

# ADDITIONS TO THE VASCULAR FLORA OF COSTA RICA: FOUR NEW RECORDS FROM THE SABANAS MIRAVALLES

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## ABSTRACT

The Costa Rican vascular flora is well known and studied, but there are gaps of floristic knowledge in some areas and ecosystems that are poorly explored. The Costa Rican savannas, cover a small geographic extent and are almost unexplored floristically. The Sabanas Miravalles are located in the western flank of the Volcán Miravalles in the Cordillera de Guanacaste. As a result of a broad floristic inventory of this site, four species have been documented as new records for the Costa Rican vascular flora: *Eriocaulon fuliginosum*, *Polygala pseudocoelosioides*, *Trimezia martinicensis*, and *Utricularia subulata*.

## RESUMEN

La flora vascular de Costa Rica es bien conocida y estudiada, pero aún existen vacíos de conocimiento florístico en varias áreas y ecosistemas poco explorados. Las sabanas costarricenses cubren una pequeña extensión territorial y han sido casi inexploradas florísticamente. Las Sabanas Miravalles está localizadas en el flanco oeste del Volcán Miravalles en la Cordillera de Guanacaste. Como resultado de un amplio inventario florístico de este sitio, cuatro especies han sido documentadas como nuevos registros para la flora vascular de Costa Rica: *Eriocaulon fuliginosum*, *Polygala pseudocoelosioides*, *Trimezia martinicensis* y *Utricularia subulata*.

KEY WORDS: Cordillera de Guanacaste, *Eriocaulon*, floristics, Volcán Miravalles, *Polygala*, *Trimezia*, *Utricularia*

Costa Rica is one of the best explored countries botanically in Latin America, but there are gaps of floristic knowledge and some areas that have been almost or wholly unexplored (Grayum et al. 2004). The savanna vegetation, dominated by a continuous herb layer of graminoids with a discontinuous layer of small trees, shrubs and palms (Beard 1953; Gómez 1986), is an ecosystem poorly studied in the country compared to the many different kinds of forest vegetation.

Savannas are usually located in areas with strong seasonality in precipitation. They are characterized by their low-nutrient, poorly drained, shallow, acidic and rocky soils (Beard 1953; Gómez 1986; Harris 1980; Huber 1987), and contain a high diversity of herbs and shrubs, few species of trees and even fewer species of vines and epiphytes (Huber 1987; Ratter et al. 1997).

Savanna vegetation in Costa Rica is patchily distributed on the Pacific slope, between 100 and 1500 m. Although the existence of these savannas was documented in the nineteenth century (Polakowsky 1879), their precise geographic extent and species composition remain unknown. The Sabanas Miravalles are located on the western flank of the Volcán Miravalles in the Cordillera de Guanacaste, is a botanically unexplored site of ca. 309 ha and a wide altitudinal range of 640–1580 m. This natural savanna ecosystem has been overlooked as such in the literature concerning Costa Rican vegetation, and no biological studies have been carried out in the area (Fig. 1).

As a result of a broad floristic inventory of the Sabanas Miravalles (part of the author's master's thesis project), the following four species have been documented as additions to the Costa Rican vascular flora.

In a search for prior collections of these species from Costa Rica, the vouchers here cited were compared to material of the same genera and/or families in the following herbaria: CR (including INB, now incorporated), MO and USJ. No additional collections of the taxa here reported were discovered.

***Eriocaulon fuliginosum*** C. Wright ex Griseb., Cat. Pl. Cub. 226. 1866. (**Fig. 1C**). TYPE: CUBA: Cuba Occ., no date, C. Wright 3239 (GOET, image!).

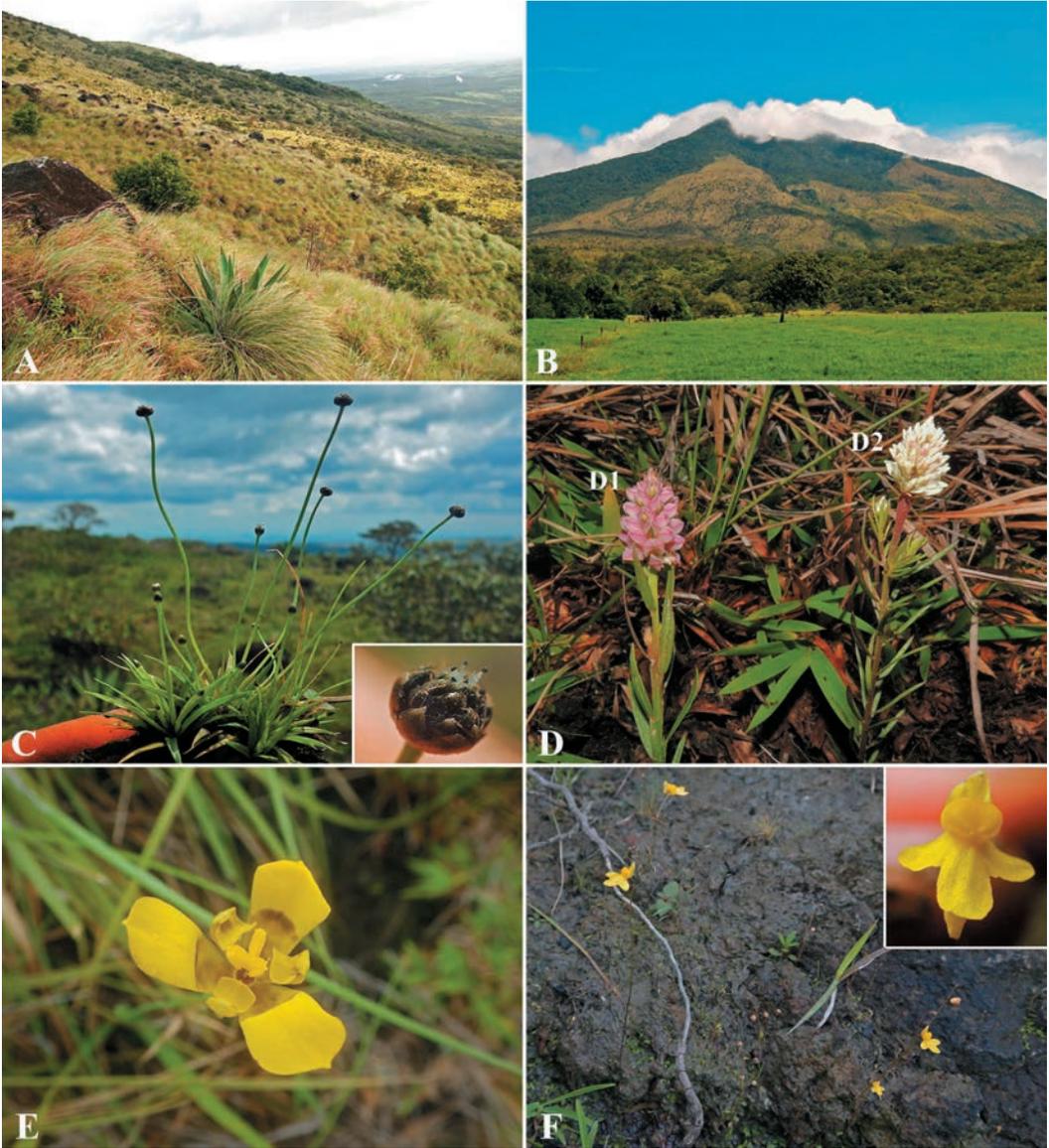


FIG 1. New records of vascular plants for Costa Rica. **A–B.** Sabanas Miravalles. **C.** *Eriocaulon fuliginosum*, **D1.** *Polygala hygrophila* (already known to Costa Rica), **D2.** *Polygala pseudocoelosioides*, **E.** *Trimezia martinicensis*, **F.** *Utricularia subulata*.

*Eriocaulon fuliginosum* differs from other congeners in Costa Rica by its dark capitula, acute or acuminate bracteoles, and pistillate flowers with emarginate petal apices. The documentation of this species in Costa Rica increases the number *Eriocaulon* species in the country to four, and the upward elevational limit of the genus from 500 to 1103 m (Hensold & Hammel 2003).

Specimens examined. **COSTA RICA. Guanacaste:** Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'36.02"N, 85°10'19.42"W, 1103 m, 16 Dic 2014 (fl, fr), J.E. Jiménez & Calderón 2472 (USJ, CR); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'30.01"N, 85°10'44.99"W, 857 m, 4 Set 2015 (fl, fr), J.E. Jiménez 3022 (USJ [one part in spirit], CR).

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**Polygala pseudocoelosoides** Chodat, Mém. Soc. Phys. Genève 31(2, 2):237–238, t. 24, f. 19–20. 1893. (**Fig. 1D2**). SINTYPES: BRAZIL. Piauhý prov.: no date, *Gardner 2482* (G-BOIS; US); no date, *Gardner 2494* (G-BOIS).

Specimens examined. **COSTA RICA. Guanacaste:** Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'51.07"N, 85°10'14.37"W, 1163 m, 21 Dic 2012 (fl, fr), *J.E. Jiménez & Campos 2081* (USJ); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'36.02"N, 85°10'19.42"W, 1103 m, 16 Dic 2014 (fl, fr), *J.E. Jiménez & Calderón 2469* (USJ).

*Polygala pseudocoelosoides* differs from its Costa Rican congeners by the combination of the following characters: stems with small capitate trichomes, leaves less than 0.8 cm wide, linear-acicular, thin and irregularly glandular-ciliated bracts, persistent fruits and ellipsoid seeds with erect trichomes. At the Sabanas Miravalles it is sympatric with *P. glochidiata*, *P. hygrophila*, *P. incarnata*, *P. longicaulis*, and *P. paniculata*. The recognition of *P. pseudocoelosoides* in Costa Rica increases the number of species of *Polygala* documented for the country to 13 (Morales 2014).

**Trimezia martinicensis** (Jacq.) Herb., Edwards's Bot. Reg. 88. 1844. (**Fig. 1E**). *Iris martinicensis* Jacq., Enum. Syst. Pl. 12. 1760. TYPE: BRAZIL: Ilha de Santa Lúcia (HOLOTYPE: W, probably destroyed; NEOTYPE: *Chukr et al. 560*, PMSP, image1, designated by Chukr & Giulietti 2008: 38).

*Trimezia martinicensis* differs from *T. steyermarkii* R.C. Foster, the other species of this genus known to occur in Costa Rica (*B. Hammel & Pérez 25494*, INB), in its slenderer rhizomes and shorter narrower leaves.

Specimens examined. **COSTA RICA. Guanacaste:** Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'44.84"N, 85°10'44.98"W, 880 m, 7 Oct 2012 (fl, fr), *J.E. Jiménez & Rojas 946* (USJ); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'37.03"N, 85°10'27.40"W, 1036 m, 3 Oct 2013 (fl, fr), *J.E. Jiménez & Campos 1831* (USJ); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'27.18"N, 85°10'53.58"W, 767 m, 3 Oct 2013 (fl, fr), *J.E. Jiménez & Campos 1850* (USJ); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Cerros Gota de Agua, 10°40'14.86"N, 85°08'19.88"W, 824 m, 11 Sep 2015 (fl, fr), *J.E. Jiménez et al. 3167* (USJ).

**Utricularia subulata** L. Sp. Pl. 1:18. 1753. (**Fig. 1F**). TYPE: U.S.A.: habitat in Virginia (LECTOTYPE: *Clayton 31*, BM-000032596, image1 designated by Taylor 1964:81).

*Utricularia subulata* is sympatric in the Sabanas Miravalles with *U. pusilla* Vahl, its closest relative in Costa Rica, with which it shares a semiaquatic habit and yellow corollas. It differs from that the latter species by its linear (vs. obovate) leaves, inflorescence axis without sterile bracts (vs. with sterile bracts alternating with fertile bracts) and corollas with the spur more or less equal in length to the lower lip (vs. longer). The discovery of *Utricularia subulata* in Costa Rica increases the number of species of *Utricularia* documented for the country to 14, of which 11 was attributed by Crow (2007) and *U. radiata* (*J. González & Chavarría 11461*, LSCR) and *U. trichophylla* (*G. Davidse & Herrera 31438*, MO) recorded for the country since 2007.

Specimens examined. **COSTA RICA. Guanacaste:** Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'44.84"N, 85°10'44.98"W, 880 m, 7 Oct 2012 (fl, fr), *J.E. Jiménez & Rojas 967* (USJ [1 sheet & 1 in spirit]); Bagaces, La Fortuna, Zona Protectora Volcán Miravalles, Sabanas Miravalles (Sitio Miravalles), 10°44'37.03"N, 85°10'27.32"W, 1036 m, 3 Oct 2013 (fl, fr), *J.E. Jiménez & Campos 1837* (USJ [1 sheet & 1 in spirit]).

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