ADDITIONS TO THE GOODYERINAE (ORCHIDACEAE) OF GUYANA

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Abstract. Three species are added to the orchid flora of Guyana, one of which, *Aspidogyne steyermarkii* is a new record, whilst *A. reddenii* and *A. tulamengensis* are proposed as novelties.

Keywords: Orchids, Guyana, Goodyerinae, new taxa, records

Subtribe Goodyerinae comprises over 700 species of mostly forest-floor terrestrials, of which about 230 are found in the Neotropics. The group may be defined by its creeping rhizome that is virtually indistinguishable from an erect, leaf-bearing stem, herbaceous leaves, and a terminal, often pubescent, racemose inflorescence of relatively small (usually 3–10 mm long) flowers.

Sixteen species are reported from the Guianas (Szlachetko et al., 2016), of which twelve are said to occur in Guyana. Of these, only one, *Microchilus mazarunensis* Szlach. et al., described in the aforementioned work, is considered to be endemic.

Recently we had the opportunity to examine several more collections of Goodyerinae from Guyana, among which were found two new species, and a new record. It is also necessary to discuss the delimitations of two entities accepted by Szlachetko et al. (2016).

Aspidogyne Garay

This a genus of about 75 species if treated in the broad sense (including *Ligeophila* Garay, and *Platythelys* Garay) following Meneguzzo (2012). Eight of the twelve previously reported Guyanese Goodyerinae belong to this broad concept of *Aspidogyne*.

Aspidogyne clavigera (Rchb.f.) Meneguzzo, Orquidario 26, 3: 89, 2012.

Basionym: *Physurus claviger* Rchb.f., Bonplandia 4: 211. 1856. TYPE: NEW SPAIN [Costa Rica or Mexico]: Without locality, 1780, *M. Sesse & J.M. Mocino 4373* (Holotype: W-R, not seen; Isotypes: AMES; G, MA, images seen).

Homotypic synonyms: *Erythrodes clavigera* (Rchb.f.) Ames, Orch. 7: 70. 1922.

Ligeophila clavigera (Rchb.f.) Garay, Bradea 2, 28: 195. 1977.

Heterotypic synonyms: *Physurus peterianus* Cogn., in Martius, Fl. Bras. 3, 4: 277. 1895. TYPE: SURINAME. Near Paramaribo, August 1844, *H. Kegel 467* (Holotype: GOET, not seen; Isotypes: BR; W, not seen).

Erythrodes peteriana (Cogn.) Ames, Orch. 7: 75. 1922.

Ligeophila peteriana (Cogn.) Garay, Bradea 2, 28: 195. 1978.

Aspidogyne peteriana (Cogn.) Meneguzzo, Orquidario 26, 3: 90. 2012.

Ligeophila clavigera (Rchb.f.) Garay var. *rhodostachys* Ormerod, Harvard Pap. Bot. 13, 1: 62. 2008, *syn. nov.* TYPE: PERU. Madre de Dios: Prov. Manu, Manu Park, Cocha Cashu uplands, 400 m, 18 August 1986, *P. Núñez 5779* (Holotype: MO).

Aspidogyne clavigera (Rchb.f.) Meneguzzo var. *rhodostachys* (Ormerod) Ormerod, Harvard Pap. Bot. 18, 1: 52. 2013.

Aspidoygne tribouillieri Archila, Chiron & Szlach., Richardiana 14: 178. 2014, *syn. nov.* TYPE: GUATEMALA. Quiche: Chajul, Estrella Polar, 400 m, November 2013, *E. Tribouillier s.n.* (Holotype: BIGU; Isotype: UGDA, neither seen).

Distribution: Mexico; Guatemala; Nicaragua; Costa Rica; Colombia; Peru; Brazil; French Guiana; Suriname; Guyana; Venezuela.

Szlachetko et al. (2016) distinguished *Ligeophila clavigera* from *L. peteriana* on the basis of labellum shape and spur width; however, their own illustrations show these parameters to be virtually continuous. This also agrees with our examination of numerous herbarium specimens. Therefore, we continue to treat *Aspidogyne clavigera* as a single, widespread, variable species. In this regard *Ligeophila clavigera* var. *rhodostachys* can no longer be recognised by its smaller floral bract size, since the recently described *Aspidogyne tribouillieri* is intermediate in this respect. The authors of the latter taxon neglected to compare it with *A. clavigera,* of which it is doubtless a synonym.

Aspidogyne foliosa (Poepp. & Endl.) Garay, Bradea 2, 28: 201. 1977.

Basionym: *Pelexia foliosa* Poepp. & Endl., Nov. Gen. Sp. 2: 17. 1836. TYPE: PERU. Loreto: Tocache Mission, near Huallaga River, July, *E. Poeppig s.n.* (Holotype: W-R, not seen).

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Homotypic synonyms: *Physurus foliosus* (Poepp. & Endl.) Lindl., Gen. Sp. Orch. Pl.: 502. 1840.

Microchilus foliosus (Poepp. & Endl.) D. Dietr., Syn. Pl. 5: 166. 1852.

Erythrodes foliosa (Poepp. & Endl.) Ames, Orch. 7: 70. 1922.

Heterotypic synonyms: *Physurus stenocentron* Schltr., Rep. Sp. Nov. Regni Veg., Beih. 9: 60. 1921. TYPE: PERU. Junin: near La Merced, *E. Kohler s.n.* (Holotype: B, destroyed).

Erythrodes stenocentron (Schltr.) Ames, Orch. 7: 75. 1922.

Aspidogyne stenocentron (Schltr.) Szlach. & Kolan., Mat. Orch. Fl. Colomb. 1: 409. 2017.

Erythrodes multifoliata C. Schweinf., Bot. Mus. Leafl. Harv. Uni. 9, 10: 234. 1941. TYPE: PERU. Loreto: Santa Rosa, lower Rio Huallaga below Yurimaguas, 135 m, 1–5 September 1929, *E.P. Killip & A.C. Smith 28759* (Holotype: US).

Aspidogyne multifoliata (C. Schweinf.) Garay, Bradea 2, 28: 202. 1977.

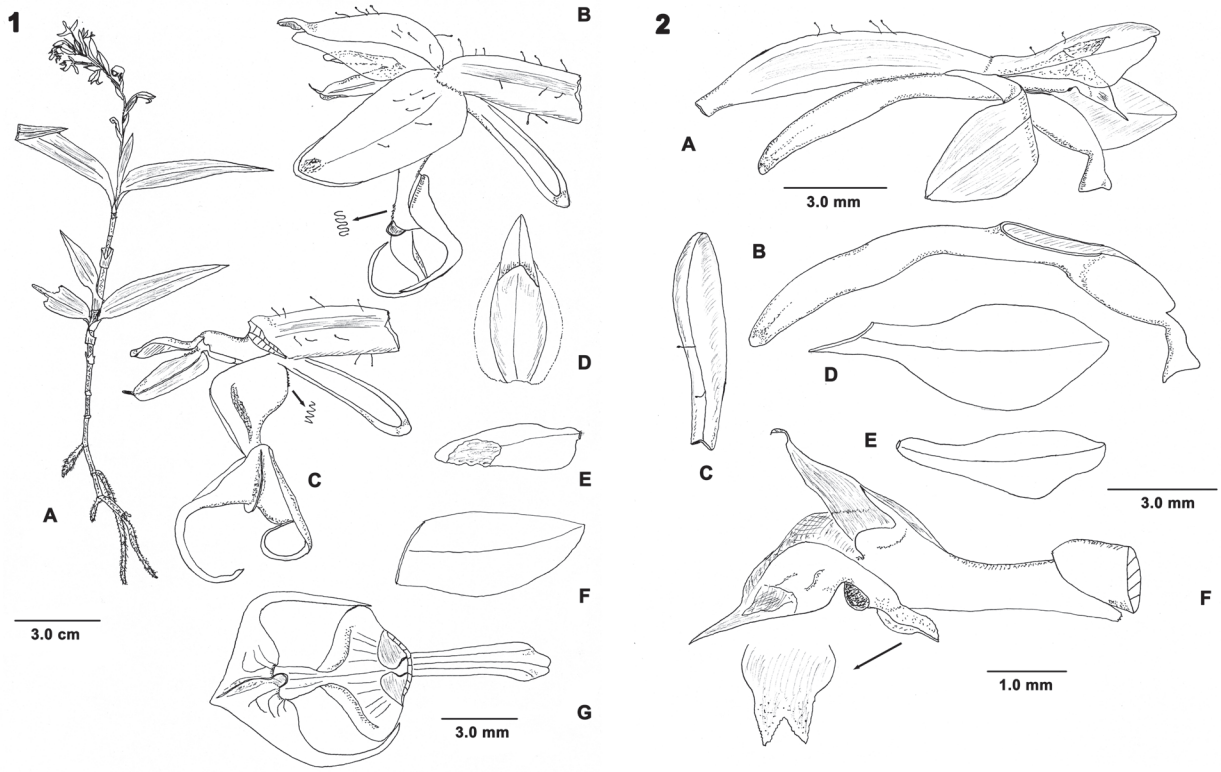
Distribution: Bolivia; Peru; Ecuador; Colombia; Venezuela; Guyana; Suriname; French Guiana; Brazil.

Szlachetko et al. (2016) argued that both *A. foliosa* and *A. multifoliata* occurred in the Guianas, despite the fact that Ormerod (2009) considered the two to be conspecific. The former authors stated that both entities can be distinguished by the shape of the labellum epichile, but according to their own drawings this character seems to be quite variable. This agrees with our observations in which we find that shape of the labellum epichile is continuous and cannot be used to distinguish the two entities. Furthermore, the types of both names originated from the lowlands near the Rio Huallaga in Peru.

Recently Szlachetko and Kolanowska (2017) reinstated the name *Physurus stenocentron,* transferring it to *Aspidogyne*, claiming it differed from the type of *Aspidogyne foliosa* in having obtuse (vs. truncate) lobules at the apex of the labellum hypochile. Their own drawing (f.537) of the type of *A. foliosa*, however, shows precisely this feature. Therefore we agree with Garay (1977) who reduced *Physurus stenocentron* to *Aspidogyne foliosa*.

Aspidogyne reddenii Ormerod & Carnevali, *sp. nov.* TYPE: GUYANA. CI Concession, Line 12 GFC, 3°21'58.9"N, 58°10'2.6"W, 105 m, 19 September 2008, *K.M. Redden (*with *K. Wurdack, A. Rodriguez, C. Perry, P. Ragnauth, N. John, H. James & H. Simon) 6079* (Holotype: US). Fig. 1.

Related to *A. unicornis* (Ormerod) Meneguzzo but flowers with the petals broadest basally (vs. apically), labellum sidelobes continuous (vs. interrupted), and the column with two basal elliptic to subquadrate wings (vs. exalate).



FIGURES 1–2. *Aspidogyne species*. FIGURE 1. *Aspidogyne reddenii* Ormerod & Carnevali. **A**, plant; **B**, flower; **C**, flower minus tepals; **D**, dorsal sepal (spread margins outlined); **E**, petal; **F**, lateral sepal; **G**, labellum and spur. Drawn from holotype. FIGURE 2. *Aspidogyne steyermarkii* Carnevali & Foldats. **A**, flower; **B**, labellum and spur; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, column (process arrowed, not to scale). Drawn from *Redden 6749* (US).

Terrestrial *herb*. *Rhizome* creeping, terete, rooting at nodes, 28–70 × 1–2 mm; internodes 10–26 mm long. *Stem* erect, terete, laxly 5–7 leaved, 92–170 × 1.0–1.2 mm; internodes 4.5–31.0 mm long. *Leaves* obliquely lanceolate, acute, "green-yellow along margin, lighter green with pink tinge," 31–79 × 6.5–12.0 mm; petiole and sheath 8–12 mm long. *Inflorescence* laxly pubescent, 50–65 mm long; peduncle ca. 20 mm long; sheathing bracts 1–2, up to 9 mm long; rachis subdensely ca. 12-flowered, 30–45 mm long; floral bracts ovate-lanceolate, subacuminate, pink, 7–10 × 3–6 mm. *Flowers* white? ("petals white"), externally sparsely pubescent. *Pedicel with ovary* subcylindric, laxly pubescent, 7–11 mm long. *Dorsal sepal* ovate-elliptic, subacuminate, concave-cymbiform, 1 veined, forming with the petals a galea, 6 × 3 mm. *Lateral sepals* obliquely oblong-elliptic, subacute-obtuse, 1 veined, 6.5 × 3.0 mm. *Petals* obliquely oblong-lanceolate, obtuse, 5.15 × 1.80 mm. *Labellum* spurred, trilobed, joined to column for 1.0–1.2 mm; spur clavate, obtuse, ca. 4.75 mm long, 1 mm wide dorsally; hypochile transversely elliptic, outside of each side with a thickened ridge parallel to the upper margin, ca. 3.3 mm long (free part ca. 2.2 mm long), 4.8 mm wide; mesochile rectangular (cuneate unspread), medially with some minute papillae on the upper surface, 2 mm long, 1.3–1.4 mm wide; epichile anchoriform, acute, 2.7 mm long medially, with lanceolate-subulate lobules each to 6 mm long; medial callus at base of epichile elliptic, obtuse, compressed, erect. *Column* ca. 4.5 mm long; rostellum basally flexible, elongate, ca. 3 mm long; column wings broadly elliptic to subquadrate, ca. 1 mm long and wide.

Distribution: Guyana.

Habitat: Swampy forest and upland slopes, 105 m.

Eponymy: Named after K.M. Redden, collector of the type.

This species is related to a group of taxa formerly placed in the genus *Ligeophila* Garay, now merged with *Aspidogyne*. Its closest relatives are three Venezuelan taxa, namely *A. amazonica* (Garay) Meneguzzo, *A. gavilanensis* (Ormerod & Romero) Meneguzzo, and *A. unicornis* (Ormerod) Meneguzzo. Among these *A. unicornis* is the only one with a compressed projection on the labellum epichile, but it differs from *A. reddenii* in having the petals widest apically, a labellum hypochile with small, truncate lobules (vs. uninterrupted), and a column lacking wings.

Aspidogyne amazonica is closest to *A. reddenii* in petal shape but the latter has oblong-lanceolate (vs. oblong) petals, a compressed projection (vs. a low thickening) on the labellum epichile, and a distinctly winged (vs. exalate) column. *Aspidogyne gavilanensis* differs in having its petals wider apically, a labellum hypochile with small, truncate lobules, and an exalate column.

Aspidogyne steyermarkii Carnevali & Foldats, Ann. Missouri Bot. Gard. 76: 596. 1989. TYPE: VENEZUELA. Bolivar: headwaters of the Rio Chicanán, Sierra de Lema, 80 km SW of El Dorado, 500 m, 22 August 1967, *J.A. Steyermark 89371* (Holotype: VEN; Isotype: MO). Fig. 2.

Terrestrial *herb*. *Rhizome* terete, creeping, rooting at nodes. *Roots* terete, pubescent. *Stem* terete, erect, laxly 6-leaved, 40 × 1.0–1.5 mm; internodes to 14 mm long. *Leaves* ovate, acute, green with pink to red markings above, 6–14 × 3.5–7.5 mm; petiole and sheath 6–7 mm long. *Inflorescence* pubescent, 97–100 mm long; peduncle 85 mm long; rachis laxly 3–4 flowered, 12–15 mm long; floral bracts ovate, acute, ca. 7 × 4 mm. *Flowers* "white-purple" or "calyx green, corolla white with purple venation," probably the flowers have greenish sepals, white petals with a purple stripe and a white lip, similar to its Brazilian relatives, sparsely pubescent externally. *Pedicel with ovary* fusiform, sparsely pubescent, ca. 8.7 mm long. *Dorsal sepal* oblanceolate, subacute, concave, forming with the petals a galea, 5.2 × 1.5 mm. *Lateral sepals* obliquely obovate-oblanceolate, obtuse, ca. 7.2 mm long (incl. basal extension), 2.6–2.7 mm wide. *Petals* obliquely rhombic-oblanceolate, subacute, 5.2 × 1.75–1.80 mm. Labellum trilobed, spurred, joined to column and ovary for 2.5 mm; spur narrowly fusiform-subterete, obtuse, 6.5–7.0 mm long, 1 mm wide laterally; hypochile elliptic, concave, at apex each side with a small triangular, subacute lobule, 2.5 × 2.2 mm; epichile obdeltate, truncate, medially with a short apiculus, 1.5 × 1.6 mm. *Column* clavate, 4.5 mm long; rostellum acuminate, ca. 1.8 mm long; sides of clinandrium meeting behind the stigma to form a retrorse, ovate, bifid, laminate process.

Distribution: Venezuela; Guyana.

Additional specimens examined: GUYANA. Kako River, Chinakuruk Mountain to Amerindian farm, 1120 m, 23 May 2009, *K.M. Redden (*with *K. Wurdack, C. Perry, D. Hunter, T. Hunter & V. Roland) 6749* (US); Kako River, 810 m, 11 May 2009, *K.M. Redden (*with *K. Wurdack, C. Perry, E. Zimmerman, D. Hunter, T. Hunter & V. Roland) 6527* (US).

Habitat: Laterite and white sand (*Redden 6749*); Gallery forest and up small mountain slope. Lower vegetation including *Macrolobium, Hevea, Eperua grandiflora,* Annonaceae, Clusiaceae. Erect herb growing at base of tree fall. Common in small colonies (*Redden 6527*). 810–1120 m.

This species represents an isolated member of the *A. argentea* (Vellozo) Garay complex, the latter group being confined to Brazil, Paraguay, and Argentina. The discovery of *A. steyermarkii* in Guyana represents a new record for the orchid flora of country, and the first additional specimens since the type was collected in 1967. We have provided a description and drawing based on the Guyanese specimens to augment knowledge of the species since it was first named. Of particular interest is a retrorse process behind the stigma, which has not been observed in this group before. We do not know its purpose.

Aspidogyne tulamengensis Ormerod & Carnevali, *sp. nov.* TYPE: GUYANA. Tulameng Mountain, along line from Camp 6, ca. 5 km E of summit to base of high falls, *c*. 4 km E to SE of summit, 675–915 m, 15 July 2010, *K. J. Wurdack* (with *K. Redden, S. Alexander, C. Perry, C. Jacobis, D. Hunter, V. Roland & H. Hunter*) *5333* (Holotype: US). Fig. 3.

Related to *A. robusta* (C. Schweinf.) Garay but with ovate-rhombic (vs. oblong-lanceolate) floral bracts, flowers half as small (sepals to 8.9 mm vs. to 16 mm), with rhombic (vs. oblanceolate) petals, and shorter (11.7 mm vs. to 26 mm) spur.

Terrestrial *herb*. *Rhizome* not seen. *Roots* terete, pubescent. *Stem* erect, terete, dark purple, 4–5 leaved apically, 64.5 × 0.7–1.3 cm; internodes 2.1–6.2 cm long. *Leaves* obliquely oblong to oblong-elliptic, subacuminate, green-drying, 13.5–15.0 × 4.6–5.3 cm; petiole and sheath 6 cm long. *Inflorescence* immature, 16.6 cm long; peduncle ca. 7.5 cm long; sheathing bracts two, flushed purple, 2.4–3.0 cm long; rachis densely many-flowered, 9.1 cm long; floral bracts ovate-rhombic, subacuminate, 3-veined, externally lax pubescent, thinly papyraceous, to 2 × 1 cm. *Flowers* cream-maroon, externally lax pubescent. *Pedicel with ovary* clavate, pubescent, 13 mm long. *Dorsal sepal* oblong-elliptic, subacute, forming a galea with the petals, 8 × 3 mm. *Lateral sepals* obliquely oblong-lanceolate, subacuminate, 8.9 mm long (incl. 1.7 mm long oblique basal part), 2.7 mm wide. *Petals* obliquely rhombic, subacute, 7.2 × 3 mm. *Labellum* trilobed, spurred, joined to ovary and column for 3 mm; spur clavate, apex shallowly bilobed, ca. 11.7 mm long, 2 mm wide dorsally; hypochile free part ca. 2 mm long, 3.2 mm wide, each side with short, obtuse to subacute tips ca. 0.3 mm long; mesochile subquadrate, ca. 1 × 1.1–1.2 mm; epichile transversely rhombic, 1.a5 × 3 mm. *Column* 6 mm long.

Distribution: Guyana.

Habitat: Transitional forest leading to falls, 675–915 m.

Etymology: Named after Tulameng Mountain, the type locality.

Externally, this species resembles *Microchilus fendleri* Ormerod from Venezuela in its robust habit and almost paleaceous floral bracts. However it is a member of the genus *Aspidogyne,* and most closely related to *A. robusta,* differing in having ovate-rhombic (not oblong to oblong-lanceolate) floral bracts, half as small flowers, and rhombic (not oblanceolate) petals.

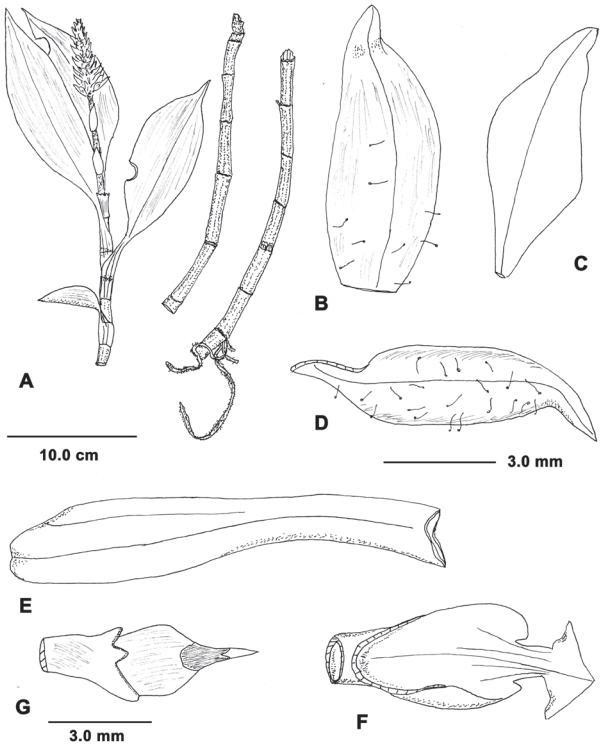


FIGURE. 3. *Aspidogyne tulamengensis* Ormerod & Carnevali. **A**, plant; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, spur; **F**, labellum; **G**, column (ventral). Drawn from holotype.

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