Project on

Ecological and Socio-economic Studies of the Sacred Groves of Mahe with special reference to Conservation and Management

Sponsored by

Department of Science, Technology and Environment
Govt. of Puducherry

Investigation team

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Government of Puducherry
Mahatma Gandhi Government Arts College, Mahe

Forward

I am happy to note that the P.G. Department of Plant Science has undertaken a project on "Ecological and Socio-economic studies of the Sacred Groves of Mahe with special reference to Conservation and Management" funded by the Department of Science, Technology and Environment, Govt. of Puducherry.

A team of researchers headed by Dr. K. Sasikala, Principal Investigator and Asst. Professor, Dept. of Plant Science, MGGAC, Dr. G. Pradeepkumar, Asst. Professor, Dept. of Plant Science, MGGAC, Dr. C.C. Harilal, Asst. Professor, Dept. of Botany, University of Calicut, Kerala, and Prof. C.P. Ravindran, Head, Department of Plant Science, MGGAC, have undertaken extensive studies on the sacred groves of Mahe and have come out with a comprehensive project report.

The data generated in this project will be useful to the authorities of Mahe and Puducherry administration, environmentalist, researchers, NGOs, forest departments, policy makers and others who are involved in the conservation of biodiversity. It is also heartening to note that the department has also organized an awareness programme for the benefit of the stakeholders of the groves and prepared a documentary on the sacred groves of Mahe.

I congratulate the research team for the successful completion of the project work and thank the Department of Science, Technology and Environment, Government of Puducherry, for the financial support.

Mahe Principal

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06 **Abstract**

The present study reveals a detailed investigation on the sacred groves of Mahe with respect to their history and tradition. Attempts were also carried out to assess their present status of phytodiversity and ecology for deriving strategies for conservation and management.

The results are documented in the report.

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CONTENTS

Figures and Plates

List of Tables

INTRODUCTION

Biological diversity is the variability among living organisms from all sources, including, 'interalia', terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems (CBD, 1995). The diversity of a species is depending on various abiotic and biotic factors such as, temperature, rainfall, altitude, soil, geography and the presence of other species. However, biodiversity is not evenly distributed; it varies greatly across the world and generally more in the tropics than in the temperate regions. Tropical regions are abode for more than two thirds of earth's biological wealth. There are 17 megadiversity countries. India is one among the megabiodiversity countries and 10th among the plant-rich countries of the world.

The biologically rich regions in the world are recognized as biodiversity hotspots. At present, there are 34 biodiversity hotspots in the world that cover only 2.3% of the earth's land surface (Mittermeier & al., 2005). These hotspots possess high level of endemism, as well as each one faces extreme threats and already had lost at least 70% of its original natural vegetation. Over 50% of the world’s plant species and 42% of all terrestrial vertebrate species are endemic to these hotspots. There are four biodiversity hotspots in India, namely, Eastern Himalaya, Western Ghats, Indo-Burma and Sundaland. Tropical forests harbour at least 50%, and probably more, of world's biodiversity. The original extent of tropical rain forests was 15 million sq. km, but, only 7.5 - 8 million sq. km remain now. India, being one of the tropical countries in the world harbours about 690,899 sq. km forest cover, which constitutes 21.02% of the total geographical cover (FSI, 2011).

The current rate of loss of forest cover is estimated at near 2% annually (100,000 sq. km destroyed, another 100,000 sq. km degraded). The average rate of loss or extinction over the past 200 million years is 1 or 2 species per year, and 3 or 4 families per million years. The loss of forest cover/biota is mainly due to various anthropogenic activities. It is estimated that the tropical forests will be reduced to 10 - 25% of their original extent by late 21st century (http://conservationbiology404.blogspot.in/). Therefore, it is essential to conserve the existing biodiversity for the welfare of the present and future generations of human beings.

The Convention on Biological Diversity (CBD, 1995) made mandatory for the signatories to conserve the areas with rich biological diversity. Article 8 of the CBD emphasizes the elementary requirement of system of protected areas or areas to conserve biological diversity. India being one of the tropical countries with rich flora and fauna has many protected areas. At present, there are 668 Protected Areas, including 102 National Parks, 515 Wildlife Sanctuaries, 47 Conservation Reserves and 4 Community Reserves in India, covering a total of 1,61,221.57 sq. km of geographical area of the country which is approximately 4.90%; besides, there are 17 Biosphere Reserves, 25 Elephant Reserves and 39 Tiger Reserves in India (http://oldwww.wii.gov.in/nwdc/).

India has a long history of nature worship and that practice continues even today, especially through sacred groves. Sacred groves are patch of relict vegetation that are usually associated with folk deities and are conserved by the local communities based on taboos, religious beliefs and social sanctions (Gadgil & Vartak, 1975). About 17,000 sacred groves have been reported all over India. In India, sacred groves are associated with temples, monasteries/shrines or with burial grounds and are scattered all over the country. They are referred to by different names in the country - Deorali in Darjeeling hills, Lakyntang in Khasia and Jaintia hills in Meghalaya, Jankor in Bihar and Madhya Pradesh, Oran in Rajasthan, Deorais or Deoranis in Maharashtra, Devarakadu, Devarabana or Sidharavanam in Karnataka, Kovilkadu or Kavu in Tamil Nadu and Sarpakavu or Kavu in Kerala.

The plant richness and conservation potential of sacred groves are impressive enough to recognize them as ‘Mini Biosphere Reserve’ (Gadgil & Vartak, 1975). Sacred groves are found in a wide range of habitats ranging from estuaries to mountain localities in India. Malhotra (1998) provided a comprehensive account on the number of existing groves in different states of India (**Table 1**). According to Gadgil & Vartak (1976), Western Ghats is one of the important regions with large number of sacred groves in India. The size of the sacred groves ranges from a small area with a few trees to 40 hectares or more with vegetation which has been left undisturbed because of their association with some deities. Gadgil & Vartak (1975) found that even smaller sacred groves harbour some old and magnificent species of trees and climbers. According to Ramachandran & Mohanan (1991) Hindus in Kerala set aside a portion of land around the house as abode of a God or Goddess, which may be considered a kind of sacred

grove. During the British Rule, the introduction of commercial plantations in the highlands resulted in the loss of pristine tropical forests leaving only a few remnants of evergreen forest patches in the form of sacred groves.

Table 1 - State wise distribution of Sacred Groves in India (Malhotra, 1998)

Sl. No.	Name of States	Number of Sacred Groves
1.	Andhra Pradesh	800
2.	Karnataka	1214
3.	Himachal Pradesh	11
4.	Kerala	2000
5.	Maharashtra	953
6.	Madhya Pradesh	275
7.	Meghalaya	79
8.	Odisha	322
9.	Rajasthan	8
10.	Tamil Nadu	11
11.	Uttar Pradesh	6
12.	West Bengal	7
13.	Puducherry	37

Many workers have reported the studies on sacred groves of different places (Gadgil & Vartak, 1976; Vartak & Gadgil, 1981; Unnikrishnan, 1995; Vartak, 1996; Praveenkumar & Ramanujam, 2003). Jayarajan, (2004) documented the biodiversity of the sacred groves of North Malabar. Pushpangadan & al. (1998) studied the floristic wealth of 168 sacred groves of Kerala. In Puducherry, biodiversity of 123 sacred groves have been documented. King (1997), Kadamban (1998), Praveenkumar, (1999), Ramakrishnan & al. (1998), Ramanujam & Kadamban (1999, 2002), Ramanujam & al. (2002), Ramanujam, & Cyril (2003), Krishnan (2004), Parthasarathy & al. (2005) have documented the flora of the sacred groves from the Pondicherry region. Ramanujam & al. (2007) surveyed the flora of the sacred groves of Puducherry region Devaraj & al. (2005) reported the status of sacred groves of Pondicherry region and discussed the need for conservation. Jisha (2005) documented the phytodiversity of the five groves of Mahe region.

Sacred groves are unique habitats that act as repositories of biodiversity and genetic resources. They harbour wild relatives of crop plants that would aid in improving the quality and yield of cultivated varieties, which in turn would be useful to local communities as well as modern pharmacopoeia. The groves also act as an abode of a large number of rare, endangered and threatened (RET) plants (Sukumaran, 2005).

In the year 2002, knowing the importance of sacred groves in conserving the biodiversity of the world, the International Convention on Biological Diversity (CBD), declared sacred groves as heritage sites. These areas show microclimatic conditions with their distinct floral and faunal values, and are important in terms of providing water for irrigation and drinking purposes. The sacred groves need to be protected for their socio-economic, genetic, ecological and ethnobotanical values. They are also considered as repositories of biological diversity where different life-forms are protected on the basis of religious practices of faith (Rao, 1996). The biological values of sacred groves are well recognized today (**Fig. 1**). It plays a dynamic role in balancing the ecosystem of a particular region. The occurrence of flagship species and keystone species play a vital role in supporting and enhancing the biodiversity.

Sacred groves are an ancient way of *in situ* conservation of genetic diversity. They play an important role in the preservation of depleting resource elements. They are conserved through conventional, social, cultural and environmental values since time immemorial. With the advent of modernization, urbanization and changing socio-economic scenario, the cultural norms and taboos are no longer much important and there need to be serious measures to conserve these groves from further depletion. A review of literature revealed that a comprehensive account on the sacred groves of Mahe is lacking hitherto. Hence, the present study has been undertaken with the following objectives.

Objectives

- to explore, identify and assess the extent of sacred groves in Mahe
- to inventorize the phytodiversity of the sacred groves; especially to evaluate the diversity and distribution of
    - rare, endangered and threatened plant species
    - medicinal and endemic plant species
    - Flagship species and keystone species.
- to assess the historical, cultural and existing conservation practices of the groves
- to document the details of taboos, rituals and beliefs associated with the groves
- to identify the threats to the biodiversity operating in the groves
- to create awareness to the public about the importance of conservation of sacred groves and to suggest strategies for long term conservation and management of sacred groves

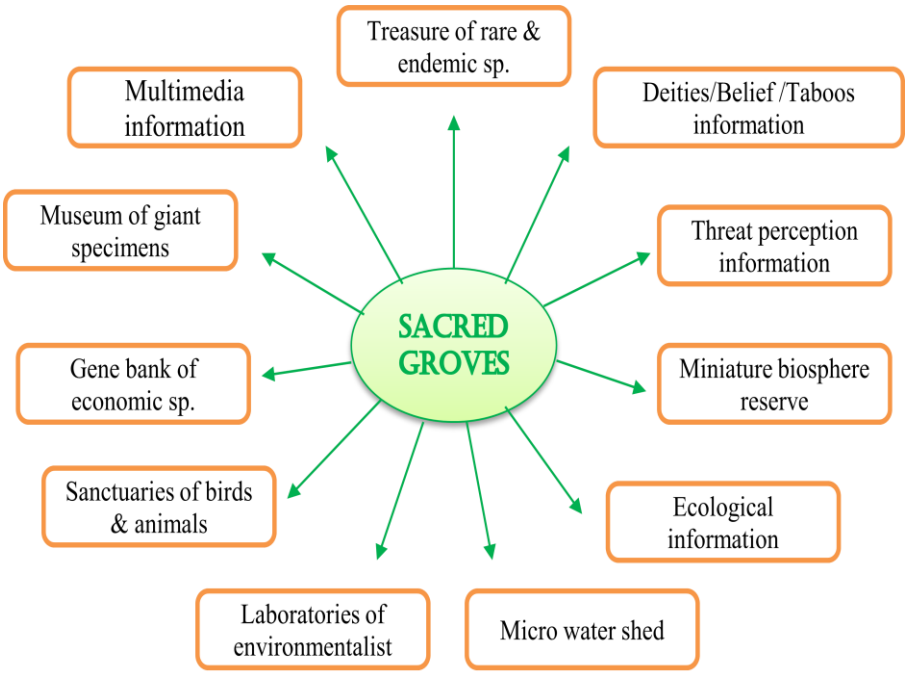

Fig. 1 Data diversity of the SGIS

Area of study

Mahe, Union Territory of Puducherry, occupies a unique geographical location near Arabian Sea (**Plate I**). It is situated on the West Coast of the Indian Peninsula between 11° 42' - 11° 43' N and 75° 31' - 75° 33' E, between Badagara and Thalassery, and 65 kilometers from Kozhikode and 28 kilometers from Kannur, Kerala State. This former small French Town, covering an area of 9 sq. km, is 650 km away from its administrative Head Quarters, Puducherry. It also forms a part of the Western Ghats, one of the hottest hotspots in the world.

Accessibility

National Highway 17 (Mangalore - Edappally) and Mangalore Shornur railway lines are passing through Mahe. The entire area, even though in three segments, is well connected through a network of paved roads.

Population

Mahe comprises of 14 wards. The total population, as per 2001 census is 36828 and the total number of households is 6054. The population density of the Municipal area is estimated to be 4092 persons / sq. km. This is expected to reach 4504.4 persons / sq. km. by 2011 (**Table - 2 & 3**).

Table 2 - Area wise distribution of population of Puducherry

Distribution of Population, sex ratio, density and decadal growth rate of population : 2011							
District Code	**State/Union Territory/District**	**Total Population**			**Sex ratio (females per 1000 males)**	**Density (Per sq.km)**	**Decadal growth rate**
		Persons	**Males**	**Females**			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	Puducherry UT	**1,244,464**	**610,485**	**633,979**	**1,038**	**2598**	**27.72**
01	Yanam	55,616	27,277	28,339	1,039	3272	77.15
02	Puducherry	946,600	466,143	480,457	1,031	3231	28.73
03	Mahe	41,934	19,269	22,665	1,176	4659	13.86
04	Karaikal	200,314	97,796	102,518	1,048	1252	17.29

Physiography

The study area falls in the coastal physiographic zone of Kerala. The region has a highly undulating terrain with hillocks and valleys. The general slope is towards southwest.

Geology

Mahe, which forms the lower region of the Mahe watershed, consists mainly hornblende gneiss, hornblende biotite and quartz mica of migmatite complex and pyroxene granulite of charnockite group.

Table 3 - Population of Mahe (2000 - 2011)

Sl. No.	Year	Population	Density /sq. km.
1	2000	36471	4052
2	2001	36828	4092
3	2002	37184	4131
4	2003	37544	4171
5	2004	37907	4211
6	2005	38274	4252
7	2006	38645	4293
8	2007	39019	4334
9	2008	39396	4376
10	2009	39777	4419
11	2010	40162	4461
12	2011	41934	4659

Soil

Soil of this area varies in their depth, texture, internal drainage and degree of erosion. The salient attributes of the soils occurring in different physiographic regions are as given below:

Texture : Clay, gravelly clay

Depth : Very deep (>150 cm)

Drainage : Imperfectly drained to well drained

Erosion status : Slight to moderate.

Land use

The area exhibits two broad land use patterns. They are:

1. Settlements with mixed crops / trees
2. Dense built up area.

Settlements with mixed crops/trees are predominantly seen in Pandakkal and Palloor segments and densely built up area is seen in Mahe Town. Of the two land use categories, the former, i.e., settlements with mixed crops/trees covers greater part (>50%) of the area.

Climate

The area enjoys tropical humid climate with summer from March to May and mild winter from December to February. The region receives Southwest Monsoon (June to September), Northeast

Monsoon (October to December), winter rain (January to February) and summer rain during March to May (**Table 4**).

Table 4 - Details of season-wise rainfall in Mahe (2000 - 2011)

Sl. No.	Year	SW Monsoon Period (in mm)	NE Monsoon Period (in mm)	Winter Period (in mm)	Hot Weather (in mm)	Total	
						mm	inches
1	2000 - 01	2044	515	5	697	3261	128.4
2	2001 - 02	1977	260	43	429	2709	106.7
3	2002 - 03	1752	905	24	124	2805	110.4
4	2003 - 04	2268	210	-	829	3307	130.2
5	2004 - 05	1967	353	21	144	2485	97.8
6	2005 - 06	2196	431	10	784	3421	134.7
7	2006 - 07	2404	410	-	467	3281	129.2
8	2007 - 08	3477	311	3	453	4244	167.1
9	2008 - 09	2036	486	-	273	2794	110.0
10	2009 - 10	2694	519.6	30	391.2	3634.8	148.3
11	2010 - 11	2263.4	566.8	-	174.4	3004.6	122.6

METHODOLOGY

Intensive field surveys were conducted during the years 2010 - 2012 to study the sacred groves in Mahe. Prior to conducting intensive field studies a detailed location map of the study area was prepared. During the present study biodiversity and ecology of 19 groves were documented. A questionnaire has been prepared to document the history of each sacred grove (Format of WWF, 1996). Based on which the historical, cultural and existing conservation practices of each sacred grove were gathered from the local populace and analysed. The taboos, rituals and beliefs associated with the groves were recorded. Observations on the distribution and diversity of rare, endangered, endemic and threatened plant species in sacred groves were made. Distribution and properties of medicinal plant species were also documented. Flagship species and keystone species of each sacred grove and their ecological services were identified. Ecological and phyto-

sociological studies were also made following standard procedures. The socio-economic threats of the sacred groves were identified and their impacts were assessed. Plant specimens collected during the study are identified using relevant floras (Nayar & al., 2006, Ramachandran, 1988 & Sasidharan, 2004) revisions, monographs and research articles. Plant materials made into herbarium specimens following standard herbarium techniques (Fosberg & Sachet, 1965) and are deposited at herbarium of Mahatma Gandhi Government Arts College, Mahe, for reference. The priests/local people/elderly people, owner of groves, helped in gathering the data pertaining to the rituals, offerings, annual festivals, etc. Strategies to conserve sacred groves by involving local communities (people participation), non-governmental and governmental organizations have been prepared. Apart from these an awareness programme was organized to disseminate the knowledge on the significance of sacred groves among students, local public and stake holders of the grove.

RESULTS

During this present study a total of 19 sacred groves have been located in Mahe. These include 5 each situated in Pandakkal and Palloor and 3 each in Chembra, Chalakara and Mahe Proper (**Plate II**). Pando Kavu Sri Ayyappan Temple, Panolil Kavu and Chembra Sri Ayyappan Kavu are considered major groves (Category A) and the remaining 16 are recognized as minor groves under Category B (**Table 5**). A total of 14 temple complexes have also been identified in Mahe and classified under Category C (**Table 6**).

Table 5 - Sacred Groves in Mahe

Sl. No.	Category	Name of the Sacred Grove	Locality
1	A	Pandokavu Sri Ayyappan Temple	Pandakkal
2	A	Panolil Kavu	Palloor
3	A	Chembra Sri Ayyappan Kavu	Chembra
4	B	Sri Koyyodan Koroth Temple	Palloor
5	B	Sri Nelliyat Kalari Bhagavathy Temple	Palloor
6	B	Puthan Pura Sri Bhadrakali Temple	Chembra
7	B	Sri Kizhanthur Bhagavathy Kavu	Chalakkara

8	B	Sri Varaprath Kavu	Chalakkara
9	B	Ponthayodu Sarpakavu	Chalakkara
10	B	Asharikavu	Chembra
11	B	Sri Peradayath Tharavadu Kannan Kattiya Bhagavathy Sthanam	Pandakkal
12	B	Pandokoolothu Kavu	Pandakkal
13	B	Sri Manikampoyil Bhagavathy Temple	Pandakkal
14	B	Oorothumal Sri Angakaran Temple	Pandakkal
15	B	Urmi Temple	Mahe
16	B	Puthalam Temple	Mahe
17	B	Sri Cheriyath Mandola Temple	Mahe
18	B	Sri Chirakandoth Porkali Bhagavathy Temple	Palloor
19	B	Kakottidathil Paradevatha Temple	Palloor

Category **A** - Major Groves; **B** - Minor Groves.

Table 6 - Temple Complexes in Mahe

Sl. No.	Category	Name of the Temples	Locality
1	C	Sri Arayal Purath Illath Mahavishnu Temple	Palloor
2	C	Kanjiramulla Parambath Temple	Palloor
3	C	Avaroth Sri Vettaikorumagan Temple	Palloor
4	C	Thekkeyil Sri Subramanian Temple	Palloor
5	C	Thundiyil Podikalam Temple	Palloor
6	C	Kurunan Madathil Temple	Palloor
7	C	Podikalam temple	Palloor
8	C	Sri MahaGanapathi Temple	Palloor
9	C	Sri Krishna Temple	Mahe
10	C	Sri Venugopala Temple	Mahe
11	C	Sri Hareeswaran Temple	Mahe
12	C	Sri Ayyappan Temple	Mahe
13	C	Sri Kurumba Bhagavathy Temple	Mahe
14	C	Devi Temple	Mahe

The sacred groves predominantly harbour various life-forms of angiosperms such as herbs, shrubs, trees, climbers, epiphytes and parasites. Preliminary floristic surveys conducted in 19 different sacred groves of Mahe recorded a total of 324 angiosperm species belonging to 95 families. These include 257 species of dicots and 67 species of monocots. The life-form composition analysis shows that herbs dominate the flora of sacred groves with a total of 138 species (42%), followed by trees with 100 species (31%), shrubs with 55 species (17%) and climbers with 31 species representing 10% of the flora (**Fig. 2**).

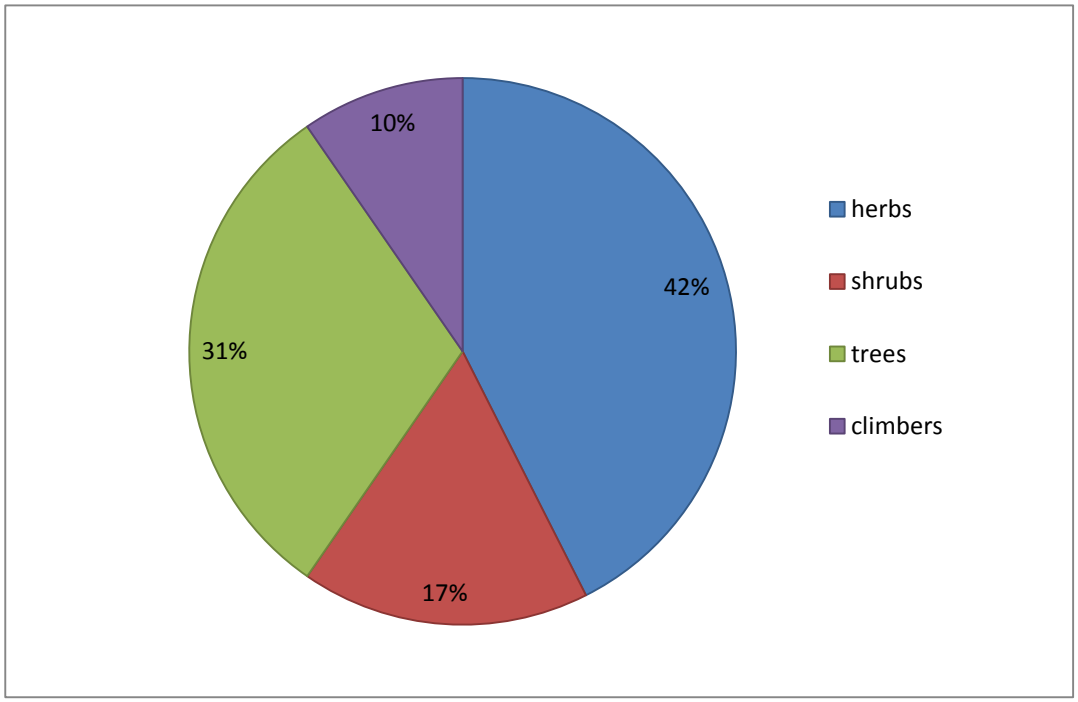

Fig. 2. Life-form Diversity of Sacred Groves in Mahe

Among the 19 sacred groves that have been floristically surveyed in Mahe, the maximum species diversity was observed in Pandokavu and the least in Sarpa Kavu. The species composition indicates the remnants of tropical evergreen forest which might have existed in the past in this region. The binomial, family, local names of the recorded angiosperm species from sacred groves are provided in **Table 7, Plate III - IX**.

Table 7 - Enumeration of Angiosperms of Sacred Groves in Mahe

Sl. No.	Binomial	Habit	Family	Local Name
1	*Abrus precatorius* L.	C	Fabaceae	Kunnikuru
2	*Abutilon indicum* (L.) Sweet	H	Malvaceae	Ooram, Thutthi
3	*Acacia auriculiformis* A. Cunn. ex Benth.	T	Fabaceae	Acacia
4	*Acacia caesia* (L.) Willd.	C	Fabaceae	Incha
5	*Acacia leucophloea* (Roxb.) Willd.	T	Fabaceae	Vellavelam
6	*Acacia mangium* Willd.	T	Fabaceae	Manjium
7	*Acampe praemorsa* (Roxb.) Blatt. & McCann	H	Orchidaceae	Maravazha
8	*Achras sapota* L.	T	Sapotaceae	
9	*Achyranthes aspera* L.	H	Acanthaceae	Kadaladi
10	*Adenanthera pavonina* L.	T	Fabaceae	Manjadi
11	*Aegle marmelos* (L.) Corrêa	T	Rutaceae	Koovalam
12	*Aerva lanata* (L.) Juss. ex Schult.	H	Amaranthaceae	Cherula
13	*Ageratum conyzoides* (L.)	H	Asteraceae	Murianpacha
14	*Alstonia scholaris* (L.) R. Br.	T	Apocynaceae	Pala
15	*Alternanthera ficoidea* (L.) Sm.	H	Amaranthaceae	
16	*Alysicarpus vaginalis* (L.) DC.	H	Fabaceae	Nila orila
17	*Allamanda cathartica* L.	S	Apocynaceae	
18	*Amorphophallus campanulatus* Decne.	H	Araceae	Chena
19	*Amorphophallus paeonifolius* (Dennst.) Nicolson (H)	H	Araceae	Kattuchena
20	*Amorphophallus sylvaticus* (Roxb.) Kunth	H	Araceae	
21	*Ampelocissus latifolia* (Roxb.) Planch.	C	Vitaceae	karantavalli
22	*Anacardium occidentale* L.	T	Anacardiaceae	Kasumavu
23	*Anamirta cocculus* (L.) Wight & Arn.	C	Menispermaceae	Pollakai
24	*Ananas comosus* (L.) Merr.	H	Bromeliaceae	Kaithachakka
25	*Andrographis paniculata* (Burm.f.) Wall. ex Nees	H	Acanthaceae	Kiriyathu
26	*Aniseia martinicensis* (Jacq.) Choisy	H	Convolvulaceae	Venthiruthali
27	*Annona squamosa* L.	T	Annonaceae	Aathachakka
28	*Antidesma montanum* Blume	T	Euphorbiaceae	Putharaval
29	*Areca catechu* L.	T	Arecaceae	Kavungu
30	*Artocarpus heterophyllus* Lam.	T	Moraceae	Plavu
31	*Artocarpus hirsutus* Lam.	T	Moraceae	Ayni, Anjili
32	*Asparagus racemosus* Willd.	C	Asparagaceae	Sathavari
33	*Asystasia chelonoides* Nees	H	Acanthaceae	Murikootipacha
34	*Asystasia gangetica* (L.) T. Anderson	S	Acanthaceae	Upputhali
35	*Azadirachta indica* A. Juss.	T	Meliaceae	Veppu
36	*Bacopa monnieri* (L.) Wettst.	H	Scrophulariaceae	Brahmi
37	*Barleria cristata* L.	H	Acanthaceae	
38	*Barleria prionitis* L.	H	Acanthaceae	
39	*Bauhinia acuminata* L.	T	Fabaceae	Vellutha Mandaram

40	*Bauhinia purpurea* L.	T	Fabaceae	Mandaram
41	*Biophytum sensitivum* (L.) DC.	H	Oxalidaceae	
42	*Blumea oxyodonta* DC.	H	Asteraceae	
43	*Boerhavia diffusa* L.	H	Nyctaginaceae	Thazhuthama
44	*Bombax ceiba* L.	T	Bombacaceae	Elavu, Poola
45	*Borassus flabellifer* L.	T	Arecaceae	Karimpana
46	*Bougainvillea spectabilis* Willd.	S	Nyctaginaceae	Kadalaspoo
47	*Bridelia retusa* (L.) Spreng.	T	Euphorbiaceae	Mukkayini
48	*Bulbophyllum sterile* (Lam.) Suresh	H	Orchidaceae	maravazha
49	*Butea monosperma* (Lam.) Taub.	T	Fabaceae	Chamatha, Plasu
50	*Caesalpinia coriaria* (Jacq.) Willd.	T	Fabaceae	
51	*Caesalpinia sappan* L.	T	Fabaceae	Pathimukam
52	*Cajanus cajan* (L.) Millsp.	H	Fabaceae	
53	*Cajanus scarabaeoides* (L.) Thouars	C	Fabaceae	Kattumuthira
54	*Caladium bicolor* (Aiton) Vent.	H	Araceae	
55	*Caladium hortulanum* Birdsey	H	Araceae	
56	*Canna indica* L.	S	Cannaceae	Katturala
57	*Canscora perfoliata* Lam.	H	Gentianaceae	
58	*Canthium rheedei* DC.	S	Rubiaceae	
59	*Capsicum annuum* L.	H	Solonaceae	Mulaku
60	*Carallia brachiata* (Lour.) Merr.	T	Rhizophoraceae	Vankana
61	*Cardiospermum halicacabum* L.	C	Sapindaceae	Uzhinja
62	*Careya arborea* Roxb.	T	Lecythidaceae	Alasoo
63	*Carica papaya* L.	T	Caricaceae	Papaya
64	*Caryota urens* L.	T	Arecaceae	Aanappana
65	*Cassia fistula* L.	T	Fabaceae	Konna
66	*Catharanthus roseus* (L.) G. Don	H	Apocynaceae	Shavanari, Nithyakalyani
67	*Cayratia mollissima* (Planch.) Gagnep.	C	Vitaceae	
68	*Centella asiatica* (L.) Urb.	H	Apiaceae	Muthil
69	*Centotheca lappacea* (L.) Desv.	H	Poaceae	
70	*Centrosema pubescens* Benth.	C	Fabaceae	Kattupayar
71	*Chamaecrista kleinii* (Wight & Arn.) V. Singh	H	Fabaceae	
72	*Chamaecrista pumila* (Lam.) K. Larsen	H	Fabaceae	
73	*Chassalia curviflora* (Wall.) Thwaites var. *ophioxyloides* (Wall.) Deb & B. Krishna	S	Rubiaceae	Yamari, Vellakurinji
74	*Chloris barbata* Sw.	H	Poaceae	
75	*Chromolaena odorata* (L.) R.M. King & H. Rob.	S	Asteraceae	Communist pacha
76	*Chrysophyllum roxburghii* G. Don	T	Sapotaceae	Pulichakka, Noolambazham
77	*Cinnamomum verum* J. Presl	T	Lauraceae	Karuka patta
78	*Cissus repens* Lam.	C	Vitaceae	
79	*Citrus limon* (L.) Burm.f.	T	Rutaceae	Cherunarekam, Ilumbichinarekam
80	*Citrus medica* L.	T	Rutaceae	Kattunaragam

81	*Cleome rutidosperma* DC.	H	Capparaceae	Neelavela
82	*Cleome viscosa* L.	H	Capparaceae	Ariavella
83	*Clerodendrum infortunatum* L.	H	Lamiaceae	Peruvellam
84	*Clitoria ternatea* L.	C	Fabaceae	Shankupushpam
85	*Cocos nucifera* L.	T	Arecaceae	Thengu
86	*Colocasia esculenta* (L.) Schott	H	Araceae	Chembu
87	*Commelina benghalensis* L.	H	Commelinaceae	
88	*Connarus monocarpus* L.	S	Connaraceae	Nai kuriel
89	*Cosmos sulphureus* Cav.	H	Asteraceae	
90	*Cheilocostus speciosus* (J. König) C.D. Specht	H	Costaceae	
91	*Crotalaria juncea* L.	H	Fabaceae	Pulivanji, Vakkavanji
92	*Cryptocoryne spiralis* (Retz.) Fisch. ex Wydler	H	Araceae	Nattathividayam
93	*Cuphea hyssopifolia* Kunth	S	Lythraceae	
94	*Curculigo orchioides* Gaertn.	H	Hypoxidaceae	Nilappana
95	*Curcuma aromatica* Salisb.	H	Zingiberaceae	Kasthurimanjal
96	*Curcuma aeruginosa* Roxb.	H	Zingiberaceae	
97	*Curcuma longa* L.	H	Zingiberaceae	Manjal
98	*Curcuma oligantha* Trimen var. lutea (Ansari & al.) K.G. Bhat	H	Zingiberaceae	
99	*Cyanthillium cinereum* (L.) H. Rob.	H	Asteraceae	Puvankurunal
100	*Cyathula prostrata* (L.) Blume	H	Amaranthaceae	Cherukadaladi
101	*Cyclea peltata* (Lam.) Hook.f. & Thomson	C	Menispermaceae	Padathali
102	*Cynodon dactylon* (L.) Pers.	H	Poaceae	Karuka
103	*Cyperus rotundus* L.	H	Cyperaceae	Kuzhimathanga
104	*Cyrtococcum deccanense* Bor	H	Poaceae	
105	*Dactyloctenium aegyptium* (L.) Willd.	H	Poaceae	Kavarapullu
106	*Dalbergia sissoides* Wight & Arn.	T	Fabaceae	Veetti
107	*Delonix regia* (Boj. ex Hook.) Raf.	T	Fabaceae	
108	*Dendrophthoe falcata* (L.f.) Ettingsh.	S	Loranthaceae	Ithil
109	*Desmodium gangeticum* (L.) DC.	H	Fabaceae	Orila
110	Desmodium scorpiurus (Sw.) Desv.	H	Fabaceae	
111	*Desmodium triflorum* (L.) DC.	H	Fabaceae	Nilapulladi
112	*Dieffenbachia seguine* (Jacq.) Schott	H	Araceae	
113	*Dioscorea bulbifera* L.	H	Dioscoreaceae	Kachil
114	*Diploclisia glaucescens* (Blume) Diels	C	Menispermaceae	Vattoli
115	*Dipteracanthus prostratus* (Poir.) Nees	H	Acanthaceae	Upputhali
116	*Dracaena elliptica* Thunb. & Dalm.	H	Agavaceae	Manjakkantha
117	*Dregea volubilis* (L.f.) Benth. ex Hook.f.	S	Asclepiadaceae	
118	*Duranta erecta* L.	S	Verbenaceae	
119	*Eclipta prostrata* (L.) L.	H	Asteraceae	Kaiyonni, Kayyunni
120	*Elephantopus scaber* L.	H	Asteraceae	Anachuvadi
121	*Eleusine indica* (L.) Gaertn.	H	Poaceae	
122	*Eleutheranthera ruderalis* (Sw.) Sch. Bip.	H	Asteraceae	

123	*Emilia sonchifolia* (L.) DC.	H	Asteraceae	Muyalchevi
124	*Epipremnum aureum* (Linden & André) G.S. Bunting	C	Araceae	Money plant
125	*Eragrostis amabilis* (L.) Wight & Arn.	H	Poaceae	
126	*Erythrina variegata* L.	T	Fabaceae	Murrikku
127	*Euphorbia hirta* L.	H	Euphorbiaceae	Kuzhinagappala
128	*Euphorbia milii* Des Moul.	S	Euphorbiaceae	
129	*Ficus benghalensis* L.	T	Moraceae	Peral
130	*Ficus drupacea* Thunb. var. *pubescens* (Roth) Corner	T	Moraceae	Chela, Kallal
131	*Ficus heterophylla* L.f.	S	Moraceae	Vallitterakam
132	*Ficus hispida* L.f.	T	Moraceae	Paroth Ela
133	*Ficus religiosa* L.	T	Moraceae	Arayal
134	*Flueggea leucopyrus* Willd.	S	Phyllanthaceae	Ambooripachila
135	*Gardenia jasminoides* J. Ellis	S	Rubiaceae	
136	*Geissapsis cristata* Wight & Arn.	H	Fabaceae	
137	*Gliricidia sepium* (Jacq.) Kunth ex Walp.	T	Fabaceae	Seena Konna
138	*Globba sessiliflora* Sims	H	Zingiberaceae	Kolachanna
139	*Gloriosa superba* L.	C	Liliaceae	Malattamara, Medoni
140	*Glycosmis pentaphylla* (Retz.) DC.	S	Rutaceae	Panal
141	*Gomphia serrata* (Gaertn.) Karnis	S	Ochnaceae	Chavetti
142	*Gomphrena globosa* L.	H	Amaranthaceae	Chendumalli
143	*Guidonia tomentosa* (Roxb.) Kurz	T	Flacourtiaceae	Anakkarana
144	*Hamelia patens* Jacq.	S	Rubiaceae	
145	*Helicteres isora* L.	T	Sterculiaceae	Edampiri valampiri
146	*Hewittia malabarica* (L.) Suresh	H	Convolvulaceae	Kattukalang
147	*Hibiscus hispidissimus* Griff.	S	Malvaceae	Suriyamani
148	*Hibiscus rosa-sinensis* L.	S	Malvaceae	Chembarathi
149	*Holigarna arnottiana* Hook.f.	T	Anacardiaceae	Cheru
150	*Hugonia mystax* L.	S	Linaceae	Karthotti
151	*Hydnocarpus pentandrus* (Buch.-Ham.) Oken	T	Flacourtiaceae	Marotti
152	*Hydrilla verticillata* (L.f.) Royle	H	Hydrocharitaceae	Ennapayil
153	*Hygrophila schulli* (Buch.-Ham.) M.R. & S.M. Almeida	H	Acanthaceae	Vayal chulli
154	*Hyptis suaveolens* (L.) Poit.	H	Lamiaceae	
155	*Ichnocarpus frutescens* (L.) W.T. Aiton	C	Apocynaceae	Palvally
156	*Impatiens minor* (DC.) S.M. Almeida	H	Balsaminaceae	
157	*Indigofera tinctoria* L.	S	Fabaceae	Amari
158	*Ipomoea carica* (L.) Sweet	H	Convolvulaceae	Kolambipoo
159	*Ipomoea quamoclit* L.	H	Convolvulaceae	Akashamulla
160	*Ixora arborea* Roxb. ex Sm.	T	Rubiaceae	Soochimulla
161	*Ixora coccinea* L.	S	Rubiaceae	Chethi, Thetty
162	*Ixora johnsonii* Hook.f.	C	Rubiaceae	
163	*Ixora singapurensis* horticultural var.	S	Rubiaceae	
164	*Jasminum angustifolium* (L.) Willd.	C	Oleaceae	Kattumulla
165	*Jasminum azoricum* L.	C	Oleaceae	

166	*Jasminum malabaricum* Wight	C	Oleaceae	Kadambavalli
167	*Jasminum multiflorum* (Burm.f.) Andrews	C	Oleaceae	Kudamulla
168	*Justicia adhatoda* L.	S	Acanthaceae	Adalodakam
169	*Justicia nagpurensis* V.A.W. Graham	H	Acanthaceae	
170	*Kamettia caryophyllata* (Roxb.) Nicolson & Suresh	S	Apocynaceae	Narumarathivu
171	*Kyllinga nemoralis* (J.R. Forst. & G. Forst.) Dandy ex Hutch. & Dalzell	H	Cyperaceae	Mottenga
172	*Lantana camara* L.	S	Asteraceae	Aripoochedi, Aripoo
173	*Laportea interrupta* (L.) Chew	H	Urticaceae	Choryanam
174	*Lawsonia inermis* L.	S	Lythraceae	Mylanji
175	*Leea indica* (Burm.f.) Merr. (S)	S	Leeaceae	Chorianthali
176	*Leucas aspera* (Willd.) Link	H	Lamiaceae	Thumba
177	*Limnophila repens* (Benth.) Benth.	H	Scrophulariaceae	Manganari
178	*Lindernia antipoda* (L.) Alston	H	Scrophulariaceae	
179	*Lindernia ciliata* (Colsm.) Pennell	H	Scrophulariaceae	
180	*Lindernia crustacea* (L.) F. Muell.	H	Scrophulariaceae	
181	*Lobelia alsinoides* Lam.	H	Campanulaceae	Kakkapoovu
182	*Ludwigia prostrata* Roxb.	H	Onagraceae	
183	*Lysiloma latisiliquum* (L.) Benth.	T	Fabaceae	Ippil
184	*Macaranga peltata* (Roxb.) Müll.Arg.	T	Eurphorbiaceae	Uppila
185	*Magnolia champaca* (L.) Baill. ex Pierre	T	Magnoliaceae	Chempakam
186	*Mallotus philippensis* (Lam.) Müll.Arg.	T	Eurphorbiaceae	Kurkuti
187	*Mangifera indica* L.	T	Anacardiaceae	Mavu
188	*Manihot esculenta* Crantz	S	Eurphorbiaceae	Maracheeni, Kappa
189	*Maranta arundinacea* L.	H	Marantaceae	Koova
190	*Melastoma malabathricum* L.	S	Menispermaceae	Athirani
191	*Melia azedarach* L.	T	Meliaceae	
192	*Merremia tridentata* (L.) Hallier f.	H	Convolvulaceae	Prasarani
193	*Merremia vitifolia* (Burm.f.) Hallier f.	H	Convolvulaceae	Manjakolambi
194	*Micrococca mercurialis* (L.) Benth.	H	Euphorbiaceae	Kunukku-thooki
195	*Microcos paniculata* L.	S	Tiliaceae	
196	*Microstachys chamaelea* (L.) Müll.Arg.	H	Euphorbiaceae	Kodiavanakku
197	*Mikania micrantha* Kunth	H	Asteraceae	
198	*Mimosa diplotricha* Sauvalle	S	Fabaceae	Aanathottavadi
199	*Mimosa pudica* L.	H	Fabaceae	Thottavadi
200	*Mimusops elengi* L.	T	Sapotaceae	Elenji
201	*Mitracarpus hirtus* (L.) DC.	H	Rubiaceae	
202	*Mirabilis jalapa* L.	H	Nyctaginaceae	Anthimandaram, Nalumanichedi
203	*Morinda citrifolia* L.	T	Rutaceae	Manjanathi, Kadapilavu
204	*Moringa oleifera* Lam.	T	Moringaceae	Muringa
205	*Mukia maderaspatana* (L.) M. Roem.	H	Cucurbitaceae	Mukkappiri
206	*Muntingia calabura* L.	T	Elaeocarpaceae	Panchara Pazham
207	*Murraya koenigii* (L.) Spreng.	T	Rutaceae	Karivepilla

208	*Musa paradisiaca* L.	T	Musaceae	Vaazha
209	*Mussaenda bellila* Buch.-Ham.	S	Rubiaceae	Belila, Vellila
210	*Myristica fragrans* Houtt.	T	Myristicaceae	jatipatri
211	*Naravelia zeylanica* (L.) DC.	H	Ranunculaceae	Vathamkodi
212	*Naregamia alata* Wight & Arn.	S	Meliaceae	Nilanarakam
213	*Nerium oleander* L.	S	Apocynaceae	Arali
214	*Nyctanthes arbor*-tristis L.	T	Oleaceae	Parijatham, Pavizhamalli
215	*Nymphaea nouchali* Burm.f.	H	Nymphaeaceae	Ambel, Neerambal
216	*Nymphoides indica* (L.) Kuntze	H	Menyanthaceae	Chinnambal
217	*Ocimum basilicum* L.	H	Lamiaceae	Rama thulasi
218	*Ocimum gratissimum* L.	S	Lamiaceae	Kattuthrithavu
219	*Ocimum tenuiflorum* L.	H	Lamiaceae	Krishna thulasi, Thulasi
220	*Oldenlandia auricularia* (L.) K. Schum.	H	Rubiaceae	Murikooti
221	*Oldenlandia corymbosa* L.	H	Rubiaceae	Onathumba, Parpadakam
222	*Olea dioica* Roxb.	T	Oleaceae	Valiya Vetila
223	*Oplismenus compositus* (L.) P. Beauv.	H	Poaceae	
224	*Osbeckia muralis* Naudin	H	Melastomataceae	Cherkulathi
225	*Oxalis corniculata* L.	H	Oxalidaceae	
226	*Pancratium triflorum* Roxb.	H	Amaryllidaceae	Kattulli
227	*Pandanus fasicularis* Lam.	T	Pandanaceae	Kaitha
228	*Passiflora foetida* L.	S	Passifloraceae	Chadayan
229	*Pavetta indica* L.	T	Rubiaceae	Mallikamuthi, Pavatta
230	*Pavetta indica* L. var. *tomentosa* (Roxb. ex Sm.) Hook.f.	S	Rubiaceae	
231	*Peltophorum pterocarpum* (DC.) Backer ex K. Heyne	T	Fabaceae	
232	*Pennisetum polystachion* (L.) Schult.	H	Poaceae	
233	*Peperomia pellucida* (L.) Kunth	H	Piperaceae	Mashipatcha, Kannadippacha
234	*Persea macrantha* (Nees) Kosterm.	T	Lauraceae	Kulirmavu
235	*Pereskia aculeata* Mill.	S	Euphorbiaceae	
236	*Phyllanthus amarus* Schumach. & Thonn.	H	Phyllanthaceae	Keezharnelli
237	*Phyllanthus emblica* L.	T	Phyllanthaceae	Nelli
238	*Physalis angulata* L.	H	Solanaceae	Pottika
239	*Pimenta dioica* (L.) Merr.	T	Myrtaceae	All spice
240	*Piper betel* L.	S	Piperaceae	Vettila kodi
241	*Piper nigrum* L.	C	Piperaceae	Kurumulaku
242	*Plumbago indica* L.	S	Plumbaginaceae	Chethikoduveli
243	*Plumeria alba* L.	T	Apocynaceae	Vellachampakam
244	*Polyalthia longifolia* (Sonn.) Thwaites	T	Annonaceae	Ashokam
245	*Portulaca oleracea* L.	H	Portulacaceae	
246	*Portulaca* grandiflora Hook.	H	Portulacaceae	Table rose
247	*Pothos scandens* L.	C	Araceae	Paruvakkodi

248	*Pouteria campechiana* (Kunth) Baehni	T	Sapotaceae	Egg fruit
249	*Pouzolzia zeylanica* (L.) Benn. & R. Br.	H	Urticaceae	Kalluruki
250	*Premna mollissima* Roth	S	Lamiaceae	Mungha, Knappa
251	*Pseuderanthemum malabaricum* (C.B. Clarke) Gamble	H	Acanthaceae	
252	*Psidium guajava* L.	T	Myrtaceae	Pera
253	*Pterocarpus santalinus* L.f.	T	Fabaceae	Rakthachandanam
254	*Rhaphidophora pertusa* (Roxb.) Schott	C	Araceae	Elithadi, Aanamakudam
255	*Rhinacanthus nasutus* (L.) Kurz	S	Acanthaceae	Nagamalli
256	*Rhynchoglossum notonianum* (Wall.) B.L. Burtt	H	Gesneriaceae	
257	*Rotala rotundifolia* (Buch.-Ham. ex Roxb.) Koehne	H	Lythraceae	
258	*Salvia splendens* Sellow ex Roem. & Schult.	H	Lamiaceae	
259	*Samanea saman* (Jacq.) Merr.	T	Fabaceae	Mazhamaram
260	*Santalum album* L.	T	Santalaceae	Chanthanam
261	*Sansevieria roxburghiana* Schult. & Schult.f.	H	Dracaenaceae	Manji
262	*Sapindus trifoliatus* L.	T	Sapindaceae	Urinjikai, Sopinkaya
263	*Saraca asoca* (Roxb.) de Wilde	T	Fabaceae	Asokam
264	*Sarcostigma kleinii* Wight & Arn.	C	Icacinaceae	Odal, Vellodal
265	*Scaevola taccada* (Gaertn.) Roxb.	S	Goodeniaceae	Bathraksham
266	*Scoparia dulcis* L.	H	Scrophulariaceae	Kalluruki
267	*Senna alata* (L.) Roxb.	S	Fabaceae	Puzhukadikonna
268	*Senna hirsuta* (L.) H.S. Irwin & Barneby	S	Fabaceae	Thakara
269	*Senna siamea* (Lam.) H.S. Irwin & Barneby	T	Fabaceae	Manjakonna
270	*Senna surattensis* (Burm.f.) H.S. Irwin & Barneby	T	Fabaceae	Takara
271	*Sida acuta* Burm.f.	S	Malvaceae	Kurunthotti
272	*Sida mysorensis* Wight & Arn.	S	Malvaceae	Vatta Kurunthotti
273	*Smilax zeylanica* L.	C	Smilacaceae	Kareelanchi
274	*Solanum anguivi* Lam.	S	Solanaceae	
275	*Solanum torvum* Sw.	S	Solanaceae	Anachunda
276	*Spathodea campanulata* P. Beauv.	T	Bignoniaceae	
277	*Spathoglottis plicata* Blume	H	Orchidaceae	
278	*Spermacoce latifolia* Aubl.	H	Rubiaceae	Tharavu
279	*Spermacoce exilis* (L.O. Williams) C.D. Adams ex W.C. Burger & C.M. Taylor	H	Rubiaceae	
280	*Sphagneticola trilobata* (L.) Pruski	H	Asteraceae	
281	*Spondias pinnata* (L.f.) Kurz	T	Anacardiaceae	Ambazham
282	*Sporobolus diandrus* (Retz.) P. Beauv.	H	Poaceae	
283	*Sporobolus indicus* (L.) R. Br.	H	Poaceae	
284	*Sporobolus wallichii* Munro ex Thwaites	H	Poaceae	
285	*Stachytarpheta indica* (L.) Vahl	H	Verbenaceae	

286	*Sterculia foetida* L.	T	Sterculiaceae	
287	*Sterculia guttata* Roxb. ex DC.	T	Sterculiaceae	Kottam
288	*Strychnos nux-vomica* L.	T	Loganiaceae	Kanjiram
289	*Swietenia macrophylla* King	T	Meliaceae	Mahogany
290	*Syngonium podophyllum*	C	Araceae	
291	*Syzygium cumini* (L.) Skeels	T	Myrtaceae	Njara
292	*Syzygium jambos* (L.) Alston	T	Myrtaceae	Chambakya
293	*Syzygium zeylanicum* (L.) DC.	T	Myrtaceae	Vellanjara, Poochapazham
294	*Tabernaemonna divaricata* (L.) R. Br. ex Roem. & Schult.	S	Apocynaceae	Nadyarvattam
295	*Tadehagi triquetrum* (L.) H. Ohashi	S	Fabaceae	Adakkapanal
296	*Tagetes patula* L.	H	Asteraceae	
297	*Tamarindus indica* L.	T	Fabaceae	Puli
298	*Tecoma stans* (L.) Kunth	T	Bignoniaceae	
299	*Tectona grandis* L.f.	T	Lamiaceae	Thekku
300	*Terminalia catappa* L.	T	Combretaceae	Bhadam
301	*Theobroma cacao* L.	T	Theobromaceae	Coco
302	*Thunbergia alata* Bojer ex Sims	C	Acanthaceae	
303	*Thunbergia fragrans* Roxb.	C	Acanthaceae	
304	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	C	Menispermaceae	Chittamruthu
305	*Toona ciliata* M. Roem.	T	Meliaceae	
306	*Tragia involucrata* L.	H	Euphorbiaceae	Kodithoova
307	*Trema orientalis* (L.) Blume	T	Ulmaceae	
308	*Trichosanthes tricuspidata* Lour.	C	Cucurbitaceae	
309	*Triumfetta rhomboidea* Jacq.	H	Tiliaceae	
310	*Typhonium flagelliforme* (Lodd.) Blume	H	Araceae	
311	*Typhonium trilobatum* (L.) Schott	H	Araceae	
312	*Urena lobata* L.	H	Malvaceae	Vatooram
313	*Uvaria narum* (Dunal) Wall. ex Wight & Arn.	S	Annonaceae	Kooril
314	*Vateria indica* L.	T	Dipterocarpaceae	Payin, Painimaram
315	*Vitex altissima* L.f.	T	Verbenaceae	Mayilellu
316	*Vitex negundo* L.	T	Verbenaceae	Nochi
317	*Xanthosoma sagittifolium* (L.) Schott	H	Araceae	Chembu
318	*Xylia xylocarpa* (Roxb.) Taub.	T	Fabaceae	Irulu
319	*Zanthoxylum rhetsa* (Roxb.) DC.	T	Rutaceae	Kattmurukku
320	*Zephyranthus roseus* Lindl.	H	Amaryllidaceae	
321	*Zingiber nimmonii* (J. Graham) Dalzell	H	Zingiberaceae	
322	*Zingiber zerumbet* (L.) Sm.	H	Zingiberaceae	Kattinchi
323	*Ziziphus mauritiana* Lam.	T	Rhamnaceae	Nullikka
324	*Ziziphus oenopolia* (L.) Mill.	T	Rhamnaceae	Tutali

Fabaceae, Rubiaceae, Araceae, Acanthaceae, Asteraceae, Poaceae, Euphorbiaceae, Lamiaceae, Apocynaceae, Moraceae and Rutaceae are the dominant families of the angiosperm flora of sacred groves of Mahe (**Table 8**). These families harbour 155 species in 115 genera, which represent 48.13% of the entire flora.

Table 8 - Diversity of Dominant Families

Sl. No.	Families	Total Number of Genera	Total Number of Species
1	Fabaceae	31	43
2	Rubiaceae	10	16
3	Araceae	11	15
4	Acanthaceae	10	14
5	Asteraceae	13	13
6	Poaceae	10	12
7	Euphorbiaceae	07	11
8	Lamiaceae	07	09
9	Apocynaceae	08	08
10	Moraceae	02	07
11	Rutaceae	06	07
Total		**115**	**155**

The sacred groves of Mahe also support few species of pteridophytes, bryophytes, gymnosperms, macro fungi and lichens. *Adiantum philippense, Bolbitis prolifera, Ceratopteris thalictroides, Cheilanthes tenuifolia, Christella dentat*a, *Drynaria quercifolia, Leptochilus axillaris, Lygodium flexuosum, Marsilea minuta, Pteris quadriaurita, Salvinia molesta, Selaginella delicatula* and *Stenochlaena palustris* are some of the pteridophyte species recorded during the present study. The bryophytes recorded include *Anthoceros* sp., *Cyathodium cavernarum, Funaria hygrometrica* and *Octoblepharum albidum* (**Table 9; Plate X**). *Cycas circinalis* is the only gymnosperm species recorded during the study, confined to Puthan Pura, Varaprath Kavu and Pandokooloth Kavu (**Table 9**). Macro fungi include species of *Agaricus* and *Polyporus*. Crustose lichen occurs in almost all the groves. A comparative analysis on the flora of the selected groves is provided in **Table 10**. Faunas of the groves are represented in **Table 11 and Plate XI**.

Table 9 - Diversity of Lower forms (Pteridophytes, Bryophytes & Gymnosperms)

S.No	Lower forms	Family
1	*Adiantum philippense* L. (H)	Adiantaceae
2	*Bolbitis prolifera* (Bory) C. Chr. & Tardieu-Blot (H)	Bolbitidaceae
3	*Ceratopteris thalictroides* (L.) Brong. (H)	Parkeriaceae
4	*Cheilanthes tenuifolia* (Burm.f.) Sw. (H)	Cheilanthaceae
5	*Christella dentata* (Forssk.) Brownsey & Jermy (H)	Thelypteridaceae
6	*Drynaria quercifolia* (L.) J. Sm. (H)	Polypodiaceae
7	*Lygodium flexuosum* (L.) Sw. (C)	Lygodiaceae
8	*Leptochilus axillaris* (Cav.) Kaulf. (H)	Polypodiaceae
9	*Marsilea minuta* L. (H)	Marsileaceae
10	*Pteris quadriaurita* Retz. (H)	Pteridaceae
11	*Salvinia molesta* Mitch. (H)	Salviniaceae
12	*Selaginella delicatula* (Desv.) Alston (H)	Selaginellaceae
13	*Stenochlaena palustris* (Burm.f.) Beddome (C)	Stenochlaenaceae
14	*Anthoceros* sp.	Anthocerotaceae
15	*Funaria hygrometrica* Hedwig. (H)	Funariaceae
16	*Cyathodium cavernarum* Kunze (H)	Cyathodiaceae
17	*Octoblepharum albidum* Hedwig. (H)	Leucobryaceae
18	*Cycas circinalis* L. (T)	Cycadaceae

Table 10 - Plants occurring in various groves of Mahe

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
1	*Abrus precatorious* L. (C)	+	+	+	-	-	+	-	-	-	-	-	-
2	*Abutilon indicum* (L.) Sweet (H)	-	-	-	+	-	-	+	-	-	-	-	+
3	*Acacia auriculiformis* A. Cunn. ex Benth. (T)	-	-	+	+	-	-	-	-	+	+	-	-
4	*Acacia caesia* (L.) Willd. (C)	+	-	-	-	-	+	+	+	+	-	-	-
5	*Acacia leucophloea* (Roxb.) Willd. (T)	-	-	-	-	-	-	-	-	-	+	-	-
6	Acacia mangium Willd. (T)	-	-	-	-	-	-	-	+	-	-	-	-
7	Acampe praemosa (Roxb.) Blatt. & Mc Cann (H)	-	-	-	-	-	+	-	-	-	+	+	+
8	*Achras* sapota L. (T)	-	-	-	-	-	+	-	-	-	-	-	-
9	*Achyranthes aspera* L. (H)	+	+	-	+	-	+	-	-	+	-	-	-
10	*Adenanthera pavonia* L. (T)	+	+	+	-	-	+	-	-	+	-	-	-
11	*Adiantum philippense* L. (H)	+	+	+	+	+	-	+	-	+	+	-	+
12	*Aegle marmelos* (L.) Corrêa (T)	-	-	-	+	-	+	-	-	-	-	+	+
13	*Aerva lanata* (L.) Juss, ex Schult. (H)	+	-	-	-	-	-	-	-	-	-	-	-
14	*Ageratum conyzoides* L. (H)	+	-	-	+	-	+	+	+	-	-	+	+
15	*Alstonia scholaris* (L.) R. Br. (T)	-	+	+	+	-	+	-	-	-	+	+	-
16	*Alternanthera ficoidea* (L.) Sm. Moq. (H)	+	-	-	+	-	-	-	-	-	+	-	-
17	*Alysicarpus vaginalis* (L.) DC. (H)	+	-	-	+	-	-	+	-	-	+	+	+
18	*Allamanda cathartica* L. (S)	-	-	-	-	-	-	-	-	-	-	+	-
19	*Amorphophallus campanulatus* Decne. (H)	-	-	-	-	-	-	-	-	+	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
20	*Amorphophallus paeonifolius* (Dennst.) Nicolson (H)	+	-	-	-	+	-	-	-	-	-	-	-
21	*Amorphophallus sylvaticus* (Roxb.) Kunth (H)	+	-	-	-	-	-	-	-	-	-	-	-
22	*Ampelocisus latifolia* (Roxb.) Planch.(S)	+	-	-	-	-	-	-	-	-	-	-	-
23	*Anacardium occidentale* L. (T)	-	+	+	+	-	+	+	+	+	-	+	-
24	*Anamirta cocculus* (L.) Wight & Arn. (C)	+	+	+	-	+	-	-	-	-	-	-	-
25	*Ananas comosus* (L.) Merr. (H)	-	+	+	+	-	+	+	-	-	+	-	-
26	*Andrographis paniculata* (Burm.f.) Wall. ex Nees (H)	-	-	-	-	-	+	-	+	-	-	-	-
27	*Aniseia martinicensis* (Jacq.) Choisy (H)	+	-	-	+	-	+	+	+	-	+	-	+
28	*Annona squamosa* L. (T)	-	-	-	-	+	-	-	-	+	-	-	+
29	*Antidesma montanum* Blume (T)	+	+	+	-	-	-	-	-	-	-	-	-
30	*Areca catechu* L. (T)	+	-	-	+	-	+	+	+	+	+	+	-
31	*Artocarpus heterophyllus* Lam. (T)	+	+	-	+	+	+	+	+	+	+	+	+
32	*Artocarpus hirsutus* Lam. (T)	+	-	+	-	-	-	-	-	-	-	-	-
33	*Asparagus racemosus* Willd. (C)	+	-	+	-	-	+	-	-	-	-	-	-
34	*Asystasia chelonoides* Nees (H)	+	+	+	-	-	+	+	+	+	+	+	-
35	*Asystasia gangetica* (L.) Anders. (S)	-	+	-	-	-	-	-	-	-	-	+	-
36	*Azadirachta indica* A. Juss. (T)	+	-	-	+	+	+	-	+	-	+	+	-
37	*Bacopa monieri* (L.) Pennell (H)	+	-	-	-	-	-	-	-	-	-	-	-
38	*Barleria cristata* L. (H)	+	+	-	-	-	-	-	-	-	-	-	-
39	*Barleria prionitis* L. (H)	-	+	-	-	-	-	-	-	-	+	-	-
40	*Bauhinia acuminata* L. (T)	-	-	-	+	+	-	-	-	-	-	-	-
41	*Bauhinia purpurea* L. (T)	+	-	-	-	-	-	-	-	-	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
42	*Biophytum sensitivum* (L.) DC. (H)	+	+	-	+	-	+	+	-	+	+	+	+
43	*Blumea oxydonta* DC. (H)	-	+	-	+	-	+	+	+	-	+	+	-
44	*Boerhavia diffusa* L. (H)	-	+	-	+	-	-	-	-	-	-	-	-
45	*Bolbitis prolifera* (Bory) C. Chr. & Tardieu-Blot (H)	+	-	+	-	-	-	-	-	-	-	-	-
46	*Bombax ceiba* L. (T)	-	-	-	-	-	-	-	-	-	+	-	-
47	*Borassus flabellifer* L. (T)	-	-	-	-	-	+	-	-	+	-	+	-
48	*Bougainvillea spectabilis* Willd. (S)	-	-	-	-	-	-	-	-	-	-	+	+
49	*Bridelia retusa* (L.) Spreng. (T)	+	-	-	-	-	-	-	-	-	-	-	-
50	*Bulbophllum sterile* (Lam.) Suresh (H)	-	-	-	-	-	-	-	-	+	+	-	-
51	*Butea monosperma* (Lam.) Taub. (T)	+	-	-	-	-	-	-	-	-	-	-	-
52	*Caesalpinia coriaria* (Jacq.) Willd. (T)	-	-	-	-	-	-	-	+	-	-	-	-
53	*Caesalpinia sappan* L. (T)	+	-	-	-	-	-	-	+	-	-	-	-
54	*Cajanus cajan* (L.) Mill. (H)	-	-	-	-	-	-	-	-	-	-	+	-
55	*Cajanus scarabaeoides* (L.) Thouars (C)	+	-	-	-	-	-	-	-	-	-	-	-
56	*Caladium bicolor* (Aiton ex Dryand.) Vent. (H)	+	-	-	-	-	-	-	-	-	-	-	-
57	*Caladium hortulanum* Birdsey (H)	+	-	-	-	-	-	-	-	-	+	-	-
58	*Canna indica* L. (S)	+	+	-	-	-	-	-	-	-	+	-	-
59	*Canscora perfoliata* Lam. (H)	-	-	-	-	-	-	+	+	-	+	-	-
60	*Canthium rheedei* DC. (T)	+	-	-	-	-	-	-	-	-	-	-	-
61	*Capsicum annuum* L. (H)	+	+	-	-	-	-	-	-	+	-	-	-
62	*Carallia brachiata* (Lour.) Merr. (T)	-	-	+	+	-	+	+	+	+	+	-	-
63	*Cardiospermum halicacabum* L. (C)	+	-	-	-	-	-	-	-	-	-	-	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
64	*Careya arborea* Roxb. (T)	-	-	-	-	-	+	-	-	-	-	+	-
65	*Carica papaya* L. (T)	+	-	-	+	-	+	-	-	+	-	+	-
66	*Caryota urens* L. (T)	+	+	+	-	-	+	+	+	-	+	-	-
67	*Cassia fistula* L. (T)	-	-	-	+	-	+	+	+	-	+	-	+
68	*Catharanthus roseus* (L.) G. Don (H)	-	-	-	-	-	-	-	-	-	-	+	-
69	*Cayretia mollissima* (Planch.) Gagnepain (C)	+	-	-	-	-	-	-	-	-	-	-	-
70	*Centella asiatica* (L.) Urban (H)	+	-	-	-	-	-	+	+	-	+	-	-
71	*Centotheca lappacea* (L.) Desv. (H)	+	-	-	-	-	-	-	-	-	+	-	+
72	*Centrosema pubescens* Benth. (C)	+	-	-	+	-	-	-	-	+	+	-	+
73	*Ceratopteris thalictroides* (L.) Brong. (H)	-	-	-	-	-	-	-	+	-	-	-	-
74	*Chamaecrista kleinii* (Wight & Arn.) Matthew (H)	-	+	+	+	-	-	-	+	-	-	-	-
75	*Chamaecrista pumila* (Lam.) K. Larsen (H)	-	-	--	-	-	-	-	+	-	-	+	-
76	*Chassalia curviflora* (Wall.) Thwaites var. *ophioxyloides* (Wall.) Deb & B. Krishna (S)	+	+	+	-	-	+	+	-	-	+	-	-
77	*Cheilanthes tenuifolia* (Burm.f.) Sw. (H)	-	+	+	+	+	-	+	+	-	-	-	+
78	*Cheilocostus speciosus* (J. König) C.D. Specht (H)	+	+	+	-	-	-	+	+	-	+	-	-
79	Chloris barbata Sw. (H)	-	-	-	+	-	-	-	-	-	+		-
80	*Christella dentata* (Forssk.) Brownsey & Jermy (H)	+	-	-	+	+	+	+	+	+	+	+	-
81	*Chromolaena odorata* (L.) R.M. King &	+	+	+	+	+	+	+	+	+	+	+	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
	H. Rob. (S)												
82	*Chrysophyllum roxburghii* G. Don (T)	+	+	-	-	-	-	+	-	-	-	-	-
83	*Cinnamomum verum* Presl. (T)	-	+	-	-	+	-	-	-	-	-	-	-
84	*Cissus repens* Lam. (C)	+	-	+	+	+	-	+	-	-	-	-	-
85	*Citrus limon* (L.f.) Burm.f. (T)	+	-	-	+	-	-	-	-	-	-	+	-
86	*Citrus medica* L. (T)	+	-	-	-	-	-	-	-	-	-	-	+
87	*Cleome rutidosperma* DC. (H)	+	+	-	+	+	+	-	-	-	+	-	+
88	*Cleome viscosa* L. (H)	-	-	-	+	-	-	-	-	-	+	-	-
89	*Clerodendron infortunatum* L. (H)	+	-	+	+	-	+	+	-	-	+	-	-
90	*Clitoria ternatea* L. (C)	+	-	-	-	-	-	-	-	-	-	-	+
91	*Cocos nucifera* L. (T)	+	+	+	+	+	+	+	+	+	-	+	+
92	*Colocasia esculenta* (L.) Schott (H)	+	-	-	+	+	+	-	-	+	+	-	+
93	*Commelina benghalensis* L. (H)	+	-	-	-	-	-	-	-	-	-	-	+
94	*Connarus monocarpus* (T)	+	-	+	-	-	-	-	-	-	-	-	-
95	*Cosmos sulphureus* Cav. (H)	-	-	-	+	-	+	-	+	-	-	+	+
96	*Crotalaria juncea* L. (H)	-	-	-	+	-	-	-	-	-	-	-	-
97	*Crustose lichen*	+	+	-	+	-	+	-	+	+	+	+	-
98	*Cryptocoryne spiralis* (Retz.) Fischer ex Wydler (H)	+	-	-	-	-	-	-	-	-	-	-	-
99	*Cuphea hyssopifolia* Kunth (S)	-	+	-	-	-	-	-	-	-	-	-	+
100	*Curculigo orchioides* Gaertn. (H)	+	-	+	+	-	-	-	+	-	+	+	+
101	*Curcuma aeruginosa* Roxb. (H)	-	+	-	+	-	-	+	-	-	+	-	+
102	*Curcuma aromatica* Salisb. (H)	+	-	-	-	-	-	-	-	-	-	-	-
103	*Curcuma longa* L. (H)	-	-	-	+	-	+	-	-	-	+	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
104	*Curcuma oligantha* Trimen var. lutea (Ansari & al.) K.G. Bhat (H)	-	-	-	-	-	-	-	-	-	+	-	-
105	*Cyanthillium cinereum* (L.) H. Rob. (H)	+	-	-	+	+	+	+	+	-	+	-	+
106	*Cyathodium cavernarum* Kunze (H)	+	+	+	-	+	-	-	+	+	-	+	+
107	*Cyathula prostrata* (L.) Blume (H)	+	+	-	+	+	+	-	-	+	-	-	+
108	*Cycas circinalis* L. (T)	-	-	-	-	-	+	-	+	-	+	-	-
109	*Cyclea peltata* (Lam.) Hook.f. & Thomson (C)	+	+	+	+	+	+	+	+	+	+	+	+
110	*Cynodon dactylon* (L.) Pers. (H)	-	-	-	+	-	-	+	-	-	+	-	+
111	*Cyperus rotundus* L. (H)	+	-	-	-	-	-	-	-	-	+	+	-
112	*Cyrtococcum deccanense* Bor (H)	+	+	+	+	-	+	-	-	+	+	+	-
113	*Dactyloctenium aegyptiacum* (L.) Willd. (H)	+	-	-	+	-	+	+	-	-	+	-	-
114	*Dalbergia sissoides* wight & Arn. (T)	+	-	-	-	-	+	-	-	-	+	-	-
115	Delonix regia (Boj. ex Hook.) Raf. (T)	+	-	-	-	-	-	+	-	-	-	-	-
116	Dendrophthoe falcata (L.f.) Ettingsh. (S)	+	-	-	-	-	+	+	+	-	+	-	-
117	*Desmodium gangeticum* (L.) DC. (H)	-	-	-	-	-	-	-	-	-	+	-	-
118	*Desmodium scorpiorus* (Sw.) Desv.(H)	-	-	-	+	-	-	+	-	-	-	-	-
119	*Desmodium triflorum* (L.) DC. (H)	+	-	+	+	+	+	+	+	-	+	+	+
120	*Dieffenbachia seguine* (Jacq.) Schott (H)	-	-	-	-	-	-	-	-	-	-	-	+
121	*Dioscorea bulbifera* L. (C)	+	-	+	-	+	-	+	-	-	-	-	-
122	*Diploclisia glaucescens* (Blume) Diels (C)	+	-	-	-	-	-	-	-	-	-	-	-
123	*Dipteracanthus prostratus* (Poir.) Nees (H)	+	+	-	+	-	-	-	+	-	+	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
124	*Dracaena elliptica* Thunb. & Dalm. (H)	+	-	-	-	-	-	-	-	-	-	-	-
125	*Dregea volubilis* (L.f.) Benth. ex Hook.f. (S)	-	-	+	-	-	-	-	-	-	-	-	-
126	*Drynaria quercifolia* (L.) J. Sm. (H)	-	-	-	-	-	-	+	+	-	+	-	-
127	*Duranta erecta* L. (S)	-	-	-	-	-	-	-	+	-	-	-	-
128	*Eclipta prostrata* (L.) L. (H)	+	-	+	+	-	-	+	-	-	-	-	-
129	*Elephantopus scaber* L. (H)	-	-	+	-	-	-	+	-	-	-	-	-
130	*Eleusine indica* (L.) Gaertn. (H)	-	-	-	+	+	-	+	-	-	-	-	-
131	*Eleutheranthera ruderalis* (Sw.) Sch. Bip. (H)	+	+	-	+	+	+	+	+	+	+	+	+
132	*Emilia sonchifolia* (L.) DC. (H)	+	+	-	+	-	-	-	-	-	+	-	+
133	*Epipremnum aureum* (Linden & Andre) G.S. Bunting (C)	-	-	-	-	-	-	-	-	+	-	-	-
134	*Eragrostis amabilis* (L.) Wight & Arn. (H)	+	-	-	+	-	+	+	-	-	+	+	+
135	*Erythrina variegata* L. (T)	+	-	+	+	-	-	+	-	+	+	+	-
136	*Euphorbia hirta* L. (H)	+	+	-	+	-	+	+	+	+	+	-	+
137	*Euphorbia milii* Des Moul. (S)	-	-	-	-	-	-	-	-	-	-	+	-
138	*Ficus benghalensis* L. (T)	-	+	+	-	-	+	-	-	-	-	-	-
139	*Ficus drupacea* (Thunb.) var. *pubescens* (Roth.) Corner (T)	-	-	-	-	+	-	-	-	-	-	-	-
140	*Ficus heterophylla* L.f. (S)	+	-	-	-	-	-	-	-	-	-	-	-
141	*Ficus hispida* L.f. (T)	+	+	+	-	-	+	+	+	+	+	-	-
142	*Ficus religiosa* L. (T)	+	+	-	+	+	+	-	+	-	+	-	+
143	*Flueggea leucopyrus* Willd. (S)	+	+	-	+	+	-	+	+	+	+	-	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
144	*Funaria hygrometrica* Hedw. (H)	+	-	-	+	-	+	-	-	-	+	-	-
145	*Gardenia jasminoides* J. Ellis (S)	+	-	-	-	-	-	-	-	-	-	-	-
146	*Geissapsis cristata* Wight & Arn. (H)	+	-	-	+	-	-	+	-	-	-	-	-
147	*Gliricidia sepium* (Jacq.) Kunth ex Walp. (T)	+	+	-	+	-	-	-	-	+	-	-	+
148	*Globba sessiliflora* Sims (H)	+	-	+	+	-	-	-	+	-	-	+	-
149	*Gloriosa superba* L. (C)	+	-	-	-	-	-	-	-	-	-	-	-
150	*Glycosmis pentaphylla* (Retz.) DC. (S)	+	+	+	+	-	+	-	-	-	-	-	-
151	*Gomphia serrata* (Gaertn.) Karnis (S)	+	-	-	-	-	-	-	-	-	-	-	-
152	*Gomphrena globosa* L. (H)	-	-	-	-	-	-	-	-	-	-	+	-
153	*Guidonia tomentosa* (Roxb.) Kurz (S)	+	-	-	-	-	-	-	-	-	-	-	-
154	*Hamaelia patens* Jacq. (S)	-	-	-	-	-	-	-	-	-	-	-	+
155	*Helicteres isora* L. (T)	+	-	-	-	-	-	-	-	-	-	-	-
156	*Hewittia malabarica* (L.) Suresh (H)	+	+	-	-	-	+	+	+	+	+	-	-
157	*Hibiscus hispidissimus* Griff. (S)	-	-	+	+	-	+	+	+	+	-	-	-
158	*Hibiscus rosa-sinensis* L. (S)	+	+	-	+	+	+	-	+	+	+	+	+
159	*Hibiscus surratensis* L. (S)	+	-	+	-	-	-	-	-	-	-	+	+
160	*Holigarna arnottiana* Hook.f. (T)	+	+	+	-	-	-	-	-	-	-	-	-
161	*Hugonia mystax* L. (S)	-	-	+	-	-	-	-	-	-	-	-	-
162	*Hydnocarpus pentandra* (Buch.-Ham.) Oken (T)	+	-	-	-	-	-	-	-	-	-	-	-
163	*Hydrilla verticillata* (L.f.) Royle (H)	+	-	-	+	-	-	-	-	+	-	-	-
164	*Hygrophylla schulli* (Buch.-Ham.) M.R. & S.M. Almeida (H)	+	-	-	-	-	-	-	-	-	-	-	-
165	*Hyptis suaveolens* (L.) Poit. (H)	-	-	+	-	-	-	-	-	+	+	-	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
166	*Ichnocarpus frutescens* (L.) W.T. Aiton (C)	+	-	+	-	-	-	-	-	-	+	-	+
167	*Impatiens minor* (DC.) S.M. Almeida (H)	+	-	+	+	-	-	-	+	-	-	-	+
168	*Indigofera tinctoria* L. (S)	+	-	-	+	-	-		-	-	-	-	-
169	*Ipomoea carica* (L.) Sweet (H)	+	-	-	-	-	-	-	-	+	-	-	+
170	*Ipomoea quamoclit* L. (H)	+	-	-	-	-	-	+	-	-	-	-	-
171	*Ixora coccinea* L. (S)	+	+	+	-	+	+	+	+	+	-	-	+
172	*Ixora johnsonii* Hook.f. (C)	+	-	-	-	-	-	-	-	-	-	-	-
173	*Ixora arborea* Roxb. ex Sm. (T)	+	-	-	-	-	-	-	-	-	-	-	-
174	*Ixora singapurensis* hort. var.(S)	-	-	-	-	-	-	-	+	-	-	+	-
175	*Jasminum angustifolium* (L.) Willd. (C)	+	-	+	-	-	-	-	+	-	-	-	-
176	*Jasminum azoricum* L. (C)	+	-	-	-	-	-	-	-	-	-	-	-
177	*Jasminum malabaricum* Wight (C)	+	-	-	-	-	-	-	-	-	-	-	-
178	*Jasminum multiflorum* (Burm.f.) Andrews (C)	+	-	-	-	-	-	-	-	-	-	-	-
179	*Justicia adhatoda* L. (S)	+	+	-	-	-	+	+	-	-	+	-	-
180	*Justicia nagpurensis* V.A.W. Graham (H)	+	-	+	+	-	+	+	+	+	+	+	+
181	*Kammetia caryophyllata* (Roxb.) Nicolson & Suresh (S)	+	-	-	-	-	-	-	-	-	-	-	-
182	*Killinga nemoralis* (J.R. Forst. & G. Forst.) Dandy ex Hutch. & Dalziel (H)	+	+	-	+	+	-	-	-	-	+	-	-
183	*Lantana camara* L. (S)	+	-	+	-	-	-	-	-	-	-	+	-
184	*Laportea interrupta* (L.) Chew (H)	+	-	-	+	-	-	-	-	-	+	-	-
185	*Lawsonia innermis* L. (S)	-	-	-	-	-	-	-	-	-	+	-	-
186	*Leea indica* (Burm.f.) Merr. (T)	+	+	+	-	+	+	-	+	+	+	+	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
187	*Leucas aspera* (Willd.) LinK (H)	+	+	+	+	-	+	+		-	+	-	+
188	*Limnophilla repens* (Benth.) Benth. (H)	+	-	-	+	-	-	-	-	-	-	-	-
189	*Lindernia antipoda* (L.) Alston (H)	-	-	-	+	+	-	-	+	-	-	-	-
190	*Lindernia ciliata* (Colsm.) Pennell (H)	+	+	-	+	+	-	+	-	-	+	+	+
191	*Lindernia crustacea* (L.) F. Muell. (H)	+	+	-	+	+	-	-	+	-	+	+	+
192	*Lobelia alsinoides* Lam. (H)	+	-	-	-	-	-	-	-	-	-	+	-
193	*Ludwigia prostrata* Roxb. (H)	+	-	-	+	-	+	-	-	-	+	+	-
194	*Lygodium flexuosum* (L.) Sw. (C)	+	+	+	+	+	+	+	+	+	+	-	-
195	*Lysiloma latisiliquum* (L.) Benth. (T)	+	-	-	-	-	-	-	-	-	-	-	-
196	*Macaranga peltata* (Roxb.) Müll.Arg. (T)	+	+	+	+	+	+	+	+	+	+	-	+
197	*Magnolia champaca* (L.) Baill. ex Pierre (T)	+	-	-	-	-	-	+	+	-	-	+	+
198	*Mallotus philippensis* (Lam.) Muell.Arg. (T)	+	+	+	+	-	+	+	+	+	+	+	+
199	*Mangifera indica* L. (T)	+	+	+	+	+	+	-	+	+	+	+	+
200	*Manihot esculenta* Crantz (S)	-	-	-	-	-	-	-	-	-	-	+	+
201	*Maranta arundinacea* L. (H)	+	-	-	+	-	-	-	-	-	+	-	-
202	*Melastoma* malabathricum L. (S)	+	-	-	-	-	+	-	+	-	-	-	-
203	*Melia azedarach* L. (T)	-	-	-	-	-	-	-	-	-	+	-	-
204	*Merremia tridentata* (L.) Hallier f. (H)	-	-	-	+	-	+	+	-	-	+	-	-
205	*Merremia vitifolia* (Burm.f.) Hallier f. (H)	+	+	-	+	-	+	+	-	-	+	-	-
206	*Micrococca mercurialis* (L.) Benth. (H)	-	-	-	+	-	-	+	-	-	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
207	*Microcos paniculata* L. (T)	+	+	+	-	-	+	+	+	-	+	-	-
208	*Microstachys chamaelea* (L.) Müll.Arg. (H)	-	-	-	-	-	-	-	+	-	+	-	-
209	*Mikania micrantha* Kunth (H)	+	-	-	-	-	+	-	-	-	-	-	-
210	*Mimosa diplotricha* Sauvalle (S)	-	-	-	-	-	-	-	-	-	-	-	+
211	*Mimosa pudica* L. (H)	+	+	+	+	-	+	+	+	+	+	+	+
212	*Mimusops elengi* L. (T)	+	-	+	+	-	+	-	+	-	-	+	+
213	*Mirabilis jalapa* L. (H)	-	+	-	-	-	-	-	-	-	+	-	+
214	*Mitrcarpus hirtus* (L.) DC. (H)	+	+	+	+	+	-	+	+	+	+	+	+
215	*Morinda citrifolia* L. (T)	+	-	-	-	-	+	-	-	-	+	-	+
216	*Moringa oleifera* Lam. (T)	-	+	-	+	-	-	-	+	-	-	-	-
217	*Mukia maderaspatana* (L.) M. Roem. (H)	+	-	-	-	-	-	-	+	+	+	-	+
218	*Muntingea calabura* L. (T)	-	+	-	+	-	-	-	-	-	-	-	-
219	*Murraya koenigii* (L.) Spreng. (T)	+	-	-	+	-	-		+	+	-	-	+
220	*Musa paradisiaca* L. (T)	+	+	-	+	+	+	+	+	+	+	+	+
221	*Mussaenda bellila* Buch.-Ham. (S)	+	-	+	-	-	-	+	-	-	+	+	-
222	*Myristica fragrans* Houtt. (T)	-	-	-	-	-	+	-	-	+	-	-	-
223	*Naravelia zeylanica* (L.) DC. (H)	+	-	+	-	-	-	-	+	-	-	-	-
224	*Naregamia* alata Wight & Arn. (S)	+	+	+	+	+	-	+	+	+	+	-	-
225	Nerium *oleander* L. (S)	-	-	-	-	-	-	-	-	-	-	+	-
226	*Nyctanthes arbor-tristis* L. (T)	+	-	-	+	-	-	-	-	-	-	-	-
227	*Nymphaea nouchali* Burm.f. (H)	+	-	-	-	-	-	-	-	-	-	-	-
228	Nymphoides *indica* (L.) Kuntze (H)	+	-	-	-	-	-	-	-	-	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
229	*Ocimum basilicum* L. (H)	+	-	-	+	-	-	-	-	-	-	-	+
230	*Ocimum grattissimum* L. (H)	+	-	-	+	-	-	-	+	-	+	-	-
231	*Ocimum tenuiiflorum* L. (H)	+	-	-	+	+	+	+	+	+	+	+	+
232	*Octoblepharum albidum* Hedwig. (H)	+	-	+	-	-	-	-	-	-	-	-	-
233	*Oldenlandia auricularia* (L.) K. Schum. (H)	-	-	-	-	-	-	-	-	+	-	-	-
234	*Oldenlandia corymbosa* L. (H)	-	+	-	+	-	+	-	+	-	+	+	+
235	*Olea dioica* Roxb. (T)	-	-	+	-	-	-	-	-	-	-	-	-
236	*Oplismenus compositus* (L.) P. Beauv. (H)	+	+	+	+	-	+	+	+	+	+	-	+
237	*Osbeckia muralis* Naudin (H)	+	-	-	+	-	+	-	-	-	-	-	-
238	*Oxalis corniculata* L. (H)	-	-	-	+	-	-	-	-	-	-	-	-
239	*Pancratium triflorum* Roxb. (H)	-	+	-	+	-	-	+	-	-	+	-	-
240	*Pandanus fasicularis* Lam. (T)	+	-	-	-	-	-	-	-	-	-	-	-
241	*Passiflora foetida* L. (S)	+	-	-	-	-	-	-	-	-	-	-	-
242	*Pavetta indica* L. (T)	-	-	-	-	-	-		-	+	-	-	-
243	Pavetta *indica* L. var. *tomentosa* (Roxb. ex Sm.) Hook.f. (S)	+	-	-	-	-	-	-	-	-	-	-	-
244	*Peltophorum pterocarpum* (DC.) Backer ex Heyne (T)	-	+	-	-	-	-	-	-	-	-	-	-
245	*Pennisetum polystachyon* (L.) Schult. (H)	-	-	-	+	+	+	+	+	+	+	+	+
246	*Peperomia pellucida* (L.) Kunth (H)	+	+	-	+	-	-	-	-	-	+	-	+
247	*Persea macrantha* (Nees) Kosterm. (T)	-	-	+	-	-	-	-	-	-	-	-	-
248	*Pereskia aculeata* Mill. (S)	-	-	-	-	-	-	-	-	-	-	-	+
249	*Phyllanthus* amarus Schumach. &	+	+	+	+	-	+	+	-	-	+	+	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
	Thonn. (H)												
250	*Phyllanthus* emblica L. (T)	-	-	+	-	-	+	-	+	-	+	-	-
251	*Physalis angulata* L. (H)	+	-	-	+	-	+	-	+	-	+	-	-
252	*Pimenta dioica* (L.) Merr. (T)	+	-	-	-	-	-	-	-	-	+	-	-
253	*Piper betel* L. (S)	+	-	-	-	-	-	-	-	-	-	-	-
254	*Piper nigrum* L. (C)	-	-	-	+	+	+	-	-	+	-	+	-
255	*Plumbago indica* L. (H)	-	-	-	-	-	-	-	-	-	-	+	-
256	*Plumeria alba* L. (T)	-	-	-	-	-	-	+	+	-	-	-	+
257	*Polyalthia longifolia* (Sonn.) Thwaites (T)	+	-	-	-	-	-	-	+	-	-	+	+
258	*Polyporus* sp.	+	-	-	+	-	-	+	+	-	-	-	+
259	*Portulaca oleracea* L. (H)	-	-	-	-	+	-	-	-	-	-	-	-
260	*Portulaca grandiflora* Hook. (H)	-	-	-	-	-	-	-	-	-	-	+	-
261	*Pothos* scandens L. (C)	+	+	+	+	+	+	+	+	+	+	+	+
262	*Pouteria campechiana* (Kunth) Baehni (T)	-	-	-	-	-	-	-	-	+	-	-	-
263	*Pouzolzia zeylanica* (L.) Benn. & R. Br. (H)	+	+	-	+	+	-	-	-	-	-	-	+
264	*Premna molissima* Roth (S)	-	-	+	-	-	-	-	-	-	-	-	-
265	*Pseuderanthemum malabaricum* (C.B. Clarke) Gamble (H)	-	+	-	-	-	-	+	+	-	-	-	-
266	Psi*d*ium guajava L. (T)	+	+	-	+	-	+	+	-	-	+	+	+
267	*Pteris quadriaurita* Retz. (H)	+	-	-	+	-	+	+	-	+	+	-	-
268	*Pterocarpus santalinus* L.f. (T)	-	-	-	+	-	+	-	-	-	+	-	-
269	*Rhaphidophora pertusa* (Roxb.) Schott	+	-	-	-	-	-	-	-	+	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
	(C)												
270	*Rhinacanthus nasutus* (L.) Kurz (S)	-	+	-	-	-	+	-	-	+	+	-	-
271	*Rhyncoblosum notonianum* (Wall) B.L. Burtt (H)	-	-	+	+	+	+	+	+	-	-	+	+
272	*Rotala rotundifolia* (Buch.-Ham ex Roxb.) Koehne (H)	+	-	-	-	-	-	-	-	-	-	-	-
273	*Salvia splendens* Sellow ex Roem. & Schult. (H)	-	-	-	-	-	+	-	+	+	-	+	-
274	*Salvinia molesta* Mitch. (H)	-	-	-	-	-	+	-	-	+	-	-	-
275	*Samanea saman* (Jacq.) Merr. (T)	+	-	-	+	-	-	+	-	-	+	-	-
276	*Santalum album* L. (T)	-	-	-	-	-	-	-	-	-	+	-	-
277	*Sapindus trifoliata* L. (T)	-	+	-	-	-	-	-	-	+		-	-
278	*Saraca asoca* (Roxb.) de Wilde (T)	+	-	-	-	-	-	-	-	-	-	-	-
279	*Sarcostigma klenii* Wight & Arn. (C)	+	-	-	-	-	-	-	-	-	-	+	-
280	*Scaevola taccada* (Gaertn.) Roxb. (S)	-	-	-	-	-	-	-	+	-	-	-	+
281	*Scoparia dulcis* L. (H)	+	+	-	+	+	+	+	+	+	+	+	+
282	*Selaginella delicatula* (H)	+	+	-	+	+	+	+	+	+	+	+	+
283	*Senna alata* (L.) Roxb. (S)	-	-	-	+	-	-	-	-	-	-	-	-
284	*Senna hirsuta* (L.) H.S. Irwin & Barneby (S)	-	-	-	+	-	-	-	-	-	-	-	+
285	*Senna siamea* (Lam.) H.S. Irwin & Barneby (T)	+	-	-	-	-	-		+	-	-	-	-
286	*Senna surattensis* (Burm.f,) H.S. Irwin & Barneby (T)	+	-	-	+	-	-	-	-	-	-	+	-
287	*Sida acuta* Burm.f. (H)	+	-	-	+	-	+	+	-	-	+	-	-
288	*Sida mysorensis* Wight & Arn. (S)	-	+	-	-	+	+	-	-	+	-	-	+

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
289	*Smilax zeylanica* L. (C)	+	-	+	-	-	-	+	+	-	-	-	-
290	*Solanum anguivi* Lam. (H)	+	-	-	+	-	-	-	-	-	-	-	-
291	*Solanum torvum* Sw. (S)	+	+	-	-	+	-	-	-	-	-	-	-
292	*Spathodea campanulata* P. Beauv. (T)	+	-	-	-	-	-	-	+	-	-	-	-
293	*Spathoglottis plicata* Blume (H)	-	-	-	-	-	-	-	-	-	-	+	-
294	*Spermacoce latifolia* Aubl. (H)	+		+	+	+	+	+	+	-	+		+
295	*Spermacoce mauritiana* Osea Gideon ex Verdc. (H)	+	-	-	+	-	+	+	+	-	+	+	+
296	*Sphagneticola trilobata* (L.) Pruski (H)	-	-	-	+	-	-	-	-	-	-	-	-
297	*Spondias pinnata* (L.f.) Kurz (T)	-	-	-	-	-	-	-	-	-	-	+	-
298	*Sporobolus diandrus* (Retz.) P. Beauv. (H)	+	+	+	+	+	+	+	+	-	+	+	+
299	*Sporobolus indicus* (L.) R.Br. (H)	+	-	-	+	-	-	-	-	-	-	-	-
300	*Sporobolus wallichii* Munro ex Thwaites (H)	+	+	-	+	+	+	+	-	-	+	+	+
301	*Stachytarpheta indica* (L.) Vahl (H)	-	-	-	-	-	-	-	-	-	-	-	+
302	*Stenochlaena palustris* (Burm.f.) Beddome (C)	+	-	+	+	+	-	+	+	-	+	+	-
303	*Sterculia guttata* Roxb. ex DC. (T)	+	-	-	-	-	-	-	+	-	+	-	-
304	*Strychnos nux-vomica* L. (T)	-	-	-	+	-	+	+	+	+	+	+	+
305	*Swietenia macrophylla* King (T)	+	-	-	+	-	-	-	-	-	+	-	-
306	*Syngonium podophyllum* Schott (C)	-	-	-	+	-	-	-	-	-	-	-	-
307	*Syzygium cumini* (L.) Skeels (T)	+	-	-	-	-	-	-	+	-	+	-	-
308	*Syzygium jambos* (L.) Alston (T)	-	-	-	-	-	-	-	-	+	-	-	-
309	*Syzygium zeylanicum* (L.) DC. (T)	-	-	+	-	-	-	-	-	-	-	-	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
310	*Tabernaemontana divaricata* (L.) R. Br. ex Roem. & Schult. (S)	-	-	-	-	-	+	-	+	-	-	-	+
311	*Tadehagi triquetrum* (L.) H. Ohashi (S)	-	-	+	-	--	-	-	+	-	-	-	-
312	*Tagetes patula* L. (H)	-	-	-	-	-	-	-	+	-	-	-	-
313	*Tamarindus indica* L. (T)	+	+	-	+	+	+	+	-	+		+	-
314	*Tecoma stans* (L.) Kunth (T)	+	-	-	+	-	-	-	-	-	-	-	-
315	*Tectona grandis* L.f. (T)	+	+	-	+	-	+	-	+	+	+	+	+
316	*Terminalia catappa* L. (T)	+	-	-	+	-	-	-	-	-	+	-	-
317	*Theobroma* cacao L. (T)	+	-	-	-	-	-	-	-	-	-	+	-
318	*Thunbergia alata* Bojer ex Sims (C)	-	-	-	+	-	-	-	-	-	-	+	+
319	*Thunbergia fragrans* Roxb. (C)	+	-	-	-	-	-	-	-	-	-	-	-
320	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson (C)	+	-	+	-	+	-	+	+	-	-	+	-
321	*Tragia involucrata* L. (H)	+	-	-	+	-	-	-	-	-	-	-	-
322	*Trema orientalis* (L.) Blume (T)	+	-	-	-	-	-	-	+	+	+	-	-
323	*Trichosanthes tricuspidata* Lour. (C)	+	-	-	-	-	-	-	-	-	-	-	-
324	*Triumfetta rhomboidea* Jacq. (S)	+	+	+	+	+	+	+	+	+	+	+	+
325	*Typhonium flagelliforme* (Lodd.) Blume (H)	+	-	+	+	+	+	+	+	+	+	+	+
326	*Typhonium trilobatum* (L.) Schott (H)	-	-	-	-	-	-	+	-	-	-	-	-
327	*Urena lobata* L. (H)	-	+	+	-	-	-	+	-	+	+	+	+
328	*Uvaria narum* (Dunal) Wall. ex Wight & Arn. (C)	-	-	+	-	-	-	+	-	-	-	-	-
329	*Vateria indica* L. (T)	-	-	+	-	-	-	-	+	-	-	-	-
330	*Vitex altissisima* L.f. (T)	+	+	+	-	-	+	-	-	-	+	+	-

Sl. No.	BINOMIAL/ HABIT	PA	PL	CA	KK	NK	PP	KB	VP	PD	PK	MP	OR
331	*Vitex negundo* L. (T)	+	+	-	-	-	-	-	-	-	-	-	-
332	*Xanthosoma sagittifolium* (L.) Schott (H)	+	-	-	+	+	+	-	-	-	+	-	-
333	*Xylia xylocarpa* (Roxb.) Taub. (T)	-	-	-	-	-	+	-	-	-	-	-	-
334	*Zanthoxylum rhetsa* (Roxb.) DC. (T)	-	-	+	-	-	-	-	-	-	-	-	-
335	*Zepyranthus roseus* Lindl.(H)	+	-	-	-	-	-	-	-	-	-	-	-
336	*Zingiber nimmonii* (J. Graham) Dalzell (H)	-	-	-	-	-	+	-	-	-	-	-	-
337	*Zingiber zerumbet* (L.) Sm. (H)	+	-	+	+	-	-	-	-	-	-	-	-
338	*Ziziphus mauritiana* Lam. (T)	+	+	+	-	-	+	+	+	-	+	-	+
339	*Ziziphus oenoplia* (L.) Mill. (T)	+	-	+	-	-	-	-	-	-	-	-	-

PA - Pandokavu Sri Ayyappan Temple; **PL** - Panolil Kavu; **CA** - Chembra Sri Ayyappan Kavu; **KK** - Sri Koyyodan Koroth Temple; **NK** - Sri Nelliyat Kalari Bhagavathy Temple; **PP** - Puthan Pura Sri Bhadrakali Temple; **KB** - Kizhanthur Bhagavathy Kavu; **VP** - Sri Varaprath Kavu; **PD** - Sri Peradayath Tharavadu Kannan Kattiya Bhagavathy Sthanam; **PK**- Pandokoolothu Kavu; **MP** - Sri Manikampoyil Bhagavathy Temple; **OR** - Oorothumal Sri Angakaran Temple. H - Herbs; S - Shrubs; T - trees; C - Climbers.

Table 11 - Diversity of Fauna

Sl. No.	Zoological name	Local Name	English Name
1	*Funambulus palmarum*	Annan	Palm Squirrel
2	*Varanus monitor*	Udumpu	Monitor lizard
3	*Herpestes edwardsii*	Keeri	Mongoose
4	*Paradoxurus hermaphroditus*	Mara-patty	Palm civet
5	*Hystrix indica*	Mullan panni	Porcupine
6	*Naja naja*	Moorkan	Indian Cobra
7	*Eudynamys scolopacea*	Kuyil	Koel
8	*Columba livia*	Pravu	Pigeon
9	*Acridotheres tristis*	Myna	Common Myna
10	*Mus rattus*	Eli	Indian Rat
11	*Chameleo calcaratus*	Patchondi	Chameleon
12	*Dendrocitta vagabunda*	Ole-nali	Indian Tree Pie
13	*Dicrurus adsimilis*	Kakkathamburatti	Racket tailed drongo
14	*Pteropus giganteus*	Kadavathil	Bat/Flying fox
15	*Corvus macrorhynchos*	Bali Kakka	Indian jungle Crow
16	*Bandicoota bengalensis*	Peruchazhi/Panniyeli	Bandicoot
17	*Psittacula krameri*	Thatha	Parrot
18	*Calotus versicolor*	Onthu	Garden Lizard
19	*Mabuya carinata*	Arana	Common skink
20	*Vipera ruselli*	Anali	Russell’s viper
21	*Rana hexadactyla*	Thavala	Indian frog
22	*Ptyas mucosus*	Chera	Rat snake
23	*Dinopium bengalense*	Maramkoti	Wood pecker
24	*Nerodia piscator*	Neerkoli	Fresh water snake
25	*Tyto alba*	Kooman	Owl
26	*Haliastur Indus*	Garudan, Krishnaparunthu	Kite
27	*Centropus sinensis*	Uppan, Chakoram	Crow pheasant
28	*Passer domesticus*	Kuruvi	Sparrow
29	*Vulplus bengalensis*	Kurukkan	Indian fox

History and traditional culture of the sacred groves

Pandokavu Sri Ayyappan Temple, Pandakkal

The grove is situated 4 km away from the Mahe town. This is one among the major groves of Mahe covering an area of 3 acres and is about 1200 years old. A concrete arch welcomes the devotees at the entrance leading to the sanctum sanctorum. The grove is bounded by a road on the western side and field on the eastern side and there is a river named Moolakadvu passing by the side of the grove on the south. Earlier before 60 years the roof was made of hay, then in the year 2009 it was made a concrete temple complex with brass coating. The Bhagavathy idol was installed during the year 2005. Navekara kalasam is also done during that year. It is a taboo that twenty years back Kooloth saw a snake going towards this grove on the right of the main deity, it rested on the same sanctum and that is how Nagam was installed and worshipped. Nagam is made of stone carved in the shape of snake. The presiding deity of the grove is Sree Ayyappan sheltered within a concrete temple complex. The subdeities are Ganapathi, Bhagavathy and Nagam. A pond is present outside the sanctum used only by the Namboodiri. Daily pooja is performed in the morning and evening. Belief system has been evolved to bind the people in conservation of the grove.

A crisscross foot path made inside the grove was later converted to the construction of the road along the boundary of the grove thereby causing destruction to the flora of that part of the grove. Ground vegetation is not much disturbed during the onset of annual festival.

There is no theyyam festival in this grove. The main festival of the grove is during December (41 days Mandala pooja) coinciding with the Sabarimala festival season. The Thalapozhi procession starts from the temple premises in the evening by chanting Swami Sharanam Ayyappa by the devotees and before it reaches back to the temple enroots at different points of the village. The presiding deity is decorated with flowers and bursting of crackers along with panchavadya and during these days a good vegetarian lunch is provided by the trust to the devotees. The 41 days auspicious Mandala pooja will be closed on 27 December. On the last of Mandalam December 28, Kurup perform the theyyambadi.

The vegetation is thick with evergreen and semi-evergreen species. A total of 214 species were identified. Of these 95 are herbs, 28 are shrubs, 62 trees and 29 are climbers (**Table 10**).

Artocarpus hirsutus, *Holigarna arnottiana*, *Hydnocarpus pentandrus*, *Impatiens minor*, *Ixora johnsonii*, *Jasminum malabaricum*, *Justicia nagpurensis*, *Kamettia caryophyllata* and *Mussaenda bellila* are found to be endemic. The common shrubs include *Antidema montanum*, *Chassalia ophioxyloides* var. *ophioxyloides*, *Ixora coccinea*, *Flueggea leucopyrus* and *Melastoma malabathricum*. *Acasia caesia* a common climber destroys the other species of interest resulted in the removal of the species by the trust. Some of the species found inside the grove are not represented outside. *Butea monosperma* is found only in this grove and it indicates the remnants of evergreen forest exist in the past. Exotic species such as *Tectona grandis* and *Dalbergia sissoides* have been introduced recently. Few weeds such as *Mikania micrantha*, *Chromolaena odorata*, *Pennisetum polystachyon* dominate in certain areas thus destroying the native species. Pteridophytes include *Christella dentata*, *Bolbitis prolifera*, *Stenochlaena palustris* and *Pteris quadriaurita*. Macrofungi like *Agaricus* and *Polyporus* are observed. The species bordering the grove include *Bridelia retusa*, *Connarus monocarpus*, *Ficus heterophylla*, *Hydnocarpus pentandra*, *Kammetia caryophyllata*, *Morinda citrifolia*, *Sterculia guttata*, *Thunbergia fragrans* and *Trema orientalis Amorphophallus sylvaticus*, *Dracaena terniflora* and *Vitex altissisima* are found to be rare. The major fauna of the grove comprises of squirrel, myna, frog, crow, rat, snake, sparrow, koel and lizard.

Name of the sacred grove	**:** Pandokavu Sri Ayyappan Temple
Village	**:** Pandakkal
Geographical Information	**:** Latitude 11˚75'82" N, Longitude 75˚53'67" E
Size of the Grove	**:** 3 Acres
Age of the Grove	**:** Approx**.** 1200 years
Any water Source	**:** Yes
If yes, nature & duration of	**:** Perennial
water source	**:** Pond/Well/River - permanent
Nature of Shrine	**:** Temple complex
Presiding deity	**:** Ayyappan
Minor deities	**:** Ganapathi, Bhaghavathy, Naga Raja
Priest hood	**:** Namboodiri
Offerings	**:** Money**,** Flowers - Ixora, Ocimum, Lotus, Ashokam
Votive offerings	**:** Ghee, butter, Ellunai; for Nagam Banana (Kadali), Turmeric, Coconut oil, Cow's Milk, Areca nut inflorescence
Metallic structures	**:** Bell
Rituals/Taboos/Beliefs	**:** Cultural traditions - ghee filling in coconut, Irumudi kettu
Restriction to caste/Gender	**:** Muslims prevented from entering. Foot wears not permitted, resource extraction not allowed
Dominant social group/Community	**:** Nair
Conservation status	**:** Good
Ownership pattern	**:** Trust

Distance from which people come to offer worship to the deity	**:** Nearby areas
Material benefits from the SG	**:** Nil
Any restrictions exist	**:** Yes
If yes	**:** Fear of deity/ Traditional
Are the outsiders involved in the protection of Grove	**:** Community/Family
Changing Scenario	**:** Developmental activities – construction of road, facilities for the devotees, area cleared for plantation of exotic plants
Introduction of exotic plants/ commercially important plants	**:** *Dalbergia sissoides*., *Tectona grandis*,
Important plant	**:** *Butea monosperma*, *Saraca asoca*
Annual festival	**:** April 10 (Thadambu Nirtham), 13, 14; December 28 - Theyyambadi

Panolil Kavu, Palloor

The grove is situated 2 km away from Palloor. The reigning deity of the grove is a serpent in the form of a stone carved in the shape of snake and lies open on a raised platform. The stone was obtained from Pambumenakavu of Thrissur district. There is no daily pooja for the deity. The deity demands Noorum palum, egg, tender coconut for the Ayilam pooja which is performed once in a year. The deity is decorated with Kurutholai along with arecanut and coconut inflorescence on the day of Ayilam pooja which is held once in a year during the month of Kumbham. On the previous day Lakshmi pooja is conducted followed by Ganapathi Homam and Sarpabali in the earling morning. The family members join together and conduct the pooja grandly. The flowers taken for pooja include species of *Hibiscus*, *Ixora*, *Nelumbo*, *Tabernaemontana* and *Ocimum*. Removal of any material even the dead wood from the grove is a taboo. Nobody is allowed to enter the shrine except the Namboodiri on the day of pooja. The perennial source of water is a well which is found at the entrance of the grove. Pond was destroyed due to the construction of building. Because of the absence of human interference throughout the year except on annual festival (Ayilam pooja) the grove is well protected and undisturbed. Ground flora is not much disturbed. *Ficus benghalensis* and *Caryota urens* are the key stone species and is an asylum for many bats. Earlier during the British reign there was hunting of bats but now it is restricted. Sakthe Devi Koroth kavu is adjacent to this grove.

Taxonomically 94 species were recorded. Of these 40 are herbs, 14 shrubs, 30 trees, 5 climbers, 1 parasite and 1 epiphyte were recorded (**Table 10**). Crustose lichen is very common. *Pteris*

quadriaurita and *Selaginella delicatula* are very common. *Anamirta cocculus, Caryota urens* and *Strychnos nux-vomica* are the dominant species in this grove. *Pseuderanthemum malabaricum* is the common species found in this grove.

Name of the sacred grove	**:** Panolil Sarpa Kavu
Village	**:** Palloor
Geographical Information	**:** Latitude 11˚72'22" N, Longitude 75˚54'22" E
Size of the Grove	**:** 50 cents
Age of the Grove	**:** Approx. 200 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Open sculptured
Presiding deity	**:** Naga Raja
Minor deities	**:** Naga Kannika, Chitrakudam
Priest hood	**:** Namboothiri (Payyanur)
Offerings	**:** Palpayasam, Chakrapayasam, Avil, Malar, dry grapes, Pori, Pal Abishekam, Turmeric, Milk, Banana
Votive offerings	**:** Tender Coconut, Coconut, Flowers, Money, Eggs
Rituals/Taboos/Beliefs	**:** Ancestors believe there is a well inside the platform
Restriction to caste/Gender	**:** Muslims not allowed
Dominant social group/Community	**:** Nair, Nambiar, Ezhavas, Namboothiri
Conservation status	**:** Very Good
Ownership pattern	**:** Tharavadu
Distance from which people come to offer worship to the deity	**:** Only neighbours
Material benefits from the SG : No	
Any restrictions exist	**:** Yes
If yes	**:** Fear of deity
Are the outsiders involved in the protection of the Grove	**:** Tharavadu
Animals/ Birds/Insects	**:** Bats, Toddy Cat, Fox, Porcupine, Wild Cat, Udumpu
Clearing of ground flora	**:** Only herbs
Annual festival	**:** February 16, 17 (Kumbahm Ayiliam)

Sri Chembra Ayyappan Kavu

This grove is situated in Chalakara village. The presiding deity is Ayyappan which is in Swayampu form. There is no sub-deity. There are 18 steps as in Sabarimala leading to the main deity. Earlier it was thatched roof and in the year 1983 the roof was converted to tiles. Daily pooja is performed in the morning and evening. On Saturday only in the morning pooja is conducted. Mandala pooja is is the main festival of this grove. During the month of Dhanu morning and evening poojas are performed for 41 days. “Kettunera” a ceremonial start to

Sabarimala is done from the Kavu itself. This grove is encircled and is dominated by woody evergreen species of *Vateria indica* which is not present outside the grove or any other grove. Natural regeneration was observed mainly for *Vateria indica*. The regeneration status of *Vateria indica* is almost 100% because of the viability of seeds. The wood is used for the manufacturing of boat. An area was cleared for the purpose to construct stage and a road was constructed adjacent to the grove. The permanent water source is well water which is adjacent to the sanctum of the grove. The administration of the grove is under the control of Cherikkal Raja committee Kovilakam (Trust), Chembra. Taxonomically there are 87 species belonging to 30 herbs, 15 shrubs, 28 trees and 14 climbers (**Table 10**).

Name of the sacred grove	**:** Sri Chembra Ayyappan Kavu
Village	**:** Chembra
Geographical Information	**:** Latitude 11˚72'65" N, Longitude 75˚53'01" E
Size of the Grove	**:** One Acre
Age of the Grove	**:** 1200 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Temple concrete
Presiding deity	**:** Ayyappan (Vana Sastha)
Priest hood	**:** Namboodiri
Offerings	**:** Flowers (*Ocimum*, *Ixora*, *Hibiscus* sp.), money
Votive offerings	**:** Coconut Rice, Neeranjanam, Ellum thiri
Metallic structures	**:** Brass Bell
Rituals/Taboos/Beliefs	**:** Not allowed to eat inside the sanctum
Restriction to caste/Gender	**:** Muslims not allowed
Dominant social group/Community	**:** Nambiar, Thiyya
Conservation status	**:** Good
Ownership pattern	**:** Trust
Distance from which people come to offer worship to the deity	**:** Nearby places
Any restrictions exist	**:** Yes
If yes	**:** Traditional/Trust restriction/
Are the outsiders involved in the protection of Grove	**:** Community
Animals/ Birds/Insects	**:** Bat, Snake, Mongoose, Monkeys, Udumbu, Marapatti, Porcupine
Annual festival	**:** Commences on Dhanu 1st Saturday up to 41 days

Sri Koyyodan Koroth, Palloor

The grove is located 3 km away from Palloor. The presiding deity is a sculptured stone placed under *Mangifera indica* on a raised platform left open in the sky. The subdeity Gulikan is placed on a raised platform under *Mallotus phillipensis* tree. Daily pooja is restricted to the lighting of lamps and is done only in the evening but during the Malayalam month of Karkadakam (mid of July – August) both morning and evening pooja is performed. Pond is not in use, only well water is taken for the temple purpose. With the help of devotees balaleyam for Bhagavathy is placed and new building construction is going on since 3 years. In the evening devotees chant Sahasranamam jabam on all Tuesdays, Fridays and Saturdays. In Mahe it is in this grove only many theyyams of Kuttichathan say near about 50 or more are performed and it is said their number is reduced nowadays due to the other job opportunities available for them. There will be one main theyyam of Kuttichathan or sasthappan and the others are votive offerings made by the devotees. During theyyam festival devotees believe that *Strychnos nux-vomica* doesn't taste bitter. Annadhanam is given to all devotees on the last day of theyyam festival. Either after birth or death in a family entry is strictly prohibited inside the grove for 16 days. The dominant species of this grove include *Mallotus phillipensis*, *Mangifera indica, Mimusops elengi* and *Strychnos nux-vomica*.

A total of 143 species were recorded. Of these 88 are herbs, 10 are shrubs, 36 are trees and 9 are climbers (**Table 10**).

Name of the sacred grove	**:** Sri Koyyodan Koroth
Village	**:** Palloor
Geographical Information	**:** Latitude 11˚72'88" N, Longitude 75˚54'29" E
Size of the Grove	**:** 1 Acre
Age of the Grove	**:** Approx. 500 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Pond/Well - permanent
Nature of Shrine	**:** Sculptured stone
Presiding deity	**:** Kuttichathan
Minor deities	**:** Bhagavathy, Gulikan, Chamundi, Karanavar, Kandakarnan
Priest hood	**:** Elder of the family
Offerings	**:** Money, Coconut oil, Rice, Flowers – Hibiscus, Jasmine, *Thunbergia*, *Ixora*, *Ocimum*, *Aegle marmelos*, Rose
Votive offerings	**:** Coconut, Tender Coconut, Green gram
Metallic structures	**:** Iron arch with lamps
Restriction to caste/Gender	**:** No

Dominant social group/Community	**:** Nambiar/Nair
Conservation status	**:** Moderate
Ownership pattern	**:** Tharavadu
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG	**:** Nil
Any restrictions exist	**:** Yes
If yes	**:** Fear of deity/ Traditional
Are the outsiders involved in the protection of Grove	**:** Tharavadu/Neighbours
Changing Scenario	**:** Construction of building for Bhagavathy deity
Introduction of exotic plants/ commercially important plants	**:** *Alstonia scholaris*, *Mallotus phillipensis*
Clearing of ground flora	**:** Yes
Sacred plant	**:** *Mangifera indica*, *Strychnos nux-vomica*, *Mimusops elengi*, *Mallotus phillipensis*
Annual festival	**:** Jan. 29, 30, 31 (Makaram, 15, 16, 17)

Sri Nelliyat Kalari Baghavathy Temple, Palloor

This grove is located 3 km away from Palloor and covers an area of 2 acres earlier and now it is restricted to 28 cents after partition. There was Gulikan Kotta earlier which covered an area of 3 1/2 cents which was destroyed due to lack of maintenance. Shrinkage of the grove is due to lack of fund for maintenance and splitting of joint family into nuclear families. Earlier the roof was made of coconut leaves and outer covering of coconut shell, later (100 yrs back) it was made of tiles. Flooring is made from mud mixed with kummayam and then plastered. In this grove there are only silent prayers. There is no Vadyagosham. The deity demands silence in the premises of the grove, if violated devotees have to face the wrath of the deity. Once it happened that tabala was played and the deity became ferocious due to the sound and the temple premises were full of water and devotees believe that it was due to wrath of deity. Utthama pooja is followed for the main deity. For Guligan Madyama pooja is performed. Lighting of the lamp is restricted in the evening on all days. Pooja is performed only in the morning on all Fridays. During the Malayalam month of Dhanu 41 day's pooja is performed in the morning and evening. On the last Friday of every Malayalam month Sankaramam pooja is conducted. Coconut breaking is done by the devotees to get rid of all doshams and obstacles. During Navarathri, vahana (vehicle) pooja is performed for the newly purchased vehicle which is not found in other groves. A new building is built for Guru recently. Another building is constructed on one side of the grove for the

preparation of food and Neivedhyam for the deity. In the fulfillments of vows, in domestic events frequency of offerings made are more by the devotees. It's a belief that oil taken from the temple and applied on the affected areas cures pain. Special programs are conducted during vishu and onam festival.

Taxonomcally a total of 59 species were analysed. Of these 29 are herbs, 8 are shrubs, 13 are trees and 9 are climbers (**Table 10**).

Name of the sacred grove	**:** Sri Nelliyat Kalari Bhagavathy Temple
Village	**:** Palloor
Geographical Information	**:** Latitude 11˚72'88" N, Longitude 75˚54'29" E
Size of the Grove	**:** 28 cents
Age of the Grove	**:** 800 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** 2 Wells - permanent
Nature of Shrine	**:** Iron, Sword
Presiding deity	**:** Karalari Bhagavathy
Minor deities	**:** Ganapathi, Saraswathi, Maha Lakshmi, Sakthi, Vaishnavi, Shiva, Guru, Kandakarnan, Veerabadran, Gulikan
Priest hood	**:** Namboothiri
Offerings	**:** Flowers, Coconut, Tender Coconut, Avil, Appam,
Votive offerings	**:** Thali, Pattu, Gold, Oil, Vilakku
Imagines/Icones	**:** Guru - Panchalokavigraham
Rituals/Taboos/Beliefs	**:** Coconut breaking, Ari Ezhith, Feeding of rice
Restriction to caste/Gender	**:** No
Dominant social group/Community	**:** Nambiar
Conservation status	**:** Average
Ownership pattern	**:** Individual family
Material benefits from the SG	**:** Water from well, manure, timber, medicinal herbs, honey, firewood
Distance from which people come to offer worship to the deity	**:** Nearby places
Any restrictions exist	**:** Yes
If yes	**:** Fear of deity/Traditional
Are the outsiders involved in the protection of Grove	**:** Neighbours
Keystone species	**:** *Ficus drupacea* var. *pubescens*
Annual festival	**:** December 27 (Dhanu 11)

Puthan Pura Sri Bhadrakali Temple, Chembra

This grove is located in Chembra. It covers an area of 50 cents and is about 500 years old. Earlier the deity was placed under a thatched roof, later converted to tiles and at present it is under renovation to make a concrete temple complex.

Name of the sacred grove	**:** Puthan Pura Sri Bhadrakali Temple
Village	**:** Chembra
Geographical Information	**:** Latitude 11˚72'63" N**,** Longitude 75˚53'22" E
Size of the Grove	**:** 1 Acre
Age of the Grove	**:** 500 years (approx.)
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Pond & Well - permanent
Nature of Shrine	**:** Thatched leaf earlier, Tiles, Concrete at present
Presiding deity	**:** Bhagavathy
Minor deities	**:** Sasthapan, Gulikan, Guru
Priest hood	**:** Namboodiri from Chembra Subramanian Temple
Offerings	**:** Archana, Pal Nivedhyam, Pal Payasam, *Ocimum tenuiiflorum*, *Ixora coccinea*, *I. microsantha*, *Hibiscus rosa-sinensis*, *Nerium* sp., *Jasminum* sp.
Votive offerings	**:** On Sankramam day, lighting the lamp, Coconut oil, Gingely oil, Thottil Kunjhu
Imagines/Icones	**:** Mirror Thedempu
Metallic structures	**:** Thali, Aal Rupam
Restriction to caste/Gender	**:** Muslim community restricted to enter
Dominant social group/Community	**:** Nair
Conservation status	**:** Average
Ownership pattern	**:** Earlier Tharavadu/ family members since 6 years
Distance from which people come to offer worship to the deity	**:** Nearby areas
Any restrictions exist	**:** No
Are the outsiders involved in the protection of the Grove	**:** No, only Trust
Changing Scenario	**:** Trees cutting for temple purpose, wood used for fuel
Animals/ Birds/Insects	**:** Monkey, Udumpu and Porcupine
Introduction of exotic plants/ commercially important plants	**:** *Peltophorum pterocarpum*, *Irul*. *Veeti*, Red Sandal wood
Clearing of ground flora	**:** Yes
Sacred Plant	**:** *Mimusps elengi*, *Tamarindus indica*, *Azadirachta indica*, *Aegle marmelos*
Annual festival	**:** February 17, 18, 19 (Kumbham 4, 5, 6)

Taxonomically a total of 112 species were recorded which includes 54 herbs, 13 shrubs, 38 trees, and 7 climbers (**Table 10**).

Kizhanthur Bhagavathy Kavu, Chalakara

This grove is located in Chalakara which is 3 km away from Mahe. It covers an area of 25 cents and is approximately 200 years old. Earlier the shrine was made of coconut leaf, later converted to tiles and only during the year 2006 it was made of concrete. On the first of every Malayalam month Uthamapooja is performed and on Sankramam Madhyam Karmam is done regularly throughout the year. Prathistadinam is celebrated every year on the 25th of Malayalam month Edavam. It starts in the early morning with Ganapathi Homam, Bhagavathy Seva, Sudarsana homam, Myrthuyumjaya homam. Pushpanjali and Neivilakku are offered by the devotees. Kumbam Aiyliam is celebrated for Naga Bhagavathy along with offerings of Noorumpalum, tender coconut, palpayasam, and banana. On the Malayalam month of Meenam Bharani Gurisi pooja is done for the main deity. On the 3rd day of Navami during Kanni month Shatheyam karmam with Madyam pooja along with non-veg is performed for the main deity. Devotees are allowed to enter only during the day of conducting poojas. Lighting of the lamp is restricted to evening on all days. People do their votive offerings at any time of the year. Taxonomically 100 species were recorded. Of these 58 are herbs, 9 shrubs, 22 trees and 9 climbers (**Table 10**)

Name of the sacred grove	**:** Kizhanthur Bhagavathy Kavu
Village	**:** Chalakara
Geographical Information	**:** Latitude 11˚72'21" N, Longitude75˚53'39" E
Size of the Grove	**:** 25 cents
Age of the Grove	**:** Approx. 100 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Concrete temple
Presiding deity	**:** Bhagavathy
Minor deities	**:** Gulikan, Sasthappan, Kandakarnan, Vasurimala, Karnavar,
Priest hood	**:** Namboodiri
Offerings	**:** Gingely Oil, Coconut Oil, Ghee, Vilakku, Flowers - *Ocimum*, *Ixora*, *Lotus*, *Jasminum*, *Tabernaemontana* and *Hibiscus*
Votive offerings	**:** Pattu, Thali in gold, Thera, evening Madhyam pooja
Metallic structures	**:** Bell, Brass
Restriction to caste/Gender	**:** No
Dominant social group/Community	**:** Nair, Thiyya

Conservation status	**:** Moderate
Ownership pattern	**:** Tharavadu
Frequency of offerings	**:** Any time
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG	**:** Nil
Any restrictions exist	**:** Yes
If yes	: Traditional
Are the outsiders involved in the protection of Grove	**:** Family
Animals/ Birds/Insects	**:** Parrot, Fox, Mongoose, Snake, Dove, Lovebirds, Crow, Peacock, Monkey, Udumpu
Clearing of ground flora	**:** Yes
Key stone species	**:** *Ficus benghalensis*
Annual festival	**:** February 15, 16 (Kumbam 3,4)

Sri Varaprath Kavu, Chalakkara

This Kavu is located in Chalakara. It covers an area of one Acre and is approximately more than 500 years old. Earlier the shrine was made of coconut leaf, later since twenty years it was converted to concrete temple complex

.

Name of the sacred grove	**:** Sri Varaprath Kavu
Village	**:** Chalakara
Geographical Information	**:** Latitude 11˚21'19" N, Longitude 75˚52'73" E
Size of the Grove	**:** One Acre
Age of the Grove	**:** 500 yrs. (Approx.)
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well (2) - permanent
Nature of Shrine	**:** Concrete temple
Presiding deity	**:** Bhadrakali
Minor deities	**:** Naga Bhagavathy, Muthappan, Kuttichathan, Kandakarnan, Gulikan, Vasurimala
Priest hood	**:** Namboodiri
Offerings	**:** Coconut Oil**,** Payasam Nivedyam, Flowers
Votive offerings	**:** Vellatam
Imagines/Icones	**:** Kannadi Vigraham
Metallic structures	**:** Bell, Panchaloka Vigraham
Restriction to caste/Gender	**:** No
Conservation status	**:** Good
Ownership pattern	**:** Committee
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG	**:** No
Any restrictions exist	**:** No
Are the outsiders involved in the protection of Grove	**:** Neighbours

Animals/ Birds/Insects	**:** Bat**,** Owl, Birds
Introduction of exotic plants/ commercially important plants	**:** *Vateria indica* and *Scaveola taccada*
Clearing of ground flora	**:** Prior to annual festival
Keystone species	: *Ficus religiosa, F. benghalensis, Mimusops elengi, Strychnos nux-vomica*
Annual festival	**:** March 20, 21

Daily pooja is performed by the Namboodiri in the morning and evening. Uthama pooja is performed for the presiding deity and Madhyama karmam is performed for the subdeities. Sankarama pooja is performed on the last day of every Malayalam month by the Koumaran. On all Fridays Annadhanam is provided for the devotees. During December 26 - January 1st (7 days) Srimath Bhagavatham Sapthaham is conducted every year. On all Tuesdays and Fridays Bhajan is conducted. On the 24th of every Malayalam month Vellatom is performed for Muthappan Deity. Every year on the 24th of Makaram month Thirunallur Thanthiri perform the rituals. On this day early morning Usha pooja is followed by Ashtadervya Maha Ganapathi Homam. Then Navakara pooja is followed by Uchha pooja. Pongala is also performed followed by Annadhanam for the devotees. In the evening rituals is followed by Thadampu Nirtham, Sarpabali for Nagam deity and Thaimpagam. Annual festival is conducted on the next day after Pooram festival of the Malayalam month Meenam.

Taxonomically a total of 108 species were recorded. Of these 51 are herbs, 14 shrubs, 35 trees and 8 are climbers (**Table 10**).

Ponthayodu Sarpakavu, Chalakkara

It is 3 km away from Mahe. The entry is strictly restricted to Hindus. The main deity is in sankalpam form. Though the size of the grove is small it is not much disturbed. But the invasion of exotics in to the buffer zone needs to be checked. Certain weeds like *Chromolaena odorata*, *Hibiscus hispidissimus* and *Pennisetum polystachyon* invade which disturbs the other growth forms. Bryophyte forms such as *Anthoceros* species, *Funaria hygrometrica, and Cyathodium cavernarum* are present.

Name of the sacred grove	**:** Ponthayodu Sarpakavu
Village	**:** Chalakara
Geographical Information	**:** Latitude 11˚72'02" N, Longitude 75˚53'16" E
Size of the Grove	**:** 7 cents
Age of the Grove	**:** 100 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Open
Presiding deity	**:** Sarpam
Priest hood	**:** Namboodiri from Parimadam
Offerings	**:** Archana, Pazham nivedhyam, Flowers
Votive offerings	**:** Coconut oil,
Restriction to caste/Gender	**:** No
Conservation status	**:** Undisturbed
Ownership pattern	**:** Tharavadu
Material benefits from the SG	**:** Nil
Any restrictions exist	**:** Yes/No
If yes	**:** Fear of deity/ Traditional
Are the outsiders involved in the protection of Grove	**:** Family
Annual festival	**:** Kumbam Ayiliam

Asharikavu, Chembra

This grove is situated 4 km away from Mahe town. Kunnoth Sri Bhagavathy temple is popularly known as Ashari Kavu. It was restored during the year 2010. It is run by the Kunnoth family. The pooja is conducted during Tuesday and Fridays only. Ganapathi Homam is performed by the offerings made by the devotees. Vellatam is the votive offerings made by the devotees. Sankaramam pooja is performed on the last day of every Malayalam month. Species found in the grove are *Acampe praemosa*, *Anacardium occidentale*, *Artocarpus heterophyllus*, *Chromolaena odoratum*, *Cocos nucifera*, *Costus speciosus*, *Cyclea peltata*, *Cyrtococcum deccanense*, *Drynaria quercifolia*, *Erythrina indica*, *Flueggea leucopyrus*, *Macaranga peltata*, *Mallotus phillipensis*, *Mangifera indica*, *Mimosa pudica*, *Mimusops elengi*, *Oplesmenus compositus*, *Plumeria alba*, *Pothos scandens*, *Strychnos nux-vomica*, *Tectona grandis*, *Tinospora cordifolia* and *Triumfetta rhomboidea*. Few species of Pteridophytes and bryophytes are also present (**Table 9; Plate X**). About 30 years back *Ficus benghalensis* was once a keystone species which is totally destroyed due to lack of fund and maintenance.

Name of the sacred grove	**:** Asharikavu
Village	**:** Chembra
Geographical Information	**:** Latitude 11˚73'19" N, Longitude 75˚53'15" E
Size of the Grove	**:** 9 cents
Age of the Grove	**:** 100 years
Any water Source	**:** Well
Nature of Shrine	**:** Sankalpam
Presiding deity	**:** Sri Porkali Bhagavathy
Minor deities	**:** Sasthapan**,** Gulikan, Tampuratti, Chamundi, Vishnumurthy, Karnavar (Guru), Bhairavan
Priest hood	**:** Namboodiri
Offerings	**:** Coconut Oil, Rice, Money
Metallic structures	**:** Bell
Rituals/Taboos/Beliefs	**:** Similar to Koduganallur
Restriction to caste/Gender	**:** No
Dominant social group/Community	**:** Hindus
Conservation status	**:** Poor due to lack of fund
Ownership pattern	**:** Tharavadu
Any restrictions exist	**:** No
Are the outsiders involved in the protection of Grove	**:** Tharavadu/Neighbours
Changing Scenario	**:** Try to revive the grove
Clearing of ground flora	**:** Yes
Annual festival	**:** March 23, 24 (Meenam 9, 10)

Sri Peradayath Tharavadu Kannan Kattiya Bhagavathy Sthanam, Pandakkal

This grove is situated 5 km away from Mahe. The main deity is Sri Bhadrakali on a peedam. Earlier the origin of the grove was in Kadanapalli at Payyanur. Koumaran used to go to Payyanur and do the rituals but finally when he was tired of travelling due to old age, the Godesses came and sat in this place which is now at Pandakkal. Theyyam of the main deity is performed by the Peruvannan community. Ther is no vellatam. Animal sacrifice is performed by the kavu to propitiate the deity. Since 2006 they celebrate annual festival along with Annadhanam. Sankramam pooja is performed on the last day of every Malayalam month throughout the year. Navami and vishu festival is celebrated in the kavu. On the Malayalam month of Meenam from the day of punartham star followed by 5 days, evening pooja is performed. Taxonomically a total of 79 species were recorded. Of the total species 34 are herbs, 9 shrubs, 28 trees and 8 are climbers (**Table 10**). *Borassus flabellifer* is found in this grove.

Name of the sacred grove	**:** Sri Peradayath Tharavadu Kannan Kattiya Bhagavathy Sthanam
Village	**:** Pandakkal
Geographical Information	**:** Latitude 11˚75'50" N, Longitude 75˚53'82" E
Size of the Grove	**:** 25 cents
Age of the Grove	**:** 800 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Pond/Well - permanent
Nature of Shrine	**:** Tiles
Presiding deity	**:** Bhagavathy
Priest hood	**:** Vanniyar Community
Offerings	**:** Flowers especially *Ixora*, *Ocimum*; rice, vilakku, Aripayasm
Votive offerings	**:** Coconut Oil
Metallic structures	**:** Sword
Restriction to caste/Gender	**:** No
Conservation status	**:** Poor
Ownership pattern	**:** Tharavadu
Distance from which people come to offer worship to the deity	**:** Nearby places
Any restrictions exist	**:** No
Annual festival	**:** February 3, 4 (Makaram 20, 21)

Pandokoolothu Paradevatha Bhagavathy temple, Pandakkal

The grove is located in Pandakkal which is 4 km away from Mahe. The main deity is Paradevatha shelterd in the concrete temple complex. Earlier the roof was made of hay and coconut leaf and since 1950 it was made of tiles. Lighting of the lamp is restricted to evening. Devotees offer coconut oil, incense sticks, money etc as offerings. Many vellattam are booked earlier by the devotees as votive offerings in case of fulfillment of the vows. The last of Theyyam festival in Mahe is held in this grove. The festival lasts for 3 days. First day is kavukairinnu, 2nd day is vellattam and 3rd day is thera. Munnuttan performs the theyyam. After theyyam, the greviences of the devotees are told and pariharam is suggested by the theyyam. The 3 groves Pandokavu, Manikampoyil kavu and pandokooloth are interrelated. From Pandokadu to Moolakadavu, 40 villages together stand with unity and conduct this theyyam festival grandly.

A total of 134 species are recorded which include 78 herbs, 12 shrubs, 38 trees and 6 climbers.

The dominant species include *Alstonia scholaris*, *Artocarpus heterophyllus*, *Ficus religiosa*, *Mimusops elengi and Strychnos nux-vomica*.

Name of the sacred grove	**:** Pandokoolothu Paradevatha Bhagavathy temple
Village	**:** Pandakkal
Geographical Information	**:** Latitude 11˚75'63" N, Longitude 75˚53'76" E
Size of the Grove	**:** 90 cents
Age of the Grove	**:** 600 years approx.
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Tiles
Presiding deity	**:** Paradevatha
Minor deities	**:** Bhagavathy
Priest hood	**:** Namboodiri from Pandokavu
Offerings	**:** Mainly coconut oil, flowers
Votive offerings	**:** Vallattam, Pattu, Velli alrupam
Imagines/Icones	**:** Panchalokam vigraham on charupedam made of wood
Metallic structures	**:** Sword
Restriction to caste/Gender	**:** Nil
Dominant social group/Community	**:** Nair
Conservation status	**:** Moderate
Ownership pattern	**:** Earlier Tharavadu, now under trust from 2010
Frequency of offerings	**:** Now and then offered by devotees
Distance from which people come to offer worship to the deity	**:** Nearby places
Changing Scenario	**:** Karnavar (Tharavadu building); new office at temple premises donated by devotees by way of offerings concrete temple complex is under construction
Animals/ Birds/Insects	**:** Bat found on *Alstonia scholaris*
Introduction of exotic plants/ commercially important plants	**:** *Santalum album*
Clearing of ground flora	**:** Yes
Sacred plant	**:** *Alstonia scholaris*, *Ficus religiosa*
Annual festival	**:** April 13, 14, 15

Sri Manikampoyil Bhagavathy Temple, Pandakkal

The grove is located in Pandakkal just a km from Pandokooloth kavu. The main deity is Bhagavathy sheltered under the tree *Strychnos nuxvomica* and *Mimusops elengi*. The daily pooja is restricted to the lighting of the lamp in the morning and evening. Vellatam is not performed in this kavu. Namboodiri from Pandokavu does the rituals. On Tuesdays and Fridays there is "Pooyam" for Gulikan deity. Sankaramam pooja is performed on the last day of every Malayalam month. Every year Prathista thinam is celebrated on 11th of February. On that day Mahaganapathi Homam, Mahamyrthunjaya Homam and Prathista pooja is performed in the morning. In Sarpakavil Kathalipazham nivedhyam, Noorum Palum, Vella nivedhyam is offered

to the deity. In the noon there is prasadha Ootu. In the evening Sarpa Bali and Bhagavathy Seva are performed.

A total of 91 species were analysed. Of these 44 are herbs, 13 are shrubs, 27 trees and 7 are climbers. The phytodiversity of the grove is depicted in Table 10. There is only one tree of *Careya arbora* belonging to Lecithydaceae. Mundaveetil a place where Tacholi Udayan came for Lunch and the pond where Thacholi Udayan took bath is a remarkable event in the history of mankind.

Name of the sacred grove	**:** Sri Manikampoyil Bhagavathy Temple
Village	**:** Pandakkal
Geographical Information	**:** Latitude 11˚75'60" N, Longitude 75˚53'95" E
Size of the Grove	**:** 1 Acre (approx.)
Age of the Grove	**:** More than 500 yrs.
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Open
Presiding deity	**:** Bhagavathy
Minor deities	**:** Gulikan, Karanavar, Kandakarnan, Sasthappan, Ellerathu Bhagavathi
Priest hood	**:** Namboodiri
Offerings	**:** Money, Flowers, Coconut oil
Votive offerings	**:** Coconut oil, Lamp, Pattu, Tender Coconut
Restriction to caste/Gender	**:** Muslims not allowed
Dominant social group/Community	**:** Thiyya, Nair
Conservation status	**:** Average
Ownership pattern	**:** Trust
Frequency of offerings	**:** Now and then offered by devotees
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG : No	
Are the outsiders involved in the protection of Grove	**:** No
Clearing of ground flora	**:** Yes
Key stone species	**:** *Mimusops elengi*, *Strychnos nux-vomica*
Annual festival	**:** February 22, 23, 24

Oorothumal Sri Angakaran Temple, Pandakkal

This grove is situated on the way to Pandakkal which is 3 km away from Mahe. The nature of shrine was made of coconut leaves and was destroyed in the year 1948. It has been renovated

since 12 years. Earlier run by Namboothiri's family and now by the thiyya family. In Mahe the theyyam festival starts first in this grove. For the main deity Angakaran and Bhagavathy Uthamam pooja is performed where as for the subdeities Gulikan, Veeran and Karnavar Madhyam pooja is performed. Sankramam pooja is performed on the last day of every Malayalam month. The devotees chant bhajans in the evening on all Sundays. Lighting of the lamp is restricted to evenings on all days. The other rituals include Ganapathi Homam, Pal payasam, betel, Sandal wood, rice taken after the first harvest from the family. Wood obtained from the grove is used as fuel. There is a belief by the devotees that food prepared by using the wood of *Strychnos nux-vomica* will taste bitter. *Aegle marrmelos* will be decorated during the theyyam festival. The owners say that there is a decrease in the number of people who performs theyyam in the community.

The phytodiversity of the grove is analysed representing a total of 100 species. Of these 55 are herbs, 16 shrubs, 22 trees and 7 are climbers (**Table 10**).

Name of the sacred grove	**:** Oorothumal Sri Angakaran Temple
Village	**:** Pandakkal
Geographical Information	**:** Latitude 11˚75'69" N, Longitude 75˚54'11" E
Size of the Grove	**:** 1 ¼ Acre
Age of the Grove	**:** Approx. 500 years
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Concrete
Presiding deity	**:** Angakaran (incarnation of Shiva)
Minor deities	**:** Bhagavathy, Gulikan, Angakaran, Veeran, Karnavar
Priest hood	**:** Eldest from family itself
Offerings	**:** Coconut, Avil, Malar, Koovalam, Ixora
Votive offerings	**:** Coconut oil, Lamp, Toddy, Rice, Vegetables, Silver and Gold in case of birth of a child
Metallic structures	**:** Bell
Restriction to caste/Gender	**:** No
Dominant social group/Community	**:** Thiyya**,** Nair
Conservation status	**:** Moderate
Ownership pattern	**:** 7 years (Trust); now Individual family
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG	**:** Wood
Any restrictions exist	**:** Yes/No
If yes	**:** Fear of deity/ Traditional/Trust restriction/
Are the outsiders involved in the protection of Grove	**:** Forest office/Priest/Political leaders/Community/Family/
Changing Scenario	**:** Construction of concrete building since 12 years

Animals/ Birds/Insects	**:** Udumpu**,** Porcupine, mongoose
Introduction of exotic plants/ commercially important plants	**:** *Scaveola taccada*
Clearing of ground flora	**:** Yes, during onset of annual festival
Annual festival	**:** January 13, 14, 15 (Makaram 27, 28, 29)

Urmi Temple, Mahe

This grove is situated in Mahe proper. It is totally disintegrated due to lack of man power. There is no worship for so many years (75 yrs) and also at present. During 1950 - 1951 thira festival was conducted and thereafter till date no rituals are performed. Regular poojas are not performed and the maintenance is very poor. Vegetation is totally disturbed, the canopy cover is not found. It is under restoration. The keystone species is *Alstonia scholaris* with lot of bats. The notable species found in this grove are *Adenanthera pavonia*, *Artocarpus heterophyllus*, *Bombax ceiba*, *Borassus flabellifer*, *Caryota urens*, *Cocos nucifera*, *Holigarna arnottiana*, *Macaranga peltata*, *Plumeria alba* and *Tectona grandis.*

Name of the sacred grove	**:** Urmi Temple
Village	**:** Mahe
Geographical Information	**:** Latitude 11˚70'24" N, Longitude 75˚53'92" E
Size of the Grove	**:** Approx. 10 cents
Age of the Grove	**:** Approx. 200 years
Any water Source	**:** No
Nature of Shrine	**:** Shrine disturbed
Presiding deity	**:** Ghandakaran
Minor deities	**:** Guligan, Karnavar, Sasthappan, Devi
Conservation status	**:** Poor
Ownership pattern	**:** Tharavadu
Any restrictions exist	**:** Yes
Are the outsiders involved in the protection of Grove	**:** No
Changing Scenario	**:** Restoration work is going on
Animals/ Birds/Insects	**:** Bat and Monkeys
Clearing of ground flora	**:** No
Annual festival	**:** Nil

Puthalam BhagavathyTemple, Mahe

This grove is very famous in Mahe since French rule. Mahatma Gandhi visited this grove during January 13, 1934. The origin of the kavu is at the back of the temple - a small house from where

the rituals are performed during the theyyam festival. This grove was reconstructed in memory of C.C. Balakrishnan on January 29, 1990. During French rule Tholamoopan started so it is called Tholamoopan thera. For a long period it was not functional due to lack of fund and it has been revived since 3 years. Daily pooja is performed on all days for the deities. Apart from lighting of the lamp on all days in the morning and evening, Sankramam pooja is performed on the last day of every Malayalam month. On Tuesdays and Fridays kalasampooja is performed for Gulikan deity. Vellatam is performed only for Gulikan deity as votive offerings. During Mandala Masam 41 day's pooja is performed by the family members. No contribution is made for conducting the theyyam festival.

The dominant species include *Ficus benghalensis*, *F. religiosa*, *Mimusops elengi* and *Sterculia foetida*. The other species include *Acampe praemorsa*, *Aegle marmelos*, *Ageratum conyzoides*, *Biophytum sensitivum*, *Blumea oxyodonta*, *Colocasia esculenta*, *Cyclea peltata*, *Desmodium triflorum*, *Eragrostis amabilis*, *Justicia nagapurensis*, *Leucas aspera*, *Ludwigia prostrata*, *Mimosa pudica*, *Ocimum tenuiflorum*, *Scoparia dulcis*, *Spermacoce latifolia*, *Sporobolus diandrus* and *Tectona grandis*.

Name of the sacred grove	**:** Puthalam BhagavathyTemple
Village	**:** Mahe
Geographical Information	**:** Latitude 11˚69'96" N, Longitude 75˚54'00" E
Size of the Grove	**:** 50 cents
Age of the Grove	**:** 200 years (approx.)
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Well - permanent
Nature of Shrine	**:** Concrete layered with brass and copper
Presiding deity	**:** Bhagavathy
Minor deities	**:** Kuttichathan, Gulikan
Priest hood	**:** Family members
Offerings	**:** Coconut oil, Coconut, Camphor, Agarbhathi
Imagines/I cones	**:** Big lamp on either side
Restriction to caste/Gender	**:** No
Conservation status	**:** Moderate
Ownership pattern	**:** Tharavadu
Distance from which people come to offer worship to the deity	**:** Nearby places
Material benefits from the SG : nil	
Clearing of ground flora	**:** Yes
Key stone species	**:** *Sterculia foetida, Ficus benghalensis, F. religiosa*
Annual festival	**:** March 6, 7, 8

Chirakandoth temple, Palloor

This grove is situated 1 km away from Palloor proper. It was once a fully fledged grove, later gradually unable to run the grove for the past 95 years due to lack of fund. Then restoration work was going on and started functioning during the year 2004. It got renovated on Jan 28 and 29, 2012. Apart from the daily poojas Sankaramam pooja is also performed on the last day of every Malayalam month. Species found in this grove include *Areca catechu, Artocarpus heterophyllus, Cassia fistula, Centella asiatica, Chromolaena odorata, Cissus repens, Clerodendrum infortunatum, Cocos nucifera, Dendrophthoe falcata, Desmodium triflorum, Eclipta prostrata, Elelutheranthera ruderalis, Ficus hispida, Glyricidia sepium, Hibiscus hispidissimus, Leea indica, Macaranga peltata, Mallotus phillipensis, Mangifera indica, Mikania micrantha, Mimosa pudica, Mussaenda bellila, Myrstica fragrans, Naregamia alata, Ocimum basilicum, O. gratisisimum, O. tenuiflorum, Oplismenus composites, Pennisetum polystachyon, Piper nigrum, Pothos scandens, Saraca asoca, Scoparia dulcis, Sporobolus diandrus, Strychnos nux-vomica, Syzygium jambos, Thunbergia grandiflora, Triumfetta rhomboidea*. The lower forms include *Selaginella delicatula, Stenochlaena palustris, crustose lichen* and *Polyporus* sp.

Name of the sacred grove	**:** Chirakandoth temple
Village	**:** Palloor
Geographical Information	**:** Latitude 11˚72'88" N, Longitude 75˚54'30" E
Size of the Grove	**:** 22 cents
Age of the Grove	**:** 500 years old
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Pond/Well - permanent
Nature of Shrine	**:** Tharupidam with sword
Presiding deity	**:** Sri Porkali Bhagavathy
Minor deities	**:** Guru, Gulikan, Ghandakarnan, Karnavar, Bhapooran, Angakaran
Priest hood	**:** Namboodiri from Parimadam temple
Offerings	**:** Flowers (*Ixora*, *Hibiscus*, *Lotus*, *Ocimum*), Coconut oil, Money
Conservation status	**:** Moderate
Ownership pattern	**:** Joint family
Any restrictions exist	**:** Yes
If yes	**:** Traditional
Are the outsiders involved in the protection of Grove	**:** Neighbours
Changing Scenario	**:** Restoration work is going on
Introduction of exotic plants/ commercially important plants	**:** *Strychnos nux-vomica, Mallotus phillipensis*

Clearing of ground flora	**:** During annual festival
Annual festival	**:** April 3, 4, 5; December 17 Vilakku pooja

Cheriyath Mandola, Mahe

This grove is situated in Mahe. Daily poojas are not performed in this grove. The pooja is performed only twice in a year - one on the month of Thulam 10th and during festival Kumbam. Munnoottan and Vannan are the two communities who perform the theyyam dances and Malayan community perform the drums. During festival season family members observe fasting only by eating Vegetarian food. For poojas cow's milk, pepper and turmeric powder is brought to temple from tharavadu as procession and these items are taken by young girls belonging to Cheriyath family. A total of 11 species which include *Abrus precatorius*, *Anacardium occidentale*, *Bombax ceiba*, *Caryota urens*, *Cocos nucifera*, *Drynaria quercifolia*, *Ficus religiosa*, *Peltophorum pterocarpum*, *Pothos scandens*, *Sansevieria roxburghiana* and *Tectona grandis*.

Name of the sacred grove	**:** Cheriyath Mandola Kavu
Village	**:** Mahe
Geographical Information	**:** Latitude 11˚69'82" N, Longitude 75˚54'16" E
Size of the Grove	**:** ½ Acre
Age of the Grove	**:** Unknown
Any water Source	**:** Yes
If yes, nature & duration of water source	**:** Pond - permanent
Nature of Shrine	**:** Theyya Kavu
Presiding deity	**:** Angakkaran
Minor deities	**:** Thonoolappan, Poothadi, Cheria Thampuratty, Valiathampuratty, Thekkan Kariyathan, Valiya karnavar, Cheria Karnavar
Priest hood	**:** Thiyya Community (Komaran)
Offerings	**:** Coconut oil, Raw Rice, Tender Coconut, Cow Milk, Turmeric powder, Pepper
Votive offerings	**:** Coconut oil, Ghee lamp, representative forming Theyyam
Imagines/I cones	**:** Peeta prathista
Metallic structures	**:** Panchaloha
Restriction to caste/Gender	**:** No restriction
Dominant social group/Community	**:** Ezhava
Conservation status	**:** Average
Ownership pattern	**:** Tharavadu

Distance from which people come to offer worship to the deity	**:** Nearby areas
Material benefits from the SG	**:** Nil
Any restrictions exist	**:** Yes
If yes	**:** Traditional
Introduction of exotic plants/ commercially important plants	**:** *Tectona grandis, Peltophorum pterocarpum*
Clearing of ground flora	**:** During onset of annual festival
Keystone species	**:** *Ficus religiosa*
Annual festival	**:** February 24, 25, 26 **(**Kumbam 12, 13, 14**)**

Kakottidathil Paradevatha temple, Palloor

This grove is located in Palloor near spinning mill. The biodiversity of the grove are destroyed. Due to the splitting of the joint family and due to lack of fund maintenance of the grove became difficult. The main deity is Bhagavathy and the subdeity is Paradevatha. Balaleyam (temporary prathista) is kept and the grove is under restoration.

RITES AND RITUALS

The sacred groves are the sites for socio-cultural and spiritual interactions. The owners of the kavu take the responsibility of conducting the rituals. The traditional customs, rites, rituals, taboos, folklore and faith creates an emotional bond between culture and conservation. They respect these taboos with much sincerity even today. They observe rituals and organize festivals to please the deities and to ward off dangers in the form of sickness, epidemics and demanding good health. If they violate the laws of sacred groves they will have to face untoward incident due to wrath of deity. Daily pooja is performed only in Pandakal Ayyappan kavu and Chembra Ayyappan kavu whereas in other groves no daily pooja is performed, instead lighting of the lamps is done in the morning and evening. Offerings such as money, flowers, coconut oil are made at all times.

Theyyam festival has been celebrated once in every year by Vannan and Munuttan community and Malayan tribe. Vellattam, Bhagavathy Thira and Theyyam are performed by various communities. Characters such as Angakaran, Bhapooran and Gulikan are played by Malayan community, Bhagavathy by Munnuttan community and Kuttichathan and Karnavar by Vannan

community. Sasthappan is incarnation of Vishnu, Gulikan is incarnation of Lord Shiva and Karnavar is incarnation of Guru. The performers are decorated with costumes and magnificent make up and gorgeous colours (**Plate XII**).

Vellattam is performed as votive offerings by the devotees. Thottam is the ritual song recited at the beginning of the theyyam. The song is the poetic narration of the legend of the deities and also the importance of sacred groves. The theyyam after their performance sits on a wooden peedam and bless the devotees by offering flowers and also tells prophecies. People native to Mahe and neighbouring parts of Kerala who live abroad also come during the festival time and attend these rituals.

A strict code of conduct has been observed by the owners of kavu and local people in protecting the sanctity of sacred groves. For instance, wearing of footwear is not permitted inside the grove. Women are not allowed to enter during menstrual period. Men are not allowed to wear shirt inside the sanctum sanctorum of the Ayyappan grove. Devotees are restricted to enter the sanctum of the Sarpakavu. Either after birth or a death in a family entry inside the grove is strictly prohibited for anyone from the family for 16 days. There is no sacrifice of animals in the grove except in Sri Puthalam and Sri Peradyath grove, where hens are sacrificed to appease the deity in these groves.

IMPORTANCE OF TREE SPECIES

Trees have been given a deep religious significance; they are revered and respected throughout the ages. Tree worship is unique and influences plant conservation which in turn helps to protect the genetic diversity. During the present study it has been observed that in most of the kavu the prime deities were found only under the tree.

Mangifera indica is considered a sacred tree in Koyyodan Koroth and the prime deity of the grove is placed under the tree on a laterite platform. *Strychnos nux-vomica* and *Mimusops elengi* are also considered sacred and found in the original site of the deity. Devotees do not cut *Strychnos nux-vomica* especially because of the fear of wrath of deities. If the tree is gone astray, the grove owners plant a sapling of it again. The principal deity is placed under *Mimusops elengi* and *Mallotus philippensis* trees in Manikampoyil sacred grove. *Ficus drupacea* is the sacred tree

at Sri Nelliyat Kalari Bhagavathy temple. The 500-year old vilvam tree (*Aegle marmelos*) in Oorothumal grove is considered the sacred tree of the grove. The two tall *Sterculia foetida* trees found in the premises of Puthalam temple are considered sacred on which the flag is hoisted on the first day of the annual festival. *Ficus benghalensis* and *F. religiosa* are also considered sacred. A tree of *Butea monosperma*, believed to be 500-year old found in Pandakkal Ayyappan kavu is considered sacred, might be the remnant of the evergreen forest exist in the past. *Alstonia scholaris*, *Ficus benghalensis*, *F. drupacea*, *F. religiosa*, *Mangifera indica* and *Mimusops elengi* are the predominant species in most of the groves (**Plate XIII, XIV**). Most of the arboreal species found in the sacred groves are indigenous, representing the local flora. The owners of kavu grow plant species of interest. This practice prevents the risk of species becoming threatened; certain species recorded rare in the wild are found in the grove. These arboreal species are also conserved as germplasm reserves in the name of sacred trees. Most of the sacred groves are associated with ponds, rivulets, wells and they act as micro watersheds which help to recharge the underground water table (**Plate XV**).

ENDEMISM

Sacred groves are ecologically important as they preserve the genetic diversity of many native species. They harbour a good number of rare, endemic and endangered species of flora and fauna (Induchoodan, 1988, 1996; Gadgil & Vartak, 1975, 1981; Jain & Rao, 1983, Sukumaran & al., 2005). Though smaller in size they are repositories of endemic flora and act as last refugia for various birds and animals, and serve as centres of dispersal, regeneration and restoration of RET species. During the present study 14 endemic species have been recorded from the sacred groves (**Table 12**).

Table 12 - List of Endemic plants

Sl. No.	Binomial	Habit	Family	Sacred Groves	Status
1	*Artocarpus hirsutus* Lam.	T	Moraceae	PA, CA	EN
2	*Cissus repens* Lam.	C	Menispermaceae	PA, CA, KK, NK, KB	
3	*Curcuma oligantha* Trimen var. lutea (R. Ansari & al.) K.G. Bhat	H	Zingiberaceae	PK	T
4	*Globba sessiliflora* Sims	H	Zingiberaceae	PA, CA, KK, VP, MP	
5	*Holigarna arnottiana* Hook.f.	T	Anacardiaceae	PA, PL, CA	T
6	*Hydnocarpus pentandrus* (Buch.-Ham.) Oken	T	Flacourtiaceae	PA (Western Ghats)	EN
7	*Impatiens minor* (DC.) S.M. Almeida	H	Balsaminaceae	PA, CA, KK, VP, OR (Peninsular India)	
8	*Ixora johnsonii* Hook.f.	C	Rubiaceae	PA	R
9	*Jasminum malabaricum* Wight	C	Oleaceae	PA (Maharashtra, Karnataka, Kerala and Tamil Nadu)	R
10	*Justicia nagpurensis* V.A.W. Graham	H	Acanthaceae	PA, CA, KK,PP, KB, VP, PD, PK, MP, OR	
11	*Kamettia caryophyllata* (Roxb.) Nicolson & Suresh	S	Apocynaceae	PA	T
12	*Mussaenda bellila* Buch.-Ham.	S	Rubiaceae	PA, CA, KB, PK, MP	
13	*Pterocarpus santalinus* L.f.	T	Fabaceae	KK, PP, PK	
14	*Vateria indica* L.	T	Dipterocarpaceae	CA, VP (Western Ghats of Karnataka, Kerala and Tamil Nadu)	TW

PA - Pandokavu Sri Ayyappan Temple; **PL** - Panolil Kavu; **CA** - Chembra Sri Ayyappan Kavu; **KK** - Sri Koyyodan Koroth Temple; **NK** - Sri Nelliyat Kalari Bhagavathy Temple; **PP** - Puthan Pura Sri Bhadrakali Temple; **KB** - Kizhanthur Bhagavathy Kavu; **VP** - Sri Varaprath Kavu; **PD** - Sri Peradayath Tharavadu Kannan Kattiya Bhagavathy Sthanam; **PK** - Pandokoolothu Kavu; **MP** - Sri Manikampoyil Bhagavathy Temple; **OR** - Oorothumal Sri Angakaran Temple. R- Rare, E - endangered, T - threatened, TW - threatened in the wild.

PHYTOSOCIOLOGICAL STUDIES OF THE MAJOR GROVES

Many works on the ecological aspects of the sacred groves have been carried out (Induchoodan, 1988, 1998; Kadamban, 1998, Anupama, 2009.) Ecological studies of two major groves Pandokavu Sri Ayyappan Temple and Chembra Sri Ayyappan Kavu have been carried out.

Importance Value Index (IVI)

Of the various sacred groves studied, two major groves, ie. Chembrakavu and Pandokavu were subjected to Importance Value Index (IVI) studies, as proposed by Curtis, 1959. This index is used to determine the overall importance of each species in the community structure. For calculating this index, percentage values of relative frequency, relative density and relative abundance are summed up. The results are depicted in **Table 13 - 16**.

Similarity and dissimilarity indices

Indices of similarity and dissimilarity among the two groves were calculated using formulae as per Misra (1989) and Sorensen (1948) as follows:

Index of similarity (S) = 2C/A+B

Where, A = Number of species in the community A

B = Number of species in the community B

C = Number of common species in both the communities

Index of dissimilarity = 1-S

Accordingly the index of similarity / dissimilarity of the two groves was worked out and the results are represented.

Table 13 - Results of the vegetation analysis of Chembra Kavu using Line transect method

Sl. No	Name of species	Transects																			
		0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20
1	*Caryota urens*	1						1		1		2				1			1		
2	*Vateria indica*	9	4	5	7	9	5	7	8	7	10	6	3	1	9	3	4	4	4	10	2
3	*Olea dioica*				1																
4	*Antidesma montanum*	2	2	1	2	2		1	1	2		1	2		1	1	1	1	1		1
5	*Mimusops elengi*						1														
6	*Chassalia curviflora* var. *ophioxyloides*		1		1	1					2		2	1		1					
7	*Holigarna arnottiana*						1			2		1									
8	*Microcos paniculata*																		1	1	
9	*Anamirta cocculus*						1	1									1				
10	*Mallotus philippensis*								1									1			
11	*Acacia auriculiformis*														1					2	1
12	*Leea indica*																2	2		1	
13	*Adenanthera pavonia*	1	1																		
14	*Areca catechu*									2											
15	*Carallia brachiata*											1	1	1		1					1
16	*Mangifera indica*												1								
17	*Mussaenda bellila*												1	1							
18	*Chromolaena*													1	8	7	4		3	4	4

	odorata																				
19	*Hyptis suaveolens*														1						
20	*Anacardium occidentale*																	3			

Table 14 - Results of the Importance Value Index of Chembra Kavu

Sl. No	Name of species	Frequency	Relative frequency	Density	Relative density	Abundance	Relative abundance	IVI
1	*Caryota urens*	30	6.896	0.35	2.592	1.16	3.116	12.6
2	*Vateria indica*	100	22.988	6.85	50.740	6.85	18.296	92.02
3	*Olea dioica*	5	1.149	0.05	0.370	1	2.670	4.19
4	*Antidesma montanum*	80	18.390	1.9	14.074	2.37	6.343	38.80
5	*Mimusops elengi*	5	1.149	0.05	0.370	1	2.670	4.19
6	*Chassalia curviflora var. ophioxyloides*	35	8.045	0.45	3.333	1.28	3.434	14.81
7	*Holigarna arnottiana*	15	3.448	0.2	1.481	1.33	3.561	8.49
8	*Microcos paniculata*	10	2.298	0.1	0.740	1	2.670	5.71
9	*Anamirta cocculus*	15	3.448	0.15	1.111	1	2.670	7.23
10	*Mallotus philippensis*	10	2.298	0.1	0.740	1	2.670	5.71
11	*Acacia auriculiformis*	15	3.448	0.2	1.481	1.33	3.561	8.49
12	*Leea indica*	15	3.448	0.4	2.962	2.66	7.122	13.53
13	*Adenanthera pavonia*	10	2.298	0.1	0.740	1	2.670	5.71
14	*Areca catechu*	5	1.149	0.1	0.740	2	5.341	7.23
15	*Carallia brachiata*	25	5.747	0.25	1.851	1	2.670	10.26
16	*Mangifera indica*	5	1.149	0.05	0.370	1	2.670	4.19

17	*Mussaenda bellila*	10	2.298	0.1	0.740	1	2.670	5.71
18	*Chromolena odorata*	35	8.045977	1.9	14.07407	5.42	14.49966	36.61
19	*Hyptis suaveolens*	5	1.149425	0.05	0.37037	1	2.670991	4.19
20	*Anacardium occidentale*	5	1.149425	0.15	1.111111	3	8.012972	10.27

Table 15 - Results of the vegetation analysis of Pandokavu using Line transect method

Sl. No	**Name of species**	**Transects**									
		0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10
1	*Mimusops elengi*	1							1		
2	*Acacia caesia*	1	1					1		1	3
3	*Sarcostigma kleinii*		1	1	1	2	1		1	1	
4	*Chassalia curviflora var. ophioxyloides*	5	8		1	5	2	9	2	5	5
5	*Antidesma montanum*	5	3	1	2	3	5	2			12
6	*Adenanthera pavonia*		1								
7	*Sterculia guttata*			1		1					
8	*Caesalpinia sappan*				1						
9	*Pothos scandens*		1	1	2	1		1			2
10	*Canthium rheedei*						1				
11	*Smilax zeylanica*	1	1		3	1	1	1		1	1
12	*Jasminium multiflorum*	1	1						2		
13	*Caryota urens*	6	9	3	1	3	5	4	4	9	9
14	*Leea indica*	3	5	3	5	4	4	4	2	8	4
15	*Stenochlaena palustris*	7	6	5	3	5	11	6	4	2	3
16	*Raphidophora pertusa*	1	1		1			1	1	1	1

17	*Cissus repens*			1	1			1	1		1
18	*Ipomoea quamoclit*										1
19	*Artrocarpus hirisutus*		2								
20	*Diploclisia glaucescens*	1	1		1	2					
21	*Connarus monocarpus*	1		1			3				
22	*Hibiscus rosa-sinensis*								1		
23	*Maranta arundinacea*			4	3	2	2				
24	*Ficus hispida*	1				1					1
25	*Microcos paniculata*							2	1		
26	*Mikania micrantha*								1		
27	*Bridelia retusa*									1	
28	*Macaranga peltata*									1	1
29	*Holigarna arnottiana*										1
30	*Mallotus philippensis*					1	1				2
31	*Uvaria narum*	1									
32	*Mussanda bellila*	1							1		
33	*Chrysophyllum roxburghii*	1									
34	*Morinda citrifolia*		1		1			1	1		
35	*Zizyphus oenoplia*		1		1	1	1			1	
36	*Cryptocoryne spiralis*				1			1		1	
37	*Citrus medica*					1					
38	*Triumfetta rhomboidea*						1				1
39	*Melastoma malabathricum*							1	2		
40	*Ficus heterophylla*								1		
41	*Urena lobata*										1

Table 16 - Results of the Importance Value Index of Pandokavu

Sl. No.	Name of species	Frequency	Relative frequency	Density	Relative Density	Abundance	Relative Abundance	IVI
1	*Mimusops elengi*	20	1.379	0.2	0.584	1	1.516	3.480
2	*Acacia caesia*	50	3.448	0.7	2.046	1.4	2.122	7.617
3	*Sarcostigma kleinii*	70	4.827	0.8	2.339	1.142	1.732	8.899
4	*Chassalia curviflora var. ophioxyloides*	90	6.206	4.2	12.280	4.666	7.075	25.563
5	*Antidesma montanum*	80	5.517	3.3	9.649	4.125	6.254	21.420
6	*Adenanthera pavonia*	10	0.689	0.1	0.292	1	1.516	2.498
7	*Sterculia guttata*	20	1.379	0.2	0.584	1	1.516	3.480
8	*Caesalpinia sappan*	10	0.689	0.1	0.292	1	1.516	2.498
9	*Pothos scandens*	60	4.137	0.8	2.339	1.333	2.021	8.498
10	*Canthium rheedei*	10	0.689	0.1	0.292	1	1.516	2.498
11	*Smilax zeylanica*	80	5.517	1	2.923	1.25	1.895	10.33
12	*Jasminium multiflorum*	30	2.068	0.4	1.169	1.333	2.021	5.260
13	*Caryota urens*	100	6.896	5.3	15.497	5.3	8.036	30.429
14	*Leea indica*	100	6.896	4.2	12.280	4.2	6.368	25.545
15	*Stenochlaena palustris*	100	6.896	5.2	15.204	5.2	7.884	29.98
16	*Raphidophora pertusa*	70	4.827	0.7	2.046	1	1.516	8.390
17	*Cissus repens*	50	3.448	0.5	1.461	1	1.516	6.426
18	*Ipomoea quamoclit*	10	0.689	0.1	0.292	1	1.516	2.498
19	*Artrocarpus hirisutus*	10	0.689	0.2	0.584	2	3.032	4.306
20	*Diploclisia glaucescens*	40	2.758	0.5	1.461	1.25	1.895	6.115

Sl. No.	Name of species	Frequency	Relative frequency	Density	Relative Density	Abundance	Relative Abundance	IVI
21	*Connarus monocarpus*	30	2.068	0.5	1.461	1.666	2.527	6.058
22	*Hibiscus rosa-sinensis*	10	0.689	0.1	0.292	1	1.516	2.498
23	*Maranta arundinacea*	40	2.758	1.1	3.216	2.75	4.169	10.144
24	*Ficus hispida*	30	2.068	0.3	0.877	1	1.516	4.462
25	*Microcos paniculata*	20	1.379	0.3	0.877	1.5	2.274	4.530
26	*Mikania micrantha*	10	0.689	0.1	0.292	1	1.516	2.498
27	*Bridelia retusa*	10	0.689	0.1	0.292	1	1.516	2.498
28	*Macaranga peltata*	20	1.379	0.2	0.584	1	1.516	3.480
29	*Holigarna arnottiana*	10	0.689	0.1	0.292	1	1.516	2.498
30	*Mallotus philippensis*	30	2.068	0.4	1.169	1.333	2.021	5.260
31	*Uvaria narum*	10	0.689	0.1	0.292	1	1.516	2.498
32	*Mussanda bellila*	20	1.379	0.2	0.584	1	1.516	3.480
33	*Chrysophyllum roxburghii*	10	0.689	0.1	0.292	1	1.516	2.498
34	*Morinda citrifolia*	40	2.758	0.4	1.169	1	1.516	5.444
35	*Zizyphus oenoplia*	50	3.448	0.5	1.461	1	1.516	6.426
36	*Cryptocoryne spiralis*	30	2.068	0.3	0.877	1	1.516	4.462
37	*Citrus medica*	10	0.689	0.1	0.292	1	1.516	2.498
38	*Triumfetta rhomboidea*	20	1.379	0.2	0.584	1	1.516	3.480
39	*Melastoma malabathricum*	20	1.379	0.3	0.877	1.5	2.274	4.530
40	*Ficus heterophylla*	10	0.689	0.1	0.292	1	1.516	2.498
41	*Urena lobata*	10	0.689	0.1	0.292	1	1.516	2.498

Studies using line transect in the two major groves (Chembra kavu and pandokavu) reveal that plant diversity is higher in Pandokavu with 41 species and lower with chembra kavu (20 species). Considering Chembra kavu, of the 20 species present, Importance Value Index (IVI) was noted to be higher with *Vateria indica* (92.02) and lower with *Olea dioica* and *Hyptis suaveolens* (4.1907). Importance Value Index with respect to Pandokavu was noted to be higher with *Caryota urens* (30.42) followed by *Stenochlaena palustris* (29.56) and *Chassalia curviflora* var. *ophioxyloides* (25.56). IVI was noted to be lower (2.498) with plants like *Adenanthera pavonia*, *Caesalpinia sappan*, *Canthium rheedei*, *Ipomoea quamoclit*, *Hibiscus rosa-sinensis*, *Mikania micrantha*, *Bridelia retusa*, *Holigarna arnottiana*, *Uvaria narum*, *Chrysophyllum roxburghii*, *Citrus medica*, *Ficus heterophylla* and *Urena lobata*. The results of IVI are indicative of more species diversity and thereby more distribution of indices in Pandokavu than Chembra kavu.

Similarly results of the index of similarity among the two groves (Chembra kavu and pandokavu) were noted to be 0.2622 and with that of dissimilarity were 0.7378. This indicates that the groves under study were more dissimilar with respect to their species composition.

DISCUSSION

Sacred groves are popularly known as kavu in Mahe. In many parts of India, sacred groves represent surviving examples of climax vegetation and are disappearing under the influence of modernization (Gadgil & Vartak, 1975). People deprived of temple-worship go to kavu for worshipping. Sacred groves are family-owned property. When the joint families become nuclear family the eldest of the family take the responsibility of conducting the rituals. The sacred groves on the basis of management systems are classified into three categories: i. managed by individual families, ii. by tharavadu and iii. by trust. Of the total sacred groves two are dedicated to God Ayyappan, two represent Sarpam or Naga Raja, one to Kuttichathan and the rest to Bhagavathy (**Plate XVI**). Majority of the groves are associated with Goddess. Idols, stones on a platform are worshipped, and there are trees considered to be sacred in each grove. Presiding deity may be a God, Goddess or Serpent. The nature of the shrine may be open or a structural concrete temple complex. In few of the groves the deity is in the form of icon of stone kept in open and in some other groves the sanctum sanctorum is within a structural concrete temple (**Plate XVII, XVIII**). Most of the kavus are without any compound wall or fence.

Namboodiri, Brahmins, Vaniyars or eldest of the joint family conduct the rituals. The sacred groves are owned by a family, trust or tharavadu. Sacred groves dedicated to snake Gods are under the control of joint families. The owners of the kavu take the responsibility of conducting rituals and the community in-turn helps in providing the necessary resources for the purpose. Daily worship is restricted to lighting of the lamps. In most of the kavus annual festival namely 'Theyyam' (decoration of deities) or Theyyatam is performed on a fixed date lasting for three days. Theyyam is the unique ritual related to kavus of northern Kerala in Malabar region and is a part of the annual festivals of all kavus to renew the deities. Thottam, the ritual song is recited at the beginning of the Theyyam and is performed by the males of Malayan, Vannan, Pulayan and Munuttan communities. Theyyam is performed in 10 kavus once in a year. Generally in Ayyappan and Sarpakavu there is no Theyyam. Theyyam is performed with the help of Vadyagosham except in Sri Nelliyat Kalari Bhagavathy Kavu where neither Theyyam nor Vadhyagosham is performed. People worship the deities daily by performing aradhanas, archanas/pushpanjali and by offering flowers. Sankrama pooja is performed in almost all the kavu on the last day of every Malayalam month. Votive offerings may be in the form of money,

coconut oil, ornaments, Pattu/Thali, lamp, tender coconut, banana etc. There is no animal sacrifice except in Puthalam Temple and Sri Peradayath kavu where hens are sacrificed to propitiate/appease the deity. Few sacred groves are associated with pond or rivulets which act as micro-watersheds.

Majority of sacred groves found in the study area have dense vegetation consisting of evergreen species only in few sacred groves the vegetation is less dense or degraded, and in few others restoration is in progress. They are also rich in species diversity preserving unique floral and faunal diversity. The tree species and associated lianas provide an ideal habitat for the ground flora, epiphytes, birds and animals besides adding serenity to the ecosystem as a whole. Thus loss of tree species is detrimental to the dependent flora and fauna. *Alstonia scholaris, Ficus benghalensis, F. religiosa* and *F. drupacea* are some of the arboreal species that play keystone role in the sacred groves. These sacred groves also possess endemic and threatened plant species and play a vital role in conserving the biodiversity. The belief system, taboos, and the folklore associated with the groves have helped in conserving the relict flora and fauna of the region. Resource extraction is restricted in almost all the groves because of fear of wrath of deities. However, the ground vegetation in some of the groves faces threat when it is completely cleared during the onset of annual festival. Occurrence of alien species such as *Chromolaena odorata, Eleutheranthera ruderalis, Lantana camara, Mikania micrantha, Pennisetum polystachion* also pose threat to the indigenous species found in the sacred grove.

Species common to the groves include *Anacardium occidentale, Artocarpus heterophyllus, Carallia brachiata, Cocos nucifera, Cyclea peltata, Cyanthillium cinereum, Ficus benghalensis, F. religiosa, Flueggea leucopyros, Hibiscus rosa-sinensis, Justicia nagpurensis, Macaranga peltata, Mallotus philippensis, Mangifera indica, Mimusops elengi, Musa paradisiaca, Naregamia alata, Ocimum tenuiiflorum, Phyllanthus amarus, Pothos scandens, Scoparia dulcis* and *Tectona grandis, Triumfetta rhomboidea and Typhonium flagelliforme*. The dominant arboreal species include: *Acacia caesia, Aegle marmelos, Alstonia scholaris, Artocarpus heterophyllus, Ficus benghalensis, F. religiosa, Macaranga peltata, Mangifera indica, Mimusops elengi, Mallotus philippensis, Strychnos nux-vomica and Tamarindus indica.* The rare species such as *Artocarpus incisa, Acacia caesia, Anamirta cocculus, Careya arborea, Jasminum multiflorum, Naravelia zeylanica, Scaveola taccada, Sterculia guttata, Swietenia macrophylla, Vateria indica* and *Vitex altissisima* are restricted to few groves only. The climbers

include *Abrus precatorious*, *Acacia caesia Cyclea peltata*, *Gloriosa superba*, *Naravelia zeylanica*. *Sarcostigma kleinii*, a perennial large liana with many Ayurvedic medicinal properties is found only in Manikampoyil and Pandakkal Ayyappan kavu. *Acacia caesia* is a gregarious climber which grows over the top canopy cover and affects the growth of the top stratum. The sacred groves also support a good number of epiphytes. *Acampe praemorsa, Bulbophyllum sterile*, *Drynaria quercifolia, Octoblepharidum albidum* and *Pothos scandens* are some of the noteworthy epiphytic species. The ground flora includes a number of herbaceous species. *Alternanthera ficoidea*, *Alysicarpus vaginalis, Blumea oxyodonta*, *Cleome viscosa, C. rutidosperma*, *Curculigo orchioides*, *Desmodium triflorum*, *Lindernia crustacea, L. ciliata*, *Lobelia alsinoides*, *Mimosa pudica, Scoparia dulcis*, *Spermacoce latifolia*, *S. mauritiana* and *Sporobolus diandrus* are some of the predominant species.

Sacred groves are also rich in lower groups of plants such as bryophytes, pteridophytes, fungi, and other micro-organisms. The fungi and bacteria act as decomposers and thus help in sustaining the nutrient cycle within and outside the system. The canopy provides shelter to several birds and insects which help in the distribution of seeds to distant places.

Sacred groves have been conserved as sustainable biological resources. They serve as a valuable gene pool. They are also considered as the first major effort to recognize and conserve biodiversity. Since ancient period kavu has been recognized as the source of medicine, edibles and other economically important plants for the natives. The notable medicinal species include *Anamirta cocculus*, *Curculigo orchioides*, *Cyclea peltata, Gloriosa superba*, *Glycosmis pentaphylla, Ocimum* spp., *Phyllanthus amarus, Sarcostigma kleinii*, *Scoparia dulcis* and *Tinospora cordifolia*.

SOCIO-ECONOMIC ASPECTS

In India, the rural poor people are depending on the biological resources for meeting 90% of their day to day needs. The well-preserved sacred groves are storehouse of valuable medicinal and other economically important plants. Generally, biomass is being extracted from the sacred groves, but the level of extraction differs from area to area. However, it is believed that the socioeconomic drivers in the modern era have weakened the traditional management systems. If local people or concerned communities are made responsible for the total management and

enforcement of the groves, it would require immense financial backup. Sacred groves can serve as an effective model for decentralized community based natural resource management, if they have the proper economic incentives and legal backing regarding the property right issues. Until and unless a viable option is provided to the local people, especially, those who reside nearby the adjoining areas of sacred groves, for sustaining their economic condition, no step for conservation of biodiversity will be successful.

However, there is no major extraction of biomass resources from the sacred groves of Mahe. Felling of trees is strictly prohibited in Ayyappan and Sarpakavu due to fear of wrath of deity. During annual festival certain community performs theyyam, Vellattam which indirectly benefit the grove and the community. Votive offerings made by the devotees will indirectly help in the maintenance of the grove and its conservation.

CURRENT STATUS OF SACRED GROVES OF MAHE AND THEIR THREATS

Sacred groves are an abode of unique flora and fauna that have been preserved as sustainable resources for long on cultural and religious beliefs. They sustain and support life under a given agro-ecological conditions. Sacred groves as an ecosystem play a vital role in conserving the soil and water, and also perform several ecological functions, besides preserving the biological wealth. However, during the past two to three decades, the number and significance of sacred groves have started to deteriorate across the country both in terms of cultural and biological integrity. The nature and extent of threats and pressures on the sacred groves and their components are often regional and even grove-specific. The impact of threats varies from region to region as well as between groves.

The ecological and socio-economic studies on the 19 different sacred groves of Mahe revealed that only 3 groves namely, Pando Kavu, Chembra Sri Ayyappan Kavu and Panolil Kavu are well protected and conserved. Koyyodan Koroth Kavu, Kizhanthur Kavu, Sri Nelliyat, Varaprath Kavu, Oorothumal Kavu, Pandokooloth, Manikampoyal, Sarpa Kavu, Peradyath, Cheriyath Mandola and Puthalam are not much disturbed and the conservation status is moderate therein, whereas, Puthan Pura, Urmi, Kakkotidathil and Chirakandoth groves are under restoration. Three groves are under the control of trust; one under committee and the rest are tharavadu system (joint family).

Sacred groves act as gene banks of several economically important plants. The biologically rich sacred groves of Mahe are facing severe threats. Due to changes in socio-economic conditions and land use systems, many sacred groves are now threatened and altered both in form and size. There is also considerable change in the nature of vegetation and species composition of each sacred grove. In several sacred groves the shifting of deities resulted in fragmentation and destruction of vegetation. Degradation and destruction of natural resources are also taking place due to construction of temple complexes within the sacred groves. Weakening of faith and belief on the groves, break up of joint family's (Tharavadu system) into nuclear families and lack of man power to manage family sacred grove is the most important threat faced by the groves of Mahe.

Clearing of ground flora during the festival time drastically affect the diversity of herbs and regeneration of arboreal species. Construction of roads along the sacred groves or rivulets by the municipality and other developmental activities lead to reduction and change in the size of the grove's vegetation. Pressure on land has become an important criterion for the reduction in size of the grove. Abundance and expansion of alien invasive species such as *Lantana camara*, *Chromolaena odorata*, *Mikania micrantha* and *Pennisetum polystachyon* also cause a serious threat to the native flora of the groves. Hence, necessary control measures have to be taken to check/prevent the further expansion of these alien species in the sacred groves.

CONSERVATION STRATEGIES

The Convention on Biological Diversity (CBD) held at the Rio de Janerio in 1992 has emphasized the importance of conservation of the biological diversity and its sustainable utilization. Sacred grove is one of the ancient traditional methods of conserving the native biological reserves of a particular region on cultural and religious beliefs. The practice of nature conservation is a very ancient tradition in India that dates back to hunting gathering stage of the society (Gadgil & Vartak, 1974). For many generations the elderly persons of the family maintain the grove in their own traditional ways.

Sacred groves in Mahe are situated in the densely populated areas. There is no effective administrative control on many groves in Mahe and whatever the biodiversity is conserved is due to involvement of the community and the faith and belief in the deity associated with the grove. Sacred grove awareness campaign should be organized among the local populace through

educational institutions and NGO's. Conservation strategies have to be strictly followed for sustainable utilization of biological reserves. Financial assistance, incentives or awards may be given to stakeholders of the groves for the proper maintenance and conservation of the grove and the activities may regularly be monitored by the concerned authorities. The phytodiversity of sacred groves may be enriched by planting the native species. Activities such as clearing of ground flora prior to the annual festival, monoculture of particular tree species, plantation of invasive alien species and construction of concrete structures and other developmental activities that would pose threat to the sacred grove and its biodiversity have to be strictly prohibited. Awareness programmes to popularize the concept and importance of biodiversity and conservation in general, ecosystem values of the sacred groves, their conservation and management, their role in conservation of biological diversity among people across Mahe have to be organized.

CONCLUSION

The documentation of the sacred groves will help to assess the status of the groves, their biodiversity, environment, traditional culture and management. During the present study a total of 19 sacred groves have been documented in Mahe. The present study also establishes the biological richness of the sacred groves of the region. Of the 19 sacred groves, Pando Kavu, Chembra Ayyappan Kavu and Panolil Kavu are larger in size compared to others and are also well protected and conserved. The assessment of phytodiversity of the sacred groves in the present study has resulted in enumeration of 324 species of angiosperms belonging to 95 families, including 14 endemic species confined to the Western Ghats. Trees with 100 species (31%) and shrubs with 55 species (17%) constitute the woody elements which form the canopy of the sacred groves. Some of the groves have been maintained in good condition in spite of being situated closer to the human habitations.

Sacred groves are an abode of good number of rare and threatened native species of flora and fauna. Preservation of sacred groves is one of the best methods for maintaining the biodiversity. However, many sacred groves are now threatened and altered both in form and size; similarly, the vegetation and species composition of sacred groves have also been altered due to change in socio-economic condition and land use system. Beliefs system and taboos associated with the groves help in conservation of biodiversity. The impact of threats varies from region to region as

well as between groves, accordingly the level of degradation in each grove. It has been strongly believed by grove authorities that the untoward incidents happened in their families are considered the aftermaths of curse by the deities of the sacred groves as they were not properly maintained by the owners. Therefore, the authorities are taking necessary effort to revive the quality of the sacred groves. The restoration of such groves will be done based on ecological knowledge gained from well preserved groves like Sri Chembra Ayyappan Kavu and Panolil Kavu.

Major threats to the groves and their biodiversity include habitat destruction or degradation due to a number of developmental activities, acquisition of lands for construction of buildings and roads and invasion of alien species. Necessary efforts need to be taken to protect the sacred groves to prevent the loss of biodiversity. Clearing of ground flora during the festival time drastically affect the diversity of herbs and regeneration of arboreal species. Plantation of native species in the groves, especially tree species needs to be encouraged. Introduction of alien invasive species in the groves should not be permitted.

By conducting appropriate management practices and environmental awareness programmes among the stake holders and local populace, and also by giving incentives to the people who are involved in the protection of the grove, many of the groves can be maintained and preserved effectively in their existing condition without any loss of biodiversity. In order to achieve this goal the stake holders of the groves may be provided with proper incentives. For instance, recently the stakeholders of one of the sacred groves, viz., Pando Kavu received financial assistance from the Government of Puducherry for enriching the biodiversity of the area. The same can be extended to other deserving stakeholders also. However, every individual should also take the responsibility of saving the sacred groves for their traditional, cultural, aesthetic and ecological values.

The data generated in the present study can provide a lot of inputs to the authorities who prepare management plans for the conservation of the sacred groves of Mahe. The data will also be helpful to the researchers and academicians.

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Appendix - 1 Questionaire Sacred Groves Database (WWF Format, 1996)

Name of the sacred grove	:	
Village	:	
Geographical Information	:	Altitude Latitude Longitude
Size of the Grove	:	
Age of the Grove	:	
Any water Source	:	Yes / No
If yes, nature & duration of water source	:	Pond/well/stream/temporary/permanent
Nature of Shrine	:	
Presiding deity	:	
Minor deities	:	
Priest hood	:	
Offerings	:	
Votive offerings	:	
Imagines/I cones	:	
Metallic structures	:	
Rituals/Taboos/Beliefs	:	
Restriction to caste/Gender	:	
Dominant social group/Community:		
Conservation status	:	
Ownership pattern	:	Trust/Tharavadu/Joint family/Community
Frequency of offerings	:	
Distance from which people come to offer worship to the deity	:	
Material benefits from the SG:		
Any restrictions exist	:	Yes/No
If yes	:	Fear of deity/ Traditional/Trust restriction/ Ignorance/Spirit
Are the outsiders involved in the protection of Grove	:	Forest office/Priest/Political leaders/Community/Family/ Tharavad/Neighbors
Changing Scenario	:	
Animals/ Birds/Insects	:	
Introduction of exotic plants/ commercially important plants	:	
Clearing of ground flora	:	
Sacred plant	:	
Annual festival	:	

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Seminar details

A seminar on "**Sacred groves - Conservation and Management**" was organized by Post Graduate Department of Plant Science, Mahatma Gandhi Govt. Arts College, Mahe, on 29th March 2012 with the financial assistance from DSTE, Govt. of Puducherry.

Objectives of the seminar

To create awareness among the local populace and the sacred grove owners about the importance of the grove, its conservation and management.

Participants

Sacred grove owners, NGOs, agriculturists, farmers of Mahe region, including students, ministerial staff and teachers of Mahatma Gandhi Govt. Arts College, Mahe.

Seminar Proceedings

The seminar was formally inaugurated with the lighting of traditional lamp by the chief guest Thiru R. Arunachalam, the Regional Administrator, Mahe, under the Presidendship of Dr. R. Sobhanna Amma, the then Principal (i/c) of Mahatma Gandhi Govt. Arts College. Prof. C.P. Ravindran welcomed the guests and participants. Dr. K. Sasikala, Asst. Professor in Botany, MGGA College, Mahe, was the organizing Secretory of the seminar. Dr. G. Pradeepkumar Asst. Professor in Botany, MGGA College, Mahe, introduced the seminar details. Thiru T.M. Sudhakaran, PTA, President, MGGA College, Mahe, Thiru K. Rosh, Deputy Director of Agriculture (i/c), Mahe and Dr. K.K. Sivadasan, Associate Professor in Plant Science, MGGA College, Mahe & member, State level expert Appraisal Committee (Envt.) Govt. of Puducherry offered felicitations. Dr. M. Mari Bhat Associate Professor in Botany, MGGA College, Mahe, proposed the vote of thanks.

The technical session I commenced immediately after the inaugural session. Dr. C. Kunhikannan, Scientist E, Institute of Forest, Genetics and Tree Breeding, Coimbatore, Tamil Nadu, delivered a lecture on "Sacred groves and their role in Biodiversity Conservation". He shared his experiences and also stressed on the need for inventorising and documenting the sacred groves

for effective conservation and management. Dr. K. Sasikala, Asst. Professor in Botany introduced the speaker to the participants and Thiru K. Nirmal Raj, General Secretary, ATEDS, Mahe, proposed the vote of thanks.

The technical session II initiated immediately after the lunch break. Dr. C.C. Harilal, Asst. Professor, Division of Environmental Sciences, Department of Botany, University of Calicut, Kerala, delivered a lecture on "Role of Sacred groves in water conservation." He emphasized on the sacred groves as a microwatershed area for local communities. Dr. K. Sasikala Asst. Professor in Botany introduced the speaker to the participants and Dr. J. Rajamurugan, Asst. Professor in Plant Science, proposed the vote of thanks.

In the technical session III Tmt. Anju P. Gopal, Asst. Professor in History, Holy Family College, Dharmadam, Thalassery, Kerala, delivered a lecture on "Socio-cultural aspects of the sacred groves". She stressed on the importance of traditional culture, rituals and belief system in conservation of groves. Tmt. T. Sunitha, Asst. Professor in Economics, MGGA College, Mahe introduced the speaker and Ms. Sruthi, II M.Sc. Plant Science, proposed the vote of thanks.

A Documentory on the sacred groves of Mahe was played for half an hour to the participants in order to show the details of the Kavu in Mahe region, its biodiversity, traditional culture (Theyyam festival) and their importance in the conservation, asthetic and ecological values.
Dr. G. Pradeepkumar, Asst. Proessor. in Botany, MGGA College, Mahe, proposed the vote of thanks.
All the participants actively participated in the seminar. Various events of the seminar are displayed in **Plate XIX**. The seminar was concluded with the distribution of certificates to the participants.

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