Botanical Sciences 102 (1): 211-222. 2024
DOI: 10.17129/botsci.3344

Received: May 8, 2023, Accepted: August 31, 2023
On line first: November 6, 2023

Taxonomy and Floristics / Taxonomía y Florística

Coccoloba burkeae and *C. najarroi*, two new species of *Coccoloba* sect. *Coccoloba* (Polygonaceae) from Mexico

Juan Javier Ortiz-Díaz, Juan Tun-Garrido, and Juan José Ancona*

Herbario UADY, Departamento de Botánica, Campus de Ciencias Biológicas y Agropecuarias, Universidad Autónoma de Yucatán, Mérida, Yucatán, Mexico.
*Author for correspondence: juanjo.ancona@gmail.com

Abstract:

Background: *Coccoloba* is a Neotropical genus of trees, shrubs, and lianas with approximately 150 species. Reviewed Mexican specimens of *Coccoloba* do not correspond to any recognized species within the genus, so they are proposed as new species.

Question: What are the morphological characteristics that differentiate the two new species from other *Coccoloba* species? What is its distribution and conservation status?

Studied species: Species of *Coccoloba* sect. *Coccoloba* endemic to Mexico.

Study site and dates: Chiapas and Veracruz, Mexico, 2022-2023.

Methods: All available information for *Coccoloba*, including herbarium specimens and online databases, was reviewed. Subsequently, a comparative analysis was carried out including the two new species proposed and the recognized species in the genus. Geographic distribution maps were prepared and the conservation status of the new species was determined, following the IUCN guidelines.

Results: *Coccoloba burkeae* and *C. najarroi* are described and illustrated as new species. Both are endemic to Mexico. *C. burkeae* is distributed in the humid forests of the Tuxtlas region in Veracruz and is morphologically similar to *C. barbadensis*, *C. hondurensis* and *C. spicata*; this species is considered in the Endangered (EN) category. *C. najarroi* is restricted to the humid forests of Chiapas and is similar to *C. ascendens* and *C. ibarrae*. This species is considered Critically Endangered (CR).

Conclusions: The morphological characteristics of the fruit, the inflorescence and the leaves are important to diagnose the two new species of *Coccoloba*; both being endemic to Mexico.

Keywords: Endemism, flora of Chiapas, flora of Veracruz, Mesoamerica, tribe Coccolobeae.

Resumen:

Antecedentes: *Coccoloba* es un género Neotropical de árboles, arbustos y lianas con aproximadamente 150 especies. Ejemplares mexicanos de *Coccoloba* revisados no corresponden a ninguna especie reconocida dentro del género, por lo que se proponen como especies nuevas.

Pregunta: ¿Cuáles son las características morfológicas que diferencian a las dos nuevas especies con respecto a otras especies de *Coccoloba*? ¿Cuál es su distribución y estado de conservación?

Especies de estudio: Especies de *Coccoloba* sect. *Coccoloba* endémicas de México.

Sitio de estudio: Chiapas y Veracruz, México, 2022-2023.

Métodos: Se revisó toda la información disponible para *Coccoloba*, incluyendo especímenes de herbario y bases de datos en línea. Posteriormente se realizó un análisis comparativo incluyendo las dos especies nuevas propuestas y las especies reconocidas. Se elaboraron mapas de distribución geográfica y se determinó el estatus de conservación de las especies nuevas, siguiendo las pautas de IUCN.

Resultados: *Coccoloba burkeae* y *C. najarroi* son descritas e ilustradas como especies nuevas. Ambas son endémicas de México. *C. burkeae* se distribuye en las selvas húmedas de la región de los Tuxtlas en Veracruz y es morfológicamente similar a *C. barbadensis*, *C. hondurensis* y C. *spicata*; esta especie es considerada en la categoría de En Peligro (EN). *C. najarroi* se restringe a las selvas húmedas de Chiapas y es similar a *C. ascendens* y *C. ibarrae*; es considerada como En Peligro Crítico (CR).

Conclusiones: Las características morfológicas del fruto, la inflorescencia y las hojas son importantes para diagnosticar las dos especies nuevas de *Coccoloba*; siendo ambas endémicas de México.

Palabras clave: Endemismo, flora de Chiapas, flora de Veracruz, Mesoamérica, tribu Coccolobeae.

Coccoloba P. Browne is the richest genus of tropical trees and shrubs within the Polygonaceae (Howard 1959a, b, 1961, Melo 2004, Burke & Sanchez 2011, Ortiz-Díaz 2023). The presence of an ochrea, small flowers with 5 tepals, 10 stamens and a globose to ovoid achene embedded in the tepals, and/or the expanded hypanthium are the diagnostic characteristics of *Coccoloba* (Melo 2004, Burke *et al*. 2010, Ortiz-Díaz 2023). The genus is native and widely distributed in the Neotropics, recognizing four regions with high species richness and endemisms (Koenemann & Burke 2020): Mesoamerica, The Antilles, Amazonia and Southestern Brazil.

The only monographic study of *Coccoloba* was carried out by Lindau in 1891, who recognized 125 species, but more recent studies estimate the number of species from 120 (Hernández-Ledesma *et al*. 2015) to 150 (Howard 1961, Brandbyge 1990, Melo 2004, Acevedo-Rodríguez & Strong 2012, Koenemann & Burke 2020). In Lindau's treatment of *Coccoloba*, the genus was classified in four sections: *Coccoloba* sect. *Rhigia*, *C.* sect. *Paniculatae*, *C.* sect. *Campderia* and *C.* sect. *Coccoloba*, estimating 80 % of all species are including in the last one. *Coccoloba* sect. *Coccoloba* comprises the species with racemiform and spiciform inflorescences; achene entirely or partially embedded in between the tepals, and/or the expanded hypanthium obtuse or crowned, at apex. Recent phylogenetic analyzes of the subfamily Eriogonoideae have shown the monophyly of the *Coccoloba* and *Neomillspaughia* Blake placed as a sister to the genus, which together with *Podopterus* Bonpl. form the Coccolobeae tribe (Burke *et al*. 2010, Burke & Sanchez 2011, Koenemann & Burke 2020). Infrageneric classification of the sections remain untested.

As part of the taxonomic study of the *Coccoloba* species for Mexico, some specimens were observed that do not correspond to the species previously described within the section *Coccoloba* and here they are proposed as two new species. Therefore, the objective of this work is to describe, illustrate and map the distribution of two new species of *Coccoloba* for Mexico. The morphological characters of these new species are compared with similar morphological species to delimit them.

Materials and methods

Field and herbarium work. The study was conducted at Herbarium UADY of the Universidad Autónoma de Yucatán. During the review of herbarium specimens for the taxonomic treatment of the genus *Coccoloba* for Mexico, more than 150 specimens deposited in the BM, CICY, MEXU, MO, NY, UADY and XAL herbaria (acronyms follow Thiers 2023) determined as *Coccoloba ascendens*, *C. barbadensis, C. escuintlensis, C. ibarrae, C. hondurensis and C. spicata,* were examined. All type specimens of the previously listed species were consulted, as well as the general collections housed in virtual herbaria, including those maintained by JSTOR Global Plants (plants.jstor.org), Red de Herbarios del Noreste de México (herbanwmex.net), speciesLink (specieslink.net) and National Autonomous University of Mexico (MEXU; datosabiertos.unam.mx/biodiversidad). Specialized taxonomic literature on *Coccoloba* was consulted; in particular, Howard (1959a, b), Lindau (1891), Melo (2004) and Ortiz-Díaz (2023). Additionally, the International Plant Names Index (www.ipni.org), and Tropicos (tropicos.org) were consulted to update the current nomenclature and geographical information.

Botanical exploration was also carried out in the field to locate living populations. In November 2022, botanical exploration was carried out in the Catemaco region to collect specimens of *Coccoloba burkeae* sp. nov. In December 2022 the authors contacted the biologist Francisco Hernández Najarro to plan the expedition in the state of Chiapas to collect the species *C. najarroi* sp. nov, but unfortunately it was not possible to access living populations due to the insecurity of the region. The distribution map was created in SimpleMappr (Shorthouse 2010) using the geographic coordinates of the herbarium labels.

Morphological analysis and conservation assessment. Morphological descriptions were made from herbarium specimens. The *Coccoloba burkeae* specimens collected in Catemaco (holotype and isotypes) were herborized before the measurements in order to homogenize the results. In *Coccoloba* the size, shape and indumentation of the fruit and leaves are taxonomically informative characters and allow the delimitation of the species. These morphological characters were measured using a Mitutoyo Absolute Digimatic digital caliper (Japan). The conservation status of

the new species was assessed using the IUCN Red List Criteria (IUCN 2023). We relied on criterion B, geographical distribution assessed both as B1 (extent of occurrence) or B2 (area of occupancy), as implemented in GeoCAT (Bachman *et al*. 2011).

Results

Coccoloba burkeae J.J. Ancona, J.J. Ortiz-Díaz & J. Tun *sp. nov*. (Figures 1 and 2).

Type. México. Veracruz: municipio Catemaco, Carretera Catemaco-Coyame, alrededor del Lago Catemaco, 18°26′29″ N 95°01′33″ W, Elev. 363 m., 29 octubre 2022, *J.J. Ancona, J. Tun, R. Ramos & R. Peraza 369* (holotype UADY!, isotype MEXU!, XAL!).

Diagnosis. Coccoloba burkeae is morphologically similar to *C. barbadensis, C. spicata* and *C. hondurensis,* but it is distinguished by: the leaf blade lanceolate, with long acuminate apex and obtuse base; fruit and globose, of 6-6.5 (7) mm long, 5-6 mm broad, tepals appressed at the achene apex when fresh and slightly acuminate or crowned when dry, rounded base. Figure 3 shows the diagnostic characters and their comparison with morphologically more similar species.

Description. Trees 10-25 m tall, bark scaly with rectangular pieces. Branches internodes solid, glabrous, striated. Ochrea 0.8-1 cm long, papery, cylindrical, glabrous. Leaves simple, alternate; petiole 1.2-1.5 cm long, 2-3 mm thick, striated, glabrous, inserted at base of the ochrea; leaf-blade lanceolate to lanceolate elliptic, 9.5-12.5(-15) × 4.5-6.5 (-7.5) cm, coriaceous to chartaceous, glabrous on both surfaces, apex acuminate to long acuminate, base obtuse; venation anastomosed, 5-7 pairs of secondary veins, primary and secondary veins prominent, glabrous. Inflorescence terminal, racemiform, 10-21cm long, raquis striated, glabrous to sparsely scabrid; bracteole 0.6-0.8 mm long, coriaceous, glabrous, cymbiform rounded in the apex; ochreolae 0.7-1 mm long, tubular, membranaceous, glabrous, lacerated; pedicel 0.7-1 mm long, glabrous. Flowers on the rachis of the inflorescence, solitary or two per fascicle, tepals 1.5-2 mm long, 0.5-1.0 mm long; hypanthium 0.8-1 mm long, green to whitish; tepals 5, 1-1.2 mm long, whitish. Fruit 6-6.5 (-7) mm long, 5-6 mm diameter, globose, glabrous; achene embedded in the succulent hypanthium and, in the tepals, this appressed at apex when fresh to slightly acuminate when dry, 6-6.5 mm long, 5-6 mm diameter, light brown-green, apex warty, base rounded.

Distribution and habitat. *Coccoloba burkeae* is endemic to Mexico. This species is distributed in the state of Veracruz (Figure 4). Populations are known from the high evergreen forests of the Tuxtlas region and around Lake of Catemaco at elevations of 300 to 400 m asl.

Etymology. The specific name is dedicated to Dr. Janelle M. Burke, who has studied the phylogenetic relationships of the Polygonaceae family with emphasis on the subfamily Eriogonoideae and the genus *Coccoloba*.

Conservation status. The GeoCAT tool (Bachman et al. 2011) estimated the Extent of Occurrence (EOO) of *C. burkeae* as 3,064.323 km^2, and its Area of Occupancy (AOO) as 52 km^2, based on cells of 2 × 2 km. Following the IUCN (2023) criteria, the EOO and AOO results place *C. burkeae* in the Endangered (EN) category.

Additional specimens examined. Mexico, Veracruz, municipality Angel R. Cabada, Laguna El Majahual, 18° 39’ 14” N, 95° 18’ 17” W, 29 noviembre 1975, *M. Sousa 3345* (MEXU). Municipality Catemaco, lado N de Lago Catemaco en cerros al E de Coyame, 18° 26’ 04” N, 95° 01’ 09” W, 501 m, 27 octubre 1971, *J. H. Beaman 5182* (MEXU); Pipiapan, 18° 27’ 37” N, 95° 02’ 33” W, 610 m, 29 noviembre 1975, *F. Ventura A. 12186* (MEXU); Laguna de Sontecomapan, 18° 31’ 03” N, 95° 02’ 04” W, 11 m, 14 diciembre 1972, *R. Cedillo-Trigos & J. I. Calzada 62* (MEXU); Laguna de Nixtamalapan al N de Catemaco, 18° 25’ 54” N, 95° 06’ 00” W, 390 m, 31 mayo 1985, *J. I. Calzada 11868*

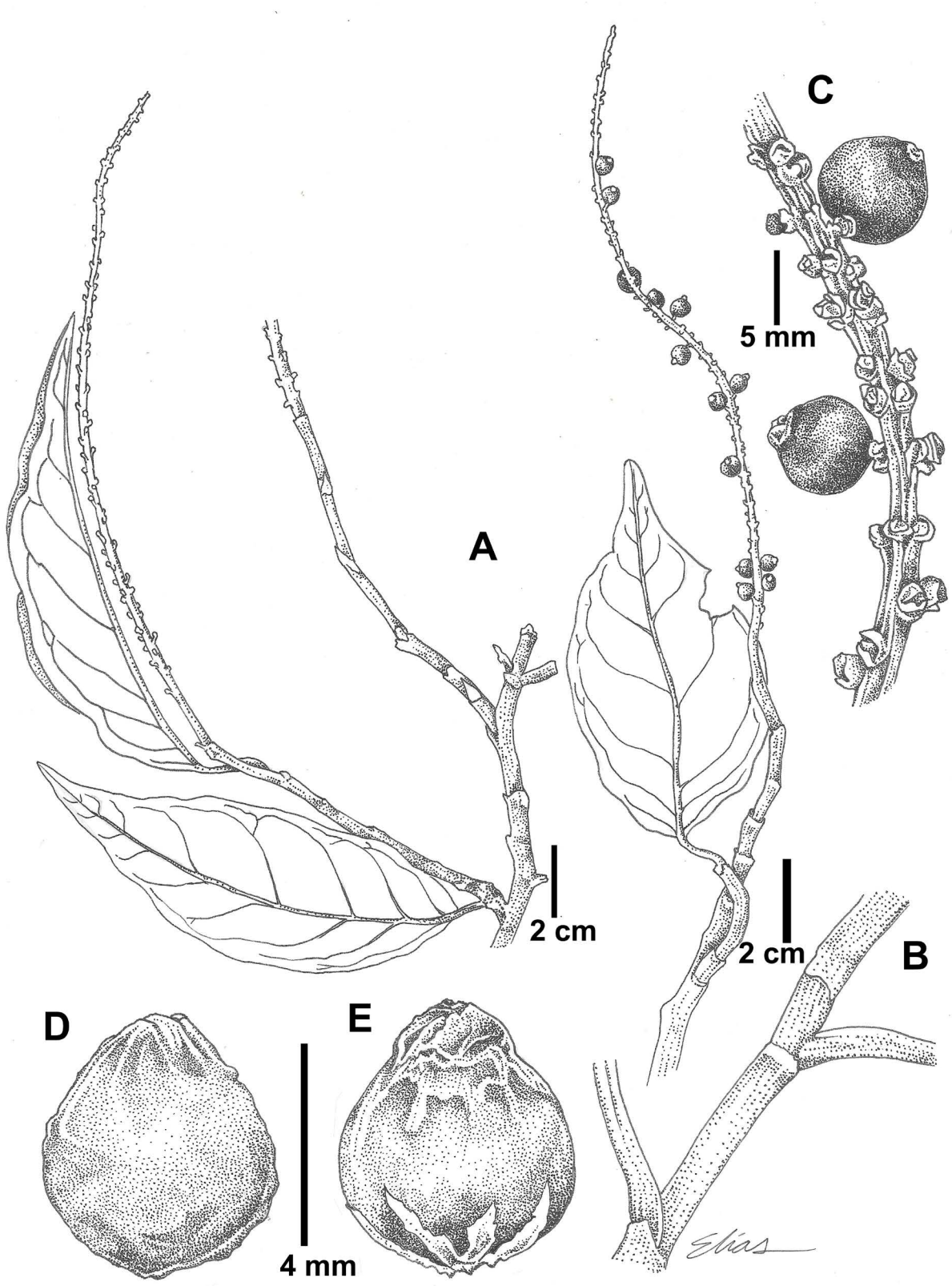

Figure 1. *Coccoloba burkeae* J.J. Ancona, Ortiz-Díaz & J. Tun. A. Branch with leaf and inflorescence; B. Petiole and ochrea; C. Details of the inflorescence and ochreoles; D. Achene embedded in the expanded hypanthium and tepals; E. Achene.

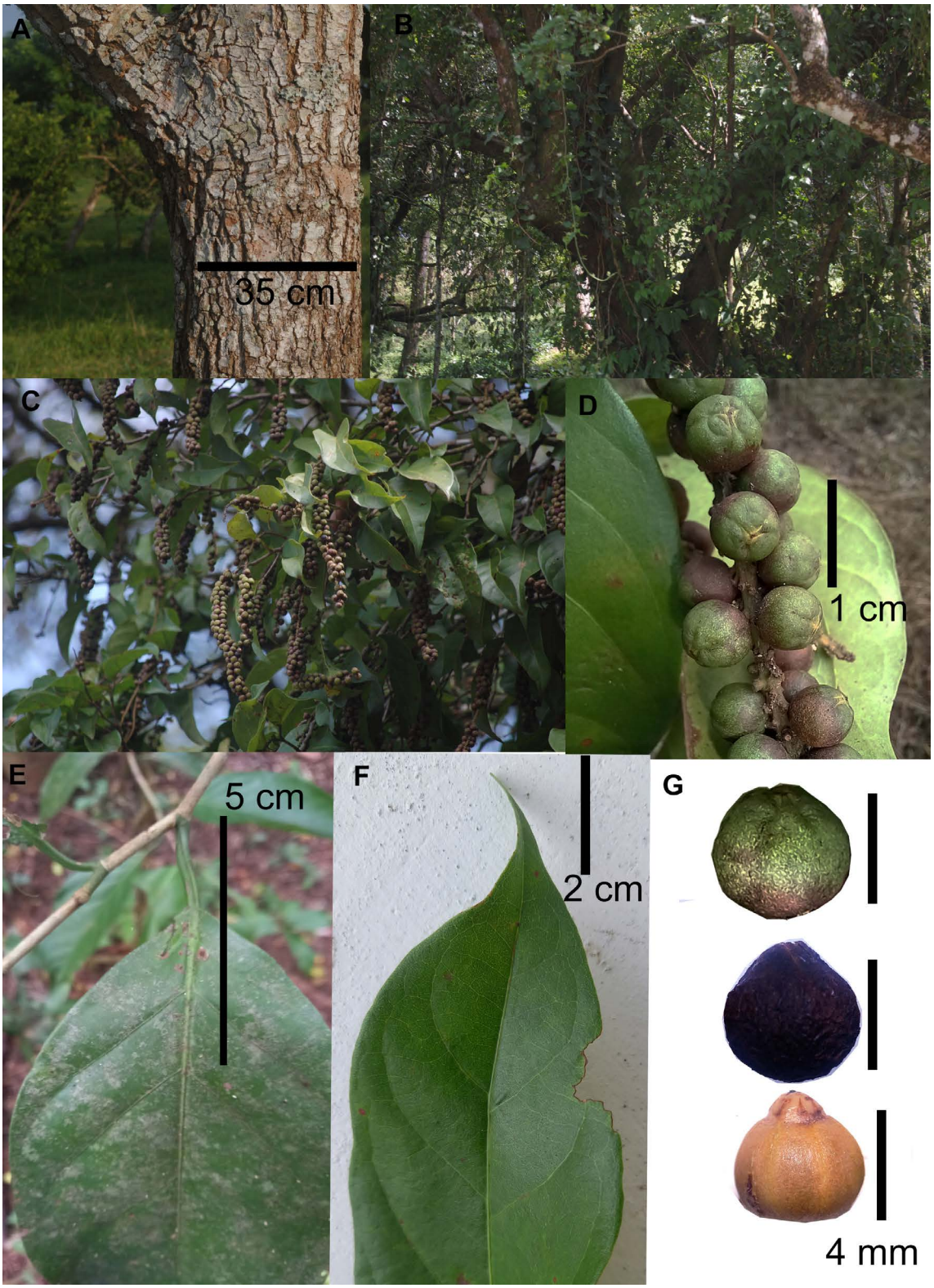

Figure 2. *Coccoloba burkeae* in the *locus classicus*: A. Stem; B. Tree; C. Branches and fruits; D. Mature inflorescence and fruits; E. Base of the leaf-blade; F. Apex acuminate of leaf-blade; G. Fruit, from top to bottom: fleshy fruit showing the appressed perianth lobes; dry fruit showing a slightly pointed apex and tepals covering the crowned apex of the achene; achene.

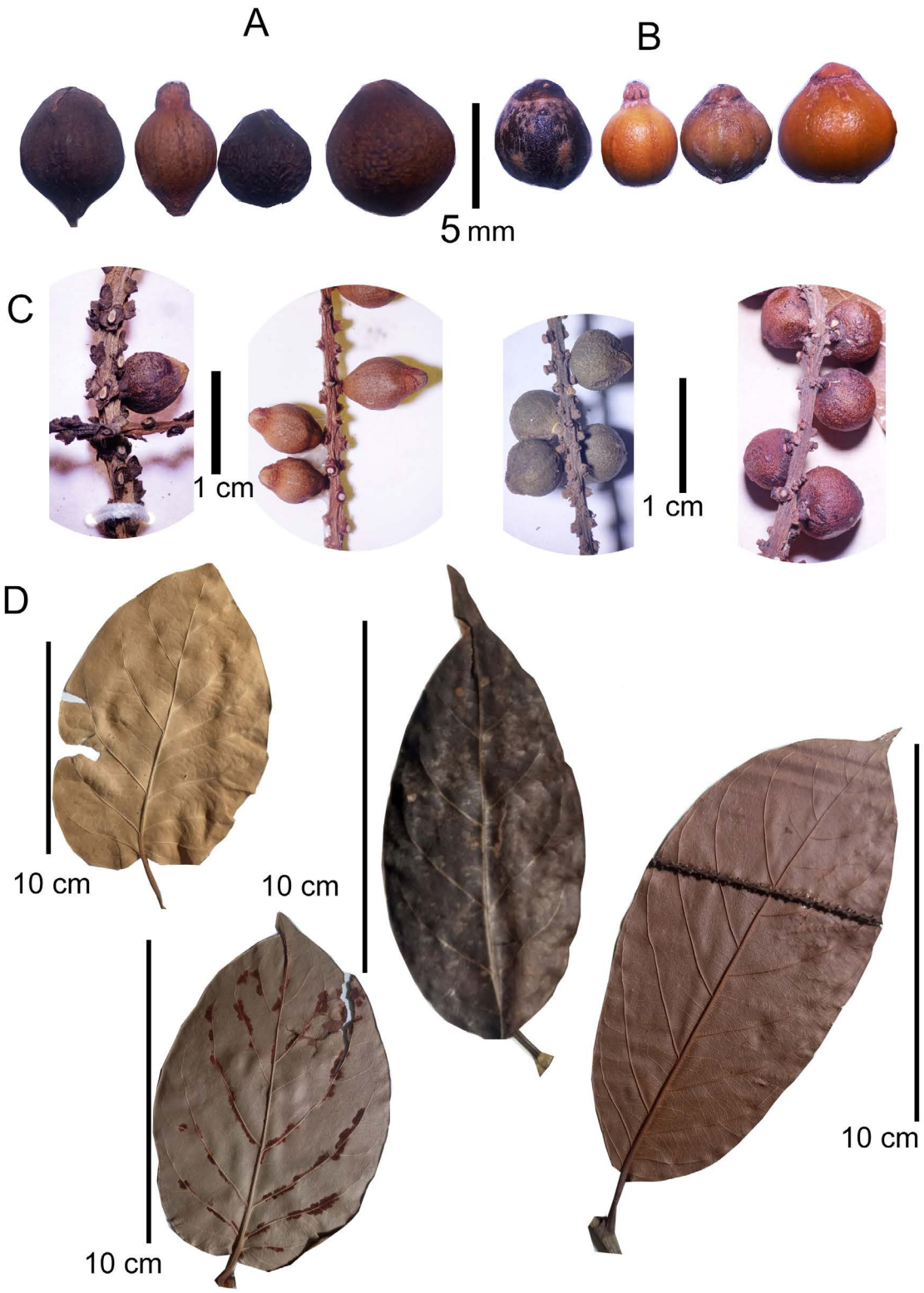

Figure 3. Comparison of diagnostic characters between *Coccoloba burkeae* and related species; from left to right: *C. spicata*, *C. barbadensis*, *C. burkeae* and *C. hondurensis*. A. Fruits (achene embedded in the hypanthium and perianth lobes); B. Achenes (naked). C. Inflorescence showing the fruits and bracteoles D. Leaf-blades shape and size.

(MEXU). Municipality Ixhuatlán del Sureste, 5.05 km al NO de Ixhuatlán del Sureste, 18° 01’ 42” N, 94° 25’ 04” W, 17 septiembre 2011, *J. Calónico Soto & B. Gómez Chagala 27839* (MEXU). Municipio Jáltipan de Morelos, Jaltipa-Tilapa, cerca del rancho Mirador Santa Isabel, al N de Ahuatepec, 17° 45’ 99” N, 94° 42’ 99” W, 27 mayo 2000, *A. Rincón, G. F. Lorea, H. C. Durán E 1693* (MEXU). Municipality San Andrés Tuxtla, 6, 3 km al N de la Est. de Biol. Los Tuxtlas, yendo a Montepío, 28 mayo 2011, *A. Campos V. 7401* (MEXU); Brecha de la Est. de Biol. Los Tuxtlas -Montepío, 14 julio 2004, *A. Campos V. & Y. Ramírez Amezcua 6013* (MEXU); Est. de Biol. Los Tuxtlas, lote 67, 18 mayo 2004, *A. Campos V. 5965* (MEXU); Est. de Biol. Los Tuxtlas, área de enseñanza, *A. Campos V. 5752* (MEXU); Ejido Laguna Escondida, 32 km de Catemaco a Montepío. Dentro de 1 km de la latitud, 01 agosto 2005, *E. Velasco Sinaca 718* (MEXU); Lote 71 Est. de Biol. Los Tuxtlas, 30 km de Catemaco a Montepío, 08 diciembre 2004, *E. Velasco Sinaca 121* (MEXU); El poblado de Laguna escondida a 5 km de la Est. de Biol. Los Tuxtlas, 18° 35’ 27” N, 95° 05’ 16” W, 148 m, 26 julio 1974, *J. I. Calzada 1392* (MEXU); Camino Laguna Escondida 1.5 km NO. Est. de Biol. Los Tuxtlas, 18° 35’ 27” N, 95° 05’ 16” W, 148 m, 20 febrero 1984, *G. Ibarra Manríquez, G. Gómez V. & Santiago Sinaca Colín 1309* (MEXU); Laguna Escondida, 3 km. NO de la Est. de Biol. Los Tuxtlas, 29 diciembre 1984, *G. Ibarra Manríquez & S. Sinaca Colín 2218* (MEXU); Est. de Biol. Los Tuxtlas, Laguna Zacatal o Laguna “Seca”, 18° 34’ N, 95° 04’ W, 02 febrero 1987, *G. Ibarra Manríquez, L. González García & D. Van Dorp 3024* (MEXU). Municipality Santiago Tuxtla, 5.2 km W de Santiago Tuxtla, 18° 27’ 30” N, 95° 20’ 37” W, 10 octubre 1965, *M. Sousa 2370* (MEXU); Cerro El Vigía Santiago Tuxtla Veracruz, 08 septiembre 1968, *V. M. Toledo 157* (MEXU). Municipality Uxpanapa, 4-6 km del Campamento Hermanos Cedillo, camino a Río Alegre, 140 m, 15 junio 1974, *J. Dorantes 3220* (MEXU, XAL).

Coccoloba najarroi Ortiz-Díaz & J.J. Ancona *sp. nov*. Figure 5.

Type. Mexico, Chiapas, Municipio La Independencia, 45-50 km east of Lagos de Montebello National Park on road to Ixcan from Santa Elena. 760 m, 22 January 1982, *D.E. Breedlove & F. Almeda 57722* (holotype: MO!, isotype: MEXU!).

Diagnosis. By the morphology of the fruit *Coccoloba najarroi* is similar to *C. ascendens* Duss ex Lindau and *C. ibarrae* J.J. Ancona & J.J. Ortiz-Díaz, but differs by its leaf blades chartaceous, glabrous, with obtuse to rounded apex and, cordate asymmetric base; inflorescence 15-30 cm; fruit oval, apex and base narrowed, 15-17.5 mm long, 10-10.5 (11) mm wide; achene included, light brown, apex helmet-shaped or semicircular, base truncated. Figure 6 exhibits of *C. najarroi* morphology with similar species.

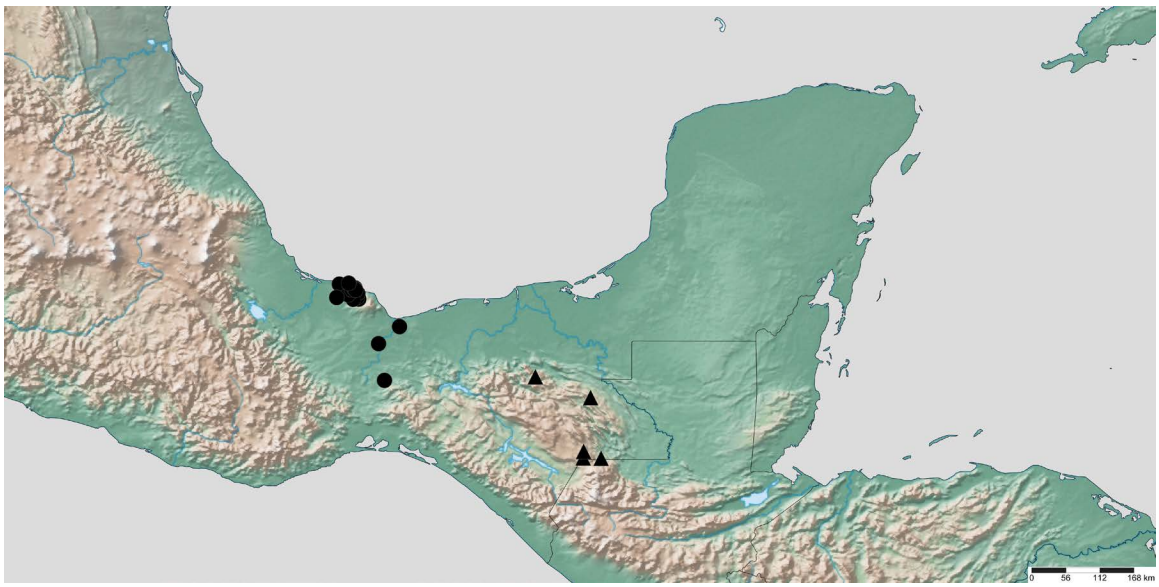

Figure 4. Geographical distribution of *Coccoloba burkeae* (circles) and *Coccoloba najarroi* (triangles).

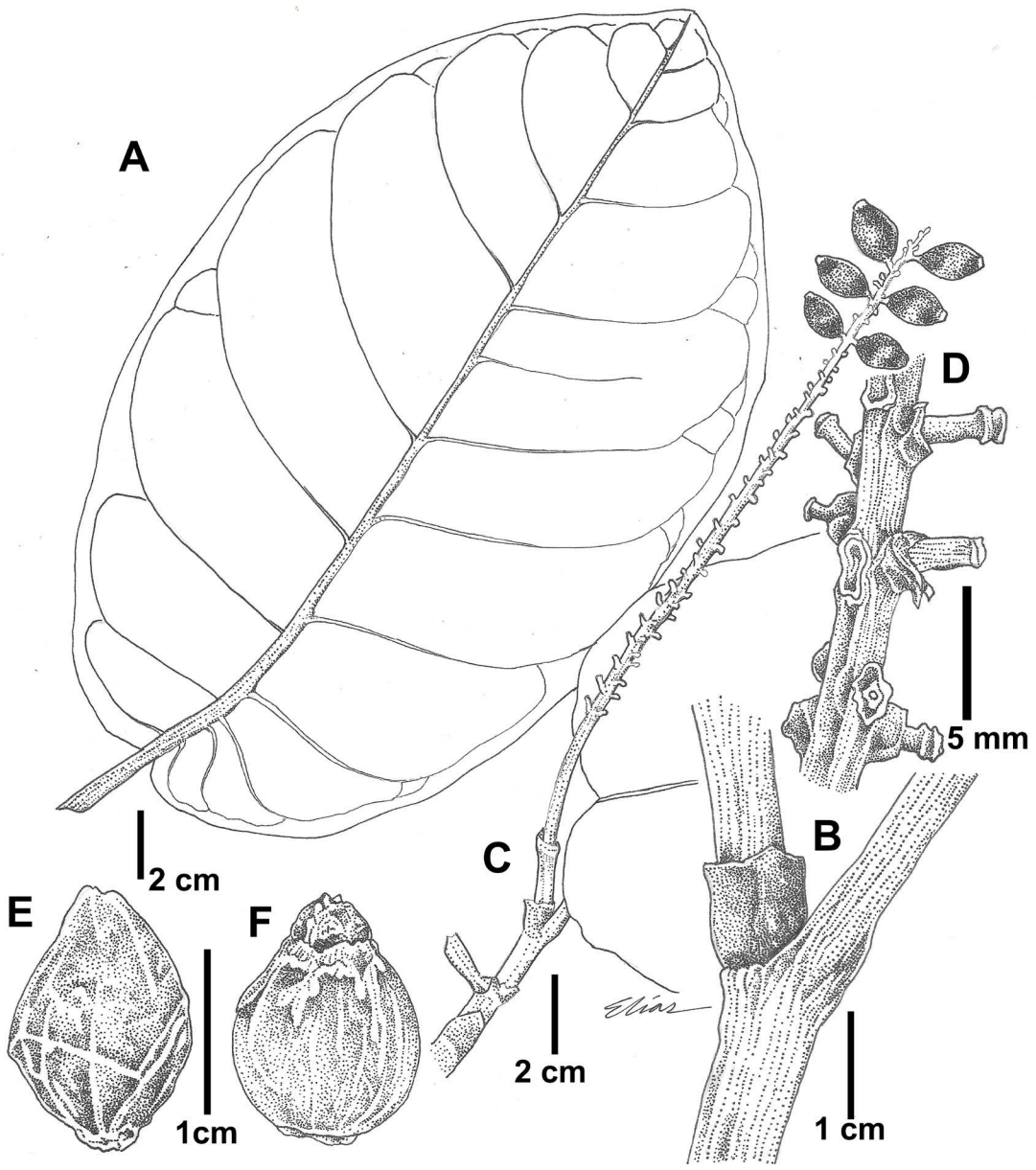

Figure 5. *Coccoloba najarroi* Ortiz-Díaz & J.J. Ancona: A. Leaf-blade; B. Petiole and ochrea; C. Branch with leaf and fruits; D. Details of the pedicels and ochreoles; E. Achene embedded in the expanded hypanthium and tepals; F. Achene.

Description. Tree 10-20 m tall. Branches internodes solid, glabrous, striated. Ochrea 8-10 mm long, glabrous, coriaceous. Leaves simple, alternate; petiole 2.5-4 cm long, 3-5 mm thick, striated, glabrous, inserted at base of the ochrea; leaf-blade elliptical 25-32 cm long, 14-16.5 cm wide, coriaceous, glabrous, apex slightly obtuse to rounded, base cordate; venation brochidodromous, 9-11 pairs of secondary veins, primary and secondary veins prominent, glabrous. Inflorescence racemiforme, terminal, 20-30 (-35) cm long, 3-5 mm thick, glabrous; rachis striate, glabrous; bracteole when mature 1.5-1.7 mm long, coriaceous, glabrous, cymbiform, ochreolae 1.2-1.5 mm long, tubular, coriaceous, glabrous, lacerated margin; pedicel 2.5-3 mm long, glabrous. Flowers, not seen. Fruit 15–17.5 mm long, 10-11.5 mm diameter, oval, apex and base narrowed, glabrous, ridged; achene almost completely covered by succulent hypanthium, tepals free at apex, ovoid, 7.5 mm long, 8 mm diameter, light brown, apex helmet-shaped or semicircular, base rounded to truncated.

Distribution and habitat. Coccoloba najarroi is known only from the high evergreen forests of the municipalities of La Independencia and La Trinitaria, Chiapas, around Lagos de Montebello, at elevations of 700-1,300 m asl (Figure 4).

Etymology. The specific epithet is dedicated to our friend Francisco "Paco" Hernández Najarro, botanist, collector and great connoisseur of Chiapas flora.

Phenology. Fruits in the months of November to January; bloom unknown.

Conservation status. The GeoCAT tool (Bachman *et al*. 2011) estimated the Extent of Occurrence (EOO) of *C. najarroi* as 0 km^2, and its Area of Occupancy (AOO) as 16 km^2, based on cells of 2 × 2 km. Following the IUCN (2023) criteria, the EOO and AOO results place *C. najarroi* in the Critically Endangered (CR) and Endangered (EN) categories, respectively.

Additional specimens examined. México, Chiapas, municipality La Independencia, Lower Montane Rain Forest in valley of Santa Elena along road to Ixcan, 800 m, 29 November 1976, *D. E. Breedlove 41954* (MEXU, MO). Municipality La Trinitaria, Montane Rain Forest 10 km east northeast of Dos Lagos above Santa Elena. 1,170 m, 19 December 1980, *D.E. Breedlove 48814* (MO). Municipality Tila, Chewpaj, 17° 17' 24" N, 92° 24' 50" W, 1000 m, 10 diciembre 1982, *A. Méndez-Tun 5236* (MEXU). Municipality Ocosingo, la comunidad Lacandoná de Nahá, se localiza en 27.0 km. Al sureste de Palenque, por la carretera fronteriza hasta el crucero Chacalá, después 55.6 km. Por el camino de terracería hacia Monte Líbano, 16° 59' N, 91° 36' W, 950 m, 22 abril 1995, *A. Durán F. & S. Levy T. 386* (MEXU).

Discussion

Currently, there is no revision of the genus *Coccoloba* for Mexico. However, Villaseñor (2016) reports 30 species of *Coccoloba* for the Mexican flora, of which seven are endemic. Ancona *et al*. (2023) described a new endemic species from Mexico plus the two new species described here, the richness of the genus increases to 33 species, of which 10 are endemic. *Coccoloba burkeae* is widely represented in herbarium collections. However, the specimens had been misidentified under the names of *C. barbadensis*, *C. hondurensis*, and *C. escuintlensis*. The first two species and *C. burkeae* belong to the section *Coccoloba*, while *C. escuintlensis* belongs to the section *Campderia* (Lindau 1891). The *Coccoloba* sect. *Coccoloba* (Lindau 1891) is distinguished by the presence of racemiform or spiciform inflorescences, the achene embedded entirely or partially by the hypanthium, and the tepals are fleshy, appressed, or free, covering the achene apex. While the *Coccoloba* sect. *Campderia* also the inflorescences are racemiform or spiciform; however, the hypanthium expands below the middle of the achene and the tepals are papery, free and completely enveloping the rest of the achene.

Due to the morphological similarity of *Coccoloba burkeae* with the aforementioned species, they can be considered as part of the *C. barbadensis* complex, which includes species that are characterized by the presence of chartaceous, ovate-elliptic leaf-blades with cordate to subcordate base, the inflorescences may vary from spiciform to racemiform, with short pedicels less than 1.5 mm long, succulent fruits, ovoid or spherical, apex prominent or crowned. They are distributed from Mexico to Honduras. Throughout its taxonomic history, 16 names have been published in this complex, but only five of them are accepted (Howard 1992), including the species *Coccoloba floresii* (Ortiz-Díaz *et al*. 2015) that were determined in the herbarium collections such as *C. barbadensis* or *C. hondurensis*. A taxonomic revision in this complex could elucidate and define the limits between the species of this complex.

Regarding their distribution, *Coccoloba burkeae* and *C. barbadensis* apparently are distributed in the same geographical areas of Veracruz. However, in ecological terms they are very different. *C. burkeae* inhabits more humid areas, in high evergreen forests, riverbanks and lagoons with very humid or swampy soils. While *C. barbadensis* occupies drier areas, in low deciduous forest vegetation, dry and stony soils. On the other hand, the species *C. hon-*

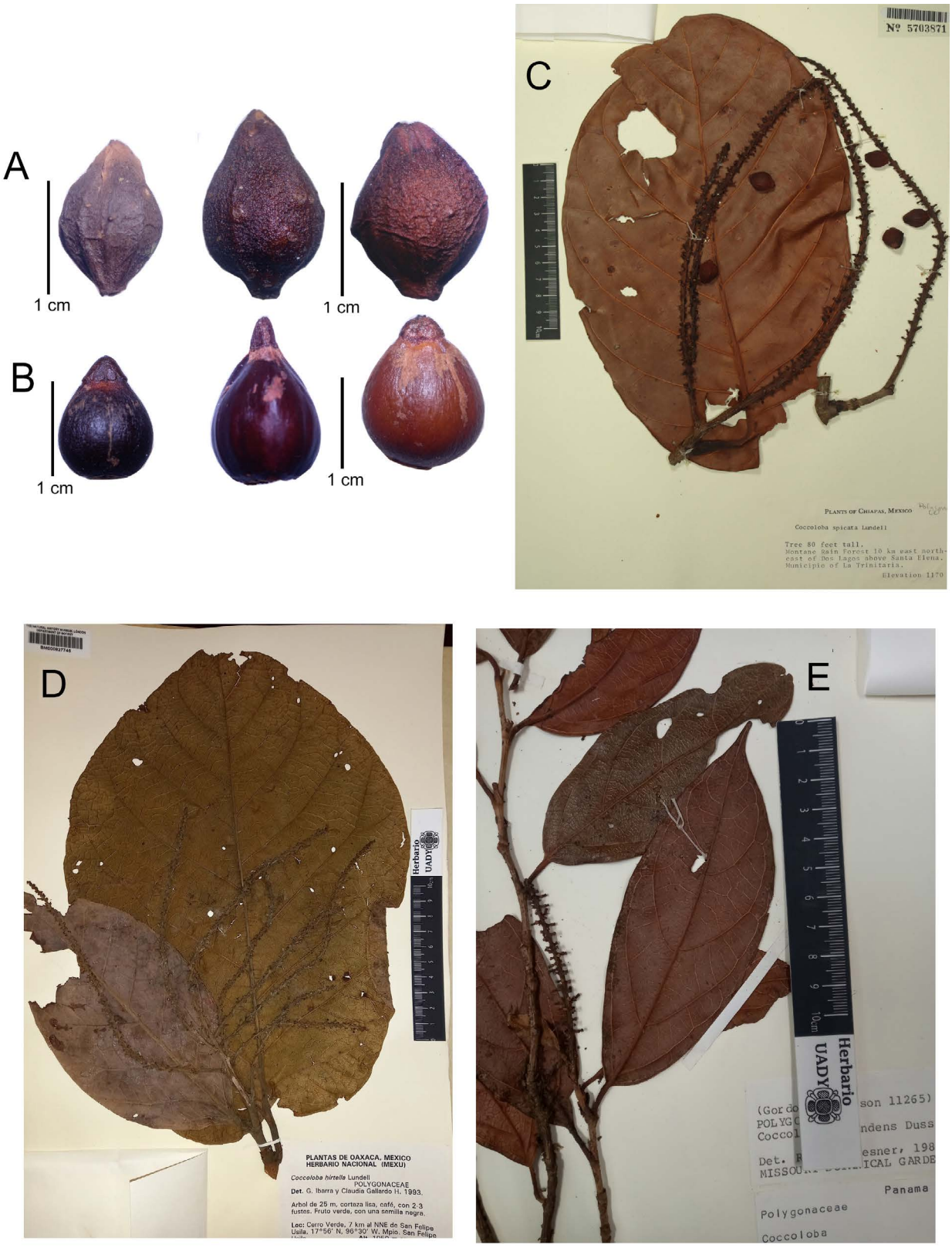

Figure 6. *Coccoloba najarroi* morphology and related species; from left to right: *Coccoloba ibarrae*, *C. ascendens*, *C. najarroi*. A. Fruits (achene included in the hypanthium and tepals); B. Achenes (naked); C–E. Shape and size of the leaf blade: C. *C. najarroi*; D. *C. ibarrae*; E. *C. ascendens*.

durensis and *C. spicata* are distributed in disjunct geographical areas and far from *C. burkeae. Coccoloba spicata* is distributed in the Yucatan Peninsula biotic province and *C. hondurensis* in high evergreen forests of Chiapas and Central America (Belize, Guatemala, El Salvador and Honduras).

The species *Coccoloba najarroi* seems to be a very different species from those known in Mexico and Central America. However, in morphology of the fruit it is very similar to *C. ascendens* and *C. ibarrae*, a recently described species of section *Paniculata* (Ancona *et al*. 2023). While *C. ascendens* and *C. najarroi* belong to the section *Coccoloba*. In the few herbarium collections, *C. najarroi* were identified as *C. spicata*. However, they are morphologically very different, *C. najarroi* presents racemose inflorescences and *C. spicata*, as its name indicates, presents spiked inflorescences.

In terms of its distribution, *C. najarroi* is only known from the high evergreen forests of the municipalities of La Independencia and La Trinitaria in the state of Chiapas. While *C. ibarrae* is known from the cloud forests of Oaxaca and Veracruz and *C. ascendens* is known from the humid forests of Panama and northern South America.

Acknowledgments.

The authors thank the biology students: Ricardo Peraza and Rosy Ramos for their support in the botanical exploration to find the populations of the species described here. We also thank the two anonymous reviewers, who enriched the version of this article with their suggestions and comments.

Literature cited

Ancona JJ, Ortiz-Díaz JJ, Tun-Garrido J. 2023. *Coccoloba efigeniana* and *C. ibarrae*, two new species of *Coccoloba* sect. *Paniculatae* Meisn. (Polygonaceae). *Phytotaxa* **599:** 100-108. DOI: https://doi.org/10.11646/phytotaxa.599.2.2

Acevedo-Rodríguez P, Strong MT. 2012. Catalogue of Seed Plants of the West Indies. *Smithsonian Contributions to Botany* **98**: 1-1192. DOI: https://doi.org/10.5479/si.0081024X.98.1

Bachman S, Moat J, Hill AW, de la Torre J, Scott B. 2011. Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *ZooKeys* **150**: 117-126. DOI: https://doi.org/10.3897/zookeys.150.2109

Brandbyge J. 1990. The diversity of micromorphological features in the genus *Coccoloba* (Polygonaceae). *Nordic Journal of Botany* **10**: 25-44. DOI: https://doi.org/10.1111/j.1756-1051.1990.tb01749.x

Burke JM, Sanchez A. 2011. Revised subfamily classification for Polygonaceae, with a tribal classification for Eriogonoideae. *Brittonia* **63**: 510-520. DOI: http://dx.doi.org/10.1007/s12228-011-9197-x

Burke JM, Sanchez A, Kron K, Luckow M. 2010. Placing the woody tropical genera of Polygonaceae: a hypothesis of character evolution and phylogeny. *American Journal of Botany* **97**: 1377-1390. DOI: https://doi.org/10.3732/ajb.1000022

Hernández-Ledesma P, Berendsohn WG, Borsch T, Von Mering S, Akhani H, Arias S, Castañeda-Noa I, Eggli U, Eriksson R, Flores-Olvera H, Fuentes-Bazán S, Kadereit G, Klak C, Korotkova N, Nyffeler R, Ocampo G, Ochoterena H, Oxelman B, Rabeler RK, Sanchez A, Schlumpberger BO, Uotila P. 2015. A taxonomic backbone for the global synthesis of species diversity in the angiosperm order Caryophyllales. *Willdenowia* **45**: 281-383. DOI: https://doi.org/10.3372/wi.45.45301

Howard RA. 1959a. Studies in the genus *Coccoloba*, VII. A synopsis and key to the species in Mexico and Central America. *Journal of the Arnold Arborertum* **41**: 176-203.

Howard RA. 1959b. Studies in the genus *Coccoloba*, VII. A synopsis and key to the species in Mexico and Central America. *Journal of the Arnold Arborertum* **41**: 205-220.

Howard RA. 1961. Studies in the genus *Coccoloba*, X. New species and a summary of distribution in South America. *Journal of the Arnold Arborertum* **42**: 87-95. DOI: http://dx.doi.org/10.5962/bhl.part.19012

Howard RA. 1992. Collected notes on *Coccoloba* L. (Polygonaceae). *Brittonia* **44**: 356-367. DOI: https://doi.org/10.2307/2806940

IUCN. 2023. *The IUCN Red List of Threatened Species. Version 2021-3*. https://www.iucnredlist.org (Accessed May 2023).

Koenemann DM, Burke JM. 2020. A molecular phylogeny for the genus *Coccoloba* (Polygonaceae) with an assessment of biogeographic patterns. *Systematic Botany* **45**: 567-575. DOI: https://doi.org/10.1600/036364420X15935294613536

Lindau G. 1891. Monographia generis Coccolobae. *Botanische Jahrbücherfür Systematik* **13**: 106-229.

Melo E. 2004. As espécies de *Coccoloba* P. Browne (Polygonaceae) da Amazônia Brasileira. *Acta Amazónica* **34**: 525-551.

Ortiz-Díaz JJ. 2023 [in press]. *Coccoloba*. *In*: Davidse G, Sousa Sánchez M, Knapp S, Chiang Cabrera F. eds. *Flora Mesoamericana, Cycadaceae a Connaraceae*, vol. 2. St. Louis: Missouri Botanical Gaden.

Ortiz-Díaz JJ, Arnelas I, Tun-Garido J, Pinzón-Esquivel JP. 2015. *Coccoloba floresii* (Polygonaceae), a new species from Chiapas (Mexico). *Phytotaxa* **213**: 263-270. DOI: https://doi.org/10.11646/phytotaxa.213.3.6

Shorthouse DP. 2010. SimpleMappr, an online tool to produce publication-quality point maps. https://www.simplemappr.net (Accessed March, 2022).

Thiers B. 2023. Index Herbariorum: A Global Directory of Public Herbaria and Associated Staff. New York Botanical Garden's Virtual Herbarium. http://sweetgum.nybg.org/science/ih/ (accessed: 22 May 2023).

Villaseñor JL. 2016. Checklist of the native vascular plants of Mexico. *Revista Mexicana de Biodiversidad* **87**: 559-902. DOI: https://doi.org/10.1016/j.rmb.2016.06.017

Associate editor: Hilda Flores Olvera

Author contributions: JJOD, reviewed and curated the herbarium material, contributed to the discussion, revision, and approval of the final manuscript. JTG conducted the field work, contributed to the discussion, review, and approval of the final manuscript. JJA conceived, designed and wrote the manuscript, conducted field work, reviewed and curated herbarium material.

Funding Agencies: Not applicable.