A new species of *Trichosalpinx* (Orchidaceae: Pleurothallidinae) from Costa Rica

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Abstract. **Trichosalpinx sanctuarii,** a new species of Orchidaceae, subtribe Pleurothallidinae, is described and illustrated. It most resembles *T. ringens*, from which it is distinguished in the text. The new species is endemic to Costa Rica.

Key Words: Costa Rica, new species, Orchidaceae, Pleurothallidinae, taxonomy, *Trichosalpinx*.

Trichosalpinx Luer comprises about 100 species ranging from Mexico and the West Indies to Bolivia, Venezuela, and Brazil. In his monographic treatment of the genus, Luer (1986) recognized two subgenera: subgenus *Trichosalpinx*, with 24 species, and subgenus *Tubella* Luer, with 68 species. In 1997, he created subgenus *Pseudolepanthes* Luer, consisting of ten Andean species, and subgenus *Xenia* Luer to accommodate five species that did not fit well the other three subgenera (Luer, 1997). Archila (2000) elevated subgenus *Tubella* (including the species of subgenus *Xenia*) and subgenus *Pseudolepanthes* to generic level. In the ITS nrDNA studies by Pridgeon et al. (2001) and Pridgeon and Chase (2001), subgenera *Tubella* and *Trichosalpinx* were separated between two unrelated clades, suggesting the genus *Trichosalpinx* is not monophyletic itself. Further phylogenetic studies are needed to clarify the relationships of the four subgenera (Luer, 1997; Pridgeon, 2005).

Twenty-one species of *Trichosalpinx* are known in Costa Rica, 12 of which belong to subgenus *Tubella*, and nine to subgenus *Trichosalpinx* (Luer, 1997; Fernández, 2011; Fernández & Bogarín, 2011). Distribution patterns differ greatly. Eight species are widely distributed throughout the Neotropics (*T. arbuscula* (Lindl.) Luer, *T. blaisdellii* (S.Watson) Luer, T. *cedralensis* (Ames) Luer, *T. ciliaris* (Lindl.) Luer, *T. dura* (Lindl.) Luer, *T. memor* (Rchb.f.) Luer, *T. orbicularis* (Lindl.) Luer, *T. pusilla* (Kunth) Luer) and represent species complexes with high morphological variability. Another 13 species are only known from Central America and Colombia (*T. carinilabia* (Luer) Luer, *T. fruticosa* Luer, *T. membraniflora* (C. Schweinf.) Luer, *T. pergrata* (Ames) Luer, *T. ringens* Luer, *T. rotundata* (C.Schweinf.) Dressler, *T. trachystoma* (Schltr.) Luer), with *T. minutipetala* (Ames & C. Schweinf.) Luer, *T. nana* (Ames & C.Schweinf.) Luer, *T. navarrensis* (Ames) Mora-Ret. & J.García, *T. reflexa* (M. Fernández & Bogarín), *T. parsonsii* Luer & Dod, and *T. todziae* Luer).

Especially within subgenus *Trichosalpinx,* several widely distributed taxa have been treated as species complexes (i.e., *T. blaisdellii, T. ciliaris,* and *T. memor*). These taxa have often been difficult to separate due to the highly variable vegetative characters and similar floral architecture (Fernández & Bogarín, 2011). Some of the taxa, however, have little morphological variation and are easily distinguished from taxa belonging to

species complexes. In Costa Rica and Panama, one of the most distinct species is *T. ringens*, recognized by the long-ciliate lepanthiform sheaths, transversely obovate synsepal (resembling a flower of *Acianthera*), and the lip, which deviates from the usual pattern by being deeply cleft with a pair of plates between the pubescent midlobes (Luer 1996, 1997). During a revision of the genus in Costa Rica, a species closely allied to *T. ringens* was found. It is here proposed as new and illustrated.

Materials and methods

This study was conducted mainly at Lankester Botanical Garden (JBL), University of Costa Rica, between March 2011 and August 2011. *Trichosalpinx* specimens at JBL (from living and spirit collections), and dried material available at USJ, CR and INB, were revised. Ecological zones were estimated by using the Holdridge Life Zone System (Holdridge, 1987) and the Mapa Ecológico de Costa Rica by Tosi (1969). Phenological data were recorded in the field and from cultivated specimens or herbarium labels. Herbarium specimens were deposited at JBL and USJ herbaria. Sketches of specimens were drawn with a Leica MZ 9.5 stereomicroscope with a drawing tube and conserved in the reference collections of JBL. The new species was illustrated by a composite line-drawing from living specimens. Descriptions were prepared from living specimens cultivated at JBL. Although herbarium material from USJ, CR and INB was revised, we were unable to find specimens of *Trichosalpinx ringens* or *T. sanctuarii*. A photocopy of the type specimen of *T. ringens* kept at INB (the original at MO) was used to evaluate the identity of plants of both species.

Trichosalpinx sanctuarii Mel.Fernández & Bogarín, **sp. nov.** Type: Costa Rica. Guanacaste: Tilarán, Arenal, Nuevo Arenal, en parcelas del Santuario Católico de la Divina Misericordia, 1.5 km noreste del puente sobre el río Dos Bocas, 10º33'N 84º53'W, 650 m, bosque muy húmedo premontano, Hermano Jorge de la Cruz invenit, Mar 2011, *M. Fernández 529* (holotype: JBL; isotype: NY). (Fig. 1)

A *T. ringenti* Luer statura minore, sepalis petalisque luteis, vittis brunneo-vinaceis ornatis, labello subarcuato lamellis destituto, lobulis lateralibus ciliatis, callo centrali submedialiter furcato et pollinario viscidiis destituto praecipue differt.

Herb epiphytic, caespitose, erect , up to 6.8 cm long. Roots slender, flexuous, 1 mm in diameter. Ramicauls slender, 2–4.2 cm long, enclosed by 3–6 tubular, lepanthiform sheaths; the sheaths cylindrical, adpressed, ribbed, minutely ciliate along ribs and margins of the dilated ostia, brown, 0.8–1.1 cm long. Leaves ovate, acute, apiculate, semi-coriaceous, 2–2.6×0.9–1.3 cm, the cuneate-attenuate base narrowing into a petiole up to 0.2 cm long, the petiole enclosed by the tip of the apical ramicaul bract. Inflorescence a successively single or two-flowered raceme, 8 mm long including the peduncle 1 mm long, produced at the base of the leaf. Floral bracts cylindric, conduplicate, 1×1 mm. Pedicels 5 mm long, persistent. Ovary cylindric, 1 mm long. Sepals and petals yellow, brown-red along the veins, the lip dark red, the column yellow and the anther white. Dorsal sepal erect, oblong, obtuse, 6.6×2.5 mm, three-veined. Lateral sepals carinate, connate into a broadly obovate, retuse, entire, concave synsepal, 3.7×4.1 mm, 4-veined. Petals oblong, obtuse, erose towards the apex, 2.3×1 mm. Lip oblong, obtuse, 3.9×1.6 mm, the middle with two short, erect, ciliate lobes and a mid-central callus that bifurcates into two low keels. Column stout, semiterete, the apex cleft, 2.5 mm long, the clinandrium apical, the stigma ventral. Anther cap incumbent, ovate, emarginate. Pollinia two, pyriform, the base transversally flattened with no viscidium.

Distribution.—Endemic to Costa Rica.

Habitat and ecology.—Epiphyte on scattered trees in pastures, in very humid premontane forest in the Atlantic watershed of Cordillera de Tilarán.

Phenology.—Under wild conditions, flowering July to October.

Etymology.—The specific epithet refers to the Santuario Católico de la Divina Misericordia, where the plants studied were collected.

Additional specimen examined. COSTA RICA. Guanacaste: Tilarán, Arenal, Nuevo Arenal, en parcelas

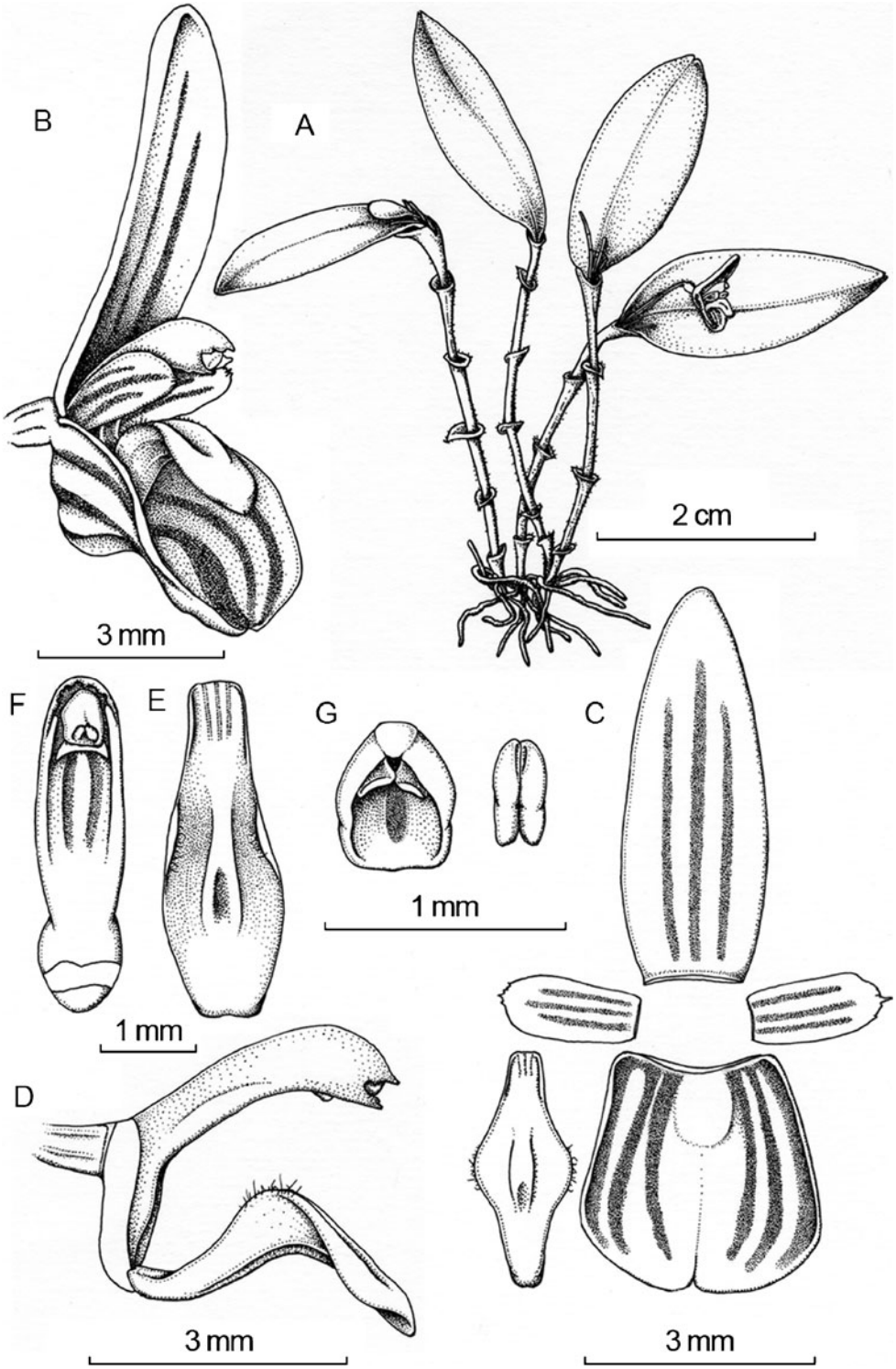

Fig. 1. *Trichosalpinx sanctuarii*. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Column and lip, lateral view. **E**. Lip, ventral view. **F**. Column, ventral view. **G**. Anther and pollinaria. (Drawn by M. Fernández from the holotype.)

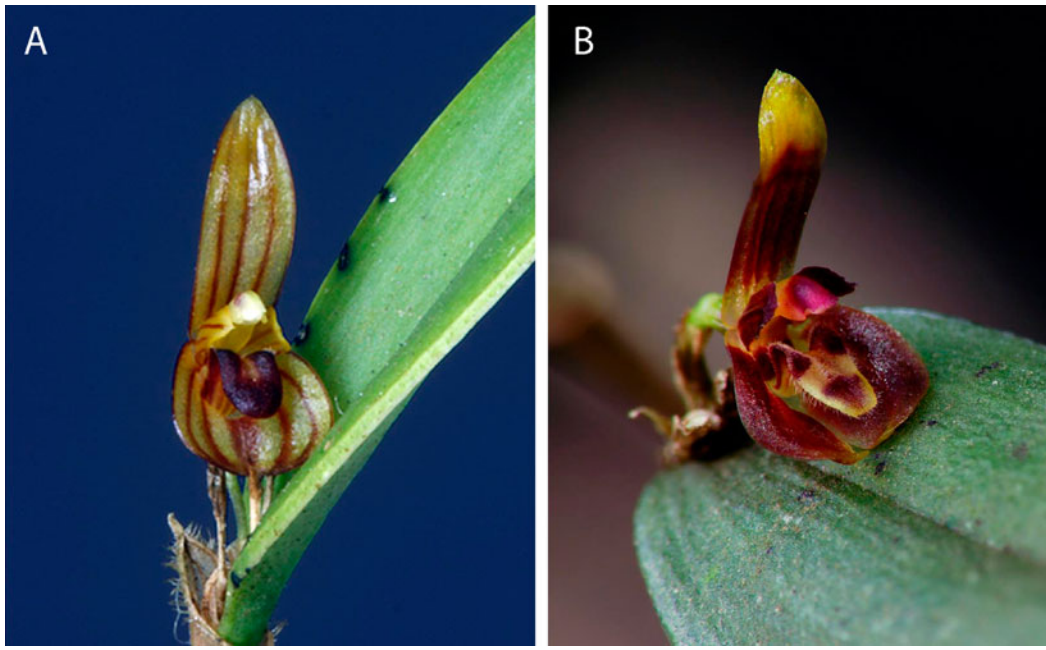

Fig. 2. **A**. *Trichosalpinx sanctuarii* (*Fernández 529*, JBL). **B**. *T. ringens* (*Fernández 338*, JBL).

del Santuario Católico de la Divina Misericordia, 10º33'N 84º53'W, 650 m, bosque muy húmedo premontano, Hermano Jorge de la Cruz invenit, *May 2011, Fernández 545 (JBL-spirit).*

Trichosalpinx sanctuarii belongs to subgenus *Trichosalpinx,* distinguished by the caespitose habit, non proliferous ramicauls, racemes shorter than the leaf, fleshy sepals, and erose petals (Luer, 1997). Nevertheless, *T. sanctuarii*, as well as the infrequent *T. ringens*, lack the basal lobes of the lip, a feature shared by most other members of this subgenus.

Trichosalpinx sanctuarii is most similar to *T. ringens*, mainly because of the coarsely long-ciliate, lepanthiform sheaths, ovate leaves, inflorescences with flowers produced near the base of the leaf, simultaneously few flowered raceme (bearing one or two flowers), erect, obovate dorsal sepal, and oblong petals. In describing *T. ringens,* Luer (1996, 1997) indicated that the specimen has single-flowered inflorescenses per ramicaul. Nonetheless, specimens examined in this project constantly produced one or two simultaneously opened flowers per ramicaul. This was observed both in the field and under greenhouse conditions (Fig. 2). This feature was also observed in *T. sanctuarii*.

Specimens of *T. sanctuarii* can be distinguished from *T. ringens* by the smaller habit up to 6.8 cm long (vs. up to 10 cm long) with flowers that bear smaller dorsal sepals (6.6×2.5 mm vs. 9×3 mm), synsepals (3.7×4.1 mm vs. 5×6 mm) and petals (2.3×1.0 mm vs. 3×1.6 mm). The identification of both species is made easier by the differing color patterns of sepals and petals. The sepals of *T. sanctuarii* are yellow, longitudinally striped with brown-red along the veins, and the petals are brown-red; in contrast the sepals of *T. ringens* are purple-brown and pale yellow toward the apices, and the petals are mostly translucent white (Fig. 3). The two species also differ in their lips. In *T. sanctuarii* the lip bends downwards approximately 20° (vs. deeply arcuate in *T. ringens*). Furthermore, the lip of *T. ringens* bears a pair of conspicuous, densely ciliate lamellate plates, whereas the lip of the new species has no lamellae but a pair of short, ciliate, lateral lobes, and a central callus that forks in two below the middle. Finally, unlike the traditional two pollinia adjoined at the base by a cellular viscidium of *Trichosalpinx*, the pollinarium of *T. sanctuarii* lacks a viscidium, thus the pollinia are separated from each other. A viscose hyaline substance was present along both margins of the ventral zone of the column. This sticky substance would allow the

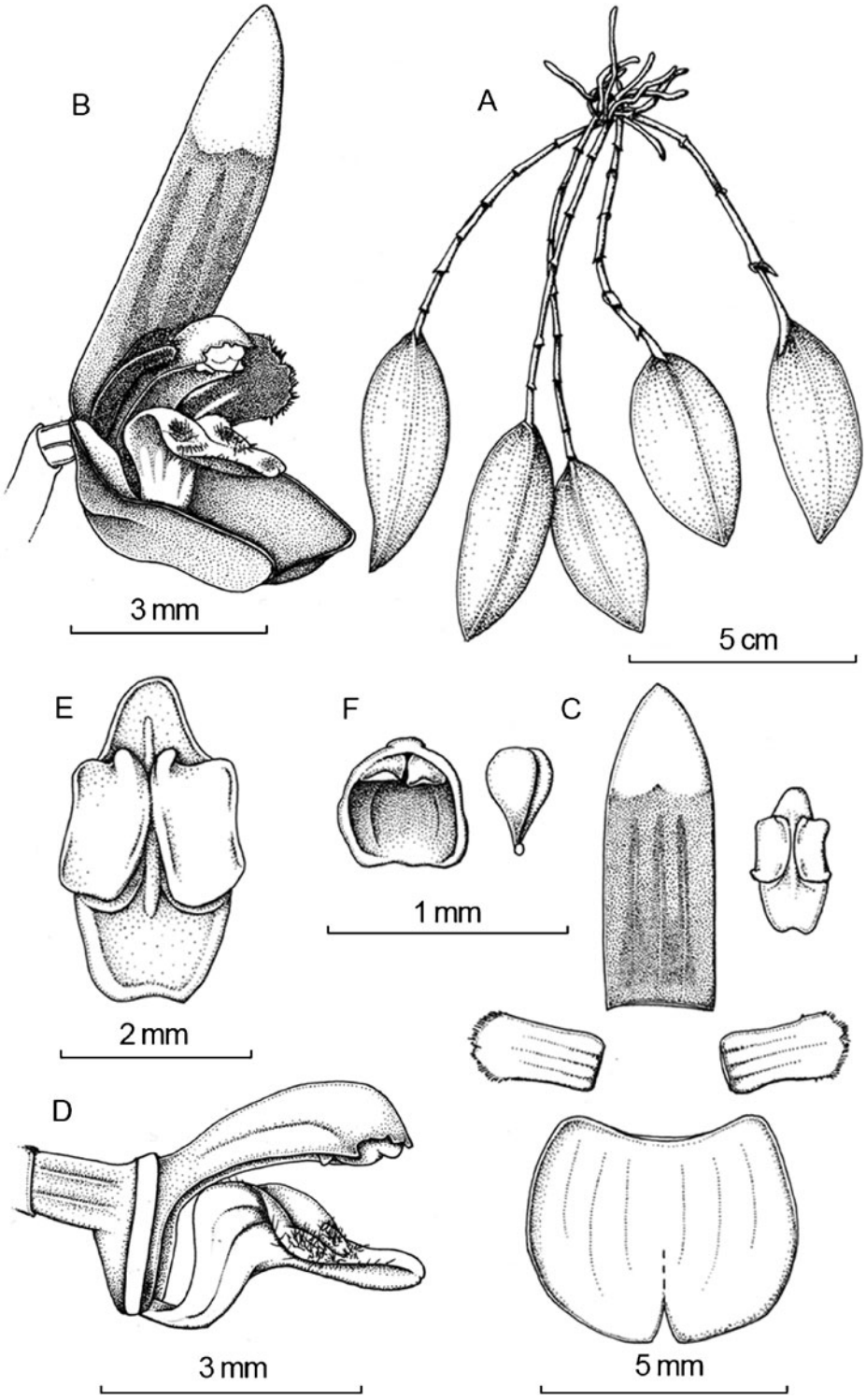

Fig. 3. *Trichosalpinx ringens*. **A**. Habit. **B**. Flower. **C**. Dissected perianth. **D**. Column and lip, lateral view. **E**. Lip, ventral view. **F**. Anther and pollinaria. (Drawn by M. Fernández from *Bogarín 7187,* JBL-spirit.)

attachment of the pollinia to the back of the pollinator, enabling their removal when the pollinator attempts to leave the flower.

The two species are also separated altitudinally and geographically: *Trichosalpinx sanctuarii* occurs at 650 m in the of Tilarán range of the Costa Rican Atlantic watershed, whereas *T. ringens* occurs from 1450–1750 m in the Cerro Colorado and in the Macizo de la Muerte mountain complex, both in the Pacific watershed of Panama and Costa Rica, respectively.

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