TWO NEW SPECIES OF *CROSSOGLOSSA* (ORCHIDACEAE, MALAXIDEAE) FROM THE WESTERN ANDES OF COLOMBIA

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Abstract. Two new species of *Crossoglossa* from the western Andes of Colombia are proposed. The new taxa, *C. dapaensis* and *C. elvirae*, are described and illustrated. ecological notes and a distribution map are also supplied.

Keywords: *Crossoglossa,* new species, Dapa, Colombia

Crossoglossa Dressler & Dodson (Orchidaceae, in Dodson and Escobar, 1993) is a genus of 55 species (taxa described herein included) distributed from Nicaragua to Bolivia, and east to Venezuela. These taxa had been placed previously in *Liparis* L.C. Rich., Malaxis Sol. ex Sw., and *Microstylis* (Nutt.) Eaton (sections *Caulescentes* Ridl., *Tipuloidea* Ridl., and *Blephariglottis* Schltr.). The genus may be characterised by the combination of short to elongate, few to many-leaved stems, often with a rhizome derived from the previous stem, herbaceous leaves, flowers with a short column, and a basally auriculate labellum with a simple to complex basal callus.

Colombia is the center of diversity for *Crossoglossa,* from where 22 species (all endemic) have now been recorded. Most of the species were described recently, based on herbarium material (Ormerod 2013, 2014; Szlachetko and Kolanowska, 2013, 2015). Due to Colombia's complex and diverse ecosystems, rainfall, microclimate diversity, and orographic factors, we expect that a number of taxa remain to be described. Most of the Colombian species of *Crossoglossa* are only known from the original collection, which indicates the rarity of the plants in nature, and also the likelihood that they are narrow endemics.

During exploration of the La Elvira National Protective Forest Reserve (part of the Arroyohondo River Basin, Valle del Cauca) in September 2020, two species of *Crossoglossa* were identified. Subsequent investigations revealed that both of them were undescribed.

Crossoglossa dapaensis Reina-Rodr. & Ormerod, *sp. nov.* TYPE: COLOMBIA. Valle del Cauca: Municipio de Yumbo, Corregimiento Dapa, Parcelacion Los Morales, Parcela Familia Rubiano-Hurtado, Microcuenca El Rincon, tributary of the rio Arroyohondo, 2255 m, 10 September 2018, *G. Reina-Rodriguez, M. Rubiano, J. Rubiano & K. Reyes 3071* (Holotype: CUVC). Fig. 1.

Crossoglossa dapaensis is similar to *C. liparidoides* (Finet) Dodson but the stems have more leaves (10–13 versus 4–8), the leaves are larger (9.5–14.3 × 2.4–3.0 cm versus 7.0 × 1.8 cm), the inflorescence peduncle longer (13.5 cm vs. 3.7 cm), and the flowers with oblong-lanceolate (versus ligulate) petals, and an elliptic-obovate, subpandurate (versus ovate) labellum.

Terrestrial *herb*. *Rhizome* terete, elongate. *Roots* terete, pubescent, 9–17 × 0.11–0.13 cm. *Stems* short, 10–13 leaved (possibly each new stem 5–6-leaved), ca. 2 cm long, 0.5 cm thick. *Leaves* oblong-elliptic, basal third subpetiolate to sessile, acute, margin laxly undulate, mid-green above, 9.5–14.3 × 1.2–3.0 cm. *Inflorescence* terminal, erect, 44.6–56.5 cm long; peduncle *c*. 13.2 cm long; rachis densely many (97–112 cm) flowered, with about 80–95% of the flowers open simultaneously, 31.4–43.0 cm long; floral bracts lanceolate, apex apiculate, margin irregular, 3.3–11.0 × 1.1–3.5 mm. *Flowers* with light green sepals and petals, lip whitish with an orange callus and an orange median stripe, column and anther cap orange, stigma green, pollinia yellow. *Pedicel with ovary* subcylindric, almost patent to almost erect, light green, 3.0–4.5 mm long. *Dorsal sepal* ovate-elliptic, obtusish, weakly concave, 3 veined, 1.8 × 1.1 mm. *Lateral sepals* obliquely ovate to ovate-elliptic, obtuse, 1 veined, 1.7 × 1.1 mm. *Petals* obliquely oblong-lanceolate, subacute, 1 veined, 1.65 × 0.46 mm. *Labellum* elliptic-obovate, subpandurate, obtuse, base auriculate with a patch of papillae on each auricle, margin ciliate-denticulate, 1.7 mm long medially (2 mm long including auricles), 1.6 mm wide; callus bilobulate, consisting of two obliquely ovate lobules. *Column* short, stout, semiterete, 0.56 mm long, 0.47 mm wide dorsally; stigma circular, concave, ventral; anther cap reniform, 0.43 × 0.47 mm; pollinia two, obovoid, 0.19 × 0.13 mm.

Distribution: Colombia**.**

Ecology: Montane rainforest, of western Colombian Andes between 2000–2250 m, with well drained volcanic soils. The annual precipitation is 1900–2100 mm and annual temperature average between 15˚C and 17˚C (CVC 2009) (Fig. 3). According to Holdridge (1987), this area can be classified as montane rain forest, more widely known as subandean forest.

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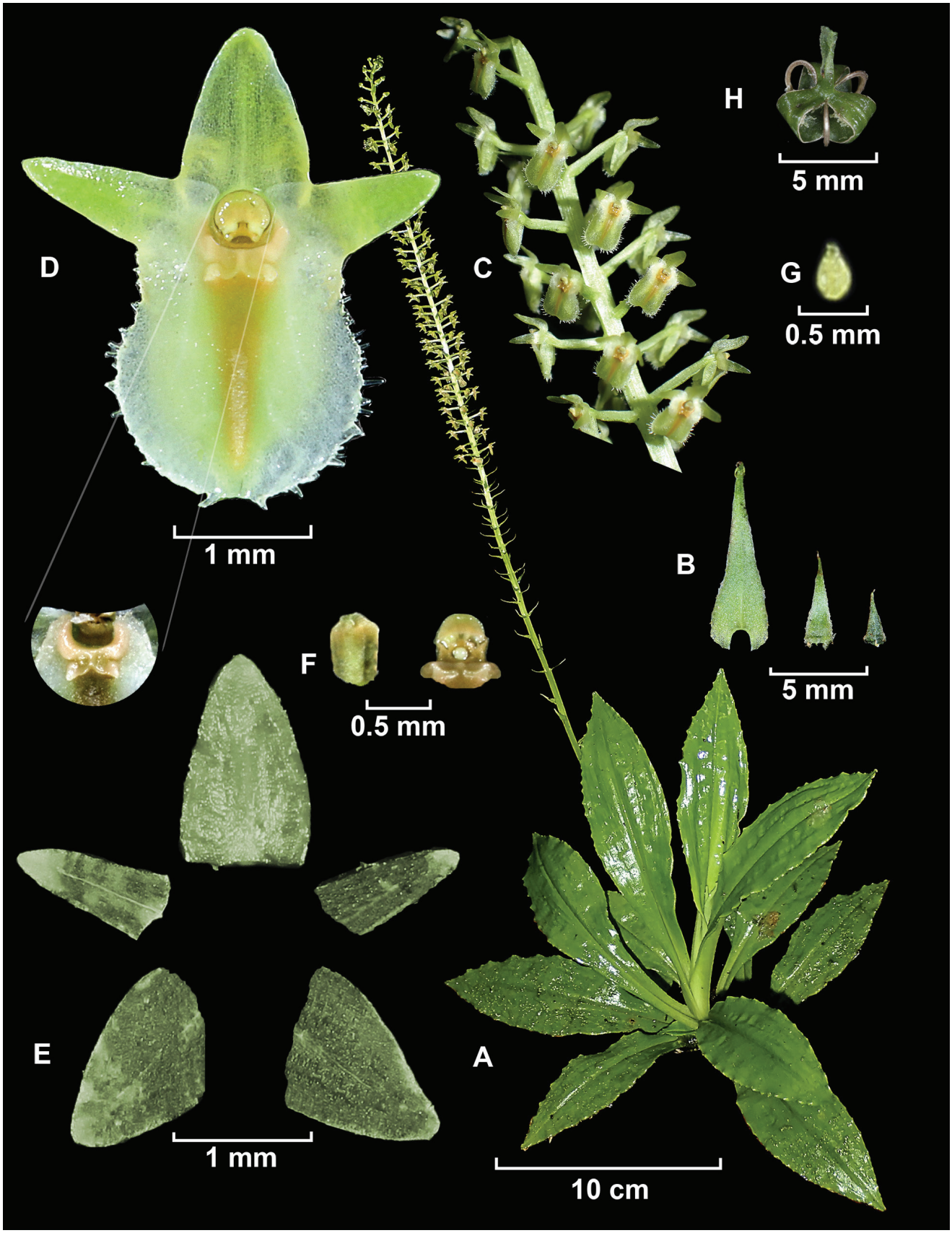

FIGURE 1. *Crossoglossa dapaensis* Reina-Rodr. & Ormerod. **A**, Habit; **B**, Floral bracts; **C**, Flowers; **D**, Flower, frontal view and projection to callus; **E**, Dissected perianth; **F**, Column, dorsal and ventral view; **G**, Pollinia; **H**, Dry fruit. LCDP by Francisco López-Machado. Photographs by Mayo Rubiano and G. Reina-Rodríguez based on the type (CUVC).

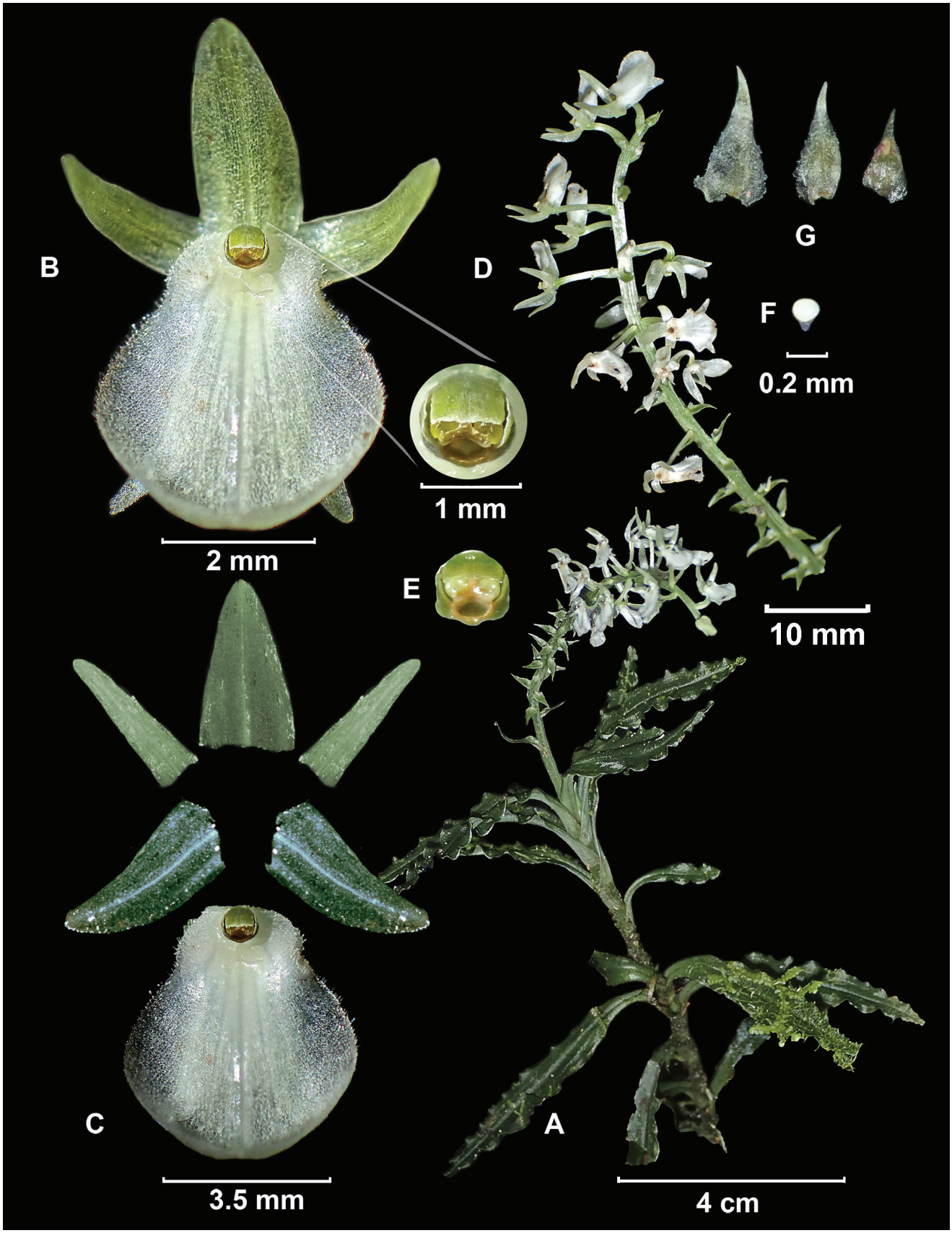

FIGURE 2. *Crossoglossa elvirae* Reina-Rodr. & Ormerod. **A**, Habit; **B**, Flower, frontal view and projection to column; **C**, Dissected perianth; **D**, Flowers; **E**, Column, frontal view; **F**, Pollinia; **G**, Floral bracts. LCDP by Francisco López-Machado. Photographs by Mayo Rubiano and G. Reina-Rodríguez, based on of the type (CUVC).

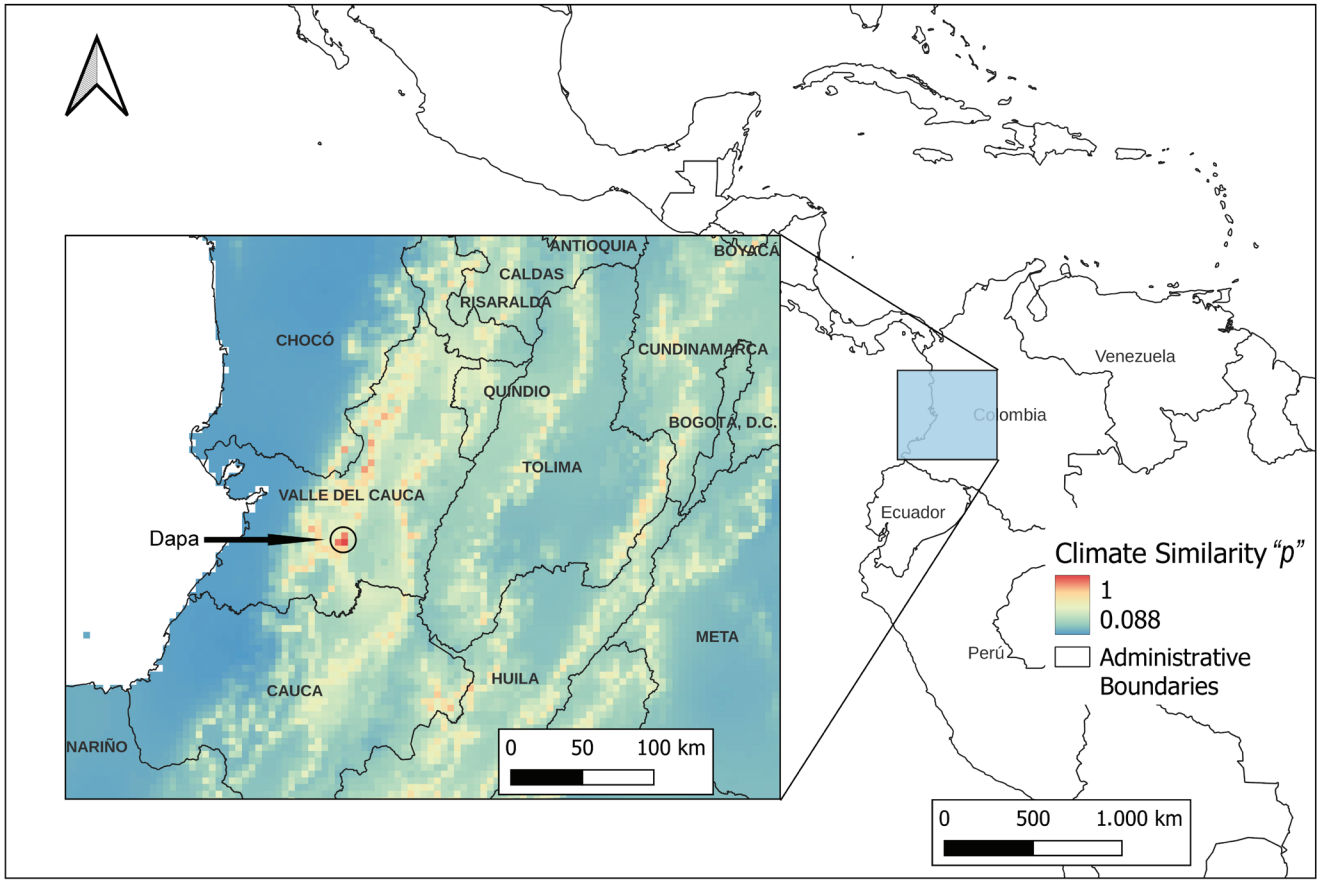

FIGURE 3. Climate similarities of the location site of the two new species. Describes the surrounding climate similarities to the site where the two species were collected (p=1). The map was generated using Analogue (Arango et al., 2020), an R package to identify climate analogues. The most similar areas are located along the western Colombian range either in the pacific or the Atlantic drainage basins.

Etymology: Named after the Dapa Hills, the type locality.

Conservation status: Critically Endangered IUCN Criteria CR B1ab(iii) (IUCN 2012). The Extent of occurrence estimated to be less than 100 km^2 and known to exist at only a single location. The area of known distribution is very limited, it is around the Dapa hills summit area of the Cordillera Occidental of the Andes. The population habitat is pressured by cattle ranching and deforestation for country houses.

As noted above this species is most closely related to *C. liparidoides* (Finet) Dodson, a species of uncertain origin (most likely from Ecuador). Both taxa share floral size (sepals *c*. 2 mm long) and lip callus shape, but *C. dapaensis* is a much larger and leafier plant, with broader petals and an obovate-elliptic (vs. elliptic) lip. Another florally similar species is *C. dalstroemii* (Dodson) Dodson from Ecuador, Peru, and Bolivia. It is, however, a short (30–55 mm long) stemmed, densely leaved plant, with smaller (38–125 × 7.5–13.0 mm), narrower leaves, slightly larger (dorsal sepal 2.40–2.75 mm long) flowers, and ligulate petals. *Crossoglossa polyblephara* (Schltr.) Dodson from Colombia is also florally similar, but it too is a short (30 mm long) stemmed, densely leaved plant, with smaller (60–110 × 10–13 mm), narrower leaves, also the lip bears a semilunate callus.

A fourth florally and vegetatively similar species is *C. zarucchii* Szlach. & Kolan. The figure in the protologue of *C. zarucchii* shows the lip to be oblong-subpandurate, and the callus to have small oblong lobules. However, study of the isotype in MO shows the lip to be obovate-elliptic, weakly subpandurate, prominently papillose-ciliate margined, and the callus to be transversely lunate (i.e., with acute, divaricate, ligulate-lanceolate arms). In *C. dapaensis* the lip callus differs in having obliquely ovate lobules like those found in *C. dalstroemii* and *C. liparidoides*.

Crossoglossa elvirae Reina-Rodr. & Ormerod, *sp. nov.* TYPE: COLOMBIA. Valle del Cauca: Municipio de Yumbo, Corregimiento Dapa, Parcelacion Los Morales, Parcela Familia Rubiano-Hurtado, Microcuenca El Rincon, tributary of the rio Arroyohondo, 2135 m, 12 August 2018, *G. Reina-Rodriguez, M. Rubiano, J. Rubiano & K. Reyes 3072* (Holotype: CUVC). Fig. 2.

Crossoglossa elvirae is similar to *C. dalstroemii* (Dodson) Dodson but its stems are more laxly leaved, its flowers are larger (sepals 2.20–2.75 mm long vs. sepals 3.5–3.7 mm long), and its labellum is obovate-elliptic (vs. ovate-elliptic).

Terrestrial *herb*. *Rhizome* terete, elongate. *Roots* terete, pubescent, 4.1–5.0 × 0.07–0.15 cm. *Stems* erect, short, 12–15 leaved (possibly each new stem 5–6 leaved), ca. 3 cm long, 0.5 cm thick. *Leaves* lanceolate, acute, basal part subpetiolate to sessile, acute to obtuse, margin strongly undulate, upper surface dark green, lower surface grey-green, 5.0–5.1 × 0.9–1.0 cm. *Inflorescence* terminal, erect, ca. 9.5 cm long; peduncle ca. 1 cm long; rachis subdensely many flowered, keeled below each floral bract, hexagonal in section, *c*. 5.2 cm long; floral bracts triangular, subacuminate, margin minutely irregularly dentate, 3.5–4.8 × 1.5–2.5 mm. *Flowers* translucent light green, lip translucent white, column and anther cap olive green, stigma orange-green, pollinia yellow. *Pedicel with ovary* terete, light green, 2.0–2.5 mm long. *Dorsal sepal* oblong-ovate, obtuse, 3 veined, 3.5–3.7 × 1.8–2.0 mm. *Lateral sepals* obliquely oblong-lanceolate, obtuse, 1 veined, 3.5 × 1.35 mm. *Petals* lanceolate, obtuse, 1 veined, 2.9 × 0.85 mm. *Labellum* obovate-elliptic, subpandurate, obtuse, base auriculate with a patch of papillae on each auricle, margin minutely papillose-ciliate, ca. 4 mm long medially (ca. 4.5 mm long including auricles), 4 mm wide; callus bilobulate, consisting of two obliquely ovate, acute, foveolate lobules. *Column* short, stout, semiterete, 0.8 mm long, 0.8 mm wide dorsally; stigma circular, concave, ventral; anther cap reniform-semicircular, 0.35 × 0.2 mm; pollinia two, subglobose, 0.18 × 0.15 mm.

Distribution: Hitherto restricted to Colombia.

Ecology: Montane rainforest, of western Colombian Andes between 2000–2250 m, with well drained volcanic soils. The annual precipitation is 1900–2100 mm and annual temperature average between 15°C and 17°C (CVC, 2009) (Fig. 3). According to Holdridge (1987), this area can be classified as montane rain forest, more widely known as subandean forest.

Etymology: Named after the La Elvira National Protective Forest Reserve.

This species appears to be mostly closely related to *C. dalstroemii* differing from it in having more laxly leafy stems, larger flowers, and a differently shaped (obovate-elliptic vs. ovate-elliptic) lip.

Conservation status: Critically Endangered IUCN Criteria CR B1ab(iii) (IUCN, 2012). The Extent of occurrence estimated to be less than 100 km^2 and known to exist at only a single location. The area of known distribution is very limited, it is around the Dapa hills summit area of the Cordillera Occidental of the Andes. The population habitat is pressured by cattle ranching and deforestation for country houses.

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