

Two New Species of *Doliocarpus* (Dilleniaceae) from Colombia

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ABSTRACT. *Doliocarpus schultesianus* Aymard from moist forests in the upper Río Negro region (Vaupés department) and *D. trianaus* Aymard from montane forests in Antioquia department, Colombia, are described, illustrated, and compared to their closely related species. *Doliocarpus schultesianus* is not evidently allied to any other *Doliocarpus* Rolander species; this new species has inflorescences produced from short shoots (brachyblasts) and young fruit completely covered by stinging yellow trichomes. *Doliocarpus trianaus* is most similar to *D. pipolyi* Aymard due its chartaceous leaves with margins dentate along the blade and its papyraceous basal bracteoles, but it differs from that species in its leaf and sepal shape, dense pubescence along the midrib and secondary nerves on the lower surface, peduncle patent-pilose, and fruit 10–12 mm in diameter, completely covered by white trichomes. An updated key to the 19 species of *Doliocarpus* from Colombia is provided.

RESUMEN. *Doliocarpus schultesianus* Aymard de bosques húmedos de la región del alto río Negro (departamento de Vaupés) y *D. trianaus* Aymard de bosques montanos del departamento de Antioquia, Colombia, son descritas, ilustradas y comparadas con sus especies afines. *Doliocarpus schultesianus* no se relaciona con ninguna especie de *Doliocarpus* Rolander en particular; esta nueva especie posee inflorescencias dispuestas en los entre nudos muy cortos (braquiblastos) y frutos jóvenes completamente cubiertos por tricomas urticantes de color amarillo. Por sus hojas cartáceas, márgenes dentados a lo largo de la lámina y bractéolas basales papiráceas *D. trianaus* es similar a *D. pipolyi* Aymard, sin embargo difiere de esta especie en la forma de las hojas y sépalos, pubescencia muy densa en el nervio central y nervios secundarios por el envés, pedúnculos patentes pilosos y frutos 10–12 mm en diámetro, completamente cubierto por tricomas blancos. Se presenta una clave actualizada de las 19 especies de *Doliocarpus* registradas de Colombia.

Key words: Catalogue of Vascular Plants of the Department of Antioquia, Colombia, Dilleniaceae, *Doliocarpus*, IUCN Red List, R. E. Schultes.

Doliocarpus Rolander includes about 50 species distributed throughout southern Mexico, Central

America, the Antilles, the Guianas, Venezuela, Colombia, Ecuador, Peru, Bolivia, Brazil, and Paraguay (Aymard, 1998). Most *Doliocarpus* species are lianas (rarely shrubs), and within Dilleniaceae the genus is easily distinguished by having the inflorescences ramiflorous, fasciculate or glomerate; the ovary unicarpellate, 1-celled; the fruit a berry, sometimes opening irregularly; and seeds completely covered by a white aril. Kubitzki (1971) divided the genus into two sections: section *Calinea* Eichler, characterized by having leaves with tertiary nerves subparallel (rarely reticulate), filaments erect-flexuose with anthers introrse at anthesis, and ovary glabrous or pilose, and section *Doliocarpus* Rolander having leaves with tertiary nerves reticulate, filaments reflexed with anthers extrorse at anthesis, and the ovary pilose. Examination of hundreds of *Doliocarpus* herbarium specimens during the past 25 years demonstrates that a small percentage of specimens were found with flowers in anthesis. In addition, most specimens are in young fruit with the stamens and the sepals persistent and lacking petals. Although these character states are useful, they are unreliable to use as two of the main features to divide the genus. Thus, leaf venation may be the most taxonomically useful character to separate the two sections of this genus.

This publication increases the number of *Doliocarpus* species known from Colombia to 19. *Doliocarpus trianaus* Aymard was discovered during the preparation of the Dilleniaceae treatment for the Catalogue of Vascular Plants of the Department of Antioquia (being carried out by the Missouri Botanical Garden and the Universidad de Antioquia), and *D. schultesianus* Aymard was discovered from an unidentified specimen at GH collected by R. E. Schultes.

1. *Doliocarpus schultesianus* Aymard, sp. nov.

TYPE: Colombia. Vaupés: Río Vaupés, raudal Dr. Tatú, Mitú vic., 27 Sep.–20 Oct. 1966, R. E. Schultes, R. F. Raffaul & D. D. Soejarto 24378 (holotype, GH; isotype, PORT). Figure 1.

Scandens, ramis ramulisque glabris. Folia elliptica, 7–12 × 4–7 cm, rigido-coriacea, basi acuta, apice acuminata, margine subrevoluta, dentata, supra pagina sparse pilosa sed costa nervisque secundariis trichomatibus luteis densis

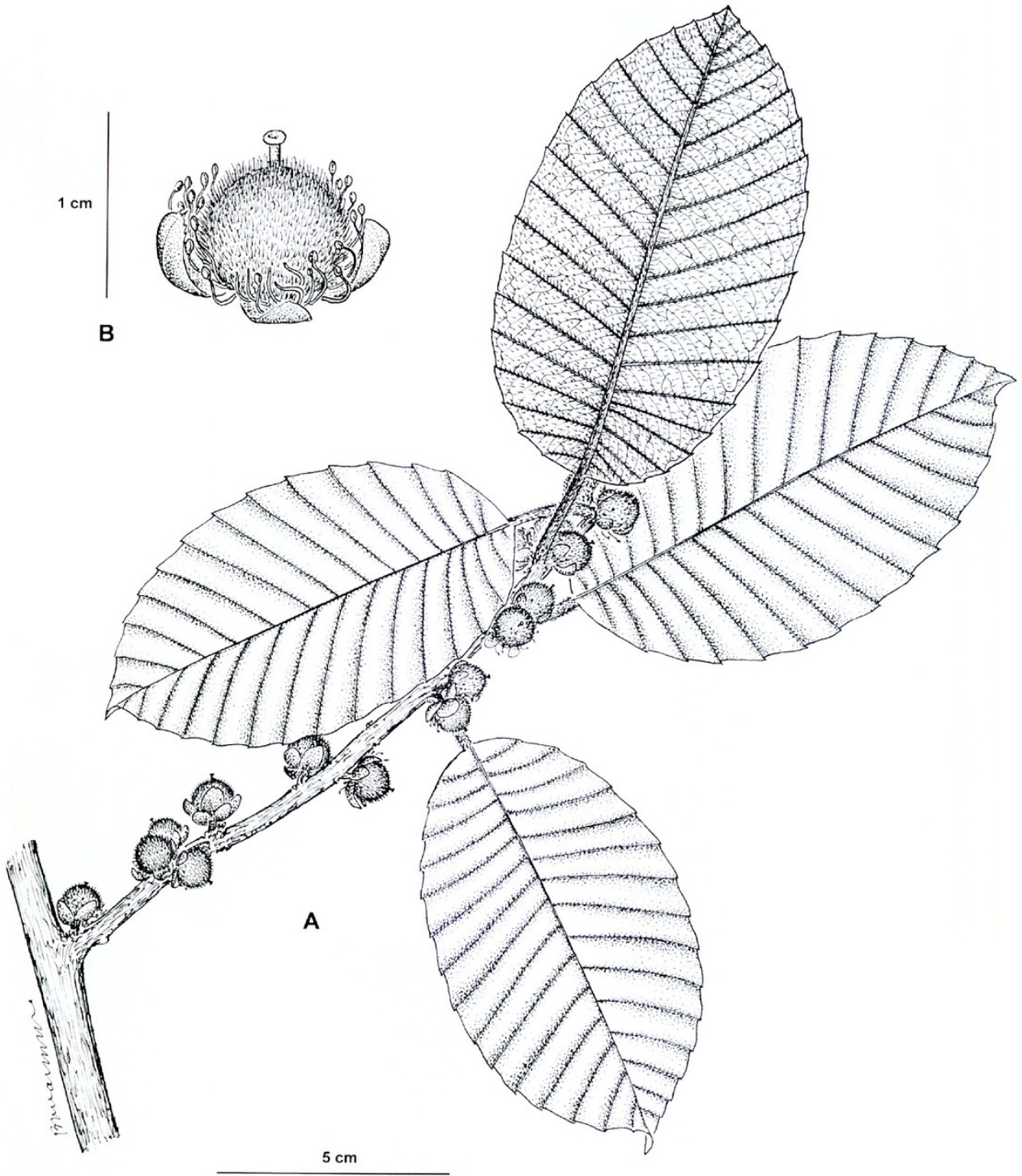


Figure 1. *Doliocarpus schultesianus* Aymard. —A. Flowering branchlet. —B. Flower with a young fruit. Drawn from the holotype, R. E. Schultes, R. F. Raffaul & D. D. Soejarto 24378 (GH).

adpressis praeditis, subtus pagina dense pubescenti (trichomatibus erectis ca. 1 mm longis), secus costam nervosque secundarios densius pubescenti, demum maturitate glabrescenti; nervis lateralibus 15 ad 17, recte ad marginem tendentibus, supra impressis, subtus elevatis; petiolis 1.5–2.2 cm longis, dense luteo-pubescentibus. Inflorescentia axillaris, glomerata, subsessilis, pedunculo ca. 2 mm longo, dense adpresse pubescenti, 2 bracteolis basalibus, ca. 2 mm longis, extus adpresse sericeis, intus glabris praedito. Sepala 5, 3–7 mm longa, inaequalia (internis obovatis, exterioribus ovatis), extus adpresse sericea, intus sparse adpresse pilosa

maturitate glabrescentia, margine ciliata. Stamina 50 ad 60, ca. 2.5 mm longa, filamentis glabris, antheris oblongis. Ovarium trichomatibus luteis urentibus, 1–1.5 mm longis opertum. Stylus glaber, 1–2 mm longus, stigmate capitato. Fructus dense luteo-hispidus, 5–8 mm diametro. Semina nigra, reniformia, 3–4 mm longa, 1 in quoque fructu, arillo integro semen operiente.

Liana, branches and branchlets glabrous, bark flaking off when mature. Leaves elliptic, 7–12 × 4–7 cm, rigid-coriaceous, base acute, apex acumi-

nate, acumen ca. 5 mm, margins subrevolute, dentate, sparsely pilose on the upper surface, except along the midrib and secondary nerves, where densely covered by adpressed yellow trichomes, densely pubescent (erect trichomes, ca. 1 mm) on the lower surface, most dense along the midrib and secondary nerves, becoming glabrescent when mature; lateral blade nerves 15 to 17, straight at the margin (craspedodromous venation), impressed on the upper surface, elevated on the lower surface, tertiary venation subparallel; petioles 1.5–2.2 cm, exalate, densely yellow-pubescent. Inflorescences produced from short shoots (brachyblasts), axillary, glomerate, subsessile, peduncle ca. 2 mm, densely adpressed-pubescent, with 2 basal bracteoles, ca. 2 mm, adpressed-sericeous externally, glabrous internally. Sepals 5, 3–7 mm, unequal (internal obovate, external ovate) adpressed-sericeous externally, sparsely adpressed-pilose internally to glabrescent when mature, ciliate at the margins; petals not seen; stamens 50 to 60, ca. 2.5 mm, filaments glabrous, anthers oblong; ovary and young fruit completely covered by stinging yellow trichomes (1–1.5 mm), style glabrous, 1–2 mm, stigma capitate. Immature fruit densely covered by stinging yellow trichomes 5–8 mm diam.; seed black, reniform, 3–4 mm, 1 per fruit, aril white, entire, completely covering the seed.

Habitat and distribution. *Doliocarpus schultesianus* is known only from the type collection, collected in moist forest in the upper Río Negro basin.

IUCN Red List category. The type locality of this new species is the remote forests of the upper Río Negro region, Colombia; therefore, using the IUCN Red List criteria (IUCN, 2001), this species should be included in the category LC (Least Concern). However, the conservation status of the population(s) has not been determined because this species is only known by a single collection.

Relationships. Because of its tertiary subparallel venation, *Doliocarpus schultesianus* belongs to the section *Calinea* (sensu Kubitzki, 1971). This new species is not apparently allied to any other species in the section. It is similar to *D. macrocarpus* Martius ex Eichler, especially in its inflorescences not racemose and produced from short shoots (brachyblasts). However, *D. schultesianus* differs from the latter in its leaves elliptic, rigid-coriaceous, with margins serrate and dense pubescence on the lower surface; peduncle ca. 2 mm long, densely adpressed-pubescent; sepals ciliate at the margins; and fruit completely covered by stinging yellow trichomes and one-seeded. By contrast, *D. macrocarpus* has subcoriaceous to coriaceous leaves, obovate or obovate-

elliptic, with margins entire or sinuate-serrulate, and tomentulose on the lower surface; peduncle 2–7 mm long, tomentulose; sepals not ciliate at the margins; and fruit sparsely adpressed-pilose (trichomes white) and two-seeded.

Etymology. The specific epithet honors the collector of the type, Richard Evans Schultes (1915–2001), distinguished authority on tropical vegetation. Dr. Schultes, best known as the father of ethnobotany (Davis, 2004), researched the use of plants by indigenous cultures for more than 40 years; he held strong conservative political beliefs and was always a staunch believer in individual freedom (Fire, 2001).

2. *Doliocarpus trianaus* Aymard, sp. nov. TYPE: Colombia, Antioquia: Amalfí, Vereda “La Gloria,” 35–37 km NE de Amalfí, vía Amalfí–Vetilla, 07°05'N, 74°56'W, 950–1100 m, 9 Dec. 1989, R. Callejas, J. Betancur & O. Escobar 9222 (holotype, HUA; isotypes, MO, NY, PORT). Figure 2.

Doliocarpus pipolyi Aymard affinis, sed diversus foliis ellipticis basi cuneatis, subtus costa nervisque secundariis dense pubescentibus, pedunculo patenti-piloso, sepalis ovatis, fructu 10–12 mm diametro hispido-piloso.

Liana, branches and branchlets pilose, becoming glabrescent when mature, bark flaking off. Leaves elliptic, 5–13 × 3–6 cm, chartaceous, base cuneate, apex acuminate, acumen ca. 5 mm, margins dentate along the blade, glabrous on the upper surface, except along the midrib, where covered by erect trichomes, sparsely pilose on the lower surface, densely pubescent along the midrib and secondary nerves; lateral nerves 10 to 17, terminating at the margin (craspedodromous venation), elevated on the lower surface, impressed on the upper surface, tertiary venation subparallel; petioles 5–10 mm, exalate, patent-pilose. Inflorescence axillary, in fascicles, not racemose, peduncles 8–16 mm, patent-pilose; with 3 basal bracteoles, papery, ca. 3 mm, densely pubescent externally, glabrous internally; sepals 4, unequal, ovate, external 3–4 mm, internal 5–6 mm, adpressed-sericeous externally, glabrous internally; petals not seen; stamens ca. 80; filaments 3–4 mm, glabrous; ovary densely hispid-tomentose, covered by yellow trichomes, style glabrous, ca. 2 mm, stigma capitate. Fruit red, 10–12 mm diam., completely covered by white hispid-pilose trichomes (ca. 2 mm); seed black, reniform, ca. 7 mm, 1 per fruit, aril white, entire, completely covering the seed.

Distribution and habitat. *Doliocarpus trianaus* is known only from the type and paratype collections, collected in montane forest in Antioquia department, Colombia.

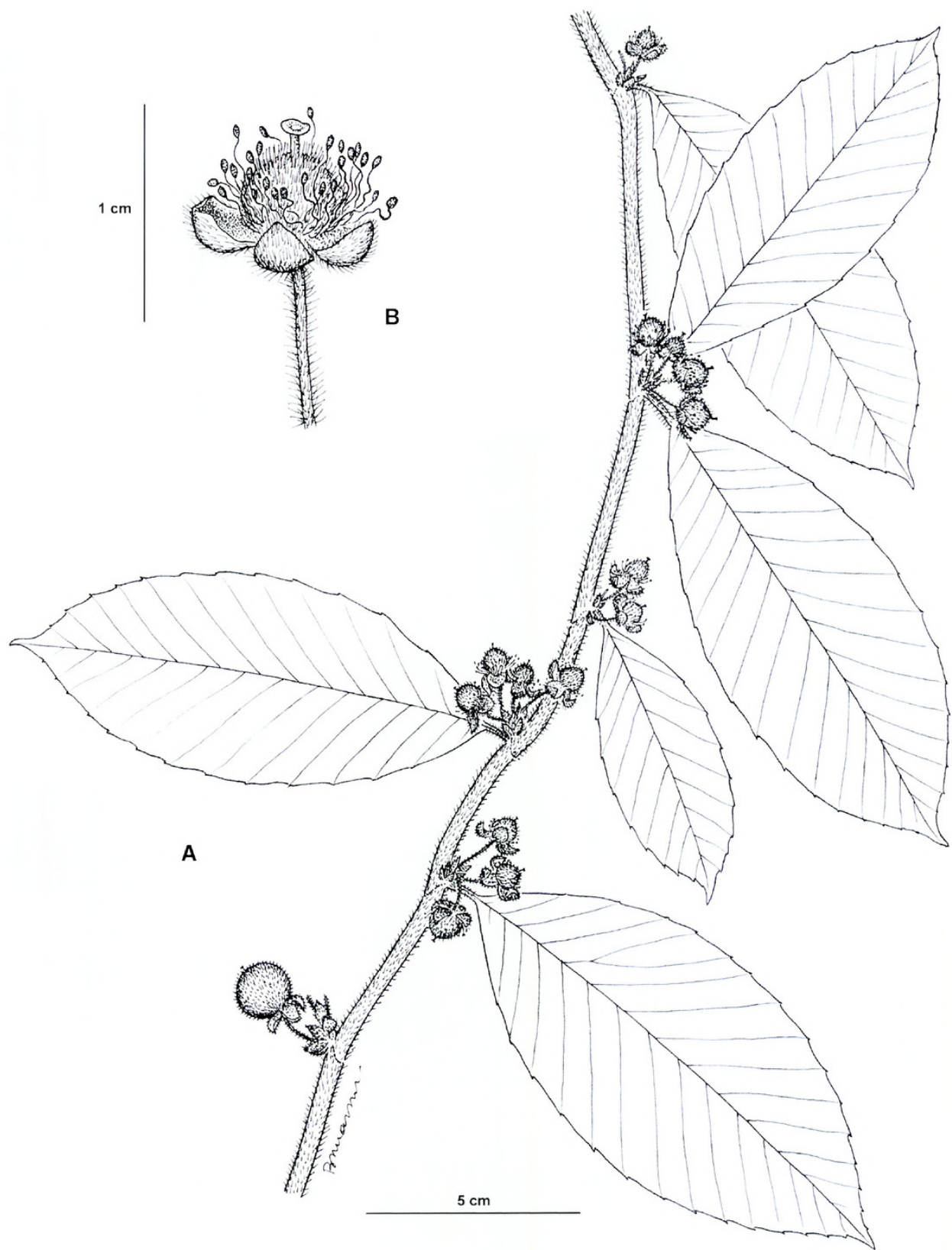


Figure 2. *Doliocarpus trianaus* Aymard. —A. Flowering branchlet. —B. Flower with a young fruit. Drawn from the holotype, R. Callejas, J. Betancur & O. Escobar 9222 (HUA).

IUCN Red List category. This new species is only known from montane forests in the Colombian Andes; therefore, using the IUCN Red List criteria (IUCN, 2001), this species should be included in the category VU (Vulnerable). However, the conservation status of the population(s) has not been determined.

Relationships. Because of its tertiary subparallel venation, *Doliocarpus trianaus* belongs to section *Calinea* (sensu Kubitzki, 1971). By its chartaceous leaves with dentate margins and papyraceous basal bracteoles, this new species is most similar to *D. pipolyi* Aymard, which is known only from Amazonian moist forests, Loreto department, Peru (Aymard, 1993). However, this new species differs from the latter in its elliptic leaves with cuneate base, dense pubescence along the midrib and secondary nerves on the lower surface; the peduncle patent-pilose; sepals ovate; and the fruit 10–12 mm in diameter, completely hispid-pilose. In contrast, *D. pipolyi* has leaves obovate to oblanceolate with base attenuate, sparsely pilose to glabrescent along the midrib and secondary nerves on the lower blade surface; peduncle adpressed-pubescent; sepals ovate-elliptic; and fruit 6–8 mm in diameter, only sparsely pilose to glabrescent when mature.

The *Callejas et al.* 9222 type specimen was previously referred to *Doliocarpus hispidus* Standley & L. O. Williams (Aymard, 1997). However, *D. hispidus* differs from the new species in its leaves broadly elliptic to elliptic-obovate, 10–21 cm long, base cuneate (vs. leaves elliptic, 5–13 cm, base attenuate); margins in the upper half of the leaf blade dentate (vs. margins dentate along the blade); petiole ca. 15 mm long (vs. petiole 5–10 mm); peduncles ca. 10 mm long, with 2 coriaceous bracteoles (vs. peduncles 8–16 cm, with 3 papyraceous bracteoles); sepals broadly ovate to suborbicular, densely yellow hispid-pubescent externally (vs. sepals ovate, adpressed-sericeous externally); and fruit covered by yellow trichomes (vs. fruit covered by white trichomes).

Etymology. This species is named in honor of José Jerónimo Triana (1828–1890), notable Colombian journalist and botanist. Throughout his participation in the Colombian Chorographic Commission (“Comisión Corográfica”) from 1851 to 1857, he explored the Colombian territory and collected nearly 4000 invaluable specimens (Dugand, 1944). Working on his *Flora Colombiana*, J. J. Triana was the first Latin American botanist to study the Dilleniaceae (Triana, 1858; Triana & Planchón, 1862).

Paratype. COLOMBIA, **Antioquia:** Amalfí, Vereda “Arenas Blancas,” 1100–1250 m, 11 Mar. 1994, R.

Fonnegra y grupo de Palinología (Sem. 1/94) 4713 (HUA, MO, PORT).

KEY TO THE SPECIES OF *DOLIOCARPUS* IN COLOMBIA (BASED ON AYMARD, 1997)

- 1. Tertiary venation reticulate; leaves with verrucosities on lower surface 2
- 1. Tertiary venation subparallel; leaves without verrucosities on lower surface. 4
- 2(1). Lateral nerves terminating at the margin; sepals glabrous externally; fruits covered by trichomes 3–5 mm long *D. olivaceus* Sprague & R. O. Williams (Antioquia, Chocó)
- 2. Lateral nerves linking close to the margin; sepals adpressed-pilose externally; fruits covered by trichomes 5–10 mm long 3
- 3(2). Branches angulate; leaves shiny on the upper surface, glabrous on the lower surface; margins entire *D. nitidus* (Triana) Triana & Planchón (Antioquia, Chocó, Ibagué, Tolima)
- 3. Branches terete; leaves dull on the upper surface, adpressed-pubescent on the lower surface; margins sinuate to dentate *D. major* J. F. Gmelin subsp. *major* (Amazonas, Antioquia, Chocó)
- 4(1). Inflorescences with peduncles 0.5–7 mm long. . . 5
- 4. Inflorescences with peduncles longer than 10 mm 13
- 5(4). Inflorescences racemose (peduncle with 2 to 6 flowers). 6
- 5. Inflorescences not racemose (peduncle with a single flower). 7
- 6(5). Leaves conduplicate, rigid-coriaceous; margins in the upper half of the leaf blade entire; sepals obovate-elliptic. . . *D. spraguei* Cheesman (Vichada)
- 6. Leaves not conduplicate, subcoriaceous or coriaceous; margins in the upper half of leaf blade serrate; sepals ovate-elliptic *D. brevipedicellatus* Garcke subsp. *brevipedicellatus* (Antioquia, Bolívar, Chocó, Córdoba, Guainía)
- 7(5). Leaves 2–4 cm wide, petiole 4–7 mm long; sepals oblong; fruit 4–6 mm diam. *D. chocoensis* Aymard (Chocó)
- 7. Leaves 4–15 cm wide, petiole 0.7–5 cm long; sepals obovate, ovate, elliptic, or obovate-elliptic; fruit 5–15 mm diam 8
- 8(7). Leaves 12–35 cm long 9
- 8. Leaves 5–12 cm long 10
- 9(8). Leaves black punctate on the lower surface; petiole 3–5 cm long; peduncle 4–7 mm long *D. lopez-palacii* Aymard (Antioquia)
- 9. Leaves not black punctate on the lower surface; petiole 1.5–3 cm long; peduncle 0.5–1 mm long *D. foreroi* Aymard (Chocó, Valle)
- 10(3). Leaves pilose on the upper surface 11
- 10. Leaves glabrous on the upper surface 12
- 11(10). Leaves elliptic, densely pubescent on the lower surface; peduncle ca. 2 mm long; sepals ciliate at the margins; fruit completely pubescent (covered by yellow stinging trichomes). *D. schultesianus* Aymard (Vaupés)
- 11. Leaves obovate or obovate-elliptic, tomentulose on the lower surface, peduncle 2–7 mm long; sepals not ciliate at the margins; fruit sparsely adpressed-pilose with white trichomes, not

stinging *D. macrocarpus*
Martius ex Eichler (Santander, Vaupés)

12(10). Leaves lanceolate or lanceolate-elliptic, coriaceous, the margins subrevolute; petioles 0.5–2 mm wide; sepals elliptic, 2–4.5 mm long, glabrous or sparsely pilose on the outside *D. savannarum* Sandwith (Guainía, Vaupés)

12. Leaves elliptic or elliptic-oblong, rigid-coriaceous, the margins strongly revolute; petioles 3–4 mm wide; sepals ovate-elliptic, 5.5–6 mm long, adpressed-pilose on the outside *D. liesneri* Aymard (Guainía)

13(4). Inflorescences racemose (peduncle with 2 to 10 flowers) 14

13. Inflorescences not racemose (peduncle with a single flower) 15

14(13). Leaves coriaceous, oblanceolate-obovate or lanceolate, the margins entire or subsinuate; sepals elliptic *D. novogranatensis* Kubitzki (Amazonas, Chocó, Meta)

14. Leaves subcoriaceous, obovate-lanceolate, the margins dentate; sepals obovate or obovate-oblong. *D. multiflorus* Standley (Antioquia, Chocó, Valle)

15(13). Sepals laxly pubescent to glabrescent on the outside; fruits glabrous 16

15. Sepals pilose to pubescent on the outside; fruits densely pubescent 19

16(15). Leaves 14–30 × 10–20 cm 17

16. Leaves 6–12 × 5–8 cm 18

17(16). Stems, petioles, and leaf blades glabrous or with sparse, non-ferruginous pubescence *D. dentatus* (Aublet) Standley subsp. *latifolius* Kubitzki (Vaupés)

17. Stems, petioles, and leaf blades with spreading, ferruginous pubescence *D. dentatus* (Aublet) Standley subsp. *ferrugineus* (Rusby) Kubitzki (Chocó)

18(16). Leaves coriaceous, the margins crenate mostly along the upper half of the blades *D. dentatus* (Aublet) Standley subsp. *undulatus* (Eichler) Kubitzki (Caquetá, Vaupés)

18. Leaves chartaceous or subcoriaceous, the margins serrate mostly along the upper half of the blades *D. dentatus* (Aublet) Standley subsp. *dentatus* (Bolívar, Boyacá, Chocó, César, Magdalena, Meta)

19(15). Margins entire or subsinuate; petioles 3–4.5 cm long; sepals pubescent adaxially . . . *D. dasyanthus* Kubitzki subsp. *robustus* Aymard (Valle)

19. Margins dentate or sinuate-crenate; petioles 1–2.5 cm long; sepals glabrous adaxially. 20

20(19). Leaves obovate or obovate-elliptic, margins sinuate-crenate; peduncle adpressed-pubescent; fruits covered by short and long trichomes *D. hispidobaccatus* Aymard (Caqueta)

20. Leaves elliptic or elliptic-obovate, margins dentate; peduncle hispid; fruits covered by uniformly sized trichomes 21

21(20). Leaves 10–21 × 4–10 cm, base cuneate, margins in the upper half of the leaf blade dentate, petiole ca. 15 mm long; peduncles with 2 coriaceous bracteoles; sepals broadly ovate to suborbicular, densely yellow hispid-pubescent abaxially; fruit 9–10 mm diam., covered by yellow trichomes. *D. hispidus* Standley & L. O. Williams (Valle)

21. Leaves elliptic, 5–13 × 3–6 cm, base cuneate, margins dentate along the entire leaf blade, petiole 5–10 mm long; peduncles with 3 papyraceous bracteoles; sepals ovate, adpressed-sericeous abaxially; fruit 10–12 cm diam., covered by white trichomes *D. trianaus* Aymard (Antioquia)

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