



ISSN 0974-7907 (Online)  
ISSN 0974-7893 (Print)

## VASCULAR PLANT DIVERSITY IN THE SACRED GROVE OF MODAPALLI IN VISKHAPATNAM DISTRICT OF ANDHRA PRADESH, INDIA

M. Tarakeswara Naidu<sup>1</sup>, O. Aniel Kumar<sup>2</sup> & M. Venkaiah<sup>3</sup>

<sup>1,2,3</sup> Department of Botany, Andhra University, Visakhapatnam, Andhra Pradesh 530003, India  
<sup>1</sup> tarakeswaranaidu@gmail.com (corresponding author), <sup>2</sup> oak.aniel@gmail.com, <sup>3</sup> venkaiah\_botany@rediffmail.com

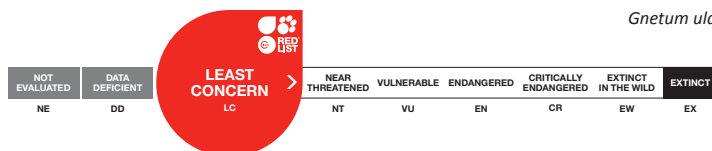
OPEN ACCESS

**Abstract:** Sacred groves are tracts of virgin forest with rich biodiversity, as they have been protected for centuries by the local people for their cultural and religious beliefs and taboos. Sacred groves are representatives of climax vegetation and exhibit diversity of species such as trees, climbers and other shade loving herbs. In the present investigation, an attempt was made to study the diversity of a sacred grove of Modapalli, Visakhapatnam District, which comes under the Eastern Ghats of India. A total of 207 species, 181 genera and 78 families comprising pteridophytes, gymnosperms and angiosperms were reported in the sacred grove. In this study, only one endemic species, i.e., *Ophiorrhiza chandrasekharanii* and a few threatened species were recorded.

**Keywords:** Conservation, Modapalli, plant diversity, sacred grove, threatened taxa.

India has a long tradition of prudent use and wise conservation of all resources that are useful to people. Traditionally, the local people have been preserving small patches of relatively dense forests based on religious values and beliefs. These are called 'sacred groves' and act as treasure houses for large numbers of endemic

and rare plants of the region (Chandrashekara & Sankar 1998; Jamir & Pandey 2003; Sujana & Sivaperuman 2008). Sacred groves thus are the relics of vegetation which have survived under a variety of ecological situations in India and are the present hot spots of biodiversity (Rao 1996). In the tropics, sacred groves play a vital role in traditional biodiversity conservation and improve the soil stability of the area and prevent soil erosion too (Rawat et al. 2011). This way of conserving natural biodiversity through preservation plots in forest areas or sacred groves are a unique feature in Indian culture (Khullar 1992). Sacred groves are true indicators of the types of vegetations that once existed before the dawn of modern civilization and their existence is due to certain taboos, strong beliefs and supplemented mystic folklore (Gadgil & Varthak 1975). In the recent past, due to change of socio-economic conditions and land use systems, many sacred groves are threatened and altered, both in terms of size, vegetation structure



*Gnetum ula*



DOI: <http://dx.doi.org/10.11609/JoTT.o3550.7683-90>

Editor: B. Ravi Prasad Rao, Sri Krishnadevaraya University, Anantapuramu, India.

Date of publication: 26 August 2015 (online & print)

Manuscript details: Ms # o3550 | Received 05 March 2013 | Final received 20 July 2015 | Finally accepted 30 July 2015

Citation: Naidu, M.T., O.A. Kumar & M. Venkaiah (2015). Vascular plant diversity in the sacred grove of Modapalli in Viskhapatnam District of Andhra Pradesh, India. *Journal of Threatened Taxa* 7(10): 7683–7690; <http://dx.doi.org/10.11609/JoTT.o3550.7683-90>

Copyright: © Naidu et al. 2015. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: Andhra University [No U5/RF/Botany/2009].

Competing interests: The authors declare no competing interests.

Acknowledgements: The authors are grateful to the Head, Department of Botany, Andhra University for encouragement. The JoTT review process significantly improved manuscript.



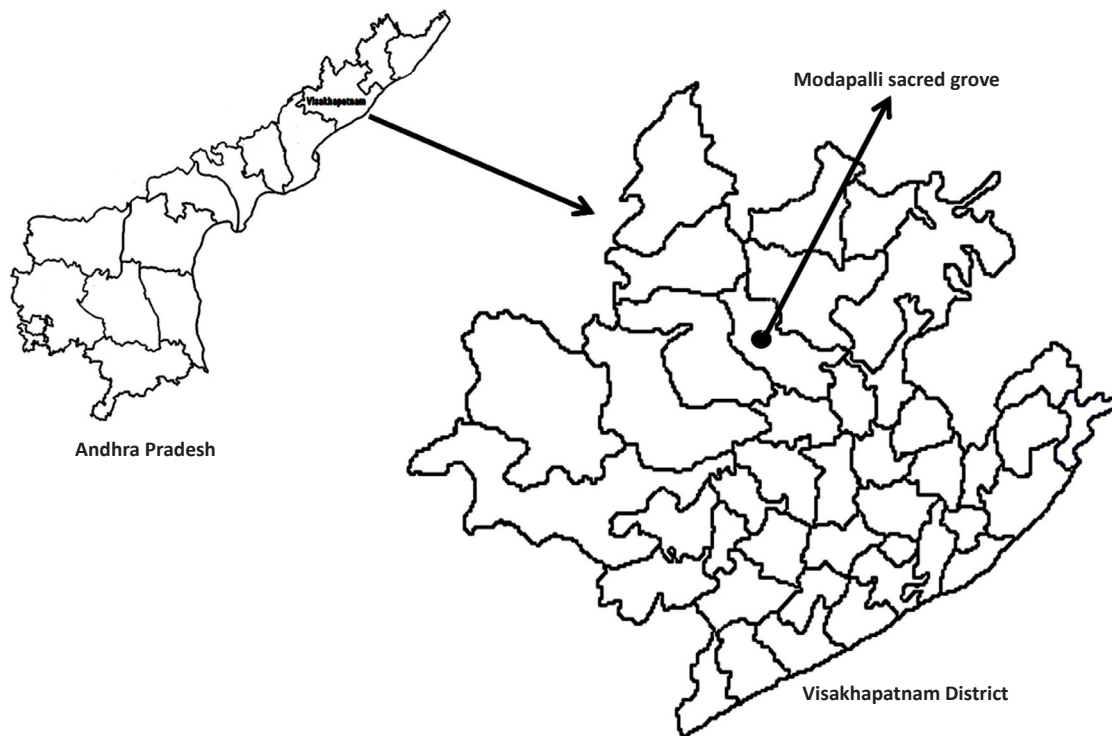


Figure 1. Map showing relative location of the Modapalli sacred grove.

and species composition. There are a number of sacred groves all over India. The erstwhile state of Andhra Pradesh, alone, has over 800 sacred groves (Rao 1996; Sunitha & Rao 1999) and Visakhapatnam District has 31 sacred groves (Lakshminarayana & Venkaiah 1998; Rao et al. 2010), locally known as *Pavithravanalu* (Rao et al. 2011).

Modapalli sacred grove is located at 18°02'324"N & 82°42'324"E in Visakhapatnam District, Andhra Pradesh (Fig. 1); it is a part of the Eastern Ghats at an altitude of 984m. The sacred grove extends over a 4ha area covered with mixed moist deciduous forest (Champion & Seth 1968) which contains black alluvial soil and a perennial stream. There is a small temple of Goddess 'Modakondamma' in the middle of the sacred grove worshiped by the Bagata tribal community based on their indigenous cultural and religious beliefs and taboos. Every year, in summer they celebrate the festival of Goddess Modakondamma for three days. This captivating site of the Modakondamma temple is an alluring attraction for pilgrims, who visit this place from all over Visakhapatnam District. This paper deals with vascular plant diversity in the Modapalli sacred grove with observations on threatened and endemic plant species.

#### MATERIALS AND METHODS

Intensive field surveys were carried out during 2010–2011, covering pre-monsoon, monsoon and post-monsoon seasons. quadruplicate specimens of each species of flowering and non-flowering vascular plants, were collected along with necessary field data. Collected specimens were made into herbarium as per the methods suggested by Jain & Rao (1977). The collected specimens were identified only after a critical examination 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). Lists of threatened and endemic plants found in the sacred grove were prepared with the help of published works (Rao et al. 2003; Jadhav & Reddy 2006; Reddy & Reddy 2008). The voucher specimens were deposited at the Botany Department Herbarium (BDH), Andhra University, Visakhapatnam. The plant species status was determined based on IUCN (2014) category.

#### RESULTS AND DISCUSSION

Sacred groves are very important in upholding traditions and beliefs in order to protect and conserve unique forest patches which represent the relict vegetation of the concerned area. Sacred groves have

presently attracted the attention of environmentalists, geneticists, botanists for their undisturbed natural conditions, which has made them repositories of valuable germplasm of medicinal plants, and endangered and endemic plant species (Anthwal et al. 2006).

A total of 207 species belonging to 181 genera under 78 families (Table 1) were reported. This is 17.2% of the species described in the flora of Visakhapatnam District (Rao & Kumari 2002–2008) and 8% of the flora of the state (Pullaiah & Kuruppusamy 2008). About 95% of the total vascular plants in the grove were angiosperms, followed by pteridophytes and gymnosperms. The genus and species ratio for the present study is 1:1.14, while this ratio is 1:1.72 for the flora of Visakhapatnam District (Rao & Kumari 2002–2008), 1:2.86 for the flora of Andhra Pradesh (Pullaiah & Kuruppusamy 2008) and 1:7 for the Indian sub continent (Hooker 1872–1897). Out of 207 species, nine species (4.3%), eight genera (3.8%) and seven families (3.3%) are pteridophytes; one species gymnosperm i.e., *Gnetum ula* (0.48%) and 197 species, 172 genera and 70 families belong to angiosperms. Among the angiosperms, there were 56 families (71.8%) of dicotyledons and 14 families (17.9%) of monocotyledons. The families of pteridophytes and gymnosperms were represented by seven families (9%) and one family, i.e., Gnetaceae (1.2%) respectively. Within the 197 angiosperms, 49 monocotyledon species (21.7%) under 41 genera (22.6%) were reported as compared to 152 (73.4%) dicotyledon species under 131 genera (72.3%). This observation is in conformity with the earlier reports (Rao & Kumari 2002–2008; Pullaiah & Kuruppusamy 2008) that there is predominance of dicotyledons 58%, 74% in the flora of Visakhapatnam District and the flora of Andhra Pradesh. The ratio of monocots to dicots among species, genera and families is 1:3.37, 1:3 and 1:4 respectively. Habitat wise analysis of flora shows comparatively higher percentage of herbs (47.8%) followed by trees (28.5%), climbers (12.5%) and Shrubs (11.1%).

The dominant family is Euphorbiaceae represented by 15 species, followed by Poaceae (11), Orchidaceae and Rubiaceae (with 10 species each), Asteraceae (8 species), Fabaceae (7 species), and Araceae, Moraceae, Rutaceae and Verbenaceae (with 6 species each), Acanthaceae, Commelinaceae, Lamiaceae and Urticaceae (with 5 species each), Meliaceae and Piperaceae (with 4 species each), Adiantaceae, Dioscoreaceae, Malveceae, Mimosaceae, Ranunculaceae, Solanaceae and Zingiberaceae (with 3 species each), 19 families have two species each while 37 families were represented by just a single species. Euphorbiaceae was the dominant

family in Palapatty (Ganesan et al. 2009) and Sethur sacred groves also (Sambandan & Dhatchanamoorthy 2012). *Ficus* is the dominant genus with five species followed by *Dioscorea* and *Solanum* comprising three species each; *Adiantum*, *Antidesma*, *Ardisia*, *Boehmeria*, *Bridelia*, *Clematis*, *Commelina*, *Lindernia*, *Oxalis*, *Peperomia*, *Phyllanthus*, *Piper* and *Vanda* have two species each and 165 genera have single species each. The present investigation on sacred groves reveals that *Ficus* is dominant genera in Modapalli, these results agreed with the findings of Jamir & Pandey (2003) and Rao et al. (2010) on Jaintia Hills and Uppa sacred grove of Visakhapatnam district respectively.

A total of 12 species are listed as threatened in this sacred grove along with *Ophiorrhiza chandrasekharanii*, which is endemic to Visakhapatnam (Rao & Kumari 2002–2008). Two species viz., *Gnetum ula* and *Lasia spinosa* are Least Concern (IUCN 2014); the Endangered species of *Cyathea gigantea* (Rao et al. 2010) and *Lassiococca comberi* (Rao et al. 2003) contributed by one and four individuals; some are state level threatened species such as *Anodendron paniculatum*, *Nervilia aragoana*, *Raphidophora decursiva* (one individual each) and *Zingiber roseum* (two individuals) assessed as Endangered and *Oroxylum indicum*, *Rubia cordifolia*, *Stemona tuberosa* (Reddy & Reddy 2008) are assessed as Vulnerable (Image 1 a–n). Some of the tall trees like *Mangifera indica*, *Michelia champaka* and *Elaeocarpus tectorius* of height 25 m are present in the middle of the grove. The most serious threat to the floristic diversity is observed from invasive species, i.e., *Lantana camara*, *Chromolaena odorata* and *Bidens pilosa* causing depletion to the indigenous plant diversity.

## CONCLUSION

This study revealed the presence of a number of plant species along with threatened plants in the sacred grove. This sacred grove has been deteriorating under constant anthropogenic pressure. Natural populations are under serious threat from fire and cultivation of coffee, in and around the sacred grove. Constant grazing, extraction of fuel wood, collection of medicinal plants and non timber forest products causes the degradation of various rare and threatened plants in the sacred grove. This kind of degraded sacred grove should be immediately restored or regenerated using appropriate technologies and by creating awareness about the significance of sacred groves in the maintenance of biodiversity. Therefore, it is important to take appropriate measures and protect such ecologically important groves. The legal status and management of sacred groves in the country needs to





**Image 1 (a–n).**  
**a - *Aglaia elaeagnoides*;**  
**b - *Chionanthus macrophylla*;**  
**c - *Citrus medica*; d - *Costus speciosus*;**  
**e - *Cyathea gigantea*; f - *Gnetum ula*;**  
**g - *Lasiococca comberi*,**  
**h - *Nervilia aragoana*, l - *Ophiorrhiza***  
**chandrasekharanii; j - *Oroxylum indicum*;**  
**k - *Rhaphidophora decursiva*;**  
**l - *Rubia cordifolia*; m - *Stemona***  
**tuberosa; n - *Zingiber roseum***  
 Photo credit: M. Tarakeswara Naidu



Table 1. List of plant species recorded in the sacred grove of Modapalli.

	Species	Habit	Family	Vernacular name
1	<i>Acalypha ciliata</i> Forssk.	H	Euphorbiaceae	Merapaku
2	<i>Achyranthes bidentata</i> Bl.	H	Amaranthaceae	
3	<i>Adhatoda vasica</i> Nees	S	Acanthaceae	Addasaram
4	<i>Adiantum caudatum</i> L.	H	Adiantaceae	Rajahamsa
5	<i>Adiantum lunulatum</i> Burm.	H	Adiantaceae	Hamsapadi
6	<i>Ageratum conyzoides</i> L.	H	Asteraceae	
7	<i>Aglaia elaeagnoides</i> L.	T	Meliaceae	Yerra adugu
8	<i>Albizia odoratissima</i> (L.f.) Benth.	T	Mimosaceae	Chinduga
9	<i>Alocasia montana</i> (Roxb.) Schott	H	Araceae	Bonasaru Kanda
10	<i>Amaranthus viridis</i> L.	H	Amaranthaceae	Thotakura
11	<i>Anodendron paniculatum</i> (Roxb) DC.	Cl	Apocynaceae	
12	<i>Antidesma ghaesembilla</i> Gaertn.	T	Stilaginaceae	Pulleru
13	<i>Antidesma menasu</i> Tul.	T	Stilaginaceae	
14	<i>Ardisia depressa</i> Cl.	S	Myrsinaceae	Kuna mokka
15	<i>Ardisia solanacea</i> Roxb.	S	Myrsinaceae	Kuntikaya
16	<i>Argyrea nervosa</i> (Burm. f.) Boj.	Cl	Convolvulaceae	Samudrapala
17	<i>Arisaema tortuosum</i> (Wall.) Schott	H	Araceae	Pamu kanda
18	<i>Artocarpus lacucha</i> Buch.-Ham.	T	Moraceae	Nakkarenu
19	<i>Arundo donax</i> L.	Cl	Poaceae	Kakiveduru
20	<i>Atalantia monophylla</i> (L.) Corr.	S	Rutaceae	Karunimma
21	<i>Barleria strigosa</i> Willd.	H	Acanthaceae	
22	<i>Bidens pilosa</i> L.	H	Asteraceae	
23	<i>Blechnum orientale</i> L.	H	Blechnaceae	
24	<i>Blumea mollis</i> (D.Don) Merr.	H	Asteraceae	
25	<i>Boehmeria glomerulifera</i> L.	H	Urticaceae	
26	<i>Boehmeria macrophylla</i> Hornem.	H	Urticaceae	Keringa
27	<i>Brachiaria ramosa</i> (L.) Stapf.	H	Poaceae	Eduro gaddi
28	<i>Bridelia airy-shawii</i> P.T.Li	T	Euphorbiaceae	Cluytia
29	<i>Bridelia pubescens</i> Kurz	T	Euphorbiaceae	
30	<i>Callicarpa tomentosa</i> (L.) Murr.	T	Verbenaceae	Sanka Gochi
31	<i>Canscora diffusa</i> (Vahl) R. Br.	H	Gentianaceae	
32	<i>Canthium dicoccum</i> (Gaertn.) Teijsm. & Binn.	T	Rubiaceae	Alli
33	<i>Carmona retusa</i> (Vahl) Masam.	S	Cordiaceae	Bapanaburri
34	<i>Catunaregum tomentosa</i> (DC.) Tirv.	S	Rubiaceae	Kotuvagochh
35	<i>Cayratia pedata</i> (Lam.) Gagnep.	Cl	Vitaceae	
36	<i>Celtis tetrandra</i> Roxb.	T	Ulmaceae	Jabjabal
37	<i>Centella asiatica</i> (L.) Urban	H	Apiaceae	Saraswati aku
38	<i>Chionanthus macrophylla</i> Blume	T	Oleaceae	Kurwa
39	<i>Chlorophytum arundinaceum</i> Baker	H	Liliaceae	Kusala
40	<i>Chromolaena odorata</i> (L.) King & Robinson	S	Asteraceae	Kampurodda
41	<i>Cipadessa baccifera</i> (Roth.) Miq.	S	Meliaceae	Phaladonda
42	<i>Cissampelos pareira</i> L.	Cl	Menispermaceae	Tingi teeva
43	<i>Citrus medica</i> L.	T	Rutaceae	Lungamu
44	<i>Clausena heptaphylla</i> (Roxb.) Wt. & Arn.	S	Rutaceae	Kondakarive-paku
45	<i>Cleidion javanicum</i> Blume	T	Euphorbiaceae	
46	<i>Cleistanthus patulus</i> (Roxb.) Muell.-Arg.	T	Euphorbiaceae	Jiguru
47	<i>Clematis gouriana</i> DC	Cl	Ranunculaceae	Gowrikuntala
48	<i>Clematis smilacifolia</i> Wall.	Cl	Ranunculaceae	Budia mal
49	<i>Clerodendrum viscosum</i> Vent.	S	Verbenaceae	Bommala-marri
50	<i>Coffea arabica</i> L.	S	Rubiaceae	Coffee
51	<i>Colebrookea oppositifolia</i> J.E.Sm.	S	Lamiaceae	
52	<i>Colocasia esculenta</i> (L.) Schott. & Endl.	H	Araceae	Chamadumpa
53	<i>Commelina benghalensis</i> L.	H	Commelinaceae	Amruthakada
54	<i>Commelina maculata</i> Edgew.	H	Commelinaceae	
55	<i>Corallocarpus epigaeus</i> (Rottl. & Willd.) Cl.	Cl	Cucurbitaceae	Kakidonda
56	<i>Costus speciosus</i> (Koen.) Sm.	H	Costaceae	Bogachika
57	<i>Crinum latifolium</i> L.	H	Amarylladaceae	
58	<i>Curculigo trichocarpa</i> (Baker) Hook.f.	H	Hypoxidaceae	Nakkudumpa
59	<i>Curcuma pseudomantana</i> Graham	H	Zingiberaceae	
60	<i>Cyanotis cristata</i> (L.) Don	H	Commelinaceae	Eggoli

	Species	Habit	Family	Vernacular name
61	<i>Cyathea gigantea</i> (Wall. ex Hook.) Holttum	T	Cyatheaceae	Pedda kollem
62	<i>Cymbidium aloifolium</i> (L.) Sw.	H	Orchidaceae	
63	<i>Cynanchum callialatum</i> Wt.	Cl	Asclepiadaceae	
64	<i>Cynodon dactylon</i> (L.) Pers.	H	Poaceae	Gariki
65	<i>Cynoglossum zeylanicum</i> (Hornem.) Lehm.	H	Boraginaceae	
66	<i>Cyperus cyperinus</i> Suring.	H	Cyperaceae	
67	<i>Cyrtococcum oxyphyllum</i> (Steud.) Stapf	H	Poaceae	
68	<i>Dactyloctenium aegyptium</i> (L.) Beauv.	H	Poaceae	Ganuku gaddi
69	<i>Dalbergia lanceolaria</i> L. f.	Cl	Fabaceae	Yerra pachari
70	<i>Debregeasia longifolia</i> (Burm. f.) Wedd.	T	Urticaceae	Kerangi
71	<i>Dendrobium aphyllum</i> (Roxb.) Fisch.	H	Orchidaceae	
72	<i>Desmodium gangeticum</i> (L.) DC.	S	Fabaceae	Kolakuponna
73	<i>Dioscorea bulbifera</i> L.	Cl	Dioscoriaceae	Pendlam
74	<i>Dioscorea oppositifolia</i> L.	Cl	Dioscoriaceae	Niru Dumpa
75	<i>Dioscorea tomentosa</i> Spreng.	Cl	Dioscoriaceae	
76	<i>Diospyros ovalifolia</i> Wt.	T	Ebenaceae	Kukka Tumiki
77	<i>Dolichos trilobus</i> L.	H	Fabaceae	Pillipesara
78	<i>Drymaria cordata</i> (L.) Roem. & Schult.	H	Caryophyllaceae	
79	<i>Duranta plumeri</i> Jacq.	S	Verbenaceae	
80	<i>Ecbolium viride</i> (Forssk.) Alston	H	Acanthaceae	
81	<i>Ehretia acuminata</i> var. <i>serrata</i> R. Br.	T	Cordiaceae	Bochchuchettu
82	<i>Elaeocarpus tectorius</i> (Lour.) Poir.	T	Elaeocarpaceae	Dippamanu
83	<i>Elephantopus scaber</i> L.	H	Asteraceae	Hastapadi
84	<i>Eragrostis atrovirens</i> (Desf.) Steud.	H	Poaceae	
85	<i>Eranthemum purpurascens</i> Nees	H	Acanthaceae	
86	<i>Erioglossum rubiginosum</i> Bl.	T	Sapindaceae	Ishirasi
87	<i>Erythrina suberosa</i> Roxb.	T	Fabaceae	Mullu Moduga
89	<i>Ficus auriculata</i> Lour.	T	Moraceae	Racha Bodda
88	<i>Ficus elastic</i> Roxb.	T	Moraceae	Rubber tree
90	<i>Ficus hispida</i> L.f.	T	Moraceae	Bodda
91	<i>Ficus microcarpa</i> L.f.	T	Moraceae	Konda juvvi

	Species	Habit	Family	Vernacular name
92	<i>Ficus semicordata</i> Sm.	T	Moraceae	Erubodda
93	<i>Firmiana colorata</i> (Roxb.) R.Br.	T	Sterculiaceae	Karu boppaja
94	<i>Gardenia latifolia</i> Ait.	T	Rubiaceae	Pedda bikki
95	<i>Garuga pinnata</i> Roxb.	T	Burseraceae	Garuga
96	<i>Globba marantina</i> L.	H	Zingiberaceae	Kalingarastra Gadda
97	<i>Glochidion velutinum</i> Wt.	T	Euphorbiaceae	
98	<i>Gnetum ula</i> Brongn.	Cl	Gnetaceae	Lollodu teega
99	<i>Gomphostemma parviflorum</i> Benth.	H	Lamiaceae	
100	<i>Gynura lycopersifolia</i> DC.	H	Asteraceae	Pottari
101	<i>Habenaria plantaginea</i> Lindl.	H	Orchidaceae	
102	<i>Haldinia cordifolia</i> (Roxb.) Ridsd.	T	Rubiaceae	Kamba
103	<i>Heliotropium bracteatum</i> R.Br.	H	Boraginaceae	
104	<i>Hemionitis arifolia</i> (Burm.f.) T. Moore	H	Adiantaceae	Rama banam
105	<i>Homalium nepaulense</i> Benth.	T	Flacourtiaceae	Tella chettu
106	<i>Homonoia riparia</i> Lour.	S	Euphorbiaceae	
107	<i>Hybanthus ennaespermus</i> (L.) F.V. Muell.	H	Violaceae	Ratnapurusa
108	<i>Hydrocotyle sibthorpioides</i> Lam.	H	Apiaceae	
109	<i>Indigofera cassioides</i> DC.	H	Fabaceae	Kondaneeli
110	<i>Jasminum angustifolium</i> Vahl	Cl	Oleaceae	Adavi malli
111	<i>Kydia calycina</i> Roxb.	T	Malvaceae	Konda patti
112	<i>Lantana camara</i> L.	S	Verbenaceae	Gaju pulu
113	<i>Laportea crenulata</i> Gaud.	S	Urticaceae	Yenugu davadalu
114	<i>Lasia spinosa</i> (L.) Thw.	H	Araceae	
115	<i>Lasiodocca comberi</i> Haine	T	Euphorbiaceae	
116	<i>Leea indica</i> (Burm.f.) Merr.	T	Leeaceae	
117	<i>Lindernia anagallis</i> (Burm.f.) Pennell	H	Schrophulariaceae	
118	<i>Lindernia antipoda</i> (L.) Alston	H	Schrophulariaceae	
119	<i>Lipocarpa chinensis</i> (Osbeck) Kern.	H	Cyperaceae	
120	<i>Luisia zeylanica</i> Lindl.	H	Orchidaceae	
121	<i>Lygodium flexuosum</i> (L.) Sw.	Cl	Schizaceae	Adavi satavari
122	<i>Macaranga peltata</i> (Roxb.) Muell.-Arg.	T	Euphorbiaceae	Konda tamara
123	<i>Malaxis rheedii</i> Sw.	H	Orchidaceae	Jivadumpa
124	<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	T	Euphorbiaceae	Sindhuram

	Species	Habit	Family	Vernacular name
125	<i>Malvastrum coromandelianum</i> (L.) Garcke	H	Malvaceae	
126	<i>Mangifera indica</i> L.	T	Anacardiaceae	Mamidi
127	<i>Manilkara hexandra</i> (Roxb.) Dubard.	T	Sapotaceae	Pala Chettu
128	<i>Maytenus hookeri</i> Loes.	T	Celastraceae	
129	<i>Melastoma malabathricum</i> L.	S	Melastomataceae	Niti danimma
130	<i>Michelia champaca</i> L.	T	Magnoliaceae	Sampangi
131	<i>Micrococca mercurialis</i> (L.) Benth	H	Euphorbiaceae	
132	<i>Millettia racemosa</i> (Wt. & Arn.) Benth	Cl	Fabaceae	Kudai goch
133	<i>Mimosa pudica</i> L.	H	Mimosaceae	Attipatti
134	<i>Murdannia nudiflora</i> (L.) Brenan	H	Commelinaceae	
135	<i>Murraya paniculata</i> (L.) Jack.	S	Rutaceae	Puvelaga
136	<i>Musa rosacea</i> Jacq.	H	Musaceae	Konda arati
137	<i>Naringi crenulata</i> (Roxb.) Nicols.	T	Rutaceae	Torruvelaga
138	<i>Neolitsea cassia</i> (L.) Kosterm.	T	Lauraceae	Mori
139	<i>Nervilia aragoana</i> Gaud.	H	Orchidaceae	Ontelud-umpa
140	<i>Nervilia plicata</i> (Andr.) Schltr.	H	Orchidaceae	
141	<i>Ophiorrhiza chandrasekharanii</i> Subba Rao & Kumari	H	Rubiaceae	
142	<i>Oplisminus burmanii</i> (Retz.) Beauv.	H	Poaceae	Kodijuttu gaddi
143	<i>Oroxylum indicum</i> (L.) Vent.	T	Bignoniaceae	Pampini
144	<i>Orthosiphon rubicundus</i> (D. Don) Benth.	H	Lamiaceae	Poda tulasi
145	<i>Oxalis corniculata</i> L.	H	Oxalidaceae	Pulichinta
146	<i>Oxalis latifolia</i> HBK	H	Oxalidaceae	
147	<i>Parabaena sagittata</i> Miers	Cl	Menispermaceae	
148	<i>Pennisetum pedicellatum</i> Trin.	H	Poaceae	
149	<i>Peperomia dindigulensis</i> Miq.	H	Piperaceae	
150	<i>Peperomia tetraphylla</i> (Forst.f.) Hook. & Arn.	H	Piperaceae	
151	<i>Phoebe wightii</i> Meissn.	T	Lauraceae	
152	<i>Phyllanthus airy-shawii</i> Jean F. Brunel & J.P. Roux	H	Euphorbiaceae	
153	<i>Phyllanthus emblica</i> L.	T	Euphorbiaceae	Usiri
154	<i>Pilea melastomoides</i> (Poir.) Wedd.	H	Urticaceae	Dongorbhori
155	<i>Piper longum</i> L.	Cl	Piperaceae	Pippallu
156	<i>Piper trioicum</i> Roxb.	Cl	Piperaceae	Mirialu

	Species	Habit	Family	Vernacular name
157	<i>Plectranthus mollis</i> (Ait.) Spreng.	H	Lamiaceae	
158	<i>Pleopeltis macrocarpa</i> (Bory ex Willd.) Kaulf.	H	Polypodiaceae	
159	<i>Pogostemon benghalensis</i> (Burm.f.) O. Ktze.	H	Lamiaceae	Dumbadal
160	<i>Polygonum barbatum</i> var. <i>gracile</i> L.	H	Polygonaceae	
161	<i>Polygonum chinense</i> L.	H	Polygonaceae	Kuna mokka
162	<i>Protium serratum</i> (Cilebr.) Engl.	T	Burseraceae	Busi
163	<i>Psidium gaujava</i> L.	T	Myrtaceae	Jama
164	<i>Psychotria monticola</i> Kurz.	H	Rubiaceae	
165	<i>Pteris vittata</i>	H	Pteridaceae	
166	<i>Pterocarpus marsupium</i> Roxb.	T	Fabaceae	Yegisa
167	<i>Remusatia vivipara</i> (Roxb.) Schott.	H	Araceae	
168	<i>Rhaphidophora decursiva</i> (Roxb.) Schott.	Cl	Araceae	Athukula chettu
169	<i>Rhopalephora scaberrima</i> (Bl.) Faden	H	Commelinaceae	
170	<i>Rhynchosyilis retusa</i> (L.) Bl.	H	Orchidaceae	
171	<i>Rotala densiflora</i> (Roem. & Schult.) Koehne	H	Lythraceae	
172	<i>Rubia cordifolia</i> L.	H	Rubiaceae	Mangala katti
173	<i>Rubus ellipticus</i> Sm.	S	Rosaceae	Gedapallu
174	<i>Sapium eugeniifolium</i> Hook.f.	T	Euphorbiaceae	
175	<i>Schefflera stellata</i> (Gaertn.) Roxb.	Cl	Araliaceae	Reval
176	<i>Schleichera oleosa</i> (Lour) Oken	T	Sapindaceae	Karaka busi
177	<i>Selaginella involvens</i> (Swartz) Spring	H	Selaginellaceae	Sanjivani
178	<i>Setaria pumila</i> (Poir.) Roem. & Schult.	H	Poaceae	Nakkatoka gaddi
179	<i>Sida acuta</i> Burm.f.	H	Malvaceae	Polikampa
180	<i>Sloanea sterculiacea</i> (Benth.) Rehder & Wilson	T	Sterculiaceae	
181	<i>Smilax zeylanica</i> L.	Cl	Smilacaceae	Kummari tivva
182	<i>Solanum erianthum</i> D. Don	S	Solanaceae	
183	<i>Solanum giganteum</i> Jacq.	S	Solanaceae	
184	<i>Solanum nigrum</i> L.	H	Solanaceae	Kamanchi
185	<i>Sorghum halepense</i> (L.) Pers.	H	Poaceae	Gaddi jonna
186	<i>Spermadictyon suaveolens</i> Roxb.	T	Rubiaceae	

	Species	Habit	Family	Vernacular name
187	<i>Spilanthes paniculata</i> DC.	H	Asteraceae	Pippannu puvvu
188	<i>Stachytarpheta urticaefolia</i> (Salisb.) Sims	H	Verbenaceae	
189	<i>Stemona tuberosa</i> Lour.	H	Stemaneaceae	Adavi tamara
190	<i>Synadenium grantii</i> Hook.f.	S	Euphorbiaceae	
191	<i>Synedrella nodiflora</i> (L.) Gaertn.	H	Asteraceae	
192	<i>Talinum portulacifolium</i> (Forsk.) Asch. & Schweinf.	H	Portulacaceae	Ceylone bachali
193	<i>Terminalia bellerica</i> (Gaertn.) Roxb.	T	Combretaceae	Tani
194	<i>Tetrastigma lanceolarium</i> (Roxb.) Planch.	Cl	Vitaceae	Gummadi-baddu
195	<i>Thalictrum foliolosum</i> DC.	H	Ranunculaceae	

Habit: Cl - Climber; H - Herb; S - Shrub; T - Tree

	Species	Habit	Family	Vernacular name
196	<i>Thunbergia fragrans</i> Roxb.	Cl	Acanthaceae	
197	<i>Thysanolaena maxima</i> Nees	H	Poaceae	Konda chipuru
198	<i>Toona cilata</i> Roem.	T	Meliaceae	Gali manu
199	<i>Uncaria sessilifructus</i> Roxb.	Cl	Rubiaceae	
200	<i>Vanda tessellata</i> (Roxb.) Don	H	Orchidaceae	Vega badanika
201	<i>Vanda testacea</i> (Lindl.) Reichb.f.	H	Orchidaceae	
202	<i>Viola betonicifolia</i> J.E. Sm.	H	Violaceae	
203	<i>Vitex leucoxylon</i> L.f.	T	Verbenaceae	Konda vavili
204	<i>Walsura trifoliata</i> (A. Juss.)	T	Meliaceae	Yerra valudu
205	<i>Xylia xylocarpa</i> (Roxb.) Taub.	T	Mimosaceae	Konda Tangedu
206	<i>Zanthoxylum armatum</i> DC.	T	Rutaceae	Tumburu
207	<i>Zingiber roseum</i> (Roxb.) Roscoe	H	Zingiberaceae	Rajuladumpa

be examined and there is an urgent need to preserve and acknowledge the efforts of the people of this area in preserving other sacred patches of forest as important areas of local biodiversity.

## REFERENCES

- Anthwal, A., R.C. Sharma & A. Sharma (2006). Sacred groves: traditional way of conserving plant diversity in Garhwal Himalaya, Uttaranchal. *Journal of American Science* 2(2): 35–38.
- Champion, H.G. & S.K. Seth (1968). Revised survey of forest types of India. Government of India Press, Delhi, India, 117pp.
- Chandrashekhara, U.M. & S. Sankar (1998). Ecology and management of sacred grove in Kerala, India. *Forest Ecology and Management* 112: 165–177; [http://dx.doi.org/10.1016/S0378-1127\(98\)00326-0](http://dx.doi.org/10.1016/S0378-1127(98)00326-0)
- Gadgil, M. & V.D. Vartak (1975). Sacred groves of India: a plea for continued conservation. *Journal of the Bombay Natural History Society* 72: 314–320.
- Gamble, J.S. & C.E.C. Fischer (1915–1936). *Flora of the Presidency of Madras* 3 Volumes. London, Rep. ed. 1957. Calcutta.
- Ganesan, S., M. Ponnuchamy, L. Kesavan & A. Selvaraj (2009). Floristic composition and practices on the selected sacred groves of Palapatty Village (Reserved forest), Tamil Nadu. *Indian Journal of Traditional Knowledge* 8(2): 154–162.
- Hooker, J.D. (1872–1897). The flora of British India, 7 Vol. L. Reeve & Co., London, 425–842pp.
- IUCN (2014). IUCN Red List of Threatened Species. Version 2014.1. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 17 June 2014.
- Jadhav, S.N. & K.N. Reddy (2006). Threatened medicinal plants of Andhra Pradesh. ENVIS-SDNP special issue, 18–28pp.
- Jain, S.K & R.R. Rao (1977). *A Handbook of Field and Herbarium Methods*. Today and Tomorrow printers, BSI, Calcutta, 157pp.
- Jamir, S.A. & H.N. Pandey (2003). Vascular plant diversity in the sacred groves of Jaintia hills in northeast India. *Biodiversity and Conservation* 12: 1497–1510.
- Khullar, P. (1992). Conservation of biodiversity in natural forest through preservation plots-A historical perspective. *Indian forester* 118(5): 337.
- Lakshminarayana, K. & M. Venkaiah (1998). Biodiversity in the sacred groves of the north coastal districts of Andhra Pradesh. National symposium on conservation of Eastern Ghats, 52–58pp.
- Pullaiah, T & S. Kuruppusamy (2008). *Flora of Andhra Pradesh - Vol. 5*. Scientific Publishers, New Delhi, 83pp.
- Rao, B.R.P., M.V.S. Babu, M.S. Reddy, V.S. Rao, S. Sunitha & K.N. Ganesaiah (2011). Sacred groves in sothern Eastern Ghats, India: Are they better managed than forest reserves? *Tropical Ecology* 52(1): 79–90.
- Rao, J.P., M.T. Naidu, P.P. Murty & M. Venkaiah (2010). Diversity of vascular plants in the sacred grove of Uppa from Eastern Ghats, Visakhapatnam District in Andhra Pradesh. *Journal of the Indian Botanical Society* 89(3&4): 406–411.
- Rao, K.C., B.L. Geetha & S. Geetha (2003). Red List of Threatened Vascular Plant Species in India. Botanical Survey of India, Howrah, 43pp.
- Rao, G.V.S & G.R. Kumari (2002–2008). *Flora of Visakhapatnam District - 2 Volumes*. Botanical Survey of India, Kolkata, 612pp.
- Rao, P. (1996). Sacred groves and conservation. *WWF India* (Quart.) 7: 4–7.
- Rawat, M., H.B. Vasista, R.K. Manhas & M. Negi (2011). Sacred forest of Kunjapuri Siddhapeet, Uttarakhand, India. *Tropical Ecology* 52(2): 219–211.
- Reddy, K.N. & C.S. Reddy (2008). First red list of medicinal plants of Andhra Pradesh, India-conservation assessment and management planning. *Ethnobotanical leaflets* 12: 103–107.
- Sambandan, K. & N. Dhatchanamoorthy (2012). Studies on the phytodiversity of a sacred grove and its traditional uses in Karaikal District, U.T. Puducherry. *Journal of Phytology* 4(2): 16–21.
- Sujana, K.A. & C. Sivaperuman (2008). Status and Conservation of threatened flora in selected sacred groves of Coastal Kerala. *Eco News* 14(2): 6–10.
- Sunitha, S. & B.R.P. Rao (1999). Sacred groves in Kurnool district, Andhra Pradesh, pp. 367–373. In: Sivadasan, M. & P. Mathew (eds.). *Biodiversity, Taxonomy and Conservation of Flowering Plants*. Mentor Publishers, Calicut.
- Venkaiah, M. (2004). *Studies on Vegetation and Flora of Vizianagaram District, Andhra Pradesh*. Andhra University Press, Visakhapatnam, 214pp.

