# Studies on the flora of the Guianas 20

## The *Dorstenia* species *(Moraceae)* of south-eastern tropical America

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ABSTRACT

One new species of *Dorstenia* from Brazil is described: *D. carautae* C.C. Berg, and four new combinations are made: *D. cayapia* Vellozo subsp. *asaroides* (Hooker) C.C. Berg, *D. cayapia* Vellozo subsp. *paraguariensis* (Hassler) C.C. Berg, *D. cayapia* Vellozo subsp. *vitifolia* (Gardner) C.C. Berg, and *D. ramosa* (Desvaux) Carauta, Valente & Sucre subsp. *dolichocaula* (Pilger) C.C. Berg. A list of and a key to the 22 *Dorstenia* species distinguished in south-eastern tropical America are presented, together with synonymy and distributional data.

## INTRODUCTION

As a sequel to the precursory paper dealing with the *Dorstenia* species of north-western tropical America (Berg & Van Leeuwen, 1982) the present paper presents a survey of the species and subspecies of *Dorstenia* recognized in the south-eastern part of the Neotropics, mainly Brazil. It includes a new species and some new combinations, as well as a key to the taxa.

The present treatment is largely based on the exploration of the Brazilian *Dorstenia* flora by Carauta and collaborators (Carauta, 1972 - Carauta & Valente, 1983).

## KEY TO THE DORSTENIA SPECIES OF BRAZIL AND ADJACENT AREAS

1. Internodes elongate, at least up to 1 cm long, leaves ± spaced along the stem.
   2. Stipules at least 0.5 cm long.

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3. Stipules subulate ..... 8. *D. setosa*
3. Stipules elliptic, ovate or (broadly) triangular.
4. Petiole (10-)15–60 cm long; base of the lamina cordate.
5. Receptacle furcate ..... 18b. *D. ramosa* subsp. *dolichocaula*
5. Receptacle orbicular to elliptic.
6. Receptacle excentrally attached; internodes rather short, occasionally to 1 cm long, 5–15 mm thick; lamina often pinnately lobed to pinnatipartite .. 17. *D. arifolia*
6. Receptacle centrally attached; internodes (normally) to 1.5 cm long, 4–10 mm thick; lamina entire, rarely pinnately lobed ..... 14. *D. grazielae*
4. Petiole 2.5–12 cm long; base of the lamina cordate to subacute or to subattenuate.
7. Lateral veins (11-)15–22 pairs; stipules 1–2 cm long, distinctly plurinervate; internodes to 8 cm long; receptacle (usually) elliptic, at least 1.5 cm broad 10. *D. elata*
7. Lateral veins 6–13 pairs; stipules 0.5–12 cm long, faintly plurinervate to uninervate; internodes to 2.5 cm long; receptacle orbictular or angular, if elliptic, then at most 1 cm broad.
8. Bracts ca. 10–12, in a single submarginal row, spathulate, (0.5-)2–3 mm long, radiating ..... 16. *D. bonijesu*
8. Bracts numerous, in 1–2 (sub)marginal rows, ovate to semi-circular, to 2 mm long, appressed.
9. Receptacle cup-shaped, red-brown ..... 11. *D. urceolata*
9. Receptacle discoid to broadly turbinate, green or partly purplish.
10. Base of the lamina acute to (sub)attenuate; petiole 3.5–8(-10) cm long; receptacle discoid, ca. 1 cm in diameter ..... 12. *D. hildegardis*
10. Base of the lamina cordate to subacute; petiole 10–21 cm long; receptacle discoid to broadly turbinate, 1–4 cm in diameter ..... 13. *D. bahiensis*
2. Stipules to 0.5 cm long.
11. Stipules ovate, plurinervate, appressed; bracts spathulate, (0.5-) 2–3 mm long, radiating ..... 15. *D. albertii*
11. Stipules subulate or (narrowly) triangular, ± patent or deflexed; bracts ovate to semi-circular, to 2 mm long and usually appressed.
12. Petiole 4–14 cm long ..... 8. *D. setosa*
12. Petiole to 3(-4) cm long.
13. Petiole 0.3–0.5 cm long; internodes to 5 cm long..... 4. *D. brevipetiolata*
13. Petiole at least 0.5 cm long; internodes to 2 cm long.
14. Base of the lamina attenuate; receptacle irregularly angular to stellate and 3–4 cm in diameter; penduncle to 3 cm long ..... 5. *D. contensis*
14. Base of the lamina obtuse to acute, or, if subattenuate, then the receptacle orbicular or to 2 cm in diameter, or the penduncle to 1 cm long.
15. Stamens 3 in all or many flowers; staminate flowers distinctly concentrated in the periphery of the flowering face.
16. Receptacle irregularly stellate by ca. 5–12, semicircular to linear, to 1.2 long, submarginal appendages ..... 1. *D. appendiculata*
16. Receptacle orbicular to slightly angular, not (long-)appendiculate, at most with numerous, very short, marginal appendages..... ..... 2. *D. turnerifolia*
15. Stamens 2; staminate and pistillate flowers (usually) intermixed.
17. Receptacle 1–3 cm in diameter, orbicular to slightly angular, green, its marginal bracts not distinctly unequal in size; peduncle 1.5–6 cm long . ..... 3. *D. hirta*
17. Receptacle 0.5–2 cm in diameter, angular to substellate (to almost orbicular), often partly purplish, its marginal bracts distinctly unequal in size; peduncle 0.5–1.5(-2) cm long.
18. Base of the lamina cordate.

19. Peduncle 1.5–4 cm long; receptacle (1-)1.5–2.5 cm in diameter; petiole 1.5–4 cm long, hirsute ..... 8. *D. setosa*
19. Peduncle 0.7–1.5(-2) cm long; receptacle 0.3–1(-1.3) cm in diameter; petiole 0.5–1(-2.5) cm long, hirtellous ..... 9. *D. milaneziana*

18. Base of the lamina acute, obtuse, or rounded.
20. Lamina lanceolate to oblong (to rounded), up to 10 × 3 cm; petiole 0.5–1.5(-2.5) cm long; Rio de Janeiro, Minas Gerais, and São Paulo ..... 6. *D. bowmaniana*
20. Lamina oblong to elliptic (to ovate), up to 16 × 7 cm, petiole (0.5-) 1–4 cm long; São Paulo, Paraná, and Santa Catarina ..... 7. *D. carautae*

1. Internodes short, at least some of them; leaves (sub)rosulate.
21. Receptacle furcate ..... 18a *D. ramosa* subsp. *ramosa*
21. Receptacle elliptic to (sub)orbicular or quadrangular to irregularly lobed.
22. Receptacle excentrally attached; lamina usually 10–30 cm long, often pinnately incised ..... 17. *D arifolia*
22. Receptacle centrally (or slightly excentrally) attached; lamina up to 15 cm long, entire or palmately incised.
23. Lamina 3-partite (sometimes 3-lobed to subentire); receptacle 2.5–3 cm in diameter; inflorescences bisexual ..... 16. *D. bonijesu*
23. Lamina entire, or if 3-lobed to 3-parted, then the receptacle 0.5–2 cm in diameter and the inflorescences unisexual.
24. Stem and leaves glabrous ..... 13. *D. bahiensis*
24. Stem and/or leaves hairy.
25. Inflorescences unisexual; stipules obtuse to rounded; endocarp body smooth; lamina ovate to cordiform to reniform, entire or palmately lobed to parted ..... 20. *D. cayapia*
25. Inflorescences bisexual; stipules acute to acuminate; endocarp body mostly tuberculate; lamina elliptic to oblong to (sub)ovate or cordiform, entire.
26. Lamina cordiform with a wide sinus at the base; lateral veins 4–6 pairs; receptacle discoid, often (sub)stellate ..... 22.*D. tenuis*
26. Lamina elliptic to ovate to oblong to subobovate, if the base (sub)cordate, then the sinus narrow; lateral veins at least 6 pairs; receptacle often ± cup-shaped, (sub)orbicular.
27. Lateral veins 6–7 pairs, faintly loop-connected, or, if not so, then not furcate; stipules conspicuous ..... 19. *D. conceptionis*
27. Lateral veins 6–14 pairs, usually terminating in the margin and furcate, if faintly loop-connected, then at least 10 pairs of lateral veins; stipules inconspicuous ..... 21. *D. brasiliensis*

1. **Dorstenia appendiculàta** Miquel in Martius, Fl. Bras. 4(1): 162. 1853.
Distribution: Brazil: Bahia, Espirito Santo, Minas Gerais.

2. **Dorstenia turnerifolia** Fischer & Meyer, Index Sem. Hort. Petropolis 11: 63. 1846.
Synonym: *D. argentata* Hooker f.
Distribution: Brazil: Bahia, Espirito Santo, Rio de Janeiro.

3. **Dorstenia hirta** Desvaux, Mem. Soc. Linn. Paris 4: 218. 1826.
Synonyms: *D. erecta* Vellozo, *D. erecta* var. *hispida* (Hooker) Bureau; *D. erecta* var. *minor* (Fischer & Meyer) Bureau, *D. erecta* var. *varroniifolia*

(Fischer & Meyer) Bureau, *D. hispida* Hooker, *D. hispida* forma *minor* (Fischer & Meyer) Miquel, *D. minor* Fischer & Meyer, *D. varroniifolia* Fischer & Meyer

Distribution: Brazil: Bahia, Espirito Santo, Minas Gerais, Paraná, Rio de Janeiro, São Paulo.

4. **Dorstenia brevipetiolata** Berg, Proc. Kon. Ned. Akad. Wetensch. Ser. C, **88** (3), 264 (1985).

Distribution: Brazil: Rio de Janeiro.

5. **Dorstenia contensis** Carauta & C.C. Berg, Proc. Kon. Ned. Akad. Wetensch. Ser. C, **88**(3), 261 (1985).

Distribution: Brazil: Bahia.

6. **Dorstenia bowmaniana** J.G. Baker in W.W. Saunders, Refug. Bot. **5**: t. 303. 1871.

Synonym: *D. lagoensis* Bureau

Distribution: Brazil, Bahia, Espirito Santo, Minas Gerais, Rio de Janeiro, São Paulo.

7. **Dorstenia carautae** C.C. Berg, spec. nov. Fig. 1.

Herba ad circ. 50 cm alta; caulis internodis longis. Folia spiraliter disposita; lamina oblonga vel elliptica, 4–16 × 2–7 cm, apice subacuta ad acuminata, basi acuta ad rotunda, supra hispidula, subtus puberula; venae laterales 6–10-jugae; petiolus (0.7–)1–4 cm longus; stipulae 0.1–0.4 cm longae, appressae, patentes vel recurvatae. Inflorescentia viridis; pedunculus 0.7–2 cm longus; receptaculum centraliter affixum, angulae ad substellatae, (0.7–)1–2 cm diam.; flores staminati inter pistillatos dispersi.

Herb, to ca. 50 cm tall; stems partly repent to rhizomatous, 1–4 mm thick, (rather) densely puberulous to hirtellous with straight, curved and/or uncinate hairs; internodes to 3.5 cm long. Leaves in spirals, tending to distichous; lamina oblong to elliptic, 4–16 cm long, 2–7 cm broad, chartaceous to membranous, apex subacute to (sub)acuminate, base acute to obtuse to rounded, margin ± coarsely crenate-dentate to subentire; upper surface hispidulous or glabrous, lower surface puberulous with straight to uncinate hairs, mainly on the veins; lateral veins 6–10 pairs, rather distinctly loop-connected; petiole (0.7–)1–4 cm long, puberulous with minute, straight, curved or uncinate hairs; stipules narrowly triangular to almost subulate, 0.1–0.4 cm long, uninervate, appressed or more or less patent to recurved, sparsely minutely puberulous.

Inflorescences green; peduncle 0.7–2 cm long, minutely puberulous; receptacle centrally attached, discoid to broadly turbinate, angular to (sub)stellate, (0.7–)1–2 cm in diameter, outside minutely puberulous; fringe distinct, ca. 1 mm broad; bracts in 2–4 rows, on the margin and the fringe, ovate to suborbicular, to 0.7 mm long, distinctly unequal in size, appressed or sometimes the larger ones radiating; staminate flowers among the pistillate ones, tepals 2, stamens 2, filament about as long as the perianth; stigmas 2, (sub)equal, ca. 0.1–0.2 mm long; endocarp body ca. 2 × 1.5 mm, tuberculate.

Typus: Brazil, São Paulo, Eldorado, near Gruta da Tapagem, 22 Jan 1971, *Carauta 1277* (holo- RB; iso- AC, COL, E, F, GH, GUA, K, NCU, SING, SP, U, US, UT, ZA).

Additional collections, all from Brazil (see Fig. 4):
PARANÁ: Adrianópolis, Barra Rio Pardo, 5 Apr 1976, *Hatschbach 38550* (MBM); Antonia, Rio Cotia, 24 Mar 1966, *Hatschbach 14137* (MBM); Cerro Azul, Barra Rio Bom Sucessa, 24 Jan 1974, *Hatschbach 33745* (MBM); Guaraqueceba, Fazenda Abebreira, 15 Nov 1969, *Hatschbach 22461* (MBM); Guaratuba, Pedra

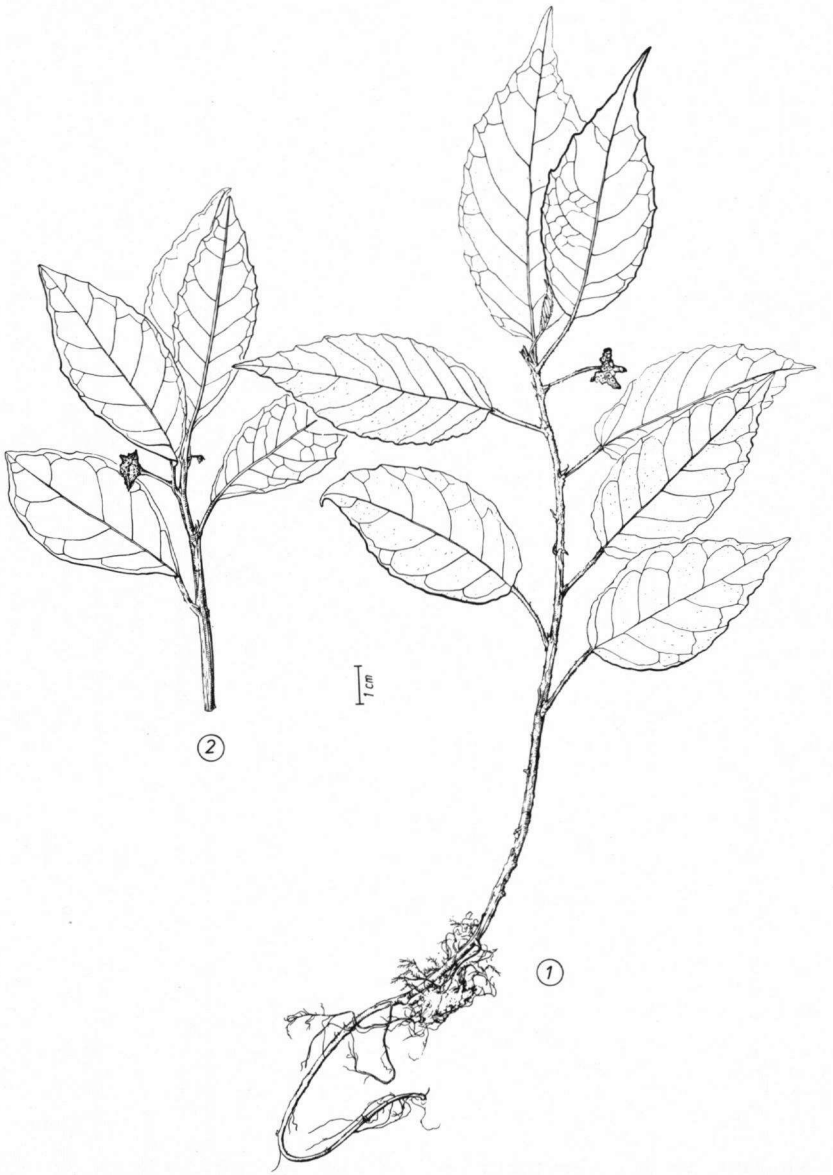


Fig. 1. *Dorstenia carautae*: 1, from *Lofgren s.n.*; 2, from *Dusén 14383*.

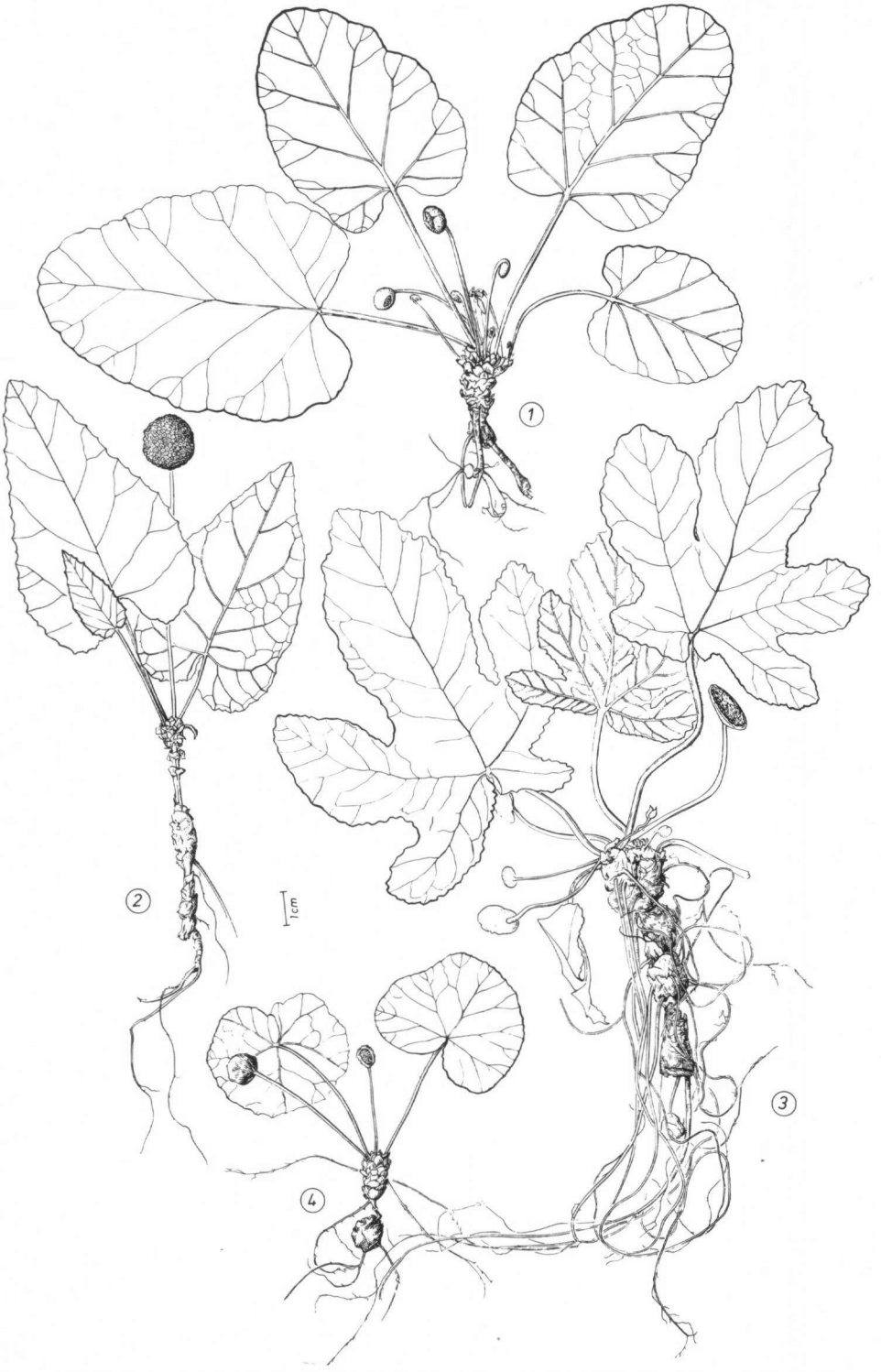


Fig. 2. *Dorstenia cayapia*: 1, subsp. *paraguariensis*, from *Hassler 7598a*; 2, subsp. *cayapia*, from *T.S. Santos 3008*; 3, subsp. *vitifolia*, from *Irwin et al. 15589*; 4, subsp. *asaroides* from *Harley et al. 10949*.


Fig. 3. *Dorstenia brasiliensis*, various forms: 1, from *Liesner et al. 5753*; 2, from *Steyermark 89331-A*; 3, from *Pereira 245*; 4, from *Troncoso et al. 2255*.

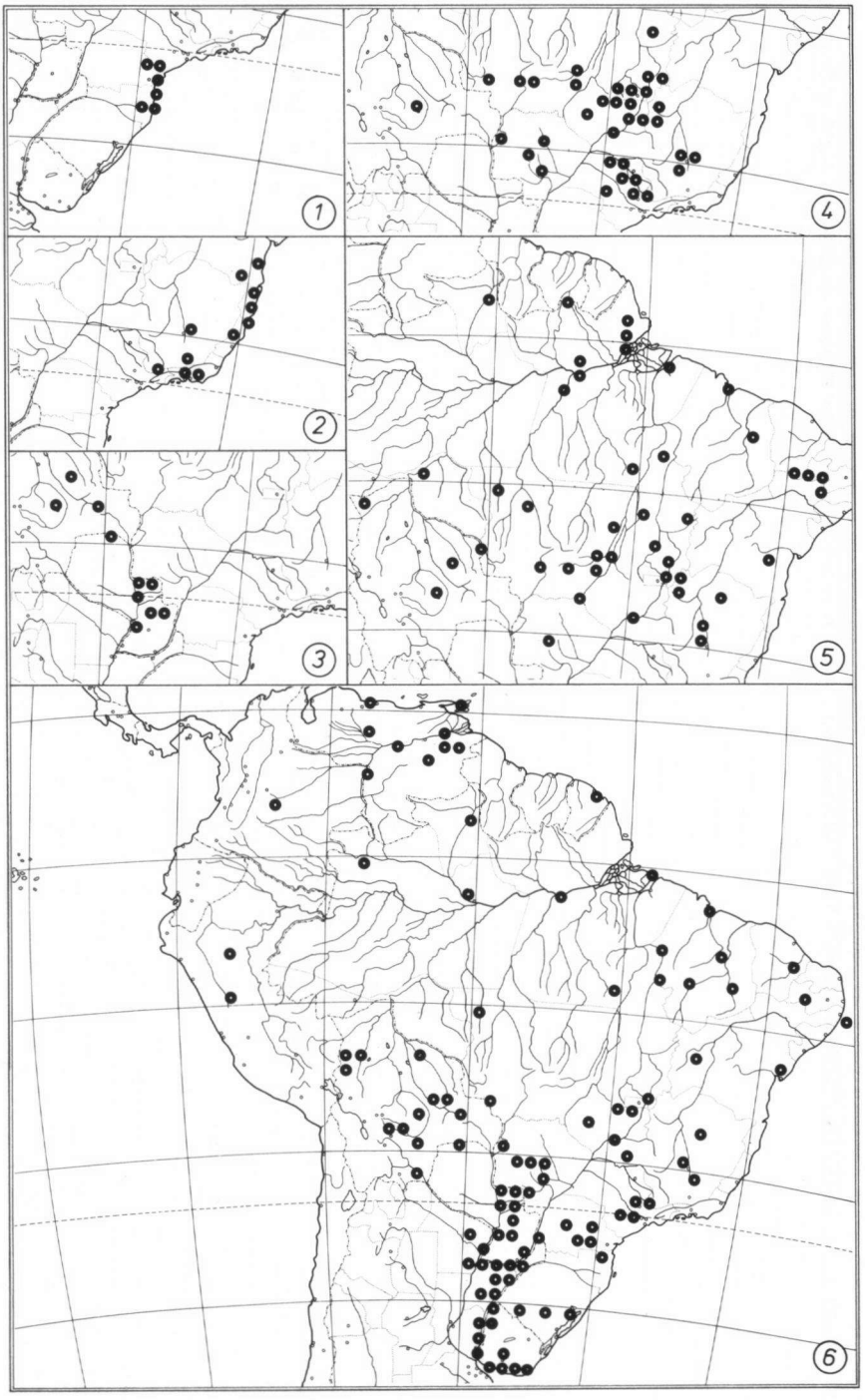


Fig. 4. Distribution of some taxa of *Dorstenia*; 1, *D. carautae*; 2, *D. cayapia* subsp. *cayapia*; 3, *D. cayapia* subsp. *paraguariensis*; 4, *D. cayapia* subsp. *vitifolia*; 5, *D. cayapia* subsp. *asaroides*; 6, *D. brasiliensis*.

de Araraquara, 9 Mar 1961, *Hatschbach 7887* (HB, HBR, MBM); Guaratuba, Rio Boguaçu, 23 Oct 1957, *Hatschbach 5185* (MBM); Morretes, 23 Jan 1914, *Dusén 14383* (F, K, MICH, NY, P), 16 Dec 1964, *Hatschbach 12038* (MBM); Morretes, Col. Floresta, 4 Oct 1968, *Hatschbach 19910* (MBM); Morretes, Estacão Marumbi, Rio Taquaral, 12 Dec 1948, *Hatschbach 1147* (MBM, US); Morretes, Rio dos Padres, 1 Dec 1972, *Hatschbach 30893* (MBM); Morretes, Serra Marumbi, Picado do Olímpio, 19 Jan 1971, *Hatschbach 26006* (MBM); Paranaguá, 14 Dec 1948, *Tessmann s.n.* (MBM, MO); Paranaguá, Rio Cambara, 28 May 1968, *Hatschbach 15254* (MBM, MICH); Porto de Cima, 12 Dec 1914, *Dusén 14617* (MO); Quarto Ramos, Rio do Carvo, 12 Jan 1967, *Hatschbach 15700* (MBM); Rio Iriranga, 2 Mar 1967, *Hatschbach s.n.* (MBM).

SANTA CATARINA: Arar, Terão, –, *Reitz 139* (RB); Florianópolis, Morro Itacoburi, 12 Mar 1952, *L.B. Smith et al. 6152* (US); Ilha de Santa Catarina, Morro Costa da Lagoa, 21 Dec 1966, *Klein 6985* (Herb. Fac. Farm, Paraná); Itajaí, Morro da Fazenda, –, *Carauta et al. 4464* (GUA), 4 Mar 1954, *Reitz et al. 1720* (HBR, US); Itajai, Luiz Alves, Braco Joaquim, 19 Apr 1956, *Reitz et al. 3164* (HBR); São Francisco do Sul, Garuva, Tres Barras, 19 Dec 1957, *Reitz et al. 5759* (HBR, K, N); Pilões, Palhoca, 17 Feb 1957, *Reitz et al. 5922* (HBR, MBM, K), 4 Apr 1957, *L.B. Smith et al. 12355* (US); Rio do Sul, Serra do Matador, 17 Oct 1958, *Reitz et al. 7327* (HBR, K). (cf. Carauta, Valente & Barth, 1979).*)

The material referred to *D. carautae* has been inserted in *D. lagoensis* Bureau (Carauta, Valente & Barth, 1979). *D. lagoensis* is regarded as a synonym of *D. bowmaniana* J.G. Baker in the present paper. The latter species has a scattered distribution in the States of Minas Gerais and Rio de Janeiro. It differs from *D. carautae* in the smaller leaves and inflorescences and in features of the indument. *D. carautae* and *D. bowmaniana* appear to be closely related, but sufficiently distinct to justify recognition at the species level.

8. **Dorstenia setosa** Moricand, Pl. Nouv. Amer. 103. 1841.
Distribution: Brazil: Bahia.

9. **Dorstenia milaneziana** Carauta, Valente & Sucre, Bradea 2(no. 48): 473, with plate. 1975.
Synonym: *D. gracilis* Carauta, Valente & Araujo
Distribution: Brazil: Bahia, Espirito Santo.

10. **Dorstenia elata** Hooker, Ic. Pl. Ser. 1, 3: t. 220. 1840.
Synonyms: *D. longifolia* Moricand, *D. plumeriifolia* Fischer & Meyer, *D. sucrei* Carauta
Distribution: Brazil: Bahia, Espirito Santo, Minas Gerais, Rio de Janeiro, São Paulo.

* Data for the collections were supplied by Dr. J.P.P. Carauta (Rio de Janeiro).

11. **Dorstenia urceolata** Schott, Flora (or Bot. Zeit.) 4(1): 197. 1821.

Synonyms: *D. caulescens* Vellozo, *D. caulescens* var. *angustifolia* Fielding & Gardner, *D. caulescens* var. *latifolia* Fielding & Gardner, *D. langsdorffiana* Fischer & Meyer, *D. nervosa* Desvaux, *D. nervosa* var. *angustifolia* Desvaux, *D. nervosa* forma angustifolia (Desvaux) Miquel, *D. nervosa* var. *latifolia* Desvaux, *D. nervosa* forma *latifolia* (Desvaux) Miquel, *D. urceolata* var. *angustifolia* (Desvaux) Bureau, *D. urceolata* var. *latifolia* (Desvaux) Bureau. *D. urceolata* var. *variegata* Bureau

Distribution: Brazil: Paraná, Rio de Janeiro.

12. **Dorstenia hildegardis** Carauta, Valente & Barth, Rev. Brasil. Biol. 38(3): 613. 1978.

Distribution: Brazil: Espirito Santo.

13. **Dorstenia bahiensis** Fischer & Meyer, Index Sem. Hort. Petropolis 11: 64. 1846.

Synonyms: *D. anthuriifolia* Blake, *D. martiana* Miquel

Distribution: Brazil: Bahia, Pernambuco.

14. **Dorstenia grazielae** Carauta, Valente & Sucre, Atas Soc. Biol. Rio de Janeiro 16(2): 59. 1973.

Distribution: Brazil: Rio de Janeiro, São Paulo.

15. **Dorstenia albertii** Carauta, Valente & Sucre, Atas Soc. Biol. Rio de Janeiro 17(2): 63, t. 1-2. 1974.

Distribution: Brazil: Espirito Santo.

16. **Dorstenia bonijesu** Carauta & Valente, Atas Soc. Bot. Rio de Janeiro 1(no.20): 112, t. 1-3. 1983.

Distribution: Brazil: Minas Gerais, Rio de Janeiro.

17. **Dorstenia arifolia** Lamarck, Encycl. Bot. 2: 317, 1786.

Synonyms: *D. arifolia* var. *pinnatifida* Miquel, *D. cyperus* Vellozo, *D. fairia* Paiva, *D. ficifolia* Fischer & Meyer, *D. fischeri* Bureau, *D. mandiocana* Fischer & Meyer, *D. maris* Valente & Carauta, *D. multiformis* Miquel (nom. illeg., forma B), *D. multiformis* var. *arifolia* (Lamarck) Bureau, *D. multiformis* var. *ficifolia* (Fischer & Meyer) Bureau, *D. multiformis* var. *pinnatifida* (Miquel) Peckolt & Peckolt, *D. peltata* Fischer & Meyer, *D. quadrata* Desvaux, *D. riedeliana* Fischer & Meyer, *D. tentaculata* Fischer & Meyer

Distribution: Brazil: (Bahia?), Espirito Santo, Minas Gerais, Rio de Janeiro, São Paulo.

18. **Dorstenia ramosa** (Desvaux) Carauta, Valente & Sucre, An. XXIII. Congr. Bot. Garanthus 158. 1973.

Synonyms: *D. multiformis* Miquel var. *ramosa* (Desvaux) Bureau, *D. sychinium* Steudel, *Sychinium ramosum* Desvaux

a. subsp. **ramosa**

Synonyms: *D. ceratosanthes* Loddiges, *D. ceratosanthes* forma *integrifolia* Wawra, *D. ceratosanthes* var. *riedeliana* Regel, *D. ceratosanthes* var. *triloba* Regel, *D. ficus* Vellozo, *D. multiformis* Miquel (nom. illeg., forma A), *D. multiformis* var. *ceratosanthes* (Loddiges) Bureau

Stem (5–) 10–15 mm thick, internodes short. Leaves (sub)rosulate; lamina to 35 cm long, if incised, then with (1–)3–5 lobes at each side; stipules often to 1.5 cm long.

Distribution: Brazil: Rio de Janeiro.

b. subsp. **dolichocaula** (Pilger) C.C. Berg, stat. et comb. nov. Based on *Dorstenia dolichocaula* Pilger, Repert Sp. Nov. **41**: 22. 1937.

Synonyms: *D. dolichocaula* var. *dissidens* Pilger, *D. capricorniana* Carauta, Valente & Sucre.

Stem 4–8 mm thick, internodes to 5 cm long. Leaves spaced along the stem; lamina to 30 cm long, on average smaller than in ssp. ramosa, if incised, then with (3–)2(–1) lobes at each side; stipules usually to 1 cm long.

Distribution: Brazil: Minas Gerais, Rio de Janeiro, São Paulo.

19. **Dorstenia conceptionis** Carauta, Bol. Mus. Bot. Curitiba **17**: 1, t. 1. 1974.

Distribution: Brazil: Espirito Santo.

20. **Dorstenia cayapia** Vellozo, Fl. Flum. 52. 1829. Fig. 2.

a. subsp. **cayapia**

Synonyms: *D. pacheoleoneana* Machado, *D. pseudo-opifera* Hassler.

Distribution (Fig. 4): Brazil: Bahia, Espirito Santo, Minas Gerais, Rio de Janeiro, São Paulo.

b. subsp. **paraguariensis** (Hassler) C.C. Berg, stat. nov. Based on *D. cayapia* forma *parguariensis* Hassler, Ann. Cons. Jard. Bot. Genève **21**: 116. 1919.

Synonyms: *D. cayapia* forma *paraguariensis* Hassler subforma *lobata* Hassler, *D. paraguariensis* (Hassler) Carauta

Distribution (Fig. 4): Bolivia: Santa Cruz; Paraguay.

c. subsp. **vitifolia** (Gardner) C.C. Berg, stat. et comb. nov. Based on *D. vitifolia* Gardner in Fielding & Gardner, Sert. Pl. **1**: t. 14. 1843.

Synonyms: *D. bryoniifolia* Miquel, *D. bryoniifolia* forma *minor* Hoehne, *D. cayapia* var. *bryoniifolia* (Miquel) Bureau, *D. morifolia* Fischer & Meyer

Distribution (Fig. 4): Brazil: Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo; Bolivia: Santa Cruz.

d. subsp. **asaroides** (Hooker) C.C. Berg, stat. et comb. nov. Based on *D. asaroides* Hooker, Ic. Pl., Ser 1, **4**: t. 399. 1841.

Synonym: *Dorstenia asaroides* var. *celiae* Carauta & Valente, *D. cayapia* Vellozo var. *asaroides* (Hooker) Bureau

Distribution (Fig. 4): Brazil: Amapá, (Acre?), Bahia, Ceará, Distrito Federal, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais,

Pará, Pernambuco, Piauí, Rondônia, and Roraima; Bolivia: Pando, Santa Cruz; probably also in southern Suriname.

The present concept of the species was proposed by Bureau (1873). Gardner (1843) already indicated the possibility that *D. vitifolia* and *D. asaroides* are conspecific. On the basis of morphological differences, mainly in the leaves, the four subspecies can be recognized. At least subsp. *cayapia* appears to be ecologically distinct as well. The majority of the specimens can be placed in one of the subspecies. However, there are more or less intermediate specimens, especially between subsp. *vitifolia* and subsp. *asaroides* and between subsp. *vitifolia* and subsp. *paraguariensis*.

Key to the subspecies of *D. cayapia*:

1. Lamina entire, mostly reniform and somewhat broader than long; stipules to 0.2(-0.3) cm long; receptacle usually ca. 1 cm in diameter; Central and Amazonian Brazil ..... 20d. subsp. *asaroides*
1. Lamina entire and ovate to cordiform, mostly longer than broad, or palmately lobed to parted; stipules to 0.5 cm long; receptacle mostly ca. 1–2 cm in diameter.
   2. Lamina palmately lobed to parted, mostly almost as long as broad; Central Brazil and Bolivia ..... 20c. subsp. *vitifolia*
   2. Lamina entire, mostly ca. 1.5–2 × as long as broad.
      3. Lamina variegated; lateral veins often faintly loop-connected; East Brazil..... 20a. subsp. *cayapia*
      3. Lamina not variegated; lateral veins terminating in the margin; Paraguay..... 20b. subsp. *paraguariensis*

21. **Dorstenia brasiliensis** Lamarck, Encycl. Bot. **2**: 313. 1786.

Synonyms: *D. amazonica* Carauta, Valente & Barth, *D. brasiliensis* forma *balansae* Chodat & Vischer, *D. brasiliensis* var. *guaranitica* Chodat & Vischer, *D. brasiliensis* var. *major* Chodat, *D. brasiliensis* (var. genuina) forma *major* (Chodat) Hassler, *D. brasiliensis* var. *palustris* Hassler, *D. brasiliensis* var. *tomentosa* (Fischer & Meyer) Hassler, *D. brasiliensis* var. *tubicina* (Ruiz & Pavon) Chodat & Vischer, *D. heringeri* Carauta & Valente, *D. infundibuliformis* Loddiges, *D. montana* Herzog, *D. montevidensis* Fielding & Gardner, *D. pernambucana* Arruda da Camara, *D. sabanensis* Cuatrecasas, *D. schulzii* Carauta, Valente & Araujo, *D. tubicina* Ruiz & Pavon, *D. tubicina* var. *opifera* (Martius) Hassler forma *subexcentrica* Hassler.

Distribution: Trinidad; Venezuela: Amazonas, Bolívar, Carabobo, Guarico, Monagas; Colombia: Meta; French Guiana; Peru: Huánuco, San Martín; Brazil: Amazonas, Ceará, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Pará, Paraíba, Paraná, Pernambuco, Piauí, Rio Grande do Sul, Roraima, São Paulo; Bolivia: Beni, Santa Cruz; Paraguay; Argentina: Chaco, Corrientes, Misiones; Uruguay.

In the present concept *D. brasiliensis* is a polymorphic species and also the most widespread in South America. In the southern part of the species area (Argentina, Uruguay, and southern Brazil) the species is represented by

specimens with thick (coriaceous to subcoriaceous), broadly elliptic to ovate leaves with on the upper surface mostly only dense minute conical hairs. In the northern part of the area (Venezuela, Trinidad, French Guiana, the Amazon Basin, and north-eastern Brazil) the species is represented by specimens with thin (thinly chartaceous to membranous), mostly oblong to subobovate leaves with on the upper surface mostly rather long, appressed hairs. In the central part of the area (Central Brazil, Peru, Bolivia and Paraguay) most of the specimens are more or less intermediate in leaf characters. In this central part of the area many specimens have leaves with an obtuse to subacute apex, a feature occasionally found in specimens of the northern and southern parts of the area. The variation in leaf characters is more or less distinctly clinal. Although the northern and southern forms are quite distinct, the lack of discontinuities in the variations renders recognition of intraspecific taxa almost impossible. However, within *D. brasiliensis* two distinct forms occur. One of them is found in Central Brazil and has been described as *D. heringeri*. It has many rows of bracts below the margin of the receptacle, while the receptacle normally bears ca. 2 rows of (sub)marginal bracts, occasionally up to 5 rows. Another distinct form is found in northern Argentina, Paraguay, Bolivia, and southern Mato Grosso. It has been described as *D. schulzii* and is distinct in the rather thin, variegated leaves. Considering the variation in the species it seems hardly justified to give formal recognition to these two forms by treating them as varieties.

22. **Dorstenia tenuis** Bureau in De Candolle, Prodr. **17**: 264. 1873.

Distribution: Brazil: Paraná, Rio Grande do Sul, Santa Catarina; Paraguay; Argentina: Chaco, Corrientes, Misiones.

Note: Due to the absence of type specimens the names *D. cordifolia* Lamarck *D. opifera* Martius (= *D. cayapia* Vellozo *opifera* (Martius) Hassler), and *D. vilella* Paiva cannot be applied or put into the synonymy.

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