

Floristic Diversity and Phytosociological Analysis of Erinjiyan Keezhil Kavu, Kannur District, Kerala

Jeeshna M V

Assistant professor, Department of Botany, Sree Narayana College Kannur, Kerala,

Kerala, India Pin: 670 007

Email ID: mvjeeshna@gmail.com

Abstract- The floristic diversity and phytosociological studies of the Erinjiyan Keezhil sacred grove, Kannur district, India were investigated. Floristic study revealed that a total of 42 species belonging to 41 genera and 26 species were observed in this sacred grove. There are about 8 red listed species. The higher frequency value is shown by the plants *Caryota urens*, *Pothos scandens* and *Cyclea peltata* and lowest frequency was shown by 28 species. *Desmodium triflorum*, *Panicum repens* and *Cyclea peltata* were present abundantly in Erinjiyan Keezhil Kavu lowest abundance is shown by 13 species. In the similar fashion *Desmodium triflorum*, *Pothos scandens* and *Panicum repens* have higher density among Erinjiyan Keezhil Kavu. About 12 species represent lowest density in this area. Based on the basal cover *Olea dioica* have got a highest basal cover of 127.2 mm²/m. *Caryota urens*, *Desmodium triflorum* and *Olea dioica* were shown highest Relative frequency, Relative density and Relative basal cover respectively. In this Erinjiyan Keezhil Kavu *Mimusops elengi* secured highest IVI of 36.21.

Keywords-: frequency, abundance, basal cover, density

1. INTRODUCTION

Sacred groves are an age-old and world-wide phenomenon, traditionally consisting of forest zones, protected by people based on their spiritual relationship with the deities or ancestral spirits believed to reside there. India alone counts nearly 50,000 sacred groves, with 2000 in Kerala where they are known as kavu. Presently, the sacred groves are under serious threat with numbers of groves reducing drastically. In this article, the authors challenge one of the dominant theories that sacred groves, while previously protected by religion, now disappear due to the loss of traditional beliefs. Starting from the observation that the destruction of sacred groves has less to do with a loss of faith but more with a change of faith, the article focuses on the ambivalent role of religion and the impact the commercial offer of some specific. Hindu rituals have on the declining number of sacred groves. Based on long-term ethnographic field work among grove-owners in Kerala, the authors argue that it may be true that religious perceptions maintained the sacred groves for centuries, but that the same religious tradition now provides both justifications and marketable rituals for cutting them down. 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. Sacred groves are characterized by rare species preserved on isolated land with social and religious

beliefs of people [1]. The way of conserving natural biodiversity through preservation plots in forest areas or sacred groves is a unique feature in Indian culture [2]. These 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 [3]. Due to the advent of industrialization, urbanization and changing socioeconomic scenario, the cultural norms and taboos were annihilated, leading to drastic deterioration of these natural resources. There need to be serious efforts to conserve these groves from further depletion [4]. The present study is an attempt to document the phytodiversity and to analyse the phytosociological analysis of a sacred grove, Erinjiyan Keezhil Kavu, Kannur district, Kerala.

2. MATERIALS AND METHODS

Erinjiyan Keezhil Kavu is a famous sacred grove situated at Melechovva, which is about 3.4 km from Kannur town. Melechovva lies between 11.8715252 N latitude and 75.3969189 E longitude. The climate is very hot and humid with maximum temperature ranging from 26-32 °C. The total annual rainfall is 3351mm. This grove is spread about 1.25 acres.

Erinjiyan Keezhil Kavu is a worship place of Bhagavathy. The main deity is Vettakorumakan. The mythology behind Erinjiyan Keezhil Bhagavathy Kavu is so. Long back a father and son were waiting in search of food. Finally, they reached Neeliyath house

where they were given porridge. After having that porridge, the son saw an arrow and asked his father to pick it up but the people in the house told them that it is not easy to pick that arrow. If they are able to pick the arrow up and throw it on to the land, then that part of the land will become theirs. With great effort, the father picked up the arrow and threw it on to the land. But the arrow struck an elenji plant (*Mimusops elengi*) and blood began to flow out of it. They realized later that the area is not fit for living and is in fact a sacred place that ought to be worshipped. Thus, people began to worship this area, namely Erinjiyin Keezhin Bhagavathy kavu, as a sacred one.

For the present study regular field trips to the grove was carried out at seasons representing pre monsoon, monsoon and post monsoon. During field visits, plant species were identified, phytosociological studies were carried out and specimens were collected. Plant materials collected were made into herbarium specimens following standard herbarium techniques [5] and are deposited at Herbarium of the Research Department of Botany, Sree Narayana College, Kannur for reference. Plant specimens are identified using relevant flora [6, 7 & 8].

For phytosociological studies of major plants, frequency, density, abundance and thereby Importance Value Index (IVI) of species were worked out using line transect method [9]. This index is used to determine the overall importance of each species in the community structure. For calculating this index, percentage values of relative frequency, relative density and relative abundance are summed up.

3. RESULT AND DISCUSSION

During the study a total of 42 vascular plants falling under 41 genera and 26 families were documented (Table 1). With respect to their habit, there are 12 herbs, 10 shrubs, a woody shrub, 12 trees, 6 climbers and 1 epiphyte. Among angiosperms dicots comprise 20 families, 33 genera and 34 species, while monocot comprises 6 families, 8 genera and 8 species. Sacred groves are the representative of climax vegetation and exhibit the diversity of species such as trees, climbers, epiphytes and other shade loving herbs [10].

The study of medicinal plants in sacred groves is recognized as an effective way to discover future medicines and a valuable step towards their conservation. The use of herbs to treat disease is almost universal among villages and rural areas and is often more affordable than purchasing expensive modern pharmaceuticals. Today many medicinal plants face extinction or severe genetic loss, but detailed information is lacking and for most of the endangered medicinal plant species, no conservation action has been taken [11]. Majority of plants species have the medicinal uses for diuretic, laxative, sedative, antidiabetic, skin disease, jaundice, headache etc (Table 1). The wide range of the plant species present

in the study areas showed its potentiality for economic species.

About 8 red listed species are present in this sacred grove. In which *Asparagus racemosus* and *Vanda roxburghii* are least concerned. *Jasminum malabaricum*, *Mallotus philippensis* and *Hopea parviflora* are endangered plants. *Clitoria ternatea* and *Hemidesmus indicus* are rare species and *Abutilon indicum* is the only one vulnerable species (Table 2). These red listed plants were categorized according to IUCN conservation status ([12&13]. 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 [14].

Table 2. Red listed plants in two study areas

SL NO	Species	Status
1	<i>Jasminum malabaricum</i> Wight	Endangered
2	<i>Mallotus philippensis</i> (Lam.) Muell.Arg.	Endangered
3	<i>Smilax zeylanica</i> L	Rare
4	<i>Hemidesmus indicus</i> (L.) R.Br	Rare
5	<i>Asparagus racemosus</i> Willd	Least concerned
6	<i>Vanda roxburghii</i> R.Br..	Least concerned
7	<i>Abutilon indicum</i> (L.) Griseb.	Vulnerable
8	<i>Hopea parviflora</i> Bedd.	Endangered

From the calculated value of quantitative attributes of documented plant species, *Caryota urens* (70%), *Pothos scandens* (50%) and *Cyclea peltata* (40%) occupied higher percentage of frequency and lowest frequency was shown by 28 species. Higher distribution of species is due to their high reproductive capacity and better adaptability to the environment [15]. *Desmodium triflorum* (194 individuals/m²), *Panicum repens* (34 individuals/m²) and *Cyclea peltata* (32.5 individuals/m²) were present abundantly in this sacred grove and lowest abundance is shown by 13 species. The species like *Desmodium triflorum* (19.4 individuals/m²), *Pothos scandens* (8.8 individuals/m²) and *Panicum repens* (6.8 individuals/m²) registered higher density and 12 species are representing lowest density in this area. Based on the basal cover, *Olea dioica* is considered to be the dominant species in this area as it secured the highest basal cover of 146.2 mm²/m (Table 3).

The plants such as *Caryota urens* (10%), *Desmodium triflorum* (24.71%) and *Olea dioica* (33.52%) were shown highest Relative frequency, Relative density and Relative basal cover respectively. In this Erinjiyin Keezhin Kavum *Mimusops elengi*

(Erinji) secured highest IVI of 36.21%. In this sacred grove the plant species *Mimusops elengi* is highly protected by the local people due to their cultural and religious beliefs and taboos that the deities reside in them. Through religious significance, sacred groves are better protected and managed, and hence harbor richer plant diversity than other forests.

Sacred groves are considered as store house of rare, endemic and endangered plants. But the anthropogenic activities like collection of firewood, dumping of waste and many antisocial elements are the major threats for the gene pool of these fragile ecosystems. Thus conservation of biodiversity of these sacred groves is an urgent need. This grove is abode of various floristic elements and necessary efforts need to be taken to protect the sacred grove to prevent the loss of biodiversity.

REFERENCES

- [1] Khullar, P. (1992): Conservation of biodiversity in natural forest through preservation plots- A historical perspective. *Indian Forester*, 118(5), pp.37-337.
- [2] Kulkarni, D.K.; Shindikar, M. (2005): Plant diversity evaluation in Shirikai sacred grove, Pune District ,Maharashtra. *Indian Journal of Forester*, 28(2), pp.127-131.
- [3] Gadgil, M.; Vartak, V. D. (1975): Sacred groves of India-A plea for continued conservation, *J. Bombay nat. Hist. Soc.*, **73**, pp.623- 647.
- [4] Sasikala, K.; Harilal, C.C.; Pradeepkumar, G. (2014). *Bioscience Discovery*, **5**(2), pp.154-159.
- [5] Fosberg, F.R.; Sachet, H. (1965): *Manual of Tropical Herbaria. Regnum Veg. Vol. 39. The Netherlands.*
- [6] Nayar, T.S.; Rasiya Beegam, A.; Mohanan, N.; Rajkumar, G. (2006): *Flowering Plants of Kerala - A Handbook. Kerala.*
- [7] Ramachandran, V.S.; Nair, V.J. (1988): *Flora of Cannanore. BSI, Calcutta.*
- [8] Sasidharan, N. (2004): *Biodiversity Documentation for Kerala. Part 6: Flowering Plants. KFRI, Peechi, Kerala, India.*
- [9] Curtis, J.T. (1959): *The Vegetation of Wisconsin. University of Wisconsin Press, Madison, WI. pp. 657.*
- [10] Bhandary, M.J.; Chandrasekar. (2003): Sacred groves of Dakshinakanda, Udipi districts of Karnataka, *current science*, **85**, pp. 1655-1656.
- [11] Reshma, K.; Indulekha, P. (2016): Ethnobotanical documentation of a sacred Grove Palakurumba temple, Olavanna in Kozhikode district, Kerala, *Journal of Medicinal Plants Studies*, **4**(4), pp. 296-298.
- [12] Rao, P. (1996): *Sacred Groves and Conservation. WWF India Quartely, &4-&. Sasidhjaran, N Flowering Plants of Kerala.*
- [13] Anonymous, (1994): *IUCN Red List Categories, IUCN Gland, Switzerland.*
- [14] Bhagwat, S. A.; Kushalappa, C. G.; Williams, P. H.; Brown, N. D. (2005): *A land scape approach to biodiversity conservation of sacred groves in the Western Ghats of India, Conservation Biology*, **19**(6), pp. 1853-1862.
- [15] Nithyadevi, J., Sivakumar, R. (2015): *Phytosociological and ethnomedicinal studies of sacred grove in konjikuppam village, cuddalore district, Tamil Nadu. 32, pp. 77-91.*

Table 1. Ethanomedicinal uses of the species in Erinjiyin Keezhil Kavu, Mele chovva, Kannur.

Si No.	SPECIES	FAMILY	MEDICINAL USES
1.	<i>Abrus pulchellus</i> Thwaites	Fabaceae	It is used to treat arthritis, good for curing asthma. Cure for hairfall. Improve eye sight.
2.	<i>Abutilon indicum</i> (L.) Griseb.	Malvaceae	It is used for diabetes, epilepsy, pain disorders and inflammatory diseases. Whole fruit, root, bark are more beneficial. Treatment of skin cancer.
3.	<i>Adenanthera pavonina</i> L.	Fabaceae	Decoction of young leaves and bark is used to treat diarrhea. Ground seeds are used to treat inflammation.
4.	<i>Alangium salviifolium</i> (L.f.) Wangerin	Alangiaceae	It is used to cure ulcerous sores. Leaves juice for the treatment of neck inflammation of bullocks.
5.	<i>Alternanthera brasiliana</i> (L.) Kuntze	Amaranthaceae	Plant is used as anti viral agent. Leaf juice is used as anti diarrhea.
6.	<i>Asparagus racemosus</i> Willd	Liliaceae	Used for upset stomach, constipation and stomach ulcers. It is used for fluid retention, pain and anxiety.
7.	<i>Caryota urens</i> L.	Aracaceae	Plant is used as a diuretic, laxative, sedative, anti inflammatory properties. The plant is used to treat leprosy, ulcer, headache etc.
8.	<i>Chassalia curviflora</i> (Wall.) Thwaite	Rubiaceae	The crushed leaves are applied to wounds to treat snake and insect bite.
9.	<i>Chromolaena odorata</i> (L.)	Asteraceae	Leaves are used to treat eye pains and infusion of leaves taken to cleanse blood. Young leaves are crushed and resulting liquid can be used to treat skin wounds.
10.	<i>Cinnamomum Zeylanicum</i> Nees.	Lauraceae	It is a remedy for respiratory, gigestive and gynecological ailments, their bark, leave, flowers, fruits has some medicinal uses.
11.	<i>Cosmostigma racemosum</i> (Roxb.) Wight	Asclepidaceae	Used to treat dermatitis or eczema or other skin injury or disease.
12.	<i>Cyclea peltata</i> Hook. f. & Thoms.	Menispermaceae	Wound healer, antidote and paste of leaves and root is used in purities, skin disorders and snake poison. Juice or powdered roots are used as a nasya.
13.	<i>Cyperus rotundus</i> L.	Cyperaceae	It is used for post patum use .it is also relief pain, inflammation and itching
14.	<i>Desmodium triflorum</i> (L.) DC.	Fabaceae	To treat dysentery, rheumatism and fever. Decoction of roots used to treat stomach ache, also for treating skin problems, wounds and ulcer treatments.
15.	<i>Digitaria bicornis</i> (Lam.) Roem.& Schult.	Poaceae	The plant is used for the treatment of venereal diseases, coughs, antimicrobials, conjunctivitis, haemostatic, weight control, diuretic, asthma, ulcer.
16.	<i>Ficus racemosa</i> Linn.	Moraceae	It is used for diabetes, liver disorder,diarrhea,inflammation,respiratory and urinary diseases.It heals fractured bone and wounds.
17.	<i>Hemidesmus indicus</i> (L.) R.Br	Apocynaceae	Used in traditional medicine. It is administered in the form of powder, infusion or decoction as syrup. It is one of the Rasayanaplant of Ayurveda.
18.	<i>Hopea parviflora</i> Bedd.	Dipterocarpaceae	Antimicrobial property.

19.	<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton	Apocynaceae	Flowers are used to treat diabetics . Root ,stem and leaves used for fever, Dyspepsia and skin complaints. Leaves are used for head-ache and wounds.
20.	<i>Ixora coccinea</i> L.	Rubiaceae	Used for skin diseases. Roots have leishmanicidal activity. Its root extract have anti dermatophytic activity.
21.	<i>Jasminum malabaricum</i> Wight	Oleaceae	It is used for the treatment of cataract and as a blood purifier and is cosmetic and detergent industries.Ethnomedicinal importance like anti bacterial,anti oxidant and anti tumor properties.
22.	<i>Jasminum sambac</i> (L.) Aiton	Oleaceae	Flower is used for removing intestinal norms,jauntice.Leaf extract is against breast tumor,flower buds are used to treat ulcers.
23.	<i>Justicia simplex</i> D.Don.	Acanthaceae	Plant is diuretic, stomach achic, expectorant .Leaf juice is dropped into eyes in case of ophthalmia.
24.	<i>Macaranga peltata</i> (Roxb.) Müll.Arg.	Euphorbiaceae	Plant is expectorant and antibacterial, infusion is used in menorrhagia. The plant juice to insect bites as an antidote, after squeezing out a little blood. The fresh root boiled with mustard oil is applied externally in rheumatism, sprains, scabies, ulcers, eczema, cut and wounds.
25.	<i>Mallotus philippinensis</i> Muell. Arg	Euphorbiaceae	Decoction of bark acts as blood purifier. Fruit gland use for treatment of intestinal worms.
26.	<i>Mangifera indica</i> L	Anacardiaceae	Anti-inflammatory properties that help in relieving acute cases inflammation. Leaves and seeds of mango containing anti-microbial properties.
27.	<i>Merremia tridentata</i> (L.) Hallier f.	Convolvulaceae	Maceration of leaves is drunk as anti venom after snake bite. Part of decoction of mixture of plants drunk against candida infection of mouth, digestive tract or anus.
28.	<i>Mimusops elengi</i> L.	Sapotaceae	It is used for dental ailments such as bleeding gums, pyorrhea, dental caries and loose teeth.
29.	<i>Mitracarpus hirtus</i> (L.) DC	Rubiaceae	It is generally used as healing medicines, pain killers for oral treatment, pulmonary troubles, cutaneous –sub cutaneous parasitic infection, venereal diseases. Used as antibiotic, bacteriostatic, fungistatic, arrow poisons.
30.	<i>Ocimum sanctum</i> Linn.	Lamiaceae	Leaves are very useful in providing relief from cold and cough. It promotes digestive fire and manages skin diseases, chest pain etc.
31.	<i>Olea dioica</i> Roxb.	Oleaceae	It is used to cure skin diseases, rheumatism, fever and cancer.
32.	<i>Panicum repens</i> L.	Poaceae	The seeds can be used to make porridge or fermented to make beer.
33.	<i>Pavetta indica</i> L.	Rubiaceae	Leaf decoction is used externally for piles. The root bark or stem bark is used for intestinal obstruction.
34.	<i>Pongamia pinnata</i> (L.) Pierre	Fabaceae	The flowers are claimed to have anti diabetic action. A decoction used as a cough remedy, an infusion of the leaves is used to relieve rheumatism.

35.	<i>Pothos scandens</i> L.	Araceae	Bruised and fried in oils is applied to cure abscess, infusion of the leaf is used to curing epilepsy.
36.	<i>Rhinacanthus nasutus</i> (L.) Kurz	Acanthaceae	It is used to treat numerous diseases such as hepatitis, diabetes, hypertension. Root and leaves bruised and mixed with lime juice are a useful remedy for ring worm and other skin affection.
37.	<i>Senna tora</i> (L.) Roxb.	Caesalpinaceae	Seeds and leaves are used to treat skin diseases and its seed can be used as laxative.
38.	<i>Smilax zeylanica</i> L.	Smilacaceae	It is used for the treatment of syphilis, gonorrhoea, skin disease and act as blood purifier.
39.	<i>Synedrella nodiflora</i> (L.) Gaertn.	Asteraceae	Crushed leaves are used for rheumatism, stomach pain. Used as pain killer Oral-ear treatment, Nasopharyngeal affections.
40.	<i>Vanda roxburghii</i> R.Br.	Orchidaceae	It is used for the treatment of pain, indigestion, cough and general debility for treatment of rheumatism.
41.	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Plant possess anticancerous property. Seeds cure diseases caused by round worm and thread worm, cough, dysuria, leucoderma and chronic skin diseases.
42.	<i>Xanthium indicum</i> J. Koenig	Asteraceae	Leaf and roots are anodyne, antirheumatic, diaphoretic and diuretic.

Table 3. Species Composition in Erinjiyin Keezhil Kavu, Mele chovva, Kannur.

Si No.	SPECIES	QUANTITATIVE ATTRIBUTES				SYNTHETIC ATTRIBUTES				
		Frequency (%)	Abundance (Individuals/m ²)	Density (Individuals/m ²)	Basel cover (mm ² /m)	R.F. (%)	R.D (%)	R.Do (%)	IVI (%)	RIVI
1.	<i>Abrus pulchellus</i> Thwaites	10	3	0.3	0.4	1.428	0.382	0.105	1.916	0.638
2.	<i>Abutilon indicum</i> (L.) Griseb.	10	3	0.3	0.5	1.428	0.382	0.131	1.942	0.647
3.	<i>Adenanthera pavonina</i> L.	30	2.666	0.8	8.1	4.285	1.019	2.134	7.439	2.479
4.	<i>Alangium salviifolium</i> (L.f.) Wangerin	10	1	0.1	1.1	1.428	0.127	0.289	1.845	0.615
5.	<i>Alternanthera brasiliiana</i> (L.) Kuntze	10	7	0.7	1.4	1.428	0.891	0.368	2.689	0.896
6.	<i>Asparagus racemosus</i> Willd	10	2	0.2	1.1	1.428	0.254	0.289	1.973	0.657
7.	<i>Caryota urens</i> L.	70	3.857	2.7	11.95	10	3.439	3.149	16.588	5.529
8.	<i>Chassalia curviflora</i> (Wall.) Thwaite	40	4.25	1.7	3.21	5.714	2.165	0.846	8.725	2.908
9.	<i>Chromolaena odorata</i> (L.) R.M. King & H. Rob	10	4	0.4	1.4	1.428	0.509	0.368	2.307	0.769
10.	<i>Cinnamomum Zeylanicum</i> Nees.	10	1	0.1	25.3	1.428	0.127	6.667	8.223	2.741
11.	<i>Cosmostigma racemosum</i> (Roxb.) Wight	10	2	0.2	2.3	1.428	0.254	0.606	2.289	0.763
12.	<i>Cyclea peltata</i> Hook. f. & Thoms.	40	32.5	13	0.65	5.714	16.560	0.171	22.446	7.482
13.	<i>Cyperus rotundus</i> L.	10	31	3.1	0.3	1.428	3.949	0.0790	5.456	1.818
14.	<i>Desmodium triflorum</i> (L.) DC.	10	194	19.4	0.4	1.428	24.713	0.105	26.247	8.749
15.	<i>Digitaria bicornis</i> (Lam.) Roem.& Schult.	10	6	0.6	0.5	1.428	0.764	0.131	2.324	0.774
16.	<i>Ficus racemosa</i> Linn.	10	1	0.1	1.2	1.428	0.127	0.316	1.872	0.624
17.	<i>Hemidesmus indicus</i> (L.) R.Br	10	7	0.7	1.3	1.428	0.891	0.342	2.662	0.887
18.	<i>Hopea parviflora</i> Bedd.	10	1	0.1	2.1	1.428	0.127	0.553	2.109	0.703
19.	<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton	10	1	0.1	0.7	1.428	0.127	0.184487	1.740	0.580
20.	<i>Ixora coccinea</i> L.	20	16.5	3.3	1	2.857	4.203	0.263	7.324	2.441
21.	<i>Jasminum malabaricum</i> Wight	10	1	0.1	0.4	1.428	0.127	0.105	1.661	0.553
22.	<i>Jasminum sambac</i> (L.) Aiton	20	1	0.2		2.857	0.254	0.105	3.217	1.072

					0.4					
23	<i>Justicia simplex</i> D.Don.	20	3.5	0.7	0.4	2.857	0.891	0.105	3.854	1.284
24	<i>Macaranga peltata</i> (Roxb.) Müll.Arg.	10	1	0.1	58	1.428	0.127	15.286	16.842	5.614
25	<i>Mallotus philippinensis</i> Muell. Arg	10	10	1	1.2	1.428	1.273	0.316	3.018	1.006
26	<i>Mangifera indica</i> L	10	1	0.1	1	1.428	0.127	0.263	1.819	0.606
27	<i>Merremia tridentata</i> (L.) Hallier f.	10	1	0.1	0.5	1.428	0.127	0.131	1.687	0.562
28	<i>Mimusops elengi</i> L.	30	20	6	92.13	4.285	7.643	24.281	36.210	12.070
29	<i>Mitracarpus hirtus</i> (L.) DC	10	17	1.7	1.8	1.428	2.165	0.474	4.068	1.356
30	<i>Ocimum sanctum</i> Linn.	10	15	1.5	2.8	1.428	1.910	0.737	4.077	1.359
31	<i>Olea dioica</i> Roxb.	10	1	0.1	127.2	1.428	0.127	33.523	35.079	11.693
32	<i>Panicum repens</i> L.	20	34	6.8	0.12	2.857	8.662	0.031	11.551	3.850
33	<i>Pavetta indica</i> L.	20	3	0.6	1.1	2.857	0.764	0.289	3.911	1.303
34	<i>Pongamia pinnata</i> (L.) Pierre	10	2	0.2	2.6	1.428	0.254	0.685	2.368	0.789
35	<i>Pothos scandens</i> L.	50	17.6	8.8	1.02	7.142	11.210	0.268	18.621	6.207
36	<i>Rhinacanthus nasutus</i> (L.) Kurz	10	5	0.5	1.8	1.428	0.636	0.474	2.539	0.846
37	<i>Senna tora</i> (L.) Roxb.	20	1.5	0.3	1.45	2.857	0.382	0.382	3.621	1.207
38	<i>Smilax zeylanica</i> L	20	1.5	0.3	2.3	2.857	0.382	0.606	3.845	1.281
39	<i>Synedrella nodiflora</i> (L.) Gaertn.	20	1.5	0.3	1.3	2.857	0.382	0.342	3.581	1.193
40	<i>Vanda roxburghii</i> R.Br..	10	10	1	1.3	1.428	1.273	0.342	3.045	1.015
41	<i>Vernonia cinerea</i> (L.) Less.	10	1	0.1	0.6	1.428	0.127	0.158	1.714	0.571
42	<i>Xanthium indicum</i> J. Koenig	10	1	0.1	15.5	1.428	0.127	4.085	5.641	1.880