A NEW SPECIES OF *FREZIERA* (PENTAPHYLACACEAE) FROM THE VENEZUELAN ANDES

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Abstract. *Freziera guaramacalana,* a new species from the Venezuelan Andes, is described and illustrated, and its morphological relationships with allied species are discussed.

Resumen. Se describe e ilustra *Freziera guaramacalana,* una especie nueva de los Andes Venezolanos, y se discute su relación morfológica con las especies afines.

Keywords: Andes, Guaramacal, Theaceae, Venezuela

Freziera Willd. is a Neotropical genus of functionally dioecious trees or shrubs with alternate leaves and lenticellate, often pubescent twigs sometimes organized in a zig-zag fashion. The genus is distributed from Mexico to Bolivia, including the Guayana Highlands, and the West Indies (Weitzman, 1987). Species of *Freziera* mainly occur in cloud forest (1000–3200 m) and sometimes in páramos, although some species may have a wider altitudinal range, from near sea level to middle elevation forests at about 1,800 m (Weitzman, 1987). Nine species are known to date from Venezuela. Four species are present in montane forests in the Andes of Mérida to the Cordillera de la Costa (*F. candicans* Tul., *F. chrysophylla* Bonpl., *F. grisebachii* Krug & Urb., and *F. tomentosa* (Ruiz & Pav.) Tul.); three species are found in montane forests of the Venezuelan Guayana (*F. calophylla* Triana & Planch., in Amazonas and *F. carinata* A. L. Weitzman and *F. roraimensis* Tul., in Bolívar and Amazonas); and two species are known only from the Andes (*F. bonplandiana* Tul. in Táchira and *F. karsteniana* (Szyszył.) Kobuski in Mérida) (Berry and Weitzman, 2005, 2008).

Berry and Weitzman (2008) suggest there may be a third species of *Freziera* in forest areas on slopes of Roraima-Tepui in the Venezuelan Guayana (*F. roraimensis* Tul.) which has been also cited by Berry & Weitzman (2007); however its presence there has still not been confirmed and the species is known only from the type collection, which does not mention a specific locality.

There is an additional Venezuelan species of *Freziera*, which is apparently very common in forests and páramos of the Andes in Mérida, Lara and Trujillo. Weitzman (1987) originally identified it as a new species, *F. serrata* A. L. Weitzman *ined*. It has since been cited by that name in different floristic and vegetation studies in Venezuela (Dorr et al., 2000; Hokche et al., 2008; Cuello and Cleef, 2009), although it has not been validly published. Here, we validly describe this species as *F. guaramacalana* and expand on Weitzman's observations.

Freziera guaramacalana D. Santam. & Cuello, *sp. nov*. TYPE: VENEZUELA. Trujillo: Boconó, Páramo Guaramacal, 17 km beyond jct. with hwy, NE of Boconó, 09°13'N, 70°13'W, 2,720 m, 13 March 1984 (♂ fl), *J. L. Luteyn & E. Cotton 9636* (Holotype: PORT [31093]; Isotypes: GH, NY [00353865], PORT [34933]). Fig. 1.

Freziera guaramacalana is distinguished by its densely lenticellate twigs; long, pubescent winged petioles; leaves with a conspicuously serrate margin and a pubescent abaxial surface. It differs from its closest related species (*F. bonplandiana* Tul.), by having the leaf basis rounded to sub-truncate and not revolute, instead of cuneate and revolute; the leaf margins are serrate instead of sinuate and by having indument only on the central portion of the abaxial surface, instead of on both leaf surfaces. Also, the new species has pubescent and longer ([1.0–] 1.5–2.6 cm) petioles against the glabrous and shorter 0.3–0.6 [–1.1] petioles in *F. bonplandiana*.

Trees or shrubs 2.5–12 m × 15–20 cm; trunk with the external bark blackish-brown; mature branches cylindrical, the outer bark grayish, internal bark reddish or whitish, glabrous; twigs cylindrical or flattened, the bark reddish-brown to dark brown, densely villous, trichomes reddish-brown or pale brown, ca. 0.08–0.1 mm long, sparsely or densely lenticellate, the lenticels whitish to grayish, elliptical or rounded. *Terminal bud* conduplicate-involute (2.8–) 4.1–6.4 cm long, densely pubescent, trichomes 0.5–1.0 mm long, reddish-brown or pale brown. *Leaves* petiolate; petiole (1.0–) 1.5–2.6 cm long, conspicuously caniculate adaxially,

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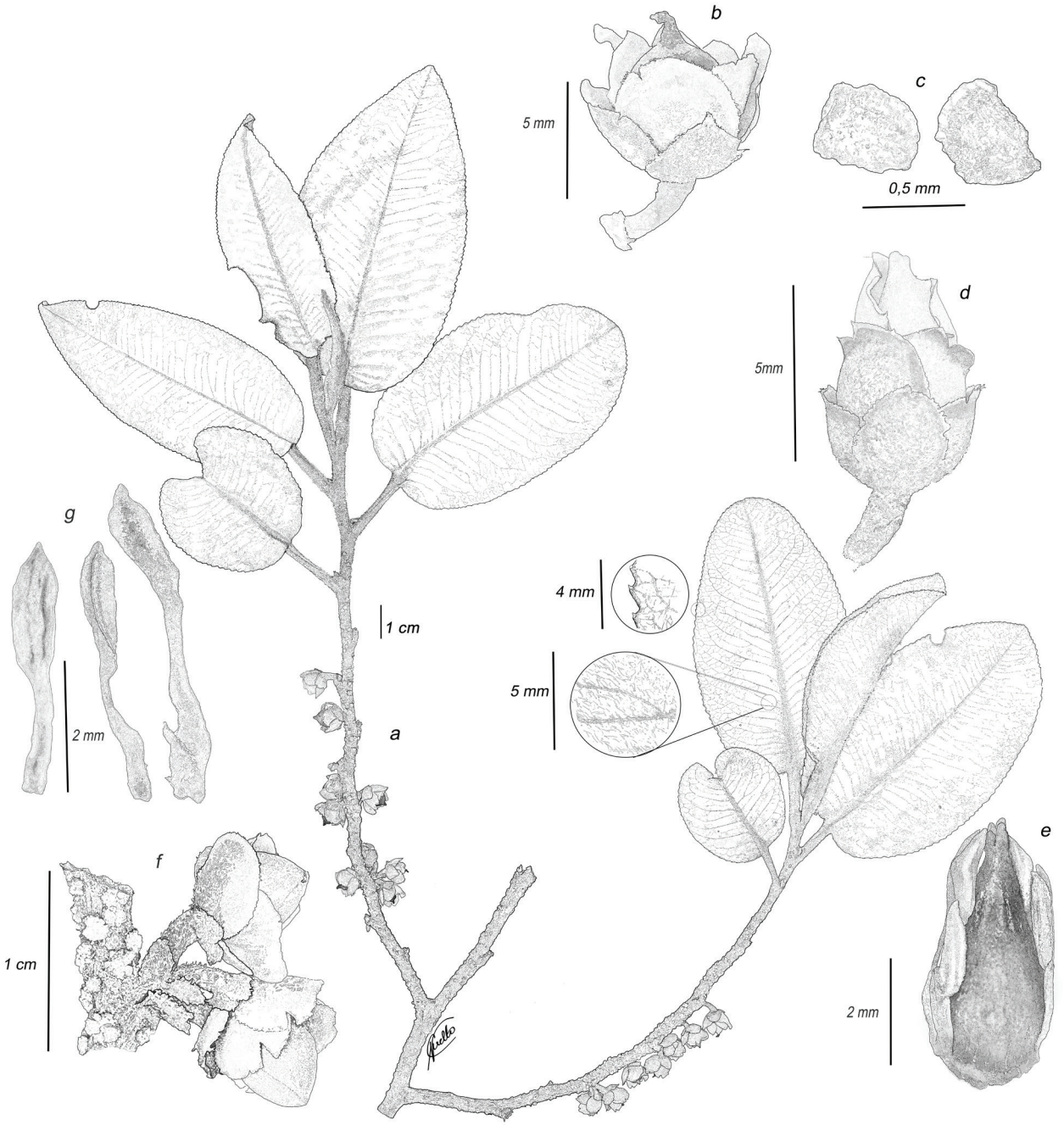

FIGURE 1. *Freziera guaramacalana* D. Santam. & Cuello. **A,** habit; **B,** pistillate flower with inmature fruit; **C,** seeds; **D,** hermaphrodite flower; **E,** inner view of a hermaphrodite flower bud; **F,** staminate flower bud; **G,** stamens; **H,** detail of pubescence on lower surface of a leaf; **I,** detail of serrate margin. Drawing by Nidia L. Cuello A–B, C and H–I based on *Dorr 9019* (PORT); D–E based on *Duno & Riina 1475* (PORT); F–G based on *Luteyn & Cotton 9636* (PORT).

rounded or more or less triangular abaxially, generally densely villous, sometimes sparsely pubescent, trichomes dark brown, reddish-brown or pale brown, 0.1–0.12 mm long, winged, the wings erect or revolute, without setae on their margins; colleters 1–9 in petiole base, black or reddish-brown. *Laminae* (4.9–) 7.1–11.3 (–13) × 3.4–5.6 cm, ovate to elliptic; base rounded to sub-truncate, not revolute, both sides equal or one weakly unequeal; apex acute; margin serrate, with 54–86 teeth per side, each tooth with a black or reddish, conical or curvate seta, caducous, the seta not ringed by trichomes; adaxial surface glabrous, densely pustulate; abaxial surface villous, tomentose or strigose, trichomes reddish-brown or pale brown, 0.1–0.18 mm long, papillate; midrib on adaxial surface flat, sometimes with some trichomes near to the base (strigose in young leaves), densely pustulate, on abaxial surface raised and rounded, densely pubescent, densely pubescent and pustulate; lateral veins 23–30 for side (including some intermediate), weakly impressed on the adaxial surface and weakly raised on the abaxial surface. *Inflorescences* 1-solitary flower or 2–5 fasciculate flowers, axillary or axillary at nodes where leaves have already fallen. *Flowers* pedicellate, pedicel 4.5–9.5 mm long, curved or erect, cylindrical, strigose, trichomes reddish-brown, sometimes each pedicel with a colleter at the base; *bracts* 2.5 × 2.0 mm, at the base of pedicel, ovate to triangular, external surface densely or sparsely strigose, internal surface glabrous, margin entire, sometimes with small setae, apex acute or rounded; *bracteoles* 2, 2.2–4.0 × 2.3–5.0 mm, persistent, opposite or sub-opposite, at apex of pedicel, unequal, widely ovate or "D" shape, external surface minutely and sparsely appressed pubescent, trichomes reddish-brown or whitish, internal surface glabrous, margin entire, ciliate, sometimes with black and conical setae, apex rounded; *sepals* 5, imbricate, pale green with the margin reddish-brown; outer sepals 3.8–5.5 (–6.0) × (3.5–) 4.0–5.5 (–6.3) mm, widely ovate, apex rounded, margin entire and chartaceous or membranaceous, ciliate, external surface appressed pubescent or glabrous, sometimes the indument restricted to the center and base, trichomes whitish or reddish-brown, internal surface glabrous; inner sepals 4.0–4.5 (–6.0) × 3.5–5.0 (–6.0), similar to the external sepals; *petals* 5, (3.0–) 3.5–6.3 × (2.0–) 3.0–4.5 mm, yellow, white or cream, free or weakly united at the base, ovate, apex acute or obtuse, glabrous. *Flower bud* 4.0–7.0 mm wide. *Staminate flowers*: 26–31 stamens, free or weakly united at the base, unequal; filaments 1.0–4.5 mm long, more or less flat; anthers 1.5–2.0 mm long, not moniliform, oblong, apex apiculate; gynoecium 4.0–6.0 mm long, glabrous, globose or conical, 5-locular; style not separated apically; stigma 5-lobulate, papillate. *Pistillate flowers*: ca. 25–30 staminodes, 1.0–2.5 mm long, free or weakly united, linear, flat, apex apiculate or acute; gynoecium 3.0–4.3 long mm, conical or pyriform, glabrous, 4 or 5-locular; style not separated apically; stigma 4 or 5-lobulate, weakly papillate. *Hermaphrodite flower bud*: 36 stamens, unequal, filaments 1.5–2.5 mm long, free or weakly united, flat toward margins and main nerve raised; anthers 1.5–2 mm long, oblong, apex apiculate; gynoecium 4–4.3 mm long, pyriform, glabrous; style not separated apically, ca. 0.25–0.3 mm long, 0.3–0.5 mm wide; stigma 4 or 5-lobulate, lobules ca. 0.25–0.4 mm long, unequal, lanceolate, apiculate, weakly papillate; ovary 5-locular, 1.2 mm wide. *Fruits* 7.0–8.0 × 6.0–7.0 mm, immature, 5-locular; *seeds* 0.5–0.8 × 0.25–0.3 mm, immature, 15–20 per locule, oblong to triangular or irregular, surface reticulate and papillose.

Etymology: The specific epithet *guaramacalana* refers to the Ramal de Guaramacal or Parque Nacional Guaramacal, the locality of most collections of this species. Guaramacal National Park protects a vascular flora of 1.227 species (Dorr et al., 2000).

Distribution and Habitat: *Freziera guaramacalana* is endemic to Venezuela, where it has been collected in the states of Lara, Mérida and Trujillo. At Ramal de Guaramacal in the state of Trujillo, the species can be found on steep slopes and rocky outcrops in wet forest and areas with shrubby páramo between 2,200–2,900 m. There, *Freziera guaramacalana* is relatively abundant, with ca. 30 individuals in 0.1 hectare (or 1,000 m^2), and it is considered characteristic of a community of dense upper montane forests, belonging to the Geissantho andini–Miconietum jahnii Cuello & Cleef association (Cuello and Cleef, 2009). *Freziera guaramacalana* has also been observed by the senior author in others montane forest communities, at the border of Trujillo and Lara state, in Dinira National Park. Because it has been broadly observed and is found in multiple protected areas, we presume that this species does not need a protected conservation status and it is at a low risk of extinction.

Phenology: *Freziera guaramacalana* has been collected with staminate flowers in January, with pistillate flowers in January, April, June and October and hermaphroditic flowers in January and April. Immature fruits were collected in June.

Freziera guaramacalana can be recognized by the generally densely lenticellate twigs; long, pubescent winged petioles; leaves with a conspicuously serrate margin and a pubescent abaxial surface, numerous colleters in the petiole base and sometimes in the pedicels. It can also be distinguished by its sepals, which have a rounded apex and are minutely and sparsely pubescent with appressed whitish or reddish-brown hairs. Of the nine species of *Freziera* known from Venezuela (Berry and Weitzman, 2008), *F. guaramacalana* is more similar to *F. bonplandiana* Tul. Adopting the concept of Weitzman (1987), the new species differs from *F. bonplandiana,* which have cuneate, revolute leaf bases (vs. rounded to sub-truncate and not revolute in *F. guaramacalana*), sinuate margin (vs. serrate), the indument on both leaf surfaces (vs. only to the central portion on abaxial surface), and shorter 0.3–0.6 [–1.1] and glabrous petioles (vs. [1.0–] 1.5–2.6 cm and, pubescent petioles). For its densely lenticellate twigs, serrate leaf margin, and relatively long petioles, *F. guaramacalana* is also similar to *F. reticulata* Bonpl. from Colombia and Ecuador; however this species is distinguished by its mostly angulate twigs (vs. cylindrical or flattened in *F. guaramacalana*), wide leaves (7.3–9.3 vs. 3.4–5.6 cm) with lateral veins markedly

impressed above and raised below (vs. weakly impressed above and raised below), sepals that are densely tomentose on the entire abaxial surface (vs. sparsely appressed pubescent or the indument restricted to center and base), and large fruits (7–11 vs. 6–7 mm wide). Because of its long petioles and abaxialy pubescent leaves, the new species can be compared to *F. longipes* Tul., and *F. smithiana* Kobuski, both from Colombia. However, the two latter species have longer petioles (3.0–4.0 vs. [1.0–] 1.5–2.6 cm in *F. guaramacalana*), sinuate leaf margins (vs. serrate), and larger leaves (15–24 × 6.0–8.5 cm). Additionally, *F. longipes* has shorter pedicels (1.0–3.0 vs. 4.5–9.5 mm long) and *F. smithiana* has two trichome types (vs. one type in *F. guaramacalana*) and densely pubescent sepals (vs. minutely and sparsely appressed pubescent).

The collections *Ruíz-Terán 6474* and *13205*, from the state of Mérida, differ somewhat from other collections by their wider, longer leaves with less pronounced teeth along their margin, but otherwise conform to the species concept adopted here.

Additional specimens examined: VENEZUELA. Lara: Parque Nacional Dinira, Quebrada Las Lajitas (sistema de tres quebradas sobre lajas) en la vertiente larense del Pico Cendé, vegetación paramera, arbustales y bosques a lo largo de las quebradas, 09°33'06"N, 70°05'42"O, 2,600 m, 11 January 2001 (♀♂ fl), *R. Duno & R. Riina 1475* (PORT, VEN). Mérida: Departamento Rangel, entre Cañada de Padre y El Baho, unos 10 km al E de la Sierra Nevada de Santo Domingo, 2300–3340, 11 October 1971 (♀ fl), *L. Ruíz-Terán 6474* (GH); Departamento Campo Elías, bosque nublado andino, muy húmedo, de la margen izquierda de la chorrera de La González, 28 January 1976 (♀ fl), *L. Ruíz-Terán & R. M. Schuster 13205* (GH). Trujillo: Boconó, páramo Guaramacal, 13.7–14.6 km beyond jct NE of Boconó, summit of road, 09°13'N, 70°13'W, 2,750–2,800 m, 19 January 1984 (♀ fl), *J. L. Luteyn & J. J. Pipoly 9310* (GH, MO, NY, PORT); Páramo de Guaramacal, W of road summit, 09°14'N, 70°11'W, 2800–2900, 28 April 1988 (♀ fl), *L. J. Dorr et al. 5005* (MO, NY, PORT, US); Parque Nacional Guaramacal, Boconó-caserío de Guaramacal road S (Qda. Jirajara) from turnoff to antennas to just above El Campamento, 2200–2900, 15 June 2001 (♀ fl), *L. J. Dorr et al. 9019* (MO, NY, PORT, US); Parque Nacional Guaramacal, bosques bajos de la vertiente sur por la vía de las antenas a Guaramacal, parcela #24, UTM 371718 E, 1022127 N, 2,554 m, July 2002 (sterile) *N. Cuello et al. 2459* (PORT); Páramo de Guaramacal, W of road summit, 09°14'N, 70°11'W, 2800–2900, 28 April 1988 (♀♂ fl), *L. J. Dorr et al. 5005* (MO, NY, PORT, US); Parque Nacional Guaramacal, bosques remanentes cerca de la carretera hacia las antenas, Vertiente Norte, parcela #39, Pos. UTM 369545 E, 1021382 N, 2,770 m, 15 April 2005 (sterile), *N. Cuello et al. 2857* (PORT).

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