
Two New Species in *Oritrophium* and *Floscaldasia* (Asteraceae: Astereae) from the High Andes of Ecuador

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ABSTRACT. Two new species from the family Asteraceae, tribe Astereae, were collected during botanical investigations in the Ecuadorian Andes. *Oritrophium llanganatense* Sklenář & H. Robinson and *Floscaldasia azorelloides* Sklenář & H. Robinson are here described and illustrated. *Oritrophium llanganatense* is distinct from other species of the genus by a combination of abaxially lanate leaves with outer phyllaries narrowly ovate to oblong. *Floscaldasia azorelloides* differs from the other species of the genus by its three-lobed leaves. The two species inhabit the upper superpáramo and are restricted to remote areas of the Ecuadorian Eastern Cordillera.

RESUMEN. Dos nuevas especies de la familia Asteraceae, tribu Astereae, se colectaron durante investigaciones botánicas en el superpáramo del Ecuador. Las dos especies, *Oritrophium llanganatense* Sklenář & H. Robinson y *Floscaldasia azorelloides* Sklenář & H. Robinson, se describen e ilustran. *Oritrophium llanganatense* difiere de las otras especies del género por tener hojas lanosas abaxialmente y brácteas exteriores ovadas a oblongas. *Floscaldasia azorelloides* difiere de las otras especies del género por tener las hojas trilobadas. Las especies se encuentran en el superpáramo alto en áreas remotas de la Cordillera Oriental del Ecuador.

In the last few years, the flora and vegetation of the Ecuadorian superpáramo have been studied by the senior author. During several field trips to remote and infrequently visited areas of the Eastern Cordillera, new species of *Oritrophium* and *Floscaldasia* were collected. The species are here described, illustrated, and compared with other species, and their ecology and distribution are briefly discussed.

The genus *Oritrophium* (HBK) Cuatrecasas has

been recently treated by Cuatrecasas (1997) with the report of 19 species and 6 subspecies. One additional species has since been described from the Mexican highlands (Nesom, 1998). The genus ranges from Mexico to southern Bolivia, with no reports from the mountains of Central America. Most species of *Oritrophium* occur in Venezuela, Colombia, and Ecuador, where they typically inhabit wet parts of páramos (Cuatrecasas, 1997). The position of the genus in the tribe Astereae has been discussed by Nesom (1992) and Cuatrecasas (1997).

Oritrophium llanganatense Sklenář & H. Robinson, sp. nov. TYPE: Ecuador. Tungurahua: Cerro Hermoso, SW ridge of mountain, humid upper superpáramo vegetation on wet rocks, 1°14'S, 78°18'W, 4200–4300 m, 6 Sep. 1997, P. Sklenář & V. Sklenářová 3651 (holotype, QCA; isotypes, PRC, QCNE). Figure 1A.

In bracteis involucri inaequalibus linearibus vel oblongis *Oritrophio limnophilo* (Schultz Bip.) Cuatrecasas similis sed in foliis abaxialiter lanatis differt.

Small perennial rosetteform herb with short rhizome-bearing fibrous roots; rhizome 1–2 × 0.5–1.0 cm, ± vertical. Leaves 12 to 20 in rosette, spreading; petioles 4–7 × 1.5–2.5 mm, lower part and basal sheaths with long, persistent, creamy-white, silky hairs at margins covering leaf bases; blades firm, flat with revolute entire margins, adaxially bright yellowish green, glabrous, abaxially densely sordid lanate except for the midrib, narrowly ovate, acute, 15–20 × 4–8 mm; center of rosette producing up to 5 scapes covered with white hairs, bearing narrowly elliptic-oblong alternate bracts 4–7 × 1.5–1.6 mm, sparsely white lanate abaxially. Capitula terminal, solitary, 5–6 mm high, 5–7 mm wide; involucre with phyllaries 3- to 4-seriate, unequal, glabrous, bright to dark green, dark purple at apices or from upper third, margins membrana-

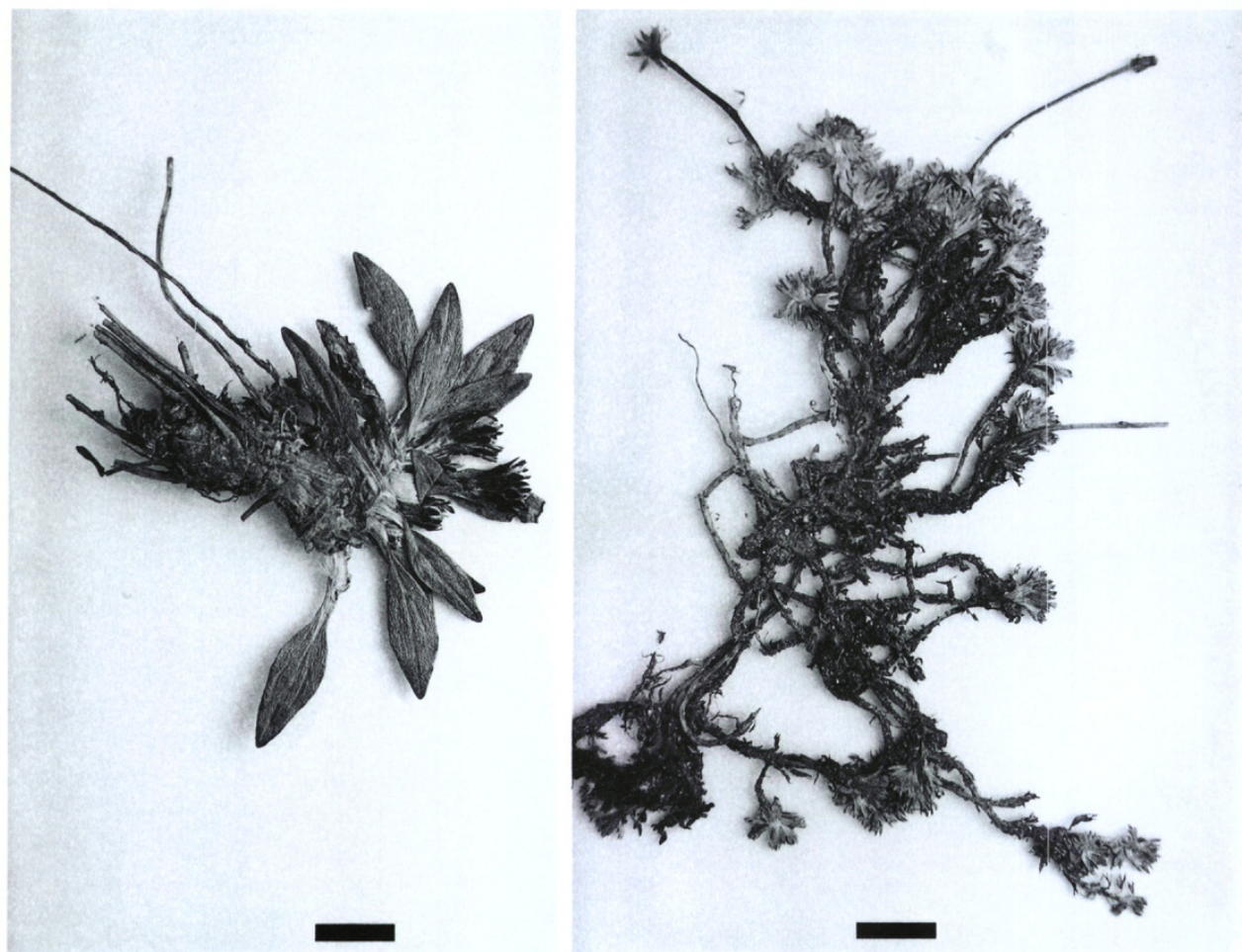


Figure 1. —A (left). Habit of *Oritrophium llanganatense* Sklenář & H. Robinson. —B (right). Habit of *Floscaldasia azorelloides* Sklenář & H. Robinson. From isotypes. Scale bar = 1 cm.

ceous, apex shortly ciliate; outer phyllaries $4-5 \times 1.4-1.8$ mm, narrowly ovate to oblong; inner phyllaries narrowly elliptic to linear-lanceolate to linear, $5.5-6.5 \times 0.7-1.1$ mm, shortly acute. Ray florets 20 to 28 per capitulum, corollas $3.5-4.1$ mm long; limb white, linear to narrowly oblong-lanceolate, canaliculate, apex acute, $1.6-1.8 \times \text{ca. } 0.2$ mm, tube pale greenish, with scattered short trichomes, which are longer and more numerous at the tube-ligule junction, $2.1-2.2 \times \text{ca. } 0.2$ mm; style $3.8-4$ mm long, with style branches $0.9-1.1$ mm long, brownish in upper half; pappus $3.0-3.3$ mm long, brownish below, yellow-brown above middle, scabrid; cypselas shortly white sericeous, not seen mature. Disc florets 7 to 10 in capitulum, corollas $3.0-3.2$ mm long, pale green, narrowly funnelform, with 5 equal triangular lobes $0.3-0.4$ mm long, corollas outside with scattered short trichomes and multicellular glands, which are longer and clustered at the tube-limb junction, trichomes short and more numerous on lobes; style branches ca. 0.8 mm long, densely papillate, linear-lanceolate; anther thecae $1.0-1.1$ mm long, apical appendages ca. 0.2 mm

long; pappus $2.9-3.1$ mm long, yellow-brown; cypselas shortly sericeous with white straight setulae, mature ones not seen.

Because of the hairy leaf sheaths and the broad outer phyllaries, *Oritrophium llanganatense* would key to *O. limnophilum* in Cuatrecasas (1997), the only other species in the genus with such involucre bracts. From this species, *O. llanganatense* differs by the bright yellowish green color of the upper surface, the densely lanate lower surface, and the revolute margins of the leaves. The name of *O. llanganatense* is derived from the name of the Llanganatis National Park, where the species was collected.

Paratypes. ECUADOR. **Tungurahua:** Cerro Hermoso, SW ridge of the mountain, sparse vegetation of the upper superpáramo on wet rocks with shallow soil, rich bryophyte cover, $1^{\circ}14'S$, $78^{\circ}18'W$, 4300 m, 6 Sep. 1997, P. Sklenář & V. Sklenářová 3630 (MO, QCA, US).

The genus *Floscaldasia* Cuatrecasas, previously credited with one species, *F. hypsophila* Cuatrecasas, was described from the Colombian páramo

(Cuatrecasas, 1969). It was distinguished from other genera of the tribe by the structure of the pappus, which had segments smooth and somewhat curved, formed by cylindrical cells (Cuatrecasas, 1969). Nesom (1993, 1994) has studied the subtribal classification of the genus. *Floscaldasia* closely resembles the genus *Laestadia* Kunth ex Lessing, from which it differs primarily by the presence of a pappus. For years, the genus was considered endemic to the páramos of Colombia (Cuatrecasas, 1969; van der Hammen & Cleef, 1986). However, recently a specimen previously determined as *Laestadia* from northern Ecuador was recognized as *F. hypsophila* (Nesom, 1993).

Floscaldasia azorelloides Sklenář & H. Robinson, sp. nov. TYPE: Ecuador. Chimborazo/Morona Santiago: Cerros Yuibug–Pailacajas (4730 m a.s.l.), rocky slopes on the E side of the mountain ridge, very humid upper superpáramo with cushions of *Werneria humilis* and grasses of *Calamagrostis podophora* and *Agrostis* spp., 1°45'S, 78°27'W, 4400 m, 31 July 1997, P. Sklenář & V. Sklenářová 2950 (holotype, QCA; isotypes, AAU, MO, PRC, QCNE, US). Figure 1B.

A Floscaldasia hypsophila in foliis trilobatis differt.

Small rosetti-form perennial herb with ramified, horizontally spreading, creeping rhizome; rhizome brownish yellow in older, and pale greenish in younger parts, with membranaceous bracts; short stem bearing terminal rosette of small leaves. Leaves alternate, sessile, 10 to 18 in cluster, pale green to yellowish green, glabrous or with few, short, appressed hairs along the veins, flat, 4–6 × 1.2–1.8 mm, narrowly oblong to oblong, membranaceous at the base, 3-lobed at apices, but a few leaves with 1 or 2 smaller additional lobes, lobes subequal, 1.0–1.5(–1.8) × 0.3–0.7 mm, acute. Capitula terminal, solitary, subsessile at onset of anthesis, becoming long pedunculate, up to 4 cm long, puberulous with scattered glandular dots, with a few small bracts. Individual capitulum 2.5–3.0 mm high, 4.5–6.0 mm wide; phyllaries 2- to 3-seriate, pale green to green, glabrous, purple at apices, 2.5–2.8 × 0.7–1.1 mm, narrowly elliptic-oblong, shortly ciliate at the apices, margins membranaceous. Ray florets female, 35 to 45 per capitulum, corolla with limb purple to dark purple (occasionally light purple to yellowish), 0.9–1.1 mm long, entire to bidentate at apex, narrowly linear-lanceolate, canaliculate, spreading, tube 0.8–0.9 mm long, pale greenish to brownish yellow, with numerous short biseriate hairs; style 1.3–1.4 mm

long, branches 0.3–0.4 mm long, brown, papillate, triangular-oblong; pappus 1.0–1.3 mm long with few bristles much shorter, golden brown, smooth, somewhat curved. Disc florets functionally staminate, 9 to 11 per capitulum, corolla 1.6–1.8 mm long, with limb light to dark purple, limb 1.1–1.2 mm long, with 5 triangular acute lobes, lobes 0.4–0.5 mm long, throat with numerous short biseriate hairs, tube 0.5–0.7 mm long, pale green; styles ca. 1 mm long, exceeding the lobes; anthers 0.6–0.7 mm long; pappus 1.5–1.6 mm long with few shorter bristles, otherwise as in ray florets. Achenes laterally compressed, biconvex, 1.4–1.6 × 0.5–0.6 mm, in rays more strongly arched and with numerous glandular dots mostly along outer margin, in disc florets more symmetric and with few glands.

Floscaldasia azorelloides is unmistakably congeneric with *F. hypsophila* by the form of the heads being terminal, solitary, subsessile becoming long pedunculate and because of the smooth bristles of the pappus. The new species has the general habit of *F. hypsophila*, although it has slightly smaller capitula and florets, and also shares similar ecological requirements. However, it is unquestionably distinct in the 3-lobed leaves. The leaves of *F. azorelloides* resemble those of several Ecuadorian *Azorella* Lamarck species, e.g., *A. corymbosa* (Ruiz & Pavón) Persoon, and the species is named accordingly.

Paratypes. ECUADOR. **Chimborazo:** El Altar, N side of the volcano, humid superpáramo on the ridge below the Canonigo peak, 1°41'S, 78°24'W, 4400 m, 19 Aug. 1995, P. Sklenář & V. Kostečková 93–13 (QCA, QCNE), 4500 m, P. Sklenář & V. Kostečková 90–6 (AAU, US). **Pichincha/Napo:** W side of a mountain ridge ca. 2 km to the W from Cerro SaraUrcu, humid superpáramo on metamorphic rocks, 0°06'S, 77°57'W, 4400 m, 29 Aug. 1995, P. Sklenář & V. Kostečková 102–8 (PRC, QCA), mountain ridge, 4200–4350 m, 30 Aug. 1995, P. Sklenář & V. Kostečková 1158 (AAU), 4350–4400 m, 30 Aug. 1995, P. Sklenář & V. Kostečková 1179 (QCA). **Chimborazo/Morona Santiago:** Cerros Yuibug–Pailacajas (4730 m a.s.l.), along a small stream on the E side of the mountain ridge, humid cushion superpáramo with *Azorella*, *Werneria humilis*, *Valeriana*, and many mosses, 1°45'S, 78°27'W, 4200 m, 31 July 1997, P. Sklenář & V. Sklenářová 3040 (PRC, QCA).

DISTRIBUTION AND ECOLOGY

The two described species occur in the open, patchy vegetation of the upper superpáramo (sensu Cleef, 1981) in very humid areas of the Ecuadorian Andes (Fig. 2). The species *Oritrophium llanganatense* is known from one locality. It was collected in permanently moist habitats in shallow soils around rocks, usually associated with abundant

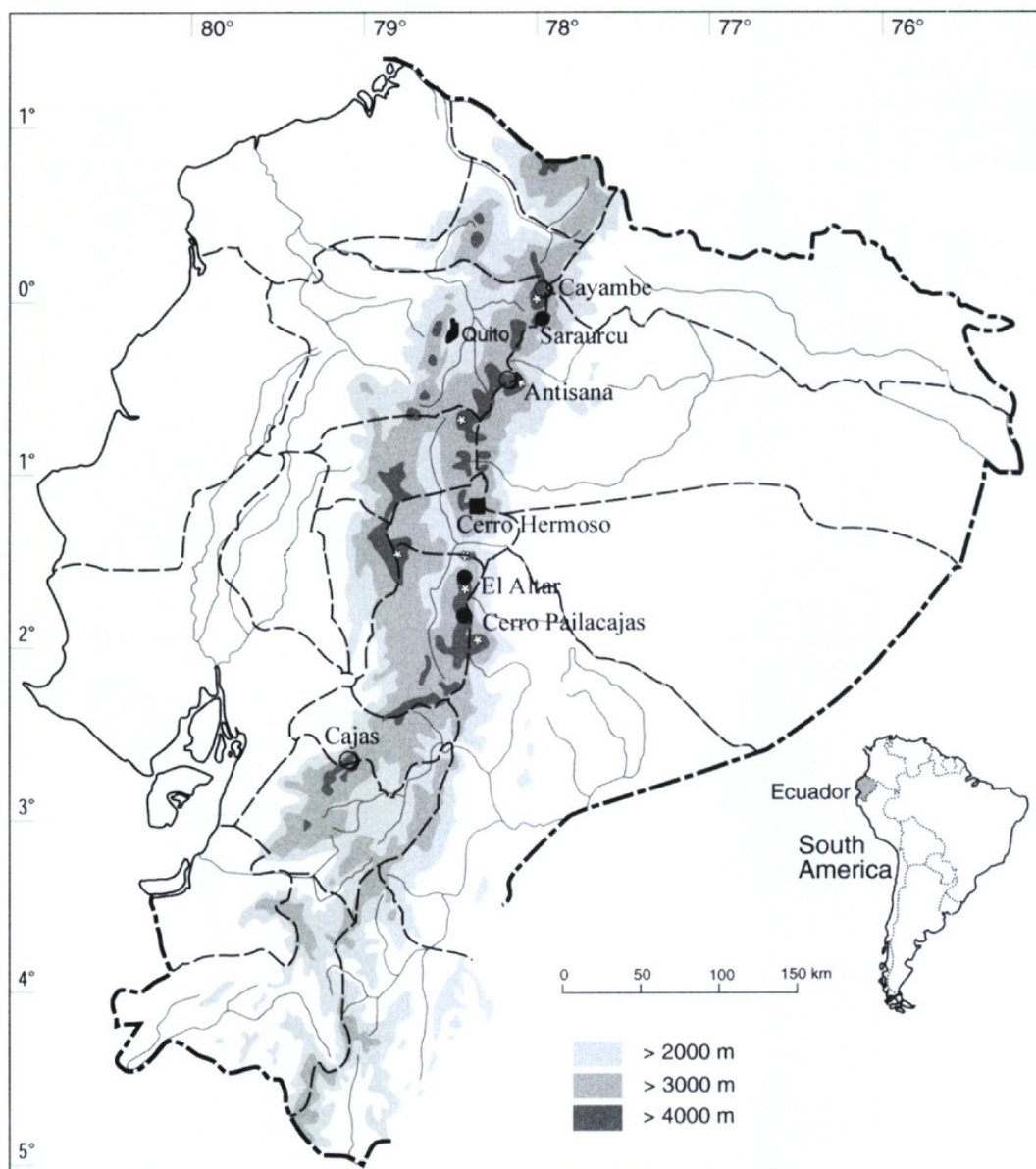


Figure 2. Distribution of *Floscaldasia azorelloides* (●), *F. hypsophila* (○, near Cayambe, Antisana, and Cajas), and *Oritrophium llanganatense* (■, near Cerro Hermoso) in Ecuador; white stars indicate major ice-capped volcanoes.

bryophytes. The species *Floscaldasia azorelloides* was collected from altitudes between 4200 and 4500 m, where it forms loose mats in very shallow, wet, sandy substrata on both metamorphic and igneous bedrock. The other species of the genus, *F. hypsophila*, is known from similar environments from high altitudes, (3900–)4100–4550 m. Besides the first Ecuadorian locality from Cayambe (Nesom, 1993), the species was repeatedly collected on Volcán Antisana in northern Ecuador, and there is a record from Cajas National Park in the southern part of the country (P. Sklenář, unpublished data). Its known distribution in Ecuador is shown in Figure 2; the distribution in Colombia is given by van der Hammen and Cleef (1986: fig. 7–3d). Unlike *F. azorelloides*, the plants of *F. hypsophila* were found growing upon the surface of cushion plants

such as *Distichia* Nees & Meyen and *Xenophyllum* V. A. Funk (Cleef, 1978; P. Sklenář, pers. obs.). Due to its limited occurrence at the highest elevations, the genus *Floscaldasia* represents a typical superpáramo element (see also van der Hammen & Cleef, 1986).

Despite recent research, the remote areas of the Eastern Cordillera of Ecuador remain botanically poorly known. The newly described species are both known from only a few localities. However, further exploration may expand their geographical range within, and perhaps also outside, the country. This is especially plausible in *Floscaldasia azorelloides*, since this species can easily be overlooked in the field.

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