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Journal of Threatened Taxa



Open Access

10.11609/jott.2025.17.10.27551-27786

www.threatenedtaxa.org

26 October 2025 (Online & Print)

17(10): 27551-27786

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)





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

Publisher
Wildlife Information Liaison Development Society
www.wild.zooreach.org

Host
Zoo Outreach Organization
www.zooreach.org

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Cover: A Warty Hammer Orchid *Drakaea livida* gets pollinated by a male thynnine wasp through 'sexual deception' — a colour pencil reproduction of photos by ron_n_beths (flickr.com) and Rod Peakall; Water colour reproduction of Flame Lily *Gloriosa superba* — photo by Passakoran_14; and a bag worm and its architectural genius (source unknown). Art work by Pannagarsi G.



Pterocarpus santalinus L.f. (Magnoliopsida: Fabales: Fabaceae) associated arboreal diversity in Seshachalam Biosphere Reserve, Eastern Ghats of Andhra Pradesh, India

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Abstract: The present study was carried out to assess the arboreal diversity associated with *Pterocarpus santalinus* in the Seshachalam Biosphere Reserve, southern Eastern Ghats of Andhra Pradesh, India. A total of 118 tree species (>10 cm GBH), belonging to 88 genera, and 41 families were enumerated in the study area. Among 118 species, 92 were deciduous, 23 were evergreen, and three were semi-evergreen. Of the total species, 13 were common, 39 were occasional, and 66 were found to be rare in occurrence. The family Fabaceae is dominant with 20 species, followed by Rubiaceae with 12 species, Combretaceae & Rutaceae, each with six species, and Anacardiaceae & Malvaceae each with five species. Of the total, 12 species were IUCN Red Listed, and 16 were endemic, which indicates that there is a need for their conservation and management.

Keywords: Conservation, deciduous, endemic, evergreen, IUCN Red List, occasional, rare, semi-evergreen.

Editor: A.J. Solomon Raju, Andhra University, Visakhapatnam, India.

Date of publication: 26 October 2025 (online & print)

Citation: Kumar, B.S., A.M. Reddy, C. Nagendra, M.V.S. Babu, N.R. Reddy, V.J.S. Rani & S. Sunitha (2025). *Pterocarpus santalinus* L.f. (Magnoliopsida: Fabales: Fabaceae) associated arboreal diversity in Seshachalam Biosphere Reserve, Eastern Ghats of Andhra Pradesh, India. *Journal of Threatened Taxa* 17(10): 27661–27674. <https://doi.org/10.11609/jott.9786.17.10.27661-27674>

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Funding: Andhra Pradesh State Biodiversity Board (APSBB), Government of Andhra Pradesh, India.

Competing interests: The authors declare no competing interests.

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Author contributions: BSK involved in field work, data collection, photographs and manuscript writing, AMR involved in the plan of work, conducted field work and compiled the manuscript. CN and NRR involved in the field work and data collection, MVS involved in analysis, VJSR and SS involved in the field work and herbarium preparation.

Acknowledgments: We thank the Andhra Pradesh State Biodiversity Board (APSBB) for their monetary assistance and the Andhra Pradesh State Forest Department for granting the necessary permissions to conduct fieldwork in the forests.



INTRODUCTION

Trees form the backbone of the Earth's ecosystems, emphasizing their ecological significance in shaping the environment. Several scientists have given different definitions for a tree. According to Lawrence (1962), all woody plants that reach a height of at least 3 m, and have a single stem with a definite crown shape can be considered trees. Ford-Robertson (1971) stated that a tree is typically large. Crystal (1997) mentions a self-supporting stem as an extra feature. Quite a few sources refer to the minimum size of a tree, a height of 3 m (Deliška & Manoilov 2004), or a diameter of 12.7 cm, and a height of 4.6 m (Helms 1998). Allaby (1998) gives a minimum height of more than 10 m. International tree and shrub definitions use similar characteristics to specify the features of trees and shrubs (UNECE/FAO 2000; FAO 2004). Based on the above definitions, a tree has three main features: it is a perennial woody plant with a single main stem, or a coppice of several stems, and has a more or less definite crown. The trees differ from other plants in having cambium tissue that accounts for the woody nature of the stem (Gschwantner et al. 2009). Trees support biodiversity by creating habitats for innumerable species and forming complex relationships that sustain life across various ecosystems. Trees provide the basic needs of human beings in the form of air, food, timber, paper, fuel wood, and medicine (Pullaiah & Rani 1999).

The floristic studies play an important role in biodiversity conservation, ecosystem management, environmental monitoring & impact assessment, research, education, and public awareness. Floristic studies carried out by several workers (Ellis 1966; Pullaiah & Rani 1999; Madhava et al. 2008; Reddy et al. 2009; Babu & Rao 2010; Reddy et al. 2019) have not provided any information on trees that are close associates of *Pterocarpus santalinus*. In this context, the present study was contemplated to provide information on trees associated with *P. santalinus* in the Seshachalam Biosphere Reserve, Eastern Ghats of Andhra Pradesh, India.

MATERIALS AND METHODS

Study area

Seshachalam Biosphere Reserve is located in the Seshachalam hill ranges and lies between 13.011° N, 79.002° E, and 13.015° N, 79.007° E, spread across two districts, Kadapa and Chittoor, in the Eastern Ghats

of southern Andhra Pradesh, India (Image 1). The vegetation type is deciduous (Champion & Seth 1968), and the forest reserve bearing *P. santalinus* trees is grouped as 5A/C2 (Sudhakar 2012). To undertake activities relating to biodiversity conservation and development of sustainable management aspects, the areas are demarcated into three interrelated zones: a) core zone, the central part of the reserve covering an area of 750.589 km² which is completely free from human habitation, remains undisturbed, and spread over 183 compartments; b) buffer or manipulation zone, covers an area of 1,865.156 km² spread over 455 forest compartments. The outer boundary of the core zone forms the inner boundary of the buffer zone, and the outer boundary of the forest compartment forms the outer boundary of the buffer zone; and c) the transition or restoration zone covers an area falling within a 5-km radius from the outer boundary of the buffer zone and spread over 41 forest beats. The study area has a typical monsoonal climate with three distinct seasons: summer, rainy, and winter. The summer is warm to extremely hot with minimum temperatures ranging from 9.7–25 °C and maximum temperatures ranging from 26–46°C. The area receives moderate to heavy rainfall with a mean of 690–760 mm. The winter is mild, pleasant, and cooler with temperatures ranging from 13–25°C. The Eastern Ghats belt is commonly referred to as the Eastern Ghat granulite belt in the geological nomenclature. The Archaean or peninsular gneisses dominate the rock formation in the study area, consisting of sandstones, limestones, and shales with granite intrusions. The soil is red ferruginous loam, shallow, and nutrient-poor with a mixture of loose boulders of varying sizes in the hills & deep valleys, and certain areas are covered with prominent quartzite outcrops.

Methodology

The present data is an outcome of field research carried out as part of phytosociological studies in the red sandal natural forest sites of Seshachalam Biosphere Reserve in 2021–2024. All the tree species of ≥ 10 cm girth at breast height (GBH) were enumerated from 100 quadrates of size 31.7 x 31.7 m. The collected specimens were identified with the help of the 2nd edition of Flora of Andhra Pradesh Vol I to IV (Pullaiah et al. 2018a,b) and Flora of Presidency of Madras (J.S Gamble 1915–1934). Later, the herbarium was prepared according to the standard methodology described by Santapu (1955) and Jain & Rao (1977). Finally, the voucher specimens were deposited in the Department of Botany, Yogi Vemana University, Kadapa. The list of angiosperm tree species

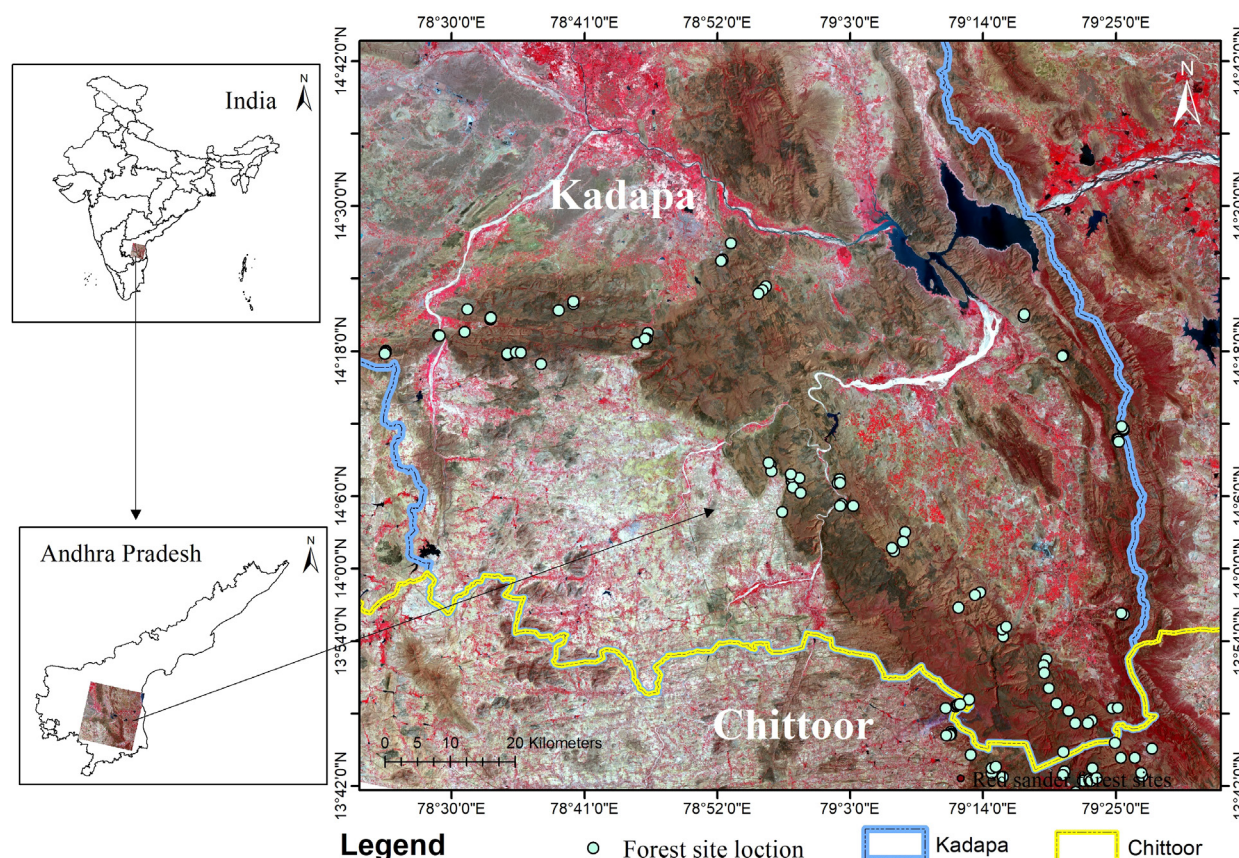


Image 1. Location map of the study area (Seshachalam Biosphere Reserve).

associated with *P. santalinus* were tabulated according to the latest Angiosperm Phylogeny Group (Chase et al. 2016) system of classification, specifying the family, nature of trees, voucher number, and distribution in the study sites (Table 1).

RESULTS AND DISCUSSION

The present study recorded 118 species belonging to 88 genera and 41 families (Table 1; Images 1–5). The top 10 dominant families are: Fabaceae with 11 genera and 18 tree species (17%) followed by Rubiaceae with 10 genera, and 12 species (10%), Rutaceae with six genera, and six species (5%), Combretaceae with one genus, and six species (5%), Anacardiaceae with four genera, and five species (4%), Malvaceae with three genera, and five species (4.3%), Euphorbiaceae & Lamiaceae each with four genera, and four species (3.5% each) while the families, Apocynaceae & Phyllanthaceae each with three genera, and four species (3.4% each). Four families, Burseraceae, Celastraceae, Meliaceae, and Rhamnaceae, were represented by three

species each. Ten families, Annonaceae, Arecaceae, Boraginaceae, Dipterocarpaceae, Ebenaceae, Loganiaceae, Melastomataceae, Moraceae, Salicaceae, and Sapotaceae, were represented by two species each. Seventeen families, Bignoniaceae, Bixaceae, Capparaceae, Clusiaceae, Cornaceae, Cycadaceae, Erythroxylaceae, Hernandiaceae, Lauraceae, Lecythidaceae, Lythraceae, Myrtaceae, Ochnaceae, Oleaceae, Poaceae, Santalaceae, and Sapindaceae were represented by one species each..

Floristic studies carried out by different researchers showed variations in the dominance of angiosperm families in different forest areas of India. Kadavul & Parthasarathy (1999) reported that Moraceae, Euphorbiaceae, and Verbenaceae families were dominant in a tropical semi-evergreen forest of Kalrayan Hills. Chittibabu & Parthasarathy (2000) reported that Moraceae, Lauraceae, and Euphorbiaceae were the dominant families in evergreen forest sites of Kolli Hills. Reddy et al. (2007, 2008) documented that Rubiaceae and Euphorbiaceae were dominant in the tropical forest of Similipal Biosphere Reserve, Odisha, and in the tropical dry deciduous forest of southern Andhra

Table 1. List of *Pterocarpus santalinus* L.f. associated arboreal diversity in Seshachalam Biosphere Reserve, India.

	Name of the taxon/family	Nature	Voucher number	Occurrence
Annonaceae				
1	<i>Miliusa tomentosa</i> (Roxb.) Finet & Gagnep.	Deciduous	5290	Rare
2	<i>Polyalthia cerasoides</i> (Roxb.) Bedd.	Semi-evergreen	5244	Rare
Hernandiaceae				
3	<i>Gyrocarpus americanus</i> Jacq.	Deciduous	0274	Rare
Lauraceae				
4	<i>Actinodaphne madraspatana</i> Bedd. ex Hook.f.	Evergreen	5101	Rare
Arecaceae				
5	<i>Phoenix loureiroi</i> Kunth.	Evergreen	5347	Rare
6	<i>Phoenix sylvestris</i> (L.) Roxb.	Evergreen	5348	Rare
Poaceae				
7	<i>Bambusa vulgaris</i> Schrad.	Deciduous	5349	Rare
Fabaceae				
8	<i>Acacia catechu</i> (L.f.) Willd.	Deciduous	5353	Occasional
9	<i>Acacia chundra</i> (Rottl.) Willd.	Deciduous	5354	Occasional
10	<i>Acacia concinna</i> Wall.	Deciduous	-	Rare
11	<i>Albizia amara</i> (Roxb.) Boivin	Deciduous	5350	Rare
12	<i>Albizia lebbek</i> (L.) Willd	Deciduous	5351	Rare
13	<i>Albizia odoratissima</i> (L.f.) Benth.	Evergreen	4629	Rare
14	<i>Bauhinia purpurea</i> L.	Deciduous	5352	Rare
15	<i>Bauhinia racemosa</i> Vahl	Deciduous	0563	Rare
16	<i>Cassia fistula</i> L.	Deciduous	0359	Occasional
17	<i>Cassia siamea</i> Lam.	Deciduous	-	Rare
18	<i>Dalbergia paniculata</i> Roxb.	Deciduous	4614	Occasional
19	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Deciduous	-	Rare
20	<i>Hardwickia binata</i> Roxb.	Deciduous	5209	Occasional
21	<i>Leucaena leucocephala</i> (Lam.) de Wit	Deciduous	-	Rare
22	<i>Pterocarpus marsupium</i> Roxb.	Deciduous	5281	Rare
23	<i>Pterocarpus santalinus</i> L.f.	Deciduous	5208	Common
24	<i>Senna spectabilis</i> (DC.) H.S.Irwin & Barneby	Deciduous	-	Rare
25	<i>Tamarindus indica</i> L.	Evergreen	5355	Rare
Moraceae				
26	<i>Ficus arnottiana</i> (Miq.) Miq.	Deciduous	5356	Rare
27	<i>Ficus hispida</i> L.f.	Deciduous	5357	Rare
Rhamnaceae				
28	<i>Ziziphus mauritiana</i> Lam.	Deciduous	5327	Rare
29	<i>Ziziphus oenopolia</i> (L.) Mill.	Deciduous	5228	Occasional
30	<i>Ziziphus xylopyrus</i> (Retz.) Willd.	Deciduous	5358	Common
Celastraceae				
31	<i>Elaeodendron glaucum</i> (Rottb.) Pers.	Evergreen	5313	Occasional
32	<i>Maytenus emarginata</i> (Willd.) Ding Hou	Deciduous	5329	Common
33	<i>Pleurostylia opposita</i> (Wall.) Alston	Semi-evergreen	5274	Rare
Clusiaceae				
34	<i>Garcinia</i> sp.	Evergreen	-	Rare

	Name of the taxon/family	Nature	Voucher number	Occurrence
	Erythroxylaceae			
35	<i>Erythroxylum monogynum</i> Roxb.	Evergreen	5315	Common
	Euphorbiaceae			
36	<i>Cleistanthus collinus</i> (Roxb.) Benth. ex Hook.f.	Deciduous	5271	Occasional
37	<i>Croton scabiosus</i> Bedd.	Deciduous	5213	Occasional
38	<i>Givotia moluccana</i> (L.) Sreem.	Deciduous	5359	Rare
39	<i>Macaranga peltata</i> Müll.Arg.	Evergreen	5360	Rare
	Ochnaceae			
40	<i>Ochna obtusata</i> DC.	Deciduous	0481	Common
	Phyllanthaceae			
41	<i>Bridelia retusa</i> (L.) A. Juss.	Deciduous	5279	Occasional
42	<i>Glochidion velutinum</i> Wight	Evergreen	5289	Rare
43	<i>Phyllanthus indofischeri</i> Bennet	Deciduous	5273	Occasional
44	<i>Phyllanthus polyphyllus</i> Willd.	Deciduous	5272	Occasional
	Salicaceae			
45	<i>Flacourtia indica</i> (Burm.f.) Merr.	Deciduous	5319	Rare
46	<i>Homalium zeylanicum</i> (Gardner) Benth.	Evergreen	5261	Rare
	Combretaceae			
47	<i>Terminalia alata</i> Roth	Deciduous	5106	Occasional
48	<i>Terminalia anogeissiana</i> Gere & Boatwr.	Deciduous	5212	Common
49	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Deciduous	5264	Rare
50	<i>Terminalia chebula</i> Retz.	Deciduous	5339	Common
51	<i>Terminalia crenulata</i> Roth	Deciduous	5295	Rare
52	<i>Terminalia pallida</i> Brandis	Deciduous	5325	Occasional
	Lythraceae			
53	<i>Lagerstroemia parviflora</i> Roxb.	Deciduous	5331	Rare
	Melastomataceae			
54	<i>Memecylon umbellatum</i> Benth.	Evergreen	-	Rare
	Myrtaceae			
55	<i>Syzygium alternifolium</i> (Wight) Walp.	Deciduous	5233	Occasional
	Anacardiaceae			
56	<i>Buchanania axillaris</i> (Desr.) Ramamoorthy	Deciduous	5342	Occasional
57	<i>Buchanania lanzan</i> Spreng.	Evergreen	-	Rare
58	<i>Lannea coromandelica</i> (Houtt.) Merr.	Deciduous	-	Occasional
59	<i>Mangifera indica</i> L.	Evergreen	5361	Rare
60	<i>Semecarpus anacardium</i> L.f.	Evergreen	-	Rare
	Burseraceae			
61	<i>Boswellia ovalifoliolata</i> N.P. Balakr. & A.N. Henry	Deciduous	5210	Rare
62	<i>Boswellia serrata</i> Roxb.	Deciduous	4862	Occasional
63	<i>Commiphora caudata</i> (Wight & Arn.) Engl.	Deciduous	5211	Occasional
	Meliaceae			
64	<i>Azadirachta indica</i> A. Juss.	Semi-evergreen	5362	Rare
65	<i>Soyimida febrifuga</i> (Roxb.) A. Juss.	Deciduous	5134	Occasional
66	<i>Walsura trifoliolata</i> (A. Juss.) Harms	Evergreen	5257	Rare
	Rutaceae			

	Name of the taxon/family	Nature	Voucher number	Occurrence
67	<i>Atalantia monophylla</i> (L.) DC.	Deciduous	0282	Rare
68	<i>Aegle marmelos</i> (L.) Corrêa	Deciduous	-	Rare
69	<i>Chloroxylon swietenia</i> DC.	Deciduous	5224	Common
70	<i>Limonia acidissima</i> L.	Deciduous	-	Rare
71	<i>Murraya koenigii</i> (L.) Spreng.	Deciduous	5308	Occasional
72	<i>Naringi crenulata</i> (Roxb.) Nicolson	Deciduous	0281	Rare
Sapindaceae				
73	<i>Sapindus emarginatus</i> Vahl	Deciduous	0715	Rare
Bixaceae				
74	<i>Cochlospermum palakondense</i>		5176	Rare
75	<i>Cochlospermum religiosum</i> (L.) Alston	Deciduous	5225	Occasional
Dipterocarpaceae				
76	<i>Shorea roxburghii</i> G. Don	Deciduous	5075	Rare
77	<i>Shorea tumbuggaia</i> Roxb.	Deciduous	5298	Rare
Malvaceae				
78	<i>Grewia hirsuta</i> Vahl	Deciduous	5218	Common
79	<i>Grewia flavescens</i> Juss.	Deciduous	-	Rare
80	<i>Grewia orbiculata</i> Rottler	Deciduous	5227	Common
81	<i>Grewia tiliifolia</i> Vahl	Deciduous	5140	Occasional
82	<i>Pterospermum xylocarpum</i> (Gaertn.) Oken.	Evergreen	5300	Rare
83	<i>Sterculia urens</i> Roxb.	Deciduous	5160	Occasional
Capparaceae				
84	<i>Maerua apetala</i> (B. Heyne ex Roth) M. Jacobs	Deciduous	0418	Occasional
Santalaceae				
85	<i>Santalum album</i> L.	Evergreen	5243	Rare
Cornaceae				
86	<i>Alangium salviifolium</i> (L.f.) Wangerin	Deciduous	5270	Rare
Ebenaceae				
87	<i>Diospyros chloroxylon</i> Roxb.	Evergreen	5307	Rare
88	<i>Diospyros melanoxylon</i> Roxb.	Deciduous	4891	Occasional
Lecythidaceae				
89	<i>Careya arborea</i> Roxb.	Deciduous	5334	Rare
Sapotaceae				
90	<i>Madhuca longifolia</i> (J. Koenig ex L.) J.F. Macbr.	Deciduous	5223	Occasional
91	<i>Manilkara hexandra</i> (Roxb.) Dubard	Evergreen	-	Rare
Apocynaceae				
92	<i>Carissa spinarum</i> L.	Deciduous	-	Occasional
93	<i>Holarrhena pubescens</i> Wall. ex G. Don	Deciduous	5292	Occasional
94	<i>Wrightia arborea</i> (Dennst.) Mabb.	Deciduous	-	Rare
95	<i>Wrightia tinctoria</i> R.Br.	Deciduous	5262	Occasional
Loganiaceae				
96	<i>Strychnos nux-vomica</i> L.	Deciduous	5306	Rare
97	<i>Strychnos potatorum</i> L.f.	Deciduous	5216	Occasional
Rubiaceae				
98	<i>Adina cordifolia</i> (Roxb.) Brandis	Deciduous	5287	Occasional

	Name of the taxon/family	Nature	Voucher number	Occurrence
99	<i>Canthium coromandelicum</i> (Burm.f.) Alston	Deciduous	-	Occasional
100	<i>Catunaregum spinosa</i> (Thumb.) Tirv.	Deciduous	-	Common
101	<i>Ceriscoides turgida</i> (Roxb.) Tirveng.	Deciduous	5263	Rare
102	<i>Deccania pubescens</i> (Roth) Tirveng.	Deciduous	5265	Occasional
103	<i>Gardenia gummifera</i> L.f.	Deciduous	5320	Common
104	<i>Gardenia latifolia</i> Schltld. ex Hook.f.	Deciduous	-	Occasional
105	<i>Gardenia resinifera</i> Roth.	Deciduous	5322	Rare
106	<i>Ixora pavetta</i> Andrews	Deciduous	5234	Occasional
107	<i>Morinda pubescence</i> Buch.-Ham.	Deciduous	5221	Occasional
108	<i>Psydrax dicoccos</i> Gaertn.	Evergreen	5296	Occasional
109	<i>Wendlandia gamblei</i> Cowan	Deciduous	-	Rare
Boraginaceae				
110	<i>Cordia monoica</i> Roxb.	Deciduous	-	Rare
111	<i>Ehretia aspera</i> Willd.	Deciduous	5204	Rare
Bignoniaceae				
112	<i>Dolichandrone atrovirens</i> (Roth) K. Schum.	Deciduous	5255	Common
Lamiaceae				
113	<i>Gmelina arborea</i> Roxb. ex Sm.	Deciduous	0326	Rare
114	<i>Premna tomentosa</i> Willd.	Deciduous	5267	Rare
115	<i>Tectona grandis</i> L.f.	Deciduous	-	Rare
116	<i>Vitex altissima</i> L.f.	Deciduous	0472	Occasional
Oleaceae				
117	<i>Schrebera swietenoides</i> Roxb.	Deciduous	5268	Rare
Cycadaceae				
118	<i>Cycas beddomei</i> Dyer	Evergreen	4701	Rare

Pradesh. Euphorbiaceae, Rubiaceae, and Moraceae families have been reported to be dominant in tropical hill forests of southern Eastern Ghats (Pragasam & Parthasarathy 2010), in the Seshachalam hill ranges of Andhra Pradesh (Babu & Rao 2010), and in the Chittoor East & West forest divisions of southern Andhra Pradesh (Rao et al. 2011). Fabaceae, Rubiaceae, and Euphorbiaceae have been reported to be dominant in the northern Andhra Pradesh, India (Reddy et al. 2011), and in the northcentral Eastern Ghats, Andhra Pradesh (Naidu et al. 2018). Fabaceae and Rubiaceae have been reported to be dominant in the northern Andhra Pradesh (Naidu & Kumar 2015), and these two families along with Meliaceae have been documented to be dominant in the tropical moist deciduous forests of Odisha (Sahoo et al. 2020). The present study shows that the most dominant family is Fabaceae in the study area. The dominance of this family has also been reported in other forest areas of Eastern Ghats of Andhra Pradesh by Reddy et al. (2011), Naidu & Kumar (2015), and Naidu

et al. (2018), and in deciduous forests of Neotropical regions by Gentry (1995), Gillespie et al. (2000), Killeen et al. (1998), and Sampaio (1995). Although the Rutaceae family was ranked third in the present study, none of the studies above showed its dominance (one of the top three ranks). Parthasarathy & Karthikeyan (1997) mentioned that Rutaceae, which ranked fifth in their study, is one of the important families in the tropical deciduous forests of India. The dominant plant families reported are similar in most of the studies, due to the presence of the same phytogeographic pattern.

The present study indicates that the majority of the tree species of Fabaceae, Rubiaceae, and Rutaceae are close associates of *P. santalinus* in the Seshachalam Biosphere Reserve. Vegetation-wise analysis of 118 tree species revealed that 80% of them are deciduous, 17% evergreen, and 3% semi-evergreen. Of the total species, 13 are common, 39 are occasional, and 66 are rare in occurrence (Table 1).

IUCN Red List and endemic taxa associated with *P. santalinus*

Of the total 118 tree species recorded, two are 'Near Threatened' (*Aegle marmelos* and *Pterocarpus marsupium*), six 'Vulnerable' (*Boswellia ovalifoliolata*, *Chloroxylon swietenia*, *Phyllanthus indofischeri*, *Santalum album*, *Shorea roxburghii*, and *Terminalia pallida*), and five 'Endangered' (*Cycas beddomei*, *Pterocarpus santalinus*, *Shorea tumbuggaia*, and *Syzygium alternifolium*) (IUCN 2025). A total of 16 endemic species were recorded from the study area. Of these, four are endemic to Andhra Pradesh (*Boswellia ovalifoliolata*, *Cycas beddomei*, *Syzygium alternifolium*, and *Terminalia pallida*), five endemic to the Eastern Ghats occur in Andhra Pradesh (*Actinodaphne madraspatana*, *Croton scabiosus*, *Pterocarpus santalinus*, *Shorea tumbuggaia*, and *Wendlandia gamblei*), and remaining are endemic to Peninsular India (*Deccania pubescens*, *Dolichandrone atrovirens*, *Maerua apetala*, *Ochna obtusata*, *Phyllanthus indofischeri*, *Polyalthia cerasoides* and *Shorea roxburghii*) (Ahmedullah & Nayar 1986; Reddy & Raju 2008).

CONCLUSION

The present study shows that there is rich and varied tree flora in close association with *Pterocarpus santalinus* in the Seshachalam Biosphere Reserve. The most dominant families include Fabaceae, Rubiaceae, and Rutaceae. Majority of the species recorded here are deciduous type with only a small fraction of evergreen or semi-evergreen ones. The study indicates that a significant number of species are under threat, with 12 species being IUCN Red Listed and 16 being endemic to the region. The status of these species indicates that there is a need for their protection in their natural sites. Given the ecological importance of *P. santalinus* and its associated species, continued monitoring, protection, and sustainable management strategies are required to safeguard the rich biodiversity of this region for future generations.

REFERENCES

- Ahmedullah, M. & M.P. Nayar (1986). *Endemic plants of the Indian region, Volume 1*. Botanical Survey of India, Calcutta, 262 pp.
- Allaby, M. (1998). *A Dictionary of Plant Sciences*. Oxford University Press, 508 pp.
- Babu, M.S. & B.R.P. Rao (2010). Diversity and quantification of trees in Seshachalam hill ranges, Eastern Ghats, India. *Indian Journal of Tropical Biodiversity* 18(2): 143–161.
- Champion, H.G. & S.K. Seth (1968). *A Revised Survey of the Forest Types of India*. Manager of Publications, Delhi, India, 606 pp.
- Chase, M.W., M.J. Christenhusz, M.F. Fay, J.W. Byng, W.S. Judd, D.E. Soltis, D.J. Mabberley, A.N., Sennikov, P.S. Soltis, P.F. Stevens & B. Briggs (2016). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants. *APG Botanical Journal of the Linnean Society* 181: 1–20. <https://academic.oup.com/botlinnean/article-lookup/doi/10.1111/boj.12385>
- Chittibabu, C.V. & N. Parthasarathy (2000). Attenuated tree species diversity in human-impacted tropical evergreen forest sites at Kolli hills, Eastern Ghats, India. *Biodiversity & Conservation* 9: 1493–1519. <https://doi.org/10.1023/A:1008971015545>
- Crystal, D. (eds.) (1997). *The Cambridge Encyclopedia*. Cambridge University Press, 1303 pp.
- Deliška, B. & P. Manoilov (2004). *Elsevier's Dictionary of Forestry*. Elsevier, Amsterdam, 1051 pp.
- Ellis, J.L. (1966). A contribution to the vascular flora of Balapalle range of Seshachellam Reserve Forest, Cuddapah district, Andhra Pradesh. *Nelumbo* 9(1): 328–340. <https://doi.org/10.20324/nelumbo/v9/1967/76133>
- FAO. (2004). Global Forest Resources Assessment update 2005 (FRA 2005): Terms and Definitions. FRA Working Paper 83/E, FAO Forestry Department, Rome, 34 pp.
- Gamble, J.S. & C.E.C. Fischer (1915–1935). *Flora of Presidency of Madras Volume 1–3*. Adlard and Son Ltd, London, UK, 112–305 pp.
- Gentry, A.H. (1995). Diversity and floristic composition of neotropical dry forests. *Seasonally Dry Tropical Forests* 1: 146–194. <https://doi.org/10.1017/CBO9780511753398.007>
- Gillespie, T.W., A. Grijalva & C.N. Farris (2000). Diversity, composition, and structure of tropical dry forests in central America. *Plant Ecology* 147: 37–47. <https://doi.org/10.1023/A:1009848525399>
- Gschwantner, T., K. Schadauer, C. Vidal, A. Lanz, E. Tomppo, L. Di Cosmo, N. Robert, D. Englert Duursma & M. Lawrence (2009). Common tree definitions for national forest inventories in Europe. *Silva Fennica* 43(2): 302–321.
- Helms, J.A. (ed.) (1998). *The Dictionary of Forestry*. CAB International: The Society of American Foresters, Wallingford, 210 pp.
- IUCN (2025). The IUCN Red List of Threatened Species. Version 2025-1. <https://www.iucnredlist.org>
- Jain, S.K. & R.R. Rao (1977). *A Handbook of Field and Herbarium Methods*. Today's and Tomorrow's Printers and Publishers, New Delhi, India, 157 pp.
- Kadavul, K. & N. Parthasarathy (1999). Structure and composition of woody species in tropical semi-evergreen forest of Kalrayan hills, Eastern Ghats, India. *Tropical Ecology* 40: 247–260.
- Killeen, T.J., A. Jardim, F. Mamani & N. Rojas (1998). Diversity, composition, and structure of a tropical semideciduous forest in the Chiquitania region of Santa Cruz, Bolivia. *Journal of Tropical Ecology* 14(6): 803–827. <https://doi.org/10.1017/S0266467498000583>
- Lawrence, G.H.M. (1962). *Taxonomy of Vascular Plants*. Scientific Publishers, Jodhpur, India, 823 pp.
- Madhava C.K., K. Sivaji & K.T. Rao (2008). *Flowering plants of Chittoor district, Andhra Pradesh, India*. Tirupati, Student Offset Printers, 600 pp.
- Naidu, M.T., D. Premavani, S. Suthari & M. Venkaiah (2018). Assessment of tree diversity in tropical deciduous forests of northcentral Eastern Ghats, India. *Geology, Ecology, and Landscapes* 2(3): 216–227. <https://doi.org/10.1080/24749508.2018.1452479>
- Naidu, M.T. & O.A. Kumar (2015). Tree species diversity in the Eastern Ghats of northern Andhra Pradesh, India. *Journal of Threatened Taxa* 7(8): 7443–7459. <https://doi.org/10.11609/JOTT.o3764.7443-59>
- Parthasarathy, N. & R. Karthikeyan (1997). Plant biodiversity inventory and conservation of two tropical dry evergreen forests on the Coromandel coast, south India. *Biodiversity & Conservation* 6: 1063–1083. <https://doi.org/10.1023/A:1018328016810>
- Pragasam, L.A. & N. Parthasarathy (2010). Landscape-level tree



Image 2 (A-H). A—*Adina cordifolia* | B—*Aegle marmelos* | C—*Anogeissus latifolia* | D—*Boswellia ovalifoliolata* | E—*Boswellia serrata* | F—*Chloroxylon swietenia* | G—*Cleistanthus collinus* | H—*Cochlospermum palakondense*. © Buchanapalli Sunil Kumar & Araveeti Madhusudhana Reddy.

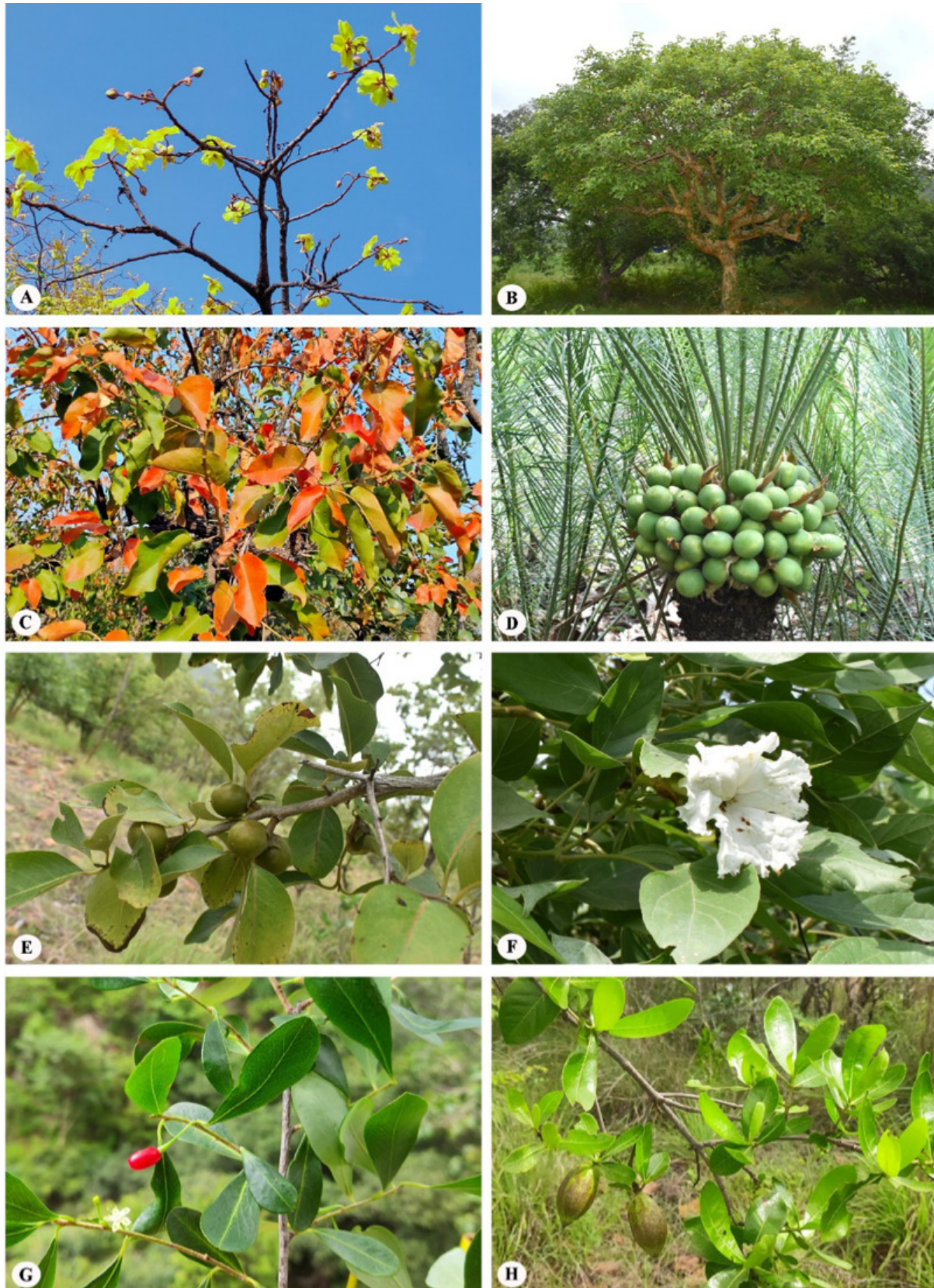


Image 3(A–H). A—*Cochlospermum religiosum* | B—*Commiphora caudata* | C—*Croton scabiosus* | D—*Cycas beddomei* | E—*Diospyros melanoxylon* | F—*Dolichandrone atrovirens* | G—*Erythroxylum monogynum* | H—*Gardenia gummifera*. © Buchanapalli Sunil Kumar & Araveeti Madhusudhana Reddy.

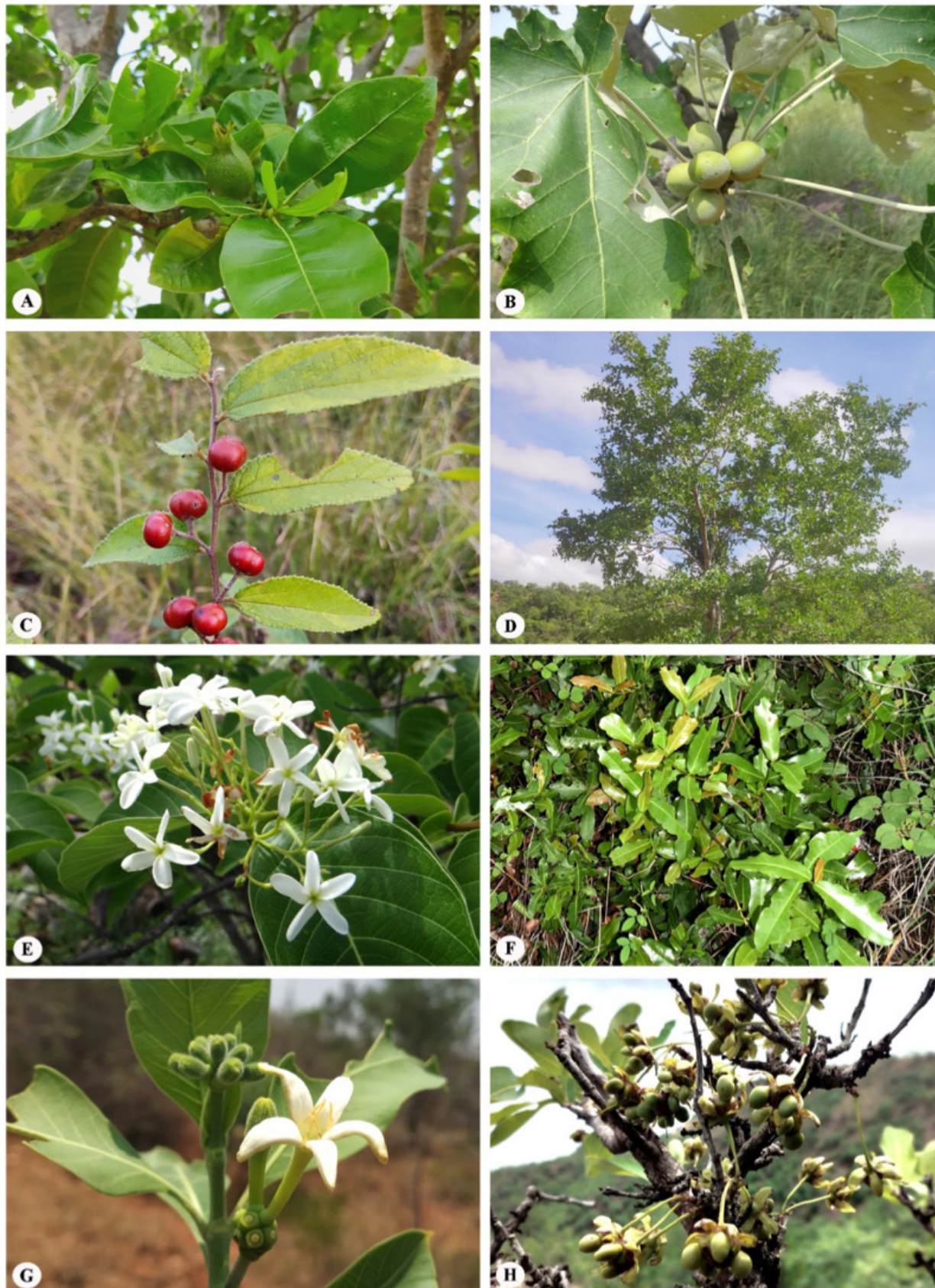


Image 4(A-H). A—*Gardenia resinifera* | B—*Givotia moluccana* | C—*Grewia hirsuta* | D—*Hardwickia binata* | E—*Holarrhena pubescens* | F—*Ixora pavetta* | G—*Morinda pubescens* | H—*Ochna obtusata*. © Buchanapalli Sunil Kumar & Araveeti Madhusudhana Reddy.



Image 5(A-H). A—*Phoenix sylvestris* | B—*Phyllanthus indofischeri* | C—*Phyllanthus polyphyllus* | D—*Polyalthia cerasoides* | E—*Pterocarpus marsupium* | F—*Pterocarpus santalinus* | G—*Santalum album* | H—*Shorea talura*. © Buchanapalli Sunil Kumar & Araveeti Madhusudhana Reddy.

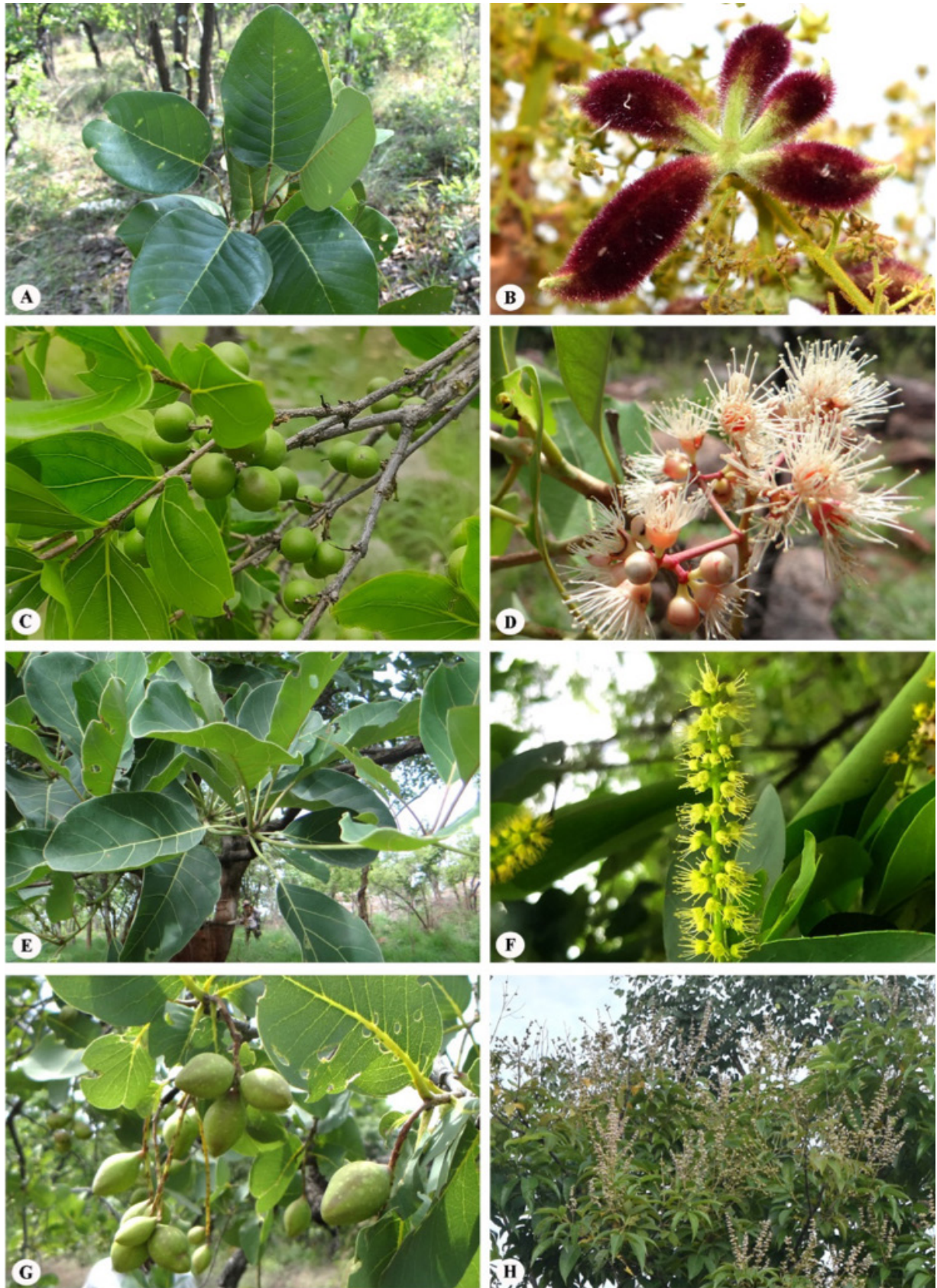


Image 6(A–H). A—*Shorea tumbergia* | B—*Sterculia urens* | C—*Strychnos potatorum* | D—*Syzygium alternifolium* | E— *Terminalia bellirica* | F—*Terminalia chebula* | G—*Terminalia pallida* | H—*Vitex altissima*. © Buchanapalli Sunil Kumar & Araveeti Madhusudhana Reddy.

- diversity assessment in tropical forests of southern Eastern Ghats, India. *Flora-Morphology, Distribution, Functional Ecology of Plants* 205(11): 728–737. <https://doi.org/10.1016/j.flora.2010.04.011>
- Pullaiah, T., E. Chennaiah & S.S. Rani (eds.) (2018a). *Flora of Andhra Pradesh. Volume 1*. Scientific Publishers, Jodhpur, 397 pp.
- Pullaiah, T. & K.S.R. Murthy (eds.) (2018). *Flora of Andhra Pradesh. Volume 2*. Scientific Publishers, Jodhpur, 399–835 pp.
- Pullaiah, T. & S. Karuppusamy (eds.) (2018). *Flora of Andhra Pradesh. Volume 3*. Scientific Publishers, Jodhpur, 839–1305 pp.
- Pullaiah, T., D.A. Moulali & S.S. Rani (eds.) (2018b). *Flora of Andhra Pradesh. Volume 4*. Scientific Publishers, Jodhpur, 1317–1831 pp.
- Pullaiah, T. (eds.) (2018). *Flora of Andhra Pradesh. Volume 5*. Scientific Publishers, Jodhpur, 1833–2363 pp.
- Pullaiah, T. & S.S. Rani (1999). *Trees of Andhra Pradesh, India*. Regency Publications, New Delhi, India, 470 pp.
- Rao, B.R.P., M.S. Babu, M.S. Reddy, A.M. Reddy, V.S. Rao, S. Sunitha & K.N. Ganeshaiah (2011). Sacred groves in southern Eastern Ghats, India: are they better managed than forest reserves? *Tropical Ecology* 52(1): 79–90.
- Reddy, A.M., M.V.S. Babu & R.R. Rao (2019). Ethnobotanical study of traditional herbal plants used by local people of Seshachalam Biosphere Reserve in Eastern Ghats, India. *Herba Polonica* 65(1): 40–54.
- Reddy, C.S., C. Pattanaik, A. Mohapatra & A.K. Biswal (2007). Phytosociological observations on tree diversity of tropical forest of Similipal Biosphere Reserve, Orissa, India. *Taiwania* 52(4): 352–359. [https://doi.org/10.6165/tai.2007.52\(4\).352](https://doi.org/10.6165/tai.2007.52(4).352)
- Reddy, C.S. & V.S. Raju (2008). Endemic spermatophytes of Andhra Pradesh, India. *Proceedings of Andhra Pradesh Akademi of Sciences* 12: 48–75 pp.
- Reddy, C.S., S.B. Shilpa Babar, A. Giriraj, K.N. Reddy & K.T. Rao (2008). Structure and floristic composition of tree diversity in tropical dry deciduous forest of Eastern Ghats, southern Andhra Pradesh, India. *Asian Journal of Scientific Research* 1(1): 57–64.
- Reddy, C.S., K.N. Reddy, E.N. Murthy & V.S. Raju (2009). Tree wealth of Eastern Ghats of Andhra Pradesh, India: an updated checklist. *Check List* 5(2): 173–194. <https://doi.org/10.15560/5.2.173>
- Reddy, C.S., S. Babar, G. Amarnath & C. Pattanaik (2011). Structure and floristic composition of tree stand in tropical forest in the Eastern Ghats of northern Andhra Pradesh, India. *Journal of Forestry Research* 22: 491–500. <https://doi.org/10.1007/s11676-011-0193-5>
- Robertson, F.C.F. (1971). *Terminology of Forest Science: Technology, Practice and Products: English-language Version*. Society of American Foresters, xxii + 349 pp.
- Sahoo, T., L. Acharya & P.C. Panda (2020). Structure and composition of tree species in tropical moist deciduous forests of Eastern Ghats of Odisha, India, in response to human-induced disturbances. *Environmental Sustainability* 3(1): 69–82. <https://doi.org/10.1007/s42398-020-00095-0>
- Sampaio, E.S.B. (1995). Overview of the Brazilian caatinga. *Seasonally Dry Tropical Forests* 35–63. <https://cir.nii.ac.jp/crid/1571417124668610944>
- Santapau, H. (1955). *Botanical Collector's Manual*. Government Press, New Delhi, 62 pp.
- Sudhakar, G. (2012). Seshachalam Biosphere Reserve–Deccan South, India. *Compendium on Indian Biosphere Reserve, Progression during two decades of Conservation*. Ministry of Environment & Forests, New Delhi, 178–183.
- UNECE/FAO (2000). Forest resources of Europe, CIS, North America, Australia, Japan, and New Zealand. Global forest resources assessment 2000. Main report. Geneva Timber and Forest Study, papers, No. 17. United Nations. New York and Geneva, 467 pp.

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Print copies of the Journal are available at cost. Write to:
The Managing Editor, JoTT,
c/o Wildlife Information Liaison Development Society,
3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore,
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Journal of Threatened Taxa is indexed/abstracted in Bibliography of Systematic Mycology, Biological Abstracts, BIOSIS Previews, CAB Abstracts, EBSCO, Google Scholar, Index Copernicus, Index Fungorum, JournalSeek, National Academy of Agricultural Sciences, NewJour, OCLC WorldCat, SCOPUS, Stanford University Libraries, Virtual Library of Biology, Zoological Records.

NAAS rating (India) 5.64



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

October 2025 | Vol. 17 | No. 10 | Pages: 27551–27786

Date of Publication: 26 October 2025 (Online & Print)

DOI: 10.11609/jott.2025.17.10.27551-27786

www.threatenedtaxa.org

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