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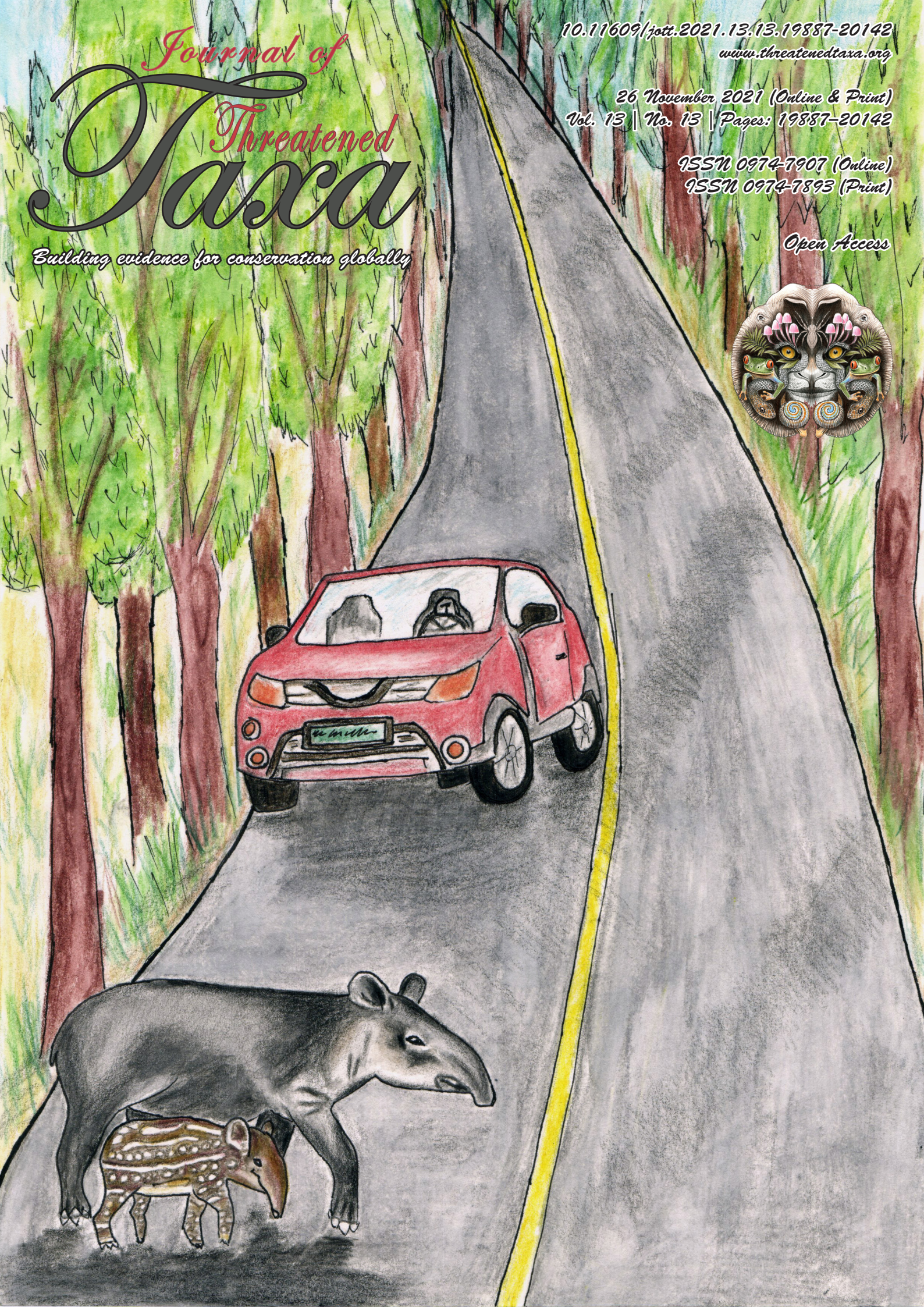

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Caption: Lowland Tapir *Tapirus terrestris* (Medium—watercolours on watercolour paper) © Aakanksha Komanduri.

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COMMUNICATION

The woody flora of Shettihalli Wildlife Sanctuary, central Western Ghats of Karnataka, India - A checklist

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Abstract: Documenting the biodiversity of protected areas and reserve forests is important to researchers, academicians and forest departments in their efforts to establish policies to protect regional biodiversity. Shettihalli Wildlife Sanctuary (SWS) is an important protected area located in the central Western Ghats of Karnataka state known for its diverse flora and fauna with distinct ecological features. For the last four decades the sanctuary has witnessed the loss of forest cover, yet the vegetation in few locations is relatively undisturbed. The current inventory was undertaken during 2019–2020 to provide a checklist of woody species from SWS under-researched earlier. The list comprises 269 species of trees, lianas and shrubs distributed in 207 genera and 68 families. The most diverse families are Fabaceae, Moraceae, Rubiaceae, Rutaceae, Lauraceae, Apocynaceae, Meliaceae, Malvaceae, Phyllanthaceae, and Anacardiaceae, representing 48% of total woody flora. The sanctuary shelters 263 native and six exotic plant species. Thirty-nine species were endemic to the Western Ghats, five species to peninsular India and one species to the Western Ghats and Andaman & Nicobar Islands. Four forest types, i.e., dry deciduous, moist deciduous, semi-evergreen, and evergreen forests, are represented in the sanctuary. Of the total species, only seven occurred in all forest types, while 111 species are exclusive to a single forest type. One-hundred-and-four taxa were assessed for the International Union for Conservation of Nature & Natural Resources (IUCN) Red List. Ten species that fall under Near Threatened, Vulnerable, and Endangered categories were encountered occasionally. The baseline data generated on plant diversity will be useful in highlighting the importance of these forests for species conservation and forest management. Such data form a cornerstone for further research. For instance, to understand the effect of invasive species and human impacts on the diversity of the region.

Keywords: Disturbance, endemic species, forest types, IUCN status, lianas, shrubs, trees.

Abbreviations: AN – Andaman & Nicobar Islands; DD – Data Deficient; DDF – tropical dry deciduous forest; EG – Eastern Ghats; EGF – tropical evergreen forest; EN – Endangered; HIFP – Herbarium of Institute Francis Puducherry; IFP – French Institute of Pondicherry; IUCN –International Union for Conservation of Nature & Natural Resources; LC – Least Concern; MDF – tropical moist deciduous forest; NE – Not Evaluated; NT – Near Threatened; PI – Peninsular India; SEGF – tropical semi-evergreen forest; SWS – Shettihalli Wildlife Sanctuary; VU – Vulnerable; WG – Western Ghats.

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Competing interests: The authors declare no competing interests.

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INTRODUCTION

India is one of the 17 mega biodiversity countries globally (Singh et al. 2015), and the Western Ghats constitute one of the 36 biodiversity hotspots. The Western Ghats are known for their exceptional biological diversity, with a high degree of endemism (Ahamedullah & Nayar 1986; Reddy et al. 2021) and a long history of field studies within and outside protected areas. Over the past few decades, there has been growing concern about the loss of biodiversity from the hotspots subjected to numerous threats (Marchese 2015), with deforestation as the primary threat; for instance the Western Ghats lost 35% of forest cover between 1920 and 2013 (Reddy et al. 2016). On the other hand, recent reviews report that annually an average of 198 new plant species are discovered from India (Reddy et al. 2021), accounting for 10% of new plant discoveries globally. But with current extinction rates we may lose many species before documentation. Furthermore, it is necessary to assess a species based on the revised IUCN Red List criteria for effective conservation as currently protected areas experience numerous threats (IUCN 2017). In this context, it is crucial to investigate underexplored areas to identify species of importance for conservation actions.

Shettihalli Wildlife Sanctuary (SWS), one of the 25 sanctuaries of the central Western Ghats in the Shivamogga district, has undergone tremendous changes in the past. The region is home to rich plant diversity with a range of forest types due to variation in rainfall, elevation, and temperature. Over the past five decades, large areas have been cleared for hydroelectric projects, dams, plantations and agricultural operations (Anonymous 2005). A four-decadal analysis (1973–2012) of land use and land cover changes in the region reveals that the forest vegetation has declined by 21.5% (Ramachandra et al. 2013).

A review of the literature shows that botanical explorations in the Shivamogga region are poor except for the available district flora (Ramaswamy et al. 2001), the flora of Agumbe and Tirthahalli areas (Raghavan 1970; Rao & Krishnamurthy 2021) and a few ecological inventories: plant diversity of the Kaan forest in Sagar (Gunaga et al. 2015) and ethnobotanical information of Hosanagara (Shivanna & Rajakumar 2011). Specifically, the SWS was underexplored for floristic enumeration except for the only study by Ramaswamy et al. (2001), who sampled a part of the sanctuary. Therefore, this study was undertaken to document woody flora from deciduous and evergreen forests of SWS in the central Western Ghats with a note on endemic species diversity and conservation status.

MATERIALS AND METHODS

Study area

Shettihalli Wildlife Sanctuary is situated in the Malanad region of central Western Ghats, distributed over six forest ranges of three taluks in the Shivamogga district, Karnataka state, India (Figure 1). The spatial extent of SWS is 395.6 km^2 and lies between 75.167 to 75.583 longitude and 13.667 to 14.083 latitude (Anonymous 2005). It was notified in 1974 as it is of adequate ecological, faunal, floral, morphological, and zoological significance to protect wildlife and its environment. SWS experiences a tropical climate, with the mean annual precipitation that varies from 1,044 mm to 3,076 mm during the period 2010–2018 (Fick & HIjmans 2017; https://worldclim.org/). Similarly, the mean minimum and maximum temperatures range 17.50–19.38 °C and 27.76–29.92 °C, respectively. The site receives bulk rainfall during June–October, with maximum precipitation in July. March is reported as the driest month. The landscape is characterized by undulating hills with steep terrains in the western part of the sanctuary, with elevation ranging from 850 to 1,050m. The eastern slopes' terrain is plain with an elevation that starts from 600 m and experiences low rainfall and high temperature. The sanctuary has two large open water bodies (Image 1B), and acts as a catchment basin for the Kumudvathi river. Geologically, SWS consists of various rock formations of the Archean gneisses, sandstones, and granites. Soils of SWS are ferrallitic to lateritic and mostly acidic (Bourgeon 1989). The abandoned Manganese ore quarries occur in three different locations inside the sanctuary (Image 1E). The landscape is dominated by moist deciduous forest besides semi-evergreen and evergreen forests on the hilltops of the sanctuary's western side (Anonymous 2005). The sanctuary is the host for 32 enclosures and 75 villages. The people's livelihood is mainly on the agriculture and seasonal collection of forest resources, including fuelwood.

Sampling, identification, and herbarium

A reconnaissance survey was carried out in November 2018 to understand the land use and land cover types in the landscape. Botanical explorations for woody flora (trees, lianas and shrubs) were made from Feb–Mar 2019 and Oct–Nov 2020 in the study site using a random sampling approach. Efforts were made to cover the

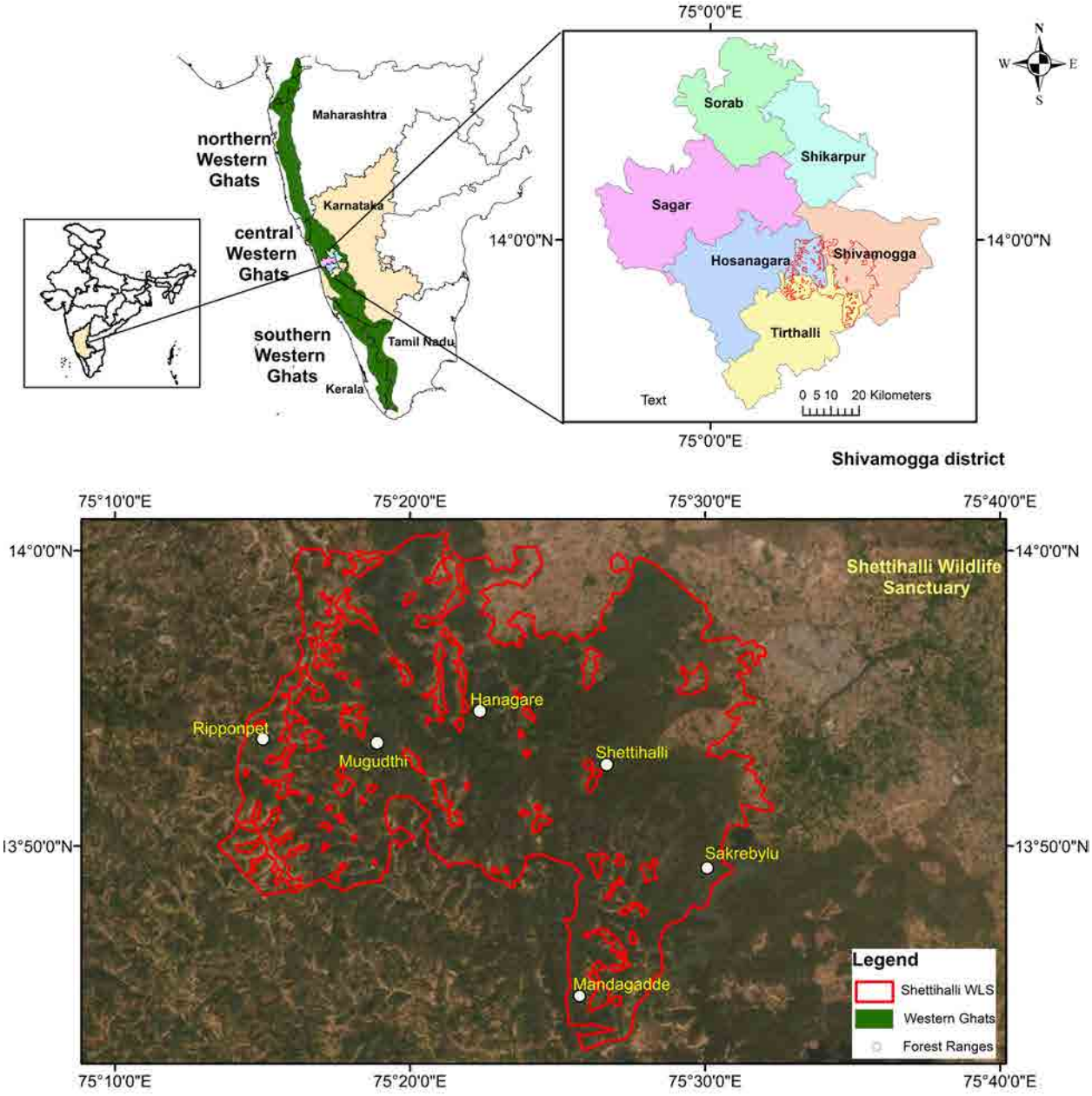

Figure 1. The geographic location of Shettihalli Wildlife Sanctuary in the central part of Western Ghats, Karnataka state.

maximum area of the region. Voucher specimens were collected, methodologically processed, and identified to the species level with assistance from botanists from IFP with expertise in the Western and Eastern Ghats flora identification (Saldanha & Nicholson 1976; Saldanha 1996; Gamble & Fischer 1915–1935; Ramaswamy et al. 2001). Species identification keys (Pascal & Ramesh 1987; Ramesh et al. 2010; http://www.biotik.org/), and specimens from the Herbier Institut Français de Pondichéry (HIFP) were used as reference. All mounted vouchers were deposited in the HIFP with the accession numbers (HIFP series). The current checklist follows APG IV classification, with the families listed alphabetically with their represented species (Chase et al. 2016). The species nomenclature was updated following Nayar et al. (2014). The endemic species distribution was assigned with the help of a published source (Singh et al. 2015), and conservation status was accessed from the IUCN (2021). Attempts were made to categorize species as common and rare, particularly for endemic and threatened species in the field.

RESULTS

Floristic diversity

This study recorded 269 woody species (trees, lianas and shrubs) belonging to 207 genera and 68 families as per the APG IV (Chase et al. 2016) classification, including three species not identified to the species level (Table 1). Of the species recorded, 269 are angiosperms and one was a gymnosperm: *Gnetum edule* (Gnetaceae). Dicots constituted the significant woody flora, with 263 species from 203 genera and 63 families, and the monocot contribution was six species belonging to seven genera and four families. Trees were represented by 184 (68%) species, followed by lianas with 67 (27%) and shrubs with 18 (7%) (Figure 2). The most diverse families include Fabaceae, Moraceae, Rubiaceae, Rutaceae, Lauraceae, Apocynaceae, Meliaceae, Malvaceae, Phyllanthaceae, and Anacardiaceae, which together represent 48% species and 46% genera of woody flora (Figure 3). The top 20 species-rich families comprised 69% (208 species) of the 269 species identified from the sanctuary. The most diverse genera include *Ficus* (13 species); *Dalbergia*, *Cissus*, *Diospyros*, and *Terminalia* (4 species each); *Artocarpus*, *Grewia*, *Holigarna*, *Jasminum*, *Litsea*, *Memecylon*, *Senna*, *Syzygium*, and *Ziziphus* (3 species each). Single species represent 174 (85.3%) genera and 30 (43.5%) families. The species diversity and dominant family composition varied among the life-forms (Table 2). Out of the 269 identified species, 263 are native to India, and six species are exotic but naturalized. Two alien invasives and *Lantana camara* and *Chromolaena odorata* (a non-woody herb to under-shrub; Image 1H), are distributed widely inside the sanctuary.

Distribution of taxa among the vegetation types

Four types of vegetation were identified from SWS, i.e., tropical dry deciduous forest (DDF), moist deciduous forest (MDF; Image 1D), semi-evergreen (SEGF; Image 1C) and evergreen forests (EGF). Taxa-wise distribution among the vegetation revealed that a maximum number of species inhabit MDF (106 species), followed by SEF (61 species), DDF (58 species), and EGF with 44 species (Table 1). Of the total species, just seven species (*Ehretia canarensis*, *Terminalia bellirica*, *Dillenia pentagyna*, *Lagerstroemia microcarpa*, *Grewia tiliifolia*, *Ziziphus oenoplia*, and *Schleichera oleosa*) occurred in all the forest types, while 111 species are exclusive to a single type of vegetation. The unique species varied greatly between 13 species from DDF to 27 to 39 species in

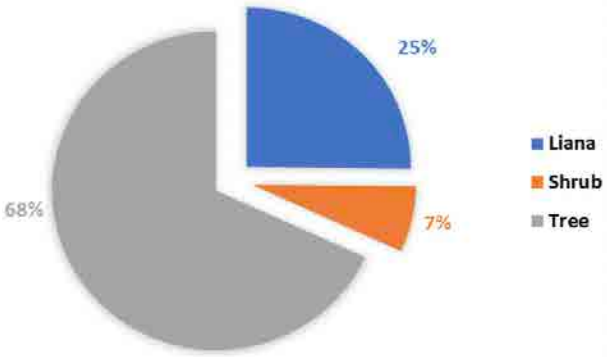

Figure 2. Percentage contribution by different plant life-forms recorded from SWS.

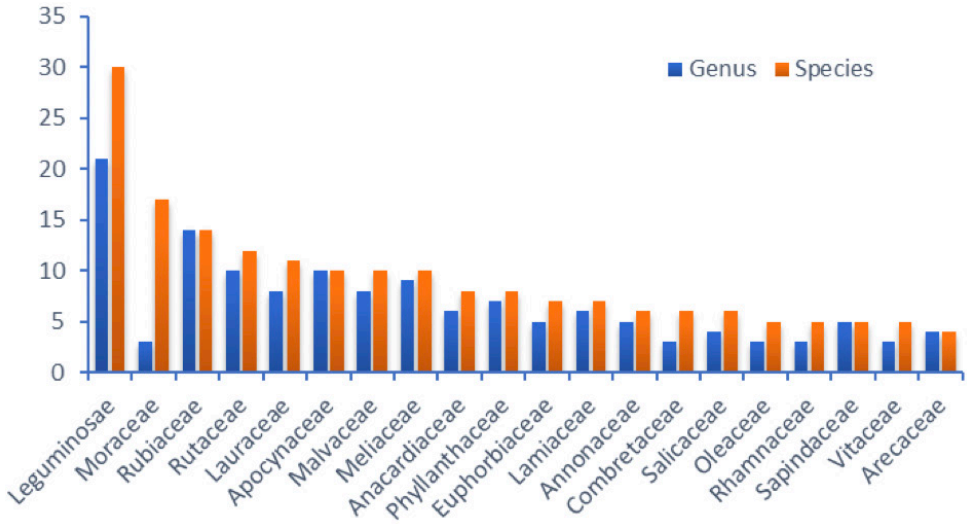

Figure 3. Top twenty families and their contribution to the genus and species richness.

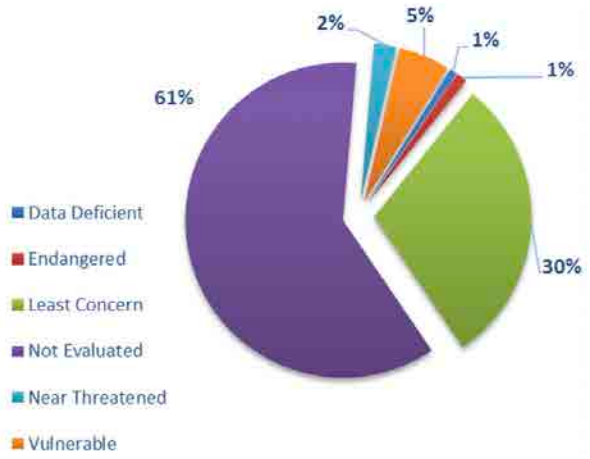

Figure 4. Percentage share of woody species of different IUCN categories from SWS.

other forest types (Table 1). Of the total liana species, *Ziziphus oenoplia* alone occurred in all forest types.

IUCN Red List categories

Out of 266 species identified to species level, only 104 (39%) are listed in the IUCN Red List assessment (Table 1; Figure 4). Categories such as Least Concern (with 79 species), Vulnerable (14), Near Threatened (six), Endangered (three), and Data Deficient (two) were listed from the study area.

Endemic distribution

From the woody flora documented from SWS, we recognized 38 species endemic to the Western Ghats, six species endemic to peninsular India and one species to the Western Ghats and Andaman & Nicobar Islands (Table 1; Images 2–5). Ninty-eight per-cent (44 species) of endemic species are reported from semi-evergreen and evergreen forest types (five and 13 species unique to SEGF and EGF, respectively). Of the 45 endemics, only two species *Ehretia canarensis* and *Lagerstroemia microcarpa,* were found in all the four vegetation types.

DISCUSSION

The study produced a comprehensive checklist of woody species of SWS, which indicates that the region is moderately diverse concerning angiosperms. The study revealed that the landscape is complex with mosaics of natural forests (dry to evergreen) to managed plantations (Teak, *Eucalyptus*, and *Acacia* species) and the human habitations surrounded by agricultural lands (Image 1G). Moist deciduous forests spread across the sanctuary, whereas semi-evergreen and evergreen forests were restricted to the western slopes of hilltops. Deciduous forests are limited to the eastern part, dominated by teak plantations.

In the present study, trees formed a major portion of the list, followed by lianas and shrubs (Figure 2). However, this can be confirmed by quantitative ecological inventories and botanical explorations in future from the region. Our results coincide with the floristic enumeration from the Agumbe region adjacent to SWS, wherein authors reported diverse woody flora (trees – 185 species; lianas – 117 species; shrubs – 62 species, Rao & Krishnamurthy 2021). Ramaswamy et al (2001) described 850 species of angiosperms from the Shivamogga district. The present checklist adds 92 woody species from SWS (69 trees, 16 lianas and seven shrubs; Table 2) to the district flora which were not reported earlier. This shows the floristic wealth of SWS and the importance of biodiversity documentation from unexplored areas. With an intensive exploration especially for herbs during the peak growing season, there is a scope for enriching the flora with new additions.

Species distribution pattern unveiled the adaptability of seven (2%) generalist species across all vegetation types despite variations in topographic, environmental and edaphic features. Similarly, 111 (44%) are specialists, exhibiting restricted distribution to other forest types might be due to the variation in micro-climatic conditions and restricted ecological niche. In our study area, the occurrence of a large number of tree populations of valuable timber species such as *Tectona grandis*, *Lagerstroemia microcarpa*, *Dalbergia latifolia* and four species of *Terminalia* portray the economic value of the forest. Of these, except *T. grandis* and *L. microcarpa,* all others are having a higher wood specific density (>0.72 g cm-3; Agarwal 1970), which is a typical value for hardwood species (as per Nogueira et al. 2005) and obviously, such species likely to contain more carbon compared to other tropical tree species. This characterizes the landscape with considerably higher carbon sequestration potential, which deserves further investigation.

Of the 10 biogeographic zones in the country, Western Ghats harbours the maximum number of endemic species (2,327 species; Reddy et al. 2021). In our study, we found 45 species that are endemic to the Western Ghats and peninsular India. Although the number is low, few species like *Lagerstroemia microcarpa*, *Terminalia paniculata*, *Flacourtia montana*, *Tabernaemontana alternifolia*, and *Cinnamomum*

Table 1. Checklist of woody species from Shettihalli Wildlife Sanctuary, central Western Ghats, India.

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
	Achariaceae					
1	*Hydnocarpus pentandrus* (Buch.-Ham.) Oken	Tree	EGF	VU	WG	HIFP 27150
	Anacardiaceae					
2	*Buchanania lanzan* Spreng.	Tree	DDF; MDF; SEGF	NE	-	HIFP 27202
3	*Holigarna arnottiana* Hook. f.	Tree	EGF; SEGF	NE	WG	HIFP 27219
4	*Holigarna beddomei* Hook. f.	Tree	EGF	NE	WG	HIFP 27256
5	*Holigarna grahamii* (Wight) Kurz	Tree	SEGF; EGF	NE	WG	SWS 41
6	*Lannea coromandelica* (Houtt.) Merr.	Tree	DDF; MDF; SEGF	LC	-	HIFP 27231
7	*Mangifera indica* L.	Tree	MDF; SEGF; EGF	DD	-	HIFP 27159
8	*Nothopegia racemosa* (Dalzell) Ramamoorthy	Tree	EGF	NE	WG	HIFP 27228
9	*Spondias pinnata* (L. f.) Kurz	Tree	MDF; SEGF	NE	-	SWS 62
	Ancistrocladaceae					
10	*Ancistrocladus heyneanus* Wall. ex J. Graham	Liana	EGF	NE	WG	HIFP 27269
	Annonaceae					
11	*Artabotrys zeylanicus* Hook. f. & Thomson	Liana	EGF	NE	-	HIFP 27270
12	*Desmos chinensis* var. lawii (Hook. f. & Thomson) Ban	Liana	DDF; MDF; SEGF	NE	-	HIFP 27304
13	*Miliusa indica* Lesch. ex A. DC.	Tree	DDF	NE	-	HIFP 27182
14	*Miliusa velutina* (Dunal) Hook. f. & Thomson	Tree	DDF	NE	-	SWS 47
15	*Polyalthia fragrans* (Dalz.) Bedd.	Tree	SEGF	NE	WG	HIFP 27170
16	*Uvaria narum* (Dunal) Wall. ex Wight & Arn.	Liana	MDF; SEGF; EGF	NE	-	HIFP 27152
	Apocynaceae					
17	*Alstonia scholaris* (L.) R. Br.	Tree	EGF; MDF; SEGF	LC	-	HIFP 27174
18	*Anodendron paniculatum* (Roxb.) A. DC.	Liana	MDF	NE	-	HIFP 27285
19	*Carissa spinarum* L. var. spinarum	Liana	SEGF	LC	-	SWS 10
20	*Chonemorpha fragrans* (Moon) Alston	Liana	SEGF	NE	-	HIFP 27298
21	*Gymnema sylvestre* (Retz.) R. Br. ex Schult.	Liana	MDF; SEGF	NE	-	HIFP 27274
22	*Holarrhena pubescens* (Buch.-Ham.) Wall. ex G. Don	Tree	DDF; MDF; SEGF	LC	-	SWS 40
23	*Ichnocarpus frutescens* (L.) W.T. Aiton	Liana	SEGF	NE	-	HIFP 27284
24	*Secamone emetica* (Retz.) R.Br. ex Schult.	Liana	SEGF	NE	-	SWS 58
25	*Tabernaemontana alternifolia* L.	Tree	MDF; SEGF	NT	WG	HIFP 27142
26	*Wrightia tinctoria* (Roxb.) R. Br.	Tree	DDF; MDF; SEGF	NE	-	HIFP 27126
	Araceae					
27	*Pothos scandens* L.	Liana	EGF	NE	-	SWS 54
	Araliaceae					
28	*Schefflera venulosa* (Wight & Arn.) Harms	Liana	SEGF	NE	-	HIFP 27286
	Arecaceae					
29	*Arenga wightii* Griff.	Tree	EGF	VU	WG	HIFP 27247
30	*Calamus gamblei* Becc. ex Becc. & Hook. f.	Liana	SEGF; EGF	NE	WG	HIFP 27309
31	*Caryota urens* L.	Tree	EGF; SEGF	LC	-	HIFP 27179
32	*Pinanga dicksonii* (Roxb.) Blume	Tree	EGF	NE	WG	SWS 52
	Asparagaceae					
33	*Asparagus racemosus* Willd.	Liana	MDF; EGF	NE	-	SWS 6
	Bignoniaceae					
34	*Dolichandrone arcuata* (Wight) C. B. Clarke	Tree	DDF	NE	PI (WG &EG)	HIFP 27196
35	*Radermachera xylocarpa* (Roxb.) K. Schum.	Tree	DDF; MDF; SEGF	NE	PI	HIFP 27157

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
36	*Stereospermum colais* (Buch.-Ham. ex Dillwyn) Mabb.	Tree	MDF; SEGF	NE	-	HIFP 27122
	Boraginaceae					
37	*Cordia dichotoma* G. Forst.	Tree	MDF; SEGF	LC	-	SWS 77
38	*Cordia macleodii* (Griff.) Hook. f. & Thomson	Tree	DDF; MDF	NE	-	HIFP 27197
39	*Ehretia canarensis* (C. B. Clarke) Gamble	Tree	DDF; MDF; SEGF; EGF	NE	PI	HIFP 27164
	Burseraceae					
40	*Canarium strictum* Roxb.	Tree	SEGF	NE	-	HIFP 27165
41	*Garuga pinnata* Roxb.	Tree	DDF; MDF	NE	-	HIFP 27117
	Calophyllaceae					
42	*Calophyllum polyanthum* Wall. ex Choisy	Tree	EGF; SEGF	NE	-	HIFP 27209
	Cannabaceae					
43	*Aphananthe cuspidata* (Blume) Planch.	Tree	SEGF	NE	-	HIFP 27120
44	*Celtis philippensis* Blanco	Tree	EGF; SEGF	LC	-	SWS 14
45	*Celtis tetrandra* Roxb.	Tree	SEGF	LC	-	SWS 15
46	*Trema orientalis* (L.) Blume	Tree	MDF; SEGF	LC	-	HIFP 27189
	Casuarinaceae					
47	*Casuarina equisetifolia* L.*	Tree	SEGF	LC	-	SWS 13
	Celastraceae					
48	*Cassine glauca* (Rottb.) Kuntze	Tree	EGF; SEGF	NE	-	SWS 12
49	*Celastrus paniculatus* Willd.	Liana	DDF; MDF; SEGF	NE	-	HIFP 27283
50	*Loeseneriella arnottiana* (Wight) A.C. Sm.	Liana	MDF; SEGF	NE	-	HIFP 27262
51	*Maytenus emarginata* (Willd.) Ding Hou	Shrub	DDF	NE	-	SWS 45
	Clusiaceae					
52	*Garcinia gummi-gutta* (L.) N. Robson	Tree	SEGF; EGF	LC	WG	HIFP 27212
53	*Garcinia morella* (Gaertn.) Desr.	Tree	SEGF	LC	-	HIFP 27241
	Combretaceae					
54	*Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr.	Tree	DDF; MDF	NE	-	SWS 4
55	*Calycopteris floribunda* (Roxb.) Lam. ex Poir.	Liana	MDF; SEGF	NE	-	HIFP 27275
56	*Terminalia bellirica* (Gaertn.) Roxb.	Tree	DDF; MDF; SEGF; EGF	LC	-	HIFP 27151
57	*Terminalia chebula* Retz.	Tree	MDF	LC	-	SWS 68
58	*Terminalia elliptica* Willd.	Tree	DDF; MDF; SEGF	NE	-	HIFP 27236
59	*Terminalia paniculata* Roth	Tree	DDF; MDF; SEGF	NE	PI	HIFP 27259
	Connaraceae					
60	*Connarus wightii* Hook. f.	Liana	SEGF; EGF	NE	WG	HIFP 27279
61	*Rourea minor* (Gaertn.) Alston	Liana	MDF; SEGF	NE	-	HIFP 27281
	Convolvulaceae					
62	*Erycibe paniculata* Roxb.	Liana	EGF	NE	-	HIFP 27261
63	*Stictocardia tiliifolia* (Desr.) Hallier f.	Liana	MDF; SEGF	LC	-	SWS 63
	Cornaceae					
64	*Alangium salviifolium* ssp. *sundanum* (Miq.) Bloemb.	Liana	MDF; SEGF; EGF	NE	-	HIFP 27263
	Dichapetalaceae					
65	*Dichapetalum gelonioides* (Roxb.) Engl.	Tree	SEGF; EGF	LC	-	HIFP 27258
	Dilleniaceae					
66	*Dillenia pentagyna* Roxb.	Tree	DDF; MDF; SEGF; EGF	NE	-	HIFP 27206

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
	Dioscoreaceae					
67	*Dioscorea hispida* Dennst.	Liana	MDF	NE	-	HIFP 27300
	Dipterocarpaceae					
68	*Dipterocarpus indicus* Bedd.	Tree	EGF	EN	WG	SWS 25
69	*Hopea ponga* (Dennst.) Mabb.	Tree	EGF	VU	WG	HIFP 27245
70	*Shorea roxburghii* G. Don	Tree	SEGF	VU	-	HIFP 27249
	Ebenaceae					
71	*Diospyros assimilis* Bedd.	Tree	MDF; SEGF; EGF	NE	PI	HIFP 27124
72	*Diospyros melanoxylon* Roxb.	Tree	DDF; SEGF	NE	-	HIFP 27130
73	*Diospyros montana* Roxb.	Tree	DDF; MDF; SEGF	NE	-	HIFP 27195
74	*Diospyros sylvatica* Roxb.	Tree	SEGF; EGF	NE	-	HIFP 27234
	Elaeagnaceae					
75	*Elaeagnus conferta* Roxb.	Liana	MDF; SEGF	LC	-	HIFP 27264
	Elaeocarpaceae					
76	*Elaeocarpus serratus* L.	Tree	MDF; SEGF; EGF	NE	-	HIFP 27235
	Erythroxylaceae					
77	*Erythroxylum monogynum* Roxb.	Tree	DDF	NE	-	SWS 27
	Euphorbiaceae					
78	*Blachia andamanica* ssp. *denudata* (Benth.) N. P. Balakr. & Chakrab.	Tree	EGF	NE	WG	HIFP 27255
79	*Croton caudatus* Geiseler	Liana	SEGF; EGF	NE	-	SWS 22
80	*Croton malabaricus* Bedd.	Tree	SEGF	NE	WG	HIFP 27149
81	*Givotia moluccana* (L.) Sreem.	Tree	DDF; MDF	NE	-	SWS 34
82	*Macaranga peltata* (Roxb.) Muell.-Arg.	Tree	MDF; SEGF; EGF	NE	-	HIFP 27204
83	*Mallotus philippensis* (Lam.) Muell.-Arg.	Tree	MDF; SEGF; EGF	LC	-	HIFP 27161
84	*Mallotus repandus* (Rottler ex Willd.) Muell.-Arg.	Shrub	SEGF	NE	-	HIFP 27292
	Gnetaceae					
85	*Gnetum edule* (Willd.) Blume	Liana	SEGF; EGF	LC	-	HIFP 27287
	Hernandiaceae					
86	*Gyrocarpus asiaticus* Willd.	Tree	EGF	NE	-	SWS 39
	Icacinaceae					
87	*Miquelia dentata* Bedd.	Liana	EGF	NE	WG	SWS 48
88	*Nothapodytes nimmoniana* (J. Graham) Mabb.	Tree	MDF; SEGF; EGF	NE	-	HIFP 27184
	Lamiaceae					
89	*Callicarpa tomentosa* (L.) Murray	Tree	EGF; MDF	NE	-	HIFP 27201
90	*Clerodendrum infortunatum* L.	Tree	EGF	NE	-	HIFP 27229
91	*Gmelina arborea* Roxb.	Tree	MDF	LC	-	SWS 36
92	*Gmelina asiatica* L.	Shrub	DDF	LC	-	SWS 37
93	*Isodon coetsa* (Buch.-Ham. ex D. Don) Kudô	Shrub	MDF	NE	-	SWS 42
94	*Tectona grandis* L. f.	Tree	DDF; MDF	NE	-	SWS 67
95	*Vitex altissima* L. f.	Tree	MDF; SEGF; EGF	NE	-	HIFP 27210
	Lauraceae					
96	*Actinodaphne angustifolia* (Blume) Nees	Tree	EGF; SEGF	LC	WG	HIFP 27251
97	*Actinodaphne tadulingamii* Gamble	Tree	EGF; SEGF	NT	WG	HIFP 27198
98	*Alseodaphne semecarpifolia* Nees	Tree	MDF; SEGF	NE	-	HIFP 27193

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
99	*Beilschmiedia wightii* (Nees) Benth. ex Hook.f.	Tree	SEGF	NT	WG	HIFP 27139
100	*Cinnamomum malabatrum* (Burm.f.) J. Presl	Tree	EGF; MDF; SEGF	LC	WG	HIFP 27178
101	*Cryptocarya wightiana* Thwaites	Tree	EGF	VU	-	HIFP 27250
102	*Litsea floribunda* (Blume) Gamble	Tree	MDF; SEGF; EGF	NT	WG	HIFP 27138
103	*Litsea ghatica* C. J. Saldanha	Tree	MDF; SEGF	VU	WG	HIFP 27137
104	*Litsea mysorensis* Gamble	Tree	MDF; SEGF	VU	WG	HIFP 27191
105	*Persea macrantha* (Nees) Kosterm	Tree	MDF; SEGF; EGF	NE	-	HIFP 27163
106	*Phoebe paniculata* (Nees) Nees	Tree	SEGF	LC	-	HIFP 27192
	Lecythidaceae					
107	*Careya arborea* Roxb.	Tree	MDF; SEGF	NE	-	SWS 9
	Fabaceae					
108	*Acacia auriculiformis* Benth.	Tree	MDF	LC	-	SWS 1
109	*Acacia caesia* (L.) Willd.	Liana	DDF; MDF; SEGF	LC	-	HIFP 27282
110	*Acacia sinuata* (Lour.) Merr.	Liana	DDF; MDF; SEGF	NE	-	HIFP 27280
111	*Albizia lebbeck* (L.) Benth.	Tree	MDF	LC	-	HIFP 27136
112	*Albizia odoratissima* (L. f.) Benth.	Tree	DDF; MDF; SEGF	LC	-	HIFP 27145
113	*Bauhinia malabarica* Roxb.	Tree	MDF; SEGF	LC	-	HIFP 27187
114	*Bauhinia racemosa* Lam.	Tree	DDF; MDF	NE	-	HIFP 27200
115	*Butea monosperma* (Lam.) Taub.	Tree	DDF; MDF	LC	-	SWS 8
116	*Caesalpinia cucullata* Roxb.	Liana	SEGF; EGF	NE	-	HIFP 27289
117	*Cassia fistula* L.	Tree	MDF; SEGF	LC	-	SWS 11
118	*Dalbergia horrida* (Dennst.) Mabb.	Liana	SEGF; EGF	NE	WG	HIFP 27302
119	*Dalbergia lanceolaria* L. f.	Tree	DDF; MDF	NE	-	SWS 23
120	*Dalbergia latifolia* Roxb.	Tree	DDF; MDF; SEGF	VU	-	SWS 24
121	*Dalbergia volubilis* Roxb.	Liana	MDF; SEGF	NE	-	HIFP 27303
122	*Derris trifoliata* Lour.	Liana	EGF	NE	-	HIFP 27276
123	*Endosamara racemosa* (Roxb.) R. Geesink	Liana	MDF	NE	-	HIFP 27295
124	*Entada rheedii* Spreng.	Liana	SEGF	NE	-	SWS 26
125	*Erythrina stricta* Roxb.	Tree	MDF	NE	-	HIFP 27143
126	*Moullava spicata* (Dalzell) Nicolson	Liana	MDF; SEGF; EGF	NE	WG	HIFP 27301
127	*Mucuna pruriens* (L.) DC.	Liana	MDF	NE	-	HIFP 27272
128	*Phyllodium pulchellum* (L.) Desv.	Shrub	MDF	LC	-	SWS 51
129	*Pongamia pinnata* (L.) Pierre	Tree	MDF; SEGF	LC	-	SWS 53
130	*Pterocarpus marsupium* Roxb.	Tree	DDF; MDF; SEGF	NT	-	SWS 55
131	*Pterolobium hexapetalum* (Roth) Santapau & Wagh	Liana	DDF	NE	-	SWS 56
132	*Senna hirsuta* (L.) H. S. Irwin & Barneby*	Shrub	MDF	NE	-	SWS 73
133	*Senna siamea* (Lam.) H. S. Irwin & Barneby	Tree	MDF	LC	-	HIFP 27154
134	*Senna tora* (L.) Roxb.	Shrub	DDF; MDF	NE	-	SWS 59
135	*Spatholobus parviflorus* (Roxb. ex DC.) Kuntze	Liana	DDF; MDF; SEGF	LC	-	HIFP 27288
136	*Tamarindus indica* L.*	Tree	DDF	LC	-	HIFP 27217
137	*Xylia xylocarpa* (Roxb.) W. Theob.	Tree	MDF; SEGF	LC	-	HIFP 27237
	Loganiaceae					
138	*Strychnos nux-vomica* L.	Tree	MDF; SEGF	LC	-	SWS 64
139	*Strychnos potatorum* L. f.	Tree	MDF	NE	-	SWS 65

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
	Lythraceae					
140	*Lagerstroemia microcarpa* Wight	Tree	DDF; MDF; SEGF; EGF	NE	WG	HIFP 27244
141	*Lagerstroemia parviflora* Roxb.	Tree	DDF	NE		SWS 43
	Magnoliaceae					
142	*Magnolia champaca* (L.) Baill. ex Pierre	Tree	SEGF	LC	-	HIFP 27127
	Malpighiaceae					
143	*Hiptage benghalensis* (L.) Kurz	Liana	MDF; SEGF	LC	-	HIFP 27277
	Malvaceae					
144	*Bomax ceiba* L.	Tree	DDF; MDF	LC	-	SWS 7
145	*Firmiana colorata* (Roxb.) R. Br.	Tree	SEGF	NE	-	HIFP 27211
146	*Grewia nervosa* (Lour.) Panigrahi	Tree	MDF	NE	-	HIFP 27169
147	*Grewia rhamnifolia* Roth	Liana	SEGF	NE	-	HIFP 27306
148	*Grewia tiliifolia* Vahl	Tree	DDF; MDF; SEGF; EGF	NE	-	HIFP 27207
149	*Helicteres isora* L.	Shrub	DDF; SEGF	NE	-	SWS 74
150	*Kydia calycina* Roxb.	Tree	MDF; SEGF	LC	-	HIFP 27223
151	*Pterospermum diversifolium* Blume	Tree	SEGF; EGF	LC	-	HIFP 27129
152	*Pterygota alata* (Roxb.) R. Br.	Tree	EGF	NE	-	HIFP 27220
153	*Sterculia guttata* Roxb. ex DC.	Tree	MDF; SEGF	NE	-	HIFP 27183
	Melastomataceae					
154	*Memecylon talbotianum* Brandis	Tree	SEGF	NE	WG	HIFP 27254
155	*Memecylon umbellatum* Burm. f.	Tree	SEGF	NE	-	HIFP 27253
156	*Memecylon wightii* Thwaites	Tree	EGF	NE	-	HIFP 27248
	Meliaceae					
157	*Aglaia elaeagnoidea* (A. Juss.) Benth.	Tree	SEGF	LC	-	HIFP 27181
158	*Aglaia lawii* (Wight) C. J. Saldanha	Tree	EGF; SEGF	LC	-	SWS 2
159	*Aphanamixis polystachya* (Wall.) R. Parker	Tree	MDF	LC	-	HIFP 27199
160	*Chukrasia tabularis* A. Juss.	Tree	MDF; SEGF	LC	-	HIFP 27185
161	*Cipadessa baccifera* (Roth) Miq.	Shrub	MDF	LC	-	SWS 18
162	*Dysoxylum malabaricum* Bedd. ex Hiern	Tree	MDF; SEGF; MDF	EN	WG	HIFP 27218
163	*Melia dubia* Cav.	Tree	MDF; SEGF	NE	-	SWS 46
164	*Reinwardtiodendron anamalaiense* (Bedd.) Mabb.	Tree	EGF	NE	WG	HIFP 27119
165	*Toona ciliata* M. Roem.	Tree	MDF	LC	-	SWS 69
166	*Trichilia connaroides* (Wight & Arn.) Bentv.	Tree	MDF; SEGF	NE	-	HIFP 27175
	Menispermaceae					
167	*Anamirta cocculus* (L.) Wight & Arn.	Liana	EGF	NE	-	SWS 3
168	*Coscinium fenestratum* (Gaertn.) Colebr.	Liana	EGF	DD	-	SWS 21
169	*Diploclisia glaucescens* (Blume) Diels	Liana	MDF; SEGF	NE	-	HIFP 27290
170	*Tinospora cordifolia* (Willd.) Miers ex Hook. f. & Thomson	Liana	MDF	NE	-	HIFP 27265
	Moraceae					
171	*Artocarpus gomezianus* ssp. *zeylanicus* Jarrett	Tree	MDF; SEGF	NE	-	HIFP 27177
172	*Artocarpus heterophyllus* Lam.	Tree	EGF; MDF; SEGF	NE	-	HIFP 27140
173	*Artocarpus hirsutus* Lam.	Tree	EGF; SEGF	LC	WG	SWS 5
174	*Ficus arnottiana* (Miq.) Miq. var. *arnottiana*	Tree	MDF	NE	-	HIFP 27230
175	*Ficus benghalensis* L.	Tree	DDF	NE	-	SWS 29

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
176	*Ficus callosa* Willd.	Tree	MDF; SEGF	NE	-	HIFP 27186
177	*Ficus drupacea* var. *pubescens* (Roth) Corner	Tree	MDF; SEGF	NE	-	HIFP 27215
178	*Ficus exasperata* Vahl	Tree	MDF	LC	-	HIFP 27224
179	*Ficus hispida* L. f.	Tree	MDF	LC	-	SWS 30
180	*Ficus microcarpa* L. f.	Tree	EGF	LC	-	HIFP 27243
181	*Ficus nervosa* B. Heyne ex Roth	Tree	SEGF; EGF	LC	-	HIFP 27146
182	*Ficus racemosa* L.	Tree	MDF	LC	-	SWS 31
183	*Ficus talbotii* King	Tree	MDF; SEGF	NE	-	HIFP 27232
184	*Ficus tinctoria* ssp. *gibbosa* (Blume) Corner	Tree	MDF	NE	-	SWS 32
185	*Ficus tsjahela* Burm.f.	Tree	MDF; SEGF	NE	-	HIFP 27225
186	*Ficus virens* Aiton	Tree	SEGF; EGF	LC	-	HIFP 27226
187	*Streblus asper* Lour.	Tree	MDF	LC	-	HIFP 27155
	Myristicaceae					
188	*Knema attenuata* (Wall.ex Hook. f. & Thomson) Warb.	Tree	SEGF	LC	WG	HIFP 27214
	Myrtaceae					
189	*Eucalyptus* sp.*	Tree	DDF	-	-	SWS 28
190	*Syzigium cumini* (L.) Skeels	Tree	MDF; SEGF; EGF	LC	-	HIFP 27188
191	*Syzygium caryophyllatum* (L.) Alston	Tree	SEGF	EN	-	HIFP 27257
192	*Syzygium laetum* (Buch. -Ham.) Gandhi	Tree	EGF	NE	WG	SWS 66
	Oleaceae					
193	*Chionanthus mala-elengi* (Dennst.) P.S. Green	Tree	EGF; MDF; SEGF	NE	PI	HIFP 27173
194	*Jasminum angustifolium* (L.) Willd.	Liana	SEGF	NE	-	HIFP 27308
195	*Jasminum flexile* Vahl	Liana	MDF; SEGF	NE	-	HIFP 27297
196	*Jasminum multiflorum* (Burm. f.) Andrews	Liana	SEGF; EGF	NE	-	HIFP 27299
197	*Olea dioica* Roxb.	Tree	MDF; SEGF; EGF	NE	-	HIFP 27158
	Opiliaceae					
198	*Cansjera rheedei* J. F. Gmel.	Liana	SEGF	NE	-	HIFP 27305
	Phyllanthaceae					
199	*Aporosa cardiosperma* (Gaertn.) Merr.	Tree	MDF; SEGF	VU	-	HIFP 27203
200	*Bischofia javanica* Blume	Tree	EGF; SEGF	LC	-	HIFP 27135
201	*Breynia retusa* (Dennst.) Alston	Shrub	SEGF	LC	-	SWS 75
202	*Bridelia stipularis* (L.) Blume	Liana	SEGF; EGF	LC	-	HIFP 27268
203	*Flueggea virosa* (Roxb. ex Willd.) Royle	Shrub	MDF	LC	-	SWS 33
204	*Glochidion ellipticum* Wight	Tree	MDF; SEGF; EGF	NE	-	HIFP 27222
205	*Glochidion* sp.	Tree	MDF	-	-	SWS 35
206	*Phyllanthus emblica* L.	Tree	DDF; MDF; SEGF	LC	-	HIFP 27208
	Piperaceae					
207	*Piper nigurm* L.	Liana	SEGF; EGF	NE	-	HIFP 27293
	Primulaceae					
208	*Ardisia solanacea* (Poir.) Roxb.	Shrub	MDF; SEGF; EGF	NE	-	HIFP 27121
209	*Maesa indica* (Roxb.) A. DC.	Tree	SEGF	LC	-	HIFP 27128
	Putranjivaceae					
210	*Drypetes confertiflora* (Hook. f.) Pax & Haffm.	Tree	EGF	NE	WG	HIFP 27133
	Rhamnaceae					
211	*Gouania microcarpa* DC.	Liana	EGF	NE	-	HIFP 27294

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
212	*Smythea bombaiensis* (Dalz.) S. P. Banerjee & P. K. Mukh.	Liana	SEGF; EGF	NE	WG	HIFP 27266
213	*Ziziphus oenoplia* (L.) Mill.	Liana	DDF; MDF; SEGF; EGF	NE	-	SWS 71
214	*Ziziphus rugosa* Lam.	Liana	MDF; SEGF	NE	-	HIFP 27153
215	*Ziziphus xylopyrus* (Retz.) Willd.	Tree	DDF	NE	-	SWS 72
	Rhizophoraceae					
216	*Carallia brachiata* (Lour.) Merr.	Tree	SEGF	NE	-	HIFP 27144
	Rubiaceae					
217	*Canthium angustifolium* Roxb.	Liana	SEGF; EGF	NE	-	HIFP 27267
218	*Catunaregam spinosa* (Thunb.) Tirveng.	Tree	DDF; MDF; SEGF	NE	-	HIFP 27233
219	*Gardenia latifolia* W. Aiton	Tree	DDF; MDF	NE	-	HIFP 27227
220	*Haldina cordifolia* (Roxb.) Ridsdale	Tree	DDF; MDF; SEGF	NE	-	HIFP 27125
221	*Hymenodictyon obovatum* Wall.	Tree	DDF; MDF	NE	WG	HIFP 27176
222	*Ixora nigricans* R. Br. ex Wight & Arn.	Tree	SEGF; EGF	NE	-	HIFP 27238
223	*Meyna laxiflora* Robyns	Tree	DDF; MDF; SEGF	NE	-	HIFP 27180
224	*Mitragyna parvifolia* (Roxb.) Korth.	Tree	MDF; SEGF	NE	-	HIFP 27221
225	*Morinda pubescens* Sm.	Tree	SEGF	NE	-	SWS 49
226	*Mussaenda frondosa* L.	Liana	MDF; SEGF	NE	-	HIFP 27278
227	*Pavetta indica* L.	Shrub	MDF; SEGF	NE	-	HIFP 27190
228	*Psychotria nigra* (Gaertn.) Alston	Shrub	SEGF	NE	-	HIFP 27252
229	*Psydrax dicoccos* Gaertn.	Tree	MDF; SEGF	VU	-	HIFP 27132
230	*Wendlandia thyrsoidea* (Roem. & Schult.) Steud.	Tree	MDF; SEGF	NE	-	HIFP 27123
	Rutaceae					
231	*Acronychia pedunculata* (L.) Miq.	Tree	EGF; SEGF	LC	-	HIFP 27118
232	*Chloroxylon swietenia* DC.	Tree	DDF	VU	-	SWS 16
233	*Citrus medica* L.	Tree	SEGF	NE	-	HIFP 27242
234	*Clausena anisata* (Willd.) Hook. f. ex Benth.	Tree	MDF; EGF	LC	-	HIFP 27246
235	*Glycosmis pentaphylla* (Retz.) DC.	Shrub	MDF; SEGF; EGF	LC	-	HIFP 27162
236	*Melicope lunu-ankenda* (Gaertn.) T. G. Hartley	Tree	MDF; SEGF	LC	-	HIFP 27148
237	*Murraya koenigii* (L.) Spreng.	Tree	MDF; SEGF	LC	-	HIFP 27194
238	*Murraya paniculata* (L.) Jack	Tree	EGF	NE	-	SWS 50
239	*Paramignya monophylla* Wight	Liana	MDF; SEGF; EGF	NE	-	HIFP 27240
240	*Toddalia asiatica* (L.) Lam.	Liana	MDF; SEGF; EGF	NE	-	HIFP 27271
241	*Zanthoxylum ovalifolium* Wight	Liana	SEGF	LC	-	HIFP 27273
242	*Zanthoxylum rhetsa* (Roxb.) DC	Tree	MDF	LC	-	SWS 70
	Salicaceae					
243	*Casearia ovata* (Lam.) Willd.	Tree	EGF; MDF; SEGF	NE	-	HIFP 27167
244	*Casearia tomentosa* Roxb.	Tree	MDF; SEGF	NE	-	HIFP 27168
245	*Flacourtia indica* (Burm.f.) Merr.	Tree	DDF; MDF; SEGF	LC	-	HIFP 27134
246	*Flacourtia montana* J. Graham	Tree	MDF; SEGF; EGF	NE	WG	HIFP 27216
247	*Homalium zeylanicum* (Gardner) Benth.	Tree	SEGF; EGF	NE	-	HIFP 27213
248	*Scolopia crenata* (Wight & Arn.) Clos	Tree	SEGF	NE	-	HIFP 27239
	Santalaceae					
249	*Santalum album* L.	Tree	MDF	VU	-	SWS 57

	Family/Species	Life-form	Forest type	IUCN status	Endemic distribution	Accession number
	Sapindaceae					
250	*Allophylus cobbe* (L.) Raeusch.	Liana	MDF; SEGF; EGF	NE	-	HIFP 27260
251	*Dimocarpus longan* Lour.	Tree	MDF; SEGF; EGF	NT	-	HIFP 27141
252	*Harpullia arborea* (Blanco) Radlk.	Tree	SEGF	LC	-	HIFP 27131
253	*Sapindus emarginatus* Vahl	Tree	MDF; SEGF; EGF	NE	-	HIFP 27156
254	*Schleichera oleosa* (Lour.) Oken	Tree	DDF; MDF; SEGF; EGF	LC	-	HIFP 27205
	Sapotaceae					
255	*Chrysophyllum roxburghii* G.Don	Tree	SEGF	LC	-	HIFP 27147
256	*Madhuca indica* J. F. Gmel.	Tree	MDF; SEGF	NE	-	HIFP 27160
257	*Mimusops elengi* L.	Tree	SEGF; EGF	LC	-	HIFP 27171
258	*Xantolis tomentosa* (Roxb.) Raf.	Tree	SEGF	NE	-	HIFP 27172
	Smilacaceae					
259	*Smilax zeylanica* L.	Liana	MDF; EGF	NE	-	HIFP 27291
	Solanaceae					
260	*Solanum giganteum* Jacq.	Shrub	MDF	LC	-	SWS 60
261	*Solanum seaforthianum* Andrews	Liana	MDF; SEGF	NE	-	SWS 61
	Symplocaceae					
262	*Symplocos macrocarpa* Wight ex C.B. Clarke ssp. *kanarana* (Talbot.) Noot.	Tree	MDF; SEGF; EGF	VU	WG	HIFP 27166
	Thymelaeaceae					
263	*Gnidia glauca* (Fresen.) Gilg	Tree	DDF; MDF; SEGF	NE	-	SWS 38
	Verbenaceae					
264	*Lantana camara* L.*	Shrub	DDF; MDF	NE	-	SWS 44
	Vitaceae					
265	*Cayratia pedata* (Lam.) Juss. ex Gagnep.	Liana	SEGF; EGF	VU	-	HIFP 27307
266	*Cissus discolor* Blume	Liana	SEGF	NE	-	SWS 19
267	*Cissus gigantea* (Bedd.) Planch.	Liana	MDF	NE	-	HIFP 27296
268	*Cissus* sp.	Liana	MDF	-	-	SWS 20
269	*Leea indica* (Burm. f.) Merr.	Shrub	MDF; SEGF	LC	-	SWS 76

Legend: DDF—tropical dry deciduous forest | MDF—tropical moist deciduous forest | SEGF—tropical semi-evergreen forest | EGF—tropical evergreen forest | IUCN—International Union for Conservation of Nature & Natural resources | VU—Vulnerable | NE—Not Evaluated | LC—Least Concern | NT—Near Threatened | EN—Endangered | DD—Data Deficient | WG—Western Ghats | PI—Peninsular India | EG—Eastern Ghats | AN—Andaman & Nicobar | *—Exotic species | #—Monocots.

Table 2. Summary of diversity, dominant families and species of woody flora from SWS.

Life-form	Diversity			Dominant family	Common species
	Richness	Genera	Family		
Tree	184	139	50	Moraceae Fabaceae Lauraceae Euphorbiaceae Rubiaceae	*Terminalia paniculata*, *Lagerstroemia macrocarpa*, *Terminalia elleptica* *Tectona grandis* *Xylia xylocarpa* *Aporosa cardiosperma*
Liana	68	61	32	Fabaceae Apocynaceae Menispermaceae Rhamnaceae Vitaceae	*Calycopteris floribunda*, *Moullava spicata* *Gnetum edule* *Stictocardia tiliifolia* *Elaeagnus conferta*
Shrub	18	16	13	Fabaceae Phyllanthacaeae Rubiaceae Lamiaceae	*Ardisia solanacea* *Cipadessa baccifera* *Glycosmis pentaphylla*, *Solanum giganteum* *Leea indica*

Image 1. A—Landscape view of Shettihalli Wildlife Sanctuary (SWS) | B—Water reservoir (Purudal), with SWS on the background | C—A view of tropical semi-evergreen forest | D—A view of tropical moist deciduous forest | E—Abandoned mines (manganese) inside the sanctuary | F—Cultural service: A famous temple in Maleshankara that attracts thousands of people every year | G—Disturbed environment: Forest landscape used for agricultural practices inside SWS | H—Dense growth of invasive species – *Chromolaena odorata* inside the sanctuary. © K. Naveen Babu

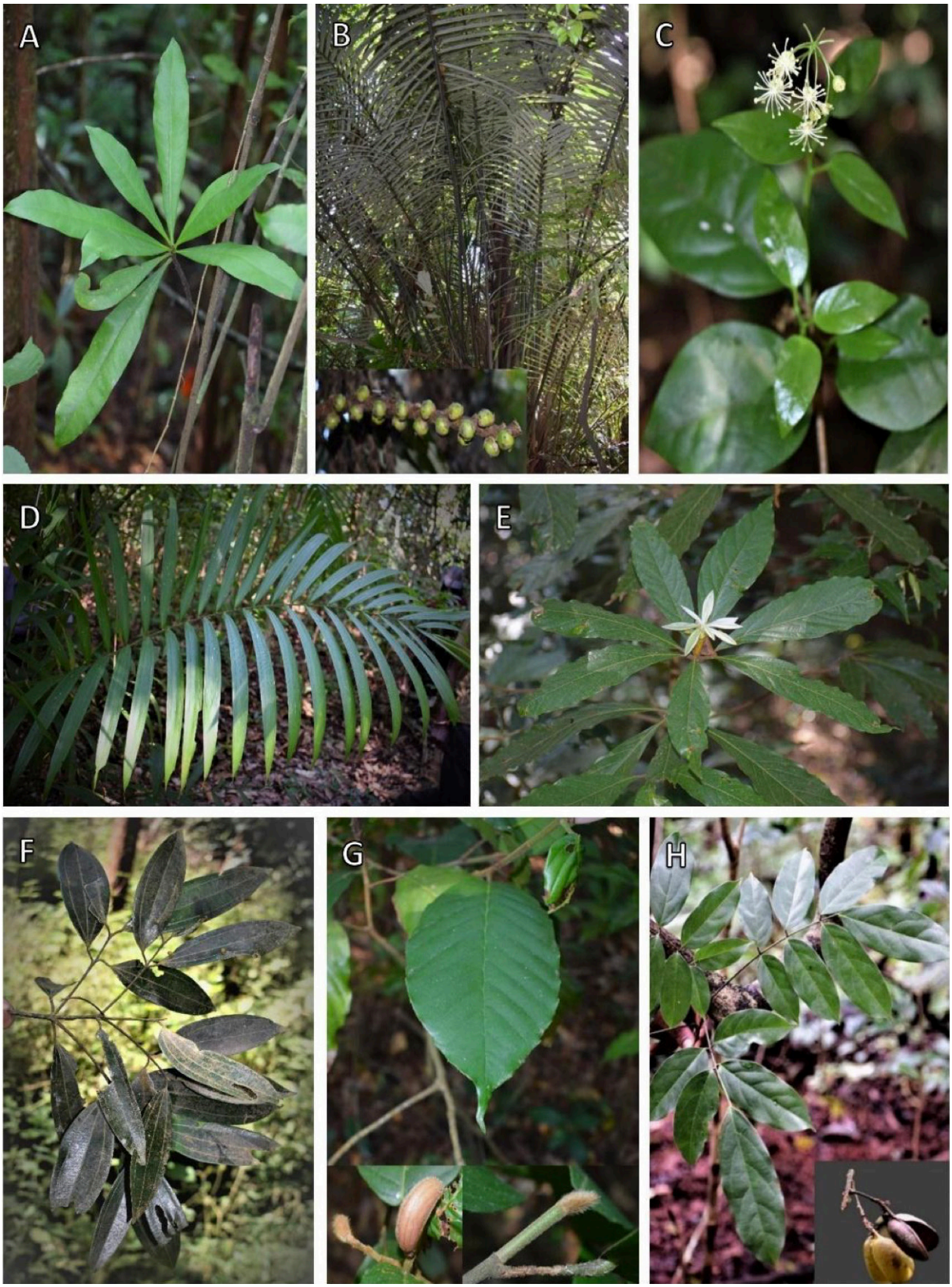

Image 2. Some endemic species from SWS: A—*Ancistrocladus heyneanus* | B—*Arenga wightii* | C—*Blachia andamanica* ssp. *denudata* | D—*Calamus gamblei* | E—*Actinodaphne tadulingamii* | F—*Cinnamomum malabatrum* | G—*Dipterocarpus indicus* | H—*Connarus wightii*. © K. Naveen Babu

Image 3. Some endemic species from SWS: A—*Holigarna beddomei* | B—*Pinanga dicksonii* | C—*Moullava spicata* | D—*Litsea floribunda* | E—*Memecylon talbotianum* | F—*Miquelia dentata* | G—*Polyalthia fragrans.* © Vincy K Wilson

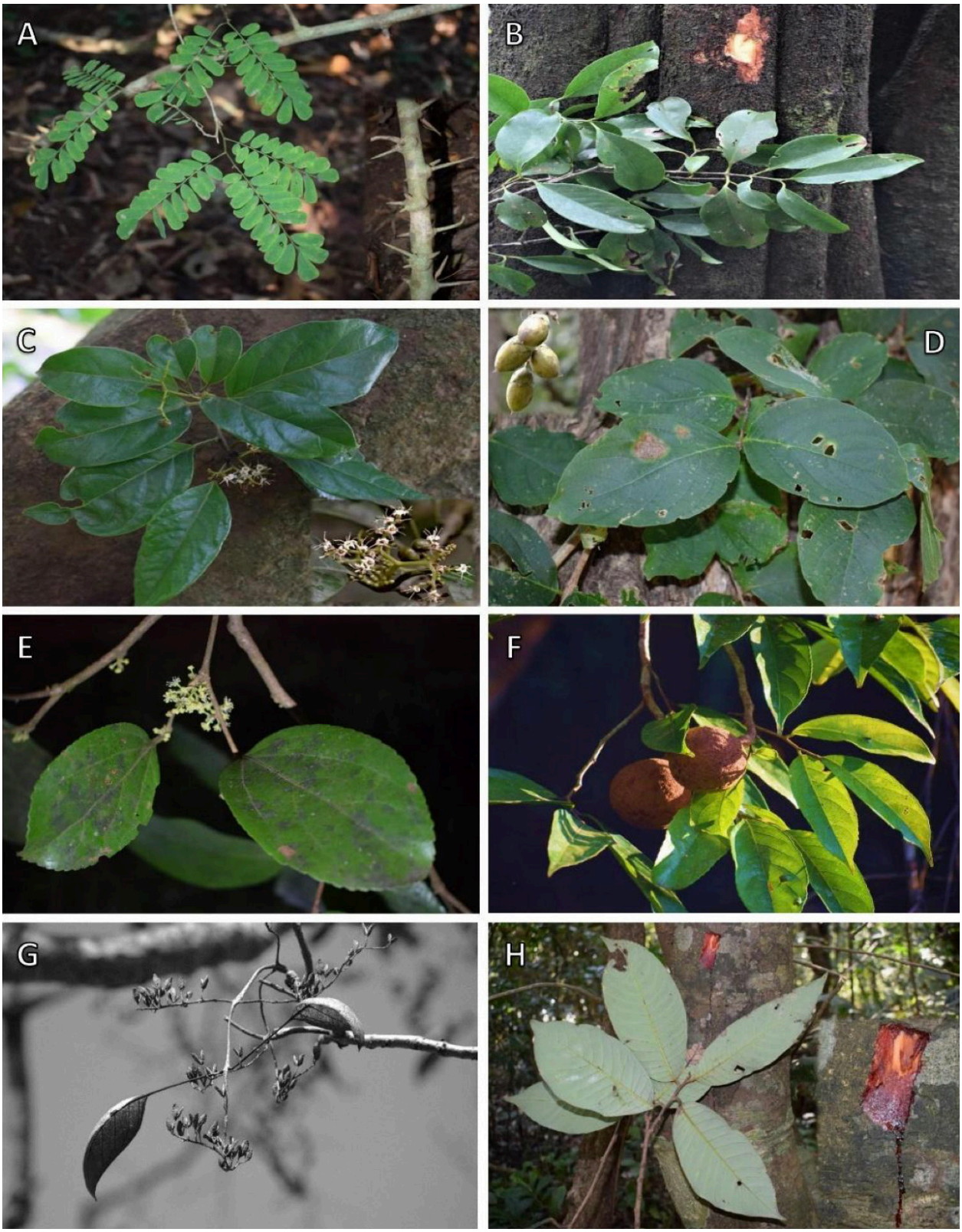

Image 4. Some endemic species from SWS: A—*Dalbergia horrida* | B—*Garcinia gummi-gutta* | C—*Ehretia canarensis* | D—*Lagerstroemia macrocarpa* | E—*Flacourtia montana* | F—*Hydnocarpus pentandrus* | G—*Hymenodictyon obovatum* | H—*Knema attenuata*. © K. Naveen Babu

Image 5. Some endemic species from SWS: A—*Radermachera xylocarpa* | B—*Reinwardtiodendron anamalaiense* | C—*Tabernaemontana alternifolia* | D—*Terminalia paniculata*. © Vincy K Wilson

malabatrum are encountered commonly across the sanctuary. Conversely, 13 endemic species were found occasionally (rare category). They include *Arenga wightii*, *Drypetes confertiflora*, *Pinanga dicksonii*, *Polyalthia fragrans*, *Dolichandrone arcuata*, *Miquelia dentata*, *Blachia andamanica* ssp. *denudata*, *Croton malabaricus*, *Syzygium laetum*, *Calamus gamblei*, *Holigarna grahamii*, *Hymenodictyon obovatum*, and *Beilschmiedia wightii*). Moreover, SWS is also host to 10 species of elevated conservation concern (*A. wightii*, *Santalum album*, *Cryptocarya wightiana*, *Cayratia pedata*, *Hopea ponga*, *Syzygium caryophyllatum*, *Beilschmiedia wightii*, *Dipterocarpus indicus*, *Symplocos macrocarpa* ssp. *kanarana*, *Chloroxylon swietenia*; IUCN 2021), which were found occasionally. Lastly, the study site harboured four medicinal species (as per Ravikumar & Ved 2000; Gowthami et al. 2021) of elevated conservation concern such as *Dysoxylum malabaricum* (Endangered), *Cayratia pedata* (Vulnerable), *Hydnocarpus pentandrus* (Vulnerable), and *S. album* (Vulnerable). Conservation effort needs to be directed towards protecting these species before they become rare from the region.

In the past, the sanctuary was subjected to many anthropogenic disturbances, including settlements, forest encroachment, mining and agricultural activities, and monoculture plantations. During our botanical explorations, authors have noticed dense growth of invasive alien species, i.e., *Chromolaena odorata* and *Lantana camara,* especially in the eastern parts of the sanctuary, posing a threat to the native flora. Due to the presence of 70 villages inside the sanctuary, most places are accessed by humans. Harvesting of plants for local use and grazing by livestock are evident in addition to the ongoing agricultural practices inside the sanctuary. Also, frequent forest fires are a major threat to the plant biodiversity of the region, especially around human habitations (Anonymous 2005). Considering the above facts and the plant biodiversity of the SWS with important endemic and threatened taxa coupled with distinct microclimatic conditions, the area deserves

Image 6. Evergreen trees of SWS: A—*Diospyros montana* | B—*Bischofia javanica* | C—*Mallotus philippensis* | D—*Elaeocarpus serratus* | E—*Nothapodytes nimmoniana* | F—*Magnolia champaca* | G—*Callicarpa tomentosa* | H—*Mimusops elengi*. © Vincy K Wilson

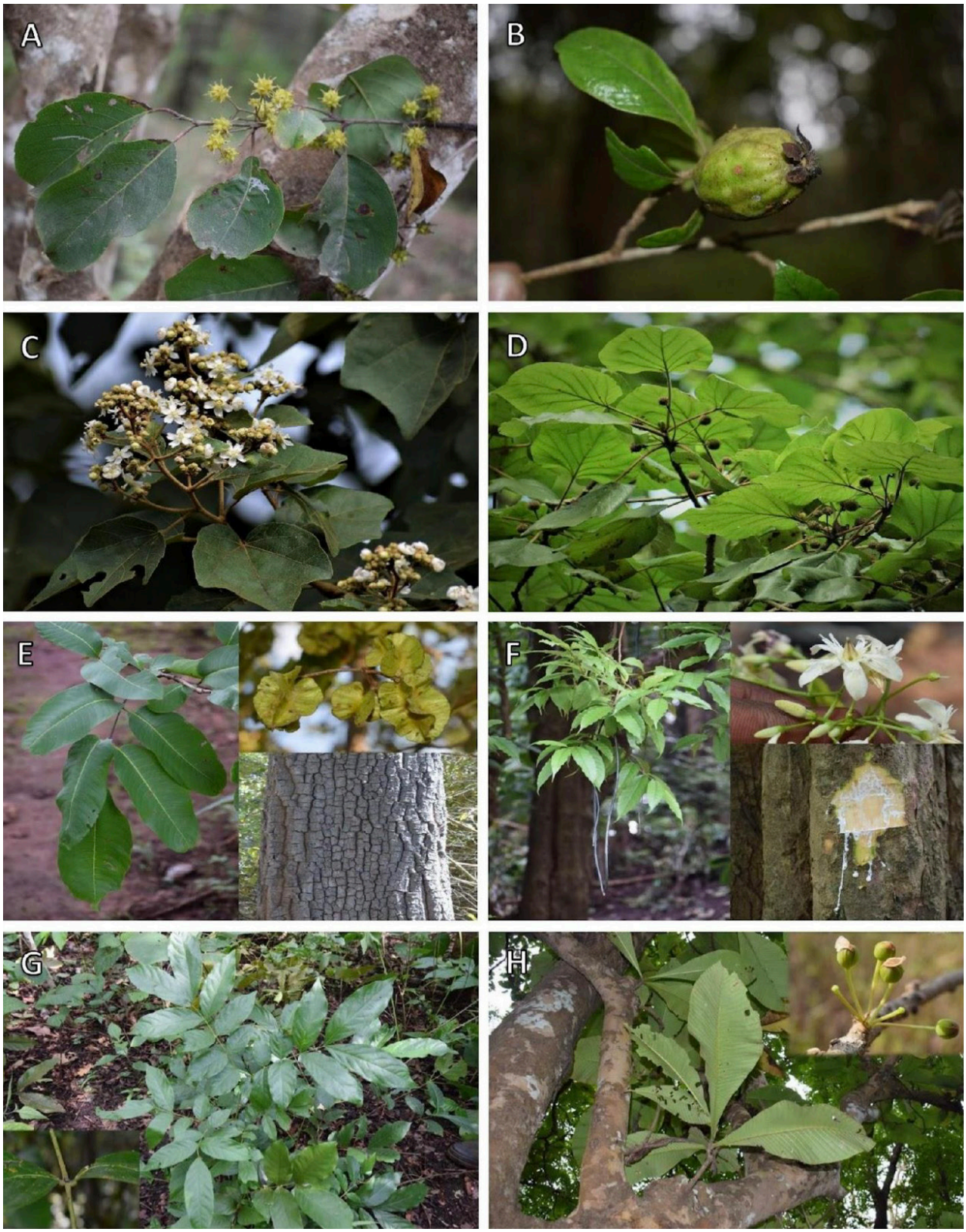

Image 7. Common deciduous trees of SWS: A—*Anogeissus latifolia* | B—*Catunaregam spinosa* | C—*Kydia calycina* | D—*Haldina cordifolia* | E—*Terminalia elliptica* | F—*Wrightia tinctoria* | G—*Xylia xylocarpa* | H—*Dillenia pentagyna*. © K. Naveen Babu

Image 8. Some liana species from SWS: A—*Elaeagnus conferta* | B—*Gnetum edule* | C—*Calycopteris floribunda* | D—*Acacia sinuata* | E—*Dioscorea hispida* | F—*Stictocardia tiliifolia* | G—*Toddalia asiatica* | H—*Smilax zeylanica* | I—*Ziziphus oenoplia*. © K. Naveen Babu

Image 9. Commonly seen shrubs in SWS: A—*Ardisia solanacea* | B—*Cipadessa baccifera* | C—*Glycosmis pentaphylla* | D—*Solanum giganteum*. © K. Naveen Babu

further research on investigating plant diversity, population assessment of endemic and threatened species, and forest structure concerning forest types and disturbances in the sanctuary in order to formulate strategies for conservation and better management.

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