



Four new species of *Lockhartia* (Orchidaceae, Oncidiinae)

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Abstract

Four new species of *Lockhartia* are described and illustrated: *L. compacta* from Bolivia, *L. endresiana* from Costa Rica, *L. rugosifolia* from Ecuador and Peru, and *L. tenuiflora* from Ecuador and Colombia. Comments are given on their phenology, distribution, conservation status, and distinction from similar species.

Resumen

Se describen e ilustran cuatro nuevas especies de *Lockhartia*: *L. compacta* de Bolivia, *L. endresiana* de Costa Rica, *L. rugosifolia* de Ecuador y Perú, y *L. tenuiflora* de Ecuador y Colombia. Se brindan comentarios sobre su fenología, distribución, estado de conservación y distinción de especies semejantes.

Key words: Augustus Endrés, Bolivian-Tucuman Forest biome, Huancabamba Depression, Utcubamba River basin.

Introduction

Orchids of the genus *Lockhartia* Hooker (1827: t. 2715) are naturally distributed from central-western Mexico to southeastern Brazil. They are epiphytes that belong in the subtribe Oncidiinae, a group that contains ca. 1,600 exclusively Neotropical species (Chase 2009a, 2009b). Most species of *Lockhartia* have a very particular vegetative morphology, with elongate stems completely covered by imbricate, laterally flattened leaves. The shoots resemble hair braids, and for this reason species of *Lockhartia* are often called braided orchids. The morphologically diverse flowers have trichomal elaiophores, which produce oil as a putative reward for pollinators (Blanco *et al.* 2013).

Historically, the systematic position of this genus has been controversial (e.g., Chase 1986, Senghas 1995; summarized by Chase 2009a, 2009b, and Blanco *et al.* 2013), although phylogenetic studies based on molecular data have confirmed its relatively isolated position within subtribe Oncidiinae (Williams *et al.* 2001, Neubig *et al.* 2012).

William Jackson Hooker established the genus in 1827 when he described *Lockhartia elegans* (Hooker 1827: t. 2715). The generic name honors David Lockhart, first superintendent of the Royal Botanic Gardens in Trinidad, who sent plants of this species to Kew. Reichenbach (1855) published the first revision of the genus (reprinted in Reichenbach 1864), in which he recognized 10 species. Kränzlin (1923) published a second revision in which he recognized 29 species; he provided illustrations for most of them, although these are somewhat stylized and inaccurate, and thus not particularly useful for species-level identification (e.g., see Garay 1970). Senghas (1995) published a synopsis of *Lockhartia*, with only 19 species accepted.

All of these treatments are outdated; Senghas's (1995) synopsis misapplies several names, and ten new species were proposed between 1994 and 2012. Species circumscriptions in *Lockhartia* have thus remained confusing and inconsistent. To solve this situation, a taxonomic revision has been carried out as part of a monograph of the genus (to be published elsewhere). As a result, four species new to science have been detected and are described below.

Leaves of *Lockhartia* are typically imbricate, a portion of their base being covered by the sheath of the previous leaf; therefore, their total length usually cannot be measured without carefully opening or removing part of the previous leaf (especially in herbarium specimens). In addition, in all species of *Lockhartia* the leaves gradually decrease in size toward the base of each shoot, where they intergrade with the rhizome bracts. Therefore, in the following descriptions, only the length and width of the exposed parts of the largest leaves are reported (ranges correspond to the observed variation of the largest leaves in the specimens examined, not to absolute variation in the dimensions of all the leaves).

Taxonomy

Lockhartia compacta M.A. Blanco & R. Vásquez, *sp. nov.* (Fig. 1)

Similar to *Lockhartia micrantha* Reichenbach (1852b: 768), but differs from that species in the more compact plants and the structure of the callus, which is suboblong and ligulate (vs. bifid in *L. micrantha*).

Type:—BOLIVIA. Santa Cruz: prov. Florida, El Sillar, 1350 m, Parque Nacional Amboró, epífita en bosque tucumano-boliviano, 3 Julio 1995, *Vásquez 2522* (holotype: LPB!).

Stems straight, descendent, 5–10 cm long when reproductive, more or less rigid, completely covered by the leaves, each one with 20–24 leaves. Leaves marcescent, unifacial, laterally flattened, triangular in side view, with straight to slightly incurving margins, acute to obtuse apically, exposed part of largest leaves 3–16 × 1–8 mm wide. Inflorescences axillary (and probably also terminal) from the distal half of the stem, with 1–2 flowers produced sequentially; exerted portion 5–9 mm long, internodes 1–2 mm long; inflorescence bracts amplexicaul, infundibuliform, cordate-acute when flattened, 2.5–3 × 2–3 mm; pedicel and ovary 4–5 mm long. Flowers resupinate, widely open, 7–8 mm tall, yellow with scant brown markings at the base of the lateral lobes of labellum and dark brown at base of column; labellar callus pale brown. Sepals elliptic to obovate, slightly concave, apex apiculate and navicular, 4–4.5 × 2.5 mm. Petals elliptic, flat, apically rounded, 4.5 × 3 mm. Labellum 3-lobate; the lateral lobes oblong, gradually diminishing in width, erect, 3 × 1 mm, apically rounded; midlobe distally 4-lobulate, apically emarginate, 6 mm long, 2.5–3 mm wide at the base, 4.5 mm at the widest part near the apex, with a slightly concave disk 1 × 1.5 mm at the base (with glandular hairs); prolonged into a simple oblong callus, 2.5 × 1 mm. Column triangular, subequilateral, 1.5–2.5 mm wide at base, 2 mm tall without anther cap, stigmatic cavity ovate, 7–8 mm long, rostellum remnant digitiform, protruding into apical part of stigma; anther cap not seen; pollinarium 0.5 mm tall, viscidium triangular, stipe bifid, with two pollinia; pollinia ellipsoid, 0.2 mm long. Fruit not seen.

Phenology:—Flowering at least in July and September.

Distribution:—Endemic to Florida province, department of Santa Cruz, in the eastern side of the eastern Andean Cordillera in Bolivia, from 1000 to 1300 m. This represents the southern limit of distribution of the genus *Lockhartia* in the Andes (*L. lunifera* [Lindley 1839: misc. 91–92] Reichenbach [1852b: 767] and *L. goyazensis* Reichenbach [1852b: 768] occur farther south in Brazil).

Additional specimens examined:—BOLIVIA. Santa Cruz: Prov. Florida, Refugio Los Volcanes, Río Elvira, 1000 m, *Vásquez et al. 4259* (Herb. R. Vásquez); Prov. Florida, Refugio Los Volcanes, Río Elvira, 1000 m, *Vásquez et al. 4281* (Herb. R. Vásquez).

Conservation status:—*Lockhartia compacta* is known from very few collections and appears to be rare and restricted to a small area of the Bolivian-Tucuman Forest biome. Collectors likely overlook plants of *L. compacta* because of their small flowers.

Etymology:—The name comes from the Latin *compactus*, in reference to the very compact plants and their small flowers.

Comments:—*Lockhartia compacta* is very similar to *L. micrantha*, but differs from that species in the ligulate callus and the more distal position of the lateral lobules of the labellum midlobe. *Lockhartia micrantha* has a bifid callus. Plants of *L. compacta* have more compact shoots than those of *L. micrantha* (2.4–4 vs. 1.5–3.5 leaves per linear cm of stem, respectively). The ranges of both species are separated by thousands of kilometers (*L. micrantha* occurs from Nicaragua to Colombia and Venezuela).

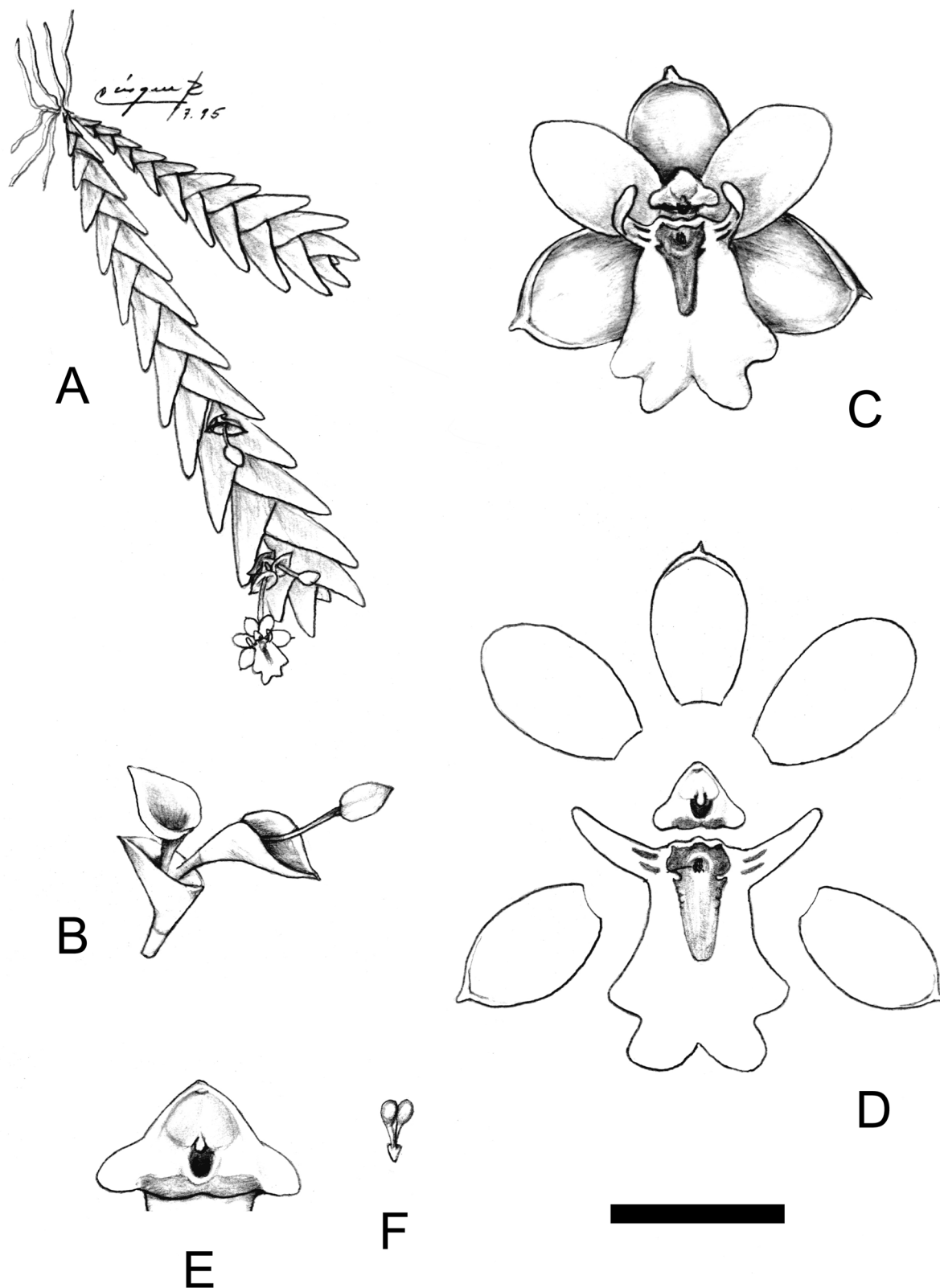


FIGURE 1. *Lockhartia compacta* M.A.Blanco & R.Vásquez. **A.** Plant habit. **B.** Inflorescence, with a bud. **C.** Flower, front view. **D.** Dissected perianth parts (flattened), with column in center (ventral view). **E.** Column, ventral view. **F.** Pollinarium. Scale bar: 3 cm (for A), 5 mm (for B–D); 1.8 mm (for E–F). Drawing by Roberto Vásquez, based on *Vásquez 2522* (LPB).

Furthermore, *Lockhartia compacta* superficially resembles *L. goyazensis*, which occurs in Bolivia (e.g., misidentified as *L. ludibunda* Reichenbach (1857: 159) in Dodson & Vásquez 1989). In Bolivia, however, *L. goyazensis* occurs at lower elevations (150–400 m, although it has been collected as high as 900 m in Brazil) in the

Humid Evergreen Forest and Humid Amazonian Forest biomes (sensu Vásquez & Ibisch 2000). *Lockhartia goyazensis* has slightly larger flowers with longer and narrower lateral lobes of the labellum and a massive, tuberculate callus that covers a large portion of the middle lobe (ca. 50% of its surface, vs. ca. 20% in *L. compacta*, which has a smooth callus).

Lockhartia endresiana M.A. Blanco, *sp. nov.* (Figs. 2, 5A)

Similar to *Lockhartia grandibractea* Kränzlin (1923: 15), but differs from that species in the structure of the callus, which consists of six to eight longitudinal, denticulate, gill-like keels (vs. an irregular mass of tubercles in *L. grandibractea*), and in the narrower basal lobes of the labellum.

Type:—COSTA RICA. Alajuela: San Ramón, camino a Colonia Palmareña, 600 m, 10°51'06"N 84°31'06"W, collected without flowers on 23 January 2001 by M. Blanco, R. Moran, E. Watkins & E. Vargas, flowered in cultivation at Lankester Botanical Garden on 15 July 2002, *Blanco 1803* (holotype: USJ!).

Stems erect, more or less rigid, 15–35 cm long when reproductive, with 28–48 leaves; shoots (stem and leaves) 8–20 mm wide. Leaves marcescent, unifacial, laterally flattened, triangular in side view, acute, with straight to incurving margins, exposed part of largest leaves 5–19 × 3–6 mm. Inflorescences both terminal and axillary from the distal part of the stem, with 1–3 flowers produced more or less simultaneously; exerted portion 1–3 cm long; inflorescence bracts amplexicaul, infundibuliform, subrotund, cordate, obtuse to round apically, 8 × 8–9 mm; pedicel and ovary 14 mm long. Flowers resupinate, widely open, 14–18 mm tall; yellow with dark chocolate-brown markings on the lateral lobes, disk, and central keels of callus of the labellum, and a dark brown line at the base of the column; occasionally spotted on the upper part of the column and at the base of the petals. Sepals ovate to elliptic, slightly concave, obtuse, 6–7 × 4–5 mm. Petals oblong-elliptic, slightly incurved, with revolute margins, rounded to truncate apically, 7–7.5 × 4–4.5 mm when flattened. Labellum 3-lobate; the lateral lobes oblong, incurved, 6 × 1.5 mm, apically obtuse to rounded; midlobe divided in 4 lobules (the two basal ones triangular and projected backward, the two distal ones rounded when flattened), apically emarginate, 10.5–11 mm long, 10.5–11.5 mm wide (across the widest part of midlobe when flattened); callus subquadrate, the basal part forming a subquadrate concave cushion with a basal tuft of short, glandular hairs, 2 × 2 mm, the distal part formed by 6–8 high (to 1.5 mm tall), subparallel, denticulate keels, 4 × 3.5 mm when labellum is flattened. Column hastate, truncate, held perpendicular to the labellum, 3–3.5 mm long, 4.5–5 mm wide at base, 2.3 mm wide distally; anther cap hemispherical, 1–1.3 mm in diameter; pollinarium not seen. Fruits not seen.

Phenology:—Field collections indicate that flowering occurs from March to September, during Costa Rica's rainy season.

Distribution:—Presently known only from Costa Rica, from 600 to 1,450 m on the Caribbean slope of the Guanacaste and Tilarán cordilleras and on the Pacific slope of the Talamanca cordillera. Several collections from places close to the Panamanian border suggest that *L. endresiana* also occurs in adjacent Chiriquí province of Panama, but I have not seen any flowering collections from that country; specimens without flowers would be impossible to distinguish from *L. amoena* Endrés & Rchb.f. (in Reichenbach 1872: 666) and *L. grandibractea*.

Additional specimens examined:—COSTA RICA. **Without additional locality data, cultivated:** 19 October 1994, *LeDoux & Stern 355* (MO). **Alajuela:** Guatuso, Cote, Lago Cote, 640 m, 4 June 2004, *Gómez-Laurito 14314* (USJ), same location, flowered in cultivation in Cartago, 3 June 2013, *Blanco 4152* (USJ); San Ramón, camino a Colonia Palmareña, 600 m, 10°51'06"N 84°31'06"W, collected without flowers on 23 January 2001 by M. Blanco, R. Moran, E. Watkins & E. Vargas, flowered in cultivation at Lankester Botanical Garden on 23 June 2004, *Blanco 1803* (FLAS; not an isotype because the specimen was prepared on a different date). **Cartago:** Turrialba, Guayabo, 16 September 1991, *Mora s.n.* (USJ-spirit no. 57678); Turrialba, Tayutic, Vereh, Grano de Oro, 2 km al E, camino a Llanos del Quetzal, 1200 m, 28 July 1995, *Herrera & Cascante 8163* (CR, F, K). **Guanacaste:** Guatuso, Cordillera de Tilarán, Lago Coter, 700 m, 18 May 1997, *Rivera 3080* (CR); Liberia, Parque Nacional Guanacaste, Estación Cacao, 1100 m, 1 June 1990, *Carballo 40* (CR). **Puntarenas:** Buenos Aires, Boruca, 700–1000 m, July 1976, *Ocampo 1423* (CR); Coto Brus, San Vito, Estación Biológica Las Cruces, Sendero Ridge, 28 August 2008, *Oviedo-Brenes 214* (HLDG), 1219 m, 16 August 1967, *Raven 21820* (F), 1 mile due S of San Vito de Java, 1067 m, 18 August 1967, *Raven 21906* (CR, DUKE, F, PMA, SEL, U); Río Sirena [Río

Sereno?], Sabalito, 1991, *Soto s.n.* (USJ-spirit no. 57681); Zona Protectora Las Tablas, Finca Las Alturas, road from Las Alturas to Fila Tigre, 1450 m, 3 July 2004, *Pupulin et al.* 4493 (JBL-spirit); Zona Protectora Las Tablas, Finca Las Alturas, road from Las Alturas to Fila Tigre, 1450 m, 22 March 2003, *Pupulin et al.* 4518 (JBL-spirit).

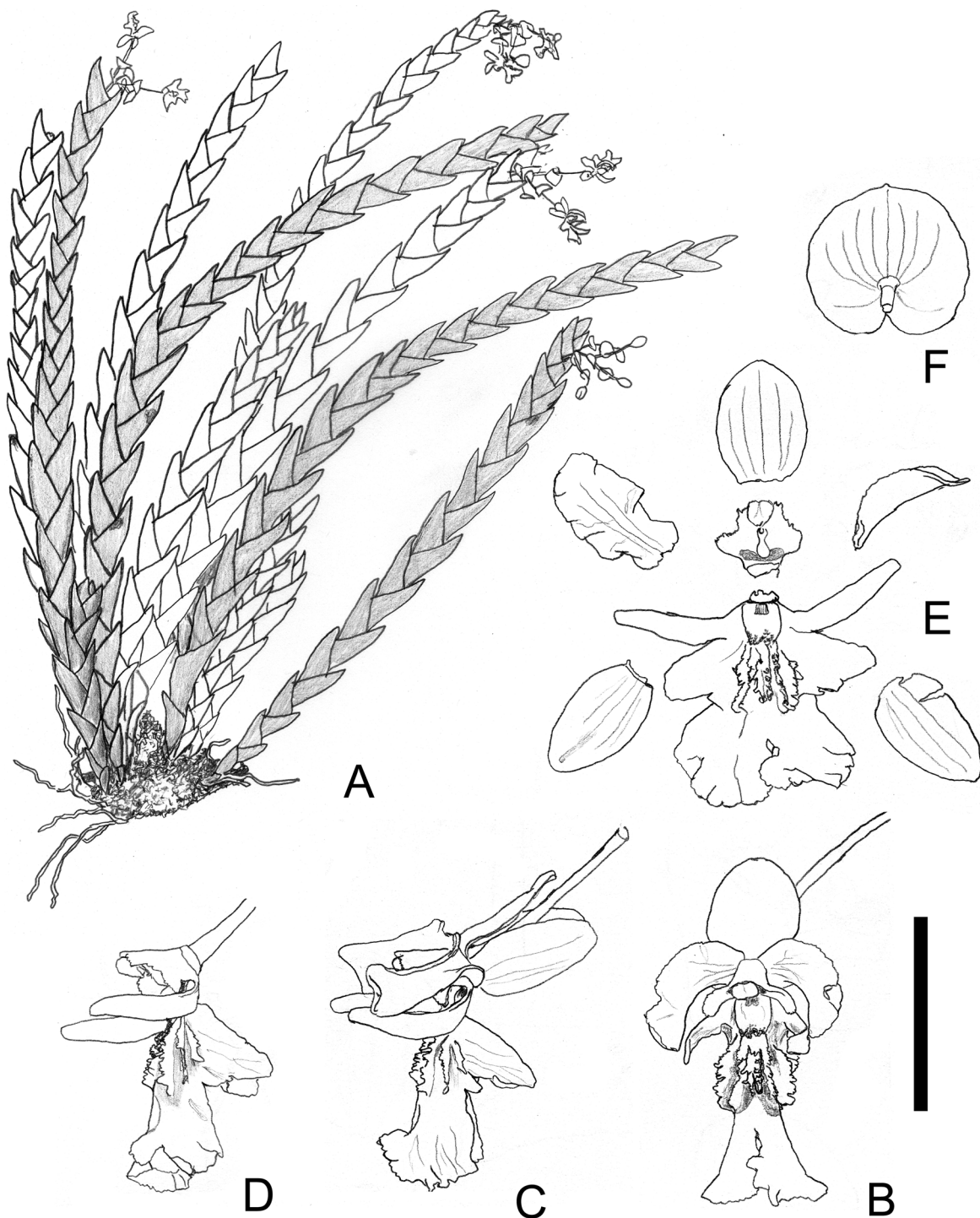


FIGURE 2. *Lockhartia endresiana* M.A.Blanco. **A.** Plant habit. **B.** Flower, front view. **C.** Flower, lateral view. **D.** Same as previous, with sepals and lateral petals removed. **E.** Dissected perianth parts (flattened, except lateral petal on right), with column in center (ventral view). **F.** Floral bract, flattened. Scale bar: 5.5 cm (for **A**), 1.0 cm (for **B–F**). Drawing by the author; **A**, based on Carballo *et al.* 40 (CR); **B–F** based on Blanco 1803 (FLAS).

Conservation status:—Although not too common, *Lockhartia endresiana* seems to be well distributed in Costa Rica and has been found in or near several protected areas. This species is not threatened.

Etymology:—The epithet honors Augustus R. Endrés (1838–1874; Ossenbach *et al.* 2010), who first illustrated this species. Endrés also collected the type specimens (or the living plants that served as material for the

types) of five other species names in *Lockhartia*, i.e., *L. amoena* Endrés & Rchb.f., *L. cladoniophora* Reichenbach (1888: 150), *L. grandibractea* Kraenzl., *L. hercodonta* Kränzlin (1923: 8), and *L. odontochila* Kränzlin (1923: 17).

Comments:—*Lockhartia endresiana* is the only species in the genus that has a callus composed of thin, raised (up to 1.5 mm), gill-like keels. It is most similar to *L. grandibractea*, with which it shares the general shape of the labellum and column. Both species have a hastate column (as seen from below, due to the column wings being twice as wide at the proximal half than at the distal half), and it is impossible to distinguish them in the absence of flowers. However, *L. endresiana* differs by the structure of its callus (composed of a compact mass of low tubercles in *L. grandibractea*). A few collections from the area around the Costa Rican-Panamanian border are intermediate between both species, which suggests that hybridization occurs between them. Both species flower mostly during the rainy season, which would permit this. Despite the existence of these intermediates, the callus morphology is very different and clearly distinguishable in most collections, and, in my opinion, this justifies their treatment as different species.

Lockhartia endresiana and *L. grandibractea* have been commonly confused with *L. amoena* in herbaria, and even *L. grandibractea* has been considered a synonym of *L. amoena* in recent treatments of Costa Rican Orchidaceae (e.g., Pupulin 2002, Dressler 2003). Although superficially similar, *L. amoena* differs from both *L. endresiana* and *L. grandibractea* in its less deeply lobed labellum midlobe, and in its much larger, subquadrate column wings that are wider distally and with a crenate margin.

Augustus Endrés prepared a detailed drawing of *Lockhartia endresiana* (Endrés 302, W-Reich.-Orch. no. 33697), which includes a stem with an inflorescence, front and side view of the flower, a detail of the callus base with the elaiophore, six details of the column, and the pollinarium with detached pollinia. At the bottom and on the right side of the sheet there are drawings of a column with wide, flabellate wings, likely representing *L. amoena*. There is no indication of the original locality for any of these elements in the drawing, and their corresponding vouchers have not been found and may have not been preserved.

Lockhartia rugosifolia M.A.Blanco, *sp. nov.* (Figs. 3, 5B,C)

Distinguished by its long, pendulous stems, rugulose leaves, and campanulate, yellow flowers with an oblong callus. Differs from *Lockhartia parthenocomos* (Reichenbach 1852a: 639) Reichenbach (1852b: 767) by its rugulose leaves, inflorescence rachis completely concealed by bracts, smaller, yellow flowers (6–11 mm across), retuse labellum, and rectangular callus (vs. smooth leaves, inflorescence rachis not concealed by bracts, larger, white to cream flowers (10–15 mm across), suborbicular, labellum apex widely round, and callus formed by a transverse ledge in *L. parthenocomos*).

Type:—PERU. Amazonas: [prov. Bongará?], Utcubamba river floodplain forest near Jazan (below Shipasbamba), 1400 m, 29 June 1962, *Wurdack 1090* (holotype: AMES!; isotypes: NY!, USM!).

Stems completely pendulous, more or less flexible, 28–84 cm long when reproductive, with 38–72 leaves; shoots (stem and leaves) 13–25 mm wide. Leaves marcescent, unifacial, laterally flattened, narrowly triangular in side view, with straight to slightly convex or concave abaxial (outer) margins, acute, rugulose–foveolate; exposed part of largest leaves 11–56 × 2–9 mm. Inflorescences both terminal and axillary from distal half of the stem, resembling grass spikelets, up to 11 per stem (sequentially produced?), with 1–4 flowers produced more or less sequentially; the rachis completely obscured by the bracts; exerted portion (i.e., part not hidden by the subtending leaf sheath) 1–2 cm long, internodes 1–2 mm long; inflorescence bracts amplexicaul, conduplicate, narrowly triangular to ovate, acute, scarious, 5–11 × 1–4 mm; pedicel and ovary 5–7 mm long, hidden by the floral bract. Flowers pendulous to resupinate, campanulate, 6–11 mm across, dark yellow with several pale brownish-orange horizontal bars across the center of the labellum (under the trichome pad). Sepals ovate, slightly concave, acute, 5–6 × 3–4 mm. Petals widely elliptic, flat, apically rounded, 6 × 5 mm. Labellum suborbicular, shallowly 3-lobate, 7–8 mm long, 10–11 mm wide when flattened; side lobes wider than long, transversely elliptic, slightly concave, 3 × 6–7 mm; midlobe wider than long, 2-lobulate, retuse, slightly reflexed, 2–3 × 5–6 mm; callus oblong, smooth, puberulous, not markedly thickened, occupying the central portion of the labellum, 4 × 2.5 mm. Column narrowly winged, subrhombic to spatulate, 3 × 2 mm, the wings obliquely oval and decurrent, wider distally, 0.5 × 1.5 mm; anther cap galeate, 1 × 1 mm; pollinarium 1 mm long. Fruit (undehisced) obovoid, 12–15 × 7 mm.

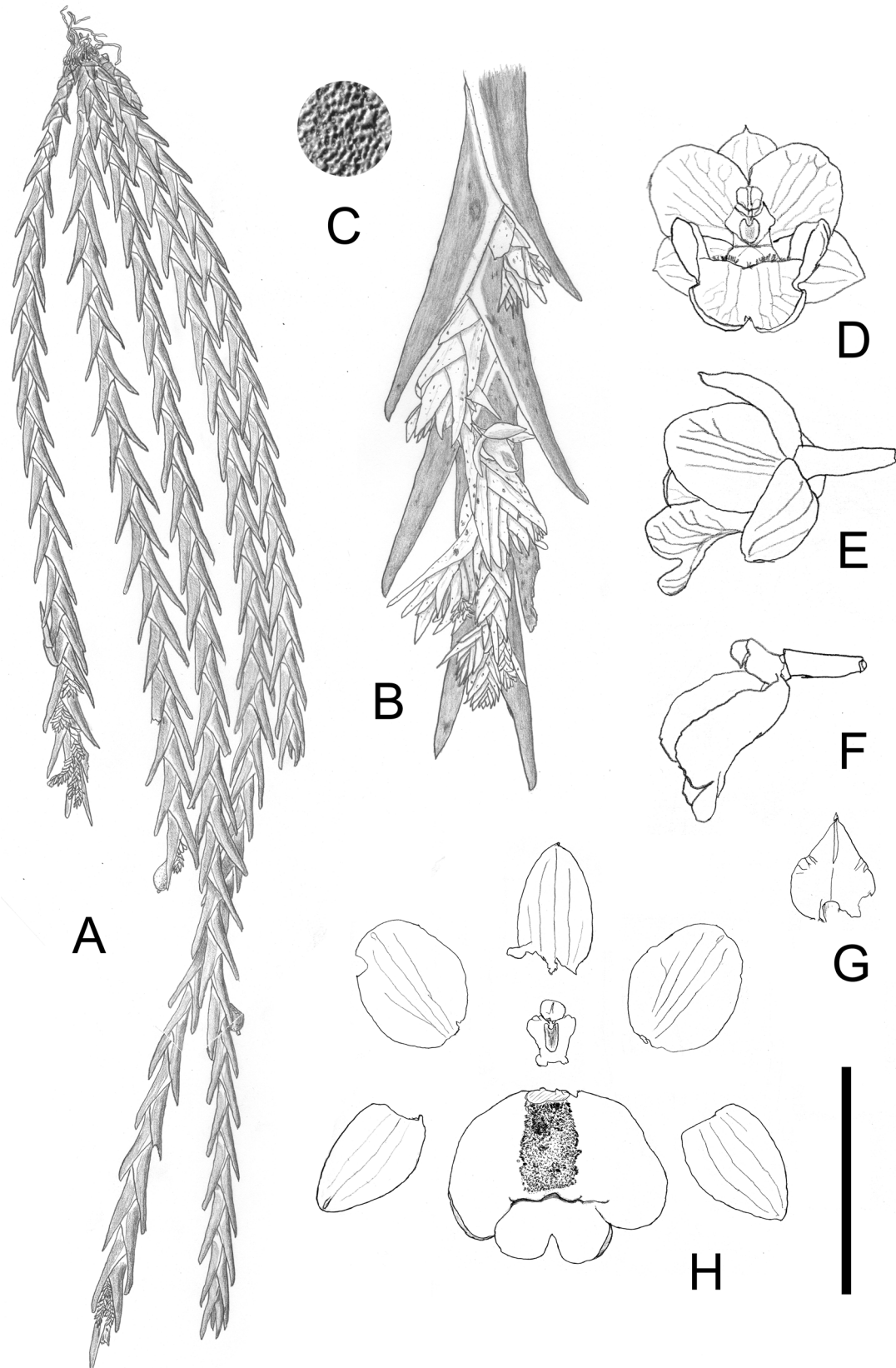


FIGURE 3. *Lockhartia rugosifolia* M.A. Blanco. **A.** Plant habit. **B.** Distal part of a shoot with six inflorescences, one with a flower. **C.** Detail of leaf texture. **D.** Flower, front view. **E.** Flower, lateral view. **F.** Same as previous, with sepals and lateral petals removed. **G.** Floral bract, flattened; basal right portion damaged. **H.** Dissected perianth parts (flattened), with column in center (ventral view). Scale bar: 10 cm (for **A**), 4 cm (for **B**), 8 mm (for **C**), 1 cm (for **D–H**). Drawing by the author, based on *Wurdack 1090* (AMES).

Phenology:—Field collections indicate that *Lockhartia rugosifolia* flowers at least in the months of January, May, June, August, and October. Flowers may actually be produced continuously or sporadically throughout the year.

Distribution:—Presently known from the Peruvian department of Amazonas, in the provinces of Bongará, Chachapoyas, and Rodríguez de Mendoza, in the Utcubamba River basin, from 1200 to 1600 m (but see below), on the eastern (Amazonian) side of the Andes. Apparently also present in the southeastern Ecuadorian province of Zamora-Chinchipe, on the basis of *Hirtz et al.* 7329 (SEL, from a cultivated plant reportedly collected in Zumba) and *D'Alessandro* 753 (RPSC, not found, listed as *L. parthenocomos* in Dodson & Bennett 1989 and in the Tropicos database (<http://www.tropicos.org/Specimen/642345>, last consulted on 28 January 2013); see commentary regarding confusion with the latter species).

I have also not been able to locate the specimen *D. & A. Bennett* 3409, cited by Dodson & Bennett (1989, as *L. parthenocomos*), reportedly collected in Chachapoyas (PERU, Amazonas) at 2800 m. This specimen most likely represents *L. rugosifolia*, and if so, it would significantly increase the elevational range reported above for this species.

Additional specimens examined:—ECUADOR. Without additional locality data, cultivated: 3 May 2004, *Blanco* 2568 (FLAS), 3 May 2004, *Blanco* 2569 (FLAS), 3 May 2004, *Blanco* 2570 (FLAS); 25 January 2000, *Whitten et al.* 1645 (FLAS); 29 September 2003, *Whitten et al.* 2432 (FLAS, QCA). Zamora-Chinchipe: Zumba, March 2000 (cultivated), *Hirtz et al.* 7329 (SEL). PERU. Without additional locality data: *anonymous s.n.* (K-spirit no. 28138.000); *Mathews s.n.* (BM no. 534522). Amazonas: Bongara, vicinity of Campomiento Ingenio 1–3 km up road to Pomacocha from Puente Ingenio, 1300 m, 27 January and 5 May 1974, *Hutchinson & Wright* 3837 (AMES, UC), Campomiento Ingenio on Río Utcubamba, 300 km E of Olmos, 1250 m, 10 October 1964, *Hutchinson & Wright* 6849 (UC 2 sheets); Chachapoyas, Jazán (Ingenio–Chachapoyas), ribera derecha del Utcubamba, 1200 m, 28 May 1963, *López et al.* 4275 (AMES, HUT); [Rodríguez de Mendoza], Mendoza, 1600 m, 8 August 1963, *Woytkowski* 8172 (GH, MO, SEL).

Conservation status:—*Lockhartia rugosifolia* is apparently a rare species, restricted to undisturbed forest in the Utcubamba River basin and possibly southeastern Ecuador. It is probably best to consider it Vulnerable.

Etymology:—From the Latin *rugosus* (rugose, wrinkled), and *folium* (leaf), in reference to the rugulose leaves, an almost unique condition in the genus.

Comments:—*Lockhartia rugosifolia* is remarkable for its long, pendulous stems, and holds the record for the largest recorded stem length in the genus (84 cm); *L. longifolia* (Lindley 1846: 13) Schlechter (1919: 99), also with pendulous stems, has a maximum recorded stem length of 80 cm, only slightly shorter. The rugulose leaf texture, and the spikelet-like condensed inflorescences with strongly conduplicate, laterally flattened, distichous bracts, are also diagnostic features of *L. rugosifolia*.

The leaves of *L. parthenoglossa* Reichenbach (1865: 300) (not *L. parthenocomos*) also have a rugulose texture, but much less pronounced and visible only under magnification. *Lockhartia parthenoglossa* occurs only from Belize to Colombia and not in Peru.

Lockhartia rugosifolia has been confused with both *L. longifolia* and *L. parthenocomos*, both of which it resembles superficially, especially in its pendulous stems and yellow flowers. It differs from *L. longifolia* in its straight, verruculose leaves, campanulate flowers, concave labellum and a low, oblong callus (vs. generally sigmoid, smooth leaves, widely open flowers, convex labellum and a crateriform callus in *L. longifolia*). The floral morphology is more similar to that of *L. parthenocomos*, although that species has smooth leaves, much larger, white to cream flowers, a transverse, ledge-like callus, and occurs only in the Venezuelan Coastal Range.

Escobar (1998: Figure 1060) published a photograph of *Lockhartia rugosifolia* (as *Lockhartia* sp.) in volume 6 of *Native Colombian Orchids*, labeled as *Escobar* N° 8170 (voucher not found). The figure legend says “without exact locality, Antioquia? [...] Grower: Rodrigo Escobar”. The northernmost field collection of *L. rugosifolia* is from Zumba in southeastern Ecuador, more than 600 km south of the Colombian border. Thus, the plant illustrated by Escobar was probably not collected in Colombia.

Dodson & Bennett (1989) and Dodson (2002) also published illustrations of *Lockhartia rugosifolia*, erroneously identified as *L. parthenocomos*. Some authors (e.g., Brako & Zarucchi 1993, Jørgensen & León-Yáñez 1999, Zelenko & Bermúdez 2009) have propagated this error, listing *L. parthenocomos* in species checklists for Ecuador and Peru. Zelenko & Bermúdez (2009) published a photo of *L. rugosifolia* (as *Lockhartia* sp.), and misidentified a photo of *L. longifolia* (as *L. parthenocomos*).

Lockhartia rugosifolia has been in cultivation for several years, almost always under the name *L. parthenocomos*. Unlike most other species of *Lockhartia*, *L. rugosifolia* appears to be difficult to keep alive in cultivation for long periods, at least in places where the nighttime summer temperatures cannot be maintained below 25°C (M.A. Blanco, personal observation).

Lockhartia tenuiflora M.A. Blanco, *sp. nov.* (Figs. 4, 5D–F)

Very similar to *Lockhartia lepticaula* Bennett & Christenson (2001: plate 678), but with a narrower middle lobe of the labellum and with smaller (1×1.5 mm), triangular column wings (vs. larger [1.5×2 mm], flabellate column wings in *L. lepticaula*).

Type:—ECUADOR. Prov. Sucumbios [actually Prov. Napo: Cantón El Chaco, Parroquia Gonzalo Díaz de Pineda]: Road from Las Palmas to El Chaco, km. 10.9, 1777 m, 00°17'40.3"S, 77°46'22.7"W, 11 February 2004, *Whitten et al.* 2719 (holotype: FLAS!; isotype: QCA!).

Stems apparently erect, more or less rigid, 14–51 cm long when reproductive, with 38–55 leaves; shoots (stem and leaves) 10–19 mm wide. Leaves marcescent, unifacial, laterally flattened, narrowly triangular in side view, with straight to slightly incurving or outcurving margins, obtuse to rounded apically, exposed part of largest leaves 10–29 \times 3–9 mm. Inflorescences both terminal and axillary from the distal half of the stem, with 1–6 flowers produced more or less simultaneously; exerted portion 1–2.5 cm long, internodes 2–5 mm long; inflorescence bracts amplexicaul, widely ovate to suborbicular, cordate, obtuse to apiculate, expanded to campanulate, 6–7 \times 3–6.5 mm; pedicel and ovary 11–15 mm long. Flowers resupinate, widely open, 12–16 mm tall, yellow, the labellum with reddish brown to purplish-brown spots around the callus and on the lateral lobes, the callus mostly orange. Sepals elliptic, slightly concave, acute to obtuse, 6–6.5 \times 3–3.5 mm. Petals elliptic to suboblong, round to subtruncate apically, slightly curved forward, the margins recurved, 6 \times 3.5 mm. Labellum 3-lobate, 8–11 mm long, 13–15 mm wide across lateral lobes when flattened; lateral lobes elongate, narrowly oblong to sublinear, attenuate, acute, curved toward front, 5.5–6.5 \times 1 mm; midlobe divided into 4 lobules, pandurate, emarginate, margin irregularly undulate, 6.5–7.5 \times 5.5–6.5 mm, the basal lobules folded backwards, the distal lobules straight; callus suboblong, the base forming a concave cushion with a tuft of short, glandular hairs, 1.5 \times 1.5 mm; the distal portion forming a mass of low tubercles, 3–4 \times 2–2.5 mm. Column rhombic, 3 mm long, 3 mm wide; wings subtriangular, with an irregularly denticulate margin, 1 \times 1.5 mm; stigmatic cavity subpandurate, 1 \times 0.4 mm; anther cap galeate, 1.3 \times 1 mm; pollinarium 1 mm tall, stipe bifid. Fruit (undehisced) fusiform to obovoid, 14–16 \times 6–7 mm.

Phenology:—The few field collections available indicate flowering at least during the months of February, July and November. Cultivated plants are known to flower in March, August, and September.

Distribution:—Ecuador and Colombia, from 1,100 to 1,900 m on the eastern (Amazonian) side of the Andes (maybe up to 2600 m, based on *Dryander 2527*; see below). Expected in northern Peru (north of the Huancabamba Depression).

The two Colombian collections cited below have somewhat deteriorated flowers or no flowers at all; their identification as *Lockhartia tenuiflora* is somewhat tentative, and it is partly based on their vegetative morphology. However, I have seen photographs of a Colombian plant, unambiguously of *L. tenuiflora*, collected by William Vargas of Universidad ICESI (Cali, Colombia). Unfortunately, the voucher is stored among many thousand unmounted herbarium specimens and has not yet been located (W. Vargas, pers. comm. 2012). De Retana (1991) published another photograph of *L. tenuiflora* in volume 2 of Native Colombian Orchids.

Additional specimens examined:—COLOMBIA. Department unknown: West. Cordillera, Observatorio, 2600 m, September 1941, *Dryander 2527* (US). Cundinamarca: Vergara, Vda. El Palmar, 1590 m, 14 June 1993, *Chaparro de Barrera & Barrera Torres 168* (COL). ECUADOR. Without additional locality data, cultivated: 11 March 2005, *Blanco 3012* (FLAS, SEL-spirit), 25 August 2009, *Blanco 3231* (FLAS); 29 September 2003, *Whitten et al.* 2430 (FLAS, QCA). Morona-Santiago: Gualaquiza, Vertiente occidental de la Cordillera del Cóndor, arriba del Valle del Río Quimi, 1600 m, 11 December 2000, *Freire 4314* (QCNE); Plan de Milagro, road Cuenca to Limón, ca. 15 km SW of Limón, 1900 m, 20 November 1989, *Dodson et al.* 17878 (MO, QCNE). Napo: 23 km E of El Chaco, Quito–Lago Agrio road, 1700 m, 7 November 1974, *Gentry 12596* (MO, NY). Zamora-Chinchipec: Zamora–Cenepa, River Zamora, 1100 m, 26 July 1960, *Dodson 182* (MO, SEL); Loyola, 1800 m, April 2001 (cultivated), *Hirtz 7687* (SEL, mixed with *Epidendrum* sp. on separate sheet).

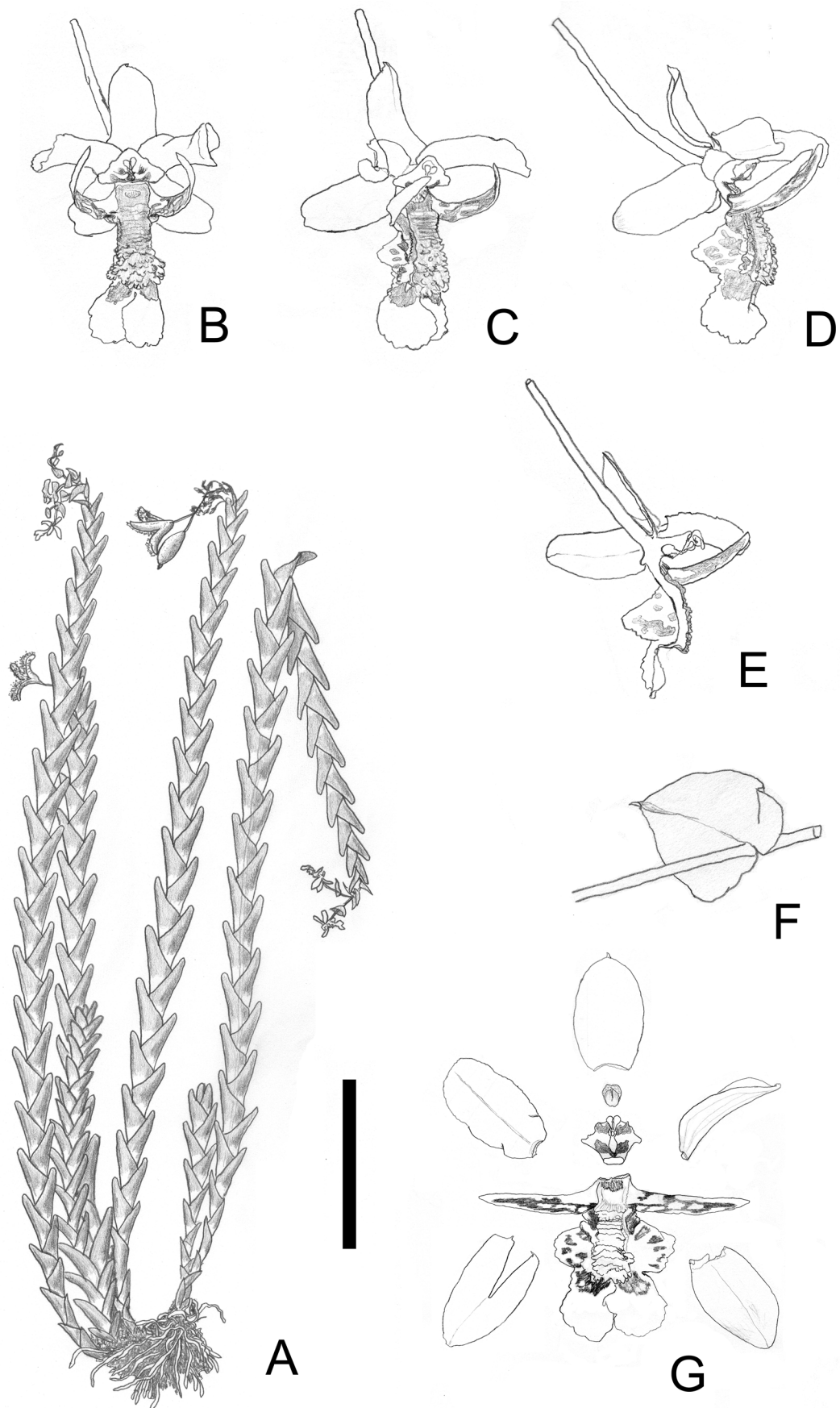


FIGURE 4. *Lockhartia tenuiflora* M.A.Blanco. **A.** Plant habit, with flowers and fruits. **B.** Flower, front view. **C.** Flower, oblique view. **D.** Flower, lateral view. **E.** Same as previous, longitudinal section. **F.** Floral bract and base of pedicel. **G.** Dissected perianth parts (flattened, except lateral petal on right). Scale bar: 6.5 cm (for A), 1 cm (for B–G). Drawing by the author; A, based on *Whitten et al.* 2719 (FLAS); B–G, based on *Blanco* 3012 (FLAS).

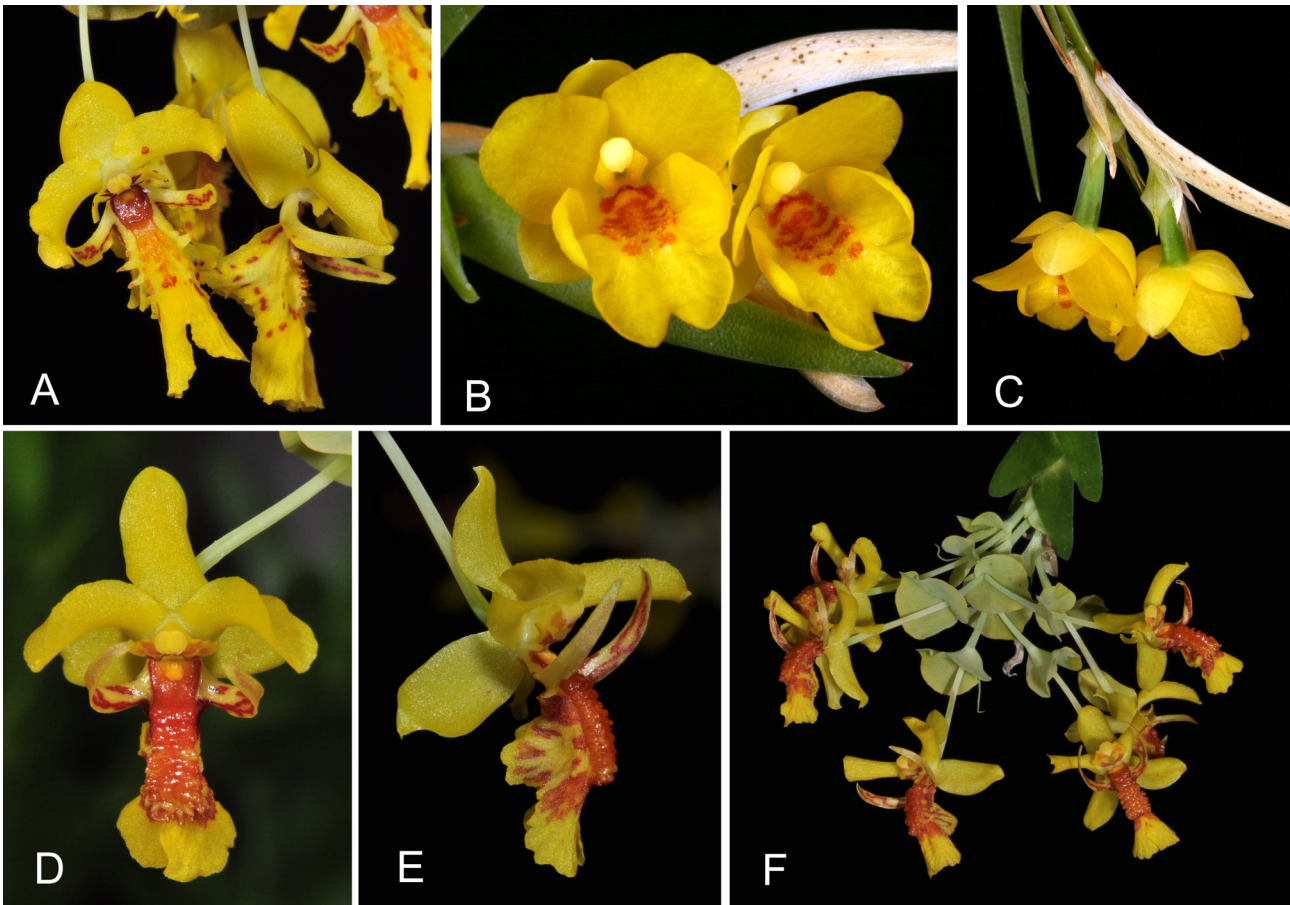


FIGURE 5. Flowers of three *Lockhartia* species described in this paper; live plants used to prepare vouchers (cited in parentheses). **A.** *Lockhartia endresiana* (Blanco 4152, USJ). **B–C.** *Lockhartia rugosifolia* (Whitten 2432, FLAS, QCA); flowers in frontal and lateral views, respectively. **D–F.** *Lockhartia tenuiflora* (Blanco 3012, FLAS, SEL-spirit); flowers in frontal and lateral views, and inflorescence, respectively. Photos **B** and **C** by Mark W. Whitten; all other photos by the author.

Conservation status:—*Lockhartia tenuiflora* appears to be uncommon but widely distributed along the eastern slope of the Andes in Ecuador and Colombia. Its geographic range includes several protected areas. Thus, this species is probably not threatened.

Etymology:—From the Latin *tenuis* (slim) and *floris* (flower), in reference to the slim appearance of the flowers in front view, due to the folding back of the lateral lobules of the labellum midlobe.

Comments:—*Lockhartia tenuiflora* is very similar to the Peruvian *L. lepticaula*, and it is very likely that both are sister species. *Lockhartia lepticaula* has a wider labellum midlobe and much larger, flabellate column wings. De Retana (1991) published a photograph of *Lockhartia tenuiflora* (without assigning a species name). Dodson (2002) published another photograph of *L. tenuiflora*, erroneously identified as *L. biserra* (Richard 1792: 112) Christenson & Garay (in Christenson 1996: 17).

It is interesting that *Lockhartia tenuiflora* has only been collected to the north of the Huancabamba Depression, while *L. lepticaula* has only been collected south of that geological feature (13 field collections seen for the latter species). This suggests that the Huancabamba Depression may have had a role in the divergence of these two putatively sister species. For a review of the potential role of the Huancabamba Depression as a phytogeographical barrier, see Weigend (2002, 2004).

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