

***CROSSOGLOSSA SOTOANA* (ORCHIDACEAE: MALAXIDEAE),
A NEW SPECIES HONORING THE LATE MEXICAN BOTANIST,
MIGUEL ÁNGEL SOTO ARENAS**

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ABSTRACT: *Crossoglossa sotoana*, a new species from Costa Rica, is described and illustrated. It is compared with Ecuadorian *C. barfodii*, from which it differs by the strongly undulate margins of the leaves, the resupinate flowers, the shorter and congested inflorescence, the porrect, incurved petals, the obovate-subpandrate lip and the callus composed by two transversely rectangular lamellae. It can be distinguished from *C. boylei*, also from Ecuador, by its shorter inflorescence, the ligulate petals and the shortly caulescent plants.

KEY WORDS: Orchidaceae, Malaxideae, *Crossoglossa*, *C. sotoana*, Costa Rica, new species

Robert L. Dressler and Calaway H. Dodson created *Crossoglossa* in 1993 to accommodate several species previously placed in *Microstylis* (Nutt.) Eaton section *Blephariglottis* Schltr., together with some misfit species of *Liparis* Rich. and *Malaxis* Sol. ex Sw. (Dressler & Dodson, 1993). *Crossoglossa* can be distinguished from the latter genera by the lack of pseudobulbs, the more or less elongate stems with several distichously arranged leaves, the short, straight column clasped by basal lobes or auricles of the lip, the incumbent anther (shared with *Liparis*), and the structure of the fruit, with the wide valves being thin and papery and the narrow ones being thick and woody and free of connecting tissue. The genus is typified by *Crossoglossa blephariglottis* (Schltr.) Dressler. In 1999, in their studies on *Liparis*, Garay and Romero reduced *Crossoglossa* (as *Crassoglossum*) as a synonym under *Liparis* sect. *Tipuloidea* (Ridl.) Garay & G. A. Romero, a group diagnosed by non-pseudobulbous plants with ascending stems from a decumbent base, basally imbricate by the bases of distichous leaves not articulated with leaf-sheaths; and a short column reminiscent of that of *Malaxis* (Garay & Romero-González, 1999). DNA studies by Salazar (cited in Cribb, 2005) seem to confirm a close relationship of *Crossoglossa* with *Liparis*, with the species of the former genus forming the sister

group to a complex of Central American *Liparis*. Even though at this time there are no published phylogenetic analyses including species referable to *Crossoglossa*, Noguera-Savelli and her co-workers (2008) suggest that in future generic realignments within the Malaxideae, *Crossoglossa* could be included in a more broadly defined genus, most likely in *Liparis*. However, updated phylogenetic results currently being prepared for publication demonstrate that *Crossoglossa*'s closest relatives are the reptant Andean "*Liparis*" such as "*L. crispifolia*" and "*L. wagneri*". *Crossoglossa* is only distantly related to the clade that includes the type species of *Liparis* [*L. loeselii* (L.) Rich.] and, according to DNA sequences of ITS and matK, deserves to be maintained as distinct (G.A. Salazar, pers. comm., 2009).

As actually circumscribed, *Crossoglossa* includes some 25 species, mainly distributed in southern Central America and Andean South America, from Colombia to Bolivia, with the highest diversity found in Colombia and Ecuador. No species have been recorded from Venezuela so far (Noguera-Savelli *et al.*, 2008). The number of taxa rapidly diminishes toward the north, with a single species recorded in Nicaragua (Hamer, 2001). The real diversity of the genus, however, is still unclear, considering that more than half of the species attributed to *Crossoglossa*

were published in the last 15 years, after the proposal of the genus (Dressler & Dodson, 1993; Dodson, 1995; Ortíz, 1995; Dressler 1997; Vásquez, 1999; Pupulin, 2000; Szlachetko & Margonska, 2001; Noguera-Savelli *et al.*, 2008). Here we describe a new species from Costa Rica:

Crossoglossa sotoana Pupulin & Karremans, *sp. nov.*

TYPE: COSTA RICA. Alajuela: San Ramón, Ángeles, Alberto M. Brenes Biological Reserve, 10°13'06" N 84°36'11" W, 800-900 m, shores of Río San Lorencito, near the Terciopelo Trail, 22 May 2004, flowered in cultivation at Lankester Botanical Garden, University of Costa Rica, 5 Apr. 2005, *D. Bogarín 817* (holotype, USJ; isotype, JBL).

Similis *Crossoglossae barfodii* Dodson, a qua recedit foliis marginibus valde undulatis, floribus resupinatis, inflorescentia congesta multo brevior, petalis linearibus incurvis, labello obovato-sub-pandurato callo duobus transverse rectangularibus lamellis composito.

Terrestrial, erect *herb*, to 15 cm tall excluding the inflorescence. *Roots* finely pubescent, pale yellow, *ca.* 2 mm in diameter. *Stem* terete, 3-5 mm in diameter, 4-5 cm long, laxly concealed by the leaf bases. *Leaves* elliptic-spathulate, obtuse, from a narrow, conduplicate base clasping the stem, the margins strongly undulate, 50-80 × 15-20 mm above the middle. *Inflorescence* an erect, successively many- (to 60) flowered raceme, hexagonal in section, with distinct longitudinal keels provided with glandular trichomes, to 15 cm long. *Floral bracts* triangular, acuminate, the margins with glandular hairs, 6.0-7.0 × 2.5 mm. *Ovary* terete-subconical, glabrous, proximally white, distally green, to 6 mm long including the pedicel. *Flowers* resupinate, spreading, slightly facing downwards, sepals and petals yellowish green, lip pale greenish yellow flushed with green toward the base, the central vein and the basal calli yellow; column green, anther yellow. *Dorsal sepal* ovate, rounded, 3-veined, concave toward the apex, 2.6 × 1.6 mm. *Lateral sepals* narrowly ovate, rounded, 3-veined, 2.5 × 1.5 mm, sometimes shortly connate at base. *Petals* ligulate, obtuse, 1-veined, slightly porrect-incurved in natural

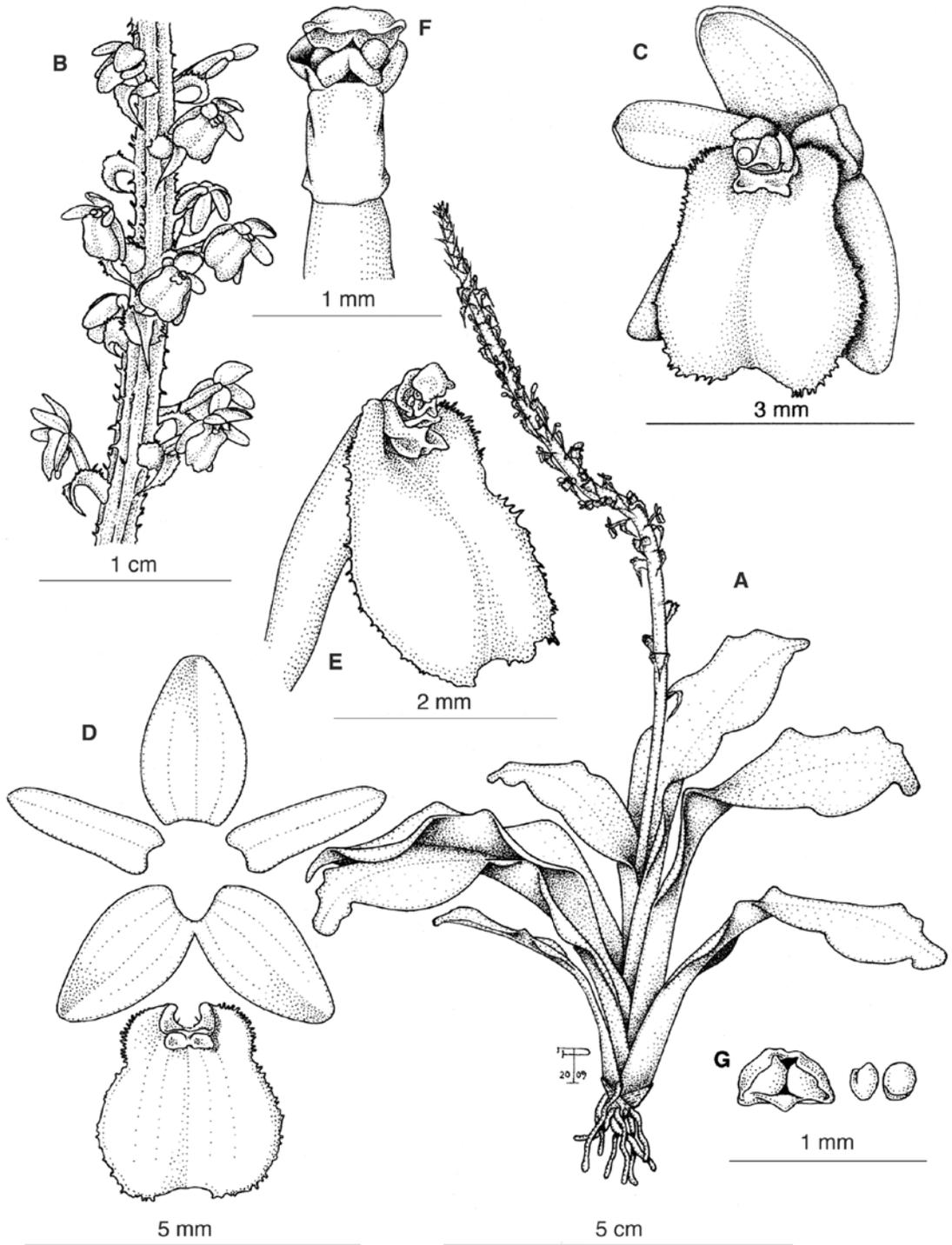
position, 2.5 × 1.0 mm. *Lip* obovate-subpandurate, retuse, 5-veined, basally concave, then convex, 3.0 × 2.8 mm, the margins finely and irregularly dentate-ciliate, the base subcordate with the auricles partially clasping the column, provided with a basal, ring-like callus around the column, the callus bearing one transversely rectangular, thickened, slightly concave projections on each side of the midvein. *Column* subterete, clavate, 1 mm long, the distal portion expanded around the subapical stigma. *Anther* cucullate, transversely elliptic-reniform, 2-celled. *Pollinia* 2, obovate-subsppherical.

DISTRIBUTION: Known only from Costa Rica.

ECOLOGY: Plants of *C. sotoana* grow as terrestrials in loose, moist soils and leaf litter in the understory of primary vegetation. The only known population of this species was found in the premontane wet forest of the Tilarán mountain range, on the Caribbean watershed of the continental divide in central Costa Rica, at about 800-900 m elevation.

EPONYMY: Named in honor of the recently deceased Mexican botanist, Miguel Ángel Soto Arenas, to commemorate his fundamental contributions to orchidology.

Crossoglossa sotoana closely resembles the Ecuadorian *C. barfodii* Dodson, but that species has flat leaves (vs. strongly undulate along margins), nonresupinate flowers (vs. resupinate), a much longer (to 30 cm vs. 15 cm), lax (vs. congested) inflorescence, subfalcate-reflexed petals (vs. linear, incurved), and an obcordiform-pandurate (vs. obovate-pandurate) lip, provided at the base with two erect, triangular lamellae (vs. low, transversely rectangular). *Crossoglossa boylei* Dodson, also from Ecuador, can be distinguished by the long caulescent plants, longer inflorescence, broadly ovate dorsal sepal and ovate petals. In Costa Rica, *C. sotoana* can be distinguished from *C. fratrum* (Schltr.) Dressler and *C. tipuloides* (Lindl.) Ktze. by the short, nearly acaulescent plants and its distinctly lobed, obovate-subpandurate, retuse lip. *Crossoglossa aurantilineata* Pupulin has longer and narrower leaves, longer floral bracts, narrower sepals and petals, and an orange stripe along the midrib of the lip, while *C. blephariglottis* (Schltr.) Dressler presents an acute lip with longer linear petals.



Crossoglossa sotoana Pupulin & Karremans. A — Habit. B — Portion of the inflorescence. C — Flower. D — Dissected perianth. E — Column and lip, oblique view. F — Column, adaxial view. G — Anther and pollinia. Drawn by F. Pupulin and J.D. Zúñiga from the holotype.

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