

DECIPHERING THE IDENTITY OF *DENDROPANAX CAUCANUS* (ARALIACEAE) AND A NEW SPECIES FROM COSTA RICA

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ABSTRACT

Based on the long-standing confusion surrounding the name *Dendropanax caucanus*, a revised description and circumscription are here proposed, included a drawing. The species is excluded from the Flora of Costa Rica and Panamá. ***Dendropanax bacchus***, endemic to Costa Rica, is described and illustrated, and is provisionally assessed as Endangered [EN B2b(ii,iii)]. A lectotype is designated for *Gilibertia caucana* Harms.

RESUMEN

Basado en la confusión histórica relacionada con el nombre *Dendropanax caucanus*, se propone una descripción y circunscripción revisadas, incluyendo una ilustración. Esta especie se excluye de la flora de Costa Rica y Panamá. Se describe y se ilustra ***Dendropanax bacchus***, endémica a Costa Rica, y se evalúa preliminarmente como Amenazada [EN B2b(ii,iii)]. Se designa un lectotipo para *Gilibertia caucana* Harms.

KEY WORDS: Apiales, Corcovado, *Gilibertia*, Mesoamerica, Osa Peninsula, taxonomy

INTRODUCTION

The pantropical *Dendropanax* Decne & Planch. comprises approximately 60–100 species, with its greatest diversity in the Neotropics (Idárraga et al. 2015; Lowry & Plunkett 2025; POWO 2025). The taxonomy of the genus and the circumscription of its Neotropical species has been problematic due to the absent of monographic treatments, the misapplication of names, and the high degree of phenotypic plasticity. Recent studies have discussed these challenges, emphasizing the urgent need for a comprehensive revision and genomic studies, proposing new circumscription for problematic taxa, and describing new species (e.g., Morales & Idárraga-Piedrahita 2022; Morales 2022; Morales & Jimenez 2025).

Several names have been misapplied over time, leading to overly broad circumscriptions that group multiple species under a single name (i.e., *D. arboreus* (L.) Decne. & Planch.) (Morales & Idárraga-Piedrahita 2022), thereby increasing the confusion. Most Neotropical *Dendropanax* species have relatively restricted geographical distributions, with only a few occurring across multiple countries. In southern Mesoamerica, the genus reaches high diversity in Costa Rica and Panamá, where more than 25 species are recorded. In both countries, the names *D. caucanus* (Harms) Harms and *D. colombianus* Cuatrec. have historically been applied to at least three distinct taxa. The study of this complex led to the description of *D. aberrans* J.F. Morales (Morales 2022), but the identity of *D. caucanus* and its actual occurrence in southern Mesoamerica remain unresolved. As part of the ongoing revision of *Dendropanax* in Mexico, Central America, and the West Indies, a revised circumscription of *D. caucanus* is proposed and a new species from Costa Rica is described.

MATERIALS AND METHODS

The descriptions presented here are based on dried herbarium specimens from B, CAUP, COAH, COL, CR, HUA, K, MO, NY, PMA, PSO, U, US, USJ, TRIN, VALLE, WAG, and Z. All cited collections were examined physically. Because the fruits of *Dendropanax* are somewhat fleshy, measurements taken from fresh material may be larger than the dimensions provided here. Acronyms cited follow Thiers (2025, continuously updated). TROPICOS.ORG (2025) and JSTOR Global Plants (2025) databases were consulted to verify original publications or type specimens. The preliminary conservation status assessment for the new species was conducted following the IUCN Red List categories and criteria (IUCN 2024). GeoCAT and Adobe Photoshop (2019) was used to make the map. Georeferenced specimen data were used to calculate the area of occupancy (AOO) and Extent of Occurrence (EOO) with the GeoCAT tool (Bachman et al. 2011). No distribution map or assessment was prepared for *D. caucanus*, because only representative specimens were examined for the description. A comprehensive study of Colombian herbarium material is needed to include all available specimens.

TAXONOMY

Deciphering the identity of *D. caucanus*

Gilibertia caucana was described by Harms (1927) based on a Colombian specimen, and was later transferred to *Dendropanax* (Harms 1942). The type was destroyed during World War two, but at least two duplicates are preserved at Kew. In their preliminary study of Araliaceae for the Flora Mesoamerica, Cannon and Cannon (1989) reported *D. caucanus* from Costa Rica and Panama for the first time, but without providing a description or citing specimens. The species was subsequently also recorded in Ecuador, thereby expanding its supposed distribution (Borchsenius & Bergmann 1999). In the Catalogue of Plants of Colombia, Rivera-Diaz and Celis (2016), cited the type as voucher and reported its range as extending from Costa Rica to Ecuador. In Panama, the species was included in several checklists (e.g., Correa et al. 2004; Condit et al. 2019).

The treatment by Cannon and Cannon (1989) provided an overview of the family in Central America, keys to the native genera (*Dendropanax*, *Oreopanax* Decne. & Planch., *Schefflera* J.R. Forst. & G. Forst.), and described several species. However, their synopsis does not include detailed descriptions or lists of examined specimens (except for novelties), thereby limiting its taxonomical value. In the checklists for Panama, Colombia, and Ecuador, the treatments merely cited names of reported species, without addressing the pervasive confusion in *Dendropanax*.

The Flora Mesoamericana treatment (Cannon & Cannon 2009) essentially followed the earlier synopsis of Cannon and Cannon (1989), with no substantial changes. Although the treatment included descriptions, these are synoptical rather than detailed, omitting several key morphological characters. Furthermore, the coexistence and correlation of andromonoecious and hermaphrodite sexual systems within the same species were not discussed. Morales et al. (2020) reported 20 species for Costa Rica, providing more detailed morphological information and including *D. caucanus* along with several unnamed species.

A preliminary comparison of the type of *D. caucanus* with Costa Rican and Panamanian specimens identified under that name revealed that at least three distinct species had been included under a single concept. To elucidate the appropriate circumscription of *D. caucanus*, the type material was examined in detail, based on the two duplicates at Kew (K). Additional specimens from Colombia that matched the type were then reviewed, along with material from Costa Rica and Panama deposited at B, COL, CR, HUA, MO, PMA, U, and USJ identified as *D. caucanus*. The specimens consistent with the type were used to complete the description and illustration of *D. caucanus* provided here.

All Costa Rican and Panamanian specimens previously identified as *D. caucanus* are misapplied. In Panama, some specimens are sterile, and in this genus (with few exceptions), fertile specimens are essential for identification. The specimens *Herrera 1801* (PMA) and *McPherson 21112* (MO, PMA), collected in the Caribbean lowlands of Panama near Costa Rica, probably represent *D. arboreus*. The specimens identified as *D. caucanus* by Morales et al. (2020), as well as some Panamanian collections, do not match the circumscription of *D. caucanus* established here; they differ by having larger inflorescences and fruits, usually with five (rarely six) styles. The identity of these specimens will be addressed in a separate paper.

At the same time, a second group of specimens from the southern Pacific lowland forest of Costa Rica is distinctive in having hermaphrodite flowers (7)8–10-merous and fruits with (7)8–10 styles. These gatherings were treated as *Dendropanax* sp. F in Morales et al. (2020). As a result of the ongoing revision of the genus, a detailed description of *D. caucanus* is given here, and the unnamed Costa Rican species is described as new.

Dendropanax caucanus (Harms) Harms, Notizbl. Bot. Gart. Berlin-Dahlem 15:692. 1942. (**Fig. 1**). *Gilibertia caucana* Harms, Repert. Spec. Nov. Regni Veg. 23(18–25):300. 1927. TYPE. COLOMBIA. VALLE DEL CAUCA: Cauca Valley, 800–1400 m, Jul year lacking (fl), F.C. Lehmann 4733 (HOLOTYPE: B [destroyed, photo F negative 3543]; LECTOTYPE, **designated here**, K barcode #K000588298; ISOLECTOTYPES: F barcodes #V0048540F, #V0048541F [fragment], K barcode #K000588299, US barcode #00037329).

Description.—Tree 8–20 m; branchlets longitudinally striate when dry, with few lenticels. **Leaves** alternate to subopposite in terminal branches, spirally arranged, spaced in old stems, young leaves not seen, stipules inconspicuous; petioles (1)–2.5–9.5 cm long, slightly canaliculate adaxially; leaf blades 7.8–15.6 × 3–8.1 cm, elliptic to ovate-elliptic, more or less symmetric, the base acute, the margin obscurely crenate and inconspicuously dentate distally, not revolute, sometimes with punctations on the abaxial surface; apex acuminate, tip obtuse, acute, or acuminate; venation pinnate, with two suprabasal vein, originating 1–1.5 mm from leaf base, inconspicuous, eucamptodromous, looping close to the margin; midvein prominent and visible on both surfaces; secondary veins 8–11 pairs, barely visible adaxially, impressed abaxially; intersecondary veins present, conspicuous on the abaxial surface; tertiary veins usually conspicuous abaxially. **Inflorescence** a raceme of umbels (andromonoecious flowers), terminal, sometimes some pedicels agglomerate distally or a fascicle or subfascicle of umbels (hermaphrodite flowers); **inflorescence with andromonoecious sexual systems** 4.2–7 cm long, with a conspicuous bract at the base of the pedicels, 3–4 mm long, deciduous, peduncle 0.6–1 cm long, pedicels 5–8, 1.7–2.3 cm long, usually straight, not flattened, not articulated or geniculated, usually without bracteoles, sometimes with solitary or paired bracteoles, not fused, less than 2 mm long, arranged on the proximal half of the pedicel; umbels many-flowered (more than 15 flowers), receptacle 3.2–5 mm in diameter, outer bracts up to 1.2 mm long, ovate, inner bracts (at the base of the pedicels) less than 1 mm long, oblong to ovate; apparently only flowers staminate present; pedicels 1–3.7 mm long. **Flowers** 5–6-merous, hypanthium 1.1–1.3 mm long, conical, sepals up to 0.2 mm long, broadly ovate, petals 5–6, white, ovate to oblong-ovate, 1.8–2.5 × 0.8–1.2 mm, the apex thickened, hooded (cucullate); **inflorescence with hermaphrodite sexual systems** ca. 3.2–4.8 cm long (based on fruiting specimens), with inconspicuous bracts at the base of the pedicels, less than 2 mm long; peduncle 0–0.8 cm, pedicels 4–6 terminal, fasciculate or subfasciculate, 1.8–2.8 cm long, straight, not articulated or geniculated, usually without bracteoles, sometimes with solitary or paired bracteoles, not fused, less than 2 mm long, arranged on the proximal half of the pedicel; umbels not examined. **Flowers** mostly (5)6–7-merous (based on fruits); mature flowers not seen; ovary 6–7-carpellate. **Fruits** globose to subglobose when mature, green when immature, black or purple when mature, 5.5–7.7 × 6.5–8 mm, disc 2.6–3.7 mm in diameter, stylar column less than 0.9 mm long, conical, styles (5)6–7, apically free, apices strongly to moderately reflexed, not covering the stylar column.

Distribution, habitat, and phenology.—Colombia and apparently Ecuador, in tropical wet and premontane forest, 700–1550 m. Flowering July; fruiting May, August, September, October, and December.

Discussion.—*Dendropanax caucanus* differs from *D. arboreus* by its shorter inflorescences with andromonoecious flowers (4.2–7 cm vs. 10–17 cm long), shorter inflorescences with hermaphrodite flowers (3.2–4.8 vs. 5.7–9 cm long), larger fruits (5.5–7.7 × 6.5–8 mm vs. 4.5–5.5 × 4.5–5 mm), conical stylar column (vs. cylindrical or conical ±), and 6 or 7 styles (although a few flowers can have 5 styles) (vs usually 5). *Dendropanax caucanus* occur at higher elevations in the Cordilleras Occidental and Oriental of Colombia (and possibly Ecuador), whereas *D. arboreus* inhabits lowland Caribbean slopes of Antioquia, Choco, and Cordoba Departments (0–700 m). Its presence in Costa Rica and Panama must be excluded. Ecuadorian records remain doubtful until further study.

Dendropanax colombianus was reduced under the synonym of *D. caucanus* by Cannon & Cannon (2009), followed by Ulloa-Ulloa et al. (2017, 2018) and Morales et al. (2020). A detailed reexamination of the type demonstrates that *D. colombianus* must be excluded from the synonymy. In *D. colombianus*, andromonoecious

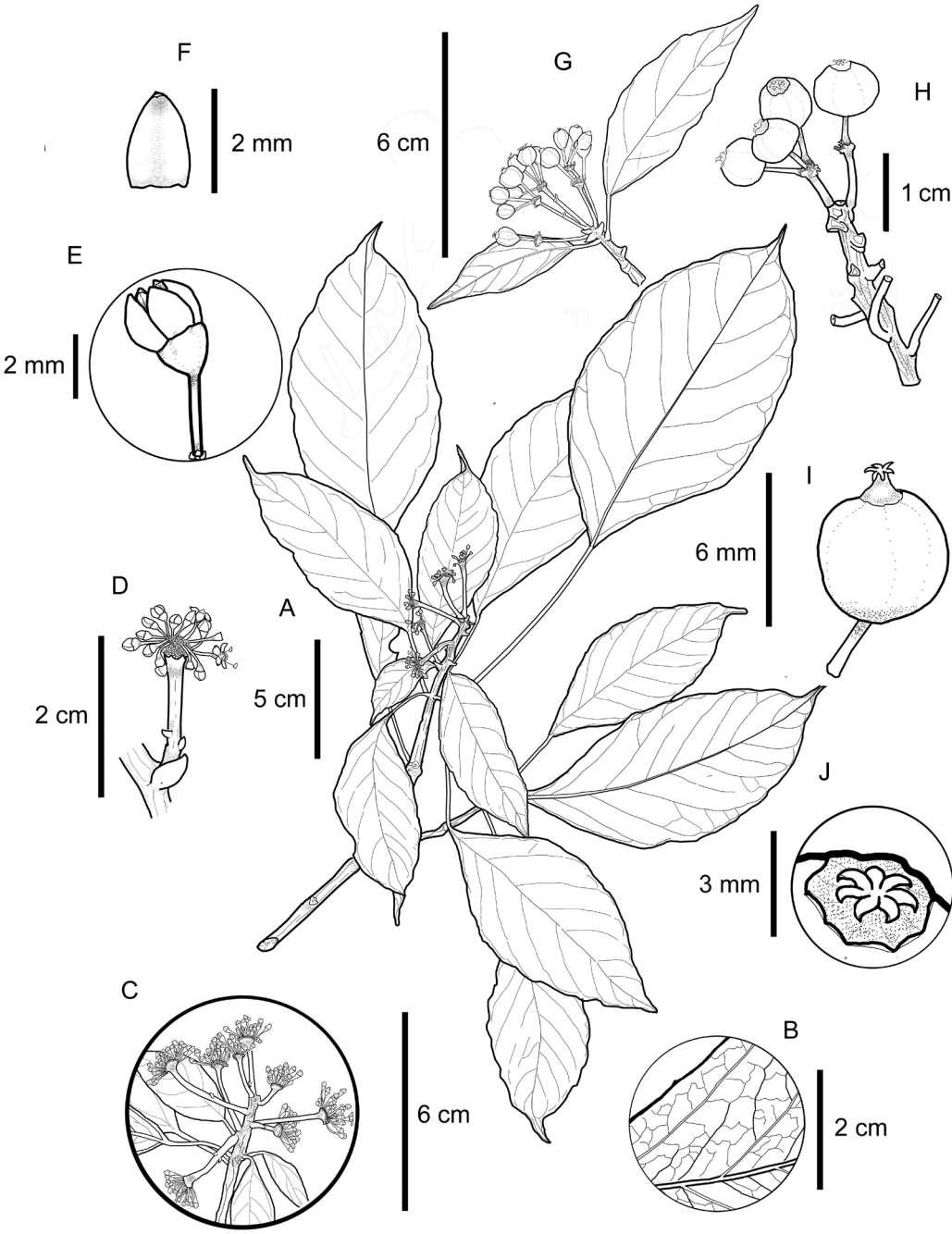


FIG. 1. *Dendropanax caucanus* (A–D from Lehmann 4733 (K); E from Dugand & Jaramillo 3914 (COL); G from Arcitia 76 (COL). A. Flowering branchlet. B. Leaf, details or nerves on the abaxial surface. C. Andromonoecious inflorescence. D. Detail of the pedicel. E. Flower, pedicel, and bracts (staminate flower). F. Petal, dorsal view (staminate flower). G. Fruiting branchlet. H. Details of the fruits. I. Fruit. J. Detail of the stylar column.

inflorescences have fasciculate or subfasciculate pedicles (vs. a raceme of umbels), and fruits are larger (10–15 vs. 5.5–7.7 mm long). *Dendropanax colombianus* is morphologically similar to *D. macrocarpus* Cuatrec., and probably conspecific, but pending further evaluation both taxa are treated as distinct.

The holotype of *Gilibertia caucana* was destroyed in Berlin (B) in 1943. The duplicate at K (barcode #K000588298) is selected as the lectotype because this specimen is the best preserved, compared to the duplicates at F and US.

Specimens examined.—**COLOMBIA.** **Antioquia:** Zaragoza, Minquillo, 30 Aug 1967 (fr), Arciria 76 (COL, UDBC); Amalfi, vereda Chorritos, La María, Montebello, km 15–35 en la vía a Chorritos-Los Monos, SNE de Amalfi, 6 Dec 1989 (fr), *Callegas et al.* 9017 (HUA); municipio de San Luis, sector Río Carderas, entre la autopista y la escuela San Pablo, 6 May 1997 (fr), *Cardona et al.* 185 (HUA); Municipio de San Carlos, vereda Peñón Grande, predios de ISAGEN, 25 Sep 1912 (fr), *Idárraga et al.* 5039 (HUA); Anorí, Providencia, above Providencia, 25 Oct 1972 (fr), *Soejarto et al.* 3496 (HUA). **Cauca:** municipio de Santander de Quilichao, Lomitas, hacienda Casa Blanca, km 11 vía a Timba, 7 Aug 1998 (fr), *Ramírez et al.* 11465 (CAUP, PSO). **Cundinamarca:** cerca de Sasaima, 1200–1400 m, 2–5 Aug 1945 (fr), *Dugand & Jaramillo* 3914 (COL); El Peñón, Hacienda Curiche, entre los ríos Bunque y Murca, 1050–1420 m, 1–3 Aug 1947 (fl), *García-Barriga* 12456 (COL).

New species

Dendropanax bacchus J.F. Morales, **sp. nov.** (Figs. 2–3). TYPE. COSTA RICA. PUNTARENAS: Parque Nacional Corcovado, Ollas trail, 26 Jul 1988 (fl), C. Kernan & P. Phillips 715 (HOLOTYPE: CR barcode #INBIOCR1001595470).

Diagnosis.—*Dendropanax bacchus* resembles *D. arboreus* but it is distinguished by its staminate flowers with petals 1.8–2.1 mm long (vs. 1–1.5 mm), hermaphrodite flowers 7–10-merous (vs. 5-merous), fruits (10–)13–18 × 14–21 mm (vs. 4.5–5.5 × 4.5–5 mm), and styles five (vs. 7–10). It differs from *D. caucanus* by its inflorescences with andromonoecious system 8–11 cm (vs. 4.2–7 cm), with 13–17 pedicels (vs. 5–8), hermaphrodite flowers (7)8–10-merous (vs. 5–6-merous), fruits (10–)13–18 × 14–21 mm (vs. 5.5–7.7 × 6.5–8 mm), and styles (7)8–10 (vs. (5)6–7).

Description.—Tree (10–)15–30 m; branchlets slightly longitudinally striate when dry, without lenticels. **Leaves** alternate to subopposite in terminal branches, spirally arranged, spaced in old stems, young leaves not lobed, stipules inconspicuous; petioles (1–)1.5–11.5(–14) cm long, slightly canaliculate adaxially; leaf blades (8.5–)10–14.5(–17) × (3.5–)8.5–11(–13) cm, broadly elliptic to elliptic, more or less symmetric, the base acute to obtuse, the margin entire to irregularly crenate, not revolute, with punctations on the abaxial surface; apex acute to shortly acuminate, tip acute; venation pinnate, with two inconspicuous suprabasal veins, originating 0–1 mm from leaf base, sometimes not evident, eucamptodromous, looping close to the margin; midvein prominent and visible on both surfaces; secondary veins 6–8 pairs, barely visible adaxially, impressed abaxially; intersecondary veins present, conspicuous; tertiary veins usually inconspicuous, impressed abaxially. **Inflorescence** a raceme of umbels (andromonoecious and hermaphrodite); **inflorescence with andromonoecious sexual systems** 8–11 cm long, with conspicuous bracts at the base of the pedicles, up to 3 mm long, deciduous; peduncle absent or up to 0.5 cm long, pedicels 13–17, 2.2–4.5 cm long, usually straight to slightly curved distally, flattened distally, articulated or non articulated, with or without bracteoles, if present, the bracteoles 1–3 bracteoles, not fused or slightly fused, less than 2 mm long, arranged on the distal half of the pedicle; umbels many-flowered (more than 25 flowers), receptacle 5–7 mm in diameter, outer bracts up to 1 mm long, ovate to narrowly ovate, inner bracts (at the base of the pedicels) less than 0.9 mm long, oblong to ovate or narrowly ovate; only flowers staminate present; pedicels 1–4.5 mm long. **Flowers** 5-merous, hypanthium less than 1.5 mm long, subcampanulate to subconical, sepals up to 0.2 mm long, broadly ovate, petals 5, white to greenish-white, ovate to oblong-ovate, 1.8–2.1 × 0.8–1.1 mm, the apex thickened, hooded (cucullate); **inflorescence with hermaphrodite sexual systems** 8.5–14.4 cm long, with inconspicuous bracts at the base of the pedicles, up to 2.5 mm, deciduous; peduncle absent or up to 0.7 cm, pedicels 5–10, 3–4.5 cm long, slightly arched, not articulated or geniculated, without bracteoles; umbels few-flowered (2–7 flowers); receptacle 2–3 mm in diameter, outer bracts up to 1.8 mm long, broadly to narrowly ovate, inner bracts (at the base of the pedicels) less than 1.1 mm long, narrowly ovate, pedicels 5–7 mm long during anthesis, reaching 14–18(–21 mm) in fruit. **Flowers** (7–)8–10-merous, hypanthium less than 1.4 mm long, conical to subconical, sepals up to 0.2 mm long, broadly ovate, petals 7–10, white, narrowly ovate to narrowly ovate, 2.1–2.4 × 0.5–0.7 mm, the apex thickened, hooded (cucullate). Fruits globose to subglobose, green when immature, black when

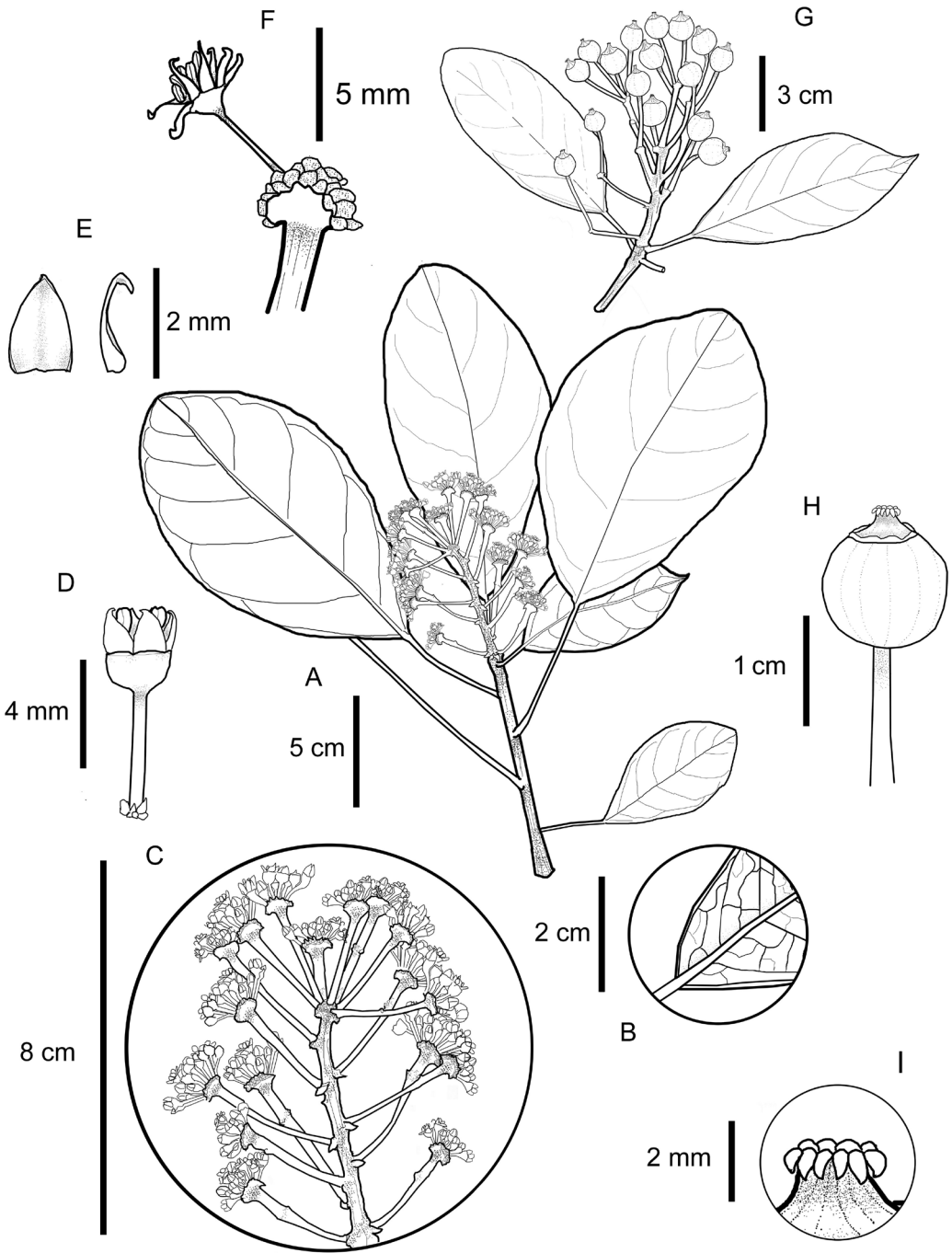


FIG. 2. *Dendropanax bacchus* (A–E from Mora 701 (CR); F from Kernan 810 (MO), G–I from Aguilar 1205 (CR). A. Flowering branchlet. B. Leaf, details or nerves on the abaxial surface. C. Andromonoecious inflorescence. D. Flower, pedicel, and bracts (staminate flower). E. Petals (staminate flower). F. Hermaphroditic flower. G. Fruiting branchlet. H. Fruit. I. Detail of the stylar column.

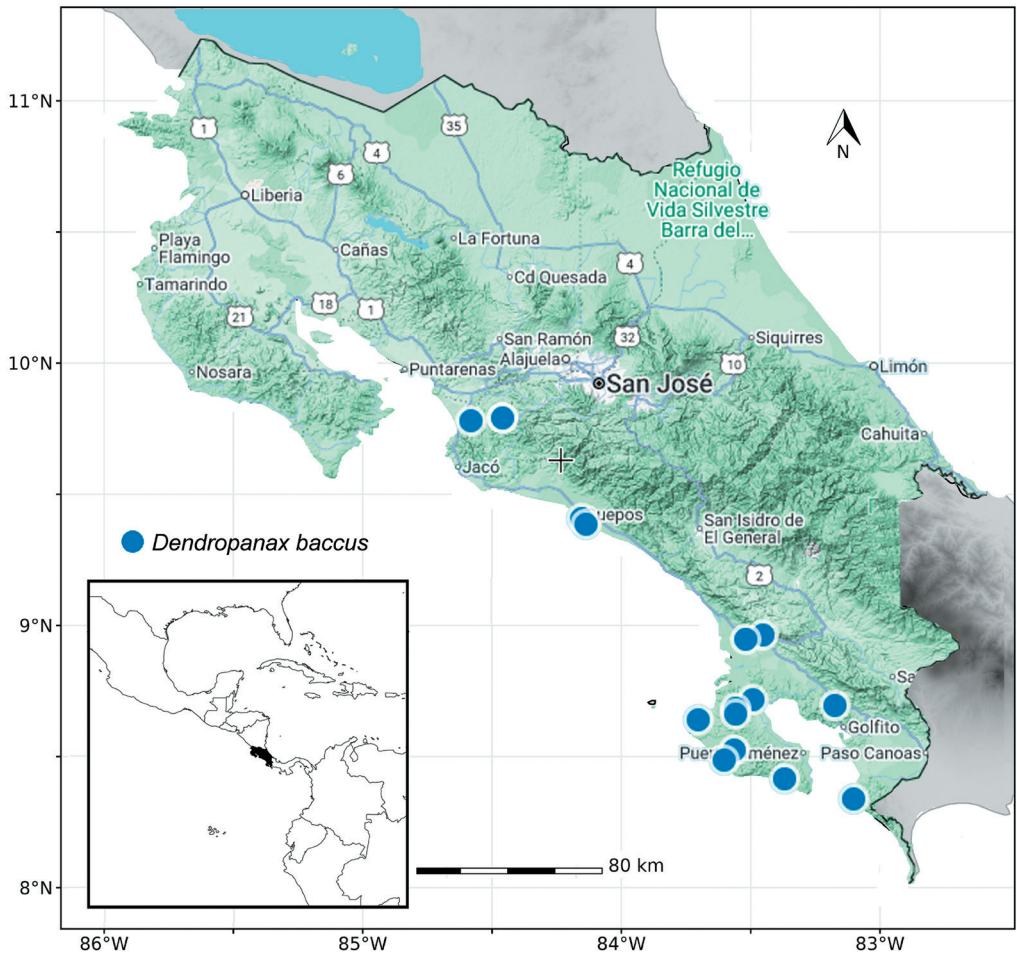


FIG. 3. Distribution map of *Dendropanax bacchus* based on herbarium specimens.

mature, (1–)1.3–1.8 × 1.4–2.1 cm, disc 6–7.5 mm in diameter, styler column 2–3 mm long, conical, styles (7)8–10, apically free, apices moderately reflexed, not covering the styler column.

Distribution, habitat, and phenology.—Endemic to Costa Rica, occurring in tropical wet forest at 0–650 m. Flowering July, August, October, and December. Fruiting July, August, September, and December.

Etymology.—The epithet *bacchus* refers to Bacchus, son of Zeus in Greek mythology, the god of wine, happiness, and fertility.

Conservation status.—*Dendropanax bacchus* has a calculated AOO of 60 km² and an EOO of 6691 km². It is known for more than 12 localities, in five geographical areas, including National Parks, protected areas, and their buffer zones. The EOO is below the threshold for EN status under Criterion B1, but the AOO falls into the EN status under Criterion B2. Although the species is protected in at least three national parks, there are four locations (three geographical areas) with the threat of clearing/deforestation for agriculture or cattle. If the deforestation in buffer zones becomes active in the future, the populations could face this threat. Based on the relatively low AOO and the potential threats, the species is provisionally assessed as Endangered [EN B2b(ii,iii)] according to the IUCN Red List Categories and Criteria (IUCN 2024).

Discussion.—*Dendropanax bacchus* can be recognized by the following combination of characters: a

large tree up to 30 m tall, long inflorescences, hermaphrodite flowers (7)8–10-merous, large fruits with elongated pedicels of 14–18(–21 mm) mm, and stylar columns with (7)8–10 styles. Its taxonomic identity remained obscure for many years due to the misapplication of names such as *D. arboreus*, *D. caucanus*, and *D. colombianus* (see diagnosis differences above) (e.g., Zimmermann & Morales 2001). *Dendropanax colombianus* differs from *D. bacchus* by having andromonoecious flowers with the verticillate or subverticillate pedicels (vs. a raceme of umbels), and inflorescences with hermaphrodite flowers less than 7 cm long (vs. 8.5–14.4 cm).

Some collectors reported strong apple-like odors from leaves or fruits (*Malus*, Rosaceae; Jiménez et al. 908), resinous (*Protium*, Burseraceae; Aguilar 1265), or peppery (*Capsicum*, Solanaceae; Kernan & Phillips 715), and noted thick and leathery blades (Kernan & Phillips 715). Such field characters are not included in the descriptions because they are rarely recorded in *Dendropanax*. A key to Costa Rica species is provided in Morales et al. (2020).

Dendropanax bacchus is a new addition to the rich flora in the central and southern Pacific in Costa Rica. Most collections are from the Osa Peninsula, with additional populations in Punta Burica, Palmar Norte, Quepos (Manuel Antonio National Park), and Carara National Park. Numerous remarkable vascular plants have been described from this region in the last two decades, including new trees, shrubs, vines, and epiphytes species (e.g., Hammel & Zamora 2005; Morales 2008, 2012, 2018; Jiménez et al. 2021; Cedeño-Fonseca et al. 2025).

PARATYPES.—**COSTA RICA. Puntarenas:** Reserva Forestal Golfo Dulce, Aguabuena, Rincón de Osa, 10 Aug 1991 (fl, fr), Aguilar 226 (CR, MO); cantón de Osa, Aguabuena, Reserva Forestal Golfo Dulce, 4 Aug 1992 (fr), Aguilar 1205 (CR, MO); parque Nacional Corcovado, Península de Osa, estación Sirena, 27 Jul 1995 (fr), Aguilar 4237 (CR, MO); Punta Burica, Punta Banco, 25 Aug 1988 (fl), Chavarria et al. 288 (CR, MO); Coto Brus, San Miguel, 18 Jul 2002 (fl), Gonzalez & Garita 1718 (CR); Parque Nacional Manuel Antonio, 17 Jul 1990 (fl), Harmon 125 (CR); reserva forestal Golfo Dulce, Península de Osa, Playa Campanario o San Josecito, Sierpe, 23 June 1993 (fl), Harmon 316 (CR, MO); near Sirena headquarters, Corcovado National Park, 16 Jul 1977 (fr), Hartshorn 1868 (MO), 17 Jul 1977 (fr), Hartshorn 1871 (MO); Parque Nacional Corcovado, upper Ollas trail, 27 Jun 1988 (fl), Kernan & Phillips 634 (CR, MO); Parque Nacional Corcovado, Ollas trail, 26 Jul 1988 (fr), Kernan & Phillips 773 (CR); Parque Nacional Corcovado, Skyway, 13 Aug 1988 (fl), Kernan 810 (CR, MO); cantón de Osa, Rancho Quemado, lado O de laguna Chocuaco, 24 Jul 1991 (fr), Marin 50 (CR); cantón de Osa, Rancho Quemado, finca de Juan Marin, cerca a Guerra, 6 Aug 1991 (fr), Marin 85 (CR); Golfito, parque nacional Corcovado, península de Osa, estación Agujas, sendero quebrada Bonanza, 10 Oct 1999 (fl), Mora 701 (CR, MO); Puerto Cortez, 18 Sep 1973 (fr), Poveda 673 (MO); Palmar Norte, 4 Feb 1976 (st), Poveda & Sáenz 1261 (CR); 4 mi W of Rincón de Osa, Osa Península, 8 Aug 1967 (fl), Raven 21615 (MO); Golfito, La Gamba, sendero Ozelot, 21 Jun 1997 (fl), Weissenhofer 114 (CR, WU). **San José:** Reserva Biológica Carara, montañas Jamaica, sendero a Bijagual, 27 Sep 1990 (fr), Jiménez et al. 908 (CR [2 sheets], MO); Puriscal, Cuenca del Tulin, 2 km antes de San Rafael, 9 Dec 2004 (fr), Soto et al. 443 (CR, USJ).

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