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THE AFRICAN DICHAPETALACEAE VIII

*A taxonomical revision.
This fifth instalment of the revision of
Dichapetalum
contains the treatment of the species r-z*

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INTRODUCTION AND ACKNOWLEDGEMENTS

This eighth publication in the series *The African Dichapetalaceae* contains the revision of the *Dichapetalum* species r-z. The parts containing the revision of the species a-b, c-f, g-l, and m-q were published in 1973, 1978, 1979, and 1981 respectively. The following part, dealing with the African species of *Tapura*, is expected to be published in 1983.

In the series r-z 16 names proved to represent distinct species or at least have been treated as such. To these 6 new species are added of which 3 were already published in 1980.

The author is grateful to the directors and curators of the herbaria cited for their continued loan of material.

The illustrations have been made by Miss M. DE GEUS (fig. 19), Miss Y. F. TAN (fig. 7, 11, 16), Mrs. P. VERHEY-HAYES (fig. 13), Miss J. WILLIAMSON (fig. 5, 6, 8, 9, 14, 18, 20), Miss H. G. D. ZEWARD (fig. 1, 2, 3, 4, 10, 15, 17, 21), Mr. A. GRUTER (fig. 12), and Mr. G. J. LANGEDIJK (fig. 22).

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TAXONOMIC TREATMENT SPECIES R-Z

D. rapaiosii Winkler, nomen (on Winkler 1281) = ***Tapura africana*** Oliv.

D. reflexum nomen = ***D. deflexum*** (Kl.) Engl.

For details see BRETELER, 1978: 47.

***D. reticulatum* Engl.**

Fig. 1 Map 1

D. reticulatum Engler, 1902: 82; 1912-a: 578; De Wildeman, 1919: B60, p.p.: except *Zenker 353 & 4351*, see notes; Keay, 1958: 438; Breteler, 1973: XIX; Punt, 1975: 27; Breteler, 1979: 66; 1980: 85.

Type: Cameroun, Bipindi, *Zenker 752* (lectotype: WU; isotypes: B, BREM).

D. cordifolium Hutchinson & Dalziel, 1928-a: 324. For full details see Breteler, 1978: 23.

Diagnostic characters. Liana or lianescent shrub. Branchlets densely villos-tomentose. Leaves obovate-elliptic, (8)11–16(19) × (5)7–8(11) cm, with (4)6–9(15) mm long petiole, shortly acuminate, velutinous-tomentose beneath.

Inflorescence subumbellate, up to ca 25-flowered. Pedicel up to ca 6 mm long. Petals spreading to reflexed, subequal in length to sepals, 3–3.5 mm long, ca 1 mm split, hairy outside. Stamens spreading to reflexed, 5–7 mm long. Stamino-odes glabrous, 2-horned apically. Pistil (2-)3-merous, 6 mm long, ovary velutinous. Fruits velutinous.

Description. *Liana* or lianescent shrub. *Branchlets* densely villous-tomentose to somewhat velutinous. *Stipules* ovate-triangular, often broadly so, 3–8 mm long, up to 5 mm wide, villous-tomentose, often early caducous. *Leaves*: petiole subterete to semiterete, (4)6–9(15) mm long, villous-tomentose; blade obovate-elliptic, 1.5–2 times as long as wide, (8)11–16(19) × (5)7–8(11) cm, rounded to obtuse rarely cordate at base, acuminate at top, the acumen acute, 0.5–1 cm long; appressed-pubescent above when young, more tomentose and longer persistent on the impressed midrib, velutinous-tomentose beneath, more densely so on the reticulate venation especially on midrib and the 8–10 pairs of main lateral nerves; glands usually few, beneath only, inconspicuous, rather well dispersed. *Inflorescence* subumbellate, sometimes once distinctly branched, up to ca 25-flowered, tomentose; peduncle often with one or a few bracts, (5)8–12(20) mm long; bracts and bracteoles triangular, 1–3 mm long, villous-tomentose both sides, often less densely so inside. *Pedicel* up to ca 6 mm long, the upper part up to 1 mm long. *Sepals* spreading-reflexed, shortly united at base, oblong-elliptic, 3–4 × 1–1.5 mm, villous-tomentose outside, puberulous apically inside. *Petals* spreading-reflexed, as long as or slightly shorter than sepals, at base shortly adnate to filaments, 3–3.5 mm long, ca 1 mm split, outside sericeous on lobes and just below lobes and apically with some curled hairs, glabrous inside; lobes concave, proximal lobe margins basally united and standing out. *Stamens* spreading-reflexed, 5–7 mm long, glabrous; anthers subreniform, up to 0.5 mm long. *Staminodes* oblong, 1–1.5 mm long, glabrous, usually 2-horned apically. *Pistil* (2-)3-merous, 6 mm long; ovary velutinous to somewhat sericeous; style glabrous or with a few sparse hairs in lower part; stigma discoid to obscurely (2-)3-lobed. *Fruits* (only immature fruits seen) subglobose, apically impressed, velutinous.

Distribution: Nigeria, Cameroun.

Ecology: Rain forest.

Specimens examined:

NIGERIA. Ibadan South Res., *Chizea* FHI 24485 (FHI, K, P); Akure, *Foster* 192 (K, type of *D. cordifolium*); Akure F.R., Aponmu, *Keay* FHI 25610 (FHI, K); *Onochie* FHI 19659 (FHI); Benin prov., Udo, *Umana* FHI 29104 (FHI, K, P).

CAMEROUN. Yaoundé, *Zenker* 752 (B, BREM, WU, type); Bipindi, *Zenker* 782 (B, K. WU, paratype).

Notes. The original material of the two syntypes cited by ENGLER was lost

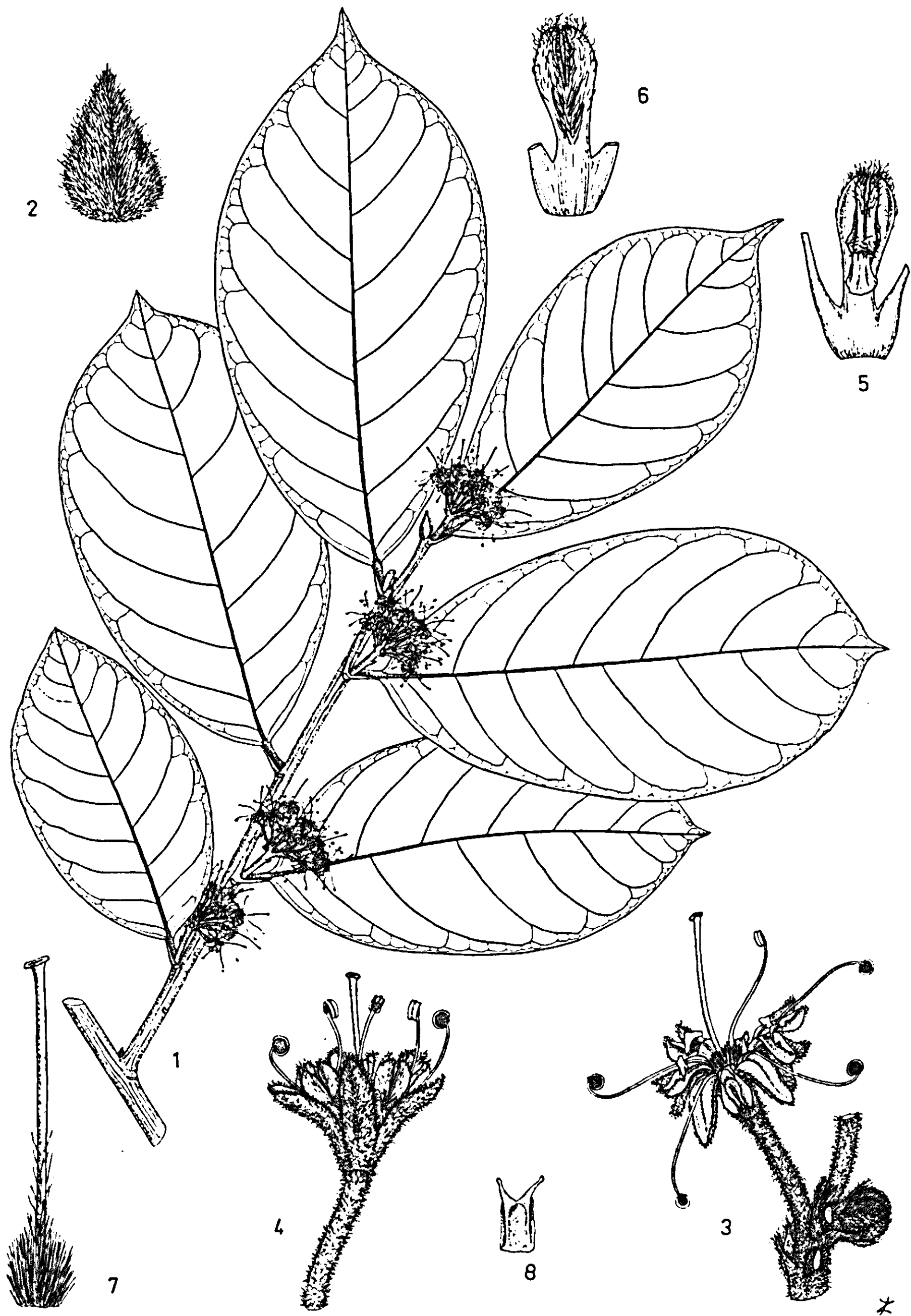
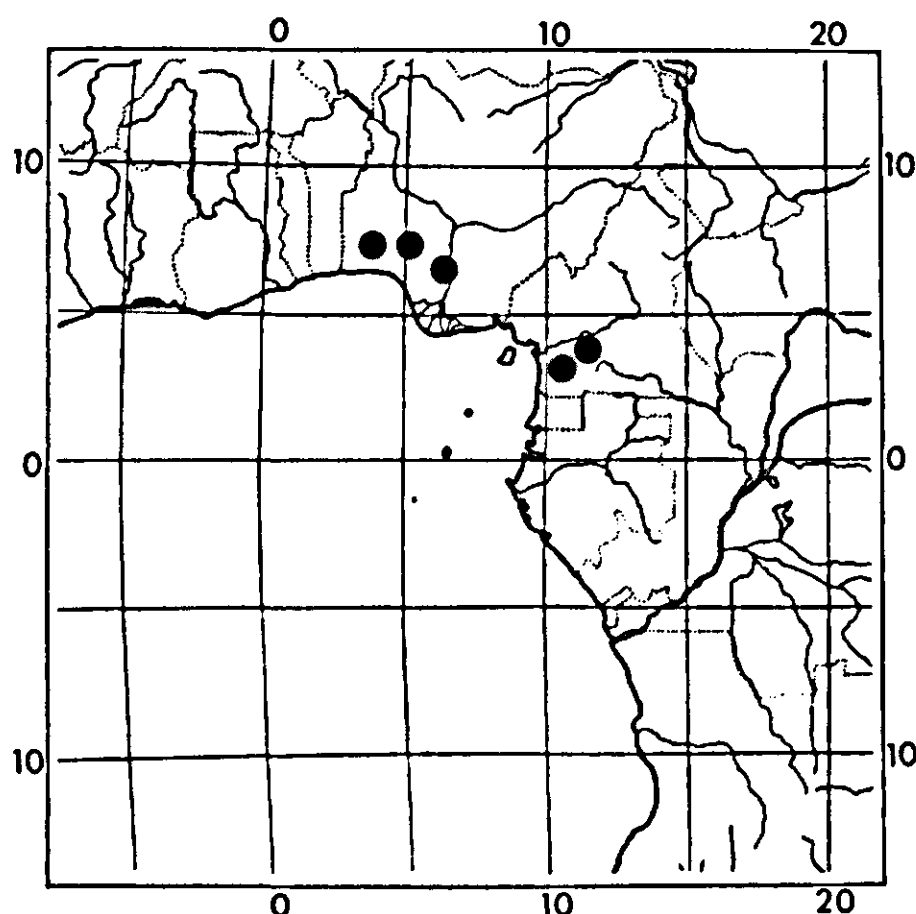


FIG. 1. *D. reticulatum*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. stipule from outside, $5 \times$; 3. flower with reflexed sepals and part of inflorescence, $4 \times$; 4. just opened flower, $4 \times$; 5. petal inside, $8 \times$; 6. petal outside, $8 \times$; 7. pistil, $8 \times$; 8. staminode outside, $8 \times$. (1-3. Zenker 782; 4-8. Foster 192).



MAP 1. *D. reticulatum*

at Berlin. Duplicate material of *Zenker* 752 at WU has been chosen as lectotype.

The *Zenker* collections 353 (pencil number) and 4351 have been distributed from Berlin as belonging to this species, and were cited as such by DE WILDEMAN. The leaves of these specimens show indeed a reticulate nervation beneath, but their flowers are quite different from those of *D. reticulatum*. Both numbers were identified as *D. heudelotii* (Planch. ex Oliv.) Baill. var. *heudelotii* (see BRETELIER, 1979: 30).

D. reticulatum shows rather close affinities to the partly sympatric *D. umbellatum*, to *D. ruficeps* and *D. trichocephalum* from Gabon, and although somewhat remote, to the West African *D. lofense* Bret. as well. The four related central African species may be distinguished as follows:

- 1a. Stipules deeply divided; pedicel not jointed ***D. trichocephalum***
- 1b. Stipules entire or nearly so; pedicel jointed 2
- 2a. Petals distinctly longer than sepals; pistil glabrous, rarely with a few, sparse, stiff hairs; petiole 1–3(6) mm long ***D. umbellatum***
- 2b. Petals as long as or slightly shorter than sepals; pistil densely velutinous, at least the ovary; petiole (2)4–9(15) mm long 3
- 3a. Inflorescence subumbellate, flowers distinctly stalked; petiole (4)6–9(15) mm long, the blade 1.5–2 times as long as wide ***D. reticulatum***
- 3b. Inflorescence a subglobose head, flowers sessile or nearly so; petiole (2)4–7 mm long, the blade 2.5–3 times as long as wide ***D. ruficeps***

D. retroversum Hiern = ***D. parvifolium*** Engl.

For details see BRETELIER, 1981: 75, 79.

D. reygaerti De Wild. = *D. angolense* Chod.

For details see BRETELER, 1973: 55.

***D. rhodesicum* Sprague & Hutch.**

Fig. 2 Map 2

D. rhodesicum Sprague & Hutchinson, 1908: 433; Eyles, 1916: 392; De Wildeman, 1919: B 62; Moss, 1928: 122, p.p.: except *Fries* 727 & 727a, see notes; White, 1962: 185; Torre, 1963: 326; Breteler, 1973: 4, 6, 32, 70, XIX; Punt, 1975: 19.

Type: Zimbabwe (S. Rhodesia), Gwaai forest, *Allen* 234 (holotype: K; isotype: SRGH).

Diagnostic characters: Shrub up to 1.20 m. Branchlets densely pubescent-tomentose. Leaves elliptic, 5–9(13) × (1.5)2–4(5) cm, subappressed-pubescent both sides, more densely so beneath or densely villous-tomentose beneath, nervation obscure above, prominent beneath. Inflorescence a pedunculate cyme, up to 10(20)-flowered. Sepals usually spreading. Petals suberect, (4)4.5–5(6) mm long, 0–1 mm split. Stamens usually more than 5, (3)4–5 mm long. Pistil (2)3(4)-merous, ovary villous. Fruit densely villous to velutinous, endocarp tomentose inside.

Description: *Shrub* up to ca. 1.20 m tall, with underground stem(s). *Branchlets* densely pubescent-tomentose, usually more villous when older, finally glabrescent. *Stipules* narrowly triangular, (1)4–8(10) mm long, pubescent-tomentose, early caducous or not. *Leaves*: petiole semi-terete, 1–4(6) mm long, pubescent-tomentose; blade elliptic, sometimes oblong, (1.5)2–3(4) times as long as wide, 5–9(13) × (1.5)2–4(5) cm, usually rounded sometimes obtuse or cuneate at base, obtuse and emarginate or retuse to acute to acuminate at top, the acumen up to 0.5 cm long; the margin sometimes slightly irregularly undulate, rarely distinctly so; subappressed-pubescent both sides, more densely so on midrib above and entirely so beneath and there mixed with often paler, shorter, curled hairs or densely villous-tomentose beneath; the 7–10(12) pairs of main lateral nerves and the tertiary nerves obscure above, prominent beneath; glands absent. *Inflorescence* a pedunculate, 1–2 times distinctly branched, up to 10(20)-flowered cyme, pubescent; peduncle very variable in length, up to 2.5 cm long; bracts and bracteoles narrowly triangular, up to 6 mm long. *Pedicel* up to ca 5 mm long, the upper part 0–1.5 mm long. *Sepals* usually spreading, sometimes reflexed, narrowly obovate-oblong, 4–5 × 1–2 mm, top usually acute, appressed-brown-pubescent outside, sparsely hairy mainly on apical part inside. *Petals* suberect, at base very shortly adnate to filaments, narrowly obovate-elliptic in outline, (4)4.5–5.5(6) mm long, 0–1 mm split, hairy outside especially in lower part, more sparsely so to glabrous inside; lobes concave, rounded to acutish apically. *Stamens* usually more than 5, sometimes 10, suberect, (3)4–5 mm long,

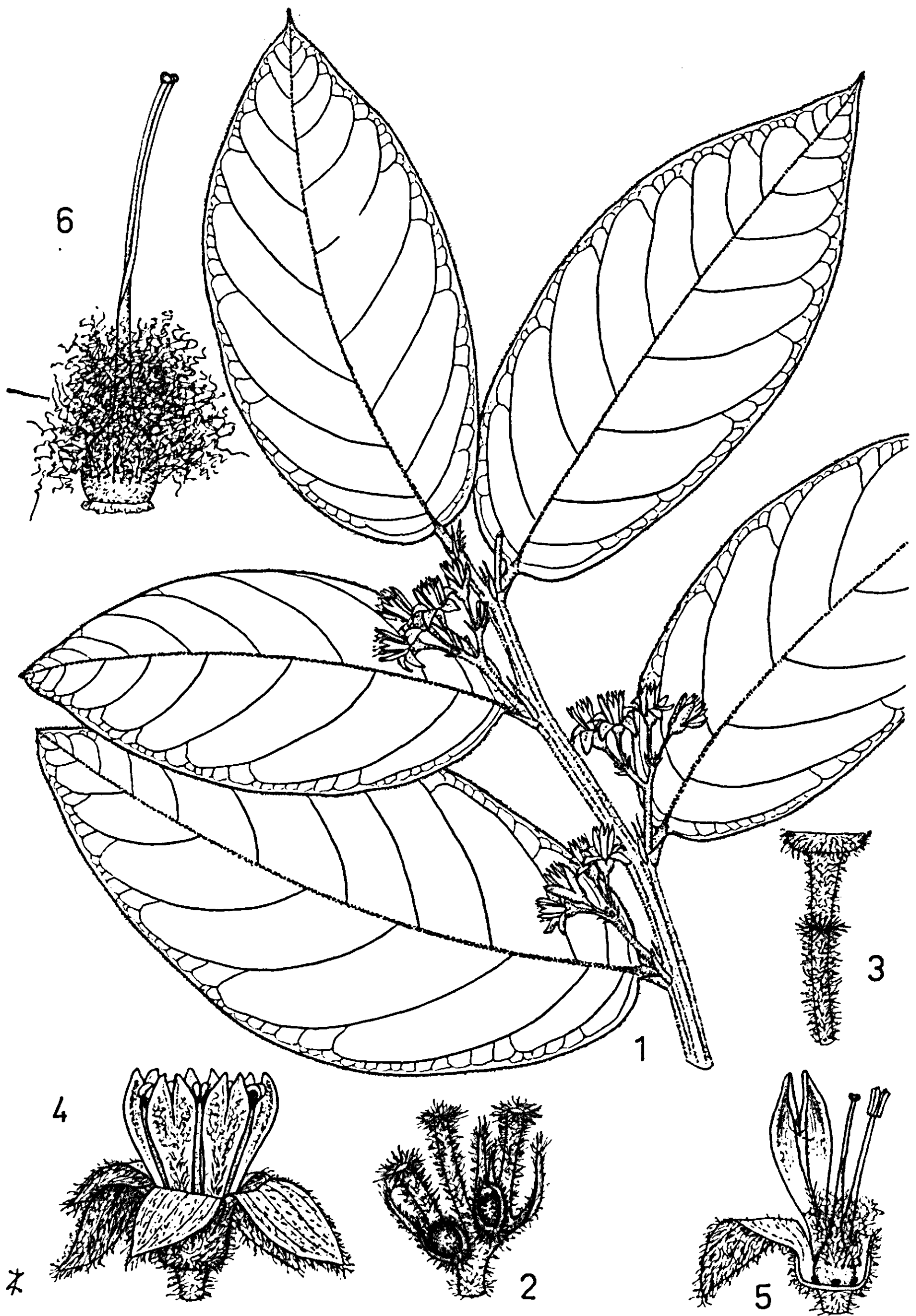
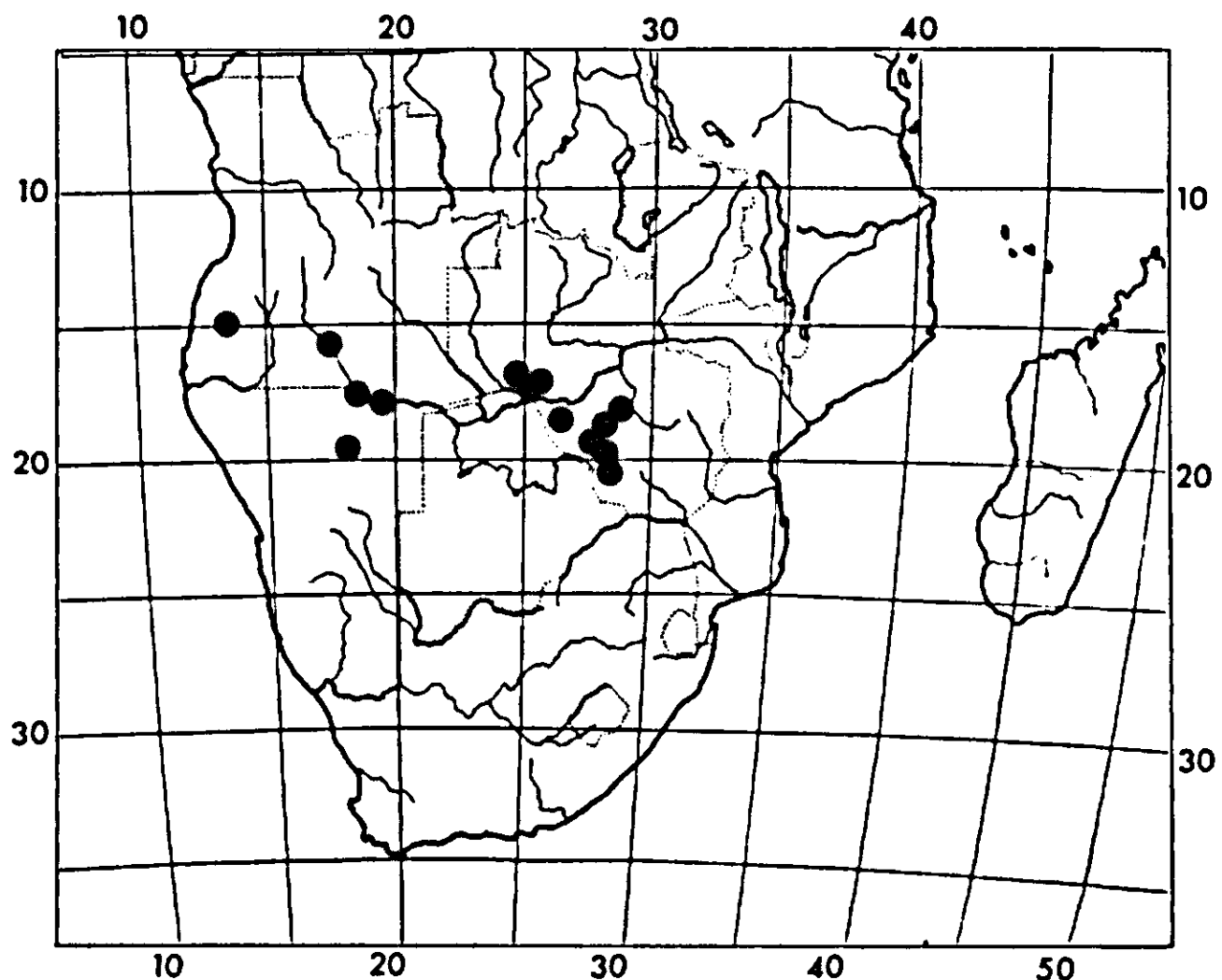


FIG. 2. *D. rhodesicum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. part of inflorescence, $5 \times$; 3. pedicel, $5 \times$; 4. flower, $5 \times$; 5. flower partly, $5 \times$; 6. pistil, $10 \times$. (1-4. Allen 234; 5-6. Rushworth 1357).

glabrous; anthers subreniform, up to ca 1 mm long, connective very distinct. *Staminodes* usually less than 5, subquadrate, rather flat, up to 0.3×0.3 mm, glabrous. *Pistil* (2)3(4)-merous, (2)4–5(6) mm long; ovary and lower part of style loosely to densely villous, upper part of style glabrous, shortly (2)3(4)-lobed; style often twisted. *Fruit* subglobose to 2–3-lobed, 1–3-seeded, densely villous to velutinous; 1-seeded fruits 2–3 cm diam.; endocarp woody, 1–1.5 mm thick, rugose outside, tomentose inside. *Seed* subglobose, ca 1 cm diam., glabrous.



MAP 2. *D. rhodesicum*

Distribution: Angola, Zambia, S.W. Africa, Zimbabwe.

Ecology: Mixed woodland, tree and shrub savannahs; up to ca 1000 m altitude.

Specimens examined:

ANGOLA. Huila, Canguelas, *de Menezes* 1176 (K, LISC, WAG); Luando, Lubango, *Mendes dos Santos* 2327 (LISC, LUAU); between the Cumpulwe and the Makongo, *Pocock* 579 (PRE); Cuando Cubango, 25 km Chana Cubati-Salonga, *Santos & Barroso* 2955 (LUAU, WAG).

ZAMBIA. Machile, *Fanshawe* 5834 (BR, K, LISC); 5892 (K); Kataba, *Fanshawe* 7010 (K); Sesheke, *Macaulay* 86 (K).

SOUTH WEST AFRICA. 5 km Runtu-Kapuko, *de Winter* 3727 (K, M); Okavango, between Katwitwi and Makambo, *de Winter* 3864 (PRE); Okavango, 26 km W. of Kuringkwu, *de Winter & Marais* 5025 (K); Grootfontein, near Nuise, *Esterhuyze* 420 (PRE); Grootfontein dist, *Schoenfelder* 268 (PRE).

ZIMBABWE. Gwaai forest, *Allen* 234 (K, SRGH, type); Matopos, *Armitage* 305/59 (SRGH); Gwaai, *Davies* 401 (SRGH); Nyamandhlovu, *Denny* 343 (SRGH); near Lupane, *Denny* 3555 (SRGH, WAG); Nyamandhlovu, *Eyles* 6203 (SRGH); Wankie, *Rushworth* 1357 (K, SRGH); Gokwe, Charama plateau, *Thompson* 15/60 (SRGH); Wankie Game Res., *Wild* 4778 (K, SRGH).

Notes. MOSS (l.c.) considered *D. ellipticum* Fries as a synonym of this species and consequently cited its two syntypes among its pertinent material. *D. ellipticum*, however, is synonymous with *D. bangii* (F. Didr.) Engl. (see BRETELER, 1973: 70).

Fieldnotes of two collections made by DE WINTER (nos 3864, 5025) report that the fruits are red when ripe and that they are edible.

D. riparium Engl. = *D. cymulosum* (Oliv.) Engl.

For Details see BRETELER, 1978: 40.

D. rowlandii Hutch. & Dalz. = *D. madagascariense* Poir. var. *madagascariense*

For details see BRETELER, 1981: 15.

***D. rudatisii* Engl.**

Fig. 3 Map 3

D. rudatisii Engler, 1912-a: 582; Baker f., 1913: 124; De Wildeman, 1919: B 62; Hutchinson & Dalziel, 1928-a: 325; Keay, 1958: 438; Breteler, 1973: 25, 28, 33, 36, XIX; Punt, 1975: 36.

Type: Cameroun, Abonando, *Rudatis 16* (holotype: B†; lectotype: Z; isotypes: BM, G, K, W).

D. ledermannii Engler, 1912-a: 582. See Breteler, 1979: 53 for full details.

D. suboblongum Engler, 1912-a: 568, p.p.: except *Scott Elliot 5601 a*, see notes; Pellegrin, 1913: 584; De Wildeman, 1919: B 68, p.p.; Breteler, 1979: XIX, p.p. in synonymy of *D. rudatisii*. Type: Cameroun, Batanga, *Bates 187* (lectotype: Z; isotypes: BM, BR, E, G, K, P).

Diagnostic characters. Liana or shrub. Branchlets, petioles, and stipules with a usually rusty brown, short-hairy, often powdery indumentum, glabrescent. Leaves papery to coriaceous, elliptic to obovate, (7)9–16(25) × (2)3–9(12) cm, rounded to cuneate at base, acuminate, glabrescent, hairs often longer persistent in the axils of some lateral nerves beneath covering domatia, midrib and the 5–8 pairs of main lateral nerves slightly prominent above, glands rather small, both sides. Inflorescence subumbellate, puberulous-tomentellous, peduncle usually completely adnate to petiole. Sepals, petals, and stamens suberect, subequal in length, the pistil usually slightly longer; petals puberulous-tomentellous, with almost plain lobes. Pistil 3-merous, ovary and lower part of style villous-tomentose.

Description. *Liana* up to ca 5 cm diam., lianescent shrub, or shrub. Wood-cylinder entire (?), wood hard, bark shallowly fissured or not. *Branches* brown



PHOT. 1. *D. rudatisii*; flowering branchlet (J. J. de Wilde & de Wit 8419; phot. H. C. D. DE WIT).

to black, glabrous; bark rather thin, usually with minute lenticels, becoming more distinct and transversely longer on older wood. Branchlets, petioles, and stipules covered by a usually rusty brown, puberulous-tomentellous, often powdery indumentum, glabrescent. *Stipules* triangular-subulate, 1–3(5) mm long. *Leaves*: petiole subterete to semiterete, grooved above or not, (2)3–5(7) mm long, (4)7–11 mm long when united with peduncle; blade elliptic to obovate, papery to coriaceous, (1.5)2–2.5(3.5) times as long as wide, (7)9–16(25) × (2)3–9(12) cm, rounded to cuneate at base, acuminate at top, often abruptly so, the acumen acute to obtuse, 0.5–1.5 cm long; appressed-short-hairy both sides when young, often only so on main nerves or only on midrib, glabrescent, often longer persistent in the axils of some main lateral nerves beneath where usually small domatia occur, midrib and the 5–8 pairs of main lateral nerves slightly prominent above, more distinctly so beneath, margin slightly revolute or not, the marginal nerve sometimes very distinct; glands rather small, crater-like, both sides, beneath often more numerous and in a narrow zone along the midrib, above more dispersed, mainly in a wide zone bordering the leaf margin. *Inflorescence* subumbellate, up to ca 30-flowered, obscurely branched, puberulous-tomentellous; peduncle usually completely adnate to and hairy as petiole, as long as or only slightly shorter than petiole, rarely completely free, sometimes

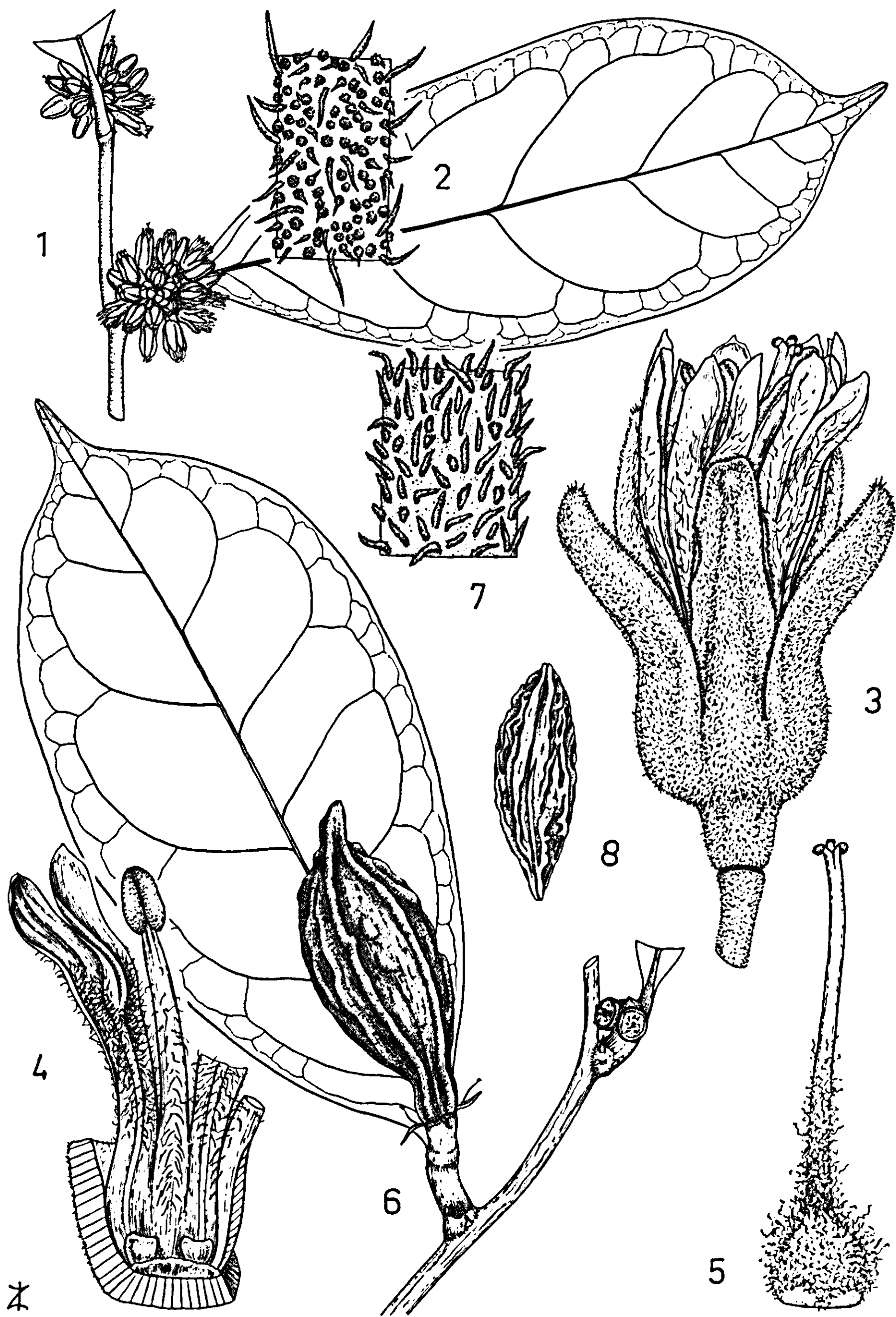
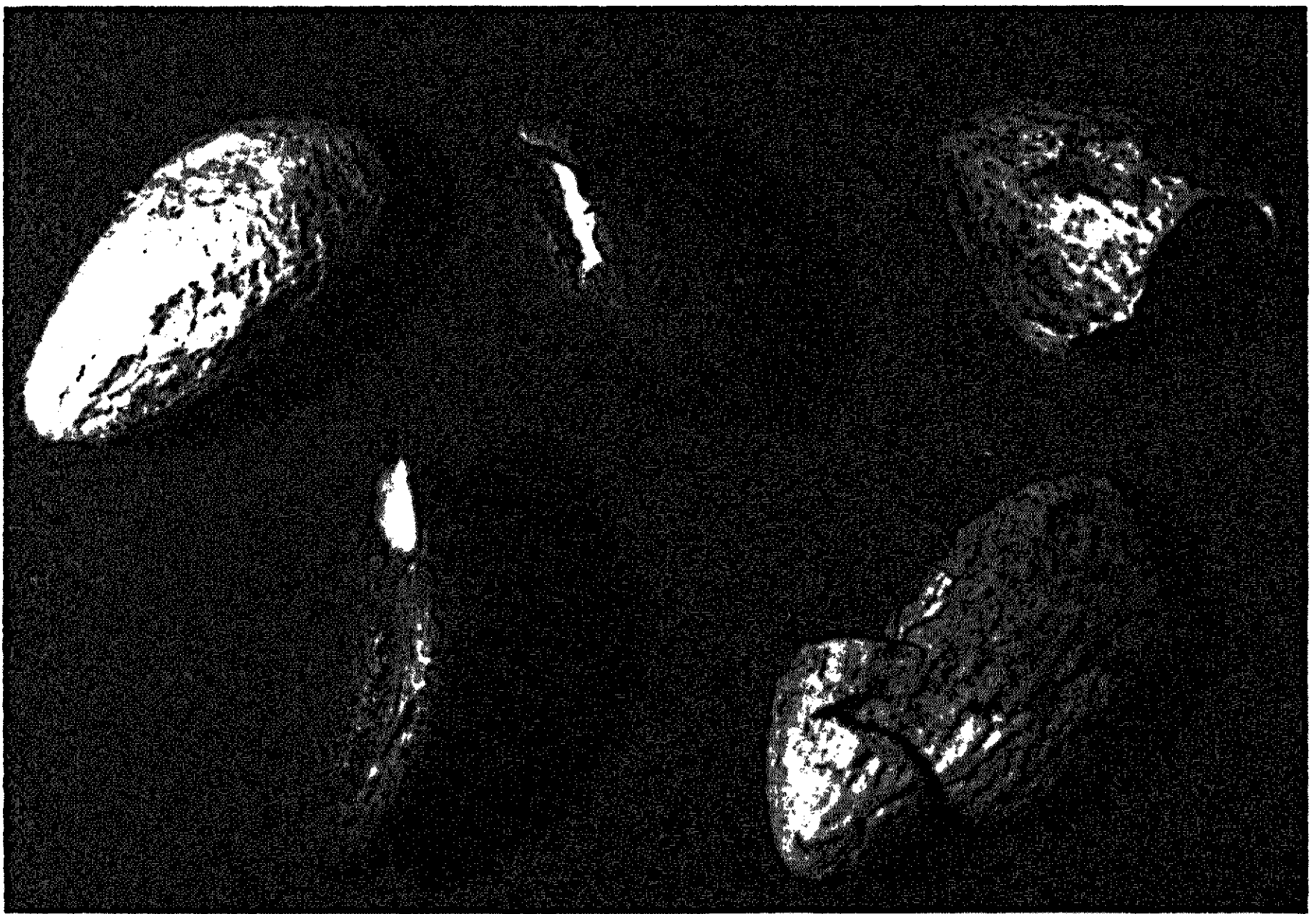


FIG. 3. *D. rudatisii*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. detail of indumentum of branchlet, $35 \times$; 3. flower, $10 \times$; 4. flower partly, $10 \times$; 5. pistil, $10 \times$; 6. fruiting branchlet, $\frac{5}{6} \times$; 7. detail of fruit indumentum, $35 \times$; 8. endocarp, $\frac{5}{6} \times$. (1-5. Leeuwenberg 5230; 6-8. Leeuwenberg 5066).



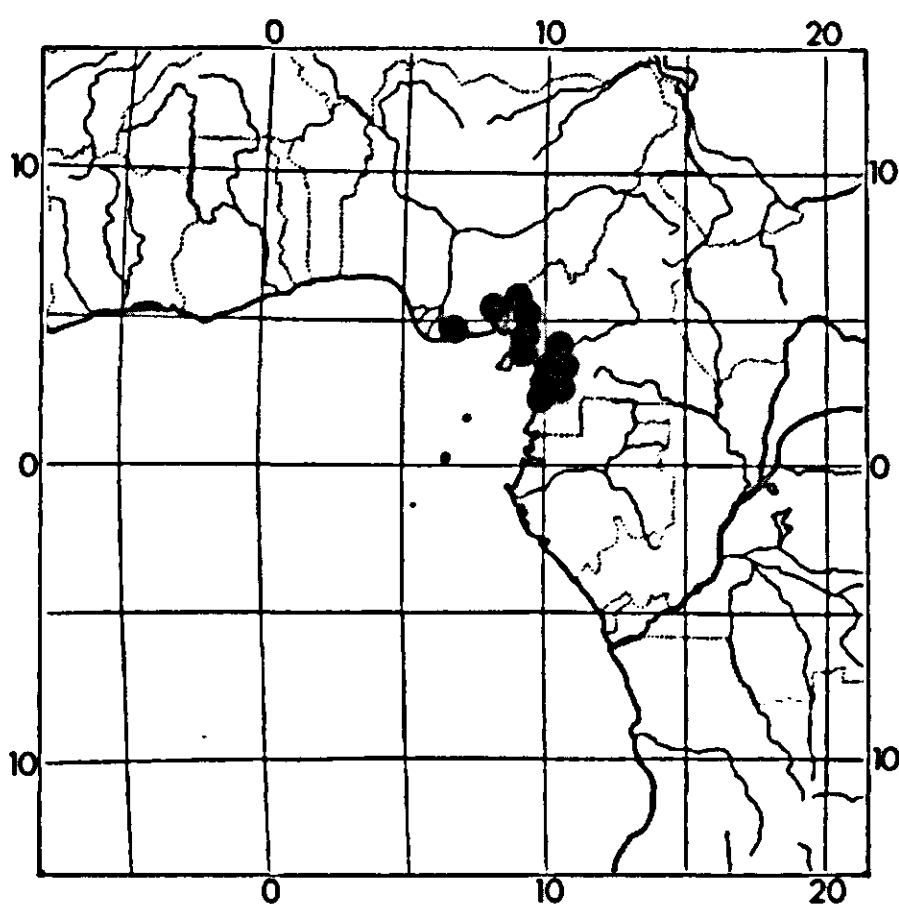
PHOT. 2. *D. rudatisii*: fruiting branchlet (J. J. de Wilde & de Wit 8419; phot. H. C. D. DE WIT.

partly so; bracts and bracteoles ovate-triangular, up to ca 0.5(1) mm long. *Pedicel* up to 5 mm long, the upper part distinct or not, up to 1 mm long. *Sepals* erect to slightly spreading, at base rather thick and shortly united, concave, ovate-elliptic to oblong, usually unequal in length, (3.5)4–5 × 1.5–2 mm, tomentellous both sides. *Petals* erect, subequal to slightly longer than sepals, narrowly obovate to oblong in outline, 4–6 mm long, (0.5)1–1.5 mm split, at base 0.5–2 mm united with filaments, puberulous-tomentellous mainly below lobes both sides; lobes almost plain. *Stamens* erect, as long as petals, 4–6 mm long; filaments puberulous-tomentellous, often partly (outside or lower part) or sparsely so to glabrous; anthers 0.5–1 mm long, connective distinct, glabrous, rarely with a few stiff hairs. *Staminodes* subquadrate, ca 0.5 × 0.5 mm, glabrous, emarginate to lobed apically. *Pistil* 3-merous, 4.5–6(7.5) mm long; ovary and lower part of style villous-tomentose, upper part of style glabrous, shortly 3-lobed. *Fruits* 1–2(3?)-seeded, aborted cells present by a distinct ridge, orange at maturity, puberulous-tomentellous; 1-seeded fruits: subellipsoid, usually beaked, often stipitate, 3–6 × 1.5–2.5 cm; beak firm, obtuse to acutish, ca 5–15 mm long, stalk firm up to 10 mm long; exocarp usually slightly wrinkled, firm, 1–3 mm thick; mesocarp juicy 1–3 mm thick; endocarp woody, ca 0.5 mm thick, rugose outside, smooth and glabrous inside. *Seeds* subellipsoid, up to ca 20 × 10



PHOT. 3. *D. rudatisii*: endocarp and seeds (Bos 3560; phot. H. C. D. DE WIT).

mm, rounded to acutish both ends, seedcoat brown, smooth, shiny, glabrous. *Seedling*: taproot usually firm; epicotyle 7–13 cm long, brownish, shiny, appressed-pubescent at base, glabrous or almost so in upper part; first two leaves opposite, ovate-elliptic, shorter and relatively broader than following leaves.



MAP 3. *D. rudatisii*

Distribution: S. E. Nigeria, S. W. Cameroun.
Ecology: Rain forest.



PHOT. 4. *D. rudatisii*: seedling, endocarp enclosing the cotyledons (*Bos* 3375; phot. H. C. D. DE WIT).

Specimens examined:

NIGERIA. Calabar, Uyanga-Ikot Opora Rd, *Daramola FHI 56414* (FHI); 71-72 mls Calabar-Mamfe Rd, *Latilo & Onyeachusim FHI 54203* (FHI, K); Akamkpa dist, Awi, *Olorunfemi c.s. FHI 76189* (FHI); 73 mls Calabar-Mamfe Rd, Owom, *Onochie FHI 36456* (FHI); Oban, *Talbot 19* (BM, K); 482 (BM, K); Degema dist, *Talbot s.n.* (BM, K); Oban, *Talbot s.n.* (K); Oban Group F.R., *van Meer 1301* (WAG); 1306 (WAG); Oban, *van Meer 1339* (WAG); Awi, 18 mls N. of Calabar, *van Meer 1611* (WAG); Oban Group F.R., *van Meer 1633* (WAG).

CAMEROUN. Edea, *Annet 512* (P, WAG); Batanga, *Bates 187* (BM, BR, E, G, K, P, Z, type of *D. suboblongum*); Kumba dist, between Bopo and Banga, *Binuyo & Daramola FHI 35635* (FHI, K, P, WAG); 5 km S. of Kribi, *Bos & Breteler 3054* (P, WAG); km 80 Ebolowa-Kribi, *Bos & Breteler 3096* (WAG); km 3 Kribi-Ebolowa, *Bos & Breteler 3105* (WAG); *3106* (WAG); Kribi, *Bos & Breteler 3115* (WAG); *Bos 3179* (WAG); *3180* (WAG); 5 km S. of Kribi, *Bos 3255* (WAG); km 5-7.5 Kribi-Ebolowa, *Bos 3349* (WAG); *3374* (WAG); *3375* (WAG); km 12 Kribi-Ebolowa, *Bos 3412* (WAG); 5 km S. of Kribi, *Bos 3414* (WAG); 13.5 km N. of Kribi, *Bos 3440* (WAG); Kribi, *Bos 3463* (WAG); *3464* (WAG); 10 km N. of Kribi, *Bos 3560* (WAG); km 12 Kribi-Lolodorf, *Bos 3645* (WAG); km 16 Kribi-Ebolowa, *Bos 3843* (WAG); 6 km S. of Kribi, *Bos 3883* (WAG); 7-10 km S. of Kribi, *Bos 4237* (WAG); Kribi, *Bos 4271* (WAG); *4482* (WAG); *4483* (WAG); *4504* (WAG); km 13 Kribi-Ebolowa, *Bos 5076* (WAG); Kribi, *Bos 5411* (WAG); 15 km S.E. of Kribi, *Bos 6645* (WAG); 9 km N. of Campo, *Bos 7043* (WAG); 20 km S.E. of Kribi, *Bos 7124* (WAG); km 30 Kribi-Campo, *Bos & Breteler 7231* (WAG); km 40-45 Kribi-Campo, *Bos & Breteler 7281* (WAG); *7293* (WAG); *J. J. de Wilde 7784 B* (WAG); km 17 Kribi-Campo, *J. J. de Wilde 8064* (WAG); ca 30 km S. of Kribi, *J. J. de Wilde & de Wit 8419* (WAG); km 9 Campo-Kribi, *J. J. de Wilde 8705* (WAG); Grand Batanga, *Dinklage 763* (HBG); *944* (HBG); *1370 B* (HBG, P); near Kribi, *Ledermann 511* (BM, type of *D. ledermanni*); 49 km S.W. of Eséka, *Leeuwenberg 5066* (BR, K, P, WAG); 8 km W. of Masok, *Leeuwenberg 5230* (BR, K, P, WAG); km 65 Edea-Kribi, *Leeuwenberg 5659* (BR, K, P, WAG); 4 km S. of Victoria, *Leeuwenberg 6930* (P, WAG); km 58 Douala-Loum, *Leeuwenberg 8748* (WAG); km 9 Kumba-Victoria, *Leeuwenberg & Berg 9809* (WAG); 5 km S. of Manyémen along Kumba Rd, *Leeuwenberg 10328* (WAG); 15 km N. of Campo, Malabe, *Letouzey 9231* (P, WAG); Abonando, *Rudatis 16* (BM, G, K, W, Z, type).

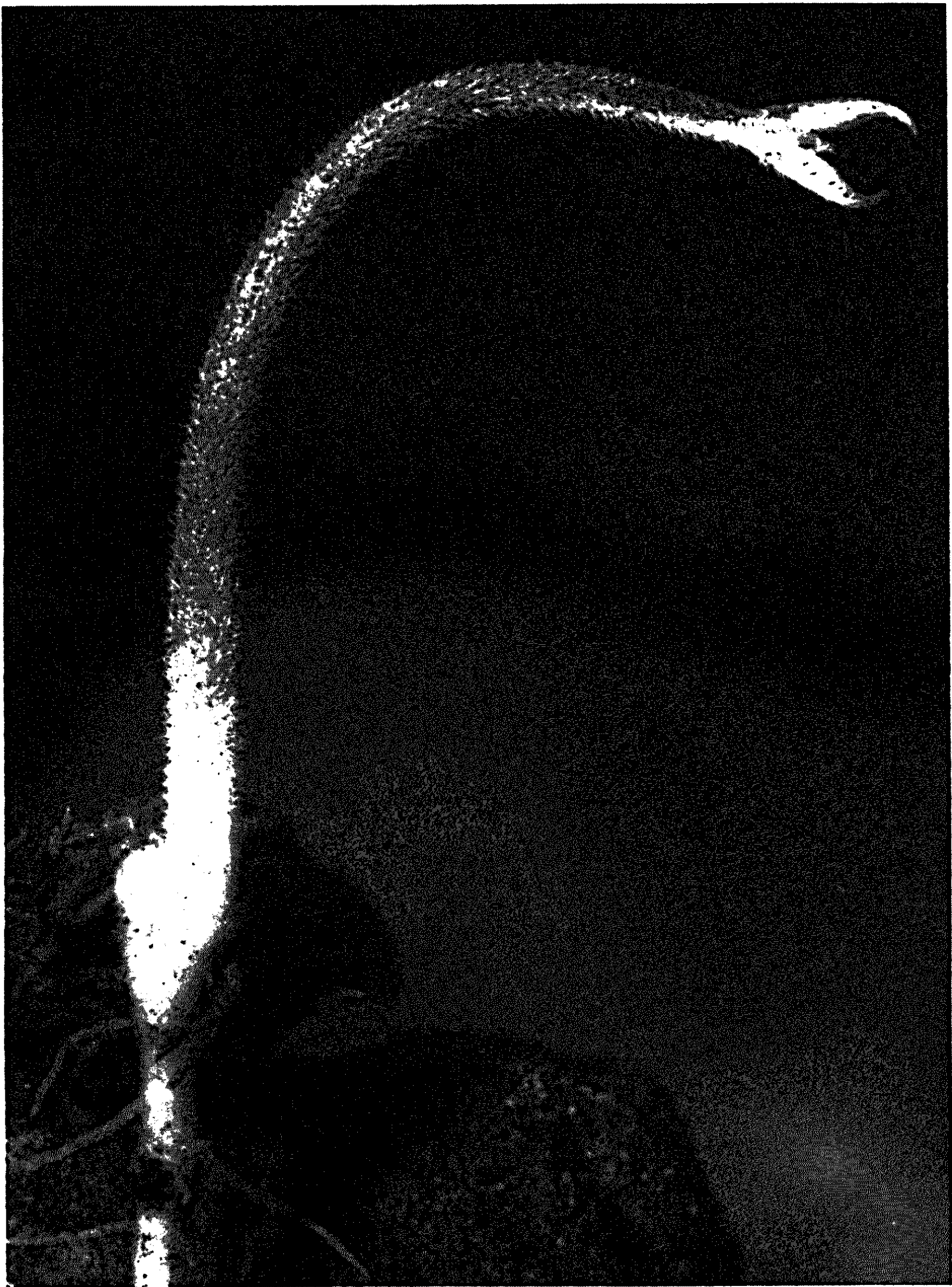
Cult. CAMEROUN. Kribi, *Bos 3560 A* (WAG). The Netherlands. Wageningen, *de Bruijn 1902* (WAG).

Notes. ENGLER (l.c.) based *D. suboblongum* on 5 syntypes, 4 from Cameroun representing this species and one from Sierra Leone (*Scott Elliot 5601 A*) belonging to *D. toxicarium*. *Bates 187* from Batanga has been selected as type. The areas of the two species involved are quite separate and their characters, especially those of the fruits, make it easy to distinguish between them.

D. rudatisii is partly sympatric with the rather closely related *D. mombuttense* Engl. The latter species lacks the rusty short-hairy indumentum on its branchlets and has glabrous, lenticellate fruits.

The fruits of *D. rudatisii* are used in Cameroun to kill mice. Pounded seeds are mixed with some meat to attract these animals. It is said to be an effective mixture which will also kill poultry when they feed on it.

The flowers of a specimen in the Wageningen Conservatory, grown from seeds of *Bos 3560*, produced nectar, although not as abundantly as was observed in *D. mombuttense* (see BRETELER, 1981: 38).



PHOT. 5. *D. rudatisii*: detail of seedling (*Bos* 3375; phot. H. C. D. DE WIT).

Liana vel frutex lianescens. Ramuli dense brunneo-villosi. Folia anguste obovata-oblonga, (9)12–16(25) × (3)4–6(9) cm, basi rotundata usque subcordata, apice acuminata, nervis lateralibus utrinque 9–11. Inflorescentia capitata, subglobosa, usque ad 20-flora, ferrugineo-villosa. Flores subsessiles. Sepala petalaeque suberecta vel patentia. Petala 3,5–4 mm longa, 1–1,5 mm fissa, extus sericeo-tomentosa. Staminea suberecta, 7–8 mm longa, glabra. Staminodia glabra, apice bicornia. Pistillum trimerum, 7–8 mm longum, ovarium velutinum. Fructus immaturi brunneo-villosi.

Type: Gabon, Haute Ngounié, between Guidouma and St. Croix, *Le Testu* 5090 (holotype: P; isotype: WAG).

Diagnostic characters. Liana or lianescent shrub. Branchlets densely brown-villous. Leaves narrowly obovate-oblong, (9)12–16(25) × (3)4–6(9) cm, rounded to subcordate at base, acuminate at top, with 9–11 pairs of main lateral nerves. Inflorescence a subglobose head, up to ca 20-flowered, rusty-villous. Flowers subsessile. Sepals and petals suberect to spreading, the latter 3.5–4 mm long, 1–1.5 mm split, sericeous-tomentose outside. Stamens suberect, 7–8 mm long, glabrous. Staminodes glabrous, 2-horned apically. Pistil 3-merous, 7–8 mm long, ovary velutinous. Immature fruits brown-villous.

Description. *Liana* or lianescent shrub. Branches with sparse, rather large, distinct lenticels, dark-brown to black, glabrous or glabrescent. *Branchlets* densely pale to dark-brown villous, glabrescent with age. *Stipules* broadly ovate-triangular to narrowly triangular-oblong, 3–9 mm long, up to 5 mm wide, with appressed dark-red to brown hairs outside, prominently nerved and almost glabrous inside, the margin entire to serrate-dentate. *Leaves*: petiole subterete, (2)4–7 mm long, brown-villous; blade narrowly obovate-oblong, 2.5–3 times as long as wide, (9)12–16(25) × (3)4–6(9) cm, rounded to subcordate at base, often obliquely so, gradually to abruptly acuminate at top, the acumen obtuse to acute, often mucronate, 0.5–2 cm long; brown-villous mainly on midrib both sides, entirely so beneath when young, glabrescent, midrib impressed above, main lateral nerves 9–11 pairs; glands usually small, often rather inconspicuous, beneath only, mainly near base and alongside midrib. *Inflorescence* a subglobose head, axillary on leafy shoots, on leafless lateral shoots, or on leafless apical parts of lateral shoots, up to ca 20-flowered, rusty-villous; peduncle 3–10 mm long, often with a distinct bract apically; bracts and bracteoles ovate-deltoid, up to 3 mm long, rusty-villous to appressed-hairy outside, distinctly nerved and glabrous inside. *Pedicel* up to ca 1 mm long, the upper part 0. *Sepals* suberect to spreading, shortly united at base, oblong-obovate, 3–4 × 1–1.5 mm, densely villous-tomentose with some rather stiff hairs as well outside, glabrous or with a few hairs apically inside. *Petals* suberect to slightly spreading, shortly adnate to filaments at base, narrowly obovate in outline, 3.5–4 mm long, 1–1.5 mm

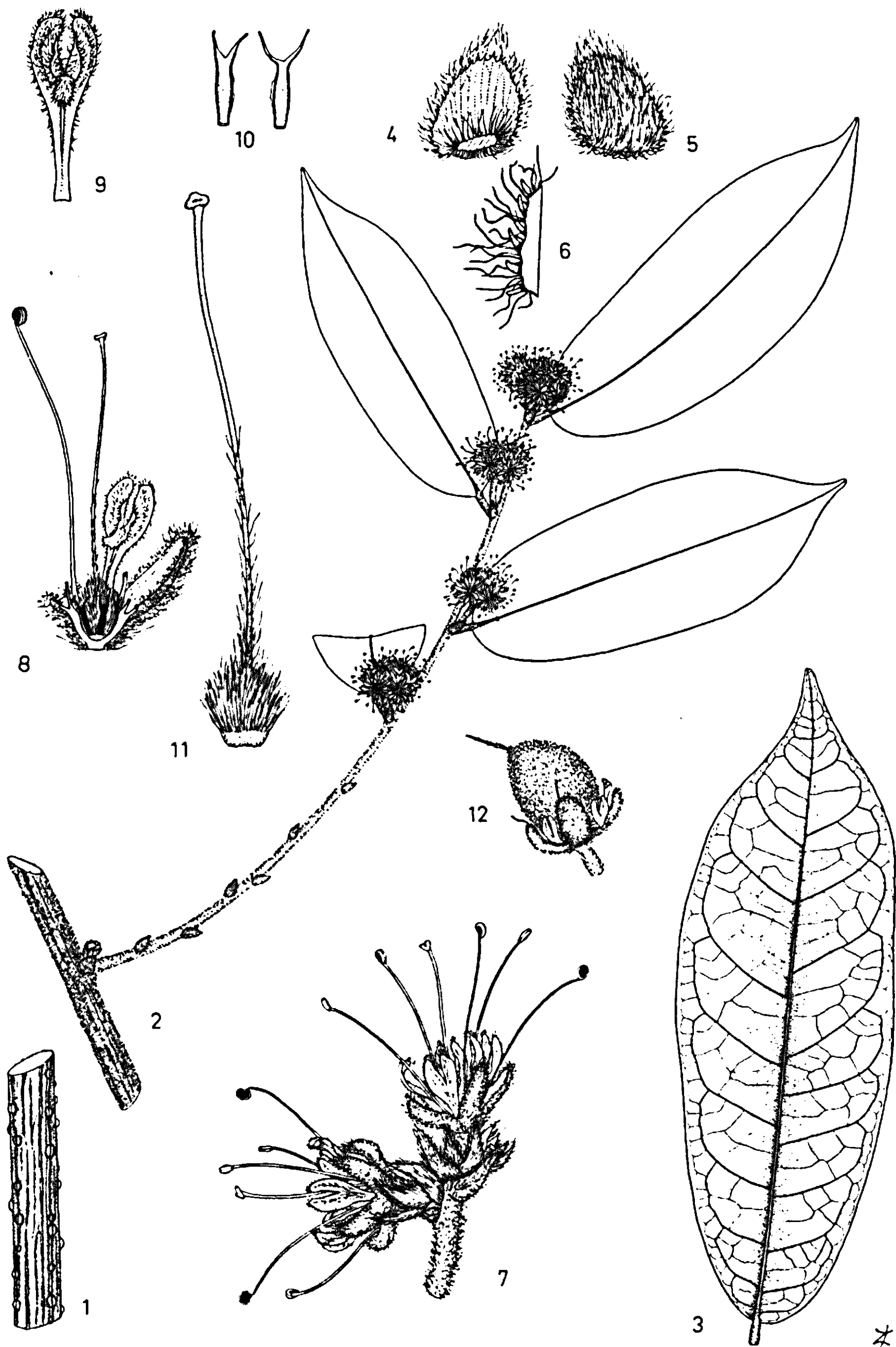
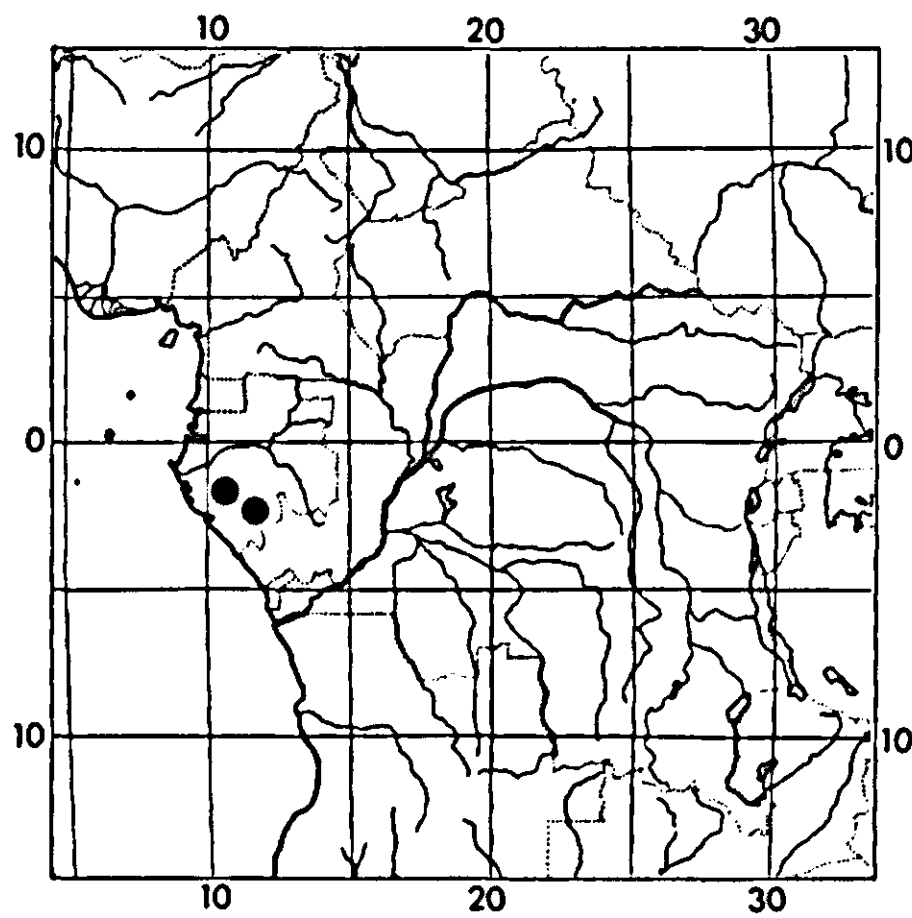


FIG. 4. *D. ruficeps*: 1. part of lenticellate branch, $1\times$; 2. flowering branchlet, $\frac{1}{2}\times$; 3. leaf beneath, $\frac{1}{2}\times$; 4. stipule inside, $4\times$; 5. stipule outside, $4\times$; 6. stipule margin, $15\times$; 7. part of inflorescence, $3\times$; 8. flower partly, $5\times$; 9. petal inside, $6\times$; 10. staminodes inside, $12\times$; 11. pistil, $10\times$; 12. young fruit, $2\times$. (1–12. *Le Testu* 5090).

split, sericeous-tomentose outside, glabrous inside; lobes concave, the two proximal lobe margins basally united and this united part somewhat erect, standing out. *Stamens* suberect, slender, 7–8 mm long, glabrous; anthers subreniform, up to 0.5 mm long, connective distinct. *Staminodes* thin, oblong, ca 1 mm long, glabrous, 2-horned apically. *Pistil* 3-merous, 7–8 mm long; ovary and basal part of style velutinous, upper part of style glabrous; stigma discoid to obscurely 3-lobed. *Immature fruits* brown-villous.



MAP 4. *D. ruficeps*

Distribution: Gabon.

Ecology: Rain forest, semi-deciduous forest.

Specimens examined:

GABON. Ndendé-Malinga Rd, *Breteler* 7695 (WAG); Haute Ngounié, between Guidouma and St. Croix, *Le Testu* 5090 (P, WAG, type).

Note. For affinities see under *D. reticulatum* p. 4.

D. rufipile (Turcz.) Engl. = *D. bangii* (F. Didr.) Engl.

For details see BRETELER, 1973: 70.

D. rufotomentosum Engl. = *D. angolense* Chod.

For details see BRETELER, 1973: 55.

D. rufum (Tulasne) Engler, 1896-a: 348; Engler & Krause, 1931: 6; Descoings, 1960: 100; 1961: 17; Breteler, 1979: 59.

Basionym: *Chailletia rufa* Tulasne, 1857: 86.

Type: Madagascar, Ile Ste Marie, Machechoua, *Boivin s.n.* (holotype: P; isotypes: TAN, n.v., WAG).

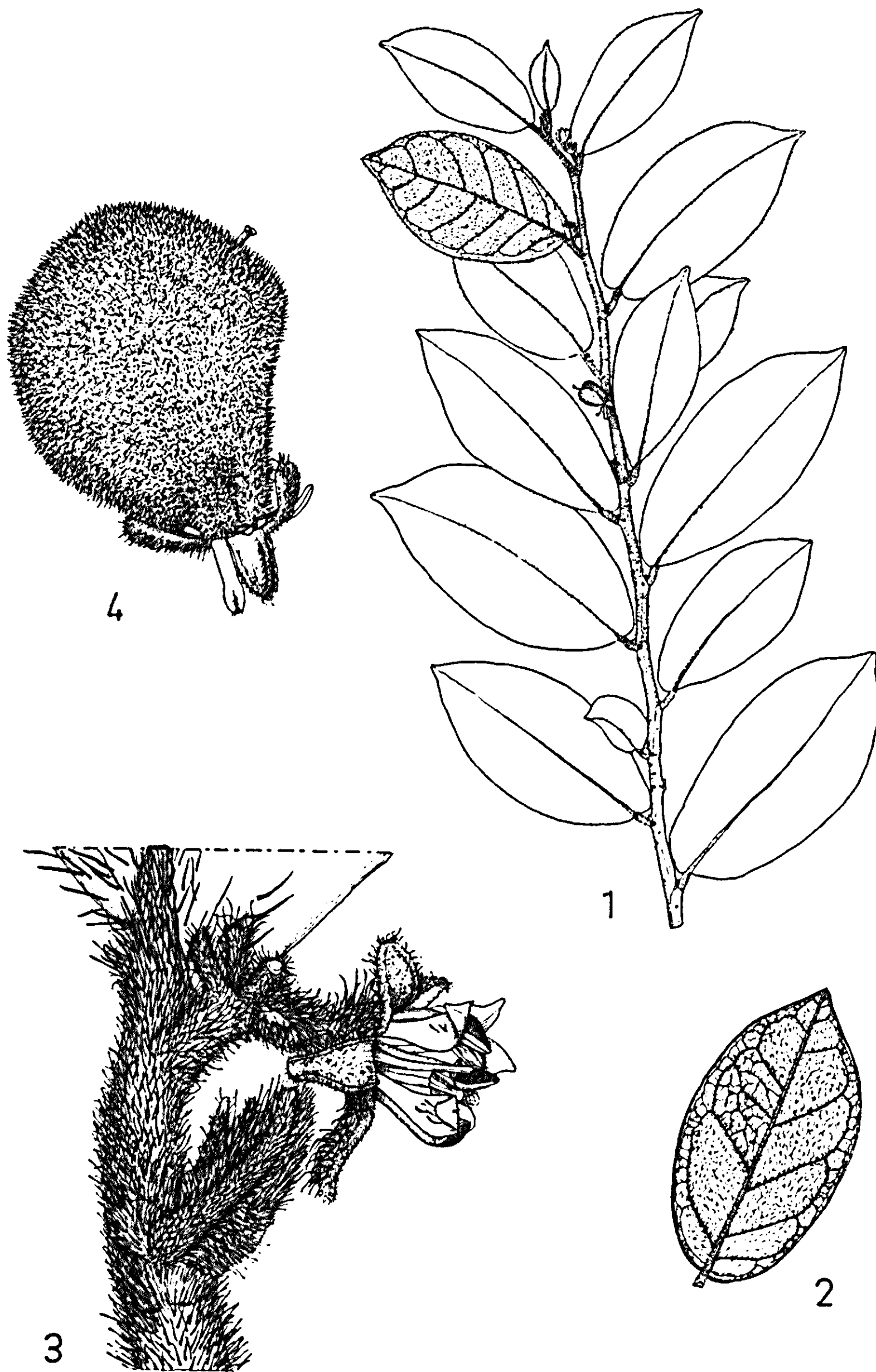
Diagnostic characters: Thin liana. Branchlets densely brown-hairy. Leaves shortly stalked, elliptic, $(1)2-3.5(4.5) \times (0.5)1-2(2.5)$ cm, subappressed-pubescent both sides when young. Inflorescences cymose up to ca 5-flowered, obscurely branched. Flowers small, 2–2.5 mm long. Petals entire. Pistil glabrous at anthesis. Fruits scabrid-velutinous.

Description. Thin *liana*. *Branches* glabrous or glabrescent, distinctly lenticellate. *Branchlets* densely brown-velutinous to tomentose, the same indumentum present on stipules and petioles. *Stipules* usually early caducous, narrowly triangular to subulate, $(0.5)1-3$ mm long. *Leaves*: petiole subterete to semiterete, 1–3(4) mm long, not or only slightly longer when united with peduncle; blade elliptic, 1.5–2 times as long as wide, $(1)2-3.5(4.5) \times (0.5)1-2(2.5)$ cm, rounded to obtuse to subcordate at base, obtuse, rounded, acutish to very slightly acuminate at top, subappressed-pubescent to somewhat strigose or tomentose both sides when young, densely and more or less persistently so beneath and on midrib above, margin revolute or not, with 4–8 pairs of main lateral nerves, glands absent. *Inflorescences* cymose, up to ca 5-flowered, obscurely branched, brown-velutinous-tomentose; peduncle partly or entirely adnate to petiole, or free, up to 4 mm long; bracts and bracteoles minute, triangular, up to 1 mm long. *Pedicel* up to ca 1 mm long, the upper part up to 0.7 mm long. *Sepals* erect to spreading, free or shortly united at base, oblong-triangular, $2 \times 0.6-0.8$ mm, appressed-pubescent to strigose outside, sparsely appressed-puberulous to tomentellous inside, rounded-acutish at top. *Petals* erect, base free or shortly adnate to filaments, narrowly obovate, $2-2.5 \times 0.5$ mm, with a few appressed hairs outside, glabrous inside, top rounded-obtuse. *Stamens* erect, 1.7–2.5 mm long, glabrous; anthers 0.5 mm long, connective distinct. *Staminodes* subquadrate, rather thick, ca 0.2×0.2 mm, glabrous. *Pistil* 3-merous, 1.7–2.5 mm long, glabrous at anthesis (ovary densely short-velutinous soon after fertilisation); style very shortly 3-lobed. *Young fruits* 1–3-seeded, distinctly lobed when more than 1-seeded, densely scabrid-velutinous.

Distribution: Madagascar.

Ecology: Rain forest area.

Specimens examined:

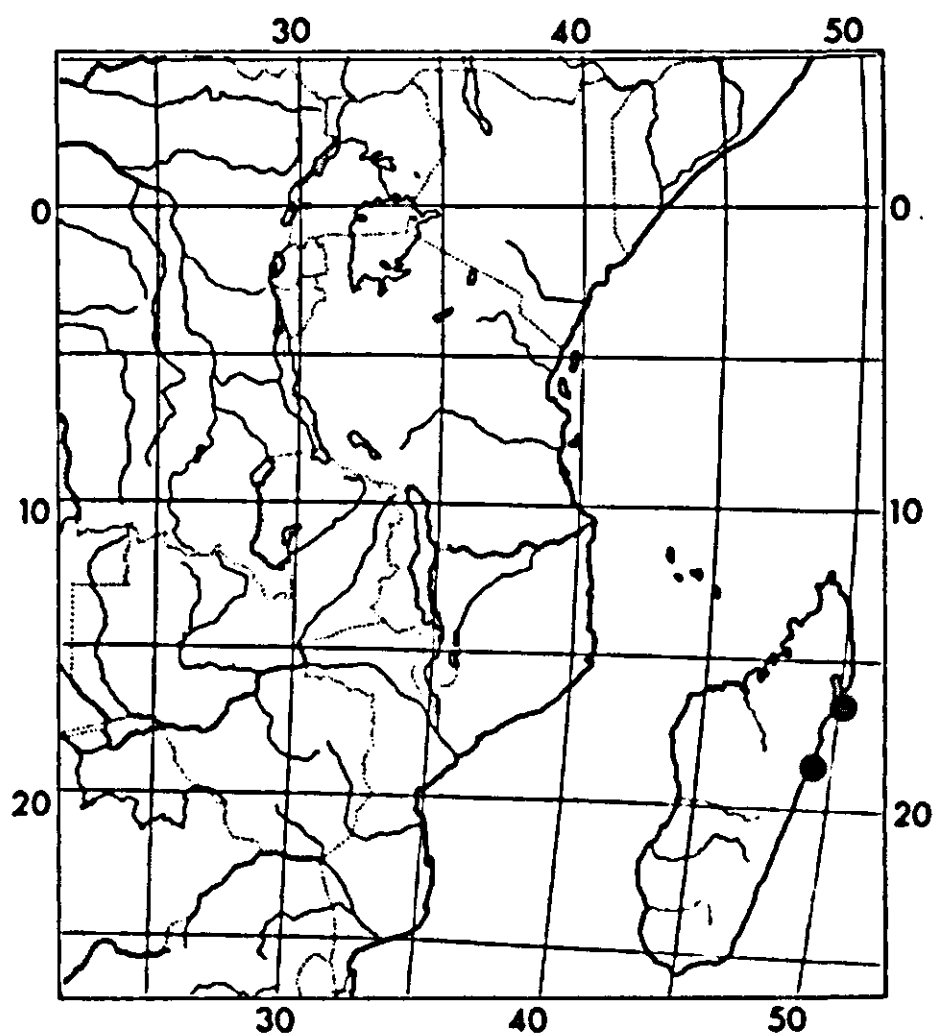


JW

FIG. 5. *D. rufum*: 1. fruiting branchlet, $\frac{5}{8} \times$; 2. leaf beneath, $\frac{5}{8} \times$; 3. inflorescence with one flower, $10 \times$; 4. fruit, $5 \times$. (1-4. Perrier de la Bâthie 13314).

MADAGASCAR. St. Marie I., *Boivin s.n.* (P, WAG, type); Tampina, *Perrier de la Bâthie 13314* (P, WAG).

Note: For affinities see BRETELER, 1979: 59.



MAP 5 *D. rufum*

D. ruhlandii Engl.

Fig. 6 Map 6

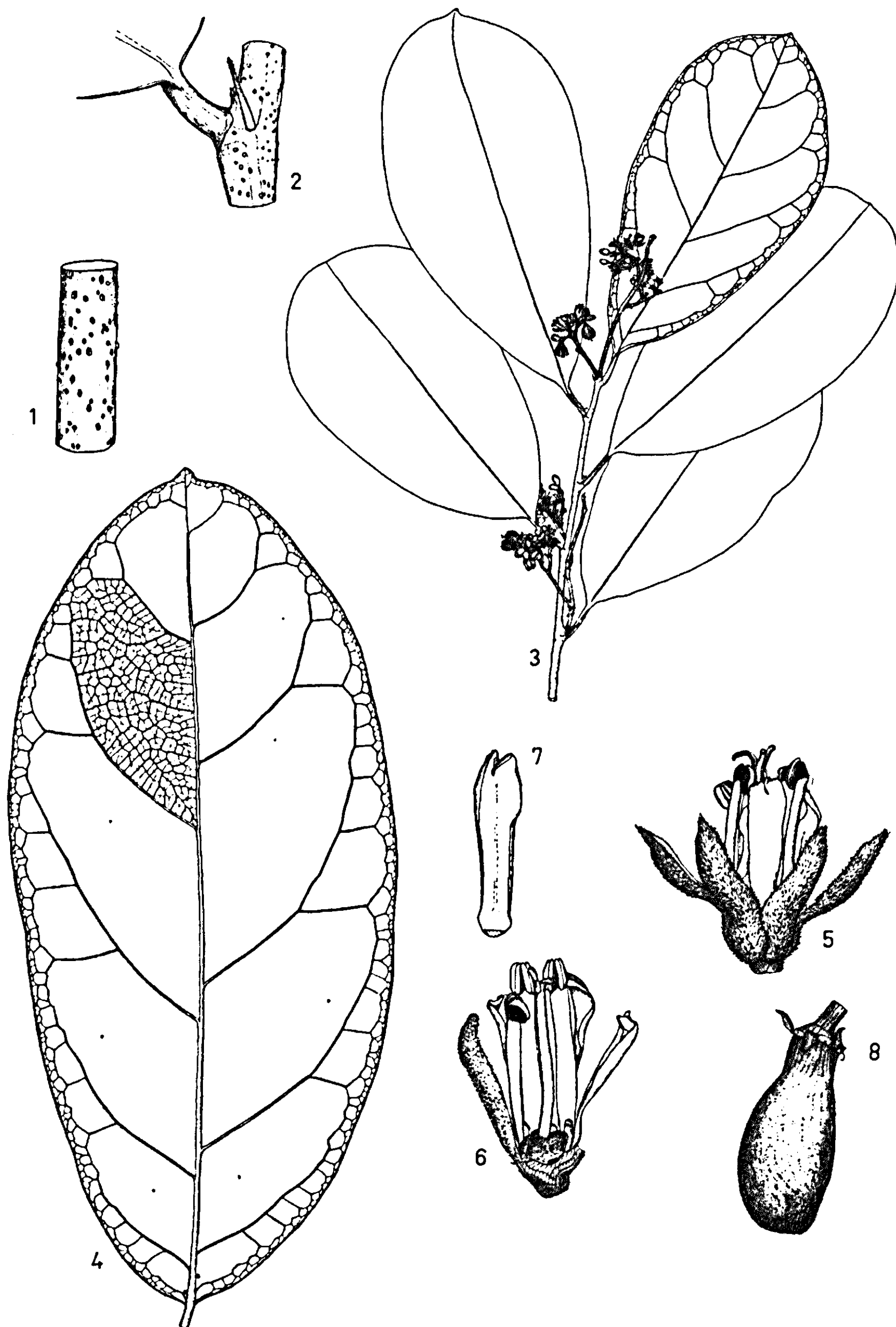
D. ruhlandii Engler, 1904: 152; 1912-a: 567; De Wildeman, 1919: B 63; Moss, 1928: 127; Brenan & Greenway, 1949: 131; Verdcourt & Trump, 1970: 68; Breteler, 1973: 36, 106, XIX; Punt, 1975: 21.

Type: Tanzania, East Usambara, above Lungusa, *Engler 419* (holotype: B†; no isotypes present, see notes).

Neotype: West Usambara, Bumbuli, *Kreysler in Harris 1335* (holotype: K; isotypes: BR, WAG).

D. cazengoense Exell & Mendonça, 1951-a: 108. See Breteler, 1978: 3 for full details.

Diagnostic characters. Liana or lianescent shrub. Branchlets soon provided with small pale lenticels. Leaves often coriaceous, elliptic to obovate, (7)9–15(22) × (3)4–9(13) cm, glabrous or glabrescent, with 4–7(9) pairs of main lateral nerves. Inflorescences cymose, axillary on leafy shoots or more often two or more together on leafless axillary shoots or leafless parts of axillary shoots. Flowers 3–6 mm long, shortly appressed-pubescent to tomentellous outside. Petals narrowly oblong-obovate, very shortly split or notched apically. Pistil 3-merous; ovary 3-lobed, densely shortly velutinous. Fruits obovoid, brown-velutinous, with a firm, thick wall.



JW

FIG. 6. *D. ruhlandii*: 1. part of branch with lenticels, 2×; 2. leaf axil with stipule, 2×; 3. flowering branchlet, $\frac{1}{2}$ ×; 4. leaf beneath, $\frac{1}{2}$ ×; 5. flower, 6×; 6. flower partly, 6×; 7. petal inside, 6×; 8. fruit, 1×. (1-2. Beal 43/32/2; 3, 5. Semsei 2375; 4, 7. Sacleux 1875; 6. Mafikiri 12; 8. Kreysler in Harris 1335).

Description. *Liana* or lianescent shrub. *Branches* densely, often pustular, lenticellate. *Branchlets* subappressed-puberulous, often soon glabrescent, soon provided with small, pale lenticels. *Stipules* narrowly triangular, 1–7 mm long, appressed-pubescent, usually early caducous. *Leaves*: petiole subterete to semiterete, usually grooved above, (3)4–9(14) mm long, glabrous or with a few hairs; blade often coriaceous, elliptic to obovate, 1.5–2.5 times as long as wide, (7)9–15(22) × (3)4–9(13) cm, cuneate-rounded or obtuse-subcordate at base, top truncate-obtuse or tapering to an obtuse to subacute top, sometimes shortly acuminate, the acumen 0.5 (–1.5) cm long, when young sparsely hairy mainly on midrib and the 4–8(9) pairs of main lateral nerves, soon glabrescent, longer persistent on the impressed midrib above; glands usually few, beneath only, often distinct. *Inflorescences* axillary on the leafy shoot, more often two or more together on leafless axillary shoots or on leafless parts of axillary shoots, cymose, up to 3 times distinctly branched, usually many-flowered, puberulous-tomentellous; peduncle 3–17 mm long; bracts and bracteoles triangular, 0.5–2 mm long. *Pedicel* up to ca 5 mm long, the upper part 0–1 mm long. *Sepals* erect to spreading, free or shortly united at base, flat to slightly concave, oblong-elliptic, 3–5(6) × (1)1.5–2(2.5) mm, shortly appressed-pubescent to tomentellous both sides. *Petals* erect or nearly so, at base shortly adnate to filaments, narrowly oblong-obovate, 3–4.5(6) × 1–1.5 mm, notched or up to 0.5 mm split at top, glabrous or with a few appressed hairs outside or on margin. *Stamens* erect, 3–4.5(6) mm long; filaments glabrous or with a few hairs in upper part; anthers ca 0.6 mm long, connective distinct, glabrous, rarely short-hairy. *Staminodes* free or partly united, subquadrate to oblong, up to 0.8 × 0.8 mm, glabrous or nearly so. *Pistil* 3-merous, 3.5–5(7) mm long; ovary 3-lobed, densely shortly velutinous; style glabrous or with a few hairs in basal part, with 3, up to 0.5 mm long lobes apically. *Fruits* (only immature fruits of 2 specimens seen) 1(–2)-seeded, obovoid, up to ca 3 × 2 cm, brown-velutinous; exocarp together with mesocarp 1–2 mm thick, firm (very hard in dry fruits); endocarp a thin, smooth, glabrous film (not finely striate and strongly fibrous as usual). Seedcoat smooth, glabrous.

Distribution: Zaïre, Angola, Kenya, Tanzania.

Ecology: Forest or anthropogenous savannahs.

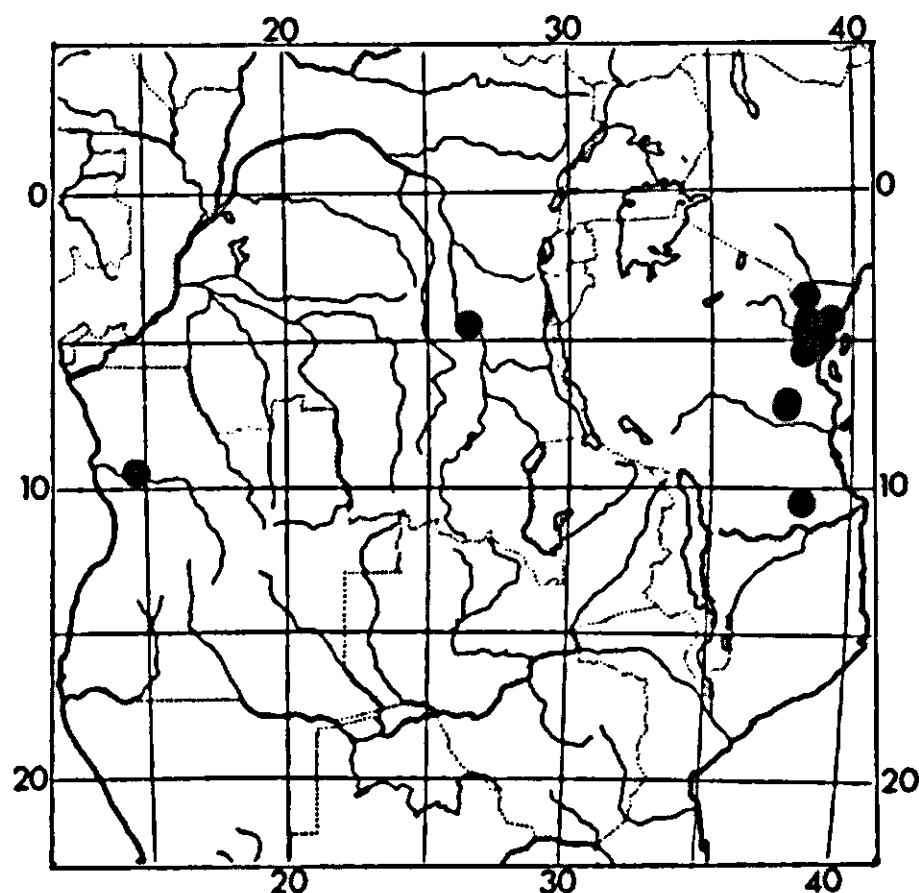
Specimens examined:

ZAÏRE. Pene-Yumbi, *Germain* 8008 (BR).

ANGOLA. Monte Lau – Monte Belo, *Gossweiler* 1641 (BM, COI, type of *D. cazengoense*); Bumba Andor, *Raimundo c.s.* 315 (WAG).

KENYA. Taita Hills, *Bally* 8775 (EA, K); *s.n.* (EA); Taita Hills, 2 km S.S.W. of Wundanyi, *Breteler* 7506 (WAG); Shimba Hills Nat. Res., Sheldricks Falls, *Faden c.s.* 70/807 (K); Mrima Hill, *Verdcourt* 1889 (BR, EA, K).

TANZANIA. Kiwanda, *Beal* 43/32/2 (EA, K); Bumbuli, *B.L. Institut Amani* 916 (EA); Lunguza, *B.L. Institut Amani* G 6134 (EA, PRE, K); Kerematonto, *Engler s.n.* (*B.L. Institut Amani* 3345) (EA); 3355 (EA); Bumbuli, *Kreysler* 1 (EA); *Kreysler in Harris* 1335 (BR, K, WAG, type); Lunguza



MAP 6. *D. ruhlandii*

F.R., *Mafikiri* 12 (EA, K); Mbondo, *Sacleux* 1875 (P); Uluguru Mts, *Schlieben* 3151 (B); Kimboza F.R., *Semsei* 829 (EA, K); Pandeni F.R., *Semsei* 2375 (EA, K); Bumbuli, *Zimmerman* 916 (E); Lunguza, *Zimmerman* s.n. (*B.L. Institut Amani* G 7555) (EA).

Notes. The holotype of this species was lost at Berlin and an isotype could not be located. The fragment at BM, which originates from Berlin, may have been taken from the holotype, but there is no indication whatsoever to prove this. Therefore a neotype has to be designated. As the fruit serves the best characters to distinguish between *D. ruhlandii* and the largely sympatric and in many aspects strongly similar *D. stuhlmannii*, a fruiting specimen has been chosen as neotype. For further details about the differentiating characters between these two species see under *D. stuhlmannii*.

Several collectors report that *D. ruhlandii*, especially its young shoots, is very poisonous to livestock. This phenomenon is also reported from related species as *D. barteri*, *D. cymosum*, and *D. stuhlmannii*.

D. salicifolium Engl. & Ruhl. = *D. heudelottii* (Planch. ex Oliv.) Baill. var. *hispidum* (Oliv.) Bret.

For details see BRETELER, 1979: 33.

D. sankuruense De Wild. = *D. heudelottii* (Planch. ex Oliv.) Baill. var. *ndongense* (Engl.) Bret.

For details see BRETELER, 1979: 38.

D. sapinii De Wild. = *D. chalotii* Pellegr.

For details see BRETELER, 1978: 4.

D. scabrum Engl. = *D. heudelotii* (Planch. ex Oliv.) Baill. var. *longitubulosum* (Engl.) Bret.

For details see BRETELER, 1979: 37.

D. schliebenii Milbr. = *D. stuhlmannii* Engl.

For details see p. 35.

D. schweinfurthii Engl. = *D. heudelotii* (Planch. ex Oliv.) Baill. var. *heudelotii*

For details see BRETELER, 1979: 28.

D. seretii De Wild. = *D. mundense* Engl.

For details see BRETELER, 1981: 46.

D. silvicola Ruhl. = *D. pallidum* (Oliv.) Engl.

For details see BRETELER, 1979: 22 and 1981: 65.

D. soyauxii Engl. = *D. gabonense* Engl.

For details see BRETELER, 1979: 4.

D. spathulatum Engl. = *D. crassifolium* Chod. var. *crassifolium*

For details see BRETELER, 1978: 29.



FIG. 7. *D. staminellatum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. flower, $17 \times$; 3. flower partly, $17 \times$. (1-3. Robin 25).

Frutex. Rami ramulique dense velutini usque tomentosi. Folia elliptica usque obovata, $8-18 \times 3-6$ cm, glabra vel fere glabra, costa plerumque supra prominente. Inflorescentia glomerata, usque 10-flora. Sepala suberecta, 1,5 mm longa. Petala subtus lobos divergentes geniculata, pars inferior erecta, 1,5 mm longa, pars superior 1,5 mm fissa. Stamina parva, erecta, 1,5 mm longa. Pistillum staminibus aequilongum vel brevius, usque 1,5 mm longum, 2-merum; ovarium velutinum.

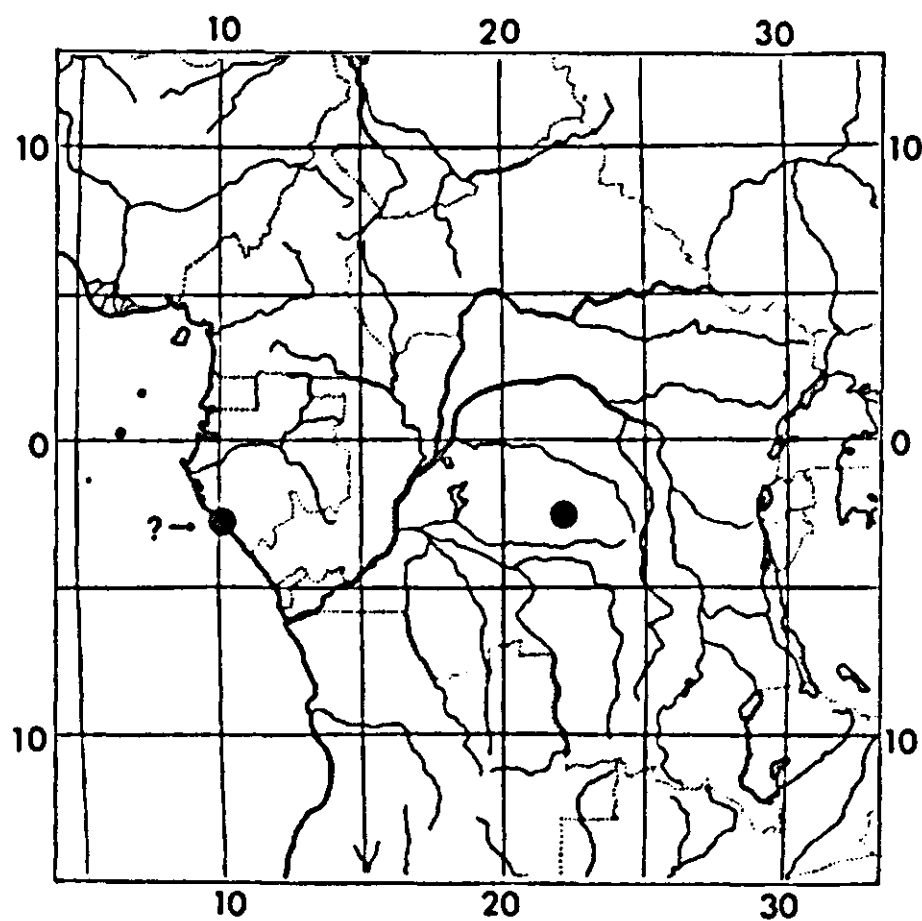
Type: Zaïre, Kole terr., south of Booke, *Robin 25* (holotype: BR; isotypes: K, WAG).

Diagnostic characters. Shrub. Branches and branchlets densely velutinous to tomentose. Leaves elliptic to obovate, $8-18 \times 3-6$ cm, glabrous or nearly so, midrib usually prominent above. Inflorescence glomerate, up to ca 10-flowered. Sepals suberect, 1.5 mm long. Petals geniculate below the spreading lobes, the lower part erect 1.5 mm long, the upper part 1.5 mm split. Stamens small, erect, 1.5 mm long. Pistil as long as or shorter than stamens, up to 1.5 mm long, 2-merous; ovary velutinous.

Description. *Shrub.* Branches and branchlets densely velutinous to tomentose, glabrescent with age. *Stipules* narrowly triangular, 1–3 mm long, caducous, hairy as branchlets. *Leaves:* petiole subterete to semiterete, 2–5 mm long, hairy as branchlets; blade elliptic to obovate, 2.5–3 times as long as wide, $8-18 \times 3-6$ cm, gradually tapering to a rounded to subcordate, usually oblique base, acuminate at top, the acumen rounded to acutish, 1–2 cm long; glabrous or with a few appressed hairs on the usually prominent midrib above, sparsely appressed-hairy along the margin and on the midrib and the 6–7 pairs of main lateral nerves beneath, glabrescent; glands small, usually beneath only, sometimes a few above as well, rather well dispersed. *Inflorescence* sessile or nearly so, glomerate, up to ca 10-flowered, velutinous-tomentose; bracts and bracteoles narrowly triangular, 0.5–1 mm long. *Pedicel* up to ca 1.5 mm long, the upper part at most 0.5 mm long. *Sepals* suberect, shortly united at base, narrowly oblong, 1.5×0.5 mm, sericeous-tomentose outside, sparsely pubescent mainly on upper part inside. *Petals* narrowly obovate in outline, 3.5–4 mm long, up to 1.5 mm split, geniculate below the spreading lobes, the lower part erect, ca 1.5 mm long, glabrous or with a few hairs below split outside. *Stamens* erect, slightly longer than sepals, ca 1.5 mm long, glabrous; anthers ca 0.3 mm long, connective distinct. *Staminodes* narrowly oblong, 3–4 times as long as wide, ca 0.5 mm long, glabrous. *Pistil* often shorter than stamens, up to 1.5 mm long, 2-merous; ovary velutinous, style glabrous, shortly 2-lobed. *Fruits* unknown.

Distribution: Only known from the type locality in Central Zaïre.

Ecology: Semi-deciduous forest.



MAP 7. *D. staminellatum*

Specimens examined:

ZAIRE. Kole terr., south of Booke, *Robin 25* (BR, K, WAG, type).

Note. *D. staminellatum* is a markedly distinct species, named after its comparatively short stamens. Its flowers resemble those of *D. geminostellatum* Bret., in the geniculate petals and in the length of the stamens being subequal to the basal, erect part of the petals. In other floral aspects, however, as well as in their vegetative characters the two species are quite different.

A sterile sample collected by *Breteler & van Raalte* (no 5642, at WAG) near Gamba in S.W. Gabon most probably represents this species as well.

D. staudtii Engl.

Fig. 8 Map 8

D. staudtii Engler, 1896-a: 349; 1896-b: 139; 1912-a: 581; Pellegrin, 1913: 642; De Wildeman, 1919: B 66; Engler & Krause, 1931: 6; Robijns, 1948: 434; Exell & Mendonça, 1951-b: 330; Keay, 1958: 438; Breteler, 1973: 4, XX; Punt, 1975: 29; Breteler, 1979: 25.

Type: Cameroun, Yaoundé, *Zenker & Staudt 205* (holotype: B†; lectotype: Z; isotypes: BM, BR, K, LE, P).

D. sulcatum Engler, 1902: 81; 1912-a: 592; Pellegrin, 1913: 583 (see notes); De Wildeman, 1919: B 68; Engler & Krause, 1931: 8; Breteler, 1973: XX (in synonymy of *D. staudtii*). Type: Cameroun, Yaoundé, *Zenker 790* (lectotype: W; isotypes: BM, E, EA, K).

D. mombongense De Wildeman, 1911-a: 223, t. 7. See Breteler, 1981: 31 for full details.

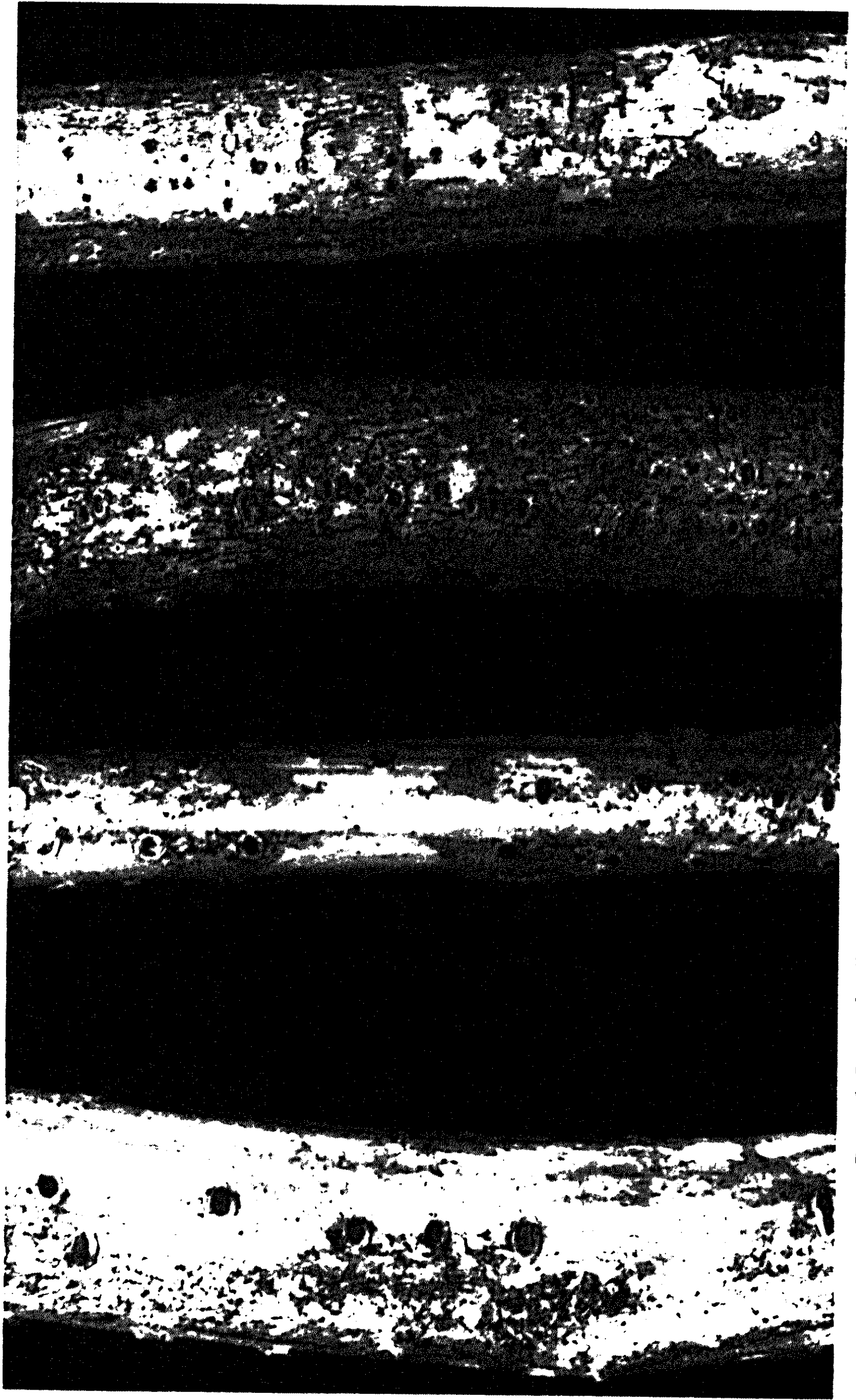
D. cinereo-viride Engler, 1912-a: 581. See Breteler, 1978: 15 for full details.

D. contractum Engler, 1912-b: 442. See Breteler, 1978: 22 for full details.

D. luteiflorum De Wildeman, 1919: B 47. See Breteler, 1979: 74 for full details.
D. echinulatum Exell, 1927: 68. See Breteler, 1978: 63 for full details.

Diagnostic characters. Liana, lianescent shrub, or shrub. Woodcylinder divided by intruding phloem. Branchlets subappressed-pubescent to hispidulous. Stipules narrowly oblong-triangular, (1)2–5(10) mm long. Leaves obovate-elliptic, (3.5)9–12(25) × (1.5)3–5(9) cm, rounded to cuneate at base, acuminate, glabrous or glabrescent, with (4)5–7(9) pairs of main lateral nerves, glands beneath only. Flowers shortly stalked on a knoblike, sessile or shortly stalked base. Sepals erect to reflexed. Petals erect or nearly so, 4–5(6) mm long, 0.5–1 mm split, glabrous. Stamens mostly slightly longer than petals. Pistil 3(4)-merous, ovary densely velutinous. Fruits 1–2 cm diam., sparsely to densely short-hairy, usually with a few long stiff hairs as well.

Description. *Liana* up to ca 50 m long and 12 cm diam., lianescent shrub, or shrub (sometimes a tree?). Woodcylinder of lianescent stems deeply divided by intruding phloem; bark rather smooth and pale, sometimes whitish, usually distinctly lenticellate, the lenticels usually in rows, either large and sparse or more dense and usually smaller. *Branches* usually glabrous and lenticellate. *Branchlets* shortly subappressed-pubescent to tomentellous to hispidulous, often soon glabrescent, usually soon lenticellate, the hairs pale-brown to dark-red, the same indumentum present on stipules, petioles and inflorescences. *Stipules* rather early caducous, narrowly oblong-triangular, (1)2–5(10) mm long, up to 1 mm wide. *Leaves*: petiole subterete to semi-terete, grooved above or not, (1)2–5(13) mm long; blade papery to coriaceous, obovate-elliptic, (1.5)2–3(4) times as long as wide, (3.5)9–12(25) × (1.5)3–5(9) cm, usually tapering to a narrow, rounded to cuneate base, gradually to abruptly acuminate apically, the acumen rounded to obtuse, sometimes emarginate, rarely mucronate, (0.5)1–1.5(2) cm long; usually glabrous above or with a few hairs to more densely hairy on impressed midrib, sparsely subappressed-hairy mainly on midrib and main laterals beneath, sometimes above hairy as beneath or, when young, the blade entirely appressed-short-hairy; main lateral nerves (4)5–7(9) pairs, often impressed in papery leaves, prominent beneath, tertiary nerves usually plane and indistinct above, rarely prominent, beneath usually distinct, plane or slightly prominent; glands usually present, beneath only, usually few and small, sometimes a few larger ones near base, mainly in a narrow zone along midrib in lower half. *Inflorescence* up to ca 50-flowered, knoblike (sometimes basally split in two), either sessile or very shortly stalked, rarely not knoblike and distinctly branched, shortly subappressed-pubescent to tomentellous to hispidulous; peduncle 0–1(3) mm long; bracts and bracteoles ovate-triangular, up to 1 mm long. Pedicel up to 4(7) mm long, the upper part very short or absent. *Sepals* erect to reflexed, free, oblong-obovate, 2–4 × 0.7–1(1.5) mm, appressed-pubescent to tomentellous outside, glabrous or with a few hairs on apical part inside, rarely completely puberulous inside. *Petals* erect or nearly so, narrowly obovate-oblong in outline, 4–5(6) mm long, 0.5–1 mm split, free



PHOT. 6. *D. staudtii*: lianescent stems showing lenticellar pattern (from left to right: *Breteler* 6943, 3 cm diam, *Breteler* 2395, 2 cm diam, *Breteler* 6737, 2.7 cm diam, *Breteler* 6848, 2.5 cm diam; phot. J. W. MUGGE).



PHOT. 7. *D. staudtii*: fruiting branchlet (*Breteler* 6848; phot. F. J. BRETELER).

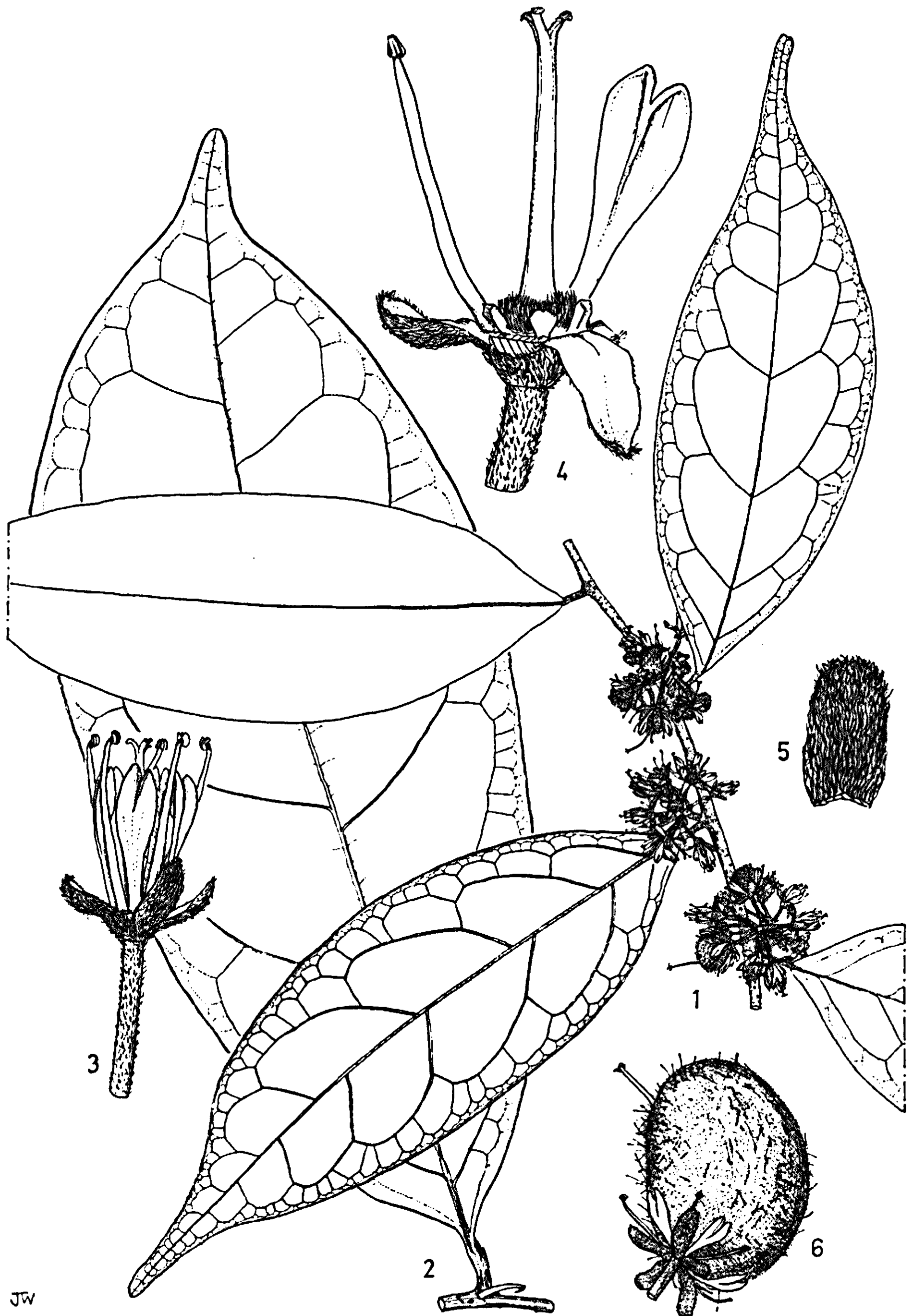
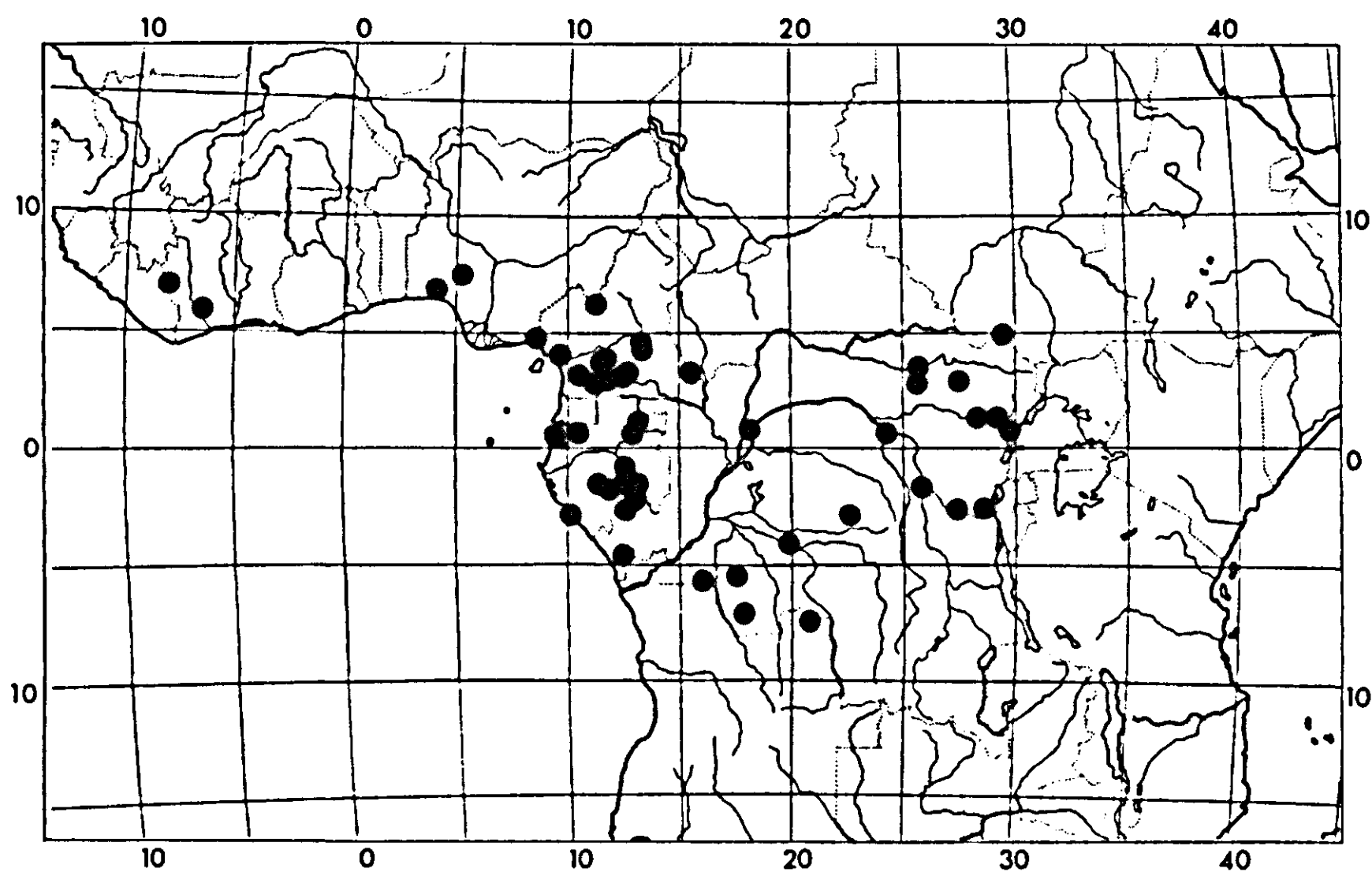


FIG. 8. *D. staudtii*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. large leaf, $\frac{5}{6} \times$; 3. flower, $5 \times$; 4. flower partly, $10 \times$; 5. sepal outside, $10 \times$; 6. fruit, $2\frac{1}{2} \times$. (1, 6. Breteler 6848; 2. Breteler 6943; 3-5. Breteler 6694).

or very shortly adnate to filaments at base, glabrous, lobes usually concave. *Stamens* erect or nearly so, mostly slightly longer than petals, (4)4.5–5.5(6.5) mm long, glabrous; anthers ca 0.2–0.5 mm long, connective usually distinct. *Staminodes* subquadrate to obovate-oblong, 0.2–0.7 × 0.2–0.5 mm, glabrous. *Pistil* 3(4)-merous, 4.5–7.5 mm long, ovary 3(4)-lobed, densely white-brown-velutinous; style glabrous, shortly 3(4)-lobed apically. *Fruits* subglobose to bi-globose to obliquely ellipsoid, usually 1–2-seeded, 1–2 cm diam., yellow to orange at maturity, sparsely to densely puberulous-tomentellous to velutinous, usually with some long, stiff, needle-like, easily caducous, irritating hairs as well; mesocarp juicy 1–2(4) mm thick; endocarp pergamentaceous, glabrous to densely strigose inside. *Seed* globose to ellipsoid, 5–12 mm long, 5–8 mm diam.; seedcoat thin to rather firm, brown, glossy.



MAP 8. *D. staudtii*

Distribution: Ivory Coast, East Nigeria, central Africa.

Ecology: Rain forest, semi-deciduous forest, alt. up to 1700 m.

Specimens examined:

IVORY COAST. Tiapleu, 30 km S. of Danané, *Aké Assi* 6107 (WAG); Taï forest, *Aké Assi* 13050 (WAG); Soubré, Taï National Parc, *Aké Assi* 13062 (WAG).

NIGERIA. Ijebu, near Grace Camp on Ajebandele Rd, *Jones & Onochie* FHI 17037 (FHI, K); Ikere-Igbara-Odo, *Olorunfemi & Fagbemi* FHI 70741 (K, WAG); Ijebu, near Agboine, *Tamajong* FHI 16921 (FHO); S.E. State, Stubbs Creek F.R., *van Meer* 1176 (WAG).

CAMEROON. Bitye, *Bates* 1656 (BM, WAG, Z); 1756 (B, K, WAG); 1761 (K, WAG); 1786 (K, WAG); near Douala Airport, *Bos & Breteler* 7330 (WAG); 40 km W. of Bertoua, *Breteler* 1350 (BR, FI, K, LISC, M, P, WAG); 27 km S.W. of Bertoua, *Breteler c.s.* 2395 (BR, FI, G, K, LISC,

M, P, WAG); 27 km Sangmélina-Yaoundé, *Breteler* 2705 (BR, FI, K, LISC, M, P, WAG); Yaoundé area, Noonguem hill, *Dang* 652 (WAG); 16 km Ebolowa-Minkok, *J. J. de Wilde* 8490 (WAG); Foumban-Banyo, *Jacques-Félix* 3202 (P); 16 km S. of Djono, 20 km E. of Somalomo, *Dja R., Letouzey* 4387 (P, WAG); Moloundou area, *Mildbraed* 4791 (HBG); Yaoundé, *Mildbraed* 7816 (BM, K); *Zenker* 790 (BM, E, EA, K, W, type of *D. sulcatum*); Bipindi, *Zenker* 2900 (B, BP, BR, COI, E, G, GOET, K, L, M, P, W, WAG, WU, Z, type of *D. cinereo-viride*); Yaoundé, *Zenker & Staudt* 205 (BM, BR, K, LE, P, Z, type).

GABON. Gamba, *Breteler & van Raalte* 5653 (WAG); km 20 Moanda-Bakoumba, *Breteler* 6501 (WAG); km 8 Lastoursville-Koulamoutou, *Breteler* 6694 (WAG); Km 33 Moanda-Bakoumba, *Breteler* 6737 (WAG); 60 km S.S.W. of Moanda, *Breteler* 6848 (WAG); 6856 (WAG); 6932 (WAG); 6943 (WAG); 7 km S.W. of Makokou, *Breteler* 7633 (WAG); near Libreville, *Breteler* 7662 (WAG); km 3 Asok-Tchimbélé R., *Breteler & J. J. de Wilde* 9 (WAG); 11 (WAG); km 13 Asok-Tchimbélé R., *Breteler & J. J. de Wilde* 161 (WAG); Bélinga-Mayibout I, *Breteler & J. J. de Wilde* 684 (WAG); Haute Ngounié, *Le Testu* 5910 (BM, P); Piti Masango, *Le Testu* 5923 (BM, P, WAG); Iméno (Ivinzi), *Le Testu* 6444 (BM, P, WAG); Gnyenzé, *Le Testu* 8298 (BM, BR, P, WAG); Iméno, *Le Testu* 8316 (BM, P, WAG); Lévicou, *Le Testu* 8397 (BM, BR, P, WAG).

CONGO. W. of Mossendjo, near Kouyi, *Sita* 3978 (P).

ANGOLA. Mayombe, Belize, *Gossweiler* 7102 (BM, COI, K, LISU, type of *D. echinulatum*); between Belize and Luali, *Gossweiler* 8164 (BM, COI, LISU); Dundo, *Gossweiler* 13578 (B, BM, K).

ZAÏRE. Penghe, *Bequaert* 2380 (BR, K, LISU); Lesse, *Bequaert* 3093 (BR); 3182 (BR); Yangambi, *Donis* 3028 (BR, M); Bomongo, *Evrard* 5897 (BR, K, WAG); Bambesa, *Gérard* 596 (BR); Madabu, *Gérard* 3506 (BR, K); Bambesa, *Gérard* 3960 (BR, K); 4812 (BR); 5357 (BR); Yangambi, *Germain* 8520 (BR); between Mushwere and l'Urega, *Lebrun* 5568 (BM, BR, EA); Odonga, *A. Léonard* 3934 (BR, M); Ulindi R., Mvenga terr., *A Léonard* 4945 (BR, WAG); Yangambi, *Louis* 8297 (BR, COI, LISC, M, SRGH); 8779 (BR, EA, LISU, P); 10415 (BR, K, U); 10678 (BR, C, EA, K, P, PRE, WAG); Ituri, between Irumu and Mawambi, *Mildbraed* 2951 (BM, type of *D. contractum*); near Nala, *Seret* 781 (BR, type of *D. luteiflorum*); Mombongo, *Thonner* 161 (BR, K, P, W, type of *D. mombongense*); between Lubue R. and Loange R., *Vanderyst* 12492 (BR); Benga, *Vanderyst* 15094 (BR); Kimbao, *Vanderyst* 15321 (BR); Panzi, *Vanderyst* 16441 (BR, type of *D. mombongense* var. *breviflorum*); 16445 (BR).

SUDAN. Meridi dist., Azza forest, *Andrews* 1349 (BR, K).

Notes. *D. staudtii* is related to *D. heudelotii* (Planch. ex Oliv.) Baill. from which it can rather easily be distinguished by its vegetative characters (see BRETELER, 1979: 26) and by its usually much smaller fruits. It is, like *D. heudelotii*, a variable species, especially so as regards its leaf size.

Rather few-flowered inflorescences and leaves with a prominent reticulum above as observed in the type material of *D. cinereo-viride* can also be observed in *van Meer* 1176 from S.E. Nigeria. The fruits of the latter specimen confirm that *D. cinereo-viride* belongs in *D. staudtii*. Whether the prominent reticulum combined with a slightly aberrant inflorescence may justify infraspecific distinction on a variety level remains to be seen. More material is needed.

D. sulcatum was based on two syntypes from Cameroun: *Zenker* 790 and *Dinklage s.n.* The originals are lost in Berlin. Of *Zenker* 790 duplicates are present in other herbaria and this number has therefore been chosen as lectotype. It is peculiar that PELLEGRIN (l.c.) cited *Zenker* 790 under *D. sulcatum* as well as under *D. staudtii*.

D. stenophyllum Krause = *D. gilletii* De Wild.

For details see BRETELER, 1979: 14.

***D. stuhlmannii* Engl.**

Fig. 9 Map 9

D. stuhlmannii Engler, 1895: 235; 1896-a: 348; 1911: 247; 1912-a: 566; 1915: 844; De Wildeman, 1919: B 67; Moss, 1928: 122; Engler & Krause, 1931: 6; Brenan & Greenway, 1949: 130; Torre, 1963: 326; Verdcourt & Trump, 1970: 70; Breteler, 1973: 7, 28, 32, 36, 85, 106, XX; Punt, 1975: 21; Breteler, 1979: 74.

Type: Tanzania, Uzaramo (Usaramo), *Stuhlmann 7145* (lectotype: K; isotype: LE).

D. schliebenii Mildbraed, 1935: 514; Brenan & Greenway 1949: 131; Verdcourt & Trump, 1970: 65; Breteler, 1973: XX; 1979: 53. Type: Tanzania, 40 km W. of Lindi, *Schlieben 5344* (holotype: B†; lectotype: K; isotypes: B, BM, BR, G, HBG, LISC, M, P, PRE, Z).

D. lebrunii Hauman, 1955: 345. See Breteler, 1979: 53 for full details.

D. michelsonii Hauman, 1958-b: 73. See Breteler, 1981: 27 for full details.

Diagnostic characters. Much branched shrub or small to medium sized tree. Branches minutely lenticellate. Branchlets tomentose to velutinous. Leaves elliptic to obovate, (4)8–13(17) × (2)3–7(9) cm, usually tomentose to velutinous both sides when young, main lateral nerves 4–6(7) pairs. Inflorescence stalked, subglobose, obscurely or basally once distinctly branched. Sepals, petals and stamens subequal in length. Sepals erect to slightly spreading, densely short-hairy outside. Petals 0.2–1 mm split. Pistil 3-merous, 3–4.5 mm long, ovary densely hairy. Fruits usually more or less echinate, velutinous-tomentose to tomentellous.

Description: Much branched *shrub* or *tree*, up to ca 12 m in Tanzania, up to ca 24 m and 50 cm diam. at B.H. in eastern Zaïre. *Branches* glabrous or glabrescent, minutely lenticellate. *Branchlets* tomentose to velutinous, often densely so, often soon lenticellate. *Stipules* narrowly triangular, 2–6 mm long, hairy as branchlet, usually early caducous. *Leaves*: petiole semiterete to subterete, (2)3–8(9) mm long, hairy as branchlet; blade usually coriaceous, elliptic to obovate or oblong, (1.2)1.5–3(4) times as long as wide, (4)8–13(17) × (2)3–7(9) cm, on flowering shoots or parts often considerably smaller than on non-flowering ones, rounded to cuneate sometimes obtuse at base, rounded-obtuse sometimes acute or emarginate, or acuminate at top, the acumen emarginate to acute, up to 0.5(1) cm long; usually tomentose to velutinous both sides when young, more densely so, often felty, and usually longer persistent beneath, margin revolute or not, midrib impressed above, prominent beneath, main lateral nerves 4–6(7) pairs; glands few, usually beneath only, mostly mainly in lower

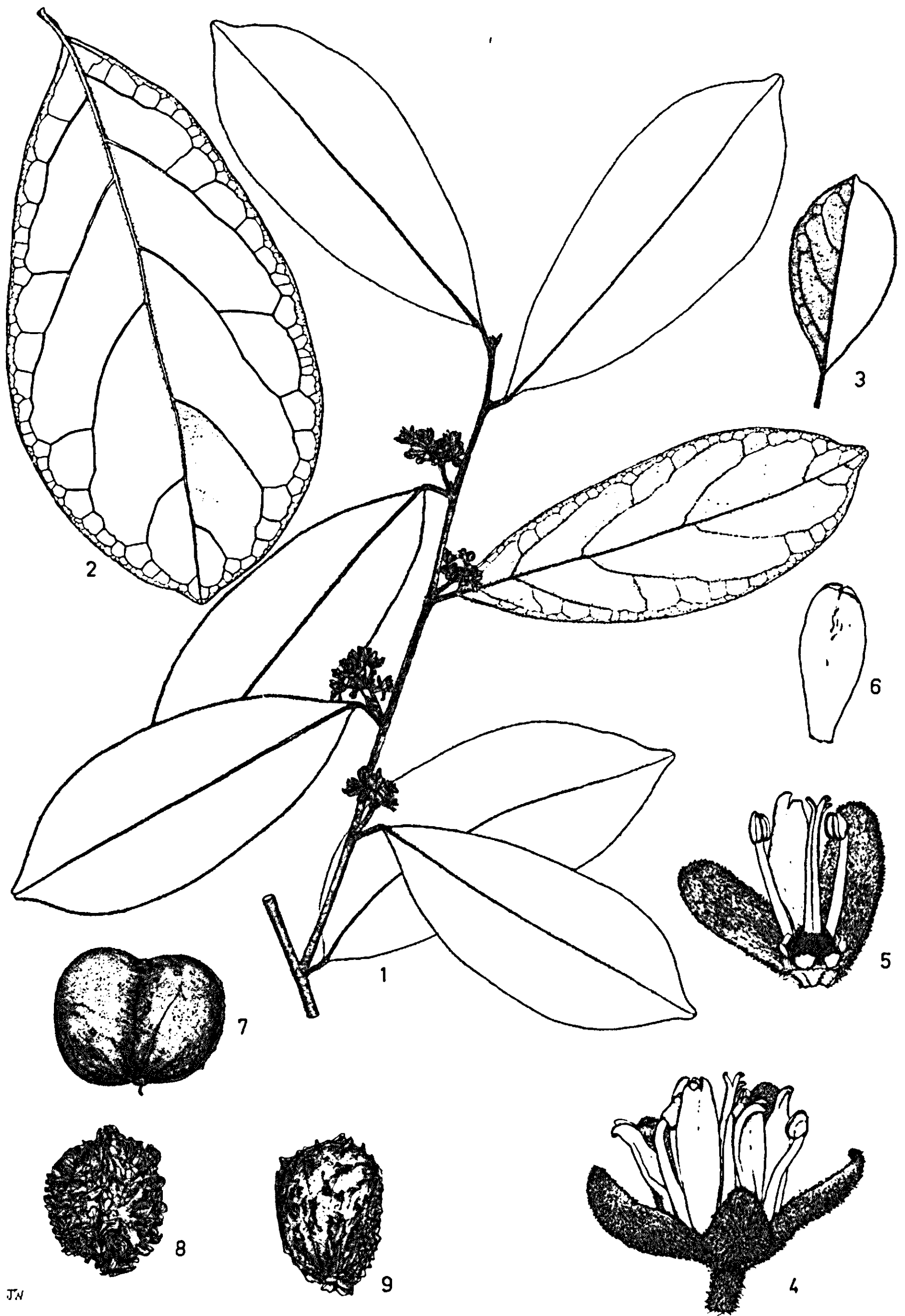
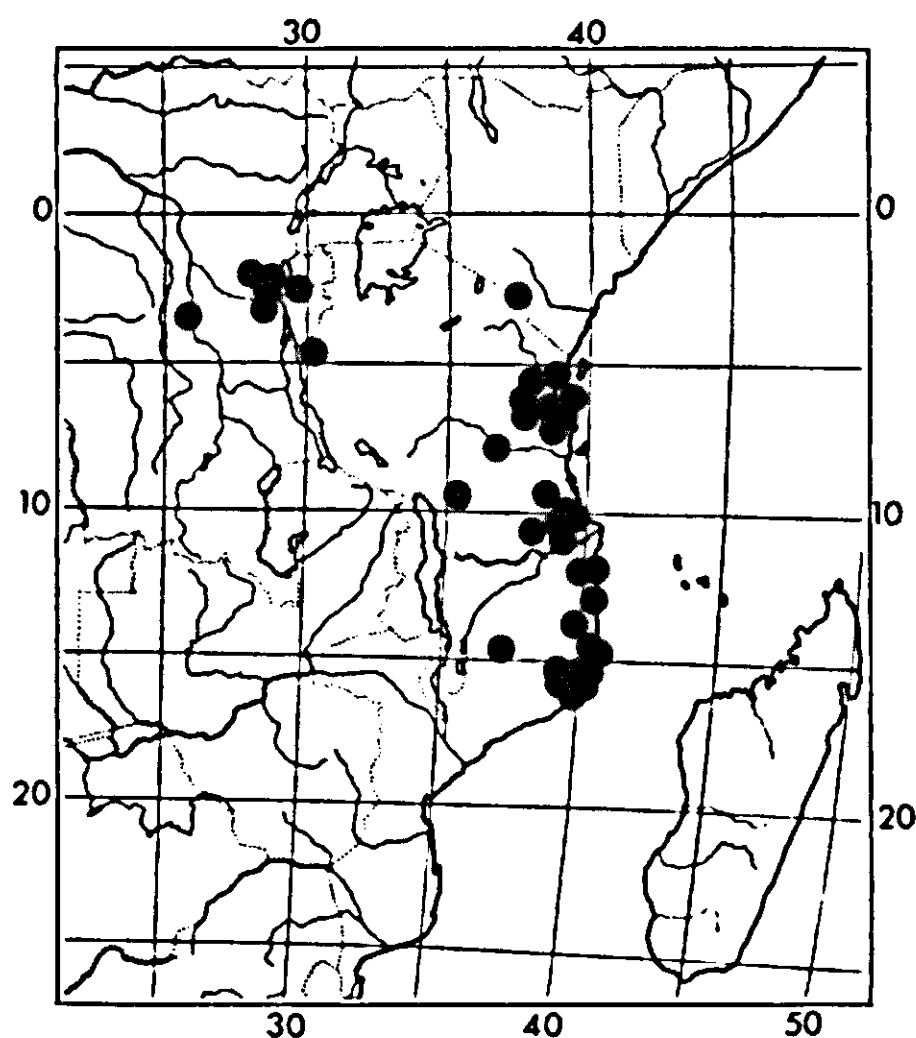


FIG. 9. *D. stuhlmannii*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. large leaf, $\frac{1}{2} \times$; 3. small leaf, $\frac{1}{2} \times$; 4. flower, $10 \times$; 5. flower partly, $10 \times$; 6. petal outside, $10 \times$; 7. 2-seeded fruit, $1 \times$; 8. 2-seeded fruit, $1 \times$; 9. 1-seeded fruit, $1 \times$. (1, 4-6. Hansen 337; 2-3, 8. Haerdi 579/0; 7. Magogo & Rose Innes RRI 465; 9. Michelson 961).

half, often hidden by the indumentum. *Inflorescence* a subglobose head, rarely sessile, obscurely shortly branched or basally once distinctly so, usually single in the leaf axil, up to ca 40-flowered, densely pubescent-puberulous; peduncle (0)5–15(20) mm long, often provided with 1–2 bracts well below the head; bracts and bracteoles narrowly triangular to subulate, 0.5–5 mm long. *Pedicel* up to ca 5 mm long, the upper part 0–0.5(1) mm long. *Sepals* erect to slightly spreading, free or nearly so, flat to slightly concave, oblong to ovate to obovate, 3–4(5) × 1–2 mm, densely shortly (sub)appressed-pubescent to tomentose both sides. *Petals* erect, at base very shortly adnate to filaments, oblong to narrowly obovate in outline, 3–4 × 1–1.5 mm, 0.2–1 mm split, glabrous or with a few hairs outside or on margin, glabrous inside, lobes ca flat, inrolled or not. *Stamens* erect, 3–4 mm long, glabrous; anthers ca 0.5 mm long, connective distinct. *Staminodes* subquadrate, free or slightly united, up to ca 0.7 × 0.7 mm, glabrous or nearly so. *Pistil* 3-merous, 3–4.5 mm long; ovary subglobose, slightly 3-lobed, densely velutinous to somewhat tomentose; style glabrous, rarely with a few hairs, with 3, up to 0.5 mm long lobes apically. *Fruits* 1–2(3)-seeded, velutinous-tomentose to tomentellous, yellow at maturity; 1-seeded fruits: subellipsoid to subglobose, 1.5–2.5 × 1–2 cm; exocarp usually echinate to more or less rugose-wrinkled, sometimes almost smooth, with protuberances up to ca 4 mm thick; mesocarp thin; endocarp distinct, pergamentaceous, fibrous, shiny, finely striate and glabrous inside. *Seeds* ellipsoid, up to 15 × 12 mm; seedcoat thin, brown.



MAP 9. *D. stuhlmannii*

Distribution: Eastern Zaïre, Rwanda, Tanzania, Moçambique.

Ecology: Montane forest in eastern Zaïre and Rwanda, alt. up to ca 2000 m; lowland forest, gallery forest, and savannah thickets in Tanzania and Moçambique.

Specimens examined:

ZAÏRE. Elundu, *Gaillez* 77 (BR); between Muswhere and the Urega, *Lebrun* 5562 (BR, K, type of *D. lebrunii*); Tchiganda, *A. Léonard* 3275 (BR, K); Lusheni, *A. Léonard* 4729 (BR, K); Mwenga, *A. Léonard* 4874 (BR, K, SRGH, WAG); 4899 (BR, P, WAG); Ngandu, *A. Léonard* 4901 (BR, K, PRE, SRGH, WAG); Mt Kahuzi, *Michelson* 961 (BR, type of *D. michelsonii*); 961 bis (BR); 961 ter (BR, K); 961-4 (BR, LISC); 961-5 (BR); Bitale, *Pierlot* 1641 (BR); Mikonzi, *Pierlot* 1723 (BR); Mt Kahuzi, *Pierlot* 3256 (BR, P).

RWANDA. Mayoga region, *Germain* 8863 (BR); near Astrida, *Hendrickx* 7844 (BR); *Thienpont in van den Ben* 2579 (BR); Gisagara, *van den Ben* 1983 (BR, K).

TANZANIA. Kilwa, *Anonymus, B.L. Inst. Amani* 274 (EA); 2016 (EA); near Kasulu, *Anonymus EA* 13029 (BR, EA); near Dar es Salaam, *Anonymus EA* 13608 (EA); Bagamoyo, *Anonymus EA* 13660 (EA); Kiberege, *Bone H* 77/42 (EA); Kasulu, *Eggeling* 6202 (BR, EA, K); Rondo Plateau, Mene, *Eggeling* 6747 (EA, K, PRE); Newala, *Gillman* 1071 (EA, K); Mitola, *Gillman* 1109 (EA, K); Morogoro, *Greenway* 2497 (BR, EA, K, WAG); Pugu Hills, *Greenway* 4983 (EA, K, PRE, WAG); Taveta, *Haerdi EA* 579/0 (BR, EA, K); 4283 (BR, P, WAG); Kerege, N.W. of Dar es Salaam, *Hansen* 337 (WAG); Kibaha, *Hansen* 392 (WAG); Pugu Hills F.R., *Hansen* 433 (WAG); Kerege, *Harris* 1333 (BR); *Harris & Mainoya* 1337 (WAG); 2007 (WAG); Pugu Hills, *Harris & Pocs* 3350 (K); 16 km W. of Kibaha, *Harris* 5267 (BR, WAG); Pugu Hills F.R., *Mabberly & Harris* 1524 (K, WAG); Pugu Hills, *Maclean* 3 (K); Kilimarondo Hill, *Magogo & Rose Innes RRI* 465 (K); Bana F.R., *Mgaza & Shabani* 759 (EA, K, LISC, PRE); Mtibwa, *Paulo* 173 (BR, EA, K); Bigwa, 45 mls S. of Dar es Salaam, *Procter* 19 (EA, K); *Banda F.R., Procter* 2752 (EA, K); Morogoro distr., *Procter* 2777 (K, UPS); Dar es Salaam distr., *Raymond* 36 (EA); Bana F.R., *Ruffo* 80 (BR, K); Zanzibar, Nhomla, *Sacleux* 1698 (P); (Zanzibar, Ngouron, *Sacleux* 1698 bis (P, WAG); Zanzibar, Nhomla, *Sacleux* 1705 (P, WAG); Lupembe, *Schlieben* 1301 (B, K, LISC, MO, SRGH); 40 km W. of Lindi, *Schlieben* 5344 (B, BM, BR, G, HBG, K, LISC, M, P, PRE, Z, type of *D. schliebenii*); Pugu F.R., *Semsei* 1296 (BR, EA, K); Turiani, *Semsei* 1445 (BR, EA, K); 1859 (K); Bana F.R., *Shabani* 81 (BR, K); Uzaramo, *Stuhlmann* 7145 (K, LE, type); 7146 (K); Chambezi, *van Rensburg* 676 (BR, EA, K); Pugu Hills, *Vaughan* 3132 (BR, EA); Morogoro distr., *Wallace* 190 (K).

MOÇAMBIQUE. Erati, Namapa, *Barbosa* 1786 (BR, EA, K, LISC, LMA, SRGH); near Porto Amelia, *Barbosa* 1866 (COI, LISC, LMA, PRE, SRGH), between Quissanga and Ingoane, *Barbosa* 2052 (G, LISC, LMA); Nacala, *Barbosa* 2442 (COI, K, LISC, LMA); between Quixaxe and Liupo, *Barbosa* 2481 (BR, LISC, LMA, PRE); Niassa, Moçambique distr., *de Sousa s.n.* (LMA); Moçambique distr., *Esquivel s.n.* (LMA); Nampula, *Hess s.n.* (LMA); Moçambique distr., *Macêdo* 3617 (LMA); Rio Metapa, *Pedro & Pedrogao* 4714 (EA, LMA); Nacala, *Pedro & Pedrogao* 4810 (EA, LMA); Niassa, between Mahate and Macomia, *Pedro & Pedrogao* 5104 (EA, LMA); Niassa, between Macomia and Chae, *Pedro & Pedrogao* 5144 (EA, LMA); near Mogincual, *Santos jr. s.n.* (K, LISC); Nampula, *Torre* 678 (COI, LISC, LMA); Nametil, *Torre* 955 (COI, LISC); Monapo, *Torre & Paiva* 9304 (LISC); 9361 (LISC); km 25 Antonio Enes – Nametil, *Torre & Correia* 17363 (LISC).

Notes. When compared with the average material of this species, the type of *D. schliebenii* represents a rather glabrous specimen, although the material from eastern Zaire, formerly described as *D. lebrunii* and as *D. michelsonii*, is usually even less hairy. Besides this character of quantitative nature i.e. more or less hairy, the type material of *D. schliebenii* is not distinct in any aspect from *D. stuhlmannii* and *D. schliebenii* has therefore been placed in synonymy of this species.

D. stuhlmannii is certainly very closely related to *D. barteri* Engl., formerly only known from West Africa, but at present also known to occur in Gabon and western Zaire (see BRETELER 1979: 74). There is no material from Cameroun or from central parts of Zaire which may link the western *D. barteri* with the eastern *D. stuhlmannii* in such a way that the two species have to be united.

So far both species can easily be distinguished by their flowers as follows:

- Petals 5–6.5 mm long, stamens (4.5)5–6.5(7) mm long; pistil 6–7.5 mm long
..... **D. barteri**
- Petals and stamens 3–4 mm long; pistil 3–4.5 mm long . . . **D. stuhlmannii**

D. stuhlmannii and *D. ruhlandii* are often difficult to distinguish. Their flowers are very much alike, only their fruits differ markedly, but fruiting material is scarce, at least of *D. ruhlandii*. To distinguish between material with flowers only, a number of small and rather weak characters combined are needed:

- Lianescent shrub or liana (rarely treelike?); leaves, at least when young, sparsely hairy, rather soon glabrous or nearly so; inflorescences often grouped on leafless axillary shoots or leafless parts of such shoots, distinctly 3–4 times branched, usually many flowered; fruits obovoid, velutinous, firmly walled; endocarp filmy, not fibrous **D. ruhlandii**
- Shrub or tree; leaves, at least when young, rather densely hairy above, especially so on midrib above and there usually long persistent; inflorescences usually single in the leaf axil, subglobose, indistinctly branched or basally once distinctly so, up to ca 40-flowered; fruits subellipsoid to subglobose, velutinous to tomentellous, usually echinate or rugose-wrinkled, rarely smooth, wall itself rather thin, endocarp pergamentaceous, fibrous, finely striate inside
..... **D. stuhlmannii**

As *D. ruhlandii* this species is reported to be very poisonous to domestic stock (see also *Verdcourt & Trump*, 1970: 70). It is rather common and therefore more dangerous than *D. ruhlandii*. In eastern Zaire PIERLOT (no 1641) reports that *D. stuhlmannii* may count up to 100 stems over 20 cm circumference per ha. In some places the stems are used as building poles.
Several collectors remark that the flowers are sweet scented.

D. subauriculatum (Oliv.) Engl. = **D. heudelotii** (Planch. ex Oliv.) Baill. var **heudelotii**

For details see BRETELER, 1979: 27.

D. subauriculatum Engl. nom. nud.

For details concerning this homonym nudum see BRETELER, 1979: 31.

D. subcordatum (Hook. f. ex Benth.) Engl. = **D. madagascariense** Poir. var. **madagascariense**

For details see BRETELER, 1981: 14.

D. subcoriaceum Engl. = **D. madagascariense** Poir. var. **madagascariense**

For details see BRETELER, 1981: 14, 21.

D. subfalcatum Engl. = **D. gabonense** Engl.

For details see BRETELER, 1979: 4.

D. suboblongum Engl. = **D. rudatisii** Engl.

For details see p. 8.

D. subsessilifolium Chod. = **D. heudelotii** (Planch. ex Oliv.) Baill. var. **hispidum** (Oliv.) Bret.

For details see BRETELER, 1979: 33.

D. subtruncatum Engl. nomen = **D. tomentosum** Engl.

For details see p. 53.

D. subuncinatum Engl. = **D. cymulosum** (Oliv.) Engl.

For details see BRETELER, 1978: 40.

D. sulcatum Engl. = **D. staudtii** Engl.

For details see p. 28.

D. sumbense Breteler, 1980: 81.

Type: Angola, near lower Zaïre R., Sumba Peco, *Gossweiler* 8986 (holotype: K; isotypes: BM, LISJC).

Diagnostic characters. Shrublet. Branchlets densely appressedly short-hairy. Stipules rather long persistent, subulate, 2–8 mm long. Leaves shortly stalked, coriaceous, ovate-elliptic, 8–14 × 3–6 cm, broadly rounded to subcordate at base, short acuminate and mucronate at top, glabrous or glabrescent, the midrib and main lateral nerves prominent both sides. Inflorescences axillary and subterminal, subsessile, rather indistinctly branched, few to many flowered, puberulous. Bracts and bracteoles 0.5–3 mm long. Sepals oblong, tomentellous outside. Petals and stamens subequal in length, at base united into a 2–3 mm long tube. Pistil 3-merous, villous. Fruits 1–2(?) seeded, distinctly apiculate, densely shortly brown-velutinous. Endocarp pergamentaceous, appressed-hairy inside.

Description. *Shrublet.* Branches with brown bark, usually with some distinct lenticels. *Branchlets* densely appressedly short-hairy, the same indumentum present on stipules and petioles. *Stipules* rather long persistent, narrowly triangular, subulate, 2–8 mm long. *Leaves:* petiole subterete, often grooved above, 3–7 mm long; blade coriaceous, ovate-elliptic, ca 2.5 times as long as wide, 8–14 × 3–6 cm, broadly rounded to subcordate at base, usually gradually and broadly short acuminate, the acumen ca 0.5 cm long, usually distinctly mucronate; midrib and the 6–8 pairs of main lateral nerves prominent both sides, in young leaves sparsely subappressed-hairy also on the margin, usually soon glabrescent; glands rather few, both sides or beneath only, not very distinct. *Inflorescences* axillary and subterminal, rather compact, indistinctly branched at least when flowering, subsessile, the peduncle at most 5 mm long, puberulous, few to many flowered; bracts and bracteoles narrowly triangular, 0.5–3 mm long. *Pedicel* up to 2 mm long, jointed just below calyx, i.e. the upper part 0 or nearly so. *Sepals* erect or slightly spreading, oblong, 3.5–4 × ca 1 mm, tomentellous, outside, sparsely puberulous inside. *Petals* erect, united at base with stamens into a 2–3 mm long tube, narrowly obovate to spatulate in outline, 5 mm long, ca 1 mm split, glabrous or with a few hairs below split outside, lobes concave. *Stamens* erect, slightly shorter than petals, 4.5 mm long, glabrous; anthers oblong, 0.8 mm long, connective distinct. *Staminodes* transversely oblong, ca 0.5 × 0.2 mm, glabrous. *Pistil* 3-merous, 4.5–5 mm long, villous, on the ovary mixed with some stiff hairs; style glabrous at top, shortly 3-lobed. *Fruits* 1–2(–3?) seeded, distinctly apiculate, the aborted cells present as a distinct ridge; one-seeded fruit: ovoid-ellipsoid, 1.5–2.5 cm long, 1–1.5 cm diam.; exocarp densely, shortly brown-velutinous, like sandpaper to the touch; mesocarp thin, in mature, dry fruits less than 0.5 mm thick; endocarp pergamentaceous,

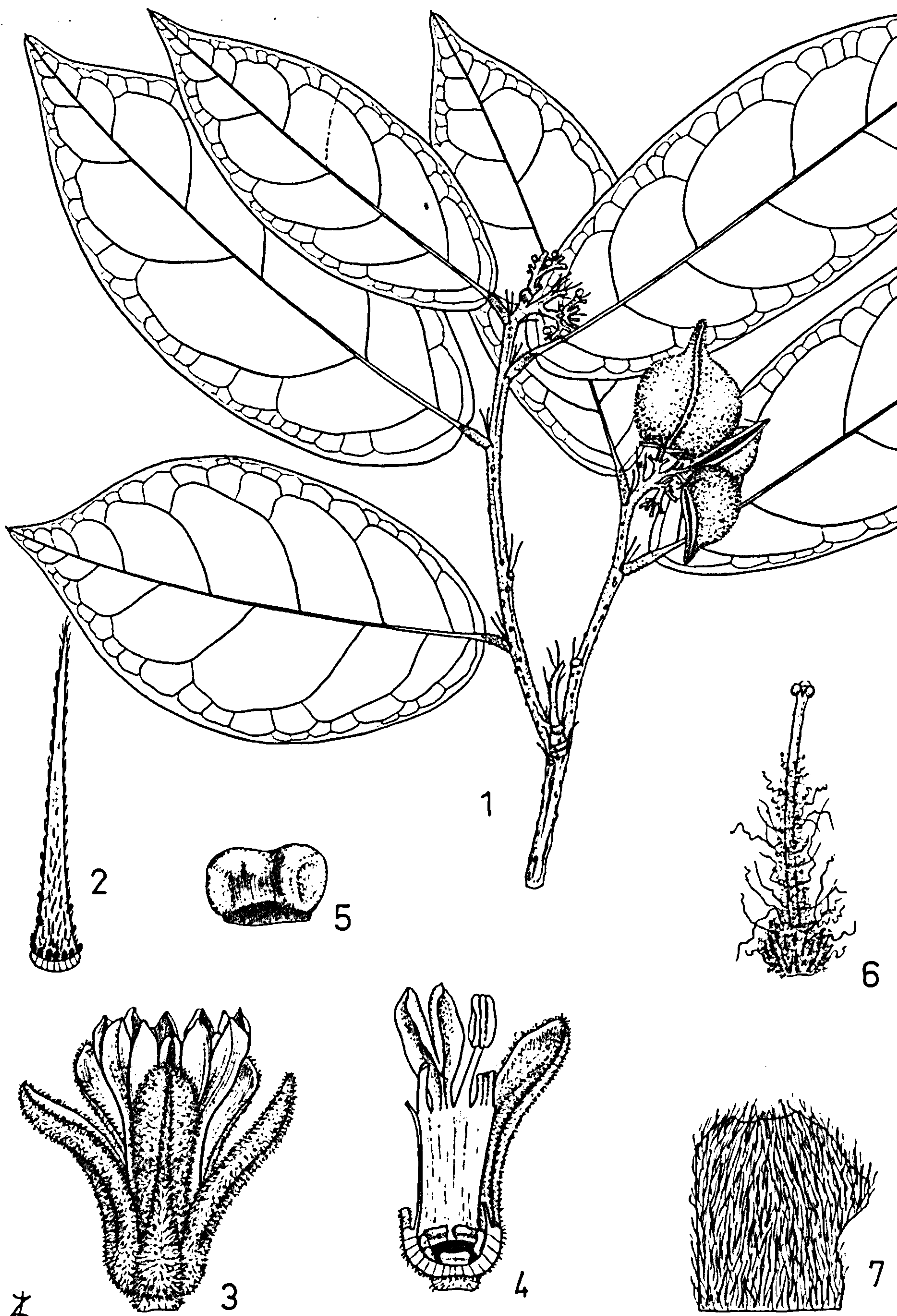
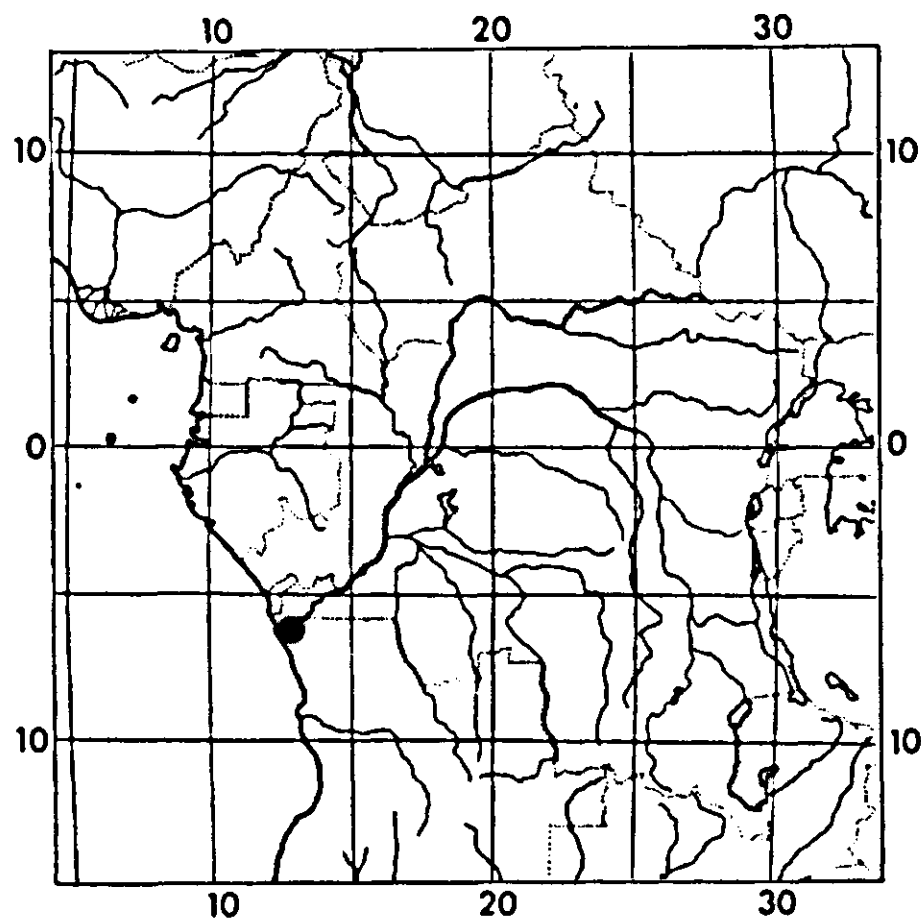


FIG. 10. *D. sumbense*: 1. fruiting branchlet, $\frac{5}{6} \times$; 2. stipule inside, $7\frac{1}{2} \times$; 3. flower, $7\frac{1}{2} \times$; 4. flower partly, $7\frac{1}{2} \times$; 5. staminode inside, $30 \times$; 6. pistil, $8\frac{1}{2} \times$; 7. fragment of endocarp inside, $5 \times$. (1-6. Gossweiler 8986; 7. Gossweiler 8528).

densely appressed-hairy inside. *Seed* ovoid-ellipsoid, ca 1.5 cm long and 1 cm diam.; seedcoat thin, brown.



MAP 10. *D. sumbense*

Distribution: Angola.

Ecology: Semi-deciduous forest, gallery forest.

Specimens examined:

ANGOLA. Lower Zaïre (= Congo) R., Sumba, *Gossweiler* 8528 (BM); *ibid.*, Sumba Peco, *Gossweiler* 8986 (BM, K, LISJC, type).

D. tessmannii Engl. = *D. acuminatum* De Wild.

For details see BRETELER, 1973: 39.

***D. tetrastachyum* Bret., sp. nov.**

Fig. 11 Map 11

Liana magna. Cylindrus ligna integer. Ramuli juveniles, stipulae, petioli, costa nervis lateralibus principalibusque foliorum subtus et inflorescentia dense puberulo-tomentelli. Stipulae plerumque curvatae, oblongae, (2)4–7(8) × 1–2 mm. Folia papyracea usque coriacea, obovato-elliptica usque oblonga, (7)9–20(27) × (2,5)3–8(10) cm, costa profunde impressa, nervis lateralibus principalibus utrinque (6)8–10(11), glabrescentibus, saepe supra et subtus glandulis instructa. Inflorescentia pedunculata, quadribrachiata, brachia omnia floribus subsessilibus biseriatis instructa. Sepala crassa, extus tomentella. Petala glabra. Stamina quam petala paululum breviora. Pistillum 2–3-merum, brevius

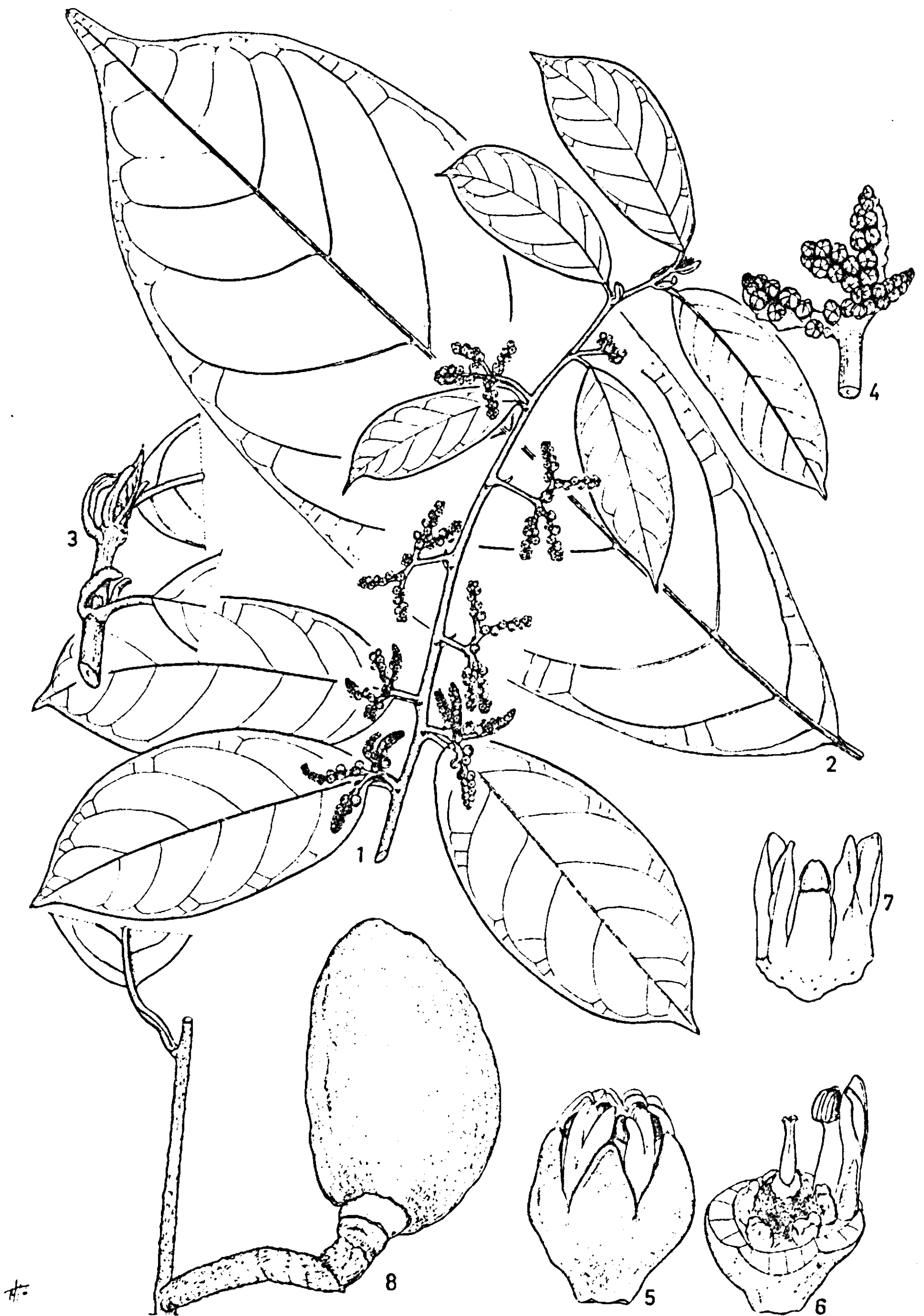


FIG. 11. *D. tetrastachyum*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. large leaf, $\frac{1}{2} \times$; 3. part of branchlet with stipules, $1\frac{1}{2} \times$; 4. young inflorescence, $1\frac{1}{2} \times$; 5. flower, $7\frac{1}{2} \times$; 6. flower partly, $7\frac{1}{2} \times$; 7. two petals with stamen, $7\frac{1}{2} \times$; 8. fruit, $1 \times$. (1, 3. Caballé 257; 2, 4-7. Breteler 7628; 8. Leeuwenberg 9909).

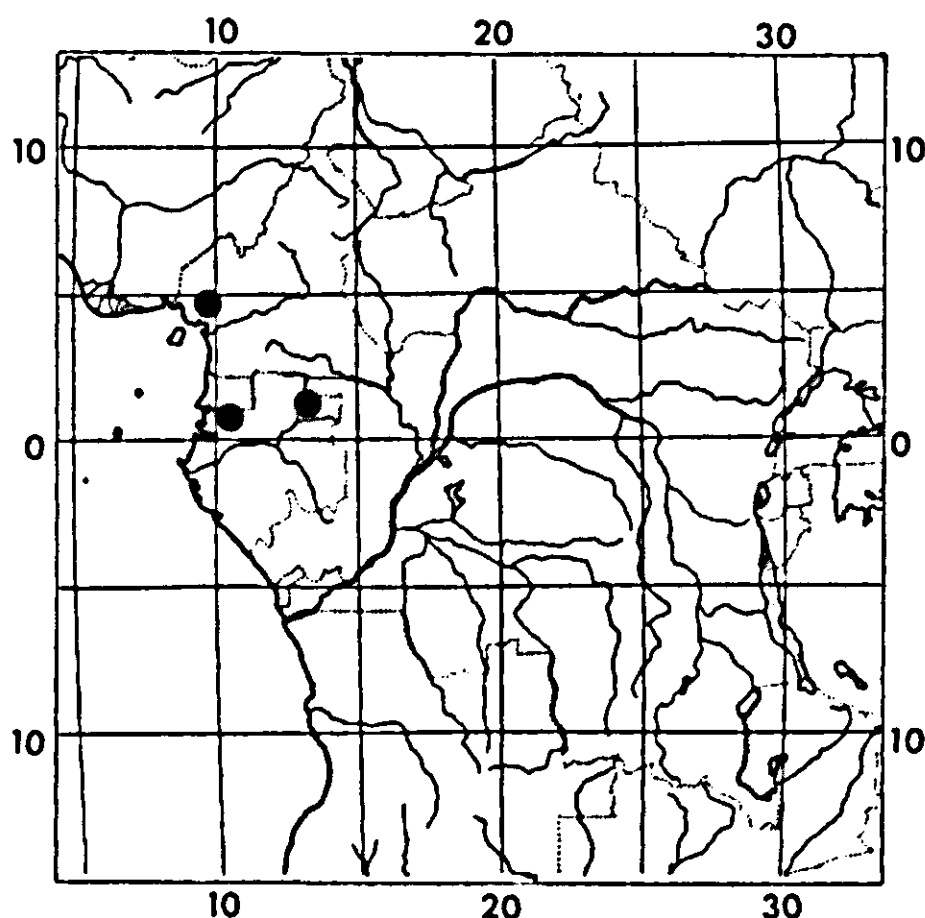
quam stamina. Ovarium dense villosum. Fructus oblique ellipsoidei, puberulo-tomentelli.

Type: Gabon, Bélinga, alt. ca 800 m, *Breteler* 7628 (holotype: WAG).

Diagnostic characters. Large liana. Woodcylinder entire. Young branchlets, stipules, petioles, midrib and main lateral nerves beneath, and inflorescences densely puberulous-tomentellous. Stipules usually curved, oblong, (2)4–7(8) × 1–2 mm. Leaves papery to coriaceous, obovate-elliptic to oblong, (7)9–20(27) × (2.5)3–8(10) cm, with deeply impressed midrib and (6)8–10(11) pairs of main lateral nerves, glabrescent, glands often both sides. Inflorescence stalked, usually 4-armed, each arm with 2 rows of (sub)sessile flowers. Sepals thick, erect, tomentellous outside. Petals glabrous. Stamens slightly shorter than petals. Pistil 2–3-merous, shorter than stamens, ovary densely villous. Fruits obliquely ellipsoid, puberulous-tomentellous.

Description. Large *liana*, up to at least 50 m long and 10 cm diam. Woodcylinder entire, wood rather dense. Bark up to at least 5 mm thick, often with many, rather large lenticels. *Branches* greyish-brown, glabrous or with remnants of original indumentum, obscurely to distinctly lenticellate. *Branchlets* often grooved to striate, at least when young with a dense, puberulous-tomentellous, almost powdery, pale-brown to greyish indumentum; the same indumentum present on stipules, petioles, on midrib and main lateral nerves beneath, and on inflorescences. *Stipules* sometimes somewhat foliaceous, usually curved inwards, oblong, (2)4–7(8) × 1–2 mm, usually early caducous. *Leaves*: petiole subterete, canaliculate to grooved above or not, often striate, (3)5–10(17) mm long; blade papery to coriaceous, obovate-elliptic to oblong, 2–3(3.5) times as long as wide, (7)9–20(27) × (2.5)3–8(10) cm, rounded to obtuse or cuneate at base, acuminate at top, the acumen 0.5–1.5(2) cm long, often mucronate, glabrous above or with a few short curled hairs on the deeply impressed midrib, glabrescent beneath; main lateral nerves (6)8–10(11) pairs; glands often both sides, rather small and well dispersed, above often more numerous in apical part. *Inflorescences* cymose, principally widely 4-armed (twice bifurcate), sometimes 5–6-armed, each arm with 2 rows of sessile or almost sessile flowers, the arms in young stage folded together, when fully developed spreading, up to ca 4 cm long, up to ca 20-flowered; peduncle up to 1.5 cm long; bracts and bracteoles appressed, circular to broadly ovate, up to ca 1 × 1 mm. *Pedicel* up to 0.5 mm long, without distinct lower part. *Sepals* erect, thick, slightly concave, ovate-triangular, 2–2.5 × 1–1.5 mm, rounded-acute at top, tomentellous outside, puberulous mainly on apical part inside. *Petals* erect, at base ca 1 mm united with filaments, 2–3 mm long, 0.2–0.3 mm split, glabrous both sides, lobes concave. *Stamens* erect, 2–2.5 mm long, glabrous; filaments rather thick, ca 1 mm wide at base, tapering to top; anthers ca 0.5 mm long, connective very distinct. *Staminodes* subquadrate to obcordate, rather thick, up to 0.6 × 0.6 mm, glabrous. *Pistil* 2–3-merous 1.5–2 mm long; ovary, except apical part, densely

villous; style glabrous, at most 0.5 mm split into 2–3 lobes apically. *Fruits* 1(–3?)-seeded, obliquely ellipsoid, slightly laterally compressed, $4-5 \times 3 \times 2.3$ cm, puberulous-tomentellous, orange at maturity; mesocarp juicy adhering to endocarp; endocarp pergamentaceous, glabrous inside. *Seeds* ellipsoid, laterally compressed, ca $3-3.5 \times 1.5 \times 1$ cm; seedcoat firm, smooth, brown.



MAP 11. *D. tetrastachyum*

Distribution: Cameroun, Gabon.

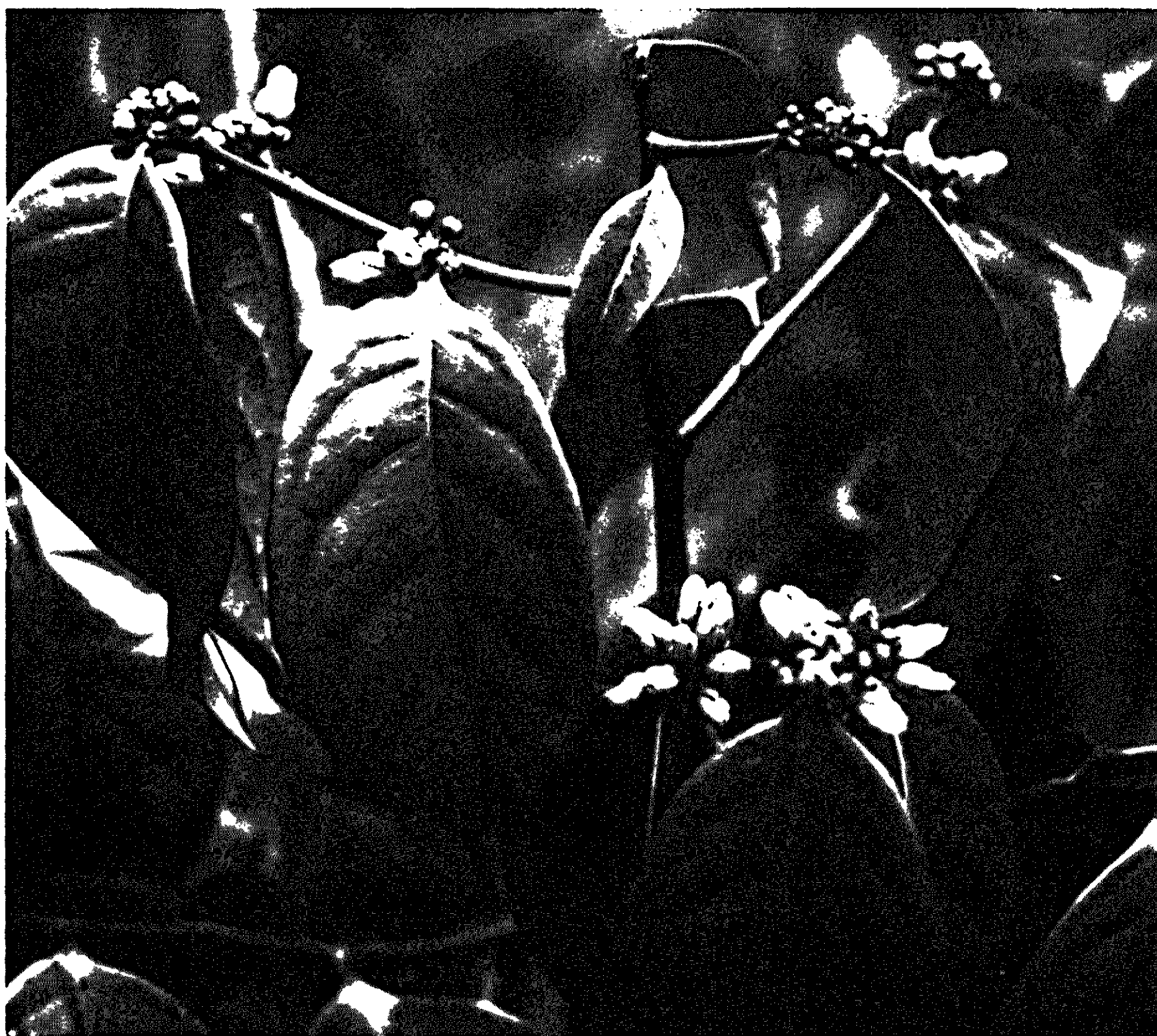
Ecology: Rain forest, alt. 500–800 m.

Specimens examined:

CAMEROON. Km 11 Nkongsamba-Loum, Bakaka Forest, *Leeuwenberg & Breteler* 8768 (WAG); *Leeuwenberg* 9909 (from the same individual as preceding number) (WAG).

GABON. Bélinga, *Breteler* 7628 (WAG, type); 15 km N.E. of Asok, *Breteler & J. J. de Wilde* 185 (WAG); 6.5 km from Bélinga, Makokou road, *Caballé* 257 (WAG); *Caballé s.n.* (WAG).

Note. *D. tetrastachyum* is a remarkable species by its 4-armed inflorescences with (sub)sessile flowers. Such inflorescences may occur in other species as well, e.g. in *D. madagascariense* Poir. and in *D. melanocladum* Bret., but in these species the inflorescences are never 4-armed from the very start. As regards floral aspects *D. melanocladum* resembles *D. tetrastachyum* also. In the former species, however, the indumentum of the ovary is velutinous, not villous. Beside this floral difference, to which some others may be added, *D. melanocladum* differs from *D. tetrastachyum* in having lianescent stems with a lobed woodcylinder, not an entire one as in the latter.



PHOT. 8. *D. thollonii*: top of flowering shrublet (Leeuwenberg 11402; phot. A. J. M. LEEUWENBERG).

***D. thollonii* Pellegr.**

Fig. 12 Map 12

D. thollonii Pellegrin, 1912: 271; 1913: 642; De Wildeman, 1919: B 68; Breteler, 1973: 33, XX; Punt, 1975: 39; Breteler, 1979: 8; 1981: 38.

Type: Congo, Brazzaville, *Thollon 512 bis* (holotype: P).

Diagnostic characters. Liana, lianescent shrub, or shrub. Branchlets hollow, sparsely hairy when young, soon glabrous. Leaves usually coriaceous, elliptic to ovate, (4)7–17(23) × (3)4–7(10) cm, margin usually revolute, sparsely hairy on main nerves when young, soon glabrous, glands large, 0.3–1 mm diam., usually beneath only. Inflorescences subumbellate, peduncle adnate to petiole. Sepals erect or nearly so. Petals usually slightly longer than stamens, the 3-merous pistil distinctly longer than both; ovary tomentose to lanate. Fruits 1(–2)-seeded, 4–6 cm long, 2–3 cm diam., puberulous-tomentellous.

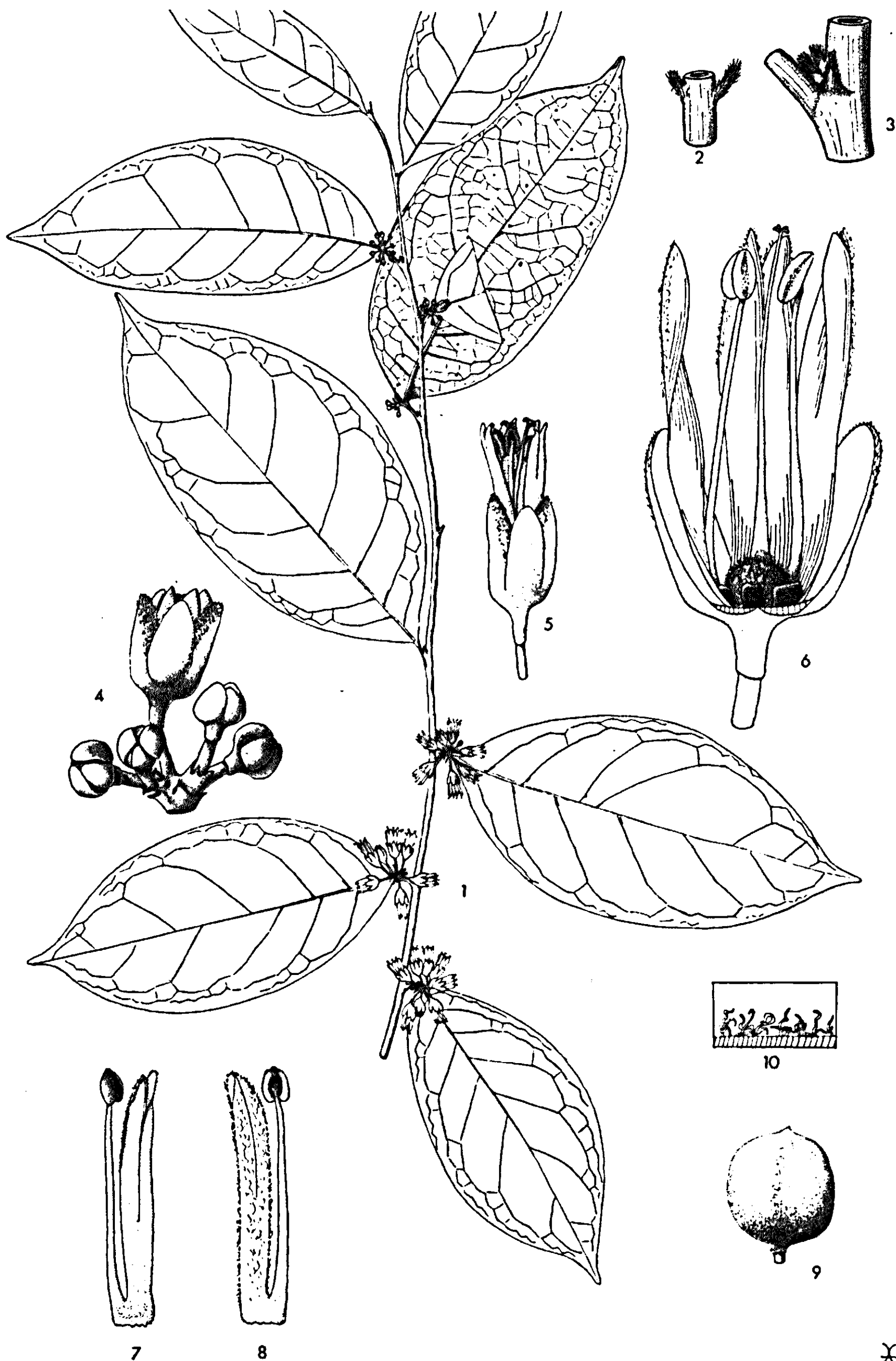


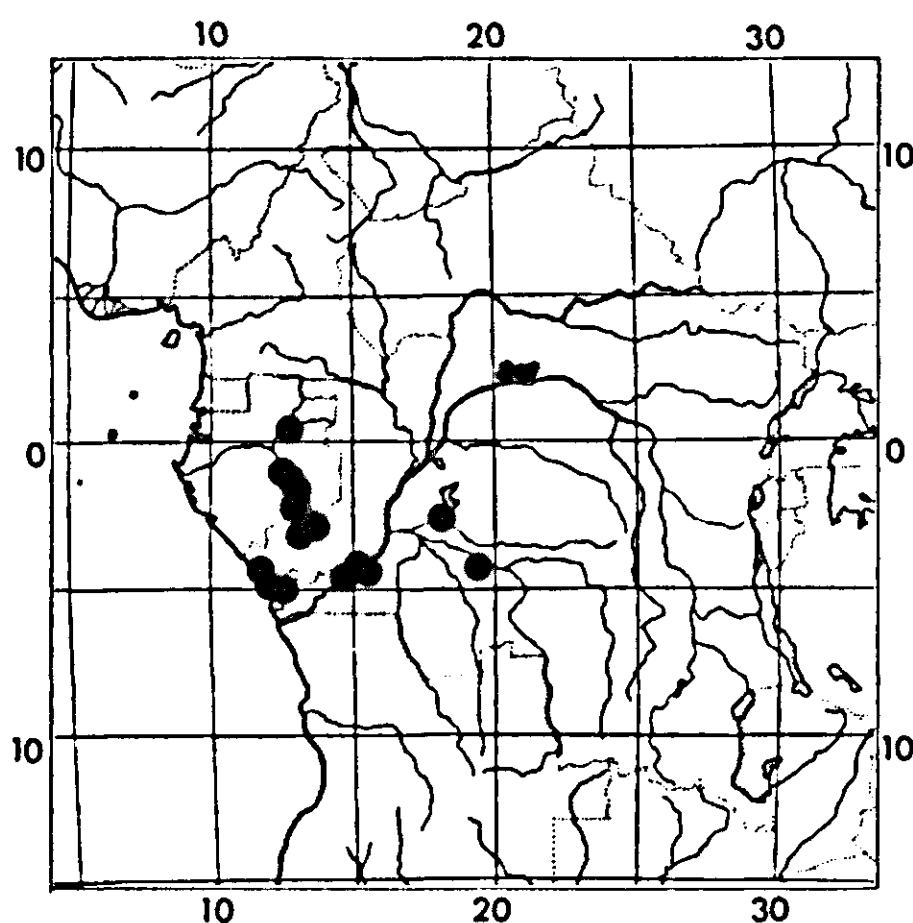
FIG. 12. *D. thollonii*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. stipules, $4 \times$; 3. axil with bud and 1 stipule, $4 \times$; 4. part of inflorescence, $3 \times$; 5. flower, $3 \times$; 6. flower partly, $6 \times$; 7. petal and stamen inside, $4\frac{1}{2} \times$; 8. petal and stamen outside, $4\frac{1}{2} \times$; 9. fruit, $\frac{1}{2} \times$; 10. detail fruit indumentum, $15 \times$. (1-8. Bouquet 1972; 9. Farron 5120 A; 10. Sita 2582).



PHOT. 9. *D. thollonii*: fruiting branchlet (*Breteler 6473*; phot. F. J. BRETELER).

Description. *Liana*, lianescent shrub, or shrub. Stem with numerous small and fewer, very distinct, long, narrow, transverse lenticels. *Branchlets* hollow, smooth or with small, rather indistinct, pustular lenticels, sparsely hairy when young, soon glabrous. *Stipules* triangular, 1–2 mm long, glabrous to sparsely hairy, caducous. *Leaves*: petiole terete to semiterete, grooved above or not, (1)2–4(6) mm long, (2)4–7(10) mm long when united with peduncle, usually sparsely hairy when young, soon glabrous; blade usually coriaceous, elliptic to ovate, 1.5–2.5 times as long as wide, (4)7–17(23) × (3)4–7(10) cm, obtuse to rounded, sometimes cuneate or cordate at base, usually gradually acuminate, the acumen usually rounded to obtuse, 0.5–1(1.5) cm long, mature leaves usually with revolute margin, when young usually sparsely hairy both sides on midrib and the 5–7 pairs of main lateral nerves, soon glabrous, the midrib impressed above, prominent beneath; glands large, distinct, 0.3–1 mm diam., usually be-

neath only, dispersed or more or less concentrated alongside the midrib and along the margin. *Inflorescences* subumbellate, rather obscurely 3–4 times branched, up to ca 20-flowered, sparsely appressed-hairy to glabrous; peduncle adnate to petiole, rarely not so, shorter than petiole, 2–6(8) mm long; bracts and bracteoles subtriangular, up to ca 0.5 mm long. *Pedice* up to 3.5 mm long, the upper part up to 1.5 mm long. *Sepals* erect or nearly so, often very unequal in size and shape, ovate to oblong to obovate, $3-5.5 \times 1.5-3$ mm, rather thick and concave when fresh, tomentellous outside on the parts covered in bud, the other parts glabrous to sparsely appressed-puberulous, inside tomentellous to puberulous mainly on upper part. *Petals* erect, usually slightly longer than stamens, shortly adnate to filaments at base, narrowly obovate to linear in outline, 5.5–8 mm long, 0.5(–1.5) mm split, sparsely to densely tomentellous outside, sparsely so inside mainly on central ridge. *Stamens* erect, 5–7 mm long, glabrous; anthers straight to somewhat curved, 0.7–1 mm long. *Staminodes* usually separate, rarely forming a more or less continuous lobed ring, subquadrate to oblong, $0.5-0.7 \times 0.3-0.5$ mm, glabrous outside, often hairy inside. *Pistil* 3-merous, usually distinctly longer than petals, 6.5–8 mm long; ovary 3-locular, densely tomentose to lanate; style glabrous or tomentose in lower part, top shortly 3-lobed, lobes usually shorter than 0.5 mm. *Fruits* 1(–2)-seeded, the aborted cells present by a more or less distinct ridge, obliquely ellipsoid to obovoid, somewhat laterally compressed, often shortly beaked, 4–6 cm long, 2–3 cm diam., yellow to orange at maturity, puberulous-tomentellous; exocarp firm, 1.5–4(6) mm thick; mesocarp juicy, somewhat fibrous, 1–4 mm thick; endocarp pergamentaceous, glossy and glabrous inside. *Seed* ovoid-ellipsoid, somewhat pointed apically, often laterally compressed and somewhat depressed between the cotyledons, 3–4 cm long, 1.2–1.5 cm diam.; seedcoat thin, brown, glossy, distinctly nerved. *Seedling* with the first leaves alternate.



MAP 12. *D. thollonii*

Distribution: Gabon, Congo, Western Zaïre, Northern Angola (Cabinda).
Ecology: Rain forest, semi-deciduous forest.

Specimens examined:

GABON. 68 km Lastoursville-Moanda, *Breteler* 6449 (WAG); 10 km Moanda-Franceville, *Breteler* 6473 (WAG); 18 km Moanda-Bakoumba, *Breteler* 6485 (WAG); 100 km Moanda-Lastoursville, *Breteler* 6520 (WAG); 6 km Lastoursville-Koulamoutou, *Breteler* 6710 (WAG); 70 km S.S.W. of Moanda, *Breteler* 6868 (WAG); 7 km S.W. of Makokou, *Breteler* 7639 (WAG); 16 km Lastoursville-Moanda, *Breteler* & *J. J. de Wilde* 756 (WAG); Ipassa near Makokou, *Farron* 7547 (P); *Hladik* 1562 (P); 2045 (P); *Leeuwenberg* 11402 (WAG); Lastoursville, *Le Testu* 7066 (BM, BR, P, WAG); 7161 (BM, BR, P, WAG); 7178 (BM, BR, P, WAG).

CONGO. Mitsiba, *Bouquet* 1085 (P); Bandzié, *Bouquet* 1151 (P); Tchiseka, *Bouquet* 1972 (P, WAG); Brazzaville, *Chevalier* 11155 (P); 11157 bis (P); Cabinda Rd, *Farron* 4810 (P); Djoumouna Forest, *Farron* 5120a (P); Djambala Rd, *Koechlin* 434 (IEC, P); Foulakari Forest, *Sita* 2582 (WAG); near Nkola, *Sita* 3693 bis (P); Brazzaville, *Thollon* 512 bis (P, type).

ZAÏRE. Kinshasa, *Evrard* 6332 (BR); Kutu, *Lebrun* 6678 (BR, WAG); Luzizila, *Pauwels* 5239 (BR); Ipamu, *Vanderyst* 9363 (BR, WAG).

ANGOLA. Mayombe, Panga-Mungo, *Gossweiler* 6106 (BM, COI, LISJC, LISU).

Note. *D. thollonii* is closely related to *D. gabonense* Engl. For details see BRETELER 1979: 8.

D. thomsonii (Oliv.) Engl. = *D. madagascariense* Poir. var. *madagascariense*

For details see BRETELER, 1981: 14.

D. thonneri De Wild. = *D. bangii* (F. Didr.) Engl.

For details see BRETELER, 1973: 70.

D. thouarsianum Roem. & Schult. = *D. madagascariense* Poir. var. *madagascariense*

For details see BRETELER, 1981: 13, 21.

D. tomentosum Engl.

Fig. 13 Map 13

D. tomentosum Engler, 1896-b: 138; 1896-a: 349; 1912-a: 578; Pellegrin, 1913: 641; Engler, 1915: 847; De Wildeman, 1919: B 69; Hutchinson & Dalziel, 1928-a: 325; Engler & Krause, 1931: 6; Keay, 1958: 438; Hauman, 1958-a: 312; Breteler, 1973: XX; Punt, 1975: 29; Breteler, 1978: 69; 1979: 16, 17.

Type: Cameroun, Barombi, between Buea and Kumba, *Preuss* 55 (holotype: B†; lectotype: K; isotype: BM).



FIG. 13. *D. tomentosum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. part of branch with lenticels, $\frac{5}{6} \times$; 3, 4. leaf axil with stipule from above and beneath, $\frac{5}{6} \times$; 5. flower, $5 \times$; 6. flower partly, $7\frac{1}{2} \times$; 7. infructescence, $\frac{5}{6} \times$. (1-2, 5-6. Bos 3269; 3-4. Leeuwenberg 5530; 7. Breteler 2927).

D. acutifolium Engler, 1896-b: 136. See Breteler, 1973: 43 for full details.

D. barensense Engler, 1912-a: 579. See Breteler, 1973: 82 for full details.

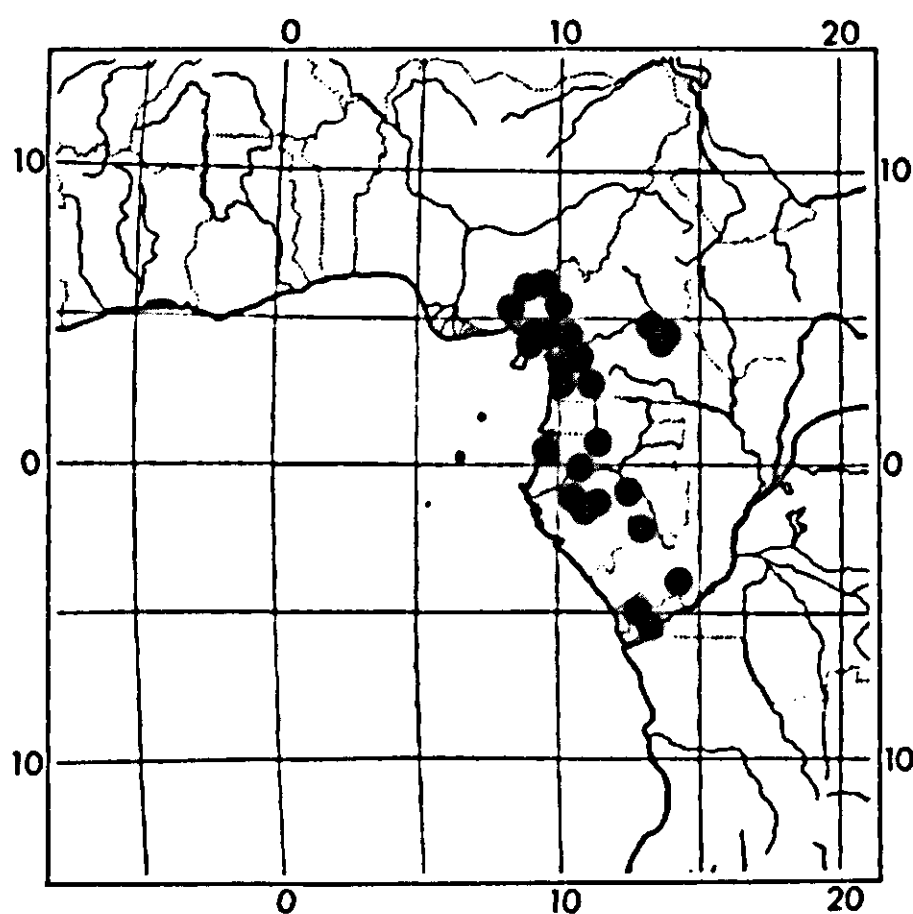
D. kribense Engler, 1912-a: 579. See Breteler, 1979: 52 for full details.

D. subtruncatum Engler, nomen, herbarium Zenker 2372.

Diagnostic characters. Usually small liana. Woodcylinder lobed. Branchlets densely hairy. Leaves with (1)2–4(7) mm long petioles, obovate-elliptic, (5)8–17(26) × (2)3–6(11) cm, rounded to subcordate at base, usually acuminate, usually densely hairy both sides when young, more or less persistent beneath, with (5)6–9(12) pairs of main lateral nerves. Inflorescence a slender stalked subglobose head. Sepals suberect to slightly spreading, tomentellous both sides. Petals narrowly obovate-oblong in outline, 3.5–4.5(6) mm long, 0.5–1 mm split. Stamens usually slightly shorter than petals. Pistil 3-merous, ovary villous. Fruits 1–3-seeded, velutinous to densely tomentose.

Description. Usually small *liana* or lianescent shrub. Stems usually distinctly lenticellate, when older with longitudinally fissured, scaly bark, the scales with curling edges. Woodcylinder lobed by intruding phloem. *Branches* glabrescent. *Branchlets* densely tomentose to appressed-pubescent to somewhat hispid. *Stipules* narrowly triangular, (1)2–4(9) mm long, appressed-pubescent to tomentose, caducous. *Leaves*: petiole subterete, grooved above or not, (1)2–4(7) mm long, tomentose to somewhat hispid; blade papery to thinly coriaceous, obovate to elliptic, (1.5)2–2.5(3) times as long as wide, (5)8–17(26) × (2)3–6(11) cm, rounded-obtuse to subcordate, sometimes cuneate at base, acuminate sometimes acute at top, the acumen up to (1)2 cm long, acute to somewhat mucronate apically; appressed-pubescent to tomentose to somewhat hispid both sides when young, often less densely so and rather soon glabrescent above except for the impressed midrib, with (5)6–9(12) pairs of main lateral nerves, indistinct above, prominent beneath, reticulation often distinct beneath in fresh leaves; glands beneath only, usually small and inconspicuous, rather well dispersed or sometimes with a few large glands near base and along the midrib. *Inflorescence* a subglobose head, usually indistinctly branched, sometimes basally once distinctly so, up to ca 70-flowered, tomentose-tomentellous; peduncle slender, (0.5)1.5–3.5(4.5) cm long; bracts and bracteoles narrowly triangular, 0.5–2 mm long. *Pedicel* up to ca 5 mm long, the upper part ca 0.5(1) mm long. *Sepals* suberect to slightly spreading, usually slightly concave, ovate-triangular to oblong, 2.5–3(4) × 1–2 mm, tomentellous outside, usually less densely so inside, top rounded to acutish. *Petals* erect, nearly free to 1 mm united with filaments at base, narrowly obovate-oblong in outline, 3.5–4.5(6) mm long, 0.5–1 mm split, with a few hairs below split outside, glabrous inside, lobes concave. *Stamens* erect, at most as long as petals, usually slightly shorter, glabrous; anthers oblong, often somewhat sagittate, 0.6–0.8 mm long, connective distinct. *Staminodes* subquadrate to slightly oblong, up to 0.5 × 0.5 mm, glabrous, truncate-emarginate to lobulate at top. *Pistil* 3-merous, at least as long as petals, usually

slightly longer, (3.5)4–5(6.5) mm long; ovary villous, tapering into style; style usually villous in lower part, glabrous in upper part, very shortly 3-lobed apically. *Fruits* 1–3-seeded, lobed when more than 1-seeded, velutinous to densely tomentose, yellow to orange at maturity; 1-seeded fruits: subglobose to ellipsoid to (obliquely) obovoid, 15–30 × 12–15 mm, shortly apiculate or not; exocarp and mesocarp together up to ca 5 mm thick, not clearly demarcated; endocarp woody, 0.2–0.5 mm thick, rugose outside, smooth and glabrous inside. *Seeds* ellipsoid, 11–15 × 6–7 mm; testa thin to rather firm, smooth, dark-brown to black, with a narrow, up to 5 mm long hilum. *Seedling* (1 sample only) with a taproot; epicotyle 7 cm long, tomentose; first two leaves opposite, ovate, sparsely hairy both sides; following leaves elliptic, sparsely hairy.



MAP 13. *D. tomentosum*

Distribution: Eastern Nigeria, Cameroun, Gabon, Congo, Zaïre.
Ecology: Rain forest, semi-deciduous forest, gallery forest.

Specimens examined:

NIGERIA. Ikom distr., Abontakon, *Keay FHI 28172* (BR, FHI, K, P); Ikom distr., Agbokun, *Latilo & Oguntayo FHI 67680* (K, WAG); Oban Group F.R., *Latilo & Oguntayo FHI 70526* (FHI, K, WAG); *van Meer 1307* (WAG); *1650* (WAG).

CAMEROUN. km 12–15 Kribi-Ebolowa, *Bos 3269* (WAG); *3322* (WAG); *4549* (WAG); km 60 Kribi-Edea, *Bos 6329* (WAG); km 18–20 Kribi-Lolodorf, *Bos 6586* (WAG); *6595* (WAG); *6667* (WAG); 47 km N.W. of Bertoua, *Breteler 1409* (BR, K, P, WAG); near Bertoua, *Breteler 1685* (WAG); south of Ebaka, *Breteler 2927* (WAG); km 16 Ebolowa-Minkok, *J. J. de Wilde 8116a* (WAG); 45 km N.E. of Kribi, *J. J. de Wilde 8293* (WAG); Eséka, *W. de Wilde c.s. 1329 A* (WAG); *1329 B* (BR, WAG); 60 km N.N.W. of Eséka, *W. de Wilde c.s. 2188* (BR, P, WAG); sin. loc., *Dusen s.n.* (G); near Kribi, *Ledermann 1024* (BM, type of *D. kribense*); between Boeda and Bare, *Ledermann 6105* (BM, type of *D. barensense*); km 58 Edea-Kribi, *Leeuwenberg 5530* (BR, K, P, WAG); km 27 Bertoua-Bétaré Oya, *Leeuwenberg 5815* (BR, K, P, WAG); 10 km N. of Ndemba II, *Leeuwenberg 5849* (WAG); km 27 Bertoua-Bétaré Oya, *Leeuwenberg 5975* (BR, K, P, WAG); km 58 Edea-



PHOT. 10. *D. tomentosum*: fruiting branchlet (*Breteler 2927*; phot. F. J. BRETELER).

Kribi, *Leeuwenberg 6311* (BR, K, P, WAG); km 58 Douala-Loum, *Leeuwenberg 8749* (WAG); 7 km E. of Yingui, *Leeuwenberg 9097* (WAG); 3 km E. of Yingui, *Leeuwenberg 9143* (WAG); km 20 Loum-Yabassi, *Leeuwenberg 9189* (WAG); km 11 Loum-Solé, *Leeuwenberg 9899* (WAG); 25 km S. of Akwaya, *Letouzey 14121* (K, P, WAG); Edea, *Lotz 133* (B); Victoria, *Maitland 663* (K); Eséka, *Mbarga 15* (P); Ebolowa, *Mildbraed 5767* (HBG); Kumba, *Olorunfemi FHI 30649* (K); Barombi, *Preuss 55* (BM, K, type); Victoria, *Preuss 1103* (BM, BR, K, P, type of *D. acutifolium*); Bipindi, *Zenker 2372* (BM, E, G, K, WU).

GABON. 50 km S.E. of Lambaréné, *Breteler 5760* (WAG); 4 km S.W. of Lastoursville, *Breteler 6544* (WAG); 60 km S.S.W. of Moanda, *Breteler 6937* (WAG); ca 60 km N.N.W. of La Lara, *Breteler & J. J. de Wilde 485* (WAG); 10 km S.W. of Ndjolé, *N. Hallé 1692* (P, WAG); near Libreville, *Klaine 2533* (BM, K, LE, P); 2724 (K, LE, P, WAG); Malanghé, *Le Testu 2263* (BM, BR, K, P, WAG, Z); Etoughi, *Le Testu 5988* (BM, P, WAG); Lastoursville, *Le Testu 7210* (BM, P, WAG); 7294 (BM, P).

CONGO. Mayé-M'Passa Rd, Bangou forest, *Bouquet & Sita 2524* (WAG); Boungolo, *Farron 4889* (P); Mayombe forest, *Makany 2063* (P).

ZAIRE. Ganda Sundi, *Goossens 1132* (BR, LISU); Gimbi, *Laurent 661* (BR); Toussaint 535 (BR); 793 (BR).

Cult. CAMEROUN. Kribi, *Bos 6154* (WAG, seedling of *Bos 4549*).

Note. For differences between this species and *D. unguiculatum* see p. 74.

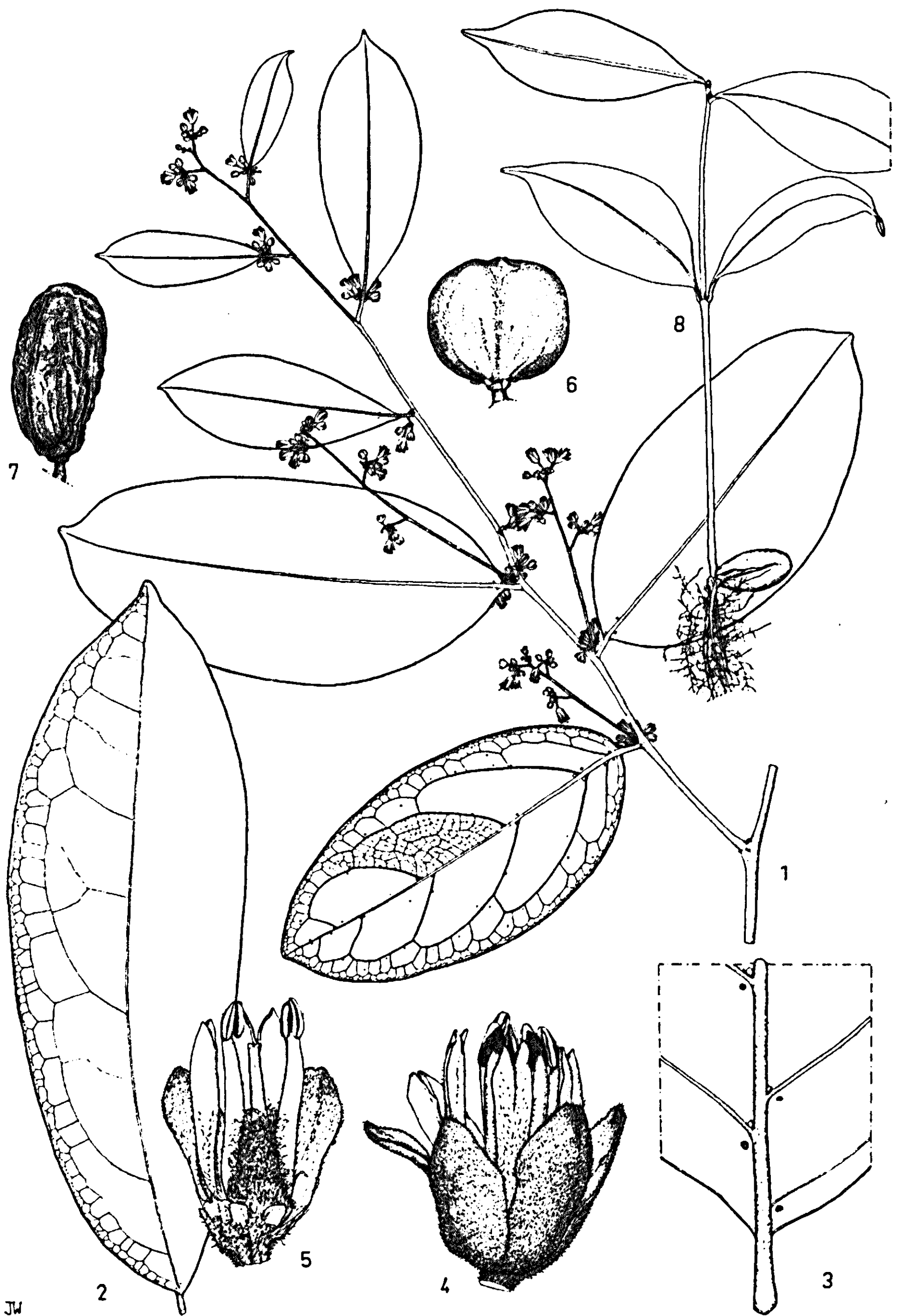


FIG. 14. *D. toxicarium*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. large leaf above, $\frac{1}{2} \times$; 3. detail of leaf beneath with glands and domatia, $2 \times$; 4. flower, $6 \times$; 5. flower partly, $6 \times$; 6. 2-seeded fruit, $\frac{1}{2} \times$; 7. 1-seeded fruit, $\frac{1}{2} \times$; 8. seedling, $\frac{1}{2} \times$. (1-3. Bos 2803; 4-5. Breteler 5342; 6. Breteler 5347; 7. Breteler 5916; 8. Breteler 6204).

D. toxicarium (G. Don) Baillon, 1874: 139; Engler, 1896-a: 349; 1912-a: 570; Pellegrin, 1913: 644; Engler, 1915: 844; De Wildeman, 1919: B 69; Chevalier, 1920: 121; Hutchinson & Dalziel, 1928-a: 325; Engler & Krause, 1931: 7, Aubréville, 1936: 6; Roberty, 1953: 1414; 1954: 75; Keay, 1958: 438; Aubréville, 1959: 10; Breteler, 1973: 25, 29, 33, 36, 45, 48, XX; Punt, 1975: 36; Jaeger & Adam, 1980: 186.

Basionym: *Chailletia toxicaria* G. Don, 1824: 348; De Candolle, 1825: 57; Bentham, 1849: 275; Oliver, 1868: 341.

Type: Sierra Leone, *G. Don s.n.* (lectotype: BM, see notes).

D. toxicarium (G. Don) Baillon var. *elliptica* (Oliver) De Wildeman, 1919: B 69. Basionym: *Chailletia toxicaria* G. Don var. *elliptica* Oliver, 1868: 341; Keay, 1958: 438 (in synonymy of *D. toxicarium*). Type: Sierra Leone, Bagroo R., Mann 826 (holotype: K; isotype: P).

D. suboblongum Engler, 1912-a: 568, partly, as regards *Scott Elliot 5601 a* (see notes under *D. rudatisii*).

Chailletia toxicaria G. Don var. *compressa* G. Don, 1824: 348; De Candolle, 1825: 58. Type: Sierra Leone, *G. Don*, not traced (see notes); neotype: Sierra Leone, near Freetown, *Singh s.n.* (WAG).

Chailletia erecta G. Don, 1824: 348; De Candolle, 1825: 58; Bentham, 1849: 276; Oliver, 1868: 341 (in synonymy of *Chailletia toxicaria*); De Wildeman, 1919: B 69 (in synonymy of *D. toxicarium*). Type: Sierra Leone, *G. Don s.n.* (lectotype: BM, see notes).

Diagnostic characters. Liana or shrub. Lianescent stem with 5-lobed woodcylinder. Branchlets appressed-puberulous, glabrescent. Leaves coriaceous to stiffly papery, elliptic to obovate, (5)9–20(25) × (2)3–8(10) cm, soon glabrescent, usually with domatia beneath, glands usually both sides. Inflorescences subumbellate, peduncle usually adnate to petiole. Sepals suberect, often thick and concave, puberulous-tomentellous outside. Petals and stamens subequal in length, usually hairy both sides. Pistil 3-merous, ovary lanate. Fruits subglobose to ovoid-ellipsoid, 2–4.5 × 1.5–2.5 cm, tomentose to tomentellous, often wrinkled to prominently nerved.

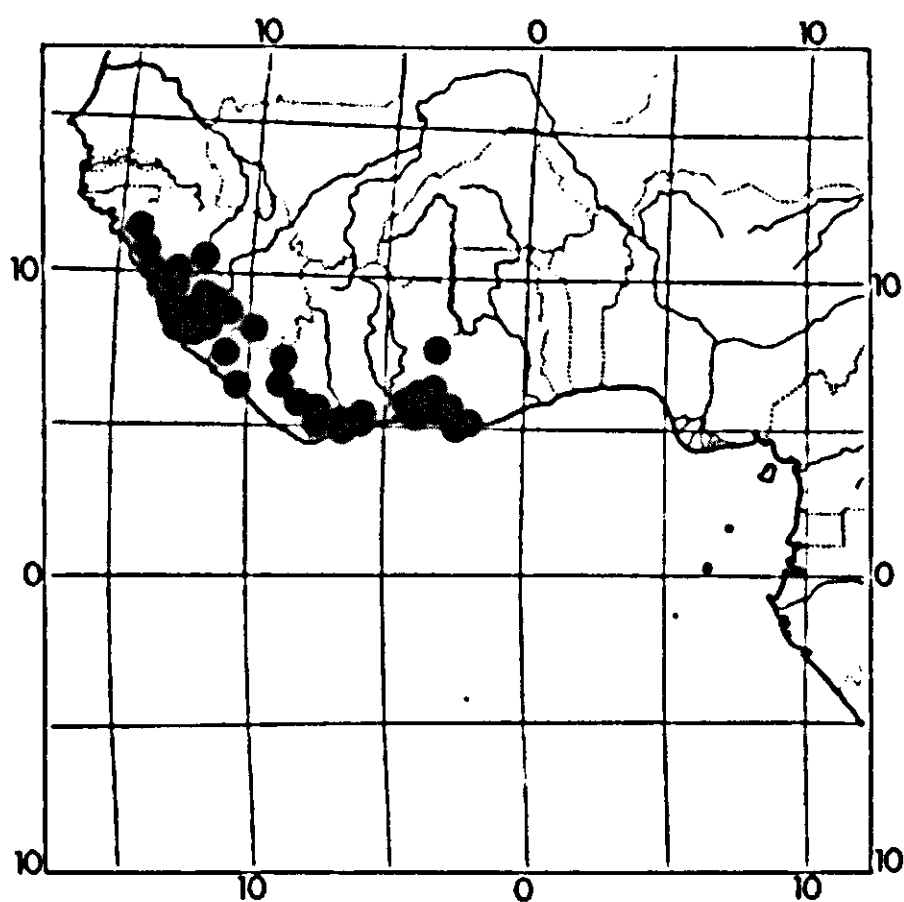
Description. *Liana* up to at least 60 m long and 12 cm diam., lianescent shrub or shrub (sometimes a treelet up to 8 m?). Lianescent stems with distinctly, often deeply 5-lobed woodcylinder and obscurely fissured and lenticellate up to ca 5 mm thick bark. *Branches* glabrous, sparsely and minutely lenticellate. *Branchlets* appressed-puberulous, glabrescent. *Stipules* triangular-oblong, 1–2(3) mm long, appressed-puberulous. *Leaves*: petiole subterete, grooved above or not, (2)4–7(13) mm long, (6)7–9(15) mm long when united with peduncle of inflorescence, appressed-puberulous, glabrescent; blade coriaceous to stiffly papery, elliptic-obovate to oblong, (1.5)2–3(4) times as long as wide, (5)9–20(25) × (2)3–8(10) cm, rounded to cuneate at base, acuminate to obtuse



PHOT. 11. *D. toxicarium*. fruiting branch (*Breteler 6026*; phot. F. J. BRETELER).

at top, the acumen up to 1(1.5) cm long, obtuse to acute or mucronate apically; appressed-puberulous when young, sometimes more densely so on midrib and main lateral nerves, glabrescent; midrib plane or impressed above, prominent beneath, main lateral nerves (4)5–6(7) pairs, plane or slightly prominent above, prominent beneath, usually with domatia (hairy or not) in some axils of the main lateral nerves beneath; glands rather large, distinct, usually both sides, above mainly near base, beneath more numerous, well dispersed or often more or less concentrated near base and top, in fresh leaves corresponding with dark-green spots above. *Inflorescences* subumbellate, usually distinctly stalked, indistinctly branched, single in the axil or often several together on apparently leafless axillary shoots and then usually shortly peduncled to subsessile and the leaves reduced to sessile bracts or the leafblade strongly reduced, puberulous-tomentellous, up to ca 30-flowered; peduncle 0–10(15) mm long, usually completely adnate to petiole; bracts and bracteoles ovate-triangular, up to 0.5 mm long. *Pedicel* up to 4 mm long, the upper part 0–0.5(1) mm long. *Sepals* free, erect to very slightly spreading, very often unequal in length, slightly so in shape, ovate-elliptic to oblong, (2.5)3–4.5 × 1–2(2.5) mm, often thick and concave, puberulous-tomentellous outside, inside as well or mainly so in upper part. *Petals* erect, at base very shortly adnate to filaments, narrowly oblong-elliptic to

obovate in outline, $3.5-4.5(5) \times 1$ mm, $0.5-1(1.2)$ mm split, usually puberulous-tomentellous both sides below split, sometimes glabrous or nearly so, usually firmly keeled below split inside, lobes concave, rounded. *Stamens* $(3.5)4-5$ mm long; filaments more or less puberulous-tomentellous both sides; anthers ovoid-ellipsoid, often somewhat arrow-shaped, $0.7-1$ mm long, the connective very distinct, usually with a few hairs outside. *Staminodes* subquadrate, up to 0.7×0.7 mm, usually hairy, at least inside, sometimes also outside. *Pistil* 3-merous, $(3.5)4-5$ mm long; ovary and lower part of style lanate, upper part of style glabrous, usually very shortly 3-lobed. *Fruits* 1-3-seeded, slightly lobed when more than 1-seeded, aborted cells often present by a more or less distinct ridge, densely villous when young, tomentose to tomentellous and yellow to orange at maturity; 1-seeded fruits: subglobose to ovoid-ellipsoid, rounded to somewhat acute, sometimes apiculate, rarely beaked at top, $2-4.5 \times 1.5-2.5$ cm; exocarp firm, $2-7$ mm thick, often wrinkled to prominently nerved outside; mesocarp juicy, adhering to endocarp, $1-2$ mm thick; endocarp bony, $1-2$ mm thick, rugose outside, glossy, finely striate, and glabrous inside. *Seeds* subglobose to ellipsoid, slightly laterally compressed, $10-25 \times 7-12$ mm; seedcoat brown, glossy. *Seedling* with a firm taproot with many thin laterals; epicotyle $5-9$ cm long, sparsely subappressed-hairy; first two leaves opposite, smaller and relatively broader than subsequent ones, sparsely hairy beneath.



MAP 14. *D. toxicarium*

Distribution: West Africa, from Guinea Bissau to Ghana.

Ecology: Rain forest, semi-deciduous forest.

Specimens examined:

GUINEA BISSAU. Bedanda, Cadique, *Alves Pereira* 2648 (K).

GUINEA. Kindia-Gangan, *Adam* 11939 (WAG); Conakry, *Chevalier* 12080 (P); 12136 (P); 12139

(P); 12158 (P, WAG); 12164 (P); Friguiagbé, *Chillou* 510 (P); 1291 (P); near Boké, Counha I., *Chillou* s.n. (K, P); near Boké, Bola, *Chillou* s.n. (BR, P); sin. loc., *Heudelot* 88 (P); 651 (G, K, P); 681 (P); 814 (B, BM); Dubreka, *Lisowski* 51056 (BR); Kindia, *Lisowski* 53811 (BR, K); Conakry, *Mac-laud* 193 (P); near Boké, *Paroisse* 54 (P); Konkouré, *Pobéguin* K 46 (P); Timbo-Conakry Rd, *Pobéguin* 794 (P); Timbo, *Pobéguin* 1535 (P); Cogon R., *Pobéguin* 2017 (K, P, WAG).

SIERRA LEONE. Sin. loc., *Afzelius* s.n. (UPS); *Barter* s.n. (51?) (K); Leicester Peak, *Brenan* 9619 (BR, K, P); sin. loc., *Burbridge* 492 (K); Moyamba, *Cole & Jarr* EAC 82 (K, P, WAG); Freetown, *Dalziel* 988 (BM, BR, K, P); Gorahun, *Deighton* 379 (K); Njala, *Deighton* 697 (BM, K); Freetown, *Deighton* 1181 (BM); sin. loc., *Don* s.n., specimen with flowers, mainly in bud (BM, KW, lectotype of *Chailletia erecta*); *Don* s.n., specimen with fruits only (BM, type of *Chailletia toxicaria*); *Dudgeon* 28 (K); Rokupr, *Jordan* 231 (K); Batiema (Dasse), *Katta* 23 (K); Rotomba I., *Kirk* 20 (K); Bagroo R., *Mann* 826 (K, P, type of *D. toxicarum* var. *elliptica*); Kondembaya, *Morton & Gledhill* SL 1148 (FHI, WAG); Fourah Bay, *Morton* SL 1272 (K, WAG); SL 1373 (K, WAG); Konelo, *Morton & Gledhill* SL 1959 (K, WAG); near Havelock, *Morton & Cole* SL 4019 (K, WAG); N. of Kukurra, *Morton* SL 4273 (K); Freetown, *Roberty* 17280 (G, K); Leicester Peak, *Scott Elliot* 3889 (K); near Mofari, *Scott Elliot* 4401 (BM, K); 4408 (K); near Kambia *Scott Elliot* 4447 (BM, K); near Layah, *Scott Elliot* 4466 (BM, K); Kafogo, *Scott Elliot* 5601 a (BM, K); near Regent, *Scott Elliot* 5820 (BM, K); near Freetown, *Singh* s.n. (WAG, neotype of *Chailletia toxicaria* var. *compressa*); Gola Forest, *Small* 573 (BR, K, P); sin. loc., *Smeathmann* s.n. (BM); *Smythe* 8 (K); 95 (K); Balkanu, *Thomas* 23 (P); Samaia, *Thomas* 255 (B, LE); Rowala, *Thomas* 1129 (LE); 1202 (LE); Mabum, *Thomas* 1529 (B, LE); 1534 (LE); Binkolo, *Thomas* 1781 (LE); 1832 (W); 1851 (LE); Jigaya, *Thomas* 2488 (Z); Ronietta, *Thomas* 5291 (B, LE); 5325 (LE); 5356 (K); sin. loc., *Thomas* 8881 (B); 8893 (B, LE); 8900 (EA); 8901 (BM); 8945 (LD); 8972 (BR); 9106 (B); 9130 (B); 9452 (B); 9524 (K); 9629 (B); 9643 (LE); 9944 (B); 10141 (B); 10249 (LD, UPS); 10316 (BR); 10415 (B); 10570 (B); Njala, *Vickery* 5 (K); 8 (WAG); 11 (WAG); 12 (K); 16 (K); 21 (K); 22 (K); 29 (K); sin. loc., *Vogel* 100 (K, UPS).

LIBERIA. Gletown, *Baldwin jr.* 6947 A (K); Tapeta, *Baldwin jr.* 9062 (K); 9113 (K); Voinjama, *Baldwin jr.* 9885 (K); Zorzor-Voinjama Rd., *Bos* 2245 (WAG); ca 3 km Tchien-Tapeta, *Bos* 2803 (BR, K, P, WAG); 22 km N.E. of Ganta, *Breteler & de Wit* 5453 (WAG); near Mano R., mine area, *Jansen* 1847 (WAG); 18 mls S. of Tchien, *Jansen* 2156 (WAG); E. of Tchien, *Jansen* 2548 (WAG); 10 mls N.W. of Tchien, *Jansen* 2565 (WAG); 2571 (WAG); Harbel, *Stoop* 4 (WAG); 10 km E. of Tapeta, *van Meer* 416 (WAG).

IVORY COAST. Adzopé, *Aké Assi* 2300 (WAG); 14 km W.S.W. of Kpata-Aidou, *Beentje* 126 (WAG); Banco Arboretum, *Bégué* 3073 (P); 3074 (P); N. of Aboisso, *Breteler* 5325 (WAG); S.E. of Agboville, *Breteler* 5342 (WAG); 5347 (WAG); km 44 Lakota-Sassandra, *Breteler* 5809 (WAG); near Sassandra, *Breteler* 5875 (WAG); between Grand Bassam and Aboisso, *Breteler* 5916 (WAG); Ayamé, *Breteler* 5930 (WAG); near Aboisso, *Breteler* 5952 (WAG); km 54 Sassandra-Gagnoa, *Breteler* 5995 (WAG); near Sassandra, *Breteler* 6026 (WAG); km 39 Sassandra-Lakota, *Breteler* 6062 (WAG); 6065 (WAG); near Sassandra, *Breteler* 6101 (WAG); 17 km N. of Grabo, *Breteler* 7422 (WAG); km 68 Grabo-Tai, *Breteler* 7430 (WAG); 33 km N.E. of Sassandra, *Breteler* 7480 (WAG); Binger-ville, *Chevalier* 15267 (P); 15412 (P); Guidéko, *Chevalier* 16365 (P); 16408 (P); 16494 (P); Bouroukrou, *Chevalier* 16598 (P); Erymakaignié, *Chevalier* 17111 (P); Yapo Forest, *J. J. de Wilde* 707 (WAG); km 66 Taï-Tabou, crossing Hana R., *J. J. de Wilde & Leeuwenberg* 3601 (BR, EA, K, P, WAG); 64 km N. of Sassandra, *W. de Wilde* 252 (WAG); 55 km N.E. of Adzopé, *W. de Wilde* 559 (BR, K, P, WAG); 573 (WAG); 573 A (K, P, WAG); between Dakpadou and Sago, N. of Sassandra, *Geerling & Bokdam* 2301 (BR, K, WAG); 70 km S. of Soubré, *Geerling & Bokdam* 2490 (BR, WAG); 25 km S.W. of Guéyo, *Leeuwenberg* 3802 (BR, K, P, WAG); near Adiopodoumé, *Leeuwenberg* 3811 (K, P, WAG); 56 km W. of Sassandra, *Leeuwenberg* 3999 (K, WAG); 35 km S.W. of Guéyo, *Leeuwenberg* 4104 (K, P, WAG); km 8 Issia-Gagnoa, *Leeuwenberg* 4126 (BR, K, P, WAG); km 56 Sassandra-Gagnoa, *Leeuwenberg* 12044 (WAG); 20 km N.E. of San Pedro, *Leeuwenberg* 12121 (WAG); near Abidjan, *Thijssen* 107 (WAG); near Aboisso, *Thijssen* 277 (WAG); near Sassandra, *Versteegh & Den Outer* 219 (BR, WAG); km 30 Sassandra – San Pedro, *Zwetsloot* 16 (WAG).

GHANA. Enchi, *Andoh* 5670 (K); Axim, *Chevalier* 12698 (P); 13807 (P); mile 36 Takoradi-Tarkwa, *Enti* 1091 (BR); *Enti & Awnah* R 1105 (BR); near Tarkwa, *Enti* FE 1230 (K); near Axim, *Irvine* 2162 (E); Dompin, Bonsa Su, *Jackson* 1979 (FHO).

Cult. IVORY COAST. Adiopodoumé, *Breteler* 6204 (WAG); 6210 (WAG): . .

Notes. In DON's publication of *Chailletia toxicaria* flowers and fruits are described. In BM, however, I have found a single fruiting specimen, that fits the description very well, but no flowering material which does so. Consequently the fruiting specimen has been designated as lectotype. In the case of *Chailletia erecta* fruiting material is lacking at BM, although DON described both flowers and fruits. The flowering specimen present fits DON's description of *Chailletia erecta*, i.e. has axillary inflorescences, and has thus been designated lectotype of this name. For the third taxon of DON, *Chailletia toxicaria* var. *compressa*, no type material has been found at BM nor elsewhere. A neotype has been designated.

For the confusion in the past between this species and the related *D. affine* (Planch. ex Benth.) Bret., see BRETELER 1973: 48.

D. toxicarium sprouts are very poisonous to stock (see also VICKERY & VICKERY, 1972). Its kernels are used to poison rats whence its name 'Ratbane' or 'Brokeback' and have been observed to be sold in the Freetown market (Smythe 95).

The flowers of this species are often reported as very sweet smelling, especially in the early morning when it can be detected from a distance.

***D. trichocephalum* Bret.**

Fig. 15 Map 15

D. trichocephalum Breteler, 1980: 83.

Type: Gabon, S. of Lastoursville, Lécala, *Le Testu* 8779 (holotype: WAG; isotypes: BM, P).

Diagnostic characters. Liana (?). Branches and branchlets densely brown-velutinous. Stipules pinnately-palmately divided into narrowly triangular to subulate lobed or toothed segments, velutinous, $9-16 \times 9-14$ mm. Leaves obovate, $12-27 \times 5-10$ cm, obtuse to subcordate at base, acutely acuminate at apex, velutinous both sides when young. Inflorescence a densely hairy stalked subglobose head. Bracts and bracteoles narrowly triangular $2.5-8 \times 0.5-1.5$ mm. Flowers sessile or nearly so. Petals suberect, appressed-hairy mainly on lobes outside, glabrous inside. Pistil 3-merous, velutinous.

Description. *Liana* (?). *Branches and branchlets* densely brown-velutinous. *Stipules* appressed, rather long persistent, pinnately-palmately divided into narrowly triangular to subulate, lobed, or toothed segments, broadly subovate in outline, $9-16 \times 9-14$ mm, velutinous outside, strigose inside, glabrescent with age. *Leaves*: petiole subterete, 2–5 mm long, densely velutinous; blade obovate, $12-27 \times 5-10$ cm, 2–2.5 times as long as wide, obtuse to subcordate and usually unequal sided at base, acutely acuminate at top, the acumen 0.5–1.5 cm long; velutinous both sides when young, more densely so on midrib and

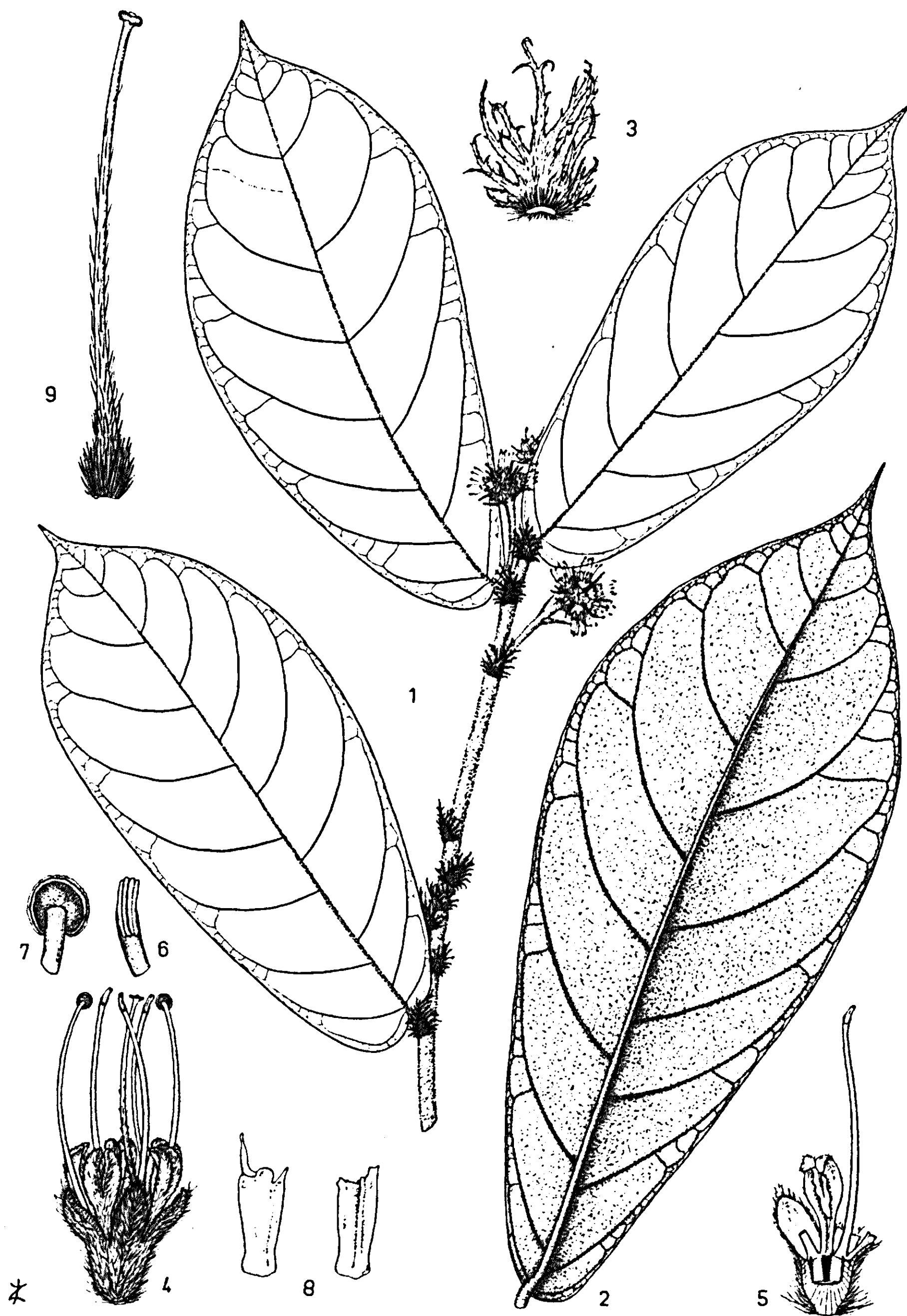
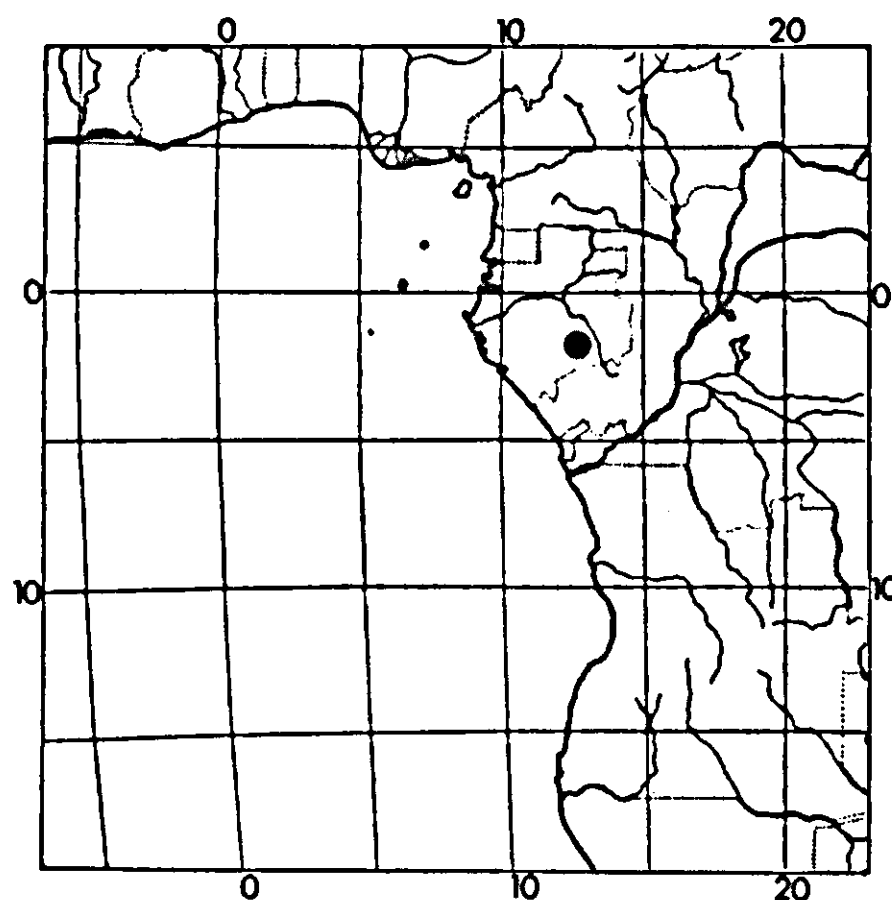


FIG. 15. *D. trichocephalum*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. leaf beneath, $\frac{1}{2} \times$; 3. stipule inside, $2 \times$; 4. flower, $4 \times$; 5. flower partly, $4 \times$; 6-7. anthers, $15 \times$; 8. staminodes outside, $20 \times$; 9. pistil, $7 \times$. (1-9. *Le Testu* 8779).

main lateral nerves, soon glabrescent above usually except for the slightly impressed midrib, persistent beneath; lateral nerves 7–12 pairs, rather obscure above, prominent beneath; glands beneath only, small, obscure, often numerous, rather well dispersed. *Inflorescence* a densely hairy, stalked, subglobose head, ca 8–15 flowered; peduncle 2–3 cm long, velutinous; bracts and bracteoles usually curved, narrowly triangular, $2.5-8 \times 0.5-1.5$ mm, velutinous outside, usually less densely so inside, margin often dentate, the lowermost bracts sometimes situated on the peduncle, distinctly below the flowering head (see fig. 15: 1). Flowers sessile or nearly so. *Sepals* suberect, shortly united at base, oblong, $2-3 \times 1$ mm, densely velutinous outside, sparsely puberulous mainly on upper part inside. *Petals* suberect, at base 1 mm united with filaments into a short tube and this tube adnate to calyx, narrowly obovate in outline, 3–4 mm long, 1–1.5 mm split, appressed-hairy mainly on lobes outside, glabrous inside, the lobes concave and hood-like. *Stamens* suberect, slender, often somewhat bent, ca 6.5–8 mm long, glabrous; anthers reniform, ca 0.5 mm long. *Staminodes* more or less flat, narrowly to broadly oblong, up to ca 0.7×0.5 mm, glabrous with 1–2 teeth at top. *Pistil* 3-merous, slender, ca 6.5–8 mm long; ovary velutinous; style velutinous, glabrous near top; stigma flat, obscurely 3-lobed. *Fruits* unknown.



MAP 15. *D. trichocephalum*

Distribution: Only known from the type locality.

Ecology: Rain forest.

Specimens examined: Only known from the type.

Notes. For differences between *D. trichocephalum* and related species see under *D. reticulatum* p. 4.

D. ubangiense De Wild. = *D. madagascariense* Poir. var. *madagascariense*

For details see BRETELIER, 1981: 15.

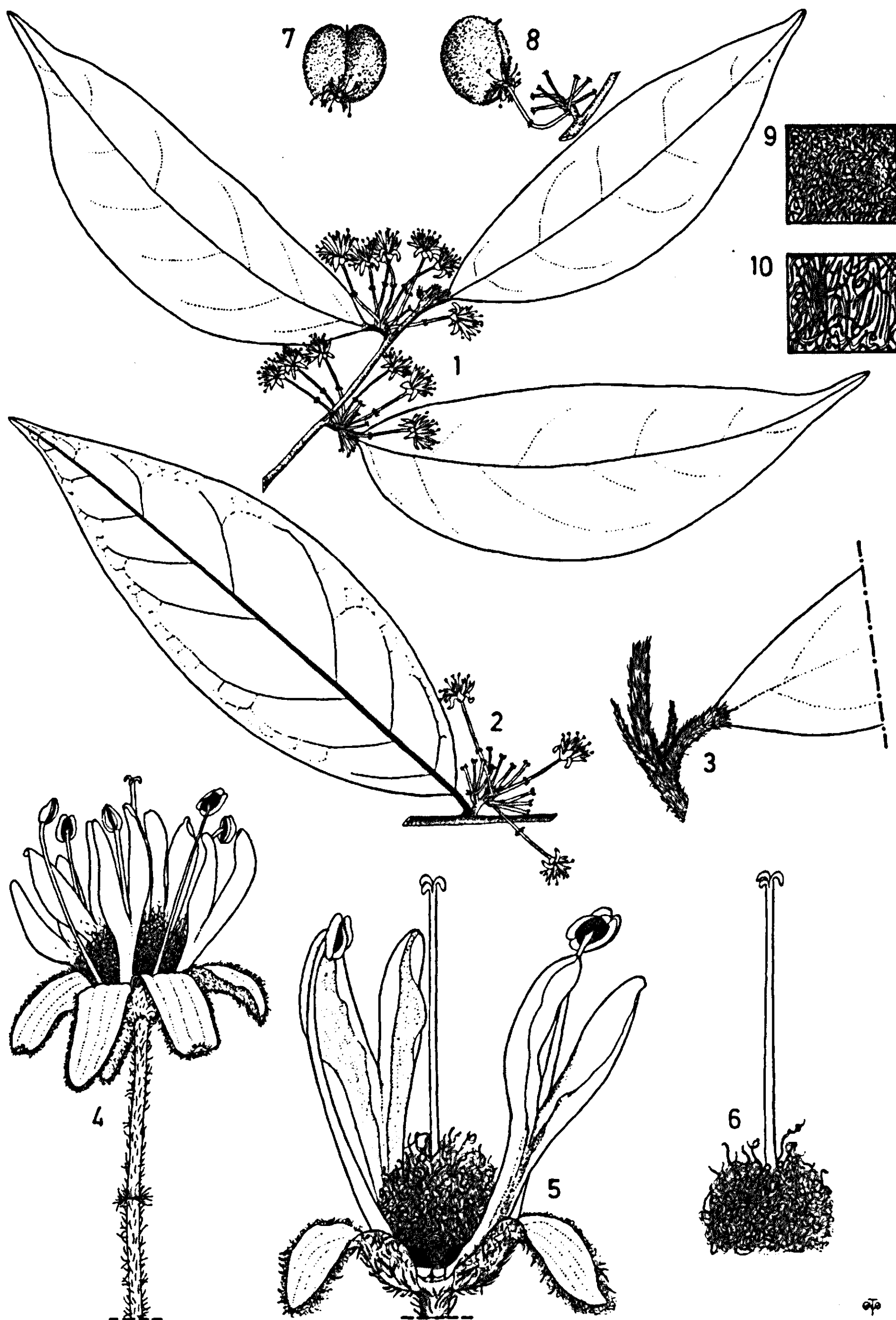


FIG. 16. *D. ugandense*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. leaf axil with one inflorescence, $\frac{5}{6} \times$; 3. leaf axil with stipules, $2\frac{1}{2} \times$; 4. flower, $5 \times$; 5. flower partly, $10 \times$; 6. pistil, $10 \times$; 7. 2-seeded fruit, $\frac{5}{6} \times$; 8. 1-seeded fruit, $\frac{5}{6} \times$; 9. detail of fruit indumentum, $10 \times$; 10. detail of endocarp indumentum inside, $10 \times$. (1, 4-6. *de Witte* 7658; 2-3. *Byabainazi* 61; 7-10. *Troupin* 1031).

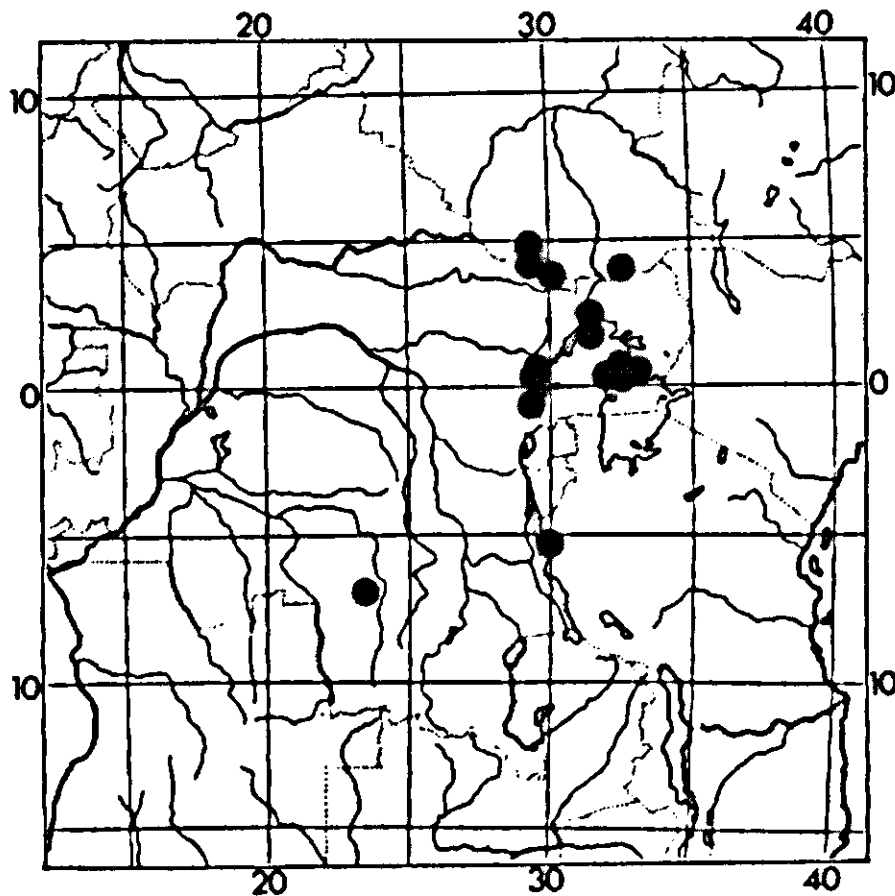
D. ugandense M. B. Moss, 1928: 125; Robijns, 1948: 434; Hauman, 1958-a: 324; Breteler, 1973: 3, XX; Punt, 1975: 16.

Type: Uganda, Mukono, *Dümmer* 292 (holotype: K; isotype: P).

Diagnostic characters. Small to medium sized, often twining liana or lianescent shrub. Branchlets appressed-short-hairy, glabrescent. Stipules narrowly triangular. Leaves elliptic, (3.5)8–11(12) × (1)3–4(5) cm, rounded to cuneate at base, gradually acuminate, glabrous or nearly so above, subappressed-hairy on midrib and the 4–6(7) pairs of main lateral nerves beneath, glands beneath only. Inflorescence subumbellate, obscurely branched, peduncle 0–2(3) mm long, free or adnate to petiole. Pedicel thread-like, up to 15 mm long, the upper part 3–6 mm long. Sepals reflexed. Petals spreading to reflexed, 3–4.5 mm long, 2–3 mm split. Stamens suberect, subequal in length to petals. Pistil (2)3(4)-merous, ovary lanate, style glabrous. Fruits tomentose-tomentellous; endocarp rather thin, villous inside.

Description. Small to medium-sized, often twining *liana* or lianescent shrub. *Branches* pale-brown to whitish, usually smooth, often grooved lengthwise, glabrous or glabrescent, sparsely lenticellate or not. *Branchlets* often grooved lengthwise, appressed-short-hairy, glabrescent. *Stipules* subappressed, narrowly triangular, (1)2–5(6) mm long, appressed-short-hairy, often long persistent. *Leaves*: petiole subterete to semiterete, often grooved above, (2)3–5(7) mm long, not distinctly longer when united with peduncle of inflorescence, appressed-short-hairy; blade elliptic to slightly obovate, rarely ovate, (2)2.5–3(3.5) times as long as wide, (3.5)8–11(12) × (1)3–4(5) cm, rounded to cuneate at base, gradually acuminate at top, the acumen usually 0.5–1 cm long, mucronate to acute to obtuse apically; glabrous above or with a few hairs on the midrib when young, soon glabrescent, beneath subappressed hairy on midrib and, to a lesser extent, on main lateral nerves and margin, midrib plane or slightly impressed above, the 4–6(7) pairs of main lateral nerves and tertiary nerves slightly prominent above; glands usually present, often few, beneath only, small, inconspicuous, rather well dispersed. *Inflorescence* subumbellate, indistinctly branched or basally once distinctly so, up to ca 35-flowered, appressed-short-hairy; peduncle 0–2(3) mm long, free to completely adnate to petiole, the blade of the supporting leaf sometimes absent; bracts and bracteoles ovate-triangular, up to 1 mm long. *Pedicel* very slender, appressed-short-hairy, up to ca 15 mm long, the upper part 3–6 mm long. *Sepals* reflexed, shortly united at base, oblong-triangular, 2.5–3.5 × 0.5–1 mm, subappressed-pubescent to tomentellous outside and on apical part inside. *Petals* slightly spreading to reflexed, at base shortly adnate to stamens, obovate in outline, 3–4.5 mm long, 2–3 mm split, glabrous or with a few hairs below split outside; lobes concave, usually spreading. *Stamens* suberect, subequal in length to petals or slightly longer, glabrous; anthers 0.5 mm long, connective somewhat distinct. *Staminodes* subquadrate, up to 0.5 × 0.5

mm, glabrous, obtuse to slightly bilobed apically. *Pistil* (2)3(4)-merous, 3.5–6 mm long; ovary lanate, style glabrous, shortly (2)3(4)-lobed at top. *Fruits* 1–2(3)-seeded, distinctly lobed when more than 1-seeded, tomentose to tomentellous; 1-seeded fruits subellipsoid, up to ca 18 × 12 mm; endocarp rather thin, firmly papery, somewhat rugose outside, villous inside. *Seeds* subellipsoid, ca 10 × 5 mm; seedcoat thin, brown-black, distinctly veined.



MAP 16. *D. ugandense*

Distribution: Zaïre, southern Sudan, Uganda, eastern Tanzania.

Ecology: Rain forest to semi-deciduous or gallery forest, up to 1500 m altitude.

Specimens examined:

ZAÏRE. Lesse, *Bequaert* 3212 (BR, WAG); Beni, *Bequaert* 3305 (BR, LISC, LISU); Lesse, *Bequaert* 4159 (BR); Rutshuru, *Bequaert* 5564 (BR); Ruwenzori, Byangolo valley, *J. de Wilde* 544 (BR, K, WAG); *G. F. de Witte* 7658 (BR, C, K, WAG); Beni terr., Kakekarritiri R., *G. F. de Witte* 13217 (BR, WAG); Kurukwata, *Gérard* 3149 (BR, K, WAG); Rutshuru, *Ghesquière* 4256 (BR, COI, EA); Mwene Ditu, *Liben* 3955 (BR, WAG); Garamba Nat. Park, *Troupin* 1031 (BR, K, WAG).

SUDAN. Meridi distr., Azza Forest, *Andrews* 1348 (K); Torit distr., *Jackson* 1374 (K).

UGANDA. Mengo distr., Mpanga forest, *Byabainazi* 61 (EA, ENT); near Karpolo, *Chandler* 1183 (BR, K); Entebbe Rd, *Chandler* 1427 (BM, BR, EA, K); Budongo forest, *Dawkins* 546 (BR, EA, K, WAG); Mengo distr., 8 km S.W. of Mpigi, *Drummond & Hemsley* 4742 (EA, K); Mukono forest, *Dümmer* 292 (K, P, type); 2445 (BM, K); Mulange forest, *Dümmer* 4457 (K); Budongo forest, *Eggeling* 1278 (EA, K); Allui forest near Pakwach, *Eggeling* 3008 (BR, K); Siba forest, *Greenway & Eggeling* 7352 (EA, K); 3 km S.W. of Mpigi, *Lye* 3796 (K, UPS); Kyagwe, *Maitland s.n.* (K); Bukondo forest, *Turner & Shantz* 4295 (BR).

TANZANIA. Kigoma distr., Kasakali, *Suzuki* 234 (EA).

Note. Some collectors (*Dümmer* nos 292 & 2445, *Turner & Shantz* 4295) reported this species as a tree of 30 ft. Most collectors, however, describe it as a liana, a scandent shrub, or shrub, which seems more likely to me.

D. umbellatum Chodat, 1895: 671; Engler 1896-a: 349; Hiern, 1896: 137; Engler 1912-a: 578; Pellegrin, 1913: 641; De Wildeman, 1919: B 71; Exell, 1927: 68; Moss, 1928: 130; Hutchinson & Dalziel, 1928-a: 324; Exell & Mendonça, 1951-b: 327, p.p.: except *Welwitsch* 4668 (= *D. insigne* Engl.); Hauman, 1958-a: 315; Keay, 1958: 438; Breteler, 1973: XX; Punt, 1975: 27; Breteler, 1979: 47, 66.

Type: Angola, Golungo Alto, *Welwitsch* 4652 (holotype: G; isotypes: BM, COI, K, LISU, P).

Diagnostic characters. Large liana up to 4 cm diam. or lianescent shrub. Woodcylinder entire. Branchlets red-brown-hairy. Stipules entire. Leaves with 1–3(6) mm long petioles, obovate-elliptic, 5–14(17) × (3)4–6(7) cm, usually subcordate to obtuse at base, hispidulous on midrib above and entirely so beneath. Inflorescence a subglobose up to ca 15-flowered head. Pedicel up to ca 2 mm long. Sepals suberect to somewhat reflexed. Petals slender, distinctly longer than sepals. Stamens slender, longer than petals. Staminodes 2-horned apically. Pistil 3(–4)-merous, glabrous or rarely with a few sparse stiff hairs. Fruits subglobose, velutinous.

Description. Large *liana* up to 4 cm diam. or lianescent shrub. Woodcylinder entire or nearly so. Bark rather smooth, with indistinct rows of sparse, rather large lenticels. *Branches* and *branchlets* red-brown velutinous to hispidulous to villous-tomentose, the former glabrescent. *Stipules* entire, triangular, narrowly so or not, 1–3(5) mm long, appressed-hairy. *Leaves*: petiole subterete, 1–3(6) mm long, velutinous to villous; blade obovate-elliptic, sometimes ovate or oblong, (1)1.5–2.5 times as long as wide, 5–14(17) × (3)4–6(7) cm, subcordate to obtuse, sometimes rounded or cordate at base, acutely acuminate to acute or obtuse and often mucronate at top, the acumen up to 1 cm long; usually strigulose (somewhat scabrid) above when young, hispidulous on midrib above and entirely so beneath, but more densely so on midrib and the (6)7–9(10) pairs of main lateral nerves, midrib and main lateral nerves often impressed above, prominent beneath; glands usually few, beneath only, inconspicuous, more or less dispersed, but usually more numerous in a narrow zone along the midrib. *Inflorescence* a subglobose head, up to ca 15-flowered, tomentose-velutinous; peduncle (2)6–25 mm long; bracts and bracteoles usually narrowly ovate-triangular, 0.5–2 mm long, appressed-brown-hairy outside, glabrous to sparsely hairy inside. *Pedicel* up to ca 2 mm long, the lower part up to 2 mm long, the upper part at most 0.5 mm long. *Sepals* suberect to spreading to somewhat reflexed, shortly united at base, oblong-obovate-elliptic, (2.5)3–4 × (0.7)1–1.5(2) mm, villous outside often mixed with a few stiff hairs, glabrous or puberulous apically inside. *Petals* slender, suberect, at least lower part, distinctly longer than sepals, narrowly obovate in outline, very shortly united with filaments at base, (3.5)4.5–5 mm long, 1.5–2 mm split, glabrous inside, outside a few rather stiff

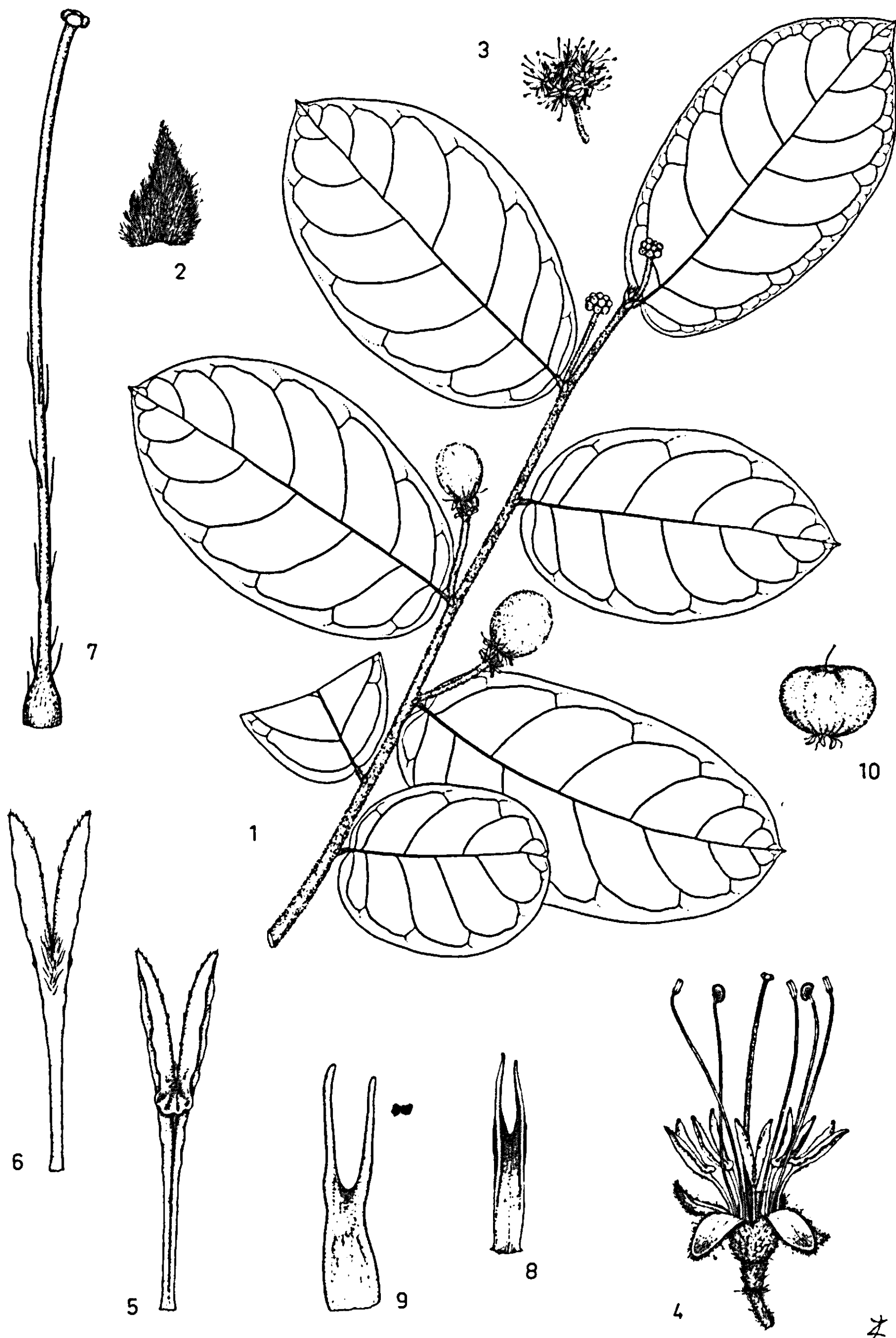
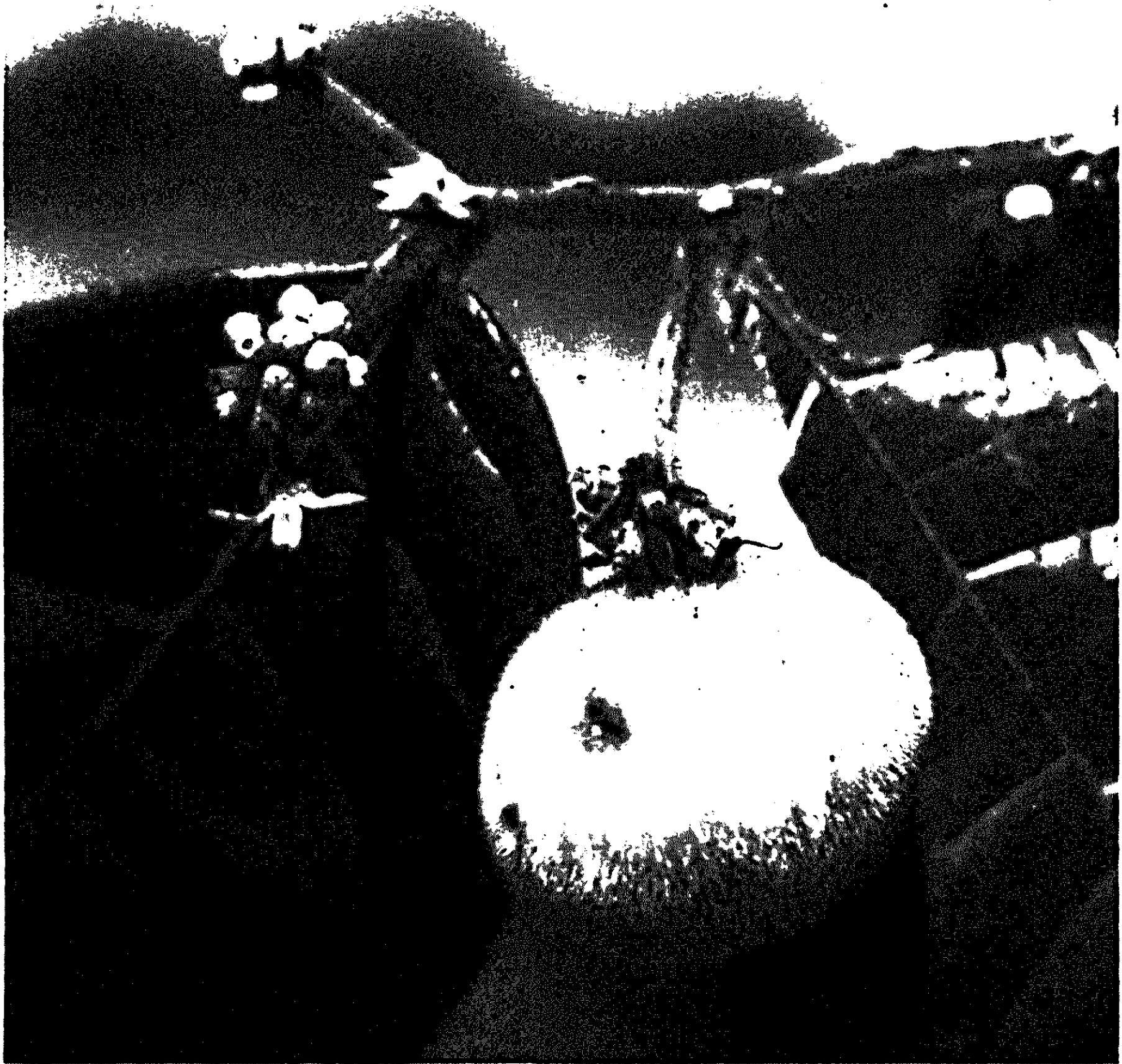
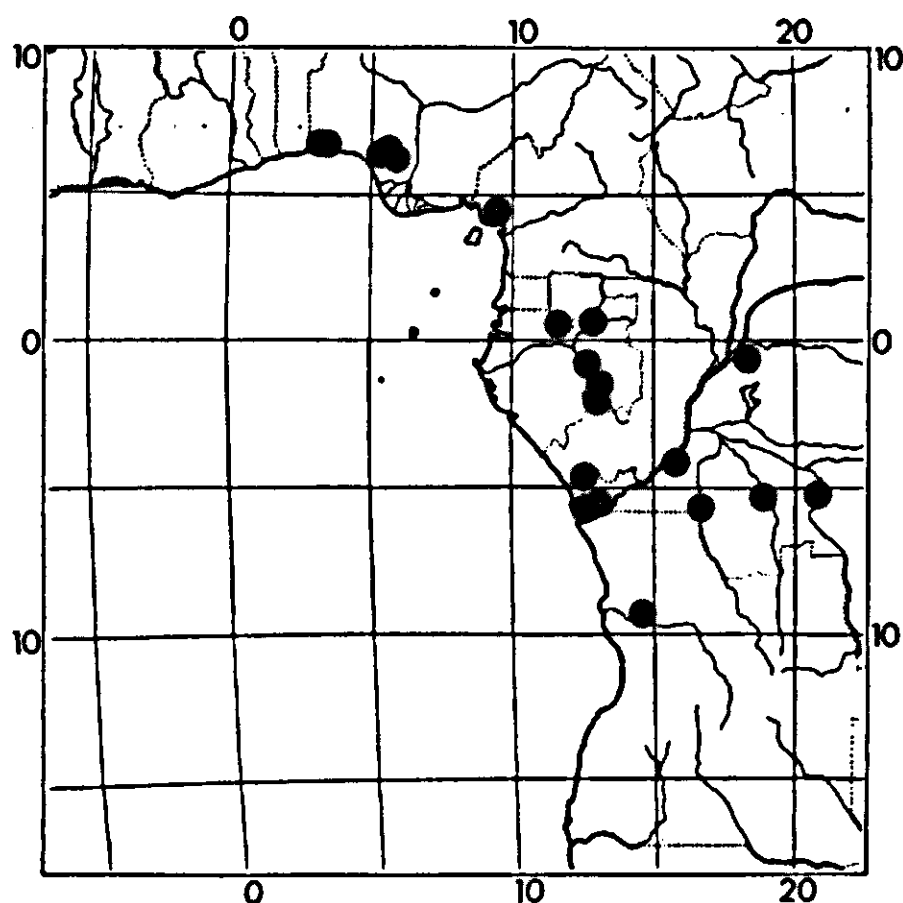


FIG. 17. *D. umbellatum*: 1. fruiting branchlet, $\frac{1}{2}\times$; 2. stipule outside, $5\times$; 3. inflorescence, $\frac{1}{2}\times$; 4. flower, $4\times$; 5. petal inside, $10\times$; 6. petal outside, $10\times$; 7. pistil, $10\times$; 8-9. staminodes outside, $20\times$; 10. fruit, $\frac{1}{2}\times$. (1-2, 10. *Breteler 6930*; 3, 9. *Breteler 6933*; 4-8. *Le Testu 7714*).



PHOT. 12. *D. umbellatum*: branchlet with flowers and fruit (Breteler 6933; phot. F. J. BRETELER).

hairs below split, sometimes extending on the lobes and downwards, and often with a few curled hairs on top of lobes; lobes concave, often somewhat curled or twisted, the proximal lobe margins basally united and standing out. *Stamens* usually suberect, slender, (6)7–9 mm long, glabrous; anthers subreniform, up to 0.5 mm long. *Staminodes* narrowly oblong, 1–1.5 mm long, thin, glabrous, 2-horned apically. *Pistil* 3(–4)-merous, 6.5–9 mm long, glabrous or rarely with a few, sparse, stiff hairs (ovary becoming velutinous soon after fertilisation); stigma flat to obscurely 3(–4)-lobed. *Fruits* 1(–3?)-seeded, aborted cells not or hardly visible by an obscure ridge, yellow-orange at maturity, subglobose, up to 25 mm diam., usually apically impressed, velutinous; exocarp 2–4 mm thick; mesocarp pallisade-like, 1–2 mm thick; endocarp cartilaginous, smooth glossy inside. *Seeds* subellipsoid, ca 10 × 7 mm; testa brown, smooth, somewhat glossy.



MAP 17. *D. umbellatum*

Distribution: Nigeria, western Central Africa.

Ecology: Rain forest, semi-deciduous forest.

Specimens examined:

NIGERIA. Benin dist., Okumu F.R., *Akpabla* 1087 (K, WAG); 60 km N.W. of Lagos, Ilaro F.R., *Bels* 8 (BR, FI, U); Sapoba dist., *Ejiofor* FHI 24626 (K, P); Benin, Ugo-Ugboko Rd, *Emwiogbon* FHI 58504 (FHI); Benin dist, Sapoba F.R., *Emwiogbon* FHI 66562 (K); Benin, Okumu F.R., *Jones in coll. Brenan* 9140 (BM, K); Lagos, *Millen* 167 (K); Benin, Iguobazowa dist, *Onochie* FHI 34893 (K).

CAMEROON. Km 64 Douala-Loum, *Leeuwenberg* 10303 (WAG); 5 km E. of Mbanga, *Letouzey* 14736 (K, P, WAG).

GABON. 60 km S.S.W. of Moanda, *Breteler* 6862 (WAG); 6930 (WAG); 6933 (WAG); km 6 Moanda-Bakoumba, *Breteler* 6989 (WAG); 10 km La Lara-Makokou, 31 km upstream Okano R., *Breteler & J. J. de Wilde* 510 (WAG); km 14 Makokou-Mekambo, *Leeuwenberg* 11530 (WAG); Liyanga near Lastoursville, *Le Testu* 7714 (BM, BR, P, WAG); Mitzi, *Le Testu* 9328 (BM, BR, P, WAG).

CONGO. Bakeki (= Guialincoumé), *Estève* 32 (P).

ZAÏRE. Near Mabana, Maluku terr., *Breyne* 983 (BR); 2206 (BR); Kiyaka, *Devred* 2749 (BR, K, P, PRE, WAG); Luki, *Donis* 2224 (BR); Boende terr., *Evrard* 3989 (BR, SRGH); Bikoro, *J. Léonard* 671 (BM, BR, COI, K, LISC, LISU, M, SRGH); Luki, *Mahieu* 348 (BR); Popokabaka, *Pauwels* 2445 (BR); Minkindu, *Toussaint* 16 (BR); Moanda, *Vanderyst* 27750 (BR); 27751 (BR); 27882 (BR); *s.n.* (BR).

ANGOLA. Cabinda, Buco Zau, *Gossweiler* 6747 (BM, COI, K, LISJC, LISU); Golungo Alto, *Welwitsch* 4651 (BM, LISU); 4652 (BM, COI, G, K, LISU, P, type); 4653 (BM, COI, G, K, LISU); 4654 (BM, LISU).

Note. For affinities see under *D. reticulatum* p. 4.

D. unguiculatum Engl.

Fig. 18 Map 18

D. unguiculatum Engler, 1912-b: 438; 1912-a: 568, nomen; Pellegrin, 1913: 646, quoad nomen (the specimen cited is *D. filicaule* Bret.); De Wildeman, 1919:

B 71; Hauman, 1968-a: 308; Breteler, 1973: 18, 19, XX; Punt, 1975: 29; Breteler, 1978: 22, 69.

Type: Zaire, Avakubi (Awakubi), *Mildbraed* 3246 (holotype: B†; lectotype: BM).

D. griseisepalum De Wildeman, 1919: B 35. See Breteler, 1979: 22 for full details.

D. corrugatum Exell, 1927: 67. See Breteler, 1978: 23 for full details.

Diagnostic characters. Small to large liana or lianescent shrub. Woodcylinder deeply divided by intruding phloem. Branchlet subappressed-hairy. Leaves elliptic, (3)5–11(15) × (1.5)2–5(6) cm, usually rounded to cuneate at base, usually gradually acuminate, pubescent at least on the main nerves, soon glabrescent or not, with 4–7(8) pairs of main lateral nerves. Inflorescences 2–4 times distinctly branched, distinctly forked well below the flowers, peduncle up to 1.5 cm long. Sepals erect to slightly spreading, puberulous-tomentellous. Petals slender, as long as the stamens, shortly lobed, glabrous or nearly so. Pistil (2)3(4)-merous, ovary completely or partly villous. Fruits shortly velutinous to tomentose-tomentellous.

Description. Small to large *liana*, up to at least 14 cm diam., winding or not, or lianescent shrub. Bark grey-brown, shallowly longitudinally fissured in older stems, usually with numerous small lenticels in younger stems; woodcylinder deeply divided by intruding phloem, on transverse section the phloem often appearing as interrupted radiary bands or as islands. *Branches* minutely lenticellate or not, usually glabrous or glabrescent. *Branchlets* subappressed-pubescent to somewhat tomentose-tomentellous, lenticellate or not. *Stipules* narrowly triangular to subulate, 1–4 mm long, appressed pubescent, usually early caducous. *Leaves*: petiole subterete to semiterete, 2–6(8) mm long, subappressed-pubescent, glabrescent or not; blade papery, shiny or not, elliptic, sometimes obovate or oblong, 2–2.5(3) times as long as wide, (3)5–11(15) × (1.5)2–5(6) cm, rounded to cuneate, sometimes obtuse to subcordate at base, usually gradually acuminate at top, the acumen up to 1(1.5) cm long, usually rounded and mucronate or acute, sometimes obtuse apically; pubescent (often subappressed) both sides on midrib and, to a less extent, on main lateral nerves and margin, when young sometimes more or lesser completely so both sides or beneath only, often also with a tuft of hairs in the axils of the most main lateral nerves beneath, soon glabrescent or not, midrib slightly impressed above, the 4–7(8) pairs of main laterals plane or slightly impressed above; glands rather small, beneath only, often mostly in a rather narrow zone along the midrib or more or less well dispersed. *Inflorescences* cymose, 2–4 times distinctly branched, peduncle distinctly forked well below the flowers, at least in fully developed inflorescences, the primary branches from half as long as to equal, or even longer than the peduncle, up to ca 70-flowered, subappressed-pubescent; peduncle up to 1.5 cm long; bracts and bracteoles narrowly triangular 0.5–2 mm long. *Pedicel* 1–2(5) mm long, the upper part up to 0.7 mm long. *Sepals*

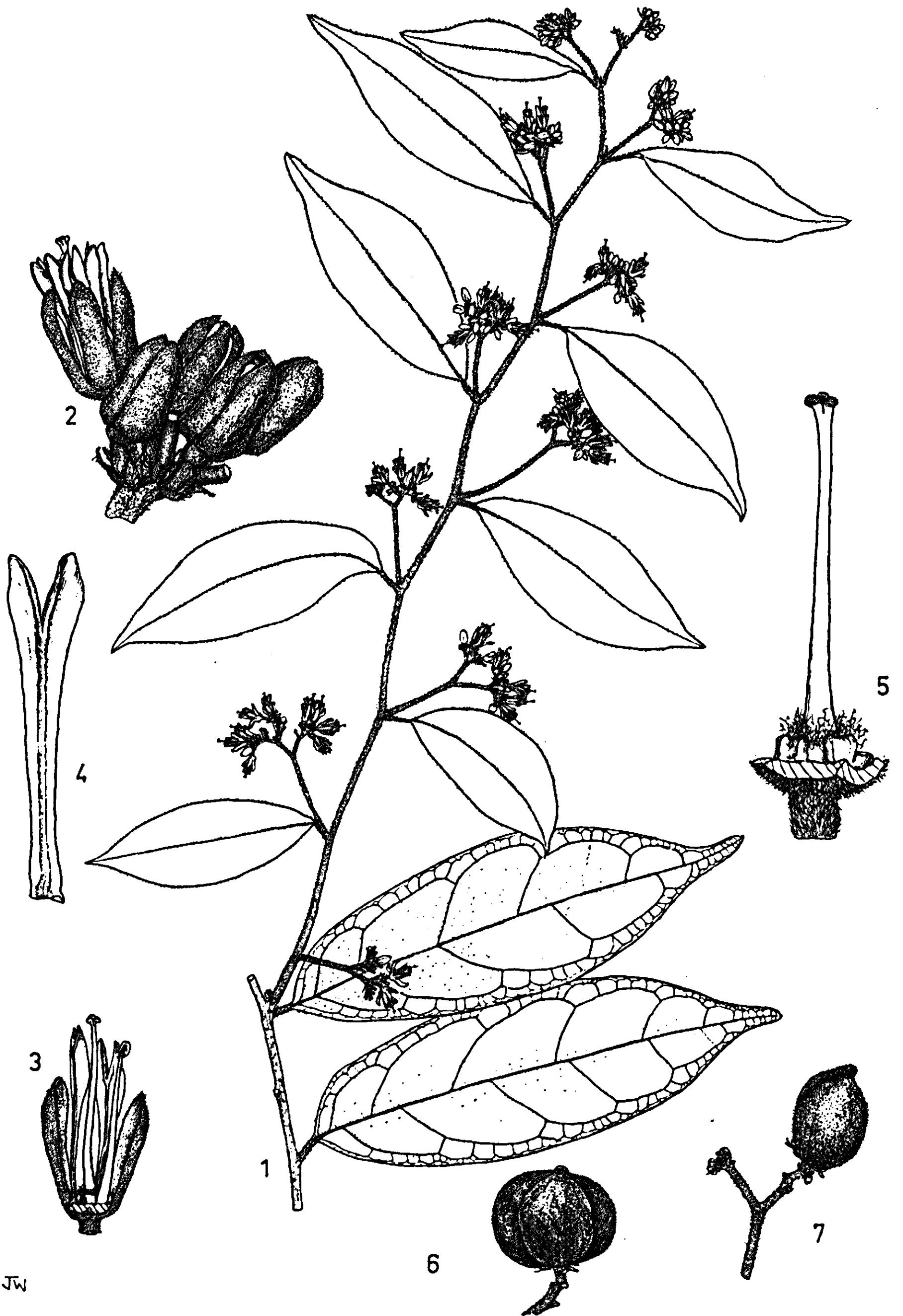
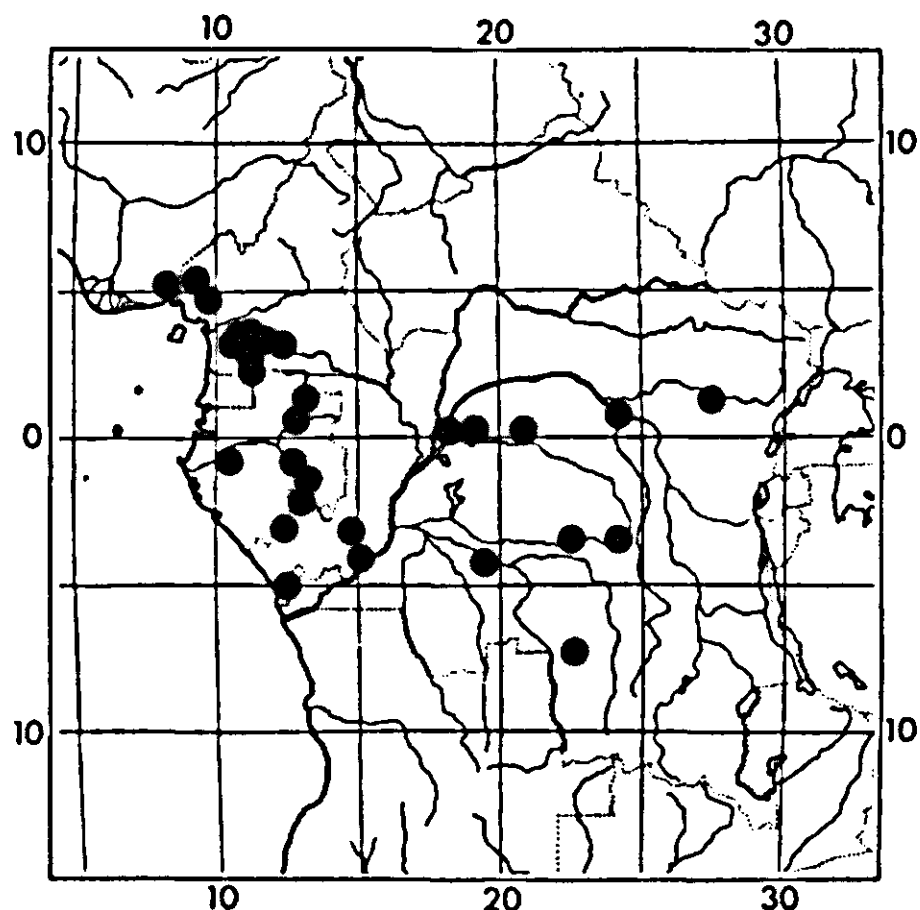


FIG. 18. *D. unguiculatum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. part of inflorescence, $5 \times$; 3. flower partly, $5 \times$; 4. petal inside, $10 \times$; 5. pistil with staminodes, $10 \times$; 6. 3-seeded fruit, $\frac{5}{6} \times$; 7. 1-seeded fruit, $\frac{5}{6} \times$. (1. J. J. de Wilde 8201; 2-5. Breteler 6758; 6-7. J. J. de Wilde 8383).

erect to slightly spreading, free or shortly united at base, flat to slightly concave, oblong-obovate, $2.5-3.5(4) \times 0.5-1.5(2)$ mm, puberulous-tomentellous both sides. *Petals* erect, free or very shortly adnate to filaments at base, narrowly obovate in outline, $(3.5)4-5(5.5)$ mm long, $0.7-1(1.2)$ mm split, glabrous or with a very few hairs outside just below split, lobes concave. *Stamens* as long as petals, sometimes slightly longer or shorter, glabrous; anthers ovoid-oblong, $0.3-0.8$ mm long, connective distinct. *Staminodes* subquadrate to oblong, up to 0.5×0.5 mm, glabrous, obtuse to bilobed apically. *Pistil* (2)3(4)-merous, $(3.5)4-5(5.5)$ mm long; ovary completely villous or more often only so in upper part; style glabrous, very shortly (2)3(4)-lobed apically. *Fruits* 1-3-seeded, distinctly lobed when more than 1-seeded, densely shortly velutinous to tomentose-tomentellous, yellow to orange at maturity; 1-seeded fruits: obliquely subellipsoid, somewhat curved or not, sometimes shortly beaked, $1.5-2.5 \times 1-2$ cm; exocarp $0.5-1.5$ mm thick; mesocarp adhering to endocarp, juicy, ca $2-3$ mm thick; endocarp woody, up to ca 1 mm thick, rugose outside, smooth or very finely striate and glabrous inside. *Seeds* obliquely subellipsoid, laterally compressed or not, $8-15 \times 5-8$ mm, sometimes covered by an, up to 0.5 mm thick, fragile aril; seedcoat firm, brown-black, smooth or very finely striate, glossy or not; hilum up to 6 mm long.



MAP 18. *D. unguiculatum*

Distribution: eastern Nigeria, Cameroun, Gabon, Congo, Zaïre, northern Angola (Cabinda).

Ecology: Rain forest, semi-deciduous forest, gallery forest.

Specimens examined:

NIGERIA. Oban Group F.R., S. of Mbarakom, *van Meer* 1634 (WAG).

CAMEROUN. 50 km S.E. of Mbalmayo, *Asonganyi* 55 (WAG); Bitye, *Bates* 1828 (K, WAG); km 16 Ebolowa-Minkok, *J. J. de Wilde* 8199 (WAG); 8201 (WAG); 8383 (WAG); 65 km S.S.W. of Eseka, *W. de Wilde* c.s. 2757 (BR, P, WAG); 11 km Nkongsamba-Loum, Bakaka forest, *Leeuwen-*

berg 8774 (WAG); 20 km S.W. of Ambam, *Letouzey* 10174 (K, P, WAG); 12 km N.N.E. of Makak, *Letouzey* 11528 (P, WAG); Mamfé-Calabar Rd, Akegan, *Letouzey* 13559 (BR, K, P, WAG); Bipindi, *Zenker* 539 (B, BR, BREM, FI, FHO, G, LD, P, U, WAG); 2084 (BM, BP, COI, E, G, GOET, K, L, M, P, W, WU, Z); 5079 (P).

GABON. Km 6 Moanda-Franceville, *Breteler* 6246 (WAG); km 17 Lastoursville-Moanda, *Breteler* 6675 (WAG); km 33 Moanda-Bakoumba, *Breteler* 6758 (WAG); 60 km S.S.W. of Moanda, *Breteler* 6893 (WAG); 6922 (WAG); 6959 (WAG); km 14 Moanda-Bakoumba, *Breteler* 6996 (WAG); Komo R., Agonenzorck, *Chevalier* 26943 (P, WAG); Bélinga, *N. Hallé* 3799 (P); 3954 (P); *N. Hallé & Le Thomas* 159 (P); Ipassa, S.W. of Makokou, *Hladik* 1932 (P, WAG).

CONGO. Baratier, *Bouquet* 507 (P); Kitabi-Kokra-moekra Rd, *Lecomte* D 22 (P); Moutampa region, *Sita* 1879 (WAG).

ZAIRE. Yangambi, *Bolema* 642 (BR); 740 (BR); 1020 (BR, K); Katako Kombe, *Claessens* 393 (BR); Eala, *Corbisier-Baland* 1425 (BR); Tshuapa, *Dubois* 431 (BR); Bolomba, Djoa, *Evrard* 4996 (BR, K, P, WAG); Mongo, *Germain* 8412 (BR); Eala, *Germain* 8417 (BR); Yangambi, *Germain* 8497 (BR); 8574 (BR, UPS); between Lodja and Kale, *Lebrun* 6292 (BM, BR); Eala, *Leemans* 374 (BR, Z); 587 (BR, EA); Kasai, Tumba, *Liben* 2565 (BR, K, P); Yangambi, *Lisowski* 18918 (BR, K); 40238 (BR, K); *Louis* 318 (BR, EA, K, P, PRE, SRGH, WAG); Eala, *Louis* 2058 (BR, U); Yangambi, *Louis* 2254 (BR); 2935 (BR, PRE); 5583 (BR, EA, P, SRGH); 9064 (BR, K); Avakubi, *Mildbraed* 3246 (BM, type); Kimbanseke terr., Manenga, *Pauwels* 6270 (BR); Eala, *Pynaert* 479 (BR); 1418 (BR, type of *D. griseisepalum*); *Staner* 1293 (BR, LISU, P); 1323 (BR, COI, FI, L, LISC, LISU, M, SRGH); 1469 (BR, EA, LISC); Ipamu, *Vanderyst* 12732 (BR).

ANGOLA. Mayombe, Panga Mungo, *Gossweiler* 6104 (BM, COI, K, LISJC, LISU, type of *D. corrugatum*).

Note. *D. unguiculatum* resembles *D. tomentosum* in so many aspects that one would probably wonder why these species have not been united. In most characters they differ only slightly so or the small differences are difficult to express verbally. I feel, however, that in this case two species are involved and not a single variable one. The best characters to separate both species rather easily are found in the inflorescence:

Inflorescence a subglobose head, indistinctly branched, rarely once distinctly so; peduncle (0.5)1.5–3.5(4.5) cm long **D. tomentosum**

Inflorescence 2–4 times distinctly branched, distinctly forked well below the flowers, the first branches often as long as or nearly as long as the peduncle; peduncle up to 1.5 cm long **D. unguiculatum**

D. varians Pellegr. = *D. heudelotii* (Planch. ex Oliv.) Baill. var. *heudelotii*

For details see BRETELER, 1979: 28.

D. venenatum Engl. & Gilg = *D. cymosum* (Hook.) Engl.

For details see BRETELER, 1978: 32.

D. verrucosulum Engl., printing error of *D. verruculosum* Engl.

D. verruculosum Engl. = *D. gabonense* Engl.

For details see BRETELER, 1979: 4.

D. virchowii (Hoffm. & Hildebr.) Engl.

Fig. 19 Map 19

D. virchowii (Hoffmann & Hildebrandt) Engler, 1896-a: 348; Engler & Krause, 1931: 6; Descoings, 1960: 111; 1961: 30; 1973: 515; Punt, 1975: 33; Breteler, 1979: 59.

Basionym: *Chailletia virchowii* Hoffmann & Hildebrandt, 1881: 11.

Type: Madagascar, Nossi-Bé, Lokobé, *Hildebrandt 3193* (holotype: B†; lectotype: P; isotypes: BM, BREM, G, GOET, K, L, LE, M).

Diagnostic characters. Shrub. Branchlets appressed-puberulous, glabrescent. Leaves elliptic, (7)9–15(19) × 3.5–8 cm, unequal sided at base, glabrescent, midrib impressed above, glands distinct, beneath only. Inflorescences cymose, up to ca 20-flowered; peduncle usually completely adnate to petiole. Sepals erect to slightly spreading, 3.5–5 mm long. Petals 4.5–5 mm long, rounded to emarginate apically. Stamens 5.5–6.5 mm long. Pistil 2–3-merous, 5.5–8 mm long, ovary glabrous or nearly so. Fruits rusty tomentose.

Description. *Shrub*. *Branches* smooth, glabrous. *Branchlets* appressed-puberulous, glabrescent. *Stipules* usually early caducous, narrowly triangular, 3–4(6) mm long, appressed-puberulous. *Leaves*: petiole subterete, grooved above, 5–11(14) mm long, appressed-puberulous, glabrescent; blade elliptic, (1.5)2–3(3.5) times as long as wide, (7)9–15(19) × 3.5–8 cm, rounded to cuneate and unequal sided at base, often strongly so, acute to slightly acuminate at top, the acumen 0.5(1) cm long; subappressed-pubescent on midrib, main lateral nerves, and margin, mainly so beneath, glabrescent, soon so above, midrib impressed above, the (6)8–10 pairs of main lateral nerves plane or slightly prominent above; glands distinct, beneath only, mainly near base or rather well dispersed. *Inflorescence* cymose, distinctly 2–4 times branched, up to ca 20-flowered, appressed-puberulous; peduncle usually completely or nearly completely adnate to petiole, rarely free, usually slightly shorter than petiole, (2)4–8 mm long; bracts and bracteoles narrowly triangular, up to 1 mm long. *Pedicel* up to 3 mm long, appressed-puberulous, the upper part up to 1.5 mm long. *Sepals* erect to slightly spreading, free or shortly united at base, narrowly oblong-triangular, 3.5–5 × 1–1.5 mm, appressed-puberulous to tomentellous outside, appressed-puberulous inside, top acutish, inrolled. *Petals* erect, free or shortly adnate to filaments at base, narrowly obovate-oblong, 4.5–5 × 0.8–1 mm, glabrous or with a few hairs at base, rounded to emarginate apically. *Stamens* erect, 5.5–6.5 mm long, glabrous or with a few hairs at base; anthers almost 1 mm long, connective distinct. *Staminodes* subquadrate, rather thick, ca 0.5 × 0.5 mm, glabrous. *Pistil* 2–3-merous, 5.5–8.5 mm long; ovary glabrous or with

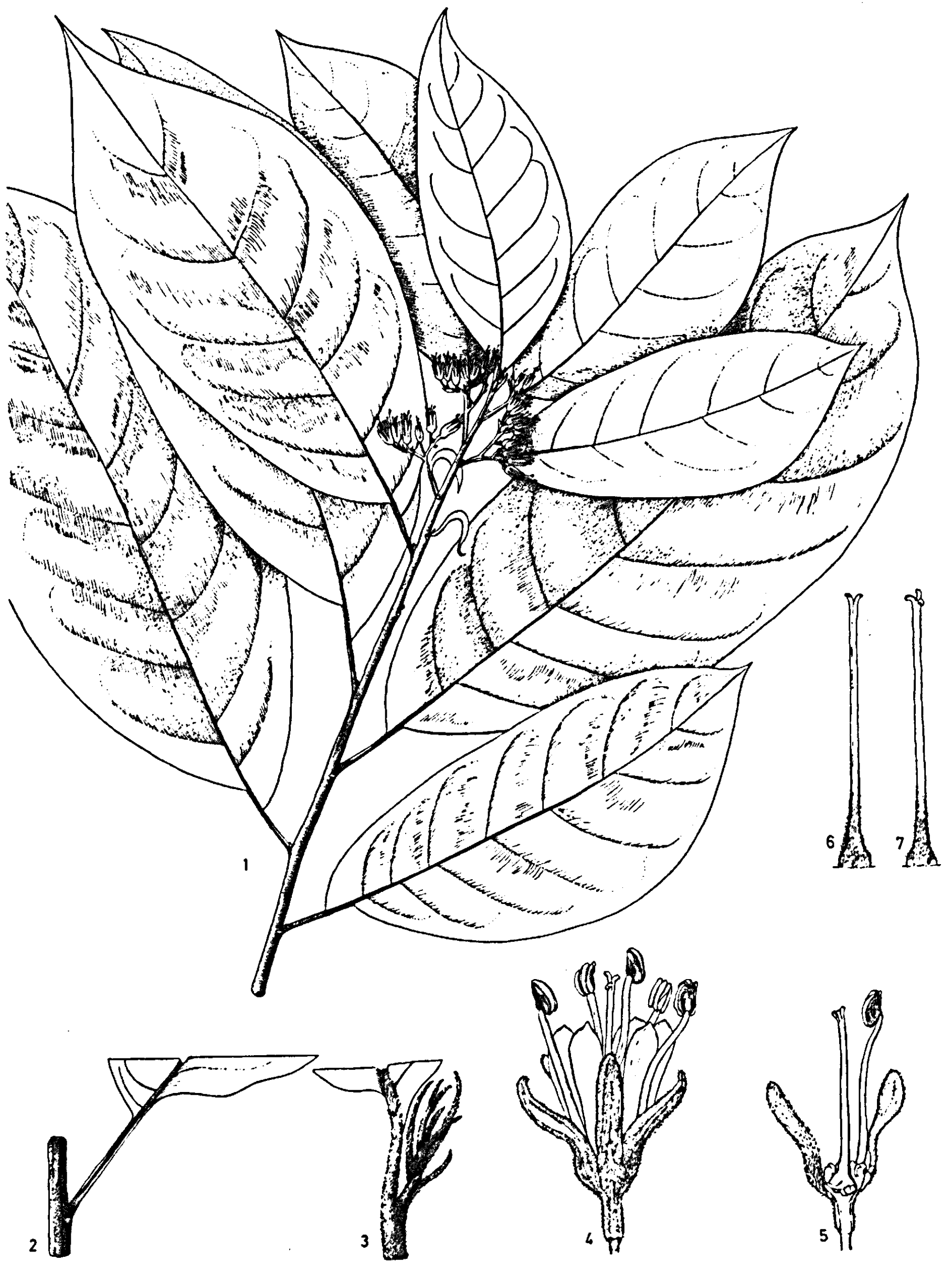
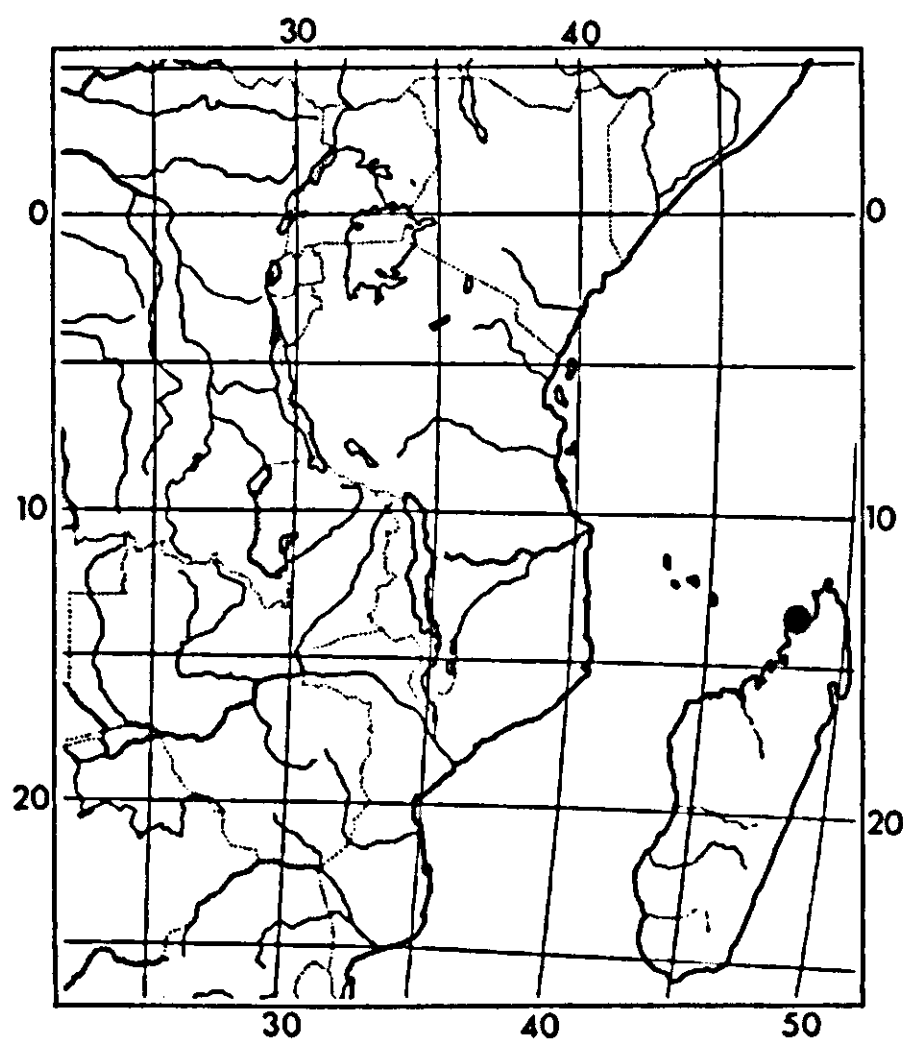


FIG. 19. *D. virchowii*: 1. flowering branchlet, $\frac{1}{2}\times$; 2. detail of leafbase, $1\times$; 3. apical part of branchlet with stipules, $2\times$; 4. flower, $4\times$; 5. flower partly showing glabrous pistil, $4\times$; 6. 2-merous hairy pistil, $4\times$; 7. 3-merous hairy pistil, $4\times$. (1–3, 6–7. Hildebrandt 3193; 4–5. Homolle 450).

a few curly hairs (shortly velutinous soon after fertilisation); style glabrous, shortly 2–3-lobed apically. *Fruits* (according to original description) obovoid, rusty tomentose, 1-seeded, 25×18 mm.



MAP 19. *D. virchowii*

Distribution: Only found twice on Nossi-Bé Island.

Ecology: Rain forest.

Specimens examined:

MADAGASCAR. Nossi-Bé, Lokobé, *Hildebrandt 3193* (BM, BREM, G, GOET, K, L, LE, M, P, type); Nossi-Bé, *Homolle 450* (P, WAG).

Note. For affinities see under *D. leucosia* (Spreng.) Engl. (BRETELER, 1979: 59).

***D. vondrozanum* Desc.**

Fig. 20 Map 20

D. vondrozanum Descoings, 1960: 111; 1961: 14; 1973: 511; Breteler, 1973: 102; Punt, 1975: 33.

Type: Madagascar, Vondrozo, *Decary 5430* (holotype: P; isotype: TAN, n.v.).

Diagnostic characters. Lianescent shrub. Branchlets densely rusty pubescent to velutinous. Leaves ovate-elliptic, $4-11 \times 2-5$ cm, rounded to cordate at base, velutinous both sides when young, usually glabrescent above. Inflorescence cymose, shortly stalked, up to ca 15-flowered, appressed-golden-pubescent. Flowers ca 5 mm long. Sepals erect. Petals entire. Pistil 3-merous, 5.5–8 mm long, ovary densely lanate.

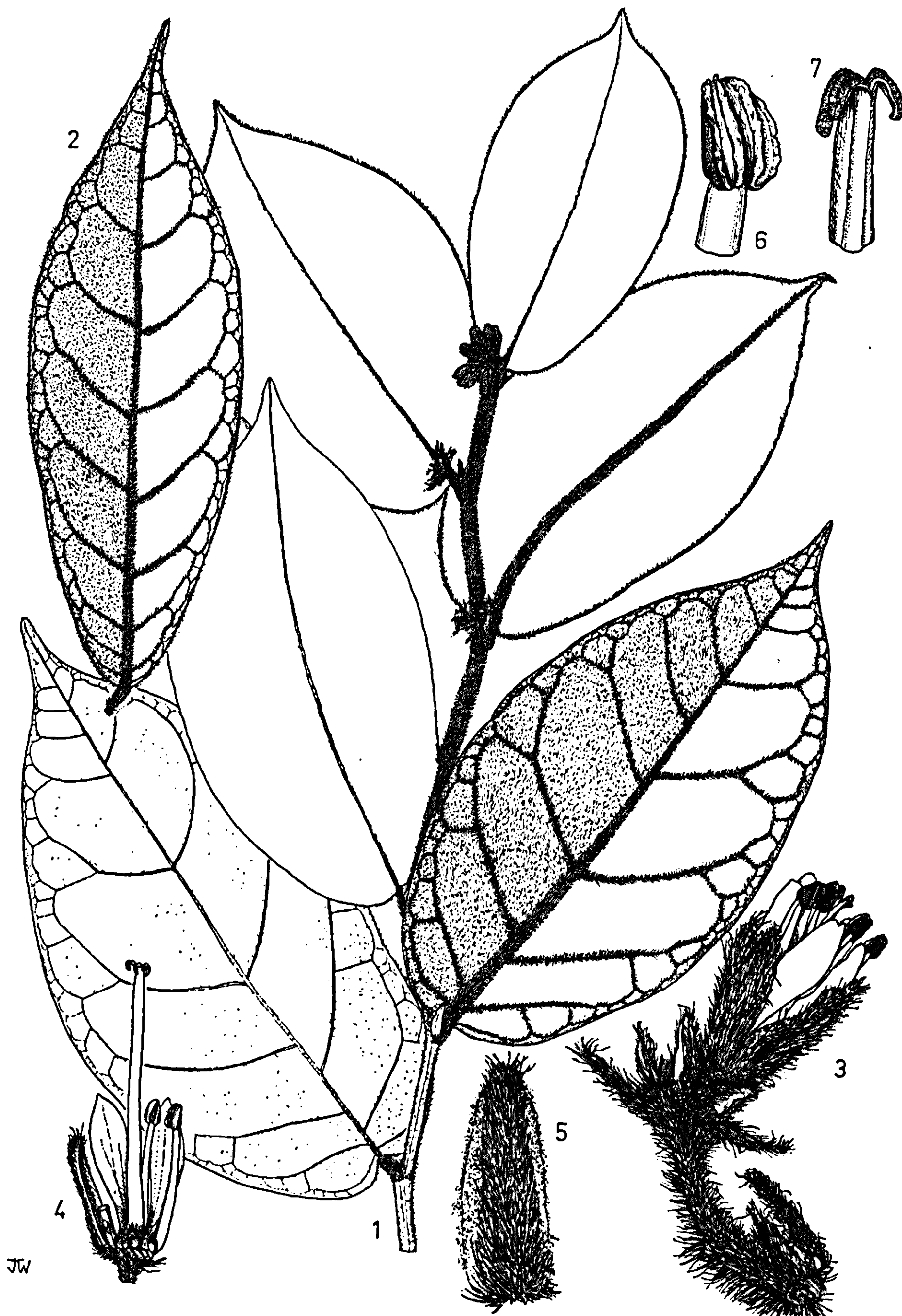
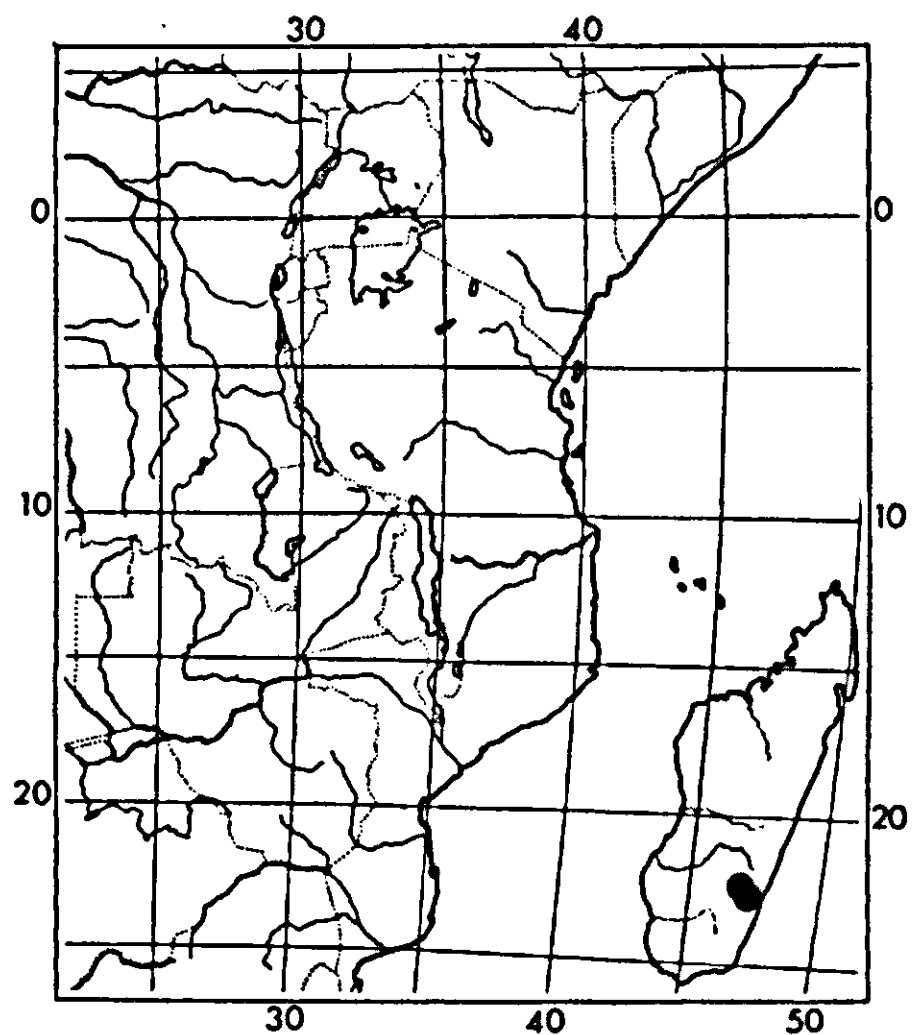


FIG. 20. *D. vondrozanum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. narrow leaf, $\frac{5}{6} \times$; 3. part of inflorescence with one flower, $5 \times$; 4. flower partly, $5 \times$; 5. sepal outside, $10 \times$; 6. anther, $20 \times$; 7. upper part of style, $20 \times$. (1–3. Decary 5540; 4–7. Decary 5430).

Description. Lianescent *shrub*. *Branches* glabrescent. *Branchlets* densely rusty-pubescent to velutinous. *Stipules* triangular, 1–5 mm long, appressedly rusty-pubescent. *Leaves*: petiole subterete, 1–5 mm long, hairy as branchlet; blade ovate-elliptic, 1.5–3 times as long as wide, 4–11 × 2–5 cm, rounded to cordate at base, acuminate, sometimes acute at top; acumen up to 1 cm long; with 5–8 pairs of main lateral nerves, velutinous both sides when young, more sparsely and appressedly so and often soon glabrescent above; glands, if present, beneath only, few, small, near base. *Inflorescence* cymose, stalked, usually rather indistinctly 2–3 times branched, up to ca 15-flowered, appressed-golden-pubescent; peduncle up to 8 mm long, sometimes shortly adnate to petiole; bracts and bracteoles narrowly triangular, 1–3 mm long, subglabrous inside. *Pedicel* up to ca 1 mm long, the upper part up to 0.5 mm long. *Sepals* erect, free or slightly united at base, ovate-elliptic to triangular-oblong, 3–4 × 1–1.5 mm, slightly concave, rounded to acute at top, strigose to appressed-golden-pubescent outside, sparsely appressed-puberulous inside. *Petals* erect, shortly adnate to filaments at base, entire, flat, narrowly obovate, 3.5–4.5 × 1 mm, rounded to obtuse at top, glabrous. *Stamens* erect, 4.5–5 mm long, glabrous; anthers 0.6–1 mm long, connective distinct. *Staminodes* subquadrate to transversely oblong, up to 0.5 × 0.5 mm, glabrous. *Pistil* 3-merous, 5.5–8 mm long; ovary densely lanate, style glabrous with 3, up to 0.5 mm long, spreading or reflexed lobes. *Fruits* unknown.



MAP 20. *D. vondrozanum*

Distribution: S.E. Madagascar.

Ecology: Primary and secondary forest, up to 1000 m altitude.

Specimens examined:

MADAGASCAR. Vondrozo, *Decary* 5430 (P, PRE, type); Ivohibé, *Decary* 5540 (BM, K, P).

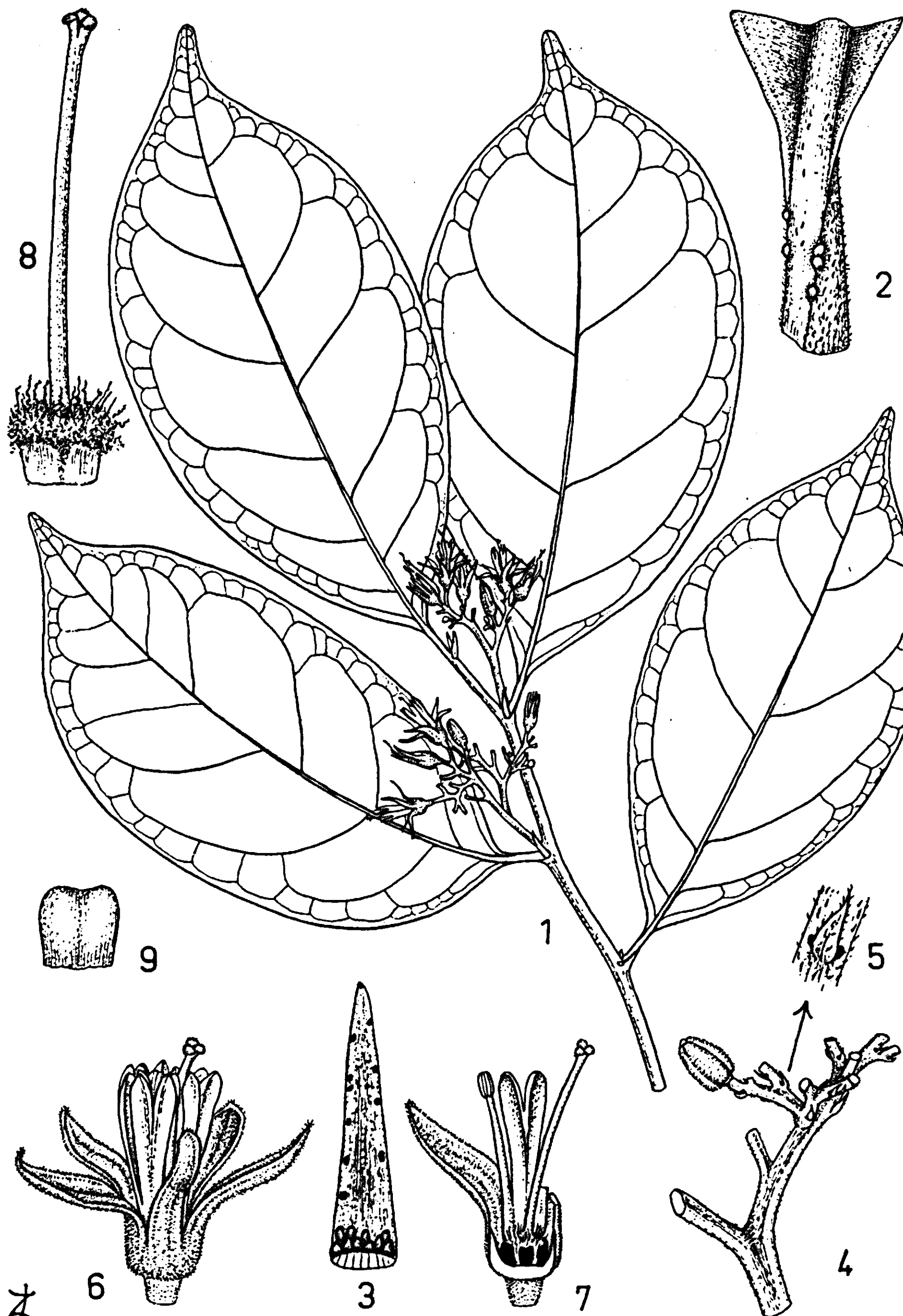


FIG. 21. *D. witianum*: 1. flowering branchlet, $\frac{5}{8} \times$; 2. petiole with pimples, $5 \times$; 3. stipule inside with pimples, $7 \times$; 4. part of inflorescences, $2\frac{1}{2} \times$; 5. bract with pimples, $15 \times$; 6. flower, $5 \times$; 7. flower partly, $5 \times$; 8. pistil, $10 \times$; 9. staminode outside, $20 \times$. (1. J. J. de Wilde 8179; 2-9. Breteler & J. J. de Wilde 774).

D. warneckei Engl. = *D. pallidum* (Oliv.) Engl.

For details see BRETELER, 1981: 65, 74.

D. whitei Torre = *D. heudelotii* (Planch. ex Oliv.) Baill. var. *heudelotii*

For details see BRETELER, 1979: 29.

D. wildemanianum Exell = *D. zenkeri* Engl.

For details see p. 83.

***D. witianum* Bret.**

Fig. 21 Map 21

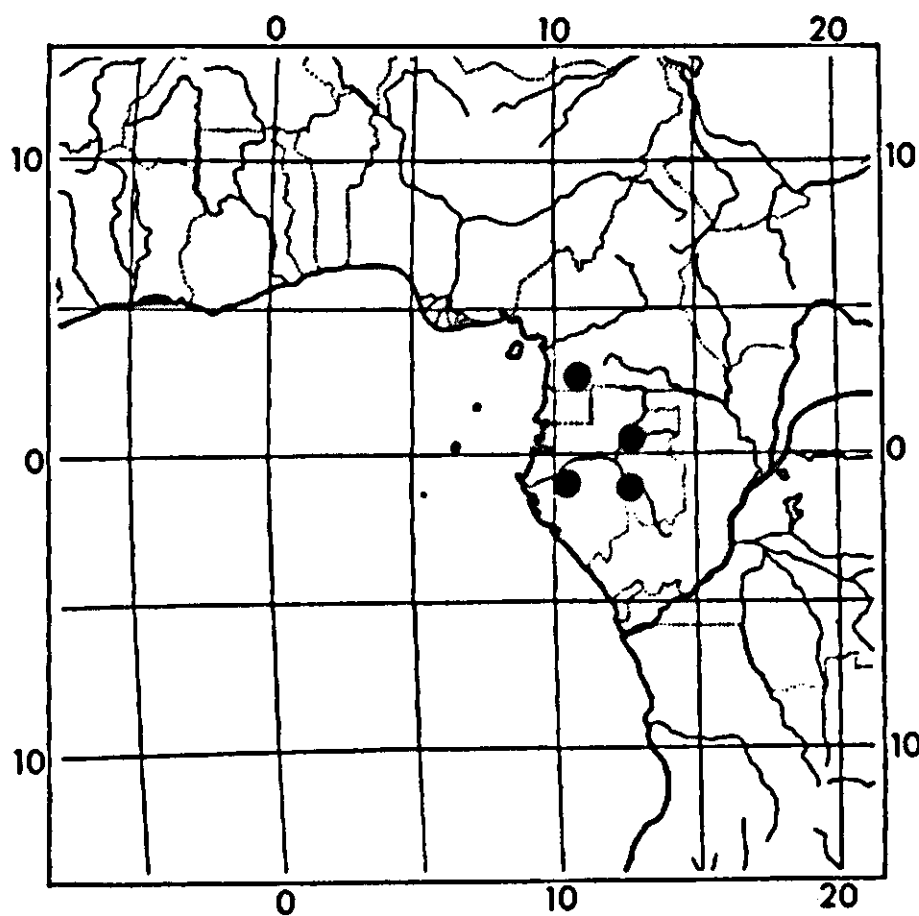
D. witianum Breteler, 1980: 85.

Type: Gabon, km 36 Lastoursville-Moanda, *Breteler & J. J. de Wilde* 774 (holotype: WAG).

Diagnostic characters. Liana. Woodcylinder lobed. Branchlets sparsely puberulous, glabrescent. Stipules soon caducous, narrowly ovate-triangular, 2–5 mm long. Leaves obovate-elliptic (7)9–15(18) × (3)4–7 cm, cuneate at base, acuminate at top, sparsely puberulous on midrib and main lateral nerves, glabrescent. Inflorescence pedunculate, distinctly branched, up to ca 25-flowered, puberulous; bracts and bracteoles minute. Sepals, petals and stamens subequal in length, ca 5–6 mm long. Pistil 3-merous, 6 mm long; ovary lanate, style glabrous. Young fruits densely villous.

Description. *Liana*. Woodcylinder of main stem 5-lobed. Orthotropic shoots with short, hook-like branchlets. *Branches* glabrous or nearly so, usually sparsely lenticellate. *Branchlets* sparsely puberulous, usually soon glabrescent. *Stipules* soon deciduous, narrowly ovate-oblong to narrowly triangular, 2–5 mm long, sparsely puberulous, at base and at margin inside often with some pimples (see fig. 21: 3). *Leaves*: petiole subterete to semiterete, (2)4–6(9) mm long, puberulous, usually with some pimples on the margin of the flat or grooved upper side (see fig. 21: 2); blade obovate-elliptic, 2–2.5(3) times as long as wide, (7)9–15(18) × (3)4–7 cm, cuneate at base the margin decurrent into petiole, acutely to obtusely sometimes caudately acuminate at top, the acumen 0.5–1.5(2) cm long; midrib and the 5–6(8) pairs of main lateral nerves flat or slightly raised above, prominent beneath, sparsely puberulous both sides, glabrescent, more rapidly so above; glands usually present, beneath only, not very distinct, often mainly alongside the midrib towards base and acumen. *Inflorescence* distinctly pedunculate, distinctly 3–5 times branched, up to ca 25-flowered, puberulous;

peduncle (2)5–15 mm long; bracts and bracteoles minute, ovate-triangular, up to 1.5 mm long, very often with two pimples laterally at base (see fig. 21: 5). *Pedicel* up to ca 2 mm long, puberulous, the upper part at most 0.5 mm long. *Sepals* erect to slightly spreading, oblong, 5–6.5 × 1–1.5 mm, tomentellous both sides. *Petals* erect, at base 1.5–2.5 mm united with stamens, oblong in outline, 5–6 × 0.7 mm, up to 1 mm split, glabrous or with a few hairs below split outside, lobes concave. *Stamens* erect, 4–6.5 mm long, glabrous; anthers oblong, 0.5–0.7 mm long, connective distinct. *Staminodes* subquadrate, flat, up to 0.5 × 0.5 mm, glabrous, obtuse to lobulate at top. *Pistil* 3-merous, 6 mm long; ovary lanate; style glabrous, shortly 3-lobed at top. *Fruits* (only young, immature fruits seen) densely villous.



MAP 21. *D. witianum*

Distribution: Cameroun, Gabon.
Ecology: Rain forest.

Specimens examined:

CAMEROUN. Km 21 Ebolowa-Kribi, *J. J. de Wilde* 8179 (WAG).

GABON. 42 km S.E. of Lambaréné, *Breteler* 5712 (WAG); 7 km S.W. of Makokou, *Breteler* 7637 (WAG); km 36 Lastoursville-Moanda, *Breteler & J. J. de Wilde* 774 (WAG, type).

D. zambesianum Torre = *D. barbosae* Torre

For details see BRETELER, 1973: 79.

D. zenkeri Engler, 1896-a: 349; 1896-b: 138; 1912-a: 570; De Wildeman, 1912: 422; Baker f., 1913: 124; Pellegrin, 1913: 647, p.p.: except material from Ivory Coast; De Wildeman, 1919: B 71; Hutchinson & Dalziel, 1928-a: 325; Engler & Krause, 1931: 6; Exell & Mendonça, 1951-b: 330; Keay, 1958: 436; Hauman, 1958-a: 300; Breteler, 1973: 10, 17, 31, 33, XX; Punt, 1975: 42; Breteler, 1978: 76; 1979: 52, 1981: 31, 64, 65.

Type: Cameroun, Yaoundé, *Zenker & Staudt 243* (holotype: B†; lectotype: K; isotypes: BM, BR, BREM, COI, GOET, LE, P, WU, Z).

D. zenkeri Engler var. *strigillosum* De Wildeman, 1911-b: 270; 1912: 422; 1919: B 74. Type: Zaïre, Lukolela, *Pynaert 222* (holotype: BR).

D. zenkeri Engler var. *lokundjensis* Engler, nomen, herbarium *Zenker 466, 4179*.

D. molundense Krause, 1912: 507. See Breteler, 1981: 31 for full details.

D. wildemanianum Exell, 1927: 66; Moss, 1928: 129; Exell & Mendonça, 1951-b: 324. Type: Angola, Golungo Alto, *Gossweiler 4387* (holotype: BM; isotypes: COI, K).

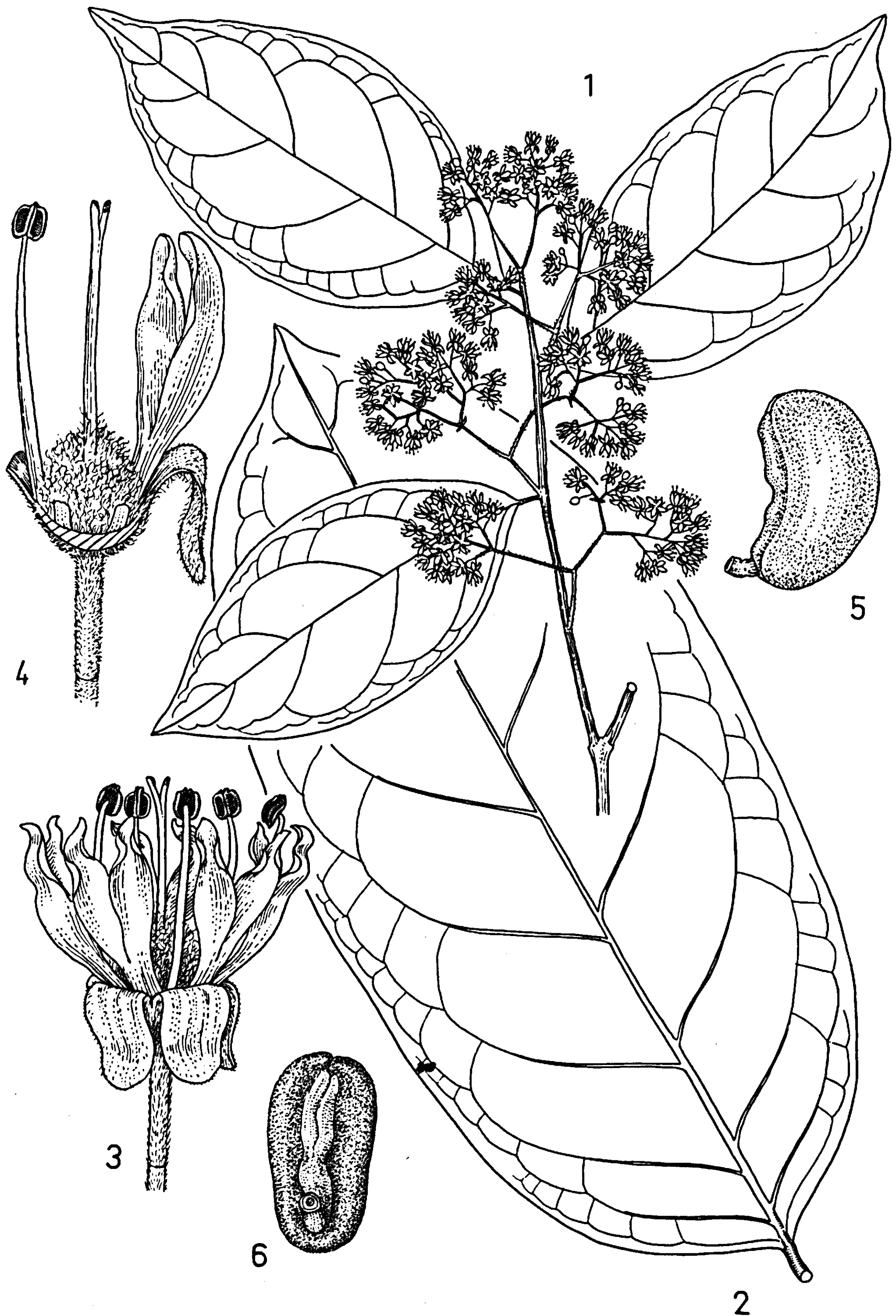
D. keniense Hutch. & Bruce, 1931: 270. See Breteler, 1979: 52 for full details.

D. pallidinervum De Wild., nomen. See Breteler, 1981: 64 for full details.

Pittosporum bicrurium Schinz & Durand, 1896: 65; De Wildeman & Th. Durand, 1898: 45; Engler, 1902: 91; Th. & H. Durand, 1909: 95. Type: Zaïre, Jawubu, *Demeuse 420* (holotype: BR).

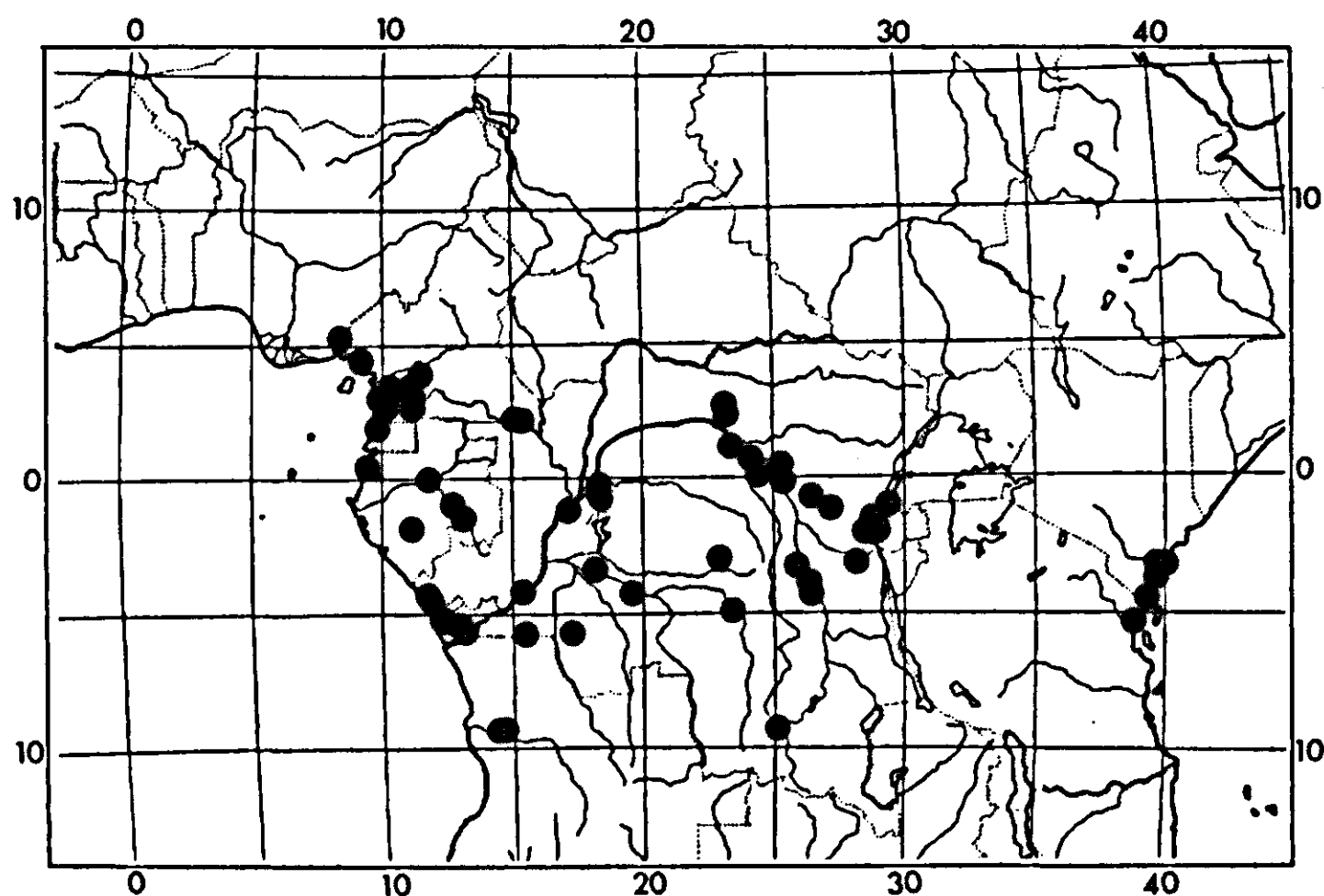
Diagnostic characters. Liana, shrub, sometimes a small tree. Branchlets pubescent-puberulous, soon glabrescent or not. Stipules early caducous. Leaves papery, usually dull beneath, elliptic to obovate, (3)4–15(22) × (1)1.5–5(12) cm, rounded to cuneate at base, acuminate, with (4)5–7(8) pairs of main lateral nerves, usually prominent both sides, glabrous or nearly so. Inflorescences cymose, usually distinctly pedunculate and branched, the first branches mostly as long as or longer than peduncle, few to very many flowered, pubescent-puberulous. Pedicel with distinct upper part. Sepals reflexed. Petals slightly spreading to reflexed, ca halfway split. Stamens often slightly longer than petals. Pistil 2-merous, ovary densely lanate. Fruits 1(–2)-seeded, densely short-hairy.

Description. Small to medium sized *liana*, sometimes a large liana up to 22 cm diam., lianescent shrub, shrub, sometimes a small tree up to 15 m. Stem whitish to pale brown with 5 rows of lenticels lengthwise. Woodcylinder entire (?). *Branches* glabrous or glabrescent, sparsely lenticellate or not, rarely hollow. *Branchlets* appressedly pubescent-puberulous, often densely so, soon glabrescent or not. *Stipules* early caducous, narrowly triangular, 1–3(4) mm long, appressedly pubescent-puberulous. *Leaves*: petiole subterete to semiterete, grooved above or not, 1–6(10) mm long, appressedly pubescent-puberulous, glabrescent or not; blade papery, sometimes coriaceous, drooping or not, usually dull beneath, margin revolute or not, elliptic to obovate, sometimes oblong or



ovate, (1.5)2–3(4) times as long as wide, (3)4–15(22) × (1)1.5–5(12) cm, rounded to cuneate at base, usually gradually acuminate at top, the acumen acute to obtuse, mucronate or not, up to 1.5 cm long; usually subappressed-pubescent on midrib both sides when young, when very young often also sparsely so on margin and the main lateral nerves both sides, early glabrescent or not, with (4)5–7(8) pairs of main lateral nerves, usually prominent both sides, the midrib often more or less impressed or grooved in lower half above, especially so in dry young leaves; glands usually present, beneath only, small, more or less concentrated near base, sometimes also apically. *Inflorescences* axillary or grouped on leafless axillary shoots, cymose, usually distinctly pedunculate, up to ca 4 times distinctly and widely branched (the first branches mostly as long as or longer than the peduncle), few to very many flowered, mostly densely appressedly pubescent-puberulous; peduncle 1–15(30) mm long; bracts and bracteoles narrowly triangular, up to 2 mm long. *Pedicel* slender, up to ca 6 mm long, the upper part (0.5)1–3.5 mm long, subappressed-puberulous. *Sepals* reflexed, free or nearly so, obovate-elliptic to oblong, 1.5–3 × 0.7–1(1.5) mm, appressed-puberulous to tomentellous outside, glabrous or with a few hairs on apical part inside. *Petals* slightly to completely spreading or even reflexed, shortly adnate to filaments at base, obovate in outline, (2)2.5–3(4) mm long, (1)1.5–2 mm split, glabrous or with a very few hairs below split outside; lobes concave often spreading. *Stamens* suberect, often slightly longer than petals, 2.5–3.5(4) mm long, glabrous; anthers 0.3–0.6 mm long, connective distinct. *Staminodes* subquadrate to oblong-ovate, up to ca 0.4 × 0.2 mm, glabrous or with a few hairs apically inside. *Pistil* 2-merous, rarely 3-merous, (2)2.5–3.5(4) mm long; ovary densely lanate; style glabrous or lanate in lower part, 2(3)-lobed apically, the lobes usually not more than 1 mm long, rarely the style completely 2-cleft. *Fruits* 1(–2)-seeded, minutely and usually densely velutinous to tomentellous, orange at maturity, the aborted cell present as a distinct often somewhat bulgy ridge, rarely distinctly beaked; 1-seeded fruits: ellipsoid-ovoid to reniform, 2–4.5 cm long, 1–2.5 cm diam.; exocarp and mesocarp together up to 4 mm thick; endocarp bony to woody, up to ca 1 mm thick, rather smooth to slightly rugose outside, smooth and glabrous inside. *Seeds* ellipsoid, slightly laterally compressed, up to ca 30 × 15 mm; seedcoat black, thin to rather thick, brittle or not, up to 0.5 mm thick. *Seedling* with a firm taproot; epicotyle 6–7 cm long, provided with some bracts, subappressed-pubescent, the first pair of leaves alternate, the first one distinctly smaller and relatively broader than the subsequent ones.

FIG. 22. *D. zenkeri*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. large leaf beneath, $\frac{5}{6} \times$; 3. flower, 10 ×; 4. flower partly, 15 ×; 5–6. 1-seeded fruit, $\frac{5}{6} \times$. (1. Zenker 3710; 2. Le Testu 7615; 3–4. Zenker & Staudt 243; 5–6. Bos 5454).



MAP 22. *D. zenkeri*.

Distribution: eastern Nigeria, Cameroun, Equatorial Guinea, Gabon, Congo, Zaïre, Angola, Kenya, Tanzania.

Ecology: Rain forest, semi-deciduous forest, gallery forest, dry lowland forest, montane forest up to 1500 m altitude.

Specimens examined:

NIGERIA. Calabar, Agoi F.R., *Binuyo FHI 4541* (FHI, K); Oban, *Talbot 1360* (BM, K); 1631 (BM, K, Z); *s.n.* (BM).

CAMEROUN. Kumba, southern Bakundu, *Binuyo & Daramola FHI 35557* (K, WAG); km 50 Kribi-Ebolowa, *Bos & Breteler 3099* (WAG); 15 km N. of Kribi, *Bos 3580* (WAG); 4535 (WAG); 4536 (WAG); 5454 (WAG); 6240 (WAG); 6241 (WAG); 6795 (WAG); km 42 old Yaoundé-Kribi Rd, *Bos 6914* (WAG); 15 km N. of Kribi, *Bos 6943* (WAG); 40 km S. of Kribi, Campo Rd, *Bos & Breteler 7279* (WAG); S. of Ebolowa, 18 km Nkoemvone-Akoakas, *J. J. de Wilde 7983* (WAG); 8128 A (WAG); km 16 Ebolowa-Minkok, *J. J. de Wilde 8215* (WAG); km 30 Ebolowa-Minkok, *J. J. de Wilde 8274* (WAG); 8399 A (WAG); km 16 Ebolowa-Minkok, *J. J. de Wilde 8408* (WAG); km 9 Camp-Kribi, *J. J. de Wilde 8704* (WAG); 40 km W.N.W. of Moloundou, *Letouzey 12136* (P, WAG); 19 km W.S.W. of Song, Mbong, *Lowe 3583* (K); Moloundou area, Dja R., *Mildbraed 3913* (BM, HBG, type of *D. molundense*); between Kribi and Bipindi, *Mildbraed 7559* (K); 6 km N.W. of river junction Boumba-Dja, *Villiers 677* (P); Bipindi, *Zenker 4* (BM); 354 (B, BR, BREM, C, FI, G, LD, U, WAG); 466 (B, BR, BREM, C, FI, G, LD, U, WAG); Yaoundé, *Zenker 659* (BM, COI, K, LE, Z); Bipindi, *Zenker 1933* (B, BM, BP, BR, E, G, GOET, K, L, LE, M, P, W, WU, Z); 2728 (BM, BR, E, G, GOET, K, L, M, P, W, WU, Z); 2901 (BR, E, G, GOET, K, L, M, P, W, WU, Z); 2923 (B, BM, BP, BR, E, G, GOET, K, L, M, P, PRE, W, WU, Z); 2931 (BM, E, G, K, Z); 2932 (BM, BR, E, GOET, HBG, K, W, WU, Z); 3710 (BM, BP, BR, COI, E, GOET, K, L, M, MO, P, PRE, W, WU, Z); 4019 (BM, BR, E, GOET, K, L, LE, MO, W, WU); 4158 (BM, BR, E, GOET, K, L, LE, M, MO, P, PRE, W, WU, Z); 4179 (BM, BP, BR, COI, E, GOET, K, L, LE, M, MO, P, PRE, W, WU, Z); 4344 (B, BM, BR, COI, E, G, GOET, K, L, LE, M, P, W, WU, Z); 4389 (BM, P, L); 4552 (BM, K, LE, WU); 4839 (BP, BR, COI, G, GOET, K, L, LE, M, W, Z); *s.n.* (LD); Yaoundé, *Zenker & Staudt 243* (BM, BR, BREM, COI, GOET, K, LE, P, WU, Z, type).

EQUATORIAL GUINEA. Near Bata, *Dinklage* 1207 (HBG); Nkolentangan, *Tessmann* 236 (K); Bata, *Trilles* 188 (P).

GABON. Km 6 Moanda-Franceville, *Breteler* 6847 (WAG); Sigange, near Libreville, *Breteler* 7661 (WAG); Achouka, *Breteler & J. J. de Wilde* 727 (WAG); near Diobomagola, *Fleury in Chevarlier* 26125 (P, WAG); near Libreville, *Klaine* 2401 (LE); 2473 (BM, K, LE, P); 2934 (BM, K, LE, P, WAG); 3008 (P); 3141 (P); Ighoumbi, *Le Testu* 6379 (BM, P, WAG); Lastoursville region, *Le Testu* 7228 (BM, BR, P, WAG); 7284 (BM, BR, P, WAG); 7412 (BM, BR, P, WAG); 7502 (BM, BR, P, WAG); 7615 (BM, BR, P, WAG); 7686 (BM, BR, P, WAG); 7762 (BM, BR, P, WAG); 8434 (BM, BR, P, WAG); 8493 (BM, BR, P, WAG); 8526 (BM, BR, P, WAG); Bangoussou, *Le Testu* 8712 (BR, P, WAG).

CONGO. Mayombé, Loundji, *Attims* 96 (P); Loango, *Pierlot s.n.* (P); M'Bamoe I, *Sita* 1712 (WAG); 2004 (WAG); 2846 (WAG).

ZAIRE. Kivu, Bulira, *Babault* 24 (P); 43 (P); 134 (P); 150 (P); 202 (P); 213 (P); 216 (P); Kivu, Ruganza, *Babault* 715 (P); Kivu, Bwaki Mt, *Babault* 724 (P); Kivu, Bulira, *Babault* 789 (P); Yangambi, *Bamps* 383 (BR, K); Walikale-Lubutu, *Bequaert* 6699 (BR); Lubutu, *Bequaert* 6769 (BR); Kisangani, *Bequaert* 6949 (BR, WAG); 7065 (BR); sin. loc., *Bequaert* 7120 (BR); Maniema, *Berger s.n.* (BR); 10 km E. of Kisangani, *Bokdam* 3090 (WAG); 3092 (WAG); Yangambi, *Bolema* 1196 (BR, P); Imbela, *Callens* 4226 (BR); Bikoro, *Cheuvard* 47 (BR); Lusambo, *Claessens* 191 (BR); Ponthier-ville, *Claessens* 475 (BR); Basoko, *Claessens* 683 (BR); Bikoro, *Claessens* 693 (BR); Matadi, *Dacremont* 299 (BR, L, W); Yawubu, *Demeuse* 420 (BR, type of *Pittosporum bicrurium*); Luki, *Donis* 2011 (BR, PRE, WAG); Yangambi, *Donis* 3538 (BR); Kindu, *Gaillez* 28 (BR); km 37 Elundu-Kindu, *Gaillez-Mahin* 103 (BR); Yangambi, *Germain* 32 (BR); 369 (BR); 371 (BR, K); Kipaka-Lutshi, *Germain* 7727 (BR); sin. loc., *Goossens* 1685 (BR); Lula near Kisangani, *Goossens* 3001 (BR); Turole, *Gutzwiller* 2151 (BR); 2460 (BR, K, P); Makaw, *Jans* 966 (BR); Wangata, *Lebrun* 918 (BR); Wendji, *Lebrun* 1262 (BR, K, WAG); Wangata, *Lebrun* 1266 (BM, BR, C, LISC, LISU, M, P, SRGH); between Walikale and Kalehe, *Lebrun* 5306 (BR); Urega, *Lebrun* 5773 (BR, LISC); Lumuna, *Lebrun* 5911 (BR); Mandungu, *Lemaire* 440 (BR, P); Kalehe, *A. Léonard* 2925 (BR, WAG); Bunyakiri, *A. Léonard* 3470 (BR, K, M); Shaminunu, *A. Léonard* 3618 (BR, WAG); Kitole, *A. Léonard* 3961 (BR, WAG); Buziba, *A. Léonard* 4932 (BR); Mvenga, *A. Léonard* 4950 (BR, WAG); near Kisangani, *Lisowski* 16711 (BR, K); 40474 (BR); 40553 (BR); 10 km N.E. Kisangani, *Lisowski* 40604 (BR); 40 km N. of Kisangani, *Lisowski* 41980 (BR, K); near Kisangani, *Lisowski* 45134 (BR); 45322 (K); 45905 (BR); 47824 (BR); 47883 (BR, K); 20 km E. of Ubundi, *Lisowski* 48027 (BR); Ubundi, *Lisowski* 48090 (BR); Yangambi, *Louis* 1220 (BR, COI, LISU); 7228 (BR, EA, Z); 10542 (BR, COI, FI, U); 11386 (BM, BR, C, K, L, LD, P, WAG); 11510 (BR, EA, FI, LD, LISU, Z); 11802 (BR); 12460 (BR, LISC, M, SRGH, W); 13006 (BR); 13186 (BR); 14730 (BR); 15174 (BR, UPS); Shabunda, *Paquay* 12 (BR); Mingazi, *Pierlot* 849 (BR); km 57 Kavumu-Bunyakiri, *Pierlot* 2378 (BR); near Bunyakiri, *Pierlot* 2885 (BR, K, P); Kishara, *Pierlot* 3039 (BR, K); Lukolela, *Pynaert* 222 (BR, type of *D. zenkeri* var. *strigillosum*); Mandungu, *Reygaert* 660 (BR); Mobwasa, *Reygaert* 1162 (BR); 1163 (BR); Sankuru, *Sapin s.n.* (BR); Mampaka, *Seret* 1061 (BR); Tumba lake, *Thonet* 47 (BR); 251 (BR); km 110 Kavumu-Walikale, *Troupin* 3372 (BR, K, L); 6296 (BR); Ipamu, *Vanderyst* 10899 (BR); Kimpasa, *Vanderyst s.n.* (BR); Temvo, *Vermoesen* 1745 (BR, P); Yaleko, *Vos* 128 (BR).

ANGOLA. Near Golungo Alto, *Gossweiler* 4387 (BM, COI, K, type of *D. wildemanianum*); Landana-Cacongo, *Gossweiler* 6076 (BM, COI, K, LISJC, LISU); 8104 (BM, COI, K, LISJC, LISU); between Monte Belo and Queta, *Gossweiler s.n.* (BM).

KENYA. Near Kilifi, *Dale* 3862 (B, BR, EA, K, P); Kwale dist., *Gillett* 21070 (BR, K); Mowesa, *Graham* 1740 (EA, G); Arabuko, *Graham* 1855 (EA, G, K); 2132 (BM, EA, G, K, MO, PRE, type of *D. keniense*); 2152 (EA, G); 2312 (EA, G, K); Sokoke forest, *Greenway* 9812 (EA, FI, K, PRE); S.E. foot slopes of Mrima Hill, *Greenway E.A.H.* 12209 (EA); Arabuko-Sokoke forest, *Musyoki & Hansen* 1000 (K, WAG); Malindi dist., *Rawlins* 745 (EA, K); Kilifi dist., south road to Ganze, *Reitsma & J. J. de Wilde* 196 (WAG).

TANZANIA. Turiani, *Milne-Redhead & Taylor* 7408 (K).

Cult. THE NETHERLANDS. Wageningen, *Breteler* 7013 (WAG); 7522 (WAG).

Notes. Although it occupies a large area, *D. zenkeri* is a rather constant

species which can easily be distinguished by its reflexed sepals and 2-merous pistil. The material from East Africa may differ somewhat by its usually smaller leaves and fewer-flowered inflorescences.

The type of *D. zenkeri* var. *strigillosum* shows some sparse, long and stiff hairs on its branchlets and leaves. This very slightly aberrant indumentum is also observed in other specimens of *D. zenkeri*, but it is not sufficient for formal infraspecific distinction. Therefore HAUMAN (1958-a) is followed in not maintaining it as a distinct variety.

There is no certainty about the date of publication of the protologue of *Pittosporum bicrurium*. According to M. TOURNAY, the former librarian at Brussels, the first reprint was received there in November 1896, well after ENGLER's valid publication of *D. zenkeri* in July 1896. As it is not likely that *Pittosporum bicrurium* has been published before ENGLER's *D. zenkeri*, I have maintained the latter as the oldest valid name for this taxon.

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