



## *Epidendra Nova Talamancana*

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### Abstract

Two new species of *Epidendrum* from the Costa Rican montane rainforest, *E. hartmanniorum* and *E. vallis-silentii*, are described, illustrated and compared with similar species. *Epidendrum stolidium* and *E. unicallosum* are reported as new records of this genus for the country.

**Key words:** Costa Rica, new records, new species, Orchidaceae, Talamanca, taxonomy

### Introduction

*Epidendrum* Linnaeus (1763: 1347) is one of the most abundant elements of the New World orchid floras, and one of the most diverse genera within the Orchidaceae. It comprises close to 2,400 species distributed from the southeast of the United States in North Carolina to Argentina, through Central America and the Antilles (Hágsater *et al.* 2016). Species of *Epidendrum* can be found at elevations from 0 to 4,000 m and in a great variety of habitats (Hágsater *et al.* 2003).

Ossenbach *et al.* (2007) reported about 190 species of this genus in Costa Rica, of which at least 45 are reported to be endemic, and many of which have been described relatively recently. Approximately 35 additional species of *Epidendrum* have been described or reported from the country since then (Bogarín *et al.* 2008, Pupulin & Karremans 2010, Karremans & Hágsater 2010, Bogarín 2011, Karremans *et al.* 2012, Karremans & Smith 2013, Karremans & Fernández 2013, Hágsater & Karremans 2013, Fernández *et al.* 2014).

In Costa Rica, species of *Epidendrum* are mainly distributed in the wet, rainy and cloud forest, between 1,000 and 2,500 m elevation (Hágsater *et al.* 2003). Nevertheless, they can be found basically anywhere in the country. The plants of this genus are recognized by the usually thick stems, with distichous leaves, apical inflorescences and flowers with the lip frequently fused to the column (Hágsater *et al.* 2003).

Efforts made by the Lankester Botanical Garden to systematically document the orchid flora of Costa Rica, with particular interest in protected areas, has allowed for the discovery of many before unknown orchid species from the country, including the following.

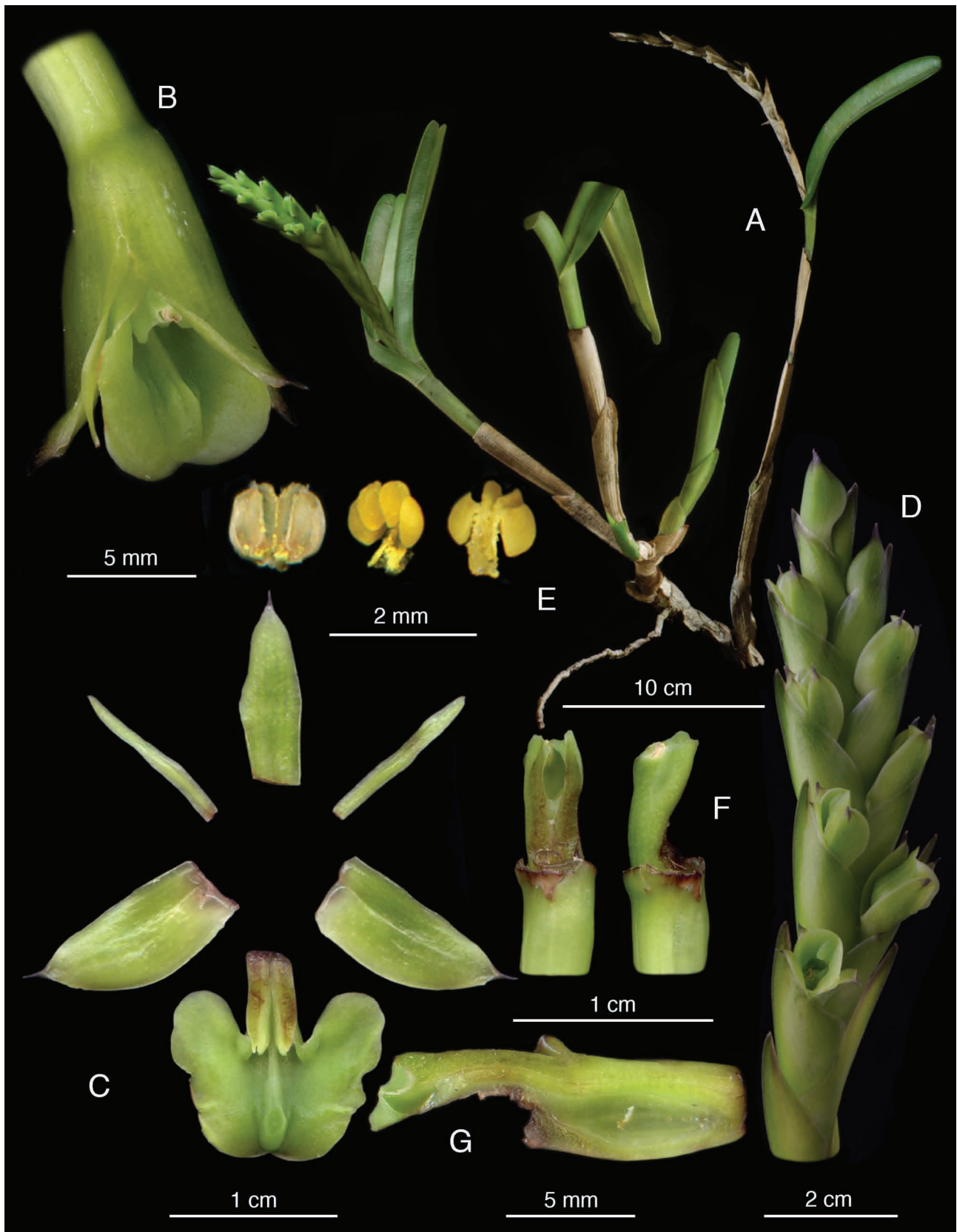
### Materials and methods

The living specimens of the four species of *Epidendrum* here included were documented with photographs. Additional specimens deposited at the USJ and CR (including those formerly hosted at INB) herbaria were revised. Measurements and colors reported for reproductive structures were based on the observation of living flowering plants. Additionally, habitat, distributions and phenology are recorded. Descriptive terminology follows Harris & Harris (1994).

### Taxonomic treatment

*Epidendrum hartmanniorum* Karremans & M.Díaz, *sp. nov.*

**Type:**—COSTA RICA. 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”, epífitas en árboles aislados en bosque pluvial montano bajo, 2,162 m, 8°58'01.98" N 82°44'57.42" W, 11 December 2013, *A. P. Karremans 6166, D. Bogarín, M. Fernández & L. Sandoval* (holotype, JBL-Spirit!; fig. 1)



**FIGURE 1.** *Epidendrum harmanniorum* Karremans & M. Díaz. Lankester Composite Digital Plate (LCDP) prepared from the plant that served as the holotype. A. habit. B. flower. C. dissected perianth. D. inflorescence. E. anther cap and pollinarium. F. column (ventral and lateral views). G. lateral view of the longitudinally dissected column, with the nectary exposed.

**Diagnosis:**—*Epidendrum hartmanniorum* is related to *Epidendrum palmense* Ames (1923: 33) but differs by the smaller overall size, shorter stems, flowers almost half the size and successive flowers. *Epidendrum hartmanniorum* is also similar to *Epidendrum palmidium* Hágsater (1999a: 364) but is distinguished from it by the larger and wider leaves, a smaller flower size and the successive flowers; also *E. palmidium* is apparently distributed at lower elevations. *Epidendrum mocinoi* Hágsater (1999b: 357) has similar flowers in size and shape, but can be distinguished for the lax inflorescence, the floral bracts shorter than the ovary and rounded rather than acute, the sepals completely spreading and the petals with the apex rounded to obtuse rather than acute.

Epiphytic, sympodial, scandent *herb*, up to 30 cm tall including the inflorescence. *Roots* 3–4 mm in diameter, fleshy. *Stems* 11–17 × 0.9–1.3 cm, erect, cane-like, laterally compressed. *Leaves*, 1–2, restricted toward the apical half of the stem; leaf sheath 1.5–4.0 cm long, tubular, laterally compressed, striated; blade 10–12 × 1.7–2.5 cm, articulate, oblong to narrowly elliptic, apex deeply bilobed, margin entire, sub-coriaceous. *Spathaceous bracts* lacking. *Inflorescence* apical, from mature growth, distichous, racemose, flowering only once, sub-erect, laterally compressed; peduncle covered by 7–9 imbricating, conduplicate, carinate, acuminate, laterally compressed bracts. *Floral bracts* 2.0–2.5 cm long, longer than the ovary, acute, conduplicate, divergent, slightly incurved, mainly green with purple at the apex. *Nectary* penetrating the length of the ovary, deep, forming a prominent vesicle. *Flowers* 5–9, successive, 3–6 open at once, non-resupinate, the lip always towards the rachis, mainly green, purple in the tips and the base of tepals and lip. *Sepals* free, partially spreading, ovate, acuminate, 7-veined, glabrous, margin entire; dorsal sepals 11.0 × 3.7 mm; lateral sepals 12.0 × 5.1 mm, oblique. *Petals* 11.5–12.5 × 4.5–5.5 mm, adherent to the lateral sepals, ovate, apex acute, margin entire. *Lip* 12.0–12.5 × 12.5–12.7 mm, reniform, pandurate, base deeply cordate, 3-ribbed, the lateral ribs short, half the length of the central rib, the fleshy central rib thickened, widened toward the apex. *Column* 6.0–6.5 mm long, straight, thick, the clinandrium-hood reduced, entire; rostellum sub-apical, slit. *Anther* ovoid, 4-celled. *Pollinia* 4, obovoid, laterally compressed; caudicles granulate, longer than the pollinia. *Capsule* not seen.

**Distribution:**—Known only from Costa Rica.

**Eponymy:**—The name honors the Hartmann family, probably the first to establish themselves in the area where the species was found.

**Habitat in Costa Rica:**—Known only from the plant found at Las Tablas protected area. It grows epiphytically on isolated trees in a montane rainforest, just above 2100 m elevation.

**Phenology:**—Flowering in June in cultivation.

***Epidendrum stolidium*** Hágsater in Hágsater & Soto Arenas (2005: 74)

Basionym: *Oerstedella ornata* Dressler (1982: 346).

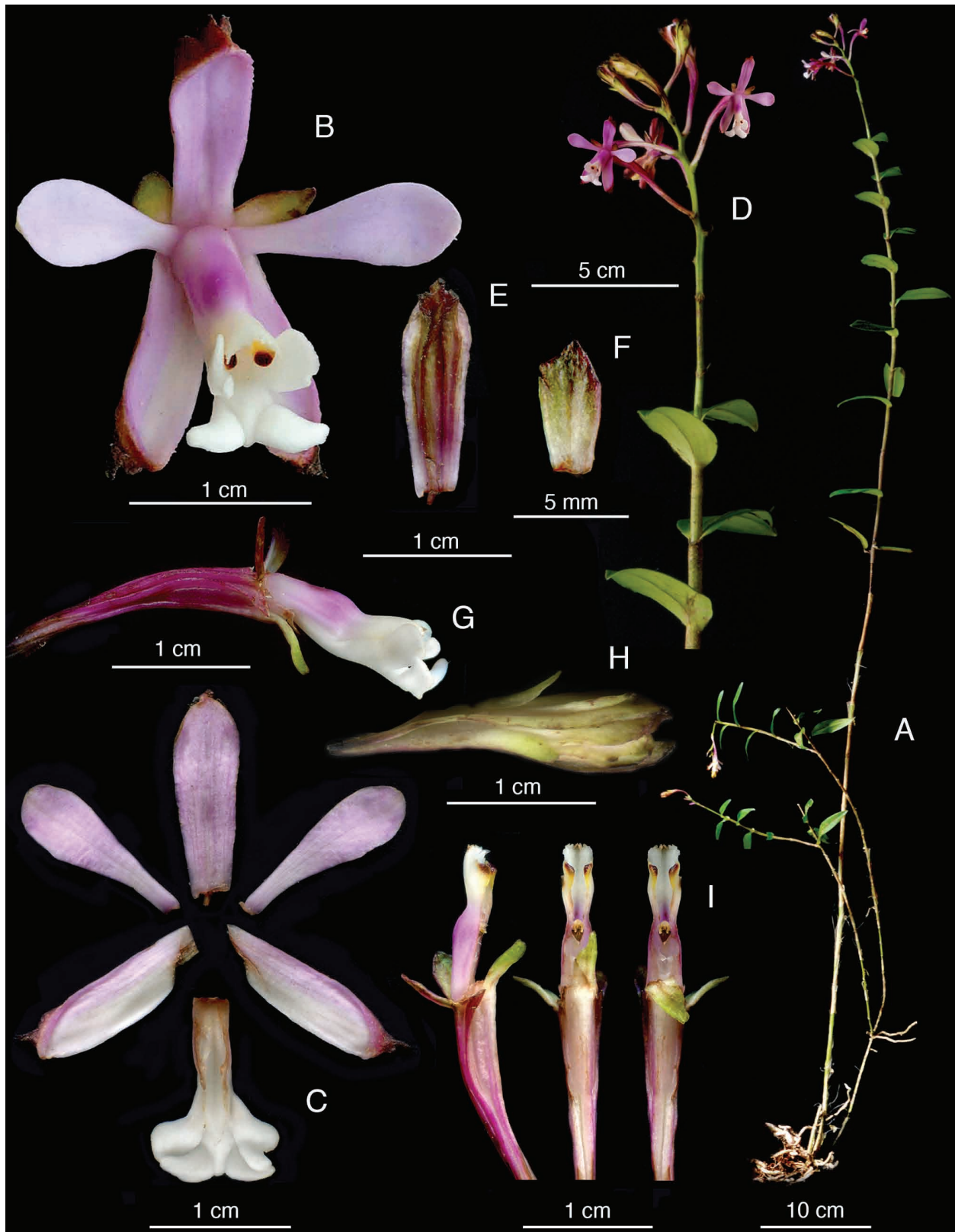
**Type:**—PANAMA. Chiriquí: arriba de Guadalupe, 2,200–2,300 m, October 1980, *R. Dressler 5930* (holotype, US 2952906 / barcode 00093861; isotypes, AMO, F, MO 3106366, MO 04568405, PMA, U).

**Material Studied:**—COSTA RICA. Limón: Talamanca, Bratsi, Parque Internacional La Amistad, Valle del Silencio, camino del refugio hacia el jardín (Turbera) antes de cruzar el Río Terbi, bosque pluvial montano, 2,411 m, 9°07'45.53" N 82°57'31.23" W, 18 September 2014, *Karremans et al. 6350* (JBL-spirit!; fig. 2). Puntarenas: Buenos Aires, Parque Nacional La Amistad, Tararia, sendero a Cerro Kámuk, entre Cerro Dudu y Cerro Kámuk, 3056 m, 9°14'45" N 83°04'25" W, 10 November 1996, *Rojas 3246* (CR-INB!).

Epiphytic, sympodial, branched *herb*, up to 125 cm tall including the inflorescence. *Roots* 3–5 mm in diameter, fleshy, basal. *Stems* 65.5–119.5 × 0.3–0.5 cm tall, erect or becoming pendent, cane-like, terete. *Leaves* 5–13, restricted to the apical half of the stem; leaf sheath 2.4–3.5 cm long, tubular, verrucose; blade 4.0–6.5 × 1.3–2.5 cm, articulate, lanceolate to ovate, acute, with entire margins. *Spathaceous bracts* lacking. *Inflorescence* 4.5–10.5 cm long, apical, racemose, erect; peduncle terete, covered at the base by a lanceolate, amplexicaul, acuminate bract. *Floral bracts* 3.5–4.0 mm long, up to 7 times shorter than the ovary, acuminate, amplexicaul, green. *Ovary* 28.5–30.0 mm, carinate, thin, dark pink dorsally, white cream ventrally, extending into three lobes alternate to the sepals, ca. 6 mm long, green ventrally, dark red dorsally, obovate, truncate, the ventral lobe bilobed, the apical margin irregularly dentate. *Flowers* 3–8 on each raceme, successive, 1–4 open at once, resupinate, pink to purple and white. *Sepals* 15.5–16.0 × 5.5–6.0 mm, free, spreading, 9-veined, glabrous, margin entire, 3–5 carinate abaxially; dorsal sepal light purple adaxially, pink to red abaxially, oblanceolate, obtuse; lateral sepals white adaxially, pink to red abaxially, oblong, obtuse. *Petals* 14.0 × 4.5 mm, free, spreading, 5-veined, glabrous, oblanceolate, obtuse, unguiculate, margin entire, pink. *Lip* 12.5–13.0 × 9.5–11.5 mm, fused to the column, unguiculate, trilobed, the margins entire, white; callus single, fleshy, channeled, with a rib in the middle that extends to the apex of the mid-lobe; lateral lobes obovate, obtuse; mid-lobe unguiculate,



bifid, the lobes divaricate. *Column* 12.0–12.5 mm long including the clinandrium-hood, straight, pink on the base, white on the apex; clinandrium-hood 7.0–7.5 mm, white cream, margin denticulate, tube shaped, with two lateral lobes, fleshy, red dots on the apex of each lateral lobe; rostellum perpendicular to the axis of the column. *Anther* botuliform, 4-celled. *Pollinia* 4, oblong, laterally compressed, the inner pair half the size of the outer pair; caudicles laminar, shorter than the pollinia, brown. *Capsule* not seen. Note: Description based only on *Karremans* 6350.



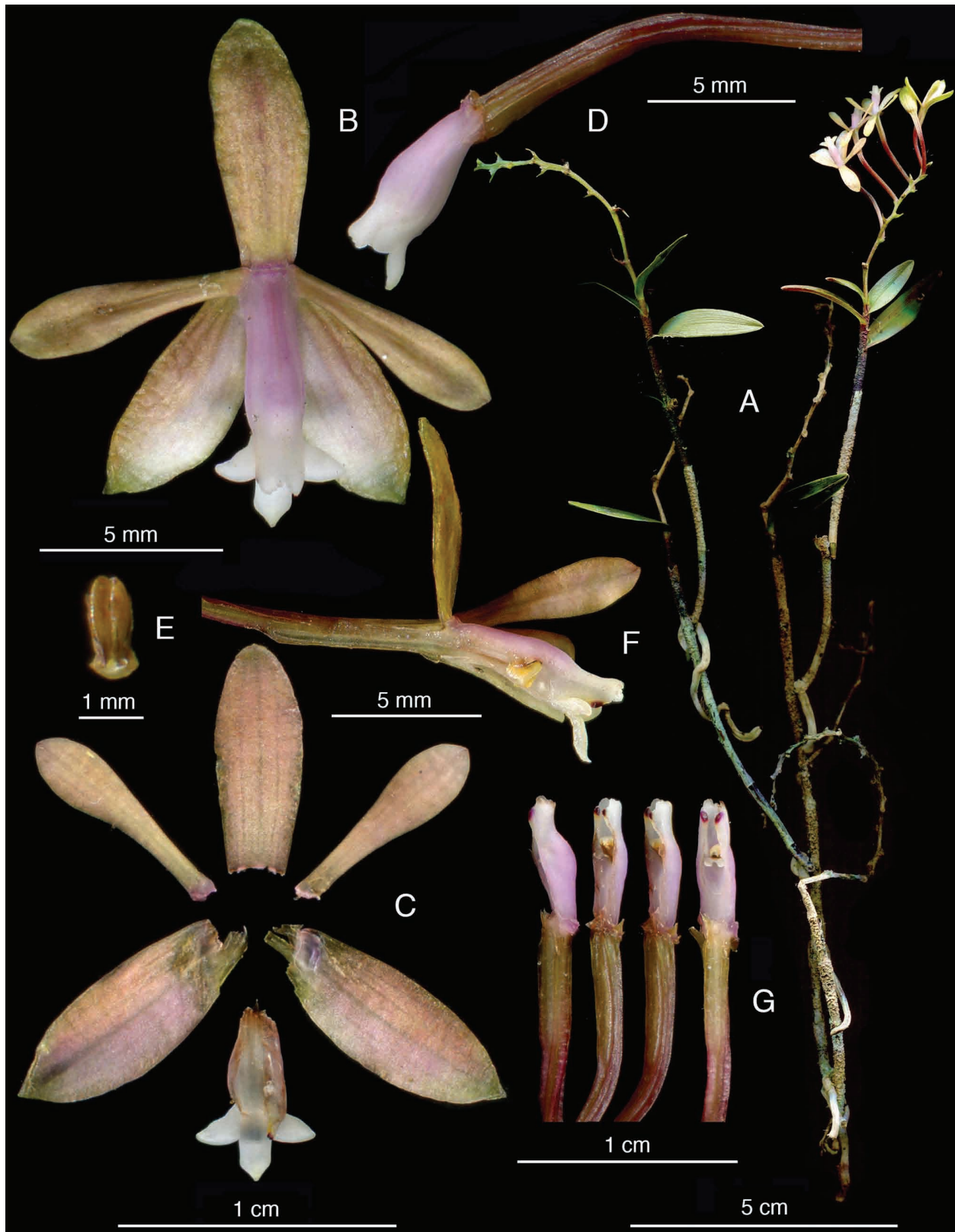
**FIGURE 2.** *Epidendrum stolidium* Hágsater. Lankester Composite Digital Plate (LCDP). A. habit. B. flower. C. dissected perianth. D. inflorescence. E. dorsal view of the sepal. F. dorsal view of the extension of the ovary. G. lateral view of the column and the lip. H. bud. I. column (lateral and ventral view).

**Distribution:**—Panama and Costa Rica.

**Etymology:**—The name is derived from the Greek *stolidi*, ornament (Hágsater & Soto Arenas 2005).

**Habitat in Costa Rica:**—Known from La Amistad National Park. It grows epiphytically in a montane rainforest, at about 2400 m elevation.

**Phenology:**—Collected with flowers in September and November.



**FIGURE 3.** *Epidendrum unicallosum* Hágsater & E.Santiago. Lankester Composite Digital Plate (LCDP). A. habit. B. flower. C. dissected perianth. D. lateral view of the column and the lip. E. pollinarium. F. lateral view of the longitudinally dissected column, with the nectary exposed. G. column (ventral and lateral views).

***Epidendrum unicallosum*** Hágsater & Santiago (2006: t.895)

**Type:**—PANAMA. Chiriquí: Guadalupe, 20 February 2001, *A. Maduro & E. Olmos 179* (holotype, AMO).

**Material Studied:**—COSTA RICA. Limón: Talamanca, Bratsi, Parque Internacional La Amistad, Valle del Silencio, alrededores de refugio, bosque pluvial montano, 2,462 m, 9°06'41.81" N 82°57'42.44" W, 18 September 2014, *Karremans et al. 6335*, (JBL-spirit!; fig. 3). Limón: Talamanca, Parque Internacional La Amistad (PILA), sector Altamira, Valle del Silencio, sendero a El Jardín, epífitas en bosque primario, bosque pluvial montano, 2,550 m, 18 September 2014, *Fernández et al. 925* (JBL-spirit!). Limón: Talamanca, Bratsi, Parque Internacional La Amistad, Valle del Silencio, orillas del Río Terbi cerca del andarivel, bosque pluvial montano, recolectada por D. Jiménez, 2,462 m, 9°06'41.81" N 82°57'42.44" W, 6 May 2013, *Bogarín 10133* (JBL-spirit!). Limón: Talamanca, Parque Nacional La Amistad, Tararia, Valle del Silencio, 2 km antes del albergue, 2,400–2,500 m, 9°06'10" N 82°58'25" W, 18 November 2004, *Soto & González 291* (CR-INB!).

Epiphytic, sympodial, climbing *herb*, up to 20 cm tall including the inflorescence. *Roots* 2–3 mm in diameter, thin, fleshy. *Stems* 10.3–11.7 × 0.3–0.4 cm tall, erect, cane-like, terete, each new one produced from an internode of the previous stem. *Leaves* 3–4, restricted to the apical half of the stem; leaf sheath 0.9–2.1 cm long, tubular, verrucose; blade 1.7–2.5 × 0.6–0.9 cm, articulate, lanceolate, acute, with margins entire. *Spathaceous bracts* lacking. *Inflorescence* 2.0–2.5 cm long, apical, from mature growth, racemose, erect, lax. *Floral bracts* 2.0–2.5 mm long, up to 7 times shorter than the ovary, acute, incurved, green. *Flowers* 5–9, successive, 4–5 open at once, resupinate, pink to purple. *Sepals* free, spreading, 5-veined, glabrous, margin entire; dorsal sepals 8.1 × 3.5 mm, oblanceolate, obtuse; lateral sepals 10.2 × 3.5 mm, elliptic, acute. *Petals* 8.2 × 2.3 mm, free, spreading, 3-veined, glabrous, margin entire, oblanceolate, obtuse. *Lip* 6.0–6.5 × 4.0–4.5 mm, fused to the column, trilobed, margin entire, white, callus single; lateral lobes elliptic, acute, oblique, divaricate; mid-lobe oblong, acute. *Column* 6.5–7.0 mm long including the clinandrium-hood, straight, white to purple on the base; clinandrium-hood almost half the length of the column, the margin crenate, white with purple to red dots on the outer crenations; rostellum perpendicular to the axis of the column. *Anther* ovoid, 4-celled. *Pollinia* 4, ovoid, laterally compressed, the inner pair half the size of the outer pair. *Capsule* not seen. Note: Description based only on *Karremans 6335*.

**Distribution:**—Panama and Costa Rica.

**Etymology:**—The name *unicallosum* makes reference to the single callus of the lip (Hágsater & Santiago 2006).

**Habitat in Costa Rica:**—Known from Valle del Silencio protected area in La Amistad National Park. It grows epiphytically in a montane rainforest, at above 2400 m elevation.

**Phenology:**—Collected with flowers in September and November.

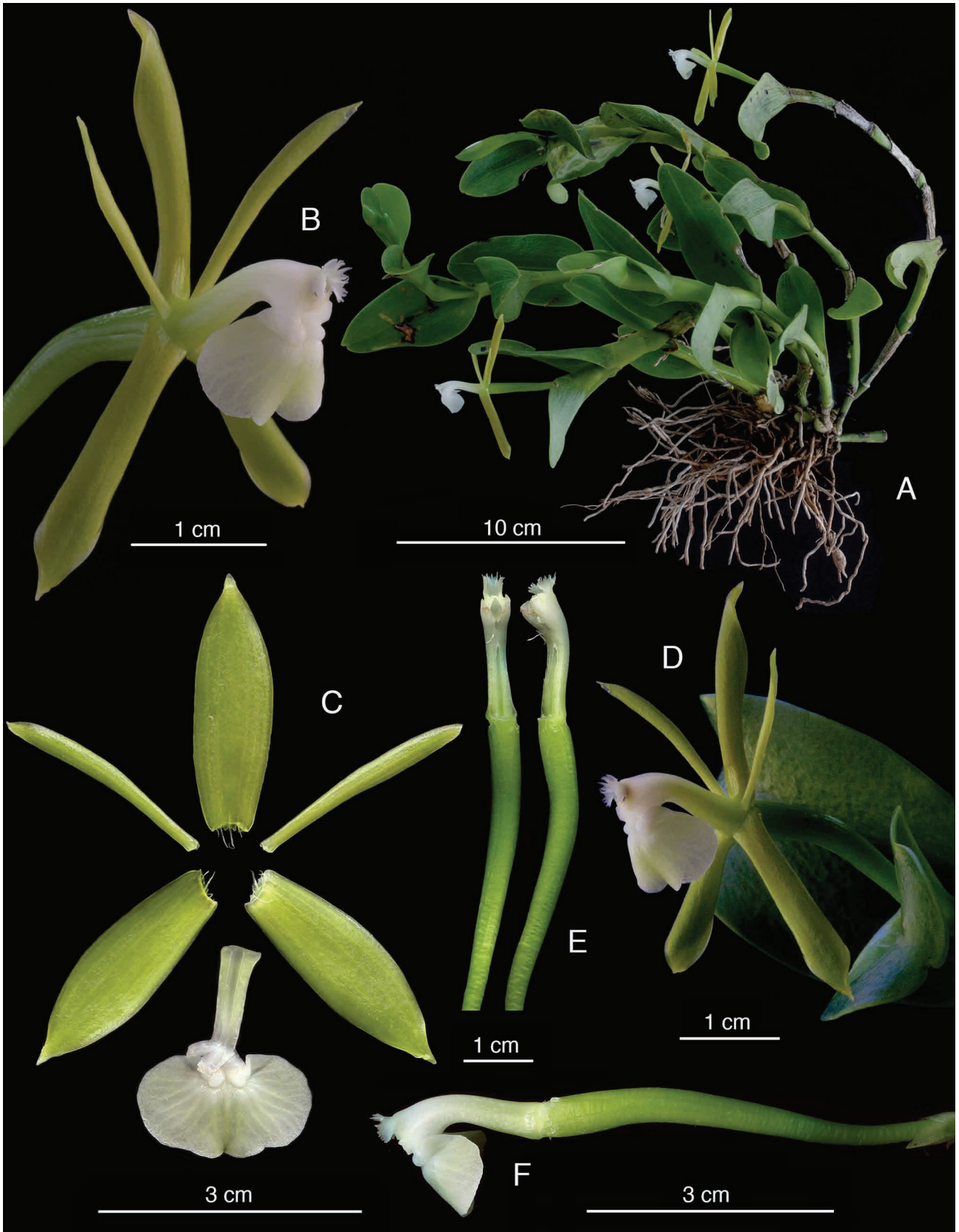
***Epidendrum vallis-silentii*** M. Díaz & Karremans, *sp. nov.*

**Type:**—COSTA RICA. Limón—Puntarenas: Talamanca—Buenos Aires, Bratsi—Potrero Grande, Parque Internacional La Amistad, Sector Altamira, sendero al Valle del Silencio, Cerro Hoffman, sobre la divisoria de aguas, bosque pluvial montano, 2,553 m, 9°05'38.2" N 82°58'37.73" W, 17 September 2014, *A.P. Karremans 6320*, *M. Díaz*, *M. Fernández*, *C. Godínez*, *J. Godínez*, *L. Oses*, *J. Ramírez & D. Villalobos* (holotype, JBL-spirit!; fig. 4).

**Diagnosis:**—*Epidendrum vallis-silentii* belongs to the *Epidendrum difforme* Jacquin (1760: 29) complex. It is related to *Epidendrum pachyceras* Hágsater & Sánchez (1993: 170), from which it is distinguished by the wider, white lip; the shorter, obtuse calli on the lip and the longer, arcuate, white column, and the densely fimbriate clinandrium-hood.

Epiphytic, sympodial, caespitose *herb*, 25–35 cm tall including the inflorescence. *Roots* basal, fleshy, 2–4 mm in diameter. *Stems* 10.5–26.5 × 0.8–1.2 cm tall, flexuose, laterally compressed, ancipitose. *Leaves* 2–9, distributed all along the stem; leaf sheath laterally compressed, ancipitose, smooth, 1.2–2.2 cm long; blade 4.0–7.5 × 1.8–3.5 cm, articulate, ovate to elliptic, bilobed, coriaceous, margin entire. *Spathaceous bracts* lacking. *Inflorescence* apical, from mature growth, racemose, flowering only once, erect. *Floral bracts* shorter than the ovary, acute, conduplicate, 3.0–5.5 mm long, translucent. *Ovary* 3.0–3.5 cm long, slightly inflated behind the perianth. *Flowers* 1–2, successive, resupinate, yellow-green, the lip and the column white. *Sepals* 28.5 × 8.7 mm, free, spreading, elliptic, acute, 7-veined, glabrous, margin revolute. *Petals* spreading, linear to oblanceolate, acute, 3-veined, margin revolute, 25.0 × 3.0 mm. *Lip* 20.0–22.5 × 18.5–20.0 mm, fused to the column, reniform, sides revolute, retuse, margins entire, bicallous, the calli thick, divergent, sub-globose. *Column* arcuate near the apex, thick, 21.0–22.0 mm long including the fimbriate clinandrium-hood, 3.0–3.5 mm long; rostellum apical, slit. *Anther* and *pollinia* not seen. *Capsule* not seen. Note: Description based only on *Karremans 6320*.





**FIGURE 4.** *Epidendrum vallis-silentii* M. Diaz & Karremans. Lankester Composite Digital Plate (LCDP) prepared from the plant that served as the holotype. A. habit. B. flower. C. dissected perianth. D. inflorescence. E. column (ventral and lateral views). F. lateral view of the column and the lip.

**Other material studied:**—COSTA RICA. Puntarenas: Foothills of the Cordillera de Talamanca, trail between Tres Colinas and Cerro Bekom, 2,500 m, 9°07–10' N 83°04' W, 28 March 1984, *Davidse & Herrera Ch. 26195* (CR-INB!).

**Distribution:**—Known only from Costa Rica.

**Etymology:**—The name alludes to the *locus typicus* of the plant, Valle del Silencio, or “the valley of silence”.

**Habitat in Costa Rica:**—Known from the Cordillera de Talamanca, at about 2500 m elevation, in the Pacific slope and close to the continental divide.

**Phenology:**—Flowering in March, and in August under cultivation.

## Acknowledgements

We are thankful for the scientific services of Costa Rican Ministry of Environment and Energy (MINAE) and its National System of Conservation Areas (SINAC) for issuing the Scientific Passports under which the species treated in this study was collected. To the Vice-Presidency of research of the University of Costa Rica for providing support under the projects, “Filogenia molecular de las especies de Orchidaceae endémicas de Costa Rica” (814-B1-239) and “Hacia una moderna flora de orquídeas de Panamá” (814-B2-161). To Franco Pupulin for his valuable comments on the manuscript and to the staff from USJ and CR herbaria for facilitating the access to the collections.

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