

NEW SPECIES AND RECORDS OF ORCHIDACEAE FROM COSTA RICA. IV.

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ABSTRACT. The fourth release of the series “New Species and Records of Orchidaceae from Costa Rica” documents and illustrates 17 taxa of the Costa Rican orchid flora. The new species records belong to the subtribes Pleurothallidinae (9 spp.), Maxillariinae (3 spp.), and Oncidiinae (2 spp.), including the description of two new species in *Pleurothallis* and *Telipogon*. Two new forms are described for *Isochilus latibracteatus* (Ponerinae) and *Masdevallia striatella* (Pleurothallidinae), and their differences from the typical forms are discussed. Additionally, the first record of a naturalized population of *Phalaenopsis stuartiana* (Aeridinae) in Costa Rica is discussed. Detailed descriptions, based on selected Costa Rican material, are included for all taxa, along with illustrations or Lankester Composite Digital Plates (LCDP). Information on their etymology, distribution, habitat, phenology, and distinguishing features compared to morphologically similar species is also provided. Finally, following the publication of the most recent Costa Rican orchid catalogue, we have identified some omissions and other new species described, which are discussed here. The orchid flora of Costa Rica now includes 1695 species and nine forms.

RESUMEN. La cuarta entrega de la serie “Nuevas especies y registros de Orchidaceae de Costa Rica” documenta e ilustra 17 taxones para la flora de orquídeas costarricenses. Los nuevos registros de especies pertenecen a las subtribus Pleurothallidinae (9 spp.), Maxillariinae (3 spp.) y Oncidiinae (2 spp.), incluyendo la descripción de dos especies nuevas en *Pleurothallis* y *Telipogon*. Se describen dos nuevas formas para *Isochilus latibracteatus* (Ponerinae) y *Masdevallia striatella* (Pleurothallidinae), y se discuten sus diferencias con las formas típicas. Además, se discute el primer registro de una población naturalizada de *Phalaenopsis stuartiana* (Aeridinae) en Costa Rica. Se incluyen descripciones detalladas, basadas en material costarricense seleccionado, para todas las especies, junto con ilustraciones o láminas digitales compuestas Lankester (LCDP). También se proporciona información sobre su etimología, distribución, hábitat, fenología y características distintivas comparadas con especies morfológicamente similares. Finalmente, tras la publicación del más reciente catálogo de orquídeas de Costa Rica, hemos identificado algunas omisiones y otras nuevas especies descritas que se comentan aquí. La flora de orquídeas de Costa Rica incluye ahora 1695 especies y nueve formas.

KEYWORDS / PALABRAS CLAVE: Aeridinae, Costa Rican orchids, *Flora Costaricensis*, Maxillariinae, Oncidiinae, orquídeas de Costa Rica, Pleurothallidinae

Introduction. In 2003, Robert L. Dressler presented the most comprehensive treatment of Orchidaceae available to date for Costa Rica (Dressler 2003). Subsequently, the series “New Species and Records of Orchidaceae from Costa Rica” was initiated to formally document newly discovered species and report those previously unknown in the country. Three contributions to this series were published between 2008 and 2014 (Bogarín *et al.* 2008, Fernández *et al.* 2014, Karremans *et al.* 2012). Since the latest publication, 114 orchid species from Costa Rica have been described as new to science, averaging approximately 11 new species per year. These belong to multiple diverse genera, such as *Anathallis* Barb.Rodr. (Karremans & Vieira-Urbe 2020), *Andreettaea* Luer (= *Muscarella* Luer) (Fernández *et al.* 2021), *Brachionidium* Lindl. (Bogarín *et al.* 2015, Bogarín & Karremans 2016), *Campylocentrum* Benth. (Bogarín 2015), *Cischweinfia* Dressler & N.H. Williams (Pupulin *et al.* 2020a), *Crossoglossa* Dressler & Dodson (Ormerod 2014), *Daiotyla* Dressler (Pupulin 2019), *Dichaea* Lindl. (Pupulin 2019, Pupulin & Karremans 2020), *Echinosepala* Pridgeon & M.W.Chase (Pupulin *et al.* 2017c, 2020b, 2022), *Epidendrum* L. (Díaz-Morales & Karremans 2016, Karremans 2021), *Eurystyles* Wawra (Bogarín 2020), *Lepanthes* Sw. (Bogarín *et al.* 2018a, 2019, 2020, Bogarín & Kisel 2014, Chinchilla *et al.* 2020, Larsen 2014, Pupulin 2020, 2021, Pupulin & Bogarín 2014a,b), *Lockhartia* Hook. (Blanco 2014), *Malaxis* Sol. ex Sw. (Chinchilla *et al.* 2022, 2023), *Masdevallia* Ruiz & Pav. (= *Reichantha* Luer) (Bogarín *et al.* 2017, Smith *et al.* 2015, Pupulin 2020), *Maxillariella* M.A.Blanco & Carnevali (Bogarín *et al.* 2018b), *Mormodes* Lindl. (Blanco *et al.* 2016), *Myoxanthus* Poepp. & Endl. (Rojas-Alvarado & Karremans 2017), *Oncidium* Sw. (Pupulin 2020), *Pelexia* Poit. ex Lindl. (Bogarín & Pupulin 2021), *Platystele* Schltr. (Karremans & Bogarín 2017), *Pleurothallis* R.Br. (Karremans & Jiménez 2018, 2023, Pupulin 2020, Pupulin *et al.* 2017a,b, 2021), *Polycycnis* Rchb.f. (Gerlach & Pupulin 2020), *Prescottia* Lindl. (Pupulin 2020), *Prosthechea* Knowles & Westc. (Bogarín & Karremans 2015), *Pterichis* Lindl. (Kolanowska 2014), *Sarcoglottis* C.Presl (Bogarín & Pupulin 2021), *Scaphosepalum* Pfitzer (Karremans & Pupulin 2022), *Sobralia* Ruiz & Pav. (Dressler & Pupulin 2014, 2015, Dressler *et al.* 2014, 2016, Pupulin & Díaz-Morales 2022), *Specklinia* Lindl. (Bogarín *et al.* 2014, Karremans & Vieira-Urbe 2020, Karremans *et al.* 2015a,b, 2020), *Stelis* Sw. (Bogarín & Pupulin

2019, Karremans & Díaz-Morales 2017, Karremans & Rojas-Alvarado 2022, Rojas-Alvarado 2023), *Telipogon* Kunth (Bogarín *et al.* 2024, Pupulin & Bogarín 2022), *Vanilla* Mill. (Karremans & Lehmann 2018), and *Zootrophion* Luer (Pupulin & Rojas-Alvarado 2022). Also, new nothospecies have been proposed in *Cochlezella* J.M.H.Shaw, *Pleurothallis*, and *Phragmipedium* Rolfe (Pupulin 2015, Pupulin & Díaz-Morales 2018, Pupulin *et al.* 2021).

The most updated comprehensive catalogue of the Costa Rican orchid flora (Pupulin *et al.* 2023) accounts for 1684 species, four subspecies, 14 natural hybrids, and seven forms across 201 genera and two nothogenera. Here, we present detailed descriptions, illustrations, or Lankester Composite Digital Plates (LCDP) for 12 new records previously listed in Pupulin *et al.* (2023) and two new species to science in the Oncidiinae and Pleurothallidinae. Additionally, we formally describe and illustrate two new forms for *Isochilus latibracteatus* A.Rich. & Galeotti (Ponerinae) and *Masdevallia striatella* Rchb.f. (Pleurothallidinae). Furthermore, we discuss the first record of a population of *Phalaenopsis stuartiana* Rchb.f. (subtribe Aeridinae) naturalized in Costa Rica. Along with the generic monographs and taxonomic treatments for groups of closely related orchids in larger genera, this series represents our ongoing effort to contribute to *Flora Costaricensis*, with the aim of providing a comprehensive treatment of Costa Rican orchids (Atwood & Mora de Retana 1999, Bogarín *et al.* 2014, Pupulin 2010, Pupulin & Bogarín 2010, 2014a,b, Pupulin *et al.* 2020b, 2021, Rojas-Alvarado & Karremans 2020).

Materials and methods. Plants collected in Costa Rica between March 2002 and October 2023, were labeled and cultivated at the Lankester Botanical Garden (JBL), where their study and documentation were carried out. Field notes for each collection included geographical, phenological, and taxonomic data. At blooming, each plant was documented with high-resolution photography, including its dissected parts and the plant habit with relative scales. Photographs were mostly taken with Nikon cameras (D7100, D810) mounted on Manfrotto tripods, fitted with macro lenses (Micro Nikkor 60mm f/2.8, Micro Nikkor 105mm AF/ED f/2.8, Sigma DG Macro HSM 105mm f/2.8). Floral details were captured with a Micro-Nikkor 60mm f.2.8 and Zeiss Luminar 63mm, 40mm, 25mm, and 15 mm,

mounted on a Nikon PB6 bellows, or with a Leica Z16 APO Zoom microscope fitted with a Leica Planapo 1x Z-series lens. Images were post-edited for optimization using Adobe® Photoshop. Lankester Composite Digital Plates (LCDP) and other comparative plates of flowers were also prepared. Flowers and floral details were drawn using dissecting stereo microscopes Leica MZ9.5 and M80, fitted with Leica Planapo lenses and drawing tubes. Line drawings were mostly done using Rotring Rapidograph technical drawing pens with line widths of 0.1 or 0.2 mm on Fabriano, acid-free, smooth paper of 240g/m². For some illustrations, the line drawing was prepared using an Apple® iPad and Procreate®, the electronic drawing successively printed on Fabriano paper with a HP Color Laser Jet Pro M452nw, and the printed drawing hand-dotted with a Rotring Rapidograph technical drawing pen.

Inflorescence terminology follows the proposal by Rojas-Alvarado *et al.* (2021). For all the descriptions, measurements were mostly taken under a dissecting stereoscope or with the aid of the electronic scale bars inserted in the high-definition images of the floral details. We specified the specimens on which each description is based. The vouchers were prepared by fixing entire or dissected flowers in FAA solution to be deposited at the JBL spirit collection. Additional Costa Rican material studied includes the revision of specimens deposited in other herbaria such as CR and USJ (acronyms cited follow Thiers 2023). Specific coordinates of cited specimens were omitted to prevent illegal poaching but can be provided upon request for scientific purposes.

TAXONOMIC TREATMENT

ANATHALLIS Barb.Rodr.

Anathallis funerea (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 115: 258. 2009. Basionym: *Lepanthes funerea* Barb.Rodr., Vellozia, ed. 2, 1: 118. 1891. Homotypic synonyms: *Pleurothallis funerea* (Barb.Rodr.) Cogn. in C.F.P.von Martius & auct. suc. (eds.), Fl. Bras. 3(4): 567. 1896. *Specklinia funerea* (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 260. 2004. *Panmorphia funerea* (Barb.Rodr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 156. 2006.

TYPE: [Brazil. Amazonas] Hab. os ramos delgados das arvores das mattas do Rio Yauapery, Floresce em Março [(holotype, lost; lectotype designated by Barros & Barberena, *Rodriguésia* 61(1): 128. 2010: fig. D, tab. 200, vol. 3 (J. Barbosa Rodrigues, Iconographie des Orchidées du Brésil, reproduced in Springer (1996, p.258)].

Heterotypic synonyms: *Pleurothallis breviscapa* C.Schweinf., Bot. Mus. Leaf. 3: 79. 1935. *Anathallis breviscapa* (C.Schweinf.) Pridgeon & M.W.Chase, Lindleyana 16(4): 248. 2001. *Specklinia breviscapa* (C.Schweinf.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 259. 2004. TYPE: British Guyana. June 1897, *E.F. im Thurn 181* (holotype, K!).

Pleurothallis praemorsa Luer, Selbyana 2: 388. 1978. *Specklinia praemorsa* (Luer) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 263. 2004. TYPE: Ecuador: Pastaza: epiphytic in rain forest about 20 km east of Puyo, alt. ca. 600 m, 3 Aug. 1977, *C. Luer 1813, J. Luer & J. Brenner* (holotype, SEL!).

DESCRIPTION: Based on *D. Bogarín 10298*.

Epiphytic herb, caespitose, small, to 5 cm tall. Roots flexuous, glabrous. *Ramicauls* erect, cylindrical, 0.6–2.0 cm long, 1 mm in diameter, with two internodes, the basal one shorter, covered by papery sheaths. *Sheaths* tubular, truncate to obtuse, ribbed, the basal one imbricate, the apical one shorter than the internode. *Leaves* elliptic to obovate, erect, 3.0–4.5 × 0.7–0.8 cm, base cuneate into a short petiole, apex acute, apiculate forming a minute tridentate apex. *Inflorescence* terminal at the apex of the ramicaul, with 1–4 successive multi-flowered cymes of 1.5–3.2 cm long, each one producing up to 4 successive brownish to greenish flowers. *Pseudopeduncle* 1–2 cm long, minutely pubescent, with a 3 mm long papery, acute, tubular bract at the base. *Floral bracts* 1.5–2.0 mm long, acute, minutely pubescent. *Ovary* subclavate, 0.75–1.0 mm long, minutely glandular, articulated to a *pedicel* 2–5 mm long, minutely glandular. *Dorsal sepal* elliptic to ovate, acute, 12 × 4 mm, yellowish. *Lateral sepals* elliptic to ovate, acute, 11.0–12.0 × 3.0–3.5 mm. *Petals* yellowish with minute irregular brownish margins,

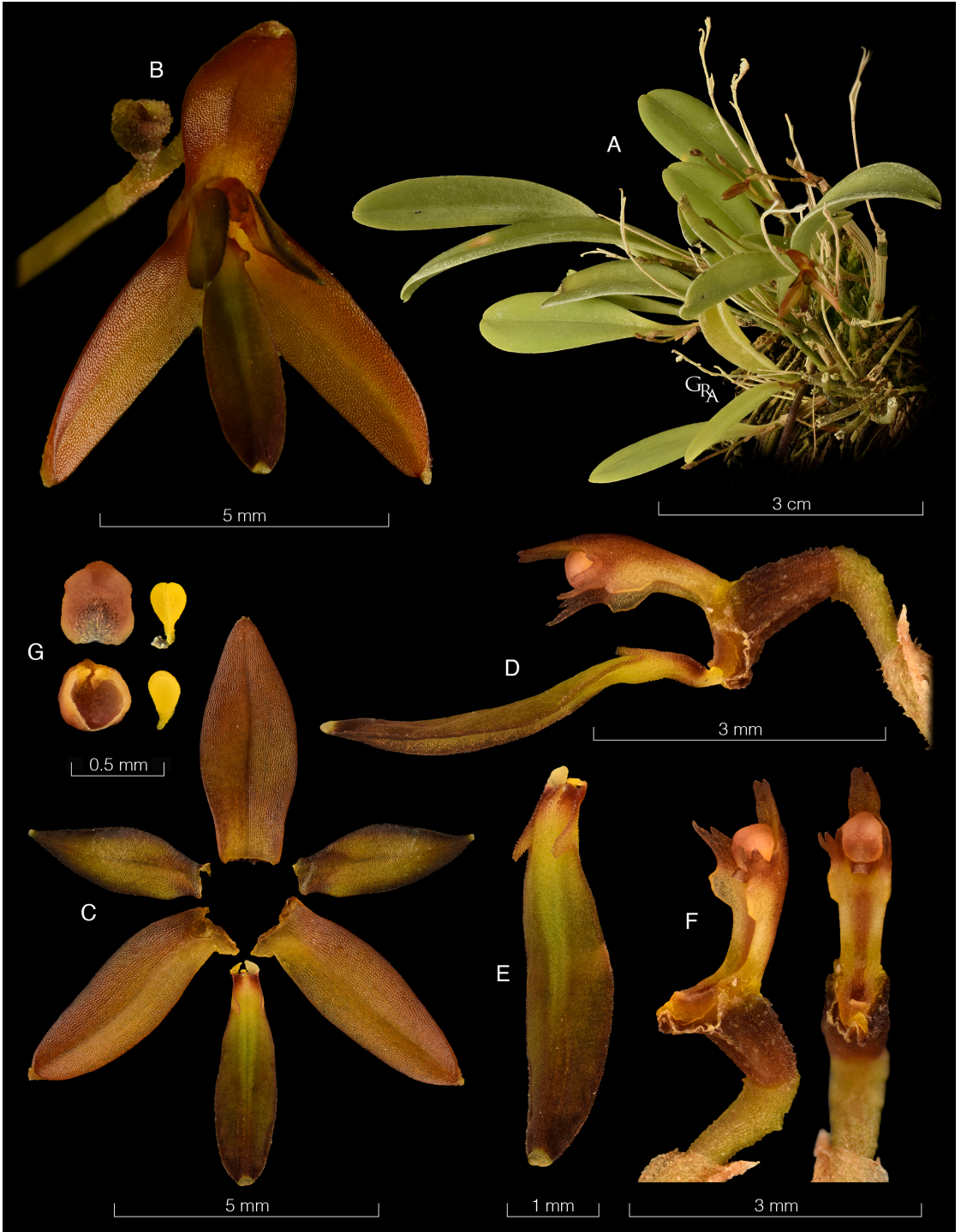


FIGURE 1. *Anathallis funerea* (Barb.Rodr.) Luer. A. Habit. B. Flower, $\frac{3}{4}$ view. C. Perianth dissected. D. Column with lip, lateral view. E. Lip, $\frac{3}{4}$ view. F. Column, $\frac{3}{4}$ and ventral views. G. Anther cap and pollinarium. LCDP prepared by G. Rojas-Alvarado based on D.Bogarín 10298.

acute, elliptic, 6.5–7.0 × 2.5 mm. *Lip* narrowly obovate, 4 × 1 mm, greenish, brownish to the margins, with a pair of auricles at the base, with short rounded and erected lateral lobes near the base, the middle lobe elliptic, with a truncate to emarginated apex. *Column* yellowish, 2 mm long, with a long-hooded apex, formed by two laterals and one dorsal long acute tooth; stigma ventral. *Anther cap* ventral, yellowish, 0.7 mm wide; pollinarium composed of two *pollinia*, 0.3 mm wide, with a pair of caudicles. *Fruit* not seen.

ETYMOLOGY: Presumably from the Latin *fūnereus* “funeral” in reference to the dark color of the flowers.

DISTRIBUTION: Costa Rica, Panama, Guyana, Guyana Francesa, Venezuela, Ecuador, Peru, Bolivia, and Brazil.

HABITAT IN COSTA RICA: Epiphytic in secondary wet forest on the Caribbean slope of the Cordillera Volcánica Central at about 750 m in elevation.

PHENOLOGY: Flowering in October and November under cultivation.

COSTA RICAN MATERIAL STUDIED: **Limón:** Pococí, Guápiles, Bellavista, *ca.* 3.8 km al sur de la Escuela La Guaría de Bellavista, 746 m, orillas de un afluente del Río Blanquito, bosque muy húmedo tropical, epífitas en bosque secundario, 8 jun. 2013, *D. Bogarín 10298* (JBL-A0740 spirit!, Fig. 1).

Anathallis funerea is distinguished by the caespitose habit with minutely pubescent inflorescences as long as the leaf, producing single-successive brownish to greenish flowers, and the lip with a truncate apex. *Anathallis angulosa* (Luer & Hirtz) Luer is superficially similar, however it is distinguished from *A. funerea* by its glabrous inflorescence (*vs.* minutely pubescent), the acuminate petals (*vs.* acute), and the ciliate margins of the lip (*vs.* not ciliate?). The lip and the particular truncate apex of the lip in *A. funerea* are reminiscent of *A. peroupavae* (Hoehne & Brade) E. Barros, but, the latter is distinguished by the glabrous inflorescences and the pubescent petals (*vs.* minutely pubescent inflorescence and glabrous petals).

DRACULA Luer

Dracula maduroi Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 234. 2004.

TYPE: Panama. Bocas del Toro: Velorio area, alt. 1100–1500 m, 10 Aug. 2003, *A. Maduro & E. Olmos 410* (holotype: MO), C. Luer illustr. 20534.

DESCRIPTION: Based on *N. Belfort-Oconitrillo 380 & K. Gil-Amaya, D. Bogarín 4405 et al.*, and *K. Gil-Amaya 246*.

Epiphytic *herb*, densely caespitose, up to 15 cm tall. *Roots* slender, *ca.* 1.2 mm in diameter. *Ramicauls* stout, erect, 1.30–3.20 cm long, enclosed by 2–3 tubular sheaths. *Leaves* erect to suberect, thinly coriaceous, carinate, narrowly linear-obovate, acute, 10.3–15.6 cm × 1.3–1.5 cm, gradually narrowed below into the conduplicate base. *Inflorescence* with successive multi-flowered cymes, each of them distantly and successively few-flowered. *Pseudopeduncle* slender, slightly descending, 10–17 cm long; *floral bract* tubular, acuminate, green, 7–10 mm long; *ovary* verrucose, round in cross section, brown, 5–6 mm long, articulated to a *pedicel* 11–15 mm long. *Flower* pendant, caudate, expanded, densely pubescent adaxially, sepals white with purple tails turning dull yellow towards the apex, slightly spotted purple brown near the base, suffused with purple-pink towards the basal portion of the tails, petals light yellow, turning bright yellow towards the verrucose apical portion, lip white, column white turning cream-yellow towards the apical portion. *Dorsal sepal* broadly ovate, shallowly concave from the middle to the basal portion below the column, 8.8 × 9.3 mm without the tail, connate to the lateral sepals for 4 mm to form an expanded flower, the apex obtuse, contracted into a slender, filamentous tail, 3.71–4.37 cm long. *Lateral sepals* 11.7–12.3 mm long without the tail, connate to *ca.* 11 mm to form a broad and bipartite synsepal 14.7 mm wide, shallowly concave near the base below the lip, the apices obtuse, contracted into slender tails 3–4 cm long. *Petals* cartilaginous, oblong, 3 mm long, 1.5 mm wide, the apex obtuse, papillose, indistinctly bivalvate, the margin obtuse, denticulate, the outer lamina rounded, denticulate. *Lip* subpandurate, truncate, 4.7 × 2.2 mm, the hypochile oblong, 2.8–3.3 × 2.2 mm, hinged to the column-foot by a thin

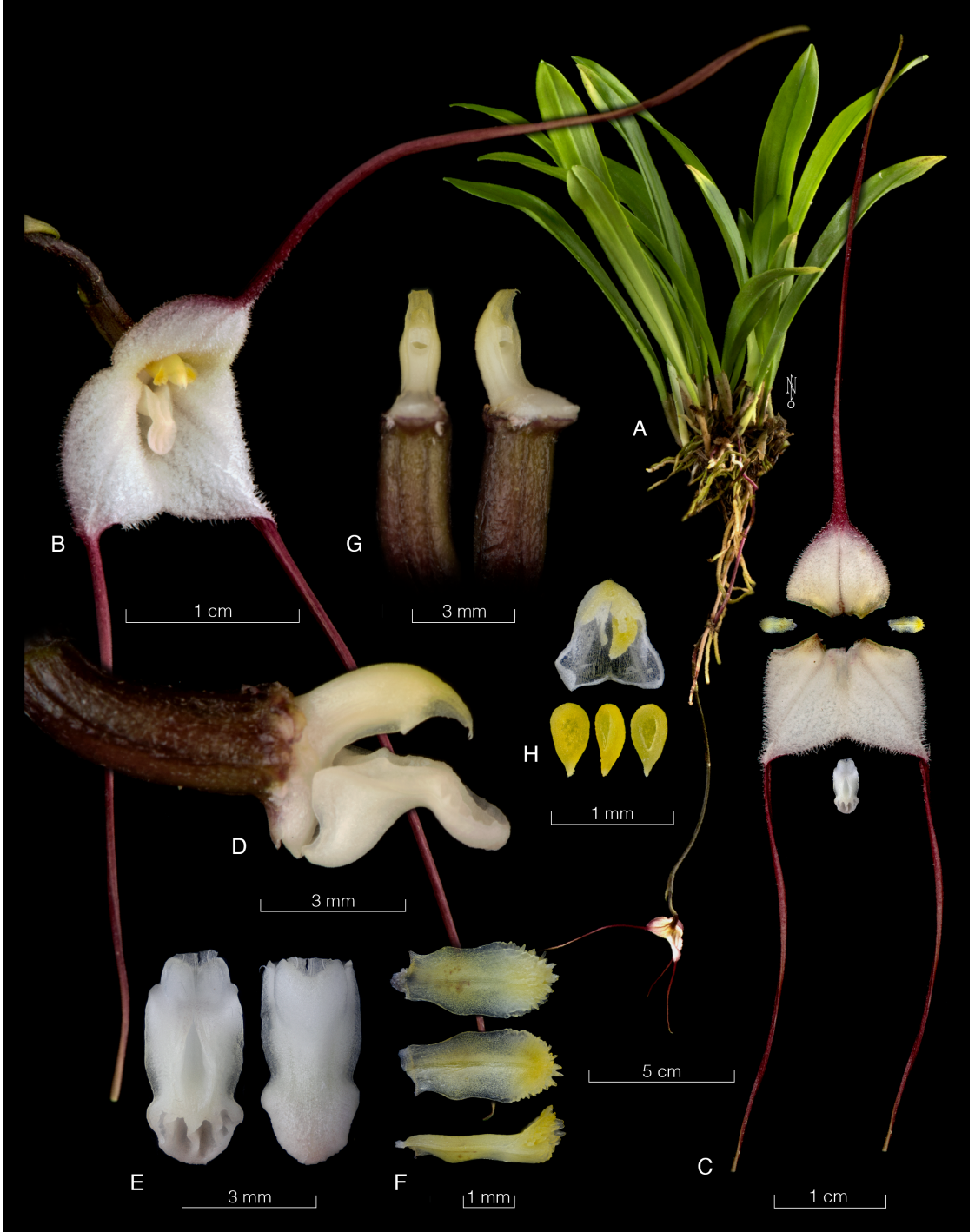


FIGURE 2. *Dracula maduroi* Luer. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip in natural position, lateral view. E. Lip, ventral and dorsal views. F. Petal, ventral, dorsal and lateral views. G. Column, ventral and $\frac{3}{4}$ views. H. Anther cap and pollinarium. Photos by K. Gil-Amaya based on *N.Belfort-Oconitrillo* 380. LCDP prepared by K. Gil-Amaya and N. Belfort-Oconitrillo.

membrane, consisting of a deeply concave depression at the base, with erect, obtuse, marginal angles, cleft centrally; the epichile semicircular, $1.5\text{--}1.9 \times 2.2$ mm, obtuse, concave with slightly incurved margins becoming more evident when dehydrating, with 3 parallel, well-developed lamellae within, flanked by a few, vestigial, radiating carinae. *Column* arcuate, stout, semiterete, 3.7 mm long, with a stout foot *ca.* 2 mm long, at the end of the column, the clinandrium dorsally long hooded with a pair of small acute teeth. *Anther cap* cucullate, 2-celled, translucent white. Pollinarium composed of two *pollinia*, obovate, laterally flattened, ventrally depressed. *Fruit* not seen.

ETYMOLOGY: Named for Andrés Maduro of Finca Dracula in the province of Chiriquí, Panama (Luer 2004).

DISTRIBUTION: Known to occur in Costa Rica and Panama.

HABITAT IN COSTA RICA: Epiphytic in secondary pluvial premontane and low montane forests along the Caribbean slope of the Cordillera Volcánica Central and northern foothills of the Cordillera de Talamanca, between 1150 and 1650 m.

PHENOLOGY: Blooming from July to February.

COSTA RICAN MATERIAL STUDIED: **Alajuela:** Sarchí, Bajos del Toro, Reserva Biológica Bosque de Paz, sendero Jaulares, 1540 m, bosque premontano en regeneración, creciendo como epífita sobre un árbol a una altura de *ca.* 3 m sobre el suelo, con una flor abierta, 27 jul. 2019, *N. Belfort-Oconitrillo 380* & *K. Gil-Amaya* (JBL-A0520 spirit!), Fig. 2). **Cartago:** Paraíso, Orosi, Tapantí, Parque Nacional Tapantí, mar. 2021, *K. Gil-Amaya 246* & *G. Villalobos* (JBL-B2286 spirit!). **Heredia:** Sarapiquí: Vara Blanca-Horquetas, camino al cráter del Cerro Cacho Negro, entre las riberas del Río Molejón y Río Cacho Negro, 1150 m, bosque pluvial montano bajo, epífitas en bosque primario a orillas del río, 10 abr. 2008, *D. Bogarín 4405 et al.* (JBL-D3523 spirit!).

The relatively small, densely pubescent white flowers and light-yellow petals distinguish this species among *Dracula* species present in Costa Rica. It can

be compared to *Dracula olmosii* from Panama, but this species grows at a higher elevation, *ca.* 2000 meters, and exhibits slightly broader leaves and white petals. In comparison to its South American counterparts, it shares morphological similarities with the Colombian species *D. posadarum* Luer & R.Escobar and *D. sergioi* Luer & R.Escobar, but differs in having all-white, densely pubescent sepals with twice longer tails, and with the three lamellae of the epichile of the lip well-developed. Other Ecuadorian species with white sepals and purple sepaline tails include *D. lotax* (Luer) Luer, *D. papillosa* Luer & Dodson and *D. rezeikiana* Luer & R.Hawley, but *D. maduroi* is distinguished by its expanded flowers, completely white sepals, short and dense pubescence, indistinctly bivalvate yellow petals, and the lip white with the epichile concave and the margins slightly incurved.

DRYADELLA Luer

Dryadella greenwoodiana Soto Arenas, Salazar & Solano, *Icon. Orchid. (Mexico)* 5–6: t. 550. 2002[2003]. **TYPE:** México. Oaxaca: Distrito de Ixtlán, km 46.7 del camino Ixtlán de Juárez-Talea de Castro, en la desviación a Tanetzé de Zaragoza y Juquila Quijanos, 2000 m, bosque de pino-encino-liquidámbar en filo de la loma; 25 mar. 2000, prensado de material cultivado, 2 jul. 2001, *M. Soto et al. 9439* (holotype, AMO).

DESCRIPTION: Based on *D. Bogarín 11108 et al.* and *A. P. Karremans 8870* & *M. Contreras Fernández*.

Plant epiphytic, caespitose or shortly rhizomatous, to 3 mm tall; rhizome to 2 mm long. *Roots* slender, to 1 mm in diameter. *Ramicauls* erect, to 3 mm long, enclosed by 2–4 thin, tubular sheaths to 3 mm long, the annulus to 0.3 mm. *Leaves* suberect, very thick (to 2.5 mm thick), coriaceous, conduplicate, elliptic, subacute, emarginate with a short apiculus, green, abaxially purple, $0.6\text{--}2.1 \times 0.3\text{--}0.7$ cm, narrowing into a subpetiolate base. *Inflorescence* with successive multi-flowered ceflorescences, each of them with flowers opened at once. *Pseudopeduncle* short, to 2–4 mm long, rachis to 5 mm, floral bracts thin, $2.5\text{--}3.0 \times 2.2$. *Ovary* to 1.8 mm long, smooth, angulate, keeled, articulated to a pedicel 2–4

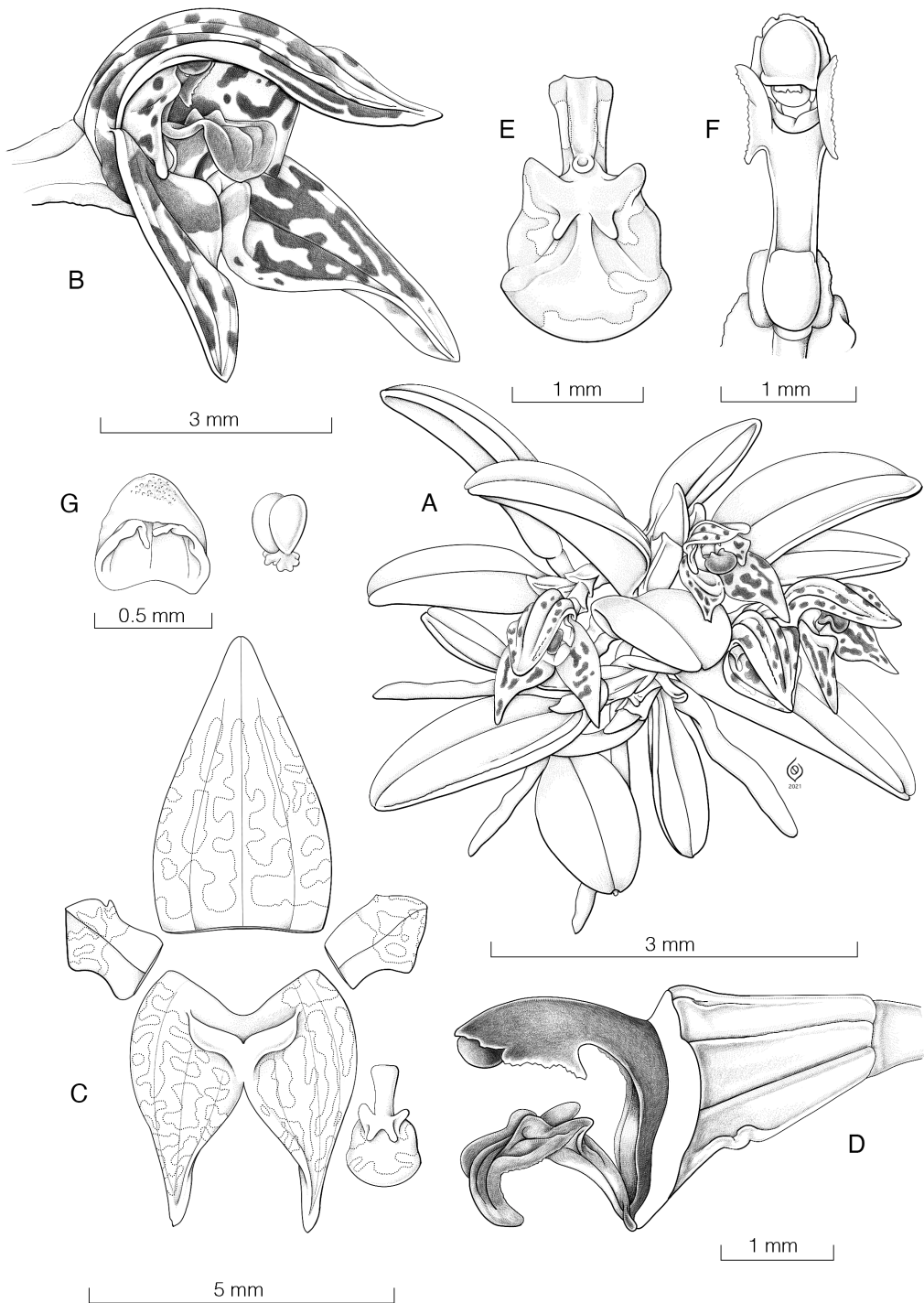


FIGURE 3. *Dryadella greenwoodiana* Soto Arenas, Salazar & R. Solano. **A.** Habit. **B.** Flower. **C.** Dissected perianth. **D.** Ovary, column and lip, lateral view. **E.** Lip, flattened. **F.** Column, ventral view. **G.** Anther cap and pollinarium. Drawn by D. Bogarín & L. Oses based on *D. Bogarín 11108* (JBL).



FIGURE 4. **A.** *Dryadella greenwoodiana* Soto Arenas, Salazar & R.Solano (*D.Bogarín 11108*). **B.** *Dryadella guatemalensis* (Schltr.) Luer (*A.P.Karremans 3642*). Photos by D. Bogarín (A) and G. Salguero (B).

mm long. *Flowers* the sepals greenish yellow with purple spots mostly along the veins, petals translucent greenish yellow with a red stain at the base and red spots towards the apex, the lip reddish. *Dorsal sepal* ovate, acute, concave, $4.5\text{--}4.7 \times 2.6\text{--}2.8$ mm, connate to the lateral sepals for 0.5 mm to form a sepaline cup. *Lateral sepals* ovate, acute to attenuate, thickened, connate for about 1.2 mm, $4.2\text{--}4.3 \times 1.7\text{--}1.8$ mm, with a transverse callus above the decurved base. *Petals* subpandurate to subhastate, acute with an obtuse angle on the upper margin and a subacute angle on the labellar margin, $1.7\text{--}1.8 \times 1.2\text{--}1.3$ mm. *Lip* unguiculate, arcuate, transversely ovate, hinged to the apex of the column-foot, $2.0\text{--}2.1 \times 1.2\text{--}1.3$ mm, rounded, decurved at the apex, the blade transversely obovate, auriculate, the disc with a pair of thick keels, the claw oblong, auriculate at the base, 8 mm long. *Column* subcylindrical, arcuate, erose at apex, to 3 mm long, with two acute, descending, stigmatic wings, with a conspicuous, canaliculate foot to 1.2 mm long, stigma ventral; anther subapical, anther cap cucullate, verrucose at the apex. Pollinarium composed of two *pollinia*, obovoid, with granulose caudicles. *Fruit* not seen.

Eponymy: Named after the Canadian Edward Warren Greenwood, one of the most influential contemporary orchidologists in Mexico.

Distribution: It has been recorded in Mexico, Guatemala, El Salvador, and Costa Rica.

Habitat in Costa Rica: Plants grow epiphytically in montane wet forest above 2400 m.

Phenology: Flowered in May and June in the wild and under cultivation.

COSTA RICAN MATERIAL STUDIED: **Alajuela:** Poás, San Juan, ca. 1 km antes de la entrada al Parque Nacional Volcán Poás, 2480 m, epífita en el tronco de un árbol aislado de *Calyptranthes pittieri* Standl. (Myrtaceae) en un potrero a orillas de la carretera, bosque pluvial montano, 19 may. 2014, *D. Bogarín 11108*, *M. Fernández & L. Sandoval* (JBL-illustration, Fig. 3–4A).

Dryadella comprises six species in Costa Rica. Among the species in the country, *D. greenwoodiana* differs by the elliptic, very thick (to 2.5 mm thick), co-

riaceous leaves in contrast to the other five species that show narrowly linear or elliptic, obovate leaves less than 1.5 mm thick. The plants are also recognized by their adaxially green and abaxially purple leaves, usually overlapping to form compact, dense, somewhat repent plants (Soto Arenas *et al.* 2002). A BLAST search using molecular data from the nrITS available in GenBank (<https://www.ncbi.nlm.nih.gov/genbank/>) suggests that *D. greenwoodiana* is related to *D. susanne* (Pabst) Luer from Brazil, which shows thick leaves, and both form compact plants with overlapping leaves.

In Costa Rica, the habitat of *D. greenwoodiana* is very different from that of the other species of the genus. *Dryadella greenwoodiana* inhabits the montane forests at high elevations above 2400 m, while the other species inhabit premontane and forests below 650 m. *Dryadella greenwoodiana* has been observed above Sacramento de Barva, towards Volcán Barva in Heredia, and in the vicinity of Madreselva, El Guarco in Cartago. However, we were unable to prepare vouchers of these specimens because they were infertile plants.

ISOCHILUS R.Br.

Isochilus latibracteatus fo. *albescens* Karremans & Salguero, *forma nova*

TYPE: Cartago. Turrialba: Santa Teresita, Guayabo, Monumento Nacional Guayabo, alrededores de los senderos principales, 1128 m, bosque muy húmedo, epifitas, 30 sep. 2015, floreció en cultivo, preparada el 2 jul. 2020, *A.P. Karremans 6720*, *N. Belfort-Oconitrillo* & *A. Morales* (holotype, JBL-J1069 spirit!) (Fig. 5).

DIAGNOSIS: *A forma typica floribus albis versus lilacino-purpureos vel rubropurpureos recedit.*

DESCRIPTION: Based on *A .P. Karremans 6720*.

Plant, epiphytic, cespitose, erect, up to 45 cm tall. *Roots*, dense, thick, fleshy, brownish, 3–5 mm in diameter. *Rhizome*, short, scandent. *Stems*, numerous, erect, 2–4 mm wide, covered by brownish leaf-sheaths, verrucose, especially the basal sheaths. *Leaves*, distichous, linear to linear-lanceolate, erect, decreasing in length as they approach the apex, apex conspicuously cleft, asymmetrically bilobed, 3.2 cm × 4.0 mm, articu-

lated with their sheaths, inconspicuously carinate in the back, green. *Inflorescence*, terminal, raceme, dense, 4–5 cm long, 5–10 successive flowers. *Floral bracts*, imbricated, scarious, tubular in the base, oblanceolate, obtuse, 10–13 mm long, pale brown. Ovary, with a short pedicel, subtrigonus, ventrally canaliculated, pale green, completely covered by bracts, 5.0–6.0 mm × 2.5–3.0 mm including the pedicel. *Flowers*, white, with a magenta linear spot on the middle of the lip, 7–10 mm long, tubular-campanulate. *Sepals*, connate in the first basal quarter, 9.0–10.0 × 3.5–4.5 mm. *Dorsal sepal*, oblong, obtuse to rounded. *Lateral sepals*, gibbous at base, lanceolate to oblong-lanceolate, prominently carinate-winged dorsally. *Petals*, elliptical-rhombic, reflexed apically, 8–9 × 3–4 mm. *Lip*, linear-oblanceolate, 9.0–10.0 × 2.5–3.0 mm, slightly constricted near the middle, apex obtused to rounded, with a sigmoid, saccate claw of 0.7–1.0 mm. *Column* up to 6 mm long, with a short inconspicuous foot, subclavate, ventrally canaliculate, clinandrium with oblong to ovate lateral wings 0.8–1.0 mm and an oblong-triangular tooth in the middle of 0.5 mm long, stigmatic cavity ventral, rostellum linear-triangular, acuminate. *Anther cap*, white, terminal, operculate, suborbicular, dorsiventrally compressed, 4-celled, cordate in the base, 1.5 × 1.5 mm. Pollinarium composed of four *pollinia*, in subequal pairs, obovate, elongate, and lateral compressed, pale yellow to whitish, 0.9–1.0 × 0.3–0.4 mm, attached to ovate-lanceolate hyaline caudicles with a keel. *Fruit* not seen.

ETYMOLOGY: From the latin *albescēns* “becoming white, whitish” in reference to the white color of the flowers, which contrasts with the typical form of the species.

DISTRIBUTION: Known only from Costa Rica.

HABITAT IN COSTA RICA: Very wet humid premontane tropical forest.

PHENOLOGY: Flowering in June and July.

Most species of *Isochilus* have either purple- or orange-colored flowers. The white flowers of *Isochilus latibracteatus* fo. *albescens* contrast notoriously with the violet-red or magenta found in the typical form of this species. Only three species of *Isochilus* have been

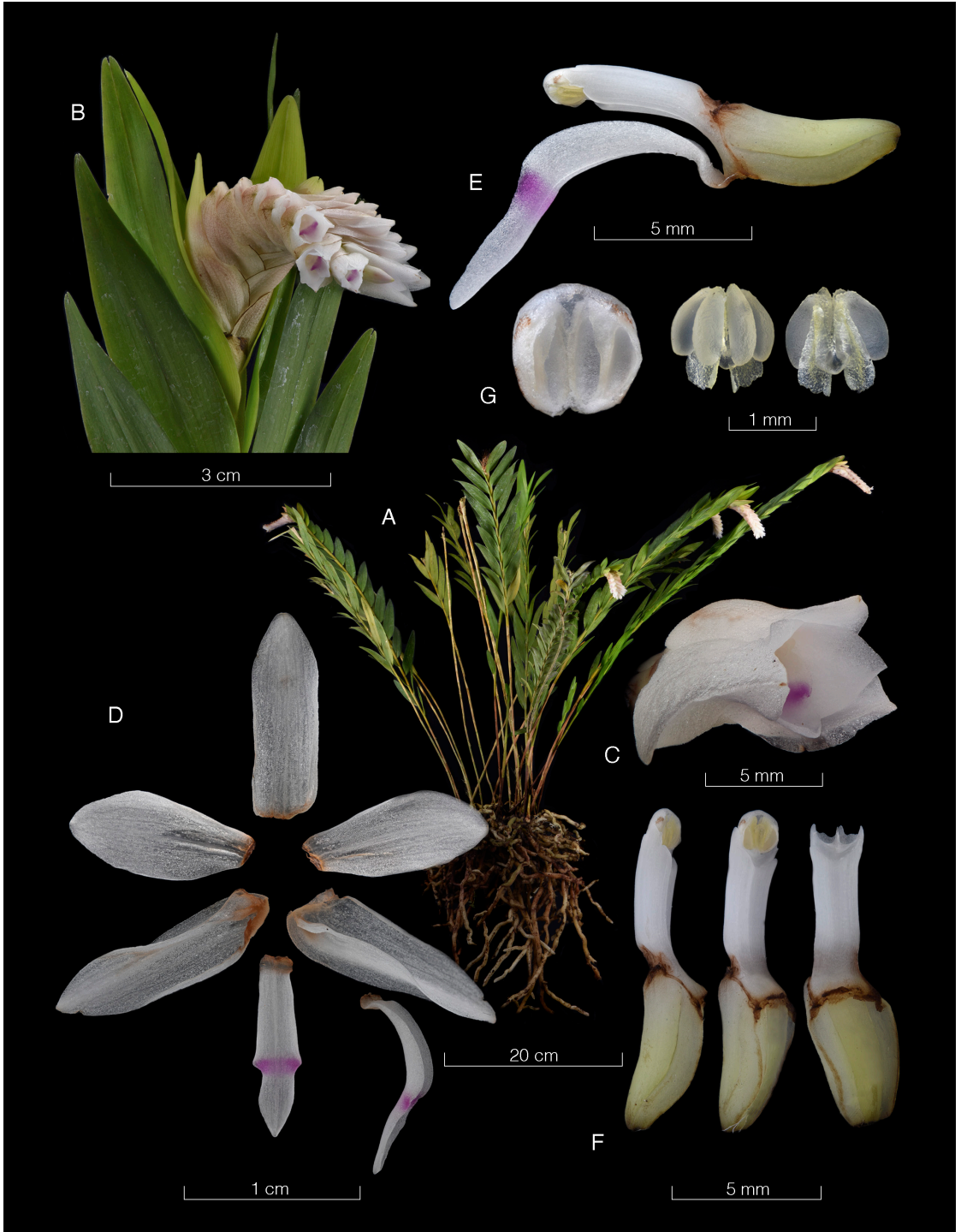


FIGURE 5. *Isochilus latibracteatus* fo. *albescens* Karremans & Salguero. **A.** Habit. **B.** Inflorescence. **C.** Flower. **D.** Dissected perianth. **E.** Lip and column in natural position, lateral view. **F.** Column in lateral, $\frac{3}{4}$ and ventral views. **G.** Anther cap and pollinarium. LCDP prepared by G. Salguero based on A.P.Karremans 6720.

formally reported to occur in Costa Rica: *I. linearis* (Jacq.) R.Br., *I. carnosiflorus* Lindl. and *I. chiriquensis* Schltr. (Dressler 2003). The reason why we want to describe formally this new form is because it's the only one known in Costa Rica, the typical form of *Isochilus lactibracteatus* is not known to occur yet in the country. Also, it is known that color polymorphism in orchids can have different ecological and evolutionary implications (Dormont *et al.* 2019).

The species is easily distinguished from *I. linearis* by the dark green leaves that are shorter toward the apex and, most important, the wide bracts that cover completely the pedicellate ovary. This new form has a very attractive white perianth and a magenta linear spot in the middle of the lip.

LEPANTHES SW.

Lepanthes acarina Luer, *Phytologia* 54(5): 326. 1983.

TYPE: Ecuador. Pichincha: epiphytic in cloud forest near Río Silante, Finca Canchacato, alt. ca. 2000 m, 28 oct. 1979, C. Luer, J. Luer & A. Hirtz 4399 (holotype, SEL).

DESCRIPTION: Based on *D. Bogarin 12501* & *K. Gil-Amaya* and *K. Gil-Amaya 202*.

Plant minute, epiphytic, caespitose, erect herb, up to 2.3 cm tall. *Roots* filiform, flexuous, slender, 0.2 mm in diameter. *Ramicauls* slender, erect, 8–14 mm long, enclosed by 3–6, tightly fitting, scabrous, lepanthiform sheaths. *Leaves* coriaceous, elliptical to ovate, obtuse, conduplicate, apiculate, abaxially with purplish veins, 7.0–11.7 × 4.6–6.9 mm, the rounded base contracted into a petiole ca. 1 mm long, the apex obtusely shortly cuspidate, excise, with the tip of the central vein protruding abaxially within the sinus. *Inflorescence* developed beneath the leaf with successive multi-flowered cincinnates, 3.6–8.5 mm long, each of them distichous, successively flowered. *Pseudopeduncle* up to 6.3–8.0 mm long, as long or longer than the leaf. *Floral bracts* triangular-ovate, muriculate, yellowish brown, 0.8–1.0 mm long. *Pedicels* 1.0–1.5 mm long, persistent. *Ovary* to 1 mm long, with prominent, slightly spiculate ribs. *Flowers* with yellowish-white, translucent sepals, the apex of the dorsal sepal tinged with purple, petals and lip pur-

plish pinkish. *Dorsal sepal* broadly ovate-triangular, subacute, serrulate-ciliate and dorsally carinate, connate to the lateral sepals for about 0.6 mm, 2.0–2.1 × 1.3–1.5 mm, 3-veined. *Lateral sepals* ovate, acute, serrulate, dorsally carinate-denticulate, connate for 0.8 mm, 1.7–1.9 × 1.0–1.1 mm, 2-veined. *Petals* bilobed, transversely oblong, minutely ciliate, 1.1–1.2 × 0.3–0.4 mm, upper lobes oblong, oblique, subtruncated, lower lobes narrowly oblong, obtuse, smaller than the upper lobes. *Lip* bilaminar, rounded, adnate to the column, the blades ovate, lunate, microscopically pubescent, 0.5–0.7 × 1.0–1.1 mm, connectives cuneate, up to 0.5 mm long; body narrow, connate to the base of the lip, appendix conspicuous for the genus, constricted above the middle, elliptic to oblong, the base concave, and the apex deflexed, pubescent. *Column* stout, terete, 1 mm long, with the anther dorsal, the stigma ventral. Pollinarium composed of two *pollinia*, ovoid, yellow. *Anther cap* cucullate, 1-celled. *Fruit* not seen.

ETYMOLOGY: Named after the order of the mites Acarina which is derived from the Greek ακαρής, akarēs, “tiny”, in reference to the little, red, prickly flowers (Luer 1983).

DISTRIBUTION: Costa Rica, Colombia, Ecuador, Peru, and Bolivia.

HABITAT IN COSTA RICA: Epiphytic in humid lower montane forest on *Quercus* spp. (Fagaceae) and *Cupressus lusitanica* Mill. (Cupressaceae), between 1800–1900 m.

PHENOLOGY: Flowering between July and October.

COSTA RICAN MATERIAL STUDIED: **Cartago**: Quebradilla, cruce a Alto Mata de Caña, carretera entre Tablón y Copalchí, 1891 m, bosque húmedo montano bajo, epífita en bosque secundario, 11 oct. 2019, *D. Bogarin 12501* & *K. Gil-Amaya* (JBL-illustration!; Fig. 6); same locality, 7 jul. 2019, *K. Gil-Amaya 202* (JBL-A0384 spirit!).

This species is widespread in the tropical Andes and is documented here for the first time in Southern Central America. *Lepanthes acarina* is the third species of the genus known to range from Costa Rica and Pan-

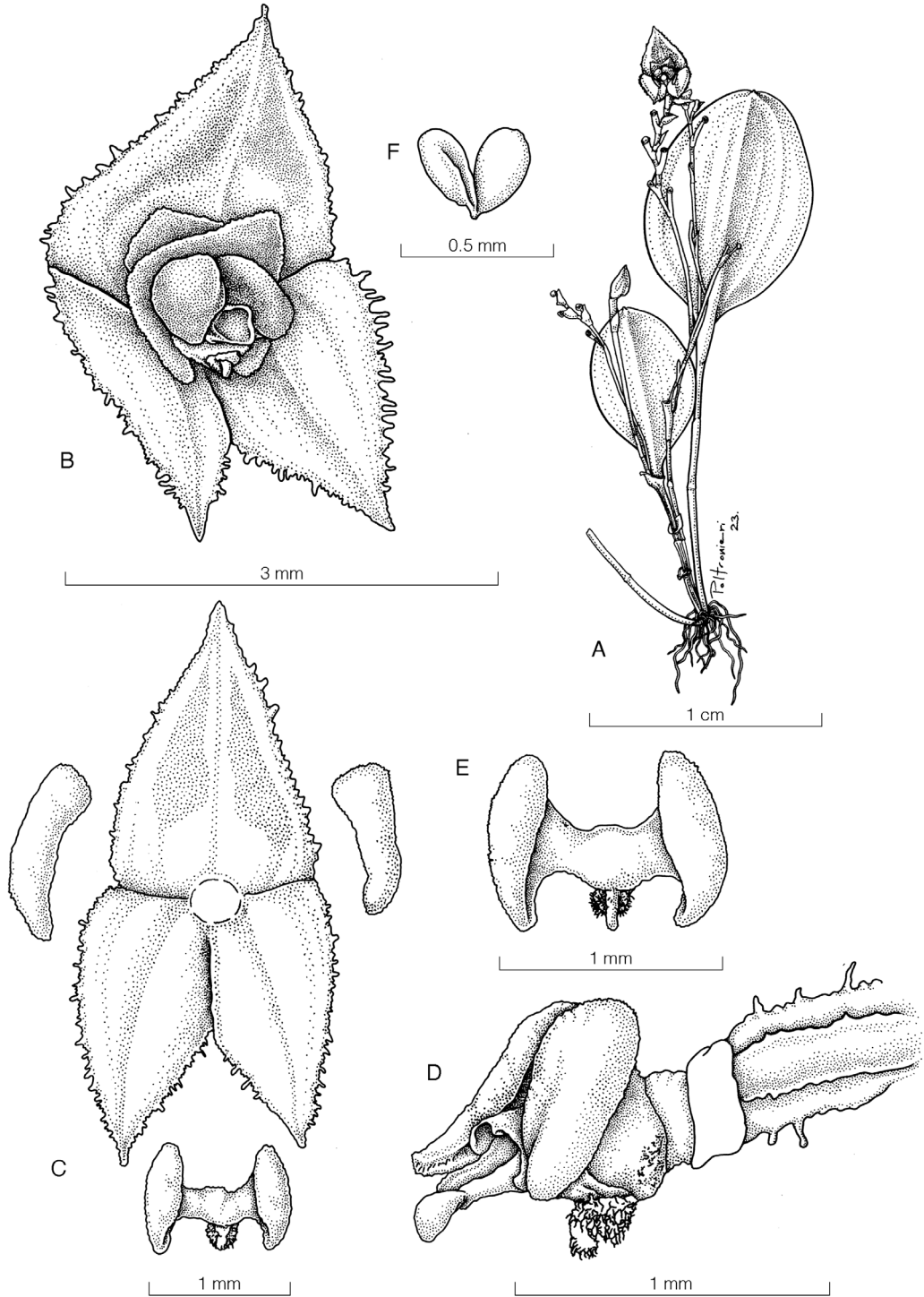


FIGURE 6. *Lepanthes acarina* Luer. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Lip, spread. F. Pollinia. Drawn by D. Bogarín, K. Gil-Amaya and S. Poltronieri based on *D. Bogarín 12501* (JBL-spirit).

ama to Colombia and Ecuador (Bogarín *et al.* 2016). It is easily distinguished by its diminutive habit (plants <3 cm tall), with inflorescences developed beneath the leaves, often longer than or as long as the leaves themselves. The flowers are minute, yellowish-white with purplish-pinkish petals and lip. The sepals are ciliate, with the dorsal sepal tinged with purple. The lunate lip blades embrace the column, and the appendix is conspicuous, constricted above the middle, with a concave base and a pubescent apex that is deflexed.

Within the populations, we observed cleistogamous plants, with some flowers opening occasionally. While *L. acarina* shares a similar plant habit with the widespread *L. eximia* Ames, which is often cleistogamous, they can be differentiated by the linear petals (as opposed to transversely bilobed, oblong petals in *L. acarina*) and the subquadrate, widely lobed lip with lobes extending far from the column (versus ovate, short lip blades in *L. eximia*). Plants of *L. acarina* typically grows on mossy twigs alongside other pleurothallids such as *Dracula erythrochaete* (Rchb.f.) Luer and *Stelis* spp.

Lepanthes pexa Luer, Lindleyana 2(4): 181. 1987.

TYPE: Panama. Prov. of Bocas del Toro: epiphytic in cloud forest between Fortuna and Chiriquí Grande, alt. 1000 m, 17 Feb. 1985, C. Luer *et al.* 10622 (holotype, MO-5122325!, barcode 150103).

DESCRIPTION: Based on *D. Bogarín 8243*.

Plant epiphytic, caespitose, erect, up to 16 cm tall. *Roots* slender, flexuous, up to 2.3 cm long, 1 mm in diameter. *Ramicauls* slender, erect to suberect, 6.0–11.5 cm long, enclosed by 5–7 pale green to brownish with age, closely adpressed lepanthiform sheaths, the ostia microscopically ciliate, ovate, acute to obtuse. *Leaves* elliptical, emarginate, apiculate, coriaceous, papillose, green, lustrous, 4.1–5.7 × 2.1–2.4 cm, the obtuse base narrowing into a petiole *ca.* 5 mm long. *Inflorescence* born beneath the leaf with successive, distichous multi-flowered cincinni, up to 3.3 cm long, each of them shorter than the leaves, with successive flowers. *Pseudopeduncle* up to 2.4 cm long, rachis up to 8 mm long; *floral bracts* pale green to brownish with age, ovate, acute, muricate, pilose, 1.5–2.0 mm long; *pedicels* 2–3 mm long, persistent; *ovary* microscopically

papillose, 1.0–1.5 mm long. *Flowers* with yellowish-green, translucent sepals, the petals light orange, basally vinaceous, the upper lobe deeply bordered with wine color, the lower lobe lightly vinaceous, the lip lilac, the column light orange to whitish. *Dorsal sepal* ovate, acute, abaxially 1-carinate, entire, connate to the lateral sepals for about 0.5 mm, 3.0 × 2.1 mm, 3-nerved. *Lateral sepals* obliquely ovate, acute, apically divergent, abaxially 1-carinate, connate for 1.1 mm, 2.8 × 1.4 mm, 2-nerved. *Petals* transversely bilobed, microscopically papillose, 1.3 × 4.0 mm, the upper lobe obliquely ovate, obtuse, converging, 2.2 mm long, the lower lobe narrow, obliquely ovate, obtuse, subcarinate along the vein, diverging at the apex, 1.8 mm long. *Lip* bilaminar, adnate to the column base, 1.5 × 2.0 mm, not exceeding the column length, the blades elliptic, obtuse, apically ciliate; the connective oblong, 0.5 × 1.0 mm; the body oblong, thick, adnate to the column base, 0.4 × 0.2 mm; the appendix cylindrical, obtuse, pubescent, 0.15 mm long. *Column* cylindrical, 1.3 mm long, exceeding the length of the lip; the anther apical; the stigma ventral. Pollinarium consisting of two *pollinia*, claviform, 0.55 × 0.28 mm, joined at the base by a rounded viscidium. *Anther cap*, subrounded, abaxially concave, 0.15 × 10 mm. *Fruit* not seen.

ETYMOLOGY: From the Latin *pexus*, “combed”, referring to the appearance of the densely distichous pedicels on the rachis (Luer 1987).

DISTRIBUTION: The species is known from Costa Rica and Panama.

HABITAT IN COSTA RICA: Plants were found growing as epiphytes on the trunks of *Cupressus lusitanica* (Cupressaceae) at the edge of the lower montane pluvial forest on the Pacific watershed of the Central Valley at 1484 m of elevation.

PHENOLOGY: Flowered in February and November under cultivation.

COSTA RICAN MATERIAL STUDIED: **San José:** Moravia, San Jerónimo, 1484 m, calle Carrillo y Tornillal, floreció en cultivo en el Jardín Botánico Lankester, preparado 18 Nov. 2010, *D. Bogarín 8243* & *D. Matamoros* (JBL-D4610 spirit!, Fig. 7–8).

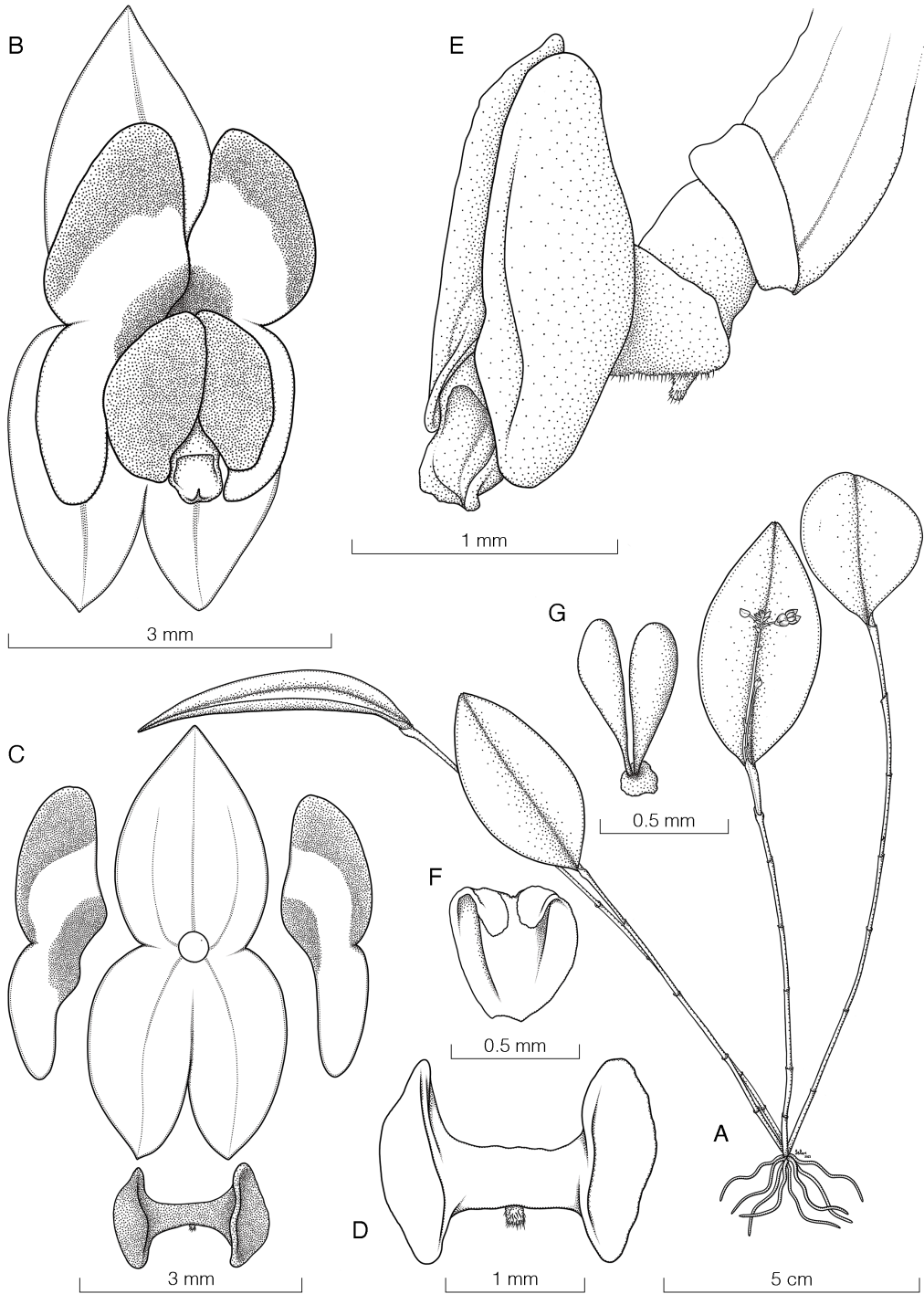


FIGURE 7. *Lepanthes pexa* Luer. **A.** Habit. **B.** Flower, in natural position. **C.** Dissected perianth, flattened. **D.** Close up of lip spread, adaxial view. **E.** Ovary, column and lip, oblique view. **F.** Anther cap, abaxial view. **G.** Pollinarium. Drawn by I. F. Chinchilla and D. Bogarín from *D. Bogarín 8243* (JBL spirit).

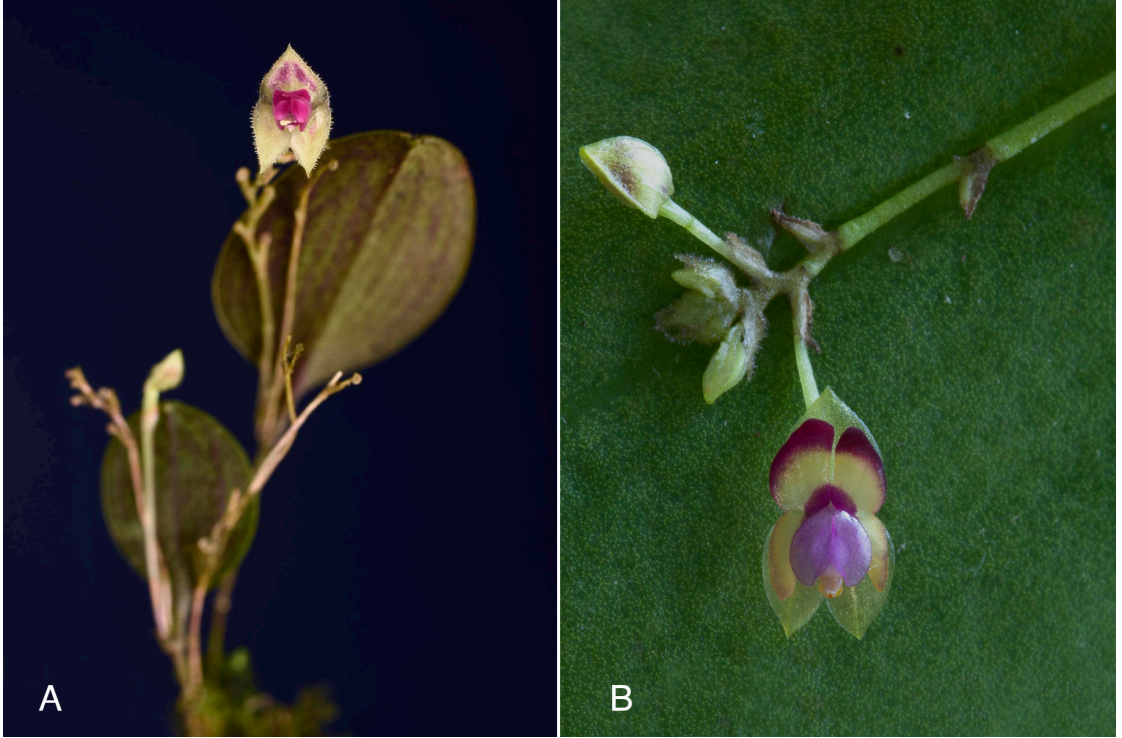


FIGURE 8. **A.** *Lepanthes acarina* Luer (D.Bogarín 12501). **B.** *Lepanthes pexa* Luer (D.Bogarín 8243). Photographs by D. Bogarín.

Lepanthes pexa is an erect herb with leaves shorter than the compact raceme. The petals have obliquely ovate lobes, while the lip, bilaminate in structure, does not exceed the length of the column. The lip consists of rose, elliptic blades with ciliate apices, an oblong body, a cylindrical and obtuse appendix, and a short, cylindrical column. The type specimen of *L. pexa* exhibits some differences in the petals compared to available Costa Rican material. For instance, its petals are acuminate at both proximal and distal ends (versus obtuse), while the labellum bears cilia at the apex of the blades (versus non-ciliate). Nevertheless, plants from Costa Rica share the characteristic rose lip, which is unusual within the genus in Costa Rica and Panama. We consider these differences variable characters until more material is available to assess morphological variation within populations.

According to Luer (1987), *L. pexa* resembles *Lepanthes turialvae* Rchb.f., a species found in Costa Rica and Panama. However, *L. pexa* can be distinguished by the carinate lower lobe of the petals (versus non-carinate) along the vein and the converging upper lobe (versus divergent).

MASDEVALLIA Ruiz & Pav.

Masdevallia smallmaniana Luer, Monogr. Syst. Bot. Missouri. Bot. Gard. 87: 505a. 2002. *Luzama smallmaniana* (Luer) Luer, Monogr. Syst. Bot. Missouri. Bot. Gard. 105: 10. 2006.

TYPE: Ecuador[?], without locality, alt. 2000–2500 m, obtained from New World Orchids by the British National Collection of *Masdevallia*, flowered in cultivation at Royden Orchids in Grand Missenden, England, Feb. 2002, *R. Barrow RO11* (holotype, barcode MO-277324!).

Heterotypic synonyms: *Masdevallia driesseniana* Luer & Sijm, Harvard Pap. Bot. 23: 48. 2018. TYPE: Panama. Chiriquí: near Amistad, 1300 m, collected by P. Dubbeldam and A. Sijm, 2003, flowered in cultivation by Wiel Driessen in Panningen, The Netherlands, February 2013, *A.P. Sijm 20130208* (holotype: MO). *Masdevallia rostriflora* Luer & Sijm, Harvard Pap. Bot. 23(1): 50. 2018. TYPE: Panama. Chiriquí: near Amistad, 1800 m, collected by P. Dubbeldam and A. Sijm, 2003, flowered in cultivation by Wiel

Driessen in Panningen, The Netherlands, Feb. 2013, *A.P. Sijm 20130204* (holotype: MO).

DESCRIPTION: Based on *Bogarín 10767 et al.*

Plant up to 7.5 cm tall, epiphytic, caespitose; thick roots. *Ramicauls* slender, erect, 5.4–11 mm long, enclosed by one thin, tubular sheath papyraceous, 5–10 mm long. *Leaves* light green darkening towards the apex, erect, coriaceous, cuneate, oblanceolate, obtuse, 54–65 × 8.5–11.0 mm including a gradually narrowed indistinct petiole *ca.* 8–15 mm long. *Inflorescence* with semierect successive single-flowered cincinni, up to 5 cm long. *Pseudopeduncle* light green, with light wine color spots from the base to the halfway, 2.7–4.0 cm long, with a tubular bract near the base; *floral bract* light green, tubular, 1 cm long; *ovary* light green, 5 × 2 mm wide, articulated to a 6 mm long pedicel; sepals greenish white, lightly suffused with red-brown at the base, glabrous. *Dorsal sepal* oblong, 20 × 4 mm including the thick tail 9 mm long, connate to the lateral sepals for 6 mm into a cylindrical tube, the free portion triangular, acute, attenuate into an erect, light olive-green tail, more pigmented towards the apex. *Lateral sepals* oblong, oblique, acute, 20 × 8 mm, connate 8 mm, synsepal expanded, the free portions narrowly triangular, acute, with light olive green, more pigmented towards the apex, fleshy, decurved tails *ca.* 12 mm long. *Petals* light olive green, red-brown above the middle, obovate below the middle, contracted into a acuminate-subulate apex suffused with red-brown spots, 13 × 3 mm. *Lip* greenish, red-brown above the middle, protruding, 15 × 3 mm, oblong below the middle, contracted above the middle into narrowly linear-subulate apex, with a midline callus extending forward onto the apex. *Column* light green, semiterete, 7 mm long. Anther greenish white cucullate; *Pollinarium* composed of two pollinia. *Fruit* not seen.

ETYMOLOGY: Named for Don Smallman of Halpringham, Norfolk, England, who cultivates this species in the British National Collection of *Masdevallia*.

DISTRIBUTION: Costa Rica, Panama, and doubtfully in Ecuador.

HABITAT IN COSTA RICA: Epiphytic in low montane rainforest and in isolated pasture trees on the Cordillera de Talamanca at 2162 m.

PHENOLOGY: Flowering in May and December.

COSTA RICAN MATERIAL STUDIED: **Puntarenas:** Coto Brus, Sabalito, Zona Protectora Las Tablas, 15 km al noreste de Lucha, Sitio Tablas, en potreros de la Finca Sandí-Hartmann “El Capricho”, 2162 m, epífitas en árboles aislados en bosque pluvial montano bajo, 11 dic. 2013, *D. Bogarín 10767 et al.* (JBL-D6293 spirit!; Fig. 9).

In Costa Rica, certain populations of *Masdevallia cupularis* Rchb.f. exhibit individuals that bear flowers that never reach anthesis and are self-pollinated while still in bud. This phenomenon is often accompanied by the development of peloric buds and flowers, wherein the floral segments display aberrant morphology. Pelorism typically denotes an abnormality where flowers appear to revert to an earlier, ancestral form. The characteristic bilateral symmetry of orchid flowers is often lost in peloric flowers, resulting in actinomorphic individuals (Mondragón-Palomino & Theißen, 2009). Taxonomists have identified three such aberrant individuals as distinct species, named *M. smallmaniana* Luer, *M. driesseniana* Luer & Sijm, and *M. rostriflora* Luer & Sijm (Karremans *et al.* 2019; Karremans 2023). All three are peloric or pseudopeloric, representing individuals of a single species. Oses (2017) found individuals of *M. cupularis* and *M. smallmaniana* as sisters within the same clade. Whether the peloric individuals form a stable population and can be considered a distinct species from *M. cupularis* needs to be assessed through population genetics. Meanwhile, *M. smallmaniana* is formally recorded in the flora of Costa Rica to acknowledge the presence of these aberrant populations.

Masdevallia striatella* fo. *pallens* Belfort, *forma nova

TYPE: Costa Rica. Alajuela: Sarchí, Bajos del Toro, Reserva Biológica Bosque de Paz, creciendo en el Jardín de Orquideas Dr. Stephen Kirby, 1534 m, 29 oct. 2023, *N. Belfort-Oconitrillo 938* (holotype, JBL-spirit; LCDP voucher, Fig. 10).

DIAGNOSIS: *A forma typica floribus albescentibus sepalibus venis rosaceis pallentis notatis, petalis labelloque plerumque albescentis (versus venas sepalorum atreopurpureas et labellum atreopurpureum) recedit.*

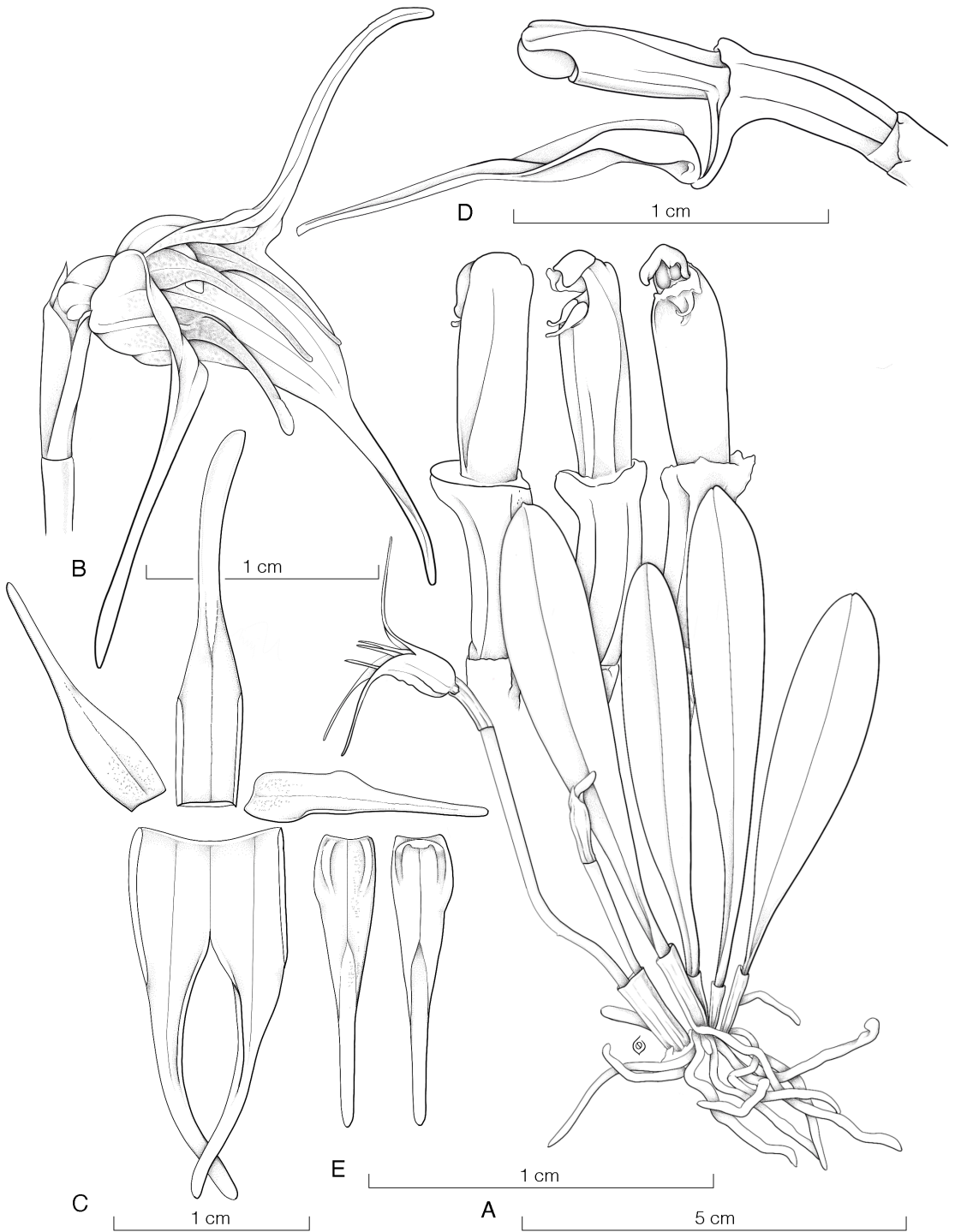


FIGURE 9. *Masdevallia smallmanniana* Luer. A. Habit. B. Flower. C. Perianth with ventral and dorsal view of the lip. D. Column, lip, and ovary lateral view. E. Column, ventral view. Drawn by L.Oses based on *D.Bogarín 10767* (JBL-spirit).

Epiphytic, caespitose, *herb*, 15–20 cm tall. *Rami-cauls* green, terete, slender, erect to suberect, 5–10 cm long. *Leaves* obovate and subpetiolate, 6.7–14.1 × 0.7–1.0 cm. *Inflorescence* with successive multi-flowered cymes, 7–13 cm long, producing up to two flowers. *Pseudopeduncle* 6–8 cm long, erect. *Pedicels* 7–10 mm long. *Ovary* cylindrical, 5 mm long, longitudinally channeled, with evident black dots. *Floral bract* triangular-ovate, brownish, membranaceous, acute, tubular, apically loose, involving most of the pedicel, 5–7 mm long. *Flowers* with sepals connate, tubular, white with nine veins light pink (three in each sepal), the sepaline tails green, the petals white with the middle vein pink, the lip pale with the base and the apex yellow, white column with light pink margins, white anther cap and yellow pollinarium. *Sepals* lanceolate, 2.01–2.18 × 0.57–0.62 cm, connate at the base for 0.7–0.8 cm, forming a tube 0.7–1.0 cm in diameter that opens towards the ends into three short sepaline tails of 5.5–6.0 mm long. *Petals* elliptical, narrow at the base, 6.5 × 2.5 mm, with an angle in the middle of the lower margin and with the apex mucronate, disposed on each side of the column, forming a narrow tunnel. *Lip* oblong, arched, 7.5 × 3.5 mm, base truncated, with two basal concave lobes and exudate as droplets in the central portion, with a minutely warty callus at the apex, bent slightly backward. *Column* elongated, straight, 6.5–6.7 mm long, shorter than the lip, with a foot of 3.5 mm long and a hook with a bifurcate apex, to which a thin layer of cells articulates the lip. *Anther cap* cucullate, white. Pollinarium composed of two *pollinia*, obovate, with a pair of whale-tail-shaped caudicles. *Fruit* not seen.

ETYMOLOGY: From the Latin *pallēns*, meaning pale, in reference to the pale color of the flowers, especially due to the much lighter petals and lip.

DISTRIBUTION: Known only from Costa Rica.

HABITAT IN COSTA RICA: Premontane tropical forest in the Caribbean slope of the Cordillera Volcánica Central.

PHENOLOGY: Blooming from September to January, with a peak in November.

Masdevallia striatella Rchb.f. is known to occur in Costa Rica and Panama, representing one of the most common species of the genus and with the broadest geographical and ecological distribution (Luer 2006, Osés 2017). The typical form consists of whitish flowers with evident dark purple veins in the sepals, green or yellow-colored sepaline tails, and a dark purple lip with yellow in the base and the apex (Fig. 11). Although in the new form, the sepals still have purple veins but are much lighter, the most evident differences are the green tails, the white lip and the white petals with much pale, inconspicuous veins (Fig. 10C), contrasting with the dark purple lip and dark veins of the typical form (Fig. 11B). This new form became evident at Bosque de Paz Biological Reserve, where the pale form blooms synchronously with plants exhibiting the typical characteristics of the species.

MAXILLARIA Ruiz & Pav.

Maxillaria hennisiana Schltr., *Orchis* 6(7): 117–118. 1912.

TYPE: Colombia. Heimat wahrscheinlich Kolumbien, von H. Hennis in Hildesheim importiert, blühte in der Sammlung des Herrn Baron v. Fürstenberg im Juni 1911, *Herrn Baron von Fürstenberg s.n.* (B, destroyed); lectotype, **hic designatus**, the illustration in the protologue (Schlechter 1912): tab. 26, fig. 10–17. Fig. 12.

Heterotypic synonym: *Maxillaria sheppardii* Rolfe, *Bull. Misc. Inform. Kew* 83. 1917. **TYPE:** Colombia. Chocó: Río Condoto, *S. Sheppard s.n.* (holotype, K).

DESCRIPTION: Based on *L. Álvarez et al. 1229*, *L. Álvarez 499* & *M. L. Morales*, and *L. Álvarez 335*.

An epiphytic, caespitose, pseudobulbous *herb* to 15 cm tall. *Roots* slender, flexuous, glabrous, *ca.* 1 mm in diameter. *Rhizome* with short internodes, covered by brown, nervous, papyraceous sheaths. *Pseudobulbs* transversely sub rectangular, thickly complanate, apically truncate, to 2.3 × 2.8 cm, monophyllous, covered at the base by 2–3 triangular, narrow, acute, glumaceous sheaths to 3 cm long, becoming dry-papyraceous with age. *Leaves* narrowly elliptic to oblong-elliptic, coriaceous, grass-green, acute to subobtusely, asimetri-

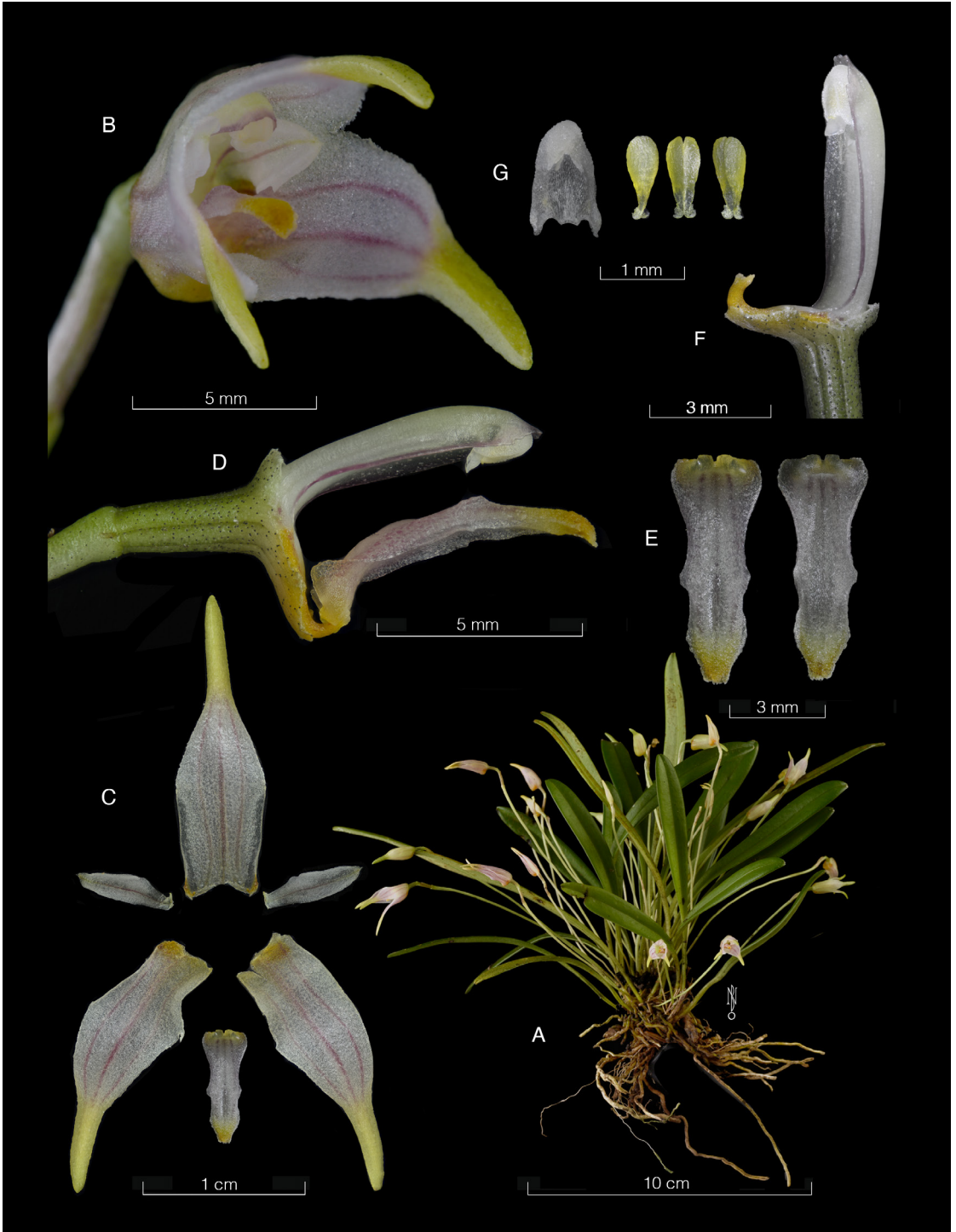


FIGURE 10. *Masdevallia striatella* fo. *pallens* Belfort. **A.** Habit. **B.** Flower. **C.** Dissected perianth. **D.** Ovary, column and lip, lateral view. **E.** Lip, adaxial and abaxial views. **F.** Column, $\frac{3}{4}$ view. **G.** Anther cap and pollinarium. LCDP prepared by N. Belfort-Oconitrillo based on *N. Belfort-Oconitrillo* 938 (JBL-spirit).

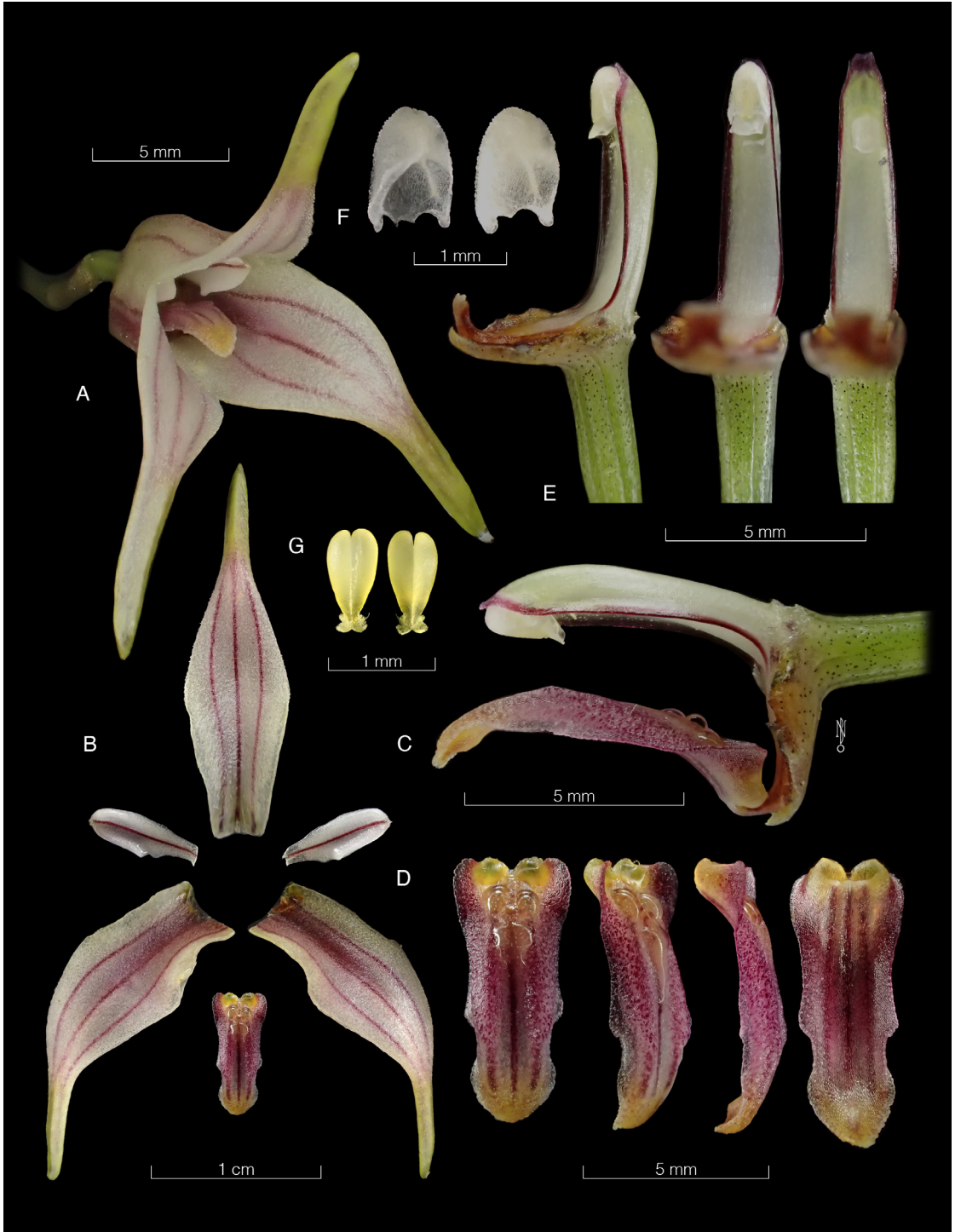
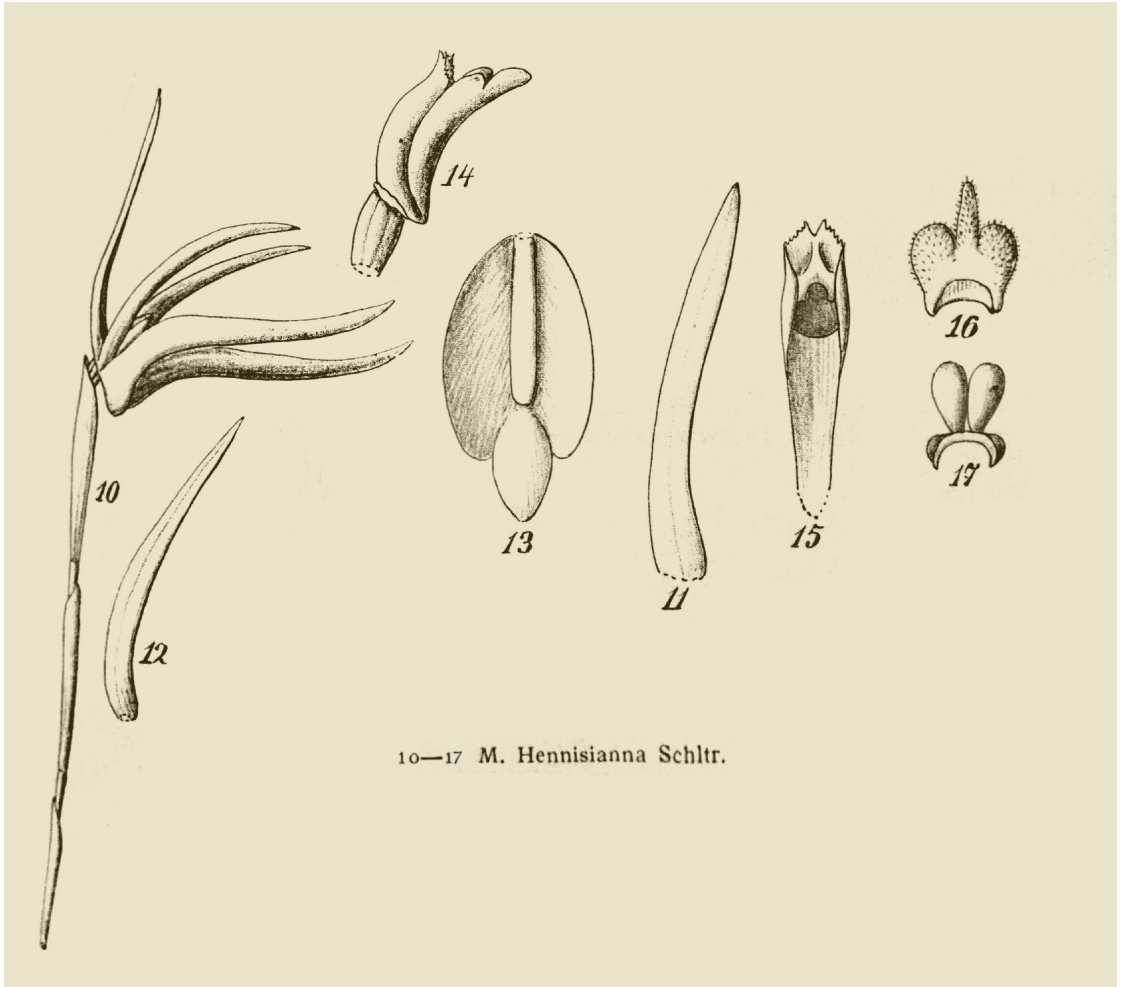


FIGURE 11. Typical floral form of *Masdevallia striatella* Rchb.f. from Bosque de Paz Biological Reserve. **A.** Flower. **B.** Dissected perianth. **C.** Ovary, column and lip, lateral view. **D.** Lip in adaxial, $\frac{3}{4}$, lateral, and abaxial views. **E.** Column. **F.** Anther cap. **G.** Pollinarium. Plate prepared by N. Belfort-Oconitrillo based *N.Belfort-Oconitrillo 676* (JBL-spirit).

10—17 *M. Hennisiana* Schltr.FIGURE 12. Original illustration of *Maxillaria hennisiana* Schltr. From Schlechter 1917: tab. 26, fig. 10–17.

cally bilobulate, distinctly keeled beneath, matte on both surfaces, $6.0\text{--}13.0 \times 1.8\text{--}2.3$ cm, narrowed at the base into a long, conduplicate-terete petiole to 3.5 cm long, ca. 0.5 cm wide. *Inflorescences* up to 8 per pseudobulb, each a single-flowered, erect raceme shorter than the leaves, 5–7 cm long, completely covered by 3–4 amplexant, tubular, apiculate, papyraceous, brown bracts to 2.8×0.8 cm. *Floral bract* glumaceous, brownish green, amplexant, obovate, acute, apically loose, strongly ancipitous, to 3×1 cm, completely covering the pedicel and ovary. Pedicellate *ovary* terete, rugulose, $3.0\text{--}3.2$ cm long including the pedicel. *Flowers* with the sepals spreading, the petals porrect, the sepals yellow flushed brown toward the apex, the petal white, the lip yellow with orange midlobe, the column white,

the anther reddish with dark purple crest. *Dorsal sepal* linear-ligulate, obtuse, carinate, the distal margins gently reflexed, $2.3\text{--}2.5 \times 0.5\text{--}0.6$ cm. *Lateral sepals* narrowly linear-ligulate, obtuse, shortly apiculate, weakly carinate, $2.4\text{--}2.6 \times 0.5\text{--}0.6$ cm, the bases forming a short mentum with the column foot. *Petals* obliquely narrowly lanceolate-subfalcate, subacuminate, porrect, the apex facing down, $1.7\text{--}2.0 \times 0.4$ cm. *Lip* 3-lobed, elliptic from a cuneate base, adnate to the base of the column foot, 1.2×0.6 cm, the disc provided with a ligulate, low callus ca. 5 mm long, extending almost to the insertion of the middle lobe; lateral lobes rounded, erect to flank the lower portion of the column; midlobe elliptic-subrounded, thickened, the margins crenulate. *Column* semiterete, thick, 1 cm long, dilated around the stigma,

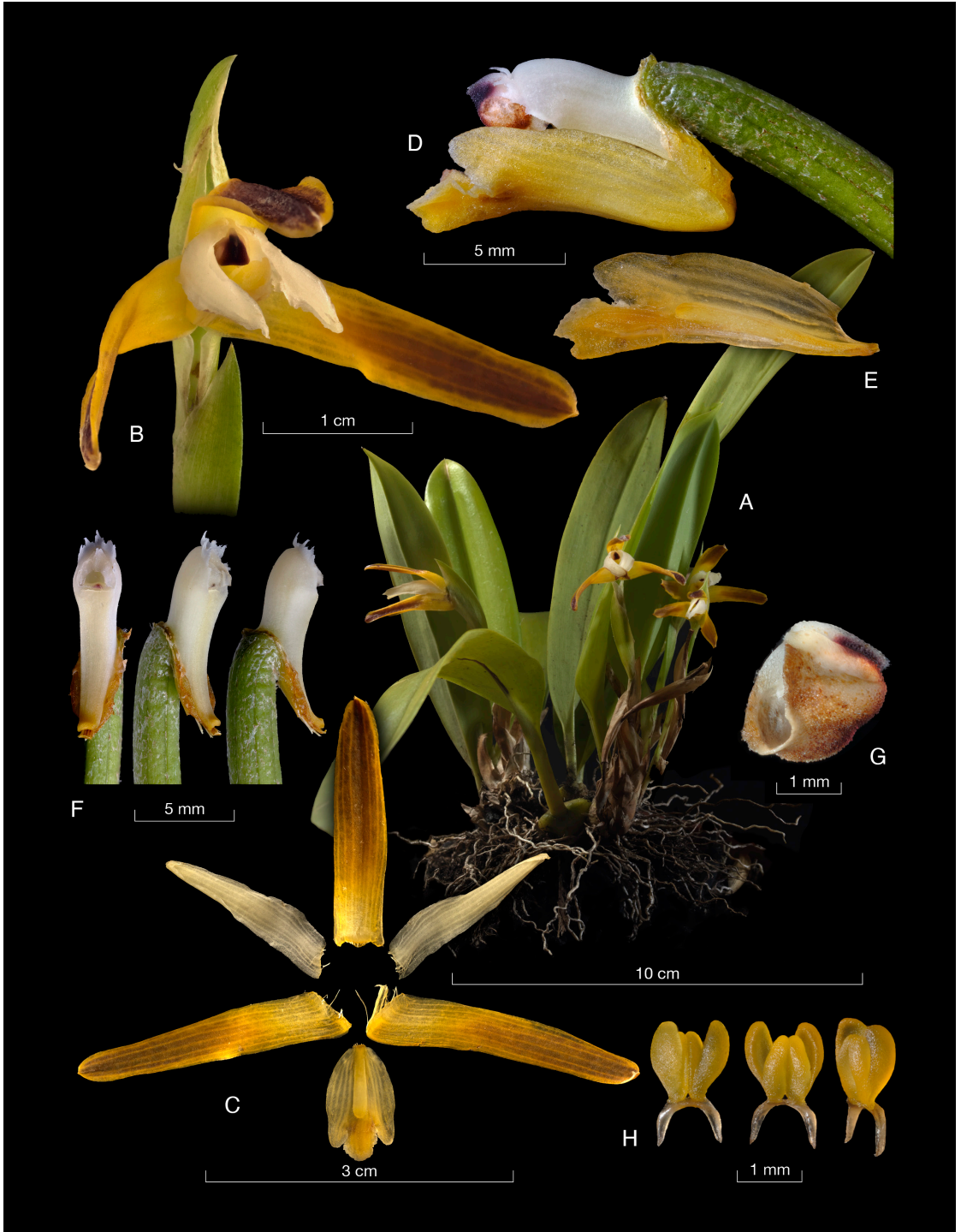


FIGURE 13. *Maxillaria hennisiana* Schltr. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view. E. Lip in longitudinal section. F. Column in several views. G. Anther cap. H. pollinarium in dorsal, ventral, and lateral views. LCDP prepared by F. Pupulin based on *L. Álvarez 499* (JBL).



FIGURE 14. Flowers of *Maxillaria hennisiana*. **A.** Álvarez 335. **B.** Álvarez 1229. Vouchers at JBL. Photographs by F. Pupulin.



FIGURE 15. Comparison of the pseudobulbs of *Maxillaria* species. **A.** *M. cryptobulbon* (A.P.Karremans 6622). **B.** *M. ringens* (D.Bogarín 11479). **C.** *M. angustisegmenta* (F.Pupulin 461). **D.** *M. brunnea* (D.Bogarín 1575). **E.** *M. porrecta* (A.P.Karremans 6727). **F.** *M. hennisiana* (L.Álvarez 355). Scale bar = 3 cm. All vouchers at JBL. Digital composite plate prepared by F. Pupulin.

extending at the base into a narrow, cuneate foot *ca.* 4 mm long; the clinandrium cucullate, lacerate; the stigma ventral, broadly subquadrate, flanked by two large, converging, membranous flaps; the anther incumbent. *Anther cap* deeply cucullate, ovate, obtuse, provided with a distinct, narrow crest on the upper part, 2-celled. Pollinarium consisting of four *pollinia*, ovoid-complanate, in two pairs of different size, dorsiventrally superposed, on a horseshoe shaped stipe, scarcely distinct from the subtended, brownish viscidium. *Fruit* not seen.

ETYMOLOGY: Dedicated to Wilhelm Hennis (1856–1943), orchid grower in Hildesheim, who imported from Colombia the type plant later flowered in the collection of Baron Max (Maximilian) von Fürstenberg (1866–1925) in June 1911.

DISTRIBUTION: Costa Rica to Ecuador.

HABITAT IN COSTA RICA: The species has been observed so far exclusively in lowland, wet tropical forest in the Pacific region of Península de Osa, at elevation around 400 m, as an epiphyte in both primary and secondary vegetation.

PHENOLOGY: Flowering in February–March and in October–November.

COSTA RICAN MATERIAL EXAMINED: **Puntarenas:** Golfito, Golfito, Parque Nacional Piedras Blancas, Fila Monge, 420 m. Bosque primario, con especies arbóreas predominantes como *Peltogyne purpurea*, *Pentagonia osaensis*, *Magnolia wetteri*, *Virola nobilis*, *Chaunochiton kappleri*, *Tachigali versicolor*; 17 mar. 2021, L. Álvarez 499 & M. L. Morales (JBL-B2626 spirit!) (Fig. 13). Golfito, Golfito, Parque Nacional Piedras Blancas, Fila San Joscito, 400 m, bosque muy húmedo tropical, bosque primario, 10 may. 2020, florecida en cultivo y preparada en el Jardín Botánico Lankester, 18 feb. 2022, L. Álvarez 335 (JBL-A0616 spirit!) (Fig. 14A). Golfito, Golfito, Cerros de Golfito entrando por la Gamba, propiedad de Conservación Osa, 400 m, bosque secundario, 7 jun. 2023, flowered in cultivation and prepared at Jardín Botánico Lankester, 28 oct. 2023, L. Álvarez 1229, M. J. Mata & F. Rodríguez (JBL) (Fig. 14B).

Maxillaria hennisiana belongs to a species complex centered around the South American *M. porrecta* Lindl., the first species surely referable to this the group, which was described in 1838 from Rio de Janeiro (Lindley 1838). This complex includes other species such as *M. acostae* Schltr., *M. amparoana* Schltr., *M. angustisegmenta* Ames & C.Schweinf., *M. brunnea* Rchb.f., *M. colemanii* Carnevali & Fritz, *M. cryptobulbon* Carnevali & J.T.Atwood, *M. longiloba* (Ames & C.Schweinf.)

J.T. Atwood and *M. ringens* Rchb.f., among others. Christenson (2002) treated this complex as the section *Amazonicae*, excluding however *M. hennisiana* as a representative species. Morphologically, species within this group share characteristics with *Maxillaria* sect. *Arachnites* Christenson – distinguished primarily by the larger size of plants and flowers – and together they represent one of the largest and less studied groups in *Maxillaria*. In their classification of the subtribe *Maxillariinae* based on ITS molecular data, Szlachetko *et al.* (2012) recovered *M. hennisiana* within *Maxillaria sensu stricto*, forming a small clade with *M. longiloba*, *M. angustisegmenta*, *M. cryptobulbon*, and *M. brunnea* as the closest relatives. However, the phylogenetic analyses of *Maxillaria* s.s. by the authors revealed several polytomies and did not reflect recent attempts at sectional delimitations as those posthumously proposed by Christenson *et al.* (2013). Due to the difficulty in distinguishing between species of these groups, given their overall floral similarity and colors, it is unsurprising that *M. hennisiana* has been recorded as ranging from southern Mexico to Peru and Trinidad in the West Indies. According to the most recent reports, the species is likely restricted to Panama (Bogarín *et al.* 2015), Colombia, and Ecuador (Bernal *et al.* 2019). This is the first documented record of the species for the flora of Costa Rica.

Among similar species, *M. hennisiana* may be recognized by the compact plants with distinctly petiolate leaves and the peculiar shape of the pseudobulbs, which are transversely rectangular, thickly lenticular, and distinctly truncate apically (Fig. 15).

MAXILLARIELLA M.A. Blanco & Carnevali

Maxillariella guareimensis (Rchb.f.) M.A. Blanco & Carnevali. *Lankesteriana* 7(3): 528. 2007.

TYPE: Venezuela. *Wagner s.n.* (holotype, W-R?; isotype, G-00355233!). Syn.: *Maxillaria guareimensis* Rchb.f., *Bonplandia* 2: 16. 1854.

DESCRIPTION: Based on *Karremans 6671 et al.* and *Karremans 7285 et al.*

An epiphytic, cane-bearing *herb* to 1 m tall. Roots slender, flexuous, glabrous, *ca.* 1 mm in diameter. *Rhizome* with short internodes, covered by brown, papyraceous sheaths, up to 5 cm long between stems. *Stems*

elongate, covered by foliaceous and papyraceous sheaths, 4.1–6.8 × 1.7–2.0 cm. *Pseudobulbs* not seen. *Leaves* narrowly elliptic, coriaceous, acute, asymmetrically bilobulate, distinctly keeled beneath, the blade 10.0–20.0 × 2.1–3.2 cm. Inflorescences from the base of the foliaceous sheath, several simultaneously appearing per stem, erect. *Floral bract* glumaceous, brown, amplexant, acute, apically loose, ancipitous, 1.0–1.5 cm, not covering the pedicel and ovary. *Pedicellate ovary* terete, rugulose, 2.5 cm long including the pedicel. *Flowers* concolorous yellow. *Dorsal sepal* elliptic, acute, shortly apiculate, 1.8–1.9 × 0.8 cm. *Lateral sepals* narrowly ovate, oblique, acute, shortly apiculate, apex revolute, 1.6–1.7 × 0.8 cm, the base forming a short mentum with the column foot. *Petals* narrowly ovate, acute, apex revolute, 1.5–1.6 × 0.8 cm. *Lip* linear-pandurate, hinged to the base of the column foot, 1.2 × 0.5 cm, the disc provided with a ligulate, low callus *ca.* 6 mm long, extending from the base to the center of the lip, apex truncate, slightly emarginate. *Column* semiterete, thick, 0.8 cm long, clavate, extending at the base into a narrow, cuneate foot *ca.* 3.5 mm long; the clinandrium cucullate, glandular; the stigma ventral, broadly subquadrate, flanked by two large, converging, membranous flaps; the anther incumbent. *Anther cap* deeply cucullate, ovate, obtuse, 2-celled. *Pollinarium* composed of four *pollinia*, ovoid-complanate, in two pairs of different size, dorsiventrally superposed, on a horseshoe shaped stipe, scarcely distinct from the subtended, brownish viscidium. *Fruit* not seen.

ETYMOLOGY: The name presumably honors mount Guareima, close to Caracas in Venezuela.

DISTRIBUTION: Trinidad and Tobago, Costa Rica, Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil.

HABITAT IN COSTA RICA: Very wet premontane tropical forest.

PHENOLOGY: Blooming at least in June.

COSTA RICAN MATERIAL EXAMINED: **Cartago:** Turrialba, Santa Teresita, Guayabo, Monumento Nacional Guayabo, alrededores de los senderos principales, 1128 m, bosque muy húmedo, epífitas, 20 jun. 2015, *A.P. Karremans 6671 et al.* (JBL-J0622 spirit!, Fig. 16). Tur-

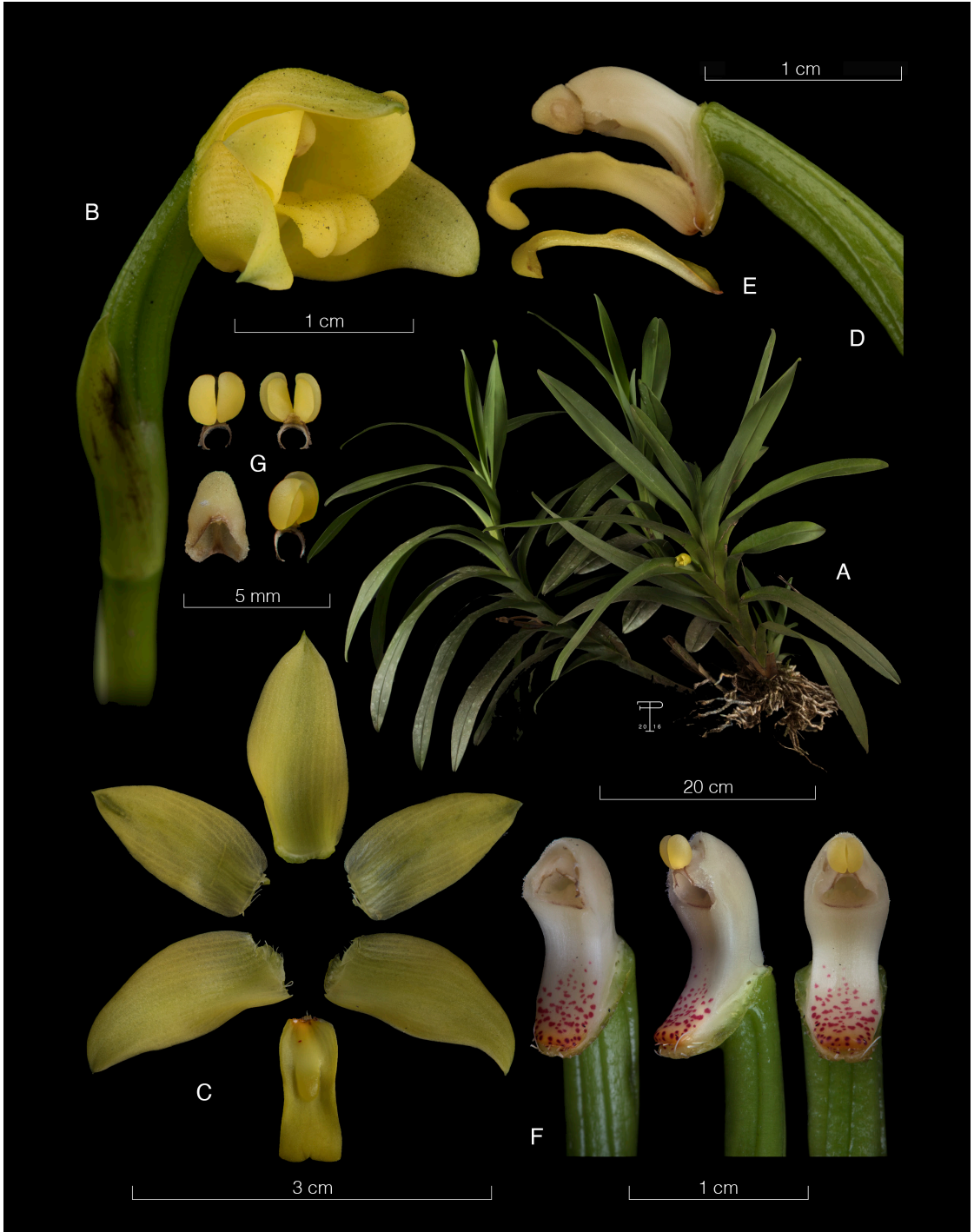


FIGURE 16. *Maxillariella guareimensis* Rchb.f. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Lip and column in natural position, lateral view. **E**. Lip, longitudinal section. **F**. Column, $\frac{3}{4}$ and ventral views (emasculate on the left). **G**. Pollinarium in abaxial, adaxial and lateral views, and anther cap. LCPDP prepared by F. Pupulin based on A.P. Karremans 6671 (JBL).

rialba, Santa Teresita, Guayabo, Monumento Nacional Guayabo, potreros al lado de la calle, a orillas del Río Lajas, 1.5 km Norte de la entrada principal, 1270 m, bosque muy húmedo, epífitas, 5 jun. 2016, *A.P. Karremans 7285, G. Rojas-Alvarado & Orquideología UCR-2016* (CR, USJ).

This seems to be a rather poorly known species despite its broad distribution. In Costa Rica, this rather voluminous orchid had somehow eluded decades of botanical exploration until recently discovered growing at the Monumento Nacional Guayabo, in Turrialba. *Maxillariella guareimensis* forms large masses, composed of multiple elongate stems, high on the thick tree trunks along the Lajas river that crosses the small natural reserve. Its cupped, yellow flowers are reminiscent of *Maxillariella diuturna* (Ames & C.Schweinf.) M.A. Blanco & Carnevali, a species with a significantly smaller plant stature and floral dimensions which occurs in the same area. Besides its large size, the newly recorded species can also be distinguished by the lack of pseudobulbs along the stem, and the neatly ordered, dense set of leaves.

MORMOLYCA Fenzl

Mormolyca gracilipes (Schltr.) Garay & M. Wirth, *Canad. J. Bot.* 37(3): 482. 1959. Bas. *Cyrtoglottis gracilipes* Schltr., *Repert. Spec. Nov. Regni Veg.* 7: 182. 1920. TYPE: Colombia. Cauca: c. 1200 – Madero s.n. [holotype, B, destroyed; lectotype (**hic designatus**), Schlechter's floral analysis published by Mansfeld (1929: Pl. 65, No.250)]. Colombia. Cauca: c. 1000 – Lehmann, F. C. 813 [neotype, AMES (Garay & M. Wirth 1959), here rejected and selected as epitype]. Note: We follow Pupulin *et al.* (2022) in recognizing Schlechter's floral analysis reproduced by Mansfeld as original material and therefore reject Garay & M. Wirth neotype in favor of a lectotype. Article 9.12 of the Shenzhen code (Turland *et al.* 2018).

DESCRIPTION: Based on *Bogarín 13092 & A. Acuña*.

Plant epiphytic, cespitose, erect, up to 27 cm tall. *Roots* scattered, thick, fleshy, whitish, 0.5–1.5 mm wide. *Rhizome* short, creeping. *Pseudobulbs*

clustered, oblong-ovoid, strongly complanate, unifoliate at the apex, with distichous, evanescent sheaths at the base, 2.5–5.5 × 0.8–1.3 cm. *Leaves* green, elliptic-oblong, acute, 5.5–11.0 × 1.0–1.5 cm. *Inflorescences* two or more, from the base of the pseudobulb, 1-flowered, elongate surpassing the leaf, erect, slender, peduncle about 3.0–6.0 cm long, with 3–4, brown, tubular sheaths. *Flowers* large for the plant, orange yellow. *Dorsal sepal* lanceolate-ovate, long-acuminate with the upper margin involute, concave, 2.1–2.8 × 0.8–1.3 cm. *Lateral sepals* lanceolate, long acuminate, with the upper margin involute, larger than the dorsal sepal, 2.4–3.5 × 0.8–1.0 cm. *Petals* much shorter than the sepals, linear, sharply acute, vertically disposed, touching each other, 1.2–1.4 × 0.1–0.15 cm. *Lip* short, strongly convex in natural position, rhombic-obovate when expanded, with an indistinct indentation on each side, about the middle, abruptly acute, hairy at the tip, about 9.0–1.1 × 0.5–0.6 cm, with the central part very thickened. *Column* green, with brown-purple spots ventrally and at the base, small, slender, arcuate, clavate, footless, up to 0.7–1.0 cm long. *Anther cap*, orange, terminal, operculate, 2-celled, cordate at the base 1.6–1.8 × 1.2–1.4 mm. Pollinarium composed of four *pollinia*, in two subequal pairs, obovate, laterally compressed, yellow, 0.5–0.7 × 0.3–0.4 mm, attached to a wide horse-shoe-shaped viscidium. *Fruit* not seen.

ETYMOLOGY: From the Latin *pedis* “foot” and the Latin *gracilis* “slender, thin, slim”, probably alluding to the slender shape of the column.

DISTRIBUTION: Costa Rica, Venezuela, Colombia, Ecuador, Perú, and Bolivia.

HABITAT IN COSTA RICA: Very humid premontane tropical forest, in moderately warm climates.

PHENOLOGY: Flowering in November.

COSTA RICAN MATERIAL STUDIED: **Limón**: Siquirres, La Alegría, San Bosco, Calle La Iberia, cerca de orillas del río Destierro, límite entre La Alegría y Pocora de Guácimo, 350 m, bosque muy húmedo tropical transición a premontano, epífitas, 22 ago. 2020, *D. Bogarín 13092 & A. Acuña*, floreció en cultivo en JBL, 26 nov. 2020 (JBL-K0121!, JBL-L0029!; LCDP voucher, Fig. 17).

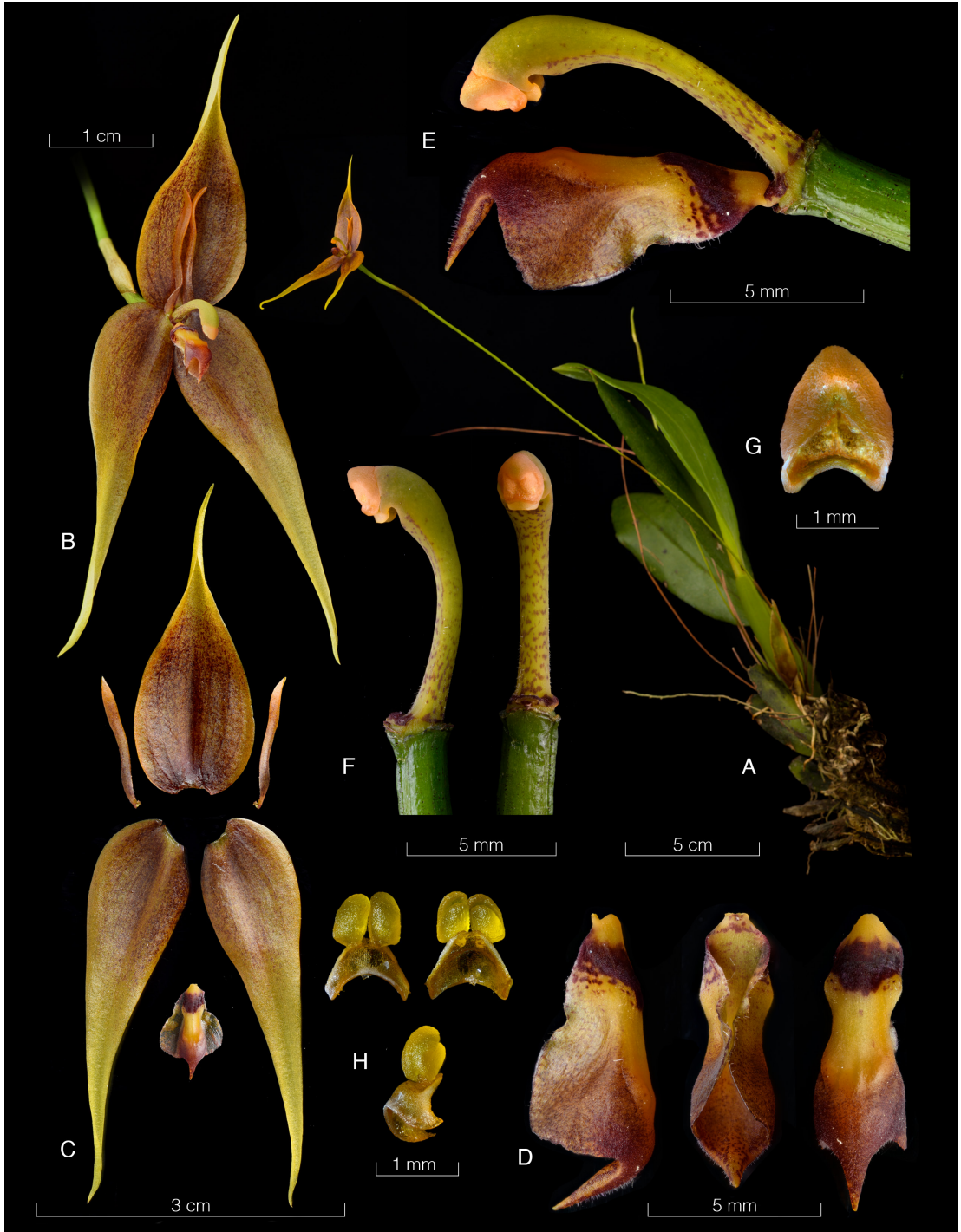


FIGURE 17. *Mormolyca gracilipes* (Schltr.) Garay & Wirth. A. Habit. B. Flower. C. Dissected perianth. D. Lip in lateral, abaxial, and adaxial views. E. Lip and column in natural position, lateral view. F. Column in lateral and ventral views. G. Anther cap. H. Pollinarium in abaxial, adaxial and lateral views. LCDP prepared by D. Bogarín and F. Pupulin based on D. Bogarín 13092 (JBL).

Mormolyca gracilipes was initially described as *Cyrtoglottis gracilipes* by Schlechter in 1920, based on a Colombian specimen to describe a new genus. Schlechter recognized the similarity with the genus *Mormolyca* at that time. However, he considered that the shape of the flower with its long and pointed floral parts, in addition to its geographical disjunction, showed that it was a different genus (Garay & Wirth 1959). The geographical separation between both was lost with the discovery of *M. peruviana* C.Schweinf. (Schweinfurth 1944), which extended the range of the genus *Mormolyca* from Central America to South America. For this reason and considering a new species with intermediate characteristics, *Mormolyca polyphylla* Garay & Wirth (1959), concluded that there were not enough reasons to separate the genera. Thus, becoming synonyms.

Mormolyca gracilipes could be easily confused at first sight with *M. schweinfurthiana* Garay & Wirth, however, it is distinguished by its simple (vs. trilobed), fleshy and convex labellum (vs. broadly obovate or rhombic-obovate when expanded) and its linear-obovate petals, erect, and directed upwards, parallel to the dorsal sepal (Dodson 1980, Vázquez & Dodson 1982).

The distribution known for this species has been from Venezuela to Bolivia, from 800 m (Dodson 1980) to 2700 m (Schweinfurth 1960) in elevation. Here it is reported at 350 m, expanding its geographical and elevational range.

PHALAEOPSIS Blume

Phalaenopsis stuartiana Rchb.f., Gard. Chron., n.s. 16(415): 748. 1881.

TYPE: [Philippines]. "Tropical Asiatic plant. Named in July last in honour of Mr. Stuart Low, of the old firm of Hugh Low & Co., is now in flower at Upper Clapton", *S. Low s.n.* (holotype, W-R). Homotypic synonym: *Phalaenopsis schilleriana* var. *stuartiana* (Rchb.f.) Burb., Garden (London 1871–1927) 22: 119. 1882.

Heterotypic synonyms: *Phalaenopsis schilleriana* var. *vestalis* Rchb.f., Gard. Chron., n.s., 17: 330. 1882. *Phalaenopsis schilleriana* subvar. *vestalis* (Rchb.f.) A.H.Kent in H.J.Veitch, Man. Orchid. Pl. 7: 37. 1891. TYPE: The Philippines, hort. *Low s.n.*

(holotype, W). *Phalaenopsis schilleriana* var. *alba* Roebelen, Gard. Chron., ser. 3, 7: 459. 1890, TYPE: The Philippines, hort. *Low s.n.* (holotype, W).

DESCRIPTION: Based on *F. Pupulin 9082*.

An epiphytic, fan-shaped, pseudobulbless, pendent herb to 22 cm tall excluding the inflorescence. *Roots* thick, flexuous, glabrous, distinctly flattened where adhering to the substrate, 3–7 mm in diameter, silvery white with orange-brown vegetative tips, occasionally forming plantlets on the upper surface. *Stem* short, the upper part completely enveloped by the sheathing bases of the leaf, the base sometimes exposed, about 2 cm wide, partially covered by the papyraceous, dry-fibrous, brownish white remnants of the leaf-sheaths. *Leaves* elliptic to oblong-elliptic, obtusely unequally bilobed, pendent, softly coriaceous to elastic, reddish green mottled with silvery gray, purple on the underside, 8.0–17.0 (40) × 3.3–5.2 cm, narrowed at the base into a short, broad conduplicate petiole less than 1 cm long, articulate with the conduplicate, short leaf-sheath. *Inflorescence* lateral, exerted from the axil of the lower leaves, a simple or paniculate, few- (2) to many- (over 100) flowered raceme, borne erect and becoming arched-pendent at flowering, distinctly longer than the leaves, 17–30 (80) cm long; peduncle terete, slender, purplish brown, to 25 cm long, completely covered by several tightly amplexent, triangular, obtuse, papyraceous, brown bracts to 3 × 3 mm; rachis slightly fractiflex. *Floral bract* papyraceous, pale brown, triangular, acute, ca. 5 × 3 mm. Pedicellate *ovary* terete, glabrous, gently curved, white, 3.0–3.6 cm long including the pedicel. *Flowers* spreading, faintly scented, the sepals and petals white, the labellar half of the lateral sepals pale greenish yellow spotted and blotched with brownish red, the lip white with base of the lobes yellow spotted and blotched with brownish red; the column white, the anther white flushed rose. *Dorsal sepal* elliptic to narrowly obovate, obtuse, 2.3–2.7 × 1.2–1.5 cm. *Lateral sepals* asymmetrically lanceolate, obtuse to subacute, 2.4–2.6 × 1.5–1.8 cm, the basal labellar margin reflexed to allow the insertion of the column foot between the sepals. *Petals* rhombic from a narrow cuneate base, obtuse-rounded to subtruncate, narrowly lanceolate-subfalcate, subacuminate, porrect, the apex facing down, 2.4–2.7 × 2.0–2.2 cm. *Lip*

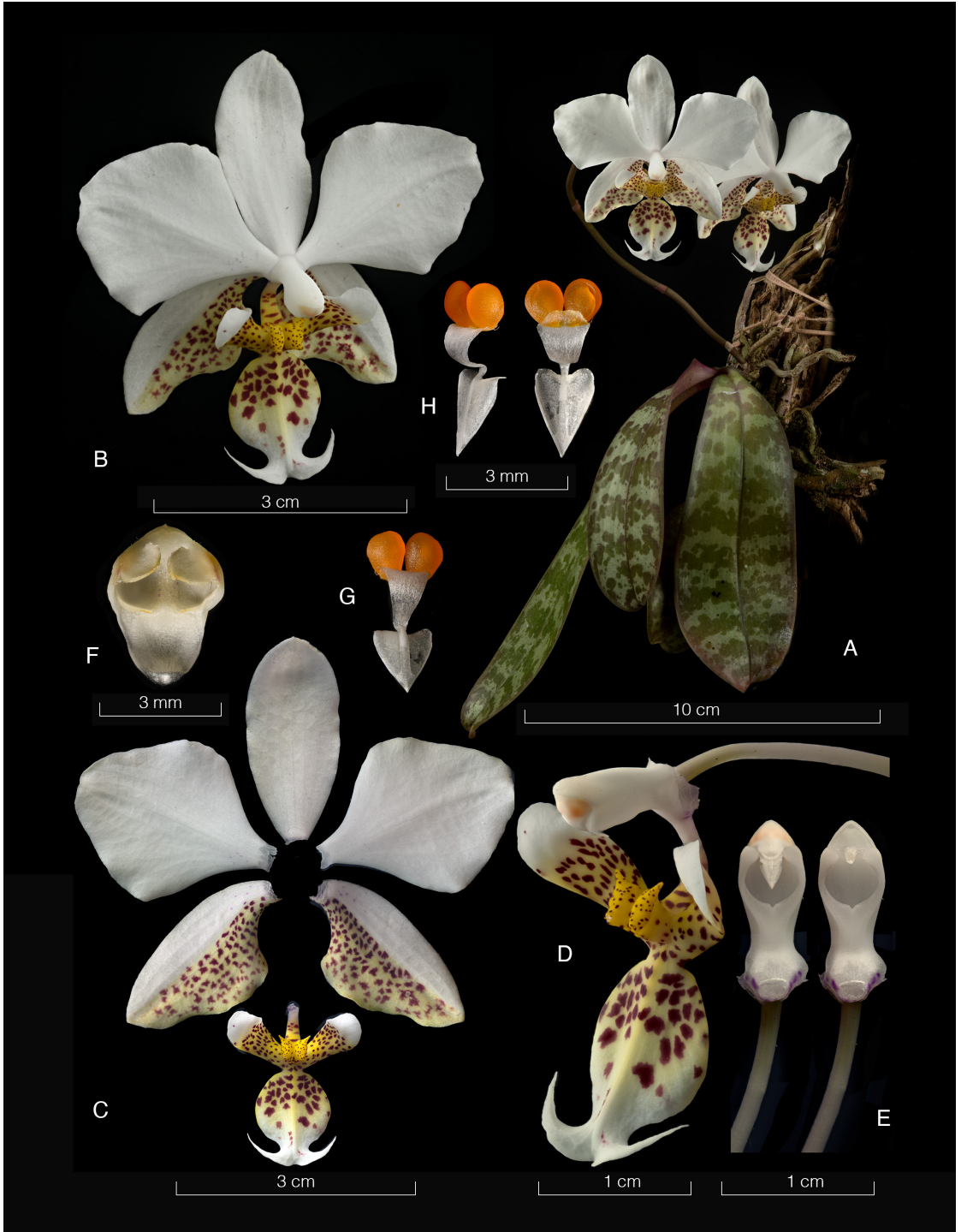


FIGURE 18. *Phalaenopsis stuartiana* Rchb.f. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, $\frac{3}{4}$ view. E. Column, ventral view (emasculate on the right). F. Anther cap. G. pollinarium, dorsal view. H. Pollinarium, $\frac{3}{4}$ and ventral views. LCDP prepared by F. Pupulin based on *F.Pupulin 9082* (JBL).



FIGURE 19. *Phalaenopsis stuartiana* Rehb.f. photographed *in situ* at Bocas del Toro, Panama, on 7 March 2014. Photograph by Jindřiška Vančurová.

3-lobed, 1.8–2.0 cm long, 1.6–1.8 cm wide across the lateral lobes; lateral lobes oblong, rounded, erect, *ca.* 1.0 × 0.5 cm; midlobe rounded, with a low longitudinal keel, ending into 2 narrowly triangular, digitiform-falcate, acuminate, retrorse extensions (cirrhi) 7 mm long, 1 mm wide at the base; the disc provided with a umbonate, erect, bilobed, high callus *ca.* 3 × 3 mm, the two halves elliptic, extending toward the rear into a short, pointed apicule *ca.* 1 mm long. *Column* semiterete subclavate, fleshy, 1 cm long, dilated in the middle around the stigma, extended at the base into a narrow, cuneate foot *ca.* 8 mm long; the rostellum a triangular, biparted teeth; the clinandrium triangular, shallow, entire, with a lower rim; the stigma ventral, broadly rounded, deep; the anther incumbent. *Anther cap* deeply cucullate, semi-ovoid, obtuse, 2-celled, the cells protected by subcircular, membranous flaps. Pollinarium composed of two *pollinia*, ovoid, hard, deeply cleft, bright orange, attached by small, lenticular caudicles to a triangular, attenuate, basally truncate, hyaline stipe apically adnate to the cordate-peltate, hyaline viscidium. *Fruit* not seen.

Eponymy: Named in honor of Mr. Stuart Henry Low (1826–1890), of the firm of Hugh Low & Co., at Upper Clapton, England, where the species flowered for the first time in Europe.

Distribution: Native from the island of Mindanao in the Philippines, the species has become naturalized in tropical America, where it has been recorded from the Atlantic coasts of Costa Rica and Panama (Central America), and Suriname (South America).

Habitat in Costa Rica: So far known exclusively from the wet tropical forests of the Caribbean plains, close to the border with Panama, where naturalized populations have been observed growing in secondary vegetation.

Phenology: Flowering in February and March.

Costa Rican material examined. **Limón:** Talamanca, Cahuita, west of Cahuita National Park, between Cahuita and Puerto Vargas, Hone Creek, vicinities of Cacao Trails Tayku, *ca.* 70 m, growing epiphytically (spontaneous) on the trunk of *Cinnamomum sp.* (Cinnamon) tree (Lauraceae), tropical rain forest, second-

ary vegetation with remnant trees of primary forest, flowered in cultivation and prepared 7 Mar. 2023, *F. Pupulin 9082* & A. Mesén (JBL) (Fig. 18).

Native from the lowlands of the island of Mindanao in the Philippines, where it is endemic, *Phalaenopsis stuartiana* has been anecdotally known for a long time from the Caribbean coast of western Panama, where it escaped from cultivation, and it reproduces from seed in the wild. It was reported from Isla Colón in Bocas del Toro Archipelago (Bogarín *et al.* 2015) and, apparently, from the mangrove vegetation in Bocas del Toro lowlands (*W. M. Whitten 3332*, FLAS; *A. Maduro & E. Olmos 251*, MO 5892639). Only recently, however, photographs of wild specimens of *P. stuartiana* were photographed *in situ* (Hoskovec 2015) (Fig. 19), and the species was formally documented from a specimen collected from a natural population in Bocas del Toro Archipelago (Z. Sarracín, pers. comm. 2019). At least another wild collected plant of *P. stuartiana* is known from the Atlantic coast of South America, where B. B. Teunissen collected it in 1971 at Paramaribo, Suriname, in the framework of a survey carried out by the Suriname Forest Service (*Teunissen LBB12998*, U, with flowers in spirit). This is the first record of a naturalized population of *P. stuartiana* naturalized in Costa Rica. The plant was originally collected by Armando Mesen in hills close to Cahuita, where it belonged to a group of more than 20 plants living epiphytically on several close trees. Flowering in the wild has been recorded in February to May.

PLEUROTHALLIS R.Br.

Pleurothallis trigyna* Pupulin, *sp. nov.

TYPE: Costa Rica. San José: Pérez Zeledón, Páramo, Berlín, Fila Temblor, *ca.* 4 km north of Berlín, road towards the highest part of the Fila, 1807 m, rain premontane forest, epiphytic in secondary vegetation, 4 March 2011, flowered in cultivation and prepared 14 Sep. 2021, *D. Bogarín 8427 et al.* (holotype, JBL) (Fig. 20).

DIAGNOSIS: *Inter speciebus Pleurothallorum sectionis Macrophyllarum-Fasciculatarum, plantae robustae floribus flavis pallentibus labello bicolori, basi rosea pallente apice flavo fulgido, minutae guttulae transparentibus in basi labelli munitis, facile distinguenda.*

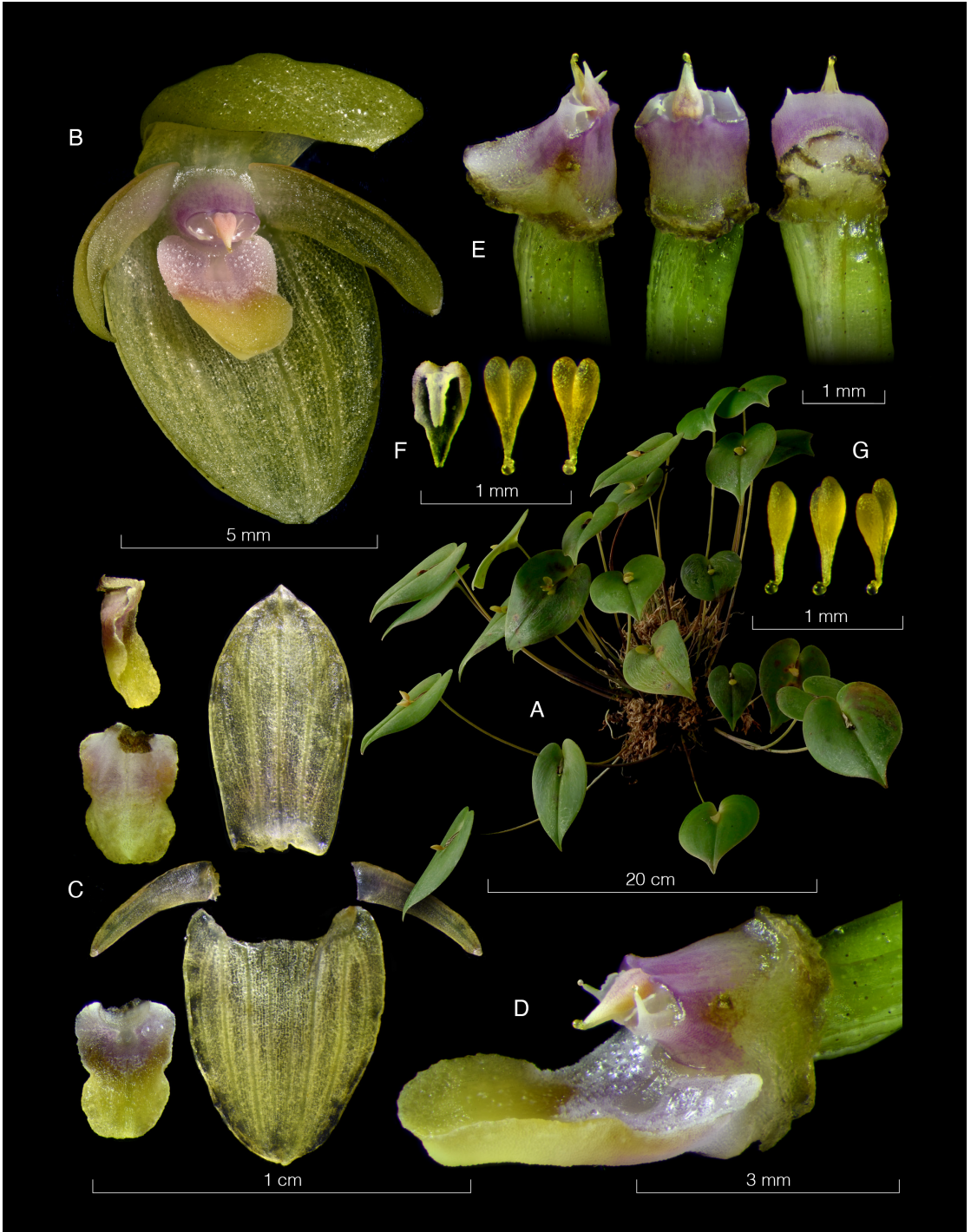


FIGURE 20. *Pleurothallis trigyna* Pupulin. A. Habit. B. Flower. C. Dissected perianth (the lip in ventral, dorsal, and lateral views). D. Column and lip, lateral view. E. Column in lateral, dorsal, and ventral views. F. Anther cap and pollinarium in dorsal and ventral views. G. Pollinarium in three lateral views. LCDP prepared by F. Pupulin based on D. Bogarín 8427 (JBL).



FIGURE 21. *Pleurothallis* species from Costa Rica that produces droplets at the base of the lip. **A.** *A.P. Karremans 6077*. **B.** *Díaz 237*. **C.** *P. trigyna (D. Bogarin 8427)*. **D.** *D. Bogarin 9091*. **E.** *D. Bogarin 8739*. Scale bar = 5 mm. All the vouchers at JBL. Photographs by F. Pupulin.

Epiphytic, tall, caespitose *herb*, to about 20 cm tall. *Roots* slender, flexuous, ca. 1.5 mm in diameter. *Ramicauls* 11–18 cm long, enclosed by 2 tubular, obtuse, tightly adpressed, papyraceous, brown sheaths, the first one basal, ca. 2 cm long, the second inserted in the lower third of the ramicaul, 4–5 cm long. *Leaves* coriaceous, pale green, ovate or lanceolate, abruptly acute, the apex minutely excised, 6–8 × 5–6 cm, deeply cordate at the conduplicate base, the basal margins not overlapping, the midvein slightly decurring on the stem. *Inflorescence* with single-flowered cymes, exerted from a narrow rectangular, obliquely acute, brown, papery, prostrate spathe, bract 1.5 cm long; *pseudopeduncle* filiform, ca. 1 cm long. *Floral bract* triangular-ovate, subacute, glumaceous, to 2 mm long. *Pedicel* terete, to 2.5 mm long. *Ovary* terete-subclavate, rounded, stout, to 2.5 mm long. *Flowers* bilabiate, not completely spreading, with the sepals pale yellow, the petals pale yellow faintly suffused with rose at the base, the lip yellow from a pale rose base, the column pink from a greenish white base, the anther white, flushed pink at the base. *Dorsal sepal* oblong, obtuse, abruptly acutiuscule at the apex, with a rounded apicule, 7 × 4 mm, 5-veined. *Lateral sepals* fused into an ovate, obtuse, rounded-apiculate, 7-veined synsepal, 7.0 × 5.5 mm. *Petals* ligulate-down curved, acute with the apex minutely rounded, 4.5 × 1 mm, 1-veined, the base thickened into a low, semicircular callus. *Lip* three-lobed,

subrectangular-subpandurate, concave, 3.5 × 2.7 mm, the base subtruncate with a central, semicircular depression, the lateral lobes rectangular-elliptic, papillose, the papillae decurring to the base of the mid-lobe, the median lobe transversely hemielliptic-ovate, truncate, ca. 2.0 × 2.5 mm; disc with a rounded glenion ca. 0.5 × 0.5 mm, flanked by subacute, protruding calli. *Column* short, thick, conical, dorsiventrally flattened, 1.5 mm long, the clinandrium 3-toothed, the anther dorsal, the stigma apical, bilobed, with two parastigmatic, triangular, acuminate lobes ending in spherical viscidia. *Anther cap* lanceolate, cucullate, minutely papillose, 2-celled. *Pollinarium* composed of two fusiform pollinia, apically attenuate-recurved, and a spherical viscidium. *Fruit* not seen.

ETYMOLOGY: From the Greek words *τρία* (*tria*), three, and *γυνή* (*gunē*), female, in allusion to the three rostellula and viscidia, which are produced from the stigmatic lobes of the gynostemium.

DISTRIBUTION: Only known from Costa Rica.

ECOLOGY: The species is known to inhabit the rain and wet premontane and lower montane forests of the Pacific drainage in the Cordillera de Talamanca, at elevations around 1800 m.

PHENOLOGY: Flowering from June to October.



FIGURE 22. Column of *Pleurothallis trigyna* Pupulin showing the three rostellae with viscidia, only one of which associate to a fertile anther. Photomacrography by F. Pupulin based on *D. Bogarín 8427*.

DISTINGUISHING FEATURES: *Pleurothallis trigyna* can be recognized by the comparatively tall plants for its group, reaching about 20 cm, the very coriaceous-thickened leaves, the solitary flowers not completely spreading, pale yellow, with a pandurate, bicolored lip (basally pale rose, apically bright yellow), the small, rounded glenion flanked by subacute, protruding calli, and the production of a large amount of transparent droplets at the base of the lip. All the flowers of the type specimen, even in different flowering times, are characterized by a gynostemium producing three rostellae, each one topped by a spherical viscidium.

During the preparatory work aimed at a systematic revision of the small-flowered *Pleurothallis* of sect. *Macrophyllae-Fasciculatae* (Pupulin *et al.* in prep.), one of the most curious novelties to appear was the species proposed here as *P. trigyna*. It belongs to a group of still unpublished species that mostly inhabit premontane and montane forests close to 2000 m elevation. The group is characterized by rather large plants with fleshy leaves and small, often ringent flowers, provided with a rectan-

gular to pandurate lip. Close to its base and around the glenion, the ventral surface of the lip produces a copious number of droplets made of a clear, transparent substance that we have not determined yet as to its chemical properties. Other examples of species in this group are the specimens *M. Díaz 237*, *A.P. Karremans 6077*, *D. Bogarín 9091*, and *D. Bogarín 8739* (all vouchers in JBL), which in all probability belongs to another four different taxa (Fig. 21). Among them, *P. trigyna* may be recognized by the pandurate lip, unique in species of *Macrophyllae-Fasciculatae* in Costa Rica, which is pale rose at the base and bright yellow at the apex. The unique characteristic of the specimen used to prepare the holotype of the new species is that the column presents three rostellae, each one ending into a spherical viscidium. Only one of the viscidia is completely functional, as it is associated with a fertile anther, from which the apices of the two pollinia elongate until they become connected to the viscidium, making the pollinarium available for removal by a pollinator (Fig. 22). As we do have only this single specimen available for study,

we refrain from consider this feature as characteristic of the species *per se*, but nonetheless all the flowers of the specimen *Bogarín 8427* present a trigynous column, indicating that this character is genetically controlled.

SPECKLINIA LINDL.

Specklinia echinata (L.O. Williams) Soto Arenas & Solano, Icon. Orchid. (Mexico) 5–6: t. 670. 2002 (2003). Bas. *Pleurothallis fuegi* var. *echinata* L.O. Williams, Ann. Missouri Bot. Gard. 33(1): 120. 1946.

TYPE: Panama. Chiriquí: Volcán de Chiriquí, alt. about 2720 m, 15 Jul. 1938, *M.E. Davidson 981* (holotype, AMES!).

DESCRIPTION: Based on *Karremans 5600* and *Karremans 8822* & *I. Chinchilla*.

Plant small, epiphytic, caespitose, up to 5 cm tall including the inflorescence. *Roots* slender, 1 mm wide. *Ramicauls* erect, minute, up to 5–6 mm long, enclosed by 2 thin tubular sheaths. *Leaf* erect, coriaceous, obovate to broadly elliptic, gradually narrowed into a petiolate base, obtuse, apiculate, apically bilobed, 1.2–1.5 × 0.5–0.6 cm. *Inflorescence* with erect, thin, loose, sub-secund, successively multi-flowered flowered cymes, up to 4.5 cm long including the pseudopoduncle up to 3.5 cm long; born from the apex of the ramicaul. *Floral bracts* imbricate, involving the ovary and rachis, membranaceous, apiculate, 1 mm, pedicel cylindrical, bent, ovary 0.8 mm long, tricarinate, covered in transparent filiform glands. *Flowers* dimorphic, transparent white with purplish veins and lip or yellow with purplish veins. *Sepals* membranaceous, carinate, glabrous, the dorsal sepal elliptic-oblong, 7.5–9.2 × 2.3–2.5 mm, 3-veined, acute, contracted into a thickened narrow tail. *Lateral sepals* connate to near the middle into a bifid synsepal, each lateral sepal ovate, 7.5–9.5 × 1.8–2.0 mm, 2-veined, acute, narrowing into a thickened tail. *Petals* oblanceolate, obtuse, rounded at the apex, 2.9–3.0 × 0.9–1.1 mm, 1-veined. *Lip* oblong, subtrilobed, rounded-truncate apically, 2.7–3.8 × 1.6–1.8 mm, with a pair of median elevated lobes, delicately hinged to the column foot. *Column* with a pair of subquadrate apical lobes, 2 mm long, the foot as long as the body,

stigma ventral. *Anther cap* incumbent, cucullate, white. Pollinarium composed of two *pollinia*, naked flattened. *Fruit* not seen.

ETYMOLOGY: From the Latin *echinatus*, “spiny like a hedgehog”, alluding to the ovary.

DISTRIBUTION: Known to occur from Mexico to Panama.

HABITAT IN COSTA RICA: Epiphytic on the Pacific watershed of the Cordillera de Talamanca growing in primary oak forest from 2300 to 2500 m.

PHENOLOGY: Flowering between June and August.

COSTA RICAN MATERIAL STUDIED: **San José:** Dota, Distrito de Copey, Parque Nacional Los Quetzales, 3 km sobre el camino a Providencia desde Ojo de Agua, 2500 m, bosque nuboso montano, 4 ago. 2012, *A.P. Karremans 5600* (JBL-D6073 spirit!; Fig. 23). Dota, Distrito de Copey, Parque Nacional Los Quetzales, 3.5 km sobre el camino a Providencia desde Ojo de Agua, 2300 m, bosque nuboso montano, 25 jun. 2021, *A.P. Karremans 8822* & *I. Chinchilla* (JBL-A0780 spirit!; Fig. 24).

Luer (2006) treated *Specklinia echinata* as a synonym of *S. fuegi*. Soto Arenas & Solano (2003) separated the two names based on the larger plants and flowers, reddish, less arcuate, not so neatly 3-lobed lip and shorter claw. Based on the original illustration and description by Reichenbach, it seems that *S. fuegi* has a glabrous ovary and shorter, thicker tails, whereas *S. echinata* has an echinate ovary and long, narrow tails. We follow Karremans *et al.* (2016) in recognizing the two taxa as distinct. Both *S. echinata* and *S. fuegi* have been reported to occur in Mexico, Guatemala, Honduras, El Salvador, Nicaragua and Panama, and although Karremans & Vieira-Uribe (2020) included a photo of the latter from Costa Rica, neither had been formally recorded for the country’s flora with a voucher. Here *S. echinata* is described and illustrated based on materials collected on the Pacific slope of the Cordillera de Talamanca. In Costa Rica, plants with smaller yellow flowers grow on the same branch, with plants bearing larger whitish with purple flowers. No specimens agreeing with *S. fuegi* (*sensu* Soto Arenas & Solano 2003) have been recorded for the country.

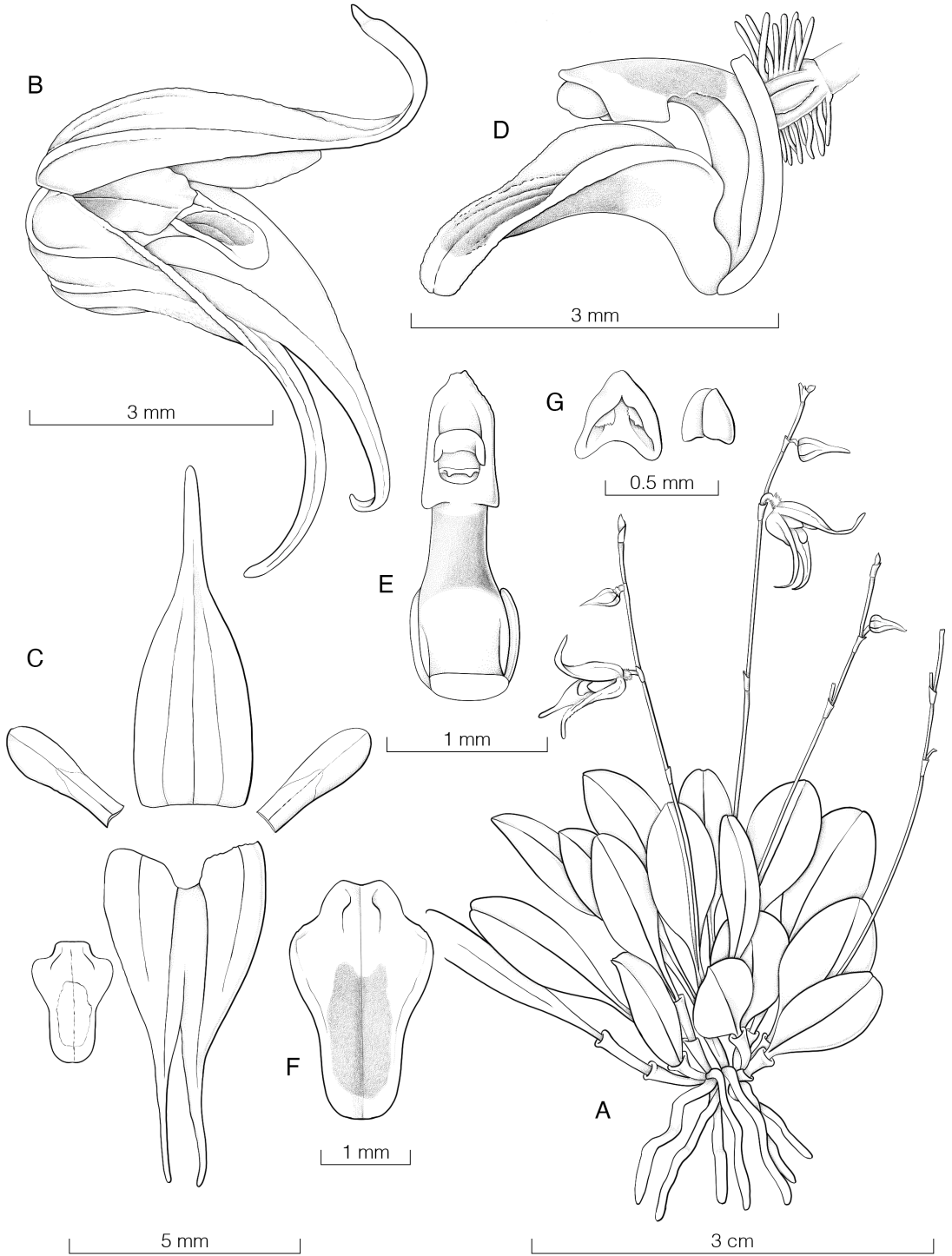


FIGURE 23. *Specklinia echinata*. A. Habit. B. Flower. C. Dissected perianth. D. Ovary, column and lip, lateral view. E. Column, ventral view. F. Lip. G. Anther cap and pollinia. Drawn by D. Bogarín and L. Oses based on A.P. Karremans 5600.

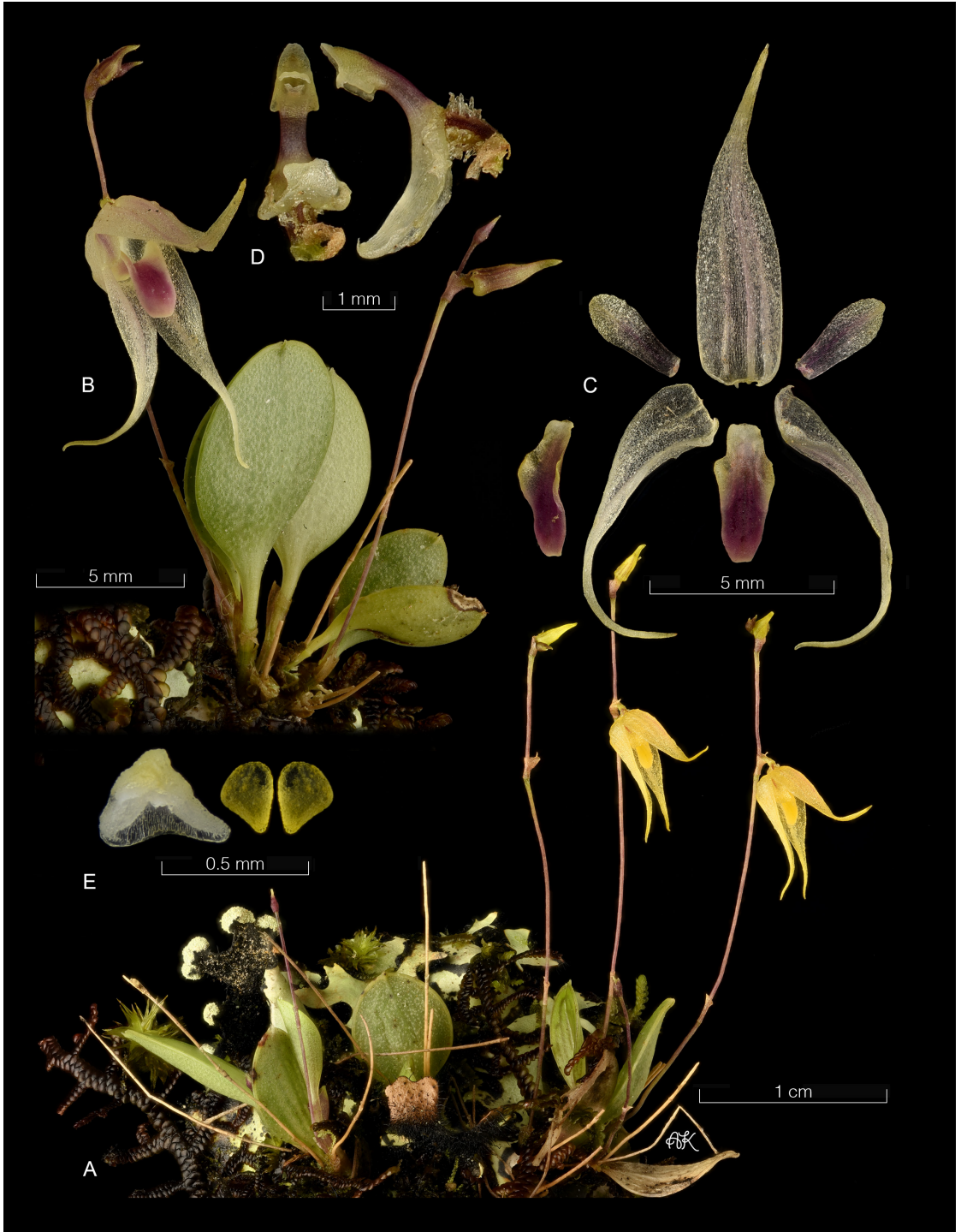


FIGURE 24. *Specklinia echinata* (L.O.Williams) Soto Arenas & Solano. **A.** Habit with three inflorescences. **B.** Habit with an open flower. **C.** Dissected perianth. **D.** Column and ovary in ventral and lateral views. **E.** Anther cap and pollinia. LCDP prepared by A.P. Karremans based on *A.P.Karremans* 8823 (A) and *A.P.Karremans* 8822 (B–E).

This species belongs to *Specklinia* subgen. *Sylphia* (Luer) Karremans, a little group of five species which in Costa Rica is represented by *S. absurda* Bogarín, Karremans & Rincón, *S. echinata* and *S. turrialbae* (Luer) Luer (Bogarín *et al.* 2013, Karremans *et al.* 2016).

STELIS Sw.

Stelis veraguasensis Luer, Selbyana 22(2): 126. 2001.

TYPE: Panama. Veraguas: alt. ca. 500 m, 5 Sep. 1976, C. Luer & R. Dressler 1235 (holotype, SEL-001096).

DESCRIPTION: Based on *D. Bogarín 10490*

Plant epiphytic, caespitose, erect, up to 32 cm tall. *Roots* slender, flexuous, up to 3.5 cm long, 2 mm in diameter. *Ramicauls* erect, stout, 6–15 cm long, enclosed by 2–3 loose, tubular, obtuse sheaths, 3–5 cm long. *Leaf* elliptic, obtuse, coriaceous, green, 13–18 × 2–5 cm, including the cuneate base narrowing into a petiole 1–2 mm long. *Inflorescence* with erect, compact, distichous, multi-flowered cymes, with several flowers open simultaneously, up to 22.5 cm long including the pseudopeduncle 7.8 cm long, from an annulus below the apex of the ramicaul, rachis up to 13.8 mm long. *Floral bracts* greenish to pale beige with age, infundibular, obtuse, 0.3–0.7 mm long. *Ovary* ca. 3 mm long, pedicel 3–4 mm long. Flowers bilabiate, the sepals cream, slightly tinged with fuchsia, the petals fuchsia with a light yellowish-green hue, vinous at the base, the lip vinous, edged in yellowish-green, the yellowish-green, lustrous glenion, the column vinous. *Dorsal sepal* elliptic, obtuse, convex, microscopically papillose, margins microscopically ciliate, connate to the lateral sepals for about 3 mm, 12 × 12 mm, 7-nerved. *Lateral sepals* asymmetrically ovate, obtuse, connate for 10 mm into a broadly ovate broadly ovate, concave synsepal, 11 × 13 mm, 9-nerved. *Petals* broadly overlapping above the column, ovate, cordate, acute, the base narrowly concave, 2.5 × 2.8 mm, 1-nerved. *Lip* ovate, truncate, obtuse, thickened along the margin, the base transversely thickened with a large glenion 1.1 × 0.6 mm, lanceolate, obtuse in contour, hinged to the base of the column, 1.6 × 1.8 mm, 3-nerved. *Column* porrect, stout, non-foot, 1.3 × 1.7 mm, with the anther apical, the stigma apical, bilobed. *Anther cap*, ovate, abaxially concave, 0.20 × 0.15 mm.

Pollinarium composed of two *pollinia*, ovoid, ca. 0.10 × 0.07 mm, joined at the base by a rounded viscidium. *Fruit* not seen.

ETYMOLOGY: Named for Veraguas, the Panamanian province where the type specimen was collected.

DISTRIBUTION: The species is known from Costa Rica and Panama.

HABITAT IN COSTA RICA: Plants were found growing as epiphytes on the Pacific basin lower montane rain forest, west of the Talamanca Mountain Range, in Las Tablas Protective Zone at 1778 m.

PHENOLOGY: Flowered in November under cultivation.

COSTA RICAN MATERIAL STUDIED: **Puntarenas:** Coto Brus, Sabalito, Zona Protectora Las Tablas, 13 km al noreste de Lucha, sitio Coto Brus, Finca de Miguel Sandí, 1778 m., floreció en cultivo en el Jardín Botánico Lankester, preparado 19 nov. 2013, *D. Bogarín 10490* & *D. Jiménez* (JBL-D6150 spirit!, Fig. 25–26).

Stelis veraguasensis is a large, robust plant with a long, multiflowered raceme of large, bilabiate, shell-shaped flowers that open simultaneously. According to Luer (2001), it is similar to *S. lankesteri* Ames, a species from Costa Rica and Panama. However, *S. veraguasensis* is distinguished by having a larger habit (ca. 32 cm vs. 20–22 cm) with generally broader leaves (4.0–5.5 cm vs. 2.0–2.5 cm), larger sepals (11–12 × 12–13 mm vs. 8.0–9.0 × 7.0–7.5 mm), larger petals (2.5 × 2.8 mm vs. 2.0 × 2.0 mm), ovate, cordate (vs. rhombic) and larger lip (1.6 × 1.8 mm vs. 1.0 × 2.0 mm), with a thick v-shaped apical margin, and a short, rounded apiculum.

TELIPOGON Kunth

Telipogon memoria-rodulfi Pupulin & Bogarín, *sp. nov.*

TYPE: Costa Rica. Cartago: Casamata del Guarco, 1930 m, epiphytic on short trees in pasture, mostly *Quercus* spp. (Fagaceae), montane cloud forest, 26 March 2002, *F. Pupulin 3557 et al.* (holotype, USJ). (Fig. 27, 28A).

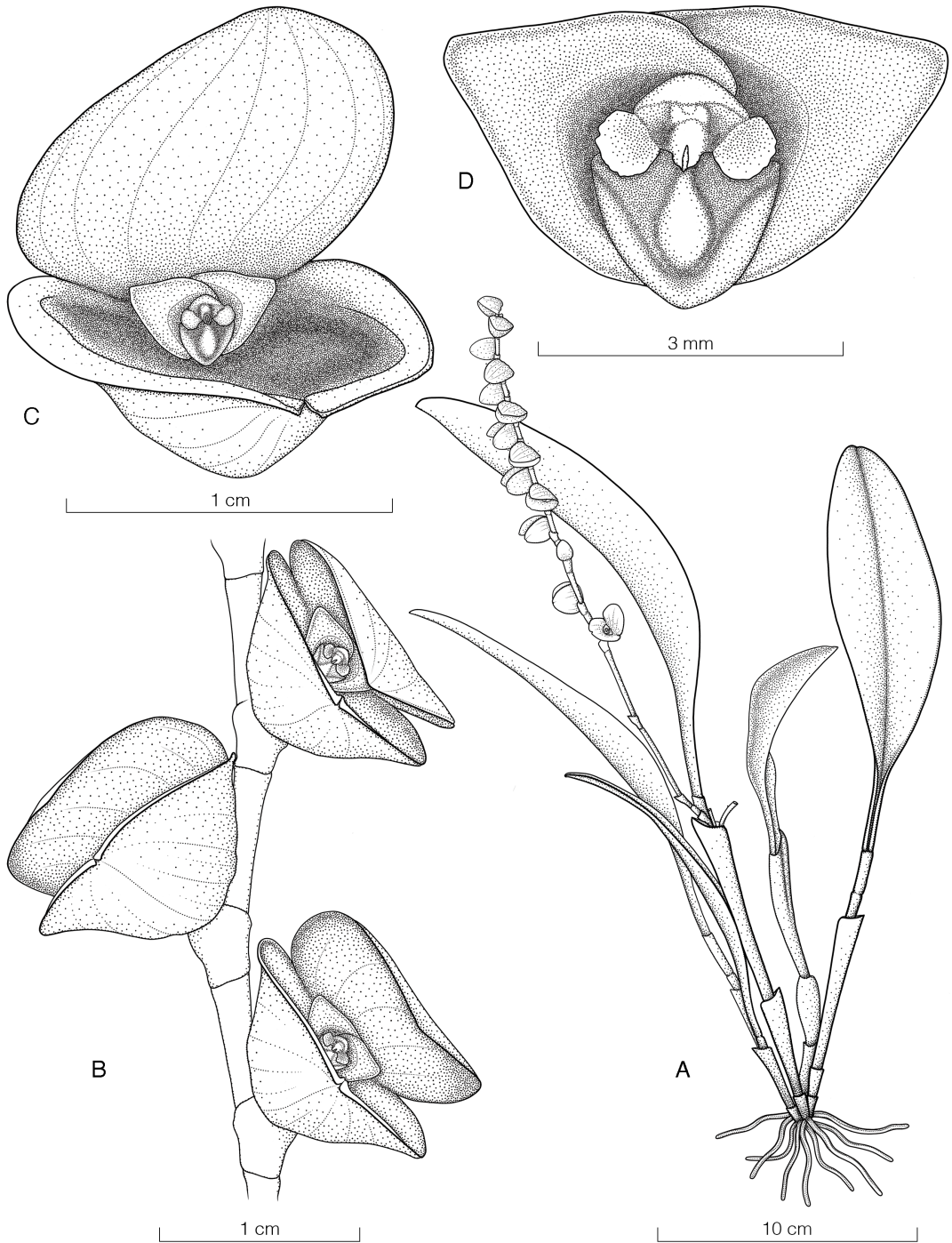


FIGURE 25. *Stelis veraguasensis* Luer. **A.** Habit. **B.** Portion of inflorescences showing three flowers. **C.** Flower, in natural position. **D.** Sepals, petals, lip and column, frontal view. Drawn by I. F. Chinchilla from *D. Bogarín 10490* (JBL-spirit).



FIGURE 26. *Stelis veraguasensis* Luer. A. Habit. B. Portion of inflorescences showing three flowers. C. Flower, in natural position. D. Sepals, petals, lip and column, frontal view. LCPD prepared by I. F. Chinchilla from D. Bogarin 10490 (JBL-spirit).

DIAGNOSIS: *A Telipogon fortuneae Dressler floribus duplo maioribus rosaceis brunneo striatis recedit.*

Epiphytic, small, monopodial *herb* to 5 cm long, including the inflorescence. *Roots* flexuous, numerous, short, to 1.5 mm in diameter, with green apices. *Stem* abbreviated, completely concealed by the base of the amplexant leaf-sheaths. *Leaves* 2, elliptic, acute, gently ribbed on the underside, 4.8–6.6 × 1 mm, sometimes deciduous at flowering. *Inflorescence* lateral, from the base of the stem, a successively 2–3-flowered raceme to 5 cm long, sometimes with a branch about 2.5 cm long in the upper half; the peduncle born terete, slender, becoming dorsiventrally flattened-ancipitous toward the apex, the flattened internodes provided with a triangular, obtuse, weakly keeled, pale green, glumaceous bract at the apex, decurrent on the peduncle; the rachis subtrigonus, straight. *Floral bract* triangular, acute, rigid, strongly conduplicate-keeled, *ca.* 1.5 × 1.0 mm. Pedicellate *ovary* terete-subclavate, rounded in section, 2.5 mm long including the pedicel. *Flowers* non-resupinate, pale rose, the sepals darker, the petals and lip longitudinally striped with pale yellowish brown, the column purple, the anther cap red. *Dorsal sepal* triangular-lanceolate, acute, reflexed, the margins shortly inflexed, 3.5 × 1.4 mm, 3-veined. *Lateral sepals* adpressed, triangular-lanceolate, acute, lightly falcate at apex, 3.3 × 1.0 mm, 1-veined, the margins lightly involute to become adpressed to the apex of the lip. *Petals* lanceolate, acute, 8 × 3 mm, 3-veined. *Lip* lanceolate, acute, slightly reflexed, 6.2 × 2.4 mm. *Column* semiterete, 2.5 mm long, the stigma recessed under a long, narrowly triangular stigmatic lobe, the anther dorsal (facing down in natural position), the rostellum long-attenuated, dilated at apex, far surpassing the apex of the stigmatic lobe. *Anther cap* cucullate, cordate, acute, with two large flaps protecting the pollen. Pollinarium composed of four *pollinia*, discoid-complanate, in two pairs of different size, on a triangular, conduplicate, hyaline stipe and a hook-shaped, brown viscidium. *Fruit* not seen.

EPONYMY: From the Latin *memoria*, remembrance, and *Rodulfus*, Rudolf, in the memory of our dear friend, untimely passed away, Rudolf Jenny (1953–2021).

DISTRIBUTION: Only known from Costa Rica.

HABITAT IN COSTA RICA: The species is known from the Caribbean watershed of the northern portion of the Talamanca Cordillera in Costa Rica, where it inhabits the premontane rain and wet forest around the Tapantí National Park.

PHENOLOGY: Flowering in March, May, and October.

COSTA RICAN MATERIAL STUDIED: **Cartago:** Cartago, San Francisco, Muñeco, 4.5 km south of Muñeco, road to Alto Belén, 1968 m, premontane rain forest, epiphytic in secondary vegetation and trees in open areas, 27 May 2009, *D. Bogarín 6582 et al.* (USJ) (Fig. 28B). Paraiso, Orosi, Tapantí, Parque Nacional Tapantí, *ca.* 9 km after the gate of the view point, road to Tapantí Hydroelectric Project, *ca.* 100 m after the waterfall, 1694 m, premontane rain forest, epiphytic on twigs of *Saurauia montana* (Actinidiaceae), 26 Aug. 2021, *D. Bogarín 13425 & G. Villalobos* (JBL) (Fig. 28C).

Telipogon memoria-rodulfi is another species belonging to *Stellilabium* sect. *Rhamphostele* *sensu* Dressler (1999). It is most similar to *T. fortuneae* (Dressler) N.H. Williams & Dressler, but the latter has much smaller flowers (all the tepals approximately half in size), and the flowers are yellow or purple (Dressler 1999).

TRICHOPILIA Lindl.

Trichopilia olmosii Dressler, Selbyana 22(1): 11–12. 2001.

TYPE: Panama. Bocas del Toro: region of Culebra, 1000–1200 m, collected by Erick Olmos; flowered in cultivation 4 Aug. 2000, *R. L. Dressler 6288* (holotype, barcode MO-1005420!).

DESCRIPTION: Based on *F. Pupulin 9118*.

An epiphytic, caespitose, pseudobulbous *herb* to 17 cm tall. *Roots* slender, flexuous, glabrous, *ca.* 1.5 mm in diameter. *Rhizome* with short internodes, covered by brown, nervous, papyraceous sheaths. *Pseudobulbs* ovate-oblong, markedly compressed sublenticular, ancipitous, 3.3–4.8 × 1.5–2.1 cm, monophyllous, covered at the base by 2–3 triangular, acute, imbricating sheaths to 3.8 cm long, born

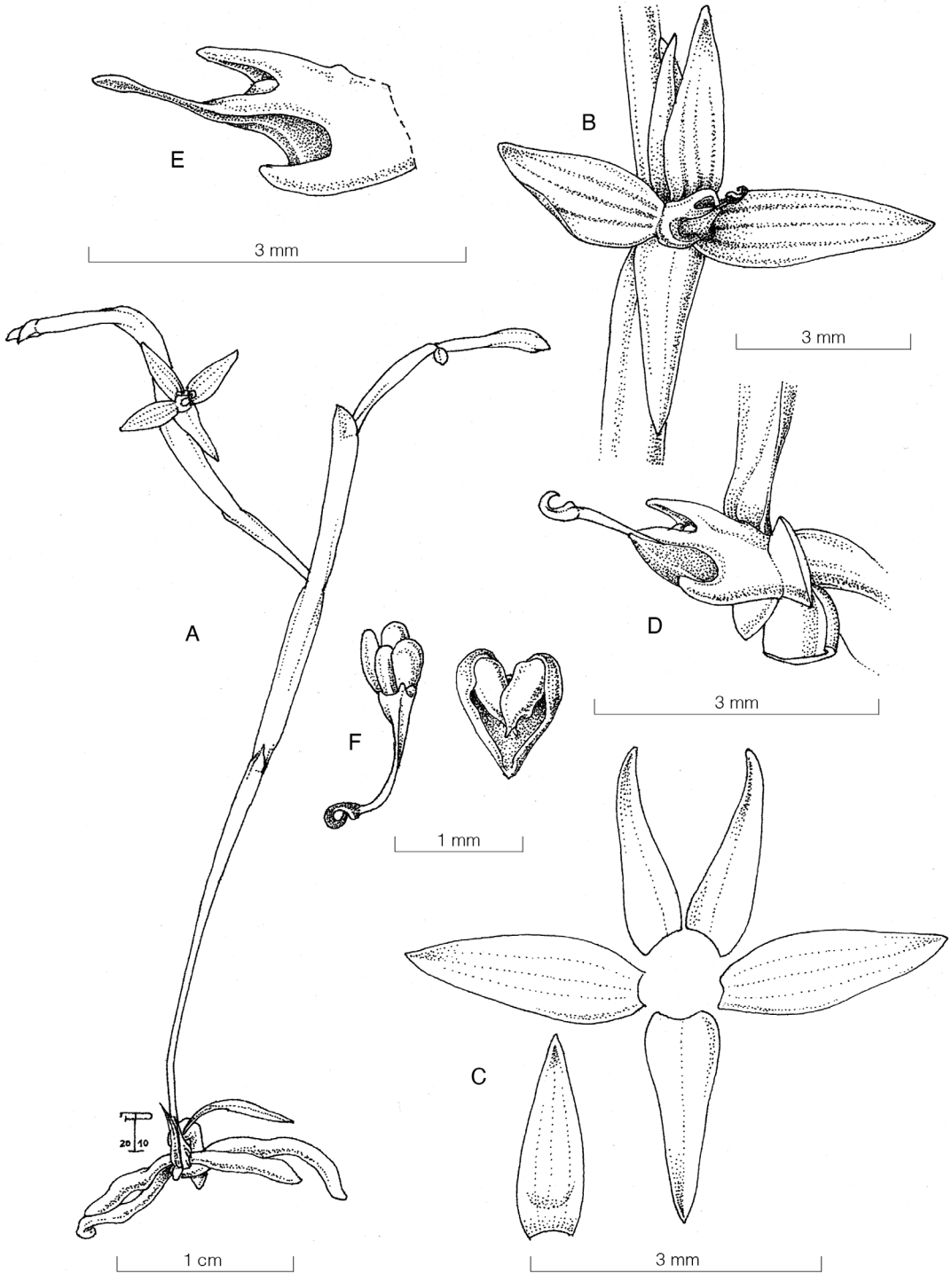


FIGURE 27. *Telipogon memoria-rodulfi* Pupulin & Bogarín. **A.** Habit. **B.** Flower. **C.** Dissected perianth. **D.** Column, lateral view, showing the bases of sepals, petals, and lip. **E.** Column in lateral view, emasculate. **F.** Anther cap and pollinarium. Drawn by F. Pupulin based on *F.Pupulin 3557* (USJ).



FIGURE 28. *Telipogon memoria-rodulfi* Pupulin & Bogarín. Vouchers: *F.Pupulin et al.* 3557 (A), *D.Bogarín et al.* 6582 (B), and *D.Bogarín* 13425 & *Villalobos* (C).

glumaceous and becoming dry-papyraceous with age, eventually becoming lacerate and dissolving. *Leaves* oblong-elliptic, grass-green, acute to sub-obtuse, weakly keeled beneath, matte on both surfaces, $10\text{--}12 \times 3\text{--}4$ cm, the margins slightly undulated and sometimes recurved, narrowed at the base in a short, folded petiole to 2 cm long, ca 0.5 cm wide. *Inflorescence* a few-flowered (2–5), pendent raceme 6–10 cm long, covered near the base by an amplexant, somewhat loose, glumaceous, tubular bract to 1.7×0.5 cm, brownish spotted dark brown. *Floral bracts* glumaceous, greenish brown, narrowly ovate, acute, carinate, $1.4\text{--}1.9 \times 0.9\text{--}1.2$ cm. Pedicellate *ovary* terete-subclavate, with deep intercarpellar grooves, 2.4–2.9 cm long including the pedicel. *Flowers* spreading, with greenish yellow to pale whitish-green spots, the lip white with bright yellow blotches on the callus and the osmophores. *Dorsal sepal* narrowly elliptic, acute, weakly carinate, $2.3\text{--}2.7 \times 0.5\text{--}0.6$ cm. *Lateral sepals* narrowly elliptic-subfalcate, short acuminate, weakly carinate, $2.5\text{--}2.7 \times 0.4\text{--}0.5$ cm, shortly connate at the base for about 5 mm. *Petals* elliptic-lanceolate, acute-subapiculate, carinate in the distal third, recurved to gently reflexed in natural position, $2.3\text{--}2.8 \times 0.5\text{--}0.6$ cm. *Lip* 3-lobed, broadly ovate from a cuneate base, $1.8\text{--}2.1 \times 1.7\text{--}2.0$ cm, basally connate to the column for ca. 5 mm, the disc provided with a distinct keel ca. 8 mm long, reaching the middle of the blade; lateral lobes rounded, erect, encircling the column; midlobe excise, divided in 2 distinct, rounded subquadrate lobes, with slightly waved margins. *Column* terete, abruptly dilated around the

stigma, ca. 1.3×0.6 cm; the clinandrium cucullate, lacerate; the stigma ventral, broadly elliptic, large, with a distinct rim; the anther incumbent. *Anther cap* cucullate, ovate-subquadrate, obtuse, 2-celled. *Pollinium* composed of two *pollinia*, ovoid, slightly complanate, hard, deeply cleft, on a narrowly triangular, basally marginate, hyaline stipe and an elliptic, orange viscidium. *Fruit* not seen.

COSTA RICAN MATERIAL EXAMINED. **San José:** Vázquez de Coronado-Moravia, Jesús-San Jerónimo, from Alto La Palma to Bajo La Hondura, ca. $10^{\circ}02'N$ $83^{\circ}59'W$, 1500 m, premontane rain forest, flowered in cultivation at Jardín Botánico Lankester and prepared 21 Sep. 2023, *F. Pupulin* 9118 & *G. Villalobos* (JBL, Fig. 29).

Dressler (2001) noted that *Trichopilia olmosii* is morphologically similar to both *T. maculata* Rehb.f. from Panama, and the Costa Rican *Trichopilia turrialbae* Rehb.f. *Trichopilia maculata* is easy to distinguish for its oblong-subquadrate pseudobulbs that are closely appressed to the substrate (Dressler 2001), as well as the single-flowered inflorescence, and even though this name has been applied to plants from Costa Rica, El Salvador, and Guatemala, we have never seen a true specimen of *T. maculata* in Costa Rica. We suspect that the species is indeed endemic to central Panama. *Trichopilia turrialbae*, and the similar *T. endresiana* Dressler & Pupulin, have much larger flowers, with lateral sepals connate to about the half of their length, and the lip of both species is distinctly convex in lateral view, unlike the almost straight lip of *T. olmosii*.

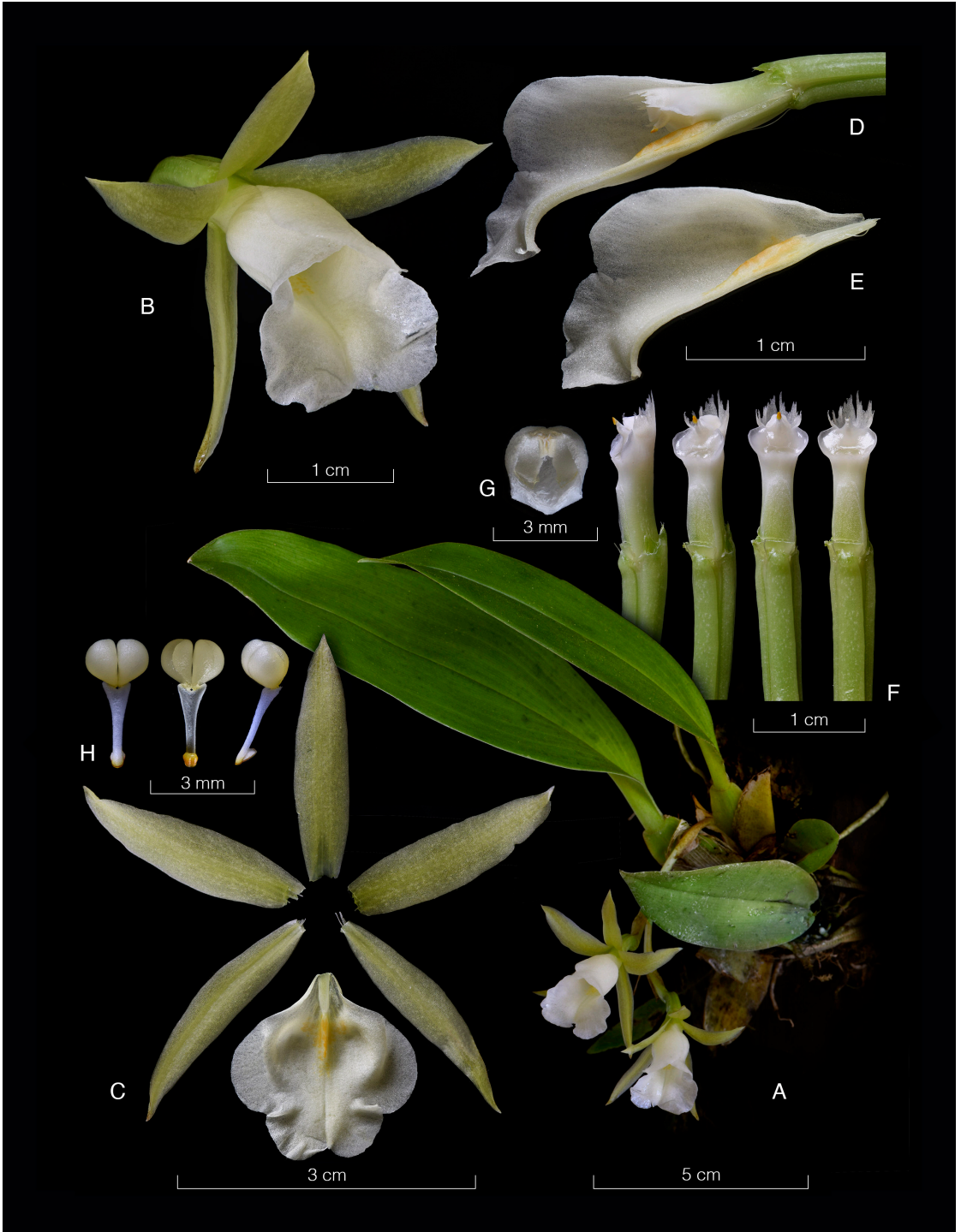


FIGURE 29. *Trichopilia olmosii* Dressler. A. Habit. B. Flower. C. Dissected perianth. D. Column and lip, lateral view (the lip in longitudinal section). E. Lip section. F. Column in several views. G. Anther cap. H. Pollinarium in dorsal, ventral, and lateral views. LCDP prepared by F. Pupulin based on *F.Pupulin 9118* (JBL).

ADDITIONS AND CORRECTIONS REGARDING THE ORCHID FLORA OF COSTA RICA

Omissions and taxa described after the publication of the most recent Costa Rican orchid catalogue (Pupulin *et al.* 2023) are discussed here. The orchid flora of Costa Rica now includes 1695 species and nine forms.

Funkiella valerioi (Ames & C.Schweinf.) Salazar & Soto Arenas, *Acta Bot. Mex.* 97: 52. 2011.

Bas.: *Spiranthes valerioi* Ames & C.Schweinf., *Schedul. Orchid.* 10: 8. 1930.

Spiranthes parasitica var. *valerioi* (Ames & C.Schweinf.) L.O.Williams, *Ceiba* 1: 186. 1950.

Schiedeella valerioi (Ames & C.Schweinf.) Szlach. & Sheviak, *Rhodora* 92: 16. 1990.

VOUCHER: P.C. Standley & J. Valerio 43952 (AMES).

NOTE: Inadvertently, *Funkiella valerioi* (Ames & C.Schweinf.) Salazar & Soto Arenas and *Schiedeella valerioi* (Ames & C.Schweinf.) Szlach. & Sheviak were listed as accepted names. However, they refer to the same species. The accepted name here is *F. valerioi*.

Karma pusilla (Kunth) Karremans, *Harvard Pap. Bot.* 28: 67. 2023.

Dendrobium peruvianum F.Dietr. in *Neu. Nachtr. Vollst. Lex. Gärtn.* 3: 354. 1834., nom. superfl.

Dendrobium pusillum Kunth in F.W.H.von Humboldt, A.J.A.Bonpland & C.S.Kunth, *Nov. Gen. Sp.* 1: 357. 1816.

Humboltia pusilla (Kunth) Kuntze in *Revis. Gen. Pl.* 2: 668. 1891.

Pleurothallis pusilla (Kunth) Lindl. in *Edwards's Bot. Reg.* 28(Misc.): 82. 1842.

Specklinia pusilla (Kunth) Lindl. in *Edwards's Bot. Reg.* 21: t. 1797. 1835.

Trichosalpinx pusilla (Kunth) Luer in *Phytologia* 54: 397. 1983.

Tubella pusilla (Kunth) Archila in *Revista Guatemalensis* 3(1): 62. 2000 publ. 2009.

VOUCHER: M. Fernández *et al.* 911 (JBL-spirit).

NOTE: This species was previously recorded for Costa Rica but omitted in the catalogue (Pupulin *et al.* 2023). Here we cite a Costa Rican voucher.

Karma todziae (Luer) Karremans, *Harvard Pap. Bot.* 28: 68. 2023.

Trichosalpinx todziae Luer in *Lindleyana* 11: 111. 1996.
Tubella todziae (Luer) Archila in *Revista Guatemalensis* 3(1): 66. 2000 publ. 2009.

VOUCHER: C. *Todzia* 344 (CR).

NOTE: This species was described from Costa Rica but omitted in the catalogue (Pupulin *et al.* 2023).

Malaxis dressleriana Chinchilla, Karremans & M.A.Blanco, *Orchids (West Palm Beach)* 92: 609. 2023.

VOUCHER: I. Chinchilla *et al.* 3209 (JBL-spirit).

NOTE: This species was described after the publication of the catalogue (Pupulin *et al.* 2023).

Maxillariella ponerantha (Rchb.f.) M.A.Blanco & Carnevali, *Lankesteriana* 7: 529. 2007.

Maxillaria ponerantha Rchb.f., *Bonplandia (Hanover)* 2: 17. 1854.

VOUCHER: P.H. Allen 5328 (SEL).

NOTE: This species was previously documented in Costa Rica but was unintentionally excluded from the catalogue (Pupulin *et al.* 2023). Although the populations in Costa Rica differ from the original type specimen based on Venezuelan material (*Wagner s.n.*, W), we treat this species under *M. ponerantha* until this taxonomic concept is thoroughly reviewed.

Sarcoglottis woodsonii (L.O. Williams) Garay, *Bot. Mus. Leafl.* 28(4): 355. 1980[1982].

VOUCHER: R. Acuña *et al.* 3282 (USJ, JBL-spirit).

NOTE: This species was first documented in Costa Rica by Acuña-Castillo *et al.* (2024).

Telipogon fortuneae (Dressler) N.H.Williams & Dressler, *Lankesteriana* 5: 169. 2005.

VOUCHER: I. Chinchilla *et al.* 3209 (JBL-spirit).

NOTE: This species was previously recorded for Costa Rica but omitted in the catalogue (Pupulin *et al.* 2023). Here we cite a Costa Rican voucher.

Telipogon lateritius Pupulin, *Lankesteriana* 24(1): 71–73. 2024.

VOUCHER: F. Pupulin *et al.* 4186 (USJ).

NOTE: This species was described after the publication of the catalogue (Pupulin *et al.* 2023).

Telipogon muntzii Bogarín, O. Pérez & Pupulin, Lankesteriana 24(1): 73–76. 2024.

VOUCHER: *D. Bogarín et al.* 14185 (JBL-spirit).

NOTE: This species was described after the publication of the catalogue (Pupulin *et al.* 2023). The epithet honors Dr. Robert Muntz. In the eponymy, the surname was originally stated as Robert Müntz (Bogarín *et al.* 2024), but it should be spelled as Muntz without the umlaut.

Trichosalpinx orbicularis (Lindl.) Luer, Phytologia 54: 396. 1983.

Humboltia orbicularis (Lindl.) Kuntze in Revis. Gen. Pl. 2: 668. 1891.

Pleurothallis orbicularis (Lindl.) Lindl. in Edwards's Bot. Reg. 28(Misc.): 79. 1842.

Specklinia orbicularis Lindl. in Edwards's Bot. Reg. 25(Misc.): 31. 1839.

VOUCHER: *M. Fernández et al.* 65 (JBL-spirit)

NOTE: This species was previously recorded for Costa Rica but omitted in the catalogue (Pupulin *et al.* 2023). Here we cite a Costa Rican voucher.

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