



A new species of *Eurystyles* (Orchidaceae: *Spiranthinae*) from Costa Rica

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Key words

Eurystyles auriculata
Eurystyles cornu-bovis
Eurystyles standleyi
floristics
neotropics
taxonomy

Abstract *Eurystyles* comprises about 23 species ranging from Mexico to northern Argentina. Six species are recognized in Mexico and Central America and three in Costa Rica. A new species, named *E. uxoris*, is here described and illustrated based on Costa Rican material. The species is similar to *Eurystyles auriculata* and *E. standleyi*, however, it differs by the smaller plants up to 3 cm tall, smaller leaves of less than 1.6 cm long, flowers with brown dorsal sepal and brown lip apex, petals callose or thickened at apex, and a pandurate lip. Information about distribution, habitat, ecology, etymology and phenology of the new species is provided. An updated key to the Costa Rican species of *Eurystyles* is presented.

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INTRODUCTION

Heinrich Wawra (1863) described *Eurystyles* based on *E. cotyledon* Wawra from a plant collected in Brazil. The genus is classified in the *Spiranthinae* Lindl. ex Meisn. and contains about 23 species distributed from Mexico, Belize and Guatemala through the Antilles to Bolivia, Brazil, Paraguay and northern Argentina (Salazar 2003, Salazar et al. 2018). Brazil harbours the highest species diversity with about 11 species, eight of them endemic (Szlachetko et al. 2005).

Eurystyles comprises small, epiphytic plants with fasciculate, fleshy roots, abbreviated stems, rosulate usually glaucous, shiny, subpetiolate, evergreen leaves and a terminal, pendent, subcapitate, often wiry or pubescent inflorescence (Salazar & Dressler 2011). Leaves and floral bracts are ciliate except for *E. cornu-bovis* Szlach. The genus shares vegetative similarities with *Lankesterella* Ames. The representatives of the latter genus are also epiphytes with abbreviated stems, fasciculate fleshy roots, and evergreen rosulate leaves. Both genera are unique in the *Spiranthinae* because of the epiphytic, bromeliad-like habit (contrasting with the generalized terrestrial habit of the *Spiranthinae*), the slender, non-tuberous roots and the non-deciduous leaves, which are another exception to the rule in the subtribe (Salazar & Dressler 2011). Dressler (1981), Salazar (2005) and Soto-Arenas (1993) suggested a close relationship between these two genera. Phylogenetic relationships among *Spiranthinae* conducted by Górniak et al. (2006), Salazar & Dressler (2011) and most recently by Salazar et al. (2018) based on nuclear (*nrITS*) and plastid (*matK-trnK*, *trnL-trnF*) DNA sequences confirmed these interpretations.

Four species of *Eurystyles* are known from Mexico and Central America (Ossenbach et al. 2007) and two from the Antilles (Ackerman 2014). In Costa Rica, three species have been recorded (Dressler 2003, Szlachetko et al. 2005) (Fig. 1). The first species described from the country was *E. auriculata* Schltr.,

based on two specimens collected by the brothers A. Brade & C. Brade in 1908 (Schlechter 1923), one without locality data and the other gathered in the locality of Cerro Tablazo in the southern mountains of San José City. The second species was *E. standleyi* Ames, based on a collection by P.C. Standley from the south of Cartago at Muñeco de Navarro (Ames 1925), and later recorded also in El Salvador and western Panama (Szlachetko et al. 2005, Bogarín et al. 2014). The most recent species recorded was *E. cornu-bovis*, described from Panama by Szlachetko (1992) and further recorded from three other localities in Costa Rica (Szlachetko et al. 2005).

The most recent treatments of the genus from Costa Rica by Dressler (2003), Salazar (2005) and Szlachetko et al. (2005) recorded the same three species. However, Dressler (2003) noticed a possibly different species identified as '*Eurystyles* sp. A', based on a plant collected by C.H. Lankester (*Lankester* 483, AMES) in Peralta, Turrialba. During fieldwork activities, led by Lankester Botanical Garden, the University of Costa Rica, which aimed to a complete orchid inventory of Costa Rica, a species which does not fit any of the previously described species of *Eurystyles* was found. It is formally proposed here as new to science.

MATERIALS AND METHODS

Plants were collected in the field and cultivated at Lankester Botanical Garden, University of Costa Rica (JBL), Cartago, Costa Rica. Herbarium acronyms follow 'Index Herbariorum' (Thiers, continuously updated). Specimens were preserved in formaldehyde: acetic acid: ethanol (FAA (53 % ethanol, 37 % water, 5 % formaldehyde and 5 % glycerol)) and deposited in the spirit collection at JBL. Phenological data were recorded in the field and from cultivated specimens. Georeferences for specimens were obtained with Garmin eTrex Vista GPS and later checked in Google Earth Pro 6.1.0. Sketches and images were prepared from living specimens with a Leica MZ9.5 stereomicroscope with a drawing tube. Draft composite plates were diagrammed in Adobe Photoshop CC and exported to Inkscape (an illustration application for iPad) for digital vectorization. Resulting images were inked with a Rotring Rapidograph

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0.1 mm. Descriptions and morphological comparisons were prepared from living specimens, data taken in the field and herbarium specimens or digital images deposited in AMES, CR, FLAS, JBL, K, NY, SEL, US and USJ.

***Eurystyles uxoris* Bogarín, sp. nov.** — Fig. 1d, 2, 3d; Map 1

The species is similar to *Eurystyles auriculata* Schltr. and *E. standleyi* Ames, it differs by the smaller plants to 3 cm tall, smaller leaves less than 1.6 cm long, flowers with a brown dorsal sepal and brown lip apex, callose petals and a pandurate lip.

Type. *D. Bogarín 10300* & *M. Bonilla* (holo JBL-spirit), Costa Rica, Limón, Pococí, Guápiles, Bellavista, c. 3.8 km south of the school of La Guaría de Bellavista, banks of a tributary of the Río Blanquito, tropical wet forest, epiphytic in secondary forest, 746 m, 8 June 2013.

Etymology. From the Latin *uxorius*, 'of the wife', in honour to my wife Maricruz Bonilla for supporting my studies on orchids and her loyal company in our journeys in search of plants.

Epiphytic, caespitose, bromeliad-like, small, less than 3 cm tall. **Roots** fleshy, fusiform, fasciculate, 1.8 mm diam. **Stem** erect, much abbreviated. **Leaves** 8 or 9, rosulate at the base of the stem, evergreen, subpetiolate; blade elliptic or oblanceolate, 0.9–1.6 by 0.3–0.5 cm, apex acute, margin ciliate, light green, adaxially glossy. **Inflorescences** racemose, densely congested, appearing capitate, to 7.5 cm long, pendent, pubescent. **Cauline leaves** up to 2, with ciliate margins. **Rachis** c. 0.7 cm long, 5–10- or more-flowered, congested, dense. **Floral bracts** broadly ovate, 9–19 mm long, apex acute to acuminate, conduplicate, lacerate, green, brownish at apex. **Flowers** small, erect, tubular, the dorsal sepal brown, the lateral sepals white, the petals white, the lip white with a brown-greenish apex, non-resupinate. **Ovary** 3–5 mm long, cylindrical, untwisted, sessile, glabrous. **Dorsal sepal** obovate to oblong, c. 3.5 by 1.2 mm, apex obtuse, conduplicate, concave above the base, 1-nerved, adaxially ciliate along the midvein. **Lateral sepals** oblong, c. 5.5 by 1.7 mm, apex



Fig. 1 Flower morphology of the species of *Eurystyles* from Costa Rica. a. *E. auriculata*; b. *E. cornu-bovis*; c. *E. standleyi*; d. *E. uxoris* (a. *D. Bogarín 1161*; b. *D. Bogarín 9611*; c. *D. Bogarín 10405*; d. *D. Bogarín 10300*; all JBL). — Photos by Diego Bogarín.

subacute, conduplicate, concave above the base, 1-nerved, denticulate, adaxially pubescent. *Petals* oblanceolate, c. 3.5 by 1.3 mm, apex thickened, obtuse, conduplicate. *Lip* clawed; claw c. 1.2 mm long, concave, adnate to the sepaline tube; the lamina pandurate, c. 4.6 by 3.2 mm, constricted in the middle, with conspicuous, basal, thickened auricles, the apex papillose, obtuse. *Column* cylindric, 2.6–2.8 mm long, abaxially pubescent, truncate. *Pollinia* 4, in pairs, oblong, viscidium rounded. *Anther cap* ovate, cucullate.

Distribution — Known only from the type locality on the Caribbean slopes of Cordillera Volcánica Central, Costa Rica.

Habitat & Ecology — Epiphytic on small mossy branches of trees along a roadside in secondary forest. Other orchids growing sympatrically were: *Benzingia reichenbachiana* (Schltr.) Dressler,

Diodonopsis pygmaea (Kraenzl.) Pridgeon & M.W.Chase, *Epidendrum mora-retanae* Hágsater, *Gongora leucochila* Lem., *Pleurothallis ruscifolia* (Jacq.) R.Br. and *Stelis* spp.

Notes — The species is similar to *E. auriculata* and *E. standleyi* (Fig. 3), however, it differs from both species by the smaller plants to 3 cm tall (vs > 5 cm), the smaller leaves of less than 1.6 cm long (vs > 4 cm), the brown dorsal sepal (vs white), the brown lip apex (vs white with a green stripe), petals callose or thickened at apex (vs ecallose), and the pandurate lip (oblong or obovate, constricted below the apex).

Dressler (2003) noticed a possibly different species based on a plant collected by C.H. Lankester (*Lankester 483*, AMES) in Peralta, Turrialba in the Caribbean of Costa Rica. This specimen, treated by Dressler (2003) as '*Eurystyles* sp. A', differs

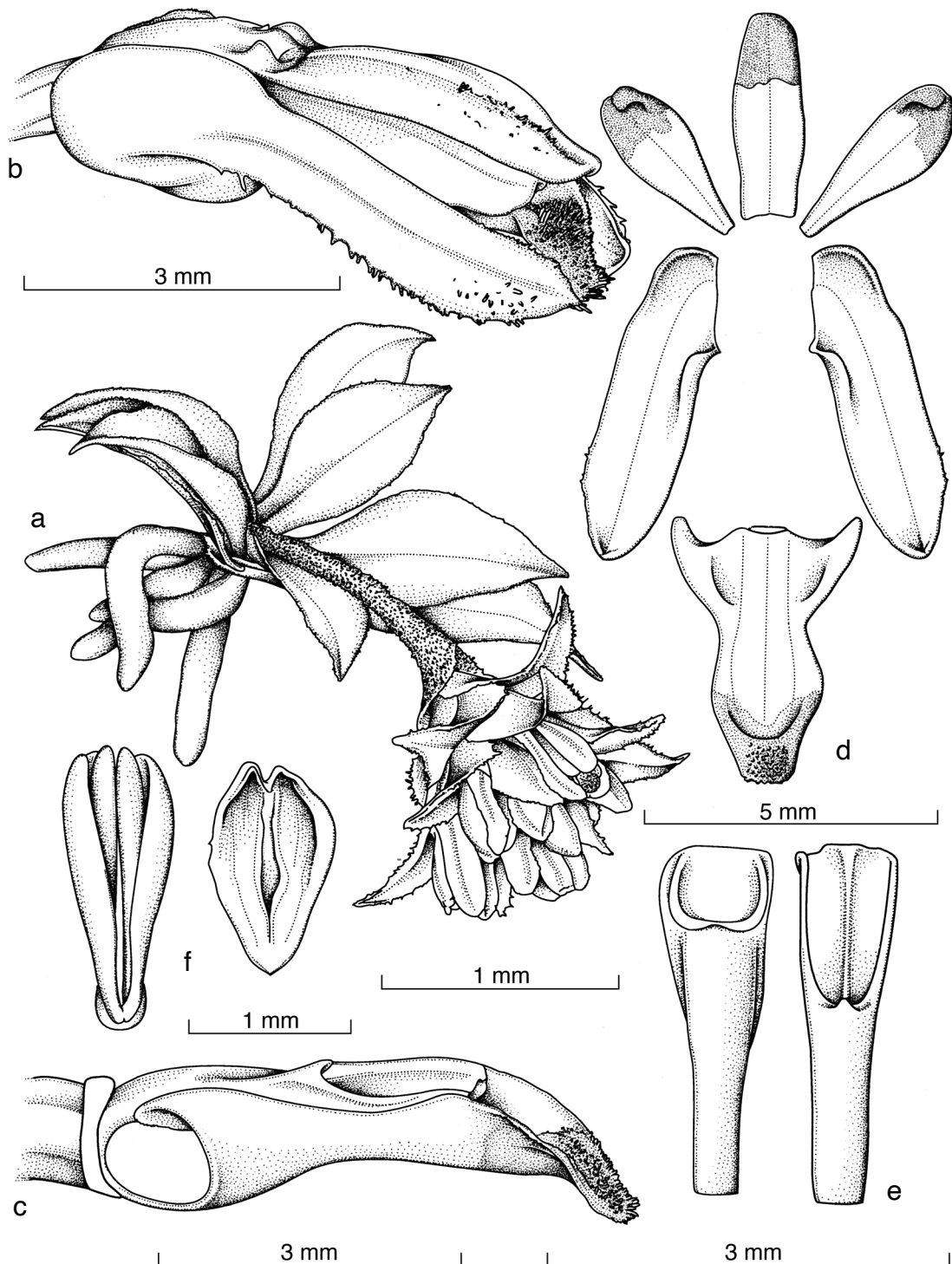


Fig. 2 *Eurystyles uxoris* Bogarin. a. Habit; b. flower; c. ovary, column and lip, side view; d. perianth, flattened; e. column, ventral and side views; f. pollinarium and anther cap (from D. Bogarin 10300 & M. Bonilla (holo JBL-spirit)). — Drawn by Diego Bogarin.

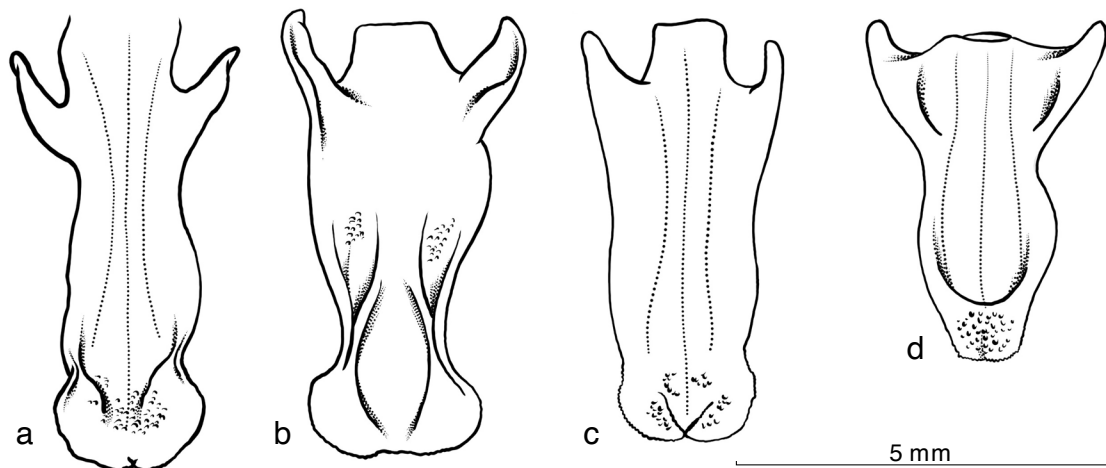


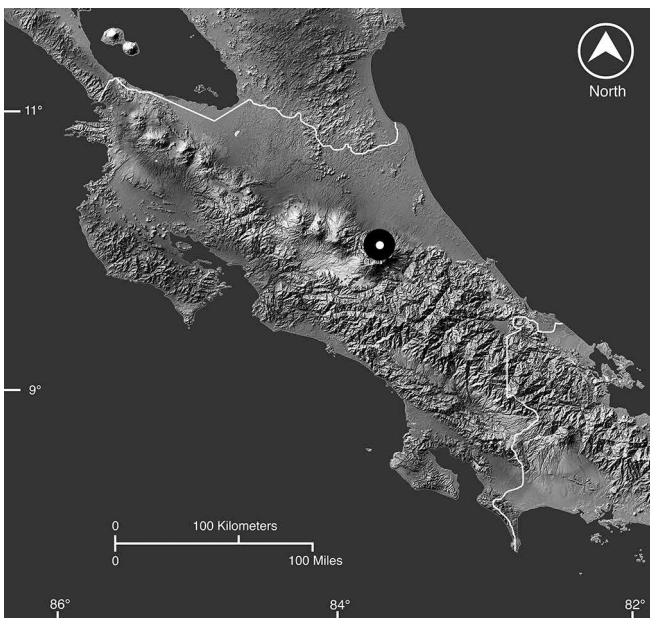
Fig. 3 Comparison of the lip morphology among the species of *Eurystyles* from Costa Rica. a. *E. auriculata*; b. *E. cornu-bovis*; c. *E. standleyi*; d. *E. uxoris* (a. D. Bogarín 1161; b. D. Bogarín 9611; c. D. Bogarín 10405; d. D. Bogarín 10300; all JBL). — Drawn by Diego Bogarín.

in the wide hypochile tapering into a narrow isthmus below the wider epichile. Unfortunately, I could not study this specimen and further analysis may confirm it to be another collection of *E. uxoris* or a different species not yet described.

KEY TO THE SPECIES OF EURYSTYLES FROM COSTA RICA

1. Leaves glabrous, floral bracts entire *E. cornu-bovis*
1. Leaves ciliate, floral bracts lacerate-fimbriate 2
2. Blade of lip oblong, not noticeably constricted *E. standleyi*
2. Blade of lip distinctly constricted below the apical lobe . . 3
3. Plants more than 5 cm tall; dorsal sepal white; petals apex ecallose; lip apex white with a green stripe . . *E. auriculata*
3. Plants less than 3 cm tall; dorsal sepal brown; petals apex callose; lip apex brown *E. uxoris*

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Map 1 Distribution of *E. uxoris* Bogarín in Costa Rica. The species is restricted to the Caribbean watershed of Cordillera Volcánica Central, north side of Volcán Turrialba.

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