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## Notes on *Crepidium* (Orchidaceae): two new combinations, a putative natural hybrid, and four species newly recorded for Thailand

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### ABSTRACT

In this paper we report various findings from our ongoing studies of *Crepidium* (Orchidaceae), mainly conducted in preparation of the Flora of Thailand account on the genus: (1) the new combinations *C. chamaeorchis* (Schltr.) Nuammee, Seelanan, Suddee & H.A. Pedersen and *C. szemaoense* (Tang & F.T. Wang) Nuammee, Seelanan, Suddee & H.A. Pedersen are made and substantiated; (2) a putative natural hybrid between *C. acuminatum* (D. Don) Szlach. and *C. polyodon* (Hook. f.) Szlach. is discussed and highlighted as being the first convincing case of natural hybridization reported for *Crepidium*; (3) *C. bahanense* (Hand.-Mazz.) S.C. Chen & J.J. Wood, *C. josephianum* (Rchb. f.) Marg., *C. maximowiczianum* (King & Pantl.) Szlach. and *C. micranthum* (Hook. f.) Szlach. are reported as new national records for Thailand; (4) the name *C. josephianum* (Rchb. f.) Marg. is lectotypified. All taxa treated in this paper are documented by photos of live plants from their natural habitat in Thailand, and for each newly recorded species we provide a morphological description based on Thai material.

**KEYWORDS:** *Crepidium acuminatum* × *polyodon*, *Crepidium bahanense*, *Crepidium chamaeorchis*, *Crepidium josephianum*, *Crepidium maximowiczianum*, *Crepidium micranthum*, *Crepidium szemaoense*.

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### INTRODUCTION

Seidenfaden (1978) recognized 22 species of *Malaxis* Sol. ex Sw. (Orchidaceae) as occurring in Thailand. Largely adopting the revised generic classification of the Malaxideae proposed by Szlachetko (1995), he later assigned the same pool of species to *Crepidium* Blume (19 species), *Denia* Lindl. (1), *Glossochilopsis* Szlach. (1) and *Oberonioides* Szlach. (1) (Seidenfaden, 1997). These genera are all accepted in *Genera Orchidacearum* (Pridgeon *et al.*, 2005) – except *Glossochilopsis* which is considered congeneric with the earlier described *Crepidium*.

In Flora of Thailand, *Crepidium* is going to be delimited according to Pridgeon *et al.* (2005), and in connection with our ongoing revision of this genus for the Flora, we have realized that two new combinations need to be published. Furthermore, recent field

inventories have revealed the occurrence in Thailand of four species not previously recorded for this country, as well as a putative natural hybrid.

This paper is mainly based on examination of herbarium specimens (collections from Thailand as well as type specimens deposited in foreign herbaria) combined with consultation of the literature and of digital images of type specimens accessed online. Based entirely on Thai material, we have prepared a comprehensive morphological description of each of the four newly recorded species; and all taxa treated in this paper are documented by photos of live plants from their natural habitat in Thailand. All examined material is cited explicitly in the individual accounts below.

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## NEW COMBINATIONS

**Crepidium chamaeorchis** (Schltr.) Nuammee, Seelanan, Suddee & H.A.Pedersen, **comb. nov.**—*Microstylis chamaeorchis* Schltr., Beibl. Bot. Jahrb. Syst. 104: 11. 1911.—*Malaxis chamaeorchis* (Schltr.) Seidenf., Bot. Tidsskr. 65: 316. 1970.—*Glossochilopsis chamaeorchis* (Schltr.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 123. 1995. Type: Indonesia, West Sumatra, Gunung Marapi, 24 Jan. 1907, *Schlechter 15942* (holotype **B**, probably destroyed; isotypes **AMES, C!, K!, L!, NSW, P**). Fig. 1A–B.

Note.—*Glossochilopsis chamaeorchis* (Schltr.) Szlach. (basionym: *Microstylis chamaeorchis* Schltr.) is the type species of *Glossochilopsis* Szlach. However, the only feature that consistently separates *G. chamaeorchis* (and *Seidenfia* Szlach.) from all species of *Crepidium* Blume s.s. is the lip not being provided with auricles (Fig. 1); and it remains to be demonstrated that *G. chamaeorchis* and *Seidenfia* are not nested in *Crepidium* s.s. Against this background, we have decided to follow Pridgeon *et al.* (2005) in treating *Glossochilopsis* and *Seidenfia* as synonyms of *Crepidium*, and we here provide the necessary combination under *Crepidium*. An account on the occurrence of this species in Thailand can be found in Seidenfaden (1978: 48–49).

**Crepidium szemaoense** (Tang & F.T.Wang) Nuammee, Seelanan, Suddee & H.A.Pedersen, **comb. nov.**—*Malaxis szemaoensis* Tang & F.T.Wang, Acta Phytotax. Sin. 1: 75. 1951. Type: China, Yunnan, Szemao, “NW Mts”, ca 1525 m, 1901, *Henry 13128* (holotype **K!**). Fig. 1C–D.

Notes.— In Flora of China, Chen & Wood (2009) placed *Malaxis szemaoensis* in the synonymy of *Crepidium ovalisepalum* (J.J.Sm.) Szlach. – a species originally described as *Microstylis ovalisepala* J.J.Sm. from Sumatra (Smith 1928). Only the type collection of the latter is known from Sumatra [West Sumatra, Gunung Kuriman, 1000 m, 24 June 1918, *Bünnemeijer 3315* (holotype **L!**)]; but when publishing the new combination *Malaxis ovalisepala* (J.J.Sm.) Seidenf., Seidenfaden (1978) also referred two collections from N Thailand, Chiang Mai province, Doi Chiang Dao to this species.

Based on comparison of the type specimens of *Microstylis ovalisepala* and *Malaxis szemaoensis*,

and of the descriptions in Smith (1928), Tang & Wang (1951) and Chen & Wood (2009), we are convinced that we are dealing with two distinct species that mainly differ in vegetative characters. Thus, *Microstylis ovalisepala* is characterized by a creeping rhizome and an elongated ascending stem bearing ca 10 foliage leaves, whereas *Malaxis szemaoensis* has a short pseudobulbous stem bearing 2–4 leaves. These differences mean that *Microstylis ovalisepala* probably shows the same annual stem/rhizome dynamics as described for *Crepidium micranthum* below (under “Ecology”), whereas *Malaxis szemaoensis* matches the majority of *Crepidium* species in producing a new replacement pseudobulb annually through sympodial growth (cf. the descriptions of *C. bahanense*, *C. josephianum* and *C. maximowiczianum* below). Against this background, we here provide the new combination *Crepidium szemaoense*.

From Thailand we have studied the two collections that Seidenfaden (1978) assigned to *Malaxis ovalisepala* as well as more recently collected material belonging to the complex [NORTHERN: Chiang Mai province, Doi Chiang Dao, June 1958, *Seidenfaden & Smitinand GT 2643 (C!)*; 15 July 1958, *Smitinand 4693 (BKF!, C!)*, 20 June 2014, *Nuammee 404 (BCU!, BKF!)*, *Nuammee 408 (BCU!, BKF!)*; Nan province, Tham Sakoen National Park, 28 July 2011, *La-ongsri et al. 1878 (QBG!)*]. All the Thai material clearly matches *Crepidium szemaoensis* (Fig. 1C–D).

## PUTATIVE NATURAL HYBRID

**Crepidium acuminatum** (D.Don) Szlach. × **polyodon** (Hook.f.) Szlach.

*Crepidium acuminatum* (Szlachetko, 1995), based on *Malaxis acuminata* D.Don, and *C. polyodon* (Szlachetko, 1995), based on *Microstylis polyodon* Hook.f., differ in a number of floral characters. Thus, *C. acuminatum* has larger flowers, fewer teeth in the distal part of the lip and narrower and differently shaped lip auricles – see Table 1 and Figure 2 (A, C). They both flower in the rainy season, but their pollination biology is unknown.

In a mixed colony of the two species at Huai Yang Waterfall National Park in Prachuap Khiri Khan province (SW Thailand), the first author came across a plant (voucher: 8 May 2015, *Nuammee 439*

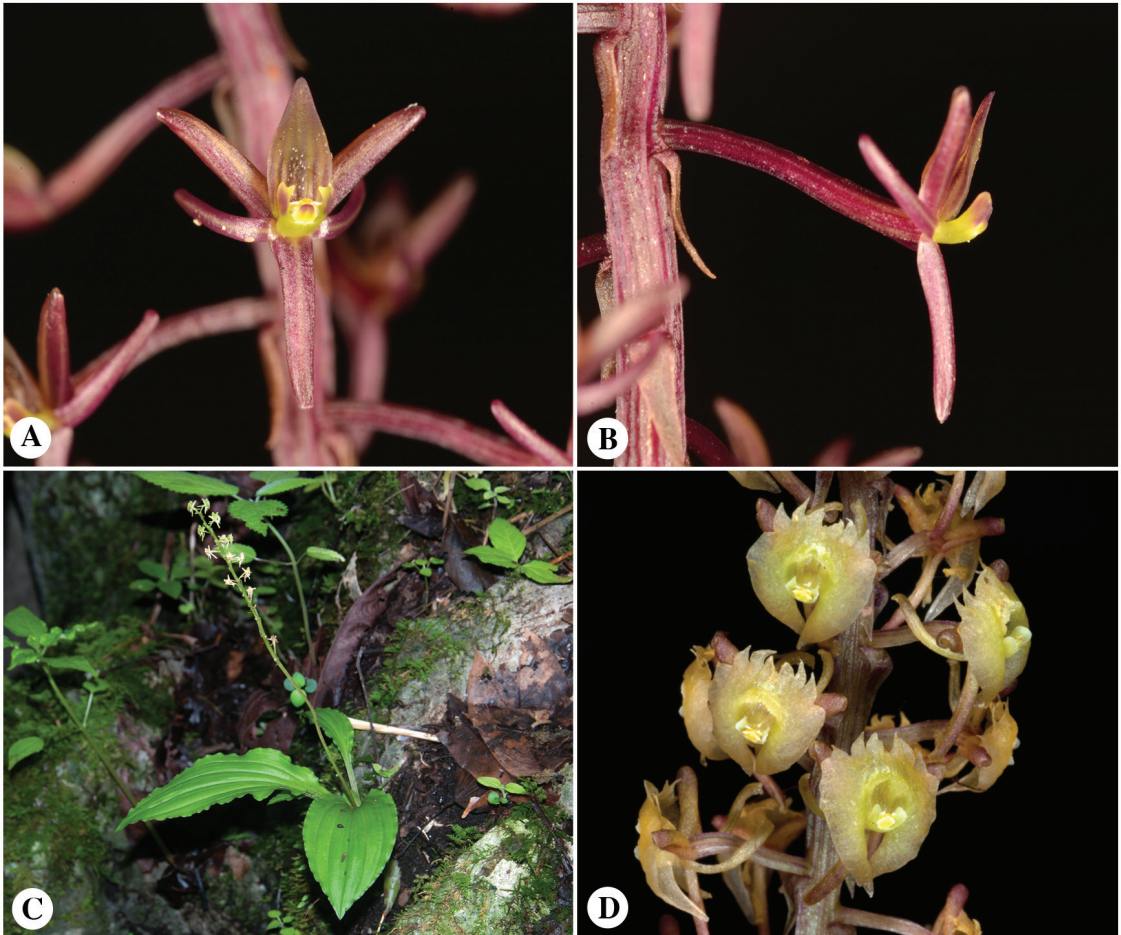


Figure 1. A–B: *Crepidium chamaeorchis* (Schltr.) Nuammee, Seelanan, Suddee & H.A.Pedersen, Nakhon Ratchasima province, Khao Yai, 11 July 2015 (A: flower in front view, B: flower in side view); C–D: *Crepidium szemaense* (Tang & F.T.Wang) Nuammee, Seelanan, Suddee & H.A.Pedersen (C: habit, D: flowers). Photos: A. Nuammee.

BCU) that appeared largely intermediary (Table 1; Fig. 2B). Thus, it had intermediate auricle shape and an intermediate number of teeth in the distal part of the lip, whereas flower diameter and auricle width were within the lower part of the range recorded for *C. acuminatum*. Referring to the general trend of orchid hybrids to be morphologically intermediary between their parental taxa (e.g. Nilsson, 1985; Aagaard *et al.*, 2005; Hedrén *et al.*, 2012), we hypothesize that the plant vouchered as *Nuammee 439* is a natural hybrid between *C. acuminatum* and *C. polyodon*. At the same time, however, we recognize that comparative molecular data would be needed

to test our hypothesis (cf. Rieseberg & Carney, 1998).

Although we cannot definitely confirm the hybrid nature of *Nuammee 439*, we consider it relevant to draw attention to this putative case of natural hybridization in *Crepidium* in Thailand. Firstly, we believe that there are no previous reports of natural interspecific hybrids in *Crepidium* from Thailand or elsewhere. Secondly, there is a surprising lack of records of plant hybrids from Thailand in general, for which reason a more systematic search was recently encouraged (Parnell *et al.*, 2013).

Table 1. Comparison of *Crepidium acuminatum* (D. Don) Szlach., *C. polyodon* (Hook.f.) Szlach. and their putative natural hybrid. All data were scored from material collected in Thailand.

Character	<i>C. acuminatum</i> <sup>1</sup>	Putative hybrid <sup>2</sup>	<i>C. polyodon</i> <sup>3</sup>
Width of lip (mm)	4.0–9.5	5.5–6.0	2.5–4.0
Teeth on distal part of lip	2	4–5	12–16
Shape of lip auricles	Obliquely triangular to oblong-ovate	Obliquely triangular-oblong	Falcately linear-triangular
Width of lip auricles (mm)	1.5–4.0	2.5	1.0–2.0

<sup>1</sup> Specimens examined: *van Beusekom & Phengkklai* 1282 (L); *Garrett* 404 (K); *Geesink et al.* 5896 (L); *Kerr* 100 (K, 4 specimens), 437 (K), 445 (K), 872 (K); *Koyama T-61151* (BKF); *Maxwell* 88-976 (L); *Nuamnee* 377 (BCU, BKF), 398 (BCU), 449 (BCU), 438 (BCU, BKF); *Palee* 233 (BKF); *Seidenfaden & Smitinand* GT 2595 (C).

<sup>2</sup> Specimen examined: *Nuamnee* 439 (BCU).

<sup>3</sup> Specimens examined: *Geesink & Santisuk* 5159 (C, L); *Kerr* 457 (K, 2 specimens); *Nuamnee* 437 (BCU, BKF).

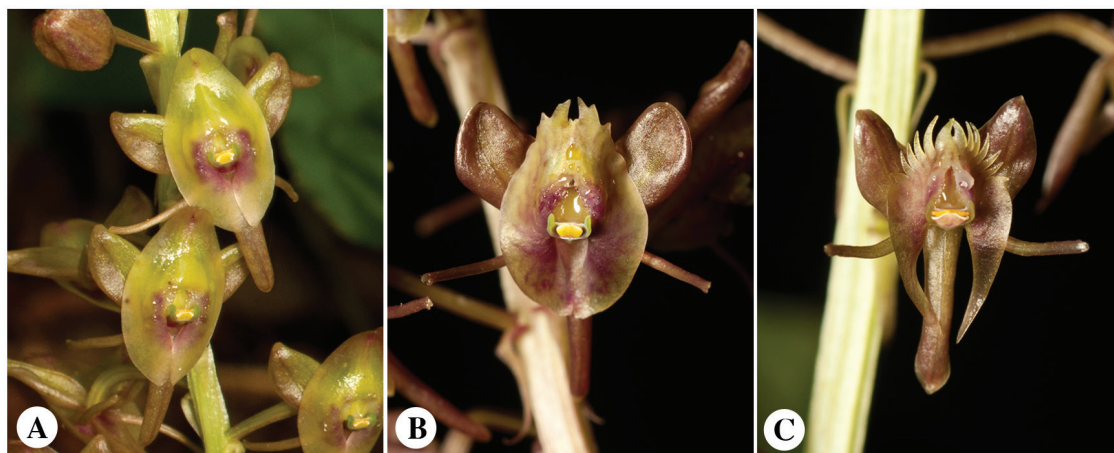


Figure 2. A: *Crepidium acuminatum* (D. Don) Szlach., Prachuap Khiri Khan province, Huai Yang Waterfall National Park, 8 May 2015 (flowers); B: *Crepidium* cf. *acuminatum* (D. Don) Szlach. × *polyodon* (Hook.f.) Szlach., Prachuap Khiri Khan province, Huai Yang Waterfall National Park, 18 May 2015 (flower); C: *Crepidium polyodon* (Hook.f.) Szlach., Prachuap Khiri Khan province, Huai Yang Waterfall National Park, 18 May 2015 (flower). Photos: A. Nuamnee.

## NEW RECORDS FOR THAILAND

***Crepidium bahanense*** (Hand.-Mazz.) S.C.Chen & J.J.Wood in Z. Wu *et al.* (eds), *Fl. China* 25: 232. 2009.— *Microstylis bahanensis* Hand.-Mazz., *Symb. Sin.* 7: 1350. 1936.— *Malaxis bahanensis* (Hand.-Mazz.) Tang & F.T.Wang. *Acta Phytotax. Sin.* 1: 71. 1951. Type: China, Yunnan, *sine loco*, 21 July 1916, *Handel-Mazzetti* 9574 [holotype **WU**

(<http://herbarium.univie.ac.at/database/detail.php>; accessed 13 March 2016)]. Fig. 3A–B.

Terrestrial, sympodial herb with a strongly condensed rhizome carrying a fresh, developing corm distally (from which the aerial shoot is produced) and 1–2 decaying corms immediately behind; flowering shoots 10–20 cm tall. *Roots* 3–5, arising from the basal part of the pseudobulb, 0.5–1 cm long. *Pseudobulbs* white, subglobose, 0.6–1.1 cm

long, 0.5–1.5 cm in diameter when fully developed, consisting of 2–4 internodes. *Cataphylls* few, oblong to oblong-lanceolate, subacute to acute, 0.8–3 by 0.4–0.7 cm. *Foliage leaves* 2(–3), sessile, sheathing at base; lamina green, lanceolate-oblong to ovate-oblong or ovate with symmetrical base, obtuse to acute, sometimes slightly apiculate, 3–7.5 by 1–2.5 cm, 1- to 3-veined, with numerous scattered white papillae on the adaxial side when young (later glabrous), margins entire, sometimes slightly undulate. *Inflorescence* racemose, erect, 9–17 cm long; peduncle brownish purple, greenish brown or green, 6–9 cm long, ca 0.1 cm in diameter; rachis laxly 10- to 30-flowered; floral bracts creamy-yellow to yellowish green, reflexed, (linear-)triangular, acute to acuminate, 2–5.5 by 1.1–1.2 mm, equal to or longer than ovaries. *Flowers* creamy-yellow with more or less purple lip mid-lobe, 4–4.5 mm in diameter. *Sepals* rounded to obtuse, glabrous, margins revolute; dorsal sepal ovate to elliptic, ca 2.5 by ca 1.5 mm, 3-veined; lateral sepals concave, obliquely ovate, ca 2.5 by 1.8–2 mm, 4-veined. *Petals* revolute, linear-ligulate, truncate, 2–2.2 by 0.5–0.6 mm, 1-veined, margins recurved to revolute. *Lip* ca 4.5 by 2.5–3 mm (maximum dimensions), oblong with a widened, strongly sagittate-auriculate base, apically bilobed with obtuse to retuse lobes, basal part forming a cavity that is broadly ovate to suborbicular in outline and bordered by a more or less horseshoe-shaped, distally prolonged, glabrous callus; auricles obliquely triangular to ovate, obtuse, ca 1.5 by ca 1 mm. *Gynostemium* yellow, erect, stout, 1–1.5 mm long, ca 1 mm in diameter; staminodes fleshy, oblong, truncate; anther orange-yellow, broadly ovate in upper view, ca 0.3 mm long, pollinia 4 in 2 pairs, obliquely clavate, without caudiculae; rostellum transversely rectangular, truncate; fertile part of stigma small. *Ovary* (including pedicel) greenish yellow, fusiform-cylindrical, with 6 longitudinal ridges, 2–2.5 mm long, glabrous. *Capsule* ellipsoid, 4–5 cm long, 0.2–0.3 cm in diameter; fruit pedicel 0.2–0.3 cm long.

Thailand.—NORTH-EASTERN: Loei [Phu Ruea National Park, trail to Suan Hin Phali, 20 July 2013, Nuammee 379 (BKF!), Nuammee 380 (BCU!, BKF!), Nuammee 383 (BCU!); 4 May 2014 [in bud], Nuammee 397 (BKF!); 2 July 2014, Nuammee 415 (BCU!).]

Distribution.—China (Yunnan).

Vernacular.—Hu suea chio bai tang (หูเสือจิวใบต้ง) (here proposed).

Ecology.—*Crepidium bahanense* grows in sandy soil along streams and shallow moist depressions in open grassland. It flowers in the rainy season (June to July) and survives the dry season as a leafless corm.

Note.—During field surveys in Phu Ruea National Park, a large population of this species was discovered along the trail to Suan Hin Phali.

***Crepidium josephianum*** (Rchb.f.) Marg., Ann. Bot. Fenn. 39: 65. 2002.—*Microstylis josephiana* Rchb.f., Bot. Mag. 103: t. 6325. 1877.—*Malaxis josephiana* (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 673. 1891. Type: Drawing by W. Fitch from a plant sent by Gammie from Sikkim (India) and flowering in Royal Bot. Gard., Kew (lectotype in the library of K!, designated here; see reproduction in Bot. Mag. 103: t. 6325. 1877). Fig. 3C–D.

Terrestrial, sympodial herb with a strongly condensed rhizome carrying a fresh, developing pseudobulb distally (from which the aerial shoot is produced) and 1 decaying pseudobulb immediately behind; flowering shoots up to 15 cm tall. *Roots* several, arising from the basal part of the pseudobulb, 1–3 cm long. *Pseudobulbs* green, oblong-fusiform, 5–6 cm long, 1–1.5 cm in diameter when fully developed, consisting of 4–5 internodes. *Cataphylls* 2–3, triangular-ovate to lanceolate-oblong (the lowermost tubular), acute 1.5–5 by 0.8–1 cm. *Foliage leaves* 3–5, sessile, sheathing at base; lamina pale purplish brown, purple-veined beneath, ovate to elliptic-lanceolate with slightly asymmetrical base, acuminate, 6–7 by 3.3–3.8 cm, 5- to 6-veined, glabrous, margins undulate. *Inflorescence* racemose, erect, 8–10 cm long; peduncle purplish brown, 5–6 cm long, 0.2–0.3 cm in diameter, with 6 longitudinal ridges at base; rachis densely 6- to 12-flowered; floral bracts purplish brown, patent to reflexed, triangular to triangular-ovate, acuminate, 3.5–4 by 1.5–2 mm, shorter than ovaries. *Flowers* light brownish yellow with red-brown or purplish red markings on the basal part of the lip, 10–12 mm in diameter. *Sepals* obtuse, glabrous, margins recurved; dorsal sepal revolute, ovate, 10–12 by 4–5.5 mm, 4-veined; lateral sepals broadly elliptic, recurved,

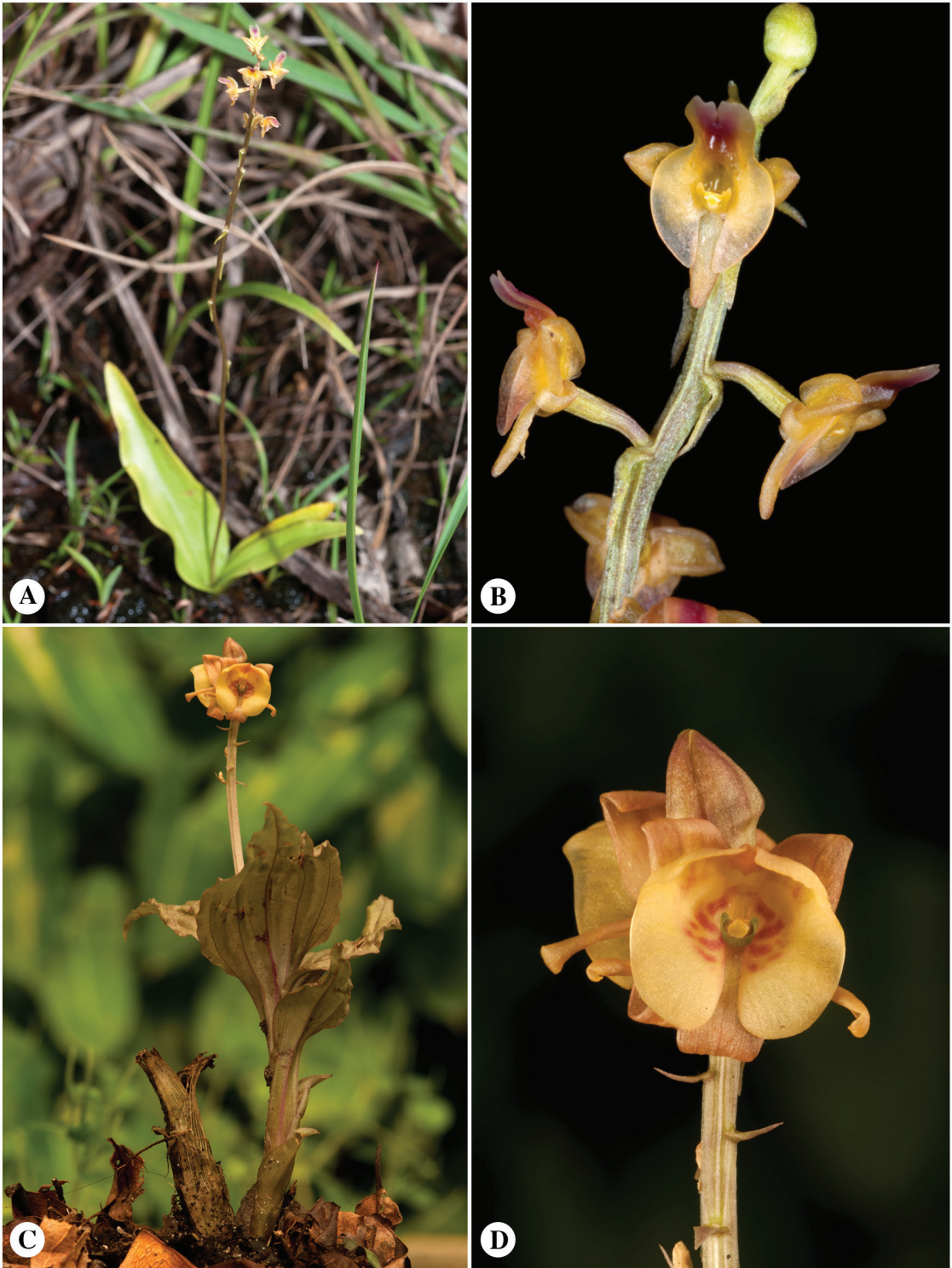


Figure 3. A–B: *Crepidium bahanense* (Hand.-Mazz.) S.C.Chen & J.J.Wood, Loei province, Phu Ruea National Park, 20 June 2013 (A: habit, B: flowers); C–D: *Crepidium josephianum* (Rchb.f.) Marg., Loei province, Phu Luang Wildlife Sanctuary, 1 April 2015 (C: habit, D: flowers). Photos: A. Nuamdee.

10–11 mm by 6–7 mm, 5-veined. *Petals* linear, rounded, 10–11 by ca 2 mm, 3-veined, margins revolute. *Lip* 12–14 by 14–16.5 mm (maximum dimensions), bowl-shaped with a strongly cordate-auriculate base, apically emarginate; basal part forming a cavity that is narrowly rectangular in outline, with 2 chambers, small; auricles broadly and obliquely elliptic-oblong, rounded, 4–5 mm by 6–7 mm. *Gynostemium* green, erect, very stout, ca 2 mm long, ca 2.2 mm in diameter; staminodes fleshy, oblong, truncate; anther orange-yellow, broadly ovate in upper view, ca 1 mm long; pollinia 4 in 2 pairs, obliquely clavate, without caudiculae; rostellum transversely rectangular, truncate; fertile part of stigma small. *Ovary* (including pedicel) greenish cream, tinged with purple, cylindrical, with 6 longitudinal ridges, 3–5 mm long, glabrous. *Capsule* not seen.

Thailand.— NORTH-EASTERN: Loei [Phu Luang Wildlife Sanctuary, near Khok Nokkaba Forest Protection Unit, 1 Apr. 2015 [in bud], *Nuammee 435* (BCU!, BKF!)].

Distribution.— Nepal, NE India.

Vernacular.— Haeo mu pa sikkhim (แห้วหมูป่า ลิกซิม)(here proposed).

Ecology.— *Crepidium josephianum* grows in humus-rich soil in hill evergreen forest. It flowers early in the rainy season (May) and survives the dry season as a leafless pseudobulb.

Note.— During field surveys in Phu Luang Wildlife Sanctuary, a small population of this species was discovered in a shaded area near Khok Nokkaba Forest Protection Unit.

***Crepidium maximowiczianum*** (King & Pantl.) Szlach., *Fragm. Florist. Geobot., Suppl.* 3: 129. 1995.— *Microstylis maximowicziana* King & Pantl., *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 64: 329. 1895.— *Malaxis maximowicziana* (King & Pantl.) Tang & F.T.Wang, *Acta Phytotax. Sin.* 1: 72. 1951. Type: India, West Bengal, Mungpoo Cinchona Plantation, July 1892, *Pantling 226* [holotype BM (<http://data.nhm.ac.uk/dataset/collection-specimens>; accessed 13 March 2016), isotype K!]. Fig. 4A–B.

Terrestrial, sympodial herb with a strongly condensed rhizome carrying a fresh, developing pseudobulb distally (from which the aerial shoot is produced) and 1 decaying pseudobulb immediately

behind; flowering shoots up to 30 cm tall, robust. *Roots* several, arising from the basal part of the pseudobulb, 1–7 cm long. *Pseudobulbs* green, terete from a fusiform base, ca 10 cm long, 0.7–0.8 cm in diameter, consisting of 5–7 internodes. *Cataphylls* 2–3, lanceolate-oblong (the lowermost tubular), acute to acuminate, 3–7 by 0.7–1.4 cm. *Foliage leaves* 5–6, petiolate, sheathing at base; petiole 2–3 cm long; lamina green, elliptic to elliptic-lanceolate or ovate with slightly asymmetrical base, acuminate, 9–17 by 4.8–6.5 cm, 7- to 9-veined, glabrous, margins undulate. *Inflorescence* racemose, erect, ca 20 cm long; peduncle green, 8–9 cm long, 0.2–0.3 cm in diameter, with several longitudinal ridges; rachis densely many-flowered; floral bracts green, strongly recurved, linear-triangular, acuminate, 3.5–8 by 0.7–1.2 mm, shorter to longer than ovaries. *Flowers* green, 2–3 mm in diameter. *Sepals* rounded to acute, glabrous, margins revolute; dorsal sepal lanceolate to oblong-lanceolate, 4.2–4.3 by ca 1.5 mm, 3-veined; lateral sepals concave, broadly and obliquely elliptic, 3–3.5 by 1.9–2 mm, 3-veined. *Petals* reflexed, linear, rounded to obtuse, 3.6–4 by 0.5–0.7 mm, 1-veined, margins revolute. *Lip* 2.7–3 by 3–3.7 mm (maximum dimensions), bowl-shaped, semicircular to transversely rectangular in outline (when spread) with a sagittate-auriculate base, apically (truncate-)rounded with a slightly thickened, recurved and subcrenate apiculum; basal/central part forming a cavity that is ovate to elliptic in outline, subdivided by a longitudinal keel and bordered by a more or less horseshoe-shaped, glabrous callus; auricles obliquely to subfalcately triangular, acute, 0.6–1 by 0.5–1 mm. *Gynostemium* green, erect, 1.5–1.8 mm long, ca 1 mm in diameter; staminodes flat, broadly and obliquely oblong, obtuse to truncate, overarching and partly hiding the anther; anther light yellow, elliptic in upper view, ca 0.5 mm long, pollinia 4 in 2 pairs, narrowly clavate, without caudiculae; rostellum transversely rectangular, truncate; fertile part of stigma large. *Ovary* (including pedicel) green, fusiform-cylindrical, with 6 longitudinal ridges, 3–4 mm long, glabrous. *Capsule* ellipsoid, 0.5–0.7 cm long, 0.2–0.4 cm in diameter; fruit pedicel 0.1–0.2 cm long.

Thailand.— NORTHERN: Chiang Mai [Doi Ang Khang, *Pongkai 100* (BCU!, BKF!)].

Distribution.— NE India.

Vernacular.— Hu suea morakot (หูลือมรกด) (here proposed).



Ecology.— *Crepidium maximowiczianum* grows in humus-rich soil in shaded areas in pine forest, ca 1700 m alt. It flowers in the rainy season (June to July) and survives the dry season as a leafless pseudobulb.

Note.— During field surveys in Doi Ang Khang, a small population of this species was discovered at National Highway 1249, ca 5 km south of Royal Agricultural Station Ang Khang.

***Crepidium micranthum*** (Hook.f.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 129. 1995.— *Microstylis micrantha* Hook.f., Hooker's Icon. Pl. 19: t. 1834. 1889.— *Malaxis micrantha* (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 673. 1891. Type: Malaysia, Peninsular Malaysia, Perak, "Taiping Hills", *sine anno*, *Scortechini 581* [holotype **K!**]. Fig. 4C–D.

— *Microstylis flavoviridis* Ridl., J. Straits Branch Roy. Asiatic Soc. 61: 37. 1912. Type: Malaysia, Peninsular Malaysia, Perak, Gunung Korbu, *sine anno*, *Haniff 3982* [holotype **K!**].

— *Microstylis trinervia* Ridl., Bull. Misc. Inform. Kew 1926: 84. 1926. Type: Indonesia, West Sumatra, Mentawi Islands, Sipura, *sine anno*, *Boden Kloss 14655* [holotype **K!**].

Terrestrial, sympodial herb with a creeping rhizome; flowering shoot erect from a decumbent base, 15–37 cm tall. *Rhizome* green to green-brown, terete, 8–20 cm long, 0.3–0.8 cm in diameter, internodes ca 1 cm long. *Roots* several, 1–3 arising from each node of the rhizome and from the lower nodes of the stem, 1–7 cm long. *Foliage leaves* 6–14, petiolate, sheathing at base; petiole light green to greenish purple, 1–2.5 cm long; lamina green to purplish brown, lanceolate to ovate-lanceolate or elliptic with asymmetrical base, acuminate, 5–12 by 2–4.5 cm, 3- to 5-veined, glabrous, margins undulate. *Inflorescence* racemose, erect, 15–30 cm long; peduncle green to purplish brown, 8–10 cm long, 0.2–0.3 cm in diameter, with several longitudinal ridges, bearing a few lanceolate sterile bracts; rachis laxly many-flowered; floral bracts green to purplish brown, reflexed, triangular, acuminate, 4–12.5 by 1–2.5 mm, longer than ovaries. *Flowers* greenish yellow, more or less flushed with purple, 4–5 mm in diameter. *Sepals* rounded to acute, glabrous, margins revolute; dorsal sepal ovate, 2.5–4 by 1.5–2 mm, 3-veined; lateral

sepals broadly and obliquely ovate, 2.5–3.5 by 1.5–2.5 mm, 3-veined. *Petals* spreading, linear, obtuse to rounded, 2.5–3 by 0.5–1 mm, 1-veined, margins revolute. *Lip* 4–5 by 4.5–6 mm (maximum dimensions), reniform to nearly semicircular in outline with a strongly sagittate-auriculate base, apically rounded with coarsely and unevenly 6- to 8-dentate margin and a large, triangular, bifid, usually incurved apiculum; basal/central part forming a small, shallow cavity that is narrowly triangular to rectangular in outline; auricles obliquely (ovate-) triangular, obtuse, 1–2 by 1–2 mm. *Gynostemium* greenish yellow, erect, stout, 1–1.5 mm long, ca 1 mm in diameter; staminodes flat, broadly and obliquely triangular-oblong, rounded to obtuse; anther orange-yellow, ovate in upper view, ca 0.5 mm long; pollinia 4 in 2 pairs, narrowly clavate, without caudiculae; rostellum transversely rectangular, truncate; fertile part of stigma small. *Ovary* (including pedicel) green to purplish brown, cylindrical, with 6 longitudinal ridges, 3–5 mm long, glabrous. *Capsule* oblongoid-ellipsoid, 0.7–0.9 cm long, 0.3–0.5 cm in diameter; fruit pedicel 0.2–0.3 cm long.

Thailand.— PENINSULAR: Nakhon Si Thammarat [Khao Luang National Park, trail from Ai Khiao Waterfall to Noen Lom Fon, *sine anno*, *Chantharaprasong H 9040* (BCU!); 21 Sept. 2015, *Nuammee 444* (BCU!, BKF!), *Nuammee 445* (BCU!, BKF!)].

Distribution.— Peninsular Malaysia, Sumatra, Borneo.

Vernacular.— Mangkon lueang thin tai (มังกรเหืองถิ่นใต้) (here proposed).

Ecology.— *Crepidium micranthum* grows in humus-rich soil in evergreen forest, ca 800–1200 m alt. It flowers late in the rainy season (September). After flowering, the inflorescence decays and the stem gradually becomes prostrate. However, at least the proximal part of the stem – and its leaves – survive the dry season and do not disappear until a new, young, erect, potentially flowering shoot has been produced from one of the lower leaf axils.

Note.— During field surveys in peninsular Thailand, a large population of this species was discovered in a shaded area nearby along a stream in Khao Luang National Park.

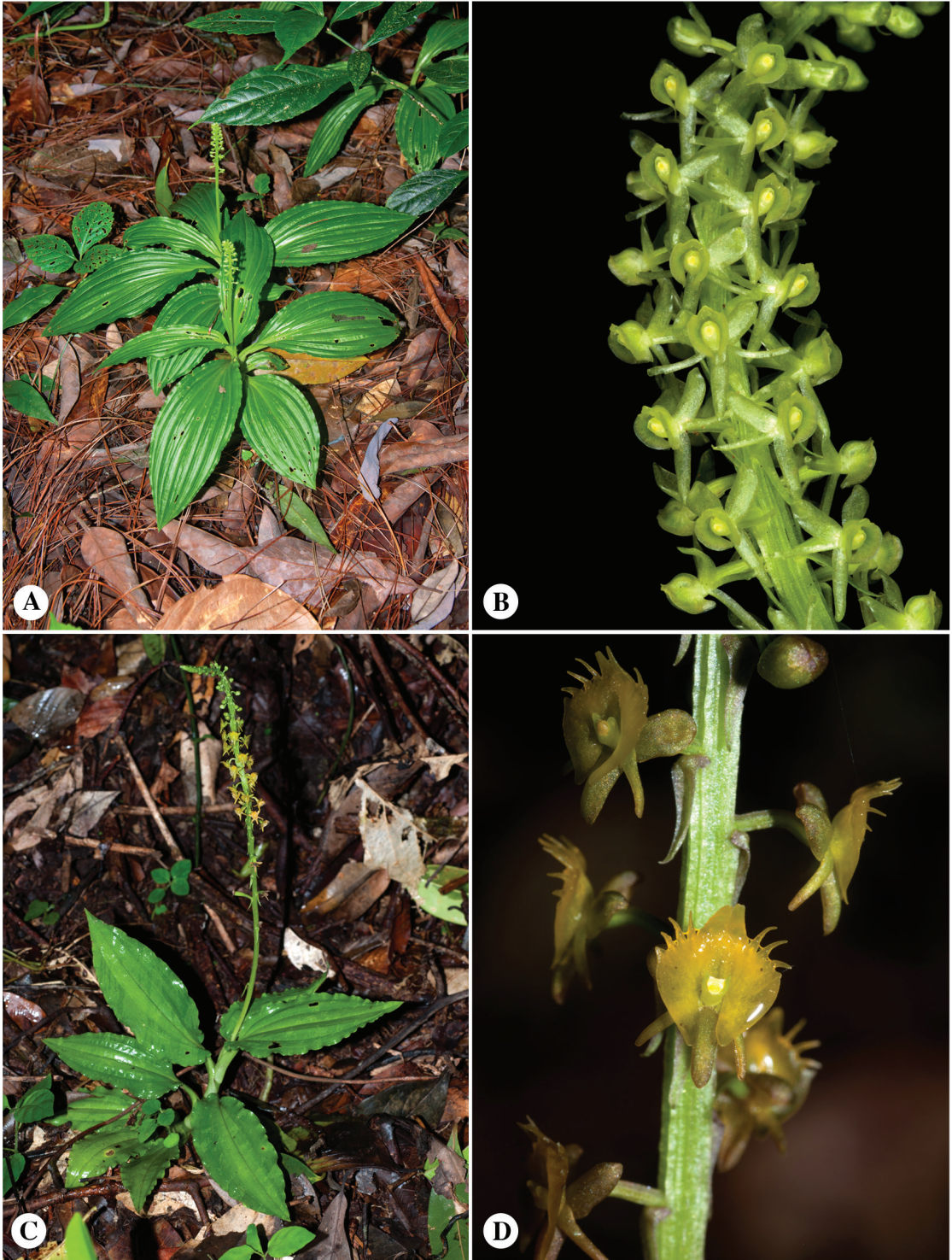


Figure 4. A–B: *Crepidium maximowiczianum* (King & Pantl.) Szlach., Chiang Mai province, Doi Ang Khang, 23 June 2014 (A: habit, B: flowers); C–D: *Crepidium micranthum* (Hook.f.) Szlach., Nakhon Si Thammarat province, Khao Luang National Park, 19 September 2015 (C: habit, D: flowers). Photos: A. Nuammee.

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