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A Checklist of the Orchids in Nilgiri Biosphere Reserve, India

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ABSTRACT: From ages, Orchidaceae is considered to be one of the largest families of flowering plants exhibiting enormous species diversity bearing aesthetic and therapeutic values. In the context of rapid global biodiversity decline, orchids are currently christened to be the most threatened taxa due to enhanced anthropogenic threats, inherent rarity and specific conservation needs. Nilgiri Biosphere Reserve (NBR) is the India's first biosphere reserve and it acts as a connecting link between Western and Eastern Ghats. The present study documents the Orchid diversity of NBR and records about 240 taxa belonging to 72 genera. The species analysis also resulted in enlisting about 114 Indian endemic species belonging to 29 genera, out of which 15 species are strictly endemic to NBR region. It has been observed that most of the orchids are present in the Western Ghats regions of Tamil Nadu and Kerala states of NBR inhabiting the regions of higher elevations and evergreen high-altitude grasslands and these forests provide conducive atmosphere to the orchids to occupy the pristine environment. The present study records in detail the orchid flora of NBR and also suggests the conservation measures which acts as baseline data which is useful for the garden enthusiasts, researchers and orchid conservators. Endemic orchids have also been marked.

Keywords: Eastern Ghats, Endemic, Orchidaceae, Western Ghats.

INTRODUCTION

Orchidaceae is the second largest family among flowering plants, with more than 28,000 species under 870 genera worldwide (Christenhusz and Byng 2016) having more diversity in the tropics than in any other region. Orchids play an important role in horticulture trade due to their elegance and aesthetic appeal. Gardeners and Horticulturists shows huge interest in hybrid orchids, which are considered as highly priced horticultural crops in the international flower market (USDA, 2019). Besides the aesthetic importance, as the orchids face over-exploitation for medicinal practices they are included in the threatened categories (Jalal *et al.,* 2014). Due to the threatened status of orchids, international agencies including Government of India has enacted different frameworks and legal acts with the aim to provide them protection and conservation. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has included native orchids in Appendix I and II to prevent over exploitation and illegal trade. Similarly, orchids are placed under Schedule VI of Wildlife Protection Act, 1972 amended in 1992 to regulate the trade activities of orchids within India (Wildlife Protection Act, 1972; Wraith and Pickering 2018). India is widespread with biogeographic regions with varied topography, climate and habitat providing the floristic wealth of country with 21,730 taxa under 2,774 genera and 268 families. In India, orchids are documented with 1,270 taxa belonging to 155 genera and 305 endemic species (Singh *et al*, 2020). Recent records from the Western Ghats indicated the presence of 305 orchid species under 77 genera and additionally, in the state of Kerala itself 265 orchid species belonging to 77 genera have been listed (Nayar *et al.,* 2014). In Peninsular India, Jalal and Jayanthi (2012) accounted about 130 endemic orchid species belonging to 38 genera. In Tamil Nadu a total of 251 taxa belonging to 71 genera have been reported (Karuppusamy *et al.,* 2022). Further, in Karnataka 220 taxa belonging to 70 genera have been recorded (Ravikumar *et al.,* 2021).

Study Area. Nilgiri Biosphere Reserve is the first Biosphere Reserve established in India under the Man and Biosphere Programme on September 1st 1986. NBR encompasses 5670 km^2 of area spread over three south Indian states, Tamil Nadu (2537.6 km^2), Karnataka (1527.4 km^2) and Kerala (1455.4 km^2) and it forms almost complete ring around the Nilgiri plateau. The Biosphere lies between 10°50′–12°16′ N latitude and 76°00′– 77°15′ E longitude, including many protected areas and reserve forests. The northern boundary of biosphere reserve stretches from Coorg-Wayanad Plateau, south to Attapadi-Bolampatti Hills at the northern edge of the Palghat Gap and eastwards into the Talamalai-Hasanur Plateau of the Eastern Ghats and the west forms natural boundary of Nilambur and Mannarghat. The reserve is spread over ten districts, namely Nilgiris, Coimbatore and Erode in Tamil Nadu; Palakkad, Malappuram, Wayanad and Kuttyade and vested forests of Kozhikode in Kerala and Coorg, Chamrajanagar and Mysore in Karnataka. The

Protected Areas (PAs) in the NBR include 4 National Parks *viz.*, Mukurthi (Tamil Nadu), Silent Valley (Kerala), Bandipur and Nagarhole (Karnataka); two wildlife Sanctuaries *viz.*, Wayanad and Karimpuzha (Kerala) and two tiger reserves *viz.*, Mudumalai and Sathyamangalam (Tamil Nadu) and many reserve forests. These areas are important for the conservation of forest biodiversity of the state. As per the Champion and Seth (1968), the NBR has 7 forest types namely, Moist deciduous, Semi-evergreen, Wet evergreen, Moist deciduous, Dry deciduous, Shola-grassland and Scrub Forests. The detailed distribution of Forest types is given in Table 1.

Table 1: Vegetation types in Nilgiri Biosphere Reserve.

Sr. No.	State	Precise locality	Vegetation Type
1.	**Kerala**	Coorg Wayanad (Tittimati, Arakeri, Hotgot, Nalkeri)	Moist deciduous
2.		Kerala Wayanad (Begur, Kudrekode, Kattikulam, Edakode, Kurchiyat)	Moist deciduous
3.		Nigiri Wayanad (Mudumalai Kumbarkolli)	Moist deciduous
4.		Nilambur vested forests	Semi evergreen
5.		New Amarambalam, Karimupuzha Wildlife Sanctuary	Moist deciduous
6.		Silent Valley	Wet evergreen
7.		Attappadi valley R.F.	Wet evergreen
8.		Attappadi plateau	Scrub forest, Wet evergreen
9.	**Tamil Nadu**	Upper Nigiri Plateau	Shola-grassland
10.		Siruvani hills (Muthikulam, Chenatnayar, Bolampatti)	Wet evergreen
11.		Nigiri south-eastern slopes	Scrub forest, Dry deciduous
		(Gopanari Pillur slopes, Melur slopes, Jakkanare R.F.)	
12.		Nigiri eastern slopes	Scrub forest
13.		Sigur plateau (Avarhalla Sigur)	Scrub forest, Semi evergreen, Dry deciduous, Wet evergreen
14.	**Karnataka**	Mysore plateau south	Scrub forest, Dry deciduous, Moist deciduous
15.		Mysore plateau north (Kakankote, Mettukuppem, Veeranahosahalli, Kachuvanhalli)	Moist deciduous

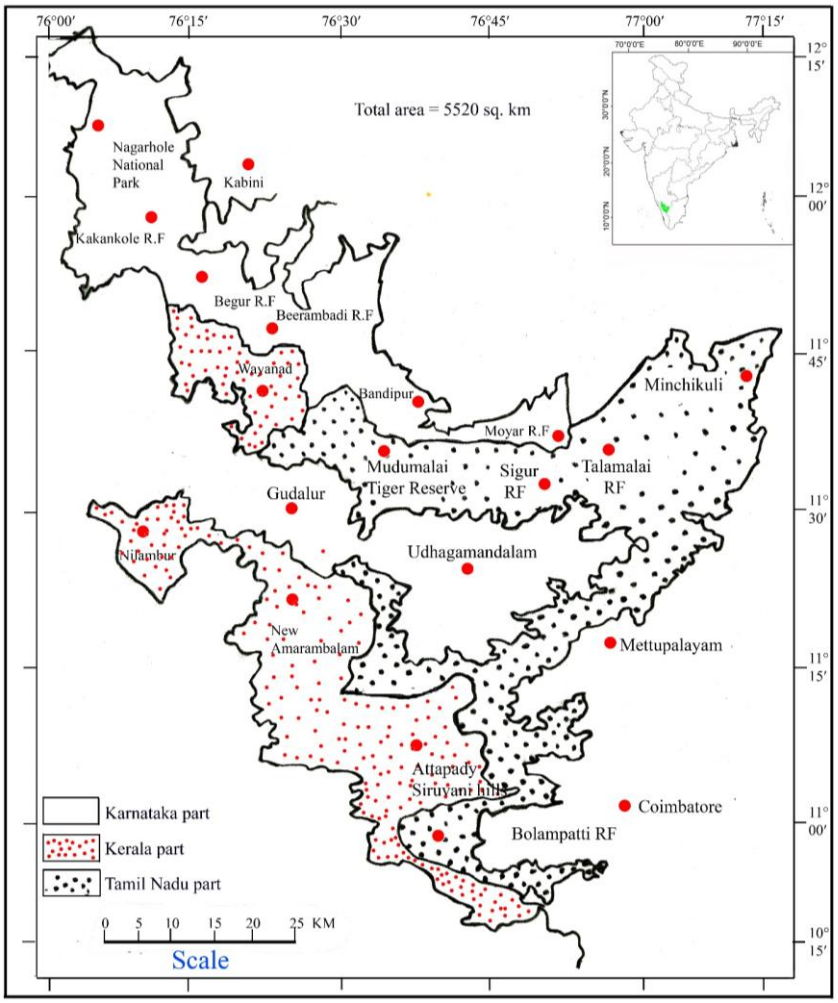

Fig. 1. Map of Nilgiri Biosphere Reserve.

REVIEW OF LITERATURE

Till date, there is no comprehensive work on orchids of NBR. However, lots of sporadic works has been recorded in each state such as the Orchids of Nilgiris, Tamil Nadu (Joseph, 1982) describing 116 species belonging to 49 genera and it remains to be one of the major works. Flora of Tamil Nadu analysis (Joseph, 1989) listed 200 orchid species most of them are endemic to South India and Peninsular India. Flora of Nilgiri and Pulney hill top reported 60 species (Fyson, 1932). Major pioneer contributions were done by British Botanists like Robert Wight (1830-1853) who contributed to the botany of southern tip of India. His contributions include 28 publications, and among them the Illustrations of Indian Botany (1840) and *Icones Plantarum Indiae Orientalis* (1838-1853) are notable. Joseph Dalton Hooker, for the first time in India brought out the complete floristic account of Indian plants in the form of a flora-the Flora of British India in 7 volumes (Hook. f. 1872-1897) where the Orchidaceae is also a part in it and this distinguished work inspired many botanists. After the publication of the Flora of British India, comprehensive regional floras were published which includes Contribution of the Flora of the Presidency of Madras by Fischer (1928). Recent publications include A Checklist of Orchids of Shola and Grasslands of Nilgiris, Western Ghats (Jeevith *et al.*, 2019). Flowering plants of Tamil Nadu enlisted 217 species in the NBR region (Narasimhan and Irwin 2021).

In Kerala State there are almost 216 species belonging to 70 genera (Manilal and Sathish Kumar 1993). In Wayanad District 165 species belong to 68 genera were reported (Narayanan and Sivadasan, 2009). Flora of Silent Valley National Park records 108 species belonging to 49 genera (Manilal, 1988). In Palghat District 73 species belonging to 42 genera are described (Vajravelu, 1990). In Nilambur Forests 39 species belonging to 28 genera are described (Sivarajan and Mathew 1996). In Calicut District 10 species belonging to 9 genera (Manilal and Sivarajan 1982) are described. In recent studies, Orchids of Kozhikode listed total 57 species belonging to 28 genera (Sulaiman *et al.*, 2022).

In Karnataka part of NBR following reports exists- Flora of Karnataka analysis reported 156 species (Sharma *et al*., 1984). In Flora of Kodagu there is 57 species (Keshavamurthy and Yoganarasimhan 1990). In flora of Rajiv Gandhi National Park, Manikandan and Lakshminarasimhan (2006) have described 46 species belonging to 26 genera. Also, recent publication Flora of Karnataka- A checklist: Volume 2 listed 190 species (Sanjappa and Sringeswara 2019) and Seed Plants of Karnataka listed 191 species (Ravikumar *et al*, 2021). Study of Survey and Conservation of Rare and Endemic Orchids of Western Ghats reported 120 species belonging to 30 genera (Sharief, 2011). Many revisionary studies have been undertaken on the Orchids genera of India such as *Coelogyne* (Das and Jain, 1980), *Habenaria* (Choudhury *et al.*, 2011), *Oberonia* (Ansari and Balakrishnan 1990).

As there exists several sporadic works in the study area and there is no complete data on orchid species in the Biosphere Reserve, hence the present work emphasizes the need to study and explore the orchid diversity in NBR. Besides, during the present study, samples were collected and identified from the orchid diversity rich localities for conservation and management for local use. The NBR is home for the c. 3500 angiosperm species of which 154 species are narrow endemics to the NBR (Shetty and Vivekanadan 1983; Kunhikrishnan, 1991; Volga *et al.,* 2013). This is second highest record of population of endemics in India next to the Agasthymalai Biosphere Reserve which is the first in India with 183 narrow endemics (Henry *et al*, 1984; Ahmedullah and Nayar 1987).

MATERIALS AND METHODS

Explorations were carried out in different regions of NBR from January 2019 to May 2023 to document the orchid diversity. Frequent field visits were conducted in all seasons thereby collecting and recording the orchids in tropical semi-evergreen forest, tropical evergreen forest, and grasslands of NBR. Usually about three specimens were collected with reproductive structures while care was taken to collect single specimen for the orchids with least population or an uncommon species. Some of the orchids in vegetative state were collected and planted in the botanical garden of the Botanical Survey of India, Coimbatore and upon flowering of the species, the identification was carried out. In addition, geo-coordinates and elevation of the orchids were recorded using GPS-Garmin and digital photos were taken using a Nikon D300s Camera. After collecting the plant materials, herbarium was prepared using standard herbarium techniques such as poisoning, drying, mounting and labeling (Jain and Rao 1976). The specimens were identified using relevant literature, regional and national floras (Abraham and Vatsala 1981; Ansari and Balakrishnan 1990; Vajravelu, 1990; Karuppusamy *et al*., 2022; Diwakar *et al*., 2020), as well as specimens examined at regional and national herbaria. Indian specimens deposited in herbaria abroad were studied in online including the Kew Herbarium (K), Edinburgh herbarium (E), British Museum (BM), New York Botanical Garden Herbarium (NY) etc. for further verification. Scientific names adopted here are those accepted by the latest ICN nomenclature mentioned in Plants of the World online facilitated by the Royal Botanic Gardens, Kew published on the Internet; http://www.plantsoftheworldonline.org/ (POWO, 2023). The mounted specimens were labelled with accessed number and deposited in the Madras Herbarium (MH), Botanical Survey of India, Southern Regional Centre, Coimbatore, Tamil Nadu.

RESULTS AND DISCUSSION

During the present study, 240 orchid species belonging to 72 genera were recorded (Table 2). Out of which 120 taxa are epiphytic, 104 taxa are terrestrial, 8 species are lithophytic, 4 species are hysteranthous (*Nervilia* sp.) and 4 species are saprophytic. Among 72 genera

reported *Habenaria* is the dominant genus having 31 species followed by *Oberonia* 19 species, *Bulbophyllum* 17 species, *Dendrobium* having 16 species, *Liparis* having 12 species, *Peristylus* having 11 species, *Crepidium* having 8 species, *Coelogyne*, *Porpax* having 7 species, *Luisia*, *Zeuxine* having 5 species, *Schoenorchis*, *Eulophia*, *Vanda* having 4 species, *Brachycorythis*, *Sirhookera*, *Robiquetia*, *Pinalia*, *Taeniophyllum* having 2 species and remaining are having only one species such as *Acanthephippium*, *Anoectochilus*, *Aphyllorchis*, *Arundina*, *Chilochista*, *Chrysoglossum*, *Cleisostomopsis*, *Didymoplexis* etc. The analysis is given in Fig. 2-4.

Table 2: List of Orchids Reported in the Nilgiri Biosphere Reserve, India.

Sr. No.	Name of the Taxa	Specimen examined/ References	Habit	Phenology	Distribution in India
1.	*Acampe ochracea* (Lindl.) Hochr.	Saxena and Brahman 5061 (JCB)	Epiphytic	May–August	TN, KL, KA, NE India
2.	*Acampe praemorsa* (Roxb.) Blatt. & McCann	Murugesan and Anusuba 142744 (MH)	Epiphytic	April–June	KA, KL, TN, MH, DD, DN, CG, MP, RJ
3.	*Acampe praemorsa* (Roxb.) Blatt. & McCann, var. *longepedunculata* (Trimen) Govaerts	Vajravelu 46263 (MH)	Epiphytic or lithophyte	April–September	KA, KL, TN, GJ, MH, DD, DH, CH, MP, RJ
4.	*Acanthephippium bicolor* Lindl.	Vajravelu 46263 (MH)	Terrestrial	March–April	KA, KL, TN, AP
5.	*Aerides crispa* Lindl.	Lawson 50249 (MH)	Epiphytic	April–June	KA, KL, TN, GA, MH, DN
6.	**Aerides maculosa* Lindl.	Ellis 34638 (MH)	Epiphytic	May–July	AP, GA, GJ, KA, KL, MP, MH, OR, RJ, TN
7.	*Aerides ringens* (Lindl.) C.E.C. Fisch. in Gamble	Murugesan and Anusuba 146626 (MH)	Epiphytic	May–July	KA, KL, TN, AP, OR
8.	*Anoectochilus elatus* Lindl.	Murugesan and Anusuba 142715 (MH)	Terrestrial	November–December	KA, KL, TN
9.	*Aphyllorchis montana* Rchb. f.	Karuppusamy *et al.*, 2021	Saprophytic leafless	August–September	KA, KL, TN, AP, OR, GA, GJ
10.	*Arundina graminifolia* (D. Don) Hochr.	Vajravelu 38427 (MH)	Terrestrial	July–September	KA, KL, TN, AP, OR, GA, GJ
11.	**Brachycorythis iantha* (Wight) Summerh.	Murugesan and Anusuba 153435 (MH)	Terrestrial	July–August	KA, KL, TN, BR, MH.
12.	**Brachycorythis splendida* Summerh.	Karuppusamy *et al.*, 2021	Terrestrial	July–September	KA, KL, TN
13.	**Bulbophyllum acutiflorum* A. Rich.	Murugesan and Anusuba 142753 (MH)	Epiphytic	March–April	KA, KL, TN
14.	**Bulbophyllum aureum* (Hook. f) J.J. Sm.	Murugesan and Anusuba 148246 (MH)	Epiphytic	November – December	KA, KL, TN
15.	**Bulbophyllum elegantulum* (Rolfe) J.J. Sm.	Karuppusamy *et al.*, 2021	Epiphytic	May–June	KA, KL, TN
16.	**Bulbophyllum fimbriatum* (Lindl.) Rchb. f. in W.G. Walpers	Karuppusamy *et al.*, 2021	Epiphytic	January – December	KA, KL, TN
17.	**Bulbophyllum fischeri* Seidenf.	Murugesan and Anusuba 146772 (MH)	Epiphytic	August – December	KA, KL, TN
18.	**Bulbophyllum fuscopurpureum* Wight	Murugesan and Anusuba 142751 (MH)	Epiphytic or lithophyte	April–May	KA, KL, TN
19.	**Bulbophyllum kaitiense* (Wight) Rchb. f.	Murugesan and Anusuba 142755 (MH)	Epiphytic or Lithophyte	August–September	KA, KL, TN
20.	**Bulbophyllum mysorense* (Rolfe) J.J. Sm	Ramamoorthy 282 (JCB)	Epiphytic	June-September	KA, KL, TN
21.	**Bulbophyllum nodosum* (Rolfe) J. J. Sm.	s.n 829967 (K)	Epiphytic	May–August	TN, AR
22.	**Bulbophyllum orezii* C.S. Kumar in C.S. Kumar & Manilal	Nayar *et al.*, 2014	Epiphytic	August – September	KA, KL, TN
23.	**Bulbophyllum proudlockii* (King & Pantl.) J.J. Sm.	Deb 31639 (MH)	Epiphytic	January – April	KA, KL, TN
24.	**Bulbophyllum rheedei* Manilal & C.S. Kumar	Ratheesh Narayanan and Sivadasan, 2009	Epiphytic	August. – September	KA, KL, TN
25.	**Bulbophyllum rosemarianum* C.S. Kumar, P.C.S. Kumar & Saleem	Nayar *et al.*, 2014	Epiphytic	January – March	KA, KL
26.	**Bulbophyllum silentvalliensis* M.P. Sharma & S.K. Srivast.	Nayar *et al.*, 2014	Epiphytic	February – March	KL
27.	**Bulbophyllum sterile* (Lam.) Suresh in D.H. Nicolson, C.R. Suresh & K.S. Manilal	Wight s.n. (K)	Epiphytic or lithophyte	December – May	KA, KL, TN
28.	**Bulbophyllum stocksii* (Benth. ex Hook.f.) J.J. Verm., Schuit. & de Vogel	Murugesan & V. Anusuba 142717 (MH)	Epiphytic	February – March	KL, TN
29.	**Bulbophyllum tremulum* Wight	Murugesan and Anusuba 142719 (MH)	Epiphytic	March–April	KA, KL, TN
30.	*Calanthe masuca* (D. Don) Lindl.	Murugesan and Anusuba 148258 (MH)	Terrestrial	August–December	KA, KL, TN, NE India
31.	*Calanthe sylvatica* (Thouars) Lindl.	Murugesan and	Terrestrial	June–	AS, KA, KL,

		Anusuba 153353 (MH)		January	MZ, TN, WB
32.	*Calanthe triplicata* (Willemet) Ames in Philipp.	Deb 31588 (MH)	Terrestrial	October–December	KA, KL, TN, AN, NE India.
33.	*Cheirostylis flabellata* (A.Rich.) Wight	Murugesan and Anusuba 148351 (MH)	Terrestrial	February-May	KA, KL, MH, TN
34.	*Cheirostylis parvifolia* Lindl.	Karuppusamy *et al.*, 2021	Terrestrial	December – January	KL, MH, OR, TN
35.	*Chiloschista fasciata* (F. Muell.) Seidenf. & Ormerod	Ratheesh Narayanan and Sivadasan, 2009	Epiphytic	January–March	KL
36.	**Chiloschista glandulosa* Blatt. & Mc Cann	Murugesan and Anusuba 142725 (MH)	Epiphytic	February – April	KA, KL, TN
37.	**Chrysoglossum ornatum* Blume	Karuppusamy *et al.*, 2021	Terrestrial	February – April	KA, KL, TN
38.	*Cleisostoma tenuifolium* (L.) Garay	Karuppusamy *et al.*, 2021	Epiphytic	June–November	KA, KL, TN, GA, MH.
39.	*Cleisostomopsis filiformis* (Rchb.f.) R. Rice	Karuppusamy *et al.*, 2021	Epiphytic	May–September	KA, KL, TN
40.	**Seidenfadeniella salimii* J.Mathew, Hrideek, V.B. Sreek. & K. Madhus.	Salim 0404 (holo, MSSRF; iso, SESH)	Epiphytic	June–January	KL
41.	**Coelogyne breviscapa* Lindl	Murugesan and Anusuba 142762 (MH)	Epiphytic	June–September	KA, KL, TN
42.	**Coelogyne mossiae* Rolfe	Murugesan and Anusuba 142765 (MH)	Epiphytic	August–October	KL, TN
43.	**Coelogyne nervosa* A. Rich.	Murugesan and Anusuba 142756 (MH)	Epiphytic	June–July	KA, KL, TN
44.	*Coelogyne odoratissima* Lindl.	Murugesan and Anusuba 142757 (MH)	Epiphytic	February–May	KA, KL, TN
45.	*Coelogyne ovalis* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	July–December	TN, NE India
46.	*Coelogyne prolifera* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	May–June	TN, NE India
47.	*Coelogyne uniflora* Lindl.	Rathakrishnan 15701 (MH)	Epiphyte or lithophyte	December–February	TN, NE India
48.	*Corymborkis veratrifolia* (Reinw.) Blume	Karuppusamy *et al.*, 2021	Terrestrial	June-September	TN, NE India
49.	*Cottonia peduncularis* (Lindl.) Rchb. f.	Vajravelu 41780 (MH)	Epiphytes	March–December	KA, KL, TN, OR, GA.
50.	*Crepidium acuminatum* (D. Don) Szlach.	Vajravelu 464335 (MH)	Terrestrial	June–September	KA, KL, TN, NE India
51.	**Crepidium crenulatum* (Ridl.) Kottaim.	Beddome 8108 (BM)	Terrestrial	August–September	KL, TN
52.	*Crepidium densiflorum* (A. Rich.) Sushil K. Singh, Agrawala & Jalal	Ellis 34651 (MH)	Terrestrial	June-September	KA, KL, TN
53.	**Crepidium intermedium* (A. Rich.) Sushil K. Singh, Agrawala & Jalal	Murugesan and Anusuba 147793 (MH)	Terrestrial	August–December	KA, KL, TN
54.	**Crepidium malabarica* (Marg. & Szlach.) J.M.H. Shaw	Kumar *et al.*, 2004	Terrestrial	September–December	KL, TN
55.	*Crepidium purpureum* (Lindl.) Szlach.	Murugesan and Anusuba 147824 (MH)	Terrestrial	September	KA, TN, N.E India, OR, UK, WB
56.	*Crepidium resupinatum* (G. Forst.) Szlach.	Ellis 34867 (MH)	Terrestrial	July–August	KA, KL, TN, BR, MP, OR.
57.	*Crepidium versicolor* (Lindl.) Sushil K. Singh, Agrawala & Jalal	Murugesan and Anusuba 153308 (MH)	Terrestrial	June–November	KA, KL, TN, AP, GA, OR
58.	*Cylindrolobus pauciflorus* (Wight) Schuit., Y.P. Ng & H.A. Pedersen	Vajravelu 24398 (MH)	Terrestrial	June–September	KA, KL, TN
59.	*Cymbidium aloifolium* (L) Sw.	Fischer 6259 (FRC)	Epiphytic	May–December	Throughout India
60.	*Cymbidium bicolor* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	May–December	KA, TN, GA, OR, MH
61.	*Cymbidium haematodes* Lindl.	Karuppusamy *et al.*, 2021	Terrestrial	January–April	KA, KL
62.	**Dendrobium anilii* P.M. Salim, J. J. Mathew & Szlach.	Murugesan and V. Anusuba142742 (MH)	Epiphytic	June–September	KL, TN
63.	**Dendrobium aqueum* Lindl.	Murugesan & Anusuba 153310 (MH)	Epiphytic	August–November	KA, KL, TN, GA, MH,
64.	**Dendrobium barbatulum* Lindl.	Murugesan and Anusuba 148258 (MH)	Epiphytic or lithophyte	December–April	KA, KL, TN, GA, GJ, MH
65.	*Dendrobium crepidatum* Lindl. & Paxton	Karuppusamy *et al.*, 2021	Epiphytic	February–August	KA, KL, TN, NE India, BH, CG, GA, MH, OR, WB
66.	**Dendrobium herbaceum* Lindl.	Murugesan and Anusuba 148212 (MH)	Epiphytic	January–May	KL, KA, TN, AP, BR, CG, GA, JK, MP, MH, MZ, OR, WB

67.	*Dendrobium heterocarpum* Wall. ex Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	December–April	KA, KL, TN, NE India, WB
68.	**Dendrobium heyneanum* Lindl.	Murugesan and Anusuba 146653 (MH)	Epiphytic	October–November	KA, KL, TN
69.	*Dendrobium jerdonianum* Wight	Goplalan 39294, 81458(MH)	Epiphytic	February–June	KA, KL, TN, GJ, MH
70.	*Dendrobium macrostachyum* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	March–October	KA, KL, TN, AR, GA, JK, MH, OR, UK, WB
71.	*Dendrobium microbulbon* A. Rich.	Karuppusamy *et al.*, 2021	Epiphytic	March–April	KA, KL, TN, GA, GJ, MH
72.	**Dendrobium nanum* Hook. f.	Subramanyam 10590 (MH).	Epiphytic	September – December	KA, KL, TN, GA, MH
73.	**Dendrobium ovatum* (L.) Kraenzl	Murugesan and Anusuba 153314 (MH)	Epiphytic	September–March	KA, KL, TN, AP, GA, GJ, MH
74.	*Dendrobium panduratum* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	May–July	KL, TN
75.	*Dendrobium salaccense* (Blume) Lindl.	Murugesan and Anusuba 153316 (MH)	Epiphytic	September–March	KA, KL, TN, AN, AR, NE India, OR, WB
76.	*Dendrobium wightii* A.D. Hawkes & A.H. Heller	Karuppusamy *et al.*, 2021	Epiphytic	September–October	KA, KL, TN
77.	*Didymoplexis pallens* Griff.	Karuppusamy *et al.*, 2021	Saprophytic	December–June	KA, KL, TN, NE India, GA, OR, WB
78.	*Dienia ophrydis* (J. Koenig) Seidenf.	Karuppusamy *et al.*, 2021	Terrestrial	March–December	KA, KL, TN, AN, NE India, CG, JK, OR, UK, WB
79.	*Diplocentrum congestum* Wight	Subbarao 41586 (MH)	Epiphytic	April–August	KA, KL, TN
80.	*Diplocentrum recurvum* Lindl.	Viswananthan 730, 1041 (MH)	Epiphytic	April–October	KA, KL, TN, AP, MH.
81.	*Diploprora championii* (Lindl.) Hook. f.	Kumar *et al.*, 2004	Epiphytic	August–September	KA, KL, AN, AR, MG, KA, OR, SK, WB
82.	**Disperis neilgherrensis* Wight	Murugesan and Anusuba 142767 (MH)	Terrestrial	April–June	KA, KL, TN, MG, OR
83.	*Epipactis veratrifolia* Boiss. & Hohen.	Lawson 50729 (MH)	Terrestrial	February–March	TN, HP, J&K, PB, RJ, SK, UK, WB
84.	*Epipogium roseum* (D. Don) Lindl.	Murugesan and Anusuba 148128 (MH)	Saprophytic	January–May	KA, KL, TN, HP, J&K, MH, NE India, UK, WB.
85.	*Eria albiflora* Rolfe	Ellis 34762 (MH)	Epiphytic	June–August	KA, KL, TN
86.	* *Eria nana* A. Rich.	Murugesan and Anusuba 146761 (MH)	Epiphytic	July–November	KA, KL, TN
87.	*Eulophia epidendraea* (Koenig ex Retz.) C.E.C. Fisch.	Althaf Ahamed Kabeer 121857 (MH)	Terrestrial	November–March	KA, KL, TN, AN, AP, CG, MH, OR, UK, WB.
88.	*Eulophia flava* (Lindl.) Hook. f.	Ratheesh Narayanan and Sivadasan, 2009	Terrestrial	January–April	KA, KL, TN, AP, BR, CG, JK, MH, MP, UK, UP
89.	*Eulophia graminea* Lindl.	Murugesan and Anusuba 149420 (MH)	Terrestrial	February–May	Throughout India
90.	*Eulophia nuda* Lindl.	Lawson 50467 (MH)	Terrestrial	January–August	Throughout India
91.	**Eulophia pratensis* Lindl.	Saldhana and Suresh N 5 (JCB)	Terrestrial	December–February	KL, TN, GJ
92.	*Eulophia pulchra* (Thouars) Lindl.	Vajravelu 45067 (MH)	Terrestrial	May–August	KA, KL, TN, MH
93.	*Eulophia zollingeri* (Rchb.f.) J.J. Sm.	Vajravelu 39643 (MH)	Terrestrial	January–March	KA, KL, TN. AN, NE India, WB
94.	**Flickingeria nodosa* (Dalzell) Seidenf.	Murugesan and Anusuba 153311 (MH)	Epiphytic	March–June	KA, KL, TN, GA, MH
95.	*Gastrochilus acaulis* (Lindl.) Kuntze	Vajravelu 44838 (MH)	Epiphytic	January–March	KA, KL, TN, MH, OR
96.	*Gastrochilus flabelliformis* (Blatt. & McCann) C.J. Saldanha	Saldhana 11513 (JCB)	Epiphytic	October–November	KA, KL, GA, MH
97.	*Gastrochilus obliqus* (Lindl.) Kuntze	Karuppusamy *et al.*, 2021	Epiphytic	November–December	KL, NE India
98.	**Gastrodia silentvalleyana* C.S. Kumar, P.C.S. Kumar, Sibi & S. Anil Kumar	Sibi 43300 (Holo,TBGT!)	Saprophytic	December–January	KL
99.	*Geodorum densiflorum* (Lam.) Schltr.	Lawson 50389 (MH)	Terrestrial	April–June	KL

100.	*Goodyera procera* (Ker Gawl.) Hook.	Murugesan and Anusuba 142720 (MH)	Terrestrial	April–June	KL
101.	*Habenaria barbata* Wight ex Hook. f.	Karuppusamy *et al.*, 2021	Terrestrial	September–December	KA, KL, TN, AP, OR
102.	**Habenaria barnesii* Summerh. ex C.E.C. Fisch.	Murugesan and Anusuba 147860 (MH)	Terrestrial	August–September	KL, TN
103.	**Habenaria brachyphylla* (Lindl.) Aitch.	Murugesan and Anusuba 149884 (MH)	Terrestrial	August–November	KL, TN, MH, OR
104.	*Habenaria commelinifolia* (Roxb.) Wall. ex Lindl.	Diwakar, 2019	Terrestrial	August–December	BR, CG, HP, J&K, JK, PI, MP, MH, NE India, PB, UK, WB.
105.	**Habenaria cephalotes* Lindl.	Murugesan and Anusuba 148481 (MH)	Terrestrial	July–September	KA, KL, TN, MH
106.	**Habenaria crinifera* Lindl.	Karuppusamy *et al.*, 2021	Terrestrial	August–December	KA, KL, TN
107.	**Habenaria decipiens* Wight	Saldhana 11150 (JCB)	Terrestrial	September–November	KL, TN
108.	**Habenaria denticulata* Reichb. f.	Barber 40923 (MH)	Terrestrial	August–December	TN
109.	*Habenaria digitata* Lindl.	Murugesan and Anusuba 148430 (MH)	Terrestrial	August–November	PI, HP, JK, UK, NE India, WB
110.	*Habenaria diphylla* (Nimmo) Dalzell	Karuppusamy *et al.*, 2021	Terrestrial	July–November	PI, NE India, UK, WB
111.	**Habenaria elliptica* Wight	Murugesan and Anusuba 148486 (MH)	Terrestrial	August–September	KA, KL, TN
112.	**Habenaria elwesii* Hook. f.	Karuppusamy *et al.*, 2021	Terrestrial	August–December	KA, KL, TN, GA
113.	**Habenaria foliosa* A. Rich.	Karuppusamy *et al.*, 2021	Terrestrial	August–September	KA. KL, MH
114.	*Habenaria furcifera* Lindl.	Viswanathan 820 (MH)	Terrestrial	August–December	KL, MP, MH, NA, OR, PB, SK, TN, UP, UK, WB
115.	**Habenaria grandifloriformis* Blatt. & McCann	Karuppusamy *et al.*, 2021	Terrestrial	June–December	KA, KL, TN, AS, CG, GA, GJ, MH, MP, OR.
116.	**Habenaria heyneana* Lindl.	Murugesan and Anusuba 147856 (MH)	Terrestrial	August–December	KA, KL, AP, GA, MH, TN
117.	**Habenaria hollandiana* Santapau	Lawson 60321 (MH)	Terrestrial	September–December	AP, JK, KA, MH, TN
118.	*Habenaria longicorniculata* J. Graham	Murugesan and Anusuba 146791 (MH)	Terrestrial	August–December	PI, CG, JK, GJ, MH, RJ
119.	**Habenaria longicornu* Lindl.	Murugesan and Anusuba 14786, 146791 (MH)	Terrestrial	August–December	PI
120.	*Habenaria malintana* (Blanco) Merr.	Karuppusamy *et al.*, 2021	Terrestrial	August–December	KL
121.	*Habenaria marginata* Colebr.	Dalzel 6 (K)	Terrestrial	August–December	Throughout India
122.	**Habenaria multicaudata* Sedgw.	Murugesan and Anusuba 147858 (MH)	Terrestrial	August–December	KA, KL, TN
123.	*Habenaria ovalifolia* Wight	Karuppusamy *et al.*, 2021	Terrestrial	August–December	KA, KL, TN, MH
124.	**Habenaria panigrahiana* S. Misra	Karuppusamy *et al.*, 2021	Terrestrial	July–September	KL, TN, AP, MH, OR
125.	*Habenaria plantaginea* Lindl.	Murugesan and Anusuba 153243 (MH)	Terrestrial	August–December	KA, KL. AP, CG, GA, HR, JK, MP, MH, OR, PB, UK, WB
126.	**Habenaria polyodon* Hook. f.	Murugesan and Anusuba 149817 (MH)	Terrestrial	September – December	TN
127.	**Habenaria rariflora* A. Rich.	Murugesan and Anusuba 149504 (MH)	Terrestrial	August–December	KA, KL, TN, AP, MH
128.	**Habenaria richardiana* Wight	Murugesan and Anusuba 147857 (MH)	Terrestrial	August–December	KL, TN, MH
129.	**Habenaria roxburghii* Nicolson	Karuppusamy *et al.*, 2021	Terrestrial	August–December	KA, KL, TN, AP, CG, MH, MP, OR
130.	**Habenaria sahyadrica* K.M.P. Kumar, T.K. Nirmesh, V.B. Sreek. & Kumar	Nirmesh and Prabhukumar 28501 (holotype: KFRI!)	Terrestrial	October–January	KL
131.	*Habenaria viridiflora* (Rottler ex Sw.) R.Br. ex Spreng.	Karuppusamy S.*et al*, 2021	Terrestrial	August–December	KA, KL, TN
132.	*Hetaeria oblongifolia* Blume	Murugesan and Anusuba 142721 (MH)	Terrestrial	February–March	KL, TN, AN
133.	**Ipsea malabarica* (Rchb. f.) Hook. f.	Murugesan and	Terrestrial	October–	KL

		Anusuba 153372 (MH)		December	
134.	**Liparis atropurpurea* Lindl.	Murugesan and Anusuba 148431 (MH)	Terrestrial	June–September	KA, KL, TN
135.	*Liparis barbata* Lindl.	Ratheesh Narayanan and Sivadasan, 2009	Terrestrial	June–July	KL, AR
136.	**Liparis biloba* Wight	Murugesan and Anusuba (MH)	Terrestrial	July–September	KA, KL, TN
137.	*Liparis cespitosa* (Lam.) Lindl.	Murugesan and Anusuba (MH)	Epiphytic	August–September	KL, TN, NE India, UK, WB
138.	*Liparis deflexa* Hook. f.	Murugesan and Anusuba 148245 (MH)	Terrestrial	August–September	KA, KL, AP, AS, CG, GA, SK, UK, WB
139.	*Liparis elliptica* Wight	Murugesan and Anusuba 148204 (MH)	Epiphytic	April–November	KA, KL, TN, AP, AR, MN, MG, OR, SK.
140.	*Liparis odorata* (Willd.) Lindl.	Karuppusamy *et al.*, 2021	Terrestrial	June–September	KA, KL, TN, AP, AR, AS, GA, JK, MH, MN, NA, OR, SK, UK, WB
141.	**Liparis sanamalabarica* P.M. Salim	Salim 0417– 0419 (MSSRF!)	Epiphytic or lithophyte	August–October	KL
142.	*Liparis platyphylla* Ridley	Subramanyam 10460 (MH)	Terrestrial	July	KA, TN
143.	*Liparis viridiflora* (Blume) Lindl.	Murugesan and Anusuba 153317 (MH)	Epiphytic	September–March	KA, KL, TN, AP, NE India, OR, UK, WB
144.	*Liparis wightiana* Thwaites	Murugesan and Anusuba 153321 (MH)	Terrestrial	June–September	KA, KL, TN
145.	**Luisia evangelinae* Blatt. & McCann	Ratheesh Narayanan and Sivadasan, 2009	Epiphytic	January–March	KA, KL
146.	**Luisia macrantha* Blatt. & McCann	Murugesan and Anusuba 153322 (MH)	Epiphytic	January–September	KA, KL
147.	*Luisia tenuifolia* Blume	Murugesan and Anusuba 153221 (MH)	Epiphytic	July–January	KA, KL, GA, MH
148.	*Luisia zeylanica* Lindl.	Murugesan and Anusuba 153222 (MH)	Epiphytic	September–May	KL, TN, AP, NE India, BR, GA, HP, MP, MH, OR, UK, WB
149.	*Nervilia concolor* (Blume) Schltr.	Murugesan and Anusuba 153224 (MH)	Terrestrial	September–April	KA, KL, TN, AN, AP, NE India, OR, RJ, UP, WB
150.	*Nervilia infundibulifolia* Blatt. & McCann	Sivaranjan and Mathew 1997	Terrestrial	June–July	KL, TN, AP, AR, JK, MH, OR, UK
151.	*Nervilia plicata* (Andrews) Schltr.	Murugesan and Anusuba 153226 (MH)	Terrestrial	February–November	Throughout India
152.	*Nervilia simplex* (Thouars) Schltr.	Murugesan and Anusuba 153307 (MH)	Terrestrial	May–July	KL, TN, AP, AR, GA, JK, MH, MN, OR, SK, UK
153.	**Oberonia anamalayana* J. Joseph	Karuppusamy *et al.*, 2021	Epiphytic	March–September	KL, TN
154.	**Oberonia arnottiana* Wight	Murugesan and Anusuba 148452 (MH)	Epiphytic	August–November	KL, TN
155.	*Oberonia bicornis* Lindl.	Murugesan and Anusuba 153309 (MH)	Epiphytic	October–November	KA, KL, TN, MH, NE India
156.	*Oberonia brachystachys* Lindl.	Nair 56754 (MH)	Epiphytic	January–April	KA, KL, TN, GA, MG, SK, WB
157.	**Oberonia brunoniana* Wight	Murugesan and Anusuba 148404 (MH)	Epiphytic	June–September	KA, KL, TN, AP, GA, MH
158.	**Oberonia chandrasekharanii* V.J. Nair, V.S. Ramach. & R. Ansari	Murugesan and Anusuba 142722 (MH)	Epiphytic	August–October	KA, KL, TN
159.	*Oberonia ensiformis* (Sm.) Lindl.	Deb 31605 (MH)	Epiphytic	August–March	KA, KL, TN, AN, AP, MH, NE India, OR, UK, WB
160.	**Oberonia falconeri* Hook.f.	Diwakar, 2019	Epiphytic	September–October	KA, MH, OR
161.	**Oberonia josephi* C.J. Saldanha	Diwakar, 2019	Epiphytic	June–September	KA, KL
162.	*Oberonia maxima* C.S.P. Parish ex Hook. f.	Kaliamoorthy and Saravanan 109649 (MH).	Epiphytic	September–November	TN, NE India.
163.	*Oberonia mucronata* (D. Don) Ormerod & Seidenf.	Saldhana C55829 (JCB)	Epiphytic	September–December	KA, KL, TN, AN, AP, NE

					India, CG, GA, GJ, OR
164.	**Oberonia muthikulamensis* K. Prasad, K.M.P. Kumar & P. Sudheshna	Prasad 008471 (CAL)	Epiphytic	November–January	KL
165.	**Oberonia nayarii* R. Ansari & N.P. Balakr.	Murugesan and Anusuba 148162 (MH)	Epiphytic	December–July	KA, KL, TN
166.	**Oberonia platycaulon* Wight	Deb 31599 (MH)	Epiphytic	July–December	KA, KL, TN
167.	**Oberonia proudlockii* King & Pantl.	Karuppusamy *et al.*, 2021	Epiphytic	September–December	KA, KL, TN, MH, OR
168.	**Oberonia sebastiana* B.V. Shetty & Vivek.	Karuppusamy *et al.*, 2021	Epiphytic	August – December	KL, TN
169.	**Oberonia swaminathanii* Ratheesh, Manudev & Sujanapal	Murugesan and Anusuba 153324 (MH)	Epiphytic	August–September	KL
170.	**Oberonia verticillata* Wight	Murugesan and Anusuba 149520 (MH)	Epiphytic	May – September	KA, KL, TN, GA, MH
171.	**Oberonia wightiana* Lindl.	Murugesan and Anusuba 148337 (MH)	Epiphytic	August – December	KA, KL, TN
172.	**Oberonia wynadensis* Sivad. & R.T. Balakr.	Murugesan and Anusuba 153325 (MH)	Epiphytic	August – December	KL
173.	*Pachystoma pubescens* Blume	Murugesan and Anusuba 142743 (MH)	Terrestrial	January – May	KA, KL, TN, AN, NE India, MP, OR, PJ, WB
174.	*Papilionanthe subulata* (Willd.) Garay	Murugesan and Anusuba 142745 (MH)	Epiphytic	January – April	KA, KL, TN
175.	*Pecteilis gigantea* (Sm.) Raf.	Murugesan and Anusuba 153323 (MH)	Terrestrial	July–October	KA, KL, TN, AP, BR, CG, GA, GJ, HP, J&K, JK, MP, OR
176.	*Peristylus aristatus* Lindl.	Murugesan and Anusuba 149885 (MH)	Terrestrial	July–September	KA, KL, TN, GA, GJ, MH
177.	**Peristylus brachypyhllus* A. Rich.	Murugesan and Anusuba 149839 (MH)	Terrestrial	October–December	KL, TN
178.	*Peristylus densus* (Lindl.) Santapau & Kapadia	Karuppusamy *et al.*, 2021	Terrestrial	July–September	KA, KL, TN, NE India, MH
179.	*Peristylus goodyeroides* (D. Don) Lindl.	Vajravelu 41787 (MH)	Terrestrial	May–October	KA, KL, TN, CG, JK, MP, MH, OR, UK, WB
180.	**Peristylus lancifolius* A. Rich	Perrottet 382, 873 (P).	Terrestrial	August–September	TN
181.	*Peristylus lawii* Wight	Lawson 10935 (MH).	Terrestrial	July–October	KA, KL, TN, AP, BR, GJ, JK, MP, MH, OR, UK
182.	*Peristylus plantagineus* (Lindl.) Lindl.	Murugesan and Anusuba 153210 (MH)	Terrestrial	July–December	KA, KL, TN, AP, CG, GA, GJ, MP, MH, OR, WB
183.	*Peristylus richardianus* Wight	Karuppusamy *et al.*, 2021	Terrestrial	August–October	KL, TN. AR, MH, MN, MG
184.	*Peristylus secundus* (Lindl.) Rathakr.	Lobb K000974214 (K)	Terrestrial	September	KA, KL, TN
185.	*Peristylus spiralis* A. Rich.	Murugesan and Anusuba 150305 (MH)	Terrestrial	July–October	KA, KL, TN, MH
186.	**Peristylus stocksii* (Hook. f.) Kraenzl.	Karuppusamy *et al.*, 2021	Terrestrial	July-September	KA, TN, BR, GJ, GA. MP, MH.
187.	*Phalaenopsis deliciosa* Rchb.f.	Saldhana 8836 (JCB)	Epiphytic	June–August	KA, KL, TN, AN, AP, NE India, UK.
188.	*Phalaenopsis difformis* (Wall. ex Lindl.) Kocyan & Schuit.	Manilal, 1988	Epiphytic	May–July	KL**,** NE India, UK, WB.
189.	*Phalaenopsis mysorensis* C.J. Saldanha	Murugesan and Anusuba 153326 (MH)	Epiphytic	February–May	KA, KL, TN
190.	*Pholidota imbricata* Hook.	Murugesan and Anusuba 142723 (MH)	Epiphytic	September–March	Throughout India
191.	*Phreatia elegans* Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	January–August	KL, TN, NE India, WB
192.	**Pinalia mysorensis* (Lindl.) Kuntze	Subramanyam 10428 (MH)	Epiphytic	July–November	KA, KL, TN, MH
193.	**Pinalia polystachya* (A. Rich.) Kuntze	Murugesan and Anusuba 146789	Epiphytic	July–February	KA, KL, TN
194.	**Plectoglossa perrottetiana* **(**A. Rich.) K. Prasad	Murugesan and Anusuba 147838 (MH)	Terrestrial	August–December	KA, KL, TN, MH
195.	**Podochilus malabaricus* Wight	Karuppusamy *et al.*, 2021	Epiphytic	October–December	KL, TN
196.	*Polystachya concreta* (Jacq.) Garay and H.R. Sweet	Karuppusamy *et al.*, 2021	Epiphytic	July–December	KA, KL, TN, AN, AP, NE India, OR

197.	*Porpax braccata* (Lindl.) Schuit.Y.P. Ng & H.A. Pedersen	Murugesan and Anusuba 153434 (MH)	Epiphytic or lithophyte	April–October	KA, KL, TN, GA, MH, UK
198.	***Porpax exilis* (Hook.f.) Schuit. Y.P. Ng & H.A. Pedersen	Murugesan and Anusuba 147801 (MH)	Epiphytic or lithophyte	January–May	KA, KL, TN, MH
199.	**Porpax filiformis* (Wight) Schuit., Y.P. Ng & H.A. Pedersen	Murugesan and Anusuba 148228 (MH)	Epiphytic	July–December	KA, KL, TN, GA, GJ, MH
200.	**Porpax jerdoniana* (Wight) Rolfe	Ansari 51452 (MH)	Epiphytic	August–November	KA, KL, TN, AN, GA, MH
201.	**Porpax microchilos* **(**Dalzell) Schuit., Y.P. Ng & H.A. Pedersen	Murugesan and Anusuba 148239 (MH)	Epiphytic	July–November	KA, KL, TN, GA, MH
202.	*Porpax reticulata* Lindl.	Vajravelu 43120 (MH)	Epiphytic	April–June	KA, KL, TN, GA, MH
203.	*Pteroceras viridiflorum* (Thwaites) Holttum	Murugesan and Anusuba 153300 (MH)	Epiphytic	April–June	KL, TN
204.	**Pteroceras monsooniae* Sasidh. & Sujanapal	Nayar *et al*., 2014	Epiphytic	May–June	KL
205.	*Rhynchostylis retusa* (L.) Blume	Vajravelu 41714 (MH)	Epiphytic	June–December	Throughout India
206.	**Robiquetia gracilis* (Lindl.) Garay	Karuppusamy *et al.*, 2021	Epiphytic	December–June	KL, TN
207.	**Robiquetia josephiana* Manilal & C.S. Kumar	Murugesan and Anusuba 142746 (MH)	Epiphytic	October–November	KL, TN
208.	*Satyrium nepalense* D. Don	Murugesan and Anusuba 147806 (MH)	Terrestrial	September–December	KA, KL, TN, AP, NE India, J&K, UK, WB
209.	**Schoenorchis jerdoniana* (Wight) Garay	Vivekananthan 40732 (MH)	Epiphytic	August–March	KA, KL, TN
210.	**Schoenorchis manilaliana* Muktesh & Stephen	Nayar *et al*., 2014	Epiphytic	November–May	KL
211.	**Schoenorchis nivea* (Lindl.) Schltr.	Karuppusamy *et al.*, 2021	Epiphytic	June–October	KL, TN
212.	**Schoenorchis smeeana* (Rchb. f) Jalal, Jayanthi & Schuit.	Murugesan and Anusuba 142764 (MH)	Epiphytic	June–February	KA, KL, TN
213.	**Seidenfadeniella filiformis* (Rchb.f.) Christenson & Ormerod, K.M. Mathew	Sharma 39874 (MH)	Epiphytic	May–September	KL, TN
214.	**Seidenfadeniella rosea* (Wight) Kumar, C.S. Kumar & Manilal	Shetty 34105 (MH)	Epiphytic	February–July	KA, KL, TN
215.	*Sirhookera lanceolata* (Wight) Kuntze	Ansari 51491 (MH)	Epiphytic	January–August	KA, KL, TN
216.	*Sirhookera latifolia* (Wight) Kutze	Murugesan and Anusuba 148240 (MH)	Epiphytic	August–December	KA, KL, TN
217.	**Smithsonia maculata* (Dalzell) C.J. Saldanha	Vajravelu 44841 (MH)	Epiphytic	June–September	KA, KL, TN, GA, MH
218.	**Smithsonia straminea* C.J. Saldanha	Vajravelu 48885 (CAL)	Epiphytic	April–May	KA, KL, GA, MH
219.	**Smithsonia viridiflora* (Dalzell) C.J. Saldanha	Nayar *et al.*, 2014	Epiphytic	January–April	GA, KA, KL, MH
220.	*Spiranthes sinensis* (Pers.) Ames	Vajravelu 38420 (MH)	Epiphytic	September–December	KA, KL, TN
221.	*Taeniophyllum alwisii* Lindl.	Ansari 51452 (MH)	Epiphytic	February–June	KL
222.	*Taeniophyllum scaberulum* Hook. f.	Nayar *et al.*, 2014	Terrestrial	February–June	KL, TN, AR, AN
223.	*Spathoglottis plicata* Blume	Murugesan and Anusuba 148214 (MH)	Terrestrial	November–May	KA, KL, TN
224.	*Tainia bicornis* (Lindl.) Rchb. f.	Murugesan and Anusuba 142724 (MH)	Epiphytic	September–January	KL, TN
225.	*Thelasis pygmaea* (Griff.) Lindl.	Karuppusamy *et al.*, 2021	Epiphytic	April–June	KA, KL, TN, AN, NE India, WB
226.	*Thrixspermum formosanum* (Hayata) Schltr.	Kaliamoorthy and Saravanan 109641 (MH).	Epiphytic	April-May	TN, NE India
227.	**Thrixspermum musciflorum* A.S. Rao & J. Joseph	Vajravelu 44950 (MH)	Epiphytic	June–September	KL, TN, NE India
228.	*Thrixspermum walkeri* Seidenf. & Ormerod	Ratheesh Narayanan and Sivadasan, 2009	Epiphytic	December–March	KL
229.	*Trichoglottis tenera* (Lindl.) Rchb.f.	Murugesan and Anusuba 142768 (MH)	Epiphytic	April–October	KA, KL, TN
230.	*Tropidia angulosa* (Lindl) Blume	Vajravelu, 1990	Terrestrial	February–October	AN, PI, NE India, WB
231.	*Taprobanea spathulata* (L.) Christenson	Barber 6765 (CAL)	Epiphytic	September–January	KA, KL, TN, AP
232.	*Vanda tessellata* (Roxb.) Hook. ex D. Don	Murugesan and Anusuba 153209 (MH)	Epiphytic	April –June	Throughout India
233.	*Vanda testacea* (Lindl.) Rchb. f.	Murugesan and Anusuba 149889 (MH)	Epiphytic	February–October	Throughout India.
234.	*Vanda thwaitesii* Hook. f.	Ratheesh Narayanan and	Epiphytic	April–	KA, KL

		Sivadasan, 2009		September	
235.	*Vanda wightii* Rchb.f., H. Trimen	Wight 2977 (CAL)	Epiphytic	September–December	KA, KL, TN, GA
236.	*Vanilla walkerae* Wight	Murugesan and Anusuba 153212 (MH)	Terrestrial	April–May	KA, KL, TN, AP
237.	**Zeuxine chowdheryi* Av. Bhattacharjee & Sabap.	Sabapathy 46024 (CAL)	Terrestrial	May – July	TN
238.	*Zeuxine gracilis* (Breda) Blume	Murugesan and Anusuba 153320 (MH)	Terrestrial	January–May	KA, KL, TN, NE India, GA, MH, MG, OR
239.	*Zeuxine longilabris* (Lindl.) Trimen	Murugesan and Anusuba 148129	Terrestrial	September–December	KA, KL, TN, NE India, BR, MH, OR, WB
240.	*Zeuxine strateumatica* (L.) Schltr.	Panigrahi 5533 (CAL)	Terrestrial	October–December	Throughout India

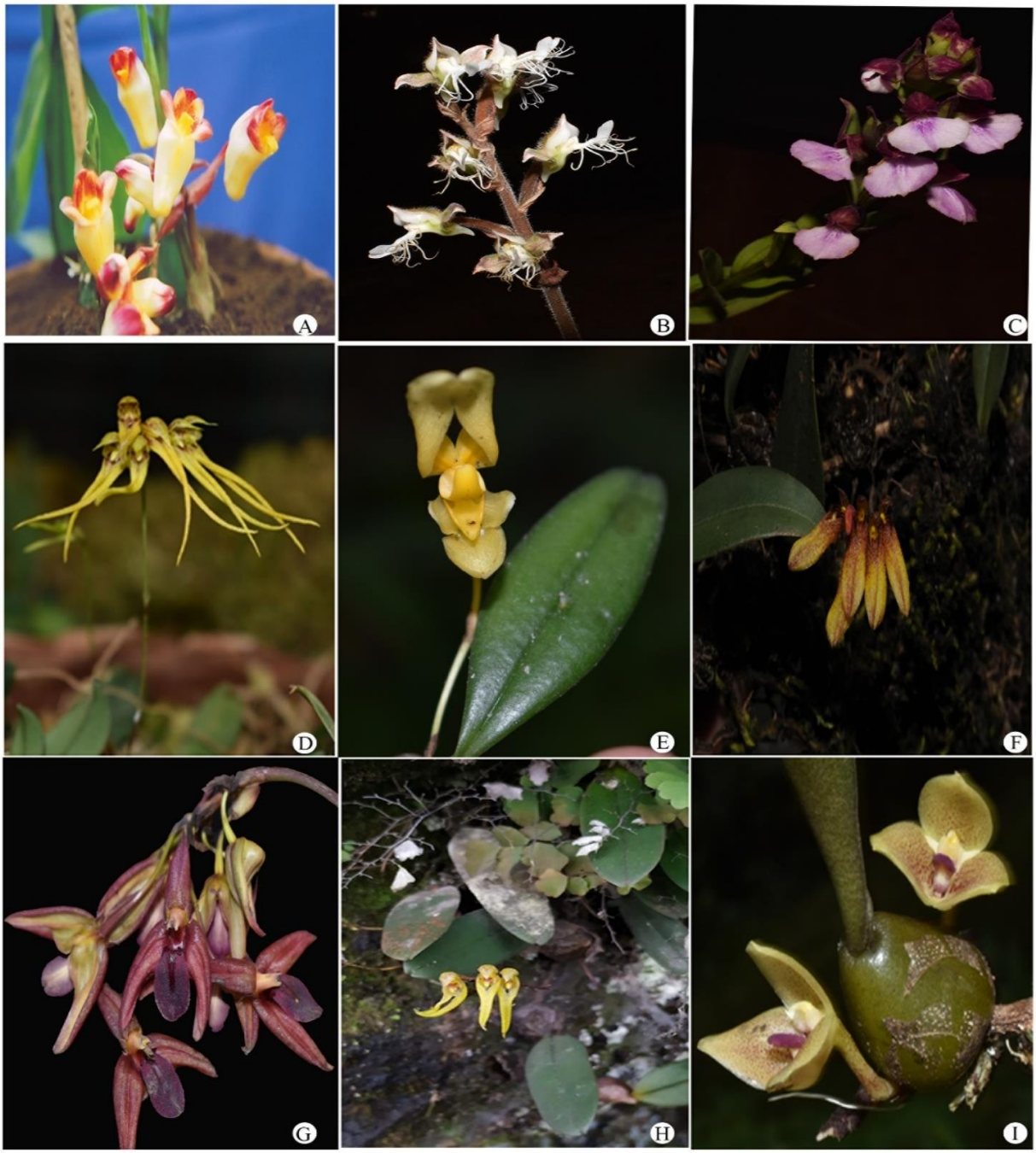

PLATE 1: A. *Acanthephippium* bicolor Lindl., **B.** *Anoectochilus elatus* Lindl., **C.** *Brachycorythis iantha* (Wight) Summerh., **D.** *Bulbophyllum acutiflorum* A. Rich., **E.** *Bulbophyllum aureum* (Hook. f) J.J. Sm., **F.** *Bulbophyllum fischeri* Seidenf., **G.** *Bulbophyllum fuscopurpureum* Wight **H.** *Bulbophyllum kaitiense* (Wight) Rchb.f., **I.** *Bulbophyllum stocksii* (Benth. ex Hook.f.) J.J. Verm., Schuit. & de Vogel

PLATE 2: A. *Bulbophyllum tremulum* Wight, **B.** *Calanthe triplicata* (Willemet) Ames, **C.** *Cheirostylis flabellata* (A. Rich.) Wight, **D.** *Chilochista glandulosa* Blatt. & McCann, **E.** *Coelogyne breviscapa* Lindl., **F.** *Coelogyne mossiae* Rolfe., **G.** *Coelogyne nervosa* A. Rich., **H.** *Crepidium intermedium* (A. Rich.) Sushil K. Singh, Agrawala & Jalal, **I.** *Crepidium versicolor* (Lindl.) Sushil K. Singh, Agrawala & Jalal

PLATE 3: A. *Dendrobium anilii* P.M. Salim, J. J. Mathew & Szlach., **B.** *Dendrobium aqueum* Lindl., **C.** *Dendrobium barbatulum* Lindl., **D.** *Dendrobium heterocarpum* Wall. ex Lindl., **E.** *Dendrobium heyneanum* Lindl., **F.** *Dendrobium macrostachyum* Lindl., **G.** *Dendrobium nanum* Hook. f., **H.** *Flickingeria nodosa* (Dalzell) Seidenf.**I.** *Dendrobium ovatum* (L.) Kraenzl

PLATE 4: A. *Dendrobium salaccense* (Blume) Lindl., **B.** *Disperis neilgherrensis* Wight, **C.** *Epipogium roseum* (D.Don) Lindl. **D.** *Eulophia graminea* Lindl., **E.** *Gastrochilus acaulis* (Lindl.) Kuntze, **F.** *Goodyera procera* (Ker Gawl.) Hook, **G.** *Habenaria barnesii* Summerh. ex C.E.C. Fisch., **H.** *Habenaria brachyphylla* (Lindl.) Aitch., **I.** *Habenaria cephalotes* Lindl., **J.** *Habenaria digitata* Lindl., **K.** *Habenaria elliptica* Wight, **L.** *Habenaria heyneana* Lindl., **M.** *Habenaria longicorniculata* Graham

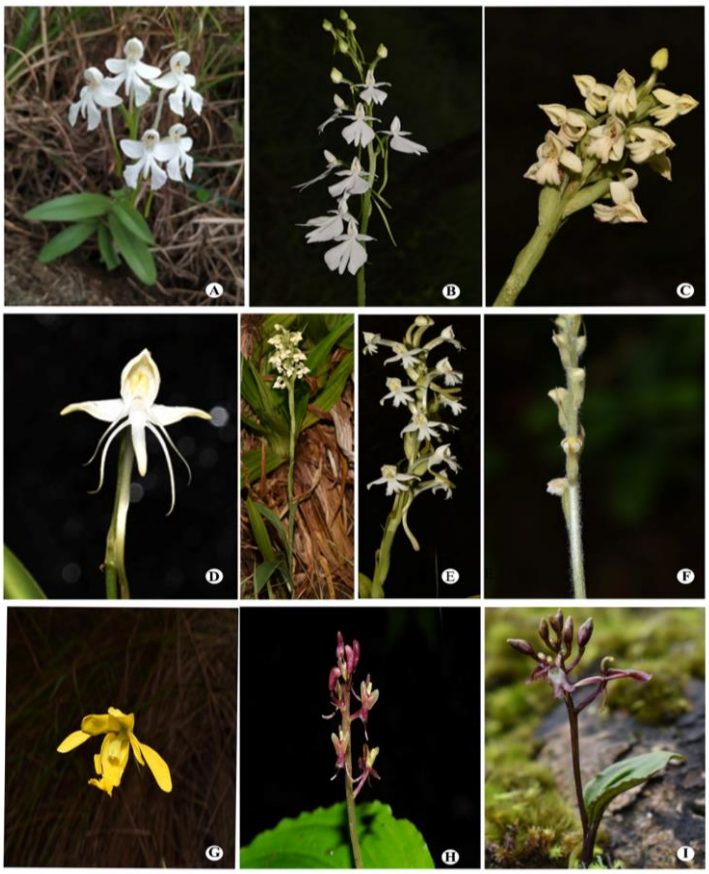

PLATE 5: A. *Habenaria longicornu* Lindl., **B.** *Habenaria plantaginea* Lindl., **C.** *Habenaria polyodon* Hook. f., **D.** *Habenaria rariflora* A. Rich. (Lindl.) Kuntze, **E.** *Habenaria richardiana* Wight, **F.** *Hetaeria oblongifolia* Blume, **G.** *Ipsea malabarica* (Rchb. f.) Hook. f., **H.** *Liparis atropurpurea* Lindl., **I.** *Liparis biloba* Wight

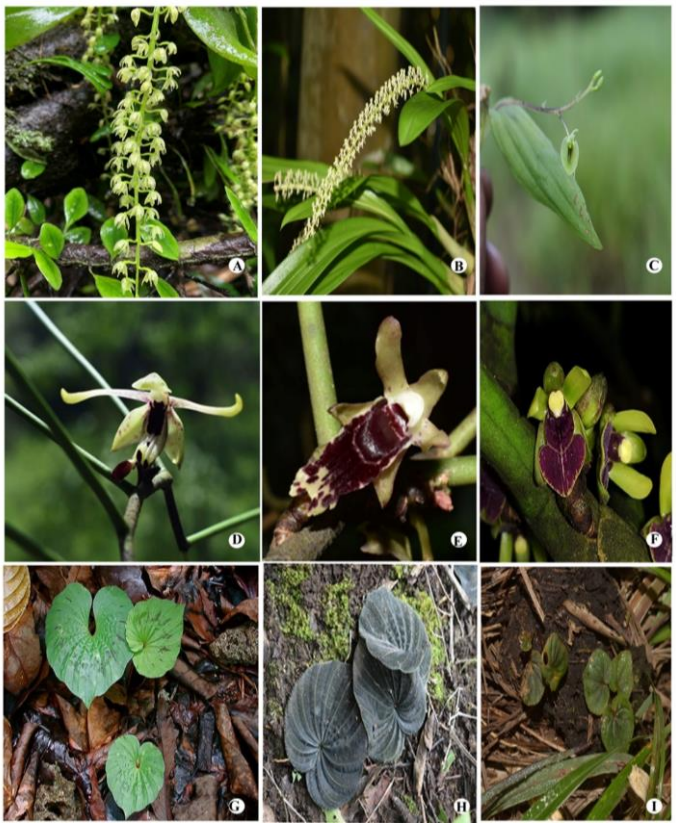

PLATE 6: A. *Liparis elliptica* Wight, **B.** *Liparis viridiflora* (Blume) Lindl., **C.** *Liparis wightiana* Thwaites **D.** *Luisia macrantha* Blatt. & McCann, **E.** *Luisia tenuifolia* Blume, **F.** *Luisia zeylanica* Lindl., **G.** *Nervilia concolor* (Blume) Schltr., **H.** *Nervilia plicata* (Andrews) Schltr., **I.** *Nervilia simplex* (Thouars) Schltr.

PLATE 7: A. *Oberonia arnottiana* Wight, **B.** *Oberonia bicornis* Lindl., **C.** *Oberonia brunoniana* Wight, **D.** *Oberonia chandrasekharanii* V.J. Nair, V.S. Ramach. & R. Ansari **E.,** *Oberonia nayarii* R. Ansari & N.P. Balakr., **F.** *Oberonia swaminathanii* Ratheesh, Manudev & Sujanapal, **G.** *Oberonia verticillata* Wight **H.** *Oberonia wightiana* Lindl., **I.** *Oberonia wynadensis* Sivad. & R.T. Balakr., **J.** *Pachystoma pubescens* Blume, **K.** *Papilionanthe subulata* (Willd.) Garay, **L.** *Pecteilis gigantea* (Sm.) Raf.

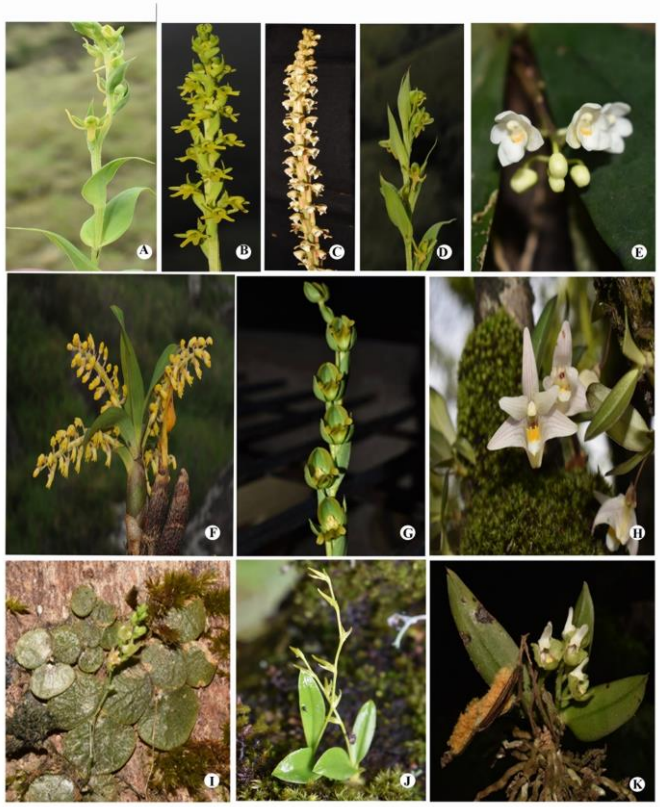

PLATE 8: A. *Peristylus aristatus* Lindl., **B.** *Peristylus brachypyhllus* A. Rich., **C.** *Peristylus plantagineus* (Lind.) Lindl., **D.** *Peristylus spiralis* A. Rich., **E.** *Phalaenopsis mysorensis* C.J. Saldanha, **F.** *Pinalia polystachya* (A. Rich.) Kuntze, **G.** *Plectoglossa perrottetiana* **(**A. Rich.) K. Prasad, **H.** *Porpax braccata* (Lindl.) Schuit. Y.P. Ng & H.A. Pedersen, **I.** *Porpax exilis* (Hook.f.) Schuit. Y.P. Ng & H.A. Pedersen, **J.** *Eria nana* A.Rich., Y.P. Ng & H.A. Pedersen, **K.** *Pteroceras viridiflorum* (Thwaites) Holttum

PLATE 9: A. *Robiquetia josephiana* Manilal & C.S. Kumar, **B.** *Satyrium nepalense* D. Don, **C.** *Schoenorchis smeeana* (Rchb. f.) Jalal, Jayanthi & Schuit., **D.** *Tainia bicornis* (Lindl.) Rchb. f., **E.** *Vanda tessellata* (Roxb.) Hook. ex D. Don, **F.** *Vanda testacea* (Lindl.) Rchb. f., **G.** *Vanilla walkerae* Wight flower, **H.** *Vanilla walkerae* Wight Fruit, **I.** *Zeuxine gracilis* (Breda) Blume, **J.** *Zeuxine longilabris* (Lindl.) Trimen

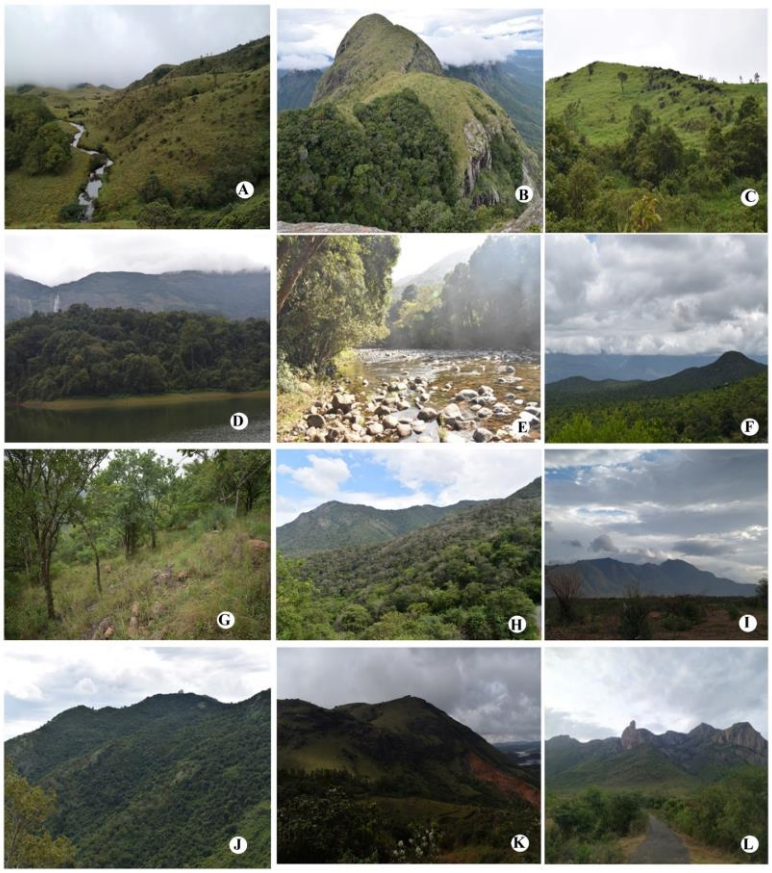

PLATE 10: A. Montane grasslands, **B.** Tropical semi evergreen forests, **C.** Southern montane wet evergreen forests, **D.** Tropical moist evergreen forests **E.** Semi evergreen riparian forests, **F.** Tropical dry evergreen forests, **G.**, Scrub forests, **H.** Southern dry mixed deciduous forests, **I.** Tropical thorn forests **J.** Tropical semi-deciduous forests, **K.** Montane shoals, **L.** Tropical deciduous forests

ABBREVIATIONS

AP - Andhra Pradesh; G - Goa; KA - Karnataka; KL - Kerala; MH - Maharashtra; TN - Tamil Nadu; AP-Andhra Pradesh; AR-Arunachal Pradesh; AS-Assam; BR-Bihar; CG-Chhattisgarh; GA-Goa; Gujarat; HR-Haryana; HP-Himachal Pradesh; J&K- Jammu and Kashmir; JK- Jharkhand; KA- Karnataka; KL-Kerala; MP-Madhya Pradesh; MH- Maharashtra; MN-Manipur; NL-Nagaland; OR-Orissa; PB-Punjab; RJ-Rajasthan; SK-Sikkim; TN-Tamil Nadu; TR-Tripura; UK-Uttarakhand; UP-Uttar Pradesh; WB-West Bengal; AN- Andaman and Nicobar Islands; DN-Dadra and Nagar Haveli; DD-Daman and Diu; DL-Delhi; LD-Lakshadweep. NE India- North East India, PI – Peninsular India, Endemic taxa denoted by * (asterisk) symbol.

CONCLUSIONS

Orchids are the natural ornamental plants which attract people from diverse groups and Indian orchids are paradoxically victims of their own beauty and popularity (Sangita Das *et al*, 2021). Peninsular India with its rich orchid diversity, amalgamated with unique topography can be exploited as natural hub for the commercial cultivation of ornamental orchid species both as live materials as well as cut flowers (Jayanthi and Jeewan Singh Jalal, 2023). The present explorations resulted in recording 113 endemic species belonging to 29 genera of which 15 species are strictly endemic to NBR region. Totally 66 species are reported from Tamil Nadu part of NBR, 51 taxa from Kerala part and 25 taxa are from Karnataka part. Most of the dominant species like *Habenaria* sp., *Peristylus* sp., are seen in high altitude grasslands, similarly in the Evergreen shola forests, the dominant genera are *Oberonia*, *Porpax*, *Bulbophyllum*, *Liparis* etc. There are new records like *Dendrobium anilii* P.M. Salim, J. J. Mathew & Szlach which is an endemic species as a new distributional record for Tamil Nadu (Karuppusamy *et al*, 2021). *Pteroceras viridiflorum* (Thwaites) Holttum which is a new record for India collected in Velliangiri hills (Sulaiman *et al*, 2022). In addition to that *Oberonia maxima* C.S.P. Parish ex Hook. f., *Thrixspermum formosanum* (Hayata) Schltr are new records for peninsular India (Kaliamoorthy and Saravanan, 2019). Some of the rare and threatened orchids are *Bulbophyllum fuscopurpureum* Wight, *Bulbophyllum kaitiense* (Wight) Rchb. f., *Bulbophyllum nodosum* (Rolfe) J.J. Sm., *Dendrobium anilii* P.M. Salim, J. J. Mathew and Szlach, *Gastrodia silentvalleyana* C.S. Kumar, P.C.S. Kumar, Sibi & S. Anil Kumar, *Habenaria polyodon* Hook.f. *Habenaria richardiana* Wight, *Plectoglossa perrottetiana* **(**A. Rich.) K. Prasad, *Ipsea malabarica* (Rchb. f.) Hook. f., *Robiquetia josephiana* Manilal & C.S. Kumar, *Robiquetia gracilis* (Lindl.) Garay, etc. From last decade, NBR have witnessed large scale destruction resulting in considerable decline in plant diversity in general and orchid diversity in particular leading to extinction of many of the endemic taxa. Hence, conservation strategies such as *in situ*, *ex situ*, cryopreservation, orchidarium maintenance and community efforts assumes greater importance to save the dwindling orchid wealth of NBR. Nevertheless, the present study points out that the orchid flora of NBR provides a baseline data which is very much useful to the horticulturists, garden enthusiasts, researchers and orchid conservators. However, it is obvious that as large number of orchids enjoy an economic status and demand, their exploitation from nature will continue. To reduce this pressure, mass propagation through conventional as well as tissue culture methods would also be an important strategy for orchid germplasm conservation.

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Conflict of Interest. None.

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