

Three new species of *Gasteranthus* (Gesneriaceae) from Ecuador

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Freiberg, M. (Department of Systematic Botany and Ecology, University of Ulm, Albert-Einstein-Allee 11, D-89081 Ulm, Germany). Three new species of *Gasteranthus* (Gesneriaceae) from Ecuador. *Brittonia* 52: 203–209. 2000.—The gesneriad flora of the Reserva Río Guajalito, Province of Pichincha, and Bosque Protector Otonga, Province of Cotopaxi, Ecuador have been investigated. Three new species, *Gasteranthus aurantiacus* M. Freiberg, *G. atrolimbus* M. Freiberg, and *G. acuticarinatus* M. Freiberg, are described and illustrated in preparation for a contribution for the Gesneriaceae in the Flora of Ecuador. While both *G. acuticarinatus* and *G. atrolimbus* are characterized by a dorsal keel on a tubular, pink to wine-red corolla, the infundibulate, bright orange-colored corolla of *G. aurantiacus* has a rather wide opening and a large limb.

Key words: Ecuador, *Gasteranthus*, Gesneriaceae.

El Bosque Protector Otonga is located in the Province of Cotopaxi, Latacunga, San Francisco de Las Pampas (00°25'S, 79°00'W); elevation ranges from 1300 to 2300 m. The private reserve of the Otonga consists of about 1000 ha, of which 70% of the vegetation is primary forest with three types of vegetation: subtropical vegetation, cloud forest, and Andean (Freiberg, 1998). Río Guajalito is located about 40 km by air west of Quito, close to the little village of Palmeras, which lies on the old road between Quito and Santo Domingo de los Colorados ("Chiriboga road"). The private reserve of Río Guajalito comprises about 320 ha of primary and 35 ha of secondary montane moist tropical forest. The station of the reserve is located at 00°13'50"S and 78°49'17"W at the base of the valley of the small river Río Guajalito, at about 1800 m. The elevation of the reserve ranges from 1800 m close to the river and 2200 m on top of the surrounding ridges. Annual precipitation ranges from 2000 to 2800 mm (average 2735 mm), with a maximum (463 mm) in April and a minimum (17 mm) in June. The dry season is from June to October. The average annual temperature is 16.4°C, the minimum is 7.4°C, in February

(J. Nieder, pers. comm.). The average height of the canopy is about 20–30 m. The reserve and station were initiated and are managed by J. Jaramillo of the Pontificia Universidad Católica del Ecuador, Quito, and V. Zak of Universidad San Francisco de Quito.

Gasteranthus aurantiacus M. Freiberg, sp. nov. (Fig. 1)

TYPE: ECUADOR. Cotopaxi: Bosque Protector Otonga, 1800 m, 30 Sep 1998, M. Freiberg 98095 (HOLOTYPE: QCA; ISOTYPES: GES, QCNE, ULM).

Ab affinibus pube omnino hispida necnon corollae aurantiacae infundibuliformis limbo quam tubum longiori diversa.

Herb; stems erect, 20–50 cm tall, mostly unbranched; internodes densely hirsute, green, terete; leaves of a pair subequal; petiole 20–45 mm, hispid, the lamina elliptic, 5–10 cm long, 2–4 cm wide in the center, cuneate at base, acute at apex, serrate, hispid above and beneath, verdigris-green above, grey-green beneath; primary veins 9–12 pairs; inflorescence an axillary cyme reduced to a few, mostly 2 flowers; peduncle 4–8 cm, usually 1 per node, hispid,

Gasteranthus aurantiacus

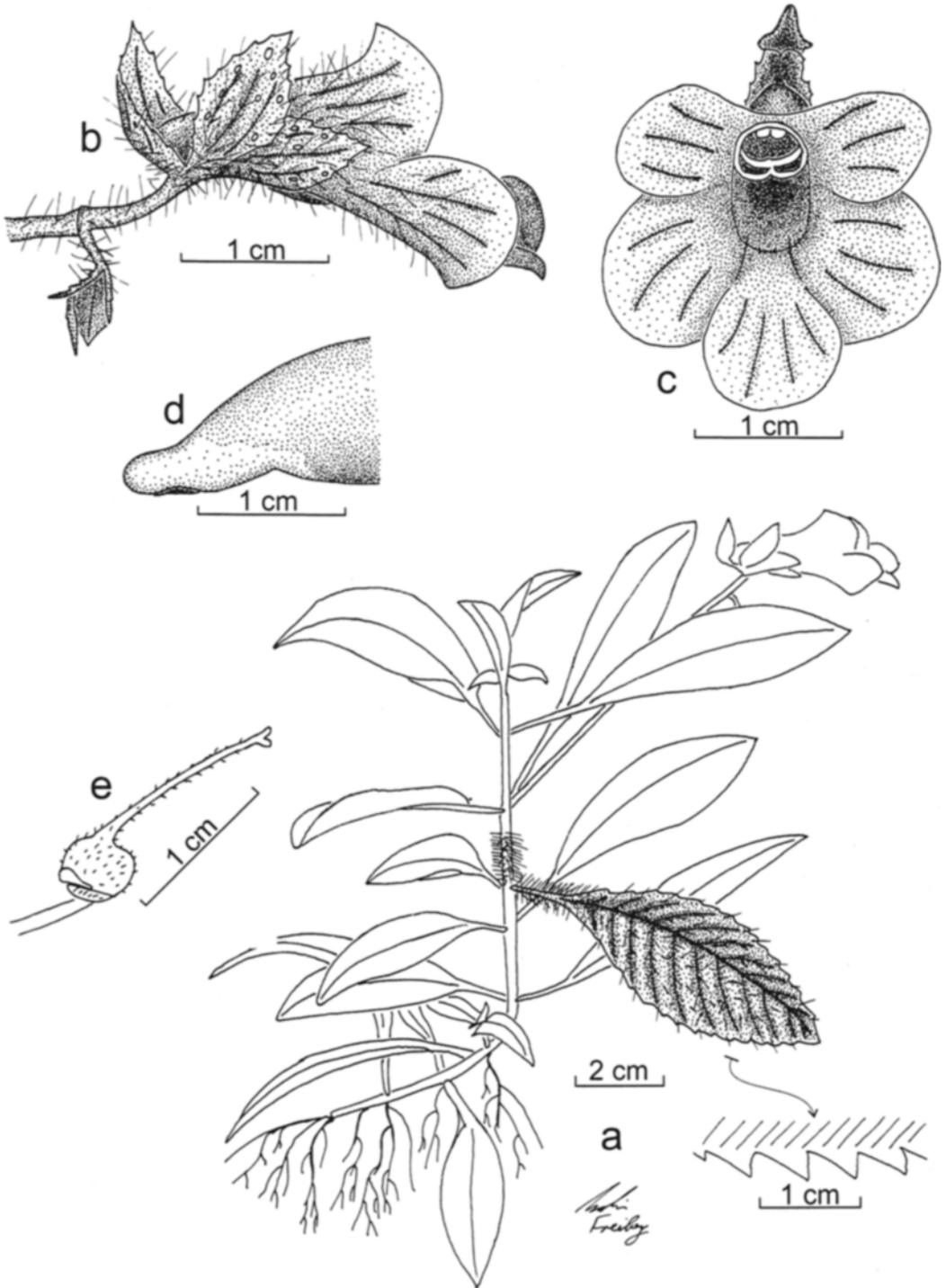


FIG. 1. *Gasteranthus aurantiacus* (from fresh holotype material). a. Habit, indumentum only partly shown. b. Side view of flower. c. Front view of flower. d. Side view of corolla showing the spur. e. Lateral view of gynoecium (sepals and petals removed) showing nectary.

grass-green, the pedicels 4–6 mm, slightly hispid; calyx lobes membranaceous, subequal, ovate, acute, the base connate for 2 mm, the margin crenate, hispid externally, especially at the base, glabrous internally, yellowish green, the dorsal lobe 11×7 mm, the lateral lobes 12×7 mm, the ventral lobes 11×6 mm, all lobes widest just above the base; corolla horizontal in calyx, funnelform, bright orange, pale yellow at base, with spur 25–32 mm long, sparsely hispid externally, glabrous at base and internally, the spur obtuse, 3 mm long, the tube 11–13 mm long and 5 mm diam. at base, then widened and 10–12 mm diam. near the limb, the limb 2–2.5 cm diam.; corolla lobes subequal, entire, rounded, the ventral lobe and the lateral lobes 12×12 mm, the dorsal lobes 9×12 mm; fertile stamens 4, included, inserted ca. 2 mm above the base of the corolla, the free part 6–8 mm, slightly papillose, flat; staminode 3 mm, glabrous, inserted at the base of the spur; anthers connate, 1.5×2 mm; ovary ovoid, laterally compressed, tomentose, 4 mm long, 3 mm high, 2 mm wide; style included, 6–8 mm, tomentose; stigma bilobed; nectary semi-annular, laterally reduced, dorsally 0.7 mm high, 2 mm wide, slightly tomentose; fruits and seeds not seen.

Representative specimens examined: ECUADOR. **Cotopaxi:** Bosque Protector Otonga, 1800 m, 27 Jul 1996, *Freiberg 96275* (ULM), 2 Oct 1998, *Freiberg 98116* (NY). **Pichincha:** Reserva Río Guajalito, 1800 m, 8 Oct 1998, *Freiberg 98123* (B).

Distribution and ecology.—*Gasteranthus aurantiacus* grows in primary and disturbed montane forests at 1700–1900 m, in the Río Guajalito Reserve as well as in Bosque Protector Otonga. Several individuals may grow together, sometimes forming small stands. Decumbent stems develop roots on the nodes.

Etymology.—The epithet *aurantiacus* refers to the bright orange-colored corolla, which makes this species visible at a distance.

***Gasteranthus atrolimbus* M. Freiberg, sp. nov. (Fig. 2)**

TYPE: ECUADOR. **Cotopaxi:** Bosque Protector Otonga, 1800 m, 30 Sep 1998, *M.*

Freiberg 98096 (HOLOTYPE: QCA; ISOTYPES: GES, QCNE, ULM).

Gasteranthus carinato Wiehler affinis sed corolla vinosa, limbo atro, tubi carina breviori, foliorumque nervis secundariis minoribus diversa.

Herb; stems erect, 1–1.5 m tall, usually unbranched, glabrous; internodes 4–7 cm long, 5–8 mm diam., terete, dark olive-green; leaves of a pair equal; petiole 3–4.5 cm long, glabrous, the lamina elliptic, $17\text{--}20 \times 5\text{--}9$ cm, cuneate at base, acute at apex, serrulate, chartaceous, glabrous above and beneath, green; primary veins 7–8 pairs; inflorescence axillary, subumbellate, a cyme with 11–15 flowers, only 1 or 2 open at a time; peduncles usually 2 per node, 10–12 cm, glabrous, blood-red; pedicels 5–8 mm, glabrous; calyx lobes subequal, thick, round, obtuse, the base connate for 1.5–2 mm, the margin subentire, glabrous on both sides, blood-red, the dorsal lobe 15×15 mm, the lateral lobes 12×12 mm, the ventral 12×13 mm, all lobes widest in center; corolla horizontal in the calyx, tubular, fleshy, slightly inflated toward the apex, wine- to blood-red, pale yellow toward the base, glabrous internally and externally, total length 21–23 mm, the dorsal spur straight, obtuse, 4–5 mm long, the tube basally 6 mm diam., at widest part 10 mm diam., dorsally keeled for 15 mm, the keel 0.5–0.8 mm high, throat opening round, 4 mm diam., the limb terminal, very dark wine-red appearing black, 8 mm diam., the lobes subequal, roundish, entire, 3 mm wide, 2 mm high; fertile stamens 4, included, flat, inserted ca. 5 mm above base of the corolla, the free part 6 mm, glabrous; staminode 3 mm; anthers connate, 2×1 mm; ovary ovoid, laterally compressed, glabrous, greenish, 5 mm long, 4–5 mm high, 3 mm wide; style included, glabrous, 8 mm long; stigma bilobed, the lobes 1×1 mm; nectary dorsal, semi-annular, tomentose, laterally and ventrally reduced, 1.5 mm high, 3.5 mm wide, 2.5 mm long; fruit a bivalved, fleshy capsule; seeds dark brown tuberculate, ca. 0.5×0.2 mm.

Representative specimens examined: ECUADOR. **Pichincha:** Reserva Río Guajalito, 1800 m, 9 Oct 1998, *Freiberg 98129* (NY). **Cotopaxi:** Bosque Protector Otonga, 1900 m, 7 Apr 1996, *Freiberg 96061*

Gasteranthus atrolimbus

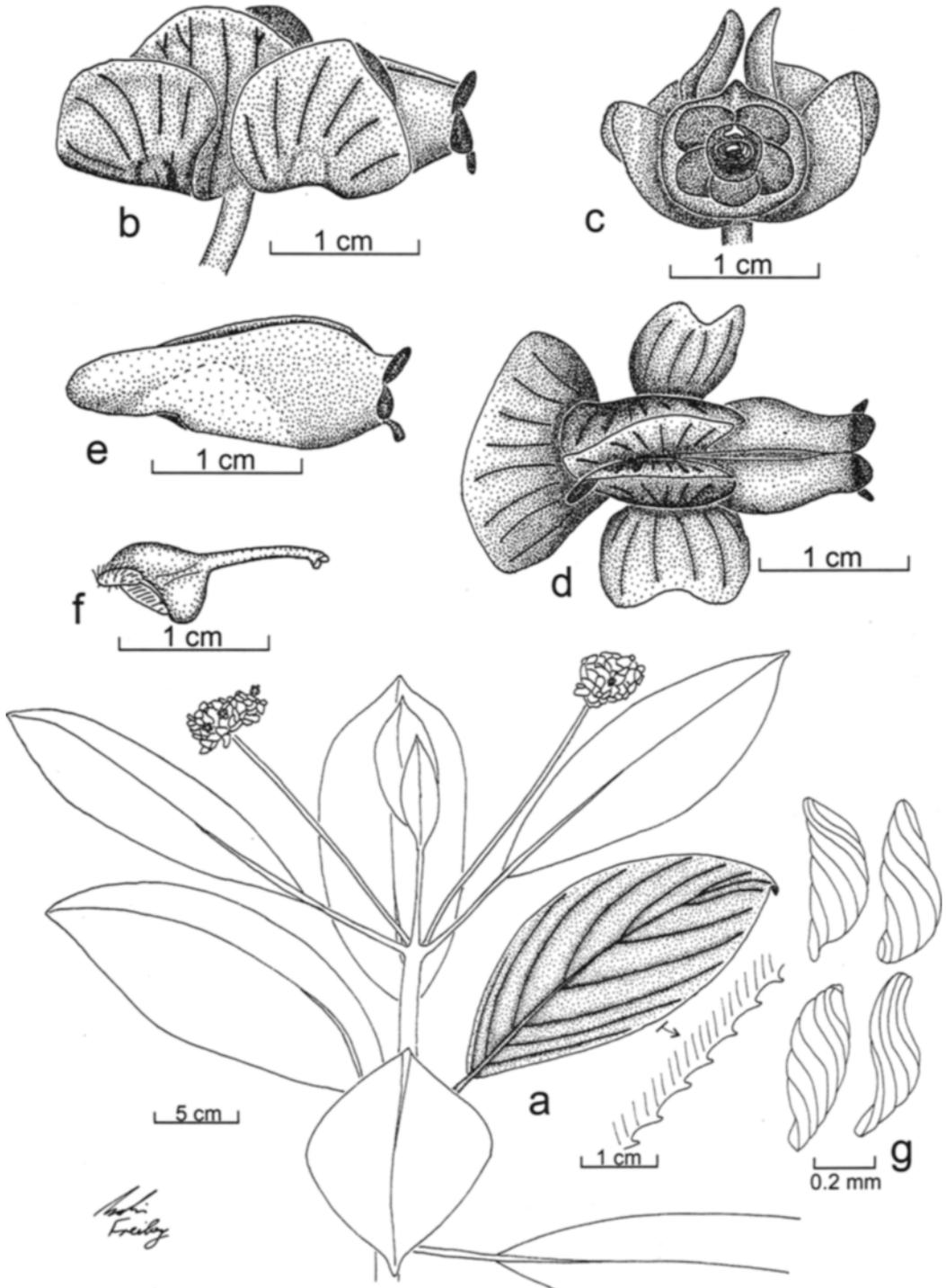


FIG. 2. *Gasteranthus atrolimbus* (from fresh holotype material). a. Habit, indumentum not shown. b. Side view of flower. c. Front view of flower. d. Top view of flower. e. Side view of corolla. f. Lateral view of gynoeceium (sepals and petals removed) showing nectary. g. Seeds.

Gasteranthus acuticarinatus

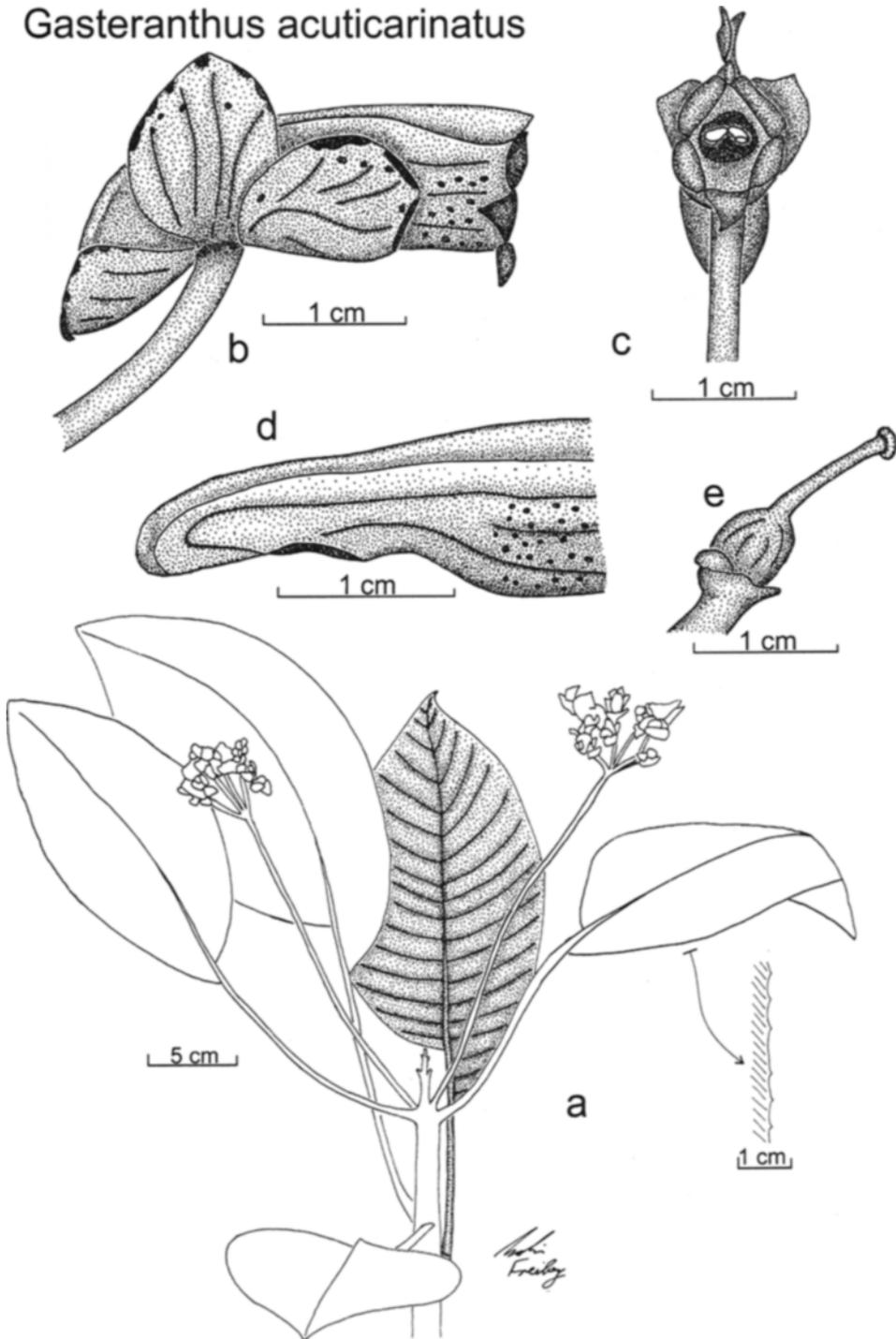


FIG. 3. *Gasteranthus acuticarinatus* (from fresh holotype material). **a.** Habit, indumentum not shown. **b.** Side view of flower. **c.** Front view of flower. **d.** Side view of corolla showing the spur. **e.** Lateral view of gynoeceum (sepals and petals removed) showing nectary.

(ULM). **Imbabura:** Los Cedros Biological Reserve, 00°18'74"N, 78°46'94"W, 2000 m, 23 Mar 1996, *Freiberg 96033* (M), 29 Jun 1996, *Freiberg 96217* (B).

Distribution and ecology.—*Gasteranthus atrolimbus* grows in primary, montane forests and has been collected in Los Cedros Biological Station (Province of Imbabura), in the Reserva Río Guajalito (Province of Pichincha), and in the type locality of the Bosque Protector Otonga (Province of Cotopaxi). Thus it seems to be a rather widespread species. Moreover, it may cover and dominate several square meters in the herb layer of the forest. It was especially found along small creeks or depressions in shady areas.

Etymology.—The species epithet “atrolimbus” refers to the very dark wine-red limb of this species, which superficially appears black.

***Gasteranthus acuticarinatus* M. Freiberg, sp. nov. (Fig. 3)**

TYPE: ECUADOR. Cotopaxi: Bosque Protector Otonga, 1600 m, 3 Oct 1998, *M. Freiberg 98112* (HOLOTYPE: QCA; ISOTYPE: ULM).

Gasteranthus carinatus Wiehler affinis, sed habitu grandior, petioli longior, corolla rosea-kermesina, tubi carina acuti diversa.

Subshrub; stems erect, 1.5–2 m tall, single stems usually unbranched, glabrous; internodes 10–15 cm long, 5–10 mm diam., terete, sea-green; leaves of a pair equal; petiole 8–15 cm long, glabrous, the lamina elliptic, 21–26 × 12–14 cm, the base oblique, unequal-sided, insertion on main vein up to 3 cm from each other, acute at apex, the margin slightly serrulate, chartaceous, glabrous on both sides, primary veins 17–19 pairs, verdigris-green above, sea-green beneath; inflorescence pseudoterminal, subumbellate, a cyme of 15–20 flowers; peduncles 2 per node, 16–20 cm long, glabrous, green; pedicels 1–2 cm long, glabrous; calyx lobes subequal, thick, roundish, the base connate for 2 mm, the margin subentire to slightly crenate, glabrous on both sides, rosy to crimson, basally pink, with purple warts at the rim, the dorsal lobe 15 × 14 mm, bent downward and folded like a cup surrounding the spur,

the lateral lobes 15 × 12 mm, the ventral lobes 13 × 12 mm, all lobes widest in the center; corolla horizontal in the calyx, tubular, ventrally slightly inflated, carmine to pinkish, paler toward the base, dark-spotted ventrally, glabrous externally, glandular internally close to entrance, total length 32 mm, the spur obtuse, glabrous, 8–10 mm long, the opening 5 × 7 mm, the limb 8 × 10 mm, with a conspicuous keel dorsally on entire length of tube, 2 mm high near limb, 1 mm near spur, pointed toward limb, the lobes subequal, entire, triangular, reflexed, the ventral and lateral 4 × 4 mm, the dorsal 5 × 3 mm; fertile stamens 4, included, inserted about 6–8 mm above base of the corolla, the free part 7–8 mm, glabrous; staminode 3 mm; anthers connate, 3.5 × 2.5 mm; ovary ovoid, laterally compressed, glabrous, 5 mm long, 5 mm high, 3 mm wide; style included, 7 mm long, glabrous; stigma bilobed, the lobes 1 mm wide, 2.5 mm long; nectary annular, laterally and ventrally reduced, glabrous, dorsally 2 mm high, 4.5 mm wide, 2.5 mm long; fruit and seeds not seen.

Distribution and ecology.—Only a few, scattered individuals of *Gasteranthus acuticarinatus* were found in the valley of the Las Damas river close to the Bosque Protector Otonga in a primary montane forest. The brilliantly colored inflorescence could be seen from 50 m away through the forest thickets. Hummingbirds were seen visiting the flowers. *Gasteranthus atrolimbus* and *G. acuticarinatus* are morphologically very similar and probably closely related. *Gasteranthus acuticarinatus* can be distinguished from *G. atrolimbus* by its larger size, the longer petioles, the flower proportions, and its different coloration. Both are characterized by a dorsal keel on the corolla tube, which in the genus *Gasteranthus* is otherwise only found in *G. carinatus* Wiehler (Wiehler, 1977). However, the keel in *G. carinatus* is obtuse while it is pointed in *G. acuticarinatus*, and only small in *G. atrolimbus*. Moreover, the flowers of *G. carinatus* are orange-colored.

Etymology.—The species epithet “acuticarinatus” expresses the similarity of this species to *G. carinatus* Wiehler in having a pronounced but differently shaped keel

("carina"), which is obtuse in *G. carinatus* and pointed ("acutus") in *G. acuticarina-tus*.

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NEW BOOKS RECEIVED

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