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ENGLEROCHARIS BLANCA-LEONIAE (BRASSICACEAE), A NEW SPECIES FROM PUNO, PERU

Ihsan A. Al-Shehbaz[1,4] Paúl Gonzáles[2] and Asunción Cano[2,3]

Abstract. *Englerocharis blanca-leoniae* is described and illustrated, and its relationship to the closely related *E. peruviana* is discussed. As a result, *Englerocharis* now includes five species, all except the latter are narrowly endemic to Peru and known from single collections. The generic limit is expanded to accommodate the new species, and a key to the five known species of the genus is presented.

Resumen. Se describe y se ilustra *Englerocharis blanca-leoniae*, y se discute su relación con *E. peruviana*, la especie más cercanamente relacionada. Como resultado, *Englerocharis* ahora incluye cinco especies, todas, excepto la última nombrada, endémicas de Perú y conocidas de una sola colección. Se expanden los límites genéricos para acomodar la nueva especie y se presenta una clave para identificar las cinco especies conocidas del género.

Keywords: Brassicaceae, Cruciferae, IUCN Red List, Peru, *Englerocharis*

Most of the remote areas of the Peruvian Andes remain poorly explored, and botanical explorations during the past several years have resulted in the discoveries of many species of Brassicaceae (Cruciferae), especially in the genera *Brayopsis* Gilg & Muschl., *Descurainia* Webb & Berth., *Draba* L., *Eudema* Humb. & Bonpl., *Lepidium* L., *Neuontobotrys* O.E.Schulz, and *Weberbauera* Gilg & Muschl., to name some (Al-Shehbaz, 2004, 2010; Al-Shehbaz and Cano, 2011; Al-Shehbaz and Montisenos, 2009; Al-Shehbaz et al., 2013). Such field studies lead to the expansion of all these genera, as well as *Englerocharis* Muschl., a genus that remained monospecific since the discovery of its first species by Muschler (1908) some 107 years ago. However, fieldwork in Peru, especially by one of us (A. Cano) and his students expanded the genus to include five species, including the one described below (see Al-Shehbaz, 1989; Al-Shehbaz and Cano, 2011; Al-Shehbaz et al., 2012).

Englerocharis blanca-leoniae Al-Shehbaz, P. Gonzáles & A. Cano, *sp. nov*. TYPE: PERU. Departamento Puno: Provincia Carabaya, Distrito Macusani, Pacaje–Chacopata, 13°57'04.23"S, 70°26'42.18"W, 4897 m, 17 March 2014, *Paúl Gonzáles 3059* (Holotype, USM; Isotype, MO). Figs. 1–2.

Herbs perennials, scapose; caudex simple, to 1 cm in diameter, covered with dry, persistent petiolar remains of previous years. *Basal leaves* rosulate, green; petiole 2.5–3.5 cm, expanded at base and to 4 mm wide, sparsely pubescent; blade oblanceolate, 1.5–2.5 × 0.5–1 cm, moderately sericeous on both surfaces with antrorsely appressed simple trichomes 0.4–0.8 mm, base attenuate, margin entire, apex obtuse to subacute. *Scapes* 6–8 cm, glabrous along proximal half, sparsely appressed pubescent distally, apically with 3–5 leafy bracts subtending base of raceme. *Racemes* 14–20-flowered, slightly elongated in fruit; rachis straight, sparsely appressed pubescent, 0.7–1.5 cm; bracts subinvolucrate, not subtending basal flowers, linear-oblanceolate, 1–1.8 cm × 1.5–4 mm; fruiting pedicels straight, erect-ascending, 1–2 mm, sparsely antrorse pubescent, persistent. *Sepals* narrowly oblong, 2–2.5 mm, persistent and 3.5–5 mm in fruit, sparsely antrorse pubescent; petals white, narrowly oblanceolate, 2–2.5 × ca. 0.5 mm; filaments ca. 1.5 mm; anthers ca. 0.5 mm; ovules 18–22 per ovary. *Fruit* linear-oblanceolate to linear, 8–11 × 1.7–2 mm, terete, more than twice as long as persistent calyx; valves antrorsely puberulent with simple trichomes 0.1–0.3 mm, dehiscing basipetally, with somewhat distinct midvein; septum membranous, complete or with a longitudinal slit when fruits fully mature; style 0.3–0.6 mm; stigma entire. *Seeds* ovoid, light brown, 0.9–1.1 × 0.5–0.6 mm.

Eponymy: This novelty is named in honor of Dr. Blanca León (Honorary Professor at Universidad Nacional Mayor de San Marcos; Plant Resource Center, University of Texas at Austin), who helped a great deal in promoting Peruvian-American botany in the past few decades.

We are grateful to Blanca León (USM & TEX) for her continuous support and to Gustavo A. Romero and Deborah Smiley for their editorial advice. Partial funding for this research was supported by the United States National Science Foundation grant DEB-1252905 to Al-Shehbaz, for which he is profoundly grateful.

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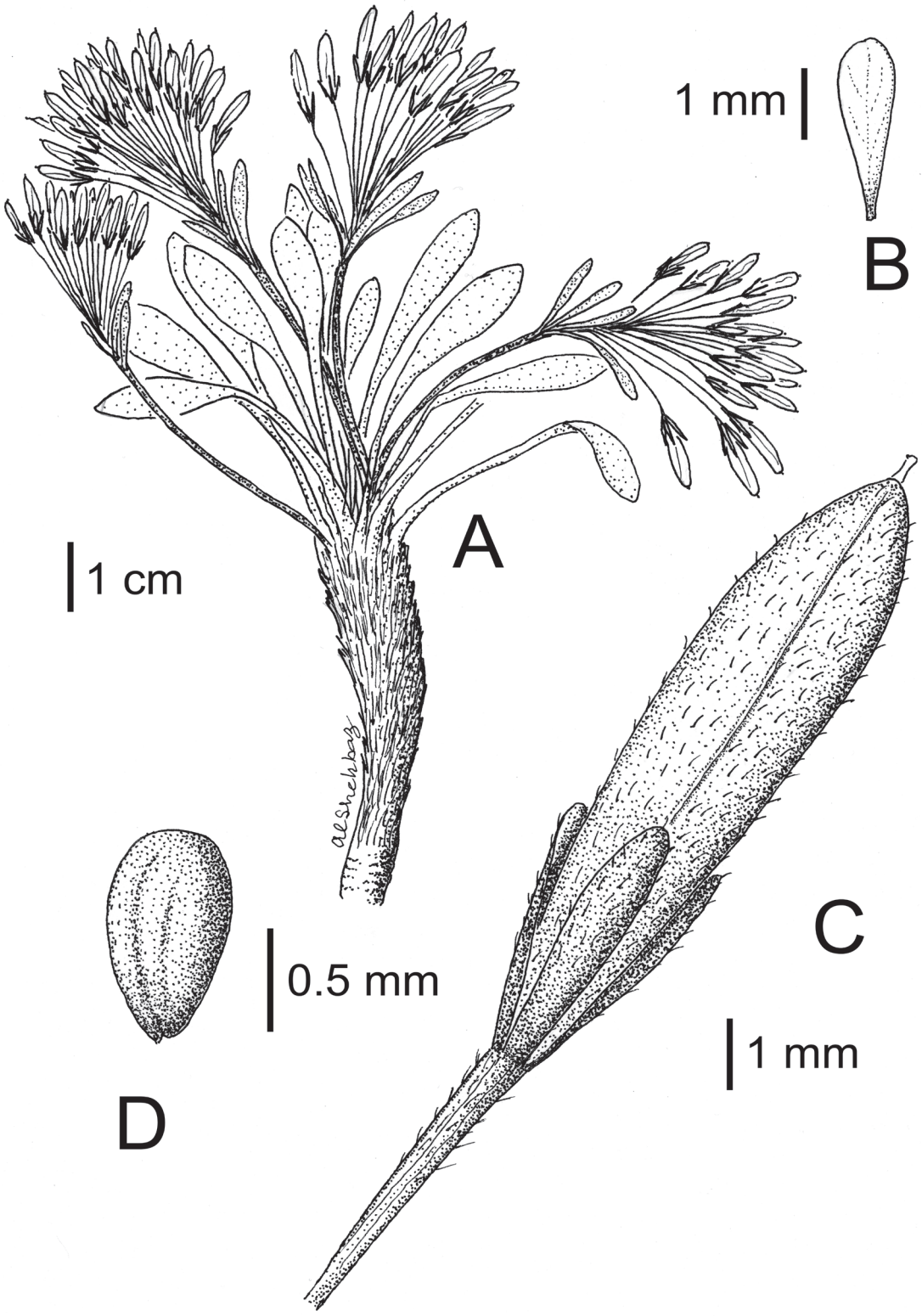

FIGURE 1. *Englerocharis blanca-leoniae* Al-Shehbaz, Gonzáles & A. Cano. **A**, Plant; **B**, petal; **C**, fruit and fruiting calyx; **D**, seed. Drawn by Al-Shehbaz from the holotype (USM).

FIGURE 2. *Englerocharis blanca-leoniae* Al-Shehbaz, Gonzáles & A. Cano. Photo by Paúl Gonzáles.

Distribution: Peru (Puno). Known only from the type collection.

IUCN Red List Category: *Englerocharis blanca-leoniae* is only known from the type collection and is therefore given the assessment of Data Deficient (DD) according to the IUCN (2001) criteria.

Distinguishing characters: *Englerocharis blanca-leoniae* is most closely related to *E. peruviana* Muschl., which it resembles in having 8–20-flowered racemes, persistent calyces 3.5–6 mm in fruit, and pubescent fruits that dehisce from the apex towards base (basipetally). It differs from the latter by having linear to linear-oblanceolate fruits more than two times longer than the fruiting calyx, styles 0.3–0.6 mm in fruit, fruiting pedicels 1–2 cm long, smaller petals 2–2.5 mm long, and 18–22 ovules per ovary. By contrast, *E. peruviana* has oblong to elliptic fruits less than two times longer than the fruiting calyx, styles 1–2 mm in fruit, fruiting pedicels 0.5–1 cm, longer petals 5–6 mm, and 10–16 ovules per ovary. Furthermore, *E. blanca-leoniae* is a taller plant (6–8 cm) with racemes elongated in fruit, compared to the much shorter (2–3 cm) plants of *E. peruviana* with compact racemes not elongated in fruit.

The generic description is amended below to accomodate the new species, and a key to the five species of *Englerocharis* is presented to facilitate their easy identification.

ENGLEROCHARIS MUSCHL., BOT. JAHRB. SYST. 40: 276. 1908.

Type species: *E. peruviana* Muschl.

Herbs perennial, scapose, cespitose, often cushion forming, with thick, simple or branched caudex densely covered with persistent, flattened petiolar bases of previous years. *Trichomes* simple, soft, antrorsely appressed, sericeous. *Multicellular glands* absent. *Stems* absent or distinct. *Basal leaves* rosulate, petiolate, not fleshy, simple, entire or dentate, densely sericeous, rarely glabrous or ciliate; cauline leaves absent or present as bracts. *Racemes* few- to many-flowered, lax or dense, ebracteate or with 2–5 basal bracts, subumbellate, slightly elongated or not elongated in fruit; rachis straight; fruiting pedicels ascending, persistent, slender or thickened, distinct or obsolete. *Sepals* oblong, oblong-ovate, or oblong-spatulate, free, green and foliaceous, persistent, erect, glabrous or pubescent, equal, base of inner pair not saccate; petals white, erect at base with flaring blade, longer than or subequaling sepals; blade obovate to narrowly oblanceolate,

apex rounded; claw undifferentiated from blade; stamens 6, slightly exserted or included, erect, slightly tetradynamous; filaments filiform, wingless, unappendaged, not dilated at base, glabrous, free; anthers oblong, not or apiculate at apex; nectar glands 1, confluent and subtending bases of all stamens, lateral nectaries semiannular; ovules 8–22 per ovary; placentation parietal. *Fruit* dehiscent, capsular siliques, oblong, elliptic, to linear, terete, not inflated, sessile, unsegmented; valves papery, with an obscure midvein, glabrous or puberulent, not keeled, smooth, wingless, unappendaged; gynophore absent; replum rounded, visible; septum complete, membranous, veinless; style distinct and to 2 mm, cylindric, persistent, glabrous; stigma capitate, entire. *Seeds* subbiseriate, wingless, ovoid, plump, on filiform funicles; seed coat smooth, not mucilaginous when wetted; cotyledons incumbent, entire.

Key to the species of *Englerocharis*

1a. Basal leaves 7–9-dentate, 10–15 mm wide . . . . . *E. dentata*
1b. Basal leaves entire, 2–8 mm wide 2
2a. Racemes 2–4-flowered; fruit valves glabrous; sepals 1.8–2.2 mm 3
2b. Racemes 8–20-flowered; fruit valves pubescent; sepals (3–)4–6 mm 4
3a. Leaves green, lanceolate, glabrous or sparsely sericeous adaxially; style 1–1.7 mm . . . . . *E. pauciflora*
3b. Leaves silvery gray, oblanceolate, densely sericeous adaxially; style 0.2–0.3 mm . . . . . *E. ancashensis*
4a. Fruits oblong to elliptic, 4–6(–7) mm, less than twice longer than persistent calyx; style in fruit 1–2 mm; petals 5–6 mm; ovules 10–16 per ovary; fruiting pedicels 0.5–1.0 cm . . . . . *E. peruviana*
4b. Fruits linear-oblanceolate to linear, 8–11 mm, more than twice longer than persistent calyx; style in fruit 0.3–0.6 mm; petals 2–2.5 mm; ovules 18–22 per ovary; fruiting pedicels 1–2 cm . . . . . *E. blanca-leoniae*

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TYPIFICATION OF HIMALAYAN TAXA OF BRASSICACEAE (CRUCIFERAE)

Ihsan A. Al-Shehbaz[1]

Abstract. The type status of 146 names of Himalayan taxa is discussed, of which the lectotypes of 133 names are designated here for the first time, including a few that were incompletely lectotypified due to the existence of more than one sheet in the institution where the type was said to be. These 133 species and infraspecfic names were originally described in the genera *Arabis* (15), *Chorispora* (4), *Cochlearia* (4), *Dilophia* (2), *Draba* (64), *Ermania* (2), *Erysimum* (5), *Eutrema* (4), *Nasturtium* (3), *Sisymbrium* (9), and *Thlaspi* (2). In addition, lectotypes are designated for one name each in the 15 other genera: *Barbarea, Brassica, Capsella, Cardamine*, *Cheiranthus, Dipoma, Goldbachia, Hemilophia, Hutchinsia, Lepidostemon, Martinella, Megacarpaea, Microsisymbrium, Sinapis,* and *Sophiopsis*. The type status of 13 additional names in *Arabis* (1), *Buchingera* (1), *Draba* (8), *Erysimum* (2), *Parlatoria* (1)*, Parrya* (2), *Sisymbrium* (1), and *Torularia* (1) are discussed.

Keywords: Brassicaceae, Cruciferae, Pan-Himalayan Flora, lectotypification

The Brassicaceae of the Himalayan Mountains include about 80 genera and 380 species that will be treated in a forthcoming volume of the Pan Himalayan Flora. The guidelines of that flora require the typification of names for all taxa. Unfortunately, the vast majority of names have not yet been typified, and although the present study typifies some of them, the remaining ones will be dealt with in other papers.

All taxa are arranged alphabetically by genus then by the basionym of species or variety, and all names in **Roman boldface** represent the currently accepted placements. For entries in italics, the taxon name is followed by its bibliographic citation and its homotypic synonym(s), if any exist. Following names of each entry, the next paragraph starts with "Described from," which lists the exact locality text citation given in the original protologue of that taxon. This is intended to place in one publication all of the typifications of Himalayan taxa to help future workers of the Pan-Himalayan Flora.

The major world herbaria consulted during the past two decades by the author for this research include A, B, BM, E, F, CAS, G, G-BOIS, GH, K, KUN, LE, M, MO, NAS, NY, P, PE, S, UC, US, W, and WU, and loans and/or digital images from them and others (e.g., FI, L, MHA, OXF, UPS, Z) were also studied. Furthermore, digital images on JSTOR Plant Science (http://plants.jstor.org/) were constantly checked. The bibliographic citations of all taxa were verified from the original literature, as well as in databases such as IPNI (The International Plant Names Index; http://ipni.org/), Tropicos (http://www.tropicos.org/), and The Plant List (http://www.theplantlist.org/).

The International Code of Nomenclature for algae, fungi, and plants (McNeill et al., 2012) was strictly followed, and the recommendations recently presented by McNeill (2014) were also fully taken into consideration.

1. *Arabis alpina* L. var. *parviflora* Franch., Bull. Soc. Bot. France 33: 401. 1887; *A. paniculata* var. *parviflora* (Franch.) W.T.Wang, Vasc. Pl. Hengduan Mount. 1: 642. 1993; **A. paniculata** Franch., Pl. Delavay. 57. 1889.

Described from: "Yun-nan, in silvis ad montem Mao-kou-tchan, supra Tapin-tze; fl., fr. 29 aug. 1883, (Delavay); in silvis ad Ta-long-tan, prope Tapin-tze, alt. 1800 m.; fl., fr. mat. 26 jul. 1885 (Delav. n. 1843)."

Lectotype (designated here): China. Yunnan, "Les bois de Mao Kou Tchang, au dessus de Ta Pin tze," 29 Aug 1883, *J. M. Delavay s.n.* (P00747405; Isolectotype: P00747406).

Of the two collections cited by Franchet (1887), one (*Delavay 1843*) in print is most likely a typo for *Delavay 1842*, for which there are three duplicates at P (P00747403, P00747404, P000747467) that match the locality data and collection date. I have not seen any material at P with *Delavay 1843*, but there are two elsewhere (K000693299, US00324470). My preference would have been the above collection had it not been for the confusion in the collection number. For that reason, I have designated the second of Franchet's (1887) cited collections as the lectotype.

2. *Arabis alpina* L. var. *rigida* Franch., Bull. Soc. Bot. France 33: 401. 1887; **A. paniculata** Franch., Pl. Delavay. 57. 1889.

Described from: "Yun-nan, in lapidosis calcareis ad Mo-so-yn, prope Lankong; fl., fr. 1 jun 1884 (Delavay n. 1062)."

Lectotype (designated here): China. Yunnan, "Terrains pierreux, calcaires, à Mo-so-yn, près de Lan Kong," 1 Jun 1884, *J. M. Delavay 1062* (P00747407; Isolectotypes: B100249613, BM, K000693303, K000693304, P00747408, P00747409, P00747410).

I am grateful to Karol Marhold (SAV) and Dmitry A. German (HEID) for advice on some typification matters. I also thank Anthony Brach (A), Robert Vogt (B), Laurent Gautier (G), Mats Hjerston (UPS), Erik Smets (L), Sa Ren and Ban Qin (PE), Geraldine Reid (LIV), and Sunil Kunar Srivastava and P. Lakshminarasimhan (CAL) for providing information and/or images of various taxa. I thank the directors and curators of these and other herbaria listed in the introduction. I also thank Zhang Libing for helping with the Chinese text and localities and Mary Stiffler for obtaining pdf files of various articles. I most sincerely thank Gustavo A. Romero for the editorial advice. Last but not least, partial funding of this research was supported by the United States National Science Foundation grant DEB-1252905, for which the author is profoundly grateful.

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Both *Arabis paniculata* and *A. alpina* var. *rigida* were based on the same type collection, and two of the four duplicates at P (P00747407, P00747410) were annotated in Franchet's handwriting under both names. The more complete sheet of these is designated above as the lectotype.

3. *Arabis alpina* var. *rubrocalyx* Franch., Pl. Delavay. 58. 1889, non Muschl. ex Diels, Notes Roy. Bot. Gard. Edinburgh 31: 104. 1912; **A. paniculata** Franch., Pl. Delavay. 57. 1889.

Described from: "Yun-nan, in lapidosis circa Mo-so-yun (Lankong); fl. fr. immat. 10 jul. 1886 (Delavay, n. 2149); in rupibus calcareis prope collum Yen-tse-hay, alt. 3200 m.; 8 jul. 1886 (Delav. n. 2363)."

Lectotype (designated here): China. Yunnan, "rochers calcaires près du col de Yen-Tzé-hay (Lankong), 3200 m, 8 Jul 1886, *J. M. Delavay 2363* (P00747398; Isolectotypes: P00747466, US00324472).

Of the two collections cited by Franchet (1889), *Delavay 2149* in print is almost certainly a typo for *Delavay 2139*, for which four duplicates are at P (P000747399, P00747400, P00747401, P00747402), and they match the locality and date in the protologue. Both collections have immature fruits, and the designated lectotype is unambiguous as far as the collector number is concerned. The US isolectotype does not carry any locality data but does have *Delavay 2363*.

4. *Arabis alticola* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1062. 1927; **A. amplexicaulis** Edgew., Trans. Linn. Soc. London 20: 31. 1851.

Described from: "Nordwest-Indien (Royle)–Kashmir: Gurais Valley, Tilailnála, Gujran (blühend am 27. Juni 1901–Inayat n. 25511), Liddar Valley, Pálgám (blühend am 18. Mai 1901–Inayat n. 25514), Jhelum Valley, Baramulla, Khadaniar, 2650 m ü. M. (blühend am 4. May 1909–Keshavanand n. 1166)."

Lectotype (designated here): "Palgám, Liddar V., 18.5.[19]01, Ináyat 25514" (K000397462; Isolectotype: DD [n.v., photo, K]).

Most of the new taxa described by Schulz (1927b) were either destroyed at B during World War II or were based on material housed at DD. Unfortunately, my attempts to obtain images of those taxa from DD did not materialize. Therefore, the K duplicate of *Arabis alticola,* which I have examined, is designated herein as the lectotype.

5. *Arabis charbonnelii* H.Lév., Repert. Spec. Nov. Regni Veg. 12: 100. 1913; **Sisymbrium irio** L., Sp. Pl. 2: 659. 1753.

Described from: "Frontière du Chan-Si et du Tche-Ly, à 6 kilom. De la Grande Muraille, 15 juin 1908, R (L. Chanet, 223)." (Holotype: E00386169).

Léveillé (1913) cited one collection number under *Arabis charbonnelii*, which is represented by two sheets in his herbarium at E. Of these, the above has the full locality data and the species name as in the protologue, but the other (E00386170) agrees only in the collection number and has the locality as "Montagnes de Kiu-Yang" and the collection date as 15 May 1908. Therefore, I agree with Lauener (1965) in his holotype listing and not considering E00386170 as part of the type collection.

6. **Arabis amplexicaulis** Edgew., Trans. Linn. Soc. London 20: 31. 1846.

Described from: [India]. "In sylvis humidis, alt. ped. 8000–9000 [2,438.4–2,743.2 m]. Chúr; Shioli in Garahuál, &c. Floret Junio."

Lectotype (designated here): "Himalaya, Nigali-Choor, altit. 8–9000 ped. 1844. *M. P. Edgeworth*." (K000077254; Isolectotype: K000077253).

The locality data in the protologue (Chúr) differs from the label information (Nigali-Choor) on the specimens, but there are no collections of *Arabis amplexicaulis* at K or elsewhere by Edgeworth prior to the publication of this species. The two sheets above carry the original collection labels and species name in Edgeworth's handwriting, and I am considering them as representatives of the type collection. Jafri (1956:100) listed the type locality as given in the protologue but did not annotate any of the two specimens above. The sheet designated herein as the lectotype has three plants, of which one is in fruit and, one of the two in flower has a basal rosette. To the isolectotype sheet, number 93 was added after the publication of the species.

7. *Arabis pendula* var. *glabrescens* Franch., Pl. Delav. 58. 1889; **Catolobus pendulus** (L.) Al-Shehbaz, Novon 15: 521. 2005.

Described from: "Yun-nan, in faucibus Lan-ho, ad pedem montis Yang-in-chan prope Lankong; fl., fr. 7 aug. 1883, (Delav. 117)."

Lectotype (designated here): China. "Yunnan, (les bois) dens les gorges du Lan Ho, au pied du Mont Yan in Chan, près Lan Kong," 7 Aug 1883, *J. M. Delavay 117* (P00747394; Isolectotypes: P00747395, P00747396).

Of the three duplicates of the single collection cited by Franchet (1899), the more complete sheet with Franchet's annotation of the varietal name and Delavay's handwritten label is designated above as the lectotype.

8. *Arabis pendula* var. *hypoglauca* Franch., Pl. David. 1: 33. 1884; **Catolobus pendulus** (L.) Al-Shehbaz, Novon 15: 521. 2005.

Described from: "Mongolie: montagnes d Géhol, sur le bord des ruisseaux, (n° 1986, 2181)."

Lectotype (designated here): "Mong[olie]. Or[ientale]., Géhol, bords de ruisseaux des montagnes, Jul 1864, " *A. J. P. David 1986* (P00747391; Isolectotypes: P00747390, P00747392).

Franchet (1884) cited two collections, *David 1986* and *David 2181*, in the original publication of this variety. Of these, the former collection is represented at P by three sheets and the latter by one. The single sheet with mature fruits that carries Franchet's varietal name is designated herein as the lectotype.

9. *Arabis quinqueloba* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1065. 1927. **Crucihimalaya tibetica** (Hook.f. & Thomson) Al-Shehbaz, D.German & M.A.Koch, Pl. Divers. Evol. 129: 74. 2011.

Described from: "Kashmir, Kamri Pass, Náigund (blühend am 11. Juli 1901–Inayat n. 25512)."

Lectotype (designated here): Kashmir, 11 Jul 1901, *Inayat 25512* (K000397468; Isolectotype: DD (n.v.), photo, K).

The DD duplicate of the type collection was annotated in Schulz's handwriting and photos of which are deposited at B and K. However, the DD specimen was not seen by me and therefore I preferred to designate the duplicate at K, which I have examined, as the lectotype.

10. *Arabis sagittata* DC. var. *nipponica* Franch. & Sav., Enum. Pl. Jap. 1: 34. 1875; *A. hirsuta* (L.) Scop. var. *nipponica* (Franch. & Sav.) Kitam., Acta Phytotax. Geobot. 20: 201. 1962; *A. hirsuta* (L.) Scop. var. *nipponica* (Franch. & Sav.) C.C.Yuan & T.Y.Cheo, Fl. Reipubl. Popularis Sin. 33:277. 1987, comb. superfl; **A. nipponica** (Franch. & Sav.) H.Boissieu, Bull. Herb. Boissier 7: 785. 1899.

Described from: "Hab. in sepibus et saxosis umbrosis: Nippon media, frequens circa Yokoska (Savatier, n. 83)."

Lectotype (designated here): Japan. Circa Yokosaka, *P. A. L. Savatier 83* (P00720152; Isolectotypes: 2 at K, MO, P00720151, P00720153, P00720154, P00720155, P00720156, US).

The most complete duplicate of the type collection at P with fully mature fruits and flowers is designated herein as the lectotype.

11. *Arabis scaposa* O.E.Schulz, Notibl. Bot. Gart. Berlin-Dahlem 9: 1065. 1927; **Scapiarabis saxicola** (Edgew.) M.Koch, R.Karl, D.A.German & Al-Shehbaz, Taxon 61: 965. 2012.

Described from: "Afghanistan: Kurrum Valley, Serátigah, bei 4300 m ü M. (blühend in Juli 1879–J. E. T. Aitchison n. 822)."

Lectotype (designated here): Afghanistan, data as above (K000397464; Isolectotype: DD, n.v.; fragments of DD duplicate: B100241210A).

Schulz (1927b) listed the single collection above and annotated the DD fragments at B but not the duplicate at K. I have examined the K duplicate and selected it as the lectotype instead of designating the DD sheet that was not available for my study.

12. *Arabis scaposa* var. *elatior* O.E.Schulz, Notibl. Bot. Gart. Berlin-Dahlem 9: 1066. 1927; *A. saxicola* var. *elatior* (O.E.Schulz) Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 100. 1956; **Scapiarabis saxicola** (Edgew.) M.Koch, R.Karl, D.A.German & Al-Shehbaz, Taxon 61: 965. 2012.

Described from: "Kashmir: Kamri Valley, bei Kálefiani an Felsen, 3300–3600 m ü, M. (Fruchtend am 25. August 1892–J. F. Duthie), Nittar Valley, Gilgit District, an Felsen, 3300–3,600 m ü. M. (fruchtedn am 5. August 1892–Duthie n.12430)."

Lectotype listed as type by Jafri (1956: 100) and designated here: Nittar Valley, *J. F. Duthie 12430* (K000397466; Isolectotypes: K000397467, DD, n.v. [photo, K, fragments B100241210]).

Schulz (1927b) listed the two collections above in his original description of this variety. Jafri (1956: 100) designated *Duthie 12439* (B, K) as the type, but because he listed two herbaria and annotated only one of the two K duplicates, his action is considered as a first-step lectotypification finalized herein.

13. *Arabis taraxacifolia* T.Anderson in Hook.f., Fl. Brit. India 1: 136. 1872; *Arabidopsis taraxacifolia* (T.Anderson) Jafri in Nasir & Ali, Fl. W. Pakistan 55: 274. 1973; **Crucihimalaya wallichii** (Hook.f. & Thomson) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 301. 1999.

Described from: "Punjab, in sandy places near Peshawar, *Stewart*."

Lectotype (designated here): India, Punjab, *J. L. Stewart s.n.* (K000247266; Isolectotype: E00438477).

A single collection was cited by Anderson (in Hooker & Anderson, 1872), and although Jafri (1973) indicated that the type is at E and K, his action does not constitute a lectotypification of the species.

14. *Arabis tenuisiliqua* Rech.f. & Köie, Anz. Österr. Akad. Wiss., Math.-Naturwiss. Kl. 91: 62. 1954; **Crucihimalaya tenuisiliqua** (Rech.f. & Köie) Al-Shehbaz, D.German & M.A.Koch, Pl. Divers. Evol. 129: 74. 2011.

Described from: "Afghanistan: Farakulum, 2,700 *m,* 19. Juli 1948 (Köie, 2532, Typus, C)."

Lectotype listed as holotype by Al-Shehbaz et al. (2001: 74) and designated here: Afghanistan, Farakulum, 19 Jul 1948, 2,700 m, *M. E. Köie 2532* (C10008794; Isolectotypes: C10008793, W).

Although Rechinger and Köie (in Rechinger, 1954), followed by Al-Shehbaz et al. (2011), indicated that the holotype of the species is at C, the existence of two sheets at C, both marked as "Typus," calls for lectotypification of the species, and the more complete sheet is designated above.

15. *Arabis thomsonii* Hook.f. in Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 143. 1861; **Crucihimalaya tibetica** (Hook.f. & Thomson) Al-Shehbaz, D.German & M.A.Koch, Pl. Divers. Evol. 129: 74. 2011.

Described from: "*Hab*. In Himalaya occidentali temperata, inter Kashmir et Dras, alt. 9000–10,000 ped.! [2,743.2–3,048 m] *T.T.*; et in Tibetia occidental, Zanskar! Et Ladak!, alt. 10000–14000 ped., *T. T.* (fl. Jun.)."

Lectotype (designated here): Kashmir & Dras, 29 Sep 1848, *T. Thomson s.n.* (K000397469).

Under his description of *Arabis thomsonii*, Hooker (in Hooker & Thomson, 1861: 143.) stated, "I have examined one good fruiting specimen, gathered by Dr. Thomson on his descent from Dras into Kashmir (29 Sept. 1848); and there are many others from Zanskar and Ladak which may belong to it or to the following [*A. tibetica*] from which in the fruiting state it differs conspicuously in its much larger size, long curved pods and broad winged seeds." Of all the sheets annotated by J. D. Hooker as *A. thomsonii*, the

designated lectotype is the only one that does not have a question mark following the species name.

16. *Arabis tibetica* Hook.f. & Thomson var. *glabrescens* O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 331. 1933; **Crucihimalaya tibetica** (Hook.f. & Thomson) Al-Shehbaz, D.German & M.A.Koch, Pl. Divers. Evol. 129: 74. 2011.

Described from: "N. W. Himalaya: Kashmir, Kolahoi Glacier, alt. ca. 12000 ft. (fast fruchtend im August–R. R. Stewart 1925 n. 8271), Upper Lidder, Har Nag, alt ca. 12,000 ft. (fruchtend am 16–20 August–R. R. Stewart 1927 n. 9344A)."

Lectotype (designated here): Kashmir, Kalohoi Glacier, Upper Lidder, 12,000 ft [3,657.6 m], *R. R. Stewart 8271* (NY172676; Isolectotypes: K, US00100396).

I have examined both collections cited by Schulz (1933), and the more complete collection with more duplicates is designated as the lectotype. Both collections were cited also by Jafri (1973) as *Arabis tibetica*.

17. *Barbarea elata* Hook.f. & Thomson, J. Linn. Soc., Bot. 5: 140. 1861; *Nasturtium elatum* (Hook.f. & Thomson) Kuntze ex O. E. Schulz, Acta Horti Gothob. 1: 158. 1924; **Rorippa elata** (Hook.f. & Thomson) Hand.-Mazz., Symb. Sin. 7: 357. 1931.

Described from: "*Hab*. In Himalaya orientali temperata et subalp. Sikkim, alt.11000–13000 ped.! (fl. Jun.)."

Lectotype (designated here): India. [Tunga, 23 Jul 1849], 11000–13000 [3,352.8–3,062.4 m], *J. D. Hooker s.n.* (K000247224; Isolectotypes: B, K000247226, P).

Of the four authentic sheets at K that were collected by Joseph Dalton Hooker, three were from Sikkim and one from India. The two sheets that match the elevation as given by Hooker & Thomson (1861) were collected on the same date, and they are treated herein as the type collection. The third sheet from Sikkim was collected nine days earlier from a different locality (Latony) and, therefore, does not belong to the lectotype collection. Handel-Mazzetti (1931) did not examine the type collection and did not typify the species.

18. *Brassica griffithii* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 171. 1861; *Diplotaxis acris* Boiss. var. *griffithii* (Hook.f. & Thomson) Coss., Comp. Fl. Atlant. 2: 171. 1885; **D. griffithii** (Hook.f. & Thomson.) Boiss., Fl. Orient. 1: 388. 1867.

Described from: "*Hab*. In Affghanistan agris ad Oostad! *Griffith*; Beluchistan: Stocks; Panjab, Kalebag ad Salt RangeI *Fleming*. (Fl. Feb.)."

Lectotype (designated here): Pakistan, Balochistan, 1851, *J. E. Stocks 707* (K000653886).

The above three collections listed by Hooker & Thomson (1861) were cited by both Hedge (1968a) and Jafri (1973) but without typification. The most complete specimen is designated herein as the lectotype.

19. *Buchingera axillaris* Boiss. & Hohen in Boiss., Diagn. Pl Orient. Ser. 1, 8: 29. 1849; **Asperuginoides axillaris** (Boiss. & Hohen.) Rauschert, Taxon 31: 558. 1982.

Described from: "Hab. ad versuras agrorum prope *urbem Tehran*, Aprili. Kotschy No. 10."

Holotype: Iran, Tehran, Apr 1843, *C. G. T. Kotschy 10* (G-BOIS 00330399; isotypes, BM, G00382767, G00382768, GOET, HAL, 2 at K, 3 at P, WAG).

The single sheet in Boissier's herbarium includes four fragments the top two of which have only flowers and are accompanied by a partially printed label on which is written "ad versuras agrorum" and "15 April" but not in Boissier's handwriting, and the label does not carry the species name. The two fragments on the lower half of the sheet have mature fruits and carry a printed label with the species name and other data identical to the label of the upper fragments. Since Boissier's original description included details of the flowers and fruits, it is safe to assume that he based his description on the four fragments. Duplicates in the other herbaria have printed labels identical to that of the fragments on the lower part of the holotype sheet. The existence at G of two other sheets might raise the need for lectotypificattion. However, one sheet (G00382767) was donated from the de Candolle herbarium in 1921, and the other (G00382768) was donated from the Moricand herbarum in 1908. Neither of the above two G sheets was annotated by Boissier, and it is not known if he examined them prior to the publication of the species.

Both Rechinger (1968) and Jafri (1973) claimed that the type was collected from Esfahan (Iran) by A. Bunge. However, Boissier (1949) clearly stated otherwise, as quoted above.

20. *Capsella thomsonii* Hook.f. in Hook.f. & Thomson, J. Proc. Linn. Soc. Bot. 5: 172. 1861; **Smelowskia tibetica** (Thomson) Lipsky, Trudy Imp. S.-Peterburgsk. Bot. Sada 23: 76. 1904.

Described from: "*Hab*. in Tibetia occidentali alpina, 16000–18000 ped.! Ladak, *T.T.*; Nubra! *H. Strachey* (fl. July.) (n.v.)."

Lectotype (designated here): India. Nubra, *H. Strachey 14* (K000247172; Isolectotype: K000247176).

It appears that Hooker (in Hooker & Thomson, 1861) renamed *Hutchinsia tibetica* Thomson as *Capsella thomsonii*. Nothing was listed in that entire work about the earlier-published *H. tibetica*. Indeed, *Hutchinsia* W.T.Aiton was numbered 35 in the outline on page 133, but the entire entry of the genus was deleted from the account, as evidenced from numbering *Clypeola* L. as genus 35 on page 178 and treating only 47 genera in the text out of the 48 listed in the outline. Despite that, the species ought to be lectotypified because every single sheet of the original collections of this complex has the name *C. thomsonii* on it instead of *H. tibetica*.

21. *Cardamine bracteata* S.Moore, J. Bot. 16: 130. 1878, non Phil., Anal. Univ. Chile 81: 85. 1893, nec Suksd., Rhodora 20: 198. 1918; *Eutrema bracteata* (S.Moore) Koidzumi, Fl. Symb. Or. Asiat. 24. 1930; **Eutrema tenue** (Miq.) Makino, Bot. Mag. (Tokyo) 26: 177. 1912.

Described from: "Habit.–Ad Oyama in Japonia legit *J. Bisset*."

Lectotyotype (designated here): Japan. Oyama, *J. P. Bisset [993]*(K 000693905).

Although no collection numbers were cited in the original publication, the single sheet at K has two numbered collections by Bisset, 993 and 37, and both were annotated in Moore's handwriting as "*Cardamine bracteata* Biss. & S. Moore." Of these, the more complete one is designated herein as the lectotype.

22. *Cheiranthus himalayensis* Cambess. in Jacquem., Voy. Inde 4: 14, t. 13. 1844; *Christolea himalayensis* (Cambess.) Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 53. 1955; *Desideria himalayensis* (Cambess.) Al-Shehbaz, Ann. Missouri Bot. Gard. 87: 555. 2001; *Ermania himalayensis* (Cambess.) O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1080. 1927; *Oreoblastus himalayensis* (Cambess.) Suslova, Bot. Zhurn. (Moscow & Leningrad) 57: 652. 1972; **Solms-laubachia himalayenis** (Cambess.) J.P.Yue, Al-Shehbaz & H.Sun, Ann. Missouri Bot. Gard. 95: 534. 2008.

Described from: "In declivitate orientali jugi vulgò Kioubrung-ghauti in Tartariâ sinensi."

Lectotype (designated here): India. *V. Jacquemont [1782]* (P00747237; Isolectotypes: K, P).

Cambessèdes (1844) did not give a collection number in his original description of the species, and the two authentic sheets at P carry different collection numbers. Neither Jafri (1955) nor Al-Shehbaz (2001) indicated either of the two sheets as the type. The more complete specimen with Cambessèdes annotation is designated herein as the lectotype. Jafri's (1955: 53) indication that the type is "N.W. Himalays, Kunawar, *Jacquemont* (P, K)" neither referred to any particular specimen nor gave the locality mentioned in the original description. Therefore, his listing is not considered as a first-step typification.

23. *Chorispora elegans* Cambess. in Jacquem., Voy. Bot. 15, t. 14. 1844; **C. sabulosa** Cambess. in Jacquem., Voy. Bot. 15, t. 15. 1844.

Described from: "In sylvis betulinis et pascuis excelsioribus vallis Sounneguele in regno Cachemir. Floret Junio."

Lectotype (designated here): India, *V. Jacquemont 520* (P00741716; Isolectotype: K000693530).

The type collection consists of small plants in flower, and both duplicates were annotated by Cambessèdes. *Chorispora sabulosa* and *C. elegans* were simultaneously published by Cambessèdes (1844). Hooker & Anderson (1872) reduced the latter to synonymy of the former and, therefore, *C. sabulosa* has priority based on Article 11.5 in McNeill et al. (2012).

24. *Choripsora elegans* var. *integrifolia* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1072. 1927; **C. sabulosa** Cambess. in Jacquem., Voy. Bot. 15, t. 15. 1844.

Described from: "Nordwest-Himalaya: 3300–5600 m ü. M. (T. Thomson, auch f. *oligosperma*, Hb. Berlin).–West-Tibet (Falconer, Hb. East Ind. Comp. n. 182 mit var. *sabulosa*, Hb. Berlin).–Kashmir: Burzil Pass, 4300 m ü. M. (blühend Mitte September 1893–Duthie n. 14043, auch var. *sabulosa*, Hb. Berlin)."

Lectotype (designated here): Kashmir, Burzil Pass, 4,300 m, Sep 1893, *J. F. Duthie 14043* (B100244922).

All three collections cited by Schulz (1927b) are housed in B, and I have not seen any duplicates elsewhere. *Chorispora sabulosa* is quite variable in morphology of basal leaves, and dentate or subentire leaves of the above variety are easily accommodated within the overall variability of the species.

25. *Chorispora elegans* var. *stenophylla* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1072. 1927; **C. sabulosa** Cambess. in Jacquem., Voy. Bot. 15, t. 15. 1844.

Described from: "Himalaya: ca. 5000 m ü. M. (1868–Jaschke in Hb. W. Hans [Herrnhut], Hb. Berlin).–Tibet: Provinz Tsánskar, Páder am Nordfuss de Shinku La Pass bis Sulle (blühend im Juni 1856–Schlagintweit n. I 6256, Hb. Berlin)."

Lectotype (designated here): China. Tibet, Provinz Tsánskar, Páder am Nordfuss de Shinku La Pass bis Sulle, Jun 1856, *H. A. R. v. Schlagintweit 6256* (B100244919).

Of the two collections cited by Schulz (1927b), I have examined only the above sheet. The original description fits exceptionally well with that of the type collection of *Chorispora sabulosa*.

26. **Chorispora sabulosa** Cambess. in Jacquem., Voy. Bot. 15, t. 15. 1844; *C. elegans* var. *sabulosa* (Cambess.) O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1071. 1927.

Described from "In excelsissimis ad torrentes supra praedium Bombour ad fines regni Cachemir et provinciae Thibet. Floret Augusto."

Lectotype (designated here): [China. Xizang], *V. Jacquemont 985* (P00741715; Isolectotypes: K000693527, P00741714).

Jafri (1973: 205) stated that the type is "Kashmir, *V. Jacquemont* (P, K)," but he did not specify which of the two collection numbers of Jacquemont at K and P is the type or where the lectotype should be. Therefore, his statement is not a lectotypification of the species name. Of the two sheets at P, the more complete one, which more closely corresponds to the illustration accompanying the original description, is taken herein as the lectotype.

27. *Cochlearia alatipes* Hand.-Mazz., Symb. Sin. Pt. 7: 370. 1931; *Hilliella alatipes* (Hand.-Mazz.) Y.H.Zhang & H.W.Li, Acta Bot. Yunnan. 8: 402. 1986; *Yinshania alatipes* (Hand.-Mazz.) Y.Z.Zhao, Acta Sci. Nat. Univ. Intramongol. 23: 568. 1992; **Cardamine fragariifolia** O.E.Schulz, Bot. Jahrb. Syst. 32: 446. 1903.

Described from: "SW-H.: Im wtp. Laubhochwalde des Yün-schan bei Wukang in dem ne des Tempels Gwanyin-go herabziehenden Graben, Tonschiefer, 1000 m, 12. VI. 1918 (1209, TYPUS). Kwangshi: Binlung, Minschan in N-Kudschön an der Grenze von KW., 1500 m, 17. VI. 1928 (Ching 6044)."

Lectotype (designated here): China. SW Hunan, Mt. Yünschan, near Wukang, 1,000 m, 12 Jun 1918, *H. F.*

von Handel-Mazzetti 12097 (1209 in the protologue) (WU0024357; Isolectotypes: E, W, WU0024348).

Of the two sheets of the type collection of *Cochlearia alatipes* at WU, the one with the full label information and Handel-Mazzetti's annotation of the species name is designated herein as the lectotype.

28. *Cochlearia hobsonii* H.Pearson, Hook. Icon. Pl. 7: t. 2643. 1900; *Lignariella hobsonii* (H.Pearson) Baehni, Candollea 15: 57. 1955; **Aphragmus hobsonii** (H.Pearson) Al-Shehbaz & Warwick, Canad. J. Bot. 84: 279. 2006.

Described from: "Tibet: Yatung, near the Sikkim border, *Hobson*."

Lectotype listed as type by Baehni (1955: 59) and Jafri (1957: 134) and designated here: [China, Xizang], Yatung, [2751N, 8835E, 1897], *H. B. Hobson s.n.* (K000247184; Isolectotype: K000247276).

Both Baehni (1955) and Jafri (1957) indicated that the type is at K, but both sheets at K were annotated by Baehni as the type. The sheet designated herein as the lectotype consists of about 15 fragments of this species accompanied by the line drawing used in the original publication, whereas the isolectotype consists of six plants of the same species plus two of what is now known as *Aphragmus serpens* (W.W.Sm.) Al-Shehbaz & Warwick. Baehni (1955) overlooked the fact that the material he cited under *Lignariella hobsonii* actually belongs to three species, including the two above and *Aphragmus ohbana* (Al-Shehbaz & Kats.Arai) Al-Shehbaz & Warwick. The three species differ remarkably in flower size, seed number, and fruit shape and size.

29. *Cochlearia scapiflora* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 154. 1861; *Pegaeophyton scapiflorum* (Hook.f. & Thomson) O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 11: 229. 1931, comb. illeg.; **P. scapiflorum** (Hook.f. & Thomson) C.Marq. & Airy Shaw, J. Linn. Soc., Bot. 48: 229. 1929.

Described from: "*Hab*. Himalaya orientali alpina, Sikkim interiore, alt. 15000–17000 ped.! *J. D. H.*; Tibetia occidental alpine, Gugi, 15500 pd.! *Str[achey]. & Wint[terbottom].*; Ladak! Nubra! Et Pangong! Alt 16000–18000 ped., *H. Strachey, T.T.* (fl. Jul.) (v.v.)."

Lectotype initially listed as type by Jafri (1973: 164) and designated here: India. Sikkim, 15000–17000 ft, [4,572–5,181.6 m]," *J. D. Hooker s.n.* (K000247223; Isolectotypes: GH, GOET, K000247222).

Of the three collections mounted on the type sheet, two were collected by J. D. Hooker and one by N. M. Przewalski. Jafri (1973) did not indicate which of the two Hooker's collections is the type. Therefore, his lectotypification is considered a first-step finalized herein.

30. *Cochlearia serpens* W.W.Sm. in W.W.Sm. & G.H.Cave, Record. Bot. Surv. India 4: 175. 1911; *Lignariella serpens* (W.W.Sm.) Al-Shehbaz, Arai, and H.Ohba, Harvard Pap. Bot. 5: 119. 2000; **Aphragmus serpens** (W.W.Sm.) Al-Shehbaz & Warwick, Canad. J. Bot. 84: 279. 2006.

Described from: "Sikkim Himalaya, at Jongri, 14,000 ft Gammie No. 156, Watt. No. 5795 in Herb. Kew."

Lectotype (first-step designation by Al-Shehbaz et al. (2000) designated here): India. Sikkim, Jongri, 14,000 ft [4,267.2 m], *Watt 5795* (K000484410; Isolectotype: K000247182).

In addition to the above two collections cited in the protologue, Smith & Cave (1911) listed two additional ones collected by them. Al-Shehbaz et al. (2000) indicated that the lectotype of this species is at K but overlooked the fact that *Watt 5795* is mounted on two sheets. Of these, the one taken herein as the lectotype has the original pencil drawing and notes in W. W. Smith's handwriting, whereas the isolectotype is a mixed collection with plants of *Aphragmus hobsonii* (see above).

31. *Dilophia macrosperma* O.E.Schulz in W. Limpricht, Repert. Sp. Nov. Regni Veg. Beih. 12: 385. 1922; **Eutrema fontanum** (Maxim.) Al-Shehbaz & Warwick, Harvard Pap. Bot. 10: 132. 2005.

Described from: "Ost-Tibet: Batang–Litang, Pungtschaumu-Taschü, an Felsen des Passes Dshagala, 5260 m (n. 2235); Hor Tschango, Schtiala, im Geröll des Schao kirr bu, 4700 m (n. 2068)."

Lectotype (designated here): China. Tibet, Batang-Litang, Pungtschamu-Taschü, 5,260 m, 22 Aug 1914, *W. Limprich 2235* (WU024358; Isolectotype: WRSL, n.v.).

Schulz (1922) did not list any herbarium in which the above two collections are housed. I have examined the WU duplicate of the former collection and was unable to study the complete set of Limpricht's collection at WRSL.

32. **Dilophia salsa** Thomson, Hooker's J. Bot. Kew Gard. Misc. 5: 20. 1853.

Described from: "Hab. In salsis paludibus Tibetiae occidentalis, alt. 12–17,000 pedum."

Lectotype (designated here): [India. Nubra, 25 Jul 1848], *T. Thomson s.n.* (K000247180; Isolectotypes: B, BM, E, GH, K000247179, NY, P).

There are five collections of Thomson from India (as Western Tibet) mounted on two sheets at K. One sheet includes 14 plants collected from Nubra on 25 Jul 1848, and this sheet is designated herein as the lectotype. The second sheet includes four collections and 11 plants, of which the four plants on the lower right corner represent the isolectotype. The pencillar illustration of flower and fruit details is mounted on the top right corner of the isolectotype sheet. However, it is not possible to determine which of the 25 plants on two sheets was used for drawing the original illustration in Thomson (1853).

33. **Dipoma iberideum** Franch., Bull. Soc. Bot. France 33: 405. 1887.

Described from: "Yun-nan, in lapidosis calcareis delabentibus ad juga nivalia Li-kiang, alt. 3800 m.; fl. fr. 9 jul. 1884, (Delav. *Lepidium,* n.8)."

Lectotype (designated here): China, Yunnan, "Pierres mouvantes au glacier de Li-Kiang," 3,800 m, 9 Jul 1884, *Lepidium # 8,*" *J. M. Delavay* (P01817491; Isolectotypes: K000484373).

Possible isolectotypes: P01817490, P01817492.

Only one of three sheets of the type collection at P and the K duplicate carry Delavay's hand writing as *Lepidium* # 8 and the same locality, date of collection, and elevation as given in the protologue. Although P01817490 and P01817492 have similar data (locality, date, and collection number), they differ from the lectotype in the elevations from which they were collected: 3,500 m and 4,000 m, respectively.

34. *Draba affghanica* Boiss. var. *subtomentosa* O.E.Schulz in Engler, Pflanzenr. IV. 105(Heft 89): 118. 1927; **D. affghanica** Boiss., Fl. Orient. Suppl. 55. 1888.

Described from: "Kurrum Valley, Serátgah, 3600–4300 m ü. M. (Aitchison 1879, n. 825 [6]–am 19. Juli blühend und fruchtend, hb. Kew)."

Lectotype (designated here): Kurrum Valley, Serátgah, 11–13,000 ft [3,352.8–3,962.4 m], 19 Jul 1879, *J. E. T. Aitchison 825* (K000729817; Isolectotype: K000568095).

Schulz (1927a) indicated that the type of this variety is at K, but there are two sheets with the same collection number. The one annotated by Schulz without any indication of type status is taken here as the lectotype. The elevation given in meters in the protologue is higher than the conversion of elevation given in feet on the herbarium sheets.

35. *Draba alpina* L. var. *involucrata* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 8: 121. 1913; **D. involucrata** (W.W.Sm.) W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 206. 1919.

Described from: "Crevices and ledges of moist limestone cliffs on the eastern flank of the Lichiang Range. Lat. 2725N. Alt. 11,000–12,000 ft. June 1910. G. Forrest No. 5732" and "On boulders and limestone drift on the eastern flank of the Lichiang Range. Lat. 2740N. Alt. 15,000–16,000 ft. July 1910. G. Forrest. No. 6138."

Lectotype (designated here): China. Yunnan, E flank of Lichiang Range, 2725N, 11–12,000 ft [3,352.8–3,657.6 m], Jun 1910, *George Forrest 5732* (E00386061; Isolectotypes: BM, K, US).

Smith (1913a) cited two collections in his original description of this taxon at the varietal level, and he (Smith, 1919) cited eight additional collections when he recognized it as a distinct species. Unfortunately, five of those additional collections turned out to be misidentifications of *Draba jucunda* W.W.Sm., a species that he described in the same publication. Despite that, lectotypification of the varietal/species name is based on one of the two collections he cited in the original publication of the variety. Of the four duplicates I examined of the above lectotype collection, only the sheet at E carries the basionym at the varietal and species ranks; the other three were identified as *Draba involucrata*. This indicates that duplicates of the lectotype were sent well after the publication of the combination at the species rank and that Smith had likely examined the entire collection before the distribution of duplicates.

36. *Draba alpina* var. *leiophylla* Franch., Bull. Soc. Bot. France 33: 401. 1887; **D. involucrata** (W.W.Sm.) W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 206. 1919.

Described from: "Yun-nan, in fissuris rupium calcarearum ad juga nivalia Li-kiang, alt. 3500 m, fl. 9 jul. 1884 (Delav. *Draba,* n. 9)."

Lectotype (designated here): China. "Yunnan: Au pied du glacier de Li Kiang, 9 Jul 1884, 4000 m, *J. M. Delavay 6*." (P02272408; Isolectotype: P02272409).

In his original description of *Draba alpina* var. *leiophylla*, Franchet (1887) cited a single collection (*Delavay 9*) collected at an elevation of 3,500 m. No such specimen was seen at P, and it is possible that the collection he intended to cite was *Delavay 6* that was gathered at 4000 m. Of the two sheets at P that qualify for the type collection, the more complete one carrying the varietal name in Franchet's handwriting is designated as the lectotype.

37. *Draba altaica* var. *foliosa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 219. 1927; **D. altaica** (C.A.Mey.) Bunge, Delect. Seminum Hort. Bot. Dorpat. 1841: 8. 1841.

Described from: "Sikkim: Tungu, ca. 4000 m ü. M (J. D. Hooker 1849–in Juli blühend)."

Lectotype (designated here): India. Sikkim, Tungua, 13,000 ft [3,962.4 m], 24 Jul 1849, *J. D. Hooker s.n.* (B100294007; Isolectotype: K).

I have examined two of the four collections cited by Schulz (1927a) under var. *foliosa*. The sheet annotated by him at B is selected herein as the lectotype.

38. *Draba altaica* var. *microcarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 219. 1927; **D. altaica** (C.A.Mey.) Bunge, Delect. Seminum Hort. Bot. Dorpat. 1841: 8. 1841.

Described from: "Karakoram, 4500 m ü. M. (C. B. Clarke 1876–am 9. August fruchtend, hb. Kew)."

Lectotype (designated here): [Pakistan]. Karakoram, 13,500 ft [4,114.8 m], 9 Aug 1876, *C. B. Clarke 30261* (K000397461).

Schulz (1927a) cited five collections under this variety and, of the four housed at K, the most complete specimen is taken herein as the lectotype.

39. *Draba altaica* var. *racemosa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 219. 1927; **D. altaica** (C.A.Mey.) Bunge, Delect. Seminum Hort. Bot. Dorpat. 1841: 8. 1841.

Described from: "Östliches Altaigebirge (Bunge 1839)."

Lectotype (designated here): [Russia]. "Herbar. Bung. *Draba altaica* mihi. Flor. orient. altaica. 1839," *A. A. von Bunge s.n.* (B100294008; Isolectotypes: 2 at BR).

Of the four collections cited by Schulz (1927a) under var. *racemosa*, I have examined the above and *Clarke 30181* (K). The Bunge collection was annotated by him and is likely represented by duplicates in other herbaria (e.g., LE, P) that I have not yet examined.

40. **Draba amoena** O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 188. 1927.

Described from: "West-Nepal: Birkenwald über Budhi Village, 3600–4000 m ü. M. (Duthie 1886, n. 5358a–am 18. Juli blühend, hb. Dehra Dun, Kew)."

Lectotype (designated here): Nepal, Budhi Village, 11–12,000 ft [3,352.8–3,657.6 m], 18 Jul 1886, *J. F. Duthie 5358* (K000247206; Isolectotypes: B, BM, G, WU).

In the original description of *Draba amoena,* Schulz (1927a) cited three collections housed at DD and K. I have examined all those at K only. Ideally, the material at B should be considered first for the lectotypification of any Brassicaceae described by Schulz. However, in the case of *D. amoena,* the B sheets consist of a collection of plant fragments accompanied by four pencil drawings, all apparently based on the K sheet designated above as the lectotype.

41. **Draba amplexicaulis** Franch., Bull. Soc. Bot. France 33: 403. 1887.

Described from: "Yun-nan, in pratis humidis ad juga nivalia Li-kiang, alt. 3000 m.; fl., fr. 10 jul. 1884 (Delav. n. 702)."

Lectotype (designated here): China, Yunnan, "Prairies fraiches au pied du glacier de Li-Kiang," 3000 m, 10 July 1884, *J. M. Delavay 702* (P02272373; Isolectotypes: E, P02272374, P02272375, ?US00810685).

Franchet (1887) cited a single collection under this species, and it is represented by three duplicates at P. Two of these carry the original handwritten label by Delavay, of which only the designated lectotype above has a complete plant in flower and another in fruit. The isolectotype at US does not carry the collection date, though it is very likely to be a duplicate of the type collections.

42. *Draba amplexicaulis* Franch. var. *dasycarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 181. 1927; **Draba calcicola** O.E.Schulz in Engler, Pflanzenr. 89(IV. 105): 373. 1927.

Described from: "Yünnan: Region von Tungshan, Yangtze drainage basin, östlich von Likiang (J. F. Rock 1923, n. 10533)."

Lectotype (designated here): China. Yunnan, region of Tungshan, Yangtze drainage basin, E of Likiang, Aug 1923, *J. F. Rock 10533* (B; Isolectotypes: GH00312596, P02272378, US00100161).

Schulz (1927a) cited a single collection for this variety without indicating the herbaria housing the specimens he examined. Although the designated B lectotype was examined by the present author, no digital image is available on the B website, and the specimen may have been misplaced or not yet digitized. However, all three sheets of the isolectotypes are available on the JSTOR website (http://plants.jstor.org/).

43. *Draba amplexicaulis* var. *dolichocarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 181. 1927; **D. amplexicaulis** Franch., Bull. Soc. Bot. France 33: 403. 1887.

Described from: "Yünnan: Yangtze-watershed, Prefectural District of Likiang, Ostabhänge von Likiang Snow Range, 3650 m ü. M. (J. F. Rock 1922, n. 6066–am 24 August fast fruchtend)."

Lectotype (designated here): China. Yunnan, Yangtze watershed, Prefectural district of Likiang, E slopes of Likiang Snow Range, 1922, 11,000 ft, *J. F. Rock 6066* (B100294010; Isolectotypes: E00386070, GH00112022, P02272376, US00100160, W1926-0015875).

Two collections were cited by Schulz (1927a), *Rock 6066* and *Handel-Mazzetti 4500* (WU, W), and I have examined all their duplicates in the major herbaria consulted. The most complete is designated herein as the lectotype.

44. **Draba cachemirica** Gandoger, Bull. Soc. Bot. France 46: 418. 1899.

Described from: "Hab.–Cum praecedente [Hab. Cachemir: Baltistán ad Marpu-Drás, alt. 12–13000 ped.]."

Lectotype (designated here): Kashmir, Baltistan, Marpu nullah, above Drás, 12–13,000 ft [3,352.8–3,657.6 m], 3 Jul 1892, *J. F. Duthie 11800* (K000772474; Isolectotypes: B, E, G).

A single collection was cited in the original publication of the species, but no herbarium name was given. The sheets at both B and K were annotated as "type," but of all duplicates I examined, the K specimen is the most complete and therefore designated above as the lectotype.

45. **Draba calcicola** O.E.Schulz in Engler, Pflanzenr. 89(IV. 105): 373. 1927; *Draba aprica* O.E.Schulz in Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 96. 1926, non Beadle in Small, Fl. SE U.S., ed. 2, App. 1336. 1913; *D. moupinensis* var. *calcicola* (O.E.Schulz) W.T.Wang, Acta Bot. Yunnan. 9: 4. 1987.

Described from: "Prov. Yünnan boreo-occ.: In rupibus calceis apricis reg. temperata ad fontem calidum infra vicum Baoschi prope pagum Dschungdien ("Chungtien"), 3400 m, legi 17. VIII. 1915 fl., fr. (Nr. 7698)."

Lectotype (designated here): China. NW Yunnan, near Chungtien [Zhongdian], below Baoschi, 3,400 m, 17 Aug 1915, *H. F. von Handel-Mazzetti 7698* (B100294045; Isolectotypes: W1926-0004140, WU024354).

No herbarium was indicated in the original publication of the species or its later renaming, and the three duplicates, any of which could easily serve as the lectotype, carry identical labels. However, the B sheet is the only one that carries the renaming of the species in Schulz's handwriting and is taken here as the lectotype.

46. **Draba cholaensis** W.W.Sm., Rec. Bot. Surv. India 4: 352. 1913.

Described from: "West of Tanka La, Sikkim, very sparingly at an elevation of 13,000 ft., No. 4175."

Lectotype (designated here): India. Sikkim, West of Tanka La, 13,000 ft, 11 Aug 1910, *W. W. Smith 4175* (K000247211; Isolectotype: CAL, n.v.).

Smith (1913b) did not list any herbarium in his original publication of the species, but because the description is based on his own collection, of which there is a duplicate at CAL, the name needed lectotypification. I am designating the K sheet, which I examined, as the lectotype.

47. *Draba composita* O.E.Schulz in Hand.-Mazz., Anz. Akad. Wiss. Wien, Math. Naturwiss. Kl. 63: 96. 1926; **D. oreodoxa** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 209. 1919.

Described from: "Prov. Yünnan: cum praecedente [Prov. Yünnan: In glarea calcea alpine lateris occid. montium Piepun ad austro-orientem pagi Dschungdien, 4500–4650 m, legi 11. VIII 1914 fr.] (Nr. 4683)."

Lectotype (designated here): China. Yunnan, in lateris occid. montis Piepun ad austro-orient. pagi Dschungdien (Chungtien). 4500–4650 m, 11 Aug 1914, *H. F. von Handel-Mazzetti 4683* (WU0045118; Isolectotype: W1962-0004142).

The WU sheet was annotated in February 1926 in Schulz's handwriting as *Draba lichiangensis* × *D. piepunensis* O.E.Schulz, and the name *D. composita* was later added by Handel-Mazzetti. By contrast, the W duplicate has all three names annotated by Handel-Mazzetti but without dates. Although the WU sheet was anonymously annotated as the holotype, it is more appropriate to treat it as the lectotype.

The alleged hybrid origin of *Draba composita* as emphasized by Schulz (1927b) is highly unlikely, and its type collection is a perfect match to that of *D. oreodoxa* in every morphological character. Indeed, there is nothing in the type collection of *D. composita* that is morphologically intermediate between its alleged parents in characters such as the white flowers of *D. lichiangensis* W.W. Sm. and the scapose habit of *D. piepunensis* (=*D. senilis* O.E.Schulz), a species with leafless stems and ebracteate racemes.

48. *Draba dasyastra* Gilg & O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 265. 1927; **D. winterbottomii** (Hook.f. & Thomson) Pohle, Repert. Spec. Nov. Regni Veg. Beih. 32: 138. 1925.

Described from: "Zentralasiatisches Gebiet.–Provinz des alpinen Himalaya: Khambajong, 5000 m ü. M. (Major D. Prain, Sept. 1903, Major F. E. Younghusband, Tibet Frontier Commission 1903, n. 86–am 16. Juli mit unreifen Fruchten, hb. Calcutta as *D. lasiophylla*)."

Lectotype (designated here): China. Tibet, Khambajong, 15,000 ft [4,572 m], 16 Jul 1903, *F. E. Younghusband 86* (K000568098; Isolectotypes: CAL (n.v.), P02272449).

Of the above two collections cited by Schulz (1927a), I have examined only the latter collection.

49. **Draba elata** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 150. 1861.

Described from: "*Hab*. In Himalaya oriental subalpina, alt. 11000–12000 ped.! *J.D.H*. (fl. Jul.)."

Lectotype (designated here): India. Sikkim, 5 Sep 1849, 11,000–13,000 ft [3,352.8–3,962.4 m], *J. D. Hooker s.n.* (K000077290, the two plants in the middle).

There is a single sheet at K with Hooker's handwritten description of the species. The sheet is a mixed collection, and the plant on the right and two on the left represent *Draba polyphylla* O.E.Schulz, whereas the two in the middle are *D. elata*. The original description (Hooker & Thomson, 1861) was based on plants of both species, and the flowers and cauline leaves are characteristic of *D. elata* plants, whereas the mature fruits "siliquis tortis longe racemosis" were based on the fruiting plants of *D. polyphylla*. Although Schulz (1927a) did not annotate the type material at K, he provided a description for *D. elata* that perfectly matches the two plants designated above as the lectotype and distinguished the species from *D. polyphylla* by having pilose and straight or only slightly curved fruits (vs. glabrous and contorted fruits). Therefore, his species concept of *D. elata*, which was adopted by Zhou et al. (2001), is accepted herein as well.

50. **Draba falconeri** O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 300. 1927.

Described from: "Zentralasiatisches Gebiet.–Provinz des alpinen Himalaya. Kashmir: Alibad, 3350 m ü. M. (C. B. Clarke 1876, n. 28697B, hb. Calcutta, n. 28955A, hb. Kew, n. 28955B, hb. Calcutta–Anfang Juli blühend un etwas fruchtend)."

Lectotype (designated here): Pakistan. Kashmir, Aliabad (as Alibad), 6 Jul 1876, 10,500 ft [3,200.4 m], *C. B. Clarke 28955A* (K 000247209; Isolectotype: B100241518).

Schulz (1927a) cited nine collections in the originial description of *Draba falconeri*. Jafri (1973) was the first to attempt the lectypification of this species and indicated that the type is *Clarke 28697* (K, B). However, his lectotypification is erroneous for a number of reasons. First, Clarke's collection numbers cited by Schulz are alphabetized, and Jafri did not indicate that in his designated type collection. Second, *Clarke 28697* was cited by Schulz (1927a) as *Clarke 28697B* from CAL. Third, this *Clarke 28697B* was never cited by Schulz from the B or K herbaria but from CAL. Fourth, neither the K nor the B herbaria has duplicates of *Clarke 28697*. Fifth, Schulz (1927a) listed in the synonymy of *D. falconeri* the unpublished name *D. incana* L. var. *flaconeri* C.B.Clarke, and of all the collections he cited, only *Clarke 28955A* bears Schulz's annotations and Clarke's handwriting of that unpublished varietal name. For these reasons, I am designating the last collection as the lectoype.

51. **Draba glomerata** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Hab. Soongnum," *J. F. Royle s.n.* (Holotype, DD, n.v.).

Jafri (1973: 138), indicated that the type of *Draba glomerata* is housed at LIV. However, extensive search by the LIV staff of Royle's *Draba* types did not yield anything, and the single known original sheet of the species is housed at DD, which I was unable to study.

52. *Draba granitica* Hand.-Mazz., Anz. Akad. Wiss. Wien, Math. Naturwiss. Kl. 62: 143. 1925; **D. gracillima** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 153. 1861.

Described from: "Yünnan bor.-occid.: prope fines Tibeto-Birmanicas inter fluvios Lu-djiang (Salween) et Djiou-djiang (Irrawadi or. sup.) in rgione alpina retro montem Gomba-la supra Tschamutong, ad rupes versus jug. Buschao. (9497)"

Lectotype (designated here): China. "Yünnan bor.-occid.: prope fines Tibeto-Birmanicas inter fluvios Lu-djiang (Salween) et Djiou-djiang (Irrawadi or. sup.) in rgione alpina retro montem Gomba-la supra Tschamutong, ad rupes versus jug. Buschao," 4050–4100 m, 10 Jul 1916, *H. F. von Handel-Mazzetti 9497* (WU0024363; Isolectotypes: B100241511, E00373108, W1925-0002036).

The lectotype and isolectotypes at E and W carry idential labels, whereas that at B includes two small plants with a handwritten label by Otto E. Schulz. The WU and W sheets were initially identified by W. W. Smith as *Draba gracillima,* but the species and Smith's names were crossed out by Handel-Mazzetti and replaced by "granitica Hand. Mazzt, sp. nova" and "H.M.," respectively. Evidently, all plants were studied by Handel-Mazzetti when describing the species, and the original description did not specify where the type is housed. Although I have annotated the WU sheet as holotype, the presence of more than one sheet examined by the species author requires lectotypification (see McNeill, 2014).

53. **Draba handelii** O.E.Schulz in Handel-Mazzetti, Anz. Akad. Wiss. Wien, Math.-Naturwiss. Kl. 63: 97. 1926.

Described from: "Prov. Yünnan bor.-occid.: prope fines Tibeto-Birmanicas ad rupes graniticas alpinas retro montem Gomba-la versus jugum Buschao inter vicum Tschamutong et fl. Irrawadi, 4050–4100 *m*, legi 10. VII. 1916 fl. et fr. juv. (Nr. 9502)."

Lectotype (designated here): China. Yunnan, "prope fines Tibeto-Birmanicas inter fluvios Lu-djiang (Salween) et Djiou-djiang (Irrawadi or. sup.) in rgione alpina retro montem Gomba-la supra Tschamutong, ad rupes versus jug. Buschao," 4050–4100 m, 10 Jul 1916, *H. F. von Handel-Mazzetti 9502* (B100241510; Isolectotypes: W1926-0004147; WU0024362).

In the protologue of *Draba handelii,* Schulz (in Handel-Mazzetti, 1926) gave the locality somewhat differently from the label as indicated above, though the information in both is identical. Both the B and WU sheets were annotated in Schulz's handwriting prior to the publication of the species, which indicates that he based his description on more than one sheet. Therefore, the species name needs lectotypification, and the better and more complete sheet at WU is designated as the lectotype.

54. **Draba humillima** O.E.Schulz in Engler, Pflanzenr. 89(IV. 105): 114. 1927.

Described from: "Provinz des Himalaya-Gebirges.–Sikkim: Cheumsanthang, 4650 m ü. M. (Ribu and Rhomoo 1911, n. 5049–blühend in September, auch vorjährige Früchte)."

Lectotype (designated here): India. Sikkim, Cheumsanthang, 14,000 ft [4,267.2 m], 6 Sep 1911, *Ribu & Rhomoo 5049* (B100386901; Isolectotype: K000077287).

Schulz (1927a) cited five collections for this species, of which I have examined only the single collection above, and the better and more complete duplicate is designated as the lectotype. The other four are housed in CAL.

54. *Draba hystrix* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 149. 1861; **Pseudodraba hystrix** (Hook.f. & Thomson) Al-Shehbaz, D.A.German & M.Koch, Pl. Divers. Evol. 129: 73. 2011.

Described from: "*Griff. It. Not*. p. 257 (No. 478). *Hab*. In Affghanistan and summum portarum Koshuk Pass, alt. 7300 ped.! *Griffith*."

Lectotype (designated here): [Pakistan. Baluchistan], Khojak (Koshuk) Pass, *Griffith 478* (K000697209; Isolectotype: K000697213).

Although Hedge (1968b: 177) and Al-Shehbaz et al. (2011) correctly gave *Griffith 478* (K) as the type collection, their typification can only be considered as a first-step because there are two duplicate sheets at K. Both sheets were annotated in Hooker's handwriting as "Draba Hystrix Hf&T," and the one with the original Griffith label and number is designated as the lectotype. In addition, there are several other unnumbered collections by Griffith at K, and none can be considered for lectotypification.

56. **Draba jucunda** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 207. 1919.

Described from: "China: N.W. Yunnan. 1913." F. K. Ward. No. 123A.

Lectotype (designated here): China. NW Yunnan, without locality, 1913, *F. Kingdon-Ward 1023a* (E00386060).

Smith (1919) cited three collections in his original description of *Draba jucunda,* and I have examined all of them. The Kingdon-Ward's collection, which carries Smith's subsequent pencil writing as the "type" and which is the most complete of all, is designated herein as the lectotype.

57. **Draba lanceolata** Royle, Ill. Bot. Himal. Mts. 1: 72. 1834.

Described from: "Hab. Shalkur."

Lectotype (designated here): India. Shalkur, *J. F. Royle, s.n.* (K000568101, plant on the lower right; Isolectotype: DD, n.v.).

As discussed under *Draba glomerata*, Royle's *Draba* types appear to be housed in CAL, DD, and some at K, and none was found in LIV. I have not seen the material in the first two herbaria, and I am recognizing the K specimen as the lectotype.

58. *Draba lanceolata* var. *brachycarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 298. 1927; **D. lanceolata** Royle, Ill. Bot. Himal. Mts. 1: 72. 1834.

Described from: "Thianschan, am Berge Keuleu, 2000–2500 m ü. M. (Jules Brocherel 1900, n. 66, hb. Deless.)."

Lectotype (designated here): [Kazakhstan?]. Tian Shan, Berge Keuleu, 2,000–2,500 m, 1900, *J. Brocherel 66* (G-DEL).

Of the four collections listed by Schulz (1927a), I have examined only the above collection, and it perfectly matches the description.

59. *Draba lanceolata* Royle var. *chingii* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 298. 1927; **D. ladyginii** Pohle, Izv. Imp. Bot. Sada Petra Velikago 14: 472. 1914.

Described from: "China: Provinz Kansu, bei Pingfan, am Waldrande, 2350–2800 m ü. M. (R. C. Ching 1923, n. 497–im Juli blühend und mit vorjährigen Fruchtstengeln)."

Lectotype (designated here): China. Gansu, near Pingfan, 2,350–2,800 m, 13 Jul 1923, *R. C. Ching 497* (US00100208; Isolectotypes: E00414268, GH00112008, P02272413, PE).

Only the above collection was cited in the original publication of the variety. I have been unable to find a duplicate of this taxon that was annotated by Schulz and, therefore, the above designation of the lectotype is arbitrary though based on selecting the more complete duplicate.

60. *Draba lanceolata* Royle var. *latifolia* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 10: 555. 1929; **D. ladyginii** Pohle, Izv. Imp. Bot. Sada Petra Velikago 14: 472. 1914.

Described from: "Eastern Tibet: Radja and Yellow River gorges, Deyang valley east of Radja, alt. 10000 ft. (blühend im Juni 1926–J. F. Rock, 1924–1927 n. 14134."

Lectotype (designated here): China. E Tibet, Radja and Yellow River gorges, Deyang Valley, E of Radga, 10,000 ft [3,048 m], Jun 1926, *J. F. Rock 14134* (GH00046947; Isolectotypes: E00414269, K000697271).

The lectotype designation here follows the same comment given for the previous variety.

61. *Draba lanceolata* var. *leiocarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 297. 1927; **D. lanceolata** Royle, Ill. Bot. Himal. Mts. 1: 72. 1834.

Described from: "Provinz Kansu, Lo Lan Shan Mts. an Felsabhängen, 1750–2650 m ü. M. (R. C. Ching 1923, n. 1047–im Juli blühend)."

Lectotype (designated here): China. Gansu, Lo Lan Shan, 1,750–2,650 m, Jul 1923, *R. C. Ching 1047* (GH; Isolectotypes: E, P, PE, US, W).

Schulz (1927a) cited eight collections for this variety, and I have examined only the one above. Unfortunately, none of the duplicates was annotated by him and, therefore, the lectotype designation is arbitrary. The variety was based on a trivial character (lack vs. presence of fruit trichomes), a feature often found within the same population.

62. *Draba lanceolata* Royle var. *sonamargensis* O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 331. 1933; **D. lasiophylla** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "N. W. Himalaya: Kashmir, Har Nag near Mt. Kolahoi, alt. 13000 ft (fruchtend im August–R. R. Stewart 1927 n. 9354)."

Lectotype (designated here): Kashmir, Har Nag, near Mt. Kolahoi, Aug 1927, 13,000 ft [3,962.4 m], *R. R. Stewart 9354* (B100294134; Isolectotypes: K000568092, MO, NY00115383, US00100209).

Under this variety, Schulz (1933) cited four collections, all collected by Ralph R. Stewart, but without indicating where the collections are housed. I have examined duplicates of all four collections and designated as the lectotype the one that most fully agrees with the original protologue and which has more duplicates.

63. **Draba lasiophylla** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Hab. Shalkur and Lippa."

Lectotype (designated here): NW India. Shalkur and Lippa, *J. F. Royle s.n.* (K000772473; Isolectotype: B100241641).

Labels of both the K or B sheets above do not have the exact locality data (Shalkur and Lippa) as given in the original description of the species. However, both labels have Royle's handwritten annotation, and there is no reason to doubt their authenticity. It is unknown to me if duplicates of the above collection are housed in Indian herbaria (e.g., CAL or DD).

64. **Draba lichiangensis** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 208. 1919.

Described from: "CHINA: Yunnan, western flank of the Lichiang Range, Lat. 2720N. Alt. 13,000 ft. Plant of 1–2 inches. Flowers white. Crevices of limestone cliffs. May 1910. G. Forrest. No. 5698."

Lectotype listed as type by Cheo et al. (2001: 72): CHINA. Yunnan, E flank of Lichiang Range, 13,000 ft [3,962.4 m], 2720N, May 1910, *G. Forrest 5698* (E 00386059; Isolectotype: BM).

Smith (1919) cited four collections in his original description of *Draba lichiangensis* and annotated *Forrest 5698* (E) in his own handwriting as the type. This collection was taken by Zhou et al. (2001) as the holotype and designated herein as the lectotype.

65. *Draba lichiangensis* var. *microcarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 214. 1927; **D. lichiangensis** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 208. 1919.

Described from: "Provinz Sze-ch'uan: Dongrergo, auf felsen oberhalb Huang-lung-ssü, ca. 5000 m ü. M (H. Smith n. 4961)."

Lectotype (designated here): China. Sichuan, Dongrergo, 5,000 m, 9 Aug 1922, *H. Smith 4961* (B100241638; Isolectotype: UPS).

This and the following variety have the same locality and collection date, and they represent a fraction of the overall variation of this widespread Himalayan species (Bhutan, China (Sichuan, Xizang, Yunnan), India, and Nepal). In my opinion, neither variety merits recognition because they were based on minor variations.

66. *Draba lichiangensis* var. *trichocarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 215. 1927; **Draba lichiangensis** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 208. 1919.

Described from: "Provinz Sze-ch'uan: Dongrergo, auf felsen oberhalb Huang-lung-ssü, ca. 5000 m ü. M (H. Smith n. 4961)."

Lectotype (designated here): China. Sichuan, Dongrergo, 5,000 m, 9 Aug 1922, *H. Smith 4959* (UPS; isolectotype, B).

67. **Draba matangensis** O.E.Schulz, Acta Horti Gothob. 1: 163. 1924.

Described from: "Nordwest-Sze-ch'uan: Berge NE von Matang, steinge Schutthalden, 4800–5100 m, 15 IX. (fr.) 1922 (no. 4415)."

Lectotype (designated here): China. Sichuan, Matang, in declivo lapidoso, 4,800–5,100 m, 15 Sep 1922, *H. Smith 4415* (UPS; Isolectotypes: B100386864, W).

The original description of the species cited a single specimen, and the most complete duplicate, which was annotated by me on 13 Sep 2000 as the holotype, is taken herein as the lectotype. The B isolectotype represents fragments taken from the UPS material, and it carries Schulz's handwritten label instead of the printed labels of the UPS and W sheets.

68. *Draba melanopus* var. *gilgitica* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 317. 1927; **D. melanopus** Kom., Trudy Imp. S.-Peterburgsk. Obshch. Estestvoisp., Vyp. 3, Otd. Bot. 26: 102. 1896.

Described from: "Norwest-Himalaya: Tui Pass, 4000–4600 m ü. M. (Giles, Gilgit Exped. 1881, n. 468–am 12 Juli blühend)."

Lectotype (designated here): Pakistan. Gilgit, Tui Pass, 12,000–14,000 ft [3,657.6–4,267.2 m], 12 Jul 1881, *G. M. J. Giles 468* (K000568091; Isolectotype: ?B100241619).

Although the printed label of the K and B sheets of var. *gilgitica* are the same, the B sheet does not carry the locality, altitude, or collection number and, therefore, it may not be part of the type collection. The specimens of both sheets were donated by Duthie in 1887, and there is no doubt that both were used in the description of the species because they were annotated in Schulz's handwriting in 1923.

69. *Draba modesta* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 208. 1919; *D. altaica* prol. *modesta* (W.W.Sm.) O.E.Schulz, Meddel. Göteborgl. Bot. Trädg. 1: 163. 1924; *D. altaica* var. *modesta* (W.W.Sm.) W.T.Wang, Acta Bot. Yunnan. 9: 5. 1987; **D. altaica** (C.A.Mey.) Bunge, Delect. Seminum Hort. Bot. Dorpat. 1841: 8. 1841.

Described from: "N.W. Yunnan at A-tun-tsu, on rocks and screes at 15,000 ft. August 1913. F. K. Ward. Nos. 943, 737."

Lectotype (designated here): China. NW Yunnan, A-tun-tsu [Deqin], on rocks and scree, 15,000 ft [4,572 m], Aug 1913, *F. Kingdon-Ward 943* (E00386071).

Both collections cited by Smith (1919) are housed E, but he did not state in the publication which one is the type. The sheet annotated in Smith's handwriting as "type" is designated herein as the lectotype.

70. *Draba mongolica* var. *trichocarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 278. 1927; **D. mongolica** Turcz., Bull. Soc. Imp. Naturalistes Moscou 15: 256. 1842.

Described from: "Dongrergo, am Kalkbach unterhalb Huang-lung-ssü, 3900–4400 m ü. M. (H. Smith n. 3597, 3924, 3944."

Lectotype (designated here): China. Sichuan, Dongrergo, 23 Jul 1922, 3,900–4,100 m, *H. Smith 3597* (UPS).

Six of the nine collections cited by Schulz (1927a) for this variety were collected by Harry Smith and housed at UPS.

71. *Draba moupinensis* Franch., Nouv. Arch. Mus. Paris, Sér. 2, 8: 200. 1886; **D. surculosa** Franch., Bull. Soc. Bot. France 33: 401. 1887.

Described from: "Moupine, in silvis humidis. Fl. fruct. Aug. 1869."

Lectotype (designated here): [China]. "Thibet oriental Prov. De Moupin, aug 1863," *Abbé David s.n.* (Lectotype: P02272438; Isolectotype: P02272437).

Neither of the above two duplicates of the type collection of this species was cited as the type, and the more complete sheet of the two at P is taken herein as the lectotype. The year of collection was mistyped in print as 1869 instead of 1863.

72. *Draba nichanaica* O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 331. 1933; **D. lanceolata** Royle, Ill. Bot. Himal. Mts. 1: 72. 1834.

Described from: "N.W. Himalaya: Kashmir, Nichanai Pass near Sonamarg, alt. 13000 ft. (fruchtend am 16. August–R. R. Stewart 1928 n. 9888, Ladak Road, Zoji Pass, alt. ca. 12000 ft. (fruchend im August–R. R. Stewart 1928 n. 9960A.)"

Lectotype (designated here): Kashmir. Ladak road, Zoji Pass, ca. 12,000 ft [2,657.6 m], *R. R. Stewart 9960A* (B100293377).

Schulz (1933) indicated that *Draba nichanaica* is of a hybrid origin between *D. lanceolata* and *D. lasiophylla* Royle. An examination of both original collections reveals that the plants represent a minor variant of *D. lanceolata* but with slightly denser indumentum and smaller leaves.

73. *Draba nubigena* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 291. 1927; **D. lasiophylla** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Kumaun, am Lebung glacier, 4300–5000 m ü. M. (Duthie 1886, n. 5336–am 3. August fruchtend, hb. Dehra Dun)."

Lectotype (designated here): [India]. Near Lebung Glacier, 13,000–15,000 ft [3,962.4–4,572 m], 3 Aug 1896, *J. F. Duthie 5336* (B100241597; Isolectotype: DD, n.v.).

Schulz (1927a) cited three collections under this species, of which a plant and fragments of one are deposited at B that I have examined. It is indistinguishable from plants of *Draba lasiophylla* except for the presence of some simple trichomes on the stems and their alleged absence in *D. lasiophylla*. The latter species is extremely variable and widespread throughout the Himalayas and the Central Asian republics of the former Soviet Union, and it can easily accommodate *D. nubigena*.

74. *Draba oaricarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 279. 1927; **D. stenobotrys** Gilg & O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 291. 1927.

Described from: "Zentralasiatische Gebiet–Provinz des extratropischen Himalaya. Sikkim: Llonakh, 4650 m ü. M. (Smith und Cave 1909, 2042–am 28. Juli blühend un kaum fruchtend, hb. Calcutta)."

Lectotype (designated here): India. Sikkim, Llonak, 14,000 ft [4,267.2 m], 28 Jul 1909, *W. W. Smith & G. H. Cave 2042* (B100386903; Isolectotype: CAL, n.v.).

Although Schulz (1927a) mentioned "hb. Calcutta" following the citation of the type collection, it most likely implies that the origin of the material is from that herbarium because the duplicate at B, which was annotated by him in 1924, has a label that says "Herb Hort Bot Calcuttensis."

Both *Draba stenobotrys* and *D. oaricarpa* were simultaneously published by Schulz (1927a), the former was selected by Cheo et al. (2001) for the combined species and therefore that name has priority (see Article 11.5 in McNeill et al., 2012).

75. *Draba obscura* Dunn, Bull. Misc. Inform. Kew 1924: 383. 1924, non Rollins, Gen. Lesquerella 10. 1973; *Lignariella obscura* (Dunn) Jafri, Candollea 16: 134. 1957; **Aphragmus obscurus** (Dunn) O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 330. 1933.

Described from: "N.W. India. Kashmir; Sonamarg, usually inconspicuous in damp grassy places at 3000–3500 m., Sept. 1917, *R. R. & I. D. Stewart 3547*."

Holotype: [India. Jammu &] Kashmir, Sonamarg, 12,000–13,000 ft [3,657.6–3,962.4 m], 3 Sep 1917, *R. R. Stewart & I. D. Stewart 3547* (K000247258; possible isotype: K000397458).

There are two sheets at K that have the same collection number, date, and locality. The one considered herein as the holotype was annotated by Stephen T. Dunn and on which is mounted a copy of the original description of the species. The possible isotype was acquired by Kew in 1924, the year in which the species was published, but was not annotated by Dunn and was collected by R. R. Stewart alone at 12,000 ft.

76. *Draba oreades* prol. *chinensis* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 109. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Ost-Tibet: zwischen Tatsienlu und Lifanfu am Passe Hungkiao (Potanin 1893–im August blühend)."

Lectotype (designated here): China. "Tibet orientali, inter Tatien lu et Lifanfu trajectus Hung Kiao. VIII 1893, [*G. N.*] *Potanin s.n.* (B100386893; Isolectotype: LE).

Thirteen collections were cited in the original publication of prol. *chinensis*, and I have examined seven of them.

Draba oreades is one of most widespread species in the genus, and its range extends from Mongolia and Russia into central Asia, the Himalayas, and China. It is also one of the most variable species, and almost all of the infraspecific taxa below were based on trivial characters of continuous nature, including the density of trichomes on the plant and their presence or absence on the fruit. Such variations are often encountered within a single population. The majority of infraspecific taxa below were described by Schulz (1927a), who often listed under each several to many collections. In order to avoid excessive discussions and save space, lectotypifications of the infraspecific taxa of *D. oreades* is done herein to reflect the best specimens cited by the original author and examined by the present author.

77. *Draba oreades* prol. *exigua* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 111. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Karakorum: 5000 m ü. M. (C. B. Clarke, 1876, n. 30227–am 8. August verblüht, hb. Kew)."

Lectotype (designated here): [Pakistan]. Karakorum, 15,000 m, 8 Aug 1896, *C. B. Clarke 30227* (K000340148).

I have examined only the above collection out of the three cited by Schulz (1927a).

78. *Draba oreades* prol. *pikei* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 111. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Tibet (Arnold Pike chiefly in Capt. Deasy's Expedition 1896–1897, hb. Calcutta und Kew n. 833)."

Lectotype (designated here): India. Without locality, Capt. Deasy's Expedition 1896–1897, *Arnold Pike 833* (K000397460; Isolectotype: CAL, n.v.).

Schulz (1927a) cited two collections (*Pike 833* and *Duthie 925*), and each is represented by duplicates at K and DD. I have examined both specimens at K, and designated the above as the lectotype that commemorates its collector.

79. *Draba oreades* var. *dasycarpa* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 109. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Sikkim: 4000–6000 m ü. M. (J. D. Hooker)."

Lectotype (designated here): India. Sikkim, 12–18,000 ft [3,657.6–5,486.4 m], *J. D. Hooker s.n.* (B100386894; Isolectotypes: BM, F, K, P).

Of the two collections cited in the original publication, I have examined only the above.

80. *Draba oreades* var. *glabrescens* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 110. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Himalaya (J. L. Stewart n. 43/HK, auch typisch, hb. Kew)."

Lectotype (designated here): [India]. Himalaya, without locality, *J. L. Stewart 43* (K000340147).

Of the two collections cited by Schulz (1927a), I have examined only the above.

81. *Draba oreades* var. *occulata* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 110. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Tihri-Garhwál, ... auch auf der Morëne des Dudu-Gletschers (Duthie 1883, n. 925–in August blühend und mit vorjährigen Früchten)."

Lectotype (designated here): India. Tihri-Garhwál, Dudu-Gádh, under Srikanta, 15–16,000 ft [4,572–4,876.8 m], 9 Aug 1883, *J. F. Duthie 925* (K000568093; Isolectotype: K000568094).

Four of the five collections cited by Schulz (1927a) are housed at CAL or DD, and those were not available for my study and verification. The designated lectotype, which I have examined, matches the varietal description perfectly well.

82. *Draba oreades* var. *racemosa* O.E.Schulz in Engler, Pflanzenreich IV, 105(Heft 89): 109. 1927; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "WEST-CHINA: auf Felsen, 4660 m ü. M. (E. H. Wilson 1904, n. 3207, hb. Kew)."

Lectotype (designated here): Western China. Rock, 14000 ft [4,267.2 m], 1904, *E. H. Wilson 3207* (K000697255; Isolectotypes: BM, GH).

I have examined material of all six collections cited by Schulz (1927a), of which five are housed at LE.

83. *Draba pakistanica* Jafri in E.Nasir & S.I.Ali, Fl. West Pakistan 55: 133. 1973; **D. olgae** Regel & Schmalh. in Regel, Izv. Imp. Obshch. Ljubit. Estestv. Moskovsk. Univ. 34(2): 8. 1882.

Described from: "Chitral gol, W. of Chitral, 3800 m, on stony slopes, fls. yellow, *Stainton* 2670 (BM, RAW, HJ)."

Lectotype (designated here): Pakistan. Chitral, Chitral Gol, W of Chitral, stony slopes, 11,500 m [3,505.2 m], 14 Jun 1958, *J. D. A. Stainton 2670* (BM000041390; Isolectotypes: A00046956, E00438304, RAW (n.v.), US00324478).

Although the BM sheet of *Draba pakistanica* is annotated as the type, Jafri (1973: 133) listed the BM, HJ, and RAW sheets as the type, and therefore a lectotypification is needed.

84. *Draba piepunensis* O.E.Schulz ex Hand.-Mazz., Anzeiger Akad. Wiss. Wien, Math. Naturwiss. Kl. 63: 96. [20 May] 1926; **D. senilis** O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 475. [25 Feb] 1926.

Described from: "Prov. Yünnan: In glarea calcea alpina lateris occid. montium Piepun ad austro-orientem pagi Dschungdien, 4500–4650 m, legi 11. VIII 1914 fr. (Nr. 4712)."

Lectotype (designated here): China. Yunnan, "in lateris occid. montis Piepun ad austro-orient. pagi Dschungdien [Zhongdian]," 4,500–4,650 m, 11 Aug 1914, *H. F. von Handel-Mazzetti 4712* (B100386865; Isolectotypes: W1926-0004150, WU0024364).

The publication of *Draba piepunensis* and *D. senilis* (see below) were each based on a single collection. However, in describing the fruiting as the former species, Schulz (in Handel-Mazzetti, 1926) did not realize that he (Schulz, 1926) described the flowering material three months earlier as *D. senilis*. Both B and WU duplicates of *D. piepunensis* were annotated by Schulz in February 1926, and either can serve as the lectotype. The B duplicate was annotated by me on 26 September 2000 as the holotype, and I am designating it as the lectotype.

85. **Draba polyphylla** O.E.Schulz in Engler, Pflanzenr. 89(IV. 105): 180. 1927.

Described from: "Too-koo-la (G. King 1877, n. 4317)."

Lectotype (designated here): India. Sikkim, Too-koo-la, 14 Jul 1877, *G. King 4317* (B100386995; Isolectotype: BM000041431).

Schulz (1927a) cited 14 collections in the protologue, but the majority of which are housed in CAL and DD, and were unavailable for my studies. However, I have examined two collections (*Hooker s.n.* and *King 4317*, both at K), and the latter perfectly agrees with the original description of the species.

86. **Draba radicans** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Hab. Shalma and Manma."

Lectotype (designated here): NW India. Shalma and Manma, *J. F. Royle s.n.* (K000247203).

As in the other taxa described by Royle, the labels list the type locality as "NW India" and no other data are given. The above lectotype is the only authentic material I have examined thus far for the species, though duplicates of Royle's collections are found in Indian herbaria, including CAL and DD.

87. *Draba radicans* var. *leiocarpa* O.E.Schulz in Engler, Pflanzenreich IV. 105(89): 186. 1927; **D. radicans** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Kumaun, Nampa Gádh, Byáns, 3800 m ü. M. (Duthie 1886, n. 5344–am 20. Juli fat fruchtend)."

Lectotype (designated here): India. Pálang (as Nampa) Gadh, Byáns, 11,400 ft [3,474.7 m], 20 Jul 1886, *J. F. Duthie 5344* (K000247205; Isolectotypes: BM000795415, G).

Schulz (1927a) cited two collections (*Duthie 5344* and *Gamble 24315*) for this variety, and I have examined both. However, I am designating the former collection with three duplicates, instead of taking *Gamble 24315* (K) with a duplicate at DD that I have not examined.

88. **Draba remotiflora** O.E.Schulz, Acta Horti Gothob. 1: 165. 1924.

Described from: "Nord-Sze-ch'uan: Dongrergo, lange schneebedeckte Schutthalden, ca. 4600 m, 9. VIII (fl. u. subfr.) 1922 (n. 3474)."

Lectotype (designated here): China. Sichuan, Dongrergo, 4,600 m, 9 August 1922, *H. Smith 3474* (UPS; Isolectotypes: B100386898, BM, E, K, S, W).

Although one might be tempted to designate the B duplicate of the above type collection as the lectotype, its label was completely handwritten by Schulz, and the B material represents fragmentary parts taken from the UPS sheet that he examined. All other duplicates have printed labels, with the species name, locality, and elevation added in apparently Harry Smith's handwriting. Therefore, the UPS sheet, where the first set of Smith's collections is housed and which was annotated by me on 13 Sept. 2000 as the holotype, is designated herein as the lectotype.

89. *Draba rockii* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 10: 555. 1929; **D. oreades** Schrenk in Fisch. & C.A.Mey., Enum. Pl. Nov. 2: 56. 1842.

Described from: "Southwestern Kansu: T'ao River basin; Mishan range; alpine meadows, alt. 12–13000 ft. and higher; flowers deep yellow (blühend im Juni 1925–J. F. Rock, Arnold Arboretum, Harvard University, Expedition to Northwestern China and Northeastern Tibet 1924–27 n. 12405)."

Lectotype (designated here): China. Gansu, Tao River basin, Mishan range, alpine meadows, 12–13,000

ft [3,657.2–3,962.4], Jun 1925, *J. F. Rock 12405* (GH00046949; fragment: PE00029180).

Schulz (1929) cited the single collection above, but I have not seen any duplicate that he annotated, and his description must have been based on another duplicate(s). Therefore, I am arbitrarily designating the GH sheet as the lectotype.

90. *Draba rostrata* Pohle, Repert. Sp. Nov. Regni Veg. Beih. 32: 136. 1925; *D. affghanica* var. *rostrata* (Pohle) O.E.Schulz in Engler, Pflanzenr. IV. 105(Heft 89): 118. 1927; **D. affghanica** Boiss., Fl. Orient. Suppl. 55. 1888.

Described from: "Kurrum Valley. 1879 Aitchison n. 464 (5). *Draba rostrata* R. Pohle spec. nov. Spec. authent. Ex H. H. Bot. Reg. Kew. Commun. Visi in H. H. P."

Lectotype (designated here): Kurrum Valley, Shéndtoi, 31/5/1879, alt. 11,000 ft [3,352.8 m], *J. E. T. Aitchison 464-5* (K000568067; Isolectotypes: K000568066, K000568068).

Although Pohle (1925) cited *Aitchison 464-5* at K as the type of *Draba rostrata,* the existence at K of three duplicates with the same collection number, of which none was annotated by Pohle as *D. rostrata*, necessitated lectotypification of the species. Of the three, the most complete sheet with full locality data and Aitchison's original label is taken here as the lectotype. The duplicate K000568068 has undated annotation by Pohle as "olgae affinis nova."

91. **Draba senilis** O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 475. [25 Feb] 1926.

Described from: "China. Yunnan, Yangtze watershed, Prefectural District of Likiang, E slopes of Likiang Snow Range, 4000 m s. m. (J. F. Rock Mai 1922 n. 3968)."

Lectotype (designated here): CHINA. Yunnan, Yangtze watershed, Prefectural District of Likiang, E slopes of Likiang Snow Range, Mt. Tse Koo, 12,000 ft [3,657.6 m], 25 May 1922, *J. F. Rock 3968* (B100386994; Isolectotypes: E00386056, GH00046950, P02272431, PE, US00100241, US00996982, W).

See the comment under *Draba piepunensis*.

92. **Draba setosa** Royle, Ill. Bot. Himal. Mts. 1: 71. 1834.

Described from: "Hab. Soongnum in Kunawur."

Lectotype listed as type by Jafri (1973: 131) as a first-step and finally designated here: India. Soongnum, Kunawur, *J. F. Royle s.n.* (K000772475).

Jafri (1973) listed both the K and LIV sheets as the type collection of *Draba setosa,* but no duplicate was found in Royle's herbarium at LIV, and it is not known if such a duplicate is lost. Furthermore, as is the case for of the other Royle types, duplicates almost certainly are found in either CAL or DD.

93. **Draba stenocarpa** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 153. 1861.

Described from: "*Hab*. In Tibetia occidentali temperata ad Das Kirim! *Winterbottom*. (fl. Jul.)."

Holotype: Kashmir, Balti, Das Kirin, 1 Jul 1847, *J. E. Winterbottom [679]* (K000247210).

Hooker and Thomson (1961) cited a single collection, and there is no indication that they based their description of the species on more than that single sheet. Furthermore, I have seen no duplicate of the above collection anywhere and, therefore, it is safe to consider it as the holotype.

94. **Draba surculosa** Franch., Bull. Soc. Bot. France 33: 401. 1887.

Described from: "Yun-nan, in vicinitate fontium ad juga nivalia Li-kiang, alt. 4000 m.; fl. 11 jul. 1804 (Delav. n. 48); ad cacumina montis Tsang-chan supra Tali; fr. mat. 25 sept. 1884 (Delav. n. 1052)."

Lectotype (designated here): China. "Yunnan: près de sources, au pied du glacier de Li Kiang," 4,000 m, 11 Jul 1884, *J. M. Delavay 48* (P02272439; Isolectotypes: MO, P02272440, P02272441, P02272442).

Franchet (1887) cited two collections, *Delavay 48* and *Delavay 1052*, in his original description of the species. I have examined at P four duplicates of the former and none of the latter, and the year of collection was mistyped as 1804 instead of 1884. The designated lectotype carries both the original handwritten label by Delavay and Franchet's annotation of the species name constituting the best of four duplicates in showing the typically surculose habit.

95. **Draba tenerrima** O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 11: 640. 1932; *Erophila tenerrima* (O.E.Schulz) Jafri in Nasir & Ali, Fl. West Pakistan 55: 149. 1973.

Described from: "Western Himalayas: Shushal, Ladak, Kashmir in shade among grass, alt. 14200 ft. (blühend und fruchtend am 26. 1931–Walter Koelz, n. 2451)."

Lectotype (designated here): Kashmir, Ladak: Shushal, in shade along grass, 14,200 ft [4,328.2 m], 26 Jul 1931, *Walter Koelz 2451* (B100386900; Isolectotypes: K000697523, NY00115387, US00100257).

Except for the single mounted plant and envelope on the lower right of the lectotype sheet, all other 22 plants have glabrous fruits and belong to *Draba tenerrima*. The excluded plant has pubescent fruits and represents the type material of the following variety. The isolectotype at NY is also a mixed collection.

96. *Draba tenerrima* var. *trichocarpa* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 640. 1932. TYPE: see the previous entry.

97. **Draba tibetica** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 152. 1861.

Described from: "in Tibetia occidental alpina, Zanskar, alt. 13000–15000 ped.! *T.T.*"

Lectotype listed in part as type by Jafri (1956: 106) and finally designated here: India. Zanskar, 13,000–15,000 ft [3,962.4–4,572 m], *T. Thomson s.n.* (K000568102; Isolectotypes: B100386897, GH00112002).

Hooker & Thomson (1861) divided *Draba tibetica* into three varieties: var. α is *thomsonii*, var. β is *sikkimensis*, and var. γ is *winterbottomii*. There is no sheet at K carrying the name var. *thomsonii* or var. α, but there is one sheet each

labeled var. β and var. γ handwritten by J. D. Hooker. The nine plants of the type collection of var. *sikkimensis* are mounted with three of *D. tibetica* on the K sheet labeled as "β." Although two barcodes have recently been added to the sheet, it is important to indicate which plants belong to each taxon, as this sheet is the only authentic one at K, and it is the key to resolving the lectotypification of both *D. sikkimensis* and *D. tibetica*. The nine *D. sikkimensis* plants (barcode K000568103) are the five on top of the sheet, three on the lower right, and the third plant from the left. The three plants representing the lectotype of *D. tibetica* (K000568102) are the two to the lower left and the one in the lower middle (fourth from either side).

Although Jafri (1956, 1973) indicated that the type is at K, he did not specify which plants on the mixed sheet belong to *Draba tibetica* or *D. sikkimensis*, and he did not annotate that mixed sheet. Therefore, his typification is unacceptable.

The lack at K of any authentic material labeled by J. D. Hooker as var. α or var. *thomsonii* is a clear indication that the latter variety is the same as *D. tibetica,* especially after determining the identities of var. *sikkimensis* and var. *winterbottomii* (see next two entries).

98. *Draba tibetica* Hook.f. & Thomson var. *sikkimensis* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 152. 1861; **D. sikkimensis** (Hook.f. & Thomson) Pohle, Repert. Spec. Nov. Regni Veg. Beih. 32: 144. 1925.

Described from: "β, in Tibetia occidental, alt. 14000–16000 ped.! *J. D.H.* (fl. Jun.-Jul.)."

Lectotype (designated here): India. Sikkim, 14,000–16,000 m [4,267.2–4,876.8 m], *J. D. Hooker s.n.* (K000568103; Isolectotypes: B100241594, BM000041190, E00438303,G,GH00112003,GOET002774,GOET002775, L, NY000743736, P02272432, P02272433, W).

Draba sikkimensis is easily distinguished from *D. tibetica* by having white (vs. yellow) petals 5–7 × 2.5–4.5 mm (vs. 3.5–5 × 1.5–2.5 mm), floccose (vs. tomentose) basal leaves, ovules 8–12 (vs. 18–24) per ovary, and oblong to elliptic (vs. oblong-linear to linear-lanceolate) fruits with styles 1–1.5 (vs. 0.4–0.8) mm.

99. *Draba tibetica* var. *winterbottomii* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 152. 1861; **D. winterbottomii** (Hook.f. & Thomson) Pohle, Repert. Spec. Nov. Regni Veg. Beih. 32: 138. 1925.

Described from: "γ, in Tibetia occidental, Balti as Deotsa et Takhala, alt. 11000–13000 ped.! *Winterbottom*."

Lectotype listed as type by Jafri (1973: 140) as a first-step and finally designated here: Kashmir, Balti, ascent to Deotso, 13,000 ft [3,962.4 m], 23 Jul 1947, *J. E. Winterbottom [623]* (K000247208; Isolectotypes: K000568097, LE).

The collector (*Winterbottom*) but not the collection number (*623*) was given in the original description of this taxon. Jafri (1973) designated that collection number as the type, but the existence of two such-numbered sheets at K necessitates the lectotypification presented herein. The sheet designated above as the lectotype carries Hooker's handwriting "D.tibetica Hf&T γ," and the sign "γ" corresponds to var. *winterbottomii* in the original publication.

100. **Draba trinervis** O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 131. 1927.

Described from: "Provinz des extratropischen Himalaya. Chitrál District (Colonel A. Barrett, hb. Kew)."

Lectotype designated as type by Jafri (1973: 136): Chitral, no locality data, Oct 1904, *A. Barrett s.n.* (K000077288).

Schulz (1927A) based his original description of *Draba trinervis* on about 20 collections, and the sheet annotated by him at K was taken by Jafri (l.c.) as the type.

101. *Draba winterbottomii* (Hook.f. & Thomson) Pohle var. *stracheyi* O.E.Schulz in Engler, Pflanzenreich, IV. 105(Heft 89): 266. 1927; **D. alajica** Litv., Trudy Bot. Muz. Imp. Akad. Nauk 1: 14. 1902.

Described from: "Tibet: 5150 m ü. M. (R. Strachey in Strachey and Winterbottom, Himal. Herb. n. 10, hb. Kew)."

Holotype: China. Tibet, [Yarkand Expedition, 10 Jul 1870], 15,500 ft [4,724.4 m], *R. Strachey & J. E. Winterbottom 10* (K000697273; Isotypes: B100241568, BM000041404, GH00112009, P02272366).

Schulz (1927a) cited the single collection above and listed only the K herbarium. He did not examine or annotate the duplicates at BM, GH, or P. The fragments at B were taken from the K sheet. Therefore, the K sheet is considered herein as the holotype.

102. **Draba yunnanensis** Franch., Bull. Soc. Bot. France 33: 402. 1887.

Described from: "Yun-nan, in rupibus calcaries ad montem Koua-la-po inter Hokin et Tali; fl. 26 maj.; fr. aug. 1884 (Delav. n. 81)."

Lectotype (designated here): China. Yunnan, "Montagne de Koua-la-po Hokin et Tali," 26 Aug 1884, *J. M. Delavay 81* (P02272450; Isolectotypes: A00112037, K000697261, P02272451, P02272452, P02272453).

Franchet (1887) cited the single collection above, and gave flowering and fruiting dates separated by three months for the same collection number. Of the four duplicates at P with *Delavay 81*, the designated lectotype is the best sheet carrying Delavay's handwritten label and Franchet's annotation, and all four are fruiting specimens collected in August.

103. *Draba yunnanensis* var. *gracilipes* Franch., Bull. Soc. Bot. France 33: 402. 1887; **D. yunnanensis** Franch., Bull. Soc. Bot. France 33: 402. 1887.

Described from: "Yun-nan, in rupibus calcareis prope juga nivalia Lankong, alt. 3000 m.; fl., fr. 10 jul. 1884 (Delav. n. 704)."

Lectotype (designated here): China. Yunnan, "Au pied du glacier de Li-Kiang (Lankong)," *J. M. Delavay 703* (*704* in the protologue) (P02272455; Isolectotypes: P02272456, P02272457).

Of the three P duplicates of the type collection of this variety, the most complete one carrying the varietal name in Franchet's handwriting and Delavay's handwritten label is designated herein as the lectotype.

104. *Draba yunnanensis* var. *latifolia* O.E.Schulz, Pflanzenreich IV. 105 (Heft 89): 182. 1927; **D. yunnanensis** Franch., Bull. Soc. Bot. France 33: 402. 1887.

Described from: "Yünnan: Ostabhänge von Likiang Snow Range, Yangtze-watershed, 5500–5650 m ü. M (J. F. Rock 1923, n. 9430–im Juli blühend)."

Lectotype (designated here): China. Yunnan, E slopes of Likiang Snow Range, Yangtze watershed, Jul 1923, 16,500–17,000 ft [5,029.2–5,181.6 m], *J. R. Rock 9430* (B100241565; Isolectotypes: E00386051, GH00112036, US).

A single collection was cited for this variety but no herbarium was listed.

105. *Draba yunnanensis* Franch. var. *ramosa* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 89): 182. 1927; **D. amplexicaulis** Franch., Bull. Soc. Bot. France 33: 403. 1887.

Described from: "Südwest-Szechuan: offene, steinige Abhänge und Ränder der Kalkklippen auf den Bergen östlich von Yungning, 4000 m ü. M (G. Forrest 1922, n. 21231, hb. Mus. Wien).

Holotype: China. SW Sichuan, open stony slopes on ledges of limestone cliffs on mountains E of Yungning, 12,000 ft [3,657.6 m], 2748N, 101E, Jun 1922, *George Forrest 21231* (W; Isotypes: E, K000697263, US00810686).

Schulz (1927a) based this taxon on the single collection above and cited only the W herbarium. He did not examine or annotate any other duplicate of that collection and therefore the W sheet ought to be considered as the holotype. However, searching the Virtual Herbaria, as well as JSTOR, failed to show that W specimen. It is not known if that sheet is lost or not yet digitized.

106. *Ermania koelzii* O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 332. 1933; **Solms-laubachia pumila** (Kurz) F.Dvořák, Folia Fac. Sci. Nat. Univ. Purkyniane Brun. Biol. 13(4): 24. 1972.

Described from: "Western Himalayas: Kashmir, Rupshu, Kyensa La, in earth on hill top, alt. 19000 ft.! (blühend am 9. Juli 1931–Walter Koelz n. 2231)."

Lectotype (designated here): Kashmir, Rupshu, Kyensa La, 19,000 ft [5,791.2 m], 9 Jul 1931, *W. Koelz 2231* (B100386932; Isolectotypes: NY00185382, US00100462).

Schulz (1933) listed a single collection for the species but did not give any herbarium where the collection is housed, though his mentioning the New York Botanical Garden was simply copying what is printed on the herbarium label.

107. *Ermania parkeri* O.E.Schulz, Repert. Sp. Nov. Regni Veg. 31: 333. 1933; *Christolea parkeri* (O.E.Schulz) Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 52. 1955; *Oreoblastus parkeri* (O.E.Schulz) Suslova, Bot. Zhurn. (Moscow & Leningrad) 57: 653. 1972; **Solms-laubachia linearis** (N.Busch) J.P.Yue, Al-Shehbaz & H.Sun, Ann. Missouri Bot. Gard. 95: 535. 2008.

Described from: "N. W. Himalaya: Kashmir, Sonamarg, Luderwas, alt. ca. 13000 ft. (blühend und fast fruchtend am 11. August–R. R. Stewart 1928 n. 9874a)."

Lectotype (designated here): Kashmir, Sonamarg, Luderwas, 13,000 ft [3,962.4 m], 11 Aug 1928, *R. R. Stewart 9874A* (B100386889; Isolectotypes: G, MO).

Schulz (1933) did not give any herbarium name where the single-cited collection is housed, and it is not known if he examined material other than the duplicate housed at B. Therefore, that particular duplicate is designated herein as the lectotype.

108. *Erysimum benthamii* var. *grandiflorum* Monnet, Not. Syst. (Paris) 2: 243. 1912; **E. benthamii** Monnet, Not. Syst. (Paris) 2: 242. 1912.

Described from: "Thibet oriental, Tongolo, Kia-la, n 809 [*Soulié*].

Lectotype (designated here): China. Thibet oriental, Tongolo, Kia-la, *J.-A. Soulié 808* (P02272696; Isolectotypes: K, P00531957, P02272697).

Monnet (1912) cited two collections, *Soulié 808* and *Wilson 3294*. I have not examined the latter collection but studied the above four duplicates of the former. Polatschek (2010) correctly reduced the variety to synonymy of *Erysimum benthamii* but did not lectotypify it, though he listed *Soulié 808* among the cited collections of the species.

109. *Erysimum bhutanicum* W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 10: 31. 1917; **E. pachycarpum** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 167. 1861.

Described from: "Bhutan:–Shado, Timpu, Alt. 13,000 ft. Coarse herb in meadow with orange flowers. Oct 1914. R. E. Cooper No. 3549 (Fruiting Plant only). Flowering specimen in Herb. Edin., cult. Bees, Ltd., from seeds of No. 3449; upper leaves and flowers."

Lectotype designated by Polatschek (2010: 212): Bhutan, Shado, Timpu, 20 Oct 1914, 13,000 ft. [3,962.4 m], *R. E. Cooper 3449* [*3549* in the protologue] (BM000522237; Isolectotype: E00438480).

Smith (1917) based his species description on the original fruiting material, of which there is a duplicate at BM, and flowering material grown at E from seeds of the type collection. It is not known if the cultivated material was taken from the BM or E duplicate, and it is not known if Smith examined both of these sheets. Therefore, I am accepting Polatschek's (2010) lectotypification, though ideally the E, rather than the BM, sheet should have been taken as the lectotype because that is where all of W. W. Smith's types are housed.

110. **Erysimum erosum** O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1081. 1927.

Described from: "Chitral: Ihala Drosh, 4800 m ü. M. (fruchtend am 29. August 1898–S. A. Harriss n. 15901), Drosh, 1500 m ü. M. (blühend im April 1908–asus dem Vermächtnis de Major S. M. Toppin n. 136, Hb. Kew)."

Lectotype listed initially as type by Jafri (1973: 238) as a first-step and finalized by Polatschek (2010: 219): Chitral, Kala Dorsh, 4,800 m, 29 May 1895, *S. A. Harriss 15901* (K000247249; Isolectotype: DD, photos at B & K).

Of the above two gatherings listed by Schulz (1927b),

Jafri (1973) designated *Harriss 15901* (B, K) as the type, but B has only a photo of the duplicate at DD. Therefore, Jafri's typification is considered as a first-step finalized by Polatschek (2010), who took the K sheet as the lectotype.

111. *Erysimum glandulosum* Monnet, Notul. Syst. (Paris) 11: 241. 1912, non Kuntze, Revis. Gen. Pl. 2: 933. 1891; **Dontostemon pinnatifidus** (Willd.) Al-Shehbaz & H.Ohba, Novon 10: 96. 2000.

Described from: "In arenis; flores albi; n 2471 [*Soulie*]."

Lectotype (designated here): China. E Tibet, Tongolo, Kiala, 10 Jun 1894, *J.-A. Soulié 2471* (P2272595; Isolectotype: P2272596).

Monnet (1912) cited only one collection under this species. The lectotype sheet was annotated by him and has a piece of paper with sketches of floral parts and a brief description of the species.

112. *Erysimum hookeri* Monnet, Notul. Syst. (Paris) 11: 242. 1912, non Boiss., Fl. Orient 1: 203. 1867; **Dontostemon pinnatifidus** (Willd.) Al-Shehbaz & H.Ohba, Novon 10: 96. 2000.

Described from: "In arenis; floret et frucificat aprili-majo.–Thibet: Tongolo, n 2460 [*Soulié*]."

Lectotype (designated here): China. E Tibet, Tongola, Kiala, 13 Apr 1894, *J.-A. Soulié 2460* (P02272601; Isolectotypes: P2272602, P2272603).

Monnet (1912) annotated the three sheets at P of the single collection he cited, and the more complete duplicate annotated by V. I. Dorofeyev on 12 April 1997 as the holotype is designated herein as the lectotype.

113. *Erysimum melicentae* var. *dolichocarpum* O.E.Schulz, Feddes Repert. Spec. Nov. Regni Veg. 31: 334. 1933; **E. melicentae** Dunn, Bull. Misc. Inform. Kew 1920: 336. 1920.

Described from: "Kashmir: Ladak Road, Misahoi, alt. ca. 10000 ft. (blühend und fruchtend im August–R. R. Stewart 1928 n. 10016, 12590A)."

Lectotype (designated here): Kashmir, Ladak Road, Mitsahoi, 10,000 ft [3,048 m], Aug 1928, *R. R. Stewart 12590A* (B100263592; Isolectotype: NY00185400).

Duplicates of both collections cited by Schulz (1933) are housed at B. The specimen with mature fruits is designated herein as the lectotype. Polatschek (2010) cited both collections under the account of *Erysimum melicentae* but did not lectotypify the varietal name.

114. *Erysimum szechuanense* O.E.Schulz, Acta Hort. Gothoburg 1: 158. 1924; **Erysimum benthamii** Monnet, Not. Syst. (Paris) 2: 242. 1912).

Described from: "Nord-Sze-ch'uan: 8 km W von Sung-pan, an Felsen und Bachufern, ca. 3200 m, 9 u. 11. VII (fl.) 1922 (no. 2470 u. 2882)."

Lectotype (partially but erroneously selected by Polatschek (2010: 239) and (designated here): China. Sichuan, 8 km W Sung-pan, ca. 3,200 m, 9 Jul 1922, *Harry Smith 2470* (UPS V-043762).

Schulz (1924a) cited two collections (*Smith 2470* and *2882*) that are mounted on separate herbarium sheets at UPS. Polatschek (2010) designated *Smith 2470* (B100263586) as the lectotype. However, his lectotypification cannot be accepted for two reasons. First, the B sheet consists of an envelope containing a fragmentary mixture of flowers, leaves, and a fruit taken from both UPS sytypes. Second, it is impossible to tell which fragment was taken from what collection. Label of the B specimen was handwritten by Schulz, and it listed both of Smith's collections. Although the lectotype I am designating is the same collection number (*Smith 2470*), as did Polatschek, it is the UPS, rather than B, specimen that should be recognized as the lectotype.

115. *Eutrema hederifolium* Franch. & Sav., Enumer. Pl. Jap. 2: 283. 1879; *Wasabia hederaefolia* (Franch. & Sav.) Matsum., Bot. Mag. (Tokyo) 12: 72. 1899; **E. tenue** (Miq.) Makino, Bot. Mag. (Tokyo) 26: 177. 1912.

Described from: "Hab. Ad rivulos: Nippon, in montibus Hakone legit Niewerth (Savatier, n. 3822. Kiousiou (Saba in Savatier, n. 3353)."

Lectotype (designated here): Japan, Mt. Hakone, *P. A. L. Savatier 3822* (P 05413458).

Under the original descritpon of *Eutrema hederifolium*, Franchet & Savatier (1879) cited the above two collections and both are at P. However, *Savatier 3353* (P02272668, P02272669) clearly belongs to *E. heterophyllum* (W.W.Sm.) H.Hara.

116. **Eutrema himalaicum** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 164. 1861; *Sisymbrium hookeri* E.Fourn., Recherch. Anat. Taxon. Fam. Crucif. 120. 1865, nom. illeg. [cited the earlier-published *E. himalaicum* in synonymy], non *S. himalaicum* (Edgew.) Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 160. 1861.

Described from: "*Hab*. In Himalaya orientali temperata, Sikkim! Alt. 10000–13000 ped., *J. D. H*. (fl. Jun.)."

Lectotype (designated here): India. Sikkim, Laiha, 10,000–13,000 ft [3,048–3,962.4 m], 25 Jul 1849, *J. D. Hooker s.n*. (K000077269; Isolectotype: K000077270).

Two sheets of the type collection of *Eutrema himalaicum* are at K, and the more complete one with mature fruits is designated herein as the lectotype.

117. **Eutrema yunnanense** Franch., Pl. Delavay. 61. 1889; *Wasabia yunnanensis* (Franch.) Nakai, J. Jap. Bot. 11: 151. 1935.

Described from: "Yun-nan, in silvis ad collum Yen-tze-hay (Lankong), alt. 3000 m.; fl. 9 maj. 1887 (Delavay); in silvis ad San-tcha-ho supra Mo-so-yn, alt. 3000 m.; fr. had mature 17 jun. 1887 (id)."

Lectotype listed as holotype by Al-Shehbaz & Warwick (2005: 135) and designated here: China. Yunnan, Yen-tzo-hay, Lankong [Lichiang], *J. M. Delavay s.n*. (P05413368; Isolectotypes: GH, K, MO, P05413369, P05413370).

Franchet (1889) listed two collectins (both Delavay's collections) under *Eutrema yunnanense*, of which one was collected from Yen-tae-yat (Lankong) on 9 May 1887, and the other from San-tcho-ho above Mo-so-yn collected in 17 June 1887. Al-Shehbaz and Warwick (2005) stated that the former collection is the holotype instead of the lectotype, but because there are three other collections that fit the exact

locality, date, and altitude information, their typification must be considered as a first-step. There are at P 13 other collections by Delavay from both localities, but only the above three agree with Al-Shehbaz & Warwick partial lectotypication. The complete specimen with handwritten label by Delavay's and Franchet's annotation is taken herein as the lectotype.

118. *Eutrema yunnanense* var. *tenerum* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 38. 1924; **E. yunnanense** Franch., Pl. Delavay. 61. 1889.

Described from: "CHINA: Nord-Shenzi bei Huan-son-shan (G. Giraldi 1900 n. 7033–in Juli blühend, WEST CHINA: Changyang (E. H. Wilson n. 157–in April blühend, hb. Kew)."

Lectotype (designated here): China. [Hubei], Changyang, *E. H. Wilson 157* (K; Isolectotypes: E, GH, NY, P, W).

Of the two collections cited by Schulz (1924b), the designated lectotype contains better material and has more duplicates.

119. *Goldbachia lancifolia* Franch., Bull. Soc. Bot. Fr. 33: 408. 1887; *Eutrema lancifolium* (Franch.) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 35. 1924; **E. himalaicum** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 164. 1861.

Described from: "Yun-nan, secus rivulos et prope fontes, ad pedem jugorum nivalium Li-kiang, alt. 3800 m.; fl. 11 jul. 1884 (Delav. n. 781)."

Lectotype (designated here): China. Yunnan, Lichiang (as Likiang), 3,800 m, 11 Jul 1884, *J. M. Delavay 701* (as 781 in the protologue) (P02272671; Isolectotype: P02272672).

Franchet (1887) cited the type collection of *Goldbachia lancifolia* as *Delavay 781*, but no such collection in the Brassicaceae exists at P. The correct collection number, *Delavay 701*, is represented by two sheets, neither of which was designated by him as the type.

120. **Hemilophia pulchella** Franch., Pl. Delavay. 65. 1889.

Described from: "Yun-nan, ad rupem calcaream, ad basin jugorum nivalium Likiang, alt. 4000 m., 14 aug, 1886 (Delavay, n. 2437)."

Lectotype (designated here): China. Yunnan, "au pied du glacier de Li-Kiang," 4,000 m, *J. M. Delavay 2437* (P01817485; Isolectotypes: K000484370; P01817486, P01817487, P1817488).

Although Al-Shehbaz (1999) indicated that the holotype and isotypes of this species are housed at P, none of them had yet been barcoded to enable precise identification. The more complete sheet with Delavay's original handwritten label, which was annotated by me in 1999 as the holotype, is designated herein as the lectotype.

121. *Hutchinsia tibetica* Thomson, Icon. Pl. 9: t. 900. 1852; *Hedinia tibetica* (Thomson) Ostenf. in Hedin, S. Tibet 6(3), Bot. 76. 1922; **Smelowskia tibetica** (Thomson) Lipsky, Trudy Imp. S.-Peterburgsk. Bot. Sada 23: 76. 1904.

Described from: "Hab. Western Tibet; Lanak Pass, alt. 18–19,000 feet, *Thomson*. Mountains above Pangong Lake, *Capt. H. Strachey. Fl.* and fr. Aug., Sept."

Lectotype listed as holotype by Al-Shehbaz & Warwick (2006: 98) and finally designated here: [India]. Western Tibet; Lanak Pass, alt. 18–19,000 ft [ca. 5,486.4–5,791.2 m], [13 Sep 1847], *Thomas Thomson [2161]* (K 000484355).

Al-Shehbaz & Warwick (2006) listing of the holotype at K can only be considered as a first-step lectotypification because they did not select any of the three duplicates. The duplicate with the pencil illustration, which matches the plate in Thomson (1852), is designated herein as the lectotype. Jafri (1973: 92) stated that the type was collected from "Ladak, Nubra," but none of the sheets carry that information, and the original publication did not list such locality data. Therefore, Jafri's listing is considered inaccurate and not accepted herein.

122. **Lepidostemon pedunculosus** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 156. 1861.

Described from: "Hab. in Himalaya orientali alpina, Sikkim interiore, 14000–16000 ped. *J. D. H.* (fl. Jul.)."

Lectotype (listed at holotype by Al-Shehbaz (2000a: 330) and finally designated here): India. [above Tungh and Lachu Pie, *J. D. Hooker s.n.* (K000693649; Isolectotypes: BM000583705, GH00368044, K000693648, P02272598).

There are two collections of J. D. Hooker from the same general locality mounted on the same sheet at K, and no dates or elevations were given. The designated lectotype is represented by eight complete plants on the lower part of the sheet and have more mature fruits, as well as pencil drawings of the fruit, petal, and stamens.

123. *Martinella violifolia* H.Lév., Bull. Soc. Bot. France 51: 290. 1904; *Neomartinella violifolia* (H.Lév.) Pilger in Engler & Prantl, Nat. Pflanzenfam. Nachtr. 3: 134. 1906; *Esquiroliella violifolia* (H.Lév.) H.Lév., Mondes Plantes, ser. 2, 18: 31. 1916; **Eutrema violifolium** (H.Lév.) Al-Shehbaz & S. I. Warwick, Harvard Pap. Bot. 10: 134. 2005.

Described from: " Kouy-Tchéo: environs de Gan-pin, Parois do Ta-long. District de Tsin-gay. Mont de Kao-tchay, 11 février et 8 mars 1898; n° 2069 (*L*[éon]. *Martin et Em*[*ile*]. *Bodinier* leg.)."

Lectotype (listed as holotype by Lauener (1965: 339) and Al-Shehbaz (2000b: 338), and finally designated here): China. Guizhou, Gan-pin, Parois do Ta-long. District de Tsin-gay. Mont de Kao-tchay, 11 Feb 1898, *Martin & Bodinier 2069* (E00022752, flowering plant on top of the sheet; Isolectotypes: P00747229, P00747230).

The species was originally described in the later homonym *Martinella* H.Lév. The type specimen consists of two gatherings, both *Martin & Bodiner 2069*, that were collected 25 days apart. The plant at the bottom of the E sheet has fruits and was collected on 8 March 1898, whereas that at the top was collected on 11 February 1898 and has flowers only. The sheet was taken as the holotype by Lauener (1965) and Al-Shehbaz (2000b), but because of the two collection dates given on the same label and because neither author indicated which is the type, lectotypification is needed. Both isolectotypes at P were also in flower and collected on 11 February 1898. A third sheet at P (P00747231) carries the number *2069bis* and was collected on March 8, just as was the fruiting plant in the mixed E sheet.

124. **Megacarpaea delavayi** Franch., Bull. Soc. Bot. France 33: 406. 1887.

Described from: "Yun-nan, in pratis montis Tsang-chan, prope cacumen, alt. 4000 m.; fl. fr., immat. 4 aug. 1884 (Delav. n. 863); in umbrosis secus rivulos, ad pedem jugorum nivalium Li-kiang, alt. 3800 m.; fl. 11 jul. 1884 (Delav. n. 699)."

Lectotype (designated here): China. Yunnan, "lieux frais et humides, bord des ruisseaux au pied du glaceier de Li-Kiang," 3,800 m, 11 Jul 1884," *J. M. Delavay* 699 (P01817529; Isolectotype: P01817528).

Of the 13 specimens of *Megacarpaea delavayi* collected by J. M. Delavay from Yunnan, only three of two collections, *Delavay 699* and *863*, were cited by Franchet (1887). Both collections fully agree with the species description, and the former is designated as the lectotype because it is more complete and is represented at P by two instead of a single sheet.

125. *Microsisymbrium flaccidum* O.E.Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1090. 1927; *Guillenia flaccidum* (O.E.Schulz) Bennett, J. Econ. Tax. Bot. 4: 593. 1983; **Crucihimalaya wallichii** (Hook.f. & Thomson) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 301. 1999.

Described from: "Kashmir: Kajnag range, Limbar nullah, 3000–3300 m ü. M. (blühend am 18. Mai 1892–J. F. Duthie n. 11055).–Hazara: Khágán (fruchtend am 16. Mai 1896–Inayat n. 19172)."

Lectotype (listed as type by Jafri (1973: 256) and designated here): Kashmir, Kajnag range, Limbar Nullah, 9–10,000 ft [2,743.2–3,048 m], 18 May 1892, *J. F. Duthie 11055* (K000247265; Isolectotype: DD, fragments and photo at B).

Schulz (1927b) cited the two collections above but did not list any herbarium. Jafri (1973) indicated that the type is "Kashmir, *Duthie 11055* (K, B)" and, therefore, his lectotypification is considered as a first-step. The sheet at B consists of fragments from DD, but the K specimen is more complete.

126. *Nasturtium barbareifolium* Franch., Bull. Soc. Bot. France 33: 396. 1887, non Baker, Fl. Mauritius 7: 1877; **Rorippa elata** (Hook.f. & Thomson) Hand.-Mazz., Symb. Sin. 7: 357. 1931.

Described from: "Yun-nan, in paludibus Kan-hay-tze, in monte Hee-chan-men, prope Lankong, alt. 2,600 m.; fl., fr. 25 sept. 1884 (Delav. n. 705 et 1840)."

Lectotype (designated here): China. Yunnan, Kan-hay-tze, prope Lankong, 25 Sep 1884, *J. M. Delavay 705* (P00271174; Isolectotypes: E00386081, K000693342).

I have examined three duplicates of each of the above two original collections. All those of *Delavay 1840* are deposited at P, whereas the *Delavay 705* duplicates are housed in three herbaria. Both collections agree fully with original description.

127. *Nasturtium cantoniense* Hance, J. Bot. 3: 378. 1865; **Rorippa globosa** (Turcz. ex Fisch. & C.A.Mey.) Hayek, Beih. Bot. Centralbl. 27: 195. 1911.

Described from: "the margin of a pond in the environs of Canton," Dec. 1959.

Lectotype (designated here): China "In vicinibus urbis Canton, ad margines stagni," Dec 1859, *H. F. Hance 5429* (BM 000583685; Isolectotype: K000693353).

Hance (1865) indicated that he examined two collections, the above and *Sampson s.n.* Both collections are mounted on the same sheet at BM, and the four plant pieces collected by him respresent the designated lectotype.

128. *Nasturtium montanum* Wall. ex Hook.f. & Thomson, J. Linn. Soc., Bot. 5: 139. 1861, non Brügger, Jahresber. Naturf. Ges. Graubündens 31. Beil. 10. 1887-88, nec Kuntze, Revis. Gen. Pl. 2: 937. 1891; *Rorippa montana* (Wall. ex Hook.f. & Thomson) Small, Fl. S.E. U.S., ed. 2: 1336, 1375. 1913; **R. dubia** (Pers.) H.Hara, J. Jap. Bot. 30: 196. 1955.

Described from: "*Hab.* In Himalaya tropica et subtropica, alt. 1000–7000 ped., a Simla! Ad Sikkim! Punjab! *T. Thomson*; Bengal! Et Ava! *Wallich, &c.*; mont. ad Khasia! *Griffith, &c.* (fl. tot. ann.)."

Lectotype (listed as type by Jafri (1973: 188) and finally designated here: India. Oudh, 1825, *Wallich Cat. No. 4778B* (K-W001039879; Isolectotypes: B100241868, B100272111).

The four sheets at K of *Wallich 4778* are marked a, b, c, and d, and they were collected from different countries (India. Myanmar, Nepal) in different years. Jafri (1973) indicated the "b" sheet from Nepal is the type, but the "b" sheet was collected from India in 1825, whereas the Nepal material is sheet "a" collected in 1821. Despite these errors, Jafri's action is considered as a first-step lectotypification because he narrowed material of the three collectors to one.

129. *Parlatoria griffithiana* Boiss., Diagn. Pl. Orient. Ser. 2, 1: 23. 1854; *Arabidopsis mollissima* (C.A.Mey.) O.E.Schulz var. *griffithiana* (Boiss.) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 281. 1924; **Arabis bijuga** Watt, J. Linn. Soc., Bot. 18: 378. 1881.

Described from: "Hab. in regno *Cabulico* (cl. Griffith N° 1472)."

Holotype: Afghanistan. Aharowal, *Griffith 1472* (G-BOIS00330375; Isotypes: 3 at K).

130. *Parrya finchiana* Dunn, Bull. Misc. Inform. Kew 1927: 247. 1927; **Solms-laubachia platycarpa** (Hook.f. & Thomson) Botsch., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 171. 1955.

Described from: "Tibet. Stony hillsides facing south east, along the Chongphu torrent, about 20 miles north east of Mt. Everest, 5700 m., 8th June, 1922. *Major E. F. Norton 41* (Mount Everest Expedition)."

Holotype: China. Tibet, stony hillside, Chongphu chu, 17,000 ft. [5,181.6 m], 8 Jun 1922, *E. F. Norton 41* (K 000077264).

There is another collection of the same species apparently from the same area: "Tibet, along Chongphu torrent, ca. 20 miles NE of Mt. Everest, Chongpin Chu, 17,000 ft. [5,181.6 m], 8 Jun 1922, *E. F. Norton 12* (K 000077263)." This sheet was annotated by Botschantzev on 19 Oct 1954 as the

type, but because it has a collection number not cited in the original publication, the sheet should not be considered as part of the type collection for typification.

131. *Parrya lanuginosa* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 136. 1861; *Ermania lanuginosa* (Hook.f. & Thomson) O.E.Schulz, Repert Sp. Nov. Regni Veg. 28: 185. 1933; *Eurycarpus lanuginosus* (Hook.f. & Thomson) Botsch., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk SSSR 17: 172. 1955; *Christolea lanuginosa* (Hook.f. & Thomson) Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 52. 1955; **Solms-laubachia lanuginosa** (Hook.f. & Thomson) D.A.German & Al-Shehbaz, Nordic J. Bot. 28: 649. 2010.

Described from: "Hab. in Tibetia occidental ad Lanjar Prov. Gugi, alt. 17500 ped.! Str[achey]. & Wint[erbottom]."

Holotype: India (as Tibet)], Lanjar, 17,500 ft [5,334 m], *R. Strachey & J. E. Winterbottom 7* (K000077280; Isotypes, BM000041439 [the holotype of *Draba lanjarica* O.E.Schulz], K000077281, LE).

Although Jafri (1955) and German & Al-Shehbaz (2010) have correctly indicated that the holotype is at K, some additional clarification is needed because there are two duplicates of *Strachey & Winterbottom 7* mounted on the same sheet. The label of the two plants on the right side was annotated in Joseph D. Hooker's handwriting as *Parrya lanuginosa* Hf&T. The plant on the left was part of Winterbottom's herbarium presented to Kew in 1900 and was not annotated by Hooker and, therefore, is taken herein as the isotype.

132. *Sinapis harra* Forssk., Fl. Aegypt.-Arab. 118. 1775; **Diplotaxis harra** (Forssk.) Boiss., Fl. Orient. 1: 388. 1867.

Described from: "Káhirae" (Cairo).

Lectotype listed as type by Hedge (1968a: 41) and designated here: [EGYPT], "Káhirae" (Cairo), 1762, *P. Forsskal s.n.* (C10003085, plant on bottom of sheet; Isolectotypes: C10003083, C10003084).

Hedge (1968a) indicated that the type is at C, but the existence there of three specimens, all annotated by N. Hepper as type, necessitate lectotypification of the species. The specimen with mature fruits originally housed in Forrskål's herbarium is designated here as the lectotype.

133. *Sisymbrium axillare* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 162. 1861; *Microsisymbrium axillare* (Hook.f. & Thomson) O.E. Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 160. 1924; *Hesperis axillaris* (Hook.f. & Thomson) Kuntze, Revis. Gen. Pl. 2: 934. 1891; *Guillenia axillare* (Hook.f. & Thomson) Bennet, J. Econ. Taxon. Bot. 4: 593. 1983; **Crucihimalaya axillaris** (Hook.f. & Thomson) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 301. 1999.

Described from: "*Hab*. In Himalaya orientali temperata, Bhotan rupibus murisque at Chupcha! *Griffith*; Sikkim lapidosis, alt. 8000–10000 ped.! *J. D. H.* (fl. Jun.)."

Lectotype (listed as type by Jafri (1956: 112) and finally designated here): India. Sikkim, Lacher, 9,000 ft [2,743.2 m], 3 Jun 1849, *J. D. Hooker s.n.* (K000397490; Isolectotypes: K000397491, B, G, W).

Hooker and Thomson (1861) cited the above two collections, of which the Griffith gathering is mounted on the sheet of the isolectotype. On the lower left side of the lectotype sheet is mounted a plant that was collected, perhaps by Hooker, on 27 May 1849, and therefore this plant should be excluded from the typification process because the protologue indicated a collection in June. Jafri (1956) selected Hooker's Sikkim collection at K as the type, but he did not indicate which of the two sheets is the type and did not annotate either of them. Therefore, his typification is considered herein as a first-step.

134. *Sisymbrium deltoideum* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 163. 1861; *Hesperis deltoidea* (Hook.f. & Thomson) Kuntze; Revis. Gen. Pl. 2: 934. 1891; **Eutrema deltoideum** (Hook.f. & Thomson) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 35. 1924.

Described from: "*Hab*. In Himalaya orientali temperata, Sikkim, alt. 11000–13000 ped.! *J. D. H.* (fl. Jul.)."

Lectotype (designated here): India. Sikkim, 11,000–13,000 ft [3,048–3,962.4 m], *J. D. Hooker s.n.* (K000247256 (two leafy flowering branches with immature fruits); Isolectotypes: B100249575, P).

Al-Shehbaz & Warwick (2005) indicated that the holotype of the species is at K because it is a unicate. However, that sheet has two species. The two plants with green leaves and young fruits (upper left) or flowers (lower right) do represent *E. deltoideum*. However, the branch with linear fruits that had shed their valves and seeds belongs to *E. himalaicum* Hook.f. & Thomson. Therefore, typification of the material is needed. Furthermore, the isolectotypes at B and P are also mixed collections, whereas the sheet at GOET, said to belong to the type collection of *E. deltoideum*, has, in fact, plants of only *E. himalaicum*.

135. *Sisymbrium foliosum* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 6: 160. 1861, non Phil., Linnaea 33: 10. 1864; **Olimarabidopsis pumila** (Stephan) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 303. 1999.

Described from: "*Hab*. In Himalaya occidentali temperata, Kashmir, alt. 5000–7000 pd.! [1,524–2,133.6 m], *T. T.* (fl. April)."

Lectotype (designated here): India. Kashmir, Apr 1848, *T. Thomson s.n.* (K000247269; Isolectotypes: GH00415771, K000397470).

Both of the two sheets of *Sisymbrium foliosum* at K were annotated in J. D. Hooker's handwriting, and the better one is taken as the lectotype.

136. *Sisymbrium jacquemontii* E.Fourn., Recherches Anat. Taxon. Fam. Crucifer. 111. 1865; **S. brassiciforme** C.A.Mey. in Ledeb., Fl. Altaic. 3: 129. 1831.

Described from: "Crescit in India superiore, ad Kachmir (Jacquemont *exicc*. in herb. Mus. Paris n. 494)."

Lectotype (designated here): India, Cachemire, *V. Jacquemont 111* (P02272609; Isolectotype: P02272610).

Fournier (1865) cited a single collection for the species, and the better of two duplicates at P is designated as the lectotype.

137. *Sisymbrium lasiocarpum* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 162. 1861, non (F.Mueller) F.Mueller, Fragm. 7: 20. 1869, nom. illeg.; *Hesperis lasiocarpa* (Hook.f. & Thomson) Kuntze, Revis. Gen. Pl. 2: 934. 1891; *Arabidopsis lasiocarpa* (Hook. & Thomson) O.E. Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 282. 1924); **Crucihimalaya lasiocarpa** (Hook.f. & Thomson) Al-Shehbaz, O'Kane & R.A. Price, Novon 9: 300. 1999.

Described from: "*Hab*. In Himalaya orientali temperata, Bhotan ad Panga! et ad vias prope Lamnoo! *Griffith*."

Lectotype (designated here): Bhutan. Panga near on banks, 1838, *Griffith [991]* (K 000247260).

Hooker & Thomson (1861) cited two collections of William Griffith from Panga and Lamno, Bhutan. They are mounted on one sheet at K, of which one is from Panga (#991) and the other from Bootan (#1761), which may or may not be from Lamno and for which there is a duplicate at BM. Although Jafri (1973: 276) indicated that the type was collected by Griffith from Bhutan, he did not lectotypify the species because he neither selected one of the two collections nor did he annotate them.

138. *Sisymbrium mollissimum* var. *glaberrimum* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 160. 1861; *Arabidopsis mollissima* var. *glaberrima* (Hook. & Thomson) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 281. 1924; *A. mollissima* O.E.Schulz var. *glaberrima* (Hook.f. & Thomson) Naqshi & Javeid, J. Econ. Taxon. Bot. 7: 619. 1986, comb. illeg.; **Crucihimalaya mollissima** (C.A.Mey.) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 299. 1999.

Described from: "var. β. Kishtwar! et Zanskar! *T. T.*"

Lectotype (designated here): India. Zanskar, near Pudum, 23 Jun 1848, *T. Thomson s.n.* (K000397482).

Hooker & Thomson (1861) cited five collections under *Sisymbrium mollisimum* C. A. Mey. and two (Zanskar and Kishtwar) under var. β *glaberrima*. Three sheets at K, all collected by Thomas Thomson, carry Hooker's varietal annotation, and the sheet with complete collection and locality data is designated above as the lectotype.

139. *Sisymbrium primulifolium* Thomson, J. Bot. 5: 18. 1853; *Eutrema primulifolium* (Thomson) Hook.f. & Thomson, J. Proc. Linn. Soc. Bot. 5: 164. 1861; **Arcyosperma primulifolium** (Thomson) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 182. 1924.

Described from: "Hab. In monte Hattu Himalayae occidentalis, alt. 10,000 ped. [3048 m], in rupibus madidis. Junio mense fere defloratum legi."

Holotype: [India. Simla, 10 Jun 1849], *T. Thomson s.n.* (K000247369).

Thomson (1853) cited the single collection from Hattu Mt., and his other collections and that of Strachy and Winterbottom are mounted on the same sheet. The Simla collection is considered here as the holotype instead of lectotype because Hattu Mt. is above Simla, and it is the only one with mature fruit and seeds, on which the original description and illustration (Thomson, 1853) must have been based. The other collections on the sheet have flowers and immature fruits.

140. *Sisymbrium spectabile* Hook.f. & Thomson ex E.Fourn., Recherch. Anat. Taxon. Fam. Crucif. 121. 1865; *Hesperis spectabilis* (Hook.f. & Thomson ex E.Fourn.) Kuntze, Revis. Gen. Pl. 2: 935. 1891; **Eutrema himalaicum** Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 164. 1861.

Described from: "Crescit in Himalaya orientali temperata, in Sikkim, 6000–9000 ped. [1,828.8–2,743.2 m], alta (J.-D. Hook.)."

Lectotype (designated here): India, Sikkim, region temp., *J. D. Hooker s.n.* (P02272670; Isolectotypes: B100386929, GH00415772, K, NY00185681, P04686474, P05324596).

Fournier (1865) annotated two sheets at P, and the more complete one is designated herein as the lectotype.

141. *Sisymbrium thomsonii* Hook.f., J. Linn. Soc. Bot. 5: 161. 1861; *Arabidopsis mollissima* var. *thomsonii* (Hook.f.) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 281. 1924; **Crucihimalaya mollissima** (C.A.Mey.) Al-Shehbaz, O'Kane & R.A.Price, Novon 9: 299. 1999.

Described from: "*Hab*. In Tibetia occidentali temperata, Ladak, alt. 12000–13000 ped. [3,657.6–3,962.4 m]! *T. T.* (fl. Jun.)."

Lectotype (designated here): [Seh (as Se), Jul 1848], *T. Thomson s.n.* (K000397483; Isolectotypes: GH, K000397484, K000397485, K000397486, K000397487).

Hooker & Thomson (1861) cited a single collection for this species, and it is represented at K by five sheets all of which indicate the locality and date as "Se 7/48" and annotated in pencil by J. D. Hooker as "*S. thomsonii* Hf," though none has the elevation range given in the publication. The most complete specimen with the handwritten description on an attached paper is designated herein as the lectotype.

142. **Sisymbrium yunnanense** W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 11: 229. 1919; *S. luteum* (Maxim.) O.E.Schulz prol. *yunnanense* (W.W.Sm.) O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 71. 1924.

Described from: "CHINA: Mountains in the N.E. of the Yangtze bend, Yunnan, in stony situations amongst scrub. Lat. 2745N. Alt. 10,000 ft. Plants of 4–5 ft. Flowers pale yellow. July 1913. G. Forrest. No. 10,593."

Lectotype (designated here): China. Yunnan, mountains NE of the Yangtze bend, 10,000 ft [3048 m], 2745N, 15 Jul 1913, *George Forrest 10593* (E00083300; Isolectotype: K000693945).

Smith (1919) cited two collections, *Forrest 10,593* and *Forrest 14,016* (both at E) without indicating which one is the holotype. However, he annotated the former as the type, and it is designated herein as the lectotype.

143. *Sophiopsis annua* var. *fontinalis* O.E.Schulz in Engler, Pflanzenreich IV. 105(Heft 86): 348. 1924; **Smelowskia annua** Rupr., Mém. Acad. Imp.Sci. Saint Pétersbourg, Sér.7, 14: 39. 1869.

Described from: "Terski Alatau: Kokbulak an den Quellen des Flusses Naryn in der alpinen Region (V. F. Brotherus, Pl. turk. N. 63–im August blühend und fruchtend)."

Lectotype (designated here): Kyrgyzstan. Terski Alatau, Kokbulak ad fontes fl. Naryn, 9 Aug 1896, *V. F. Brotherus 63* (B100277571).

Schulz cited two collections, *Brotherus 63* at B and *Alcock 17682* at K. I have examined both collections and designated the more complete one as the lectotype.

144. *Thlaspi cardiocarpum* Hook.f. & Thomson, J. Proc. Linn. Soc., Bot. 5: 176. 1861; **Noccaea platycarpa** (Fisch. & C.A.Mey.) Al-Shehbaz, Harvard Pap. Bot. 19: 44. 2014.

Described from: "*Hab*. In Himalaya occidental temperate, Kashmir! Alt. 6000–9000 ped., *T.T.*; Afghanistan! *Griffith*. (fl. Apr.–Mai)."

Lectotype (designated here): Afghanistan. 1838–1840, *W. Griffith 1402* (K; isolectotype: W).

Although Al-Shehbaz (2014: 44) attributed the lectotypification of this name to Meyer (2001: 49), that lectotypification was ineffective because it did not follow Article 9, note 6 of the International Code of Nomenclature (McNeill et al., 2012).

145. *Thlaspi yunnanense* Franch., Bull. Soc. Bot. France 33: 407. 1887; **Noccaea yunnanensis** (Franch.) Al-Shehbaz, Adansonia sér. 3, 24(1): 91. 2002.

Described from: "Yun-nan, ad collum Yen-tze-hay circa lacum, haud procul ab urbe Lankong, alt. 3200 m.; 1 jun. 1886 (Delav. n. 4077)."

Lectotype (listed as holotype by Al-Shehbaz (2002: 91) and finally designated here: China. "Province du Yun-nan, au col du "Yen-tze-hay" pautour du lac Lan Kong," 3,200 m, 1 Jun 1886, *J. M. Delavay 2077* (P02141454; Isolectotypes: K000484324, MO, NY, P2141455, P00730123, P00730133, US, W).

Franchet (1887) cited a single collection and erroneously listed *Delavay 4077* instead of *2077*, as there are four sheets of Delavay 4077, and all belong to *Blysmus compressus* (L.) Panz. ex Lin. By contrast, there are four sheets of *Thlaspi yunnanense* with *Delavay 2077*.

In treating *Thlaspi yunnanense* as *Noccaea*, Al-Shehbaz (2002, 2014) indicated that the holotype is at P. However, lectotypification of the species is needed, and the best of the four sheets is designated herein.

146. *Torularia shuanghuica* K.C.Kuan & C.H.An, Fl. Xizang. 2: 404. 1985, nom. illeg.; **Sisymbriopsis shuanghuica** (K.C.Kuan & C.H.An) Al-Shehbaz, C.H.An & G.Yang, Novon 9: 311. 1999.

Described from: "Xizang: Shanghu, Qinghai-Xizang Comp. Exp. 9891 (Typus in Inst. Bot. Acad. Sinic. Conservatur), alt. 4950 m., 29. VII 1976."

Lectotype designated by Al-Shehbaz et al. (1999: 311): China. Xizang (Tibet), Shuanghu, 4,950 m, 29 Jul 1976, *Lang Kai-yong 9891* (PE 00133858; Isolectotypes: HNWP60059, KUN, PE 00133857).

The basionym was illegitimate because it was assigned to the later homonym *Torularia* O.E.Schulz. Al-Shehbaz et al. (1999) transferred the species to *Sisymbriopsis* and indicated that the "holotype" and "isotype" at PE carry the herbarium numbers 1172825 (current barcode PE00133858) and 1172826 (current barcode PE00133857), respectively.

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RECONSIDERING *STRYCHNOS GUBLERI* (LOGANIACEAE)

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Abstract. *Strychnos gubleri* was described by François Gustave Planchon based on material collected in what is currently Amazonas state, Venezuela. Although it is one of the most widely cited species of the genus in the literature, it is not listed in *Tropicos*, appears as "unresolved" in *The Plant List*, and it was not included in the most recent flora and checklist of the region. We present here a history of the name, point out the valid description, and conclude that this taxon was described again in 1927 as *S. panurensis*. We also provide miscellaneous information on the species and list specimens cited in the text.

Resumen. *Strychnos gubleri*, fue una especie descrita por François Gustave Planchon basándose en material colectado en lo que hoy en día es el estado Amazonas de Venezuela. A pesar de ser una de las especies más citadas del género, actualmente no está registrada en *Tropicos*, aparece como una especie no resuelta en *Plant List* y no fue incluida en las floras y catálogos de plantas recientes de la región. Se presenta la historia del nombre, señalando la descripción válida de la especie, y se concluye que este taxón fue descrito nuevamente en 1927 como *S. panurensis*. También se presenta información miscelánea sobre la especie y se listan los ejemplares citados en el texto.

Keywords: Amazonas, Loganiaceae, *Strychnos*, Venezuela

Strychnos gubleri, described by François Gustave Planchon based on samples from the Orinoco region of Venezuela, is one of the American species of the genus most widely cited in the botanical and pharmaceutical literature, second perhaps only to *S. toxifera* R.H.Schomburgk ex Lindley. The name, nonetheless, is not listed in *Tropicos*, its status is "unresolved" in *The Plant List*, and it was not included in the latest revision and checklist of the genus for the Guayana region (Brant and Berry and 2001: 28–36; Berry et al., 2007). Furthermore, Krukoff and Monachino (1942, 1946), Krukoff (1972), and Krukoff and Barneby (1974) repeatedly listed this species among the doubtful names attributed to *Strychnos* L., as did Berry and Brant (2008: 443).

The purpose of this essay is first to ascertain where and when this species was validly published, and then to place it among the hitherto described species of *Strychnos*.

A reconstruction of the history of this species reveals the following. Adolphe-Marie Gubler received material and documentation of an unknown *Strychnos* species donated by the Venezuelan consul in Paris, Eugène Thirion.[4] Gubler (1879) later published an account of these materials. His essay included a description of the species, illustrations (Figure 1 herein; see also iconography below), and a comparison to other *Strychnos* species, written by F. G. Planchon, to whom Gubler had sent samples. Planchon concluded that it was most likely an undescribed species but that flowers and fruits were needed to write a complete diagnosis, never assigning a binomial to the plant (Planchon in Gubler, 1879: 327).

Planchon later published three articles citing *Strychnos gubleri*: two nearly identical ones based on a lecture delivered during the 19 January 1880 session of the Paris Academy of Science (Planchon, 1880a, 1880c), and a revision of the genus in the context of curare (Planchon, 1880b), the arrow poison. Planchon's revision was translated into English (Planchon 1880d) and Spanish (Planchon 1880e), was partially printed in French elsewhere (Planchon, 1880f), and later widely cited and reviewed in the late 1800s and early 1900s (e.g. Dallas 1880; Anonymous 1888; Squire, 1916).

Planchon (1880a, c) listed the vegetative characters that differentiated his new species, for which he proposed the name *S. Gubleri*, "... to remember the last work of the scientist and late therapist on the curare of the Rio Negro," but he did not provide a valid description; he finally did in his treatment of *Strychnos* (1880b: 295–300).

We thank, at the Harvard University herbaria, the Botany Libraries, especially G. Wade, for her indefatigable support, K. Gandhi, for his nomenclatural advice, and T. Iturriaga, for her help with A. Gaillard's collections. We also thank P. E. Berry at MICH and C. Brewer-Carías for comments and suggestions, the LuEsther T. Mentz Library for allowing access to the archives of the New York Botanical Garden, A. Brock at the Missouri Botanical Garden Press, T. Gaslonde at *Faculté de pharmacie - Université Paris Descartes*, L. Kawasaki at F, L. Green, B. B. Klitgaard, and S. Zmarzty at K, K. Yatskievych at MO, C. Loup at MPU, A. T. Whittemore at NA, M. Pignal at P, and B. Manara and O. Hokche at VEN for their kind assistance procuring information, permission to reproduce drawings, and images of herbarium specimens.

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[4] Gubler (1821–1879) was a French physician and pharmacologist. He (1879) stated that he had received material from Thirion in 1867 *via* his colleague and friend Professor [Charles Victor] Daremberg. According to Thirion (in Gubler, 1879), he [Thirion] provided a report sent by the "*gouverneur du district Amazonas (Vénézuéla)*" accompanied by samples of curare, leaves, roots, branches, as well as a sample of the soil where the plant grew. Curiosity about curare may have arisen when Thirion (1813–1879, "Eugenio" in sources in Spanish) presented a curare calabash (*Calebasse pleine de curare*) and a full description of the poison at the Universal Exposition in Paris in 1867 (Thirion, 1867: 30). Thirion did not reveal the name of the governor who sent him the curare material. The historical sequence of governors, even during this short period, is so unclear (see Tavera Acosta, 1901: 41–42; 1954: 120) that the authors hesitate to propose a name.

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Planchon later examined *Strychnos* specimens collected along the upper Orinoco river by Albert Gaillard.[5]

Planchon identified at least two of Gaillard's *Strychnos* collections as *S. gubleri* (these two specimens are currently deposited in the herbarium of the *Faculté de Pharmacie, Université Paris Descartes* (T. Gaslonde, personal communication, 2015; this herbarium collection is not currently listed in *Index Herbariorum*).

As indicated by Bisset (1992: 48), a specimen of *Gaillard 16* at P (Figure 2) is most likely a duplicate of his collections at *Faculté de Pharmacie* identified by Planchon: the two specimens (based on images supplied by P and the herbarium of the *Faculté de pharmacie, Université Paris Descartes*) share the same general appearance and were collected at the same locality in April 1887, and both were labelled "curare simple."

However, in 1946, Boris A. Krukoff and J. Monachino, identified a specimen of *Gaillard 16* at P as *S. panurensis* Sprague & Sandwith (Krukoff and Monachino, 1947; Figure 2). As Bisset suggested (1992: 48), it appears that *Strychnos gubleri* was redescribed in 1927 as *S. panurensis* and, following the synonymy proposed by Krukoff and Monachino (1942), again in 1934 as *S. placida* J.F.McBride.

Strychnos gubleri G.Planchon, Journal de Pharmacie et de Chimie, 5° Série, 1: 295[–300]. [April] 1880. TYPE: VENEZUELA. Amazonas: without specific locality, 1867, collected by the governor of the Amazonas District (Holotype: not located; Epitype, proposed here, same country and state, Municipio Autónomo Atures, Puerto Perico [currently within the city limits of the state's capital, Puerto Ayacucho], *A. Gaillard 16*, P; possible Isoepitype: at the herbarium of the *Faculté de pharmacie, Université Paris Descartes*). Fig. 1–5.

Synonyms: *Strychnos panurensis* Sprague & Sandwith, Bulletin of Miscellaneous Information No. 3: 132. 1927. TYPE: COLOMBIA: *Prope Panuré ad Rio Uaupés* [Departamento del Guaviare, Municipio de San José del Guaviare Resguardo Indígena Panuré, Panuré], Twiner and climber; fruits yellowish, succulent, October 1852, *R. Spruce 2634* (Lectotype, proposed here, K 000573468 [Figure 3 herein]; Isolectotypes: K [K 000573467], P [P00641298], TDC [TDC 0000691]).

Strychnos placida J.F.McBride, Candollea 5: 400. 1934. TYPE: PERU. Departamento Loreto, Yurimaguas: 21 November 1929, *L. Williams 5312* [as "5313"; see Krukoff and Monachino 1942] (Holotype: F; Isotype S).

Usage synonym: *Strychnos gubleriana* G. Planch. in Baillon, Traité de Botanique Médicale Phanerogamique 1219. 1884.

Nomenclature: None of the specimens of *Strychnos gubleri* identified by Planchon at the herbarium of the *Faculté de pharmacie, Université Paris Descartes* could be matched to the type material of *Strychnos gubleri*, and no samples of *S. gubleri* were found at NA (A. T. Whittemore, personal communication, 2015), where it had been suggested that G. Planchon's types may be deposited (Stafleu and Cowan 1983: 283). The material collected by the governor of the Amazonas District that Thirion passed on to Professor Daremberg may not have been preserved. Notwithstanding, we hesitated to propose a neotype.

There are two specimens of the type collection of *Strychnos panurensis* (*Spruce 2634*) at K: one from *Herbarium Benthamianum* (Fig. 3A) and one from *Herbarium Hookerianum* (Fig. 3B). Following criteria established by McNeill (2014), these two specimens have to be treated as syntypes, because the authors did not select one as the holotype and no recent authors have selected one of the sheets as a "type," qualifying as a *de facto* lectotypification. Furthermore, the locality cited in the protologue obviously combines elements of the two labels. A lectotype is proposed herein, the collection formerly in the Bentham herbarium (Fig. 3A), as its label includes the most elements of the locality cited in the protologue.

Iconography: Gubler (1879: figures 1–4); Planchon (1880b: figures 1–4; 1880d: figures 1–3); Planchon and Collin (1895: 672–674, figures 555–557); Krings and Braham (2005: 84: figure 6.3A, as *S. panurensis*); Brant and Berry (2001: 35, figure 27, as *S. panurensis*; see figure 4 herein).

[5] Albert Gaillard [de Tiremois] (1858–1903), was hired by the *Syndicat Français du Haut-Orénoque* to complete a botanical inventory of Venezuela south of the Orinoco river, including vast regions currently under the sovereignty of Colombia (Gaillard 1907: footnote on page 131; see also F. Plumley in Ralston, 1906: 328). He collected vascular plants, liverworts, and fungi around Caracas and along the Orinoco river in 1887 (see rough itinerary in Patouillard and Gaillard, 1888; see also Fidalgo and Pacheco Kauffmann Fidalgo, 1968). The numbering of his collections indicates he used a different number series for each of these three categories (and at least three series for his fungi). During his stay in Venezuela Gaillard suffered both an accidental fall and also from malaria, which forced his return to France and from which he never quite recovered, dying when he was only 45 years old (Patouillard, 1903). He wrote several essays about curare (Gaillard, 1899, 1907; in Labesse, 1905a–b, 1906) and collected at least two species of fungi from the bark of *Strychnos gubleri* that were later described as *Amphisphaeria strychnicola* Pat. (Amphisphaeriaceae) and *Gloniella strychnicola* Pat. & Gaill. (Hysteraceae); the protologue of the latter, in fact, states "Sur écorce de 'Curare simple' (*Strychnos Gubleri*). Puerto Perico, Avril (No. 45)" (Patouillard and Gaillard 1888: 119–120). The original label, however, reads "sur le Strychnos sp. 'Curare simple', Puerto Perico, Avril 1887" (taken from the specimen at FH).

Gaillard's collection of vascular plants was partially identified by Maury (1889), but novelties from his collections from the area continue to be described (e.g., *Trichovaselia canescens* Thiegh. [1902: 208], currently referred to *Elvasia canescens* (Thiegh.) Gilg; *Faramea orinocensis* Standl. [1931: 418], and *Ixora gaillardii* Standl. [1936: 218], currently referred to *I. acuminatissima* M. Arg.). Of the few orchids he collected, *Gaillard 228* represents a species not described until 1920, based on another collection (*Habenaria amambayensis* Schltr.), and one remains undescribed (*Habenaria* sp.; *Gaillard 83*).

His fungal collections, identified by Patouillard (1887, 1889) and Patouillard and Gaillard (1888), included many new species.

According to Plumley (in Ralston, 106: 328), in an analysis of a legal claim against the government of Venezuela, "... the flora of the territories was carefully studied and reported upon by Dr. Gaillard, a distinguished expert, the result of his investigations being printed in two volumes and presented to the Venezuelan Government. Explorations were made on the rivers Vichada, Guaviare, Inirida, Ventuario, Atabapo, Guainia, and the Casiquiare." There is no trace in the recent literature of the two cited volumes and, for their legal claim, either the *Syndicat Français du Haut-Orénoque* exaggerated the extent of Gaillard's collecting expeditions or there are many Gaillard's collections that were never identified: Maury (1889) and Patouillard and Gaillard (1888) only cited collections gathered near Caracas, and along the Orinoco river up to the confluence of the Atabapo and Guaviare rivers (up to numbers 271 and 274 in the largest series, respectively).

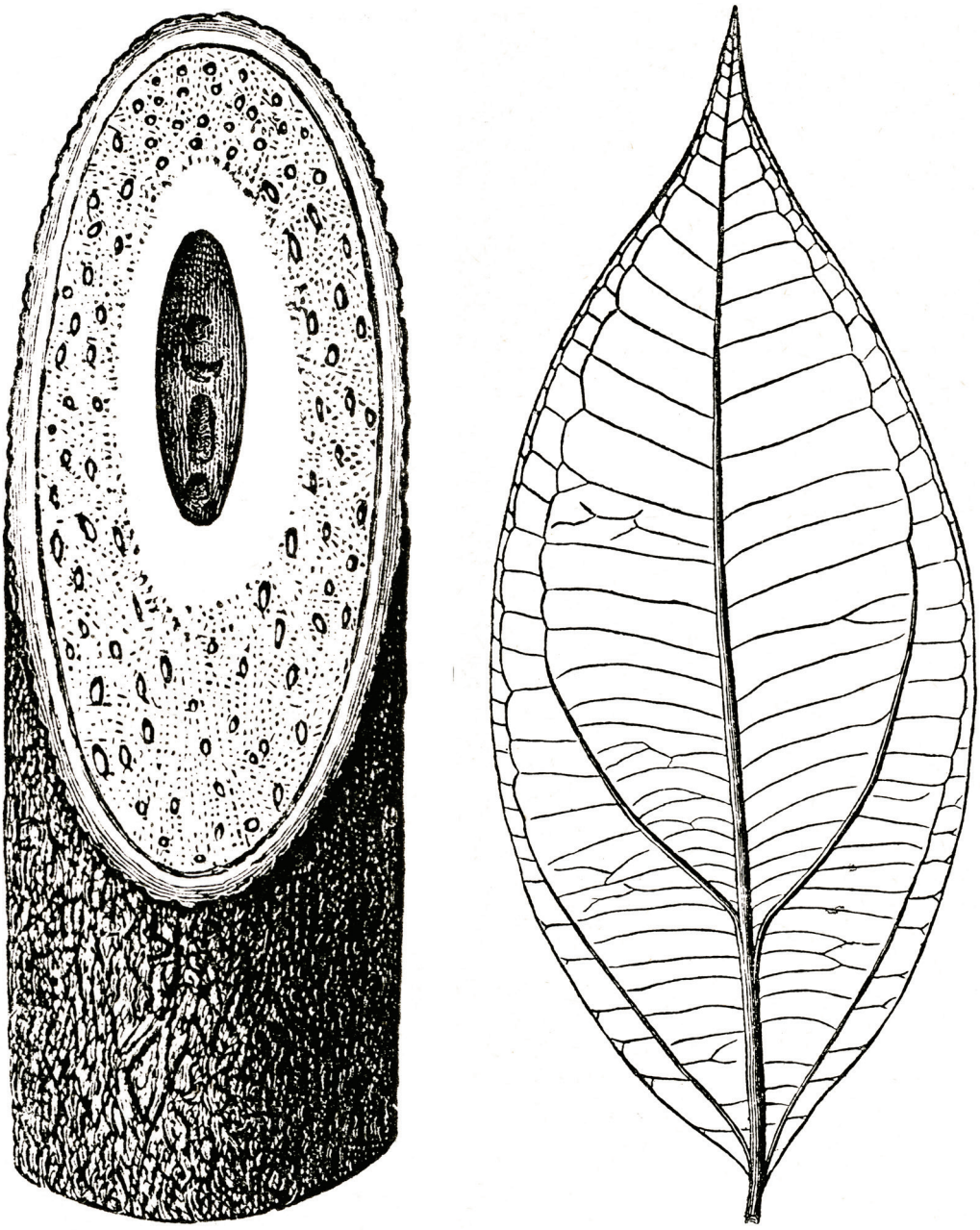

FIGURE 1. *Strychnos gubleri* G.Planchon. Illustrations of a cross section of a branch and a leaf by G. Planchon, first published as figures 1 and 4 in Gubler (1879). Scale not indicated in the original illustrations.

FIGURE 2. Specimen of *Strychnos gubleri* G.Planchon, *A. Gaillard 16* (P), selected here as Epitype. © Muséum National d'Histoire Naturelle, Paris. Scale not included in the original illustration.

FIGURE 3. Types of *Strychnos panurensis* Sprague & Sandwith at the Herbarium, Royal Botanic Gardens, Kew. **A**, Lectotype, selected here (Stable URL http://specimens.kew.org/herbarium/K000573468); **B**, Isolectotype (Stable URL http://specimens.kew.org/herbarium/K000573467). © The Board of Trustees of the Royal Botanical Gardens, Kew.

Selected additional specimens cited: VENEZUELA. Amazonas: Municipio Autónomo Alto Orinoco, Río Cunucunuma, *J. J. Wurdack & L. S. Adderley 43072* (MO, NY, VEN); Municipio Autónomo Alto Río Negro, bajo río Siapa, boca del caño Chimoni, *G. Aymard et al. 10053* (MO, VEN); Municipio Autónomo Atabapo, Laja Nericagua, entre Caño Piojo y Caño Ucata, *G. A. Romero, F. Guánchez & L. Alvarez 1977* (GH, MO, NY, TFAV, VEN); Municipio Autónomo Atures, "Puerto Perico, Raudal d'Atures", April 1887, *A. Gaillard s.n.* (kept at the herbarium of the *Faculté de pharmacie, Université Paris Descartes*). Apure: cerca de San Fernando, *T. Lasser s.n.* (VEN).

Field and herbarium characters: Detailed descriptions of *Strychnos gubleri* (as *S. panurensis*) were provided in English by Krukoff and Monachino (1942) and in Spanish by Krukoff and Barneby (1974). *Strychnos gubleri* can be identified using the following combination of characters (largely based on Krukoff and Barneby, 1974, on Brant and Berry, 2001: 29–31, and selected herbarium specimens at GH): Leaf nodes, interpetiolar lines, and axillary buds glabrous; pubescence barely visible under the leaf blade; leaf blades elliptic-obovate to oblanceolate, 5–9 × 5–25 cm, green, brownish to grey in herbarium specimens, with 5-plinervate veins, reticulation conspicuous on both surfaces; inflorescences axillary, compound, generally elongated and bearing many flowers; calyx greenish yellow, flowers white, fragrant, corolla tube 1.0–2.5 mm long, lobes ca. 4 mm long, style glabrous; mature fruits to 2.5 cm in diameter, the pericarp macroscopically smooth, shiny, thin. The yellow to orange mature fruits are described as usually having one seed, but the fruits in the specimen collected by the senior author (Figure 5) had 1–4 seeds; according to Gaillard, the fruits have up to five seeds (Figure 2); the pulp of the fruits is white, turning lightly pink when exposed to air, and edible (Gaillard in Labesse, 1906).

Distribution: Based on the reported distribution of *Strychnos panurensis*, *S. gubleri* is found in Brazil, Colombia (Amazonas and Pacific coast), Panama, Peru, Venezuela

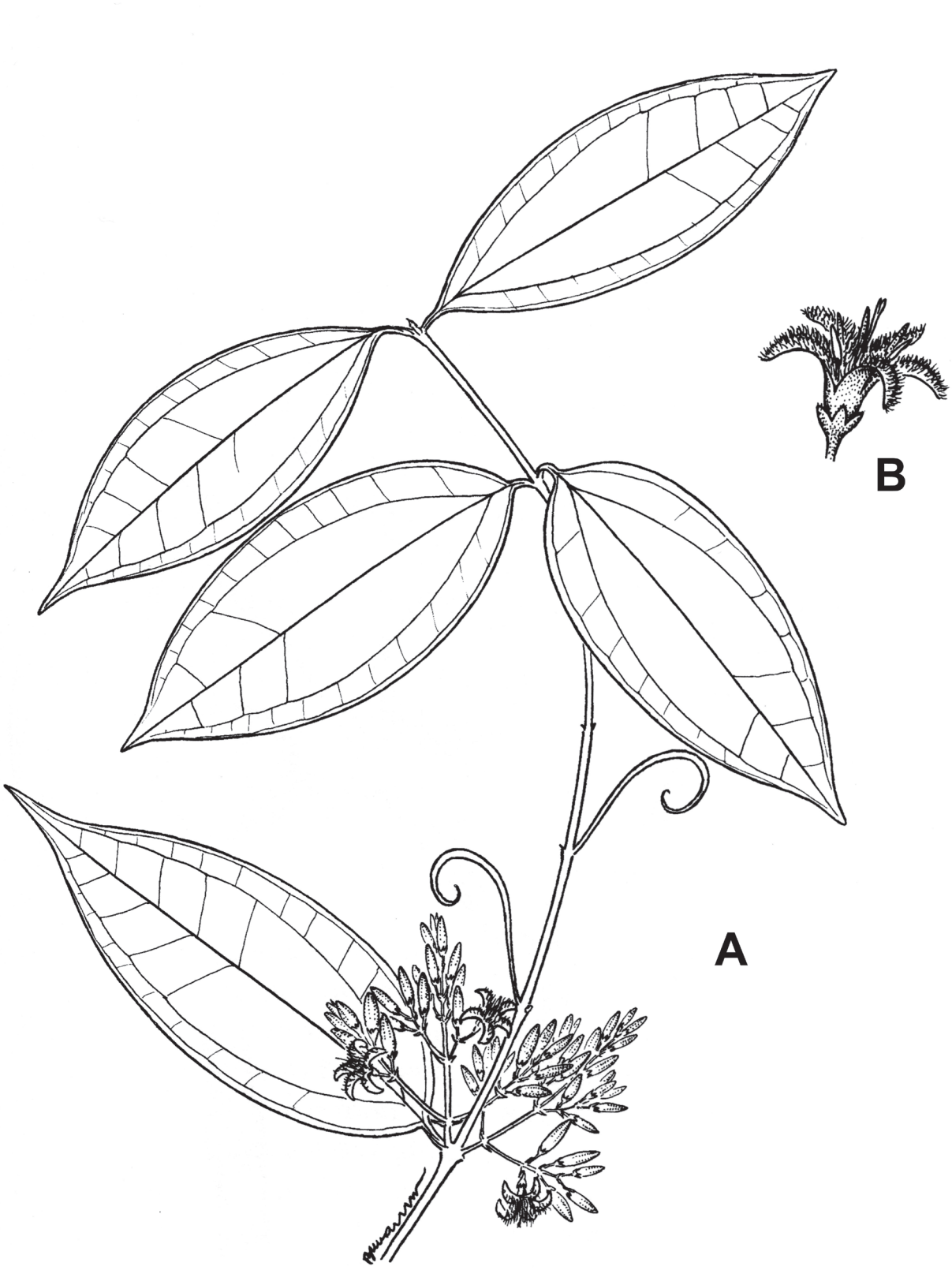

FIGURE 4. *Strychnos guebleri* G.Planchon (as *S. panurensis* in Brant and Berry 2001: 37, Figure 27; **A**, habit based on *T. Lasser s.n* [VEN]; **B**, flower based on *Wurdack and Adderley 43,072* [VEN]). Drawn by Bruno Manara and reproduced with permission from the Missouri Botanical Garden Press. Scale not indicated in the original illustration.

FIGURE 5. *Strychnos gubleri* collected by the senior author, *Romero et al. 1977* (GH).

(Krukoff and Barneby, 1974); Ecuador (Brant and Berry 2001: 33); Mexico (Veracruz), Belize and Guatemala (according to Tropicos); the Guianas (according to specimens at P); and Costa Rica (Krings and Braham, 2005: 83; Sánchez, 2007: 216). In Venezuela it is known from the states de Amazonas, Apure, Bolívar, Guárico (Brant and Berry 2001: 33; Estrada, 2007: 538), and Zulia (according to TROPICOS).

Planchon (1880b) cited *S. gubleri* as the source of curare in the Orinoco river basin, later proposing *S. toxifera* as an additional source, which he called, quoting his sources, "curare fort" (Planchon, 1882; see also Le Janne, 1881).

Gaillard (in Labesse, 1906) added that *Strychnos gubleri* was used to prepare a weak curare ("Curare faible"):

> "The weak curare is used only for hunting birds and small quadrupeds. It is often used to capture some live animals that only momentarily faint or are paralyzed,"

This weak curare may be the "curare destemplado" cited by Humboldt (Humboldt and Bonpland, 1811: 334; Humboldt, 1819: 267; 1820: 338; 1825: 528; 1942: 358; 1956: 296, in a footnote in 1811, 1819, and 1820).

As of 1979, *Strychnos gubleri* had not been chemically studied (Krukoff, 1979, as *S. panurensis*).

Strychnos gubleri, long overlooked since the late 1800s and early 1900s, is hereby re-instated and made available for the anthropological, botanical, ethnological, pharmaceutical, and scientific literature at large.

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NEW SPECIES AND NOMENCLATURAL NOTES IN THE PLEUROTHALLIDINAE (ORCHIDACEAE) FROM BRAZIL

A. L. V. Toscano de Brito[1,2] and Carlyle A. Luer[3]

Abstract. One new species in the genus *Acianthera*, *A. imitator*, is described and illustrated. Sixteen species are proposed as synonyms. They are listed in alphabetical order: *Acianthera gradeae* as synonym of *A. agathophylla*; *A. spilantha* as synonym of *A. breviflora*; *A. antennata* as synonym of *A. gracilisepala*; *A. dichroa* as synomym of *A. strupifolia*; *Anathallis crebrifolia*, *A. montipelladensis*, and *A. ourobranquensis* as synonyms of *A. aristulata*; *A. liparanges* as a synomym of *A. heterophylla*; *A. bolsanelloi*, *A. githaginea*, and *A. nectarifera* as synonyms of *A. lobiserrata*; *A. limbata* and *A. marginata* as synonyms of *A. muscoidea*; *A. longiglossa* as synonym of *A. paranaensis*; *Lankesteriana gehrtii* as synonym of *L. caudatipetala*, and *Specklinia rubidantha* as synonym of *Lankesteriana imberbis*. Correct provenance and habitat information are provided for the type collection of the recently described *Anathallis johnsonii*. This species is herein formally recorded for Brazil. Lectotypes are selected for seven species: *Anathallis heterophylla*, *A. nectarifera*, *Lepanthes crebrifolia*, *Pleurothallis gracilisepala*, *P. microgemma*, *P. paranaensis*, and *P. spilantha*, and an epitype is selected for *Pleurothallis paranaensis*. Illustrations and taxonomic discussions are also provided.

Keywords: *Acianthera*, *Anathallis*, *Lankesteriana*, *Lepanthes, Pleurothallis*, *Specklinia*.

In the course of preparing generic treatments of Pleurothallidinae of Brazil, material of several genera was examined and their morphologies and nomenclature elucidated. One species is described as new and sixteen are proposed as synonyms. Illustrations, updated synonym lists, typifications, and taxonomic discussions are provided. Genera and species follow in alphabetical order.

New species

Acianthera imitator Toscano, Luer & L.Kollmann, *sp. nov.* TYPE: BRAZIL. Espírito Santo: Santa Maria do Jetibá, collected and cultivated by Ludovic Kollmann, flowered in cultivation in Santa Teresa, 15 July 2010, *A. Toscano de Brito 2866* (Holotype: MBML [43914]), C. Luer illustr. 21679. Fig. 1.

Plant small, epiphytic, long-repent, the rhizome slender, 15–20 mm long between ramicauls; *roots* slender. *Ramicauls* ascending, erect, 5–8 mm long, enclosed by a tubular sheath from below the middle and another sheath at the base. *Leaf* erect, suberect to horizontal, thickly coriaceous, elliptical to ovate, obtuse to subacute at the apex, 20–30 mm long, 12–15 mm wide, the base rounded, sessile. *Inflorescence* a single-flowered peduncle 3–4 mm long, borne from the base of the leaf with a spathe 2 mm long; floral bract 2–2.5 mm long; *pedicel* 3 mm long with a minute filament; *ovary* 1.5 mm long; *sepals* fleshy, glabrous, the dorsal sepal greenish with dark purple veins, elliptical-oblong, obtuse to rounded at the tip, 9 mm long, 3 mm wide, 5-veined, the *lateral sepals* adaxially spotted with dark purple, connate into an ovate, obtuse, minutely bidentate, concave synsepal, 8 mm long, 6 mm wide expanded, 6-veined, concave below the middle; *petals* translucent-green, elliptical, acute, microscopically serrulate above the middle, 3.5 mm long, 1.5 mm wide, 3-veined; *lip* dark purple with green lateral lobes, thick, oblong-subtrilobed, 4 mm long, 2.5 mm wide, markedly

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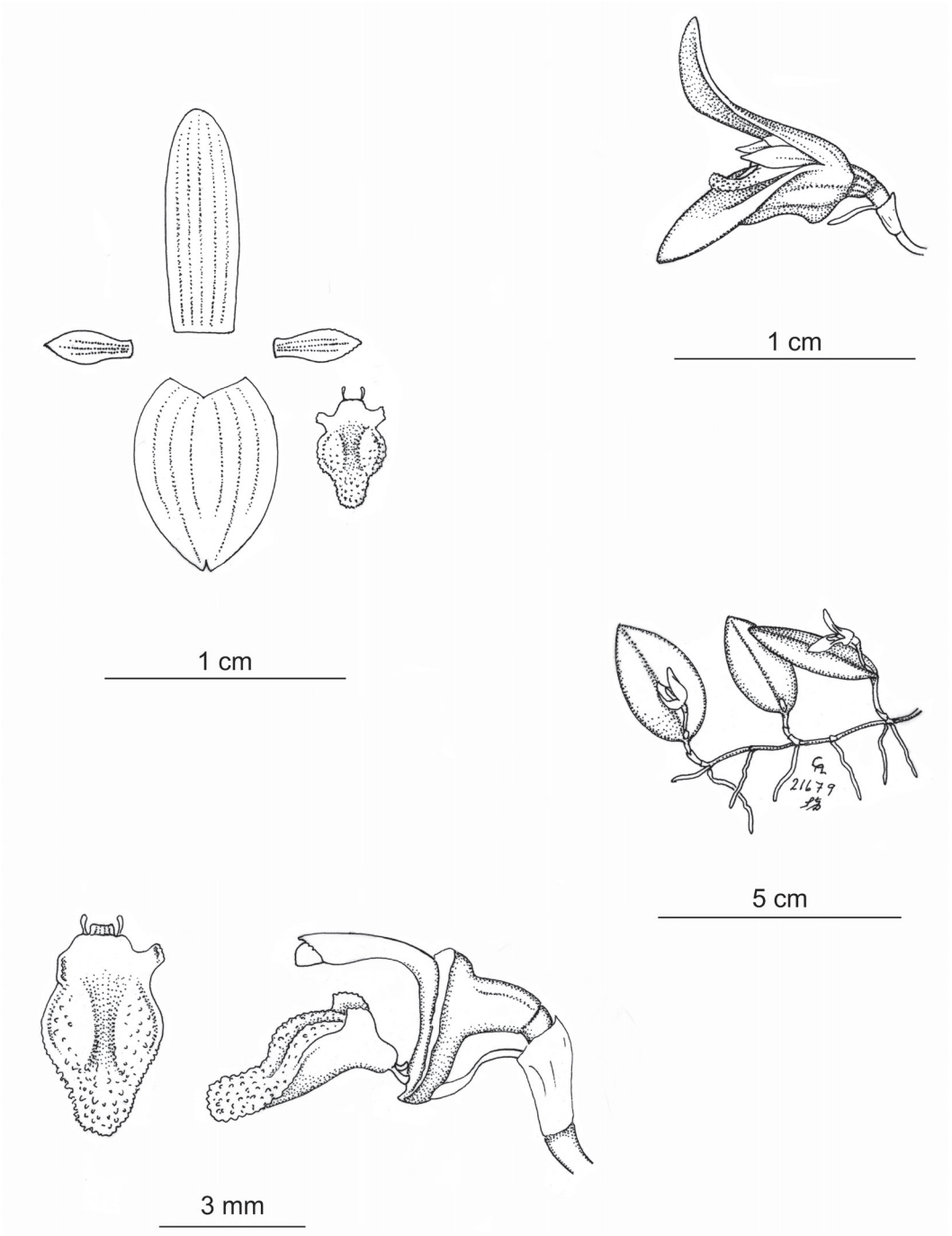

FIGURE 1. *Acianthera imitator* Toscano, Luer & L.Kollmann, *sp. nov.* Based on the holotype, *A. Toscano de Brito 2866* (MBML). Drawn by C. A. Luer.

verrucose, serrulate, narrowly rounded and thickened at the apex, the lobes below the middle, small, erect, obtuse to rounded, the disc narrowly channeled between a pair of verrucose calli on the middle third, the base truncate with a minute, pedunculated lobule at the corners; column green, semiterete, narrowly winged toward the purple spotted apex, 3 mm long, anther, rostellum and stigma ventral, the foot thick, 1.5 mm long.

Etymology: From the Latin *imitator*, "an imitator," referring to its similarity to Barbosa Rodrigues's *Pleurothallis bidentula* [= *Acianthera bidentula* (Barb. Rodr.) Pridgeon & M.W.Chase].

This new species belongs to a complex of long-repent, similar taxa recently referred to as the *Acianthera saundersiana* (Rchbf.) Pridgeon & M.W.Chase complex (Toscano de Brito and Luer, 2015). It resembles in habit

Acianthera bidentula, but it is distinguished by a markedly verrucose lip that is narrowly rounded at the tip, instead of broadly rounded or truncate. The creeping rhizome is delicate and the leaves are elliptical to slightly ovate. The flowers are relatively smaller and more delicate than those of *A. bidentula*. In shape and color, the lip of *A. imitator* resembles that of *A. saundersiana*, but the latter species is a much larger one with longer ramicauls and larger flowers. The reader should refer to Toscano de Brito and Luer (2015) for further discussion on the identities of some species in this complex, especially that of *A. bidentula* and *A. saundersiana*.

Nomenclatural notes

Acianthera agathophylla (Rchb.f.) Pridgeon & M.W.Chase, Lindleyana 16: 241. 2001. Fig. 2.

Basyonym: *Pleurothallis agathophylla* Rchb.f., Xenia Orchid. 3: 25. 1881. TYPE: BOLIVIA. La Paz: Larecaja, vinicinity of Sorata, Cerro del Iminapi, alt. 2600 m, March–May 1860, *G. Mandon 1132* (Holotype: W [45938]; Isotypes: AMES [118553], BM [82439], G [24887], K [584177], MPU [18064, photo seen], NY [9220], P [489101], P [489102], P [489103]).

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

Pleurothallis cyclophylla Luer, Selbyana 3: 92. 1976. TYPE: BOLIVIA. Santa Cruz: near Samaipata, alt. 1500 m, flowered in cultivation at J and L Orchids, Easton, CT, 20 October 1976, *F. Fuchs s.n.* (Holotype: SEL [002781]), C. Luer illustr. 249-S.

Pleurothallis nakatae T.Hashim., Ann. Tsukuba Bot. Gard. 4: 3. 1986. TYPE: PERU. Junín: Chanchamayo, near La Merced, alt. 1700–1800 m, flowered in cultivation in TBG, 8 May 1985, *M. Nakata 626* (Holotype: TNS [not seen]).

Acianthera gradeae Chiron & Benelli, Richardiana 13: 66. 2012, ***syn. nov.*** TYPE: BRAZIL. Mato Grosso: Nova Bandeirante, Fazendinha da Lagoa, alt. 304 m, *A. Petini-Benelli, A. Grade and & H.S. Lima APB963* (Holotype: HERBAM [4953, not seen]); same locality, June 2005, flowered in cultivation in September 2005, *A. Petini-Benelli, A. Grade and & H.S. Lima APB964* (Paratype: HERBAM [4954, not seen].

Acianthera agathophylla is a common species distributed from central Peru through Bolivia (Váquez & Dodson 1982; Váquez & Ibisch, 2000; Luer, 2004) and has been recently collected in the Brazilian state of Mato Grosso. It was redescribed as *Acianthera gradeae*, in 2012, based on two collections from the municipality of Nova Bandeirantes, also in the state of Mato Grosso, but this name is illegitimate and it is here placed in the synonym of *Acianthera agathophylla*. This synonymy has been alluded to in some non-scientific websites (e.g. http://pt.wikipedia.org/wiki/Acianthera) without provision of supporting evidence. Chiron and Petini-Benelli (2012) distinguished *Acianthera gradeae* from *A. agathophylla* based on a number of characters such as rhizome length, leaf shape, leaf base and apex, spathe size, petals and lip shape, type of margins, lip surface, and column thickness. However, none of these features can be used to distinguish these two taxa because they are variable characters and some of them, e.g. leaf shape, base and apex, may vary even in the same individual. *Acianthera agathophylla* is a variable species, both vegetatively and in floral morphology, but it can be easily recognized by its repent rhizome, ascending ramicauls, and spreading, broad elliptical to suborbicular leaves. The inflorescence is a short, few-flowered raceme at the base of the leaf and produces 1 to 4 orange-yellow flowers. Most distinctive is a darker, convex thickening above the middle of the sepals. The Brazilian collection that we studied comes from the municipality of Apiacás, in the state of Mato Grosso, near the border with the state of Pará. It was collected by Ronaldo Herculano Alves and flowered in cultivation by Maria Rita Cabral in 2012. This same collection was photographed by Luiz Filipe Varella and a couple of his photographs are reproduced here (Fig. 2A–B). Several others can be found at: http://www.flickr.com/photos/luizfilipevarella/sets/72157620101297689. Duplicates of this collection are currently in cultivation at Rio de Janeiro Botanical Garden (Fig. 2C).

Additional specimen examined: BRAZIL. Mato Grosso: Apiacás, collected by *R.H. Alves s.n.*, flowered in cultivation in 25 August 2012, *M.R. Cabral 6* (MBM).

Acianthera **breviflora** (Lindl.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 253. 2004. Fig. 3.

Basionym: *Pleurothallis breviflora* Lindl., Edwards's Bot. Reg. 27(Misc.): 59. 1841. TYPE: MEXICO (in error, most likely from Brazil): imported by *Messrs. Loddiges s.n.* (Holotype: K [000885713]).

Synonyms: *Humboltia breviflora* (Lindl.) Kuntze, Revis. Gen. Pl. 2: 667. 1891.

Pleurothallis spilantha Barb.Rodr., Gen. Spec. Orchid. 2: 32. 1881, ***syn. nov.*** TYPE: BRAZIL. Minas Gerais: Serra das Bicas, alt. 600 m, *J. Barbosa Rodrigues s.n.* [Holotype: Lost; Lectotype here designated: Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 3, tab. 173, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 752 (unpubl.) in Barb. Rodr. loc.cit; copied and reprod. in black and white in Cogn., Fl. Bras. (Mart.) 3(4), tab. 106, fig. 1. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 231, fig. A].

Myoxanthus spilanthus (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 15: 38. 1986, ***syn. nov.***

Pleurothallis paspaliformis Loefgr., Arch. Jard. Bot. Rio de Janeiro 2: 53. 1918, ***syn. nov.*** TYPE: BRAZIL. Rio de Janeiro: Itatiaia, *P. Campos Porto s.n.* (Holotype: RB [14168].

Acianthera spilantha (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 118. 2007, ***syn. nov.***

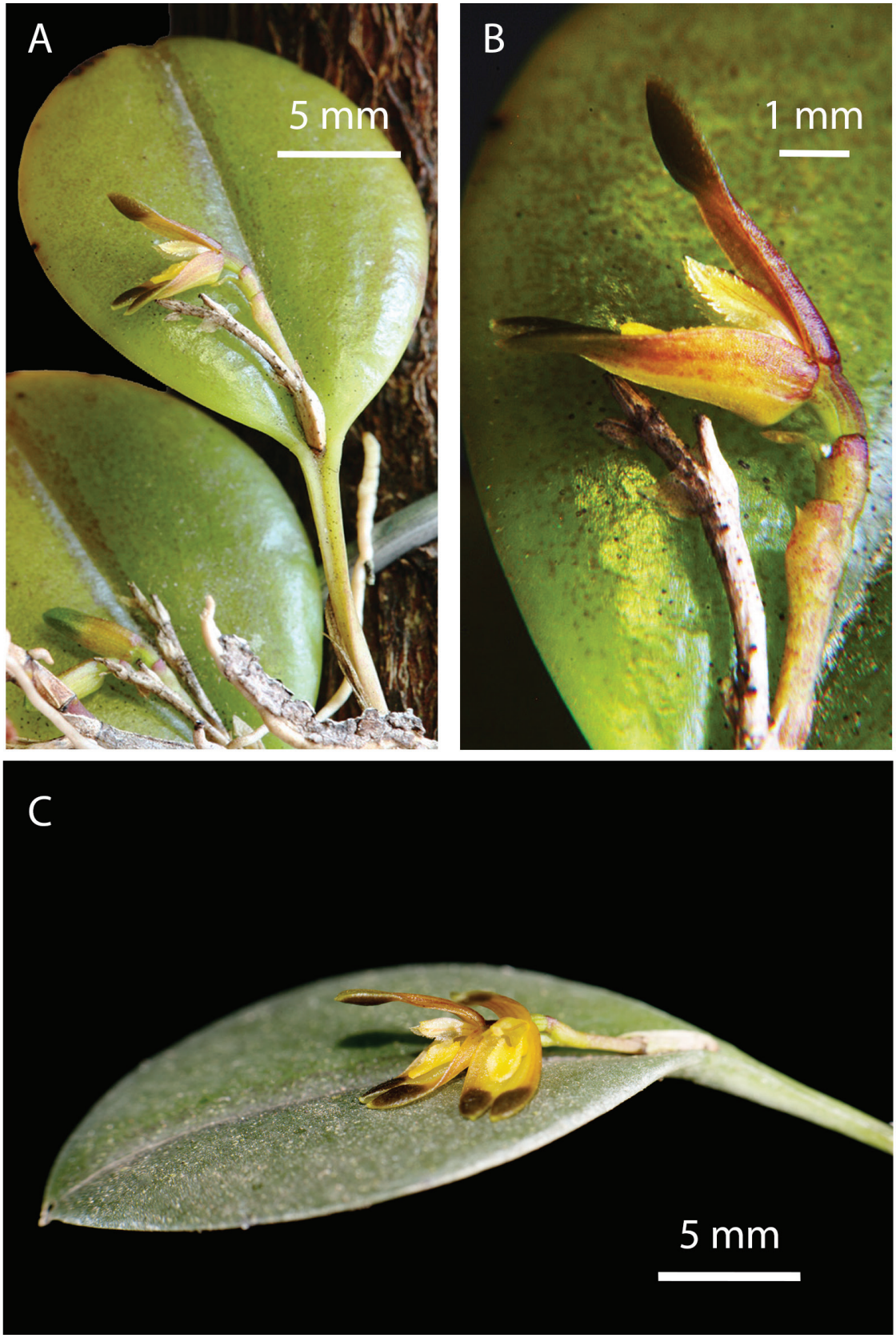

FIGURE 2. *Acianthera agathophylla* (Rchb.f.) Pridgeon & M.W.Chase. **A–B**. Photographed by Luiz Filipe Varella based on a plant in cultivation in Porto Alegre, Rio Grande do Sul, Brazil. C. Photographed by Wade Collier based on a plant in cultivation at Rio de Janeiro Botanical Garden. All based on duplicate specimens of *M.R. Cabral 6* (MBM).

FIGURE 3. *Acianthera breviflora* (Lindl.) Luer. Holotype of *Pleurothallis breviflora* Lindl. at K showing watercolor by John Lindley on the type sheet. © The Board of Trustees of the Royal Botanic Gardens, Kew. Reproduced with permission.

Acianthera spilantha (Barb.Rodr.) Campacci Bol. CAOB 69–70: 25. 2008, *nom. illeg*.

John Lindley described *Pleurothallis breviflora* [= *Acianthera breviflora*] based on a specimen said to have been imported from Mexico by the Loddiges family. No flowers remain on the type specimen preserved at K (Fig. 3) but a fine watercolor prepared by Lindley can be found on the herbarium sheet. This painting and the sterile specimen at Kew agree in every detail with Barbosa Rodrigues's original illustration of *Pleurothallis spilantha*, a frequent species in the Atlantic forest of southeast Brazil. It also agrees with the type specimen of *Pleurothallis paspaliformis*. Therefore, these two taxa are here placed in the synonym of *Acianthera breviflora*. This casts doubt on the Mexican origin of the specimen imported by the Loddiges, which most certainly came from Brazil. An illustration based on a collection by Martin Martens, probably from Brazil, was published by Luer in 2004. As in the case of *Acianthera gradeae,* previously treated here, this synonymy has also been alluded to in some non-scientific websites (e.g. http://pt.wikipedia.org/wiki/Acianthera) without providing further evidence.

The type specimen of *Pleurothallis spilantha* is lost and the only extant original material is the illustration that appeared in Barbosa Rodrigues's *Iconographie des orchidées du Brésil*, which 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 reproduced in color in Sprunger et al. (1996). It is selected here as lectotype.

Additional specimens examined: BRAZIL. Espírito Santo: Vargem Alta, 650 m, 3 June 1949, *A.C. Brade 19966* (RB). Minas Gerais: without collection data, cultivated in Poços de Caldas, 1 March 2004, *Americo s.n.* (SEL), C. Luer illustr. 20636. São Paulo: without collection data, cultivated in São Paulo by V.P. Castro, 28 February 2004, *C. Luer 20617* (SEL). Without collection data, cultivated in Hort. Bot. Leuvenensis, 1837, by *M. Martens s.n.* (BR), C. Luer illustr. 18913.

Acianthera gracilisepala (Brade) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 253. 2004. Fig. 4.

Basionym: *Pleurothallis gracilisepala* Brade, Arch. Jard. Bot. Rio de Janeiro 11: 74. 1951. TYPE: BRAZIL. Paraná: Campos Gerais, 1949, flowered in cultivation 4 January 1950, *A. Guimarães s.n.* (RB [74403, lost]; Lectotype here designated: Brade original drawings of the holotype deposited in Guido F. J. Pabst's reference files at Herbarium Bradeanum (HB), numbered Brade 20159, reproduced in Arch. Jard. Bot. Rio de Janeiro 11: plate 4, fig. 1–10. 1951.

Synonyms: *Pleurothallis antennata* Garay, Arch. Jard. Bot. Rio de Janeiro 12: 170. 1953, ***syn. nov.*** TYPE: BRAZIL. Paraná: Capão Grande, fl. cult. 21 February 1915, *P. Dusén 16727* (Holotype: S [S-R-4949, photo seen]; Isotype: AMES [118552].

Acianthera antennata (Garay) Pridgeon & M.W.Chase, Lindleyana 16: 242. 2001, ***syn. nov.***

Study of an isotype of *Pleurothallis antennata* and of a photograph of the holotype deposited at S has shown that this species is a synonym of *Pleurothallis gracilisepala* [= *Acianthera gracilisepala*]. The holotype specimen of *Pleurothallis gracilisepala* has not been located at RB and is apparently lost. However, this species was nicely illustrated in the protologue leaving no doubt that it is conspecific with *P. antennata*. Brade's original drawings that appeared in the protologue have also been examined and confirm our opinion. Figure 4 in the present work is based on the isotype of *Pleurothallis antennata* at AMES. Although rehydration of the flower using ammonia was not satisfactory and the column was still somewhat distorted, all other floral segments match well those of *Acianthera gracilisepala*. This specimen was collected by Dusén in forests by the Guabiroba river, in Capão Grande, state of Paraná. As far as we could ascertain, Capão Grande is a farm in the municipality of Ponta Grossa. It was founded in 1850 and is located near what today is Vila Velha State Park. For further information on these sites, the reader should refer to the following website addresses: http://sigep.cprm.gov.br/sitio099/sitio099.htm and http://www.webhotel.com.br/parana/turismo/tc2_pontagrossa.htm

Additional specimens examined: BRAZIL. São Paulo: Rio Claro, collected locally and cultivated by Wagner Marques, 16 March 2007, *D.H. Baptista s.n.* (SEL), C. illustr. 21131. Paraná: Ortigueira, Rio Barra Grande, 13 May 1969, *G. Hatschbach 21472* (C). Without collection data, flowered in cultivation 16 March 2007 by *Wagner s.n.* (SEL), C. Luer illustr. 21131.

Acianthera strupifolia (Lindl.) Pridgeon & M.W.Chase, Lindleyana 16: 246. 2001. Fig. 5–7.

Basyonym: *Pleurothallis strupifolia* Lindl., Edwards's Bot. Reg. 25(Misc.): 2. 1839. TYPE: BRAZIL. Without collection data, imported by *Messrs. Loddiges s.n.* (Holotype: K [000885712]).

Synonyms: *Pleurothallis picta* Hook., Bot. Mag. 68: t. 3897 (1841), *nom. illeg.*, non Lindl. 1835. TYPE: MEXICO (in error): imported by Mr. Parkinson, flowered in cultivation at Woburn, submitted to the Botanical Magazine in 1839 by *Mr. Forbes s.n.* (Holotype: K [not located]).

Pleurothallis bicolor Lindl., Edwards's Bot. Reg. 28(Misc.): 76. 1842, replacement name for *Pleurothallis picta* Hook.

Pleurothallis dichroa Rchb.f., Hamburger Garten-Blumenzeitung 21: 356. 1865, *syn. nov.* TYPE: BRAZIL. Without locality, collected by H. Blunt, flowered in cultivation in 1863, *S.H. Low s.n.* (Holotype: W [R-21887].

Pleurothallis hookeri Regel, Trudy Imp. S. Peterburgsk. Bot. Sada 7: 545. 1881, *nom. illeg.*, replacement name for *Pleurothallis picta* Hook.

Humboltia strupifolia (Lindl.) Kuntze, Revis. Gen. Pl. 2: 668. 1891.

Pleurothallis glaucophylla Hoehne, Arch. Bot. São Paulo 1: 579. 1927. TYPE: BRAZIL. Minas Gerais: Santa Bárbara do Mato Dentro, flowered in cultivation at Horto Oswaldo Cruz, Butantan, in 30 October 1922, *F.C Hoehne s.n.* (Holotype: SP [8117]; Isotype: B [destroyed]).

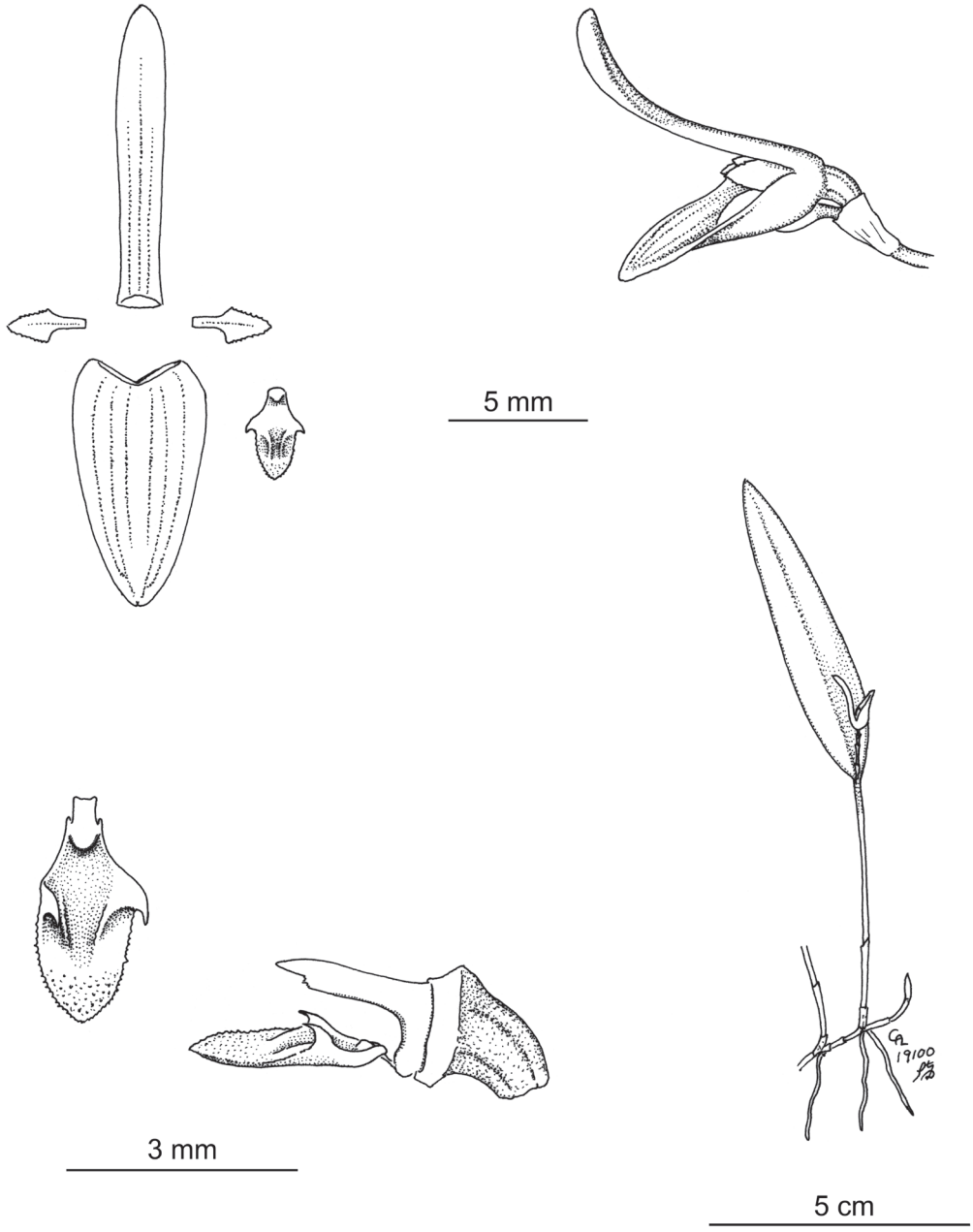

FIGURE 4. *Acianthera gracilisepala* (Brade) Luer. Drawing based on the isotype of *Pleurothallis antennata* Garay, *P. Dusén 16727* (AMES). Drawn by C. A. Luer.

Acianthera dichroa (Rchb.f.) F.Barros & L.Guimarães, Neodiversity 5: 28 (2010), ***syn. nov.***

Study of the type specimen of *Pleurothallis dichroa* has shown that this species is a synonym of the common and showy *Pleurothallis strupifolia* [=*Acianthera strupifolia*].

Pleurothallis dichroa was described by Reichenbach in 1865 based on a collection received from Stuart Henry Low in 1863. Stuart was the younger son of Hugh Low (1793–1863), founder of Hugh Low & Co., a famous nursery at Upper Clapton, London. He received the specimen from his plant collector in Brazil, Henry Blunt. Three herbarium sheets labeled as *Pleurothallis dichroa* are found in the Reichenbach orchid herbarium at W. One of them, numbered 21887 (Fig. 5), contains a specimen and a colored illustration accompanied by a short description in Reichenbach's almost illegible handwriting. It is labeled "Low 63," the number 63 meaning the year (1863) he received it from Low. The other two sheets are numbered 41142 (Fig. 6) and 18556 (Fig. 7). The former bears a sketch, description and notes, also in Reichenbach's almost illegible handwriting. On the upper right side of these notes the number "258" can be read. The latter sheet, numbered

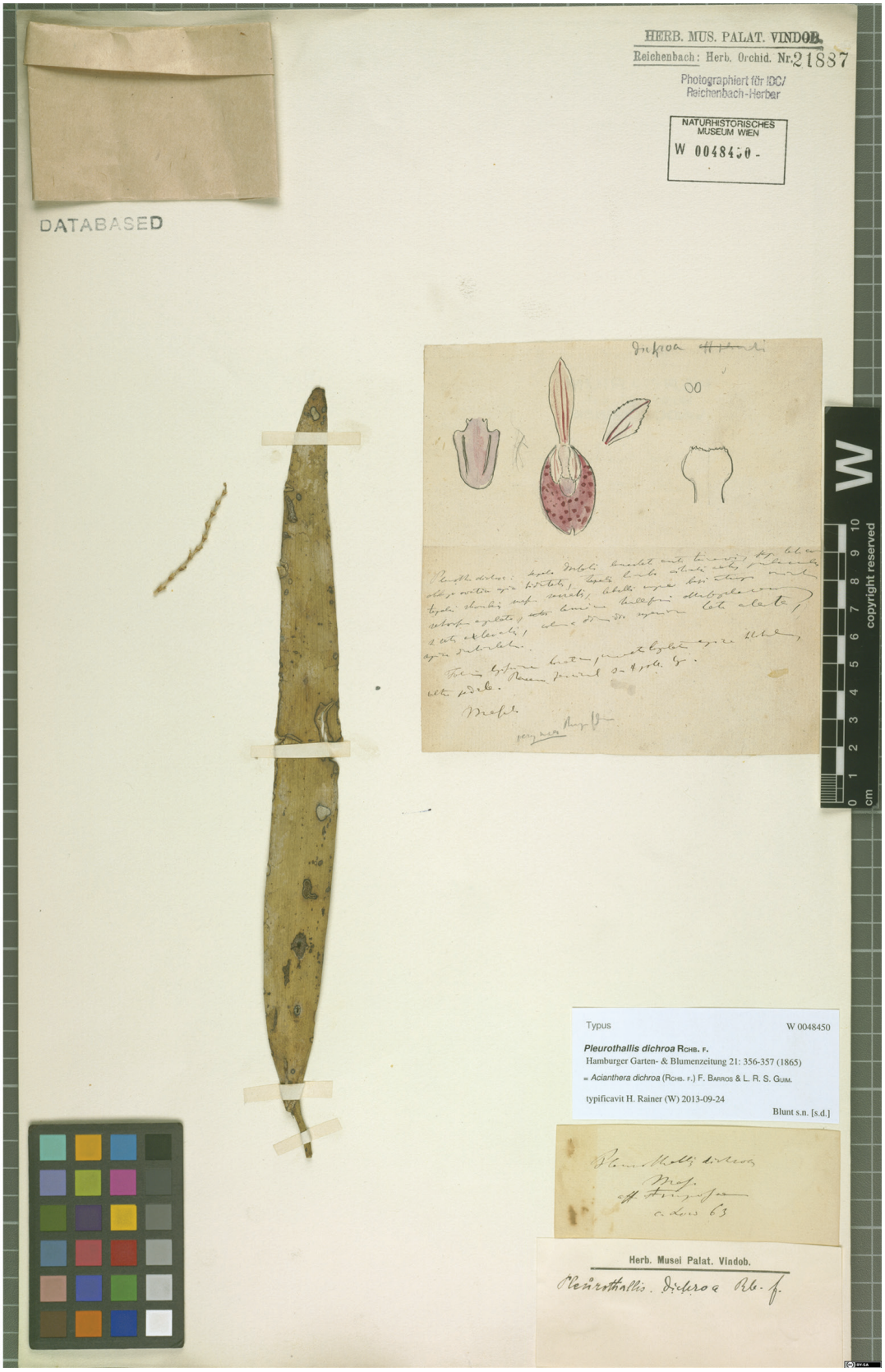

FIGURE 5. *Acianthera strupifolia* (Lindl.) Pridgeon & M.W.Chase. Holotype of *Pleurothallis dichroa* Rchb.f., herbarium sheet 21887, in Reichenbach Orchid Herbarium at W. By permission of the Keeper, Herbarium Natural History Museum in Vienna.

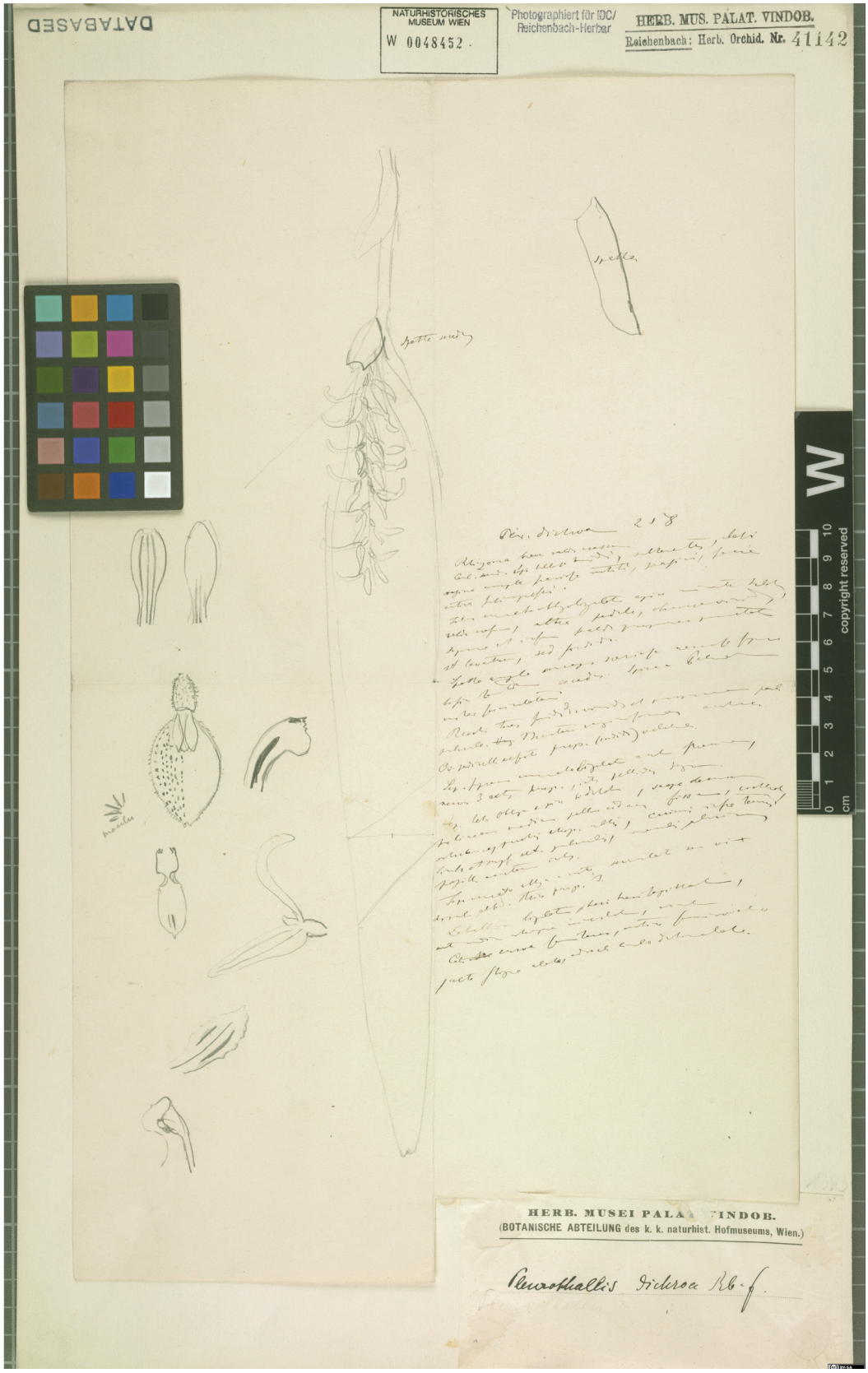

FIGURE 6. *Acianthera strupifolia* (Lindl.) Pridgeon & M.W.Chase. Herbarium sheet 41142 of *Pleurothallis dichroa* Rchb.f., Reichenbach Orchid Herbarium at W. By permission of the Keeper, Herbarium Natural History Museum in Vienna.

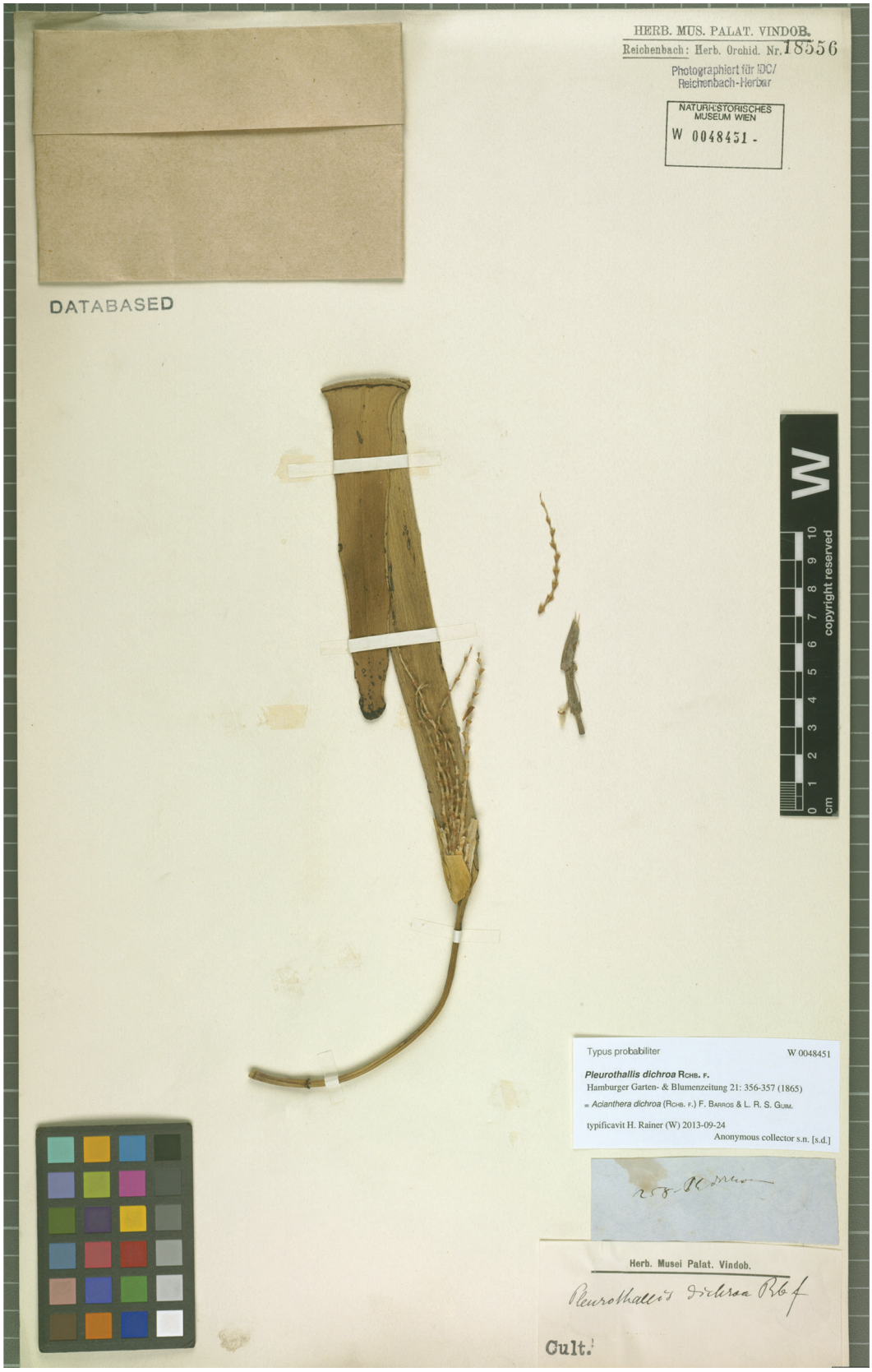

FIGURE 7. *Acianthera strupifolia* (Lindl.) Pridgeon & M.W.Chase. Herbarium sheet 18556 of *Pleurothallis dichroa* Rchb.f., Reichenbach Orchid Herbarium at W. By permission of the Keeper, Herbarium Natural History Museum in Vienna.

18556, contains an actual specimen and is labeled "258 Pl. dichroa" in Reichenbach's handwriting. The number "258" is most certainly not Blunt's collection number, but an identification number applied to each live specimen at Low's nursery (L. A. Garay 2013, pers. comm.). The cross-labelling on the herbarium sheets 41142 and 18556 in Reichenbach herbarium indicates that these two sheets with a "Blunt's number," one containing the drawings and the other a specimen, refers to the same collection. Following standard practice of his time, Reichenbach did not explicitly cite the word "type" (or "typus") in the protologue of *Pleurothallis dichroa*. However, he explicitly cited that he received the plant from Low in 1863 and that it had been collected by Blunt. All three herbarium sheets mentioned here seem to constitute original material and might have been used by Reichenbach to base his description. Nonetheless, the herbarium sheet 21887 is the only one which contains unambiguous information that agrees with the protologue (Low's name and the year Reichenbach received the specimen), apart from agreeing with the original description. It is therefore here interpreted as the actual holotype of *Pleurothallis dichroa*. Blunt's name is also cited in the protologue but no number is mentioned in the original description.

The name *Restrepia liebmanniana* Kraenzl. has been usually cited in the synonymy of *Acianthera strupifolia* (e.g. Barros *et al*. 2015; Govaerts et al. 2015) but this Mexican species is a distinct taxon. It is actually a synonym of *Pleurothallis spectrilinguis* Rchb.f. [= *Muscarella marginata* (Rich.) Luer] and it is therefore here excluded from the synonymy of *Acianthera strupifolia*.

Additional specimens examined: BRAZIL. Without locality: *Blunt 258* (W [R-18556 and R-41142, drawings and notes]). Rio de Janeiro: Carmo, Rio Paquequer, date not given, *Neves-Armond 120* (BR). Espírito Santo: Serra do Castelo, near Alto Ribeirão do Meio, alt. 1000 m, cultivated at Fazenda Capijuma, November 2002, *M. Frey 282* (SEL), C. Luer illustr. 20253. Santa Catarina: Ilha de Santa Catarina, Saco Grande, 24 January 1969, *R.M. Klein 8131* (M).

Anathallis aristulata (Lindl.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 118. 2007. Fig. 8–10.

Basionym: *Pleurothallis aristulata* Lindl., Fol. Orchid. 9: 41. 1859. TYPE: BRAZIL. Rio de Janeiro, *J. Miers .n*. (Holotype: K [000885711]; Isotype: BR [658536]).

Synonyms: *Lepanthes crebrifolia* Barb.Rodr., Gen. Spec. Orchid. 2: 67. 1881, ***syn. nov.*** TYPE: BRAZIL. Rio de Janeiro: near Rodeio, flowered in November, *J. Barbosa Rodrigues s.n*. [Holotype: Lost; Lectotype here designated: Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 6, tab. 298, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 611 (unpubl.) in Barb.Rodr. loc.cit; copied and reprod. in black and white in Cogn., Fl. Bras. (Mart.) 3(4), tab. 98, fig. 3. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 426, fig. E].

Pleurothallis crebrifolia (Barb.Rodr.) Cogn., Fl. Bras. (Mart.) 3(4): 483. 1896, ***syn. nov.***

Pleurothallis montipelladensis Hoehne, Arch. Inst. Biol. Defesa Agric. 2: 36. 1929, ***syn. nov.*** TYPE: BRAZIL. São Paulo: Morro Pellado, January 1901, *G. Edwall ex Comissão Geográfica e Geológica de São Paulo 6020* (SP [22463]).

Specklinia crebrifolia (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 259. 2004, ***syn. nov.***

Anathallis montipelladensis (Hoehne) F.Barros, Bradea 8: 295. 2002, ***syn. nov.***

Specklinia aristulata (Lindl.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 258. 2004, ***syn. nov.***

Specklinia montipelladensis (Hoehne) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 262. 2004, ***syn. nov.***

Anathallis ourobranquensis Campacci & Menini, Bol. Bol. CAOB 60: 123. 2005 (publ. 2006), ***syn. nov.*** TYPE: BRAZIL. Minas Gerais, Ouro Branco, alt. 1500 m, flowered in cultivation, 24 October 2004, *M.A. Campacci MAC-1679* (Holotype: SP [not seen]).

Anathallis crebrifolia (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 118. 2007, ***syn. nov.***

John Lindley described *Pleurothallis aristulata* [= *Anathallis aristulata*] based on a John Miers's collection from the state of Rio de Janeiro. The holotype specimen is kept in Lindley herbarium at K. We have recently examined it and an illustration (Fig. 8) has been prepared by one of us (CAL). We have also examined an isotype deposited at BR. Comparison of these collections with illustrations, collections, and protologues of *Lepanthes crebrifolia*, *Pleurothallis montipelladensis*, and *Anathallis ourobranquensis*, shows that they are all conspecific.

Anathallis aristulata is a widespread species in eastern Brazil, found from Rio Grande do Sul, in the south, to the interior of Bahia, in the northeast. It inhabits the moist Atlantic forests and usually grows as epiphytes in shade places at low (ca. 200 m) or moderate altitudes (700–1000 m). It also grows at higher altitudes (1000–1600 m) in open spaces, either as lithophytes or epiphytes exposed to cold temperatures during the night and plenty of sunshine during the day. When growing in protected areas, plants of *A. aristulata* possess elongate ramicauls and dorsiventrally flattened, elliptical or spathulate, green leaves. When growing in open, exposed places, however, they may have much shorter, usually inconspicuous ramicauls and the leaves are reduced, thicker and fleshier, sometimes almost orbicular and subcylindrical, and occasionally yellowish. Variations from one extreme to another may occasionally be found in the same individual. Inflorescence and floral morphology are, however, much less variable and quite uniform throughout its distribution range. There are usually two, occasionally three, yellow to greenish-yellow flowers on a solitary raceme. In specimens with thicker leaves the inflorescence usually exceeds the leaves, but it can be much shorter in those specimens with longer, thinner leaves. Sepals and petals are somewhat similar and acute, and the lip, usually minutely papillose towards the base, is slightly three-lobed with lateral lobes below the middle. Figures 9–10 illustrate some variants of *Anathallis aristulata*.

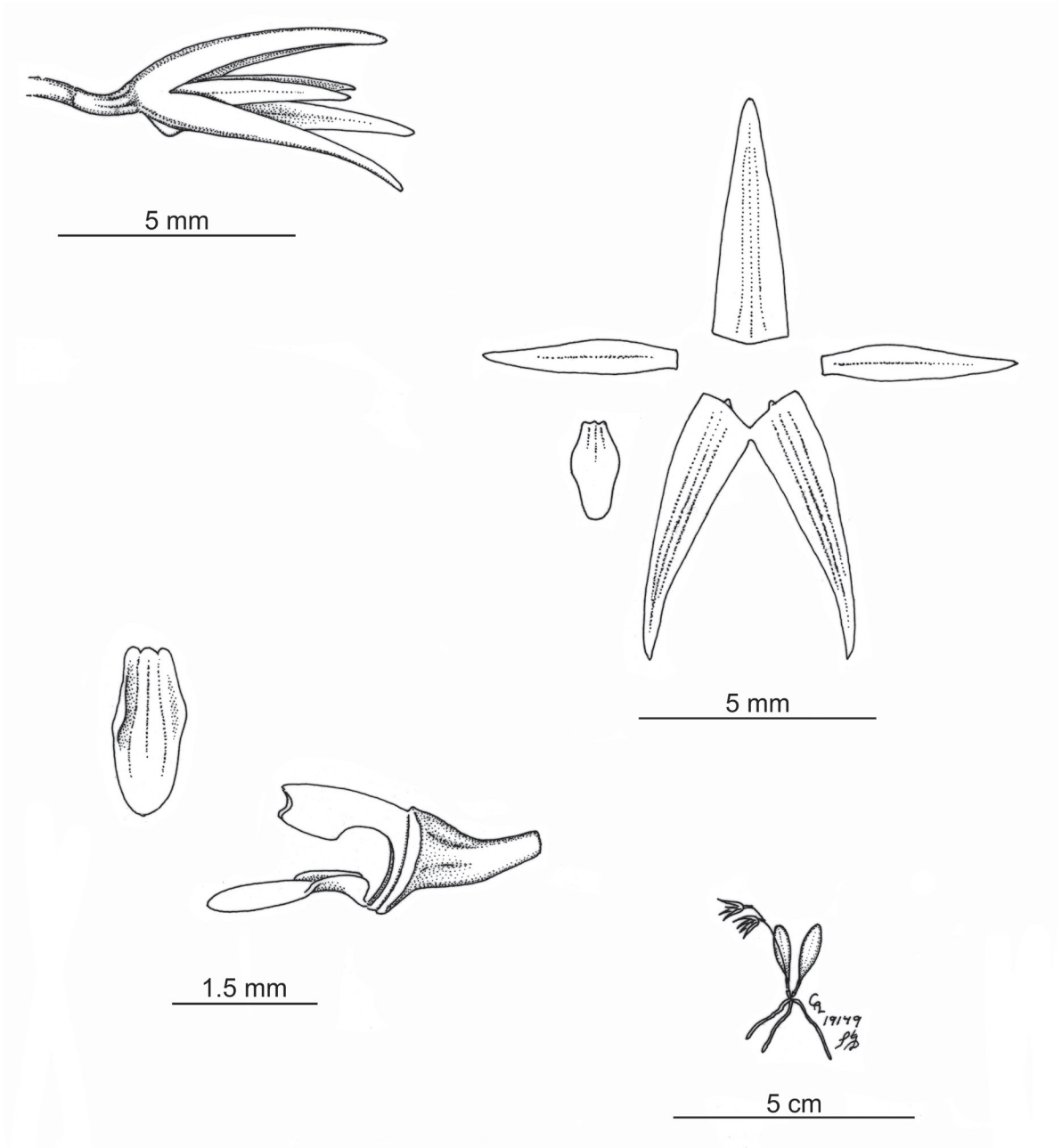

FIGURE 8. *Anathallis aristulata* (Lindl.) Luer. Based on the holotype of *Pleurothallis aristulata* Lindl, *J. Miers s.n.* (K). Drawn by C. A. Luer.

Additional specimens examined: BRAZIL. Bahia: Rio de Contas, Pico das Almas, alt 1500 m, 25 December 1988, *R.M. Harley & D.J.N. Hind 27369* (K), C. Luer illustr. 19144. Espírito Santo: Vargem Alta, collected in 1949, flowered in cultivation, 20 December 1950, *A.C. Brade 20560* (RB). Minas Gerais: without collection data, flowered in cultivation by Wladyslaw Zaslawski in 1983, *A. Toscano de Brito 1584* (SEL), C. Luer illustr. 21578; Bejamim Constant, collected in 1934, flowered in cultivation at Rio Botanical Garden, 14 January 1936, *P.P. Horta s.n.* (RB). Rio de Janeiro: Above Petrópolis, alt. 1500 m, sold by Verboonen at EOC, in NJ, 21 October 1988, *C. Luer 13757* (SEL). Rio Grande do Sul: Itati, Barata, 170 m, 15 August 2010, *J. Klein 057* (UPCB, spirit). Santa Catarina: cultivated in Corupá by Orquidário Alvim Seidel, presumably collected locally, 22 March 2007, *D.H. Baptista s.n.* (SEL), C. Luer illustr. 21178. Without collection data: *W.J. Burchell 2097* (K).

Anathallis heterophylla Barb.Rodr., Gen. Spec. Orchid. 2: 74. 1881. TYPE: BRAZIL. Rio de Janeiro: Serra de Santa Anna, flowered in May, *J. Barbosa Rodrigues s.n.* (Holotype: [Lost]; Lectotype here designated: Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 3, tab. 181, fig. B, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 658 (unpubl.) in Barb.Rodr. loc.cit; copied and reprod. in black and white in Cogn., Fl.

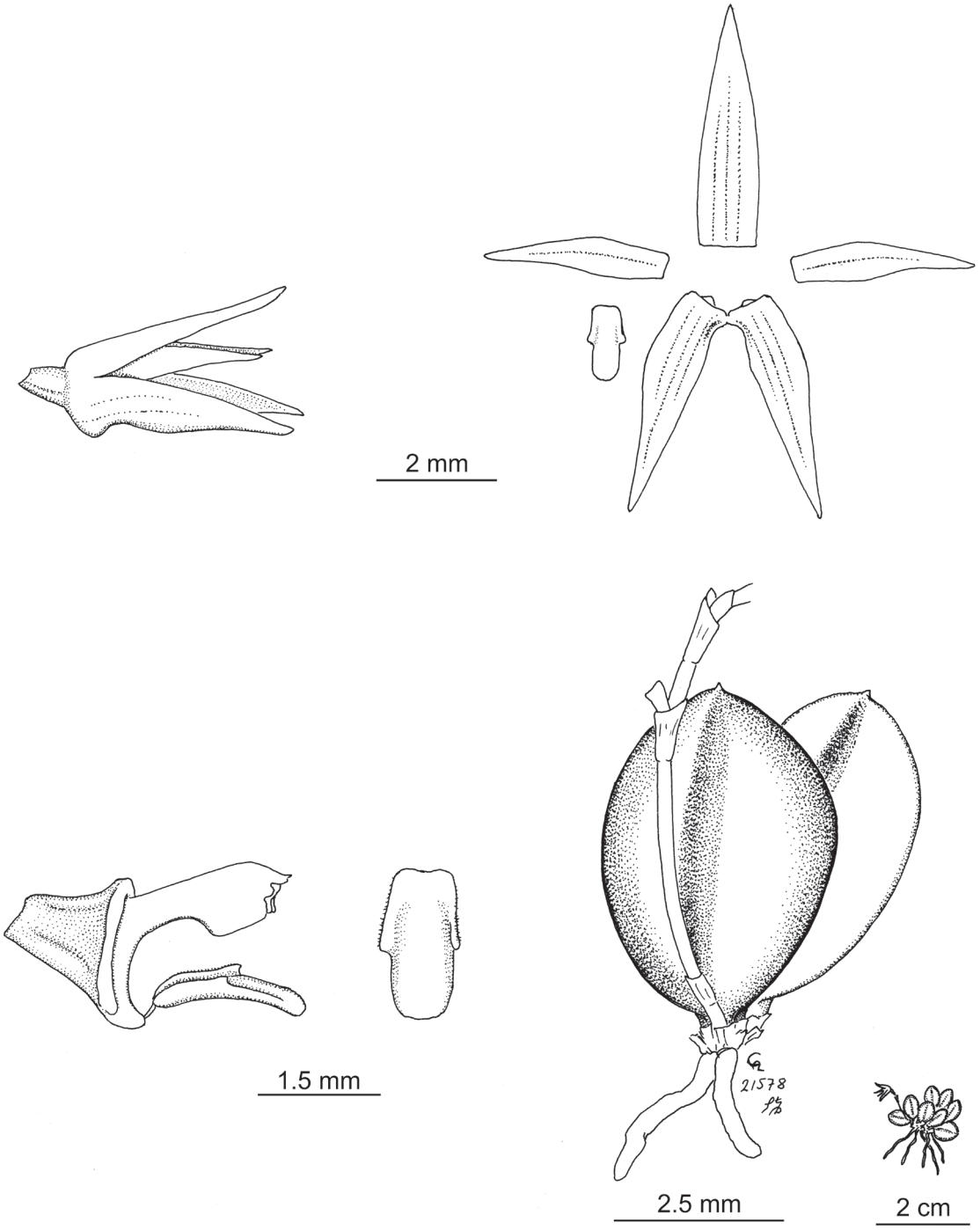

FIGURE 9. *Anathallis aristulata*. (Lindl.) Luer. Based on *A. Toscano de Brito 1584* (SEL). Drawn by C. A. Luer.

Bras. (Mart.) 3(4), tab. 3, fig. 1. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 239, fig. B).

Synonyms: *Pleurothallis liparanges* Rchb.f., Gard. Chron., n.s., 23: 532. 1885, ***syn. nov.*** TYPE: BRAZIL. Without locality: obtained from *G.M. Binot*, flowered in cultivation at Leiden Botanical Garden, *H. Witte s.n.* (Holotype: W [R-45888]; Isotype: AMES [69074, fragment]).

Pleurothallis heterophylla (Barb.Rodr.) Cogn., Fl. Bras. (Mart.) 3(4): 556. 1896.

Pleurothallis hoehnei Schltr., Arch. Bot. São Paulo 1: 215. 1926. TYPE: BRAZIL. São Paulo: Estação Biológica Alto da Serra, 5 May 1921, *A. Gehrt s.n.* (Holotype: B [destroyed]; Lectotype: designated by Barros (2004): SP [5542]; Isolectotypes: AMES [54816 and 118513]; HB [2739, not seen]).

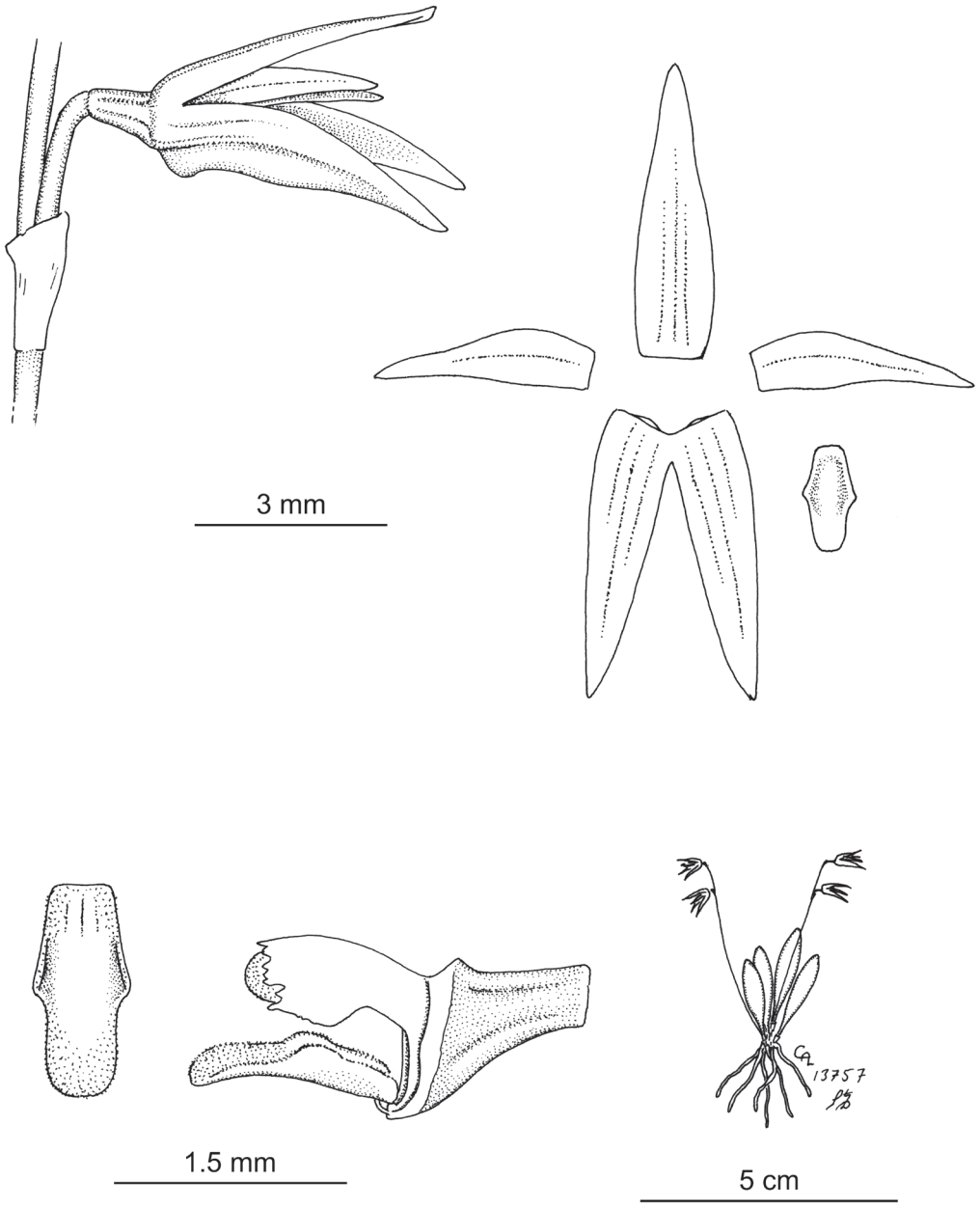

FIGURE 10. *Anathallis aristulata*. (Lindl.) Luer. Based on *C. Luer 13757* (SEL). Drawn by C. A. Luer.

Specklinia heterophylla (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 261. 2004, ***syn. nov.***

Specklinia liparanges (Rchb.f.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 261. 2004, ***syn. nov.***

Anathallis liparanges (Rchb.f.) Luer, Novon 18: 78. 2008, ***syn. nov.***

Examination of the holotype of *Pleurothallis liparanges* deposited at W confirms that this species is conspecific with *Anathallis heterophylla* as stated in Barros *et al*. (2015). However, this name is actually a later synonym published four years after the publication of *Anathallis heterophylla*.

The type specimen of *Anathallis heterophylla* is lost and the only extant original material is the illustration that appeared in Barbosa Rodrigues's *Iconographie des orchidées du Brésil*, which 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 reproduced in color in Sprunger et al. (1996). It is here selected as lectotype.

Anathallis johnsonii Luer & Toscano, Harv. Pap. Bot. 16(2): 365. 2011. TYPE: ARGENTINA. Misiones: Departmento San Pedro, El Piñalito, Arroyo Manduri, 750 m,

collected 6 January 1991, flowered in cultivation 10 March 1991, *A. Johnson 0171* (MO), C. Luer illustr. 18109.

The type specimen of *Anathallis johnsonii* was discovered by the late Andrés E. Johnson (1956–2009) and sent to one of us (CAL) for identification in December 1996. The specimen remained unnamed for 15 years and was only recently recognized as new and finally published in 2011. Johnson's correspondence did not provide specific locality and the original label, which accompanied the specimen, had been, unfortunately, lost. While studying additional collections by Johnson, we rediscovered the original label of the type specimen of *Anathallis johnsonii*. It contains precise location and additional ecological information on this species. The type citation of *Anathallis johnsonii* is, therefore, herewith corrected and should be cited as above. This species was found near a small stream growing as an epiphyte on upper branches of *Luehea divaricata* Mart. (Malvaceae). The bases of sepals and petals are yellowish with the tips magenta. The tip and sides of the lip are also magenta, and the center is yellow.

First described for Argentina, this species has recently been discovered in the Brazilian state of Rio Grande do Sul. It is herewith formally recorded for Brazil. A series of photographs based on this collection can be found in the following website: http://www.orquideasgauchas.net/P_desc_especie.php?cod_especie=480

Additional specimens examined: BRAZIL. Rio Grande do Sul. Cambará do Sul, 19 July 2014, *A. Toscano de Brito, L.F. Varella, J. Klein & S. Kuhn 3267* (UPCB).

Anathallis lobiserrata (Barb.Rodr.) Luer & Toscano, Monogr. Syst. Bot. Missouri Bot. Gard. 115: 259. 2009. Fig. 11–12.

Basionym*: Lepanthes lobiserrata* Barb.Rodr., Gen. Spec. Orchid. 2: 63. 1881. TYPE: BRAZIL. Rio de Janeiro: Rodeio, flowered in January, *J. Barbosa Rodrigues s.n.* [Holotype: Lost; Lectotype selected by Barros and Barberena (2010): Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 6, t. 298, fig. F, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 617 (unpubl.) in Barb.Rodr. loc. cit; copied and reprod. in black and white in Cogn., Fl. Bras. (Mart.) 3(4), tab. 92, fig. 4. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 426, fig. F].

Synonyms: *Anathallis nectarifera* Barb.Rodr., Gen. Spec. Orchid. 2: 74. 1881, ***syn. nov.*** TYPE: BRAZIL. Rio de Janeiro: Serra do Mar, flowered in May, *J. Barbosa Rodrigues s.n.* [Holotype: Lost; Lectotype here designated: Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 3, tab. 145, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 538 (unpubl.) in Barb.Rodr. loc.cit; copied and reprod. in black and white in Cogn., Fl. Bras. (Mart.) 3(4), tab.111, fig. 4. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 203].

Pleurothallis lobiserrata (Barb.Rodr.) Cogn., Fl. Bras. (Mart.) 3(4): 438. 1896.

Pleurothallis nectarifera (Barb.Rodr.) Cogn., Fl. Bras. (Mart.) 3(4): 560. 1896, ***syn. nov.***

Pleurothallis githaginea Pabst & Garay, Arch. Jard. Bot. Rio de Janeiro 14: 12. 1956, ***syn. nov.*** TYPE: BRAZIL. Rio de Janeiro: Serra da Carioca, near Trapicheiro, 300 m, cultivated at Rio de Janeiro Botanical Garden, collector unknown, flowered in July 1952, *G. Pabst 1689* (Holotype: RB [81252]; Isotype: AMES [118516]; HB [1689, not seen]).

Anathallis githaginea (Pabst & Garay) Pridgeon & M.W.Chase, Lindleyana 16: 248. 2001, ***syn. nov.***

Specklinia lobiserrata (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 261. 2004.

Specklinia githaginea (Pabst & Garay) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 260. 2004, ***syn. nov.***

Specklinia nectarifera (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 262, 2004, ***syn. nov.***

Panmorphia githaginea (Pabst & Garay) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 177. 2006, ***syn. nov.***

Panmorphia lobiserrata (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 177. 2006.

Anathallis bolsanelloi Chiron & V.P.Castro Richardiana 9(1): 4. 2008, ***syn. nov.*** TYPE: BRAZIL. Espírito Santo: Domingos Martins, Biriricas, 200–600 m, collected by R. Bolsanello s.n., *G. Chiron 08184* (Holotype: SP [not seen]).

Anathallis lobiserrata (Barb.Rodr.) F.Barros & Barbarena, Rodriguésia 61(1):128. 2010, *nom. illeg.*

Study of the protologues and original illustrations of *Lepanthes lobiserrata* [= *Anathallis lobiserrata*], *Anathallis nectarifera* and *Anathallis bolsanelloi*, and examination of the type specimens of *Pleurothallis githaginea* have shown that all these taxa belong within a same species concept. We did not examine the type specimen of *Anathallis bolsanelloi*, but the description, illustration, and photographs provided in the protologue leave no doubt that it also belongs here.

Anathallis lobiserrata is frequent in the Atlantic forests of Rio de Janeiro and Espírito Santo. It is recognized by its oblong-elliptical leaves, which are longer than the ramicauls, and the inflorescences which are much shorter than the leaves and usually produced in a fascicle of several racemes at the apex of the ramicauls. The short, few-flowered racemes produce up to ca. 6 successive flowers; a single open flower is found near the apex of the racemes. The lip is slightly three-lobed, the side lobes are round and erect with minutely pillose margins; a central, longitudinal callosity runs from the very base up to near the middle of the lip; at the middle or between the middle and the apical three-quarters of the lip there is also a pair of parallel, short, elongate callosities or elevations which are usually very faint and difficult to see without magnifying lenses. They were described and illustrated in the protologue of *Anathallis nectarifera*, but are missing in the original descriptions and illustrations of *Lepanthes lobiserrata*, *Anathallis bolsanelloi*, and *Pleurothallis githaginea*. Examination of a flower from an isotype at AMES has shown, however,

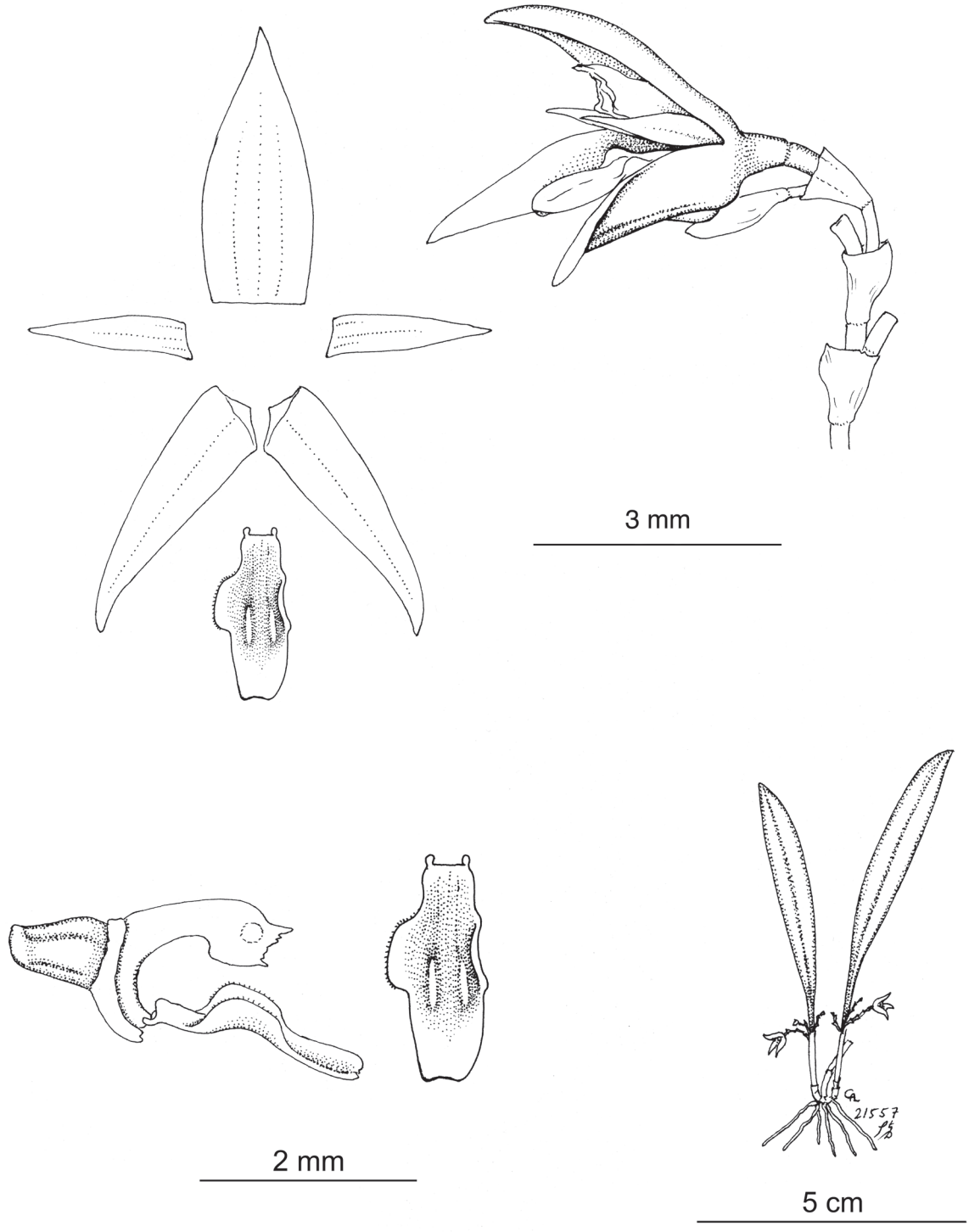

FIGURE 11. *Anathallis lobiserrata* (Barb.Rodr.) Luer & Toscano. Based on *A. Toscano de Brito 2020* (MBML). Drawn by C. A. Luer.

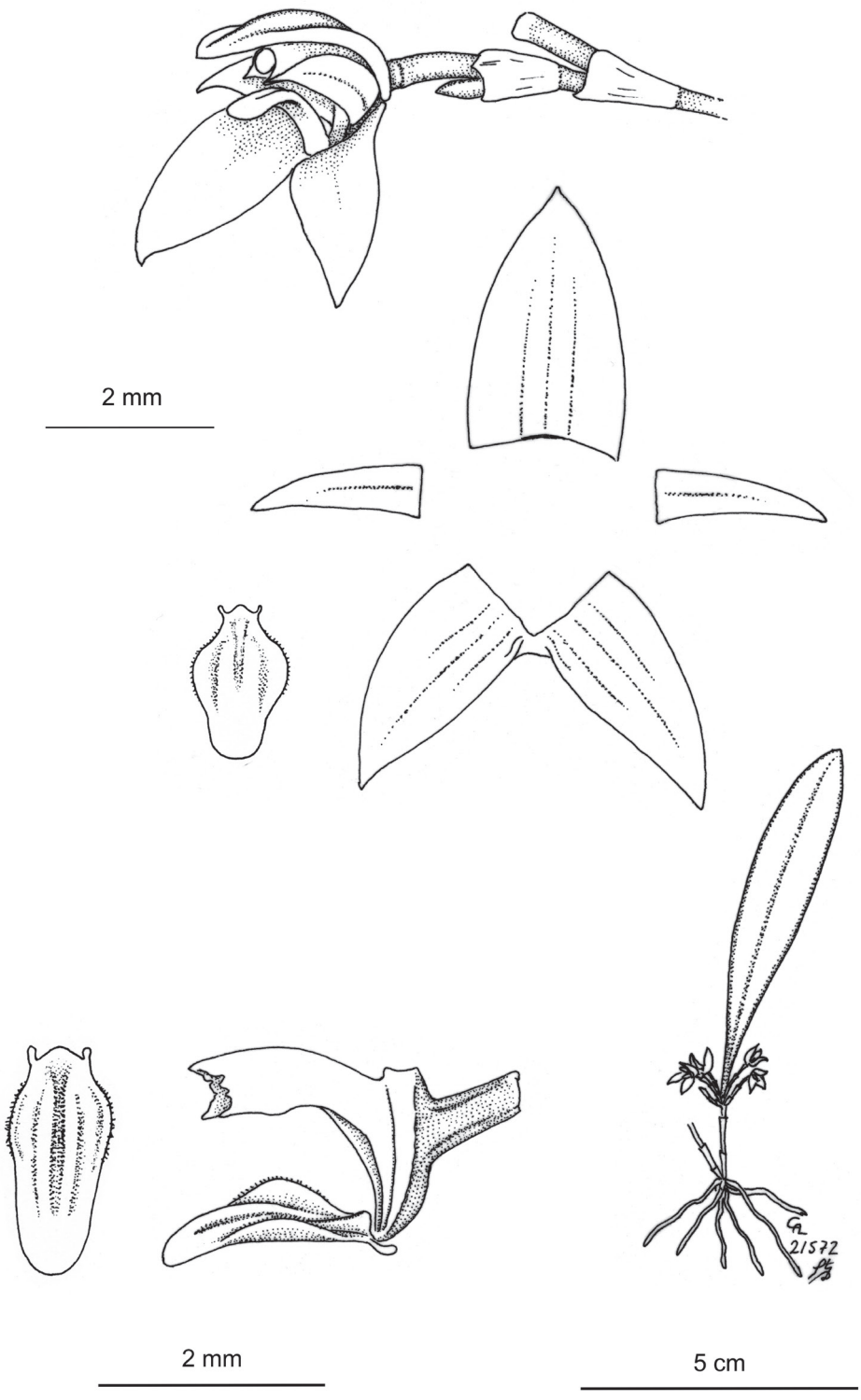

FIGURE 12. *Anathallis lobiserrata* (Barb.Rodr.) Luer & Toscano. Based on *A. Toscano de Brito 1483* (SEL). Drawn by C. A. Luer.

that these callosities are present on the lip of *Pleurothallis githaginea*. They are also present on the lip of *Anathallis bolsanelloi* and can be seen in a photograph of a flower in front view in the protologue of this species (Chiron & Castro Neto 2008: 17, fig. b). Figures 11–12 in the present work illustrate two collections from Espírito Santo.

The type specimen of *Anathallis nectarifera* is lost and the only extant original material is the illustration that appeared in Barbosa Rodrigues's *Iconographie des orchidées du Brésil*, which is now deposited in the library of Rio de Janeiro Botanical Garden. This illustration, which was copied and reproduced in black and white in Cogniaux (1896) and reproduced in color in Sprunger et al. (1996), is selected here as the lectotype.

Additional specimens examined: BRAZIL. Espírito Santo: Domingos Martins, 700 m, property of Roberto Kautsky, 15 April 1997, *A. Toscano de Brito 1483* (SEL), C. Luer illustr. 21572; same locality, flowered in cultivation by Roberto Kautsky 1059, 24 March 1999, *A. Toscano de Brito 2020* (MBML); Santa Teresa, Estação Biológica de Santa Lúcia, 10 Nov. 2000, *L. Kollmann et al. 3121* (MBML, SEL), C. Luer illustr. 20548.

Anathallis muscoidea (Lindl.) F.Barros & Barberena, Rodriguésia 61(1): 129. 2010. Fig. 13–14.

Basionym: *Pleurothallis muscoidea* Lindl., Edwards's Bot. Reg. 24(Misc.): 89. 1838. TYPE: BRAZIL. Without locality: *C. Loddiges s.n.* (Holotype: K [000885710]).

Synomyms: *Lepanthes marginata* Barb.Rodr., Gen. Spec. Orchid. 2: 68. 1881, ***syn. nov***. TYPE: BRAZIL. Rio de Janeiro, Palmeiras, Pascoinha, flowered in October, *J. Barbosa Rodrigues s.n.* [Holotype: Lost; Lectotype selected by Barrros & Guimarães (2010): Barbosa Rodrigues's original illustration in Iconogr. Orchid. Brésil, vol. 3, tab. 133, fig. C, at the Library of Rio de Janeiro Botanical Garden, cited as tab. 677 (unpubl.) in Barb.Rodr. loc.cit; copied and reprod. in black and white in Cogn., Fl. Bras. (Mart.) 3(4), tab.98, fig.2. 1896; reprod. in color in Sprunger et al. (1996), vol. 1: 191, fig. C].

Humboldtia muscoidea (Lindl.) Kuntze, Revis. Gen. Pl. 2: 668. 1891.

Pleurothallis limbata Cogn., Fl. Bras. (Mart.) 3(4): 485. 1896, replacement name for *Lepanthes marginata* Barb.Rodr., ***syn. nov***.

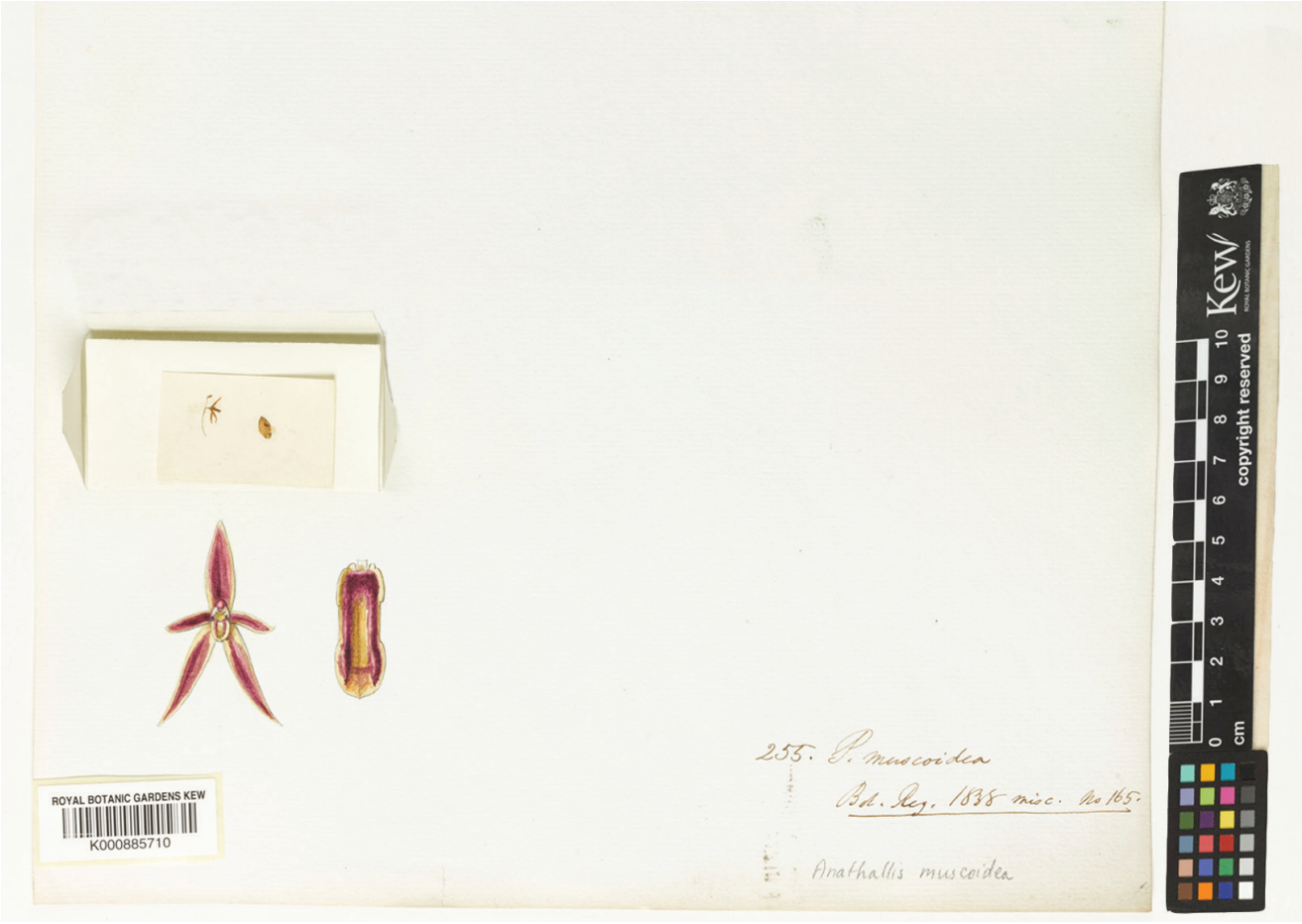

FIGURE 13. *Anathallis muscoidea* (Lindl.) F.Barros & Barberena. Holotype of *Pleurothallis muscoidea* Lindl. deposited in Lindley's herbarium at K. © The Board of Trustees of the Royal Botanic Gardens, Kew. Reproduced with permission.

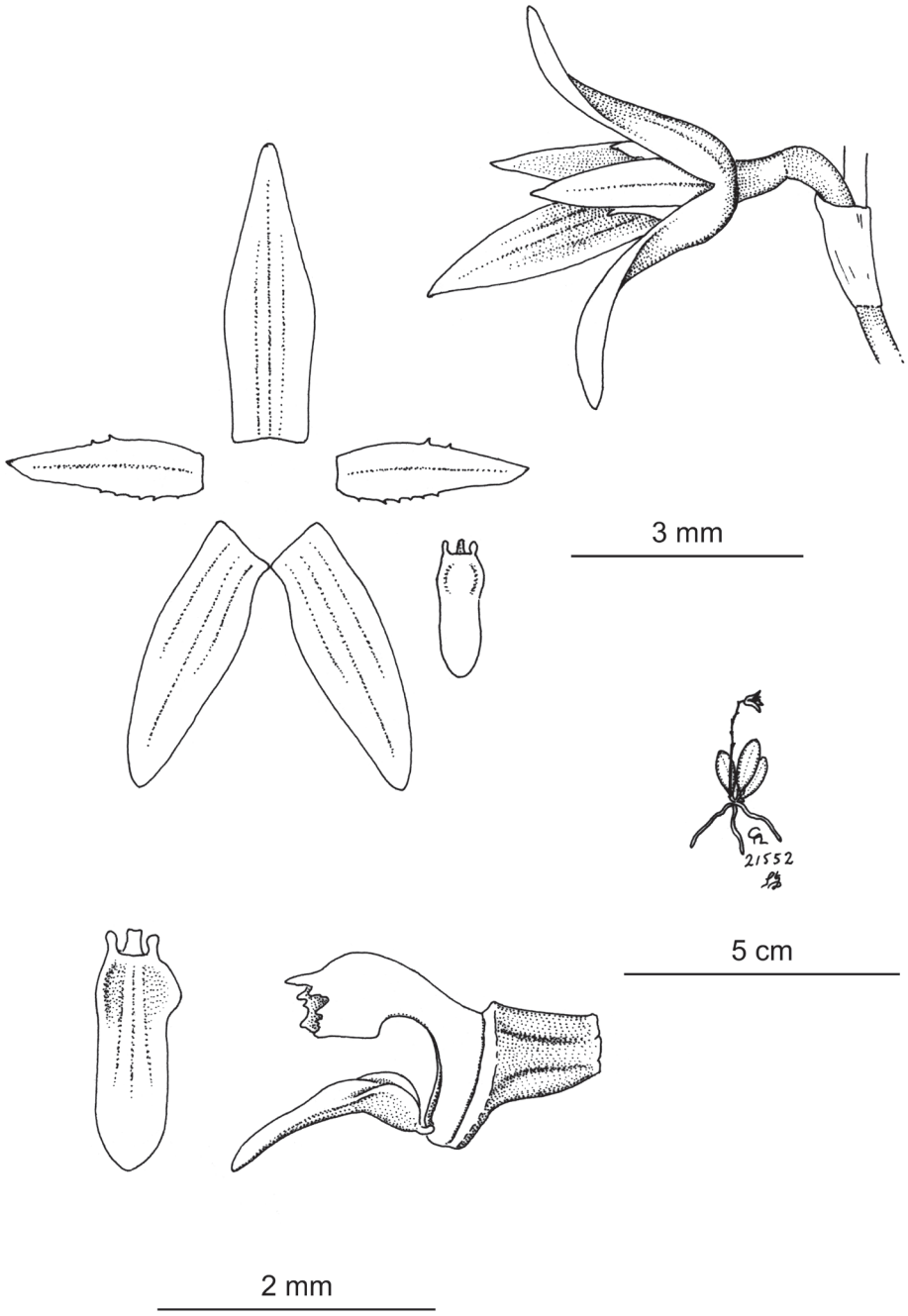

FIGURE 14. *Anathallis muscoidea* (Lindl.) F.Barros & Barberena. Based on *A. Toscano de Brito 2575* (UPCB). Drawn C. A. Luer.

Specklinia limbata (Cogn.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 261. 2004, *nom. illeg.*

Specklinia muscoidea (Lindl.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 121. 2007.

Panmorphia limbata (Cogn.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 177. 2006, *nom. illeg.*

Anathallis limbata (Cogn.) Luer & Toscano, Monogr. Syst. Bot. Missouri Bot. Gard. 115: 258. 2009, *nom. illeg.*

Anathallis marginata (Barb.Rodr.) F.Barros & Barberena, Rodriguésia 61(1): 129. 2010 [before 15 Dec 2010], ***syn. nov.***

Anathallis marginata (Barb.Rodr.) F.Barros & L.R.S.Guim. Neodiversity 5(1): 30. 2010 [31 Dec 2010], *nom. illeg.*

Anathallis muscoidea (Lindl.) F.Barros & L.R.S.Guim. Neodiversity 5(1): 30. 2010 [31 Dec 2010], *nom. illeg.*

John Lindley described *Pleurothallis muscoidea* [=*Anathallis muscoidea*] based on a Brazilian collection he received from the Loddiges family. The type specimen is deposited at K and comprises a leaf and an inflorescence with only one tiny flower, all glued on a small piece of paper which is kept within an envelope. We were not able, for this reason, to dissect and properly examine that flower. However, a detailed watercolor of a flower prepared by Lindley is found on the herbarium sheet of *Pleurothallis muscoidea* (Fig. 13) and provides enough information for recognition of this species. It is conspecific with *Lepanthes marginata*, a later synonym first illustrated by Barbosa Rodrigues in his unpublished *Iconographie des Orchidées du Brésil*. Figure 14 presented herein illustrates a specimen from São Carlos in the state of São Paulo, southeast Brazil. Photographs and an illustration of a specimen from the same area, and most probably representing a duplicate of this same collection, were recently published by Ferreira et al. (2013) named as *Anathallis marginata*.

A lectoptification of *Lepanthes marginata* was proposed almost simultaneously by Barros and Barberena (2010) and Barrros and Guimarães (2010). The latter reference correctly selected Barbosa Rodrigues's original illustration, the only extant original material, as the lectotype of this species. For this reason, it must be the one to be accepted. Barros and Barberena (2010) failed to select Barbosa Rodrigues's actual, original illustration.

Additional specimens examined: BRAZIL. São Paulo: São Carlos, obtained from Dalton H. Baptista, flowered in cultivation, February 2010, *A. Toscano de Brito 2575* (UPCB), C. Luer illustr. 21552.

Anathallis paranaensis (Schltr.) Pridgeon & M.W.Chase, Lindleyana 17: 100. 2002. Fig. 15–19.

Basionym: *Pleurothallis paranaensis* Schltr., Notizbl. Bot. Gart. Berlin-Dahlem 7: 274. 1918. TYPE: BRAZIL. Paraná: without locality, flowered in cultivation in June 1918, *P. Dusén s.n.* (Holotype: B [destroyed]; Lectotype here designated: Schlechter's illustration reproduced in Feddes Repert. Spec. Nov. Regni Veg. 58, tab. 35, fig. 138. 1930. Epitype here designated: Rio de Janeiro: Friburgo, Alto Macaé, collected by R. Warren s.n., flowered in cultivation by Manning 94-0319, September 1997, *C. Luer 18557* (SEL).

Synonyms: *Pleurothallis microgemma* Schltr. ex Hoehne, Bol. Mus. Nac. Rio de Janeiro 12(2): 9. 1936, ***syn. nov.*** TYPE: BRAZIL. São Paulo, Iguape, Morro das Pedras, 20 November 1920, *A.C. Brade 8055* (Holotype: B [Lost], Lectotype here designated: HB [8232, not seen]; Brade's original drawings: HB).

Specklinia microgemma (Schltr. ex Hoehne) F.Barros, Hoehnea 10: 110. 1983 (publ. 1984), ***syn. nov.***

Anathallis microgemma (Schltr. ex Hoehne) Pridgeon & M.W.Chase, Lindleyana 16: 249. 2001, ***syn. nov.***

Specklinia paranaensis (Schltr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 262. 2004.

Panmorphia paranaensis (Schltr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 177. 2006.

Anathallis longiglossa Chiron & N.Sanson, Richardiana 10: 153 (2010), ***syn. nov.*** TYPE: BRAZIL. Espírito Santo: Conceição do Castelo, *G. Chiron 9858* (Holotype: MBML [41733]), C. Luer illustr. 21804.

Pleurothallis paranaensis [= *Anathallis paranaensis*] was described based on a specimen collected by *P. Dusén* in the state of Paraná. The original description lacks an illustration and the holotype was most certainly destroyed by the World War II bombing of the Berlin-Dahlem herbarium. Schlechter prepared a detailed illustration of a floral dissection of this species, but his original drawing remained unpublished until it was posthumously reproduced by Mansfeld (1930). The protologue does not mention any voucher other than the type and we were unable to locate any original material associated with the protologue except the illustration published in 1930. This illustration (Fig. 15) is here selected as the lectotype. As no information on the origin of Schlechter's drawings was provided in the 1930 publication, it could be argued that this illustration could have been based on a different specimen rather than on Dusén's collection. Here we share the opinion expressed by Buzatto et al. (2011) who, while investigating a similar case (*Capanemia angustilabia* Schltr.), found no reason to think otherwise. We have examined several specimens which fit nicely Schlechter's illustration and description. One of them, *C. Luer 18557* (Fig. 16) has been selected here as the epitype as it complements the lectotype illustration which is represented by a floral analysis.

Hoehne (1929) proposed an amendment to Schlechter's description of *Pleurothallis paranaensis* claiming that Schlechter had not correctly diagnosed it. He provided a Latin description and an illustration based on a different collection from São Paulo, *F. C. Hoehne s.n.* (SP 17176). Hoehne slightly altered the diagnostic features of this taxon and cited only his collection from São Paulo, which seems like he intended to exclude the type of *P. paranaensis*. However, he kept the same specific epithet and authority (Schlechter) meaning that he did not want to change the author citation of the name of the taxon. Therefore, he did not intend and effectively publish a new name, but only proposed an amendment to Schlechter's description. In 1936, Hoehne changed his opinion and concluded that the specimen he had used for amending Schlechter's description of *Pleurothallis paranaensis* actually represented an undescribed species. He described it as *Pleurothallis microgemma*, taking an unpublished name given by Schlechter, and cited a collection from Rio das Pedras, Iguape, in the state of São Paulo. This collection, whose flowers possess a characteristically emarginated lip, apparently existed in Germany and was destroyed during the bombing of Berlin-Dahlem herbarium (Barros, 2004). A duplicate of the specimen studied by Hoehne and Brade's original drawings cited and reproduced in the protologue are preserved at HB. The former is here selected as the lectotype of *Pleurothallis microgemma*. We have studied other collections which match well the protologue and Brade's original illustration of *Pleurothallis microgemma*, including specimens which have the characteristic emarginated lip shown in the prologue.

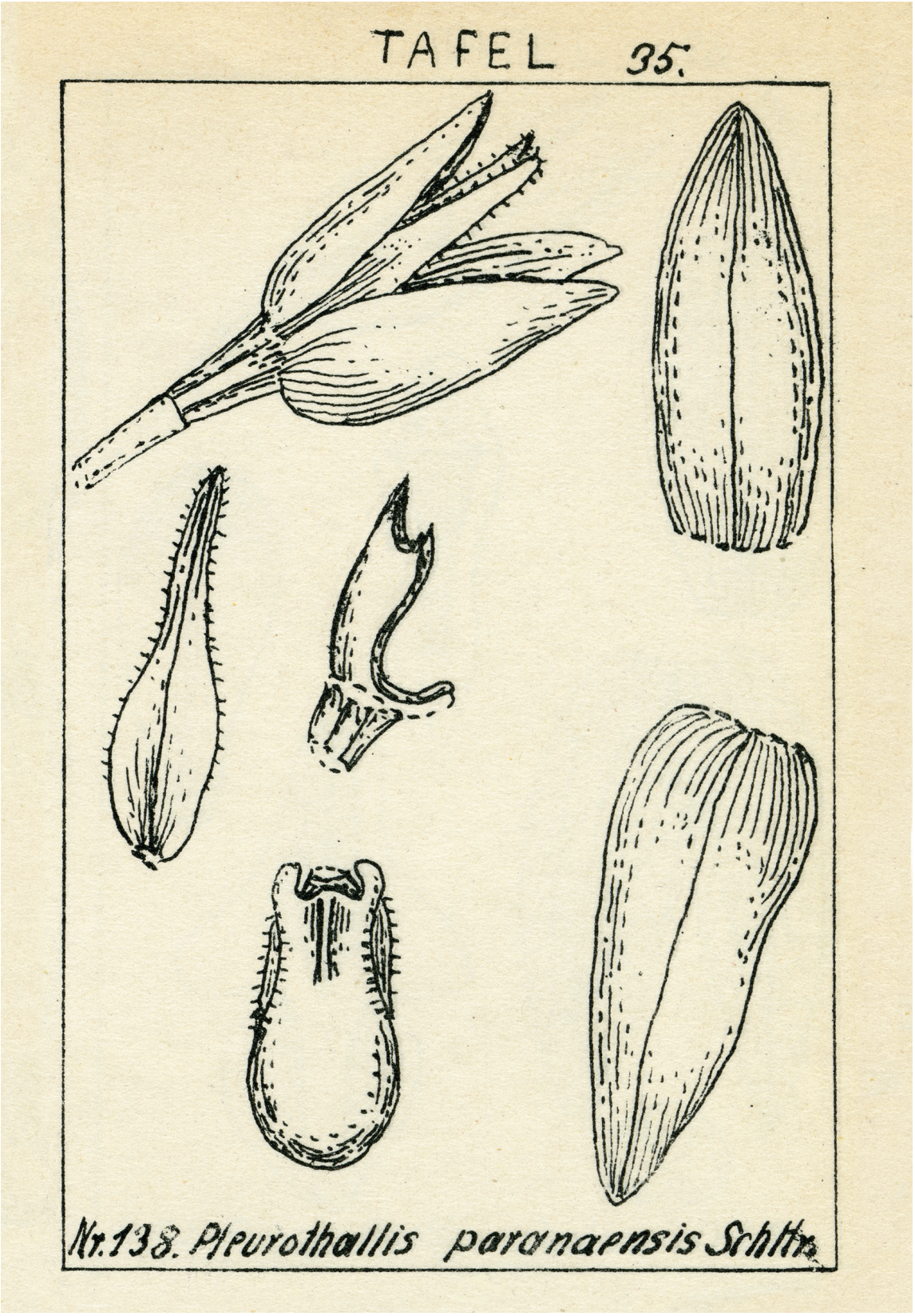

FIGURE 15. *Anathallis paranaensis* (Schltr.) Pridgeon & M.W.Chase. Lectotype of *Pleurothallis paranaensis* Schltr., selected here: Schlechter's illustration published by Mansfel in 1930.

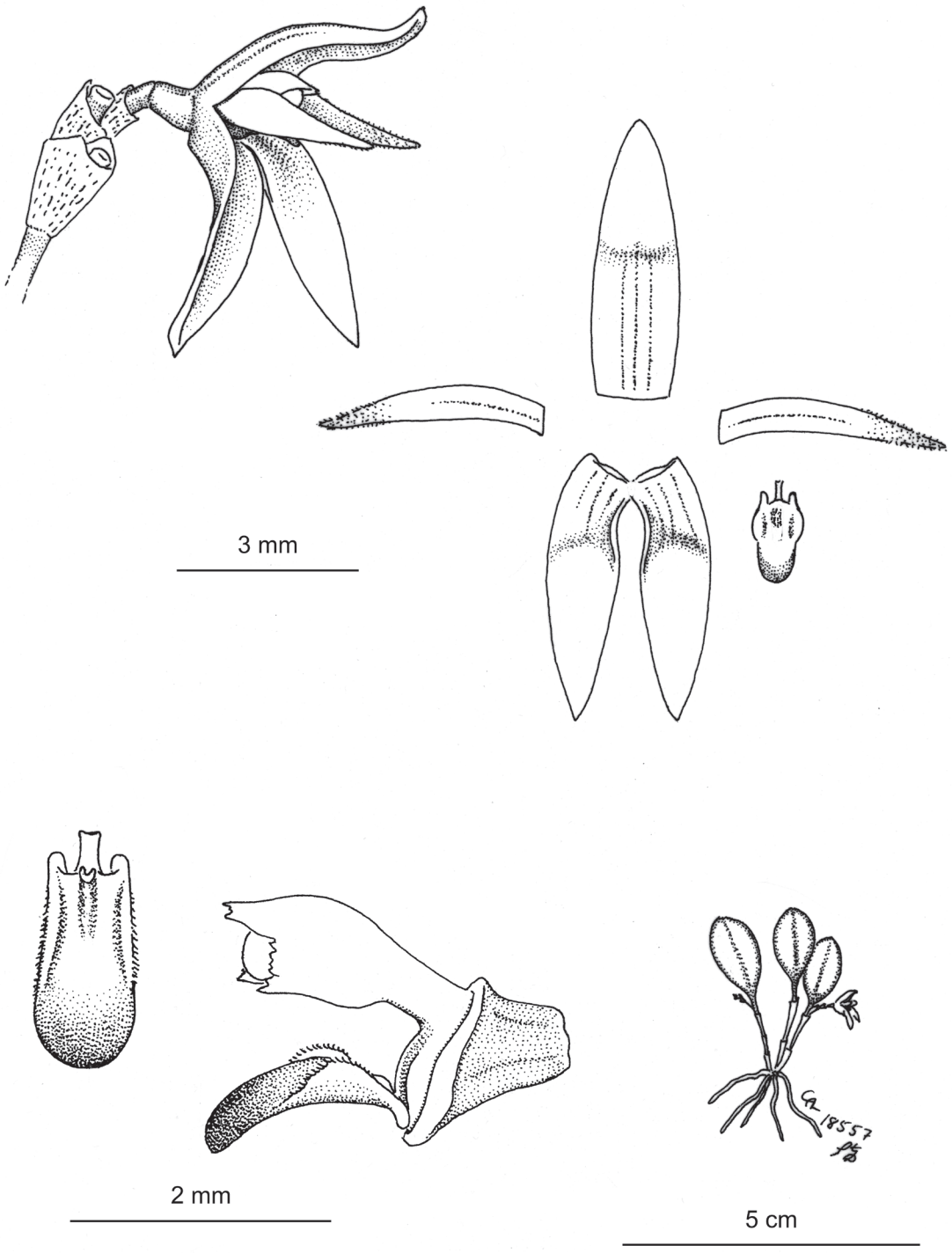

FIGURE 16. *Anathallis paranaensis* (Schltr.) Pridgeon & M.W.Chase. Based on the epitype of *Pleurothallis paranaensis* Schltr., here selected: *C. Luer 18557* (SEL). Drawn by C. A. Luer.

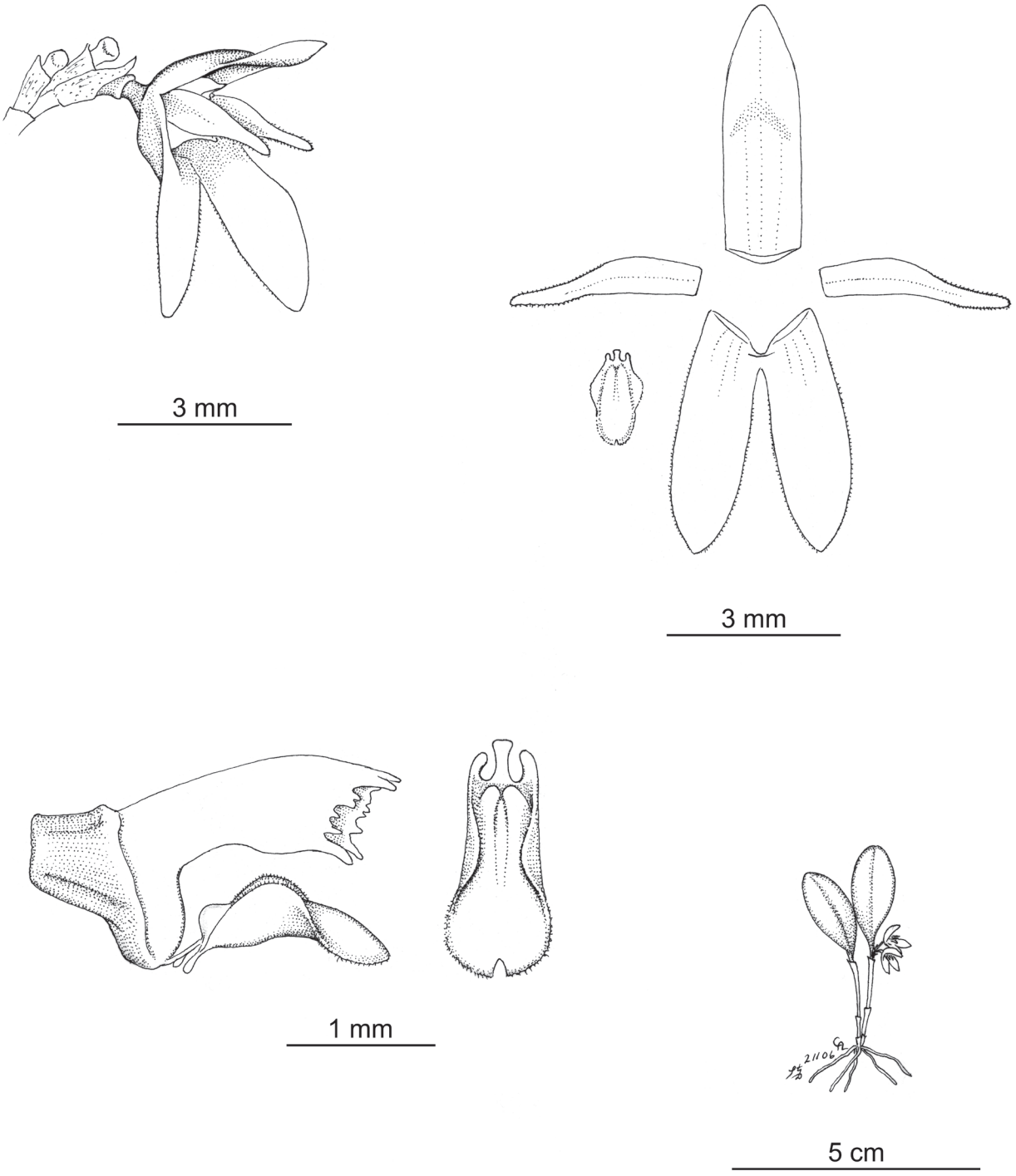

FIGURE 17. *Anathallis paranaensis* (Schltr.) Pridgeon & M.W.Chase. Based on a plant cultivated at *Orquidário Colibri s.n.*, C. Luer illustr. 21106. (SEL). Drawn by C. A. Luer.

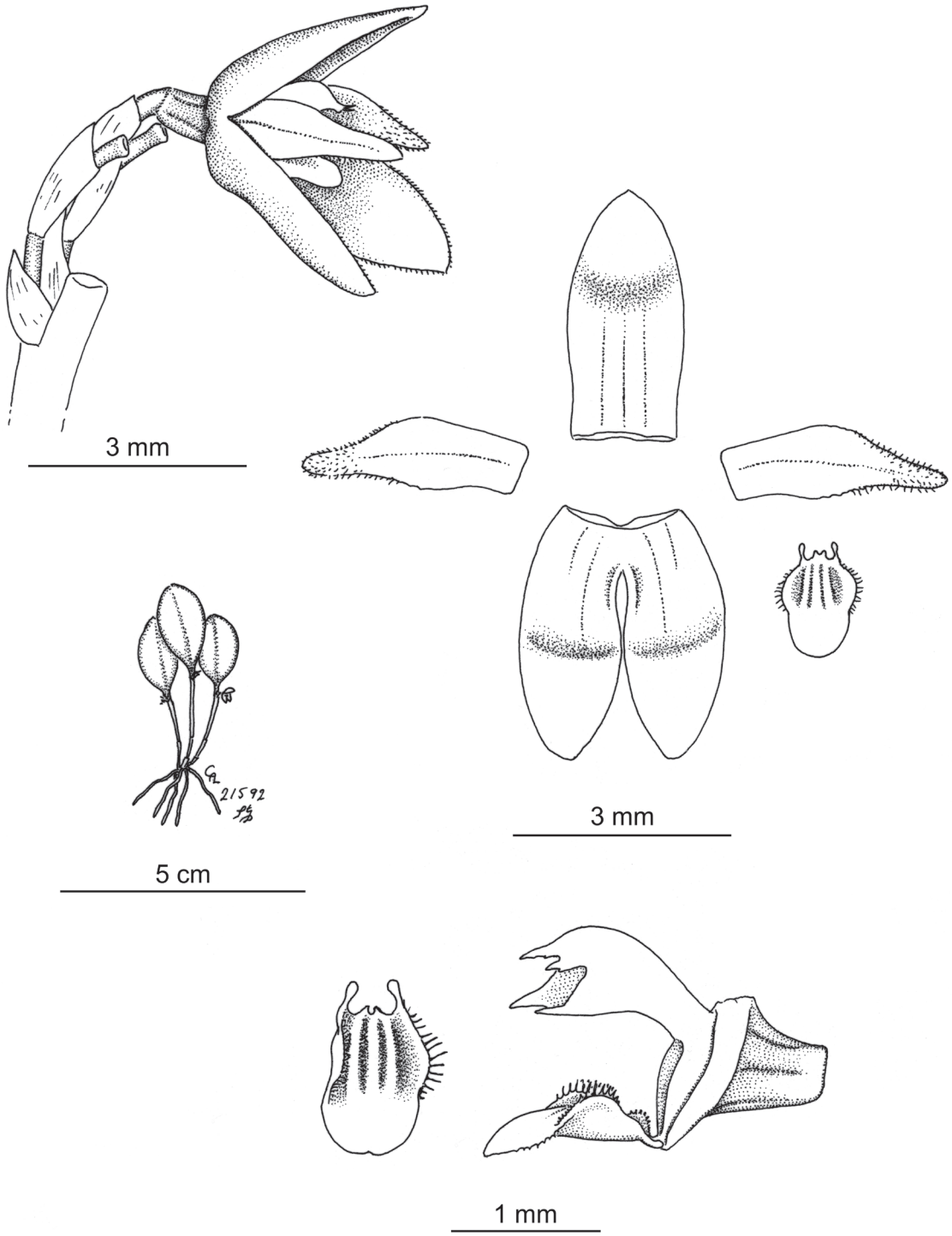

FIGURE 18. *Anathallis paranaensis* (Schltr.) Pridgeon & M.W.Chase. Based on *A. Toscano de Brito 2592* (HUEFS). Drawn by C. A. Luer.

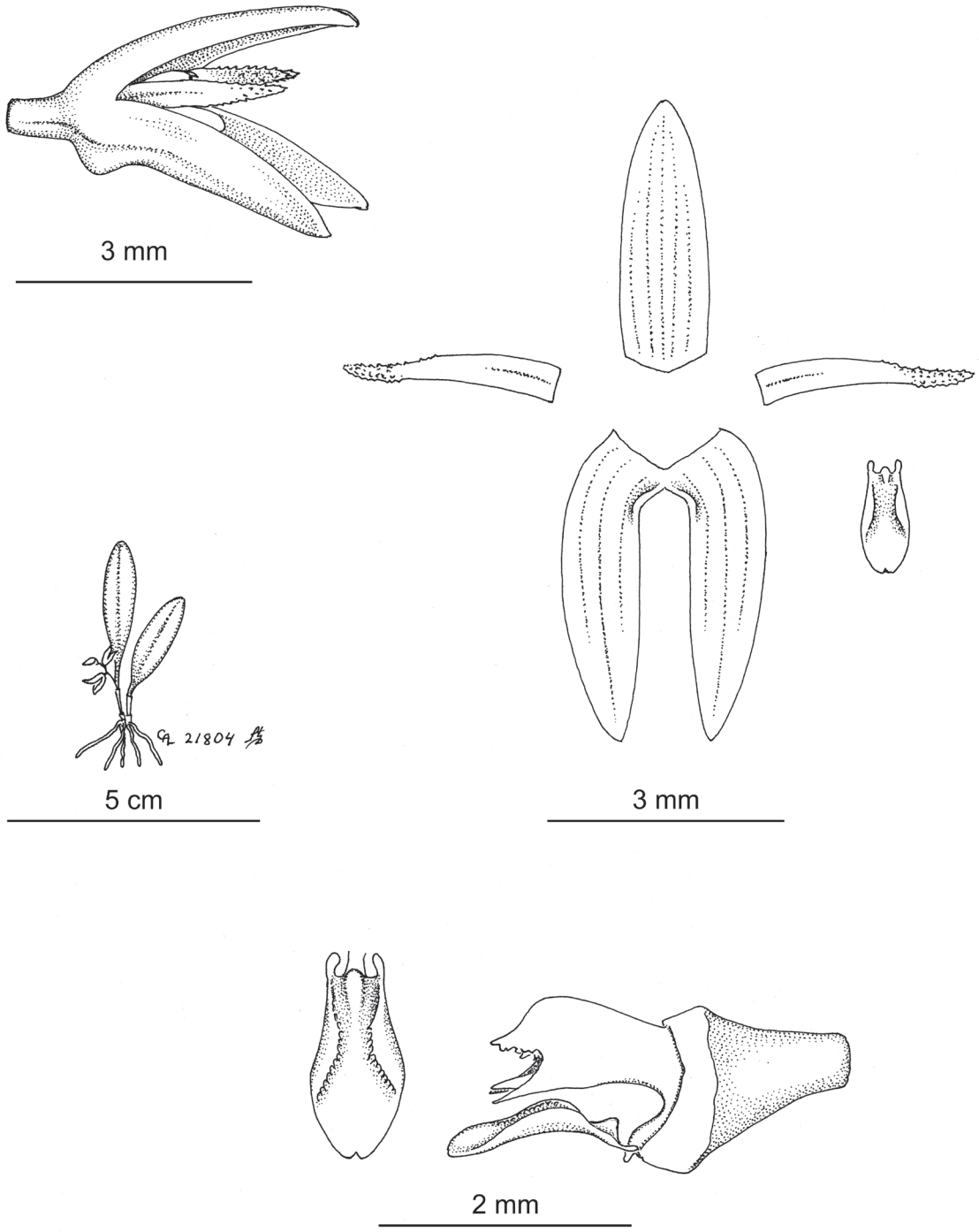

FIGURE 19. *Anathallis paranaensis* (Schltr.) Pridgeon & M.W.Chase. Based on the holotype of *Anathallis longiglossa* Chiron & N.Sanson, *G. Chiron 9858* (MBML). Drawn by C. A. Luer.

Figure 17 in the present article illustrates one of them. This feature has been shown to be only a variation of a spectrum ranging from entire to emarginate lip and cannot be used to distinguish *A. microgemma* from *A. paranaensis*. Figure 18 illustrates an intermediate variant collected in the Brazilian state of Paraná.

Study of the holotype of *Anathallis longiglossa* reveals not only that it is conspecific with *A. paranaensis*, but also shows that the illustration of the lip in the protologue of the former (Chiron and Sanson, 2010: fig. 1, f.1–f. 2) is inaccurate. It is so different from the lip in the type specimen that we can only assume that the illustrator either confused one of the lateral sepals as being the lip or based his illustration on a distinct collection. Nevertheless, with the exception of the lip, all other features in the protologue and on the type specimen agree well with those of *A. paranaensis*. The illustration presented herein (Fig. 19) was made from a rehydrated flower from the type specimen of *A. longiglossa*. The tiny flower was too badly flattened to allow an adequate drawing of the lip surface and its callosities. It is worth noticing, however, that the lip of *A. longiglossa* is also emarginate just like in the type of *Pleurothallis microgemma*.

Additional specimens examined: BRAZIL. Espírito Santo: Domingos Martins, collected and cultivated by R. A. Kautsky s.n., fl. cult. 20 March 1999, *A. Toscano de Brito 2002* (SEL), C. Luer illustr. 21343; Serra do Castelo, vicinity of Fazenda Capijuma, collected by Michel Frey, flowered in cultivation at Capijuma, 6 Mar. 2004, *M. Frey s.n.* (SEL), C. Luer illustr. 20670. Paraná: Rio Tibagi, cultivated by D. H. Baptista s.n., fl. cult. 19 December 2008, *A. Toscano de Brito 2592* (HUEFS), C. Luer illustr. 21592; Curitiba, flowered in cultivation, 21 March 2007, *Marcos Klingelfus s.n.* (SEL). São Paulo: São Paulo, Parque do Estado, flowered in cultivation, 20 April 1934, *F.C. Hoehne s.n.* (AMES, SP); São Paulo, Parque Jabaquara, 2 February, 1926, *F.C. Hoehne s.n.* (SP-17176); São Bernado do Campo, Serra do Mar, 800 m, *M. Campacci and V.P. Castro s.n.* (SEL), C. Luer illustr. 18212; without collection data, flowered in cultivation in Embú, São Paulo, 11 March 2007, *R.B. Galati s.n.* (SEL), C. Luer illustr. 21082; Caucaia, flowered in cultivation, 12 March 2007, *Orquidário Colibri s.n.* (SEL), C. Luer illustr. 21106.

Lankesteriana caudatipetala (C.Schweinf.) Karremans, Lankesteriana 13(3): 327. 2014. Fig. 20–21.

Basionym: *Pleurothallis caudatipetala* C.Schweinf., Bot. Mus. Leafl. 10: 175. 1942. TYPE. PERU. Junín: Chanchamayo Valley, alt. 1500 m, March 1930, *C. Schunke 1307* (Holotype: F [622342]; Isotype: AMES [00083282, flower from the holotype, not seen].

Synonyms: *Pleurothallis gehrtii* Hoehne & Schltr., Arch. Bot. São Paulo 1: 214. 1926, ***syn. nov.*** TYPE. BRAZIL. São Paulo: Alto da Serra, Mata da Estação Biológica, 6 May 1921, *A. Gehrt s.n.* (Holotype: destroyed at B; Lectotype selected by Barros (2004): SP [5539, photo seen]; Isolectotype: AMES 54815).

Pleurothallis illudens Spann., An. Prim. Reun. Sul-Amer. Bot. 3: 171. 1938 (publ. 1940), ***syn. nov.*** TYPE. BRAZIL. Rio de Janeiro: Petrópolis, June 1938, collected by Fr. Hermenegildo s.n., *C. Spannagel 486* (Holotype: SP [42297, photo seen]).

Specklinia caudatipetala (C.Schweinf.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 259. 2004.

Anathallis gehrtii (Hoehne & Schltr.) F.Barros, Orchid Memories: 10. 2004, ***syn. nov.***

Specklinia gehrtii (Hoehne & Schltr.) Luer, Monogr. Syst. Bot. Missouri Bot.Gard. 95: 260. 2004, ***syn. nov.***

Panmorphia gehrtii (Hoehne & Schltr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard.105: 177. 2006, ***syn. nov.***

Anathallis caudatipetala (C.Schweinf.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 115: 257. 2009.

Anathallis edmeiae F.J. de Jesus, Xim.Bols. & Chiron, Richardiana 13: 296. 2013, ***syn. nov.*** TYPE. BRAZIL. São Paulo: Salesópolis, at the border of Salesópolis and Caraguatatuba, 1270 m, 9 March 2013, *F. José de Jesus & J. Rodrigues Gomes s.n.* (Holotype: SP [447912, not seen]).

Lankesteriana gehrtii (Hoehne & Schltr.) Karremans & Luer, Orchids 84(5): 308. 2015, ***syn. nov.***

Lankesteriana caudatipetala is widely distributed from Central America into the Andes to southern Brazil. It has been described for Brazil on three occasions: first as *Pleurothallis gehrtii*, second as *Pleurothallis illudens*, and more recently as *Anathallis edmeiae*. We concur with Karremans (2015), who recently recognised *Anathallis edmeiae* as conspecific with *Lankesteriana gerthii*. However, these two species are only forms of a same taxon and are therefore here placed in the synonymy of *L. caudatipetala*.

This species is frequent in the Brazilian Atlantic forest ocurring in Santa Catarina (Spannagel, 1940), Rio de Janeiro, São Paulo, and in Espírito Santo. It is characterized by a lax, flexuous, successively flowered raceme that usually surpasses the leaves. Flowers are very variable in color; sepals, petals and lip run from dark purple, through red-purple to greenish-yellow and intermediate combinations within this spectrum. The sepals are acute, vary from glabrous to ciliate or pubescent, and are connate more or less at or above the middle into a bifid, ovate lamina. The petals are glabrous or pubescent, usually contracted near the middle into a narrowly caudate or linear, apical portion. The lip is oblong to subpandurate and ciliate. A pair of longitudinal calli begins tall above the middle, diverges near the middle, and in apposition at the base. At base of the lip there are a couple of minute lobules, a common feature found in many other *Lankesteriana* and *Anathallis* species. These lobules are missing in the illustration of the lip in the protologue of *A. edmeiae*. The drawings in the present work illustrate two collections from Rio de Janeiro showing variation in tepals pubescence. The specimen in Fig. 20 has glabrous sepal margins, the synsepal is minutely pubescent in the basal, central portion, and petals are glabrous. The specimen in Fig. 21 has ciliate sepals and minutely ciliate petals.

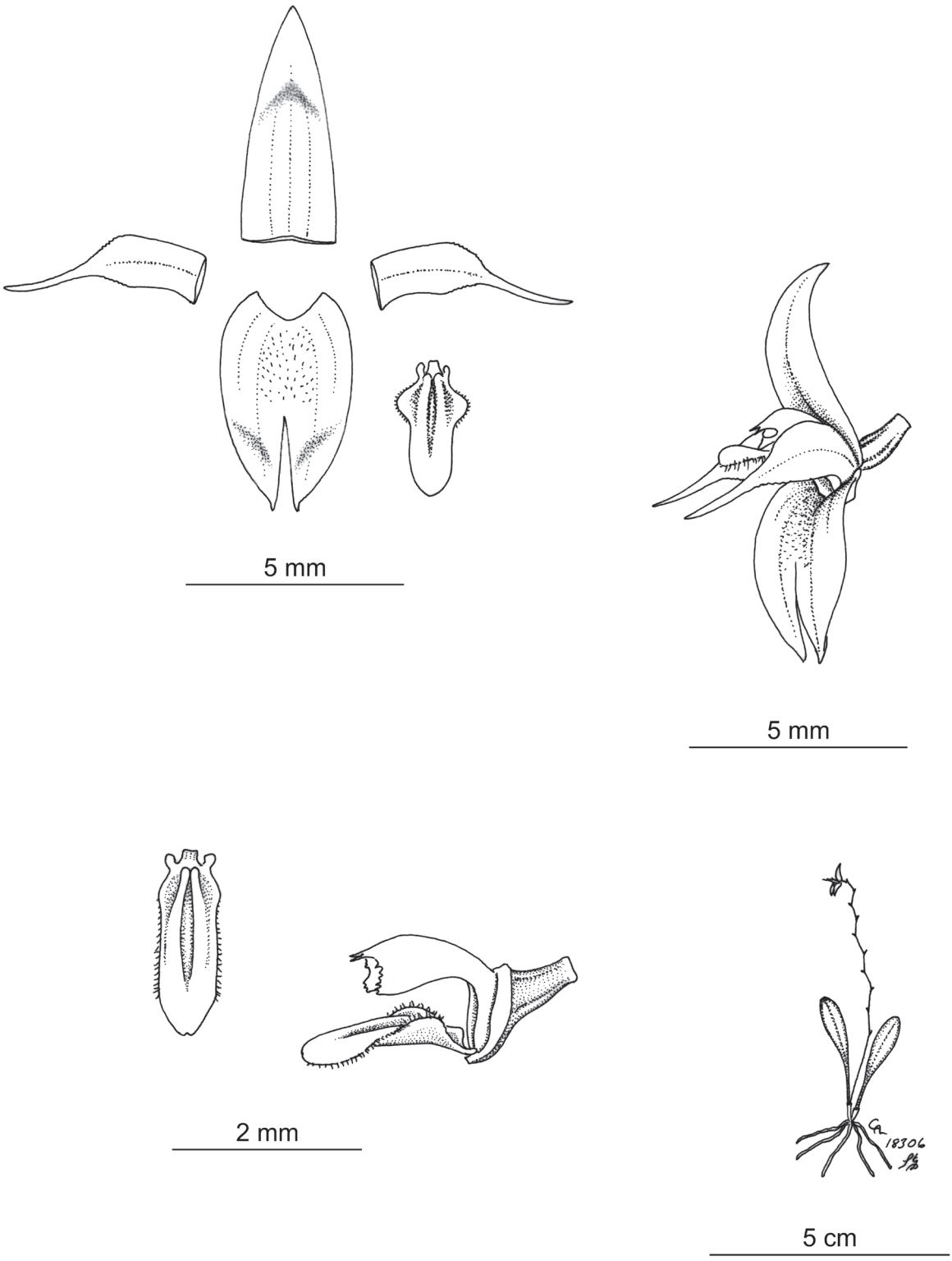

FIGURE 20. *Lankesteriana caudatipetala* (C.Schweinf.) Karremans. Based on *A. Toscano de Brito s.n.*, C. A. Luer illustr. 18306 (SEL). Drawn by C. A. Luer.

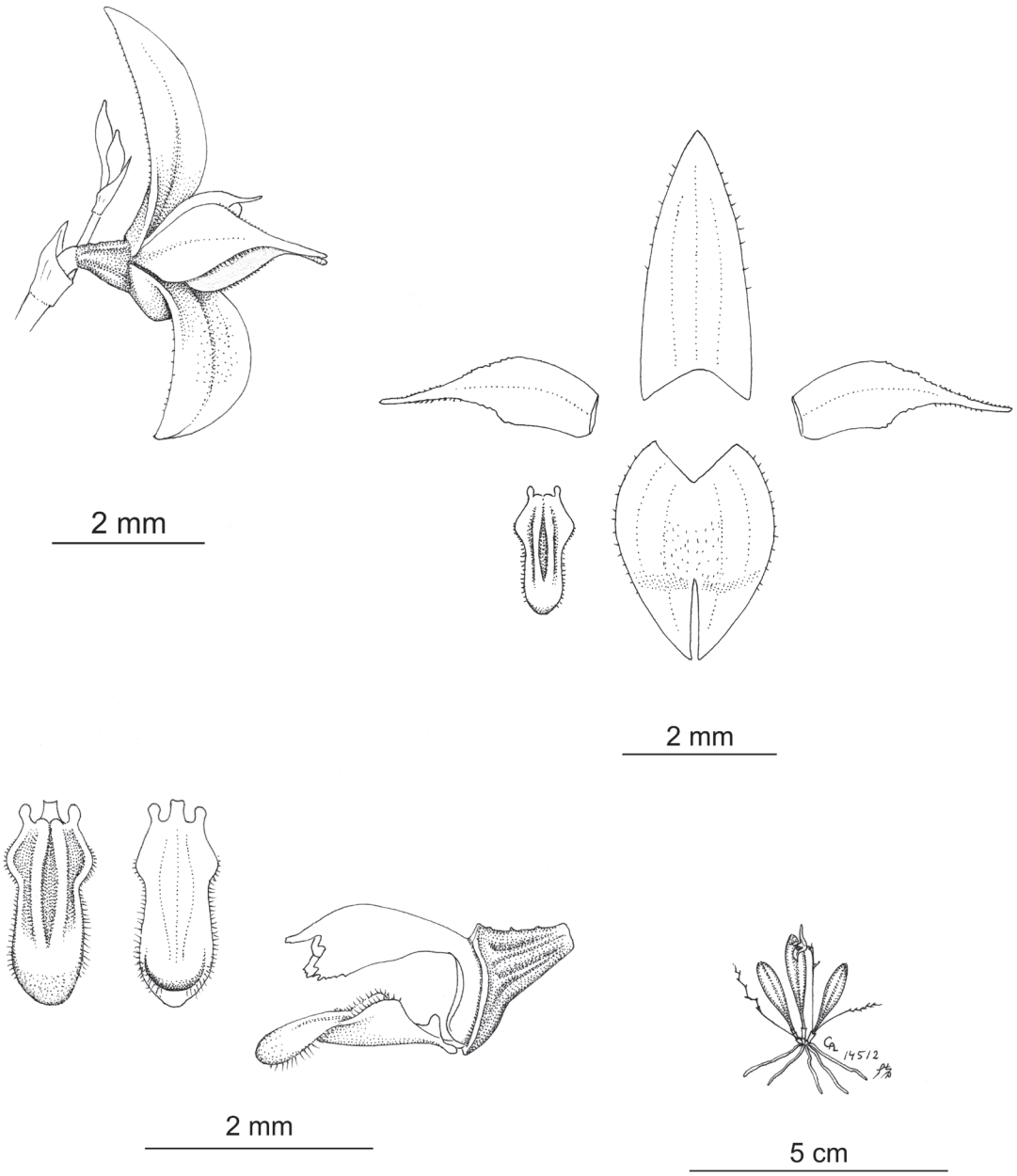

FIGURE 21. *Lankesteriana caudatipetala* (C.Schweinf.) Karremans. Based on *C. Luer 14512* (SEL). Drawn by C. A. Luer.

Additional specimens examined: BRAZIL. Rio de Janeiro: Teresópolis: Picada do Rancho Frio, 1500 m, flowered in cultivation 20 Nov. 1940, *A.C. Brade 16746* (RB); Petrópolis: cultivated at Orquidário Binot by Jorge and Maurício Verboonen, 27 Jan. 1997, *A. Toscano de Brito s.n.* (SEL), C. Luer illustr. 18306; near Petrópolis, 1000 m, cultivated at Orquidário Binot by Jorge and Maurício Verboonen, 30 Nov. 1989, *C. Luer 14512* (SEL). São Paulo: São Bernardo do Campo, 800 m, 19 Jan. 1997, *M. Campacci & V.P. Castro s.n.* (SEL), C. Luer illustr. 18204. Espírito Santo: Alfredo Chaves, São Bento de Urânia, 1200 m, 20 March 1999, *A. Toscano de Brito & R. Kautsky 1954* (MBML). PERU: Cuzco: Huancabamba, Machu Picchu, 2040 m, 16 April 1943, *C. Vargas 3367* (AMES); Urubamba, Machu Picchu, on rocks, 2040 m, ca. 16 April 1948, *C. Vargas 3367* (AMES). BOLIVIA: La Paz: Nor Yungas, Yierbani, alt. 2750 m, collected by M. Manon, 5 Feb. 1980, *C. Luer 5132* (SEL). Cochabamba: Chapare, between Cochabamba and Villa Tunari, alt. 1200 m, 17 Jan. 1988, *C. Luer, J. Luer & R. Vásquez 12854* (MO). ECUADOR: Pichincha: old road between Quito and Santo Domingo, collected by C.H. Dodson, cultivated at SEL, 1975, *C. Luer 565* (SEL). COSTA RICA: San José: near Cascajal, 1700 m, collected and cultivated by W. Ballestero, 21 Mar. 1986, *C. Luer & B. Luer 12137* (MO).

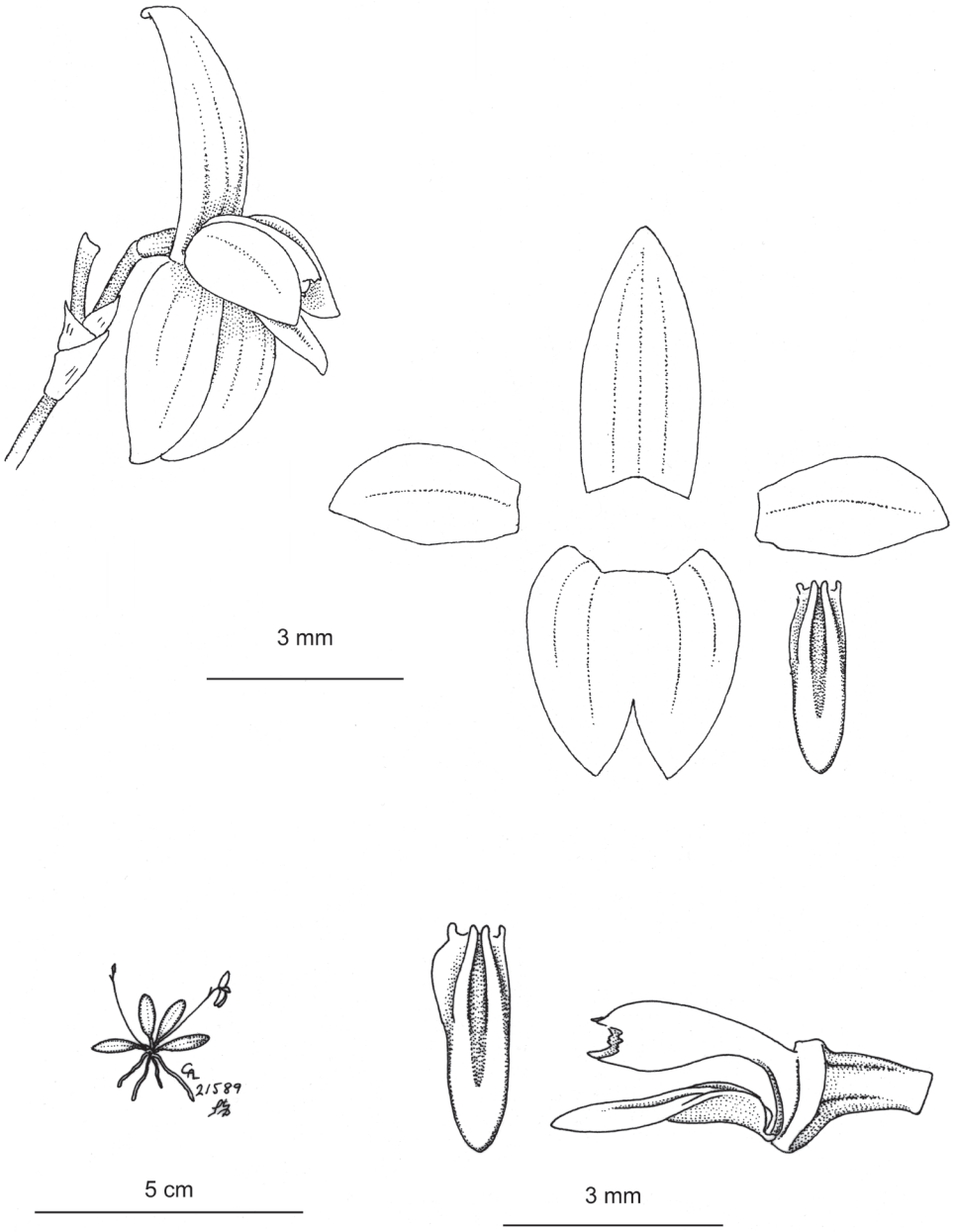

FIGURE 22. *Lankesteriana imberbis* (Luer & Hirtz) Karremans. Based on *A. Toscano de Brito 1573* (MBML). Drawn by C. A. Luer.

Lankesteriana imberbis (Luer & Hirtz) Karremans, Lankesteriana 13(3): 327. 2014. Fig. 22.

Basionym: *Pleurothallis imberbis* Luer & Hirtz, Lindleyana 11: 163. 1996. TYPE: ECUADOR. Morona-Santiago: Cordillera de Cuticú, epiphytic in forest along the new road between Mendez and Morona, alt. ca. 900 m, 19 January 1989, *A. Hirtz, A. Andreetta & S. Ortega 4136* (Holotype: MO [5259628]), C. Luer illustr. 14917.

Synonyms: *Pleurothallis aondae* Carnevali & G.A.Romero in G.A.Romero & G.Carnevali, Orchids Venez. (ed. 2): 1141. 2000. TYPE: VENEZUELA. Bolívar: forest of Río Aonda, Auyantepui, alt. 600 m, September 1972, *C.G.K. Dunsterville 1239* (Holotype: AMES [00287231, drawing]).

Specklinia imberbis (Luer & Hirtz) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 261. 2004.

Panmorphia imberbis (Luer & Hirtz) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 160. 2006.

Specklinia rubidantha Chiron & Xim.Bols. Richardiana 9(3): 125. 2009, ***syn. nov.*** TYPE: BRAZIL. Espírito Santo, Domingos Martins, Biriricas, 200–600 m, collected by R.X. Bolsanello 90511, *G. Chiron 9381* (MBML [not located]; Isotype: LY [not seen]).

Anathallis imberbis (Luer & Hirtz) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 115: 258. 2009.

Lankesteriana rubidantha (Chiron & Xim.Bols.) Karremans, Lankesteriana 13(3): 327. 2014, ***syn. nov.***

Lankesteriana imberbis was originally described in the genus *Pleurothallis* R.Br. based on a collection from lowland Ecuador. Two other collections, one from Amazonian Bolivia and one from Amazonian Brazil, were also cited in the protologue. Comparison of the collections cited in the protologue and two additional collections from Domingos Martins, in Espírito Santo, southeast Brazil, with the protologue of the recently described *Specklinia rubidantha*, whose type specimen also comes from Domingos Martins, leaves no doubt that *S. rubidantha* is a synonym of *Lankesteriana imberbis* and corroborates the view of Karremans (2015) who alluded to this synonymy. The illustration of the lip in the protologue of *Specklinia rubidantha* (page 126, fig. 1–2) is crude, seems to be inaccurate and therefore misleading: the lip is shown with disc free of callosities and the truncate base lacks basal lobules, features always present on the lip of *L. imberbis*. We have been unable to locate the holotype of *S. rubidantha* at MBML during a recent visit by one of us (ALVTB). Apparently a specimen has not been deposited in this herbarium. The two collections from Domingos Martins cited in the present article, *A. Toscano de Brito 1449* and *A. Toscano de Brito 1573*, confirm the presence of *Lankesteriana imberbis* in southeast Brazil. One of them, *A. Toscano de Brito 1573*, is illustrated in Fig. 22. This species seems to rival in distribution *Lankesteriana barbulata* (Lindl.) Karremans, a frequent and apparently closely related species. We believe that other collections of *L. imberbis* might exist in Brazilian herbaria misidentified as *L. barbulata*.

Additional specimens examined: ECUADOR. Napo: between Puerto Napo and Misahualli, alt. 430 m, 23 June 1987, *C.H. Dodson and M.W. Chase 17230* (MO). BRAZIL. Espírito Santo: Domingos Martins, collected by *R.A. Kautsky s.n.*, 1996, flowered in cultivation in February 1997, *A. Toscano de Brito 1573* (MBML), C. Luer illustr. 21589; same locality, collected by *R.A. Kautsky s.n.*, 1996, flowered in cultivation 14 April 1997, *A. Toscano de Brito 1449* (MBML). Amazonas: Igarapé do Tarumã, near Manaus, alt. 200 m. collected by M. Madison, flowered in cultivation 19 March 1979, *C. Luer 4038* (SEL).

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VALIDATION OF TWO NAMES AND THE DESCRIPTION OF A NEW SPECIES OF *FREZIERA* (PENTAPHYLACACEAE) FROM THE PERUVIAN ANDES

Daniel Santamaría-Aguilar[1]

Abstract. Three species of *Freziera* from Peru are described and illustrated, including a discussion of their distinguishing characters and affinities to other closely related species. The names of two of these species, *F. cyanocantha* and *F. incana,* were proposed by A. L. Weitzman in herbarium annotations in 1990.

Resumen. Se describen e ilustran tres nuevas especies de *Freziera* de Perú, se discuten sus posibles relaciones y caracteres distintivos entre las especies más cercanamente relacionadas. Los nombres de dos de estas especies, *Freziera cyanocantha* y *F. incana*, fueron propuestos por A. L. Weitzman en anotaciones de herbario en 1990.

Keywords: Andes, Peru, Theaceae, Yanachaga-Chemillén

The present paper validates the names *Freziera cyanocantha* and *F. incana*, first proposed by A. L. Weitzman on herbarium sheets in 1990 but never formally published. An additional Peruvian new species, *F. oxapampensis*, is also described.

Twelve species of *Freziera* Willd. were reported in the Catalog of the Flowering Plants and Gymnosperms of Peru (van der Werff, 1993). With the addition of the three species described here and elsewhere (Santamaría-Aguilar and Lagomarsino, in press), *Freziera* is represented by 16 formally described species in Peru.

Taxonomy

Freziera cyanocantha A. L. Weitzman ex D. Santam., *sp. nov.* TYPE. PERU. Pasco: Oxapampa, Cordillera Yanachaga: Cerro Pajonal "chacos," 12 km SE of Oxapampa. Shrubland on white sandstone, spongy sphagnum humus up to 2 m deep except where burned, 10˚35'S, 075˚20'W, 2700–2800 m, 07 October 1982 (bud fl, fr), *R. B. Foster 9046* (Holotype: MO [3012790]; Isotypes: F [1961946], MEX [608111-digital image], MO [3891057], USM [69535]). Fig. 1–2.

Shrubs 1–2 m tall; external and internal bark undescribed. Mature branches cylindrical, the outer bark grayish, longitudinally striate, not lenticellate, glabrous; leaf-bearing branches weakly angulate and flattened, densely arachnoid-villous, trichomes ferruginous or grayish, ca. 0.2–0.5 mm long, inconspicuously papillate, barely lenticellate, the lenticels reddish-brown or whitish-gray, elliptical or rounded. *Terminal bud* conduplicate-involute 21–32 mm long, densely arachnoid-villous, trichomes ferruginous ca. 0.2–0.6 mm long. *Leaves* petiolate; petiole (0.2–) 0.4–0.7 cm long, adaxially caniculate, abaxially rounded, densely arachnoid-villous, trichomes ferruginous or grayish, ca. 0.3–0.8 mm long, weakly winged, the wings erect, without setae on their margins; colleters absent. *Laminae* 4.7–7.3 × 1.7–2.2 cm, lanceolate-elliptic; base not revolute or weakly revolute, cuneate or subtruncate, both sides equal or one side weakly unequal; apex acute, bearing a single and curved black seta, caducous; margin denticulate or serrate, with 30–50 teeth per side, each tooth with a black, conical, caducous seta, the seta usually ringed by trichomes; adaxial surface glabrous (except in young leaves), pustulate; abaxial surface densely arachnoid-villous, trichomes ferruginous, ca. 1.0 mm long, not papillate; midrib flat or weakly caniculate, glabrous on adaxial surface, sparsely or densely pubescent, pustulate, rounded and densely arachnoid-villous on abaxial surface, not papillate; lateral veins 15–20 per side, weakly elevated on the adaxial surface, indistinct on the abaxial surface; tertiary veins reticulate and conspicuous on the adaxial surface, indistinct on the abaxial surface. *Inflorescences* fasciculate, bearing 1–3 flowers per axil. *Flowers* pedicellate, pedicel 3.0–6.0 mm long, curved or erect, cylindrical, densely arachnoid-villous; *bracts* 3.5–5.5 × 1.0–1.5 mm, at base of pedicel, persistent, lanceolate or narrowly triangular, carinate, external surface densely arachnoid-villous, internal surface glabrous, margin entire, apex acute or acuminate, with black, curved, caducous seta at apex; *bracteoles* 2, 4.0–5.5 × 3.0–4.0 mm, persistent, opposite or subopposite, at apex of pedicel, weakly unequal, ovate, not carinate, external surface densely arachnoid-villous, internal surface glabrous, margin entire, apex rounded and without seta; *sepals* 5, imbricate; outer sepals 4.0–4.5 × 3.0–3.5 mm, ovate, apex acute or rounded, margin entire and chartaceous, external surface densely arachnoid-villous, internal surface glabrous; inner sepals 3.5–4.5 × 2.5–3.5 mm, ovate, apex acute or rounded, margin entire, ciliate and membranaceous, external surface densely

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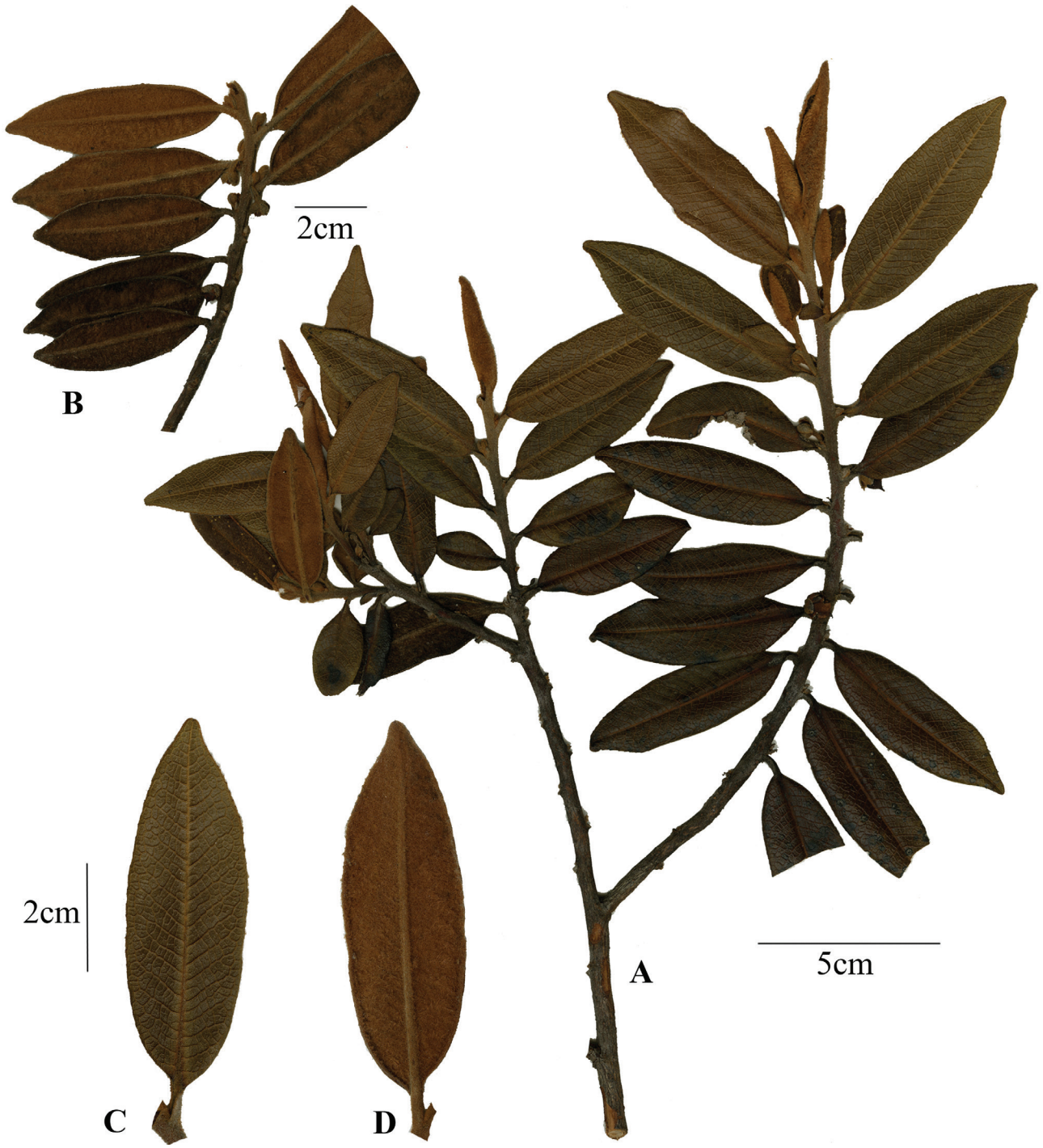

FIGURE 1. *Freziera cyanocantha* A. L. Weitzman ex D. Santam. **A**, branch with fruits; **B**, twig with flower bud; **C**, lamina showing adaxial surface and venation; **D**, lamina showing abaxial surface. Based on *Vásquez 34510* (GH).

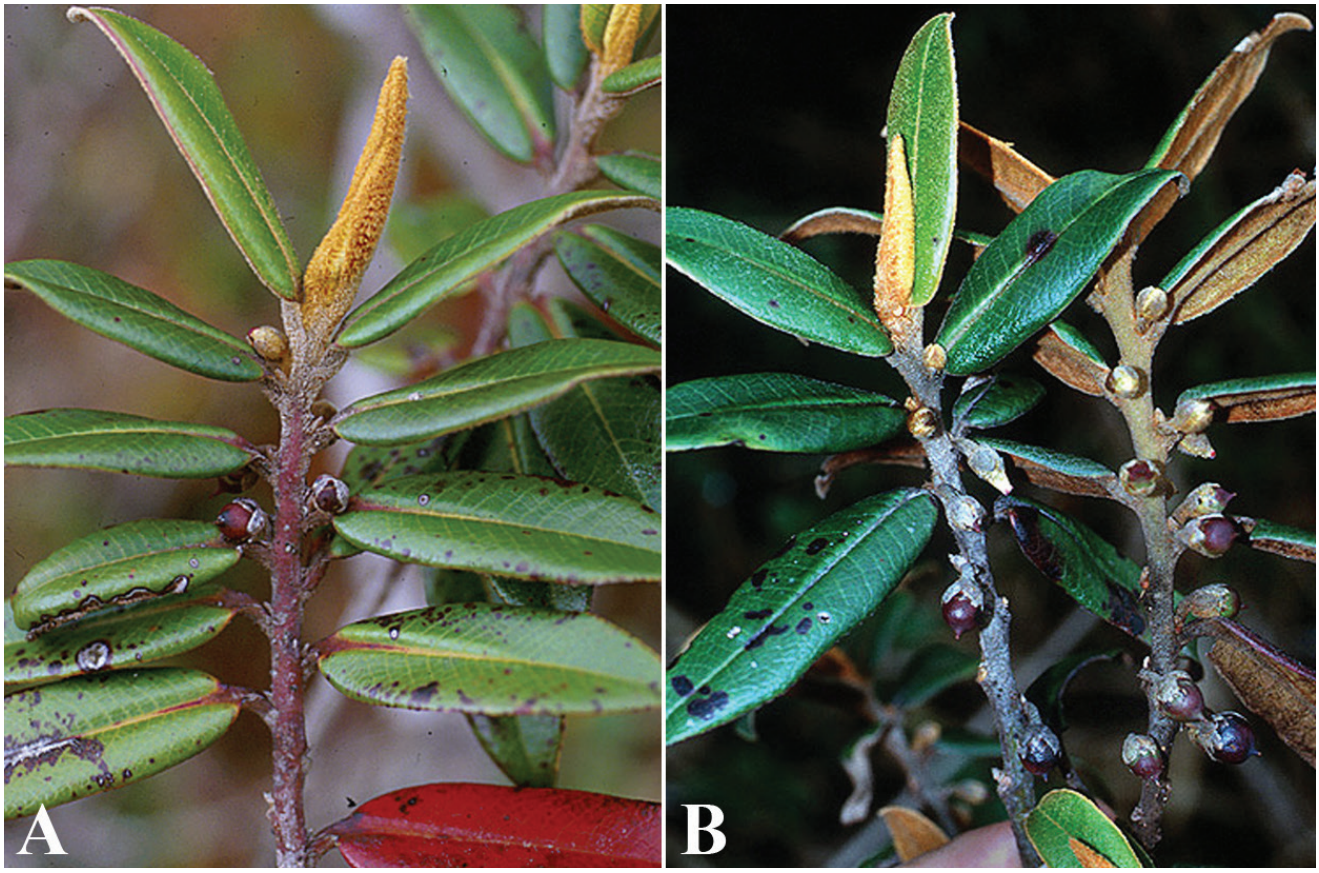

FIGURE 2. *Freziera cyanocantha* A. L. Weitzman ex D. Santam. **A**, branch showing lamina on adaxial surface, terminal bud, and fruits; **B**, branch showing lamina on abaxial surface, flower bud, and mature fruits. Photographs by R. Foster of the isotype at F.

arachnoid-villous or glabrous to the sides, internal surface glabrous; *petals* 5, 5.5–7.0 × 1.5–2.9 mm, white with blue around the margin or cream, free at the base, ovate, margin chartaceous and entire, apex acute or acuminate, glabrous. *Flower bud* 3.0–5.0 mm wide. *Staminate flowers* not observed. *Pistillate flowers*: 14–16 staminodes, 1.0–1.5 mm long, attached to the base of the petals, linear, flat, apex acute; gynoecium 5.0 × 2.0 mm, pyriform, glabrous, 2 or 3-locular; style not separated apically; stigma 2-lobulate. *Fruits* 5.0–8.0 × 3.0–5.0 mm, rounded, green, red or blackish-purple, glabrous; fruit walls ca. 1.0 mm thick; *seeds* 26–46 per fruit, reddish-brown, shiny, ca. 0.7–1.0 mm long, more or less reniform to rounded, foveolate.

Etymology: The specific epithet likely refers to the blue coloration sometimes on the petals. The name was coined by Weitzman (1990: in herbarium), but never validly published.

Distribution and Habitat: *Freziera cyanocantha* is endemic to Peru and is known only in the district of Oxapampa in the Pasco department. It has been collected in primary forest on sandstone soil at ca. 1900 and 2800 m in elevation.

Phenology: Pistillate flowers and fruits were collected in May and October. Staminate flowers unknown.

Additional specimens examined: PERU. Pasco: Oxapampa, from Antenna past Chacos to the Laguna, 10°37'11"S, 075°17'16"W, 2700–2800 m, 05 May 2005 (♀ fl, fr), *H. van der Werff 19647* (GH, MO); Zona de Amortiguamiento del Parque Nacional Yanachaga-Chemillén, sector Chacos, 10°36'44"S, 075°22'29"W, 1902 m, 13 October 2008 (♀ fl, fr), *R. Vásquez 34510* (GH-2 sheets, MO, USM).

Freziera cyanocantha is very distinct species in the genus. It is characterized by ferruginous or ferruginous-grayish trichomes; densely arachnoid-villous indument on young branches, abaxial leaf surface and inflorescences; small leaves with lateral and tertiary veins that are conspicuous above and inconspicuos below; and fruits with thick walls. Additionally, it is a small shrub with vegetative parts covered in densely arachnoid-villous pubescence.

The new species is probably related to *F. ferruginea* Wawra, from Peru and *F. canescens* Humb. & Bonpl. f. *rufescens* Kobuski from Ecuador. These three species share small leaves and densely and ferrugineous trichomes covering young braches, abaxial leaf surfaces, and inflorescences. The new species differs from both by the lateral and tertiary veins that are abaxially inconspicuous (vs. conspicuous). According to measurements of *F. ferruginea* in Kobuski (1941: 479), *F. ferruginea* differs from *F. cyanocantha* by pedicels to 2.0–4.0 mm long (vs. 3.0–6.0 mm in *F. cyanocantha*), bracteoles ca. 1.0–1.5 mm long (vs. 4.0–5.5 mm), and petals 3.5–4.0 mm long (vs. 5.5–7.0 mm). The new species is further distinguished from *F. canescens*

f. *rufescens* by the laminae base conspicuously revolute (vs. not revolute in *F. cyanocantha*), external sepals ca. 7.0 × 5.0 mm (vs. 4.0–4.5 × 3.0–3.5 mm), and fruits 10–12 × 7.0–9.0 mm (vs. 6.0–8.0 × 5.0–6.0 mm). Other species that are densely pubescent with ferrugineous trichomes are *F. guatemalensis* (Donn. Sm.) Kobuski, *F. inaequilatera* Britton, and *F. incana* (described here), but all these species have large leaves (between 9.2–22 × 3.0–7.7 cm) and lateral veins that are generally visible on the abaxial surface.

Freziera incana A. L. Weitzman ex D. Santam., *sp. nov.* TYPE. PERU. Pasco: Oxapampa, Parque Nacional Yanachaga Chemillén, Abra La Esperanza, 10°31'S, 075°20'W, 2800 m, 23 March 2003 (♂ bud fl), *A. Monteagudo, G. Ortiz, C. Mateo & R. Francis 4770* (Holotype: GH; Isotypes: MO, USM [195866]). Fig. 3.

Small *trees* 2–7 or *trees* 10–35 m tall; external bark undescribed; possible internal bark in one instance described as pink. Mature branches cylindrical, the outer bark

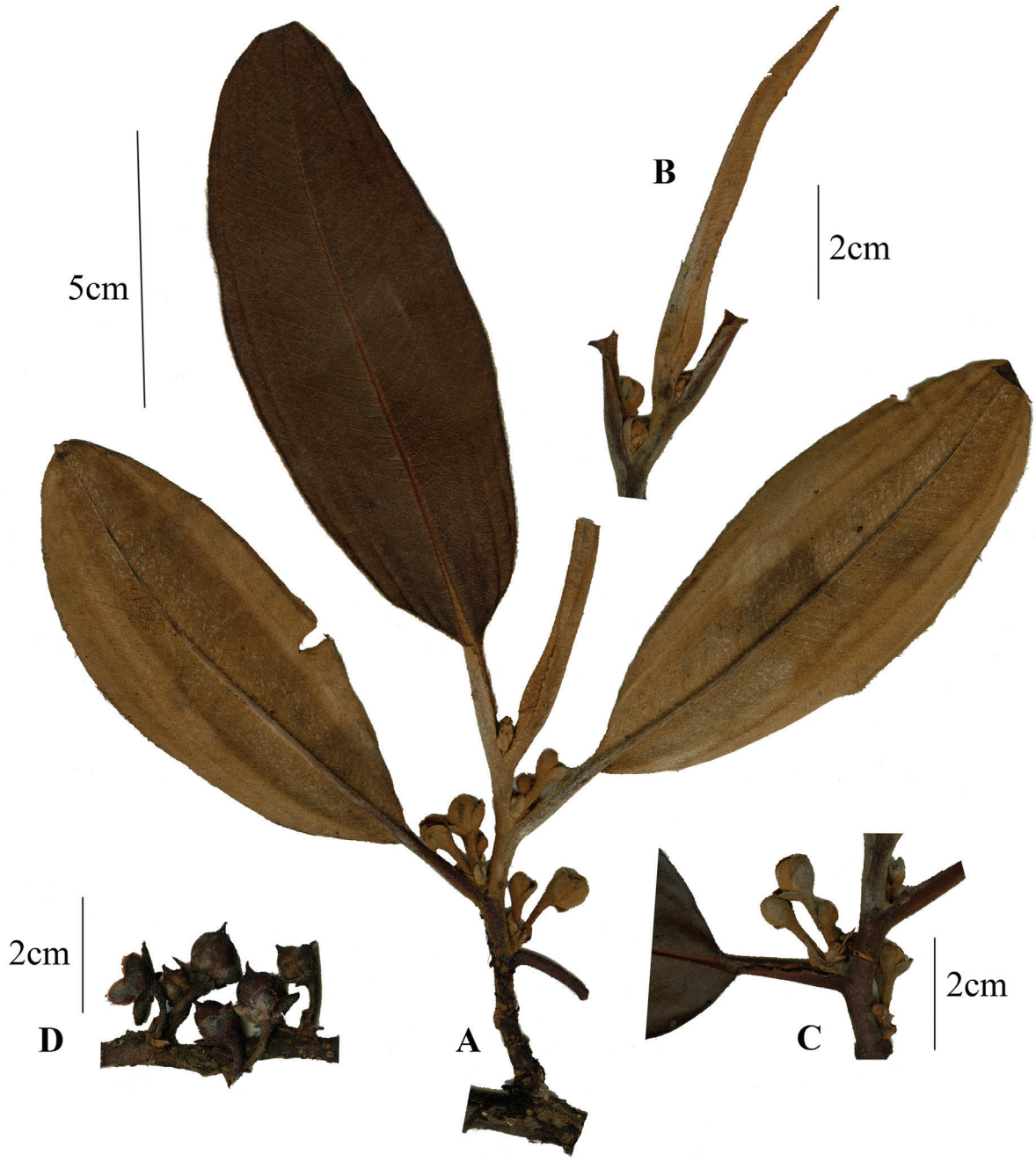

FIGURE 3. *Freziera incana* A. L. Weitzman ex D. Santam. **A**, branch showing lamina on adaxial and abaxial surface; **B**, terminal bud; **C**, lamina base and flower bud; **D**, fruits. A, based on the holotype; B and C based on *Monteagudo et al. 12845* (GH); D, based on *Vásquez 32017* (GH).

reddish-brown or grayish, longitudinally striate, generally lenticellate; leaf-bearing branches weakly angulate and flattened, generally densely arachnoid-villous, trichomes ferruginous or grayish-white, to 1.2 mm long, papillate, lenticels sparsely or absent, the lenticels, if present, reddish-brown or grayish-white, rounded or elliptical. *Terminal bud* conduplicate-involute 41–77 mm long, densely arachnoid-villous, trichomes ferruginous or whitish-brown, to 1.0 mm long. *Leaves* petiolate; petiole 1.2–2.9 cm long, adaxially caniculate, abaxially more or less rounded, generally densely arachnoid-villous, sometimes glabrescent, trichomes ferruginous or whitish-brown, to 1.0 mm long, weakly winged, the wings erect or involute, with or without setae in their margin, if setae present, black and curved; colleters 1–4 in petiole base or absent. *Laminae* (7.3–) 9.2–18.2 × (3.0–) 3.7–7.7 cm, ovate to elliptic; base cuneate, obtuse, subtruncate or decurret on the petiole, not revolute, both sides equal or one weakly unequeal; apex acuminate, bearing a single and curved black seta, caducous; margin inconspicuously denticulate, with ca. 70–140 teeth per side, each tooth with a black, conical seta, caducous, the seta usually ringed by trichomes or not; adaxial surface glabrous (except in young leaves), pustulate; abaxial surface densely arachnoid-villous, trichomes ferruginous or whitish-brown to 1.5 mm long, not papillate; midrib on adaxial surface caniculate or flat, glabrous or pubescent, pustulate, on abaxial surface rounded to more or less rectangular, densely arachnoid-villous, pustulate; lateral veins 20–45 for side (including some intermediate), flat and impressed on the adaxial surface, elevated on the abaxial surface; tertiary veins reticulate, distinct on both surfaces, generally more conspicuous on the adaxial surface. *Inflorescences* fasciculate, bearing 1–3 (–8; *Sánchez-Vega 6350*) flowers per axil. *Flowers* pedicellate, pedicel 8.0–17 mm long, curved or erect, cylindrical, densely arachnoid-villous; *bracts* 4.0–7.0 (–10–25) × 1.4–2.5 (–5.0–9.0) mm, at the base of pedicel, persistent or caducous, lanceolate or narrowly triangular, carinate or not carinate, external surface densely arachnoid-villous, internal surface glabrous or densely arachnoid-villous, margin entire or with small setae, apex acute with black, curved and caducous seta at apex; *bracteoles* 2, 3.0–7.0 × 5.0–7.0 mm, persistent, opposite or subopposite, at apex of pedicel, unequal, very widely ovate to depresed ovate, carinate or not carinate, external surface generally densely arachnoid-villous, internal surface glabrous, margin entire, apex rounded and without seta; *sepals* 5, imbricate; outer sepals 5.0–9.0 × 5.0–8.0 mm, widely ovate, apex acute or rounded, margin entire and chartaceous, ciliate, external surface generally densely arachnoid-villous or sometimes glabrous towards the margins, internal surface glabrous; inner sepals 5.0–7.0 × 4.0–6.0 mm, similar in shape to the external sepals, apex acute or rounded, margin entire, chartaceous or membranaceous, ciliate, external surface densely arachnoid-villous, sometimes glabrous towards the margins, internal surface glabrous; *petals* 5, 4.0–8.0 × 3.0–5.3 mm, white or cream, free at the base, ovate, margin chartaceous and entire, apex acute or acuminate, glabrous. *Flower bud* 5.0–9.0 mm wide. *Staminate flowers*: 22–26 stamens, free, weakly unequal (sometimes with trichomes at the base); filaments 1.0–3.0 mm long, more or less flat; anthers 1.0–2.5 mm long, not moniliform, elliptic to oblong, base subcordate, apex acute or apiculate; gynoecium 4.5–6.0 × 2.0–4.0 mm, glabrous or sometimes pubescent, conical, 5-locular; style not separated apically; stigma 2–5-lobulate. *Pistillate flowers*: staminodes absent, sometimes with trichomes at the base; gynoecium 7.0 × 4.0 mm, conical or globose, glabrous or with sparsely trichomes, 5-locular; style not separated apically; stigma 5-lobulate. *Hermaphroditic flowers*: 21–23 stamens, free, weakly unequal; filaments 0.5–2.5 mm long, more or less flat; anthers 0.5–1.0 mm long, not moniliform, elliptic to oblong, base cordate or subcordate, apex acute; gynoecium 3.0–6.0 × 1.2–2.0 mm, glabrous, conical or lanceolate, 3-locular; style not separated apically; stigma 2 or 3-lobulate. *Fruits* 9.0–13 × 6.0–9.0 mm, rounded, green or black, glabrous or pubescent; fruit walls ca. 0.5–1.0 mm thick; *seeds* (3–) 18–47 per fruit, sometimes the seeds absent (*Humán 25*; *Valenzuela 6937*), reddish-brown, pale brown or beige, shiny, ca. 1.0–2.0 mm long, more or less rounded or ovoid, foveolate.

Etymology: The specific epithet possibly refers to the white trichomes on branches, leaves and sepals of the first collection annotated with this name (at least as seen by me in herbaria), *F. Woytkowski, 8004*. The name was coined by Weitzman (1990: in herbarium), but never validly published.

Distribution and Habitat: *Freziera incana* it has been collected in the departments of Cajamarca, Cusco, Huánuco, and Pasco in Peru. The species grows mainly in primary forest and areas cleared by landslides in cloud forest habitats at 1950–3000 m elevation.

Phenology: *Freziera incana* was collected with staminate flowers (bud) in March, August and October, pistillate flowers (bud) in February and June, and in fruit in February, April to June, and October to December.

Additional specimens examined: PERU. **Cajamarca:** Cutervo, Parque Nacional de San Andrés, entre San Andrés y la Pucarilla, siguiendo el camino de herradura, 2250 m, 26 June 1992 (☿ fl?), *I. Sánchez-Vega & A. Miranda 6350* (F, MO, NY); San Ignacio, Cerro Picorana, 04°59'30"S, 078°52'56"W, 2580 m, 14 October 2000 (bud fl, fr), *M. Huamán 25* (GH, MO). **Cusco:** La Convención, Distrito Quellouno, Lacco, 12°37'31"S, 072°14'03"W, 2770 m, 17 June 2006 (♀ bud fl, fr), *L. Valenzuela et al. 6937* (GH, MO); La Convención, Distrito Quellouno, Punta Lacco, 12°36'43"S, 072°13'15"W, 2368 m, 21 August 2007 (♂ fl), *L. Valenzuela et al. 10095* (GH, MO); Paucartambo, Kosñipata, trocha Unión km 4, 3000 m, 06 October 2003 (bud fl), *W. Farfán 1239* (USM). **Huánuco:** Distrito Chinchao San Pedro de Carpish, arriba del túnel, 09°43'14"S, 076°06'53"W, 2770–2820 m, 01 May 2005 (fr), *I. Salinas & H. Beltrán 1043* (USM); Tumanga, 2400 m, 29 April 1963 (fr), *F. Woytkowski 8004* (GH). **Pasco:** Oxapampa, Distrito Huancabamba, Parque Nacional Yanachaga-Chemillén, parte alta de la trocha Yanachaga-Palcazú, 10°22'42"S, 075°27'00"W, 2650 m, 01 December 2007 (fr), *A. Monteagudo et al. 16073* (GH, MO, USM); Distrito Oxapampa, Parque Nacional Yanachaga Chemillén, camino del Refugio al Abra La Esperanza, 10°32'S, 075°21'W, 2490–2610, 22 November 2002 (bud fl, fr), *A. Monteagudo et al. 4409* (GH, MO, MOL, USM);

Parque Nacional Yanachaga Chemillén, flanco Oriental hacia el Valle de Palcazu, 30 minutos del Refugio Abra Esperanza, 10°31'56"S, 075°20'54"W, 2720 m, 15 October 2006 (♂ bud fl), *A. Monteagudo et al. 12845* (GH, MO, USM); Parque Nacional Yanachaga Chemillén, Abra la Esperanza, 10°31'54"S, 075°20'59"W, 2750 m, 16 October 2006 (bud fl, fr), *A. Monteagudo et al. 12876* (GH, MO); Camino desde el Abra Esperanza hacia el refugio El Cedro-Sector San Alberto, Parque Nacional Yanachaga Chemillén, 10°32'22"S, 075°21'10"W, 2760 m, 12 March 2005 (ste), *E. M. Ortiz 413* (GH); sector Quebrada San Alberto (Abra Esperanza), 10°32'22"S, 075°21'23"W, 2636 m, 24 October 2004 (fr), *J. Perea & J. L. Mateo 1966* (GH, MO); Parque Nacional Yanachaga Chemillén, sector Abra Esperanza, 10°31'54"S, 075°20'59"W, 2650 m, 26 February 2007 (♀ bud fl), *R. Vásquez 31992* (GH, MO); Parque Nacional Yanachaga Chemillén, sector Abra Esperanza, 10°31'54"S, 075°20'59"W, 2550 m, 28 February 2007 (♀ bud fl, fr), *R. Vásquez 32017* (GH, MO).

Freziera incana can be recognized by its densely pubescent, arachnoid-villous and whitish-brown or ferruginous trichomes on the abaxial leaf surface. The same indument is also found covering young branches, petioles, and inflorescences. Additionally, tertiary veins are finely reticulate in the adaxial leaf surface and fruits have thick walls and relatively large seeds.

Among validly described species, this species is most superficially similar to *F. guatemalensis* from Mexico, Guatemala, Honduras and Nicaragua and *F. inaequilatera* from Bolivia. All these species have large leaves and dense ferruginous or brown indument on the abaxial leaf surfaces, young branches, and inflorescences. The new species differs from both by the wide floral bud 5.0–9.0 (vs. 2.0–6.0 mm wide). *F. incana* differs from *F. guatemalensis* by its longer pedicels (8.0–17 mm vs. 2.0–5.0 mm) and external sepals (5.0–9.0 mm vs. 3.1–4.2 mm). It further is distinguished from *F. inaequilatera* by its leaf bases with both sides equal or weakly unequal (vs. one side conspicuously unequal), trichomes on the young branches, petioles, and abaxial leaf surfaces 1.0–1.5 mm long (vs. 1.0–5.0 mm), and leaf margin inconspicuously denticulate (vs. serrulate). The collections *F. Woytkowski 8004* (GH) and *I. Salinas & H. Beltrán 1043* (USM), both from the Huánuco department, resemble *F. canescens* Bonpl., for their small leaves and abaxial leaf surface and other vegetative parts that are covered with grayish-white trichomes, but the leaves base in *F. canescens* are markedly revolute (vs. not revolute). Material from the Cusco department (e.g. *L. Valenzuela 6937, 10095*) sometimes has wider leaves, pubescence that is more densely ferruginous, and bracts longer and wider (10–25 × 5.0–9.0 mm) than most representatives of *F. incana* is tentatively included here. The flowers of *I. Sánchez-Vega & A. Miranda 6350,* are apparently hermaphroditic.

Freziera oxapampensis D. Santam., *sp. nov.* TYPE: PERU. Pasco: Provincia Oxapampa, Río San Alberto valley, E of Oxapampa, W slopes of Cordillera Yanachaga, High montane primary forest, on ridge, 10°34'S, 075°22'W, 2500 m, 24 July 1984 (fr), *D. N. Smith & A. Pretel 8002* (Holotype: MO [3614305]; Isotypes: F [1993476], MOL, NY). Fig. 4.

Trees 3–23 tall; external bark sometimes described as reddish-brown or grey, striate; internal bark undescribed. Mature branches rounded or weakly angulate, the outer bark blackish or reddish-brown, longitudinally striate and sparsely lenticellate, glabrous or minutely pubescent; leaf-bearing branches angulate and flattened, densely sericeous, the trichomes pale gold, ca. 0.5–0.7 mm long, papillate, sparsely lenticellate, the lenticels whitish-gray, elliptical. *Terminal bud* conduplicate-involute 21–70 mm long, densely sericeous, trichomes golden or whitish, ca. 0.5–1.0 mm long. *Leaves* petiolate; petiole 1.5–3.5 cm long, adaxially caniculate, abaxially rounded or sometimes more or less tringular, densely sericeous, the trichomes golden, 0.5–1.0 mm long, usually winged, when winged, the wings erect or involute, their margins entire; colleters 1–4 in the petiole base, or absent. *Laminae* 14.5–21.6 × 3.8–6.5 cm, narrowly elliptic to lanceolate; base cuneate, both sides equal or one side weakly unequal, weakly revolute or not revolute; apex acute, not bearing a seta; margin diminutely dentate or subentire, with ca. 95–116 teeth per side, each tooth bearing a terminal black or reddish-brown, conical setae, seta ringed by trichomes or not; adaxial surface glabrous, pustulate; abaxial surface densely sericeous, trichomes golden, 0.5–1.2 mm long, papillate; midrib on adaxial surface flat or weakly caniculate, glabrous, papillate, on abaxial surface rounded, densely sericeous, papillate; lateral veins 43–68 per side (including some intermediate), flat in the adaxial surface, prominent and raised on abaxial surface; tertiary veins reticulate, distinct in both surfaces, generally more conspicuous in the abaxial surface. *Inflorescences* fasciculate, generally bearing 5–13 flowers per axil. *Flowers* pedicellate, pedicel 3.0–4.3 mm long, erect, cylindrical, densely sericeous; *bracts* ca. 2.0–4.0 × 1.0–1.5 mm, at the base of pedicel, persistent, triangular or lanceolate, carinate or not carinate, external surface sericeous, internal surface glabrous, margin entire, apex acute, with black seta at apex; *bracteoles* 2, 2.5–4.0 × 2.0–2.3 mm, persistent, opposite or subopposite, at apex of pedicel, weakly unequal, widely ovate or more or less triangular, carinate or not carinate, external surface densely sericeous, internal surface glabrous, margin entire, apex rounded or acute and without seta; *sepals* 5, imbricate; outer sepals 3.7–5.0 × 2.8–3.5 mm, widely ovate, apex rounded or acute, margin entire and chartaceous, external surface sericeous, internal surface glabrous; inner sepals 3.5–4.0 × 2.0–3.0 mm, similar in shape to the external sepals, apex acute or rounded, sometimes brittle, margin entire, membranaceous, ciliate, external surface sericeous centrally, glabrescent towards the sides, internal surface glabrous; *petals* 5, 5.0–7.0 × 1.5–3.5 mm, white, free at the base, lanceolate or lanceolate-elliptic, margin chartaceous and entire, apex acute and weakly reflexed, glabrous. *Flower bud* 3.0–5.0 mm wide. *Staminate flowers*: 15–18 stamens, free or weakly united at the base; filaments 1.0–1.7 mm long, more or less flat; anthers 1.0–1.5 mm long, not moniliform, ovate or lanceolate, base subcordate or cuneate, apex acute, rounded or apiculate; gynoecium 3.0–4.0 × 2.0 mm, glabrous, pyriform or conical, 3-locular; style not separated apically; stigma 3-lobulate, sometimes

FIGURE 4. *Freziera oxapampensis* D. Santam. **A**, branch with fruits; **B**, flowers; **C**, fruits. A and C based on the holotype; B based on *Vásquez et al. 28931* (GH).

inconspicuously lobulate. *Pistillate flowers*: unknown. *Fruits* 5.0–6.0 × 4.0–5.0 mm, rounded, green, glabrous; fruit walls ca. 0.2–0.5 (–1.0) mm thick; *seeds* 54–93 per fruit, reddish-brown or beige, shiny, ca. 0.4–1.0 mm long, more or less rounded or reniform, foveolate.

Etymology: The specific epithet refers the locality of all known collections of this species in the Oxapampa province of Pasco, Peru.

Distribution and Habitat: *Freziera oxapampensis* is endemic to Peru and known only from the Oxapampa province. It has been collected in primary sclerophyllous and dwarf forests and *pajonal* (high elevation grassland) vegetation between 2136–2720 m in elevation.

Phenology: Collected with staminate flowers in January and in fruit in February and July. Pistillate flowers remain unknown.

Additional specimens examined: PERU. Pasco: Oxapampa, Distrito Huancabamba, Parque Nacional Yanacha-Chemillén, sector San Daniel, 10°26'13"S, 075°20'13"W, 2136 m, 12 July 2004 (bud fl), *J. Perea et al. 1551* (GH, MO, USM); Parque Nacional Yanacha-Chemillén, sector San Daniel, 10°28'13"S, 075°27'33"W, 2363 m, 23 February 2008 (fr), *R. Vásquez et al. 33690* (GH, MO, USM); Distrito Oxapampa, trail to summit of Cordillera Yanachaga via Río San Daniel, 10°23'S, 075°27'W, 2600 m, 18 July 1984 (bud fl), *D. N. Smith et al. 7880* (MO, MOL); Parque Nacional Yanachaga-Chemillén, camino al Abra La Esperanza, 10°32'S, 075°21'W, 2720 m, 25 August 2002 (bud fl), *A. Monteagudo et al. 3778* (GH, MO, USM); Parque Nacional Yanachaga-Chemillén, Sector chacos-Antena, 10°37'S, 075°17'W, 2600 m, 14 January 2004 (♂ fl), *R. Vásquez et al. 28649* (GH, MO); Parque Nacional Yanachaga-Chemillén, Sector Chacos, 10°37'S, 075°17'W, 2471 m, 24 January 2004 (♂ fl), *R. Vásquez et al. 28931* (GH, MO).

Freziera oxapampensis can be distinguished by its narrowly elliptic to lanceolate leaves with the abaxial surface densely sericeous; long petioles (1.5–3.5 cm long) that are usually winged; inflorescences frequently with many flowers; sericeous sepals; and small fruits. The species is also characterized by the young angulate and flattened branches and lateral and tertiary veins that are conspicuous on the abaxial surface.

Freziera oxapampensis is morphologically similar to *F. tomentosa*. Both species have leaves that are similar in shape and size and are densely pubescent below (more conspicuously pubescent in *F. tomentosa*), petioles that are usually winged, and flowers with short pedicels. However, *F. oxapampensis* usually produces more flowers per inflorescence (5–13 vs. 1–4 in *F. tomentosa*) and has external sepals are sericeous and smaller (vs. glabrous or sparsely pubescent). Additionally, the petioles are longer, the lateral and tertiary veins are conspicuous on the abaxial leaf surface, and the adaxial surface of the leaf is inconspicuously pustulate (vs. densely pustulate in *F. tomentosa*, a feature also shared with *F. chrysophylla*). *Freziera oxapampensis* also has a degree of morphological affinity with *F. candicans* Tul. and *F. chrysophylla* Bonpl., especially in the sericeous indument on the leaves and inflorescence and fruit size. The main differences between two taxa are shorter in petioles (0.5–2.5 or sessile vs. 1.5–3.5 cm long in *F. oxapampensis*) that are inconspicuously winged (vs. conspicuously winged), fewer flowers per inflorescence (1–6 [–10] vs. 5–13), denser indument with gold, silver or whitish in *F. candicans* and orange-gold or gold in *F. chrysophylla* and shorter leaves (6.0–20 cm long vs. 14.5–21.6 cm in *F. oxapampensis*).

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LECTOTYPIFICATION OF PERUVIAN CAMPANULACEAE NAMES ASSOCIATED WITH COLLECTIONS MADE BY AUGUSTO WEBERBAUER

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Abstract. We designate lectotypes for thirteen Peruvian *Centropogon* and *Siphocampylus* (Campanulaceae: Lobelioideae) names associated with type collections made by Augusto Weberbauer.

Keywords: *Centropogon*, lectotype, Lobelioideae, Peru, *Siphocampylus*

Augusto Weberbauer (1871–1948) was an explorer and botanist who made many important contributions to the understanding of the flora and phytogeography of Peru (Weberbauer, 1911, 1936, 1945). He amassed more than 8,000 specimens over the course of 35 years of active collecting in the early twentieth century (Velarde, 1968, 1969; León, 2002; Luteyn et al., 2008). His principal set of specimens was deposited at Berlin-Dahlem (B), and from there, duplicates were sent to other major European and American herbaria, including F, GH, K, NY, and US (Velarde, 1968; León, 2002). In addition, a few hundred of his specimens remained in Peru, where they are currently housed in the Weberbauer Herbarium (MOL) at the Universidad Nacional Agraria La Molina in Lima (Velarde, 1968; Luteyn et al., 2008). More than twenty percent of the specimens Weberbauer collected were recognized as new to science. Most of these new species were described from collections at Berlin (Luteyn et al., 2008). Unfortunately, many of these type specimens were destroyed during World War II. While many of the associated names have since been lectotypified (León et al., 2006; Luteyn et al., 2008; Burke and Michelangeli, 2013), the majority likely still require treatment.

Here, we designate lectotypes for thirteen names associated with type collections made by Weberbauer in *Siphocampylus* Pohl and *Centropogon* C. Presl (Campanulaceae: Lobelioideae), genera included in the centropogonid clade (Lagomarsino et al., 2014). Many specimens cited herein can be viewed on the JSTOR Global Plants website (https://plants.jstor.org/). Where possible, we designate specimens at MOL as lectotypes as they are in good condition and have the most complete label information available, sometimes including detailed descriptions of the plant and/or locality; specimens outside of Peru typically have a truncated version of this information. We place the names that we treat into two groups. The first comprises names erected by A. Zahlbruckner (1906), who did not designate herbaria in his original species descriptions. The second comprises names erected by Franz Elfried Wimmer (1924, 1929, 1935, 1943, 1953, 1968), who sometimes designated holotypes in his protologues, though frequently listed a series of syntypes. Some of these holotypes and syntypes were destroyed during the bombing of Berlin. We choose lectotypes for these names. We note that the majority of Weberbauer type specimens of Campanulaceae are extant, likely because they had been loaned to F. E. Wimmer, who was based in Vienna, Austria (W).

Lectotypification of taxa described by A. Zahlbruckner (1906)

Centropogon grandicephalus Zahlbr. Bot. Jahrb. Syst. 37(4): 454. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Amazonas: Östl. von Chachapoyas: zwischen den Tambos Almirantes und Incatambo, 1800–1900 m, 31 July 1904 (fl), *A. Weberbauer 4461*. Lectotype (designated here): *A. Weberbauer 4461* (B [10 0244141-barcode, digital image], negative of B sheet: F 30218).

Centropogon macrocarpus Zahlbr. Bot. Jahrb. Syst. 37(4): 452. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Huánuco: Provincia Huamalíes, Berge südwestlich von Monzon, gesträuch stellenweise unterbrochen durch moor und grassteppe, 3400–3500 m, 1906 (fl), *A. Weberbauer 3344*. Lectotype (designated here): *A. Weberbauer 3344* (G [00236661-barcode, digital image]).

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Homotypic synonym: *Burmeistera macrocarpa* E.Wimm. Repert. Spec. Nov. Regni Veg. 30: 41. 1932.

Centropogon pulcher Zahlbr. Bot. Jahrb. Syst. 37(4): 451. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Junín: Provincia Tarma, cerros al Oeste de Huacapistana, monte bajo compuesto de arbustos, 14 January 1903 (fl), 2000 m, *A. Weberbauer 2164* Lectotype (designated here): *A. Weberbauer 2164* (MOL [00209]; Isolectotypes: B-2 sheets [10 0244119, 10 0244121-barcode, digital image], G [006035, digital image], negative of B sheet: F 30221).

This name was invalidly lectotypified in the unpublished dissertation thesis of Bruce A. Stein (1987). While he had intended to designate a Berlin specimen with a photo negative available at F (30221) as the lectotype, we instead chose the MOL specimen as it is more complete and has been verified.

Centropogon weberbaueri Zahlbr. Bot. Jahrb. Syst. 37(4): 453. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Huánuco: Provincia Huamalíes, Berge südwestlich von Monzon, 3400–3500 m, 11 July 1903 (fl), *A. Weberbauer 3347*. Lectotype (designated here): *A. Weberbauer 3347* (B [10 0244102-barcode, digital image]); Isolectotype: B [10 0244103-barcode, digital image], negative of B sheet: F 30230).

Siphocampylus floribundus Zahlbr. Bot. Jahrb. Syst. 37(4): 460. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Huánuco: Provincia Huamalies, cerros al Sudoeste de Monzon, monte bajo tupido, siempreverde compuesto de arbustos y escasos arbolitos, predominando el follaje rígido, 2400–2500 m, s.d. (fl), *A. Weberbauer 3421*. Lectotype (designated here): *A. Weberbauer 3421* (MOL [00206]).

Siphocampylus macropodoides Zahlbr. Bot. Jahrb. Syst. 37(4): 458. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Áncash: Provincia Huaylas, Abajo de la Had. Cajamba, estepa de gramíneas con arbustos esparcidos, 3500 m, 30 May 1903 (fl), *A. Weberbauer 3201*. Lectotype (designated here): *A. Weberbauer 3201* (MOL [00205]; Isolectotype: B [10 024258-barcode, digital image]).

Siphocampylus sanguineus Zahlbr. Bot. Jahrb. Syst. 37(4): 456. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Amazonas: Provincia Chachapoyas, vertientes Orientales del valle del Marañón, encima de Balsas, monte bajo, siempreverde, compuesto de arbustos y pequeños árboles, predominando el follaje rígido, 3200 m, s.d. (fl), *A. Weberbauer 4285*. Lectotype (designated here): *A. Weberbauer 4285* (MOL [00204]; Isolectotypes: B [10 0242553-barcode, digital image], G [00237858-barcode, digital image], negative of B sheet: F 30245).

Siphocampylus superbus Zahlbr. Bot. Jahrb. Syst. 37(4): 455. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Cajamarca: Hualgayoc, 3600 m, 11 May 1904 (fl), *A. Weberbauer 3983*. Lectotype (designated here): *A. Weberbauer 3983* (B [10 0242547-barcode, digital image]; Isolectotype: B [10 0242548-barcode, digital image], negative of B sheet: F 30212).

Siphocampylus tortuosus Zahlbr. Bot. Jahrb. Syst. 37(4): 459. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Loreto: Moyobamba, 1500 m, 28 August 1904 (fl), *A. Weberbauer 4646*. Lectotype (designated here): *A. Weberbauer 4646* (B [10 0242546-barcode, digital image]; Isolectotype: B [10 0242545-barcode, digital image], negative of B sheet: F 30247).

Siphocampylus weberbaueri Zahlbr.–Bot. Jahrb. Syst. 37(4): 456. 1906 [24 Apr 1906].

TYPE: PERU. Departamento Cajamarca: Provincia Hualgayoc, encima de la Hacienda La Tahona, estepa de gramíneas con arbustos esparcidos, 3100–3300 m, 04 May 1904 (fl),), *A. Weberbauer 4019* . Lectotype (designated here): *A. Weberbauer 4019* (MOL [00203]; Isolectotypes: B-2 sheets [10 0242533, 10 0242534 -barcode, digital image], G [00237944, digital image], negative of B sheet: F 30213).

Lectotypification of taxa described by Wimmer (1929, 1935) based on Weberbauer collections

Siphocampylus albus E.Wimm. Repert. Spec. Nov. Regni Veg. 26: 17, pl. 72, fig. 15. 1929.

TYPE: PERU. Departamento Piura: Provincia Ayavaca, Ayavaca, 2700–2800 m, 1909–1914 (fl), *A. Weberbauer 6383* (Holotype: B, most likely destroyed; Lectotype (designated here): *A. Weberbauer 6383* (F [628514, digital image]; Isolectotype: GH [00033376-barcode]).

Siphocampylus citrinus E.Wimm. Repert. Spec. Nov. Regni Veg. 38: 75. 1935.

TYPE: PERU. Departamento Cuzco: Provincia Quispicanchi, Marcapata valley, Chaupichaca, mixed formation, 1700 m, 19–20 February (fl), *A. Weberbauer 7829*. Lectotype (designated here): *A. Weberbauer 7829* (F [605331, digital image]; Isolectotypes: (US [1496787, digital image]; K [000329901-barcode, digital image]).

Wimmer noted three collections of the type in the prologue ("Herb. Field, Wien, Berl.," i.e., F, W, B), of which only the one from F appears to be extant; it is here selected as the lectotype.

Siphocampylus nobilis E.Wimm. Repert. Spec. Nov. Regni Veg. 26: 12, pl. 72, fig. 23. 1929.

TYPE: PERU. Departamento Cajamarca: Provincia Jaen, above Shumaya, 2200–2300 m, 07 May 1912 (fl), *A. Weberbauer 6291*. Lectotype (designated here): *A. Weberbauer 6291* (F [548771, digital image]; Isolectotypes: GH, NY-2 sheets [00547290, 00547291-barcode, digital image], US [1496196, digital image]).

Wimmer noted two collections of the type in the prologue ("Hb. Berol. et Vid.," i.e., B and W), which the authors were not able to locate, and are presumed destroyed. We have chosen the specimen at F as the lectotype as it is in the best condition.

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TWO NEW SPECIES OF MYRTACEAE FROM ECUADOR

Maria Lúcia Kawasaki[1,2] and Álvaro J. Pérez[3]

Abstract. Two new species from Ecuadorian Amazon, *Calyptranthes yasuniana* and *Eugenia bullatifolia*, are described and illustrated. Their relationships to closest relatives in these genera are discussed. One hundred and forty-nine individuals of *C. yasuniana* and 68 individuals of *E. bullatifolia* with dbh ≥ 1 cm were recorded in a 25-ha plot at Yasuní National Park.

Resumen. Se describen y se ilustran *Calyptranthes yasuniana* y *Eugenia bullatifolia*, dos especies nuevas de Myrtaceae provenientes de la Amazonía Ecuatoriana. Se discuten sus relaciones con especies afines en los géneros. En una parcela de 25 ha en el Parque Nacional Yasuní se ha registrado un total de 149 individuos de *C. yasuniana* y 68 individuos de *E. bullatifolia* con DAP ≥ 1 cm.

Keywords: Myrtaceae, *Calyptranthes*, *Eugenia*, Ecuador, Yasuní, 25-ha plot.

Myrtaceae are represented in Ecuador by 16 genera and ca. 150 species; the genera with the largest number of species are *Eugenia* L. (ca. 50) and *Calyptranthes* Sw. (ca. 30). Several new species of these genera have been described based on material collected in the Yasuní National Park (Holst and Kawasaki, 2006; Kawasaki and Holst, 2005, 2009a, 2009b, 2009c), probably the richest center of diversity in the world for woody plants (Bass et al., 2010), located in the Ecuadorian Amazon. Two additional ones are here described and illustrated.

Calyptranthes yasuniana M. L. Kawasaki & A. J. Pérez, *sp. nov.* TYPE: ECUADOR. Orellana: Yasuní National Park, Yasuní Scientific Station, 50-ha plot, south trail, 00°38'S, 76°30'W, 200–300 m, 24 November 2010 (fl), *A. J. Pérez, W. Loor & J. Suárez 4955* (Holotype: QCA; Isotype: F). Fig. 1.

This new species is similar to *Calyptranthes macrophylla* O. Berg in leaf morphology; it is distinguished by the very short 3-flowered, velutinous inflorescences, with flower buds tearing at anthesis into irregular lobes, one of them with a calyptriform tip.

Trees 5–15 m high; trichomes dibrachiate, yellowish-brown to yellowish, on lower surface of leaves, inflorescences, and fruits; stem branching bifurcate, the branchlets terete in cross section. *Leaf blades* narrowly elliptic, coriaceous, 18.5–25 × 5–9 cm, glabrous and drying olive-green to brownish above, greyish or yellowish below, sericeous-pubescent; glands indistinct on both surfaces; midvein impressed above, convex below; lateral veins ca. 15–20 pairs, slightly convex on both surfaces; marginal vein 1, 1–2 mm from blade margin, similar to the lateral veins in prominence; apex obtuse to shortly and abruptly acuminate, the acumen 3–10 mm long; base broadly cuneate; petioles 8–10 mm long, channeled, pilose. *Inflorescences* subterminal, of paired, very abbreviated panicles, pauciflorous, with 3 flowers, to 2 cm long, the main axis ca. 1 cm long, velutinous; bracteoles not seen, early deciduous. *Flower buds* closed, obovoid, apiculate, 7–8 mm long, sessile to subsessile; calyx lobes irregularly shaped, one of them calyptriform at the tip, velutinous without, deciduous; petals not seen; hypanthium prolonged ca. 2 mm beyond the ovary, velutinous without; disk ca. 2 mm diam., glabrous; stamens numerous, the filaments ca. 5–7 mm long, the anthers ca. 0.5 mm long; style ca. 8 mm long, the stigma punctiform; ovary 2-locular, with 2 ovules per locule. *Fruits* globose to oblate, crowned by remnants of the calyx lobes, 1.3–2 × 1.4–2.4 cm; seeds 1 or 2, ca. 12 × 9 mm, the seed coat membranous; embryo myrcioid, the cotyledons leafy and folded, the radicle elongate, equaling the cotyledons in length.

Among the Neotropical Myrtaceae, *Calyptranthes* is probably the genus that is most readily recognized by biologists. *Calyptranthes yasuniana* is, however, atypical in the genus: at anthesis, the calyx is not clearly calyptriform, but it tears into irregular lobes, one of them with an early deciduous calyptriform tip; the fruits are not crowned by a circular scar, but by remnants of these lobes. Nevertheless, at the Yasuní National Park, this new species was already assigned to *Calyptranthes* because of the combination of other distinguishing characteristics of the genus (indumentum with dibrachiate hairs, dichotomous branchlets, and paired panicles with closed flower buds).

In leaf morphology, *Calyptranthes yasuniana* is similar to *C. macrophylla* O. Berg (including *C. speciosa* Sagot), a species known from Northern South America to Bolivia. These two species are contrasted in the following key:

1a. Inflorescences 3-flowered, to 2 cm long, velutinous; flower buds 7–8 mm long; calyx tearing into irregular lobes at anthesis, one of them calyptriform at the tip; fruits crowned by remnants of the calyx lobes. . . . . *C. yasuniana*

1b. Inflorescences with more than 3 flowers, usually multiflorous, 5–10 cm long, appressed-pubescent; flower buds 3–5 mm long; calyx calyptrate and circumscissile at anthesis; fruits crowned by a circular scar . . . . . *C. macrophylla*

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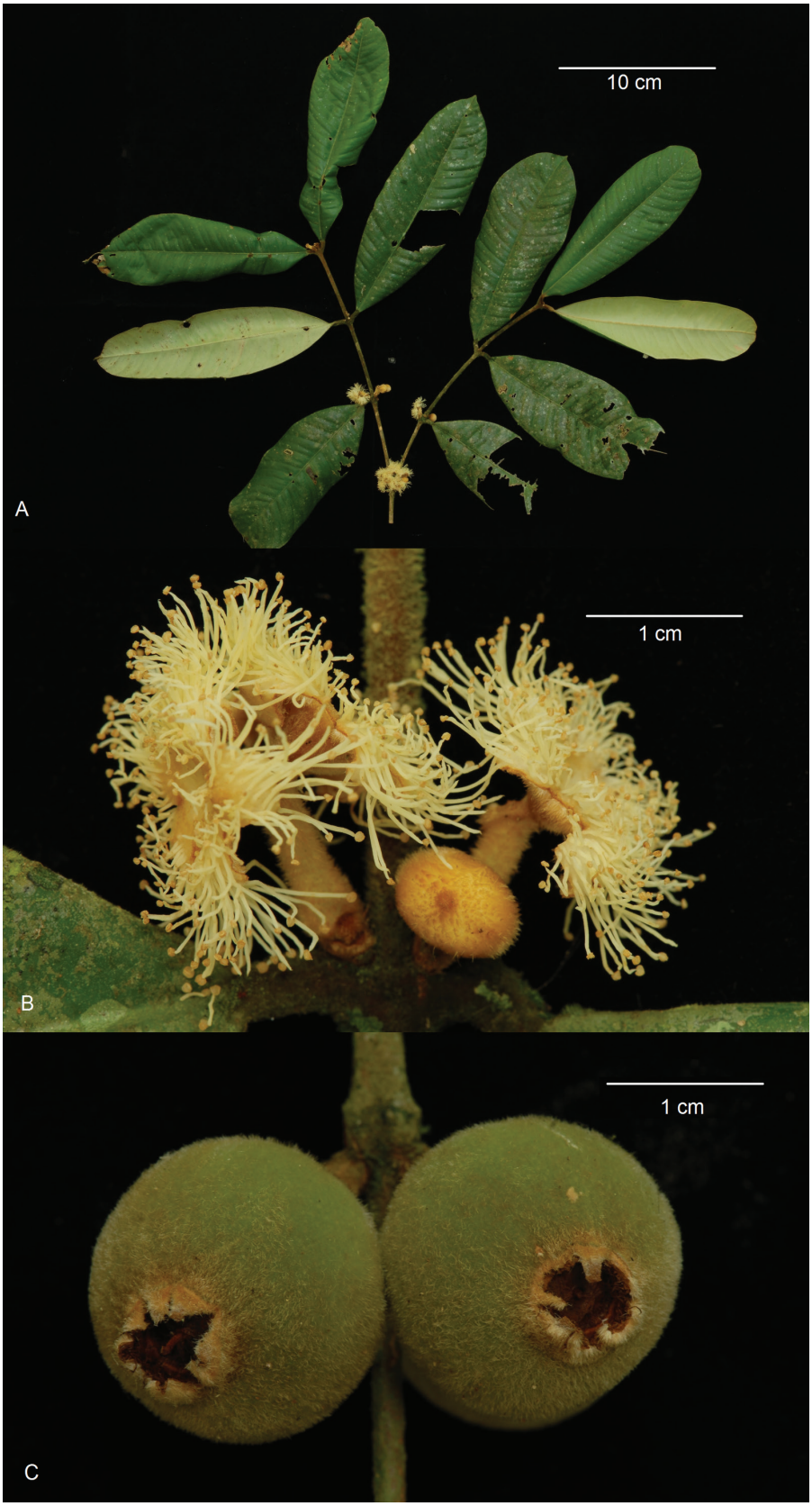

FIGURE 1. *Calyptranthes yasuniana* M. L. Kawasaki & A. J. Pérez. **A**, Branchlet with leaves and inflorescences; **B**, Flowers; **C**, Fruits. A–B from *Pérez 4955* (QCA); C photo by Wilson Loor.

FIGURE 2. *Eugenia bullatifolia* M. L. Kawasaki & A. J. Pérez. **A**, Leaves and inflorescences; **B**, Flowers. A–B from *Pérez 4676* (QCA).

Etymology: Named after the type locality, Yasuní National Park.

Additional specimen examined: ECUADOR. Orellana: Yasuní National Park, Yasuní Scientific Station, 50-ha plot, tag # 235026, 00°38'S, 76°30'W, 200–300 m, 27 Apr 2004 (fr), *G. Villa, P. Alvia & M. Zambrano 3056* (QCA).

Distribution and habitat: Known only from the Yasuní National Park in Orellana Province, in lowland wet forests. To date it has been recorded only in a 25-ha plot in the forest surrounding the Yasuní Scientific Station. Inside this plot, there are 149 individuals with dbh ≥ 1 cm (6 individuals per hectare); between 2002 and 2007, the annual mortality rate was 1.98% and the annual growth rate was 0.43 mm per year.

Phenology: Flowering in November; fruiting in April.

Eugenia bullatifolia M. L. Kawasaki & A. J. Pérez, *sp. nov.* TYPE: ECUADOR. Orellana: Yasuní National Park, Yasuní Scientific Station, "Napo" trail, 00°40'40"S, 76°23'40"W, 200–300 m, 26 January 2010 (fl), *A. J. Pérez & W. Santillán 4676* (Holotype: QCA; Isotype: F). Fig. 2.

This new species is similar to *Eugenia stipitata* McVaugh in the morphology of inflorescences; it is distinguished by the leaves that are strongly coriaceous and bullate, with longer petioles.

Trees 12–15 m high, the trichomes yellowish-white on leaves and inflorescences; stems slightly compressed. *Leaf blades* narrowly elliptic to elliptic, or slightly ovate, 9–21 × 6–11.5 cm, strongly coriaceous and bullate, drying olive-green, greenish-brown to brown on the upper surface, paler on the lower surface, sparsely pubescent, the trichomes especially evident near veins; glands indistinct above, dark and salient below; midvein plane to impressed above, convex below; lateral veins 8–12 pairs, strongly impressed above, convex below, joining in large arches, not forming a clear marginal vein; apex abruptly acuminate, the acumen 1–1.5 cm long; base cuneate to obtuse; petioles 8–12 mm long, flattened, pubescent. *Inflorescences* axillary, of irregular racemes, 1.5–5 cm long, densely pubescent, the pedicels 1–1.5 cm long, with 1–3-flowers; bracteoles ovate to linear, 1–3 mm long. *Flowers* 4-merous, densely pubescent; buds subglobose to obovoid, 6–8 mm long; calyx lobes ca. 5 × 4–5 mm, obtuse; petals white, ca. 9 mm long, obtuse, ciliate; disk ca. 5 mm diam., densely pubescent; stamens numerous, the filaments 5–7 mm long, the anthers ca. 1 mm long; style 8–9 mm long, the stigma punctiform; ovary 4-locular, with several ovules per locule. *Fruits* not known.

Eugenia bullatifolia is similar to *E. stipitata* McVaugh, a species from Colombia, Amazonian Brazil, Peru, Ecuador, and Bolivia, commonly cultivated for its edible fruits ("araçá-boi" in Portuguese, "[Guayaba] araza" in Spanish). In both species, the racemes are irregular with 1–3-flowered pedicels, the ovary is unusually 4-locular, and the leaves have few pairs of lateral veins that join in large arches, not forming a clear marginal vein. In *E. bullatifolia*, however, the leaves are strongly coriaceous and bullate (vs. chartaceous to coriaceous, not bullate), cuneate to obtuse (vs. obtuse to subcordate) at base, and the petioles are 8–12 mm long (vs. 1–4 mm long). In *E. stipitata*, the bracteoles are distinctively below the hypanthium (thus the flowers are stipitate), but this characteristic is not clearly seen in *E. bullatifolia*.

Etymology: The specific epithet denotes the bullate leaves.

Additional specimen examined: ECUADOR. Orellana: Yasuní National Park, Yasuní Scientific Station, "Botánico" trail, 00°38'S, 76°30'W, 200–300 m, 30 May 2013 (fl), *A. J. Pérez, W. Loor & P. Alvia 6348* (F, QCA).

Distribution and habitat: It has been collected only in the Yasuní National Park, in lowland wet forest in a 25-ha plot. Inside this plot, there are 68 individuals with dbh ≥ 1 cm (3 individuals per hectare); between 2002 and 2007, the annual mortality rate was 0.83% and the annual growth rate was 0.38 mm per year.

Phenology: Collected with flowers in January and May.

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ETHNOBOTANY OF THE HAWRAMAN REGION OF KURDISTAN IRAQ

SAMAN A. AHMAD[1,2] AND ALI A. ASKARI[3]

Abstract. An ethnobotanical survey was carried out in the Hawraman region, southern Kurdistan, Iraq. A total of 64 plant species belonging to 30 families are currently utilized in various traditional uses, including local foods, medicines, tools, gums, fodder, tanning, and dyes, among others. Data were gathered from local markets, where various plant parts were sold, as well as from interviewing elderly villagers. For each ethnobotanical entry, the species, plant family, and Kurdish names are given.

Keywords: Iraq, Kurdistan, Hawraman, Ethnobotany

Ethnobotanical studies involve the documentation, description, and interpretation of complex relationships among and within cultures, and ultimately how plants are utilized across human societies. Unfortunately, the ethnobotanical heritage of various ethnic groups, especially in undeveloped or developing countries, is rapidly disappearing before being recorded. Kurdistan Iraq is no exception.

During work on the flora of Hawraman Mountains in Kudistan Iraq, Ahmad (2013) paid special attention to the ethnobotany of the Hawrami people. It had never been recorded before: many parts of the mountain have been isolated from the rest of the world for many centuries. Two ethnic-religious groups of Hawrami people, the Kakais (or Yarsane) and the Naqshbandi, have lived in the area since the sixth and twelveth centuries, respectively. Although their religious and social beliefs are well known (http://en.wikipedia.org/wiki/Y%C3%A2rs%C3%A2nism, http://www.highbeam.com/doc/1G1-135732899.html), hardly anything is known about their ethnobotanical heritage.

Hawraman Mountains are located between 35˚05'–35˚20'N and 45˚53'–46˚11'E and occupy a total area in Iraq of 660 km^2. They are part of the Zagros system, a massive range that extends from southeastern Turkey along the Iranian-Iraqi border into southwestern Iran. Hawraman region has a very diverse geology and topography that resulted in numerous micro-habitats and a rich botanical diversity (Jassim & Goff, 2006).

The ethnobotanical compilation presented here is based primarily on information from the local elderly via recorded interviews, the purchase and photography of artifacts from craftsmen shops, and documentation throughout the year of the native wild plants on sale in the markets of Hawraman towns and villages. Fruits, vegetables, cereals, and other economically important foods grown and consumed worldwide (e.g., grapes, apricots, pomegranates, apples, pears, plums, corn, rice, wheat, barley, walnuts, almonds, various legumes and mustards, etc.) are not dealt with herein except in cases where they are used in Hawraman in ways not known elsewhere, or only used in other parts of Kurdistan Iran, Iraq, Syria, and Turkey.

The Hawraman plants below are arranged according to their uses, and species scientific names are followed in parentheses by family and Kurdish (hereafter K) names.

Foods

Leaves and bulbs of the wild onion *Allium akaka* Gmelin (Amaryllidaceae; K: lucha) are used in omelet preparation..

The young, immature fruits of *Pistacia eurycarpa* Yalt. (Anacardiaceae; K: daraban) are eaten fresh before the stony endocarp (inner fruit wall) hardens; the mature fruits are salted and the seeds are eaten.

The young basal leaves of *Hellenocarum amplifolium* Boiss. & Hausskn. (Apiaceae; K: Bareza) are used as a vegetable.

After treatment with sumac and straining, the leaves of *Arum italicum* Mill. (Araceae; K: karduw) are used either as a wrap in the preparation of dolma (a famous Middle Eastern dish) or chopped and mixed with eggs to prepare an omelet.

The leaves of *Melissa officinalis* L. (Lamiaceae; K: hallall perajenana) are also used as a wrap in dolma preparation.

The young plants of *Gundelia tournefortii* L. (Asteraceae; K: kinger) are eaten fresh or boiled or fried with eggs and onions to produce the Kurdish dish kinger kabab or kinger masie. The woody dry fruits are salted, roasted, and sold throughout Kurdistan for their edible seeds. Furthermore, in western and central Anatolia, the leaves are used in roasts, salads, and pickles (Dogan, 2004).

The tender stems of the Asteraceae Syrian thistle *Notobasis syriaca* (L.) Cass. (K: chawbaza) and milk thistle *Silybum marianum* L. (K: chawbaza) and the fleshy roots of several species of *Scorzonera* (K: gulla bahara) are eaten fresh as vegetables.

The seedlings of *Bongardia chrysogonum* (L.) Spach (Berberidaceae; K: Gablla) are chopped and mixed with eggs to make a special type of omelet.

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The young rosettes of *Anchusa italica* Retz. (Boraginaceae; K: gozrwan) are boiled, and fried with eggs, and flavored with sumaq and eaten as an omelet. The dried leaves and flowers of this *Anchusa* species are used to prepare a tea taken as a tonic (Chakravarty, 1976).

The acorns of *Quercus aegilops* L. (Fagaceae; K: dar baroo, mazo, mazi) are sold in the local markets, roasted and eaten in winter.

The seed of *Juglans regia* L. (Juglandaceae; K: guez) are eaten raw or used im making cakes.

The chopped and boiled parts of various *Malva* species (Malvaceae; K: tollaka) are mixed with eggs and fried to prepare a traditional dish.

The very young inflorescences of *Imperata cylindrica* (L.) P.Beauv. (Poaceae) are eaten fresh.

The spikes of wheat, *Triticum* spp. (Poaceae; K: ganme sawar) are harvested before the seeds are dry and mixed with hay and set on fire. After roasting, the kernels are dried and crushed and later cooked like rice in the preparation of a typically Kurdish dish called qarakharman. Fig. 1.

The fresh leaves of *Rumex crispus* L. (Polygonaceae; K: trshoka) are eaten raw or used for preparing dolma, whereas the young petioles of wild rhubarb, *Rheum ribes* L. (Polygonaceae; K: rewass), are pealed and eaten as a fresh vegetable.

The aboveground parts of common purslane, *Portulaca oleracea* L. (Portulacaceae; K: Pallpena), are used as a fresh vegetable in salads, or mixed with lentils to prepare a special soup (Pallpena Batrsh).

Several wild members of the rose family (Rosaceae), such as hawthorn, *Crataegus monogyna* Jacq. and *C. azarolus* L. (K: goezh), *Prunus microcarpa* (C.A.Mey.) Boiss. (K: ballaluk), and wild blackberry *Rubus* spp. (K: tutrik) have eible fruits sold in the local markets. The fresh or dried fruits of *Ficus carica* L. (Moraceae; K: hanjer) are utilized to make a jam (Chakravarty, 1976), and they are also eaten as a demulcent and laxative (Al-Rawi & Chakravarty, 1964).

Medicines

The leaves and rhizomes of *Adiantum capillus-veneris* L. (Pteridaceae) are used as pectoral expectorant, sudorific, tonic, stimulant, astringent, emollient, soothing, diuretic, and in the treatment of chronic cough and cold (Al-Rawi & Chakravarty, 1964). The Rhizomes and leaves are also used as antilithic tea (Ali, 2009), whereas in eastern Anatolia the herbs and leaves are used for Kidney stones, tonic, intestinal disorders, and as an orexigenic (Altundag & Ozturk, 2011).

A decoction mash of the fresh fruits of *Ammi majus* L. (Apiaceae; K: danpakrawa) is used for vitiligo or as an emollient in small concentrations (Al-Douri, 2000).

The decoction of the root, leaves, and flowers of *Alcea kurdica* (Schlecht.) Alef. and *Althaea officinalis* L. (both Malvaceae) are used to cure irritation and inflammation of the mucous membrane (Al-Rawi & Chakravarty, 1964). Also, in east Anatolia, *Althaea officinalis* L., and *A. cannabina* L. are used as a diuretic and treatment of kidney stones (Altundag and Ozturk, 2011).

Flowers of *Anchusa italica* (Boraginaceae; K: gozrwan) are used in a tea-like tonic to lower pulse rate (Al-Rawi & Chakravarty, 1964) and as an analgesic, sedative, sudorific, and diuretic (Al-Douri, 2000).

The Juice and peel of *Punica granatum* L. are used for the treatment of diarrhea (Lev & Amar, 2000).

Freshly crushed stems of the native wild pistachio, *Pistacia eurycarpa*, exude a bitter gum (K: bneshta tall) used to cure gastrointestinal problems. A mixture of this gum with finely shreded soap made from pistacia oil is used as a dressing to clean old wounds or to erupt boils. A tea made from the dried fruit is used as antidiarrheal medicine. The gum collected from plants growing in the Kurdish towns Çuar qurne, Zaxo, and Ranya, is sold in the Qaysari, Market, Erbil, Kurdistan Autonomous region Iraq for the treatment of gastric ulcers, stomach pain, sour eructation, poor appetite, catarrhal inflammation, dry cough, diarrhea, diabetes, stomatch problem, gastric ulcers, hypertension, cancer, and diabetes, (Rivera et al., 2012).

The fresh or dried leaves of Ferulago abbreviata C.C. Towns. (Apiaceae; K: chnur) are used as foot deodorant by placing them inside footwear.

After boiling and straining the leaves and roots of *Arctium lappa* L. (Asteraceae), the liquid is drunk for the treatment of gastrointestinal problems and chest pain. The root is used in the treatment of skin diseases, burns and gout, and strengthening hair, (Al-Rawi & Chakravarty, 1964). Similarly, a decoction of all plant parts of *Artemisia haussknechtii* Boiss. (Asteraceae; K: barzaling) is drunk for the treatment of diabetes, weight loss, and as a carminative.

The roots and basal parts *Tragopogon longirostris* Bisch. (Asteraceae; K: shing) are eaten fresh and allegedly believed to be aphrodisiac.

A tea prepared from fresh or dry bulbs of *Iris reticulata* M.Bieb. (Iridaceae) is used to cure tonsillitis.

The roots of *Aristolochia bottae* Jaub. & Spach (Aristolochiaceae; K: marska) are used as an antiseptic to treat cuts, wounds, and leprosy (Al-Rawi & Chakravarty, 1964).

All plant parts of *Equisetum ramosissimum* Desf. (Equisetaceae; K: klka rewe) are used for stop bleeding and help in kidney troubles (Al-Rawi & Chakravarty, 1964).

The dried aboveground parts of *Hymenocrater longiflorus* Benth. (Lamiaceae; K: surahallalla) are boiled with water and used as a compress against scorpion stings; whereas a tea from the upper parts of *Prunella vulgaris* L.(Lamiaceae) is used in the treatment of colds and asthma.

The aboveground fresh parts of various species of *Malva* (Malvaceae; K: tollaka) are chopped and boiled in water and eaten to treat constipation; and flowers and leaves are particularly suitable for coughs and colds (Al-Rawi & Chakravarty, 1964).

Although eaten fresh or dried, the fruits of white mulberry *Morus alba* L. (Moraceae; K: twa spee) and black mulberry *M. nigra* L. (K: twa rasha) are soaked and consumed for the treatment of constipation.

The leaves of *Plantago lanceolata* L. and *P. major* L. (Plantaginaceae; K: ragakesha, guebarkha) are compacted together and used as a compress to alleviate pain associated with rheumatism and bruises. Furthermore, in Hawraman and other parts of Iraq, the decoction of the areal parts is used for treatment of chest infections and as an aperitive (Al-Douri, 2000).

FIGURE 1. Roasting the spike and kernels of *Triticum* spp. (Poaceae; K: ganme sawar) in the field prior to preparing a typical Kurdish dish called qarakharman.

The unripe fruits of almond *Prunus amygdalus* Batsch. (Rosaceae; K: badam, chwala) are eaten fresh before becoming bitter. They are allegedly useful for weight loss and as a hypotensive agent.

The crushed ripe seed of *P. microcarpa* C.A.Mey. cause severe diarrhea, and small amounts of it are used as a laxative.

The underground parts of various wild blackberries of the genus *Rubus* are chopped to prepare a tea used for alleviating intestinal cramps.

A tea made of the petals and rosehips of *Rosa canina* L. (K: shelan) is used as hypotensive and a weight-loss medication. In east Anatolia, leaves of this species are used for colds, tonic, asthma, kidney stones, whereas the fruits and roots are used as an anti-hemorrhoidal, tonic, immunostimulant, antitussive, and diuretic, as well as for the treatment of cough, stomachic disorders, constipation, bronchitis asthma (Altundag and Ozturk, 2011).

The burned branches of Jerusalem thorn, *Paliurus spina-christi* Mill. (Rhamnaceae; K: zee) give greasy material used for the treatment of eczema.

The leaves of *Urtica urens* L. (Urticaceae; K: gazna) are used Kurdista, Israel, and other parts of SW Asia for the treatment of fever, blood cleansing, heart diseases, rheumatism (Lev & Amar, 2000; Ali, 2009).

A decoction of fresh plant of *Fumaria parviflora* Lam. (Papaveraceae; K: shatara) is used as a diaphoretic, tonic, diuretic, anthelmintic, aperient, laxative, and alterative (Chakravarty, 1976).

The leaves of *Juglans regia* are used as an astringent, tonic, and anthelmintic. The leaves and bark are used as alterative and detergent and are given to treat herpes, eczema, scrofula and syphilis. The fruits are considered alterative in rheumatism. Vinegar of the pickled young fruits is used as gargle in sore throat. The green hull and unripe shell are considered useful in syphilis and are vermifugal. The oil is used against tapeworm and as a laxative (Chakravarty, 1976). In east Anatolia the leave are used as antihemorrhoidal, anthelmintic, and hemostatic, and treatment of fungal infection, eczema and abscess (Altundag and Ozturk, 2011).

The whole plants of *Mentha longifolia* (L.) Hudson (Lamiaceae; K: poungga) are used as a carminative, antiseptic, stimulant (Al-Rawi & Chakravarty, 1964). Also in east Anatolia the species is used for colds, flu, cough, abdominal pain, menstrual pain, stomachic disorders, bronchitis, headache, pulmonic disorders, diarrhoea, asthma, and as an antihemorrhoidal (Altundag and Ozturk, 2011).

The root decoction of *Euphorbia helioscopia* L. (Euphorbiaceae; K: sherkhwshelk) is used as an anthelmintic and laxative, whereas leaf decoction is used as an anthelmintic for treatment of anasarca, antimalarial, and antifever (Al-Douri, 2000).

The flower decoction or infusion of *Matricaria chamomilla* L. (Asteraceae; K: gwlla hajela) is used as an antipyretic, antirrhumatic, and depurative; for treatment of common cold and colpitis; and as gargle for treatment of sphagitis, gingivitis, uloglossitis, gingivostomatitis (Al-Douri, 2000).

Tools

The fine wood of native maple *Acer monspessulanum* L. (Aceraceae; K: kawit) is used in the manufacture of several household utensils such as pina (K: darxona) used for spreading dough in preparing traditional Kurdish bread (K: nani Hawrami and nani Teeri), large spoons for drinking buttermilk (K: mastaw), combs (K: shana), and smoking pipes (K: qulda).

The dry ripe fruits of *Pistacia eurycarpa* are bored from two opposite ends and converted into necklaces and prayer worry beads (K: tazbeh). The full mature fruits of *Pistacia khinjuk* Stocks are used for making neckaces (K: tazbeh) in Kurdistan (Qazi, 1990).

Walnut, *Juglans regia*, is the most commonly cultivated tree in Hawraman, both for its fruits and wood. In addition to its extensive use in the manufacture of furniture, doors, and windows, the wood of walnut is used for making a tool locally called "terok," used for spreading dough in the preparation of local bread, and also for making "blwer," used to drain urine from children during their night sleep in the cradle (K: beshka, lank).

The young branches of the native ash, *Fraxinus syriaca* Boiss. (Oleaceae; K: bnaw), are used for making canes (K: gochān).

As in many other parts of the world, the locals use the stems of common reed, *Phragmites australis* (Cav.) Trin. ex Steud. (Poaceae; K: qamish) in making flutes (K: blewer).

The young braches of *Prunus microcarpa* are used for making canes, and the woody inner fruit wall is used for making worship beads (K: tazbeh).

The young branches of willow, *Salix acmophylla* Boiss. (Salicaceae; K: bee) are used for making baskets (K: barchina), beehives (K: zambila meshhang), and bread baskets (K: tilyana).

The young branches of hackberry, *Celtis australis* L. (Ulmaceae; K: dara rash), are used for making canes.

Gums

The local chewing gum (K: bnesht) is made from the fresh gummy exudate (bneshtatall) from the stems of *Pistacia eurycarpa* (see above) by boiling the exudate in water and discarding the water after cooling to obtain the chewing gum.

Several shrubby species of *Astragallus* (Fabaceae; K: katera or gawan) are used as a source of gum tragacanth, which was sold in Kurdistan markets until about the mid 1960s. Gillett recorded on the herbarium sheets that the gum (K:Gazu) of *A. carduchorum* Boiss. & Hausskn is eaten by the local Kurdish people but not sold in the markets (Chakravarty, 1976).

Condiments

The fresh or dried fruits of *Pistacia eurycarpa* are used as a condiment mixed with yogurt.

The seeds and fruits of wild sumac, *Rhus coriaria* L. (Anacardiaceae; K: trsha sumaq, smaq), are used in flavoring many traditional dishes in Kurdistan and as a spice in Anatolia (Dogan, 2004).

The dried leaves of *Mentha longifolia* and *Satureja laxiflora* C. Koch (K: hezba), both Lamiaceae, are used in the flavoring local dishes, and their flowers are used in hot drinks (Dogan, 2004).

Fodder

The aboveground parts of *Ferulago angulata* (Schlechtl.) Boiss. (Apiaceae; K: low) are harvested when green, dried in the sun, and piled for use in winter as hay (K: Gzra).

The aboveground green parts of the mature plant of *Gundelia tournefortii* are cut, dried, and crushed into coarse pieces and used as fodder for animals.

The young oak branches (K: shakhal) of *Quercus infectoria* Oliv. and *Q. aegilops* L. (K: dar baroo, mazo, or mazi) are piled either under a heavy pile of stones or among the major branches of oaks (K: gull) and are kept as feed for goats and sheep in the winter (Rivera et al., 2012).

During its flowering period, the locals collect *Phalaris arundinacea* L. (Poaceae; K: zhazh) as forage.

Oil-cake of *Juglans regia* is used for cattle feed, and the cake contains protein (35%), fatty oil (12.5%), carbohydrates (27.6%), fiber (6.7%), and ash (5.1%) (Chakravarty, 1976).

Tanning

The acorn cups (K: gawit) and insect galls of the native oaks *Quercus infectoria* and *Q. aegilops* are used for leather tanning in Kurdistan. The fruit rind of pomegranate, *Punica granatum* (Lythraceae; K: hanar), is also used locally in tanning, though the plant is widely cultivated for its fruits and syrup (K: rubahanar), which is extensively used for juice and countless local cusines and salad dressing. The bark, leaves , and green shells of *Juglans regia* are also used for tanning (Chakravarty, 1976).

Dyes

The green outer fruit wall of walnut is macerated in water, and the aqueous part is used for dying local textiles a permanent dark brown. The bark of the fully grown walnut tree is peeled, dried, soaked in water, and used as a lipstick, especially by villagers outside of Kurdistan.

Construction

The trunk of the oriental plane tree, *Platanus orientalis* L. (Platanaceae; K: swra chnar), is used as the main beam in the roof construction of local housing.

The stems of common reed, *Phragmites australis* (K: qamish), are used in the construction of fences, partitions in village homes, and roofs.

The dry, pealed stems of white poplar, *Populus alba* L. (Salicaceae; K: spedar, chnar), are extensively used in the construction of roofs of traditionalhouses in Hawraman and the rest of Kurdistan.

Miscellaneous

The trunks and thick branches of native oaks (*Quercus infectoria* and *Q. aegilops*) are used for making charcoal, and the thick and straight branches are used in roofing.

The rays of the Umbles of *Ammi majus* Linn. when dry are used as tooth picks (Chakravarty, 1976).

The oil of walnuts (*Juglans regia*) is used in paint by artists, and it is also utilized for printing ink, varnishes, and in thesoap industry (Chakravarty, 1976).

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