Scholars Academic Journal of Biosciences
Abbreviated Key Title: Sch Acad J Biosci
ISSN 2347-9515 (Print) | ISSN 2321-6883 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Botany

Assessment of Plant Diversity in Bodakondamma Sacred Grove, Eastern Ghats of Visakhapatnam District, Andhra Pradesh, India

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DOI: 10.36347/sajb.2023.v11i06.004 | **Received:** 19.05.2023 | **Accepted:** 15.06.2023 | **Published:** 26.06.2023

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Abstract **Original Research Article**

The present investigation reflects the findings of Assessment of plant Diversity which have been undertaken in the sacred grove of Bodakondamma, Eastern Ghats of Visakhapatnam district, Andhra Pradesh, India. The forest types of Sacred Grove are mainly dry deciduous forest. Plant diversity assessment was conducted during 2021 - 2022. The survey documentation of the plant species in the Sacred Grove area were recorded a total of 67 species are trees and 45 species are shrubs and 73 species are herbs and 45 species are climbers. This study provides preliminary information on the sacred groves of Bodakondamma. Appropriate conservation and management can considerably improve the plant diversity value of Sacred Grove of Eastern Ghats, Visakhapatnam District.

Keywords: Assessment, Plant diversity, Bodakondamma sacred Grove, Eastern Ghats, Visakhapatnam District.

INTRODUCTION

Sacred groves are the repositories of rare and endemic species and can be regarded as the remnant of the primary forest left untouched by the local inhabitants and protected then due to the belief that the deities reside in these forests. Many people have described sacred groves in different ways. However, there is an evident fact that wherever sacred groves existed, indigenous traditional societies have spiritual relationships with the existing physical environment sustained them. A document of MAB (1995) has described the sacred groves present in Ghana, Senegal, and Sumatra. Various sacred sites associated with rich vegetation in Bangladesh were reported by Hussain (1998). In Afghanistan, after advent of Islam, the creation and conservation of sacred grove became a part of historical and geographical tradition of the rural people (Mohamed 1998). All forms of vegetation in the groves are supposed to be under the protection of reigning deity of that grove, and the removal of even a small twig is a taboo (Vartak and Gadgil 1973). Collection and removal of any material from the sacred groves is prohibited (Khan *et al.*, 1987, Khiewtam and Ramakrishnan 1989). Sacred groves are found all over India especially in those regions where indigenous communities inhabit. Traced the historical link of sacred groves with the pre-agricultural, hunting and gathering stage, before human being had settled down to raise livestocks or till land (Gadgil and Vartak (1976, 1981ab). Most of the sacred groves reported from India are in the Western Ghats, North Eastern India and Central India (Gadgil and Vartak 1976, Burman 1992, Rodgers 994, Balasubramanyam and Induchoodan 1996, Tripathi 2006, Khumbongmayum *et al.*, 2005a). In India, sacred groves are found mainly in tribal dominated areas and are known by different names in ethnic terms (Bhakat 1990) such as *Sarna* or *De*v in Madhya Pradesh, *Devrai* or *Deovani* in Maharashtra, *Sarnas* in Bihar, *Orans* in Rajasthan, *Devaravana* or *Devarakadu* in Karnataka, *Sarpakavu* and *Kavu* in Tamil Nadu and Kerala, *Dev van* in Himachal Pradesh, *Law Lyngdoh* or *Law Kyntang* etc. in Meghalaya, *Sarana* or *Jaherthan* in Jharkhand and *Lai umang* in Manipur. The state of Andhra Pradesh, alone, has over 500 sacred groves (Anon. 1996), locally known as Pavithravanalu (Rao *et al.*, 2001). Biodiversity of Sacred groves is preserved in mostly undisturbed condition probably due to certain taboos and religious beliefs (Lakshmi Narayana and Venkaiah 1998). The local people of each sacred grove in general also believe that their livelihood, security and cultural existence are complementary to the blessings of their deity.

Study Area

In Andhra Pradesh the hilly region of Eastern Ghats is divided into Northern, Central and Southern Ghats. The Northern Eastern Ghats portion covers the districts of Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari and Khamam. Forests are endowed with rich, varied and endemic flora. Climate of Eastern Ghats typically tropical, enough to support the most luxuriant type of vegetation and maintain rich biodiversity. The study area Bodakondamma sacred groveis situated in Chinthapalli Mandal, Visakhapatnam District, Andhra Pradesh. It lies between 17°47'7.05"North latitude and 82°30'52.70"East longitude. The vegetation is dry deciduous type and height of the hill is 615 M on which Bodakondamma temple is located. Annual jathara used to hold during Sivarathri and all the tribal and non-tribal communities involve in the annual festival.

MATERIAL AND METHODS

Assessment of plant biodiversity studies were carried out during year 2019-2020 at Bodakondamma Sacred Grove, Visakhapatnam District, Andhra Pradesh. The following ecological parameters were used for the study. Vegetation data were quantitatively analyzed for density, frequency and abundance using standard methodologies (Curtis and McIntosh (1950) and Mueller – Dombois and Ellenberg (1974). Collected specimens were made into herbarium as per the methods suggested by Jain & Rao (1977). The collected specimens were identified with the help of different floras like Flora of the Presidency of the Madras (Gamble & Fischer 1915–1936), Flora of Visakhapatnam District (Rao & Kumari 2002–2008), and Flora of Vizianagaram District (Venkaiah 2004).The voucher specimens were deposited at the Botany Department Herbarium, Andhra University, Visakhapatnam.

RESULT AND DISCUSSION

Trees

A total of 613 individuals belonging to 67 species, 57 genera and 32 families were recorded in the 2.0-ha^{-1} plot and the vegetation type is moist deciduous vegetation. The most numerously represented genera were *Diospyrous*, *Terminalia* 3 species each. Among the 32 observed families, Rubiaceae and Euphorbiaceae contributed with 6 species, Verbanaceae, Sterculiaceae, Fabaceae, Combretaceae and Anacardiaceae has each one 4 species, Moraceae, Ebenaceae and Apocynaceae has 3 species each and Rutaceae, Mimosaceae, Caesalpiniaceae and Burseraceae both are contributed with 2 species remaining 18 families are consist single species(More than two species consisting family in Fig. 2).

Fig. 2

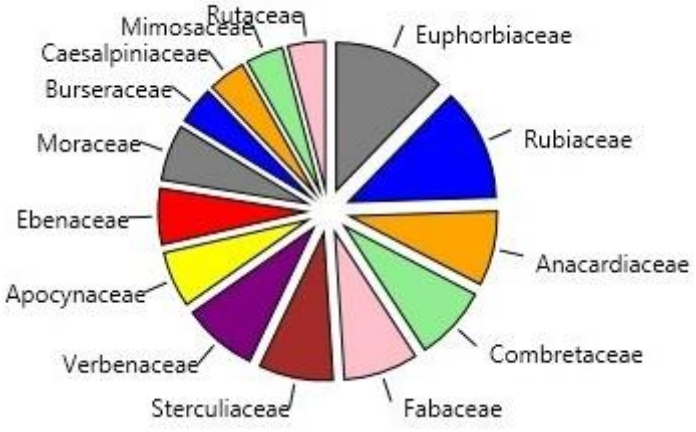
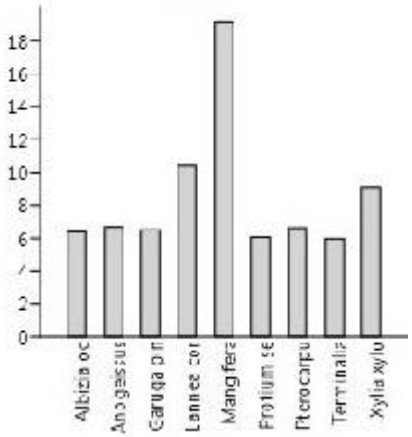


Fig. 3 Top ten IVI



A total density of the tree species 58.00 plants/ ha^{-1}. In this undisturbed sacred grove area *Xylia xylocarpa* (4.10/ ha^{-1}) has the highest density. The other tree species having high density was *Mangifera indica* (3.60/ ha^{-1}) followed by *Lannea coromandelica* (3.30/ ha^{-1}), *Grewia tiliifolia* (2.50/ ha^{-1}), *Garuga pinnata*, *Anogeissus latifolia* (2.30/ ha^{-1}) and *Protium serratum* (2.20/ ha^{-1}). The stand density is more for small stemmed individuals are (61-90cm) girth class intervals. Total basal area occupied by all the species in this area was 24.330/ ha^{-1}, out of which *Mangifera indica* contributed (3.889/ h^{-1}) followed by *Lannea coromandelica* (1.783/ ha^{-1}), *Xylia xylocarpa* (1.537/ ha^{-1}), *Anogeissus latifolia* (1.151/ ha^{-1}), *Pterocarpus marsupium* (1.019/ ha^{-1}) and *Garuga pinnata* (0.917/ ha^{-1}). Among the tree species *Mangifera indica*was the dominant trees species with highest IVI (19.136/ ha^{-1}) followed by *Lannea coromandelica* (10.384/ ha^{-1}), *Anogeissus latifolia* (6.667/ha^{-1}), *Grewia tiliifolia* (5. 666/ ha^{-1}), *Dalbergia paniculata* (4. 566/ ha^{-1}), *Albizia odoratissima* (4.409/ ha^{-1}) and *Mallotus philippensis* (4.294/ ha^{-1}). The IVI parameters are given (Table-1). The Dominance index of tree taxa is (0.03027), Simpson index is (0.9697), Shannon index is (3.789), Evenness index is (0.6598), Menhinick index is (2.782) and Equitability index is (0.9011). The present study compare to tropical rain forests, the range of tree species count per hectare is about 20 - 223 (Parthasarathy and Sethi, 1997), 42-47

species ha^{-1} (Kadavul and Parthasarathy, 1998). Reported a maximum of 83 tree species in the 50 ha Upper Ahobilam sacred grove Kurnool district of Andhra Pradesh (Sunitha 2002). Similarly, 83 species were identified in Nakuleshwar sacred groves (Singh *et al*., 2011).The present study sites diversity is slight similar to that of Eastern Ghats of East and West Godavari districts, Andhra Pradesh (Premavani, 2009; Shannon index-3.318-4.052) and less for (Sudhakar Reddy *et al.*, 2008; Shannon index-3.71 to 5.5), diversity and dominance index is more when compared with that of tropical Semi evergreen forests in Shervarayan hills (Kadavul and Parthasarathy, 1999; Shannon index-2.37 to 3.072, Simpson's index 0.07 to 0.143).

Shrubs

A total of 488 individuals belonging to 45 species, 34 genera and 23 families were recorded in the 2.0-ha^{-1} plot. Among the 23 observed families, Euphorbiaceae has 6 species, Acathaceae 5 species, Rutaceae 4 species, Verbenaceae and Rhamnaceae contributed with 3 species, Urticaceae, Poaceae, Oliaceae, Malvaceae, Lamiaceae and Fabaceae each one has 2 species and remaining 12 families consist single species (Fig. 4 More than two species consisting families).

Fig.4

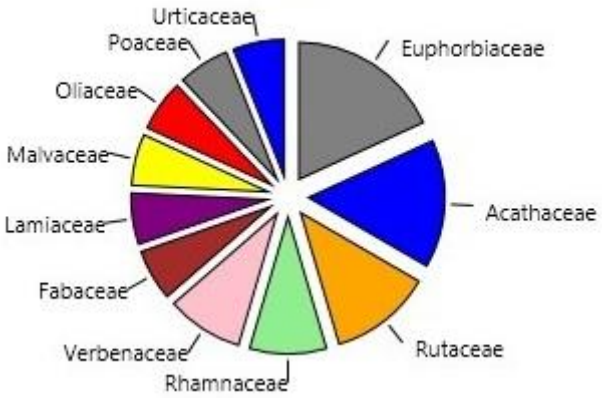
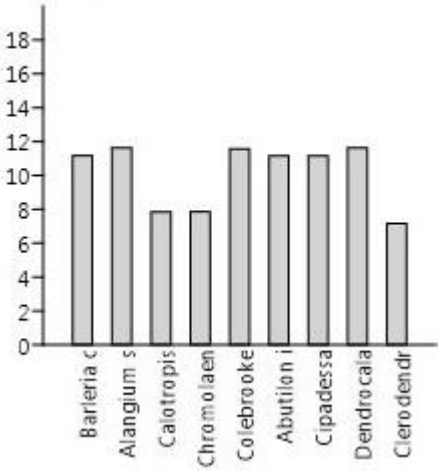


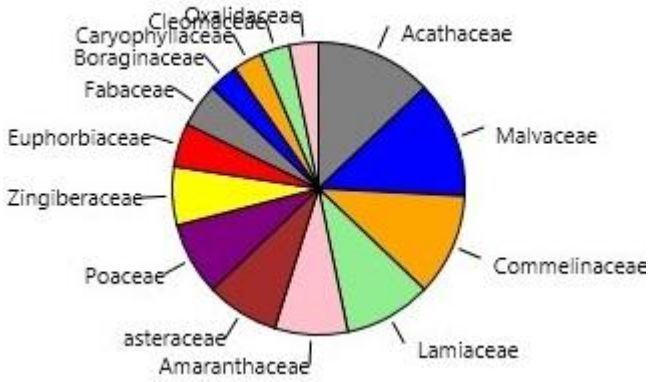
Fig. 5 Top ten IVI Shrubs

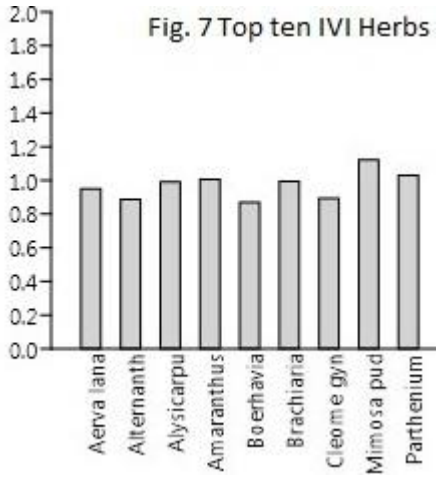


A total density of the shrubs species 48.80 plants/ ha^{-1}.In this undisturbed sacred grove area *Dendrocalamus strictus* and *Alangium salviifolium*has the highest density (2.40/ ha^{-1}) followed by *Colebrookea oppositifolia, Abutilon indicum, Cipadessa baccifera* (2.30/ ha^{-1}), *Barleria cristata* (2.20/ ha^{-1}), *Clerodendrum serratum, Clerodendrum philippinum* and *Clerodendrum inerme* (1.20/ha^{-1}). However the most abuundent species was *Colebrookea oppositifolia* (4.600/ ha^{-1}) followed by *Barleria cristata, Dendrocalamus strictus, Alangium salviifolium* (4.000/ ha^{-1}), *Cipadessa baccifera, Abutilon indicum* (2.286/ ha^{-1}), *Grewia rothii, Glycosmis mauritiana* (3.000/ ha^{-1}) and *Boehmeria macrophylla* (2.750/ ha^{-1}). Among the shrubs species *Dendrocalamus strictus* and *Alangium salviifolium*were the dominant shrubs species with highest IVI (11.195/ ha^{-1}) followed by *Colebrookea oppositifolia* (11.149/ ha^{-1}), *Barleria cristata*(10.758/ ha^{-1}),*Cipadessa baccifera, Abutilon indicum* (10.734/ ha^{-1}),*Chromolaena odorata* (7.532/ ha^{-1}) and *Calotrophis gygantium* (7.532/ ha^{-1}). The top ten IVI parameters are given (Fig. 5).The Dominance index of shrubs species is (0.02728), Simpson index is (0.9727), Shannon index is (3.711), Evenness index is (0.9085), Menhinick index is (2.037) and Equitability index is (0.9748). In Eastern Ghats from Downuru Sacred Grove a total of 290 Shrubs individuals belonging to 28 species and 14 families were recorded in the 0.5-ha-1 plot (Satya *et al.*, 2016).

Herbs

A total of 1615 individuals belonging to 73 species, 61 genera and 26 families were recorded in the 2.0-ha^{-1} plot. Out of 26 familis Malvaceae and Acathaceae both contributed with 8 species, Commelinaceae 7, Lamiaceae 6,Poaceae and Asteraceae with 5, Zingiberaceae and Amaranthaceae wth 4, Fabaceae and Euphorbiaceae with 3, Oxalidaceae, Cleomaceae, Caryophyllaceae and Boraginaceae with 2 species and remaining 12 familie are consist single species (Fig. 6). A total density of this sacred grove was 161.50 plants / ha^{-1}.Out of which *Amaranthus viridis* shared (8.00/ ha^{-1}) followed by *Brachiaria distachya*(7.70/ ha^{-1}), *Alysicarpus monilifer*, (7.60/ ha^{-1}), *Parthenium hysterophorus* , *Aerva lanata* (6.70/ ha^{-1}), *Mimosa pudica, Cleome gynandra*(5.60/ ha^{-1}), *Alternanthera sessilis*(5.50/ ha^{-1}) and *Boerhavia diffusa*(5.10/ ha^{-1}).

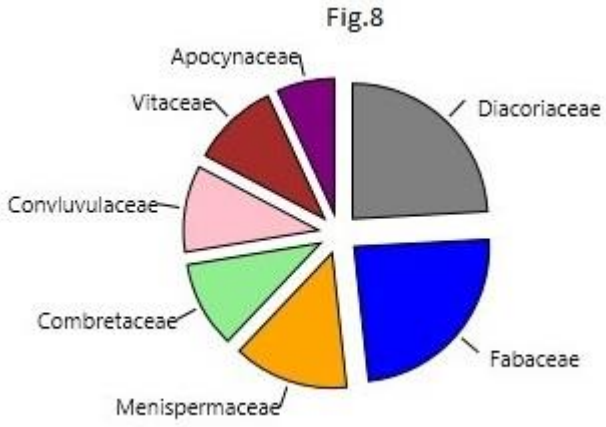


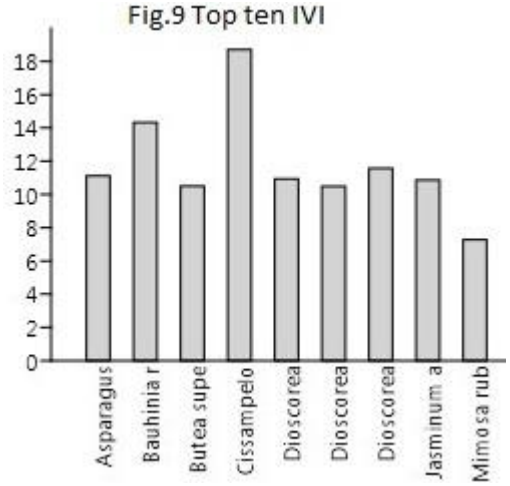


Among the herbs *Mimosa pudica* was the most abundant species (28.000/ ha^{-1}) followed by *Parthenium hysterophorus* (16.750/ ha^{-1}), *Sorghum halepense*(8.500/ ha^{-1}), *Alysicarpus monilifer*(8.444/ ha^{-1}), *Amaranthus viridis* (8.000/ ha^{-1}), *Brachiaria distachya*(7.700/ ha^{-1}), *Aerva lanata* (7.333/ ha^{-1}) and *Cleome gynandra* (7.000/ ha^{-1}). Based on the contributed IVI value of species *Mimosa pudica* was shown highest IVI with (13.231/ ha^{-1}) followed by *Parthenium hysterophorus*(10.703/ ha^{-1}), *Amaranthus viridis* (10.141/ ha^{-1}), *Brachiaria distachya*(9.857/ ha^{-1}), *Alysicarpus monilifer* (9.787/ ha^{-1}), *Aerva lanata* (8.899/ ha^{-1}), *Cleome gynandra* (7.817/ ha^{-1}), *Alternanthera sessilis*(7.714/ ha^{-1}), *Boerhavia diffusa* (7.388/ ha^{-1}) and *Achyranthes aspera*(6.818/ ha^{-1}). The top ten IVI parameters are given (Fig. 7). The Dominance index of Herbs is (0.02448), Simpson index is (0.9755), Shannon index is (3.96), Evenness index is (0.7187), Menhinick index is (1.817) and Equitability index is (0.923).

Climbers

A total of 519 individuals belonging to 45 species, 37 genera and 23 families were recorded in the 2.0-ha^{-1} plot. Out of 23 families Fabaceae and Dioscoriaceae contributed with 7 species, Menispermaceae with 4, Vitaceae, Convluvulaceae and Combretaceae with 3, Apocynaceae 2 species and remaining 16 families consist single species (Fig. 8).





The density of all the climbers in this grove was 51.90 plants/ ha^{-1}. Highest density was shown by *Cissampelos pareira*(4.50/ ha^{-1}) followed by *Bauhinia vahlii*(3.40/ ha^{-1}), *Dioscorea pentaphylla* (2.40/ ha^{-1}), *Jasminum arborescens, Dioscorea bulbifera, Asparagus racemosus* (2.30/ ha^{-1}), *Dioscorea glabra, Butea superb*(2.20/ ha^{-1}), *Mimosa rubicaulis*(1.30/ ha^{-1}), *Mucuna gigantean, Dioscorea oppositifolia* and *Calycopteris floribunda* (1.20/ ha^{-1}). The most abundant species was *Cissampelos pareira*(7.500/ ha^{-1}) followed by *Dioscorea pentaphyll*(4.800/ ha^{-1}), Dioscorea *anguina*(4.000/ ha^{-1}), Jasminum *arborescens*(3.833/ ha^{-1}), Butea *superb* (3.667/ ha^{-1}), Bauhinia *vahlii*(3.400/ ha^{-1}), *Dioscorea oppositifolia* (3.000/ ha^{-1}), *Naravalia zeylanica, Merremia hederacea and Dioscorea glabra* (2.750/ ha^{-1}). Based on the contributed IVI value of species dominant species on this grove was recorded. *Cissampelos pareira* (18.708/ ha^{-1}) followed by *Bauhinia vahlii*(14.323/ ha^{-1}) *Dioscorea pentaphylla* (11.562/ ha^{-1}) *Asparagus racemosus*(11.120/ ha^{-1}) *Dioscorea bulbifera* (10.929/ ha^{-1}) *Jasminum arborescens*(10.860/ ha^{-1}) *Butea superba* (10.503/ ha^{-1}) Dioscorea *glabra* (10.486/ ha^{-1})*Mimosa rubicaulis*(7.277/ ha^{-1}) *Dioscorea oppositifolia* (7.035/

ha^{-1}). The top ten IVI parameters are given (Fig. 9). The Dominance index of Climbers is (0.0337), Simpson index is (0.9667), Shannon index is (3.601), Evenness index is (0.8139), Menhinick index is (1.975) and Equitability index is (0.9459). Satya *et.al* 2017 reported a total of 155 species of which 55 trees, 25 shrubs, 60 herbs and 15 climbing species from random quadrates covering 0. 5 ha^{-1} area in Sanjavanam sacred grove.

Table 1: Phytosociological inventory of tree species in Bodakondamma Sacred Grove

S.No.	Species Name	RD	RF	RBA	IVI
1	*Albizia odoratissima* (L.f.) Benth.	2.414	1.584	2.369	6.367
2	*Alstonia venenata* R.Br.	0.065	0.198	0.028	0.291
3	*Annona squamosa* L.	0.065	0.198	0.068	0.332
4	*Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Bedd.	0.749	1.188	4.730	6.667
5	*Artocarpus heterophyllus* Lam.	0.228	0.990	2.017	3.235
6	*Atalantia monophylla* DC.	0.098	0.396	0.262	0.756
7	*Bischofia javanica* Blume	0.065	0.396	0.228	0.690
8	*Bombax ceiba* L.	0.261	0.792	1.946	2.999
9	*Bridelia retusa* (L.) A.Juss..	0.326	0.990	1.604	2.920
10	*Bridelia montana* (Roxb.) Willd.	0.228	0.594	0.742	1.565
11	*Buchanania lanzan* Spreng.	0.033	0.198	0.169	0.400
12	*Callicarpa arborea* Roxb.	0.130	0.396	0.327	0.854
13	*Canthium dicoccum* (Gaertn.) Merr.	0.228	0.594	0.503	1.325
14	*Careya arborea* Roxb.	0.065	0.198	0.114	0.377
15	*Caryota urens* L.	0.228	0.990	1.977	3.195
16	*Cassia fistula* L.	0.065	0.198	0.109	0.372
17	*Chloroxylon swietenia* DC.	0.163	0.396	0.551	1.110
18	*Cleistanthus collinus* (Roxb.) Benth. ex Hook.f.	0.098	0.396	0.578	1.071
19	*Dalbergia latifolia* Roxb.	0.098	0.396	0.238	0.732
20	*Dalbergia paniculata* Roxb.	0.586	1.782	2.198	4.566
21	*Dillenia pentagyna* Roxb.	0.130	0.396	0.380	0.907
22	*Diospyros melanoxylon* Roxb.	0.163	0.396	0.444	1.003
23	*Diospyros montana* Roxb.	0.098	0.396	0.394	0.888
24	*Diospyros sylvatica* Roxb.	0.098	0.396	0.463	0.957
25	*Erythrina variegata* L.	0.065	0.396	0.428	0.889
26	*Ficus benjamina* L.	0.098	0.396	0.116	0.610
27	*Ficus semicordata* Buch.-Ham. ex Sm.	0.195	0.396	1.265	1.857
28	*Firmiana colorata* (Roxb.) R.Br.	0.228	0.792	0.378	1.398
29	*Gardenia gummifera* L.f.	0.098	0.396	0.205	0.699
30	*Gardenia latifolia* Aiton	0.033	0.198	0.029	0.260
31	*Garuga pinnata* Roxb.	0.749	1.980	3.771	6.500
32	*Gmelina arborea* Roxb.	0.326	0.990	0.881	2.197
33	*Grewia tiliifolia* Vahl	0.814	1.584	3.268	5.666
34	*Haldina cordifolia* (Roxb.) Ridsdale	0.358	1.386	2.085	3.829
35	*Ixora pavetta* Andr.	0.065	0.198	0.063	0.326
36	*Kydia calycina* Roxb.	0.098	0.396	0.339	0.833
37	*Lagerstroemia parviflora* Roxb.	0.065	0.396	0.641	1.102
38	*Lannea coromandelica* (Houtt.) Merr.	1.075	1.980	7.329	10.384
39	*Macaranga peltata* (Roxb.) Müll.Arg.	0.130	0.396	0.892	1.418
40	*Madhuca longifolia* (J.König ex L.) J.F.Macbr.	0.098	0.396	0.369	0.863
41	*Mallotus philippensis* (Lam.) Müll.Arg.	0.489	1.386	2.419	4.294
42	*Mangifera indica* L.	1.173	1.980	15.983	19.136
43	*Mitragyna parvifolia* (Roxb.) Korth.	0.065	0.396	0.174	0.635
44	*Naringi crenulata* (Roxb.) Nicolson	0.033	0.198	0.040	0.271
45	*Nyctanthes arbor-tristis* Linn.	0.098	0.396	0.337	0.831
46	*Oroxylum indicum* (L.) Kurz	0.163	0.396	0.564	1.123
47	*Phyllanthus emblica* L.	0.195	0.594	0.556	1.345
48	*Premna tomentosa* Willd.	0.261	0.792	0.560	1.612
49	*Protium serratum* (Wall. ex Colebr.) Engl.	0.717	1.584	3.766	6.067
50	*Pterocarpus marsupium* Roxb.	0.651	1.782	4.190	6.623
51	*Pterospermum xylocarpum* (Gaertn.) Santapau	0.293	0.990	1.604	2.888

S.No.	Species Name	RD	RF	RBA	IVI
52	*Schleichera oleosa* (Lour.) Merr.	0.326	0.990	3.149	4.465
53	*Semecarpus anacardium* L.f.	0.586	1.386	2.139	4.111
54	*Sterculia urens* Roxb.	0.065	0.198	0.149	0.412
55	*Sterculia villosa* Roxb.	0.033	0.198	0.209	0.440
56	*Strychnos potatorum* L.f.	0.065	0.198	0.073	0.336
57	*Syzygium cumini* (L.) Skeels	0.456	1.386	2.101	3.943
58	*Tamarindus indica* L.	0.261	0.792	1.113	2.166
59	*Terminalia alata* Wall.	0.717	1.584	3.670	5.970
60	*Terminalia bellirica* (Gaertn.) Roxb.	0.521	1.584	2.239	4.344
61	*Terminalia chebula* Retz.	0.358	1.386	1.690	3.434
62	*Vitex leucoxylon* L.f.	0.130	0.396	0.560	1.087
63	*Walsura trifoliolata* (A.Juss.) Harms	0.098	0.396	0.097	0.591
64	*Wrightia arborea* (Dennst.) Mabb.	0.195	0.594	0.664	1.454
65	*Wrightia tinctoria* R.Br.	0.293	0.792	0.751	1.837
66	*Xylia xylocarpa* (Roxb.) Taub.	1.336	1.386	6.319	9.041
67	*Ziziphus xylopyrus* Hochst. ex A.Rich.	0.098	0.396	0.382	0.876
	Total	**100**	**100**	**100**	**300**

Table 2: Phytosociological inventory of Shrubs in Sacred grove of Bodakondamma

S.No	Name of the Plants	RD	RF	RA	IVI
1	*Abutilon indicum* (L.) Sweet	4.713	3.153	3.287	11.154
2	*Acacia sinuata* (Lour.) Merr.	2.459	2.252	2.401	7.112
3	*Alangium salviifolium*(L.f.) Wang.	4.918	2.703	4.002	11.623
4	*Barleria cristata* L.	4.508	2.252	4.402	11.163
5	*Barleria longiflora* L.f.	2.459	2.252	2.401	7.112
6	*Boehmeria macrophylla* Hornem.	2.254	1.802	2.751	6.807
7	*Boehmeria platyphylla* D.Don.	2.049	1.802	2.501	6.352
8	*Breynia retusa* (Dennst.) Alston	2.049	1.802	2.501	6.352
9	*Breynia vitis-idea* (Brum.f.) Fischer	2.254	2.252	2.201	6.707
10	*Caesalpinia bonduc* (L.) Roxb.	2.459	2.252	2.401	7.112
11	*Calotropis gigantea* (L.) Dryand.	2.459	4.054	1.334	7.847
12	*Chromolaena odorata* (L.) R.M.King & H.Rob.	2.254	4.505	1.101	7.859
13	*Cipadessa baccifera* (Roth) Miq.	4.713	3.153	3.287	11.154
14	*Clerodendrum inerme* (L.) Gaertn.	2.459	2.252	2.401	7.112
15	*Clerodendrum philippinum* Mold.	2.459	2.703	2.001	7.163
16	*Clerodendrum serratum* (L.) Moon.	2.459	2.252	2.401	7.112
17	*Colebrookea oppositifolia* J.E. Smith	4.713	2.252	4.602	11.568
18	*Dendrocalamus strictus* (Roxb.ex DC.)	4.918	2.703	4.002	11.623
19	*Desmodium caudatum* (Thunb.) DC.	2.254	2.703	1.834	6.791
20	*Ecbolium viride* (Forssk.) Alston	2.049	3.153	1.429	6.632
21	*Erythroxylum monogynum* Roxb.	1.639	2.703	1.334	5.676
22	*Euphorbia cattimandoo* Elliot ex Wight	1.639	2.252	1.601	5.492
23	*Flacourtia indica* (Burm. f.) Merr.	1.639	1.802	2.001	5.442
24	*Flemingia stricta* Roxb.	1.639	2.252	1.601	5.492
25	*Glycosmis mauritiana* (Lam.) Tanaka	1.844	1.351	3.002	6.197
26	*Gmelina asiatica* L.	1.639	1.802	2.001	5.442
27	*Grewia rothii* DC.	1.844	1.351	3.002	6.197
28	*Helicteres isora* L.	1.230	1.802	1.501	4.532
29	*Homonoia riparia* Lour.	1.639	2.703	1.334	5.676
30	*Jasminum angustifolium* (L.) Willd.	1.639	1.802	2.001	5.442
31	*Jasminum auriculatum* Vahl	1.639	1.351	2.668	5.659
32	*Jatropha curcas* L.	1.844	1.802	2.251	5.897
33	*Jatropha gossypifolia* L.	1.844	1.802	2.251	5.897
34	*Justicia adhatoda* L.	1.434	1.802	1.751	4.987
35	*Justicia betonica* L.	1.434	1.802	1.751	4.987
36	*Murraya exotica* L.	1.639	2.252	1.601	5.492
37	*Murraya koenigii* (L.) Spreng.	1.639	1.802	2.001	5.442

S.No	Name of the Plants	RD	RF	RA	IVI
38	*Solanum torvum* Sw.	1.230	2.252	1.201	4.682
39	*Streblus asper* (Retz.) Lour.	1.230	1.802	1.501	4.532
40	*Thysanolaena maxima* (Roxb.)	1.230	1.802	1.501	4.532
41	*Urena lobata* L.	1.434	2.252	1.401	5.087
42	*Zanthoxylum armatum* DC.	1.434	1.802	1.751	4.987
43	*Ziziphus mauritiana* Lam.	1.639	1.802	2.001	5.442
44	*Ziziphus rugosa* Lam.	1.639	1.802	2.001	5.442
45	*Zizipus oenoplia* (L.) Mill.	1.434	1.802	1.751	4.987
	Total	**100**	**100**	**100**	**300**

Table 3: Phytosociological inventory of Herbs in Bodakondamma Sacred Grove

S.No	Name of the Plants	RD	RF	RA	IVI
1	*Acalypha indica* L.	2.167	2.545	1.157	5.869
2	*Achyranthes aspera* L.	2.786	2.545	1.487	6.818
3	*Aerva lanata*(L.) A.L. juss. ex Schultes	4.149	2.290	2.461	8.899
4	*Alternanthera sessilis* (L.) R. Br. ex DC.	3.406	2.036	2.272	7.714
5	*Alysicarpus monilifer* (L.) DC.	4.706	2.290	2.791	9.787
6	*Amaranthus viridis* L.	4.954	2.545	2.644	10.142
7	*Andrographis paniculata*(Burm.f.) Wall.	1.362	2.036	0.909	4.307
8	*Anisochilus carnosus* (L.f.) Wall. ex Benth	0.495	1.272	0.529	2.296
9	*Argemone mexicana* L.	0.681	1.527	0.606	2.814
10	*Arisaema tortuosum* (Wall.) schott	0.310	1.018	0.413	1.741
11	*Biophytum sensitivum* (L.) DC.	0.310	1.272	0.331	1.912
12	*Blepharis maderaspatensis* (L.) Heyne ex Roth	2.105	2.036	1.405	5.546
13	*Boerhavia diffusa* L.	3.158	2.545	1.686	7.388
14	*Brachiaria distachya* (L.) Stapf	4.768	2.545	2.545	9.857
15	*Cleome gynandra* L.	3.467	2.036	2.314	7.817
16	*Cleome viscosa* L.	2.786	2.290	1.653	6.729
17	*Colocasia esculenta* (L.) Schott	2.786	2.036	1.859	6.681
18	*Commelina attenuata* Koen.	2.724	2.290	1.616	6.630
19	*Commelina bengalensis* L.	2.043	2.036	1.363	5.442
20	*Commelina diffusa* Brum.f.	0.495	2.290	0.294	3.079
21	*Commelina erecta* L.	0.495	1.781	0.378	2.654
22	*Commelina longifolia* Lam.	0.495	1.527	0.441	2.463
23	*Corchorus trilocularis* L.	0.681	1.018	0.909	2.608
24	*Costus speciosus* (koen.) J.E.Smith	0.805	0.509	2.148	3.462
25	*Crinum asiaticum* L.	0.495	0.763	0.881	2.140
26	*Croton bonplandianus* Baill.	0.619	0.763	1.102	2.484
27	*Curcuma amada* Roxb.	0.495	1.018	0.661	2.174
28	*Cyanotis cristata* (L.) D. Don	1.362	1.018	1.818	4.198
29	*Cyanotis tuberosa* (Roxb.)	1.424	1.018	1.901	4.343
30	*Desmodium gangeticum* (L.) DC.	0.743	1.272	0.793	2.809
31	*Drymaria cordata* (L.) Willd. ex Schult.	0.681	1.527	0.606	2.814
32	*Ecbolium viride* (Forssk.) Alston	0.495	1.272	0.529	2.296
33	*Echinochloa colona* (L.) Link	0.743	1.018	0.992	2.752
34	*Eclipta prostrata* (L.) L.	0.743	1.527	0.661	2.931
35	*Elephantopus scaber* L.	0.310	1.018	0.413	1.741
36	*Eleusine indica* (L.) Gaertn.	0.743	0.763	1.322	2.829
37	*Elytraria acaulis* (L.f.) Lindau	1.362	0.763	2.424	4.549
38	*Emilia sonchifolia* (L.) DC. ex DC.	0.681	1.272	0.727	2.681
39	*Ensete glaucum* (Roxb.) E.E. Cheesm.	0.495	1.527	0.441	2.463
40	*Eranthemum capense* L.	0.743	1.272	0.793	2.809
41	*Globba marantina* L.	0.495	1.272	0.529	2.296
42	*Gloriosa superba* L.	0.557	1.018	0.744	2.319
43	*Heliotropium curassavicum* L.	0.495	1.272	0.529	2.296
44	*Heliotropium indicum* L.	0.557	1.527	0.496	2.580
45	*Hypericum japonicum* Thunb.	0.557	0.763	0.992	2.312

S.No	Name of the Plants	RD	RF	RA	IVI
46	*Hyptis suaveolens* (L.) Poit.	0.743	1.018	0.992	2.752
47	*Impatiens balsamina* L.	0.372	1.272	0.397	2.040
48	*Indigofera cordifolia* Roth	0.372	1.018	0.496	1.885
49	*Indoneesiella echioides* (L.) Sreemadh.	0.495	0.509	1.322	2.326
50	*Justicia glauca* Rottler	2.167	1.781	1.653	5.601
51	*Justicia procumbens* Blume	1.424	1.527	1.267	4.218
52	*Leucas biflora* (Vahl) R.Br. ex Sm.	0.805	0.763	1.432	3.001
53	*Leucas indica* (L.) R.Br. ex Vatke	0.805	1.018	1.074	2.897
54	*Malvastrum coromandelianum* (L.) Garcke	0.867	0.763	1.542	3.173
55	*Mimosa pudica* L.	3.467	0.509	9.255	13.231
56	*Ocimum basilicum* L.	0.248	0.763	0.441	1.452
57	*Oxalis corniculata* L.	1.424	1.018	1.901	4.343
58	*Parthenium hysterophorus* L.	4.149	1.018	5.536	10.703
59	*Pavonia odorata* Willd.	1.424	1.272	1.520	4.217
60	*Phyllanthus maderaspatensis* L.	2.105	1.527	1.873	5.505
61	*Plectranthus mullis* (Ait.) Spreng.	0.743	1.018	0.992	2.752
62	*Polycarpaea corymbosa* (L.) Lam.	0.681	0.763	1.212	2.656
63	*Pouzolzia zeylanica* (L.) Bennett	1.424	1.018	1.901	4.343
64	*Sida acuta* Burm.f.	2.105	1.272	2.248	5.625
65	*Sida cordata* (Burm.f.) Borss.Waalk.	1.424	1.527	1.267	4.218
66	*Solanum suratense* Burm.f.	0.743	0.763	1.322	2.829
67	*Sorghum halepense* (L.) Pers.	2.105	1.018	2.810	5.933
68	*Triumfetta pentandra* A.Rich.	0.372	1.527	0.331	2.229
69	*Triumfetta rotundifolia* Lam.	0.495	1.781	0.378	2.654
70	*Vetiveria zizanioides* (L.) Nash	0.557	1.018	0.744	2.319
71	*Waltheria indica* L	0.495	0.763	0.881	2.140
72	*Xanthium strumarium* L.	0.495	1.018	0.661	2.174
73	*Zingiber roseum* (Roxb.) Roscoe	0.557	0.763	0.992	2.312
	Total	**100**	**100**	**100**	**300**

Table 4: Phytosociological inventory of Climbers in Bodakondamma Sacred Grove

S.No	Name of the plants	RD	RF	RA	IVI
1	*Abrus precatorius* L.	1.541	1.770	1.969	5.280
2	*Ampelocissus latifolia* (Roxb.) Planch.	1.734	1.770	2.215	5.719
3	*Argyreia nervosa* (Burm. f.) Bojer	1.734	2.212	1.772	5.718
4	*Aristolochia tagala* Cham.	0.771	1.327	1.312	3.411
5	*Asparagus racemosus* Willd.	4.432	4.425	2.264	11.120
6	*Bauhinia racemosa* Vahl	6.551	4.425	3.347	14.323
7	*Butea superba* Roxb.	4.239	2.655	3.609	10.503
8	*Calycopteris floribunda* (Roxb.) Lam. ex Poir.	2.312	2.212	2.362	6.887
9	*Capparis zeylanica* L.	1.541	3.540	0.984	6.066
10	*Cardiospermum halicacabum* L.	1.734	3.982	0.984	6.701
11	*Cassytha filiformis* L.	1.541	1.770	1.969	5.280
12	*Cayratia pedata* (Lam.) Gagnep.	1.734	2.212	1.772	5.718
13	*Celastrus paniculatus* Willd.	2.119	2.212	2.166	6.497
14	*Cissampelos pareira* L.	8.671	2.655	7.383	18.708
15	*Cissus quadrangularis* L.	1.927	2.212	1.969	6.108
16	Clitoria ternatea L.	2.119	1.770	2.707	6.596
17	*Cocculus hirsutus* (L.) W.Theob.	2.119	2.212	2.166	6.497
18	*Combretum decandrum* Jacq.	1.541	1.770	1.969	5.280
19	*Combretum roxburghii* Spreng.	1.734	2.212	1.772	5.718
20	*Cryptolepis sinensis* (Lour.) Merr.	1.156	1.327	1.969	4.452
21	*Derris scandens* (Roxb.) Benth.	0.963	1.327	1.641	3.931
22	*Dioscorea anguina* Roxb.	1.541	0.885	3.937	6.364
23	*Dioscorea bulbifera* L.	4.432	3.982	2.516	10.929
24	*Dioscorea glabra* Roxb.	4.239	3.540	2.707	10.486
25	*Dioscorea hispida* Dennst.	2.119	2.212	2.166	6.497

S.No	Name of the plants	RD	RF	RA	IVI
26	*Dioscorea oppositifolia* L.	2.312	1.770	2.953	7.035
27	*Dioscorea pentaphylla* L.	4.624	2.212	4.725	11.562
28	*Dioscorea tomentosa* Koen. ex Spreng.	1.541	2.655	1.312	5.509
29	*Gymnema sylvestre* (Retz.) Schult.	1.734	3.540	1.107	6.381
30	Hemidesmus indicus (L.) R. Br.	1.541	3.097	1.125	5.764
31	*Hiptage benghalensis* (L.) Kurz	1.541	1.770	1.969	5.280
32	*Ipomoea pes-tigridis* L.	1.734	2.655	1.477	5.865
33	*Jasminum arborescens* Roxb.	4.432	2.655	3.773	10.860
34	*Merremia hederacea* (Burm. f.) Hallier f.	2.119	1.770	2.707	6.596
35	*Mimosa rubicaulis* Lam.	2.505	2.212	2.559	7.277
36	*Mucuna gigantea* (Willd.) DC.	2.312	2.655	1.969	6.936
37	*Naravelia zeylanica* (L.) DC.	2.119	1.770	2.707	6.596
38	*Pueraria tuberosa* (Willd.)DC.	1.541	2.212	1.575	5.329
39	*Smilax zeylanica* L.	0.963	1.770	1.230	3.964
40	*Stemona tuberosa* Lour.	0.578	0.885	1.477	2.940
41	*Stephania japonica* (Thunb.) Miers	0.963	1.327	1.641	3.931
42	*Tinospora cordifolia* (Willd.) Miers	0.578	0.885	1.477	2.940
43	*Tragia involucrata* L.	0.578	1.327	0.984	2.890
44	*Trichosanthes tricuspidata* Lour.	0.771	0.885	1.969	3.624
45	*Ventilago denticulata* Willd.	0.963	1.327	1.641	3.931
	Total	**100**	**100**	**100**	**300**

CONCLUSION

Sacred groves have become biodiversity hotspots, as various species seek refuge in the areas due to progressive habitat destruction, and hunting. Sacred groves often contain plant and animal species that have become extinct in neighboring areas. They therefore harbor great genetic diversity. They are the abodes of rare, endemic and endangered species of flora and fauna. Local tribes are depending upon surrounding forest for the resources, but sometimes due to the lack of knowledge and negligence younger generations are enter in to the sacred groves for the collection of forest resources and caused for above mentioned threats. There is urgent need for conservation of threat effecting sacred groves, it is necessary to create awareness to the young generations.

ACKNOWLEDGEMENTS

We thank to Department of Botany, Andhra University for providing administrative help. Prof. M. Venkaiah & Dr. J. Prakas Rao helped in identification of the specimens.

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