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SCAPHOSEPALUM LUANNAE, A NEW SPECIES, AND *SCAPHOSEPALUM ANCHORIFERUM* (ORCHIDACEAE: PLEUROTHALLIDINAE) FROM NORTH-WESTERN ECUADOR

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Abstract. A new species, *Scaphosepalum luannae,* is described, and new records for *Scaphosepalum anchoriferum* from Ecuador are presented. *Scaphosepalum luannae* is superficially similar *to S. swertiifolium* but its differs in the the dark green leaves, conspicuously nerved at the abaxial side and shiny at the adaxial side, the sub-quadrate petals with a basal lobe at the columnar margin and the lip with a truncate base without lobes with an oblong and flat hypochile. *Scaphosepalum luannae* and *S. anchoriferum* were discovered growing sympatrically in a poorly explored cloud forest from north-western Ecuador, near the border with Colombia.

Resumen. Una nueva especie, *Scaphosepalum luannae*, es descrita y se presenta el nuevo registro de *Scaphosepalum anchoriferum* en Ecuador. *Scaphosepalum luannae* es superficialmente similar a *S. swertiifolum* pero se diferencia en las hojas verdes, oscuras, conspicuamente nervadas en el lado abaxial y brillosas en el lado adaxial, los pétalos sub-quadratos con un lóbulo basal en el margen columnar y el labelo con su base truncada sin lóbulos y, un hipoquilo oblongo y plano. *Scaphosepalum luannae* y *S. anchoriferum* se descubrieron creciendo de manera simpátrica en un bosque nublado poco explorado del nor-oeste de Ecuador, muy cerca de la frontera con Colombia.

Key words / Palabras clave: Ecuador, nueva especie, new species, Reserva Dracula, *Scaphosepalum anchoriferum*

Introduction. The species of *Scaphosepalum* Pfitzer (Pleurothallidinae) are recognized by the non-resupinate flowers and the connated sepals with osmophores at the base forming a deep and rounded structure with conspicuous sepaline tails in most of the species (Luer 1988). More than 50 species have been described many of them discovered in the past three decades (Luer 1988, 1991, 1992, 1998a, 1998b, 2000, 2009, Endara *et al*. 2011, Chase *et al*. 2015, Karremans 2016, Karremans *et al*. 2016, Valenzuela 2015, Baquero 2017).

Luer (1988) recognized some species-complexes with extensive geographical distributions and populations with similar morphological traits across the geographical range, like *Scaphosepalum breve* (Rchb.f.) Rolfe, *Scaphosepalum odontochilum* Kraenzl. or *Scaphosepalum swertiifolium* (Rchb.f.) Rolfe. Nonetheless, some years after his monograph of the genus, Luer described more species as *Scaphosepalum martineae* Luer, *S. redderianum* Luer, *S. jostii* Luer or *S. globosum* Luer, segregated from the species-complexes where they would originally fit (Luer 1988a, 1998b, 2009). *Scaphosepalum. jostii* and *S. globosum*, two species related to *S. odontochilum*, were considered distinct species; as well as *S. martineae* and *S. redderianum* (Luer 1998b, 2009). A similar case happens with a recently discovered new species of *Scaphosepalum* which is described here.

Another species, *Scaphosepalum anchoriferum* (Rchb.f.) Rolfe, which has a wide phenotypic variation among several populations (Luer 1988b), is mostly known from Costa Rica and Panama, except for a mention of the species for Ecuador by Luer (2003) without voucher specimen. Nevertheless, in north-western Ecuador, several plants of *S. anchoriferum* have been recently found, corroborating Luer´s observation. The new species mentioned above and *S. anchoriferum* were found growing sympatrically in a forest in north-

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western Ecuador. Notes on the new species and *S. anchoriferum* from north-western Ecuador are given here.

Materials and methods. Plants of *Scaphosepalum luannae* and *S. anchoriferum* were discovered and collected by the team of the Botanical Garden of Quito. These plants were cultivated by the Botanical Garden of Quito, where they were used for morphological comparisons, together with specimens preserved in alcohol. The flowers of the plants cultivated for more than 15 months shown no appreciable differences in morphology compared to those observed in the field when the specimens were collected.

Due to the small size of the flowers, measurements were largely conducted on the basis of photos with a 10 mm ruler and the open-source, image-processing program ImageJ (National Institutes of Health) downloaded from https://imagej.nih.gov/ (Lind 2012). The material was photographed with a ruler at the same focal distance. The photos were opened in ImageJ and 10 mm of the ruler were set as a scale. The program calculates the number of pixels to the given unit, providing measurements for the photographed objects.

Taxonomic treatment

Scaphosepalum luannae Baquero, ***sp. nov.*** (Fig. 1–4).

TYPE: Ecuador. Carchi: between Chical y El Carmen, 0°54'42.5" N 78°12'48.7" W, 1750 m, collected by Luis Baquero on 8th of May 2016, *LB 3121* (holotype, QCNE).

Diagnosis. *Scaphosepalum luannae* is similar to *S. swertiifolium* but it differs in the smaller (7–10 vs. 8–21 cm long), dark green, reflective leaves (vs. light green, non-reflective) conspicuously nerved at the abaxial surface (vs. not conspicuously nerved); the shorter ramicauls (3.5–5.0 vs 4–10 cm long); the well-developed, subquadrate, reflexed osmophores of the lateral sepals (vs. transversely lunate, markedly divergent); the sub-quadrate petals with a callous lobe at the base of the columnar margin (vs. ovate, oblique, ecallose), the lip truncate at the base, elobulate (vs. provided wit minutely auricles); and the flat and oblong hipochile (vs. shallowly concave, more or less oblong in *S. swertiifolium*) (Fig. 3–4).

Plant epiphytic, densely caespitose, to 10 cm tall. *Roots* slender, 0.6 mm in diameter. *Ramicauls* erect, slender, 2.0–3.5 cm long, enclosed by 3 sheaths. *Leaf* elliptic, acute, sub-erect, thinly coriaceous, markedly veined at the abaxial side, 7–10 cm long including the petiole, 3.5–5.0 cm wide, cuneate below into a slender, channeled petiole 2 cm long, dark green adaxially, glaucous green abaxially, conspicuously shiny-reflective at both sides. *Inflorescence* a loose, flexuous, successively several to many-flowered raceme from low on the ramicaul, 5–7 cm long, each flower borne on a slender, glabrous, horizontal peduncle 2.5–4.0 cm long. *Floral bracts* thin, shorter than the pedicel, conduplicate, acuminate, bristle-pointed, 3 mm long. *Pedicel* 4 mm long. *Ovary* ribbed, 2.5 mm long. *Sepals* cream, suffused with pink spots which turn into pink stripes towards the junction of the lateral sepals, margins ciliate, with two carinae (a high and a low carina); *dorsal sepal* tricarinate, ovate, concave in the basal quarter, 12.0 × 2.5 mm in natural position, narrowly tubular with revolute margins, the apical three-fourths rose to pink; *lateral sepals* trapezoid, diverging, prickly, thick, reflexed, terminating in a straight, white tail 10–15 mm long, connate 8 mm, with an oblong, concave lamina 9 mm long unexpanded, the apical portion of each sepal suffused with pink and rose dots; cushion (osmophore) 4 × 3 mm (2 × 3 mm in the shorter sides of the trapezium), the total length of each lateral sepal including the tail 19–24 mm. *Petals* sub-quadrate, cream suffused with yellow, columnar margin with a round projection, labellar margin glandulose in texture, suffused with red stripes and blotches, 3.0 × 2.5 mm. *Lip* purple, oblong-subpandurate, reflexed near the middle, 2.2 × 1.0 mm; the epichile narrowly obovate, slightly ciliate at the edge; the disc with a pair of tall, erect, keeled lamellae above the middle; the hypochile rectangular, shallow, the base truncate. *Column* white suffused with rose at the apex, arcuate, semiterete, slender, 3.5 mm long, with two wings in the middle, with a short, 0.5 mm long foot. *Pollinia* 2, yellow. *Fruits* and seeds not observed.

Eponymy: This species is named in honor of Luanne Lemmer of Washington State, USA. Luanne, her husband Eric Veach, and their two sons, Malcolm and Nigel, are passionate supporters of conservation and have given important help to Rainforest Trust and EcoMinga for the establishment of the Dracula

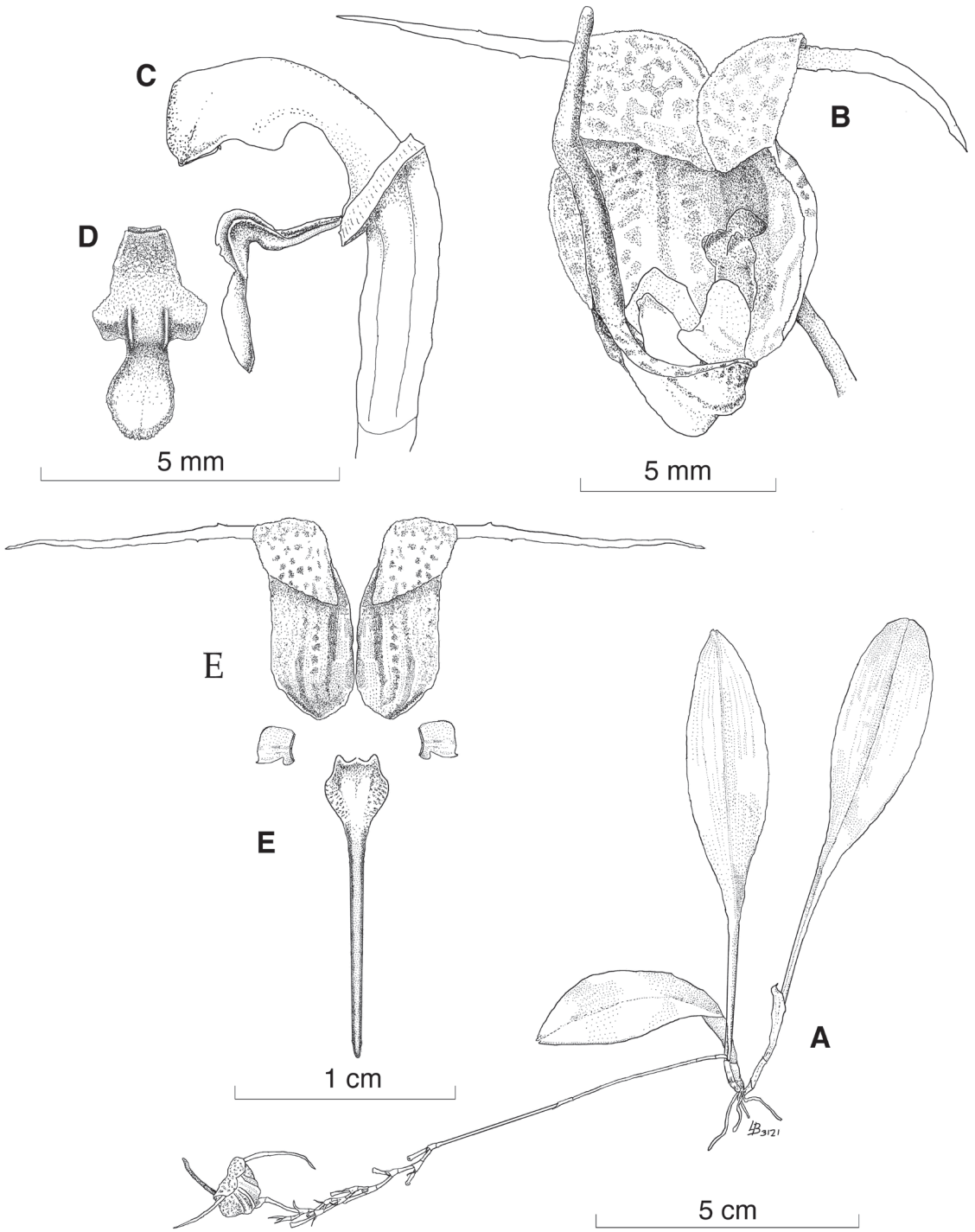

Figure 1. *Scaphosepalum luannae*. **A**. Habit. **B**. Flower in ¾ view. **C**. Column and lip. **D**. Lip, adaxial view. **E**. Dissected flower. Illustration by Luis Baquero based on the holotype.

FIGURE 2. *Scaphosepalum luannae* photographs. **A**. Flower of *S. luannae*: **A1**. Frontal view, **A2**. Lateral view B. Flower of *S. luannae in situ*. **C**. Lip and petal of *S. luannae*: **C1**. Lip, three quartres view. **C2**. Petal, adaxial view. Photos by Luis Baquero, based on the holotype.

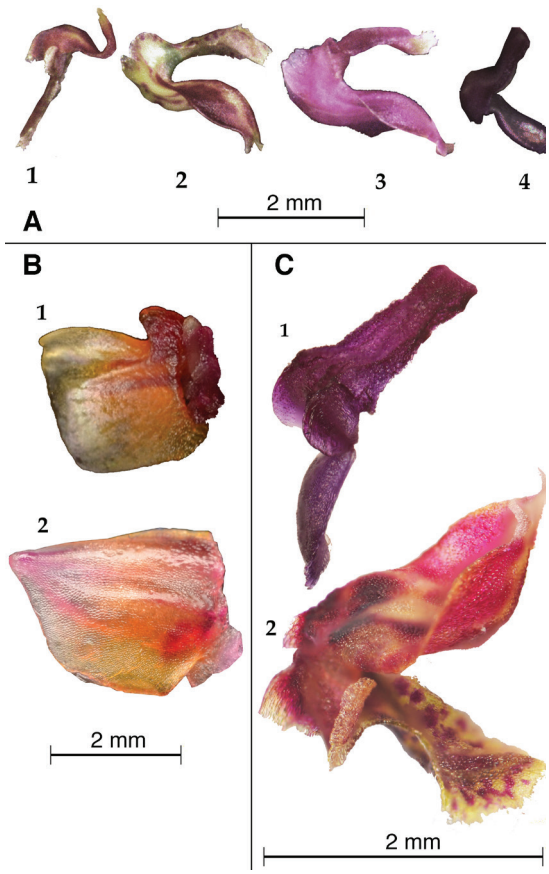

Figure 3. Comparison of the lips and petals of *Scaphosepalum luannae* and other similar species. **A**. Lips of three species of *Scaphosepalum*: *S. cimex* (**A1**), *S. swertiifolium* (**A2, A4**) and *S. luannae* (**A3**). **B**. Petals of *S. luannae* (**B1**) and *S. swertiifolium* (**B2**). **C**. Lips of *S. luannae* (**C1**) and *S. swertiifolium* (**C2**). Photos by Luis Baquero.

Orchid Reserve, which now protects this species.

Other studied material: Ecuador. Carchi, Cerro Oscuro, 0°54'42.5"N 78°12'48.7"W, 1818 m, cultivated at the Jardín Botánico de Quito, *LB 3132* (QCNE-spirit).

Distribution: This species is known from three areas close to Chical in north-western Ecuador. *Scaphosepalum luannae* was first found by the author in a remnant of cloud forest around km 9 of the Chical-El Carmen road. Eventually, more plants where found growing in Cerro Oscuro very close to Chical, and afterwards in the Peñas Blancas ridge, within sight of the mountains of Colombia. It would not be surprising if the species is eventually found growing in adjacent regions of Colombia.

Habitat and ecology: *Scaphosepalum luannae* grows as an epiphyte in moist cloud forest simpatrically with *S. decorum* Luer & Escobar, *S. cimex* Luer & Hirtz, *S. ophidion* Luer, *S. reptans* Luer & Hirtz, *S. swertiifolium* and the recently discovered *S. zieglerae* Baquero. No intermediates of *S. luannae* and *S. swertiifolium* have been found at the locality where they grow sympatrically, which might suggest both species have independent pollinators. In addition, the only known population of *S. zieglerae* was found very close to the type locality of *S. luannae* (Luer 1988, Luer 2009, Baquero 2017).

The most similar species to *Scaphosepalum luannae* is *S. swertiifolium* mainly due to the long sepaline tails. Although, there are some color variations in *S. swertiifolium* (even a big pink big flowered form from Colombia), in all the geographic variations and sub-species of this widely distributed species, the shape and structure of the lip and petals are always different from those of *S. luannae*. The sub-quadrate petals of *S. luannae* have a tooth-like, conspicuous, rounded and callous projection at the base of the columnar margin that is absent in any variation or subspecies of *S. swertiifolium*. The lip of *S. luannae* has an oblong and flat hypochile with a truncate, elobulate base, while in *S. swertiifolum* the hypochile of the lip is suborbicular and shallowly concave, always minutely bilobulate at the base (Fig. 3). Apart from the morphology of the lip, petals, and osmophores, *S. luannae* is also immediately distinguished from *S. swertiifolium* by the shiny surface and dark olive color of the leaves, which are always smaller in the former species. Another unique feature of *S. luannae* is the abaxial side of the leaves with strongly marked veins, which is not seen in any other species in the genus (Fig. 4).

***Scaphosepalum anchoriferum* in Ecuador**. *Scaphosepalum anchoriferum* was discovered in the area of Peñas Blancas, Carchi province of north-western Ecuador, close to the border with Colombia. It grows sympatrically with *S. luannae, S. cimex* and *S. swertiifolium*. The flowers are brightly colored and with a relatively shallow synsepal compared to forms found in Costa Rica and Panama (Luer 1998).

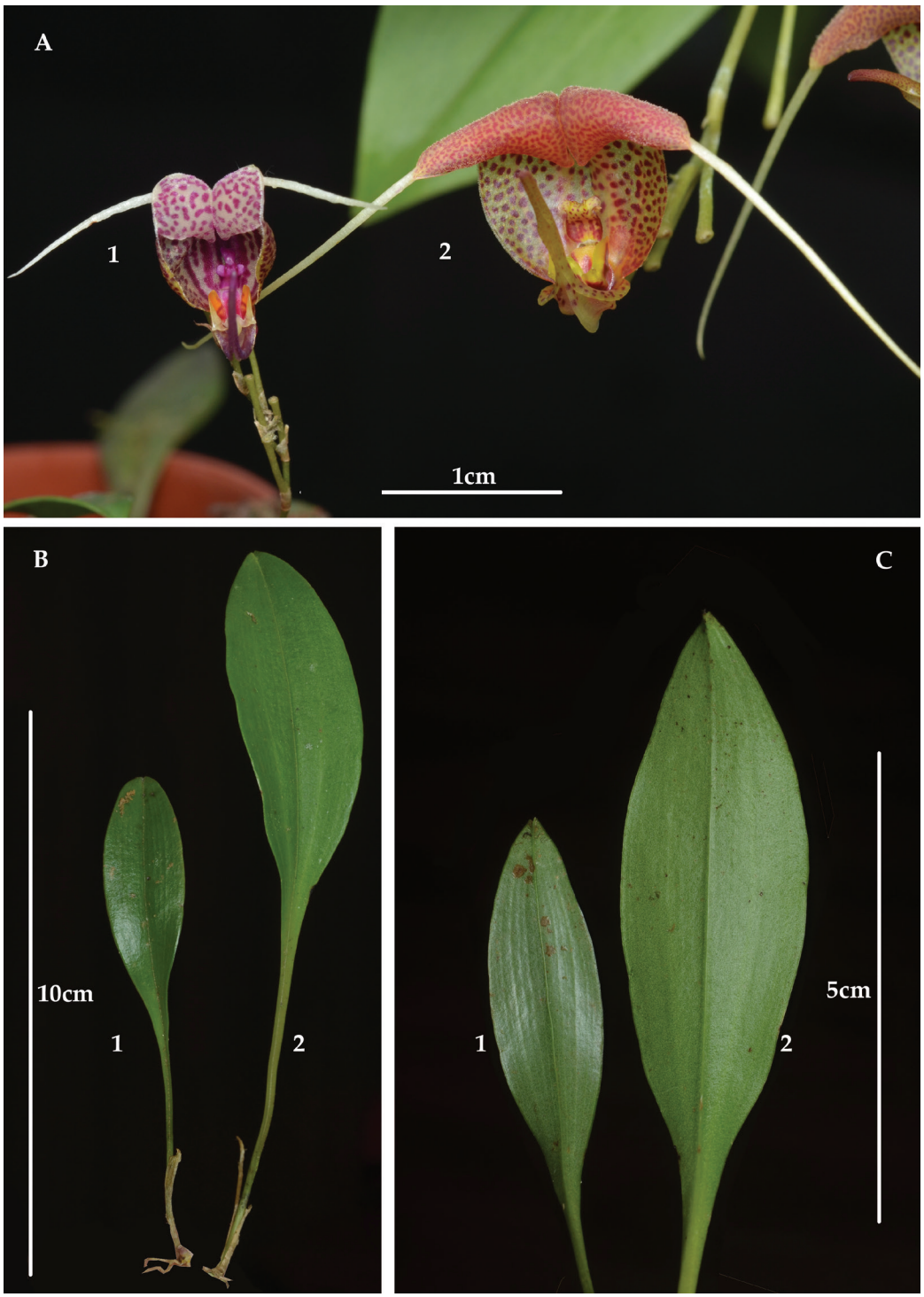

FIGURE 4. Comparison between *Scaphosepalum luannae* and *S. swertiifolium*. **A**. Flowers of *S. luannae* (**A1**) and *S. swertiifolum* (**A2**). **B**. Leaves of *S. luannae* (**B1**) and *S. swertiifolium* (**B2**) in adaxial view. **C**. Leaves of *S. luannae* (**C1**) and *S. swertiifolium* (**C2**) in abaxial view. Photos by Luis Baquero.

Considering that *Scaphosepalum bicolor* Luer is the most similar species to *S. anchoriferum* found in Colombia, it is most probable that *S. anchoriferum* will eventually be discovered in this country as well. The shape of the flower and the bright colored sepals of the Ecuadorian variety seems to differ from the typical *S. anchoriferum*. Nevertheless, the lips of plants from Panama and Ecuador are identical in structure and shape when compared. Both varieties have lips which are oblong-subpandurate, dilated in the middle third, with a pair of denticulate lamellae, the epichile orbicular, serrulate, the hypochile more or less oblong, truncate, minutely bilobulate (Fig. 5). Also, the habit of the plants and consistency of the leaves (coriaceous, "harder" than in other species like *S. swertiifollium*) are the same in the plants from Ecuador and Panama.

Scaphosepalum anchoriferum (Rchb.f.) Rolfe (Fig. 5). Ecuador. Carchi: between Chical y El Carmen, 0°59'24.0"N 78°13'14.9"W, 1636 m, collected by Luis Baquero *et al.* on February 26, 2017, *LB 3128* (holotype, QCNE).

Plant epiphytic, densely caespitose, to 10 cm tall. *Roots* slender, 0.5 mm in diameter. *Ramicauls* erect to sub-erect, slender, 1–4 cm long, enclosed by 3 sheaths. *Leaf* elliptic, subacute, erect to sub-erect, thinly coriaceous, markedly veined at the abaxial side, 7–15 cm long, 2.0–5.0 cm wide, gradually narrowed below in to a slender, channeled petiole 1–4 cm long. *Inflorescence* a congested, successively several-flowered raceme from low on the ramicaul, up to 8 cm long, born by a slender, smooth, horizontal to descending peduncle up to 10 cm long. *Floral bracts* thin, 3 mm long, 2–7 mm long. *Ovary* ribbed, 2 mm long. *Sepals* yellow-green, suffused with red-purplish spots, the margins ciliate. *Dorsal sepal* yellow-green, tri-carinate at the outer surface, ovate, acute, concave below the middle, narrowed and with revolute margins above the middle, 10 × 4 mm expanded. *Lateral sepals* yellow spotted with red dots, concave, the lamina elliptic, 10.2 × 6.1 mm, connate 10 mm, the apical half of each lateral sepal occupied by a thick, well-developed, triangular, microscopically densely pubescent cushion 4 × 6 mm, the obtuse, diverging apices contracted into a slender, decurved tail 5 mm long. *Petals* yellow, marked with red-purple, ovate, acute, more or less dilated on the labellar margin, 4.5 × 2.5 mm. *Lip* yellow spotted with red-purple, oblong-subpandurate, 3.5 × 2 mm, reflexed and dilated near the middle, with a pair of denticulate lamellae extending from the base to one third of its length, the epichile orbicular, serrulate, the hypochile more or less oblong, truncate, minutely bilobulate. *Column* yellow-green, suffused with red, semiterete, slender, 4 mm long, broadly winged above the middle, with a thick, 2 mm long foot. *Pollinia* 2, yellow. *Fruits* and seeds not observed.

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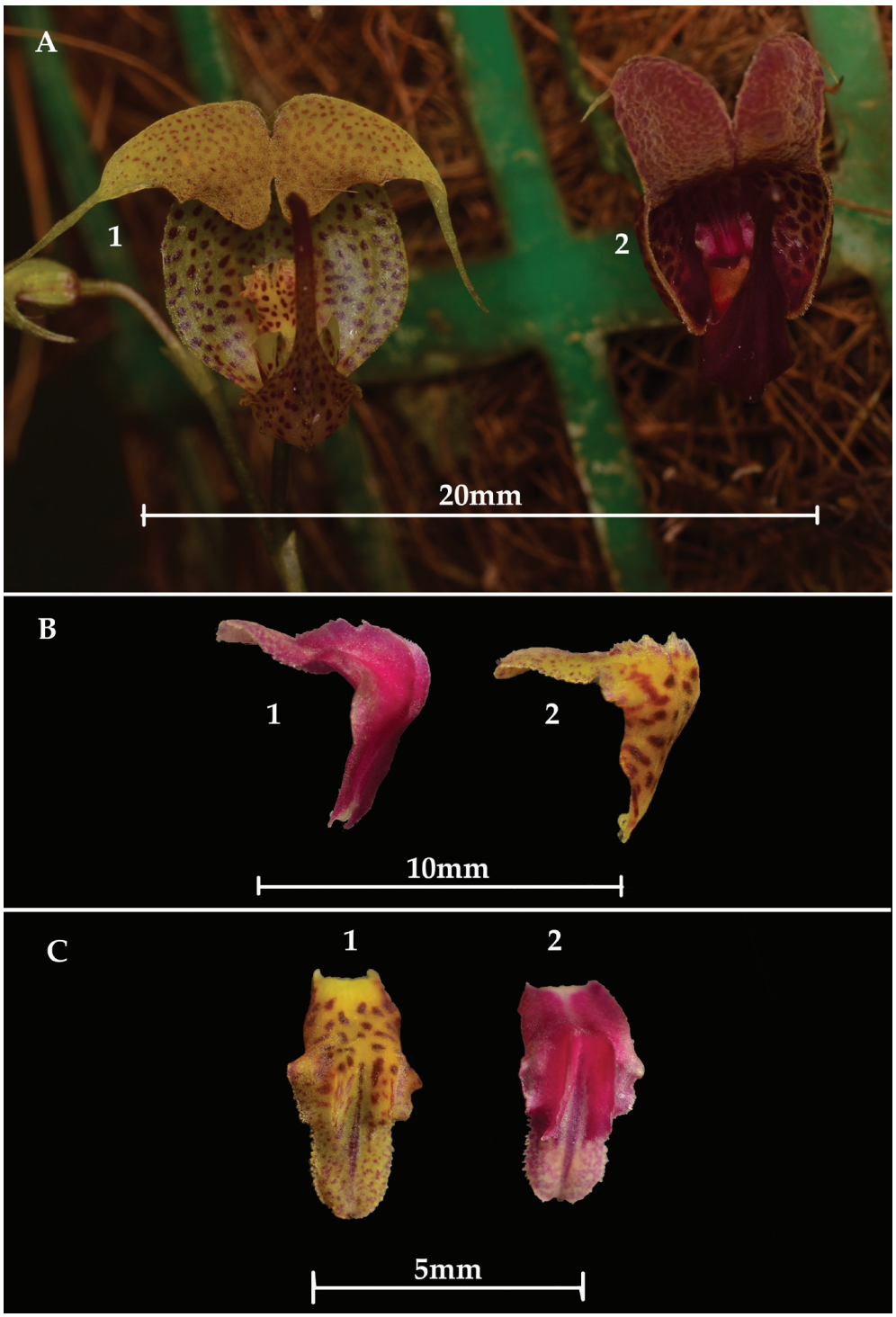

Figure 5. *Scaphosepalum anchoriferum*. **A**. Flowers from Ecuador (**A1**) and Panama (**A2**). **B**. Lateral view of the lips of *S. anchoriferum* from Panama (**B1**) and from Ecuador (**B2**). C. Dorsal view of the lips of *S. anchoriferum* from Ecuador (**C1**) and from Panama (**C2**). Photos by Luis Baquero.

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