

A NEW SPECIES OF QUARARIBEA (MALVACEAE) FROM COSTA RICA

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ABSTRACT

Some previous collections of *Quararibea nigrescens* have been misidentified, confused or tentatively assigned to *Quararibea costaricensis*. Both species, however, can be consistently distinguished because *Q. nigrescens* has always twigs, leaves and calyx conspicuously silvery or grayish lepidote or stellate-peltate pubescent, while in *Q. costaricensis* twigs and leaves are sparsely diminute tomentulose with dark brown fasciculate or rufous-brown stellate or stellate-peltate pubescent, becoming essentially glabrate with age, except, the calyx which possesses a dense pubescence of granuliferous-lepidote golden or greenish-brown trichomes. The proposed species name, *Q. nigrescens*, refers to the peculiar, unique and consistent dark gray, blackish to almost black color of leaves (mainly) that is noticeable upon drying, while in *Q. costaricensis* dried leaves are always conspicuously yellowish-green or yellowish-brown. This character (leaves color upon drying of *Q. nigrescens*) is unique among all Costa Rican species of *Quararibea*; additional morphological differences between both species are included.

RESUMEN

Algunas colecciones previas de *Quararibea nigrescens*, han sido mal identificadas, confundidas o tentativamente asignadas a *Quararibea costaricensis*. Ambas especies se distinguen consistentemente porque *Q. nigrescens* siempre tiene ramitas, hojas y flores (cáliz) con una pubescencia plateada o grisácea lepidota o estrellado-peltada conspicua, mientras en *Q. costaricensis* las ramitas y hojas tienen una pubescencia densa o esparcida diminuta con tricomas pardo-oscuro fasciculados o pardo-rojizo estrellado o estrellado-peltados, llegando a ser casi glabras con la edad, excepto, el cáliz que está cubierto densamente con tricomas dorados o pardo-verdoso granuloso-lepidotos. El nombre propuesto, *Q. nigrescens*, obedece al color peculiar, único y consistente, gris oscuro, negruzco o casi negro de las hojas (principalmente) después del secado, mientras que en *Q. costaricensis* las hojas secas siempre se tornan conspicuamente verdoso-amarillentas o pardo-amarillentas después de secas. Este carácter (color de las hojas de *Q. nigrescens* después del secado) es único entre todas las especies de *Quararibea* de Costa Rica; otras diferencias morfológicas entre ambas especies se mencionan.

Quararibea Aubl. (Malvaceae, Bombacoideae) is a neotropical genus of mostly trees and treelets (rarely shrubs) from humid forests that comprises about 25 species, distributed from southern Mexico to South America. The genus is characterized by its, commonly, monopodial trunk and verticillate branching, simple and usually perennial leaves, axillary or cauliflorous flowers borne single, in fascicles or on short twigs, having an elongate staminal column, sometimes apically 5-lobed with numerous sessile anthers at the apex, and drupaceous indehiscent fruits (Alverson 1989; Gentry & Alverson 2001). The forthcoming treatment of the genus (A. Cascante, in prep.) for the Manual de Plantas de Costa Rica's project recognizes 12 species of *Quararibea*, two of them are endemic to the country, including the one herein described as new.

QUARARIBEA NIGRESCENS N. Zamora, Cascante, & S.-Y. Kim, **sp. nov.** **TYPE: COSTA RICA.**

Alajuela. Parque Nacional Rincón de la Vieja, puesto Santa María, del mirador siguiendo la fila hacia noreste, bajando al canal, 10° 46' N, 85° 18' W, 1100 m, 9 Mar. 1988 (fl.), *Herrera* 1625 (holotype, CR; isotype, MO). Figures 1-2.

Differing from all other species of *Quararibea* known to us by its combination of conspicuously silvery or grayish lepidote or stellate-peltate pubescence and its unique consistent dark gray, blackish to almost black leaves color character upon drying. This new species has been previously misidentified or confused with *Quararibea costaricensis* Alverson, which it shares a similar floral morphology.

Tree of 5–15 m tall, 10–35 cm dbh; trunk monopodial or forked, cylindric, with smooth bark; plagiotropic branches usually horizontal and drooping, verticillate; young twigs slender, greenish-gray or grayish, sparsely to densely silvery, dark gray or blackish (when dry) lepidote or stellate-peltate pubescent towards the apex, older twigs reddish; **stipules** 4–9 x 1 mm, linear, densely lepidote pubescent, deciduous; stipule scars minute or not very conspicuous. **Leaves** simple, alternate, entire; petiole terete, 6–13 mm long, sparsely lepidote pubescent, lamina 6.3–19 x 3.5–7.5 cm, elliptic to ovate-elliptic, apex short acuminate to apiculate (acumen 1 cm), base oblique with one side rounded to nearly subcordate and the other obtuse to truncate, sparsely lepidote or stellate-peltate pubescent when young but soon glabrous above with the age, sparsely lepidote or stellate-peltate pubescent abaxially to almost glabrous with the age, only sparsely lepidote or stellate-peltate pubescent along main veins, sometimes conspicuously barbate (with domatia in the abaxial vein axils); secondary veins impressed above and prominent below, pinnate, 4–5 per side, weakly or pseudo trinerved at the base underneath (see, Fig. 1 and Fig. 2B, F), ascending, becoming brochidodromous near at the middle, tertiary veins reticulate on both sides and conspicuously dark gray or blackish to almost black upon drying. **Flowers** actinomorphic, usually solitary and opposite the leaves or sometimes borne on short lateral shoots, ramiflorous (up to 4 flowers), or from nodes, bending down to reflexed at anthesis (see, Fig. 2A, B); **pedicel** (8–)11–17 mm long, bearing usually 2–3 bracteoles, 1–2 mm long, subulate or scale like, at 4–7 mm apart from the base of the pedicel, more or less at middle length (rarely near the base), alternate, well-spaced or equidistant along length, lepidote pubescent; **calyx** narrowly conical, 6–8(–10) mm, blackish (when dry), densely silvery or dark grayish lepidote pubescent outside and dark brown hispid inside, lobes 3–5, 3 mm long; **petals** 5, white, asymmetrically and narrowly-oblongate to lanceolate, 13–17 x 3–4 mm, at the apex obtuse to acute, reflexed (in vivo), densely whitish-gray tomentulose pubescent on both sides, except glabrous towards the base; staminal column striate-cylindrical, 10–20 mm long, glabrous or sparsely stellate tomentulose; thecae many, reniform; style slightly exerted, stigma capitate. **Fruits** ovoid to ellipsoid, 3–5 x 1.7–2.8 cm, glabrous but densely gray-lepidote pubescent at the apex, finely longitudinally striate, yellow-green (fresh), blackish when dry, umbonate at the apex, bending down to reflexed at maturity (see, Fig. 2C, D); pedicels (10–)15–17 mm, bearing 2–3 persistent bracteoles; calyx cup of fruit persistent, accrescent, 8–10 mm long, covering ca. 1/3 of fruit length, irregularly lobed or erose at the apex. Seeds no seen.

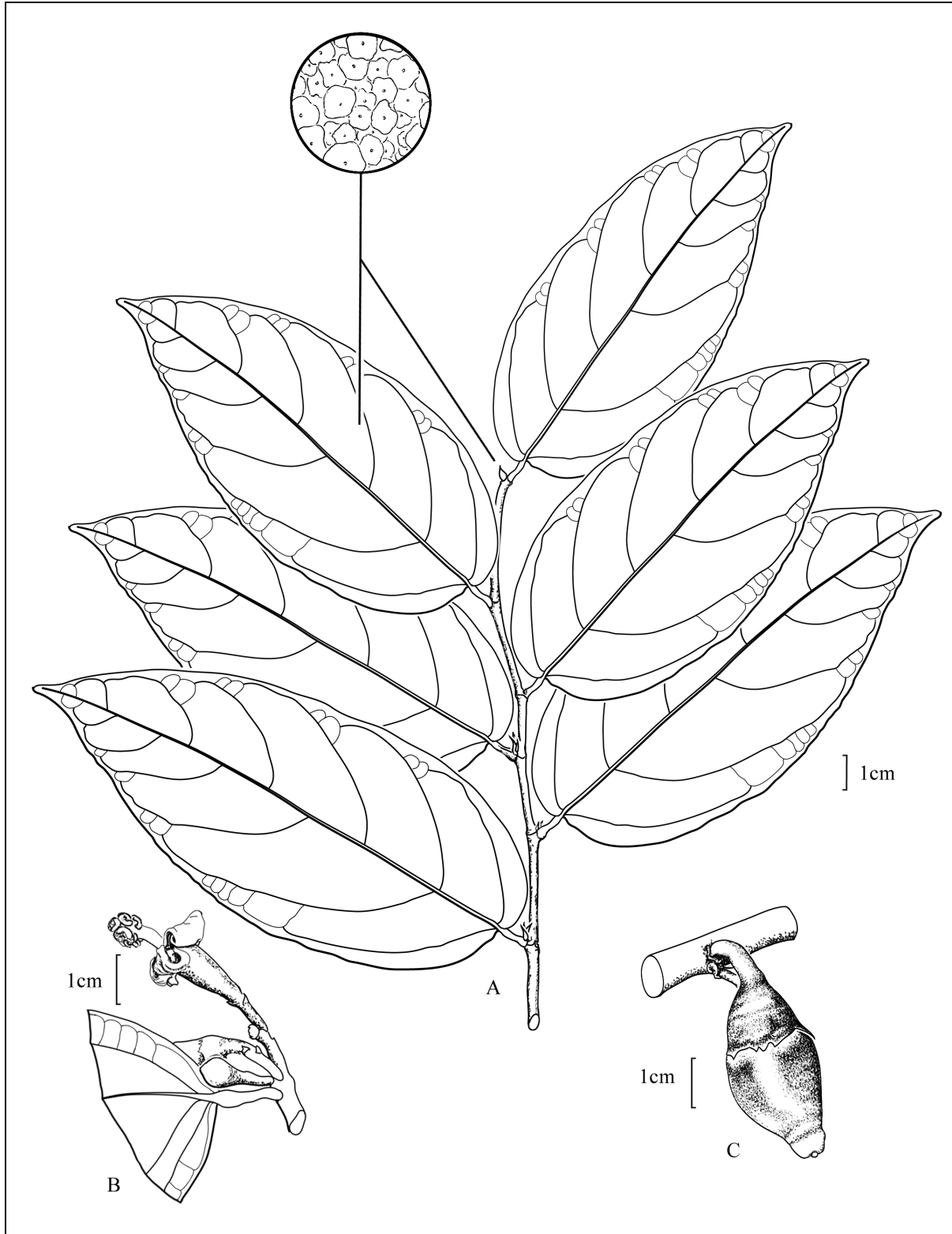


Figure 1. *Quararibea nigrescens*. A. Twig with leaves and lepidote pubescent detail (in circle) on the lamina and twig apex. B. Flower and flower buds. C. Fruit. Drawing by Claudia Aragón (All from Zamora et al. 6158).

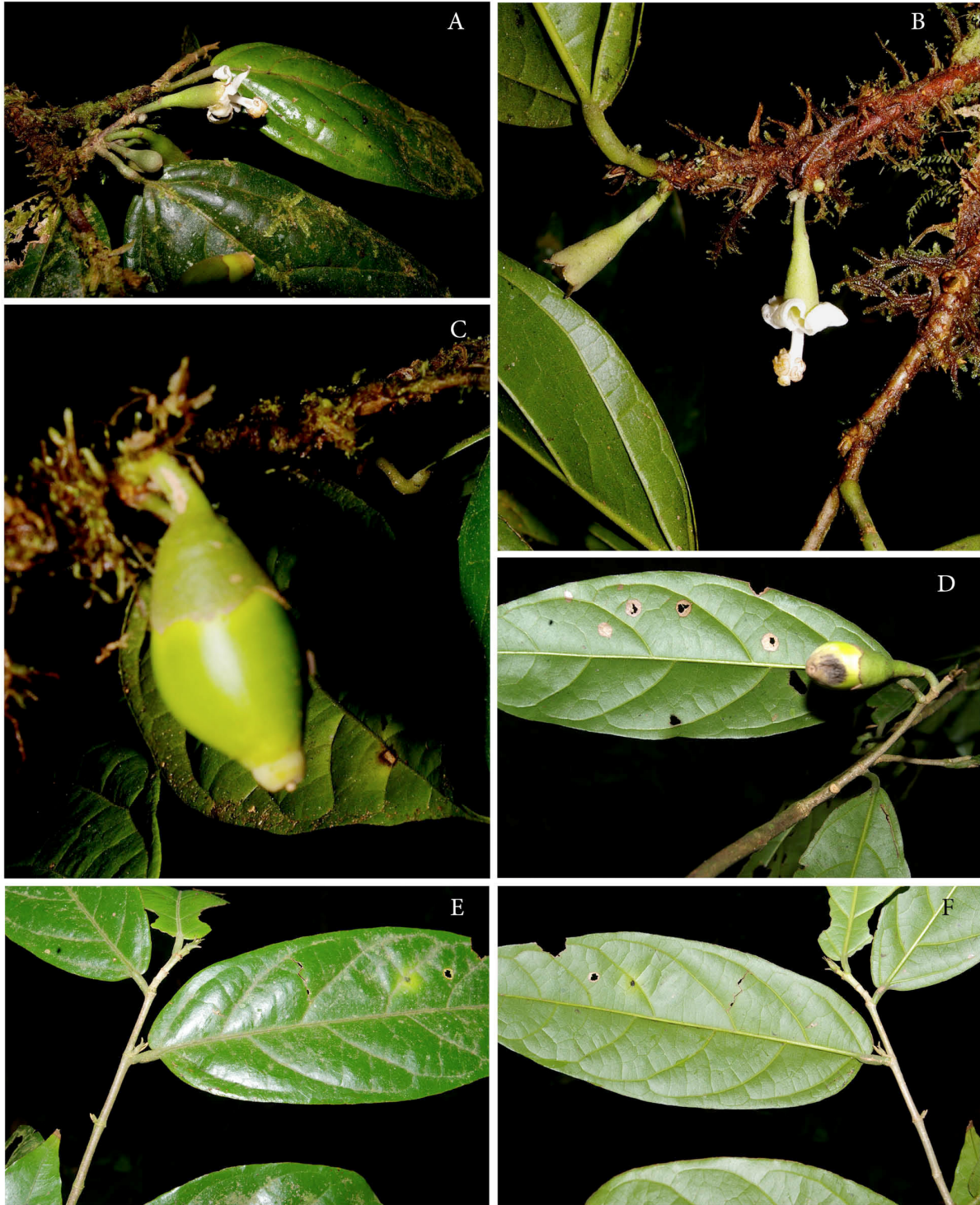


Figure 2. *Quararibea nigrescens*. A. Flower and flower buds. B. Flower with reflexed petals, bending down on old reddish twigs. C. Fruit shape, showing accrescent calyx cup. D. Fruit turning yellowish-green. E. Leaves upper surface and venation. F. Leaves underneath surface and venation. Photographs by N. Zamora. (All from Zamora et al. 6158).

Table 1. Differential characters between *Quararibea costaricensis* and *Q. nigrescens*. Measurements and characters for *Q. costaricensis* were taken from Alverson (1989).

Character	<i>Quararibea costaricensis</i>	<i>Quararibea nigrescens</i>
Twigs and leaves pubescence	densely or sparsely diminute tomentulose with dark brown fasciculate or rufous-brown stellate or stellate-peltate	densely or sparsely diminute silvery, dark gray or blackish(when dry) lepidote or stellate-peltate
Stipules shape and scars	triangular, characteristically pale and conspicuous	mostly linear, dark and minute, not conspicuous
Leaf color upon drying	conspicuously yellowish-green or yellowish-brown	consistent dark gray, blackish to almost black
Pedicle length in flower	(4–)6–9(–11) mm	(8–)11–17 mm
Position of bracteoles on pedicels of flower	confined to lower part	equidistant and more or less at middle length
Calyx length in anthesis	9–13 mm	6–8(–10) mm
Calyx color, texture, and pubescence in flower	densely granular-lepidote golden or greenish-brown	densely silvery lepidote, smooth and blackish
Calyx shape and length in fruit	urceolate to elongate-cupulate, accrescent covering ca. 1/2 of fruit, 15–25 mm	cup-shaped, accrescent covering ca. 1/3 of fruit, 8–10 mm
Petals shape and size (mm)	spathulate, 15–25 x 5–7	asymmetrically and narrowly-oblongate to lanceolate, 13–17 x 3–4
Fruit color when dried	brown or reddish-brown	black

Habitat and distribution. *Quararibea nigrescens* is an endemic species to Costa Rica, so far only known from the Caribbean slope of Cordillera de Guanacaste, Cordillera de Tilarán and Cordillera Volcánica Central, at lower-middle elevation between 400–1100 m. It grows as an understory and subcanopy tree in wet and cloudy forest conditions classified as Humid and Wet Premontane Forest in the Holdridge Life Zones System (Bolaños & Watson 1993). The suggested related species *Q. costaricensis* occurs on both slopes (Pacific-Caribbean) and seems more commonly collected on the seasonal Pacific slope at middle and upland forests between elevations of (800-) 1100-1720 meters. *Quararibea costaricensis* is reported as intermittently deciduous (Alverson 1989), whereas *Q. nigrescens* is non-deciduous.

Phenology. Flowering specimens have been collected in March, May, June, and August; fruiting material in May and June.

Etymology. The specific epithet refers to the peculiar and consistent dark gray, blackish to almost black color of leaves upon drying.

Taxonomy and relationships. On morphological grounds, *Quararibea nigrescens* looks closely related to *Q. costaricensis* from which it has been previously confused in herbarium collections. Both species share a similar floral morphology, of more or less petals size and strongly reflexed at anthesis, but much longer pedicels, bracteoles positioned at the middle length and different petals shape in *Q. nigrescens*. The most notably qualitative character that separates both entities, is the blackish to almost black color of the leaf blade and fruit upon drying in *Q. nigrescens* versus yellowish-greenish to yellowish-brown in *Q. costaricensis*.

Moreover, frequently herbarium specimens of *Quararibea nigrescens* show leaves that appear much smaller, with fewer secondary veins numbers (sometimes barbate in the leaves axils) and twigs with inconspicuous stipule scars, compared to those of *Q. costaricensis*; additional differences are provided in Table 1. For more about *Q. costaricensis* relationships, see Alverson (1989).

Additional material examined. COSTA RICA. Guanacaste. Z. P. Tenorio, Tilarán, Cordillera Volcánica de Tilarán, Tierras Morenas, Finca El Sábalo, 10° 34' 50" N, 84° 59' 30" W, 685 m, 10 Ago 1993 (fl), *Rodríguez et al.* 181 (CR). **Alajuela.** Upala, Parque Nacional Tenorio, cuenca del río Zapote, Estación Heliconias, 10° 42' 45" N, 85° 02' 27" W, 700 m, 27 Abr 2001(fl buds), *Chaves et al.* 1160 (CR); San Ramón, Reserva Forestal de San Ramón, Sendero al SO del Río San Lorencito, 10° 13' 00" N, 84° 37' 00" W, 900-1100 m, 8 Abr 1993 (fr), *Gómez-Laur. et al.* 12405 (USJ); Cantón de San Carlos, Cordillera de Tilarán, 4 km SW of La Tigra, Río La Esperanza watershed, Araya-Ledezma farm, 10° 17' 00" N, 84° 37' 00" W, 500-600 m, 4 Mar 1993 (fr), *Haber et al.* 11438(CR, MO); Upala, Cuenca del Zapote, entrada La Camelia, saliendo de la Estación, 10° 43' 15" N, 84° 59' 45" W, 600-700 m, 19 May 2004 (fl), *Kriebel* 4597 (CR); Upala, Zapote de Upala, unos 2 kms antes del desvío al caserío Las Flores, 20 May 1975 (fl. bds), *Poveda s.n.* (CR, USJ); San Carlos, cuenca del Río San Carlos, San Carlos, La Fortuna, R. B. Arenal Mundo Aventura, 10° 27' 10" N, 84° 39' 30" W, 400 m, 27 May 2004 (fl), *Rodríguez* 8989 (CR); Guatuso, Área de Conservación Arenal-Tempisque, P. N. Tenorio, Estación El Pilón, main trail to La Catarata, 10° 42' 54" N, 84° 59' 13" W, 700 m, 20 Jun 2012 (fl, fr), *Zamora et al.* 6158 (CR, KIB); Upala, Dos Ríos, Buenos Aires, P. N. Rincón de la Vieja, sendero entrando por el albergue Sensoria, rumbo al cráter, parte media-baja del sendero, 10° 50' 58.3" N, 85° 19' 38.2" W, 1009 m, 28 Nov 2014 (str), *Zamora et al.* 7351(CR); Upala, Bijagua, Alto Los Brenes, Albergue Heliconias, Sendero circular. 10° 43' 22" N, 85° 02' 12.5" W, 700 m, 14 Jun 2016 (fl), *Zamora et al.* 8729 (CR); San Ramón. Reserva Biológica Manuel Alberto Brenes, cuenca media del Río San Lorencito, Estación Rodolfo Ortiz, Sendero al Volcán Muerto, 10°, 13' 07" N, 84° 35' 54" W, 900 m, 26 Ago 2017 (fl buds), *Zamora et al.* 9985 (CR).

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