RESEARCH ARTICLE

FLORISTIC DIVERSITY OF SREEDHARAN CHUMARATH MANA SACRED GROVE IN MUTHUTHALA PANCHAYATH, PALAKKAD DISTRICT, KERALA, INDIA

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Abstract

The present investigation on the floristic diversity of sacred groves of Sreetharan Chumarthuman, Muthuthala Panchayath, Pattambi Taluk, Palakkad district, Kerala resulted in the documentation of 126 important medicinal plants. The conservation of such precious sacred groves is an urgent need for future generation.

Introduction:

Traditionally, the local people have been preserving small patches of relatively dense forests that have been dedicated to a god or goddess or ancestral spirits as ‘sacred groves’ and they act as treasure houses for large numbers of endemic and rare plants of the region (Sujana & Sivaperuman, 2008). Sacred groves are very important in upholding traditions and beliefs in order to protect and conserve unique forest patches which represent the relict vegetation of the concerned area (Chandrashekhar & Sankar, 1998). Sometimes, they are also known as natural museums of giant trees, treasure houses of threatened species, dispensaries of medicinal plants, regulators of water sheds, recreation centers for urban life, veritable gardens for botanists, gene banks of economic species, paradise for nature-lovers and laboratory for environmentalists (Gadgil & Vartak, 1975). One of the most important traditional uses of sacred groves was that it acted as a repository for various Ayurvedic medicines, in modern times, it have become biodiversity hotspots.

In India, nature worship dates back to the pre-Vedic period (5000 B.C.) and is based on the proposition that all creations of nature have to be protected. In India, different religions having different traditions, beliefs, and rituals are associated with conservation of biodiversity and forests. In Hindu religion, it is a traditional belief that nature shows a reverence for five basic elements i.e., Earth (Prithvi), Fire (Agni), Water (Jal), Air (Wayo) and Space (Akash). All the five elements are treated as a body of God and are worshipped. These five elements are protected for religious, cultural and spiritual reasons. There are many studies entitled to further quantify this ethics, which leads to biodiversity conservation and sustainable ecosystem (Chandrashekhara & Sankar, 1998).

Around 1,00,000 to 1,50,000 sacred groves are reported in India (Malhotra et al. (2007). In India, the highest number of sacred groves (5000) has been reported to be present in state of Himachal Pradesh followed by Kerala and Chhattisgarh. The erstwhile state of Kerala, alone, has over 2000 sacred groves locally known as Sarpakavu or pambum kavu (Rao et al., 2011). In the recent past, due to change of socio-economic conditions and land use systems, many sacred groves are threatened and altered, both in terms of size, vegetation structure and species composition.

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In Kerala, it is the common practice among Hindus to assign a part of their land near the Tharavadu or house as the abode of goddess Durga or serpent god Naga or Shastavu and the place is called Kavu, Sarpa kavu or Pambum kavu. It is considered as the islands of biodiversity and relics of past vegetation. These contain large numbers of Rare, Endemic, Endangered and Threatened floras and faunas. It also includes economically and medicinally important plants.

Sreedharan Chumarathumana sacred grove is located at Muthuthala Panchayath, Pattambi Taluk, Palakkad district, Kerala. The sacred grove extends near half acre area (pers. Comm. with Sri. Sreedharan Nambuthirippad). There is a small temple for the god of ‘Naga’ in the middle of the sacred grove worshiped by them based on their indigenous cultural and religious beliefs. Every year, in ‘Ayilyam’ (believes to be the star of ‘Nagadevatha’) star of Malayalam month ‘Kanni’, they celebrate the festival of Goddess.

Sacred groves have presently attracted the attention of environmentalists, geneticists, botanists for their undisturbed natural conditions, which has made them repositories of valuable germplasm of medicinal plants, and endangered and endemic plant species (Anthwal et al., 2006). This paper deals with the rare and important medicinal angiospermic plants in the sacred grove.

**Materials and Methods:-**
Intensive field surveys were carried out during 2019–2020, covering pre-monsoon, monsoon and post-monsoon seasons (Figure 1). Specimens of each species of flowering plants were collected along with necessary field data. The collected specimens were identified with the help of local peoples and scientific names with the help of taxonomists / scientists. Lists of plants found in the sacred grove were prepared.

**Results and Discussion:-**
A total of 126 species belonging to 118 genera under 43 families (Table 1, Figures 2,3,4) were reported. This is 6.5% of the species described in the flora of Palakkad District (Vajravelu, 1990; Sasidharan, 2004; Anilkumar, 2015) and 2.35% of the flora of the Kerala state (Sasidharan 2004, 2013).

**Table 1:-** List of flowering plants observed in the study area.

| Sl. No. | Scientific name                  | Family                | Habit   | Local name | No. of mature individuals |
|---------|----------------------------------|-----------------------|---------|------------|---------------------------|
| 1.      | *Abrus precatorius* L.           | Fabaceae              | Climber | Kunni      | 3                         |
| 2.      | *Abutilon persicum* (Burm.f.) Merr. | Malvaceae             | Herb    | Oorakam    | 1                         |
| 3.      | *Acalypha indica* L.             | Euphorbiaceae         | Herb    | Kuppameni  | >30                       |
| 4.      | *Acampe praemorsa* (Roxb.) Blatt. & McCann | Orchidaceae         | Herb    | Maravazha  | 3                         |
| 5.      | *Achyranthes aspera* L.          | Amaranthaceae         | Herb    | Kadaladi   | >30                       |
| 6.      | *Aerva lanata* (L.) Juss. ex Schult. | Euphorbiaceae       | Herb    | Cherula    | >30                       |
| 7.      | *Ailanthus triphylla* (Dennst.) Alston | Ailanthaceae       | Tree    | Matti      | 1                         |
| 8.      | *Alangium salvifolium* (L.f.) Wang. ssp. *hexapetalum* (Lam.) Wang. | Angiaceae           | Shrub   | Ankolam    | >30                       |
| 9.      | *Alstonia scholaris* (L.) R. Br. | Apocynaceae           | Tree    | Ezhilam pala | 1                     |
| 10.     | *Amorphophallus paeonifolius* (Dennst.) Nicolson | Araceae             | Herb    | Kaattuchema | 7                      |
| 11.     | *Anamirta cocculus* (L.) Wight & Arn | Menispermaceae       | Climber | Garaphala  | 7                         |
| 12.     | *Aristolochia indica* L.         | Aristolochiaceae      | Climber | Karlayam, Karalakam | 3                |
| 13.     | *Artocarpus incisus* (Thunb.) L.f. | Moraceae             | Tree    | Kadaplu, kadachakka | 1                |
| 14.     | *Barleria prionitis* L.          | Acanthaceae           | Herb    | Kanchanara | 7                         |
| No. | Scientific Name | Family | Habit | Common Name | District |
|-----|----------------|--------|-------|-------------|----------|
| 15. | Bauhinia scandens var. anguina (Roxb.) Ohashi | Fabaceae | Climber | Nagavalli | 2 |
| 16. | Blepharis maderaspatensis (L.) Roth. | Acanthaceae | Herb | Murikootippacha | >30 |
| 17. | Blumea membranacea Wall. ex DC. var. membranacea | Asteraceae | Herb | Bhoothamkolli | 9 |
| 18. | Boerhavia diffusa L. | Nyctaginaceae | Herb | Thazhuthama | >30 |
| 19. | Bremia retusa (Dennst.) Alston | Euphorbiaceae | Shrub | Aattacherukola | 6 |
| 20. | Briedelia retusa (L.) A. Juss. | Euphorbiaceae | Tree | Kaini | 2 |
| 21. | Briedelia stipularis (L.) Blume | Euphorbiaceae | Climber | Vallikaini | 4 |
| 22. | Butea monosperma (Lam.) Taub. | Fabaceae | Tree | Plasu | 5 |
| 23. | Canavalia gladiata (Jacq.) DC. | Fabaceae | Climber | Valpayar | 6 |
| 24. | Canthium angustifolium Roxb. | Rubiaceae | Shrub | Kattaramullu | 9 |
| 25. | Canthium rheedei DC. | Rubiaceae | Shrub | Edalimaram | 5 |
| 26. | Caryota urens L. | Arecales | Tree | Aanapana | 3 |
| 27. | Cassia fistula L. | Fabaceae | Tree | Kattukadugu | 12 |
| 28. | Chassalia curviflora (Wall. ex Kurz.) Thw. var. ophioxyloides (Wall.) Deb & Krishna | Rubiaceae | Herb | Vellakurinji, Amalpori | >30 |
| 29. | Chionanthus mala-elengi (Dennst.) P.S. Green | Oleaceae | Tree | Mala elangi | 1 |
| 30. | Chromolaena odorata (L.) King & Robins | Asteraceae | Herb | Communist pacha | >30 |
| 31. | Cleome burmannii Wight & Arn. | Capparaceae | Herb | Aadunarivela | 10 |
| 32. | Cleome viscosa L. | Capparaceae | Herb | Aattacherukola | 6 |
| 33. | Clerodendrum infortunatum L. | Lamiaceae | Shrub | Peruku | >30 |
| 34. | Clitoria ternatea L. | Fabaceae | Climber | Sankhupushpum | 14 |
| 35. | Commelina diffusa Burm. f. | Commelinaceae | Herb | Vazhaparuthipoo | 12 |
| 36. | Cryptolepis buchananii Roem. & Schult. | Apocynaceae | Climber | Vattolam | 5 |
| 37. | Dioscorea bulbifera L. | Dioscoreaceae | Climber | Kaattukavath | 4 |
| 38. | Diploclisia glaucescens (Blumes) Diels. | Menispermaceae | Climber | Malathangi | 2 |
| 39. | Diploclisia palmatus (L.) Jeffrey. | Cucurbitaceae | Climber | Sivalingakaya | 9 |
| No. | Scientific Name | Family       | Type    | Village Name       | Location |
|-----|----------------|--------------|---------|--------------------|----------|
| 50  | *Dipteracanthus prostratus* (Poir.) Nees | Acanthaceae | Herb    | Thuppalampotti    | 14       |
| 51  | *Ecbolium viride* (Forsk.) Alston | Acanthaceae | Herb    | Koranda            | 8        |
| 52  | *Elephantopus scaber* L. | Asteraceae | Herb    | Anachuvadi        | >30      |
| 53  | *Erythrina strica* Roxb. | Fabaceae    | Tree    | Murukku            | 1        |
| 54  | *Ficus exasperata* Vahl | Moraceae    | Tree    | Parakam            | 2        |
| 55  | *Ficus hispida* L. f. | Moraceae    | Tree    | Thondi             | 3        |
| 56  | *Ficus virens* Alton | Moraceae    | Tree    | Cherla maram       | 1        |
| 57  | *Flacourtia indica* (Burm.f.) Merr. | Flacourtiaeae | Tree    | Vayyamkatha       | 6        |
| 58  | *Gliocidia sepium* (Jacq.) Kunth ex Walp. | Fabaceae | Shrub   | Seemakonna        | 2        |
| 59  | *Gloriosa superba* L. | Liliaceae   | Climber | Branthan poo      | 7        |
| 60  | *Glycosmis pentaphylla* (Retz.) DC. | Rutaceae    | Shrub   | Panal             | 13       |
| 61  | *Geodorum densiflorum* (Lam.) Schltr. | Orchidaceae | Herb    | ..................... | 7        |
| 62  | *Hemidesmus indicus* (L.) R. Br. | Apocynaceae | Climber | Nannari            | >30      |
| 63  | *Hibiscus hispidissmus* Griff. | Malvaceae   | Herb    | Muttipuli         | 10       |
| 64  | *Holigarna arnottiana* Hook.f. | Anacardiaceae | Tree    | Cheru             | 3        |
| 65  | *Holoptelea integrifolia* (Roxb.) Planch. | Fabaceae | Tree    | Aaval             | 2        |
| 66  | *Holostemma ada-kodiien* Schult. | Apocynaceae | Climber | Adapathiyan      | 9        |
| 67  | *Hybanthus enneaspermus* (L.) F.v. Muell. | Violaceae | Herb    | Orithalthamara    | 8        |
| 68  | *Hyptis suaveolens* (L.) Poit. | Lamiaceae   | Herb    | Natapoochedi      | 17       |
| 69  | *Ichneumon frutescens* (L.) R. Br. | Apocynaceae | Climber | Paalvally          | 13       |
| 70  | *Ipomoea obscura* (L.) Ker-Gawl. | Convolvulaceae | Climber | Thiruthali       | 8        |
| 71  | *Ipomoea pes-tigridis* L. | Convolvulaceae | Climber | Pulichuvadi      | 3        |
| 72  | *Ixora coccinea* L. | Rubiaceae   | Herb    | Kaattuthachi      | 2        |
| 73  | *Jasminum courcatus* Roxb. | Oleaceae    | Climber | Kaattumulla      | 14       |
| 74  | *Justicia japonica* Thunb. | Acanthaceae | Herb    | Neelathumba       | >30      |
| 75  | *Lantana camara* L. | Lamiaceae   | Shrub   | Pochedi           | >30      |
| 76  | *Leea indica* (Burm. f.) Merr. | Leeaceae    | Shrub   | Choriyanthal      | 6        |
| 77  | *Leucaena leucocephala* (Lam.) de Wit. | Fabaceae | Tree    | Subabul           | 3        |
| 78  | *Luffa cylindrica* (L.) Roem. | Cucurbitaceae | Climber | Peechingha chedi | 6        |
| 79  | *Macaranga peltata* (Roxb.) Muell.-Arg. | Euphorbiaceae | Tree    | Vatta            | 4        |
| 80  | *Mallotus philippensis* (Lam.) Muell.-Arg. | Euphorbiaceae | Tree    | Sindooram        | 2        |
| 81  | *Mangifer indica* L. | Anacardiaceae | Tree    | Mavu             | 6        |
| 82  | *Merremia vitifolia* (Burm. f.) Hall. f. | Convolvulaceae | Climber | Dridarashrapacha | 11       |
| 83  | *Mikania micrantha* Kunth | Asteraceae | Climber | Vayara           | >30      |
| 84  | *Mimosa dipotricha* C. Wight ex Sanvalle var. *inermis* (Adelb.) Veldk. | Fabaceae | Climber | Anathottavadi    | >30      |
| 85  | *Mimosa pudica* L. | Fabaceae | Herb    | Thottavadi       | >30      |
| 86  | *Momordica dioica* Roxb. ex Wild. | Cucurbitaceae | Climber | Kattpaval        | 12       |
| 87  | *Mukia maderaspatana* (L.) Roem. | Cucurbitaceae | Climber | kasappuchedi     | 14       |
| No. | Scientific Name                           | Family            | Life Form | Location     | Height (m) |
|-----|------------------------------------------|-------------------|-----------|--------------|------------|
| 88  | Naregamia alata Wight & Arn.             | Meliaceae         | Herb      | Nilanaragam  | >30        |
| 89  | Naringi crenulata (Roxb.) Nicolson       | Rutaceae          | Tree      | Mahavilvam   | 14         |
| 90  | Ocimum americanum L.                     | Liliaceae         | Herb      | Kattuthulasi | 5          |
| 91  | Olea diouc Roxb.                         | Oleaceae          | Tree      | Vayala       | 8          |
| 92  | Pancratium triflorum Roxb.               | Amaryllidaceae    | Herb      | Kattulli     | 11         |
| 93  | Passiflora foetida L.                    | Passifloraceae    | Climber   | Poochappazham| 3          |
| 94  | Phyllanthus urinaria L.                  | Phyllanthaceae    | Herb      | Chuvannakizhanelli | 13 |
| 95  | Physalis angulata L.                     | Solanaceae        | Herb      | Njottanjodian | 2          |
| 96  | Plumbago indica L.                       | Plumbaginaceae    | Shrub     | Chethikoduveli | 1          |
| 97  | Pogostemon purpurascens Dalz.            | Lamiaceae         | Herb      | Poothachida  | 2          |
| 98  | Pothos scandens L.                       | Araceae           | Climber   | Paruvakodi   | >30        |
| 99  | Pseudarthria viscida (L.) Wight & Arn.   | Fabaceae          | Herb      | Movila       | 12         |
| 100 | Pterocarpus marsupium Roxb.              | Fabaceae          | Tree      | Venga        | 2          |
| 101 | Rauwolfia serpentina (L.) Benth. ex Kurz | Apocynaceae       | Herb      | Sarpagandhi  | 7          |
| 102 | Rotella serrata (L.) Steane & Mabb.      | Lamiaceae         | Shrub     | Cheruthekku  | 5          |
| 103 | Santalum album L.                        | Santalaceae       | Tree      | Chandanam    | 1          |
| 104 | Schleichera oleosa (Lour.) Oken          | Sapindaceae       | Tree      | Poovam       | 5          |
| 105 | Sida cordata (Burm. f.) Borss.           | Malvaceae         | Climber   | Vallikurumthotti | 15 |
| 106 | Sida cordifolia L.                       | Malvaceae         | Herb      | Anakurumthotti | 6          |
| 107 | Smilax zeylanica L.                      | Smilacaceae       | Climber   |              | 4          |
| 108 | Sterculia gutata Roxb. ex DC.            | Malvaceae         | Tree      | Anathondi maram, pottakkala | 8 |
| 109 | Streblus asper Lour.                     | Moraceae          | Tree      | Paravamaram  | 4          |
| 110 | Strychnos nux-vomica L.                  | Loganiaceae       | Tree      | Kanjiram     | 5          |
| 111 | Synechocystis nodiflora (L.) Gaertn.      | Asteraceae        | Herb      | Mudian pacha | >30        |
| 112 | Tabernamontana alternifolia L.            | Apocynaceae       | Shrub     | Koonampla    | 3          |
| 113 | Tamarindus indica L.                     | Fabaceae          | Tree      | Valanpuli    | 1          |
| 114 | Tectona grandis L.                       | Lamiaceae         | Tree      | Thekku       | 14         |
| 115 | Tephrosia purpurea (L.) Pers.            | Fabaceae          | Herb      | Kalakomban   | 4          |
| 116 | Teramnus labialis (L.f.) Spreng.         | Fabaceae          | Climber   | Cherukattuzhunnu | 7          |
| 117 | Tetrapeta acuminata (Poir.) Miers ex Hook.f. & Thoms. | Malvaceae | Climber | Valli kanjiram | 18         |
| 118 | Tinospora cordifolia (Willd.) Miers.      | Menispermeaceae   | Climber   | Chitamruth   | 7          |
| 119 | Tragia involucrata L.                    | Euphorbiaceae     | Climber   | Cherukuduthuva | 5          |
| 120 | Triumfetta rhomboidea Jacq.              | Asteraceae        | Herb      | Oorpam       | 16         |
| 121 | Tylophora indica (Burm. f.) Merr.        | Apocynaceae       | Climber   | Vallippala   | 2          |
| 122 | Urena lobata L.                          | Malvaceae         | Herb      | Kuruva chedi | 4          |
| 123 | Xenostegia tridentata (L.) Austin & Staples. | Convolvulaceae | Climber | Thalaneeli   | 9          |
| 124 | Zanthoxylum rhetsa (Roxb.) DC            | Rutaceae          | Tree      | Mullilam     | 1          |
| 125 | Zingiber zerumbet (L.) Roscoe ex Sm.      | Zingiberaceae     | Herb      | Mala-inchi   | >30        |
| 126 | Ziziphus oenoplia (L.) Mill.             | Rhamnaceae        | Shrub     | Thodali      | 12         |

Out of 126 species, forty two species (33%) are herbs, forty nine species (32%) are climbers, thirteen species (10%) are shrubs and thirty one (25%) are trees. Habitat wise analysis of flora shows comparatively higher percentage of herbs (33%) followed by climbers (32%), trees (25%) and Shrubs (10%). (Figure 5.)
The dominant family is Fabaceae represented by 18 species, followed by Apocynaceae (9), Euphorbiaceae (8), Asteraceae (7), Malvaceae (7), Rubiaceae (7), Lamiaceae (6), Acanthaceae (5), Moraceae (5), Convolvulaceae (4), Cucurbitaceae (4), Menispermaceae (3) and Oleaceae. Nine families viz. Araceae, Anacardiaceae, Arecales, Capparaceae, Liliaceae, orchidaceae, Sapindaceae, Vitaceae and Zingiberaceae have two species each while 21 families were represented by just a single species viz. Ailanthaceae, Alangiaceae, Arecaceae, Amaryllidaceae, Aristolochiaceae, Commelinaceae, Dioscoreaceae, Flacourtiaceae, Hypoxidaceae, Leeaceae, Loganiaceae, Meliaceae, Nyctaginaceae, Passifloraceae, Phyllanthaceae, Plumbaginaceae, Rhamnaceae, Santalaceae, Smilacaceae, Solanaceae and Violaceae. (Figure 6).

The most dominant species in this sacred groves are Acalypha indica, Achyranthes aspera, Aerva lanata, Alangium salvifolium ssp. Hexapetalum, Blepharis maderaspatensis, Boerhavia diffusa, Chassalia curviloba var. ophioxyloides, Chromolaena odorata, Clerodendrum infortunatum, Curcuma haritha, Elephantopus scaber, Hemidesmus indicus, Justicia japonica, Lantana camara, Mikania micrantha, Mimoso diplotricha var. inermis,
Mimosa pudica, Naregamia alata, Pothos scandens, Synedrella nodiflora and Zingiber zerumbet. All the taxa are recorded with more than 30 mature individuals in the area.

Out of the 126, two taxa viz. Curcuma haritha and Holostemma ada-kodien are strictly endemic to south Indian region of India and of which, H. ada-kodien is listed Endangered as per IUCN conservation categories and criterias. Some of the tall trees like Ficus virens and Mangifera indica of height 25 m are present in the middle of the grove. The most serious threat to the floristic diversity is observed from invasive species, i.e., Chromolaena odorata, Lantana camara, Mikania micrantha and Mimosa diplotricha var. inermis causing depletion to the indigenous plant diversity.

Out of the 126 taxa recorded, more than 96% of plants are used as important medicinal drug in various systems of medicines and also in folklore medicine. The species like Centrosema molle and Mikania micrantha are important climbers and used for snake bites (Deepa et al. 2016) and the presence of rare and most important medicinal plant Rauvolfia serpentina in the groves enhance the importance of Sreedharan Chumarath Mana sacred grove. We also observed numerous termites nest in the grove (Figure 7)

**Conclusion:-**
This study revealed the presence of a number of plant species along with medicinal uses in the sacred grove. Sacred groves play a crucial role in soil and water conservation. Many sacred groves hold water resources in the form of springs, ponds, lakes, streams or rivers. The vegetation of the groves itself retains water, soaking it up like a sponge during wet periods and releasing it slowly in times of drought. It is evident that one of the important ecological roles of these groves is to provide a more dependable source of water for the organisms living in and around the sacred grove. In addition, transpiration from the sacred grove vegetation would increase atmospheric humidity and reduce temperature in the immediate vicinity and produce a more favourable microclimate for many organisms. The major threats to these existing ecosystems are habitat destruction, habitat alteration, introduction of exotic species and pollution has resulted in the decline of sacred groves. The conservation of such precious sacred groves is an urgent need for future generation.

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![Figure 1](image-url): Sreedharan Chumarath Mana Sacred grove. A.- F. Different views of interior region.
Figure 2: Colour photographs of species. A. & B. Abrus precatorius; C. Abutilon persicum; D. Alangium salvifolium ssp. hexapetalum; E. Aristolochia indica; F. Barleria prionitis; G. Blepharis maderaspatensis; H. Canavalia gladiata; I. Cayratia pedata; J. Centrosema molle; K. Chromolaena odorata.

Figure 3: Colour photographs of species. A. Clerodendrum infortunatum; B. Clitoria ternatea; C. Cryptolepis buchananii; D. Cyanthillium cinereum; E. Diplocyclos palmatus; F. Ecbolium viride; G. Elephantopus scaber; H. Geodorum densiflorum; I. Glycosmis pentaphylla; J. Hemidesmus indicus; K. Hibiscus hispidissmus; L. Ipomoea pes-tigridis.
Figure 4: Colour photographs of species. A. Lantana camara; B. Mimosa pudica; C. Momordica dioica; D. Naregamia alata; E. Passiflora foetida; F. Pseudarthria viscida; G. Rauwolfia serpentina; H. Sida cordata; I. Tephrosia purpurea; J. Tinospora cordifolia; K. Urena lobata; L. Zingiber zerumbet.

Figure 5: A.-C. Different termite nests observed in Sreedharan Chumarath Mana Sacred grove.
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