

MONOPODIAL ORCHIDS IN INDIA- AN UPDATE

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Abstract

The paper includes all the monopodial orchid species *i.e.* 250 species (including 3 varieties) belonging to 43 genera, which have so far been recorded from India; these are tabulated with zonal-wise distribution. Amongst them, *Luisia* is the largest genus with 24 species followed by *Thrixspermum* (22), *Vanda* (21), *Gastrochilus* (20), *Cleisostoma* (18), and *Phalaenopsis* (17). Out of 250 monopodial species, 134 new species have been described from India. Out of them, 92 species are considered valid and 42 are reduced to synonyms. Further, amongst the 92 valid species, 38 are transferred to other genera, as new combinations. There are as many as 10 genera which are represented by only one species, in the country.

Introduction

MONOPODIAL ORCHIDS, with single stem grow-on indefinitely at their apex. Unlike, sympodial orchids, they never produce new stems annually from the base of old stems. However, when the apex of the stem gets damaged, a new stem is produced from a lateral bud present at the node and it continues to grow indefinitely. They are also popularly known as vandaceous orchids. In the family Orchidaceae, monopodial orchids belong to the subfamily Epidendroideae, tribe Vandeae and the Subtribe Aeridinae (Chase *et al.*, 2015).

Material and Methods

Study Area

The present study covers mainland India with 28 states, 9 Union territories, including one *i.e.* Andaman and Nicobar Islands. The entire area has been demarcated into 4 main zones *i.e.* i) Western Himalayas including Gangetic plains; ii) Eastern and NorthEastern Himalayas; iii) Western, Central, and Peninsular India including Eastern and Western Ghats; and iv) Andaman and Nicobar Islands (Fig. 1).

Besides extensive field survey experience of the author in various states of NorthEast India, vast literature on orchids of India including regional and state enumeration lists, and new taxa and new distributional records by various authors (Chakraborty *et al.*, 2020; Chauhan, 2001; Chowdhery, 1998; Deb, 1983; Deb and Temjensangba, 2008; Deb *et al.*, 2004, 2021; Gogoi, 2011, 2018; Gogoi and Rinya, 2019, 2020a,b; Gogoi and Yonzon, 2012, 2015; Gogoi *et al.*, 2012, 2020; Hynniewtta *et al.*, 2000; Jakha *et al.*, 2014, 2015; Jamir, 2015; Kamba and Deb, 2021; Kataki, 1986; Kumar *et al.*, 2013, 2014, 2016; Lama *et al.*, 2013; Lucksom,



Fig. 1. India with four orchid zones shown in the table.

2007; Manilal and Sathish Kumar, 2004; Nanda *et al.*, 2012, 2013, 2014; Phukan and Odyuo, 2006a,b; Pradhan, 1976, 1979; Pridgeon *et al.*, 2014; Rao, 1995, 2009, 2010; Rao and Hegde, 2004; Rao *et al.*, 2016; Sathish Kumar, 2001; Sathish Kumar and Suresh Kumar, 1998, 2006; Sharma *et al.*, 2013; Singh *et al.*, 1991; Szlachetco, 1995; Vasudeva Rao, 1985; Verma and Lavania, 2014; Verma *et al.*, 2009), was consulted for the present study. For latest nomenclature of various species, World Checklist of Selected Plant Families facilitated by the Royal Botanic Gardens, Kew has been consulted (WCSP, 2019).

Species Distribution in India

From the present critical study, it has been noted that 250 species (including 3 varieties) belonging to 43 genera have been recorded so far from India of which the maximum number of species *i.e.* 176 occur in Eastern and NorthEastern Himalayas

followed by 84 species in Western, Central, and Peninsular India including Eastern and Western Ghats; 46 species in Andaman and Nicobar Islands; and minimum number of species *i.e.* 24 are reported from Western Himalayas including Gangetic plains. All these species are listed with zonal-wise distribution in Table 1.

Table 1. List of monopedal orchid species distributed in various zones of India.

Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>Acampe carinata</i> (Griff.) Panigrahi (<i>Acampe papillosa</i> var. <i>flava</i> A. P. Das, Katham & Nirola)	-	*	*	-
<i>A. cephalotes</i> Lindl.	-	*	-	-
<i>A. ochracea</i> (Lindl.) Hochr.	-	*	*	-
<i>A. praemorsa</i> (Roxb.) Blatt. & Mc. Cann [<i>A. papillosa</i> (Lindl.) Lindl.]	*	*	*	-
<i>A. praemorsa</i> var. <i>longepedunculata</i> (Trimen) Govaerts [<i>A. rigida</i> (Buch.Ham. ex J.E.Sm.) P.F. Hunt]	*	*	*	*
<i>Aerides crassifolia</i> Par. ex Burb.	-	*	-	-
<i>A. crispa</i> Lindl.	-	-	*	-
<i>A. emericii</i> Rchb.f.	-	-	-	*
<i>A. falcata</i> Lindl. & Paxton	-	*	-	-
<i>A. maculosa</i> Lindl.	-	-	*	-
<i>A. multiflora</i> Roxb.	*	*	*	*
<i>A. odorata</i> Lour.	*	*	*	*
<i>A. ringens</i> (Lindl.) C.E.C.Fisch.	-	-	*	-
<i>A. rosea</i> Lodd. ex Lindl. & Paxt.	-	*	-	-
<i>Arachnis cathcartii</i> (Lindl.) J.J.Sm. [<i>Esmeralda cathcartii</i> (Lindl.) Rchb.f.]	-	*	-	-
<i>A. clarkei</i> (Rchb.f.) J.J.Sm. [<i>Esmeralda clarkei</i> Rchb.f.]	-	*	-	-
<i>A. labrosa</i> (Lindl. & Paxt.) Rchb. f.	-	*	-	-
<i>A. labrosa</i> var. <i>Zhaoi</i> (Z.J.Liu et al.) S.C.Chen & J.J.Wood	-	*	-	-
<i>A. senapatiana</i> (Phukan & Mao) Kocyan & Schuit. [<i>Armorum</i> <i>senapatianum</i> S. Phukan & A. A. Mao]	-	*	-	-
<i>Biermannia arunachalensis</i> A. N. Rao	-	*	-	-
<i>B. bimaculata</i> (King & Pantl.) King & Pantl.	-	*	-	-
<i>B. jainiana</i> Hegde & A.N.Rao	-	*	-	-
<i>B. quinquecallosa</i> King & Pantl.	-	*	-	-
<i>Brachypeza unguiculata</i> (Lindl.) Kocyan & Schuit.	-	-	-	*
<i>Chiloschista confusa</i> M.J. Mathew, J. Mathew, P.M. Salim & Szlach.	-	-	*	-
<i>C. fasciata</i> (F.Muell.) Seidenf. & Ormerod [<i>Sarcochilus wightii</i> Hook.f.]	-	-	*	-
<i>C. glandulosa</i> Blatt. & McCann	-	-	*	-
<i>C. lunifera</i> (Rchb.f.) J.J.Sm.	-	*	-	-
<i>C. parishii</i> Seidenf.	-	*	*	*
<i>C. usneoides</i> (D.Don) Lindl.	*	*	-	-

Table 1. List of monopodial orchid species distributed in various zones of India (contd.).

Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>Cleisocentron neglectum</i> M.J.Mathew & J.Mathew	-	-	*	-
<i>C. pallens</i> (Lindl.) Pears. et Cribb	-	*	-	-
<i>Cleisomeria pilosulum</i> (Gagnep.) Seidenf. et Garay	-	*	-	-
<i>Cleisostoma appendiculatum</i> (Lindl.) Jacks.	-	*	*	-
<i>C. arietinum</i> (Rchb.f.) Garay	-	*	-	-
<i>C. aspersum</i> (Reichb.f.) Garay	*	*	-	-
<i>C. discolor</i> Lindl.	-	*	-	-
<i>C. duplicilobum</i> (J.J.Sm.) Garay [<i>Garayanthus duplicilobus</i> (J.J.Sm.) Szlach.]	-	*	-	-
<i>C. filiforme</i> (Lindl.) Garay	-	*	-	-
<i>C. linearilobatum</i> (Seidenf. & Smitinand) Garay	-	*	-	-
<i>C. loratum</i> Rchb.f.	-	*	-	-
<i>C. paniculatum</i> (Ker Gawl.) Garay [<i>Garayanthus paniculatus</i> (Ker.-Gawl.) Schltr.]	-	*	-	-
<i>C. racemiferum</i> (Lindl.) Garay	-	*	-	-
<i>C. rolfeanum</i> (King & Pantl.) Garay	-	*	-	-
<i>C. simondii</i> (Gagnep.) Seidenf. [<i>Echioglossum simondii</i> (Gagnep.) Szlach]	-	*	-	-
<i>C. striatum</i> (Rchb.f.) N.E.Br. [<i>Echioglossum striatum</i> Rchb.f.]	-	*	-	-
<i>C. subulatum</i> Bl.	-	*	-	-
<i>C. tenuifolium</i> (L.) Garay	-	*	*	-
<i>C. tricallosum</i> Hegde & A.N. Rao	-	*	-	-
<i>C. uraiense</i> (Hayata) Garay & H.R.Sweet	-	*	-	*
<i>C. williamsonii</i> (Rchb.f.) Garay [<i>Echioglossum williamsonii</i> (Rchb.f.) Szlach.]	-	*	-	*
<i>Cleisostomopsis filiformis</i> (Rchb.f.) R.Rice [<i>Seidenfadeniella filiformis</i> (Rchb.f.) Christenson & Ormerod; <i>Seidenfadeniella chrysantha</i> (Alston) C.S.Kumar]	-	-	*	-
<i>C. roseus</i> (Wight) R.Rice [<i>Seidenfadeniella rosea</i> (Wight) C.S.Kumar in C.Sathish Kumar & K.S.Manilal]	-	-	*	-
<i>C. salimii</i> (J.Mathew, Hrideek, V.B.Sreek. & K.Madhus.) A.N.Rao [<i>Seidenfadeniella salimii</i> J.Mathew, Hrideek, V.B.Sreek. & K.Madhus.]	-	-	*	-
<i>Cottonia peduncularis</i> (Lindl.) Rchb.f.	-	-	*	-
<i>Cymbilabia undulata</i> (Lindl.) D.K.Liu & Ming H.Li [<i>Vandopsis undulata</i> (Lindl.) J.J. Sm.]	*	*	-	-
<i>Diplocentrum congestum</i> Wight	-	-	*	-
<i>D. recurvum</i> Lindl.	-	-	*	-
<i>Diploprora championi</i> (Lindl.) Hk.f.	-	*	*	*
<i>D. truncata</i> Rolfe ex Downie	-	*	-	-
<i>Gastrochilus acaulis</i> (Lindl.) O. Ktze.	-	-	*	-
<i>G. acutifolius</i> (Lindl.) O. Ktze.	*	*	-	-

Table 1. List of monopodial orchid species distributed in various zones of India (contd.).

Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>G. affinis</i> (King & Pantl.) Schltr.	-	*	-	-
<i>G. arunachalensis</i> A.N. Rao	-	*	-	-
<i>G. bellinus</i> (Rchb.f.) O.Ktz.	-	*	-	-
<i>G. calceolaris</i> (J.E. Sm.) D. Don. [<i>G. carnosus</i> Z.H.Tsi, <i>G. garhwalensis</i> Z.H.Tsi]	*	*	-	*
<i>G. dasypogon</i> (J.E. Sm.) Ktze.	-	*	-	-
<i>G. distichus</i> (Lindl.) Ktze. [<i>G. corymbosus</i> A.P. Das & Chanda]	*	*	-	-
<i>G. flabelliformis</i> (Blatt. & Mc Cann) C.J.Saldanha	-	-	*	-
<i>G. inconspicuus</i> (Hook.f.) Kuntze [<i>Luisia inconspicua</i> (Hook.f.) King & Pantl.; <i>Luisiopsis inconspicuua</i> (Hook.f.) C.S.Kumar & P.C.S. Kumar]	*	*	*	-
<i>G. intermedius</i> (Griff. ex Lindl.) Ktze. [<i>Gastrochilus changjiangensis</i> Q. Liu & M. Z.Huang <i>sensu</i> K. Gogoi & K.Rinya]	-	*	-	-
<i>G. linearifolius</i> Tsi et Garay [<i>Gastrochilus changjiangensis</i> Q. Liu & M.Z.Huang <i>sensu</i> K. Gogoi & K. Rinya]	-	*	-	-
<i>G. obliquus</i> (Lindl.) Ktze. [<i>G. bigibbus</i> (Rchb.f. ex Hook.f.) Kuntze]	-	*	*	-
<i>G. platycalcaratus</i> (Rolfe) Schltr.	-	*	-	-
<i>G. pseudodistichus</i> (King & Pantl.) Seidenf.	-	*	-	-
<i>G. rutilans</i> Seidenf.	-	*	-	-
<i>G. sessanicus</i> A.N. Rao	-	*	-	-
<i>G. sonamii</i> Lucksom	-	*	-	-
<i>G. suavis</i> Seidenf.	-	*	-	-
<i>G. yei</i> J.W. Li & X.H. Jin	-	*	-	-
<i>Grosourdya appendiculata</i> (Blume) Rchb.f.	-	-	-	*
<i>G. muscosa</i> (Rolfe) Garay	-	-	-	*
<i>Holcoglossum amesianum</i> (Rchb.f.) Christ.	-	*	-	-
<i>H. himalaicum</i> (Deb, Sengupta & Malick) Aver. [<i>Saccolabium himalaicum</i> Deb, Sengupta & Malick; <i>Pendulorchis himalaicum</i> (Deb, Sengupta & Malick) Aver.]	-	*	-	-
<i>H. nagalandense</i> (Phukan & Odyuo) X.H.Jin [<i>Penkimia nagalandensis</i> Phukan & Odyuo]	-	*	-	-
<i>H. semiteretifolium</i> (Seidenf.) R.Rice [<i>Ascocentrum semiteretifolium</i> Seidenf.]	-	*	-	-
<i>Luisia abrahami</i> Vatsala	-	-	*	-
<i>L. amesiana</i> Rolfe	-	-	-	* ?
<i>L. antennifera</i> Blume	-	* ?	-	-
<i>L. balakrishnani</i> S.Misra	-	-	-	*
<i>L. brachystachys</i> (Lindl.) Blume	-	*	-	*
<i>L. diglipurensis</i> Sanjay & Jalal	-	-	-	*
<i>L. filiformis</i> Hook.f. [<i>L. gamblei</i> , <i>L. grovesii</i>]	-	*	-	-
<i>L. hancockii</i> Rolfe	-	*	-	-
<i>L. jarawana</i> Sanjay & Jalal	-	-	-	*
<i>L. jonesii</i> J.J.Sm. (recorded by Ghatak & Devi)	-	*	-	-
<i>L. macrantha</i> Blatt. & McCann	-	-	*	-

Table 1. List of monopodial orchid species distributed in various zones of India (contd.).

Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>L. macrotis</i> Rchb.f.	-	*	-	*
<i>L. megamalayana</i> S.Kuruppusamy & V.Ravichandran	-	-	*	-
<i>L. microptera</i> Rchb.f.	-	*	-	-
<i>L. primulina</i> C.S.P.Parish & Rchb.f.	-	* ?	-	-
<i>L. psyche</i> Rchb.f.	-	*	-	-
<i>L. recurva</i> Seidenf.	-	-	-	*
<i>L. tenuifolia</i> Blume [<i>L. birchea</i> Blume; <i>L. evangelinae</i> Blatt. & McCann]	-	-	*	* ?
<i>L. trichorrhiza</i> (Hook.) Bl. [<i>Luisia trichorrhiza</i> var. <i>flava</i> Gogoi]	-	*	*	-
<i>L. tristis</i> (G.Forst.) Hook.f.	-	*	*	*
<i>L. unguiculata</i> J.J.Sm.	-	-	-	* ?
<i>L. volucris</i> Lindl.	-	*	-	-
<i>L. zeylanica</i> Lindl. [<i>L. indica</i> Khuraijam & R.K. Roy]	-	*	*	-
<i>L. zollingeri</i> Rchb.f.	-	-	-	*
<i>Macropodanthus alatus</i> (Holtum) Seidenf. & Garay	-	-	-	*
<i>M. berkeleyi</i> (Rchb.f.) Seidenf. & Garay	-	-	-	*
<i>Micropera mannii</i> (Hook.f.) Tang & Wang	-	*	-	-
<i>M. obtusa</i> (Lindl.) Tang & Wang	-	*	-	-
<i>M. pallida</i> (Roxb.) Lindl.	-	*	*	-
<i>M. rostrata</i> (Roxb.) Balakr.	-	*	-	-
<i>Papilionanthe biswasiana</i> (Ghose & Mukherjee) Garay [<i>Aerides biswasiana</i> Ghose & Mukerjee]	-	*	-	-
<i>P. cylindrica</i> (Lindl.) Seidenf. [<i>Aerides cylindrica</i> Lindl.]	-	-	*	-
<i>P. subulata</i> (Willd.) Garay [<i>P. teres</i> (Roxb.) Schltr.]	-	*	*	*
<i>P. uniflora</i> (Lindl.) Garay (<i>Aerides longicornu</i> Hook.f.)	-	*	-	-
<i>P. vanderum</i> (Rchb.f.) Garay	-	*	-	-
<i>Pelatantheria insectifera</i> (Rchb.f.) Ridl.	*	*	*	-
<i>Pennilabium labanyaeum</i> C. Deori, N. Odyuo & A. A. Mao	-	*	-	-
<i>P. proboscideum</i> A.S.Rao & J.Joseph	-	*	-	-
<i>P. struthio</i> Carr	-	*	-	-
<i>Phalaenopsis arunachalensis</i> K.Gogoi & Rinya	-	*	-	-
<i>P. cacharensis</i> (Barbhuiya, B.K.Dutta & Schuit.) Kocyan & Schuit. [<i>Ornithochilus cacharensis</i> Barbhuiya, B. K. Dutta et Schuit]	-	*	-	-
<i>P. cornu-cervi</i> (Breda) Bl. & Rchb.f.	-	*	-	-
<i>P. deliciosa</i> Rchb.f.	*	*	*	*
<i>P. difformis</i> (Wall. ex Lindl.) Kocyan & Schuit. [<i>Ornithochilus difformis</i> (Wall. ex Lindl.) Schltr.]	*	*	-	-
<i>P. fasciata</i> Rchb.f.	-	*	-	-
<i>P. fasciata</i> var. <i>bhalukpungensis</i> K.Gogoi & R.Sonowal	-	*	-	-
<i>P. hygrochila</i> J.M.H.Shaw [<i>Hygrochilus parishii</i> (Rchb.f.) Pfitzer]	-	*	-	-
<i>P. lobii</i> (Rchb.f.) Sweet	-	*	-	-
<i>Phalaenopsis malipoensis</i> Z.J. Liu & S.C. Chen	-	*	-	-
<i>P. mannii</i> Rchb.f.	-	*	-	-
<i>P. parishii</i> Rchb.f.	-	*	*	-

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Orchid species	Zone(s) of Occurrence			
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<i>P. pulcherrima</i> (Lindl.) J.J.Sm.	-	*	-	-
<i>P. taenialis</i> (Lindl.) Christen. & U.C.Pradhan	*	*	-	-
<i>P. tetraspis</i> Rchb.f. [<i>P. speciosa</i> Rchb.f.]	-	-	-	*
<i>P. wilsonii</i> Rolfe	-	*	-	-
<i>P. yingjiangensis</i> (Z.H.Tsi) Kocyan & Schuit. [<i>Ornithochilus yingjiangensis</i> Z.H. Tsi.]	-	*	-	-
<i>Pomatocalpa armigerum</i> (K. & P.) Tang & Wang	-	*	-	-
<i>P. decipiens</i> (Lindl.) J.J.Sm.	-	-	*	-
<i>P. maculosum</i> subsp. <i>andamanicum</i> (Hook.f.) Watthana	-	-	-	*
<i>P. spicatum</i> Breda(<i>mannii</i> , <i>wendlandorum</i>)	-	*	*	*
<i>Pomatocalpa undulatum</i> (Rchb.f.) J.J. Sm.	-	*	-	-
<i>Pteroceras indicum</i> Punekar	-	-	*	-
<i>P. leopardinum</i> (C.S.P.Parish & Rchb.f.) Seidenf. & Smitinand [<i>Proteroceras holttumii</i> J.Joseph & Vajravelu]	-	-	*	-
<i>P. monsooniae</i> Sasidh. & Sujanapal	-	-	*	-
<i>P. muriculatum</i> (Rchb.f.) P.F.Hunt	-	-	-	*
<i>P. teres</i> (Bl.) Holtt.(<i>P. suaveolens</i>)	*	*	-	*
<i>P. unguiculatum</i> (Lindl.) Pedersen	-	-	-	*
<i>Renanthera imschootiana</i> Rolfe	-	*	-	-
<i>Rhinerrhiza divitiflora</i> (F. Muell. ex Benth.) Rupp. (<i>R. freemannii</i> Rchb.f.) Garay	-	*	-	-
<i>Rhynchostylis cymifera</i> Yohannan, J.Mathew & Szlach.	-	-	*	-
<i>R. gigantea</i> (Lindl.) Ridl.	-	*	-	-
<i>R. retusa</i> (L.) Bl.	*	*	*	*
<i>Robiquetia andamanica</i> (N.P.Balakr. & N.Bhargava) Kocyan & Schuit. [<i>Malleola andamanica</i> N.P.Balakr. & N.Bhargava]	-	-	-	*
<i>R. arunachalensis</i> (A.N.Rao) Kocyan & Schuit. [<i>India arunachalensis</i> A.N.Rao]	-	*	-	-
<i>Robiquetia bambusara</i> (King & Pantl.) R.Rice [<i>Pomatocalpa bambusarum</i> (King & Pantl.) Garay; <i>Sarcanthus bambusarum</i> King & Pantl.]	-	*	-	-
<i>R. gracilis</i> (Lindl.) Garay	-	-	*	-
<i>R. josephiana</i> Manilal & C.S.Kumar	-	-	*	-
<i>R. rosea</i> (Lindl.) Garay	-	-	*	-
<i>R. spathulata</i> (Bl.) J.J. Sm.	-	*	-	-
<i>R. succisa</i> (Lindl.) Seidenf. & Garay	-	*	-	-
<i>R. virescens</i> Ormerod & S.S.Fernando	-	-	*	-
<i>Saccolabiopsis pusilla</i> (Lindl.) Seidenf. & Garay	-	*	-	-
<i>Sarcoglyphis arunachalensis</i> A.N. Rao	-	*	-	-
<i>S. mirabilis</i> (Rchb.f.) Garay	-	*	-	-
<i>S. parishii</i> (Hook.f.) A.N. Rao [<i>S.manipurensis</i> A.N.Rao & V.Kumar]	-	*	-	-
<i>Schoenorchis fragrans</i> (Par. et Rchb.f.) Seidenf. (<i>S. manipurensis</i> U.C.Pradhan)	-	*	-	-
<i>S. gemmata</i> (Lindl.) J.J. Sm.	-	*	-	-
<i>S. jerdoniana</i> (Wight) Garay [<i>Taeniophyllum</i> <i>jerdonianum</i> Wight]	-	-	*	-
<i>S. manilaliana</i> M. Kumar & Sequiera	-	-	*	-

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Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>S. minutiflora</i> (Ridl.) J.J.Sm.	-	-	-	*
<i>S. nivea</i> (Lindl.) Schltr.	-	-	*	-
<i>S. smeeana</i> (Rchb.f.) Jalal, Jayanthi & Schuit. [<i>Xenikophyton smeeanum</i> (Rchb.f.) Garay; <i>X. seidenfadenianum</i> M. Kumar, Sequiera & J.J. Wood]	-	-	*	-
<i>Smithsonia maculata</i> (Dalzell) C.J.Saldanha	-	-	*	-
<i>S. straminea</i> C.J.Saldanha	-	-	*	-
<i>S. viridiflora</i> (Dalzell) C.J.Saldanha [<i>Sarcochilus dalzellianus</i> Santapau; <i>Sarcochilus dalzellianus</i> Santapau]	-	-	*	-
<i>Smitinandia helferi</i> (Hook.f.) Garay	-	-	-	*
<i>S. micrantha</i> (Lindl.) Holttum	*	*	*	-
<i>Stereochilus arunachalensis</i> K.Chowlu & A.N.Rao	-	*	-	-
<i>S. erinaceus</i> (Rchb.f.) Garay	-	*	-	-
<i>S. hirtus</i> Lindl.	-	*	-	-
<i>S. laxus</i> (Rchb.f.) Garay	-	*	-	-
<i>S. ringens</i> (Rchb.f.) Garay	-	*	-	-
<i>Taeniophyllum alwisii</i> Lindl.	-	-	*	-
<i>T. andamanicum</i> N.P.Balakr. & N.Bhargava	-	-	-	*
<i>T. arunachalense</i> A.N. Rao & J. Lal	-	*	*	-
<i>T. companulatum</i> Carr	-	*	-	-
<i>T. crepidiforme</i> King. & Pantl.	-	*	-	-
<i>T. filiforme</i> J.J.Sm.	-	-	-	*
<i>T. glandulosum</i> Bl. [<i>T. khasianum</i> J.Joseph & S.N.Yoganarasimhan]	-	*	-	-
<i>T. retrospiculatum</i> (King & Pantl.) King & Pantl.	-	*	-	-
<i>T. scaberulum</i> Hook.f.	-	-	*	-
<i>T. stella</i> Carr	-	*	-	-
<i>Taprobanea spathulata</i> (L.) Christenson [<i>Vanda spathulata</i> (L.) Spreng.]	-	-	*	-
<i>Thrixspermum acuminatissimum</i> (Bl.) Rchb.f.	-	*	-	-
<i>T. amplexicaule</i> (Bl.) Rchb.f.	-	-	-	*?
<i>T. centipeda</i> Lour.	-	*	-	-
<i>T. changlangensis</i> Gogoi	-	*	-	-
<i>T. complanatum</i> (J.Koenig) Schltr.	-	-	*	-
<i>T. crassilabre</i> (King & Pantl.) Ormd. (<i>Gastrochilus crassilabris</i>)	-	*	-	-
<i>T. filiforme</i> (Hook.f.) Kuntze [<i>Papilionanthe subulata</i> (Willd.) Garay]	-	-	*	-
<i>T. formosanum</i> (Hayata) Schltr.	-	*	*	-
<i>T. hystrix</i> (Bl.) Rchb.f.	-	-	-	*
<i>T. indicum</i> Vik. Kumar, D.Verma & A.N.Rao	-	*	-	-
<i>T. japonicum</i> (Miq.) Reichb.	-	*	-	-
<i>T. laurisilvaticum</i> (Fukuy) Garay.	-	*	-	-
<i>T. merguense</i> (Hook.f.) Ktze.	-	*	-	*
<i>T. musciflorum</i> A.S.Rao & J.Joseph [<i>T. musciflorum</i> var. <i>nilagiricum</i> J.Joseph & Vajr.]	-	*	*	-
<i>T. patkaiensis</i> K.Gogoi	-	*	-	-
<i>T. pauciflorum</i> (Hook.f.) Ridl.	-	*	-	-
<i>T. pulchellum</i> (Thwaites) Schltr.	-	-	*Kerala plants.in	-

Table 1. List of monopodial orchid species distributed in various zones of India (contd.).

Orchid species	Zone(s) of Occurrence			
	Western Himalayas (I)	Eastern Himalayas (II)	Western, Central, and Peninsular India (III)	Andaman and Nicobar Islands (IV)
<i>T. pygmaeum</i> (King & Pantl.) Holttum	-	*	-	-
<i>T. saruwatarii</i> (Hayata) Schltr.	-	*	-	-
<i>T. trichoglottis</i> (Hook.f.) Ktze.	-	*	*Kerala plants.in	*
<i>T. tsii</i> W.H.Chen & Y.M.Shui	-	*	-	-
<i>T. walkeri</i> Seidenf. & Ormerod	-	-	*Kerala plants.in	-
<i>Trachoma coarctatum</i> (King & Pantl.) Garay [<i>Saccolabium coarctatum</i> King & Pantl.]	-	*	-	-
<i>Trichoglottis cirrhifera</i> Teijsm. & Binnend.	-	-	-	*
<i>T. orchidea</i> (Koeng.) Garay [<i>T. quadricornuta</i> Kurz.]	-	-	-	*
<i>T. ramosa</i> (Lindl.) Senghas [<i>Staurochilus ramosus</i> (Lindl.) Seidenf.]	-	*	*	-
<i>T. tenera</i> (Lindl.) Rchb.f.	-	-	*	-
<i>Unicifera acuminata</i> Lindl.	-	*	-	-
<i>U. lancifolia</i> (King & Pantl.) Schltr.	-	*	-	-
<i>U. obtusifolia</i> Lindl.	-	*	-	-
<i>Vanda alpina</i> (Lindl.) Lindl. [<i>Trudelia alpina</i> (Lindl.) Garay]	*	*	-	-
<i>V. ampullacea</i> (Roxb.) L.M.Gardiner [<i>Ascocentrum</i> <i>ampullaceum</i> (Roxb.) Schltr.; <i>Ascocentrum ampullaceum</i> var. <i>aurantiacum</i> U.C.Pradhan]	*	*	-	*
<i>V. bicolor</i> Griff.	-	*	-	-
<i>V. bensonii</i> Bateman	-	*	-	-
<i>V. coerulea</i> Griff. ex Lindl.	-	*	-	-
<i>V. coerulescens</i> Griff.	-	*	-	-
<i>V. cristata</i> Wall. ex Lindl. [<i>Trudelia cristata</i> (Lindl.) Senghas ex. Roeth]	*	*	-	-
<i>V. curvifolia</i> (Lindl.) L.M.Gardiner [<i>Ascocentrum</i> <i>curvifolium</i> (Lindl.) Schltr.]	-	*	-	-
<i>V. flavobrunnea</i> Rchb.f.	*	-	-	-
<i>V. griffithii</i> Lindl. [<i>Trudelia griffithii</i> (Lindl.) Garay]	-	*	-	-
<i>V. jainii</i> A.S.Chauhan [<i>Trudelia jainii</i> (Chouhan) S.Misra]	-	*	-	-
<i>V. liouvillei</i> Finet	-	*	-	-
<i>V. miniata</i> (Lindl.) L.M.Gardiner [<i>Ascocentrum</i> <i>miniatum</i> (Lindl.) Schltr.]	-	*	-	-
<i>V. motesiana</i> Choltco	-	*	-	-
<i>V. pumila</i> Hook.f. [<i>Trudelia pumila</i> (Hook.f.) Senghas]	-	*	-	-
<i>V. stangeana</i> Rchb. f.	-	*	-	-
<i>V. tessellata</i> (Roxb.) Hook. ex D.Don [<i>V. roxburghii</i> R.Br.]	*	*	*	-
<i>V. testacea</i> (Lindl.) Rchb.f. [<i>V. parviflora</i> Lindl.]	*	*	*	-
<i>V. thwaitesii</i> Hook.f.	-	-	*	-
<i>V. tricolor</i> Lindl.	-	*	-	-
<i>V. wightii</i> Rchb.f.	-	-	-	-
*, Present; -, Absent	-	-	*	-

Out of 43 genera, *Luisia* is the largest genus with 24 species followed by *Thrixspermum* (22), *Vanda* (21), *Gastrochilus* (20), *Cleisostoma* (18), and

Phalaenopsis (17). There are as many as 10 genera which are represented by only one species, in the country.

New Species Recorded from India

Out of 250 monopodial species, 134 are new species described from India. Out of them, 92 species are

considered valid (Table 2) and 42 are reduced to synonyms by subsequent studies (Table 3). Further, it may be stated that among the 92 valid species, 38 are transferred to other genera as new combinations.

Table 2. New species of monopodial orchids discovered from Indian Type locality.

Orchid Species	Type locality in India (References)
<i>Aerides ampullacea</i> Roxb. [<i>Vanda ampullacea</i> (Roxb.) L.M.Gardiner, <i>comb.nov.</i>]	Meghalaya (Garo hills)(Roxburgh,1832; Gardiner, 2012)
<i>A. crispa</i> Lindl.	Kerala (Lindley, 1833)
<i>A. cylindrica</i> Lindl. [<i>Papilionanthe cylindrica</i> (Lindl.) Seidenf., <i>comb.nov.</i>]	India Oriental (Lindley, 1833; Seidenfaden, 1995)
<i>A. rosea</i> Loddiges ex Lindl. & Paxt.	Meghalaya (Jaintia hills) (Lindley and Paxton, 1851)
<i>Armadorum senapatianum</i> S.Phukan & A.A.Mao [<i>Arachnis senapatiana</i> (Phukan & Mao) Kocyan & Schuit., <i>comb.nov.</i>]	Nagaland (Phukan and Mao, 2002)
<i>Biermannia arunachalensis</i> A.N.Rao	Arunachal Pradesh (Rao, 2006)
<i>Sarcochilus bimaculatus</i> King & Pantl. [<i>Biermannia bimaculata</i> (King & Pantl.) King & Pantl. <i>comb.nov.</i>]	Sikkim (King and Pantling, 1896, 1898)
<i>Biermannia jainiana</i> S.N.Hegde & A.N.Rao	Arunachal Pradesh (Hegde and Rao, 1984)
<i>Biermannia quinqueallosa</i> King & Pantl.	Meghalaya (King and Pantling, 1897)
<i>Camarotis obtusa</i> Lindl. [<i>Micropera obtusa</i> (Lindl.) Tang & Wang, <i>comb.nov.</i>]	N.E.India (Lindley, 1844; Tang and Wang, 1951)
<i>Chiloschista confusa</i> J.M.Mathew, J.Mathew, S.M.Salim & D.L.Szlachetco	Kerala (Mathew <i>et al.</i> , 2021)
<i>C. glandulosa</i> Blatt. & McCann	Maharashtra (Blatter and Mc Cann, 1932)
<i>Cleisocentron neglectum</i> M.J.Mathew & J.Mathew	Karnataka (Mathew and Mathew, 2020)
<i>Cleisostoma andamanicum</i> Hook.f. [<i>Pomatocalpa maculosum</i> subsp. <i>andamanicum</i> (Hook.f.) Watthana, <i>comb.nov.</i>]	Andaman Islands (Hooker, 1890; Watthana, 2006)
<i>C. armigera</i> King & Pantl. [<i>Pomatocalpa armigerum</i> (King & Pantl.) Tang & F.T.Wang, <i>comb.nov.</i>]	Sikkim (King and Pantling, 1896; Tang and Wang, 1951)
<i>C. loratum</i> Rchb.f.	Assam (Reichenbach, 1872)
<i>C. tricallosum</i> S.N.Hegde & A.N.Rao	Arunachal Pradesh (Hegde and Rao,1983)
<i>Cottonia championii</i> Lindl. [<i>Diploprora championii</i> (Lindl.) Hook.f., <i>comb.nov.</i>]	Meghalaya (Hooker, 1890)
<i>Diplocentrum congestum</i> Wight.	Kerala (Wight, 1852)
<i>D. recurvum</i> Lindl.	Tamil Nadu (Lindley, 1832)
<i>Epidendrum retusum</i> L. [<i>Rhynchostylis retusa</i> (L.) Bl., <i>comb.nov.</i>]	Kerala (Maravara) (Linnaeus, 1753)
<i>E. spathulatum</i> L. [<i>Taprobanea spathulata</i> (L.) Christenson, <i>comb.nov.</i>]	Kerala (Malabar) (Linnaeus, 1753)
<i>E. tessellatum</i> Roxb. [<i>Vanda tessellata</i> (Roxb.) Hook. ex G.Don, <i>comb.nov.</i>]	Andhra Pradesh (Roxburgh, 1795)
<i>Esmeralda clarkei</i> Rchb.f. [<i>Arachnis clarkei</i> (Rchb.f.) J.J.Sm., <i>comb.nov.</i>]	Sikkim (Reichenbach, 1886)
<i>Gastrochilus arunachalensis</i> A.N.Rao	Arunachal Pradesh (Rao, 1992)
<i>G. sessanicus</i> A.N.Rao	Arunachal Pradesh (Rao, 1997)
<i>G. sonamii</i> S.Z.Lucksom	Sikkim (Lucksom, 2003)
<i>India arunachalensis</i> A.N.Rao [<i>Robiquetia arunachalensis</i> (A.N.Rao) Kocyan & Schuiteman, <i>comb.nov.</i>]	Arunachal Pradesh (Rao, 1998; Kocyan and Schuiteman, 2013)
<i>Luisia abrahamii</i> P.Vatsala	Kerala (Abraham and Vatsala, 1981)
<i>L. alpina</i> Lindl. [<i>Vanda alpina</i> (Lindl.) Lindl., <i>comb.nov.</i>]	Meghalaya (Lindley, 1853)
<i>L. balakrishnanii</i> S.Misra	Andaman & Nicobar Islands (Misra, 2010)
<i>L. diglipurensis</i> Sanjay Mishra & J.S.Jalal	Andaman & Nicobar Islands (Mishra <i>et al.</i> , 2020)
<i>L. filiformis</i> Hook.f.	Meghalaya (Hooker, 1890)
<i>L. grovesii</i> Hook.f.	Mizoram (Lushai hills) (Hooker, 1890)
<i>L. jarawana</i> Sanjay Mishra & J.S.Jalal	Andaman & Nicobar Islands (Mishra <i>et al.</i> , 2020)
<i>L. macrantha</i> Blatt. & McCann	Maharashtra (Blatter and Mc Cann, 1932)

Table 2. New species of monopodial orchids discovered from Indian Type locality (contd.).

Orchid Species	Type locality in India (References)
<i>L. macrotis</i> Rchb.f.	Assam (Reichenbach, 1869)
<i>L. megamalayana</i> Karuppusamy & V.Ravich.	Tamil Nadu (Karuppusamy and Ravichandran, 2019)
<i>L. volucris</i> Lindl.	Meghalaya (Lindley, 1853)
<i>Malleola andamanica</i> Balakr. & Bharg. [<i>Robiquetia andamanica</i> (N.P.Balakr. & N.Bhargava) Kocyan & Schuiteman, <i>comb.nov.</i>]	Andaman & Nicobar Islands (Balakrishnan and Bhargava, 1979; Kocyan and Schuiteman, 2013)
<i>Micropera maculata</i> Dalz. [<i>Smithsonia maculata</i> (Dalz.) Saldanha, <i>comb.nov.</i>]	Maharashtra (Saldanha, 1974a)
<i>M. viridiflora</i> Dalz. [<i>Smithsonia viridiflora</i> (Dalz.) Saldanha, <i>comb.nov.</i>]	Maharashtra (Saldanha, 1974a)
<i>Ornithochilus cacharensis</i> Barbhuiya, B.K.Dutta & Schuiteman [<i>Phalaenopsis cacharensis</i> (Barbhuiya, B.K.Dutta & Schuiteman) Kocyan & Schuiteman, <i>comb.nov.</i>]	Assam (Barbhuiya <i>et al.</i> , 2012; Kocyan and Schuiteman, 2013)
<i>Penkimia nagalandensis</i> Phukan & Odyuo [<i>Holcoglossum nagalandense</i> (Phukan & Odyuo) X.H.Jin, <i>comb.nov.</i>]	Nagaland (Phukan and Odyuo, 2006b)
<i>Pennilabium labanyaeum</i> C.Deori, N.Odyuo & A.A.Mao	Meghalaya (Deori <i>et al.</i> , 2015)
<i>P. proboscideum</i> A.S.Rao & J.Joseph	Meghalaya (Rao and Joseph, 1968)
<i>Phalaenopsis arunachalensis</i> K.Gogoi & K.Rinya	Arunachal Pradesh (Gogoi and Rinya, 2020b)
<i>P. fasciata</i> var. <i>bhalupungensis</i> K. Gogoi & R. Sonowal	Arunachal Pradesh (Gogoi and Sonowal, 2021)
<i>P. mannii</i> Rchb.f.	Assam (Reichenbach, 1872)
<i>P. mysorensis</i> C.J.Saldanha	Karnataka (Saldanha, 1974a)
<i>P. parishii</i> Rchb.f.	Sikkim (Reichenbach, 1865)
<i>Pteroceras indicum</i> S.A.Punekar	Karnataka, Tamil Nadu (Punekar, 2008)
<i>P. monsooniae</i> Sasidh. & Sujanapal	Kerala (Sasidharan and Sujanapal, 2003)
<i>Rhynchostylis cymifera</i> R.Yohannan, J.Mathew & D.L.Szlachetco	Kerala (Yohanan <i>et al.</i> , 2018)
<i>Robiquetia josephiana</i> Manilal & Sathish	Kerala (Manilal and Sathish Kumar, 1984)
<i>Saccolabium carinatum</i> Griff. [<i>Acampe carinata</i> (Griff.) Panigrahi, <i>comb.nov.</i>]	W.Bengal (Griffith, 1851)
<i>S. coarctatum</i> King & Pantl. [<i>Trachoma coarctatum</i> (King & Pantl.) Garay, <i>comb.nov.</i>]	Meghalaya (King and Pantling, 1897)
<i>S. crassilabre</i> King & Pantl. [<i>Thrixspermum crassilabre</i> (King & Pantl.) Ormerod, <i>comb.nov.</i>]	Meghalaya (King and Pantling, 1897)
<i>S. distichum</i> Lindl. [<i>Gastrochilus distichus</i> (Lindl.) Kuntze, <i>Comb.nov.</i>]	Sikkim (Lindley, 1858)
<i>S. gemmatum</i> Lindl. [<i>Scoenorchis gemmata</i> (Lindl.) J.J.Sm., <i>comb.nov.</i>]	Meghalaya (Lindley, 1838)
<i>S. inconspicuum</i> Hook.f. [<i>Gastrochilus inconspicuous</i> (Hook.f.) Kuntze, <i>comb.nov.</i>]	Lower Assam (Hooker, 1890)
<i>S. intermedium</i> Griff. ex Lindl. [<i>Gastrochilus intermedium</i> (Griff. ex Lindl.) Kuntze., <i>comb.nov.</i>]	Meghalaya (Lindley, 1858)
<i>S. lancifolium</i> King & Pantl. [<i>Uncifera lancifolia</i> (King & Pantl.) Schltr., <i>comb.nov.</i>]	Sikkim (King and Pantling, 1896)
<i>S. pallens</i> Cathcart ex Lindl. [<i>Cleisocentron pallens</i> (Cathcart ex Lindl.) N. Pearce & P. J. Cribb, <i>comb. nov.</i>]	Sikkim (Lindley, 1858)
<i>S. pseudodistichum</i> King & Pantl. [<i>Gastrochilus pseudodistichus</i> (King & Pantl.) Schltr., <i>comb.nov.</i>]	Sikkim (King and Pantling, 1896)
<i>S. ramosum</i> Lindl. [<i>Staurochilus ramosus</i> (Lindl.) Seidenf., <i>comb.nov.</i>]	Uttar Pradesh (Ganges delta) (Lindley, 1833)
<i>S. ringens</i> Lindl. [<i>Aerides ringens</i> (Lindl.) C.E.C.Fisch., <i>comb.nov.</i>]	Tamil Nadu (Lindley, 1833)
<i>Sarcanthus babusarum</i> King & Pantl. [<i>Robiquetia bambusara</i> (King & Pantl.) R.Rice, <i>comb.nov.</i>]	Sikkim (King and Pantling, 1896)
<i>Sarcophilus mannii</i> Hook.f. [<i>Micropera mannii</i> (Hook.f.) Tang & F.T.Wang, <i>comb.nov.</i>]	Assam (Hooker, 1890)
<i>S. muriculatus</i> Rchb.f. [<i>Pteroceras muriculatum</i> (Rchb.f.) P.F.Hunt, <i>comb.nov.</i>]	Andaman Islands (Reichenbach, 1881)
<i>Sarcoglyphis arunachalensis</i> A.N.Rao.	Arunachal Pradesh (Rao, 1990)
<i>Schoenorchis manilaliana</i> Muktesh Kumar & S. Sequiera	Kerala (Kumar and Sequiera, 2000)
<i>S. manipurensis</i> Pradhan	Manipur (Pradhan, 1978)
<i>Seidenfadeniella salimii</i> J.Mathew, Hrideek, V.B.Sreekanth & K.Madhusudhan [<i>Cleisostomopsis salimii</i> (J.Mathew, Hrideek, V.B.Sreekanth & K.Madhusudhan) A.N.Rao, <i>comb.nov.</i>]	Kerala (Rao, 2020)

Table 2. New species of monopodial orchids discovered from Indian Type locality (contd.).

Orchid Species	Type locality in India (References)
<i>Smithsonia straminea</i> C.J.Saldanha	Karnataka (Saldanha, 1974b)
<i>Stereochilus arunachalensis</i> K.Chowlu & A.N.Rao	Arunachal Pradesh (Chowlu and Rao, 2020)
<i>S. hirtus</i> Lindl.	Meghalaya (Lindley, 1858)
<i>Taeniophyllum andamanicum</i> N.P.Balakrishnan & N.Bhargava	Andaman & Nicobar Islands (Balakrishnan and Bhargava, 1978)
<i>T. arunachalense</i> A.N.Rao & J.Lal	Arunachal Pradesh (Rao and Lal, 1991)
<i>T. scaberulum</i> Hook.f.	Kerala (Hooker, 1890)
<i>Thrixspermum berkeleyi</i> Rchb.f. [<i>Macropodanthus berkeleyi</i> (Rchb.f.) Seidenf. & Garay, <i>comb.nov.</i>]	Nicobar Islands (Seidenfaden, 1988)
<i>T. changlangensis</i> K.Gogoi	Arunachal Pradesh (Gogoi, 2019)
<i>T. muscaeflorum</i> A.S.Rao & J.Joseph	Meghalaya (Rao and Joseph, 1969)
<i>T. indicum</i> Vik. Kumar, D.Verma & A.N.Rao	Meghalaya, Manipur (Kumar <i>et al.</i> , 2017)
<i>Uncifera acuminata</i> Lindl.	Assam, Meghalaya (Lindley, 1858)
<i>U. obtusifolia</i> Lindl.	Meghalaya (Lindley, 1858)
<i>Vanda cathcartii</i> Lindl. [<i>Arachnis cathcartii</i> (Lindl.) J.J.Sm., <i>comb.nov.</i>]	Sikkim (Lindley, 1853)
<i>V. coerulea</i> Griff. ex Lindl.	Meghalaya (Lindley, 1857)
<i>V. jainii</i> A.S.Chauhan	Meghalaya (Chauhan, 1984)
<i>V. motesiana</i> Choltco	Manipu (Choltco, 2009)
<i>V. stangeana</i> Rchb.f.	Assam (Reichenbach, 1858)
<i>V. undulata</i> Lindl. [<i>Cymbilabia undulata</i> (Lindl.) D.K.Liu & Ming H.Li, <i>comb.nov.</i>]	Sikkim (Lindley, 1858)

Table 3. List of synonymised new species of monopodial orchids discovered from India.

Original species	Present name	Distribution in India
<i>Acampe dentata</i> Lindl.	<i>Acampe ochracea</i> (Lindl.) Hochr.	Sikkim (Lindley, 1853)
<i>A. excavata</i> Lindl.	<i>A. praemorsa</i> (Roxb.) Blatt. & McCann	Maharashtra (Concan) (Lindley, 1853)
<i>A. papillosa</i> var. <i>flava</i> A.P.Das, Katham & Nirola	<i>A. carinata</i> (Griff.) Panigrahi	West Bengal (Das and Chanda, 1989)
<i>Aerides cylindrica</i> Hook.	<i>Papilionanthe vandaram</i> (Rchb.f.) Garay	Tamil Nadu
<i>Cleisostoma bicuspidatum</i> Hook.f.	<i>Cleisostoma aspersum</i> (Rchb.f.) Garay	Meghalaya (Hooker, 1890)
<i>C. brevipes</i> Hook.f.	<i>C. striatum</i> (Rchb.f.) N.E.Br.	Sikkim (Hooker, 1890)
<i>C. mannii</i> Rchb.f.	<i>Pomatocalpa spicatum</i> Breda	Assam (Reichenbach, 1872)
<i>C. sikkimensis</i> S.Z.Lucksom	<i>C. linearilobatum</i> (Seidenf. & Smitinand) Garay	Sikkim (Lucksom, 1992)
<i>Cottonia macrostachya</i> Wight	<i>Cottonia peduncularis</i> (Lindl.) Rchb.f.	Kerala (Wight, 1852)
<i>Diplocentrum longifolium</i> Wight	<i>Diplocentrum recurvum</i> Lindl.	Tamil Nadu (Wight, 1852)
<i>Gastrochilus carnosus</i> Z.H.Tsi	<i>Gastrochilus calceolaris</i> (Buch.-Ham. ex Sm.) D.Don	Meghalaya (Tsi, 1996)
<i>G. corymbosus</i> A.P.Das & S.Chanda	<i>G. distichus</i> (Lindl.) Kuntze	Darjeeling (Das and Chanda, 1989)
<i>G. garhwalensis</i> Z.H.Tsi	<i>G. calceolaris</i> (Buch.-Ham. ex Sm.) D.Don	Uttarakhand (Tsi, 1996)
<i>Kingidium niveum</i> C.S. Kumar	<i>Phalaenopsis mysorensis</i> C.J.Saldanha	Kerala (Satish Kumar and Manilal, 1994)
<i>Luisia evangelinae</i> Blatt. & McCann	<i>Luisia tenuifolia</i> Blume	Maharashtra (Blatter and Mc Cann, 1932)
<i>L. indica</i> J.S.Khurajam & R. K.Roy	<i>L. zeylanica</i> Lindl.	Bihar (Khurajam and Roy, 2015)
<i>L. indivisa</i> King & Pantl.	<i>L. brachystachys</i> (Lindl.) Blume	Sikkim (King and Pantling, 1898)
<i>L. microptera</i> Rchb.f.	<i>L. zeylanica</i> Lindl.	Assam (Reichenbach, 1870)
<i>L. pseudotenuifolia</i> Blatt. & Mc Cann	<i>L. tenuifolia</i> Blume	Maharashtra (Blatter and Mc Cann, 1932)
<i>L. pulniana</i> P.Vatsala	<i>L. tenuifolia</i> Blume	Kerala (Abraham and Vatsala, 1981)
<i>L. trichorrhiza</i> var. <i>flava</i> K.Gogoi	<i>L. trichorrhiza</i> (Hook.) Blume	Assam (Gogoi, 2016)
<i>L. truncata</i> Blatt. & Mc.Cann	<i>L. zeylanica</i> Lindl.	Maharashtra (Blatter and Mc Cann, 1932)
<i>Phalaenopsis mastersii</i> King & Pantl.	<i>Phalaenopsis pulcherrima</i> (Lindl.) J.J.Sm.	Nambur falls, Assam (King and Pantling, 1897)

Table 3. List of synonymised new species of monopodial orchids discovered from India (contd.).

Original species	Present name	Distribution in India
<i>P. wightii</i> Rchb.f.	<i>P. deliciosa</i> Rchb.f.	Malabar (Kerala) (Reichenbach, 1862)
<i>Proteroceras holttumii</i> J. Joseph & Vajravelu	<i>Pteroceras leopardinum</i> (C.S.P. Parish & Rchb.f.) Seidenf. & Smitinand	Tamil Nadu (Joseph and Vajravelu, 1974)
<i>Rhynchostylis albiflora</i> I. Barua & Bora	<i>Rhynchostylis retusa</i> (L.) Blume	Assam (Barua and Bora, 2002)
<i>Sarcanthus pallidus</i> Lindl.	<i>Cleisostoma racemiferum</i> (Lindl.) Garay	Meghalaya (Lindley, 1840)
<i>S. pauciflorus</i> Wight.	<i>C. tenuifolium</i> (L.) Garay	Kerala (Malabar) (Wight, 1852)
<i>S. peninsularis</i> Dalzell	<i>C. tenuifolium</i> (L.) Garay	Western India (Garay, 1972)
<i>S. sagittatus</i> King & Pantl.	<i>C. linearilobatum</i> (Seidenf. & Smitinand) Garay	Meghalaya (King and Pantling, 1897)
<i>S. secundus</i> Griff.	<i>C. subulatum</i> Blume	Arunachal Pradesh (Daffla hills) (Griffith, 1851)
<i>Sarcochilus dalzellianus</i> Santapau	<i>Smithsonia viridiflora</i> (Dalzell) C.J. Saldanha	Maharashtra (Saldanha, 1974b)
<i>Sarcoglyphis manipurensis</i> A.N. Rao, Vik. Kumar & H.B. Sharma	<i>Sarcoglyphis parishii</i> (Hook.f.) A.N. Rao	Manipur (Rao, 2020)
<i>Stereochilus wattii</i> King & Pantl.	<i>Stereochilus ringens</i> (Rchb.f.) Garay	Assam (King and Pantling, 1897)
<i>Thalia maravara</i> Rheede	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Kerala (Malabar) (Blatter and McCann, 1932)
<i>Thrixspermum freemanii</i> Rchb.f.	<i>Rhinerrhiza divitiflora</i> (F. Muell. ex Benth.) Rupp	Assam (Reichenbach, 1877)
<i>T. musciflorum</i> var. <i>nilagiricum</i> J. Joseph & Vajravelu	<i>Thrixspermum musciflorum</i> A.S. Rao & J. Joseph	Meghalaya (Joseph and Vajravelu, 1981)
<i>Xenikophyton seidenfadenianum</i> Muktesh Kumar, S. Sequiera & J.J. Wood	<i>Schoenorchis smeeana</i> (Rchb.f.) Jalal, Jayanthi & Schuit.	Kerala (Jalal <i>et al.</i> , 2014)
<i>Vanda congesta</i> Lindl.	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Tamil Nadu (Blatter and McCann, 1932)
<i>V. roxburghii</i> R.Br.	<i>Vanda tessellata</i> (Roxb.) Hook. ex G. Don	W. Bengal (Brown, 1820)
<i>V. wightiana</i> Lindl. ex Wight	<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Kerala (Blatter and McCann, 1932)

New Genera of Monopodial Orchids from India

Out of 43 genera, 10 are described as new, from India. However, based on the subsequent critical

studies, 5 genera *i.e.* *India* A.N. Rao, *Luisiopsis* Kumar & Kumar, *Penkimia* Phukan & Odyuo, *Proteroceras* J. Joseph & Vajravelu and *Seidenfadeniella* C. S. Kumar, are transferred to other genera (Table 4).

Table 4. New genera of monopodial orchids from India and present status.

New genus	Present genus	Reference
<i>India</i> A.N. Rao	<i>Robiquetia</i> Gaudich.	Pridgeon <i>et al.</i> (2014)
<i>Luisiopsis</i> C.S. Kumar & S. Kumar	<i>Gastrochilus</i> D. Don	Pridgeon <i>et al.</i> (2014)
<i>Penkimia</i> Phukan & Odyuo	<i>Holcoglossum</i> Schltr.	Pridgeon <i>et al.</i> (2014)
<i>Proteroceras</i> J. Joseph & Vajravelu	<i>Pteroceras</i> Hasselt ex Hassk.	Pridgeon <i>et al.</i> (2014)
<i>Seidenfadeniella</i> C.S. Kumar	<i>Cleisostomopsis</i> Seidenf.	Rice (2019)
<i>Smithsonia</i> C.J. Saldanha	<i>Smithsonia</i> C.J. Saldanha	Saldanha (1974b)
<i>Biermannia</i> King & Pantling	<i>Biermannia</i> King & Pantling	King and Pantling (1897)
<i>Vanda</i> R. Brown	<i>Vanda</i> R. Brown	Brown (1820)
<i>Uncifera</i> Lindl.	<i>Uncifera</i> Lindl.	Lindley (1858)
<i>Cottonia</i> R. Wight	<i>Cottonia</i> R. Wight	Wight (1852)

Notes on a New Synonym

A new species *i.e.* *Sarcoglyphis brevilabia* has been established by Averyanov (2012) from Vietnam. This species is subsequently transferred to the genus *Cleisostoma* by Rice in 2018. During the present study, the author has critically studied the Type specimen photograph, drawings and full description

of *S. brevilabia* and compared with the Type specimen photos, drawings and detailed description of *Cleisostoma tricallosum* S. N. Hegde & A. N. Rao which was discovered from Arunachal Pradesh in North Eastern India in 1983. From the study, it has been noticed that the above two taxa are similar in all vegetative and floral characters. Having convinced with the conspicuity of both the species and following

the Rule of priority of ICBN (International Code of Botanical Nomenclature), *S. brevilabia* has been reduced here as a new synonym to *Cleisostoma tricallosum*. Accordingly, the new citation is as follows.

Cleisostoma tricallosum Hegde & A. N. Rao in Orch. Rev. 91: 54. 1983. Type: India, Arunachal Pradesh, Sessa, 11th July 1980, *Hegde 4127* (Orchid Herbarium, Tipi).

Sarcoglyphis brevilabia Aver., *Taiwania* 57: 133. 2012. *Syn. Nov.* Type: Vietnam, Dien Bien prov., Muong Cha distr., Hua Ngai municipality, Thien Pa Village, 8 April 2011, L. Averyanov, P. K. Loc, N. Q. Hieu, N. T. Vinh, *CPC 2106* (CPC Herbarium).

Cleisostoma brevilabium (Aver.) R. Rice, Photo Intro Vandoid Orchid Gen. Asia: 158. 2018.

Syn. Nov.

Global Distribution: India and Vietnam.

Conclusion

Monopodial orchids, epiphytes in habit are considered as an evolved group in the family Orchidaceae. Some of them (*e.g. Chiloschista, Taeniophyllum etc.*) exhibit highly condensed stem (inconspicuous) without any leaf but with a few green flat clinging roots which perform function of photosynthesis. Flowers of some species of *Cleisostoma, Schoenorchis, Smitinandia, Taeniophyllum etc.* are very small with very complex spur of the labellum containing back wall callus, front wall callus, lateral wall calli, septum, papillae or hair *etc.* Roots of some species (*e.g. Vanda tessellata*), known as *Rasna* in Ayurvedic medicine are used to cure muscular and rheumatic pains. Flowers of some species of *Arachnis, Papilionanthe, Phalaenopsis, Renanthera, Vanda etc.* are large and highly ornamental, as they are compatible even at generic level in breeding experiments; several multi-generic hybrids of cut flower quality are produced which have great demand in the International Trade market. Considering the importance of natural species in the wild habitats, two endangered monopodial orchid species *e.g. Renanthera imschootiana* (Red Vanda) and *Vanda coerulea* (Blue Vanda) are listed under Schedule VI (Section 2) of Wildlife Protection Act 1972 [Act 44 of 1991, w.e.f. 2.10.1991] so as to prevent illegal collections from the wild.

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