

# Vascular plant diversity of the select sacred grove of Kanyakumari district, Tamilnadu, India

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## Abstract

Sacred groves are the important places in which biodiversity is preserved in mostly undisturbed condition because of certain taboos and religious beliefs. Based on the inventory and preliminary survey, two sacred groves were selected in 'Parakudi' village along the southwest coast of Kanyakumari district for the purpose of detailed studies on floristic richness. Floristically a total of 124 species of angiosperms belonging 48 families, 10 species of pteridophytes and 1 species of gymnosperms were recorded. Of these 25 were trees, 28 shrubs, 56 herbs and 15 climbers were well represented in the sacred forests studied. Five species remain unidentified including an orchid taxa. Family-wise distribution of plant families shows that Poaceae was the most speciose family with 10 species in site 1, whereas, Asteraceae, Fabaceae and Malvaceae were the dominant family in site 2 with 5 species each. Thus, the enumeration of the sacred grove at Parakudi village of Vilavancode taluk in Kanyakumari district and the assessment of the floristic wealth would provide a strong basis for evolving measures for their protection.

**Key words:** floristic survey, Kanyakumari district, Parakudi village, sacred grove, vascular plants

## Introduction

Sacred groves are the important places in which biodiversity is preserved in mostly undisturbed condition because of certain taboos and religious beliefs. They are ancient natural sanctuaries that have supported the growth of several interesting and rare species of flora and fauna (Kosambi, 1962). In India, the sacred groves are spread over the country and most of them remain unprotected today from lack of federal legislation. The role of sacred groves in the conservation of biodiversity has long been recognized (Kosambi, 1962; Haridasan and Rao, 1985; Khan *et al.*, 1997; Anthwal *et al.*, 2006). All forms of vegetation in the sacred groves are supposed to be under the protection of the reigning deity of that grove, and the removal of even a small twig is taboo (Vartak and Gadgil, 1973). There are about 14,000 sacred groves known and reported in the country

that harbor and act as repositories of rare fauna and flora. Sacred groves are abundantly present along the Western Ghats in the states of Kerala and Karnataka (Deshmukh *et al.*, 1998). Further, these sacred groves vary in size from a few trees to dense forests covering vast tracts of land (Jonathan, 2008).

Many scholars have been working on conservation of sacred groves through socio-cultural practices in different parts of India (Gadgil and Vartak, 1975, 1976; Boojh and Ramakrishnan, 1983; Khiewtam and Ramakrishnan, 1989; Rodgers, 1994; Oliver *et al.*, 1997; Sinha and Maikhuri, 1998; Sunitha and Rao, 1999; Basu, 2000; Kushalapa *et al.*, 2001). However, a little information is available on sacred groves and conservation of the biodiversity in Kanyakumari district. In view of this fact, the present study was conducted to investigate the floristic richness and highlights the botanical significance of the sacred groves of Parakudi village, which is situated on the foothills of the fragmented hillock of southern Western Ghats.

## Materials and Methods

### Study Area

Based on the inventory and preliminary survey, two sacred groves (site I and II) was selected in 'Parakudi' village along the south west coast of Kanyakumari district for the purpose of detailed studies on floristic composition and ethnobotanical importance (Plate 1). The sacred forest mainly lies in the boundary of Kerala and Tamilnadu, at Kunnattoor village and managed by the village communities. The distance between the two groves was 100m. As per the information of villagers it is a single grove in olden days, however due to anthropogenic disturbance, mainly construction of road inside the forests and agricultural activity leads to fragmentation of these groves.

The total area of this grove is about 1 hectare. Nearly 60% of this area has been now converted into agro-ecosystem. Previously, this grove was a 'Kaavu' where the snakes were worshipped. At that period of time, there was not much destruction of the grove by the people because of their religious beliefs. Species loss may now happen due to the construction of the road. Because of this reason, now the area of this sacred forest has

been reduced to one acre with canopy openings. The perennial fresh water source present in this grove is consumed by the local people near the vicinity of the sacred forest.

### ***Taxonomic Evaluation***

Plants species were collected and identified taxonomically with the help of regional and local floras (Gamble, 1915-1936; Matthew, 1999; Manickam *et al.*, 2008). The Herbaria of Botanical survey of India, Southern Circle, Coimbatore; Kerala Forest Research Institute, Peechi; Tropical Botanical Garden and Research Institute (TBGRI), Palode, Trivandrum, Kerala, and Department of Botany, N. M. Christian College were consulted for correct identification of plant specimens. The nomenclature of species follows the regional flora. The voucher specimens were made and deposited in the herbarium (NMCCH) of N.M. Christian College, Marthandam, Kanyakumari, Tamil Nadu, India for further reference.

### **Results and Discussion**

Floristically a total of 124 taxa of angiosperms belonging 48 families (Table 1), 10 species of pteridophytes and a species of gymnosperm were recorded. Of these, 25 were trees, 28 shrubs, 56 herbs and 15 climbers (Figure 1). Five species remain unidentified including a species of orchids. The invasion of exotic weeds such as *Lantana camara* and *Chromolaena odorata* in the periphery of the sacred groves depicted that the sacred groves are under various degrees of disturbance due to the declination of religious beliefs of the managing trustee of the sacred groves.

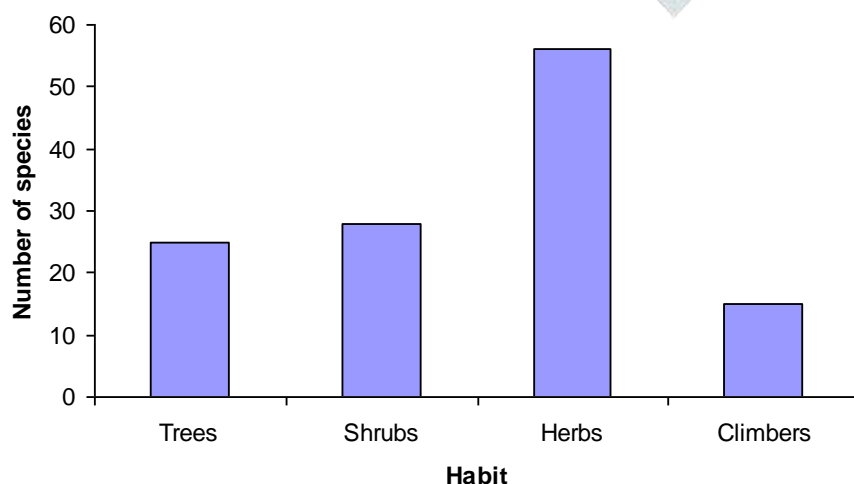


Figure 1. Habit wise distribution of plant species in the study area

Family wise distribution of plant families in site I shows that Poaceae was the most speciose family with 10 species and Asteraceae with 9 species was the co-dominant family, followed by Acanthaceae and Fabaceae with 5 species each, four families (Lamiaceae, Moraceae, Euphorbiaceae and Amaranthaceae) having 4 species each. Three families (Rubiaceae, Malvaceae, Oleaceae) having 3 species each, 9 families had 2 species each, whereas, 25 families were monospecific. Asteraceae, Fabaceae and Malvaceae were the dominant family in site II with 5 species each, Euphorbiaceae, Lamiaceae and Poaceae with four species was the codominant family, followed by Acanthaceae with 3 species. Seven families had 2 species each, however, 16 families were represented by single species.

The pteridophytes recorded in the study area are, *Acrostichum aureum*, *Adiantum latifolium*, *Christella parasitica*, *Hemionitis arifolia*, *Marislea minuta*, *Pityrogramma calomelanos*, *Lygodium flexuosum* and *Salvinia molesta*. Presence of an IUCN red listed rare gymnospermic species *Cycas circinalis* denotes the conservation status of the groves. However, it is being defoliated during the festival time for decoration purposes is the serious threat to this species.

During the study, some species of wild related cultivated species were reported in the sacred forests. They are *Ananas comosus*, *Artocarpus hirsutus*, *Artocarpus heterophyllus*, *Borassus flabellifer*, *Gloriosa superba*, *Hemidesmus indicus*, *Murraya koenigii*, *Tamarindus indicus* and *Zizyphus oenoplia*. The medicinal plants ranked first, followed by edible, timber, non-timber forest produce, etc. Among the edible species, *Artocarpus heterophyllus*, *A. hirsutus*, *Mangifera indica* and *Tamarindus indica* are economically valuable.

**Table 1.** Plant species observed from the sacred groves

| S.No  | Botanical Name              | Family        | Sacred Grove |         |
|-------|-----------------------------|---------------|--------------|---------|
|       |                             |               | Site I       | Site II |
| Trees |                             |               |              |         |
| 1     | <i>Allianthus triphysa</i>  | Simaroubaceae | +            | -       |
| 2     | <i>Acacia mangiam</i>       | Fabaceae      | +            | -       |
| 3     | <i>Artocarpus hirsutus</i>  | Moraceae      | +            | -       |
| 4     | <i>Azadirachta indica</i>   | Meliaceae     | +            | +       |
| 5     | <i>Borassus flabellifer</i> | Areceae       | +            | +       |

|               |                                 |                 |   |   |
|---------------|---------------------------------|-----------------|---|---|
| 6             | <i>Canthium dicoccum</i>        | Rubiaceae       | + | - |
| 7             | <i>Calophyllum inophyllum</i>   | Guttiferae      | + | - |
| 8             | <i>Cocus nucifera</i>           | Arecaeae        | + | + |
| 9             | <i>Dichrostachys cinera</i>     | Nimosaceae      | + | - |
| 10            | <i>Fiscus benghalensis</i>      | Moraceae        | + | - |
| 11            | <i>Lannea coromandelica</i>     | Anacardiaceae   | + | - |
| 12            | <i>Leucaena leucocephala</i>    | Mimosaceae      | + | - |
| 13            | <i>Madhuca indica</i>           | Sapotaceae      | + | - |
| 14            | <i>Morinda tinctoria</i>        | Rubiaceae       | + | - |
| 15            | <i>Murraya koenigii</i>         | Rutaceae        | + | - |
| 16            | <i>Musa paradisiacal</i>        | Musaceae        | + | - |
| 17            | <i>Olea dioca</i>               | Oleaceae        | + | - |
| 18            | <i>Pongamia pinnata</i>         | Fabaceae        | + | - |
| 19            | <i>Psidium guajava</i>          | Myrtaceae       | + | - |
| 20            | <i>Santalum album</i>           | Santalaceae     | + | - |
| 21            | <i>Schleicheria oleosa</i>      | Sapindaceae     | + | - |
| 22            | <i>Sizygium cumini</i>          | Myrtaceae       | + | - |
| 23            | <i>Tamrindus indica</i>         | Caesalpiniaceae | + | + |
| 24            | <i>Tectona grandis</i>          | Verbanaceae     | - | + |
| 25            | <i>Terminalia catappa</i>       | Combretaceae    | + | - |
| <b>Shurbs</b> |                                 |                 |   |   |
| 26            | <i>Abutilon indicom</i>         | Malvaceae       | - | + |
| 27            | <i>Alstonia scholaris</i>       | Apocyanaceae    | + | - |
| 28            | <i>Annona squamosa</i>          | Annoaceae       | + | - |
| 29            | <i>Anisomeles malabarica</i>    | Lamiaceae       | + | + |
| 30            | <i>Barleria prionitis</i>       | Acanthaceae     | + | - |
| 31            | <i>Barleria mysorensis</i>      | Acanthaceae     | - | + |
| 32            | <i>Carmona retusa</i>           | Boraginaceae    | + | + |
| 33            | <i>Carissa carandas</i>         | Apocyanaceae    | - | + |
| 34            | <i>Carissa spinarum</i>         | Apocyanaceae    | - | + |
| 35            | <i>Canthium angustifolium</i>   | Rubiaceae       | + | - |
| 36            | <i>Crotalaria juncea</i>        | Fabaceae        | - | + |
| 37            | <i>Chlerodendrum inerme</i>     | Vernanaceae     | + | - |
| 38            | <i>Chlnomolena oderata</i>      | Asteraceae      | + | + |
| 39            | <i>Desmodium vaxillatum</i>     | Papilionaceae   | + | - |
| 40            | <i>Grewia bracteata</i>         | Teliaceae       | + | - |
| 41            | <i>Hibiscus rosa-sinensis</i>   | Malvaceae       | + | - |
| 42            | <i>Jatropha glandulifera</i>    | Euphorbiaceae   | - | + |
| 43            | <i>Knoxia heyneana</i>          | Rubiaceae       | - | + |
| 44            | <i>Lantana camara</i>           | Verbanaceae     | + | + |
| 45            | <i>Manihot esculenta</i>        | Euphorbiaceae   | - | + |
| 46            | <i>Naregamia alata</i>          | Meliaceae       | + | + |
| 47            | <i>Orthosiphon thymifloorum</i> | Lamiaceae       | - | + |
| 48            | <i>Polygala javana</i>          | Polygalaceae    | - | + |



|    |                            |               |   |   |
|----|----------------------------|---------------|---|---|
| 49 | <i>Phyllanthus emblica</i> | Euphorbiaceae | + | - |
| 50 | <i>Sida cordifolia</i>     | Malvaceae     | - | + |
| 51 | <i>Streblus asper</i>      | Moraceae      | + | - |
| 52 | <i>Urena lobata</i>        | Malvaceae     | - | + |
| 53 | <i>Ziziphus oenoplia</i>   | Rhamaceae     | + | - |

**Herbs**

|    |                                |               |   |   |
|----|--------------------------------|---------------|---|---|
| 54 | <i>Achyranthus aspera</i>      | Amaranthaceae | + | + |
| 55 | <i>Aerva lanata</i>            | Amaranthaceae | + | + |
| 56 | <i>Ageratum coryzoides</i>     | Asteraceae    | + | - |
| 57 | <i>Alloteropsis cimicina</i>   | Poaceae       | + | + |
| 58 | <i>Alternanthera sessilis</i>  | Amaranthaceae | + | - |
| 59 | <i>Altnanthera sps</i>         | Amaranthaceae | + | - |
| 60 | <i>Andrographis paniculata</i> | Acanthaceae   | + | + |
| 61 | <i>Apluda mutica</i>           | Poaceae       | + | + |
| 62 | <i>Aristida setacea</i>        | Poaceae       | - | - |
| 63 | <i>Asteracanta longifolia</i>  | Acanthaceae   | + | - |
| 64 | <i>Axonopus compressus</i>     | Poaceae       | + | - |
| 65 | <i>Biophytum sensitivum</i>    | Oxalidaceae   | + | + |
| 66 | <i>Centella asiatica</i>       | Apiaceae      | + | + |
| 67 | <i>Chrysanthimum sps</i>       | Asteraceae    | + | - |
| 68 | <i>Cleome rutidosperma</i>     | Capparaceae   | + | - |
| 69 | <i>Commelina benghalensis</i>  | Commelinaceae | + | - |

|    |                                  |                |   |   |
|----|----------------------------------|----------------|---|---|
| 70 | <i>Commelina erecta</i>          | Commelinaceae  | + | + |
| 71 | <i>Cymbapogon travancorensis</i> | Poaceae        | + | + |
| 72 | <i>Cyanodon dactulon</i>         | Poaceae        | + | - |
| 73 | <i>Cyperus corybusus</i>         | Cyperaceae     | + | - |
| 74 | <i>Cyrtococcum longipes</i>      | Poaceae        | - | + |
| 75 | <i>Dactyloctenium aegyptium</i>  | Poaceae        | + | - |
| 76 | <i>Eclipta alba</i>              | Asteraceae     | + | - |
| 77 | <i>Eleusine indica</i>           | Poaceae        | + | - |
| 78 | <i>Elephantopus scaber</i>       | Asteraceae     | + | - |
| 79 | <i>Emillia sonchifolia</i>       | Asteraceae     | + | + |
| 80 | <i>Eragrostis gangetica</i>      | Poaceae        | + | - |
| 81 | <i>Euphorbia hirta</i>           | Euphorbiaceae  | + | + |
| 82 | <i>Evolvulus alsinoides</i>      | Convolvulaceae | + | - |
| 83 | <i>Evolvulus nummularis</i>      | Convolvulaceae | - | + |
| 84 | <i>Gymnema sylvestre</i>         | Asclepiadaceae | - | + |
| 85 | <i>Hedyotis corymbosa</i>        | Rubiaceae      | + | - |
| 86 | <i>Helotropium indicum</i>       | Boraginaceae   | - | + |
| 87 | <i>Hibiscus brackenridgei</i>    | Malvaceae      | + | + |
| 88 | <i>Hybanthus enneaspermus</i>    | Violaceae      | + | + |
| 89 | <i>Hyptis suaveolens</i>         | Lamiaceae      | + | + |
| 90 | <i>Justicia simplex</i>          | Acanthaceae    | + | + |
| 91 | <i>Kyllinga squamulata</i>       | Cyperaceae     | + | - |
| 92 | <i>Leucas aspera</i>             | Lamiaceae      | + | + |
| 93 | <i>Maranta arundinacea</i>       | Aeraceae       | + | + |
| 94 | <i>Mimosa pudica</i>             | Mimosaceae     | + | + |

|     |                               |                  |   |   |
|-----|-------------------------------|------------------|---|---|
| 95  | <i>Ocimum sanctum</i>         | Lamiaceae        | + | - |
| 96  | <i>Panicum antidotale</i>     | Poaceae          | + | - |
| 97  | <i>Phyllanthus niruri</i>     | Euphorbiaceae    | + | + |
| 98  | <i>Pseudarthria viscida</i>   | Fabaceae         | + | + |
| 99  | <i>Sesbastiana chamalea</i>   | Euphorbiaceae    | - | + |
| 100 | <i>Scoparia dulcis</i>        | Scrophulariaceae | + | - |
| 101 | <i>Sida acuta</i>             | Malvaceae        | + | + |
| 102 | <i>Sporobolus inclados</i>    | Poaceae          | + | - |
| 103 | <i>Stylosanthes fruticosa</i> | Fabaceae         | + | + |
| 104 | <i>Tephrosia</i> sps          | Papilionaceae    | - | + |
| 105 | <i>Tridax procumbens</i>      | Asteraceae       | + | + |
| 106 | <i>Vernonia cineria</i>       | Asteraceae       | + | + |
| 107 | <i>Vicoa indica</i>           | Asteraceae       | - | + |
| 108 | <i>Weddelia trilobata</i>     | Asteraceae       | + | - |
| 109 | <i>Synedrella nodiflora</i>   | Asteraceae       | + | - |

### Climbers

|     |                                  |                  |   |   |
|-----|----------------------------------|------------------|---|---|
| 110 | <i>Aristolochia indica</i>       | Aristolochiaceae | + | - |
| 111 | <i>Blepharis maderaspatensis</i> | Acanthaceae      | + | - |
| 112 | <i>Cardiospermum halicacabum</i> | Sapindaceae      | - | + |
| 113 | <i>Centrosema pubescens</i>      | Fabaceae         | - | + |
| 114 | <i>Cissampelos pareira</i>       | Menispermaceae   | - | + |
| 115 | <i>Crotalaria retusa</i>         | Fabaceae         | - | + |
| 116 | <i>Ficus tinctoria</i>           | Moraceae         | + | - |
| 117 | <i>Glorisa superba</i>           | Liliaceae        | - | + |
| 118 | <i>Jasminium angustifolium</i>   | Oleaceae         | + | - |
| 119 | <i>Jasminium malabaricum</i>     | Oleaceae         | + | - |
| 120 | <i>Merremia tridellata</i>       | Convolvulaceae   | + | - |
| 121 | <i>Mukia maderaspatans</i>       | Cucurbitaceae    | + | + |
| 122 | <i>Piper nigrum</i>              | Piperaceae       | + | - |
| 123 | <i>Tinospora cordifolia</i>      | Menispermaceae   | - | + |
| 124 | <i>Vanda tassellata</i>          | Orchidaceae      | + | + |

Abbreviations: (- absent; + present)

Sorensen similarity index showed, 35.71% (20 species) of the herbaceous species were common in both the groves. It may be due to the locality of the groves, i.e., both the groves are situated in between 100m distance. An epiphytic orchidaceous species *Vanda tassellata* (Orchidaceae) represented both the groves showed the similarity distribution of species in the groves studied.

Dominance of phanerophytes (44 - 51%) in the sacred groves brings them closer to the tropical forests at Mexico (Vazquezg *et al.* 1998) and Costa Rica (Lieberman *et al.* 1996). High concentrations of lianas and climbers, another important characteristic feature of the tropical forests (Daniels *et al.* 1995; Vazquezg *et al.* 1998) was also observed in the sacred forests. High percentage of epiphytes (11 - 16%) in the sacred groves

is attributed to the year round precipitation and high atmospheric humidity (Benzing 1983; Sugden and Robins 1979). The finding of the present study is supported with the earlier work of Upadhaya *et al.* (2003) in the sacred groves of Jaintia Hills in Meghalaya, northeast India. Sunitha (2002) studied 14 sacred groves in Kurnool district of Andhra Pradesh and recorded a maximum of 83 tree species in the 50 ha Upper Ahobilam sacred grove.

## Conclusion

The present study has documented the prevalence of the sacred forest among the agricultural/urban societies. It further confirms that this forest have managed to survive up to the modern times but are struggling for survival now. Despite their alarming conservation status, the biodiversity conserved in them is significantly rich, varied and valuable. Unless urgent and stem measures are taken, the time is not far-off that the “mini biosphere reserves” will be turned to the “relicts of dying wisdom”.

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