



Coccoloba tunii (Polygonaceae), a new species from Chiapas (Mexico)

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Abstract

Coccoloba tunii is here described as a new species from Mexico. Morphological characters of the leaf, inflorescence, and fruit show discontinuities among populations of *C. tunii* and its relative, *C. liebmannii*. In addition, both species exhibit different geographical patterns, *C. tunii* is exclusive of the Central Depression and Plateau of Chiapas (Mexico) at mid elevations, while *C. liebmannii* ranges from Oaxaca to Colima on lowlands along the Pacific watershed.

Keywords: *Coccoloba*, *Coccoloba liebmannii*

Resumen

Se describe *Coccoloba tunii* como nueva especie para México. Al comparar los caracteres morfológicos de la hoja, inflorescencia y frutos de *C. tunii* se encontraron discontinuidades con aquellos de *C. liebmannii*. Además, las dos especies muestran diferentes patrones de distribución geográfica, *C. tunii* es exclusiva de las provincias fisiográficas Depresión Central y Meseta Central de Chiapas (México) en altitudes medias, mientras que el rango de distribución de *C. liebmannii* va desde Oaxaca hasta Colima en la zona costera del Océano Pacífico.

Palabras clave: *Coccoloba*, *Coccoloba liebmannii*

Introduction

Coccoloba P. Browne (1756: 209) is the most species-rich genus of the subfamily Eriogonoideae Arn. (Polygonaceae Juss.) (Burke & Sánchez 2011), including about 150 species which are mainly distributed in the Amazon Basin, Caribbean Islands and Middle America (Howard 1961).

A comprehensive taxonomic revision of the genus *Coccoloba* was not published at the being time. Bentham and Hooker (1880) published a taxonomic treatment for this woody genus, considering *Campderia* Bentham [1844, t. 52: 159, *nom. illeg.* (Art. 53.1 of ICN; McNeill *et al.* 2012)] as a different genus, while Lindau (1890) treated *Campderia* at section rank of *Coccoloba*. In Mexico and Central America, Standley and Steyemark (1946), Breedlove (1973, 1981, 1986), Howard (1959, 1992), Ortiz-Díaz (1994), and Ortiz-Díaz *et al.* (2013, 2015) have contributed to a better understanding of *Coccoloba*. Phylogenetic studies of the subfamily using molecular data, showed incongruences with the taxonomic classifications based on morphological data. These studies also demonstrated that the position of *Neomillspaughia emarginata* (Gross 1913: 218) Blake (1921: 85) is sister to *Coccoloba* (Burke *et al.* 2010, Burke & Sánchez 2011). From the morphological point of view, *Coccoloba* can be identified by its woody habit, simple and alternate leaves, well defined ochreae, and achenes surrounded by an accrescent hypanthium and perianth lobes.

The taxonomic revision carried out by Ortiz-Díaz for *Flora Mesoamericana* project (Ortiz-Díaz. *et al.* 2016) accepts 44 species of which 16 occur in Chiapas. Recent botanical surveys in Chiapas allowed to find new discoveries for the genus (Ortiz-Díaz *et al.* 2015). In this context, *C. tunii*, which appears to be morphologically similar to *C. liebmannii* Lindau (1890: 189), is here proposed as a new species for Science.

Material and Methods

The work is based on a morphological and biometrical analyses carried out on material collected in field by one of the authors (J.J. Ortiz-Díaz), and on specimens preserved in different herbaria (BM, CAS, CHIP, F, LL, MEXU, MO, UADY; acronyms according to Thiers 2016+). Measurements were taken from 32 specimens, 19 of *C. tunii* (two specimens at flower), and 13 of *C. liebmannii* (seven at flower). Morphological characters were measured using a digital caliper Absolute Digimatic Mitutoyo (Japan). Length of perianth lobes was measured from the top of the hypanthium and inflorescence length includes the short peduncle.

Taxonomic Treatment

Coccoloba tunii Ortiz-Díaz & Arnelas, *sp.nov.* (Fig. 1)

Type:—MEXICO. **Chiapas:** Chiapa de Corzo, El Chorreadero en las laderas de la cascada. Selva baja caducifolia con *Hauya*, *Euphorbia*, *Diospyros*, *Cedrela*, *Trichilia* y *Heliocarpus*, 800 m a.s.l., 14 September 2014, Ortiz & Palma 2942 (Holotype UADY!, isotypes MEXU!, MO!, XAL!).

Diagnosis:—Similar to *Coccoloba liebmannii*, differing in elliptic to elliptic oblong or narrowly ovate, chartaceous leaf blades, shorter racemes, longer pedicels and perianth lobes.

Description:—Trees 3–7 m tall; stem smooth with irregular cork pieces, internodes 0.7–3.4 cm long (diameter 3–5 mm), striate, sparsely lenticelled, sparse to densely pubescent, trichomes simple, 0.2–0.3 mm long, green-yellowish; ochreae 3–7 mm long, cylindrical, lacerate at apex, chartaceous, sparse to densely pubescent, trichomes simple, 0.2–0.3 mm long, green-yellowish, sparsely glandular punctiform, dark brown. Leaves simple, alternate; petioles 5–7(–11) mm long (diameter 0.5–1.0 mm), densely pubescent, trichomes simple, 0.2–0.3 mm long, green-yellowish, canalculated, arising near or at the base of the ochreae; leaf blades (3.5–)6.7–10.3(–11.2) × (2.2–)2.4–3.2(–4.6) cm, elliptic to elliptic oblong or narrowly ovate, chartaceous, scarce to sparsely pubescent above and beneath, trichomes simple, 0.2–0.3 mm long, green-yellowish, base rounded to subcordate, apex obtuse to shortly acuminate, margin entire to slightly undulate; nerve prominent above, 5–8 pairs of primary nerves. Inflorescences terminal, solitary, racemes (2.7–)4.5–5.1(–6.2) cm long, rachis rounded (0.5–)1–2 mm wide, sparse to densely pubescent, trichomes simple, 0.2–0.3 mm long, green-yellowish; ochreolae 0.3–0.7 mm long, sparsely pubescent, trichomes simple, 0.2–0.3 mm long, green yellowish, with a fringe of trichomes at apex; pedicels 3–6(–8) mm long, glabrous, longer than ochreolae, articulated at apex; flowers solitaires, 2.5–3.0 mm long, glabrous; hypanthium 1–1.3 mm long, 5 perianth lobes 1.5–1.8 mm long, glabrous, creamy to yellowish. Stamens 9–10, connate at base, glabrous, filaments 1.5–1.7 mm long, filiform; anthers 0.3–0.5 mm long, dorsifixed, yellowish. Ovary 1.0–1.4 mm long, glabrous, style 3; stigma 3, linear. Fruit 6–7(–10) mm long × 5.9–7.0(–9.7) mm diameter, globose with a rounded to obtuse base, glabrous to powdery, glandular punctiform, green to dark brown when mature; achene included among the accrescent and succulent hypanthium and perianth lobes; perianth lobes free up to medial part of the fruit. Seed with ruminant endosperm; embryo straight.

Eponymy:—The epithet is dedicated to Juan Tun Garrido, curator of UADY herbarium who has contributed to a better knowledge of the tropical flora of South Eastern Mexico.

Distribution and ecology:—*Coccoloba tunii* is a tree growing in cliff faces or disturbed slopes on limestone or sandstone, along banks rivers in tropical dry forests at an elevation of 650–1800 m (Fig. 2). It is only known from the physiographic regions Central Depression, and Chiapas Plateau (Müllerried 1957).

Conservation status:—*Coccoloba tunii* mostly occur in the Central areas of Chiapas, in the Biosphere Reserve “Selva del Ocote” (IUCN & UNEP, category VI, WDPa 2014) (Fig. 2). On the basis of the available data (IUCN 2012) we can use the criterion B1. The area of occupancy (AOO) of the new species is less than 2000 km², suggesting the inclusion of it in “vulnerable” (VU) IUCN criteria. However, considering the number of available herbarium material studied, we assumed the presence of more than six populations over the distributional range of the new species (Fig. 2). Therefore, we considered that *C. tunii* is in a “least concern” (LC) category.

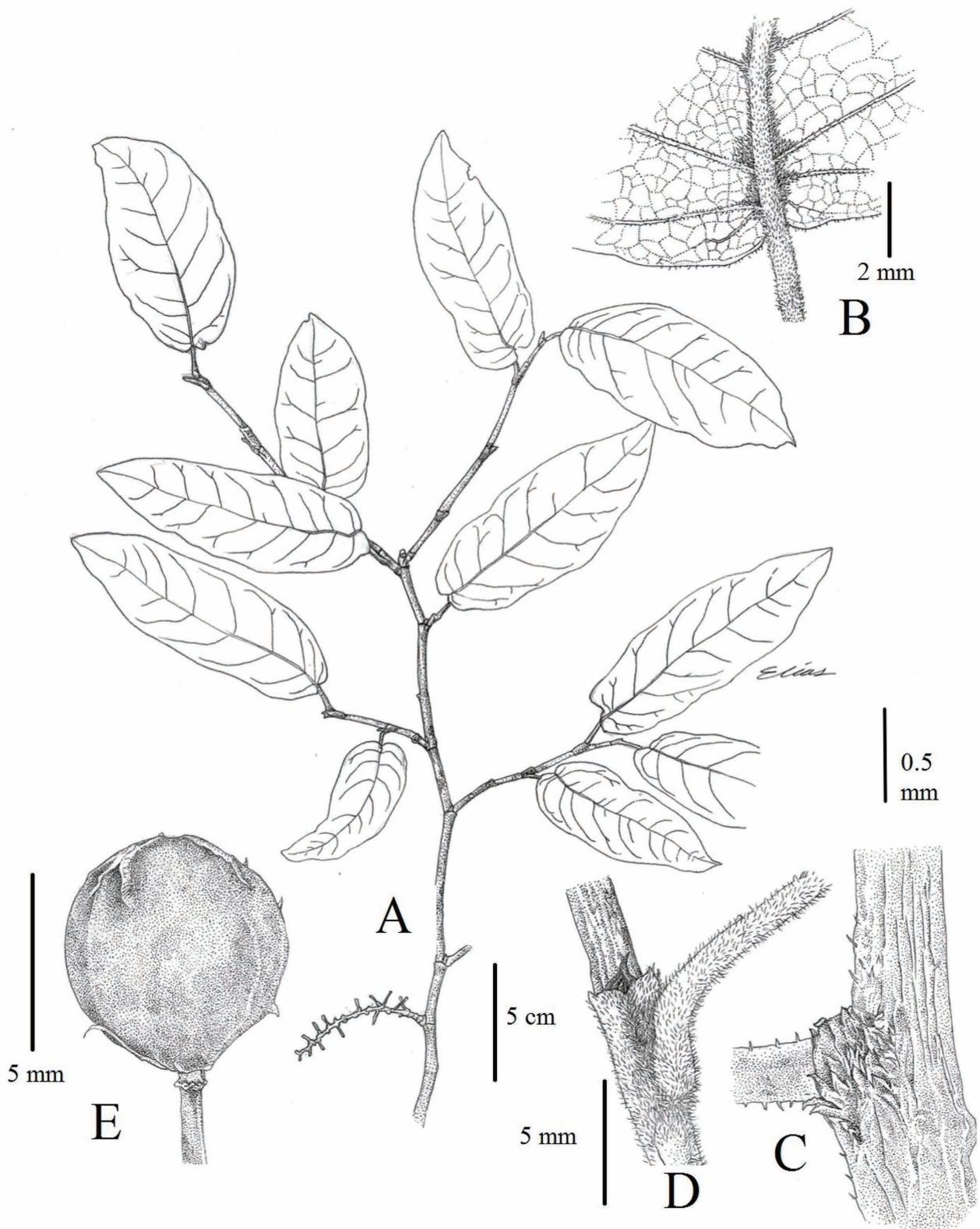


FIGURE 1. *Coccoloba tunii*. Drawing based on the holotype. **A)** Branch, leaves and inflorescence axis. **B)** Detail of indumentum on midvein, and primary veins. **C).** Portion of the inflorescence, bracteoles, ochreolae and pedicel **D)** Ochrea and petiole. **E)** Fruit.

Observations:—On the basis of the morphological characters, *Coccoloba tunii* appears to be similar to *C. liebmannii* (Table 1). *C. tunii* differs from *C. liebmannii* in having elliptic to elliptic-oblong or narrowly ovate (vs. oblong to obovate in *C. liebmannii*), chartaceous leaf blades (vs. coriaceous), shorter racemes, longer pedicels and

longer perianth lobes (Table 1). The two species also have different distributional areas (Fig. 2): *Coccoloba liebmannii* ranges from Colima to Oaxaca as a part of the Floristic Province Pacific Lowlands at elevational range of 0 to 550 m. Only one collection is known from Chiapas (*Itié* 3878, MEXU). Like *C. liebmannii*, *C. tunii* inhabits tropical dry forests but the latter is endemic to Central Depression, and Chiapas Plateau provinces at an elevation range of 650 to 1800 m.

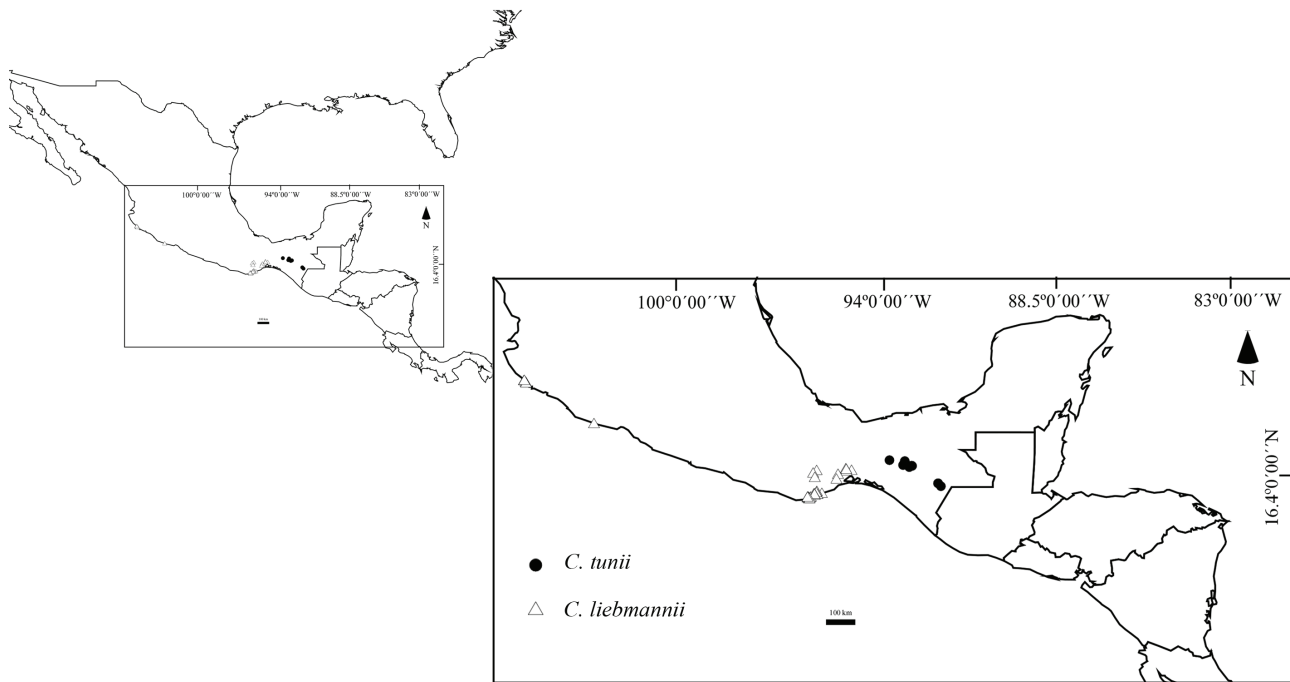


FIGURE 2. Distribution map of *Coccoloba tunii* (circle) and *C. liebmannii* (triangle).

TABLE 1. Morphological comparison among *Coccoloba tunii* and *C. liebmannii*.

	<i>C. tunii</i>	<i>C. liebmannii</i>
Leaf blades features	Chartaceous, elliptic to elliptic oblong or narrowly ovate, entire to slightly undulate, obtuse to shortly acuminate	Coriaceous, oblong to obovate, margin entire undulate, rounded, cordate
Leaf blades size (cm)	(3.5–)6.7–7.8(11.2) × (2.2–)2.4–3.2(–4.6)	(4.8–)6.2–7.8(–12.5) × 2.8–3.2(–5.0)
Leaf blades veins (pairs)	5–7	7–9
Inflorescence length (cm)	(2.7–)4.5–5.1(–6.2)	(9.3–)12.6–18.8
Perianth lobes length (mm)	1.5–1.8	0.7–1.2
Fruiting pedicels (mm)	3–6(–8)	1.5–2.3
Fruit	Globose, 6–7(–10) × 5.9–7(–9.7)	Ovoid, 6.2–8.5 × 4.3–5.4

Additional specimens examined (paratypes):—MEXICO. Chiapas. Municipio Berriozabal: 5 km E of Berriozabal along Mexican hwy 190, 11 October 1971, *Breedlove* 20383 (CAS, MO). Municipio Chiapa de Corzo: Above El Chorreadero, 11 August 1972, *Breedlove* 26875 (CAS, MO); El Chorreadero, 5.6 miles SE of Chiapa de Corzo along Mexican hwy 190, 20 September 1967, *Shilom Ton* 2968 (MO). Municipio Chicoasén: Mirador of Chicoasén Dam along road from Tuxtla GTZ to the Chicoasén Dam, 9 September 1976, *Breedlove* 39949 (MO); 2 km al NO de la estación meteorológica CFE, Chicoasén, 5 May 2009, *Martínez* 2617 (MEXU). Municipio Comitán de Domínguez: 5 km al N de J. Mújica, camino a Tzimol, 15 December 1987, *Martínez & García* 22097 (MEXU). Municipio La Trinitaria: 18 km S of La Trinitaria, 29 October 1980, *Breedlove & Strother* 46993 (MO). Municipio Ocozocuautla: Mirador Manos que Imploran, 42 km al N de Tuxtla Gutiérrez en el camino a Chicoasén, 17 June 1991, *Hernández et al.* 2559 (MEXU); En bajada del Rio Encajonado La Venta, 3 km de la caseta Reserva el Ocote, 20 August 1990, *Méndez* 9487 (CHIP); Along river 13 km E of Ocozocuautla on rte 190, then N road to Aguacero, 2 October 1984, *Huft*

et al. 2297 (MO); At the head of the Rio de La Venta at The Chorreadero near Derna, 24 August 1972, *Breedlove* 27387 (MO); Al Rio La Venta, 30 km al NO de Ocozucuaula, 28 March or May 1950, *Miranda* 6310 (MEXU). Municipio San Fernando: Al E de cañada La Chacona, 22 October 1988, *Palacios & Breedlove* 744 (CHIP, MO); Arriba en cañada Chacona-San Fernando NO de Tuxtla Gtz., 8 January 1970, *Miranda* 5876 (MEXU); Arriba Encañada carretera a San Fernando, 18 June 1950, *Miranda* 6404 (CHIP, MEXU); Cañada la Chacona, lado E, 10 August 1989, *Palacios* 1253 (CHIP); At Mirador for Chicoasen Dam along road from Tuxtla Gtz to the Chicoasen Dam, 16 July 1981, *Breedlove* 51583 (MO). Municipio Tzimol: 15 km S of Comitán on road to Tzimol and Tuxtla Gtz., 20 October 1981, *Breedlove* 53733 (LL, MO).



FIGURE 3. *Coccoloba tunii* in locus classicus. **A)** Stem and bark. **B)** Branch and leaves. **C)** Fruits. **D)** Inflorescence and fruits.

Acknowledgements

We are grateful to the Directors and Curators of the cited Herbaria. We would also like to thank to Janelle M. Burke (Howard University, Washington) and the other anonymous reviewer for helpful comments, and F. H. Najarro (Tuxtla Gutierrez, Mexico), G. Palma Pech (Merida, Mexico) for their support during the field trips. We acknowledge to J. E. G. López (Campeche, Mexico) for the finest illustration. This work was partially financed by SEP-PROMEP “Fortalecimiento del Cuerpo Académico Diversidad de los Recursos Florísticos de Mesoamérica UADY-CA-94”.

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