

CERATOSTEMA LOUCIANAE AND DISTERIGMA CHRISCANADAYI (ERICACEAE:  
VACCINIEAE)—NEW EPIPHYTIC SPECIES FROM EASTERN ECUADOR

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ABSTRACT

**Ceratostema loucianae** and **Disterigma chriscanadayi** (Ericaceae: Vaccinieae), species of pendulous epiphytic shrubs, from eastern Ecuador and of ornamental potential are described and illustrated.

RESUMEN

**Ceratostema loucianae** y **Disterigma chriscanadayi** (Ericaceae) dos nuevas especies de arbustos colgantes epifitos del este de Ecuador y de potencial ornamental son formalmente descritas e ilustradas.

KEY WORDS: Macas, Morona Santiago, Neotropics, Sangay National Park, Vaccinieae

INTRODUCTION

In this paper, we have described, illustrated, and discussed two new species of Ericaceae: Vaccinieae from eastern Ecuador in order that they may be included in floristic studies, national checklists and cataloging projects. Because they grow in highly threatened Andean environments, their naming constitutes the first obvious step towards their conservation.

Ericaceae are a family of vascular plants whose members are conspicuous elements in the floristic and landscape composition of Central and South American cloud forests and páramos. A few species are widespread, but most are narrow endemics, altitudinally restricted to cool or cold humid environments. The species are terrestrial or epiphytic shrubs, their corollas frequently have a tubular structure of red, pink, orange, and purple (rarely green) colors that are attractive to hummingbirds for pollination. Their fruits are small juicy berries with numerous seeds that are food for birds and small mammals (but include the spectacled bear). Our current knowledge of the phylogenetic relationships within the monophyletic tribe Vaccinieae based on molecular data is still preliminary and phylogenomic analyses with greatly expanded taxonomic sampling and using different sources of data are still needed. Due to their beautiful appearance, many species of this family are cultivated and sold as ornamentals (Luteyn 2002; Cornejo et al. pers. obs.). It is expected that additional field work, especially in eastern Ecuador and northeastern Peru, will yield more interesting material. The new species are circumscribed under the phenetic-morphological species concept (Cronquist 1978). We hope that the description of these two new species stimulates their collection and study.

## CERATOSTEMA

**Ceratostema** Jussieu (1789:163) is a neotropical genus of ca. 32–35 species, ranging from Venezuela to northern Peru—ca. 29 species are endemic to Ecuador, three to northern Peru, one to the Guayana Highland of Venezuela, and two common to southern Colombia and eastern Ecuador. When A.C. Smith (1952) treated all of the species of *Ceratostema* known at that time, he recognized 16 species; whereas, when Luteyn (1996) treated the genus for Ecuador, he recognized 27 species there (out of a total of 32 species known at that time). Within the last three years Jiménez et al. (2021, 2023) have published an additional two new species in Ecuador.

Traditionally, *Ceratostema* has been morphologically characterized by the combination of flowers conspicuous (large and colorful) with corollas often ranging to 4 cm in length and bright scarlet in color; calyx articulate with the pedicel; corollas usually basally gibbous and with proportionately very elongate lobes; stamens (including filaments and anthers) of  $\pm$  equal lengths and as long as the corollas, the anther tubules about half the diameter of the thecae and much longer (3–5 times) than the anther thecae, and the thecae very coarsely granular; and anthers without spurs. Only six species of *Ceratostema* have been represented in broad-scale molecular phylogenetic analyses of the tribe (Kron et al. 2002; Powell & Kron 2003; Pedraza et al. 2015) and these same studies suggest that *Ceratostema* is polyphyletic, but the underrepresentation of species makes it impossible to have a knowledgeable account of the evolutionary relationships in the genus at this time. To date, the genus remains poorly collected and understood.

**Ceratostema loucianae** Cornejo, G. Tello, & Luteyn, **sp. nov.** (Fig. 1). TYPE: ECUADOR. MORONA SANTIAGO: Macas, 0.2 km N of San Isidro, lower Sangay National Park, eastern Andean slopes, 2°12'33.51" S 78°10'1.94" O, ca. 1165 m, montane wet forest, 29 Dec 2023 (fl), X. Cornejo & G. Tello 10152 [HOLOTYPE: GUAY (mounted and spirit); ISOTYPE: QCA].

**Diagnosis.**—*Ceratostema loucianae* is similar to *C. rauhii* Luteyn (1992), but differs by having leaf blades broader (1.5–3.3 cm wide), narrowly acuminate to caudate at apex, sepals broadly deltoid to hemiorbicular (1 mm long), corolla lobes deep-purple, stamens with free filaments, and mature fruits larger (1.3–1.5 mm in diam.), versus *C. rauhii* which has its leaf blades narrower (0.5–1 cm wide), acute at apex, sepals narrowly-lanceolate to linear-lanceolate (3–4.5 mm long), corolla lobes pinkish-red to scarlet, stamens with filaments connate (staminal tube 6–7 mm long), and mature fruits smaller (7–8 mm in diam.).

**Description.**—**Epiphytic shrubs** with branches loosely pendulous to 3 m long, tomentulose, the hairs eglandular, white; roots axonomorphous with well-developed lignotubers, the lignotubers globose, 10–15 × 10–15 cm; branches terete to subterete, green, smooth, villose with white trichomes (fresh), becoming terete to occasionally somewhat flattened, maroon, trichomes light brown and somewhat deciduous (dry). **Leaves** spirally arranged, subpendulous; petioles 1–2 mm long, subterete, pale green, white-villose (fresh), becoming brown and pilose to tomentulose (dry); blades thick coriaceous (fresh), becoming chartaceous (dry), ovate-lanceolate to short-lanceolate, 2.5–6 × 1.5–3.3 cm, minutely glandular, dark green and somewhat glossy (fresh), opaque dark brown (dry), tomentulose to pilose at base, glabrescent adaxially, paler green (fresh), light brown (dry), glandular tomentulose to glandular pilose abaxially, marginally revolute, base inconspicuously subcordate to truncate, apex narrowly-acuminate to short-caudate; weakly 5-plinerved from base, the nerves weakly impressed to inconspicuous (fresh), weakly prominent (dry) on both sides. **Inflorescence** axillary or supracillary, 1–2-flowered, short-pedunculate; the peduncle subterete, 1 mm long, pale green (fresh), brown (dry); floral bracts triangular to broadly ovate, ca. 1 × 1 mm (fresh), ca. 0.5 × 0.5 mm (dry); pedicel articulate with calyx, mostly straight to slightly incurved, 5–6 × 2 mm (fresh), 3–4 × 0.8–1.5 mm (dry), thickly terete (fresh), mostly linear (dry), light-green, white-tomentulose-villose (fresh); bracteoles narrowly-lanceolate, 0.8 × 0.4 mm. **Flowers** 5-merous, divergent to subpendulous; calyx ca. 5 × 5 mm, light-green, white-tomentulose-villose (fresh), the hypanthium obconic, truncate at base, terete, ca. 2.8 × 3 mm (fresh), ca. 2.5 × 2.5 mm (dry), occasionally with black glandular trichomes, the limb open, spreading, 1.5–2 × 5–5.5 mm (fresh), the lobes 5, broadly deltoid to hemiorbicular, 1.5–2 × 3 mm, short-acuminate or apiculate; corolla thick-carnose, the tube cylindrical but 5-sulcate (bluntly and broadly angled) longitudinally, 18–20 mm long (fresh), 15–17 mm long (dry), slightly ventricose and 6–7.5 mm (fresh), 3–7 mm (dry) diam. at base, 6–7 mm (fresh), 3–7 mm (dry) diam. at throat, crimson-red, tomentulose-villose, the hairs white, erect, ca. 2 mm long (fresh), the lobes 5,

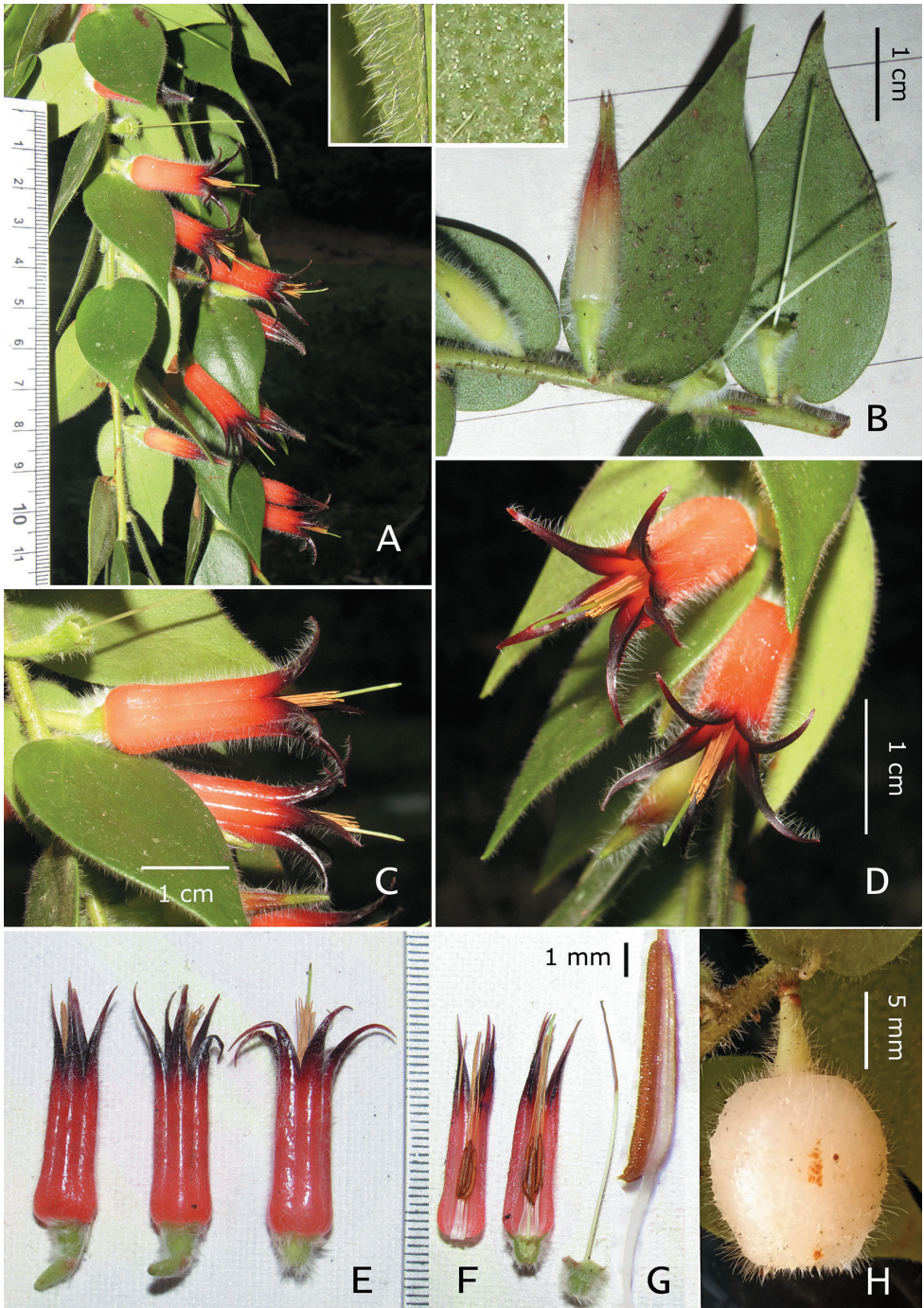


FIG. 1. *Ceratostema louicianae* Cornejo, G. Tello, & Luteyn. **A.** Pendulous habit, the white trichomes beneath blades at upper right square. **B.** Stem bearing leaves in abaxial view, and flowers in pre- and post-flowering stages, glandular surface of blades at upper left square. **C.** Flowers at anthesis, lateral view. **D.** Flowers at anthesis, adaxial-lateral view. **E.** Flowers at maturity, from left to right. **F.** Sectioned flower, and calyx with persistent style after falling corolla. **G.** Thecae and upper filament, dorsal-lateral view. **H.** Berry at maturity, lateral view. (A–H, based on the type. Photos: A–G, X. Cornejo; H, G. Tello).

spreading to somewhat reflexed, narrowly-lanceolate, 11–14 × 2–3 mm, dark purple, polished and sparsely verruculose within, white-pilose without (fresh); **stamens** 10, nearly equaling the corolla, slightly unequal with each other, ca. 2.5 cm long; filaments free, 5–6 mm long, white, glabrous; anthers 19–25 mm long, the thecae 6.5–7 mm long, papillose, the tubules distinct or barely fused at base, 12–15 mm, long, dehiscent by terminal pores, the pores oblique, 0.5–1 mm long; style exerted, 30–35 mm long, green or greenish, glabrous, the stigma truncate. **Berry** white to pearl-white at maturity, broadly subovoid to subglobose, ca. 1.5 × 1.3–1.5 cm, white tomentulose, mesocarp white; seeds cream-colored with embryos deep green (fresh).

**Distribution.**—*Ceratostema loucianae* is known only from the type locality, north of San Isidro parish which is located at the lower part of Sangay National Park near the Upano mountains. It is a persistent epiphyte under shade in secondary habitats. Flowers have been observed from Dec to Feb; fruits from Jan to Mar.

**Discussion.**—*Ceratostema loucianae* resembles and sometimes has been confused with *C. rauhii* (Luteyn 1992) the latter being another beautiful species cultivated and sold as an ornamental, that was discovered from the department of Lambayeque in NW Peru and to the present has not been found in Ecuador. Both species share an epiphytic habit with elongate, loosely pendulous, narrow branches to over 2 m long, abundant tomentulose pubescence of erect white hairs throughout the plant, 1–2 axillary flowers per inflorescence, corollas red with narrowly lanceolate, spreading to somewhat reflexed lobes, fruits white at maturity, mesocarp white, seeds cream-colored, and embryos green. *Ceratostema loucianae* can be easily distinguished from *C. rauhii* by the characters presented in the diagnosis. Both species are currently sold online (by Ecuagenera; this is not an endorsement), where *C. loucianae* was given the informal name “*Ceratostema villosa*” or “*Ceratostema rauhii* variety *villosa*”—neither name having been validly described (neither therein nor here) and, therefore, neither having nomenclatural status. More collections of both species are sorely needed to confirm the close relationship and validity of both species.

**Etymology.**—The species is named after Louciana Tello, daughter of Gabriel Tello the type co-collector, who helped to find this beautiful species with flowers and fruits in the field.

**Biological interactions.**—The fruits have been observed in the field to be eaten by birds known as mangos (*Cacicus* sp.). Due to the relative small size and soft and juicy pulp, it is most likely that the fruits are eaten and the seeds dispersed by bats.

**Uses.**—The flowers are occasionally consumed to quench thirst (José Rivadeneira, pers. comm. with G. Tello).

**Conservation status.**—At present, due to the lack of information, the new species is designated as DD (data deficient; IUCN 2022). Plants of *Ceratostema loucianae* are occasionally cultivated as ornamentals by Ecuagenera (see online)—an excellent option for *ex situ* conservation of this and many other beautiful native species.

## DISTERIGMA

**Disterigma** (Klotzsch) Nied. is a neotropical genus of ca. 30–40 species, ranging from southern Mexico through Central and South America, to central Bolivia, and east to Guyana and Brazil (Mt. Roraima). The most recent taxonomic treatment of *Disterigma* was a monograph by Pedraza-Peñalosa (2010a) in which 32 species were recognized. Traditionally, *Disterigma* has been morphologically characterized by the combination of persistent leaves; one to three axillary flowers; corollas 4-lobed and tubular or conical; anthers without spurs; and a distinctive pair of bracteoles embracing the calyx. *Disterigma* flowers are usually inconspicuous and small with corollas usually less than 1 cm in length and white to pink in color, but sometimes green or red. Based on the molecular studies of Kron et al. (2002), Powell and Kron (2003), and Pedraza-Peñalosa (2009, 2010b), *Disterigma* s.l. is polyphyletic, although the majority of species form a well supported monophyletic group. Most species in this genus still remain poorly collected.

**Disterigma chriscanadayi** Cornejo & Luteyn, **sp. nov.** (**Fig. 2**). TYPE: ECUADOR. ZAMORA-CHINCHIPE: Cordillera del Cóndor, environs Cabañas Yancuam, Los Tepuyes trail, 4°14'S, 78°40'W, 1400–1800 m, 11 Mar 2017 (fl, fr), X. Cornejo, C. Persson, & J. Rova 8945 [HOLOTYPE: GUAY; ISOTYPE: NY, image <https://sweetgum.nybg.org/science/vh/specimen-details/?irn=3208911>).

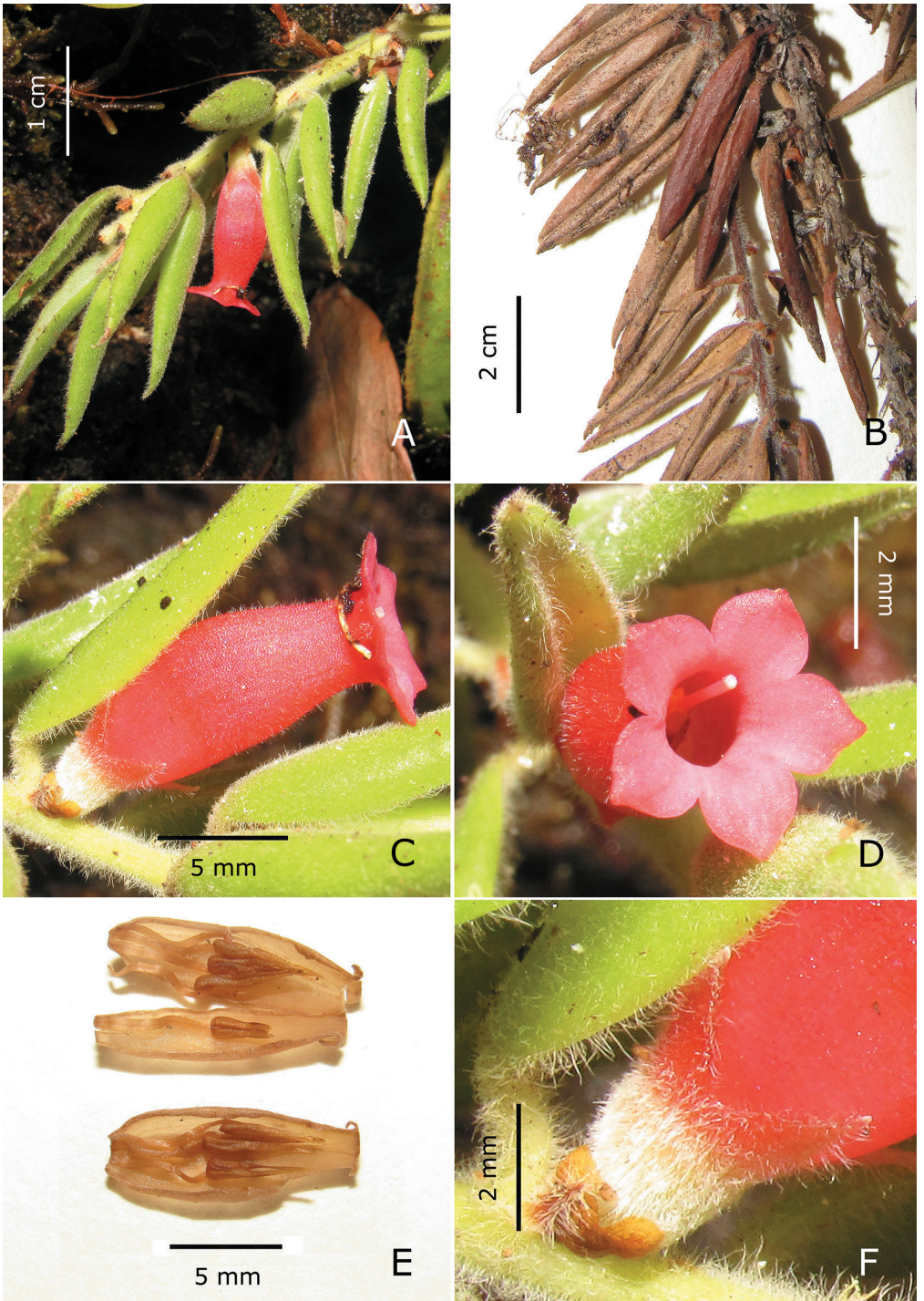


FIG. 2. *Disterigma chriscanadyi* Cornejo & Luteyn. A. Terminal leafy branch and a attached flower. B. Stem and leaves from dry herbarium material. C. Flowers at anthesis, lateral view. D. Flowers at anthesis, adaxial-lateral view. E. Sectioned corolla, preserved in alcohol. F. Close up of calyx, floral bracts, petiole, leaf base and part of stem, lateral view. (A–F, based on the type. Photos: X. Cornejo).

**Diagnosis.**—*Disterigma chriscanadayi* is similar to *D. appendiculatum* Pedraza (2008) in having connate staminal filaments, but differs by having leaf blades convex and strongly revolute ( $1.1\text{--}2 \times 0.3\text{--}0.5$  cm), bracteoles linear, 1–2 mm long, much shorter and not enveloping the calyx, aestivation valvate, calyx 4–5 mm long, the lobes distinct with sinuses conspicuously acute, and anthers without peculiar flap-like dorsal spurs, versus *D. appendiculatum* which has its leaf blades flat, not revolute ( $1.8\text{--}2.8 \times 1.1\text{--}1.8$  cm), bracteoles suborbicular to reniform, 6.3–6.5 mm long and enveloping nearly the entire calyx, aestivation imbricate, calyx 5.6–6.5 mm long, the lobes imbricate and obscuring the sinuses, and anthers with flap-like dorsal spurs.

**Description.**—**Epiphytic subshrubs** with branches loosely pendulous, tomentose to tomentulose, the hairs eglandular, white; roots not seen. **Leaves** spirally arranged, 3–8 per centimeter, divergent to subpendulous; petiole 1.3–2.5 mm, tomentose to tomentulose, the hairs eglandular, white; lamina thick, narrowly lanceolate,  $1.1\text{--}2 \times 0.3\text{--}0.5$  cm, cuneate at base, narrowly acute at apex, margins strongly revolute, adaxially convex, light-green (when fresh), light-brown (dry), tomentulose, somewhat glabrescent, abaxially concave, tomentulose, the hairs white; venation obscure, the blades entirely smooth on both sides. **Inflorescence** of axillary solitary flowers or sometimes 2-flowered fascicles, circumscribed at the base by floral bracts ca. 5–7, papyraceous to membranaceous, the outer deltoid,  $0.5\text{--}1.0 \times 0.5\text{--}0.1$  mm, marginally ciliate at distal half and sometimes pilose on midvein adaxially, obtuse to acute at apex, abaxially glabrous; pedicels ca. 0.5 mm long, reduced and hidden by overlapping floral bracts; bracteoles paired, linear, 1–2 mm long, marginally ciliate, abaxially pilose. **Flowers** 5-merous, diplostemonous; calyx aestivation valvate, campanulate overall, 4–5 mm long, the hypanthium smooth, ca. 2.5 mm long, abaxially glabrous, adaxially white tomentose, the lobes lanceolate,  $2.5\text{--}3 \times 1.3\text{--}1.5$  mm, red, adaxially tomentulose, apically acute, the sinuses acute (V-shaped); corolla tubular, thin-fleshy, ca.  $12\text{--}13 \times 4$  mm, ca. 3 mm wide at throat, red, abaxially glabrous, adaxially pilose, the lobes suborbicular-deltoid, ca.  $1.5 \times 2\text{--}2.5$  mm, apically short-acuminate, divergent, abaxially glabrous, adaxially pilose; **stamens** 10, ca. 9 mm long, up to ca.  $2/3$  corolla length; filaments glabrous, laterally fused (the staminal tube ca. 3.2 mm long), free part of filament ca. 1 mm long; anthers distinct, alternate, ca. 5 mm long, the thecae ca. 2 mm long, papillose, with a tiny basal appendage downwards curved, ca. 0.25 mm long, the tubules 2, distinct, 3 mm long, cylindrical, flexible, dehiscing introrsely by longitudinally slits ca. 2 mm long; ovary 5-locular; style ca. 12 mm long, barely exceeding the corolla mouth. **Immature berry** spherical, tomentulose, with a persistent calyx the lobes of which remain erect.

**Distribution.**—*Disterigma chriscanadayi* is known only from a single population in the type locality that is within a conserved, lower montane wet forest, Andean forest. *Disterigma chriscanadayi* is sympatric with *Sphyrnospermum grandiflorum* (Cornejo & Pedraza 2019), another endemic known only from the type collection, that was found the same day and locality as *D. chriscanadayi*. Flowers have been observed in Mar; fruits are expected in Jun and Jul.

**Discussion.**—Only two species of *Disterigma* have the distinctive character of connate filaments—*D. appendiculatum* Pedraza and the new *D. chriscanadayi*—the former species, however, is clearly distinctive due especially to its calyx and anther features mentioned in the diagnosis (see Pedraza-Peñalosa 2008). At this time *D. chriscanadayi* is without known close morphological relationships.

**Etymology.**—The epithet of this taxonomic novelty honors Christopher Canaday, a north American conservationist that settled in Puyo, Amazonia of Ecuador, and former Director of Omaere foundation. During the past four decades, he devoted himself to conservation of natural habitats in southeastern Ecuador; he passed away in October 2023.

**Conservation status.**—At present, the native vegetation of the area where *Disterigma chriscanadayi* occurs is conserved. However, deforestation and forest fragmentation is expected in the near future by roads construction and mainly due to the advance of agriculture and land use or forest conversion to cattle farms or mine exploitation. Therefore, the preliminary status of Near Threatened (NT) (IUCN 2022) is assigned to this species.

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