

A Checklist of orchids of Chala Reserve Forest, Charaideo district (Assam, India)

Khyanjeet Gogoi^{1*}, Ankurraj Gogoi¹ & Manas Protim Shyam¹

¹ The Orchid Society of Eastern Himalaya (TOSEHIM), Regional Orchids Germplasm Conservation & Propagation Centre (Assam Circle), Daisa Bordoloi Nagar, Talap, Tinsukia - 786 156, Assam, India

* Corresponding author: khyanjeet.gogoi@gmail.com

Abstract

The present study is an outcome of repeated surveys carried out during the period 2018-to 2021 in Chala reserve forest, Charaideo District of Assam. This reserve forest is rich in flora and fauna with many orchid species. This paper deals with the orchid flora from this forest consisting of 65 species under 35 genera. Colored photographs along with flowering period, habits and occurrence are also provided.

Keywords: Conservation, Diversity, Encroachment, Orchidaceae.

Introduction

Orchids are well-known highly evolved angiosperm plants representing 9% of the Indian flora. A total of 32,000 orchids have been recorded in the world (Misra, 2019). In India, about 1430 species, 8 subspecies and 46 varieties under 191 genera, including 400 endemic species have been reported (Misra, 2019) mainly from the

Himalayas and the mountain regions of the Eastern and Western Ghats (Gogoi *et al.*, 2012a). Northeastern India is represented with 900 species under 165 genera, constituting 72.8% of the total orchid species in India. In Assam, several studies carried out in reserve forests and adjoining areas have led to the identification of 411 orchid species (Gogoi, 2022).

Chala reserve forest is a significant forest for the Charaideo district due to its richness of flora and fauna. The orchid flora of this forest has been very little studied. So far, no article about the orchids of this reserve have been published. The present work aims to document orchid species for the first time from this forest.

Study area: It is a protected area of evergreen forest located between 27°02'32" N and 94°91'19" E and 26°99'79" N and 94°92'01" E, with an area of 683.173 hectares, situated in the Charaideo District of Assam. Tea gardens and small villages surround the forest and the river Safrai flows parallel with the forest towards the south. Chala reserve forest is fragmented into 3 distinct zones: Bongaon reserve area, Kolakhati reserve area and Kawoimora reserve area. A road Horihotto Ali runs in the middle of the forest in the north to south direction and the railway track passing from the east to west direction demarcates the zones of the forest. It is almost similar to rain forests of North-East India in terms of floral and faunal diversity. The forest receives 3600 mm to 4000 mm annual rainfall, the highest temperature so far recorded is 36°C in summer and the lowest at 7.0°C in winter.

The orchids present in this forest are more conspicuous mainly in the flowering season i.e., March - June. Nowadays, most orchids are in critical condition due to anthropogenic disturbances, habitat loss, encroachment, oil mining, the felling of trees, etc. Due to the present trend of deforestation, the forest biodiversity and orchids will disappear very soon.

Material and methods

The present investigation is the outcome of several field trips covering all the seasons between 2018 –2021 within Chala reserve. The collected specimens were dissected and examined in the laboratory during the flowering period. Herbarium

specimens were prepared by standard methods (Jain & Rao, 1977). The nomenclature of the species was followed using (POWO, 2022; WFO, 2022) and classified as per Angiosperm Phylogeny Group system, APG IV (Chase *et al.*, 2016). Specimens were identified with the help of relevant literature (Pradhan, 1976, 1979; Chowdhery, 1998; King & Pantling, 1898; Hegde, 1984; Pearce & Cribb, 2002; Lucksom, 2007; Chen *et al.*, 2009; Rao, 2010; Gogoi *et al.*, 2012a, b; Gogoi, 2011, 2012a, b, 2016a, b, 2018, 2019; Singh *et al.*, 2019) and matched at the herbarium of the Department of Botany Guwahati University and BSI Shillong (Assam herbarium). Herbarium specimens have been deposited at the herbarium of TOSEHIM, Regional Orchid Germplasm Conservation & Propagation Centre (Assam Circle). In the enumeration, each species is supported with the author citation by its flowering, habit, distribution and voucher number.

Results

During this study, a total of 65 orchid species within 35 genera have been documented [Table: 1]. Among them, 52 species are epiphyte, and 13 are terrestrial. Out of 35 genera present, *Dendrobium* is the largest with 13 species. A good number of species produce beautiful ornamental flowers.

The suitable hosts are *Lagerstroemia speciosa* (Linnaeus) Persoon, *Mesua ferrea* Linnaeus, *Terminalia chebula* Retzius, *Castanopsis indica* (Roxburgh ex Lindley) Alphonse Pyrame de Candolle, *Artocarpus chama* Buchanan-Hamilton, *Alstonia scholaris* (Linnaeus) Roxburgh, *Dipterocarpus retusus* Blume, *Neolamarckia cadamba* (Roxburgh) Bosser, *Canarium bengalense* Roxburgh, *Stereospermum chelonoides* Augustin Pyrame de Candolle, *Terminalia myriocarpa* Van Heurck & Muller Argoviensis, *Bombax ceiba* Linnaeus, *Bischofia javanica* Blume, *Premna bengalensis* C.B. Clarke, *Dillenia indica* Linnaeus, etc. were observed.

Only 13 species of terrestrial orchids have been collected from the forest. The terrestrial orchid shows very localized occurrence in the forest; *Ania penangiana*, *Anoectochilus roxburghii*, *Calanthe sylvatica*, *Dienia ophrydis*, *Geodorum densiflorum*, *Hetaeria affinis*, *H. anomala*, *H. oblongifolia*, *Tainia latifolia*, *T.*

wrayana, *Tropidia curculigoides*, *Zeuxine nervosa* are growing on the forest floor of the forests. Similarly, the saprophytic species *Didymoplexis pallens* growing in the bamboo forest due to the presence of a thick layer of decomposed leaf litter under the damp and shady situation. [Table: 2]

Table 1. Orchid genera collected from Chala Reserve Forest along with the number of species.

SL No	Genus	Number of species	SL No	Genus	Number of species
1	<i>Acampe</i> Lindley	1	19	<i>Hetaeria</i> Blume	3
2	<i>Aerides</i> Loureiro	3	20	<i>Liparis</i> Richard	2
3	<i>Agrostophyllum</i> Blume	1	21	<i>Luisia</i> Gaudichaud	2
4	<i>Ania</i> Lindley	1	22	<i>Micropera</i> Lindley	3
5	<i>Anoectochilus</i> Blume	1	23	<i>Oberonia</i> Lindley	1
6	<i>Bulbophyllum</i> Thouars	6	24	<i>Papilionanthe</i> Schlechter	1
7	<i>Calanthe</i> R. Brown	1	25	<i>Phalaenopsis</i> Blume	2
8	<i>Cleisocentron</i> Brühl	1	26	<i>Pholidota</i> Lindley	1
9	<i>Cleisostoma</i> Blume	2	27	<i>Pinalia</i> Lindley	1
10	<i>Collabium</i> Blume	1	28	<i>Pomatocalpa</i> Breda	1
11	<i>Crepidium</i> Blume	1	29	<i>Rhynchostylis</i> Blume	1
12	<i>Cymbidium</i> Swartz	1	30	<i>Robiquetia</i> Gaudichaud	1
13	<i>Dendrobium</i> Swartz	13	31	<i>Taeniophyllum</i> Blume	2
14	<i>Dendrolirium</i> Blume	1	32	<i>Tainia</i> Blume	2
15	<i>Didymoplexis</i> Griffith	1	33	<i>Thrixspermum</i> Loureiro	2
16	<i>Dienia</i> Lindley	1	34	<i>Tropidia</i> Lindley	1
17	<i>Gastrochilus</i> D. Don	1	35	<i>Zeuxine</i> Lindley	1
18	<i>Geodorum</i> Andrews	1			

Table 2. Checklist of orchids of Chala Reserve Forest. Abbreviations used: Flo. - Flowering; Vno. - Voucher no; H - Habit [E - Epiphytic, T - Terrestrial]; O - Occurrence [C - Common, R - Rare], Fig. - Figure.

Sl no.	Taxon	Flo.	Vno.	H	O	Fig.
1	<i>Acampe praemorsa</i> (Roxburgh) Blatter & McCann var. <i>longepedunculata</i> (Trimen) Govaerts	May – August	0003	E	C	1A
2	<i>Aerides multiflora</i> Roxburgh	March – August	0032	E	R	1B
3	<i>Aerides odorata</i> Loureiro	March – August	0017	E	C	1C
4	<i>Aerides rosea</i> Loddiges ex Lindley & Paxton	May – August	0004	E	C	1D
5	<i>Agrostophyllum planicaule</i> (Wallich ex Lindley) Reichenbach f.	August – November	0005	E	C	1E
5	<i>Ania penangiana</i> (Hooker f.) Summerhayes	March – April	0063	T	C	1F
6	<i>Anoectochilus roxburghii</i> (Wallich) Lindley	August – January	0056	T	C	1G
7	<i>Bulbophyllum affine</i> Lindley	June – September	0018	E	C	1H
8	<i>Bulbophyllum careyanum</i> (Hooker f.) Sprengel	October – February	0033	E	C	1I
9	<i>Bulbophyllum delitescens</i> Hance	June – September	0019	E	R	1J
10	<i>Bulbophyllum ornatissimum</i> (Reichenbach f.) J.J. Smith	June – October	0034	E	R	1K
11	<i>Bulbophyllum roxburghii</i> (Lindley) Reichenbach f.	May – August	0020	E	C	1L
12	<i>Bulbophyllum spathulatum</i> (Rolfe ex E.W. Cooper) Seidenfaden	March – June	0035	E	R	2A
13	<i>Calanthe sylvatica</i> (Thouars) Lindley	August – November	0036	T	C	2B

14	<i>Cleisocentron pallens</i> (Cathcart ex Lindley) N. Pearce & P.J Cribb	June – September	0021	E	C	2C
15	<i>Cleisostoma appendiculatum</i> (Lindley) Bentham & Hooker f. ex B.D. Jackson	August – October	0038	E	R	2D
16	<i>Cleisostoma subulatum</i> Blume	March – August	0022	E	C	2E
17	<i>Collabium chinense</i> (Rolfe) Tang & F.T. Wang	June – August	0064	T	C	2F
18	<i>Crepidium purpureum</i> (Lindley) Szlachetko	June- July	0037	T	R	2G
19	<i>Cymbidium aloifolium</i> (Linnaeus) Swartz	April – September	0006	E	C	2H
20	<i>Dendrobium acinaciforme</i> Roxburgh	June – September	0007	E	C	2I
21	<i>Dendrobium aduncum</i> Lindley	March – September	0023	E	C	2J
22	<i>Dendrobium aphyllum</i> (Roxburgh) C.E.C. Fischer	March – July	0008	E	C	2K
23	<i>Dendrobium fimbriatum</i> Hooker	March – June	0039	E	R	2L
24	<i>Dendrobium formosum</i> Roxburgh ex Lindley	May – September			R	3A
25	<i>Dendrobium jenkinsii</i> Wallich ex Lindley	April – August	0040	E	R	3B
26	<i>Dendrobium lindleyi</i> Steudel	February – June	0041	E	R	3C
27	<i>Dendrobium lituiflorum</i> Lindley	April – July	0009	E	C	3D
28	<i>Dendrobium moschatum</i> (Banks) Swartz	June – September	0024	E	C	3E
29	<i>Dendrobium nobile</i> Lindley	March – July	0043	E	R	3F
30	<i>Dendrobium parciflorum</i> Reichenbach f. ex Lindley	May – August	0044	E	R	3G
31	<i>Dendrobium sulcatum</i> Lindley	April – August	0042	E	R	3H
32	<i>Dendrobium transparens</i> Wallich ex Lindley	April – July	0010	E	C	3I

33	<i>Dendrolirium lasiopetalum</i> (Willdenow) S.C. Chen & J.J. Wood	February – July	0025	E	C	3J
34	<i>Didymoplexis pallens</i> Griffith	April – July	0011	T	C	3K
35	<i>Dienia ophrydis</i> (J. Koenig) Seidenfaden	May – August	0045	T	C	3L
36	<i>Gastrochilus inconspicuus</i> (Hooker f.) Kuntze	June – September	0046	E	C	4A
37	<i>Geodorum densiflorum</i> (Lamarck) Schlechter	June – September	0026	T	C	4B
38	<i>Hetaeria affinis</i> (Griffith) Seidenfaden & Ormerod	January – May	0047	T	C	4C
39	<i>Hetaeria anomala</i> Lindley	February – March	0057	T	R	4D
41	<i>Hetaeria oblongifolia</i> Blume	March – April	0062	T	C	4E
40	<i>Liparis mannii</i> Reichenbach f.	November – February	0058	E	R	4F
42	<i>Liparis viridiflora</i> (Blume) Lindley	October – December	0016	E	C	4G
43	<i>Luisia trichorrhiza</i> (Hooker f.) Blume	March – June	0027	E	C	4H
44	<i>Luisia tristis</i> (G. Forster) Hooker f.	April – July	0028		C	4I
45	<i>Micropera obtusa</i> (Lindley) Tang & F.T. Wang	June – October	0048	E	C	4J
46	<i>Micropera pallida</i> (Roxburgh) Lindley	April – July	0029	E	C	4K
47	<i>Micropera rostrata</i> (Roxburgh) N.P. Balakrishnan	April – July	0049	E	R	4L
48	<i>Oberonia mucronata</i> (D. Don) Ormerod & Seidenfaden	September – January	0015	E	C	5A
49	<i>Papilionanthe teres</i> (Roxburgh) Schlechter	April – August	0002	E	C	5B
50	<i>Phalaenopsis deliciosa</i> Reichenbach f.	May – September	0050	E	R	5C

51	<i>Phalaenopsis lobbii</i> (Reichenbach f.) H.R. Sweet	April – July	0059	E	R	5D
52	<i>Phalaenopsis mannii</i> Reichenbach f.	March – July	0060	E	R	5E
53	<i>Pholidota imbricata</i> Hooker	March – August	0061	E	C	5F
54	<i>Pinalia amica</i> (Reichenbach f.) Kuntze	March – July	0065	E	R	5G
55	<i>Pomatocalpa undulatum</i> (Lindley) J.J. Smith.	March – June	0014	E	C	5H
56	<i>Rhynchosstylis retusa</i> (Linnaeus) Blume	May – August	0001	E	C	5I
57	<i>Robiquetia spathulata</i> (Blume) J.J. Smith	May – August	0055	E	R	5J
58	<i>Taeniophyllum crepidiforme</i> (King & Pantling) King & Pantling	August – November	0054	E	C	5K
59	<i>Taeniophyllum glandulosum</i> Blume	April – August	0052	E	C	5L
60	<i>Tainia latifolia</i> (Lindley) Reichenbach f.	March – June	0013	T	C	6A
61	<i>Tainia wrayana</i> (Hooker f.) J.J. Smith	June – September	0053	T	C	6B
62	<i>Thrixspermum acuminatissimum</i> (Blume) Reichenbach f.	November – February	0051	E	R	6C
63	<i>Thrixspermum centipeda</i> Loureiro	May – October	0031	E	R	6D
64	<i>Tropidia curculigoides</i> Lindley	May – November	0012	T	C	6E
65	<i>Zeuxine nervosa</i> (Wallich ex Lindley) Bentham ex Trimen	February – April	0030	T	C	6F

Conclusion

According to government records, there are 5 reserve forests in the Charaideo district. Among them, Chala Reserve Forest is very rich in terms of biodiversity. A characteristic feature of the forest is the stratification of floristic elements into three distinct canopy structures, *Lagerstroemia speciosa* and *Bombax ceibia* being the predominant trees.

The growing interest in orchids, orchid export, biopiracy, and destruction of forests has cumulatively led to the rapid disappearance of many orchids from this region.

Besides, overgrazing, unplanned human activities, and orchid collection for ornamental, medicinal, and commercial purposes have also been considered the main root cause of orchid depletion.

Hence, there is an urgent need for the conservation of orchids in the Chala reserve forest and the primary concern is the management of ecosystems. Unsustainable harvesting for floriculture is one of the major threats, so reliance on orchids from nature must be avoided. The species under threatening conditions should be addressed at the government level. *Ex-situ* and *in situ* conservation of rare and endangered orchids could be recommended.

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Fig. 1: Orchids of Chala Reserve Forest. A. *Acampe praemorsa* var. *longepedunculata*; B. *Aerides multiflora*; C. *Aerides odorata*; D. *Aerides rosea*; E. *Agrostophyllum planicaule*; F. *Ania penangiana*; G. *Anoectochilus roxburghii*; H. *Bulbophyllum affine*; I. *Bulbophyllum careyanum*; J. *Bulbophyllum delitescens*; K. *Bulbophyllum ornatissimum*; L. *Bulbophyllum roxburghii*

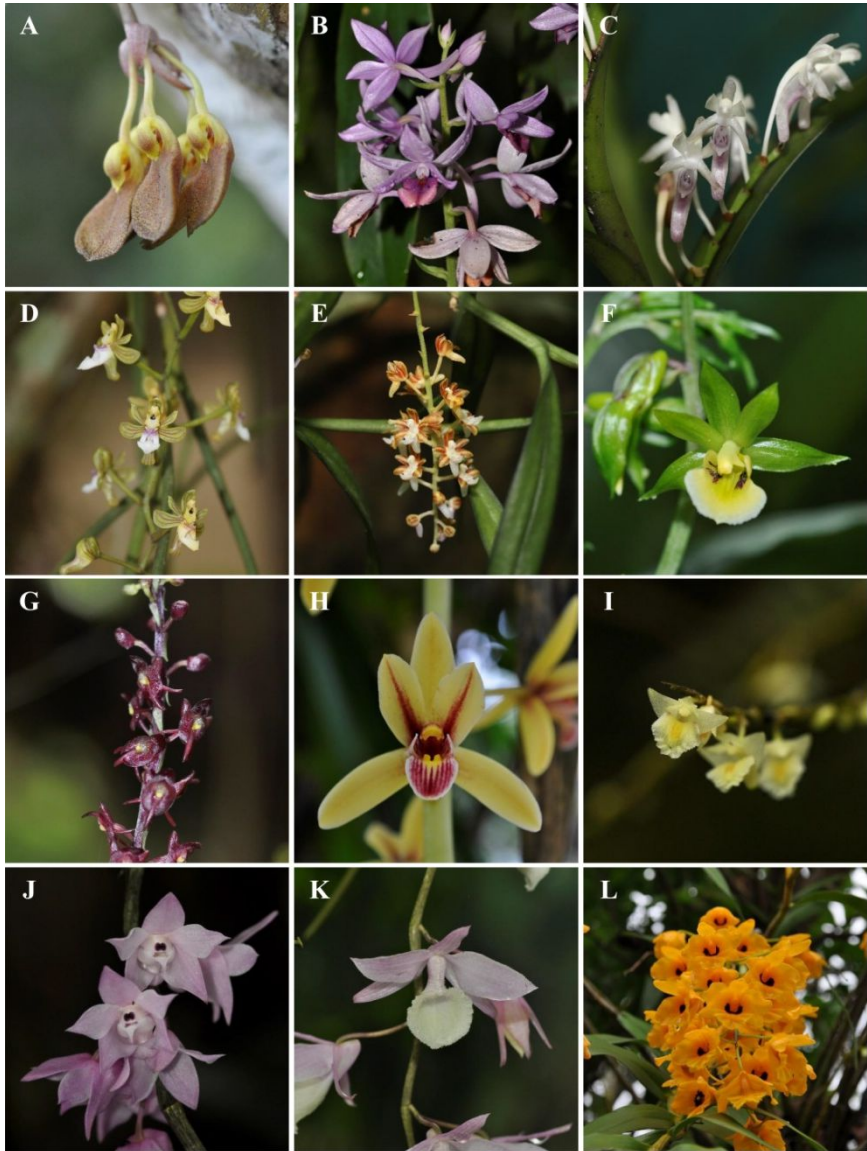


Fig. 2: Orchids of Chala Reserve Forest. A. *Bulbophyllum spathulatum*; B. *Calanthe sylvatica*; C. *Cleisocentron pallens*; D. *Cleisostoma appendiculatum*; E. *Cleisostoma subulatum*; F. *Collabium chinense*; G. *Crepidium purpureum*; H. *Cymbidium aloifolium*; I. *Dendrobium acinaciforme*; J. *Dendrobium aduncum*; K. *Dendrobium aphyllum*; L. *Dendrobium fimbriatum*



Fig. 3: Orchids of Chala Reserve Forest. A. *Dendrobium formosum*; B. *Dendrobium jenkinsii*; C. *Dendrobium lindleyi*; D. *Dendrobium lituiflorum*; E. *Dendrobium moschatum*; F. *Dendrobium nobile*; G. *Dendrobium parviflorum*; H. *Dendrobium sulcatum*; I. *Dendrobium transparens*; J. *Dendrolirium lasiopetalum*; K. *Didymoplexis pallens*; L. *Dienia ophrydis*

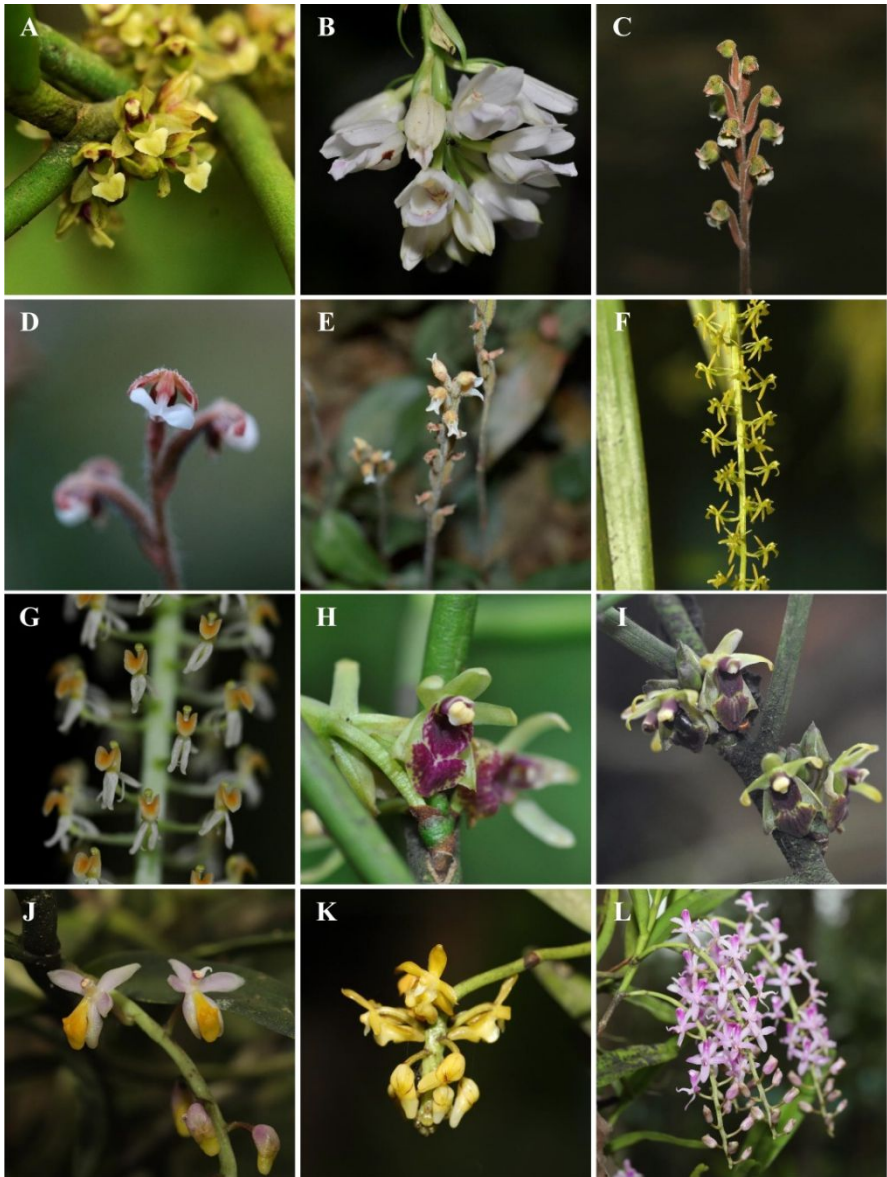


Fig. 4: Orchids of Chala Reserve Forest. A. *Gastrochilus inconspicuus*; B. *Geodorum densiflorum*; C. *Hetaeria affinis*; D. *Hetaeria anomala*; E. *Hetaeria oblongifolia*; F. *Liparis mannii*; G. *Liparis viridiflora*; H. *Luisia trichorrhiza*; I. *Luisia tristis*; J. *Micropera obtusa*; K. *Micropera pallida*; L. *Micropera rostrata*

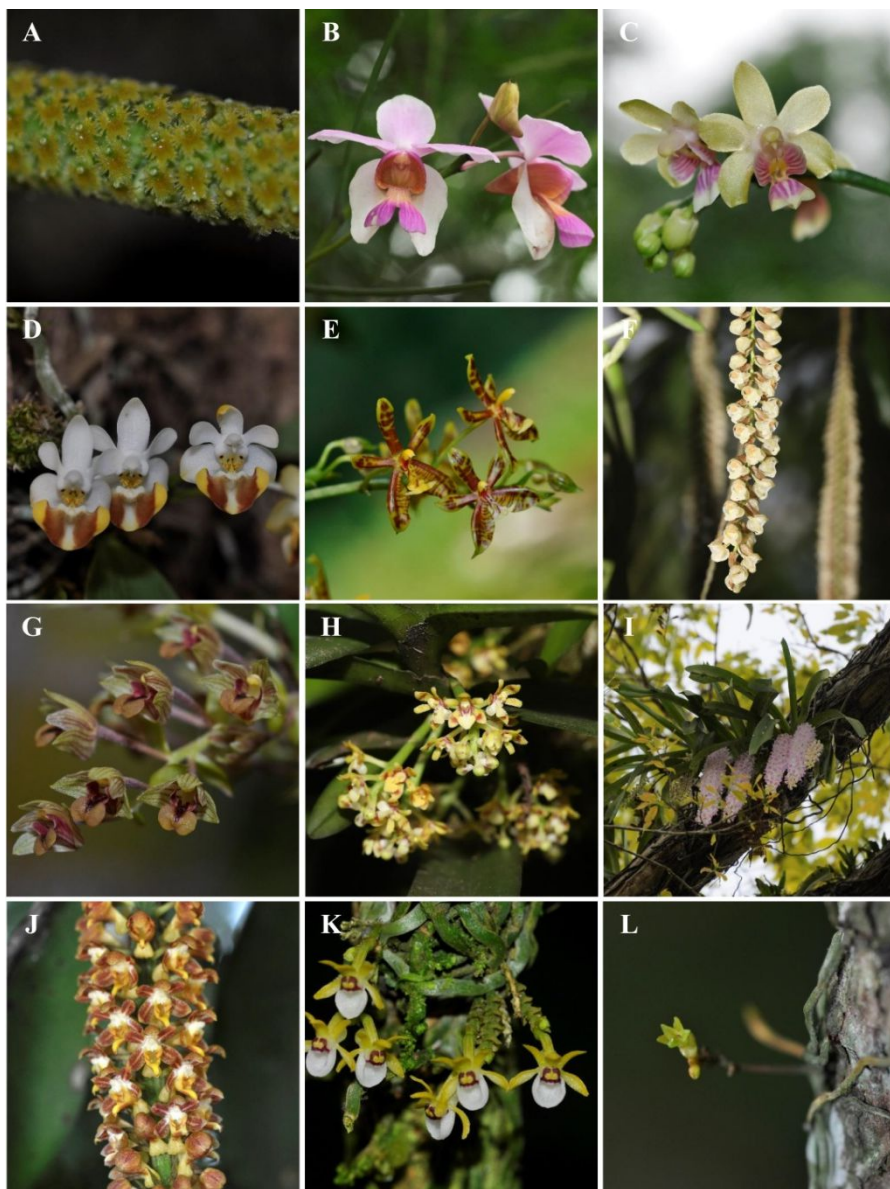


Fig. 5: Orchids of Chala Reserve Forest. A. *Oberonia mucronata*; B. *Papilionanthe teres*; C. *Phalaenopsis deliciosa*; D. *Phalaenopsis lobbii*; E. *Phalaenopsis mannii*; F. *Pholidota imbricata*; G. *Pinalia amica*; H. *Pomatocalpa undulatum*; I. *Rhynchostylis retusa*; J. *Robiquetia spathulata*; K. *Taeniophyllum crepidiforme*; L. *Taeniophyllum glandulosum*

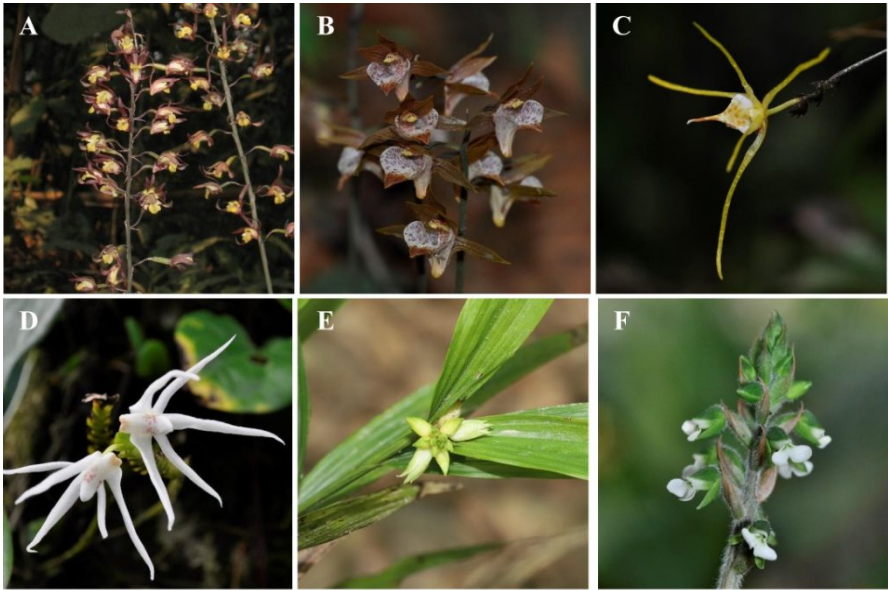


Fig. 6: Orchids of Chala Reserve Forest. A. *Tainia latifolia*; B. *Tainia wrayana*; C. *Thrixspermum acuminatissimum*; D. *Thrixspermum centipeda*; E. *Tropidia curculigoides*; F. *Zeuxine nervosa*

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