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A Study on the Plant Biocultural Diversity of Palrampattu and Vadakanandal Sacred Groves in Villupuram District, Tamil Nadu

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Abstract

Floristic diversity associated with the cultural activities of people in Palrampattu and Vadakanandal sacred groves of Villupuram district, Tamil Nadu, India were explored in the present study. Mimosaceae (11 species), Caesalpiniaceae (10 species) were the dominant families in the Palrampattu grove followed by Fabaceae (9 species), Apocynaceae (8 species), Acanthaceae (7 species), Malvaceae (7 species), Asteraceae (6 species), Capparaceae (6 species), Rubiaceae (6 species), Euphorbiaceae (5 species), Rutaceae (5 species). Mimosaceae (12 species), Fabaceae (10 species) were the dominant families in Vadakanandal sacred grove. Culturally, the deities associated with these groves are: Aagasa Karuppusami, Periyakruppu and Nondikaruppu. A total of 190 plant species belonging to 168 genera were recorded from the Palrampattu sacred grove which included herbs (59 species), shrubs (28 species), climbers (43 species), trees (58 species), and parasite (2 species). In Vadakanandal sacred grove, a total of 178 species belonging to 159 genera consisting of herbs (54 species), shrubs (27 species), climbers (39 species), trees (56 species) and parasites (2 species) were reported. Sacred groves are one of the most valuable sources of plant diversity and ethnobotany, non-timber forest products and cultural ethos. In short, the floristic diversity of the Palrampattu and Vadakandhal sacred groves act as a storehouse of medicinal plants.

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Introduction

Sacred groves may be defined as pristine patches of native biodiversity that are persevered in their original state over the centuries. This is mainly due to the religious beliefs, taboos and customs that have been handed down from generation to generation. They are distinct segments of various landscapes containing trees and other life forms and geographical features (Gadgil and Vartak, 1975). Gadgil's group at the Indian Institute of Science in Bangalore first reported the existence of a pristine grove in the Western Ghats. The cultural links to conservation was the central theme whereas the ecological and biological values were highlighted by Ramakrishnan (1998), Malhotra et al. (2001) and Ramanujam et al. (2002) which were concise but comprehensive too. Indian society is thus an agglomeration of about 40,000 endogamous groups of castes and communities including 3000 tribal sects (Malhotra, 2001). This diversity is reflected in the variety of cultures which integrated the concept of sacred groves in their own way and practiced with characteristic

traditions, rites and rituals. Rightly, this is called `vernacular conservation'. Soon they found hundreds of such groves on the Western Ghats in the States of Maharashtra and Karnataka (Gadgil and Vartak, 1981). In Southern India, groves have been reported by different groups from Uttara and Dakshina Kannada regions, from southern and northern Kerala, and from Tamil Nadu.

Sacred groves - an overview

Historically, the sacred groves could be traced back to the hunter- gatherer societies which viewed the environment as an inalienable part of their life. Such societies consisted of "ecosystem people" as they were truly conscious of their total dependence on nature and natural resources, and hence worshipped nature as God. Sooner or later, when population increased they cleared large tracts of forests. Fortunately, the religions that subsequently invaded the societies also approved of and practiced the sacred grove concept. From strictly including only the climax forest patches (Gadgil and Vartak, 1981), two types - village groves near the hamlets and far off sacred groves - were recognized. 'Aswathakattes' are paired trees of neem and pipal while Tanchavati' is a group of five species of trees; 'Banni Mantaps' are clusters of *Acacia ferruginia* trees; rarely a large banyan tree may represent the grove as well (Somasekhar, 1998). Each ecosystem had people carrying out their unique habits of hunting, gathering, cultivating and worshipping deities. Although some of the deities may not be associated with extensive forest cover, most are found intimately connected with at least a small grove of plants. Each grove is dedicated to the local folk deities and spirits (vanadevathai) and has folklore associated with either the deity or the grove. Commonly found deities are Aiyanar, Sastha, Muniyappa, Karuppuswami, Veeran (Kaaval Teivam / protective deity), Andavar (a powerful wish-fulfilling deity) and the goddesses are Selliyamman, Kali, Ellaikali, Ellaipidari, Sapta Kannis, Pechiyamman, Rakkachiyamman and Nagadevadhai (fertility and good health). In certain sacred groves, people fulfill their vows by tonsuring (shaving the head to make a ceremonial offering of hair to the god). Terracotta horses of various sizes are lined up in front of the deity within the sacred groves praying for a good harvest (Kadamban, 1998).

Sacred groves were first described in India by Dietrich Brandis in 1857. According to Fergusson (1971), sacred groves are believed to be pre-Vedic in origin. More recently, Gadgil and Vartak (1981) reviewed the sacred groves of India's states and reported some 13,270 intact sacred groves, with the highest number found in Himachal Pradesh (nearly 5000 sacred groves). Other estimates put the total number of such groves in India at over a lakh. In culturally vibrant Tamil Nadu, over 1200 sacred groves have been reported (Amirthalingam, 2012). Maheswaran et al. (1995) studied the floristic of a miniature sacred grove measuring the size of a basket ball court on the Passumari hill-top near Vedanthangal bird sanctuary in Kanchipuram district of Tamil Nadu. Generally, the sacred groves of Tamil Nadu are dedicated to Aiyanar and/or Amman. Footwear or any other leather wear is not permitted inside the grove. In certain cases, people observe '*viradh'* (fasting) prior to ceremonial visits to the grove (http://www.ecoheritage.cpreec.org)

Biodiversity and vegetation types

The compositions of the vegetation of the groves are considered climax vegetation of the respective areas (Gadgil and Vartak, 1981). The World Conservation Strategy (WCS) has appreciated the ecological prudence imbued in the concept of sacred groves and recommended that the cultural connections to conservation practices as prevailing in the classical societies be encouraged. Such an attempt would also directly involve the local people in biodiversity conservation. Thus it emerges from the foregoing that the status report of sacred groves in India is still incomplete despite an intensive survey; the analysis of the floristic and phyto-sociology of the selected grove are still ongoing. Thirdly, the aim is to document in detail the belief systems, rites and rituals, folklore and their impact on biodiversity conservation and finally, to make a comprehensive inventory of the species covering the Palrampattu and Vadakanandal groves and to assess the conservation value to bring out the comprehensive plant biodiversity of the sacred groves in Kallakurichi taluk.

Materials and methods

This study envisages the estimation of floral wealth of the sacred groves in Palrampattu (Fig. 1) and Vadakanandal (Fig. 2), understanding the vegetation from a holistic point of view and ascertaining their floristic composition (Fig. 3). First hand information about the existence of sacred groves was gathered from hereditary priests and the temple authorities, environmental action groups and various social organizations. With this background information,

thorough field surveys were carried out by visiting the sacred grove and the neighbouring people were interviewed to confirm the information about the presence of other groves in the vicinity. For this study, the Palrampattu and Vadakanandal grove has taken for detailed analysis. The data collection was done from these sacred groves through field survey. Plants either with flowers or fruits were collected and identified or confirmed with available regional floras of Gamble (1915 – 1936), Matthew (1982, 1983 and 1988), Nair and Henry (1983), Henry et al. (1987, 1989), Sanjappa (1992), Balakrishnan and Chakrabarthy (2007), and Karthikeyan et al. (2009). Photographic documentation has also been done. Herbaria were prepared for all the plants and deposited in the Presidency College, Chennai.

Fig. 1: An outer view of Palrampattu sacred grove.

Fig. 2: Deities in Vadakanandal sacred grove.

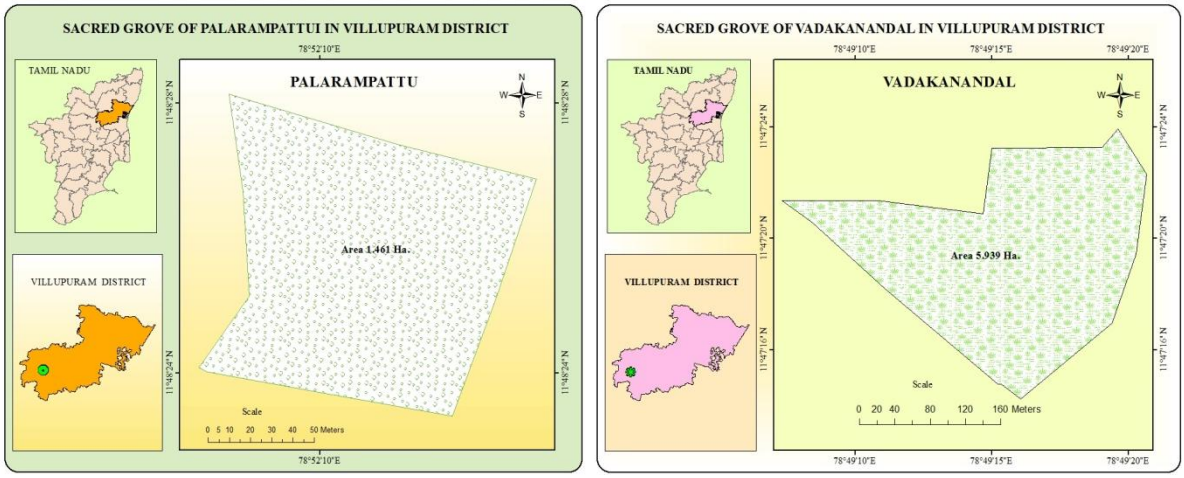

Fig. 3: Location of the study site.

Results and discussion

Floristic analysis of Palrampattu has been defined as the theoretical study of classification including its basis, principal, procedures and rules. The results of the pooled data of semi-evergreen vegetation type indicate the species richness of the grove. There are 190 species recorded in Palrampattu sacred grove (Table 1 and Fig. 4) and 178 species in Vadakanandal grove (Table 2 and Fig. 5). The present observation is very close to the range of plant species recorded by Karthik et al. (2015) who reported a total of 185 plant species belonging to 158 genera and 58 families in Kilcheruvi (Edaicheruvi) sacred grove of Cuddalore district, south India. In the present study, Mimosaceae (11 species), Caesalpiniaceae (10 species) were the dominant families followed by Fabaceae (9 species), Apocynaceae (8 species), Acanthaceae (7 species), Malvaceae (7 species), Asteraceae (6 species), Capparaceae (6 species), Rubiaceae (6 species), Euphorbiaceae (5 species), Rutaceae (5 species) in Palrampattu sacred grove. Amaranthaceae, Arecaceae, Asparagaceae, Cactaceae, Celastraceae, Ebenaceae, Loganiaceae, Molluginaceae and Myrtaceae were represented by single species each in Palrampattu grove. Mimosaceae (12 species), Fabaceae (10 species) were found to be the dominant families in the Vadakanandal sacred grove followed by Apocynaceae (9 species), Caesalpiniaceae (8 species), Acanthaceae (7 species), Capparaceae (6 species), Rubiaceae (6 species). The families which showed minimum number of species in Vadakanandal sacred grove were: Alangiaceae, Anacardiaceae, Annonaceae, Araceae, Aristolochiaceae, Asphodelaceae, Bignoniaceae, Cactaceae, Casuarinaceae, Commelinaceae, Commelinaceae, Commelinaceae, Ebenaceae, Flacourtiaceae, Hernandiaceae, Lauraceae, Loranthaceae, Meliaceae, Moringaceae, Myrtaceae, Passifloraceae, Pedaliaceae, Plumbaginaceae, Sapotaceae, Scrophulariaceae, Violaceae, Vitaceae and Zygophyllaceae.

Cultural ethos of the groves

In addition to restrictive practices, people observe rituals and organize festivals to please the supernatural forces for warding off the dangers in the form of drought, sickness, epidemics etc and for seeking a rich harvest and good health. Offerings are made naturally during festivals and these include miniatures of horses, bulls and elephants, the last one being characteristic of the coastal groves; the terracotta images were smaller in olden days but have assumed gigantic proportions recently (Amirthalingam, 1998). The philosophical underpinning in the making of a terracotta image is interesting. Parts of the old terracotta images or soil from the grove are pounded and mixed with clay for making new ones. The cyclic role of clay is correlated to the Hindu philosophy of birth, death and rebirth. The images of horses, elephants, or bulls represent the finiteness of a human life time. Customarily, terracotta images are offered, but figures from lime - stone or granite were also offered in earlier days. In the agricultural plains of Tamil Nadu, such events are part of the annual village festival during which a day is allotted for Aiyanar grove. The rites and ritual prevailing in the Puducherry region have been documented recently (Ramanujam et al., 2002). People perform important domestic ceremonies like tonsuring or ear-boring of the first born-child in the family. They also customarily offer invitations for their domestic functions like marriages.

Table 1. List of plants recorded in the Palrampattu sacred grove.

S. No.	Botanical name	Habit	Family
1	*Abrus precatorius* L.	C	Fabaceae
2	*Abutilon indicum* (L.) Sweet	H	Malvaceae
3	*Acacia ferruginea* DC.	T	Mimosaceae
4	*Acacia leucophloea* (Roxb.) Willd.	T	Mimosaceae
5	*Acacia caesia* (L.) Willd.	C	Mimosaceae
6	*Acacia nilotica* (L.) Delile	T	Mimosaceae
7	*Acalypha indica* L.	H	Euphorbiaceae
8	*Aerva lanata* (L.) Juss. ex Schult.	H	Amaranthaceae
9	*Alangium salviifolium* (L. f.) Wangerin	T	Alangiaceae
10	*Albizia amara* (Roxb.) Boivin	T	Mimosaceae
11	*Albizia lebbeck* (L.) Benth.	T	Mimosaceae
12	*Aloe vera* (L.) Burm.f.	H	Asphodelaceae
13	*Amarantus viridis* L.	H	Amaranthaceae
14	*Andrographis paniculata* (Burm.f.) Nees	H	Acanthaceae
15	*Annona squamosa* L.	T	Annonaceae
16	*Apluda mutica* L.	H	Poaceae
17	*Asparagus racemosus* Willd.	C	Asparagaceae
18	*Asystasia gangetica* (L.) T.Anderson	H	Acanthaceae
19	*Atalantia monophylla* (L.) DC.	T	Rutaceae
20	*Azadirachta indca* a. Juss.	T	Meliaceae
21	*Azima tetracantha* Lam.	S	Salvadoraceae
22	*Bambusa bambos* (L.) Voss	T	Poaceae
23	*Barleria prionitis* L.	H	Acanthaceae
24	*Bauhinia racemosa* Lam.	T	Caesalpiniaceae
25	*Blepharis maderaspatensis* (L.) B.Heyne ex Roth	H	Acanthaceae
26	*Blumea obliqua* (L.) Druce	H	Asteraceae
27	*Boerhavia diffusa* L.	H	Nyctaginaceae
28	*Borassus flabellifer* L.	T	Arecaceae
29	*Bougainvillaea spectabilis*, Willd.	C	Nyctaginaceae
30	*Butea monosperma* (Lam.) Taub.	T	Fabaceae
31	*Cadaba fruticosa* (L.) Druce	S	Capparaceae
32	*Caesalpinia bonduc* (L.) Roxb.	C	Caesalpiniaceae
33	*Calotropis gigantea* (L.) Dryand.	S	Asclepiadaceae
34	*Canavalia virosa* (Roxb.)	C	Fabaceae
35	*Cansjera rheedii* Gmel.	C	Opiliaceae
36	*Canthium coromandelicum* (Burm.f.) Alston	S	Rubiaceae
37	*Capparis sepiaria* L.	C	Capparaceae
38	*Capparis zeylanica* L.	C	Capparaceae
39	*Cardiospermum helicacabum* L.	C	Sapindaceae
40	*Carissa spinarum* L.	S	Apocynaceae
41	*Cascabela thevitia* (L.) Lipp.	T	Apocynaceae
42	*Cassia fistula* L.	T	Caesalpiniaceae
43	*Cassine glauca* (Rottb.) Kuntze	T	Celastraceae
44	*Cassytha filiformis* L.	P	Lauraceae
45	*Catharanthus roseus* (L.) G.Don	H	Apocynaceae
46	*Catunaregam spinosa* (Thunb.) Tirveng	T	Rubiaceae
47	*Cereus pterogonus* Lam.	S	Cactaceae
48	*Chloris barbata* Sw.	H	Poaceae
49	*Chloroxylon swietenia* DC.	T	Rutaceae
50	*Cissampelos pareira* L.	C	Menispermaceae
51	*Cissus quadrangularis* L.	C	Vitaceae
52	*Citrus aurantiifolia* (Christm.) Swingle	T	Rutaceae
53	*Cleome gynandra* L.	H	Capparaceae
54	*Cleome viscosa* L.	H	Capparaceae
55	*Clerodendrum phlomidis* L. f.	H	Laminaceae

S. No.	Botanical name	Habit	Family
56	*Clitoria ternatea* L.	C	Fabaceae
57	*Coccinia grandis* (L.) Voigt	C	Cucurbitaceae
58	*Cocculus hirsutus* (L.) W.Theob.	C	Menispermaceae
59	*Combretum albidum* G. Don.	C	Combretaceae
60	*Commelina attenuata* J. König ex Vahl	H	Commelinaceae
61	*Commelina benghalensis* L.	H	Commelinaceae
62	*Commiphora caudata* (Wight & Arn.) Engl.	T	Burseraceae
63	Corallocarpus epigaeus (Rottler) Hook.f.	C	Cucurbitaceae
64	*Corchorus aestuans* L.	H	Malvaceae
65	*Corypha macropoda* Kurz ex Kiden	T	Arecaceae
66	*Cratavea manga*(Lour.) DC.	T	Capparaceae
67	*Crossandra infundibuliformis* (L.) Nees	H	Acanthaceae
68	Croton bonplandianus Baill.	H	Euphorbiaceae
69	Cyanotis cristata (L.) D.Don	H	Commelinaceae
70	*Cyanthillium cinereum* (L.) H.Rob	H	Asteraceae
71	*Cynodon dactylon* (L.) Pers.	H	Poaceae
72	*Dalbergia latifolia* Roxb.	T	Fabaceae
73	*Datura metel* L.	H	Solanaceae
74	*Delonix elata* (L.) Gamble	T	Caesalpiniaceae
75	*Dendrophthoe falcata* (L.f.) Ettingsh.	P	Loranthaceae
76	*Derris ovalifolia* (Wight & Arn.) Benth.	C	Fabaceae
77	*Derris scandens* (Roxb.) Benth.	C	Fabaceae
78	Desmodium triflorum (L.) DC.	H	Fabaceae
79	*Dichrostachys cinerea* (L.) Wight & Arn.	T	Mimosaceae
80	*Dioscorea pentaphylla* L.	C	Dioscoreaceae
81	*Diospyros ebenum* J. Koeng. Ex Retz.	T	Ebenaceae
82	*Diospyros montana* Roxb.	T	Ebenaceae
83	*Diplocyclos palmatus* (L.) C.Jeffrey	C	Cucurbitaceae
84	*Ecbolium viride* (Forssk.) Alston	H	Acanthaceae
85	*Ehretia microphylla* Lam.	S	Boraginaceae
86	*Eucalyptus tereticornis* Sm.	T	Myrtaceae
87	*Euphorbia trigona* Mill.	T	Euphorbiaceae
88	*Evolvulus alsinoides* (L.) L.	H	Convolvulaceae
89	*Evolvulus nummularius* (L.) L.	H	Convolvulaceae
90	*Ficus religiosa* L.	T	Moraceae
91	*Ficus amplissima Sm.*	T	Moraceae
92	*Ficus benghalensis* L.	T	Moraceae
93	*Flacourtia indica* (Burm. f.) Merr.	S	Flacourtiaceae
94	*Flueggea leucopyrus* Willd.	T	Euphorbiaceae
95	*Glinus oppositifolius* (L.) Aug.DC.	H	Molluginaceae
96	*Gloriosa superba* L.	C	Liliaceae
97	*Glycosmis mauritiana* (Lam.) Tanaka	S	Rutaceae
98	*Gmelina arborea* Roxb.	T	Verbenaceae
99	*Gmelina asiatica* L.	C	Verbenaceae
100	*Gymnema sylvestre* (Retz.) Schult.	C	Apocynaceae
101	*Gyrocarpus americanus* Jacq.	T	Hernandiaceae
102	*Hemidesmus indicus* (L.) R. Br. ex Schult.	C	Asclepiadaceae
105	*Hibiscus rosa-sinensis* L.	T	Malvaceae
103	*Hugonia mystax* L.	C	Linaceae
104	*Hybanthus enneaspermus* (L.) F.Muell.	H	Violaceae
106	*Ichnocarpus frutescens* (L.) W.T.Aiton	C	Apocynaceae
107	*Ipomea staphylina* Roem. & Schult.	C	Convolvulaceae
108	*Jasminum angustifolium* (L.) Willd.	C	Oleaceae
109	*Jasminum auriculatum* Vahl	C	Oleaceae
110	*Jatropha gossypiifolia* L.	S	Euphorbiaceae
111	*Justicia prostrata* Gamble	H	Acanthaceae

S. No.	Botanical name	Habit	Family
112	*Lantana camara* L.	S	Verbenaceae
113	*Lepisanthes tetraphylla* (Vahl) Radlk.	T	Sapindaceae
114	*Madhuca longifolia* (L.) J. F. Macbr.	T	Sapotaceae
115	*Malvastrum coromandelianum* (L.) Garcke	H	Malvaceae
116	*Mangifera indica* L.	T	Anacardiaceae
117	*Marsdenia brunoniana* Wight & Arn.	C	Asclepiadaceae
118	*Maytenus emarginata* (Ruiz & Pav.) Loes.	S	Celastraceae
119	*Mimosa pudica* L.	H	Mimosaceae
120	*Mitragyna parvifolia* (Roxb.) Korth.	T	Rubiaceae
121	*Mollugo pentaphylla* L.	H	Molluginaceae
122	*Morinda pubescens* J.E. Smith	T	Rubiaceae
123	*Moringa oleifera* Lam.	T	Moringaceae
124	*Mukia maderaspatana* (L.) M.Roem.	C	Cucurbitaceae
125	*Nelumbo nucifera* Gaertn.	H	Nelumboginaceae
126	*Nerium oleander* L.	S	Apocynaceae
127	*Nyctanthes arbor-tristis* L.	T	Oleaceae
128	*Ocimum tenuiflorum* L.	H	Lamiaceae
129	*Ocimum americanum* L.	H	Lamiaceae
130	*Oldenlandia umbellata* L.	H	Rubiaceae
131	*Opuntia dillenii* (Ker Gawl.) Haw.	S	Cactaceae
132	*Pachygone ovata* (Poir.) Hook. f. & Thomson	C	Menispermaceae
133	*Pamburus missionis* (Wall. ex Wight) Swingle	T	Rutaceae
134	*Pandanus odoratissimus* L.f.	T	Pandanaceae
135	*Parthenium hysterophorus* L.	H	Asteraceae
136	*Passiflora foetida* L.	C	Passifloraceae
137	*Pavonia zeylanica* (L.) Cav.	H	Malvaceae
138	*Pedalium murex* L.	H	Pedaliaceae
139	*Peltophorum pterocarpum* (DC.) K.Heyne	T	Caesalpiniaceae
140	*Pentanema indicum* (L.)Ling	H	Asteraceae
141	*Phoenix pusilla* Gaertn.	S	Arecaceae
142	*Phyllanthus amarus* Schumach. & Thonn.	H	Euphorbiaceae
143	*Physalis minima* L.	H	Solanaceae
144	*Pithecellobium dulce* (Roxb.) Benth.	T	Mimosaceae
145	Plumbago zeylanica L.	H	Plumbaginaceae
146	*Pongamia pinnata* (L.) Pier.	T	Fabaceae
147	*Prosopis juliflora* (Sw.) Dc.	T	Mimosaceae
148	*Pterolobium hexapetalum* (Roth) Santapau & Wagh	C	Caesalpiniaceae
149	*Rivea hypocrateriformis* Choisy	C	Convolvulaceae
150	*Ruellia prostrata* Poir.	H	Acanthaceae
151	*Salvadora persica* L.	T	Salvadoraceae
152	*Sansevieria roxburghiana* Schult. & Schult. f.	H	Asparagaceae
153	*Santalum album* L.	T	Santalaceae
154	*Sarcostemma acidum* (Roxb.) Voigt	C	Asclepiadaceae
155	*Scoparia dulcis* L.	H	Scrophulariaceae
156	*Scutia myrtina* (Burm. f.) Kurz	C	Rhamnaceae
157	*Secamone emetica* (Retz.) R. Br. ex Schult.	C	Apocynaceae
158	*Senna auriculata* (L.) Roxb.	S	Caesalpiniaceae
159	*Senna occidentalis* (L.) Link	S	Caesalpiniaceae
160	*Senna tora* (L.) Roxb.	S	Caesalpiniaceae
161	*Senna siamea* (Lam.) H. S. Irwin & Barneby	T	Mimosaceae
162	*Sida acuta* Burm.f.	H	Malvaceae
163	*Sida cordifolia* L.	H	Malvaceae
164	*Solanum trilobatum* L.	C	Solanaceae
165	*Solanum xanthocarpum* Schrad. & H. Wendl.	H	Solanaceae
166	*Spermacoce hispida* L.	H	Rubiaceae
167	*Stachytarpheta jamaicensis* auct.non(L.) Vahl	H	Verbenaceae

S. No.	Botanical name	Habit	Family
168	*Streblus asper* Lour.	T	Moraceae
169	*Strychnos nux-vomica* L.	T	Loganiaceae
170	*Strychnos potatorum* L. f.	T	Loganiaceae
171	*Syzygium cumini* (L.) Skeels	T	Myrtaceae
172	*Tabernaemontana divaricata* (L.) R.Br. ex Roem. & Schult.	S	Apocynaceae
173	*Tagetus erecta* L.	H	Asteraceae
174	*Tamarindus indica* L.	T	Caesalpiniaceae
175	*Tarenna asiatica* (L.) Kuntze ex K.Schum.	S	Rubiaceae
176	*Tecoma stans* (L.) Juss. ex Kunth	T	Bignoniaceae
177	*Tectona grandis* L.f.	T	Verbenaceae
178	*Tephrosia purpurea* (L.) Pers.	H	Fabaceae
179	*Thespesia populnea* (L.) Sol. ex Corrêa	T	Malvaceae
180	*Tinospora cordifolia* (Willd.) Hook. f. & Thomson	C	Menispermaceae
181	*Toddalia asiatica* (L.) Lam.	C	Rutaceae
182	*Tribulus terrestris* L.	H	Zygophyllaceae
183	*Tridax procumbens* L.	H	Asteraceae
184	*Tylophora indica* (Burm. f.) Merr.	C	Asclepiadaceae
185	*Ventilago maderaspatana* Gaertn.	C	Rhamnaceae
186	*Vitex negundo* L.	T	Laminaceae
187	*Wrightia tinctoria* (Roxb.) R. Br	T	Apocynaceae
188	*Xanthium indicum* J.Koenig	H	Asteraceae
189	*Ziziphus mauritiana* Lam.	T	Rhamnaceae
190	*Ziziphus oenoplia* (L.) Mill.	C	Rhamnaceae

C-Climber; H – Herb; S – Shrub; T – Tree; P – Parasite.

Table 2. List of Plants recorded in the Vadakkanandal sacred grove.

S. No.	Botanical name	Habit	Family
1	*Abrus precatorius* L.	C	Fabaceae
2	*Abutilon indicum* (L.) Sweet	H	Malvaceae
3	*Acacia ferruginea* DC.	T	Mimosaceae
4	*Acacia leucophloea* (Roxb.) Willd.	T	Mimosaceae
5	*Acacia planifrons* Wight & Arn.	T	Mimosaceae
6	*Acacia caesia* (L.) Willd.	C	Mimosaceae
7	*Acacia nilotica* (L.) Delile	T	Mimosaceae
8	*Acalypha indica* L.	H	Euphorbiaceae
9	*Achyranthes aspera* L.	H	Amaranthaceae
10	*Aerva lanata* (L.) Juss. ex Schult.	H	Amaranthaceae
11	*Alangium salviifolium* (L. f.) Wangerin	T	Alangiaceae
12	*Albizia amara* (Roxb.) Boivin	T	Mimosaceae
13	*Albizia lebbeck* (L.) Benth.	T	Mimosaceae
14	*Allophylus serratus* (Roxb.) kurz.	S	Sapindaceae
15	*Aloe vera* (L.) Burm.f.	H	Asphodelaceae
16	*Amarantus viridis* L.	H	Amaranthaceae
17	*Andrographis paniculata* (Burm.f.) Nees	H	Acanthaceae
18	*Annona squamosa* L.	T	Annonaceae
19	*Apluda mutica* L.	H	Poaceae
20	*Aristolochia indica* L.	C	Aristolochiaceae
21	*Asparagus racemosus* Willd.	C	Asparagaceae
22	*Atalantia monophylla* (L.) DC.	T	Rutaceae
23	*Azadirachta indca* A. Juss.	T	Meliaceae
24	*Azima tetracantha* Lam.	S	Salvadoraceae
25	*Bambusa bambos* (L.) Voss	S	Poaceae
26	*Barleria prionitis* L.	H	Acanthaceae
27	*Basilicum polystachyon* (L.) Moench	H	Laminaceae
28	*Blepharis maderaspatensis* (L.) B.Heyne ex Roth	H	Acanthaceae

S. No.	Botanical name	Habit	Family
29	*Boerhavia diffusa* L.	H	Nyctaginaceae
30	*Borassus flabellifer* L.	T	Arecaceae
31	*Bougainvillaea spectabilis,* Willd.	S	Nyctaginaceae
32	*Bulbostylis barbata* (Rottb.) Kunth ex C.B. Clarke	H	Cyperaceae
33	*Butea monosperma* (Lam.) Taub.	T	Fabaceae
34	*Cadaba fruticosa* (L.) Druce	S	Capparaceae
35	*Caesalpinia bonduc* (L.) Roxb.	C	Caesalpiniaceae
36	*Calotropis gigantea* (L.) Dryand.	S	Asclepiadaceae
37	*Calycopteris floribunda* Lam.	C	Combretaceae
38	*Canavalia virosa* (Roxb.)	C	Fabaceae
39	*Canthium coromandelicum* (Burm.f.) Alston	S	Rubiaceae
40	*Capparis brevispina* DC.	C	Capparaceae
41	*Capparis sepiaria* L.	C	Capparaceae
42	*Capparis zeylanica* L.	C	Capparaceae
43	*Cardiospermum helicacabum* L.	C	Sapindaceae
44	*Carissa spinarum* L.	S	Apocynaceae
45	*Carmona retusa* (Vahl) Masam.	S	Boraginaceae
46	*Cascabela thevitia* (L.) Lipp.	T	Apocynaceae
47	*Cassia fistula* L.	T	Caesalpiniaceae
48	*Cassine glauca* (Rottb.) Kuntze	T	Celastraceae
49	*Cassytha filiformis* L.	P	Lauraceae
50	Casuarina equisetifolia L.	T	Casuarinaceae
51	*Catharanthus roseus* (L.) G.Don	H	Apocynaceae
52	*Catunaregam spinosa* (Thunb.) Tirven.	S	Rubiaceae
53	*Chloris barbata* Sw.	H	Poaceae
54	*Chloroxylon swietenia* DC.	T	Rutaceae
55	*Cissampelos pareira* L. var. *hirsuta* (Buch.-Ham. ex DC.) Forman	C	Menispermaceae
56	*Cissus quadrangularis* L.	C	Vitaceae
57	*Cleome gynandra* L.	H	Capparaceae
58	*Cleome viscosa* L.	H	Capparaceae
59	*Clitoria ternatea* L.	C	Fabaceae
60	*Coccinia grandis* (L.) Voigt	C	Cucurbitaceae
61	*Cocculus hirsutus* (L.) W.Theob.	C	Menispermaceae
62	*Combretum albidum* G. Don.	C	Fabaceae
63	*Convolvulus arvensis* L.	H	Convolvulaceae
64	*Corchorus aestuans* L.	H	Malvaceae
65	*Cordia monoica* Roxb.	T	Boraginaceae
66	*Cratavea manga*(Lour.) DC.	T	Capparaceae
67	*Crossandra infundibuliformis* (L.) Nees	H	Acanthaceae
68	*Croton bonplandianus* Baill.	H	Euphorbiaceae
69	*Cucumis maderaspatana* L.	C	Cucurbitaceae
70	Cyanotis cristata (L.) D. Don	H	Commelinaceae
71	*Cyanthillium cinereum* (L.) H.Rob	H	Asteraceae
72	*Cyperus rotundus* L.	H	Cyperaceae
73	*Dalbergia sissoo* Roxb. ex DC.	C	Fabaceae
74	*Datura metel* L.	H	Solanaceae
75	*Delonix elata* (L.) Gamble	T	Caesalpiniaceae
76	*Dendrophthoe falcata* (L.f.) Ettingsh.	P	Loranthaceae
77	*Derris ovalifolia* (Wight & Arn.) Benth.	C	Fabaceae
78	*Derris scandens* (Roxb.) Benth.	C	Fabaceae
79	*Dichrostachys cinerea* (L.) Wight & Arn.	T	Mimosaceae
80	*Dioscorea pentaphylla* L.	C	Dioscoreaceae
81	*Dioscorea oppositifolia* L.	C	Dioscoreaceae
82	*Diospyros ebenum* J. Koeng. Ex Retz.	T	Ebenaceae
83	*Euphorbia antiquorum* L.	T	Euphorbiaceae
84	*Evolvulus alsinoides* L.	H	Convolvulaceae

S. No.	Botanical name	Habit	Family
85	*Evolvulus nummularis* L.	H	Convolvulaceae
86	*Ficus amplissima* J. E.	T	Moraceae
87	*Ficus religiosa* L.	T	Moraceae
88	*Ficus benghalensis* L.	T	Moraceae
89	*Ficus hispida* L. f.	T	Moraceae
90	*Flacourtia indica* (Burm. f.) Merr.	S	Flacourtiaceae
91	*Flueggea leucopyrus* Willd.	S	Euphorbiaceae
92	*Glinus oppositifolius* (L.) Aug.DC.	H	Molluginaceae
93	*Glycosmis mauritiana* (Lam.) Tanaka	S	Rutaceae
94	*Gmelina asiatica* L.	C	Verbenaceae
95	*Grewia orientalis* L.	C	Tiliaceae
96	*Gymnema sylvestre* (Retz.) Schult.	C	Apocynaceae
97	*Gyrocarpus americanus* Jacq.	T	Hernandiaceae
98	*Hemidesmus indicus* (L.) R. Br. ex Schult.	H	Asclepiadaceae
99	*Hybanthus enneaspermus* (L.) F.v. Muell.	H	Violaceae
100	*Hygrophila auriculata* (K.Schum.)Heine	H	Acanthaceae
101	*Ichnocarpus frutescens* (L.) W.T.Aiton	C	Apocynaceae
102	*Ipomoea carnea* Jacq.	S	Convolvulaceae
103	*Jasminum angustifolium* (L.) Willd.	C	Oleaceae
104	*Jatropha gossypiifolia* L.	S	Euphorbiaceae
105	*Lantana camara* L.	S	Verbinaceae
106	*Lepisanthes tetraphylla* (Vahl) Radlk.	T	Sapindaceae
107	*Limonia acidissima* L.	T	Rutaceae
108	*Madhuca longifolia* (L.) J. F. Macbr.	T	Sapotaceae
109	*Malvastrum coromandelianum* (L.) Garcke	H	Malvaceae
110	*Mangifera indica* L.	T	Anacardiaceae
111	*Maytenus emarginata* (Ruiz & Pav.) Loes.	S	Celastraceae
112	*Merremia tridentata* (L.) Hall.f.	H	Convolvulaceae
113	*Mimosa pudica* L.	H	Mimosaceae
114	*Mitragyna parvifolia* (Roxb.) Korth.	T	Rubiaceae
115	*Mollugo pentaphylla* L.	H	Molluginaceae
116	*Morinda pubescens* J.E. Smith	T	Rubiaceae
117	*Moringa oleifera* Lam.	T	Moringaceae
118	*Mukia maderaspatana* (L.) M.Roem.	C	Cucurbitaceae
119	*Nerium oleander* L.	S	Apocynaceae
120	*Nyctanthes arbor-tristis* L.	T	Oleaceae
121	*Ocimum cannum* Sims L.	H	Lamiaceae
122	*Ocimum tenuiflorum* L.	H	Lamiaceae
123	*Oldenlandia umbellata* L.	H	Rubiaceae
124	*Opuntia dillenii* (Ker Gawl.) Haw.	H	Cactaceae
125	*Parthenium hysterophorus* L.	H	Asteraceae
126	*Passiflora foetida* L.	C	Passifloraceae
127	*Pavonia zeylanica*	H	Malvaceae
128	*Pedalium murex* L.	H	Pedaliaceae
129	*Peltophorum pterocarpum* (DC.) K.Heyne	T	Caesalpiniaceae
130	*Phoenix pusilla* Gaertn.	S	Arecaceae
131	*Phyllanthus amarus* Schumach. & Thonn.	H	Euphorbiaceae
132	*Physalis minima* L.	H	Solanaceae
133	*Pithecellobium dulce* (Roxb.) Benth.	T	Mimosaceae
134	*Pleiospermium alatum* (Wight & Arn.) Swingle	T	Rutaceae
135	Plumbago zeylanica L.	H	Plumbaginaceae
136	*Pongamia pinnata* (L.) Pier.	T	Fabaceae
137	*Prosopis juliflora* (sw.) Dc.	T	Mimosaceae
138	*Pterolobium hexapetalum* (Roth) Santapau & Wagh	C	Caesalpiniaceae
139	*Reissantia indica* (Willd.) N. Hallé	C	Celastraceae
140	*Rivea hypocrateriformis* Choisy	C	Convolvulaceae

S. No.	Botanical name	Habit	Family
141	*Ruellia prostrata* Poir.	H	Acanthaceae
142	*Salvadora persica* L.	T	Salvadoraceae
143	*Sansevieria roxburghiana* Schult. & Schult. f.	H	Asparagaceae
144	*Sapindus emarginatus* Vahl	T	Sapindaceae
145	*Sarcostemma acidum* (Roxb.) Voigt	C	Asclepiadaceae
146	*Scoparia dulcis* L.	H	Scrophulariaceae
147	*Scutia myrtina* (Burm. f.) Kurz	C	Rhamnaceae
148	*Secamone emetica* (Retz.) R. Br. ex Schult.	C	Apocynaceae
149	*Senna auriculata* (L.) Roxb.	S	Caesalpiniaceae
150	*Senna occidentalis* (L.) Link	S	Caesalpiniaceae
151	*Senna siamea* (Lam.) H. S. Irwin & Barneby	T	Mimosaceae
152	*Sida acuta* Burm.f.	H	Malvaceae
153	*Solanum triflorum* Nutt.	H	Solanaceae
154	*Spermacoce hispida* L.	H	Rubiaceae
155	*Streblus asper* Lour.	T	Moraceae
156	*Strychnos nux-vomica* L.	T	Loganiaceae
157	*Strychnos potatorum* L. f.	T	Loganiaceae
158	*Syzygium cumini* (L.) Skeels	T	Myrtaceae
159	*Tabernaemontana divaricata* (L.) R.Br. ex Roem. & Schult.	S	Apocynaceae
160	*Tamarindus indica* L.	T	Caesalpiniaceae
161	*Tarenna asiatica* (L.) Kuntze ex K.Schum.	S	Rubiaceae
162	*Tecoma stans* (L.) Juss. ex Kunth	T	Bignoniaceae
163	*Tectona grandis* L.f.	T	Verbenaceae
164	*Tephrosia purpurea* (L.) pers.	H	Fabaceae
165	*Terminalia arjuna* (Roxb.ex DC.) Wt.& Arn	T	Combretaceae
166	*Theriophonum minutum* (Willd.) Baill.	H	Araceae
167	*Thespesia populnea* (L.) Sol. ex Corrêa	T	Malvaceae
168	*Tinospora cordifolia* (Willd.) Hook. f. & Thomson	C	Menispermaceae
169	*Toddalia asiatica* (L.) Lam.	C	Rutaceae
170	*Tribulus terrestris* L.	H	Zygophyllaceae
171	*Tridax procumbens* L.	H	Asteraceae
172	*Triumfetta rhomboidea* Jacq.	H	Tiliaceae
173	*Tylophora indica* (Burm. f.) Merr.	C	Asclepiadaceae
174	*Ventilago maderaspatana* Gaertn.	C	Rhamnaceae
175	*Vitex negundo* L.	T	Laminaceae
176	*Wrightia tinctoria* (Roxb.) R. Br	T	Apocynaceae
177	*Ziziphus mauritiana* Lam.	T	Rhamnaceae
178	*Ziziphus oenoplia* (L.) Mill.	C	Rhamnaceae

C-Climber; H – Herb; S – Shrub; T – Tree; P – Parasite.

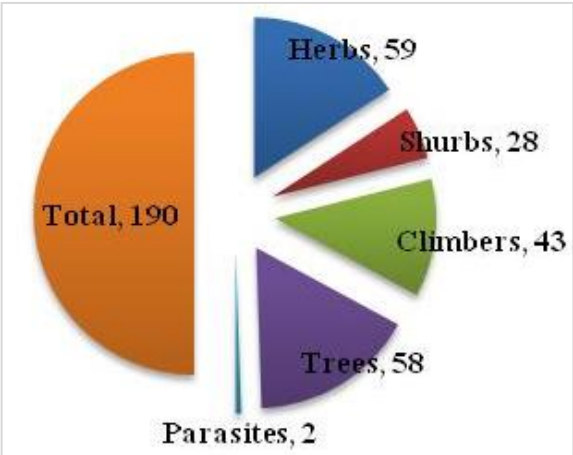

Fig. 4: Dominant habits in Palrampattu sacred grove.

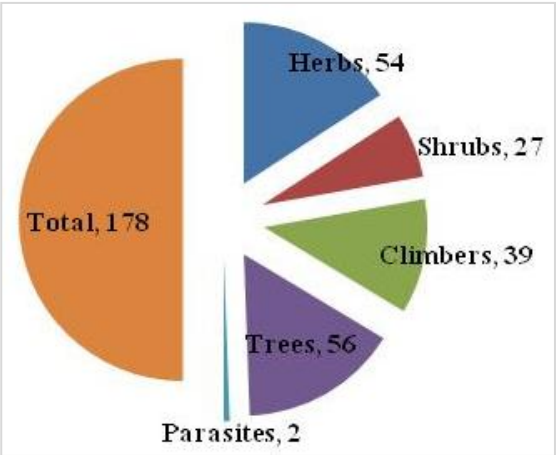

Fig. 5: Dominant habits in Vadakanandal sacred grove.

Soliamman grove at Palrampattu

It is situated in Palarampattu village, Kallakurichi Taluk of Villupuram district. The deities associated with this grove are Aagasa Karuppusami, Periyakruppu and Nondikaruppu. There are also water bodies which are used for agricultural practices. The grove is surrounded by Karadicithoor on the west, Ammapettai on the south, Mathur on the north and Mathvacheri on the east. Pooja is conducted every day and special poojas are performed on Tuesdays and Fridays. The ceremony of ear boring is performed in the month of Aadi (mid- July to mid-August) during the *Urani Pongal*. Much importance is given to women. Animals such as goat and fowl are sacrificed. The administration is conducted by the village committees. The *poojari* (the person who is performing *poojas*) is from the Vanniya caste. During *Urani Pongal*, the places are cleared and temporary constructions are made. The grazing of cattle around the grove is permitted.

Thiyagapaadi amman grove at Vadakanandal

Vadakanandal is situated at Kallakurichi taluk of Viluppuram district. Kachirayapalayam, Akkarayapalayam, Mettupalayam, Kamaraj salai are the main places of Vadakananadal. The goddess Thiyagapaadi Amman temple is considered to be one of the powerful goddesses in the surrounding villages. The grove is dedicated to Thiyagapaadi Amman and is surrounded by the Gomukhi dam on the north, Palrampattu village on the south, Kachirayapalyam on the west and Parigam village on the east. Greenery can be seen throughout the year because of the Gomukhi dam. Sugarcane, rice and turmeric are cultivated because of the availability of water. Other deities like Karuppaiya and Putru (ant-hill) Mariamman are also worshipped in this grove. Poojas are performed everyday throughout the year. A car festival is organized once in five years during the month of Aadi (mid-July to mid-August). Coconut milk, curd and *navadhanyas* are offered to the goddess during the festival. Goats and fowl are sacrificed to the deity Karuppaiya who is also associated with this grove.

Disturbance analysis

Both the groves are managed by the local village communities. Nowadays, concrete buildings are being constructed by destroying the grove for the benefit of the visitors. The local people use the grove for cattle grazing and also collect fuel wood by cutting small trees. The grove has also become a refuge for drunkards.

Conclusion

A total number of plants of 190 species belong to 168 genera from the Palrampattu grove. The plants include herbs (59 species), shrubs (28 species), climbers (43 species), trees (58 species), and parasite (2 species). In Vadakandhal sacred grove, a total of 178 species belong to 159 genera, herbs 54 species, shrubs 27 species, climbers 39 species, trees 56 species and parasites 2 species.

Sacred groves are thus one of the most valuable sources of plant diversity, ethnobotany, non timber forests products and cultural aspects. The taboos, rituals and beliefs associated with the groves, supported by mystic folklore have been the prime motivating factors for preserving them in a pristine condition. In short, the floristic diversity of the Palrampattu and Vadakanandal sacred groves act as a storehouse of medicinal plants. Many of these plants are valuable to the village communities as well as modern pharmacopoeia. It is also a storehouse of rare, endangered and threatened plants.

Conflict of interest statement

Authors declare that they have no conflict of interest.

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