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Conservation and Botanical exploration of Sacred Groves in Traditional Ecological Heritage site of Thoranamalai Murugan Kovil, Kadayam, Southern Western Ghats,Tirunelveli District, Tamilnadu

M. Maridass

Fissd's Research Institute of Conservation Ecology, Tirunelveli, Tamilnadu
*Corresponding Author Email: fissdrice@gmail.com
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Abstract
The present study was conducted in Sacred groves floral diversity of heritage site on Thoranaimalai, Murugan Kovil, Kadayam range on Southern Westrn Ghats, Tirunelveli District, Tamilnadu. The main objective of present study was observed that diversity of trees species in these sacred groves and role played by them in biodiversity conservation. During the study a total of 61 species belonging to 30 genera were found in these sacred groves. The dominant family of Asteraceae and Amaranthaceae were identified. The conclusion of the present study observed that most of the floral diversity highlighted the various threats faced by the sacred groves like construction activities, grazing of live stocks and modernization.

Keywords: Thoranai malai, Murugan Kovil, Sacred groves; Southern Westrn Ghats

1 INTRODUCTION

Sacred groves are covers of native vegetation, and they were traditionally protected by local and tribal communities and are significant instances of *in situ* biodiversity conservation[1]. The important role of sacred groves playing an in ensuring smooth ecosystem services such as clean environment, that is, air, soil, and water conservation, flora and fauna conservation, carbon sequestration, temperature control, and conservation of traditional knowledge. Moreover, sacred groves hold the potential for preservation of biological diversity, ecological functions, providing various ecosystem services, cultural diversity and also sacred groves serve as a home for birds and mammals, and hence they indirectly help in the conservation of biodiversity[2-3]. Previous studies on several authors reports revealed that these SGs can support and conserve flora and fauna [4-9]. The SGs threat to various witnessed from the process of modernization, industrialization, greed of land mafias and construction of building structures resulting is loss of cultural and ecological importance among the younger generation of local people [10]. The Western Ghats are internationally recognized as a region of immense global importance for the conservation of biological diversity, besides containing areas of high geological, cultural and aesthetic values. A chain of mountains running parallel to India's western coast, approximately 30-50 km inland, the Ghats traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat. These mountains cover an area of around 140,000 km² in a 1,600 km long stretch that is interrupted only by the 30 km Palghat Gap at around 11°N. In the present study complete analysis and document on the floral diversity of heritage site on Sacred groves of Thoranamalai Murugankovil, Kadaiyam, Tirunelveli District, Tamilnadu.

2 MATERIALS AND METHODS

2.1 Study area

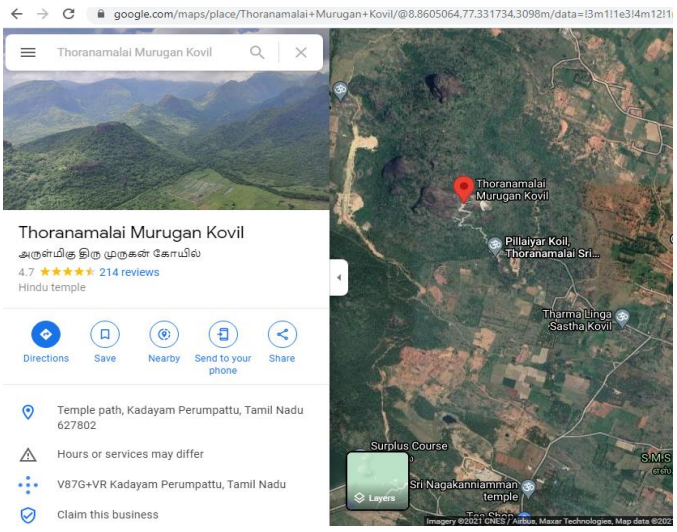

Fig.1: Study area of Heritage site on Thoranamalai Murugan Kovil, Southern Western Ghats.

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The study area of sacred groves of Thoranaimalai Murugan Kovil, Kadayam range of Western Ghat regions of Tirunelveli, Tamilnadu (Fig.1). Field surveys were carried out the August to December 2018 in the study area, using a multistage random sampling technique. A floristic diversity of sacred groves of Thoranaimalai Murugan Kovil was completely survey and current status of plant species of groves was recorded. The collected floras were identified by method of flora of Carnatics [11].

3. RESULTS AND DISCUSSION

The results of the present study was observed that floral diversity of the heritage site on the Thoranaimalai Murugan Kovil, Kadayam range of Southern Western Ghats represented in the table -1. The field observation of the floral diversity counted in the total of 61 plant species belongs to the 30 families identified in the Table-1,2 & Fig.2. Most of the plants were used by the rural community for curing various ailments. The dominant family of Amaranthaceae and Asteraceae were identified by each 6 species. Most of the Amaranthaceae species were used for food of spinach and Asteraceae species used for medicinal purposes for instance whole plants extract of *Tridax procumbens* L was used for healing of wound. Very interesting primitive vascular plants of 4 species of pteridophytes were identified in the table-1).

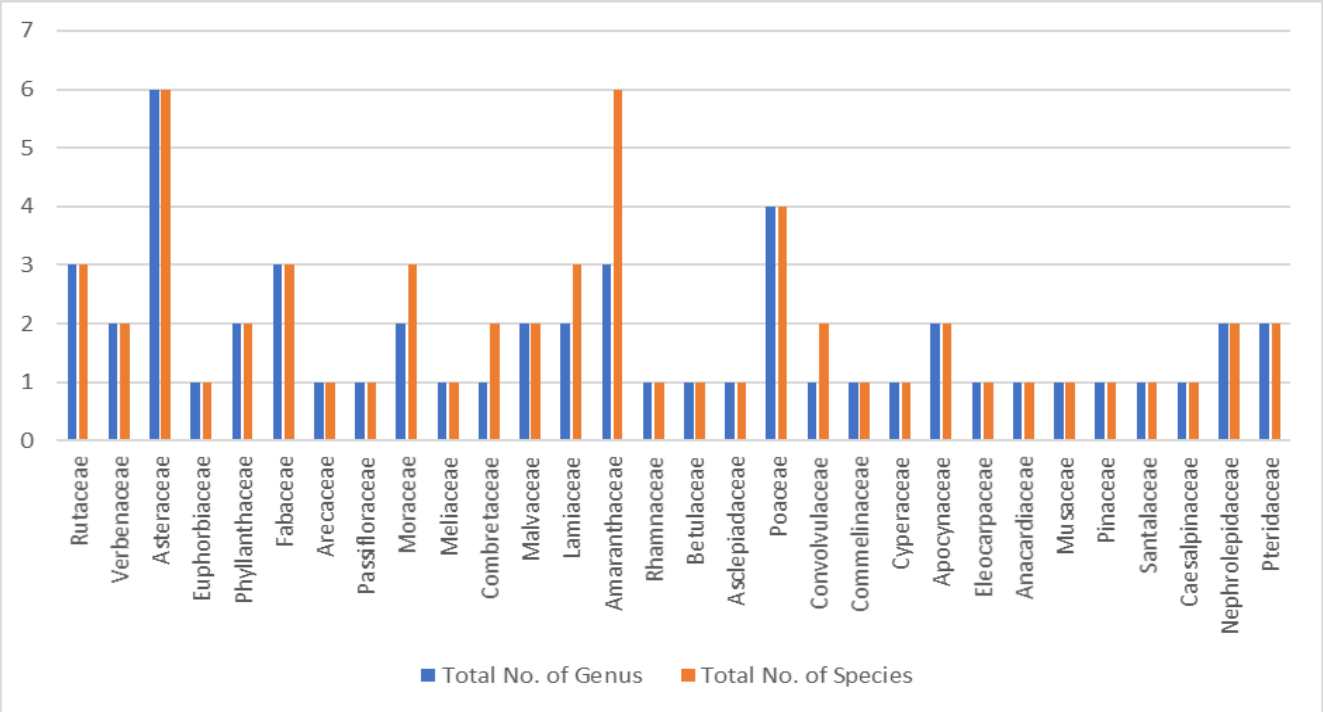

Fig.2:Botanical Exploration of Heritage site of Sacred groves of Thoranamalai Murugan Kovil, Southern Western Ghats, Tamilnadu

Table-2: Botanical Name, family and habit types of Sacred Groves plants in Traditional Ecological Heritage site of Thoranamalai Murugan Kovil, Kadayam, Tirunelveli District, Tamilnadu

Sl.No.	Plant Name	Family	Habit
1.	Aegle marmelos (L.) Corr	Rutaceae	Tree
2.	Toona ciliata M. Roem.	Rutaceae	Tree
3.	Zanthoxylum armatum DC.	Rutaceae	Tree
4.	Verbena officinalis L.	Verbenaceae	Herb
5.	Vitex negundo L	Verbenaceae	Small tree
6.	Artemisia nilgirica (Clarke)	Asteraceae	Herb
7.	Synedrella nodiflora (L.) Gaertn	Asteraceae	Herb
8.	Parthenium hysterophorus L.	Asteraceae	Herb
9.	Eupatorium odoratum L.	Asteraceae	Herb
10.	Blumea balsamifera (L.) DC.	Asteraceae	Herb
11.	Tridax procumbens L	Asteraceae	Herb
12.	Acalypha indica L.	Euphorbiaceae	Herb

13.	Phyllanthus niruri L.	Phyllanthaceae	Herb
14.	Emblica officinalis L.	Phyllanthaceae	Sub tree
15.	Tamarindus indica L.	Fabaceae	Tree
16.	Erythrina indica Lam	Fabaceae	Tree
17.	Pongamia pinnata L. Pierr.,	Fabaceae	Tree
18.	Borassus flabellifer L	Arecaceae	Tree
19.	Passiflora foetida L.	Passifloraceae	Twiner
20.	Atrocarpus heterophyllus Lamk.	Moraceae	Tree
21.	Ficus benghalensis L.	Moraceae	Tree
22.	Ficus religiosa L.	Moraceae	Tree
23.	Azadirachta indica Juss.	Meliaceae	Tree
24.	Terminalia arjuna (Roxb.)	Combretaceae	Tree
25.	Terminalia catappa L.	Combretaceae	Tree
26.	Abutilon indicum (L.) Sweet	Malvaceae	Herb
27.	Sida rhombifolia L.	Malvaceae	Herb
28.	Ocimum tenuiflorum Linn	Lamiaceae	Herb
29.	Ocimum sanctum Linn	Lamiaceae	Herb
30.	Leucas aspera L.	Lamiaceae	Herb
31.	Achyranthes aspera L.	Amaranthaceae	Herb
32.	Amaranthus dubius Mart. ex Thell.	Amaranthaceae	Herb
33.	Amaranthus spinosus L.	Amaranthaceae	Herb
34.	*Amaranthus polygonoides L.*	Amaranthaceae	Herb
35.	*Alternanthera sessilis (L.) R. Br. ex DC*	Amaranthaceae	Herb
36.	*Alternanthera caracasana Kunth*	Amaranthaceae	Herb
37.	Ziziphus oenopolia (L.) Mill.	Rhamnaceae	Herb
38.	Betula utilis D.Don	Betulaceae	Tree
39.	Calotropis procera (Ait.) R. Br	Asclepiadaceae	Herb
40.	Cynodon dactylon Pers.	Poaceae	Grasses
41.	Eleusine coracana (L.) Gaertn.	Poaceae	Grasses
42.	Dendrocalum strictus Nees	Poaceae	Grasses
43.	Desmostachya bipinnata L.	Poaceae	Grasses
44.	Ipomoea coccinea L.	Convolvulaceae	Twiner
45.	Ipomoea cordatotriloba Dennst.	Convolvulaceae	Herb
46.	Commelina benghalensis L.	Commelinaceae	Herb
47.	Physalis minima L.	Solanaceae	Herb
48.	Datura stramonium L.	Solanaceae	Herb
49.	Cyperus rotundus L.	Cyperaceae	Herb
50.	Plumeria alba L.	Apocynaceae	Shrub
51.	Catharanthus roseus (L.) G. Don	Apocynaceae	Herb
52.	Elaeocarpus ganitrus Roxb.	Eleocarpaceae	Tree
53.	Mangifera indica L	Anacardiaceae	Tree
54.	Musa paradisica	Musaceae	Tree
55.	Pinus roxburghii Sarg	Pinaceae	Tree
56.	Punica granatum L.	Santalaceae	Small tree
57.	Senna obtusifolia (L.) H. S. Irwin & Barneby	Caesalpinaceae	Herb
58.	Nephrolepis biserrate (Swartz) Schott,	Nephrolepidaceae	Herb
59.	Nephrolepis exaltata (Linnaeus) Schott	Nephrolepidaceae	Herb
60.	Actiniopteris radiata (J.König ex Sw.)	Pteridaceae	Herb
61.	Adiantum capillus-veneris L	Pteridaceae	Herb

Table-2: Total number of families and and genus

Sl.No	Total No. of Family	Total No. of Genus	Total No. of Species
1.	Rutaceae	3	3
2.	Verbenaceae	2	2
3.	Asteraceae	6	6
4.	Euphorbiaceae	1	1
5.	Phyllanthaceae	2	2
6.	Fabaceae	3	3
7.	Arecaceae	1	1
8.	Passifloraceae	1	1
9.	Moraceae	2	3
10.	Meliaceae	1	1
11.	Combretaceae	1	2
12.	Malvaceae	2	2
13.	Lamiaceae	2	3
14.	Amaranthaceae	3	6
15.	Rhamnaceae	1	1
16.	Betulaceae	1	1
17.	Asclepiadaceae	1	1
18.	Poaceae	4	4
19.	Convolvulaceae	1	2
20.	Commelinaceae	1	1
21.	Cyperaceae	1	1
22.	Apocynaceae	2	2
23.	Eleocarpaceae	1	1
24.	Anacardiaceae	1	1
25.	Musaceae	1	1
26.	Pinaceae	1	1
27.	Santalaceae	1	1
28.	Caesalpinaceae	1	1
29.	Nephrolepidaceae	2	2
30.	Pteridaceae	2	2

Adiantum capillus -veneris belongs to the family Pteridaceae. The fresh or dried leafy fronds of *A. capillus* -veneris used for antidandruff, antitussive, astringent, demulcent, depurative, emetic, weakly emmenagogue, emollient, weakly expectorant, febrifuge, galactogogue, laxative, pectoral, refrigerant, stimulant, sudorific and tonic For the medicinal utilization frequency of the plant species, Laminaceae and Rutaceae appear as the most prominent families (3 species each). The documentation of plant diversity from sacred groves has got prime importance in last few decades. The identification of the several floras are accepted as sacred by Hindus and hence worshipped (Kulkarni et al.,2010). It will be very useful for in situ conservation of floral diversity of heritage site on Thoranamalai Murugan Kovil, Southern Western Ghats. The conclusion of the present study observed that most of the floral diversity was highlighted the various threats faced by the sacred groves like construction activities, grazing of live stocks and modernization.

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