

A CHECKLIST TO THE ORCHIDS OF BILIGIRI RANGASWAMY TEMPLE TIGER RESERVE, WESTERN GHATS, INDIA

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ABSTRACT. This paper provides a comprehensive account of the orchid diversity in the Biligiri Rangaswamy Temple Tiger Reserve (BRTTR), Karnataka, India. A total of 97 orchid species belonging to 33 genera were documented. This includes 50 terrestrial and 47 epiphytic orchids, including one mycoheterotrophic orchid, *Epipogium roseum*, and a climbing leafless *Vanilla walkerae*. Additionally, 39 endemic orchids were documented during the study. The evergreen forests provide the most habitable conditions for the orchids in BRTTR. The present study adds 26 species to the orchid flora of BRTTR. About 49% of the orchid flora of Karnataka state and 32% of orchids of Western Ghats is found in BRTTR, making this area a microcenter for orchid diversity.

KEYWORDS/PALABRAS CLAVE: Biligirirangan, biodiversity hotspot, bosque siempreverde, checklist, diversidad, diversity, evergreen forest, Karnataka, listado, Orchidaceae, punto caliente de biodiversidad, santuario de vida silvestre, wildlife sanctuary

Introduction. During recent decades, the abundance and distribution of many species of plants and animals have declined dramatically, mainly because of habitat loss and fragmentation (Štípková & Kindlmann 2021). Orchids are among them and are considered one of the most threatened groups of plants despite their largest species diversity (Fay 2018). Orchidaceae is the second largest family among flowering plants, with more than 28,000 species worldwide (Christenhusz & Byng 2016), having more diversity in the tropics than in any other region. Orchids are indicators of ecosystem and climate health (Gale *et al.* 2018) because of their interactions with other organisms like fungi for seed germination and insects for pollination (Rasmussen 2002, Swarts & Dixon 2009, Sydes 1994). This makes orchid species highly sensitive to any disturbance in their environmental conditions and climate change. Many of the orchid species are now threatened and considered to be at risk of extinction due to habitat loss, habitat destruction, and indiscriminate collection from the wild for their fascinating flowers and medicinal use (Brummitt *et al.* 2015, Fay 2018, IUCN 2015). These disturbances highly impact their complex mutual ecological relationship with other organisms. Because of its high value, threatened status, and its significant ecological role in the ecosystem, the family is

often considered a flagship group in biological conservation. All the wild orchid species are included under the Convention on International Trade in Endangered Species (CITES), and their trade is restricted between countries (Wraith & Pickering 2018).

India is one of the world's recognized mega-diverse countries and home to a rich diversity of orchids. A recent documentation by Botanical Survey of India estimates 1256 orchid species in 155 genera, of which 307 are endemic (Singh *et al.* 2019). These are mainly found in the biodiversity hotspots of India, viz. the Himalayas, Western Ghats, Indo-Burma region and the Sundaland. The present paper focus on the diversity of orchid flora in one of the protected areas in the Western Ghats hotspot. The Biligiri Rangaswamy Temple Tiger Reserve (BRTTR) has been selected for its unique geographic position with diverse climatic conditions that serves as a meeting point for the distinct floristic zones viz., the Western Ghats, the Eastern Ghats and the Tropical montane (Nilgiris) (Ramesh 2002). References to the botanical history of BRTTR hills began with the colonial botanical explorations carried out by C.E.C. Fischer, a forester who was in charge of the south Coimbatore division. Fischer's note on the floristic information covered part of these hills later published by Blatter in 1908 as "Contributions to the flora

of North Coimbatore”. A total of 23 orchid species were reported in that work and is the first document available on the orchids of BRTTR. Later, a chemistry Professor Edward Barnes who had a special interest in plants, visited these hills during 1938 and 1939 and published his findings as “Notes on the flowering plants of the Biligirirangan hills” in 1944. This report included 66 orchid species. While botanizing these hills Barnes stated that this area is remarkably rich in orchid diversity. Later on, R.V. Kammathy, A.S. Rao and R.S. Rao undertook botanical explorations in these hills in 1961 and 1962 which were later published as “A contribution towards a flora of Biligirirangan hills, Mysore state” in 1967. A total of 65 orchid species were documented in that study. Afterwards, R.R. Rao and B.A. Razi explored the flora of the Mysore district and also made collections in BRTTR during the period 1970 to 1972 and published “A synoptic flora of Mysore District” in 1981. This documentation included 56 orchids from BRTTR. B.R. Ramesh studied the Evergreen forests of the Biligirirangan hills from 1984 to 1987 and reported a few orchids, namely *Habenaria* sp., *Geodorum densiflorum*, and *Anoetochilus elatus* as the study was basically on trees and shrubs. Recently, Jayanthi (2017, 2018), while surveying the flora of BRTTR reported *Habenaria sahyadrica* K.M.P.Kumar, Nirmesh, V.B.Sreek & Kumar as a new record for Karnataka and *Vanilla walkeriae* Wight, a rediscovery after a lapse of 110 years from Karnataka. Documentation of species in a particular area provides the baseline information for setting conservation priorities. Hence, this paper aims to present an overview of all orchid species known from BRTTR to date, their identification, distribution within the reserve, and habitat and to facilitate their monitoring, and conservation within BRTTR. This is the first comprehensive documentation exclusively on the orchids of BRTTR.

Materials and methods.

Study area.— The BRTTR (also wildlife sanctuary) is located between 11-13° N and 77-78° E in the Chamara-janagar district of Karnataka state, India (Fig. 1A). It is spreading in five ranges viz., Yelandur, Kollegal, Kyathadevara Gudi (K.Gudi), Bylore, Punajur under three taluks such as Yelandur, Kollegal and Chamara-janagar covering an area of 574.82 sq. km. The BRTTR comprises two main hill ranges running in the north-

south direction contiguous with the Sathyamangalam Tiger Reserve in the adjacent Tamil Nadu state. The entire Biligirirangan hill range belongs to one geomorphic unit. These are structurally controlled mountain ranges with steep slopes, valleys and narrow gorges (Basavarajappa & Srikantappa 1996). The elevation varies between 600 to 1825 m. The western hill range includes many hills with an average elevation of 1350 m. The eastern range consists of chain of hills with an average elevation of 1650 m. Kattaribetta is the highest peak reaching 1825 m elevation. The terrain is undulating with a network of valleys and west flowing streams. The hill ranges receive both the South-West monsoon and North-East monsoon rains with an average rainfall of 650 mm (range 600–3000 mm) in the low-lying plateaus, and 1990 mm in the higher elevations. The annual temperature ranges between 18-38° C. Due to its geographical location between western ghats and eastern ghats, and variation in topographical and climatic factors, BRTTR hosts a diversity of habitats within its boundaries including scrub forests, dry and moist deciduous forests, semi-evergreen and evergreen forests and the climax vegetation Sholas at higher elevation (Fig. 1–2). The valleys of hills provide ideal habitat for evergreen forests and few coffee plantations are located in this area. BRTTR is also known for its rich faunal diversity and the habitat for charismatic species like tigers and elephants. It was declared as Tiger Reserve in 2011. It is also home to the Soliga tribes, a forest dwelling indigenous communities of about 2900 families (~12,250 people) living in 63 hamlets in and around the reserve (Lingaraja *et al.* 2017).

Data collection.— Intensive botanical explorations were carried out from 2013 to 2017 across the tiger reserve. All five ranges were visited in every field tour covering all the seasons. Whenever the orchids were encountered in the field, all the macromorphological characters were noted and photographs were taken. Voucher specimens were collected, preserved, and deposited in BSI (Botanical Survey of India, Western Regional Centre, Pune) for future reference. The species found in vegetative condition were brought and grown in the conservatory in Botanical Survey of India, Pune for observation of flowering. The specimens were identified in the field and confirmed in laboratory using regional floras, relevant literature, protologues and

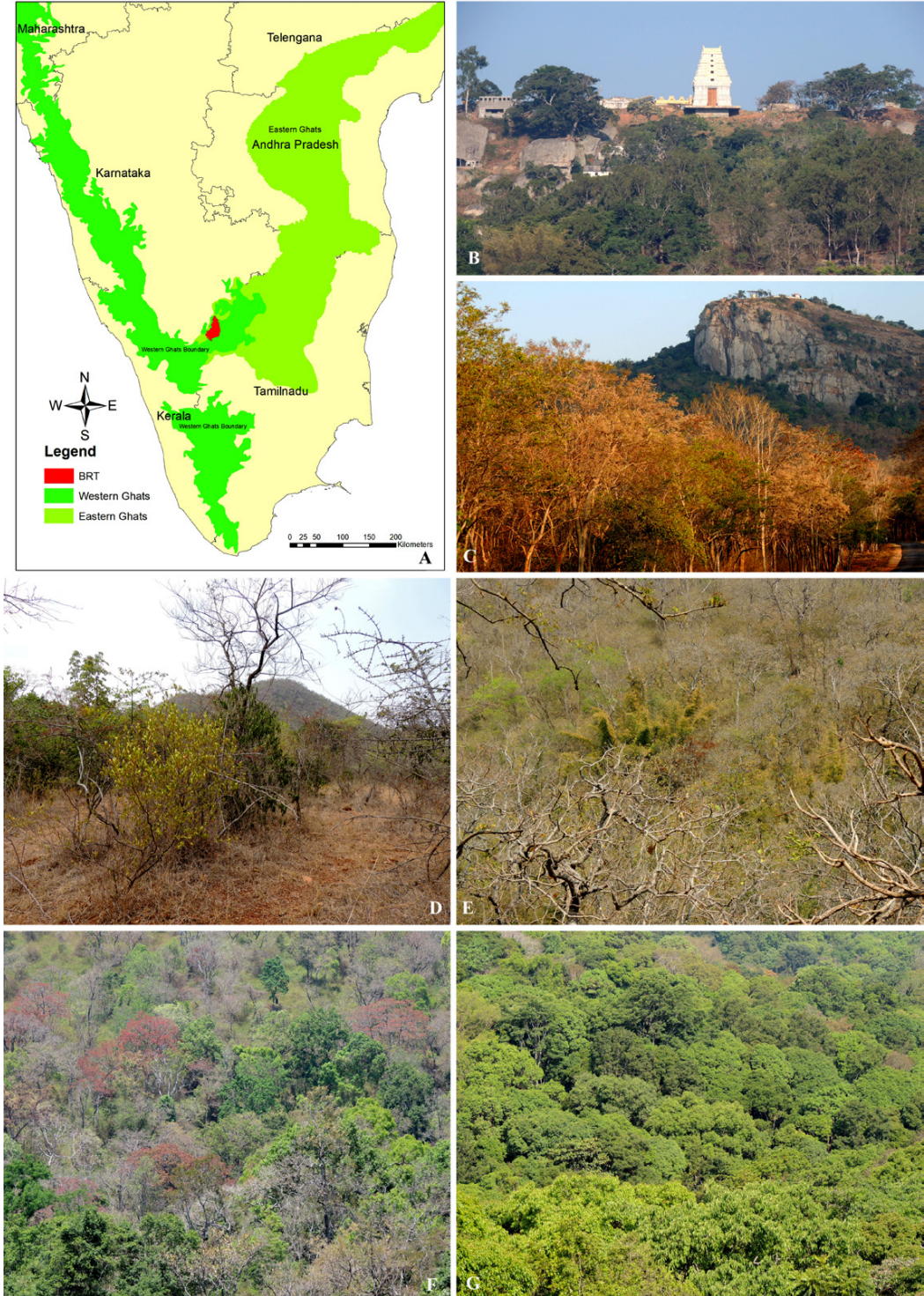


FIGURE 1. A. Location of BRTTR. Map by J.S.Jalal. B–C. View of Biligirirangan hill. D. Scrub Forest. E. Dry deciduous forest. F. Moist deciduous forest. G. Semi-evergreen forest. Photograph by J.Jayanthi.



FIGURE 2. **A.** Evergreen forest. **B, D.** Shola evergreen forest. **C.** Shola grassland. **E.** Luxuriant growth of epiphytic orchids (*Bulbophyllum fuscopurpureum* and *Coelogyne nervosa*). Photograph by J.Jayantani.

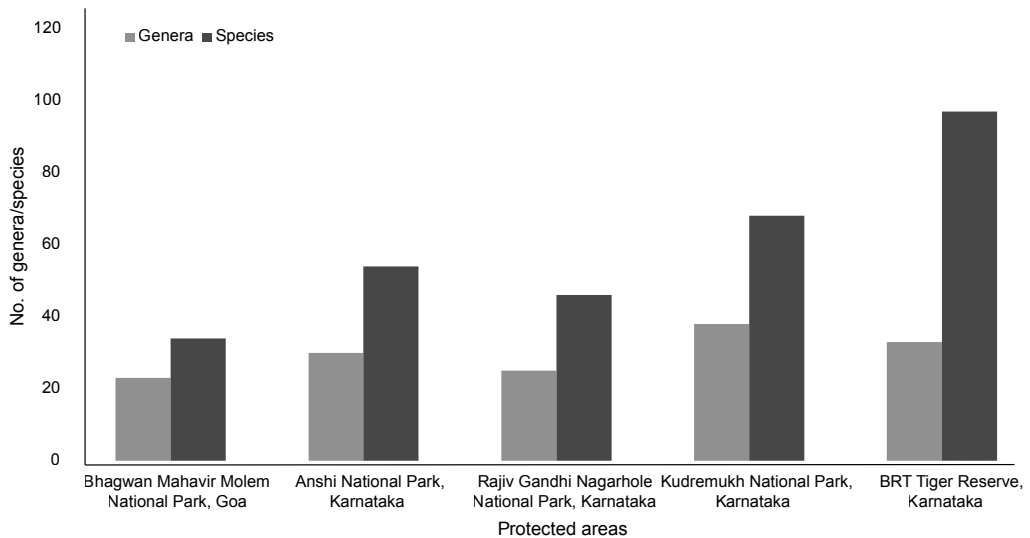


FIGURE 3. A comparison of orchid diversity in different protected areas.

compared with the herbarium specimens, including type specimens (Jalal 2018, Jalal *et al.* 2014, Rao 1998, Rao & Razi 1981, Saldanha 1976). The nomenclature is updated based on online databases such as IPNI (2023), POWO (2023) and the erstwhile World Checklist of Selected Plant Families (WCSP). However, the genus *Eria* Lindl. is followed *sensu lato* for easy identification in the field. Information on the orchid diversity of BRTTR was gathered through a comprehensive literature survey and review and consultation of herbaria (BSI, HIFP, Mysore University herbarium). This is substantiated by the field documentation and has resulted in the preparation of this current status on the orchid diversity of BRTTR. The data is presented in the following format: each genus and species are arranged alphabetically, under which flowering, habit, habitat, distribution within the BRTTR, elevation, specimen number and endemic information are provided. Photographs taken *in situ* as well as plants from there are separately provided. This checklist will be helpful to know the orchid flora of this region, to facilitate their monitoring, and conservation and further contribute to orchid research.

Results and discussion. In the present documentation, a total of 97 orchid species are recorded under 33 genera from BRTTR. Out of the total species, 47 are epiphytic, and 50 are terrestrial, including one mycoheterotrophic orchid; *Epipogium roseum*, and a climbing, leafless orchid; *Vanilla walkerae*. The genus *Habena-*

ria is the dominant genera with 20 species, followed by *Eria* (10 spp.), *Oberonia* (7 spp.), *Dendrobium* (6 spp.), *Peristylus* (6 spp.) and *Bulbophyllum* (5 spp.). The occurrence of 97 species of orchids in the present study area demonstrates the orchid diversity of this reserve, which contributes to almost 49% of the total orchid flora of Karnataka state. A comparison of orchid diversity in other protected areas based on published literature is also provided (Fig. 3).

Endemic orchids of BRTTR.— A total of 39 endemic orchid species under 13 genera are found in BRTTR. The genus *Habenaria* and *Eria* are the dominant genera having more endemic species. Almost 40% of the orchid species documented in BRTTR are endemic either to Western Ghats, Eastern Ghats, Peninsular India or India. 77% of the endemic orchids in BRTTR are endemic to Western Ghats (Fig. 4) mainly concentrated in high rainfall areas like evergreen and shola forests. In addition, 57% of endemic epiphytic orchids are also found in the high-altitude (above 1200 m) evergreen and shola forests, which makes them very important habitat for conservation. Table 1 provides the list of endemic species.

Orchids and their habitat within BRTTR.— In BRTTR, the orchids are found in different habitats ranging from dry scrub forests at lower elevations (600 m) up to Shola grasslands at higher elevation (1825 m). An

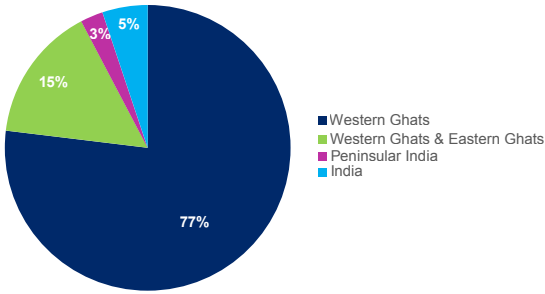


FIGURE 4. Phylogeographical distribution of endemic orchids in BRTTR.

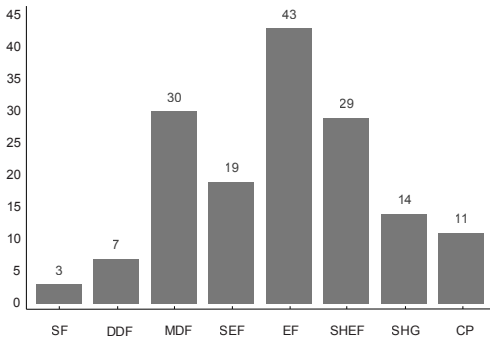


FIGURE 5. Diversity of orchids across various forest types in BRTTR. Scrub forests (SF), Dry deciduous forests (DDF), Moist deciduous forests (MDF), Semievergreen forests (SEF), Evergreen forests (EF), Shola evergreen (SHEF), Shola grassland (SHG), Coffee plantations (CP).

analysis based on the habitat preference shows that moist deciduous, semi-evergreen and evergreen forests provide suitable habitats for several terrestrial and epiphytic orchid assemblages due to the presence of moisture and humidity (Fig. 5). Table 1 provides the diversity of orchids across various habitat types.

Addition of orchids to BRTTR.— During the present study several orchids were reported as new additions to BRTTR. As many as 26 species were added to the orchid flora of BRTTR in the present documentation, including 15 endemic orchids. It is interesting to note that *Habenaria sahyadrica*, was described from Western Ghats of Kerala in 2016. The same was also collected in BRTTR in 2016 showing its extended distribution to Karnataka. Similarly, a climbing leafless orchid *Vanilla walkerae* was reported from the dry scrub thickets of BRTTR after a lapse of 110 years from Karnataka. These reports also emphasize the im-

portance of intensive field explorations and taxonomic studies. Following are the new orchid records for BRTTR. *Coelogyne breviscapa* Lindl., *Dendrobium aqueum* Lindl., *Dendrobium nodosum* Dalzell, *Eria exilis* Hook.f., *Eria microchilos* (Dalzell) Lindl., *Eria mysorensis* Lindl., *Eria pseudoclavicaulis* Blatt., *Eria reticosa* Wight, *Eulophia graminea* Lindl., *Gastrochilus flabelliformis* (Blatt. & McCann) C.J.Saldanha, *Habenaria brachyphylla* (Lindl.) Aitch., *Habenaria crinifera* Lindl., *Habenaria elwesii* Hook.f., *Habenaria furcifera* Lindl., *Habenaria gibsonii* Hook.f., *Habenaria longicornu* Lindl., *Habenaria marginata* Colebr., *Habenaria multicaudata* Sedgw., *Habenaria roxburghii* Nicolson, *Habenaria sahyadrica* K.M.P.Kumar, Nirmesh, V.B.Sreek. & Kumar, *Lusisia trichorhiza* (Hook.) Blume, *Oberonia brachystachys* Lindl., *Oberonia chandrasekharanii* V.J.Nair, V.S.Ramach. & R.Ansari, *Oberonia ensiformis* (Sm.) Lindl., *Peristylus plantagineus* (Lindl.) Lindl., and *Vanilla walkerae* Wight.

Diversity of orchid host species.— In BRTTR, several tree species are found to be good phorophytes for epiphytic orchids. Their trunk with rough bark, branches heavily laden with mosses, lichens, and crevices with thin layers of humus form suitable substrata for orchids. These epiphytic orchids are often associated with other epiphytes such as *Hoya pauciflora* Wight, *Aeschynanthus perrottetii* A.DC., ferns, mosses, lichens etc. Some common host trees and shrubs are, *Artocarpus heterophyllus* Lam., *Bischofia javanica* Blume, *Careya arborea* Roxb., *Catunaregam spinosa* (Thunb.) Tirveng., *Celtis tetrandra* Roxb., *Citrus medica* L., *Dalbergia lanceolaria* L.f., *Dalbergia latifolia* Roxb., *Elaeocarpus tuberculatus* Roxb., *Ficus racemosa* L., *Ficus virens* Aiton, *Garuga pinnata* Roxb., *Grevillea robusta* A.Cunn. ex R.Br., *Lagerstroemia parviflora* Roxb., *Machilus glaucescens* (Nees) Wight, *Mangifera indica* L., *Melia azedarach* L., *Meliosma simplicifolia* (Roxb.) Walp., *Meyna laxiflora* Robyns, *Neolitsea zeylanica* (Nees & T.Nees) Merr., *Olea paniculata* R.Br., *Phyllanthus emblica* L., *Platyclusus orientalis* (L.) Franco, *Psydrax dicoccos* Gaertn., *Pterocarpus marsupium* Roxb., *Radermachera xylocarpa* (Roxb.) Roxb. ex K.Schum., *Symplocos acuminata* (Blume) Miq., *Syzygium cumini* (L.) Skeels, *Syzygium jambos* (L.) Alston, *Sterculia guttata* Roxb.

TABLE 1. Orchid diversity in different habitat type. Endemic species*, Scrub forests (SF), Dry deciduous forests (DDF), Moist deciduous forests (MDF), Semievergreen forests (SEF), Evergreen forests (EF), Shola evergreen (SHEF), Shola grassland (SHG), Coffee plantations (CP).

Species	SF	DDF	MDF	SEF	EF	SHEF	SHG	CP
<i>Aerides ringens</i> (Lindl.) C.E.C.Fisch.			x	x		x		
<i>Anoectochilus elatus</i> Lindl.*					x			
<i>Bulbophyllum fimbriatum</i> (Lindl.) Rchb.f.*			x		x	x		x
<i>Bulbophyllum fischeri</i> Seidenf.					x		x	x
<i>Bulbophyllum fuscopurpureum</i> Wight*					x	x		x
<i>Bulbophyllum kaitiense</i> Rchb.f.*					x	x		
<i>Bulbophyllum proudlockii</i> (King & Pantl.) J.J.Sm.*					x			
<i>Calanthe sylvatica</i> (Thouars) Lindl.					x			
<i>Cheirostylis flabellata</i> (A.Rich.) Wight			x					
<i>Chiloschista fasciata</i> (F.Muell.) Seidenf. & Ormerod				x	x			
<i>Chrysoglossum ornatum</i> Blume					x	x		
<i>Coelogyne breviscapa</i> Lindl.						x		x
<i>Coelogyne nervosa</i> A.Rich.*						x		x
<i>Coelogyne odoratissima</i> Lindl.						x		x
<i>Crepidium intermedium</i> (A.Rich.) Sushil K.Singh, Agrawala & Jalal*						x		
<i>Crepidium versicolor</i> (Lindl.) Sushil K.Singh, Agrawala & Jalal				x		x		
<i>Cymbidium aloifolium</i> (L.) Sw.		x	x		x			
<i>Dendrobium aqueum</i> Lindl.*						x		
<i>Dendrobium heterocarpum</i> Wall. ex Lindl.				x	x	x		
<i>Dendrobium macrostachyum</i> Lindl.		x	x					
<i>Dendrobium nanum</i> Hook.f.*				x	x			
<i>Dendrobium nodosum</i> Dalzell*					x	x		x
<i>Dendrobium nutantiflorum</i> A.D.Hawkes & A.H.Heller						x		
<i>Diplocentrum recurvum</i> Lindl.				x				
<i>Disperis neilgherrensis</i> Wight					x	x		
<i>Epipogium roseum</i> (D.Don) Lindl.				x	x			
<i>Eria braccata</i> (Lindl.) Lindl.					x	x		
<i>Eria exilis</i> Hook.f.*					x	x		
<i>Eria filiformis</i> (Wight) Rchb.f.*					x	x		
<i>Eria microchilos</i> (Dalzell) Lindl.*						x		x
<i>Eria mysorensis</i> Lindl.*				x	x			
<i>Eria nana</i> A.Rich.*					x	x		
<i>Eria pauciflora</i> Wight*					x			
<i>Eria polystachya</i> A.Rich.*				x	x			
<i>Eria pseudoclavicaulis</i> Blatt.*				x	x			x
<i>Eria reticosa</i> Wight*						x		x
<i>Eulophia graminea</i> Lindl.	x							
<i>Eulophia nuda</i> Lindl.			x		x			
<i>Eulophia pratensis</i> Lindl.*							x	

<i>Gastrochilus acaulis</i> (Lindl.) Kuntze						x		
<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don				x	x			
<i>Gastrochilus flabelliformis</i> (Blatt. & McCann) C.J.Saldanha*				x	x			
<i>Geodorum densiflorum</i> (Lam.) Schltr.			x		x			
<i>Habenaria barbata</i> Wight ex Hook.f.		x						
<i>Habenaria brachyphylla</i> (Lindl.) Aitch.*			x					
<i>Habenaria crinifera</i> Lindl.						x		
<i>Habenaria elliptica</i> Wight*					x		x	
<i>Habenaria elwesii</i> Hook.f.*							x	
<i>Habenaria foliosa</i> A.Rich.*					x		x	
<i>Habenaria furcifera</i> Lindl.			x					
<i>Habenaria gibsonii</i> Hook.f.			x					
<i>Habenaria heyneana</i> Lindl.*								x
<i>Habenaria hollandiana</i> Santapau*		x						
<i>Habenaria longicorniculata</i> J.Graham								x
<i>Habenaria longicornu</i> Lindl.*			x					
<i>Habenaria marginata</i> Colebr.			x					
<i>Habenaria multicaudata</i> Sedgw.*					x			
<i>Habenaria ovalifolia</i> Wight*			x					
<i>Habenaria perrottetiana</i> A.Rich.*								x
<i>Habenaria plantaginea</i> Lindl.		x	x					
<i>Habenaria rariflora</i> A.Rich.*								x
<i>Habenaria roxburghii</i> Nicolson, C.J.Saldanha & D.H.Nicolson	x	x						
<i>Habenaria sahyadrica</i> K.M.P.Kumar, Nirmesh, V.B.Sreek. & Kumar*						x		
<i>Liparis atropurpurea</i> Lindl.					x			
<i>Liparis deflexa</i> Hook.f.			x					
<i>Liparis odorata</i> (Willd.) Lindl.					x			
<i>Liparis platyphylla</i> Ridl.*			x					
<i>Liparis wightiana</i> Thwaites			x					
<i>Luisia tenuifolia</i> Blume			x					
<i>Luisia trichorhiza</i> (Hook.) Blume			x	x				
<i>Luisia zeylanica</i> Lindl.			x					
<i>Nervilia concolor</i> (Blume) Schltr.			x					
<i>Nervilia plicata</i> (Andrews) Schltr.			x					
<i>Nervilia simplex</i> (Thouars) Schltr.			x					
<i>Oberonia brachystachys</i> Lindl.						x		
<i>Oberonia brunoniana</i> Wight				x	x			
<i>Oberonia chandrasekharanii</i> V.J.Nair, V.S.Ramach. & R.Ansari*				x	x			
<i>Oberonia ensiformis</i> (Sm.) Lindl.			x	x	x			
<i>Oberonia mucronata</i> (D.Don) Ormerod & Seidenf.			x		x	x		
<i>Oberonia verticillata</i> Wight*				x	x			
<i>Oberonia wightiana</i> Lindl.					x			
<i>Papilionanthe cylindrica</i> (Lindl.) Seidenf.					x	x		

<i>Pecteilis gigantea</i> (Sm.) Raf.								x	
<i>Peristylus aristatus</i> Lindl.						x			
<i>Peristylus caranjensis</i> (Dalzell) Ormerod & C.S.Kumar*								x	
<i>Peristylus densus</i> (Lindl.) Santapau & Kapadia								x	
<i>Peristylus goodyeroides</i> (D.Don) Lindl.				x					
<i>Peristylus plantagineus</i> (Lindl.) Lindl.				x					
<i>Peristylus spiralis</i> A.Rich.								x	
<i>Polystachya concreta</i> (Jacq.) Garay & H.R.Sweet				x	x			x	
<i>Satyrium nepalense</i> D.Don								x	
<i>Schoenorchis jerdoniana</i> (Wight) Garay*						x	x		
<i>Schoenorchis smeeana</i> (Rchb.f.) Jalal, Jayanthi & Schuit.*						x	x		x
<i>Trichoglottis tenera</i> (Lindl.) Rchb.f.							x		
<i>Vanda testacea</i> (Lindl.) Rchb.f.			x	x					
<i>Vanilla walkerae</i> Wight	x								
<i>Zeuxine longilabris</i> (Lindl.) Trimen				x					

ex DC., *Sterculia urens* Roxb., *Terminalia anogeisiana* Gere & Boatwr, *Terminalia bellirica* (Gaertn.) Roxb., *Terminalia chebula* Retz., *Terminalia elliptica* Willd., *Tetrapilus dioicus* (Roxb.) L.A.S.Johnson and *Wendlandia thyrsoides* (Roth) Steud.

Threats and conservation.— The flora of the BRTTR resembles the one of the Western Ghats. Barnes (1944) stated that the “valleys between the two ridges are largely filled by dense evergreen forests. Apart from the five not very large coffee plantations the hills are almost uninhabited and much of the area remains virgin”. Coffee plantations in BRTTR was introduced by Morris in 1877. About 800 hectares of evergreen forests were converted into coffee plantations (Ramesh 2002). Apart from that, a considerable area of forests was cleared for the cultivation of *Eucalyptus* L’Hér and teak (Kammathy, 1967) before the notification of this area as BRT wildlife sanctuary in 1974. The area is in a state of delicate equilibrium with the climatic conditions, which makes it more vulnerable to any disturbance (Ramesh 2002). The semi-evergreen and evergreen and shola forests are severely restricted by the coffee plantations. Despite that, it has been observed that many of the coffee plantations harbour numerous orchids and the trees are fully laden with plants. When the trees are either pruned or felled by means of anthropogenic activities or fallen due to natural causes will result in a complete wipe out of the orchid population. Even removing a single tree will threaten the life of hundreds of plants and possibly

an entire population. The lack of any rehabilitation program in such cases will endanger the habitat of those orchids. Hence, the cutting of trees in coffee plantations should be stopped or monitored critically. Those host trees with orchid populations should be geotagged for protection and long-term monitoring.

Dry deciduous forests are the predominant forest type found in BRTTR. Dry deciduous forests are prone to forest fires frequently (Verma *et al.* 2017). Hence, forest fires in some areas of BRTTR also cause damage to the trees as well as epiphytic orchid populations. In addition, routine activities such as repairing main roads and internal mud roads trample the orchids such as *Crepidium versicolor* (Lindl.) Sushil K.Singh, Agrawala & Jalal, *Disperis neilgherrensis* Wight, *Habenaria roxburghii* Nicolson, *Habenaria plantaginea* Lindl. and attempts should be made to rehabilitate them in the nearby undisturbed areas within the vicinity. Climate change is another alarm for the evergreen forests and orchids which are mainly dependent on the moisture as one of the factors. Any changes or decline in the rainfall pattern may increase the dry period, which will eventually affect the threshold of the evergreen forests and ultimately the orchid populations. The diversity of orchids, including the endemic species is more in the high rainfall areas, higher elevations and valleys of evergreen forests such as Attikan, Honnemeti, Jodigere, Kattari betta, Bellaji betta, Akka thange betta, Devakere betta, Bedguli, Doddasampige and also in the coffee plantations. These areas have to be highly

protected and periodically monitored. This is because less than 10% of the total area of BRTR comprises evergreen and shola forests. Hence, these forests should be given the top most priority within BRTR. These are some of the orchid species which should be given immediate attention such as *Bulbophyllum fuscopurpureum*, *Bulbophyllum fischeri* Seidenf., *Coelogyne* spp., *Dendrobium aqueum*, *Anoectochilus elatus*, *Schoenorchis smeana*, and *Papilionanthe cylindrica* (Lindl.) Seidenf.. Unless strict measures are taken to prevent any threat to these species, the orchid species may gradually disappear. Some orchids documented earlier by Barnes could not be relocated in the present study which includes *Chiloschista fasciata* (F.Muell.) Seidenf. & Ormerod, *Chrysoglossum ornatum* Blume, *Crepidium intermedium* (A.Rich.) Sushil K.Singh, Agrawala & Jalal, *Dendrobium nutantiflorum* A.D. Hawkes & A.H.Heller, *Eulophia pratensis* Lindl., *Habenaria barbata* Wight ex Hook.f., *Liparis atropurpurea*

Lindl., *Liparis platyphylla*, *Liparis wightiana* Thwaites, *Pecteilis gigantea* (Sm.) Raf., *Peristylus goodyeroides* (D.Don) Lindl., *Peristylus spiralis* A. Rich., *Peristylus caranjensis* (Dalzell) Ormerod & C.S.Kumar, *Schoenorchis jerdoniana*. Of these the habitats of terrestrial orchids are encroached upon by invasive alien species such as *Lantana camara* L. and *Ageratina adenophora* (Spreng.) R.M.King & H.Rob.

This study identifies BRTR as an important region for orchid diversity as it is nestled between the Western Ghats, Eastern Ghats, and the Nilgiri Biosphere reserve. Due to its geomorphic features and monsoonal climate, the BRTR offers macroclimatic and microclimatic conditions with varied habitats providing favorable niches for the orchids. About 49% of the orchid flora of Karnataka state and 32% of orchids of Western Ghats is found in BRTR. Hence, BRTR should be designated as one of the microcenters for orchid diversity along the Western Ghats hotspot for orchid conservation.

CHECKLIST TO THE ORCHIDS OF THE BILIGIRI RANGASWAMY TEMPLE TIGER RESERVE, INDIA

AERIDES Lour.

Aerides ringens (Lindl.) C.E.C.Fisch. in Gamble, Fl. Madras 1442. 1928; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967. BASIONYM: *Saccolabium ringens* Lindl., Gen. Sp. Orchid. Pl.: 220. 1833. Fig. 6A. TYPE: India, Madras, *Wallich 7313* (leg. Wight s.n.) (holotype, K-WALL; isotype, IC-LINDL, icon.). FLOWERING: July. HABIT AND HABITAT: Epiphyte. On trunks and branches of trees, shrubs in moist deciduous forests to evergreen forests. Scatteredly occurring. DISTRIBUTION: Nellikathir, Avinmulla, B.R. Hills, At-tikan, K. Gudi. 1000–1600 m. SPECIMENS EXAMINED: *J.Jayanthi 194449 & 194547* (BSI).

ANOECTOCHILUS Blume

Anoectochilus elatus Lindl., J. Proc. Linn. Soc., Bot. 1: 178. 1857; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967. Fig. 6B.

TYPE: India, Tamil Nadu, Otacamund, Wal-laghaut, Jan.-May, *Mclvor 59* (holotype, K-LINDL; isotype, K).

FLOWERING: December.

HABIT AND HABITAT: Terrestrial. Along slopes and shady places of streamsides in evergreen forests. Often covered under the invasive plants such as *Ageratina adenophora* (Spreng.) R.M.King & H.Rob. which could be a potential threat to its habitat within the reserve.

DISTRIBUTION: Honnemetti, Burude bungalow road. 1350–1500 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 195959* (BSI), *B.R.Ramesh 1520* (HIFP).

BULBOPHYLLUM Thouars

Bulbophyllum fimbriatum (Lindl.) Rchb.f., Ann. Bot. Syst. (Walpers) 6(2): 260. 1861. BASIONYM: *Cir-rhopetalum fimbriatum* Lindl., Edwards's Bot. Reg. 25(Misc.): 72. 1839; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 591. 1981. Fig. 6C.

TYPE: India, Bombay, cult. *Loddiges s.n.* (holotype, K-LINDL).

FLOWERING: March–May.

HABIT AND HABITAT: Epiphyte. On the moss-covered tree trunks and branches of trees in moist deciduous forests, evergreen forests, coffee plantations and shola forests. Also found on the rocky boulders on the slopes of shola grassland.

DISTRIBUTION: Devakere, Honnemetti, Moskal. 1200–1500 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 197448* (BSI).

Bulbophyllum fischeri Seidenf., Dansk Bot. Ark. 29(1): 202. 1974. *Cirrhopetalum gamblei* Hook.f., Fl. Brit. India 5(16): 778. 1890; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967. Fig. 6D. TYPE: India, Nilgiri Hills, Conoor, alt. 6000 ft, Nov. 1883, *J. S. Gamble s.n.* (holotype, K; isotype, CAL). FLOWERING: May–June.

HABIT AND HABITAT: Epiphyte. On the branches of trees in evergreen forests, coffee plantations and rocky boulders in shola grassland slopes.

DISTRIBUTION: Attikan, Dupabare, Honnemetti, Moskal. 1400–1500 m

SPECIMENS EXAMINED: *J.Jayanthi 195961 & 195744* (BSI).

Bulbophyllum fuscopurpureum Wight, Icon. Pl. Ind. Orient. 5: t. 1651. 1851; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R. Rao & Razi, Synop. Fl. Mysore District: 591. 1981. Fig. 6E. SYNTYPES: India, Nilgiri Hills, on the banks of Kartairy river below Kaiti, Feb. 1850, also below Neddawuttim on the north-eastern slopes, *Wight s.n.* (syntypes, K [“Neelgherry Hill”]).

FLOWERING: February–April.

HABIT AND HABITAT: Epiphyte. On the moss-covered tree trunks and branches in evergreen forests, coffee plantations and shola forests.

DISTRIBUTION: Attikan, Bedguli, Bellaji, Honnemetti, Kattaribetta. 1400–1800 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 197450* (BSI), *B.R.Ramesh 1564* (HIFP), *R.R.Rao 1792* (MU).

Bulbophyllum kaitiense Rehb.f., W.G. Walpers, Ann. Bot. Syst. 6: 262. 1861. *Cirrhopetalum nilgherrense* Wight, Icon. Pl. Ind. Orient. 6: t. 1654. 1853; R.R. Rao & Razi, Synop. Fl. Mysore District: 592. 1981. Fig. 12A.

TYPE: India, Kartairy [River] below Kaitie, *Wight s.n.* (holotype, K)

FLOWERING: June–October.

HABIT AND HABITAT: Epiphyte. On trees and branches of evergreen forests.

DISTRIBUTION: Attikan. 1400–1600 m. Endemic.

SPECIMENS EXAMINED: *R.R. Rao 1039* (MU).

Bulbophyllum proudlockii (King & Pantl.) J.J.Sm., Bull. Jard. Bot. Buitenzorg ser. 2, 8: 27. 1912.

BASIONYM: *Cirrhopetalum proudlockii* King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 588. 1897; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R. Rao & Razi, Synop. Fl. Mysore District: 592. 1981.

TYPE: India, Tamil Nadu, Nilgiri Hills, Otacumund, Apr. 1897, *R. L. Proudlock s.n.* (holotype, CAL; isotype, K, L, W).

FLOWERING: April–May.

HABIT AND HABITAT: Epiphyte. On trees and branches of evergreen forests.

DISTRIBUTION: Moskal, Bedguli. Endemic.

SPECIMENS EXAMINED: *A.S.Rao 79899* (BSI). The specimen could not be traced.

CALANTHE R.Br.

Calanthe sylvatica (Thouars) Lindl., Gen. Sp. Orchid. Pl.: 250. 1833. Fig. 6F.

BASIONYM: *Centrosis sylvatica* Thouars, Hist. Orchid.: t. 35. 1822.

TYPE: Mascarene Islands, *Thouars s.n.* [holotype, P] *Calanthe masuca* (D. Don) Lindl., Gen. Sp. Orchid. Pl.: 249. 1833; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967. *Bletia masuca* D. Don, Prodr. Fl. Nepal.: 30. 1825.

TYPE: Nepal, Bagmati Zone, Narain-hetty, 21 Feb. 1803, *Buchanan-Hamilton s.n.* (holotype, BM; isotype, LINN).

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Along the stream-sides and slopes of valleys in evergreen to shola forests with rich humus ground.

DISTRIBUTION: Doddasampige, Honnemetti. 1300–1600 m.

SPECIMENS EXAMINED: *J.Jayanthi 194736* (BSI).

CHEIROSTYLIS Blume

- Cheirostylis flabellata*** (A.Rich.) Wight, Icon. Pl. Ind. Orient. 5: 16. 1851; R.R.Rao & Razi, Synop. Fl. Mysore District: 591. 1981. Fig. 6G.
 BASIONYM: *Goodyera flabellata* A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 79. 1841.
 TYPE: India, Nilgiri Hills, Kaity, May–June, *Perrottet s.n.* (holotype, P)
 FLOWERING: December–March.
 HABIT AND HABITAT: Terrestrial. Occurs in evergreen forests and degraded forests along grassy hill slopes, under shade of *Lantana camara* thickets.
 DISTRIBUTION: Attikan, Gummane betta. 1200–1300 m.
 SPECIMENS EXAMINED: *J.Jayanthi 206563* (BSI), *R.R.Rao 1202* (MU).

CHILOCHISTA Lindl.

- Chiloschista fasciata*** (F.Muell.) Seidenf. & Ormerod, Opera Bot. 124: 64. 1995. BASIONYM: *Sarcochilus fasciatus* F.Muell., Fragm. 5: 202. 1866.
 TYPE: Icon. Pl. Ind. Orient. [Wight] 5(1): t. 1741. 1851 (right hand figure, iconotype).
 sensu *Chilochista pusilla* (Willd.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 275. 1919; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967.
Taeniophyllum pusillum auct. non (Willd.) Seidenf. & Ormerod in Seidenf., Descr. Epidendrorum J.G.König: 23. 1995.
 FLOWERING: April–May.
 HABIT AND HABITAT: Epiphyte. Occurs in Shola evergreen forests.
 DISTRIBUTION: Dupabare, Bedguli. 1300–1500 m.
 NOTE: Included based on Barnes report.

CHRYSOGLOSSUM Blume

- Chrysoglossum ornatum*** Blume, Bijdr. Fl. Ned. Ind.: 338. 1825.
 TYPE: Indonesia, Java, Mt. Salak, *Blume 295* (holotype, L).
Chrysoglossum maculatum (Thwaites) Hook.f., Fl. Brit. India 5: 784. 1890; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull.

- Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 591. 1981.
Tainia maculata (Thwaites) Hook. f., Fl. Brit. India [J. D. Hooker] 5(16): 821. 1890.
 TYPE: Sri Lanka, Hapootelle, *Thwaites s.n.* [Ceylon Plants 3515].
 FLOWERING: May–June.
 HABIT AND HABITAT: Terrestrial. Occurs in evergreen and shola forests.
 DISTRIBUTION: Honnemetti. 1600–1700 m.
 NOTE: Included based on Barnes report.

COELOGYNE Lindl.

- Coeogyne breviscapa*** Lindl., Fol. Orchid. 5: 4. 1854.
 TYPE: Sri Lanka, *Walker s.n.* (holotype, K-LINDL). Fig. 6H.
 FLOWERING: March–April.
 HABIT AND HABITAT: Epiphyte. Occurs in the trees of shola forests and coffee plantations.
 DISTRIBUTION: Honnemetti. 1600–1800 m.
 SPECIMENS EXAMINED: *J.Jayanthi 197478* (BSI).
Coeogyne nervosa A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 16. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 592. 1981. Fig. 6I.
 SYNTYPES: India, Nilgiri Hills, Neddoubetta, July 1840, *Perrottet s.n.*, [522 & 868] (syntypes, P)
 FLOWERING: August–September.
 HABIT AND HABITAT: Epiphyte. Occurs in the trees of shola forests and coffee plantations, also found in abundance in the rocky boulders and cliffs of grassy hill tops.
 DISTRIBUTION: Honnemetti, Doddamalki, K.Gudi. 1400–1700 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 195769* (BSI), *R.R. Rao 1794, 1592* (MU).
Coeogyne odoratissima Lindl., Gen. Sp. Orchid. Pl.: 41. 1830; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 592. 1981. Fig. 6J.
 TYPE: Sri Lanka, Nuera Elba, *Wallich 1960* (leg. Macrae 14, 1829) (holotype, K-LINDL; isotype, K-WALL).
 FLOWERING: March–April.

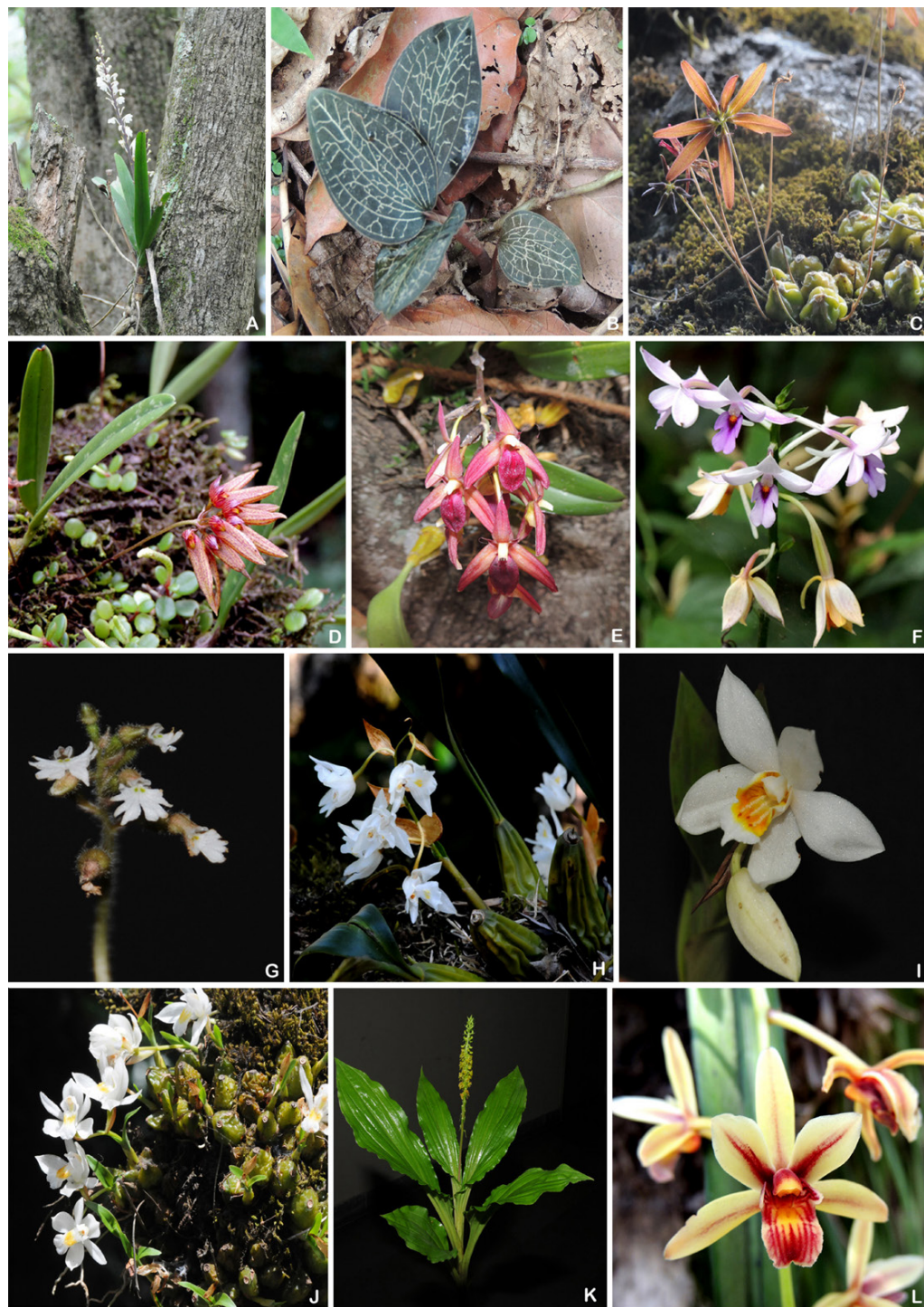


FIGURE 6. A. *Aerides ringens*. B. *Anoectochilus elatus*. C. *Bulbophyllum fimbriatum*. D. *Bulbophyllum fischeri*. E. *Bulbophyllum fuscopurpureum*. F. *Calanthe sylvatica*. G. *Cheirostylis flabellata*. H. *Coelogyne breviscapa*. I. *Coelogyne nervosa*. J. *Coelogyne odoratissima*. K. *Crepidium versicolor*. L. *Cymbidium aloifolium*. Photograph by J.Jayanthi.

HABIT AND HABITAT: Epiphyte. Occurs in the trees of shola forests and coffee plantations.

DISTRIBUTION: Dupabare, Honnemetti. 1600–1800 m.

SPECIMENS EXAMINED: *J.Jayanthi 197479* (BSI).

CREPIDIUM Blume

Crepidium intermedium (A.Rich.) Sushil K.Singh, Agrawala & Jalal, *Orchids India*: 172. 2019.

BASIONYM: *Liparis intermedia* A.Rich., *Ann. Sci. Nat., Bot.*, sér. 2, 15: 17. 1841.

Malaxis intermedia (A.Rich.) Seidenf., *Bot. Tidsskr.* 73: 99. 1978.

TYPE: India, Nilgiri Hills, Waterfall (“Water-Fat”) not far from Kaiti, *Perrotet s.n.* (lectotype, W, designated by Margoriska, 2012; isotype, G).

Microstylis stocksii Hook.f., *Hooker’s Icon. Pl.* 19: t. 1833. 1889; E.Barnes, *J. Bombay Nat. Hist. Soc.* 44: 452. 1944; Kammathy *et al.*, *Bull. Bot. Surv. India* 9: 229. 1967.

TYPE: India, Deccan Peninsula, Canara, Bababoodan [Baba Budan] Hills, *J. E. Stocks s.n.* (lectotype, K, designated by Margoriska, 2012; isotype, BM, C, FI, G, K, L, P, W).

FLOWERING: June–September.

HABIT AND HABITAT: Terrestrial. Occurs in shola forests.

DISTRIBUTION: Dupabare. 1600–1700 m. Endemic.

NOTE: Included based on Barnes (1994).

Crepidium versicolor (Lindl.) Sushil K.Singh, Agrawala & Jalal, *Orchids Maharashtra*: 57. 2018. BASIONYM: *Microstylis versicolor* Lindl., *Gen. Sp. Orchid. Pl.*: 21. 1830; E.Barnes, *J. Bombay Nat. Hist. Soc.* 44: 452. 1944. Fig. 6K.

Malaxis versicolor (Lindl.) Abeyw., *Ceylon J. Sci., Biol. Sci.* 2: 83. 1959; Kammathy *et al.*, *Bull. Bot. Surv. India* 9: 229. 1967; R.R.Rao & Razi, *Synop. Fl. Mysore District*: 595. 1981.

TYPE: Sri Lanka, *Macrae s.n.* [2] (lectotype, K-LINDL, designated by Jayaweera, 1981; isotype, K, K-LINDL, LE, NY, SING).

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in semievergreen forests and shola forests.

DISTRIBUTION: Attikan, Bellaji. 1400–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 194748* (BSI), *R.R. Rao 1053* (MU).

CYMBIDIUM Sw.

Cymbidium aloifolium (L.) Sw., *Nova Acta Regiae Soc. Sci. Upsal.* 6: 73. 1799; E.Barnes, *J. Bombay Nat. Hist. Soc.* 44: 453. 1944; Kammathy *et al.*, *Bull. Bot. Surv. India* 9: 228. 1967; R.R.Rao & Razi, *Synop. Fl. Mysore District*: 592. 1981. Fig. 6L. BASIONYM: *Epidendrum aloifolium* L., *Sp. Pl.*: 953. 1753.

TYPE: India, Malabar, icon. “Kansjiram-mara-vara” in Rheede, *Hort. Malab.* 12:17, t. 8.1692 (lectotype, designated by Seth, 1982).

FLOWERING: October–November.

HABIT AND HABITAT: Epiphyte. Occurs on trees of dry deciduous to moist deciduous and evergreen forests.

DISTRIBUTION: Burude. 1200–1600 m.

SPECIMENS EXAMINED: *J.Jayanthi 207146* (BSI).

DENDROBIUM Sw.

Dendrobium aqueum Lindl., *Edwards’s Bot. Reg.* 29(Misc.): 5. 1843. Fig. 7A.

TYPE: India, Bombay, cult. Loddiges s.n. (not found).

FLOWERING: September–October.

HABIT AND HABITAT: Epiphyte. Occurs in the stunted trees of shola evergreen forests.

DISTRIBUTION: Attikan. 1400–1600 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207149* (BSI).

Dendrobium heterocarpum Wall. ex Lindl., *Gen. Sp. Orchid. Pl.*: 78. 1830; E.Barnes, *J. Bombay Nat. Hist. Soc.* 44: 452. 1944; Kammathy *et al.*, *Bull. Bot. Surv. India* 9: 228. 1967; R.R.Rao & Razi, *Synop. Fl. Mysore District*: 592. 1981. Fig. 7B.

TYPE: Nepal, *Wallich s.n.* (holotype, K-LINDL).

FLOWERING: December–April.

HABIT AND HABITAT: Epiphyte. Occurs on the moss-covered trees of semievergreen, evergreen and shola forests.

DISTRIBUTION: Aneyeratha betta, Attikan, Devakere, Honnemetti, Kattari betta. 1400–1800 m.

SPECIMENS EXAMINED: *J.Jayanthi 197474* (BSI), *R.R. Rao 1233* (MU).

Dendrobium macrostachyum Lindl., *Gen. Sp. Orchid. Pl.*: 78. 1830; E.Barnes, *J. Bombay Nat. Hist. Soc.* 44: 452. 1944; Kammathy *et al.*, *Bull. Bot. Surv. India* 9: 228. 1967; R.R.Rao & Razi, *Synop. Fl. Mysore District*: 592. 1981. Fig. 7C.

TYPE: Sri Lanka, *Macrae s.n.* [17] (holotype, K-LINDL).

FLOWERING: May–June.

HABIT AND HABITAT: Epiphyte. Occurs in the trees of dry deciduous to moist deciduous forests.

DISTRIBUTION: Burude, Dhumanegathe, K.Gudi, Moskal, MPCA, Seematti. 900–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 195966 & 195730* (BSI).

Dendrobium nanum Hook.f., Hooker's Icon. Pl. 19: t. 1853. 1889; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 592. 1981. Fig. 7D.

TYPE: India, Malabar, Bababoodan [Baba Budan] Hills, *J. S. Law s.n.* (holotype, K; isotype, CAL)

FLOWERING: June–September.

HABIT AND HABITAT: Epiphyte. Occurs on the trees and branches of semievergreen and evergreen forests.

DISTRIBUTION: Attikan, Bellaji, Nellikathir, Avinmulla. 1100–1400 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 194450* (BSI), *R.R.Rao 1269*.

Dendrobium nodosum Dalzell, Hooker's J. Bot. Kew Gard. Misc. 4: 292. 1852. *Desmotrichum nodosum* (Dalzell) Tang & F. T. Wang, Acta Phytotax. Sin. 1: 83. 1951. *Flickingeria nodosa* (Dalzell) Seidenf., Dansk Bot. Ark. 34(1): 41. 1980. Fig. 7E.

TYPE: India, Deccan, Ram Ghat, *J. E. Stocks 30* (holotype, K; isotype, K-LINDL).

FLOWERING: September.

HABIT AND HABITAT: Epiphyte. Occurs in the trees of evergreen, shola forests and coffee plantations.

DISTRIBUTION: Akkatange betta, Attikan, Bellaji. 1400–1500 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207134* (BSI).

Dendrobium nutantiflorum A.D.Hawkes & A.H.Heller, Lloydia 20: 122. 1957. *Dendrobium nutans* Lindl., Gen. Sp. Orchid. Pl.: 90. 1830; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981.

TYPE: Sri Lanka, Peradeniya, *Macrae s.n.* (holotype, K-LINDL).

FLOWERING: April–May.

HABIT AND HABITAT: Epiphyte. Occurs in the trees of Shola evergreen forests.

DISTRIBUTION: Dupabare. 1600–1700 m.

NOTE: Included based on Barnes report. Probably must have been eradicated with the clearing of forests in that region (Rao & Razi 1981). Could not be located during the present field study also.

DIPLOCENTRUM Lindl.

Diplocentrum recurvum Lindl., Edwards's Bot. Reg. 18: t. 1522. 1832; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 7F.

TYPE: India, *Wallich 7331* (leg. Heyne) (holotype, K-WALL).

FLOWERING: May–June (in fruits upto December).

HABIT AND HABITAT: Epiphyte or lithophyte. Occurs in the trees and large shrubs of semievergreen forests, at times in rocky boulders.

DISTRIBUTION: Biligirirangan temple area, Ittuboodhi kanive, Devagiribetta, Jenumane ella, 1200–1400 m.

SPECIMENS EXAMINED: *J.Jayanthi 195952 & 195767* (BSI), *R.S.Rao 73770* (BSI), *A.S.Rao 80436* (BSI).

NOTE: Population of this species around Biligirirangan temple area are not located in the present study. Probably could have been diminished due to anthropogenic activities.

DISPERIS Sw.

Disperis neilgherrensis Wight, Icon. Pl. Ind. Orient. 5: t. 1719. 1851; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 7G.

TYPE: India, Nilgiri Hills, July-Aug., *Wight s.n.* [173] (lectotype, K, designated by Kurzweil 2005 as Wight 3018).

FLOWERING: May–June & November–December.

HABIT AND HABITAT: Terrestrial. Occurs along the shady vertical slopes and near streamsides of evergreen forests and shola forests, completely covered by the ground vegetation and grasses.

DISTRIBUTION: Doddasampige, Bellaji. 1200–1600 m.

SPECIMENS EXAMINED: *J.Jayanthi 195979* (BSI).

NOTE: After Barnes, this species was collected during the present study after a lapse of 80 years in BRTR.

EPIPOGIUM J.G.Gmel. ex Borkh.

Epipogium roseum (D.Don) Lindl., J. Proc. Linn. Soc., Bot. 1: 177. 1857; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. BASIONYM: *Limodorum roseum* D.Don, Prodr. Fl. Nepal.: 30. 1825. Fig. 7H. TYPE: Nepal, 1818, *Wallich s.n.* (holotype, BM). *Epipogium nutans* (Blume) Rchb.f., Bonplandia (Hannover) 5: 36. 1857; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944. TYPE: Indonesia, Java, Mt. Salak, *Blume s.n.* (holotype, ? L [Blume 723]). FLOWERING: March–June. HABIT AND HABITAT: Terrestrial. Occurs in the dense shady humus rich areas of semievergreen and evergreen forests. DISTRIBUTION: Ittuboodhikanive, Chikkasampige. 1200–1300 m. SPECIMENS EXAMINED: *J.Jayanthi 195737 & 197431* (BSI). NOTE: After Barnes, this species was collected during the present study after a lapse of 80 years from BRTTR.

ERIA Lindl.

NOTE: Morphologically the genus *Eria* is very heterogeneous group and divided into various genera by many workers. The morphological characters are overlapping and not well defined. So, for easy identification in the field, we are treating all the species under the genus *Eria* in the broad sense.

Eria braccata (Lindl.) Lindl., J. Proc. Linn. Soc., Bot. 3: 46. 1858; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 12B. BASIONYM: *Dendrobium braccatum* Lindl., Gen. Sp. Orchid. Pl.: 75. 1830. *Porpax braccata* (Lindl.) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 199. 2018. TYPE: Sri Lanka, *Macrae 53* (holotype, K-LINDL) FLOWERING: June–August. HABIT AND HABITAT: Epiphyte. Occurs on the trunks and branches of trees of evergreen and shola forests. DISTRIBUTION: Attikan, Honnemetti.

SPECIMENS EXAMINED: *Rao 1042* (MU).

NOTE: Once a common species, now become a rare sight.

Eria exilis Hook.f., Fl. Brit. India 5(16): 788. 1890. Fig. 7I. *Porpax exilis* (Hook.f.) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 199. 2018. TYPE: India, Travancore, *Johnson s.n.* (holotype, K). FLOWERING: August–September. HABIT AND HABITAT: Epiphyte. Occurs in the trees and branches of evergreen and shola forests. DISTRIBUTION: Gombegallu. 1200–1300 m. Endemic. SPECIMENS EXAMINED: *J.Jayanthi 202964* (BSI).

Eria filiformis (Wight) Rchb.f., W.G. Walpers, Ann. Bot. Syst. 6: 268. 1861. Fig. 7J. BASIONYM: *Dendrobium filiforme* Wight, Icon. Pl. Ind. Orient. 5: t. 1642. 1851. *Eria dalzellii* (Hook. ex Dalzell) Lindl., J. Proc. Linn. Soc., Bot. 3: 47. 1858; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. *Porpax filiformis* (Wight) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 199. 2018. TYPE: India, Tamil Nadu, Nilgiri & Iyamally Hills near Coimbatore, *Wight s.n.* (syntype, IC); without locality, *J.S. Law s.n.* (syntype, K). FLOWERING: August–October. HABIT AND HABITAT: Epiphyte. Occurs in the moss-covered trunks and branches of trees in evergreen and shola forests. DISTRIBUTION: Attikan, Doddasampige. Endemic. SPECIMENS EXAMINED: *J.Jayanthi 207130* (BSI). NOTE: After Barnes, this species was collected during the present study in BRTTR after a lapse of 80 years.

Eria microchilos (Dalzell) Lindl., J. Proc. Linn. Soc., Bot. 3: 47. 1858. Fig. 7K. BASIONYM: *Dendrobium microchilos* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 3: 345. 1851. *Porpax microchilos* (Dalzell) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 200. 2018. TYPE: India, Western Bengal, *Dalzell s.n.* (holotype, K). FLOWERING: October. HABIT AND HABITAT: Epiphyte. Occurs in the trees of Shola forests and coffee plantations. DISTRIBUTION: Honnemetti. 1600–1700 m. Endemic. SPECIMENS EXAMINED: *J.Jayanthi 194739* (BSI).



FIGURE 7. A. *Dendrobium aqueum*. B. *Dendrobium heterocarpum*. C. *Dendrobium macrostachyum*. D. *Dendrobium nanum*. E. *Dendrobium nodosum*. F. *Diplocentrum recurvum*. G. *Disperis neilgherrensis*. H. *Epipogium roseum*. I. *Eria exilis*. J. *Eria filiformis*. K. *Eria microchilos*. Photograph by J.Jayanthi.

- Eria mysorensis*** Lindl., J. Proc. Linn. Soc., Bot. 3: 54. 1858.
Pinalia mysorensis (Lindl.) Kuntze, Revis. Gen. Pl. 2: 679. 1891.
 TYPE: India. Mysore, *Law s.n.* (holotype, K-LINDL; isotype, K).
 FLOWERING: September–October.
 HABIT AND HABITAT: Epiphyte. Occurs on trees of evergreen and semievergreen forests.
 DISTRIBUTION: Bellaji. 1500–1600 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 202976* (BSI).
- Eria nana*** A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 19. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 12C.
Porpax nana (A.Rich.) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 200. 2018.
 TYPE: India, Nilgiri Hills, Condas, Oct., *Perrottet s.n.* (holotype, P; isotype, K, L).
 FLOWERING: September–October.
 HABIT AND HABITAT: Epiphyte. Occurs in evergreen and shola forests.
 DISTRIBUTION: Attikan, Devagiribetta, Dodasari-halla. Endemic.
 SPECIMENS EXAMINED: *R.S.Rao 73721 & 73770* (BSI), *R.R.Rao 1046* (MU).
- Eria pauciflora*** Wight, Icon. Pl. Ind. Orient. 5(1): 4, t. 1636. 1851; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 8A.
Cylindrolobus pauciflorus (Wight) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 195. 2018.
 TYPE: India, Nilgiri Hills, Kaitie Falls, Aug.-Sep., *Wight s.n.* (holotype, K).
 FLOWERING: September–October.
 HABIT AND HABITAT: Epiphyte. Occurs in evergreen forests.
 DISTRIBUTION: Attikan, Bellaji. 1500–1700 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 202978* (BSI), *R.R.Rao 1049* (MU).
- Eria polystachya*** A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 20. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967. Fig. 8B.
Pinalia polystachya (A.Rich.) Kuntze, Revis. Gen. Pl. 2: 679. 1891.
 TYPE: India, Nilgiri Hills near Neddoubetta, Sep. 1840, *Perrottet s.n.* (holotype, P).
 FLOWERING: September.
 HABIT AND HABITAT: Epiphyte. Occurs in semievergreen forests and evergreen forests.
 DISTRIBUTION: Honnemetti. 1600–1700 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 207139* (BSI).
- Eria pseudoclavicaulis*** Blatt., J. Bombay Nat. Hist. Soc. 32: 519. 1928. Fig. 8C.
Cylindrolobus pseudoclavicaulis (Blatt.) Schuit., Y.P.Ng & H.A.Pedersen, Bot. J. Linn. Soc. 186: 195. 2018.
 TYPE: India, Bombay, cultivated, Sep. 1917, *Blatter 554* (holotype, St. Xavier's College, Bombay, kept in formalin).
 FLOWERING: September.
 HABIT AND HABITAT: Epiphyte. Occurs in semievergreen, evergreen forests and coffee plantations.
 DISTRIBUTION: Honnemetti. 1500–1600 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 203499* (BSI).
- Eria reticosa*** Wight, Icon. Pl. Ind. Orient. 5(1): 4, t. 1637. 1851. Fig. 8D.
Pinalia reticosa (Wight) Kuntze, Revis. Gen. Pl. 2: 679. 1891.
Conchidium reticosum (Wight) Ormerod, Taiwania 57: 119. 2012.
Porpax reticosa (Wight) Schuit., Malesian Orchid J. 24: 107. 2020.
 TYPE: India, Pycarrah, May-June, *Wight s.n.* (holotype, K).
 FLOWERING: June–July.
 HABIT AND HABITAT: Epiphyte. Occurs on trees of shola evergreen forests and coffee plantations.
 DISTRIBUTION: Hatthubarebetta, Doddasampige. 1500–1700 m. Endemic.
 SPECIMENS EXAMINED: *J.Jayanthi 207152* (BSI), *B.R.Ramesh 1490* (HIFP).

EULOPHIA R.Br.

- Eulophia graminea*** Lindl., Gen. Sp. Orchid. Pl.: 182. 1833. Fig. 8E.
 TYPE: Singapore, 1822, *Wallich 7372.C* (leg. T. Lobb) (syntypes, BM, CAL, K-LINDL, K-WALL).
 FLOWERING: April–May.
 HABIT AND HABITAT: Terrestrial. Occurs in the dry

open scrub forests and thickets.

DISTRIBUTION: Punajur. 700 m.

SPECIMENS EXAMINED: *J.Jayanthi 207144* (BSI).

Eulophia nuda Lindl., Gen. Sp. Orchid. Pl.: 180. 1833; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 593. 1981. Fig. 8F.

TYPE: Nepal, Morung [Morang] Hills, 27 Apr. 1810, *Wallich 7371* (leg. Buchanan-Hamilton) (holotype, K-WALL).

FLOWERING: April–August.

HABIT AND HABITAT: Terrestrial. Occurs in humus rich soil in moist deciduous forests to evergreen forests.

DISTRIBUTION: Gombegallu betta, K. Gudi. 1200–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 207141* (BSI), *A.S.Rao 80089* (BSI).

Eulophia pratensis Lindl., J. Proc. Linn. Soc., Bot. 3: 25. 1858; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 453. 1944.

TYPE: India, Deccan, *Stocks 22 bis* (holotype, K-LINDL).

Eulophia ramentacea Wight, Icon. Pl. Ind. Orient. 5: t. 1666. 1851; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967.

FLOWERING: April–June.

HABIT AND HABITAT: Terrestrial. Occurs in marshy areas near shola grasslands.

DISTRIBUTION: Dupabare. 1500–1600 m. Endemic.

NOTE: Included based on Barnes.

HABIT AND HABITAT: Epiphyte. Occurs on the trunks of trees in semievergreen to evergreen forests.

DISTRIBUTION: Attikan, Bedguli, Gombegallu, Kattari betta. 1200–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 207105* (BSI).

Gastrochilus calceolaris (Buch.-Ham. ex Sm.) D.Don, Prodr. Fl. Nepal.: 32. 1825; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. Fig. 8H.

BASIONYM: *Aerides calceolaris* Buch.-Ham. ex Sm. in A.Rees, Cycl. 39(1): no. 11. 1818. TYPE: Nepal, Bagmati Zone, Kathmandu, Narainhetty, *Buchanan-Hamilton s.n.*

FLOWERING: March–April.

HABIT AND HABITAT: Epiphyte. Occurs on the trunks of trees in semievergreen to evergreen forests.

DISTRIBUTION: Attikan, Bedguli, Gombegallu. 1200–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 197454* (BSI), *A.S.Rao 79856* (BSI), *R.R.Rao 1267* (MU).

Gastrochilus flabelliformis (Blatt. & McCann) C.J.Saldanha in C.J.Saldanha & D.H. Nicolson, Fl. Hassan Distr.: 830. 1976. Fig. 8I.

BASIONYM: *Saccolabium flabelliforme* Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 722. 1932. TYPE: India, North Kanara, Devimane Ghat, *Sedgwick & T. R. Bell 6975* (holotype, BLATT)

FLOWERING: March.

HABIT AND HABITAT: Epiphyte. Occurs on the trunks of trees in semievergreen to shola evergreen forests. Endemic.

DISTRIBUTION: Doddasampige, Jodigere. 1300–1400 m.

SPECIMENS EXAMINED: *J.Jayanthi 207138* (BSI).

GASTROCHILUS D.Don

Gastrochilus acaulis (Lindl.) Kuntze, Revis. Gen. Pl. 2: 661. 1891. Fig. 8G.

BASIONYM: *Cleisostoma acaule* Lindl., Gen. Sp. Orchid. Pl.: 227. 1833.

TYPE: Sri Lanka, *Macrae s.n.* (not found).

Saccolabium pulchellum (Wight) C.E.C.Fisch. in J.S.Gamble, Fl. Madras: 1446. 1928; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967.

TYPE: India, Nilgiri Hills, on the banks of the Kaitairy River, *Wight s.n.* (holotype, K).

FLOWERING: March–April.

GEODORUM Andrews

NOTE: Chase *et al.* (2021a) reduced *Geodorum* under *Eulophia* R.Br. based on phylogenetic study and subsequently proposed (Chase *et al.*, 2021b) to conserve *Eulophia* over *Geodorum*. However, treating *Eulophia* as a conserved name over *Geodorum* is subject to acceptance the proposal in the XX International Botanical Congress to be held in Madrid, Spain in 2024 and therefore, *Geodorum* must be treated as correct name at present due to priority.

Geodorum densiflorum (Lam.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 259. 1919; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy

et al., Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. Fig. 8J.
BASIONYM: *Limodorum densiflorum* Lam., Encycl. 3: 516. 1792.

Eulophia cernua (Willd.) M.W.Chase, Kumar & Schuit., Phytotaxa 491: 51. 2021.

TYPE: India, Malabar, Rheede, icon. Hort. Malab. 2: 69, t. 35. 1692.

FLOWERING: June–October. (Fruiting in December).
HABIT AND HABITAT: Terrestrial. Occurs in the moist deciduous forest floors under *Lantana* thickets, in Bamboo brakes and in evergreen forests.

DISTRIBUTION: B.R. Hills, Bedguli, Burude bungalow road, Bylore, K. Gudi, Honnemetti. 1000–1400 m.
SPECIMENS EXAMINED: *J.Jayanthi 194442* (BSI), *B.R.Ramesh 1504* (HIFP).

HABENARIA Willd.

Habenaria barbata Wight ex Hook.f., Fl. Brit. India 6: 133. 1890; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967.

TYPE: India, Travancore, Pulney and Dindygul Mountains, *Wallich 7034* (leg. Wight) (missing).

Habenaria virens (Lindl.) Abeyw., Ceylon J. Sci., Biol. Sci. 2: 83. 1959 *nom. inval. et illeg.*, non A. Rich. & Galeotti, 1845; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: India, Dindigul, alt. 4000 ft, *Wight s.n.* [2084] (holotype, K-LINDL.; isotype, K)

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in moist shaded places of dry deciduous forests.

DISTRIBUTION: Moskal.

NOTE: Included based on Barnes report.

Habenaria brachyphylla (Lindl.) Aitch., J. Linn. Soc., Bot. 19: 188. 1882. Fig. 8K.

BASIONYM: *Platanthera brachyphylla* Lindl., Gen. Sp. Orchid. Pl.: 293. 1835.

TYPE: India, *Wight s.n.* (holotype, K-LINDL.; isotype, P).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests.

DISTRIBUTION: Burude. 1100–1200 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207148* (BSI).

Habenaria crinifera Lindl., Gen. Sp. Orchid. Pl.: 323. 1835. Fig. 8L.

TYPE: Sri Lanka, *Macrae s.n.* (holotype, K-LINDL).

FLOWERING: August–September.

HABIT AND HABITAT: Epiphytic. Occurs in the shola evergreen forests.

DISTRIBUTION: Kattaribetta. 1600–1800 m.

SPECIMENS EXAMINED: *J.Jayanthi 207145* (BSI).

Habenaria elliptica Wight, Icon. Pl. Ind. Orient. 5: t. 1706. 1851; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981.

TYPE: India, Pulney Hills, Sep., *Wight s.n.* (holotype, K).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in the evergreen and shola grasslands.

DISTRIBUTION: Devagiribetta. 1500–1600 m. Endemic.

SPECIMENS EXAMINED: *R.S.Rao 73789* (BSI).

Habenaria ebwesii Hook.f., Bot. Mag. 122: t. 7478. 1896. Fig. 9A.

TYPE: India, Nilgiri Mountains, *Proudlock s.n.* (holotype, K).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in the shola grasslands.

DISTRIBUTION: Kattaribetta. 1700–1800 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207140* (BSI).

Habenaria foliosa A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 71. 1841. Fig. 9B.

Habenaria digitata var. *foliosa* (A. Rich) Hook.f., Fl. Brit. India 6: 135. 1890; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981.

TYPE: India, Nilgiri Hills near Avalanchy and Otacamund, July–Aug., *Perrottet s.n.* (holotype, P).

FLOWERING: June–September.

HABIT AND HABITAT: Terrestrial. Occurs in grassy slopes in evergreen forests and shola grasslands.

DISTRIBUTION: Ittuboodhikanive. 1400–1700 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 203500* (BSI).

Habenaria furcifera Lindl., Gen. Sp. Orchid. Pl.: 319. 1835. Fig. 9C.

TYPE: India, Mussoorie, *Royle s.n.* (holotype, K-LINDL).



FIGURE 8. A. *Eria pauciflora*. B. *Eria polystachya*. C. *Eria pseudoclavicaulis*. D. *Eria reticosa*. E. *Eulophia graminea*. F. *Eulophia nuda*. G. *Gastrochilus acaulis*. H. *Gastrochilus calceolaris*. I. *Gastrochilus flabelliformis*. J. *Geodorum densiflorum*. K. *Habenaria brachyphylla*. L. *Habenaria crinifera*. Photograph by J.Jayanthi.

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests, amidst grasses in moist places.

DISTRIBUTION: K. Gudi, Manjikere, Bylore. 1000–1100 m.

SPECIMENS EXAMINED: *J.Jayanthi 207124* (BSI).

Habenaria gibsonii Hook.f., Fl. Brit. India 6: 135. 1890. Fig. 9D.

TYPE: India, the Concan, Kyreswur and Kandalla [Khandala], *Gibson s.n.* (holotype (syntype?), K).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests.

DISTRIBUTION: Bylore. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi 207131* (BSI).

Habenaria heyneana Lindl., Gen. Sp. Orchid. Pl.: 320. 1835; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. Fig. 9E.

TYPE: India, locality not recorded, 23 Sep. 1826, *Wallich 7044* (leg. Heyne s.n.) (holotype, K-LINDL; isotype, K-WALL).

FLOWERING: August–November.

HABIT AND HABITAT: Terrestrial. Occurs in marshy and swampy places in shola grasslands.

DISTRIBUTION: Honnemetti, Kattaribetta. 1700–1800 m and above. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 203482 & 203485* (BSI), *R.R. Rao 1043* (MU).

Habenaria hollandiana Santapau, Fl. Purandhar: 126. 1957; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. *Habenaria affinis* Wight, Icon. Pl. Ind. Orient. 5: t. 1707. 1851; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944.

TYPE: India, ?Belgaum, ?]. *S. Law s.n.* (?holotype, K [without collector or locality])

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in open tall grassy areas of dry deciduous forests.

DISTRIBUTION: Moskal. Endemic.

SPECIMENS EXAMINED: *R.S. Rao 73746* (BSI).

Habenaria longicorniculata J.Graham, Cat. Pl. Bombay: 202. 1839; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. Fig. 9F. SYNTYPES: India, South Concan, Kandalla

[Khandala], Sir Herbert Compton's Bungalow, *J. S. Law s.n.* (syntypes, K, P); Pulney Hills, *Wight s.n.* (syntypes, K, P).

Habenaria longecalcarata A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 71. 1841; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944.

TYPE: India, Nilgiri Hills, Konoor, Otacamund, July–Aug., *Perrottet s.n.* (holotype, P).

FLOWERING: August–October.

HABIT AND HABITAT: Terrestrial. Occurs in grassy slopes in semievergreen forests and shola grasslands.

DISTRIBUTION: Ittuboodhikanive, Honnemetti. 1300–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 194732 & 202967* (BSI), *R.R.Rao 1040* (MU).

Habenaria longicornu Lindl., Gen. Sp. Orchid. Pl.: 322. 1835. Fig. 9G.

TYPE: India, locality not recorded, 17 Aug. 1818, *Wallich 7027* (leg. Heyne s.n.) (holotype, K-LINDL; isotype, K-WALL).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Along the open rocky slopes of moist deciduous forests.

DISTRIBUTION: On the way to Bedguli. 1100–1200 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 203440* (BSI).

Habenaria marginata Colebr., W.J.Hooker, Exot. Fl.: t. 136. 1824. Fig. 9H.

TYPE: India, July 1814, cult. Calcutta s.n. (probably not preserved and hence the illustration in Exot. Fl. 2 :1.136, 1824, considered as the type).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in open rocky, grassy slopes in moist deciduous forests.

DISTRIBUTION: Bedguli. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi 207137* (BSI).

Habenaria multicaudata Sedgw., Rec. Bot. Surv. India 6: 352. 1919. Fig. 9I.

TYPE: India, North Kanara, Near Kaswar, Gudihalli, Sep. 1917, *T. R. D. Bell s.n.*

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in the shady places of evergreen forests.

DISTRIBUTION: Bedguli. 1300–1400 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207135* (BSI).

Habenaria ovalifolia Wight, Icon. Pl. Ind. Orient. 5: t. 1708. 1851; E.Barnes, J. Bombay Nat. Hist. Soc.

44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981. Fig. 9J.

TYPE: India, Malabar and Anamally Hills, July–Aug., *Wight 3017* (syntype, K).

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests, amidst grasses in moist places.

DISTRIBUTION: K. Gudi, Manjikere, Bylore. 1000–1100 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 195934* (BSI), *R.S. Rao 73597* (BSI).

Habenaria perrottetiana A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 74. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 594. 1981.

TYPE: India, Nilgiri Hills, Otacamund to Avalanchy, Aug. 1840, *Perrottet s.n.* [1129 in G] (holotype, P; isotype, G).

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in shola grasslands.

DISTRIBUTION: Bedguli, Dupabare, Honnemetti. 1500–1600 m. Endemic.

SPECIMENS EXAMINED: *R.S.Rao 73786* (BSI), *R.R.Rao 1041* (MU).

Habenaria plantaginea Lindl., Gen. Sp. Orchid. Pl.: 323. 1835; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

SYNTYPES: India, betw. Tenevelly & Travancore, Oct. 1814, *Wallich 7053A* (leg. Rattler) (syntypes, K-LINDL, K-WALL)

FLOWERING: September–November.

HABIT AND HABITAT: Terrestrial. Occurs in scrub, dry deciduous to moist deciduous forest slopes and bamboo brakes.

DISTRIBUTION: Bodipadaga, Burude, B.R. Hills, K.Gudi, Nellikathir, Punajur-Bedguli, Yelandur. 700–1100 m.

SPECIMENS EXAMINED: *J.Jayanthi 194679, 194680, 194683, 195914, 195785, 197250 & 202916* (BSI).

NOTES: After Barnes, this species is collected in the present study after a lapse of 80 years.

Habenaria variflora A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 70. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44:

455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: India, Nilgiri Hills near Konoor, July, *Perrottet s.n.* (holotype, P).

FLOWERING: September–October.

HABIT AND HABITAT: Terrestrial. Occurs in shola grasslands.

DISTRIBUTION: Devagiribetta, Honnemetti, Kattaribetta. 1600–1800 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207150* (BSI), *R.S.Rao 73788* (BSI).

Habenaria roxburghii Nicolson, C.J.Saldanha & D.H.Nicolson, Fl. Hassan Distr.: 834. 1976. Fig. 9M. TYPE: India, Coromandel coast, icon. *Roxburgh s.n.*, Pl. Coromandel 1: 32, t. 37. 1795.

FLOWERING: July–November.

HABIT AND HABITAT: Terrestrial. Occurs in scrub thickets and dry deciduous forests.

DISTRIBUTION: Bodipadaga, Bellatha, Yelandur. 800–900 m.

SPECIMENS EXAMINED: *J.Jayanthi 194441, 202957 & 203472* (BSI).

Habenaria sahyadrica K.M.P.Kumar, Nirmesh, V.B.Sreek. & Kumar, Phytotaxa 244: 196. 2016. Fig. 9N.

TYPE: India, Kerala: Palakkad district, Muthikulam, way to Elival hills, 1700 m, 22 Nov. 2013, *Nirmesh & Prabhukumar 28501* (holotype, KFRI; isotype, CMPR, CALI).

FLOWERING: December–January.

HABIT AND HABITAT: Terrestrial. Occurs along the slopes of evergreen forests.

DISTRIBUTION: Gombegallu, Ittuboodhikanive. 1400–1500 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 206559* (BSI).

LIPARIS Rich.

Liparis atropurpurea Lindl., Gen. Sp. Orchid. Pl.: 28. 1830; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: Sri Lanka, *Macrae s.n.* (holotype, K-LINDL).

FLOWERING: July–September.

HABIT AND HABITAT: Terrestrial. Occurs in ever-

green forests.

DISTRIBUTION: Attikan, Bellaji. 1200–1600 m.

NOTE: Included based on Barnes report.

Liparis deflexa Hook.f., Fl. Brit. India 5: 697. 1890. Fig. 9O.

Liparis flavoviridis Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 260. 1931.

TYPE: India, Sikkim Himalaya, Darjeeling, 1844, *Griffith's collector 5367* (holotype, K; isotype, K-LINDL).

FLOWERING: July–September.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of moist deciduous forests.

DISTRIBUTION: K. Gudi, Burude. 1100–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 202915* (BSI).

Liparis odorata (Willd.) Lindl., Gen. Sp. Orchid. Pl.: 26. 1830; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967. Fig. 9P.

BASIONYM: *Malaxis odorata* Willd., Sp. Pl., ed. 4, 4: 91. 1805.

TYPE: India, Malabar, icon, of “la-Poulou-Maravara” in Rheede, Hort. Malabar. 12: 53, t. 27.

FLOWERING: July–September.

HABIT AND HABITAT: Terrestrial. Occurs in semievergreen forests.

DISTRIBUTION: Bellaji. 1400–1500 m.

SPECIMENS EXAMINED: *J.Jayanthi 207122* (BSI).

Liparis platyphylla Ridl., J. Linn. Soc., Bot. 22: 264. 1886; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981. TYPE: India, Anamallays, alt. 3000 ft, *Beddome s.n.* (holotype, BM).

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of moist deciduous forests.

DISTRIBUTION: Western slopes. 1100–1300 m. Endemic.

NOTE: Included based on Barnes report.

Liparis wightiana Thwaites, Enum. Pl. Zeyl.: 295. 1861; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 452. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: Sri Lanka, Central Province, alt. 3000–5000 ft, *Thwaites s.n.* [Ceylon Plants 3 1 79] (holotype, BM; isotype, K, P).

FLOWERING: August–September.

HABIT AND HABITAT: Terrestrial. Occurs in rocky crevices of hill top forests.

DISTRIBUTION: Pokkibetta. 1400–1600 m.

NOTE: Included based on Barnes report.

LUISIA Gaudich.

Luisia tenuifolia Blume, Rumphia 4: 50. 1849; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981. Fig. 10A.

TYPE: Sri Lanka, Peradenia, *Macrae s.n.* [67] (holotype, K-LINDL).

FLOWERING: July–September.

HABIT AND HABITAT: Epiphyte. Occurs on trees of moist deciduous forests.

DISTRIBUTION: Doddasampige, K.Gudi. 1100–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 194546* (BSI).

NOTE: After Barnes, this species is collected from BRT after a lapse of 80 years. Rao & Razi 1981 stated that this species has been completely eradicated from the area along with the deforestation programme. However, during the present study some moderately good population observed due to protection measures.

Luisia trichorhiza (Hook.) Blume, Rumphia 4: 50. 1849. Fig. 10B.

Vanda trichorhiza Hook., Exot. Fl. 1: t. 72. 1823.

TYPE: Nepal, cult. Liverpool (leg. *Wallich s.n.*) (not found).

FLOWERING: March–April.

HABIT AND HABITAT: Epiphyte. Occurs on trees of moist deciduous forests and disturbed semievergreen forests.

DISTRIBUTION: Seegevadibetta. 1100–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi 207147* (BSI).

Luisia zeylanica Lindl., Fol. Orchid. 4: 3. 1853. Fig. 10C.

TYPE: Sri Lanka, *Macrae 50* (holotype, K-LINDL).

Luisia teretifolia auct. non Gaudich. 1829; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

FLOWERING: March–April & October–February.

HABIT AND HABITAT: Epiphyte. Occurs on trees of moist deciduous forests.



FIGURE 9. A. *Habenaria elwesii*. B. *Habenaria foliosa*. C. *Habenaria furcifera*. D. *Habenaria gibsonii*. E. *Habenaria heyneana*. F. *Habenaria longicorniculata*. G. *Habenaria longicornu*. H. *Habenaria marginata*. I. *Habenaria multicaudata*. J. *Habenaria ovalifolia*. K. *Habenaria plantaginea*. L. *Habenaria rariflora*. M. *Habenaria roxburghii*. N. *Habenaria sahyadrica*. O. *Liparis deflexa*. P. *Liparis odorata*. Photograph by J.Jayanthi.

DISTRIBUTION: B.R. Hills, Devakere, K.Gudi, Punajur ghat. 1100–1300 m.

SPECIMENS EXAMINED: *J.Jayanthi* 207123 (BSI), *R.R.Rao* 1793 (MU).

NERVILIA Comm. ex Gaudich.

Nervilia concolor (Blume) Schltr., Bot. Jahrb. Syst. 45: 404. 1911. Fig. 10D–E.

BASIONYM: *Cordyla concolor* Blume, Bijdr. Fl. Ned. Ind.: 416. 1825.

TYPE: Indonesia, Java, Mt. Salak, *Blume s.n.* (?holotype, L).

Nervilia aragoana Gaudich., Voy. Uranie: 422. 1829; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R. Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: Mariana Islands (Gaum), *Gaudichaud s.n.* (holotype, P).

FLOWERING: April–May. (Leaves appear in June onwards).

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forest floors.

DISTRIBUTION: Dhumanegathe, K.Gudi, Minchiguli. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi* 194530 (BSI), *A.S. Rao* 80089 (BSI).

Nervilia plicata (Andrews) Schltr., Bot. Jahrb. Syst. 45: 403. 1911. Fig. 10F–G.

Arethusa plicata Andrews, Bot. Repos. 5: 321. 1803. Lectotype (designated by Atthanagoda *et al.*, 2021): Andrews, Bot. Repos. 5: t. 321. 1803. (plate 321 is based on the collection, *A.B. Lambert s.n.*, from East India in 1803).

Nervilia biflora (Wight) Schltr., Bot. Jahrb. Syst. 39: 48. 1906; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R. Rao & Razi, Synop. Fl. Mysore District: 595. 1981.

TYPE: India, Wynad, *Jerdon s.n.* (not found).

FLOWERING: April–May. (Leaves variegated, appear in June onwards).

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forest floors.

DISTRIBUTION: Cubbongundi, Dhumanegathe. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi* 194592 (BSI).

NOTE: After Barnes, this has been collected from BRTTR after a lapse of 80 years.

Nervilia simplex (Thouars) Schltr., Bot. Jahrb. Syst. 45: 401. 1911. Fig. 10H–I.

BASIONYM: *Arethusa simplex* Thouars, Hist. Orchid.: t. 24. 1822.

TYPE: icon. Thouars, Hist. Orchid.: t. 24. 1822 (lectotype, designated by Pettersson, 1990). *Nervilia crispata* (Blume) Schltr. ex K. Schum. & Lauterb., Fl. Schutzgeb. Südsee: 240. 1900; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967.

TYPE: Indonesia, Java, Bantam Prov., Mt. Batuauwel, *van Hasselt s.n.* (holotype, ? L, not found, painting W).

Nervilia monantha Blatt. & McCann, J. Bombay Nat. Hist. Soc. 35: 724. 1932; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944.

TYPE: India, North Kanara, Yellapur, June 1911, *T. R. Bell* 5428a (holotype, BLAT). *Nervilia crociformis* (Zoll. & Moritzi) Seidenf., Dansk Bot. Ark. 32: 151. 1978.

TYPE: Indonesia, Java, Tjikoya, 11 Oct. 1812, *Zollinger* 762.

FLOWERING: May. (Leaves appear in July).

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forest floors.

DISTRIBUTION: B.R. Hills. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi* 194534 (BSI).

OBERONIA Lindl.

Oberonia brachystachys Lindl., Sert. Orchid.: t. 8 B. 1838. Fig. 10J. SYNTYPES: “Burmese Empire,” Griffith 697 (not found); *Griffith* 778 (syntypes, K-LINDL, P); Griffith s.n. (possible syntype, K).

Oberonia recurva Lindl., Edwards’s Bot. Reg. 25(Misc.): 14. 1839.

TYPE: India, Bombay, Messrs. *Loddiges s.n.* (holotype, K-LINDL).

FLOWERING: December.

HABIT AND HABITAT: Epiphyte. Occurs on trees of evergreen forests.

DISTRIBUTION: Kattaribetta. 1600–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi* 207143 (BSI).

Oberonia brunoniana Wight, Icon. Pl. Ind. Orient. 5: t. 1622. 1851; E. Barnes, J. Bombay Nat. Hist. Soc.

44: 451. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981. Fig. 10K.

TYPE: India, Tamil Nadu, Iyamally Hills near Coimbatore, Mt. Agamullu, June-July, *Wight s.n.* (lectotype, K, designated by Geiger, 2019).

Oberonia lindleyana Wight, Icon. Pl. Ind. Orient. 5: t. 1624. 1851; E. Barnes, J. Bombay Nat. Hist. Soc. 44: 451. 1944.

TYPE: India, Tamil Nadu, Iyamally Hills, near Coimbatore, Aug.-Sep., *Wight s.n.* (holotype, K).

Oberonia santapau Kapadia, J. Bombay Nat. Hist. Soc. 57: 265. 1960; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981. TYPE: India, Iyamally hilla, Coimbatore (holotype, K?).

FLOWERING: December–February.

HABIT AND HABITAT: Epiphyte. Occurs on trees of riparian forests, semievergreen to shola evergreen forests. Also found on the crevices of rocky boulders amidst shola grasslands.

DISTRIBUTION: Attikan, Bellaji, Bedguli, Devagiri-betta, Dupabarebetta, K.Gudi. 1400–1550 m.

SPECIMENS EXAMINED: *J.Jayanthi 194755 & 206598* (BSI), *R.R. Rao 1051, 1596 & 1786* (MU), *B.R.Ramesh & M.Deshayes 626* (HIFP).

Oberonia chandraskharanii V.J.Nair, V.S.Ramach. & R.Ansari, Blumea 28: 361. 1983. Fig. 10L.

TYPE: India, Kerala State, Cannanore District, Chandanathode, 2500 ft, 15 Aug. 1980, *Ramachandran 66948* (holotype, CAL; isotype, K, MH).

FLOWERING: December.

HABIT AND HABITAT: Epiphyte. Occurs on trees of semievergreen and evergreen forests.

DISTRIBUTION: Bellaji. 1400–1500 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 207133* (BSI).

Oberonia ensiformis (Sm.) Lindl., Fol. Orchid. 8: 4. 1859. Fig. 10M.

Malaxis ensiformis Sm., A.Rees, Cycl. 22: n.° 14. 1812.

Oberonia iridifolia Lindl., Gen. Sp. Orchid. Pl.: 15. 1830.

TYPE: Nepal, Bagmati Zone, Kathmandu, Narayanhetty, on trees, 12 Nov. 1802, *Buchanan-Hamilton s.n.* (lectotype, LINN sheet LINN-HS 1396.11.1-2, designated by Ansari & Balakrishnan, 1990 and Geiger, 2020; isolectotype, K).

FLOWERING: September–December.

HABIT AND HABITAT: Epiphyte. Occurs on trees of moist deciduous to evergreen forests.

DISTRIBUTION: Seematti, Dodduveetha Kadavu, Honnemetti. 1100–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 194738 & 202954* (BSI).

Oberonia mucronata (D.Don) Ormerod & Seidenf. in G. Seidenfaden, Contrib. Orchid Fl. Thailand 13: 20. 1997. Fig. 10N.

Stelis mucronata D.Don, Prodr. Fl. Nepal.: 32. 1825.

TYPE: Nepal, *Buchanan-Hamilton s.n.* (holotype, BM).

Oberonia iridifolia var. *denticulata* (Wight) Hook.f., Fl. Brit. India 5: 676. 1890; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 451. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

TYPE: India, Tamil Nadu, Coimbatore, Iyamally Hills, July-Aug. [December 1847], *Wight s.n.* [2939] (syntypes, CAL, K).

FLOWERING: September–December.

HABIT AND HABITAT: Epiphyte. Occurs in shaded areas, on the trunks and branches of trees in moist deciduous forests, evergreen forests and along streams in shola forests.

DISTRIBUTION: Attikan, Bedguli, K.Gudi, Seerindi. 1200–1400 m.

SPECIMENS EXAMINED: *J.Jayanthi 202955* (BSI), *R.S. Rao 73593* (BSI), *R.R.Rao 1052* (MU).

Oberonia verticillata Wight, Icon. Pl. Ind. Orient. 5: t. 1626. 1851; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 451. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967. Fig. 10O.

TYPE: India, Nilgiri Hills, July-Oct., *Wight s.n.* (lectotype, BM, designated by Ansari & Balakrishnan, 1990).

FLOWERING: September–December.

HABIT AND HABITAT: Epiphyte. Occurs on trees of semievergreen and evergreen forests.

DISTRIBUTION: Bellaji, Devabetta. 1500–1600 m. Endemic.

SPECIMENS EXAMINED: *J.Jayanthi 202977* (BSI).

Oberonia wightiana Lindl., Edwards's Bot. Reg. 25(Misc.): 14. 1839; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

TYPE: India, Nilgiri & Pulney Hills, Aug.-Sep., *Wight 181* (lectotype, K-LINDL, designated by Ansari & Balakrishnan, 1990; isotype, MH).

FLOWERING: December–February.

HABIT AND HABITAT: Epiphyte. Occurs on trees of evergreen forests.

DISTRIBUTION: Bedguli.

SPECIMENS EXAMINED: *R.R. Rao 1785* (MU).

PAPILIONANTHE Schltr.

Papilionanthe cylindrica (Lindl.) Seidenf., Descr.

Epidendrorum J.G.König: 33. 1995. Fig. 11A. BASIONYM: *Aerides cylindrica* Lindl., Gen. Sp. Orchid. Pl.: 240. 1833; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 228. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 591. 1981.

TYPE: India, without locality, *Wallich 7317B* (leg. Wight s.n.) (syntype, K-WALL), *Wallich 7317A* (leg. Heyne s.n., 21 Mar. 1817) (syntypes, K-LINDL, K-WALL).

FLOWERING: March–May.

HABIT AND HABITAT: Epiphyte. Occurs on trees of evergreen and shola forests. Most of the time found loosely hanging from the trees of *Elaeocarpus* sp.

DISTRIBUTION: Bedguli, Bellaji, Honnemetti. 1400–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 195706 & 197449* (BSI).

PECTEILIS Raf.

Pecteilis gigantea (Sm.) Raf., Fl. Tellur. 2: 38. 1837.

Orchis gigantea Sm., Exot. Bot. 2: 79. 1806.

TYPE: Nepal, *Buchanan-Hamilton s.n.*

Platanthera susannae auct. non (L.) Lindl., 1835; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of shola grasslands.

DISTRIBUTION: Attikan, Dupabare. 1400–1600 m.

NOTE: Included based on Barnes report.

PERISTYLUS Blume

Peristylus aristatus Lindl., Gen. Sp. Orchid. Pl.: 300.

1835; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456.

1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 229. 1967. Fig. 11B.

TYPE: Sri Lanka, *Macrae s.n.* (holotype, K-LINDL).

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of evergreen forests.

DISTRIBUTION: Attikan. 1400–1500 m.

SPECIMENS EXAMINED: *J.Jayanthi 207136* (BSI).

Peristylus caranjensis (Dalzell) Ormerod & C. S. Kumar,

Harvard Pap. Bot. 23 (2): 283. 2018. BASIONYM: *Habenaria caranjensis* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 262. 1850 (as "caraujensis").

TYPE: India, Bombay, Caranja ("Carauja") Island, *Dalzell s.n.* NEOTYPE: India, Dronagheree, July 1848, *J. E. Stocks(?) s.n.* (holotype, K, designated by Ormerod & Kumar, 2018). *Habenaria stocksii* Hook.f., Fl. Brit. India 6: 158. 1890.

Peristylus stocksii (Hook.f.) Kraenzl., Orchid. Gen. Sp. 1: 513. 1898; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

TYPE: India, Mysore, *J. E. Stocks 173* (lectotype, K, designated by Ormerod & Kumar, 2018).

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in shola grassland.

DISTRIBUTION: Attikan. 1500–1600 m.

NOTE: Included based on Barnes report.

Peristylus densus (Lindl.) Santapau & Kapadia, J. Bom-

bay Nat. Hist. Soc. 57: 128. 1960; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981. Fig. 11C.

BASIONYM: *Coeloglossum densum* Lindl., Gen. Sp. Orchid. Pl.: 302. 1835.

TYPE: India, Sylhet, Pundua, July 1820, *Wallich 7057* (leg. De Silva 115) (holotype, K-LINDL; isotype, K-WALL).

FLOWERING: October–December.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of shola grasslands.

DISTRIBUTION: Attikan, Honnemetti. 1400–1500 m.

SPECIMENS EXAMINED: *J.Jayanthi 207151* (BSI), *R.R. Rao 1038* (MU).



FIGURE 10. **A.** *Luisia tenuifolia*. **B.** *Luisia trichorhiza*. **C.** *Luisia zeylanica*. **D.** *Nervilia concolor* (leaf). **E.** *Nervilia concolor* (flower) **F.** *Nervilia plicata* (leaf). **G.** *Nervilia plicata* (flower). **H.** *Nervilia simplex* (leaf). **I.** *Nervilia simplex* (flower). **J.** *Oberonia brachystachys*. **K.** *Oberonia brunoniana*. **L.** *Oberonia chandrasekharanii*. **M.** *Oberonia ensiformis*. **N.** *Oberonia mucronata*. **O.** *Oberonia verticillata*. Photograph by J.Jayanthi.

Peristylus goodyeroides (D.Don) Lindl., Gen. Sp. Orchid. Pl. 299. 1835; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

Habenaria goodyeroides D.Don, Prodr. Fl. Nepal.: 25. 1825.

TYPE: Nepal, Toka, July 1821, *Wallich s.n.* [7066A] (lectotype, K-LINDL.; isotype, K-WALL).

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests.

DISTRIBUTION: Burude.

NOTE: Included based on Barnes report.

Peristylus plantagineus (Lindl.) Lindl., Gen. Sp. Orchid. Pl.: 300. 1835. Fig. 11D.

BASIONYM: *Herminium plantagineum* Lindl., Edwards's Bot. Reg. 18: t. 1499. 1832. TYPE: Sri Lanka, *Macrae s.n.* (holotype, K-LINDL).

FLOWERING: July–September.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests.

DISTRIBUTION: Doddasampige road. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi 194591* (BSI).

Peristylus spiralis A.Rich., Ann. Sci. Nat., Bot., sér. 2, 15: 69. 1841; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 596. 1981.

TYPE: India, Nilgiri Hills, Avalanchy, Aug.-Sep., *Perrottet s.n.* (holotype, P).

FLOWERING: September.

HABIT AND HABITAT: Terrestrial. Occurs in moist shola grassland.

DISTRIBUTION: Honnemetti. 1500–1600 m.

NOTE: Included based on Barnes report.

POLYSTACHYA Hook.

Polystachya concreta (Jacq.) Garay & H.R.Sweet, Orquideologia 9(3): 206. 1974. Fig. 11E.

BASIONYM: *Epidendrum concretum* Jacq., Enum. Syst. Pl.: 30. 1760.

TYPE: Martinique, *Privault 136* (neotype, P, designated by Mytnik-Ejsmont & Raranow, 2010).

Polystachya purpurea Wight, Icon. Pl. Ind. Orient. 5: t. 1679. 1851; E.Barnes, J. Bombay Nat. Hist.

Soc. 44: 454. 1944.

TYPE: India, Tamil Nadu, top of Iyamally Hill, alt. 3000 ft, June, *Wight s.n.* (holotype, K).

Polystachya flavescens (Blume) J.J.Sm., Orch. Java: 284. 1905; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981.

SYNTYPES: Indonesia, Java, Mt. Salak & Mt. Seribu, *Kuhl & van Hasselt s.n.* (syntypes, L).

FLOWERING: June–September.

HABIT AND HABITAT: Epiphyte. Occurs in moist deciduous forests to semievergreen forests and shola forests, at times in crevices of rocks.

DISTRIBUTION: Attikan, Kuraji Kadavu, K.Gudi. 1100–1500 m.

SPECIMENS EXAMINED: *J.Jayanthi 194491* (BSI), *R.R. Rao 1044* (MU).

SATYRIUM L.

Satyrium nepalense D.Don, Prodr. Fl. Nepal.: 26. 1825; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 456. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981. Fig. 11F.

TYPE: Nepal, Bagmati Zone, Rashuwa District, Gosainthan [Shishapangma], *Wallich s.n.* (holotype, BM).

FLOWERING: September–December.

HABIT AND HABITAT: Terrestrial. Occurs in slopes of shola grassland.

DISTRIBUTION: Anebetta, Honnemetti. 1600–1700 m.

SPECIMENS EXAMINED: *J.Jayanthi 194737 & 203429* (BSI), *R.R. Rao 1045* (MU), *B.R.Ramesh 1531* (HIFP).

SCHOENORCHIS Reinw. ex Blume

Schoenorchis jerdoniana (Wight) Garay, Bot. Mus. Leaft. 23: 202. 1972.

BASIONYM: *Taeniophyllum jerdonianum* Wight, Icon. Pl. Ind. Orient. 5: t. 1756. 1851. *Saccolabium jerdonianum* (Wight) Rchb.f., W.G.Walpers, Ann. Bot. Syst. 6: 886. 1864; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981.

TYPE: India, Malabar, *Jerdon s.n.* (holotype, K).

FLOWERING: September.

HABIT AND HABITAT: Epiphyte. Occurs on trees of evergreen and shola forests.

DISTRIBUTION: Honnemetti. 1400–1600 m. Endemic.

NOTE: Included based on Barnes report.

Schoenorchis smeeana (Rchb.f.) Jalal, Jayanthi & Schuit., Kew Bull. 69(2)-9508: 4. 2014. Fig. 11G. BASIONYM: *Saccolabium smeeanum* Rchb.f., Gard. Chron., ser. 3, 2: 214. 1887. *Xenikophyton smeeanum* (Rchb.f.) Garay, Bot. Mus. Leaflet. 23: 375. 1974.

TYPE: Origin unknown, cult. *Smee s.n.* (holotype, K).

Schoenorchis latifolia (C.E.C.Fisch.) C.J.Saldanha, J. Bombay Nat. Hist. Soc. 70: 415. 1973; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981.

Rhynchostylis latifolia C.E.C. Fisch., Bull. Misc. Inform. Kew 1927: 358. 1927; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967. TYPE: India, Cardamonai, Mysore, Sep. 1903, *C. A. Barber 6093* (holotype, K). *Xenikophyton seidenfadenianum* M.Kumar, Sequiera & J.J.Wood, Kew Bull. 57: 227. 2002. TYPE: India, Kerala, Palghat District, Siruvani Forest Reserve, Dam Site, *Stephen 0020621* (holotype, KFRI).

FLOWERING: June–October.

HABIT AND HABITAT: Epiphyte. Occurs on trees of semievergreen and shola forests. Endemic.

DISTRIBUTION: Attikan, Doddasampige, Honnemetti. 1100–1600 m.

SPECIMENS EXAMINED: *J.Jayanthi 195738 & 195943* (BSI), *R.R. Rao 1050* (MU).

TRICHOGLOTTIS Blume

Trichoglottis tenera (Lindl.) Rchb.f., Gard. Chron. 1872: 699. 1872; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981. Fig. 11H.

BASIONYM: *Oeocloclades tenera* Lindl., Gen. Sp. Orchid. Pl.: 236. 1833.

TYPE: Sri Lanka, *Macrae s.n.*, [66] (holotype, K-LINDL; isotype, K).

FLOWERING: March–April & September–December. HABIT AND HABITAT: Terrestrial. Occurs on trees of Shola forests.

DISTRIBUTION: Honnemetti. 1600–1800 m.

SPECIMENS EXAMINED: *J.Jayanthi 197480* (BSI), *R.R. Rao 1626* (MU).

VANDA R.Br.

Vanda testacea (Lindl.) Rchb.f., Gard. Chron., n.s., 8: 166. 1877; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967; R.R.Rao & Razi, Synop. Fl. Mysore District: 597. 1981. Fig. 11I.

BASIONYM: *Aerides testacea* Lindl., Gen. Sp. Orchid. Pl.: 238. 1833.

TYPE: Sri Lanka, *Macrae s.n.* (not found).

Vanda parviflora Lindl., Edwards's Bot. Reg. 30(Misc.): 45. 1844; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 454. 1944.

TYPE: India, Bombay, Messrs. *Loddiges s.n.* (holotype, K-LINDL).

FLOWERING: March–April.

HABIT AND HABITAT: Epiphyte. Occurs in moist deciduous and dry deciduous forests.

DISTRIBUTION: Basavnalla kere, Kathekallane kere, K.Gudi, Manjikere, Navodhaya gate. 700–1300 m. SPECIMENS EXAMINED: *J.Jayanthi 202854* (BSI), *R.S Rao 73664* (MU).

VANILLA Plum. ex Mill.

Vanilla walkerae Wight, Icon. Pl. Ind. Orient. 3: t. 932. 1845. Fig. 11J–K.

TYPE: Sri Lanka, icon. *Walker s.n.* (not found).

FLOWERING: March (Fruiting upto December).

HABIT AND HABITAT: Terrestrial. Occurs in scrub forests.

DISTRIBUTION: Gumballi. 700–800 m.

SPECIMENS EXAMINED: *J.Jayanthi 207115* (BSI).

ZEUXINE Lindl.

Zeuxine longilabris (Lindl.) Trimen, Syst. Cat. Fl. Pl. Ceylon 90. 1885; E.Barnes, J. Bombay Nat. Hist. Soc. 44: 455. 1944; Kammathy *et al.*, Bull. Bot. Surv. India 9: 230. 1967.

Monochilus longilabris Lindl., Gen. Sp. Orchid. Pl.: 487. 1840. Fig. 11L. TYPE: Sri Lanka. 1829, *Macrae s.n.* [4] (holotype, K-LINDL).

TYPE: Sri Lanka. 1829, *Macrae s.n.* [4] (holotype, K-LINDL).

FLOWERING: December.

HABIT AND HABITAT: Terrestrial. Occurs in moist deciduous forests.

DISTRIBUTION: Bedguli. 1100–1200 m.

SPECIMENS EXAMINED: *J.Jayanthi 207142* (BSI).



FIGURE 11. A. *Papilionanthe cylindrica*. B. *Peristylus aristatus*. C. *Peristylus densus*. D. *Peristylus plantagineus*. E. *Polystachya concreta*. F. *Satyrium nepalense*. G. *Schoenorchis smeeana*. H. *Trichoglottis tenera*. I. *Vanda testacea*. J. *Vanilla walkerae* (flower). K. *Vanilla walkerae* (Habit). L. *Zeuxine longilabris*. Photograph by J.Jayanthi.



FIGURE 12. A. *Bulbophyllum kaitiense*. B. *Eria braccata*. C. *Eria nana*. D. *Habenaria perrottetiana*. Herbarium image taken from Mysore University.

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