

# The genus *Myrmecis* (Orchidaceae) in India<sup>a</sup>

Avishek Bhattacharjee<sup>1</sup> & H.J. Chowdhery<sup>2</sup>

**Key words/mots clés :** Biogeography, India/Inde, *Myrmecis*, Orchidaceae, terrestrial/terrestre.

## Abstract

A detailed taxonomic account of the orchid genus *Myrmecis* (J.Lindley) C.L.Blume in India is provided with relevant illustrations and photographs.

## Résumé

**Le genre *Myrmecis* (Orchidaceae) en Inde** – Un traitement taxinomique détaillé du genre *Myrmecis* (J.Lindley) C.L.Blume en Inde est proposé et accompagné d'illustrations et de photographies appropriées.

## Introduction

The genus *Myrmecis* (J.Lindley) C.L.Blume (Orchidaceae: Orchidoideae: Cranichideae: Goodyerinae) comprises fifteen (Pridgeon *et al.*, 2003; Mabberley, 2008; Xinqi *et al.*, 2009) or seventeen species (Govaerts *et al.*, 2012) distributed in Eastern Himalayas, North-east India to South Japan, the Philippines, South-east Asia, and New Guinea. The present work is part of the revision of the subtribe Goodyerinae for 'Flora of India', where we found the occurrence of two species of *Myrmecis* in India. As the species of *Myrmecis* are very tiny plants with short flowering period, and occur on dense humus-rich forest floor in regions that are difficult to access, they are easily overlooked and difficult to collect, and thus poorly known. Furthermore they are very much like the species of *Cheirostylis* C.L.Blume

<sup>a</sup>: manuscrit reçu le 30 juillet 2012, manuscrit révisé accepté le 21 septembre 2012

article mis en ligne sur [www.richardiana.com](http://www.richardiana.com) le 11/10/2012 – pp. 26-38 - © Tropicalia  
ISSN 1626-3596 (imp.) - en cours d'attribution (élect.)

and *Zeuxine* J.Lindley, and therefore often misidentified. On the basis of a thorough literature review and critical examination of living and dried (herbarium) materials, our present study gives an up to date account of the genus *Myrmecis* in India. We hope that this contribution will help to identify, understand and conserve this rare orchid genus.

### ***Myrmecis* (J.Lindley) C.L.Blume**

*Collection des Orchidées les plus remarquables de l'Archipel Indien et du Japon:* 76 (1859); G. Bentham in G. Bentham & J.D. Hooker, *Genera Plantarum* 3(2): 601 (1883); E.H.H. Pfitzer in A. Engler & K. Prantl, *Die Naturlichen Pflanzenfamilien* 2 (6): 117 (1889); A.M. Pridgeon *et al.*, *Genera Orchidacearum* 3(2): 124 (2003). Type: *Myrmecis gracilis* (C.L.Blume) C.L.Blume  
*Anoectochilus* C.L.Blume sect. *Myrmecis* J.Lindley, *Genera and Species of Orchidaceous Plants:* 500 (1840). Type: *Anoectochilus gracilis* C.L.Blume

Small, terrestrial herbs. Rhizomes terete, creeping, rooting at nodes. Roots small, thread like. Stems short to elongate, green, ascending, succulent. Leaves few to many, small, scattered along stem, rarely crowded near apex, glabrous, persistent; lamina ovate-cordate to suborbicular, dark green, convolute; petiole sheathing at base. Inflorescence a terminal raceme, few flowered, glabrous to pubescent; peduncle short to long with few sheathing bracts. Floral bracts ovate-lanceolate, glabrous to pubescent. Flowers small, semi-open, white, resupinate. Sepals free or connate, subequal, glabrous to pubescent; dorsal sepal lanceolate to ovate-lanceolate, forming hood with petals; lateral sepals ovate to ovate-lanceolate with an oblique, concave base enclosing base of labellum. Petals obliquely lanceolate to oblong-elliptic, membranous, rarely papillose at apex. Labellum 'Y' or 'T' shaped, without spur, connate to base of column; hypochile semi-globose to spatulate with small sac, entire at base with 2 entire or bilobed appendages (1 in each side); mesochile elongate, incurved, sometimes with finely serrate margin; epichile broad, 2-lobed, recurved. Column short, with 2 columnar wings, foot absent; rostellum short, deltoid, bifid. Anther ovoid, bilocular; pollinarium with 2 pollinia; pollinia obovoid, sectile, bifid, caudicles distinct, attached to viscidium. Stigma 2-lobed, each on short lateral projection. Ovary terete, glabrous to pubescent, twisted.

Distribution: India (Arunachal Pradesh, Manipur, Sikkim, West Bengal); Bhutan; China; Indonesia; Japan; Malaysia; Myanmar; Nepal; New Guinea; Philippines; Taiwan; Thailand; Vietnam.

Etymology: The name of the genus is derived from the Greek word ‘myrmix’ (an ant), probably referring to the resemblance of its tiny flowers to ants.

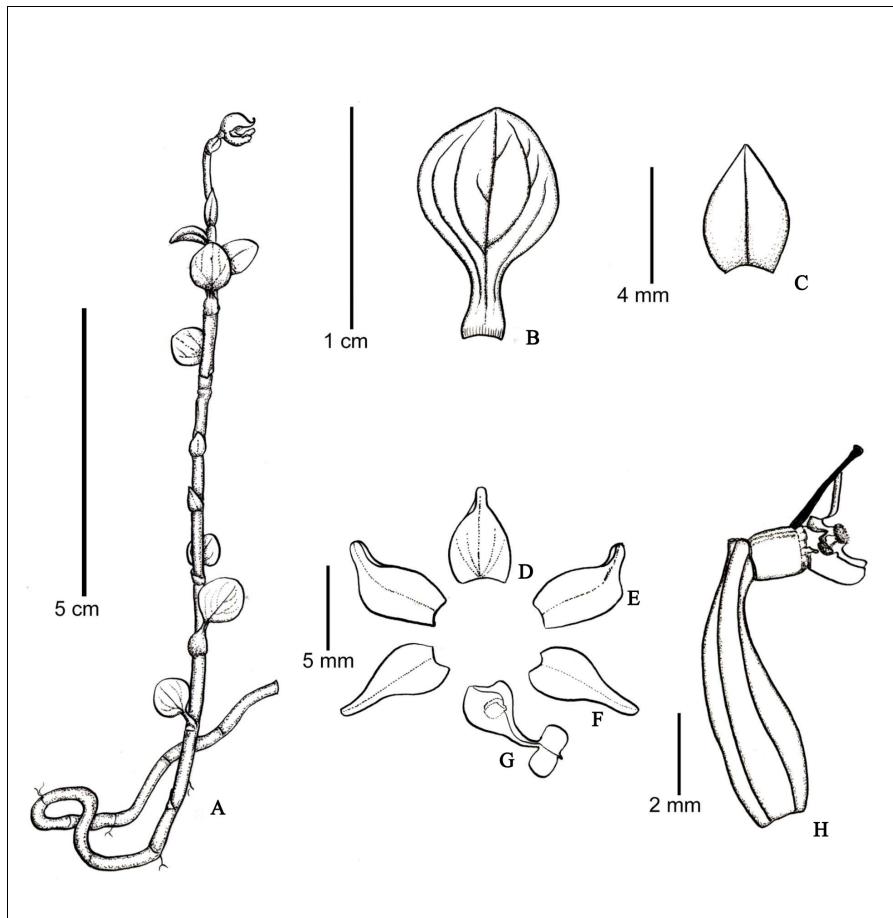
Notes:

- Lindley (1840) established *Myrmecis* as a section under the genus *Anoectochilus* with two species, *viz.* *A. sandvicensis* J.Lindley and *A. gracilis* C.L.Blume. Later, Blume (1859) raised *Myrmecis* as a genus based on *A. gracilis*. The genus *Myrmecis* is allied to *Cheirostylis* and *Zeuxine* but can be distinguished mainly in having stigma lobes which are situated on short lateral processes.
- Pridgeon *et al.* (2003) cited the genus as ‘*Myrmecis* (Lindl.) Blume, *Fl. Javae nov. ser.* 1: 76. 1858’ whereas Xinqi *et al.* (2009) and Govaerts *et al.* (2012) cited it as ‘*Myrmecis* (Lindl.) Blume, Coll. Orchid.: 76. 1859’. Stafleu & Cowan (1976) mentioned that the main part of the book ‘*Flora Javae et insularum adjacentium nova series*’ (*Fl. Javae. nov. ser.*) and ‘*Collection des Orchidées les plus remarquables de l’Archipel Indien et du Japon*’ (*Coll. Orch.*), both authored by C.L. Blume, are identical (the half-title, frontispiece, title and dedication are different) and almost simultaneously published in between 1858–1859. It is observed that according to Stafleu & Cowan (1976) the year of publication of most taxa belonging to subtribe Goodyerinae treated in ‘*Coll. Orch.*’ is 1859. The pages ‘59–74’ of ‘*Coll. Orch.*’ were published in late 1858 or early 1859, whereas the pages ‘75–114’ were published in late 1859 (before December). As the month and year of publication of different parts, pages and plates of ‘*Coll. Orch.*’ are available (but not available for ‘*Fl. Javae. nov. ser.*’), it is cited in the present study instead of ‘*Fl. Javae. nov. ser.*’.

Key to the species of *Myrmecis* in India:

- 1a. Dorsal sepal 5- veined; labellum ‘T’ shaped..... 1. *M. bakhimensis*
- 1b. Dorsal sepal 1- veined; labellum ‘Y’ shaped..... 2. *M. pumila*

1. *Myrmecischis bakhimensis* D.Maity, N.Pradhan & G.Maiti  
in *Acta Phytotaxonomica Sinica* 45(3): 321 (2007). Types: West Sikkim,  
Bakhim to Dzongri, 3400 m, 25-07-1999, D. Maity 21921 [holotype: CAL (not  
found), photo! (provided by Dr. D. Maity); isotypes: BSHC (not found), PE  
(not found)]. (Fig 1, 3A)



**Fig 1: *Myrmecischis bakhimensis* D.Maity et al.**

A) Habit; B) Leaf; C) Bract; D) Dorsal sepal; E) Petal; F) Lateral sepal; G) Labellum;  
H) Column with ovary. [fide Maity et al., 2007 (redrawn and rearranged)]

Terrestrial herbs, up to 12 cm tall. Stems ca. 7 cm long, ca. 2 mm thick, glabrous, unbranched. Leaves few, 0.5-1.1 cm long, laxly spread along stem, glabrous; petiole up to 5 mm long; lamina 5-9 × 5-8 mm, orbicular-ovate, entire, rounded at apex. Inflorescence 1-2 flowered; peduncle ca. 10 mm long, with few scattered hairs. Floral bracts 4-4.5 × ca. 2 mm, oblanceolate-oblong, acute, shorter than ovary, glabrous, eciliate, 1-veined. Flowers ca. 10 mm long; sepals coherent, green; dorsal sepal 5-5.5 × ca. 3 mm, ovate, concave, 5-veined, obtuse at apex; lateral sepals 6-6.5 × ca. 3 mm, obliquely ovate, 1-veined, obtuse at apex; petals ca. 6 × 3 mm, obliquely oblong-elliptic, entire, recurved, abruptly narrowed, 1-veined, obtuse at apex. Labellum ca. 6 × 3 mm, 'T'-shaped, 3-lobed, white; hypochile saccate, with 2 lateral, quadrate appendages (1 in each side); mesochile ca. 2.5 mm long, narrowly clawed, convolute, smooth, glabrous; epichile ca. 3 × 1.5 mm, rectangular, 2-lobed, lobules squarish, with a distinct mucro in between 2 lobules, mucro 0.5-0.7 mm long. Column ca. 1 mm long, terete; rostellum oblong-conical. Stigma lobes well separated, suborbicular, muricate. Ovary ca. 6.5 × 2 mm, glabrous.

Flowering: July

Habitat: Along track sides in evergreen temperate forests in moist, shady, humid situation at about 3400 m above sea level.

Distribution: India (Sikkim); endemic.

Conservation status: Data Deficient (DD)

Etymology: The species is named after its type locality 'Bakhim' in West Sikkim, India.

Notes: No specimen could be found during the present study. The data provided here is based on the image of holotype (provided by Dr. D. Maity) and protologue of *M. bakhimensis*. Although the types of *M. bakhimensis* are said to have been deposited at 'CAL, BSHC and PE', we were unable to locate them in these herbaria. Maity *et al.* (2007) compared *M. bakhimensis* with its closest relatives *Myrmechis japonica* (H.G.Reichenbach) R.A.Rolfe, *M. chinensis* R.A.Rolfe, *M. glabra* C.L.Blume and *M. pumila* (J.D.Hooker) T.Tang & F.T.Wang, however, we observed that *M. bakhimensis* is closer to *M. pumila* than to the other three species.

*M. bakhimensis* was distinguished by Maity *et al.* (2007) from *M. pumila* in having 'T'-shaped labellum (*versus* 'Y'-shaped), dorsal sepal with 5 veins (*versus* 1 vein), epichile with emarginate, mucronate apex (*versus* without any mucro) and eciliate floral bracts (*versus* distinctly ciliate), but we consider some of these characteristics just to be variations. While studying a good number of herbarium as well as fresh specimens we observed both ciliate and eciliate margins (in rare cases) of bracts in *M. pumila*. The nature of mucronate sinus is also variable depending on the maturity of flowers as well as on the angle between the epichile lobules and the mesochile. However, the dorsal sepal with palmate venation (5-veins) seems to be an unusual and unique character in *M. bakhimensis* which is not seen in any other member of the genus, or in the subtribe. The 'T' shaped labellum (*versus* 'Y' shaped in *M. pumila*) may be a valid characteristic in respect to the differentiation between *M. bakhimensis* and *M. pumila*. In order to be able to phrase a definite opinion in respect to the valid taxonomic status of this species, further study is required.

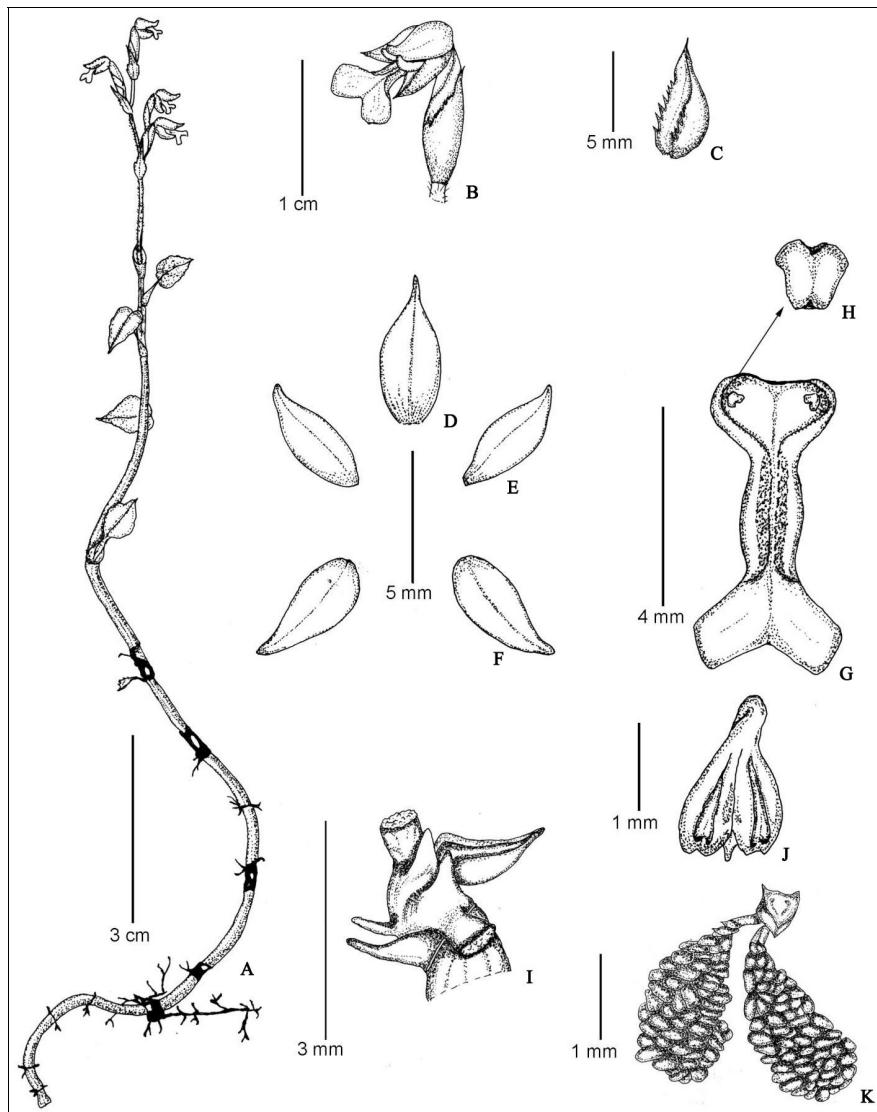
## 2. *Myrmecis pumila* (J.D.Hooker) T.Tang & F.T.Wang

in *Acta Phytotaxonomica Sinica* 1(1): 69 (1951); G. Seidenfaden in *Dansk Botanisk Arkiv Udgivet af Dansk Botanisk Forening* 32(2): 76, t.47 (1978); H.J. Chowdhery, *Orchid Flora of Arunachal Pradesh*: 517, t.315 (1998); N. Pearce & P.J. Cribb, *Orchids of Bhutan*: 101, t.25 (2002); C. Sathkumar & P.C.S. Kumar in *Rheedia* 15(1): 48 (2005); S.Z. Lucksom, *Orchids of Sikkim and North East Himalaya*: 114, t.70 (2007). Types: Sikkim, 7-8000 ft, JDH 325 [lectotype: K-LINDL, photo!; designated by: G. Seidenfaden (l.c.), (as 'Type')]; Sikkim, 7-8000 ft, J.D.H. s.n. (syntype: K-LINDL, photo!); Tungloo, King s.n. (syntype: CAL!). *Odontochilus pumilus* J.D.Hooker, *Flora of British India* 6: 99 (1890) & in D. Oliver (ed.), *Hooker's Icones Plantarum* 22: t.2163 (1894). *Cystopus pumilus* (J.D.Hooker) C.E.O.Kuntze, *Revisio Generum Plantarum* 2: 658. 1891. *Zeuxine pumila* (J.D.Hooker) G.King & R.Pantling in *Annals of the Royal Botanic Garden, Calcutta* 8: 291, t.389 (1898); P. Bruhl, *A guide to the orchids of Sikkim*: 167 (1926); U.C. Pradhan, *Indian Orchids: Guide to identification & culture* 1: 117 (1976). *Anoectochilus pumilus* (J.D.Hooker) G.Seidenfaden & T.Smitinand, *The Orchids of Thailand (Prelim. List)* 1: 89 (1959), p.p.

*Cheirostylis pusilla* J.Lindley in *Journal of the Linnean Society, Botany* 1: 188. 1857, p.p., non J. Lindley (1840).

*Cheirostylis franchetiana* G.King & R.Pantling in *Journal of the Asiatic Society of Bengal. Part 2, Natural History* 64: 341. 1895. Type: Surail, 6000 feet, Sept. 1894, Pantling 338 (holotype: CAL!). *Zeuxine franchetiana* (G.King & R.Pantling) G.King & R.Pantling in *Annals of the Royal Botanic Garden, Calcutta* 8: 292, t.398 (1898); P. Bruhl, *A guide to the orchids of Sikkim*: 167 (1926); U.C. Pradhan, *Indian Orchids: Guide to identification & culture* 1: 117 (1976); T.K. Bose & S.K. Bhattacharjee, *Orchids of India*: 527 (1980). *Myrmecis franchetiana* (G.King & R.Pantling) F.R.R.Schlechter in *Repertorium Specierum Novarum Regni Vegetabilis, Beihefte* 4: 174 (1919); S.Z. Lucksom, *Orchids of Sikkim and North East Himalaya*: 115, t.71 (2007). (Fig 2, 3B-3D)

Terrestrial herbs, 7-17 cm tall. Stem 1.6-8 cm long, 0.5-2 mm thick, succulent, unbranched, glabrous. Leaves few, 0.5-2.5 cm long, laxly scattered, glabrous; petioles 5-7 mm long; lamina 7-15 × 5-8 mm, ovate to ovate-cordate to suborbicular, green, acute at apex with undulate margins. Inflorescence laxly 2-5 flowered; peduncle 0.8-2.5 cm long, pubescent, with 1 sheathing bract; sheathing bract 3-6 mm long, lanceolate, acuminate at apex; rachis 1-1.2 cm long, pubescent. Floral bracts 4-6 mm long, lanceolate, acute at apex, ciliate, rarely eciliate, 1-veined. Flowers 1-1.5 cm long. Sepals cohering, 1-veined; dorsal sepal 5.5-6.5 × 2.5-3.5 mm, concave, acuminate to sub-acute at apex, recurved; lateral sepals 5-6 × 2-3 mm, obliquely triangular-ovate to triangular-elliptic, subacute at apex; petals 4.5-5.5 × 2-3 mm, obliquely oblanceolate-oblong to lanceolate, subacute to obtuse at apex, apiculate, erose, 1-veined. Labellum 5-7 mm long, 'Y' shaped, 3-lobed, white with greenish tinge near base; hypochile 3-4 × 4.5-5.5 mm, saccate, with 1 large partly clefted, subsquarish appendage on each side; mesochile 1-2 × 0.8-1.2 mm long, narrowly oblong-linear, convolute; epichile 1.5-2.5 × 3.5-5 mm, 2-lobed, lobules obliquely subrectangular, diverging. Column 1-2 mm long, thick; rostellum 0.8-1 mm long, conical, thick. Anther 2-2.5 × 1.8-2.2 mm, ovate, biloculate; pollinarium 2.5-3 mm long; pollinia ca. 2 mm long, white; caudicles ca. 0.3 mm long, faintly curved; viscidium ca. 0.4 × 0.3 mm, triangular, knob-like, thick. Stigma lobes large, suborbicular, muricate. Ovary including pedicel 0.6-1 mm long, green, pubescent.



**Fig 2: *Myrmecischis pumila* (J.D.Hooker) T.Tang & F.T.Wang**

A) Habit; B) Flower; C) Bract; D) Dorsal sepal; E) Petal; F) Lateral sepal; G) Labellum; H) Appendage (magnified) within hypochile; I) Column; J) Anther; K) Pollinarium. [C.M. Sabapathy 32680, CAL]

Flowering & Fruiting: June-September.

Habitat: In dense forests on moss and leafy debris in the shade or on large boulders between 1000-3500 m above sea level.

Distribution: India: Arunachal Pradesh, Manipur, Sikkim, West Bengal; Bhutan; China; Myanmar; Nepal; Thailand; Vietnam.

Conservation status: Not Evaluated (NE)

Etymology: From the Latin '*pumilus*' (dwarf) indicating the inconspicuous habit of the plant.

Specimens examined: India: Arunachal Pradesh: Dibang Valley District, Dara Camp, 1800 m, 27.06.2002, M. Bhaumik 4043 (CAL). Manipur: Ukhrial District, Sirohu (Sirohee), July 1948, Kingdon Ward 3267 (CAL). Sikkim: North District: Chungthang, 1828.8 m, July 1897, Pantling 162 (BM, photo; CAL); Lachen, 2438.4 m, 20.07.1909, Smith & Cave 2847 (CAL); South District: Tendong, 1828.8 m, 1891, Pantling 162 (CAL); Tendong, 1828.8 m, 1891, Pantling s.n. (CAL); West District: Rimbik, 2133.6 m, 20.07.1919, Cave s.n. (Lloyd Botanical Garden Herbarium, Darjeeling); without precise locality, 2743.2 m, 05.08.1874, Treutler 474 (K, photo); without precise locality, 1875 – 1875, King 3027 (CAL). West Bengal: Darjeeling District: Tongloo, 2438.4 – 3048 m, 03.08.1862, Anderson 1191 (CAL); Tongloo, 2438.4 – 3048 m, Kurz s.n. (CAL); Pankasari, 2743.2 m, 15.07.1912, Cave s. n. (Lloyd Botanical Garden Herbarium, Darjeeling); Neora Valley National Park, 18.07.2004, C.M. Sabapathy 32680, 32681 (CAL).

Notes:

➤ *M. pumila* is a rare plant found in some remote areas of Eastern Himalaya and North-east India. The species is closely allied to *Cheirostylis*

**Fig 3 – see opposite page**

A) Holotype of *Myrmecis bakhimensis* D.Maity et al.; B) Holotype (top left corner) of *M. pumila* (J.D.Hooker) T.Tang & F.T.Wang; C) - D) *M. pumila*. [B: Reproduced with kind permission of the Director and the Board of Trustees, Royal Botanic Gardens, Kew]



*pusilla* but can be differentiated by its non-moniliform rhizome, an hypochile with one large partly clefted, sub-squarish appendage inside on each side, entire margins of epichile lobules, pollinarium without tegula and stigma lobes on distinct stalks. In comparison, *Cheirostylis pusilla* has moniliform rhizome, hypochile with one bifurcated filiform appendage inside on each side, irregularly erose margins of epichile lobules, pollinarium with tegula and lacking stalked-stigma lobes.

➤ Lindley (1840) described *Cheirostylis pusilla* based on W. Gomez's collections (Wall. Cat. Numer. List no. 7382) from Sylhet. Lindley (1857) later included further collections from Sikkim by J.D. Hooker within his concept of *C. pusilla* along with the specimens collected by Griffith, J.D. Hooker & T. Thomson from Khasia. However, Lindley erred to include Hooker's Sikkim plants (Sikkim, 7-8000 ft, JDH 325) in *C. pusilla* which were actually not *Cheirostylis*. Later, Hooker (1890) described *Odontochilus pumilus* based on his own collection (which Lindley earlier included in *C. pusilla*) as well as Thomson's and King's collections from Sikkim. Tang & Wang (1951) finally transferred *O. pumilus* to *Myrmecis* as *M. pumila*.

➤ The type sheet with barcode number K000364616 at K consists of 4 sets of plants. The specimens (Sikkim, 7-8000 ft, JDH 325) mounted on top left corner of the sheet are *M. pumila*. Seidenfaden (1978) mentioned these Sikkim plants (as 'J.D.H. & T.T. 325 A') as 'type' of *M. pumila*, whereas Pearce & Cribb (2002) mentioned the same as holotype. As there are more than one collection (three collections) mentioned in the protologue, and as the author of *O. pumilus* did not designate any particular specimen as 'holotype', the term 'holotype' used by Pearce & Cribb (2002) is corrected here as lectotype according to Article 9.8 of Vienna Code (McNeill *et al.*, 2006).

➤ Lucksom (2007) treated *M. franchetiana* as a distinct species. But after detailed study of the holotype of *C. franchetiana* (basionym of *M. franchetiana*), we consider *M. franchetiana* to be conspecific with *M. pumila*. It is worth to mention that the herbarium label on the holotype of *C. franchetiana* shows the elevation as '6000 feet' and the month of collection as 'September', however, the same is mentioned in protologue as '6500 feet' and 'August' respectively. These discrepancies might be due to typographic error.

## Acknowledgements

The authors are grateful to the Director, Botanical Survey of India, Kolkata for encouragement and facilities. Sincere thanks are due to Dr. P. Lakshminarasimhan, Ex-IBLO, Kew for sending cibachrome photographs of the types of *M. pumila*. The Board of Trustees of Royal Botanic Garden Kew is thankfully acknowledged for permission to publish the photograph of lectotype of *M. pumila*. Thanks are also due to Mr. C.M. Sabapathy, Central National Herbarium, Botanical Survey of India, Howrah for providing some live specimens and a photograph (Fig 3D) of *M. pumila*, Dr. D. Maity, Department of Botany, University of Calcutta for providing holotype image of *M. bakhimensis* and Dr. D.K. Agrawala, Central Council for Research in Ayurveda and Siddha, New Delhi for his suggestions.

## References:

- Govaerts, R., J. Pfahl, M.A. Campacci, D.H. Baptista, H. Tigges, J. Shaw, P. Cribb, A. George, K. Kreuz & J. Wood, 2012. *World Checklist of Orchidaceae*. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/> accessed 18 January 2012; 17:10 GMT.
- Hooker, J.D., 1890. Orchidaceae. In: Hooker, J.D. (ed.), *Flora of British India* 6. L. Reeve & Co., London, pp. 1-198.
- Lindley, J., 1840. *Genera and species of Orchidaceous Plant*. Ridgways, Piccadilly, London, pp. 1-553.
- Lindley, J., 1857. Contribution to the Orchidology in India – No. 1. *Journal of the Proceedings of the Linnean Society, Botany* 1: 170-190.
- Lucksom, S.Z., 2007. *The orchids of Sikkim and North East Himalaya*. Concept, Siliguri, p. 115.
- Mabberley, J.D., 2008. *Mabberley's Plant Book – A portable dictionary of plants, their classification and uses* (ed. 3). Cambridge University Press, Cambridge, UK, p. 567.
- Maity, D., N. Pradhan & G.G. Maiti, 2007. *Myrmechis bakhimensis* D. Maity, N. Pradhan & G.G. Maiti, a new species of Orchidaceae from Sikkim Himalaya. *Acta Phytotaxonomica Sinica* 45(3): 321-323.

McNeill, J., F.R. Barrie, H.M. Burdet, V. Demoulin, D.L. Hawksworth, K. Marhold, D.H. Nicolson, J. Prado, P.C. Silva, J.E. Skog, J.H. Wiersema & N.J. Turland (eds.), 2006. *International Code of Botanical Nomenclature (Vienna Code) adopted by the Seventeenth International Botanical Congress Vienna, Austria, July 2005*. Regnum Vegetabile 146. Ruggell: Gantner.

Pearce, N.R & P.J. Cribb, 2002. *Orchids of Bhutan*. In: Flora of Bhutan 3(3). Royal Botanic Garden, Edinburgh, and Royal Government of Bhutan, Thimpu, p. 101.

Pridgeon, A.M., P.J. Cribb, M.W. Chase, & F.N. Rasmussen, 2003. *Genera Orchidacearum 3, Orchidoideae (Part 2), Vanilloideae*. Oxford University Press, Oxford, p. 124.

Seidenfaden, G., 1978. Orchid genera in Thailand VI. *Dansk Botanisk Arkiv Udgivet af Dansk Botanisk Forening* 32(2): 1-195.

Stafleu, F.A. & R.S. Cowan, 1976. *Taxonomic Literature (ed. 2)* 1. Regnum Vegetable 94. Bohn, Scheltema & Holkema, Utrecht, p. 240.

Tang, T. & F.T. Wang, 1951. Contributions to the knowledge of Eastern Asiatic Orchids. *Acta Phytotaxonomica* 1(1): 24-102.

Xinqi, C., S.W. Gale & P.J. Cribb, 2009. *Myrmecis* (Lindley) Blume. In: Wu, Z.Y., Raven, P.H. and Hong, D.Y. (eds.), *Flora of China*. 25 (Orchidaceae). Science Press, Beijing and Missouri Botanical Garden Press, St. Louis, pp. 63-65.

---

1: Central National Herbarium, Botanical Survey of India, P.O. Botanic Garden, Howrah- 711 103, India. E-mail: avibsi@rediffmail.com

Corresponding author

2: Botanical Survey of India, Northern Regional Center, 192 Kaulagarh Road, Dehradun- 248 195, India. E-mail: hjchowdhery\_bsi@rediffmail.com