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Crossoglossa puipuiensis (Malaxideae : Orchidaceae), a new species, and new records of *Crossoglossa* from Peru

Alexander Damián[1,*], Nicole Mitidieri[2] & Paul Ormerod[3]

[1)] *Universidad Científica del Sur, Lima, Perú (*corresponding author's e-mail: ldamian@cientifica.edu.pe)*
[2)] *Food and Agriculture Organization of the United Nations (FAO-Peru), Calle Manuel Almenara 328, La Aurora, Miraflores, Lima*
[3)] *P.O. Box 8210, Cairns 4870, Queensland, Australia*

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Crossoglossa puipuiensis Damián & Mitidieri (Orchidaceae) is described and illustrated as a new species from Peru. It differs from *C. steinii* by having an orbicular (*vs*. ovate to ovate–elliptic) labellum bearing at its base two, erect, subquadrate to rectangular (*vs*. prostrate, lanceolate to ovate) calli. *Crossoglossa neirynckiana* and *C. dalessandroi* are reported as new to the Peruvian flora.

Crossoglossa is a genus of about 52 species recorded from Nicaragua to Bolivia (Pridgeon *et al.* 2005, Ormerod 2013). The plants are terrestrial, rarely epiphytic herbs with many-leaved stems, and terminal inflorescences of several, small to medium-sized resupinate flowers, which have a short column and relatively large labellum (Ormerod 2013, 2014), similar to Andean species of *Liparis*. Previously, many species were included in *Liparis* (elongate column) or *Malaxis* (plants with pseudobulbs and non-resupinate flowers), but the combination of characters outlined above distinguish *Crossoglossa* from both genera. According to Garay and Romero (1999), *Crossoglossa* is considered a section below a broad concept of *Liparis* (*Liparis* sect. *Tipuloidea*) characterized by distichous leaves not articulated with leaf-sheaths and short column. However, some preliminary DNA studies indicate that *Crossoglossa*'s closest relatives are the reptant Andean *Liparis* such as *L. crispifolia* (Noguera-Savelli *et al.* 2008, Pupulin & Karremans 2010).

In recent years, 20 new species of *Crossoglossa* were proposed (Ormerod 2013, 2104, Szlachetko & Kolanowska 2015). Because members of the genus are rarely encountered in the field, many species are still known from the type collection only. Very few taxa are known from several specimens, and for the most part these are Central American species. In the Andes, most species are recorded in Colombia with 20 species, followed by Ecuador with 18 (Ormerod 2013, 2014). Four species have been recorded from Peru: *C. tetraphylla, C. dalstroemii, C. tilletii* and *C. liparidoides*, with the latter being traditionally cited for the country by several authors (Schweinfurth 1959, Brako & Zaruchi 1993, Bennet & Christenson 1993). After reviewing herbarium material as part of a larger study on the orchid flora in the Andes, a new species from Peru was encountered. In addition to this, two

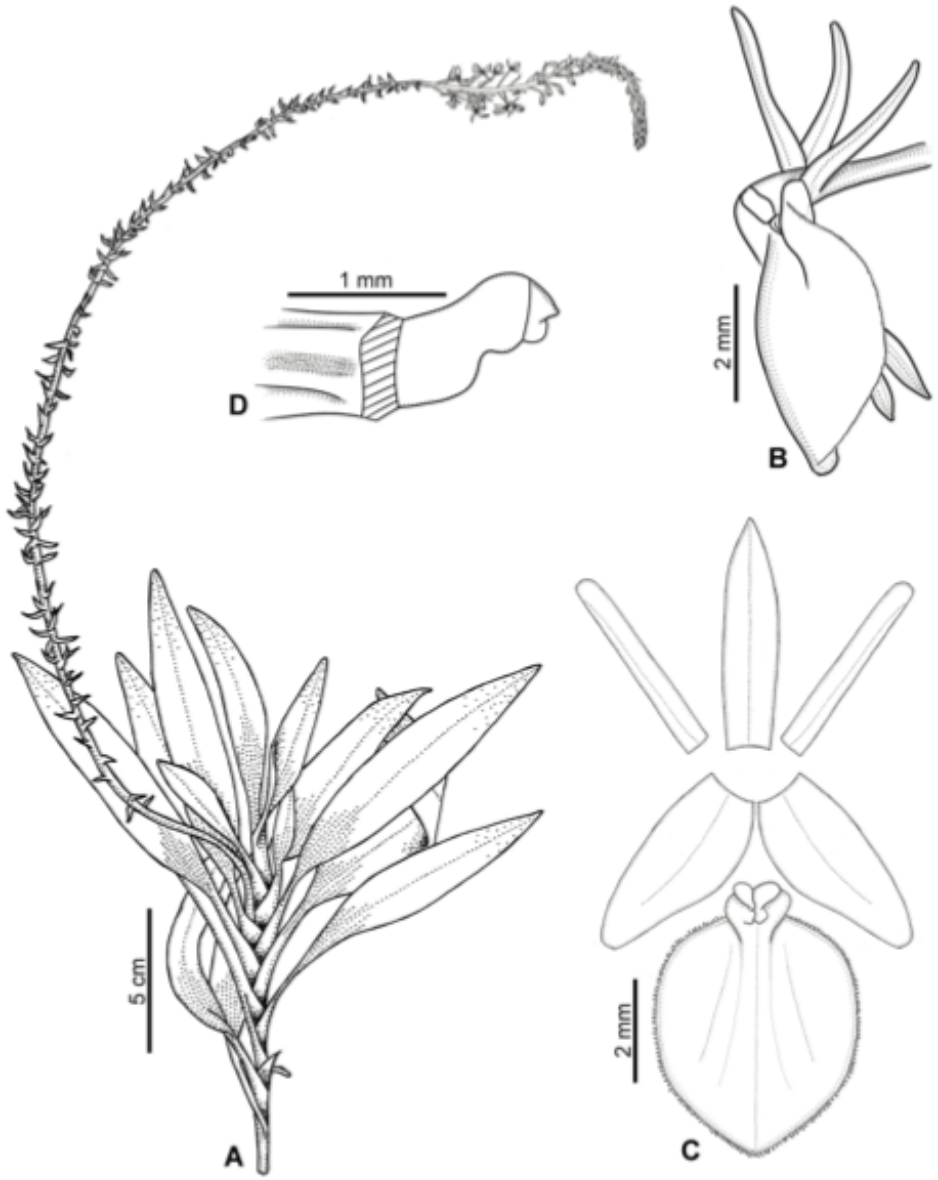


Fig. 1. *Crossoglossa puipuiensis* (from the holotype). — **A**: Habit. — **B**: Flower in lateral view. — **C**: Dissected perianth. — **D**: Column in lateral view.

new records of the genus are reported for the country.

Herbarium specimens of *Crossoglossa* deposited in MO, SEL, USM, AUUK and K were examined. Images of material held at GB and the Lindley Herbarium (K) were also consulted. Each studied sheet was photographed and data from the labels were taken. The perianth segments and morphology were studied after softening flowers in boiling water. Line drawings of both new species were made using a Euromex SB-1903 stereomicroscope and a Nikon D810/ Micro Nikkor 105 mm camera. Sources for obtaining new records presented herein come from herbarium revision (above cited herbaria), the first authors's own field collections and an extensive literature revision (Schweinfurth 1959, Bennett & Christenson 1993, Brako & Zaruchii 1993, Ulloa Ulloa *et al.* 2004, 2017). If the species in question was not found in any of the mentioned studies, it was considered as a new country record.

Crossoglossa puipuiensis Damián & Mitidieri, *sp. nova* (Figs. 1, 2, 3A and 4)

Type: Peru. Junin, Chanchamayo, Dtto. Pichanaqui, Bosque de Proteccion Pui Pui Hito 03. Bosque primario suelo muy húmedo. 11°13′54′′Sm 74°54′′09′′W, 1542 m a.s.l., Hierba con escapo ca. 40 cm, flores verdes, 17 February 2011 *R. Vasquez, M. Aldave & Carlos Mateo 37064* (holotype MO; isotype USM).



Fig. 2. Holotype of *Crossoglossa puipuiensis*.

ETYMOLOGY: The name refers to the place — Pui Pui Protection Forest in Junín Department of Peru — where the holotype was collected.

Terrestrial, erect herb, to 50 cm tall, including inflorescence. Roots finely pubescent, ca. 0.8 mm in diameter. Stem terete, 4.8 mm in diameter, 20 cm long, congested, concealed by leaf bases. Leaves elliptic, acute from a narrow conduplicate base clasping stem, margins slightly undulate, 8–14 cm long, 1.2–2.5 cm wide. Inflorescence an erect, successively many- (to 65) flowered raceme, hexagonal in section, with distinct longitudinal keels provided with low glandular trichomes, to 16 cm long (peduncle 4 cm long, rachis 12 cm long). Floral bracts triangular, long acuminate, margins erose,

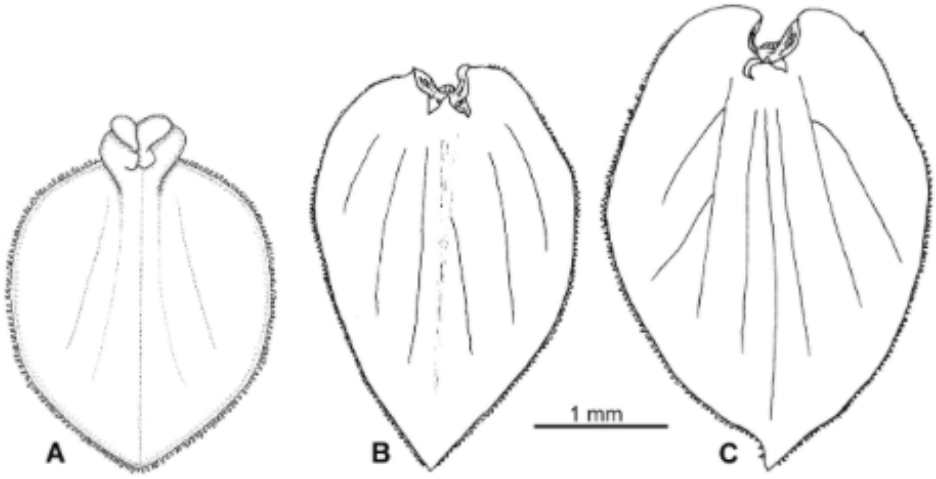


Fig. 3. — **A**: *Crossoglossa pupipuiensis* (from the holotype). — **B** and **C**: *Crossoglossa steinii* (B from *W. Quizhpe 985*, MO; C from *B. Stein 2812*, MO).

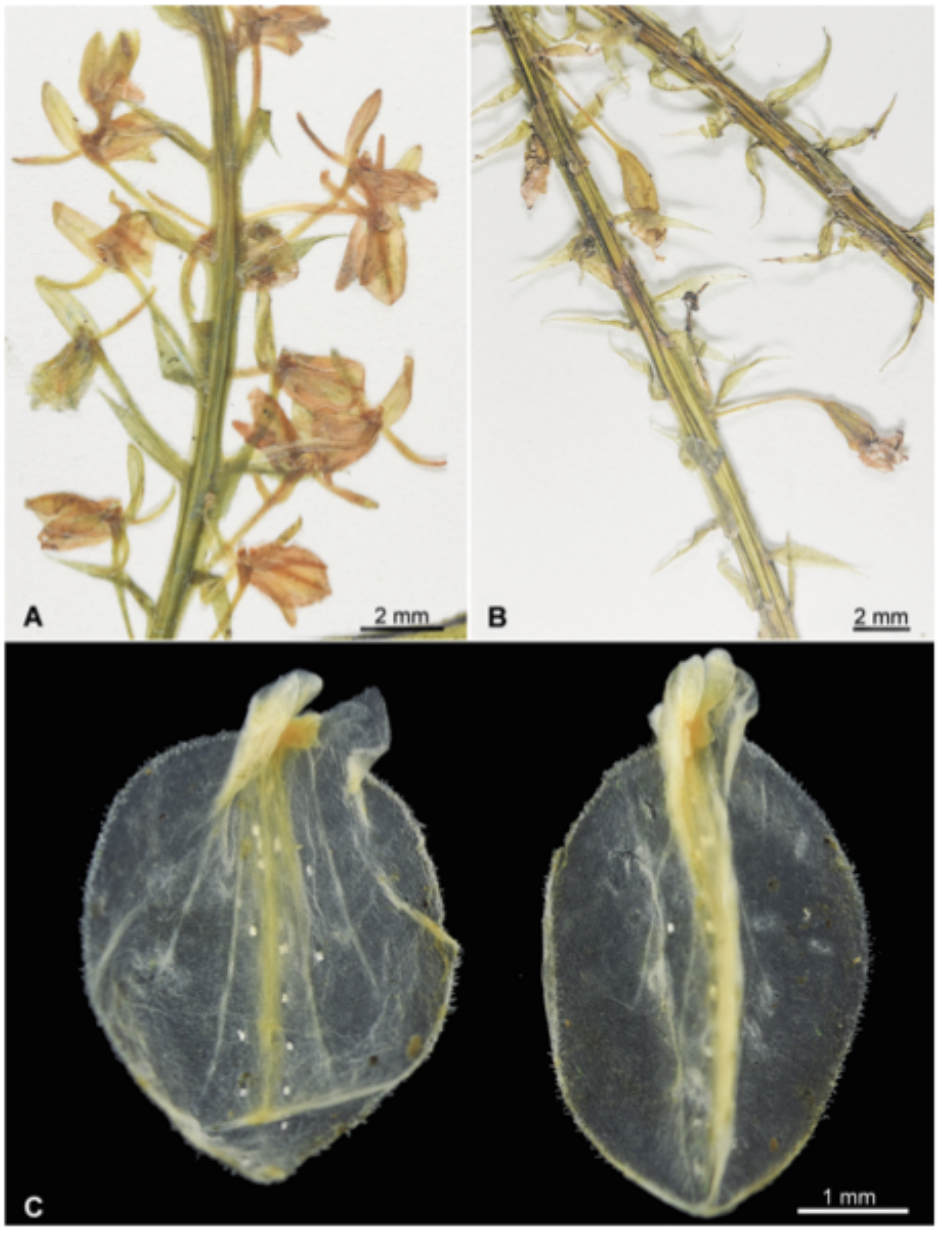


Fig. 4. *Crossoglossa puipuiensis* (from the holotype). — **A**: Inflorescence. — **B**: Fruits. — **C**: Dissected labellum.

7–7.5 mm long, 1–1.5 mm wide. Ovary terete, glabrous, reddish (when dry), to 5 mm long including pedicel. Flowers resupinate, spreading, greenish, when dry reddish. Dorsal sepal oblong-

elliptic, acute, base truncate, margins entire, 1-veined, 4.3–4.5 mm long, 1 mm wide. Lateral sepals transversely ovate, oblique, rounded, base truncate, margins entire, 3-veined, 4–4.2 mm long, 1.5–1.6 mm wide. Petals linear-oblong, rounded, base truncate, margins entire, 1-veined, 4–4.2 mm long, 0.3–0.4 mm wide. Lip orbicular, 5-veined, 5–5.3 mm long, 3.5–4 mm wide, margins finely ciliate, apex obtuse, base rounded with two tall auricles flap-like partially clasping base of column, glabrous, callus bearing two erect, transversely rectangular, thickened, projections on each side of mid-vein. Column subterete, 1 mm long, distal portion expanded around subapical stigma. Anther and Pollinia not seen. Fruit cylindric, slightly carinate, 0.5 cm long.

HABITAT: The only known population of this species grows in premontane forests of the eastern slope of the Peruvian Andes at 1540 m a.s.l. in Bosque de protection de Pui Pui, a natural protected area in the Junin region.

Crossoglossa puipuiensis is unique in the genus because of its suborbicular lip. The most similar species is the Ecuadorian *C. steinii* with a similar habit and floral dimensions. However, it is easily distinguished by its 3-veined lateral sepals, 1–1.6 mm wide (*vs*. 1-veined, 2.2–2.3 mm wide), orbicular (*vs*. ovate to ovate-elliptic) lip with the base bearing erect, rectangular to subquadrate (*vs*. prostrate, ovate to lanceolate) calli, 5 mm (*vs*. 6.90–7.95 mm) long (Fig. 3B and C). Another slightly similar species is *C. elliptica* from Panama and recently recorded for Ecuador (Ormerod 2014), with a similar lip morphology but differing in having wider leaves, 2–3.2 mm (*vs*. 1.2–2.5 mm) wide smaller flowers with sepals 2 mm (*vs*. 5 mm) long and obtuse to retuse apex lip, 2.5 mm long (*vs*. obtuse not retuse, 5 mm long) with ovate calli (*vs*. rectangular calli).

SPECIMENS EXAMINED of *Crossoglossa steinii*: **Ecuador**. Morona-Santiago, *B. Stein 2812* (MO); Zamora-Chinchipe, *W. Quizhpe, B. Medina, C. Aguirre & M. Prado 985* (MO).

New Peruvian records

The genus *Crossoglossa* is poorly represented in Peru, with only four species being recorded (Ormerod 2013, 2014) from there. Indeed, the first species repeatedly found in Peru, *C. liparidoides*, has an uncertain origin and may have been found in what is now Ecuador. In this paper, we add the new species *C. puipuiensis* to the flora of Peru, as well as *C. neirynckiana* and *C. dalessandroi* which were described from the adjacent Ecuador.

Crossoglossa dalessandroi (Dodson) Dodson (Fig. 5A–D)

Nat. Ecuad. Orch. 1: 149. 1993. — BASIONYM: *Malaxis dalessandroi* Dodson, Icon. Pl. Trop. s. 2: t. 519, 1989.

TYPE: Ecuador. Loja: along Rio Yambala, 8 km upriver from Vilcabamba, 2100 m a.s.l., 23 September 1981 *D.D'Alessandro 171* (holotype MO!).

The Peruvian specimen agrees well with the definition of *C. dalessandroi* in habit, with laxly-leaved stems, leaves relatively wide, ca. 2 cm, asymmetric petal shape, and shape of the lip. However, the Peruvian plants have a differently-shaped dorsal sepal and terete horns of the labellum callus. In the type of *C. dalessandroi*, the two lobes of the lip callus appear to be flat or laminate (Ormerod 2014). The drawing of the type of *Malaxis dalessandroi* (Dodson & Roberto-Vásquez 1989: plate 157) is somewhat inaccurate as it does not show the papillose pubescent margins of the lip or the patches at the base of the lip. One of the specimens cited in the Tropicos database (https://www.tropicos.org/name/23518184) as a Peruvian record of *C. dalessandroi* (*R. Vasquez et al. 37064*) is a misidentification and corresponds to the type specimen of *C. puipuiensis*.

SPECIMENS EXAMINED: **Peru**. Amazonas, Prov. Bagua, Bosque Berlin, 2000 m a.s.l., December 2015 *A. Damián & L. Rimarachin LR524* (USM, HUT).

Crossoglossa neirynckiana Szlach. & Marg. (Fig. 5E–H)

Ann. Bot. Fennici 38: 91. 2001. — TYPE: Ecuador. Napo-Pastaza, Mera, 15 March 1940 *S. Lugo 63* (holotype B, not seen; isotypes AMES!, GB!).

The specimens from Peru agree with Ecuadorian material in habit, flower size, and in having

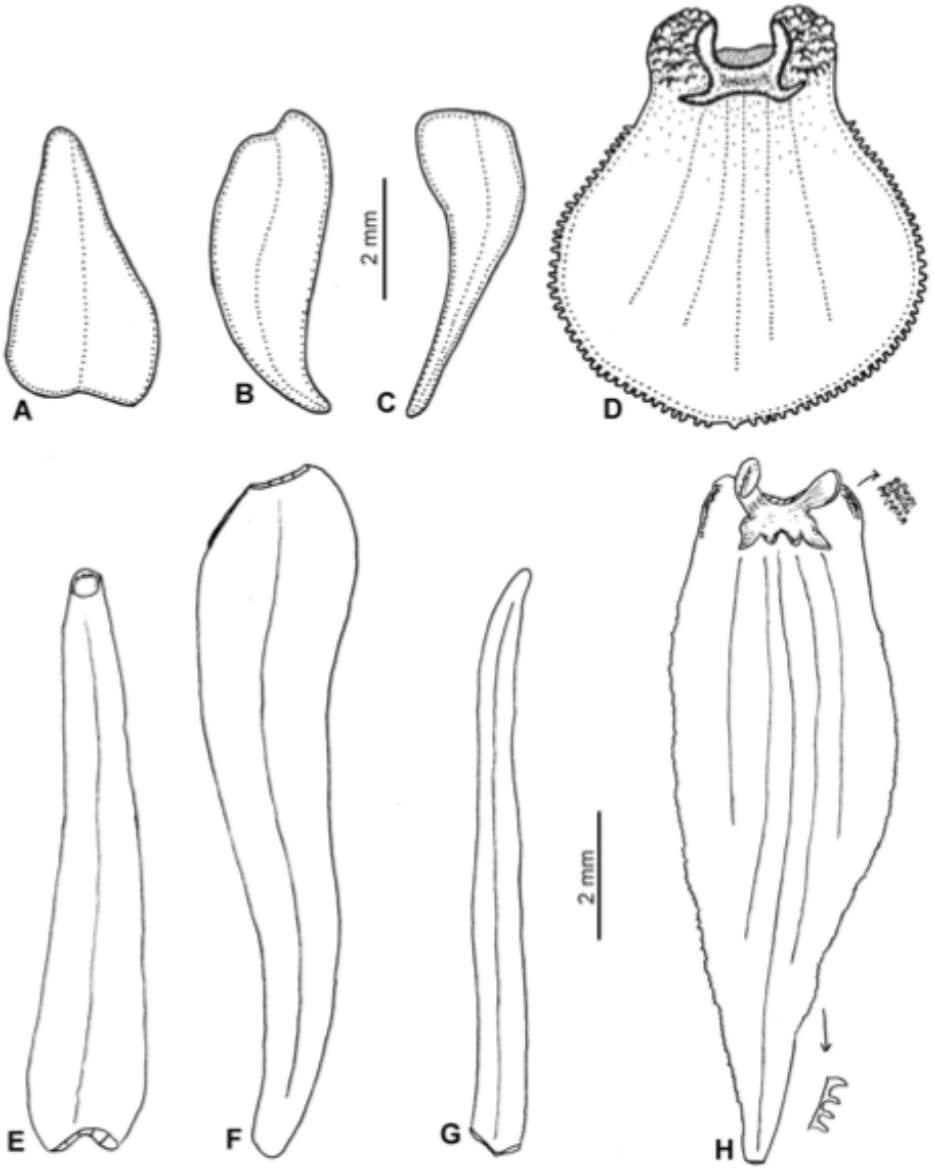


Fig. 5. Dissected perianth of (**A–D**) *Crossoglossa dalessandroi* (*A. Damián & L. Rimarachin LR524*, UFV), and (**E–H**) *C. neirynckiana* (*R. Vasquez M. et al. 33791*, SEL). — **A** and **E**: Dorsal sepal. — **B** and **F**: Lateral sepal. — **C** and **G**: Petal. — **D** and **H**: Labellum.

an oblong-lanceolate lip with papillose-ciliate margins. However, in the Peruvian specimens, the lip has a callus with thicker, more triangular (*vs*. subulate) lobules. Another point worth noting is that in the protologue (Szlachetko & Margonska 2001) of *C. neirynckiana* the lip is said to have entire margins and is illustrated as such. However, a meticulous analysis of the AMES isotype showed the margins to be papillose-ciliate. The second Peruvian collection (*Vasquez et al. 30996*), cited from Yanachaga-Chemillen National Park, is a mixture of two different *Crossoglossa* species. The second plant on the right-hand side has a conspicuously muricate inflorescence but unfortunately lacks flowers. We believe it is undescribed, and further searches should be made for it.

Specimens examined: **Ecuador**. Carchi, 7 February 1983 *B. Øllgaard, J. Korning, K. Thomsen & T. Illum 57318* (AAU). — **Peru**. Pasco, Oxapampa, 29 February 2008 *R. Vasquez M., A. Monteagudo, A. Pena & J.L. Mateo 33791* (MO, SEL); same area, 6 March 2006 *R. Vasquez M., A. Monteagudo, A. Pena, J.L. Mateo & V. Flores 30996* (MO, SEL).

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