONNINGIA 7

1b. Inflorscences exceeding leaf - sheaths :

2a. Plants terrestrial :

3a. Fertile stamens 3 :

4a. Cymes from spathaceous bracts ... COMMELINA 3

4b. Cymes not from spathaceous bracts :

5a. Flowers regular ... MURDANNIA 6

5b. Flowers irregular ... ANEILEMA 1

3b. Fertile stamens 6 ;

6a. Inflorescence a cyme ... CYANOTIS 4

6b. Inflorescence a panicle ... FLOSCOPA 5

2b. Plants epiphytic ... BELOSYNOPSIS 2

1. ANEILEMA R. BR.

1a. Inflorescence in terminal panicles :

2a. Leaves crowded below the panicles ... *A. montanum* 1

2b. Leaves scattered :

3a. Leaves hispid above ; bracts persistent ... *A. scaberrimum* 3

3b. Leaves glabrous ; bracts caducous ... *A. ovalifolium* 2

1b. Inflorescence in axillary cymes ... *A. versicolor* 4

1. Aneilema montanum (Wight) Clarke in DC. Monogr. Phan. 3 : 217. 1881 ; Hook. f. Fl. Brit. Ind. 6 : 382. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1346. 1931, Repr. ed. 3 : 1079. 1957 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 182. 1964. *Dictyospermum montanum* Wight, Ic. t.

2069. 1853. *Tradescantia paniculata* Heyne ex Roth Nov. Pl. Sp. 188. 1821 non Roxb. 1799.

Stout, subscandent herbs. Leaves ovate to elliptic lanceolate, acuminate as apex, narrowed at base, glabrous. Panicles longer than upper - most leaves. Flowers white ; bracts leafy. Stamens 3. Capsules globose.

Fl. & Fr. : July - October.

Common ; in lower Ghats ; Mukkali forest, Sappal hill Dhoni R. F., Valiyaparathode way.

"It appears to be restricted to Peninsular India" Rao *l. c.*

2. **Aneilema ovalifolium** (Wight) Hook. f. ex. Clarke in DC. Monogr. Phan. 3 : 218. 1881 ; Hook f. Fl. Brit. Ind. 6 : 382. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1546. 1931, Repr. ed. 3 : 1079. 1957 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 188. 1964. *Dictyospermum ovalifolium* Wight, Ic. t. 2070. 1853.

Erect, stout herbs. Leaves elliptic - lanceolate, caudate - acuminate at apex, narrowed at base. Panicles shorter than upper most leaves. Stamens 2 - 3. Staminode 1. Capsules globose with recurved pedicels.

Fl. & Fr. : October.

Rare ; once collected in Aruvampara slopes — Silent Valley R. F.

3. **Aneilema scaberrimum** (Bl.) Kunth, Enum. 4 : 69. 1843 ; Hook. f. Fl. Brit. Ind. 6 : 382. 1892 ; Fischer in Gamble. Fl. Pres. Madr. 1546. 1931, Repr. ed. 3 : 1079. 1957. *Commelina scaberrima* Bl. Enum. 1 : 4. 1827. *Dictyospermum protensum* Wight, Ic. t. 2071. 1853.

Tall, scandent herbs, 30 - 45 cm. Leaves oblong lanceolate, acuminate. narrow at base, glabrous below, hispid above. Bracts funnel - shaped, persistent. Flowers pale pink, in panicles of umbelled racemes. Stamens 3. Capsule globose, pubescent. Seeds 3, rugose.

Fl. & Fr. : November.

Common ; in upper Ghats ; Pothundi - Kaikatty forest.

4. **Aneilema versicolor** Dalz. in Hook. Kew J. Bot. 3 : 136. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 378. 1892 ; Cooke, Fl. Pres. Bombay 3 : 298. 1958 (Repr. ed.).

Small herbs, rooting from nodes. Leaves alternate, bifarious, oblong - lanceolate, hispid, clasping the stem. Pedicels axiliary, filiform. Flowers blue. Stamens 3. Staminodes 3. Filaments bearded at base. Capsules linear.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R. F.

It is an addition to the Flora of the Presidency of Madras. Morton (J. Linn. Soc. Bot. London 59 : 431 - 478. 1966). has transferred all Asiatic species of *Aneillema* to *Dictyospermum* Wight ; but not followed here.

2. BELOSYNOPSIS Hassk.

Belosynopsis vivipara (Dalz.) Fischer ex Sprague & Fischer in Bull. Misc. Inform. Kew 254. 1928 ; Fischer in Gamble, Fl. Pres. Madr. 1551. 1931, Repr. ed. 3 : 1082. 1957. *Cyanotis vivipara* Dalz. in Hook. Kew J. Bot. 3 : 226. 1851.

Prostrate, epiphytic herbs. Stems viviparous, (detaching at nodes). Flowering stems slender, up to 25 cm. Radical leaves fleshy, oblong - lanceolate, acute or acuminate. Cauline ones ovate - elliptic, acuminate, pubescent. Flowers white, in umbels. Sepals oblong, villous. Petals connate at base. Capsules oblong hairy.

Fl. & Fr. : September - October.

Common ; on moss - covered tree trunks, in upper Ghats ; Panthanthode, Silent Valley R. F.

3. COMMELINA L.

1a. Spathes peduncled :

2a. Leaves ovate - lanceolate :

3a. Capsules 3 - seeded ... *C. diffusa* 2

3b. Capsules 1 - seeded ... *C. indehiscens* 4

2b. Leaves linear - lanceolate to oblong :

4a. Stems erect ; flowers yellow ... *C. wightii* 7

4b. Stems decumbent ; flowers dark blue ... *C. longifolia* 5

1b. Spathes sessile :

5a. Leaves ovate, oblong or suborbicular ... *C. benghalensis* 1

5b. Leaves lanceolate or elliptic :

6a. Capsule, 3 - valved ; seeds free ... *C. paludosa* 6

6b. Capsules 2 - valved ; seeds adnate ... *C. erecta* 3

1. **Commelina benghalensis** L. Sp. Pl. 41. 1753 ; Wight, Ic. t. 2065. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 370. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1539. 1931, Repr. ed. 3 : 1075. 1957. '*Kaanankozhai*', '*Kaananvazhai*' (Tam), '*Vaazhapadathi*', (Mal.).

Subscandent herbs with underground naked stems, ending in cleistogamous, white fertile flowers. Leaves ovate or oblong - ovate, membranous, often asymmetrical at base ; sheath with rufous hairs. Spathes clustered, funnel - shaped, pubescent. Flowers (aerial) blue. Sepals 3. Capsules ellipsoid, 5 seeded.

Fl. & Fr. : July.

Common ; in lower Ghats and plains ; Olavakkot.

2. **Commelina diffusa** Burm. f. Fl. Ind. 18. t. 7. f. 2. 1768 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 179. 1964. *C. nudiflora* auct. non L. 1753 ; Hook. f. Fl. Brit. Ind. 6 : 369. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1538. 1931, Repr. ed. 3 : 1074. 1957.

Slender, succulent herbs. Leaves ovate lanceolate, puberulous, acuminate ; sheaths loose, glabrous, ciliae at margins. Spathes ovate - lanceolate, base cordate. Flowers blue. Sepals 3. Capsules oblong, beaked. Seeds tubercled, dark brown.

Fl. & Fr. : December.

Common ; in upper Ghats ; Panthanthode forest.

3. **Commelina erecta** L. Sp. Pl. 41. 1753 ; Morton in J. Linn. Soc. Bot. 60 : 183. 1967 : Rao in Maharashtra Vidhan Mandir Patrica 6 : 53. 1971. *C. undulata* R. Br. Prodr. 270. 1810 ; Rao in Blumea 14 (2) : 351. 1966. *C. kurzii* Clarke in J. Linn. Soc. Bot. 11 : 444. 1871 ; Hook. f. Fl. Brit. Ind. 6 : 373. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1540. 1931, Repr. ed. 3 : 1075. 1957.

Stout herbs. Leaves narrowly lanceolate, acuminate, hirsute ; sheaths ciliate, glaucous below. Spathes sessile, cucullate, broadly cordate. Flowers blue. Capsules ellipsoid, glabrous, 3 - seeded.

Fl. & Fr. : August

Rare ; once collected in Panthanthode at *ca* 825 m.

4. **Commelina indehiscens** Barnes in J. Bombay Nat. Hist. Soc. 46 : 74. 1946 ; Sebastine in Bull. Bot. Surv. Ind. 2 : 221. 1960.

Much - branched, prostrate herbs. Leaves ovate to broadly lanceolate, acute, base rounded, hairy. Speathes broadly cordate. Sepals boat -

shaped. Petals reniform or deltoid. Stamens 3. Staminoes 3 (or 2). Capsules indehiscent, 1 seeded.

Fl. & Fr. : November.

Rare ; once collected in Karivara forest at *ca* 750 m.

It is similar to *C. nudiflora* but larger with cleistogamous flowers and indehiscent, 1 seeded capsules. It is an addition to the Flora of the Presidency of Madras.

5. **Commelina longifolia** Lam. Encycl. 1 : 129. 1783 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 179. 1964. *C. salicifolia* Roxb. Fl. Ind. 1 : 176. 1820 ; Hook. f. Fl. Brit. Ind. 6 : 370. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1538. 1931. Repr. ed. 3 : 1074. 1957.

Decumbent, slender herbs. Leaves linear lanceolate, glabrous. Spathes ovate, axillary, caudate acuminate, base rounded cordate. Flowers dark blue, in cymes. Sepals ovate. Petals ovate, undulate entire. Seeds smooth, ovate subglobose.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R. F.

6. **Commelina paludosa** Bl. Enum. 1 : 2. 1827 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 181. 1964. *C. obliqua* Buch. Ham. ex D. Don, Prodr. Fl. Nepal. 45. 1825 non Vahl 1806 ; Hook f. Fl. Brit. Ind. 6 : 372. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1539. 1931, Repr. ed. 3 : 1075. 1957. *C. polyspatha* Wight, Ic. t. 2066. 1853.

Stout, tall herbs, up to 1 m. Leaves ovate to elliptic lanceolate, scabrid, caudate acuminate, oblique at base. Sheaths rufous hairy at mouth and margin. Spathes funnel shaped ; base cordate. Flowers blue. Sepals unequal. Capsules trigonous, 3 - seeded.

Fl. & Fr. : September.

Not common ; in upper Ghats ; Panthanthode forest.

C. obliqua Buch. - Ham. ex D. Don is illegitimate as it is a later homonym of *C. obliqua* Vahl (Enum. 2 : 172. 1806) which is a Mexican species.

7. **Commelina wightii** Rao in Bull. Bot. Surv. Ind. 3 : 168. 1961 (1962). *C. glabra* (Wight) Clarke in DC. Monogr. Phan. 3 : 163. 1881 non Meyer 1818 ; Hook. f. Fl. Brit. Ind. 6 : 371. 1891 ; Fischer in Gamble, Fl. Pres. Madr. 1538. 1931, Repr. ed. 3 : 1074. 1957. *Heterocarpus glabra* Wight, Ic. t. 2067. 1853.

Erect or caespitose, branched, slender herbs. Leaves linear oblong, acute : margins ciliate. Peduncles scabrous pubescent. Spathes ovate - lanceolate, acuminate, cordate at base, ciliate at margin. Flowers yellow - orange, small. Capsules globose.

Fl. & Fr. : July.

Common ; in lower Ghats and plains ; Olavakkot.

4. CYANOTIS D. Don *nom. cons.*

1a. Plants cottony :

2a. Stems slender, decumbent ; leaves less than 10 cm long ... *C. fasciculata* 5

2b. Stems robust, suberect ; leaves more than 10 cm long ... *C. arachnoides* 1

1b. Plants not cottony :

3a. Roots tuberous ; cymes curved ... *C. concanensis* 3

3b. Roots not tuberous ; cymes not curved :

4a. Bracts shorter or equalling cymes :

5a. Leaves silky villous beneath ... *C. villosa* 7

5b. Leaves glabrous or sparsely pilose beneath ... *C. arcotensis* 2

4b. Bracts longer than cymes :

6a. Cymes solitary, recurved ... *C. cristata* 4

6b. Cymes clustered, straight ... *C. pilosa* 6

1. **Cyanotis arachnoides** Clarke in DC. Monogr. Phan. 3 : 250. 1881 ; Hook. f Fl. Brit. Ind. 6 : 306. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1550. 1931, Repr. ed. 3 : 1081. 1957. *C. pilosa* auct. non Roem. & Schult. 1830 ; Wight Ic. t. 2083. 1853.

Herbs, rooting from lower nodes, cottony - cobwebby. Leaves linear to oblong, acute. Cymes terminal and axillary, dense ; bracts ovate - lanceolate ; bracteoles falcately lanceolate, woolly, acuminate. Flowers blue. Stamens 6. Seeds pitted.

Fl. & Fr. : December.

Rare ; once collected near Poochipara.

2. **Cyanotis arcotensis** Rao in Blumea 14 : 345. 1966. *C. papilionacea* auct. non (L.) Schult. f. *p. p.* ; Wight, Ic. t. 2089. 1853 *p. p.* ; Hook. f. Fl. Brit. Ind. 6 : 384. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1549. 1931, Repr. ed. 3 : 1081. 1957 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 185. 1965.

Decumbent, pubescent herbs, rooting at nodes. Leaves linear - lanceolate or ensiform oblong, pubescent below, glabrous above, cordate at base, ciliate at margin. Cymes solitary or in clusters of 2 4. Bracts falcate. Bracteoles ovate - falcate, ciliate. Flowers purple. Petals ovate. Filaments bearded. Capsules hairy, 6 seeded.

Fl. & Fr. : July.

Common in plains ; Malampuzha area.

3. **Cyanotis concanensis** Hassk. Commelin. Ind. 114. 1870 ; Rao in Blumea 14 : 348. 1966. *C. stocksii* Hassk. *l.c.* 118. *C. sahayadrica* Blatter in J. Bombay Nat Hist. Soc. 33 : 77. 1928 ; Rao in Notes Roy. Gard. Edinburgh 25 : 189. 1964.

Herbs with thick roots. Leaves *ca.* 20 × 2 cm, linear - oblong, narrowed to base, silky - villous. Cymes peduncled. Peduncles 4 6 cm long, densely hirsute ; bracts shorter than cymes. Flowers bluish. Filaments densely bearded, inflated at apex. Capsules hairy upward.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Ayyappankoil - Kaikatty forest.

Hasskarl *l.c.* described *C. concanensis* and *C. stocksii* as distinct species but they are conspecific. R. S. Rao *l. c.* while merging the two, prefers *C. concanensis* based on better representative specimen as the type and also of its characteristic distribution restricted to the Concan region. It is a gigantic hexaploid occupying high hill tops above 1000 m along the Ghats.

4. **Cyanotis cristata** (L.) D. Don, Prodr. Fl. Nepal. 46. 1825 ; Wight Ic. t. 2082. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 385. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1549. 1931, Repr. ed. 3 : 1081. 1957. *Commelina cristata* L. Sp. Pl. 42. 1753.

Decumbent herbs, rooting at nodes. Leaves ovate - oblong, glabrous, obtuse, base rounded cordate. Bracteoles ovate falcate. Flowers purple, enclosed in recurved falcate cymes. Sepals oblong - lanceolate, hirsute. Petals oblong - spathulate. Filaments violet hairy. Capsules violet, hairy. Capsules glabrous.

Fl. & Fr. : July - October.

Common ; in lower Ghats ; Anamooly Mukkali, Marapalam Pothundy forest.

5. **Cyanotis fasciculata** (Heyne ex Roth) Schult. f. in Roem. & Schult. Syst. Veg. 7 (2) : 1152. 1830 ; Wight, Ic. t. 2086. 1853 ; Hook. f. Fl. Brit. Ind. 6 : 387. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1550. 1931, Repr. ed. 3 : 1082. 1957. *Tradescantia fasciculata* Heyne ex Roth, Nov. Pl. Sp. 189. 1821.

Pinkish herbs. Branchlets cottony. Leaves ovate linear to lanceolate, silvery silky or floccose. Cymes peduncled, axillary and terminal. Bracts lanceolate, recurved. Sepals villous. Petals pinkish. Filaments hairy. Capsules pilose at apex, oblong.

Fl. & Fr. : October.

Not common ; once collected in Aruvampara grassy slopes.

6. **Cyanotis pilosa** Schult. f. in Roem. & Schult. Syst. Veg. 7 (2) : 1154. 1830 ; Hook. f. Fl. Brit. Ind. 6 :387. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1549. 1931, Repr. ed. 3 : 1081. 1957 *p. p. C. longifolia* Wight, Ic. t. 2048. 1853.

Succulent, prostrate herbs. Leaves linear - lanceolate, ciliate at margins. Sheaths loose, pilose. Cymes subcorymbose, several. Bracts lanceolate. Bracteoles ovate falcate. Flowers pinkish. Calyx lobes pilose. Capsules hirsute at apex.

Fl. & Fr. : October.

Rare ; in upper Ghats ; Silent Valley R.F.

7. **Cyanotis villosa** (Spreng.) Schult. f. in Roem. & Schult. Syst. Veg. 7 (2) : 1155. 1830 ; Hook. f. Fl. Brit. Ind. 6 : 387. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1550. 1931, Repr. ed. 3 : 1081. 1957. *Tradescantia villosa* Spreng. Syst. Veg. 2 : 116. 1825. *Cyanotis lanceolata* Wight, Ic. t. 2085. 1853.

Herbs, rooting from nodes. Leaves 5 11 × 2.0 - 2.5 cm, purplish, lanceolate, acuminate, ciliate, cordate at base. Cymes terminal and in upper axils. Flowers purple - blue. Bracteoles silky - villous. Sepals hairy. Capsules pilose.

Fl. & Fr. : August.

Rare ; once collected in Silent Valley R. F. at *ca* 875 m.

5. FLOSCOPA Lour.

Floscopa scandens Lour. Fl. Cochinch. 193. 1790 ; Hook. f. Fl. Brit. Ind. 6 : 390. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1552. 1931, Repr. ed. 3 : 1083. 1957. *Dithyrocarpus rothii* Wight, Ic. t. 208. 1839. *D. petiolatus* Wight, Ic. t. 2079. 1853. *D. undulatus* Wight, Ic. t. 2380. 1853. *Padathipullu* (Mal).

Slender herbs. Leaves elliptic lanceolate, acuminate, scaberulous above. Sheaths *ca* 1 cm long, mouth long hairy. Flowers orbicular, glabrous.

Fl. : January.

Rare ; in lower Ghats ; Mukkali.

6. MURDANNIA Royle *nom. cons.*

1a. Seeds 1 seriate in each locule :

2a. Flowers corymbose or panicled :

3a. Leaves ovate - lanceolate ... *M. japonica* 2

3b. Leaves linear - lanceolate :

4a. Panicles sessile ... *M. zeylanica* var *longicapsa* 8

4b. Panicles pedunculate :

5a. Stems erect ; roots tuberous. ... *M. esculenta* 1

5b. Stems decumbent ; roots not tuberous ... *M. spirata* 7

2b. Flowers cymose panicled :

6a. Flowers less than 5 in each panicle ... *M. pauciflora* 5

6b. Flowers more than 5 in each panicle ... *M. nudiflora* 4

1b. Seeds 2 - seriate in each locule :

7a. Flowers axillary ; pedicels jointed ; capsules oblong, trigonous ... *M. lanuginosa* 3

7b. Flowers terminal ; pedicels not jointed ; capsules subglobose ... *M. semiteres* 6

1. Murdannia esculenta (Wall. ex Clarke) Rao & Kammathy in Bull. Bot. Surv. Ind. 3 : 394. 1961. *Aneilema esculentum* Wall. ex Clarke in DC. Monogr. Phan. 3 : 206. 1881 ; Hook. f. Fl. Brit. Ind. 6 : 377. 1892 ;

Fischer in Gamble, Fl. Pres. Madr. 1545 1931, Repr. ed. 3 : 1078. 1957. *A. pulneyensie* Fyson in Bull. Misc. Inform. Kew 1914 : 332. 1914.

Erect herbs. Leaves linear or oblong elliptic, recurved, obtuse or acute, glabrous. Flowers pale blue violet, in panicles. Bracts oblong. Calyx lobes 3, oblong. Stamens 3. Staminodes 3. Seeds dark brown, rugose, tuberculate.

Fl. & Fr. : October.

Common in marshy places ; in upper Ghats ; Aruvampara Silent Valley R. F.

2. **Murdannia japonica** (Thunb.) Faden in Taxon 26 : 142. 1971. *Commelina japonica* Thunb. in Trans. Linn. Soc. London 2 : 332 1794. *C. elata* Vahl, Enum. 2 : 178. 1805. *Murdannia elata* (Vahl) Brueckn. in Pflanzenfam ed. 2. 15a : 173. 1930. *Aneilema lineolatum* Kunth, Enum. 4 : 69. 1843 ; Hook. f. Fl. Brit. Ind. 6 : 376. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1544. 1931, Repr. ed. 3 : 1078. 1957. *A. latifolium* Wight, Ic. t. 2072. 1853.

Robust, erect, tuberous herbs. Leaves ovate lanceolate or elliptic - oblong, undulate, acute, rounded at base Flowers white, in stout dichotomously branched panicles, glandular pubescent. Sepals brown. Filaments bearded. Capsules sub globose. Seeds glandular pubescent.

Fl. & Fr. : August October.

Fairly common ; in lower Ghats ; Chindaki forest, Mukkali forest.

3. **Murdannia lanuginosa** (Wall. ex Clarke) Brueckn. in pflanzenfam. ed. 2. 15a : 173. 1930. *Aneilema lanuginosum* Wall. ex Clarke in DC. Monogr. Phan. 3 : 214. 1881 ; Hook. f. Fl. Brit. Ind. 6 : 380 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1545. 1931, Repr. ed. 3 : 1079. 1957.

Slender, grass - like, tuberous herbs. Leaves linear - lanceolate to oblong, acuminate, pubescent Flowers dull yellow turning blue with age, 1 5, clustered in upper leaf sheaths. Pedicels jointed at middle. Filaments bearded at base. Capsules oblong. Seeds angular.

Fl. & Fr. : September October.

Fairly common in upper Ghats ; on grassy slopes ; Aruvampara slopes Silent Valley R. F.

4. **Murdannia nudiflora** (L.) Brenan in Kew Bull. 7 : 189. 1952. *Commelina nudiflora* L. Sp. Pl. ed. 2. 412. 1762. *Aneilema nudiflorum* (L.) R.Br. Prodr. 271. 1810 ; Hook. f. Fl. Brit. Ind 6 : 378. 1822 ; Fischer in

Gamble, Fl. Pres. Madr. 1545. 1931, Repr. ed. 3 : 1078. 1957. *Murdannia malabarica* (L.) Brueckn. in Pflanzenfam. ed. 2. 15a : 172. 1930 ; Sant. in J. Bombay Nat. Hist. Soc. 52 : 658. 1954 - 55.

Procumbent herbs, rooting at nodes ; branchlets reddish, radiating, ascending. Leaves linear - lanceolate to oblong, acute, base cordate or rounded. Sheaths ciliate. Flowers pinkish, in lax terminal cymose panicles. Filaments bearded. Capsules globose, 6 seeded.

Fl : August.

Rare ; once collected in Mukkali forest at *ca* 500 m.

5. **Murdannia pauciflora** Brueckn. in Pflanzenfam. ed. 2. 15a : 173. 1930. *Aneilema pauciflorum* Wight, Ic. t. 2077. 1853 non Dalz. 1851 ; Hook. f. Fl. Brit. Ind. 6 : 378. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1545. 1931, Repr. ed. 3 : 1078. 1957. *Murdannia wightii* Rao & Kammathy in Notes Roy. Bot. Gard. Edinburgh 25 : 184. 1964. *nom. superfl.*

Decumbent, tufted herbs with fibrous roots. Leaves ovate, acute, hairy, cordate at base. Flowers 1 5, light yellow, in axillary and terminal cymes. Filaments glabrous. Pedicels recurved in fruit.

Fl. : November.

Rare ; in shady wet places in lower Ghats ; Panangoteri Nemmara.

Murdannia pauciflora Brueckn. (1930) is based on the illegitimate basionym *Aneilems pauciflorum* Wight (1853) non Dalzell (1851). However, Article 72 of the Code says that in such cases it should be treated as a new name (without the author in parenthesis) and not a combination and the priority of such a name begins only from the time of the first legitimate usage. Hence *M. wightii* Rao & Kammathy is a *nom. superfl* as has been pointed out by Nicolson (Taxon 27 (4) : 366. 1978).

6. **Murdannia semiteres** (Dalz.) Sant. in Poona Agric. Coll. Mag. 41 (4) : 284. 1951 ; Brenan in Kew Bull. 7 : 184. 1952. *Aneilema semiteres* Dalz. in Hook. Kew J. Bot. 3 : 138. 1851. *A. paniculatum* Wall. ex. Clarke in DC. Monogr. Phan. 3 : 215. 1881 non Wight 1853 ; Hook. f. Fl. Brit. Ind. 6 : 380. 1892, *p. p.* ; Fischer in Gamble, Fl. Pres. Madr. 1546. 1931. Repr. ed. 3 : 1079. 1957. *Dichaespermum juncoides* Wight, Ic. t. 2078. 1853.

Tufted, erect, branched herbs. Leaves filiform, linear, apiculate, acute. Flowers blue, in branched panicles ; bracts minute, ochreate, apiculate. Capsules subglobose, angular. Seeds compresed, smooth.

Fl. & Fr. : October - November.

Fairly common ; in upper Ghats ; Karivara slopes, Malampuzha area.

7. **Murdannia spirata** (L.) Brueckn. in Pflanzenfam. ed. 2. 15a : 173. 1930. *Commelina spirata* L. Mant. 176. 1771. *Aneilema spiratum* (L.) R. Br. Prodr. 271. 1810 ; Hook. f. Fl. Brit. Ind. 6 ; 377. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1545. 1931, Repr. ed 3 : 1078. 1957.

Herbs with fibrous roots. Leaves oblong or lanceolate, acute at apex, glabrous, cordate and semiamplexicaul at base. Flowers blue, in branched slender panicles. Bracts minute, ovate, amplexicaul. Calyx - lobes oblong. Filaments beard. Capsules hairy.

Fl. & Fr. : July - August.

Rare ; collected in Anamooly slopes at *ca* 150 m. and Olavakkot area.

8. **Murdannia zeylanica** (Clarke) Brueckn. var. **longicapsa** (Clarke) Rao & Kammathy in Bull. Bot. Surv. Ind. 3 : 394. 1961. *Aneilema zeylanica* Clarke var. *longicapsa* Clarke in DC. Monogr. Phan. 3 : 204. 1881 ; Hook. f. Fl. Brit. Ind. 6 : 376. 1892 ; Fischer in Gamble, Fl Pres. Madr. 1544. 1931, Repr. ed. 3 : 1078. 1957.

Slender herbs. Leaves narrowly lanceolate or ovate lanceolate, acuminate, base cuneate, rounded or cordate. Flowers white, in terminal, sessile, panicles. Capsules ellipsoid.

Fl. : July.

Rare ; in lower Ghats ; Mukkali forest.

7. TONNINGIA Neck.

Tonningia axillaris (L.) Kuntze, Rev. Gen. Pl. 2 : 721. 1891. *Commelina axillaris* L. Sp. Pl. 42. 1753. *Amischophacelus axillaris* (L.) Rao & Kammathy in J. Linn. Soc. Bot. 53 : 306 1966. *Cyanotis axillaris* (L.) D. Don, Prodr. Fl. Nepal. 46. 1825 ; Hook. f. Fl. Brit Ind. 6 : 388. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1550. 1931, Repr. ed. 3 : 1082. 1957. *Zygomenes axillaris* (L.) Salisb. in Trans. Hort. Soc. 1 : 271. 1812 ; Rao in Notes Roy. Bot. Gard. Edinburgh 25 : 187. 1964.

Slender, branched herbs, creeping or subercct. Leaves narrow lanceolate, succulent ; sheaths pilose, pouched. Cymes in clusters at leaf sheaths. Flowers pinkish. Calyx lobes lanceolate. Petals ovate. Stamens 6. Filaments pink, hairy. Capsules ellipsoid, 6 - seeded.

Fl. & Fr. : July

Common ; in plains ; Olavakkot.

137. ARECACEAE

(PALMAE)

1a. Leaves simple, fan - like (palmate) ... BORASSUS 3

1b. Leaves compound, feather - like (pinnate) :

2a. Leaves unarmed :

3a. Leaflets auriculate at base ... ARENGA 2

3b. Leaflets not auriculate at base :

4a. Stems 3 - 10 m high, less than 10 cm across ... PINANGA 6

4b. Stems 10 - 30 m high, more than 10 cm across ... ARECA 1

2b. Leaves armed with hooks or spines at tips :

5a. Leaves scattered ; fruits scaly ... CALAMUS 4

5b. Leaves crowned at apex ; fruits not scaly ... PHOENIX 5

1. ARECA L.

Areca catechu L. Sp. Pl. 1189. 1753 ; Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 : 405. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1555. 1931, Repr. ed. 3 : 1085. 1957. '*Kamugu*', '*Paakku*' (Tam.), '*Kamugu*' (Mal.).

Slender, erect trees ; stems annulate. Leaves pinnate ; leaflets linear, glabrous ; lower ones plicate ; upper ones coherent. Crown shaft prominent, tubular. Spadices branched. Spathes boat - shaped. Male flowers small. Petals obliquely lanceolate, fragrant. Females large, few. Sepals 3, triangular. Stamens 6. Fruits ovoid, orange.

Fl. & Fr. : All seasons.

Commonly cultivated as a cash crop in estates ; Bhavani river bank - Mukkali, Siruvani estate.

The seed is the betel nut of commerce, used as a masticatory, also used in medicine. Wood is used as rafters and poles in temporary constructions.

2. ARENGA Labill. *nom. cons.*

Arenga wightii Griff. in Calcutta J. Nat. Hist. 5 : 475. 1845 ; Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 : 422. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1558. 1931, Repr. ed. 3 : 1087. 1957. '*Alam panai*'. '*Malam thengu*' (Mal.).

Erect, monoecious trees ; stems smooth, stout, up to 10 m. Leaves pinnatisect, up to 7 m long. Leaflets alternate, white beneath, linear - ensiform with 2, unequal auricles at base. Spadices *ca* 1 m long. Inflorescence basipetal (opening from apex downwards). Pistillate flowers between staminate only. Stamens many. Flowers dull yellow. Fruits depressed - globose.

Fl. & Fr. : April.

Rare but abundant in restricted areas on the Ghats ; Anamooly slopes, Siruvani slopes.

Toddy is tapped by hillmen. The juice of the fruits causes severe itching and blisters.

3. BORASSUS L.

Borassus flabellifer L. Sp. Pl. 1187. 1753 ; Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 : 482. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1562. 1931, Repr. ed. 3 : 190. 1957 ; Whitm. Palms Malaya 41. 1979. *B. flabelliformis* Murray in L. Syst. Veg. (ed. 13) 827. 1774 ; Roxb. Fl. Ind. 3 : 790. 1832. '*Panaimaram*' (Tam.).

Erect, unbranched trees. Leaves simple, palmate ; leaflets 60 - 80, in duplicate. Petiole stout, spinous on both the edges ; base broad, split, clasping the stems. Spadices interfoliolar, dioecious, branched. Male flowers small, clustered. Sepals 3. Petals 3, obovate spathulate. Stamens 6. Female flowers large, globose. Perianth fleshy, accrescent. Sepals reniform, imbricate. Drupe yellow when ripe, fleshy, fibrous, with 1 - 3 compressed pyrenes.

Fl. & Fr. : February - April.

Common in plains ; Nemmara, Chittoor area.

The tender endosperm and ripe fruits edible. On germination of nuts, the cotyledons (tuber like) roasted or baked and eaten and the endosperm becoming spongelike soft, sweet also edible. Toddy is extracted during the flowering season. Trees, leaves and petiole used for building purposes.

4. CALAMUS L.

1a. Spines on petioles flat and black ... *C. thwaitesii* var. *canarana* 4

1b. Spines on petioles not flat and black :

2a. Male spikes inserted within spathes ; leaf - sheath spines straight ... *C. pseudo - tenuis* 2

2b. Male spikes inserted at or above the mouth of spathes ; leaf - sheath spines hooked :

3a. Leaf - sheaths and spines glabrous ... *C. rotang* 3

3b. Leaf - sheaths and spines pubescent ... *C. huegelianus* 1

1. **Calamus huegelianus** Mart. Hist. Nat. Palm. 3 : t. Z (12), f. 4. 1849 ; Beccari in Ann. Roy. Bot. Gard. Calcutta 11 : 314. t. 122. 1908 ; Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 : 455. 1893 ; Fischer in Gamble, Fl. Pres Madr. 1568. 1931, Repr. ed. 3 : 1094. 1957.

Prickly, climbing shrubs. Petioles with flat, solitary spines ; rachis trigonous, armed with claws. Leaflets 45 - 60 × 1.0 2.5 cm long, ensiform, with penicillate bristles on ribs, ciliate on margins. Leaf sheaths with flat, scurfy spines. Spathes 3, compressed, 2 keeled, armed with solitary, straight, short, broad - based spines. Flowers pale yellowish. Fruits pedicelled, globose ; scales rhomboid, black.

Fl. & Fr. : October.

Rare ; once collected in Aruvamparai slopes - Silent Valley.

2. **Calamus pseudo tenuis** Beccari ex Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 : 445. 1892 ; Beccari in Ann. Roy. Bot. Gard. Calcutta 11 : 223. t. 69. 1908 ; Fischer in Gamble, Fl. Pres. Madr. 1567. 1931, Repr. ed. 3 : 1093. 1957.

Slender, prickly climbers. Spines on leaf sheaths, petiole and rachis needle like. Ocrea of leaf up to 10 cm long. Leaflets linear - lanceolate, 30 50 × 1.0 - 2.0 cm long, apex bristly, penicillate. Flowers greenish yellow. Fruits subovoid, sessile, apiculate ; scales triangular, orange - yellow.

Fl. & Fr. : April.

Rare ; once collected in Karasuryamalai R. F. at *ca* 1250 m.

3. **Calamus rotang** L. Sp. Pl. 325. 1753 ; Beccari & Hook. f. in Hook. Fl. f. Brit. Ind. 6 : 447. 1892 ; Beccari in Ann. Roy. Bot. Gard. Calcutta

11 : 277. t. 97. 1908 ; Fischer in Gamble, Fl. Pres. Madr. 1568. 1931, Repr. ed. 3 : 1094. 1957. '*Chural*' (Mal.), '*Sathu pirambu*' (Tam.).

Tall, slender, prickly climbers. Ocrea short, truncate. Petioles very short ; rachis trigonous upwards, armed. Leaflets narrowly lanceolate, 1 ribbed, up to 30 cm long. Spadices axillary, elongate, branched. Flowers pale greenish in 3 or 4 series. Calyx 3 - lobed. Petals 3. Stamens 6. Fruits globose ; scales rhomboid.

Fl. & Fr. : January - June.

Common ; in upper Ghats ; Silent Valley R. F.

Fruit edible ; canes used for making furniture and other similar articles.

4. **Calamus thwaitesii** Beccari ex Beccari & Hook. f. var. **canarana** Beccari in Ann. Roy. Bot. Gard. Calcutta 11 : 138. t. 12. 1908 ; Fischer in Gamble, Fl. Pres. Madr. 1567. 1931, Repr. ed. 3 : 1093. 1957 ('*canarana*'). '*Valiachural*' (Mal.).

Erect, climbing shrubs. Leaf sheaths flagelliferous. Petioles with black, flat, pointed spines ; rachis trigonous above with deflexed black spines. Leaflets broadly ensiform with black short bristles on margins. Primary spathes tubular, armed with black tipped bristles. Flowers pale yellow. Fruits obovoid ; scales channelled in middle.

Fl. & Fr. : December.

Rare ; once collected along the banks of Kunthipuzha - Silent Valley R. F.

5. PHOENIX L.

Phoenix loureirii Kunth, Enum. Pl. 3 : 257. 1841 ; Moore in Principes 7 : 157. 1963. *P. humilis* Royle (Illustr. Bot. Himal. 394. 397 & 399. 1840 nomen) var. *pedunculata* Beccari in Malesia 3 : 379, 387. t. 44. ff. 13 15. 25 27. 1890 ; Beccari & Hook. f. in Hook. of Fl. Brit. Ind. 6 : 427. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1560. 1931, Repr. ed. 3 : 1099. 1957. '*Malai eechan*' (Tam.).

Erect, short trees ; stem 2 3 m, densely covered with bases of petioles. Leaves 2 3 m long, crowning the stem ; leaflets fascicled ; basal ones moidified into spines. Spathes 15 - 20 cm long. Spadices branched. Flowers pale yellow. Calyx lobes triangular. Petals oblong. Stamens 6. Fruits fleshy, black when ripe.

Fl. & Fr. : April.

Common ; on open grassy slopes in upper Ghats ; Kunthipuzha dam site area, Silent Valley R. F.

Fruit edible. Leaves used for making mats.

6. PINANGA Bl.

Pinanga dicksonii (Roxb.) Bl. Rumphia 2 : 85. 1837 38 ; Scheffer in Naturk. Tijdschr. Ned. Indie 32 : 174. 1871 ; Beccari & Hook. f. in Hook. f. Fl. Brit. Ind. 6 ; 409. 1892 ; Fischer in Gamble, Fl. Pres. Madr. 1556. 1931, Repr. ed. 3 : 1086. 1957. *Areca dicksonii* Roxb. Fl. Ind. 3 : 616. 1832. '*Kaanakamugu*' (Mal.).

Slender, erect trees, 5 10 m, monoecious. Stems annulate, smooth. Leaves 1 2 m, crowning the stem. Leaflets opposite, broadest at base, praemorse at tip. Flowers dark pinkish, 3 together ; females in middle. Stamens many. Fruits ellipsoid, with fibrous pericarp, 1 seeded.

Fl. & Fr. : October March.

Rare ; but abundant in restricted areas in upper Ghats ; Kunthipuzha dam site area, Silent Valley R. F.

Caryota urens L. '*Koonthalpanai*' (Tam.) is common ornamental tree, the inflorescence is used as decorative material for festival ; **Cocos nucifera** L. '*Thengu*' (Mal.), '*Thennai*' (Tam.) common cultivated tree for its nuts ; **Corypha umbraculifera** L. Talipot Palm '*Koda pana*' (Mal.) cultivated tree, is found in the district.

138. PANDANACEAE

PANDANUS L. f. *nom. cons.*

Pandanus canaranus Warburg in Pflanzenr. IV. 9 : 75. f. 21E. 1900 ; Fischer in Gamble, Fl. Pres. Madr. 1570. 1931, Repr. ed. 3 : 1905. 1957 ; St. John in Bot. Mag. Tokyo 85 : 242. f. 1. 1972 ; Stone in Sald. & Nicol. Fl. Hassan Dist. 778. 1976.

Small, trees, 5 7 m, distally branching. Leaves 2 3 m × 4 6 cm, margins and midribs armed with short, sharp, forward pointing spines. Staminate spathes fragrant, yellow ; anthers clustered. Style flattened. Female head oblong ovoid, 20 24 cm long, containing many drupes. Drupes at first coherent, 3 5 cm long.

Fr. : November.

Fairly common ; once collected from the bank of a small stream in Mathur - Kollengode slopes. Also found on banks of Bharathapuzha in Olavakkot area.

139. TYPHACEAE

TYPHA L.

Typha angustata Bory & Chaub. Exped. Sci. Moree Bot. 1 : 338. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 489. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1571. 1931, Repr. ed. 3 : 1096. 1957. *T. angustifolia* auct. non L. 1753 ; Backer in Steenis, Fl. Males. ser. 1. 4 : 243. 1957. '*Sambu*' (Tam.).

Erect, perennial, aquatic herbs, 2 3 m. Leaves 50 - 160 cm long, radical, elongate linear, thick, spongy, base sheathing, flat at apex. Spikes 40 - 45 cm. Flowers brown yellow, unisexual ; male above, deciduous. Stamens 2 or 3. Pistillate flowers below, intermixed with clavate, sterile pistillodes. Fruit an achene with persistent style, ovoid, brown.

Fl. & Fr. : July.

Rare ; but abundant in Walayar canal (marshy places).

Leaves used for thatching purposes and for mats and screens.

140. ARACEAE

1a. Terrestrial or epiphytic plants :

2a. Scandent shrubs with adventitious aerial roots :

3a. Leaves oblong - lanceolate ; flowers with tepals ... POTHOS 9

3b. Leaves ovate ; flowers without tepals ... RHAPHIDOPHORA 11

2b. Erect plants without adventitious aerial roots :

4a. Terrestrial or epiphytic : roots tuberous :

5a. Leaves simple :

6a. Terrestrial plants ; without leafless bulbiform shoots :

7a. Leaves peltate :

8a. Leaves suborbicular ... ARIOPSIS 4

8b. Leaves ovate - cordate ... COLOCASIA 5

7b. Leaves not peltate ... THERIOPHONUM 12

6b Epiphytic ; with leafless bulbi - form shoots ... REMUSATIA 10

5b. Leaves compound :

9a. Leaflets pedate ... ARISAEMA 4

9b. Leaflets not pedate :

10a. Spadices with barren appendages ... AMORPHOPHALLUS 1

10b. Spadices without barren appendages ... ANAPHYLLUM 2

4b. Marshy plants ; roots not tuberous :

11a. Leaves linear - lanceolate ... CRYPTOCORYNE 6

11b. Leaves elliptic ... LAGENANDRA 7

1b. Floating (herbs) plants ... PISTIA 8

1. AMORPHOPHALLUS Bl. ex Decne. *nom. cons.*

Amorphophallus bulbifer (Roxb.) Bl. Rumphia 1 : 148. 1837 ; Hook. f Fl. Brit. Ind. 6 : 515. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1587. 1931, Repr. ed. 3 : 1105. 1957. Vajravelu & Bhargavan in J. Econ. Tax. Bot. 3 : 969. 1982. *Arum bulbiferum* Roxb. Fl. Ind. 3 : 510. 1832.

Tuberous herbs, leafless when flowering. Leaflets lanceolate or obovate, acute ; petioles up to 1 m. Spathes erect, ovate - cymbiform, acute. Spadices sessile ; appendages creamy, elongate or oblong.

Fl. : May.

Rare ; once collected in Mukkali forest at *ca* 300 m, *Vajravelu* 27771.

2. ANAPHYLLUM Schott

Anaphyllum wightii Schott, Gen. Aroid. t. 83. 1857 ; Hook. f. Fl. Brit. Ind. 6 : 551. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1598. 1931, Repr. ed. 3 : 1108 1957. '*Sulli*' (Mal.).

Tall herbs, 2 m. Leaves hastate sagitate, pinnatisect, 40 - 50 cm long. Leaflets linear oblong to ovate - lanceolate, narrowed or decurrent

at base. Petioles 30 50 cm long. Spathes linear to oblong lanceolate, acuminate, convolute at base, dark violet. Perianth lobes 4.

Fl. & Fr. : December - March.

Common ; in upper Ghats ; Silent Valley R. F.

3. Ariopsis Nimmo

Ariopsis peltata Nimmo in Graham, Cat. Pl. Bombay 252. 1839 ; Hook. f. Fl. Brit. Ind. 6 : 519. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1580. 1931, Repr. ed 3 : 1102. 1957. *Remusatia vivipara* auct. non Schott 1832 ; Wight, Ic. t. 900. 1846.

Small, tuberous herbs. Leaves simple, solitary, suborbicular, peltate, apiculate, base cordate. Peduncles 7 10 cm, slender. Spathes apiculate, 2 3 cm long, violet with green dorsal ridge. Male flowers dark purple. Females greenish. Stigma yellow.

Fl. & Fr. : July.

Rare ; collected only in Dhoni R. F. and Mukkali forest at *ca* 525 m.

4. Arisaema Mart.

1a. Leaflets linear - oblanceolate, margins papillose ... *A. leschenaultii* 2

1b. Leaflets elliptic - lanceolate, margins entire. .. *A. barnesii* 1

1. **Arisaema barnesii** Fischer in Bull. Misc. Inform. Kew 342. 1933 & in Gamble Fl. Pres. Madr. 1890. 1936, Repr. ed. 3 : 1308. 1957.

Cormous, deciduous herbs. Leaflets petiolulate, acuminate at both ends. Spathes dark purple and white striped ; limb dark purple - streaked outside. Spadices purple, fusiform, tapering into a short tail, terminated by a minutely warted small knob.

Fl. : May

Rare ; once collected in Silent Valley R. F. at *ca* 960 m ; *Vajravelu* 27670.

2. **Arisaema leschenaultii** Bl. Rumphia 1 : 93. 1836 ; Hook. f. Fl. Brit. Ind. 6 : 504. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1585.

1931, Repr. ed. 3 : 1105. 1957. *A. pulchrum* N. E. Br. in J. Linn. Soc. Bot. 18 : 252. t. 6. 1880 ; Hook. f. *l. c.* 505 ; Fischer *l. c.*

Tuberous herbs. Leaflets 5 12, usually 7. elliptic or oblong - lanceolate, long, mottled, banded with red and brown. Spathes dark green, vertically striped with purple ; tubes cylindric, ribbed, dilated into ovate - lanceolate limbs ; spadices sessile. Sterile flowers above fertile ones, tapering into a narrow appendage.

Fl. & Fr. : May October.

Common ; in upper Ghats ; Silent Valley R. F.

5. Colocasia Schott

Colocasia esculenta (L.) Schott in Schott & Endl. Melet. Bot. 18. 1832. *Arum esculentum* L. Sp. Pl. 965. 1753. *Colocasia antiquorum* Schott l. c. ; Wight, Ic. t. 786. f. 2. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 523. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1580. 1931, Repr. ed. 3 : 1102. 1957. '*Shana dumpa*' (Tam.). '*Kaattuchembu*' (Mal.).

Tuberous, tall herbs. Leaves ovate suborbicular, undulate, cordate ; petioles up to 1 m. Spathes lower portion green, accrescent, the upper elongate, deciduous, caudate - acuminate. Male and femele flowers with interposed, flat neuters.

Fl. & Fr. : November.

Common ; in marshy places in lower Ghats ; Mathur Kollenkode.

All parts of the plant are used as vegetable.

6. Cryptocoryne Fischer ex Wydl.

Cryptocoryne retrospiralis (Roxb.) Kunth, Enum. 3 : 12. 1841 ; Wight, Ic. t. 772. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 493. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1575. 1931, Repr. ed. 3 : 1098. 1957. *Ambrosinia retrospiralis* Roxb. Fl. Ind. 3 ; 492. 1832. *A. unilocularis* Roxb. Fl. Ind. 3 : 493. 1832. *Cryptocoryne unilocularis* (Roxb.) Kunth. *l. c.* 13 ; Wight *l. c.* 774 ; Fischer *l. c.* 3 : 1099.

Aquatic, deciduous herbs with creeping rootstock. Leaves linear lanceolate, radical. Spathes elongate, deep green, purple streaked, twisted ; spadices short, apex adherent to deflexed ligules within the

spathe tubes. Male flowers numerous forming a cylindric mass. Stamens 1 2. Stigma orbicular. Fruit a fleshy berry with many oblong seeds.

Fl. & Fr. : October - November.

Rare ; but abundant in sandy Bhavani river bed near Mukkali at *ca* 650 m.

7. LAGENANDRA Dalz.

1a. Rhizomes *ca* 5 cm across ; spathes more than 5 cm long ... *L. ovata* 2

1b. Rhizomes *ca* 2 cm across ; spathes less than 5 cm long ... *L. meeboldii* 1

1. **Lagenandra meeboldii** (Engler) Fischer in Gamble, Fl. Pres Madr. 1575. 1931. Repr. ed. 3 : 1099. 1957. *Cryptocoryne meeboldii* Engler, Pflanzenr. 71 : 234. 1920.

Small, aquatic herbs. Leaves 6 12 × 3.5 6.5 cm, elliptic oblong, obtuse or acute. Stipular sheaths triangular. Peduncles short, slender, up to 3 cm long. Spathes dark purple, constricted below, tubular portion oblong ; limb triangular with subulate filiform tip.

Fl. & Fr. : November.

Rare ; but abundant in marshy places and paddy fields in lower Ghats; Mukkali.

2. **Lagenandra ovata** (L.) Thw. Enum. Pl. Zey. 334. 1864 ; Fischer in Gamble, Fl. Pres. Madr. 1576. 1931. Repr. ed. 3 : 1099. 1957. *Arum ovatum* L. Sp. Pl. 967. 1753. *Lagenandra toxicaria* Dalz. in Hook. Kew J. Bot. 4 : 289. 1852 ; Hook. f. Fl. Brit. Ind. 6 : 495. 1890. '*Andavazha*', '*Karin - pola*' (Mal.).

Large, aquatic, gregarious herbs. Leaves 15 20 × 4 - 8 cm, elliptic - oblong, obtuse. Stipular sheaths 2 keeled, acuminate. Spathes greenish - purple ; tubes broad ; limbs ovate - lanceolate, caudate, acuminate.

Fl. & Fr. : March.

Rare ; but abundant along streams ; Mukkali forest.

8. PISTIA L.

Pistia stratiotes L. Sp. Pl. 963. 1753 ; Hook. f. Fl. Brit. Ind. 6 : 497. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1573. 1931, Repr. ed. 3 : 1097. 1957. '*Kodi taamarai*', '*Agasa taamarai*' (Tam.).

Small floating, gregarious, stoloniferous herbs. Leaves in rosette, obovate acuminate, densely white pubescent. Spathes oblong ovate, whitish, sessile. Spadices adnate to spathes. Male flowers in whorls. Females solitary. Fruit is ovoid ellipsoid with persistent style.

Fl. : November.

Abundant in tanks in plains ; once collected in Kollengode tank at *ca* 325 m.

9. POTHOS L.

Pothos scandens L. Sp. Pl. 968. 1753 ; Wight, Ic. t. 776. 1844 ; Hook. f. Fl. Brit. Ind. 6 : 551. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1592. 1931, Repr. ed. 3 : 1110. 1957. '*Paruvakodi*' (Mal.).

Climbing, evergreen herbs. Leaves simple, lanceolate, acuminate. Petioles winged, semi amplexicaul. Peduncles axillary, solitary. Spathes sub orbicular, apiculate. Spadices globose, yellow, deflexed. Berries oblong, red.

Fl. & Fr. : October April.

Common ; on rocks and tree trunks in lower Ghats ; Karivara, Mukkali, Pothundi - Kaikatty, Sappal hill Dhoni R. F., Tiruvizhan kunnu forest.

10. REMUSATIA Schott

Remusatia vivipara (Roxb.) Schott in Schott & Endl. Melet. Bot. 18. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 521. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1583. 1931, Repr. ed. 3 : 1104. 1957. *Arum viviparum* Roxb. Hort. Beng. 65. 1814 '*viviparium*' ; Fl. Ind. 3 : 496. 1832 ; Wight, Ic. t. 798. 1844. *Caladium viviparum* (Roxb.) Loddiges Bot. Cab. 3 : t. 281. 1820. *Colocasia vivipara* (Roxb.) Thw. Enum. Pl. Zeyl. 336. 1864.

Tuberous, epiphytic herbs. Leaf solitary, ovate, peltate, undulate. Leafless bulbiferous shoots erect, slender, brown ; bulbils at nodes oblong, scaly.

Bulbils : October November.

Common ; in clefts of tree trunks in lower Ghats ; Ayyappankoil forest, Mukkali forest.

Rarely flowers ; propagation mostly by bulbils.

11. RHAPHIDOPHORA Hassk.

Rhaphidophora pertusa (Roxb.) Schott in Bonplandia 5 : 45. 1857 ; Hook. f. Fl. Brit. Ind. 6 : 546. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1590. 1931, Repr. ed. 3 : 1109. 1957. *Pothos pertusa* Roxb. Fl Ind. 1 : 455. 1820. *Scindapsus pertusus* (Roxb.) Schott in Schott & Endl. Melet. Bot. 21. 1832 ; Wight, Ic. t. 781. 1844. '*Anai - tippili*' (Tam.), '*Elithadi*' (Mal.).

Climbing, stout, evergreen shrubs. Leaves ovate, 20 50 × 15 30 cm, pinnatisect or perforate. Petioles not winged. Spathes convolute, deciduous. Spadices cylindric, with naked bisexual flowers. Anthers strap - shaped. Filaments flat. Berries aggregate.

Fl. & Fr. : October - April

Rare ; twice collected from a tree near Karapara river at *ca* 900 m.

THERIOPHONUM Bl.

1a. Spadix - appendix stipitate	...	*T. infaustum*	2
1b. Spadix - apendix sessile	...	*T. fischeri*	1

1. **Theriophonum fischeri** Sivadasan in Aroideana 4 : 64. 1981 ; Sivadasan & Nicolson in Kew Bull. 37 : 282. 1982.

Tuberous herbs. Leaves narrowly hastate ; midlobes *ca* 14 × 2.5 cm ; basal lobes *ca* 5.5 × 1.2 cm. Spathes to 12 cm, purplish, abruptly acuminate. Spadices shorter ; pistillate flowers at base ; sterile ones above, dense, suberect ; staminate flowers dense. Appendix round at base, tapering.

Fl. & Fr. : October - June.

Rare ; in lower Ghats ; Attappadi valley above ; Agali *Fischer* 2359 (CAL).

"This species was collected in 1910 by Fischer and was misidentified as *T. dalzellii* from which it differs by its broadly ovate spathe, pistillate

flowers in more than one whorl and having the sterile flowers continuous with pistillate flowers. Efforts to relocate it, have not been successful" Sivadasan & Nicolson *l. c.*

2. **Theriophonum infaustum** N. E. Br. in J. Linn. Soc. Bot. 18 : 260. 1881 ; Hook. f. Fl. Brit. Ind. 6 : 513. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1579. 1931. Repr. ed. 3 : 1102. 1957 ; Sivadasan & Nicolson in Kew Bull. 37 (2) : 283. 1982. *Calyptrocoryne wightii* Schott in Oesterr. Bot. Wochenbl. 7 : 262. 1857. *Theriophonum wightii* (Schott) Engler in DC. Monogr. Phan. 2 : 608. 1879. *nom illeg.*

Tuberous herbs. Leaves hastate sagittate, rarely broadly ovate cordate ; basal lobes rounded to ovate. Spathes greenish - purplish, blade oblong. Spadices with pistillate portion at base contiguous with sterile flowers. Appendix creamy - purplish. Pistillate flowers few ; stigma sessile, discoid. Sterile flowers creamy purplish. Staminate flowers dense, purplish, sessile.

Fl. & Fr. : July.

Common in plains and lower Ghats ; Walayar forest.

141. LEMNACEAE

1a. Root one per frond ; fronds without scales	...	LEMNA	1
1b. Roots several per frond ; fronds with scales	...	SPIRODELA	2

1. LEMNA L.

Lemna perpusilla J. Torrey, Fl. N. Y. 2 : 245. 1843 ; van der Plas in Steenis Fl. Males. ser. 1. 7 : 231. 1971. *L. paucicostata* Heglem. Lemnae 139. t. 8. 1868 ; Hook. f. Fl. Brit. Ind. 6 : 556. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1539. 1931. Repr. ed. 3 : 111. 1957. '*Payal*' (Mal.).

Minute floating herbs. Fronds in group of 2 or 3, or solitary, ovate - obovate or oblong, dorsal side flat with a hook shaped papillose at the tip, ventral side flat to convex ; base obtuse, apex obtuse - rounded, 3 nerved. Stipe hyaline. Root sheath with 2 lateral wings ; cap acute. Budding pouches 2, one on either side of the axis, triangular. Inflorescence one on either side of the axis, triangular in the budding pouch, with one male and 2 female flowers. Fruits ellipsoid.

Fl. & Fr. : October.

Common in ponds and stagnant waters ; Sappal hill Dhoni R. F.

2. SPIRODELA Schleid.

Spirodela polyrhiza (L.) Schleid. in Linnaea 13 : 392. 1839 ; van der Plas in Steenis Fl. Males ser. 1. 7 : 224. 1971. *Lemna polyrhiza* L. Sp. Pl. 970. 1753 ; Hook. f. Fl. Brit. Ind. 6 : 557. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1593. 1931, Repr. ed. 3 : 1111. 1957. *L. orbiculata* Roxb. Fl. Ind. 3 : 565. 1832.

Aquatic, floating, thalloid herbs. Fronds often in groups of 3 5, sometimes solitary, asymmetric, suborbicular - round, dorsal side flat, smooth - green, ventral side turgid, pigmented purplish, 7 12 nerved. Stipe fugaceous, base obtuse, apex rounded. Ventral scales covering the roots, strongly pigmented. Primary root 1 or 2 ; secondary roots more than 12 ; root cap acute. Inflorescence from the budding pouches, enclosed in spathes. Staminal flowers 2. Utricles with winged margin.

Fl. & Fr. : May.

Abundant in still waters in Walayar river - bed.

142. ERIOCAULACEAE

ERIOCAULON L.

1a. Leaves capillary ; anthers white ... *E. cinereum* 1

1b Leaves not capillary ; anthers dark :

2a. Sepals in female 2 ; receptacles glabrous ... *E. truncatum* 4

2b. Sepals in female 3 ; receptacles hairy :

3a. Leaves purplish ; sepals white ... *E. quinquangulare* 3

3b. Leaves not purplish ; sepals dark ... *E. collinum* 2

1. **Eriocaulon cinereum** R. Br. Prodr. 254. 1810 ; Sant. in Rec. Bot. Surv. Ind. 16 (ed. 3) : 294. 1967. *E. sieboldianum* Seib. & Zucc. ex Steud. Syn. Pl. Glum. 2 : 272. 1855 ; Hook. f. Fl. Brit. Ind. 6 : 577. 1893 ; Fyson in J. Indian Bot. Soc. 2 : 15. tt. 50 & 51. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1619. 1931, Repr. ed. 3 : 1127. 1957.

Erect, tufted, glabrous herbs. Leaves narrowly linear, 5 nerved. Heads spherical. Peduncles many, 5 6 cm long, rarely longer. Bracts pale, glabrous. Calyx spathaceous, 3 toothed at apex. Corolla lobes (male) minute with apical black glands. Female sepals 3, spathulate ; petals 3, linear lanceolate. Seeds globose, reddish brown.

Fl. & Fr. : November.

Common ; in marshy places ; in lower Ghats ; Ayyappankoil forest Padagari, Olavakkot.

2. **Eriocaulon collinum** Hook. f. Fl. Brit. India 6 : 584. 1893 ; Fyson in J. Indian Bot. Soc. 2 : 206. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1920. 1931, Repr. ed. 3 : 1128. 1957.

Tufted herbs. Leaves linear lanceolate, 4 6 cm long. Peduncles 16 - 20 cm long, 7 - ribbed. Heads subglobose. Floral bracts cuneate obovate, acute. Female sepals 3, free, boat shaped, white papillose hairy. Petals spathulate, with apical black glands. Male calyx spathaceous, 3 lobed. Capsules ellipsoid with brown seeds.

Fl. & Fr. : October March.

Common in marshy places ; in lower Ghats ; Karapara river area.

3. **Eriocaulon quinquangulare** L. Sp. Pl 87 1753 ; Hook. f. Fl. Brit. Ind. 6 : 582. 1893 ; Fyson in J. Indian Bot. Soc. 2 : 204. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1620. 1931, Repr. ed. 3 : 1128. 1957.

Tufted herbs. Leaves lanceolate, purplish, drying red, 7 nerved. Heads globose, white. Peduncles twisted, many, 7 - ribbed. Involucral bracts obovate, glabrous. Floral bracts hyaline, ciliate ; receptacles globose, sparsely villous. Calyx of male flowers spathaceous, 3 - partite, apically ciliate ; petals subequal, ciliate, glandular. Stamens 3 + 3. Female sepals 3, oblanceolate, densely ciliate ; petals 3, pilose. Seeds pale brown.

Fl. & Fr. : October.

Common in plains and puddles ; Dhoni R. F.

4. **Eriocaulon truncatum** Buch. Ham. ex Mart. in Wall. Pl. Asiat. Rar. 3 : 29. 1832 ; Hook. f. Fl. Brit. Ind. 6 : 578. 1893 ; Fyson in J. Indian Bot. Soc. 2 : 199. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1619 1931, Repr. ed. 3 : 1127. 1957 ; Moldenke in Phytologia 19 : 473. 1970.

Tufted herbs. Leaves ensiform oblong to lanceolate, 7 nerved, 2.5 - 4 × 0.2 0.3 cm. Peduncles 8 - 11 cm long, 5 7 ribbed. Involucral bracts elliptic, glabrous. Floral bracts spathulate obovate Male sepals 2, connate, obovate, concave. Corolla lobes 3, glabrous. Female sepals 2, free, linear or spathulate ; petals 3, oblanceolate. Seeds ellipsoid, brown.

Fl. & Fr. : December.

Common ; in marshy places in upper Ghats ; Malampuzha canal area.

143. CYPERACEAE

1a. All leaves reduced to sheaths :

2a. Hypogynal bristles present ... SCHOENOPLECTUS 10

2b. Hypogynal bristles absent :

3a Style base articulate with ovary. ... FIMBRISTYLIS 4

3b. Style base not articulate ... BULBOSTYLIS 1

1b. All leaves not reduced to sheaths :

4a. Ligules present ... SCLERIA 11

4b. Ligules absent :

5a. Nuts enclosed in utricular scales ... CAREX 2

5b. Nuts not enclosed in utricular scales :

6a. Hypogynal structure present :

7a. Spikes sessile, compact ... LIPOCARPHA 7

7b Spikes pedunculate, subcorymbose. ... HYPOLYTRUM 5

6b. Hypogynal structure absent :

8a. Rachilla articulate, deciduous :

9a. Spikes stalked ... MARISCUS 8

9b. Spikes sessile ... KYLLINGA 6

8b. Rachilla not articulate, persistent :

10a. Nuts flattened with one edge against rachilla PYCREUS 9

10b. Nuts trigonous or if flattened one edge not against rachilla. ... CYPERUS 3

1. BULBOSTYLIS Kunth *nom. cons.*

Bulbostylis barbata (Rottb.) Clarke in Hook. f. Fl. Brit. Ind. 6 : 631. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1662. 1931, Repr. ed. 3 : 1153. 1957 ; Kern in Steenis Fl. Males. ser. 1. 7 : 539. 1974. *Scirpus barbatus* Rottb. Descr. Pl. Rar. Programm. 27. 1772 et Descr. Ic. Pl. 52. t. 17, f. 4. 1773.

Tufted, annual herbs. Leaves much reduced, glabrous. Inflorescence capitate, hemispherical. Bracts filiform, overtopping. Spikes linear - oblong sessile, *ca.* 10 flowered. Glumes red - brown with strong, green curved keel. Stamens 2. Nuts obovoid, trigonous, smooth, reticulate.

Fl. & Fr. : July.

Common near water sources and in sandy soils ; Malampuzha.

2. CAREX L.

1a. Stems less than 1 m high ; inflorescences spicate ; utricles densely white - reddish - papillose ... *C. phacota* 3

1b. Stems more than 1 m high ; inflorescences panicled ; utricles wholly glabrous or hispidulous on margins :

2a. Spikes short (4 - 15 mm long) ; utricles narrow, beaks long ... *C. filicina* 2

2b. Spikes long (20 - 60 mm long) ; utricles gibbous, beaks short .. *C. baccans* 1

1. **Carex baccans** Nees in Wight, Contrib. Bot. Ind. 122. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 722. 1894 ; Fischer in Gamble, Fl. Pres. Madr. 1687. 1931, Repr. ed. 3 : 1169. 1957 ; Nelmes in Reinwardtia 1 (3) : 322. 1951.

Tufted herbs with short, woody rhizomes and tall erect trigonous stems, up to 2 m. Leaves long, revolute, stiff, coriaceous, alternate at base ; sheaths membranous, blackish red. Bracts longer. Spikelets linear elongate. Inflorescences compound panicles ; spikes many, sessile. Glumes ovate, reddish brown. Utricles ellipsoid trigonous.

Fl. & Fr. : October.

Not common ; Silent Valley R. F.

2. **Carex filicina** Nees in Wight, Contrib. Bot. Ind. 123. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 717. 1894 ; Fischer in Gamble, Fl Pres. Madr. 6 : 1686. 1931, Repr. ed. 3 : 1169. 1957 ; Nelmes in Reinwardtia 1 (3) : 304. 1951 ; Kern & Nooteb. in Steenis Fl. Males. ser. 1. 9 : 122. 1979.

Large, slender, tufted herbs with stout woody rhizomes ; stems erect, trigonous, tall, up to 160 cm, stout. Leaves basal, scabrid, flat with brown membranous, glabrous sheaths. Spikes many ; spikelets linear, slender ; female glumes ovate lanceolate, acute, reddish brown ; male glumes long, glabrous, reddish. Stamens 3. Utricles ellipsoid trigonous, exceeding glumes, scabrid.

Fl. & Fr. : October May.

In moist places, not common ; Kunthipuzha dam site area.

3. **Carex phacota** Spreng. Syst. Veg. 3 : 826. 1826 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 708. 1894 ; Fischer in Gamble, Fl. Pres. Madr. 1686. 1931, Repr. ed. 3 : 1169. 1957 ; Nelmes in Reinwardtia 1(3) : 426. 1951 ; Kern. & Nooteb. in Steenis Fl. Males. ser. 1. 9 : 170. 1979. *C. lenticularis* D. Don in Trans. Linn Soc. London 14 : 331. 1824 non Michx. 1803.

Tall, loosely tufted herbs with creeping rhizomes and trigonous stems. Leaves basal, very stiff with strongly revolute margins ; sheaths membranous. Spikes 4 6, dense, cylindric ; spikelets solitary, terete, elongate, drooping ; male glumes oblanceolate, mucronate ; bracts long - awned ; female glumes oblong obovate, awned. Utricles broadly elliptic obovoid, apiculate. Nuts pyriform orbicular, compressed biconvex, yellow.

Fl. & Fr. : January May.

Not common ; in open places ; Kunthipuzha dam site area.

3. CYPERUS L.

1a. Rays absent :

2a. Spikelets many, in a dense head ... *C. pygmaeus* 14

2b. Spikelets few, in a cluster ... *C. laevigatus* 8

1b. Rays present :

3a. Rays not many (1 3) ; annuals :

4a. Glumes with a strong mucro :

5a. Glumes silvery to golden with straight green tips ... *C. compressus* 1

5b. Glumes brown with recurved tips ... *C. cuspidatus* 2

4b. Glumes without mucro ... *C. malaccensis* 9

3b. Rays many ; annuals or perennials :

6a. Secondary rays absent :

7a. Spikelets in digitate clusters ... *C. difformis* 3

7b. Spikelets in spikes :

8a. Spikes ovoid or hemispheric with a short rachis :

9a. Spikelets golden, quadrangular in fruit ... *C. tenuiculmis* 16

9b. Spikelets reddish - brown, compressed in fruit :

10a. Plants with several leaves ... *C. rotundus* 15

10b. Plants with 1 - 2 leaves only ... *C. pangorei* 11

8b. Spikes cylindric with long rachis :

11a. Spikelets golden yellow ... *C. iria* 7

11b. Spikelets reddish - brown ... *C. pilosus* 12

6b. Secondary rays present :

12a. Spikelets in digitate groups or clusters ;

13a. Spikelets 2 - 3 mm wide ; glumes ovate ... *C. pubisquama* 13

13b. Spikelets less than 2 mm wide ; glumes oblong ... *C. tenuispica* 17

12b. Spikelets in spikes :

14a. Spikes ovoid or obovoid ; spikelets lax :

15a. Spikelets acuminate ... *C. distans* var. *distans* 4

15b. Spikelets acute ... *C. pangorei* 11

14b. Spikes cylindric ; spikelets dense :

16a. Glumes appressed, mucronate. ... *C. exaltatus* 6

16b. Glumes speading, apiculate :

17a. Glumes retuse and mucronate ... *C. nutans* var. *eleusinoides* 10

17b. Glumes obtuse and apiculate. ... *C. distans* var. *pseudonutans* 5

1. **Cyperus compressus** L. Sp. Pl. 46. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 605. 1893 ; Fischer in Gamble. Fl. Pres. Madr. 1640. 1931, ed. 3 : 1140. 1957 ; Kern in Backer & Bakh. f. Fl. Java 3 : 480. 1968 & in Steenis, Fl. Males. ser. 1. 7 : 617. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 138. 1977. '*Kunnagorai*' (Tam.).

Tufted annuals with trigonous stems. Leaves rigid, scabrid, short or long with purple sheaths. Bracts leafy, erect. Spikelets compressed, yellow

when ripe, oblong to linear. Glumes ovate lanceolate, imbricate, keeled, mucronate. Stamens 3. Nuts trigonous, dark brown.

Fl. & Fr. : October.

Rare ; at lower elevations ; Thenkarai Mannarghat.

2. **Cyperus cuspidatus** Kunth, Nov. Gen. Pl. 1 : 204. 1815 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 598. 1893 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 629. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 143. 1977. *C. uncinata* auct. non Poir. 1806 ; Fischer in Gamble, Fl. Pres. Madr. 1639. 1931, Repr. ed. 3 : 1139. 1957.

Tufted herbs with capillary stems. Leaves setaceous with purple sheaths. Involucral bracts 5. Spikes ovoid. Spikelets narrow oblong, purplish. Glumes obovate with recurved aristae. Keel flat, yellow. Stamens 3. Nuts ovoid, triquetrous, winged.

Fl. & Fr. : July.

Common ; in plains ; Malampuzha hill slopes.

3. **Cyperus difformis** L. Cent. Pl. 2 : 6. 1756 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 599. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1640. 1931, Repr. ed. 3 : 1139. 1957. Kern in Steenis, Fl. Males. ser. 1 : 7. 629. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 143. 1977.

Erect, tufted annuals, 10 40 cm ; roots reddish. Leaves few, abruptly acuminate. Bracts leafy, unequal, erect or spreading. Inflorescences of several, globose, dense clusters of spikes. Spikelets 5 15 flowered, linear - lanceolate, compressed. Glumes broadly obovate, 3 nerved. Nuts elliptic to obovoid.

Fl. & Fr. : October December.

In open moist localities ; Thenkara Mannarghat.

4. **Cyperus distans** L. f. Suppl. 103. 1781 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 607. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1640. 1931, Repr. ed. 3 : 1140 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 610. 1974.

var. **distans**

Perennials with creeping rhizomes. Leaves few, membranous ; sheaths purplish below. Inflorescences large. Spikes branched with distant, linear spikelets. Glumes dark brown, oblong - ovate. Stamens 3. Nuts oblong trigonous, apiculate.

Fl. & Fr. : September - December.

Common ; in wet grassy open places ; Kaikatty forest, Mukkali forest, Silent Valley R.F.

5. **Cyperus distans** L.f. var. **pseudonutans** Kuekenth. in Engler Pflanzenr. 101 : 140. 1935. *C. nutans* auct. non Vahl, 1806 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 607. 1893, *p.p.*

Perennials with tall stems, up to 90 cm. Spikes penicillate with crowded, dense, suberect spikelets.

Fl. & Fr. : October April.

Common ; in wet places ; Thenkarai, Kudam Siruvani area.

It resembles *C. nutans* and often confused with it, but distinguishable by the remote, not imbricate glumes with nerveless sides and the long internodes of the rachilla.

6. **Cyperus exaltatus** Retz. Obs. Bot. 5 : 11. 1789 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 617. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1642. 1931, Repr. ed. 3 : 1141. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 602. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 129. 1977.

Tall, densely tufted perennials ; rhizomes short ; stems trigonous. Leaves flat with prominent midrib, scabrous on margins ; sheaths long, tough, spongy, dark purple. Bracts longer than rays. Spikelets *ca.* 20 flowered, oblong linear, compressed, dark brown. Glumes membranous, ovate, mucronate. Nuts ovate - elliptic, apiculate, yellowish.

Fl. & Fr. : February.

In marshy places ; common ; Ommala area - Mukkali, Neelipara-Vaniyampara.

7. **Cyperus iria** L. Sp. Pl. 45. 1753 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 606. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1640. 1931, Repr. ed. 3 : 1140. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 616. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 139. 1977.

Annual, tall herbs. Leaves basal, flaccid, scabrid towards apex ; sheaths purplish ; bracts long, 5, leaf like. Inflorescences loose umbels. Spikelets oblong, 15 20 flowered. Glumes membranous, orbicular ovate, keeled. Nuts obovate elliptic, sides concave, smooth.

Fl. & Fr. : October April.

In wet places ; common ; Mukkali forest Thenkara area.

Very variable in size and in the number of florets in the spikelets.

8. **Cyperus laevigatus** L. Mant. 179. 1771 ; Kuekenth. in Engler Pflanzenr. 101 (3) : 321. 1936. *Juncellus laevigatus* (L.) Clarke in Hook. f. Fl. Brit. Ind. 6 : 596. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1629. 1931. Repr. ed. 3 : 1133. 1957.

Erect, rigid herbs with triquetrous stems. Leaves flat, often reduced. Bracts 2. Spikelets 15 20, in a cluster, lanceolate, about 20 - flowered. Glumes ovate, glossy. Stamens 3. Nuts obovoid, apiculate.

Fl. & Fr. : July.

Common in plains ; Walayar river bed.

9. **Cyperus malaccensis** Lam. Ill. 1 : 146. 1791 ; Clarke in Hook f. Fl. Brit. Ind. 6 : 608. 1893 ; Fischer in Gamble. Fl. Pres. Madr 1641. 1931, Repr. ed. 3. 1140. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 613. 1974. *Chlorocyperus malaccensis* (Lam.) Palla, Allg. Bot. Zeits 17. Beil 6. 1912.

Perennials with woody rhizomes ; stems robust, 3 winged. Leaves 10 15 cm long, scabrid at apex. Inflorescence broader than long ; spikelets linear, dull yellowish - brown. Glumes ovate to elliptic. Nuts trigonous, oblong, dark brown.

Fl. & Fr. : October - December.

Rare ; in marshy places ; Thenkara Mannarghat.

10. **Cyperus nutans** Vahl ssp. **eleusinoides** (Kunth) Koyama in Gard. Bull. Straits Settlem. 30 : 136. 1977. *C. nutans* Vahl var. *eleusinoides* (Kunth) Haines, Bot. Bihar & Orissa 898. 1924 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 610. 1974. *C. eleusinoides* Kunth, Enum. 2 : 39. 1837 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 608. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1640. 1931.

Erect herbs with trigonous, leafy stems. Leaves as long as or slightly shorter than stems. Bracts leafy. Spikes short, many, dense ; spikelets 10 20 flowered, linear elliptic. Glumes lanceolate obovoid, cuspidate. Nuts oblong, trigonous.

Fl. & Fr. : October February.

In wet places ; not common ; Thenkara Mannarghat.

11. **Cyperus pangorei** Rottb. Descr. & Ic. 31. t. 7. f. 3. 1773 ; Fischer in Gamble, Fl. Pres. Madr. 1641. 1931, Repr. ed. 3 : 1140. 1957. *C. tegetum* Roxb. Fl. Ind. 1 : 208. 1832 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 613. 1893. '*Pangorai*' (Tam.).

Tall, perennial, glaucous herbs with stout creeping rhizomes ; stems 100 120 cm high. Leaves flat, few with long, papery, brown to purple sheaths. Bracts 3 - 5, leafy. Spikes broadly ovate ; spikelets clustered, linear, acute, red brown. Glumes obtuse, 3 5 nerved. Stamens 3. Nuts oblong brown.

Fl. & Fr. : October - March.

In marshy places at lower elevations ; not common ; Mukkali forest.

Stem of this species is used for making mats.

12. **Cyperus pilosus** Vahl, Enum. 2 : 354. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 609. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1641 1931, Repr. ed. 3 : 1140. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 611. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 138. 1977.

Perennial small herbs with slender rhizomes ; stems triquetrous. Leaves shorter or equal to stems, rigid with golden, papery sheaths ; bracts leafy, exceeding inflorescence. Spikes clustered, ovoid - cylindric ; spikelets reflexed, 5 20 flowered, elliptic to linear lanceolate, flat. Glumes ovate, apiculate with sharp keel, 3 5 nerved. Nuts obovate elliptic.

Fl. & Fr. : October - April.

Common ; in open wet swampy places : Mukkali, Neelipara Vaniyampara.

13. **Cyperus pubisquama** Steud. Syn. Pl. Glum. 2 : 20. 1854 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 604. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1639. 1931, Repr. ed. 3 : 1139. 1957. *C. diffusus* Vahl var. *macrostachyus* Boeck. in Linnaea 35 : 534. 1867 68 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 619. 1974.

Stout, leafy, perennials with triangular, tall stems. Leaves flat, acuminate, scabrid. Sheaths purplish. Spikelets 1 - 4, linear, 20 30 flowered. Glumes closely clasping, appressed, ovate deltoid, mucronate. Nuts elliptic, small.

Fl. & Fr. : September - December.

In lower Ghats ; not common ; Anamooly slopes Thenkara.

14. **Cyperus pygmaeus** Rottb. Descr. Ic. Rar. Pl. 20, t. 14, ff. 4 & 5. 1773 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 634. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 146. 1977. *Juncellus pygmaeus* (Rottb.) Clarke

in Hook. f. Fl. Brit. Ind. 6 : 596. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1629. 1931, Repr. ed 3 : 1133. 1957.

Erect herbs with triquetrous stems. Leaves flaccid, several, scaberulous with reddish sheaths. Bracts 5 7, unequal. Spikelets ovate lanceolate, 10 - 20 flowered. Glumes oblong lanceolate, membranous, 5 7 nerved. Stamens 1 2. Nuts ellipsoid, yellow.

Fl. & Fr. : July.

Common ; in plains ; Walayar forest.

15. **Cyperus rotundus** L. Sp. Pl. 45. 1753 ; Clarke in Hook. f. Fl. Brit Ind. 6 : 614. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1641. 1931, Repr. ed. 3 : 1140 1957 ; Kern in Steenis. Fl. Males. ser. 1. 7 : 604. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 132. 1977. '*Korai*' (Tam.), '*Karimuttan*' (Mal.).

Tufted, tuberous herbs Stems erect, rigid, triquetrous. Leaves several, flat, scabrous with brown sheaths. Bracts 3, unequal ; Primary rays 5 7 ; secondary rays 1 3. Spikelets narrow, oblong, 10 20 flowered. Glumes closely imbricating, ovate, membranous. Stamens 3. Nuts oblong, trigonous.

Fl. & Fr. : All seasons.

Common ; in plains ; Walayar dam area.

The tubers are aromatic and used in medicines.

16. **Cyperus tenuculmis** Boeck. in Linnaea 36 : 286. 1869 70 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 608. 1974 ; Koyama in Gard. Bull. Straits Settlem. 30 : 135. 1977. *C. zollingeri* auct. non Steud. 1854 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 612. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1641. 1931, Repr. ed. 3 : 1141. 1957.

Perennials with short woody rhizomes. Stems solitary, ribbed, 30 60 cm. Leaves rigid, flat, shorter than stem, with brownish sheaths. Spikes ovoid, lax ; spikelets linear - lanceolate, compressed, yellow, 10 - 15 - flowered, quadrangular on maturity. Glumes ovate or elliptic, keeled, apiculate. Nuts reddish brown, ellipsoid.

Fl. & Fr. : October - December.

Rare ; in open grasslands ; Valiyaparathode Silent Valley R.F.

17. **Cyperus tenuispica** Steud. Syn. Pl. Glum. 2 : 11. 1854 ; Fischer in Gamble, Fl. Pres. Madr. 1640. 1931, Repr. ed. 3 : 1139. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 625. 1974 ; Koyama in Gard. Bull. Straits

Settlem. 30 : 143. 1977. *C. flavida* auct. non Retz. 1789 ; Clarke in J. Linn. Soc. Bot. 21 : 112. t. 3. f. 25. 1884 et in Hook. f. Fl. Brit. Ind. 6 : 600. 1893.

Small, erect, tufted annuals. Leaves linear, flaccid. Bracts 3 5, acute. Rays 7 10, oblong, 3 nerved, purple brown. Nuts trigonous, ellipsoid, warty.

Fl. & Fr. : October - January.

In wet places ; not common ; Thenkara Mannarghat.

4. FIMBRISTYLIS Vahl *nom. cons.*

1a. Spikelets 1 2 ... *F. acuminata* 1

1b. Spikelets many :

2a. Nuts oblong - cylindrical ... *F. dipsacea* 4

2b. Nuts not oblong - cylindrical :

3a. Nuts trigonous :

4a. Cauline leaves well developed ... *F. tenera* 7

4b. Cauline leaves (on fertile shoots) reduced to sheaths ... *F. miliacea* 5

3b. Nuts not trigonous :

5a. Ligules present ; stems up to 40 cm :

6a. Spikelets 2 - 4 mm wide ; stems 10 - 40 cm long ... *F. dichotoma* 3

6b. Spikelets 5 - 10 mm wide ; stems 10 - 20 cm long ... *F. narayanii* 6

5b. Ligules absent ; stems up to 30 cm ... *F. aestivalis* 2

1. **Fimbristylis acuminata** Vahl, Enum. 2 : 285. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 631. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1658. 1931, Repr. ed. 3 : 1150. 1957.

Caespitose herbs with terete, ridged stems. Leaves 2, triangular. Spikelets terminal, ovate, acute. Glumes ovate elliptic. Styles 2. Nuts ovate orbicular, compressed with wavy ridges.

Fl. & Fr. : May.

Common in lower Ghats ; Malampuzha hill slopes.

2. **Fimbristylis aestivalis** (Retz.) Vahl, Enum. 2 : 288. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 637. 1893. *p. p.* ; Fischer in Gamble. Fl.

Pres. Madr. 1658. 1931, Repr. ed. 3 : 1151. 1957 ; Kern in Back. & Bakh. f. Fl. Java 3 : 467. 1968 & in Steenis, Fl. Males. ser. 1. 7 : 584. 1974. *Scirpus aestivalis* Retz. Obs. Bot. 4 : 12. 1786. *Fimbristylis dichotoma* Presl, Reliq. Haenk. 1 : 191. 1828 non (L.) Vahl 1805. '*Kadukorai*' (Tam.).

Small, tufted annuals, 5 20 cm with rigid angular stems. Leaves filiform, membranous, densely hairy. Spikelets few, solitary, oblong lanceolate, angular. Glumes ovate, membranous, purplish brown. Nuts broadly elliptic or obovate, glossy, smooth, compressed, biconvex.

Fl. & Fr. ; December - April.

In open places ; not common ; Kakkupadi - Mukkali.

3. **Fimbristylis dichotoma** (L.) Vahl, Enum. 2 : 287. 1805 ; Fischer in Gamble, Fl. Pres. Madr. 1658. 1931. Repr. ed. 3 : 1151. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 575. 1974. *Scirpus dichotoma* L. Sp. Pl. 50. 1753. *S. diphyllus* Retz. Obs. Bot. 5 : 15. 1789. *Fimbristylis diphylla* (Retz.) Vahl *l.c.* 289 ; Clarke in Hook. f. Fl Brit. Ind. 6 : 636. 1893. *F. annua* Roem. & Schult. var. *diphylla* (Retz.) Kuekenth. in Bot. Jahrb. 59 : 47. 1924 ; Fischer *l.c.*

Tufted, annuals or perennials with short rhizomes, 10 40 cm. Leaves flat, basal, abruptly acuminate. Ligules hairy. Spikelets solitary or aggregated, oblong ovoid, red brown. Glumes oblong ovate, brown, mucronate. Nuts obovate, smooth or verrucose.

Fl. & Fr. : October April.

Common ; in open marshy places ; Chindaki forest, Mukkali, Silent Valley dam site area.

A very variable species with contrasting characters.

4. **Fimbristylis dipsacea** (Rottb.) Clarke in Hook. f. Fl. Brit. Ind. 6 : 635. 1893 ; Fischer in Gamble. Fl. Pres. Madr. 1658. 1931. Repr. ed. 3 : 1151. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 590. 1974. *Scirpus dipsaceaus* Rottb. Descr. Ic. Rar. Pl. 56. t. 12. f. 1. 1773.

Caespitose, slender, dwarf herbs. Leaves filiform, scaberulous with pinkish grey sheaths. Bracts 3 5. Spikelets solitary, globose or ovoid. Glumes membranous, lanceolate with recurved awns. Stamen 1. Nuts narrow obovoid.

Fl. & Fr. : May.

Common ; in lower ghats ; Malampuzha hill slopes.

5. **Fimbristylis miliacea** (L.) Vahl, Enum. 2 : 287. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 644. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1660. 1931, Repr. ed. 3 : 1152. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 552. 1974. *Scirpus miliaceus* L. Syst. Nat. ed. 10. 868. 1759. *Fimbristylis litoralis* Gaud. Voy. Bonite Bot. 413. 1826.

Tufted, glabrous annuals. Leaves shorter or equal to stems, scabrid on margins, without ligules. Spikelets solitary, ovoid, dense, many-flowered. Glumes ovate, obtuse, apiculate, keeled. Stamens 3. Nuts ellipsoid, oblong linear, glossy, verruculose.

Fl. & Fr. : April.

In open places ; not common ; Mandhampatty Mukkali.

6. **Fimbristylis narayanii** Fischer in Bull. Misc. Inform. Kew 46. 1931 & Gamble, Fl. Pres. Madr. 1660. 1931, Repr. ed. 3 : 1152. 1957.

Small, tufted, slender herbs. Leaves narrowly ensiform ; rays 1 4, capillary. Spikelets lanceolate. Glumes broadly triangular, glabrous but keel scabrid, pale brown. Nuts pale brown, obpyramidal with white tubercles.

Fl & Fr. : October December.

Rare ; in open wet places ; Silent Valley dam site area.

7. **Fimbristylis tenera** Schult. Mant. 2 : 57. 1824 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 642. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1660. 1931, Repr. ed. 3 : 1152. 1957.

Slender, annual, tufted herbs. Leaves filiform. Bracts 2 3, setiform ; rays 2 4. Spikelets oblong ellipsoid. Glumes ovate - lanceolate, glandular puberulous, brownish to yellowish brown. Nuts obovoid, greyish white, tubercled.

Fl. & Fr. : July.

Common ; in plains ; Malampuzha area.

5. HYPOLYTRUM Rich.

Hypolytrum nemorum (Vahl) Spreng. Syst. Veg. 1 : 233. 1824 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 490. 1974. *Schoenus nemorum* Vahl, Symb. Bot. 3 : 8. 1794. *Hypolytrum latifolium* Rich. in Pers. Syn. Pl. 1 : 70. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 678. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1673. 1931, Repr. ed. 3 : 1163. 1957.

Robust perennials with woody rootstocks and leafy erect stems. Leaves 3 nerved, long - acuminate ; bracts leafy. Spikes sessile, in compound panicles. Male glumes brown with dark dots, oblong. Nuts ovoid, brown, smooth rugose, acute or with swollen beaks.

Fl. & Fr. : October January.

Rare ; in shady wet places ; Mukkali forest.

6. KYLLINGA Rottb. *nom. cons.*

1a. Glumes winged on keel . *K. nemoralis* 2

1b. Glumes not winged on keel :

2a. Rhizomes densely tufted ... *K. triceps* 3

2b. Rhizomes not tufted ... *K. melanosperma* 1

1. **Kyllinga melanosperma** Nees in Wight, Contrib. Bot. India 91. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 588. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1624. 1931, Repr. ed. 3 : 1130. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 162. 1977. *Cyperus melanospermus* (Nees) Valck. Sur. Het. Gesl. Cyp. Mal. Archip. 50. t. 2. f. 8. 1898 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 655. 1974.

Perennial slender herbs with purple red, horizontally creeping rhizomes. Leaves acuminate with purple sheaths ; bracts 3, reflexed. Heads globose oblong ; spikelets many, oblong elliptic, compressed. Glumes 4, ovate lanceolate, red veined, mucronate. Stamens 3. Nuts compressed, oblong - obovate, black.

Fl. & Fr. : October January.

Common in wet places ; Pottikkal Mukkali, Silent Valley R.F.

2. **Kyllinga nemoralis** (J.R. & G. Forst.) Dandy ex Hutch. Fl. W. Trop. Africa 2 : 487. 1936. *Thryocephalon nemorale* J. R. & G. Forst. Char. Gen. Pl. 130. 1776. *K. monocephala* Rottb. Descr. Ic. Rar. Pl. 13. t. 4. f. 4. 1773 *nom. superfl.* ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 588. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1624. 1931, Repr. ed. 3 : 1130. 1957. *Cyperus kyllinga* Endl. Cat. Hort. Acad. Vindob. 1 : 94. 1842 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 659. 1974.

Perennials with creeping horizontal rhizomes. Leaves shorter or as long as stems ; bracts 3 - 4. Heads solitary, ovoid ; spikelets ovate - elliptic, compressed. Glumes compressed, winged. Nuts suborbicular, yellowish brown.

Fl. & Fr. : November - May.

Rare ; in shaded or open places ; Silent Valley R.F.

3. **Kyllinga triceps** Rottb. Descr. Ic. Rar. Pl. 14. t. 4. f. 6. 1773 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 587. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1623. 1931, Repr ed. 3 : 1130. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 162. 1977. *Cyperus triceps* Endl. Cat. Hort. Acad. Vindob. 1 : 94. 1842 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 659. 1974.

Erect, tufted herbs with slender triquetrous stems. Leaves flat or folded, flaccid, scabrid, with pale or yellow sheaths. Spikes 3 - 5 lobed. Spikelets oblong, 1 flowered. Glumes 4, hyaline, ovate linear, 5 - 7 nerved. Stamens 2. Nuts biconvex, oblong, laterally compressed, apiculate.

Fl. & Fr. : October.

Common in plains ; Walayar forest.

7. LIPOCARPHA R. Br. *nom. cons.*

Lipocarpha chinensis (Osb.) Kern in Blumea (Suppl.) 4 : 167. 1958 et in Steenis, Fl. Males. ser. 1. 7 : 521. 1974. *Scirpus chinensis* Osb. Dagb. Ostind. Rese 220. 1757. *Lipocarpha argentea* (Vahl) R. Br. ex Nees in Linnaea 9 : 207 1835 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 667. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1670. 1931, Repr. ed. 3 : 1158. 1957 ; *Hypaelyptem argenteum* Vahl. Enum. 2 : 283. 1805.

Tufted, erect annuals or perennials, 15 50 cm. Leaves shorter or longer than stems, rigid. Spikelets ovoid oblong, white ; glumes membranous, spathulate oblong. Stamens 1 2. Nuts oblong - obovate, apiculate with long scales.

Fl. & Fr. : October January.

Rare ; in marshy places ; Silent Valley R.F.

8. MARISCUS Vahl *nom. cons.*

1a. Stem - bases thickened by sheaths ... *M. dubius* 3

1b. Stem bases not thickened by sheaths :

2a. Glumes aristate ... *M. squarrosus* 5

2b. Glumes not aristate :

3a. Inflorescence compound ... *M. compactus* 1

3b. Inflorescence simple :

4a. Spikelets 1 - flowered ... *M. paniceus* 4

4b. Spikelets 2 - 4 - flowered :

5a. Nut bearing glumes cuspidate ... *M. sumatrensis* 6

5b. Nut bearing glumes not cuspidate ... *M. cyperinus* 2

1. **Mariscus compactus** (Retz.) Bold. Zakfl. Java 77. 1916 ; Fischer in Gamble, Fl. Pres. Madr. 1645. 1931, Repr. ed. 3 : 1143. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 153. 1977. *Cyperus compactus* Retz. Obs. Bot. 5 : 10. 1789. *C. spinulosus* Roxb. Fl. Ind. 1 : 203. 1832. *C. dilutus* Vahl. Enum. 2 : 357. 1805. *Mariscus dilutus* (Vahl) Nees ex Wight, Contrib. Bot. Ind. 90. 1834. *M. microcephalus* Presl, Reliq. Haenk. 1 : 182. 1828 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 624. 1893.

Erect herbs, 40 90 cm. Stems rigid, terete, spongy. Leaves 30 60 cm, scabrid below with purplish grey sheaths. Bracts 5 10 ; rays 5 - 7. Spikes globose, racemose ; spikelets linear, terete. Nuts narrowly obovoid, beaked.

Fl. & Fr. : May.

Common, in plains ; Walayar canal.

2. **Mariscus cyperinus** (Retz.) Vahl, Enum. 2 : 377. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 621. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1644. 1931, Repr. ed. 3 : 143. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 157. 1977. *Kyllinga cyperina* Retz. Obs. Bot. 6 : 21. 1791. *Cyperus cyperinus* (Retz.) Valck. Sur. Het. Gesl. Cyp. Mal. Archip. 154. t. 6. f. 10. 1898 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 641. 1974.

Perennial, tufted herbs with short rhizomes. Leaves rigid, flat, with reddish to dark brown sheaths. Spikes cylindric, dense ; spikelets 2 4 flowered, oblong linear. Glumes appressed, ovate oblong or elliptic. Stamens 3. Nuts trigonous, oblong ellipsoid, slightly curved.

Fl. & Fr. : October December.

In marshy or moist localities ; not common ; Mukkali slopes.

3. **Mariscus dubius** (Rottb.) Kuekenth. ex Fischer in Gamble, Fl. Pres. Madr. 1644. 1931, Repr. ed. 3 : 1142. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 158. 1977. *Cyperus dubius* Rottb. Descr. Ic. Rar. Pl. 20.

t. 4. f. 5. 1773 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 643. 1974. *Mariscus dregeanus* Kunth, Enum. Pl. 2 : 120. 1837 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 620. 1890, *p.p.*

Tufted herbs with bulbous base, 10 35 cm. Leaves many, flat or canaliculate. Sheaths pale or pinkish brown. Bracts 3. Spikelets ovate lanceolate, many in a cluster. 3 6 - flowered. Glumes ovate, mucronulate, concave. Stamens 3. Nuts ellipsoid, trigonous, apiculate.

Fl. & Fr. : July.

Common ; in lower Ghats ; Walayar forest.

4. **Mariscus paniceus** (Rottb.) Vahl. Enum. 2 : 373. 1805 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 620. 1893 ; Fischer in Gamble, Fl Pres. Madr. 1644. 1931, Repr. ed. 3 : 1143. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30. 157. 1977. *Kyllinga panicea* Rottb. Descr. Ic. Rar. Pl. 15. t. 4 f. 1. 1773. *Cyperus paniceus* (Rottb.) Boeck. in Linnaea 36 : 381. 1870 *p.p.* ; Kern in Steenis, Fl. Males. ser. 1. 7 : 643. 1974. '*Poonkorai*' (Tam.).

Slender, tufted herbs with creeping, stoloniferous rhizomes. Leaves short, narrow ; bracts 3 6 ; rays 3 7. Spikes cylindric, dense. Spikelets lanceolate, acute, curved. Stamens 3. Glumes 4, ovate oblong, convolute. Nuts oblong ellipsoid, trigonous, curved, pale brown.

Fl. & Fr. : July - April.

Common ; at lower elevations in Ghats ; Mukkali forest.

5. **Mariscus squarrosus** (L.) Clarke in Hook. f. Fl. Brit. Ind. 6 : 623. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1645. 1931, Repr. ed. 3 : 1143. 1957 ; Koyama in Gard. Bull. Straits Settlem. 30 : 153. 1977. *Cyperus squarrosus* L. Cent. Pl. 2 : 6. 1756 ; Kern in Blumea 10 : 642. 1960 & in Steenis, Fl. Males. ser. 1. 7 : 631. 1974. *C. aristatus* Rottb. Descr. Pl. Rar. 22. 1772 ; Clarke *l.c.* 606 ; Fischer *l.c.* 1640.

Erect, tufted annual herbs. Stems 3 winged. Leaves flat folded with purplish - grey sheaths. Bracts 3 5. Spikes globose - ovoid, brown. Spikelets oblong, compressed, 15 20 -flowered. Glumes ovate, with erect or curved arista, 9 nerved. Stamen 1. Nuts triquetrous, obovoid, apiculate.

Fl. & Fr. : July.

Common ; in plains ; Malampuzha.

6. **Mariscus sumatrensis** (Retz.) Koyama in Gard. Bull. Straits Settlem. 30 : 154. 1977. *Kyllinga sumatrensis* Retz. Obs. Bot. 4 : 13. 1786. *Scirpus cyperoides* L. Mant. 181. 1771 non *Mariscus cyperoides* (Roxb.) Dietrich. Sp. Pl. 2 : 438. 1833. *M. sieberianus* Nees ex Clarke in Hook. f. Fl. Brit. Ind. 6 : 622. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1645. 1931, Repr. ed. 3 : 1143. 1957. *Cyperus cyperoides* (L.) Kuntze, Rev. Gen. Pl 3 : 333. 1898 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 642. 1974.

Perennials with very short rhizomes ; stem tufted. Leaves flat, rigid, with reddish brown sheaths. Bracts 5 7. Spikes cylindric, very dense ; spikelets 2 flowered, reflexed, linear, acute. Glumes membranous, oblong, ovate. Nuts ellipsoid, oblong, black.

Fl. & Fr. : July November.

Common ; in open wet places ; Mukkali forest Thenkara, Silent Valley dam site area.

9. Pycreus Beauv.

1a. Glumes distinctly cuspidate ... *P. pumilus* 3

1b. Glumes not cuspidate :

2a. Surface of the nuts horizontally marked with white raised lines ... *P. stramineus* 4

2b. Surface of the nuts puncticulate :

3a. Rachilla straight ... *P. flavidus* 1

3b. Rachilla zigzag ... *P. polystachyos* 2

1. **Pycreus flavidus** (Retz.) Koyama in J. Jap. Bot. 51 : 313. 1976 & in Gard. Bull. Straits Settlem. 30 : 150. 1977. *Cyperus flavidus* Retz. Obs. Bot. 5 : 13. 1789 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 648. 1974. *P. globosus* (All.) Reichb. Fl. Germ. Exc. 2 : 140. 1830 ; Fischer in Gamble, Fl. Pres. Madr. 1627. 1931, Repr. ed. 3 : 1132. 1957 ; Hooper in Sald. & Nicol Fl. Hassan Dist. 692. 1976. *Cyperus globosus* All. Fl. Pedem. 49. 1789. *Pycreus capillaris* Nees in Linnaea 9 : 283. 1834 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 591. 1893.

Tufted annuals with tall stems, 10 15 cm high. Leaves flat or folded or filiform, short. Umbels simple ; bracts 2 8. Spikes ovoid, congested ; spikelets compressed, linear, black. Glumes oblong - ovate, obtuse ; styles exserted. Stamens 2. Nuts oblong obovoid, dark brown, biconvex, compressed.

Fl. & Fr. : October April.

In marshy places ; not common ; Aruvampara slopes, Silent Valley R.F.

2. **Pycreus polystachyos** (Rottb.) Beauv. Fl. Oware & Benin 2 : 48. t. 86. f. 2. 1807 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 592. 1893 ; Koyama in Gard. Bull. Straits Settlem. 30 : 149. 1977. *Cyperus polystachyos* Rottb. Descr. Pl. Rar. 21. 1772 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 649. 1974. *Pycreus odoratus* Urban, Symb. Antill. 2 : 164. 1900 ; Fischer in Gamble, Fl. Pres. Madr. 1627. 1931, Repr. ed. 3 : 1132. 1957 non *C. odoratus* L. 1753.

Perennials with short rhizomes and slender, tufted stems. Leaves many, flat with light purplish sheaths. Bracts 3 5. Spikelets linear lanceolate or oblong, compressed, acute, 15 20 flowered. Glumes elliptic - ovate, acute, yellow, sharply keeled. Stamens 1 2. Nuts compressed, oblong, biconvex, compressed.

Fl. & Fr. : October April.

Common ; in marshy places ; Mukkali Thenkara, Muthikulam forest.

A very viariable species in size, density of inflorescence etc. hence many varieties have been recognised but characters overlap.

3. **Pycreus pumilus** (L.) Nees in Linnaea 9 : 283. 1834 ; Fischer in Gamble, Fl. Pres. Madr. 1627. 1931, Repr. ed. 3 : 1132. 1957. *Cyperus pumilus* L. Cent. Pl 2 : 6. 1756 ; Kern in Steenis, Fl. Males. ser. 1. 7 : 650. 1974. *C. nitens* Retz. Obs. Bot. 6 : 13. 1789. *Pycreus nitens* (Retz.) Nees in Nov. Act. Acad. Caes. Leop. Carol. Nat. Cur. 19 (Suppl. 1) : 53. 1843 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 591. 1893.

Tufted, slender annuals, 5 15 cm. Leaves several, flat, or canaliculate, scabrid above. Bracts 3 5 ; rays 3 7. Spikelets oblong - linear, compressed, 10 20 flowered. Glumes ovate, membranous, retuse, apiculate. Stamens 2. Nuts biconvex, oblong - obovate, brown.

Fl. & Fr. : October April.

In damp localities ; not common ; Mukkali forest.

4. **Pycreus stramineus** (Nees) Clarke in Hook. f. Fl. Brit. Ind. 6 : 589. 1893 ; Fischer in Gamble Fl. Pres. Madr. 1627. 1931, Repr. ed. 3 : 1132. 1957. *Cyperus stramineus* Nees in Wight, Contrib. Bot. Ind. 74. 1834 non Desf. ex Link. 1820. *C. substramineus* Kuckenth. in Engler Pflanzenr. 101 : 398. 1936.

Slender tufted herbs with aromatic roots. Leaves filiform. Spikelets few, linear. Bracts 1 2. Glumes ovate, subacute, mucronulate with narrow keel. Nuts compressed orbicular, obtuse, black.

Fl. & Fr. : October.

Common in plains and paddy fields, Olavakkot.

10. SCHOENOPLECTUS (Reichb.) Palla *nom. cons.*

Schoenoplectus mucronatus (L.) Palla, Verh. K. K. Zool. Bot. Ges. Wien 38. Sitzb. 49. 1888. *Scirpus mucronatus* L. Sp. Pl. 50. 1753 ; Clarke. in Hook. f. Fl. Brit. Ind. 6 : 657. 1893 ; Fischer in Gamble, Fl. Pres. Madr. 1666. 1931, Repr. ed. 3 : 1156 1957 ; Kern in Steenis, Fl. Males. ser 1. 7 : 510. 1974. *S. triangulatus* Roxb. Fl. Ind. 1 : 219. 1820 ; Koyama in J. Fac. Sci. Univ. Tokyo sect. 3. Bot. 7 : 317. 1957.

Tufted, erect, stout perennials ; stems spongy. Leaves reduced to brown sheaths. Inflorescences pseudolateral, globose with few - many spikelets ; bracts reflexed, stem like. Spikelets sessile, ovoid, purplish grey, dense. Glumes appressed, concave, ovate, acute. Bristles 5 6, retrorsely scabrid. Stamens 3. Nuts broadly obovate, planoconvex, black.

Fl. & Fr. : April.

In swamps ; not common ; Varadimalai estate area.

11. SCLERIA Berg.

1a. Stems stout, without cluster of leaves about the middle ; nuts reticulate ... *S. terrestris* 2

1b. Stems slender, with cluster of leaves about the middle ; nuts smooth ... *S. lithosperma* 1

1. **Scleria lithosperma** (L.) Sw. Prodr. 18. 1788 ; Clarke in Hook. f. Fl. Brit. Ind. 6 ; 685. 1894 ; Fischer in Gamble, Fl. Pres. Madr. 1677. 1931, Repr. ed. 3 : 1163. 1957 ; Kern in Steenis, Fl. Males. ser. 1. 7 ; 740. 1974. *Scirpus lithospermus* L. Sp. Pl. 51. 1753.

Slender tufted perennials, 75 125 cm. Leaves rigid, aggregated towards the middle of stem, narrowly linear, brown hairy. Inflorescences

loose, narrow with terminal panicles. Spikelets 1 3, bisexual ; glumes ovate - lanceolate, acuminate, ferruginous. Stamens 1 or 2. Nuts oblong ovoid, shining.

Fl. & Fr. : July October.

Common ; along forest edges and open places ; Mukkali forest.

2. **Scleria terrestris** (L.) Fass. in Rhodora 26 : 159. 1924 ; Kern in Fl. Males. ser. 1. 7 : 733. 1974. *Zizania terrestris* L. Sp. Pl. 991. 1753. *Scleria elata* Thw. Enum. Pl. Zeyl. 353. 1864 ; Clarke in Hook. f. Fl. Brit. Ind. 6 : 690. 1894. *S. cochinchinensis* (Lour.) Druce in Bot. Exch. Club Soc. Brit. Isles 4 : 646. 1917 ; Fischer in Gamble, Fl. Pres. Madr. 1678. 1931, Repr. ed. 3 : 1163. 1957. *Diaphora cochinchinensis* Lour. Fl. Cochinch. 578. 1790.

Tall, scabrid, leafy herbs, 1.5 2.5 m. Stems solitary, triquetrous. Leaves scattered, 3 nerved, brown, ciliate with winged sheaths. Inflorescences branched, scabrid. Spikelets solitary or 2 3, lanceolate, unisexual. Glumes ovate lanceolate, purple. Stamens 3. Nuts white, subglobose ovoid, reticulate, umbonulate.

Fl. & Fr. : April.

Fairly common ; in moist localities ; Anavayee way, Silent Valley R.F.

144. POACEAE

1a. Woody shrubs or trees ... BAMBUSA 7

1b. Herbs or shrubs, not woody :

2a. Leaves tesselately veined ... CENTOTHECA 10

2b. Leaves not tesselately veined :

3a. Female spiklets solitary ... COIX 12

3b. Female spikelets not solitary :

4a. Inflorescences feathery ... SACCHARUM 45

4b. Inflorescences not feathery :

5a. Racemes simple (unbranched) :

6a. Spikelets subtended by bristles :

7a. Bristles solitary ... PSEUDORAPHIS 43

7b. Bristles few to many :

8a. Mature spikelets persistent ... PENNISETUM 38

8b. Mature spikelets deciduous ... SETARIA 47

6b. Spikelets not subtended by bristles :

9a. Spikelets awned :

10a. Lower glumes of sessile spikelets winged ;

11a. Racemes terete ... ROTTBOELLIA 44

11b. Racemes compressed ... MANISURIS 32

10b. Lower glumes of sessile spikelets not winged :

12a. Awns twisted ... HETEROPOGON 25

12b. Awns not twisted ;

13a. Glumes awned :

14a. Awns 2 ... PEROTIS 39

14b. Awn 1 ... POGONATHERUM 41

13b. Lemmas awned ... TRIPOGON 52

9b. Spikelets not awned :

15a. Spikelets secund :

16a. Lemmas hairy on the back ... LEPTOCHLOA 31

16b. Lemmas glabrous on the back ... ERAGROSTIELLA 20

15b. Spikelets not secund ... HACKELOCHLOA 24

5b. Racemes compound (branched) :

17a. Inflorescences paniculate :

18a. Spikelets awned :

19a. Lemma 3 - awned from tip ... ARISTIDA 3

19b. Lemma 1 - awned from tip :

20a. All spikelets not pedicelled ;

21a. Pedicels and joints filiform ... CAPILLIPEDIUM 9

21b. Pedicels and joints not filiform ... CHRYSOPOGON 11

20b. All spikelets pedicelled :

22a. Lemma single :

23a. Aquatic plants :

24a. Leaf blades ovate-oblong ... HYGRORYZA 26

24b. Leafblades linear ... ORYZA 34

23b. Terrestrial plants ... GARNOTIA 23

22b. Lemma double :

25a. Panicles congested ... JANSENELLA 30

25b. Panicles not congested ... ARUNDINELLA 5

18b. Spikelets not awned :

26a. Spikelets 3 - to many - flowered :

27a. Rachilla long - hairy ... PHRAGMITES 40

27b. Rachilla glabrous :

28a. Panicles decompound ... ARUNDO 6

28b. Panicles not decompound :

29a. Lemmas awned ... SILENTVALLEYA 48

29b. Lemmas not awned ... ERAGROSTIS 21

26b. Spikelets 1 or 2 - flowered :

30a. Spikelets 1 - flowered ... SPOROBOLUS 50

30b. Spikelets 2 - flowered :

31a. Panicles not cylindric :

32a. Glumes similar ... ISACHNE 27

32b. Glumes dissimilar ... PANICUM 35

31b. Panicles cylindric ... SACCIOLEPIS 46

17b. Inflorescences whorled or crowded spikes or racemes :

33a. Inflorescences interrupted by spathes :

34a. Leaves aromatic ... CYMBOPOGON 13

34b. Leaves not aromatic :

35a. Involucre present :

36a. Grains linear - obovate, grooved ... THEMEDA 51

36b. Grains oblong, compressed ... ISCHAEMA 29

35b. Involucre absent ... APLUDA 1

33b. Inflorescences not interrupted by spathes :

37a. Sessile and pedicelled - spikelets in groups :

38a. Leaves sessile :

39a. Sessile and pedicelled - spikelets dissimilar :

40a. Glumes broadly rounded ... DICHANTHIUM 15

40b. Glumes acute :

41a. Spikelets solitary ... ISCHAEMUM 28

41b. Spikelets 2 ... APOCOPIS 2

39b. Sessile and pedicelled - spikelets similar :

42a. Awns of lemmas basal ... ARTHRAXON 4

42b. Awns of lemmas apical ... EULALIA 22

38b. Leaves petioled ... SPODIOPOGON 49

37b. Sessile or pedicelled - spikelets in groups or solitary :

43a. Spikelets 3 - to many - flowered ... ELEUSINE 19

43b. Spikelets 1 or 2 - flowered :

44a. Lower glumes reduced or absent :

50a. Spikelets muticous ... DIGITARIA 16

50b. Spikelets plano - convex ... PASPALUM 37

44b. Lower glumes present :

51a. Spikelets 1 - flowered ... CYNODON 14

51b. Spikelets 2 - flowered :

52a. Upper lemma membranous ... DINEBRIA 17

52b. Upper lemma crustaceous :

53a. Lemma with an apical barbellate mucro ... UROCHLOA 53

53b. Lemma without a mucro :

54a. Glumes awned ... OPLISMENUS 33

54b. Glumes not awned :

55a. Ligules absent ... ECHINOCHLOA 18

55b. Ligules present :

56a. Spikelets laterally compressed ... PSEUDECHINOLAENA 42

56b. Spikelets dorsally compressed :

57a. Rachises triquetrous ... PASPALIDIUM 36

57b. Rachises flat ... BRACHIARIA 8

1. APLUDA L.

Apluda mutica L. var. **aristata** (L.) Hack. ex Backer, Handb. Fl. Java 2 : 54. 1928 ; Bor, in Rechinger, Fl. Iran. 524. 1970. *A. aristata* L. Amoen. Acad. 4 : 303. 1756 ; Fischer in Gamble, Fl. Pres. Madr. 1750. 1934, Repr. ed. 3 : 1212. 1957. '*Mandapillu*', '*Moongilpillu*' (Tam.).

Tufted, tall herbs, up to 2 m. Leaves linear - lanceolate, oblong, glabrous. Sheaths glabrous. Ligule membranous. Glumes pale greenish. Spikelets 3 - nate, one sessile, two pedicelled.

Fl. & Fr. : October.

Rare ; once collected in Aruvampara - Silent Valley R.F.

2. APOCOPIS Nees

Apocopis courtallumensis (Steud.) Henr. in Blumea 4 : 524. 1941 ; Bor*, Grasses India 95. 1960. *Andropogon courtallumensis* Steud. Syn. Pl. Glum. I : 377. 1854. *Apocopis wightii* Nees ex Thw. Enum. Pl. Zeyl. 365. 1864 ; Hook. f. Fl. Brit. Ind. 7 : 142. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1725. 1934, Repr. ed. 3 : 1196. 1957.

Tufted herbs with creeping culms. Leaves densely imbricate or distant, elliptic, hairy. Sheaths hairy at mouth. Ligule a ciliate membrane. Spikelets brownish, in racemes. Rachis, pedicels and glumes hairy. Lemma 2, bifid, awned.

Fl. & Fr. : December.

Rare ; once collected in Thiruvizhankunnu forests at *ca* 100 m.

* Bor, Grasses India—Bor, N.L. *The Grasses of Burma, Ceylon, India and Pakistan*. 1960, London.

3. ARISTIDA L.

Aristida adscensionis L. Sp. Pl. 82. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 224. 1896, *p.p.* ; Bor, Grasses India 407. 1960. *A. depressa* Retz. Obs. Bot. 4 : 22. 1786 ; Fischer in Gamble, Fl. Pres. Madr. 1809. 1934, Repr. ed. 3 : 1252. 1957. '*Cheeranpul*' (Tam.).

Densely tufted perennials. Leaves linear, convolute, ligulate. Spikelets linear, green purple. Glumes linear lanceolate, shortly aristate. Lemmas elliptic, awned. Caryopsis narrowly ellipsoid.

Fl. & Fr. : All seasons.

Common in plains ; Walayar dam area.

4. ARTHRAXON Beauv.

Arthraxon nudus (Steud.) Hochst. in Flora 39 : 188. 1856 ; Bor, Grasses India 101. 1960. *Andropogon nudus* Steud. Syn. Pl. Glum. 1 : 363. 1854. *Bathratherum nudum* Nees ex Steud. *l.c. nom. nud. Arthraxon ciliaris* Beauv. Ess. Agrost. 3 : 152. t. 11. f. 6. 1812 *p.p.* ; Hook. f. Fl. Brit. Ind. 7 : 146, 1896 *p.p.* ; Fischer in Gamble, Fl. Pres. Madr. 1728. 1934, Repr. ed. 3 : 1198. 1957 *p. p.*

Creeping or prostrate annual herbs. Leaves ovate lanceolate, ciliate, glabrous, cordate at base. Sheaths hairy. Racemes 2 5 cm long. Lower glumes scabrid.

Fl. & Fr. : October.

Not common ; in upper Ghats ; Aruvampara Silent Valley R.F.

5. ARUNDINELLA Raddi

1a. Upper lammas awned :

2a. Glumes with tubercle - based bristles :

3a. Panicles compact ... *A. ciliata* 1

3b. Panicles effuse ... *A. mesophylla* 3

2b. Glumes without bristles ... *A. pumila* 4

1b. Upper lemmas not awned ... *A. leptochloa* 2

1. **Arundinella ciliata** (Roxb.) Nees ex Miq. Verh. Kon. Ned. Inst. Westensch. 3 (4) : 30. 1851 ; Bor, Grasses India 421. 1960. *Holcus ciliatus*

Roxb. Fl. Ind. 1 : 321. 1820. *Arundinella holcoides* auct. non Trin. 1836 ; Fischer in Gamble, Fl. Pres. Madr. 1801. 1934, Repr. ed. 3 : 1247. 1957. '*Masapul*' (Tam.).

Tufted annuals, 10 - 25 cm. Leaves oblong, hairy. Panicles ovoid or oblong. Spikelets oblong, crowded. Glumes 5 nerved ; lower glumes awned. Upper lemmas scaberulous. Caryopses ellipsoid.

Fl. & Fr. : October January.

Common ; in lower Ghats ; Panthanthode.

This species has been much confused with *A. holcoides*. It can be differentiated by the lower glume exceeding the lower lemma by a great deal while in *A. holcoides* the lower glume just reaches the tip of the lower lemma.

2. **Arundinella leptochloa** (Nees ex Steud.) Hook. f. Fl. Brit. Ind. 7 : 76. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1802. 1934, Repr. ed. 3 : 1247. 1957 ; Bor, Grasses India 423. 1960. *Panicum leptochloa* Nees ex Steud. Syn. Pl. Glum. 1 : 62. 1854.

Slender, perennial herbs, 45 90 cm ; rootstocks hairy. Leaves linear - lanceolate, glabrous. Panicles branched, 8 15 cm. Branches and axis scabrid. Spikelets binate, ovate lanceolate, pale yellow. Lower glumes shorter than upper ones. Upper lemmas papillose.

Fl. & Fr. : October.

Not common ; in uper Ghats ; Valiyaparathode forest.

3. **Arundinella mesophylla** Nees ex Steud. Syn. Pl. Glum. 1 : 115. 1854 ; Hook. f. Fl. Brit. Ind. 7 : 69. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1801. 1934. Repr. ed. 3 : 1246. 1957 ; Bor, Grasses India 423. 1960.

Erect herbs. Leaves 3 - 15 × *ca* 0.5 cm, linear. Panicles up to 15 cm long. Spikelets sessile, awned, bifariously imbricate in spikes. Glumes bristly. Upper lemmas awned.

Endemic ; rare ; once collected in Ayyappankoil forest of Nelliyampathy Ghat at *ca* 90 m in October 1976.

4. **Arundinella pumila** (Hochst. ex A. Rich.) Steud. Syn. Pl. Glum. 1 : 141. 1854 ; Fischer in Gamble, Fl. Pres. Madr. 1801. 1934, Repr. ed. 3 : 1247. 1957 ; Bor, Grasses India 423. 1960. *Acrantherum pumilum* Hochst.

ex A. Rich. Tent. Fl. Abyss. 2 : 414. t. 100. 1851. *Arundinella tenella* Nees ex Steud. *l.c.* 115 ; Hook. f. Fl. Brit. Ind. 7 : 71. 1896.

Delicate annuals. 10 30 cm. Nodes bearded. Leaves 8 20 cm, hairy. Panicles effuse, feathery. Glumes 3 nerved. Spikelets small, awned.

Fl. & Fr. : October November.

Fairly common ; in lower Ghats ; Mukkali forest.

6. ARUNDO L.

Arundo donax L. Sp. Pl. 81. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 302. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1805. 1934, Repr. ed. 3 : 1250. 1957 ; Bor, Grasses India 413. 1960. '*Mudam pul*' (Tam.).

Stout, tall reed like shrubs. Culms fistular. Leaves ensiform, amplexicaul. Panicles erect, branched. Spikelets silky - pilose, 3 flowered, yellowish. Glumes oblong lanceolate, 3 nerved, awned. Lemmas lanceolate, 3 nerved.

Fl. & Fr. : September November.

Not common ; in lower Ghats ; Anaikkatty area, Mathur.

7. BAMBUSA Schreb.

Bambusa arundinacea (Retz.) Roxb. Pl. Cor. t. 79. 1798 ; Hook. f. Fl. Brit. Ind. 7 : 395. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1859. 1934, Repr. ed. 3 : 1286. 1957. *Bambos arundinacea* Retz. Obs. Bot. 5 : 24. 1788. '*Moongil*' (Tam.), '*Mula*' (Mal.).

Large, woody, thorny trees, 20 30 m. Internodes hollow. Culm sheaths broad, trinagular ; ligules white hairy. Leaves linear lanceolate, ciliate. Panicles compound. Spikelets 1 - to many - flowered. Glumes ovate, mucronate. Lemma oblong, mucronate. Bracts glume like. Lodicules 3, membranous, ciliate. Stamens 6.

Fl. & Fr. : August March.

Common ; in lower Ghats ; Bhavani river bank - Mukkali, Panthanthode forest.

After gregarious flowering, the clumps wither and die.

8. BRACHIARIA Griseb.

Brachiaria miliiformis (J. Presl) Chase in Contr. U.S. Natl. Herb. 22 : 35. 1920 ; Fischer in Gamble, Fl. Pres. Madr. 1769. 1934, Repr. ed. 3 : 1226. 1957 ; Bor, Grasses India 283. 1960. *Panicum miliiforme* J. Presl in C. Presl Reliq. Haenk. 1 : 300. 1830.

Erect, slender herbs. Leaves sparsely hairy. Racemes simple, 4 - 6. Spikelets secund, oblong obovate, acute, apiculate.

Rare ; once collected in Mukkali forests at *ca* 450 m in July 1969.

9. CAPILLIPEDIUM Stapf

Capillipedium huegelii (Hack.) Stapf in Hook. Ic. Pl. t. 3085. 1922 ; Fischer in Gamble, Fl. Pres. Madr. 1769. 1934, Repr. ed. 3 : 1226. 1957 ; Bor, Grasses India 111. 1960. *Andropogon huegelii* Hack. in DC. Monogr. Phan. 6 : 492. 1889 ; Hook. f. Fl. Brit. Ind. 7 : 180. 1896. *A. schmidii* Hook. f. *l.c.*

Slender, tufted herbs ; nodes long bearded. Leaves lanceolate ; sheaths hairy. Panicles contracted. Spikelets oblong, obovate, densely villous. Lower glumes villous.

Fl. & Fr. : December January.

Endemic, common ; in lower Ghats ; Chindaki forest, Panthan - thode forest.

10. CENTOTHECA Desv.

Centotheca lappacea (L.) Desv. in Nouv. Bull. Sci. Soc. Philom. Paris 2 : 189. 1810 ; Hook. f. Fl. Brit. Ind. 7 : 332. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1848. 1934. Repr. ed. 3 : 1229. 1957 ; Clayton in Kew Bull. 27 : 449. 1972. *Cenchrus lappacea* L. Sp. Pl. ed. 2. 2 : 1488. 1763. *Centotheca latifolia* (Osb.) Trin. Fund. Agrost. 141. 1820, *nom superfl.*, (based on *Cenchrus lappaceus* L.). *Holcus latifolius* Osb. Dagb. Ostind. Resa 247. 1757.

Tufted herbs. Leaves broadly elliptic ovate, acute. Spikelets secund, alternate, compressed. Glumes 2, unequal, 3 5 nerved, ovate - oblong. Lemmas oblong, emarginate, shortly awned, glabrous or with reflexed hairs.

Not common ; once collected in Panthanthode forest in January 1980.

11. CHRYSOPOGON Trin. *nom. cons.*

1a. Pedicels half as long as the spikelets or longer :

2a. Pedicels glabrous ... *C. aciculatus* 1

2b. Pedicels rufous hairy ... *C. orientalis* 3

1b. Pedicels less than half as long as spikelets ... *C. hackelii* 2

1. **Chrysopogon aciculatus** (Retz.) Trin. Fund. Agrost. 188. 1820 ; Fischer in Gamble, Fl. Pres. Madr. 1738. 1934, Repr. ed. 3 : 1205. 1957 ; Bor, Grasses India 115. 1960. *Andropogon aciculatus* Retz. Obs. Bot. 5 : 22. 1789 ; Hook. f. Fl. Brit. Ind. 7 : 188. 1896.

Tufted herbs with creeping rhizomes. Leaf sheaths glabrous with minute ligule. Leaves basal, glabrous, with ciliate margin. Panicles branched. Spikelets pedicelled and sessile ; lower glumes flat, stiff - hispid at back with 2 dentate apex ; upper glumes folded, scabrid at back. Callus short hairy. Pedicelled spikelets glabrous, with aristate lower glume.

Fl. & Fr. : July.

Common in plains ; lower Ghats ; Walayar forest.

2. **Chrysopogon hackelii** (Hook. f.) Fischer in Gamble, Fl. Pres. Madr. 1739. 1934, Repr. ed. 3 : 1205. 1957 ; Bor, Grasses India 117. 1960. *Andropogon hackelii* Hook. f. Fl. Brit. Ind. 7 : 194. 1896.

Tall herbs. Leaf sheaths silky, margins ciliate, acuminate. Spikelets in branched panicles, awned. Upper glumes of sessile spikelets glabrous.

Fl. & Fr. : September - November.

Common ; in Ghats ; Pottikkal forest Mukkali.

3. **Chrysopogon orientalis** (Desv.) A. Camus in Lecomte, Fl. Gen. Indo Chine 7 : 332. 1922 ; Fischer in Gamble, Fl. Pres. Madr. 1739. 1934, Repr. ed. 3 : 1205. 1957 ; Bor, Grasses India 118. 1960. *Rhaphis orientalis* Desv. Copusc. 69. 1831. *Andropogon wightianum* Nees ex Steud. Syn. Pl. Glum. 1 : 395. 1854 ; Hook. f. Fl. Brit. Ind. 7 : 191. 1896.

Densely tufted herbs. Leaves cauline and basal, oblong, distichous, densely pubescent. Panicles branched, oblong. Spikelets sessile and pedicellate. Lower glumes stiff - hirsute. Lemmas softly pilose.

Fl. & Fr. : July.

Common in lower Ghats ; Walayar forest.

12. Coix L.

1a. Lower glumes of male spikelets not or narrowly winged ... *C. lacryma-jobi* 2

1b. Lower glumes of male spikelets broadly winged ... *C. gigantea* 1

1. **Coix gigantea** Koenig ex Roxb. in Fl. Ind. 3 : 570. 1832 ; Fischer in Gamble, Fl. Pres. Madr. 1705. 1934, Repr. ed. 3 : 1183. 1957 ; Bor, Grasses India 264. 1960.

Large, erect herbs, 2 3 m. Leaves linear, base narrowed or rounded. Peduncles 10 15 cm long. Spikelets 3 nate.

Fl. & Fr. : April.

Not common ; once collected near Anavayee at *ca* 850 m.

2. **Coix lacryma - jobi** L. Sp. Pl. 972. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 100. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1705. 1934, Repr. ed. 3 : 1182. 1957.

Erect, tall, annual herbs, 2.5 to 3.5 *m*. Leaves linear lanceolate, cordate at base. Spikelets 2 - 3 nate. Peduncles 5 7 cm long. Bracts of female spikelets smooth, stony, polished.

Fl. & Fr. : February April.

Common in lower Ghats ; Minnampara.

13. Cymbopogon Spreng.

Cymbopogon flexuosus (Nees ex Steud.) Wats. in Atkins. Gez. N.W. Prov. India 392. 1882 ; Fischer in Gamble, Fl. Pres. Madr. 1756. 1934, Repr. ed. 3 : 1216. 1957 ; Bor, Grasses India 127. 1960 ; Soenarko in Reinwarditia 9 : 353. 1977. *Andropogon flexuosus* Nees ex Steud. Syn. Pl. Glum. 1 : 388. 1854. *A. nardus* L. var. *flexuosus* (Nees ex Steud.) Hack. in DC. Monogr. Phan. 6 : 603. 1889 ; Hook. f. Fl. Brit. Ind. 7 : 207 1896. *Cymbopogon travancorensis* Bor in J. Bombay Nat. Hist. Soc. 52 : 179. 1954. '*Chukkunari pillu*', '*Malabar grass*', *Inchi pullu* (Mal.).

Aromatic tufted herbs ; nodes hairy. Leaves 25 80 × 1 2 1.8 cm, linear lanceolate, scabrid, rough. Leaf sheaths hairy or glabrous, often auricled. Panicles 18 20 cm long, lax, greyish, drooping. Lower glumes

of sessile spikelets narrowly winged, 3 nerved. Lower glumes of pedicellate spikelets, lanceolate, acuminate.

Fl. & Fr. : October.

Common ; in lower Ghats ; Panthanthode forest.

It is the source of the valuable aromatic oil known as "Oil of Lemon grass" It is cultivated for this purpose in certain areas.

Bor *l.c.* treats *C. travancorensis* as distinct species based on the colour of stems etc. but Seenarko *l.c.* reduces it to a synonym.

14. CYNODON Richard ex Persoon *nom. cons.*

Cynodon dactylon (L.) Pers. Syn. Pl. 1 : 85. 1805 ; Hook. f. Fl. Brit. Ind. 7 : 288. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1835. 1934, Repr. ed. 3 : 1270. 1957 ; Bor, Grasses India 469. 1960. *Panicum dactylon* L. Sp. Pl. 58. 1753. '*Arugampul*' (Tam.).

Slender but gregarious herbs, rooting and glabrous at nodes. Ligule membranous, shortly ciliate. Leaves oblong, folded or flat. Spikes 3 or 4, digitate, 1 sided, oblong. Spikelets sessile, compressed, 2 seriate, one flowered. Glumes lanceolate, persistent, scaberulous along keel. Lemmas pubescent on keel. Anthers 3.

Fl. & Fr. ; All seasons.

Common in plains ; Walayar.

15. DICHANTHIUM Willemet

Dichanthium annulatum (Forsk.) Stapf in Oliver, Fl. Trop. Africa 9 : 178. 1917 ; Fischer in Gamble, Fl. Pres. Madr. 1741. 1934, Repr. ed. 3 : 1206. 1957 ; Bor, Grasses India 133. 1960. *Andropogon annulatus* Forsk. Fl. Aegypt. Arab. 173. 1775 ; Hook. f. Fl. Brit. Ind. 7 : 196. 1896.

Tufted herbs, 30 80 cm ; nodes bearded. Leaf - sheath terete, densely ciliate. Leaves linear, sparsely tuberculate pubescent. Racemes 2 5, oblong. Lower glumes of sessile spikelets 7 nerved, cartilaginous with setose margins ; upper glumes 3 nerved, scabrid.

Fl. & Fr. : July.

Common in plains ; Walayar forest.

16. DIGITARIA Haller *nom. cons.*

1a. Rachis flat, margins winged	...	*D. ciliaris*	1
1b. Rachis trigonous, margins not winged	...	*D. griffithii*	2

1. **Digitaria ciliaris** (Retz.) Koeler, Descr. Gram. Gallia et Germania 27. 1802 ; Blake in Proc. Roy Soc. Queensland ser. 2. 81 : 14. 1969 ; Veldkamp in Blumea 21 : 32. 1973. *Panicum ciliare* Retz. Obs. Bot. 4 : 16. 1786. *P. adsendens* H.B.K. Nov. Gen. Sp. 1 : 97. 1816. *Digitaria adscendens* (H.B.K.) Henr. in Blumea 1 : 92. 1934 ; Bor, Grasses India 298. 1960. *D. marginata* Link var. *fimbriata* (Link) Stapf in Prain, Fl. Trop. Africa 9 : 440. 1919 ; Fischer in Gamble. Fl. Pres. Madr. 1764. 1934, Repr. ed. 3 : 1222. 1957. *D. fimbriata* Link, Enum. Hort. Berole 1 : 226. 1821.

Annual herbs, 30 60 cm. Leaves narrow, oblong - lanceolate, up to 20 cm long, pubescent. Racemes 2 many, digitate. Peduncles hairy at joints. Spikelets elliptic - lanceolate, bristly. Upper glumes linear lanceolate.

Fl. & Fr. : August - October.

Not common ; Silent Valley R.F.

2. **Digitaria griffithii** (Hook. f.) Henr. in Blumea 1 : 100. 1934 ; Fischer in Gamble Fl. Pres. Madr. 1765. 1934, Repr. ed. 3 : 1222. 1957 ; Bor, Grasses India 301. 1960. *Paspalum sanguinale* (L.) Lam. var. *griffithii* Hook. f. Fl. Brit. Ind. 7 : 15. 1896.

Creeping and rooting at base ; nodes bearded. Leaves oblong - linear. Racemes 6, digitate. Spikelets oblong, bipinnate. Lower glumes scaly.

Fl. & Fr. : July.

Common ; in Lower Ghats ; Dhoni R. F.

17. DIMERIA R. Br.

Dimeria ornithopoda Trin. Fund. Agrost. 167. t. 14. 1820 ; Hook. f. Fl. Brit. Ind. 7 : 104. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1713. 1934, Repr. ed. 3 : 1188. 1957 ; Bor, Grasses India 142. 1960.

Slender, tufted herbs. Leaf - sheaths keeled, pubescent. Leaves narrow, hairy. Racemes spiciform, 2 3. Spikelets oblong. Glumes 4, pinkish, linear, acuminate, hairy, awned. Upper lemmas awned.

No common ; once collected near Poochipara in December. 1980.

18. ECHINOCHLOA Beauv.

1a. Plants robust ; lemma awned ... *E. crusgalli*

1b. Plants slender ; lower lemma not awned ... *E. colona*

Echinochloa colona (L.) Link, Enum. Hort Berol. 2 : 209. 1833 ; Fischer in Gamble, Fl. Pres. Madr. 1776. 1934, Repr. ed. 3 : 1230. 1957 ; Bor, Grasses India 308. 1960. *Panicum colonum* L. Syst. Nat. ed. 10. 870. 1789. '*Sauri*', '*Pullam payiru*' (Tam.).

Tufted annuals. Leaves 5 15 × 0.5 1 cm, lanceolate. Racemes simple, linear, distant. Spikelets ovoid ellipsoid. Glumes 5 nerved ; lower broadly ovate. Lemmas crustaceous.

Fl. & Fr. : October November.

Common ; in Ghats ; Panangateri.

Echinochloa crusgalli (L.) Beauv. Ess. Agrost. 53 : 161. 1812 ; Fischer in Gamble, Fl. Pres. Madr. 1777. 1934, Repr. ed. 3 : 1231. 1957 ; Bor, Grasses India 310. 1960. *Panicum crusgalli* L. Sp. Pl. 56. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 31. 1896.

Annual herbs. Leaves lanceolate. Ligule absent. Panicles 10 15 cm long. Spikelets 3 nate, elliptic, hispidulous. Lower glumes ovate - rounded, 5 nerved ; upper glumes 7 nerved.

Fl. & Fr. : October.

Rare ; once collected in Silent Valley R. F. at *ca* 900 m.

19. ELEUSINE Gaertn.

Eleusine indica (L.) Gaertn. Fruct. 1 : 8. 1788 ; Hook. f. Fl. Brit. Ind. 7 : 293. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1939. 1934, Repr. ed. 3 : 1273. 1957 ; Bor, Grasses India 493. 1980. *Cynosurus indicus* L. Sp. Pl. 72. 1753.

Erect, tufted herbs. Leaves 5 - 30 × 0.5 cm, scabrid above, glabrous below. Spikes 2 - 9. Spikelets 2 seriate, ovate oblong, greenish. Rachis slender, glabrous. Glumes lanceolate, subacute. Lemmas boat shaped, 3 nerved.

Fl. & Fr. : October - November.

Common in Ghats ; Karivara forest, Mukkali, Silent Valley R. F.

Eleusine coracana (L.) Gaertn. is cultivated for the grains. It is the main crop for the hill tribes.

20. ERAGROSTIELLA Bor

Eragrostiella bifaria (Vahl) Bor in Indian Forester 66 : 270. 1940 & Grasses India 494. 1960. *Poa bifaria* Vahl, Symb. Bot. 2 : 19. 1791. *Eragrostis bifaria* (Vahl) Wight ex Steud. Syn. Pl. Glum. 1 : 264. 1854 ; Hook. f. Fl. Brit. Ind. 7 : 325. 1896 ; Rangachariyar & Tadulingam, Handb. S. Indian Grass. 307. f. 227. 1921 ; Fischer in Gamble, Fl. Pres. Madr. 1828. 1934, Repr. ed. 3 : 1265. 1957.

Tufted perennials, 15 80 cm. Leaves convolute, narrow, linear, rigid. puberulous above. Spikes up to 20 cm long. Spikelets 6 4 flowered, linear to ovate, secund. Lower glumes ovate, acute. Lemma broadly ovate - suborbicular.

Fl. & Fr. : December.

Rare ; once collected in Attappadi Block at *ca* 525 m.

21. ERAGROSTIS Wolf

1a. Spikelets breaking up from below upwards ;
- 2a. Spikelets ovate - oblong ... *E. unioloides* 6
- 2b. Spikelets linear - oblong :
  - 3a. Spikes fascicled, not pendulous ... *E. gangetica* 3
  - 3b. Spikes scattered, pendulous :
    - 4a. Upper glumes 3 - nerved ... *E. cilianensis* 1
    - 4b. Upper glumes 1 - nerved :
      - 5a. Mouth of sheaths bearded ... *E. pilosa* 4
      - 5b. Mouth of sheaths not bearded ... *E. tenuifolia* 5

1b. Spikelets breaking up from above downwards ... *E. diarrhena* 2

1. **Eragrostis cilianensis** (All.) Vignolo-Lutati in Malpighia 18 : 386. 1904 ; Fischer in Gamble, Fl. Pres. Madr. 1827. 1934, Repr. ed. 3 : 1264.

1957 ; Bor, Grasses India 503. 1960. *Poa ciliatensis* All. Fl. Pedam. 2 : 246. t. 91. f. 2. 1785. *Eragrostis major* Host, Gram. Austr. 4 : 14. t. 24. 1809 ; Hook. f. Fl. Brit. Ind. 7 : 320. 1896.

Erect, tufted, annual herbs, 20 80 cm. Leaves ovate lanceolate, flaccid, glandular along margins. Panicles oblong, lax or contracted. Spikelets compressed, ovate, pale green, many flowered.

Fl. & Fr. : August.

Common ; in lower Ghats ; Panthanthode forest.

2. **Eragrostis diarrhena** (Schult.) Steud. Syn. Pl. Glum. 1 : 266. 1854 ; Fischer in Gamble, Fl. Pres. Madr. 1826. 1934, Repr. ed. 3 : 1264. 1957 ; Bor, Grasses India 507. 1960. *Poa diarrhena* Schult. Mant. 2 : 616. 1827. *Eragrostis interrupta* var. *diarrhena* (Schult.) Stapf ex Hook. f. Fl. Brit. Ind. 7 : 316. 1896.

Tufted perennial herbs ; culms erect, stout, 15 - 40 cm. Leaves linear, flat. Panicles contracted with spreading branches. Spikelets ovate to linear, pinkish, crowded. Stamens 2. Grains obovoid.

Fl. & Fr. : January.

Common ; in lower Ghats ; Mukkali forest.

3. **Eragrostis gangetica** (Roxb.) Steud. Syn. Pl. Glum. 1 : 266. 1854 ; Fischer in Gamble, Fl. Pres. Madr. 1826. 1934, Repr. ed. 3 : 1264. 1957 ; Bor, Grasses India 508. 1960. *Poa gangetica* Roxb. Fl. Ind. 1 : 341. 1820.

Annual herbs. Leaves linear - subulate, glaucous. Spikelets grey, crowded. Glumes ovate lanceolate, 1 nerved, with scabrid keel. Lemmas elliptic ovate, 3 nerved.

Fl. & Fr. : January.

Rare ; once collected in Chindaki forest.

It is closely allied to *E. nutans* (Retz.) Nees ex Steud. but differs by its annual habit and in having spikelets with deciduous lemmas.

4. **Eragrostis pilosa** (L.) Beauv. Ess. Agrost. 71 ; 162. 1812 ; Hook. f. Fl. Brit. Ind. 7 : 323. 1896 ; Fischer in Gamble. Fl. Pres. Madr. 1827. 1934, Repr. ed. 3 : 1265. 1957 ; Bor, Grasses India 512. 1960. *Poa pilosa* L. Sp. Pl. 68. 1753.

Annual, tufted herbs, 20 70 cm ; culms erect. Leaves 5 15 cm. filiform, glabrous. Sheaths glabrous. Panicles lax, oblong - elliptic. Rachis

glabrous. Spikelets pedicellate, ovate to elliptic, greenish. Glumes unequal. Lemmas 3 nerved, ovate. Grains ellipsoid, compressed.

Fl. & Fr. : August.

Rare ; once collected in Panthanthode forest at *ca* 825 m.

5. **Eragrostis tenuifolia** (A. Rich.) Hochst. ex Steud. Syn. Pl. Glum. 1 : 268. 1854 ; Hook. f. Fl. Brit. Ind. 7 : 322. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1827. 1934, Repr. ed 3 : 1265. 1960 ; Bor, Grasses India 514. 1960. *Poa tenuifolia* A. Rich. Tent. Fl. Abysis. 2 : 425. 1851.

Tufted, perennial herbs, 15 - 30 cm Leaves oblong. Sheaths glandular, pitted. Panicles oblong to lanceolate. Spikelets dark olive green blackish. Glumes hyaline. Lemmas mucronate, obtuse. Grains oblong, grooved.

Fl. & Fr. : October.

Not common ; in Ghats ; Aruvampara slopes - Silent Valley R. F.

6. **Eragrostis unioloides** (Retz.) Nees ex Steud. Syn. Pl. Glum. 1 : 264. 1854 ; Fischer in Gamble. Fl. Pres. Madr. 1826 1934, Repr. ed. 3 : 1284. 1957 ; Bor, Grasses India 515. 1960. *Poa unioloides* Retz. Obs. Bot. 5 : 19. 1789. *Eragrostis amabilis* auct. non L. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 317. 1896.

Tufted, slender annuals, 20 - 70 cm. Leaves linear lanceolate, glabrous. Panicles oblong - ovoid ; branches spreading. Spikelets ovate oblong, compressed, pinkish or reddish purple. Anthers 3.

Fl. & Fr. : October.

Fairly common ; in Ghats ; Mukkali forest.

22. EULALIA Kunth

Eulalia trispicata (Schult.) Henr. in Blumea 3 : 453. 1940 ; Bor, Grasses India 157. 1960. *Andropogon tristachyus* Roxb. Fl. Ind. 1 : 261. 1820 non H.B.K. 1816. *A. trispicatus* Schult. Mant. Syst. 2 : 452. 1824. *Eulalia tristachya* (Roxb.) Kuntze, Rev. Gen. Pl. 775. 1891 ; Fischer in Gamble, Fl. Pres. Madr. 1715. 1934, Repr. ed. 3 : 1189. 1957. *Pollinia argentia* Trin. Bull. Sci. Acad. Imp. Sci. St. Petersbourg 1 : 71. 1836 ; Hook. f. Fl. Brit. Ind. 7 : 111. 1896.

Perennial herbs, 30 90 cm. Nodes glabrous. Leaves erect, linear Ligule bearded. Spikes 3 7. Spikelets binate, oblong. Lower glumes

liner oblong, pale brown, 2 nerved. Upper glumes oblong, 1 nerved. Lemmas linear - oblong, ciliate, awned.

Fl. & Fr. : December.

Rare ; once collected in Valiyaparathode.

23. GARNOTIA Brongn.

1a. Leaves not basal (scattered), articulate :

2a. Leaves rounded or subcordate at base ... *G. arundinacea* 1

2b. Leaves narrowed at base ... *G. tenella* 3

1b. Leaves basal, not articulate ... *G. schmidii* 2

1. **Garnotia arundinacea** Hook. f. Fl. Brit. Ind. 7 : 243. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1812. 1934, Repr. ed. 3 : 1255. 1957 ; Bor, Grasses India 567. 1960 ; Gould in Kew Bull. 27 : 532. 1972 ; Prakash & Jain in Fasc. Fl. India 3 : 7. 1973.

Tall, weak, perennial herbs ; culms erect *ca.* 1 m from trailing base ; nodes pubescent. Leaves flat, lanceolate, glabrous, acuminate ; sheaths ciliate on margins. Panicles contracted with many capillary branches. Spikelets 2 - 3 mm long. Glumes subequal, acuminate, awned. Lemmas awned.

Fl. & Fr. : December.

Endemic ; rare ; once collected In Silent Valley R. F. at *ca* 925 m.

2. **Garnotia schmidii** Hook. f. Fl. Brit. Ind. 7 : 242. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1812. 1934, Repr. ed. 3 : 1254. 1957 ; Bor, Grasses India 568. 1960 ; Prakash & Jain in Fasc. Fl. India 3 : 11. 1979.

Perennial tufted herbs ; culms stiff, erect, smooth. Leaves flexuous, glabrous ; sheaths flabellate, keeled. Panicles erect, branched. Spikelets scabrid, bearded at base. Lower glumes aristate ; upper acuminate or mucronate. Lemmas awned from the bilobed apex.

Fl. & Fr. : February.

Fairly common ; in rocky areas in Ghats ; Ayyappankoil forest, Nelliyampathy Ghat.

3. **Garnotia tenella** (Arn. ex Miq.) Jan. in Feddes, Repert. 17 : 86. 1921 ; Gould in Kew Bull. 27 : 528. 1972 ; Prakash & Jain in Fasc. Fl. India 3 : 13. 1979. *Berghausia tenella* Arn. ex Miq. in Verh. Konink.

Nederl. Inst. 3 (4) : 34. 1851. *Garnotia stricta* auct. non Brongn. 1832 ; Hook. f. Fl. Brit. Ind. 7 : 243. 1896 *p. p.* ; Fischer in Gamble, Fl. Pres. Madr. 1812. 1934, Repr. ed. 3 : 1255. 1957 ; Bor, Grasses India 569. 1960.

Tufted, erect, annual herbs, 10 70 cm. Nodes densely bearded. Leaves lanceolate or linear lanceolate, flat, acute, hispid. Panicles branched, contracted, scabrid. Spikelets paired, scabrid. Glumes unequal, 3 nerved, awned.

Fl. & Fr. : November.

Rare ; once collected in Pothundi Kaikatty forest at *ca* 700 m.

Bor. *l.c.* (Grass. Bur. Ceyl. Ind. Pak. 569. 1960) remarks that *G. stricta* (*G. tenella*) is a polymorphic species and *G. puchiparensis* described by him in Indian For. Records (N.S.) Bot. 2 : 234. 1941 probably should be included in it. But Prakash & Jain *l.c.* treat *G. puchiparensis* as a distinct species.

24. Hackelochloa Kuntze

Hackelochloa granularis (L.) Kuntze, Rev. Gen. Pl. 2 : 776. 1891 ; Fischer in Gamble, Fl. Pres. Madr. 1758. 1934, Repr. ed. 3 : 1218. 1957 ; Bor, Grasses India 159. 1960. *Cenchrus granularis* L. Mant. 575. 1771. *Manisuris granularis* (L.) L. f. Nov. Gram. Gen. 40. 1779 ; Hook. f. Fl. Brit. Ind. 7 : 159. 1896.

Slender, erect, annual herbs, 10 15 cm. Nodes bearded. Leaves lanceolate, hairy, acute, cordate at base ; sheaths inflated, hirsute. Racemes spiciform, compressed. Spikelets binate. Sessile spikelets globose. Lower glumes ovate orbicular, pitted, tubercled. Pedicelled spikelets ovate - lanceolate, acute. Lemmas lenceolate.

Fl. & Fr. : October.

Common ; in lower Ghats ; Chindaki forest, Mukkali forest.

25. Heteropogon Pers.

Heteropogon contortus (L.) Beauv. ex Roem. & Schult. Syst. Veg. 2 : 826. 1817 ; Fischer in Gamble, Fl. Pres. Madr. 1743. 1934, Repr. ed. 3 : 1208. 1957 ; Bor, Grasses India 163. 1960. *Andropogon contortus* L. Sp. Pl. 1045. 1753 ; Hook. f. Fl. Brit. Ind. 7 : 199. 1896. '*Oosi pullu*' (Tam.)

Gregarious perennials. Culms capillay. Leaves linear - flat, hirsute ; sheaths glabrous, ciliate at top. Spikelets close, imbricate, sessile, pubescent.

Lower glumes of fertile spikelets oblong, densely hairy ; upper glabrous. Awns twited.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Agali forest, Thiruvizhankunnu forest.

26. HYGRORYZA Nees

Hygroryza aristata (Retz.) Nees ex Wight & Arn. in Edinb. New Phil. J. 15 : 380. 1833 ; Hook. f. Fl. Brit. Ind. 7 : 95. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1846. 1934, Repr. ed. 3 ; 1277. 1957 ; Bor, Grasses India 597. 1960. *Pharus aristatus* Retz. Obs. Bot. 5 : 23. 1789. *Leersia aristata* (Retz.) Roxb. Fl. Ind. ed. 2. 2 : 207. 1832. *Zizania aristata* (Retz.) Kunth, Rev. Gram. 1 : 8. 1829.

Glabrous, floating herbs ; culms spongy below with capillary roots at nodes. Leaves ovate oblong or ovate - lanceolete with inflated sheaths and subcordate base. Panicles short, broad. Spikelets long pedicelled, 1 - flowered, lanceolate. Glumes absent. Lemmas awned, strongly 5 nerved ; awns scabrid. Stamens 6. Grains narrowly oblong.

Fl. & Fr. : October.

Common in ponds ; Olavakkot.

27. ISACHNE R. Br.

1a. Leaves elliptic ; ligules absent	...	*I. gracilis*	2
1b. Leaves ovate - lanceolate ; ligules present	...	*I. disper*	1

1. **Isachne globosa** (Thunb.) Kuntz, Rev. Gen. Pl. 2 : 778. 1891. *Milium globosum* Thunb. Fl. Jap. 49. 1784. *Isachne disper* auct. non Trin. 1828 ; Hook. f. Fl. Brit. Ind. 7 : 26 1896 ; Fischer in Gamble. Fl. Pres. Madr. 1797. 1934. Repr. ed. 3 : 1244. 1957 ; Bor, Grasses India 580. 1960. *Panicum disper* (Trin.) Steud. Syn. Pl. Glum. 1 : 96. 1854.

Decumbent herbs, 15 30 cm with glabrous nodes. Leaves flat, tuberculate pilose along nerves. Ligules represented by a line of stiff hairs. Spikelets ovoid - globose. Glumes boat shaped, hairy. Lemmas 5 - nerved, glabrous, ciliate.

Fl. & Fr. : October.

Common in plains ; Walayar forest.

2. **Isachne gracilis** Hubb. in Bull. Misc. Inform. Kew 77. 1927 ; Fischer in Gamble, Fl. Pres. Madr. 1797. 1934, Repr. ed. 3 : 1244. 1957 ; Bor, Grasses India 581. 1960.

Small, slender, erect herbs, 5 20 cm. Leaves ovate to elliptic, acute, flaccid. Spikelets small. Glumes membranous, elliptic ovate, setose.

Fl. & Fr. : December.

Rare ; once collected on the grassy slopes near Kunthipuzha dam site.

28. ISCHAEMUM L.

1a. Leaves narrowed at base :

2a. Racemes more than 3 ; spikelets more than 4 mm long ... *I. nilagiricum* 1

2b. Racemes less than 3 ; spikelets less than 4 mm long ... *I. timorense* 3.

1b. Leaves cordate at base ... *I. rangacharlanum* 2

1. **Ischaemum nilagiricum** Hack. in Oesterr. Bot. Z. 51 : 150. 1901 ; Fischer in Gamble, Fl. Pres. Madr. 1722. 1934, Repr. ed. 3 : 1194. 1957 ; Bor, Grasses India 183. 1960. *I. hirtum* Hook. f. Fl. Brit. Ind. 7 : 135. 1896 *p. p.* non Hack. 1889.

Erect, robust herbs, 25 - 75 cm, rooting below. Leaves sessile, narrowed at base, softly hairy. Racemes 7 12, corymbose, hirsute. Spikelets bearded, awned.

Fl. & Fr. : January.

Endemic, Rare ; once collected on Kunthipuzha bank.

2. **Ischaemum rangacharlanum** Fischer in Bull. Misc. Inform. Kew 352. 1933 & in Gamble, Fl. Pres. Madr. 1722. 1934, Repr. ed. 3 : 1194. 1957 ; Bor, Grasses India 184. 1960. *I. aristatum* Rangachariyar & Tadulingam, Handb. South Ind. Grass. 151. 1921 non L. 1753.

Erect herbs from prostrate base, 20 - 50 cm. Leaves 5 - 10 × 0.9 - 1.00 cm, petioled, cordate at base. Pedicels trigonous, ciliate. Spikelets sessile and pedicelled, awned. Lower glumes of sessile spikelets obliquely linear - lanceolate ; lemmas 2 lobed.

Fl. & Fr. : October - December.

Endemic ; fairly common ; in lower Ghats ; Ayyappankoil area, Nelliyampathy Ghat, Thiruvizhankunnu forest.

3. **Ischaemum timorense** Kunth, Rev. Gram. 1 : 369. t. 98. 1830 ; Hook. f. Fl. Brit. Ind. 7 : 136. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1722. 1934, Repr. ed. 3 : 1193. 1957 ; Bor, Grasses India 185. 1960.

Straggling, slender herbs ; nodes hairy or glabrous. Leaves linear - lanceolate, hairy, narrowed into a broad petiole. Rachis undulate. Racemes 2 3, slender, sparingly villous. Sessile spikelets awned. Lower glumes of sessile spikelets hirsute ; upper glumes minutely 2 lobed, mucronate.

Fl. & Fr. : January.

Not common ; in damp places in upper Ghats ; Kunthipuzha bank.

29. ISEILEMA Ander.

Iseilema anthephoroides Hack. in DC. Monogr. Phan. 6 : 683. 1889 ; Hook. f. Fl. Brit. Ind. 7 : 219. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1748. 1934, Repr. ed. 3 : 1211. 1957 ; Bor, Grasses India 187. 1960. '*Thengai Naaripul*' (Tam.).

Decumbent herbs with glabrous nodes. Leaves lanceolate, flat. Spikelets lanceolate. Lower glumes lanceolate, beaked, 5 nerved, scabrid. Upper glumes 3 - nerved, shortly aristate. Grains ellipsoid.

Fl. & Fr. : July.

Common in plains and on river banks ; Walayar dam area.

30. JANSENELLA Bor

Jansenella griffithiana (Muell.) Bor in Kew Bull. 9 : 98. 1955 & Grasses India 426. 1960. *Danthonia griffithiana* Muell. in Bot. Zeit. Berlin 14 : 347. 1856. *Arundinella avenacea* Munro ex Thw. Enum. Pl. Zeyl. 362. 1864 ; Hook. f. Fl. Brit. Ind. 7 : 69. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1801. 1934, Repr. ed. 3 : 1246. 1957.

Erect herbs. Leaves ovate lanceolate, acuminate, softly hairy, cordate and amplexicaul at base, ciliate at margin. Panicles compact, crowded. Spikelets 2 flowered. Lemmas awned ; upper lemmas bilobed, densely hairy, bearded at base. Paleas elongate, 2 keeled, 2 fid at tip, bearded below.

Fl. & Fr. : October.

Rare ; once collected in Aruvampara grassy slopes at *ca* 725 m.

31. LEPTOCHLOA Beauv.

Leptochloa chinensis (L.) Nees in Syll. Pl. Nov. 1 : 4. 1824 ; Hook. f. Fl. Brit. Ind. 7: 299. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1820. 1934, Repr. ed. 3 : 1260. 1957 ; Bor, Grasses India 516. 1960. *Poa chinensis* L. Sp. Pl. 69. 1753.

Tufted herbs, 20 75 cm. Nodes glabrous. Ligule apically lanceolate. Leaves linear, flat or convolute. Panicles branched. Spikelets linear, scaberulous. Glumes ovate lanceolate. Lemmas ovate. Grains oblong - obovoid.

Fl. & Fr. : May.

Common in plains ; Walayar river bed.

32. MANISURIS L.

Manisuris forficulata Fischer in Bull. Misc. Inform. Kew 355. 1933 & in Gamble, Fl. Pres. Madr. 1761. 1934, Repr. ed. 1220. 1957 ; Bor, Grasses India 192. 1960. emend. Jain in Bull. Bot. Surv. Ind. 12 : 12. 1970.

Annual, tufted herbs ; culms erect or ascending, villous or glabrous. Leaves linear, flat or conduplicate, hairy, acute or acuminate ; sheaths compressed, densely villous. Racemes erect, solitary, spiciform. Spikelets paired, sessile and pedicelled. Glumes with 4 5 rows of hooked, bearded tubercles at base. Lower glumes oblanceolate - ovate ; upper once elliptic - lanceolate. Lemmas elliptic ovate, hyaline.

Fl. & Fr. : October.

Rare ; once collected in Ayyappankoil slopes at *ca* 800 m.

33. OPLISMENUS Beauv.

Oplismenus compositus (L.) Beauv. Ess. Agrost. 54 : 168. 1812 ; Hook. f. Fl. Brit. Ind. 7 : 66. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1778. 1934. Repr. ed. 3 : 1231. 1957 ; Bor, Grasses India 317. 1960. *Panicum compositus* L. Sp. Pl. 57. 1753.

Gregarious perennials. Leaves ovate, acute acuminate, hairy; sheaths ciliate. Spikelets paired, 2 flowered, lanceolate, acute; awns longer than glumes, stiff, smooth, viscid, reddish. Lower glumes scabrid on back, 5 nerved.

Fl. & Fr. : October.

Common ; in Ghats ; Silent Valley R.F.

34. ORYZA L.

Oryza rufipogon Griff. Notul. 3 : 5. 1851 ; Bor, Grasses India 605. 1960. *O. nivea* Sharma et Shastry in Indian J. Gen. Pl. Breed. 25 : 161. 1965.

Aquatic, erect herbs, culms spongy below. Leaves flat ; ligules membranous. Spikelets laterally compressed, keeled, many ribbed, scabrid on keel and ribs, long awned. Staments 6. Styles 2.

Fl. & Fr. : October.

Rare ; once collected in Thenkara area.

Oryza sativa L. is cultivated on a large scale in the district and also found as an escape. **O. officinalis** Wall. ex Watt. ssp. **malampuzhaensis** (Krishnas. et Chandrasek.) Tateoka in Bot. Mag. Tokyo 75 : 422. 1962. (=*O. malampuzhaensis* Krishnas. et Chandrasek. in Madr. Agric. J. 45 : 471. 1958.) is an addition to science from this district but the author could not trace it from its type locality

35. PANICUM L.

1a. Leaves ovate to lanceolate, not basal :

2a. Leaves lanceolate, ciliate ; culms woody ... *P. montanum* 2

2b. Leaves ovate, not ciliate ; culms not woody ... *P. gardneri* 1

1b. Leaves linear, basal ... *P. trypheron* 3

1. **Panicum gardneri** Thw. Enum. Pl. Zeyl. 359. 1864 ; Fischer in Gamble, Fl. Pres. Madr. 1783. 1924, Repr. ed. 3 : 1235. 1957 ; Bor, Grasses India 326. 1960. *Isachne gardneri* Benth. in Benth. et Hook. f. Gen. Pl. 3 : 1100. 1883 ; Hook. f. Fl. Brit. Ind. 3 : 26. 1896.

Slender herbs, rooting at nodes, 1 1.5 m. Leaves ovate - lanceolate, acuminate, rounded or cordate at base. Lower glumes shorter than spikelets. Glumes silvery - hyaline.

Fl. & Fr. : October.

Common ; in Ghats ; Valiyaparathode forest Silent Valley R.F.

2. **Panicum montanum** Roxb. Fl. Ind. 1 : 315. 1820 ; Hook. f. Fl. Brit. Ind. 7 : 53. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1783. 1934, Repr. ed. 3 : 1235. 1957 ; Bor. Grasses India 329. 1960. *P. courtallense* Nees & Wall. ex Steud. Syn. Pl. Glum. 1 : 83. 1854.

Tall, erect herbs, woody at base, 90 120 cm. Leaves lanceolate, deeply cordate and tubercle - based hairy at base. Panicles branched. Spikelets terete oblong. Lower lemmas longer than upper lemmas.

Fl. & Fr. : October.

Common ; in lower Ghats ; Chindaki forest.

3. **Panicum trypheron** Schult. Mant. 2 : 244. 1824 ; Hook. f. Fl. Brit. Ind. 7 : 47. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1783. 1934, Repr. ed. 3 : 1235. 1957 ; Bor, Grasses India 331. 1960. *P. tenellum* Roxb. Fl. Ind. 1 : 309. 1820 non Lam. 1791. '*Saamai kurunai*' (Tam.).

Tufted, perennial herbs, 20 50 cm ; nodes glabrous. Leaves linear, hairy ; sheaths glabrous. Spikelets elliptic in branched large panicles. Lower glumes ovate, acuminate - cuspidate, 5 nerved. Lemmas cuspidate, 7 nerved. Palea obtuse.

Fl. & Fr. : July.

Common ; in lower Ghats ; Mukkali forest.

Panicum miliare Lam. '*Saamai*' (Tam.) is found as an escape from cultivation.

36. PASPALIDIUM Stapf

Paspalidium flavidum (Retz.) A. Camus in Lecomte, Fl. Gen. Indo - Chine 7 : 419. 1922 ; Fischer in Gamble, Fl. Pres. Madr. 1774. 1934, Repr. ed. 3 : 1229. 1957 ; Bor, Grasses India 333. 1960. *Panicum flavidum* Retz. Obs. Bot. 4 : 15. 1786 ; Hook. f. Fl. Brit. Ind. 7 : 28. 1896. '*Artsipillu*' (Tam.).

Annual or perennial herbs ; culms erect, slender, tufted. Leaves lanceolate, prominently nerved below, glabrous ; sheaths hairy at throat. Panicles filiform, recurved. Spikelets 2 nate, ovoid ellipsoid, obtuse, glabrous, straw coloured. Lower glumes suborbicular, obtuse, 5 nerved. Lemmas ovate, 5 - nerved.

Fl. & Fr. : October.

Common ; in damp places ; Mukkali forest Thenkarai slopes.

37. PASPALUM L.

1a. Annuals ; racemes many (up to 20) :

2a. Leaves glabrous ; racemes less than 5 ... *P. scrobiculatum* 3

2b. Leaves hairy ; racemes more than 5 ... *P. compactum* 1

1b. Perennials ; racemes a few (up to 3) ... *P. conjugatum* 2

1. **Paspalum compactum** Roth, Nov. Pl. Sp. 36. 1821 ; Hook. f. Fl. Brit. Ind. 7 : 12. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1772. 1934, Repr. ed. 3 : 1228. 1957 ; Bor, Grasses India 336. 1960.

Small herbs, 15 - 20 cm. Leaves elliptic lanceolate, densely hairy, acute. Ligule membranous, ciliate. Spikelets less than 2 mm long, I 2, turgid, convex, obtuse. Glumes ciliate, broadly ovate, 3 nerved. Lemmas ovate, crustaceous, granular.

Fl. & Fr. : October.

Common ; in Ghats ; Valiyaparathode way Silent Valley R.F.

2. **Paspalum conjugatum** Berg. in Act. Helv. Phys. Math. 7 : 129. t. 8. 1772 ; Hook. f. Fl. Brit. Ind. 7 : 11. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1772. 1934, Repr. ed. 3 : 1228. 1957 ; Bor, Grasses India 336. 1960.

Stoloniferous, perennial herbs. Leaves lanceolate oblong, cordate at base, acuminate at apex ; sheaths compressed, glabrous. Racemes 3 - 4. Spikelets 2 - nate, ovate, acute. Pedicels hairy at base. Upper glumes ovate, ciliate, hairy. Lemmas ovate rounded, hairy at tip.

Fl. & Fr. : May October.

Common ; in Ghats ; Bhavani bank Mukkali, dam site area, Silent Valley R.F.

3. **Paspalum scrobiculatum** L. Mant. 29. 1767 ; Hook. f. Fl. Brit. Ind. 7 : 10. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1772. 1934, Repr. ed. 3 : 1227. 1957 ; Bor, Grasses India 340. 1960. '*Varagu*' (Tam.).

Tall, tufted, erect, annual herbs, 15 60 cm ; rooting below. Ligule a ciliate rim. Leaves linear - lanceolate, flat, glabrous ; sheaths compressed, keeled. Racemes 2 5, subdigitate. Rachis winged. Spikelets 2 seriate,

30 - 70 per raceme, rounded obovate. Upper glumes 5 7 - nerved ; upper lemmas crustaceous, 3 nerved.

Fl. & Fr. : July October.

Escape from cultivation and frequently met with.

38. PENNISETUM Rich.

1a. Spikelets sessile : inner bristles densely villous ... *P. polystachyon* 2

1b. Spikelets pedicelled : inner bristles laxly ciliate ... *P. pedicellatum* 1

1. **Pennisetum pedicellatum** Trin. in Mem. Acad. Sci. Petersb. ser. 6. 3 : 184. 1834 ; Hook. f. Fl. Brit. Ind. 7 : 86. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1792. 1934, Repr. ed. 3 : 1241. 1957 ; Bor, Grasses India 346. 1960.

Slender herbs, 30 70 cm. Leaves flat, flaccid, glabrous. Spikes dense. Spikelets pedicellate, solitary or 2. Inner bristles densely villous. Lower glumes villous ; upper puberulous, acute. Lower lemmas 3 - toothed at apex.

Fl. & Fr. : October.

Common ; in upper Ghats ; dam site area Silent Valley R.F.

2. **Pennisetum polystachyon** (L.) Schult. Mant. 2 : 146. 1824 ; Fischer in Gamble, Fl. Pres. Madr. 1792. 1934, Repr. ed. 3 : 1241. 1957 ; Bor, Grasses India 346. 1960. *Panicum polystachyon* L. Syst. Nat. ed. 10. 2 : 870. 1759.

Tall, branched herbs, 30 90 cm. Leaves flaccid. Spikes linear, slender ; rachis angled. Spikelets sessile, solitary, in involucres. Inner bristles laxly ciliate. Lower glumes minute. Upper glumes chartaceous.

Fl. & Fr. : August - December.

Common ; in lower Ghats ; Panthanthode forest.

39. PEROTIS Aiton

Perotis indica (L.) Kuntze, Rev. Gen. Pl. 2 : 787. 1891 ; Fischer in Gamble, Fl. Pres. Madr. 1814. 1934, Repr. ed. 3 : 1256. 1957 ; Bor, Grasses India 611. 1960. *Anthoxanthum indicum* L. Sp. Pl. 28. 1753. *Perotis latifolia* Aiton, Hort. Kew. 1 : 85. 1789 ; Hook. f. Fl. Brit. Ind. 7 : 98. 1896. '*Narivaal pul*' (Tam.).

Tufted, erect, wiry herbs, 20 - 45 cm. Leaves *ca* 2.5 × 0.5 cm, ovate lanceolate, glabrous, imbricate, ciliate at margins. Racemes 15 20 cm, slender, violate purple, feathery due to long awns. Spikelets narrowly linear, scabrous. Glumes hispid, awned. Stamens 3. Grains linear.

Fl. & Fr. : July.

Common ; in lower Ghats ; Mukkali forest.

40. PHRAGMITES Trin.

Phragmites karka (Retz.) Trin. ex Steud. Nom. Bot. ed. 2. 2 : 324. 1841 ; Hook. f. Fl. Brit. Ind. 7 : 304. 1896 *p.p.* ; Fischer in Gamble, Fl. Pres. Madr. 1807. 1934, Repr. ed. 3 : 1251. 1957 ; Bor, Grasses India 416. 1960. *Arundo karka* Retz. Obs. Bot. 4 : 21. 1786. *'Tharpai pul'* (Tam.).

Robust herbs, 1 3 m ; culms erect, fistular. Leaves linear - lanceolate, bifarious, coriaceous, acuminate, rounded or subcordate at base ; sheaths hairy at throat. Panicles compound, silky plumose ; branches in whorls. Spikelets ovate lanceolate, 3 10 flowered. Rachilla silk hairy. Lower glumes lanceolate ; upper 3 nerved, acute. Lemmas lanceolate, 3 nerved. Stamens 3.

Fl. & Fr. : January.

Common near water sources ; in lower Ghats ; Chindaki forest.

41. POGONATHERUM Beauv.

Pogonatherum panicum (Lam.) Hack. in Allg. Bot. Z. Syst. 12 : 178. 1906 ; Fischer in Gamble, Fl. Pres. Madr. 1714. 1934, Repr. ed. 3 : 1188. 1957 ; Bor, Grasses India 202. 1960. *Saccharum panicum* Lam. Encycl. 1 : 595. 1785. *Pogonatherum saccharoideum* Beauv. Ess. Agrost. 176. 1812 ; Hook. f. Fl. Brit. Ind. 7 : 141. 1896.

Tufted, erect, much branched, perennial herbs. Leaves narrow, flat, rounded and ciliate at base ; sheaths hairy at throat. Racemes solitary. Sessile spikelets lanceolate oblong ; lower glumes lanceolate, 2 toothed, ciliate, 5 nerved ; upper lanceolate. Lemmas linear - lanceolate. Palea oblong, bidentate, ciliate at apex.

Fl. & Fr. : April.

Common in rocky crevices ; in Ghats ; Kunthipuzha banks (dam site).

42. PSEUDECHINOLAENA Stapf

Pseudechinolaena polystachya (H.B.K.) Stapf in Prain, Fl. Trop. Africa 9 : 495. 1919 ; Fischer in Gamble, Fl. Pres. Madr. 1766. 1934, Repr. ed. 3 : 1224. 1957 ; Bor, Grasses India 332. 1960. *Echinolaena polystachya* H.B.K. Nov. Gen. Sp. 1 : 119. 1816. *Panicum uncinatum* Raddi, Agrost. Bras. 41. 1823 : Hook. f. Fl. Brit. Ind. 7 : 58. 1886.

Erect or creeping, slender, annual herbs. Leaves ovate to linear lanceolate, hairy, acuminate, amplexicaul at base. Ligules membranous. Spikelets pedicelled, solitary or 2 - nate. Glumes dissimilar, ovate to oblong ; upper ones with hooked bristles. Lemmas oblong, acute, 3 nerved. Stamens 3. Stigmas plumose.

Fl. & Fr. : January.

Common ; in Ghats ; Dam site Valiyaparathode forest.

43. PSEUDORAPHIS Griff.

Pseudoraphis spinescens (R. Br.) Vickery in Proc. Roy. Soc. Queensland 9 : 495. 1919 ; Bor, Grasses India 353. 1960. *Panicum spinescens* R. Br. Prodr. 193. 1810. *Chaemoraphis spinescens* (R. Br.) Poir. in Lam. Encycl. Suppl. 2 : 189. 1811 ; Hook. f. Fl. Brit. Ind. 7 : 62. 1896. *P. aspera* (Koenig) Pilger in Notizbl. Bot. Gart. Berlin Dahlem 10 : 210. 1928 : Fischer in Gamble, Fl. Pres. Madr. 1790. 1934, Repr. ed. 3 : 1239. 1957.

Decumbent herbs, 20 65 cm with woolly nodes. Ligule a membranous rim. Leaves linear, flat or convolute, tuberculate, pubescent beneath. Panicles effuse or contracted ; branches flat, scabrid, apex prolonged. Spikelets linear, articulate. Glumes unequal, ovate, aristate. Lower lemmas of male 5 7 nerved, aristate. Anthers 3. Upper lemmas keeled. Grains linear oblong.

Fl. & Fr. : October.

Common in plains near water sources ; Dhoni R.F.

44. ROTTBOELLIA L. f. *nom. cons.*

Rottboellia cochinchinensis (Lour.) Clayton in Kew Bull. 35 : 817. 1981. *Stegosia cochinchinensis* Lour. Fl. Cochinch. 1 : 51. 1790. *Rottboellia exaltata* L. f. Nov. Gram. 40. t. 1. 1779 ; Hook. f. Fl. Brit. Ind. 7 : 156. 1896 *p. p.* ; Fischer in Gamble, Fl. Pres. Madr. 1759. 1934, Repr. ed. 3 : 1219. 1957 ; Bor, Grasses India 206. 1960.

Erect, annual herbs ; nodes glabrous. Ligules membranous, fimbriate. Leaves linear, flat, hairy ; sheaths glabrous, ciliate at margins. Racemes

1 3, cylindric. Sessile spiketets sunk in inter node, lanceolate. Lower glumes ovate lanceolate, keeled. Lemmas lanceolate, keeled, acute, 2 - nerved. Anthers 3. Pedicelled spikelets lanceolate, acuminate.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Ayyappankoil forest, Panthanthode forest, Silent Valley R.F.

45. SACCHARUM L.

Saccharum spontaneum L. Mant. 183. 1771 ; Hook. f. Fl. Brit. Ind. 7 : 118. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1709. 1934, Repr. ed. 3 : 1185. 1957 ; Bor, Grasses India 214. 1960. '*Naanal*' (Tam.).

Tall, erect, perennial herbs with waxy nodes. Leaves linear filiform, glaucous beneath, scabrid on margins. Ligule a fringe of hairs. Sheaths auriculate, glabrous, hairy at throat. Panicles contracted, silky white ; joints woolly. Sessile spikelets linear - lanceolate Lower glumes lanceolate, 2 - nate, acute. Lemmas ciliate.

Fl. & Fr. : August.

Common on river banks ; in lower Ghats ; Bhavani bank Mukkali.

Saccharum officinarum L. '*Karumbu*' (Tam.), is cultivated in some parts of the district.

46. SACCIOLEPIS Nash

1a. Culms spongy, more than 1 cm wide	...	*S. interrupta*	2
1b. Culms not spongy, less than 0.5 cm wide	...	*S. indica*	2

1. **Sacciolepis indica** (L.) Chase in Proc. Biol. Soc. Wash. 21 : 8. 1908 ; Fischer in Gamble, Fl. Pres. Madr. 1787. 1934, Repr. ed. 3 : 1238. 1957, (Sacolepis) ; Bor, Grasses India 357. 1960. *Aira indica* L. Sp. Pl. 63. 1753. *Panicum indicum* (L.) L. Mant. 184. 1771 non Miller 1768 ; Hook. f. Fl. Brit. Ind. 7 : 41. 1896.

Decumbent herbs, 10 - 80 cm long. Leaf sheaths compact, glabrous. Leaves lanceolate, flat, tuberculate, pilose. Panicles spiciform, 2 8 cm. Spikelets ovoid ellipsoid, compressed. Lower glumes 5 7 nerved, clasping at base. Lower lemmas 7 nerved, tuberculate pilose. Upper lemmas glossy, 3 nerved.

Fl. & Fr. : May.

Common in plains near water sources ; Malampuzha.

2. **Sacciolepis interrupta** (Willd.) Stapf in Prain, Fl. Trop. Africa 9 : 757. 1920 ; Fischer in Gamble, Fl. Pres. Madr. 1787. 1934, Repr. ed. 3 : 1238. 1957 ; Bor, Grasses India 358. 1960. *Panicum interruptum* Willd. Sp. Pl. 1 : 341. 1798 ; Hook. f. Fl. Brit. Ind. 7 : 40. 1896. '*Tandan pillu*' (Tam.).

Semi aquatic herbs ; culms spongy below, rooting at base, 30 100 cm long. Leaves linear lanceolate, glabrous, rounded or cordate at base. Panicles spiciform, compact, interrupted. Spikelets crowded in fascicles, ovoid lanceolate, glabrous, acute. Glumes ovate, 9 - 11 nerved. Lemmas ovate, acute, 7 nerved.

Fl. & Fr. : October.

Common ; in lower Ghats near water sources ; Thenkara Mannarghat road.

Nash in Britton, Man. Fl. North. States Canada 89. 1901 has favoured the spelling '*Sacciolepis*' which is followed here though the generic name has been spelt in two different ways, '*Saccolepis*' & '*Sacciolepis*'.

47. SETARIA Beauv. *nom. cons.*

1a. Perennials ; leaves plicate	...	*S. palmifolia*	2
1b. Annuals ; leaves not plicate (flat) :			
2a. Panicles continuous ; bristles up to 8	...	*S. pumila*	3
2b. Panicles interrupted ; bristles up to 4	...	*S. intermedia*	1

1. **Setaria intermedia** Roem. & Schult. Syst. Veg. 2 : 489. 1817 ; Hook. f. Fl. Brit. Ind. 7 : 79. 1896 ; Fischer in Gamble. Fl. Pres. Madr. 1789. 1934, Repr. ed. 3 : 1239. 1957. *Panicum intermedium* (Roem. & Schult.) Roth, Nov. Pl. Sp. 47. 1821 non Vahl ex Hornem 1813. *P. tomentosum* Roxb. Fl. Ind. 1 : 303. 1820. *Setaria tomentosa* (Roxb.) Kunth, Rev. Gram. 1 : 47. 1829 ; Bor, Grasses India 365. 1960.

Decumbent herbs with glabrous nodes, 15 80 cm. Leaf sheaths long ciliate. Leaves linear lanceolate, flaccid, flat, 5 7 nerved. Panicles contracted, oblong, branched ; involucral bristles 5 - 7 per whorl ; bearded. Spikelets 1 2, ovoid ellipsoid. Lower glume obovate, 3 nerved. Upper glumes boat-shaped, 5 7 nerved. Lemmas 5 nerved.

Fl. & Fr. : October.

Common in plains ; Walayar.

2. **Setaria palmifolia** (Koenig) Stapf in J. Linn. Soc. Bot. 42 : 186. 1914 ; Fischer in Gamble, Fl. Pres. Madr. 1789. 1934, Repr. ed. 3 : 1239. 1957 ; Bor, Grasses India 363. 1960. *Panicum palmaefolium* Koenig in Naturf. 23 : 208. 1788. *P. plicatum* Willd. Enum. Pl. Hort. Berol. 1033. 1903, non Lam. 1791 ; Hook. f. Fl. Brit. Ind. 7 : 55. 1896 *p. p.*

Tall, perennial herbs with creeping rhizomes. Leaves lanceolate, flaccid, flat. Panicles spiciform ; involucral bristles 9 11 per whorl, barbed. Spikelets elliptic - lanceolate, 1 or 3, glabrous. Lower glumes ovate rounded. Upper glumes 5 - 7 - nerved. Upper lemma boat shaped.

Fl. & Fr. : August October.

Common ; in upper Ghats ; Panthanthode forest, Silent Valley R.F.

3. **Setaria pumila** (Poir.) Roem. & Schult. Syst. Veg. 2 : 891. 1817. *Panicum pumilum* Poir. in Lam. Encycl. (Suppl.) 4 : 273. 1816. *P. pallide - fuscum* Schum. Beskr. Guin. Pl. 58. 1827. *Setaria pallide - fusca* (Schum.) Stapf & Hubb. in Bull. Misc. Inform. Kew 259. 1930 ; Fischer in Gamble, Fl. Pres. Madr. 3 : 1789. 1934, Repr. ed. 3 : 1239. 1957 ; Grasses India 363. 1960. *S. glauca* Hack in Biol. Soc. Brit. 3 : 135. 1884 non Beauv. 1812 ; Hook. f. Fl. Brit. Ind. 7 : 78. 1896.

Slender, glabrous, annual herbs ; culms prostrate or decumbent, rooting below. Leaves linear lanceolate, flaccid, flat, glabrous. Rachis pubescent. Involucral bristles 8, barbellate. Spikelets 3 or solitary, ovate to elliptic. Lower glumes ovate, 1 - 3 - nerved ; upper glumes 5 7 nerved. Upper lemmas boat shaped, transversely rugose. Grains ellipsoid.

Fl. & Fr. : August October.

Common ; in lower Ghats ; Panthanthode forest.

48. SILENTVALLEYA Nair *et al.*

Silentvalleya nairii Nair, Sreekumar, Vajravelu & Bhargavan in J. Bombay Nat. Hist. Soc. 79(3) : 654. 1982.

Tufted perennials. Leaves linear, glaucous, villous towards mouth. Spikelets oblong lanceolate, 6 - 10 - flowered. Lower glumes ovate, acute, glabrous. Upper glumes lanceolate, 3 nerved, acuminate. Lemmas ovate -

lanceolate, 3 nerved. Paleas keeled, elliptic. Stamens 3. Grain oblong - lanceolate, stalked.

Fl. & Fr. : October - April.

Not common ; in upper Ghats ; Silent Valley R.F. *Nair* 64268, 64465, *Vajravelu & Nair* 67260 (TYPES).

49. SPODIOPOGON Trin.

Spodiopogon rhizophorus (Steud.) Pilger in Pflanzenfam. 14c : 119. 1940 ; Bor, Grasses India 246. 1960. *Andropogon rhizophorus* Steud. Syn. Pl. Glum. 1 : 381. 1854. *Spodiopogon albidus* Benth. in J. Linn. Soc. Bot. 19 : 66. 1881 ; Hook. f. Fl. Brit. Ind. 7 : 108. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1710. 1934, Repr. ed. 3 : 1186. 1957.

Slender, tufted herbs 60 70 cm. Leaves 10 18 × 1.5 - 2.0 cm, linear - lanceolate, membranous, flaccid, glabrous ; petioles 3 - 6 cm long. Panicles narrow, branched. Spikelets lanceolate ; rachis silky villous. Glumes subequal, membranous. Lemmas bifid, awned.

Fl. & Fr. : October - December.

Common ; in lower Ghats ; Panthanthode forest, Pothundy - Kaikatty forest.

50. SPOROBOLUS R. Br.

Sporobolus piliferus (Trin.) Kunth, Enum. 1 : 211. 1833 ; Hook. f. Fl. Brit. Ind. 7 : 251. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1817. 1934, Repr. ed. 3 : 1258. 1957 ; Bor, Grasses India 652. 1960. *Vilfa pilifera* Trin. Diss. Bot. 157. 1824.

Erect, tufted, annual herbs, 5 30 cm. Leaves radical, oblong flat or convolute, scabrid, ciliate at margins. Panicles dense, branched. Spikelets pale brown, short pedicelled. Glumes ovate to oblong - lanceolate ; lower shorter than upper ones. Anthers 3. Grains obovoid.

Fl. & Fr. : October.

Common ; on grassy slopes in lower Ghats ; Aruvampara slopes, Karasuryamalai area.

51. THEMEDA Forsk.

Themeda triandra Forsk. Fl. Aegyp. - Arab. 178. 1775 ; Fischer in Gamble, Fl. Pres. Madr. 1746. 1934, Repr. ed. 3 : 1209. 1957 ; Bor,

Grasses India 254. 1960. *Anthistiria imberbis* Retz. Obs. Bot. 3 : 11. 1783 ; Hook. f. Fl. Brit. Ind. 7 : 211. 1896. '*Erigai Thattu pullu*' (Tam.).

Tall, erect, perennial herbs, 1.5 2.0 m. Leaves narrow, linear, flat, glabrescent scabrid. Spikelets in fan - shaped clusters, lanceolate, drooping. Lower glumes (involucral) glabrous or setose ; those of bisexual spikelets glabrous or densely silky, awned, linear - oblong, dark brown.

Fl. & Fr. : October.

Common ; in lower Ghats ; Mukkali forest, Valiyaparathode forest.

52. TRIPOGON Roem. & Schult.

Tripogon bromoides Roem. & Schult. Syst. Veg. 2 : 600. 1817 ; Hook. f. Fl. Brit. Ind. 7 : 287. 1896 ; Fischer in Gamble, Fl. Pres. Madr. 1834. 1934, Repr. ed. 3 : 1269. 1957 ; Bor, Grasses India 521. 1960.

Tufted perennial herbs, 15 - 60 cm. Leaves linear, convolute, glabrous to densely hairy. Spikelets close, many - flowered, 2 - seriate, sessile, lanceolate. Glumes notched. Lemmas apically 4 lobed, 2 inner lobes short, acute, aristate. Paleas hyaline, keeled. Anthers 3.

Fl. & Fr. : October.

Fairly common ; in upper Ghats ; Silent Vally dam site slopes.

53. UROCHLOA Beauv.

Urochloa panicoides Beauv. Ess. Agrost. 53. t. 11. f. 1. 1812 ; Fischer in Gamble, Fl. Pres. Madr. 1775. 1934, Repr. ed. 3 : 1230. 1957 ; Bor, Grasses India 372. 1960.

Tufted, erect, annual herbs, 10 - 35 cm. Leaves linear - lanceolate with tuberculate - pilose sheaths. Spikes lax ; spikelets ovoid, flat. Lower glumes broadly ovate, 3 5 nerved. Upper glumes ovate, 9 - 12 nerved. Lower lemmas membranous. Palea lanceolate. Upper lemmas crustaceous, warty. Anthers 3.

Fl. & Fr. : July.

Common ; in lower Ghats & plains ; Walayar dam area.

Hordeum vulgare L. the Barley is found as an escape from occasional cultivation.

Sorghum halepense (L.) Pers. '*Karuppan pull*' (Tam.) an introduced grass, is widely cultivated under the name '*Johnson Grass*' is also found as an escape.

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