

New orchid records for Myanmar, including the first record of the genus *Stereosandra*

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ABSTRACT. Nine orchid species, *Bulbophyllum capnophyton* J.J.Verm. et al., *Dendrobium macrostachyum* Lindl., *D. praecinctum* Rchb.f., *Habenaria reniformis* (D.Don) Hook.f., *Liparis distans* C.B.Clarke, *L. resupinata* Ridl., *Micropera thailandica* (Seidenf. & Smitinand) Garay, *Oberonia obcordata* Lindl. and *Stereosandra javanica* Blume, are reported as new for Myanmar. Of particular interest is the *Stereosandra* as it is the first record of this genus in the country.

Keywords. Myanmar, Orchidaceae, new distribution records

Introduction

The orchid flora of Myanmar is very rich but as yet poorly known (a brief overview of the current state of orchid floristics in the country is given in Ormerod & Sathish Kumar, 2003, 2008), and a complete inventory of all species of Orchidaceae found in the country is not yet available. Our ongoing studies resulted in nine additions to the orchid flora of Myanmar, namely *Bulbophyllum capnophyton* J.J.Verm. et al. (syn. *Trias nana* Seidenf.), *Dendrobium macrostachyum* Lindl., *D. praecinctum* Rchb.f., *Habenaria reniformis* (D.Don) Hook.f., *Liparis distans* C.B.Clarke, *L. resupinata* Ridl., *Micropera thailandica* (Seidenf. & Smitinand) Garay, *Oberonia obcordata* Lindl. and *Stereosandra javanica* Blume, all of which are new records for Myanmar of species found in adjacent countries. *Stereosandra* is recorded from Myanmar for the first time.

Brief descriptions, various notes and illustrations are provided for all species. Detailed locality data below the level of townships are not given here, in order not to reveal localities which may endanger their populations through over-collecting. The morphological descriptions are partly based on the specimens from Myanmar and have been partly extracted from previously published descriptions.

Enumeration of new records

1. *Bulbophyllum capnophyton* J.J.Verm., Schuit. & de Vogel, Phytotaxa 166: 110 (2014). – *Trias nana* Seidenf., Bot. Tidsskr. 71: 24 (1976); Seidenf., Opera Bot. 89:

164, fig. 106 (1986). – TYPE: Peninsular Thailand, Nam Yong, *Seidenfaden, G. & Smitinand, T. GT 6096* (holotype C). (Fig. 1A)

Bulbophyllum sp., Seidenf. & Smitinand, Orch. Thailand (Prelim. List): 388, fig. 294 (1961). Based on *A.F.G. Kerr 0361* (BK) from Thailand.

Herb to 2 cm tall, glabrous. **Pseudobulbs** spaced along a creeping rhizome at intervals of 10–14 mm, globular, somewhat flattened, 5–8 mm high, 6–10 mm in diameter, 1-leaved. **Leaf** sessile, fleshy, duplicate, oblong-lanceolate, acute, 10–21 mm long. **Inflorescences** 1-flowered, scape 1–2 mm long, pedicel and ovary c. 4 mm long, bract 1–2 mm long, hyaline, cup-shaped. **Flowers** light yellow, the lip deeper yellow. Sepals spreading, oblong-elliptic, acute, 5-veined, 7–8 × 2.3–3 mm. Petals narrowly ovate, acute, 1-veined, 2.5–3 × c. 1.5 mm; lip oblong, obtuse, 2.3–2.8 × c. 1 mm, with forward curved auricles at the base; column c. 1.7 mm long (excluding its anther process), stelids insignificant, anther process fleshy, oblong, somewhat spoon-shaped, c. 1.6 mm long, apex emarginate.

Distribution. Peninsular regions of Thailand and Myanmar.

Ecology and phenology. Very little habitat information on this species is available. The specimen from Myanmar was growing as an epiphyte at an elevation of about 400 m. In neighbouring Thailand the specimen *Kerr 0361* (BK) was collected in savanna (Seidenfaden & Smitinand, 1961: 388). In the distribution area of the species flowering has been recorded in November and January.

Material examined. MYANMAR. **Taninthayi Region:** Yebyu Township, 22 Nov 2012, *Saw Lwin, Pan Khet Khet & Zaw Oo Wai TNRO 162* (SING, SING [spirit], herbarium of Taninthayi Nature Reserve Education Centre).

Notes. The specimen from Myanmar, *Lwin et al. TNRO 162*, matches Seidenfaden's type very well in its structure (Seidenfaden, 1976a). However, it differs in the slightly larger size of the leaf and flowers: leaf 20–21 mm long (as opposed to 10–14 mm in the type); sepal c. 8 mm long (as opposed to c. 7 mm in the type); petal c. 3 mm long (as opposed to 2.5–2.8 mm in the type); lip c. 2.8 mm long (as opposed to 2.3–2.5 mm in the type). The epithet *nanum* was not available in *Bulbophyllum* when *Trias nana* was moved into it due to *Bulbophyllum nanum* De Wild.

2. *Dendrobium macrostachyum* Lindl., Gen. Sp. Orchid. Pl. 78 (1830). – *Callista macrostachya* (Lindl.) Kuntze, Revis. Gen. Pl. 2: 655 (1891). – TYPE: Sri Lanka, 1829, *Macrae, J. 17* (holotype K-LINDL! [K000364613]). (Fig. 2A)

Dendrobium stuartii F.M.Bailey, Proc. Roy. Soc. Queensland 1: 12 (1884); Vaddhanaphuti, Wild Orch. Thailand, ed. 4, 125, incl. colour photo (2005); Seidenf. &

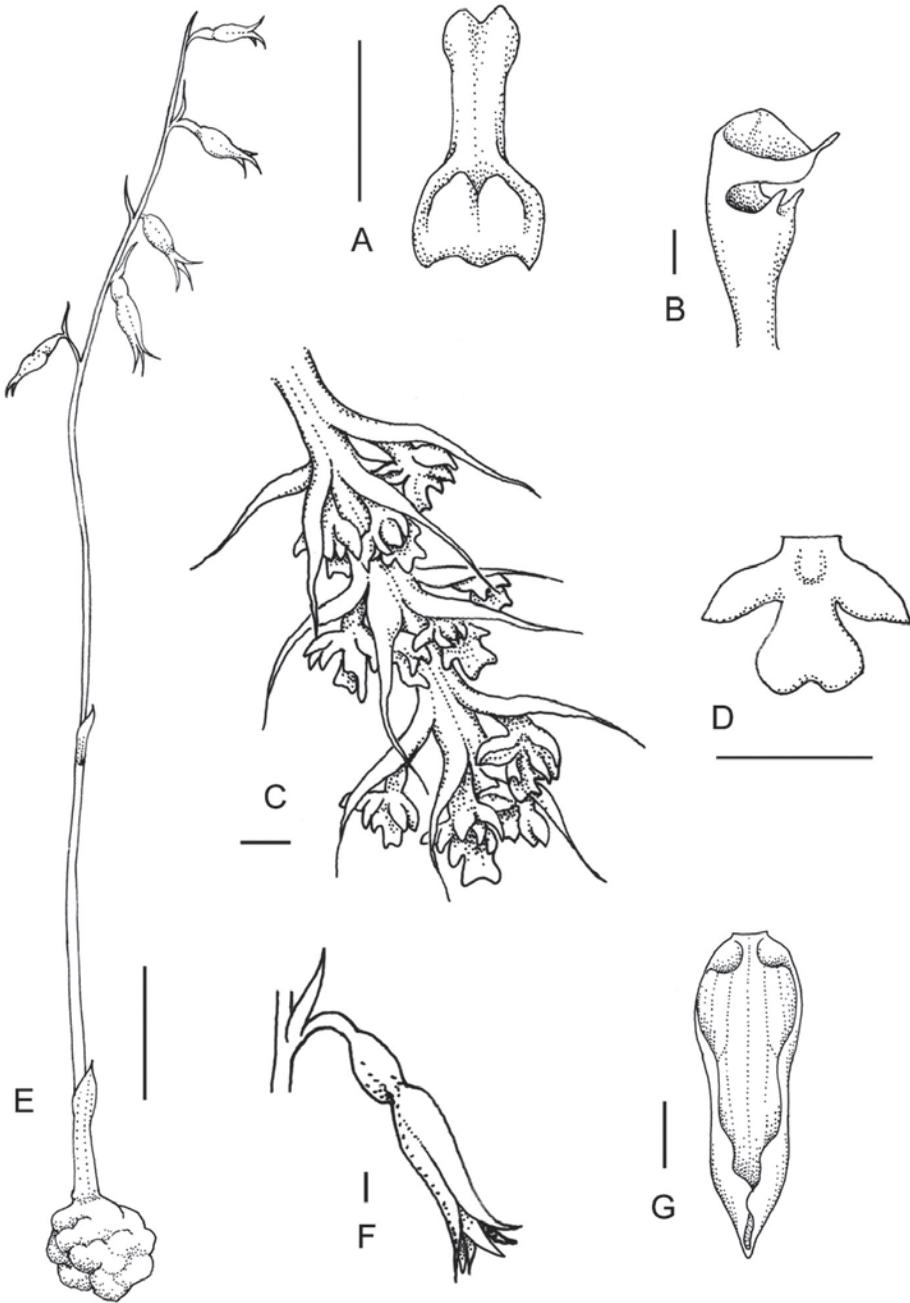


Fig. 1. **A.** Anther of *Bulbophyllum capnophyton* J.J.Verm., Schuit. & de Vogel. From Lwin et al. TNRO 162. **B.** Column of *Micropera thailandica* (Seidenf. & Smitinand) Garay. From Lwin et al. TNRO 61. **C.** Inflorescence of *Oberonia obcordata* Lindl. From Kurzweil & Lwin KL 2664. **D.** Lip of *Oberonia obcordata* Lindl. From Kurzweil & Lwin KL 2664. **E.** Habit of *Stereosandra javanica* Blume. From Lwin et al. TNRO 5. **F.** Flower of *Stereosandra javanica* Blume. From Lwin et al. TNRO 5. **G.** Lip of *Stereosandra javanica* Blume. From Lwin et al. TNRO 5. Scale bars: A–D, F–G = 1 mm, E = 20 mm. (Drawn by Joshua Yang)

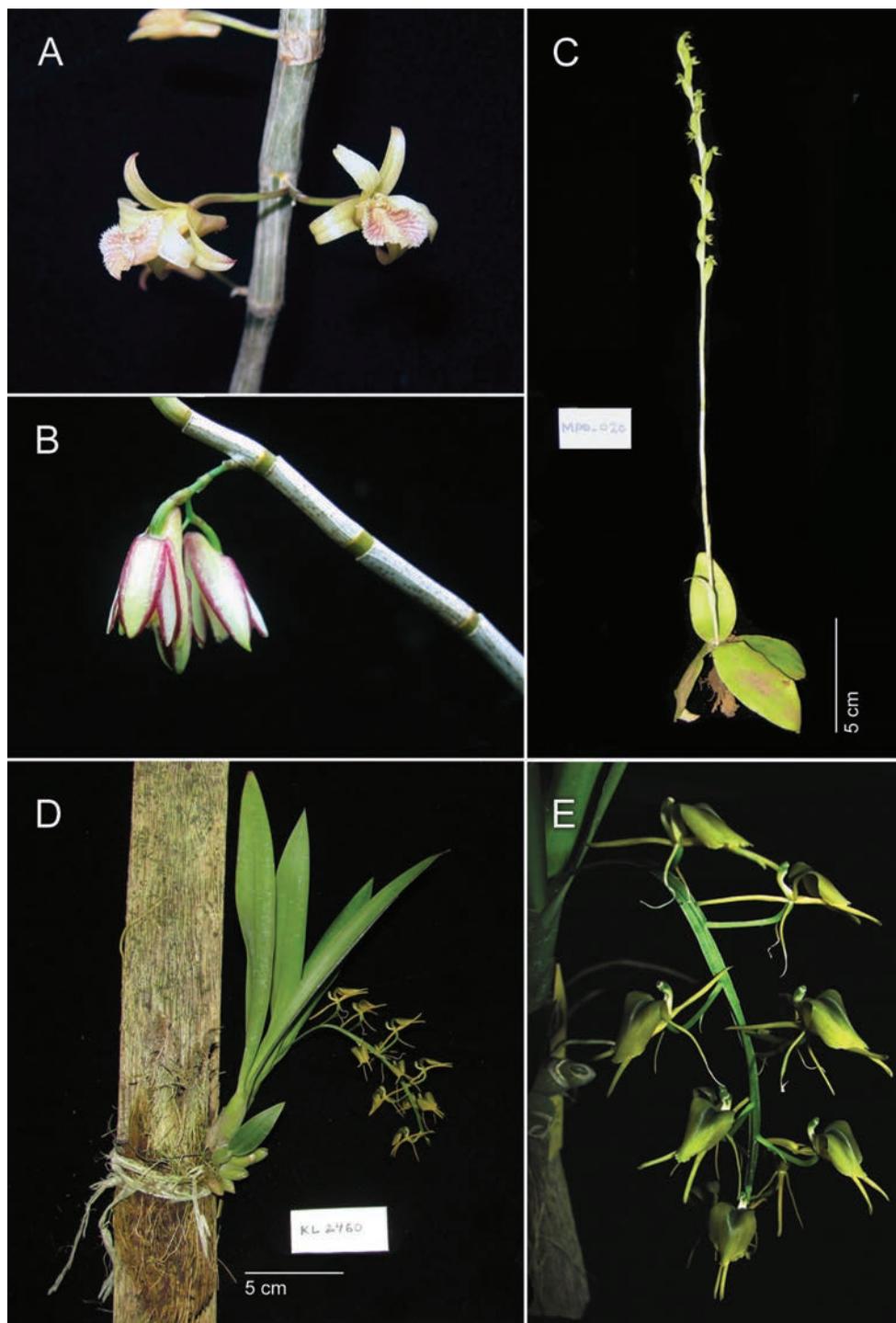


Fig. 2. A. *Dendrobium macrostachyum* Lindl. From Lwin MPO 050. B. *Dendrobium praecinctum* Rchb.f. From Lwin SL 49. C. *Habenaria reniformis* (D. Don) Hook.f. From Lwin et al. MPO 020. D–E. *Liparis distans* C.B. Clarke. From Kurzweil & Lwin KL 2460 (Photos: Saw Lwin)

J.J.Wood, Orchids Penins. Malaysia Singapore 389, fig. 175, pl. 26d (1992). – *Callista stuartii* (F.M.Bailey) Kuntze, Revis. Gen. Pl. 2: 655 (1891). TYPE: Australia, drawing by R.D.Fitzgerald in *Austral. Orch.* 2(3): t. 6 (1888) (neotype designated by Clements, 1989).

Dendrobium tetradon auct. non Rchb.f. ex Lindl.: Seidenf., Opera Bot. 83: 34, fig. 13 (1985).

Herb with slender pseudobulbous and sometimes almost wiry, pendulous stems to 70 cm long, glabrous except for the lip. **Stems** slightly zig-zagged, internodes 2–2.5 cm long, entirely covered by white membranous sheaths, leafy throughout. **Leaves** distichous, sessile, spreading, ovate to oblong-lanceolate, acute or acuminate, 4–8 × 0.9–2.5 cm. **Inflorescences** to 2.5 cm long, with 1–3(–4) flowers; bracts oblong-ovate, acute, 2.5–2.6 × 1.5–1.8 mm. **Flowers** 20–25 mm across, sepals and petals spreading or recurved; whitish to greenish yellow, lip with red-brown or purple veins on the side lobes, ageing to yellow; median sepal oblong-lanceolate, acute, 13–15 × 3.5–4 mm; lateral sepals similar but often slightly longer; mentum c. 6 mm long, narrowly conical; petals elliptic-lanceolate, acute or obtuse, as wide as the sepals, 13–15 × 3.5–4 mm; lip quadrately-ovate and very obscurely 3-lobed, 17–18 × c. 12 mm, unspurred, hairy particularly on the margin and midrib, basal part inrolled around the column, callus in the basal lip portion of three diverging ridges; column 3.5–4 mm long.

Distribution. Widespread in tropical Asia from Sri Lanka, India and the Himalayas to eastern Malesia; also found in northern Australia.

Ecology and phenology. The specimen from Myanmar was growing as an epiphyte on medium-sized road-side trees at an elevation of 1150 m. Elsewhere the species is found in wet and dry low-altitude and montane forest to 1220 m (Jayaweera, 1981; Seidenfaden & Wood, 1992). In the distribution area of the species flowering has been recorded in January and February.

Material examined. MYANMAR. **Mandalay Region:** Kyaukpadaung Township, Jan 2010, *Saw Lwin MPO 050* (SING, SING [spirit]). Very uncommon in this locality, growing in a small population of about 20 individuals.

Notes. A widespread species with rather small flowers in bunches of mostly 1–3 on leafless stem. The taxonomy of this species was previously disputed (Christenson & Wood, 2003), in particular its relationship to *Dendrobium aphyllum* (Roxb.) C.E.C.Fisch., but this has now been clarified (Schuiteman, 2011).

3. *Dendrobium praecinctum* Rchb.f., Gard. Chron., n.s., 7: 750 (1877); N.Pearce & P.J.Cribb, Fl. Bhutan 3(3): 416, pl. 23 [top right] (2002); Jin et al., Acta Bot. Yunnan. 32: 332 (2010). – *Callista praecincta* (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 655 (1891). TYPE: Unlocalised, cult. *Veitch s.n.* (holotype W). (Fig. 2B)

Dendrobium pauciflorum King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64: 332 (1895); Seidenf., Opera Bot. 83: 97, fig. 57, pl. XIIc (1985). – *Dendrobium sikkimense* A.D.Hawkes & A.H.Heller, Lloydia 20: 124 (1957), nom. illeg. – TYPE: India, Sikkim, July 1895, *Pantling, R. 172* (holotype K! [K000943939]).

Herb, pendent stems to 70 cm long, but often much shorter. **Stems** leafy in the distal half, branching from nodes in the upper part of the stem, internodes 1.4–4 cm long. **Leaves** distichous, to 12, lanceolate or linear-lanceolate, acute, sessile, 3–9 × 0.7–1.2 cm. **Inflorescences** axillary, arising from apical nodes of the leafless stem, with 1–5 flowers; floral bracts ovate, obtuse, c. 2 mm long. **Flowers** to 20 mm long, not opening widely; yellow to whitish yellow, sepals and petals with prominent purple marginal areas, midlobe and side lobes of lip with red spots; pedicel and ovary 5–10 mm long; median sepal lanceolate or lanceolate-ovate, obtuse, 3–10 × up to 4 mm; lateral sepals ovate, weakly falcate, keeled, 4–10 × 2–4 mm; petals lanceolate-ovate, usually ciliolate, 4–10 mm long and up to 3 mm wide; lip rather deeply 3-lobed, somewhat clawed, 4–12 × 3–8 mm, hispid-fimbriate on the margins; lateral lobes narrow, tooth-like; mid-lobe oblong, flat; disk with three prominent, thickened veins; column broad, with a foot 2–7 mm long.

Distribution. Northeastern India and eastern Himalayas to Myanmar, Thailand and southwestern China (Yunnan).

Ecology and phenology. Habitat information of the specimen from Myanmar has not been recorded. In Sikkim and Bhutan the plants are epiphytic in evergreen broad-leaved forest at elevations ranging from 1000 to 1330 m, and rarely up to 1850 m (Pearce & Cribb, 2002). In the distribution area of the species flowering has been recorded in June and July.

Material examined. MYANMAR. **Shan State:** Ho Pone Township, 2011, *Saw Lwin SL 49* (herbarium of the Myanmar Floriculturist Association).

Notes. Easily recognised by the prominent purple edges on the pale yellow flowers and the rather deeply 3-lobed lip which is strongly hairy to fringed on the margins. As far as we are aware no vouchered record of the occurrence of *Dendrobium praecinctum* in Myanmar has previously been made. However, a photograph of an unidentified *Dendrobium* species from Putao in northern Kachin State was published by Nyan Tun (2014: 254) and was later referred to this species by Paul Ormerod (pers. comm.). Interestingly, the distribution ‘Myanmar’ was also listed in a publication newly reporting *Dendrobium praecinctum* in Yunnan, China (Jin et al., 2010), but no specimen from Myanmar was cited and therefore this listing appears to be based on a sight-record only.

4. *Habenaria reniformis* (D.Don) Hook.f., Fl. Brit. India 6: 152 (1890); Seidenf., Dansk Bot. Ark. 31(3): 132, fig. 85 (1977); S.C.Chen & P.J.Cribb in Z.Y.Wu et al. (eds), Fl. China 25: 149 (2009); Kurzweil, Fl. Thailand 12(1): 133, fig. 76 (2011). – *Listera reniformis* D.Don, Prodr. Fl. Nepal.: 28 (1825). – *Neottia reniformis* (D.Don) Spreng., Syst. Veg. 3: 707 (1826). – TYPE: Nepal, 1821, *Wallich, N. 7067* (lectotype K-W!, designated by Seidenfaden (1977)). (Fig. 2C)

Habenaria clovisii Gagnep., Bull. Soc. Bot. France 78: 68 (1931). – TYPE: Cambodia, Stung-treng, 1866–1868, *Thorel, C. 2143* (syntypes P! [P00439699, P00439700]); Vietnam, near Dalat, 17 Oct 1924, *Evrard, F. 1480* (syntype P! [P00439698]).

Herb to 20 cm tall, glabrous. **Tubers** globose to oblong, to 1 cm in diameter, fleshy. **Stems** slender, wiry, to 1 mm in diameter. **Leaves** 2–4, basal and addressed to the substrate, orbicular, elliptic or ovate, acute or obtuse, 1.4–4 × 1–2.7 cm. **Inflorescences** lax, with 3–7(–10) flowers; with or without a spreading amplexicaul leafy bract near the base; sterile bracts 4–6(–9), mostly erect, lanceolate, acuminate, 0.5–1.8 cm long; rachis 3–8 cm long; floral bracts lanceolate or ovate-lanceolate, acuminate, 7–10 × 1.5–2 mm, much shorter than the ovary. **Flowers** 6.5–9 mm in diameter, resupinate; green, greenish-white, yellow-green or brownish; ovary twisted mainly in its basal portion, cylindric-fusiform, indistinguishable from the pedicel, 13–18 mm long; median sepal erect, concave, ovate or ovate-oblong, obtuse, 3-veined, 3.5–4(–5) × 1.5–3 mm; lateral sepals spreading or reflexed, obliquely ovate-lanceolate, subacute or acute, 3-veined, 3.5–4(–6) × 1.7–3.4 mm; petals forming a hood with the median sepal, falcately elliptic-lanceolate or linear-triangular, subacute or obtuse, 1-veined, 3–4.5 × 0.8–1.6 mm, sometimes widened at the base; lip 4.5–10 mm long, either unlobed and linear, or 3-lobed with filiform side lobes to 29 × 0.1–0.3 mm; spur either present or absent, if present saccate or cylindric and to 7.6 mm long; column 1–2.3 mm long; anther canals insignificant; stigmas subcylindric or clavate, 1.5–2 mm long. **Capsule** fusiform-elliptic, 9.5–10 × 2.2–3 mm.

Distribution. India and Nepal to Indochina and southern China; also recorded from northern Sumatra.

Ecology and phenology. No ecological information on the specimens from Myanmar is available except that the species grows terrestrially. Elsewhere found in grassy places in forests, in bamboo thicket and scrubland at elevations ranging from 150 to 825 m, sometimes also in cracks of limestone rocks (Chen et al., 2009; Kurzweil, 2011). In the distribution area of the species flowering has been recorded in August, October and November.

Material examined. MYANMAR. **Mandalay Region:** Kyaukpadaung Township, 26 Oct 2009, *Saw Lwin, Pan Khet Khet & Sandar Maung MPO 020* (SING). Growing in a small population.

Notes. *Habenaria reniformis* is characterised by small greenish or brownish flowers with sepals mostly less than 4.5 mm long. The lip shape is variable, ranging from entire to 3-lobed (Banerji & Pradhan, 1984: 36; Chen et al., 2010: 193; Baretto et al., 2011: 260), and the spur can be absent or cylindrical and up to 7.6 mm long (Seidenfaden, 1977: 133; Kurzweil, 2011: 133; Baretto et al., 2011: 260). The rather robust anther and the long protruding stigmas are characteristic of the species (Seidenfaden, 1977).

In the collection from Myanmar, *Lwin et al. MPO 020*, the petals are basally widened to more than double their width above. The petals and the lip are basally united with the column. The lips of the two plants in this collection are mostly unlobed. The only exception is one flower which has an asymmetric 3-lobed lip and appears to be abnormally developed: one side lobe is linear-filiform and 4 mm long, and the other one semicircular and only 0.5 mm long.

Habenaria reniformis is very close to *H. humidicola* Rolfe and *H. poilanei* Gagnep., both of which differ by having larger leaves, consistently deeply 3-lobed lips and longer spurs. The *Habenaria diphylla* (Nimmo) Dalzell group is also very close. The relationships among these species are not fully resolved and it is not yet clear if all of these taxa can be maintained as separate species. As already noted by Seidenfaden (1977), further research is needed to reach a final position on their status.

5. *Liparis distans* C.B. Clarke, J. Linn. Soc., Bot. 25: 71 (1889); Seidenf., Dansk Bot. Ark. 31(1): 76, fig. 50 (1976); N. Pearce & P.J. Cribb, Fl. Bhutan 3(3): 212 (2002); S.C. Chen et al. in Z.Y. Wu et al. (eds), Fl. China 25: 225 (2009). – *Leptorkis distans* (C.B. Clarke) Kuntze, Revis. Gen. Pl. 2: 671 (1891). – *Stichorkis distans* (C.B. Clarke) Marg., Szlach. & Kulak, Acta Soc. Bot. Poloniae 77: 38 (2008). – TYPE: India, Nagaland, Kohima, 21 Oct 1885, Clarke, C.B. 41071 (syntype K! [K000387820], CAL); Kohima, Clarke, C.B. 41099 (syntype K, not found); Kohima, 21 Oct 1885, Clarke, C.B. 41105 (syntype K! [K000387819]); Kohima, 21 Oct 1885, Clarke, C.B. 41574 (syntype K! [K000387821]). (Fig. 2D–E)

Liparis macrantha Hook. f., Hooker's Icon. Pl. 19: t. 1854 (1889). – TYPE: India, Nagaland, Prain, D. 44 (lectotype K, designated by Seidenfaden (1976b)).

Liparis yunnanensis Rolfe, J. Linn. Soc., Bot. 36: 8 (1903). – TYPE: China, Yunnan, Henry, A. 10485 (holotype K! [K000364665]).

Liparis oxyphylla Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 63 (1919). – TYPE: China, Yunnan, Henry, A. 12593 (lectotype K! [K000364666], designated here; isolectotype E! [E00286229]).

Herb mostly 20–40 cm tall, pseudobulbous, glabrous. **Pseudobulbs** clustered, subcylindric or narrowly ovoid, 2–6(–9.5) cm long, slightly compressed. **Leaves** 2, distichous, shortly and indistinctly petiolate, articulate, spreading, narrowly oblanceolate, acute or acuminate, 15–35 × 1–2.8 cm. **Inflorescences** arcuate or

pendulous, 15–39 cm long, lax, with up to 12 distant flowers; peduncle somewhat compressed, narrowly winged, with 2–3 sterile bracts; floral bracts narrowly triangular, 6–12 mm long. **Flowers** medium-sized, olive-green to dull yellow; pedicel and ovary 14–22 mm long; sepals narrowly lanceolate, obtuse, mostly 10–16 × 3–5 mm, margins often revolute; petals linear-filiform, obtuse, 10–16 × c. 2 mm; lip ovate, obovate or elliptic, 10–14 × 10–11 mm, basal part a short claw, margin irregularly denticulate, rounded or obtuse at the apex, with a 2-lobed callus at the base, unspurred; column arcuate, 5–6 mm long, narrowly winged in the upper part. **Capsule** ellipsoid or narrowly obovoid-oblong, 12–18 × 6–7 mm.

Distribution. Widespread from northeastern India and the eastern Himalayas to Myanmar, Indochina and southwestern and southern China. Also in the Philippines.

Ecology and phenology. The specimen from Myanmar was growing as an epiphyte in primary mountain forest. Elsewhere the species is lithophytic or epiphytic in various forest types at elevations up to 2400 m (Chen et al., 2009). In Vietnam often found in limestone regions (Averyanov, 2013). In the distribution area of the species flowering has been recorded between September and February.

Material examined. MYANMAR. **Kachin State:** Border region of Putao and Nongmung Townships, 7 Mar 2007 (fruiting at the time of collection; flowering in cultivation), *Kurzweil, H. & Saw Lwin* KL 2460 (herbarium of the Myanmar Floriculturist Association).

Notes. Distinct with its large flowers in lax inflorescences and the wide lip with denticulate margins.

6. *Liparis resupinata* Ridl., J. Linn. Soc., Bot. 22: 290 (1886); Seidenf., Dansk Bot. Ark. 31(1): 88, fig. 60 (1976); N.Pearce & P.J.Cribb, Fl. Bhutan 3(3): 209, pl. 7 [top right] (2002); S.C.Chen et al. in Z.Y.Wu et al. (eds), Fl. China 25: 228 (2009). – *Leptorkis resupinata* (Ridl.) Kuntze, Revis. Gen. Pl. 2: 671 (1891). – *Platystyliparis resupinata* (Ridl.) Marg., Richardiana 7: 39 (2007). – TYPE: India, Darjeeling, 1844, *Griffith, W. s.n.* (syntype K-LINDL! [K000873787]); India, Khasia, *sine collector* 986 (syntype K-LINDL! [K000873786]); India, Khasia, *Griffith, W. s.n.* (syntype K-LINDL! [K000873788]); India, Sikkim, 5000 ft [1524 m], *Hooker, J.D. 90* (syntype K-LINDL! [K000873785]); India, Khasia, *Lobb, T. 122* (syntype K-LINDL! [K000873784]); India, Khasia, *Hooker, J.D. & Thompson, T. 90* (syntype K-LINDL! [K000873783]). (Fig. 3A–B)

Liparis ridleii Hook.f., Hooker's Icon. Pl. 19: t. 1887 (1889). – *Leptorkis ridleii* (Hook.f.) Kuntze, Revis. Gen. Pl. 2: 671 (1891). – TYPE: India, Sikkim, 3000–5000 ft [914–1524 m], *Hooker, J.D. 89* (syntype K-LINDL! [K000873782]); India, Sikkim, *Hooker, J.D. s.n.* (syntype K-LINDL! [K000387829]); *Griffith's collector, Kew Distr. 5081* (syntype K); India, Darjeeling, 5500 ft [1676 m], 11 Mar 1875, *Clarke, C.B.*

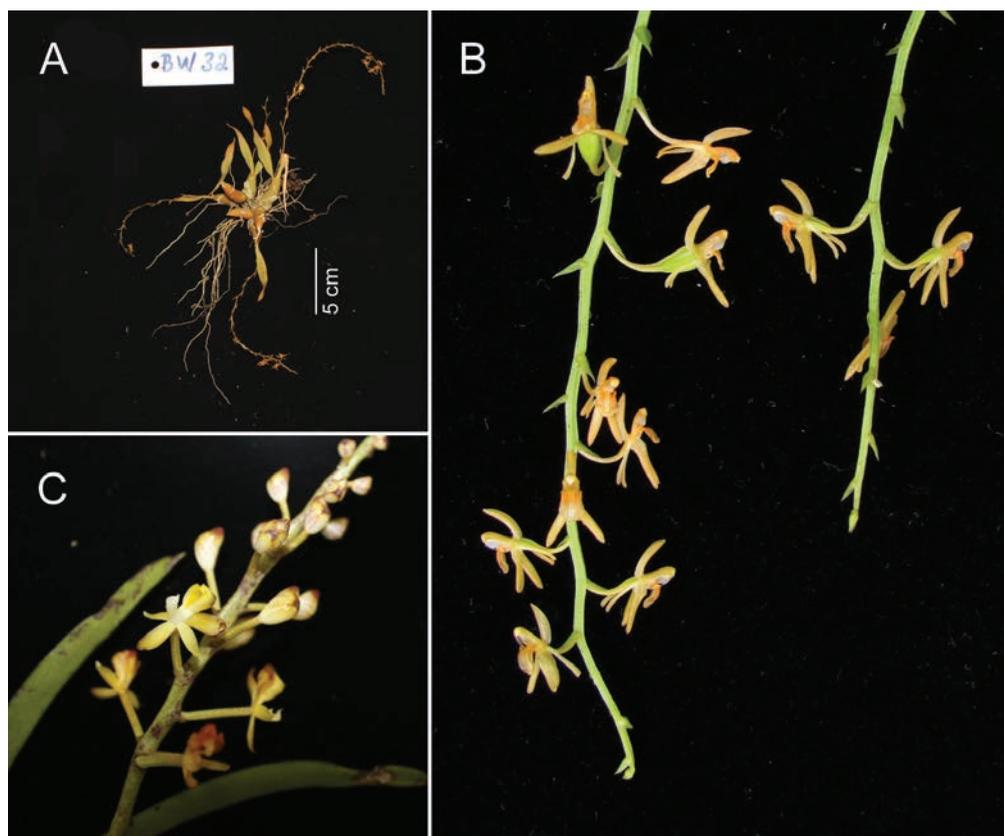


Fig. 3. A–B. *Liparis resupinata* Ridl. From *Lasi Bawk Naw BW 32*. C. *Micropera thailandica* (Seidenf. & Smitinand) Garay. From *Lwin et al. TNRO 61* (Photos: A, H. Kurzweil; B–C, Saw Lwin)

27235 (syntype K-LINDL! [K000387827]; India, Darjeeling, 5000 ft, [1524 m], 2 Mar 1876, *Clarke, C.B.* 27088 (syntype K-LINDL! [K000387828]).

Herb 12–28 cm tall, with densely arranged pseudobulbous stems. **Pseudobulbs** 1.5–5 × 0.3–0.6 cm, made up of a few nodes, with leaves in the upper half. **Leaves** 2–4, papery, sessile, narrowly oblong to linear-lanceolate, acute to acuminate, 6–13 × 0.4–1.2 cm, articulate. **Inflorescences** arching or pendent, lax, 10–50-flowered; peduncle slightly zig-zagged, 5–8 cm long, with several sterile bracts 0.5–0.9 cm long; rachis 8–18 cm long; floral bracts lanceolate, acute, concave, 3–5 × 1–1.5 mm. **Flowers** to 2 mm wide and 5 mm high when seen from the front; in the specimen from Myanmar pale greenish orange-yellow with orange on the basal part of the lip including its auricles, in other parts of the distribution area reported as pale green, greenish yellow, golden brownish or creamy; pedicel and ovary 5–7 mm long; sepals subequal, spreading, oblong or elliptic-oblong, obtuse or acute, 1-veined, 3–4 × 1–1.8 mm; petals reflexed downwards, narrowly linear, obtuse, 2–3.5 × c. 0.3 mm; lip knee-

like, bent with the lower portion erect and parallel to the column and the distal portion spreading forwards, broadly elliptic-oblong or broadly ovate-oblong, 2.5–3 mm long, unspurred, base auriculate and with a bilobed callus, apex obtuse, margins incurved, forming a pouch; column erect, 1–2.8 mm long, with two suborbicular wings, each with a prominent pendulous filiform appendage. *Capsule* obovoid-oblong, c. 5×2 –3 mm.

Distribution. India and Himalayas to Indochina and southwestern China (Xizang and Yunnan). Also recorded in the Gaoligongshan Mountains in western Yunnan Province (Jin et al., 2009), which is very close to where our specimen from Myanmar was collected.

Ecology and phenology. The specimen from Myanmar was growing as an epiphyte in degraded mixed broad-leaved forest with much bamboo and moss-covered trees at an elevation of 2100 m. Elsewhere the species is found in evergreen broad-leaved and coniferous forest from 1500 to 2500 m (Pearce & Cribb, 2002; Chen et al., 2009; Averyanov, 2013). In the distribution area of the species flowering has been recorded from October to March.

Material examined. MYANMAR. **Kachin State:** Waingmaw Township, 10 Mar 2011, *Stephen Lasi Bawk Naw BW 32* (herbarium of the Myanmar Floriculturist Association). Locally common.

Notes. One of the epiphytic *Liparis* species with few-leaved pseudobulbs. Well-characterised by the shape of the small flowers that have a broadly oblong lip with an obtuse and pouched apex and the column with characteristic pendulous filiform appendages on the wings.

7. *Micropera thailandica* (Seidenf. & Smitinand) Garay, Bot. Mus. Leaflet 23: 187 (1972); Seidenf., Opera Bot. 95: 126, fig. 72 (1988); Vaddhanaphuti, Wild Orch. Thailand, ed. 4, 186, incl. colour photo (2005). – *Camarotis thailandica* Seidenf. & Smitinand, Orch. Thailand (Prelim. List) 712, fig. 529 (1965). – TYPE: Thailand, Satun Province, Feb 1961, *Seidenfaden, G. & Smitinand, T. GT 4118* (holotype C). (Fig. 1B, 3C)

Herb with monopodial growth. *Stems* to 30 cm long, glabrous, covered by the dark, rugose bases of the leaves. *Leaves* about 10, distichous, spaced at intervals of about 2 cm, flat, conduplicate, oblong-linear, apex unequally bilobed with rounded lobes, 8 – 15×1 – 1.5 cm, fleshy. *Inflorescences* 17–23 cm long, several-flowered; peduncle 10–15 cm long, with 2–3 sheathing sterile bracts 0.3–0.4 cm long; rachis 8–10 cm long, unbranched; bracts broadly triangular, obtuse, 2 – $2.5 \times c. 4$ mm, fleshy. *Flowers* yellow or light orange-yellow, lip base sometimes white, sepals sometimes tipped with brown, column white or cream; median sepal elliptic-ovate, apex broadly rounded,

to 9×3.5 mm, concave, fleshy; lateral sepals similar but somewhat shorter and wider, adnate to the column-foot; petals elliptic-lanceolate, acute, to 8×3.3 mm; lip 7 mm long, deeply boat-shaped with a conical spur 4–5 mm long in its distal part, obscurely 3-lobed, very fleshy; midlobe triangular, c. 2×2 –2.5 mm; side lobes inconspicuous, broadly triangular, edges minutely serrate; callus a triangular tongue at the base of the midlobe, split at the end, below this a rounded callus at the backwall of the spur (terminology after Seidenfaden, 1988); spur with a longitudinal septum; column c. 6 mm long, ventrally with a sudden horizontal edge with two short lateral horns below the stigma, above which the column narrows to about one half of its width below, higher up widening again under the anther and the rostellum, rostellum beak c. 2 mm long, not or only slightly twisted.

Distribution. Myanmar, Thailand and Vietnam.

Ecology and phenology. The specimen from Myanmar was found in primary evergreen forest at about 220 m, growing as an epiphyte on tall trees. In Thailand recorded at elevations of between 700 and 1000 m (Seidenfaden, 1988). In the distribution area of the species flowering has been recorded in February and March.

Material examined. MYANMAR. **Taninthayi Region:** Yebyu Township, 712 ft [217 m], 25 Mar 2012, *Saw Lwin, Pan Khet Khet & Zaw Oo Wai TNRO 61* (SING, SING [spirit], herbarium of the Myanmar Floriculturist Association). Locally common.

Notes. This species is unmistakable in its lip and column structure. It is known from several collections in Thailand and is also found in Vietnam; in addition it is here newly reported for Myanmar. Seidenfaden & Smitinand (1965) compared it with the Malaysian *Camarotis adnata* (Ridl.) Holttum (now included in *Micropera fuscolutea* (Lindl.) Garay), which is superficially similar, but this species differs in details of its lip and column (Seidenfaden & Wood, 1992).

8. *Oberonia obcordata* Lindl., *Fol. Orchid.* 8: 7 (1859); Seidenf., *Dansk Bot. Ark.* 33(1): 30, fig. 19 (1978); N.Pearce & P.J.Cribb, *Fl. Bhutan* 3(3): 230 (2002); S.C.Chen et al. in Z.Y.Wu et al. (eds), *Fl. China* 25: 240 (2009). – *Malaxis obcordata* (Lindl.) Rchb.f. in W.G.Walpers, *Ann. Bot. Syst.* 6: 216 (1861). – *Iridorkis obcordata* (Lindl.) Kuntze, *Revis. Gen. Pl.* 2: 669 (1891). – TYPE: India, Sikkim, *Hooker, J.D. & Thompson, T. 112* (syntype K-LINDL! [K000974237]); India, Darjeeling, 1844, *Griffith, W. s.n.* (syntype K-LINDL! [K000974238]); India, Khasia, *Griffith, W. s.n.* (syntype K-LINDL! [K000974231]). (Fig. 1C–D, 4A)

Oberonia treutleri Hook.f., *Hooker's Icon. Pl.* 18: t. 1786 (1888). – *Iridorkis treutleri* (Hook.f.) Kuntze, *Revis. Gen. Pl.* 2: 669 (1891). – TYPE: India, Sikkim, 6000 ft [1829 m], 1 Dec 1874, *Treutler, W.J. 1151* (holotype K! [K000387726]).

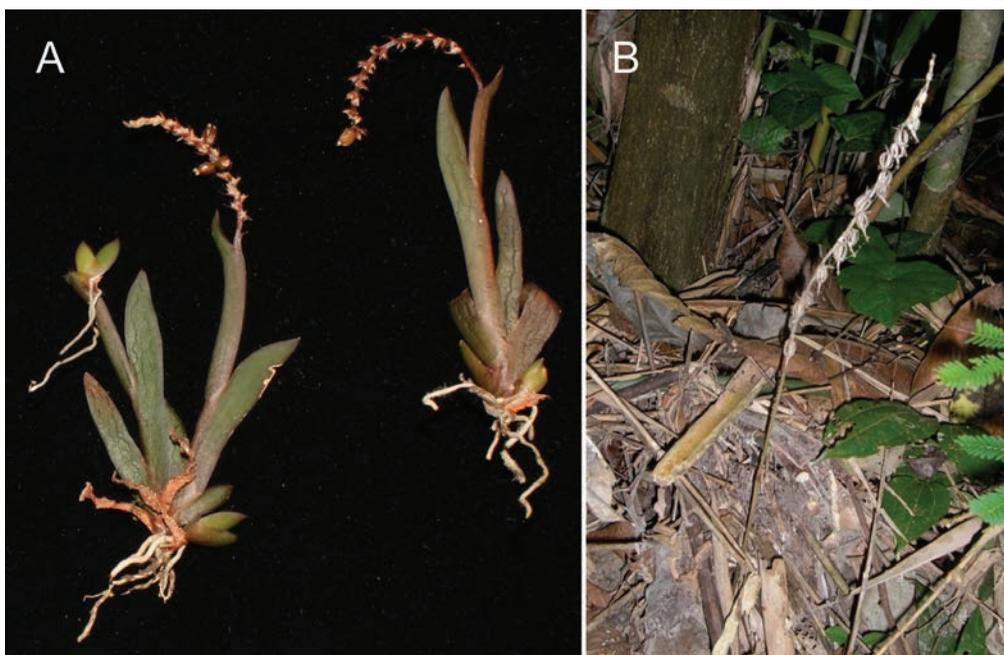


Fig. 4. **A.** Fruiting specimens of *Oberonia obcordata* Lindl. From *Lasi Bawk Naw BW 8*. **B.** Fruiting specimen of *Stereosandra javanica* Blume in its natural habitat in southern Myanmar. From *Lwin et al. TNRO 5* (Photos: A, H. Kurzweil; B, Saw Lwin)

Herb to 9 cm tall, with leafy stems to 4 cm tall, glabrous. **Leaves** (3–)5–8, distichous, equitant, bilaterally compressed, fleshy, linear-oblong, slightly falcate, acute to acuminate, mostly $1.5\text{--}5 \times 0.5\text{--}0.9$ cm, base not articulate. **Inflorescences** terminal, densely or subdensely many-flowered, 4.5–7.5 cm long; peduncle connate to lower part of uppermost leaf and therefore appearing to arise from its blade, with few to many erect sterile bracts about 0.5 cm long; rachis slender, 1.5–6 cm long; floral bracts verticillate, lanceolate or ovate-lanceolate, apex acuminate-caudate, 2–4 mm long, much longer than the flowers, margin slightly erose. **Flowers** 1–1.5 mm in diameter; reddish brown or red; pedicel and ovary 0.5–1.5 mm long; median sepal ovate, acute, to 1.1×0.6 mm; lateral sepals broadly ovate, obtuse, to 1.1×1 mm; petals linear-oblong, subacute, to 0.9×0.5 mm; lip 3-lobed, not spurred, to 1.6 mm long; side lobes divergent, ovate-oblong, obtuse, to 0.5 mm long; midlobe obcordate or reniform, emarginate, to 1×0.8 mm, with a prominent basal callus; column to 0.5 mm long. **Capsule** ovoid, to 5×4 mm.

Distribution. Himalayas, northeastern India, Myanmar and southwestern China to Thailand.

Ecology and phenology. The specimens from Myanmar were found in forest at various elevations (see below). Elsewhere either epiphytic or lithophytic, usually at elevations

up to 3000 m (Pearce & Cribb, 2002; Chen et al., 2009). In the distribution area of the species flowering has been recorded between July and December and in March. Flowering and fruiting plants can sometimes be found at the same time.

Material examined. MYANMAR. **Kachin State:** Putao Township, undisturbed evergreen forest, 1500 m, 21 Mar 2009, *Kurzweil, H. & Saw Lwin KL 2664* (SING); Waingmaw Township, degraded mixed forest, 2200-2300 m, 9 Mar 2011, *Stephen Lasi Bawk Naw BW 8* (RAF, herbarium of the Myanmar Floriculturist Association). Locally common in both localities.

Notes. Very distinct due to the inflorescence which is connate to the uppermost leaf, the long and whorled floral bracts, and the small flowers with their large lip side lobes and the basal lip callus.

9. *Stereosandra javanica* Blume, Mus. Bot. 2: 176 (1856); Seidenf., Dansk Bot. Ark. 32(2): 173, fig. 107 (1978); Hedge & Rao, Indian J. Forest. 10(3): 196 (1987); Seidenf. & J.J. Wood, Orchids Penins. Malaysia Singapore 143, fig. 60 (1992); N.Pearce & P.J.Cribb, Fl. Bhutan 3(3): 582 (2002); S.C.Chen et al. in Z.Y.Wu et al. (eds), Fl. China 25: 207 (2009); H.A.Pedersen, Fl. Thailand 12(2): 632, fig. 342 (2014). – TYPE: Western Java, Bantam Province, *Kuhl, H. & van Hasselt, J.C.A. s.n.* (? holotype L!). (Fig. 1E–G, 4B)

Stereosandra pendula Kraenzl., Bot. Tidsskr. 24: 11 (1901). – TYPE: Thailand, South-Eastern, Ko Chang, *Schmidt, J. s.n.* (not known to exist; see Seidenfaden, 1978: 173).

Herb terrestrial, holomycotrophic, 15–40 cm tall, glabrous. **Corm** ellipsoid or ovoid, 1.5–4.4 × 0.6–2.4 cm. **Stems** leaf-less, slender to robust, 1–4 mm in diameter; with 2–7 erect and sheathing sterile bracts 1.1–1.8 cm long. **Inflorescences** laxly 3- to many-flowered; rachis 3–19 cm long; floral bracts lanceolate, acuminate, 3.5–11.6 × 1.2–4.3 mm, mostly shorter than the ovary. **Flowers** resupinate; white or cream with purple markings and purple-tipped sepals, petals and lip; pedicel and ovary distinct from each other, ovary ellipsoid, 3–8.2 mm long, pedicel 1.5–5 mm long; sepals lanceolate, acute to acuminate, 8–10.1 × 1.6–2.2 mm; petals similar, linear-lanceolate, acute to acuminate, 7–9.2 × 2.2–2.6 mm; lip ovate-lanceolate, obtuse to subacuminate, entire to irregularly undulate-crenate, 5–8 × 2.3–3.5 mm, concave; with two ellipsoid wart-like calli at the base; column incurved, 3–4.2 mm long. **Capsule** ellipsoid to subspherical, 5–13 × 3–7 mm.

Distribution. Widespread from the eastern Himalayas through the whole of tropical and subtropical Asia to New Guinea and the islands of the southwestern Pacific Ocean (east to Samoa).

Ecology and phenology. The specimens from Myanmar were found in bamboo-rich hill evergreen forest near a stream at an elevation of 180 m. Elsewhere the species is

found in primary evergreen forest from 100 to 1500 m (Seidenfaden & Wood, 1992; Chen et al., 2009; Pedersen, 2014). In the distribution area of the species flowering occurs mostly between March and June but has also been recorded between December and February. At the locality in southern Myanmar both flowering and fruiting plants were seen at the same time.

Material examined. MYANMAR. **Taninthayi Region:** Yebyu Township, 23 Mar 2012, *Saw Lwin, Pan Khet Khet & Zaw Oo Wai TNRO 5* (SING, SING [spirit]). Locally common.

Notes. This is a new generic record for the country. Given its overall distribution (tropical Asia from Thailand and Peninsular Malaysia eastwards to New Guinea; Pridgeon et al., 2005: 528) the occurrence of *Stereosandra* in Myanmar is not surprising. In neighbouring Thailand *Stereosandra javanica* is also found in areas adjacent to the border with Myanmar. Known localities in southern and southwestern Thailand are the provinces of Ranong and Phetchaburi, both bordering Myanmar's Taninthayi Region where our specimen was collected. We suggest that *Stereosandra javanica* may be more widespread in the southern part of Myanmar, but has probably been overlooked because of its inconspicuous appearance.

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References

- Averyanov, L. (2013). The orchids of Vietnam illustrated survey. Part 4. *Turczaninowia* 16(1): 5–163.
- Banerji, M.L. & Pradhan, P. (1984). *The Orchids of Nepal Himalaya*. Liechtenstein, Vaduz: J. Cramer, A.R. Gantner Verlag Kommanditgesellschaft.
- Baretto, G., Cribb, P.J. & Gale, S. (2011). *The Wild Orchids of Hong Kong*. Malaysia, Kota Kinabalu: Natural History Publications (Borneo) & China, Hong Kong: Kadoorie Farm and Botanic Garden.
- Chen, S.-C., Liu, Z.J., Zhu, G.H., Lang, K.-Y., Tsi, Z.-H., Luo, Y.B., Jin, X.H., Cribb, P.J., Wood, J.J., Gale, S.W., Ormerod, P., Vermeulen, J.J., Wood, H.P., Clayton, D. & Bell, A. (2009). Orchidaceae. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds) *Flora of China*, vol. 25: 1–570. China, Beijing: Science Press & USA, St. Louis: Missouri Botanical Garden Press.

- Chen, S.-C., Liu, Z.J., Zhu, G.H., Lang, K.-Y., Tsi, Z.-H., Luo, Y.B., Jin, X.H., Cribb, P.J., Wood, J.J., Gale, S.W., Ormerod, P., Vermeulen, J.J., Wood, H.P., Clayton, D. & Bell, A. (2010). Orchidaceae. In: Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds) *Flora of China*, vol. 25, illustrations: 1–666. China, Beijing: Science Press & USA, St. Louis: Missouri Botanical Garden Press.
- Christenson, E. & Wood, H. (2003). The mystery of *Limodorum aphyllum* – Resolving lingering taxonomic problems concerning two dendrobiums. *Orchids (West Palm Beach)* 72: 774–777.
- Clements, M.A. (1989). Catalogue of Australian Orchidaceae. *Austral. Orchid Res.* 1: 1–160.
- Jayaweera, D.M.A. (1981). Orchidaceae. In: Dassanayake, M.D. & Fosberg, F.R. (eds) *A revised Handbook to the Flora of Ceylon*, vol. 2. India, New Delhi: Amerind Publishing Co.
- Jin, X.-H., Zhao, X.-D. & Shi, X.-C. (2009). *Native Orchids from Gaoligongshan Mountains, China*. China, Beijing: Science Press.
- Jin, X.-H., Dai, Z.-Q., Liu, Q.-Y. & Ju, X.-Y. (2010). Miscellaneous taxonomic notes on Orchidaceae from China. *Acta Bot. Yunnan.* 32: 331–333.
- Kurzweil, H. (2011). *Habenaria*. In: Santisuk, T. & Larsen, K. (eds) *Flora of Thailand*, vol. 12(1): 79–149. Thailand, Bangkok: The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation.
- Nyan Tun (2014). *Wild Orchids of Myanmar*. Myanmar, Yangon: Daw Tin Tin Aye (Green Leaf Publishing House).
- Ormerod, P. & Sathish Kumar, C. (2003). Orchidaceous additions to the flora of Burma (Myanmar). *Rheedea* 13: 43–50.
- Ormerod, P. & Sathish Kumar, C. (2008). Orchidaceous additions to the flora of Myanmar 2. *Rheedea* 18: 75–80.
- Pearce, N.R. & Cribb, P.J. (2002). *Flora of Bhutan: Including a record of plants from Sikkim and Darjeeling*, vol. 3(3), *The Orchids of Bhutan*. UK: Royal Botanic Garden Edinburgh & Bhutan: Royal Government of Bhutan.
- Pedersen, H.Æ. (2014). *Stereosandra*. In: Santisuk, T. & Balslev, H. (eds) *Flora of Thailand*, vol. 12(2), pp. 631–633. Thailand, Bangkok: The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation.
- Pridgeon, A.M., Cribb, P.J., Chase, M.W. & Rasmussen, F.N. (2005). *Genera Orchidacearum*, vol. 4 (Epidendroideae, part 1). UK: Oxford University Press.
- Schuiteman, A. (2011). The strange case of *Dendrobium aphyllum*. *Orchid Rev.* 119: 104–110.
- Seidenfaden, G. (1976a). Contributions to the orchid flora of Thailand VII. *Bot. Tidsskr.* 71: 1–30.
- Seidenfaden, G. (1976b). Orchid genera in Thailand IV. *Liparis* L.C.Rich. *Dansk Bot. Ark.* 31(1): 1–105.
- Seidenfaden, G. (1977). Orchid genera in Thailand V. Orchidoideae. *Dansk Bot. Ark.* 31(3): 1–149.
- Seidenfaden, G. (1978). Orchid genera in Thailand VI. Neottioideae Lindl. *Dansk Bot. Ark.* 32(2): 1–195.
- Seidenfaden, G. (1988). Orchid genera in Thailand XIV. Fifty-nine vandid genera. *Opera Bot.* 95: 1–398.
- Seidenfaden, G. & Smitinand, T. (1961). *The Orchids of Thailand – A preliminary list*. Part III. Thailand, Bangkok: The Siam Society.
- Seidenfaden, G. & Smitinand, T. (1965). *The Orchids of Thailand – A preliminary list*. Part IV (2). Thailand, Bangkok: The Siam Society.
- Seidenfaden, G. & Wood, J.J. (1992). *The Orchids of Peninsular Malaysia and Singapore*. Denmark, Fredensborg: Olsen & Olsen.