

Illustrations and Studies in Neotropical Orchidaceae.

3. On the identity of *Dracontia pachyglossa* and *D. ramonensis*; with a new species, *D. lueriana* (Pleurothallidinae)

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Abstract

The Costa Rican *Dracontia ramonensis* is discussed and illustrated. It had been already illustrated as early as 1867 by A.R. Endrés, but only described in 1923 by Rudolf Schlechter. Costa Rican specimens of that species have been misidentified as *Dracontia pachyglossa*, a species known only from Mexico and Guatemala. Additionally the name *Dracontia ramonensis* has been incorrectly applied to an unnamed species from Costa Rica, here described and illustrated as *D. lueriana*.

Keywords. Costa Rica, Orchidaceae, *Dracontia*, *D. pachyglossa*, *D. lueriana*, *D. ramonensis*, C.A. Luer.

Introduction

This paper was prepared as part of the series “Illustrations and studies in Neotropical Orchidaceae”, by the staff at Lankester Botanical Garden (JBL), University of Costa Rica, aimed at discussing and illustrating small groups of closely related species (PUPULIN & BOGARÍN 2010). Pleurothallidinae are one of the main subjects of current research programs at JBL. Species of *Pleurothallis* R. BR. subgenus *Dracontia* were transferred to *Stelis* SW. by PRIDGEON & CHASE (2001) and subsequently to *Dracontia* LUER (LUER 2004). DNA based studies by PRIDGEON et al. (2001) and KARREMANS (2010) show that the group is in effect closer to *Stelis* than to *Pleurothallis*. However, as discussed by KARREMANS (2010; 2011), the *Dracontia* form a well supported monophyletic clade which can easily be defined using morphological features. Keeping this group of species (and a few others) separate from *Stelis* also helps to better define *Stelis* itself on morphological grounds without losing DNA based clade support. As such *Dracontia* includes some 20 species, found from Mexico to Panama and the Antilles. More than three quarters of the species have been reported to be found in Costa Rica, several of which still await description.

Taxonomic history of *Dracontia ramonensis*

The history of this species remounts to 1867, when August R. Endrés lived in San Ramón, Costa Rica, where he then profusely collected plants (OSSENBACH et al. 2010). Endrés not only sent many dried specimens to Heinrich Gustav Reichenbach, the leading authority

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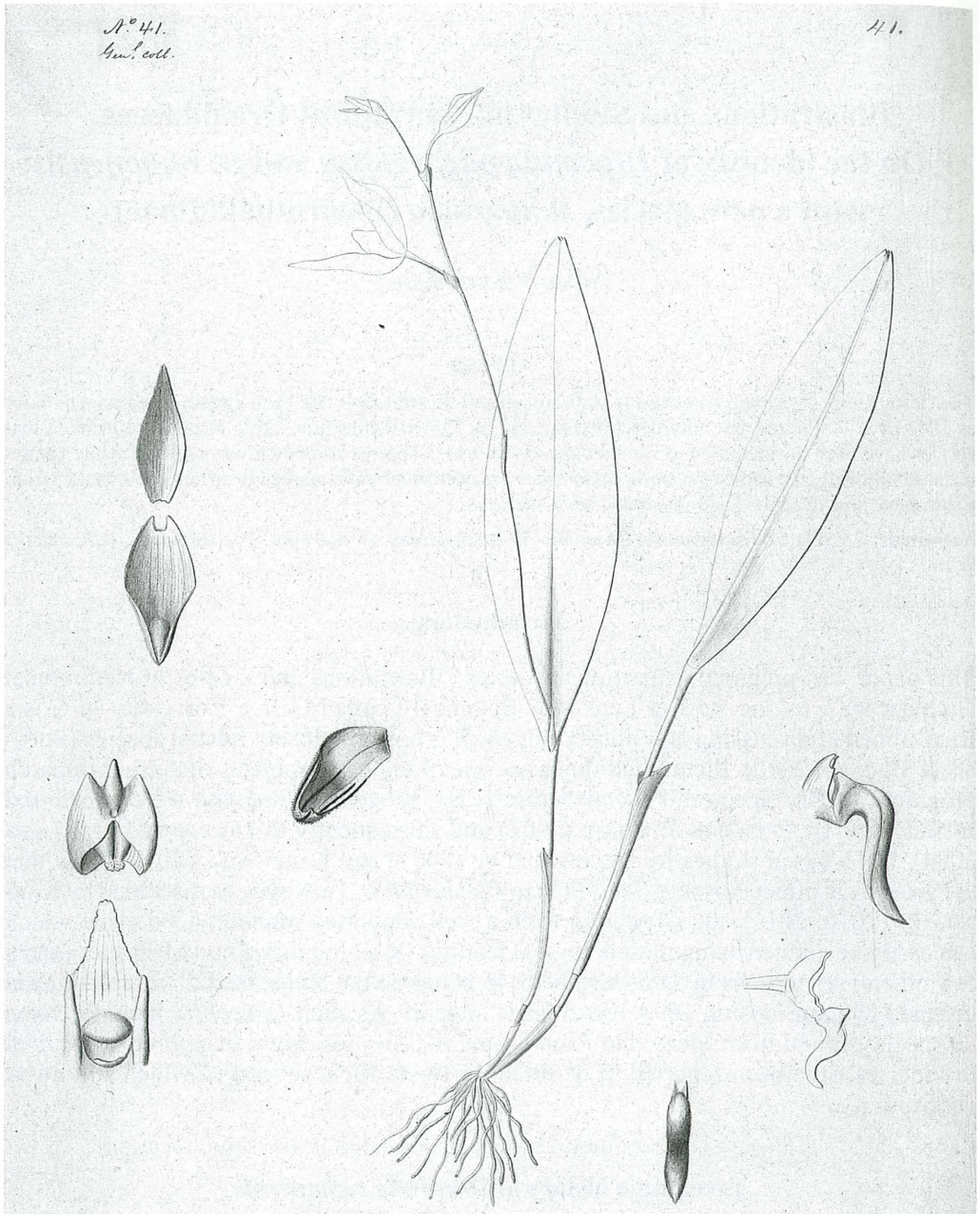


Fig. 1: *Dracontia ramonensis*. Illustration by A.R. Endrés based on Endrés 41.

on orchids at the time, but also prepared detailed sketches and descriptions of many of the species he found. One of the plants he collected, sketched and characterized was his number 41, preserved at W (Fig. 1 & 2). L.A. Garay determined this plant in 1957 as *Pleurothallis pachyglossa* LINDL., and the specimen was used as one of the two Costa

Pijiquil
 flowers membranous. Sepals deeply concave. x
 Lower ^{eyes} sepals connate. ~~Black~~ except the inner base which is white.
 Petals membranous pubescent on the inner side, glabrous on the ^{inner} outer side (transparent).
 Margins and three longitudinal nerves black on their apical ^{two thirds}
 Labellum fleshy, black, with two membranous white wings
 on the hypochil. ^{the dissepiment} Apra of column (very diminutive) black

Fig. 2: *Dracontia ramonensis*. Description by A.R. Endrés based on Endrés 41.

Rican vouchers of that species by C.A. Luer in his treatment of *Pleurothallis* subgenus *Dracontia* (LUER 1998).

Pleurothallis pachyglossa was described in 1840 by John Lindley, based on a plant from Mexico. The species, as noted, has an outstanding flower size and is quite attractive; it can be recognized by the thick tongue-like lip which thickens towards the apex and is verrucose-papillose. Luer gave *P. pachyglossa* a wide distribution, pointing out that it is quite common in Mexico and Guatemala, absent in Honduras, El Salvador and Nicaragua, and uncommon in Costa Rica (LUER 1998). As clearly illustrated by Endrés and successively noted by Ames on the herbarium specimen of this species, the lip of the species from Costa Rican is inornate and narrow, much different from that of *P. pachyglossa*.

In 1923, Rudolf Schlechter described *Pleurothallis ramonensis* from a plant collected by Alberto Manuel Brenes at San Pedro de San Ramón in Costa Rica. As with most of Schlechter's species, the type specimen was lost and no drawing of the original material was apparently made. The species was lectotypified by K. BARRINGER (1986) and again by LUER (1998) using an isotype kept at AMES (Fig. 3). The lectotype shows a small plant with several ramicauls, a few short leaves, and a short inflorescence. On that specimen C. Schweinfurth wrote "flowers are rather poor", but unfortunately they are not present (anymore?) at all (G.A. ROMERO pers. comm.).

Curiously enough, not only are *Dracontia (Pleurothallis) pachyglossa* (LINDL.) LUER and *Dracontia (Pleurothallis) ramonensis* (SCHLTR.) LUER different species, but there is a third. When C.A. Luer discussed and illustrated *P. ramonensis* (LUER 1998) he used a plant cultivated in the Netherlands, collected by J. Wubben. Wubben's plant had thin leaves (about 1 cm wide) and large dark flowers, a combination of features consistent with *P. ramonensis*, and the fact that it had been collected in the same location as *P. ramonensis*, at San Ramón in Costa Rica, lead the author to suspect they were the same. However, that is not the case. No specimen of the plant illustrated by LUER (1998), with its long and narrow leaves, many-flowered inflorescences and emarginate petals, are conserved among A.M. Brenes' herbarium specimen materials, while he collected *D. pachyglossa* many times. After a careful reconsideration of the original protologue, the study of the lectotype and of an additional specimen of A.M. Brenes 88 (1295) at AMES (a specimen with the same number as the type material but with different collection date) (Fig. 4), it becomes evident that Luer's illustration represents a distinct and unnamed species, described herein.

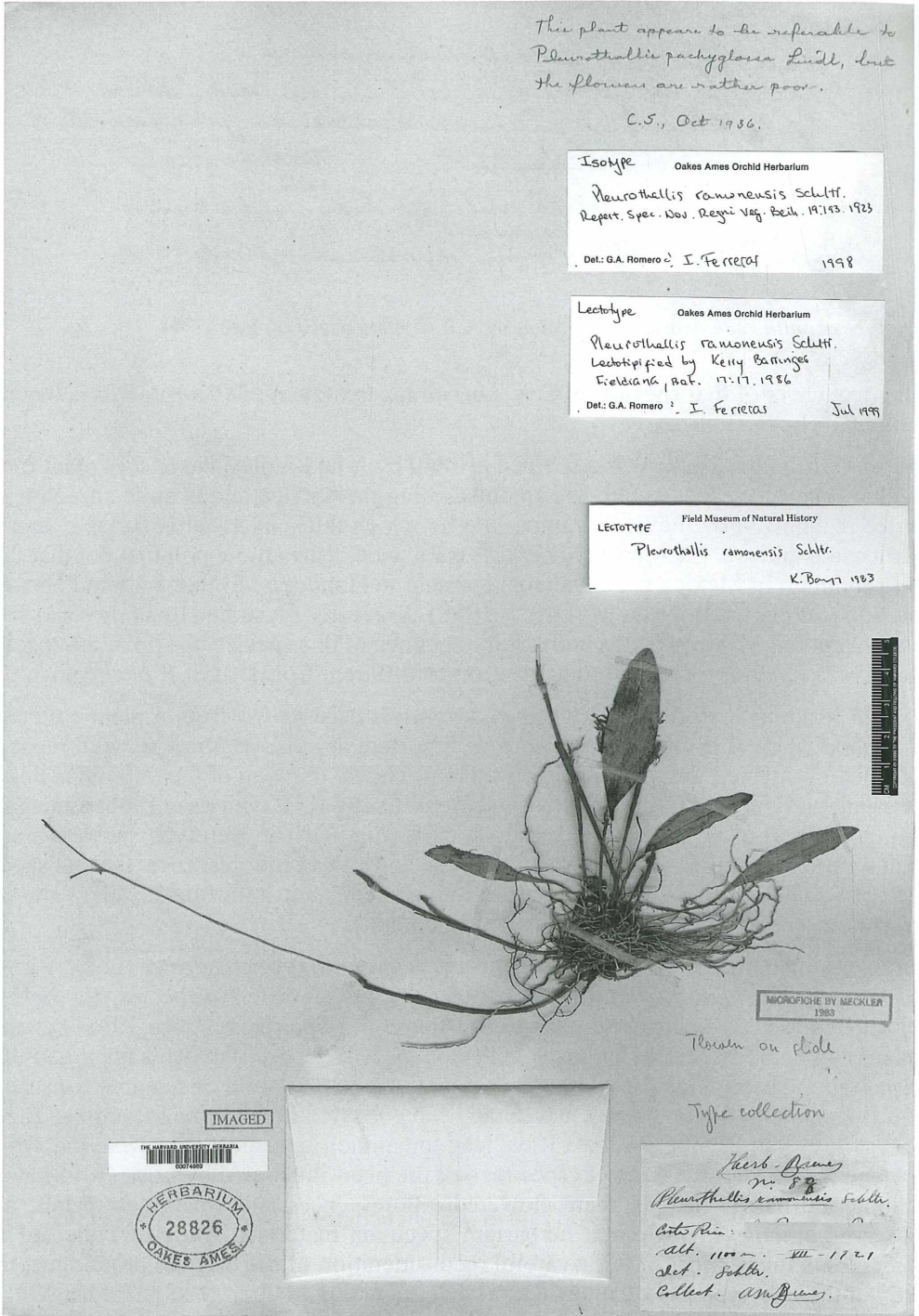


Fig. 3: Lectotype of *Dracontia (Pleurothallis) ramonensis*, A.M. Brenes 88, kept at AMES. – Reproduced under the kind permission of the Director, Harvard University Herbaria.

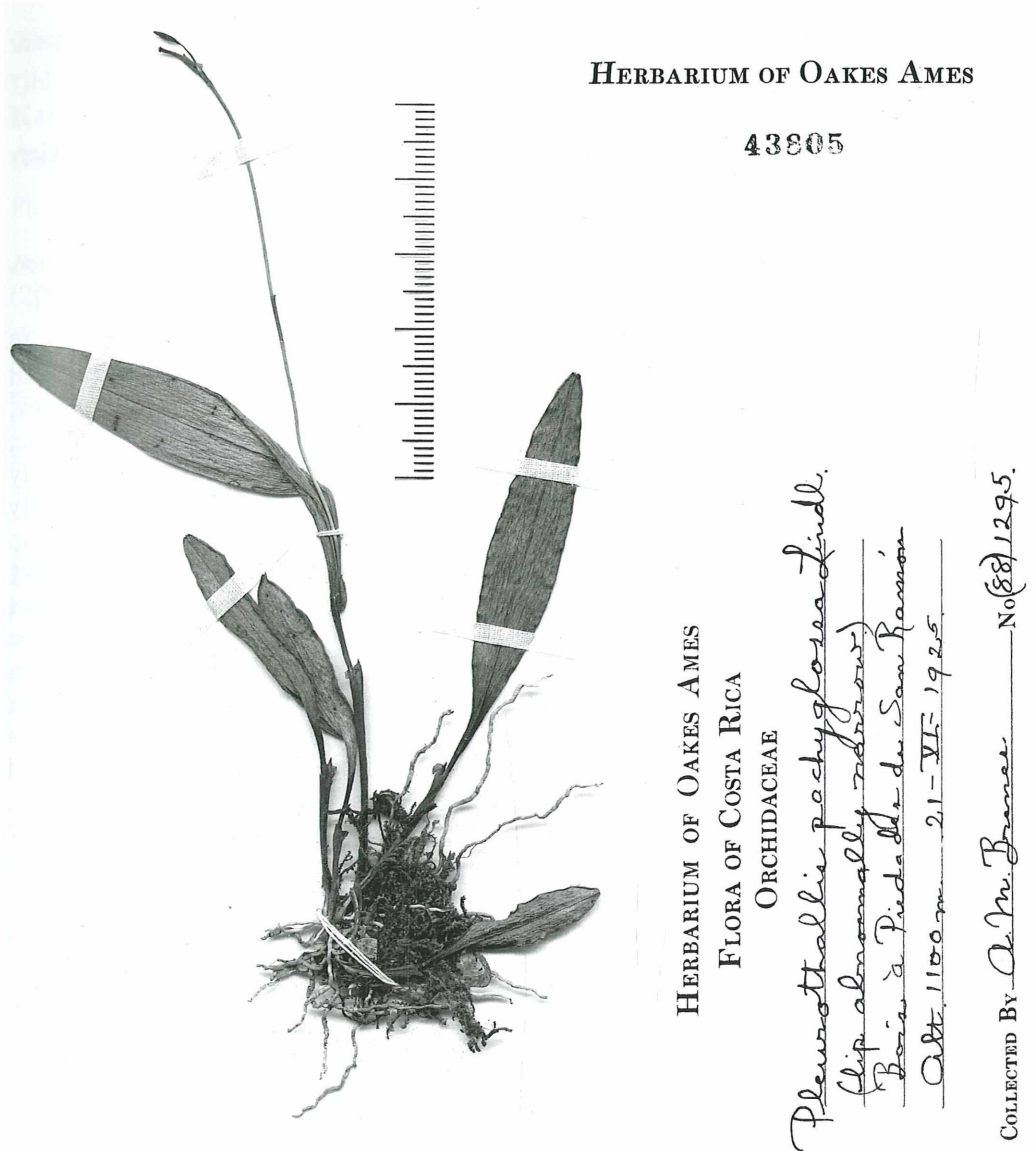


Fig. 4: Specimen of *Dracontia ramonensis*, A.M. Brenes 88 (1295) kept at AMES, not part of the type material. – Reproduced under the kind permission of the Director, Harvard University Herbaria.

Taxonomic treatment

Dracontia pachyglossa (LINDL.) LUER, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 257 (2004)

≡ *Pleurothallis pachyglossa* LINDL., Edwards’s Bot. Reg. 26: Misc. 68 (1840)

≡ *Stelis pachyglossa* (LINDL.) PRIDGEO & M.W. CHASE, Lindleyana 16 (4): 265 (2001).

Type: Mexico, without locality, imported and cultivated in England by a Mr. Barker, s.n. [K!].

= *Pleurothallis conanthera* RCHB.f., *Xenia Orchidaceae* 3: 41 (1900).

Type: Mexico, Veracruz, Córdoba, flowered in cultivation Mar. 1878, in Erfurt, Germany, by Haage & Schmidt s.n. [W, illustration of type!].

= *Pleurothallis formosa* SCHLTR., *Repert. Spec. Nov. Regni Veg.* 10: 291 (1912).

Type: Guatemala, Alta Verapaz, in forest near Cobán, alt. 1600 m, Oct. 1907 H. v. Tuerckheim II-1995 [holotype W, isotypes AMES!, BM, BR, HB, US; drawing of type!].

Epiphytic, caespitose (shortly creeping), sometimes prolific, erect herb, up to about 20 cm tall. Roots basal, filiform. Ramicauls terete, 2–18 cm long, more commonly around 6 cm, enclosed by a thin tubular sheath born below and ending just below the apex, 1.5–3.5 cm long, and with two basal sheaths. Leaves erect to suberect, leathery, elliptic, petiolate, acute, apex emarginate and apiculate, 2.2–8.5 × 1.0–2.9 cm, most commonly about 7 × 2.5 cm. Inflorescence successive, racemose, secund, apical, produced singly from a spathaceous bract, peduncle 4–15 cm and rachis at least up to 10–20 cm long. Floral bracts short, acute, 5–7 mm long. Pedicel cylindrical, 8–15 mm long curved, ovary straight, somewhat rugose, 4–6 mm long. Flowers few (1–4), one (two?) open at a time, suffused with purple, petals transparent-yellowish with 3 dark purple stripes, papillae white or purple. Sepals glabrous, the dorsal sepal elliptic, shortly acuminate, concave, 15–20 × 7 mm, 3-veined; the lateral sepals connate to the apex into an ovate-elliptic, bifid, concave lamina, 16–22 × 10 mm, 6 veined. Petals concave, embracing the column, elliptic, obtuse, papillose externally, shallowly papillose internally on the veins and close to the involute apex, rounded, 6–10 × 3–6 mm, with 3 veins prominently colored, especially above the middle. Lip somewhat twisted downward, fleshy, 3-lobed, 10–17 mm long and 2.5–3.5 mm wide, apical lobe thick, conspicuously thickening towards the apex, ligulate-elliptic, obtuse, minute papillose, with a whitish glabrous midline depression, with two prominent depressions close to the base on each side of it, lateral lobes basal, erect, elliptic, inconspicuous, base of the lip hinged to the tip of the column-foot. Column semiterete, conical, 2 mm long, with a short, thin, incurved column foot, with a white bubble-like rostellum. Anther membranous, helm-like, prominent. Pollinaria 2, subglobose, with two flat, transparent, whale-tail like caudicles.

Derivation of the name: from the Greek *pachy* “thick” and *glossa* “tongue”, in reference to the lip.

Specimens: **Mexico**. Puebla, near Mecaxa, alt. 1000 m, 24 Aug. 1924 **E. Hultén 3962** [AMES]; – Sierra Santa Marta, San Andrés Tuxtla, 15 Mar. 1968 **M. Sousa 3585** [AMES]; – flowered in cultivation, Nov. 1979 **E. Hágsater & J. Gómez 3959** [AMES, AMO]; – Oaxaca: southwest of La Esperanza, alt. 1650 m, 1 Nov. 1977 **M. Sousa & O. Tellez 8820** [AMO, K].

Guatemala. Alta Verapaz, Cobán, near Sanchamach, alt. 4,500 ft., Nov. 1877 **H. v. Tuerckheim 12** [W]; – same locality, alt. 4,500 ft. Jan. 1888 **H. v. Tuerckheim 799** [BR, K]; – between Chamá and Cobán, alt. 3,000 ft., 16 Oct. 1920 **H. Johnson 828** [AMES]; – same area, s.dat. O. Mittelstaedt, flowered in cultivation in Cobán, 27 Nov. 1990 **C. Luer 14844** [MO; illustration in LUER 1998]; – between Cobán and Siguanhá, Chicon, alt. 4,500 ft., s.dat. O. Mittelstaedt, flowered in cultivation in Cobán, 13 Feb. 1990 **C. Luer 14612** [MO].

Without collecting data: plant introduced from J. Wubben’s private orchid collection, flowered in cultivation in the Hortus Botanicus of Leiden University in The Netherlands, 20 Dec. 2011 **Karremans 4822** [L-Spirit!].

Other Records: **Mexico**. Without specific locality [Fig. 23 in KARREMANS 2011].

DNA barcode: Internal Transcribed Spacer (ITS) and maturase K (matK) sequences of **Karremans 4822** will shortly be available in the GenBank data base.

Distribution and habitat: only known from the south of Mexico and Guatemala.

Phenology: the plant flowers at least from November to January in culture.

Dracontia ramonensis (SCHLTR.) LUER, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 257 (2004) – Fig. 5.

≡ *Pleurothallis ramonensis* SCHLTR., Repert. Spec. Nov. Regni Veg. Beih. 19: 193–194 (1923)

≡ *Stelis ramonensis* (SCHLTR.) PRIDGEON & M.W. CHASE, Lindleyana 16 (4): 266 (2001), nom. illeg., non *Stelis ramonensis* SCHLTR. (1923)

≡ *Stelis alajuelensis* PRIDGEON & M.W. CHASE, Lindleyana 17 (2): 98 (2002).

Type: Costa Rica. Bois humides. San Pedro de San Ramón, alt. 1150 m, Jul 1921, A.M. Brenes 88 [holotype B lost, lectotype (designated by BARRINGER 1986) AMES!].

Epiphytic, caespitose, erect herb, up to about 16 cm tall. Roots basal, filiform. Ramicauls terete, 7–8 cm long, enclosed by a thin tubular sheath born below and ending just above the middle, and with two basal sheaths. Leaves erect, coriaceous, elliptic, sessile, obtuse, apex emarginate and apiculate, the largest up to 60–70 × 20–21 mm. Inflorescences successive, racemose, secund, apical, produced in succession from the same spathaceous bract over time, appearing as a fascicle, peduncle 10 cm and rachis 4–6 cm long. Floral bracts short, acute, 4–5 mm long. Pedicel cylindrical, 11 mm long, ovary 5 mm long. Flowers at least 4, 1 open at a time, dark purple, the petals pale yellow with 3 purple stripes. Sepals glabrous, incurved, the dorsal sepal elliptic, acute, concave, 21 mm long and 8 mm wide, 3-veined; the lateral sepals connate to near the apex into an elliptical, bifid, deeply concave lamina, 21–22 mm long and 15 mm wide, 6-veined. Petals concave, embracing the column, narrowly ovate, acute, yellow-papillose externally, apex involute, rounded, 10 mm long and 5–6 mm wide, with 3 veins prominently colored above the middle. Lip twisted straight downward, fleshy, inornate, 3-lobed, 14 mm long and 2.5 mm wide, apical lobe shiny, thick, elliptical, obtuse, lateral lobes basal, erect, triangular, inconspicuous, base of the lip hinged to the tip of the column-foot. Column semiterete, conical, 3 mm long, with a short, thick, slightly incurved column foot. Anther membranaceous, helm-like, prominent. Pollinaria 2, subglobose, with two flat, transparent, whale-tail like caudicles.

Derivation of the name: named after San Ramón in Costa Rica where the type material was collected.

Specimens: **Costa Rica**, Puntarenas: Puntarenas. La Pitahaya. Rincón. Los Planes de Monestel. 10°15'20"N 84°41'50"W, 1400 m. Epífita morada. 31 de Mayo 1996 **G. Herrera 9105**, P. Kuss, O. & W. Badilla [CR!]; – Reserva Biológica Monteverde Río Veracruz. 10°16'N 84°22'W, 1300 m, 4 May 1991 **Erick Bello 2764**, Eladio & Roy Cruz [INB!]; – Same locality, 4 May 1991 **Erick Bello 2729**, Eladio & Roy Cruz [INB!]; – Reserva Biológica Monteverde, lower montane wet and rain forest, 10°18'N 84°47'W, 1500–1600m. Epiphyte in tree trunk, road/forest edge, 26 July 1988 **William Haber 8522**, Willow Zuchowski & David de Laubenfels [INB!]; – Alajuela: San Ramón, Santiago, mountains toward Las Torres de Berlín, 10°02'22"N 84°29'01"W, 1340 m, lower montane wet forest, epiphytic in primary forest and secondary vegetation along pastures and coffee plantations, 2 Aug. 2003 **F. Pupulin 4900**, M. Pupulin, C. Pupulin, E. Salas, H. León-Páez, D. Bogarín & E. Serrano [JBL-Spirit!, CR!]; – San Ramón, Santiago, finca of Jesús Salas Jiménez, mountains toward the towers of Berlín, 10°02'22"N 84°29'01"W, 1350 m, lower montane rain forest, epi-

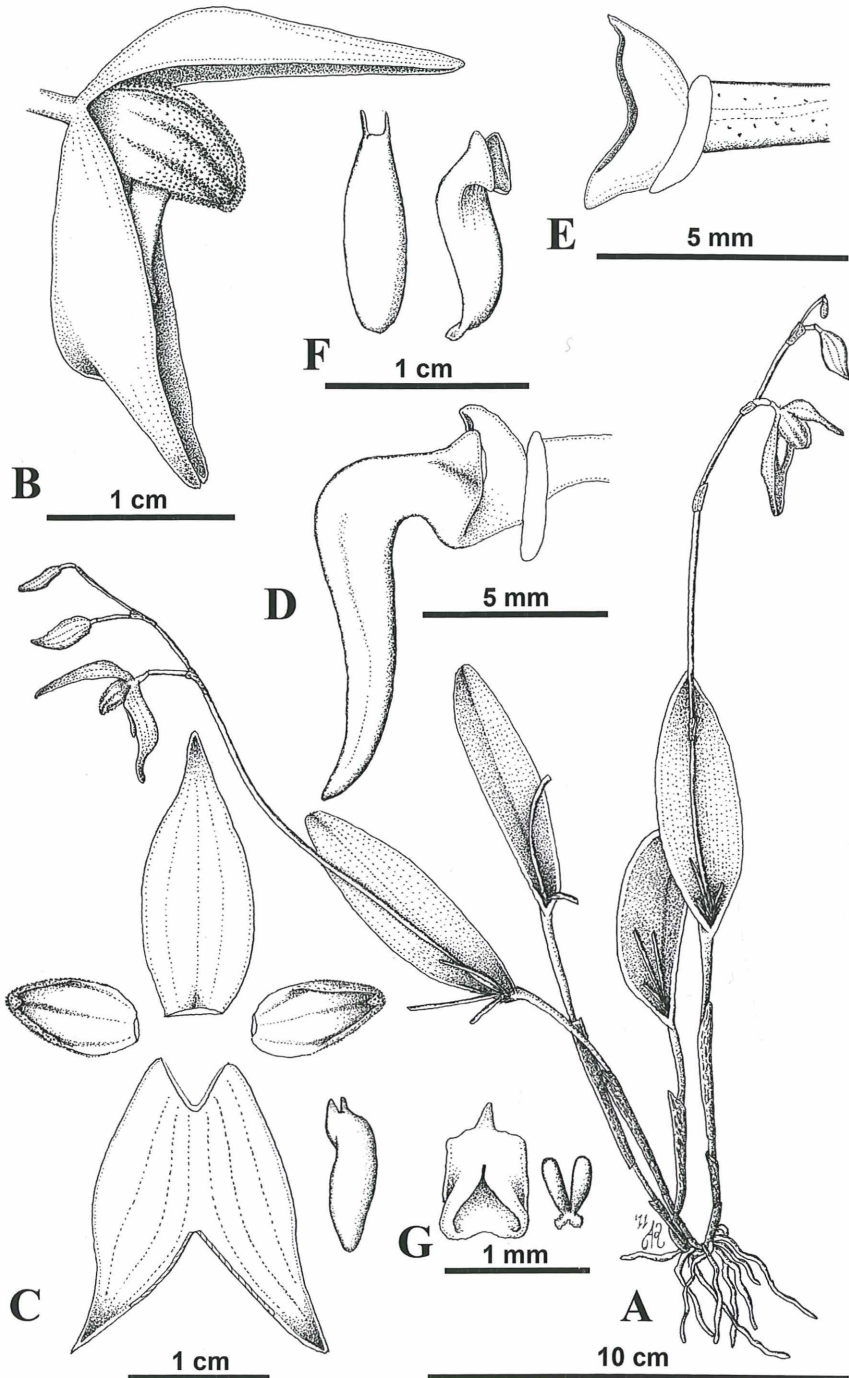


Fig. 5: A–G. *Dracontia ramonensis* SCHLTR. (LUER): (A) Habit. (B) Flower. (C) Dissected perianth. (D) Column and lip, lateral view. (E) Column side view. (F) Lip front and back view. (G) Pollinarium and anther cap. – Drawings based on F. Pupulin 5437 by Adam P. Karremans.

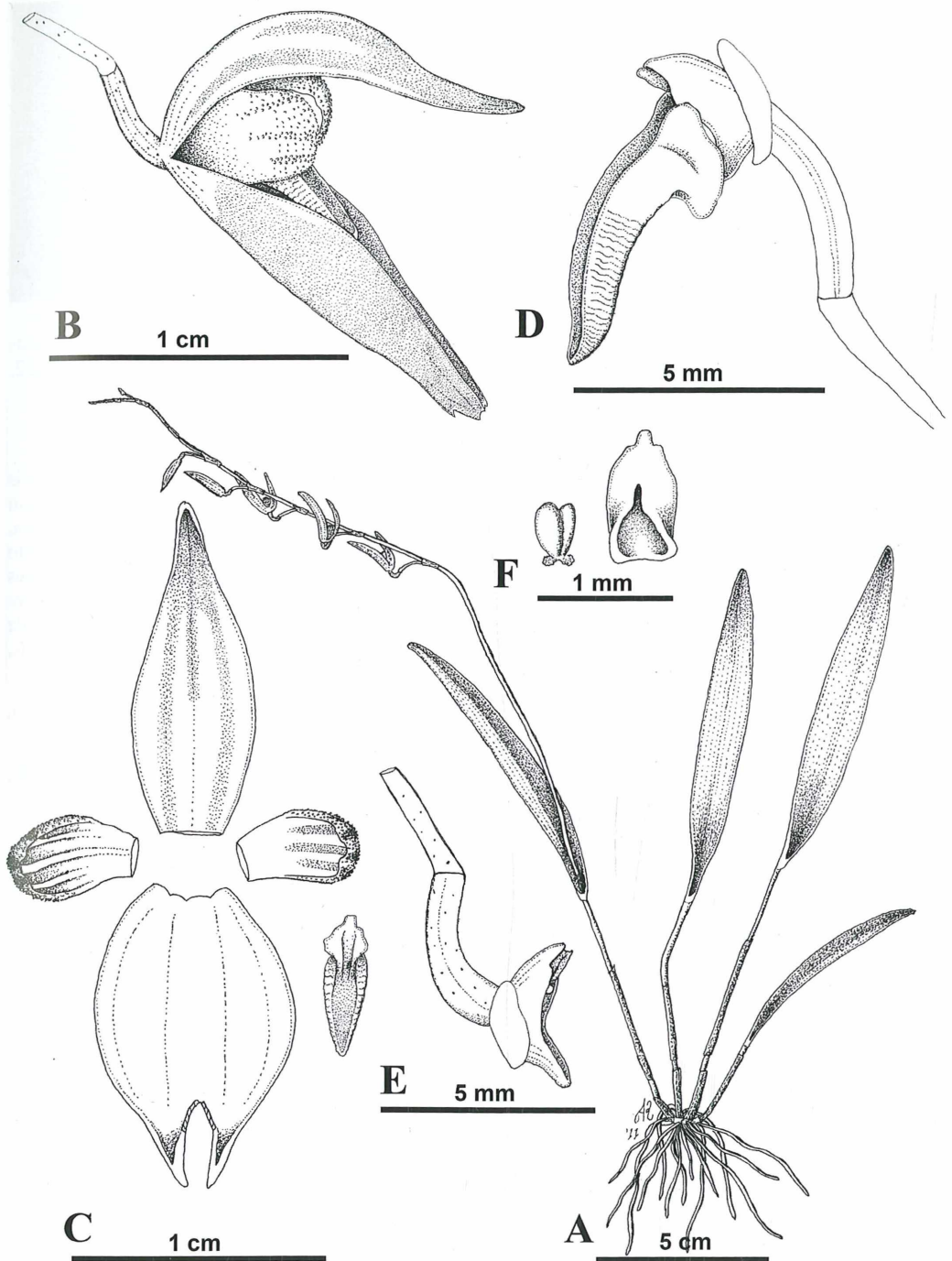


Fig. 6: A–F. *Dracontia lueriana* KARREMANS: (A) Habit. (B) Flower. (C) Dissected perianth. (D) Column and lip, lateral view. (E) Column. (F) Pollinarium and anther cap. – Drawings based on JBL-00819 by Adam P. Karremans.

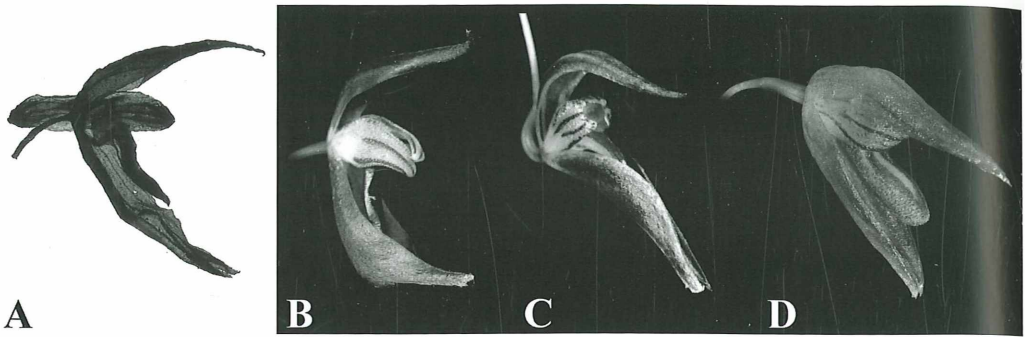


Fig. 7: Flower comparisons. (A) *Dracontia ramonensis* [Brenes 88 (1295)]; (B) *Dracontia ramonensis* (Pupulin 5437); (C) *Dracontia lueriana*; (D) *Dracontia pachyglyssa* (Karremans 4822, courtesy of Rogier v. Vugt, L).

phytic in primary vegetation, 25 December 2004 **F. Pupulin 5437**, E. Salas-Pupulin, S. Dalström, C. Lewis & J. Salas [JBL-Spirit!, CR! (Illustration voucher)]; – San Ramón, Berlin, s.d. **D.E. Mora s.n.** [USJ!]; – San Ramón, La Palma, alt. 1160 m, 30 de Octubre 1922 **A.M. Brenes 390 (95)** [CR!]; – San Ramón, La Palma, alt. 1175 m, 26 de Agosto 1924 **A.M. Brenes 2286 (180)** [CR!]; – San Ramón, Los Ángeles, 2 de Agosto 1932 **A.M. Brenes 16234 (16)** [CR!]; – San Ramón, San Pedro, alt. 1125 m, 20 de Mayo 1923 **A.M. Brenes 2062 (584)** [CR!]; – San Ramón, La Palma, 3-10 de Agosto 1935 **M. Quirós 155 (169)** [CR!]; – San Ramón: San Pedro, alt. 1190 m, 18 Nov. 1923 **A.M. Brenes 142** [AMES!]; – San Ramón. Colinas de San Pedro de San Ramón, alt. 1125m. 18 VII 1924 **A.M. Brenes 2220 (45)** [CR!]; – without specific locality, 1867 **A.R. Endres 41** [W!]; – without specific locality, **Rafael L. Rodríguez 1408** [USJ!; Illustration 822, not seen].

Other records: **Costa Rica**, Alajuela, San Ramón, **Pupulin 4900** [Fig. 20 in KARREMANS 2011]; – San Ramón, **Pupulin 5437** [Fig. 21 & Fig. 22 in KARREMANS 2011].

DNA barcode: Internal Transcribed Spacer (ITS) and maturase K (*matK*) sequences of **F. Pupulin 4900** will shortly be available in the GenBank data base.

Distribution and habitat: It is only known to grow in Costa Rica, and although not uncommonly found in herbaria and private collections, all plants seems to come from basically the same area around San Ramón of Alajuela. It grows epiphytically in lower montane wet forests at altitudes between 1160 and 1400 m.

Phenology: the plant flowers at least from May to September.

***Dracontia lueriana* KARREMANS sp.n.** – Fig. 6.

Type: Costa Rica. San José: Pérez Zeledón, San Isidro de El General, carretera a Dominical, desvío a Pacuarito, Bijaguales, Quebrada Valerio, 9°17'35.5" N 83°45'24.00" W, 1002 m, bosque húmedo premontano, en bosque secundario alterado y árboles en potreros, 23 Octubre 2005 **D. Bogarín 1987**, R.L. Dressler, R. Gómez, A.P. Karremans, F. Pupulin, A. Rambelli & S. Rambelli [holotype JBL-Spirit D3648!; isotypes CR!, JBL-Spirit!].

Diagnosis: Species *D. ramonense* (SCHLTR.) LUER similis, sed foliis linearibus, inflorescentia multiflora, ovario curvo, petalis emarginatis, labello verrucoso minore differt.

Epiphytic, caespitose, erect herb, up to about 30 cm tall. Roots basal, filiform. Rami-cauls terete, 4–15 cm long, more commonly around 10 cm, enclosed by a thin tubular



Fig. 8: Habit comparisons. (A) *Dracontia pachyglossa* (Karremans 4822); (B) *Dracontia ramonensis* (Pupulin 5437); (C) *Dracontia lueriana* (JBL-00819).

sheath born below and ending just above the middle, 2.5–5.5 cm long, and with two basal sheaths. Leaves erect, coriaceous, linear-narrowly elliptic, sessile, acute, apex emarginate and apiculate, 5.5–15 × 0.9–1.9 cm, most commonly about 11 × 1.3 cm. In-florescence successive, racemose, secund, apical, produced in succession from the same spatheaceous bract over time, appearing as a fascicle, peduncle 3.5–9.0 cm and rachis at least up to 14 cm long. Floral bracts short, acute, 8 mm long. Pedicel cylindrical, with black crystals, 7–14 mm long, ovary bent, with black crystals, 5 mm long. Flowers many (at least 11), a few open at a time, strongly suffused with dark purple, petals pale whitish-yellow with 3 purple stripes, margins purple, papillae white or purple. Sepals glabrous internally, hirsute on the margins, the dorsal very much incurved, while the synsepal perfectly straight but placed parallel to the rachis, the dorsal sepal elliptic, acute, shortly acuminate, concave, 15–20 × 5.0–5.5 mm, 3-veined; the lateral sepals connate to near the apex into an elliptical-sub orbicular, bifid, deeply concave lamina, 18–20 × 9 mm, 6 veined. Petals concave, embracing the column, elliptic, obtuse, emarginate, papillose externally, shallowly lamellate internally, apex involute, rounded, 4–5 × 3 mm, with 3 veins prominently colored above the middle. Lip somewhat twisted downward, fleshy, 3-lobed, 6–7 mm long and 2 mm wide, apical lobe thick, triangular-ovate, acute, having a sort of minutely cellular-papillose depressed lamina with tall shallowly verrucose margins, apex lowly dentate, lateral lobes basal, erect, elliptic, inconspicuous, base of the lip hinged to the tip of the column-foot. Column semiterete, conical, 2 mm long, with a short, thin, incurved column foot, with a white bubble-like rostellum. Anther membranaceous, helm-like, prominent. Pollinaria 2, subglobose, with two flat, transparent, whale-tail like caudicles.

Derivation of the name: Dedicated to Carlyle A. Luer, recognized expert in the Pleurothallidinae, who for the first time illustrated and characterized this species.

Specimens: **Costa Rica**. Alajuela, San Ramón, Ángeles, Reserva Biológica Alberto M. Brenes, 10°13'08.5" N 84°35'48.4" W, 900–1000 m, ascenso por del Sendero Saino, bosque muy húmedo tropical transición a premontano, epífitas en bosque secundario, 25 Setiembre 2005 **D. Bogarín 1926** [JBL-Spirit E0490!]; – San Carlos, Volcán Chato. Sobre el sendero a la laguna de la cima de volcán, en bosque primario, muy húmedo premontano, 10°26'34"N 84°40'51"W, 899 m. 26 de Julio 2011 **A.P. Karremans 4394** [JBL-Spirit!]; – *same locality*, **A.P. Karremans 4395** [JBL-Spirit!]; – without collecting data, **JBL-00819** [JBL-Spirit! (Illustration voucher)]; – Alajuela, Reserva Biológica Monteverde, Río Peñas Blancas, Finca de Jaun Cruz, 10°19' N 84°4' W, 950–1000 m, epífita en árbol de bosque, 7 Dec. 1989 **Eric Bello 1559** [INB!]; – Road from San Ramón to Santa Clara, kms. 7 to 12, before Alto de La Palma, alt. 1130–1230, 13 Jul. 1983 **R. Escobar & K. Anderson 2782** [CR!]; – Reserva Biológica A.M. Brenes, 850–1000 m, sin más datos de colecta, floración en cultivo en el Jardín Botánico Lankester, G. Hoffmann s.n., JBL-00798, **M. Blanco 1052** [USJ!; JBL-Spirit D2023!].

Other records: **Costa Rica**. Alajuela, San Ramón, **Wubben s.n.** (illustration in LUER 1998); – San Ramón, **JBL-00819** (Fig. 25 in KARREMANS 2011; as *Dracontia* sp. 3); – Cartago, Turrialba, Moravia de Chirripó, **Pupulin 3658** (Fig. 24 in KARREMANS 2011, as *Dracontia* sp. 3).

DNA barcode: Internal Transcribed Spacer (ITS) and maturase K (*matK*) sequences of **D. Bogarín 1987** (type) can be found in GenBank under accession numbers *JF934870* and *JF934810* respectively.

Distribution and habitat: although this species is scarce among herbarium material, it can be found commonly in certain locations, such as the Alberto M. Brenes reserve in San Ramón. It is endemic to Costa Rica, where it has been collected mostly around the San

Ramón area of the Central Volcanic Range but also in the General Valley in the Pacific watershed on the Talamanca Cordillera.

Recognition

Dracontia ramonensis can be easily distinguished from *D. pachyglossa* by the ovate petals with an incurved apex (vs. elliptic and straight apex), and the glabrous shiny lip, which is thickest at the base and tapers to a thin and acute apex, and is twisted straight downwards (vs. a papillose lip which is thick and obtuse at the apex, and is parallel to the sepals). While *D. lueriana* can be distinguished from both other species by its large plants with long narrow linear leaves (vs. short and elliptic), the multiflowered inflorescence with several flowers open at once (vs. inflorescence that has one open flower at once), the flowers parallel to the rachis (vs. perpendicular), the curved ovary (vs. straight) and the emarginate petals (vs. obtuse or acute). Additionally, *D. ramonensis* and *D. lueriana* are only known from Costa Rica, while *D. pachyglossa* is only known from Mexico and Guatemala. A comparison of flowers (Fig. 7) and habits (Fig. 8) is provided.

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