



Eugenia naraveana (Myrtaceae), a new species from Cofre de Perote volcano slopes in Veracruz, México

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Abstract

The new species *Eugenia naraveana* is described and illustrated here. It is only known at the windward slopes of Cofre de Perote volcano, and it grows in the upper tropical montane cloud forest. Its closest relatives are *Eugenia sotoesparzae* and *Eugenia mexicana*, but they differ from the new species because they grow in tropical perennial forests and coastal dunes, in addition to the differences in their morphological structures. This new species breaks the typical altitude range of *Eugenia* in Veracruz, Mexico, being registered above 2,100 up to 2,600 meters.

Key words: Acajete, Coatepec, endemic species, Flora of Veracruz

Resumen

La nueva especie *Eugenia naraveana* es descrita e ilustrada aquí. Sólo se conoce en las colinas de barlovento del volcán Cofre de Perote, creciendo en el bosque mesófilo superior. Sus congéneres más estrechamente relacionados son *Eugenia sotoesparzae* y *Eugenia mexicana*, pero difieren de la nueva especie porque crecen en el bosque tropical perennifolio y en dunas costeras, además de las diferencias en sus estructuras morfológicas. Esta nueva especie rompe el rango altitudinal típico de *Eugenia* en Veracruz, México, siendo registrada por encima de los 2,100 hasta los 2,600 metros.

Palabras clave: Acajete, Coatepec, especie endémica, Flora de Veracruz

Introduction

Eugenia P.Micheli ex Linnaeus (1753a: 470) is placed in tribe Myrteae, and is the largest Neotropical genus of Myrtaceae, with ca. 1,100 species recognized (Mazine *et al.* 2014, WCSP 2016), far away from the 2,000 species mentioned by Sánchez-Vindas (1990). Their distribution covers from Southern México through Central America until Uruguay & Argentina (Mazine *et al.* 2014, van der Merwe *et al.* 2005). México has 80 species of *Eugenia* (Monroy-Ortiz & Monroy 2006) and the revision of the Flora of Veracruz state, in Eastern Mexico, registered 25 species, eight of them endemic for this state (Sánchez-Vindas 1990).

Recently, some species of *Eugenia* have been described for the states of Hidalgo, Querétaro (Sánchez-Chávez & Zamudio 2016) and Chiapas in Mexico, besides of the large number of species described by Barrie (2005) for Mesoamerica.

The Cofre de Perote volcano is located in western Veracruz, and its eastern slopes harbors various zones of undisturbed cloud forest. The new species was found in the upper montane cloud forest proposed by Williams-Linera *et al.* (2013). It is a remarkable date because the cloud forest is highly endangered by human activities and remains only approximately less than 10% of its original area (Williams-Linera *et al.* 2002).

During field trips carried by M. Cházaro, Luis Tapia and Patricia Hernández in 1987 along the windward slopes of Cofre de Perote volcano, was collected a species of *Eugenia* that does not coincide with the previously documented.

Material and methods

Material from CICY, ENCB, MEXU and XAL herbaria were examined (acronyms according to Thiers 2016). Morphological analysis was performed in flowers and fruits preserved in 50% ethanol for drawings. Additionally, measurements were made of dried herbarium specimens using stereoscopic microscope at XAL herbarium. After morphological analysis and comparison with related species the specimens were assigned into a new species.

Taxonomy

Eugenia naraveana Cházaro & Franc.Gut. *sp. nov.* Figures 1 and 2; map 1.

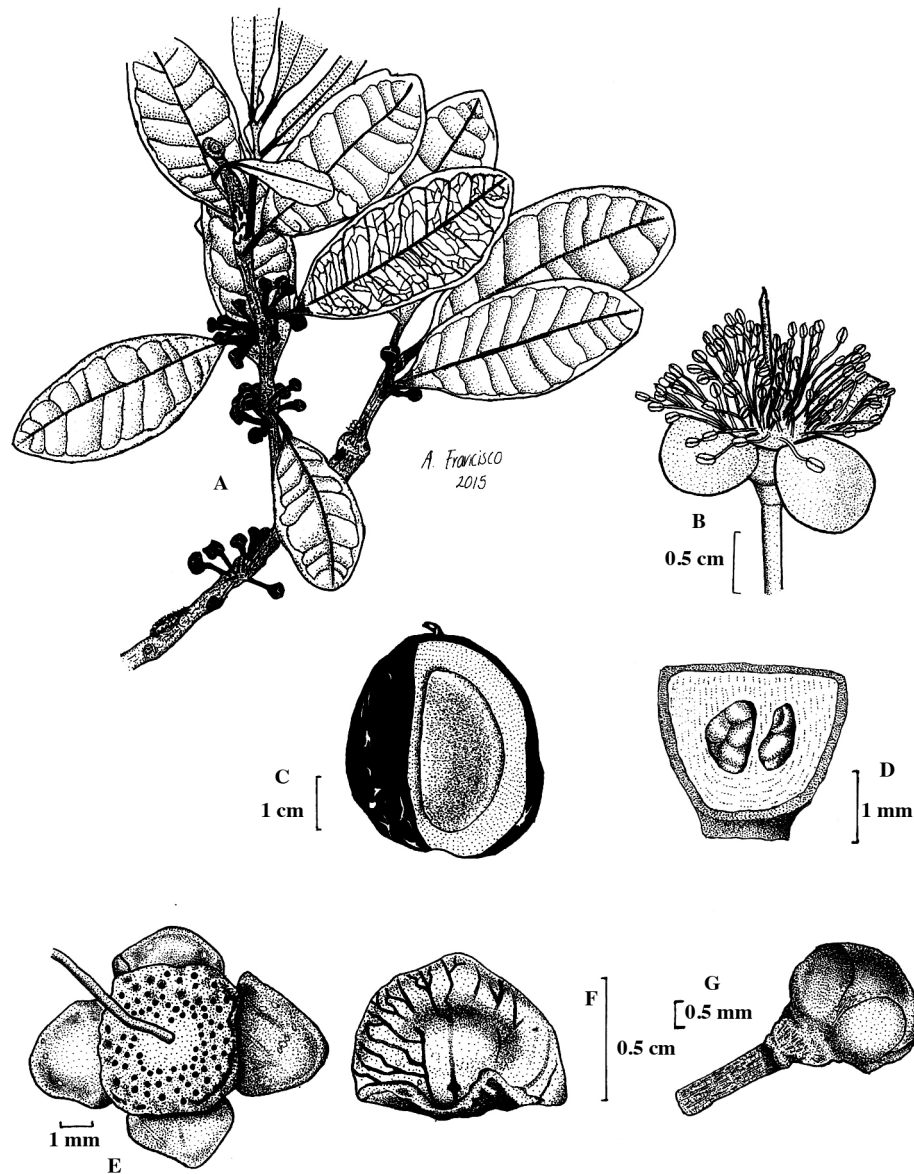


FIGURE 1. *Eugenia naraveana*: A. habit, B. flower, C. fruit, D. hypanthium, E. quadrangular staminal disc with sepals and style, F. petal, G. floral bud. Illustration by A. Francisco (A from Cházaro & Hernández 4676, XAL —paratype; B, D, E, F, G from A. Francisco *et al.* 110, XAL —holotype; C from Cházaro *et al.* 10735, XAL —paratype).

Eugenia naraveana is most similar to *E. sotoesparzae* P.E. Sánchez (Sánchez Vindas 1986: 139) and *E. mexicana* Steudel (1840: 603); it can be distinguished from *E. sotoesparzae* by its smaller leaves up to 9.5 cm (up to 14.2 cm in *E. sotoesparzae*), quadrangular staminal disc (circular in *E. sotoesparzae*), fruits up to 3.4 cm wide (up to 2.3 cm in *E. sotoesparzae*) and its altitude of 2,100 up to 2,600 meters (0 up to 50 meters in *E. sotoesparzae*), and it is distinguished from *E. mexicana* by its inflorescence (fascicle vs.

raceme in *E. mexicana*), larger fruits to 4.3×3.4 cm (up to 2.5×2.7 cm in *E. mexicana*) and quadrangular staminal disc (circular in *E. mexicana*).

Type:—MEXICO. Veracruz: Coatepec, Tierra Grande en el camino hacia La Yerbabuena, $19^{\circ}30'35.90''$, $-97^{\circ}02'59.94''$, 2462 m, 16 April 2016, fl., A. Francisco 110, M. Cházaro, H. Narave, A. Lobato & E. García. (holotype XAL!; isotypes CHAPA!, CICY!, CORU!, ENCB!, MEXU!, WTU!).

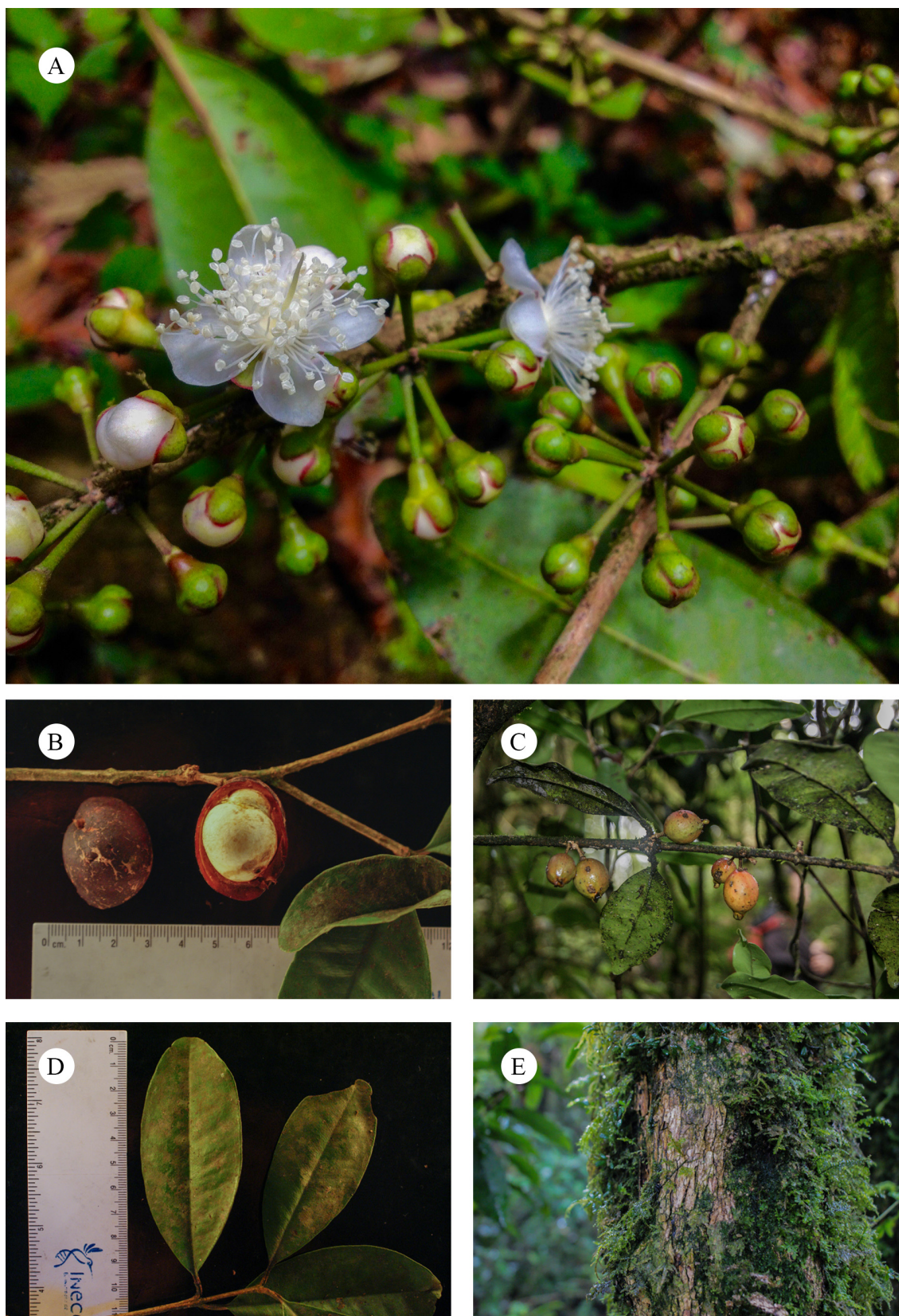


FIGURE 2. *Eugenia naraveana*: A. Inflorescence with mature flowers and floral buds, B. Fruit and seeds, C. Immature fruits, D. Leaves, E. Bark behind moss covering. Photographs A, B, D & E: A. Francisco, C: J.L. Ramírez-Pacheco.

Trees, 8–10 m tall, trunk very branched, bark striated, yellowish to pink. *Leaves* oblong-elliptic to elliptic or rarely lanceolate, 5.7–11.6 × 2.2–5.5 cm, subcoriaceous, glabrous in both surfaces, apex acute to obtuse or rarely shortly acuminate; base decurrent; midvein lightly impressed to canaliculate in upper surface and prominent in lower surface; lateral veins 7–13 at each side, leaving the midvein at angles of 60–70°; marginal vein 2–5 mm from the margin, bright green. *Inflorescence* 1–2 axillary fascicles per node, 15–18 mm long. Pedicels cylindrical 6–12 × 1–2.6 mm, bracteoles ovate, 0.1–0.13 × 0.67–0.15 cm, glabrous, bright green. *Flowers* 3–16 per fascicle, verticillate; floral buds globose 4.5–6 × 3–4.5 mm; flowers anthesis with pleasant fragrance citric-like scent; sepals 4, ovate-deltoid, 3–4.1 × 2.8–3.4 mm, apex obtuse, glabrous and persistent, bright green with red margin when immature; petals 4, orbicular, 4.6–9 × 8.7–9 mm, apex obtuse, white, with circular glandules, glabrous; hypanthium campanulate to slightly infundibuliform, 2.6–3.4 × 4–4.2 mm, pubescent with few strigose hairs; staminal disc quadrangular, 3–5 mm wide, glabrous; stamens 70–131, 4.6–5.7 mm long, anthers 0.85–1 × 0.4–0.45 mm; ovary bilocular, 8–13 ovules, each 0.4–0.5 × 0.3–0.35 mm; style 7.5–9.7 × 0.4–0.5 mm. *Fruit* a subglobose drupe, 1.1–4.3 × 0.9–3.4 cm, yellowish to orange when immature and red to dark purple when mature, with 1 or rarely 2 spheroid seeds.

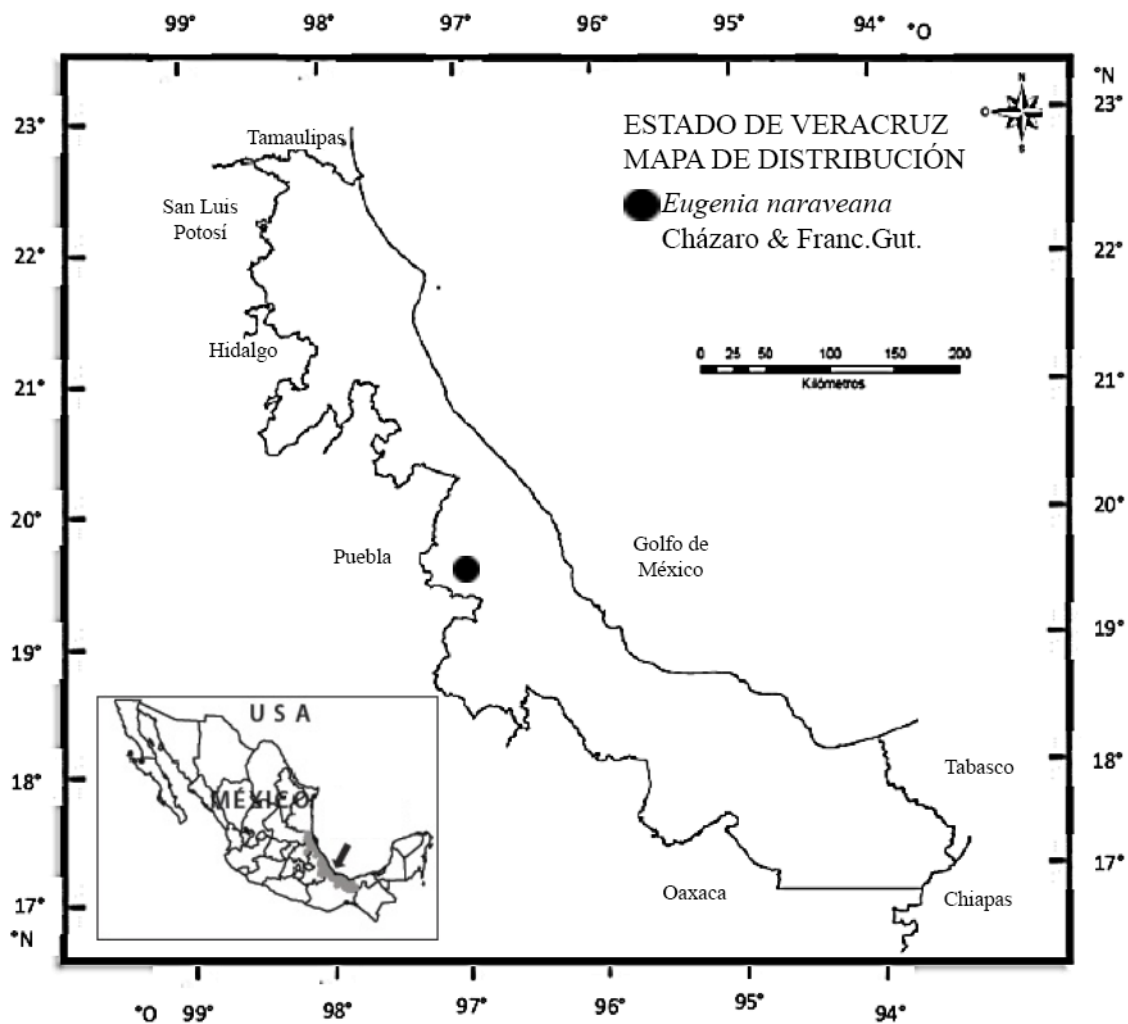


FIGURE 3. *Eugenia naraveana*: Distribution map.

Geographic distribution & ecology:—Only known in a few sites in Acajete and Coatepec counties in the southern slopes of Cofre de Perote volcano at central Veracruz, in eastern Mexico. This species occurs in the upper tropical montane cloud forest with *Symplocos longipes* Lundell (1986: 123), *S. coccinea* Bonpland (1808: 185) (Symplocaceae), *Drimys granadensis* Linnaeus filius (1781[1782]: 269) (Winteraceae), *Weinmannia intermedia* Schlechtendal & Chamisso (1830: 555) (Cunoniaceae), species of *Quercus* Linnaeus (1753b: 994) (Fagaceae), *Ptelea trifoliata* Linnaeus (1753a: 118) (Rutaceae), and with abundant epiphytic plants as *Oreopanax flaccidus* Marchal (1879: 84) (Araliaceae), *Senecio parasiticus* Hemsley (1881: 244) (Asteraceae), *Aporocactus flagelliformis* Linnaeus (1753a: 467) Lemaire (1860: 68) (Cactaceae), *Tillandsia violacea* Baker (1887a: 279), *T. gymnotrya* Baker (1887b: 243) (Bromeliaceae), *Cochlioda rosea* Lindley (1844: 151) Bentham (1881: 327) and *Prosthechea vitellina* Lindley (1831: 97) W.E. Higgins (1997: 381)

(Orchidaceae), etc. The unusual altitude range where it was found from 2,100 to 2,600 m elev. is much higher than the previously reported maximum elevation for the species of *Eugenia* of Veracruz, which is 1,800 meters (Sánchez-Vindas 1990), besides the other morphological characters from congeners of Veracruz, which are compared in Table 1.

Phenology:—Flowers are recorded from April, fruits from September to December.

Vernacular names:—“Guayabo” (Macario Córdova-Cortina, pers. comm., 2015).

Etymology:—It is a pleasure to name this new species in honor to Héctor Narave-Flores, a Mexican botanist pioneer in the floristic research of Cofre de Perote volcano during 1980 decade, publishing the unique botanical study for this area (Narave 1985). He also made contributions to the Flora of Veracruz with the taxonomic treatments of Junglandaceae (Narave 1983), Turneraceae (Gama *et al.* 1985) and Pinaceae (Narave & Taylor 1997).

TABLE 1. Comparison of morphological features of *E. naraveana* and the most similar species of the genus from Veracruz State, Mexico.

	<i>E. naraveana</i>	<i>E. sotoesparzae</i>	<i>E. mexicana</i>
Leaf length	5.7–9.5 cm	4.1–14.2 cm	5.5–14.5 cm
Leaf shape	lanceolate to elliptic or oblong-elliptic	elliptic to ovate	elliptic to ovate-elliptic
Inflorescence	fascicle	umbrella or fascicle	raceme robust
Flowers per inflorescence	3–16	2–8	1–8
Disc shape	quadrangular	circular	circular
Disc size	4–4.2 mm per side	3.5–5.2 mm ø	3–4 mm ø
Stamens	131	150–180	125–150
Fruit length	1.1–4.3 cm	1.3–4 cm	1.3–2.5 cm
Fruit diameter	0.9–3.4 cm	0.9–2.3 cm	1.2–2.7 cm
Habitat	Cloud forest	Coastal dunes	Tropical rain forest
Altitude	2100–2600 m	0–50 m	150–1300 m

Paratypes:—MÉXICO. Veracruz: Coatepec, Cerro Huilotepec, entre Mesa de Los Laureles y Tierra Blanca [Tierra Grande], 2600 m, 19 April 1987 (fl.), Cházaro & Hernández 4676 (WIS, XAL!); Coatepec, Cerro Huilotepec, entre Mesa de Los Laureles y Tierra Blanca [Tierra Grande], 27 December 1987 (fr.), Cházaro *et al.* 5276 (WIS, XAL!); Acajete, Cuchuluyapan, alrededor de la cascada El Capote, 2 km N de El Zapotal, 2100 m, 26 September 2010 (fr.), Cházaro *et al.* 9898 (ENCB!, IBUG!, IEB!, CHAPA!, MEXU!, XAL!); Coatepec, Mesa de los Laureles, 08 October 2014 (fr.), Cházaro *et al.* 10735 (XAL!, XALU!, CORU!, CICY!, CHAPA!); Acajete, El Encinal II, Ejido San Pedro Buenavista, 2,500 m, 21 October 2012, fr., I. Cortés-Flores 50 (CHAPA!, CICY!, ENCB!, MEXU!, XAL!).

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