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Cover: *Piper sotobosquense* S. M. Niño & Dorr
(see page 10, Figure 1). Drawing by Alice R. Tangerini.

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A Publication of the Harvard University Herbaria Including
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Wayne Takeuchi and Deby Arifiani

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FLORISTIC RECORDS IN RUBIACEAE FROM THE UPPER SEPIK
OF PAPUA NEW GUINEA: *AIROSPERMA GRANDIFOLIA*
AND *PSYCHOTRIA AUGUSTAFLUSSIANA SP. NOV.*

WAYNE TAKEUCHI^{1,2} AND DEBY ARIFIANI³

Abstract. *Psychotria augustaflussiana* is described from remote environments in Papua New Guinea's upper Sepik drainage. Taxonomic and distributional notes are provided for *Airosperma grandifolia*, a frequent associate of the new species but otherwise rarely represented in herbarium collections.

Keywords: distributional records, Kaiserin-Augusta-Fluss Expedition, new species

Although its generic conspectus is subject to continuing debate and refinement, the rubiaceaceous flora is undoubtedly one of the most diversified and endemic components of the Papuan vegetation (Davis et al., 2009). *Psychotria* L. is by far the largest element, with an estimated 120 fruticose/arborescent species in New Guinea and adjacent islands, but the family also includes

many small and poorly understood genera. *Airosperma* K. Schum. & Lauterb. is one of these obscure groups. The following discussion presents previously unknown details for the most distinctive species in the latter genus, drawing from observations on newly discovered populations. An unusual *Psychotria* is also described from the same habitats.

MATERIALS AND METHODS

Taxonomic descriptions are based on the attributes from dried specimens. Characters determined in situ from living plants are reported separately as "field characters."

Silica-dried leaf samples from *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25061 (*Airosperma grandifolia*) have been inserted with the A, K, and L duplicates. Similarly prepared

leaf samples from *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 24926 (*Psychotria augustaflussiana*) are included with the A, CANB, and K duplicates. Ethanol-preserved flowers in a Nalgene® bottle are with the LAE duplicate for *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25061.

TAXONOMY

Airosperma grandifolia Valetton (1912: 760). TYPE: INDONESIA. Jayapura District: Beguwri River, 02°58'23"S, 140°57'18"E, ca. 170 m, 29 June 1910, *K. Gjellerup* 239 (Holotype: BO [1887340]). Figs. 1–5.

Additional specimens examined: PAPUA NEW GUINEA. West Sepik Province: upper Sepik basin, alluvial forest in steep-sided valley, 04°37'16"S, 141°43'42"E, 630 m, 3 December 2009, *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25061 (A, BO, CANB, K, L, LAE); streambed in lowland hill forest, 04°37'16"S, 141°41'23"E, 420 m, 13 December 2009, *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25334 (A, K, L, LAE); *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25336 (A, LAE); riverbed in lowland hill forest, 04°38'45"S, 141°47'41"E, 380 m, 3 February 2010, *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25437 (A, LAE); riverine forest, 04°43'25"S, 141°47'13"E, 355 m, 19 February 2010, *W. N. Takeuchi*, *D. Ama* & *A. Gambia* 25788 (A, L, LAE).

There are very few specimens of this species, and essentially nothing was previously known of its ecology or in situ occurrences. For his synopsis of the genus, Darwin (1980) was able to examine a single specimen, which (like the type) had only insect-damaged flower buds. The fruits of *Airosperma grandifolia* had not been seen until the 2009–2010 surveys of the upper Sepik.

For obvious logistical reasons, biological exploration of the cross-border region (the interval from Jayapura in Indonesian Papua, to West Sepik Province in PNG) has been historically confined to the coast and nearby environments. Interior forests of the major basins, especially at the Central Divide, are practicably accessible only by helicopter. From recently concluded surveys, it has become increasingly apparent that many species once thought to be rare or possibly even extinct (e.g., *Christensenia aesculifolia* (Blume) Maxon, *Diospyros fusicarpa* Bakh.,

The Sepik botanical surveys of 2009–2010 were supported (in part) by the Arnold Arboretum and the Harvard University Herbaria. Francis Crome (ornithologist) was the senior investigator and principal planner for the terrestrial studies. Our colleagues in the field also included Ken Aplin (mammalogist), Chris Müller (entomologist), Stephen Richards (herpetologist), Michael Sale (Coffey Natural Systems liaison), and Iain Woxvold (ornithologist and team leader).

¹ PNG National Herbarium, PNG Forest Research Institute, P. O. Box 314, Lae, Morobe Province 411, Papua New Guinea

² Corresponding author: wtnewguinea@hotmail.com

³ Herbarium Bogoriense, Research Center for Biology, Indonesian Institute of Sciences, Jl. Raya Jakarta-Bogor KM 46, Cibinong 16911, Indonesia; debyarifiani@yahoo.com



FIGURE 1. *Airosperma grandifolia* Valetton. Photograph of the holotype. From K. Gjellerup 239 (BO). Photograph by D. Arifiani.



FIGURE 2. *Airosperma grandifolia* Valetton. Ascending stalks, ca. 1 m tall. From W. N. Takeuchi, *D. Ama & A. Gambia 25061*. Photograph by W. N. Takeuchi.



FIGURE 3. *Airosperma grandifolia* Valetton. Vegetative structures. **A**, apical view of branched shoot; **B**, stipules. Valetton (1912) had described the stipules as early-falling, but in all individuals examined in the field they are persistent. A–B from W. N. Takeuchi, *D. Ama & A. Gambia 25061*. Photographs by W. N. Takeuchi.

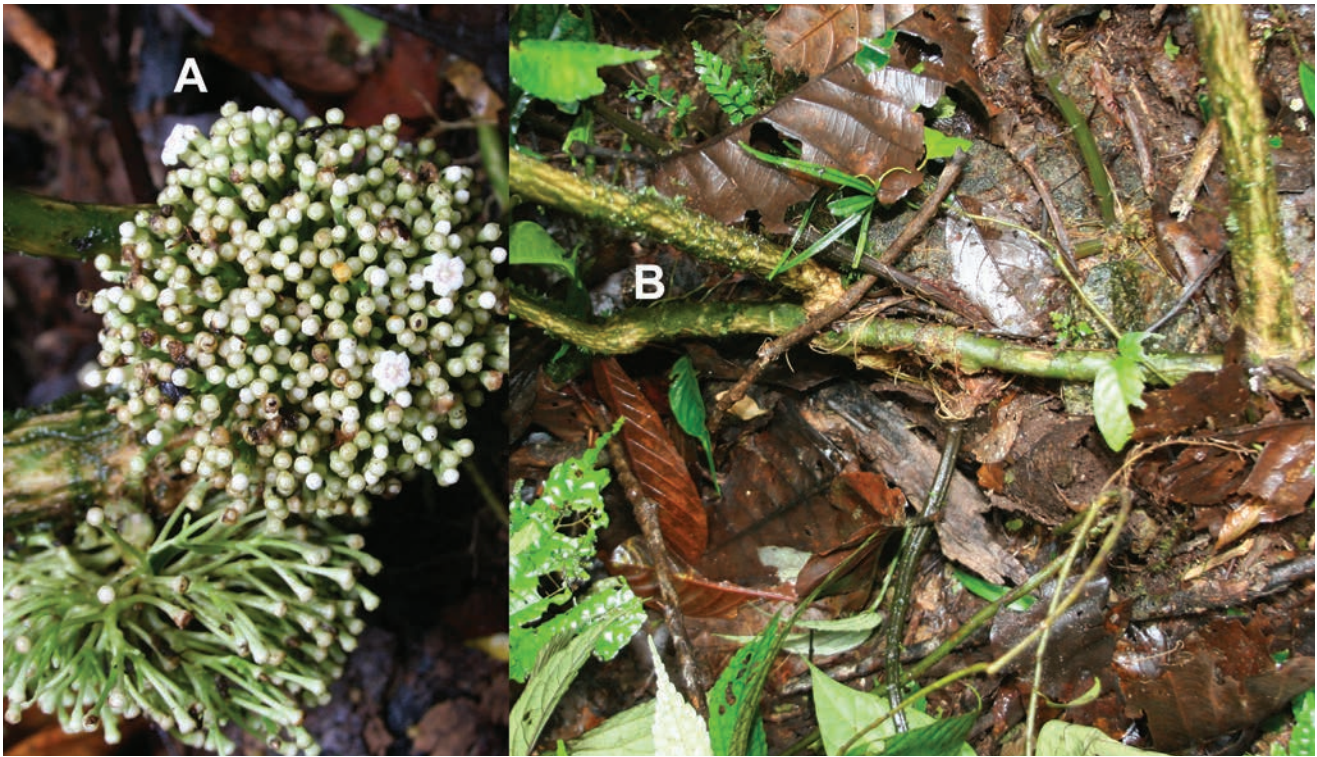


FIGURE 4. *Airosperma grandifolia* Valetton. **A**, cauline inflorescences at ground level; **B**, ascending stems (3 shown) developed from a surface runner. A–B from W. N. Takeuchi, D. Ama & A. Gambia 25061. Photographs by W. N. Takeuchi.

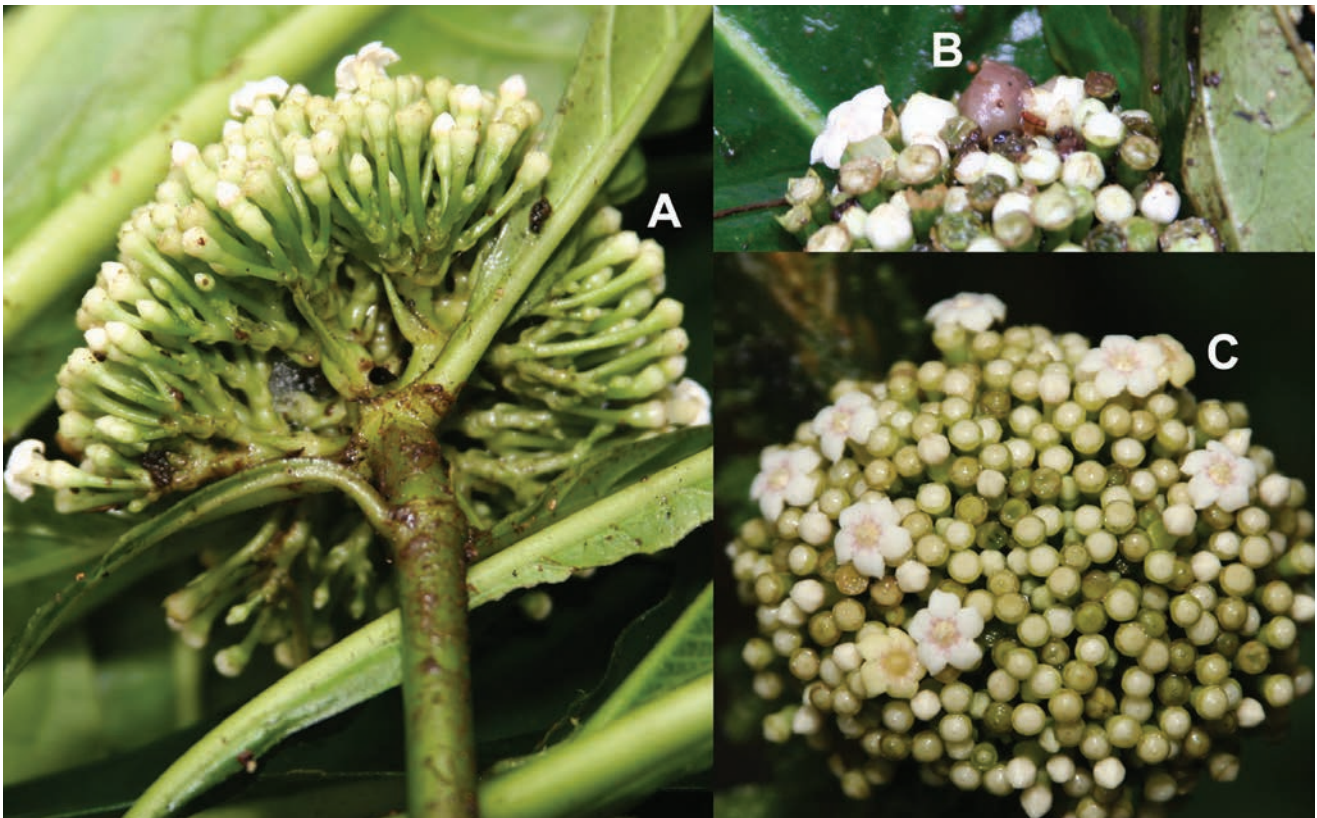


FIGURE 5. *Airosperma grandifolia* Valetton. **A**, proximal view of a terminal head; **B**, submature fruit (purple); **C**, anthetic corollas in frontal perspective. A, C from W. N. Takeuchi, D. Ama & A. Gambia 25061; B from W. N. Takeuchi, D. Ama & A. Gambia 25334. Photographs by W. N. Takeuchi.

Dischidia torricellensis (Schltr.) P. I. Forst., *Discocalyx pygmaea* Kaneh. & Hatus., *Rheopteris cheesmaniae* (Alston), are actually common plants of these remote inland habitats. Historical perceptions of rarity are primarily the result of narrow endemics being first discovered at their geographic limits. *Airosperma grandifolia* can be added to this expanding list of misunderstood plants.

Despite the many knowledge gaps associated with *A. grandifolia*, large populations were recorded at nearly every lowland bivouac on the Sepik surveys. Although described as monocaulous by Valetton (1912: 760) the species often occurs as a gregarious tangle of stems, with individual stalks (unbranched or not) developed from surface runners or from trailing/leaning axes which can extend for several meters along the ground (Figs. 2–4). The distinctive inflorescences are produced from apical axils or from old wood near ground level (Figs. 4–5). Less frequently the heads are also terminal on short lateral shoots. Anthetic flowers are heterostylous, with staminate and pistillate forms on separate individuals. In long-styled (pistillate) flowers the stigmatic lobes are well developed (1.5 mm long in bottled material) and slightly exerted. The androecium is comprised of barren stamens attached inside the hair ring. In short-styled (staminate) flowers the included style is greatly reduced (shorter than the corolla tube), and with contracted stigmatic lobes (0.5 mm long). The polleniferous stamens are clearly larger. In his description of the type, Valetton (1912) was obviously working from a short-styled specimen. Functional dioecy had been established earlier (in Darwin, 1980) for the sympatric *Airosperma psychotrioides* K. Schum. & Lauterb. but was previously impossible to evaluate for *A. grandifolia*.

Unlike its congeners, *A. grandifolia* is a riparian species associated with closed overstories. Hundreds of sightings were made during the 2009–2010 expeditions; always a short distance from flowing water and usually within the surge zone around streams. The umbrophilous communities populated by *A. grandifolia* are collectively among the largest formations in the Sepik Foothill Zone, encompassing many thousands of hectares and including vast forest tracts never subjected to scientific scrutiny. Significant range extensions can be expected as future investigators venture further into the upper basin.

Psychotria augustaflussiana W. N. Takeuchi, *sp. nov.*
TYPE: PAPUA NEW GUINEA. West Sepik Province: upper Sepik drainage, lowland hill forest, 04°38'47"S, 140°47'47"E, 355 m, 2 February 2010, W. N. Takeuchi, D. Ama & A. Gambia 25405 (Holotype: A; Isotypes: BO, CANB, K, L, LAE). Figs. 6–8.

Affinis Psychotriae leucococcae Valetton *sed lobis stipulis filiformibus foliis chartaceis nec rugosis inflorescentiis et fructibus pilosis persistentibus differt.*

Subshrubs 55–110 cm tall, sparingly-branched (or monoaxial). *Basal stems* cylindrical, (2–)3–5 mm diameter, periderm pale brown, smooth to inconspicuously furrowed, without lenticels (rarely with elliptic lenticels 0.5–4 mm long). *Branchlets* compressed, 0.8–3 mm wide, planate or not, opposed, divaricate, pithy, longitudinally wrinkled, light brown, abscission scars absent, surfaces obscured by

hairs; indument pilose (or hirsute), usually 1–1.5 mm long, septate, crispate, dense, persisting, tawny to yellow brown; internodes 5–40(–62) mm long. *Leaves* equal, divergent, pilose; stipules deltate-ovate, (2.5–)5–13 × (0.7–)2–4 mm, parted to the middle, paired, free, persisting, papery, bifacially marked by linear raphides, adaxially appressed-barbate at the base, otherwise glabrous on the inside, lobes filiform, 2.5–5.5(–8) mm long; petioles 3–12(–18) × 0.4–1 mm, planoconvex or subcylindrical, concolorous with branchlets, not articulated; leaf-blades linear-elliptic, (22–)64–110(–122) × 4–22(–28) mm, chartaceous; base cuneate (or obtuse), symmetrical; margin entire; apex acute to attenuate, often curved to one side; lamina surfaces inconsistently pustulate; adaxially fuliginous-nigrescent, abaxially brunnescent, granulate; cystoliths linear, discolorously pale, infrequent; domatia absent; venation brochidodromous, secondary veins 7–15 per side, at the lamina center with divergence angles of 45–60(–80)°, (2–)4–9 mm apart, arcuate, uniting by commissural looping nerves 0.2–2 mm from the margin, anastomosing beyond the loops or not; reticulum obscure, filiform, irregular, coarsely areolate; midribs adaxially flat or nearly so, abaxially prominent; higher order venation invisible above, weakly raised beneath. *Inflorescence* terminal, condensed, 9–13 × 7–12 mm, dichasial, cernuous, shaggy, black; peduncle 2.5–5 × 0.3–1 mm, compressed; bracts linear, 2–4.5 × 0.1–0.3 mm, caducous; pedicels 1–1.5 × 0.2–0.4 mm. *Flowers* (measurements from bottled material) heterostylous, pentamerous, 3–9 together, obtuse in bud, externally villous; calyx funnelform, united in the lower 1.7–2 mm, glabrous inside, lobes triangular, 0.8–1.2 × 0.8–1 mm; corolla tube cylindrical, 2.8–4 × 1.5–2 mm, lobes elliptic, 2.5–4 × 1–1.6 mm, reflexed at anthesis, throat barbate; stamens alternipetalous, filaments 1.5–1.7 × 0.2–0.3 mm, attached inside the 1–1.5 mm wide hair-ring, anthers oblongoid, 1.2–1.4 × 0.2–0.3 mm, basifixed, exerted; disk dome-shaped, fleshy, smooth; style (in short-styled flower): ca. 2.5 × 0.2 mm, stigmatic lobes ca. 0.5 mm long, included, not reaching the filaments; long-styled form (seen in bud only): style longer than corolla tube, stigmatic arms exerted. *Drupe*s ellipsoid-obovoid, 6.5–10 × 4.5–7.5 mm, pilosulous, ebracteate, jet black (or light brown), copiously set with pale raphides, crowned by the disk; fruiting calyx early-falling (or with linear segments 0.5 mm long); pyrenes 2, hemispherical; endocarp crustaceous, 3(–4)-ridged on the back, commissural face planate; preformed germination slits (2) marginal, extending halfway to the apex; seed without ethanol soluble pigments, endosperm ruminant.

Etymology: The epithet commemorates the historic Kaiserin-Augusta-Fluss Expedition (1912–13) to the upper Sepik.

Additional specimens examined: PAPUA NEW GUINEA. West Sepik Province: upper Sepik drainage, premontane forest, 04°39'03"S, 141°43'14"E, 945 m, 30 November 2009, W. N. Takeuchi, D. Ama & A. Gambia 24923 (A, BO, BRI, CANB, K, L, LAE); W. N. Takeuchi, D. Ama & A. Gambia 24926 (A, BO, CANB, K, L, LAE); ridgeline in lowland hill forest, 04°39'05"S, 141°48'08"E, 300 m, 4 February 2010, W. N. Takeuchi, D. Ama & A. Gambia 25452 (A, K, L, LAE).



FIGURE 6. *Psychotria augustaflussiana* W. N. Takeuchi. Habit, 0.5 m subshrubs (two shown) in forest understory. From W. N. Takeuchi, *D. Ama & A. Gambia* 24923. Photograph by W. N. Takeuchi.



FIGURE 7. *Psychotria augustaflussiana* W. N. Takeuchi. Vegetative structures. From W. N. Takeuchi, *D. Ama & A. Gambia* 25405. Photographs by W. N. Takeuchi.



FIGURE 8. *Psychotria augustaflussiana* W. N. Takeuchi. **A**, immature fruits; **B**, mature fruit; **C**, pre-anthetic flowers. A from W. N. Takeuchi, D. Ama & A. Gambia 25405; B–C from W. N. Takeuchi, D. Ama & A. Gambia 24923. Photographs by W. N. Takeuchi.

Field characters: Understory subshrubs, gregarious; all parts densely white-pilose; branches opposed, horizontal, fragile; stipules white; leaf-blades chartaceous, adaxially mid-green, abaxially pale green; inflorescence/infructescence erect or nodding, axes green; fruits spongy, dull white, irregularly shaped, globose, 13–15 × 13–14 mm in vivo; endosperm white with brown ruminations from the margins.

Distribution: Throughout the colline zone in West Sepik Province, near historical localities of the Kaiserin-Augusta-Fluss Expedition of 1912–13 (Fig. 9).

Habitat and ecology: A dominant understory species in lowland and premontane forests from 300–945 m.

Phenology: Flowering and fruiting in November and February.

The new species is the latest addition to an informal complex of congeners centered around *Psychotria leucococca* K. Schum. & Lauterb. and comprised of small montane shrubs with commensurately reduced structures and white fruits (the “*leucococca* group” sensu Sohmer, 1988). The most common members of the alliance are *Psychotria dieniensis* Merr. & L. M. Perry, *P. dolichosepala* Merr. & L. M. Perry, *P. giluwensis* Sohmer, *P. magnasepala* Sohmer, *P. murmurensis* Sohmer, *P. nanifrutex* Sohmer, and *P. valetoniana* Sohmer. Species circumscriptions within this assemblage are often problematic and will probably require future adjustment.

The overwhelming majority of Papuan *Psychotria* are glabrous or obscurely puberulent. Within the *leucococca* facies, *Psychotria dolichosepala*, *P. frodinii* Sohmer, and *P. murmurensis* are unusually hairy (reddish-brown) on most parts, recalling the dense hair-covering on *P. augustaflussiana* (the latter tawny- or yellowish-pilose). The similarity in indument is coincidental—hairy representatives of the complex can be easily separated from *P. augustaflussiana* by their much thicker (rugose) leaves and by fruits persistently crowned by large calyces.

In the new *Psychotria*, vegetative characters (stature, leaf size, internode length) vary inversely with elevation. Lowland populations for example, have leaf-blades (64–) 80–110(–122) × 12–22(–28) mm, but at the premontane transition the blades are (22–)31–68(–88) × 4–12(–18) mm. The characteristic indument remains constant however, throughout the plant’s elevational range. Although montane populations of *P. augustaflussiana* can have a superficial resemblance to *Amaracarpus* Blume, the flower and pyrene characters are undoubtedly indicative of *Psychotria* as defined by modern study of the Psychotrieae (cf. Davis and Bridson, 2001, 2004; Davis et al., 2001; Sohmer and Davis, 2007). The stamens inserted within the corolla hair-ring, and pyrenes with marginal germination slits (2) provide conclusive support for the generic assignment.

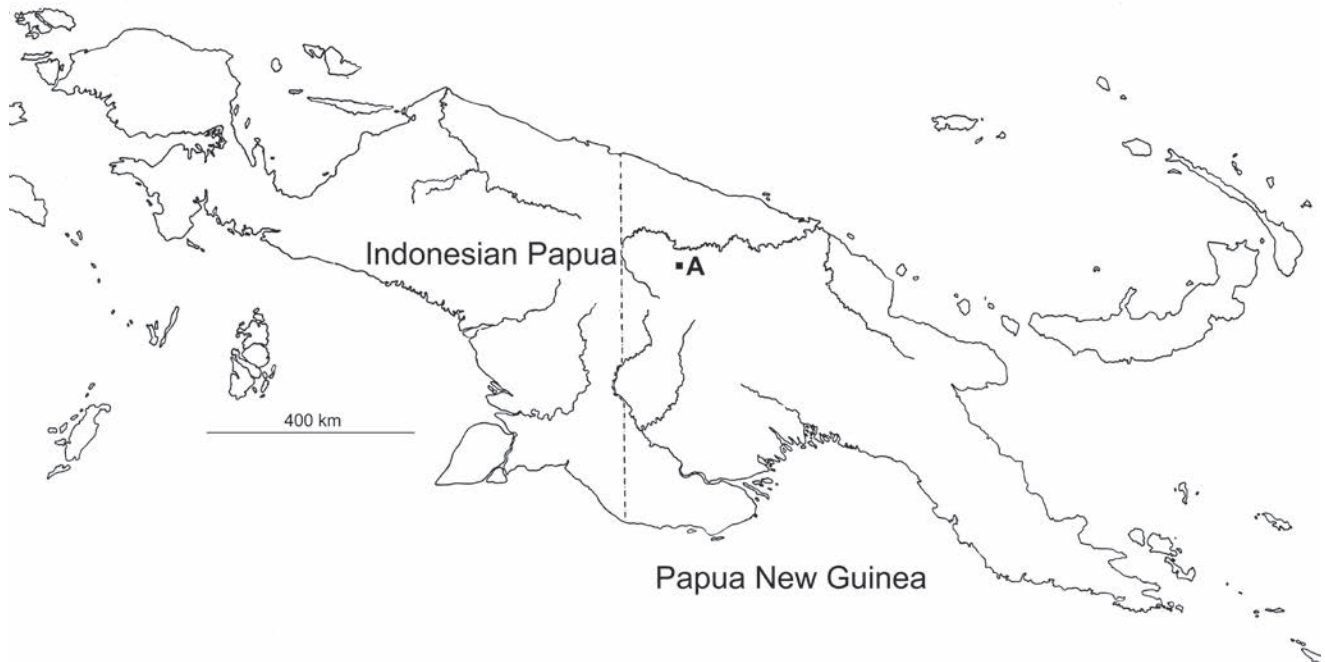


FIGURE 9. Island of New Guinea. A, location of the 2009–2010 surveys of the upper Sepik.

LITERATURE CITED

- DARWIN, S. 1980. Notes on *Airosperma* (Rubiaceae), with a new species from Fiji. *J. Arnold Arbor.* 61: 95–105.
- DAVIS, A. P. AND D. M. BRIDSON. 2001. A taxonomic revision of the genus *Dolianthus* (Rubiaceae). *Blumea* 46: 421–446.
- AND D. M. BRIDSON. 2004. A taxonomic revision of the genus *Amaracarpus* (Rubiaceae, Psychotrieae). *Blumea* 49: 25–68.
- , D. M. BRIDSON, C. JARVIS, AND R. GOVAERTS. 2001. The typification and characterization of the genus *Psychotria* L. (Rubiaceae). *Bot. J. Linn. Soc.* 135: 35–42.
- , R. GOVAERTS, D. M. BRIDSON, M. RUHSAM, J. MOAT, AND N. A. BRUMMITT. 2009. A global assessment of distribution, diversity, endemism, and taxonomic effort in the Rubiaceae. *Ann. Missouri Bot. Gard.* 96: 68–78.
- SOHMER, S. H. 1988. The nonclimbing species of the genus *Psychotria* (Rubiaceae) in New Guinea and the Bismarck Archipelago. *Bishop Mus. Bull. Bot.* 1: 1–339.
- AND A. P. DAVIS. 2007. The genus *Psychotria* (Rubiaceae) in the Philippine Archipelago. *Sida, Bot. Misc.* 27: 1–247.
- VALETON, TH. 1912. Rubiaceae. *Nova Guinea* 8: 755–775.

DOS NUEVAS ESPECIES DE *PIPER* (PIPERACEAE) DE LOS ANDES DE VENEZUELA

SANTOS M. NIÑO^{1,3} Y LAURENCE J. DORR²

Abstract. Two new species of *Piper* are described and illustrated. *Piper sotobosquense* and *P. calvarii*, currently considered endemic to Venezuela, are found only on the slopes and montane forests of Guaramacal National Park, Portuguesa and Trujillo states, Venezuela. Taxonomic relationships also are discussed and comments on distribution and ecology are presented.

Keywords: *Piper*, Andes, Guaramacal National Park, Venezuela

Resumen. Dos nuevas especies de *Piper* son descritas e ilustradas. *Piper sotobosquense* y *P. calvarii* hasta ahora se consideran endémicas de Venezuela, ubicadas únicamente en laderas y bosques montañosos del Parque Nacional Guaramacal, estados Portuguesa y Trujillo, Venezuela. También se discuten relaciones taxonómicas y se presentan comentarios sobre distribución y ecología.

Palabras clave: *Piper*, Andes, Parque Nacional Guaramacal, Venezuela

Piperaceae se distribuyen por todo el trópico y subtropical del planeta. Incluyen cinco géneros y unas 3000–3600 especies (Wanke et al., 2006, 2007; Samain et al., 2008; Callejas, 2014). En Venezuela se encuentran tres géneros (*Manekia* Trel., *Peperomia* Ruiz & Pav. y *Piper* L.) y ca. de 272 especies, 82 de ellas endémicas (Callejas, 2008). El género *Piper* es pantropical con unas 2000 especies alrededor del mundo (Jaramillo y Manos, 2001; Quijano-Abril et al., 2006; Jaramillo et al., 2008), y ca. de 150 en Venezuela (Steyermark, 1984; Steyermark y Callejas, 2003, 2008).

En este artículo se describen e ilustran dos especies nuevas de *Piper*, que crecen en bosques andinos en la Cordillera de Mérida, Venezuela en su vertiente sur, hacia la gran Cuenca del Orinoco. El área de distribución de ambas especies fue explorada intensivamente por los autores durante los años 1988–2005, lo que resultó en un inventario preliminar del Parque Nacional Guaramacal (Dorr et al., 2000), del cual resultaron estas especies nuevas para la ciencia.

Piper sotobosquense S. M. Niño & Dorr, *sp. nov.* TYPE: VENEZUELA. Trujillo: Municipio Boconó, Parque Nacional Guaramacal, on road from Boconó to Guaramacal, SE of Guaramacal, montane forest, N slope of mountain, understory tree, 09°13'N, 070°12'W, 1950 m, 15 July 1995, L. J. Dorr, L. C. Barnett & J. Rivero 8136 (Holotipo: PORT; Isotipos: HUA, K, US [00513985]). Fig. 1.

Diagnosis: Shrub or small tree 2–4 m tall. Petiole 4–8 mm long, sheathed; stipule almost always persistent, curved, 3–10 mm long, black when dry; leaf blade 6–12(–14) cm long, 1.5–4(–5.5) cm wide, pinnatinerved with 3–6 secondary veins on each side, densely or conspicuously glandular-stipitate below, glands brown or almost black. Spike 3–6 cm long and 2–3 mm in diameter at anthesis; peduncle 4–10 mm long and 0.8–1 mm in diameter; floral bracts fimbriate, not forming rings, dispersed on the floral axis; stigmas 3, curved.

Arbusto o árbol pequeño 2–4 m de altura. Tallos glabros con entrenudos de ramas basales de 5–9 cm de separación y ramas terminales con 2–3.5 cm, con evidentes cicatrices y restos de peciolos envainadores, casi siempre glabros, pero a veces piloso adpresos. Estípulas regularmente persistente, negra al secar, curva, 3–10 mm largo, casi siempre glabra, en ocasiones hirsuto, glandulosa. Hojas con lámina ovado-lanceolado o lanceolado acuminadas, base subequilaterales o equilaterales en algunas hojas de la misma rama, ambos lados agudos o subagudos, el lado desigual generalmente 1–3 mm más corto que el otro, 6–12(–14) cm de largo y 1.5–4(–5.5) cm de ancho, pinnatinervada con 3–6 venas secundarias de cada lado, extendiéndose hacia los márgenes en un ángulo de 30°–45° anostomosándose a 3–4 mm del margen, nervio principal y secundarios glabros o pubescente adpresos, levemente elevados por el envéz, glabros y lisos o levemente elevados en la haz, envéz densamente o conspicuamente glandular punteado café o casi negro; peciolo 4–8 mm de largo, cortamente alado, cada ala se inserta en la base laminar, generalmente glabros, algunas minutamente hirtulos, vaginados en la base con 2–2.5 mm de largo-vaginal y siempre con borde levemente elevado sobre el eje peciolar a veces calloso-involuto. Inflorescencia erecta; espiga verde o banquescina-verdosa, 3–6 cm de largo, 2–3 mm de grueso en antesis y 3–4 mm de grosor en fruto; pedúnculo 4–10 mm de largo y 0.8–1 mm de grosor; bráctea floral triangular, con bordes densamente fimbriados; anteras divaricadas, lateralmente dehiscentes, teca 0.3 mm de largo. Fruto globoso, subgloboso o redondeado apicalmente, 0.8–1.2 mm de diámetro, algo deprimido en el centro, glabro, liso, a veces verrucoso; estigmas 3, cortos, curvos, 0.1–0.2 mm de largo.

Etimología: El epíteto se deriva del hábitat.

Distribución y hábitat: Solo conocida del Parque Nacional Guaramacal, en ambas vertientes; 1550–2120 m. La especie es abundante y frecuente en sitios poco disturbados

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¹ BioCentro-UNELLEZ, Mesa de Cavacas, Guanare, estado Portuguesa, Venezuela

² Department of Botany, MRC-166, National Museum of Natural History, Smithsonian Institution, P.O. Box 37012, Washington DC 22013, U.S.A.

³ Autor de correspondencia: santosmiguelnino@gmail.com



FIGURA 1. *Piper sotobosquense* S. M. Niño & Dorr. **A**, Hábito; **B**, Base de la hoja, prófalo y inflorescencia opuesta a la hoja; **C**, Parte de la infructescencia; **D**, Parte de la inflorescencia (estaminodios); **E**, Parte apical de la inflorescencia; **F**, Bráctea floral; **G**, Frutas (vista lateral). A–C, E–F, Dorr et al. 8136 (US [00513985]); D, Dorr and Yustiz 8539 (US). Dibujo de A. R. Tangerini.

y prístinos, siempre a elevaciones superiores a 1500 m. Representa un elemento importante en el sotobosque de los bosques nublados de Guaramacal. Aparentemente, una vez que la planta alcanza su madurez, mantiene floración y fructificación durante todo el año, pues se reporta en esta condición desde marzo hasta diciembre.

Observaciones: *Piper sotobosquense* posee similitudes con *P. jauaense* Steyererm. y *P. tenuimicronatum* C. DC., la primera del Escudo Guayanés venezolano (1800–1900 m) y la segunda de la región montana boscosa de Panamá (1200–1700 m). *Piper tenuimicronatum* es siempre arbustiva de 1–2 m y posee brácteas florales triangulares formando anillos, mientras que *P. sotobosquense* puede alcanzar porte arbóreo, hasta 2–4 m, sin anillos y sus brácteas son dispersas en el eje floral. *Piper jauaense* posee espigas cortas, hasta 4 cm de largo, brácteas florales minutamente fimbriadas y estigmas redondeados, mientras que *P. sotobosquense* posee espigas más largas, 4–7 cm de largo, brácteas densamente fimbriadas y los estigmas curvos, nunca redondeados.

Especímenes adicionales examinados: VENEZUELA. Portuguesa: Municipio Sucre, Parque Nacional Guaramacal, Sector El Paramito, transecto que conduce a Batatal, 09°19'31"N, 070°04'25"W, 1550–1640 m, 10 March 1999, *N. Cuello & al. 1449* (PORT, US); Camino Real, La Aguadito-El Batatal, 09°19'18"N, 070°04'15"W, 1600–1800 m, 8 July 1999, *L. J. Dorr and S. Yustiz 8539* (HUA, MO, NY, PORT, US); La Divisoria de la Concepción, 09°18'N, 070°06'W, 23 October 1985, *H. van der Werff & al. 7542* (MO, PORT). Trujillo: Municipio Boconó, Parque Nacional Guaramacal, parcel de estudio fitosociológico No. 5 adyacente a las instalaciones del acueducto de Boconó, 09°14'38"N, 070°13'12"W, 1850 m, 15–16 July 1999, *N. Cuello & al. 1208* (HUA, NY, PORT, US), *Ibid.*, road from Boconó to Guaramacal, SE of Boconó, 09°13'N, 070°12'W, 2000 m, 13 July 1995, *L. J. Dorr and L. C. Barnett 8059* (G, PORT, US), *Ibid.*, “El Campamento” below Cerro El Diablo, ca. 10 km S of Boconó on road from Fundación La Salle to El Santuario, 09°09'N, 070°17'W, 1910 m, 21 July 1995, *L. J. Dorr & al. 8194* (HUA, P, PORT, US, VEN), *Ibid.*, across country from El Campamento NW to Mogote along the 1800 m countour level, NE slope of mountain, 09°10'N, 070°18'W, 1800 m, 28 October 1998, *L. J. Dorr & al. 8316* (PORT, US), *Ibid.*, slope forests of El Pumar, SE of Boconó, between camp (UTM: 19–3364614E; 1021651N) on Roberto’s finca near Pozo Verde on old mule trail to caserío de Guaramacal, 1920–2120 m, 26 December 2000, *L. J. Dorr & al. 8634* (MO, PORT, US), *Ibid.*, sector trocha Laguna Negra-quebrada del Salvaje, 1850–2100 m, 15 June 2002, *B. Stergios and R. Caracas 19691* (PORT, US), *Ibid.*, “El Campamento,” below Cerro El Diablo, and vicinity, UTM: 1013005N, 357770E, 17 August 2005, *B. Stergios & al. 20887* (K, PORT, US), *Ibid.*, *B. Stergios & al. 20912* (P, PORT, US).

Piper calvarii S. M. Niño & Dorr, *sp. nov.* TYPE: VENEZUELA. Trujillo: Municipio Boconó, Parque Nacional Guaramacal, trail from El Cafenol (E of Mosquey) (UTM: 19–369976E; 1026628N) to Fila Los Recostaderos (UTM: 19–370258E; 1026389N), passing from “potrero”

along forest margin to forest, 1790–2200 m, 12 June 2001, *L. J. Dorr, B. Stergios & S. M. Niño 8890* (Holotipo: PORT; Isotipos: HUA, K, US [00662733]). Fig. 2.

Diagnosis: Shrub 1–2 m tall. Intravaginal stipule almost always present in terminal nodes, deltoid, 2–8 mm long, glabrous; leaf blade linear-lanceolate or lanceolate, 4–9 cm long, 1.5–2.3 cm wide, pinnate with 6–8 secondary veins on each side, apices long acuminate, glands above and below, nerves only prominent below. Spike with an off-white rachis at anthesis, 3–5.5 cm long and 1.5–2 mm in diameter; peduncle 7–11 mm long and 0.7–1 mm in diameter.

Arbusto de 1–2 m de altura con tallos lisos, cilíndricos, estriados, con glándulas punteadas dispersas; nudos glabros, prominentes, casi siempre con cicatrices estipulares; entrenudos basales amplios de 7–20 cm de largo, entrenudos de ramas terminales cortos 1–3 cm de largo. Estípula intravaginal casi siempre presente en nudos de ramas terminales, glabra, deltoide, 2–8 mm de largo, algunas veces extendida o curva-enrollada, caediza. Hojas con lámina linear-lanceolado o lanceolado, largamente acuminado el ápice, bases obtusas o agudas, equilaterales o subequilaterales en algunas hojas de la misma rama, el lado desigual generalmente 0.5–1 mm más corto que el otro, 4–9 cm de largo y 1.5–2.3 cm de ancho, pinnatinervada con 6–8 venas secundarias de cada lado, el primer par de venas basales opuestas ascendentes en un ángulo de 45°–60°, resto de nervios alternos ascendentes en ángulo de 10°–30°, anostomosándose 0.5–1.5 mm del margen, nervio principal y secundarios glabros, elevados por el envéz, glabros y lisos o no elevados en la haz, envéz densamente o conspicuamente glandular punteado café, negros o casi negros; peciolo 3–6 mm de largo, cortamente alado, cada ala se inserta en las bases de la lámina, generalmente glabros, vaginados en la base con 1.5–2 mm de largo-vaginal y siempre con borde levemente elevado sobre el eje peciolar o con alas caedizas. Inflorescencia erecta; espiga con raquis banquecino en anthesis, 3–5.5 cm de largo, 1.5–2 mm de grueso; pedúnculo 7–11 mm de largo y 0.7–1 mm de grosor; bráctea floral triangular, ovada hasta orbiculares, con bordes densamente fimbriados y centro glabro, 0.4–0.5 mm de largo en su parte más ancha; anteras divaricadas, lateralmente dehiscentes, teca 0.2–0.3 mm de largo. Fruto, no completamente maduro en la muestra Tipo, subgloboso o redondeado apicalmente, glabro, liso; estigmas 3, curvos, muy cortos, 0.2 mm de largo.

Etimología: Del Calvario, monte donde murió Jesucristo, lo que sugiere la dificultad de subir a la localidad tipo.

Distribución y hábitat: Hasta ahora solo colectada en la Fila de Los Recostaderos, en la vertiente sur del Parque Nacional Guaramacal, 1790–2200 m.

Se distingue fácilmente por sus hojas pequeñas angostamente lanceoladas y acuminadas (4–9 cm de largo y 1.5–2.3 cm de ancho), con pequeñas estípulas que surgen de la apertura vaginal del peciolo de la hoja. Es una planta poco frecuente, y solo conocida del lugar original de colección. Es necesario hacer más colecciones para conocer aspectos fenológicos. Por ahora se conoce que es parte de la transición bosque-pastizal, al margen del bosque con individuos solitarios, cuya floración ocurre durante el mes de junio.



FIGURA 2. *Piper calvarii* S. M. Niño & Dorr. A, Hábito; B, Detalle de la hoja que muestra la venación y las glándulas; C, Nodo que muestra la hoja, una estípula intravaginal, y una espiga pedunculato; D, Parte de la infructescencia (estaminodios) con brácteas densamente fimbriados; E, Parte apical de la inflorescencia; F, Frutas y bracteas (vista lateral). A–F, Dorr *et al.* 8890 (US [00662733]). Dibujo de A. R. Tangerini.

Observaciones: *Piper calvarii* comparte caracteres con *P. pseudoecalyptifolium* Trel. & Yunck., sobre todo en morfología de hojas y brácteas florales, sin embargo difieren por su condición eglandular con nervios prominentes en

ambos lados de la hoja. *Piper calvarii* presenta glándulas en ambos lados de la hoja y los nervios sólo son prominentes en el envés.

LITERATURA CITADA

- CALLEJAS, R. 2008. Piperaceae. Páginas 546–557 en O. HOKCHE, P. E. BERRY, AND O. HUBER, EDS. *Nuevo catálogo de la flora vascular de Venezuela*. Fundación Instituto Botánico de Venezuela, Caracas.
- . 2014. Piperaceae. Páginas 6–326 en B. E. HAMMEL, M. H. GRAYUM, C. HERRERA, Y N. ZAMORA, EDS. *Manual de plantas de Costa Rica*. Vol. VII. Dicotiledóneas (Picramniaceae-Rutaceae). *Monogr. Syst. Bot. Missouri Bot. Gard.* 129: i–xvii, 1–840.
- DORR, L. J., B. STERGIOS, A. R. SMITH, Y N. L. CUELLO A. 2000 [2001]. Catalogue of the vascular plants of Guaramacal National Park, Portuguesa and Trujillo states, Venezuela. *Contr. U.S. Natl. Herb.* 40: 1–155.
- JARAMILLO, M. A., R. CALLEJAS, C. DAVIDSON, J. F. SMITH, A. C. STEVENS, Y E. J. TEPE. 2008. A phylogeny of the tropical genus *Piper* using ITS and chloroplast intron *psbJ-petA*. *Syst. Bot.* 33: 647–660.
- JARAMILLO, M. A., Y P. S. MANOS. 2001. Phylogeny and patterns of floral diversity in the genus *Piper* (Piperaceae). *Amer. J. Bot.* 88: 706–716.
- QUIJANO-ABRIL, M.A., R. CALLEJAS-POSADA, Y D. R. MIRANDA-ESQUIVEL. 2006. Areas of endemism and distribution patterns for Neotropical *Piper* species (Piperaceae). *J. Biogeogr.* 33: 1266–1278.
- SAMAIN, M.-S., G. MATHIEU, S. WANKE, C. NEINHUIS, Y P. GOETGHEBEUR. 2008. *Verhuellia* revisited—unravelling its intricate taxonomic history and a new subfamilial classification of Piperaceae. *Taxon* 57: 583–587.
- STEYERMARK, J. A. 1984. *Flora de Venezuela. Piperaceae*. Vol. II. Segunda Parte. Ediciones Fundación Educación Ambiental, Caracas.
- STEYERMAK, J. A., Y R. CALLEJAS-POSADA. 2003. Piperaceae. Páginas 681–738 en P. E. BERRY, K. YATSKIEVYCH, AND B. K. HOLST, EDS. *Flora of the Venezuelan Guyana*. Vol. 7. *Myrtaceae-Plumbaginaceae*. Missouri Botanical Garden Press, St. Louis.
- WANKE, S., M. A. JARAMILLO, T. BORSCH, M.-S. SAMAIN, D. QUANDT, Y C. NEINHUIS. 2007. Evolution of Piperales—*matK* gene and *trnK* intron sequence data reveal lineage specific resolution contrast. *Molec. Phylogenet. Evol.* 42: 477–497.
- , M.-S. SAMAIN, L. VANDERSCHAEVE, G. MATHIEU, P. GOETGHEBEUR, Y C. NEINHUIS. 2006. Phylogeny of the genus *Peperomia* (Piperaceae) inferred from the *trnK/matK* region (cpDNA). *Plant Biol. (Stuttgart)* 8: 93–102.

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A NEW COMBINATION IN *HELIOTROPIMUM* (HELIOTROPIACEAE) FROM SOUTH AMERICA

JOSÉ IRANILDO MIRANDA DE MELO^{1,2} AND MÁRCIO GLEISSON MEDEIROS GONÇALVES³

Abstract. A new combination in *Heliotropium* (Heliotropiaceae) from South America is proposed in this paper: *Heliotropium lilloi*.

Resumen. En este trabajo se propone una nueva combinación en *Heliotropium* (Heliotropiaceae) de Sudamérica: *Heliotropium lilloi*.

Keywords: Boraginaceae s. l., flora, Neotropics, nomenclature

The genus *Heliotropium* (Heliotropiaceae) was proposed by Linnaeus (1753) and, in its current circumscription according to suggestions of Diane et al. (2003), also encompasses all the species incorporated into *Tournefortia* sect. *Tournefortia* (= genus *Tournefortia* s.str.).

Based on Diane et al. (2016), *Heliotropium* encompasses about 300 cosmopolitan species growing especially in dry zones with centres of taxonomic diversification in the Irano-Turanian region and in the Neotropics.

Heliotropium representatives are herbs, subshrubs, shrubs or small trees, rarely scandent or lianescent. The leaves are alternate to pseudo-opposite, rarely pseudoternate, linear to broadly ovate or obovate. Inflorescences are 1-pluribranching, ebracteose, many-flowered. The fruit are dry or fleshy; dry fruits separating into one- or two-seeded mericarps, rarely dry drupes, fleshy fruits unlobed, white, composed of usually two 2-seeded mericarps, often with empty chambers (Diane et al., 2016). According to The Plant List (2018) *Heliotropium* currently encompasses 821 names

of which approximately 130 are valid being necessary the updating of the names recently transferred to *Euploca* by Feuillet (2016), Luebert and Frohlich (2016), Feuillet and Hasle (2016, 2017), and Melo (2017a, b) as well as proceed the new combinations of the species of *Tournefortia* s.str. for *Heliotropium*.

Considering the current morphological characterization of *Heliotropium*, here one species of *Tournefortia* endemics from South America (Argentina and Bolivia), is transfer to the genus *Heliotropium* (Heliotropiaceae sensu BWG, 2016; Diane et al., 2016).

Heliotropium lilloi (I.M. Johnst.) J.I.M. Melo, *comb. nov.*

Basionym: *Tournefortia lilloi* I.M. Johnst., Contr. Gray Herb. 92: 71. 1930. TYPE: ARGENTINA. Tucumán, Tafi Viejo, en las cercas, 22 September 1922, 550 m, *M. Lillo 7099* (Holotype: GH; isotype: CTES [not seen]).

Distribution: Argentina and Bolivia.

LITERATURE CITED

- BORAGINALES WORKING GROUP (BWG). 2016. Familial classification of the Boraginales. *Taxon* 65(3): 502–522. <https://doi.org/10.12705/653.5> (accessed February 25, 2018).
- DIANE, N., H. FÖRTHNER, AND H. H. HILGER. 2003. A systematic analysis of Heliotropiaceae (Boraginales) based on trnL and ITS1 sequence data. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 125: 19–51. <http://dx.doi.org/10.1127/0006-8152/2003/0125-0019> (accessed February 25, 2018).
- , H. H. HILGER, H. FÖRTHNER, M. WEIGEND, AND F. LUEBERT. 2016. Heliotropiaceae. Pages 203–211 in J. W. KADEREIT AND V. BITTRICH, EDS. *Flowering Plants. Eudicots, The Families and Genera of Vascular Plants*. Vol. 8. Springer International Publishing, Switzerland.
- FEUILLET, C. 2016. Two new combinations in *Euploca* Nutt. (Heliotropiaceae, Boraginales) and a conspectus of the species of the Guiana Shield area. *Phytokeys* 61: 101–124. <https://doi.org/10.3897/phytokeys.61.6260> (accessed February 25, 2018).
- AND R. R. HASLE. 2016. New combinations from *Heliotropium* to *Euploca* (Boraginales: Heliotropiaceae). *Phytoneuron* 5: 1–3. <http://www.phytoneuron.net/2016Phytoneuron/5PhytoN-Euploca.pdf> (accessed February 25, 2018).
- AND ———. 2017. New combinations for *Heliotropium powelliorum* and *Heliotropium pringlei* in the genus *Euploca* (Boraginales: Heliotropiaceae). *Phytoneuron* 5: 1–3. <http://www.phytoneuron.net/2017Phytoneuron/05PhytoN-EuplocaCombinations.pdf> (accessed February 25, 2018).

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¹ Universidade Estadual da Paraíba, Centro de Ciências Biológicas e da Saúde, Departamento de Biologia. Avenida das Baraúnas, 351, Bairro Universitário, 58429-500, Campina Grande, Paraíba, Brazil

² Corresponding author: tournefort@gmail.com

³ Universidade Federal de Campina Grande, Centro de Ciências e Tecnologia, Unidade Acadêmica de Engenharia de Petróleo, Rua Aprígio Veloso, 882, Bairro Universitário, 58429-900, Campina Grande, Paraíba, Brasil; marcio.gmgoncalves@yahoo.com.br

- LINNAEUS, C. 1753. *Species Plantarum*. Vol. 2. Laurentii Salvii, Stockholm.
- LUEBERT F. AND M. W. FROHLICH. 2016. Four new combinations in Argentinian Heliotropiaceae. *Darwiniana*, nueva serie 4: 192–194. <http://dx.doi.org/10.14522/darwiniana.2016.42.717> (accessed February 25, 2018).
- MELO, J. I. M. 2017a. New combinations in *Euploca* (Heliotropiaceae) from Mexico. *Revista Mexicana de Biodiversidad* 88(3): 759–760. <http://www.revista.ib.unam.mx/index.php/bio/article/view/1877/1558> (accessed February 26, 2018).
- MELO, J. I. M. 2017b. New combinations in *Euploca* Nutt (Heliotropiaceae) from Mexico and Central America. *Harvard Papers in Botany* 22(2): 125–126. https://huh.harvard.edu/files/herbaria/files/22_2_125_miranda_demelo.pdf (accessed February 25, 2018).
- THE PLANT LIST: A working list of all plant species 2018. *Heliotropium*. In Boraginaceae. <http://www.theplantlist.org/tpl1.1/search?q=Heliotropium> (accessed February 9, 2018).

ALCHEMILLA PUROHITII, A NEW NAME FOR *A. SOJAKII*
K.M. PUROHIT & PANIGRAHI (ROSACEAE)

P. LAKSHMINARASIMHAN,^{1,2} S. BANDYOPADHYAY,³ AND CHANDANI GUPTA³

Abstract. The new name *Alchemilla purohitii* Lakshmin., Bandyop. & Chand. Gupta (Rosaceae) is proposed to replace the later homonym *Alchemilla sojakii* K.M. Purohit & Panigrahi.

Keywords: *Alchemilla*, *A. sojakii*, India, Rosaceae

Plocek (1986) validly published the name *Alchemilla sojakii* Plocek for a species native to Malá Fatra mountain area of Slovakia. Perhaps, unaware of the existence of the preceding species name, Purohit and Panigrahi (1991) published a new species from India under the same name.

The late Dr. Gopinath Panigrahi was known for his nomenclatural expertise and had contributed in some ways to the revisions of the *International Code of Botanical Nomenclature*. Therefore, the nomenclatural error committed by Purohit and Panigrahi (1991) may be attributed to the non-availability of the Plocek's 1986 publication to them. Furthermore, prior to 2001, for verification of published seed plant names, botanists relied upon the then existing *Index Kewensis* and its supplements. In this case, *Alchemilla sojakii* Plocek was included in the *Index Kewensis* Supplement XIX, dated 1991, which was likely not available to Purohit and Panigrahi prior to their 1991 publication.

According to the International Code of Nomenclature (Art. 53.1; Turland et al., 2018) *Alchemilla sojakii* K.M. Purohit & Panigrahi is an illegitimate later homonym. The replacement name *Alchemilla purohitii* Lakshmin., Bandyop. & Chand. Gupta is, therefore, proposed here.

Alchemilla purohitii Lakshmin., Bandyop. & Chand. Gupta, *nom. nov.*

Replaced name: *Alchemilla sojakii* K.M. Purohit & Panigrahi, *Fam. Rosac. India* 1: 218, t. 69, f. 74. 1991, *nom. illeg.*, non *Alchemilla sojakii* Plocek (1986). Fig. 1.

TYPE: INDIA, Jammu & Kashmir, Amarnath on way, 3700 m, 27 July 1966, *N.C. Nair* 37046 (Holotype BSD00008326, image!).

Eponymy: The specific epithet is given in the honour of Dr. K.M. Purohit, who made significant contribution to the taxonomy of Indian Rosaceae

LITERATURE CITED

- PLOCEK, A. 1986. New Taxa and Combinations in *Alchemilla* for the Flora of Slovakia and the Flora of Czechoslovakia (1). *Folia Geobot. Phytotax.* 21(4): 423–427.
- PUROHIT, K. M. AND G. PANIGRAHI. 1991. The family Rosaceae in India (Revisionary studies on some genera). Bishen Singh Mahendra Pal Singh, Dehra Dun.
- TURLAND, N. J., J. H. WIERSEMA, F. R. BARRIE, W. GREUTER, D. L. HAWKSWORTH, P. S. HERENDEEN, S. KNAPP, W.-H. KUSBER, D.-Z. LI, K. MARHOLD, T. W. MAY, J. MCNEILL, A. M. MONRO, J. PRADO, M. J. PRICE, AND G. F. SMITH. 2018. International Code of Nomenclature for algae, fungi and plants (Shenzhen Code). *Regnum Veg.* Vol. 159. Königstein: Koeltz Scientific Books.

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¹Western Regional Centre, Botanical Survey of India, 7, Koregaon Road, Pune, Maharashtra, India

²Corresponding author: lakshminarasimhanp@yahoo.co.in

³Central National Herbarium, Botanical Survey of India, PO Botanic Garden, Howrah, West Bengal, India



BSL N. C.
No. 37046



HOLOTYPE
Alchemilla sojakii K.M. Purohit & Panig.
ROSACEAE

BOTANICAL SURVEY OF INDIA

Flora of KASHMIR. No. 37046

Family Rosaceae

Name *Alchemilla vulgaris* Linn.

Local Name _____ Locality Amarnath on way

Date 27 July, 1966 Altitude 3700 m

Remarks Stem with procumbent branches, fls. greenish yellow.

Coll. N.C. Noh

FIGURE 1. Holotype of *Alchemilla sojakii* K.M. Purohit & Panigrahi (BSD). Botanical Survey of India, Kolkata.®

ICONES STELIDARUM (ORCHIDACEAE) COLOMBIAE V¹

CARLYLE A. LUER²

Abstract. Thirty-five species of the genus *Stelis* Sw. (Orchidaceae) from Colombia that have not had a complete illustration published are presented in the fifth of a series. Three are described as new.

Keywords: Colombia, Orchidaceae, Pleurothallidinae, *Stelis*

Two hundred collections of *Stelis* Sw. made in Colombia have been illustrated as new species in the first four parts of this series. Approximately three percent have proved to be synonyms. In the fifth part, 35 species not previously published with a complete illustration are presented. Illustrations of 24 species had never been published. Three appeared in part III (Luer, 2017a): *Stelis attenuata* as *Stelis dynamica*, *Stelis dispar* as *Stelis dendrophila*, and *Stelis sesquipedalis* as *Stelis ephippium*. The remainder have not been published with a complete illustration. The beautiful drawings by Elmer Smith, which appeared in Garay (1980), consist of only two-dimensional sepals and petals.

Stelis alba Kunth, Nov. Gen. Sp. 1: 363, 1816. TYPE: COLOMBIA. Cauca: Popayán, between Almaguer, 1400 hex., A. Bonpland 2073 (Holotype: P; Isotype: P). Fig. 1.

Plant medium in size, epiphytic, densely caespitose; roots slender. Ramicauls erect, stout, 3–5.5 cm long, enclosed by a tubular sheath from below the middle and another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, obtuse to rounded at the tip, 5–7 cm long including a petiole ca. 1 cm long, the blade thick, 1.8–2.2 cm wide in the dry state, abruptly narrowed below into the petiole. *Inflorescence* single; 12–20 cm tall, the raceme erect, strict, subcongested, distichous, many-flowered; floral bracts oblique, acute, 1.5–2 mm long; pedicels 2 mm long; ovary 1.5 mm long; the peduncle ca. 5 cm long, with a spathe 1–1.5 cm long, from a node at the apex of the ramicaul; *sepals* light yellow-green, expanded, minutely pubescent, ovate, obtuse, connate below the middle, 3-veined, the dorsal sepal 4 mm long, 3 mm wide, the lateral sepals, 3 mm long, 3 mm wide; *petals* green, transversely ovate, concave, the apex broadly rounded with a thickened margin, 1.25 mm long, 2 mm wide, 3-veined, with a transverse carina; *lip* green, ovoid, 1.3 mm long, 2 mm wide, 1 mm deep, concave below a central, elevated, shallowly divided bar, the apex thin, broadly obtuse to rounded, the lateral margins thin, rounded, the dorsum microscopically pubescent at the base, truncate, hinged to the base of the column; *column* clavate, ca. 1.8 mm wide, 1.5 mm long, the anther and the stigmatic lobes apical.

Etymology: From the Latin *albus*, “dull white,” referring to the flowers.

Additional collection: COLOMBIA. Valle del Cauca: Farallones de Cali, collected September 1976, collector unknown, flowered in cultivation at Colomborquídeas, 20 November 1981, C. Luer 6727 (SEL).

Vegetatively, *Stelis alba* is distinctive. The leaves are elliptical, broad and obtuse to rounded at the apex, and are exceeded by a single inflorescence of relatively large flowers. The sepals are pubescent, ovate and three-veined, and the petals are also three-veined. The lip is a variation of type A with a high, rounded bar that is shallowly cleft to form a gaping glenion.

Lindley mistakenly identified an Ecuadorian collection by Jameson as *Stelis alba* Kunth. This collection was illustrated by Smith and used by Garay (1980, plate 81). Apparently, the true *Stelis alba* has not been identified again, but a collection made in 1976, and cultivated at Colomborquídeas, answers the published photographs and descriptions.

The author explicitly excludes the synonymy cited by Duque (2008: 40).

Stelis angustifolia Kunth, Nov. Gen. Sp. 1: 162, 1816. TYPE: COLOMBIA. Cauca: Timbio, near Popayán, A. Humboldt & A. Bonpland s.n. (Holotype: P). Fig. 2–4.

Synonyms: *Stelis lanata* Lindl., Folia Orch. *Stelis* 13, No. 100. 1859. TYPE: ECUADOR. Pichincha: west slope of the Andes of Quito, W. Jameson s.n. (Holotype: K). Etymology: From the Latin *lanatus*, “wooly,” referring to the densely pubescent sepals.

Stelis physoglossa Luer & F. Werner, Monogr. Syst. Bot., Missouri Bot. Gard. 115: 174, 2009. TYPE: ECUADOR. Zamora-Chinchipec: Estación Científica San Francisco, 1750 m, 14 January 2004, F. Werner 767 (Holotype: MO).

Etymology: From the Greek, *physoglossa*, “a blown up tongue,” referring to the deeply concave lip.

Plant medium in size, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 2–5 cm long, enclosed by a close, tubular sheath from below the middle and another

The author is grateful to the staff of MO and SEL for making their specimens available for study, to herbaria cited herein that facilitated loans, to S. Dalström for inking the figures presented herein, all based on pencil drawings by the author, and to the generosity of the Pleurothallid Alliance for making the inking possible. Adam Karremans and Antonio Toscano de Brito reviewed an early version of the text.

¹ Part I, II, and III, and IV of this series were published in Luer (2016a–b, 2017a–b, respectively).

² 3222 Old Oak Drive, Sarasota, Florida 34239-5019, U.S.A.; cluer@juno.com

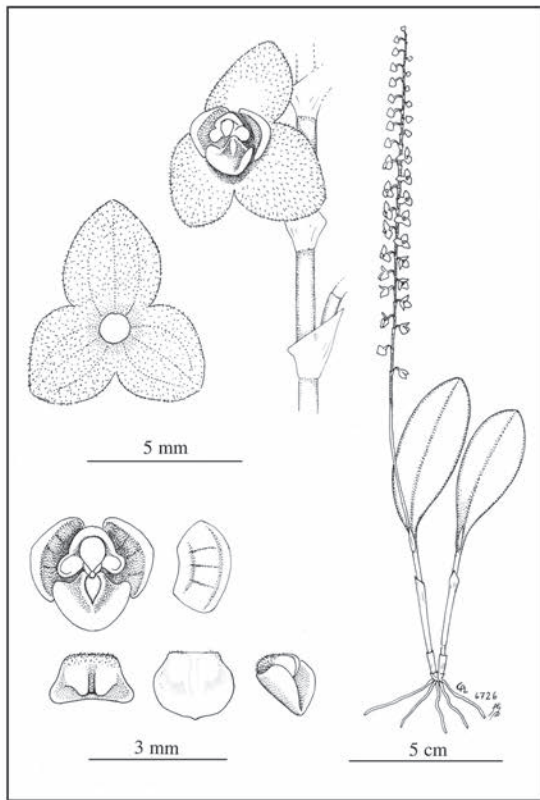


FIGURE 1. *Stelis alba* Kunth

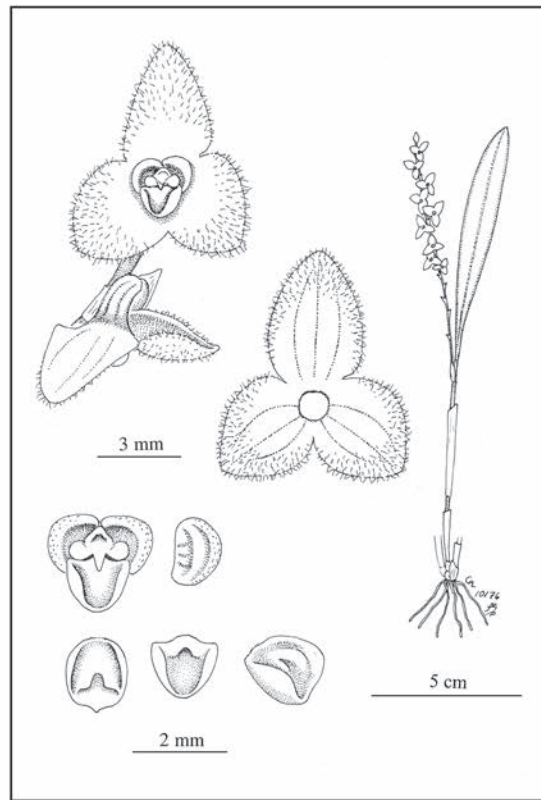


FIGURE 2. *Stelis angustifolia* Kunth

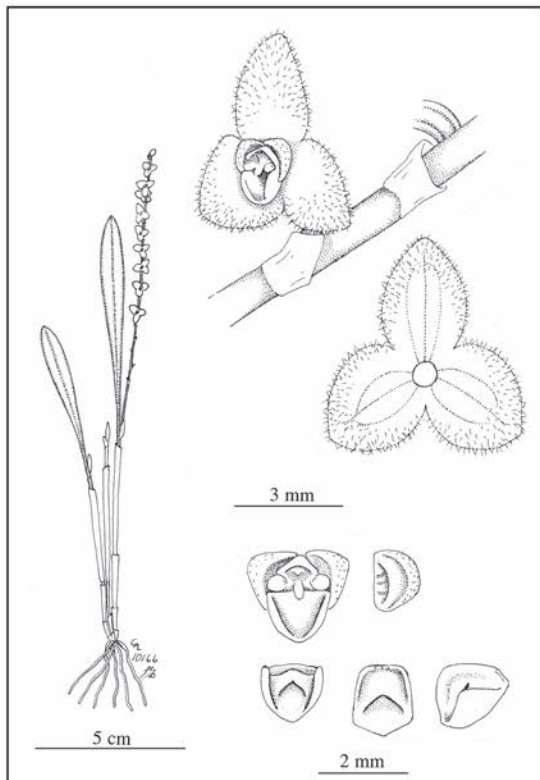


FIGURE 3. *Stelis angustifolia* Kunth

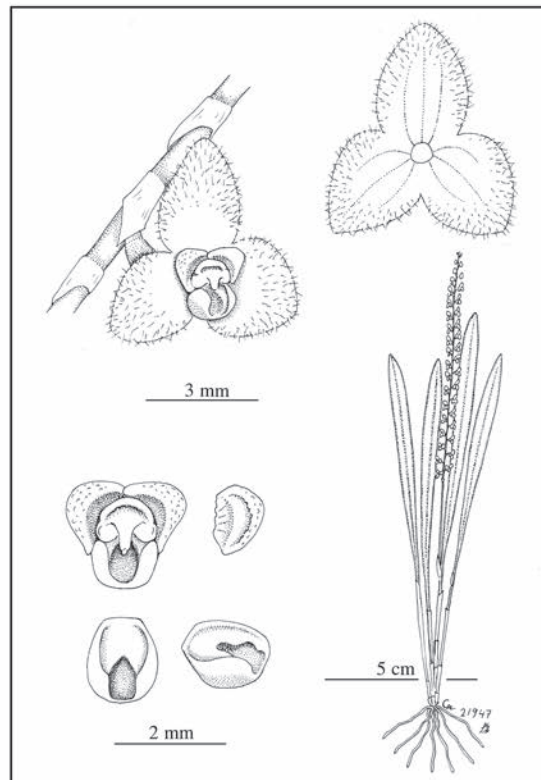


FIGURE 4. *Stelis angustifolia* Kunth

sheath at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 5–10 cm long, including a petiole 1–2 cm long, the blade thick, 0.6–1 cm wide in the dry state, narrowed below into the petiole. *Inflorescence* 1–3; 9–12 cm tall, the racemes erect, strict, congested, distichous, many-flowered, with most flowers open simultaneously; floral bracts oblique, acute, 2–3 mm long; pedicels 2 mm long; ovary 1.5–2 mm long; the peduncle 2–4 cm long, with a spathe less than 1 cm long, from a node at the apex of the ramicaul; flowers purple or yellow; *sepals* expanded, pubescent, ovate, subacute, connate above the base, 3-veined, the dorsal sepal 3–4 mm long, 2.5–3 mm wide, the lateral sepals oblique, 3 mm long, 3 mm wide; *petals* transversely ovate, concave, the apex broadly rounded with a thickened, subverrucose margin, 1 mm long, 1.3 mm wide, 3-veined, with a transverse carina; *lip* ovoid, 1.5 mm long, 1.2 mm wide, 1 mm deep, concave below a widely bifid bar, the apex and lateral margins thin, obtuse, the dorsum smooth, truncate, hinged to the base of the column; *column* clavate, ca. 1 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *angustifolius*, “narrow-leaved,” referring to the foliage.

Additional collections: COLOMBIA. Antioquia: Medellín, Altos de Barbacoa W of Velez, 3150 m, 15 September 1984, *C. Dodson & R. Escobar 15299* (SEL), *C. Luer* illustr. 21947. Boyacá: between Arcabuco and Moniquirá, 2500 m, 25 April 1982, *C. Luer, J. Luer & R. Escobar 7551, 7555* (SEL). Santander: Bucaramanga, between Bucaramanga and Berlin, 3200 m, 27 April 1982, *C. Luer, J. Luer, R. Escobar 7602* (SEL); E of Bucaramanga toward Berlin, 2950 m, 7 May 1984, *C. Luer, J. Luer & R. Escobar 10166, 10176, 10199* (MO). Norte de Santander, Páramo de Jurisdicciones, 2800 m, 30 April 1982, *C. Luer, J. Luer & R. Escobar 7629* (SEL).

Although *Stelis angustifolia* has been previously illustrated as the synonym *Stelis lanata* Lindl., the closed flower is inadequate for identification.

Stelis angustifolia is characterized by one to three densely many-flowered racemes that are about as long as, or shortly longer than narrow, elliptical leaves; variously pubescent, three-veined sepals; and three-veined petals. Most distinctive is the lip with a deeply hollowed out cavity beneath a widely cleft bar.

Stelis colombiana Ames from the southern part of the Western Cordillera, is similar to *Stelis angustifolia*. With similar, pubescent, three-veined sepals it is distinguished from the later by broader leaves up to two centimeters wide, slightly smaller flowers, and a lip with a simple, cleft bar and cavity.

Stelis antioquiënsis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 83, 1921. TYPE: COLOMBIA. Antioquia: above Aguada, 2300 m, 17 September 1883, *F. C. Lehmann 3175* (Holotype: K; Isotypes: AMES, BM, BR, US), Fig. 5.

Usage synonym: *Stelis campanulifera* Kraenzl., Bot. Jahrb. Syst. 26: 449, 1899, *non auct.* 1858.

Etymology: From the Latin for “bell-bearing,” without obvious reference.

Plant large, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 13–17 cm long, enclosed by a tubular sheath from below the middle and another 2–3 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical-ovate, slightly acuminate, acute, the blade 8–11 cm long, the petiole 2.5–3 cm long, the blade 1.7–2 cm wide, narrowed below into the petiole. *Inflorescence* 2–4; 15–20 cm tall, the racemes erect, strict, distichous, loosely many-flowered; floral bracts oblique, acute, 2 mm long; pedicels 2 mm long; ovary 1.5 mm long; the peduncle 2–4 cm long, with a spathe at least 1 cm long, from a node at the apex of the ramicaul; *sepals* expanded, apparently pubescent, ovate, connate below the middle, the dorsal sepal acute, 3.5–4 mm long, 2.75 mm wide, 5- or 7-veined, the lateral sepals oblique, obtuse, 3 mm long, 2.75 mm wide, 4-veined; *petals* transversely semicircular, 1 mm long, 1.3 mm wide, 3-veined, concave below the broadly rounded apex, with a broad, thick margin with multiple, microscopic crystals and a transverse carina, *lip* ovoid, 0.75 mm long, 1 mm wide, 0.75 mm deep, narrowly concave below an intact bar, the apex broadly rounded with a broad, thick margin with multiple, microscopic crystals, the dorsum featureless, the base truncate, hinged to the base of the column; *column* clavate, ca. 1.8 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: Named for Antioquia, the department in which the collection was made.

This species was apparently abundant locally where collected, no subsequent collection is known. The description of the plant offered herein was made from Schlechter’s description and photos of the type. The flower was drawn from two pickled flowers from the type at K.

Stelis antioquiënsis is large and slender with acute, slightly acuminate, narrow, petiolate leaves surpassed by two to four loose, racemes of relatively large flowers with microscopically pubescent sepals. The dorsal sepal has five veins with an occasional additional, incomplete pair. The rounded, apical margin of both the three-veined petals and the type A lip is broad and thick with scattered, microscopic particles.

Stelis asseris O.Duque, Orquideología 20(3): 329, 1997. TYPE: COLOMBIA. Antioquia: Sonsón, near Sonsón, 2300 m, coll. by Nicolas Peláez, fl. in cult. 27 December 1991, *O. Duque 1400* (Holotype: JAUM). Fig. 6–7.

Synonym: *Stelis patella* O.Duque, Orquideología 27(3): 134, 2011. TYPE: COLOMBIA. Antioquia: between Santuario and Corconó, 1900–2200 m, 3 December 1991, *O. Duque 196* (Holotype: JAUM).

Etymology: From the Latin *patella*, “a small pan,” referring to the shallow synsepal.

Plant small to medium, epiphytic, caespitose; roots slender. Ramicauls erect, 2.5–7 cm long, enclosed by a tubular sheath from below the middle, and another 2 sheaths below the middle and at the base. *Leaf* erect, coriaceous, elliptical, acute to subacute, 5–10 cm long including a petiole 1–2.5 long, the blade 0.7–1.3 cm wide, cuneate

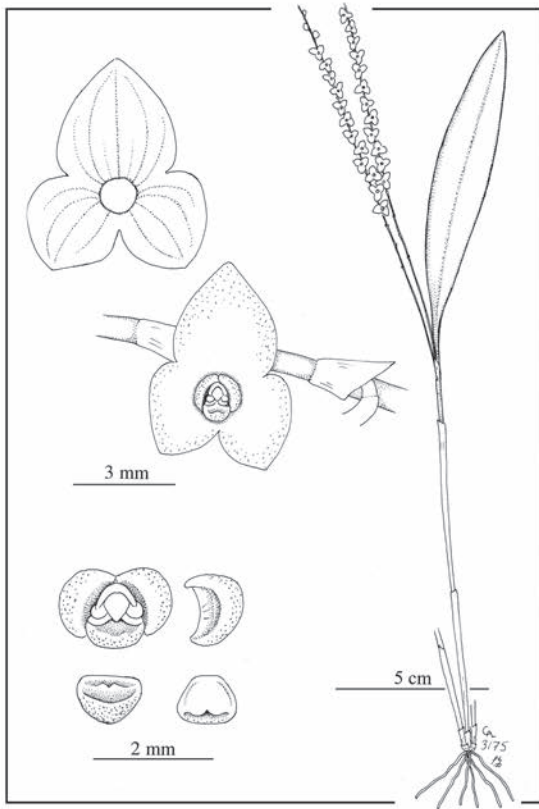


FIGURE 5. *Stelis antioquiensis* Schltr.

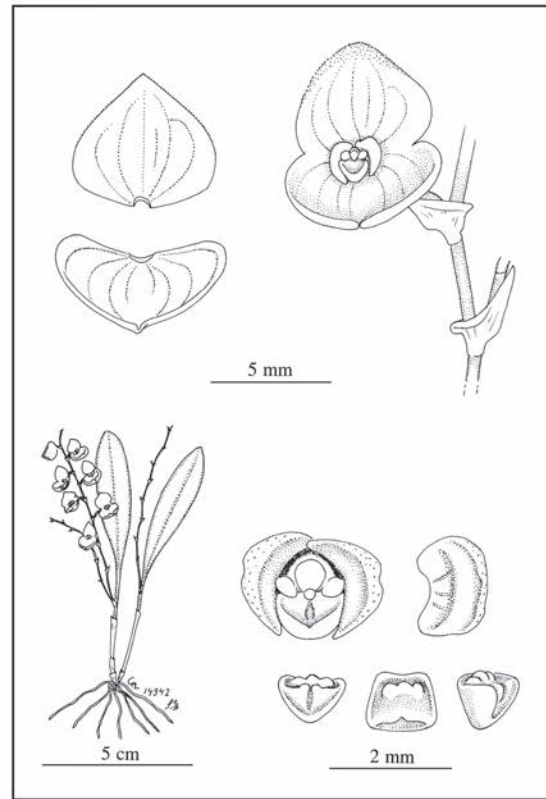


FIGURE 6. *Stelis asseris* O.Duque

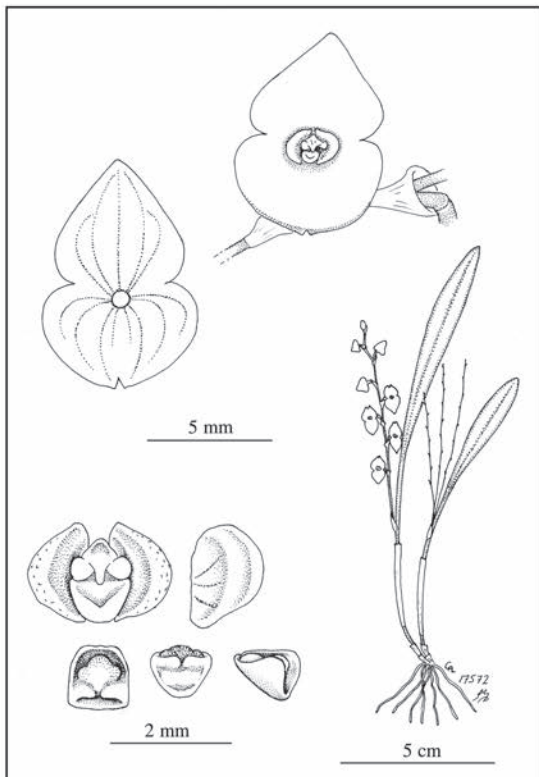


FIGURE 7. *Stelis asseris* O.Duque

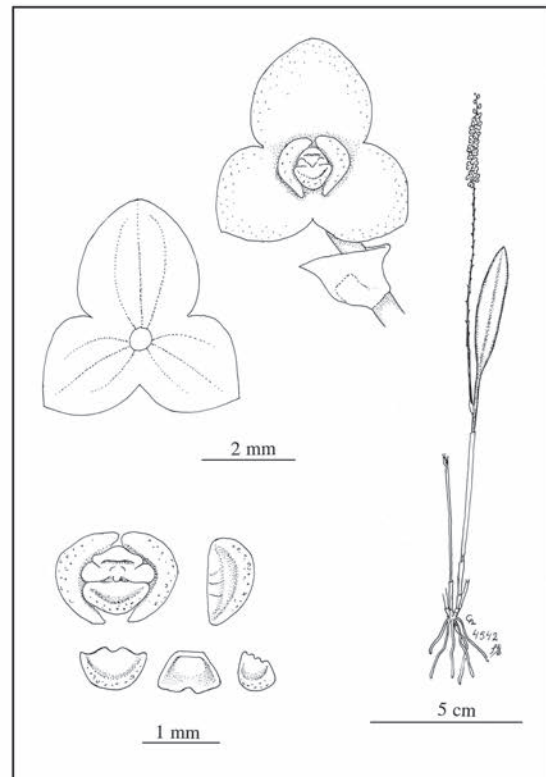


FIGURE 8. *Stelis bigibba* Schltr.

below into the petiole. *Inflorescence* 1–3; 5–10 cm tall, the raceme erect, loosely 8- to 10-flowered, floral bracts oblique, acute, 3 mm long; pedicels 2 mm long; ovary 2 mm long; the peduncle ca. 2 cm long, subtended by a spathe 0.7–1 cm long, from a node near the tip of the ramicaul; flowers purple; *sepals* glabrous, but sometimes minutely ciliate, the dorsal sepal erect, transversely ovate, subacute, 5–6 mm long, 6–6.5 mm wide, 5-veined, connate ca. 2 mm, the lateral sepals connate into a transversely cordate, shallowly concave synsepal, 3.5–4 mm long, 6–7.5 mm wide, 8-veined; *petals* transversely oblong, concave, 0.8–1 mm long, 1.25–1.75 mm wide, 3-veined, the apex broadly rounded with an uneven, thickened margin, with a transverse callus; *lip* subquadrate, 0.5–0.75 mm long, 0.8–1 mm wide, 0.7–1 mm deep, shallowly concave below the bar with a narrow glenion, the apex obtuse, the dorsum with the three veins thickened and confluent into a rounded or transverse callus above the base, the base truncate, hinged to the base of the column; *column* semiterete, 0.8–1 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Latin *asser*, “a stake, a pole,” apparently referring to the bar of the lip.

Additional collections: COLOMBIA. Antioquia: Sonsón, Altos de Buenos Aires, 2400 m, coll. by E. Valencia, fl. in cult. at Colomborquídeas, 12 December 1992, *R. Escobar 5021* (MO), *C. Luer* illustr. 17572; near Río Piedras, coll. by Eric Hagsater et al., 2500 m, 23 April 1983, *C. Luer 8776* (SEL); El Retiro, above Colomborquídeas, 2400 m, coll. by Walter Teague, 17 April 1988, *C. Luer 13222* (MO); Medellín, between San Pedro and Don Matius, 2200–2700 m, 15 September 1984, *C. Dodson & R. Escobar 15301* (MO); Altos de Fitzebad, coll. by Pacho López, fl. in cult. at Colomborquídeas, 23 May 1995, *C. Luer 17582* (MO); El Camnen, San Lorenzo, 2500 m, 21 March 1989, *C. Luer, J. Luer & W. Teague 14342* (MO); east of Santo Domingo, toward the TV antenna, 2170 m, 12 May 1985, *C. Luer 11351* (MO); near Guarne, fl. in cult. at Colomborquídeas, 23 May 1995, *C. Luer 17586*; between Concordia and Betulia, 2100 m, 29 May 1995, *C. Luer, J. Luer & R. Escobar 17629* (MO). Cauca: Valle de Popayán, 1750 m, fl. in cult. by Amalia Lehmann de Sarria in Popayán, 16 Nov. 1982, *C. Luer 8446* (SEL).

This small to medium-sized, caespitose species with narrow leaves bears relatively large, purple, widely expanded flowers in a loose raceme that equals or barely surpasses the leaf. The sepals are broad and multiveined, with the synsepal transverse and shallowly concave; the petals are three-veined. The lip is type A with an obtuse apex, a narrow glenion, and a transverse confluence above the base of the calli of the three veins.

Stelis bigibba Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 84, 1928. TYPE: COLOMBIA. Cauca: Andes west of Cali, 1600–2000 m, October, *F. C. Lehmann 6834* (Holotype destroyed at B); Lectotype, here designated, fragment of *F. C. Lehmann 6834* (AMES). Fig. 8.

Plant small to medium in size, epiphytic, densely caespitose; roots slender. Ramicauls fascicled, erect,

slender, 2–6 cm long, enclosed by a close, tubular sheath from below the middle and another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 3–6 cm long including an ill-defined petiole ca. 1 cm long, 0.4–0.6 cm wide, narrowly cuneate below into the petiole. *Inflorescence* one or two, erect, 8–11 cm long, racemes congested, distichous, simultaneously many-flowered, the peduncle ca. 3 cm long, from a spathe 5–6 mm long at a node below the apex of the ramicaul; floral bracts oblique, acute, 1.5 mm long; pedicels 0.5–1 mm long; ovary 1 mm long; *sepals* expanded, yellow or green, glabrous, but cellular, broadly ovate, obtuse, connate basally, the dorsal sepal 1.5–2 mm long, 1.5–2 mm wide, 3-veined, the lateral sepals 1.5–2 mm long and wide, 3-veined; *petals* yellow, transversely semilunate, with the apex thickened and broadly rounded, with a transverse carina, 0.5 mm long, 1 mm wide, 3-veined; *lip* yellow, obliquely ovoid, 0.6 mm long, 0.75 mm wide, 0.4 mm deep, shallowly concave below a bigibbous bar, the apical margin thick and broadly rounded, the dorsum acutely deflexed, the base truncate, firmly attached to the base of the column; *column* stout, ca. 0.75 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Latin *bigibbus*, “with two humps,” referring to the margin of the bar of the lip.

Additional collections: COLOMBIA. Nariño: forest around La Planada above Ricaurte. 1950 m, 2 November 1979, *C. Luer, J. Luer & A. Hirtz 4541, 4543, 4554* (SEL).

Vegetatively, this small species resembles other species, such as *Stelis braccata* Rchb.f. & Warsz. From these it is easily distinguished by three-veined petals and the distinctive lip. The lip is triangular in lateral view, with a two-humped bar uppermost, the dorsum being acutely deflexed from the anterior surface.

Stelis chamaestelis (Rchb.f.) Garay & Dunst., Venez. Orch. Illustr. 4: 292, 1966. Basionym: *Pleurothallis chamaestelis* Rchb.f., Linnaea 22: 825, May 1860. TYPE: VENEZUELA: Mérida, 6,500 ft., September 1846, *L. J. Schlim 1195* (Holotype: G; Isotypes: LE, MPU, P). Fig. 9.

Synonyms: *Apatostelis chamaestelis* (Rchb.f.) Garay & Dunst., Bot. Mus. Leaf. 27: 189, 1979.

Stelis florea Lindl., Folia Orch. *Stelis* 5, No. 27. 1859, *nom. nov.* for *Pleurothallis chamaestelis* Rchb.f.

Etymology: A derivation (“floreus”) from the Latin *flora*, possibly referring to the numerous flowers.

Plant medium to large, epiphytic, ascending-caespitose, rhizome thick, 1–5 mm long between ramicauls; roots slender. Ramicauls erect, slender, 5–11 cm long, with a tubular sheath above the middle and another tubular sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute to subacute, 5–14 cm long including a petiole 1–2 cm long, the blade 0.8–1.5 cm wide in dry state, cuneate below into the petiole. *Inflorescence* 1–3 erect, congested, distichous, many-flowered racemes 10–20 cm long including the peduncle 2–3 cm long, with many flowers open simultaneously, with a spathe 6–12 cm long, from a node below the apex of the ramicaul; floral bracts

oblique, acute, 2 mm long; pedicels 1 mm long; ovary 1–1.5 mm long; flowers yellowish white to white; *sepals* glabrous, ovate, subacute, connate basally, 3-veined, the dorsal sepal 2 mm long, 1.2–1.5 mm wide, the lateral sepals oblique, more or less antrorse, 1.5–2 mm long, 1–1.25 mm wide; *petals* thin, subcircular, concave below the slightly thickened apex, 0.6 mm long, 0.6 mm wide, 1-veined; *lip* yellow, subquadrate-oblong, 0.6 mm long, 0.5 mm wide, 0.3 mm deep, narrowed and concave below the bar to the rounded tip with thickened margins, thick below the bar, microscopically pubescent above the base, the base truncate, hinged to the base of the column; *column* stout, 0.6 mm long and wide, with the anther and the bilobed stigma apical.

Etymology: From the Greek *chamae*-, “low, creeping,” and the genus *Stelis* Sw., referring to the repent habit.

Additional collections: COLOMBIA. Norte de Santander: Alto de Santa Inés, 2250 m, 13 May 1984, C. Luer, J. Luer & R. Escobar 10336 (MO). Santander: Bucaramanga, terrestrial on the road embankment E of Bucaramanga, 2400 m, 3 November 1981, C. Luer & R. Escobar 6555, 6556, 6561 (SEL); terrestrial on the road embankment between Bucaramanga and Berlin, 2800 m, 27 April 1982, C. Luer, J. Luer & R. Escobar 7594 (SEL); Bucaramanga, E of Bucaramanga toward Berlin, 2950 m, 7 May 1984, C. Luer, J. Luer & R. Escobar 10166, 10169 (MO).

Lindley transferred Reichenbach’s *Pleurothallis chamaestilis* to *Stelis* with another name (*florea*), because he believed that the plant was “neither dwarf, nor a *Pleurothallis*.” Actually, *Pleurothallis* might have been inadvertently printed instead of *Stelis*. The habit is densely ascending or repent with caespitose components along a thick rhizome with erect, slender ramicauls with narrowly elliptical leaves that are far exceeded by two to eight erect, slender racemes of tiny flowers with three-veined sepals and single-veined petals. The minute lip is rounded and concave below a broad, thick bar.

The author explicitly excludes the synonymy proposed by Duque (2008: 84).

Stelis chocoënsis O. Duque, *Orquideología* 27(1): 16, 2010. TYPE; COLOMBIA. Chocó: San José del Palmar, 1300 m, collected by L. Serna, 1993, *O. Duque* 2192 (Holotype: JAUM). Fig. 10.

Plant medium in size, epiphytic, densely caespitose, roots slender. Ramicauls erect, slender, 8–13 cm long, with a close, tubular sheath near the middle and another below and at the base. *Leaf* erect, coriaceous, elliptical, subacute, 5–9 cm long including a petiole 1.5–2 cm long, the blade 1.4–2 cm wide in dry state, cuneate below into the petiole. *Inflorescence* 2–5 simultaneous; 5–7 cm long, the racemes erect, strict, congested, distichous, many-flowered with most flowers open simultaneously, floral bracts tubular, acute, 1.5–2 mm long; pedicels 1–1.5 mm long; ovary 1.5–2 mm long; the peduncle ca. 1 cm long, flowering from near the base with a spathe ca. 1 cm long, from a node below the apex of the ramicaul; flowers various shades of purple; *sepals* pubescent to glabrous, ovate, obtuse, the dorsal sepal 2–2.5 mm long, 2 mm wide, the lateral; sepals

1.75–2 mm long, 2 mm wide, 3-veined, the dorsal sepal rarely incompletely 5-veined, connate below the middle; *petals* yellow or purple, transversely obovate, concave, broadly rounded at the apex, with the margin thickened, a transverse carina not always obvious, 0.9 mm long, 1.2 mm wide, 3-veined; *lip* yellow or purple, subquadrate, 0.8–1 mm long, 0.8–1 mm wide, 0.5 mm deep, concave below a cleft bar, the apex obtuse with a small, indistinct apiculum, the dorsum slightly convex; the base truncate, hinged to the base of the column; *column* clavate, ca. 1 mm wide and long, anther and bilobed stigma apical.

Etymology: Named for Chocó, the Department where the species was collected.

Additional collections: COLOMBIA. Páramo de Guanacas, between Totoro and Inza, 2850 m. 15 November 1982, C. Luer & R. Escobar 8409 (SEL). Tolima: S slope of Mt. Tolima, 2930 m, C. Luer, J. Luer & R. Escobar 7509 (SEL).

This species is characterized by an obtuse, elliptical leaf about as long as the ramicaul, an inflorescence of several racemes about half as long as the leaf, and small, crowded, purple flowers. The sepals are glabrous to short-pubescent. The petals are three-veined and the lip is type A with a cleft bar, and the dorsum is without callus.

Stelis colombiana Ames, *Sched. Orchid.* 1: 4, 1922. COLOMBIA. Cauca: Headwaters of Río López, Río Palo basin, Tierra Adentro, 2500–300 m, January 1906, H. Pittier 1093 (Holotype: AMES). Fig. 11.

Synonym: *Stelis navicularis* Garay, *Canad. J. Bot.* 34: 353, 1956. COLOMBIA. Caldas: Cerro Churumbelo, 2835 m, 3 December 1944, H. St. John 20,875 (AMES, Isotype: US), C. Luer illustr. 21892.

Etymology: From the Latin *navicularis*, “like a boat,” referring to the concave lip.

Plant large, epiphytic, densely caespitose; roots slender. Ramicauls erect, stout, 8–12 cm long, with a tubular sheath from near the middle and 2 tubular sheaths below and at the base. *Leaf* erect, coriaceous, elliptical-ovate, acute to narrowly obtuse, 8–12 cm long including a petiole 1–1.5 cm long, the blade 2–2.5 cm wide, cuneate below into the petiole. *Inflorescence* 1–3 erect, subcongested, many-flowered racemes 12–15 cm long including the peduncle 1–4 cm long, with many flowers open simultaneously, with a spathe 1–1.5 cm long, from a node below the apex of the ramicaul; floral bracts oblique, acute, 2–3 mm long; pedicels 2 mm long; ovary 1.5 mm long; color of flowers unknown; *sepals* glabrous externally, densely pubescent within, broadly-ovate, obtuse, 3-veined, connate basally, the dorsal sepal 2.5–3 mm long, 2.3–2.5 mm wide, the lateral sepals 2.3–2.5 mm long and wide; *petals* transversely elliptical, concave, the apex broadly rounded, narrowly thickened, 1 mm long, 1.5 mm wide, 3-veined; *lip* obovoid, 1 mm long, 1 mm wide, 0.75 mm deep, concave below a thick, notched bar, the tip obtuse with the margin thin with a small apiculum, the dorsum densely cellular toward the base, the base truncate, firmly attached to an obsolescent column-foot; *column* stout, 1.5 mm long and wide, with the anther and the bilobed stigma apical.

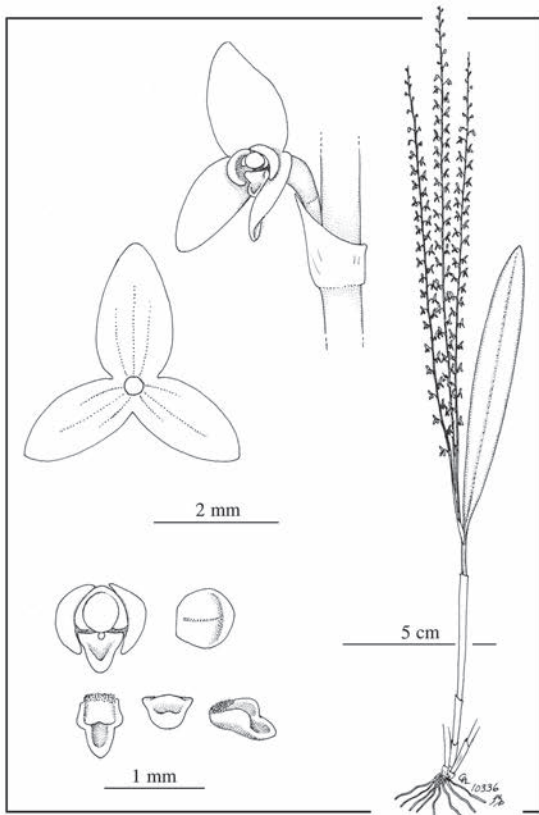


FIGURE 9. *Stelis chamaestelis* Dunst. & Garay

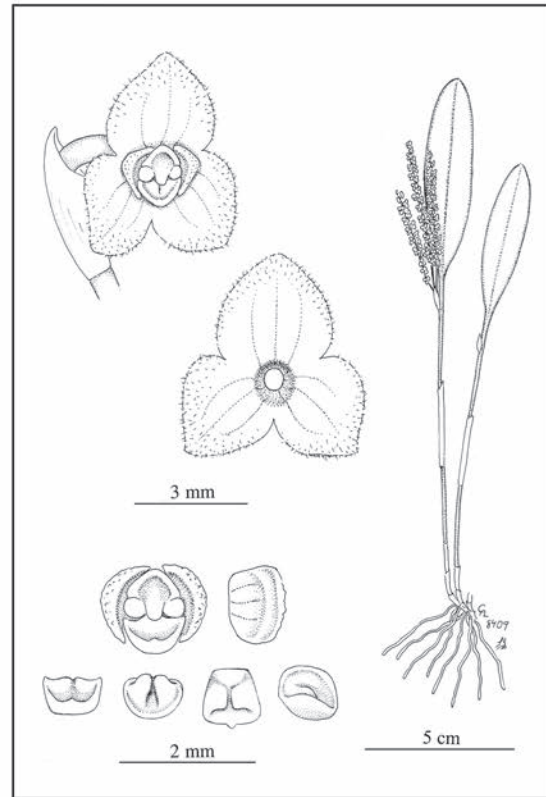


FIGURE 10. *Stelis chocoënsis* O.Duque

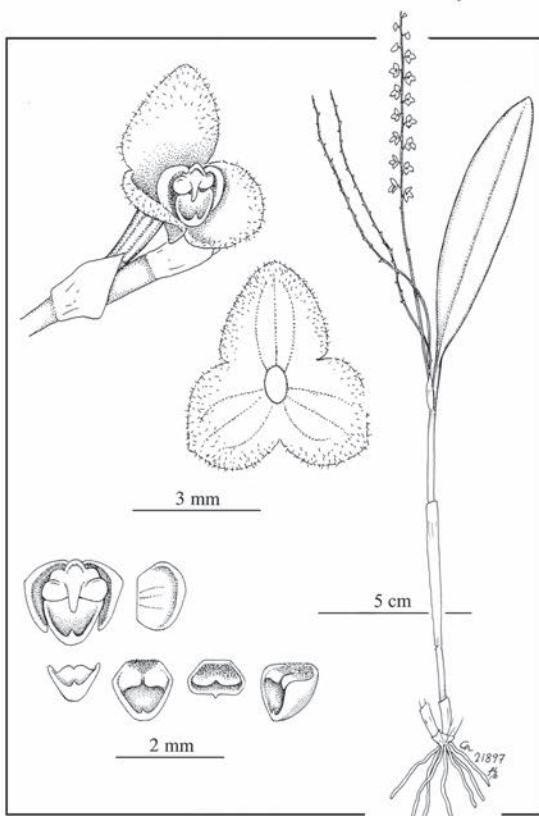


FIGURE 11. *Stelis colombiana* Ames

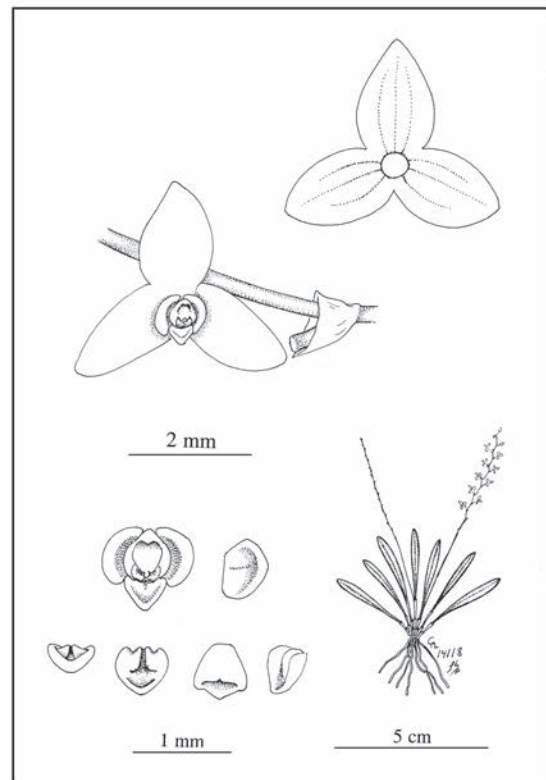


FIGURE 12. *Stelis comica* O.Duque

Etymology: Named for Colombia, the country of origin.

Additional collection: COLOMBIA. Risaralda: forest remnant near San Clemente, 2100 m, 20 April 1982, C. Luer, J. Luer & R. Escobar 7456 (SEL).

Vegetatively, this large species resembles many others with two or more racemes more or less equaling the leaf, but it is distinguished from them by small, obtuse, three-veined, pubescent sepals; thin, three-veined petals; and a lip concave below a thick, grooved bar, and a rounded, minutely apiculate apex.

The author explicitly excludes *Stelis corae* Foldats from the synonymy of *Stelis colombiana* (Duque, 2008: 265, albeit indirectly).

Stelis comica O.Duque, *Orquideología* 20(3): 338, 1997. TYPE: COLOMBIA. Antioquia: Sonsón, between Santuario and Cocorná, 2100 m, January 1990, O. Duque 1232 (Holotype: JAUM). Fig. 12.

Plant very small, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 6–8 mm long, enclosed by a tubular sheath and another at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 2.5–3 cm long including an ill-defined petiole, 2–3 mm wide in dry state, gradually narrowed below to the base. *Inflorescence* single; 4–6 cm long, the raceme erect, subax, many-flowered, with several flowers open simultaneously; floral bracts oblique, acute, 1 mm long; pedicels 0.5 mm long; ovary 0.5 mm long; the peduncle ca. 2 cm long, from a node below the apex of the ramicaul; flowers yellow; *sepals* expanded, similar, glabrous, ovate, acute to subacute, connate basally, 2 mm long, 1.3 mm wide, 3-veined; *petals* transversely ovate, 0.4 mm long, 0.6 mm wide, 1-veined, the apex rounded, thickened, without a transverse carina; *lip* obovoid, 0.5 mm long, 0.5 mm wide, 0.3 mm deep, concave below a cleft bar with a large glenion, the apex obtuse, not thickened, the dorsum slightly convex, the base truncate, hinged to the base of the column; *column* stout, 0.5 mm long and wide, the anther apical, the stigmatic lobes adjacent beneath the rostellum.

Etymology: From the Latin *comicus*, “comical,” Duque’s impression of a strange view of the flower.

Additional collection: COLOMBIA. Without collection data, purchased from an orchid vendor at the Medellín orchid show, 19 March 1989, C. A. Luer 14118 (MO).

This very small, densely caespitose species is distinguished by a laxly multiflowered raceme that surpasses a narrow leaf; ovate, widely spread, three-veined sepals; single-veined petals with thickened margin; and a type A lip with the apex obtuse, and a cleft bar with a glenion. The stigmatic lobes are within the clinandrium and are adjacent, perhaps even confluent, beneath the rostellum.

Duque found *Stelis comica* to be “common” in that part of the Central Cordillera, but it has not yet been identified elsewhere. His name *comica* refers to what he sees in a “buffoon-like appearance of the flower when seen from the side,” something I have not been able to visualize.

Stelis dressleri Luer, *Phytologia* 49(3): 227, 1981. TYPE: PANAMA. Veraguas: above Santa Fe, ca. 700 m, 5 September 1976, C. Luer & R. Dressler 1146 (Holotype: SEL). Fig. 13.

Synonym: *Stelis gustavii* O.Duque, *Orquideología* 20(3): 348, 1997. TYPE: COLOMBIA. Antioquia: Paraje Musinga, ca. 2500 m, collected by Aguirre, 8 June 1995, O. Duque 1835 (Holotype: JAUM).

Etymology: Named for Gustavo Aguirre, collector of this species.

Plant small to medium in size, epiphytic, ascending, the rhizome erect, 0.5–2 cm long between ramicauls, concealed by loose sheaths and parallel ramicauls; roots slender. Ramicauls erect, densely fasciculate, relatively stout, 2–2.5 cm long, enclosed by 1–2 loose, tubular sheaths. *Leaf* erect, coriaceous, elliptical, subacute, 2–4 cm long including the petiole 5–7 mm long, the blade 1–2 cm wide, cuneate below into the petiole. *Inflorescence* 1–3; 25–37 mm long, erect, congested, distichous, many-flowered raceme, successively flowered, with a few flowers open simultaneously, flowering from near the base, borne behind the leaf, from a node below the apex of the ramicaul; floral bracts oblique, acute, 1–1.5 mm long; pedicels 0.75 mm long; ovary 0.75 mm long; *sepals* light yellow, glabrous, connate below the middle, transversely ovate, obtuse, 1 mm long, 1.5 mm wide, 3-veined; *petals* purple, transversely ovate, minutely pubescent, shallowly concave, 0.4 mm long, 0.8 mm wide, 3-veined, the apex broadly obtuse, the margin slightly thickened; *lip* purple, subtriangular, 0.4 mm long, 0.5 mm wide, 0.3 mm deep, concave within the obtuse apex with a minute, obtuse apiculum, the bar thick, convex, shallowly channeled centrally, the dorsum with a low, rounded callus, the base truncate, hinged to the base of the column; *column* stout, 0.5 mm long and wide, the anther and the bilobed stigma apical.

Etymology: Named for Dr. Robert L. Dressler, co-collector of this species.

Additional collection: COLOMBIA. Valle del Cauca: old road between Cali and Buenaventura, 200 m, Nov. 1981, collected by Janet Kuhn, fl. in cult. 23 November 1981, C. Luer 6760 (MO).

This species is an uncommon, low-land species known from Central America and low-land, western Colombia. The collection described as *Stelis gustavii* O.Duque was obtained from a local orchid enthusiast, and I have no doubt that the locality at 2500 meters altitude is erroneous.

The habit of this species is distinctive and very similar to that of the larger *Stelis morgani* Dodson & Garay, which is relatively frequent in Ecuador. The densely fasciculate, erect ramicauls bear overlapping, elliptical leaves, behind which a few, simultaneous racemes are borne. The sepals are glabrous, while those of *S. morgani* are long-pubescent.

Stelis ecmeles Luer, *sp. nov.* TYPE: COLOMBIA. Chocó: San José del Palmar, Cerro Torrá, above heliport, 1920–1950 m, 11 August 1988, P.A. Silverstone-Sopkin 4310 (Holotype: MO; Isotype: CUVC), C. Luer illustr. 21994. Fig. 14.

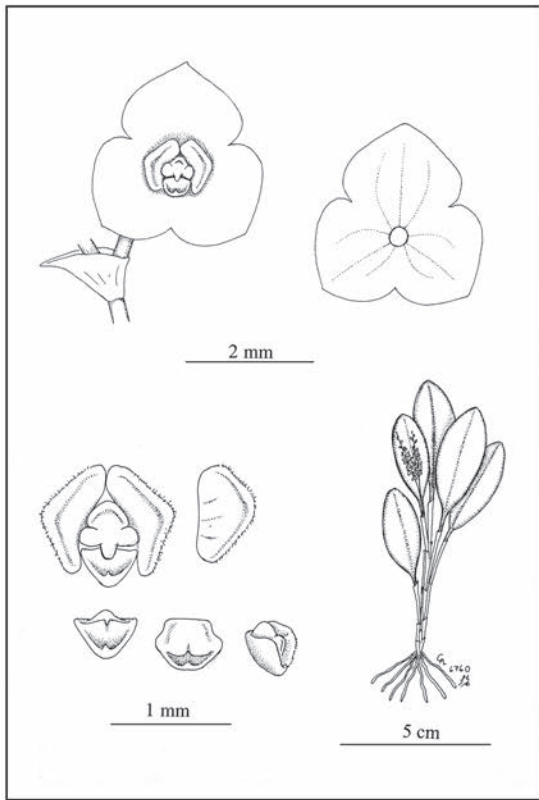


FIGURE 13. *Stelis dressleri* Luer

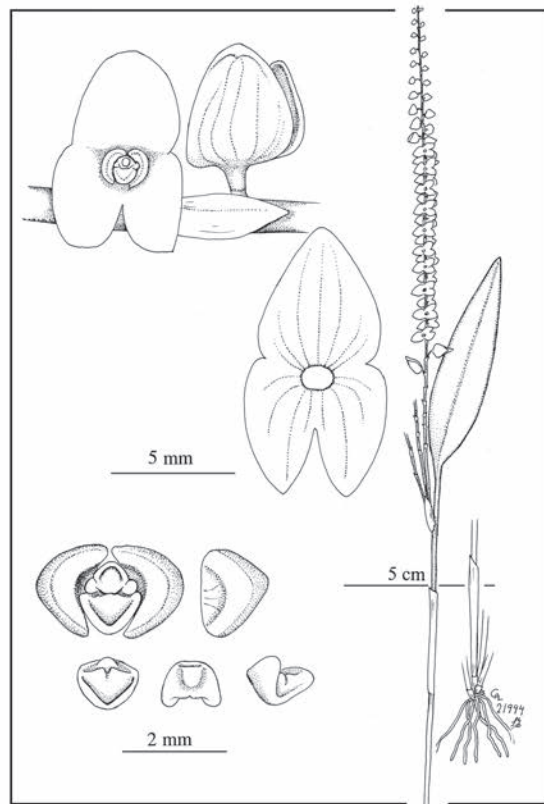


FIGURE 14. *Stelis ecomeles* Luer, *sp. nov.*

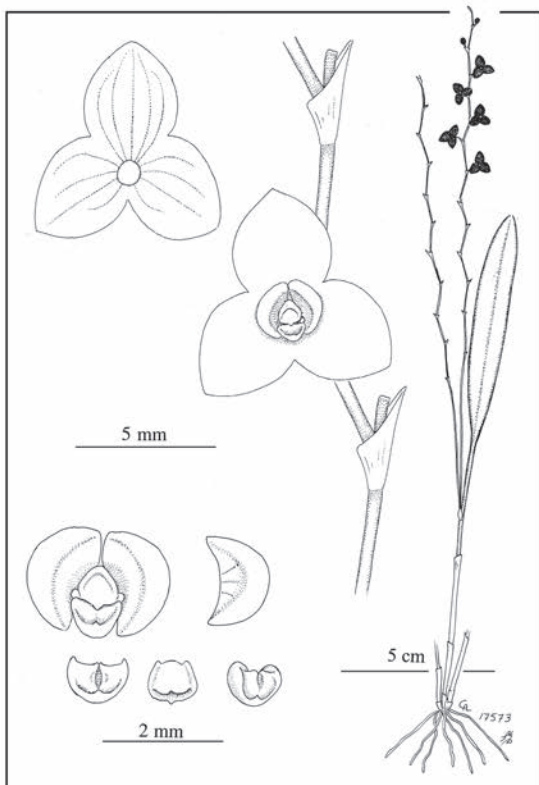


FIGURE 15. *Stelis felix* Luer & R. Escobar

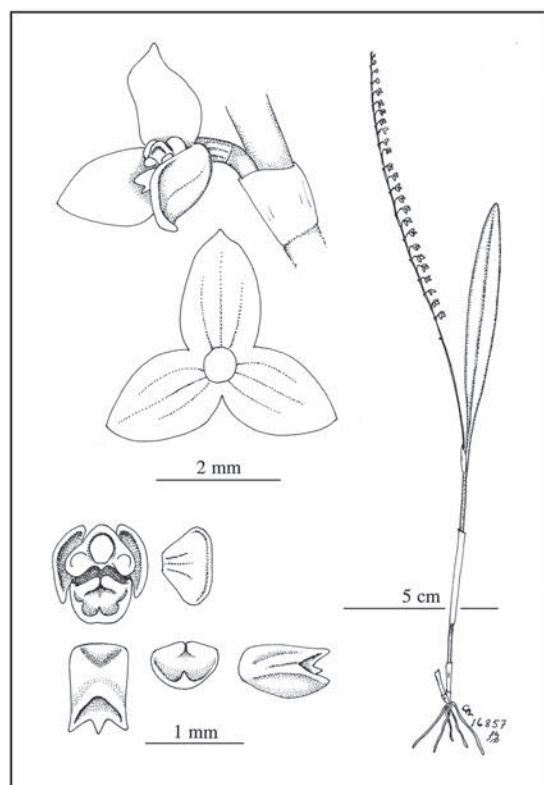


FIGURE 16. *Stelis foetida* O. Duque

This large, caespitose species is characterized by acute, ovate leaves exceeded by congested racemes; an ovate dorsal sepal that is either five- or seven-veined in the same raceme, and lateral sepals connate below the middle, to the tips into a shallowly concave synsepal; thick, three-veined petals; and a subquadrate lip.

Plant large, epiphytic, densely caespitose; roots slender. Ramicauls slender, 4–16 cm long, enclosed by a tubular sheath from near the middle and another sheath below and at the base. *Leaf* erect, coriaceous, ovate, acute, petiolate, 4–10 cm long, 2–2.3 cm wide in dry state, contracted below into a slender petiole 2–2.5 cm long. *Inflorescence* 1–6, 8–18 cm long, the raceme erect, congested, strict, distichous; floral bracts erect against the rachis, acute, 3–6 mm long; pedicels 2–5 mm long; ovary 1.5 mm long; peduncle 2–4 cm long, subtended by a spathe 1–1.5 cm long, from a node below the apex of the ramicaul; flowers dark red-violet; *sepals* glabrous, dorsal sepal ovate, acute, 5.25 mm long, 5 mm wide, 5- to 7-veined, connate in lower quarter, lateral sepals connate from near the apex to below the middle, 5 mm long, each 3 mm wide to 5–6 mm wide together; *petals* semilunate, thick, 1 mm long, 1.2 mm wide, 3-veined below a transverse carina, the apex broadly truncate with a thickened margin, shallowly concave; *lip* subquadrate, 0.5 mm long, 0.75 mm wide, 0.5 mm deep, concave below a shallowly retuse bar, the apex obtuse without thickened margins, the base convex, truncate, hinged to the base of the column; *column* clavate, ca. 1 mm wide and long, the anther and bilobed stigma apical.

Etymology: From the Greek *ekmeles*, “dissonant,” referring to differences in the sepals among two collections.

Additional collections: COLOMBIA. Chocó: San José del Palmar, Cerro Torrá, below the summit, 1940–2450 m, 30 August 1988, P.A. Silverstone-Sopkin 4922 (MO, CUVC), C. Luer illustr. 21992.

This large, caespitose species is characterized by acute, ovate leaves exceeded by congested racemes with rather large flowers. The dorsal sepal is ovate, subacute and usually five-veined, but some dorsal sepals in the same raceme are also seven-veined. The lateral sepals are variously connate below the middle, or connate to the tips into a shallowly concave synsepal. The petals are thick and three-veined, and the lip is type A with a smooth, rounded callus on the dorsum.

Stelis felix Luer & R. Escobar, *sp. nov.* TYPE: COLOMBIA. without collection data, fl. in cult. by Colomborquídeas, 23 May 1995, R. Escobar 5014 (Holotype: MO), C. Luer illustr. 17573. Fig. 15.

This large, caespitose species is characterized by two or three loose, subflexuous racemes of dark purple, glabrous flowers that exceed elliptical leaves; five-veined, obtuse sepals; thick, three-veined petals; and a minutely apiculate lip.

Plant large, epiphytic, densely caespitose; roots slender. Ramicauls slender, 5–7 cm long, enclosed by a tubular sheath from below the middle and another sheath below and at the base. *Leaf* erect, coriaceous, elliptical, acute, petiolate,

8–10 cm long, 1–1.3 cm wide in dry state, contracted below into a slender petiole 2 cm long. *Inflorescence* 2–3, 15–20 cm long, the racemes erect, lax, subflexuous; floral bracts oblique, acute, 5–6 mm long; pedicels 4–5 mm long; ovary 5 mm long; peduncle 4–5 cm long, subtended by a spathe 5 mm long, from a node below the apex of the ramicaul; *sepals* dark purple with narrow, white margins, glabrous, ovate, obtuse, connate below the middle, five-veined, dorsal sepal 4 mm long, 4 mm wide, lateral sepals 4 mm long, 3.5 mm wide; *petals* purple, semilunate, thick, 1 mm long, 1.5 mm wide, 3-veined, concave below a transverse carina, the apex broadly rounded with a thickened margin; *lip* purple, subquadrate, 0.75 mm long, 1 mm wide, 0.75 mm deep, shallowly concave below a curved bar with a glenion, the apex broadly rounded with a minute apiculum, the dorsum convex, the base truncate, hinged to the base of the column; *column* clavate, ca. 1 mm wide and long, the anther and bilobed stigma apical.

Etymology: From the Latin *felix*, “happy.” If this species was capable of emotions, it would be happy to have been found.

This handsome species, unfortunately without collection data, is distinguished by two or three tall, loosely flowered, subflexuous racemes of rather large, widely expanded, glabrous, dark purple flowers. The petals are proportionately large, thick and three-veined. The lip is type C, as in *Stelis argentata* Lindl., with a similar, minute apiculum.

Stelis foetida O. Duque, *Orquideología* 20(3): 342, 1997. TYPE: COLOMBIA. Antioquia: Alto de Minas, between Medellín and Santa Bárbara, 2300 m, collected by E Acevedo, fl. in cult. 14 March 1993, O. Duque 1760 (Holotype: JAUM). Fig. 16.

Synonym: *Stelis juncea* Luer & Hirtz, *Monogr. Syst. Bot. Missouri Bot. Gard.* 88: 81, 2002. TYPE: ECUADOR: Carchi: terrestrial on the road embankment west of pass between Tulcán and Maldonado, 2400 m, 16 March 1991, C. Luer, J. Luer, J. del Hierro, A. & X. Hirtz 15086 (Holotype: MO).

Etymology: From the Latin *junceus*, “slender like bulrushes,” referring to the long, slender habit.

Plant medium in size, epiphytic, densely ascending-caespitose; roots slender. Ramicauls erect, slender, 5–12 cm long, enclosed by a tubular sheath from below the middle and 2–3 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 6–13 cm long including an indistinct petiole 1–2 cm long, the blade 1–1.5 cm wide, narrowed below into the indistinctly petiolate base. *Inflorescence* single, rarely 2; 7–18 cm tall, the raceme erect, congested, many-flowered, secund with most flowers open simultaneously, the peduncle 1–4 cm long, subtended by a slender spathe 1–1.5 cm long, from a node below the apex of the ramicaul; floral bracts oblique, acute, 1.5 mm long; pedicels 1–1.5 mm long; ovary 1 mm long; flowers yellow, *sepals* similar, glabrous to sparsely pubescent, connate basally, elliptical-ovate, subacute, 2 mm long, 2.2–2.5 mm wide, 3-veined, the lateral sepals more or less antrorse; *petals* transversely obovate, shallowly concave,

without a transverse callus, 0.5 mm long, 0.75 mm wide, 3-veined, the apex broadly rounded to truncate with the margin thickened; *lip* thick, oblong, 0.9–1.2 mm long, 0.6–0.7 mm wide, 0.5 mm deep, concave below an obtusely cleft bar, the apex subtruncate, with an acute apiculus between acute, marginal angles, the dorsum slightly convex, more or less densely short-pubescent at the base, the base broadly truncate, hinged to the base of the column; *column* stout, ca. 1 mm long, 0.8 mm wide, the anther and the stigma apical, the stigmatic lobes more or less elongated and antrorse.

Etymology: From the Latin *foetidus*, “foul-smelling,” referring to scent of the flowers.

Additional collections: COLOMBIA. Antioquia: Mesopotamia, 2300 m, collected by D. Orbelaez et al., fl. in cult. at Colomborquídeas, 3 January 1992, *R. Escobar 5198* (MO), C. Luer illustr. 21910. Risaralda: Pueblo Rico, fl. in cult. by S. Tsubota, *O. Duque 1136* (JAUM); above Thermals, 2400 m, fl. in cult. 15 May 1993, *A. de Wilde s.n.* (MO), C. Luer illustr. 16857.

Stelis foetida is widely distributed in Colombia and Ecuador. It is characterized by acute, narrowly elliptical leaves surpassed by a slender, secund raceme of small flowers. The sepals are ovate and three-veined, with the laterals more or less antrorse. The petals are thin and three-veined. The lip is subquadrate, longer than wide with a deep obtusely cleft bar, and the apex is triapiculate, being acutely apiculate between acute, marginal angles.

Stelis furfuracea F. Lehm. & Kraenzl., Bot. Jahrb. Syst. 26(3–4): 447, 1898. TYPE: COLOMBIA. Cauca: western slope of volcano Sotará, 2800–3000 m, *F. C. Lehmann 6253* (Holotype destroyed at B); Lectotype, here designated, *F. C. Lehmann 6253* (K); isolectotype (LE). Fig. 17.

Synonym: *Stelis pleurothalloides* Ames, Orchidaceae 7: 132, 1922. TYPE: COLOMBIA. Cauca: Páramo de Buena Vista, 3000–3600 m, January 1906, *H. Pittier 1156* (Holotype: US; Isotype: AMES).

Etymology: From the Greek *pleurothallidoides*, “recalls some species of *Pleurothallis*,” to quote Ames.

Plant medium in size, epiphytic, caespitose-ascending, roots slender. Ramicauls erect, slender, 4–7 cm long, with a tubular sheath from near the middle and 2 tubular sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, subacute, 6–9 cm long including a petiole ca. 1 cm long, the blade 0.2–1.5 cm wide in dry state, cuneate below into the petiole. *Inflorescence* an erect, congested, distichous, many-flowered raceme 10–15 cm long including the peduncle 2–4 cm long, with many flowers open simultaneously, with a slender spathe 2 cm long, from a node below the apex of the ramicaul; floral bracts oblique, acute, 2–3 mm long; pedicels 1 mm long; ovary 1 mm long; flowers yellowish white; *sepals* glabrous, with numerous, minute, irregular crystals, narrowly ovate, acute, connate basally, 4.5–6 mm long, 2–3 mm wide, 3-veined, the lateral sepals oblique, more or less antrorse; *petals* ovoid, concave below a thickened margin with the tip subacute, thicker, 0.9 mm long, 1 mm wide, 3-veined; *lip* subquadrate-oblong, 1.25 mm long,

0.9 mm wide, 0.75 mm deep, concave below a broadly forked bar, the apex broadly acuminate, acute, without thickened margins, the dorsum thickened centrally, the base truncate, hinged to the base of the column; *column* stout, 0.75 mm long and wide, with the anther and the bilobed stigma apical.

Etymology: From the Latin *furfuraceus*, “covered with thin flaky particles,” a misnomer referring to the sepals.

Additional collections: COLOMBIA. Cauca: Popayán, Páramo de Barbillas, 3070 m, *C. Luer, J. Luer & R. Escobar 3038* (SEL); collected near Pasto, collector unknown, fl. in cult. at Colomborquídeas, 16 May 1993, *C. Luer 16863* (SEL).

This high-altitude species is seldomly collected. From a thick, ascending rhizome, ramicauls produce a congested, distichous raceme that surpasses an elliptical leaf. The sepals are narrowly ovate with a smooth, non-scurfy surface. Throughout the substance of all three sepals, a multitude of minute, irregular particles are visible. Without good magnification, the surface appears scurfy, or furfuraceous. The distinctive petals are concave below a thickened, subacute apex: In the description, it was called “semirhombic.” The lip is concave below a broadly forked bar with the dorsum thickened centrally, and the broad apex is slightly acuminate to the acute tip.

Stelis vicaria Luer & R. Escobar with similar, narrowly ovate sepals free of the minute particles, was identified as *Stelis furfuracea* in *Systematics of the Genus Stelis* (Garay, 1980). It also varies with leaves proportionately shorter and wider and the apex is obtuse to rounded, instead of acute. The peduncle is distinctly longer than the leaves, instead of being shorter.

Stelis glumacea Lindl., Folia Orch. *Stelis* 3, No. 9. 1859. TYPE: ECUADOR. Pichimcha: Andes of Quito, on the road to Nanegal, *W. Jameson s.n.* (Holotype: K). Fig. 18.

Plant large, robust, epiphytic, shortly ascending, the rhizome 6–8 mm thick, 5–10 mm between ramicauls; roots coarse. Ramicauls erect, stout, 9–10 cm long, enclosed by a tubular sheath from below the middle, and another 2 below and at the base. *Leaf* erect, coriaceous, elliptical, acute to subacute, petiolate, 11–13 cm long including a distinct petiole 1.5 cm long, the blade 3–3.5 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* solitary; to 30 cm tall, the raceme erect, distichous, strict, many-flowered, with several flowers open simultaneously; floral bracts spreading, oblique, acuminate, acute, 10 mm long low in the raceme to 8 mm long above; pedicels 4 mm long; ovary 2 mm long; the peduncle 10 cm long, with distant bracts, subtended by a spathe 1.2 cm long, from a node below the apex of the ramicaul; *sepals* light yellow, suffused with purple externally and within, expanded, glabrous, transversely ovate, obtuse, 5-veined, connate below the middle, the dorsal sepal, 4 mm long, 5.5 mm wide, the lateral sepals 3.5 mm long, 5 mm wide; *petals* thick, fleshy, transversely semilunate, concave near the base below a thick transverse lamina, 1.3 mm long, 2 mm wide, 3-veined; *lip* type A, ovoid, 1 mm long, 1.5 mm wide, 1 mm deep,

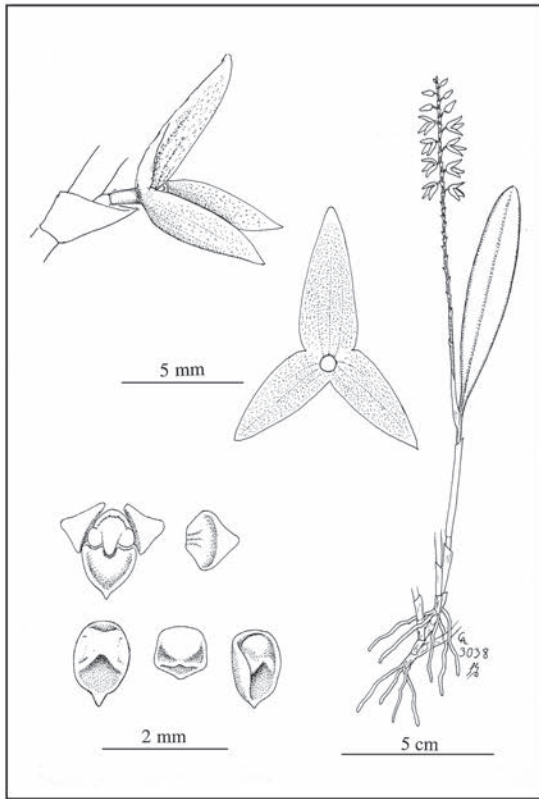


FIGURE 17. *Stelis furfuracea* F. Lehm. & Kraenzl.

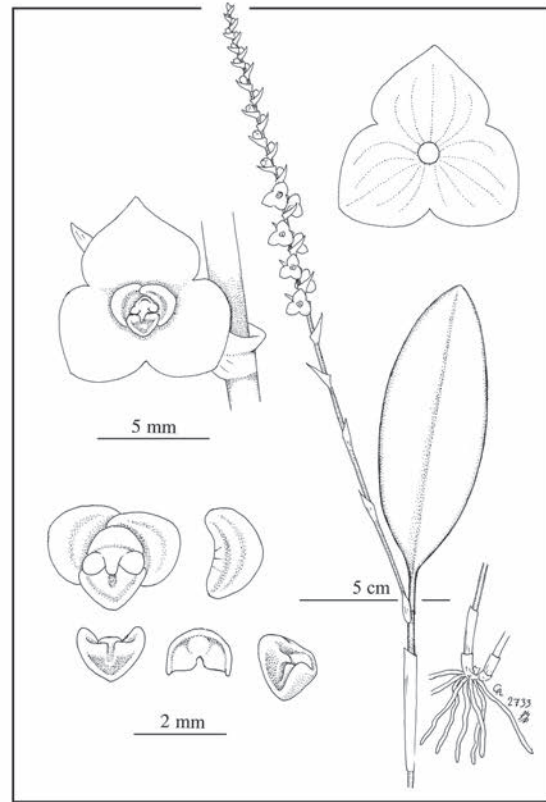


FIGURE 18. *Stelis glumacea* Lindl.

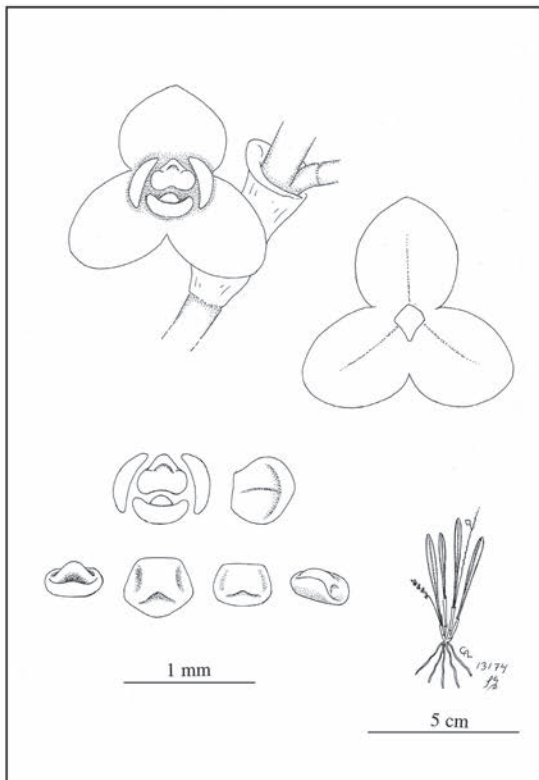


FIGURE 19. *Stelis graminea* Lindl.

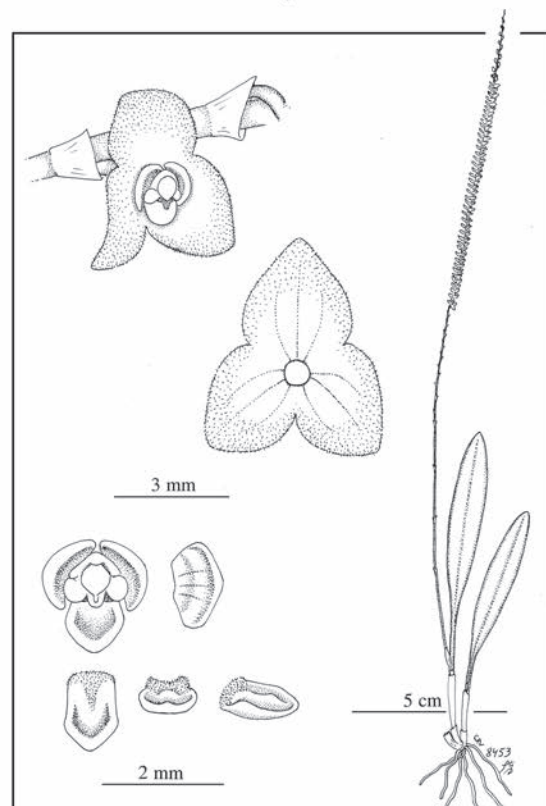


FIGURE 20. *Stelis hirsuta* Garay

concave below a shallowly cleft bar with a glenion, the apex obtuse. the dorsum descending with a low, indistinct, rounded callus, the base truncate, hinged to the base of the column; *column* stout, ca. 1 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *glumaceus*, “glumaceous (with glums), with chaffy bracts, like a spike of wheat” in allusion to the conspicuous floral bracts.

Additional collection: COLOMBIA. Nariño: SE of Ipiales toward La Victoria, 3000–3200 m, 22 Feb. 1978, C. Luer, J. Luer & A. Hirtz 2733 (SEL).

This large, robust species is similar to *Stelis grandiflora* Lindl., but is distinguished by a thick, ascending rhizome; ramicauls about as long as an elliptical, abruptly petiolate leaf; and conspicuous floral bracts spreading from the rachis. The flowers of the two species are similar with transversely ovate, five-veined sepals; thick, semilunate petals; and type A lips.

Stelis graminea Lindl., Fol. Orchid. *Stelis* 11, No. 77. 1859. TYPE: ECUADOR. probably Pichincha, W. Jameson s.n., (Holotype: K). Fig. 19.

Plant very small, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 5–8 mm long, enclosed by a tubular sheath and another sheath at the base. *Leaf* erect, coriaceous, narrowly linear-elliptic, oblanceolate, acute, 2–3 cm long, 2 mm wide in the living state, gradually narrowed below to the peduncle. *Inflorescence* single; 2–3.5 cm long, the raceme erect, strict, subclax, many-flowered, flowering from near the base; floral bracts tubular, 1 mm long; pedicels 1 mm long; ovary 0.5 mm long; the peduncle from near the apex of the ramicaul; flowers yellow; *sepals* glabrous, similar, subcircular, obtuse to rounded at the apex, 0.8 mm long and wide, 1-veined; *petals* thin, concave, subcircular, the apical margin slightly thickened, without a transverse callus, 0.4 mm long and wide, 1-veined; *lip* subquadrate, 0.4 mm long, 0.4 mm wide, 0.2 mm deep, shallowly concave below an intact bar to the broadly obtuse tip, the dorsum slightly convex, the base truncate, hinged to the base of the column; *column* ca. 0.4 mm long and wide, the anther and the stigma apical.

Etymology: From the Latin *gramineus*, “grass-like,” referring to the habit.

Additional collections: COLOMBIA. Antioquia: Concepción, between Concepción and Barbosa, 2380 m, 12 April 1988, C. Luer, J. Luer & R. Escobar 13174 (MO); without collection data, fl. in cult. by Colomborquídeas, 22 November 1981, C. Luer 6744 (SEL).

This very small, caespitose species is distinguished by narrow, linear leaves and a successively flowering raceme that eventually surpasses the leaves. The flowers are the smallest of any known species of *Stelis* Sw., rivaling the smallest species of *Platystele* Schltr. The subcircular sepals and petals are single-veined, the sepals being about eight tenths of a millimeter long and wide. The tiny, obtuse lip, less than a half millimeter long or wide, is concave below a curved bar. The lip is not basically similar to those closely related to *Stelis pusilla* Kunth, with which it has been synonymized in the past.

Stelis hirsuta Garay, Bot. Mus. Leaff. 27 (7–9): 184, 1980; *non Stelis parviflora* (Ruiz & Pav.) Pers. 1807. Fig. 20.

Basionym: *Stelis jamesonii* var. *parviflora* Garay, Can. J. Bot. 34: 352. 1956. TYPE: COLOMBIA. Cundinamarca: Cordillera Oriental, San Isidro, S of Gachala, 2200 m, 27 May 1944, M. L. Grant & F. R. Fosberg 9362 (Holotype: AMES; Isotypes: COL, US, WS).

Etymology: From the Latin *parviflorus*, referring to the presumed size of the flowers.

Plant medium in size, epiphytic, caespitose to ascending; roots slender. Ramicauls erect, 2.5 cm long, enclosed by tubular sheath below the middle and another 2 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical, subacute to narrowly obtuse, petiolate, 5–9 cm long including a petiole 1.5–2 cm long, 1–1.5 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* single; 20–27 cm tall, the raceme erect, congested, secund, strict, short-pedicellate, many-flowered with many flowers open simultaneously; floral bracts oblique, obtuse, 1.5 mm long and wide; pedicels 1.5 mm long; ovary 1 mm long; the peduncle 7–8 cm long, from a node below the apex of the ramicaul with a spathe 1 cm long; *sepals* purple externally, greenish purple within, minutely pubescent, broadly ovate, obtuse, connate below the middle, 3-veined, the dorsal sepal 3 mm long, 3 mm wide, the lateral sepals 2.5 mm long, 2.5 mm wide; *petals* yellow-green, transversely obovate, concave, 0.75 mm long, 1.2 mm wide, 3-veined, the apex broadly rounded with the margin slightly thickened; *lip* yellow-green, subobovate-discoid, 1 mm long, 0.8 mm wide, 0.5 mm deep, concave within the obtuse apical margin, surrounding a low, rounded callus extending forward from a densely short-pubescent callus at the base, the base truncate, hinged to the base of the column; *column* stout, ca. 1 mm long and wide, with an obsolescent foot, the anther and the bilobed stigma apical.

Etymology: From the Latin *hirsutus*, “hairy,” referring to the pubescent sepals.

Additional collection: COLOMBIA. Cauca: Sotará, between Paispamba and Chapa, 2300 m, 16 November 1982, C. Luer & R. Escobar 8453 (SEL).

This medium-sized species is characterized by short ramicauls bearing longer, elliptical leaves; a long, strict, crowded, raceme of short-pedicellate flowers, as compared to those of the type, with minutely pubescent sepals, instead of glabrous; and petals and lip very similar to those of *S. jamesonii* Lindl. The floral bracts and the pedicels of *S. jamesonii* are conspicuously longer.

Stelis hirsuta from the Eastern Cordillera of Colombia was first described by Garay as a variety of *Stelis jamesonii*, citing as differences a slender, densely multiflowered inflorescence, and flowers believed to be smaller than those of the type. Another collection from the Central Cordillera in the department of Cauca appears to be the same species, except that the flowers, instead of smaller, are about the same size, but with different colors. No mention of the lengths of the pedicels and floral bracts, nor pubescence of the sepals is made, although the illustration of the flower of the variety shows pubescent sepals.

Stelis lindenii Lindl., *Orchid. Linden.* 3, 1846. TYPE: VENEZUELA: Mérida: valley of Mérida, 6000 ft., *J. Linden 679* (Holotype: K), C. Luer illustr. 21950. Fig. 21–23.

Synonyms: *Stelis grandis* Rchb.f., *Bonplandia* 3: 70, 1855.

TYPE: VENEZUELA: Mérida, *L. J. Schlim 1019* (Holotype: W).

Etymology: From the Latin *grandis*, “large,” referring to the size of the plant.

Stelis cairoënsis Luer, *Selbyana* 30(1): 20, 2009. TYPE: COLOMBIA. Valle del Cauca: El Cairo, Cerro del Inglés, Serranía Paraguas, 2080 m, 9 November 1997, *P. A. Silverstone-Sopkin 8000* (Holotype: CUV; Isotype: MO), C. Luer illustr. 21264;

Etymology: Named for the community of El Cairo, Valle del Cauca, where this species was collected.

Plant large, epiphytic, densely caespitose-ascending, the rhizome stout, to ca. 1 cm thick, roots slender. Ramicauls erect, relatively slender, 10–20 cm long, with by a tubular sheath from below the middle and another 2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical-ovate, acute, petiolate, 6–13 cm long including the petiole 1.5–2 cm long, the blade 1.5–3 cm wide, cuneate below into the petiole. *Inflorescence* 2–6 simultaneous; 8–18 cm long, the racemes more or less erect, strict, congested, distichous, many-flowered, with many flowers open simultaneously; floral bracts tubular, acute, 2–3 mm long; pedicels 1.5–2 mm long; ovary 1–2 mm long; the peduncle 5–8 cm long, with a spathe 1–1.5 cm long, at an annulus below the apex of the ramicaul; *sepals* usually green or yellow-green, one known with purple suffusion, similar, glabrous, broadly ovate, broadly obtuse, connate to below the middle, the dorsal sepal 3.5–4.5 mm long, 4–5 mm wide, 5-veined, the lateral sepals oblique, 3–4 mm long, 3–5 mm wide, 4- to 5-veined; *petals* green or purple, transversely semilunate, concave, 1 mm long, 1.5 mm wide, 3-veined, the apical margin broadly thickened and with a transverse carina; *lip* green or purple, obliquely subquadrate, 0.75–1 mm long, 0.8–1 mm wide, 0.5–0.8 mm deep, concave below a thick bar with a glenion, with a transverse carina, the apex broadly rounded, the dorsum more or less descending, with a rounded or trilobed callus, the base truncate, hinged to the base of the column; *column* stout, ca. 1 mm long and wide, the anther and the bilobed stigma apical.

Etymology: Named in honor of Jean Linden, Belgian orchidist, who collected this species.

Additional collections: COLOMBIA. Antioquia: El Carmen, Alto de San Lorenzo, 2600 m, 17 September 1984, *C. Dodson & R. Escobar 15317* (MO); Boquerón San Lorenzo, 2500 m, cultivated by M. and O. Robledo, 19 March 1989, *C. Luer 14284* (MO); Urrao, between Urrao and Carmen de Atrato, 2700 m, 30 May 1995, *C. Luer, J. Luer, L. Posada & R. Escobar 17643* (MO); La Union, between La Union and Mesopotamia, 2400 m, 8 April 1988, *C. Luer, J. Luer & R. Escobar 13061, 13067* (MO); Yarumal, NE of Santa Rosa, Yarumalito, 2350 m, 15 May 1985, *C. Luer, R. Rodrigo & E. Valencia 11365* (MO). Valle

del Cauca: El Cairo, Cerro del Inglés, Serranía Paraguas, 2430 m, 1 April 1988, *P.A. Silverstone-Sopkin et al. 3887* (CUVC), C. Luer illustr. 21254. Nariño: near Laguna La Cocha, along road from Pasto to Mocoa, 25 July 1960, *L. A. Garay 45* (AMES).

Stelis lindenii Lindl. of Venezuela and Colombia is variable both florally and vegetatively. It is characterized by an elongated ramicaul that bears a shorter, acute, elliptical-ovate leaf and an inflorescence of several racemes about as long as to longer than the leaf. The expanded flowers are with broad, five-veined sepals; thick, three-veined petals; and a type A lip are basically similar to those of *Stelis grandiflora* that is distinguished by proportionately short ramicauls and the inflorescence with a single, longer raceme.

Stelis ochreatea Lindl. was mistakenly identified as *Stelis lindenii* in Luer (2009).

Stelis longipetala O. Duque, *Orquideología* 20(3): 353, 1997. TYPE: COLOMBIA. Antioquia: between Urrao and Frontino, 2500 m, collected by M. Zapata, October 1995, fl. in cult., February 1996, *O. Duque 1903* (Holotype: JAUM). Fig. 24.

Plant small, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 1–3 cm long, enclosed by a tubular sheath from below the middle and 1–2 sheaths at the base. *Leaf* erect, coriaceous, narrowly elliptical, obtuse, 2–3.5 cm long including the petiole 1–1.5 cm long, the blade 5–7 mm wide, narrowly cuneate below into the petiole. *Inflorescence* an erect, subcongested, distichous, many-flowered raceme with many flowers open simultaneously, 6–9 cm long including the peduncle ca. 3 cm long, from a node below the apex of the ramicaul; floral bracts tubular, acute, 1.5 mm long; pedicels 1 mm long; ovary 1 mm long; *sepals* light yellow, the lateral sepals more or less lightly suffused with purple, glabrous, the dorsal sepal broadly ovate to suborbicular, broadly obtuse to rounded at the tip, 3 mm long, 3 mm wide, 3-veined, connate basally to the synsepal, the lateral sepals, connate below the middle, connivent, forming an ovoid, deeply concave synsepal, 3 mm long, each sepal 2 mm wide, 3-veined; *petals* pale yellow, transversely elliptical-oblong, the apex obtuse to rounded, 1.2 mm long, 0–8 mm wide, 3-veined at the base; *lip* pale yellow, cordate-triangular, 0.5 mm long, 0.6 mm wide, 0.3 mm deep, shallowly concave, the apex obtuse with thickened margin, the base slightly thickened centrally, truncate, hinged to the base of the column; *column* stout, 0.5 mm long, 1 mm wide across stigmatic lobes, the anther and bilobed stigma apical.

Etymology: From the Latin *longipetalus*, “long-petaled,” referring to the outstretched petals.

Additional collection: Antioquia: Chocó: south of the pass between Urrao and Carmen de Atrato, 2700 m, 31 May 1985, *C. Luer, J. Luer & R. Escobar 17679* (MO).

This little species of section *Humboldtia*, is easily identified by thick, elliptical petals rounded at their tips, that expand laterally from column. The three veins are visible only at the base below the blade of the lip.

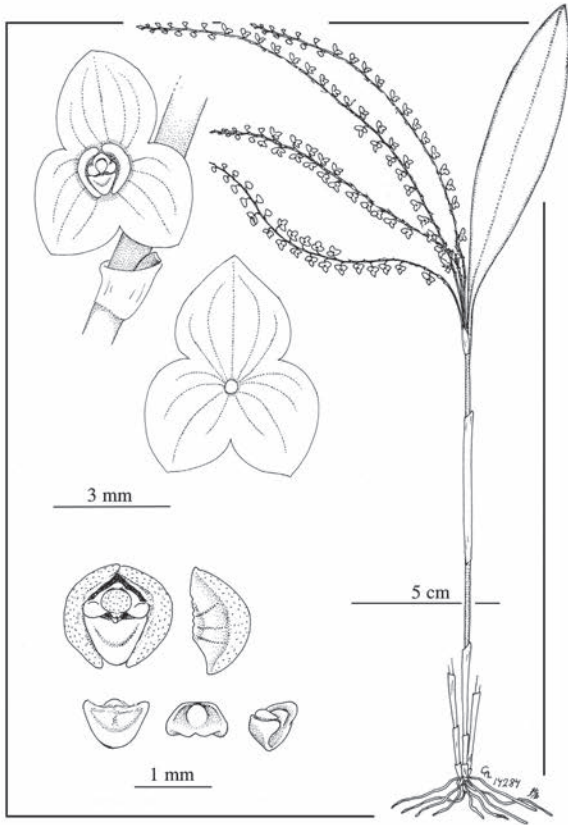


FIGURE 21. *Stelis lindenii* Lindl.

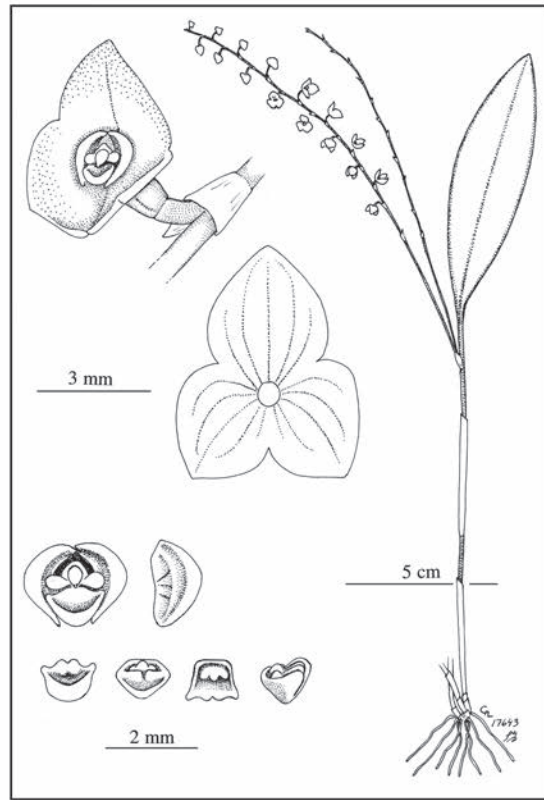


FIGURE 22. *Stelis lindenii* Lindl.

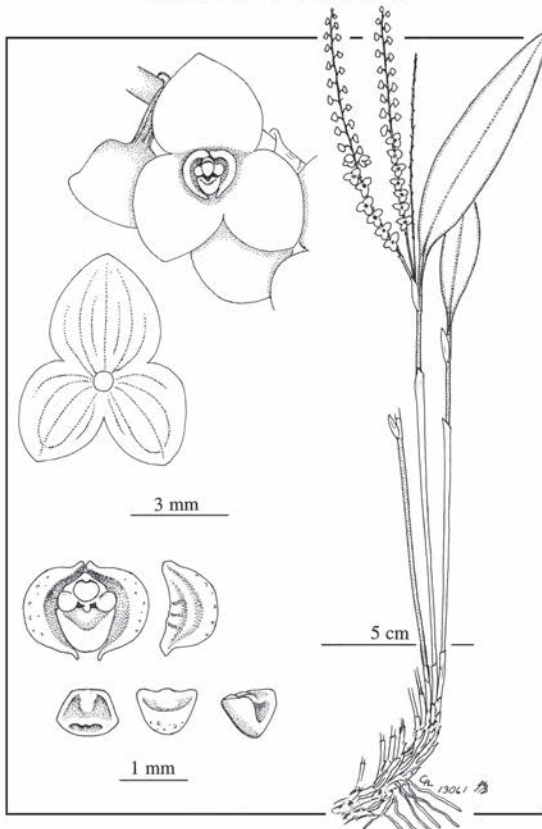


FIGURE 23. *Stelis lindenii* Lindl.

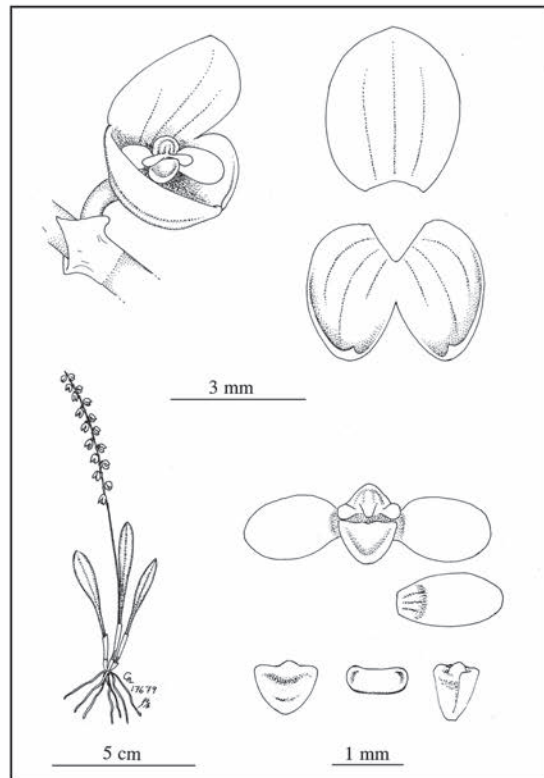


FIGURE 24. *Stelis longipetala* O.Duque

Stelis macropoda Schltr., Repert. Spec. Nov. Regni Veg. 7: 90, 1920. TYPE: COLOMBIA. Cauca: West Andes above Cali, 1600–2000 m, October, *F. C. Lehmann 4519* (Holotype destroyed at B; Isotype: K). Fig. 25–26.

Plant large, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 10–15 cm long, with a close, tubular sheath above the middle, 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical-ovate, acute, 10–16 cm long, 2–3 cm wide, cuneate below into a petiole 2–2.5 cm long. *Inflorescence* 2–4, 10–15 cm long, the racemes erect, congested, distichous, many-flowered; floral bracts oblique, acute, 2 mm long; pedicels 2 mm long; ovary 1–5 mm long; the peduncle 1–3 cm long, subtended by a spathe 1–1.5 cm long, from a node below the apex of the ramicaul; flowers yellow-green; *sepals* glabrous to cellular-pubescent, 3-veined, the dorsal sepal erect, elliptical, subacute, 4 mm long, 2 mm wide, connate basally to the synsepal, the lateral sepals semiconnate into a broadly ovate, centrally concave synsepal, 3 mm long, 4 mm wide, 6-veined; *petals* transversely ovate, concave, 0.75 mm long, 1 mm wide, the apex obtuse with thickened margin, 3-veined; *lip* subquadrate, obtuse, 0.5 mm long, 0.6 mm wide, 0.3 mm deep, concave below a thick bar with a narrow glenion, the dorsum filled with a low, rounded callus, the base truncate, hinged to the base of the column; *column* stout, 0.75 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Greek *makropoda*, “long-footed,” referring to the long ramicauls.

Additional collections: COLOMBIA. Risaralda: Pueblo Rico, road to TV antenna, 2400 m, *C. Luer, J. Luer, R. Escobar & A. de Wilde 16792* (MO). Valle del Cauca: old road between Cali and Buenaventura, 1800 m, 7 October 1989, *J. E. Ramos 1943* (SEL). Cauca: Meseta de Popayán, cultivated by Amalia Lehmann de Sarria in Popayán, 16 November 1982, *C. Luer 8445* (SEL).

This tall species of section *Humboldtia* is vegetatively similar to *Stelis lindenii* Lindl., with narrow, acute leaves borne by slender ramicauls and two to four many-flowered racemes about as long as the leaves. The sepals are glabrous and three-veined without forming a synsepal. However, the three-veined petals and the type A lip with a low, rounded callus on the dorsum, are similar.

Stelis major Rchb.f., Bonplandia 2: 23, 1854. TYPE: VENEZUELA. Dist. Fed. Caracas, collected by H. Wagener, flowered in cultivation at Berlin-Dahlem Botanical Garden, *H. Wagener s.n.* (Holotype: K), *C. Luer* illustr. 21976. Fig. 27–28.

Plant medium to large, epiphytic, presumably caespitose. Ramicauls erect, stout, 3–4 cm long, with a close, tubular sheath from below the middle, another 2 sheaths below and at the base. *Leaf* erect, coriaceous, obovate, obtuse, 5–8 cm long including a petiole, ca. 1.5 cm long, the blade 1.2–1.8 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* single; 10–15 cm long, the raceme erect, subcongested, distichous, many-flowered; floral bracts

oblique, acute, 3 mm long; pedicels 3 mm long; ovary 2 mm long; peduncle ca. 6 cm long, subtended by a spathe ca. 1.5 cm long, from a node below the apex of the ramicaul; color of flowers unknown; *sepals* glabrous, broadly ovate, 3-veined, connate below the middle, the dorsal sepal obtuse, 5 mm long, 5 mm wide, the lateral sepals subcircular, 4 mm long, 5 mm wide; *petals* transversely oblong, 1.75 mm long, 2 mm wide, thin, concave, 3-veined, the apical margin broadly rounded, narrowly thickened; *lip* subcircular, 2 mm long, 1.75 mm wide, 0.5 mm deep, concave, with a central, sulcate callus, the apex subtruncate with thin margins, the dorsum minutely pubescent, the base truncate, connate to the base of the column; *column* stout, ca. 1.5 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *major*, “greater,” referring to the flowers being larger than those of the usual species of *Stelis*.

Additional collection: COLOMBIA. Caldas: Cerro Tatamá, Quebrada Peñas Blancas, SW of Santuario, 3135 m, 3 December 1944, *H. St. John 20879*, *C. Luer* illustr. 21975 (AMES, US).

This species was described by Reichenbach from a collection by Hermann Wagener from the Sierra Nevada de Mérida, apparently sent from Caracas, and cultivated at Berlin, hence the holotype consists of only two detached ramicauls, but each with leaf and a raceme. Dunsterville’s illustration nr. 604 published by Romero and Carnevali (2000: 1031) is an unidentified species.

Stelis major is characterized by a single, many-flowered raceme that exceeds an obovate, obtuse leaf; relatively large flowers with glabrous, three-veined, subcircular sepals; thin, three-veined petals; and a concave lip with a central, pubescent, sulcate callus. In the original description the apex of the callus is described as being three- or four-carinate, but the callus of the lip from a rehydrated flower from the holotype is clearly bicarinate. The apex of the lip is thin, subtruncate with the tip recurved, creating a bilobed appearance.

Stelis microphylla Lindl., Fol. Orchid. *Stelis* 10(74), 1858. TYPE: ECUADOR. Eastern Cordillera, at 13000 ft., *W. Jameson s.n.*, (Holotype: K). Fig. 29.

Plant small, epiphytic, repent, ascending; rhizome slender, 5–15 mm between ramicauls; roots slender. Ramicauls ascending-erect, slender, 10–12 mm long, enclosed by a tubular sheath from below the middle and another at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 1.5–2.8 cm long including an indistinct petiole, 2 mm wide when dry, gradually narrowed below into the petiole. *Inflorescence* single, 2.5–4.5 cm long, the raceme erect, subclax, distichous, several-flowered; floral bracts acute, 1.5–2 mm long; pedicels 0.5 mm long; ovary 0.5 mm long; the peduncle ca. 1 cm long, from a node below the apex of the ramicaul; flowers yellow; *sepals* glabrous, ovate, obtuse, 3-veined, dorsal sepal 1.75 mm long, 1.75–1.3 mm wide, the lateral sepals 1.5 mm long, 1.3 mm wide, connate below the middle; *petals* subcircular to transversely cuneate, obtuse, ca. 0.5 mm long, 0.5 mm wide, 1-veined,

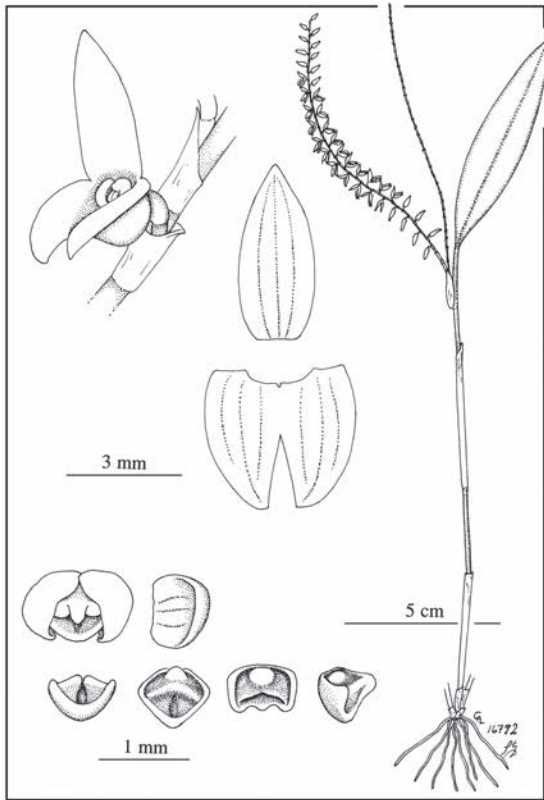


FIGURE 25. *Stelis macropoda* Schltr.

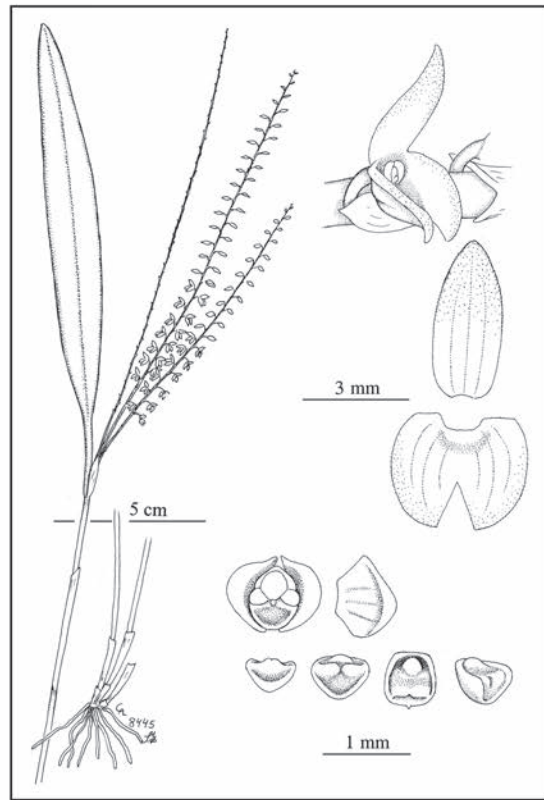


FIGURE 26. *Stelis macropoda* Schltr.

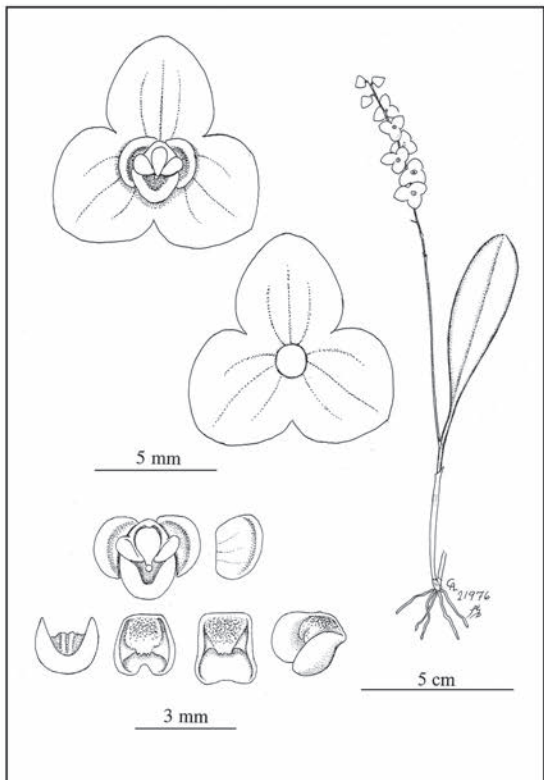


FIGURE 27. *Stelis major* Rehb.f.

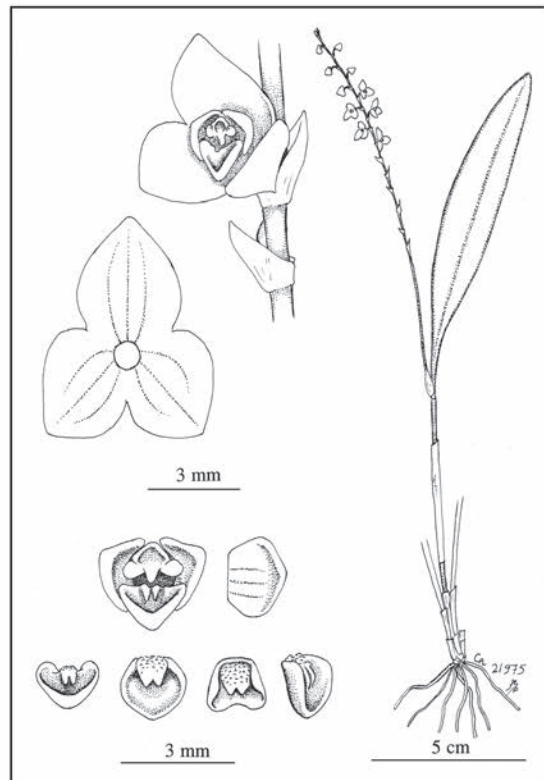


FIGURE 28. *Stelis major* Rehb.f.

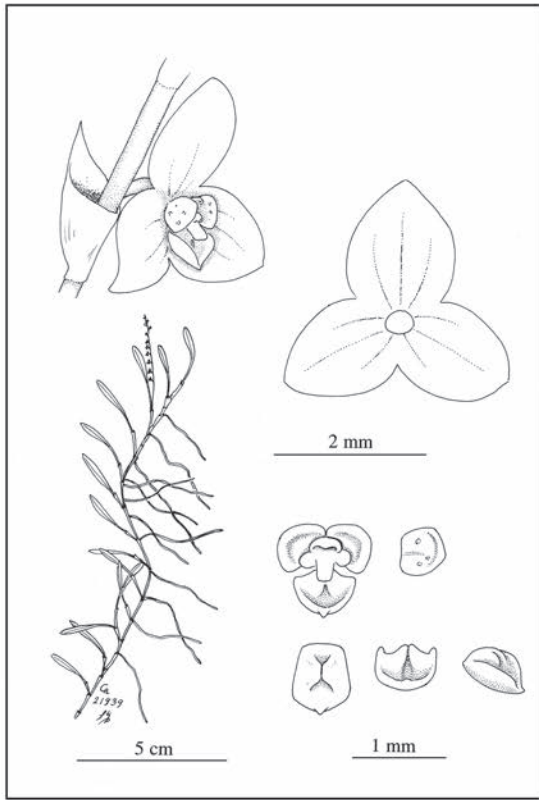


FIGURE 29. *Stelis microphylla* Lindl.

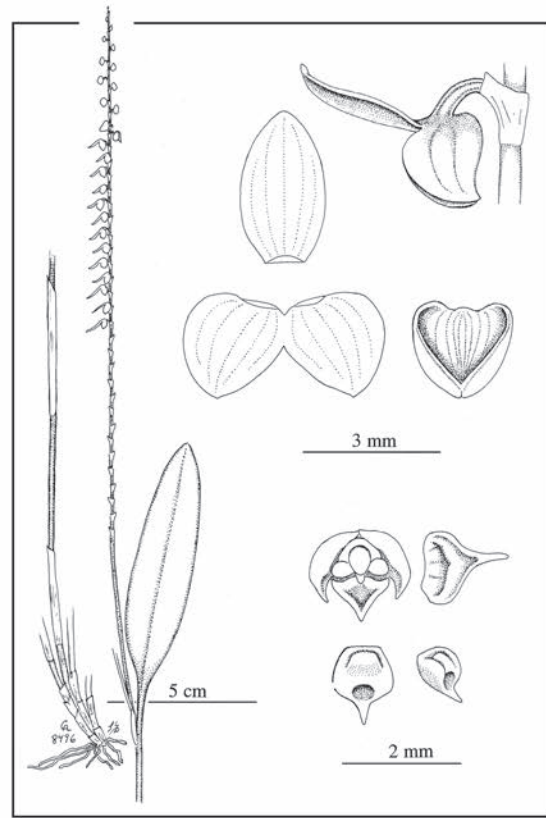


FIGURE 30. *Stelis mucronipetela* Schltr.

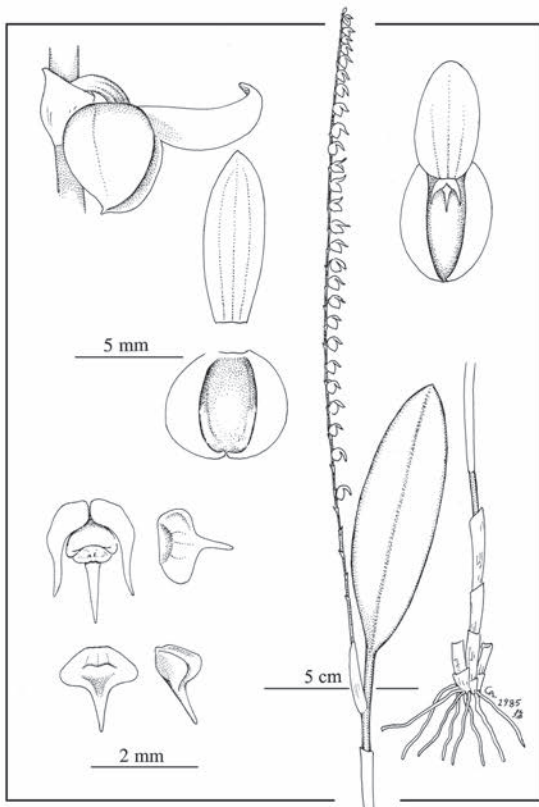


FIGURE 31. *Stelis mucronipetela* Schltr.

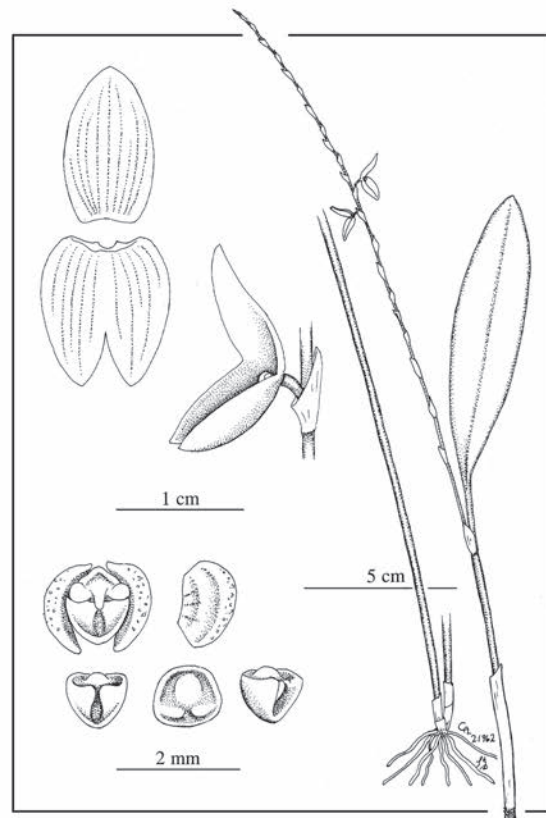


FIGURE 32. *Stelis pachystele* Schltr.

thin, shallowly concave, narrowly thickened on the apical margin; *lip* subquadrate, ca. 0.6 mm long, 0.6 mm wide, 0.5 mm deep, the apex broadly obtuse to truncate with a small, indistinct, triangular apiculum, concave below a shallowly cleft bar, the dorsum slightly convex, microscopically pubescent at the base, the base hinged to the base of the column; *column* stout, ca. 0.5 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Greek *microphyllon*, “minute-leaved,” referring to the foliage.

Additional collections: COLOMBIA. Cauca: Páramo de Guanacas, 2800–3200 m, 9 January 1886, *F. C. Lehmann 6039* (AMES), *C. Luer* illustr. 21072. Quindío: at the pass between Salento and Tocha, 3300 m, 10 May 1993, *C. Luer, J. Luer & R. Escobar 16750* (MO). Putumayo: Santiago, San Antonio de Bellavista, 3240 m, 18 Mar. 1999, *S. M. Pasmíño & M. R. Posso 040* (MO, PSO), *C. Luer 21936*.

The flowers of this small species are basically similar to those of *Stelis pusilla* Kunth, but the habit differs distinctly. Minute, narrowly elliptical leaves are borne by also minute ramicauls spaced loosely along a slender, creeping rhizome, sometimes forming great clumps. The inflorescence of tiny flowers surpasses the leaf. This species is usually reduced to the synonymy of *Stelis pusilla*, but it is distinguished by a loose, scandent, repent habit.

Stelis mucronipetala Schltr., Rep. Spec. Nov. Regni Veg. Beih. 27: 33, 1924. TYPE: COLOMBIA. Nariño: near Daza, 10 Km NW of Pasto, 2800 m, January 1922, *W. Hopp 135* (Holotype lost at B), Neotype, here designated: COLOMBIA. Tolima: La Linea between Ibagué and Armenia, 3500 m, 20 October 1982, *C. Luer & R. Escobar 8496* (SEL). Fig. 30–31.

Plant large, epiphytic, caespitose. Ramicauls erect, stout, 10–15 cm long, with a tubular sheath from near or below the middle, and another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical-ovate, acute to subacute, 5–12 cm long including a petiole 1.5–3 cm long, the blade 1.5–3 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* 1–2; 15–30 cm long, the raceme erect, subclax, distichous, with nearly simultaneous, nodding flowers; floral bracts oblique, obtuse, 2–3 mm long; pedicel 2–3 mm long; ovary 2–3 mm long; the peduncle 3–5 cm long, subtended by a slender spathe 12–20 mm long, from a node near the apex of the ramicaul; flowers purple-brown, *sepals* glabrous, the dorsal sepal elliptical, obtuse, 5-(or 3-)veined, connate near the base, dorsal sepal 6–8 mm long, 2.5–3.5 mm wide, the lateral sepals ovate, oblique, obtuse, connate to the tips into a suborbicular synsepal, 4–5 mm long, 4–6 mm wide unexpanded, multiveined; *petals* rose, long-apiculate, the blade 0.75 mm long, 1.5 mm wide, 3-veined, with a transverse carina, the apex subtruncate, contracted into a slender process 0.5 mm long; *lip* trilobed, ca. 1.5 mm long, 1.25 mm wide, 0.5 mm deep, concave below a shallowly channeled bar, the apex long-acuminate to an acute tip, the dorsum with a low, rounded callus, the base truncate, connate to the base of the column; *column* stout, ca. 1 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *mucronipetalus*, “with sharp-pointed petals” referring to the elongated tips of the petals.

Additional collections: COLOMBIA. Cauca: above Monchique, W of Popayan, 2750 m, 26 July 1978, *C. Luer, J. Luer & R. Escobar 2985* (SEL); above Monchique, W of Popayan, 2750 m, 26 July 1978, *C. Luer, J. Luer & R. Escobar 2985, 2985-A* (SEL); Putumayo: between La Cocha and Sibundoy, 2700 m, 5 August 1978, *C. Luer, J. Luer & R. Escobar 3109* (SEL); Tolima: Alto de Pozo, W of Ibagué, 3300 m, 20 April 1982, *C. Luer, J. Luer & R. Escobar 7483* (SEL).

This large, caespitose species is one of several with long-apiculate petals and lip similar to those of *Stelis pardipes* Rchb.f., which is frequent in Central America and the Andes, and several prolific species, i.e. *S. bicornis* Lindl. and *S. trisetata* Lindl. *Stelis mucronipetala* is distinguished by a larger habit, twice broader elliptical-ovate leaves; twice larger flowers with the dorsal sepal six to eight millimeters long; and a suborbicular synsepal. The petals and lip are similar to those of *S. pardipes*, with the slender, apical processes of the petals and lip pointing forward like the three prongs of a trident.

Stelis pachystele Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 92, 1920. COLOMBIA. Cauca: “West-Andes von Cali,” 1600–2000 m, October–November 1886, *F. C. Lehmann 6922* (Holotype destroyed at B; Isotype: AMES). Fig. 32.

Plant large, epiphytic, caespitose; roots slender. Ramicauls stout, erect, 12–28 cm long, enclosed by a tubular sheath above the middle, and another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical-ovate, acute, petiolate, 12–28 cm long including the petiole 3 cm long, the blade 1.5–3 cm wide, cuneate below into the petiole. *Inflorescence* 2 successive; 15–20 cm long, erect, strict, subclax, many-flowered, with several flowers open simultaneously; floral bracts oblique, acute, 6–7 mm long below, 4 mm long above; pedicels 2 mm long; ovary 4 mm long; the peduncle ca. 5 cm long, subtended by a spathe 1.5 cm long, from a node below the apex of the ramicaul; flowers appear to have been purple; *sepals* glabrous, membranous, the dorsal sepal ovate, acute, 8–12 mm long, 6–9 mm wide, 7- to 9-veined, connate basally ca. 3 mm, the lateral sepals connate to near the apex into a concave synsepal, 8–12 mm long, 8–10 mm wide expanded, 10-veined; *petals* transversely ovate, 1 mm long, 1.25 mm wide, 3-veined, concave, the apex broadly rounded, with a broadly thickened margin, with a transverse callus; *lip* type A, subquadrate, 0.75 mm long, 1 mm wide, 0.75 mm deep, shallowly concave below the bar with a short, central cleft that is continuous with a long glenion nearly to the rounded tip, the dorsum with a broad, low callus, the base truncate, hinged to the base of the column; *column* semiterete, ca 1 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Greek *pachystele*, “thick column,” referring to the column, but the column of an isotype does not appear thicker than would be expected.

Additional collections: COLOMBIA. Cauca: above Tocota, "West Andes of Cali," 1700–2000 m, *F. C. Lehmann 6811* (AMES), C. Luer illustr. 21962; Cauca: "West Andes of Cali," 2000 m, 15 December 1882, *F. C. Lehmann 2025* (AMES).

This large, caespitose species had been considered to be a variation of the variable *Stelis purpurea* (Ruiz & Pav.) Willd., but it differs with most ramicauls being much longer than the longest ones of *S. purpurea*; shorter, non-acuminate floral bracts; and larger flowers with multiveined sepals. Schlechter stated that the dorsal sepal is only five-veined, as in his illustration, but the additional veins are not easily seen. The column is not proportionately larger or thicker than would be expected. A rehydrated flower from *Lehmann 6922*, an isotype at AMES, has a dorsal sepal with nine veins as illustrated herewith.

Stelis papilio O. Duque, *Orquideología* 20(3): 358, 1997. TYPE: COLOMBIA. Risaralda: near Pueblo Rico, 2100 m, collected by P. Alvarez, fl. in cult. 28 October 1989, *O. Duque 419* (Holotype: JAUM). Fig. 33.

Synonym: *Stelis papiliopsis* O. Duque, *Orquideología* 20(3): 361, 1997. TYPE: COLOMBIA. Antioquia: La Honda between La Union and Sonsón, 1800 m, 22 September 1991, *O. Duque 1366* (Holotype: JAUM). Etymology: From the Latin *papilio*, "a butterfly," and the Greek suffix *-opsis*, "aspect," "appearance," referring to the appearance of the species to *S. papilio*.

Plant large, epiphytic, densely caespitose; roots slender. Ramicauls erect, fasciculate, relatively slender, 15–17 cm long, enclosed by a loose, tubular sheath above the middle and 2–3 close, tubular sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, acute, 14–16 cm long, including a petiole 2.5 cm long, the blade 3–3.5 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* an erect, congested, distichous, large-bracted, many-flowered raceme with few flowers open simultaneously, to 15 cm long including the peduncle 1–2 cm long, subtended by a slender spathe 1.5 cm long, from an a node below the apex of the ramicaul; floral bracts oblique, acute, 8 mm long low in the raceme to 5 mm long above and imbricating; pedicels 3–4 mm long; ovary 1.5 mm long; *sepals* expanded, rose, microscopically pubescent within, connate in lower third, broadly ovate, obtuse, 5-veined, the dorsal sepal 6 mm long, 5.5 mm wide, the lateral sepals oblique, 4.5 mm long, 5 mm wide; *petals* yellow, ovate, obtuse, with a broad, faintly demarcated margin with multiple, minute crystalline deposits, 1.5 mm long, 1.2 mm wide, 3-veined at the base; *lip* red, subcircular, 1.5 mm long, 1.5 mm wide, 0.8 mm deep, concave with thin margins below a thick bar and with the tip of the lower third incurved, flat on the dorsum, base broadly truncate, hinged to the base of the column; *column* proportionately small, ca. 0.5 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *papilio*, "a butterfly," referring to the appearance of the petals and lip.

Additional collections: COLOMBIA. Risaralda: near Pueblo Rico, November 1993, collected by R. Escobar

s.n., fl. in cult. by Colomborquídeas, 23 May 1995, *C. Luer 17580* (MO). Antioquia: Finca San Francisco, between El Santuario and Cocorná, 2000 m, *O. Duque 1410* (JAUM).

Stelis papilio is a strong species with a large, elliptical leaf, a long, multiflowered raceme, and a variable lip. The morphology of the sepals and petals remain the same in two variations. The sepals are large, purple, five-veined, obtuse, deeply connate and microscopically cellular. The petals, emerging obliquely above the column, are ovate and thick with a broad, obtuse margin with multiple, minute crystals.

According to Duque's descriptions and discussions, the raceme of *Stelis papilio* is not congested, while that of *Stelis papiliopsis* is congested with conspicuous, imbricating floral bracts, and that the tip of the lip of *S. papilio* is concave and incurved, while the lip of *S. papiliopsis* is not. A variation from Risaralda with a congested raceme as in *S. papiliopsis*, and a lip with an incurved tip as in *S. papilio*, is illustrated herewith. The racemes of variations from Antioquia are not congested, and the tips of the lips are incurved.

Stelis parvilabris Lindl., *Ann. Mag. Nat. Hist.* 15: 385, 1845. TYPE: COLOMBIA. Cauca: Popayán, Páramo de Guanacas, 10,000 ft., *T. Hartweg s.n.* (Holotype: K), C. Luer illustr. 21998. Fig. 34.

Plant small, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 3–4 cm long, enclosed by a tubular sheath from below the middle and 1–2 sheaths below and about the base. *Leaf* erect, coriaceous, elliptical, acute, ca. 7 cm long including a petiole ca. 1.5 cm long, the blade 1.5 cm wide, cuneate below into the petiole. *Inflorescence* 2–3; the racemes erect, loose, subflexuous, ca. 4- to 5-flowered, 3–4 cm long, from below the apex of the ramicaul; floral bracts oblique, inflated, obtuse, 4 mm long, 3 mm broad; pedicels 1.5 mm long; ovary 1 mm long; flower color unknown; *sepals* antrorse, glabrous, 3-veined, the dorsal sepal broadly ovate, obtuse, concave, connate below the middle, 2 mm long, 2 mm wide, 3-veined, the lateral sepals connate below the middle, adherent to near the apex into a broadly ovate, concave synsepal, 2 mm long, 2.5 mm wide together, *petals* ovate, concave, the apex broadly obtuse, 0.5 mm long, 0.8 mm wide, 3-veined; *lip* subquadrate, 0.6 mm long, 0.5 mm wide, 0.3 mm deep, shallowly concave below a cleft in a rounded bar, the apex truncate with an obtuse tip, the base broadly truncate, hinged to the base of the column; *column* stout, clavate, ca. 0.5 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: From the Latin *parvilabris*, "with small lip," referring to the labellum.

This rare species was collected by Hartweg in the Páramo de Guanacas, stated by him to be "very scarce," and did not assign a collection number. At about the same time and place, another species, given his collection number 1411, was apparently abundant, because duplicate specimens were widely distributed among herbaria. The single, "scarce" specimen at K was described by Lindley as *Stelis parvilabris*, while one of the many duplicate collections was described as *Stelis brevilabris*, both descriptions being published in the *Annals of the Magazine of Natural History*

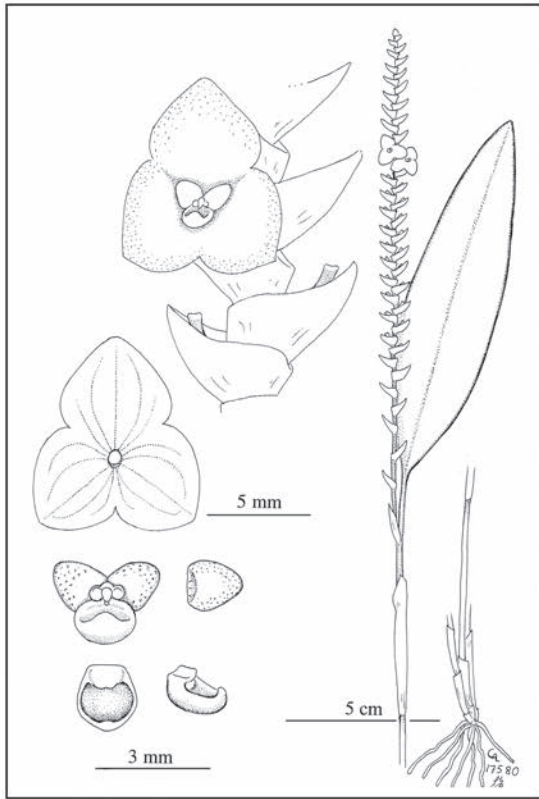


FIGURE 33. *Stelis papilio* O. Duque

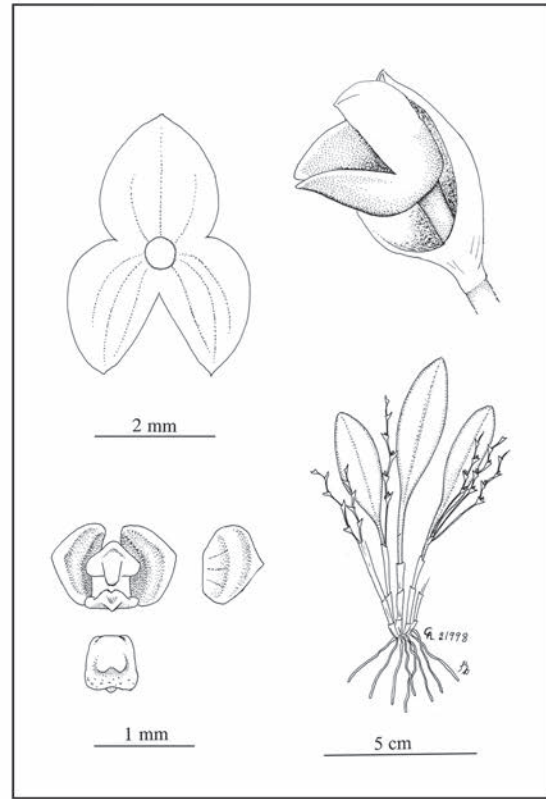


FIGURE 34. *Stelis parvilabris* Lindl.

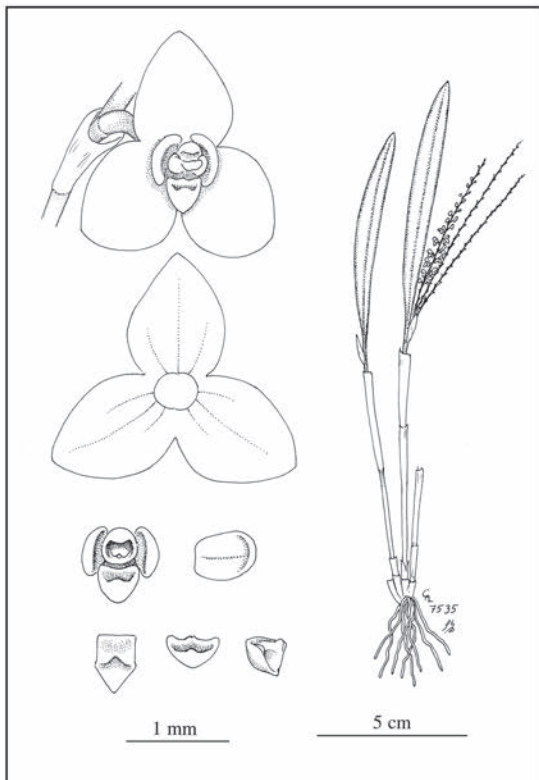


FIGURE 35. *Stelis pleistantha* Schltr.

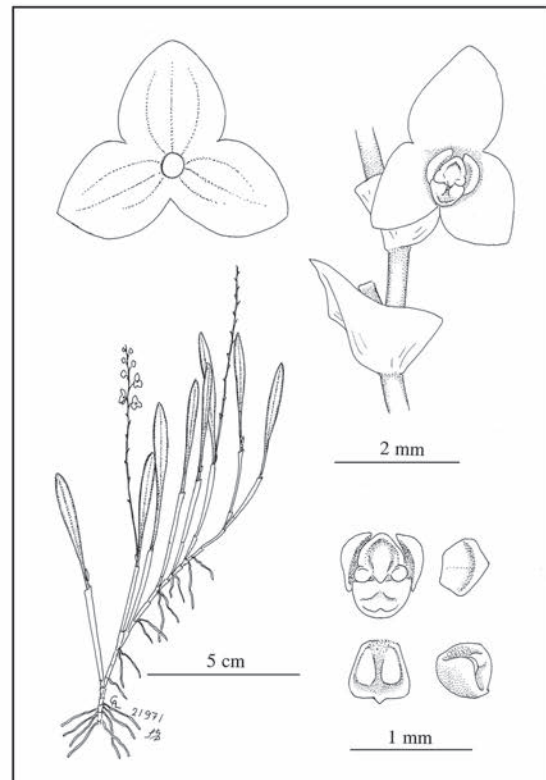


FIGURE 36. *Stelis polyclada* Lindl.

in 1845, but in different volumes. Confusion in the similar names arose. The single collection, *S. parvilabris*, is small and caespitose with loose racemes not longer than the leaves, while the other one of many, *S. brevilabris*, is larger and repent with racemes distinctly longer than the leaves. No subsequent collection of *S. parvilabris* is known.

Stelis parvilabris is characterized by a densely caespitose habit; acute, elliptical, petiolate leaves longer than the ramicauls; loose, subflexuose, few-flowered racemes shorter than the leaves; inflated floral bracts; three-veined sepals with the lateral sepals semiconnate.

Stelis pleistantha Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 36, 1924. TYPE: COLOMBIA. Nariño: epiphytic near Daza, 10 km NW of Pasto, 2800 m, January 1922, W. Hopp 139 (Holotype: probably lost at B). Fig. 35.

Synonym: *Apatostelis pleistantha* (Schltr.) Garay, Bot. Mus. Leaflet. 27: 190, 1980.

Plant medium to large, epiphytic, densely caespitose; roots slender. Ramicauls erect, stout, 4–9 cm long, enclosed by a loose, tubular sheath near the middle and 2 sheaths below and about the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 7–10 cm long including ad petiole ca. 1 cm long, 0.8–1 cm wide, narrowly cuneate below into the petiole. *Inflorescence* 3–5 simultaneous racemes, 6–8 cm long, erect, many-flowered, congested, distichous, floral bracts oblique, acute, 1 mm long; pedicels 0.5 mm long; ovary 0.5 mm long; the peduncle less than 1 cm long, from a spathe 1 cm long at a node below the apex of the ramicaul; Flowers yellow; *sepals* expanded, glabrous, broadly ovate, subacute, connate to near the base, 3-veined, the dorsal sepal 1.5 mm long, 1 mm wide, the lateral sepals 1 mm long and wide; *petals* thin, obovate, with the apex broadly obtuse, slightly thickened on the edge, 0.6 mm long, 0.5 mm wide, 1-veined; *lip* subquadrate, shallowly concave below an obtusely curved bar, the apex triangular, subacute, 0.6 mm long, 0.6 mm wide, 0.3 mm deep, the dorsum shallowly concave above the bar, the base broadly truncate, hinged to the base of the column; *column* stout, ca. 0.6 mm long and wide, the anther and the stigma apical, the stigma narrow within the sides of the column.

Etymology: From the Greek *pleistantha*, “most flowers,” referring to the inflorescence.

Additional collections: COLOMBIA. Boyacá: between Arcabuco and Moniquirá, 2500 m, 23 April 1982, C. Luer, J. Luer & R. Escobar 7535 (SEL).

This species is similar to *Stelis braccata* Rehb.f. and Warsz. that is relatively frequent in the Andes of Colombia and Ecuador. A variation in Colombia seems to differ sufficiently to be recognized. *Stelis pleistantha* is distinguished by a larger habit with stout, densely fascicled ramicauls about as long as narrow leaves, and three to five many-flowered racemes. The flowers are similar, but the thin, obovate petals are longer than wide, and the apex of the lip is triangular and subacute at the apex.

Stelis polyclada Lindl., Fol. Orchid. *Stelis* 10, No. 69. 1859. TYPE: ECUADOR. Pichincha: Quito, W. Jameson s.n., (Holotype: K). Fig. 36.

Synonyms: *Stelis scandens* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 39, 1924. TYPE: COLOMBIA. Cauca: Daza, 19 km. NW of Pasto, 2800 m, January 1922, W. Hopp 151 (Holotype destroyed at B), non Rolfe 1907. Etymology: From the Latin *scandens*, “scandent,” referring to the habit.

Stelis dazae Garay, name proposed to replace *S. scandens* Schltr. non Rolfe. Bot. Mus. Leaflet. 27 (7–9): 202 (index). 1980, *Nom. inval.*

Etymology: Named for the community of Daza, where the plant was collected.

Plant small to medium in size, epiphytic, repent, ascending; rhizome slender, 0.5–1 cm between ramicauls; roots slender. Ramicauls ascending-erect, slender, 1–4 cm long, enclosed by a tubular sheath from below the middle and another at the base. *Leaf* erect, coriaceous, narrowly elliptical, acute, 2–5.5 cm long including an indistinct petiole, 0.4–0.6 cm wide when dry, gradually narrowed below into the petiole. *Inflorescence* single, 4–14 cm long, the raceme erect, subclax, distichous, many-flowered with many flowers open simultaneously; floral bracts acute, 1.5–3 mm long; pedicels 1 mm long; ovary 0.5 mm long; the peduncle 1–2 cm long, from a node below the apex of the ramicaul; flowers yellow; *sepals* glabrous, ovate, obtuse, 3-veined, dorsal sepal 1.8–2 mm long, 1.5–1.8 mm wide, the lateral sepals 1.5 mm long, 1.8 mm wide, connate below the middle; *petals* subcircular to transversely cuneate, obtuse, ca. 0.5 mm long, 0.6 mm wide, 1-veined, thin, shallowly concave, narrowly thickened on the apical margin; *lip* subquadrate, ca. 0.7 mm long, 0.6 mm wide, 0.5 mm deep, the apex broadly obtuse to truncate with a small, indistinct, triangular apiculum, concave below a shallowly cleft bar, the dorsum slightly convex, microscopically pubescent at the base, the base hinged to the base of the column; *column* stout, ca. 0.5 mm long and wide, the anther and the bilobed stigma apical.

Etymology: From the Greek *polyclados*, “many branched,” referring to the ramicauls branching from the rhizome.

Additional collections: COLOMBIA. Cauca: Volcán Puracé, road from La Plata to San Rafael, 3450–3600 m, 21 July 1948, B. Garcia-Barriga & J. Hawkes 12821 (AMES, COL); Páramo de Puracé, San Francisco, 3400 m, 23 July 1943, J. Cuatrecasas 14688 (AMES); Alto de Duende, 3300 m, 1–2 December 1944, J. Cuatrecasas 18818 (AMES); Volcán Puracé, Páramo de San Rafael, ca. 10000 ft., 23 July 1960, L. A. Garay 9 (AMES), C. Luer illustr. 21971. Valle del Cauca: El Cerrito, between Tenerife and Páramo de Azúcar, 3440 m, 25 March 1994, P. A. Silverstone-Sopkin 6659 (CUVC, MO).

Among the numerous variations of species with flowers basically similar to those of variations of *Stelis pusilla* Kunth, this species is distinguished by a larger, distinctly repent habit with longer, narrowly elliptical leaves. This species is usually reduced to the synonymy of *Stelis pusilla* Kunth, but it is recognized by larger, ascending, repent habit with usually slightly larger flowers.

Stelis popayanensis F.Lehm. & Kraenzl., Bot. Jahrb. Syst. 26(3–4): 448, 1899. TYPE: COLOMBIA. Cauca: near Corrales, central declivities near Popayán, 2000–3000 m, May and September without year, *F. C. Lehmann 6817* (Holotype: K), C. Luer illustr. 21999; *non Stelis popayanensis* (F.Lehm. & Kraenzl.) Pridgeon & W.Chase (2001), *nom. illeg.* Fig. 37.

Plant large, epiphytic, prolific-caespitose. Ramicauls single, becoming fasciculate at the apex of another ramicaul, erect, slender, 5–12 cm long, with a tubular sheath from below the middle, another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, acute to subacute, 6–8.5 cm long including a petiole 1.5 cm long, the blade 1.2–2 cm wide in the dry state, cuneate below to the petiole. *Inflorescence* single; 12–18 cm long, the raceme erect, congested, distichous, many-flowered; floral bracts oblique, acute, 3–4 mm long; pedicels 3 mm long; ovary 2 mm long; peduncle ca. 5 cm long, subtended by a spathe ca. 1 cm long, from a node below the apex of the ramicaul; flowers light yellow to light yellow-green; *sepals* glabrous, ovate, 3-veined, connate below the middle, the dorsal sepal acute, 2.75 mm long, 2.25 mm wide, the lateral sepals obtuse, 2.3 mm long, 2 mm wide; *petals* broadly ovate, rounded at the apex, 1.3 mm long, 1.3 mm wide, concave, 1-veined, the apical margin thickened; *lip* transversely obovate, thin, concave, broadly rounded at the apex, 2 mm long, 2 mm wide, 1 mm deep, with an elevated, rounded, superficially channeled callus, extending from the base to the center of the lip, the base truncate, hinged to the base of the column; *column* stout, ca. 2 mm long and wide, the anther and the stigmatic lobes apical.

Etymology: Named for Popayán, the city near the site of collection.

Stelis popayanensis is one of two species that bears Lehmann's collection number 6817. The published description of *Stelis popayanensis* applies to the larger of the two, the smaller, answering the published description of *Stelis rhynchanthera* F.Lehm. & Kraenzl.

Stelis popayanensis is characterized by a prolific habit with one or several, erect ramicauls produced at the apex of a ramicaul with a leaf and inflorescence. The raceme is many-flowered, exceeding the acute, elliptical leaf. The flowers are relatively large with glabrous, three-veined, subacute to obtuse sepals; thin, single-veined petals; and a thin, subcircular, concave lip with a central, shallowly sulcate callus, suggesting a similarity to that of *Stelis major* Rchb.f.

The author explicitly excludes *Stelis dunstervilleorum* Foldats from the synonymy of *Stelis popayanensis*, as proposed by Duque (2008: 316).

Stelis rhomboidea Garay, Canad. J. Bot. 34: 353, 1956. TYPE: COLOMBIA. Cundinamarca: Cordillera Oriental, Páramo de Guasca, 2840 m, 2 June 1940, *J. Cuatrecasas 9465* (Holotype: US; Isotype: AMES), C. Luer illustr. 21245. Fig. 38.

Plant small, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 2–6 cm long, with a tubular sheath

from near or below the middle and another sheath below at the base. *Leaf* erect, coriaceous, elliptical-ovate, acute, obtuse, petiolate, 2–4 cm long including the petiole ca. 1 cm long, the blade 1 cm wide dry, cuneate below into the petiole. *Inflorescence* an erect, lax, subflexuous, many-flowered raceme, 10–12 cm long including the peduncle 3–4 cm long, with many flowers open simultaneously, from a node below the apex of the ramicaul; floral bracts acute, 1.5 mm long; pedicels 1.5 mm long; ovary 1 mm long; flowers dark purple; *sepals* expanded, glabrous, narrowly ovate, acute, 3-veined, connate basally, the dorsal sepal 3 mm long, 1.3 mm wide, the lateral sepals 3 mm long, 1.6 mm wide; *petals* elliptical, concave, the apex broadly rounded, narrowly thickened on the margin, 0.8 mm long, 1.2 mm wide, 1-veined; *lip* rhombic, narrowly rounded at the tip, concave with a narrow, erect margin, with a low, elevated, longitudinal callus from the base, with the dorsum shallowly concave, probably a modified glenion, 1.5 mm long, 1.2 mm wide, 0.5 mm deep, the base truncate, attached to an obsolescent column-foot; *column* stout, 1.5 mm long and wide, with the anther and the bilobed stigma apical.

Etymology: From the Latin *rhomoideus*, “rhombic,” referring to shape of the lip.

Additional collections: COLOMBIA. Cundinamarca: Chocontá, Páramo del Sisga, 2600–2850 m, 5 Nov. 1960, *H. García-Barriga 17307* (AMES, COL), C; Luer illustr. 10386; Chocontá, El Sisga, alta de La Represas, 2700–2900 m, 14 January 1962, *H. García-Barriga 17369* (AMES, COL).

This small species with a loose, subflexuous raceme of purple flowers with widely spread, narrowly ovate, acute sepals and thin, single-veined petals is distinguished with a unique, rhombiform lip. A central, longitudinal callus descends from the base, suggesting a giant glenion, filling the center of the concave lip.

Stelis rhynchanthera F.Lehm. & Kraenzl., Bot. Jahrb. Syst. 26(3–4): 447, 1899. TYPE: COLOMBIA. Cauca: near Corrales, central declivities near Popayán, 2000–3000 m, May and September without year, *F. C. Lehmann 6817* (Holotype: K), C. Luer illustr. 21999. Fig. 39.

Plant small, epiphytic, loosely caespitose. Ramicauls erect, slender, 1.5–4 cm long, with a tubular sheath from below the middle, another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, acute to subacute, 2.5–6.5 cm long including a petiole 1–1.5 cm long, the blade 0.8–1.5 cm wide in the dry state, narrowly cuneate below to the petiole. *Inflorescence* single; 8–12 cm long, the raceme erect, congested, distichous, many-flowered; floral bracts oblique, acute, 3 mm long; pedicels 3 mm long; ovary 2 mm long; peduncle 2–4 cm long, subtended by a spathe ca. 1 cm long, from a node below the apex of the ramicaul; flowers yellowish brown; *sepals* long-pubescent within, ovate, 3-veined, connate below the middle, the dorsal sepal acute, 2.5 mm long, 2.25 mm wide, the lateral sepals obtuse, 2.3 mm long, 2 mm wide; *petals* transversely ovate, broadly obtuse, 1 mm long, 1.5 mm wide, concave, 3-veined, the apical margin thickened; *lip* transversely ovate, subacute,

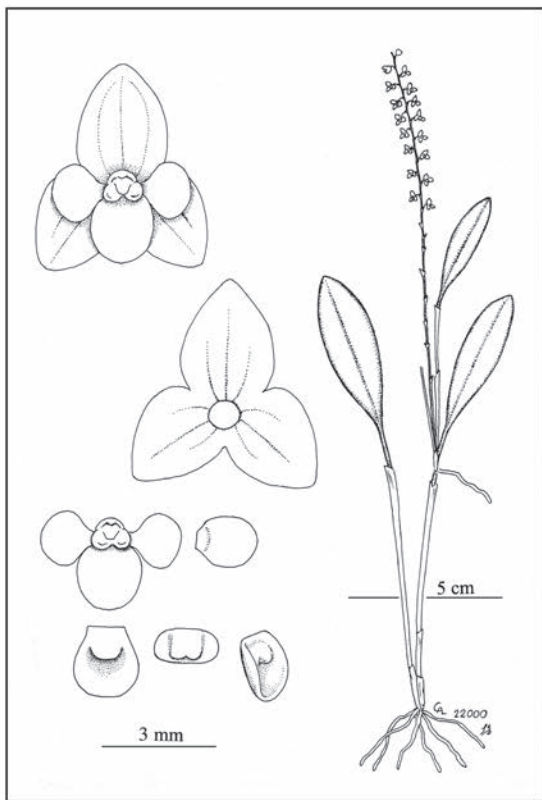


FIGURE 37. *Stelis popayanensis* FLehm. & Kraenzl.

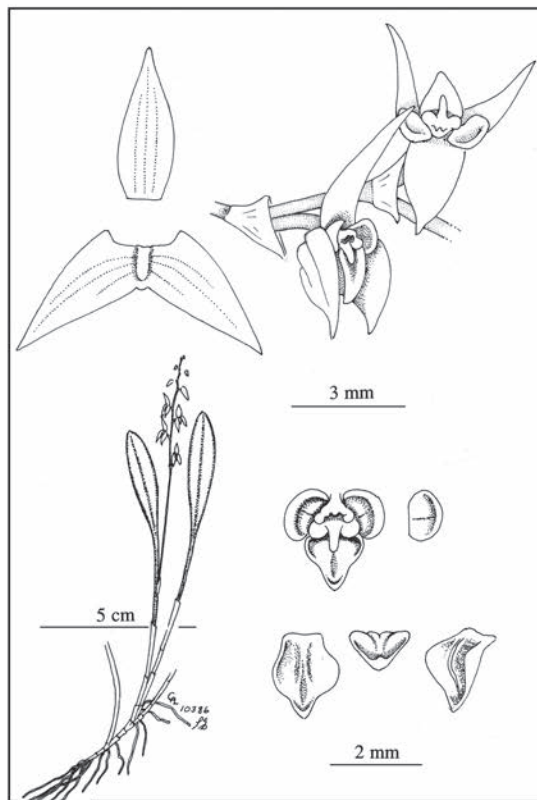


FIGURE 38. *Stelis rhomboidea* Garay

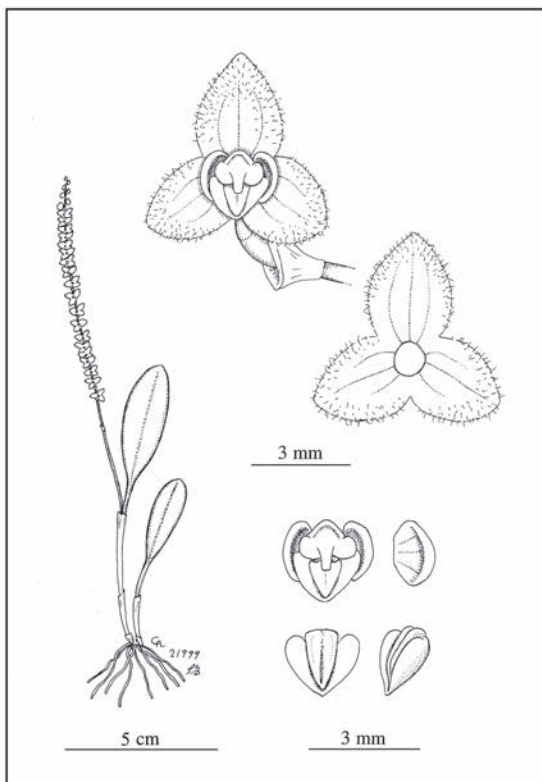


FIGURE 39. *Stelis rhynchanthera* FLehm. & Kraenzl.

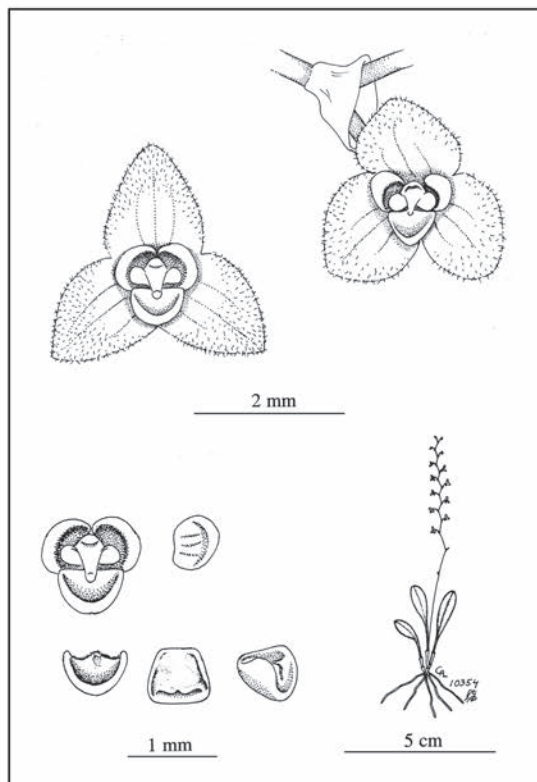


FIGURE 40. *Stelis schmidtchenii* Schltr.

2 mm long, 2.3 mm wide, 1 mm deep, concave on both rounded sides of an elevated, central, triangular, narrowly sulcate callus, extending from a broad base to an acute tip nearly to the tip of the lip, the dorsum elevated with the protruding callus, the base truncate, hinged to the base of the column; *column* stout, ca. 2 mm long and wide, the anther and the stigmatic lobes apical, an anther cap not seen.

Etymology: From the Greek *rhynchanthera*, “beaked anther,” referring to the shape of the anther-cap.

Stelis rhynchanthera is one of two species that bears Lehmann’s collection number 6817. The published description of *Stelis rhynchanthera* applies to the smaller of the two, the larger, answering the published description of *Stelis popayanensis*.

Stelis rhynchanthera is characterized by a small, caespitose habit; a many-flowered raceme that exceeds an acute, elliptical leaf; relatively large flowers with long-pubescent, three-veined sepals; three-veined petals; and a concave lip with a thick, acute, triangular callus that extends from the base to the tip.

Stelis schmidtchenii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 157, 1924. TYPE: COLOMBIA. Antioquia: without data, *G. Schmidtchen s.n.* (Holotype lost at B), Neotype here designated: COLOMBIA. Antioquia: Urrao, Pabón, coll. by M. Zapata, fl. in cult. at Colomborquideas, 23 May 1995, *C. Luer 17593* (MO). Fig. 40–42.

Plant small, epiphytic, densely caespitose, roots slender. Ramicauls erect, slender, 5–20 mm long, with a close, tubular sheath above the middle and another sheath below at the base. *Leaf* erect, coriaceous, elliptical to narrowly elliptical, acute, petiolate, 2–5 cm long including a petiole 5–10 mm long, the blade 3–5 mm wide in dry state, cuneate below into the petiole. *Inflorescence* 1–3; 4–30 cm long, the raceme, flexuous, lax, distichous, successively many-flowered, with 2–8 flowers open simultaneously; floral bracts oblique, acute, 0.6–1.5 mm long; pedicels 0.6–1.5 mm long; ovary 0.5 mm long; the peduncle 2–5 cm long, from a node from near the apex of the ramicaul; flowers purple with white or rose pubescence; *sepals* expanded, pubescent within, ovate, subacute, 3-veined, connate basally, 1.3–1.5 mm long, 1–1.3 mm wide; *petals* purple, subcircular, concave, thickened on the rounded apex, 0.5 mm long, 0.8 mm wide, 3-veined; *lip* purple, subquadrate, 0.4–0.5 mm long, 0.4–0.5 mm wide, 0.3–0.5 mm deep, concave below a shallowly sulcate bar, the apex rounded, the dorsum slightly convex, the base truncate, hinged to the base of the column; *column* clavate, ca. 0.5 mm wide and long, the anther and the bilobed stigma apical.

Etymology: Named for G. Schmidtchen, who collected the specimen described by Schlechter.

Additional collections: COLOMBIA. Antioquia: Sonsón, Quebrada Oscura, between La Ceja and Sonsón, 2250 m, 29 April 1983, *C. Luer, J. Luer & R. Escobar 8906* (SEL); Frontino, above Nutibara, Alto de Cuevas, 2050 m, 4 May 1983, *C. Luer, J. Luer & R. Escobar 9000* (SEL); Cocorná, El Viaha, along Río Cocorná, 1900 m, 24 April 1983 m, *C. Luer, J. Luer & R. Escobar 8818* (SEL);

NE of Santa Rosa, above the Miraflores Dam, 2050 m, 13 May 1985, *C. Luer & R. Escobar 11375* (MO). Norte de Santander: Alto de Santa Inez, 2150 m, 13 May 1984, *C. Luer, J. Luer & R. Escobar 10353, 10354* (MO).

Stelis schmidtchenii is found frequently in the northern parts of the Central and Eastern Cordilleras at relatively high altitudes, and in Venezuela at lower altitudes. With narrowly elliptical leaves and shorter ramicauls this caespitose, little species is vegetatively variable. One to three delicate, hair-like, flexuous racemes of tiny flowers are produced slowly and successively in many-flowered racemes with several flowers open simultaneously toward the tip. Great lengths accumulate in long-cultivated plants. The sepals are ovate, three-veined, and purple with a white pubescence. The petals are thick and three-veined, and the lip is a simple type A.

Stelis stenophylla Rchb.f., Bonplandia 3: 70, 1855. TYPE: COLOMBIA. Norte de Santander: Ocaña, Agua de La Virgen, Enllanada, 3–6000 ft., *H. Wagener s.n.* (Holotype: W). Fig. 43.

Plant small, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 4–5.5 cm long, enclosed by a tubular sheath from below the middle, and another 1–2 sheaths below and at the base. *Leaf* erect, coriaceous, narrowly elliptical to linear, acute, 4.5–5.5 cm long including a petiole 1.5 mm long, the blade 0.5–0.6 mm wide in the dry state, gradually narrowed below to the petiole. *Inflorescence* single; 5–6 cm long, the raceme erect, loose, distichous; floral bracts oblique, acute, 2 mm long; pedicel 1 mm long; ovary 1 mm long; the peduncle ca. 2 cm long, with a spathe 3–4 mm long, from a node near the apex of the ramicaul; flowers greenish white; *sepals* antrorse, glabrous, fleshy, concave, ovate, obtuse, 3-veined, connate near the base, the dorsal sepal 3.5 mm long, 2.2 mm wide, the lateral sepals 2.5 mm long, 2.5 mm wide; *petals* thin, transversely ovate, 0.7 mm long, 1 mm wide, concave below a broad, thickened margin, 3-veined; *lip* bilobed, the lateral lobes ovate, 0.8 mm long, 0.5 mm wide, concave below the bar, 0.3–0.4 mm deep, the dorsum narrow, smooth, convex, shallowly concave below the bar, the apex obtuse, the dorsum smooth, slightly convex between the lateral lobes, the base truncate, hinged to the column-foot; *column* stout, ca. 0.6 mm long and wide, the anther and stigmatic lobes apical.

Etymology: From the Greek *stenophylla*, “narrow-leaved,” referring to the foliage.

Additional specimens examined: COLOMBIA. Norte de Santander: forest near Agua de La Virgen, W of Ocaña, 1650 m, 4 May 1982, *C. Luer, J. Luer & R. Escobar 7696* (SEL).

This little, caespitose species is characterized by a loose raceme about as long as nearly linear leaves; glabrous, obtuse, concave and antrorse sepals; and thin, three-veined petals. The most distinctive lip is shallow and concave below the bar between lateral lobes and the obtuse apex.

The author explicitly excludes *Stelis tachirensis* Foldats from the synonymy of *Stelis stenophylla*, as proposed by Duque (2008: 372).

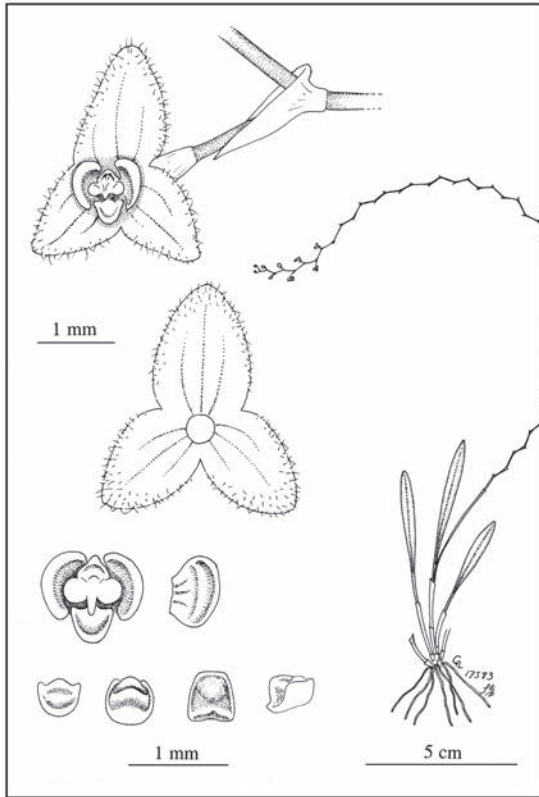


FIGURE 41. *Stelis schmidtchenii* Schltr.

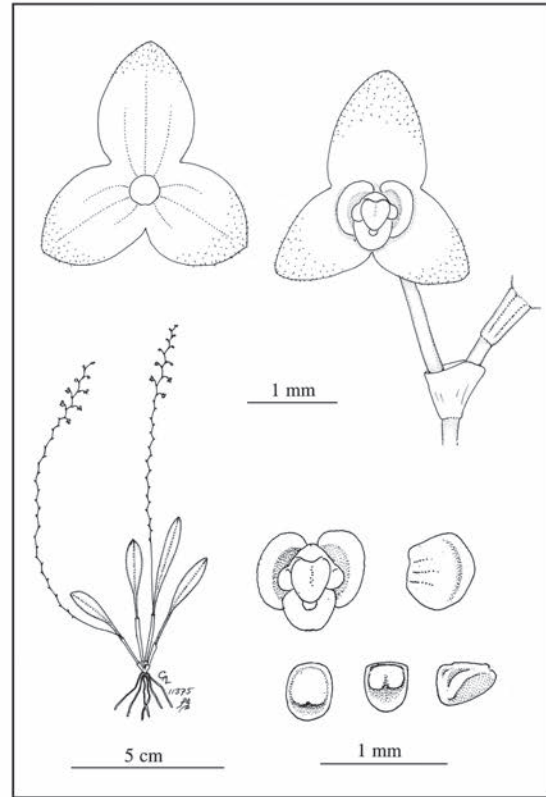


FIGURE 42. *Stelis schmidtchenii* Schltr.

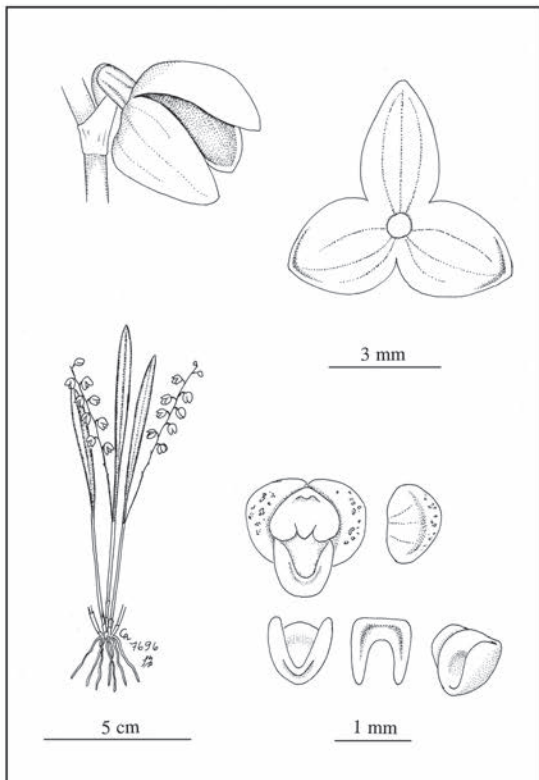


FIGURE 43. *Stelis stenophylla* Rehb.f.

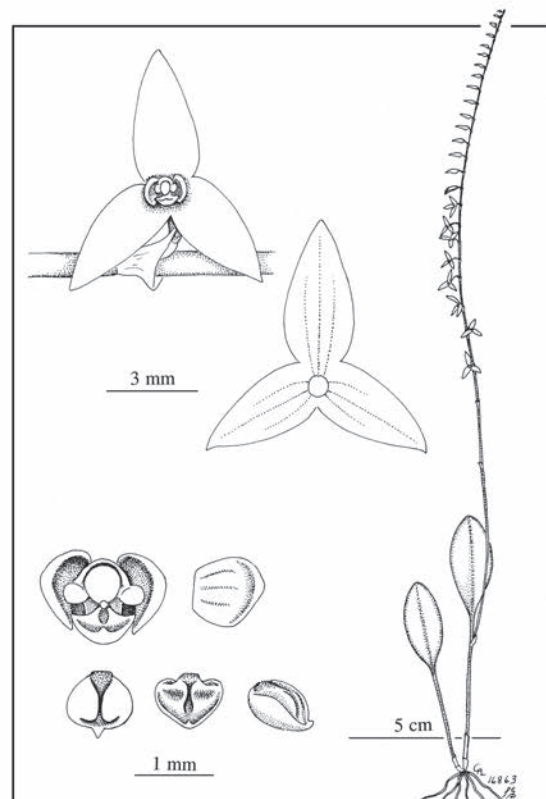


FIGURE 44. *Stelis vicaria* Luer & R.Escobar

Stelis vicaria Luer & R. Escobar, *sp. nov.* TYPE: COLOMBIA. Cauca: collected near Pasto, collector unknown, fl. in cult. at Colomborquídeas, 16 May 1993, C. Luer 16863 (Holotype: SEL). Fig. 44.

The flowers of this species are similar to those of *Stelis furfuracea* with narrowly ovate, acute sepals, but the sepals are free of the irregular, microscopic particles; the petals are broadly obovate with an subacute, thickened tip; and the bar of the lip is incised to a cellular callus above the base.

Plant small to medium-sized, epiphytic, caespitose, shortly ascending, roots slender. Ramicauls erect, slender, 3–4.5 cm long, with a tubular sheath from below the middle and 2 tubular sheaths below at the base. *Leaf* erect, coriaceous, elliptical, subacute to obtuse, 3–4.5 cm long including a petiole 1.5 cm long, the blade 1–1.3 cm wide in dry state, cuneate below into the petiole. *Inflorescence* single; to 23 cm long, the raceme erect, congested, secund, many-flowered, with many flowers open simultaneously; floral bracts oblique, acute, 2 mm long; pedicels 1 mm long; ovary 1.5 mm long; the peduncle 7–10 cm long, with a thin spathe 5 mm, from a node below the apex of the ramicaul; *sepals* light green above the middle, purple below the middle, glabrous, expanded, narrowly ovate, acute, connate basally, 3-veined, the dorsal sepal 5 mm long, 2.5 mm wide, the lateral sepals oblique, 4 mm long, 2 mm wide; *petals* rose, obovate, concave, slightly thickened at the rounded apex, 1 mm long, 1.2

mm wide, 3-veined; *lip* rose, subquadrate, 0.8 mm long, 1 mm wide, 0.8 mm deep, concave below an incised bar, the apex broadly acuminate, acute, without thickened margins, the dorsum cleft to a minutely pubescent, basal callus, the base truncate, hinged to the base of the column; *column* clavate, 1.2 mm wide, with the anther and the bilobed stigma apical.

Etymology: From the Latin *vicarius*, “substituted,” referring to an illustration used for *Stelis furfuracea*.

Additional specimen examined: COLOMBIA. Norte de Santander: valley of Río Chitagá, 3140–3500 m, 24 September 1944, H. St. John 20782 (AMES, US).

A species with a flower similar to the flower used to illustrate *Stelis furfuracea* in Garay (1980), is described herewith as *Stelis vicaria*. Unfortunately, nothing is known about the plant from which the flower illustrated by Elmer Smith was obtained. Vegetatively, the leaves are proportionately shorter and wider than those of *S. furfuracea* and the apex is broadly obtuse, instead of acute. The peduncle is distinctly longer than the leaves, instead of being shorter.

The sepals of *Stelis vicaria* are similarly narrowly ovate, but totally free of the minute particles, believed to be a kind of crystal, that are seen in the sepals of *S. furfuracea*. The petals are merely obovate and obtuse, instead of thick and triangular at the apex. The bar and dorsum of the lip are cleft to a minutely pubescent callus above the base.

LITERATURE CITED

- DUQUE, O. 2008. Orchidaceae—*Stelis* Swartz: Compendium. Editorial Universidad de Antioquia, Medellín.
- GARAY, L. A. 1980. Systematics of the genus *Stelis*. Botanical Museum Leaflets 27, No. 7–9: 167–209, tab. 43–97.
- LUER, C. A. 2009. *Icones Pleurothallidarum XXX*. Systematics of *Stelis*: *Stelis* of Ecuador part 4. Monogr. Syst. Bot. Missouri Bot. Gard. 115: 31–237.
- _____. 2016a. *Icones Stelidarum (Orchidaceae) Colombiae*. Harvard Papers in Botany 21, No. 1: 59–92.
- _____. 2016b. *Icones Stelidarum (Orchidaceae) Colombiae* II. Harvard Papers in Botany 21, No. 2: 193–225.
- _____. 2017a. *Icones Stelidarum (Orchidaceae) Colombiae* III. Harvard Papers in Botany 22, No. 1: 27–60.
- _____. 2017b. *Icones Stelidarum (Orchidaceae) Colombiae* IV. Harvard Papers in Botany 22, No. 2: 81–112.
- ROMERO-GONZÁLEZ, G. A. AND G. CARNEVALI FERNÁNDEZ-CONCHA. 2000. Orchids of Venezuela—An Illustrated Field Guide, Ed. 2. Armitano Editores, Caracas.

APPENDIX

In Luer (2017a), the following two names were not validly published because the holotype citation in each case was ambiguous.

The relevant species names are herewith validated:
Stelis frondifera Luer & R. Escobar, *sp. nov.* TYPE: COLOMBIA. Antioquia: Yarumal, Ratón Pelado, above of Yarumal, 2650 m, 1 May 1984, C. Luer, J. Luer & Rodrigo Escobar 10051 (Holotype: SEL). Paratype: COLOMBIA. Antioquia: Yarumal, Santa Rosa de Osa, above Estadero Manicomio, 2580 M, 14 March 1989, C. Luer, J. Luer, S. Dalström & W. Teague 14144 (SEL).

Synonym: “*Stelis frondifera* Luer & R. Escobar, Harvard Pap. Bot. 22, No. 1: 44, Fig. 29–30. 2017,” *nom. invalid*.

Stelis imperiosa Luer & R. Escobar, *sp. nov.* TYPE: COLOMBIA. Cauca: Popayán, Páramo de las Barbillas, SE of Popayán, 3150 m, 13 November 1982, C. Luer & R. Escobar 8380 (Holotype: SEL). Paratype: COLOMBIA. Cauca: SE of Popayán, 3150 m, 13 November 1982, C. Luer & R. Escobar 8379 (SEL).

Synonym: “*Stelis imperialis* Luer & R. Escobar [as “*imperialis*”], Harvard Pap. Bot. 22, No. 1: 46, Fig. 35–36. 2017,” *nom. inval*.

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MISCELLANEOUS NEW SPECIES IN THE PLEUROTHALLIDINAE (ORCHIDACEAE)

CARLYLE A. LUER¹ AND A. L. V. TOSCANO DE BRITO^{2,3}

Abstract. Two new species of *Crocodelanthe*, *C. dewildei* and *C. steinbachii*, three new species of *Masdevallia*, *M. calochrysos*, *M. driesseniana* and *M. rostriflora*, and one new species of *Pleurothallis*, *P. amentacea*, are described and illustrated.

Keywords: *Crocodelanthe*, *Masdevallia*, *Pleurothallis*, *Stelis*

Two species of *Crocodelanthe* Rchb. f. & Warsz., three species of *Masdevallia* Ruiz & Pav., one species of *Pleurothallis* R. Br. and one species of *Stelis* Sw. are described as new.

As discussed elsewhere (Toscano de Brito, 2018), the genus *Crocodelanthe* is related to *Stelis* Sw. Vegetatively, *Crocodelanthe* is inseparable from many species of *Stelis*, which is reflected in portions of their DNA. Species of *Crocodelanthe* are distinguished by morphology of the sepals, petals, lip and column. The sepals of *Crocodelanthe* are developed into a recognizable dorsal sepal, which is free of variably connate to the lateral sepals that are also more or less connate and antrorse. The sepals of *Stelis* are either similar (*Stelis* sect. *Stelis*) or dissimilar with the lateral sepals more or less connate, often into a concave synsepal [*Stelis* sect. *Humboldtia* (Ruiz & Pav.) Pers.]. These patterns do not occur in *Crocodelanthe*. The petals of *Crocodelanthe* are longer than wide. The petals of *Stelis* are usually wider than long. Many are thick with a transverse callus. The lip of *Crocodelanthe* is usually thick, with a pair of calli in most species, and occasionally forming lateral lobes. In all species the base is concave on the end and articulated to the tip of the column-foot. The concavity is sometimes narrow and not easily seen, resembling a hinge, and the anterior margin not being apparent. This type of articulation, usually referred to as “ball and socket,” does not occur in *Stelis*. The column of *Crocodelanthe* is more or less terete with a single, subapical anther with a pair of pollinia, and a ventral stigma. The column of *Stelis* is short and usually with a pair of apical stigmatic lobes, one on either side of the central, bilocular anther, and each locule with a single pollinium. The occasional species with the stigmatic lobes confluent beneath the rostellum have been segregated into *Apatostelis* Garay (Garay, 1980), a synonym of *Stelis*.

Crocodelanthe dewildei Luer & Toscano, *sp. nov.* TYPE: COLOMBIA. Risaralda: Santa Rosa de Cabal, Ucumarí, Regional Nature Reserve, 2250 m, 10 Oct. 1992, A. de Wilde 339 (Holotype: MO), C. Luer illustr. 21922. Fig. 1.

The authors are grateful to the staff of MO and SEL for making their specimens available for study, to herbaria cited herein that facilitated loans, to Nancy Karam and Wade Collier, volunteers at SEL, for help in assembling the illustrations, to Stig Dalström for inking the figures presented herein, all based on pencil drawings by the senior author, and to the generosity of the Pleurothallid Alliance for making the inking possible.

¹ Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299 U.S.A. Mailing Address: 3222 Old Oak Drive, Sarasota, Florida 34239-5019, U.S.A.; cluer@juno.com

² Marie Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida 34236-7726, U.S.A.; atoscano@selby.org

³ Orchid Herbarium of Oakes Ames, Harvard University Herbaria, 22 Divinity Avenue, Cambridge, Massachusetts 20138, U.S.A.

This large species is characterized by a thick rhizome, long ramicauls, and one or two many-flowered racemes shorter than an elliptical leaf; small, fleshy, obtuse sepals; oblong, membranous, single-veined petals; and a fleshy lip with erect, broadly rounded margins overlaid with similarly shaped calli nearly to the tip.

Plant large, epiphytic, densely caespitose from a rhizome 5 mm thick; roots slender. Ramicauls erect, stout, 18–23 cm long, with a close, tubular sheath on the middle third and 2–3 other sheaths below at the base. *Leaf* erect, coriaceous, elliptical, subacute, 14–16 cm long including a petiole 1–1.5 mm long, the blade 3 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* an erect, strict, distichous, subsecund, many-flowered raceme, with many flowers open simultaneously, 7–10 cm long including the peduncle 1–2 cm long, subtended by a spathe 2 cm long, from a node below the apex of the ramicaul; floral bracts tubular, obtuse, 1.5–2 mm long; pedicels 1.5 mm long; ovary 1.5 mm long; flowers light green, slightly suffused with rose; *sepals* glabrous, fleshy, sepals ovate, subacute to obtuse, 2.5 mm long, 2 mm wide, 3-veined; *petals* membranous, oblong, rounded at the tip, 1.5 mm long, 1 mm wide; *lip* fleshy, ovoid, with erect sides, rounded at the tip, 2 mm long, 1.2 mm wide unexpanded, with low, rounded calli overlying the margins toward the apex, the base truncate with a transverse cavity to which the base of the column is attached; *column* terete, stout, 1 mm long, the anther apical, the stigma ventral.

Etymology: Named for José Ahrend de Wilde, who collected and cultivated this species.

This large species is characterized by a raceme of small, fleshy flowers, which is shorter than the leaf; thin, oblong and single-veined petals; and the ovoid lip. A pair of flat, rounded calli overlie the erect margins of the lip near the apex. It is apparently related to the much smaller and more widely distributed *C. pachypus* (Lehm. & Kraenzl.) Luer and also to the Bolivian *C. vasquezii* Luer. The former differs by the subquadrate lip with distinct callosities, and the latter by the three-lobed lip.

Crocodelanthe steinbachii Luer & Toscano, *sp. nov.* TYPE: BOLIVIA. Cochabamba: Chapare, Incaacorral, 2350 m, 19 March 1929, *J. Steinbach s.n.* (Holotype: AMES [116369]), C. Luer illustr. 21887. Fig. 2.

This species is characterized by a minutely flowered raceme about as long as an elliptical leaf; fleshy sepals with the dorsal sepal cymbiform; large, spatulate, membranous, single-veined petals; a fleshy lip with erect, broadly rounded halves; and a curved, cylindrical column.

Plant small to medium-sized, epiphytic, densely caespitose; roots slender. Ramicauls erect, slender, 5–7 cm long, with a close, tubular sheath from below the middle and 2–3 other sheaths below. *Leaf* erect, coriaceous, elliptical, acute, 5–8 cm long including a petiole 1–1.5 mm long, the blade 1–1.3 mm wide in the dry state, cuneate below into the petiole. *Inflorescence* an erect, strict, distichous, simultaneously many-flowered raceme, 5–7 mm long including the peduncle less than 1 cm long, subtended by a spathe 8–10 mm long, from a node below the apex of the ramicaul; floral bracts oblique, acute, 2 mm long; pedicels 1–1.5 mm long; ovary 1 mm long; flowers transparent light green, suffused with violet (*fide* collector); *sepals* glabrous, fleshy, the dorsal sepal cymbiform, 2 mm long, 1 mm wide unexpanded, 3-veined, the lateral sepals oblong, subacute, 2 mm long, 1 mm wide, thickened along the veins; *petals* membranous, spatulate, unguiculate, broadly obtuse at the apex, 1.5 mm long, 1 mm wide, thickened externally along the midvein; *lip* fleshy, oblong with erect sides broadly rounded, the apices obtuse, with a small lobule, 1 mm long, 1.2 mm wide if expanded, the base truncate, narrowly concave between the rounded bases of the lip, strongly connate to the base of the column; column terete, curved, 1 mm long, the anther apical, the stigma ventral, the foot thick.

Etymology: Named for José Steinbach, German naturalist who emigrated to Bolivia and collected the type of this species.

Crocodelanthe steinbachii is a small to medium sized species without close relatives. It is characterized by a minutely flowered raceme about as long as an elliptical leaf; fleshy sepals with the dorsal sepal cymbiform; large, spatulate, membranous, single-veined petals; a fleshy lip with erect, broadly rounded halves; and a curved, cylindrical column.

Masdevallia calochrysos Luer & Sijm, *sp. nov.* TYPE: ECUADOR. Without collection data, flowered in cultivation in Venhuizen, the Netherlands, March 2013, A. P. Sijm 20130401 (Holotype: MO); C. Luer illustr. 21819. Fig. 3.

Among the species of *Masdevallia* subsect. *Saltatrices* (Rchb. f.) Luer, this species is recognized by the broadly cylindrical and bright orange sepaline tube, the elongated and recurved basal process of the petals, the ovate lip, and the extension of the tip of the column-foot, which is elongated as in *M.* subsect. *Oscillantes* Luer.

Plant medium in size, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 2 cm long, enclosed by 1–2 tubular sheaths. *Leaf* erect, coriaceous, petiolate, 9 cm

long including the petiole 3 cm long, the blade elliptical, subacute, 2 cm wide, the base cuneate into the petiole. *Inflorescence* a solitary, more or less horizontal flower borne by a slender, suberect peduncle 6 cm long, with a bract near the base, from low on the ramicaul; floral bract unknown; pedicel unknown; ovary 7 mm long; *sepals* bright orange, yellow at the apex, glabrous externally, the dorsal sepal obovate, 19–20 mm long, 9 mm wide, connate to the lateral sepals for 18 mm into a cylindrical, ventricose tube, the free portion transversely ovate, then abruptly contracted into a slender, orange tail 30–34 mm long, the lateral sepals 20–21 mm long, connate 19 mm into an oblong, broadly ventricose lamina 14–18 mm wide, sparsely pubescent toward the apices, the apices rounded abruptly contracted into tails similar to that of the dorsal sepal; *petals* oblong, 7 mm long, 2 mm wide, the apex with a short, obtuse apiculum, the labellar half with a longitudinal callus ending in a 2 mm long, retrorse process, incurved at the tip; lip ovate, 6 mm long, 3 mm wide, the apex obtuse, the base truncate, hinged beneath; column semiterete, 4 mm long, the foot 5 mm long with a long, slender, incurved extension.

Etymology: From the Greek *calochrysos*, “beautiful gold,” referring to the flowers.

With a bright orange sepaline tube, this species joins a select few in *Masdevallia* subsect. *Saltatrices*. The sepaline tube is broad and cylindrical and ventricose near the middle. The basal process of the petals is elongated with the tip incurved. By a long, slender, curved extension from the base of the column, the ovate lip is held forward where it certainly must oscillate, but to what degree is limited by the sides of the sepaline tube.

Masdevallia driesseniana Luer & Sijm, *sp. nov.* TYPE: PANAMA. Chiriquí: near Amistad, 1300 m, collected by P. Dubbeldam and A. Sijm, 2003, flowered in cultivation by Wiel Driessen in Panningen, the Netherlands, February 2013, A. P. Sijm 20130208 (Holotype: MO); C. Luer illustr. 21809. Fig. 4.

This species is related to *Masdevallia audax* Königler, but differs with broader leaves; a longer peduncle; longer, protruding petals; and a broader lip with a longitudinal callus and a slender, terete apex.

Plant small to medium in size, epiphytic, caespitose; roots slender. Ramicauls slender, erect, ca. 1 cm long, enclosed by a tubular sheath from above the base and another at the base. *Leaf* erect, coriaceous, elliptical-oblongate, subacute to obtuse, 5–10 cm long including a petiole ca. 2 cm long, the blade 0.8–1.6 cm wide, narrowed below to the petiole. *Inflorescence* a single flower borne by a slender, erect peduncle 8–9 cm long, from low on the ramicaul; floral bract tubular, acute, 12 mm long; pedicel 8 mm long; ovary green, 5–6 mm long; *sepals* pale green, suffused with rose, glabrous, the dorsal sepal elliptical, concave, 30 mm long including the tail, the blade 15 mm long, 8 mm wide, connate to the lateral sepals for 8 mm to form a sepaline tube, the apex acute, contracted into a stout, terete tail 15 mm long, the lateral sepals elliptical, connate ca. 6 mm into a bifid synsepal 30 mm long, 15 mm

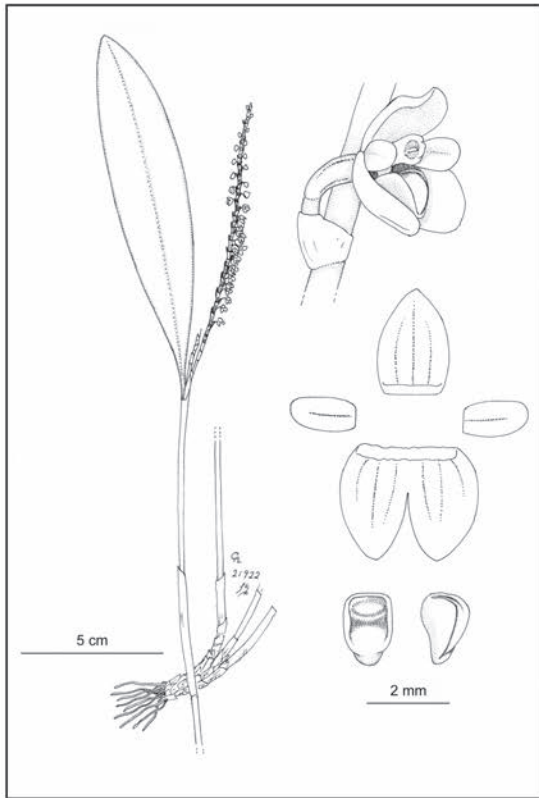


FIGURE 1. *Crocodeilanthe dewildei* Luer & Toscano

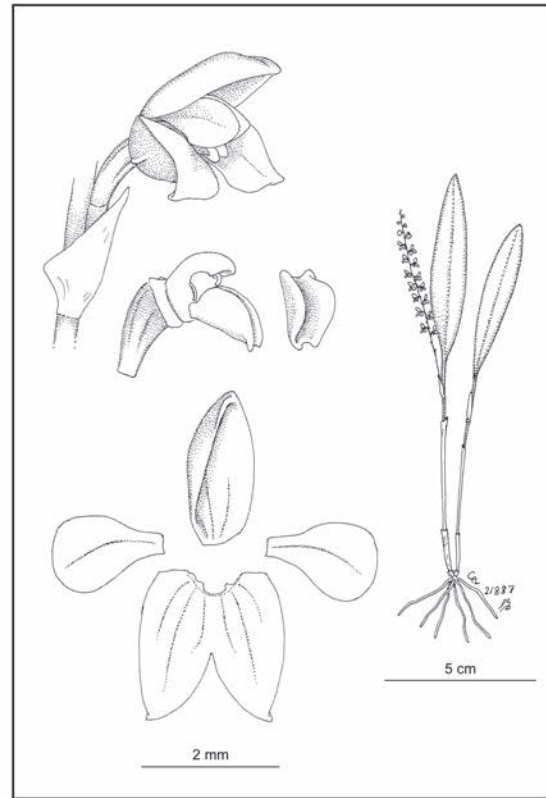


FIGURE 2. *Crocodeilanthe steinbachii* Luer & Toscano

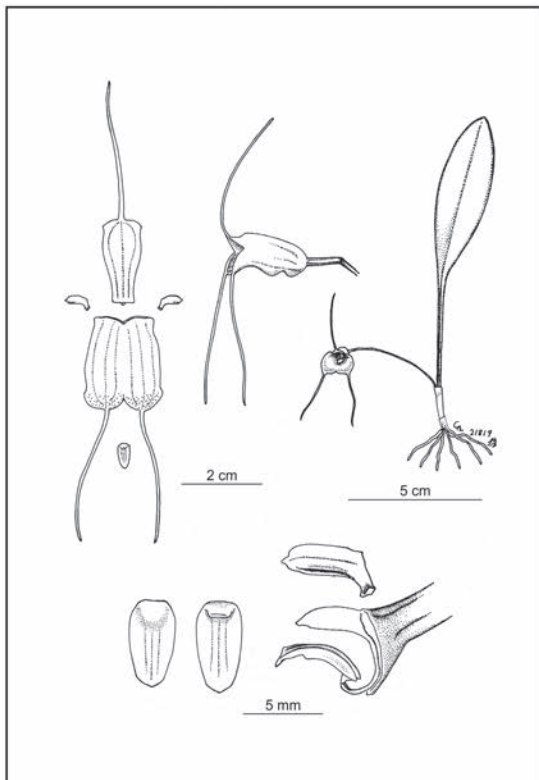


FIGURE 3. *Masdevallia calochrysis* Luer & Sijm

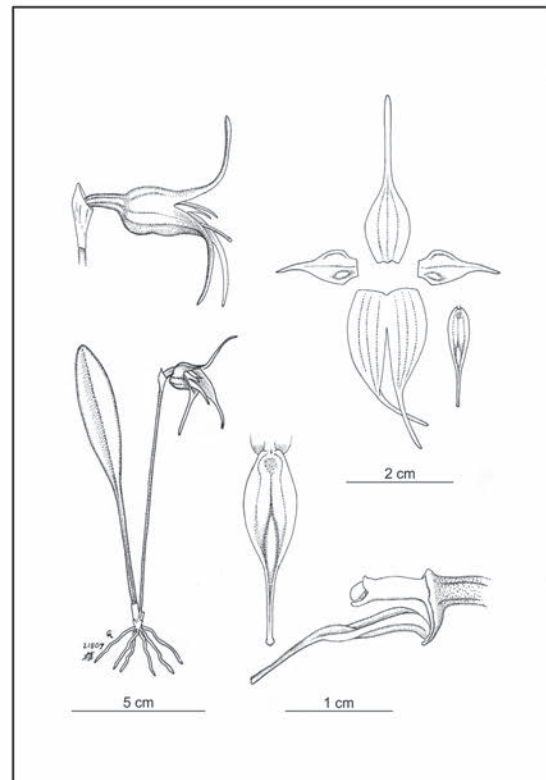


FIGURE 4. *Masdevallia driesseniana* Luer & Sijm

wide, the apices acute, contracted into stout tails ca. 10 mm long, similar to that of the dorsal sepal, 1 mm thick; *petals* rose, ovate, 15 mm long, 6.5 mm wide, 1-veined, contracted near the middle into an acute, acuminate tip, the blade with a 2-mm-long lamella toward base on the lower portion; *lip* dark rose, ovate, 18 mm long including the tip, 5.5 mm wide, 4-veined, the sides membranous, acuminate near the middle into a slender, terete tip 8–9 mm long, with a smooth, longitudinal convexity from near the middle of the blade and extending onto the terete tip, with a shallow, rounded depression at the base, the base contracted into a solid, fixed process connected to the tip of the column-foot; *column* terete, 6 mm long, the foot 3 mm long, the anther non-deciduous in the apical clinandrium, the pair of pollinia adherent within the anther cap.

Etymology: Named for Wiel Driessen of Panningen, the Netherlands, who successfully cultivates this species.

This unusual species of *Masdevallia* has been found in Chiriquí, Panama, near the border with Costa Rica. It is related to *Masdevallia audax* König from Amazonian Peru. The habit and sepals are not remarkable for the genus, but the acuminate petals and lip that protrude from the sepaline tube are most distinctive. Both petals and lip are contracted near the middle into long, slender, acuminate tips.

Masdevallia rostriflora Luer & Sijm, *sp. nov.* TYPE: PANAMA. Chiriquí: near Amistad, 1800 m, collected by P. Dubbeldam and A. Sijm, 2003, flowered in cultivation by Wiel Driessen in Panningen, the Netherlands, February 2013, A. P. Sijm 20130204 (Holotype: MO); C. Luer illustr. 21810. Fig. 5.

This taxon is closely related to *Masdevallia driesseniana*, described herein, but differs with cleistogamous flowers with an ecallous lip.

Plant small, epiphytic, caespitose; roots slender. Ramicauls slender, erect, ca. 1 cm long, enclosed by a tubular sheath from above the base and another at the base. *Leaf* erect, coriaceous, elliptical-oblancoolate, subacute to obtuse, 4–6 cm long including a petiole 1–2 cm long, the blade 1 cm wide, narrowed below to the petiole. *Inflorescence* a single flower borne by a slender, erect peduncle ca. 3 cm long, from low on the ramicaul; floral bract tubular, acute, 12 mm long; pedicel 12 mm long; ovary green, 5–6 mm long; *sepals* pale green, suffused with rose, glabrous, the dorsal sepal elliptical, concave, 30 mm long including the tail, the blade 15 mm long, 9 mm wide, completely connate to the lateral sepals, the apex acute, contracted into a stout, terete tail 15 mm long along with the tails of the lateral sepals, the lateral sepals elliptical-oblong, completely connate, 30 mm long, 10 mm wide, the apices acute, contracted into tails along with the tail of the dorsal sepal; *petals* white, ovate, 15 mm long, 4 mm wide, 1-veined, contracted near the middle into an acute, acuminate tip; *lip* white, ovate, 20 mm long, 4 mm wide, 2-veined, acuminate from near the middle into a slender, terete tip 8 mm long, the base truncate, fixed to the tip of the column-foot; *column* terete, 7 mm long, 3.5 mm thick, the foot subnil, the anther non-deciduous in the apical clinandrium, the pair of pollinia fixed within the anther cap.

Etymology: From the Latin *rostriflora*, “with beaked, or

snout-nose flower,” referring to the long, connate tails of the lateral sepals.

The flowers of this cleistogamous species are similar to those of *Masdevallia driesseniana*, and comes from the same locality where the latter was found, but at a slightly higher altitude. In addition to the cleistogamous flowers, in *Masdevallia rostriflora* the body of the lip below the long-acuminate apex is slightly concave without the longitudinal convexity seen in *M. driesseniana*. The truncate base of the lip is solidly united to the base of a footless column.

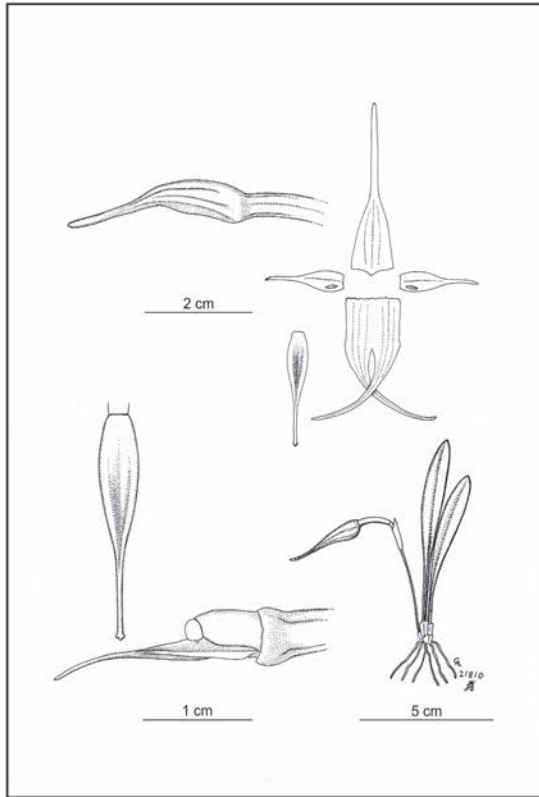
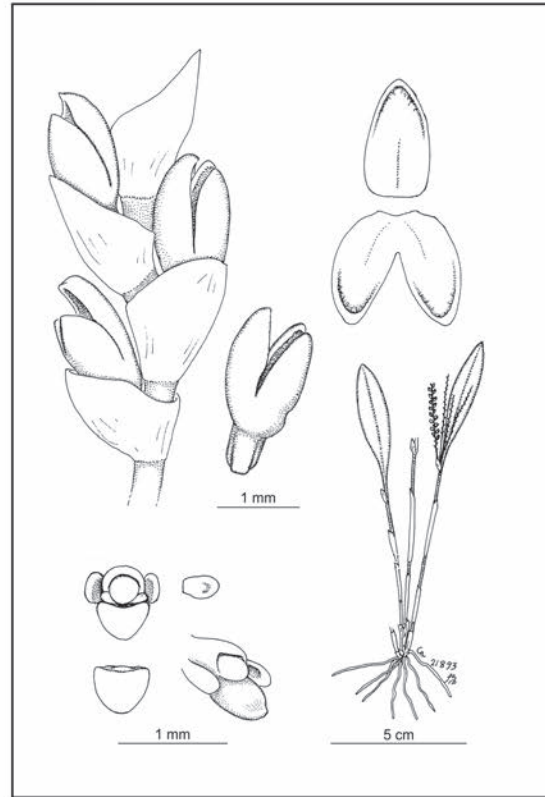
Pleurothallis amentacea Luer & Toscano, *sp. nov.* TYPE: BOLIVIA. Santa Cruz: Pojos, Huertas, 2900 m, 31 October 1928, J. Steinbach 8589 (Holotype: AMES; Isotype: BOLV), C. Luer illustr. 21893. Fig. 6.

This small, caespitose species of *Pleurothallis* subsect. *longiracemosae* Luer is characterized by minute, closed flowers borne erect, partially within comparatively large floral bracts; the sepals are concave and apparently single-veined; the petals are oblong and thickened at the apex; the minute, ovate lip is featureless; and the column is short with an apical anther and ventral stigma.

Plant small, epiphytic, caespitose; roots slender. Ramicauls erect, slender, 4–7 cm long, with a tubular sheath from below the middle and 2 tubular sheaths below and at the base. *Leaf* erect, coriaceous, elliptical, acute at the tip, 4–6 cm long including a petiole 0.5 cm long, the blade 1 cm wide in the dry state, cuneate below into the petiole. *Inflorescence* 3–4 erect, distichous, congested, many-flowered racemes 3–4 cm long including the peduncle ca. 0.5 cm long, from a node below the apex of the ramicaul; floral bracts oblique, acute, 1 mm long; pedicels less than 1 mm long; ovary 0.3 mm long; color of flowers not stated; *sepals* fleshy, convex with an indistinct, midline thickening, without other visible veins, glabrous externally, sparsely pubescent within above the middle, the dorsal sepal ovate, subacute, 1 mm long, 0.6 mm wide, connate basally to the lateral sepals, the lateral sepals antrorse, ovate, oblique, 1 mm long, 0.6 mm wide, connate below the middle; *petals* thick, oblong, rounded and concave at the apex, 0.2 mm long, 0.1 mm wide, without visible vein; *lip* ovate, obtuse, featureless, 0.3 mm long, 0.4 mm wide, the base truncate, hinged to the base of the column; *column* stout, 0.3 mm long and wide, the anther apical, the stigma ventral.

Etymology: From the Latin *amentaceus*, “like a pussy willow,” referring to the inflorescence.

This species of *Pleurothallis* subsect. *longiracemosae* was collected in the early twentieth century by José Steinbach, and tentatively identified as a *Stelis*. Like some other members of this section, such as *Pleurothallis divaricans* Schltr. and *Pleurothallis univervia* Luer & Dodson, this new species does indeed resemble a *Stelis* but the morphology of sepals, petals, lip and column readily exclude *Stelis*. The flowers are distinct with fleshy, convex sepals; minute, oblong petals that are concave at the apex; and an ovate, featureless lip. The flowers are non-expanding and borne erect from within equally large floral bracts, giving the appearance of the catkins of a minute pussy willow.

FIGURE 5. *Masdevallia rostriflora* Luer & SijmFIGURE 6. *Pleurothallis amentacea* Luer & Toscano

LITERATURE CITED

GARAY, L. A. 1980. Systematics of the genus *Stelis* Sw. Bot. Mus. Leaflet 27 (79): 167–259.

TOSCANO DE BRITO, A. L. V. 2018. New combinations in *Crocodeilanthe* (Pleurothallidinae, Orchidaceae). Harvard Pap. Bot. 23 (1): 53–55.

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NEW COMBINATIONS IN *CROCODEILANTHE* (PLEUROTHALLIDINAE, ORCHIDACEAE)

A. L. V. TOSCANO DE BRITO^{1,2}

Abstract. Four new combinations in *Crocodeilante* (Pleurothallidinae, Orchidaceae) are proposed. A second-step lectotype is selected for *Pleurothallis stelidioides* and a first-step lectotype for *Pseudostelis bradei*.

Keywords: *Crocodeilante*, *Niphanta*, *Physosiphon*, *Pseudostelis*, *Pleurothallis*, *Stelis*

Crocodeilante Rchb. f. & Warsz., as currently recognized by the author, comprises ca. 90 epiphytic orchids mostly distributed in Central and South America, with one species restricted to the Greater Antilles and another reaching Trinidad and Tobago (Luer, 1998). Previously considered a monotypic genus (Garay, 1974) and a subgenus of *Pleurothallis* (Luer, 1986, 1998), Luer finally elevated it to the generic rank in 2004.

Pseudostelis Schltr., which included species distributed in Central America through the Andes down to southern Brazil, was first described in 1922 based on three names: *Physosiphon spiralis* Lindl., *Stelis deregularis* Barb. Rodr. and *Pseudostelis bradei* Schltr. They all have been proven to be conspecific, and the oldest available binomial for this taxon is *Physosiphon spiralis*, the basionym of *Pseudostelis spiralis* (Lindl.) Schltr. Schlechter did not select a type for his new genus, but Garay (1974) designated *Physosiphon spiralis* as the lectotype.

Luer (1999) treated *Pseudostelis* as a subgenus of *Pleurothallis* R. Br. and recognized six species: *Pleurothallis bracteosa* C. Schweinf., *P. deregularis* (Barb. Rodr.) Luer, *P. magdalenae* Rchb.f., *P. melanostele* Luer & R. Vásquez, *P. rufobrunnea* (Lindl.) Luer, and *P. simplex* Ames & C. Schweinf. With exception of *P. rufobrunnea*, which is clearly a member of the genus *Stelis* and duly transferred to this genus by Williams (1939), the other five species share the same habit and floral morphology with *Crocodeilante*. While *Pleurothallis bracteosa* has been already transferred to *Crocodeilante* (Luer, 2011), the remaining names still wait for the necessary nomenclatural changes.

The molecular evidence published so far (Pridgeon et al., 2001; Solano, 2005; Karremans et al., 2013) suggests that *Crocodeilante* is largely a monophyletic assemblage and closely related to *Stelis* Sw., but not embedded in it. Only five *Crocodeilante* species were sampled and the nomenclatural type of the genus, *C. xiphiusa* Rchb. f., was not. This renders the relationships of *Crocodeilante* still uncertain. In Karremans et al. (2013), *Physosiphon spiralis* (cited as *Stelis deregularis*), the nomenclatural

type of *Pseudostelis*, was analyzed and found sister to *Crocodeilante*. *Pleurothallis rufobrunnea* (= *Stelis rufobrunnea* (Lindl.) L.O. Williams) was also sampled and not surprisingly found embedded in *Stelis*. This species presents typical sepals, petals, and lip found in *Stelis* and the column is not distinct from several others whose bilobed stigma coalesces in one. Luer (1999) erroneously placed it in *Pleurothallis* subgen. *Pseudostelis* (Schltr.) Luer.

Although vegetative and floral morphology align with available molecular data and support the inclusion of *Pseudostelis* in the synonym of *Crocodeilante*, additional studies employing a broader sample, using supplementary DNA fragments and additional methods of phylogenetic analysis combining morphological data, are required to clarify incongruences found in Karremans et al. (2013). The placement of *Crocodeilante domingensis* (Cogn.) Luer (cited as *Stelis antillensis* Pridgeon & M. W. Chase) next to *Stelis nexipous* Garay and to *Niphantha gelida* (Lindl.) Luer (cited as *Stelis gelida* (Lindl.) Pridgeon & M. W. Chase) should be further investigated and their assessment reconsidered.

Crocodeilante, including *Pseudostelis*, forms a well-defined group as presented by Luer (1998, 2004) and discussed in Luer & Toscano de Brito (2018). This genus may well include *Niphantha* Luer, as proposed by Carnevali & Ramírez (2014), with which it shares similar habit and floral morphology, but the transfer of all *Crocodeilante* species to *Stelis*, as proposed by Pridgeon & Chase (2002) and later advocated by Karremans et al. (2013) and Karremans (2015, 2016), is not justified and therefore not followed here.

In this article *Pseudostelis* is considered a synonym of *Crocodeilante* based on morphology and on the current molecular evidence. Therefore species previously treated in *Pseudostelis* and in *Pleurothallis* subgenus *Pseudostelis* are transferred herein to *Crocodeilante*, the only exception being *Pleurothallis rufobrunnea* for the reasons already stated in this article. *Stelis duckei* E. M. Pessoa & M. Alves, recently described for northeast Brazil, clearly belongs to this orchid group and it is also duly transferred to *Crocodeilante*.

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¹ Marie Selby Botanical Gardens, 811 South Palm Avenue, Sarasota, Florida 34236-7726, U.S.A.; atoscano@selby.org

² Orchid Herbarium of Oakes Ames, Harvard University Herbaria, 22 Divinity Avenue, Cambridge, Massachusetts 20138, U.S.A.

TAXONOMY

Crocodelanthus duckei (E. M. Pessoa & M. Alves) Toscano, *comb. nov.*

Basionym: *Stelis duckei* E. M. Pessoa & M. Alves, *Brittonia* 66 (2): 156. 2013. TYPE: BRAZIL. Ceará: Município Maranguape, próximo a Rajada, 900 m, 14 Sept. 1908, A. Ducke *s.n.* (Holotype: SP [37566, not seen], Digital Image SP; Isotype: MG [not seen]).

This species has been recently described for the brejo forests of northeast Brazil. Reader should refer to Andrade Lima (1982) for a review of this type of forest. Together with *C. spiralis* (Lindl.) Toscano and another still unidentified species (A. L. V. Toscano de Brito and E. C. Smidt, unpubl. data), the genus is currently known to possess three species in Brazil.

Crocodelanthus magdalena (Rchb. f.) Toscano, *comb. nov.*

Basionym: *Pleurothallis magdalena* Rchb. f., *Bonplandia* (Hannover) 3: 72. 1855. TYPE: COLOMBIA. Old dept. of Ocaña: “Magdalena,” ca. 1854, H. Wagener *s.n.* (Holotype: W).

Synonyms: *Humboltia magdalena* (Rchb. f.) Kuntze, *Revis. Gen. Pl.* 2: 667. 1891.

Pleurothallis stelioides Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 7: 116 (1920). TYPE: COLOMBIA. Cauca: dense forests around Chiribio and Paisbamba above Popayán, 1800–2400 m, Mar. 1885, F. C. Lehmann 8198 (B [destroyed]; Lectotype designated by Luer (2009), second-step Lectotype selected here: AMES [14836]; Isolectotypes: AMES [118477]; HB [not seen]; K [not seen], Digital Image K; US [not seen], Digital Image US).

Stelis magdalena (Rchb.f.) Pridgeon & M. W. Chase, *Lindleyana* 16: 264. 2001.

Pleurothallis ligulata auct. non Lindl: *Kranzl. in Bot. Jahrb. Syst.* 26: 442. 1899.

Luer (2009) designated a lectotype for *Pleurothallis stelioides* based on an isotype at AMES, but there are two duplicates in that herbarium: AMES 14836 and AMES 118477. One of them, AMES 14836, is here selected as the second-step lectotype (see Article 9.17 of the *Code* in McNeill et al. 2012).

Crocodelanthus melanostele (Luer & R. Vásquez) Toscano, *comb. nov.*

Basionym: *Pleurothallis melanostele* Luer & R. Vásquez, *Phytologia* 49: 210. 1981. TYPE: BOLIVIA. La Paz: Prov. Inquisivi, between Inquisivi and Circuata, 2550 m, 28 Jan. 198, C. Luer, J. Luer, E. Besse & R. Vásquez 5798 (Holotype: SEL).

Synonym: *Stelis melanostele* (Luer & R. Vásquez) Pridgeon & M. W. Chase, *Lindleyana* 16: 264. 2001.

Crocodelanthus simplex (Ames & C. Schweinf.) Toscano, *comb. nov.*

Basionym: *Pleurothallis simplex* Ames & C. Schweinf., *Sched. Orchid.* 10: 37. 1930. TYPE: COSTA RICA.

San José: Cerro de las Vueltas, 29 Dec. 1925–1 Jan 1926, alt 2700–3000 m, P.C. Standley & J. Valeriu 44023 (Holotype: AMES).

Synonym: *Stelis simplex* (Ames & C. Schweinf.) Pridgeon & M. W. Chase, *Lindleyana* 16: 266. 2001.

Crocodelanthus spiralis (Lindl.) Toscano, *comb. nov.*

Basionym: *Physosiphon spiralis* Lindl., *Edwards’s Bot. Reg.* 21, t. 1797. 1835. TYPE: BRAZIL. Santa Catarina: near Port St. Catharina (Florianópolis), *J. Tweedie s.n.* (Holotype: K).

Synonyms: *Stelis deregularis* Barb. Rodr., *Gen. Spec. Orchid.* 2: 94. 1881. TYPE: BRAZIL. Rio de Janeiro, Paulo de Frontin (formerly Rodeio), 12 Mar. 1880 (date and year not cited in the protologue), *J. Barbosa Rodrigues s.n.* (Holotype: Lost; Lectotype here designated: illustration tab. 115, fig. B, vol. 2, in *Iconogr. Orchid. Brésil* at the Library of Rio de Janeiro Botanical Garden, cited as tab. 640 (unpubl.) in Barb. Rodr. *loc. cit.*; copied and reproduced in black and white in Cogn., *Fl. Bras. (Mart.)* 3(4), tab. 78, fig. 3. 1896, cited as *Physosiphon deregularis* (Barb. Rodr.) Cogn.; digitally restored image of the original reproduced in color in Sprunger et al., 1996, vol. 1: 171, fig. B., cited as *Pleurothallis deregularis*.

Pleurothallis clausa A. Rich. ex Rchb.f., *Cat. Orch.-Samml. Schiller*, ed. 3: 59. 1857, *nom. nud.*, *non* De Puydt 1880, *nom. nud.*

Physosiphon deregularis (Barb. Rodr.) Cogn., *Fl. Bras.* 3 (4): 341. 1896.

Pseudostelis bradei Schltr., *Anexos Mem. Inst. Butantan, Secç. Bot.* 1(4): 38. 1922. TYPE: BRAZIL. São Paulo, Iguape, Morro das Pedras, 20 m, collected in 1919, A. C. Brade 7793 (B, destroyed; Lectotype designated by Luer (1999): US [1208172], not seen, Digital Image US; Isolectotypes: AMES [30638], R [24942], not seen, Digital Image R; SP [8193]).

Pseudostelis deregularis (Barb. Rodr.) Schltr., *Anexos Mem. Inst. Butantan, Secç. Bot.* 1(4): 38. 1922.

Physosiphon minutiflorus Ames & Schweinf., *Sched. Orchid.* 8: 11. 1925. TYPE: PANAMA. Chiriqui: Caramillo, Oct. 1923, 5000 ft., C. W. Powell 345 (Holotype: AMES).

Pleurothallis schweinfurthiana L. O. Williams, *Ceiba* 5: 92. 1956, replacement name based on *Physosiphon minutiflorus* Ames & Schweinf. *non Pleurothallis minutiflora* Hoffmanns. 1842 *nec* S. Watson 1888 *nec* Cogn. 1896.

Pleurothallis deregularis (Barb. Rodr.) Luer, *Selbyana* 2(4): 385. 1978.

Pleurothallis crassipes auct. non Lindl., Rchb.f. in *Wawra Itin. Princ. S. Coburg* 2: 82. 1888.

The type specimen of *Stelis deregularis* is lost and the only extant, original material is the illustration which appeared in Barbosa Rodrigues’s *Iconographie des*

orchidées du Brésil and is now deposited in the library of Rio de Janeiro Botanical Garden. This illustration was copied and reproduced in black and white in Cogniaux (1896), and in color by Sprunger et al. (1996). It is here selected as the lectotype.

The name *Pseudostelis bradei* is based on a Brazilian collection by Alexander Curt Brade (1881–1971), numbered 7793, from Morros das Pedras, located in the municipality of Iguape, state of São Paulo, in 1919. The holotype was presumably destroyed at B during World War II, but duplicates exist at AMES, R, SP and US. Luer (1999) designated the specimen at US as the neotype, but as it is an extant original material, the use of neotype is to be

treated as an error and corrected to lectotype, according to Article 9.9 of the Code (McNeill et al. 2012). Barros (2004) provided a superfluous lectotypification for this taxon based on the duplicate at SP and mistakenly stated that the correct herbarium accession number of SP is “7703” not “7793.” He was certainly referring to the collector’s number not to the herbarium accession number. With exception of the specimen at SP, which carries 7703 as the collector’s number, all other duplicates agree with the protologue and bear “A. C. Brade 7793” on their labels. It should be noticed, however, that on the duplicate at AMES and the one at US the collection date is 1920, which is also most certainly erroneous.

LITERATURE CITED

- ANDRADE-LIMA, D. 1982. Present-day forest refuges in northeastern Brazil. Pages 245–250 in G. T. PRANCE, ED. *Biological Diversification in the Tropics*, Columbia University Press, New York.
- BARROS, F. 2004. Taxonomic and nomenclatural notes on Brazilian Orchidaceae. Pages 7–22 in K. S. MANILAL AND C. SATHISH KUMAR, EDS. *Orchid Memories: A Tribute to Gunnar Seidafén*. Mentor Books, Calicut.
- CARNEVALI, G. AND L. DORR. 2014. Orchidaceae. Flora of Guaramacal (Venezuela): Monocotyledons. *Smithson. Contrib. Bot.* 100: 106–209.
- COGNIAUX, A. 1896. *Orchidaceae*, Fl. Bras. (Mart.) 3(4), tab. 78, fig. 3. 1896.
- GARAY, L. A. 1974. *Acostaea* Schltr. y los géneros del complejo *Pleurothallis*. *Orquideología* 9(2): 103–126.
- KARREMANS, A. 2015. Nomenclatural notes in the Pleurothallidinae (Orchidaceae): *Stelis*. *Phytotaxa* 203(3): 292–296.
- . (2016). *Genera Pleurothallidarum*: An updated phylogenetic overview of Pleurothallidinae. *Lankesteriana* 16: 219–241.
- KARREMANS, A., F. BAKKER, F. PUPULIN, R. SOLANO-GÓMEZ, AND M. SMULDERS 2013. Phylogenetics of *Stelis* and closely related genera (Orchidaceae: Pleurothallidinae). *Plant Syst. Evol.* 299:151–176.
- LUER, C. A. 1996. *Icones Pleurothallidarum* III. Systematics of *Pleurothallis* (Orchidaceae). *Monogr. Syst. Bot. Missouri Bot. Gard.* 20: 1–109.
- . 1998. *Icones Pleurothallidarum* XVI. Systematics of *Pleurothallis* subgenera *Crocodeilanthé*, *Rhynchopera* and *Talpinaria*. *Monogr. Syst. Bot. Missouri Bot. Gard.* 65: 1–82.
- . 1999. *Icones Pleurothallidarum* XVIII. Systematics of *Pleurothallis* subgen. *Pleurothallis* sect. *Pleurothallis*, subsect *Antenniferae*, subsect *Longiracemosae*, subsect *Macrophyllae-Racemosae*, subsect *Perplexae*, subgen. *Pseudostelis*, subgen. *Acuminatia*; addenda to *Dracula*, *Lepanthes*, *Masdevallia* and *Pleurothallis*; miscellaneous new species of *Dryadella*, *Lepanthes* and *Pleurothallis*. *Monogr. Syst. Bot. Missouri Bot. Gard.* 76: 1–182.
- . 2004. *Icones Pleurothallidarum* XXVI. Systematics of *Pleurothallis* subgenus *Acianthera* (Orchidaceae). A second century of new species of *Stelis* of Ecuador; *Epibator*, *Ophidion*, *Zootrophion*. *Monogr. Syst. Bot. Missouri Bot. Gard.* 95: 1–265.
- . 2009. *Icones Pleurothallidarum* XXX. *Lepanthes* of Jamaica; Systematics of *Stelis*: *Stelis* of Ecuador, part 4. Addenda: Systematics of *Masdevallia*; New species of *Lepanthes* from Ecuador, and miscellaneous new combinations. *Monogr. Syst. Bot. Missouri Bot. Gard.* 115: 1–265.
- . 2011. Miscellaneous new species in the Pleurothallidinae (Orchidaceae) excluding species from Brazil. *Harv. Pap. Bot.* 16(2): 311–360.
- LUER, C. A. AND A. L. V. TOSCANO DE BRITO. 2018. Miscellaneous new species in the Pleurothallidinae (Orchidaceae). *Harvard Pap. Bot.* 23(1): 47–51.
- MCNEILL, J., F. R. BARRIE, W. R. BUCK, V. DEMOULIN, W. GREUTER, D. L. HAWKSWORTH, P. S. HERENDEEN, S. KNAPP, K. MARHOLD, J. PRADO, W. F. PRUD’HOMME VAN REINE, G. F. SMITH, J. H. WIERSEMA, AND N. J. TURLAND. 2012. International Code of Nomenclature for algae, fungi, and plants (Melbourne Code) adopted by the Eighteenth International Botanical Congress Melbourne, Australia, July 2011. *Reg. Veg.* 154.
- PRIDGEON, A. M. 2005. 356. *Stelis*. Pages 405–412 in A. M. PRIDGEON, P. J. CRIBB, M. W. CHASE, AND F. N. RASMUSSEN, EDS. *Genera Orchidacearum, Volume 4. Epidendroideae (Part One)*. Oxford University, Oxford.
- PRIDGEON, A. M. AND M. W. CHASE. 2001. A phylogenetic reclassification of Pleurothallidinae (Orchidaceae). *Lindleyana* 16: 235–271.
- . 2002. Nomenclatural notes on Pleurothallidinae (Orchidaceae). *Lindleyana* 17(2): 98–101.
- SOLANO-GÓMEZ, R. 2005. Inference of the phylogenetic relationships in *Stelis sensu lato* clade based upon morphology and sequences of the ITS region data sets. Pages 460–468 in A. RAYNAL-ROQUES, A. ROGUENANT AND D. PRAT, EDS. *Proceedings of the 18th World Orchid Conference*, March 2005, Dijon.
- SPRUNGER, S., P. J. CRIBB, AND A. L. V. TOSCANO DE BRITO, EDS. 1996. *João Barbosa Rodrigues—Iconographie des orchidées du Brésil, Vol. 1: The illustrations*. Friedrich Reinhardt Verlag, Basle.
- WILLIAMS, L. O. 1939. Two new combinations. *Bot. Mus. Leaf.* 7(10): 180.

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A SYNOPSIS OF THE GENUS *XYLOBIUM* (ORCHIDACEAE: MAXILLAREAE)

PAUL ORMEROD¹

Abstract. A synopsis is presented of the Neotropical orchid genus *Xylobium*, wherein 18 species are recognized, including one new species and three varieties. A key is supplied to help identify the species, along with discussion under each entity on its recognition characters, notes where necessary on the synonymy, and a list of specimens examined. The new names are *X. miliaceum* var. *patens*, *X. undulatum* var. *portillae*, *X. undulatum* var. *variegatum*, and *X. wilhelminae*. At the end of the treatment, a list of excluded taxa is provided, which includes the currently known status of each name. Among those taxa, *Dendrobium longifolium* is neotypified, and the combinations *Cyrtochilum bicolor* and *Sudamerlycaste insolita* are proposed.

Keywords: *Xylobium*, synopsis, new species, varieties, transfers

The genus *Xylobium* was proposed by John Lindley in 1825 based on his own *Dendrobium squalens* from Brazil. However *Xylobium* was short-lived, its validity being doubted by Hooker (1827), before he eventually moved the sole species to *Maxillaria* Ruiz & Pavon in 1829. Lindley (1832a, b) accepted this view and afterward treated all *Xylobium* within the genus *Maxillaria*. The latter genus however always has single-flowered inflorescences, and conduplicate, often coriaceous leaves, whereas *Xylobium* has multiflowered inflorescences, and plicate,

papyraceous leaves. It would not be until 1881 when George Bentham reinstated *Xylobium* and outlined its distinctive characteristics. He did not make any transfers, but suggested 16 species belonged to it. He was soon followed by Hemsley (1883), Nicholson (1887), and Rolfe (1889). Eventually Rolfe (1912) published a small half-page enumeration of the genus, making seven new combinations. The following year, Schlechter (1913) contributed a slightly more detailed account of *Xylobium*, proposing an additional five new combinations.

TAXONOMY

Xylobium Lindl., Bot. Reg. 11: sub t.897. 1825.

Type species: *Dendrobium squalens* Lindl.

Homotypic synonyms: *Maxillaria* Ruiz & Pav. section *Xylobium* (Lindl.) Endl., Gen. Pl.: 197. 1836.

Maxillaria Ruiz & Pav. section *Racemosae* Lindl. & Paxt., Paxt. Fl. Gard. 3: 69. 1852 *nom. illeg.*

Maxillaria Ruiz & Pav. section *Spicatae* Rchb.f., Ann. Bot. Syst. 6: 507. 1863 *nom. illeg.*

Heterotypic synonyms: *Onkeripus* Raf., Fl. Tellur. 4: 42. 1838.

Type species: *Maxillaria pallidiflora* W.J. Hook.

Pentulops Raf., Fl. Tellur. 4: 42. 1838.

Type species: *Maxillaria decolor* Lindl.

Epiphytic or terrestrial *herbs*. *Roots* terete. *Pseudobulbs* clustered on a short rhizome, rarely long-creeping, terete, fusiform, to ovoid, 1–2(–3)-leaved apically. *Leaves* papyraceous, plicate, usually strongly 3(–5) veined below, subsessile to long petiolate. *Inflorescence* basal, few to many-flowered, erect, or rarely pendent, racemose; floral bracts very short to elongate. *Flowers* semi-closed to wide open, sometimes with a fine pubescence on the inner basal surfaces of the sepals and petals. *Pedicel plus ovary* clavate, terete to triquetrous, weakly ribbed, glabrous. *Sepals* similar, but the lateral ones with a dilated base decurrent on the column foot to form a short, open mentum. *Petals* similar

to sepals, but often slightly narrower and shorter. *Labellum* entire to trilobed, moderately arcuate, medially with a low 3–5 ribbed callus confined to the hypochile, rarely on the epichile; epichile (or midlobe) often much thickened apically, often adorned with keels or rows of papillae, or verrucae. *Column* stout, semiterete; *column foot* straight to slightly incurved, forming a mentum with the lateral sepals; *pollinia* 4, in two oblong-ellipsoid pairs, attached to broadly lunate *viscidium*; *rostellum* inverted V-shaped; *stigmatic area* elliptic to circular.

Distribution: About 18 species distributed in Mesoamerica (Mexico to Panama), the Caribbean, and South America (Colombia to Bolivia, and Brazil).

Etymology: The generic name is derived from the Classical Greek *xulon*, meaning wood, and *bios*, meaning life. It appears to be a homage to the similarly derived generic name *Dendrobium*, in which the type species was proposed. Suggestions the name *Xylobium* alludes to its epiphytic habit are wrong, since the type species was clearly noted in its protologue to be a terrestrial plant.

The majority of *Xylobium* species have a set of characters that makes it a relatively simple process to identify the various entities. Furthermore, most of the species have been ably illustrated over time. Nevertheless, one can be misled by variable features such as the shape and length of the pseudobulbs, the number, and width of the leaves, the length

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

and density of the inflorescence, the size and color of the flowers, and of course details of the labellum and its parts.

Generally though, if a plant has slender, stick-like pseudobulbs it is likely either *X. elongatum* or *X. pallidiflorum* (however *X. leontoglossum* and *X. undulatum* can have slender pseudobulbs); if it has short floral bracts then it could be *X. corrugatum*, *X. leontoglossum*, or *X.*

zarumense; if it has short, dense inflorescences it could be *X. coelia*, *X. colleyi*, *X. stanhopeifolium*, *X. subpulchrum*, or *X. undulatum*.

Xylobium elongatum and *X. foveatum* have been entered twice in the following key, though both are relatively easy to identify. The epichile, a segment of the labellum, is used in several couplets below.

KEY TO SPECIES

- 1a. Floral bracts short, 0.5–7.0 mm long 2
 1b. Floral bracts longer, 10–55 mm long 4
 2a. Inflorescence few-flowered; labellum weakly trilobed; epichile broad, not thickened. *X. corrugatum*
 2b. Inflorescence densely many-flowered; labellum strongly trilobed, epichile narrower, strongly thickened 3
 3a. Pseudobulbs unifoliate; inflorescence erect; flowers whitish to light greenish, spotted with purple, epichile oblong *X. leontoglossum*
 3b. Pseudobulbs bifoliate; inflorescence semipendulous; flowers yellowish-green, petals with a brownish stripe; epichile ovate ... *X. zarumense*
 4a. Inflorescence peduncle less than 3 cm long 5
 4b. Inflorescence peduncle more than 5 cm long 7
 5a. Pseudobulbs 1–2 leaved; labellum entire *X. colleyi*
 5b. Pseudobulbs unifoliate; labellum strongly trilobed. 7
 6a. Leaf subsessile to shortly (5 cm) petiolate *X. subpulchrum*
 6b. Leaf long petiolate, petiole to 20 cm long. *X. stanhopeifolium*
 7a. Labellum with medial callus on epichile. *X. wilhelminae*
 7b. Labellum with medial callus on hypochile 8
 8a. Labellum with epichile broader than long. 9
 8b. Labellum epichile as wide as long, or longer than wide 10
 9a. Pseudobulbs bifoliate; mentum to 5 mm long. *X. foveatum*
 9b. Pseudobulbs unifoliate; mentum 6–9 mm long 11
 10a. Dorsal sepal elliptic; labellum strongly trilobed *X. coelia*
 10b. Dorsal sepal lanceolate; labellum weakly trilobed *X. palmifolium*
 11a. Epichile thin to fleshy, naked, obscurely papillose to ridged, or with well separated keels, cuneate, deltate, subcircular, to elliptic 12
 11b. Epichile much thickened, covered with papillae and verrucae, ovate, oblong, to lanceolate 16
 12a. Pseudobulbs bifoliate; epichile transversely elliptic, subcircular to cuneate, obliquely erect *X. foveatum*
 12b. Pseudobulbs 1 (rarely 2)–leaved; epichile elliptic, subcircular to deltate, apex decurved 13
 13a. Epichile with lamellate, dentate keels 14
 13b. Epichile without lamellae, rarely low, broad ridges, sometimes obscurely papillose. 15
 14a. Labellum with medial callus having curved, flared out lateral keels; epichile thickened in upper third to half, lamellae c. 0.5 mm tall *X. bractescens*
 14b. Labellum with medial callus having straight, sometimes bifurcate lateral keels; epichile only thickened near margins, if at all, lamellae to c. 0.3 mm tall, usually less *X. varicosum*
 15a. Labellum weakly lobed medially; medial callus distinct, of 3–5 raised lamellae. *X. pallidiflorum*
 15b. Labellum weakly lobed in upper third; medial callus obscure, of 3–5 low ridges *X. sulfurinum*
 16a. Lateral sepals falcate 17
 16b. Lateral sepals straight to weakly curved 18
 17a. Petals obliquely oblong; labellum epichile ovate, spreading, covered with rounded verrucae *X. undulatum* var. *portillae*
 17b. Petals obliquely lanceolate; epichile ovate, oblong to lanceolate, sides upcurved to infolded, inside with sharper, smaller verrucae and papillae *X. elongatum*
 18a. Pseudobulbs slender, finely or not sulcate dry, (5.5) 13–32 cm long; dorsal sepal to 4 mm wide *X. elongatum*
 18b. Pseudobulbs narrowly ovoid to fusiform, sulcate dry, generally 5–8 (–12) cm long; dorsal sepal 5 mm or more wide 19
 19a. Inflorescence laxly to subclaxly flowered; peduncle 18–30 cm long; floral bracts narrowly cymbiform 20
 19b. Inflorescence densely to subdensely (rarely subclaxly) flowered; floral bracts lanceolate. 21
 20a. Flowers erect, mentum pointing towards rachis *X. miliaceum*
 20b. Flowers patent, mentum pointing upwards or slightly outwards *X. miliaceum* var. *patens*
 21a. Rachis 12–20 cm long 22
 21b. Rachis 4–11 cm long 23
 22a. Peduncle 30–90 cm long, slender, ca. 2 mm thick; lateral sepals oblong; labellum epichile oblong-lanceolate *X. elatum*
 22b. Peduncle 12–30 cm long, ca. 3 mm thick; lateral sepals oblong-lanceolate; labellum epichile ovate *X. undulatum* var. *variiegatum*
 23a. Labellum epichile elliptic, subcircular, to obovate, 3–5 mm wide *X. undulatum*

ACCOUNT OF THE SPECIES OF *XYLOBIUM*

Xylobium bractescens (Lindl.) Kraenzl. ex Rolfe, Orch. Review 20: 359. 1912.

Basionym: *Maxillaria bractescens* Lindl., Edwards's Bot. Reg. 28: 84, misc. 92. 1842. TYPE: ECUADOR. Loja, leg. K. T. Hartweg, cult. Hort. Soc. s.n. (Holotype: K-L, image seen). Fig. 1.

Distribution: Ecuador; Peru.

Additional specimens examined: ECUADOR. Loja: KM 13 on Pan American Highway N of Loja, 2050 m, 1 May 1973, L. Holm-Nielsen, S. Jeppesen, B. Lojmant & B. Ollgard 4634 (AMES). PERU. Cajamarca: Prov. Chota, Rio Chotano, below Lajas, road to Chicalayo, 1925 m, 19 October 1964, P.C. Hutchison & J.K. Wright 7042 (AMES); Prov. Cutervo, above Socota, following the route to San Andres, 2000 m, 2 November 1981, I. Sanchez Vega, A. Sagastegui & J. Guevera 5875 (GH); near Socota, valley of Rio Cutervo, 1900–1980 m, 10 February 1988, A. Gentry, C. Diaz & C. Blaney 61464 (F, MO, SEL). Amazonas: Prov. Bongara, trail above highway to Chicalayo and Rio Utcubamba, 3–10 km NW of Pedro Ruiz Gallo, 1300–1400 m, 4 May 1981, K. Young & M. Eisenberg 292 (MO, NY); same data, K. Young & M. Eisenberg 288 (MO).

This species appears to grow exclusively as a terrestrial. Its flowers are reported to be yellow, with maroon keels on a white lip. Generally the species may be characterised by its narrowly ovoid to fusiform, 6–12 cm long, 1–2-leaved pseudobulbs, long-pedunculate (peduncle 29.0–48.5 cm) inflorescence with a lax-flowered (15.5–18.5 cm long) rachis, elongate (25–55 mm long) floral bracts, weakly trilobed lip, the median callus with lamellate lateral keels in its upper part, above it are five undulate, dentate lamellae which go to the apex of the midlobe, the midlobe is noticeably thickened in its apical quarter to third.

Xylobium bractescens is closely related to *X. varicosum*, the latter generally with a shorter rachis, and flowers in which the lip has a much lower medial callus without lamellate lateral keels, and the apical part of the midlobe only weakly thickened at the margins, if at all.

I have not examined any bifoliate examples of *X. bractescens*, but one such plant from Ecuador was depicted by Dodson (1984). The combination *X. bractescens* is usually attributed to Kraenzlin (1908) but he gave no hint of a basionym therein, so I have given the credit to Rolfe.

Xylobium coelia (Rchb.f. & Warc.) Rolfe, Orch. Review 20: 43. 1912.

Basionym: *Maxillaria coelia* Rchb.f. & Warc., Bonplandia 2: 97. 1854. TYPE: [PERU]. Without origin, J. R. Warcewicz s.n. (Holotype: W-R 41437, image seen).

Heterotypic synonyms: *Maxillaria ornata* Klotzsch, Allg. Gartenz. 23: 257. 1855 syn. nov. TYPE: PERU. Without data [1853, J.R. Warcewicz s.n.] (Holotype: B, destroyed; photograph seen: AMES, F, MO).

Xylobium ornatum (Klotzsch) Rolfe, Orch. Review 20: 43. 1912.

Xylobium latilabium C. Schweinf., Bot. Mus. Leaflet Harv. Uni. 15: 155. 1952. TYPE: PERU. Junin: Prov.

Tarma, Vitoc, 1800 m, 1942, F.L. Woytkowski 10 (Holotype: AMES).

Distribution: Ecuador; Peru.

Additional specimens examined: ECUADOR. Pastaza: Cushillo Urco, c. 8 km N of Puerto Sarayacu, 6 October 1974, H. Lugo S. 3927 (AMES). PERU. Loreto: Alto Amazonas, Andoas [on Rio Pastaza], 180 m, 2 November 1983, R. Vasquez & N. Jaramillo 4514 (MO). Junin: Yaupi, 1470 m, 12 October 1964, D.E. Bennett 829 (AMES).

A beautiful species with dense racemes of yellowish to orange flowers, the lip with reddish-purple stripes inside. It is easily recognised by its unifoliate pseudobulbs, rather short inflorescences (peduncle shorter to longer than the pseudobulb) of showy flowers, a relatively large mentum (9 mm long) with the apex of the columnfoot slightly recurved, a broadly trilobed lip with wide truncate sidelobes, and a transversely oblong-elliptic, emarginate midlobe with a modestly thickened margin.

The name *X. ornatum* is very apt for this species but unfortunately it is predated by *X. coelia* (named for the resemblance of the inflorescence to that of *Coelia* Lindl.). It is highly likely that both names were based on living material from the same consignment, sent back from Peru by Josef Warcewicz, but that flowered in different collections.

Xylobium colleyi (Batem. ex Lindl.) Rolfe, Gard. Chron. s.3, 7: 288. 1890.

Basionym: *Maxillaria colleyi* Batem. ex Lindl., Edwards's Bot. Reg. 24: misc. 161. 1838. TYPE: Not cited [GUYANA: Demerara, leg. T. Colley, cult. J. Bateman s.n.] (Holotype: K-L, image seen).

Homotypic synonym: *Lycaste colleyi* (Batem. ex Lindl.) P.N. Don, in Donn, Hort. Cantabr. ed. 13: 721. 1845.

Heterotypic synonyms: *Maxillaria rebellis* Rchb.f., Fl. des Serres 9: 102. 1853. TYPE: Origin unknown, cult. Consul Schiller s.n. (Holotype: W-R 41366, image seen).

Xylobium rebellis (Rchb.f.) Schltr., Orchis 7: 23. 1913.

Xylobium brachystachyum Kraenzl., Gard. Chron. s.3, 40: 302. 1906. TYPE: BRAZIL. Santa Catarina: without locality, October 1906, cult. W. Hennis s.n. (Holotype: lost). Neotype (here proposed): BRAZIL. Santa Catarina: without locality, November 1907, cult. W. Hennis s.n. (Holotype: HBG, image seen).

Distribution: Belize; Guatemala; Costa Rica; Panama; Colombia (?); Venezuela; Trinidad; Guyana; Brazil.

Additional specimens examined: TRINIDAD. Valencia Forest Reserve, 1957, G.A.C. Herklots s.n. (= *Herb. Trin. 15449*) (AMES); Saut d'Eau, August 1930, W.E. Broadway 7435 (AMES).

I cannot vouch for the above-cited distribution, having seen very few collections of this species. Records from Colombia, Ecuador, and Peru were referred by Dressler to his *X. subpulchrum*, a taxon with white flowers, and a trilobed lip with a reddish midlobe.

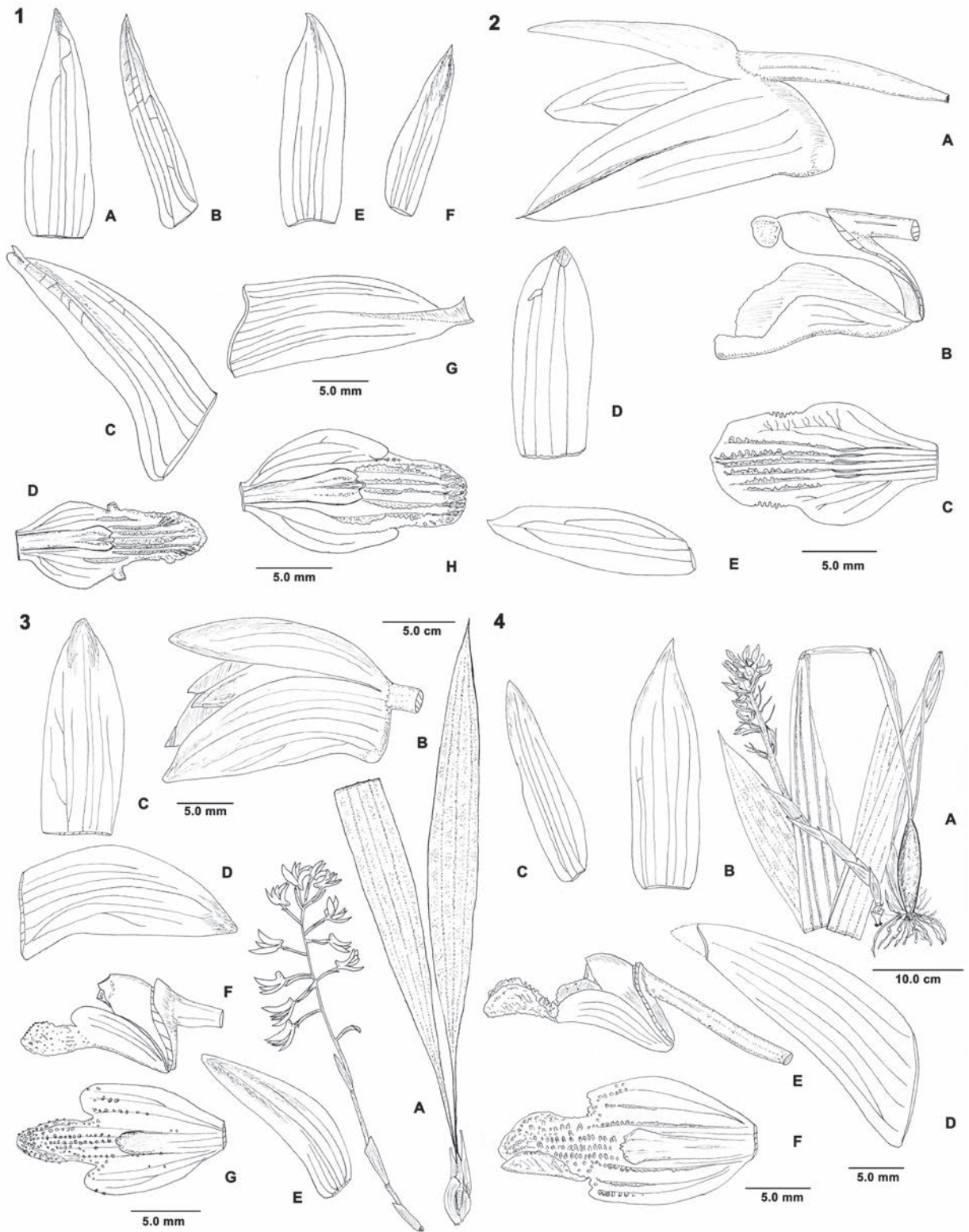


FIGURE 1. *Xylobium bractescens* (Lindl.) Rolfe. **AE**, dorsal sepals; **BF**, petals; **CG**, lateral sepals; **DH**, labellums. A-D from Gentry *et al.* 61464 (MO), E-H from Hutchison & Wright 7042 (AMES). FIGURE 2. *Xylobium corrugatum* (Lindl.) Rolfe. **A**, flower; **B**, flower minus tepals; **C**, labellum; **D**, dorsal sepal; **E**, petal. Drawn from Bristol 756 (AMES). FIGURE 3. *Xylobium miliaceum* (Rchb.f.) Rolfe var. *patens* Ormerod. **A**, plant and inflorescence; **B**, flower; **C**, dorsal sepal; **D**, lateral sepal; **E**, petal; **F**, flower minus tepals; **G**, labellum. Drawn from holotype. FIGURE 4. *Xylobium undulatum* (Ruiz & Pav.) Rolfe var. *undulatum*. **A**, plant; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E**, flower minus tepals; **F**, labellum. Drawn from Cuatrecasas 13140 (US).

Xylobium colleyi may be recognised by its 1–2-leaved pseudobulbs, short, pendent, few-flowered inflorescences with large, cymbiform floral bracts, the rather attractive flowers are whitish to yellowish with numerous reddish-brown spots, and the fleshy, oblong, entire lip also has some reddish-brown spotting, with blackish margins and a blackish apex.

Xylobium corrugatum (Lindl.) Rolfe, Gard. Chron. s.3, 5: 459. 1889.

Basionym: *Maxillaria corrugata* Lindl., Edwards's Bot. Reg. 30: misc. 14. 1844. TYPE: COLOMBIA/VENEZUELA. Between Maracaibo (Venezuela) and Bogota (Colombia), leg. J. Linden, cult. G. Barker s.n. (Holotype: K-L, image seen). Fig. 2.

Heterotypic synonyms: *Maxillaria wagneri* Rchb.f., Bot. Zeit. 10: 735. 1852. TYPE: VENEZUELA. Federal [District]: Caracas, leg. H. Wagner, cult. in Krollwitz by Bottyer for C. Keferstein s.n. (Holotype: W-R 40285, image seen).

Xylobium corrugatum (Lindl.) Rolfe var. *wagneri* (Rchb.f.) Schltr., Orchis 7: 22. 1913.

Xylobium wagneri (Rchb.f.) Schltr., Rep. Sp. Nov. Regni Veg., Beih. 6: 85. 1919.

Distribution: Venezuela; Colombia; Ecuador (?).

Additional specimens examined: COLOMBIA.

Putumayo: Valle de Sibundoy, 1 km S of Sibundoy, 2200 m, 12 April 1963, *M.L. Bristol 756* (AMES, US). Valle: W Andes of Cali, 1500–2000 m, February/March, *F.C. Lehmann 4529* (AMES, NY); “Calima” on Rio Calima, 14–15 September 1922, *E.P. Killip 11197* (AMES); Pavas, 1500–1800 m, 24 & 29 September 1922, *E.P. Killip 11573* (AMES). Santander: S slope of Mt. San Martin, near Charta, 2300–2500 m, 10 February 1927, *E.P. Killip & A.C. Smith 19171* (AMES, US); vicinity of California, 2300 m, 11–27 January 1927, *E.P. Killip & A.C. Smith 17076* (AMES, US); Rio Surata valley, 2000–2300 m, 5–6 January 1927, *E.P. Killip & A.C. Smith 16644* (AMES). Cesar: Sierra Nevada de Santa Marta, near junction of next creek E of Quebrada Indiana and the Rio Frio, 1270 m, 29 August 1972, *J.H. Kirkbride Jr. 1974* (NY).

An easily recognisable species by virtue of its small (2–4 cm tall), unifoliate pseudobulbs, consistently narrow (2–4 cm wide) leaves, wiry, laxly few-flowered inflorescences, short (to 7 mm long) floral bracts, pale brownish-suffused flowers, and broad, weakly trilobed, yellowish lip with red spots and lines, on which the medial callus is formed of five well-separated keels which are superseded by 7–9 lines of undulate, dentate lamellae on the midlobe.

Some references (e.g., Kolanowska and Szlachetko, 2016) list *Linden 655* (or 659?) (K-L, P, images seen) as the type of *X. corrugatum* but this collection from “Estado Mérida,” Venezuela differs in having much longer floral bracts, and a strongly trilobed lip. Lindley (1846) referred it to *Maxillaria scabrilinguis* (i.e. *Xylobium undulatum* var. *variegatum*). The identity of *Linden 655* remains unresolved, but it certainly is not referable to *X. corrugatum*.

It is possible *X. corrugatum* occurs in northern Ecuador but I have not examined any material from there though one specimen is listed in the Kew alcohol collection.

Xylobium elatum Rolfe, Bull. Misc. Inf. Kew: 341. 1914. TYPE: PERU. Without locality, leg. L. Forget, cult. Messrs. Sander & Sons s.n. (Holotype: lost).

Distribution: Peru.

Additional specimens examined: PERU. Junin: Prov. Tarma, canyon of Rio Huasahuasi, below Huasahuasi, in valley bottom, mouth of gorge near river, 2400m, 10 August 1957, leg. P.C. Hutchison 1080, 18 September 1959, cult. Univ. Calif. Bot. Gard., Acc. No. 61-359-1 (NY); Utcuyacu, leg. F. Woytkowski 61, 21 November 1958, cult. Univ. Calif. Bot. Gard., Acc. No. 50.1779-2 (AMES).

I have seen two collections of this species, both consisting of inflorescences only. Specimens with a 90 cm long peduncle as noted by Rolfe in the protologue remain to be rediscovered. The species may be characterised by its bifoliate pseudobulbs, long (30–90 cm), wiry, erect peduncle, subaxly to densely rachis, yellowish to greenish flowers with coalesced reddish to brown mottling on the back of the sepals, the lip yellowish to greenish with reddish to brownish spotting, the lateral sepals are oblong, sometimes twisted 90 degrees halfway, petals ligulate-lanceolate, and the lip strongly trilobed, with a smooth three-ridged median callus, above which numerous laxly scattered verrucae, and a relatively narrow (less than 2 mm wide) oblong-lanceolate midlobe.

Xylobium elongatum (Lindl. & Paxt.) Hemsl., in Godm. & Salv., Biol. Centr.-Amer., Bot. 3: 252. 1883.

Basionym: *Maxillaria elongata* Lindl. & Paxt., in Paxt. Fl. Gard. 3: 69. 1852. TYPE: GUATEMALA. Without locality, G. U. Skinner s.n. (Holotype: K-L, image seen).

Heterotypic synonyms: *Maxillaria cylindrobulba* Regel, Gartenfl. 7: 341. 1858. TYPE: MEXICO. Without locality, leg. H.G. Galeotti, cult. Bot. Gard. St. Petersb. s.n. (Holotype: LE, image seen).

Xylobium cylindrobulbum (Regel) Schltr., Beih. Bot. Centralbl. 36, Abt. 2: 493. 1918.

Xylobium papillosum Archila, Szlach. & Perez-Garcia, Richardiana 14: 119. 2014, syn. nov. TYPE: GUATEMALA. Alta Verapaz: Barrancas de Kaquipeck, near old mining camp, 1500 m, *F. Archila s.n.* (Holotype: BIGU, not seen).

Xylobium tubilabium Szlach. & Kolan., Phytion (Horn) 54, 1: 78. 2014 syn. nov. TYPE: COLOMBIA. Choco: Pacific N coast, 10–100 m, July 1988, *G. Misas Urreta 148* (Holotype: COL, not seen).

Distribution: Mexico; Guatemala; El Salvador; Costa Rica; Panama; Colombia; Ecuador; Peru (?).

Additional specimens examined: MEXICO. Vera Cruz: San Andreas Tuxtla region, near Cerro Tapalcapan and Cerro Mastagaga, NW of Catemarcó, 23 August 1953, *R.L. Dressler & Q. Jones 144* (AMES); Volcan San Martin, 600 m, 3 May 1937, *O. Nagel & J. Gonzalez 5798* (AMES). Chiapas: NE of Comitán, near settlements of “La Selva” and La Florida, 900–1000 m, 16 March 1936, *O. Nagel 5575* (AMES). GUATEMALA. Alta Verapaz: Cobán, 1280 m, 7 March 1940, *M.W. Lewis 224* (AMES). COSTA RICA. Alajuela: Vara Blanca de Sarapiquí, N slope

of Central Cordillera, 1500–1750 m, July to September 1937, *A.F. Skutch 3327* (AMES); same area, between Poas and Barba Volcanoes, 1340 m, *A.F. Skutch 3637* (AMES); Canton Alfaro Ruiz, Guadeloupe de Zareero, 1550 m, 24 August 1938, *A. Smith H1126* (AMES); Canton San Carlos, Zapote, 1575 m, 4 July 1938, *A. Smith H827* (AMES). Cartago: Tapanti, 1200 m, September 1937, *M. Valerio 2607* (AMES); S of Navarro, El Muneco, 1400 m, 8–9 February 1924, *P.C. Standley 33523* (AMES); La Palma de San Jose, 28 September 1932, *M. Valerio 158* (AMES). San Jose: La Hondura, 1300–1700 m, 16 March 1924, *P.C. Standley 37784* (AMES). PANAMA. Chiriqui Prov., 1220 m, January 1919, *C.W. Powell 167* (AMES); March 1923, *cult. C.W. Powell 167* (= *C.W. Powell 3154*) (AMES); near Boquete, *C.W. Powell 3154* (AMES). Cocle: hills N of El Valle de Anton, trail to las Minas, 1000 m, 1 September 1941, *P.H. Allen 2705* (AMES); trail to La Mesa, 1000 m, 2 September 1941, *P.H. Allen 2745* (AMES). ECUADOR. Esmeraldas: off road to Lita, N of Rio Mira, between Guallupe and Parambas, 900 m, 16 February 1986, *A. Hirtz & X. Hirtz 6298* (SEL). Imbabura: Cordillera Occidental, along trail to Rio Chalguayaco, below Magnolia, lower Intag Valley, 1220 m, 12 September 1944, *W.B. Drew E-578* (AMES). Pichincha: lower end of old road to Santo Domingo de los Colorados, c. 1.6 km E of junction with new road, 920 m, 15 January 1971, *B. MacBryde 90* (AMES); Aloag to Santo Domingo road, Tandapi (M. Cornejo Astorga), at the confluence between Rio Tandapi and Rio Pilaton, 1500 m, 11 February 1967, *B. Sparre 14374* (MO, US); Hacienda La Palma del Sr. Alfonso Darquea, KM 35, Santo Domingo to Quito, 900–1250 m, 3 February 1985, *C.H. Dodson & D. Neill 15553* (MO).

I am not sure this species occurs in Peru, though it is found in nearby Ecuador. The Peruvian record is based on a determination by Kraenzlin, mentioned in Weberbauer (1911). It is possible the now destroyed specimen was a misdetermined collection of *X. pallidiflorum*. *Xylobium papillosum* agrees well with Lindley's sketches on the type sheet of *X. elongatum*, which also came from Guatemala. *Xylobium tubilabium* from Colombia also fits into the variation of *X. elongatum*, under which latter name Misa Urruta (2005) illustrated the type specimen.

The species is easily recognised by its slender, elongate, bifoliate pseudobulbs, the peduncle can be shorter or longer than the pseudobulbs, the rachis densely to laxly flowered, 4–12 cm long, the flowers variable in color, white, pale yellow, to buffy pink, sometimes with purplish tips, the lip is trilobed, with a reddish to purplish, rarely yellow-orange midlobe and papillae, the hypochile with a three-keeled (lateral keels often sulcate) median callus, superseded by five lines of low, undulate, papillate, dentate lamellae, the midlobe ovate to lanceolate, obtuse, usually with raised, variously rugose, often infolded margins.

Xylobium foveatum (Lindl.) G. Nicholson, Ill. Dict. Gard. 4: 225. 1887.

Basionym: *Maxillaria foveata* Lindl., Edwards's Bot. Reg. 25: misc. 2. 1839. TYPE: GUYANA. Demerara, *imp. & cult. Messrs. Loddiges s.n.* (Holotype: K-L, image seen).

Heterotypic synonyms: *Maxillaria concava* Lindl., Edwards's Bot. Reg. 30: misc. 12. 1844. TYPE: GUATEMALA. Without locality, 1841, *leg. K.T. Hartweg, cult. Hort. Soc. s.n.* (Holotype: K-L, image seen).

Xylobium concavum (Lindl.) Hemsl., in Godm. & Salv., Biol. Centr.-Amer., Bot. 3: 252. 1883.

Maxillaria stachyobiorum Rchb.f., Bot. Zeit. 10: 735. 1852. TYPE: PANAMA. Chiriqui, *J.R. Warcewicz s.n.* (Holotype: W-R 41346; Isotype: K-L, images seen).

Xylobium stachyobiorum (Rchb.f.) Hemsl., in Godm. & Salv., Biol. Centr.-Amer., Bot. 3: 252. 1883.

Maxillaria hyacinthina Rchb.f., Linnaea 22: 855. 1852 *syn. nov.* TYPE: VENEZUELA. Merida: Rio Chama, December, *J.W.K. Moritz 1084* (Lectotype here designated: BM; Isolectotype: W-R 41337, images seen).

Xylobium hyacinthinum (Rchb.f.) Schltr., Orchis 7: 22. 1913.

Maxillaria affinis Hort. Petrop. ex Rchb.f., Ann. Bot. Syst. 6: 511. 1863, *pro syn.* [*non* (Poepp. & Endl.) Garay 1962]. BASIS FOR NAME: ORIGIN UNKNOWN. *Cult. Hort. Bot. Petrop. s.n.* (W-R?, not seen).

Maxillaria chapadensis Barb. Rodr., Plant. Matogr.: 35. 1898. TYPE: BRAZIL. Mato Grosso: Capao Secco to Serro da Chapada, March, *J. Barbosa Rodrigues s.n.* (Holotype: lost; Lectotype, here designated: t. 12B in Barb. Rodr., Plant. Matogr. 1898).

Xylobium chapadense (Barb. Rodr.) Cogn., Chron. Orchideenne 1, 22: 172. 1898.

Xylobium chapadense (Barb. Rodr.) Cogn. var. *luteoalbum* Hoehne, Relat. Commiss. Linhas Telegr. Estrateg. Matto Grosso Amaz. 5, Bot. 1: 46. 1910. TYPE: BRAZIL. Mato Grosso: Tapiripua, banks of Rio Sepatuba, March 1909, *F.C. Hoehne 1700* (Syntype: R, image seen); same data, *F.C. Hoehne 2263* (Syntype: R?, not seen).

Xylobium ecuadorensis Rolfe, Bull. Misc. Inf. Kew: 341. 1913. TYPE: ECUADOR. Canar: Naranjapata, 75 miles (= 120 km) from the coast, 305 m, 1911, *leg. J.L. Lipscomb*, fl. in cult. November 1912, Wimbledon, *Mrs. Lipscomb s.n.* (Holotype: K, image seen).

Xylobium filomenoi Schltr., Rep. Sp. Nov. Regni Veg., Beih. 9: 100. 1921. TYPE: PERU. Loreto: near Moyobamba, *Dr. S. Filomeno s.n.* (Holotype: B, destroyed).

Xylobium modestum Schltr., Rep. Sp. Nov. Regni Veg., Beih. 27: 142. 1924 *syn. nov.* TYPE: COLOMBIA. Cundinamarca: Eastern Cordillera, Rio Pescado, 1200 m, March 1922, *A. Schultze 25* (Holotype: B, destroyed).

Distribution: Jamaica; Mexico; Guatemala; Nicaragua; Costa Rica; Panama; Colombia; Ecuador; Peru; Bolivia; Brazil; French Guiana; Guyana; Venezuela.

Additional specimens examined: VENEZUELA. Sucre: El Guayabito, along Rio Guayabo, at its juncture with Rio Zumbador (future basin of Neveri Dam), 230–250 m, 20–22 November 1981, *G. Davidse & A.C. Gonzalez 19201* (MO). COLOMBIA. Antioquia: Municipio de San Luis, canyon of the Rio Claro, 300–450 m, 29 April 1984, *A. Cogollo & R. Borja 1596* (MO). Cauca: Murillo, 2 July 1853, *I.F. Holton s.n.* (NY); Murillo, 9 July 1853, *I.F. Holton s.n.* (NY). Meta: Sabanas de San Juan de Arama, left hand bank of the Rio Guejar, near the “Los Micos” landing, 500 m, 22 January 1951, *J.M. Idrobo & R.E. Schultes 1231* (GH, US); Cordillera Macarena, path between the Rio Guejar and the Cano Guapayita, 500–600 m, 20–28 December 1950, *J.M. Idrobo & R.E. Schultes 763* (US). ECUADOR. Imbabura: Playa Luisa, below Magnolia, lower Intag Valley, 1035 m, 17 September 1944, *W.B. Drew E-671* (AMES). PERU. Cajamarca: San Ignacio, San Jose de Lourdes, El Crucero, 1200 m, 8 June 1999, *C. Diaz & S. Flores 10673* (MO); Distrito Namballe, El Pacashal forest, right hand bank of Rio Canchis, 650–800 m, 10 July 1997, *E. Rodriguez & O. Pesantes 1699* (MO); Caserio Las Abejas, 690–780 m, 7 July 1997, *J. Campos & J. Pezantes 4085* (MO); Distrito Huarango, Caserio el arenal, 1100 m, 24 May 2006, *J. Perea & V. Flores 2314* (MO); San Martin to Alrededores de San Martin, 900 m, 18 May 1996, *J. Campos, R. Vasquez, A. Vasquez & P. Lopez 2808* (MO); along Rio Chichipe, between Tamborapa and San Ignacio, 500 m, 23 August 1980, *C. Luer, J. Luer, W. Koeniger & H. Koeniger 5413* (SEL). Junin: E of Quimiri, near La Merced, 800–1300 m, 1–3 June 1929, *E.P. Killip & A.C. Smith 23869* (AMES); Prov. Chanchamayo, Puntayacu, 1800 m, 1 September 1992, *O. del Castillo & D.E. Bennett 5436* (NY); Puntayacu, 1800 m, 1 September 1993, *D.E. Bennett 5436* (NY). San Martin: Prov. Lamas, to the E of San Juan de Pacayzapa (road to Moyobamba), Alonso de Alvarado, 900 m, 19 April 1973, *J. Schunke V. 5986* (NY); Moyobamba, 1100–1600 m, July 1937, *G. Klug 10113* (AMES). BOLIVIA. Santa Cruz: Prov. Nuflo de Chavez, Perseverancia, Rio Negro vicinity, tributary of the Rio Baures, 75 km S of the border of the Dept. Beni, and 150 km W of the Rio Paragua, 200 m, 16 May 1991, *B. Mostacedo & R. Foster 94* (NY).

This species has the widest distribution in the genus, found from Mexico and Jamaica to Brazil and Bolivia. It is easily recognised by its ovoid, bifoliate pseudobulbs, subaxillary, usually many-flowered inflorescences, often starry flowers colored white to yellow, with pinkish to brownish stripes on the lip sidelobes, the lip has an elliptic-obovate hypochile with a 3–5 ridged medial callus, and a small, reniform, cuneate to suborbicular, fleshy midlobe.

I cannot find any characters justifying the separation of *X. hyacinthinum*. In the sense of Dunsterville and Garay (1979) it would appear to have a shorter columnfoot and medially narrower lateral sepals. However the type material of *X. hyacinthinum* does not have these characters (which are of trivial value), and matches other material of *X. foveatum*. The combination *X. hyacinthinum* cannot be attributed to Gentil (1907) because there is no reference at all to a basionym either under *Maxillaria* or *Xylobium*. I have also added *X. modestum* to the synonymy, its

protologue offers no distinguishing features of any value. There is in LE material (images seen) cultivated by the St. Petersburg Botanical Gardens (*Hort. Petrop.*) under the name *Maxillaria hyacinthina* but none of it bears the manuscript appellation “*M. affinis*.”

Xylobium leontoglossum (Rchb.f.) Rolfe, Gard. Chron. s. 3, 5: 458. 1889.

Basionym: *Maxillaria leontoglossa* Rchb.f., Bonplandia 3: 67. 1855. TYPE: COLOMBIA. Norte de Santander [as Ocana]: San Pedro, 1830 m, *H. Wagenser s.n.* (Holotype: W-R; Isotype: G, images seen).

Heterotypic synonym: *Xylobium gracile* Schltr., Rep. Sp. Nov. Regni Veg., Beih. 8: 92. 1921. TYPE: ECUADOR. Pichincha: Nanegal, August 1871, *A. Sodiro 139* (Holotype: B, destroyed; Isotype: BR, image seen).

Xylobium squalens (Lindl.) Lindl. var. *gracile* (Schltr.) C. Schweinf., Bot. Mus. Leaf. Harv. Uni. 11: 198. 1944.

Distribution: Peru; Ecuador; Colombia; Venezuela.

Additional specimens examined: PERU. Amazonas: Prov. Bongara, Shillac, 2320 m, 12–13 September 1983, *M.L. Luna 333* (MO); Shillac, N by trail from Pedro Ruiz, 2300 m, 31 August to 2 September 1983, *D.N. Smith & S. Vasquez S. 4921* (MO); Distrito Pomacocha, on main Moyobamba to Chachapoyas road, 2330 m, 14 April 1984, *T.B. Croat 58256* (GH, MO, SEL); Pomacochas, 1985, *L. Moore s.n.* (SEL); Prov. Chachapoyas, Cerros Calla Calla, W side, 45 km above Balsas, midway on road to Leimebamba, 3100 m, 22 June 1964, *P.C. Hutchison & J.K. Wright 5803* (A); 5 km from N end of Lake Pomacocha, 2000 m, 8 October 1964, *P.C. Hutchison & J.K. Wright 6793* (AMES); Distrito Yambrasbamba, 1860–2000 m, 2 March 1967, *S.S. Tillett 673-245* (GH). Pasco: Prov. Oxapampa, 4–5 km N of Mallampampa, 2400 m, 22 January 1984, *D.N. Smith & J. Canne 5813* (MO); Huancabamba, Parque Nacional Yanachaga-Chemillen, Quebrada Diablo Fuerte, 2300 m, 31 November 2006, *A. Monteagudo, A. Pena, J.L. Mateo & R. Francis 13007* (SEL); road in construction between Oxapampa and Villa Rica, KM 7, 2100 m, 4 January 1984, *R. Foster, M. Chanco, D.N. Smith & J. Alban 7803* (F). ECUADOR. Carchi: Mira, El Carmen, Cerro Golondrinas, 2000–2400 m, 18–25 August 1994, *M. Tirado, P. Fuentes, R. Zurita & L. Chamorro 1203* (SEL). Imbabura: along trail to Rio Chalguayaco, below Magnolia, lower Intag Valley, 1495 m, 12 September 1944, *W.B. Drew E-599* (AMES). Morona-Santiago: Macasto to Guamote road, 2200 m, March 2000, *A. Hirtz, C. Luer & J. Luer 7222* (SEL). Napo: Baeza to Tena road, near Cosanga, 13 December 1976, *E.W. Davis 352* (AMES); road between Baeza and Tena, 72 km N of Archidona, 2000 m, 21 December 1979, *T.B. Croat 49588A* (NY); Santa Barbara to La Bonita road, trail towards La Bonita, 25–28 km S of Santa Barbara, along Rio Chingual, 2135–2345 m, 17 May 1982, *J.L. Luteyn, H. Balslev & B.M. Boom 8446* (NY). Pichincha: Quito, Reserva Geobotanica del Pululuha, Cerro los Reales, 2200 m, 17 March 1992, *C.E. Ceron 18560* (MO); Chiriboga to Santo Domingo road, just below Chiriboga, 1900 m, 2 June 1979, *L.B. Holm-*

Neilsen 18122 (MO); Aloag to Santo Domingo road, San Ignacio, 2000 m, 4 March 1967, *B. Sparre 14686* (MO); Chiriboga, on the road from Quito to Santo Domingo, "La Favorita" Forest Reserve, Ministry of Agriculture, near the Rio Salaya, 1600–1800 m, 5 December 1989, *C.E. Ceron, G. Benavides & E. Guzman 7919* (MO); near Rio Salante and Finca Canchacato, 2000 m, 28 October 1979, *C. Luer, J. Luer & A. Hirtz 4412* (SEL); KM 18, Nono to Nanegal, 2000 m, 20 June 1967, *C.H. Dodson, N.H. Williams & R. Adams 3729* (SEL). Sucumbios: along road between Tulcan and La Bonita, 2100 m, 13 March 1996, *S. Dalstrom, S. Ingram & K. Ferrell-Ingram 2119* (SEL). Tungurahua: 5 km W of Banos, 1850 m, 28 May 1968, *G. Harling, G. Storm & B. Strom 9887* (AMES); road S of Banos toward Riobamba, on slopes of Volcan Tungurahua, above Rio Chambo, 2300 m, 20 January 1971, *B. MacBryde 118* (AMES); Caserio Runtun, 3–4 km from Banos, 28 April 1969, *H. Lugo S. 1219* (AMES, MO). COLOMBIA. Narino: W Andes of Tuquerres, 1500–2100 m, June/July, *F.C. Lehmann 8575* (AMES, NY). Narino/Putumayo: near Laguna de la Cocha, February 1942, *R.E. Schultes s.n.* (AMES). Putumayo: Paramo de Tambillo, NE of Valle de Sibundoy, 2700–2800 m, 13–14 December 1942, *R.E. Schultes & C.E. Smith 3094* (AMES). Cauca: Cabeceras de rio Palo, Quebrada de Santo Domingo, 2640–2740 m, 15 December 1944, *J. Cuatrecasas 19366* (AMES); to the N of Volcan Purace, around Laguna de San Rafael, paramo, 3350 m, 29 January 1947, *J. Cuatrecasas 23508* (F, US); cerro above the Alto de Mira, between Tabor and Carrizales, 2100–2350 m, 23 October 1946, *J. Cuatrecasas 22445* (F); Monte La Guarida, above La Carbonera, between Las Brisas and Alban, 1950–2000 m, 16, 18, 24 October 1946, *J. Cuatrecasas 22138* (F). Valle: Municipio La Elvira, Finca Zingara, 1600–1700 m, 20 April 1989, *J.L. Luteyn, J. Giraldo & R. Ruiz 12552* (NY); La Cumbre, 1800–2100 m, 14–19 May 1922, *E.P. Killip 5581* (AMES, GH, US). Tolima: Rio Toche to "Machin," old Quindio trail, 2000–2500 m, 3 August 1922, *E.P. Killip & T.E. Hazen 9567* (AMES, NY, US). Cundinamarca: between Tequendama Falls and Santandercito, 1675–2135 m, 12 July 1961, *L.A. Garay, C.E. McClellan & A. Kapuler 220* (AMES). Caldas: Rio Santa Rita, Salento, 1600–1800 m, 26 August 1922, *E.P. Killip & T.E. Hazen 10141* (AMES). Antioquia: near Porcesito, valley of the Rio Medellin, 1100 m, 16 April 1946, *W.H. Hodge 6813* (AMES, US). VENEZUELA. Tachira: along Quebrada Agua Azul, S of El Reposo, 14 km SE of Delicias, 2150–2300 m, 22–23 July 1979, *J.A. Steyermark & R. Liesner 118479* (MO).

This attractive, commonly collected species is easily recognised by its unifoliate pseudobulbs, sublux to dense racemes, small (0.5–5.0 mm long) floral bracts, white to yellowish, rarely greenish flowers spotted purple to maroon, the lip trilobed, with a fleshy oblong midlobe densely covered with papillae and verrucae.

Though there are more than ten sheets of *X. leontoglossum* in Herbarium Reichenbach, none that had material collected by Wagener could be located (Szlachetko, pers. comm.). Therefore, I suspect the type material may be lost. It is not fully certain that the "isotype" in G is original material *per se*: it probably derives from cultivated plants that were sent by Wagener.

Xylobium miliaceum (Rchb.f.) Rolfe, Orch. Review 20: 43. 1912.

Basionym: *Maxillaria miliacea* Rchb.f., Xenia Orch. 3: 22. 1878. TYPE: BOLIVIA. La Paz: Prov. Larecaja, near Sorata, Cerro de Iminapi, on rocks at the source of the Rio Cacique, 2650 m, December 1859, *G. Mandon 1148* (Holotype: W-R 40279; Isotypes: G, K, P, images seen).

Heterotypic synonyms: *Xylobium buchtienianum* Kraenzl., Orchis 2: 129. 1908 *syn. nov.* TYPE: BOLIVIA. La Paz: Prov. Sud Yungas, Sirypaya, near Yanacachi, 2300 m, 19 December 1906, *O. Buchtien 303* (Holotype: HBG; Isotypes: AMES, US, images seen). *Xylobium medinae* Szlach. & Kolan., Phytion (Horn) 54, 1: 74. 2014 *syn. nov.* TYPE: COLOMBIA. Putumayo: Valle de Sibundoy, Vereda La Cumbre, 2300 m, fl. in cult. 29 November 2012, *R. Medina 817* (Holotype: HPUJ; photo.: MEDEL, neither seen).

Distribution: Bolivia; Peru; Ecuador; Colombia.

Additional Specimens examined: BOLIVIA. La Paz: Prov. Morillo, 30.5 km N of (below) Lago Zongo dam, trail up Jachcha Cruz, 2200 m, 16–17 December 1982, *J.C. Solomon 9088* (MO, SEL). Cochabamba: Prov. Chapare, road between Cochabamba and Villa Tunari, near Hotel Caballeros at KM 94, 21 November 1980, *T.B. Croat 51354* (MO). Santa Cruz: Prov. Florida, Parque Nacional Amboro, slopes of Los Toros, 1800–2000 m, 29–30 April 1994, *I.G. Vargas 3174* (MO, NY). Yungas, 1830 m, 1885, *H.H. Rusby 2747* (AMES, US). PERU. Puno: Prov. Carabaya, near Ollachea, 3100 m, 31 December 1947, *C. Vargas C. 6989* (AMES). Cuzco: Prov. Calca, Vilcabamba, 2550 m, 7 January 1944, *C. Vargas C. 4010* (AMES); Prov. La Convencion, Distrito Huayopata, basin of the Lucumayo, Incatambo, 2290 m, 16 November 2004, *L. Valenzuela, V. Chama, J. Latorre, J. Tito & M. Luza 4340* (SEL); Distrito Santa Teresa, Yerbabuenayoc, 2420 m, 16 September 2005, *I. Huamantupa, N. Anaya, M. Callalli, J. Tito & L. Vargas 6578* (SEL); Prov. Urubamba, Machupicchu, 2300 m, 29 November 1966, *C. Vargas C. 18333* (AMES); Machupicchu, between Winayhuayna and Intipunco, 2900 m, 26 October 1987, *P. Núñez V. 8376* (MO, NY). ECUADOR. Tungurahua: Banos, 2300 m, 9 January 1970, *L.A. Garay 1032* (AMES); Banos, Rio Pastaza, 1750 m, 15 March 1939, *C.W. Penland & R.H. Summers 84* (AMES). Napo: just W of Baeza, 1960 m, 26 October 1971, *B. MacBryde 861* (AMES).

The records from Ecuador represent a new addition to the flora of that country. It is understandable that the authors of the Colombian *X. medinae* proposed that taxon, because *X. miliaceum* was unknown from nearby Ecuador, and the flowers of some Bolivian collections are rather small (sepals *c.* 12 mm long). However the two taxa agree in all characters, and furthermore, variation was found in flower size (sepals 12–23 mm long).

The lack of published illustrations of *X. miliaceum* has probably contributed to a poor understanding of the species. The only detailed plate available is that published by Bennett and Christenson (2001). However, this figure is a bit misleading, showing a relatively dense inflorescence,

and separately, a single resupinate flower. The flowers are never resupinate, and most often the flowers are erect with the mentum pointing to the rachis, or in var. *patens*, pointing upwards.

A misprint in the protologue of *Maxillaria miliaceum* wrongly gives the type number as *Mandon 1140*, it is correctly *Mandon 1148*. The collection *Mandon 1140* is the type number of *Amblostoma densum* Rchb.f.

This species may be recognised by its bifoliate pseudobulbs, tall, lax to subaxly flowered racemes, narrowly cymbiform floral bracts, erect (mentum pointing to rachis), white to brownish-yellow flowers, often with reddish spots, the trilobed lip similarly colored but with several reddish points or verrucae on the ovate to ovate-elliptic, obtuse midlobe.

Xylobium miliaceum (Rchb.f.) Rolfe var. ***patens*** Ormerod, var. nov. TYPE: PERU. Amazonas: Prov. Bongara, on the road to La Rioja, 5 km N of the N end of Lake Pomacocha, 2000 m, 8 October 1964, leg. P.C. Hutchison & J.K. Wright 6793, 5 October 1968, cult. Univ. Calif. Bot. Gard., Acc. No. 64.1634 (Holotype: NY). Fig. 3.

Usage synonym: *Maxillaria scabrilinguis* auct. non (Lindl.) Lindl., Lindl., Edwards's Bot. Reg. 30: misc. 71, no. 66. 1844.

A *X. miliaceum* var. *miliaceum floribus patentibus* (vs. *erectis*) differt.

Terrestrial herb (?). Pseudobulbs ovoid to narrowly ovoid, bifoliate, 3.5–7.0 cm long, 1.2 cm thick. Leaves petiolate, blade narrowly to broadly oblong-lanceolate, acute, prominulously 5-veined below, 29.0–69.5 × 3.2–9.0 cm; petiole 6–29 cm long. Inflorescence erect, 24.5–32.0 cm long; peduncle 14.5–18.0 cm long; sheathing bracts 3–4, lax, slightly inflated, 2.7–3.7 cm long; rachis laxly 12–16 flowered, 10–14 cm long; floral bracts narrowly cymbiform, acute, 20–21 × 4–6 mm. Flowers with sepals pale brown externally, green internally, petals and lip green with fine brown dots, densest on lip, column white. Pedicel plus ovary clavate, 16–20 mm long. Dorsal sepal broadly oblong-cymbiform, obtuse, 5–7 veined, 19.5 × 6.0–6.5 mm. Lateral sepals obliquely broadly oblong-lanceolate, subacute, weakly falcate, 7–9 veined, 19.0–19.5 × 8–9 mm, forming with the columnfoot a right-angled, obtuse, 5–6 mm long mentum. Petals oblong-lanceolate, obtuse, 3–5 veined, 16.2–17.5 × 4.2–4.5 mm. Labellum trilobed, 13.0–13.2 × 7.3–8.0 mm; hypochile obovate; nerves inside adorned with a few verrucae, each side either truncate with an irregular apical margin, or produced into short, semi-elliptic, obtuse lobes, 8.0–8.5 × 7.3–8.0 mm; medial callus obscurely tricarinate, thickest in the upper half; epichile oblong to ovate, obtuse, upper margins raised slightly, fleshy, upper surface covered by c. 7 lines of verrucae, with some verrucae on the exterior, carinate below tip, 4.5–5.0 × 2–3 mm. Column very stout, 4.3–4.5 mm long, 3 mm wide laterally; columnfoot 4.3–4.5 mm long.

Distribution: Ecuador; Peru.

Additional specimens examined: ECUADOR. Loja, K. T. Hartweg 1172 (K-L, image seen). PERU. Junin: Prov. Satipo, Cordillera Vilcabamba, N part, E slope, upper Rio

Puyeni watershed, 2090 m, 26 June 1997, B. Boyle, M. Arakaki & H. Beltran 4682 (F).

Habitat: Wet cloud forest at base of a cliff. All surfaces heavily covered with epiphytes. Cyclanthaceae numerous in understory, 2000–2090 m (Boyle et al. 4682).

Etymology: From the Latin *patens*, meaning open, in reference to the flowers spreading away from the rachis.

I had intended to describe this plant as a new species since it seemed so different from *X. miliaceum* in its spreading (not erect) flowers. There are however no differences in the flowers. This variety was first discovered in Ecuador by Theodor Hartweg and sent to England where it was cultivated at the Royal Horticultural Society. According to Lindley (1844) this plant had dull purplish-yellow flowers. Lindley's drawing of the lip closely matches the type of var. *patens* in having produced sidelobes and a narrow midlobe.

I have only used the color notes given on the other Peruvian collection since those on the type number ("flowers cream, spotted or flecked purplish-red") probably apply to *X. leontoglossum* because the duplicate of Hutchison & Wright 6793 in AMES is clearly that taxon, easily recognised by its unifoliate pseudobulbs and small floral bracts. Duplicates of the type number should be checked first to see which taxon is present.

Xylobium pallidiflorum (W.J. Hook.) G.Nicholson, III. Dict. Gard. 4: 225. 1887.

Basionym: *Maxillaria pallidiflora* W.J. Hook., Bot. Mag. 55: t.2806. 1828. TYPE: SAINT VINCENT. Cult. Glasgow Bot. Gard., L. Guilding s.n. (Holotype: K, image seen).

Homotypic synonyms: *Colax pallidiflorum* (W.J. Hook.) A. Spreng., Tent. Suppl. Syst. Veg.: 29. 1828.

Onkeripus pallidus Raf., Fl. Tellur. 4: 42. 1838, nom. illeg.

Heterotypic synonyms: *Maxillaria stenobulbon* Klotzsch, Index Sem. Hort. Berolin. (App. Sp. Nov.): 1. 1853. TYPE: VENEZUELA. Without locality, leg. H. Wager, fl. in cult. October 1853, Hort. Berolin. Bot. Gard. s.n. (Holotype: B, destroyed).

Xylobium latifolium Schltr., Rep. Sp. Nov. Regni Veg. 27: 66. 1929. TYPE: BOLIVIA. La Paz: Hacienda Casana, on the road to Tipuani, 1400 m, 27 January 1923, O. Buchtien 7224 (Holotype: B, destroyed; Isotype: HBG, image seen).

Distribution: Nicaragua; Colombia; Ecuador; Peru; Bolivia; Brazil; Suriname (?); Venezuela; Grenada; St. Vincent; Dominica.

Additional specimens examined: NICARAGUA. Jinotega: Mt. Kilambe, 1300 m, May 1971, A.H. Heller 11831 (SEL). COLOMBIA. Cauca: highlands of Popayan, 1500–2000 m, F.C. Lehmann B.T. 110 (NY). Cesar: Sierra Nevada de Santa Marta, between Finca Risaralda and Finca Los Arroyitos, 1700–1900 m, 30 September 1972, J.H. Kirkbride 2288 (NY). ECUADOR. Carchi: around Maldonado, 1450–1650 m, 2 June 1978, M.T. Madison, T.C. Plowman, H.A. Kennedy & L. Besse 4924 (SEL); along crest of mountain behind Rio Blanco, KM 78 along railroad from Ibarra to San Lorenzo, 1400–1500 m, 14 December

1961, *C.H. Dodson & L.B. Thien 1599* (SEL). Napo: along Archidona to Coca road, KM 16, 1000–1200 m, 17 February 1990, *S. Dalstrom & L. Arnby 1355* (SEL). Pichincha: along river above Tandapi, 1500 m, no date, *C. Luer, J. Luer & A. Hirtz 2451* (SEL). Pastaza: Banos to Puyo, 1500 m, April 1991, fl. in cult., *A. Hirtz 5413* (SEL). Zamora: near KM 33, 1600 m, 11 June 1958, *C.H. Dodson 233* (SEL). Loja: KM 55, road from San Lucas to pass, near pass, 2700–3000 m, 27 September 1961, *C.H. Dodson & L.B. Thien 750* (SEL). PERU. Amazonas: Prov. Bongara, KM 350, Olmos to Jumbilla, 10 July 1957, *D.E. Bennett 1962* (SEL). Cajamarca: Prov. San Ignacio, Distrito Huarango, Caserio el arenal, 1100 m, 20 May 2006, *J. Perea & V. Flores 2246* (MO); La Palma, 10 km NW of Chirinos, *Podocarpus* forest remnant, 1780 m, 5 February 1980, *C. Diaz & C. Blaney 61189* (MO); Distrito Huarango, El Covento, 1200–1600 m, 1 July 1996, *J. Campos & E. Rodriguez 2852* (MO). San Martin: Zepelacio, near Moyobamba, 1100 m, May 1934, *G. Klug 3619* (AMES, F, MO, NY, SEL); Prov. Rioja, along Rioja to Pedro Ruiz road, 1170 m, 23 March 1998, *H. van der Werff, B. Gray, R. Vasquez & R. Rojas 15516* (MO). Huanuco: Muna, 2135 m, 23 May to 4 June 1923, *J.F. MacBride 4047* (F); near Muna, 1620 m, no date, *D.E. Bennett s.n.* (SEL); Prov. Leoncio Prado, Distrito Hermilio Valdizan, La Divisoria, 1600 m, 18 April 1980, *J. Schunke V. 11319* (MO). BOLIVIA. La Paz: Prov. Nor Yungas, 4.6 km below Yolosa, then 19.1 km on road up the Rio Huarinilla, 1700 m, 12 November 1982, *J.C. Solomon 8850* (MO, SEL). Cochabamba: San Omogre, 2000 m, fl. in cult. 24 November 1981, *M. Foster s.n.* (= *SEL 79–1970*) (SEL). VENEZUELA. Monagas: Cerro de la Cueva de Dona Anita, S of and bordering valley of Caripe, 1100 m, 7 April 1945, *J.A. Steyermark 61889* (F). DOMINICA. Valley of Pegoua River, 19 April 1940, *W.H. Hodge & B. Hodge 2973* (AMES). SAINT VINCENT. Without locality, *H.H. Smith & G.W. Smith 1422* (NY).

I am not sure this species occurs in Suriname or the Guianas, though it could be expected to occur there. Material (and also online images) so far seen has proven to be either *X. foveatum* or *X. wilhelminae*.

Xylobium pallidiflorum is easily recognised by its slender, unifoliate pseudobulbs, lax, 3–12 flowered inflorescences, yellowish to greenish flowers, with a weakly lobed white lip, the medial callus 3–5 keeled, and an oblong, elliptic to suborbicular midlobe lacking any keels or marginal thickening.

Xylobium palmifolium (Sw.) Benth. ex Fawcett, Prov. List Fl. Plants Jamaica: 39. 1893.

Basionym: *Epidendrum palmifolium* Sw., Nov. Gen. Sp. Pl. Prodr.: 123. 1788. TYPE: JAMAICA. Without locality, *O. Swartz s.n.* (Lectotype, designated by Fawcett & Rendle 1910: 115 as “Type:” BM, not seen; Isolectotypes: G, not seen; S, image seen).

Homotypic synonyms: *Dendrobium palmifolium* (Sw.) Sw., Nov. Act. Reg. Soc. Sc. Ups. 6: 82. 1799.

Maxillaria palmifolia (Sw.) Lindl., Bot. Reg. 11: sub t.897. 1825.

Colax palmifolius (Sw.) Lindl. ex Spreng., Syst. Veg. ed. 16, 3: 727. 1826.

Heterotypic synonyms: *Maxillaria decolor* Lindl., Edwards’s Bot. Reg. 18: t. 1549. 1832. TYPE: JAMAICA. Without locality, January 1831, *imp. & cult. J. Lee s.n.* (Holotype: K-L, image seen).

Pentulops discolor Raf., Fl. Tellur. 4: 42. 1838 *nom. illeg.*

Xylobium decolor (Lindl.) G. Nicholson, Ill. Dict. Gard. 4: 225. 1887.

Usage synonym: *Xylobium variegatum auct. non* (Ruiz & Pav.) Garay & Dunsterv., Stewart & Stearn, Orch. Paint. Franz Bauer: 150. 1993.

Distribution: Cuba; Jamaica; Haiti; Dominican Republic.

Additional specimen examined: JAMAICA. Mt. Moses, *JP 2315* (NY).

The figure in Stewart and Stearn (1993: 150) misidentified as *X. variegatum* is somewhat problematic in that Bauer’s careful painting clearly shows a bifoliate plant with swollen pseudobulbs much like that of *X. foveatum*, whilst the inflorescence and flowers are clearly referable to *X. palmifolium*. Since the latter two species are both known from Jamaica, it is possible the figure is an amalgam of the two. A record of *X. palmifolium* from Trinidad (Schultes, 1960) is erroneous, the specimen is *X. colleyi*.

Xylobium palmifolium may be recognised by its unifoliate, 2.5–5.0 cm tall pseudobulbs, laxly 4–12 flowered inflorescences, whitish to pale yellow flowers, with a white, entire to weakly trilobed, oblong-oblancoleate, rounded, apically recurved lip, a 5–7 ribbed medial callus, and a narrowly conical, 7–8 mm long mentum.

Xylobium stanhopeifolium Schltr., Rep. Sp. Nov. Regni Veg., Beih. 27: 84. 1924. TYPE: COLOMBIA. Putumayo: near Mocoa, 550 m, May 1921, *W. Hopp 79* (Holotype: B, destroyed).

Distribution: Colombia.

This taxon remains unknown and awaits rediscovery. It is very similar to *X. subpulchrum* but differs in having a long-petiolate leaf (20 vs. up to 5 cm). The characters of *X. stanhopeifolium* are its unifoliate pseudobulbs, long-petiolate leaf, shortly peduncled inflorescence with a short, dense raceme, and trilobed lip with a fleshy verruculose midlobe.

Xylobium subpulchrum Dressler, Orquideologia 21, 3: 310. 2000. TYPE: PERU. Huanuco: Tingo Maria, fl. in cult. June 1999, *R.L. Dressler s.n.* (Holotype: MO; Isotypes: FLAS, SEL, USM, images seen).

Usage synonyms: *Xylobium colleyi auct. non* (Batem. ex Lindl.) Rolfe, C.H. & P.M. Dodson, Icon. Pl. Trop. s.2: t. 600. 1989; R. Escobar R., Nat. Colomb. Orch. 4: 600, ph. 700. 1992; Bennett & E.A. Christenson, Icon. Orch. Peruv.: t.198. 1993; Zelenko & Bermudez, Orch. Sp. Peru: 372. 2009.

Xylobium hyacinthinum auct. non (Rchb.f.) Schltr., Fernandez, Orq. Nat. Tachira: 237. 2003.

Distribution: Peru; Ecuador; Colombia; Venezuela.

Additional specimen examined: ECUADOR. Napo: Aguarico, Reserva Etnica Huaaurani, road and oil pipeline of Maxus in construction, KM's 75–76, between Rio Tivacuño and Rio Yasuni, 250 m, 17–20 February 1994, *M. Aulestia* & *O. Gunti* 1760 (MO).

The protologue lists an isotype for AMES but no such specimen has been recorded as being lodged there, nor was it found after a thorough search. I add Venezuela to the distribution based on a photograph identified as *X. hyacinthinum* in Fernandez (2003).

The species is characterised by its unifoliate pseudobulbs, sessile to shortly petiolate leaf, shortly peduncled inflorescences with a short, dense raceme of white flowers with a red to yellowish midlobe, the lip is trilobed in its upper third, with an ovate-elliptic midlobe densely covered in verrucae.

Xylobium sulfurinum (Lemaire) Schltr., Beih. Bot. Centralbl. 36, Abt. 2: 493. 1918.

Basionym: *Maxillaria sulfurina* Lemaire, Fl. des Serres 4, 3: 330–b. 1848, non Josst 1851. TYPE: GUATEMALA. Without locality, *imp.* & *cult.* *L. B. van Houtte s.n.* (Holotype: W-R 40251, image seen).

Heterotypic synonyms: *Maxillaria hypocrita* Rchb.f., Hamb. Gart.-Blumenz. 16: 15. 1860, *syn. nov.* TYPE: Origin unknown, *cult.* *E. Stange s.n.* (Syntype: W-R 40255, image seen); *cult.* *F.W.G. Lauche s.n.* (Syntype: W-R 40255, image seen).

Xylobium hypocritum (Rchb.f.) Rolfe, Orch. Review 20: 43. 1912.

Xylobium powellii Schltr., Rep. Sp. Nov. Regni Veg., Beih. 17: 66. 1922. TYPE: PANAMA. Prov. Chiriqui, without locality, 1220 m, no date, *C.W. Powell* 117 (Holotype: B, destroyed; Lectotype [designated by Christenson, 1991: 132: AMES; Isolectotypes: K, image seen; MO [not seen]).

Xylobium sublobatum Schltr., Rep. Sp. Nov. Regni Veg., Beih. 19: 51. 1923. TYPE: COSTA RICA. San Jose, 1100 m, no date, *cult.* *Madame Amparo de Zeledon*, in *A. Tonduz* 50 (Holotype: B, destroyed; drawing AMES).

Xylobium tuerckheimii Kraenzl., Ann. Naturh. Mus. Wien 44: 325. 1930. TYPE: GUATEMALA. Alta Verapaz: road from Tactic, in the Polochictal, 2925 m, July 1878, *H. von Tuerckheim* 163 (Holotype: W-R 12948, image seen; drawing AMES).

Maxillaria pallens A. Rich. ex Soto, Icon. Orch. 10: t.1100. 2008 *pro syn.* BASIS FOR NAME: MEXICO. Veracruz: without locality, 915 m, August 1840, *H.G. Galeotti* 5148 (P, not seen).

Distribution: Mexico; Guatemala; Nicaragua; Costa Rica; Panama.

Additional specimens examined: MEXICO. Oaxaca: near Chiapam, 1160–1370 m, 29 July 1894, *E.W. Nelson* 909 (AMES). Vera Cruz: SW of Orizaba, 12 August 1937, *G.P. de Wolf* 888 (AMES); Jalapa region, Coatepec, 1000 m, 16

August 1933, *K.E.M. Oestlund* 1621 (US); near Coatepec, 1300 m, 12 August 1932, *K.E.M. Oestlund* 1046 (AMES). Chiapas: E of Ocasingo, near Finca Quexil, 1500 m, 14 July 1937, *H. von Schmeling* in *K.E.M. Oestlund* 5741 (AMES, US). GUATEMALA. Alta Verapaz: Rio Frio, 1220 m, 20 September 1920, *H. Johnson* 733 (AMES). Huebuetenango: Yalambohock, 22 August 1896, *E. Seler* 2305 (GH). Chichabae, near Tecpam, 2590 m, August 1932, *W.R. Hatch* 501 (AMES). COSTA RICA. Cartago: Santa Cruz on Volcan Turrialba, 1525 m, 26 July 1947, *G.P. de Wolf* 430 (AMES). San Jose: Tarbaca, central valley, 1400 m, 12 July 1925, *A. Alfaro* 144 (AMES). PANAMA. Chiriqui: near Boquete, Finca Collins, 1675 m, 24 July 1959, *W.L. Stern, K.L. Chambers, J.D. Dwyer & J.B. Ebinger* 1110 (AMES); Finca Lerida to Pena Blanca, 1750–2000 m, 9 July 1940, *R.E. Woodson & R.W. Schery* 534 (AMES); valley of the upper Chiriqui Viejo, near Monte Lirio, 1300–1900 m, 27 June to 13 July 1935, *R.J. Seibert* 223 (AMES); same data, *R.J. Seibert* 135 (AMES). ORIGIN DUBIOUS: (“Venezuela”), *cult.* *Missouri Bot. Gard., G.H. Pring s.n.* (MO).

A fairly commonly collected Mesoamerican species characterised by having narrowly ovoid to fusiform, unifoliate (occasionally bifoliate) pseudobulbs, erect, lax-flowered racemes, the flowers yellow, with an entire or barely lobed white lip, the apex of which is narrowed into a blunt, slightly thickened triangle, the median callus is very low, tricarinate, and easily overlooked. The lip is 7–9 veined, and in rehydrated flowers these veins can appear raised, and can thus be mistaken for low keels.

The later *Maxillaria sulfurina* Josst (Besch. Cult. Orch.: 261. 1851) is not to be confused with Lemaire's plant, the former entity is Brazilian and a synonym of *Bifrenaria racemosa* (W.J. Hook.) Lindl. *Maxillaria hypocrita* is not any different from *Xylobium sulfurinum*, and is here reduced to synonymy. A later plate by Regel (1881) of *Maxillaria hypocrita* correctly depicts a flowering plant, but the figure of the lip (f.2) which shows a four-lobed callus, belongs to another orchid. This figure may have misled later workers into thinking that *M. hypocrita* had differences in the labellum, but this is not the case.

Xylobium undulatum (Ruiz & Pav.) Rolfe, Orch. Review 20: 43. 1912.

Basionym: *Maxillaria undulata* Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 221. 1798. TYPE: PERU. Huanuco: forests of Chinchao and Muna, August/September 1786, *H. Ruiz & J. Pavon s.n.* (Holotype: MA; Iconotypes: MA, 2 paintings, images seen). Fig. 4–5.

Homotypic synonym: *Dendrobium undulatum* (Ruiz & Pav.) Pers., Syn. Pl. 2: 524. 1807, non R. Br. 1810.

Heterotypic synonyms: *Dendrobium squalens* Lindl., Bot. Reg. 9: t.732. 1823, *syn. nov.* TYPE: BRAZIL. Rio de Janeiro area, 1822, *leg. J. Forbes s.n.* (Holotype: lost). NEOTYPE: BRAZIL. Rio de Janeiro area, 1824, *leg. J. Forbes s.n.* (Neotype, here designated, K-L, image seen).

Xylobium squalens (Lindl.) Lindl., Bot. Reg. 11: sub t. 897. 1825.

Maxillaria squalens (Lindl.) W.J. Hook., Bot. Mag. 56: t. 2955. 1829.

Maxillaria squalens (Lindl.) W.J. Hook. var. *genuina* Mutel, Mem. Soc. Hist. Nat. Strasb. 3, 1: 16. 1840, *nom. illeg.*

Dendrobium squalens Lindl. var. *houttei* Ch. Morren, Hort. Belg. 2: 193. 1834. TYPE: BRAZIL. Without locality, *imp. & cult.* *L.B. van Houtte s.n.* (Holotype: lost).

Xylobium houttei Makoy ex Mutel, Mem. Soc. Hist. Nat. Strasb. 3, 1: 16. 1840, *pro syn.*

Maxillaria houttei (Ch. Morren) Josst, Besch. Cult. Orch.: 247. 1851.

Maxillaria supina Poepp. & Endl., Nov. Gen. Sp. 1: 39. 1836. TYPE: PERU. Huanuco: Pampayaco, November 1829, *E. Poeppig 1511* (Holotype: W, image seen).

Xylobium supinum (Poepp. & Endl.) Schltr., Orchis 7: 24. 1913.

Maxillaria squalens (Lindl.) W.J. Hook. var. *taffinii* Mutel, Mem. Soc. Hist. Nat. Strasb. 3, 1: 16. 1840. TYPE: BRAZIL. Without locality, *cult., sine coll. s.n.* (Holotype: lost).

Xylobium taffinii Makoy ex Mutel, Mem. Soc. Hist. Nat. Strasb. 3, 1: 16. 1840, *pro syn.*

Xylobium squalens (Lindl.) Lindl. var. *taffinii* (Mutel) Cogn., in Mart., Fl. Bras. 3, 5: 469. 1902.

Maxillaria truxillensis Rchb.f., Bonplandia 2: 17. 1854. TYPE: VENEZUELA. Trujillo: without locality, *H. Wagenser s.n.* (Holotype: W-R 40263, image seen).

Xylobium truxillense (Rchb.f.) Rolfe, Orch. Rev. 20: 43. 1912.

Maxillaria squalens (Lindl.) W.J. Hook. var. *stenopetala* Regel, Index Sem. Hort. Petrop.: 20. 1856. TYPE: BRAZIL. Without locality, *cult. Hort. Bot. Petrop. s.n.* (Holotype: lost).

Xylobium squalens (Lindl.) Lindl. var. *stenopetalum* (Regel) Cogn., in Mart., Fl. Bras. 3, 5: 469. 1902.

Maxillaria squalens (Lindl.) W.J. Hook. var. *obscura* Regel, Index Sem. Hort. Petrop.: 20. 1856. TYPE: BRAZIL. Without locality, September 1856, *cult. Hort. Bot. Petrop. s.n.* (Holotype: LE, image seen).

Xylobium squalens (Lindl.) Lindl. var. *obscurum* (Regel) Cogn., in Mart., Fl. Bras. 3, 5: 469. 1902.

Xylobium dusenii Kraenzl., Kongl. Sven. Vet. Akad. Handl. 46, 10: 65. 1911. TYPE: BRAZIL. Parana: coastal regions, March 1909, *P. K. H. Dusen 8022* (Lectotype, here designated: HBG 502092; Isolectotype: S, images seen).

Xylobium squalens (Lindl.) Lindl. var. *majus* Hoehne, Relat. Commiss. Linhas Telegr. Estrateg. Matto Grosso Amaz. 5, Bot. 9: 38. 1919, as "*major*." TYPE: BRAZIL. Mato Grosso: near waterfall of Sao Lucas, upper Rio Tapajoz, January, *J.G. Kuhlmann 111*

(Syntype: R?, not seen); same data, *J.G. Kuhlmann 112* (Syntype: R?, not seen).

Xylobium serratum D.E. Bennett & E.A. Christenson, Icon. Orch. Peruv.: t.799. 2001 *syn. nov.* TYPE: PERU. Pasco: Oxapampa, 8 km N of Villarica, 1525 m, August 1993, *leg. J. Campoverde, cult. D.E. Bennett 6030* (Holotype: lost). NEOTYPE: PERU. Pasco: Oxapampa, 8 km N of Villarica, 1525 m, August 1993, *leg. J. Campoverde, cult. D.E. Bennett 6030-1* (Neotype, designated by Trujillo, 2014: 79, as "Lectotype:" MOL spirit, image seen; Isoneotype: NY).

Xylobium ortizianum Szlach. & Kolan., Phytion (Horn) 54, 1: 78. 2014, *syn. nov.* TYPE: COLOMBIA. Meta: Parque Nacional Natural Tinigua, Rio Duda, Serrania Chamusa, Centro de Investigaciones Ecologicas La Macarena, 350 m, April 1997, *P. Stevenson 2044* (Holotype: COL, not seen; Isotype: NY).

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

Additional specimens examined: COSTA RICA. Cartago: Pejivalle, 15 May 1920, *C.H. Lankester 858* (AMES); Turrialba, 1906, *cult. New York Bot. Gard., leg. W.R. Maxon 171* (NY). COLOMBIA. Valle: Cordillera Central, La Marina, 1400 m, March 1941, *E. Dryander 2487* (US); San Marco to Sevilla, 1100 m, February 1946, *E. Dryander 2861* (F); above La Cumbre, 1800–2200 m, 14–19 May 1922, *E.P. Killip 5581* (NY); Cordillera Occidental, Pavas, 1500–1800 m, 24 & 29 September 1922, *E.P. Killip 11574* (AMES, GH, NY); same data, *E.P. Killip 11572* (AMES). Norte de Santander: Cordillera Oriental, Sarare region, El Banco, confluence of the Rio Cubugon and Rio Cobarria, 320 m, 15 November 1941, *J. Cuatrecasas 13140* (US). ECUADOR. Tungurahua: Banos, Rio Pastaza, 14 March 1939, *C.W. Penland & R.H. Summers 79* (AMES); Caserio Runtun, 3–4 km from Banos, 28 April 1969, *H. Lugo S. 1219* (AMES, MO). Morona-Santiago: W of Mision Bomboiza, road to Gualaquiza, 840 m, 30 January 1971, *B. MacBryde 172* (AMES). Pichincha: Quito, Reserva Geobotanica del Pululuhua, Cerros Los Reales, 2200 m, 17 March 1992, *C.E. Ceron 18560* (MO); Chiriboga to Santo Domingo road, just below Chiriboga, 1900 m, 2 June 1979, *L.B. Holm-Nielsen 18122* (MO); Aloag to Santo Domingo road, San Ignacio, 2000 m, 4 March 1967, *B. Sparre 14686* (MO); Chiriboga, Reserva Forestal "La Favorita," near Rio Salaya, 1600–1800 m, 5 December 1989, *C.E. Ceron, G. Benavides & E. Guzman 7919* (MO). PERU. Cajamarca: Prov. San Ignacio, Distrito Namballe, La Colmena, Paschall Tipode forest, 800–900 m, 18 December 1996, *J. Campos, P. Diaz & J. Pezantes 3169* (GH, MO, SEL); road to Caserio "Tamana," 780 m, 9 December 1977, *J. Campos & A. Pena 4793* (MO); Vega del Toro, 800–1000 m, 7 December 1997, *R. Vasquez, R. Rojas, A. Pena & E. Chavez 25102* (MO, SEL). Amazonas: near Huampami, 245 m, 18 July 1974, *R. Kayap 1213* (MO). San Martin: Zepalacio, near Moyobamba, 1200–1600 m, December 1933, *G. Klug 021* (AMES, GH, NY); Moyobamba, 1100–1600 m, July 1937, *G. Klug 10123*

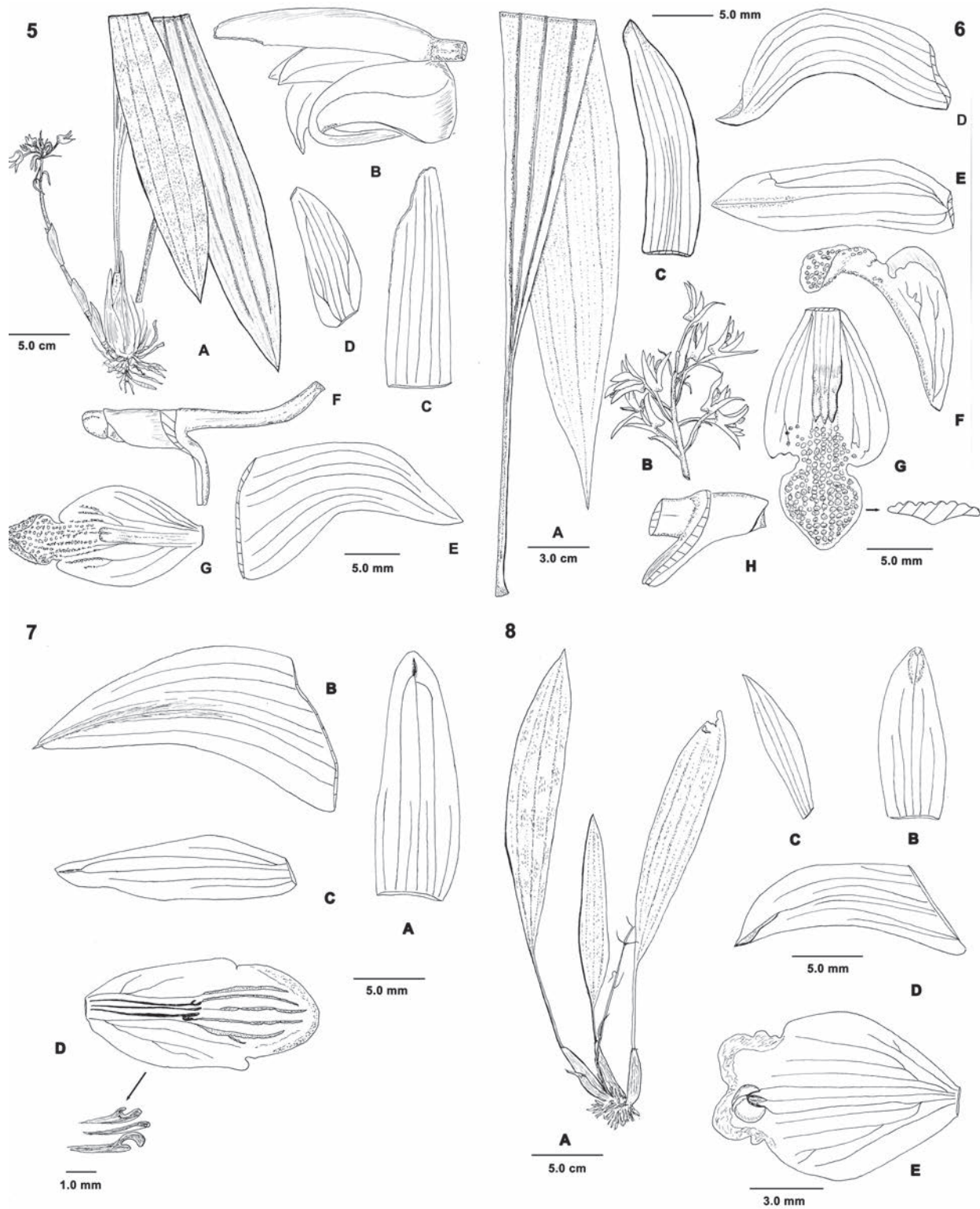


FIGURE 5. *Xylobium undulatum* (Ruiz & Pav.) Rolfe var. *undulatum*. A, plant; B, flower; C, dorsal sepal; D, petal; E, lateral sepal; F, column; G, labellum. Drawn from Killip 11574 (AMES). FIGURE 6. *Xylobium undulatum* (Ruiz & Pav.) Rolfe var. *portillae* Ormerod. A, leaf; B, rachis; C, dorsal sepal; D, lateral sepal; E, petal; FG, Labellum; H, column. Drawn from holotype. FIGURE 7. *Xylobium varicosum* (Rchb.f.) Rolfe. A, dorsal sepal; B, lateral sepal; C, petal; D, labellum (detail of callus arrowed). Drawn from Micklow s.n. (SEL). FIGURE 8. *Xylobium wilhelminae* Ormerod. A, plant; B, dorsal sepal; C, petal; D, lateral sepal; E, labellum. Drawn from holotype.

(AMES); Prov. Mariscal Caceres, Tocache Nuevo, Palo Blanco, SE of Puente, 600–700 m, 6 December 1972, *J. Schunke* V. 5680 (NY). San Martin/Loreto: near Aguaytia, 2 km E of Funda Chela, KM 209, 5 July 1959, *M.E. Mathias & D. Taylor* 3609 (MO). Loreto: Ramon Castilla, Pevas, 105 m, 14 October 1987, *R. Vasquez & N. Jaramillo* 9809 (MO). Huanuco: Tingo Maria, bank of the Rio Huallaga, 19 July 1940, *E. Asplund* 12355 (AMES). Pasco: Prov. Oxapampa, Distrito Pozuzo, Zona de amortiguamiento del Parque Nacional Yanachaga-Chemillen, Parte Alta de Puesto de Control Huampal, 1300 m, 21 July 2006, *A. Monteagudo, J.L. Mateo & R. Francis* 12471 (SEL); Gran Pajonal, trail between Chequitavo and Shumahuani, 1200–1300 m, 30 March 1984, *D.N. Smith* 6585 (MO, SEL). Ayacucho: Aina, between Huanta and Rio Apurimac, 750–1000 m, 7 & 17 May 1929, *E.P. Killip & A.C. Smith* 23165 (AMES); same data, *E.P. Killip & A.C. Smith* 22591 (AMES). BOLIVIA. La Paz: Tumupasa, 305–455 m, 10 December 1921, *O.E. White* 1105 (AMES); same data, 8 December 1921, *O.E. White* 1841 (AMES); Prov. Sud Yungas, basin of Rio Bopi, Asunta, near Evenay, 690–750 m, 27–31 July 1939, *B.A. Krukoff* 10696 (AMES, MO, NY). Beni: Prov. Ballivia, lower slopes of Serrania Pilon Lajas, 14.3 km N of the bridge over the Rio Quiquibey, 700 m, 10 June 1985, *J.C. Solomon* 13956 (MO). Cochabamba: Ayopaya, 1000 m, 21 July 2001, *I.G. Vargas* 6336 (MO). BRAZIL. Parana: Serra do Morretes, Usina Electrica Marumbi, 25 May 1966, *G. Hatschbach* 14461 (US). VENEZUELA. Anzoategui: near Estado Sucre border, near confluence of Rio Leon with Rio Zumbador, NE of Bergantin, 400–500 m, 26 February 1945, *J.A. Steyermark* 61205 (AMES). Aragua: Parque Nacional Henry Pittier, steep wet forest slopes between trail to Periquito and Finca la de Periquito, along upper slopes of tributary to Quebrada Palo Vaco, on side towards Lago Valencia, opposite Rancho Grande Biological Station, 1300–1400 m, 25 October 1961, *J.A. Steyermark* 89908 (AMES). Miranda: rainforests of the Guatope, 400–600 m, 28 November 1956, *A.L. Bernardi* s.n. (NY).

The accepted facies of the species long known as *X. squalens*, then *X. variegatum*, is of a plant with ovoid, bifoliate pseudobulbs, an inflorescence peduncle shorter or longer than the pseudobulb and covered with three relatively large inflated sheaths, topped by a dense raceme of whitish, often purplish suffused or marked flowers with a whitish to yellowish trilobed lip, and a fleshy, verrucose, purple-red midlobe. In this regard the herbarium material that forms the type of *X. undulatum* perfectly agrees with the above characters. But looking at the paintings (reproduced in Pupulin 2012b) of *X. undulatum* by Isidrio Galvez one could be forgiven for thinking that a different taxon is at hand due to the way the sheaths on the peduncle are depicted, and that the floral bracts are only faintly pencilled in. Indeed Pupulin (2102b) accepted that *X. squalens* was a separate taxon also occurring in Peru, reproducing a painting by J.G. Rivera showing the “typical” features listed above.

However the type material of *X. undulatum* matches “typical” *X. squalens*, and therefore the paintings of Galvez only look different due to artistic interpretation and do not represent another taxon. Examination of numerous Peruvian specimens also bears this conclusion out.

The variability of *X. undulatum* includes the length of the peduncle (up to 22 cm long, but generally half as short or less), the disposition and size of the peduncular sheaths, density of the raceme, flower color (white to purple, lip white, yellow to purple, with a red-purple, sometimes yellowish midlobe), and mentum length (4–9 mm long).

To the synonymy of *X. undulatum* not only have I added *X. squalens*, which does not differ in any way, but also *X. serratum* and *X. ortizianum*.

The type sheet of *Dendrobium squalens* in herbarium Lindley at Kew contains four elements, namely on the lower left an inflorescence of a plant from Forbes, flowering in 1824; on the lower right a small undated sketch of a lip, column, and pollinia; on the upper left is plate 2955 from Curtis’s Botanical Magazine of 1829; and on the right-hand side an inflorescence of *A. Mathews* 1877 (this was probably collected in the 1830’s in Peru, and is likely referable to *X. bractescens*). Since no original material survives, and the plate accompanying the protologue is rather inadequate since it lacks an analysis, I have chosen the 1824 collection of Forbes as neotype. This specimen probably represents a later flowering of the type plant.

Maxillaria truxillensis was based on material collected by Wagener in Venezuela. Dariusz Szlachetko studied the type in Vienna, and his drawings, which he kindly shared, show that it is not separate from *Xylobium undulatum*. The reduced sidelobe tips (giving the appearance of an elliptical hypochile) agree quite well with material from El Valle, Colombia. Plants later called *X. truxillense* (e.g., Dunsterville & Garay, 1979) do not agree with the type, and therefore presumably represent another taxon, material of which has not been available for study.

Xylobium serratum was described from a plant that appears to have suffered in culture, and thus has a somewhat poorly developed inflorescence. I have treated Trujillo’s (2014) lectotypification as a neotypification since the collection *Bennett* 6030-1 is not given in the protologue. The flowers of the isoneotype in NY show no differences from *X. undulatum*, and it is also apparent that the original drawing is not quite accurate in its depiction of the midlobe and the so-called serrate processes that gave the species its name.

Xylobium ortizianum was separated on account of its five-keeled median callus ending in a four-lobed mass. Upon studying the NY isotype I find a three-keeled callus overlaying five veins, whilst the apex gives the appearance of terminating in four teeth, this is because the middle tooth is divided or apically sulcate. I have observed the latter state occasionally in some other Colombian and Peruvian specimens and place no value on it.

Xylobium undulatum (Ruiz & Pav.) Rolfe var. ***portillae*** Ormerod, var. nov. TYPE: ECUADOR. Morona-Santiago: Macas, 1000 m, cult. at Ecuagenera, April 2001, *A. Hirtz* 7689 (Holotype: SEL). Fig. 6.

A *X. undulatum* (Ruiz & Pav.) Rolfe var. *undulatum* *inflorescentiis laxioribus, sepalis lateralis falcatis et verrucae labello rotundatis differt.*

Rhizome, roots, and pseudobulbs not seen. *Leaf* petiolate, blade oblong-lanceolate, acute, prominulously 3–5 veined

below, 43.8 x 5.8–6.0 cm; petiole 13 cm long. *Inflorescence* incomplete; rachis subclaxly 11–12 flowered, 5.7 cm long; floral bracts narrowly oblong-lanceolate, acute, 23 x 3.8 mm. *Flowers* with semi-spreading segments, white, lip light yellow. *Pedicel plus ovary* clavate, 18–25 mm long. *Dorsal sepal* oblong-lanceolate, acute, 7 veined, 20 x 4.5–5.0 mm. *Lateral sepals* broadly oblong-lanceolate, acute, falcate, 5 veined, midvein low carinate toward apex, 20 x 6 mm, forming with the columnfoot a slightly retrorse, obtuse, 4.5–5.0 mm long mentum. *Petals* obliquely oblong, subacute to obtuse, 3 veined, 15.5 x 4.5 mm. *Labellum* trilobed, 15.5 x 8.5 mm; hypochile obovate, with obtuse to truncate apices, the inside of which with some scattered verrucae, 9.5–10.0 x 8.5 mm; medial callus low tricarinate, thickest in upper half; epichile ovate-cordate, obtuse, densely covered by 7–9 rows of rounded verrucae (except for the very edge), the underside laxly adorned with rounded verrucae, 5.5–6.0 x 4.8 mm. *Column* short, stout, 3 mm long, 2 mm wide laterally; columnfoot straight, slightly retrorse, 4.0–4.3 mm long.

Distribution: Ecuador.

Eponymy: Named after Jose Portilla, founder of Ecuagenera, and at whose facility this variety was cultivated.

Unfortunately the material available of this distinctive variety consists only of a leaf and the upper part of an inflorescence. It differs from typical *X. undulatum* in having a laxer inflorescence, falcate lateral sepals, and rounded verrucae on the lip.

Xylobium undulatum (Ruiz & Pav.) Rolfe var. ***variegatum*** (Ruiz & Pav.) Ormerod, *comb. nov.*

Basionym: *Maxillaria variegata* Ruiz & Pav., *Syst. Veg. Fl. Peruv. Chil.* 1: 222. 1798. TYPE: PERU. Huanuco: Muna, June & September 1786, *H. Ruiz & J. Pavon s.n.* (Holotype: MA, 2 sheets; Iconotype: MA, images seen).

Homotypic synonyms: *Dendrobium variegatum* (Ruiz & Pav.) Pers., *Syn. Pl.* 2: 524. 1807.

Xylobium variegatum (Ruiz & Pav.) Garay & Dunsterv., *Venez. Orch. Ill.* 2: 342. 1961.

Heterotypic synonyms: *Dendrobium carnosum* Presl, *Reliq. Haenk.* 1: 102. 1827, *non* Teijsm. & Binn. 1853, *nec* (Blume) Rchb.f. 1861. TYPE: PERU. Huanuco: without locality, *T. Haenke s.n.* (Holotype: PR, 2 sheets, images seen).

Xylobium carnosum (Presl) Schltr., *Rep. Sp. Nov. Regni Veg.*, *Beih.* 9: 160. 1921.

Cyrtopera scabrilinguis Lindl., *Gen. Sp. Orch. Pl.*: 189. 1833. TYPE: PERU. Without locality, *H. Ruiz & J. Pavon s.n.* (Holotype: BM, image seen).

Maxillaria scabrilinguis (Lindl.) Lindl., *Edwards's Bot. Reg.* 30: misc. 71, no. 66. 1844.

Xylobium scabrilingue (Lindl.) Rolfe ex Gentil, *Pl. Cult. Serres Jard. Bot. Brux.*: 194. 1907.

Distribution: Peru.

This variety differs from typical *X. undulatum* in generally having rather taller inflorescences, due to the longer peduncle (25–30 cm vs. up to 22 cm, but with an average of 9–13 cm) and rachis (14–24 cm vs. 4–11 cm). It appears to be endemic to the Department of Huanuco.

Szlachetko et al. (2012) lectotypified *X. variegatum* with a sheet in MA, but failed to indicate which one of the two sheets present they had chosen. It would therefore seem necessary to take a second step and choose one of the sheets, but I prefer to postpone such a choice at this time. They also mention an “isolectotype” in BM, but this is actually the holotype of *Cyrtopera scabrilinguis*. The BM type of the latter does not seem to be of the same facies as the type material of *Xylobium variegatum*, so it is possible this collection represents a separate find by Ruiz and Pavon during their time in Peru.

Pupulin (2012b) reproduced the original painting of *Maxillaria variegata* by J. Brunete. Perhaps the plant illustrated was just beginning to flower because the rachis is very short, unlike the much longer ones in the type specimens.

Xylobium varicosum (Rchb.f.) Rolfe, *Mem. Torrey Bot. Club* 4: 263. 1895.

Basionym: *Maxillaria varicosa* Rchb.f., *Gard. Chron.* n.s., 20: 392. 1883. TYPE: BOLIVIA. Without locality, *leg. M. Bang, cult. T. Christy s.n.* (Holotype: W-R 41335, image seen; drawing AMES). Fig. 7.

Heterotypic synonyms: *Xylobium flavescens* Schltr., *Rep. Sp. Nov. Regni Veg.* 12: 493. 1913, *syn. nov.* TYPE: BOLIVIA. Santa Cruz: near Tres Cruces, 1500 m, February 1911, *T. Herzog 1608* (Holotype: B, destroyed; Lectotype, designated by Christenson 1996: 25; L; Isolectotypes: S, Z, images seen).

Xylobium subintegrum C. Schweinf., *Amer. Orch. Soc. Bull.* 12: 350. 1944 *syn. nov.* TYPE: PERU. Cuzco: Prov. Quispicanchis, Marcapata, Hacienda Itio, 2000 m, 27 January 1943, *C. Vargas C. 3120* (Holotype: AMES).

Distribution: Bolivia; Peru; Ecuador (?).

Additional specimens examined: BOLIVIA. La Paz: Cordillera Real Okara, 2285 m, 26–29 April 1926, *H.H. Tate 929* (NY); Yungas region. 1890, *M. Bang 573* (AMES, NY). Santa Cruz: 15 km E of Zandipata, 1500 m, fl. in cult. 24 November 1981, *F. Micklow s.n.* (= *SEL 80-976*) (SEL). PERU. Amazonas: Prov. Bongara, Distrito Sipabamba, Shilla [Shillac?], 1900 m, 5 May 1981, *K. Young & M. Eisenberg 353* (MO, SEL); above Quebrada Chacuaico, 1900 m, 7 May 1981, *K. Young, G. Eisenberg & D. La Torre 402* (NY). Cajamarca: San Ignacio, San Jose de Lourdes, base of Cerro Picorana, 2010 m, 20 January 1999, *C. Diaz, J. Yactayo, E. Palomino, C. Vargas, D. Portocarrero, M. Medina, O. Diaz & E. Zurita 10379* (GH, MO, SEL). Junin: Chanchomayo Valley, 1200 m, February 1930, *C. Schunke 1302* (F); same data, September 1924–1927, *C. Schunke 525* (F); same data, 1500 m, December 1929, *C. Schunke 1089* (F); Prov. Tarma, above La Merced on Cumbre Yucunay, near summit, 2000 m, 17 August 1957, *P.C. Hutchison 1879* (AMES); Utcuyacu, fl. in cult. Univ. Calif. Berkeley, *leg. F. Woytkowski 61* (AMES); Utcuyacu, 1900 m, 26 February 1948, *F. Woytkowski 35386* (AMES). Pasco: Prov. Oxapampa, between Oxapampa and Villa Rica, KM 7, 2100 m, 4 January 1984, *R. Foster, M. Chanco, D.N. Smith & J. Alban 7789* (F, MO, SEL); 5 km SE of Oxapampa, 1850 m, 1 February 1983, *D.N. Smith 3195* (MO, NY); Distrito

Huancabamba, Parque Nacional Yanachaga-Chemillen, Quebrada Yanachaga, 2100 m, 21 January 2005, *E. Beccera, R. Vasquez, C. Arias & A. Pena 0405* (SEL). Cuzco: Rio Marcapato, 60 km above Quincemil, 1880 m, 17 January 1973, *M.T. Madison 1009* (GH).

This species is listed from Ecuador by Dodson (2004) as *X. subintegrum*. I have not yet seen Ecuadorian material of *X. varicosum*, but it likely occurs there.

As noted above, *X. varicosum* is closest to *X. bractescens*, under which the differences are discussed. Sometimes *X. varicosum* is considered an ally of *X. pallidiflorum*, but the latter generally has longer, stick-like pseudobulbs, and its midlobe lacks lamellate keels.

Analysis of the protologue, and of images of the surviving type material of *X. flavescens* leaves no doubt it is a synonym of *X. varicosum*. However, the published illustration (Schlechter, 1930) is very misleading, showing a rhombic-oblongate, subacute lip with an elongate, thickened medial callus, and smooth keels in the upper half. Another taxon, *X. subintegrum*, is also no different from *X. varicosum*.

Xylobium varicosum may be characterised by having small (3.0–4.5 cm long), unifoliate pseudobulbs, the leaf shortly to long petiolate, the inflorescence with a 7–18 cm long peduncle, with a short (3.7–4.8 cm long), 3–8 flowered rachis, the flowers yellow-green, the entire to weakly lobed lip white to pale pinkish-orange, with brown to purplish lines on the midlobe, the medial callus is often indistinct and consists of three low keels that are most prominent apically, that are then superseded by 5–7 well-separated, irregularly dentate, low lamellae that radiate out onto the broadly rounded to emarginate midlobe.

Xylobium wilhelminae Ormerod, *sp. nov.* TYPE: SURINAME. Wilhelmina Range, near summit of hill, West Rivier, 4 km S of Juliana Top, 700 m, 1 September 1963, *H.S. Irwin, G.T. Prance, T.R. Soderstrom & N. Holmgren 55297* (Holotype: NY). Fig. 8.

Species nova singularis, pseudobulbis unifoliatis, inflorescentiis paucifloro, flores pallide lutescens, labello late obovatis, leviter trilobatis, callus subterminalis, semiglobosis.

Terrestrial herb. Rhizome short. Pseudobulbs caespitose, unifoliate, narrowly ovoid, 4.8 x 0.8 cm. Leaves petiolate, blade ligulate-lanceolate, acute, prominently 3 veined below, 14.5–21.7 x 2.0–3.5 cm; petiole 2.0–7.2 cm long. Inflorescence basal, erect, 13.5 cm long; peduncle 9 cm long; sheathing bracts 3, lax, to 1.8 cm long; rachis laxly

5–6 flowered, 4.5 cm long; floral bracts linear-lanceolate, acute, 8–14 mm long. Flowers pale yellow. Pedicel plus ovary clavate, 15 mm long. Dorsal sepal oblong-lanceolate, subacute, 5 veined, 11 x 4 mm. Lateral sepals obliquely oblong-lanceolate, acute, weakly falcate, 5–7 veined, 12 x 7.5–8.0 mm, forming with the columnfoot a c. 4.5 mm long mentum. Petals rhombic-lanceolate, acute, 3 veined, 9 x 2.5 mm. Labellum weakly trilobed, 10 x 7 mm; hypochile broadly obovate, 7.7 x 7 mm; medial callus subterminal on lip, hemispherical, singly keeled on front side; epichile transversely oblong-reniform, emarginate, 2.3 x 4.7–5.0 mm. Column short, broad, 3 mm long; columnfoot ca. 4.0–4.5 mm long.

Distribution: Suriname.

Habitat: Known to occur on a granite cliff, at 700 m.

Etymology: Named after the Wilhelmina Range, origin of the type collection.

Xylobium wilhelminae is the only species in the genus in which the medial callus is found on the epichile, rather than on the hypochile. The type material has only a single remaining flower with a fragmentary lip (part of the midlobe is missing). Because of the way this flower was pressed it has not been possible to accurately state the shape of the mentum, or decide if the ovary is circular or triquetrous in section.

The species may be recognised by its unifoliate pseudobulbs, laxly 5–6 flowered inflorescence, light yellow flowers, weakly trilobed lip with a broadly obovate hypochile, transversely oblong-reniform epichile, upon which is placed the hemispherical medial callus.

Xylobium zarumense Dodson, *Icon. Pl. Trop. s. 1, 4: t. 358*. 1980. TYPE: ECUADOR. El Oro: near Zaruma, 1300 m, 10 October 1979, *C.H. Dodson & A.L. Gentry 9234* (Holotype: SEL, image seen). Fig. 9.

Distribution: Ecuador.

Additional specimen examined: ORIGIN UNKNOWN: *ex Hort. Herrington*, 1900, *cult. New York Bot. Gard.*, 30 June 1908, *G.V. Nash 3423* (NY).

This species may be recognised by its bifoliate pseudobulbs, long-peduncled, arching to pendent, densely many-flowered inflorescences, short (4–7 mm long) floral bracts, yellowish-green to reddish-brown flowers with a whitish to yellowish lip with some yellow and red ornamentation, the sepals and petals are shortly and finely pubescent on the inner halves, their tips subacuminate, the lip strongly trilobed with a thickly fleshy, ovate, rugulose midlobe, the medial callus is 3–5 keeled, and superseded by five well-separated lines of verrucae.

EXCLUDED SPECIES

The list below is arranged in alphabetical order by basionym, and the currently accepted name is in bold print.

Bifrenaria pickiana Schltr., *Orchis* 6: 8. 1912. TYPE: COLOMBIA. Without locality, December 1910, *cult. Konigl. Berggart. Herrenhausen (Hanover) s.n.* (Holotype: B, destroyed).

Xylobium pickianum (Schltr.) L.O. Williams, *Ceiba* 4: 271. 1955.

= ***Teuscheria pickiana*** (Schltr.) Garay, *Rhodora* 61: 41. 1959.

Dendrobium longifolium Kunth, *Nov. Gen. Sp.* 1: 360. 1816. TYPE: COLOMBIA. [Cauca]: Province of Popayan, between Pitatumba and the towns of Guayacan and Almaguer, 2525 m (1380 hexap.), November, A. *Humboldt & A.J.A. Bonpland s.n.* (Holotype: lost; Neotype, here designated: VENEZUELA. [Bolivar]: Angostura [= Ciudad Bolivar], Trapiche de Don Felix Farreras, 21 April to 20 May 1800, A. *Humboldt & A.J.A. Bonpland 1067*: P 00669685; Isonotype: B-W 16988-010, images seen).

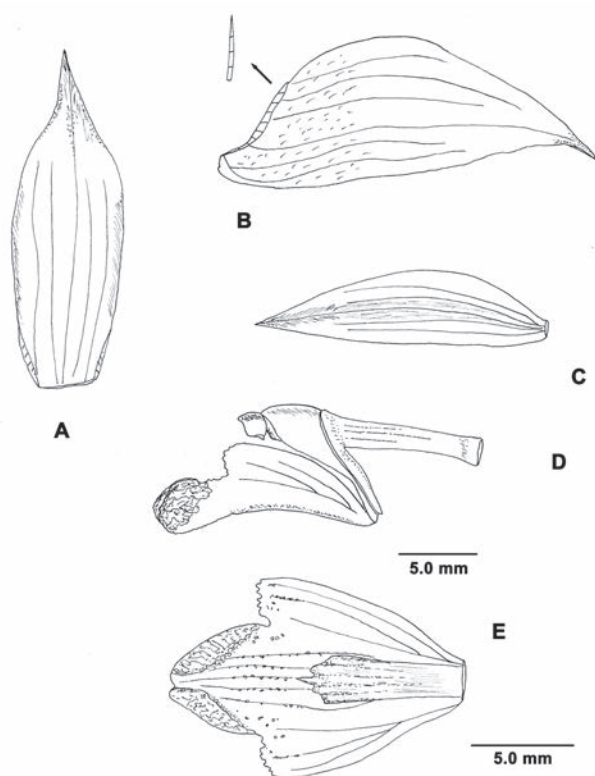


FIGURE 9. *Xylobium zarumense* Dodson. **A**, dorsal sepal; **B**, lateral sepal (trichome arrowed); **C**, petal; **D**, flower minus tepals; **E**, labellum. Drawn from Nash 3423 (NY).

Xylobium longifolium (Kunth) Lindl. ex Spreng., Syst. Veg. ed. 16, 3: 732. 1826.

Maxillaria longifolia (Kunth) Lindl., Edwards's Bot. Reg. 18: sub t.1549. 1832.

Cyrtopera longifolia (Kunth) Rchb.f., Ann. Bot. Syst. 6: 668. 1863.

Eulophia longifolia (Kunth) Schltr., Die Orchideen ed. 1: 347. 1914.

= ***Eulophia alta*** (L.) Fawc. & Rendle

Type material from Colombia of this name has not been located, and it is possible an error occurred and that the wrong locality data was published in the protologue. This is suggested by the rather high altitude given for the Colombian type, since *Eulophia alta* is generally a plant of lower altitudes (0–1300 m, rarely higher). Furthermore, the neotype proposed here has been annotated *Dendrobium longifolium* by Kunth, and it is probably the true type of the name. The ‘trapiche’ of Don Felix Farreras mentioned in the type locality is a sort of press for extracting juice from sugar cane.

Maxillaria alata Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 223. 1798. TYPE: PERU. [Junin]: on rocks near Huassa-Huassi, October & November 1779, *H. Ruiz & J. Pavon s.n.* (Holotype: lost).

Dendrobium alatum (Ruiz & Pav.) Pers., Syn. Pl. 2: 524. 1807.

Xylobium alatum (Ruiz & Pav.) Mend.-Tinc., Molinari & Carpio, Weberbauerella 1, 9: 2. 2016.

= ***Cyrtochilum bicolor*** (Ruiz & Pav.) Ormerod

Among the orchids described by Ruiz and Pavon this taxon was the only one based on fruiting material. The reason for this is likely because the pseudobulbs were edible (“edulis”) and therefore the plant had some possible use. Thus it fell under the remit of “useful knowledge” to be obtained by the Spanish in their colonies (Pupulin, 2012 a).

It seems evident that the unique edibility of this plant was pointed out by the indigenous people (see under *Maxillaria bicolor* below). Other characters mentioned in the protologue such as the lithophytic habit, compressed pseudobulbs, foot long, racemose inflorescences, and trigonous, winged capsules clearly identify this plant as a fruiting collection of *Cyrtochilum bicolor*.

Maxillaria aurantiaca A. Rich. & Galeotti, Ann. Sci. Nat. s. 3, 3: 25. 1845. TYPE: [Not cited]. Without locality, July 1844, *cult. Bot. Gard. Paris s.n.* (Holotype: P, image seen; drawing P, not seen).

Xylobium aurantiacum (A. Rich. & Galeotti) Schltr., Beih. Bot. Centralbl. 36, Abt. 2: 492. 1918.

= ***Bifrenaria aurofulva*** (W.J. Hook.) Lindl.

This species is based on material cultivated in the Botanical Garden of Paris, and was thought to have been collected by H.G. Galeotti in Mexico. However it is clearly a synonym of the Brazilian endemic *Bifrenaria aureofulva*, as already noted by the late Miguel Angel Soto on the type sheet. Galeotti did not collect in Brazil, but because he sent so many plants to the Paris Botanical Gardens, some unlabelled plants from other places were wrongly assumed to have been collected by him in Mexico. Another example is *Maxillaria galeottiana* A. Rich. & Galeotti, which is not from Mexico but a member of the endemic Brazilian *M. picta* W.J. Hook. alliance.

Maxillaria bicolor Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 224. 1798. TYPE: PERU. [Junin]: on rocks near Huassa-Huassi, November & December 1779, *H. Ruiz & J. Pavon s.n.* (Holotype: lost).

Dendrobium bicolor (Ruiz & Pav.) Pers., Syn. Pl. 2: 524. 1807, *non* Lindl. 1830.

Xylobium bicolor (Ruiz & Pav.) Mend.-Tinc., Molinari & Carpio, Weberbauerella 1, 9: 2. 2016.

= ***Cyrtochilum bicolor*** (Ruiz & Pav.) Ormerod, *comb. nov.*

Ruiz & Pavon (1798) recorded the indigenous name *zaca-zaca* (or *shaca shaca*) for this orchid, noting that the juicy pseudobulbs formed densely packed aggregations on rocks, and were frequently chewed and sucked on by local people in Huassa-Huassi. M. Arias Silva (in Zelenko & Bermudez, 2009) confirmed that the name *shaca shaca* was still applied to this species (as *Oncidium aureum* Lindl.), that the pseudobulbs were eaten, and considered a delicacy, and were now a part of Christmas celebrations.

Further information about *Maxillaria bicolor* can be gleaned from Ruiz's diary (Dahlgren, 1940: 48) of his travels in Peru. Thus “*M. bicolor*... which is called *cacca*, that means pavement, because the land is so covered with its

bulbs that it looks like a pavement placed there on purpose. These bulbs are so juicy and tender that they can be chewed very easily, and they give so much tasteless juice that six of them are sufficient to quench the thirst; the Indians do this very frequently when they pass through those places in order not to go out of their way to drink in the depths of the quebradas.”

The following excerpt from Ruiz’s diary (Dahlgren, 1940: 58) also likely refers to *M. bicolor*: “On November 24 th [1779] I went with Senor Dombey to a place called Lanco, a league and a half [= c. 15 km] from Huassa-Huassi; in this place there are so many species of orchids, and in such abundance, that it is astonishing even to look at the patterns they form on the ground with the peculiar structure of their flowers, leaves and bulbs . . . of which there are some bulbs of which we chewed and drank the juice to relieve our thirst, as did the Indians who came with us, without the need of going down to the river to drink, because their taste was pleasant and we noted no suspicious flavor.”

Thus the Quechua name, indigenous use, habitat, habit, and bicolored flowers allow *Maxillaria bicolor* to be identified as the earliest binomial for the species that has been known as *Oncidium aureum* Lindl., *Odontoglossum bicolor* Lindl., *O. dichromum* Rolfe, *O. festatum* Rchb.f., and *O. hemichrysum* Rchb.f. & Warc. As noted above, I also regard *Maxillaria alata* to be a synonym too.

No type material appears to survive of *Maxillaria bicolor*. There is however in Madrid one herbarium specimen of the species, but it is from Palca and dates from 1794. A colored drawing of this specimen [no. 112 by F. Pulgar (reproduced by Pupulin, 2012 b)] formed the types of *Odontoglossum bicolor* and *O. festatum*. The drawing accurately captures of the aspect of this species, showing the caespitose habit, bicolored flowers, and winged, trigonous capsules.

Maxillaria brachypus Rchb.f., Bot. Zeit. 10: 734. 1852. TYPE: GUATEMALA. Without locality, *J.R. Warcewicz* (Holotype: W-R 41348 image seen; drawing AMES; Isotype: K-L, image seen).

Xylobium brachypus (Rchb.f.) Hemsl., in Godm. & Salv., Biol. Centr.-Amer., Bot. 3: 252. 1883.

The identity of this species is unclear, but it does not seem to belong in *Maxillaria* or *Xylobium*. It has been treated as a synonym of *Xylobium colleyi*, which may be correct for the vegetative element of the type. However the floral element (represented by a sketch on the holotype in W-R, and a single flower in K-L, with the origin “Nicaragua” on the latter) is of an entirely different entity. It has so far not proved possible to identify the generic place of this flower, which has characters such as a rounded mentum, a lip with a relatively long, narrow, bicarinate claw that is expanded into a rather broad blade.

Maxillaria cuneiformis Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil. 1: 223. 1798. TYPE: PERU. [Huanuco]: Prov. Tarma, steep places near Acobamba and Picoy, July and August, *H. Ruiz* & *J. Pavon s.n.* (Holotype: lost).

Dendrobium cuneiforme (Ruiz & Pav.) Pers., Syn. Pl. 2: 523. 1807.

Xylobium cuneiforme (Ruiz & Pav.) Mend.-Tinc., Molinari & Carpio, Weberbauerella 1, 9: 2, 2016.

According to Pupulin (2016), Ruiz has annotated the fair copy manuscript of this species in Madrid with the comment that neither a drawing was made of it, nor was any material preserved. Whilst the type locality is in the Department of Huanuco, Ruiz (see Dahlgren, 1940) also mentions that *Maxillaria cuneiformis* was found near Huassa-Huassi [Dept. Junin] in 1779.

Regardless, knowledge of this taxon thus can only be gleaned from the brief diagnosis in the protologue, and the more extensive descriptions found in the manuscripts in MA. Possibly the plant at hand is a member of the Oncidiinae since it has cuneiform petals, an entire, cordiform lip, and ensiform, canaliculate leaves.

Maxillaria racemosa W.J. Hook., Bot. Mag. 54: t.2789. 1827. TYPE: BRAZIL. Rio de Janeiro, June 1827, *imp. & cult. R. Harrison s.n.* (Holotype: K, not seen).

Colax racemosus (W.J. Hook.) A. Spreng., Tent. Suppl. Syst. Veg.: 29. 1828.

Xylobium racemosum (W.J. Hook.) Sweet, Hort. Brit. [Sweet] ed. 2: 489. 1830.

Adipe racemosa (W.J. Hook.) Raf., Fl. Tellur. 2: 101. 1837.

Adipe fulva Raf., Fl. Tellur. 2: 101. 1837, *nom. illeg.*

Stenocoryne racemosa (W.J. Hook.) Kraenzl., Xenia Orch. 3: 142. 1896.

= **Bifrenaria racemosa** (W.J. Hook.) Lindl., Edwards’s Bot. Reg. 29: 52, sub misc. 67. 1843.

Xylobium crassifolium Kraenzl., Rep. Sp. Nov. Regni Veg. 17: 389. 1921. TYPE: Not Cited [February 1921, *cult. Bot. Gard. Hamburg s.n.*] (Holotype: HBG, image and drawing seen).

= **Xiphosium roseum** (Lindl.) Griff.

Analysis of the original description, images of the holotype, plus drawings of a floral dissection kindly provided by Dr. Dariusz Szlachetko, leave no doubt this taxon is a synonym of the Chinese species long known as *Eria rosea* Lindl. Its current generic place is debatable, but I have preferred to place it in Griffith’s genus *Xiphosium*.

Xylobium insolitum Szlach. & Kolan., Phytom (Horn) 54, 1: 73. 2014. TYPE: COLOMBIA. Norte de Santander: Municipio La Playa de Belen, Quebrada la Teneria, Area Natural Unica los Estoraques, 1600 m, 14 April 2002, *R. Galindo-Tarazona 805* (Holotype: COL; Isotype: UIS, images seen).

= **Sudamerlycaste insolita** (Szlach. & Kolan.) Ormerod, *comb. nov.*

The fascicled, uniflorous inflorescences, broad, bilobed labellum callus, erose epichile, and elongate column are all characters of the genus *Sudamerlycaste* Archila. In *Xylobium* the inflorescences are never fascicled, or uniflorous, the labellum callus is never bilobed, and the column is never elongate. Though the authors of *Xylobium insolitum* say it is 1–3 flowered, I have been unable to see this on images

of the holotype (the isotype is sterile). Though it should be noted that though *Lycaste* Lindl. and *Sudamerlycaste* are usually uniflorous, they can have two, and rarely three-flowered inflorescences.

Xylobium steyermarkii Foldats, Noved. Cient. Contrib. Ocas. Mus. Hist. Nat. La Salle, Bot. 35: 1. 1970. TYPE: VENEZUELA. Bolivar: 125 km to the S of El Dorado, 1155 m, 25 December 1963, J. A. Steyermark, G. C. K.

Dunsterville & E. Dunsterville 62185A (Holotype: VEN, image seen).

Homotypic synonym: *Bifrenaria steyermarkii* (Foldats) Garay & Dunsterv., Venez. Orch. III. 6: 56. 1976.

This is a very rare plant. The holotype in VEN is wrongly provided with a label stating it is a paratype.

According to G. A. Romero (AMES) and G. Carnevali (CICY), it is a species of an undescribed genus, which they will describe shortly.

LITERATURE CITED

- BENTHAM, G. 1881. Notes on Orchideae. J. Linn. Soc., Bot. 18: 281–360.
- BENNETT JR., D. E. AND E. A. CHRISTENSON. 2001. *Xylobium miliaceum* (Reichb.f.) Rolfe. Icon. Orch. Peruv.: t. 798.
- CHRISTENSON, E. A. 1991. Mesoamerican Orchid Studies II. Powell's Panamanian Orchidaceae. Lindleyana 6, 3: 124–132.
- . 1996. Notes on Neotropical Orchidaceae II. Lindleyana 11, 1: 12–26.
- DAHLGREN, B. E. 1940. Travels of Ruiz, Pavon, and Dombey in Peru and Chile. Bot. Ser. Field Mus. Nat. Hist. 21: 1–372.
- DODSON, C. H. 2004. Native Ecuadorian Orchids 5. *Rodriguezia* to *Zygosepalum*. Dodson Publishing, Sarasota, Florida.
- AND P. M. DODSON. 1984. *Xylobium bractescens* (Lindl.) Kranzl. Icon. Pl. Trop. s. 1, 10: t. 999.
- DUNSTERVILLE, G. C. K. AND L. A. GARAY. 1979. Orchids of Venezuela. An Illustrated Field Guide. P–Z: 695–1055. Botanical Museum, Harvard University, Cambridge, Massachusetts.
- FAWCETT, W. AND A. B. RENDLE. 1910. Flora of Jamaica 1. Orchidaceae. Trustees of the British Museum.
- FERNANDEZ, C. 2003. Orquideas Nativas de Tachira. Loteria del Tachira, Venezuela.
- GENTIL, L. 1907. Liste des Plantes Cultivees dan les Serres Chaudes et Coloniales du Jardin Botanique de L'Etat a Bruxelles. M. Weissenbruch, Brussels.
- HEMSLEY, W. 1883. *Xylobium* Lindl., in Godman and Salvin, Biol. Centr.-Amer., Bot. 3: 252.
- HOOKE, W. J. 1827. *Maxillaria racemosa*. Raceme-flowered *Maxillaria*. Bot. Mag. 54: t. 2789.
- . 1829. *Maxillaria squalens*. Dingley-flowered *Maxillaria*. Bot. Mag. 56: t.2955.
- KOLANOWSKA, M. AND D. L. SZLACHETKO. 2016. Orchids of the Department of Valle del Cauca (Colombia) 4. Vandoideae. Koeltz Scientific Books, Germany.
- KRAENZLIN, F. 1908. Neue und kritische Arten. Orchis 2: 127–129.
- LINDLEY, J. 1825. *Maxillaria harrisoniae*. Bot. Reg. 11: t. 897.
- . 1832a. *Maxillaria decolor*. Edwards's Bot. Reg. 18: t. 1549.
- . 1832b. *Maxillaria* Ruiz & Pav. in Gen. Sp. Orch. Pl.: 142–151.
- . 1844. *Maxillaria scabrilinguis*. Edwards's Bot. Reg. 30: misc. 77, no. 66.
- . 1846. Orchidaceae Lindenianae; Or, Notes Upon a Collection of Orchids Formed in Colombia and Cuba, by Mr. J. Linden. Bradbury & Evans, London.
- MISAL URRETA, G. 2005. Orquideas de la Serrania del Baudo. Choco. Colombia. Concreto S.A., Medellin.
- NICHOLSON, G. 1887. *Xylobium* Lindl. in Ill. Gard. Dict. 4: 225.
- PUPULIN, F. 2012a. The Orchidaceae of Ruiz & Pavon's "Flora Peruviana et Chilensis." A taxonomic study I. Anales Jard. Bot. Madr. 69, 1: 21–79.
- . 2012b. The Orchidaceae of Ruiz & Pavon's "Flora Peruviana et Chilensis." A taxonomic study II. Anales Jard. Bot. Madr. 69, 2: 143–186.
- . 2016. A Note on Three "new" species of *Xylobium* (Orchidaceae; Maxillariinae) from Ruiz and Pavon's Peruvian collections. Harv. Pap. Bot. 21, 2: 321–324.
- REGEL, E. 1881. *Maxillaria hypocrita* Rchb.fil. Gartenfl. 30: 259.
- ROLFE, R. A. 1889. *Xylobium leontoglossum*. Gard. Chron. Ser. 3, 5: 458.
- . 1912. The Genus *Xylobium*. Orch. Review 20: 43.
- RUIZ, H. AND J. PAVON. 1798. *Systema vegetabilum Florae Peruviana et Chilensis, characteres prodromi genericos differentiales, specierum omnium differentias, durationem, loca natalia, tempus florendi, nomina vernacula, vires et usus nonnullis illustrationibus interspersis complectens*. Typis Gabrielis de Sancha, Madrid.
- SCHLECHTER, R. 1913. Die Gattung *Xylobium* Lindl. Orchis 7: 21–24.
- . 1930. Blütenanalysen neuer Orchideen. I. Sudamerikanische Orchideen. Rep. Sp. Nov. Regni Veg., Beih. 58: Taf. 1–60.
- SCHULTES, R. E. 1960. Native Orchids of Trinidad and Tobago. Pergamon Press, New York.
- STEWART, J. AND W. T. STEARN. 1993. The Orchid Paintings of Franz Bauer. The Herbert Press, London.
- SZLACHETKO, D. L., Y. VEYRET, J. MYTNIK-EJSMONT, M. SAWICKA, P. RUTKOWSKI AND P. BARANOW. 2012. Orchids of French Guyana. A. R. G. Gantner Verlag K.G., Ruggell, Germany.
- TRUJILLO, D. 2014. Annotated List of Orchidaceae Types of the Bennett Collection at the Forestry Herbarium MOL. Lankesteriana 14, 1–88.
- WEBERBAUER, A. 1911. Die Pflanzenwelt der peruanischen Anden in ihren Grundzügen (Die Vegetation der Erde 12: 1–355).
- ZELENKO, H. AND P. BERMUDEZ. 2009. Orchids Species of Peru. Zai Publications.

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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) Rchb.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

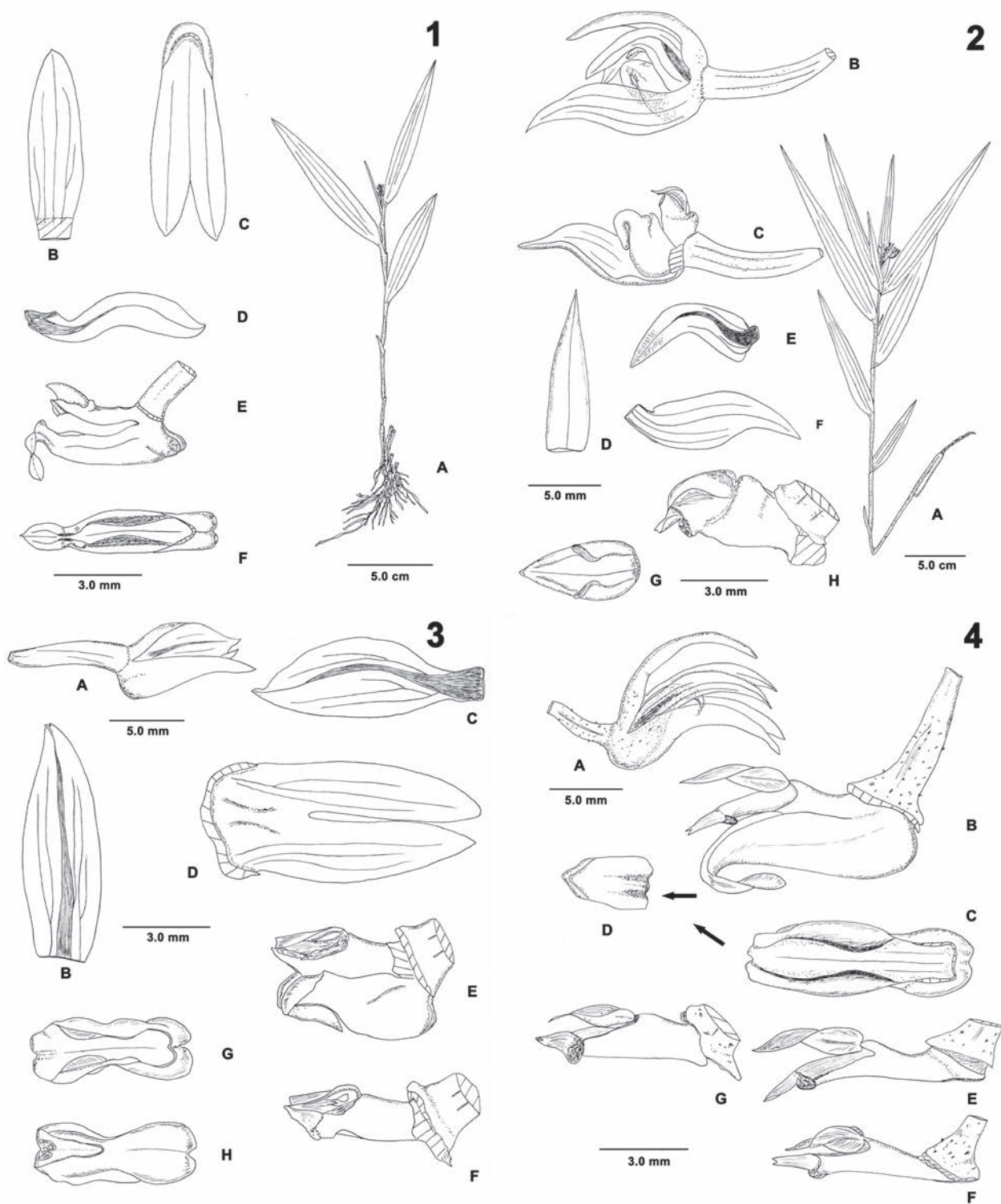
dark yellow anther cap. Pedicel plus ovary terete to clavate, sparsely furfuraceous, 4–7 mm long. Dorsal sepal ovate-elliptic to oblong-lanceolate, apex subacute, 3–5 veined, concave, sparsely furfuraceous basally, 5.5–10.0 × 2.5–3.0 mm. Lateral sepals obliquely ovate-elliptic to oblong-lanceolate, acute 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).

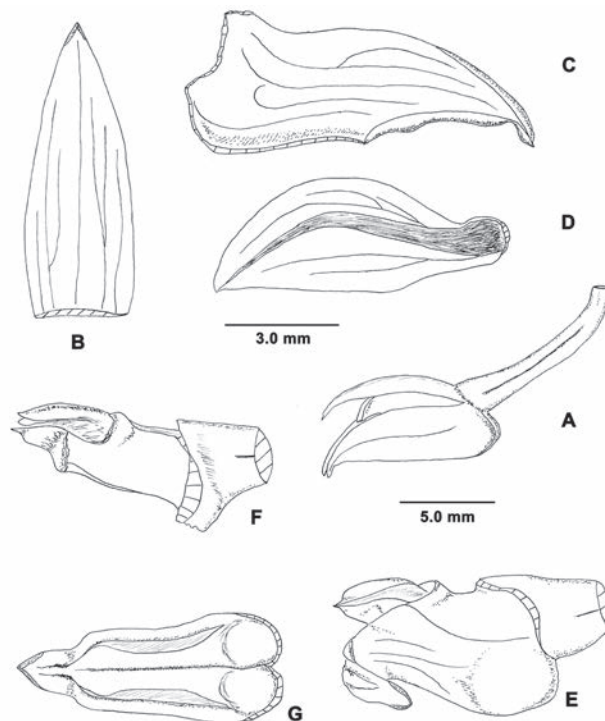


FIGURE 5. *Tropidia squamata* Blume. **A**, flower; **B**, flower minus tepals; **C**, labellum from above; **D**, labellum apex; **E–G**, columns. A–E drawn from Robinson & Kloss 6012 (K), F from Yi 56563 (L), G from Krukoff 4162 (AMES).

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.

LITERATURE CITED

- BARRETTO, G., P. CRIBB, AND S. GALE. 2011. The Wild Orchids of Hong Kong. Natural History Publications, Borneo.
- BLUME, C. L. 1858. Collection des Orchidees les plus remarquables de l'Archipel Indien et du Japon. C.G. Sulpke, Amsterdam.
- CHEN, S.-C., S. GALE, AND P. CRIBB. 2009. *Tropidia*. Pages 195–197 in Z. WU AND P. H. RAVEN, EDs. Flora of China 25: 1–570. Science Press, Beijing & Missouri Bot. Gard. Press, St. Louis.
- COMBER, J. B. 1990. Orchids of Java. Royal Botanic Gardens, Kew.
- COOTES, J. 2011. Philippine Native Orchid Species. Katha Publishing Co., Inc., Quezon City.
- DE, A. AND P. K. HAJRA. 2001. The Genus *Tropidia* in India. J. Orch. Soc. India 15, 1–2: 49–58.
- DEVA, S. AND H. B. NAITHANI. 1986. The Orchid Flora of North West Himalaya. Print & Media Associates, New Delhi.
- GOGOI, K. 2016. *Tropidia formosana* decourvete dans l'Assam, une nouvelle espece pour L'Inde. Orchidophile 116: 335–342.
- HOLTUM, R. E. 1953. A Revised Flora of Malaya 1. Orchids of Malaya. Government Printing Office, Singapore.
- HOOKE, J. D. 1890. Flora of British India 6. Orchideae to Cyperaceae. L. Reeve & Co., London.
- JAYAWEERA, D. M. A. 1980. Apostasiaceae & Orchidaceae. Pages 1–386 in M. D. DASSANAYAKE AND F. R. FOSBERG, EDs. Rev. Handb. Fl. Ceylon 2.
- KING, G. AND R. PANTLING. 1898. The Orchids of the Sikkim-Himalaya. Ann. Roy. Bot. Gard. Calcutta 8: 1–342, 448 plates.
- KUMAR, V., A. NAGESWARA RAO, AND D. K. AGRAWALA. 2015. *Tropidia namasiae* (Orchidaceae): a new distributional record for India from Manipur. Richardiana 15: 317–322.
- LECOMTE, H., ED. 1932–1934. Orchidaceae and Apostasiaceae. Flore Generale de l'Indochine 6: 142–652.
- MANSFELD, R. 1934. Orchideologische Mitteilungen. II. Rep. Sp. Nov. Regni Veg. 36: 58–64.
- MISRA, S. 2012. A new species of *Tropidia* (Orchidaceae) from Tamil Nadu, India. Nelumbo 54: 13–16.
- ORMEROD, P. 2017. Checklist of Papuanian Orchids. Nature & Travel Books, Australia.
- PEDERSEN, H. A. 2014. *Tropidia*. Pages 659–664 in T. SANTISUK AND H. BALSLEV, EDs. IN CHIEF, M. NEWMAN AND A. BARFOD, EDs. Flora of Thailand 12, 2: 303–670.
- RIDLEY, H. N. 1924. The Flora of the Malay Peninsula IV.—Monocotyledones. L. Reeve & Co., London.
- SEIDENFADEN, G. 1978. Orchid Genera in Thailand VI. Neottioideae Lindl. Dan. Bot. Ark. 33, 2: 5–1–95.
- AND T. SMITNAND. 1959. The Orchids of Thailand. A Preliminary List. 1, 1: 1–98 c. The Siam Society, Bangkok.
- SMITH, J. J. 1905. Die Orchideen von Java. E.J. Brill, Leiden.
- . 1913. Die Orchideen von Java. Dritter Nachtrag. Bull. Jard. Bot. Buitenz. Ser. 2, 9: 1–130.

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ADDITIONS TO THE GOODYERINAE (ORCHIDACEAE) OF GUYANA

PAUL ORMEROD^{1,2} AND GERMAN CARNEVALI FERNANDEZ-CONCHA^{3,4}

Abstract. Three species are added to the orchid flora of Guyana, one of which, *Aspidogyne steyermarkii* is a new record, whilst *A. reddonii* 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.

Aspidogyne 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).

We would like to thank US for loaning the material that is the basis for this study. Herbarium and library staff at the Harvard University Herbaria are thanked for their help and hospitality.

¹PO. Box 8210, Cairns 4870, Queensland, Australia

²Corresponding author: wsandave1@bigpond.com

³Herbario CICY, Centro de Investigacion Cientifica de Yucatan, Calle 43. No. 130. Col. Chuburna de Hidalgo, 92700 Merida, Yucatan, Mexico; carneval@cicy.mx

⁴Orchid Herbarium of Oakes Ames, Harvard University Herbaria, 22 Divinity Avenue, Cambridge, Massachusetts 02138, U.S.A.

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. Leaf. 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.

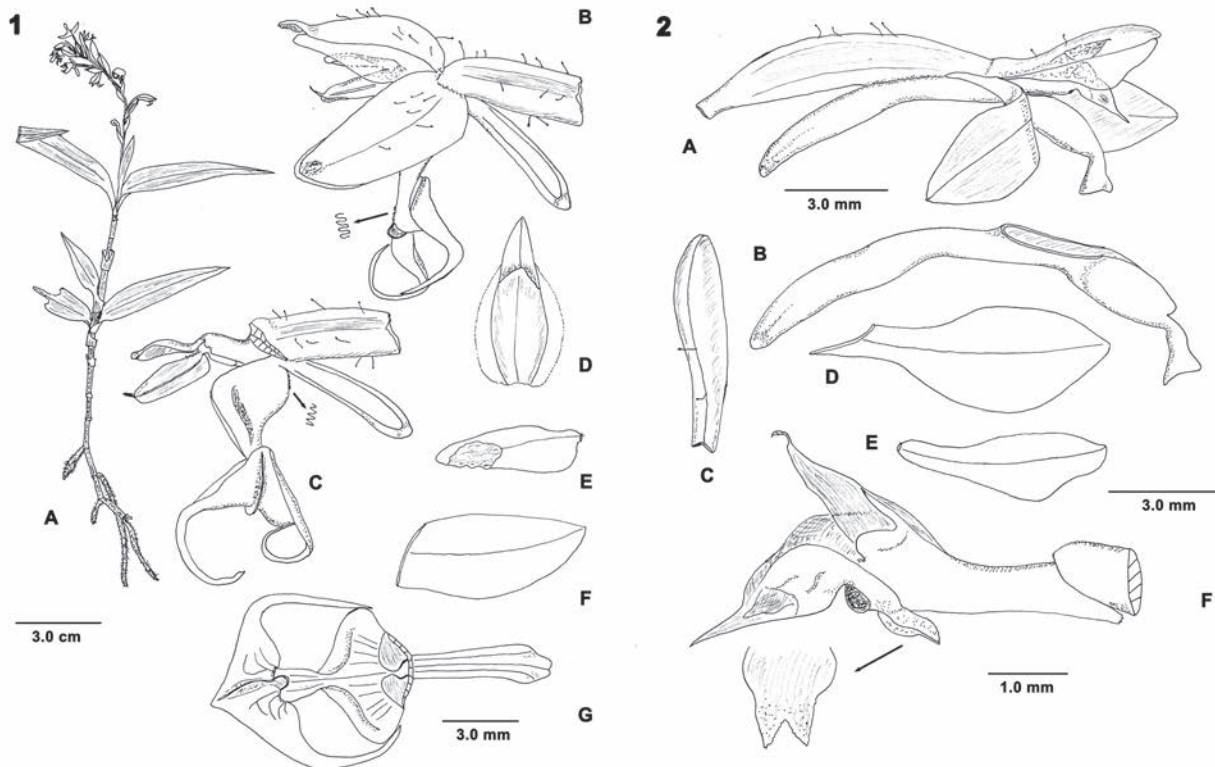
Szlachetko et al. (2016) argued that both *A. foliosa* and *A. multifoliata* occurred in the Guianas, despite the fact that Ormerod (2009) considered the two to be conspecific.

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. *Pedicele* 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. reddonii* 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. reddonii* 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. *Pedicele* 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 obdelate, 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. *Pedice*l 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, 1.5 × 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.

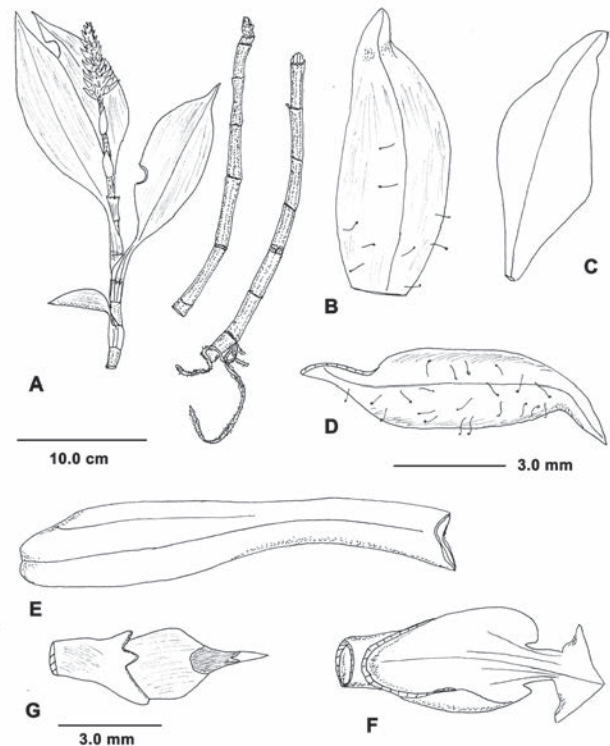


FIGURE 3. *Aspidogyne tulamengensis* Ormerod & Carnevali. A, plant; B, dorsal sepal; C, petal; D, lateral sepal; E, spur; F, labellum; G, column (ventral). Drawn from holotype.

LITERATURE CITED

- GARAY, L. A. 1977. Systematics of the Physurinae (Orchidaceae) in the New World. *Bradea* 2, 28: 191–204.
- MENEGUZZO, T. E. C. 2012. Mundunças Nomenclaturais em Goodyerinae do Novo Mundo (Orchidaceae). *Orquidario* 26, 3: 86–91.
- ORMEROD, P. 2009. Studies of Neotropical Goodyerinae (Orchidaceae) 4. *Harvard Pap. Bot.* 14, 2: 111–128.
- SZLACHETKO, D. L., M. KOLANOWSKA, S. NOWAK, AND S. VIEIRA-URIBE. 2017. In D. L. SZLACHETKO AND M. KOLANOWSKA, EDS. Materials to the orchid flora of Colombia 1. Koeltz Botanical Books, Germany.
- SZLACHETKO, D. L., S. NOWAK, P. BARANOW, AND M. KOLANOWSKA. 2016. Orchids of the Guianas (Guyana, Suriname, French Guiana) 1. Koeltz Botanical Books, Germany.

BOTANICAL PALIMPSESTS, OR ERASURE OF WOMEN IN SCIENCE: THE CASE STUDY OF MME DUGAGE DE POMMEREUL (1733–1782)

SARAH BENHARRECH¹

Abstract. While 18th-century French scientific institutions such as the Parisian academies and the *Jardin du Roi* did not accept women among their ranks, the few contributions that women made to Old Regime science have been either forgotten, erased, or attributed to their male counterparts. Mme Dugage de Pommereul's life and work (1733–1782) are a prime example. Although she gained some recognition from 1778–1780, she sank into oblivion in the 19th century when all mentions of her were gradually obliterated. She worked under the supervision of A. Thouin in 1778 and assisted her former professor A.-L. de Jussieu (1748–1836) who entrusted her with the preparation of a study of grasses and a contribution to the *Encyclopédie méthodique*. Joseph Dombey (1742–1794) dedicated the short-lived *Dugagesia margaritifera* to her. Ortega Gomez (1741–1818) awarded her a degree from the Royal Academy of Medicine in Madrid, and Linnaeus the Younger named the *Pommereulla cornucopia* in her honor. Piecing together biographical elements with archival evidence, this study provides for the first time a narrative of her life and botanical practice.

Keywords: Paris, A.-L. de Jussieu, J. Dombey, A. Thouin, *Pommereulla*

Wondering why there were so few women scientists in the past, Londa Schiebinger in *The Mind Has No Sex?* (Schiebinger, 1989) reconfigured the history of science as misogynic because scientific institutions excluded women from their ranks. She also remarked that women who attempted to engage in scientific pursuits may have been discouraged by the mechanistic turn of modern science or put off by the sexual politics deriving from Linnaean metaphorical descriptions of the sexual life of plants (Schiebinger, 1993). Focusing on women's reluctance may, however, create the impression that they had no interest in science. The first step in ascertaining if women were truly absent from fields of scientific inquiry would be to adopt a larger view that eschews concentrating on the institutions, and, as Sarah Hutton invites us to do, focusing “on only the few high-profile women who had the attendant disadvantage of ignoring their less famous colleagues” (Hutton, 2011: 22). This approach goes hand in hand with reevaluating science as it was practiced in 18th-century France and distancing ourselves from our paradigms of what constitutes the profession of scientist nowadays. The distinction between professionals and others was not well defined nor was it as prevalent as it would become in the subsequent centuries. In the feminine practice of science and its probable reluctance to cross the publication threshold, sociological factors such as rank, gender, and morals played a greater role than strictly skill-related considerations (Seguin, 2004).

However, these historical perspectives still tend to see the past as an inert matter waiting to be investigated, as much as they fail to examine it as a living historical byproduct of present times. They obscure or do not put enough emphasis on the slow erosion at work on material sources. Testimonies and evidence are lost, not only because accidents destroyed

them, but also because past and present historians did not deem them worthy to preserve. Although abstract time is commonly held responsible for the fortune of the deserving and the disappearance of the obscure, acting like a great decanter, ideology and prejudice are to blame for creating women's invisibility in science. As we shall see, a trend, akin to the process of de-feminization in science that Ann B. Shteir (Shteir, 1996) documented for female botanists in England, also occurred in 19th- and 20th-century France and led to the concerted and systematic destruction of evidence of female involvement in science. Past historians' bias not only distorted historical accounts, but also led them to select what conformed to their thesis; to transform or falsify what did not conform; or worse, to destroy evidence of the contrary.

The life and work of Mme Dugage de Pommereul will fittingly exemplify this ideological shift in historiography. It is the story of her fate in archival documents that I present here as emblematic of the deliberate erasure of a woman botanist in late 18th-century France. Mme Dugage worked under the supervision of André Thouin, the head gardener of the *Jardin du Roi*, and assisted her professor Antoine-Laurent de Jussieu. Her botanical competence was then so prized that Buffon entrusted her with a study of grasses and a contribution to the *Encyclopédie méthodique*. She rose to fame in the late 18th century. Unfortunately illness—she died of breast cancer—curtailed her endeavors, likely before she could publish. Since her death, her existence has been gradually erased from botanical works to such an extent that you will not find her name in dictionaries nor in historical works. On the basis of new evidence that I discovered in libraries and archives, I will present how 19th- and 20th-century scholars have all deliberately cast her aside, without even acknowledging her in a footnote.

I would like to express my gratitude to the following people who contributed to this study in one way or another: Alexandra Cook (University of Hong Kong) for her advice; Régine Fabri, Nicole Hanquart, and Philippe Martin for their assistance with the collections of the Botanic Garden Meise and of the Herbarium of Namur, respectively; Marc Philippe (Université Lyon 1) for generously sharing his discoveries on Mme Dugage, Antoine Monaque and Véronique Van de Pongeele for providing access to archival material held at the Bibliothèque Centrale du Muséum d'Histoire Naturelle de Paris; Florence Tessier, curator of the Botany Library at the National Museum of Natural History in Paris for her generous assistance; and Andrea Deneau, Digital Assets Manager of the Linnaean Society, for allowing use of images.

¹School of Languages, Literatures, and Cultures, 4125 Library Lane, University of Maryland, College Park, Maryland 20742, U.S.A.; sbenharr@umd.edu

BIRTH AND EARLY LIFE OF MME DUGAGE

Elisabeth-Julienne Pommereul was born on 5 July 1733 (Ille-et-Vilaine Parish Registers, Brie, 1733: 12) and baptized on the following day, in a rustic, sturdy, austere-looking manor of la Godinière near Brie, a small village near Rennes in Brittany. Her father, Guy-René Pommereul des Longrais, was a lawyer in the Breton parliament, and was a member of the minor nobility or the nobiliary plebs. Her mother, Louise-Thérèse Letort, lady of Navinal, came from a similar background, where most of the men were attorneys, seneschals, or lawyers, who lived off rural properties.²

During the years following Elisabeth's birth, three siblings would be born: Thérèse-Renée in 1735; Renée-Anne in 1736, who would die at the young age of 11; and a brother, Sébastien Marie in 1737. None of her family gained fame except for her cousin, François-René-Jean de Pommereul (1745–1823), who authored several books and served in Napoléon's imperial administration.

Little is known about Elisabeth's education except what we can glean from reviewing a few hand-written documents. She could sign her name at 13 when she sometimes accompanied her mother to their church where they would witness weddings and baptisms. Her mother ensured that her daughter would become a lady enmeshed in the social fabric of Brie. In 1747, she was the godmother of a little girl to whom she gave her first name, Elisabeth. Two years later, she was again a witness and signed "Elizabeth Daislongrais Pommereul," Fig. 1. When Elisabeth reached adulthood, her letters demonstrated a mastery of grammar and spelling superior to most writers. For instance, her spelling is far better than André Thouin's, who as the gardener who succeeded his father, never had any formal education. Her word letters are nicely shaped; her accentuation is consistent and her syntax mostly correct and bears nothing in common with the phonetic spelling of Mme Geoffrin, Mme de Graffigny, or Mme de Genlis (see Goodman, 2002). Probably Elisabeth benefited from some form of formal education, be it with a private instructor or in an institution.

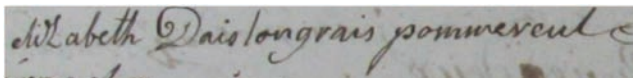


FIGURE 1. Departmental Archives of Ille et Vilaine, Brie 1749, 10 NUM 35041 100.

The eulogy that her cousin wrote for her in 1778 helps to further conjecturing about her education. Besides a few lines devoted to her beauty and modesty, from which little personal knowledge can be drawn, as these were simply mandated by social protocol, Pommereul informs us that Elisabeth was curious and showed a keen interest in the sciences, which first led her to study mathematics, then to improve her expression, style, and grammar:

"Born with all the graces of the mind and beauty, you did not disdain science, which other women seem to seek only to supplement these two gifts of nature. You only applied yourself to those with a real useful goal.

You wanted to know mathematics, and you learned them with the most peculiar ease. The study of our language and grammar did not deter you despite its tediousness" (Pommereul, 1778: v–vi).

According to her cousin, Elisabeth studied botany with the primary goal of educating the poor and superstitious Breton peasants, thereby participating in the entrepreneurial physiocratic movement that was dedicated to renovating and modernizing French agricultural practices. Brittany was an ideal candidate since its soil was known to be unfertile with its population's diet relying mostly on rye. It was also commonplace to justify the study of plants with a useful ultimate goal such as medicine or agriculture. Pommereul praised his cousin's scientific and literary knowledge, but nevertheless reassured his readers that her taste for intellectual pursuits did not diminish her femininity in any way. Never did she exhibit her knowledge, Pommereul is quick to add, no more than she transgressed the limits assigned to her gender:

"The works of these eternally famous men, who gave France its immortal glory, shared with those of the ancient Romans, the pleasure to amuse your solitude. I often saw Voltaire, Virgil, Lucretius, and Buffon on your vanity in place of a jar of blush or a patch-box, which surprised me even less than your extreme discretion that led you to hide hitherto so rare and profound knowledge" (Pommereul, 1778: vi–vii)³.

By selecting one ancient and one modern author in the epic genre and in natural history, her cousin used the four writers as metonymic figures for literature and science. The epic illustrated by Virgil author of the *Aeneid*, emulated by Voltaire with the *Henriade*, still was the most prestigious literary genre in the Enlightenment. Readers could have expected to read "Pliny the Elder," the author of the *Natural History*, as the pendant of Buffon, rather than Lucretius, whose name was used as a label for 18th-century materialist philosophy. Could he be hinting at a major influence in Elisabeth's intellectual life? Probably Pommereul divulged his own interests instead of his cousin's. The mention of Lucretius demonstrated his fine understanding of Buffon's natural philosophy. Furthermore, Pommereul had a predilection for the Epicurean Roman poet in whom he found support for his atheism that he would later make public in one of his publications.⁴

For whatever reason he may have had, his homage made

²The professions chosen by her male family members are consistent with the observations of Michel Nassiet who noted that during the 18th century, members of minor nobility gradually tended to stay away from attorneyships and seneschalships by fear of degradation, and, instead, sought parliamentary lawyerships (Nassiet: 23, 309).

³All translations from French and Latin are the author's.

⁴In 1783 he wrote an essay eloquently entitled *Recherches sur l'origine de l'esclavage religieux et politique du peuple en France* and *Contes théologiques* in an anticlerical and erotic vein. S. Maréchal listed him among the atheists in his *Dictionnaire des athées anciens et modernes* (78).

clear that Elisabeth had first chosen to study mathematics, and later botany in a context when physiocratic thought had stimulated many agronomy improvement projects since the publications of essays by Cantillon, Quesnay, and Mirabeau. In sum, Pommereul highlighted the fact that Elisabeth was an autodidact with eclectic tastes; she pursued a superior education on her own, all the while preserving appearances and decorum. A portrait corroborated by two other testimonies, with multiple references to ‘natural education.’

In the portrait of Elisabeth that her friend Lohier de La Saudraye gave in his letter to Linnaeus the Younger, he dwelt on how intuitively she acquired scientific knowledge: “As early as childhood, she was drawn to this curious part of natural history by inclination and by instinct, so to speak, she sensed the art of observation” (Lohier de La Saudraye, 1779: 431). Thanks to her innate qualities, Elisabeth was able to compete with the best experts.

“As a result, with no guidance and with no master other than nature and her own genius, without even books and without knowing any naturalist, in the middle of the countryside, she conducted all the experiments that Reaumur did, and she brought this science as far as the famous naturalist did; she even went further in some aspects” (Lohier de La Saudraye, 1779: 431).

We suspect that Elisabeth’s interest in insects was actually his own, when a few lines later, Lohier de La Saudraye requested Charles De Geer’s study of insects for his own use. Nevertheless, his portrait confirms that botany was not Mme Dugage’s first passion, yet its practice was prescribed to her as a remedy for her poor health: “After the fortunate prelude of her astonishing childhood, she devoted herself daily to botany as her health required some exercise, and has reached a point where she now outshines us all. Fortunately her youth assures a career that is just beginning” (Lohier de La Saudraye, 1779: 431). La Saudraye tends to greatly exaggerate; by no means was Elisabeth young. She was then 46, which made her an old woman by 18th-century standards. His evocation of Elisabeth’s health borrowed from well-known Rousseauist discourse on the benefits of botany as a preservative from vice and other perils of leisurely life that the philosophe developed in his *Lettres élémentaires sur la botanique* (1771–1774) to Mme Delessert’s daughter. Practicing botany involved outdoor activities that would counteract the harmful consequences of a sedentary life at a time when the famous physician from Geneva, Théodore Tronchin, advocated for daily walks. Botany was a remedy for healing the body and the soul.

Mme Necker also corroborated Elisabeth’s depiction as an autodidact when she portrayed her as a model of natural

education in a collection of essays she wrote on feminine education. She argued that meditation and attention sufficed to become learned and to assert her point, she invoked Mme Dugage’s example:

“Mme Dugage learned botany through observation and reflection, and without books; she had devised a particular method of classifying plants and memorizing them. She had acquired a commanding knowledge so that when she was loaned botanical works, she knew their content, except for words and names, and so much more that she was even able to correct the author. This proves what can be accomplished through meditation and attention” (Necker, 1798: 12).

Old Regime women were not allowed to study in any of the universities. They could not engage in any professional pursuits except a few resolutely feminine ones such as embroidery or selling articles of clothing. Acquiring knowledge as a solitary pursuit was not a voluntary decision but the only resort for women who aspired to gain advanced proficiency in any intellectual field. What Lohier de La Saudraye and Mme Necker both emphasized are the determination and the talents that distinguished Mme Dugage from her peers. Not only did she study on her own but leading botany experts also praised the competence she had acquired. This was the inexplicable and unexpected outcome in a society that had begun to value merit over the privilege of birth.

Mathematics, grammar, philology, and botany contributed to the intellectual progression of Mme Dugage. She was also proficient in Latin. In her letters to her mentor Antoine-Laurent de Jussieu, Elisabeth quoted Virgil’s *Eclagues* in a famous passage about Daphnis’s death (5, 25), which denotes classical training and a comprehension of Roman poetry. Overall, she was culturally well versed in the arts and humanities. For instance, in another letter to the same correspondent, she cited Lully and Quinault’s opera *Phaéton, tragédie en musique* (1683) (Buford, 2009: 250). In conclusion, it is evident that Elisabeth was successful at educating herself for she was knowledgeable in ancient and modern literature, Latin, mathematics, and natural history, etc. She combined a bookish education with her outdoor empirical observation of plants. In the testimonies of her contemporaries, she embodied the ideal Enlightenment education model, decisively shaped by the pedagogical perspectives that Jean-Jacques Rousseau (1712–1778) envisioned and popularized for boys. Her friends used the most flattering terms to express their admiration and to that end they drew their inspiration from the then most prestigious contemporary Enlightenment sources.

PROVINCIAL ENLIGHTENMENT

The Age of Enlightenment did not only happen in Paris and in other European capitals. French provinces also participated in the general keen interest in the sciences, the arts, and ideas. The multiplication and rise of provincial academies

have been well documented (Roche, 1989; McClellan III, 1985); much less so the contributions of so called amateurs who held a key role in the development and propagation of Enlightenment ideas beyond Parisian elite circles.⁵

⁵ We must except from the relative indifference to amateurs, the important work of Roger L. Williams (2001) who researched many little known or unknown practitioners of botany outside or at the periphery of institutional venues.

The following factual episodes will broadly sketch the scientific infatuation that seized all ranks of the cultivated French and, in particular, Elisabeth's milieu.

On 29 December 1768 Voltaire wrote a lighthearted letter graced with a few verses to thank a young woman who had sent him an "élixir de longue vie" or elixir of life, usually a recipe for a potion that promised to ensure the drinker a healthy and long life. His correspondent was Mme Renée-Anne Bichon de Pommereul from the city of Fougères (Voltaire, 1974, D15397). She was the wife of Guy-René Pommereul's half-brother, and therefore Elisabeth's aunt. No doubt this lady would cherish Voltaire's letter as a keepsake. The renowned philosopher well knew while penning his response that his letter would become the talk of the little Breton town and would be preserved as a fetish of Enlightenment luminaries. Charles-Joseph Lohier de La Saudraye, whom we mentioned earlier, was a close friend of Elisabeth. He came from a similar background, which we might call the active fringes of the Enlightenment. His elder brother, Pierre-Augustin-Marie Lohier, corresponded with the naturalist Réaumur to inform him of a curious electrical phenomenon he witnessed on a stormy day. He gave a detailed account of the shape, size, and appearance of the "luminous corpuscles" that he compared with worms, alluding to Réaumur's expertise in insects. Lohier also demonstrated a knowledge of the meteorological cause of the phenomenon, duly noting the day's weather and temperature. Refraining from giving any conclusion, the writer was content with carefully describing what he saw and counted on the naturalist to interpret the facts. Therefore, Lohier fully assumed his function of fact-collector, and left it to the scientific authorities to understand the inner workings of Nature's spectacle. In so doing, the amateur offered help to the tenants of institutional science by collecting empirical facts. In response, the Academician published the letter in the 1746 volume of the memoirs of *l'Histoire de l'Académie royale des sciences* (1751: 23–24). Natural philosophy was also a keen interest of Lohier's brother, Lohier de La Charmeraye (1720–1783), who owned a copy of the *Nova Plantarum Americanarum Genera* by Charles Plumier (FR13010, University Library of Sciences and Techniques, Bordeaux). Lohier de La Saudraye showed his entrepreneurial fiber when, in 1787, he recorded an exclusivity contract for the "manufacturing of vitriolic acid, marine acid or artificial soda" that he planned to produce in a workshop near Guérande (Partnership Agreements 1770–1790, 144 deeds registered in the notary in Paris district of Luxembourg by G. Nahon, 1995–2000, ET/XCI/1233, French National Archives, Paris, hereafter AN). As for Elisabeth's cousin, Pommereul, he published several works in natural sciences, philosophy, fine arts, and military strategy. One could object that these few scattered elements are too fragmentary to paint a decisive portrait of intellectual and scientific activities among the French provincial elite. It is indeed possible that these moments remained exceptional, but it is even more plausible that the fragments have been preserved from oblivion for the very reason that they were related to two famous people of the French Enlightenment,

Voltaire and Réaumur. If so, one should suppose an even more frequent and intense contribution of amateurs to the development of natural sciences.

In 1755, Elisabeth married François-Alexis Fresnel (Monterfil 25 October 1772–Iffendic, 25 March 1785) (Ille-et-Vilaine Parish Registers Monterfil 1722: 7; Iffendic 1752–1764: 169) Sieur Dugage, a Breton landowner and magistrate. She was 22 and still a minor; the groom was 33. Her husband came from the same social class, minor nobility, with duties in the parliamentary judicature. François-Alexis bore the title *avocat au parlement* even though there are no signs that he ever practiced law since his name was not listed on the *Tableau des avocats au parlement de Bretagne* (Anneix de Souvenel, 1755). He lived in the nearby little town of Monterfil, near Iffendic, where his father performed the duties of seneschal (judge of local affairs) during his lifetime. We do not know if the union was happy. If she had children, none of them survived her (see Accounts of the Estate of dame du Gage, Fonds de la Nicolière, ii, 133. Archives of Nantes). Fresnel Dugage would pass away alone in the manor of Iffendic in 1785. Once married, Elisabeth may have lived in Monterfil or in Rennes for a few years. She regularly visited her mother in Brie. Eight years after her wedding, she signed with her husband's name, "Mme Du Gage," but eventually she referred to herself as "Mme Du Gage de Pommereul," Fig. 2. Whatever place her husband may have held in her life, her friendship with Lohier de La Saudraye is far better documented.

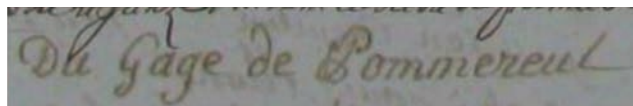


FIGURE 2. Departmental Archives of Ille et Vilaine, Brie 1767 10 NUM 35041 114.

His name constantly appears in association with Mme Dugage's. Breton born in Rennes, Lohier belonged to the same social group whose members held positions in the royal judicature and administration. While his father was a seneschal, La Saudraye was a lawyer by training. When Mme Dugage lived in Paris in the late 1770s, she referred to him as her "companion" in a letter to her professor Antoine-Laurent de Jussieu (J. Laissus, 1964: 33). 19th- and 20th-century commentators sometimes winced at the mention of this "irregular couple" (Henriet, 1932: 291) and hinted at a possible adulterous relationship. However, before casting her as a woman of ill-repute, and making a moral judgment, let us consider that his presence in Elisabeth's life is evident as early as 1763, when she attended a wedding in Brie, in his company and her mother's (Ille-et-Vilaine Parish Registers Brie, 1763: 8). In 1776, while Mme Dugage was studying botany in Paris, she welcomed Lohier's mother in her own house in Brie, where the old lady would eventually pass away. The friendship between Mme Dugage and Lohier de La Saudraye therefore encompassed the exclusive type of relationship that may join two individuals together. Personal inclinations were strengthened by ties of loyalty among Breton families of similar origins and backgrounds.

Lohier's social trajectory is especially of interest because it illustrates how the upward social mobility of Breton minor nobility and bourgeoisie significantly derived from the commercial activity of France with its colonies, and especially with Saint-Domingue, where slave-produced sugar and indigo became major sources of wealth and economic development in the 18th century. His brother,⁶ François Lohier de La Charmeraye, left the port of Nantes on 26 November 1742 to settle down in Saint-Domingue, where he entered the judicial administration of the city of Cap Français. In 1761, he was a lawyer and was promoted to the rank of first substitute of the general procurer in 1773, and counselor at the Superior Council of the same city till 1777, when at last he requested his leave from the royal administration (Archives Nationales d'outre-mer, Personnel Colonial Ancien, 1774–1783). Lohier de La Saudraye followed in his footsteps. He joined him in Saint-Domingue to serve on the council of Fort Dauphin in 1768 (Moreau de Saint-Méry, 1768: 200), then in Cap Français. In 1745, La Charmeraye married Marie Thérèse Lepelletier de la Chaize, a creole and French colon born in Saint-Domingue. The several houses that he purchased there provided him with a steady flow of income when he returned to France in 1773 (Estate inventory MC/ET/XCI/1217, AN). His social promotion was definitively validated when he married his daughter to the general procurer Viau de la Thébaudière. Social upward mobility was facilitated by widespread slavery. The indigo and sugar cane crops were profitable thanks to slave labor. Like many colons, La Charmeraye owned slaves. Several advertisements published in the newspaper the *Affiches*

américaines indicated that he searched for marooned slaves who had fled their lodgings. "Petite-Zabeth," an 18- or 20-year old, escaped in 1767; her body was easy to identify by the marks left by whipping.⁷ Seven years later, three little slave boys named Philippe, Germain, and Pierre ran away from the house of Lohier.⁸ With the colonization of Saint-Domingue came the development of colonial administration, which in turn gave new professional opportunities to the members of minor nobility in search of annuity-paying positions. It is noteworthy that none of their ancestors had the same opportunities so they stayed in Brittany, whereas La Saudraye and his brother moved to Paris after their tenures in Saint-Domingue. The close association of Breton minor nobility with the colonies and its infamous slave trade extended to the commercial development of port cities such as Le Havre, Bordeaux, or Nantes where Mme Dugage lived in the 1770s. There, she became acquainted with the Bonamy family, whose members made a name for themselves in medicine, botany, and colonial commerce. Mme Dugage's practice of botany therefore took place at the nexus of three interrelated currents. By promoting and valorizing natural philosophy, Enlightenment culture spurred the participation of amateurs or fact-collectors in the making of empirical science. Colonial exploitation of slave-run plantations prompted the dramatic rise in wealth of the Atlantic port cities of Le Havre, Lorient, and Nantes, as well as benefited the minor nobility and parliamentary bourgeoisie who found lucrative positions in the colonial administration. Lastly, botanical knowledge and collections greatly expanded with the discoveries of plants in Saint-Domingue and the Caribbean.

BOTANIZING IN PARIS

After her wedding in 1755, Mme Dugage left few traces, except for scant mentions of her in Brie and in Nantes in the circle of François Bonamy (1710–1786). We rediscover her in 1775. By then, Elisabeth Dugage de Pommereul lived in Paris. She was 42 and separated from her husband. She lodged in a garret in the Royal Botanical Garden of Paris where she diligently attended Antoine-Laurent de Jussieu's courses for at least three consecutive years, in 1775, 1776, and 1777 (S. Benharrech, in prep.) in the company of Lohier de La Saudraye. Antoine-Laurent (1745–1836) had joined his uncle in 1765 and began teaching botany in 1770. He succeeded his uncle in 1778 and also substituted for Le Monnier from 1770 till 1785 (Brongniart, 1837: 5–24; Stafleu, 1973: 198–199). During this period, Mme Dugage became acquainted with the young Joseph Dombey who was preparing his expedition to Peru, and who would always remember their friendship with fondness. Mme Dugage also met Bernard de Jussieu, André Thouin, Desfontaines, Buffon, etc.

From the time of his nomination in 1739 to his death, and especially in the years 1771 onwards, Buffon strove to expand the *Jardin du Roi* (Laissus and Torlais, 1986:

295). After the Intendant secured funds from the minister Lavrillière, Antoine-Laurent de Jussieu undertook to reconfigure the Botany School's flowerbeds according to the principals of the *méthode naturelle* that he laid out in April 1774 in his presentation to the Academy (see Jussieu, 1778: 175–197) after his uncle had implemented it in the Jardin du Trianon from 1759 onwards. The rehabilitation of the Botany School's Garden occasioned at last the belated adoption of Linnaeus's binomial system in 1775. In the following years, the surface of the Botany School's Garden was doubled, and in 1788 the School could proudly boast of 6000 plants (See Thouin, unpublished "Mémoire concernant le Jardin du roi pour sa culture avant son aggrandissement," AJ/15/503, AN). Antoine-Laurent's main project executor was André Thouin, the often overlooked yet dedicated gardener-in-chief who had succeeded his father when he was 18 (see Laissus and Torlais, 1986: 319–341).

Thouin tirelessly worked for the improvement of the Botany School's Garden. He would buy trees, review renovations, manage the staff, and keep the books. The School's Garden demanded constant care, Thouin reminded

⁶ La Saudraye had two more brothers and one sister. Pierre-Augustin-Marie Lohier, the elder (?–1801) was a lawyer in Rennes, then in Paris. Hyacinthe-Jean-Valentin Lohier du Mezeray (1727–?), also a lawyer, lived in Rennes. Their sister, Pelagie-Jeanne-Louise Lohier de La Charmeraye, resided in Paris, on Saint-Louis Street on Notre-Dame Island.

⁷ <http://www.marronnage.info/fr/lire.php?type=annonce&id=10902>

⁸ <http://www.marronnage.info/fr/lire.php?type=annonce&id=4148>

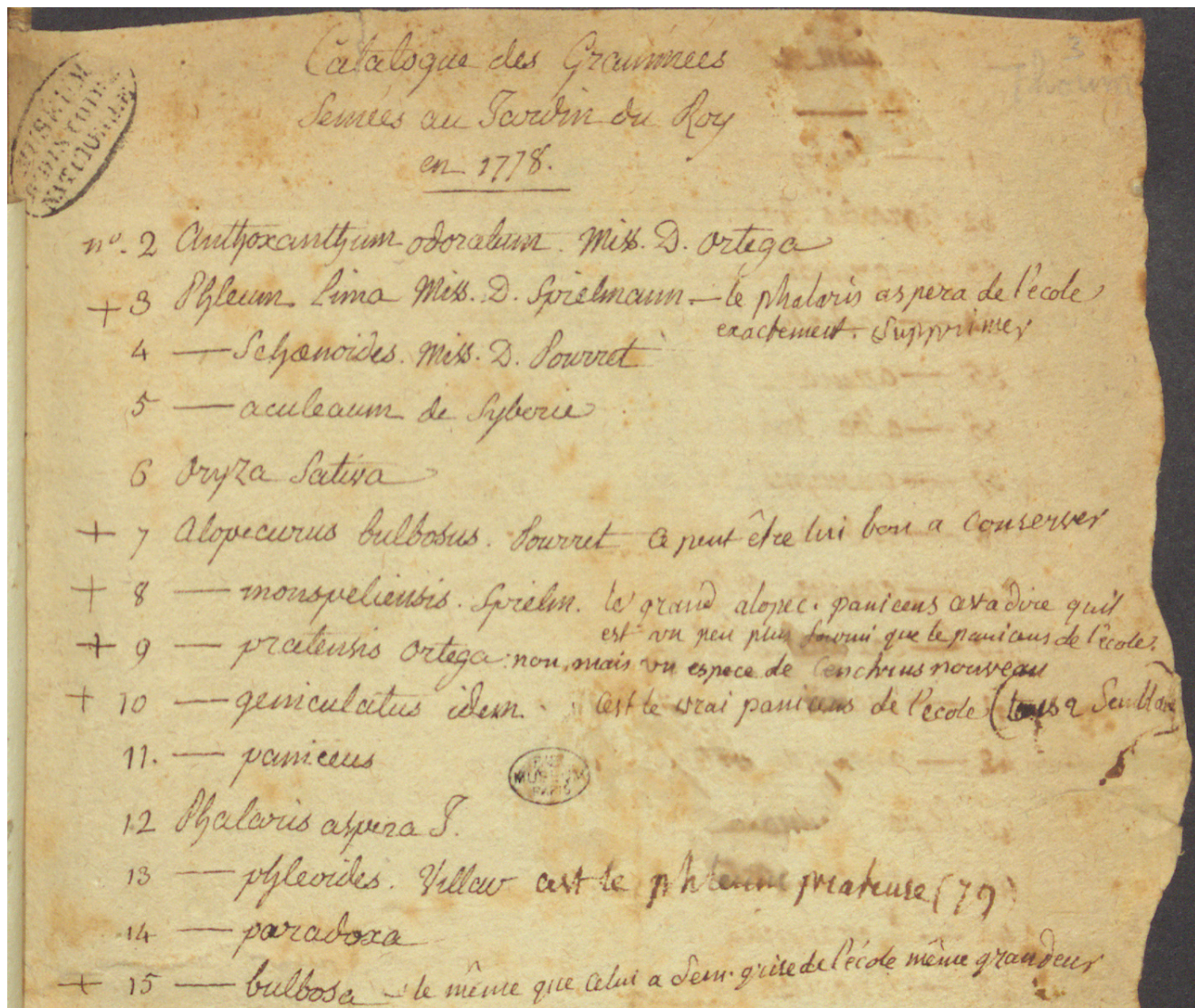


FIGURE 3. "Catalogue des graminées semées au Jardin du Roi en 1778" Ms 701, BCMNHN[©] Muséum national d'histoire naturelle. On the left, we recognize Thouin's handwriting and on the right, Mme Dugage's. Detail.

the royal administrators ("Etat des ouvriers nécessaires à l'entretien du Jardin du Roi, en cas d'acception du premier moyen," AJ/15/503, AN). In March, it was time to seed annuals outdoors and cover seeds with soil. At the end of the month, all the plants kept in the greenhouses were taken outside. In April, the second seeding of annuals occurred. Alleys and paths had to be cleared. In May, all the plants deemed useful for the School were taken outside from the heated greenhouses. In June, during the botany courses, about 2,400 pots of annuals were moved back and forth from the beds. During the whole season, seeds were collected. Gardeners watered, hoed, and raked daily. As a result, Amelot, in 1779, was proud to announce that between 1000 and 1200 students came to study botany at the School. The School's Garden was in his words "the place where scientists, foreigners, and the most honorable class of citizens meet, drawn by its pleasing location, clean air,

and pleasant walkways" ("Copie de la lettre écrite par M. Amelot à M. Necker datée à Versailles le 24 août 1779," AJ/15/513: 530, AN). Despite insufficient funding, the School's Garden was a work of love spurred by Jussieu and Thouin, shouldered by a group of amateurs dedicated to the cause of the advancement of botany. Mme Dugage was one of them.

In 1777 or 1778, Thouin gave Mme Dugage her first known assignment. In the Archives of the Museum lies a document entitled "Catalogue of the grasses sown in the Royal Garden in 1778" (Ms 701, Bibliothèque centrale of the Natural History Museum, Paris hereafter BCMNHN; Fig. 3). André Thouin composed the list, on which someone added comments. A careful examination of the handwriting of the anonymous commentator proves that Mme Dugage, whose writing style we know from her letters to Linnaeus the Younger, penned these notes. Her way of forming the

Liste des Seules Graminées qui ont fleuri cette
année 1778. dans la pépinière & quelques autres
de l'école ou couches

| | | |
|------|---|--|
| no 5 | n'est qu'une répétition du <i>phalaris aspera</i> | peut être <u>Supprimé</u> |
| 7 | <i>alopecurus bulbosus</i> nouvelle esp. | bonne à <u>Conserver</u> |
| 8 | — <i>mousetieris</i> | un peu plus fourré que le panicéus |
| 9 | — <i>prat. falsè.</i> | C'est bien une n ^{lle} espèce de <i>Cenchrus</i> <u>conserver</u> |
| 10 | — <i>geniculatus</i> Fabrè | c'est le <i>panicéus</i> de l'école. |
| 15 | <i>phalaris bulbosa</i> Fabrè | { C'est le même que celui à semence grise de l'école. à épis plus menus que le <i>canariensis</i> , à <u>Suppr</u> idem idem idem idem beaucoup plus petit. idem grand comme école } |
| 17 | — | |
| 19 | — <i>aquatica</i> Fabrè | |
| 21 | — <i>tridentata</i> | |
| 23 | — | |
| 24 | — | |
| 34 | <i>agrostis radiata</i> | c'est le <i>Cynosurus bernunderis</i> de l'école id ^e . |
| 35 | — <i>arenaria</i> | <i>andropogon fasciculatum</i> Linn ^e <u>Supprimer</u> |
| 37 | — <i>fabrè</i> | <i>agrostis mutique</i> bon à mettre en parallèle avec le <i>capillaris</i> de l'école p ^r la proch ^e année |

FIGURE 4. "Liste des Seules Graminées qui ont fleuri cette année 1778 dans la pépinière ou quelqu'autre de l'école ou couches," Ms 1389 BCMNHN © Muséum national d'histoire naturelle. Detail.

lowercase letters "b," "p," "s," "r," and "t" signs her writing style. She later provided a clean copy of the same comments in the "List of only the grasses that bloomed this year of 1778 in the nursery and in any of the School's beds" (Ms 1389, BCMNHN; fig. 4).⁹

This document gives us the rare opportunity to peek into the skilled activity of a botanical amateur: how she fulfilled the task assigned to her, and how she humbly stated her opinion. Both documents reveal her determination to make herself helpful and dependable.

Thouin asked her to inventory all the grasses that grew in the School's beds and greenhouses from the seeds that he kept accumulating in his office. This task involved identifying plants and deciding whether to save them or dispose of them in order to avoid duplicates. Mme Dugage added

notes to Thouin's list that recorded 228 samples of grasses. Compiling the inventory was made all the more difficult as seeds were occasionally mixed up and were often identified with temporary names. Thouin had established a large network of correspondents with whom he exchanged seeds (see Spary, 2000: 49–98). Most of the samples came by mail with a simple tentative identification, sometimes just bearing the name of the donor, sometimes both. Other plants came from Thouin's botanizing excursions to areas surrounding Paris. Mme Dugage was expected to sort vast quantities of seeds and plants. A difficult assignment, Desfontaines reminds us, because of the "unavoidable mistakes that are made every year in the Botany School, either because of the seeds spreading from one place to another, or by misplacing tags, or other mishaps" (Desfontaines, 1815: vi). To carry

⁹ Until now the authorship of this document has been solely attributed to Thouin (Letouzey, 1989: 98; Kobayashi, 2012: 82) even though his handwriting greatly differs from hers.

out her task, Mme Dugage had access to references in the Botanical Garden's library, especially the herbaria of Vaillant, Jussieu, and Tournefort.

In the 8-page document, Thouin gave each batch of seedlings a number. In total, the "Catalogue" numbered 228 specimens of grasses. The Botanical Garden's collections of seeds were certainly more extensive than what is provided in this list, since seeds did not always germinate and grow, and identification and description had sometimes to be postponed. For this reason, Mme Dugage mentioned that she added the seeds of grasses that bloomed that year except those from which she could sample only one spike. For those, she would differ her study till the following year. Each specimen is named in French or in Latin, on the model of binomial nomenclature, followed by a proper name. Abbreviated proper names are in some cases preceded with the precision in Latin *missa/missum de* "sent by," which means that those seeds came from the network of Thouin's correspondents. The numbering was an inventory tool. Upon receipt of seeds, Thouin probably gave each consignment a number that he carefully copied on tags in the School's nursery and flowerbeds to bind together the donor, the tentative identification, the seeds, and the plants in their grown forms. The goal was twofold: catalogue all the donations and verify—or establish—the determinations. Other proper names seem to indicate that the plant had been identified as such by the botanist who sent it. However, in most cases, it is likely that proper names revealed the identity of the sender as well as the author of the identification. For instance, number 15, "*Hordeum vulgare coeleste* M^d. du Gag" (probable syn. of *Hordeum vulgare* L. *Sp. Pl.* 85 1753) could either mean that the specimen was a gift from Mme Dugage or that she suggested the identification of *Hordeum vulgare coeleste*, or both.

As this document shows, Thouin received seeds and plants from Casimir Ortega, Pierre-André Pourret (1754–1818), Antoine Gouan (1733–1821), Jakob Reinbold Spielmann (1722–1783), Dominique Villard (1745–1814), Carlo Allioni (1728–1804), and many others. "When Thouin's correspondents requested species from him, they relied upon such inscriptions, increasingly the Linnaean binomial nomenclature, to communicate. Sometimes a full-length description was given, always in highly stylized form" (Spary, 2000: 80). In the 1778 "Catalogue," Mme Dugage is responsible for identification by comparing the newly acquired plants with the specimens kept at the Botany School. It was also her responsibility to organize the specimens, eliminate any duplicate plants that were already in the School's collections. In many cases, Mme Dugage gave priority to the School's Garden plants over the newly acquired species. For instance, number 3, "*Phleum lima*" sent by Spielmann is identical to "the School's *Phalaris aspera* exactly" that is number 12. So she decided to "eliminate" the first one. Elsewhere, she corrected a few determinations. A specimen of *Alopecurus pratensis* (*Alopecurus pratensis* L. *Sp. Pl.* 60 1753) identified as such by Ortega is, according to Mme Dugage, "a species of *Cenchrus* new." In other instances, she evaluated the specimens' specific value, and *in fine* determined whether

or not the School should keep them. Number 63, the *Holcus lanatus* (*Holcus lanatus* L. *Sp. Pl.* 1048 1753) "looks like the *Halepensis* but without any awn." Later she added: "it grew some, that's it." As she observed the grasses through the successive stages of vegetative growth, she reviewed and amended her first evaluations. At first glance, she declared about number 40, "*Agrostis capillaris* id. [Ortega]," "it seems to me true (mutic)" and identical to the School's specimen, but upon second glance, she noticed a slight difference: "imperceptibly different from the School's," so she opted for saving it: "good to keep." Any variation deserved to be inventoried. She held the School's pedagogical mission close to her heart, as seen in her remarks concerning the number 35, "*Agrostis arenaria* D. Gouan" (= *Agrostis arenaria* Gouan, syn. of *Sporobolus pungens* (Schreb.) Kunth): "It is true mutic *Agrostis*." On second examination, "it should be kept in tandem with the *capillaris*." Again with the *Panicum lineare* (*Panicum lineare* L. *Sp. Pl.* ed 2 85 1762, syn. of *Cynodon dactylon* (L.) Pers.) from Spielmann, she declared it another species, the *Panicum sanguinale*. Yet, she recommended saving it because of the variation in the length of the leaves. Mme Dugage first recognized in the *Bromus distachios* (= *Bromus distachyos* L. syn. of *Brachypodium distachyon* (L.) P.Beauv.) from Pourret, number 131, "the School's *Bromus phallaroides*, entirely similar to the tall one." In the "Liste" (Ms 1389, BCMNHN), she thought it over and opted for saving the specimen because it was identical to the plant registered the previous year as the *B. phallaroides*. However, the plant that grew in 1778 showed varietal differences: "It is the School's 1777 *Phallaroides*. But this year's looked like a dwarf variety. Both should be saved for comparison." For identification purposes, Mme Dugage consulted Jussieu's and Rousseau's herbaria in the Garden's collections. Number 158, mailed by Ortega as a *Festuca maritima* (*Festuca maritima* L.), was identified as the "*Cyn.[osurus] lima* des Herbiers Jussieu" (probably *Cynosurus lima* L., syn. of *Wangenheimia lima* (L.) Trin.). In the "Liste" (Ms 1389 BCMNHN), Mme Dugage added the comment: "new species: to be saved." In another instance, number 122, listed by Thouin under the name "*Secale reptans* Sibérie" has its identification confirmed when compared with dried specimens donated by Rousseau. When in doubt, Mme Dugage referred to Thouin's authority and in some instances she left quotation marks. Another difficulty arose from the fact that at the School and more generally in France, plant nomenclature was transitioning from Tournefort's system of classification and determination to Linnaeus's binomial nomenclature. In the 1778 "Catalogue," many specimens' names bore the annotation "t.," meaning that the name was of Tournefortian nomenclature. Even though Jussieu started using Linnaean names only in 1773–1774 (see Ms 2134 BCMNHN), which was considered late compared with most botanical centers in Europe, some botanists were still reluctant to make the change.

Overall, this document demonstrates that Mme Dugage collected plant specimens and donated some to Thouin. It also shows the meticulous care with which she wrote her opinion and her justification. The text on the "Liste" is neatly organized into two columns. She underlined generic

and specific names as well as important words such as her recommendations, so that the reader – presumably Thouin – would easily find the information he needed.

Approximately at the same time, and as early as 1777, André Thouin solicited Mme Dugage's help to gather documents and materials for an ambitious book project about grasses, under the authority of Antoine-Laurent de Jussieu. The book was to include engravings and drawings made at the King's expense. Thouin invited her to contact his correspondence network to collect many samples of grasses. He soon wrote to Carl von Linnaeus the Younger, who had succeeded his father in Uppsala, Sweden:

“A lady, the pride of her sex, distinguished by useful knowledge, counts on your benevolence, and expects from you, Sir, a favor. She undertakes a tedious and cumbersome work on the family of grasses. She was able to obtain all the dry specimens held in the *Cabinet du Roi*, from M. de Jussieu's herbaria and from all French botanists who hastened to supply her with materials and this great work [is] undertaken under the auspices of the government. In spite of all the help, she needs several genera and many species. She hopes that you will agree to loan them, she will take the greatest care, I assure you; her attached letter will inform you of her needs” (10 March 1778, Ms 2081 BCMNHN).

Armed with such a gracious recommendation, Mme Dugage presented her project to him on the same day. Her carefully worded letter reveals the many ambiguities of her position. In the opening lines, Elisabeth Dugage first referred to herself in the third person, as if the extreme disparity between her and him annihilated her ego. “Will you kindly accept the esteem of a French lady who is bold enough to claim that she has benefitted from the Great Linnaeus's immortal works?” The opening lines continue Thouin's letter; they have the same register and bear identical connotations of admiration and worldly politeness. The addressee, lauded as the great man, is begged to come to the rescue of the lady in distress. It is noteworthy that she used the same device to close her letter where the third person nicely contrasts with the last and final self-assertions of “my favor,” “I would be bold enough,” “I beg you,” almost threatening him to go to Uppsala to pick up the samples if he failed to mail them on time!

“If a lady who has no passion other than natural history and who loves to study may be esteemed by you, Sir, if her zeal to meet the expectations of her Nation who awaits a complete body on Grasses in relation to agriculture may speak in my favor, I would be bold enough to beseech you to grant my request: I would add to it, the need to expedite the mailing. If only I could go and seek the resources I need in the scientific museum of the Great Linnaeus and pay to his family the respectful tribute that I beg you to accept here, your humblest servant Du Gage de Pommereul” (Dugage, 1778).

After the incipit, Elisabeth Dugage switched to the first person narrative. The back and forth movement between the “we” and the “I” reveals another tension between the two other sides of the triangular relationship. The first person plural appears at the beginning in association with the French nation, and more specifically with the Parisian community of botanists gravitating toward the *Jardin du Roi*. Most notably, from then on, the “we” in Elisabeth Dugage's letter is constantly associated with negative statements. The entity “we” does not have any specimen of seven genera of grasses and when it does, as for the *Cinna*, what they have is pitiful: a panicle without leaves and stem, which makes identification impossible. So she entreated him to send samples of the seven genera in the class of grasses, of which they did not “have one specimen, not one species:”

“We do not have seven genera in the class of grasses; of these we do not have one specimen, not one species. Because M. von Linnaeus's genera are not purely fictitious and are based on nature, you have them, likely in your country or herbaria. I mean the genera *Bobartia*, *Olyra*, *Zizania*, *Manisuris*, *Spinifex*, *Apluda*, *Christrix*¹⁰ and even the *Cinna*, of which we only have a panicle without stem or leaves: essential parts for specific determinations” (Dugage, 1778).

Not only do they have many gaps in their collections, but none of the French botanists possessed any of these. Fortunately, Mme Dugage came. She made it clear that she chose to work on grasses even though she did so at the solicitation of her mentor. Her letter becomes even more assertive in the final two paragraphs where she multiplied first person statements. She pledged her honor to carry out her assignment:

“I undertook this class, the most thankless and the most difficult of all, at the behest of our famous M. de Jussieu and of our dear and learned cultivator M. Thouin, who deemed me capable of the requisite perseverance; I have pledged on my honor that I will collect all the objects and complete this work to be worthy of their trust. All the more so as the government has an interest in it and will defray the costs of drawings and engravings” (Dugage, 1778).

To convey the gravity of her involvement, she appealed to the aristocratic and masculine notion of honor, the sense of one's dignity and public reputation that leads the subject to follow a code of ethical conduct, rather than feminine honor, reducible to chastity. The expressions that she used in her letter all conveyed her acute sense of commitment, and her dependability; she wanted the success of her own undertaking, “succès de *mon* entreprise.”

Mme Dugage did not state precisely what her role was in this book project even though her assertiveness implicitly gives her authorial agency. The work she mentioned was to be costly since it would include engravings, done after drawings. In charge of collecting specimens of grasses from fellow botanists, Mme Dugage was at the forefront of the

¹⁰This genus does not exist. Mme Dugage may have misspelled *Crypsis*.

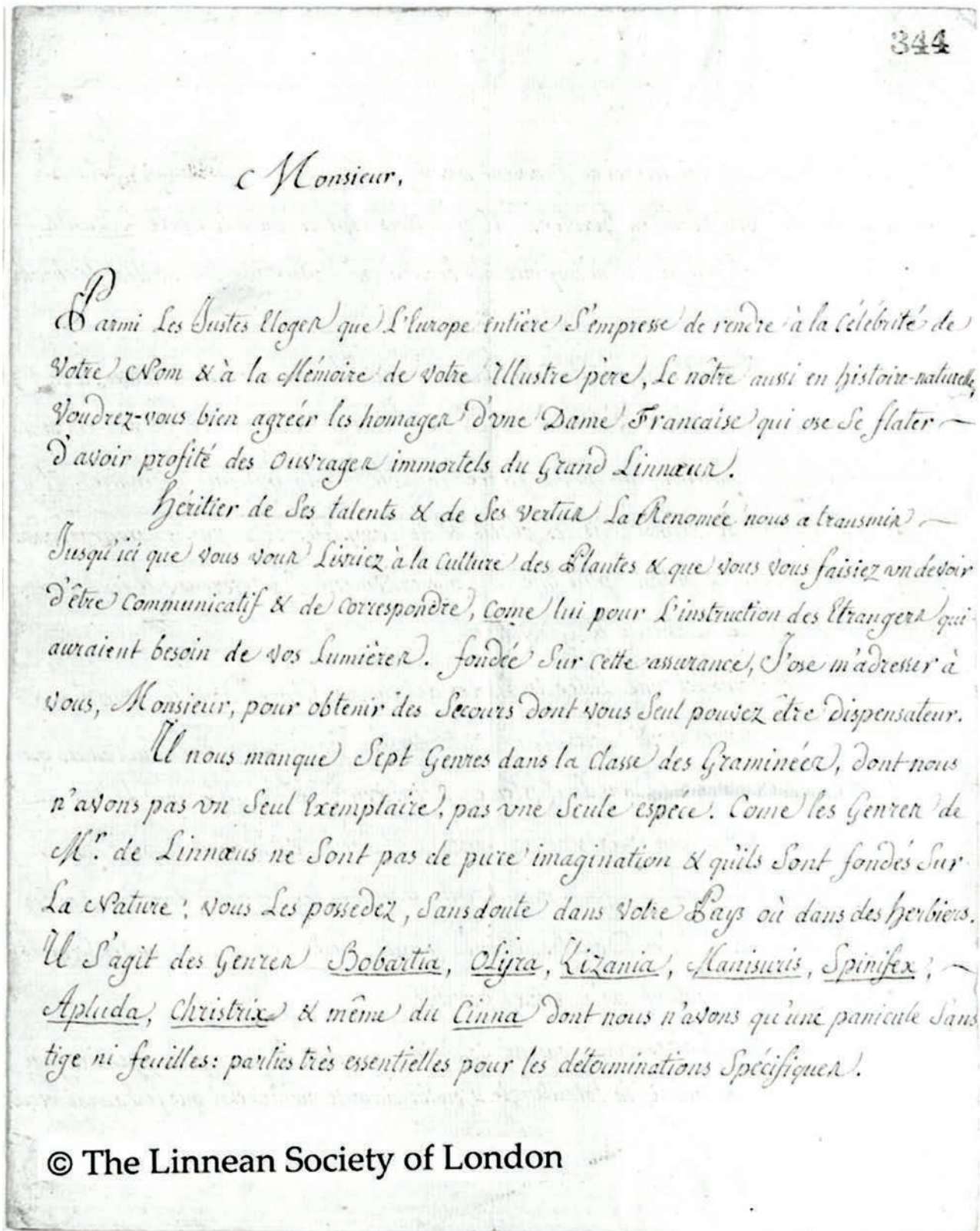


FIGURE 5. First page of Mme Dugage's letter to Linnaeus the Younger, March 1778. Courtesy of The Linnean Society of London.

undertaking. As a woman she performed the public relations role of the project and made sure that the exchanges were performed in a courteous way. Thouin perhaps may have even hoped that his fellow botanists would be gallant enough to rush to help her with many of their grass specimens. If not, it is difficult to understand why she would be the one chosen to contact botanists all over Europe. Dutifully, Mme Dugage mentioned her protectors who guaranteed the official nature of the request and the seriousness of the endeavor. Yet, Thouin and Jussieu revealed to the European community of botanists that they had a woman on their team. It could be that a study of grasses was not considered dignified enough to be their prerogative. When she qualified the class of grasses as thankless (“ingrate”), Elisabeth Dugage seemed well aware of the niche she had found. In her contemporaries’ perceptions, there was, perhaps, little prestige to gain from such modest plants with discreet flowers and low, supple stems.

When describing her book project, Mme Dugage uses the word “body” which she emphasises with the adjective “complete.” In 18th-century dictionaries, “body” (“corps”) refers to a collection of several pieces, by one or several authors, most notably on laws and regulations, anthologies, etc. Similarly, the expression “compleat body,” or “corps complet,” is given preeminence in the subtitle of the *Gentilhomme cultivateur, ou Corps complet d’agriculture* (1761–1763) by Thomas Hale and translated from the English *A Compleat Body of Husbandry* (1756–1758). Therefore, Mme Dugage’s project looks more like a collection of observations targeted for an audience made of agronomists and agriculturists. However, writing a multivolume book would have been a time-consuming task for a lone writer. It is more likely that her book was collaborative project.

Two months later, in May 1778, Thouin pressed Linnaeus the Younger to send the grass samples to Mme Dugage:

“In my previous letter I had the honor to convey the request of a lady of the rarest merit. She is rightfully expecting the assistance of all botanists, including you, Sir, who owe her more than any other because your books were her sole masters and by applying your principles, we will all be grateful for your generosity that will benefit science, I dare assure you” (Ms 2081 BCMNHN).

On 13 July 1778, the Swede answered Thouin in Latin, alleging some delay in the post for his own lateness. He had quickly read Thouin’s letter for he had assumed that “M. Du gage” was a man:

“Convey to M. du Gage de Mar... my greetings; I could not perhaps express it successfully in French; tell him that I am wholly and in all my power at his service because he contributes to the glory of botany; I shall not however have the pleasure to mail him plants or seeds of which I only have a single part, a single type” (Ms 2081, BCMNHN).

When he learned that his correspondent was a woman, he switched gears stylewise, by inserting amorous metaphors such as “desire,” “burn,” and “satisfy,” in his letter:

“I hope that you received the letters that I wrote to Mme Dugage and you. I informed your learned botanist that I would be ready to fulfill her desires as soon as she tells me the easiest way to collaborate. But there is little time to waste, I am burning with the desire to bring complete satisfaction” (25 December 1778, Ms 2081 BCMNHN).

In January 1779, one year after her initial contact with Linnaeus the Younger, Mme Dugage ought to have received the specimens since she thanked him profusely. Her second letter greatly differs from the first one in tone as well as in content. Mme Dugage tried a very different approach, by infusing her letter with gratitude and sensibility. She is sensitive to the attentions of Linnaeus the Younger. Twice did she repeat the word “pleasure” (“plaisir”), once in thanking him, and a second time when making another request:

“I thank you very much, Sir, for all your obliging and flattering words. Please forgive me if I took so much time to express my due gratitude. Health problems, mounting work prevented me until now from fulfilling my obligation. I was not in the least unaffected by your charming letter and by your shipments that you were generous to send. Grasses were in optimal condition and did not suffer any damage in the transfer. These plants gave me, as well as our fellow botanists, the greatest pleasure, especially because they came from you” (Dugage, 1779).

Her emotional letter culminated in the report of the effects that the King’s speech had on her. She reports that she felt complete ravishment (“ravisement,” “transport”), an explosion of intense pleasure that is made manifest with the typographical marks:

“I have just read with delight the speech that your monarch gave at the general estates of the nation at the end of October.¹¹ What a sublime eloquence! What smoothness of style! What a noble simplicity! Ah, Sir, what a man! What a father, what a friend to his subjects! O Swedes, fortunate people: Among all the treasures that Nature bestowed upon you in the most beautiful country in the universe, what else do we not envy you !... Forgive my delight; it is the fair testimony of my deep affection for a prince that reigns over hearts, even of foreigners. He deserves to be forever adored and made for having subjects such as you” (Dugage, 1779).

Such stylistic devices—exclamation marks, nominal sentences, repetitions, and silences—point to her skills as a writer, simultaneously knowledgeable in the literature of her time in which instances of emotional writing abound,

¹¹ On 30 October 1778, Gustavus III of Sweden (1746–1792) opened the Diet and gave a speech that was so admired in France that the *Gazette de France* published a translation of it in the 8 December 1778 issue of the *Supplément* (413–416).

as well as extremely careful in the crafting of the self image she intended for her correspondent. In her epistolary transactions with a man, Elisabeth Dugage created the *ethos* of a respectable woman, with linguistic marks that contemporaries would construe as evidence of authenticity and virtue. The brief climatic interlude ends with inquiries about the wellbeing of another woman, Linnaeus's daughter and the sister of her correspondent. Then Elisabeth Dugage resorts to more conventional elements of letter writing. The emotional writer yields to the sharp botanist. The switch is nowhere clearer than at the end when she gave advice about the format of the awaited volumes of the *Supplement*:

"If it is true that you strive to augment and improve this superb botanical work, no doubt you will not omit adding two tables of synonymous and vernacular names. We felt they were lacking in the *Genera*. I believe they are indispensable so that there is nothing left to be desired in your new edition" (Dugage, 1779).

A closer look shows that she interspersed her text with many elements hinting at her competence in botany. Mme Dugage first shared recommendations on how to mail dry samples. Then, she doubled the vernacular *Fraxinella* with its Latin generic denomination *Dictamnus*. She alluded to the *Mantissa Plantarum* (Mant. Pl.) first published in 1767, and continued in 1771 (Mant. Pl. Alt.), and to the *Supplementum Plantarum* (Suppl. Pl.). Her post-scriptum summarizes her final posturing: "I beg you, Sir, to eschew all formality and to write to me as if I were one of your students, in Latin or in French, whichever is convenient for you. In any way, your letters will always be dear to me." She wanted to establish a relationship based on the transmission of knowledge, finding in the teacher-student relationship a model for interactions with male scholars. In February 1780, Linnaeus the Younger showed interest in her project and sent her a thesis on grasses: "Attached to this letter is a dissertation on grasses that I directed but this issue is flawed: as soon as time allows me to pick a more complete copy, I will mail it to your amateur who is, I hope, in good health and to whom I wish it to endure" (20 February 1780, Ms 2081 BCMNHN). In the meantime, Linnaeus the Younger announced that most of his letters were never sent because of a servant who had kept the postage money (Letter received on 10 December 1778, Ms 2018 BCMNHN). He promised that he would mail a specimen of the "*Pomeralia*" (*Pommereulla* L.f. Nov. Gram Gen. 31. 1779) very soon.

Encouraged by Thouin, Mme Dugage contacted other botanists. In response, Antoine Gouan and Pierre-André Pourret (Gay 1862, 530) mailed grass specimens to Mme Dugage. On 31 March [1778], Gouan announced that he had received a first letter from her (Ms 1987/535 BCMNHN). In another letter to Thouin, on 4 October 1778, he whimsically called her the "patron of grasses" and asked her to compare the specimen with those kept in Vaillant's and Tournefort's herbaria:

"I am sending to your and her attention a seedling that will interest you. It is triander.

That's why all the Italians took it for Linnaeus's *Scirpus michelianus*. Others took it for the *Juncus bufonius cui maxime affinis* but they were all wrong because that's not it; this seedling is always *simplicissimu culmo et trifloro*; however one day I'll mention it in my second fascicule. In the meantime, please receive it as *Juncus triandrus* and give a sample to Madame. Moreover, she will have the opportunity to browse the herbaria of Tournefort and Vaillant. I beg her to keep me informed of the results of her research and the synonyms that she believes would apply to it" (Ms 1987/536 BCMNHN).

In May 1779, Gouan announced the visit of a friend in Paris, whom he entrusted with a few specimens for Mme Dugage (Ms 1987/538 BCMNHN). Several months later, he complained that she still had not fulfilled his request of the previous year (Ms 1987/539 BCMNHN). However he also took his time and it was only in October 1779 that he mailed the "little fascicule" (Ms 1987/541 BCMNHN) he had promised one year earlier. Other correspondents contributed to Mme Dugage's work on grasses. In a letter dated 10 September 1779, Desfontaines told his friend and fellow botanist Savary¹² who was on an expedition in Egypt that Mme Dugage had requested seeds if he could find some "without occasioning expenses and without running into any danger" (Chevalier, 1939: 208).

Not surprisingly, the young botanist who had spent the most time with Mme Dugage and the small company of friends working on herbaria would have had the most vivid recollections of her. Joseph Dombey left in November 1776, his first stops being Madrid, then Cadiz, from where he boarded on the ship *El Peruano* to Lima, Peru. Dombey complimented Mme Dugage effusively in his letters to Jussieu from Spain and later from Peru. On 31 March 1777, he exclaimed: "Mme Dugage is a real prodigy. Her amiable qualities and her rare knowledge make her very dear to all the people who are fortunate to know her. She will be cited as a model for posterity" (Ms 222 BCMNHN). Thouin concurred and reminded Dombey that the highest authorities stood behind her work: "Mme Du Gage still counts on you for the grasses. She showed her work to MM. de Jussieu and Buffon who could not be happier" (Ms 2625 BCMNHN). In the following spring, on 16 April 1778 (Hamy, 1905: 240), after his arrival in Lima, Dombey promised to mail grass seeds to her, a task that he still had to accomplish six months later in September 1778 (Hamy, 1905: 242). In April 1778, Dombey invoked her expertise on grasses: "I shall not do like other travellers who sent only what they knew or what they were able to determine. I shall send you everything while confessing my ignorance. I will not forget the grasses for Mme Dugage to whom you will pay my respects, as well as to M. de La Saudraye. This amiable lady will accept the responsibility to determine them" (Ms 222 BCMNHN). From then on, Dombey gave up identifying and describing the specimens and relied on her expertise to do so. In the letter he wrote to their mutual friend, Lohier de La Saudraye,

¹² Claude-Etienne Savary (1750–1788) traveled to Egypt in 1776 where for 3 years he collected plants and gathered information for his *Letters on Egypt* published in 1788.

Dombey finally announced the imminent mailing of grasses “in two copies” with a “selection of new or rare plants that will increase or ornate her herbarium” (AJ/15/511, AN). He declared himself impatient to see the publication of her “work printed by the Academy.” More than any others, he praised her personal qualities, skills, and work ethic and congratulated her for being Antoine-Laurent de Jussieu’s new personal assistant. In the same letter, we learn that she might also have been contributing to a new project.

According to Dombey, Mme Dugage was invited to collaborate on the new edition of the *Encyclopédie*, better known as the *Encyclopédie méthodique*, that would be published in 1782 and subsequent years.

“Mr. Guettard and Daubenton will be all the more esteemed for bestowing their protection upon our dear friend who should not need any protector. I am grateful that she has been invited to work on the article on natural history in the new edition of the *Encyclopédie*. No one is more capable of better addressing this issue than our respectable friend because she knows well the subject matter. Our dear friend will also couple the beauty of the topic itself with her charming style that it is unusually beautiful. It is thus that women have a delicate touch that men can’t achieve, and our dear friend will overshadow all other famous people of her gender” (AJ/15/511 AN).

The *Encyclopédie méthodique* was first conceived of as a revision of Diderot and D’Alembert’s *Encyclopédie* (see Doig, 2013). Yet, with the resolute determination of its initiator, the printer and publisher Panckoucke, it quickly grew to enormous proportions. In 1781, Panckoucke announced the publication of twenty-seven treatises in 42 volumes in quarto as well as 84 volumes of plates. The idea of publishing a volume of the *Natural History* on plants had been brewing since 1771 when Panckoucke first contacted Rousseau (Watts, 1957: 321), but the discussion went nowhere. Panckoucke however persevered. In 1778, he promoted his publication project quite successfully in the scholarly circles of Paris (see Watts, 1958; Panckoucke, 153), for in 1779, in a letter to the Société Typographique de Neuchâtel, Panckoucke

declared that: “the entire plan of the *Encyclopédie méthodique* is set. I have already entered into three contracts; the censors are designated” (quoted in Darnton, 1979: 410). Panckoucke recruited Suard, D’Alembert, and Condorcet to direct his project. He later solicited the contribution of many more experts, among whom was Thouin, who recalled the beginnings of the publication in his *Curriculum vitae*:

“Upon the bookseller Panckoucke’s initiation, Buffon asked me to undertake the writing of the gardening dictionary for the new *Encyclopédie méthodique*. In the first five half-volumes for this publication, I provided, until 1793, a rather large number of contributions on plant culture, descriptions of tools, and of landscape architectural decorations, which in total represents about the quarter of this part in 4.” (quoted in Letouzey, 1989: 66).

Searching for Mme Dugage’s contribution in the immensity of the *Encyclopédie méthodique* is like looking for a needle in a haystack. She is not listed among the contributors nor did she sign the rubric “Histoire naturelle” in the fourth volume in the series on Agriculture (Tessier and Thouin, 1796: 615–619). We presume that her project did not come to fruition, and her notes were probably lost before the eventual publication.

While pursuing her botanical endeavors, Mme Dugage consulted Buffon’s *Natural History*, Réaumur’s volumes on the history of insects, and the works of Geoffroy and Bauhin. She also worked on Jussieu’s herbaria to which she contributed by adding plants that she had collected while botanizing in Brittany.¹³ In the meantime, the testimony of Lamarck confirmed her expertise in botany. In his *Flore française* published in 1778, he cited Mme Dugage’s observations on the alpine butterwort she saw growing in Brittany (Lamarck 1778, 432). The publication of her study on grasses was announced as imminent in 1779: “Dugage de Pommereul has devoted the best days of her life to the study of botany. She is currently busy with the publication of a work, the fruit of her profound knowledge in such an interesting science” (Riballier and Cosson, 1778: 232–233). As Elisabeth Dugage stood on the brink of becoming a public figure, praise and official recognition started pouring in.

HONORS AND RECOGNITION

As early as 1777, Casimiro Gómez Ortega (1741–1818), a regular correspondent of Thouin since 1776 when he was elected associate correspondent of the French Royal Academy of sciences and professor at the Madrid Royal Botanical Garden since 1772 (González Bueno, 2002; Puerto Sarmiento, 1992: 321), had learned about her project on grasses. He promised to mail her specimens (15 December 1777, Ms 1913 BCMNHN). Ortega was inclined to assist Thouin whom he had met in 1775 during an extended stay in Paris. Moreover, they had several overlapping interests. With the expansion of Spain’s botanical collections in mind, Ortega gleefully entered the scholarly correspondence

network that bound botanists together. In their give-and-take relationship, Ortega was the gateway to the numerous plants and seeds that Ruiz and Pavon were collecting in Peru. For that matter, any piece of news concerning the young Dombey interested Ortega as much as Thouin. As an associate correspondent of the Royal Academy of Science in Paris since 1776, Ortega sent Elisabeth Dugage sought-out specimens of the quinquina from Santa Fé. He also announced that the Royal Academy of Medicine in Madrid would present Mme Dugage with an honorary degree as soon as the President had recovered (Ms 1913 BCMNHN, Paris; *Memorias*, 1797: 32). This announcement coincided

¹³ A specimen of *Eleocharis* (Cyperaceae): <https://science.mnhn.fr/institution/mnhn/collection/p/item/p00668650> and one of *Carex humilis* (Cyperaceae): <https://science.mnhn.fr/institution/mnhn/collection/p/item/p00668824> are the sole remains of her botanical activity in the French National herbarium (P).

with Antoine-Laurent de Jussieu's presentation (*Histoire de la Société royale de médecine*, 1782: 252–262) on quinquina, partially based on another specimen that Ortega had previously mailed to Vicq d'Azyr. Ortega, however, did not see his generosity reciprocated. On the contrary, he discovered that the report had not mentioned the inventor of the discovery nor the botanical description and the chemical analysis that Ortega had himself conducted and whose results he had shared with Jussieu. Despite his irritation, the Spaniard still fulfilled his promise and mailed Mme Dugage "the degree that all the voting members of the Academy granted her unanimously" (8 April 1779, Ms 1913 BCMNHN). Mme Dugage sent him a brief and modest message thanking him and the Academy:

"I beg M. Thouin to convey to M. Ortega the avowal of my real gratitude for the precious mailing that he was kind enough to do. I assure him that I am as flattered as I am grateful. I dare to beg him again to continue his assistance and accept the sincere homage of his admirer Du Gage De Pommereul."¹⁴

Encouraged by the first official signs of recognition that Mme Dugage had received, Dombey decided to dedicate a Peruvian flower to her, a plant discovered in the environs of Lima. Dombey wrote to Thouin on 11 December 1778:

"Mme Dugage received the flower that I wanted to add to the crown that her grateful country is weaving for her. I dedicated a plant from the *Diandria monogynia* to her: this genus includes three species, only two of which will reach her with this mailing, along with their descriptions. Nothing is prettier than this genus (Hamy, 1905: 40).

Dombey extolled her qualities and talents, reading his friend's letters to the small refined society of Lima: "Do you know," he told Lohier de la Saudraye on 11 December 1778, "...that in the circle of selected amiable men who practice sciences at the extreme point of the world, do you know that Mme Dugage is praised? Her letters have been translated, and our Peruvian ladies won't believe that such a prodigy does exist in Europe. A plant dedicated to our dear friend will remind forthcoming centuries of Mme Dugage's name and talents, and will spur emulation that makes virtues flourish" (AJ/15/511 AN).

However the genus of the plant he intended to name after her, the flower of Amancaes, was already known; his companions Ruiz and Pavon had already named and described it as *Piper umbilicata*. Dombey thus had to find another plant. "The plant that I previously dedicated to her, has just been downgraded with the peppers," he lamented; so he picked a pearly plant in her honor: "At last, to avoid any ambiguity, I dedicated a new genus under the name of *Dugagesia margaritifera*. It is a little perennial shrub, with pinnate leaves, and its fruit is a white drupe with only one

stone" (Hamy, 1905: 59–60). Despite Dombey's good will, the *Dugagesia* (sometimes written *Dugagelia*) did not last long. Ruiz and Pavon eventually named it *Margyricarpus setosus* Ruiz & Pav., and the plant would later be accepted as *Margyricarpus pinnatus* (Lam.) Kuntze. Besides, Mme Dugage never saw the specimen and its diagnosis (20 August 1783, Ms 222 BCMNHN) from Dombey (Hamy, 1905: 268–269). Unbeknown to him, she had already passed away.

The ultimate consecration and the only lasting tribute came from Sweden when Carl von Linnaeus the Younger named a genus of grass, the *Pommereulla* in her honor. On Christmas day in 1778, he wrote to Thouin: "Tell her, when you greet her on my behalf, that I have a beautiful genus of grass that I decided to name after her" (Ms 2081 BCMNHN). He promised to mail the consecrated plant: "The *Pomeralia* [*Pommereulla* L.f.] is not included in this letter, I could not insert it, afraid that it would break among the seeds that this letter carries." Mme Dugage thanked him in her January 1779 letter. She keenly appreciated this vastly impressive homage. Not only did the son of Linnaeus give her maiden name to a plant, but this honor would be continuously renewed in every listing of the plant in taxonomic works, where usually a few lines mentioning her name would explain the designation. Thus, the naming coupled with the explanation was a dual homage to Mme Dugage. Linnaeus the Younger would even go further in esteeming her. On 21 December 1779, Daniel Eric Naezén's thesis on grasses (*Nova Graminum Genera, Upsaliae 31, 1779*) introduced the new genus along with a few lines to justify the designation. Two months later, Linnaeus the Younger mailed his student's dissertation to Thouin and Mme Dugage (20 February 1780, Ms 2081 BCMNHN). At the request of his advisor, Naezén lauded her in the historical overview on *agrostographia* that preceded his thesis. Extolling her aptitudes and profound knowledge of botany, he declared:

"Our hopes are renewed by this illustrious treasure, Mme Dugage whose ardent love for botany always overcame obstacles how large they may have been, when she started to sort out the difficult family of grasses, for which she has spared none of her time, nor effort, nor expenses. For long we have foreseen the worth and usefulness of this work that this woman who comes first in the Muses' contests by her literary talents as well as her skills will write" (Naezén, 1779: 7).

Once she found herself mentioned along with J. Scheuchzer, Linnaeus, C. P. Thunberg, C. König, and C. Friis Rottbøll, she had entered the Hall of Fame of grass experts. Linnaeus the Younger's gesture equated induction and legitimized her status and efforts. The *Pommereulla* belongs to the family of *Poaceae*, and the name referred at the same time to the genus and to its only species, the *Pommereulla cornucopiae* L.f., the binomial nomenclature reflecting the peculiarity of Mme Dugage's situation as

¹⁴ "Nota de Du Gage de Pommereul en la que agradece a Casimiro Gómez Ortega el envío que ha echo," Archivo del Real Jardín Botánico RJB01/0020/0002/0022. We are most indebted to Marc Philippe (Univ. Lyon 1) who graciously communicated the existence of this letter and its transcription.

a lone female botanist. Naezén's thesis was eventually republished in the series of the *Amaenitates*, which would ensure forever the recognition of her botanical work in the Linnaean archives. Finally, her repute was confirmed when, in the 1781 *Supplement* (Suppl. Pl) that Linnaeus the Younger added to his father's seminal works, the new genus *Pommereulla* (*Pommereulla cornucopiae* L. f., Suppl. Pl. 105. 1782) appeared to preserve the "memory of the very famous Mme Dugage de Pommereul, who worked on the study of grasses with relentless resolve" (Naezén, 1779: 13). Linnaeus was a proponent of populating the realm of plants with monuments erected to the memory of past and contemporary botanists. Having a plant named after oneself was the ultimate and the only long lasting recognition that could save a lifetime of work from total oblivion. Such was the case with Mme Dugage. Linnaeus the Younger's homage brought her short career to its acme.

Induction was therefore complete. It showed it was possible for an amateur, and here an "amatrice," to alter the history of botany. As early as March 1779, even before Naezén defended his dissertation, the word of Mme

Dugage's induction was disseminated in the community of botany practitioners. One of them, the abbé Jean-Baptiste Cotton Deshoussayes, a dedicated amateur botanist, wrote to the son of the great man and seized on the opportunity to insinuate himself in the epistolary exchange of Linnaeus the Younger with his French counterparts: "He will also have the option of mailing your reply to the illustrious Mme du gage de Pommereul, whom I will declare women solely by her sex, and a man, and even a man made famous by his genius and the scope and the variety of his science" (Cotton Deshoussayes, 1779: 105). Vain ambition, for Linnaeus the Younger wrote to Thouin that he would not collect anything for Cotton (Letter received on 15 December 1779, Ms 2081 BCMNHN). After the *Supplement* publication, and now that Mme Dugage had been recognized by the ultimate authority, all nomenclature repertory would list the *Pommeruella* and mention the filiation (Sonnini, 1801: 375–376; Théis, 1801: 379; Briquet, 1804: 130). After the Linnean homage, publication of Mme Dugage's work was greatly anticipated. A publication still presented it as a work in progress in July 1783 (*Journal de médecine*, 1783: 493).

THE DEMISE OF MME DUGAGE

Her relentless work deeply affected Mme Dugage's health. As far away as Peru, Dombey worried about her well-being and wished that "her labor would not affect her health, or at least that the glory resulting from her work would warm up her heart and pour a salutary balm into her blood" (AJ/15/511 AN). Unfortunately, Mme Dugage's health had by then considerably worsened and prevented her from working on her projects. While Thouin saluted Dombey's initiative, he warned him that she may not be able to complete her endeavors:

"The beautiful genus that you dedicated to Mme Dugage was rightfully presented to her. She is without contradiction a woman of the rarest merit but whose health is so poor that I do not believe that she will be able to complete her projects. You are well aware, Sir, that she has a cancer in her left breast; since your departure, it has grown so much that we thought that we would lose her at any time. The physicians had given up on her, and she believed she was helpless. Then came an old wife who promised to cure her. Mme Dugage yielded herself to her; she applied treatment with honey and cream for several months after which she can see a positive change so striking that she continues this simple remedy from which we hope her full recovery to everyone's astonishment" (Ms 2625 BCMNHN).

Madame Dugage desperately tried to find a cure or, at least, ways to abate the crucifying pains of her disease. She even volunteered for an experiment with the innovative use of magnets proposed by the abbé Le Noble, whose observations would be published in the first volume of the *Memoirs of the Royal Society of Medicine*. In her zeal to contribute to the advancement of medical science, Mme Dugage let him test magnetism on her body. However, despite her goodwill and her faith in modern medicine, her

disease kept growing and spreading. Pains in her breast, rheumatism, and stomachache compelled her to wear magnetized metal plates on a daily basis, causing even more damage (Andry and Thouret, 1782: 73). "The necessary application of a large number of plasters and poultices for another very serious disease did not allow continuous usage. Plates were always rusted and the contact with bruised skin was very painful" (Andry and Thouret, 1782: 74). Sick and in pain, Mme Dugage sought in a change of climate the relief that medicine had so far denied her. In the subsequent years, she went to the French Riviera, to Hyères, in the company of her old friend Lohier de La Saudraye. Coincidentally, we know of her last days through the testimony of her fellow travellers, the ailing academician Thomas, who sejournd with his sister first in Hyères, then in Forcalquier in the castel of Fougères between October 1781 and May 1782 (Oudot de Dainville, 1926: 57). Thomas's friend, Barthe, was introduced to Mme Dugage in the spring of 1782:

"Mr. de La Saudraye and Mme Du Gage came to join us from Hyères. They both live with us but one is here to suffer, the other to give her all the care that the most tender friendship allows. This unfortunate lady is in a terrible state; she does not digest anything; she can barely stand; the condition in which you saw her was healthy compared with what it is now. Her friend is much altered and very thin. Night watches, worries, and the signs of pain are killing him. Both deserve our empathy, and one cannot see them without feeling the most tender compassion" (Henriet, 1932: 291).

Mme Dugage soon passed away in Forcalquier on 3 July 1782 (Archives of the Alpes de Haute-Provence, Forcalquier 1776–1792, 1MI5/0371, 121). Thomas described his sorrow at witnessing her passing, especially as it occurred so soon after his own mother's death:

“I delay, my friend, for the longest I can the time when I must talk to you about the purchases you were kind enough to make for Mr. De La Saudraye and Mme du Gage. Alas! this wretched woman is no more. She was dead and in the grave even before the mule driver arrived from Marseille. I saw this terrible spectacle, in our very house, and next to me. The very morning of the day or rather the night when she died, Mr. de La Saudraye was gay and serene; he was far from suspecting so imminent an end. For nine years, he saw her sick, and he

grew used to her condition. Death put an end to his illusions in a cruel way. This event occurred three days after you announced the death of my mother. It seems that I saw her dying for the second time” (Henriet, 1932: 295).

At the current stage of our research, we do not know if Mme Dugage was able to complete her work. If probably her cancer forced her to interrupt her activities, then all traces of her life and work were also gradually dispersed or omitted, and sparse mentions gave a distorted depiction of both her and her work.

PALIMPSESTIC BOTANY

For Elisabeth Dugage, all was not rosy in the 18th century despite her numerous mentors. Even though she worked under the protection of Buffon, Jussieu, and Thouin, other botanists could not help expressing their surprise at learning her gender. The shock created by such an incongruity, a woman who worked almost officially at the Royal Botanical Garden in Paris, in the close vicinity of the great scholars, led to some curious and revealing reactions among her male mentors. Linnaeus the Younger first took her for a man; then, when enlightened, he could not refrain from inquiring about her marital status in the following letter he wrote to Thouin: Was she a widow? Was she married? he asked (20 February 1780, Ms 2018 BCMNHN). Needless to say that such a question did not usually arise in letters between men. A. Gouan, member of the venerable medical school of Montpellier, hailed Mme Dugage as the “patron of grasses” (4 October 1778, Ms 1987/536 BCMHN) and gave her credit for her botanical knowledge. He nevertheless coated his query about a grass with ironic traits regarding women and their taste for cuteness. Even more telling of the then prevalent bias against women in science is the reaction of the anonymous translator in charge of translating the letters of Linnaeus the Younger into French. Correspondences were at the time mostly conducted in Latin, a *lingua franca* for all European scientists, and André Thouin needed the assistance of a translator for letters sent from and addressed to foreign correspondents who could not speak French. Where Linnaeus the Younger wrote “agrostographa” which means “writer on grasses,” or “expert in grasses,” a laudatory title he granted Mme Dugage, the translator took upon himself to diminish her skills by using the word “amatrice” or, in other words, “lover” of botany (20 February 1780, Ms 2081 BCMNHN). Through this less than anodyne correction, the translator excluded her from established professional circles. Mme Dugage’s peripheral status, in the margins yet in close contact with the great naturalists of the Botanical Garden, aroused curiosity, incredulity, and eventually, suspicion. After the death of her direct contemporaries, Mme Dugage’s name disappeared from all accounts of the *Jardin du Roi*. Even among those who knew her, some chose not to acknowledge her presence, especially those who held official positions at the Museum. For instance, we have been unable to find her name in any of Antoine-Laurent de Jussieu’s writings.

Although there does exist a rare mention in contrast with Jussieu’s silence. In 1792, in the fourth volume of the *Encyclopédie méthodique*, Jean Verdier (1735–1820), a collaborator, recalled the modest beginnings of the Botany School in the *Jardin du Roi* and listed all the people who took part in its success. He attributed the development of botany to the three Jussieu, Antoine-Laurent, Bernard, and Joseph; to Le Monnier professor of botany; André Thouin; and Mme Dugage, whom he posthumously honored with the following words: “a lady Du Gage, more learned than many academicians [who] worked for years at the Botanical Garden at sorting out the large family of grasses” (Verdier, 1792: 75). Verdier’s account did not have any bearing on the history of science. Neither a member of the Museum nor of the Academy of Science, he was what we would now call an independent scholar, an outsider who would eventually be excluded from historiographical works on institutionalized science. Verdier directed a school in the Hotel de Magny, located next to the Botanical Garden, on the rue Seine-Saint-Victor. He might have known Mme Dugage personally for he published his sole botanical treatise in 1778, *Introduction à la connoissance des plantes*, when Mme Dugage was at the height of her activities in the *Jardin du Roi*. His jab at academicians seems to indicate a feeling of bitterness toward members of the institutions, some of whom were in his mind less competent than female autodidacts. His hostility may originate in the long and unsuccessful litigation he had with Buffon who had set his eyes on the building of the Hotel de Magny and had him expropriated.

In the 19th and 20th centuries, two interrelated processes of programmed oblivion were at work: first, the dispersion, immediate, or postponed loss of direct evidence; for instance, unsigned handwritten documents or signed by non-famous writers are bound to disappear from institutional conservatories. Second, when the *Jardin du Roi* morphed into a modern institution, and took up the new name of Museum, it also undertook a cleansing of its collections, presumably because members disavowed old regime modes of scientificity. Documents that did not fit into the overarching narrative of the Museum were deemed superfluous and some were discarded. While the Museum glorified the great names of its past and present, letters by lesser contributors were sold on the private autograph market, anonymously and in bulk. Both phenomena are

intertwined, in the sense that the fewer archival documents remain, the less likely the author will be mentioned and therefore given recognition in historiographical works. Of course, other incidences such as wars or natural disasters also account for the destruction of primary sources. However, historiographical collections always result from implicit or explicit choice of preservation, an underlying strategy, which aims at shaping the memory of past events.

We do know from a late 18th-century list of correspondents that regularly communicated with the *Jardin du Roi* that the collections had 8 letters that Mme Dugage wrote to the administration (“Liste des Correspondans du Muséum d’Histoire naturelle,” Ms 2310, 23 BCMNHN). These letters have disappeared. The search for them is made all the more difficult since catalogues of autographed letters do not list names of lesser contributors. Even if a letter is preserved for the reason that it is addressed to a great naturalist, chances are that the catalogue description will not list Mme Dugage by name. While it is still relatively easy to find letters penned by well-known figures of botany in the 18th century, it is a more arduous task to locate their passive correspondence. Conservators and librarians stripped Mme Dugage of her very own existence by putting her memorabilia in the dustbins of the history of science. On the other hand, what has been preserved and recovered does not fail to intrigue. What will emerge from this wreckage is a fragmentary picture, or should we say a puzzle in need of completion, of past and current prejudices in the representations of women of science.

Interestingly enough, the only Mme Dugage’s letters that have been deemed worthy enough of publication are all addressed to Antoine-Laurent de Jussieu, and it is only in relation to him and his career that the letters hold value according to the author Joseph Laissus in his 1964 article. The interest that J. Laissus found in this correspondence is chiefly a matter of feminine writing and an occasion to provide a few details of the life of the great botanist. In an article focused on Antoine-Laurent de Jussieu, J. Laissus reproduced Mme Dugage’s letters that he found “naïve,” moving (“touchante”), and even childish (“puérite”) (J. Laissus, 1964: 35). He entitled his article “Antoine-Laurent de Jussieu ‘l’aimable professeur,’” using an expression that he borrowed from Mme Dugage. Nevertheless, withdrawn from its context, the expression seems to imply a gallant conversation between the two correspondents. Besides, when commenting on a letter in which Mme Dugage requested to consult several herbaria, the historian suggests that Mme Dugage borrowed botanical treatises only as a pretext to converse with Jussieu (J. Laissus, 1964: 34). Implicitly, because of its insistence on seductive undertones, J. Laissus’s article depicts Mme Dugage as a woman who confused her love for botany with her alleged love for the botanist.

The bias that is manifest in J. Laissus’s representation of Mme Dugage is not entirely of his own making. The 19th century construed a seductive feminine figure neatly summarized in the appellation “marquise.” In the few documents where she is mentioned, Mme Dugage is described as a “marquise,” which she was not, who hosted a

“salon,” where young men aspiring to pursue a career in the natural sciences were welcome. Using the word “salon” is not insignificant. It conjures visions of polite conversations, in an elegant aristocratic setting that provided networking opportunities to socially challenged scientists.

In 1835, René Baron Desgenettes (1762–1837), who made a name for himself as a military doctor in Napoleon’s armies, wrote his memoirs in which he recalled his beginnings. The first contact this young provincial had in Paris was Mme Dugage, a family connection. Astonished, he recalled that she lived alone with only one female servant, in a garret at the Botanical Garden of Paris. Thanks to Mme Dugage, Desgenettes was fortunate enough to meet Buffon, an encounter that he retold with flourish. In his fictitious dialogue between Buffon and Mme Dugage, the great naturalist irreverently called her “my pretty lady” (“ma belle dame”), and let her kiss him (Desgenettes, 1835–1836: 49). As told, the anecdote reasserts the implicit libertine innuendo in which J. Laissus would indulge while interpreting her correspondence with Jussieu. For Desgenettes, women could not lead a scientific trajectory of their own: they ought to provide some sort of social glue to men gravitating around them. Not surprisingly, he did not give any detail on Mme Dugage’s botanical activities in his memoirs. The same tradition of misogynistic historiography continues into the first part of the 20th century. One hundred years later, in 1935, identical equivocal connotations again permeate Delaunay’s account of Mme Dugage. In his history of medical life from the 16th to the 18th century, Paul Delaunay embellished the few details provided by Desgenettes. He relegated Mme Dugage to the chapter “social life,” and credited her with conducting a scientific salon while remaining mute about her botanical pursuits. Again, she is called “marquise.” Without the slightest evidence, historians chose only to portray Mme Dugage as an aristocrat, prone to engage in frivolous conversations and expert in sociability; but failed to integrate into their narratives the “lonely grass eater” (J. Laissus, 1964: 33) she called herself in her letter to Jussieu. As evident from the examples cited from Laissus and Delaunay, 19th-century and 20th-century historians felt the urge to recast Mme Dugage’s identity from its original incarnation. The singularity of her situation, a woman, alone in the *Jardin du Roi*, working on herbaria, had to be amended and transformed into a conventional portrait.

The growing uneasiness about her being a woman is gradually made manifest in passing mentions that can be found in brief accounts of botanists all through the 19th century. First mentioned in relation to the Botanical Garden, chroniclers and journalists tended to confine her to the narrower field of “women botanists” as opposed to the non-gendered group of “botanists.” As early as 1810, Mouton-Fontenille, while giving an overview of the history of botany, listed together the women who gained notoriety in this field, a group that included Maria Sybilla Mérian, Linnaeus’ daughter, Mme de Genlis, etc. (Mouton-Fontenille, 1819: 67). True, Mouton-Fontenille had only praise for them, but he restricted women to a category distinct from the

mainstream and official history of science. The same perspective was shared by Antoine Laurent Apollinaire Fée who in 1827 devoted a short paragraph to the plants named in honor of women (Fée, 1827: 173) before delving into more general matters.

Despite the aforementioned passing mentions, deliberate silence more often precluded acknowledgement of Mme Dugage's contributions to botany. Antoine-Laurent de Jussieu, who relied on her assistance when she worked on grasses, failed to mention her even once in the detailed history of the Natural History Museum, which was published in six installments in the *Annals of the Museum* between 1802 and 1810, where he recounted a detailed history of the Garden from its origin to 1788, when Buffon passed away. Jussieu's silence was not broken in subsequent historical accounts of the Museum, and so by his omissions, he had effectively banished her from the official history of science. Joseph-Philippe-François Deleuze and Ernest-Théodore Hamy, both members of the Museum, would follow in Jussieu's footsteps. Deleuze wrote a 700-page *Histoire et Description du Muséum royal d'histoire naturelle* in 1823. He had presumably direct access to early sources, some of which have disappeared. Ernest-Théodore Hamy (1842–1907), a French ethnologist and anthropologist, also known for his history of the Natural History Museum, published in 1893 a very informed description of the last years of the Old Regime Jardin du Roi. His book, which was bound to be referenced in all later works, remained silent on Mme Dugage even though he knew of her existence and work, after having edited Joseph Dombey's correspondence that contained numerous references to Mme Dugage (Hamy, 1905: xiv, 8, 257, 268). Her name is not even mentioned in a footnote: her projects, the singularity of her situation did not raise the historian's curiosity.

Misogynistic bias did not stop in 1900. On the contrary, it continued to be prevalent into the 20th century. None of the bibliographical works make any mention of Mme Dugage even though she appears in the letters of Thouin, Dombey, Desfontaines, and Gouan. She is absent from Louis Crestois's 1953 study of the teachings and teachers of botany at the Museum of Natural History of Paris. Neither does A. Davy de Virville's sweeping synthesis of three centuries of botany in France make any reference to Mme Dugage. A legacy of biased history keeps infecting current research that otherwise would not be suspected of voluntarily misogyny as exemplified in Yves Laissus's classic examination of the teaching of sciences at the Jardin du Roi first published in 1964 and reprinted in 1986. Arthur Robert Steele, author of *Flowers for the King: the expedition of Ruiz and Pavon and the Flora of Peru*, quotes Dombey's letters where Mme Dugage appears but does not provide any salient information other than "feminine amateur" (Steele, 1986: 80 and 131). She is absent from Emma Spary's seminal study entitled *Utopia's Garden: French Natural History from Old Regime to Revolution* who nevertheless argued that the distinction between "the canon of 'scientific' botanists" and the "botanizing fad" is "hard to sustain in a botanical culture in which private and royal systems of plant introduction and exchange

were interdependent" (Spary, 2000: 61–62). Neither does Elisabeth Dugage appear in the recent *Dictionnaire des Femmes des Lumières* (Krief and André, 2015). However, the most revealing example of omission may lie with Yvonne Letouzey's 1989 monography on André Thouin, the head gardener and protector of Mme Dugage. Even though Letouzey extensively quoted Thouin's letters—her study gives access to many unpublished Thouin's manuscripts—she systematically expurgated sentences and passages related to our woman botanist from Thouin's letters (see Letouzey, 1989: 133–136 and 152–153). The list of current works without any reference to Mme Dugage is endless. In sum, whether historians have re-checked their sources or whether they have based their research on previous works, they have invariably blindly accepted the legacy.

Evaluating scientific activities of women in 18th-century France differs from quantifying their presence in academies, royal societies, or their publications, as Natalie Zemon Davis and Arlette Farge warned in the 3rd volume of their history of western women (Davis and Farge, 1992: 6). What could be more pointless since women could not aspire to any position, nor gain the protection of their elders, nor attend university? Studying the scientific works of women therefore requires us to rid ourselves of the historical paradigms of masculine history and reconsider prejudices toward women and amateurs. It demands that we re-think the abyss commonly accepted between institutionalized science and the private or semi-private practice of sciences. Finally, researchers ought to reflect upon the hermeneutic screen that previous historians handed over to them all too liberally. As evidenced with Mme Dugage's case study, discourses presented distorted perceptions of her by depicting her as a marquise, hosting a salon, kissing Buffon, and longing after Jussieu. Even the most illustrious French women scientist of the Enlightenment did not avoid repeated attempts by historians to erase her, remarked Judith P. Zinsser and Julie Candler Hayes about Mme Du Châtelet whose "major works have been attributed to men, other writings have been ignored or belittled, and her entire life has been reconfigured so as to minimize her intellect and to dramatize her sexuality" (Zinsser and Hayes, 2006: 6). Suffering a fate similar to Mme Du Châtelet, Mme Dugage's femininity has been distorted to exclude her from the realm of 'real' science and to mask her scientific accomplishments. Moreover, unlike Mme Du Châtelet who was wealthy enough and well connected, and who published several works on Newton, Mme Dugage never crossed the publication threshold. In her case, silence prevailed. Her contributions, however small they might have been deemed, have been buried under a thick layer of omissions. In her study of women practitioners of botany, Ann B. Shteir examines how the gradual professionalization of plant science in 19th-century England was achieved at the expense of women. Mme Dugage's example demonstrates that an identical phenomenon happened in France when the Natural History Museum re-wrote the history of its previous incarnation, *the Jardin du Roi*, and erased markers of Old Regime polite science by excluding amateurs and women. Sarah Hutton laments

that: “it is an unavoidable fact that the names of only a handful of women grace the annals of the history of science. Even when celebrating those distinguished female names who have come to historical notice, there is no escaping the fact that a Madame Du Châtelet here, or an Ada Lovelace there, are exceptions that prove the lamentable rule that very few women have achieved recognition for their scientific endeavors” (Hutton, 2001: 18). Yet, it was even worse. How can women get recognition when their contributions have been materially destroyed? Mockery and sarcasm

as well as imputation to male friends or mentors might have undermined any basis for recognition; moreover, physical elimination of evidence also happened and still occurs nowadays. While gender-aware scholars are working on including women and lesser contributors, other forces, much more general and more forceful, tend to obliterate women from historiographical accounts of the past, in an attempt to shape memory and identity. It is therefore up to us to interrogate silence in the hope of regaining the stolen past.

LITERATURE CITED

- ANDRY, C. L. F. AND M. A. THOURET. 1782. Observations et recherches sur l’usage de l’aimant en médecine, ou Mémoire sur le magnétisme médicinal. Extrait des Mémoires de l’Histoire de la Société royale de médecine. Paris.
- ANNEIX DE SOUVENEL, A. F. J. 1755. Tableau des avocats au parlement de Bretagne, rectifié le 9 août 1755 et déposé au greffe de la cour le 12 dudit mois, par Me A.-F.-J. Anneix de Souvenel, ancien avocat et bâtonnier. G. Vatar, Rennes.
- ANONYMOUS. 1778. Gazette de France. Supplément à la Gazette du 8 décembre 1778: 413–416.
- . 1782. “Réflexions sur deux espèces de quinquina découvertes nouvellement aux environs de Santa-Fé, dans l’Amérique méridionale.” *Histoire de la Société royale de médecine* (1779): 252–262.
- . 1797. *Memorias de la Real Academia de Medicina de Madrid*. Vol. 1. Imprenta Real, Madrid.
- ARCHIVES NATIONALES D’OUTRE-MER. PERSONNEL COLONIAL ANCIEN. 1774–1783. “Etat des services du sieur Lohier de La Charmeraye, conseiller au Conseil supérieur du Cap. Résidant depuis trente ans dans la colonie de Saint-Domingue 1774–1783,” *FRAN NOM COL E 288 Secrétariat d’Etat à la Marine*.
- BRIQUET, F. 1804. *Dictionnaire historique, biographique et littéraire des Françaises et étrangères naturalisées en France*. Treuttel and Würtz, Paris.
- BRONGNIART, A. 1837. Notice historique sur Antoine-Laurent de Jussieu. *Annales des Sciences naturelles* 7 (2): 5–24.
- BUFORD, N. 2009. Quinault, librettiste de Lully, poète des Grâces. Mardaga, Wavre.
- CARADONNA, J. L. 2012. *The Enlightenment in Practice. Academic Prize Contests and Intellectual Culture in France, 1670–1794*. Cornell University Press, Ithaca.
- CHEVALIER, A. 1939. La vie et l’œuvre de René Desfontaines fondateur de l’herbier du Muséum: la carrière d’un savant sous la Révolution Vol. 4 of the Publications du Muséum d’histoire naturelle. Édition du Museum, Paris.
- CRESTOIS, P. 1953. Contribution à l’histoire de l’enseignement de la pharmacie: l’enseignement de la botanique au Jardin royal des plantes de Paris. A. Coueslant, Cahors.
- COTTON DESHOUSAYES, J.-B. 1779. Letter to Linnaeus fil., Carl. Letter L6243 15 March 1779. The Linnaean correspondence, an electronic edition prepared by the Swedish Linnaeus Society, Uppsala, and published by the Centre international d’étude du XVIII^e siècle, Ferney-Voltaire.
- DARNTON, R. 1979. *The Business of the Enlightenment*. The Belknap Press of Harvard University Press, Cambridge.
- DAVIS N. Z. AND A. FARGE. 1992. “Women as historical actors.” Pages 1–8 in *History of women in the west*. Vol. 3, *Renaissance and the Enlightenment Paradoxes*. Harvard UP, Cambridge.
- DELEUZE, J.-P.-F. 1823. *Histoire et description du Muséum royal d’histoire naturelle*. Royer, Paris.
- DENIS, G. 2006. “L’Agriculture dans l’Encyclopédie méthodique: l’ébauche d’une nouvelle discipline?” Pages 615–619 in C. BLANCKAERT AND M. PORRET, EDs. *L’Encyclopédie méthodique (1732–1832): des Lumières au Positivisme*. Droz, Geneva.
- DESFONTAINES, R. 1815. *Tableau de l’école de botanique du Muséum d’histoire naturelle*. 2nd ed. J. A. Brosson, Paris.
- DESGENETTES, R.-N. DUFRICHE. 1835–1836. *Souvenirs de la fin du XVIII^e siècle et du commencement du XIX^e, ou Mémoires de R. D. G.* 2 vol. Paris.
- DOIG, K. H. 2013. *From Encyclopédie to Encyclopédie méthodique revision and expansion*. The Voltaire Foundation, Oxford.
- DUGAGE DE POMMEREUL, E.-J. 1778. Letter to Linnaeus fil., Carl. L6269 10 March 1778. The Linnaean correspondence, an electronic edition prepared by the Swedish Linnaeus Society, Uppsala, and published by the Centre international d’étude du XVIII^e siècle, Ferney-Voltaire.
- . 1779. Letter to Linnaeus fil., Carl. L6270 31 January 1779. The Linnaean correspondence, an electronic edition prepared by the Swedish Linnaeus Society, Uppsala, and published by the Centre international d’étude du XVIII^e siècle, Ferney-Voltaire.
- FÉE, A. L. A. 1827. *Essai historique et critique sur la phytonomie, nomenclature végétale*. Recueil des travaux de la société des sciences, de l’agriculture et des arts de Lille: 161–184.
- GAY, M. J. 1862. Observations de M. J. Gay après la séance du 26 décembre 1862. *Bulletin de la Société botanique de France* 9: 529–531.
- GONZALES BUENO, A. 2002. Gómez Ortega, Zea, Cavanilles: tres botánicos de la ilustración. *La ciencia al servicio del poder*. Nivola, Tres Cantos.
- GOODMAN, D. 2002. L’ortographe des dames: Gender and Language in the Old Regime. *French Historical Studies* 25(2): 191–223.
- HAMY, E.-T. 1905. Joseph Dombey, Médecin, naturaliste, archéologue, explorateur du Pérou, du Chili et du Brésil (1778–1785). *Sa Vie, son œuvre, sa correspondance*. Librairie orientale et américaine E. Guilmoto, Paris.
- . 1893. *Les derniers jours du Jardin du Roi et la foundation du Muséum*. Imprimerie nationale, Paris.
- HENRIET, M. 1932. Correspondance inédite entre Thomas et Barthe 1759–1785. *RHLF* 39(2): 274–295.
- HISTOIRE DE L’ACADÉMIE ROYALE DES SCIENCES. 1746. 1751: 23–24.
- HUTTON, S. 2011. Before Frankenstein. Pages 17–28 in J. A. HAYDEN, ED. *The New Science and Women’s Literary Discourse. Prefiguring Frankenstein*. Palgrave Macmillan, New York.
- JOURNAL DE MÉDECINE, CHIRURGIE, ET DE PHARMACIE, ETC. 1783. Vol. 60. Didot, Paris.
- JUSSIEU, A. L. 1778. Exposition d’un nouvel ordre de plantes adopté dans les démonstrations du Jardin Royal. *Histoire de l’Académie royale des Sciences 1774*: 175–197.
- . 1802–1810. *Notices historiques sur le Muséum d’histoire naturelle*. *Annales du Muséum d’histoire naturelle par les professeurs de cet établissement*.
- KRIEF, H. AND V. ANDRÉ. 2015. *Dictionnaire des femmes des Lumières*. 2 vols. H. Champion, Paris.

- KOBAYASHI, T. 2012. *Écrits sur la botanique de J.-J. Rousseau*, édition critique. Ph. D. diss., Faculté des Lettres et Sciences humaines, Université de Neuchâtel, Neuchâtel.
- LAISSUS, J. 1964. Antoine-Laurent de Jussieu 'l'aimable professeur'. Pages 27–39 in 89^e Congrès des Sociétés savantes. Lyon.
- LAISSUS, Y. AND J. TORLAIS. 1986. *Le Jardin du Roi et le Collège royal dans l'enseignement des sciences au XVIII^e siècle*. Hermann, Paris.
- LAMARCK, J.-B. DE. 1778. *Flore Française ou Description succincte de toutes les plantes qui croissent naturellement en France*. Imprimerie royale, Paris.
- LETOUZEY, Y. 1989. *Le Jardin des plantes à la croisée des chemins, avec André Thouin (1747-1824)*. Éditions du Muséum National d'Histoire Naturelle, Paris.
- LOHIER DE LA SAUDRAYE, C.-J. 1779. Letter to Linnaeus fil., Carl. L0000 30 January 1779. The Linnaean correspondence, an electronic edition prepared by the Swedish Linnaeus Society, Uppsala, and published by the Centre international d'étude du XVIII^e siècle, Ferney-Voltaire.
- MARÉCHAL, S. 1833. *Dictionnaire des athées anciens et modernes*. 2nd ed. Bruxelles.
- MARRONNAGE IN SAINT-DOMINGUE (Haïti), History, Memory, Technology. Electronic edition and repository of advertisements published in the Affiches américaines (1766–1790). <http://www.marronnage.info/en/accueil.php#>
- MCCELLAN, J. E. 1985. *Science Reorganized: Scientific Societies in the Eighteenth Century*. Columbia University Press, New York.
- MOREAU DE SAINT-MÉRY, L. E. 1766–1779. *Lois et Constitutions des colonies françaises de l'Amérique sous le vent*. Vol. 5. Paris.
- MOUTON-FONTENILLE DE LACLOTTE, M. J. P. 1810. Coup d'œil sur la botanique. Discours prononcé le mercredi 9 mai 1810, jour de l'ouverture du cours d'Histoire naturelle à l'Académie de Lyon. Yvernault et Cabin, Lyon.
- NAEZÉN, D. E. 1779. *Nova Graminum Genera*. Upsaliae 31.
- NASSIET, M. 2012. *Noblesse et Pauvreté. La petite noblesse en Bretagne XV^e-XVIII^e siècle*. Presses Universitaires de Rennes, Rennes.
- NECKER, S. 1798. *Mélanges extraits des manuscrits de Mme Necker*. Vol. III. Charles Pougens, Paris.
- OUDOT DE DAINVILLE, M. 1926. Une page sentimentale de la vie de Pierre-Jean-Paul Bonnet avocat du roi au bureau des finances de Provence. *Provincia: bulletin de la Société de statistique de Marseille* 6: 53–60.
- PANCKOUCKE, C. J. 1781. *Encyclopédie méthodique*. *Mercure de France* (December 8): 51–155.
- POMMEREUL, F.-R.-J. DE. 1778. A Madame de P***. D. G**. Pages v–viii in *Lettre sur la littérature et la poésie italienne, traduite de Bettinelli*. Cailleau, Paris.
- . 1783. *Contes théologiques*. Imprimerie de la Sorbonne, Paris.
- . 1783. *Recherches sur l'origine de l'esclavage religieux et politique du peuple en France*. Londres.
- PUERTO SARMIENTO, F. J. 1992. *Ciencia de Cámara*. Casimiro Gómez Ortega (1741-1818) *El Científico cortesano*. Consejo superior de investigaciones científicas, Madrid.
- RIBALLIER AND C.-C. COSSON DE LA CRESSONNIÈRE. 1779. *De l'éducation physique et morale des femmes, avec une notice alphabétique*. Bruxelles-Paris.
- ROCHE, D. 1989. *Le Siècle des Lumières en province: académies et académiciens provinciaux, 1680-1789*. 2 vols. Éd. de l'École des hautes études en sciences sociales, Paris.
- ROUSSEAU, J.-J. 2002. *Huit Lettres élémentaires sur la botanique à Mme Delessert*, ed. Le Dantec. *Mercure de France*, Paris. Composed between 1771 and 1774.
- SCHIEBINGER, L. 1989. *The mind has no sex? Women in the origins of modern science*. Harvard University Press, Cambridge.
- . 1993. *Nature's Body. Gender in the Making of Modern Science*. Beacon Press, Boston.
- SEGUIN, M. S. 2004. *Les femmes et les sciences de la nature. Dix-huitième siècle* 36: 333–343.
- SHTEIR, A. B. 1996. *Cultivating women, cultivating science: Flora's daughters and botany in England, 1760-1860*. Johns Hopkins university press, Baltimore.
- SONNINI DE MANONCOURT, C. N. S. 1801. *Histoire naturelle, générale et particulière des plantes*. Paris.
- SPARY, E. 2000. *Utopia's Garden. French Natural History from Old Regime to Revolution*. The University of Chicago Press, Chicago.
- STAFLEU, F. 1973. Jussieu, Antoine-Laurent de. Pages 198-199 in C. GILLISPIE, DIR. Vol. 7 of *Dictionary of Scientific Biography*. Charles Scribner's Sons, New York.
- STEELE, A. R. 1964. *Flowers for the King: the expedition of Ruiz and Pavon and the Flora of Peru*. Duke UP, Durham.
- TESSIER, H. A. AND A. THOUIN. 1796. *Agriculture* vol. 4 of *Encyclopédie méthodique*: 686–687.
- THÉIS A. DE. 1801. *Dictionnaire étymologique de tous les noms et termes relatifs à cette science*. Paris.
- VERDIER, J. (1778) 1802. Introduction à la connaissance des plantes. Pages 489–555 of *Almanach pour l'an dixième de la république française, contenant ce qui concerne la culture générale de toutes les plantes potagères, des arbres fruitiers de toute espèce; oignons et plantes à fleurs, même les plus rares, et des arbres arbrisseaux d'ornement*. Nouvelle édition. Par Th. Fr. de Grace, cultivateur. Augmentée de l'Introduction à la connoissance des plantes, du C. Verdier, médecin. Onfroy, Paris.
- . 1792. "Botanique" in *Médecine* vol 4 of *Encyclopédie méthodique*: 66–83.
- VIRVILLE, A. DAVY. DE. 1954. *Histoire de la botanique en France*. Société d'édition d'enseignement supérieur, Paris.
- Voltaire. 1974. *Les œuvres complètes de Voltaire*. 118, Correspondence and related documents. XXXIV, August 1768–May 1769, letters D15164-D15672. The Voltaire Foundation, Oxford.
- WATTS, G. B. 1957. The Comte de Buffon and his Friend and Publisher Charles-Joseph Panckoucke. *Modern Language Quarterly* 18(4): 313–322.
- . 1958. *The Encyclopédie méthodique*. PMLA 73(4): 348–366.
- WILLIAMS R. L. 2001. *Botanophilia in Eighteenth-Century France. The Spirit of Enlightenment*. Kluwer Academic Publishers, Dordrecht.
- ZINSSER, J. P. AND J. C. HAYES. 2006. *Emilie Du Châtelet: rewriting Enlightenment philosophy and science*. Voltaire Foundation, Oxford.

FIRST REPORT OF PERIDISCACEAE FOR THE VASCULAR FLORA OF COLOMBIA

GERARDO A. AYMARD C.^{1,2,3} AND HENRY ARELLANO P.^{1,4}

Abstract. *Peridiscus lucidus* (Peridiscaceae) is recorded for the first time for the vascular flora of Colombia based on a collection from the upper Río Cuyarí, Guanía Department. This locality extends the northwestern distribution of the species in the Amazon basin to the upper Río Negro basin. Notes about the phytogeography and habitats of *P. lucidus* and an updated overview of the currently known specimens using a geographic distribution map of this taxon are also included. In addition, we provide information on the distinctive vegetative characters that help identify this genus in absence of flowers and fruits. Finally, a lectotype of *P. lucidus* is newly designated. The discovery of this family in the upper Río Negro region of Colombia demonstrates the value of field work through alliances between private initiatives and the Kuripaco nation.

Resumen: Se registra la familia Peridiscaceae para la flora vascular de Colombia y la región del alto Río Negro basándose en una colección de *Peridiscus lucidus* en la cuenca alta del río Cuyarí, departamento del Guanía. Esta localidad extiende la distribución de esta familia al noroeste de la región Amazónica, en la cuenca alta del Río Negro. Se incluyen notas acerca de la fitogeografía, hábitos de *P. lucidus* y un mapa de la distribución geográfica elaborado a partir de la actualización de las colecciones de esta especie. Adicionalmente se presenta información para la identificación del género en ausencia de flores o frutos y se propone el lectotipo para *P. lucidus*. El hallazgo de *P. lucidus* en la región del alto Río Negro de Colombia demuestra el valor de los trabajos de campo a través de la alianza de iniciativas privadas y el pueblo Kuripaco.

Yaakuti iipena (Kuripaco): Padana Peridiscaceae shapuko inakuapanaa Colombia likuperi jaiko jnete payawiya jiwidan tsakja wakapa waikawa pada naniwanda lipitana *Peridiscus lucidus* Benth kuwialiriku, departamento del Guanía. Paaketa natawiñakawa jnaja jaiko puawajle amazonia isro jnete escudo guayanés tsakja. Warueta yaakuti wakaitekawa kjaleka nema jnaja jaiko, kuame natawiñaka jnaja *P. lucidus* jnete pada mapa wakaitekawa kjaleka neema wadzekatanda waniwakaujle jnapepe jaiku. Waruetsakja yaakuti yajnekaru ikapaka jlieje jaiko karukadanaku lisro liwi o liinaka jnete wakaite isro pada yajneshopa *P. lucidus*. Waaketa jlieje *P. lucidus* payawiya jiwidansre karukawa naapiñeta nenkani nenshopa kanakaidali jlieje idejnikjeti awakadaliko napidza jnaja empresas privadas jnete kuripako nai.

Keywords: Peridiscaceae, Colombian Flora, upper Río Negro, new family record

Peridiscaceae Kuhlmann *nom. cons.* are a tropical group included in Saxifragales (Soltis et al., 2013; APG-IV, 2016). The family comprises four genera: *Medusandra* Brenan, *Soyauxia* Oliv., *Peridiscus* Benth., and *Whittonia* Sandwith (Bayer, 2007). These genera have a disjunct distribution, with *Peridiscus* occurring in Guyana, Venezuela, northern Brazil and now in Colombia (Fig. 1), *Whittonia* in Guyana, *Medusandra* in Cameroon, and *Soyauxia* in tropical West Africa. The genus *Whittonia* is known only from the type specimen collected below Kaieteur Falls in Guyana, in the Potaro River basin; a field effort to collect more material in 2006 was not successful (Wurdack and Davis, 2009).

The genus *Peridiscus* has had a rather significant taxonomic history. Using Richard Spruce's collections made in 1853–1854 along the Pasiva and Pacimoni rivers, tributaries of the Casiquiare Channel (Venezuela), and along the lower Rio Uaupés (Brazil), George Bentham established the genus

in *Genera Plantarum* (1862), describing a single species, *Peridiscus lucidus*. In addition, the genus was illustrated (Fig. 2) with a renewed description in Hooker's *Icones Plantarum* (Oliver, 1896). These authors both placed it, with some doubt, in the *Bixanaeae*, a part of the group which he called "*Tribus Flacourtieae*" (Bentham and Hooker, 1862), and which later would be known as the family Flacourtiaceae. In his description, Bentham wrote no etymology for the name, but it is generally believed that the name refers to the fact that the stamens are attached along the outer edge of the nectary disk (Quattrocchi, 2000). The genus was placed in Bixaceae, tribe *Flacourtieae*, by Eichler (1871) in Martius's *Flora Brasiliensis*, and with doubt in Flacourtiaceae in the first and second editions of the *Pflanzenfamilien* (Warburg, 1893; Gilg, 1925). The family Flacourtiaceae was a polyphyletic lineage, as Hermann Sleumer intimated (Miller, 1975; Chase et al., 2002),

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¹ Compensation International Progress S.A.–Ciprogress Greenlife– P.O. Box 260161, Bogotá, D. C. Colombia

² UNELLEZ–Guanare, Programa de Ciencias del Agro y el Mar, Herbario Universitario (PORT), Mesa de Cavacas, Estado Portuguesa, 3350 Venezuela

³ Corresponding author: cuyuni24@hotmail.com

⁴ Grupo de Investigación en Biodiversidad y Conservación, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, P.O. Box 7495, Bogotá, D.C., Colombia

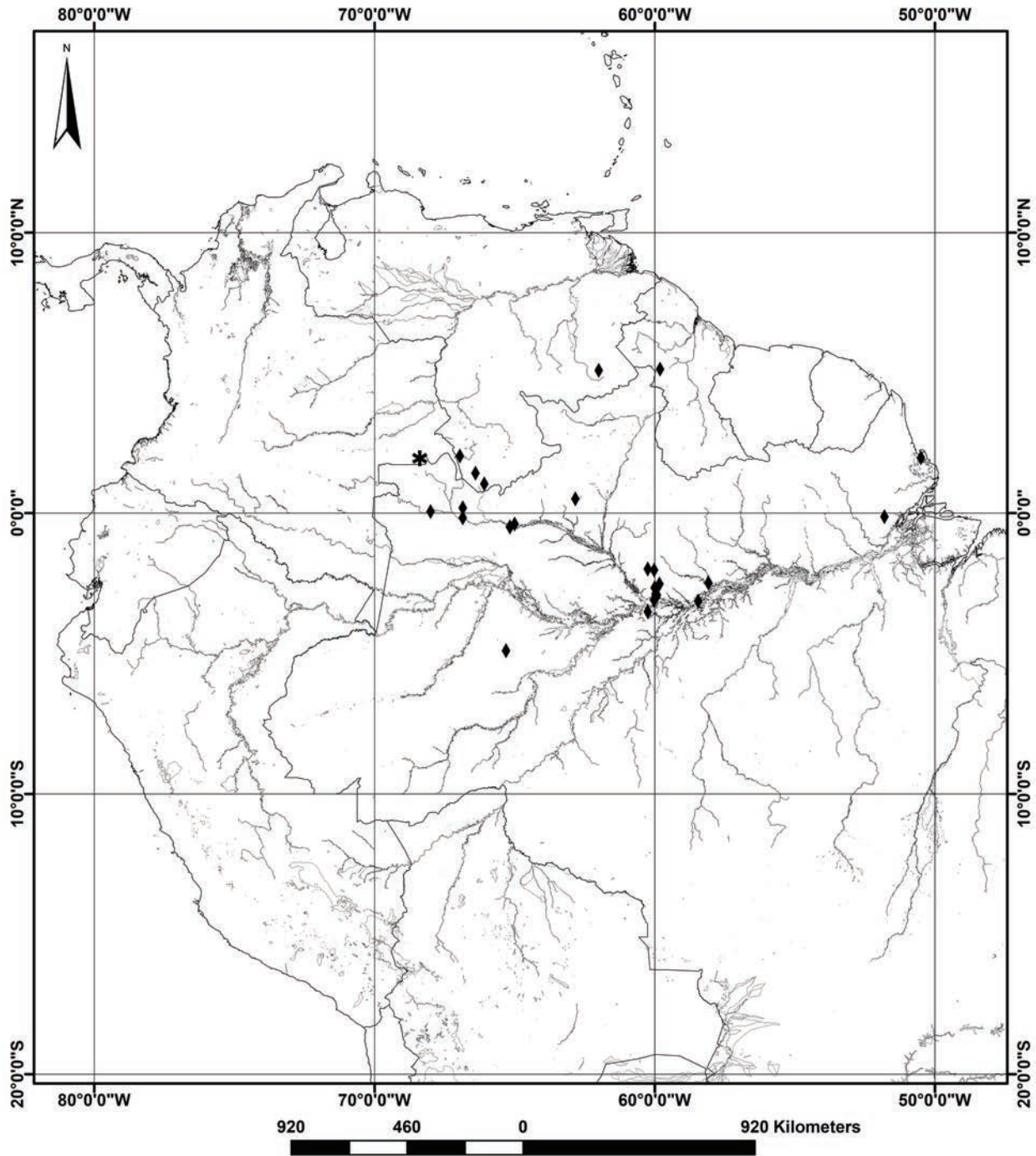


FIGURE 1. Geographical distribution of *Peridiscus lucidus* Benth. (◆) with emphasis on new record from Colombia (*).

and *Peridiscus* was one of its most improbable members. Understanding its distinctiveness, Kuhlmann (1947) placed the genus in a separate family (Peridiscaceae) after its differences from Flacourtiaceae in many features of morphology and anatomy. Peridiscaceae was accepted and placed in order Tiliales by Hutchinson (1959) in the second edition of his *Families of Flowering Plants*, but rejected in the third edition (Hutchinson, 1967). Thereafter, Peridiscaceae was viewed as a family of uncertain

taxonomic position, placed in the Violales (*sensu* Cronquist, 1981). A DNA sequence for the chloroplast *rbcL* placed Peridiscaceae in a clade with Elatinaceae and Malpighiaceae, a very surprising and unexpected result (Savolainen, et al., 2000). In 2004, using DNA from *Peridiscus*, it was shown that Elatinaceae and Malpighiaceae are indeed sister families, and that Peridiscaceae belongs to Saxifragales (Davis and Chase, 2004). Two additional studies also found strong support for the inclusion of Peridiscaceae into



FIGURE 2. *Peridiscus lucidus* Benth. in Hooker's *Icones Plantarum* (Oliver, 1896). 1, Flower; 2, Group of stamens; 3, Anther, from and back views; 4, Pistil with adnate disk; 5, Vertical section of ovary.

Saxifragales (Soltis et al., 2007; Shuguang et al., 2008), and the latter showed that Peridiscaceae is sister to the rest of Saxifragales as it maintained in the last Angiosperm Phylogeny Group classification (APG-IV, 2016).

In Neotropical forests, *Peridiscus* should be considered a rare component, known only from 52 collections (from 1853 to present) mainly in terra-firme and high plains on clays soils. It is also found in black-water floodplain forests on white sand soils (Daly, 2004). The occurrence of Peridiscaceae in the flora the Colombia, as well as the

extension of their distribution along the northern of the upper Rio Negro basin, are reported here for the first time based on a collection of *P. lucidus* from the Cuyarí River, Guainía Department (Fig. 1). In addition, we provide information on the morphological features to help identify this species in the absence of flowers and fruits, and updated information about its geographical distribution and the structure and floristic composition of the habitats that it occupies in Colombia and Venezuela, respectively.

MATERIAL AND METHODS

The specimen was determined consulting pertinent literature (Riviero et al., 1999; Holst, 2003. Daly, 2004; Keller, 2004; Every, 2010). An updated database and a map of the geographic distribution of this species (Fig. 1) was compiled using information from Tropicos (www.Tropicos.org), the speciesLink Network (<http://www.splink.org.br>), *Lista de espécies da Flora do Brasil* (Medeiros, 2015), Jabot (<http://www.jbrj.gov.br/jabot>), and the Amazon Tree Diversity Network (<http://atdn.myspecies.info/>). In the last decade, the use of geographic information has become increasingly important tool to interpret the analysis of species distribution (Franklin,

2009), due the available digital biodiversity databases that permit assembly of species occurrence data from various sources, such as herbaria and museums, as well as data from literature. The current demand for reliable, easily accessible and free biodiversity data makes electronic infrastructures fundamental for facilitating access (Canhos et al., 2015).

In addition, we incorporate the specimens of *P. lucidus* deposited in the following herbaria: GH, MO, US, and NY (acronyms according to Thiers, 2012). Our updated database has 52 records (Brazil: 46; Colombia: 1; Guyana: 1; Venezuela: 4; see Appendix 1).

RESULTS

Peridiscus is known from the northeastern Guayana Shield, where it can be found at an altitude of 800 m. This species also is known from the upper Rio Negro region of Brazil and Venezuela, and now in Colombia, which extends its southern range to central Amazon basin (e.g., the Manaus area), with two disjunct populations in Maracá region and Urubú river in Amapá and Amazonas states (Brazil), respectively (Fig. 2).

Peridiscus Benth. *Genera Plantarum* 1: 127. 1862.

Type species: *Peridiscus lucidus* Benth.

Peridiscus lucidus Benth., *Genera Plantarum* 1: 127. 1862. TYPE: BRAZIL. Amazonas: Rio Uaupés, 1853, *R. Spruce 2843* (Syntypes: BR, G, K); VENEZUELA. Amazonas. Casiquiare, Pasiva et Pasimoni, Casiquiari, 1853–1854, *R. Spruce 3389* (Syntypes: BR, G, RB), Lectotype, here designated: VENEZUELA. Amazonas. Casiquiare, Pasiva et Pasimoni, 1853–1854, *R. Spruce 3389* (G 00440028; isolectotype BR).

In the JSTOR database, *Spruce 3389* deposited in RB (a single leaf) is annotated as *P. lucidus*, but based on an examination of this material we conclude the leaf belongs to a species of *Aspidosperma* (Apocynaceae), and it is therefore excluded from the lectotypification.

Medium to large trees up 25 m tall. Branches and bractlets terete, glabrous, bark fissured, rough, dark brown. Leaves alternate, 15–25 x 5–12 cm, entire, lustrous above, glabrous on both sides, coriaceous, ovate to elliptic or oblong, acute to acuminate, acumen 2–3.5 cm long, base obtuse or acute, leaf blades strongly 3-veined from the base, the tertiary venation finely reticulate, the lower surface with a small to medium pit in the axil of each of basal lateral

nerve; stipules intrapetiolar, villous, early deciduous and leaving a narrow oblique amplexicaul scars; petioles 1.5–2.5 cm long, glabrous, strongly pulvinate at both ends, with an adaxial plate. Inflorescences short, in clusters of elongate axillary racemes, axes and pedicels ferruginous-villous (short branched trichomes), bracts ovate-oblong, early deciduous. Sepals 4–5(6), imbricate, ferruginous-villous outside, glabrous inside; petals 0; ovary without a central column; stamens inserted outside the large several-lobed disk; filaments partly united at the base, incurved, glabrous; anthers bisporangiate, dehiscing by slits. Ovary subhemispheric, glabrous, half immersed in the nectary disk. Fruit ovoid, obovoid or ellipsoidal drupe, narrowed at the base into a short stipe. Seed one; embryo small; endosperm copious, horny.

Whittonia differs from *Peridiscus* by having the leaves villous, pliveined (versus, glabrous, strongly trinerved), flowers in fascicles (versus elongate racemes), an annular disk that subtends the ovary (versus the half of the ovary immersed in the nectary disk), and ovary densely pubescent (versus glabrous). The position of *Whittonia* within Peridiscaceae is uncertain due to lack of material, but it is most likely sister to *Peridiscus* since the two genera share several potential morphological synapomorphies (Soltis et al., 2011).

Additional Specimen examined: COLOMBIA. Guainía: Panapaná, río Cuyarí, ca. 3.5 km al norte de la comunidad de Miraflores, 1°56'51.5976"N; 68°22'8.6344"W, 115 m, 21 April 2014, G. Aymard, F. Castro-Lima, V. Minorta-C., A. Lozano, M. González y C. Villegas 14158 (COL, COAH, FMB, HUA). Fig. 3–4.



FIGURE 3. Specimen I of *Peridiscus lucidus* from Cuyarí river, Guanía, Colombia (G. Aymard, F. Castro-Lima, V. Minorta-C., A. Lozano, M. González y C. Villegas 14158, (COL 604628).



FIGURE 4. Specimen II of *Peridiscus lucidus* from Cuyarí river, Guainía, Colombia (G. Aymard, F. Castro-Lima, V. Minorta-C., A. Lozano, M. González y C. Villegas 14158, (COL 604629).

Field identification in absence of flowers and fruits.

Because of its alternate leaves, entire, coriaceous, leaf blades strongly 3-veined from the base, and petioles strongly pulvinate at both ends, specimens of *Peridiscus* are sometimes referred to *Abuta* sp. (Menispermaceae). However, *Peridiscus* is easy to distinguish in absence of flowers and fruits by the combination of the following characters: trees, leaves alternate, entire, lustrous above,

glabrous on both sides, coriaceous, ovate to elliptic or oblong, acute to acuminate, acumen 2–3.5 cm long, leaf blades strongly 3-veined from the base, the tertiary venation finely reticulate, the lower surface with a small to medium pit in the axil of each of basal lateral nerve; stipules intrapetiolar, villous, early deciduous and leaving a narrow oblique amplexicaul scars, and petioles 1.5–2.5 cm long, glabrous, strongly pulvinate at both ends.

DISCUSSION

Currently, understanding the diversity of plants, their distribution patterns (e.g., rarity versus hyperdominance), dispersal events, and endemisms in the entire Amazon watershed (*sensu lato*: 8,121,313 km²), with its four peripheral region (Amazon *sensu stricto*, Guayana Shield, Plateau, Andes foothills and Gurupi basin, *sensu ter* Steege et al., 2013; Antonelli et al., 2018; Alves Valles et al., 2018a) continues to be a major challenge (Prance, 2014; ter Steege et al., 2015; 2016; Pennington et al., 2015).

Amazonia represents the world's most diverse rainforest, and it is also the region in tropical America with the largest biodiversity (Gentry, 1982a,b, 1992; ter Steege 1998; Ter Steege et al., 2010, 2013, 2016; Dexter and Chave, 2016; Dexter et al., 2017; Antonelli et al., 2018). Many regions inside the basin are not represented by even a single collection, perhaps implying that many species distributions are still poorly known and/or not well understood (Nelson et al., 1990; Hopkins, 2007; Schulman et al., 2007; ter Steege et al., 2011, 2016; Cardoso et al., 2015). However, several areas inside the basin (e.g. the Rio Negro basin, Manaus, and, s.l., the Guayana Shield) had been relatively well explored and studied, the information about the explorations were summarized in Aymard et al. (2016) and ter Steege et al. (2016), respectively. As a result, currently there exists a relatively good understanding of the structure and floristic composition of forests inside the Amazon basin (Prance, 1989, 2001; Tuomisto et al., 1995, 2016; ter Steege 1998; ter Steege et al., 2003, 2006, 2010, 2015, 2016; Pitman et al., 2008; Aymard et al., 2009; Higgins et al., 2011; Prance, 2014; Slik et al., 2018). In addition a considerable number of endemics (Carvalho, 2011; Alves Valles et al., 2018b), and rare species are found there (Zizka et al., 2018). No doubt due by the environmental variables, the biographical history and the dispersal mechanism allow assembly of unique habitats, such as numerous and diverse terra-firme and flooded forests growing in white-sand and clay soils as well; the Amazonian Caatinga, and abundant plants communities mixed of palms over black and white water rivers vegetation (Kristiansen et al., 2012; Alves Valles et al., 2018a).

Currently, very little information is known about the habitats occupied by *Peridiscus lucidus*. After the R. Spruce's collections of 1853–1854, the next ones took place ca. 80 years later (A. Ducke, 1931; L. Williams, 1942; and R. L. Froes, 1947) on terra-firme forests in the Manaus region (Rio Taruma), and the upper Rio Negro (Piedra de Cocuy and Tapuruquara, respectively). Other localities and habitats of this species are: in montane forests over lateritic soils (Guyana, Potaro-Siparuni region. Mt. Wokokomung,

790 m). In Brazil it is found through the central to eastern Brazilian Amazon, where it is found along terra-firme and flooded forests growing in sand and clay soils (e.g., Amazonas: Manaus area, Rodovia Manaus-Itacoatiara, R. F. A. Ducke, São Sebastião do Uatumã e Uruará, Sierra da Lua, Rio Urubu, Rio Cuieiras), and in terra-firme forests growing in clay soils (e.g., Amapá: Matará, Macapá, Pará: Monte Dourado). It is also found growing in the middle and upper Rio Negro (e.g., Santa Isabel do Rio Negro, São Gabriel da Cachoeira, Rio Uaupés) over sandy and clay soils tall forests, and in black water communities subject to flooding dominated by *Tachigali odoratissima* (Spruce ex Benth.) Zar. & Herend., *Protium reticulatum*. (Engl.) Engl., *Molongum laxum* (Benth.) Pichon, *Heisteria duckei* Sleumer, *Guatteria dura* R. E. Fr. and *G. punctata* (Aubl.) R. A. Howard (e.g., middle Río Baria, Venezuela).

We report here that *Peridiscus lucidus* also occurs in the upper Rio Negro basin of Colombia, specifically in the upper Río Cuyarí (Fig. 1); the latter is a black water river, the basin of which includes largely unexplored flooded and non-flooded forests (Aymard and Castro-Lima, 2015; Aymard et al., 2016). The collection from the Río Cuyarí is represented by a single individual, and was made during inventories made to compare tree communities. This locality is dominated by terra-firme tall forests, in high plains over clays soils with an important presence of *Micrandra spruceana* (Baill.) R. E. Schult. ("Cunuri tierra firme") and *Caryocar gracile* Wittm ("Jigua montera"). Other trees species found in this forest are: *Iryanthera coriacea* Ducke, *Aspidosperma excelsum* Benth., *Swartzia acuminata* Willd. ex Vogel, *Ocotea rhodophylla* A. Vicentini, *Faramea anisocalyx* Poepp. & Endl., *Dacryodes cuspidata* (Cuatr.) Daly, *D. negrensis* Daly & M. A. Martínez, *Qualea acuminata* Spruce ex Warm., and *Ferdinandusa goudotiana* K. Schum. The forests dominated by *Micrandra spruceana* (Baill.) R. E. Schult. are common in many places inside the northeastern portion of the Amazon basin, with the same habitat preferences described above such as San Carlos de Rio Negro, Venezuela (Dezseo et al. 2000; Aymard et al., 2009), Amacayacu, Caquetá, Loretoyacu and Mirití rivers, Colombia (Rangel, 2008) and Pico da Neblina National Park, Brazil (Boubli, 2002). The variety of habitats where *Peridiscus lucidus* is found indicates that this species is not a soil specialist, and also suggests that the terra-firme forests growing in sand and clay soils may have a common evolutionary history, and support the model that advises the ability of plants to grow across a wide range of soils (Duivenvoorden, 1995; Pitman et al., 2001; ter Steege et al., 2003; Aymard et al., 2009, 2016).

When the geographical distribution of *Peridiscus lucidus* is plotted and analyzed (Fig. 1), it shows us that this taxon is mainly a Rio Negro basin element (from its headwaters to Manaus area), with only five collections outside of this basin. The family so far is absent in Ecuador, Peru, Bolivia, and the southeastern and northwestern Amazon basin region (Gentry, 1983). It would be easy to treat the absence of *P. lucidus* from this large area as a collection artifact because the area is still vastly unexplored, which we regard as an unlikely explanation given the large number of plant collectors who have worked in this particular area in the last 250 years, since the age of exploration in the Neotropics began (Aymard et al., 2016; ter Steege et al., 2016). The latter is an area that comprises a large portion of the Amazon basin of Colombia, Ecuador and Peru, considered one of the world's last zone of high biodiversity with an extraordinary number of species across taxa and where large tracts of forests still remain largely intact (Pitman et al., 2008; Bass et al., 2010). The absence of this family in southeastern and northwestern Amazonia could be related to the Pebas wetland system (Hoorn et al., 2010b; Sacek, 2014), which may also have played a role as a dispersal barrier for pre-Pebas groups, and could account for the well-known pattern of Andean-centered vs. Amazonian-centered biodiversity (Gentry, 1982; Antonelli and Sanmartín, 2011).

A modern ecological insight is that some Amazonian tree species are consistently more abundant than would be expected from chance alone (ter Steege et al., 2013). An estimated 16,000 tree species make up Amazonian forests, yet over half the stems belong to just 227 of them; this subset of disproportionately common trees has been dubbed the "hyperdominants" (ter Steege et al., 2013). The contribution of rare species to this diversity has been recognized (Wills et al., 2006; Kenfack et al., 2007), however their spatial distribution remains poorly understood (Zizka et al., 2018). Wills et al. (2006) presented census data from seven New and Old World tropical forest dynamics plots that all showed that the erosion of diversity can be prevented over the short term if recruits are highly diverse as a result of preferential recruitment of rare species or, alternatively, if rare species survive preferentially, which increases diversity as the ages of the individuals increase.

The current distribution of *P. lucidus*, based on a few collections (52) in 161 years, and only 42 individuals measured in 16 one-hectare plots (ter Steege et al., 2013), suggest that this is a rare species. However, the lack of material for DNA extraction and information about the dispersal biology (although the fruits are most likely dispersed by animals, perhaps birds) provide us with elements to explore an alternative hypothesis to explain its distribution, based in its present in both white-sand and clay soils in the North and Central Amazon lowlands, as well as in medium altitudes in the Guayana Shield.

The Guayana Shield (GS) has been considered the place of origin of some widespread lineages in South America (Frasier et al., 2008; Rull, 2008, 2010; Givnish et al., 2011). Perhaps *P. lucidus* is currently migrating from the GS to the lowlands forests located inside the North and Central

Amazon region. Furthermore, the GS was above water at time of high sea levels (23 to 10 Ma, 10 to 7 Ma), which allowed the survival of forests, active speciation, and the maintenance of high levels of sympatric species diversity (Givnish et al., 2000, 2011; Rull, 2005, 2007); during this period, the current Amazon basin was inundated as a result of sea levels up to 50 m higher than the present (Hoorn et al., 2010a,b; Sacek, 2014). The lowland rainforest could not have existed in the mega-wetlands or Pebas system during 16 to 10 Ma.

During this phase, the Pebas wetland in western Amazonia was possibly separated from the fluvial eastern Amazonia by the Purus Arch (Wesselingh, 2006; Figueiredo et al., 2009). Later, 10 to 6 Ma ago, the sea level was low again, and warm tropical climates drier prevalence than the one existing today in the Amazon. During this interval the sediment accumulation was reduced and/or ceased, erosion took place under warm, tropical weather having well defined dry seasons which, resulting in deep lateritic paleosol and spodosol horizons (Montes et al., 2011) that allowed the formation of the first fluvial plains in eastern and western Amazonia and, consequently, marked the beginning of an unstoppable processes of distribution, dispersion and a high turnover of species, a scenario implicating high rates of speciation through space and time in the basin, resulting in the highly diversity of the modern rainforest (Morley, 2000; Burnham and Johnson, 2004; Hughes et al., 2013; Pennington et al., 2015). This process was supported by the establishment of the transcontinental drainage post Pebas System of the present Amazon by an overflowing of the Andean foreland basin in the Late Miocene (Wesselingh et al., 2010; Hoorn et al., 2010b; Antonelli and Sanmartín, 2011). All this evidence show that the GS region may have allowed old lineages to survive over time, with diverse traits that provide the stock for species diversifications through time to neighborhood regions (Rull, 2008; 2010; Désamóré et al., 2010) contributing to the accumulation of diversity, at least in part, detectable in the current species richness of tropical forests.

The first occurrence of Peridiscaceae reported herein for the flora of Colombia expands the geographical distribution and improves the family-level information of the floras of Brazil, Colombia, and Amazon basin as well (Medeiros, 2015; Rangel, 2015; Bernal et al., 2016; ter Steege et al., 2016; Cardozo et al., 2017; Ulloa-Ulloa et al., 2017).

A recent work on rarity in the Neotropics identified 26,315 species for Amazonia, of this 10,080 species as putatively rare within this region (Zizka et al., 2018). Inside Amazonia most collections of rare species were in the sub-Andean region and on the GS, and in few areas scattered across the study area. The authors also found that rare species are homogeneously distributed through most parts of the lowland Neotropics and Amazonia, but more concentrated in highlands, with no clear disjunction patterns within lowland areas. These results suggest that a considerable proportion of rare plant species have surprisingly large distribution ranges (e.g., *P. lucidus*), and that collections of rare species across most of the lowland Neotropics, and in particular in Amazonia, show no clear directionality.

The Amazon basin has outstanding global conservation significance because this region represents the largest tropical rain forest in the world, storing ca. 40% of the global biomass of tropical forests (Saatchi et al., 2007, 2011). However, this tropical forest is at risk due to the impact of increases in drought frequency (Longo et al., 2018) and fires (Carmenta et al., 2018) that are altering the Amazon forest's composition, structure and functioning. This situation, suggests that parts of the Amazon basin may be susceptible to biome shifts, biodiversity loss and depletion of carbon stores because of changes in climate and weather

variability (Duffy et al., 2015; Boit et al., 2016; Bathiany et al., 2018). In addition, mining activities, selective logging, and new road developments will threaten its as yet unvalued conservation status. These findings help to form the scientific basis for policy recommendations, including stopping new destructive events, and creating more areas off limits to large-scale development in adjacent regions of the three countries that comprises the basin. Finally, this report is yet another example that demonstrates the need for continued taxonomic and floristic studies in regions where there are large geographic gaps in the knowledge of Amazonian flora.

LITERATURE CITED

- ALVEZ-VALLES, C. M., H. BALSLEV, R. GARCÍA-VILLACORTA, F. A. CARVALHO, AND L. MENINI NETO. 2018a. Palm species richness, latitudinal gradients, sampling effort, and deforestation in the Amazon region. *Acta Botanica Brasilica*. doi: 10.1590/010233062017abb0400.
- , H. BALSLEV, F. A. CARVALHO, R. GARCÍA-VILLACORTA, C. GRANDEZ, AND L. MENINI NETO. 2018b. Endemism and conservation of Amazon palms. *Biodiversity and Conservation* 27: 765–784.
- ANTONELLI A., A. ZIZKA, F. ANTUNES CARVALHO, R. SCHARN, C. D. BACON, D. SILVESTRO, AND F. L. CONDOMINE. 2018. Amazonia is the primary source of Neotropical biodiversity. *Proceedings of the National Academy of Sciences, USA* 115. www.pnas.org/cgi/doi/10.1073/pnas.1713819115.
- AND I. SANMARTÍN. 2011. Why are there so many plant species in the Neotropics? *Taxon* 60: 403–414.
- APG-IV. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society* 181(1): 1–20.
- AYMARD, G., H. ARELLANO-P., V. MINORTA-C., AND F. CASTRO-LIMA. 2016. First report of Rhabdodendraceae for the vascular flora of Colombia and the Upper Río Negro basin, with comments on phytogeography, habitats, and distribution of *Rhabdodendron amazonicum*. *Harvard Papers in Botany* 21: 5–21.
- AYMARD, G. AND F. CASTRO-LIMA. 2015. A second tree species of *Ampelozizyphus* (Rhamnaceae), from the upper Cuyarí river basin, Guianá (Colombia). *Harvard Papers in Botany* 20: 161–166.
- , R. SCHARFEL, P. BERRY, AND B. STERGIOS. 2009. Estudio de los suelos y la vegetación (estructura, composición florística y diversidad) en bosques macrotérmicos no-inundables, estado Amazonas, Venezuela (aprox. 01°30'–05°55'N; 66°00'–67°50'O). *Biollania (Edición Especial)* 9: 6–251.
- BASS, M. S., M. FINER, C. N. JENKINS, H. KREFT, D. F. CISNEROS-HEREDIA, S. F. MCCracken, N. C. A. PITMAN, P. H. ENGLISH, K. SWING, G. VILLA, A. DI FIORE, C. C. VOIGT, AND T. H. KUNZ. 2010. Global Conservation Significance of Ecuador's Yasuní National Park. *PLOS One* 5: 1–22.
- BATHIANY, S., V. DAKOS, M. SCHEFFER, AND T. M. LENTON. 2018. Climate models predict increasing temperature variability in poor countries. *Science Advances* 2018: 4:eaar5809
- BAYER, C. 2002. Peridiscaceae. Pages 297–300 in K. KUBITZKI, ED. *The Families and Genera of Vascular Plants* volume IX. Springer, Berlin.
- BENTHAM, G. AND J. D. HOOKER. 1862. *Genera Plantarum*, Volume 1, part 1, page 127. A. Black, William Pamplin, Lovell Reeve & Co., Williams & Norgate, London, England.
- BERNAL, R., S. R. GRADSTEIN, AND M. CELIS, EDs. 2016. Catálogo de plantas y líquenes de Colombia. Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá. [online]. Available from www.catalogoplantasdecolombia.unal.edu.co (accessed May 7, 2018).
- BOIT, A., B. SAKSCHEWSKI, L. BOYSEN, A. CANO-CRESPO, J. CLEMENT, N. GARCIA-ALANIZ, K. KOK, M. KOLB, F. LANGERWISCH, A. RAMMIG, R. SACHSE, M. VAN EUPEN, W. VON BLOH, D. ZEMP, AND K. THONICKE. 2016. Large-scale impact of climate change vs. land-use change on future biome shifts in Latin America. *Global Change Biology* 22: 3689–3701.
- BOUBLI, J. P. 2002. Lowland floristic assessment of Pico da Neblina National Park, Brazil. *Plant Ecology* 160: 149–167.
- BURNHAM, R. J. AND K. R. JOHNSON. 2004. South American paleobotany and the origins of Neotropical rainforests. *Philosophical Transactions of the Royal Society B Biological Sciences* 359: 1595–1610.
- CANHOS D. A., M. S. SOUSA-BAENA, S. DE SOUZA, L. C. MAIA, J. R. STEHMANN, V. P. CANHOS, R. DE GIOVANNI, W. LOS, AND A. T. PETERSON. 2015. The importance of biodiversity e-infrastructures for megadiverse countries. *PLoS Biology* 13(7): e1002204. doi: 10.1371/journal.pbio.1002204.
- CARDOSO, D., T. SARKINEN, S. ALEXANDER, A. M. AMORIN, V. BITTRICH, M. CELIS, D. C. DALY, P. FIASCHI, V. A. KUNK, L. L. GIACOMIN, R. GOLDENBERG, G. HEIDEN, J. IGANCI, C. L. KELLOFF, S. KNAPP, H. CAVALCANTE DE LIMA, A. F. P. MACHADO, R. M. DOS SANTOS, R. MELLO-SILVAR, F. A. MICHELANGELI, J. MITCHELL, P. MOONLIGHT, P. L. RODRIGUES DE MORAES, S. A. MORI, T. S. NUNES, T. D. PENNINGTON, J. R. PIRANI, G. T. PRANCE, L. P. DE QUEIROZ, A. RAPINI, R. RIINA, C. A. VARGAS-RINCÓN, N. ROQUE, G. SHIMIZU, M. SOBRAL, J. R. STEHMANN, W. D. STEVENS, C. M. TAYLOR, M. TROVÓ, C. VAN DEN BERG, H. VAN DER WERFF, P. L. VIANA, C. E. ZARTMAN AND R. CAMPOSTRINI FORZZA. 2017. Amazon plant diversity revealed by a taxonomically verified species list. *Proceedings of the National Academy of Sciences* 114: doi:10.1073/pnas.1706756114.
- , J. G. CARVALHO SOBRINHO, C. E. ZARTMAN, D. L. KOMURA, AND L. P. QUEIROZ. 2015. Unexplored Amazonian diversity: rare and phylogenetically enigmatic tree species are newly collected. *Neodiversity* 8: 55–73.
- CARMENTA, R., E. COUDEL, AND A. M. STEWARDS. 2018. Forbidden fire: Does criminalising fire hinder conservation efforts in swidden landscapes of the Brazilian Amazon? *The Geographical Journal*. 184: 1–15. DOI: 10.1111/geoj.12255
- CARVALHO, C. J. B. 2011. Áreas de Endemismo, Pages 45–50 in C. J. B. CARVALHO AND E. A. B. ALEMIDA, EDs. *Biogeografia da América do Sul: Padrões and Processos*. Editora Roca Ltda, São Paulo, Brasil.
- CRONQUIST, A. 1981. *An integrated system of classification of flowering plants*. Columbia University Press, New York.
- DALY, D. C. 2004. Peridiscaceae. Pages 290–291. in N. P. SMITH, S. A. MORI, A. HENDERSON, D. W. STEVENSON, AND S. V. HEALD, EDs. *Flowering Plants of the Neotropics*. The New York Botanical Garden, Princeton University Press, Princeton, New Jersey.
- DAVIS, C. C. AND M. W. CHASE. 2004. Elatinaceae are sister to Malpighiaceae; Peridiscaceae belong to Saxifragales. *American Journal of Botany* 91: 262–273.

- DEXTER, K. G., M. LAVIN, B. TORKE, A. TWYFORD, T. A. KURSAR, P. D. COLEY, C. DRAKE, R. HOLLANDS, AND R. T. PENNINGTON. 2017. Dispersal assembly of rain forest tree communities across the Amazon basin. *Proceedings of the National Academy of Sciences* 114: 2645–2650.
- AND J. CHAVE. 2016. Evolutionary patterns of range size, abundance and species richness in Amazonian angiosperm trees. *PeerJ* 4: e2402; DOI 10.7717/peerj.2402.
- DEZZEO, N., P. MAQUIRINO, P. E. BERRY, Y G. AYMARD. 2000. Principales tipos de bosques en el área de San Carlos de Río Negro, Venezuela. *Scientia Guaianae* 11: 15–36.
- DUIVENVOORDEN, J. E. 1995. Tree species composition and rain forest–environment relationships in the middle Caquetá area, Colombia, NW Amazonia. *Vegetatio* 120: 91–113.
- EICHLER, A. G. 1871. Bixaceae, Flacourtiaceae, C. F. von Martius, *Flora Brasiliensis* 13(1): 450.
- EVERY, J. L. R. 2010. Neotropical Peridiscaceae. In MILLIKEN, W., B. KLITGÅRD, AND A. BARACAT (2009 onwards). Neotropikey—Interactive key and information resources for flowering plants of the Neotropics. <http://www.kew.org/science/tropamerica/neotropikey/families/Peridiscaceae.htm>.
- FIGUEIREDO, J., C. HOORN, P. VAN DER VEN, AND E. SOARES. 2009. Late Miocene onset of the Amazon River and the Amazon deep-sea fan: evidence from the Foz do Amazonas Basin. *Geology* 37: 619–622.
- FRANKLIN, J. 2009. Mapping species distributions: spatial inference and prediction. Cambridge University Press, Cambridge.
- FRASIER, C., V. ALBERT, AND L. STRUWE. 2008. Amazonian lowland, white sand areas as ancestral regions for South American biodiversity: Biogeographic and phylogenetic patterns in *Potalia* (Angiospermae: Gentianaceae). *Organisms, Diversity & Evolution* 8: 44–57.
- GENTRY, A. H. 1993. A Field Guide to the Families and Genera of Woody Plants of Northwest South America. Conservation International, Washington, D.C.
- . 1992. Tropical forest biodiversity: distributional patterns and their conservational significance. *Oikos* 63: 19–28.
- . 1982a. Patterns of neotropical plant species diversity. *Evolutionary Biology* 15: 1–84.
- . 1982b. Neotropical floristic diversity: phytogeographical connections between Central and South America, Pleistocene climatic fluctuations, or an accident of the Andean orogeny? *Annals of the Missouri Botanical Garden* 69: 557–593.
- GILG, E. 1925. In A. Engler & K. Prantl, K., *Die natürlichen Pflanzenfamilien*, 2 Aufl. 21: 457.
- GIVNISH, T. J., M. H. J. BARFUSS, B. V. EE, R. RIINA, K. SCHULTE, R. HORRES, P. A. GONSISKA, R. S. JABAILY, D. M. CRAYN, J. A. C. SMITH, K. WINTER, G. K. BROWN, T. M. EVANS, B. K. HOLST, H. LUTHER, W. TILL, G. ZIZKA, P. E. BERRY, AND K. J. SYTSMA. 2011. Phylogeny, adaptive radiation, and historical biogeography in Bromeliaceae: Insights from an eight-locus plastid phylogeny. *American Journal of Botany* 98: 872–895.
- , T. M. EVANS, M. L. ZIHR, T. B. PATTERSON, P. E. BERRY, AND K. J. SYTSMA. 2000. Molecular evolution, adaptive radiation, and geographic diversification in the amphiatlantic family Rapateaceae, evidence from *ndhF* sequences and morphology. *Evolution* 54: 1915–1937.
- HIGGINS, M. A., K. RUOKOLAINEN, H. TUOMISTO, N. LLERENA, G. CÁRDENAS, O. L. PHILLIPS, R. VÁSQUEZ, AND M. RÁSÁNEN. 2011. Geological control of floristic composition in Amazonian forests. *Journal of Biogeography* 38: 2136–2149.
- HOLST, B. K. 2003. Peridiscaceae. *Flora of the Venezuelan Guayana* 7: 670–671. Missouri Botanical Garden.
- HOPKINS, M. J. G. 2007. Modeling the known and unknown plant biodiversity of the Amazon Basin. *Journal of Biogeography* 34: 1400–1411.
- HOORN, C., F. P. WESSELINGH, H. TER STEEGE, M. BERMÚDEZ, A. MORA, J. SEVINK, I. SANMARTÍN, A. SANCHEZ-MESEGUER, C. ANDERSON, J. FIGUEIREDO, C. JARAMILLO, D. RIFF, F. R. NEGR, H. HOOGHIEMSTRA, J. LUNDBERG, T. STADLER, T. SÄRKINEN, AND A. ANTONELLI. 2010a. Amazonia through time: Andean uplift, climate change, landscape evolution, and biodiversity. *Science* 330: 927–931.
- , F. P. WESSELINGH, J. HOVIKOSKI, AND J. GUERRERO. 2010b. The development of the Amazonian Mega-Wetland (Miocene; Brazil, Colombia, Peru, Bolivia). Pages 123–142 in C. HOORN, AND F. P. WESSELINGH, EDs. Amazonia: Landscape and Species Evolution: A Look into the Past. Wiley Online Library.
- HUGHES, C. E., R. T. PENNINGTON, AND A. ANTONELLI. 2013. Neotropical plant evolution: Assembling the big picture. *Botanical Journal of the Linnean Society* 171: 1–18.
- HUTCHINSON, J. 1967. The genera of flowering plants (Angiospermae), ed. 3, 2. Oxford: Clarendon Press. U.K.
- . 1959. The families of flowering plants, ed. 2, 2. Clarendon Press, Oxford, U.K.
- JIAN, S., P. S. SOLTIS, M. A. GITZENDANNER, M. J. MOORE, R. LI, T. A. HENDRY, Y. L. QIU, A. DHINGRA, C. D. BELL, AND D. E. SOLTIS. 2008. Resolving an Ancient, Rapid Radiation in Saxifragales. *Systematic Biology* 57: 38–57.
- KELLER, R. 2004. Identification of tropical Woody plants in the absence of flowers (A field guide). 2 ed. Birkhäuser, Verlag, Basel, Switzerland, 294 p.
- KENFACK, D., D. W. THOMAS, G. CHUYONG, AND R. CONDIT. 2007. Rarity and abundance in a diverse African forest. *Biodiversity and Conservation* 16: 2045–2074.
- KRISTIANSEN, T., J. C. SVENNING, L. W. EISERHARDT, D. PEDERSEN, H. BRIX, S. MUNCH KRISTIANSEN, M. KNADDEL, C. GRÁNDEZ, AND H. BALSLEV. 2012. Environment versus dispersal in the assembly of western Amazonian palm communities. *Journal of Biogeography* 39: 1318–1332.
- KUHLMANN, J. G. 1947. Peridiscaceae (Kuhlmann). *Arquivos do Serviço Florestal* 3: 3–5.
- LONGO, M., R. G. KNOX, N. M. LEVINE, L. F. ALVES, D. BONAL, P. B. CAMARGO, D. R. FITZJARRALD, M. N. HAYEK, N. RESTREPO-COUBE, S. R. SALESKA, R. DA SILVA, S. C. STARK, R. P. TAPAJÓS, K. T. WIEDEMANN, K. ZHANG, S. C. WOFSEY, AND P. R. MOORCROFT. 2018. Ecosystem heterogeneity and diversity mitigate Amazon forest resilience to frequent extreme droughts. *New Phytologist*. doi: 10.1111/nph.15185
- MEDeiros, H. 2015. Peridiscaceae in Lista de Espécies da Flora do Brasil. Jardim Botânico do Rio de Janeiro. Disponível em: <http://floradobrasil.jbrj.gov.br/jabot/floradobrasil/FB86411> (accessed March 11, 2018).
- MILLER, R. B. 1975. Systematic anatomy of the xylem and comments on the relationships of Flacourtiaceae. *Journal Arnold Arboretum* 56: 20–102.
- MONTES, R. C., Y. LUCAS, O. J. R. PEREIRA, R. ACHARD, M. GRIMALDI, AND A. J. MELFI. 2011. Deep plant-derived carbon storage in Amazonian podzols. *Biogeosciences* 8: 113–120.
- MORLEY, R. J. 2000. *Origin and Evolution of Tropical Rain Forests*. John Wiley & Sons, Chichester.
- NELSON, B. W., C. A. C. FERREIRA, M. F. DA SILVA, AND M. L. KAWASAKI. 1990. Endemism centres, refugia and botanical collection density in Brazilian Amazonia. *Nature* 345: 714–716.
- OLIVER, E. D. 1896. *Peridiscus lucidus* Benth. *Hooker's Icones Plantarum* pl. 2441.
- PENNINGTON, T., M. HUGHES, AND P. W. MOONLIGHT. 2015. The origins of tropical rainforests hyperdiversity. *Trends in Plant Science* 20: 693–695.
- PITMAN, N. C., H. MOGOLLÓN, N. DÁVILA, M. RÍOS, R. GARCÍA-VILLACORTA, J. GUEVARA, T. BAKER, A. MONTEAGUDO, O. PHILLIPS, R. VÁSQUEZ-MARTÍNEZ, M. AHUITE, M. AULESTIA, D. CARDENAS,

- C. CERÓN, P. A. LOIZEAU, D. NEILL, P. NUÑEZ, W. PALACIOS, R. SPICHTER, AND E. VALDERRAMA. 2008. Tree community change across 700 km of Lowland Amazonian Forest from the Andean Foothills to Brazil. *Biotropica* 40: 525–535.
- , J. W. TERBORGH, M. R. SILMAN, P. NUÑEZ, D. A. NEILL, C. E. CERÓN, W. A. PALACIOS, AND M. AULESTIA. 2001. Dominance and distribution of tree species in upper Amazonian terra firme forests. *Ecology* 82: 2101–2117.
- PRANCE, G. T. 2014. That glorious forest (exploring the plants and their indigenous uses in Amazonia). *Memoirs of the New York Botanical Garden* 113: 1–214.
- . 2001. Amazon Ecosystems. Pages 145–157 in S. ASHER-LEVIN, ED. *Encyclopedia of Biodiversity*, Vol. 1: A–C. Academic Press, New York.
- . 1989. American tropical forests. Pages 99–132 in H. LIETH AND M. J. A. WERGER, EDs. *Tropical Rain Forest Ecosystems, Ecosystems of the World 14B*, Elsevier, Amsterdam, The Netherlands.
- QUATTROCCHI, U. 2000. *CRC World Dictionary of Plant Names*. Vol. III, page 2010. CRC Press: Baton Rouge, New York, London, Washington DC.
- RANGEL-CH. J. O. 2015. La riqueza de las plantas con flores de Colombia. *Caldasia* 37: 279–307.
- . 2008. La vegetación de la región Amazónica de Colombia—Aproximación inicial. Pages 1–53 in O. J. RANGEL-CH., ED. *Colombia Diversidad Biótica VII: Vegetación, palinología y paleoecología de la Amazonia Colombiana*, Universidad Nacional de Colombia, Instituto de Ciencias Naturales, Bogotá, Colombia.
- RIBEIRO, S. DA J. E. L., M. J. G. HOPKINS, A. VINCENTINI, C. A. SOTHERS, M. A. DA COSTA, J. M. DE BRITO, M. A. DE SOUZA, L. H. P. MARTINS, L. G. LOHMANN, P. A. ASSUNÇÃO, E. DA C. PEREIRA, C. FERNANDES DA SILVA, M. R. MESQUITA, AND L. C. PROCÓPIO. 1999. Flora da Reserva Ducke (Guia de identificação das plantas vasculares de uma floresta de terra-firme na Amazônia Central. INPA-DFID, Manaus Brazil.
- RULL, V. 2010. The Guayana Highlands: a natural laboratory for the biogeographical and evolutionary study of the Neotropical flora. Pages 84–102 in M. M. SÁNCHEZ-VILLAGRA, O. AGUILERA, AND A. A. CARLINI, EDs. *Urumaco and Venezuelan paleontology—The fossil record of the northern Neotropics*. Indiana University Press, Bloomington.
- . 2008. Speciation timing and Neotropical biodiversity: The Tertiary-Quaternary debate in the light of molecular phylogenetic evidence. *Molecular Ecology* 17: 2722–2729.
- . 2007. The Guayana Highlands: A Promised (but Threatened) Land for Ecological and Evolutionary Science. *Biotropica* 39: 31–34.
- . 2005. Biotic diversification in the Guayana Highlands, a proposal. *J. Biogeogr.* 32: 921–927.
- SAATCHI, S. S., N. L. HARRIS, S. BROWN, M. LEFSKY, E. T. A. MITCHARD, W. SALAS, B. R. ZUTTA, W. BUERMANN, S. L. LEWIS, S. HAGEN, S. PETROVAC, L. WHITE, M. SILMAN, AND A. MOREL. 2011. Benchmark map of forest carbon stocks in tropical regions across three continents. *Proceedings of the National Academy of Sciences* 108: 9899–9904.
- , R. A. HOUGHTON, R. C. D. S. ALVALÁ, J. V. SOARES, AND Y. YU. 2007. Distribution of aboveground live biomass in the Amazon basin. *Global Change Biology* 13: 816–837.
- SACEK, V. 2014. Drainage reversal of the Amazon River due to the coupling of surface and lithospheric processes. *Earth and Planetary Science Letters* 401: 301–312.
- SANDWITH, N. Y. 1943. New and noteworthy Polypetalae from British Guiana. *Journal of the Arnold Arboretum* 24: 218–226.
- SAVOLAINEN, V., M. F. FAY, D. C. ALBACH, A. BACKLUND, M. VAN DER BANK, K. M. CAMERON, S. A. JOHNSON, M. D. LLEDO, J. C. PINTAUD, M. P. POWELL, M. C. SHEAHAN, D. E. SOLTIS, P. S. SOLTIS, P. WESTON, W. M. WHITTEN, K. J. WURDACK, AND M. W. CHASE. 2000. Phylogeny of the eudicots: a nearly complete familial analysis based on *rbcL* gene sequences. *Kew Bulletin* 55: 257–309.
- SCHULMAN, L., T. TOIVONEN AND K. RUOKOLAINEN. 2007. Analysing botanical collecting effort in Amazonia and correcting for it in species range estimation. *Journal of Biogeography* 34: 1388–1399.
- SOLTIS, D. E., M. EMORT, M. LATVIS, E. V. MAVRODIEV, B. C. O'MEARA, P. S. SOLTIS, J. GORDON-B., AND R. RUBIO DE CASAS. 2013. Phylogenetic relationships and character evolution analysis of Saxifragales using a supermatrix approach. *Amer. J. Bot.* 100: 916–929.
- , S. A. SMITH, N. CELLINESE, K. J. WURDACK, D. C. TANK, S. F. BROCKINGTON, N. F. REFULIO-RODRIGUEZ, J. B. WALKER, M. J. MOORE, B. S. CARLSWARD, C. D. BELL, M. LATVIS, S. CRAWLEY, C. BLACK, D. DIOUF, Z. XI, C. A. RUSHWORTH, M. A. GITZENDANNER, K. J. SYTSMA, Y. L. QIU, K. W. HILU, C. C. DAVIS, M. J. SANDERSON, R. S. BEAMAN, R. G. OLMSTEAD, W. S. JUDD, M. J. DONOGHUE, AND P. S. SOLTIS. 2011. Angiosperm Phylogeny: 17 genes, 640 taxa I. *American Journal of Botany* 98: 704–730.
- , J. W. CLAYTON, C. C. DAVIS, M. A. M. A. GITZENDANNER, M. CHEEK, V. SAVOLAINEN, A. M. AMORIN, P. S. SOLTIS, AND M. C. CHASE. 2007. Monophyly and relationships of the enigmatic amphitropical family Peridiscaceae. *Taxon* 56: 65–73.
- SLIK., F. J. W., J. FRANKLIN, V. ARROTO-R., R. FIELD, S. AGUILAR, N. AGUIRRE, J. AHUMADA, S. I. AIBA, L. F. ALVES, ANITHA K. A. AVELLA, F. MORA, G. A. AYMARD-C., S. BÁEZ, P. BALVANERA, M. L. BASTIAN, J. F. BASTIN, P. J. BELLINGHAM, E. VAN DEN BERG, P. DA C. BISPO, P. BOECKX, K. BOEHNING-GAESE, F. BONGERS, B. BOYLE, F. BRAMBACH, F. Q. BREARLEY, S. BROWN, S. LEE-CHAI, R. L. CHAZDON, S. CHEN, P. CHHANG, G. CHUYONG, C. EWANGO, I. M. CORONADO, J. C. AZKARATE, H. CULMSEE, K. DAMAS, H. S. DATTARAJA, P. DAVIDAR, S. J. DEWALT, H. DIN, D. R. DRAKE, A. DUQUE, G. DURIGAN, K. EICHORN, E. SCHMIDT-ELER, T. ENOKI, A. ENSSLIN, A. B. FANDOHAN, N. FARWING, K. J. FEELEY, M. FISCHER, O. FORSHED, Q. SOUZA-GARCÍA, S. C. GARKOTI, T. W. GILLESPIE, J. F. GILLET, C. GONMADIE, I. G. DE LA CERDA, D. M. GRIFFITH, J. GROGAN, K. R. HAKEEN, D. J. HARRIS, R. D. HARRISON, A. HECTON, A. HEMP, J. HOMEIER, M. S. HUSSAIN, G. IBARRA-M., I. F. HANUM, N. IMAI, P. A. JANSEN, C. A. JOLY, S. JOSEPH, K. KARTAWINATA, E. KEARSLEY, D. L. KELLY, M. KESSLER, T. J. KILLEEN, R. M. KOOYMAN, Y. LAUMONIEN, S. G. LAURANCE, W. F. LAURANCE, M. J. LAWES, S. G. LETCHER, J. LINDSELL, J. LOVETT, J. LOZADA, X. LU, A. M. LYKKE, K. B. MAHMUD, N. P. D. MAHAYANI, A. MANSOR, A. R. MARSHALL, E. H. MARTIN, D. C. LEAL-MATOS, J. A. MEAVE, F. P. L. MELO, Z. H. AGUIRRE-M., F. METALI, V. P. MEDJIBE, J. P. METZGER, T. METZKER, D. MOHANDASS, M. A. MUNGUÍA-R., R. MUÑOZ, E. NURTIAHY, E. L. DE OLIVEIRA, ORIANZAL, P. PAROLIN, M. PARREN, N. PARTHSARATHY, E. PAUDEL, R. PÉREZ, E. A. PÉRES-G., U. POMMER, L. POORTER, L. QUI, M. T. F. PIEDADE, J. R. RODRIGUES-P., A. D. POULSEN, J. R. POULSEN, J. S. POWERS, R. C. PRASAD, J. P. PUYRAVAUD, O. RANGEL, J. REITSMA, D. S. B. ROCHA, S. ROLIM, F. ROVERO, A. ROZAK, K. RUOKOLAINEN, E. RUTISHAUSER, G. RUTTEN, M. N. M. SAID, F. Z. SAITET, P. SANER, B. SANTOS, J. R. DOS SANTOS, S. K. SARKER, C. B. SCHMITT, J. SCHOENGART, M. SCHULZE, D. SHEIL, P. SIST, A. F. SOUZA, W. R. SPIRONELLO, T. SPOSITO, R. STEINMETZ, T. STEYART, M. S. SUGANUMA, R. SUKRI, A. SULTANA, R. SUKUMAR, T. SUDERLAND, SUPRIYAD, H. S. SURESH, E. SUZUKI, M. TABARELLI, J. TANG, ED. V. J. TANNER, N. TARGHETTA, I. THEILADE, D. THOMAS, J. TIMBERLAKE, M. DE MORISSON-V., J. VAN VALKENBURG, T. VAN DO, H. VAN SAM, J. H. VANDERMEER, H. VERBEECK, O. R. VETAAS, V. ADEKUNIE, S. A. VIEIRA, C. O. WEBB, E. L. WEBB, T. WHITFIELD, S. WICH, J. WILLIAMS, S. WISER, F. WITTMANN, X. YANG, C. Y. A.

- YAO, S. L. YAP, R. A. ZAHAWI, R. ZAKARIA, AND R. ZANG. 2018. A phylogenetic classification of the world's tropical forests. *Proceedings of the National Academy of Sciences* 115: 1837–1842. www.pnas.org/cgi/doi/10.1073/pnas.1714977115.
- TER STEEGE, H. R. W. VAESSEN, D. CÁRDENAS-LÓPEZ, D. SABATIER, A. ANTONELLI, S. MOTA DE OLIVEIRA, N. C. A. PITMAN, P. M. JØRGENSEN AND R. P. SALOMAO. 2016. The discovery of the Amazonian tree flora with an updated checklist of all known tree taxa. *Scientific Reports* 6: 29549. DOI: 10.1038/srep29549
- , N. C. A. PITMAN, T. J. KILLEEN, W. F. LAURANCE, C. A. PERES, J. E. GUEVARA, R. P. SALOMÃO, C. V. CASTILHO, I. L. AMARAL, F. D. DE ALMEIDA MATOS, L. DE SOUZA COELHO, W. E. MAGNUSSON, O. L. PHILLIPS, D. DE ANDRADE LIMA FILHO, M. DE J. VEIGA CARIM, M. V. IRUME, M. P. MARTINS, J.-F. MOLINO, D. L. SABATIER, F. WITTMANN, D. CÁRDENAS-LÓPEZ, J. R. DA SILVA GUIMARÃES, A. MONTEAGUDO-M., P. NÚÑEZ-VARGAS, A. G. MANZATTO, N. F. COSTA REIS, J. TERBORGH, K. R. CASULA, J. C. MONTERO, T. R. FELDPAUSCH, E. N. HONORIO-CORONADO, A. J. DUQUE MONTOYA, C. E. ZARTMAN, B. MOSTACEDO, R. VÁSQUEZ, R. L. ASSIS, M. BRILHANTE MEDEIROS, M. FRAGOMENI SIMON, A. ANDRADE, J. L. CAMARGO, S. G. W. LAURANCE, H. E. MENDONÇA NASCIMENTO, B. S. MARIMON, B.-H. MARIMON JR., F. COSTA, N. TARGHETTA, I. C. GUIMARÃES VIEIRA, R. BRIENEN, H. CASTELLANOS, J. F. DUIVENVOORDEN, H. F. MOGOLLÓN, M. T. FERNANDEZ PIEDADE, G. A. AYMARD C., J. A. COMISKEY, G. DAMASCO, N. DÁVILA, R. GARCÍA-VILLACORTA, P. R. STEVENSON DIAZ, A. VINCENTINI, T. EMILIO, C. LEVIS, J. SCHIETTI, P. SOUZA, A. ALONSO, F. DALLMEIER, L. VALLE FERREIRA, D. NEILL, A. ARAUJO-MURAKAMI, L. ARROYO, F. ANTUNES CARVALHO, F. COELHO SOUZA, D. D. DO AMARAL, R. GRIBEL, B. GARCIA LUIZE, M. P. PANSONATO, E. VENTICINQUE, P. FINE, M. TOLEDO, C. BARALOTO, C. CERÓN, J. ENGEL, T. W. HENKEL, E. M. JIMENEZ, P. MAAS, M. C. PEÑUELA MORA, P. PETRONELLI, J. D. CÁRDENAS R., M. SILVEIRA, J. STROPP, R. THOMAS-CAESAR, T. R. BAKER, D. DALY, M. RÍOS P., N. FERREIRA DA SILVA, A. FUENTES, P. M. JØRGENSEN, J. SCHÖNGART, M. R. SILMAN, N. CASTAÑO A., B. B. LADVOCAT CINTRA, F. CORNEJO V., A. DI FIORE, J. F. PHILLIPS, T. R. VAN ANDEL, P. VON HILDEBRAND, E. M. BARBOSA, L. C. DE MATOS BONATES, D. DE CASTRO, E. DE SOUSA FARIAS, T. GONZALES, J.-L. GUILLAUMET, B. HOFFMAN, Y. MALHI, I. P. DE ANDRADE MIRANDA, A. PRIETO, A. RUDAS, A. R. RUSCHELL, N. SILVA, C. I. A. VELA, V. A. VOS, E. L. ZENT, S. ZENT, A. CANO, M. T. DE NASCIMENTO, A. A. OLIVEIRA, H. RAMIREZ-ANGULO, J. FERREIRA RAMOS, R. SIERRA, M. TIRADO, M. N. UMAÑA M., G. VAN DER HEIDEN, E. VILANOVA T., C. VRIESENDORP, O. WANG, K. R. YOUNG, C. BAIDER, H. BALSLEV, N. DE CASTRO, W. FARFAN-RIOS, C. FERREIRA, C. MENDOZA, I. MESONES, A. TORRES-LEZAMA, L. E. URREGO G., D. VILLARROEL, R. ZAGT, M. N. ALEXIADES, K. GARCÍA-C., L. HERNÁNDEZ, I. HUAMANTUPA-C., W. MILLIKEN, W. PALACIOS, S. PANSINI, D. PAULETTO, F. RAMIREZ A., A. F. SAMPAIO, E. H. VALDERRAMA S., AND L. VALENZUELA G. 2015. Estimating the global conservation status of more than 15,000 Amazonian tree species. *Science Advances* 1 (10): 1–10.
- , N. C. A. PITMAN, D. SABATIER, C. BARALOTO, R. P. SALOMÃO, J. E. GUEVARA, O. L. PHILLIPS, C. V. CASTILHO, W. E. MAGNUSSON, J.-F. MOLINO, A. MONTEAGUDO, P. NÚÑEZ VARGAS, J. C. MONTERO, T. R. FELDPAUSCH, E. N. HONORIO C., T. J. KILLEEN, B. MOSTACEDO, R. VÁSQUEZ, R. L. ASSIS, J. TERBORGH, F. WITTMANN, A. ANDRADE, W. F. LAURANCE, S. G. W. LAURANCE, B. S. MARIMON, B.-H. MARIMON JR., I. C. GUIMARÃES VIEIRA, I. L. AMARAL, R. BRIENEN, H. CASTELLANOS, D. CÁRDENAS LÓPEZ, J. F. DUIVENVOORDEN, H. F. MOGOLLÓN, F. D. DE ALMEIDA MATOS, N. DÁVILA, R. GARCÍA-VILLACORTA, P. R. STEVENSON D., F. COSTA, T. EMILIO, CAROLINA LEVIS, J. SCHIETTI, P. SOUZA, A. ALONSO, F. DALLMEIER, A. DUQUE, M. T. FERNANDEZ PIEDADE, A. ARAUJO-MURAKAMI, L. ARROYO, R. GRIBEL, P. V. A. FINE, C. A. PERES, M. TOLEDO, G. A. AYMARD C., T. BAKER, C. CERÓN, J. ENGEL, T. W. HENKEL, P. MAAS, P. PETRONELLI, J. STROPP, C. E. ZARTMAN, D. DALY, D. NEILL, M. SILVEIRA, M. RÍOS PAREDES, J. CHAVE, D. DE ANDRADE LIMA F., P. M. JØRGENSEN, A. FUENTES, J. SCHÖNGART, F. CORNEJO, A. DI FIORE, E. M. JIMENEZ, M. C. PEÑUELA M., J. F. PHILLIPS, G. RIVAS, T. R. VAN ANDEL, P. VON HILDEBRAND, B. HOFFMAN, E. L. ZENT, Y. MALHI, A. PRIETO, A. RUDAS, A. R. RUSCHELL, N. SILVA, V. VOS, S. ZENT, A. A. OLIVEIRA, A. CANO S., T. GONZALES, M. T. DE NASCIMENTO, H. RAMIREZ-ANGULO, R. SIERRA, M. TIRADO, M. N. UMAÑA M., G. VAN DER HEIDEN, C. I. A. VELA, E. VILANOVA, C. VRIESENDORP, O. WANG, K. R. YOUNG, C. BAIDER, H. BALSLEV, C. FERREIRA, I. MESONES, A. TORRES-LEZAMA, L. E. URREGO, R. ZAGT, M. N. ALEXIADES, L. HERNANDEZ, I. HUAMANTUPA-C., W. MILLIKEN, W. PALACIOS, D. PAULETTO, E. VALDERRAMA S., L. VALENZUELA G., K. G. DEXTER, K. FEELEY, G. LOPEZ-GONZALEZ, AND M. I. R. SILMAN. 2013. Hyperdominance in the Amazonian tree flora. *Science* 342: 225–335.
- , P. P. HARIPERSAUD, O. S. B. BÁNKI, AND F. SCHIEVING. 2011. A Model of Botanical Collectors' Behaviour in the Field: Never the Same Species Twice. *American Journal of Botany* 98: 31–37.
- , ATDN (Amazon Tree Diversity Network: collective author), and RAINFOR (The Amazon Forest Inventory Network: collective authorship). 2010. Contribution of current and historical processes to patterns of tree diversity and composition of the Amazon. Pages 349–359 in C. HOORN AND F. P. WESSELINGH, EDS. *Amazonia, Landscape and Species Evolution*, 1st edition. Blackwell Publishing, Oxford.
- . 2006. Continental-scales patterns of canopy tree composition and function across Amazonia. *Nature* 443: 444–447.
- . 2003. A spatial model of tree alpha-diversity and tree density for the Amazon. *Biodiversity and Conservation* 12: 2255–2277.
- . 1998. The use of forest inventory data for a National Protected Area Strategy in Guyana. *Biodiversity and Conservation* 7: 1457–1483.
- THIERS, B. 2012. Index Herbarium. A Global Directory of Herbaria and Associated Staff. New York Botanical Garden's Virtual Herbarium. Electronic database accessible at <http://sweetgum.nybg.org/ih/>. Consulted 20 March 2018.
- TUOMISTO, H., G. M. MOULATLET, H. BALSLEV, T. EMILIO, F. O. G. FIGUEIREDO, D. PEDERSEN, AND K. RUOKOLAINEN. 2016. A compositional turnover zone of biogeographical magnitude within lowland Amazonia. *Journal of Biogeography* 43: 2400–2411.
- , K. RUOKOLAINEN, R. KALLIOLA, A. LINNA, W. DANJOY, AND Z. RODRIGUEZ. 1995. Dissecting Amazonian biodiversity. *Science* 269: 63–66.
- ULLOA ULLOA, C., P. ACEVEDO-RODRÍGUEZ, S. G. BECK, M. J. BELGRANO, R. BERNAL, P. E. BERRY, L. BRAKO, M. CELIS, G. DAVIDSE, S. R. GRADSTEIN, O. HOKCHE, B. LEÓN, S. LEÓN-YÁNEZ, R. E. MAGILL, D. A. NEILL, M. H. NEE, P. H. RAVEN, STIMMEL, M. T. STRONG, J. L. VILLASEÑOR RÍOS, J. L. ZARUCCHI, F. O. ZULOAGA, AND P. M. JØRGENSEN. 2017. An integrated assessment of vascular plants species of the Americas. *Science* 358: 1614–1617.
- WARBURG, O. 1893. In A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien* III. 6A: 54.
- WESSELINGH F. P. C. HOORN, S. B. KROONENBERG SB, A. ANTONELLI, J. G. LUNDBERG, H. B. VONHOF, AND H. HOOGHIEMSTRA. 2010. On the origin of Amazonian landscapes and biodiversity: a synthesis. Pages 421–431 in C. HOORN AND F. P. WESSELINGH, EDS. *Amazonia, Landscape and Species Evolution*, 1st edition. Blackwell Publishing, Oxford.
- . 2006. Miocene long-lived lake Pebas as a stage of mollusc radiations, with implications for landscape evolution in Western Amazonia. *Scripta Geologica* 133: 1–17.

- WILLS, C., K. E. HARMS, R. CONDIT, D. KING, J. THOMPSON, F. HE, H. C. MULLER-LANDAU, P. ASHTON, E. LOSOS, L. COMITA, S. HUBBELL, J. LAFRANKIE, S. BUNYAVEICHWIN, H. S. DATTARAJA, S. DAVIES, S. ESUFALI, R. FOSTER, N. GUNATILLEKE, S. GUNATILLEKE, P. HALL, A. ITOH, R. JOHN, S. KIRATIPRAYOON, S. R. KASSIM, R. SUKUMAR, H. S. SURESH, I-FANG SUN, S. TAN, T. YAMAKURA, AND J. ZIMMERMAN. 2006. Nonrandom processes maintain diversity in tropical forests. *Science* 311: 527–531.
- WURDACK, K. AND C. C. DAVIS. 2009. Malpighiales phylogenetics: Gaining ground on one of the most recalcitrant clades in the angiosperm tree of life. *American Journal of Botany* 96: 1551–1570.
- ZIZKA A., H. TER STEEGE, M. DO CÉO R. PESSOA, AND A. ANTONELLI. 2018. Finding needles in the haystack: Where to look for rare species in the American tropics. *Ecography* 41: 321–330.

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NOVELTIES IN THE ORCHID FLORA OF VENEZUELA IX. SUBTRIBE ZYGOPETALINAE. *KOELLENSTEINIA LILIJAE*

GUSTAVO A. ROMERO-GONZÁLEZ,^{2,3,4} CARLOS A. GÓMEZ-DAHUEMA,^{5†}
GERMÁN CARNEVALI,^{2,3} AND GUENTER GERLACH⁶

Abstract. We present additional information on and illustrations of *Koellensteinia lilijae*, a species previously known only from the holotype. A new historical report of *Warreopsis colorata* from northern Venezuela is presented in an appendix.

Resumen. Se presenta información e ilustraciones adicionales de *Koellensteinia lilijae*, una especie que previamente sólo se conocía del holotipo. Se presenta en un apéndice un nuevo reporte histórico de *Warreopsis colorata* del norte de Venezuela.

Keywords: *Koellensteinia lilijae*, Orchidaceae, Venezuela, Zygopetalinae

Koellensteinia Rchb.f. (Orchidaceae) is a Neotropical genus currently encompassing 14 species found from Belize, and Panama (but so far not found in between these two countries) to Brazil and Bolivia, mostly in Brazil (10 species) and Venezuela (6 species), one of which is presented herein.

Koellensteinia Rchb.f. Bonplandia (Hannover) 2, 2: 17. 1854.

Type Species: *Koellensteinia kellneriana* Rchb.f.

Eponymy: named after Kellner von Köllenstein, an austrian captain of the 19th century.

Pollination: Unknown, but presumably by euglossine bees.

Koellensteinia lilijae Foldats. Boletín de la Sociedad Venezolana de Ciencias Naturales 22: 100. 1961. TYPE: VENEZUELA. Amazonas: Departamento Atabapo, Laja Cabezón, en las orillas del río Cabezón, cerca de su desembocadura en el río [Atacavi], [11 September 1960] *E. Foldats 3899* (Holotype: VEN [48828]; Holotype fragment: AMES). Fig. 1–3.

“Río Cabezón” is not a tributary of the Atabapo river, as stated in the protologue, but, rather, of the Atacavi river (their confluence at ca. 03°07'33"N, 67°17'18"W); the latter is a tributary of the Atabapo, itself one of the Orinoco river.

Here we transcribe the description provided by the author in the protologue, verbatim (Foldats, 1961), as well as an

English translation; additional information, from the present authors, is included in brackets.

Hierba terrestre, [de] unos 80 cm [de] alto. *Rizoma* abreviado. *Pseudobulbos* agregados, elipsoides, cuando jóvenes vestidos con varias vainas escariosas, dísticas, imbricadas, agudas, que se desintegran con la edad, cuando viejos desnudos, unos 2.5 cm [de] largo y 7 mm [de] ancho, continuándose en una porción delgada, talliforme, terete, longitudinalmente surcada, unos 30 cm [de] largo y 6 mm [de] espesor [en el ápice de la cual se encuentra la zona de abscisión de la hoja], unifoliados. *Hojas* [articuladas, glaucas, adaxialmente verde-azuladas, abaxialmente verde oscuras] lanceoladas, agudas o acuminadas, atenuadas en la base en un pecíolo; limbos hasta aproximadamente 40 cm [de] largo y 6 cm [de] ancho, con 3 ó 5 nervios más pronunciados; *pecíolo* acanalado, hasta aproximadamente 7 cm [de] largo. *Inflorescencia* racimo subdensamente plurifloro, unos 55 cm [de] largo, erecto; *pedúnculo* [púrpura] vestido con varias vainas aplicadas, las basales aproximadas, las superiores distanciadas, unos 1.52 cm [de] largo [raquis verde]. *Flores* [resupinadas], erecto-patentes, cuando aplanadas unos 27 mm [de] diámetro, amarillas con los segmentos del perianto, especialmente los pétalos y labelo con puntos o cortas rayitas purpúreas [labelo blanco crema en flores recién abiertas, tornándose amarillo con el tiempo, el lóbulo central con líneas transversales anchas y cortas, púrpura, los lóbulos laterales con líneas longitudinales del mismo color, angostas; sépalos y pétalos

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¹ Previous articles in this series were Romero-González and Batista (2009), Romero-González et al. (2010a), Romero-González et al. (2010b), Romero-González and Meneguzzo (2012), Romero-González et al. (2013a), Romero-González et al. (2013b), Romero-González and Gómez (2014), and Romero-González et al. (2015).

² Oakes Ames Orchid Herbarium, Harvard University Herbaria, 22 Divinity Avenue, Cambridge, Massachusetts 02138, U.S.A.

³ Herbarium CICY, Centro de Investigación Científica de Yucatán A. C. (CICY), Calle 43, No. 130, Col. Chuburná de Hidalgo, 97200 Mérida, Yucatán, México; carneval@cicy.mx

⁴ Corresponding author: romero@oeb.harvard.edu

⁵ Calle Urdaneta No. 36, Puerto Ayacucho, Amazonas, Venezuela 7101. Carlos A. Gómez-Dahuema (1943–2016), was my faithful field companion for many years (1989–2013). Carlos unfortunately died of a bout of malaria, this time caused by a *Plasmodium falciparum* Welch (Plasmodiidae). A drug treatment exists to treat this deadly parasite, but unfortunately it was not available in the hospital of his home town when he needed it (GAR-G).

⁶ botanischer Garten münchen-Nymphenburg, menzinger Str. 65 D-80638 münchen, Germany; gerlach@snsb.de

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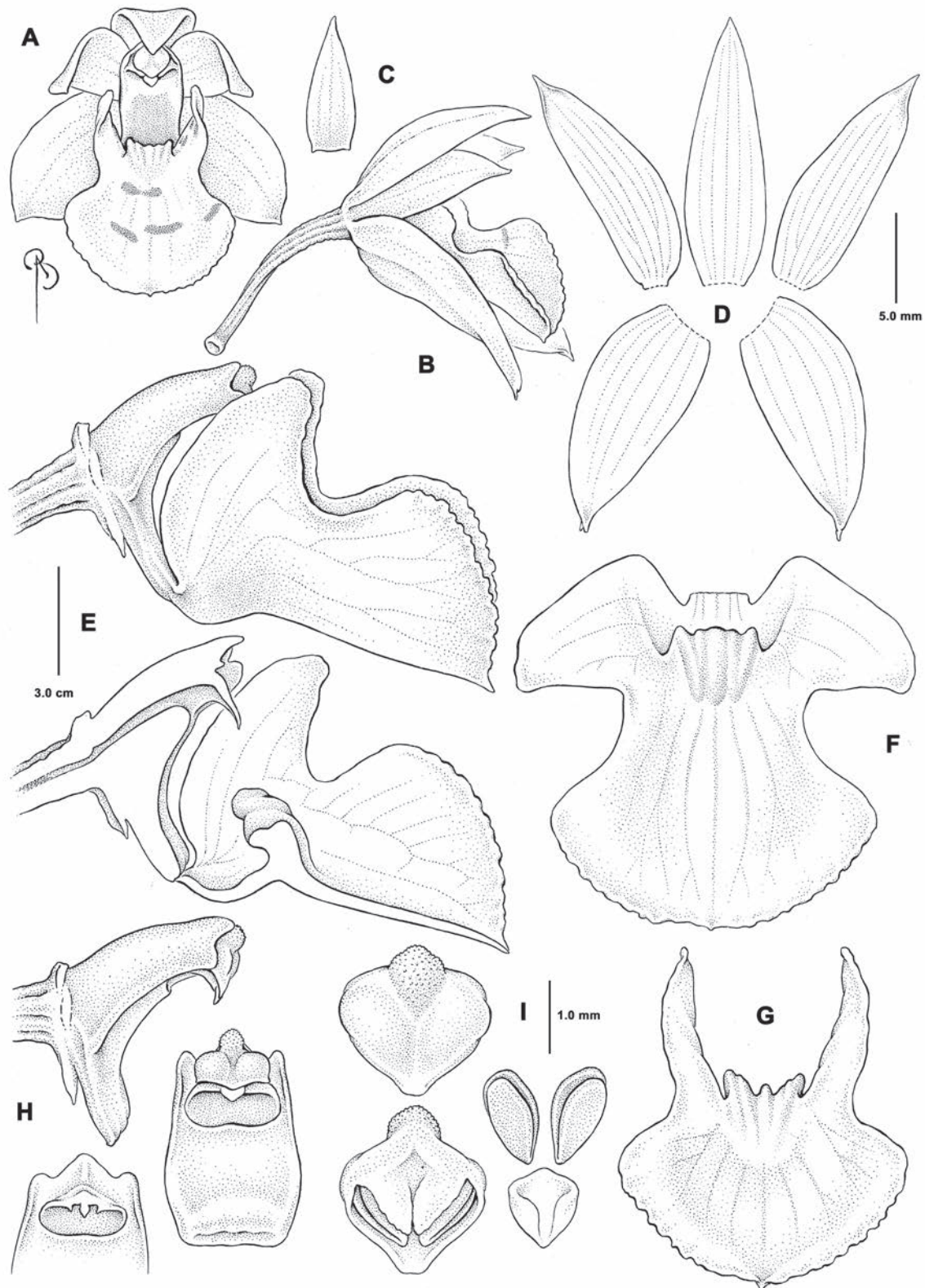


FIGURE 1. *Koellensteinia lilijae* Foldats. **A**, Front view of flower; **B**, side view of flower; **C**, floral bract; **D**, sepals and petals; **E**, side view of column and labellum, entire and longitudinally sectioned; **F**, above view of the labellum; **G**, front view of the labellum; **H**, different views of the column. **I**, views of the anther and the pollinarium. Drawing by B. Angell based on G. A. Romero, C. Gómez & G. Gerlach 3588 (AMES).

verde claro en flores recién abiertas, tornándose amarillo verdosos con el tiempo]. *Ovario* pedicelado [verde oscuro] unos 8 mm [de] largo. *Brácteas* aovadas o triangular-aovadas, agudas, 4–8 mm [de] largo y 3–4.5 mm [de] ancho. *Sépalos* carnosos, elípticos o aovado-elíptico, agudos o apiculados, unos 14–15 mm [de] largo, uninervados; sépalo dorsal unos 7 mm [de] ancho; sépalos laterales oblícuos, unos 8,5 mm [de] ancho. *Pétalos* semejantes a los sépalos, ligeramente oblicuos, unos 14 mm [de] largo y 5.5 mm [de] ancho. *Labelo* carnoso, sésil, moviblemente articulado a la punta del pie de la columna, profundamente trilobulado, ligeramente cordado en la base, unos 8–9 mm [de] largo y cuando aplanado 13–14 mm [de] ancho entre los lobos laterales; lobos laterales erectos, semi-aovados o subelípticos, anchamente redondeados en el ápice; lobo intermedio mayor que los laterales, transversalmente elíptico, en el ápice ligeramente retuso hasta anchamente redondeado, a veces con un apículo mínimo [en flores recién abiertas, lóbulo central subespatulado, anchamente redondeado en el ápice, apiculado]; disco entre los lobos laterales con un callo transversal, compuesto de dos dientes laterales y un lobo medio semi-esférico, retrorso. *Columna* claviforme, incluyendo el pie basal corto unos 6 mm [de] largo. [Antera blanco-amarillenta, transversal y anchamente rómbica, el ápice mínimamente tuberculado, pollínios amarillos].

Terrestrial *herbs*, some 80 cm in height. *Rhizome* abbreviate. Pseudobulbs aggregate, ellipsoid, when young covered with scarios, distichous, imbricate, acute sheaths, which disintegrate with time, naked when old, ca. 2.5 cm high and 7 mm wide, with a thin, tubular, terete, stem-like, longitudinally grooved extension [at the apex of which is the leaf abscission layer], unifoliate. *Leaves* [articulate, glaucous, adaxially bluish-green, abaxially dark green] lanceolate, acute or acuminate, basally attenuate to a petiole; lamina to ca. 40 cm long and 6 cm wide, with 3 or 5 pronounced nerves; petiole grooved, to 7 cm long. *Inflorescence* a a subdense, pluriflorous raceme, erect, ca. 50 cm long; peduncle [purple] with several tubular, sheathing bracts, the basal ones clustered, the upper ones remote, ca. 1.5 cm long [rachis green]. Flowers [resupinate], erect-patent, when flattened ca. 27 mm in diameter, yellow with perianth segments, especially the petals and labellum, with purple dots or short lines [labellum creamy white at anthesis, becoming yellowish green with age, the central lobe with short, wide, transversal purple lines, the lateral lobes with thin, longitudinal purple lines; other perianth segments light green at anthesis, becoming greenish yellow with age]. Pedicellate *ovary* [dark green], ca. 8.0 mm long. [Floral] *bracts* ovate to triangular-ovate, acute, 4–8 mm long and 3–4.5 mm wide. *Sepals* fleshy, elliptic to ovate-elliptic, acute [apiculate], ca. 14–15 mm long, uninervate; dorsal sepal ca. 7 mm wide; lateral sepals oblique, ca. 8.5 mm wide. *Petals* similar to the sepals, slightly oblique, ca. 14 mm long and 5.5 mm wide. *Labellum* fleshy, sessile, actively articulate with the apex of the column foot, distinctly trilobate, slightly cordate at the base, ca. 8–9 mm long and, when flattened, 13–14 mm wide between the lateral lobes; lateral lobes erect, semi-ovate or sub-elliptic, broadly rounded at the apex; central lobe larger than the

lateral lobes, transversally elliptic, slightly retuse in the apex to wide rounded, sometimes with a small apiculum [central lobe subspatulate at anthesis, widely rounded at apex, apiculate]; disc between the lateral lobes with a transversal callus, composed of two lateral teeth [keels] and a subspherical, retrorse central lobe. *Column* claviform, ca. 6 mm long including the basal foot. [*Anther* yellowish-white, transverse and widely rhombic, the apex minutely tuberculate. Pollinia yellow].

Eponymy: Named after Lilija Kupfers de Foldats, wife of the author of the species, Ernesto Foldats Andins (1925–2003). She cultivated the sterile, field-collected plants that eventually flowered under her care. See also Hágsater and Santiago (2015).

Iconography: Foldats (1961: Fig. 5; 1970: 253, Fig. 662).

Distribution: Apparently endemic to granite outcrops in the basin of the Atacavi river, but most likely to be found in Colombia in similar habitats.

Field characters: The glaucous leaves, bluish-green on top, dark green below, and the retrorse central lobe on the callus of the labellum.

Other references: Romero-González (2003); Meneguzzo et al. (2015); Ferreira (2015).

Additional specimen examined: VENEZUELA. Amazonas: Municipio Autónomo Maroa, Cerro Mesaque, hierba terrestre, frecuente pero sólo un individuo con flores, hojas verde azuladas, glaucas, verde oscuras en el envés, pedúnculo morado, raquis verde, tépalos verde pálidos, labelo blanco, con manchas moradas, 23 July 2006, G. A. Romero, C. Gómez & G. Gerlach 3588 (AMES [fragment], TFAV, VEN).

This species was never treated in *Venezuelan Orchids Illustrated* (Dunsterville and Garay, 1959–1976), nor in the *Field Guides* (Dunsterville and Garay, 1979; Romero-González and Carnevali Fernandez-Concha, 2000), and no drawing referable to it is to be found among Dunsterville's drawings at AMES or at the American Orchid Society. Foldats and Garay did exchange correspondence regarding this species, archived at the library of the Oakes Ames Orchid Herbarium. Garay received a flower of the type, but he was unable to reconstruct the diagnostic feature: "... un callo lateralmente bilobado con un lobo central retrorso y semiesférico" ("a laterally bilobed callus with another central, retrorse and semispherical lobe"; Foldats 1970: 254; Fig. 1A, F–G and Fig. 2D herein) and, in verbal communications with the senior author (GAR-G), he doubted the existence of this species. Garay, in one of his replies to Foldats, dated [Cambridge, Massachusetts, U.S.A.] February 4, 1963, stated the following: "Koellensteinias are devils and I wish they weren't around"!

Koellensteinia lilijae illustrates a common problem in Orchidaceae and other plant families with somewhat "fragile flowers": collectors and growers, who know the plants well, can distinguish several species, whereas "herbarium botanists," who have to rely strictly on what re-hydrated material and herbarium labels can reveal, most often refer otherwise easily distinguishable species to the synonymy of others.

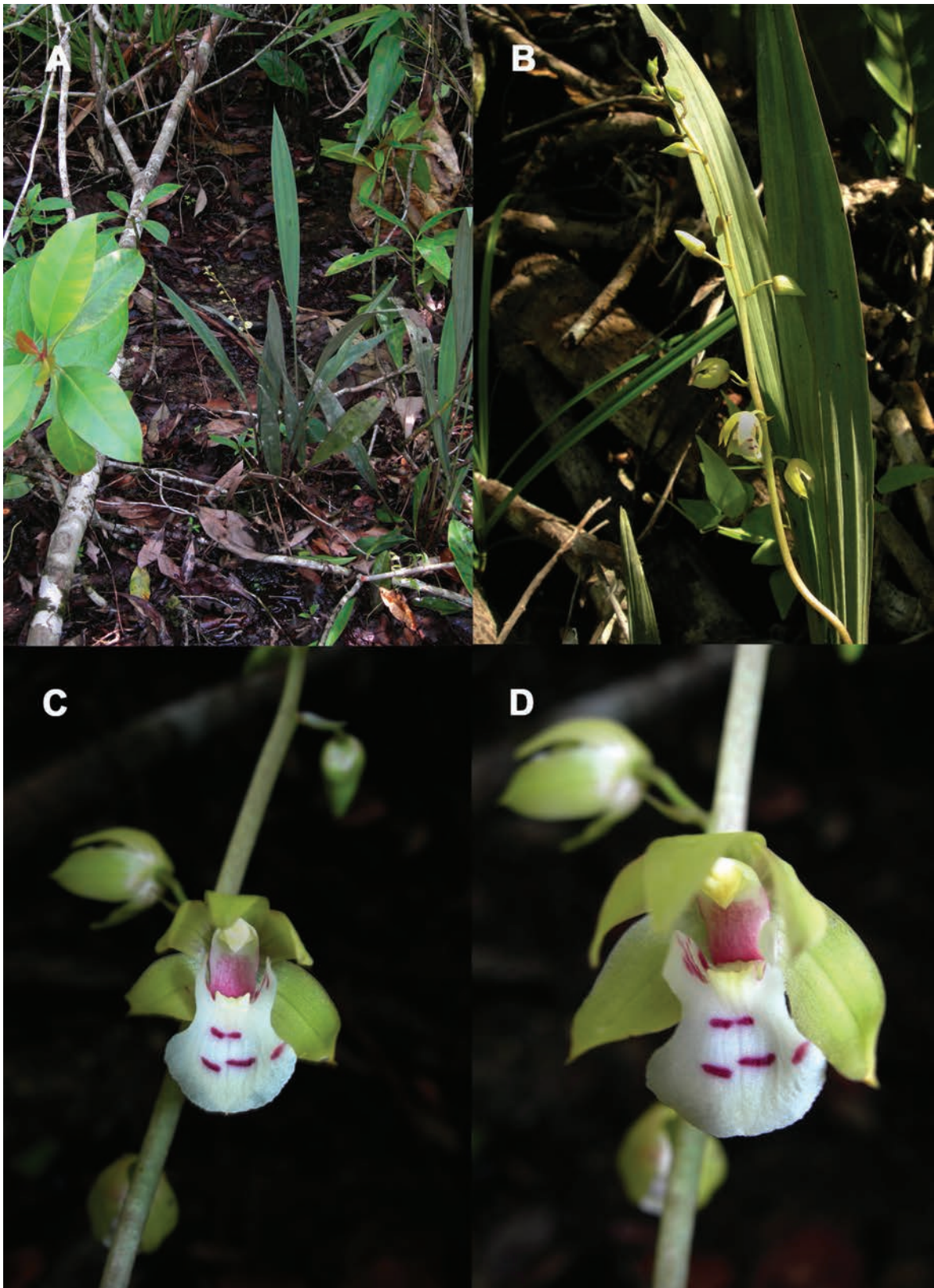


FIGURE 2. *Koellensteinia lilijae* Foldats, plant in the field. **A**, habit; **B**, inflorescence and partial view of leaves; **C**, flower; **D**, close-up of flower. Photographs by G. A. Romero-González based on G. A. Romero, C. Gómez & G. Gerlach 3588 (VEN).



FIGURE 3. *Koellensteinia lilijae* Foldats. Holotype. Courtesy of the Venezuelan Orchid Herbarium (VEN).

While the senior author (GAR-G) lived in southern Venezuela in the 1980s and later during several plant collecting expeditions (1990–2005), looking for this species became a major goal. In retrospect, two of the authors (GAR-G and CAG-D) encountered this species several times, every time without flowers, although always growing on granite, as in the lower slopes of Cerro Sipapo and on granite outcrops north of Tabucal, along the lower Atacavi river, always growing under moderate to heavy shade. Eventually three of the authors (GAR-G, CAG-D, and GG) found it in flower in the lower slopes of Cerro Mesaque, a granite boulder the highest point of which reaches ca. 500 m. It is near the Mesaque river, a tributary of the Atacavi river.

Foldats (1969; 1970: 252), described the color of flowers segments as *flavis...* (from the Latin *flavus*, golden, blonde), suggesting that he examined material already “passed,” or perhaps even “wilting,” where floral segments look “yellowish.” Even in the flowers from the additional collection reported herein, although the background color of the labellum of fresh flowers was brilliant, creamy white, it already presented some yellowish spots (Fig. 2C–D). In addition, the drawing by B. Manara published in the protologue (Foldats, 1961) and later in the orchid treatment

for the *Flora de Venezuela* (Foldats, 1970: 253) was most likely based on herbarium material, where floral parts, particularly the labellum, are shown shrunken longitudinally when compared to the flower *in vivo* (Fig. 1F and Fig. 2C–D versus Fig. 3, emphasizing the labellum shown on the upper margin of the packet).

Number 3899 in Foldats’s collections, cited herein as *Koellensteinia lilijae*, is also cited when referring to *Halimeda incrassata* (J. Ellis) J.V.Lamouroux (Halimedaceae), a macroalga (Ardito and Vera, 1997). Foldats also studied “algae” (see Lasser, 2001 and Vera, 2003). A careful study of Foldats’s field notes and herbarium specimens is needed to sort out this overlap in collection numbers.

It should be emphasized that Foldats collected the species treated here during a trip conducted, as stated in the protologue, in the early 1960s, when he also carried out miscellaneous ecological studies (e.g., see Foldats, 1962), and **not** later in the 1980s, when he participated in one plant collecting expedition to the same general area, this time organized by *Técnica Minera*, C.A. (TECMIN), then a subsidiary of Venezuela’s *Corporación Venezolana de Guayana* (C.V.G.), currently part of *Ministerio del Poder Popular de Desarrollo Minero Ecológico*.

LITERATURE CITED

- ARDITO, S. AND B. VERA. 1997. Catálogo de las macroalgas marinas del Herbario Nacional. *Acta Botanica Venezuelica* 20, 2: 25–108.
- DUNSTERVILLE, G. C. K. AND L. A. GARAY. 1959–1976. Venezuelan Orchids Illustrated 1–6. Andre Deutsch, London.
- AND ———. 1979. Orchids of Venezuela: an Illustrated Field Guide. Botanical Museum of Harvard University, Cambridge, Massachusetts.
- FERREIRA HALL, C. 2015. Sistemática Filogenética, Citogenética e Taxonomia de Zygopetalinae (Orchidaceae), com ênfase em *Koellensteinia*. Tese (Doutorado). Instituto de Botânica da Secretaria de Estado do Meio Ambiente, São Paulo.
- FOLDATS, E. 1961. Contribución a la orquídeoflora de Venezuela III. *Boletín de la Sociedad de Ciencias Naturales (Caracas)* 22, No. 100: 253–276.
- . 1962. La concentración de oxígeno disuelto en las aguas negras. *Acta Biologica Venezuelica* 3: 149–159.
- . 1970. *Koellensteinia*. Pages 240–255 in T. LASSER, ED. *Flora de Venezuela* 15, part IV. Instituto Botánico, Caracas.
- HÁGSATER, E. AND E. SANTIAGO. 2015. *Epidendrum lilijae* Foldats. *Icones Orchidacearum* 15, 1: 1534.
- IDC MICROFORM PUBLISHERS. 1987. John Lindley [Orchid] Collection. IDC, the Netherlands.
- LASSER, T. 2001. *De profundis*: ha muerto el Doctor Ernesto Foldats. *Boletín de la Academia de Ciencias Físicas, Matemáticas y Naturales* 61, No. 4: 71.
- LINDLEY, J. 1861. *Orchideae Fendlerianae Venezuelanae*. Page 220 in A. Grisebach, *Plantae Wrigtianae e Cuba Orientali (Polypetalae et Apetalae)*. *Memoirs of the American Academy of Arts and Sciences N.S.*, 8, part I: 153–220.
- MENEGUZZO, T. E. C., J. F. A. BAUMGRATZ, AND C. VAN DEN BERG. 2015. Taxonomic studies in the *Aganisia* complex (Orchidaceae, Zygopetalinae). *Phytotaxa* 238 (1): 1–39.
- ROMERO-GONZÁLEZ, G. A. 2003. *Koellensteinia*. Pages 399–401 in P. E. BERRY, K. YATSKIEVICH, AND B. K. HOLST, EDS. *Flora of the Venezuelan Guayana* 7. Missouri Botanical Garden, St. Louis.
- . 2005. *Orchidaceae Schomburgkianae*. *Harvard Pap. Bot.* 10, No. 2: 231–268.
- AND G. CARNEVALI FERNÁNDEZ-CONCHA. Orchids of Venezuela: an Illustrated Field Guide—Orquídeas de Venezuela: una Guía Ilustrada. Armitano Editores, Caracas, Venezuela.
- AND J. A. N. BATISTA. 2009. Novelties in the Orchid flora of Venezuela—*Habenaria*. *Harvard Pap. Bot.* 14: 203–211.
- , G. CARNEVALI FERNÁNDEZ-CONCHA, AND P. ORMEROD. 2010a. Novelties in the Orchid flora of Venezuela II—Cranichideae. *Lankesteriana* 9: 513–519.
- , C. GÓMEZ, AND G. CARNEVALI FERNÁNDEZ-CONCHA. 2010b. Novelties in the Orchid flora of Venezuela III—*Epidendrum*. *Harvard Pap. Bot.* 15: 165–170.
- AND T. E. C. MENEGUZZO. 2012. Novelties in the Orchid flora of Venezuela IV—Reinstatement of *Otostylis alba* (Orchidaceae, Zygopetalinae). *Harvard Pap. Bot.* 17: 235–244.
- , C. GÓMEZ, A. L. V. TOSCANO DE BRITO, AND G. CARNEVALI FERNÁNDEZ-CONCHA. 2013a. Novelties in the Orchid flora of Venezuela V—Cranichideae II. *Veyretia szlachetkoana* (Orchidaceae, Spirantheae). *Harvard Pap. Bot.* 18: 17–21.
- , H. HENAO, C. GÓMEZ, AND G. CARNEVALI FERNÁNDEZ-CONCHA. 2013b. Novelties in the Orchid flora of Venezuela VI—Vanilloideae, Pogonieae. Notes on *Cleistes tenuis*, a dual personality species. *Harvard Pap. Bot.* 18: 225–235.
- AND C. GÓMEZ. 2014. Novelties in the orchid flora of Venezuela VII. —Cymbidieae, Catasetinae. Notes on *Galeandra* (Orchidaceae), including a new species. *Harvard Pap. Bot.* 19, 2: 203–217.
- , G. CARNEVALI FERNÁNDEZ-CONCHA, G. GERLACH, AND W. CETZAL-LX. 2015. Novelties in the orchid flora of Venezuela VIII.—Subtribe Eriopsidinae. *Eriopsis*. *Harvard Pap. Bot.* 20, 2: 101–143.
- VERA, B. 2003. Obituario [Ernesto Foldats Andins]. *Acta Científica Venezolana* 54: 87.

APPENDIX

Warreopsis colorata (Linden & Rchb.f.) Garay, Orquideología 8, 1: 51. 1973.

Basionym: *Zygopetalum coloratum* Linden & Rchb.f., Ann. Bot. Syst. 6: 662. 1863. TYPE: COLOMBIA. [Norte de Santander: Mesa Rica] “*E Nova Granata iconem misit Schlim*”... (Holotype: J. J. Schlim, Reichenbach Herb. Orchid. 40578, W [45415], drawing on left of sheet).

“...tepalis oblongis apiculatis, sepalis lateralibus obliquis curvatis, labello pandurato apiculato, crista baseos multidentata.

Sepala et tepala extus pallide rufina; intus kermesina maculis luteis. Labellum album seu flavum. Racemus multiflorus. Bractee lanceae dimitiam tertiamve ovarii pedicellali aequantes.”

A specimen collected by August Fendler (1813–1883) under number 1396 (VENEZUELA: Aragua, *Prope Coloniam Tovar*, 1854–5; Lindley Herbarium at K, BR; 255/20 in the microfiche version of the Lindley herbarium; IDC Microforms Publishers, 1987) is not referable to *Koellensteinia* (as “*Källensteinia*” in Lindley, 1861); it is, rather, one, if not the first Venezuelan collection of *Warreopsis colorata*.

The description of the basionym is quoted above, verbatim, from the protologue. The holotype was selected by T. E. C. Meneguzzo in 2012, as indicated in his annotation label placed on the sheet cited above.

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