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## Two Remarkable New Species of *Gasteranthus* (*Gesneriaceae*) from Central Ecuador

by

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With 2 Figures

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### Summary

FREIBERG M. 1998. Two remarkable new species of *Gasteranthus* (*Gesneriaceae*) from Central Ecuador. – *Phyton* (Horn, Austria) 38 (1): 167–173, 2 figures. – English with German summary.

The Gesneriad Flora of the Bosque Protector Otonga, Province of Cotopaxi, Ecuador, has been investigated. The new species *Gasteranthus magentatus* M. FREIBERG (a small herb with magenta coloured flowers) and *G. otongensis* M. FREIBERG (corolla shorter than the red calyx) are described and illustrated.

### Zusammenfassung

FREIBERG M. 1998. Zwei bemerkenswerte neue Arten von *Gasteranthus* (*Gesneriaceae*) aus Zentral-Ecuador. – *Phyton* (Horn, Austria) 38 (1): 167–173, 2 Abbildungen. – Englisch mit deutscher Zusammenfassung.

Die Gesneriaceenflora des Bosque Protector Otonga, Provinz Cotopaxi, Ecuador, wurde untersucht. Die neuen Arten *Gasteranthus magentatus* M. FREIBERG (krautig, mit magentaroten Blüten) und *G. otongensis* M. FREIBERG (Krone kürzer als der rote Kelch) werden beschrieben und illustriert.

### Introduction

The Bosque Protector Otonga is located about 4 km North West of San Francisco de Las Pampas, Province of Cotopaxi, Central Ecuador. This is

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about 40 km of direct line southeast to Quito. The private Reserve of Otonga consists of about 300 ha of mainly primary premontane and montane wet tropical forest. The Station of the Reserve is located at 0° 25' S and 79° 0' W at 1800 m a.s.l. The altitude ranges between 1600 m a.s.l. on the border of the reserve at Río Esmeraldas and 2200 m a.s.l. on top of the surrounding ridges. The topography is heavily ridged, with ground inclinations up to 45°. Data on precipitation and temperature are not complete for a year round basis, but first measurements and comparisons to nearby locations show that an average yearly rainfall of 3000 mm and a temperature between about 15°C to 21°C is to be expected. A dry season exists between July and October, but during these months the area is still regularly covered by clouds. The average canopy height is about 20–30 m, whereas the canopy is not completely closed and a lot of openings support a dense shrubby and herbaceous ground flora. Reserve and station was initiated and is managed by Dr. Giovanni ONORE of Pontificia Universidad Católica de Quito with help of Cesar, Carmen, Elicio, Italo, Irene and Arturo TAPIA of San Francisco de Las Pampas.

*Gasteranthus magentatus* M.FREIBERG spec. nova (Fig. 1)

Diagnosis: Forma et color corollae calycisque *Gasterantho trifoliato* M. FREIBERG similis, sed ab eo corollis majoribus, habitu herbaceo, nodis bifoliatis et foliorum lamina ovato-elliptica distinguitur.

Description: Low, erect herb, between 50 and 80 cm high, stems unbranched, internodes tomentose, especially close to the apex, pale green, round. Leaves of a pair equal, somewhat clustered at apex, petiole 20 mm, shortly tomentose, lamina ovate-elliptic, 10–11 cm long and 4 cm wide in the middle, cuneate at base, acuminate at apex, entire, membranous, scarcely tomentose and shiny above, tomentose beneath, especially on the veins, primary veins 8–10 pairs, dark green above, pale green beneath, clustered stomata as conspicuous white dots; Inflorescence a pseudoterminal axillary cyme reduced up to one flower, peduncle 5–10 cm, usually one flower, but up to three per node, glabrous, pale green, the pedicels 1 cm, glabrous, bracts minutely, reduced. Calyx lobes subequal, ovate, obtuse, base connate for 3–5 mm, margin entire, glabrous externally, glandulous internally, light green, with base and veins paler, pale dotted, the dorsal lobe 20–23 × 13–15 mm, the lateral lobes 20 × 8–10 mm, the ventral 22 × 10 mm, all lobes widest at base. Corolla horizontal in calyx, urceolate, ventral pouch 15–20 mm wide, magenta coloured, in total 25–32 mm long, glandular tomentose externally, spurred at ventral base, the spur 5 mm long and 5–6 mm wide, throat contracted, opening 3 × 3 mm, petal lobes subequal, entire, rounded, 3 × 4 mm, glandular tomentose. Stamens included, about 5 mm inserted above base of the corolla, free part 10–14 mm,

# *Gasteranthus magentatus*

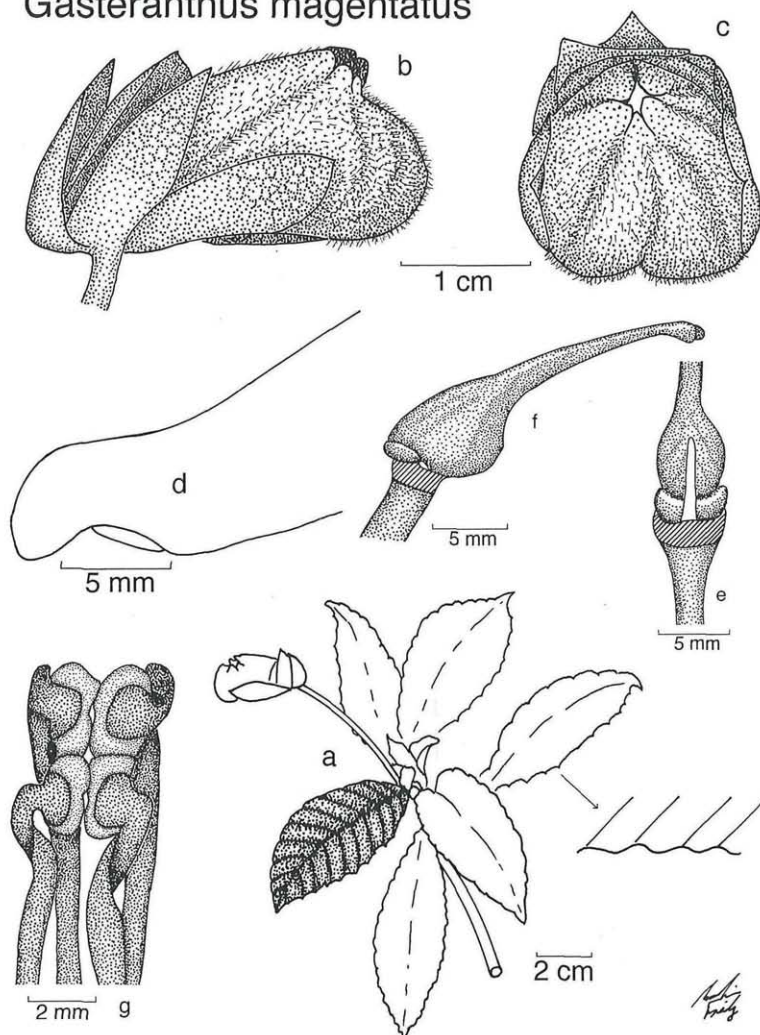


Fig. 1. – *Gasteranthus magentatus* M. FREIBERG. – a habit and detail of leaf margin. – b side view of corolla and calyx. – c front view of corolla and calyx. – d base of corolla showing spur. – e dorsal view of the base of the gynoecium (sepals and petals removed) showing the nectary and the staminodium. – f lateral view of the gynoecium. – g anthers from above.

glabrous, flat, base 1 mm enlarged towards spur, staminode 5 mm, glabrous, inserted at the base of the spur, anthers connate, 2 × 3 mm. Ovary laterally compressed, glabrous, 7 mm long, 7 mm high and 5 mm wide, style included, 10–12 mm, glabrous, stigma bilobed. Nectary half-ring

shaped, dorsally, 1.5 mm high, 5 mm wide, glabrous. Fruit a flattened, bivalved, fleshy capsule, about  $10 \times 15$  mm, calyx lobes enlarged and bended downwards. Seeds black, tuberculate,  $0.5 \times 0.2$  mm.

*Gasteranthus magentatus* grows in primary, montane forests at about 1800 m a.s.l.. March is the main flowering season. It has also been reported from the Rio Guajalito Reseve, which is located about 30 km northeast of Bosque Protector Otonga.

Form and colour of the corolla resemble *G. trifolius* M. FREIBERG, which has been described from the Los Cedros Biological Reserve in the Northwest of Ecuador (FREIBERG 1996), but the habitus of *G. magentatus* being a small herb rather than a shrub, the larger corolla and the different leaves make it a well defined, distinct species.

Etymology: "*magentatus*" refers to the conspicuously magenta coloured corolla of this species, which makes it visible for up to a hundred meters in direct sight.

Holotype: ULM M. FREIBERG 96047, 05. 04. 1996

*Gasteranthus otongensis* M.FREIBERG spec. nova (Fig. 2)

Diagnosis: Haec species insignis calycibus longioribus quam corollis, calycibus conspicue rubris, crassis et indumento totae plantae villosotomentoso.

Description: Erect subshrub, up to 1 m high, base slightly woody, stems usually unbranched, densely villous-tomentose below apex, less near base, internodes 2–5 cm long, 4–8 mm in diameter, round, seagreen. Leaves of a pair equal, petiole 1–2.5 cm long, densely villous-tomentose, lamina elliptic, 9–12 cm long and 4–6 cm wide, cuneate at base, obtuse to shortly acute at apex, crenate, chartaceous and reticulated, villous-tomentose above and beneath, especially on the veins, primary veins 7–11 pairs, deep green from above, appearing grey from side, sea-green beneath. Inflorescence axillary, projecting over the apex, subumbellate, cymes with 6–20 flowers, only one open at a time, peduncle 3–8 cm, densely villous-tomentose, grey-green, the pedicels 3–6 (8) mm, densely villous-tomentose. Calyx lobes subequal, thick, lanceolate, acuminate, base connate for 4 mm, margin denticulate to subentire, densely villous-tomentose on both sides, red, basally paler, the dorsal lobe  $23 \times 6$  mm, bended upwardly, the lateral lobes  $27 \times 7$  mm, the ventral  $28-30 \times 6-7$  mm, all lobes widest at base. Corolla horizontal in the calyx, ventricose, ventral pouch 2 mm, yolk yellow to flame coloured, pale yellow towards base and spur, densely villous-tomentose externally, glabrous at base, hairs red towards apex, total length 18–22 mm, spurred at ventral base, the spur obtuse, about 2 mm long, throat not contracted, limb terminal, lobes subequal, entire, rotund,  $2-3 \times 3$  mm, tube towards apex slightly tomentose internally, basally papillose. Stamens included, about 2–3 mm inserted above base of the cor-



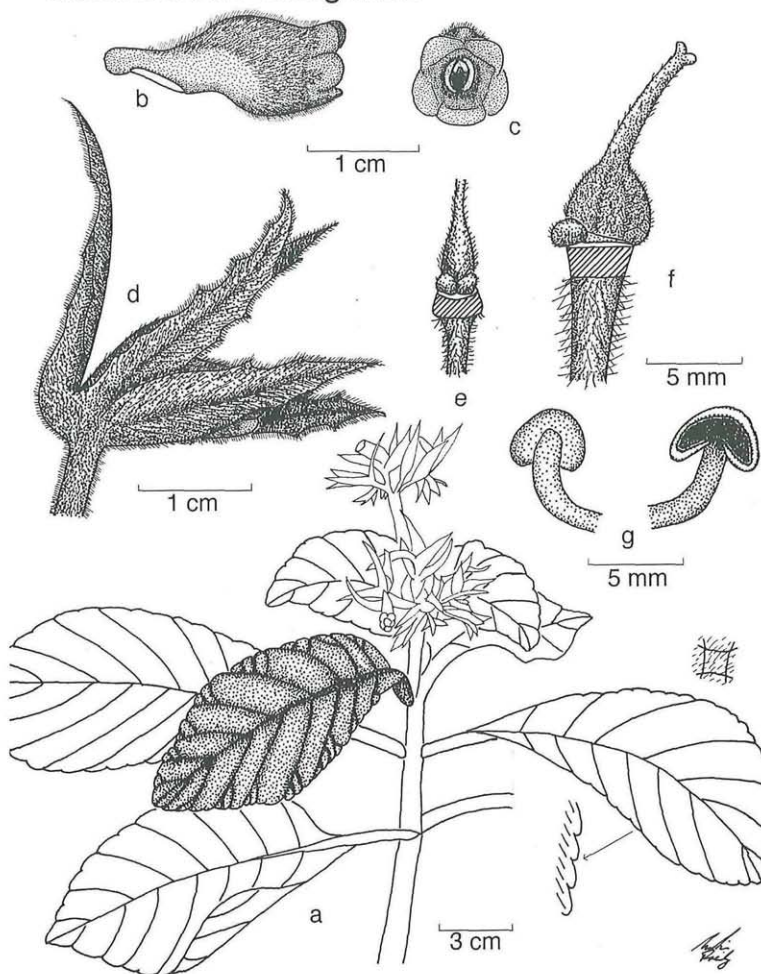
*Gasteranthus otongensis*

Fig. 2. – *Gasteranthus otongensis* M. FREIBERG. – a habit and detail of leaf margin, indumentum not shown. – b side view of corolla showing spur. – c front view of corolla. – d side view of calyx and almost completely hidden corolla. – e dorsal view of the base of the gynoecium (sepals and petals removed) showing the nectary. – f lateral view of the gynoecium. – g anther from above (left) and below (right).

olla, free part 6–7 mm, glabrous, basally papillose, staminode 3 mm, anthers connate,  $2.5 \times 2$  mm. Ovary ovoid, laterally compressed, tomentose, 4 mm long, 3 mm high, 2 mm wide, style included, 6 mm long, tomentose, stigma bilobed. Nectary annular, dorsally bilobed, laterally and ventrally reduced, sparsely tomentose towards ovary, basally glabrous, dorsally

1.5 mm high, 3 mm wide. Fruit a flattened, bivalved, fleshy capsule, calyx lobes widened and bended downwards. Seeds black.

*Gasteranthus otongensis* grows in primary, montane forests of the Bosque Protector Otonga. Stands are scattered in shaded areas close to small creeks. It is especially abundant in the valley along Rio Esmeraldas. The flowering season starts in July, fruiting season is March and April.

The corolla of this *Gasteranthus* is totally hidden in the conspicuously red coloured calyx lobes, which are themselves clustered in dense inflorescences above the apex of the stems. In most other species of the genus the brightly coloured corolla functions as the main pollinator attractor. Superficially it resembles *Gasteranthus quitensis* BENTH., but form, size and colour of this species along with differences of the leaves provide clearly distinct features.

Etymology: "*otongensis*" is derived from the Bosque Protector Otonga, which is the only location so far where this species was found.

Holotype: QCA M. FREIBERG 96263, 27. 07. 1996 (Isotypes QCNE, ULM)

### Discussion

The Genus *Gasteranthus* consists of about 40 species in the tribe *Beslerieae* of the subfamily *Gesnerioideae* in the family *Gesneriaceae* (BURTT & WIEHLER 1995). It is closely related to the genus *Besleria*, with which it was combined by several authors (e.g. MORTON 1939) as a section or subsection, until WIEHLER 1975 redefined *Gasteranthus* as a distinct genus. The genus *Gasteranthus* itself was established already in 1846 by BENTHAM (p. 233), based on *G. quitensis*, but at that time defined on superficial structures. Main differences are the fleshy capsule rather than a berry, clustered stomata on the surface of the leaves, which often appear as pale dots, and the shape of the nectaries.

Two groups in *Gasteranthus* can be distinguished: those with urceolate, mostly pouched, ornithophilous flowers and those with funnelliform flowers, the latter which is often pollinated by Euglossine bees (WIEHLER 1975). Both groups could be considered as sections in the genus. *G. magentatus* clearly has urceolate flowers and rises the known number of *Gasteranthus* of this section. *G. otongensis* is a somewhat intermediate: the throat is not constricted, but a small pouch at the base of the corolla can be distinguished.

The very local distribution of some *Gasteranthus* species and the still rising number of species make it difficult to further subdivide the genus. Studies on the pollination biology together with detailed distribution maps, especially in the highly ridged areas of the Andes, would help a lot in our further understanding of this genus. The ongoing deforestation and consequently the endanger of endemic species is thus a great obstacle.

### Acknowledgements

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### Recensio

**ROTH Lutz & KORMANN Kurt 1997. Duftpflanzen Pflanzendüfte.** Ätherische Öle und Riechstoffe. – Gr. 8°, 544 Seiten, 10 Schwarz-Weiß-Abbildungen, 164 Farb-Abbildungen; geb. – Ecomed Verlagsgesellschaft D-86887 Landsberg. – DM 128,-. – ISBN 3-609-65140-7.

Der Einführungsabschnitt (p. 9–43) enthält kurze Hinweise zur Geschichte der Duftstoffe und ihrer Gewinnung, Erläuterungen von Fachbegriffen (z.B. Balsame, Absolues, Concretes, Enfleurage), einen Abschnitt über die Rohstoffe (natürliche, synthetische, Lösungsmittel), Tabellen von Pflanzen bzw. Pflanzenprodukten nach

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