

CROSSOGLOSSA DRESSLER AND DODSON (ORCHIDACEAE: MALAXIDEAE)—AN ADDENDUM

PAUL ORMEROD¹

Abstract. Studies of the Neotropical orchid genus *Crossoglossa* reveal seven new species and a new synonym. Discussion is also provided on some prior misidentifications, and some emended descriptions are provided to clarify the characters of previously published taxa. The novel taxa are *C. boekeana*, *C. dressleri*, *C. kolanowskiae*, *C. oliveirae*, *C. pellucida*, *C. sprucei*, and *C. tetraphylla*. *Crossoglossa dodsonii* is considered a synonym of *C. dalstroemii*.

Keywords: Neotropical *Liparis*, *Crossoglossa*

Crossoglossa was proposed by Dressler & Dodson (in Dodson and Escobar, 1993) to accommodate a group of Neotropical taxa previously included in *Liparis* L.C. Rich., *Malaxis* Sol. ex Swartz, and *Microstylis* (Nuttall) Eaton. The genus may be characterized 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 complicate basal callus.

The purpose of this paper is to build on a previous synopsis (Ormerod, 2013) of the genus, where 31 species were listed. Taking into account synonymy, an accidentally omitted entity, a recently published taxon, and new taxa, 39 species can now be attributed to *Crossoglossa*. Dariusz Szlachetko (pers. comm.) however has at hand another five novelties from Colombia that will be described in due course.

Crossoglossa blephariglottis (Schltr.) Dressler, Nat. Ecuad. Orch. 1: 148, 1993.

Basionym: *Microstylis blephariglottis* Schltr., Rep. Sp. Nov. Regni Veg. 12: 202. 1913. TYPES: COSTA RICA. Without locality, A. & C. Brade s.n. (Syntype: B, destroyed); PANAMA. Chiriqui: above El Boquete, Holcomb’s Trail, upper caldera watershed, between camp 1 and the divide, 1650–1950 m, 23 March 1911, W.R. Maxon 5667 (Syntype: B, destroyed; Isosyntype: US, drawings, photo’s AMES).

Homotypic synonym: *Malaxis blephariglottis* (Schltr.) Ames, Proc. Biol. Soc. Wash. 35: 84, 1922.

Epiphytic herb. Stem short, 4–9 leaved, 1.5–2.0 cm long. Leaves lanceolate to oblanceolate, acute to obtuse, 3.5–10.0 cm long, 0.53–1.50 cm wide. Inflorescence terminal, 6.5–26.7 cm long; peduncle 2.5–6.5 cm long; sheathing bract one, 1.5 cm long; rachis narrowly winged, the wings with irregular teeth, 4–22 cm long; floral bracts ovate-lanceolate, acute, margins dentate to deeply lacerate, 5–7 mm long, 3 mm wide. Flowers green, translucent green, green with an orange callus, greenish white with an orange lip, white with pale yellow in the very center. Dorsal sepal oblong-lanceolate, obtuse, 1–3 veined, 3.0–3.2 mm long, 1.2–1.4

mm wide. Lateral sepals obliquely ovate-lanceolate, subacute, 1–2 veined, 3.3–3.9 mm long (to 4.2 mm long along upper margin), 1.3–1.6 mm wide. Petals linear-ligulate, obtuse, 1 veined, 3.2–3.4 mm long, 0.4 mm wide. Labellum elliptic, ovate-elliptic to obovate, obtuse to acute, base auriculate with a patch of papillae on each auricle, margin papillose-ciliate to ciliate, 3–5 veined, 3.2–4.1 mm long medially (3.6–4.4 mm long including auricles), 1.9–3.2 mm wide; callus bilobulate, lobules ovate to lanceolate, acute, flat, apices divergent, rarely subquadrate to circular and foveolate. Column short, stout, ca. 0.6 mm long.

Distribution: Costa Rica; Panama.

Specimens examined: COSTA RICA. Alajuela: Upala, Bijagua, El Retiro, area around the lagoon, 1000 m, 28 July 1983, R. Ampie, J.J. Jimenez & G. Herrera 6383 (K); San Carlos, La Fortuna, Finca El Jilguero, Cumbre de Volcan Chato, 1140 m, 25 November 1992, G. Herrera 5663 (K); “El Silencio,” to the W of La Palma, 1250 m, 15 November 1922, A.M. Brenes (127) 457 (AMES); “El Silencio,” 950–1000 m, 10 October 1922, A.M. Brenes (27) 322 (AMES); Los Angeles de San Ramon, 1030 m, 11 June 1926, A.M. Brenes (11) 1492 (AMES); La Palma de San Ramon, 3–10 October 1935, M. Quiros C. (27) 285 (AMES). Cartago: along creek emptying into Rio Grande de Orosi from the E, ca. 1 km upstream from confluence of Quebrada Salta, Tapanti, 1500–1700 m, 12 July 1984, M.H. Grayum & P. Sleeper 3464 (MO). Heredia: N of San Isidro, Cerro Las Lajas, 2000–2400 m, 7 March 1926, P.C. Standley & J. Valerio 51599 (AMES). Puntarenas: on border with Alajuela Prov., Sendero Brillante, 1600 m, 8 July 1989, J.T. Atwood 89-280 (GH, K, MO); Osa Peninsula, 4 km SW of Rincon, 12 September 1972, H. Kennedy 1665 (MO); Monteverde, Veracruz River valley, S of reserve, Pacific slope, 1300–1500 m, 22 August 1986, W.A. Haber ex E. bello & A. Clagget 5344 (MO). San Jose: Cascajal, 1675 m, sent July 1919, C.H. Lankester 61 (K). PANAMA. Bocas del Toro: NW of Cerro Pate Macho, 1980 m, 10 February 1979, B. Hammel 6108 (MO); on border with Chiriqui Prov., Fortuna Dam region, along continental divide trail, 1200 m, 16 January 1989, G. McPherson 13559 (MO). Chiriqui: near

I wish to thank the herbarium and library staff at the Harvard University Herbaria (A, AMES, GH) for their help and hospitality. Andre Schuiteman (K) and Tom Zanoni (NY) kindly searched their collections for critical material. K, MO and NY generously loaned material for study.

¹P.O. Box 8210, Cairns 4870, Queensland, Australia; wsandave1@bigpond.com

Fortuna Dam, 1100 m, 16 February 1985, *C. & J. Luer & R.L. & K. Dressler 10565* (MO); Distrito Boquete, Fortuna Dam site, along trail following continental divide, 1100 m, 8 February 1985, *H. van der Werff & C. van Hardeveld 6716 p.p.* (MO). Cocle: hills N of El Valle de Anton, 15 August 1971, *R.L. Dressler 4082* (MO); mountains N of El Valle de Anton, 760–915 m, 28 May 1967, *W.H. Lewis, B. MacBryde, R.L. Oliver & J.E. Ridgway 1722* (MO). Veraguas: ridge of Cordillera de Tute, trail to Cerro Tute, above Escuela Agrícola Alto de Piedra, just W of Santa Fe, 800–1350 m, 5 June 1982, *S. Knapp & R.L. Dressler 5462* (MO); mountains W of Alto de Piedras, W of Santa Fe, 975–1705 m, 8 September 1978, *B. Hammel 4629* (MO); ridge E of Cerro Tute, NW of Santa Fe, 900–1250 m, 25 October 1975, *R.L. Dressler 5204* (MO).

After studying several collections of this species I must agree with Dressler (1997) that it is a rather variable plant. Apart from the differences in habit regarding overall slenderness of the plant, stem length, and leaf shape already noted by Dressler (1997), there is also much variation in the degree of laceration of the floral bracts. Specimens with highly lacerate floral bracts have an inflorescence that imparts an almost shaggy appearance.

Crossoglossa boekeana Ormerod, *sp. nov.*

TYPE: ECUADOR. Napo-Pastaza: Salcedo to Napo, trail to Tena, 2390–2590 m, 7 February 1977, *J.D. Boeke 944* (Holotype: NY). Fig. 1.

Species nova singularis, sepalis floribus alte connatis, papillae juxta callus uniseriatis.

Terrestrial (?) *herb.* Rhizome terete, *ca.* 11 cm long, 0.3–0.6 cm thick. Roots terete, 0.5–2.0 mm thick. Stem terete, 5–7 leaved, *ca.* 3 cm long, 0.4 cm thick. Leaves lanceolate to ligulate-oblong-lanceolate, acute, margin undulate, 6.5–14.0 cm long, 1.1–1.9 cm wide. Inflorescence terminal, 33.8–44.4 cm long; peduncle stout, evaginate, 13.5–16.0 cm long; rachis elongate, many-flowered, 20.3–28.4 cm long; floral bracts ovate-lanceolate, acute to subacuminate, margin irregularly erose, to 7 mm long, 4.3 mm wide. Flowers green, ovary yellow. Pedicellate ovary narrowly winged, *ca.* 4 mm long. Synsepal ovate, apex trifid, 7 mm long, 4.9–5.0 mm wide, apical 1–2 mm free. Dorsal sepal oblong-lanceolate, subacute, 1 veined, 7 mm long, 2.0–2.1 mm wide. Lateral sepals obliquely lanceolate, subacute, 1 veined, 7 mm long, *ca.* 1.75 mm wide. Petals linear-ligulate, obtuse, 1 veined, *ca.* 7.3 mm long, 1 mm wide. Labellum oblong-lanceolate, acute, base auriculate (auricles concave), 3 veined, margins retrorse ciliate, parallel to each side of callus a single line of papillae, 6 mm long (6.9 mm long including auricles), 2.8–2.9 mm wide; callus transversely rectangular, medially retuse, each side with a lanceolate arm. Column very short, *ca.* 1.3 mm long (1.5 mm long with anther cap).

Distribution: Ecuador.

Habitat: Primary forest, 2390–2590 m.

Eponymy: Named after Jef D. Boeke, collector of the type, and world-renowned yeast geneticist.

This species is unique in *Crossoglossa* in that the sepals are united into a synsepal, and that there is a line of papillae on each side of the callus. All other known *Crossoglossa*

species have free sepals, and any papillae next to the callus are in clusters or patches.

Crossoglossa boylei Dodson, *Orquideologia* 19, 1: 85, 1993. TYPE: ECUADOR. Esmeraldas: KM's 13–17, Lita to San Lorenzo, 720–850 m, 13 May 1990, *C.H. Dodson, A.L. Gentry, B. Boyle & D. Rubio 18285* (Holotype: MO). Fig. 2.

Flowers green, lip with a red-orange triangular blotch from the base to the apex. Pedicellate ovary 5 ridged, *ca.* 3.9 mm long. Dorsal sepal ovate-elliptic, obtuse, 1 veined, 1.2–1.3 mm long, 1 mm wide. Lateral sepals obliquely ovate-elliptic, obtuse, 1 veined, 1.5 mm long medially (1.75 mm long along upper margin), 1.3 mm wide. Petals obliquely oblong-lanceolate, obtuse, 1 veined, 1.3 mm long, 0.4–0.5 mm wide. Labellum obovate, emarginate, base with papillose auricles, margin papillose-ciliate, 5 veined, 2 mm long medially (2.5 mm long including auricles), 2.2 mm wide; callus of two transversely rectangular locules. Column short, stout, *ca.* 0.5 mm long (minus anther cap).

Distribution: Ecuador.

I have supplied an emended floral description because there are some discrepancies between details published in the protologue and the holotype. The most notable difference is that the labellum does not have two transverse lamellae at its base, but rather a single transverse callus of two rectangular loculae.

Crossoglossa dalessandroi (Dodson) Dodson, *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, 23 September 1981, *D. D'Alessandro 171* (Holotype: MO). Fig. 3.

Flowers light green. Pedicellate ovary *ca.* 5 mm long. Dorsal sepal oblong-lanceolate, subacute, 1 veined, 4.9–5.2 mm long, 1.8–1.9 mm wide. Lateral sepals obliquely oblong-lanceolate, subacute, 1 veined, 5.4–6.0 mm long, 1.90–1.95 mm wide. Petals obliquely ovate-lanceolate from a dilated base, subacute, 1 veined, 5.2 mm long, 2.0–2.1 mm wide. Labellum obovate, emarginate, base with densely papillose auricles, margin papillose-ciliate, 5 veined, 6.7 mm long medially (7.7 mm long including auricles), 5.3 mm wide; callus with 2 lanceolate, acute arms. Column short, stout, 1.1 mm long.

Distribution: Ecuador.

I have supplied an emended floral description of this species since examination of the holotype showed some discrepancies between that and the published figure (Dodson, 1989a). The main differences are that lip has papillose-ciliate margins, densely papillose auricles, and a short, stout column.

Crossoglossa dalstroemii (Dodson) Dodson, *Nat. Ecuad. Orch.* 1: 149, 1993.

Basionym: *Malaxis dalstroemii* Dodson, *Icon. Pl. Trop.* s. 2: t. 520, 1989. TYPE: ECUADOR. Zamora-Chinchipe: Quebrada Honda, SE of Vilcabamba, 1600 m, 6 April 1982, *S. Dalstrom 186* (Holotype: MO). Fig. 4.

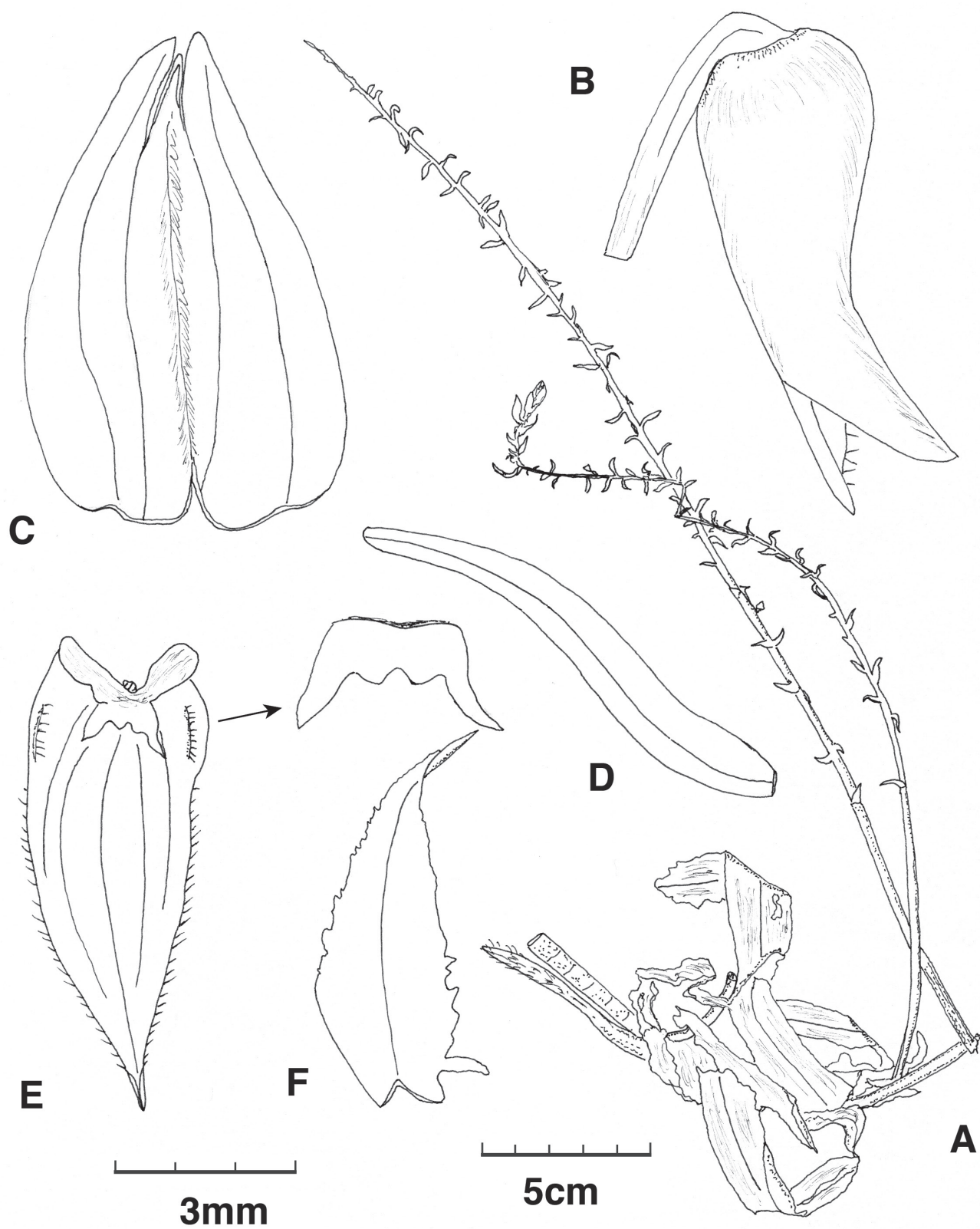


FIGURE 1. *Crossoglossa boekeana* Ormerod. A, plant; B, flower; C, synsepal; D, petal; E, labellum (callus arrowed); F, upper floral bract. Drawn from holotype.

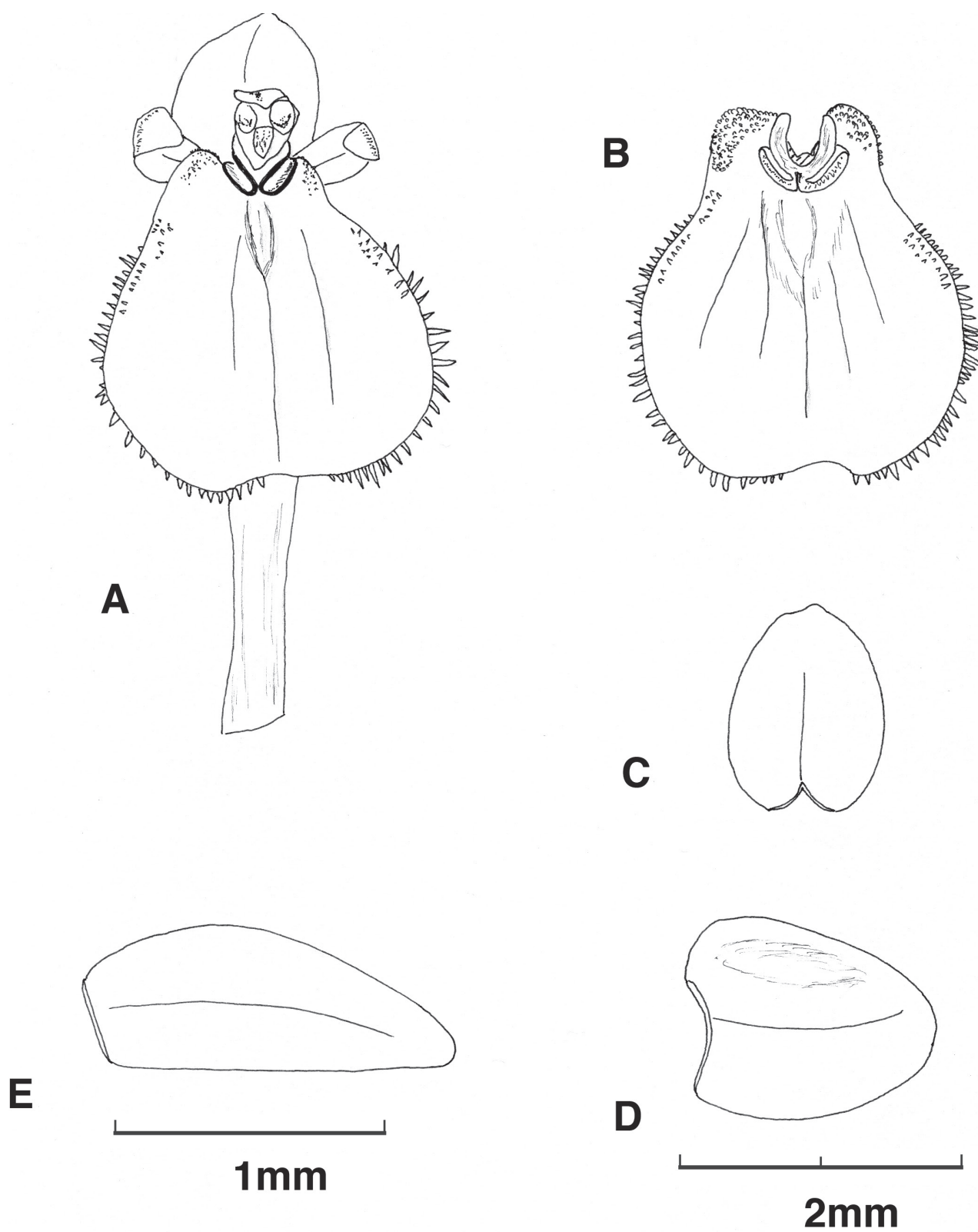


FIGURE 2. *Crossoglossa boylei* Dodson. A, flower; B, labellum; C, dorsal sepal; D, lateral sepal; E, petal. Drawn from holotype.

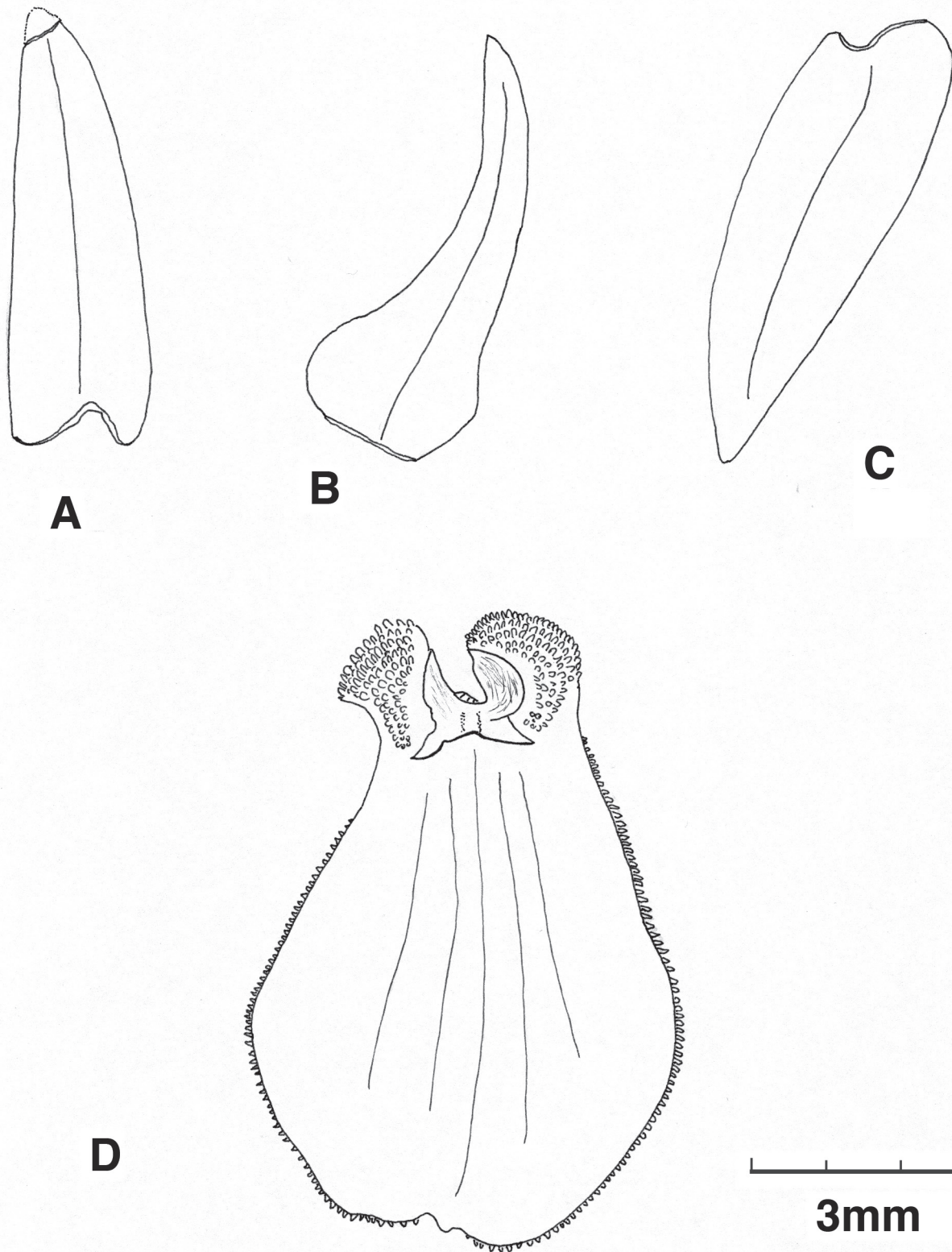


FIGURE 3. *Crossoglossa dalessandroi* (Dodson) Dodson. **A**, dorsal sepal; **B**, petal; **C**, lateral sepal; **D**, labellum. Drawn from holotype.

Heterotypic synonym: *Crossoglossa dodsonii* R. Vasquez, Rev. Soc. Boliv. Bot. 2, 2: 155, 1999, *syn. nov.*

TYPE: BOLIVIA. Cochabamba: Chapare, El Sillar, KM 105, between Cochabamba and Villa Tunari, 1840 m, 22 January 1987, R. Vasquez 927 (Holotype: LPB; Isotype: Herbarium Vasquezianum, neither seen).

Usage synonyms: *Malaxis liparidoides* auct. non (Finet) Schweinf., C.H. & P.M. Dodson, Icon. Pl. Trop. s.2: t.522, 1989.

Malaxis topoensis auct. non (Mansf.) Dodson, C.H. & P.M. Dodson, Icon. Pl. Trop. s.2: t.528, 1989.

Crossoglossa liparidoides auct. non (Finet) Dodson, Dodson, Nat. Ecuad. Orch. 1: 149, f.237, 1993; Dodson & Luer, Fl. Ecuad. 76: 275, 2005.

Crossoglossa topoensis auct. non (Mansf.) Dodson, Dodson, Nat. Ecuad. Orch. 1: 149, f.238, 1993; Dodson & Luer, Fl. Ecuad. 76: 280, 2005.

Epiphytic herb. Roots terete, slender, pubescent, 0.5–2.0 mm thick. Stem short, densely 9–14 leaved, 2.0–5.5 cm long, 0.20–0.25 cm thick. Leaves ligulate-oblongate to oblanceolate, acute to obtusish, margins often wavy, 3.8–12.5 cm long, 0.75–1.30 cm wide. Inflorescence terminal, 13.8–17.6 cm long; peduncle evaginate, 3.5–5.3 cm long; rachis laxly to subdensely many-flowered, 8.3–13.6 cm long; floral bracts ovate-lanceolate, acute, 4–7 mm long, 2 mm wide. Flowers green, lip white. Pedicellate ovary triquetrous, 3–5 mm long. Dorsal sepal ovate-lanceolate to lanceolate, obtuse, 1 veined, 2.40–2.75 mm long, 0.9–1.3 mm wide. Lateral sepals obliquely ovate-elliptic to lanceolate, obtuse, 1 veined, 2.2–2.7 mm long medially (2.5–2.6 mm long along top margin), 1.1–1.3 mm wide. Petals ligulate, subacute, 1 veined, 2.3–2.6 mm long, 0.35–0.40 mm wide. Labellum ovate-elliptic, obtuse, base with papillose auricles, margins papillose-ciliate, 3–5 veined, 2.0–2.4 mm long medially (2.4–2.8 mm long including auricles), 1.30–1.95 mm wide; callus of two ovate, acute to subacute, foveolate lobes. Column short, stout, 0.6–0.7 mm long.

Distribution: Ecuador; Peru; Bolivia.

Specimens examined: ECUADOR. Pastaza: Pastaza, 1500 m, September 1984, A. Hirtz 1895 (MO). Zamora-Chinipe: below Tapala, 20 February 1982, D. D'Alessandro 163 (MO); heights of Goly, F.C. Lehmann s.n. (=HK 399) (K). PERU. San Martin: Rioja Prov., along Rioja to Pedro Ruiz road, 1170 m, 23 March 1998, H. van der Werff, B. Gray, R. Vasquez & R. Rojas 15532 (MO).

Examination of specimens referred to *Malaxis liparidoides* and *M. topoensis* by Dodson (1989b, c) show that these are referable to *Crossoglossa dalstroemii*. I have not seen two further collections referred to *C. liparidoides* by Dodson & Luer (2005). Bennett & Christenson (1993) were the first to point out that *Malaxis liparidoides* sensu Dodson (1989b) was misidentified. Unfortunately the *M. liparidoides* of Bennett & Christenson (1993) from Peru [D.E. Bennett 6115 (reportedly at NY, but not found there)] also appears to be misidentified, and seems to represent an undescribed taxon. Though type material of *C. dodsonii* has not been seen, the excellent description and figure that comprise the protologue of the latter agrees very well with the concept of *C. dalstroemii* as here understood.

Crossoglossa polyblephara (Schltr.) Dodson from Colombia is probably a close relative of *C. dalstroemii* but it has fewer-leaved (6 vs. 9–14) stems, smaller (sepals 2 mm vs. 2.20–2.75 mm) flowers, and a semilunate (vs. bilobulate with ovate lobules) callus on the lip. Another close relative is the Central American *C. blephariglottis* but it generally has few-leaved (rarely up to 9) stems, larger (sepals 3.0–4.2 mm long) flowers, and flat (rarely foveolate) lobules of the lip callus.

***Crossoglossa dressleri* Ormerod, sp. nov.**

TYPE. PANAMA. Veraguas: near continental divide, third branch of Rio Santa Maria to drop-off to lowlands, 12–15 km NW of Santa Fe, 650–800 m, 16–17 November 1974, R.L. Dressler 4830 (Holotype: MO). Fig. 5.

Usage synonym: *Crossoglossa tipuloides* auct. non (Lindl.) Dodson, Dressler, Orquideologia 20, 3: 257, 1997 p.p.; in Hammel et al., Man. Pl. Costa Rica 3: 62, 2003 p.p. (both citing Hammel & Trainer 14269).

Affinis *C. eustachys* (Schltr.) Dressler sed basi foliis curvatis (vs. recto), pedunculis brevioribus (ad 5 vs. 10 cm) et lobulis calli labello subquadratis, foveolatis (vs. ovato-lanceolatis, planis) differt.

Terrestrial herb. Roots terete, pubescent, 0.5–2.0 mm thick. Rhizome terete, rooting at nodes, ca. 7.5 cm long, 0.1–0.3 cm thick. Stem terete, densely 3–9 leaved, 3–4 cm long, 0.35–0.40 cm thick. Leaves ligulate to ligulate-oblongate, acute, 13.2–15.5 cm long, 2.00–2.55 cm wide. Inflorescence terminal, 19.8–40.0 cm long; peduncle evaginate, 3–5 cm long, 0.2–0.5 cm thick; rachis subclaxly many-flowered, 16.3–35.0 cm long; floral bracts lanceolate, acute, margin entire to irregular, sometimes sparsely dentate but usually when old, 6.5–12.0 mm long, 2–3 mm wide. Flowers pale green, greenish white to green. Pedicellate ovary narrowly winged, 7–9 mm long. Dorsal sepal lanceolate, subacute to obtuse, 1 veined, 5.8–7.2 mm long, 1.6–2.0 mm wide. Lateral sepals obliquely lanceolate, subacute, 1 veined, 5.2–7.7 mm long medially (6–8 mm long along upper margin), 1.8–2.0 mm wide. Petals linear-lanceolate, acute, 1 veined, 6.0–7.5 mm long, 0.95–1.00 mm wide. Labellum ovate-elliptic, acute, base shortly auriculate with a small patch of papillae each side, margins minutely papillose-dentate, 3–5 veined, 7.0–8.1 mm long medially (7.9–9.0 mm long including auricles), 4.2–6.0 mm wide; callus of two subcircular to subquadrate, foveolate lobules. Column short, stout, 0.8–1.0 mm long (minus anther cap).

Distribution: Costa Rica; Panama.

Specimens examined: COSTA RICA. San Jose: Braulio Carillo Park, road from entrance to Rio Sucio, near Estacion Carillo along Rio Sucio, 400–1500 m, 28 July 1985, B. Hammel & J. Trainer 14269 (MO). PANAMA. Bocas del Toro: along pipeline road, near end, Fortuna Dam area, 900–950 m, 8 March 1986, G. McPherson 8713 (MO).

Eponymy: Named after Robert Dressler, authority on Mesoamerican orchids, among many other achievements.

This species is florally similar to *C. eustachys* but it has a rather different habit (the leaves are curved basally prior to insertion on the stem, rather than spreading out patently from it due to the straight bases that are a feature of *C.*

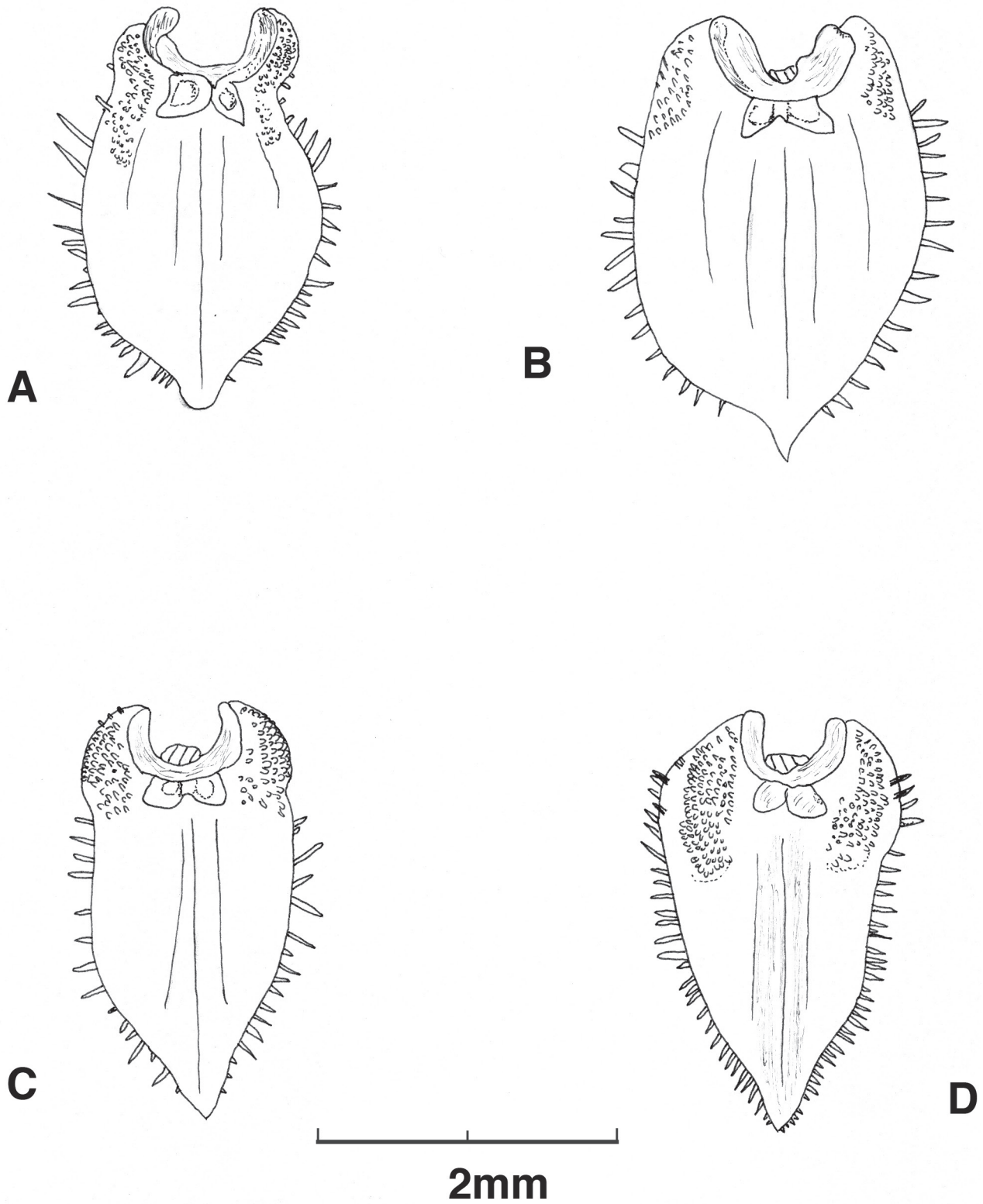


FIGURE 4. *Crossoglossa dalstroemii* (Dodson) Dodson. A–D, labellums. A from holotype; B from A. Hirtz, 1895 (MO); C from D. D’Alessandro 163 (MO); D from H. van der Werff et al. 15532 (MO).

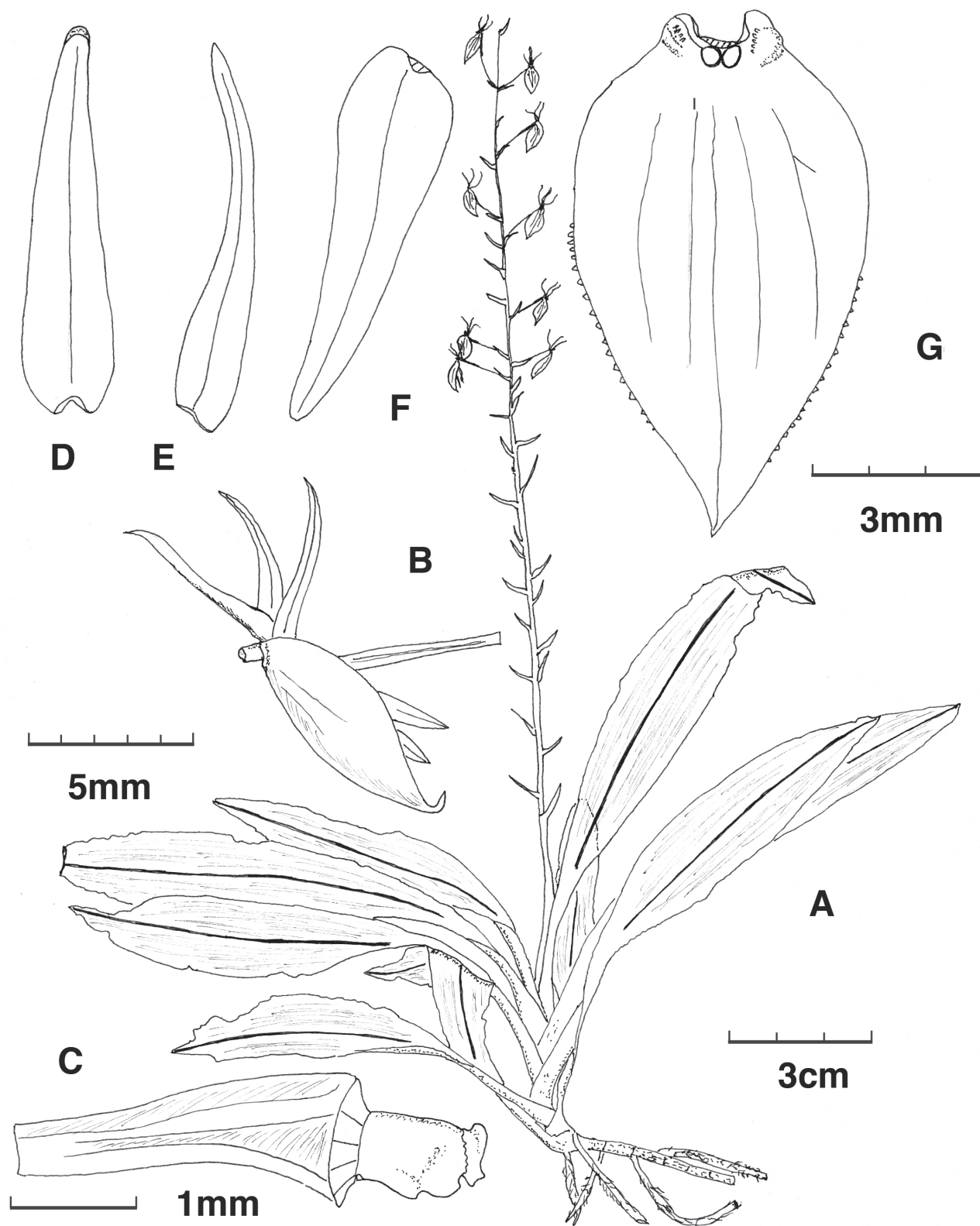


FIGURE 5. *Crossoglossa dressleri* Ormerod. A, plant; B, flower; C, column; D, dorsal sepal; E, petal; F, lateral sepal; G, labellum. Drawn from holotype.

eustachys), a shorter peduncle, generally entire (not erose-lacerate) floral bracts, a minutely papillose-dentate (vs. papillose-ciliate) labellum margin, and a labellum callus composed of subcircular to subquadrate, foveolate (vs. ovate-lanceolate, flat) lobules.

I have not included the stem (8 cm long) and rhizome (12 cm long) measurements of the collection *Hammel & Trainer 14269* in the description. It appears to me that this plant was somehow buried in the humus and that the stem and rhizome became elongated as the plant strove to reach the surface.

Crossoglossa elliptica Dressler, *Orquideologia* 20, 3: 256, 1997.

TYPE: PANAMA. Cocle: near Aserradero El Cope, ca. 8 km N of El Cope, January 1978, *J.P. Folsom s.n.* (Holotype: MO; Isotype: FLAS, neither seen).

Distribution: Panama.

This was accidentally omitted from my synopsis of *Crossoglossa* (Ormerod 2013). Two collections from Ecuador [*F.C. Lehmann 8167* (K); 9996 (AMES, K)] appear to be very similar to *C. elliptica* except that the margins of the lip are ciliate (vs. minutely dentate).

Crossoglossa eustachys (Schltr.) Dressler, *Nat. Ecuad. Orch.* 1: 149, 1993. Fig. 6.

Basionym: *Liparis eustachys* Schltr., *Rep. Sp. Nov. Regni Veg., Beih.* 19: 91, 1923. TYPE: COSTA RICA. San Jose: Carillo, 1400 m, June 1909, A. & C. Brade 1260 (Holotype: B, destroyed; drawing AMES).

Usage synonyms: *Microstylis tipuloides* auct. non Lindl., *Rchb.f., Beitr. Orch. Centr. Amer.*: 102, 1866.

Crossoglossa tipuloides auct. non (Lindl.) Dodson, Dressler, *Orquideologia* 20, 3: 257, 1997; in Hammel, *Man. Pl. Costa Rica* 3: 62, 2003; Szlach. & Margonska, *Ann. Bot. Fenn.* 38: 93, f.2, 2001; Kolanowska & Szlach., *Orch. Dept. Valle del Cauca* 1: 252, f.233, 2012 p.p. (figure only); Szlach. & Kolanowska, *Nord. J. Bot.* 31: 448, f.3–2A–D, 2013.

Epiphytic herb. Stem short, 8 leaved, 2.5 cm long, 0.2–0.3 cm thick. Leaves ligulate, acute to obtuse, patently spreading from stem, bases not curved, 16–18 cm long, 1.80–2.55 cm wide. Inflorescence terminal, 43 cm long; peduncle ca. 10.5 cm long; rachis subclaxly many-flowered, 32.5 cm long; floral bracts lanceolate, acute, margins erose-lacerate, to 15 mm long, 2–4 mm wide. Flowers green, lip translucent pink-green with a darker pink midstrip. Pedicellate ovary to 6.5 mm long. Dorsal sepal lanceolate, acute, 1 veined, 7 mm long, 1.5 mm wide. Lateral sepals obliquely lanceolate, acute, 1 veined, 7 mm long medially (7.2 mm long along upper margin), 1.95 mm wide. Petals linear, acute, 1 veined, 7 mm long, 0.8 mm wide. Labellum ovate-elliptic, subacuminate, base auriculate with a small group of papillae each side, margins papillose-ciliate, 6.8 mm long medially (7.6 mm long including auricles), 4.1 mm wide; callus of two divergent, obliquely ovate, acute, flat lobules. Column short, stout, ca. 1 mm long

Distribution: Costa Rica; Panama.

Specimens examined: COSTA RICA. Heredia: near

San Miquel, 20 May 1857, *H. Wendland 750* (W-R 41072, 41073, seen on microfiche). PANAMA. Panama: around Rancho Chorro, mountains above Torti Arriba, Canazas mountain chain, 400–700 m, 3 December 1977, *J.P. Folsom, L. Collins & G. Alonzo de Monte 6735* (MO).

The above description is based solely on the Panamanian collection. As noted above under *C. dressleri* the habit of this species is quite distinct due to the ligulate leaves having almost straight bases (a character also of the Costa Rican *C. aurantilineata* Pupulin but this has shorter leaves, smaller flowers and a much blunter, narrowly obovate lip). This distinctive habit also distinguishes it from the true *C. tipuloides* (Lindl.) Dodson of Colombia, a taxon that remains incompletely known (Ormerod 2013).

Crossoglossa fratrurn (Schltr.) Dressler, *Nat. Ecuad. Orch.* 1: 149, 1993.

Basionym: *Liparis fratrurn* Schltr., *Rep. Sp. Nov. Regni Veg., Beih.* 19: 92, 1923.

TYPE: COSTA RICA. Alajuela: La Palma, 1400 m, March 1909, A. & C. Brade 1132 (Holotype: B, destroyed; drawing AMES).

Usage synonyms: *Malaxis tipuloides* auct. non (Lindl.) Kuntze, L.O. Williams, *Ann. Miss. Bot. Gard.* 33: 136, 1946; Hamer, *Icon. Pl. Trop.*: t.839, 1983; Atwood, *Icon. Pl. Trop.*: t.1332, 1989.

Distribution: Nicaragua; Costa Rica; Panama.

Specimens examined: NICARAGUA. Volcan Mombacho, near summit, above Finca Las Delicias, 7 August 1976, *J.S. Hall & S.M. Bockus 7533* (MO); Volcan Mombacho, 20 January 1974, *J.T. Atwood & D.A. Neill 7055* (GH, MO); Volcan Mombacho, above Finca Las Delicias, 20 January 1974, *J.T. Atwood & D.A. Neill 7053* (MO). COSTA RICA. Alajuela: Monteverde Reserve, El Valle trail, near continental divide with Atlantic exposure, 1600 m, 26 October 1985, *W.A. Haber ex E. Bello 3189* (MO); Alfaro Ruiz Canton, La Pena de Zarcero, 1650 m, 30 July 1938, A. Smith H498 (AMES); La Pena, 1500 m, 22 August 1938, A. Smith H1108 (AMES); San Luis de Zarcero, 1625 m, 14 June 1938, A. Smith H770 (AMES); San Carlos Canton, Zapate, 6 August 1938, 1500 m, A. Smith H1055 (AMES). Cartago: Reserva de Tapanti, 1300–1800 m, November 1982, *L.D. Gomez 18896* (MO). Heredia: Vasquez de Coronado Canton, Braulio Carillo National Park, Zurqui Station, along Sendero Natural National Highway 32, 1650–1700 m, 18 September 1990, *S. Ingram & K. Ferrell 522* (K, MO). Puntarenas: Monteverde, Veracrus River valley, S of reserve, Pacific slope, 1300–1500 m, 22 August 1986, *W.A. Haber ex E. Bello & A. Clagget 5345* (MO). San Jose: La Hondura, 1300–1700 m, 16 March 1924, *P.C. Standley 37619* (AMES); La Hondura, 1300–1700 m, 2–4 March 1924, *P.C. Standley 36610* (AMES); La Palma, 1600 m, 3 February 1924, *P.C. Standley 33025* (AMES). PANAMA. Chiriqui: near Cerro Punta, 2000 m, 21–24 January 1939, *P.H. Allen 1528* (AMES, MO).

This species may be recognized by its elongate, leafy stems, and obovate leaves. The flowers are very similar to those of *C. eustachys* but the latter has short stems and ligulate leaves.

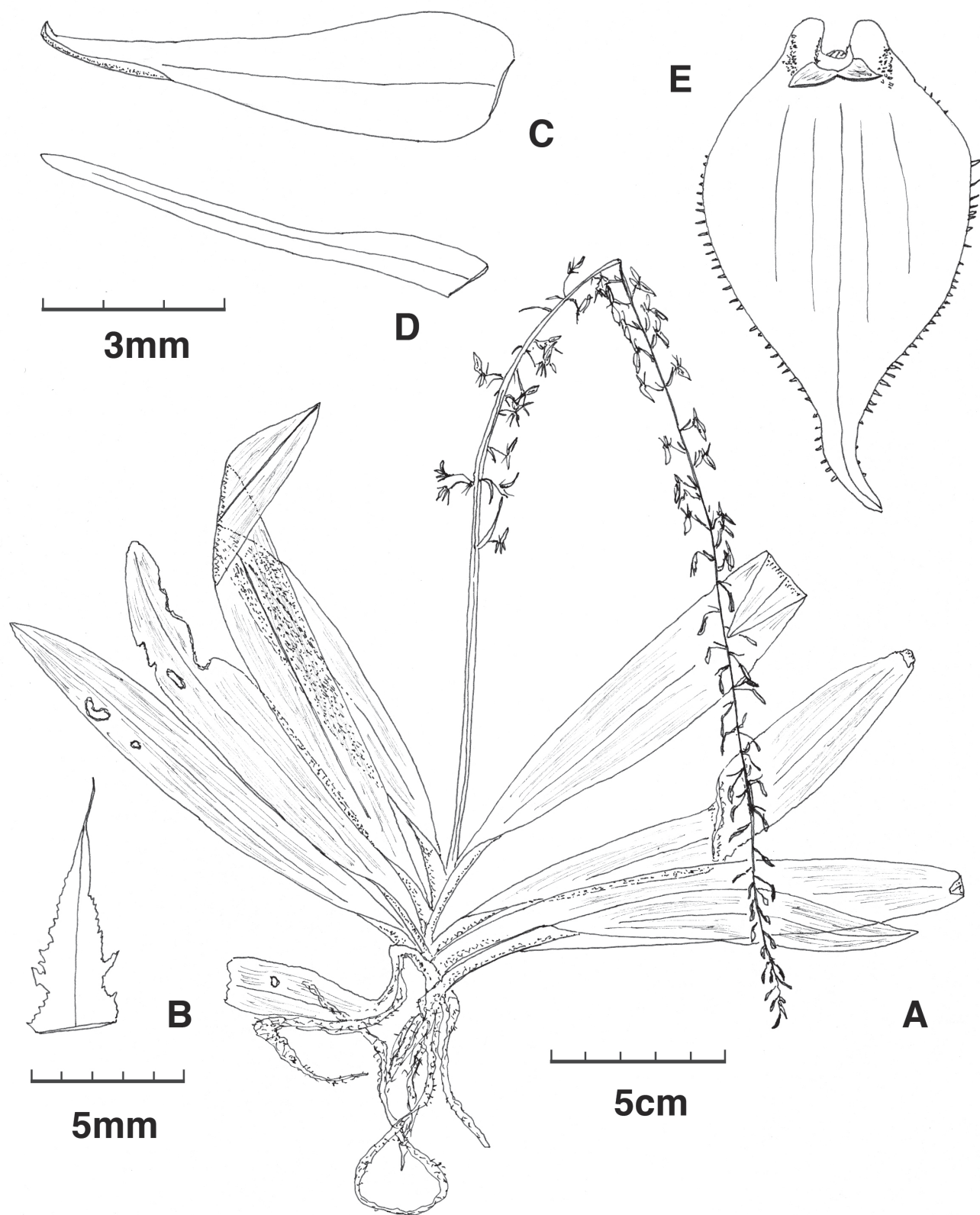


FIGURE 6. *Crossoglossa eustachys* (Schltr.) Dressler. A, plant; B, floral bract (upper half); C, lateral sepal; D, petal; E, labellum. Drawn from J.P. Folsom et al. 6735 (MO).

Crossoglossa frontinoensis Szlach. & Kolanowska, Nord. J. Bot. 31, 4: 446, 2013.

TYPE: COLOMBIA. Antioquia: Municipio Frontino, Corregimiento Nutibara, Cuenca alta del Rio Cuevas, 1900 m, 23 November 1986, *D. Sanchez, C. Orrega, S. Sylva, G. Galeano, G. Martinez, D. Restrepo & N. Bedoya* 820 (Holotype: COL, not seen).

Distribution: Colombia.

This is the third species to be recorded from the Department of Antioquia, the other two earlier taxa are *C. kalbreyeriana* (Kraenzl.) P. Ortiz and *C. longissima* (Kraenzl.) P. Ortiz.

Crossoglossa kolanowskiae Ormerod, *sp. nov.*

TYPE: ECUADOR. Imbabura: Selva Alegre, W of Otavalo, 2850 m, 6 April 1984, *C. Luer, S. Dalstrom & T. Hoijer* 9989 (Holotype: MO). Fig. 7.

Usage synonym: *Crossoglossa tipuloides* auct. non (Lindl.) Dodson, Dodson & Luer, Fl. Ecuador 76: 279, 2005 *p.p.*

Affinis C. sprucei Ormerod *sed foliis brevioribus* (2.5–6.5 vs. 10.0–14.7 cm) *et sinus callus labello V-formis* (vs. *bilobulatis*) *differt*.

Epiphytic herb. *Roots* terete, 0.5–2.0 mm thick. *Rhizome* terete, 8.0–13.5 cm long, 0.2 cm thick. *Stem* terete, 6–7 leaved, 4.0–9.5 cm long (sometimes forming a 11 cm long “stem” comprised of 3 superposed stems), 0.2–0.3 cm thick. *Leaves* narrowly oblong-lanceolate, acute, margins undulate to crispate, 2.5–6.5 cm long, 0.9–2.1 cm wide; petiole and sheath 2.1 cm long. *Inflorescence* terminal, to 25 cm long; peduncle evaginate, 6–10 cm long; *rachis* laxly many-flowered, at least 15 cm long; floral bracts lanceolate, acute, to 7 mm long, 1.6 mm wide. *Flowers* light green, lip (‘synsepal’) with brown stripes. *Pedicellate ovary* slender, 5–7 mm long. *Dorsal sepal* lanceolate, obtuse, base with 2 oblong convexities, 1 veined, 6.1 mm long, 1.8 mm wide. *Lateral sepals* obliquely lanceolate, acute, 1 veined, 5.4 mm long (5.9 mm long along upper margin), 1.5–1.6 mm wide. *Petals* linear-ligulate, subacute, 1 veined, 6 mm long, 0.95 mm wide. *Labellum* elliptic-lanceolate, acute, base auriculate with a patch of papillae on each auricle, margins densely papillose-ciliate, 5 veined, *ca.* 6.5 mm long medially (7 mm long including auricles), 2.95–3.00 mm wide; *callus* bilobulate, lobules triangular, acute, apices divergent. *Column* short, *ca.* 0.75 mm long.

Distribution: Ecuador.

Habitat: Cloud forest, 2850 m.

Eponymy: Named after Marta Kolanowska, student of Neotropical orchids.

This species is probably closest to *C. sprucei* since it has flowers about the same size and a similar lip. However *C. kolanowskiae* may be recognised by its shorter leaves, and flowers that have a simpler callus with a V-shaped (vs. bilobulate) sinus.

Crossoglossa oliveirae Ormerod, *sp. nov.*

TYPE: PANAMA. Bocas del Toro: Trocha 3 de Noviembre, near continental divide, 1500 m, 7 January 1977, *R.L. Dressler* 5570 (Holotype: MO). Fig. 8.

Affinis C. dressleri Ormerod *sed foliis brevioribus* (6.5–10.0 vs. 13.2–15.2 cm) *et pedunculis inflorescentiis longioribus* (7–10 vs. 3.5–5.0 cm) *differt*.

Terrestrial herb. *Roots* terete, pubescent, 0.5–1.0 mm thick. *Rhizome* terete, rooting at nodes, to 7 cm long, 0.05–0.20 cm thick. *Stem* terete, erect, laxly to densely 10–15 leaved, 6–9 cm long, 0.2–0.4 cm thick. *Leaves* ligulate-lanceolate, obtuse to acute, margin undulate, 6.5–10.0 cm long, 0.7–1.2 cm wide. *Inflorescence* terminal, 29.0–39.5 cm long; *peduncle* evaginate or with one sheath (only one seen damaged) 7–10 cm long, 0.25–0.30 cm thick; *rachis* narrowly winged, the wings with irregular dentations, 19.1–29.5 cm long; *floral bracts* lanceolate, acute, margins irregularly dentate, 6–7 mm long, 2.0–3.6 mm wide. *Flowers* pale green. *Pedicellate ovary* narrowly winged, to 7 mm long. *Dorsal sepal* ovate-lanceolate to lanceolate, acute, 1 veined, 5.0–5.5 mm long, 1.40–1.75 mm wide. *Lateral sepals* obliquely lanceolate, obtuse, 1 veined, 4.8–5.0 mm long medially (5.5 mm long along upper margin), 1.20–1.25 mm wide. *Petals* linear-ligulate, subacute, 1 veined, 5.20–5.75 mm long, 0.75 mm wide. *Labellum* rhombic to ovate-elliptic, acute, base auriculate with each auricle covered by a patch of papillae, margin shortly papillose-ciliate, 5 veined, 5.8–6.3 mm long medially (6.1–6.9 mm long including auricles), 3.25–3.70 mm wide; *callus* bilobulate, lobules ovate to lanceolate, acute to obtuse, concave to flat, apices divergent. *Column* short, stout, *ca.* 0.75 mm long.

Distribution: Panama.

Habitat: On boulder (type), cloud forest (*van der Werff & van Hardeveld* 6716), and lower montane rainforest with trees to 5 m tall (*Mori & Kallunki* 5840), 1100–1675 m.

Specimens examined: PANAMA. Chiriqui: Distrito Boquete, Fortuna Dam site, along trail following continental divide, 1100 m, 8 February 1985, *H. van der Werff & C. van Hardeveld* 6716 *p.p.* (MO); N of San Felix at the Chiriqui/Bocas del Toro provincial border, on copper mine road of Cerro Colorado, along continental divide, 1525–1675 m, 4 May 1975, *S. Mori & J. Kallunki* 5840 (MO).

Eponymy: Named after Maria H. de Oliveira (1943–), to whose kindness the author is indebted.

This species is florally similar to *C. dressleri* but it is easily recognized by its more compact habit, leafier (10–15 vs. 3–9 leaves) stems, longer (7–10 vs. 3.5–5.0 cm) inflorescence peduncle, irregularly dentate (vs. entire or hardly dentate) floral bracts and narrower (3.25–3.70 vs. 4.2–6.0 mm) lip. I have not included the color notes (flowers white) of the collection *van der Werff & van Hardeveld* 6716 in the above description since it is a mixture of *C. blephariglottis* and *C. oliverae*. It is not certain to which taxon the color notes refer to.

Crossoglossa pellucida Ormerod, *sp. nov.*

TYPE: PANAMA. Bocas del Toro: near Fortuna Dam trail along continental divide, 1300–1400 m, 6 February 1987, *G. McPherson* 10382 (Holotype: MO). Fig. 9.

Affinis C. dressleri Ormerod *sed sepalis floribus brevioribus* (3.6–3.8 vs. 5.8–8.0 mm), *labello latolanceolatis* (vs. *ovato-ellipticis*) *et angustioribus* (1.8 vs. 4.2–6.0 mm) *differt*.

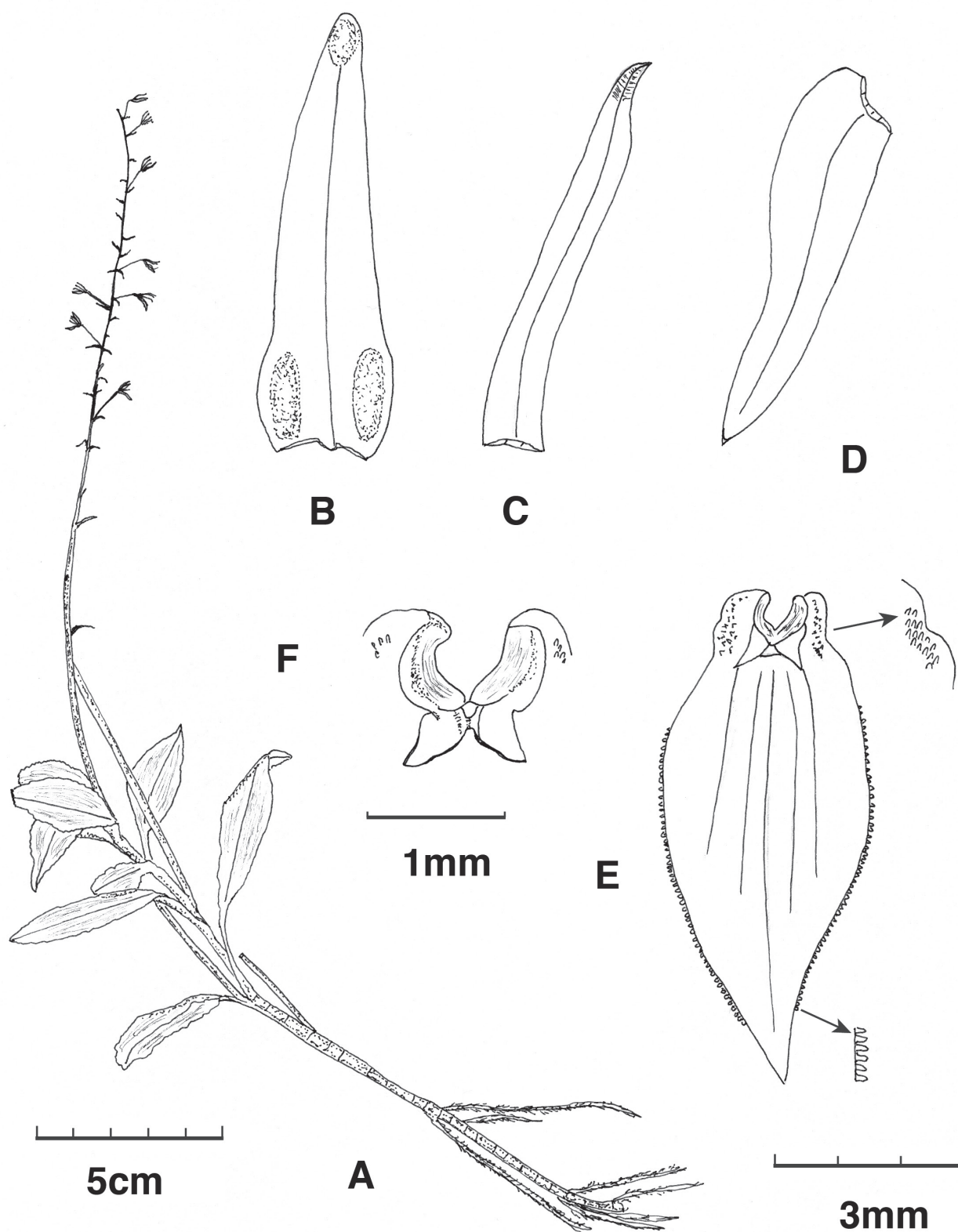


FIGURE 7. *Crossoglossa kolanowskiae* Ormerod. A, plant; B, dorsal sepal; C, petal; D, lateral sepal; E, labellum (papillae arrowed); F, labellum base. Drawn from holotype.

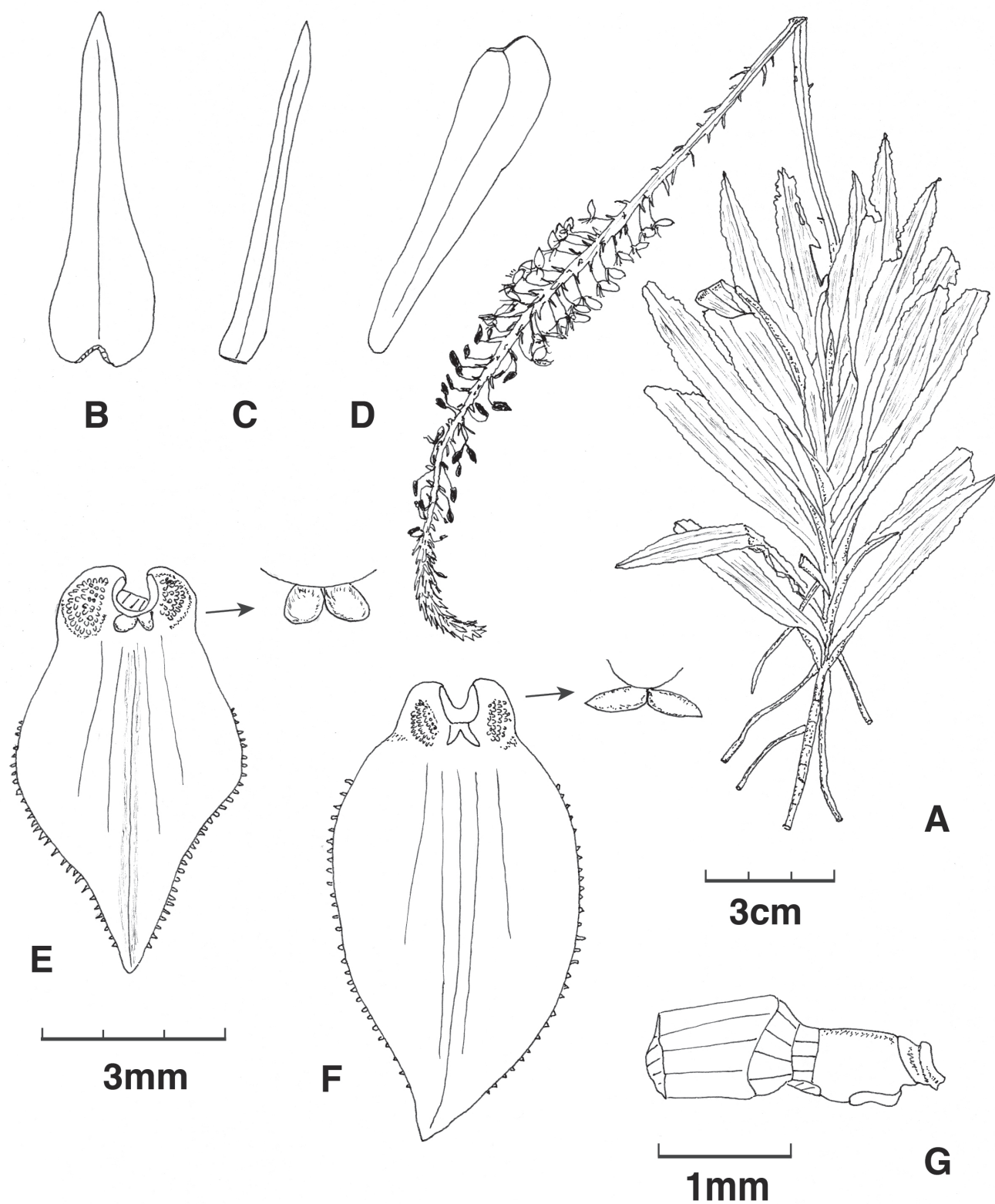


FIGURE 8. *Crossoglossa oliverae* Ormerod. **A**, plant; **B**, dorsal sepal; **C**, petal; **D**, lateral sepal; **E–F**, labellums (calli arrowed); **G**, column. **F** from *H. van der Werff & C. van Hardeveld 6716* (MO), rest from holotype.

Epiphytic herb. Roots terete, pubescent, 0.5–1.0 mm thick. Stem terete, 11–12 leaved, ca. 4.5 cm long, 0.2–0.3 cm thick. Leaves oblanceolate, subacute to obtuse, base subpetiolate, 7.5–12.3 cm long, 1.00–1.95 cm wide. Inflorescence terminal, 50.2 cm long; peduncle ca. 7.8 cm long; sheathing bracts 2, 1.0–1.5 cm long; rachis subaxly to subdensely many-flowered, 42.4 cm long; floral bracts lanceolate, acute, margin irregularly dentate, 3–8 mm long, 0.6–2.2 mm wide. Flowers translucent green. Pedicellate ovary slender, narrowly winged, ca. 4 mm long. Dorsal sepal lanceolate, subacute, 1 veined, 3.8 mm long, 1.2 mm wide. Lateral sepals obliquely lanceolate, subacute, 1 veined, 3.6 mm long medially (3.75 mm long along upper margin), 1.1 mm wide. Petals linear-ligulate, acute, 1 veined, 3.8 mm long, 0.4 mm wide. Labellum broadly lanceolate, acute, base auriculate with a band of papillae on each auricle, margin laxly dentate-papillose, 5 veined, 4 mm long medially (4.2 mm long including auricles), 1.8 mm wide. Column short, ca. 0.6 mm long.

Distribution: Panama.

Habitat: Forest, 1300–1400 m.

Etymology: The specific epithet comes from the Latin *pellucidus*, itself derived from *perlucidus*, meaning transparent, in reference to the flowers appearing rather translucent in the dry state.

This species is a relative of its Central American congeners *C. dressleri* and *C. oliveirae* but differs from both of them in its smaller flowers and narrower, broadly lanceolate lip. In habit it is most like *C. dressleri* but the stem has a few more leaves and the inflorescence peduncle is longer.

Crossoglossa sprucei Ormerod, *sp. nov.*

TYPE: ECUADOR. Tungurahua: Volcan Tungurahua, 2440 m, May 1858, R. Spruce *s.n.* (Holotype: K). Fig. 10.

Affinis C. kolanowskiae Ormerod *sed foliis longioribus* (10.0–14.7 vs. 2.5–6.5 cm) *et sinus callus labello bilobulatis* (vs. V-formis) *differt*.

Terrestrial herb. Roots terete, pubescent, to 1.5 mm thick. Rhizome terete, 6.5 cm long, 0.20–0.25 cm thick. Stem terete, 10 leaved, ca. 9.4 cm long, 0.3 cm thick. Leaves ligulate-oblanceolate, acute, base subpetiolate, margins wavy, drying dark, 10.0–14.7 cm long, 1.1–1.2 cm wide. Inflorescence terminal, ca. 25.2 cm long; peduncle evaginate, ca. 8.7 cm long; rachis subaxly many-flowered, ca. 16.5 cm long; floral bracts lanceolate, acute, to 7 mm long, 1.8–2.0 mm wide. Flowers reddish green. Pedicellate ovary slender, ca. 6 mm long. Dorsal sepal lanceolate, subacute, 1 veined, ca. 5.6 mm long, 1.7 mm wide. Lateral sepals obliquely lanceolate, acute, 1 veined, 5.8–6.0 mm long, 1.60–1.75 mm wide. Petals linear-ligulate, subacute, 1 veined, 5.5 mm long, 0.6 mm wide. Labellum ovate-lanceolate, subacute, base auriculate with a broad band of papillae on each auricle, margin papillose-ciliate, 5 veined, 6.5 mm long medially (6.8 mm long including auricles), 2.8–2.9 mm wide; callus quadrilobulate, outer arms lanceolate, acute, divergent, medially with 2 circular, obtuse, lobules. Column short, stout, ca. 0.6 mm long.

Distribution: Ecuador.

Eponymy: Named after the botanist-explorer Richard Spruce (1817–1893), collector of the type.

This species is probably most closely related to *C. kolanowskiae* but it has longer leaves, and flowers in which the labellum has a bilobulate (vs. V-shaped) sinus.

Crossoglossa steinii (Dodson) Dodson, Nat. Ecuad. Orch. 1: 149, 1993.

Basionym: *Malaxis steinii* Dodson, Icon. Pl. Trop. s.2: t.527, 1989. TYPE: ECUADOR. Morona-Santiago: Limon (General Plaza) to Cuenca road, ca. 3 km above Plan de Milagro, 1900–2000 m, 18 May 1985, B. Stein 2812 (Holotype: QCNE, not seen; Isotypes: MO, 2 sheets). Fig. 11.

Flowers entirely green. Pedicellate ovary slender, ca. 4.5 mm long. Dorsal sepal oblong-lanceolate, acute to obtuse, 1 veined, 5.2–6.5 mm long, 1.6–2.2 mm wide. Lateral sepals obliquely lanceolate, obtuse, 1 veined, 4.8–5.4 mm long medially (5.0–6.2 mm long along top margin), 1.80–2.25 mm wide. Petals ligulate, obtuse to emarginate, 4.95–5.8 mm long, 0.95–1.40 mm wide. Labellum ovate to ovate-elliptic, acute, base auriculate, margins papillose-dentate, 5–7 veined, 6.60–7.15 mm long medially (6.90–7.95 mm long including auricles); callus bilobed, arms triangular to lanceolate, acute to subacute, apices curved to straight, divergent. Column short, stout, 0.6–0.8 mm long (0.8–1.0 mm long including anther cap).

Distribution: Ecuador.

Specimen examined: ECUADOR. Zamora-Chinchipe: Palanada, Region de la Cordillera del Condor, S sector, Parroquia San Francisco de Vergel, Cuenca alta del Rio Vergel, Sangola track, 2200 m, 12 March 2005, W. Quizhpe, B. Medina, C. Aguirre & M. Prado 985 (MO).

Habitat: Shrubby Paramo, dominated by Bromeliaceae, *Macrocarpaea*, *Clusia* and Melastomaceae, substrate sandstone rock (Quizhpe et al. 1985), wet, upper montane cloud forest (type), 1900–2200 m.

I have supplied an emended floral description based on the type and the other collection cited above. Though the lip was originally described as obovate and entire, examination of the type shows it to be broadly elliptic with papillose-dentate margins. *Crossoglossa steinii* was only known from the type but now a second specimen has been found in MO. This differs from the type in having slightly smaller flowers, a more ovate lip, with stouter, straighter callus arms.

Crossoglossa tetraphylla Ormerod, *sp. nov.*

TYPE: PERU. Cajamarca: Prov. Cutervo, Distrito San Andres de Cutervo, Parque Nacional de Cutervo, caserio “Pajonal,” towards the divide, road towards Jaen (waterfall), 2600 m, 10 August 1987, C. Diaz S. & H. Osorio 2603 (Holotype: MO). Fig. 12.

Affinis C. neirynckiana Szlach. & Marg. *sed caule 3–4* (vs. 6–10) *foliatis et foliis lineari-ligulatis* (vs. lanceolatis) *differt*.

Terrestrial herb. Roots terete, fleshy, 0.5–3.0 mm thick. Rhizome terete, woody, formed from previous stems, 24.5 cm long, 0.45–0.60 cm thick. Stem terete, 3–4 leaved, ca. 7.2 cm

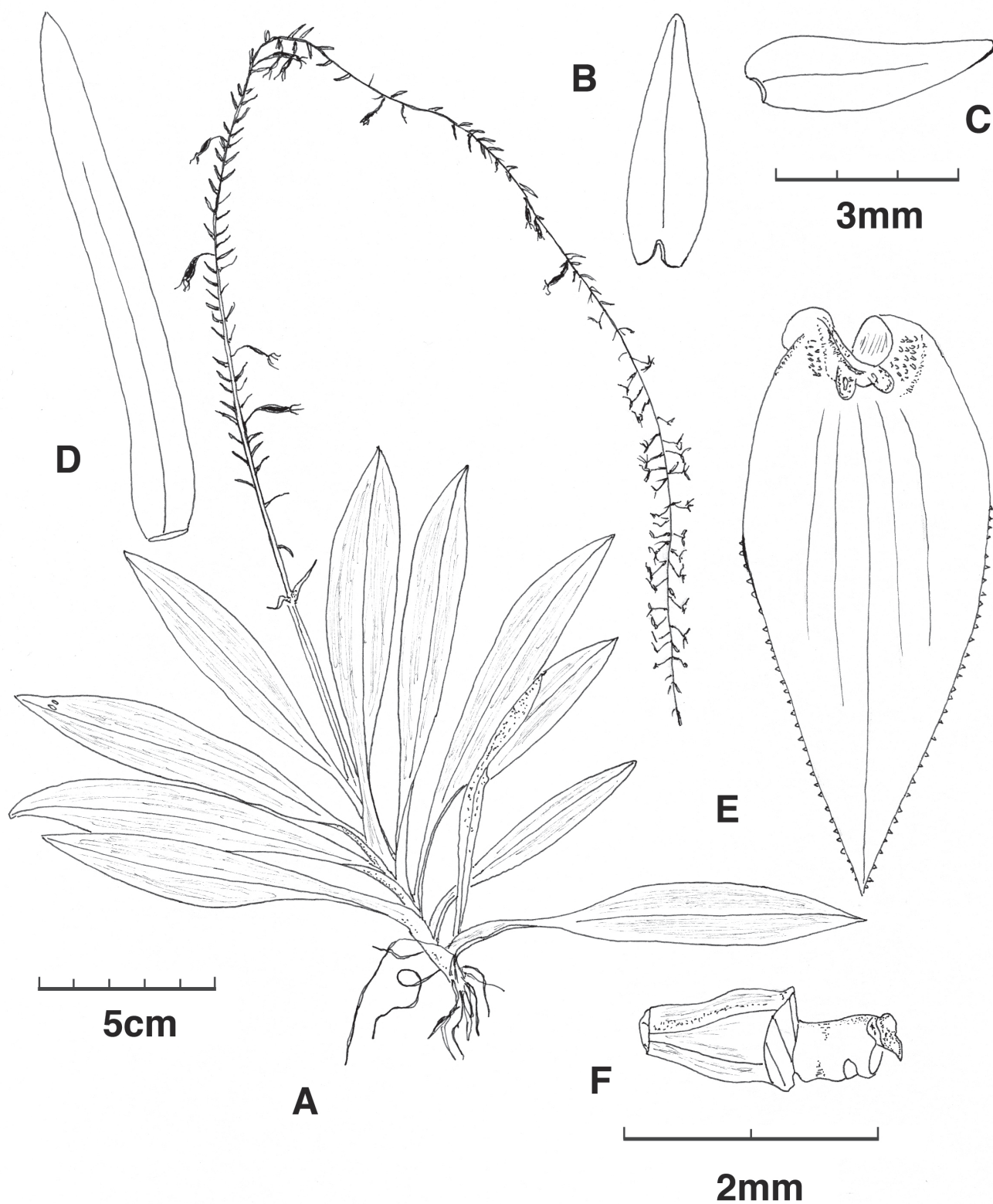


FIGURE 9. *Crossoglossa pellucida* Ormerod. A, plant; B, dorsal sepal; C, lateral sepal; D, petal; E, labellum; F, column. Drawn from holotype.

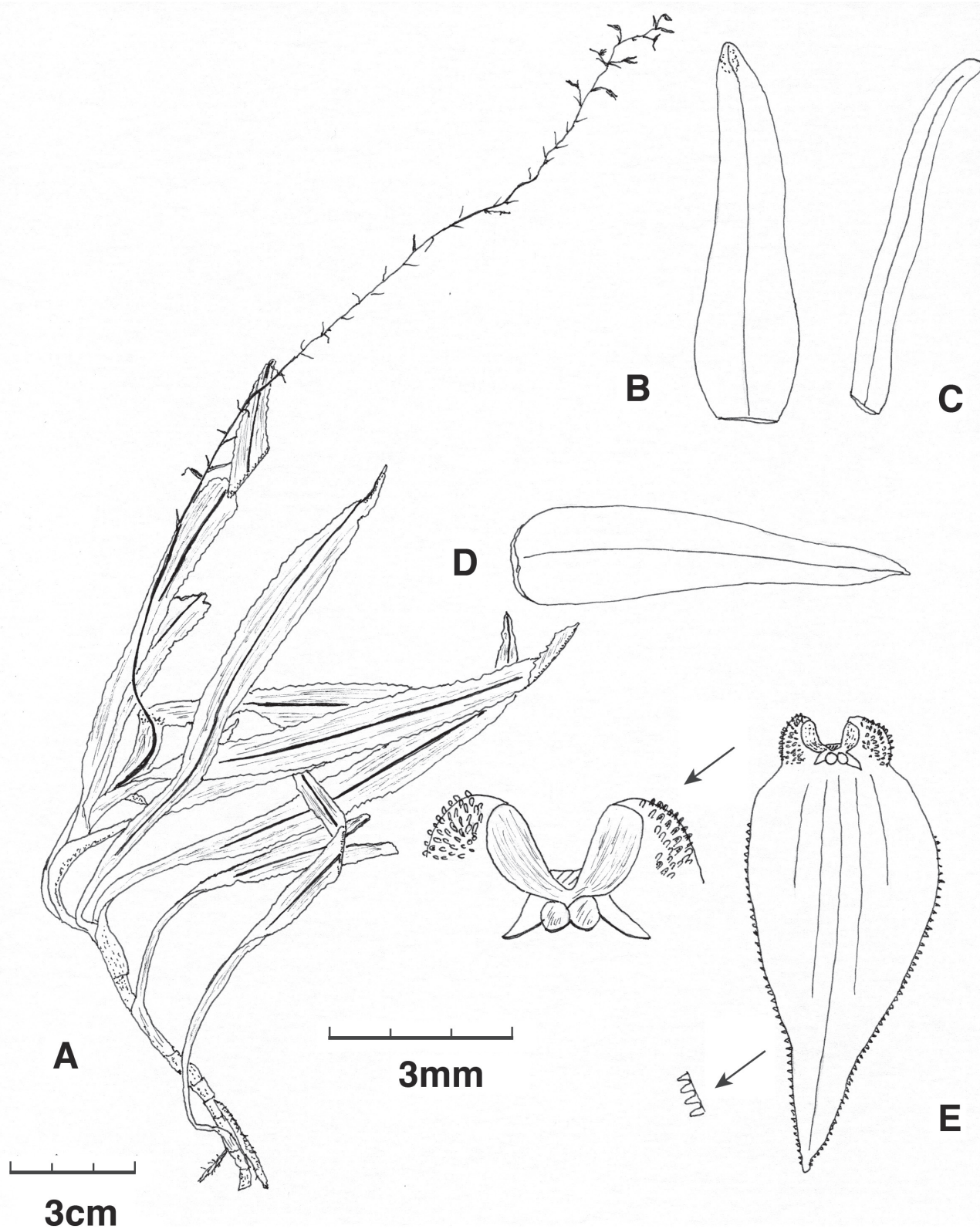


FIGURE 10. *Crossoglossa sprucei* Ormerod. A, plant; B, dorsal sepal; C, petal; D, lateral sepal; E, labellum (base and papillae arrowed). Drawn from holotype.

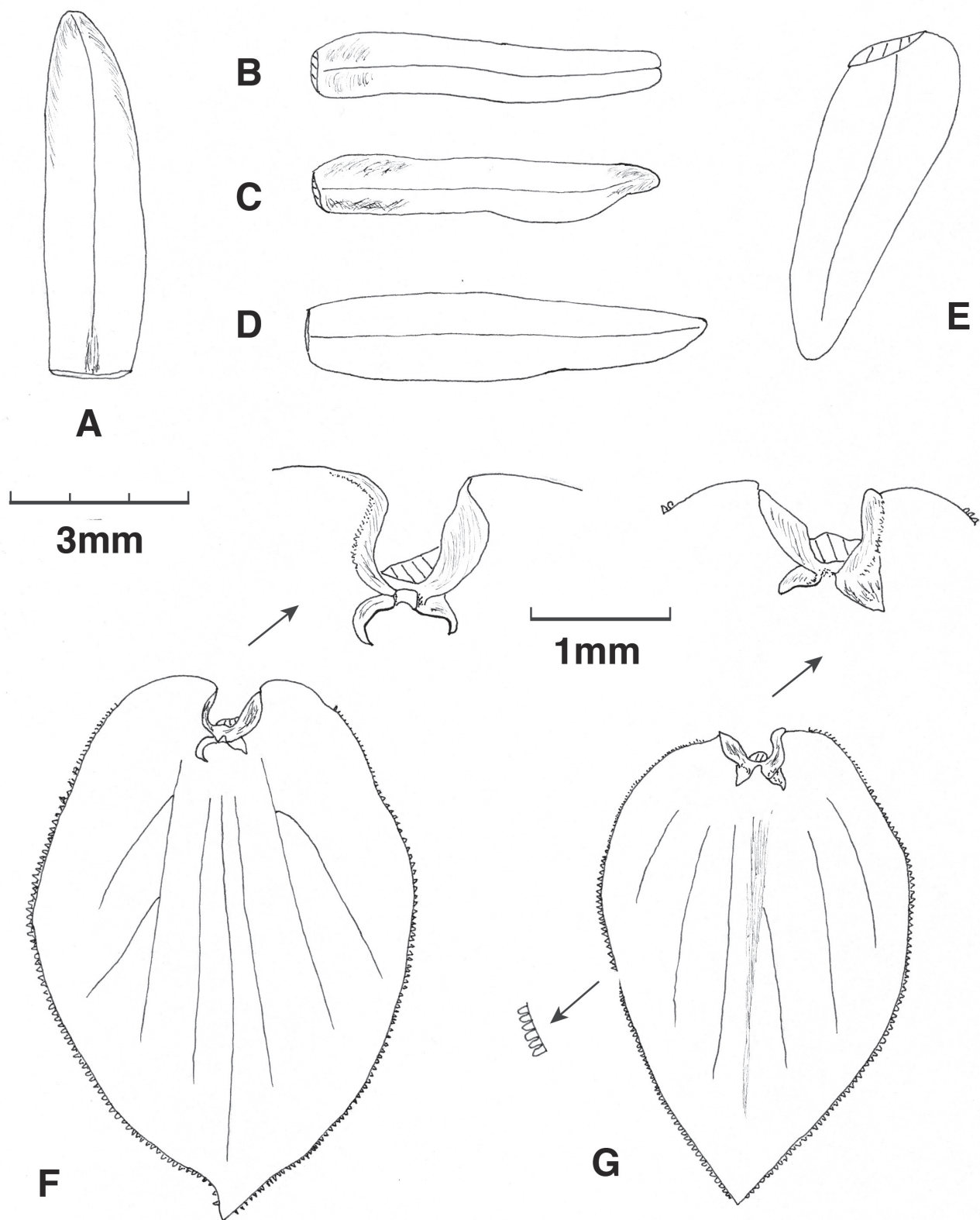


FIGURE 11. *Crossoglossa steinii* (Dodson) Dodson. A, dorsal sepal; B–D, petals; E, lateral sepal; F–G, labellums (bases arrowed). DF from isotype, rest from W. Quizhpe et al. 985 (MO).

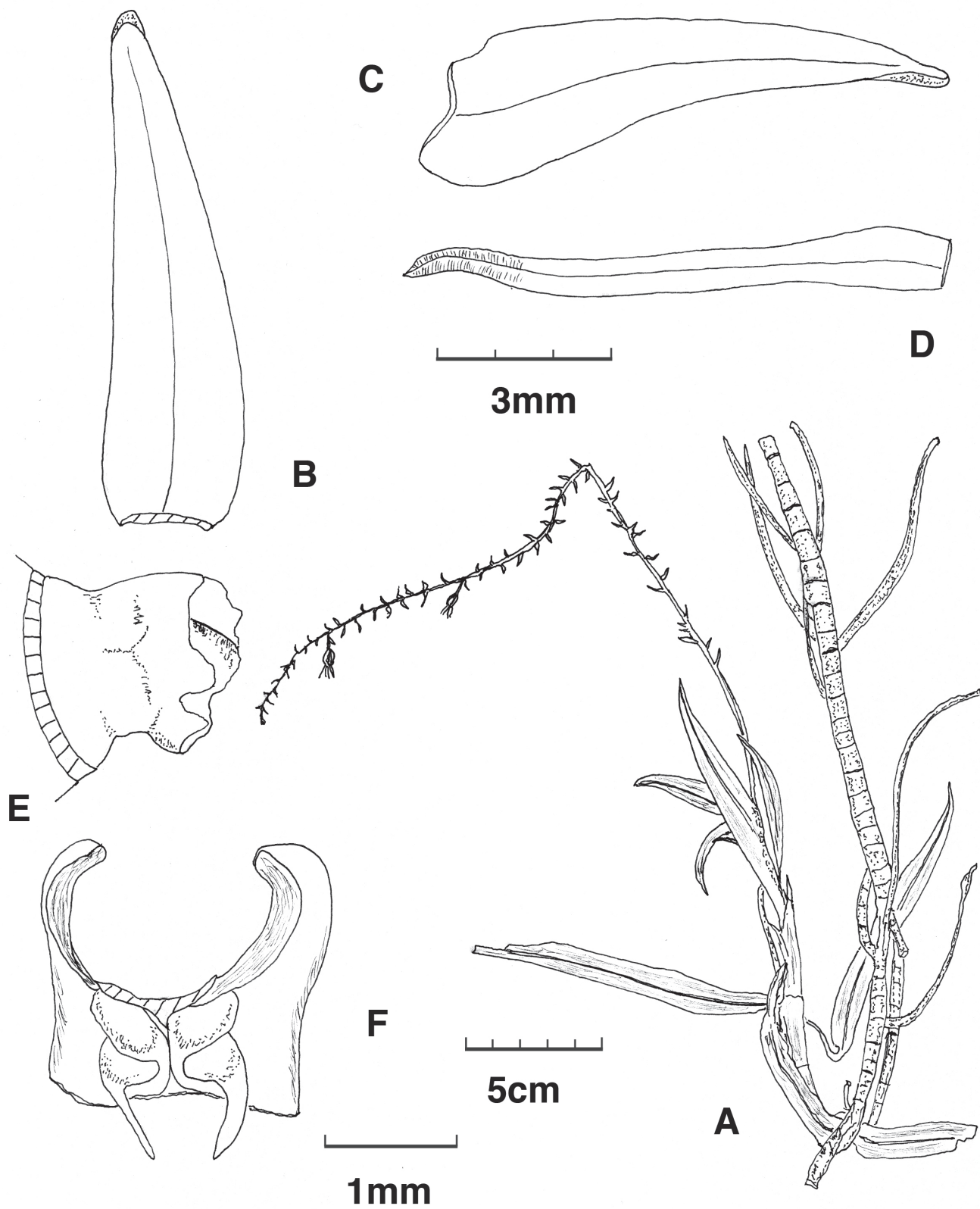


FIGURE 12. *Crossoglossa tetraphylla* Ormerod. A, plant; B, dorsal sepal; C, lateral sepal; D, petal; E, column (swollen); F, labellum base. Drawn from holotype.

long, 0.4 cm thick. *Leaves* linear-ligulate, acute to subacute, 10.0–11.5 cm long, 1.0–1.3 cm wide. *Inflorescence* terminal, green, 35 cm long; peduncles evaginate, 10.5 cm long; *rachis* subaxly to subdensely many-flowered, angulate, 24.5 cm long; *floral bracts* ovate to lanceolate, acute to subacuminate, 3–10 mm long, 2–4 mm wide. *Flower* color unknown. *Capsule* obovoid, green, 13.2 mm long (including 7.2 mm long pedicel). *Dorsal sepal* lanceolate, obtuse, 1 veined, 7.75 mm long, 2.1 mm wide. *Lateral sepals* obliquely lanceolate, subacute, 1 veined, 7.65 mm long medially (8 mm long along upper margin), 2.3 mm wide. *Petals* linear-ligulate, acute, 1 veined, 8 mm long, 0.95 mm wide. *Labellum* (basal part remaining only) auriculate, 2.75 mm wide; *auricles* cornute, papillose inside, ca. 1.5 mm long; *callus* bilobulate, lobules with incurved,

subulate arms. *Column* short, stout, ca. 1 mm long.

Distribution: Peru.

Etymology: The specific epithet is derived from the Classical Greek *tetras*, four, and *phullon*, leaf, in reference to the four leaved stems.

I describe this species from incomplete floral material (all flowers only have the basal part of the lip remaining). The habit of the plant is quite distinctive, it has short stems topped by three to four narrow leaves, and a long woody rhizome composed of previous stems. The flowers are much like those of the Ecuadorian *C. neirynckiana* Szlach. & Marg. in the shape of the segments and form of the labellum callus but the latter has multileaved (6–10 vs. 3–4) stems with broader (24–34 vs. 10–13 mm), lanceolate (vs. linear-ligulate) leaves.

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