Revision of Dorstenia sect. Nothodorstenia (Moraceae)

C. C. Berg

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The African genus *Craterogyne* Lanjouw has to be united with *Dorstenia* L. Most species of *Craterogyne* can be included in *Dorstenia* sect. *Nothodorstenia* Engl. A revision of this section is presented. 5 species have been accepted, viz. *D. elliptica* Bureau, *D. djettii* J. L. Guillaumet, *D. oligogyna* (Pellegrin) C. C. Berg, *D. africana* (Baillon) C. C. Berg and *D. kameruniana* Engler.

C. C. Berg, Institute for Systematic Botany, State University of Utrecht, Trans. II, Heidelberglaan 2, Utrecht, Netherlands.

In 1875 Baillon described *Trymatococcus africanus* as the second species of a genus established by Poeppig & Endlicher (1838) for material collected in Peru. A few more African species were described in *Trymatococcus* by Engler (1898, 1902), De Wildeman (1903–1906) and Pellegrin (1929). In 1935 Lanjouw set the African *Trymatococcus* species apart in a new genus *Craterogyne*, in which he recognized 4 species. Hallé & Aké Assi (1967) added a fifth species by transferring *Dorstenia djettii* Guillaumet (1965), placed by the author near *Dorstenia elliptica*, the only species classified under *Dorstenia* sect. *Nothodorstenia* Engler.

In a study of African Moraceae (Berg 1977) it proved impossible to maintain *Craterogyne* as a distinct genus. The species of *Craterogyne* should be placed in *Dorstenia* sect. *Nothodorstenia*, with the exception of *C. dorstenioides* (Engl.) Lanjouw which belongs to another group of *Dorstenia* species (cf. Berg & Hijman 1977).

Material from the following herbaria was used: ABI, B, BM, BR, COI, E, FHI, FHO, G, HBG, K, L, LISC, LISU, P, S, U, UPS and WAG.

The collections on which the present study is based are included in an Index of exsiccatae also comprising the collections examined during revisional work of other African Moraceae (Berg 1977). Requests for the index can be sent to the author.

Habit

Most herbaceous to suffrutescent *Dorstenia* species inhabiting the forest floor have creeping rhizomes from which erect or ascending, mostly unbranched twigs with spirally arranged leaves arise. *D. elliptica*, the smallest and the least woody of the five species of sect. *Nothodorstenia* fully matches this habit. The other four species form branched or unbranched shrubs and possibly have rhizomes only when young. *D. africana* and *D. kameruniana* form shrubs with sympodial growth. The medium-sized leaves are arranged in spirals on vertical parts and in two rows on horizontal parts of the stem and on the plagiotropic branches (cf. Hallé & Oldeman 1970). This habit is also found in *D. turbinata* Engl. and allied frutescent species (cf. Berg & Hijman 1977). *D. djettii* and *D. oligogyna* have unbranched stems (in *D. oligogyna* up to 2.5 m tall) bearing relatively large leaves (in *D. oligogyna* up to 50 cm long) in spirals. Because of its manifest monocaul habit *D. oligogyna* can be ranked among the type of rosette trees occurring in the lower stories of rain forests.

Inflorescence

The inflorescences are borne in the axils of the leaves on short-shoots bearing stipules modified

into scales, and forming successively or almost simultaneously several inflorescences. The inflorescences bear bracts which in texture and shape are reminiscent of the stipules. These bracts occur in 2–3 rows on the margin of the receptacle, but occur in *D. elliptica*, *D. djettii* and *D. oligogyna* also lower on the receptacle even onto the peduncle. *D. djettii* is exceptional in *Dorstenia* because of the presence of interfloral peltate bracts. These bracts are caducous and can only be found in young inflorescences.

The inflorescences are bisexual; they have a single pistillate flower in *D. africana*, *D. kameruniana* and *D. oligogyna*, mostly more than one in *D. djettii*, and always several in *D. elliptica*.

The greater part of the perianth of the pistillate flower is fused with the surrounding tissue which probably consists of fused pedicels of the staminate flowers. As in many *Dorstenia* species of other sections the perianths bear swollen, papilla-like hairs. Such hairs do not occur in *D. djettii*. The stamens are inflexed in the bud. At anthesis, they remain inflexed or straighten gradually. The filaments are short and often basally swollen. *D. djettii* have relatively long and slender filaments.

Fruit

The fruit is more or less distinctly stipitate and has a white fleshy dehiscent exocarp which pushes outward the endocarp body by tearing the upper surface of the infructescence.

The endocarp body is not ejected as in microspermous *Dorstenia* species. In these species the endocarp is often tuberculate. It is smooth in the species with larger seeds. In the microspermous *Dorstenia* species there is usually endosperm and a simple embryo with flat cotyledons and a long radicle. In the large-seeded species of sect. *Nothodorstenia*, endosperm is lacking and the embryo has thick cotyledons unequal in size, and a short radicle. *D. elliptica* with its relatively small seeds is transitional to the microspermous species because of the rather thin cotyledons, the rather long radicle, and the presence of remnants of endosperm.

Distribution

The species of sect. *Nothodorstenia* are components of the undergrowth of forests. *D. africana*, *D. elliptica* and *D. oligogyna* are confined to the area of rain forests ranging from SE Nigeria to the Lower Congo River (Fig. 1 A–C), in which area most of the rain forest species of *Dorstenia* occur (cf. Berg & Hijman 1977). *D. djettii* is a rather rare species in rain forest areas in West Africa (Fig. 1 A). *D. kameruniana* is the only species of the section which also occurs in drier types of forest. As in many Moraceae adapted to drier conditions, the area of *D. kameruniana* is much more extensive than those of the rain forest species (Fig. 1 D; cf. Berg 1977).

Systematic position and relationships

Engler's (1898) main reason for distinguishing section *Nothodorstenia* was the presence of bracts not only on the margin but also lower on the receptacle of the inflorescences of *D. frutescens* (=*D. elliptica*), the only species classified under that section since.

This arrangement, and the more advanced situation in which the bracts are placed in several rows on the margin of the receptacle only, is one of the characters uniting the five species here included in sect. *Nothodorstenia*. Not only the arrangement, but also the shape, texture, and venation of the bracts, which still resemble the stipules in these features, are differentiating characters. The predominantly woody habit and the presence of relatively large seeds and the small number of pistillate flowers in the inflorescence are shared with a small group of African *Dorstenia* species comprising, e.g., *D. turbinata* Engl., *D. scaphigera* Bur. and *D. dorstenioides* (Engl.) M. Hijman & C. C. Berg (=*Craterogyne dorstenioides*). In this group, however, the margin of the receptacle bears a single row of appendages which are not reminiscent of stipules.

D. djettii is the least advanced species in the section. *D. oligogyna* is very closely related to *D. djettii*. Without inflorescences one cannot even tell them apart. *D. elliptica* is less closely, yet distinctly related to *D. djettii* (cf. Guillaumet 1965). *D. africana* and *D. kameruniana* can be regarded as the most advanced species in the section.

The presence of interfloral bracts, and, to a lesser degree, the absence of papilla-like hairs on the perianth, and the relatively long stamens

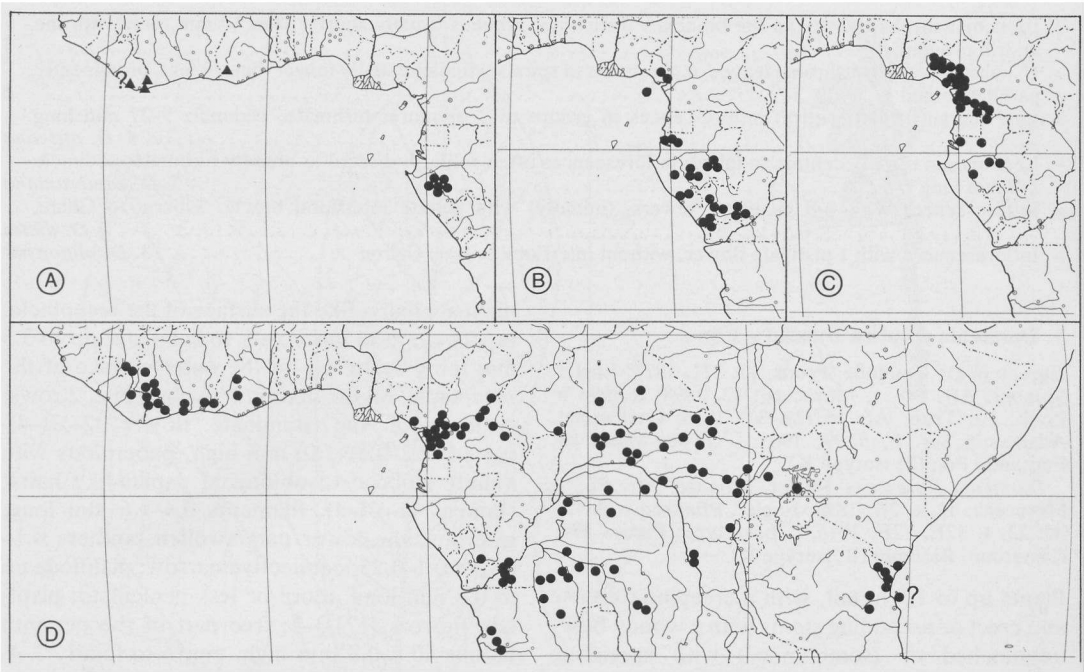


Fig. 1. Distribution of the species of *Dorstenia* sect. *Nothodorstenia*. – A: ▲ *D. djettii*, ● *D. oligogyna*. – B: *D elliptica*. – C: *D. africana*. – D: *D. kameruniana*.

set *D. djettii* apart in the genus, and, moreover, link *Dorstenia* with other genera of the Dorstenieae sensu Berg (1973). Sect. *Nothodorstenia* appears to contain the morphologically least advanced species of *Dorstenia*.

Dorstenia L. sect. **Nothodorstenia** Engler

Engler, Monogr. Afr. Pfl. 1, Moraceae: 7, 10, 1898; Rendle in Prain, Fl. Trop. Afr. 6 (2): 25, 1916. – Type species: *Dorstenia frutescens* Engler (=*Dorstenia elliptica* Bureau).

Craterogyne Lanjouw, Rec. Trav. Bot. Néerl. 32: 272, 1935. – Type species: *Craterogyne africana* (Baillon) Lanjouw (=*Dorstenia africana* (Baillon) C. C. Berg).

Shrubs or undershrubs with branched or unbranched stems. Leaves in spirals or distichous on branches, pinnately veined; stipules free, semi-amplexicaul or lateral. Inflorescences often in groups on short-shoots in the axils of the leaves, bisexual, rarely only staminate, turbinate to (convexly) discoid, pedunculate; short bracts in 2–3 rows on the margin of the receptacle, sometimes also lower onto the peduncle; staminate flowers numerous; perianth 2–3(–4)-parted, mostly bearing papilla-like hairs; stamens 2–3(–4), inflexed in the bud, at anthesis still more or less bent or curved; anthers latrorse, connective broad to narrow; pistillode lacking or minute; pistillate flowers embedded in the receptacle, solitary in the centre of the receptacle or up to 8; the upper free part of the perianth 2–3-lobed, mostly bearing papilla-like hairs; ovary free, style bifid; in fruit the receptacle enlarged, usually green; exocarp white, fleshy, dehiscent, pushing upward the endocarp body, endocarp body 4–10 mm in diameter, smooth; testa with a thickened vascularized part below the hilum, endosperm mostly absent, cotyledons thick, free, unequal or equal.

Key to the species of Dorstenia sect. Nothodorstenia

1. Stipules subulate, lateral ..... 1. *D. elliptica*
– Stipules with a broad base, semi-amplexicaul 2

2. Branched shrubs; leaves on the branches distichous; stipules usually shorter than 10 mm, only with the midrib prominent 3
– Usually unbranched shrubs; leaves on the stems in spirals; stipules usually longer than 10 mm, prominently parallel-veined 4
3. Leaf margin usually entire; inflorescences in groups of 2 or more, turbinate; peduncle 5–27 mm long ..... 4. *D. africana*
– Leaf margin usually dentate to lobed; inflorescences often solitary, discoid to broadly turbinate; peduncle 2–9 mm long ..... 5. *D. kameruniana*
4. Inflorescences with 1–8 pistillate flowers, (initially) with peltate interfloral bracts; Liberia to Ghana ..... 2. *D. djettii*
– Inflorescences with 1 pistillate flower, without interfloral bracts; Gabon ..... 3. *D. oligogyna*

1. **Dorstenia elliptica** Bureau – Fig. 2

Bureau in De Candolle, Prodr. 17: 271, 1873; Engler, Monogr. Afr. Pfl. 1, Moraceae: 12, 1898; Rendle in Prain, Fl. Trop. Afr. 6 (2): 31, 1916; Guillaumet, Adansonia Ser. 2, 5: 99, 1965. – Type: Mann 64, Fernando Póo (P; isotype K).

Dorstenia frutescens Engler, Monogr. Afr. Pfl. 1, Moraceae: 12, t. 2B, 1898; Engler, Pflanzenw. Afr. 3 (1): 23, t. 12E, 12F, 1915. – Lectotype: Preuss 384, Cameroun, Barombi (B; isotype K).

Plants up to 1.5 m tall, with a creeping rhizome and erect or ascending stems with a woody base, unbranched or (sometimes?) with spreading branches. Leafy twigs 1.5–4 mm thick, sparsely to rather densely puberulous, partly with uncinate hairs.

Leaves (at least on the stem) in spirals, (elliptic to) oblong to lanceolate, mostly tending to obovate or oblanceolate, (3–)7–28 cm long, (1–)2.5–9 cm broad, chartaceous, acuminate or sometimes tending to obtuse or acute, at the base attenuate to acute; margin entire to faintly repand or faintly dentate, on both sides almost glabrous or, especially at the base, sparsely puberulous with uncinate hairs, glabrescent; (6–)10–16(–19) pairs of secondary veins, without parallel tertiary veins; petioles (2–)5–12(–20) mm long, puberulous with uncinate hairs; stipules subulate, 3–17 mm long, sparsely puberulous with straight hairs to almost glabrous, subpersistent.

Inflorescences one, two, or occasionally a few simultaneously in the leaf axils, broadly turbinate to discoid, 5–11 mm in diameter, usually brownish to purplish; peduncle 4–6 (in fruit up to 10) mm long, puberulous, partly with uncinate hairs, like the surface of the receptacle; bracts ovate to lanceolate to subulate, up to 3.5 mm long, scattered on the outer surface of the receptacle, on the margin crowded, in c. 2 rows; perianth of the staminate flower (2–)3(–4)-parted, 0.2–0.8(–1.0) mm high, puberulous with minute globose to oblongoid papilla-like hairs; stamens (2–)3(–4), filaments 0.4–1.6 mm long, glabrous, the lower part swollen, anthers 0.1–0.25 × 0.1–0.25, connective narrow; pistillode up to 0.8 mm long, more or less penicillate; pistillate flowers (1?–)3–7; free part of the perianth tubular, 0.4–0.8 mm high, entire to faintly 3–4-lobed, puberulous with minute globose to oblongoid papilla-like hairs; style c. 1.5 mm long, stigmas 0.2–1.0 mm long.

Infructescences broadly turbinate to convexly discoid, 1–2 cm in diameter; fruit ellipsoid, c. 8 × 6 mm; endocarp body subglobose, c. 4–5 × 5–6 mm, endocarp crustaceous (to coriaceous?); seed c. 5 × 4 mm, testa with a thickened but not distinctly vascularized part below the hilum; embryo with rather thin, folded, unequal cotyledons, the inner one almost completely enclosed by the outer one, radicle rather long, curved, remnants of endosperm in the median split of the embryo.

Distribution (Fig. 1 B). From western Cameroun to Angola-Cabinda, and in Fernando Póo; in the undergrowth of rain forests, usually in moist places, often along streams, locally frequent. About 65 collections have been examined.

Flowering probably throughout the year, possibly mainly from September to April. Fructification normal.

Fig. 2. *Dorstenia elliptica*. – A: Leafy stem with rhizome (Le Testu 7490). – B: Leafy stem with inflorescences (Le Testu 1359). – C: Infructescences (Onochie 9301). – D: Pistillate and staminate flower. – E: Stamens and pistillode (Le Testu 1359). – F: Staminate flower (Le Testu 7511). – G: Staminate flower. – H: Stamens and pistillode. – I: Swollen hairs of the tepals. – J: Fruit. – K: Seed. – L, M: Embryo (Daramola 29834).


5 cm
C
B
1 cm
1mm
K
L
1mm
M
I
0,05 mm
A
2 mm
J
D
1mm
E
F
1mm
G
H

The staminate flowers have somewhat longer perianths and filaments in specimens from Gabon than in specimens from Cameroun.

2. **Dorstenia djettii** J. L. Guillaumet – Fig. 3

J. L. Guillaumet, Adansonia Ser. 2, 5: 99, t. 1, 1965. – *Craterogyne djettii* (J. L. Guillaumet) N. Hallé & Aké Assi, Adansonia Ser. 2, 7: 390, 1967. – Type: Guillaumet 744, Ivory Coast, near Tabou (P; isotype ABI).

Plants up to 1 m tall, with unbranched stems with a woody base. Leafy twigs 2–5 mm thick, almost glabrous, periderm peeling off in ribbon-shaped flakes.

Leaves (at least on the stems) in spirals, tending to obovate, oblanceolate or to sub-pandurate, 14–26 cm long, 4–8 cm broad, chartaceous to subcoriaceous, acuminate or subacute, at the base truncate, obtuse, acute, or attenuate; margin entire or subentire; on both sides glabrous or with sparse, partly uncinate hairs, glabrescent; 14–12 pairs of secondary veins, without distinct parallel tertiary veins; petioles 4–8 mm long, more or less thickened at the base, sparsely puberulous with partly uncinate hairs; stipules semi-amplexicaul, ovate to lanceolate, 10–16 mm long, coriaceous, apiculate to subaristate, with conspicuous parallel veins, almost glabrous, always ciliolate, subpersistent.

Inflorescences (always?) solitary, broadly turbinate to discoid, c. 1–1.5 cm in diameter; peduncle c. 1 cm (?) long, like the outer surface of the receptacle appressed-puberulous to almost glabrous; bracts appressed-puberulous to almost glabrous, with conspicuous veins, those scattered from the base of the peduncle towards the margin of the receptacle about ovate, those on the margin reniform to subrotundate to oblong, obtuse, up to 3 mm long, and in c. 3 rows; among the flowers peltate to subpeltate bracts up to 1 mm high and up to 1 mm in diameter, at first completely covering the young flowers, caducous; perianth of the staminate flowers c. 1 mm high, 2-parted, segments cucullate, puberulous, at the base with up to 0.5 mm long hairs; stamens 2, filaments 1.5–1.8 mm long, glabrous, at the base somewhat swollen but never cushion-shaped, the upper part more or less tortuous or incurved; anthers 0.15–0.3 × 0.15–0.3 mm, connective rather small; pistillate flowers 1–3 (or more?).

Infructescences broadly turbinate, c. 1–2 cm in diameter; endocarp body subglobose, c. 8–10 mm in diameter, endocarp subcoriaceous; seeds subglobose, c. 7–9 mm in diameter, testa partly with a brown to purple network, below the hilum an ovate, thickened, vascularized part; cotyledons thick, equal, free, radicle apical, very short.

Distribution (Fig. 1 A). The species is known from SE Liberia (Sinoe Coast), Western Ivory Coast (in the region of the Lower Cavally River, from Tabou to Fété), and from Ghana (Ankasa Forest Reserve), in damp places in rain forests.

Collections examined: Liberia: Sinoe Coast, Kulo (Baldwin 11441) – Ivory Coast: near the Néka River, E of Néka, c. 80 km N of Tabou (Debray s.n.); between Fété and the Cavally River (Guillaumet 847); near Pata-Idié, E of Tabou (Guillaumet 744, 1811; Tehe 401) – Ghana: Ankasa Forest Reserve (Hall & Enti 36266; Vigne 3186).

Collections with flowers have been made from November to March.

In the inflorescences examined only 1–3 pistillate flowers were found. According to Guillaumet (1965) the inflorescences may contain up to 8 pistillate flowers.

3. **Dorstenia oligogyna** (Pellegrin) C. C. Berg – Fig. 4

C. C. Berg, Adansonia Ser. 2, 16: 422, 1977. – *Trymatococcus oligogyna* Pellegrin, Bull. Mus. Hist. Nat. Paris Ser. 2, 1: 62, 1929. – *Craterogyne oligogyna* (Pellegrin) Lanjouw, Rec. Trav. Bot. Néerl. 32: 277, t. 10, 1935. – Lectotype: Le Testu 2234, Gabon, near Sindara (P; isotypes B, BM, K).

Plants up to 2.5 m tall, with erect, mostly unbranched stems with a woody base. Leafy twigs 3–10 mm thick, sparsely puberulous with straight hairs to almost glabrous.

Leaves (at least on the stem) in spirals, tending to oblanceolate to obovate or sometimes to pandurate, 14–50 cm long, 4–16 cm broad, chartaceous to subcoriaceous, acuminate to

Fig. 3. *Dorstenia djettii*. – A: Leafy part of the stem with infructescence. – B: Stipule (Hall & Enti 36266). – C: Staminate flower and bracts. – D: Staminate flower and stamen (Baldwin 11441). – E: Fruit. – F: Seed. – G: Embryo (Hall & Enti 36266).


1cm
A
C
1mm
B
2cm
D
1mm
E
5mm
G
5mm
F

subacute, at the base truncate, obtuse, acute or attenuate; margin entire or subentire; on both sides (almost) glabrous or often at first with sparse, partly uncinate hairs on the costa beneath; (12–)14–22 pairs of secondary veins, without distinct parallel tertiary veins; petioles 3–14 mm long, sparsely puberulous to almost glabrous, more or less thickened at the base; stipules semi-amplexicaul, lanceolate to ovate, 8–17 mm long, coriaceous, sometimes shortly apiculate, minutely puberulous to almost glabrous, with conspicuous parallel veins, subpersistent.

Inflorescences one, two, or a few simultaneously in the leaf axils, narrowly to broadly turbinate to almost discoid, 4–8 mm in diameter; peduncle 4–10 mm long, peduncle and outer surface of the receptacle sparsely puberulous; bracts ovate to reniform, almost glabrous but always ciliolate, sometimes with some distinct veins, scattered from the base of the peduncle to the margin of the receptacle, there in c. 2 rows; perianth of the staminate flower 0.5–0.7 mm high, 2–3(–4)-parted, puberulous, in the upper part with clavate or oblongoid to globose minute papilla-like hairs; stamens 1–3, mostly 2, filaments 0.7–1.0 mm long, at the base strongly swollen and mostly more or less cushion-shaped, glabrous or nearly so, their upper parts usually incurved, anthers 0.2–0.3 × 0.2–0.3 mm, connective usually broad and more or less swollen; pistillate flowers solitary, the free part of the perianth 0.6–0.8 mm high, 4-lobed, puberulous; style c. 1 mm long, stigmas 0.5–1.5 mm long.

Infructescences c. 1 cm in diameter, broadly turbinate to subglobose.

Distribution (Fig. 1 A). The species has only been collected in the region of the Ngounyé River in Gabon. 8 collections have been examined.

Collections with flowers have been made in September, October and November.

4. Dorstenia africana (Baillon) C. C. Berg – Fig. 5

C. C. Berg, Adansonia Ser. 2, 16: 422, 1977. – *Trymatococcus africanus* Baillon, Adansonia 11: 300, 1875; Engler, Monogr. Afr. Pfl. 1, Moraceae: 28, t. 11A, 1898. – *Craterogyne africana* (Baillon) Lanjouw, Rec. Trav. Bot. Néerl. 32: 273, t. 6, 1935. – Type: Mann 723, Cameroun, near Douala ("Cameroons River") (K).

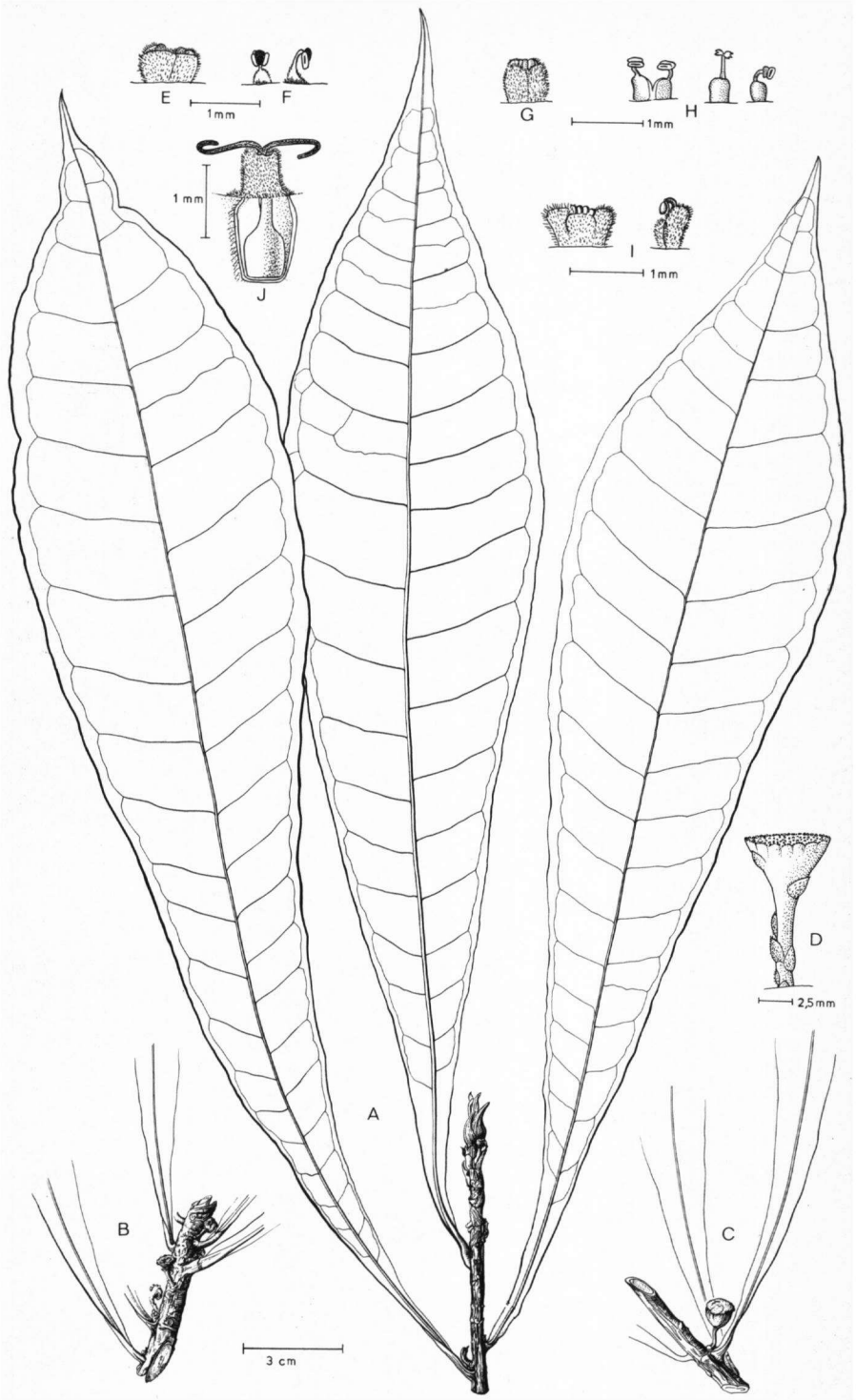
Trymatococcus conrauanus Engler, Bot. Jahrb. Syst. 33: 117, 1902; Lanjouw, Rec. Trav. Bot. Néerl. 32: 273, 1935. – Type: Conrau 130, Cameroun, near Tinto (B).

Shrubs up to 2.5 m tall, with spreading or arching branches, leafy twigs 0.5–3 mm thick, puberulous with very short patent hairs and longer retrorse and usually appressed uncinate hairs.

Leaves (at least on the branches) distichous, oblong to lanceolate, (3–)7–25 cm long, (1.5–)2.5–11 cm broad, chartaceous, acuminate to subcaudate, at the base obtuse to subacute, sometimes subtruncate to emarginate; margin entire, sometimes subentire to faintly dentate; on both sides sparsely puberulous, usually with appressed and retrorse uncinate hairs, glabrescent; (6–)8–14 pairs of secondary veins arching rather far from the margin, without or with a few parallel tertiary veins; petioles 2–6 mm long, 1–1.5 mm thick; stipules caducous or subpersistent, 3–8 mm long, semi-amplexicaul, sparsely puberulous, costa rather prominent.

Inflorescences (sometimes only with staminate flowers) mostly 2 or more simultaneously in the leaf axils, pendulous, turbinate, 3–7 mm in diameter, mostly bright yellow, hardly to rather distinctly lobed, bearing c. 10–25 reniform to ovate, up to 0.6 mm long bracts in two rows on the margin of the receptacle; peduncle 5–27 mm long, often with a single bract on its lower part or on its base, like the receptacle usually with appressed and retrorse uncinate hairs; perianth of the staminate flower c. 0.5 mm high, 2(–3)-lobed, or sometimes tending to 3-fid or 3-parted, puberulous, especially on the margins with minute clavate papilla-like hairs; stamens 2, occasionally 3, filaments mostly even at anthesis incurved, 0.6–0.8 mm long, the lower part puberulous, at first thickened, later on cushion-

Fig. 4. *Dorstenia oligogyna*. – A: Leafy part of the stem. – B: Inflorescences (Le Testu 5092). – C: Young infructescence. – D: Inflorescence. – E: Staminate flower. – F: Stamens (Le Testu 2234). – G: Staminate flower. – H: Stamens (Breteler 5683). – I: Staminate flowers. – J: Pistillate flower (Le Testu 5575).


E
F
1mm
1 mm
J
G
H
1mm
I
1mm
D
2,5mm
A
B
C
3 cm

shaped, anthers 0.2–0.3 mm long, 0.3–0.4 mm broad, connective rather broad; the free part of the perianth of the pistillate flower 0.5–0.7 mm high, 2-lobed, puberulous, especially on the margins with minute, clavate to globose, papilla-like hairs; style 1–1.5 mm long, stigmas 2, 1–1.2 mm long, of equal or unequal length, straight or twisted.

Infructescences green, subglobose, c. 7 mm, crowned by a disc consisting of the remains of the staminate flowers and bracts; endocarp body subglobose, c. 5 mm in diameter, seeds subglobose to transversely ellipsoid, c. 4–5 × 4.5–3 mm, testa with a slightly thickened and sparsely vascularized part below the small hilum; cotyledons very unequal, radicle short.

Distribution (Fig. 1C). From SE Nigeria (east of the Cross River) to Gabon, in the undergrowth of rain forests, sometimes in secondary forests, often along streams, locally frequent, from sea level to 850 m. About 80 collections have been examined.

Flowering throughout the year, probably mainly from December to April. A low percentage of the inflorescences set fruit.

Except for the differences indicated in the key to the species, *D. africana* differs slightly from *D. kameruniana* in the indumentum (mostly appressed and retrorse, longer, uncinate hairs), the secondary leaf veins (looping rather far from the margin), the smaller connectives of the stamens, and the less deeply divided perianths of the staminate flowers.

5. **Dorstenia kameruniana** Engler – Fig. 6

Engler, Bot. Jahrb. Syst. 20: 142, 1894. – *Trymatococcus kameruniana* (Engler) Engler, Monogr. Afr. Pfl. 1, Moraceae: 29, t. 11B, 1898; Rendle in Prain, Fl. Trop. Afr. 6 (2): 76, 1916. – *Craterogyne kameruniana* (Engler) Lanjouw, Rec. Trav. Bot. Néerl. 32: 274, t. 7, 8, 1935; Mangenot, Ic. Pl. Afr. IV. No. 83. – Type: Dinklage 232, Cameroun, Lokoundjé (B; isotype HBG).

Trymatococcus kameruniana (Engler) Engler var. *welwitschii* Engler, Monogr. Afr. Pfl. 1, Moraceae: 29, 1898. – Type: Welwitsch 2594, Angola, Golungo Alto, Sange (B, not seen; isotypes BM, K, LISU, P).

Trymatococcus usambarensis Engler, Bot. Jahrb. Syst. 33: 117, 1902; Lanjouw, Rec. Trav. Bot. Néerl. 32: 274, 1935. – Type: Scheffler 251, Tanzania, Useguha, Makingumbi (B).

Trymatococcus gilletii De Wildeman, Ann. Mus. Congo Ser. 5, Bot. 1: 119, t. 26, 1904; Lanjouw, Rec. Trav. Bot. Néerl. 32: 274, 1935; Hauman, Fl. Congo Ruanda-Urundi 1: 81, 1948. – Type: Gillet 2194, Zaire, Kimuenza (BR).

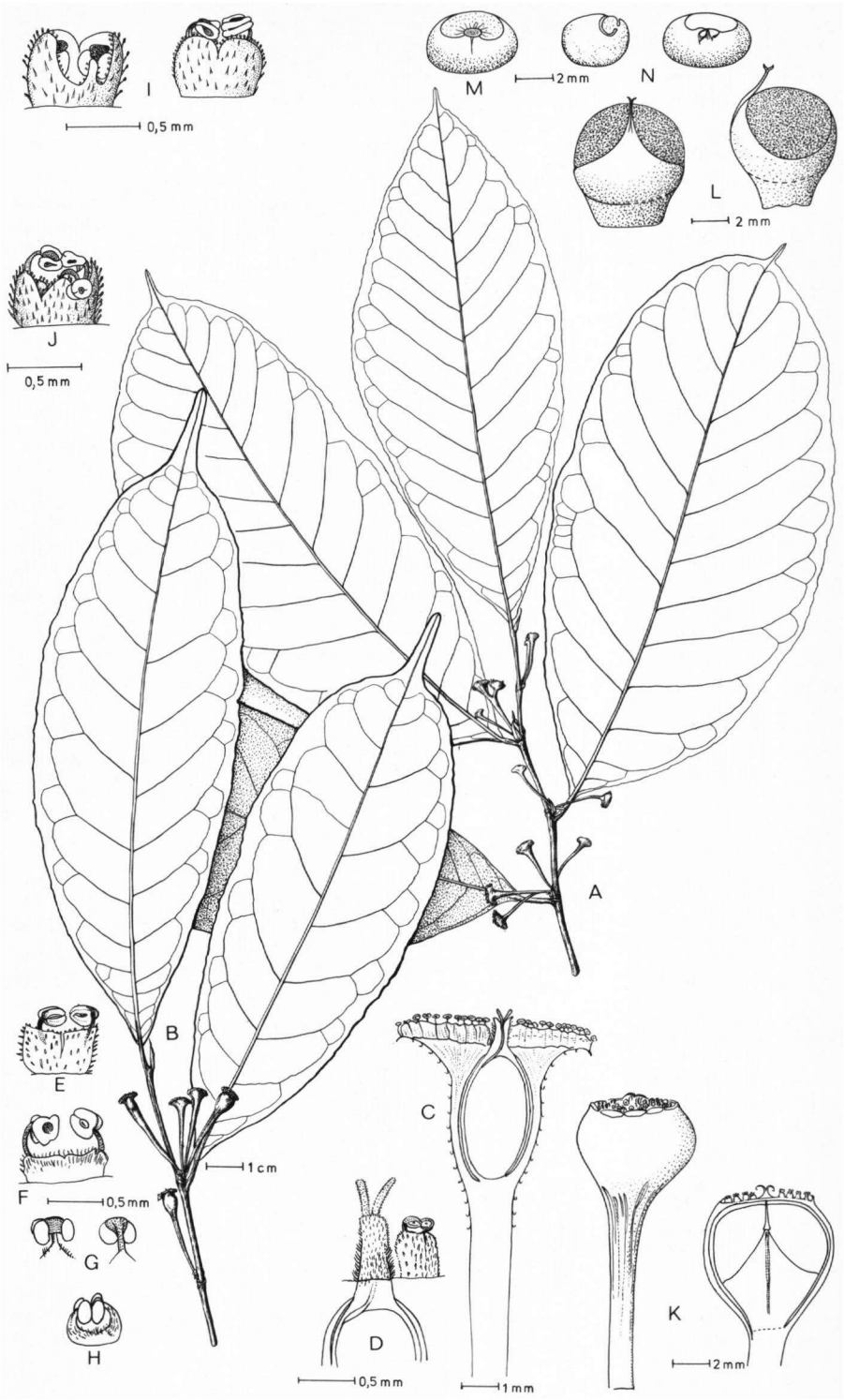
Dorstenia amoena A. Chevalier, Bull. Soc. Bot. France 58, Mém. 8: 208, 1912; Lanjouw, Rec. Trav. Bot. Néerl. 32: 274, 1935. – Type: Chevalier 21528, Ivory Coast, between Diodandougon and Niangouepleu (P).

Shrubs or undershrubs, usually 0.5–3 m, sometimes up to 6 m tall, with few or many stiff or weak branches; latex white or yellowish. Leafy twigs 0.5–2 mm thick, rather densely white or sometimes brownish puberulous to hirtellous to scabrous with very short patent hairs intermixed with mostly (distinctly) longer, (almost) patent, uncinate, near the nodes often straight hairs.

Leaves (at least on branches) distichous, elliptic to lanceolate, or obovate to oblanceolate (3–)7–16(–22) cm long, (1–)2.5–9 cm broad, chartaceous to subcoriaceous, acuminate to subcaudate, often truncate and coarsely dentate (to lobed) towards the apex, at the base usually distinctly inequilateral, acute to obtuse; margin dentate, often coarsely dentate to lobed, sometimes almost entire or entire; on both sides sparsely puberulous to hirtellous with straight and/or uncinate hairs, glabrescent; (4–)6–12(–14) pairs of secondary veins, usually with some parallel tertiary veins; petioles 3–10(–17) mm long; stipules often subpersistent, semi-amplexicaul, 3–11 mm long, sparsely puberulous to substrigulose, costa prominent.

Inflorescences (occasionally entirely staminate with an abortive pistillate flower) often one, sometimes 2–3 or occasionally more simultaneously in the leaf axils, broadly turbinate to discoid, 3–8 mm in diameter, whitish, mostly more or less lobed; peduncle 2–8(–9) (in fruit up to 12) mm long, puberulous with (almost) patent, straight or uncinate hairs; receptacle puberulous with (almost) patent, straight and usually longer and retrorse uncinate hairs, with reniform to ovate bracts in two rows on its margin, sometimes a single bract inserted lower on the

Fig. 5. *Dorstenia africana*. – A: Leafy twig with inflorescences (Zenker 875). – B: Leafy twig with young infructescences (de Wilde 1951). – C: Inflorescence (Zenker 3092). – D: Pistillate and staminate flower. – E: Staminate flower. – F, G, H: Stamens (Zenker 3092). – I: Staminate flowers (Letouzey 1257). – J: Staminate flower (Zenker 170). – K: Infructescence. – L: Fruit. – M: Seed. – N: Embryo (de Wilde 1951).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receptacle; perianth of the staminate flowers c. 0.5 mm high, 2-parted to near the base, often with 3-lobed segments, sometimes 6-parted, at least the upper part puberulous with minute clavate to globose papilla-like hairs; stamens 2, incurved at and after anthesis, filaments 0.5–0.8 mm long, initially with a thickened, later with a cushion-shaped, sparsely puberulous to glabrous base, anthers 0.2–0.3 mm long, 0.4–0.5 mm broad, connective very broad; often a tuft of hairs in the centre of the flower; pistillate flowers 1, occasionally 2, the free part of the perianth 2.5–3.5 mm high, 2-parted, puberulous with clavate to globose minute papilla-like hairs; style 2–2.5 mm long, stigmas c. 1–2 mm long, strap-shaped to filiform, straight or twisted, often unequal in length, puberulous.

Infructescences turbinate to subglobose, c. 7–8 mm in diameter, crowned by a discoid part consisting of the bracts and staminate flowers; endocarp body subglobose, c. 6.5 mm in diameter; seed subglobose, c. 6 mm in diameter, testa with a hardly thickened vascularized part below the small hilum; cotyledons very unequal, radicle short.

Distribution (Fig. 1 D). The main and central part of the disjunct area occupies the central and northern part of Zaire and extends westwards through the Central African Republic to southern Cameroun, southwestwards to Angola (E of Luanda), and eastwards to Uganda. In W Africa the species ranges from SE Guinea (region of Mount Nimba) to SE Ghana. In E Africa the species inhabits some areas in E Tanzania. *D. kameruniana* is a species of the undergrowth of evergreen forests, sometimes of secondary forests; often near streams. In the central part of its area it often occurs in gallery forests. It grows from sea level to c. 1300 m altitude (in Uganda). About 250 collections have been examined.

Flowering throughout the year. Rather few inflorescences set fruit.

The perianth of the staminate flower usually consists of two large segments corresponding to the stamens. These segments are often 3-lobed or 3-fid. The two smaller lateral lobes may even be almost completely separated from the large middle lobe. Sometimes there are 1 or 2 much smaller segments between the large ones. They may be regarded as the reduced third and fourth tepal. Thus, the perianth of the staminate flower is rather variable: with at least 2 large segments, lobed or not, up to at most 6 segments, 4 of which are (very) small.

D. kameruniana is very variable in leaf shape. The variations seem not to be regionally confined, although certain variations seem to occur more frequently in one region than in another. For example, leaves with a truncate apex and coarsely dentate to lobed margin towards the apex are more common in Cameroun than elsewhere.

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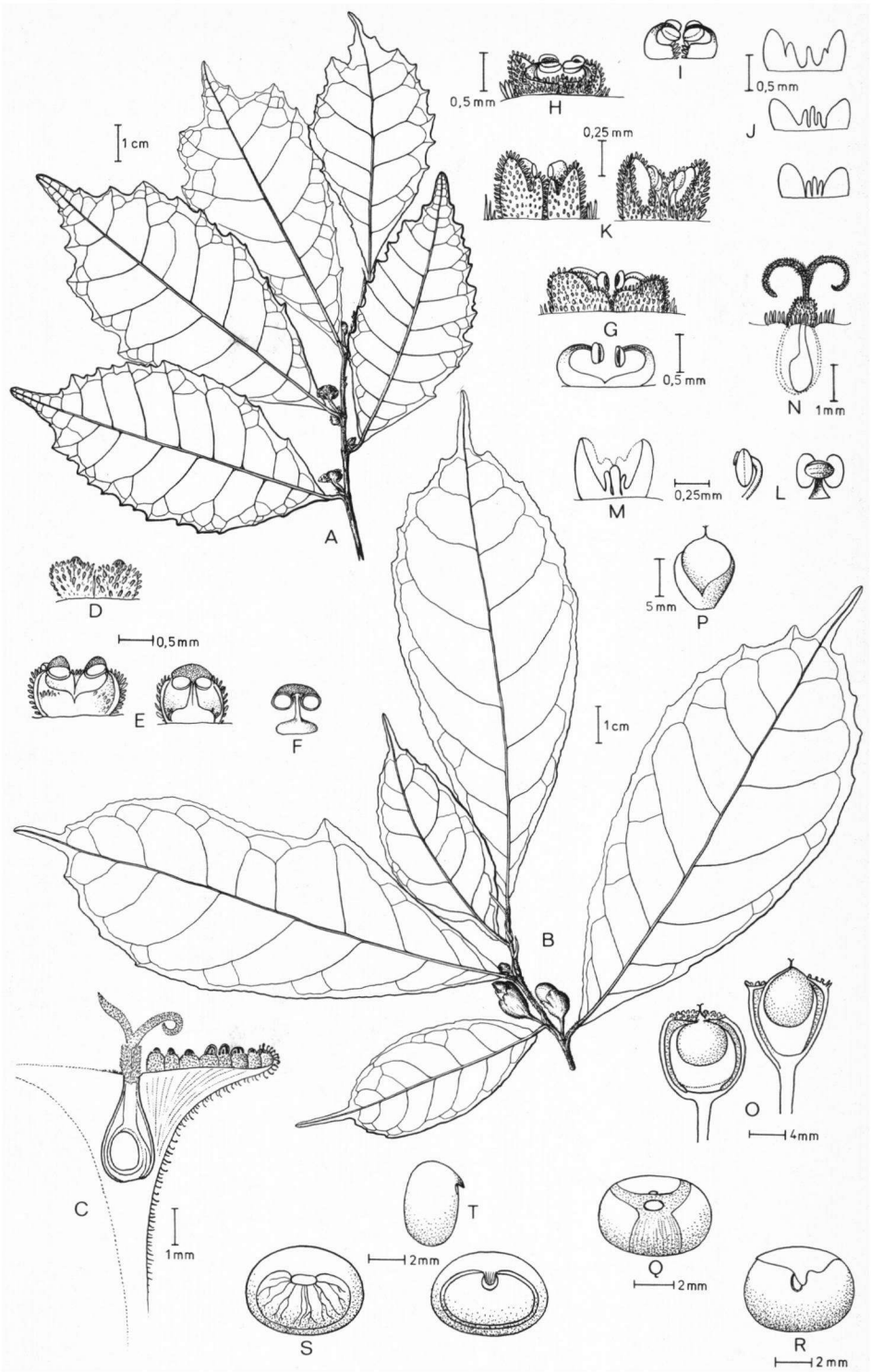
Fig. 6. *Dorstenia kameruniana.* – A: Leafy twig with inflorescences (Proctor 2786). – B: Leafy twig with infructescences (Leeuwenberg 3886). – C: Inflorescence (de Wilde 1638). – D: Staminate flower. – E, F: Stamens (Leeuwenberg 5184). – G: Staminate flower and stamens (Callens 3738). – H: Staminate flower. – I: Stamens. – J: Tepals (Gilbert 2090). – K: Staminate flowers. – L: Stamens. – M: Tepals (Brenan & Greenway 8275). – N: Pistillate flower (Evrard 5736). – O: Infructescences (Tisserant 998). – P: Fruit. – Q: Seed. – R: Embryo (Breteler 1382). – S: Seed. – T: Embryo (Callens 3738).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