Gasteranthus diverticularis, a new species of Gesneriaceae from southern Ecuador

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Abstract. A new species of *Gasteranthus* (Gesneriaceae, Beslerieae) is described from the eastern Andean slopes of southern Ecuador. The presence of a strongly hypocyrtoid corolla with lateral protrusions along the pouch and ternate leaves differentiate **Gasteranthus diverticularis** from all other congeners.

Key Words: Beslerieae, *Gasteranthus*, hypocyrtoid corolla, Ecuador, Gesneriaceae.

Resumen. Se describe una nueva especie de *Gasteranthus* (Gesneriaceae, Beslerieae) de la vertiente oriental de los Andes del sur de Ecuador. La presencia de una corola marcadamente hipocirtoide con prominencias laterales a lo largo de la giba y las hojas ternadas diferencian a **Gasteranthus diverticularis** de otros congéneres.

Gasteranthus is a genus of terrestrial herbs and subshrubs that ranges from Mexico to Bolivia. Molecular phylogenetic studies strongly support the inclusion of *Gasteranthus* as a member of the New World tribe Beslerieae (Smith, 2000; Roalson & Clark, 2006; Clark et al. 2010). The genus is easily defined by the presence of conspicuous stomatal clusters on the lower leaf surfaces, a feature that is relatively rare in the New World Gesneriaceae. The only other New World members with stomatal clusters are *Napeanthus* and *Gesneria*, but they are less conspicuous relative to the stomatal clusters in *Gasteranthus*. The monograph of *Gasteranthus* (Skog & Kvist, 2000) recognized 35 species, including three subspecies. Freiberg (2000) published three species of *Gasteranthus* the same year of the monograph, but a month later. The month of publication for Freiberg (2000) is August and the month of publication for Skog and Kvist (2000) is July. Two of the three species published by Skog and Kvist therefore have priority over species that were published by Freiberg. More species of *Gasteranthus* have been discovered since Skog and Kvist's monograph (2000), and one of these is described here. The description of *Gasteranthus diverticularis* brings the total described diversity of the genus to 37 species.

The corolla shapes in *Gasteranthus* have a wide range from campanulate-funnelform to constricted-hypocyrtoid (see Figs. 2–10 in Skog & Kvist, 2000). The campanulate-funnelform corolla has a wide limb and throat, a shape often associated with pollination by Euglossine bees (Endress, 1994). The constricted-hypocyrtoid corolla has a narrow throat and distinctive pouch on the ventral surface and is associated with pollination by birds (Clark, pers. obs.). *Gasteranthus diverticularis* has a constricted-hypocyrtoid corolla and is different from other congeners by the highly developed pouch on the ventral surface with lateral protrusions. The lateral protrusions are consistently present, but irregularly distributed. No other *Gasteranthus* or other member of the Gesneriaceae is known to have such an extremely developed pouch as found in the species described here.

Gasteranthus diverticularis J. L. Clark, **sp. nov.** Type: Ecuador. Zamora-Chinchipe: Cantón Zamora, buffer zone near the eastern border of Parque Nacional Podocarpus, 2.5 km S of Zamora, along small stream near Cabañas Ecológicas Copalinga, 04º05'08"S, 078º57'23"W, 904 m, 4 Jun 2007, *J. L. Clark & Gesneriad Research Expedition Participants 10000* (holotype: US; isotypes: AAU, COL, E, F, K, MO, NY, QCA, QCNE, SEL, UNA, VEN). (Figs. 1, 2)

A ceteris *Gasteranthi* speciebus caule verticillis 3-foliatis et corollae sacco perelongato udonoide differt.

Terrestrial herb; stems erect and rarely branched, 40–60 cm tall, to 0.5 cm in diameter, herbaceous, internodes 1–4 (−10) cm long, terete, strigillose below, pilose above. Leaves whorled (3 per node), all equal, petioles terete, (1–)1.5–3 cm long, densely pilose; blades 6–13×1.5–3.5 cm, oblong-lanceolate, base cuneate, apex acute, margin crenate, adaxially light green and sometimes variegated, glabrous, abaxially much lighter green with conspicuous stomatal clusters, sparingly pilose, becoming more pilose along venation, membranous, lateral veins 6–8 per side. Inflorescence an open cyme of 2–6 flowers, pilose; peduncles 3–7 cm long; pedicels 0.5–1.0 cm long. Calyx green, pilose, lobes basally connate 1–3 mm, subequal, each of the lobes ovate to lanceolate with acute apex, 3–10×2–3 mm, entire, pilose, dorsal lobe directed backward and surrounding spur, ventral lobes directed forward, lateral lobes directed upward. Corolla 2–2.8 cm long, hypocyrtoid with constricted throat and extended ventral pouch that appears vertically flattened, tube length (distance from base of the corolla to throat) 1–1.5 cm, length of pouch (distance from throat to end of corolla) to 1.0 cm long, apex and lateral margins of pouch with small protrusions, uniformly bright orange, outside sparsely pilose, inside glabrous; spur 2–3 mm long, narrow and slightly recurved; throat 3–7 mm in diameter; limb uniformly orange, lobes 1.5–2×2–4 mm, subequal to equal, rotund to acute, glabrous. Filaments 4–7 mm long, adnate to base of corolla tube for 1.5–2 mm, glabrous; anthers ca. 1.5×1.5 mm. Ovary 2–3×1 mm, pilose; style 6–7 mm long, glabrous; stigma stomatomorphic to weakly bilobed. Fruits not observed.

Distribution and ecology.—*Gasteranthus diverticularis* is a narrow endemic along the eastern Andes in southern Ecuador that is only known from a single, but locally abundant population, along humid areas near small streams in a 100 hectare private reserve (Cabañas Ecológicas Copalinga) managed by Catherine Vits and Boudewijn De Roover. Plants are especially abundant along the reserve's Blue Trail, Yellow Trail, Orange Trail, and the Red Trail. Populations range from 900 to 1300 meters, but are more abundant in the lower elevations.

The type is the only known collection of *Gasteranthus diverticularis* and all of the images are from the type locality. Jason Grant (Neuchatel University, Switzerland) has visited and photographed *Gasteranthus diverticularis* on more than one occasion from the type locality. A picture of *Gasteranthus diverticularis* appeared on the front cover of the horticultural journal, Gesneriads (2008, Vol. 58, No. 1) that featured an article about the expedition that resulted in the discovery of this species (Cichocki, 2008).

Conservation and IUCN Red List category.—This species has not been found in any formally protected area in Ecuador. The private reserve Cabañas Ecológicas Copalinga is located three kilometers north from Parque Nacional Podocarpus (Bombuscaro entrance) where it is likely to occur. According to the IUCN Red List criteria (IUCN, 2001) for limited geographic range (B2a, less than 10 km^2 and known to exist at only a single location) and considering the uncertain future of habitat conservation outside of Parque Nacional Podocarpus, *Gasteranthus diverticularis* should be listed in the category CR (Critically Endangered).

Etymology.—The specific epithet reflects the resemblance of the corolla's ventral pouch with lateral protrusions to diverticula, circumscribed pouches or sacs that branch out from a hollow organ or structure. The name is well known for the digestive disease, diverticulitis that is caused by an inflammation of the diverticula in the large intestine. The specific

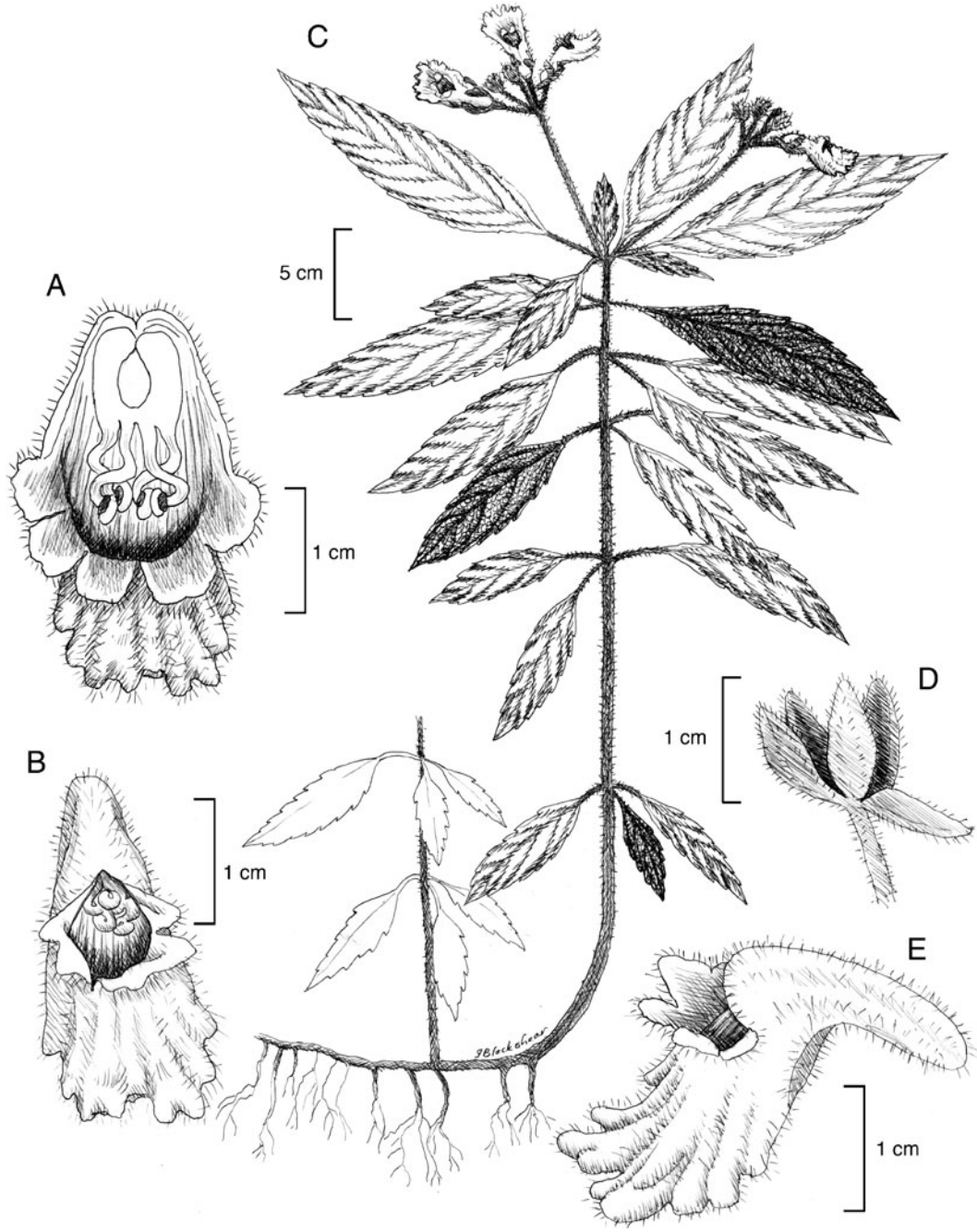

Fig. 1. *Gasteranthus diverticularis*. **A.** Corolla dorsally open to show androecium. **B.** Front view of corolla. **C.** Habit. **D.** Calyx. **E.** Lateral view of corolla. (Drawn from the holotype.)

epithet was suggested by well-known gastroenterologist, Dr. Charles G. Clark, who introduced gastroscopy to the University Medical Center at Princeton, New Jersey where he performed the hospital's first endoscopy in 1967.

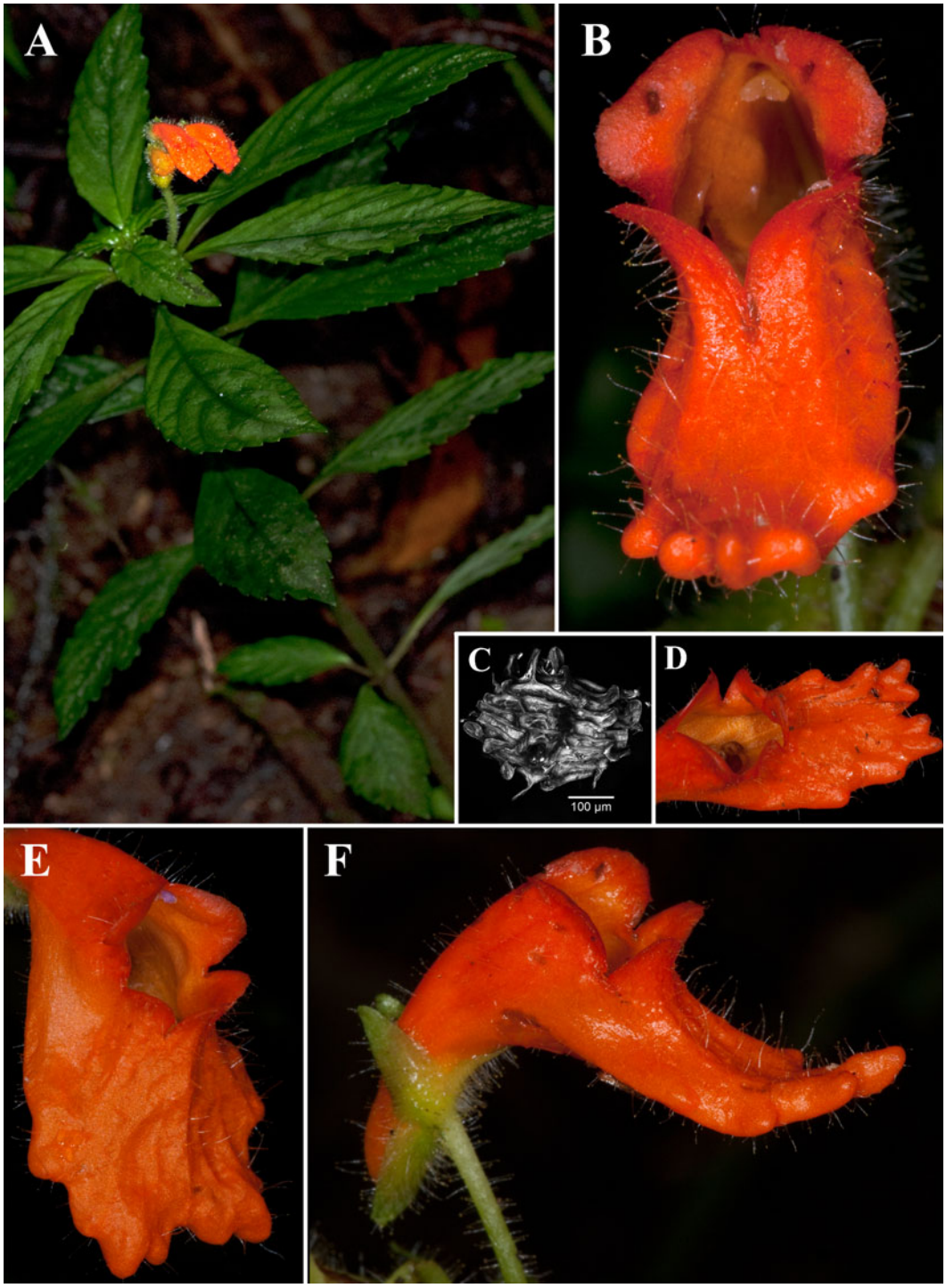

Fig. 2. *Gasteranthus diverticularis.* **A.** Habit. **B.** Front view of flower. **C.** Confocal image of seed. **D.** Dorsal view of flower. **E.** Front view of flower. **F.** Lateral view of flower. (From the holotype.)

Gasteranthus diverticularis is easily distinguished from all other congeners by its lanceolate ternate leaves and a remarkable extended ventral pouch with lateral protrusions. Other *Gasteranthus* species with ternate leaves include *Gasteranthus ternatus* L. E. Skog & L. P. Kvist, *G. perennis* (C. V. Morton) Wiehler and *G. trifoliatus* M. Freiberg. *Gasteranthus diverticularis* is easily differentiated from other species with ternate leaves by the presence of an accentuated ventral pouch with lateral protrusions (Fig. 2). The presence of a ventral pouch with lateral protrusions is found in other *Gasteranthus* species (e..g, *Gasteranthus lateralis* (C. V. Morton) Wiehler, *G. macrocalyx* Wiehler, and others), but the pouches with lateral protrusions are not nearly as accentuated as those found in *Gasteranthus diverticularis*. The leaves of *G. diverticularis* are sometimes variegated, which also distinguishes this taxon from other congeners.

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