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Three New Species of *Dracontia* (Pleurothallidinae, Orchidaceae) from Costa Rica

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Abstract—Three new species of *Dracontia* are described and illustrated from Costa Rica and comparisons with close relatives are made. A short discussion for the preference of describing them in *Dracontia* instead of *Stelis* is given. The three species are afterwards described: *Dracontia montis-mortense*, a species with a unique whitish lip with three purple stripes, which is found along the Pan-American Highway on the Cerro de la Muerte, and has been confused with *Dracontia dracontea*; *Dracontia pileata*, recognized by its hat-like dorsal sepal, and *Dracontia viridi-flava*, recognized by its all green-yellow flowers and erose lip. The latter species are both native to the south-Pacific watershed of the Talamanca Cordillera and closely related to *Dracontia conochila* and *Dracontia hydra*. A key to the Costa Rican species of *Dracontia* is given, accompanied by a discussion of the included species.

Keywords—*Dracontia montis-mortense*, *Dracontia pileata*, *Dracontia viridi-flava*, *Stelis*, taxonomy.

There is still some discussion as to what classification system should be preferred in subtribe Pleurothallidinae (Orchidaceae). The species of *Pleurothallis* subgen. *Dracontia* Luer (Luer 1986) were transferred to a broad concept of *Stelis* Sw. by Pridgeon and Chase (2001), and then once more segregated as a distinct genus by Luer (2004), as *Dracontia* (Luer) Luer. In our opinion, whether authors prefer broad or narrow generic concepts is not as important as accommodating species in discrete groups of close relatives, at whatever rank it may be. In such large groups as *Stelis*, with more than 1,000 species in its broad sense (Luer 2009), placing species among their relatives is the only way of accurately studying and comprehending them. As no subgeneric classification of *Stelis* in its broad sense exists, in the interest of maintaining these novelties in discrete taxonomical units that are as informative as possible, we prefer to describe them in *Dracontia*.

In a phylogenetic study of *Stelis* and its relatives, Karremans et al. (2012) find that *Condylago* Luer, *Dracontia*, *Effusiella* Luer, *Mystacorchis* Szlach. & Marg. and *Salpistele* Dressler are sisters to a well defined and supported *Stelis* clade (in this sense including *Crocodeilanthe* Rehb. f & Warsz., *Dialissa* Lindl., *Lomax* Luer, *Niphantha* Luer, *Physosiphon* Lindl., *Physothallis* Garay and *Pseudostelis* Schltr.), with *Dracontia* itself being monophyletic and well supported. Species of those genera can be readily distinguished individually from *Stelis* by several morphological characters, however, the papyraceous spathe (vs. foliaceous), successive and undetermined inflorescences (vs. mostly simultaneous and determinate) and the lateral sepals fused into a synsepal (vs. lateral sepals not fused), are diagnostic characters shared by all of these genera (Karremans et al. 2012).

Species of *Dracontia* can be recognized by their successive, undetermined inflorescences, fleshy flowers with long, thick, three-lobed, movable lips, convergent sepals forming a synsepal that is similar to the dorsal sepal, concave, obtuse, papillose petals, a triangular column that is apically dentate and much shorter than the lip, an incumbent, helm-like, large anther (exceeding the column), a ventral stigma covered by a bubble-like rostellum, and two flat dry, whale-tail shaped caudicles (Karremans 2011; Karremans et al. 2012).

During exploration of the South Pacific watershed of the Talamanca mountain range in Costa Rica we encountered three different “entities” belonging to *Dracontia*. Those

“entities” show a series of morphological features that are constant and are not part of the observed variation of other known species of the genus, suggesting reproductive isolation. Based on these observations, and taking into consideration that these entities are also geographically isolated from other similar species, they are described as different species herein.

MATERIALS AND METHODS

This study was conducted at the Lankester Botanical Garden (JBL) of the University of Costa Rica, between 2010 and 2012. Cited specimens belong to the species of *Dracontia* and include vouchers kept at CR, JBL, INB, and USJ. Phenological data were recorded in the field and from cultivated specimens or herbarium labels. Herbarium specimens were deposited at the CR and JBL. Sketches of specimens were drawn with a Leica MZ 9.5 stereomicroscope with a drawing tube and conserved in the reference collections of JBL. The species were illustrated by composite line-drawings from living specimens by A.P. Karremans. Descriptions were prepared from living specimens and herbarium material from CR, JBL, INB, and USJ.

TAXONOMIC TREATMENT

Dracontia montis-mortense Karremans & Bogarín, sp. nov.—TYPE: COSTA RICA. San José: Desamparados, San Cristóbal, Carretera Interamericana Sur, ca. 100 m del cruce hacia La Lucha, 9°45'27.9" N 83°59'06.5" W, 1832 m, bosque pluvial montano, “in arborum truncis ramulisque in sylva ad marginem per viam La Lucha”, 10 diciembre 2010, D. Bogarín, R. Gómez, B. Klein & G. Meza 8246 (holotype: JBL-Spirit!; isotype CR!).

Species *D. dracontea* (Luer) Luer similis, sed sepalis intus glabris, petalis intus papillosis, labello elliptico obtuso majore differt.

Plant epiphytic, caespitose, erect, up to 23 cm tall. Roots basal, filiform. Ramicauls terete, 4–15 cm long, enclosed by a thin tubular sheath extending from the first to the second third of the ramicaul, and with two basal sheaths. Leaves erect, coriaceous, elliptic, sessile, obtuse, apex emarginate and apiculate, the largest up to 6.2–8.5 × 2.9–3.3 cm. Inflorescence successive, racemose, secund, apical, from a 10 mm long triangular spathe, producing several inflorescences from the same spathe over time, peduncle 7 cm and rachis

8 cm long, but getting longer with time. Floral bracts short, acute, 3–4 mm long. Pedicel cylindrical, 9 mm long, ovary 4 mm long. Flowers up to 8 in the type specimen, 3–4 open at once whitish-green suffused with rose-purple. Sepals glabrous, fine-hirsute on the margins, especially near the apex, incurved, the dorsal sepal elliptic, acuminate, concave, 16–17.0 × 6.0–6.5 mm, 3-veined; the lateral sepals connate to near the apex into an elliptical, concave lamina, 16.0–17.0 × 7.5 mm, 6-veined. Petals concave, embracing the column, elliptic, obtuse, papillose externally, apex somewhat involute, rounded, 7.0–7.5 × 4.5 mm, 3-veined. Lip twisted downward, fleshy, ornate, 7.5–8.0 × 2.5–3.0 mm, thick, ligulate, acute, rugose-verrucose, with erect margins near the base, base of the lip hinged to the tip of the column-foot, lip cream-white with 3 purple streaks. Column semiterete, conical, 2.5–3.0 mm long, with a short, thick, slightly incurved column foot. Figure 1.

Additional Specimens Examined—COSTA RICA. San José: Desamparados, San Cristóbal, Carretera Interamericana Sur, ca. 100 m del cruce hacia La Lucha, 9°45'27.9" N 83°59'06.5" W, 1832 m, bosque pluvial montano, "in arborum truncis ramulisque in sylvia ad marginem per viam La Lucha", 10 diciembre 2010, D. Bogarín, R. Gómez, B. Klein & G. Meza 8244 (JBL-Spirit!). Cartago-San José: Desamparados-El Guarco, San Isidro, Casa Mata, Carretera Interamericana, km 43, ca. 3 km después de Casa Mata, 9°45'24.7" N 83°58'4.2" W, 1,927 m, epífitas en árboles a orillas de la calle, bosque muy húmedo montano bajo, 2 mayo 2008, D. Bogarín et al. 4866 (JBL-Spirit!). Madreselva, Carretera Interamericana km 66, mayo 1990, B. Schmidt & R. Sandoval s. n. (USJ!). Reserva Forestal Madre Selva, epífitas, 2,750 m, julio 1988, J. Sánchez V. 4 (USJ!). Cordillera de Talamanca, Carretera Interamericana Sur, 22 abril 1992, 2,540 m, D. E. Mora s. n. (USJ!). Cartago: Camino a Palmital, Carretera Interamericana Sur, 25 mayo 1993, 1,865 m, V. Rojas 4 (USJ!).

Additional Records—COSTA RICA. Without collecting data, D. Jiménez s. n., as *Dracontia* sp. 4 (Fig. 29 in Karremans 2011).

Distribution and Ecology—Endemic to Costa Rica, where it is known from several locations along the Pan-American highway on the route known as the Cerro de la Muerte, from 1,800–2,750 m elevation. Flowering recorded in December to March.

Etymology—From the Latin "montis", mountain, and "mortem", death. In allusion to the place it was collected. Thus *Dracontia montis-mortense* would be the death mountain dragon.

Discussion—*Dracontia montis-mortense* is similar to *Dracontia dracontea* (Luer) Luer, but can be easily recognized by the glabrous (vs. verrucose and hirsute) sepals, the internally papillose (vs. lamellate) petals, and the ligulate-elliptic (vs. conical-ovoid) lip, which is white with 3 dark purple stripes (vs. diversely suffused and spotted with purple).

Molecular Data—An internal transcribed spacer (ITS) sequence of Bogarín 8246 is available in GenBank under the accession number KC425741.

Dracontia pileata Karremans & Bogarín, sp. nov.—TYPE: COSTA RICA. San José: Pérez Zeledón, San Isidro. Chirripó. Colectada y cultivada por Denis Elizondo en Herradura de Rivas. Floreció en cultivo en el Jardín Botánico Lankester el 14 de septiembre del 2011, A.P. Karremans 4604 (holotype: JBL-Spirit, D4749!).

Species *D. conochilae* (Luer) Luer similis, sed floribus majoribus, sepalis hirsutis longiores, petalis intus papillosis, labello elliptico lineare longiore differt.

Plant epiphytic, caespitose, erect, up to 16 cm tall. Roots basal, filiform. Ramicauls terete, 3–7 cm long, enclosed by a

loose thin tubular sheath extending from the just above the base to close to the apex of the ramicaul, and with two basal sheaths. Leaves erect, coriaceous, elliptic, sessile, obtuse, apex emarginate and apiculate, the largest up to 7.0–9.5 × 2.5–3.0 cm. Inflorescence successive, racemose, secund, apical, from a 9 mm long triangular spathe, peduncle 11 cm long and rachis 14 cm long, but getting longer with time, producing several inflorescences over time. Floral bracts short, acute, 3–4 mm long. Pedicel cylindrical, 7–8 mm long, ovary 4 mm long. Flowers up to 10 in the type specimen, 2–3 open at once, greenish, much suffused with brownish-purple, column mostly purple, column and lip basally translucent white. Sepals glabrous except for a few fine hairs on the margins near the apex, incurved, the dorsal sepal elliptic, acute, shortly apiculate, concave, 13.0–14.0 × 6.0 mm, 3-veined; the lateral sepals connate to near the apex into an elliptical, concave lamina, 13.0–14.0 × 10.0–11.0 mm, 6-veined. Petals concave, embracing the column, elliptic, obtuse, papillose externally, margin somewhat involute, rounded, 8.0 × 4.5 mm, 3-veined. Lip twisted downward, fleshy, ornate, 3-lobed, 7.0–8.0 × 1.5–2.0 mm, apical lobe thick, ligulate, acute, rugose-verrucose, lateral lobes basal, erect, suborbicular, thin, inconspicuous, base of the lip hinged to the tip of the column-foot. Column semiterete, conical, 2–3 mm long, with a short, thick, slightly incurved column foot. Figure 2.

Additional Specimens Examined—COSTA RICA. San José: Pérez Zeledón, Páramo, Berlín, Fila Temblor, ca. 4 km al norte de Berlín, camino hacia la parte alta de la Fila, 9°27'39.36" N 83°45'33.32" W, 1,807 m, bosque pluvial premontano, en bosque secundario, "invenit in sylvia secundaria ad jugum Temblor Berlín borealis per saltus versus verticem jugum", 5 marzo 2011, A.P. Karremans, M. Fernández, D. Bogarín & C. Montagnani 3574 (JBL-Spirit, D5024!). Puntarenas: Coto Brus, P.I. La Amistad. Cordillera de Talamanca. Estación Pittier. Frente al portón de la entrada Parque (potrero). 09°01'30"N 82°57'40"W, 1,680 m, 15 June 1995, L. Angulo 367 (INB!; INB-Spirit!). Coto Brus. P.I. La Amistad. Cordillera de Talamanca. Estación Pittier, sendero a Río Gemelo. 09°01'30"N 82°57'40"W, 1,700 m, 13 de junio 1995, R. Villalobos 229 (INB!). Costa Rica. San José: Pérez Zeledón, Río Nuevo. Area no protegida. Fila Jilguero. Sendero a la derecha de Cuatro Cruces, 09°28'28"N 83°51'49"W, 1,700 m. Epífitas creciendo en árbol con mucho musgo y en asocio con *Sobralia leucantha*, 5 Noviembre 2002, A. Quesada & R. Chacón 1062 (CR!).

Additional Records—COSTA RICA. Without collecting data, D. Matamoros s. n., as *Dracontia* sp. 2 (Fig. 18 in Karremans 2011).

Distribution and Ecology—Endemic to Costa Rica, where it is known from the mountains around the valley of San Isidro de El General and the Pacific watershed of the Cordillera de Talamanca, from 1,680–1,810 m elevation. Flowering recorded from March to November.

Etymology—From the Latin "pileum," hat. In allusion to the hat-like flattening of the short-acuminate dorsal sepal.

Discussion—*Dracontia pileata* belongs to a group of closely related species that have elliptical, obtuse, subpetiolate leaves, an inconspicuous spathe, and an elongated, loose raceme of long-pedicellate, medium-sized flowers. *Dracontia conochila* (Luer) Luer is closely related; however the new species can be recognized by its larger flowers (dorsal sepal 13–14 mm long and 6 mm wide vs. 8 mm long and 3.75 mm wide; lip 7–8 mm vs. 4.5 mm long), the sepals hirsute at the apex (vs. glabrous), the ligulate-elliptic (vs. cone-shaped) lip, with the basal lobes being less than one fifth of the lip length (vs. one third). The type specimen of *Dracontia conochila* was collected at around 700 m on elevation in the Caribbean watershed of the Talamanca cordillera, but *D. pileata* is from around 1,700–1,800 m on the Pacific watershed of that cordillera. *Dracontia thymochila* (Luer)

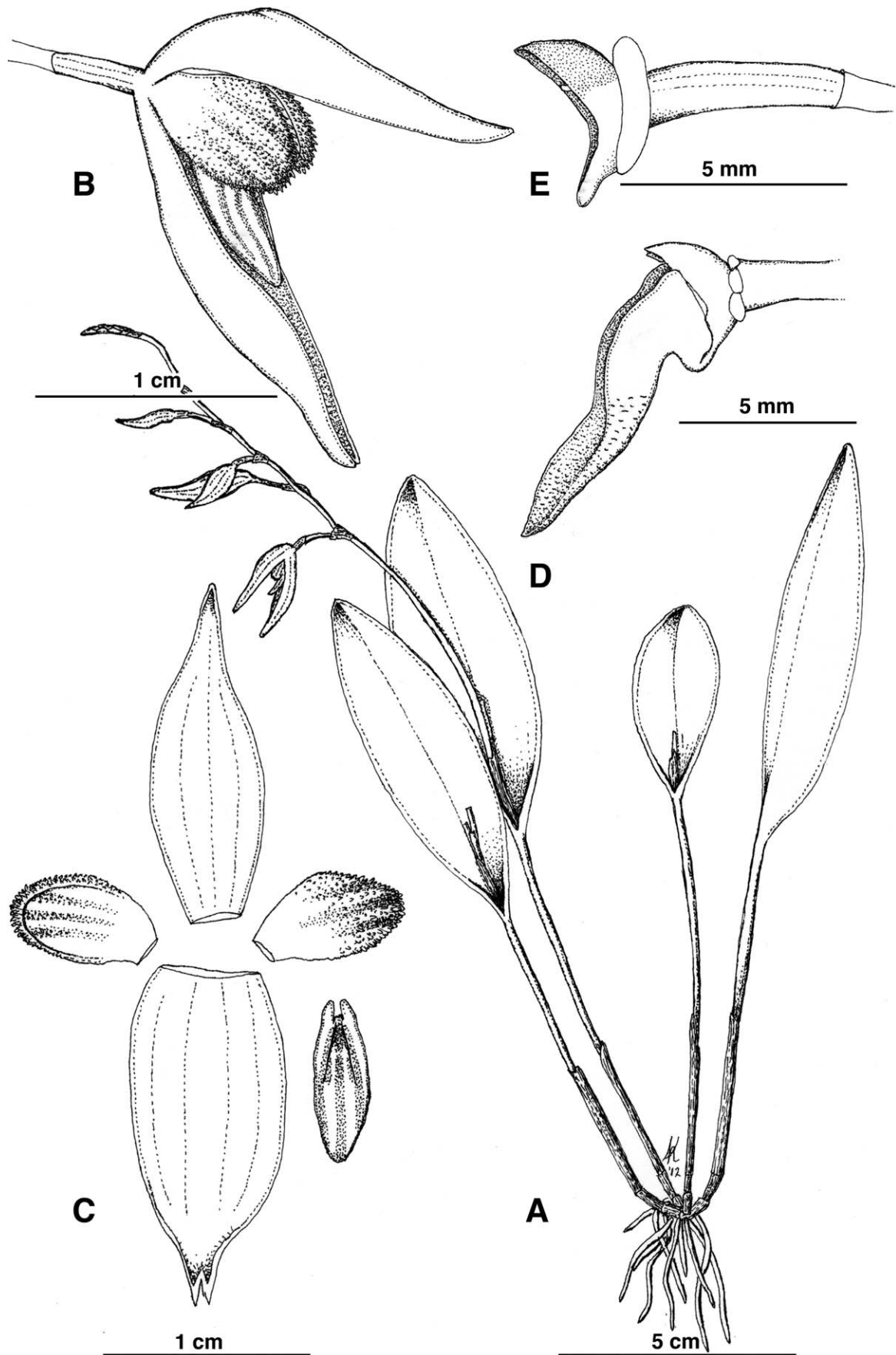


FIG. 1. *Dracontia montis-mortense* Karremans & Bogarín. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Column, lateral view. Drawings by Adam P. Karremans based on D. Bogarín 8246.

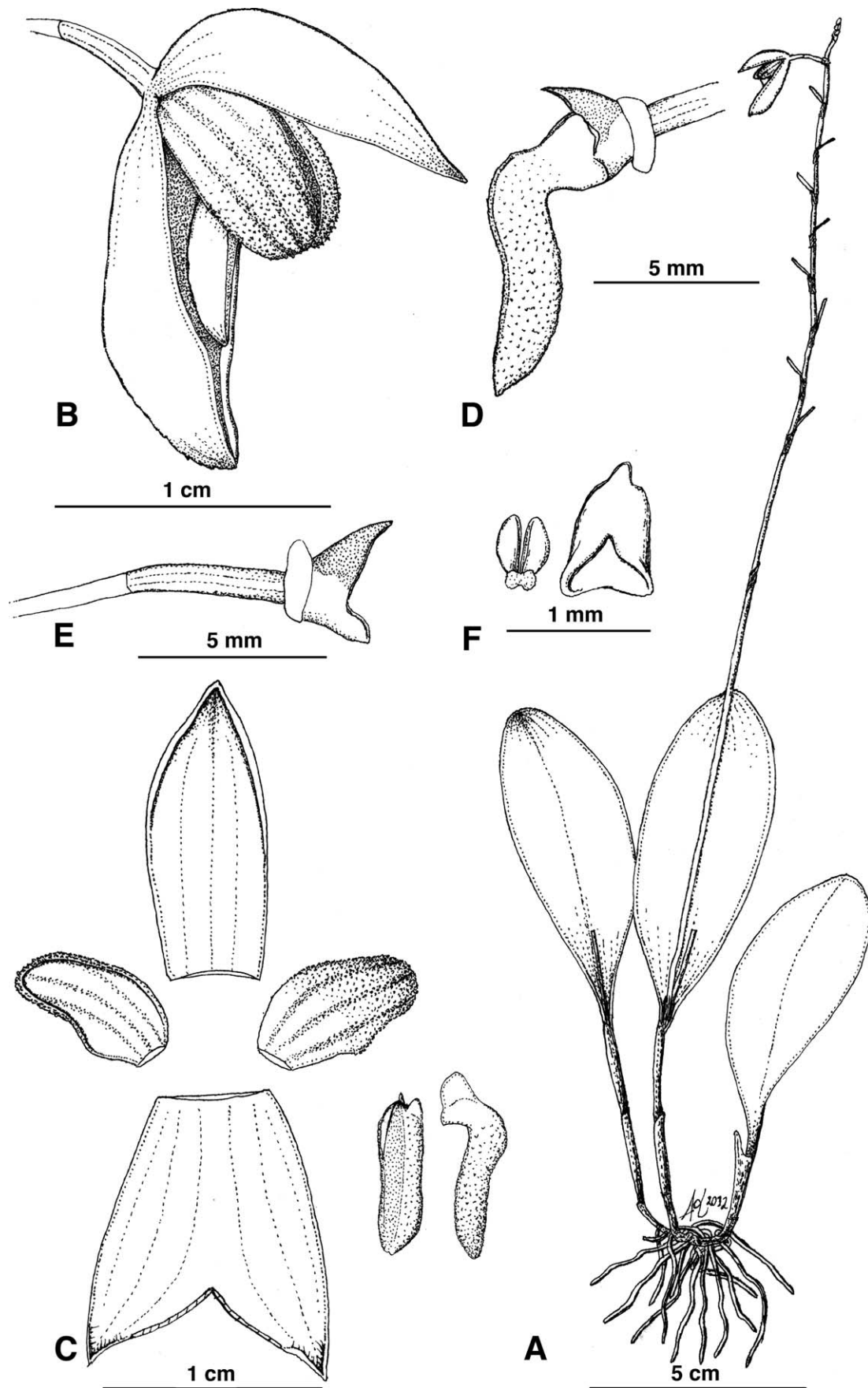


FIG. 2. *Dracontia pileata* Karremans & Bogarín. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Column, lateral view. F. Pollinarium and anther cap. Drawings by Adam P. Karremans based on A.P. Karremans 4604.

Luer has a similar habit; however, it has glabrous sepals with incurved margins and a broad elliptic, concave lip. *Dracontia viridi-flava* Karremans & Bogarín has greenish-yellow flowers, it has a evenly ascending dorsal sepal, not "hat-like" and the lip is deeply erose-verrucose. *Dracontia hydra* Karremans & C.M.Sm. is also similar but has longer acuminate sepals, and the lip is twisted straight downwards (instead of being sigmoid).

Molecular Data—Two internal transcribed spacer (ITS) sequences of *Karremans 4604* are available in GenBank under the accession numbers JQ995328 and JQ995329. A *maturase K* (*matK*) sequence of *Karremans 4604* is available in GenBank under the accession number KC425861.

***Dracontia viridi-flava* Karremans & Bogarín, sp. nov.**—

TYPE: COSTA RICA. Puntarenas: Coto Brus, Sabalito, Zona Protectora Las Tablas, 13 km al noreste de Lucha, Sitio Coto Brus, entre Río Surá y Quebrada Sutú, Finca de Miguel Sandí, 8°56'46.1" N 82°44'30.9" W, 1,778 m, bosque pluvial montano bajo, epífitas en potreros arbolados, 6 junio 2010, *D. Bogarín & A.P. Karremans 7698* (holotype: CRI!; isotypes JBL-Spirit, D4397! D4455! E0895!; Fig. 15–17 in Karremans 2011).

Species *D. conochilae* (Luer) Luer *similis*, sed floribus viridiflavus, sepalis hirsutis longiores, labello elliptico lineare eroso longiore differt.

Plant terrestrial (epiphytic?), growing on mosses and organic matter, caespitose, erect, up to 20 cm tall. Roots basal, filiform. Ramicauls terete, 5–7 cm long, enclosed by a thin tubular sheath extending from below to well above the middle, and with two basal sheaths. Leaves erect, coriaceous, elliptic, sessile, obtuse, apex emarginate and apiculate, the largest up to 8.5–9.0 × 2.8–3.0 cm. Inflorescence successive, racemose, secund, apical, from a 10 mm long triangular spathe, peduncle 20 cm long and rachis 10 cm long. Floral bracts short, acute, 2 mm long. Pedicel cylindrical, 8 mm long, ovary 5 mm long. Flowers 9 in the type specimen, 3–4 open at once, greenish-yellow. Sepals glabrous externally, hirsute internally near the apex, somewhat incurved, the dorsal sepal elliptic, acute, shortly apiculate, concave, 14.0–15.0 × 6.0 mm, 3-veined; the lateral sepals connate to near the apex into an elliptical, concave lamina, 15.0–16.0 × 10.0–11.0 mm, 6-veined. Petals concave, embracing the column, elliptic, obtuse, papillose externally, apex somewhat involute, rounded, 9.0–10.0 mm long and 5.0–6.0 mm wide, 3-veined. Lip twisted downward, fleshy, ornate, 3-lobed, 7.0–8.0 × 1.5–2.0 mm, apical lobe sigmoid, thick, ligulate, acute, entirely verrucose-erose, lateral lobes basal, erect, suborbicular, inconspicuous, base of the lip hinged to the tip of the column-foot. Column semiterete, conical, 2–3 mm long, with a short, thick, slightly incurved column foot. Figure 3.

Additional Specimens Examined—COSTA RICA. Puntarenas: Coto Brus, Sabalito, Zona Protectora Las Tablas, 13 km al noreste de Lucha,

Sitio Coto Brus, entre Río Surá y Quebrada Sutú, Finca de Miguel Sandí, 8°56'46.1" N 82°44'30.9" W, 1778 m, bosque pluvial montano bajo, epífitas en potreros arbolados, 6 junio 2010, *D. Bogarín & A.P. Karremans 7697* (JBL-Spirit!).

Distribution and Ecology—Endemic to Costa Rica, however, most probably found also in Panama, as the type species was collected very close to the border. It is known only from the southernmost portion of the Pacific slope of the Cordillera de Talamanca. Growing on the ground on mosses and organic matter (however it might also grow epiphytically) in disturbed montane forests, at around 1,800 m elevation. Flowering recorded in June and July.

Etymology—From the Latin "viridis", green, and "flavus", yellow. In allusion to the greenish yellow flowers, unique in the genus.

Discussion—*Dracontia viridi-flava* is unique within the genus for having almost completely yellowish-green flowers, only the apex of the column being purplish. It is important to mention that yellow or "flava" forms are common in purple-flowered Pleurothallidinae and have been found for *Dracontia alta* (Luer) Luer and *Dracontia tuerckheimii* (Schltr.) Luer. It is therefore possible that a purple form exists as well; however we have not yet seen it.

The species belongs to a group of closely related species that have elliptical, obtuse, subpetiolate leaves, an inconspicuous spathe, and an elongated, loose raceme of long-pedicellate, medium-sized flowers. *Dracontia conochila* is closely related; however the new species can be recognized by its larger flowers (dorsal sepal 14–15 mm long and 6 mm wide vs. 8 mm long and 3.75 mm wide; lip 7–8 mm vs. 4.5 mm long), the sepals hirsute at the apex (vs. glabrous), the elliptic (vs. cone-shaped) and very prominently verrucose (vs. somewhat verrucose) lip, with the basal lobes being less than one fifth of the lip length (vs. one third). The type specimen of *Dracontia conochila* was collected at around 700 m in elevation in the Caribbean watershed of the Talamanca cordillera, but *D. viridi-flava* is from around 1,800 m in the Pacific watershed of that cordillera. *Dracontia thymochila* has a similar habit; however, it has red-purple flowers, glabrous sepals with incurved margins and a broad elliptic, concave lip. *Dracontia pileata* Karremans & Bogarín is similar but has red-purple flowers, the dorsal sepal is ascending in the first third but flattens out below the middle in natural position, "hat-like", and the lip is rugose-verrucose, not erose. *Dracontia hydra* is also similar but has purple flowers as well, longer acuminate sepals, and the lip is twisted straight downwards (instead of being sigmoid). To aid with the distinction of *D. hydra*, *D. pileata* and *D. viridi-flava*, which are clearly closely related, a photographic comparison of floral details is presented in Fig. 4.

Molecular Data—An ITS sequence of *Bogarín 7698* is available in GenBank under the accession number JQ995330. A *maturase K* (*matK*) sequence of *Bogarín 7698* is available in GenBank under the accession number KC425862.

KEY TO THE COSTA RICAN SPECIES OF DRACONTIA

The key is modified from Luer 1998 and Luer 2003.

1. Leaves > 20 cm long and > 8 cm wide. Petals narrow, acute, externally glabrous, not conspicuously 3-veined 2
 2. Sepals about 3 cm long, petals about 11 mm long, decurved in natural position; lip much longer than tall *D. grandis* (Rolfe) Luer
 2. Sepals about 2 cm long, petals about 5 mm long, incurved, lip nearly as tall as long *D. powellii* (Schltr.) Luer
1. Leaves < 20 cm long and < 8 cm wide (mostly much smaller). Petals wide, obtuse to emarginate, externally papillose, conspicuously 3-veined 3
 3. Leaf distinctly petiolate, inflorescence borne from a conspicuous spathe, inflorescence with several flowers open at a time 4

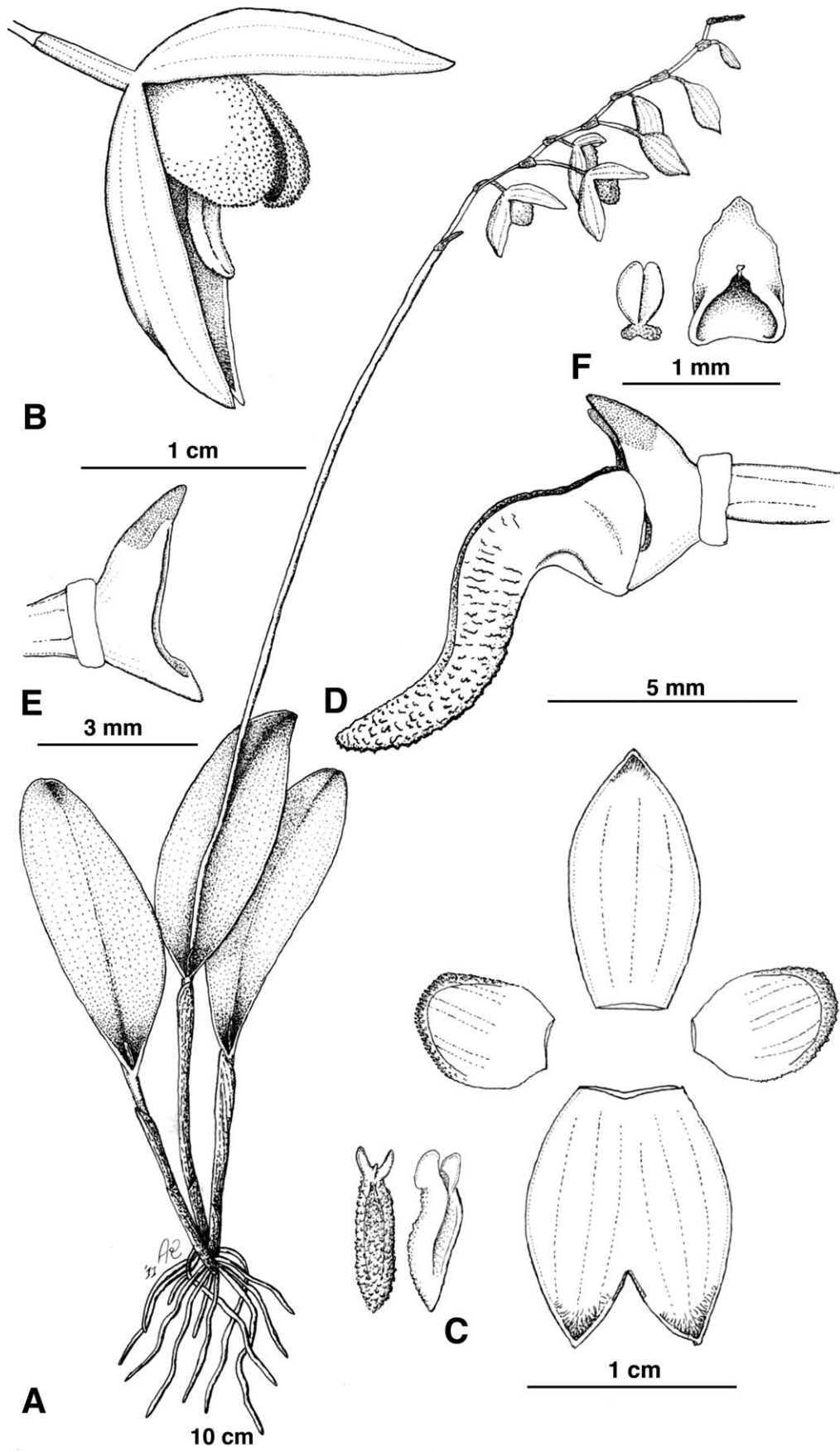


FIG. 3. *Dracontia viridi-flava* Karremans & Bogarín. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Column, lateral view. F. Pollinarium and anther cap. Drawings by Adam P. Karremans based on *D. Bogarín* 7698.

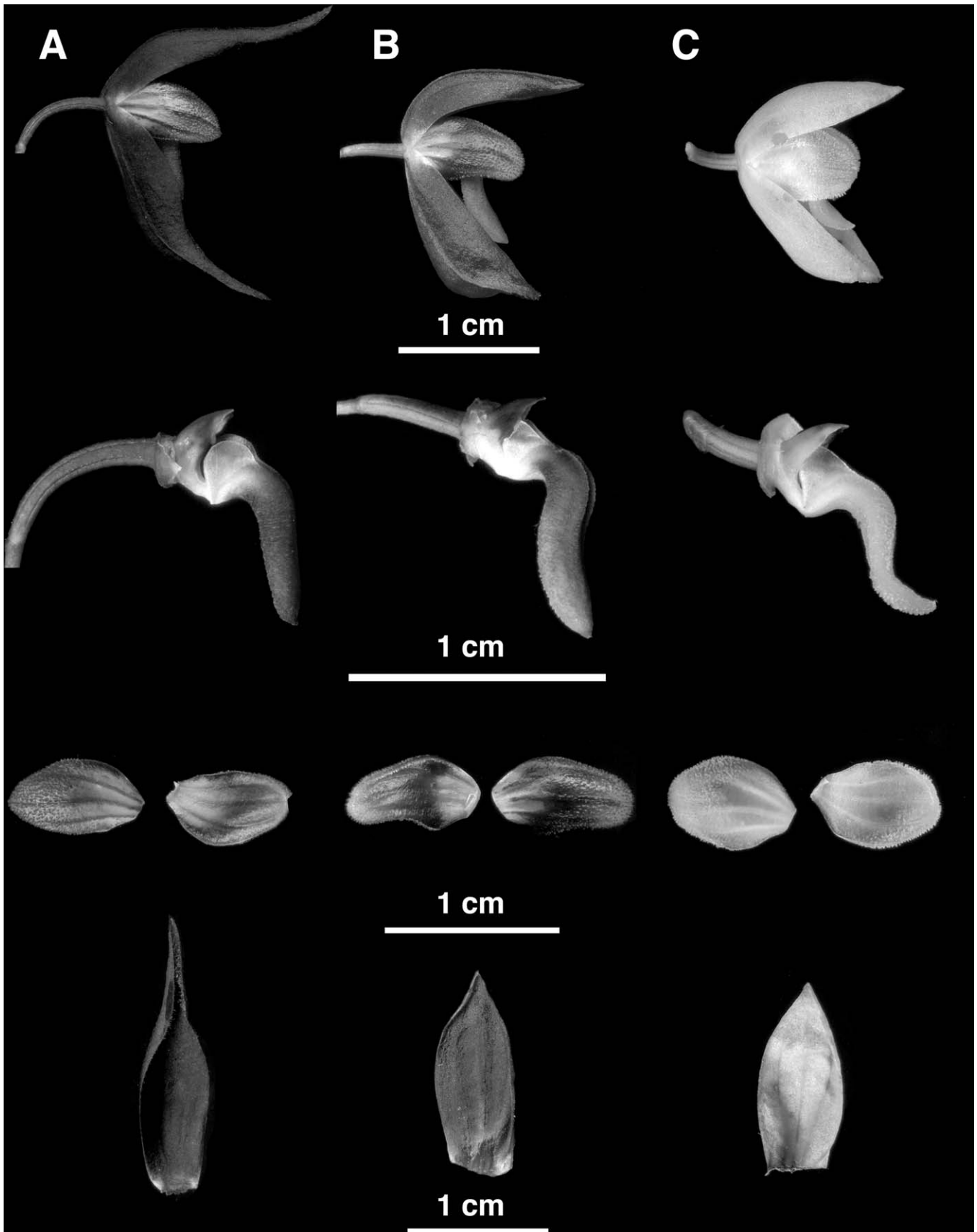


FIG. 4. Comparison of (1) flowers, (2) column and lip, (3) petals, and (4) dorsal sepal, as seen from top to bottom. A. *Dracontia hydra* Karremans & C.M.Sm. (Bogarín 7840). B. *Dracontia pileata* Karremans & Bogarín (Karremans 4604). C. *Dracontia viridi-flava* Karremans & Bogarín (Bogarín 7698). Photographs by A. P. Karremans.

4. Plant > 20 cm tall, spathe large, 4–7 cm long, inflorescence > 30 cm long, not cleistogamous, dorsal sepal at least 15 mm long *D. tuerckheimii*
4. Plant < 20 cm tall, spathe small, 1.5–4 cm long, inflorescence < 30 cm long, flowers frequently cleistogamous, dorsal sepal < 15 mm long *D. cobanensis* (Schltr.) Luer
3. Leaf sessile, narrowly cuneate or indistinctly petiolate, inflorescence borne from an inconspicuous spathe, inflorescence with 1–4 flowers open at a time 5
5. Lip with the sides involute, tube-like *D. macrantha* (L.O.Williams) Luer
5. Lip not with sides involute, not tube like 6
6. Mature ramicauls up to 5 cm long, lip nearly as large as the synsepal, spatulate, broadly rounded at the apex *D. carnosilabia* (A.H.Heller & A.D.Hawkes) Luer
6. Mature ramicauls over 5 cm long, lip smaller than the synsepal, ligulate, acute to obtuse at the apex 7
7. Leaves narrowly elliptic to linear, at least 5–6 times longer than wide, acute 8
8. Leaves coriaceous, linear, acute, synsepal straight *D. lueriana* Karremans
8. Leaves herbaceous, narrowly elliptic, acuminate, synsepal L-shaped *D. ingramii* (Luer) Luer
7. Leaves elliptic to suborbicular, about 2–4 times as long as wide, obtuse 9
9. Inflorescence 1–2 flowered, not becoming successively single-flowered, lip smooth *D. ramonensis* (Schltr.) Luer
9. Inflorescence producing 6–9 flowers initially, with 2–4 open at once, becoming successively single-flowered for weeks to months, lip verrucose 10
10. Plants < 10 cm tall, inflorescence flexuous, flowers nutant, lip with a concavity above the transverse callus *D. tintinnabula* (Luer) Luer
10. Plants > 10 cm tall, inflorescence straight, flowers not nutant, lip without a concavity 11
11. Petals emarginate, flowers greenish-yellow, petal veins and papillae dark purple *D. papillifera* (Rolfe) Luer
11. Petals obtuse, flowers without the above color combination 12
12. Disc of the lip without a tall callus above the base, basal lobes thick, not rounded, opaque, not “earlike” 13
13. Sepals internally verrucose and hirsute, petals internally lamellate, lip sub-conical to narrowly ovoid, apex narrowly oblong, somewhat incurved, lip yellow, suffused with purple *D. dracontea*
13. Sepal internally glabrous, petals internally papillose, lip ligulate-elliptic, lip apex obtuse, not incurved, white with three purple stripes *D. montis-mortense*
12. Disc of the lip with a tall callus above the base, basal lobes erect, thin, suborbicular, translucent, earlike 14
14. Flowers small, sepals 8–9 mm long, 3.75–5.5 mm wide, lip conical *D. conochila*
14. Flowers larger, sepals 14–16 mm oblong, 6–11 mm wide, lip linear-elliptic 15
15. Lip twisted straight downward, sepals acuminate, dorsal sepal 16–17 mm long *D. hydra*
15. Lip twisted sigmoidally downward, sepals acute, dorsal sepal 13–14 mm long 16
16. Flowers greenish-yellow, dorsal sepal ascending evenly from the base to the apex, lip deeply erose-verrucose *D. viridi-flava*
16. Flowers reddish-purple, dorsal sepal ascending in the basal third, flattening out below the middle and to the apex, lip rugose-verrucose *D. pileata*

Excluded Taxa—The name *Dracontia pachyglossa* (Lindl.) Luer has been used for Costa Rican material (Luer 1998, 2003; Pupulin 2002); however, we have never seen any material from the country that resembles the species, otherwise only known from Mexico and Guatemala. Collections by Brenes determined as *D. pachyglossa* at CR and AMES represent collections of *D. ramonensis* (Karremans 2012). Cited collections by D.E Mora at USJ represent *D. montis-mortense* and *D. ramonensis*. The name *Dracontia thymochila* (Luer) Luer, a species otherwise only known from Panama, has also been used for Costa Rican material in herbaria, but has been misapplied to specimens of *D. hydra* and *D. pileata* mostly. *Dracontia perennis* (Luer) Luer, a species described from Costa Rica, was distinguished from *D. dracontea* on the basis of its successively single-flowered inflorescence; however, there are several species of *Dracontia* that initially produce a several flowered inflorescence with a few open flowers at once, and then becomes successively single-flowered, *D. dracontea* is one of them. Karremans and Smith (2012) provided evidence that the name *D. perennis* was based on a successively single-flowered specimen of *D. dracontea*; the former is therefore a synonym of the latter. *Dracontia carnosilabia* (Heller & Hawkes) Luer was cited by Pupulin (2002) but it was excluded from the Costa Rican flora by Luer (2003). We include it based on the presence of several collections of that species at JBL and at least one at INB and USJ from the country. Additionally, it is noteworthy to point out that there are a couple of addi-

tional undescribed species of *Dracontia* to be found among the Costa Rican herbarium material kept at CR, JBL, INB and USJ.

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