

## TWO NEW SPECIES OF *GUAPIRA* (NYCTAGINACEAE) FROM MONTANE HUMID FORESTS IN NORTHWESTERN VENEZUELA

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**Abstract.** *Guapira fundacionensis* from montane forests over the “Aguardiente” sandstone formation, “La Fundación” region, Andes of Táchira State, and *Guapira guasarensis* from “río Guasare”, on foothills and montane forests located in eastern side of Sierra de Perijá, Zulia state, both in Venezuela, are described, illustrated, and their morphological relationships with allied species are discussed. Both species have similarities with *G. opposita*, however they differ by having branches, petioles and perianth densely ferruginous tomentose, by leaf shape and texture, peduncle size, and flowers subtended by three bracteoles. In a geographical and taxonomical context, *G. guianensis* and *G. pacurero* are regarded here as different from *G. eggersiana* and *G. opposita*, while *Guapira ayacuchae* is considered a synonym of *G. cuspidata*, *G. olfersiana* of *G. opposita*, whereas *G. davidsei* is regarded as a recognizable species. An updated key to the 20 Venezuelan species of *Guapira* is presented, and phytogeographical information about the La “Fundación” is provided. *Guapira fundacionensis* and *G. guasarensis* are remarkable species, the first by its two stigmas and the latter for bearing five glands at the top of the ovary in an otherwise predominantly one stigma genus, without glands at the top of the ovary.

**Keywords:** Flora of Venezuela, wet forests, *Guapira*, sandstone outcrops

**Resumen.** *Guapira fundacionensis* sobre afloramientos de areniscas de la formación Aguardiente, La Fundación, estado Táchira, Andes de Venezuela y *Guapira guasarensis*, de bosques del piedemonte y montanos del río Guasare, del lado este de la Sierra de Perijá, estado Zulia son descritas, ilustradas y sus relaciones morfológicas con la especie afín son discutidas. Ambas especies poseen similitudes con *G. opposita*, sin embargo, difieren en la pubescencia densamente ferruginosa en las ramas, pecíolos y perianto, en la forma y textura de las hojas, tamaño del pedúnculo y las flores subtendidas por 3 bractéolas. En un contexto geográfico y taxonómico, *G. guianensis* y *G. pacurero* son tratadas como especies diferentes de *G. eggersiana* y de *G. opposita*. Por otra parte, *G. ayacuchae* es considerada un sinónimo de *G. cuspidata*, *G. olfersiana* de *G. opposita* y *G. davidsei* es reconocida como una especie válida. Se presenta una clave actualizada para diferenciar las 20 especies del género *Guapira* presentes en Venezuela e información acerca de la fitogeografía del sector La Fundación. *Guapira fundacionensis* y *G. guasarensis* son especies notables, la primera por sus dos estigmas y la segunda por poseer 5 glándulas en el ápice del ovario, en un género donde predomina un solo estigma y ovario sin glándulas.

**Palabras clave:** afloramientos de arenisca, bosques húmedos, *Guapira*, Flora de Venezuela

*Guapira* Aubl. (1775: 308) together with *Neea* Ruiz & Pav. (1794: 52) are the most diverse and representative genera of Nyctaginaceae (Pisonieae) (Bittrich and Kühn, 1993; Douglas and Spellenberg, 2010; Rossetto et al., 2019, Rossetto and Caraballo-Ortiz, 2020). *Guapira* has a Neotropical distribution and ranges from southern Florida (i.g., *G. discolor* (Spreng.) Little), central to southern Mexico through Central America, the Caribbean, Colombia, Venezuela, the Guianas, Ecuador, Peru, Brazil, Bolivia and Paraguay (Damascena and Coelho, 2009 Onwards; Ulloa Ulloa et al., 2018 Onwards) and comprises ca. 70 species (Lundell, 1968: Ulloa Ulloa et al., 2018 Onwards; World Checklist of Vascular Plants; kew.org).

*Guapira* is most diverse throughout the lowland vegetation of humid to seasonally dry forests and savannas; some endemic taxa are found in Brazilian Atlantic forest and Cerrado vegetation (Furlan and Guilietti, 2014; Chagas and Costa-Lima, 2020; Rossetto and Ferraz, 2020) and in the Antilles (Little Jr., 1968; Ulloa Ulloa et al., 2018 Onwards). Several species are found over rocky slopes and oligotrophic soils derived from the Precambrian crystalline basement of the Guayana Shield (e.g., *G. bolivarensis* Steyer., *G. neblinensis* Maguire & Steyer. and, drained by black waters rivers (e.g., *G. sancarlosiana* Steyer.), on scrub

(“bana” or “campina”) and low Amazonian forests known as “caatinga Amazonica” or “campinarana” on white-sand soils (Steyermark and Aymard, 2003; Aymard et al., 2009).

*Guapira* is closely related to *Neea*: both genera have unarmed stems and branches, the leaves are commonly opposite, sometimes verticillate, rarely alternate, flowers unisexual (sometimes bisexual in *N. floribunda* Poepp. & Endl. *sensu* Defilipps and Maina, 2003) with a dioecious condition, and fleshy anthocarps. These two genera have been treated conventionally as distinct taxa, basically separated based on the shape of the staminate perianth and the stamen position in the staminate perianth, which is exerted in *Guapira* and inserted in *Neea*. Burger (1983) was the first to recommend that both genera should be united under *Guapira*. Molecular evidence indicates that these genera form a single lineage (Douglas and Manos, 2007; Rossetto et al., 2019), and that the character “exserted stamens” is homoplastic (Rossetto et al., 2019). However, Chagas and Costa Lima (2020) pointed out that these studies were based on a small sample of species (20%), and the resulting data still do not represent a robust phylogenetic support to demonstrate that these entities should be merged. Nevertheless, so far, *Guapira* and *Neea* can be morphologically distinguished by the state characters presented in Table 1.

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TABLE 1. Comparison of diagnostic morphological characters of *Guapira* and *Neea*

CHARACTER	<i>GUAPIRA</i>	<i>NEEA</i>
Inflorescence	cymes; distal branches bearing groups of 2–3(–5) flowers at the end of flowered cymules	Cymes or panicles; sometimes cauliflorous or ramiflorous; distal branches compound by multifloral cymules
Perianth buds	Clavate, rounded or obtuse at apex	Elliptic or oblong, long-acuminate at apex
Staminate flower	Perianth obconic-campanulate, infundibuliform or funnel-shaped, rarely urceolate; elongate, stamens exerted	Perianth usually urceolate, sometimes tubular to ellipsoid or infundibuliform, globose or elongate; stamens included
Pistillate flower`	Perianth tubular or urceolate, not contracted at apex; stigma exerted, penicellate-fimbriate	Perianth tubular, contracted at apex; stigma included, rarely shortly exerted, rounded or penicellate
Pistil	Borne on a shortly stalk or stipe	Sessile or narrowed at the base
Anthocarps	Soft and fleshy, oblong-ellipsoid, drupaceous, rarely globose; crowned by a united portion of perianth; longitudinally sulcate when dry, black or purple	Firm, globose or ellipsoid, usually crowned by a free portion of perianth, not sulcate when dry, yellow, orange or purple

No comprehensive monograph of *Guapira* and *Neea* have been completed, although the genera have been treated largely as part of Nyctaginaceae for Flora of Peru (Standley, 1937), Flora of Guatemala (Standley and Steyermark, 1946), Flora of Panama (Woodson et al., 1961), Flora of Belize and Petén region (Lundell, 1962), Flora of Costa Rica (Burger, 1983), Flora de Nicaragua (Pool, 2001), Flora of the Guianas (DeFilipps and Maina, 2003), Flora of the Venezuelan Guayana (Steyermark and Aymard, 2003), *Manual de Plantas de Costa Rica* (González-Rámirez, 2007), Flora of Ecuador (Harling, 2010), and Flora of Brazil (Furlan and Giulietti, 2014).

#### MATERIAL AND METHODS

This work is based on morphological (using a dissecting stereomicroscope) and herbarium studies in COL, GH, MO, NY, PORT, and VEN (herbarium codes after Thiers, 2019). The world checklist of vascular plants (WCVP) was consulted: this dataset is a comprehensive list of scientifically described plant species, compiled over four decades, from peer-reviewed literature, authoritative scientific databases, herbaria and observations, then reviewed by experts (Govaerts et al., 2021). Historical taxonomic literature on *Guapira* and *Neea* were examined using Biodiversity Heritage Library website (<http://www.biodiversitylibrary.org>). Current bibliography were scrutinized, mainly the treatments of Nyctaginaceae of northwestern South America (Standley, 1931), Flora of the Lesser Antilles (Kellogg, 1988), Flora of the Guianas (DeFilipps and Maina, 2003), the Flora of the Venezuelan Guayana (Steyermark, 1987; Steyermark and Aymard, 2003), the Flora of Ecuador (Harling, 2010) and Flora of Brazil (Furlan and Giulietti, 2014). Also, the checklist: *Nuevo Catálogo de la Flora*

The present contribution increases to 20 the number of species known of *Guapira* from Venezuela, ten of them are endemic; the two new taxa are the first records of the genus for the Venezuelan Andes. In this geographical and taxonomical context, *G. guianensis* Aubl. and *G. pacurero* (Kunth) Little are treated here as different from *G. eggersiana* (Heimerl) Lundell and *G. opposita* (Vell.) Reitz as well. *G. ayacuchae* Steyermark is considering a synonymy of *G. cuspidata* (Heimerl) Lundell, *G. olfersiana* (Link, Klotzsch & Otto) Lundell of *G. opposita* (Vell.) Reitz. and *G. davidsei* Steyermark is recognized as validate species, different of *G. ferruginea* (Klotzsch ex Choisy) Lundell.

*Vascular de Venezuela* (Aymard, 2008) was reviewed. Type specimens of *Guapira* and *Neea* species involved in this study were examined using on-line images from JSTOR Global Plants (<https://plants.jstor.org/>). In addition, International Plant Names Index (<https://www.ipni.org/>) and Tropicos (<http://legacy.tropicos.org/Home.aspx>) were also consulted to update the current nomenclature and geographical information.

The specific terminology for vegetative characters, vestiture description, inflorescences, flowers, and fruit morphology follow Font-Quer (2001), Harris and Harris (2006), and Endress (2010).

To determine the conservation status (according to IUCN categories and criteria; IUCN, 2017), the extent of occurrence (EOO) and area of occupancy (AOO) were calculated using the supporting Red List threat assessments with GeoCAT (Bachman et al. 2011), constantly updated through the <https://www.kew.org/science/our-science/projects/geocat-geospatial-conservation-assessment-tool>.

## TAXONOMY

***Guapira fundacionensis*** Aymard, *sp. nov.*

TYPE: VENEZUELA. Táchira: 10 km E of La Fundación, around Represa La Dorada, 07°47'N, 71°46'W, 700–1000 m, 10–13 March 1981 (fl and fr), R. Liesner & A. González 10465 (Holotype: VEN, Isotypes: MO, PORT). Fig. 1.

*Guapira fundacionensis* is similar to *G. opposita*, but morphologically it differs from the latter in having branches and petioles densely ferruginous pubescent, leaves ovate, membranaceous, base acute; peduncle 3 cm long, axes, densely adpressed ferruginous pubescent, without glandular trichomes; flowers subtended by 3 bracteoles, triangular; pistillate perianth ferruginous outside and ovary bearing five glands at the top.

Small tree 4–10 m tall, branchlets adpressed ferruginous pubescent, glabrescent when mature. Leaves opposite, black-brown when drying, blades 10–15 × 3–5 cm membranaceous, ovate, acuminate at the apex, acute at the base, glabrous at both sides, the midvein sparsely to dense adpressed ferruginous pubescent below, apex acuminate, base acute, margin entire, lateral nerves 5–8 each side, raised below, impressed above, brochidodromous, arcuated and convergent towards margin and linking ca. 3 mm to the margin, tertiary venation scarcely evident at both sides; petiole 0.5–2 cm long, striate, pubescence same as the branchlets. Pistillate inflorescence terminal cymes, 3–5 × 2–3 cm, dichotomously branched with three primary axes, densely adpressed ferruginous pubescent. The peduncle ca. 3 cm long, ca. 2 mm diam., striate, pubescence same as the axes, with four primary branches, ca. 1.25 cm long, bearing groups of 2–3(–5) flowers at the end of these axes. Pistillate perianth subtended by three bracteoles, lanceolate, ca. 1 mm long, pedicels 0–1 mm long, pubescence same as peduncle outside. Perianth 4–5 × ca. 1.5 mm, tubular, pubescence same as peduncle outside, glabrous inside, ovary sessile, subconic, ca. 1.5 mm long, glabrous, bearing 5 glands at the top, style 2–3 mm long, stigma ca. 2 mm long, frimbriate, into 5 divisions, staminodes 5, ca. 1 mm long, glabrous. Staminate inflorescences not seen. Young anthocarps globose, sessile, 3–4 × 2–3 mm, sparsely pilose at the base, glabrescent at the top, rostrum ca. 0.5 mm long, adpressed pubescent outside.

**Phenology:** this new species has been collected with flowers and young fruits in March.

**Etymology:** the epithet *fundacionensis* is coined after the “La Fundación”, a high biodiversity locality in the Western portion of the Cordillera de Mérida, Táchira state, Venezuela.

**Distribution and ecology:** Known only from primary wet forests near “La Fundación” between 700–1000 m.

The type locality of *Guapira fundacionensis*, La Fundación, is located in the western portion of “Cordillera de Mérida”, on sandstone outcrops belonging to the “Formación Aguardiente” (Notestein et al., 1944; Salvador, 1961a, b). The vegetation of this area is relatively well known because of the collections made by R. Liesner, J. A. Steyermark and collaborators. These botanists observed that the vegetation associated with these sandstone outcrops

includes several endemic species as well as many taxa that are present only in the Guayana Shield highlands on table-like mountains known as “Tepuis”, as well in the Amazon and Orinoquia basins floras (Riina, 1996; Aymard and Campbell, 2007, 2008). This entire highland region is called Pantepui, it is rich in endemic species and unique habitats (Riina et al., 2019). This natural region is located on oligotrophic soils derived from the Precambrian crystalline basement and sandstone rocks belong to the Roraima group on the Guayana Shield (Gibbs and Barrow, 1993).

No descriptive analysis of vegetation types from the sandstone rocks and sandy substrates of the Venezuelan Andes has been undertaken so far. The entire Tertiary was characterized by tectonic events and changes in climate and sea level (Hooghiemstra and van der Hammen, 2004). The Western Cordillera is the most recently upraised (Kroonenberg et al., 1990) of the northern Andes complex, and paleobotanical and geomorphological data indicate that its final uplift was completed around 4–3 mya (Gregory-Wodzicki, 2000). The progressive physical separation of the Andes from the other natural regions resulted in the present Andean flora: a mosaic of endemics, and elements from the Guayana, Amazonia, south-temperate, and northtemperate floras (van der Hammen and Cleef 1984; van der Hammen, 2000; van der Hammen and Hooghiemstra 2000; Hooghiemstra et al., 2006). Gansser (1974) pointed out that the table mountains near the Andean orogeny are topped by sandstones of Upper Cretaceous age (ca. 22 mya). According to him, these formations are lithologically similar to the pre-Cambrian sandstones on the Guayana Shield (besides its oldest age: 1,700–1,800 mya). Currently, no continuous outcrops connect the Guayana Shield with the Andes range, although many conspicuous table mountains such the La Mesa de Yambí, Mapiripán, Serranía de La Lindosa and further west, La Macarena range, maybe represent reliable places to link the Guayana Shield and the Andes (Gansser, 1974). Furthermore, few studies have examined whether taxa occurring in the Andes considered to be Amazonia-Guayana relicts do indeed have a lowland origin, and whether present day disjunctions are a result of vicariance or dispersal. Studies on two families with high species diversity in both the Guayana region and the Andes, (Bromeliaceae [Givnish et al. 2004] and Gentianaceae, Helieae [Gould and Struwe, 2004]) suggest different histories leading to the modern distributions: evolution of the group in the lowlands and dispersal to the Andes (Givnish et al., 2004), or Andean origins with subsequent radiation (Gould and Struwe, 2004).

A broader biogeographic question regarding the affinities of floras occurring on sandstone habitats located far away each other with a very different geological history. Nevertheless, using tropical dry forest as example, Pennington et al. (2009) established a plausible approach relating floras of separate places that appearing on similar habitats, explaining it through the vicariance of habitats. In this sense, the high degree of conservation of phylogenetic niches suggests the probability of dispersal of a tropical dry

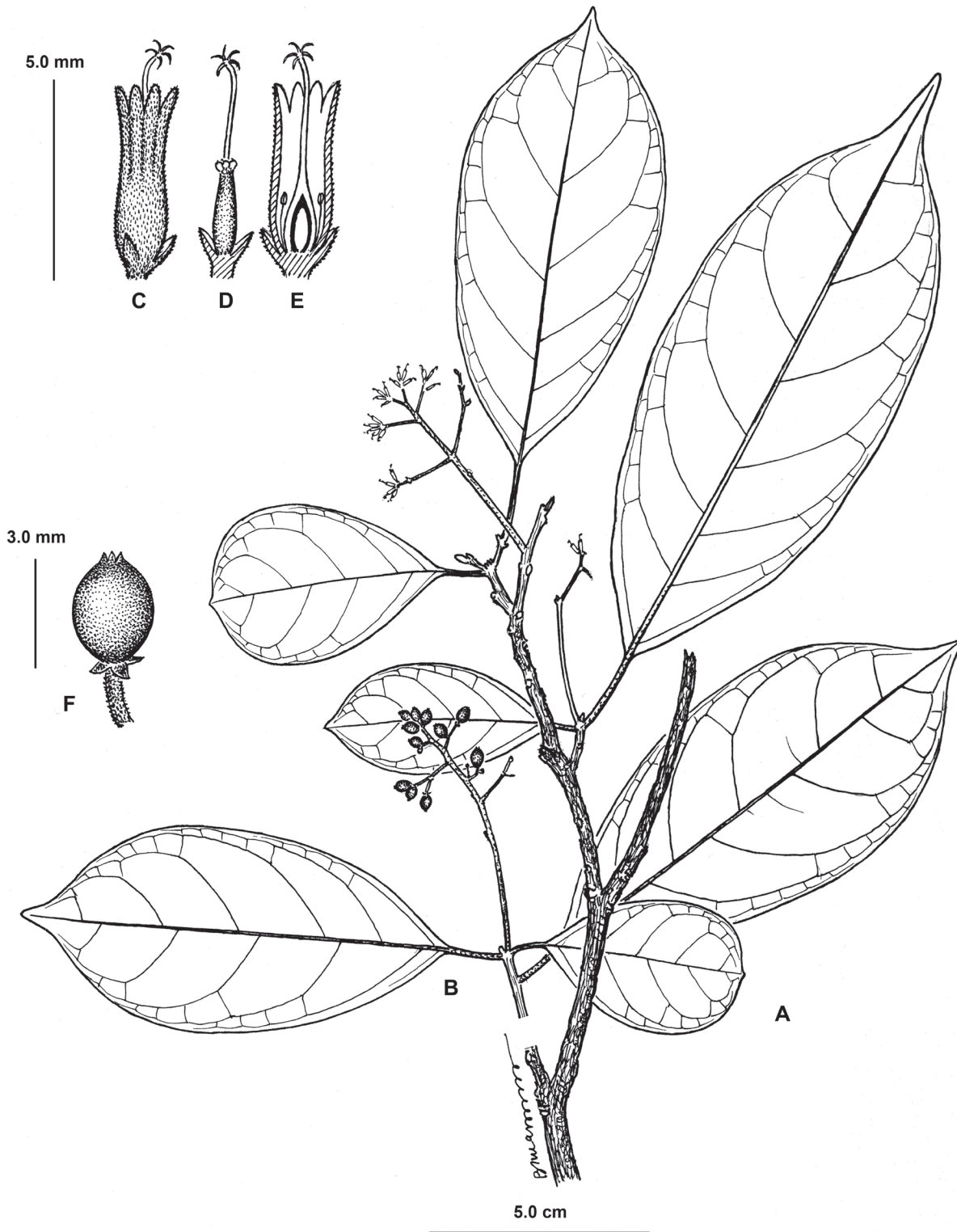


FIGURE 1. *Guapira fundacionensis* Aymard. A–B, branches showing the pistillate inflorescence and young fruits; C, frontal view of the pistillate perianth showing the stigma; D, pistillate flower without perianth showing the glands at the top of apex; E, inside the pistillate perianth in longitudinal section showing the gynoecium and the staminodes; F, young anthocarp. Drawn by Bruno Manara<sup>†</sup> based on the holotype.

forest lineage to another larger distant area of tropical dry forest is higher than the probability that species of adjacent biomes will incorporate or develop the adaptations necessary to colonize its near areas of tropical dry forest. A similar argument could be applied to floras over sandstone outcrops located in different natural regions. See also Melton et al. (2022), who studied disjunct genera in eastern Asia (EA) and eastern North America (ENA), in the context of climatic niches, and found that “...niche-neutral processes and niche conservatism may affect the distribution of disjunct species.”

Future floristic and genomics research should make comparative surveys of the Andean floras occupying habitats over sandstone derived from both the Guayana and Amazon regions.

**Conservation status.** Currently, this species is only known from the type collection. However, under IUCN (2017) guidelines fewer localities constitute deficient data (DD) to determine its conservation status. Nevertheless, it should be regarded as Critically Endangered (CR) based on the criterion B1ab(iii)+2ab(iii), due to the lower number of known localities and to its smaller estimated Area of Occupancy, with just 4,000 km<sup>2</sup>, an estimated Extent of Occurrence of 0 km<sup>2</sup> (IUCN, 2017), and the continuous deforestation and degradation of the ecosystems of the “La Fundación” area in the last five decades.

By its glabrous lower leaf surface, or essentially so, the midrib or veins with scattered microscopic tomentum and peduncle and pedicels with dense ferruginous or red tomentum, this new species is morphologically similar to *Guapira opposita*. However, *G. fundacionensis* differs from the latter species by its branches and petioles densely ferruginous pubescent (vs. glabrous), leaves ovate, membranaceous (vs. elliptic to broad-elliptic, chartaceous to subcoriaceous), base acute (vs. attenuate); peduncle 3 cm long, axes, densely appressed ferruginous pubescent, without glandular trichomes (vs. ca. 1.5, dense red with glandular trichomes); flowers subtended by 3 bracteoles, triangular (vs. 2–5, linear to lanceolate); pistillate perianth ferruginous outside (vs. red-puberulous) and ovary bearing five glands at the top (vs. without glands). The latter morphological feature represents a unique character that does not occur in any species of the genus.

***Guapira guasarensis* Aymard, sp. nov.**

TYPE: VENEZUELA. Zulia. Mara. NW slopes of Cerro Negro, between Hacienda Santa Clara and Hacienda Tonchal, 5.5 km SW of Rancho 505, S of río Guasare, 10°55'N, 72°27'W, 500–620 m, 29 May 1980 (fl and fr), J. A. Steyermark, G. Davidse & A. Stoddart 122761 (Holotype: VEN, Isotype: MO). Fig. 2.

*Guapira guasarensis* is similar to *G. opposita*, but morphologically it differs from the latter in having branches and petioles densely ferruginous tomentose, leaves obovate-elliptic to elliptic, membranaceous, base acute; peduncle 6–9 cm long; flowers subtended by 3 bracteoles; pistillate perianth ferruginous outside and two stigmas.

Small to medium tree 10–20 m tall, branchlets striate,

appressed ferruginous pubescent, glabrescent when mature. Leaves opposite, black when drying, blades 8–20 × 4–10 cm, membranaceous, obovate-elliptic to elliptic, glabrous at both sides, apex acuminate, acumen 0.5–1 cm long, base acute, margins entire, lateral nerves 10–16 each side, raised below, impressed above, brochidodromous, arcuated and convergent towards margin and linking ca. 5 mm to the margin, tertiary venation evident at both sides; petiole 1.5–4 cm long, striate, pubescence same as the branchlets. Pistillate inflorescence 2–6 × 3–8 cm, terminal cymes, erect, peduncle 6–9 cm long, 2–3 mm diam., striate, densely appressed ferruginous pubescent, with two bracts at the base, subopposite, lanceolate, ca. 2.5 mm long, pubescence same as peduncle. The peduncle with four primary branches, 4–4.5 × 0.2–0.4 cm, bearing groups of 2–3(–4) flowers at the end of these axes. Pistillate perianth subtended by three bracteoles, ca. 1 mm long, triangular, pubescence outside same as peduncle, glabrous inside; pedicels ca. 1 mm long, pubescence same as peduncle; perianth ca. 4 × 1.5 mm, tubular-urceolate, pubescence outside same as peduncle, glabrous inside, ovary ca. 2 mm long, ellipsoid, glabrous, style 2–3 mm long, stigmas 2, 4–5 mm long, deeply frimbriate, into 10 divisions, staminodes 5, 1–2 mm long, glabrous. Staminate inflorescences, not seen. Anthocarps 7–12 × 2–4 mm, ellipsoid, 8-costate, pubescence same as perianth, pilosule to glabrescent when mature, rostrum ca. 0.5 mm long, densely ferruginous pubescent at the base.

**Phenology:** this new species has been collected with flowers and young fruits in May.

**Etymology:** the epithet *guasarensis* is coined after the “Río Guasare”, with which the “Río Socuy” formed the “Río Limón, the latter is most important affluent of “Bahía de El Tablazo,” an estuary located in west side of Venezuelan Gulf.

**Distribution and ecology:** the species is hitherto known to occur in primary or secondary wet montane forest at 400–1000 m elevation, located in the NE portion of “Sierra de Perijá,” Zulia state. The “Sierra de Perijá” is the northernmost projection mountain range of the Andean Cordillera Oriental of Colombia, formed a natural boundary between Colombia and Venezuela. It has a distinct orogenic history from the adjacent ranges of northern South America (Montes et al., 2010), This natural region is well known by its interesting biogeographical types of vegetation (Rangel and Arellano, 2007; 2009), several endemics (e.g., *Albizia buntingii* Barneby & J.W. Grimes–Leguminosae, *Begonia perijaensis* Jara–Begoniaceae, *Espeletia perijaensis* Cuatr.–Asteraceae, *Gustavia tejerae* R. Kunth–Lecythidaceae, and *Linochilus perijaensis* (S. Díaz & G.P. Méndez) Saldivia & O.M. Vargas–Asteraceae), rare taxa (e.g., *Copifera venezuelana* Harms & Pittier–Leguminosae, and *Ocotea gentryi* van der Werff–Lauraceae), as well as the presence of Amazonian and Guayana elements (e.g., *Iryanthera hostmannii* (Benth.) Warb. *I. juruensis* Warb.–Myristicaceae, *Ouratea ferruginea* Engl.–Ochnaceae, *Pouteria gongrijpii* Eyma–Sapotaceae, and *Xylopia amazonica* R.E. Fr.—Annonaceae).

**Additional specimens examined:** VENEZUELA. Zulia: Mara. Caño Izquierda, tributary of río Guasare, W of Rancho

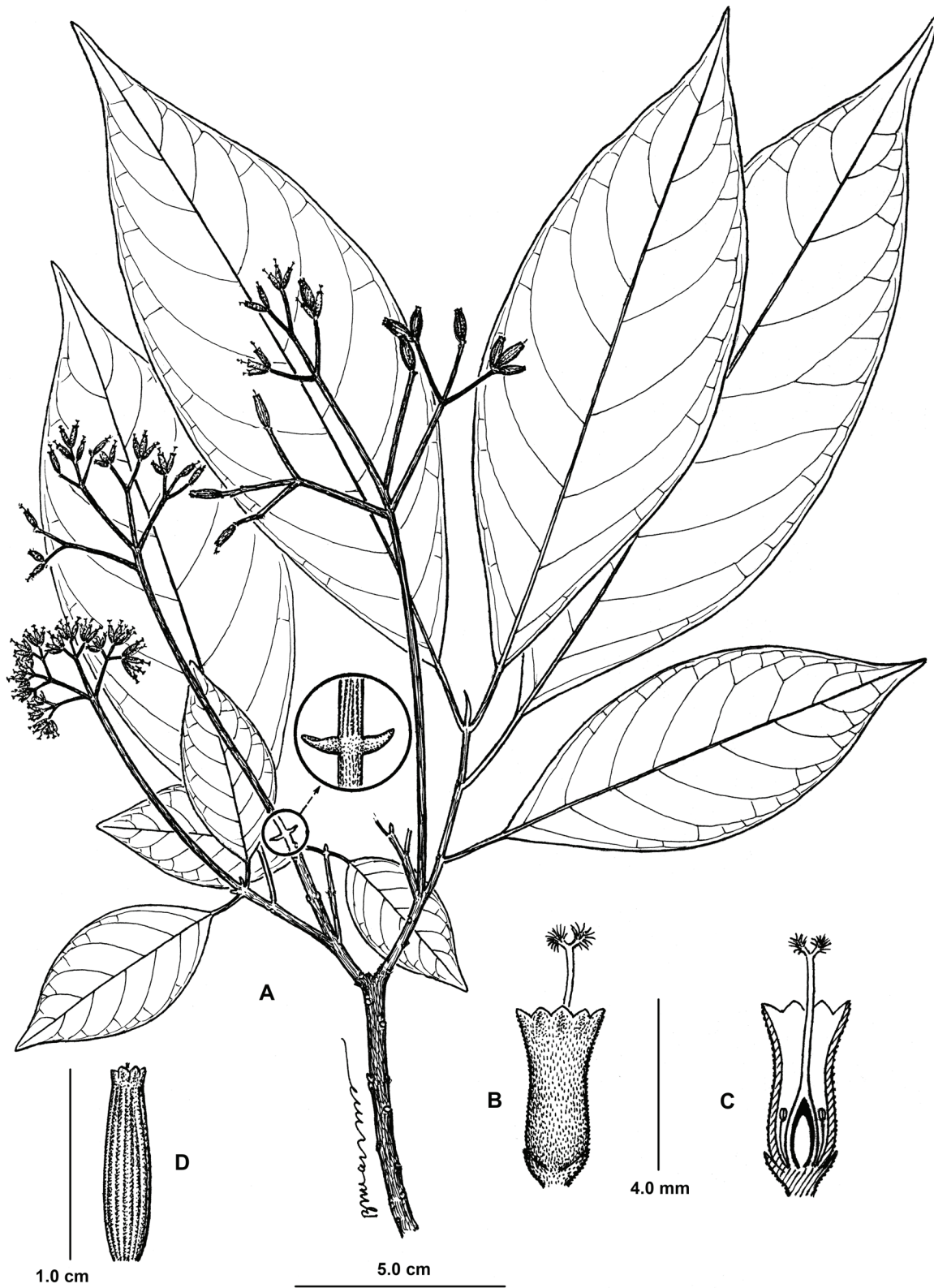


FIGURE 2. *Guapira guasarensis* Aymard. A, habit showing the branch of pistillate plant and basal bracts located on primary branches; B, frontal view of the pistillate perianth showing the two stigmas; C, inside the pistillate perianth in longitudinal section showing the gynecium and the staminodes; D, young anthocarp. Drawn by Bruno Manara<sup>†</sup> based on the holotype.

55, 4 km W of Campamento Carichuano (Corpozulia), 11°01'N, 72°18'W, 600–1000 m, 03 May 1980 (fr), J. A. Steyermark, G. Davidse & A. Stoddart 123230 (MO, VEN). Zulia. Mara. NW slopes of Cerro Negro, between Hacienda Santa Clara and Hacienda Tonchal, 5.5 km SW of Rancho 505, S of río Guasare, 10°55'N, 72°27'W, 500–620 m, 29 May 1980 (fr), J. A. Steyermark, G. Davidse & A. Stoddart 122771 (MO, VEN).

**Conservation status.** Currently, this species is only known from the type and two additional collections, and it is reported here as rare species. However, under IUCN (2017) guidelines fewer localities constitute deficient data (DD) to determine its conservation status. Nevertheless, it should be regarded as Critically Endangered (CR) based on the criterion B1ab(iii)+2ab(iii), due to the lower number of known localities and to its smaller estimated Area of Occupancy, with just 8,000 km<sup>2</sup>, an estimated Extent of Occurrence of 0.000 km<sup>2</sup> (IUCN, 2017), and the continuous deforestation and degradation of the ecosystems of the “Sierra de Perijá.” These areas have been highly deforested during the last six decades. This deforestation increases rapidly and without regulation, with significantly greater patch sizes due the emergence of illegal land uses in both side of the “Sierra de Perijá.” This degradation unfortunately will accelerate land cover change in the coming years (for

reviews see: Pacheco-Angulo et al., 2014; Quiroga-Angel et al., 2022). Although conservation status assessments can still be carried out for species with such low numbers of collections (Rivers et al., 2011), it may be hard to determine whether an appearance of rarity in a species is due to the lack of data or to its actual rarity.

In addition, the region where *G. guasarensis* was found is out of the Venezuelan national park system, particularly “Sierra de Perijá” National Park, which only includes the southwestern portion of the “Sierra de Perijá” range mountains.

Given its lower surface of leaves glabrous or essentially so, the midrib or veins with scattered microscopic tomentum and peduncle and pedicels with dense ferruginous or red tomentum, it new species appear to be closely allied to *Guapira opposita*. However, this new species different from de latter by its branches and petioles densely ferruginous tomentose (vs. glabrous), leaves membranaceous, obovate-elliptic to elliptic (vs. chartaceous to subcoriaceous, elliptic to broadly elliptic), base acute (vs. attenuate); peduncle 6–9 cm long (vs. ca. 1.5); flowers subtended by 3 bracteoles (vs. 2–5, linear to lanceolate); pistillate perianth ferruginous outside (vs. red-puberulous) and two stigmas (vs. one stigma). The latter morphological feature represents an unique character that does not occur in any species of the genus.

#### KEY TO THE SPECIES OF *GUAPIRA* IN VENEZUELA

Modified from Steyermark and Aymard (2003); species indicated with an asterisk (\*) are endemic to Venezuela

- 1a. Leaves 25–35 × > 15 cm; fruits 2–2.5 cm long . . . . . *G. sipapoana* (Amazonas)
- 1b. Leaves 0.1–18 × 0.5–13 cm; fruits < 1.5 cm long . . . . . 2
- 2a. Inflorescence globose or sub-hemispheric, head-like; densely flowered, flowers sessile . . . . . 3
- 2b. Inflorescence elongate cymes, variously branched, the flowers usually pedicellate, or if sessile, the leaves rounded or obtuse at apex and 1.8 cm wide or less . . . . . 4
- 3a. Leaves oblong-elliptic to rounded, 2–5.5 cm long, densely ferruginous pubescent on the lower surface; staminate flowers 3–3.5 mm long, without glandular trichomes outside . . . . . *G. ferruginea*\* (Aragua, Bolívar, Carabobo, Delta Amacuro, Falcón, Guárico, Lara, Miranda, Portuguesa, Yaracuy)
- 3b. Leaves lanceolate-elliptic or oblong-elliptic, 6–13 cm long, minutely subappressed puberulent on the lower surface; staminate flowers 4–5 mm long, with glandular trichomes outside . . . . . *G. davidsei*\* (Delta Amacuro)
- 4a. Lower and/or upper surface of leaves, or lower midrib, densely pubescent or pilosulous with lax, spreading, or divaricate hairs . . . . . 5
- 4b. Lower surface of leaves (including lower midrib, itself sometimes pubescent), glabrous, but if pubescent, it appressed pubescent . . . . . 7
- 5a. Branchlets pilose with spreading gray trichomes; lower and/or upper surface of leaves, or lower midrib, densely pubescent; petiole 3–5 cm long; peduncle 1.5–2.5 cm long . . . . . *G. pubescens*\* (Apure, Cojedes, Miranda, Guárico, Portuguesa)
- 5b. Branchlets with a densely ferruginous tomentum; lower and/or upper surface of leaves, or lower midrib pilosulous with lax, spreading, or divaricate hairs . . . . . 6
- 6a. Peduncle 7–9.5 cm long; petiole and young stems densely pubescent with spreading hairs 0.2–0.5 mm long . . . . . *G. marcano-bertii*\* (Bolívar, Delta Amacuro)
- 6b. Peduncle (1–)3.5–5 cm long; petiole and young stems with hairs < 0.1 mm long . . . . . *G. rusbyana*\* (Bolívar, Delta Amacuro, Vargas)
- 7a. Lower surface of leaves, midrib and veins with a minute tomentum of non spreading hairs or densely pubescent . . . . . 8
- 7b. Lower surface of leaves glabrous or essentially so, the midrib or veins with scattered microscopic tomentum . . . . . 9
- 8a. Leaves coriaceous, lower surface covered completely by dense rufo-ferruginous tomentum, the tertiary venation on both surfaces very conspicuous or elevated . . . . . *G. sancarlosiana* (Amazonas)
- 8b. Leaves chartaceous to subcoriaceous, lower surface sparsely rufous-tomentose to glabrescent, but never covered with dense rufo-ferruginous tomentum; tertiary venation either not evident, inconspicuous, or not elevated . . . . . *G. cuspidata* (Amazonas, Apure, Bolívar, Delta Amacuro, Monagas, Sucre)
- 9a. Peduncle and pedicels with dense ferruginous or red tomentum . . . . . 10
- 9b. Peduncle and pedicels glabrous or sparsely pubescent . . . . . 13
- 10a. Branches and petioles glabrous; leaves chartaceous to subcoriaceous, base attenuate; peduncle ca. 1.5 cm long; flowers subtended by 2–5 bracteoles, linear to lanceolate; pistillate perianth red-puberulous outside . . . . . *G. opposita* (Apure, Barinas, Distrito Capital, Falcón, Guárico, Miranda, Nueva Esparta, Sucre, Yaracuy, Zulia)
- 10b. Branches and petioles densely ferruginous tomentose, leaves membranaceous or coriaceous, base acute to cuneate; peduncle 1.7–9 cm long; flowers subtended by 3 bracteoles, triangular; pistillate perianth ferruginous outside . . . . . 11

KEY TO THE SPECIES OF *GUAPIRA* IN VENEZUELA CONT.

Modified from Steyermark and Aymard (2003); species indicated with an asterisk (\*) are endemic to Venezuela

- 11a. Leaves elliptic-ovate or lance-ovate, coriaceous, base cuneate; peduncle 1.7–4 cm long; perianth ca. 7 mm ..... *G. amacurensis*\* (Bolívar, Delta Amacuro)
- 11b. Leaves ovate, obovate-elliptic to elliptic, membranaceous, base acute; peduncle 3–9 cm long; pistillate perianth 4–5 mm ..... 12
- 12a. Leaves obovate-elliptic to elliptic, lateral nerves 10–16; peduncle 6–9 cm long; pistillate perianth tubular-urceolate, ovary without glands at the top, stigmas 2; anthocarps ellipsoid. .... *G. guasarensis*\* (Zulia)
- 12b. Leaves ovate, lateral nerves 5–8; peduncle ca. 3 cm long; pistillate perianth tubular, ovary bearing 5 glands at the top, stigmas 1; anthocarps globose ..... *G. fundacionensis*\* (Táchira)
- 13a. Peduncle and/or axes of inflorescence sparsely to moderately puberulent ..... 14
- 13b. Peduncle and/or axes of inflorescence glabrous ..... 16
- 14a. Leaves often broadest above the middle, conspicuously venose, shiny; lateral veins conspicuous, 9–11 on each side, subelevated or impressed on both sides, conspicuously anastomosing with the tertiary veinlets, ascending to an angle of 45° or more; tertiary veinlets forming a prominent network ..... *G. fragrans* (Amazonas, Apure, Aragua, Bolívar, Carabobo, Delta Amacuro, Falcón, Lara, Nueva Esparta, Portuguesa, Táchira, Yaracuy, Zulia)
- 14b. Leaves often broadest near the middle, not venose, opaque; lateral veins inconspicuous, 5 or 6 on each side, impressed, divaricately spreading at an angle of 15–30°; tertiary veinlets obsolete or inconspicuous ..... 15
- 15a. Leaves 2–4 cm broad, elliptic, elliptic-lanceolate, rarely oblanceolate, base cuneate to rounded; petioles ca. 1.5–2 cm long; inflorescences axes glabrous ..... *G. eggersiana* (Anzoátegui, Aragua, Bolívar, Delta Amacuro, Miranda, Monagas, Nueva Esparta, Sucre)
- 15b. Leaves 5–7 cm broad, elliptic to obovate, base acute; petioles 2–3 cm long; inflorescences axes pubescent ..... *G. guianensis* (Anzoátegui, Aragua, Bolívar, Delta Amacuro, Miranda, Sucre)
- 16a. Tertiary veinlets prominent and finely reticulate on both sides of leaf blades ..... 17
- 16b. Tertiary veinlets inconspicuous and subreticulate ..... 19
- 17a. Leaves 1–4 × 0.5–2.5 cm; apex rounded or manifestly obtuse; petiole 0.1–0.5 cm long; staminate inflorescence peduncle not longer than 3 cm ..... *G. microphylla* (Anzoátegui, Apure, Aragua, Bolívar, Carabobo, Falcón, Miranda, Nueva Esparta, Sucre, Táchira)
- 17b. Leaves 6–18 × 3–8 cm; apex acute to long acuminate; petiole 0.8–2 cm long; staminate inflorescence peduncle 4–8 cm long ..... 18
- 18a. Branches with ferruginous-glandular trichomes; leaves elliptic to ovate, dark dotted on the lower surface, black-greenish when dry; pistillate perianth 3–3.5 long, tubular, anthocarp fusiform ..... *G. bolivarensis* (Bolívar)
- 18b. Branches glabrous or sparsely gray puberulent; leaves elliptic-oblong to ovate-elliptic, without dark dotted on the lower surface, bright yellowish to brown when dry; pistillate perianth ca. 2 mm long; obconic, anthocarp oblong ..... *G. pacurero* (Anzoátegui, Aragua, Carabobo, Dependencias Federales, Distrito Capital, Falcón, Guárico, Lara, Mérida, Miranda, Nueva Esparta, Sucre, Zulia)
- 19a. Leaves oblanceolate to elliptic-lanceolate; staminate perianth cylindrical-tubular, 1.8–2 mm wide; stamens 8. .... *G. glabriflora*\* (Amazonas)
- 19b. Leaves ovate or elliptic-ovate; staminate perianth ± funnel-shaped, 3.2 mm wide; stamens 10 ..... *G. neblinensis*\* (Amazonas)

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