

NOTES ON ASIATIC *TROPIDIA* (ORCHIDACEAE: TROPIDIEAE).

PAUL ORMEROD¹

Abstract. Studies of material of Asiatic *Tropidia* reveals the need to clarify the identities and distribution of various taxa. A full description, illustration, and specimen citation is provided of the recently published *T. maxwellii*. The previously misunderstood *T. capitata* is characterized and illustrated. Notes are also supplied on the synonymy and distribution of *T. curculigoides*, *T. namasiae*, *T. pedunculata*, *T. reichenbachiana*, *T. schlechteriana*, *T. septemnervis*, *T. squamata*, and *T. thwaitesii*.

Keywords: *Tropidia*, Asia, synonymy, distribution

The genus *Tropidia* Lindl. contains about 30 species distributed from Sri Lanka and India to Samoa, with one or two taxa in the New World. Several species resemble small palm seedlings and have dull white to greenish flowers, often beset with a scurfy pubescence, which resulted in Seidenfaden (1978) declaring it a "...peculiarly unattractive genus and very much in need of a thorough revision, which may result in a strong reduction of acceptable species...." Indeed the genus is rather hard to work with due to similar vegetative characters in some groups, many specimens lacking flowers or having only buds, conservative floral features (such as segment shape), and the flowers of some species rehydrating poorly, thus making them difficult to draw and measure.

This study began as an attempt to understand the genus in Thailand where it was evident different taxa had been mixed up. Even after expanding the work into neighbouring countries of southeast Asia, it became obvious that knowledge of the Malesian entities was required. Therefore an examination has been made of specimens found from India and Sri Lanka to New Guinea. This is not an attempt to revise the genus, but I hope the notes supplied on the problems encountered will help a future monographer, or at least facilitate more certain identifications.

Tropidia angulosa (Lindl.) Blume, Coll. Orch. Arch. Ind.: 122. 1858. TYPE: INDIA. Mountains of Sylhet, *W. Gomez in Wallich Catal. No. 7388* (Syntype: K-L, not seen); Courtallum, *R. Wight 928* (Syntype: K-L, image seen).

Basionym: *Cnemidia angulosa* Lindl., Edwards's Bot. Reg. 19: sub t. 1618. 1833, *nom. inval.*; Gen. Sp. Orch. Pl. 463. 1840.

Heterotypic synonyms: *Cnemidia semilibera* Lindl., Edwards's Bot. Reg. 19: sub t. 1618. 1833, *nom. inval.*; Gen. Sp. Orch. Pl.: 463. 1840. TYPE: INDIA. Without locality, *N. Wallich s.n.* (Holotype: K-L, not seen).

Tropidia semilibera (Lindl.) Blume, Coll. Orch. Arch. Ind. 122. 1858.

Govindooia nervosa R. Wight, Icon. Pl. Ind. Orient.

6: t. 2090. 1853. TYPE: INDIA. Courtallum, *R. Wight 928* (Holotype: K-L, image seen).

Tropidia govindooii Blume, Coll. Orch. Arch. Ind.: 122. 1858, *nom. illeg.*

Distribution: India; Bangladesh; Bhutan; Myanmar; China; Vietnam; Thailand; Malaysia; Indonesia (Sumatra, Java, Flores); Philippines; Taiwan.

Additional specimens examined: INDONESIA. Nusa Tenggara Prov., Flores Island, Mberai, 800 m, 25 April 1980, *Father E. Schmutz 4672* (L); Manggarai, Nunang, Puar Lewé, 600 m, 1 April 1982, *Father E. Schmutz SVD 5759* (L); Manggarai, Kempo, 900 m, 12 March 1981, *Father E. Schmutz SVD 4833* (L).

The above new records appear to be the most easterly that I can find in Indonesia, though Smith (1913) when noting the find in Java said *T. angulosa* also occurred in the Moluccas, but this can't be verified since no material or prior reference was cited. I have not cited other synonyms usually accredited to this taxon such as *T. bellii* Blatter & McCann, *T. calcarata* Ames, and *T. somae* Hayata because I have not fully investigated the variability of *T. angulosa*.

Tropidia capitata (Thorel ex Gagnep.) Ormerod, Checkl. Papuas. Orch. 437. 2017. TYPE: CAMBODIA. Mekong, Stung Treng, 1866–1868, *C. Thorel 2165* (Lectotype here designated: P 00345364; Isolectotype: P 00345365). Fig. 1. Basionym: *Schoenomorphus capitatus* Thorel ex Gagnep., Bull. Soc. Bot. France 80: 351. 1933.

Usage synonyms: *Tropidia graminea auct. non* Blume, Mansfeld, Rep. Sp. Nov. Regni Veg. 36: 58. 1934.

Tropidia pedunculata auct. non Blume, Seidenf., Opera Bot. 114: 27. 1992.

Tropidia curculigoides auct. non Lindl., Averyanov, Ident. Guide Vietnam Orch. 27–28. 1994.

Terrestrial herb. *Roots* terete, to 1.5 mm thick. *Stem* erect, terete, 3–5 leaved, 15–16 cm long, to 0.2 cm thick. *Leaves* narrowly lanceolate to lanceolate, acute, 7.0–10.5 × 1.2–1.6 cm. *Inflorescence* terminal, ca. 2.5 cm long; peduncle 1.2 cm long; rachis 1.3 cm long; floral bracts lanceolate, acute, 7 veined, to 6 × 2 mm. *Flower* color not known.

I wish to thank David Lau and Pankaj Kumar for images of *Tropidia curculigoides* in Hong Kong. Dinesh Agrawala for help with Indian collections, Lina Juswara for consulting material in BO, and herbarium and library staff at the Harvard University Herbaria for enabling loans, finding literature, and their generous hospitality. K, L, and P kindly loaned specimens for study.

¹P.O. Box 8210, Cairns 4870, Queensland, Australia; wsandave1@bigpond.com

Pedicel plus ovary terete, 7 mm long. *Dorsal sepal* oblong, subacute, 3 veined, 5.7 (incl. 0.7 mm united to back of column) x 1.75–1.80 mm. *Lateral sepals* joined by the inner margins for ca. 5 mm and thus forming a basally saccate, 7 x 3 mm synsepalum; individually sepals are linear-ligulate, subacute, 1 veined, 7 x 1.5 mm. *Petals* subsigmoid, ligulate-oblongate, subacute, midvein broadly thickened basally, thinner and low carinate above, ca. 5.7 x 1.2 mm. *Labellum* oblong-cymbiform, apiculate, 6 mm long; spur or sac retrorse, bilobulate, c. 0.8–1.0 mm long; hypochile oblong-cymbiform, inside each side with a lamellate keel, these eventually pair together on the base of the epichile, ca. 4.7–4.9 mm long, 2.2 mm wide spread; epichile ovate, apiculate, 3 veined, ca. 1.5 mm long, 1 mm wide. *Column* obliquely erect, ca. 3 mm long.

Distribution: Thailand; Laos; Cambodia.

Additional specimens examined: “COCHINCHINA” [prob. CAMBODIA]. Without locality, 1862–1866, *C. Thorel s.n.* (P). “INDOCHINA” [prob. LAOS], without locality, *Massie s.n.* (P, 2 sheets). CAMBODIA. Stung Treng Prov., 1866–1868, *C. Thorel s.n.* (AMES); Kratie Prov., Sambour District, Mekong River, Sahng Gawng Gap Island, 30 m, 13 November 2006, *J.F. Maxwell 06-818* (A, L). LAOS. Luang Prabang, *Massie s.n.* (P). THAILAND. Tak, c. 50 km S of Changwat Tak, near the Karen Village of Phu Yai Yi, 420–440 m, 16 December 1985, *H. Kurzweil 681* (K).

This taxon has had a somewhat confused history due in part to the misleading drawing published by Gagnepain (in Lecomte 1934) that fails to show the retrorse spur of the lip and synsepalum. This led Mansfeld (1934) to declare *Schoenomorphus capitatus* conspecific with *Tropidia graminea* Blume (= *T. curculigoides* Lindl.).

Tropidia capitata is not closely related to any mainland Asian species of the genus. Instead its affinities lie with *T. formosana* Rolfe [TYPE: TAIWAN. Bankinsing, *A. Henry 1573* (Holotype: K; Isotype: NY, images seen). Synonym: *T. nanhuae* W.M. Lin, L.K. Huang & T.P. Lin (see T.P. Lin 2016)] from Taiwan, and *T. septemnervis* (Schauer) Rehb.f. from the Philippines. Both taxa have a retrorsely saccate spur enclosed by a retrorsely saccate synsepalum. Unfortunately *T. formosana* has been included in the synonymy of *T. curculigoides* (see e.g. Chen et al. in Wu and Raven 2009), thus masking its true identity.

Tropidia capitata differs from *T. formosana* in having a longer ovary plus pedicel (7 vs. 4 mm), narrower petals (1.2 vs. 2 mm), and two keels (vs. two calli that meet obliquely, tip to tip) that are parallel on the base of the epichile.

Maxwell’s specimen from Kratie Province (adjacent to Stung Treng Province) in Cambodia has leaves covered in algae, suggesting that the plants may be inundated for periods, which is a possibility on riverine islands.

Tropidia curculigoides Lindl., Gen. Sp. Orch. Pl. 497. 1840. TYPE: INDIA. Mountains of Sylhet, 1821, *F. de Silva & W. Gomez in Wallich Catal. No. 7386A* [Lectotype here designated, 2nd step (1st step J. D. Hook. 1890: 93): K-L; Isolectotypes: CAL, not seen; GH, K, K-W, L].

Heterotypic synonyms: *Tropidia assamica* Blume, Coll. Orch. Arch. Ind. 124. 1858; Fl. Javae Ins. Adj. n.s. 1: 104. 1858. TYPE: INDIA. Assam, “1844,” *W. Griffith s.n.* (Holotype: L, image seen; Isotypes: BM, K, K-L, P).

Tropidia graminea Blume, Coll. Orch. Arch. Ind.: 124. 1858; Fl. Javae Ins. Adj. n.s. 1: 104. 1858. TYPE: INDONESIA. Java, Gunung Gede, Pangerango, *C. L. Blume s.n.* (Holotype: L, image seen).

Tropidia hongkongensis Rolfe, J. Linn. Soc., Bot. 36: 40. 1903. TYPE: CHINA. Hong Kong, Happy Valley, Wangnanchang [= Wong Nai Chung] woods, *J.G. Champion 522* (Holotype: K-L, image seen).

Terrestrial herb. *Roots* ligneous, to 1.5 mm thick. *Stems* erect, terete, simple to regularly branched above, laxly 5–11 leaved, 11–32 x 0.075–0.300 cm, branches to 21 cm long. *Leaves* lanceolate to narrowly elliptic, acute to subacuminate, 5–7 veined, green to deep green above, 4.5–21.5 x 0.9–4.8 cm. *Inflorescences* axillary and terminal, c. 10 mm long; peduncle 3.5–7.0 mm long; peduncular sheath ovate-lanceolate, acute, 9 x 3.8 mm; rachis densely flowered, ca. 7 mm long; floral bracts ovate-lanceolate, acute, to 5 x 3 mm. *Flowers* white or whitish green, ageing pale to greenish yellow, lip with a subapical yellow line. *Pedicel plus ovary* clavate, laxly furfuraceous, ca. 5.5 mm long. *Dorsal sepal* oblong-lanceolate, acute, 3–5 veined, concave, 10–11 x 2.5–3.0 mm. *Lateral sepals* oblong-lanceolate, acute, subsigmoid, 3–5 veined, 11–14 x 2.5–4.0 mm. *Petals* oblong-lanceolate, acute, falcate to subsigmoid, 3–5 veined, 8.8–9.0 x 1.8–3.5 mm. *Labellum* oblong-cymbiform, 6.5–9.0 mm long; hypochile subglobose-cymbiform, near the apex each side produced into a short semi-elliptic to triangular, obtuse to acute lobule, inside each side is a lamellate keel that runs parallel to the upper margin, most prominent under the lobules, each keel running out onto the epichile but quickly disappearing in the basal third, ca. 3.7–6.0 x 3–4 mm; epichile ovate-lanceolate, apex shortly cucullate, obtuse, 2.8–3.0 mm long. *Column* clavate, 4.0–4.5 mm long.

Distribution: India; Myanmar; China; Vietnam; Cambodia; Thailand; Malaysia; Indonesia (Sumatra, Java).

Additional specimens examined: INDIA. “extra Gangem” [upper Ganges River], 1898, *S. Mayer s.n.* (AMES). Andaman Islands, Little Andaman Island, Hut Bay, 17 August 1976, *N. Bhargava 4143* (L). THAILAND. Chang Mai, Doi Sutep, 760 m, 8 August 1909, *A.F.G. Kerr 234* (K, L, P); Phitsanulok, Tung Salaeng Luang, 600 m, 23 July 1966, *K. Larsen, T. Smitinand & E. Warnecke 801* (L). CAMBODIA. Kout La-det, June 1875, *A. Godefroy 452* (K, P); mountains of Pursat, 18 June 1875, *A. Godefroy 452* (P); mountains of Pursat, 20 June 1875, *A. Godefroy 548* (P). VIETNAM. Ha Long Bay, Lat Ba Island, October 1998, *J.J. Vermeulen & A.J. Whitten s.n.* (L); Bana Prov., Mt. Dinh, August 1869, *L. Pierre 6585* (P). CHINA. Hainan, Kumyun, 4 August 1936, *S.K. Lau 27612* (AMES); Taam-chau District, in front of Sha Po Shan and vicinity, 26 August 1927, *W.T. Tsang 626* (= *Lingnan University 16125*) (AMES); Poting, 640 m, 17 June 1935, *F.C. How*

72933 (AMES). MALAYSIA. Sarawak: Ulu Tinjar, Sungei Balapar, Gunung Laiun, under 300 m, 2 November 1932, P.W. Richards 2437 (K). INDONESIA. Sumatra: Atjeh, Gunung Leuser Reserve, ascending Gunung Mamas, c. 2 km SW from the mouth of Lau Ketambe, c. 30 km NW of Kutatjane, 800–1100 m, 7 February 1975, W.J.J.O. de Wilde & B.E.E. de Wilde-Duyffes 14617 (L); upper Mamas River valley, Camp Pawang, 1250 m, 22 June 1979, W.J.J.O. de Wilde & B.E.E. de Wilde-Duyffes 18333 (K, L); same data, W.J.J.O. de Wilde & B.E.E. de Wilde-Duyffes 18585 (L). Java: hills 10 km SE of Pronojiwo, SE of Gunung Semeru, 850 m, 13 March 1983, J.B. Comber 1413 (K).

Joseph Hooker (1890) was the first to realise that Lindley's concept of *T. curculigoides* contained a mixture of taxa. Hooker considered the element from Myanmar (*Wallich Catal. No. 7386B*) to be an undescribed species (see *T. maxwellii* below), whilst he referred the element from Sri Lanka (*Macrae 58*) to *T. thwaitesii*, thus he attached the name *T. curculigoides* to material (*Wallich Catal. No. 7386A*) from the mountains behind Sylhet (= Silet, Bangladesh. The mountains behind it are however in India).

Tropidia maxwellii Ormerod, Checkl. Papuas. Orch.: 438. 2017. TYPE: THAILAND. Chiang Mai Prov., Muang District, Doi Sutep-pui National Park, E side, Palaht Temple area, 720 m, 7 August 1993, A. Phuakam 43 (Holotype: A; Isotype: L, image seen). Fig. 2.

Usage synonyms: *Tropidia curculigoides* auct. non Lindl., Lindl., Gen. Sp. Orch. Pl. 497. 1840 p.p.; King and Pantl., Ann. Roy. Bot. Gard. Calc. 8: 275. 1898; Deva and Arora, Indian Forest. 97: 699. 1971; Barretto, Cribb and Gale, Wild Orch. Hong Kong: 276, f.230, 2011.

Tropidia pedunculata auct. non Blume, Seidenf. and Smitin., Orch. Thail. 1: 98. 1959; Seidenf., Dan. Bot. Ark. 32, 2: 110, f.69. 1978; Deva and Naithani, Orch. Fl. NW Himalaya: 93, f.42. 1986; Misra, Orch. Orissa: 277–281, f.'s, 771 p.p., 2004; Lucksom, Orch. Sikkim and NE Himalaya: 73, f.45, 2007; Pedersen, Fl. Thail. 12, 2: 663–664, 2014.

Tropidia formosana auct. non Rolfe, Gogoi, Orchidophile 116: 335, f., 2016.

Terrestrial herb. Roots wiry, light brown, to 2 mm thick. Stems erect, terete, simple or up to 3 branched, main stem laxly 7–11 leaved, branches 4–7 leaved, dark green, 29.5–46.5 × 0.06–0.25 cm, branches 5–10 cm long; internodes 3.2–5.1 cm long. Leaves narrowly lanceolate, lanceolate, to narrowly elliptic, acute, 3–5 (–7) veined, dark green above, green below, 6.5–20.0 × 0.7–3.4 cm. Inflorescences axillary and terminal, simple or rarely with 6 branches bunched together, 7–31 mm long; peduncle 3–17 mm long; peduncular sheaths 1–2, tubular-infundibuliform, obliquely truncate, 1.3–5.0 mm long; rachis successively (1–2 at a time) to simultaneously densely many-flowered, 4–14 mm long; floral bracts broadly triangular to lanceolate, acute, 3–7 veined, green, 3.5–12.0 mm long. Flowers light greenish turning white, lip tip yellow, column white with a

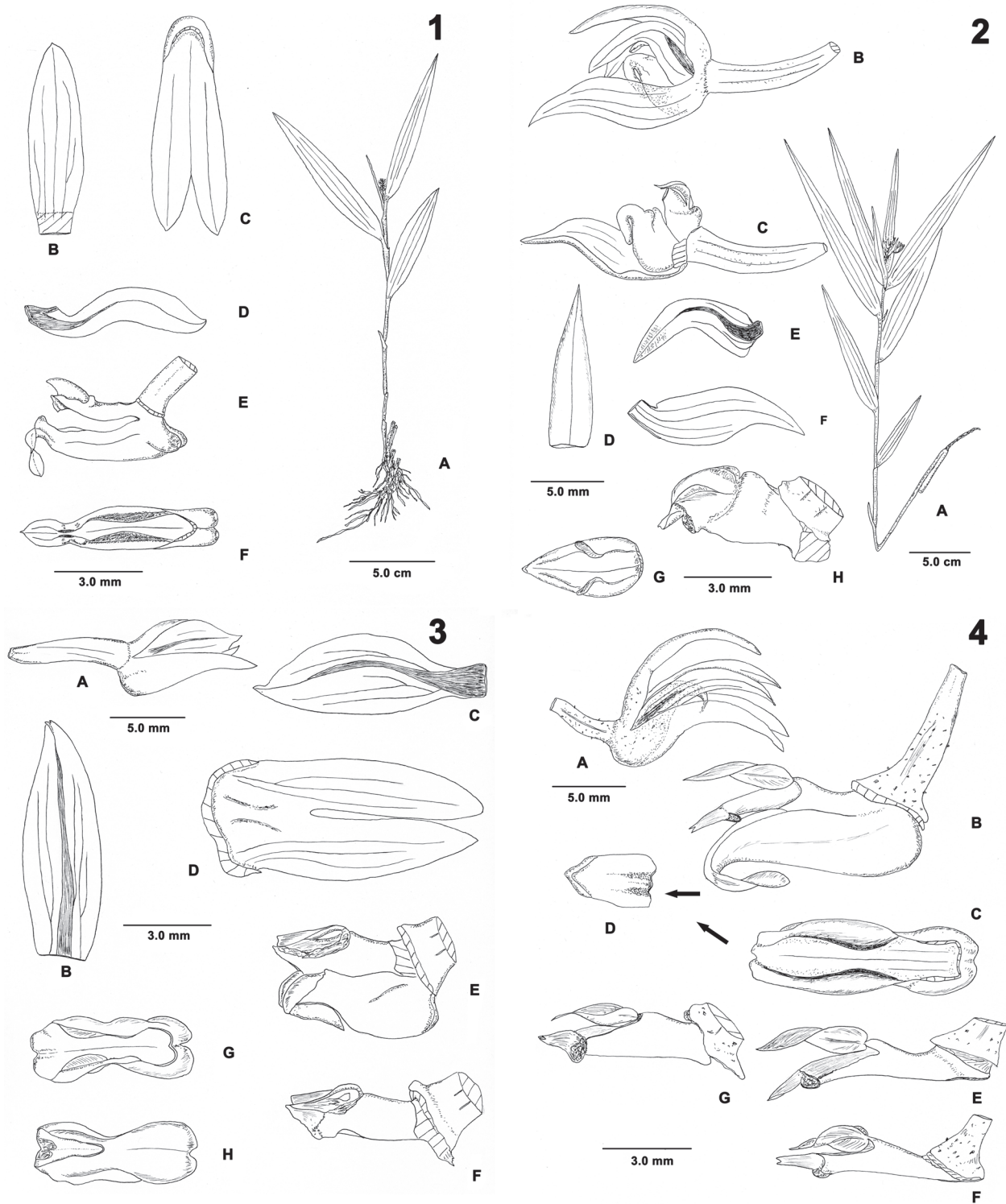
dark yellow anther cap. Pedicel plus ovary terete to clavate, sparsely furfuraceous, 4–7 mm long. Dorsal sepal ovate-elliptic to oblong-lanceolate, apex subacute, 3–5 veined, concave, sparsely furfuraceous basally, 5.5–10.0 × 2.5–3.0 mm. Lateral sepals obliquely ovate-elliptic to oblong-lanceolate, acute to subacute, midvein carinate at apex, 3–5 veined, lower inner margins adherent for 2.8–5.0 mm (but easily separated), sparsely furfuraceous basally, 6–11 × 2.6–3.2 mm. Petals obliquely oblong-lanceolate, acute to subacute, weakly falcate to subsigmoid-falcate, midvein broadly thickened in lower external third, 3 veined, 4.7–9.2 × 1.9–2.8 mm. Labellum ovoid-cymbiform, 4.2–7.0 mm long; hypochile cymbiform to ovate-elliptic, inside each side a short, thickly laminate, truncate keel that is obliquely angled to the upper margin (it may appear to continue onto the epichile due to the veins following an internal convex, narrow fold each side that meet eventually on the lower half of the epichile and can resemble true keels), ca. 3–5 × 2.8–5.0 mm; epichile ovate to ovate-lanceolate, apex shortly cucullate, obtuse, deflexed, ca. 1.2–2.2 mm long. Column obliquely erect, stout, 2.9–3.8 mm long.

Distribution: India; Bangladesh; Myanmar; Thailand; Cambodia; Laos (?); China.

Additional specimens examined: INDIA. Garwhal, Dehra Dun, Golatappar, 450 m, 4 July 1969, C.M. Arora 38869 (L). Sikkim, tropical valleys, May 1892, R. Pantling 180 (AMES, K, L, P). Jharkhand State, Singhbhum, Poganma (?) area, February 1943, K. Sanjal in H.F. Mooney 4641 (AMES). BANGLADESH. Cox's Bazar, Tulabagan, Panerchara, 15 October 1998, C.K. Dey, Z. Hossain and M.K. Huda 3841B (K). MYANMAR. Attran River, 1827, *Wallich Catal. No. 7386B* (K-W, image seen). THAILAND. Khorat, Ban Chum Seng, 23 May 1929, N. Noe 188 (K); Surin, leg. Put s.n., cult. in Bangkok, 12 July 1927, A.F.G. Kerr 420 (K); Saraburi, Muak Lek, 16 July 1925, N. Noe 108 (K); Songkla, Klong Hoy Kong, c. 10 km W of Toong Loong, 25 m, 17 June 1986, J.F. Maxwell 86-391 (A, L, P). CAMBODIA. Stung Treng, 1866–1868, C. Thorel 2165 (P 00345366). "INDOCHINA" [possibly LAOS]. Without locality, *Massie s.n.* (P). CHINA. Yunnan, Jinghong Xian, 800 m, 23 July 1991, Z.H. Tsi 91-182 (A); Mengla Xian, 700 m, 6 July 1991, Z. H. Tsi 91-34 (A).

Joseph Hooker (1890) was the first to realise that this taxon was different from *T. curculigoides* when he commented on the mixture found in Lindley's concept of the plant. Later Seidenfaden and Smitinand (1959) and Seidenfaden (1978) identified Thai material as the Malesian *T. pedunculata*, which led to similar identifications from India (e.g. Deva and Naithani 1986). A further complication is that the well known and influential work of King and Pantling (1898) has a plate (t. 366) depicting "*T. curculigoides*," that in reality represents *T. maxwellii*. Only the drawing called *T. curculigoides* by Barretto et al. (2011) is referable to *T. maxwellii*, though because it is drawn from buds diagnostic characters are not evident. Fortunately the duplicate of *Tsi 91-182* in A had mature flowers, enabling it to be identified.

Externally *T. maxwellii* can usually be distinguished from *T. curculigoides* by its often distinctly pedunculate



FIGURES 1-4. *Tropidia* species. FIGURE 1. *Tropidia capitata* (Gagn.) Ormerod. A, plant; B, dorsal sepal; C, synsepal; D, petal; E, flower minus tepals; F, labellum. Drawn from *Thorel s.n.* (AMES). FIGURE 2. *Tropidia maxwellii* Ormerod. A, plant; B, flower; C, flower minus tepals (except one lateral sepal); D, dorsal sepal; E, petal; F, lateral sepal; G, labellum (not to scale); H, column. Drawn from holotype. FIGURE 3. *Tropidia reichenbachiana* Kraenzl. A, flower; B, dorsal sepal; C, petal; D, synsepal; E, flower minus tepals; F, column; G-H, labellum (dorsal and ventral). Drawn from *Loeters 1671* (L). FIGURE 4. *Tropidia septemnervis* (Schauer) Rchb.f. A, flower; B, dorsal sepal; C, lateral sepal; D, petal; E, flower minus tepals; F, column; G, labellum. Drawn from *Ramos & Edano BS 26267* (AMES).

(vs. sessile) axillary inflorescences, and longer, narrow lanceolate (vs. broadly triangular) floral bracts. However these features are variable (Pedersen 2014), and further identifying features can be found in the flowers. In *T. maxwellii* the labellum has a short, often truncate keel inside each side that is obliquely angled to the upper margin of the hypochile, whilst in *T. curculgioides* the labellum has each side a continuous lamellate keel that is parallel to the upper margin of the hypochile, the two keels reaching the base of the midlobe or epichile, and sometimes continuing onto it in the basal half, but not onto the apex.

Tropidia maxwellii may be distinguished from the Malaysian *T. pedunculata* in that it never has proliferated inflorescences, and the short, obliquely angled, lamellate (vs. low and parallel) keels in the labellum hypochile.

The above description and specimen citation is provided to supplement the short diagnosis given in the protologue (Ormerod, 2017). The species is named after J.F. Maxwell (1945–2015), a prodigious collector and teacher, who contributed so much to the Flora of Thailand.

Tropidia namasiae C.K. Liao, T.P. Lin and M.S. Tang, *Novon* 22: 426. 2013. TYPE: TAIWAN. Kaoshing City, Namasia District, on mountain ridge, 1380 m, 5 May 2009, C.K. Liao 3594 (Holotype: TAI, not seen).

Distribution: NE India; Thailand; Taiwan.

Additional specimens examined: THAILAND. Doi Intanon, 1300 m, 30 April 1921, A.F.G. Kerr s.n. (K); Doi Intanon, 1400 m, 3 May 1921, A.F.G. Kerr 413 (K).

The above material represents a new record for Thailand. It was found among specimens named *T. pedunculata*. The species is recognised by its superposed stems that form a pseudostem, each stem is topped by a pair of leaves, and pedunculate inflorescences with small (sepals 4 mm long) flowers. It was also recently recorded from Manipur State, India (Kumar et al. 2015). *Tropidia hegderaii* S. Misra (Misra 2012) from India may prove to be an earlier name for *T. namasiae* but this requires further studies.

Tropidia pedunculata Blume, *Coll. Orch. Arch. Ind.*: 122. 1858; *Fl. Javae Ins. Adj. n.s. 1*: 103. 1858. TYPE: INDONESIA. Sumatra, Padang, P.W. Korthals s.n. (Syntype: L; Isosyntype: K, images seen); Palembang, C.F.E. Praetorius s.n. (Syntype: L, image seen).

Heterotypic synonyms: *Tropidia maingayi* J.D. Hook., *Fl. Brit. Ind.* 6: 93. 1890. TYPE: MALAYSIA. Malacca, Mt. Ophir, August 1867, A.C. Maingay 2577 (= k.d. 1665) (Holotype: K, image seen).

Tropidia acuminata Schltr., *Rep. Sp. Nov. Regni Veg.*, *Beih.* 1: 92. 1911. TYPE: PAPUA NEW GUINEA. Near Jaduna, 250 m, April 1909, R. Schlechter 19333 (Holotype: B, destroyed; Isotypes: AMES, 2 sheets, GH; G, K, L, MO, NSW, images seen; BO, E, not seen).

Tropidia mindanaensis Ames, *Leaf. Philipp. Bot.* 5: 1553. 1912. TYPE: PHILIPPINES. Mindanao, Davao District, Todaya, Mt. Apo, September 1909, A.D.E. Elmer 11785 (Holotype: AMES; Isotypes: F, NY, images seen).

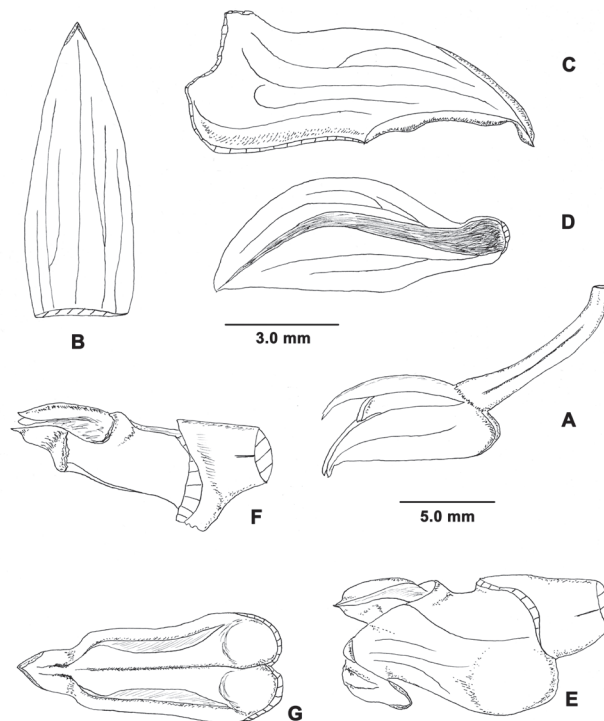


FIGURE 5. *Tropidia squamata* Blume. **A**, flower; **B**, flower minus tepals; **C**, labellum from above; **D**, labellum apex; **E–G**, columns. A–E drawn from Robinson & Kloss 6012 (K), F from Yi 56563 (L), G from Krukoff 4162 (AMES).

Distribution: Malaysia; Philippines; Indonesia; Papua New Guinea.

Additional specimens examined: MALAYSIA. Sarawak, Lundu District, Kubah National Park, NW side of Mt. Serapi, 250 m, 27 November 1994, J.H. Beaman & T.E. Beaman 11048 (K). Sabah, Kota Belud District, S of Sayap on NW side of Mt. Kinabalu, c. 30 km SE of Kota Belud, 800–1000 m, 19–20 May 1984, J.H. Beaman 9789 (K). PHILIPPINES. Luzon, Laguna Prov., San Antonio, 16 March 1913, M. Ramos BS 20558 (AMES); San Antonio, August 1910, M. Ramos BS 12001 (AMES). Mindanao, Zamboanga del Norte, Diklus, 500 m, 28 December 1957, C.O. Frake 392 (= PNH 38005) (AMES, L); Malangas, 11 October 1919, M. Ramos & G. Edano BS 37322 (AMES). INDONESIA. Sumatra, Toba, Tapianoeleli Residency, near Loemban Lobo, near KM 142, road from Porsea to Parapat, 27 & 31 July 1936, R. Si Boeea 9688 (AMES, L); Asahan, Tor Matoetoeng, 10–15 July 1936, R. Si Boeea 9523 (AMES). Papua Prov., Najaja, near Oeta, 3 m, 21 June 1941, Aet (*Exped. Lundquist*) 336 (L). PAPUA NEW GUINEA. Palmer River, 3.2 km below junction with Black River, 100 m, June 1936, L.J. Brass 6885 (AMES); Milne Bay Prov., Fergusson Island, mountains between Agamoia and Ailuluai, 800 m, 15 June 1956, L.J. Brass 27178

(AMES); Morobe Prov., Lae Subdistrict, Buso Valley, 5–6 m, 13 August 1970, *H. Streimann NGF 45122* (A).

Ethnobotany: used in an agricultural ritual in the Philippines (*Frake 392*).

Vernacular name: Bebesug (Philippines, *Frake 392*).

This species is unique in that it may sometimes possess proliferating inflorescences (i.e. where one inflorescence emerges out of the top of the previous one). It seems to be a Malesian endemic, and is not found north of Peninsular Malaysia, but could be expected from peninsular Thailand. As noted above the records from India, Thailand, and Indochina belong to the recently described *T. maxwellii*.

Examination of the types of *T. acuminata* Schltr. and *T. mindanaensis* Ames, as well as other material from Malaysia, show these taxa to be synonyms of *T. pedunculata* (Ormerod, 2017).

Tropidia reichenbachiana Kraenzl., Bot. Jahrb. Syst. 7: 442. 1886. TYPE: INDONESIA. Maluku Prov., Lucepara Island, 1 June 1875, *F.C. Naumann s.n.* (Holotype: B, destroyed; Isotype: HBG, image seen). Fig. 3.

Heterotypic synonym: *Tropidia multiflora* J.J. Sm., Blumea 5: 692. 1945, *syn. nov.* TYPE: INDONESIA. Nusa Tenggara Prov., Sumba Island, E part, Maoemaroo, 7 May 1925, *Iboet 425* (Holotype: BO, image seen).

Distribution: Indonesia.

Additional specimens examined: INDONESIA. Nusa Tenggara Prov., Flores Island, *Father J.J. Loeters 1671* (L); same area, *Father J.J. Loeters 1449* (L); W part, Manggarai, Waewako, 180 m, 22 March 1981, *E. Schmutz 4907* (L). Sumba Island, 16 July 1974, *J.A.J. Verheijen 3984* (L). Maluku Prov., Tanimbar Island, *J.G.F. Riedel s.n.* (K); Jamdena, Makatian, 7 April 1956, *J. van Borssum Waalkes 3314* (L). Papua Prov., without locality, 1904–1905 Exped., *J.W.R. Koch 14* (L).

Study of material from throughout the range of this species shows that it fully encompasses the characters given for *T. multiflora* J.J. Sm. from Sumba Island.

Tropidia schlechteriana J.J. Sm., Bull. Dep. Agr. Ind. Neerl. 15: 1. 1908. TYPE: INDONESIA. Maluku Prov., Ternate, on the peak, *J.J. Smith s.n.* (Holotype: BO; Isotype: L, neither seen).

Heterotypic synonym: *Tropidia triloba* J.J. Sm., Bull. Dep. Agr. Ind. Neerl. 19: 38. 1908. TYPE: INDONESIA. Papua Prov., S from Geluks Hill, July 1907, *G.M. Versteeg 1433* (Holotype: BO, not seen).

Distribution: Indonesia (Maluku, Papua); Philippines.

Specimens examined: PHILIPPINES. Luzon, Sorsogon Prov., Irosin, Mt. Bulusan, April 1916, *A.D.E. Elmer 15673* (AMES); Polillo Island, Karlagan, 20 m, 12 January 1949, *R.B. Fox 272* (= *PNH 9149*) (AMES); Karlagan, 50 m, 27 December 1948, *R.B. Fox 171* (= *PNH 9084*) (AMES). Mindanao, Surigao Prov., Tuhud Plasir, 150 m, 15 May 1927, *C.A. Wenzel 10059* (AMES); Agusan Prov., Butuan Subprovince, Agusan River, October 1910, *E.D. Merrill 7311* (AMES); Agusan Prov., Cabadbaran to Agay trail, 8 m, 13 December 1911, *C.M. Weber 322* (AMES).

Vernacular name: Aligbangon (*Fox 272*).

This species was first recorded from the Philippines by Cootes (2011), noting that it had been found on Mindoro and Negros. It was however first collected in the Philippines by Elmer Merrill in 1910, but the lack of flowers on this and several subsequent discoveries delayed its identification. In living flowers the keels on the lip are fleshy and pad-like, but in rehydrated material the keels are thickly lamellate. The species may be recognised by its distichous floral bracts, sequentially flowered inflorescences, and strongly trilobed lip with thick pad-like keels.

Tropidia septemnervis (Schauer) Rchb.f., Linnaea 25: 230. 1852. Fig. 4.

Basionym: *Ptychochilus septemnervis* Schauer, Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur. 19, Suppl. 1: 431. 1843. TYPE: PHILIPPINES. Luzon, toward Manila, October 1931, *F.J.F. Meyen s.n.* [Holotype: B, destroyed; Lectotype here designated: K-L (upper plant on sheet of *Tropidia thwaitesii*, *Macrae 58*), image seen].

Heterotypic synonym: *Tropidia minor* Ames, Orch. 2: 65. 1908. TYPE: PHILIPPINES. Luzon, Pampanga Prov., lower slopes of Mt. Arayat, 15–200 m, 15 September 1905, *E.D. Merrill 4204* (Holotype: AMES).

Distribution: Philippines.

Additional specimens examined: PHILIPPINES. Luzon, Bataan Prov., Lamao River, 50 m, September 1905, *H.N. Whitford 1368* (AMES, lhp); Lamao, September 1907, *H.M. Curran FB 7501* (AMES); Bulacan Prov., Angat, 25 m, 22 December 1914, *M. Ramos BS 22308* (AMES); Nueva Ecija Prov., Mt. Umingan, 6 September 1916, *M. Ramos & G. Edano BS 26267* (AMES). Palawan, Busuanga Island, 5 m, 17 September 1910, *E.D. Merrill 7202* (AMES).

This species is related to *T. capitata* from Thailand, Laos and Cambodia, *T. formosana* from Taiwan, and *T. reichenbachiana* from Indonesia. These taxa share a similar habit (3–5 leaved stems) and floral characters (e.g. retrorsely saccate lip and synsepalum). I studied *T. septemnervis* because Seidenfaden (1978) suspected it may be the earlier name for several taxa, presumably including *Schoenomorphus capitatus* and *Tropidia pedunculata*. However the resemblance between these taxa is superficial, and Seidenfaden's 1978 concept of *T. pedunculata* is referable to *T. maxwellii*.

Two collections from Mindoro [*J. Bermejos BS 1542* (AMES); *H.C. Conklin PNH 39180* (A)] are similar to *T. septemnervis* but have slightly broader leaves than usual. I am not sure about the identity of these plants so have not listed them above.

The photograph labelled *T. septemnervis* in Cootes (2011) in my opinion represents *T. pedunculata* because of the more robust habit and proliferated inflorescence.

Tropidia squamata Blume, Coll. Orch. Arch. Ind.: 123. 1858; Fl. Javae Ins. Adj. n.s. 1: 104. 1858. TYPE: INDONESIA. Kalimantan, *G. Muller s.n.* (Holotype: L, image seen). Fig. 5.

Distribution: Malaysia; Indonesia [Sumatra, Java (?), Kalimantan].

Additional specimens examined: MALAYSIA. Kedah, Kedah Peak, *C.B. Kloss & H.C. Robinson 6012* (AMES, K). Perak, Taiping Hills, *H.N. Ridley 11416* (K). Sarawak, 7th Division, Belaga, Dataran Tinggi Batu Laga, Bukit Luang, 900 m, 8 March 1989, *P.C. Yü 56563* (L). Sabah, without locality, *A. Lamb 2004/1180* (K); Ranau District, Bukit Kulung, near Bukit Hampun at SE base of Mt. Kinabalu, 750 m, 8 December 1983, *J.H. Beaman 7785* (K); Ranau District, Crocker Range, Bukit Lugas, Kampong Himbaan, 8.5 km SE of Tenompok, 1250–1300 m, 7 July 1984, *J.H. Beaman 10551* (K). INDONESIA. Sumatra, Riau Archipelago, Palau Bintan, 300 m, 13 June 1919, *H.A.B. Bunnemeijer 6168* (L); Asahan, Masihi Forest Reserve, October/November 1932, *B.A. Krukoff 4162* (AMES). Kalimantan, Gunung Damoos, *J.G. Hallier s.n.* (= *Hort. Bogor. 629*) (L); Gunung Raja, on the ridge, 100–700 m, 25 January 1965, *A. Elsener 79* (L).

Smith (1905) reduced *T. squamata* to *T. curculigoides* when treating the orchids of Java. However he always seems to have later accepted *T. squamata* judging from his annotations on herbarium material. Unfortunately Smith's 1905 position was accepted by some later authors (e.g., Ridley, 1924; Comber, 1990), leading to some confusion whether *T. squamata* is a distinct species or not.

Tropidia squamata may be distinguished from *T. curculigoides* by its labellum which is narrowed toward the epichile in the upper half and thus somewhat oblong-lanceolate (vs. lobulate in the upper half, thus pandurate), inside of which the two keels are very low and ridge-like (vs. strongly lamellate).

There seems to be variation in column shape and

stoutness in populations of *T. squamata*. Plants seen from the Riau Archipelago and Sumatra have quite stout columns, whilst those from Peninsular Malaysia and Sarawak have rather slender columns. The two specimens from Indonesian Borneo however were intermediate between the two groups.

Tropidia thwaitesii J.D. Hook., Fl. Brit. Ind. 6: 93. 1890. TYPES: SRI LANKA. Without locality, 1829, *J. Macrae 58* (Syntype: K-L, image seen); without locality, *CP 3565* [Lectotype (Jayaweera 1980: 330): K; Isolectotypes: BM, images seen; CAL, not seen; P].

Usage synonym: *Tropidia curculigoides* auct. non Lindl., Lindl., Gen. Sp. Orch. Pl.: 497. 1840, p.p.

Distribution: S. India; Sri India.

Additional specimens examined: INDIA. S Concan, Bailsey (?), February 1853, *D. Ritchie 1423* (GH). SRI LANKA. Hinidumkandi (Haycock), near Hiniduma, 600 m, 2 September 1974, *A.J.G.H. Kostermans s.n.* (L); Udawathakella, 595 m, 26 October 1960, *D.M.A. Jayaweera 51 (1)* (AMES).

It was necessary to examine material of this species since larger plants superficially resemble *T. maxwellii*. However after studying Jayaweera's collection in AMES, which is a rather small, slender specimen, I find that the flowers differ in having carinae in the lip that are parallel (not obliquely angled) to the upper margin.

Another point of interest is that Lindley has made analytical drawings on the syntype *Macrae 58*, at a time when he considered the plant to be *T. curculigoides*. From this it can be inferred that he probably derived the generic characters for *Tropidia* from this specimen.

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