

# FLORISTIC DIVERSITY AND PHYTOSOCIOLOGICAL ANALYSIS OF A SACRED GROVE, KAYYALAKATH MARIYAMMAN KAVU, ALAVIL, KANNUR DISTRICT, KERALA

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## **Abstract**

*Sacred groves are more or less pockets of climax vegetation preserved on religious grounds. These forests are the true indicators of the type of vegetation that once existed here before the dawn of modern civilization. Their existence is mostly due to certain taboos, strong belief, and supplemented mystic folklores. Sacred groves are characterized by rare species preserved on isolated land with social and religious beliefs of people. Therefore, the biodiversity-rich sacred groves are of immense ecological significance. They also play an important role in the conservation of flora and fauna. The present study deals with floristic diversity and phytosociological analysis of plants recorded in a sacred grove Kayyalakath Mariyamman KavU, Alavil, Kannur district, Kerala. A total of 62 vascular plants falling under 60 genera and 42 families were documented. Out of which, the angiosperms dominate with 57 members, while 4 were Pteridophytes and *Cycas revoluta* the lone gymnosperm. With respect to their habit, there are 13 herbs, 18 shrubs, 19 trees, 11 climbers and one woody climber.*

**Key words:** *Sacred groves, climax vegetation, phytosociology, biodiversity.*

## **Introduction**

Assessment of regional biological diversity is a widely accepted new trend in life sciences. Exploring the floristic diversity as an resources for conservation priorities is an essential part of this venture. In addition to the qualitative surveys, approach for quantitative analysis can be equally helpful for identifying genetic diversity of various plant groups. Further this resource can be understood with the perception of its richness, distribution, threat, endemism, commercial utilization etc. Sacred groves are characterized by rare species preserved on isolated land with social and religious beliefs of people (Kulkarni and Shindikar, 2005). The way of conserving natural biodiversity through preservation plots in forest areas or sacred groves is a unique feature in Indian culture. According to Malhotra *et al.*, (2001) groves are those area dedicated by local communities to their ancestral spirits or deities. There have immense value from genetic diversity as well as ecological point of view and rich in flora. They are repository of several medicinal and economically important plants. Attached with socio-cultural and religious sentiments there exists has undisturbed islands. But today these are adversely affected by human activities. Due to urbanization, industrialization and rationalization, scarcity of land leading to the

depletion of the cover and shrinkage of these areas as a result the large chunk of the areas are diverted for other activities and only a small portion maintained near the temple or Kavu (Devaraj *et al.*, 2005). There is a need to take serious efforts to conserve these groves from further depletion.

The study area Kayyalakath Mariyamman Kavu is situated at Alavil which is about 6 Km away from Kannur town (Fig.1 and 2). This Kavu lies between  $11.8791852^{\circ}$  N latitude and  $75.3564569^{\circ}$  E longitude. The climate is very hot and humid with maximum and minimum temperature ranging from  $26^{\circ}$  C to  $34^{\circ}$  C. The total annual rainfall is 3438 mm. This grove is spread about 2 acres.

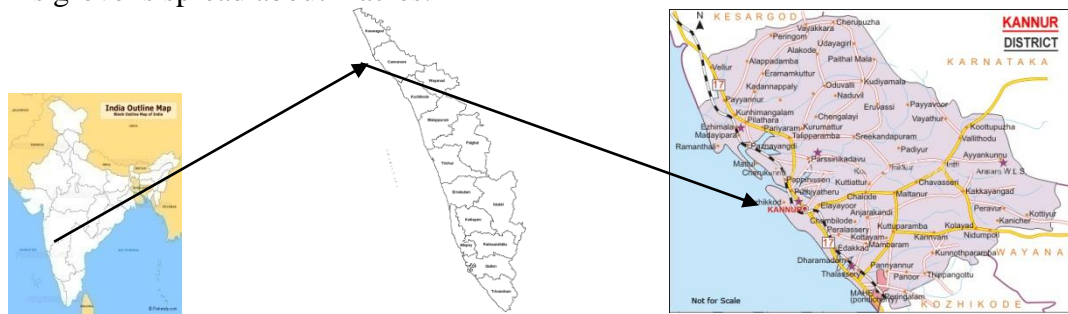


Fig.1 Location of study areas Kayyalakath Mariyamman Kavu.

## Materials and methods

Floristic inventory was carried out in the Kayyalakath Mariyamman Kavu for about six months from October 2018 to March 2019. All the plant life forms trees, shrubs and herbs were recorded. Plant specimens were collected through several field trips, pressed dried and stitched on herbarium sheets. (Jain and Rao, 1977).

Plants are identified with the help of Madras Presidency (Gamble, 1915-1936), Flora of Cannanore (Ramachandran and Nair, 1988) and also by using available field keys and taxonomic bulletins. The identification was further confirmed with the help of taxonomic experts in Botany.

The minimum quadrat size of 1 x 1 was fixed by the species- area curved method of phytosociological observations. Each time 10 quadrats were laid by the randomized method in each site. The minimum number of quadrat required was ten determined as described by Greig – Smith (1974). The number and type of each species occurring in each quadrat were recorded. From the observations, the quantitative characters such as frequency, density, abundance, relative frequency, relative density, relative dominance, importance value index and relative value of importance were calculated (Shukla and Chandel, 1982; Misra, 1980).

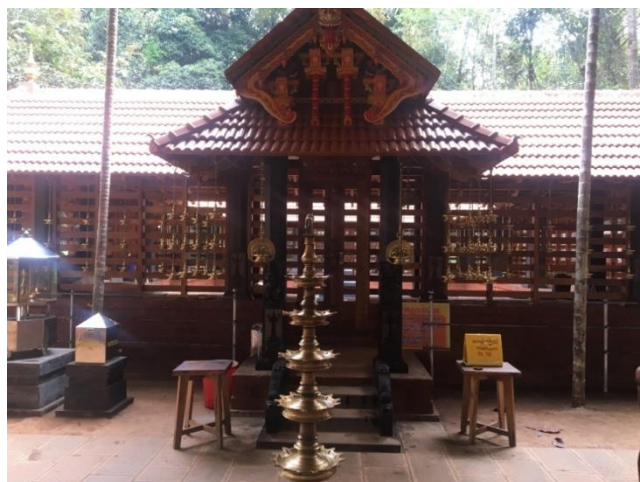


Fig.2 Kayyalakath Mariyamman KavU, Alavil.

## Result

### Floristic analysis

During study in Kayyalakath Mariyamman kavu, Alavil, a total of 62 vascular plants falling under 60 genera and 42 families were documented. Out of which, the angiosperms dominate with 57 members, while 4 were pteridophytes and *Cycas revoluta* the only one gymnosperm. With respect to their habit, there are 13 herbs, 18 shrubs, 19 trees, 11 climbers and one woody climber. Among angiosperms dicots comprises 31 families, 47 genera and 48 species while monocot 7 families, 5 genera and 7 species. The relative proportion of dicot with monocot species are shown in Table 1. The dominant families are Malvaceae and Rubiaceae with three species each.

### Phytosociological studies

During our present study we analysed that there are about 8 red listed species in this KavU. The least concerned species are *Clerodendrum paniculatum* and *Acacia caesia*. The plants in endangered category are *Mallotus philippensis* and *Naregamia alata*. The endangered species include *Mallotus philippensis*. Two rare species are *Clitoria ternatea* and *Hemidesmus indicus*. *Aegle marmelos* is a single vulnerable species (Table 3).

The quantitative ecological characters such as frequency, abundance, density and basal cover and synthetic characters such as relative frequency, relative density, relative dominance, importance value index and relative value of importance for all the study species present in study area Kayyalakkath Mariyamman KavU, Alavil, Kannur are given in Table 2 respectively.

The species such as *Caryota urens*, *Pothos scandens* and *Pterospermum acerifolium* have higher frequency value than the rest of the species. Lowest frequency was shown by about 51 species. *Vernonia elaeagnifolia*, *Holigarna longifolia* and *Piper nigrum* have distributed abundantly than the other constituent species. Lowest abundance is shown by 23 species. The species like *Caryota urens*, *Pothos scandens* and *Vernonia elaeagnifolia* were registered highest density and lowest density is shown by 22 species. Based on the basal

cover, *Mangifera indica* was considered to be dominant species secured the basal cover of 146.2 mm<sup>2</sup>/m.

The relative positions of constituent species in terms of frequency, density and basal cover in are presented in Table 2. In this site *Pothos scandens*, *Cariota urens* and *Mangifera indica* were registered highest Relative frequency, Relative density and Relative basal cover respectively. Of the various plant species available in the study area, the species *Mangifera indica* securing higher IVI of 71.264. The species of least significance (lowest IVI) were shown by the species like *Hemidesmus indicus*, *Cyclea peltata*, *Lygodium flexuosum*, *Abrus pulchellus* and *Dissotis rotundifolia*. Based on IVI score made by this species it is understood that thus are poorly established species in the communities of the study sites of sacred grove.

## Discussion

Phytosociological analysis of a plant community is the first and foremost basis of the study of any piece of vegetation as it is a pre-requisite for the understanding of community structure and organization. For understanding the community structure and organization, species composition is foremost requisite. Species composition is one of the major characters of plant community (Dansereau, 1960).

Bhagwat (2005) said that the sacred groves are the last home of some endangered species and also are known to represent the only existing climax vegetation communities in Northeastern India. But the area under sacred groves is fast depleting due to the interplay of an array of factors. Sacred groves originally maintained in the form of untouched ecosystems dedicated to the deity are looked as a source of revenue. Role of sacred groves in maintenance of biodiversity is undoubtedly significant. It is very important therefore refresh this traditional establishment and its further conservation (Sujana and Sivaperuman, 2008).

According to Misra (1980) this may be attributed to their high reproductive capacity, quick dispersal of seeds and wind pollination to produce viable seeds. Due to the lacking of these attributes, the other constituent species may show poor distribution. These species may be less disturbed in the sacred groves may be due to the social and religious believes of people (Kulkarni and Shindikar, 2005). Their existence is also due to certain taboos, strong and supplemented mystic folklore (Gadgil and Vartak, 1975).

Due to endemism, over exploitation, shifting cultivation and other socio economic activities the sacred groves are under threat. Therefore, there is urgent need for conservation and protection of sacred groves before it becomes completely disappear (Sambandan and Dhatchanamoorthy, 2012).

## Conclusion

In conclusion, it is suggested that the studied sacred groves must be given conservation priority to protect valuable endangered medicinal species. Despite the seasonal changes, the anthropogenic were determined to be most influencing factor to affect the species composition and the quantitative ecological attributes of many sensitive species. Therefore construction activities, over grazing, collection of fire wood, tress passing, dumping of waste and many antisocial elements must be checked so as to protect the species in their habitats. Further, ecosystem- specific management plans must be developed to protect the

individual species in these sacred groves. Protection of such activities aid in the regulation of ecological process like energy flow, food chain and food web and cycling of materials which would result in ecological balance and stability of ecosystem.

### Acknowledgment

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Table 1. Vascular flora of KayyalakathMariyammanKavu, Alavil, Kannur.

Si .no	Species	Family	Habit	Medicinal/food	Common name
1.	<i>Abrus pulchellus</i> Thwaites	Fabaceae	Climber	Medicinal	Kunnikuru
2.	<i>Acacia caesia</i> (L.) Willd.	Mimosaceae	Climbing shrub	Medicinal	Incha
3.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Herb	medicinal	Kadaladi
4.	<i>Adenanthera pavonina</i> L.	Fabaceae	Tree	Medicinal & food	Manjadi
5.	<i>Aegle marmelos</i> (L.) Corrêa	Rutaceae	Tree	Medicinal & Food	Koovalam
6.	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	Vitaceae	Climber	Medicinal	Karantavalli
7.	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Tree	Food & medicinal	Plavu
8.	<i>Asystasia gangetica</i> (L.) T. Anders on	Acanthaceae	Herb	Medicinal	Upputhali
9.	<i>Calycopteris floribunda</i> (Roxb.) Lam. ex	Combretaceae	Shrub	Medicinal	Pullani
10.	<i>Carallia brachiata</i> (Lour.) Merr	Rhizophoraceae	Tree	Medicinal	Vallabham
11.	<i>Caryota urens</i> L.	Aracaceae	Tree	Food and Medicinal	Choondapana
12.	<i>Centrosema virginianum</i> (L.) Benth.	Fabaceae	Climber	Medicinal	Kattupayar
13.	<i>Chassalia curviflora</i> (Wall.) Thwaite	Rubiaceae	Shrub	Medicinal	Neelaamalpari
14.	<i>Chrysophyllum cainito</i> L.	Sapotaceae	Tree	Food & medicinal	Nagapazham
15.	<i>Clerodendrum infortunatum</i> L.	Verbenaceae	Shrub	Medicinal	Vattaperuku
16.	<i>Clerodendrum</i>	Verbenaceae	Shrub	Medicinal	Hanuman

	<i>paniculatum</i> L.				kiridam
17.	<i>Clitoria ternatea</i> L.	Fabaceae	Climber	Medicinal	Shankupushpam
18.	<i>Cosmostigm aracemosum</i> (Roxb.) Wight	Asclepediaceae	Climber	Medicinal	Vattuvalli
19.	<i>Cycas revolute</i> Thunb.	Cycadaceae	Tree	Food & medicinal	Sago palm
20.	<i>Cyclea peltata</i> Hook.f. & Tho ms.	Menispermaceae	Climber	Medicinal	Padathali
21.	<i>Cyperus alternifolius</i> Rottb.	Cyperaceae	Herb	Medicinal	Umbrella palm
22.	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult .	Poaceae	Herb	Medicinal	Crabgrass
23.	<i>Dissotis rotundifolia</i> (Sm.) Triana	Melastomatacea e	Shrub	Medicinal	Pink shawl
24.	<i>Ficus hispida</i> L.f.	Moraceae	Tree	Medicinal	Kaattaththi
25.	<i>Glycosmis pentaphylla</i> (Retz.) DC.	Rutaceae	Shrub	Medicinal & Food	Panal
26.	<i>Hemidesmus indicus</i> (L.) R.Br	Apocyanaceae	Shrub	Medicinal	Nannari
27.	<i>Hibiscus surattensis</i> L.	Malvaceae	Shrub	Medicinal	Assam susor
28.	<i>Holigarna longifolia</i> Roxb.	Anacardiaceae	Tree	Medicinal	Cherumaram
29.	<i>Ixoracoccinea</i> L.	Rubiaceae	shrub	Medicinal	Chekki
30.	<i>Jasminum sambac</i> (L.) Aiton	Oleaceae	Shrub	Medicinal	Mulla
31.	<i>Justicia gendarussa</i> Burm.f.	Acanthaceae	Shrub	Medicinal	Karunochchi
32.	<i>Leea indica</i> (Burm. f.) Merr.	Vitaceae	Shrub	Medicinal	Manipiranta
33.	<i>Litsea floribunda</i> (Bl.) Gamble	<u>Lauraceae</u>	Tree	Medicinal	Pattuthali
34.	<i>Lygodium flexuosum</i> (L.) Sw.	Lygodiaceae	Herb	Medicinal	Maidenhair
35.	<i>Macaranga peltata</i> (Roxb.) Müll.Arg.	<i>Euphorbiaceae</i>	Tree	Food & Medicinal	Uppila
36.	<i>Mallotus philippensis</i> (Lam.)	Euphorbiaceae	Tree	Medicinal	Kamala tree
37.	<i>Mangifera indica</i> L.	Anacardiaceae	Tree	Medicinal & Food	Mavu
38.	<i>Merremia tridentata</i> (L.) Hallier f.	Convolvulaceae	Herb	Medicinal	Prasarini

39.	<i>Merremia umbellata</i> (L.) Hallier f.	Convolvulaceae	Climber	Medicinal	Kolavaravalli
40.	<i>Mikania scandens</i> B.L.Rob.	Asteraceae	Climber	Medicinal	Dritharastrapach a
41.	<i>Murdannia simplex</i> (Vahl) Brenan	Commelinaceae	Herb	Medicinal	Dew flower
42.	<i>Naregamia alata</i> Wight & Arn.	Meliaceae	Herb	Medicinal	Nilanarakam
43.	<i>Nephrolepis biserrata</i> (Sw.) Schott	Nephrolepidaceae	Herb	Food & medicinal	Boston fern
44.	<i>Ocimum sanctum</i> Linn.	Lamiaceae	Herb	Medicinal & food	Thulsi
45.	<i>Olea dioica</i> Roxb.	Oleaceae	Tree	Medicinal	Karivetti
46.	<i>Pajanelia longifolia</i> (Willd.) K.Schum	Bignoniaceae	Tree	Medicinal	Payyani
47.	<i>Panicum repens</i> L.	Poaceae	Herb	Medicinal	Crown grass
48.	<i>Pavetta indica</i> L.	Rubiaceae	Shrub	Medicinal	Mallikamutti
49.	<i>Piper nigrum</i> L.	Piperaceae		Medicinal & food	kurumulaku
50.	<i>Pogostemon paniculatus</i> (Willd.) Benth.	Lamiaceae	Subshrub	Medicinal	Manampotham
51.	<i>Pothos scandens</i> L.	Araceae	Climber	Medicinal	Anaparua
52.	<i>Pteris pellucida</i> Presl	Pteridaceae	Herb	Medicinal	Chinese brake
53.	<i>Pterospermum acerifolium</i> (L.) Willd.	Malvaceae	Shrub	Medicinal	Malanjudali
54.	<i>Selaginella kraussiana</i> (Kunze) A. Braun	Selaginellaceae	Herb	Medicinal & food	Cheeyothi
55.	<i>Smilax zeylanica</i> L.	Smilacaceae	Climber	Medicinal	Chennaravalli
56.	<i>Sterculia guttata</i> Roxb.	Malvaceae	Tree	Medicinal	Kithkondi
57.	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Tree	Medicinal	Kanjiram
58.	<i>Syzygium jambos</i> L. (Alston)	Myrtaceae	Tree	Food and medicinal	Malakkachampa
59.	<i>Tabernaemontana alternifolia</i> L.	Apocyanaceae	Tree	Medicinal	Kundalappala
60.	<i>Vernonia elaeagnifolia</i> Dc.	Asteraceae	Climber	Ornamental	Curtain plant
61.	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Shrub	Food & medicinal	Enchi
62.	<i>Ziziphus oenopolia</i> (L.) Miller.	Rhamnaceae	Shrub	Food and medicinal	Kottakka

Table 2. Species Composition in Kayyalakath Mariyamman Kavu, Alavil, Kannur.

Si no	Species	Quantitative attributes				Synthetic attributes				
		Freq ency (%)	Abundance (Individual/ m <sup>2</sup> )	Density (Individu al/m <sup>2</sup> )	Basel cover (mm <sup>2</sup> /m)	R.F (%)	R.D (%)	R.D o (%)	IVI	RIVI
1.	<i>Abrus pulchellus</i> Thwaites	10	1	0.1	0.9	12	0.19	0.43	1.77	0.59
2.	<i>Acacia caesia</i> (L.) Willd.	10	4	0.4	8.3	1.14	0.78	3.96	5.90	1.96
3.	<i>Achyranthes aspera</i> L.	10	5	0.5	0.7	1.14	0.98	0.33	2.46	0.82
4.	<i>Adenanthera pavonina</i> L.	30	2.33	0.7	0.9 6	3.44	1.37	0.45	5.28	1.76
5.	<i>Aegle marmelos</i> (L.) Corrêa	10	1	0.1	17	1.14	0.19	8.13	9.47	3.15
6.	<i>Ampelocissus latifolia</i> (Roxb.) Planch.	30	6.66	2	1.3	3.44	3.92	0.62	7.99	2.66
7.	<i>Artocarpus heterophyllus</i> Lam.	10	1	0.1	134	1.14	0.19	64.0	65.4	21.8
8.	<i>Asystasia gangetica</i> (L.) T. Anderson	10	1	0.1	1.7	1.14	0.19	0.81	2.15	0.71
9.	<i>Calycopteris floribunda</i> (Roxb.) Lam. ex Poir.	10	1	0.1	23. 2	1.14	0.19	11.1	12.4	4.14
10.	<i>Carallia brachiata</i> (Lour.) Merr	10	1	0.1	1.8	1.14	0.19	0.86	2.20	0.73
11.	<i>Caryota urens</i> L.	60	10.33	6.2	18. 31	6.89	12.1	8.75	27.8	9.27
12.	<i>Centrosema virginianum</i> (L.) Benth.	10	5	0.5	0.4	1.14	0.98	0.19	2.32	0.77
13.	<i>Chassalia curviflora</i> (Wall.) Thwaite	20	3.5	0.7	2.4 5	2.29	1.37	1.17	4.84	1.61
14.	<i>Chrysophyllum cainito</i> L.	10	1	0.1	9.7	1.14	0.19	4.63	5.98	1.99
15.	<i>Clerodendrum infortunatum</i> L.	10	1	0.1	1.5	1.14	0.19	0.71	2.06	0.68
16.	<i>Clerodendrum paniculatum</i> L.	10	3	0.3	1.2	1.14	0.58	0.57	2.31	0.77
17.	<i>Clitoria ternatea</i> L.	10	8	0.8	0.8	1.14	1.57	0.38	3.10	1.03



18.	<i>Cosmostigma racemosum</i> (Roxb.) Wight	10	1	0.1	3.8	1.14	0.19	1.81	3.16	1.05
19.	<i>Cycas revolute</i> Thunb.	10	1	0.1	1.4	1.14	0.19	0.66	2.01	0.67
20.	<i>Cyclea peltata</i> Hook. f. & Thoms.	10	2	0.2	0.2	1.14	0.39	0.09	1.63	0.54
21.	<i>Cyperus alternifolius</i> Rottb.	20	2	0.4	1.7 5	2.29	0.78	0.83	3.92	1.30
22.	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	10	14	1.4	0.5	1.14	2.75	0.23	4.13	1.37
23.	<i>Dissotis rotundifolia</i> (Sm.) Triana	10	2	0.2	0.8	1.14	0.39	0.38	1.92	0.64
24.	<i>Ficus hispida</i> L.f.	10	3	0.3	2.1	1.14	0.58	1.00	2.74	0.91
25.	<i>Glycosmis pentaphylla</i> (Retz.) DC.	10	2	0.2	1.5	1.14	0.39	0.71	2.25	0.75
26.	<i>Hemidesmus indicus</i> (L.) R.Br	10	1	0.1	0.4	1.14	0.19	0.19	1.53	0.51
27.	<i>Hibiscus surattensis</i> L.	10	12	1.2	1.6	1.14	2.35	0.76	4.27	1.42
28.	<i>Holigarna longifolia</i> Roxb.	10	38	3.8	2.3	1.14	7.46	1.09	9.71	3.2 3
29.	<i>Ixora coccinea</i> L.	10	9	0.9	1.4	1.14	1.76	0.66	3.58	1.1 9
30.	<i>Jasminum sambac</i> (L.) Aiton	20	1	0.2	0.9	2.29	0.39	0.43	3.12	1.0 4
31.	<i>Justicia gendarussa</i> Burm.f.	10	8	0.8	4.3	1.14	1.57	2.05	4.77	1.5 9
32.	<i>Leea indica</i> (Burm. f.) Merr.	30	2.66	0.8	2	3.44	1.57	0.95	5.97	1.9 9
33.	<i>Litsea floribunda</i> (Bl.) Gamble	10	10	1	6.2	1.14	1.96	2.96	6.07	2.0 2
34.	<i>Lygodium flexuosum</i> (L.) Sw.	10	1	0.1	0.8	1.14	0.19	0.38	1.72	0.5 7
35.	<i>Macaranga peltata</i> (Roxb.) Müll.Arg.	10	1	0.1	141	1.14	0.19	67.4	68.7	22. 9
36.	<i>Mallotus philippensis</i> (Lam.) Muell.Arg.	10	1	0.1	2.9	1.14	0.19	1.38	2.73	0.9 1

37.	<i>Mangifera indica</i> L.	10	1	0.1	146 .2	1.14	0.19	69.9	71.2	23. 7
38.	<i>Merremia tridentata</i> (L.) Hallier f.	10	4	0.4	0.5	1.14	0.78	0.23	2.17	0.7 2
39.	<i>Merremia umbellate</i> (L.) Hallier f.	30	6.66	2	0.8 6	3.44	3.92	0.41	7.78	2.5 9
40.	<i>Mikania scandens</i> B.L.Rob.	10	3	0.3	0.6	1.14	0.58	0.28	2.02	0.6 7
41.	<i>Murdannia simplex</i> (Vahl) Brenan	10	4	0.4	0.4	1.14	0.78	0.19	2.12	0.7 0
42.	<i>Naregamia alata</i> Wight & Arn.	10	5	0.5	0.4	1.14	0.98	0.19	2.32	0.7 7
43.	<i>Nephrolepis exaltata</i> (L.) Schott	10	8	0.8	10. 6	1.14	1.71	5.06	7.79	2.5 9
44.	<i>Ocimum sanctum</i> Linn.	10	3	0.3	2	1.14	0.58	0.95	2.69	0.89
45.	<i>Olea dioica</i> Roxb.	20	1.5	0.3	10. 15	2.29	0.58	4.85	7.74	2.58
46.	<i>Pajanelia longifolia</i> (Willd.) K.Schum	10	1	0.1	126	1.14	0.19	60.2	61.6	20.5
47.	<i>Panicum repens</i> L.	10	10	1	0.4	1.14	1.96	0.19	3.30	1.10
48.	<i>Pavetta indica</i> L.	10	1	0.1	1.7	1.14	0.19	0.81	2.15	0.71
49.	<i>Piper nigrum</i> L.	10	35	3.5	1.8	1.14	6.87	0.86	8.88	2.96
50.	<i>Pogostemon paniculatus</i> (Willd.) Benth.	10	3	0.3	1.8	1.14	0.58	0.86	2.59	0.86
51.	<i>Pothos scandens</i> L.	60	9	5.4	1.1 2	6.89	10.6	0.53	18.0	6.01
52.	<i>Pteris pellucida</i> Presl	10	8	0.8	1	1.14	1.57	0.47	3.19	1.06
53.	<i>Pterospermum acerifolium</i> (L.) Willd.	40	2.75	1.1	2.1	4.59	2.16	1.00	7.76	2.58
54.	<i>Selaginella kraussiana</i> (Kunze) A. Braun	10	13	1.3	3	1.14	2.55	1.43	5.13	1.71
55.	<i>Smilax zeylanica</i> L.	10	1	0.1	9	1.14	0.19	4.30	5.65	1.88
56.	<i>Sterculia guttata</i> Roxb.	10	1	0.1	136	1.14	0.19	65.0	66.3	22.1 2
57.	<i>Strychnos nux-vomica</i> L.	10	1	0.1	1.8	1.14	0.19	0.86	2.20	0.73
58.	<i>Syzygium jambos</i>	10	2	0.2	1	1.14	0.39	0.47	2.02	0.67

	L. (Alston)									
59.	<i>Tabernaemontana alternifolia</i> L.	10	1	0.1	47.5	1.14	0.19	22.7	24.0	8.02
60.	<i>Vernonia elaeagnifolia</i> DC.	10	52	5.2	1.1	1.14	10.2	0.52	11.8	3.96
61.	<i>Zingiber officinale</i> Roscoe	10	14	1.4	1.6	1.14	2.75	0.76	4.65	1.55
62.	<i>Ziziphus oenopolia</i> (L.) Miller.	10	1	0.1	8.1	1.14	0.19	3.87	5.21	1.73

Table 3. Red listed plants in Kayyalakath Mariyamma Kavau.

Sl no	Species	Status
1	<i>Clerodendrum paniculatum</i> L.	Least concerned
2	<i>Clitoria ternatea</i> L.	Rare
3	<i>Mallotus philippensis</i> (Lam.) Muell.Arg.	Endangered
4	<i>Smilax zeylanica</i> L	Rare
5	<i>Acacia caesia</i> (L.)Willd.	Least concerned
6	<i>Naregamia alata</i> Wight & Arn.	Endangered
7	<i>Hemidesmus indicus</i> (L.) R.Br	Rare
8	<i>Aegle marmelos</i> (L.) Corrêa	vulnerable

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