

THE LOGANIACEAE OF AFRICA

I. ANTHOCLEISTA

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The present paper is the first of a series of revisions of the genera of *Loganiaceae* represented in Continental Africa. A genus is entirely revised only if the majority of the species occurs in Africa; if a small number of species is present only African representatives are taken into account.

The delimitation of the family of *Loganiaceae* is a much debated problem. The present author so far prefers to follow SOLEREDER (1892) and BRUCE & LEWIS (1960), but is of the opinion that *Retzia* which usually has been treated as an aberrant *Solanacea* belongs also in this family. After further study of the several genera constituting *Loganiaceae*, their relationship may become better understood and the family be delimited more satisfactorily. *Gaertnera*, generally regarded as a *Rubiaceae*, related to *Psychotria*, is not accepted as *Loganiaceae* here.

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A REVISION OF ANTHOCLEISTA Afzel. ex R.Br.

HISTORY OF THE GENUS

Anthocleista was first described by ROBERT BROWN (1818) who adopted the name which had been written by AFZELIUS on a herbarium sheet. Its first species had been recognized by G. DON (1838). Afterwards, in the second half of the 19th century and especially shortly before and after 1900, many species were described, most of which were later reduced to synonymy, especially by Miss BRUCE (1955). The present study is based on more ample material and Miss BRUCE's conclusions regarding the delimitation of the species and their synonymy were confirmed.

GEOGRAPHICAL DISTRIBUTION

Anthocleista occurs in Continental Africa in the tropical regions, and also on Madagascar, the Comores, and the islands in the Gulf

of Guinea. Three species are endemic in Madagascar. The others are extra-Madagascan and none of them occurs throughout the area of the genus. Among those the seven "large-leaved" arborescent species are much more widely distributed than the four "small-leaved" lianas which are known from very few collections. *A. vogelii* Planch. has the largest area; it occurs from Sierra Leone to the Sudan in the North and to Angola and N. Rhodesia in the South (cf. Map 5). The highest concentration of species is between Lagos and Yaoundé, an area in which nine species occur.

The names of the countries are in accordance with the most recent map of Africa issued by the National Geographic Society. The distributional maps are from Goode's Series of Base Maps, published by the University of Chicago Press.

RELATIONSHIP WITH OTHER GENERA

Anthocleista belongs to the tribe *Potalieae* which is characterized as follows:

Potalieae (Mart.) Endl., Gen. Pl. 576. 1838.

Type genus: *Potalia* Aubl.

Homotypic synonym: *Potaliaceae* Mart., Nov. Gen. 2: 91, 133. 1827 (as *Potalieae*); Hutchinson, Fam. Flow. Pl. 2nd. ed. 1: 371. 1959 (p.p. excl. *Desfontainea*).

Heterotypic synonym: *Fagraeeae* Meisner, Gen. Pl. 1: 259. 1840 (as *Fagraeaceae*); Progel in Martius, Fl. Bras. 6(1): 267. 1868; Solereder in Engl. Prantl, Nat. Pflanzenf. 4(2): 41. 1892. Type genus: *Fagraea* Thunb.

Entirely glabrous trees, shrubs, or lianas. *Leaves* opposite, those of a pair equal or unequal, petiolate or sessile; petioles or bases of a pair usually confluent, often auriculate and/or ligulate; blade often fleshy or coriaceous, variously shaped, ovate to linear-lanceolate, entire or sometimes minutely crenate, pinnately veined. Stipules intrapetiolar and ligular, or interpetiolar and entirely connate into an ochrea. *Inflorescence* terminal or occasionally axillary, dichasial, sometimes thyrsoid, or (by reduction) racemose or spicate, 1-many-flowered. Calyx sometimes subtended by 1-several pairs of sometimes enlarged bracts; sepals 4-5, thick, fleshy-coriaceous, concave, appressed to the base of the corolla. Corolla mostly thick, fleshy, brittle, tubular; lobes 5-16, contorted (usually turned to the right) in the bud, entire. Stamens as many as the corolla lobes and alternating with them, equal; anthers ellipsoid to linear, sagittate at the base or not; cells 2, discrete, parallel, not or only at the base divergent, dehiscent throughout by a longitudinal split. Ovary superior, 2-, 4-celled, or basally 4- and apically 2-celled, with one large bilobed placenta with many ovules on both sides in each cell; style simple; stigma unbranched, capitate or saucer-shaped, sometimes bilobed. Fruit a berry, indehiscent or rarely dehiscent and 4-valved. Seeds obliquely polyhedral or ovate-orbicular, flattened or not, more or less verrucose, not winged, sometimes surrounded by a narrow ring. Embryo small,

cylindric or nearly so, surrounded by much endosperm; cotyledons short. Colleters in the axils of the leaves, bracts, and sepals.

Distribution: circumtropical; consisting of 3 genera (1 in Africa, 1 in America, and 1 in Asia and Oceania).

The tribe *Potalieae* was delimited by MARTIUS and, being a clearly demarcated natural group, is here maintained. The genera can be distinguished as follows:

1. Sepals 5; corolla lobes and stamens 5; filaments free from each other. TROPICAL ASIA, TROPICAL AUSTRALIA, and the PACIFIC ISLANDS **Fagraea**
- Sepals 4; corolla lobes and stamens 8–16; filaments entirely connate or sometimes for two-thirds of their length 2
2. Style with a globose thickening at the base; berry apically 2-celled, with few large seeds. TROPICAL SOUTH AMERICA **Potalia**
- Style not thickened at the base; berry entirely 4-celled, with many small seeds. TROPICAL AFRICA **Anthocleista**

Potalia Aubl., Hist. Pl. Guian. 1: 394, t. 151. 1775; Martius, Nov. Gen. 2: 89, t. 170. 1827; Progel in Martius, Fl. Bras. 6(1): 267. 1868; van Raalte in Pulle, Fl. Suriname 4(1): 108. 1932.

One species: *P. amara* Aubl.

Fagraea Thunb., Vet. Acad. Handl. Stockh. 3: 132, t. 4. 1782; Leenhouts, Revision of *Fagraea* in Blumea ¹⁾.

About 60 species.

Anthocleista Afzel. ex R.Br., Exp. Tuckey Congo 30. 1818; Martius, Nov. Gen. 2: 91. 1827; Reichenbach, Consp. 133. 1828; G. Don, Gen. Syst. 4: 68. 1838; Endlicher, Gen. Pl. 577. 1838; Spach, Vég. Phan. 8: 483. 1839; Meisner, Gen. Pl. 1: 259. 1840 and 2: 168. 1840; Steudel, Nom. 2nd. ed. 1: 105. 1841; Endlicher, Ench. 289. 1841; De Candolle, Prod. 9: 36. 1845; E. Bureau, Thèse Logan. 14, 74. 1856; Bentham & J. D. Hooker, Gen. Pl. 2: 795. 1876; Solereder in Engl. Prantl, Nat. Pflanzenf. 4(2): 43. 1892; Baker in Fl. Trop. Afr. 4(1): 537. 1903; Prain & Cummins in Fl. Cap. 4(1): 1049. 1909; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931; Aubréville, Fl. For. Cot. Iv. 3: 153. 1936; op. cit. 2nd. ed.: 3. 184. 1959; Hasselberg, Symb. Bot. Upsal. 2(3): 40, 49. 1937; Bruce, Kew. Bull. 1955: 45; Nozeran, Nat. Monsp. Sér. Bot. 8: 167. 1957; Bruce & Lewis, in Fl. Trop. E. Afr., Loganiaceae 8. 1960.

Entirely glabrous trees, 1–35 m high, shrubs, or lianas. *Leaves* opposite, those of a pair equal or unequal, petiolate or sessile; bases or petioles joined, often auriculate, and, especially in young plants more or less conspicuously ligulate at the base; blade soft and brittle

¹⁾ In anticipation of publication the author kindly communicated his conclusions on the characters of this genus.

or coriaceous when living, membranaceous or papyraceous and often brittle, or coriaceous when dry, entire or minutely crenate; margin recurved or not; secondary veins conspicuous or not. Stipules intrapetiolar (ligula). *Inflorescence* terminal, erect, sometimes pendulous when in fruit, dichasial, 1–5 × branched, easily breaking at the nodes when dry. Lower bracts leafy, the others usually very small, triangular or ovate, acute or obtuse, entire. In the continental species mostly only one flower of each inflorescence open at a time (more in those of Madagascar). *Sepals* 4, green, creamy, or occasionally partially orange, free, or sometimes connate at the base (*A. laxiflora*), orbicular or nearly so, concave, decussate, appressed to the corolla tube and later to the fruit which therefore is often impressed at the base in living plants¹⁾, usually rounded at the apex, entire, the 2 inner ones usually becoming retuse or torn by the development of the corolla, often spreading when dry, often enlarged under the fruit. *Corolla* white, creamy, violet, violet-blue, mauve, or sometimes pale yellow, the limb often paler than the tube which is sometimes green, actinomorphic, tubular, erect in the calyx, usually not contracted when mature, thick, fleshy, brittle, also when living, often sweet-scented, soon turning brown when being shed; mature bud 1.5 – 10 × as long as the calyx; tube approximately cylindric, more or less gradually widened towards the throat, not ventricose; lobes 8–16, contorted in the bud, usually turned to the right, spreading or recurved, elliptic to lanceolate, usually obtuse, entire. *Stamens* as many as the corolla lobes and alternating with them, exserted, equal; filaments short or very short, mostly shorter than the anthers, entirely connate into a short tube or occasionally connate for two-thirds of their length, inserted near the apex of the corolla tube; anthers white or creamy, often partially green, sometimes brownish, lanceolate, obtuse or sometimes acute at the apex, usually sagittate at the base; cells 2, parallel and if sagittate only at the base divergent, dehiscent throughout by a longitudinal split. *Ovary* superior, ovoid-conic, cylindric, or obovoid-cylindric, 4-celled, usually thick-walled; style thick, about as long as the corolla tube, persisting during a short period after the corolla is shed; stigma large, usually obovoid-cylindric and apically bilobed, often slightly laterally compressed. In each cell one large bilobed placenta with numerous ovules on both sides. *Fruit* a berry, dark green or yellow, hard, globose or ellipsoid (irregular or regular indentations or furrowings are due to shrinkage and are always artificial), rounded at the apex, sometimes apiculate; wall usually thick; septa thin. *Seeds* obliquely ovoid-orbicular or irregularly polyhedral, flattened, medium to dark brown, slightly verrucose, faveolate, slightly or hardly lustrous, sometimes surrounded by a narrow ring (in some Madagascan specimens); hilum in the middle of one of the flat sides. Embryo small, nearly cylindric, slender, surrounded by much endosperm; cotyledons very short. Small collectors in one rank in the axils of the leaves, bracts, and sepals.

¹⁾ Living seen: *A. djalensis* fl. fr., *A. nobilis* fl. fr., *A. procera* fr.; spirit coll.: 7 continental arborescent spp., fl. fr. and *A. obanensis* fl. buds.

Type species: *A. nobilis* G. Don.

Distribution: 14 species in tropical Africa, Madagascar, and the Comores.

All specimens studied for this revision are entirely glabrous except one, Gossweiler 8036, the leaves of which are pubescent beneath. In all other characters it agrees with *A. vogelii*. Without further collections its identity remains doubtful.

ANGOLA: between Seva and Maiombe, Gossweiler 8036 (BM, COI, K, LISU, with immature fruits).

Anthocleista may be subdivided into two groups: one with large crowded leaves and thick twigs with short internodes and one with smaller leaves and comparatively thinner twigs with long internodes.

The species with large crowded leaves are trees or few-stemmed shrubs. Those with the small leaves are as far as known usually lianas or shrubs. The latter group consists of rare species on which few field notes have been taken. Most of them were said to be terrestrial or epiphytic shrubs, some were noted as lianas, and some others were declared to be trees. If growing in open places, without support, some lianas assume the habit of shrubs (e.g. *Usteria* (Logan.) and *Abrus* (Papil., BRETELER, Blumea 1960)). Sometimes plants which were noted as trees may actually be shrubs epiphytic in trees. *A. madagascariensis*, a tree, approaches in habit the second group, because its leaves which are not distinctly crowded, but differs from all species in that group by its violet instead of creamy corolla.

The arborescent species (nrs. 1-11), and especially the continental ones, may be characterized as follows:

Trunk cylindric, sometimes with buttresses or stilt-roots, up to 70 cm in diam.; bark smooth, pale grey or pale brownish grey, not or slightly fissured when the tree is maturing; slash yellow, orange, or ochraceous; with brown stripes or not; pith thick; branches umbellate; twigs thick, with conspicuous leaf-scars, with or without spines or cushions above the leaf-axils. Trunk and branches terminating in an inflorescence. At and after anthesis the axillary buds of the upper leaves develop and give rise to some branches at the same level (umbellate branching), the tree then resembling a candelabrum (Photograph 1). Leaves crowded at the apices of the twigs (Photograph 6) (or nearly so in *A. madagascariensis* and some specimens of *A. liebrechtsiana*), usually very large, decreasing in size when the tree is maturing¹), largest when the trunk is still unbranched, obovate, obovate-elliptic, oblong-elliptic, lanceolate, oblanceolate, or linear-lanceolate (in young plants usually comparatively narrower), variable in shape and size in a single tree, usually not more than 40 × 15 cm, in young plants and low-level branches up to 150 × 50 cm, mostly rounded or obtuse or sometimes acute at the apex, but more acute to acuminate in very young plants which have thin stems with conspicuous internodes (Figs. 6 and 10). In dense forests the trunk remains unbranched, and the tree becomes a long slender pole crowned by a cluster of large leaves and fails to flower (Photograph 2).

¹) This character not known for *A. madagascariensis*.

The axillary buds are placed on the twigs above the leaf axils, as figured by NOZERAN (1957). If the twigs are spiny, the spines surround the buds. The developing lateral branch starts in that case with two opposite spines before producing leaves and therefore on some branches 4 spines are placed together (Fig. 7).

English names: Cabbage tree or cabbage palm; fever tree (*A. grandiflora*).

French name: Arbre à chou.

The African names do not distinguish between the species as far as known.

Madagascan name: Landemy or Landemy Lahy.

The "lianos" species (nrs. 12-14) have the following characters in common:

Unarmed shrubs, lianas, or trees (?), sometimes epiphytic. Leaves not crowded, those of a pair equal or subequal, usually shortly petiolate; blade coriaceous also when living, oblong-elliptic or oblong-obovate, up to 20 × 11 cm, usually apiculate; veins inconspicuous, margin not revolute nor recurved.

Uses: Wood rarely used as timber (*A. nobilis*, teste Chevalier 16196; *A. grandiflora*, testibus Johnston 5 et Leyson 1358), but as it is soft and the pith is thick it is not valuable. Sometimes used as fire-wood, but people sitting round the fire will become sick (*A. nobilis*, teste Deighton 512; *A. schweinfurthii*, teste Louis 7873).

Roots, bark, and leaves have medicinal value. Africans apply a decoction for various ailments, e.g.: fever (bark of *A. grandiflora*, teste Brady 17 Oct. 1905), chest pains (roots of *A. djalonensis*, teste Deighton 4215), and constipation (roots and leaves of *A. nobilis*, teste Deighton 512). Bark used as poultice for sores (*A. nobilis*, teste Cooper 190).

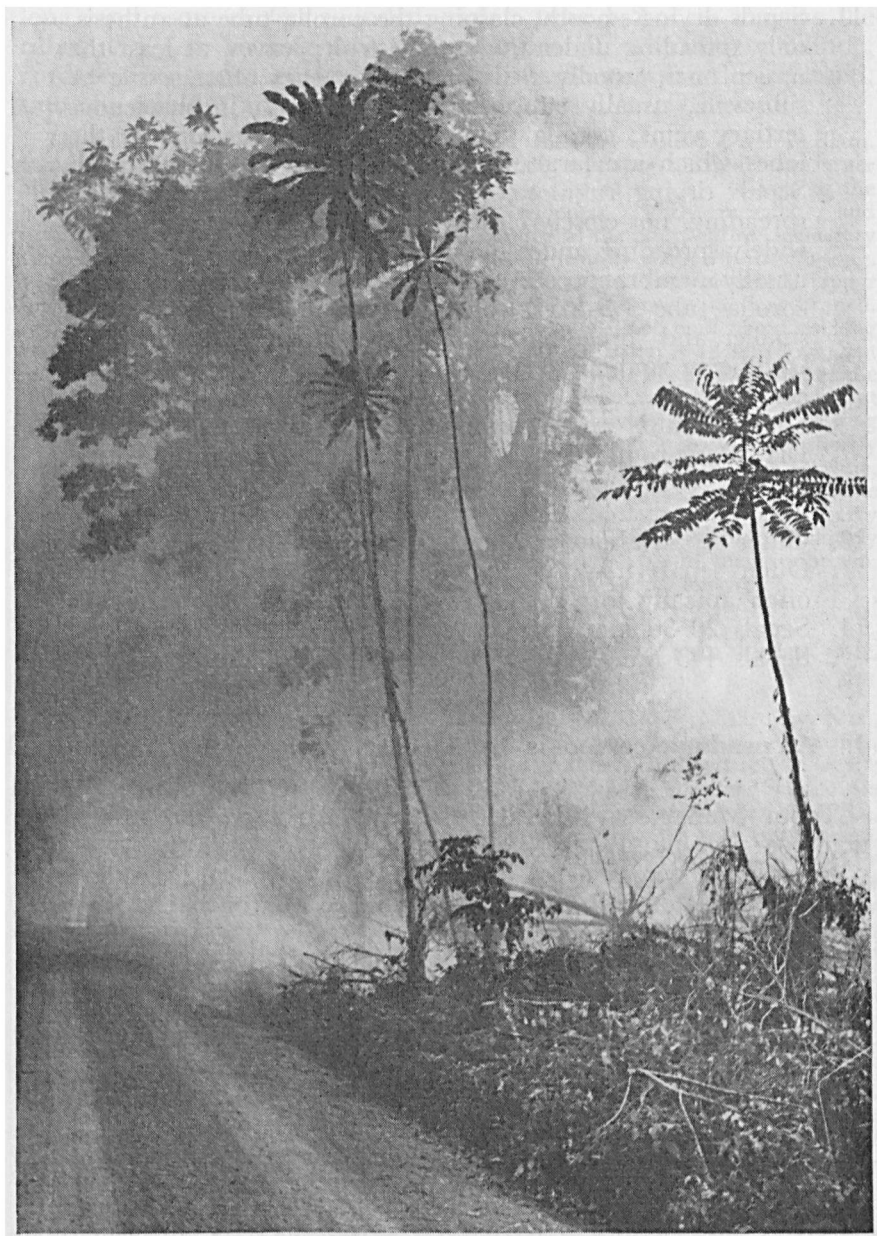
Key to the species:

1. Sepals acuminate and keeled. RIO MUNI. 14. **A. laxiflora**
- Sepals rounded, not keeled 2
2. Corolla violet or violet-blue, small, up to 20 mm long; lobes in mature corolla bud broadly overlapping. MADAGASCAR 3
- Corolla creamy or white, larger, usually more than 25 mm long; lobes in mature corolla bud narrowly overlapping. AFRICAN CONTINENT AND THE ISLANDS EXCEPT MADAGASCAR 5
3. Leaves papyraceous when dry, large or rather large, sessile; secondary and some tertiary veins conspicuous 3. **A. amplexicaulis**
- Leaves coriaceous when dry, smaller, petiolate or if sessile then usually more than 5 × as long as wide, and costa acute beneath; secondary veins inconspicuous. 4
4. Leaves not or not conspicuously crowded at the apices of the twigs, mostly petiolate, usually 2-3 × as long as wide and up to 17 cm long; costa not acute beneath; mature



Photograph 1. *A. procera*, tree in swamp, 6 km east of Agnéby, Ivory Coast (Leeuwenberg 3178). On the foreground *Raphia*.

- corolla in the bud 15–20 mm long 1. **A. madagascariensis**
- . Leaves crowded at the apices of the twigs, sessile, usually more than $5 \times$ as long as wide and 20–80 cm long; costa triangular and acute beneath; mature corolla in the bud usually 10–12 mm long 2. **A. urbaniana**
 - 5. Secondary veins conspicuous; leaves crowded at the apices of the twigs; candelabrum-shaped trees or few-stemmed shrubs 6
 - . Secondary veins inconspicuous; leaves not crowded at the apices of the twigs; lianas, shrubs or sometimes trees (?). (see also *A. liebrechtsiana*) 13
 - 6. Branches armed with short usually paired spines; flower buds uniformly rounded or subtruncate at the apex. 7
 - . Branches unarmed; or if with incipient or occasional spines then flower buds not rounded, but tapering at the apex 9
 - 7. Branches conspicuously spiny; spines divergent, confluent at the base, paired or sometimes 3–4 together; leaves conspicuously discolorous, dark green above, more or less glaucous beneath, usually sessile; margin usually revolute and undulate; mature corolla in the bud usually less than $5 \times$ as long as the calyx 8
 - . Branches not conspicuously spiny; spines parallel or slightly divergent, confluent for at least half their length, paired; leaves not conspicuously discolorous, petiolate; margin not revolute nor undulate; mature corolla in the bud $5.5\text{--}6 \times$ as long as the calyx. WEST AFRICA 6. **A. djalensis**
 - 8. Corolla tube $0.9\text{--}1.5 \times$ as long as the lobes and $1.25\text{--}2 \times$ as long as the calyx; fruits drying smooth, neither shrivelled nor dented; leaves never drying black, mostly obovate and often comparatively wider than in the following species 5. **A. vogelii**
 - . Corolla tube $2\text{--}3 \times$ as long as the lobes and $2.5\text{--}3.5 \times$ as long as the calyx; fruit when dry with 4 more or less irregular dents or irregularly shrivelled; leaves often drying black. WEST AFRICA 4. **A. nobilis**
 - 9. Leaves petiolate and buds usually uniformly rounded at the apex 10
 - . Leaves sessile or subsessile, if petiolate then buds not rounded, but tapering at the apex 11
 - 10. Leaves obovate, usually rounded at the base; calyx narrowed, not definitely constricted at the mouth; branches with incipient or occasional spines; berry drying smooth, mature $35\text{--}50 \times 25\text{--}35$ mm, with a thick wall (about 3 mm) 6. **A. djalensis**
 - . Leaves elongate-oblongate, always cuneate at the base; calyx definitely constricted at the mouth; branches never spiny; berry irregularly shrivelled when dry, mature $15\text{--}27 \times 10\text{--}18$ mm, with a thin wall (about 1 mm) 7. **A. liebrechtsiana**



Photograph 2. In the centre *A. nobilis*, 25 km north of Taï, Ivory Coast, along road to Guiglo.

11. Sepals drying smooth, clasping the corolla tube at anthesis, only spreading under the mature fruit; leaves, at least the upper ones, usually petiolate, lower ones often sessile or subsessile, usually subcoriaceous, and with inconspicuous tertiary veins; corolla tube about 1–1.5 × as long as the lobes which are large and reflexed 8. **A. schweinfurthii**
 - . Sepals drying rugulose, outer pair at least more or less spreading, not closely clasping the corolla tube at anthesis, widely spreading under the fruit; leaves sessile or subsessile, usually membranaceous, and with conspicuous tertiary veins; corolla tube 1.5–2.5 × as long as the lobes, which are smaller and spreading or sometimes recurved 12
12. Dry berry umbonate at the apex, at least when young; corolla tube 1.5–2.5 × as long as the calyx. EAST and SOUTH AFRICA and COMORES 9. **A. grandiflora**
 - . Dry berry rounded or truncate at the apex; corolla tube 3.5–5.5 × as long as the calyx. WEST AFRICA 10. **A. procera**
13. Outer sepals about as long as wide or wider 14
 - . Outer sepals 1.5–2 × as long as wide, 12–17 × 8–11 mm, often apically torn 13. **A. obanensis**
14. Sepals 20–30 mm long 12. **A. scandens**
 - . Sepals 4–8 mm long 11. **A. microphylla**

1. **A. madagascariensis** Bak., Journ. Bot. 20: 173. 1882.

Fig. 1; Map 1

Type: Madagascar: Betsileo District, Ankafina, Baron 73 (K, holotype; isotype: P).

Heterotypic synonyms: *A. rhizophoroides* Bak., Journ. Linn. Soc. 22: 506. 1887. Lectotype: Madagascar: sin. loc., Baron 3814 (K, lectotype; isotypes: P, 3 sheets).

A. hildebrandtii Gilg in Engl. Bot. Jahrb. 17: 584. 1893. Type: Madagascar: Betsileo District, Nandihizana, Hildebrandt 3899a (holotype destroyed in B; isotype: K!).

Tree 3–15 (usually about 8–12)m high, without spines. Leaves petiolate or sometimes sessile; blade dark green above, paler beneath, coriaceous and dull or hardly shiny on both sides when dry, oblong-obovate or oblanceolate, $1\frac{1}{2}$ – $3\frac{1}{4}$ (usually about 2–3) × as long as wide, 5–17 × 2–9 cm (up to 24 × 11 cm or more (?)), decurrent into the petiole; costa prominent but not acute beneath; secondary veins inconspicuous; margin usually revolute when dry and not well pressed. Sepals creamy or pale green, rounded, when dry more or less rugulose outside and often more or less spreading, the outer ones orbicular or broadly ovate, 5–9 × 6–9 mm, the inner ones not or slightly larger and becoming retuse by the development of the corolla. Corolla in the young bud rounded or slightly tapering and apiculate at the apex, in the mature bud 2–4 × as long as the calyx, 15–20 mm

long, and more or less rounded, violet; tube $1-2 \times$ as long as the calyx, $1-1\frac{1}{2} \times$ as long as the lobes; lobes 10, orbicular or elliptic, cordate or rounded at the base, spreading. Berry when dry ellipsoid, smooth, shining, apiculate, thick-walled.

Trunk up to 30 cm in diam. or more(?); twigs when dry about 5–8 mm in diam. *Leaves* not conspicuously crowded, those of a pair equal or unequal, the larger one up to about twice as long as the smaller; petiole up to $\frac{1}{4} \times$ as long as the blade, usually 1–2.5 cm, up to 4 cm long, widened, slightly auriculate, and inconspicuously ligulate at the base; blade rounded at the apex, entire, and secondary veins 5–9 pairs. *Inflorescence* 3–5 \times branched, 5–20 (usually about 10–15) cm long. Peduncle, branches, and pedicels creamy or pale green, not thickened. Upper bracts triangular, $1-2 \times$ as long as the diameter of the corresponding branch, acute. Outer sepals $0.62-1.25 \times$ as long as wide, the inner ones about as long as wide or wider. Corolla tube cylindric or nearly so, short, 8–12 mm long, not contracted but often seemingly so by drying, 3–5 mm wide at the base and at the throat; lobes $1-1\frac{1}{2} \times$ as long as wide, $7-10 \times 7-8$ mm, obtuse or rounded at the apex. Filaments entirely connate; anthers brownish-white, about $4 \times$ as long as wide, $4-6 \times 1-1.5$ mm, with an often large petal-like sterile acute apex, shortly sagittate at the base. Pistil green. Ovary obovoid, about $2 \times$ as long as wide, $5-6 \times 2.5-3$ mm, thick-walled; stigma obovoid, about $1\frac{1}{2} \times$ as long as wide and as wide as thick, $2-2.5 \times 1.5-2 \times 1-1.5$ mm, apically retuse. Dry berry $1.2-2 \times$ as long as wide, $2.5-4 \times 1.5-2.5$ cm, hard. Seeds orbicular, obliquely ovate, or ellipsoid, $1-1\frac{1}{2} \times$ as long as wide, $2-2.5 \times 1.5-2.5$ mm, medium brown, usually surrounded by a narrow ring. Embryo about 1 mm long.

Distribution: Madagascar.

Ecology: In open moist (?) places, mostly in rain forests. Alt. 450–1700 m or less (?).

MADAGASCAR: Ambatolana, Herb. Tananarive 4375d (P); Marojejy Mts., Cours 3584 (P); *ibid.*, Humbert 22587 (P), 23018 (P); near Bealanana, Ankaizina, Perrier de la Bâthie 15081 (P); Sofia R., near Antsakabary, Humbert 18094 (G, P); Masoala, East Coast, Perrier de la Bâthie 10261 (P); Maroambitsy, Service des Eaux et Forêts 9765 (P); Amberimay, between the Mahajamba and Bemarivo Rs., Perrier de la Bâthie 10214 (P); Alaotra Lake, between Menasaka and Ambodriana, banks of Maningory R., Homolle 487 (P); Ambohimirahavavy Mts., Service des Eaux et Forêts (Capuron) 967 (P); between Antoby and Ambositra, Service des Eaux et Forêts 6357 (P); Mandraka, east of Tananarive, Perrier de la Bâthie 14593bis (P); between Manohaka and Manjakandriana, Service des Eaux et Forêts 10292 (P); between Vohitraramy and Moramanga, Service des Eaux et Forêts 7595 (P); south of Moramanga, Decary 7017 (P); Forêt d'Analamazaotra, near Perinet, Moramanga District, Andovoranto Province, Viguier & Humbert 1115 (B, P); *ibid.*, Thouvenot 68 (P); *ibid.*, Perrier de la Bâthie 8622 (P); Perinet, east of Moramanga, Service des Eaux et Forêts 15011 (P); *ibid.*, Reserves Naturelles (Saboureau) 1254 (P); *ibid.*, Service des Eaux et Forêts 4238 (P), 7609 (P); Antanjona, Alleizette 726M (P); Jarahina, near boundary of Sihanaka District, Herb. Tananarive 2732 (P); between Vatondrangy and Tandriana, Service des Eaux et Forêts 14830 (P); km 56, road Anosibé–Namorana–Moramanga, Service des Eaux et Forêts 7837 (P); Ambatolampy, Service des Eaux et Forêts 1010 (P); between Tsinjoarivo and Ambatolampy, Service des Eaux et Forêts 3934 (P); road Ambomitzara–Anjamana–Ambatolampy, Service des Eaux et Forêts 13008 (P); near Ambositra, Forêt de Ranomena, Humbert & Swingle 4861 (P); Betsileo District, Ankafina, Baron 73 (K, P, type); Betsileo District, Nandihizana, Hildebrandt 3899a (K, isotype of *A. hildebrandtii*); near Fort-Carnot, Service des Eaux et Forêts 5451 (P); Ivakoany Mts., Humbert 6989 (P), 12196 (G, P); Upper Mandrare R., Marosousi Mt., Humbert 6628 (P); Ampanatonampingotra, Andapa, Service des Eaux et Forêts 3662 (P); Forêt d'Analamihilana, Cours 2031 (P); Ambalavoanio, Mainampango Mt., Cours 3216 (P); Anjahanaribe, Cours 3721 (P); *sin. loc.*: Baron 1283, p.p. (P), 1357 (K), 1952 (K, paratype of *A. rhizophoroides*), 3814 (K, P, 3 sheets, lectotype of *A. rhizophoroides*), 5097 (K).

A comparison of the types of *A. madagascariensis*, *A. rhizophoroides*, and *A. hildebrandtii*, and the other specimens cited, shows that all belong to a single species. The range of variation within this species is much smaller than in most of the continental species.



Map 1. *A. madagascariensis*; Map 2. *A. urbaniana*; Map 3. *A. amplexicaulis*.

2. ***A. urbaniana*** Gilg in Engl. Bot. Jahrb. 17: 584. 1893.

Fig. 2; Map 2

Type: Madagascar: sin. loc., Humblot 662 (holotype destroyed in B; isotypes: K!, P, 5 sheets!).

Tree, 3–7 m high or more (?), without spines. Leaves sessile or subsessile; blade medium (?) to dark (?) green above, paler and with pale costa beneath, when dry brownish to brownish-green, dull or slightly shiny on both sides, coriaceous, rather brittle, oblanceolate to linear, very variable in shape and size, 3–15 × as long as wide, 20–80 × 2–21 cm, narrowed to the base; costa sharply triangular beneath; secondary veins more or less inconspicuous. Sepals white, rounded, when dry dull, minutely rugulose, and usually clasping the corolla or the fruit, the outer ones orbicular or broadly ovate, 5–9 × 4–8 mm, the inner ones usually slightly larger, becoming retuse by the development of the corolla. Corolla in the young bud rounded at the apex, usually included in the calyx, in the mature bud 1.5–1.8 × as long as the calyx, 10–14 mm long, and rounded, violet; tube 0.6–1 × as long as the calyx, about as long as the lobes; lobes 9–11, ovate-elliptic, rounded at the base, spreading. Dry berry rather hard, globose or nearly so, rounded or acuminate at the apex, more or less rugulose, rather thick-walled.

Twigs about 5–15 mm in diam. when dry. Leaves of a pair subequal or unequal; base widened and obscurely ligulate; blade obtuse to acuminate at the apex; costa prominent beneath; secondary veins 10–16 pairs. Inflorescence 4–6 × branched, 10–24 cm long, usually broader than long. Peduncle, branches, and pedicels white, not thickened. Upper bracts oblong-triangular to triangular-lanceolate, 2–6 × as long as the diameter of the corresponding branch, 1½–4 × as long as wide, up to 25 mm long, obtuse. Outer sepals 1–1.2 × as long as wide. Corolla tube approximately infundibuliform, 4–8 mm long, not or slightly contracted, widened towards the throat, 2.5–3 mm wide at the base, 2.5–5 mm at the throat; lobes about 1.2–1.5 × as long as wide, 6 × 4–5 mm, obtuse at the apex. Filaments entirely connate; anthers 3–4 × as long as wide, 3.5–4 × 1–1.5 mm, apically sterile or not, sagittate at the base. Ovary comparatively large, ovoid-conic, about

2 × as long as wide, 4–5 × 2–3 mm, thick-walled; stigma ovoid-conic, about 1½ × as long as wide, not refuse. Dry berry 0.75–1.2 × as long as wide, 15–20 × 15–20 mm. Seeds medium or dark brown, obliquely polyhedral or approximately orbicular-ovate, sometimes surrounded by a narrow ring, 1–1½ × as long as wide, 2.5–3.5 × 2–2.5 mm.

Distribution: Madagascar.

Ecology: In rain forests or secondary forests, in open (?) places. Alt. 0–500 m.

MADAGASCAR: Maroantsetra, Anonymus 149 (P); Soanierana-Ivongo, Service des Eaux et Forêts 2365 (P); 2369 (P); between Soanierana-Ivongo and Antasibe, Lam & Meeuse 5805 (L); Mananjary Province, Geay 7189 (P), 7190 (P), 7695 (P); *ibid.*, Vatovavy Mt., Decary 13686 (P); Lower Matitanana R., Perrier de la Bâthie 2036 (P); Karianga, Farafangana Province, Decary 5656 (P); Mandena, north of Fort-Dauphin, Service des Eaux et Forêts (Capuron) 393 (P); Col d'Ivolo, Fort-Dauphin District, Decary 10549 (P); Nahampoana, Fort-Dauphin District, Decary 10786 (P); Manantantely, near Fort-Dauphin, Humbert 5731 (P); Ankat-saka, Antalaha, Service des Eaux et Forêts 5038 (P); *sin. loc.*: Commerson s.n. (P); Humblot 662 (K, P, 5 sheets, type); de Lastelle anno 1841 (P); Chapelier anno 1813 (BM).

3. **A. amplexicaulis** Bak., Journ. Linn. Soc. 22: 506. 1887.

Fig. 3; Map 3

Type: Madagascar: *sin. loc.*, Baron 3795 (K, holotype; isotypes: K, P, fragm.).

Tree 3–15 m high, without spines. Leaves sessile; blade dark green above, paler beneath, brittle, when dry greenish-brown, dull or shining, papyraceous to subcoriaceous, obovate to oblanceolate or sometimes linear-lanceolate, 1½–4(6) × as long as wide, 7.5–90 × 3.5–35 cm; costa often acute beneath; veins conspicuous; margin not revolute nor recurved. Sepals whitish-green or green, rounded, when dry conspicuously rugulose or not and more or less spreading, the outer ones orbicular or broadly ovate, 4–10 × 4–10 mm, the inner ones becoming emarginate by the development of the corolla. Corolla in the young bud at the apex as in the mature bud or rounded, in the mature bud about 1.6–2.5 × as long as the calyx, 10–19 mm long, more or less tapering and often apiculate at the apex, violet or mauve; tube 0.8–1.25 × as long as the calyx, 0.8–1 × as long as the lobes; lobes 8–12, orbicular, broadly ovate, or elliptic, cordate or rounded at the base, spreading. Dry berry ovoid, subglobose, ellipsoid, or fusiform, smooth and shining to conspicuously rugulose, apiculate or acuminate, with a thick or rather thick wall.

Trunk 15–20 cm in diam.; twigs about 1–3 cm in diam. when dry. **Leaves** of a pair subequal; base often auriculate; blade rounded at the apex, narrowed to the base, entire; costa and veins prominent beneath; secondary veins 8–17 pairs. **Inflorescence** 4–6 × branched, 15–30 cm long or more (?). Peduncle, branches, and pedicels greenish-white, not or slightly thickened at the nodes. Upper bracts triangular or oblong-triangular, 1–6 × as long as the diameter of the corresponding branch, 1–3 × as long as wide, obtuse, acute, or acuminate. Outer sepals 0.8–1.2 × as long as wide, the inner ones usually slightly larger. Corolla tube cylindric to amply infundibuliform, 5–9 mm long, not contracted, 2–5 mm wide at the base, 3–8 mm at the throat; lobes 1–1.5 × as long as wide, 5–10 × 4–7 mm, obtuse or rounded at the apex. Filaments usually entirely connate, sometimes for about

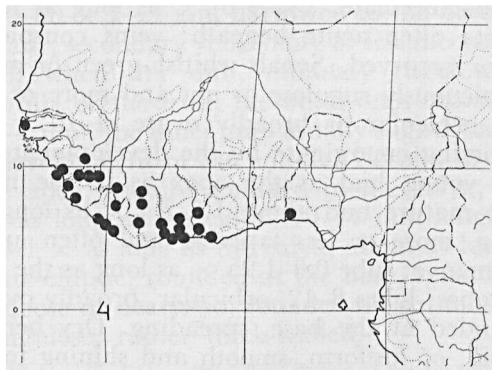
two-thirds of their length; anthers sometimes reported as brownish, about $3-4 \times$ as long as wide, $3.5-6 \times 1-1.5$ mm, with a sterile acute apex, truncate or shortly sagittate at the base. Ovary ovoid or oblong-ovoid, about $2 \times$ as long as wide, $5-6 \times 2.5-3$ mm, thick-walled; style short or very short; stigma globose or obovoid, about $1.5-2 \times 1.5$ mm, retuse at the apex. Berry green, rather hard, when dry $1.3-2.5 \times$ as long as wide, $20-30 \times 11-22$ mm. Seeds medium brown, obliquely ovate-orbicular or polyhedral, $1-2 \times$ as long as wide, $2.3 \times 1.5-3$ mm. Embryo 1.5×0.15 mm.

Distribution: Madagascar.

Ecology: Usually (?) in swamps, in forests. Alt. 0–1200 m.

MADAGASCAR: Ambre Mt., Service des Eaux et Forêts 686 (P); Soanierana-Ivongo, Ambohoabé, Lam & Meeuse 5666 (L, WAG); Forêt d'Analamaitso, Upper Bemarivo R., Perrier de la Bâthie 10200 (P); north of Ankazobé, Decary 7393 (P); Manerinerina, between Tampoketsa and Ankazobé, Decary 17241 (P); between Ampitanonoka and Fotsianana, Cours 2463 (P); between Ambonidobo and Moramanga, Service des Eaux et Forêts 7388 (P); Angavotzety (?), Carion Canton, Manjakandriana District, Reserves Naturelles (Saboureaux) 1541 (P); Mandraka, Alleizette 685 (P); Forêt d'Analamanity, Imerina, Camboué 1 (P), 2 (P), 12 (P); Forêt d'Analamazaotra, near Perinet, Moramanga District, Andovoranto Province, Viguier & Humbert 1119 (B, P); *ibid.*, Perrier de la Bâthie 8600 (P), 8601 (P), 8620 (P), 15977 (P); Anosibé, south of Moramanga, Decary 18304 (P); between Ampotaka and Moramanga, Service des Eaux et Forêts 6611 (P); Ranomena, near boundary of Sihanaka District, Herb. Tananarive 2721 (P); Midongy du Sud, near Farafangana, Decary 4919 (P); *sin. loc.*: Baron 1283, p.p. (K, P), 1284 (BM, K, P), 3795 (K, 2 sheets, P, type); Humblot 496 (K, P).

Although this species is far more variable than both other Madagascan species, especially in the shape and size of the inflorescence, peduncle, branches, pedicels, and fruit, it is easily recognized by its large, usually rather thin leaves with conspicuous veins.



Map 4. *A. nobilis*.

4. ***A. nobilis*** G. Don, Gen. Syst. 4: 68. 1838; De Candolle, Prod. 9: 36. 1845; Baker, Fl. Trop. Afr. 4(1): 538. 1903, p.p. excl. *syn. A. vogelii* Planch., *A. buchneri* Gilg, *A. niamniemensis* Gilg et *A. macrantha* Gilg; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931, p.p. excl. *syn. A. djalonensis* A. Chev.; Aubréville, Fl. For. Cot. Iv. 3: 154, pl. 301. 1936; op. cit. 2nd. ed. 3: 186, pl. 318. 1959; Bruce, Kew Bull. 1955: 47.

Figs. 4-6; Map 4

Lectotype: Sierra Leone: sin. loc., Don s.n. (BM).

Heterotypic synonyms: *A. macrophylla* G. Don, l.c.; De Candolle, l.c. Cult. in garden, no type specimen preserved.

A. parviflora Bak., Kew Bull. 1895: 99; et l.c. p. 539. Type: Sierra Leone: Bagroo R., Mann anno 1861 (K, holotype; isotype: P).

Tree 4–30 (usually up to 18) m high. Twigs with 2 spines above the leaf axils which are divergent and confluent at the base. Leaves sessile or shortly petiolate; blade dark green and slightly shining above, pale glaucous and dull beneath, usually drying dark brown to black, especially above, coriaceous when living, brittle, drying coriaceous to papyraceous, oblong-elliptic, obovate-elliptic, or oblanceolate, $1\frac{1}{2}$ –4 (usually about 3, in young plants up to $4\frac{1}{2}$ – $8\frac{1}{2}$) \times as long as wide, 6.5–35 \times 4–12 cm, up to 150 \times 35 cm in young plants, usually long-decurrent into the petiole or narrowed to the base; margin often largely undulate and usually recurved. Sepals creamy or pale green, rounded, when dry more or less rugulose and appressed to the corolla, the outer ones orbicular or ovate-elliptic, 7–10 \times 4.5–13 mm, the inner ones slightly larger or smaller, often becoming retuse by the development of the corolla. Corolla in the mature bud 3.75–5 \times as long as the calyx, 30–39(45) mm long, and as in the young bud rounded or subtruncate at the apex, white or creamy; tube $2\frac{1}{2}$ – $3\frac{1}{2}$ \times as long as the calyx, 2–3(4) \times as long as the lobes; lobes 11–14, oblong, spreading. Berry ellipsoid, rounded, when dry irregularly shrivelled and with 4 more or less irregular dents, rounded; wall thick.

Trunk without buttresses, 15–90 (usually up to 45) cm in diam.; twigs about 1–3 cm in diam. *Leaves* of a pair subequal or sometimes unequal; petiole up to $\frac{1}{6}$ \times as long as the blade, auriculate at the base, blade in young leaves soft, pale green and shining on both sides, mostly rounded at the apex, acuminate to obtuse in young plants; costa and veins prominent beneath; secondary veins 5–18 pairs. *Inflorescence* 3–6 \times branched, 12–60 cm long and wide. Peduncle, branches, and pedicels creamy or green, thickened at the nodes. Upper bracts triangular, acute, about as long as the diameter of the corresponding branch or longer. Outer sepals 0.75–1.25 \times as long as wide, inner sepals 8–10 \times 7–11 mm. Corolla tube nearly cylindric, 21–31 mm long, contracted at the base when young, gradually widened towards the throat, 5–7 mm wide at the base, 10–12 mm at the throat; lobes 2.25–2.5 \times as long as wide, 9–12 \times 4–5 mm, obtuse or rounded. Filaments entirely connate; anthers about 4–5 \times as long as wide, 5–6 \times 1–1.5 mm, shortly sagittate at the base. Ovary obovoid, about 2 \times as long as wide, 6–7 \times 3–4 mm, thick-walled; stigma obovoid-cylindric, about 1–1.5 \times as long as wide, 3–3.5 \times 2.5–3 mm, apically emarginate. Berry dark green, hard, about 1.2–1.5 \times as long as wide, 3–4 \times 2–2.5 cm. Seeds dark brown, obliquely ovate-orbicular, 1.25–1.75 \times as long as wide, 2–2.5 \times 1.5–1.7 mm. Embryo about 1 \times 0.15 mm.

Distribution: West Africa, from Sénégal to S.W. Nigeria.

Ecology: In secondary forests and on road sides in rain forests or on coastal savannas in the rain forest region. Usually at low elevations. Alt. 0–1200 m.

SÉNÉGAL: between Bignona and Sindialone, Casamance, Chevalier 21–23 Feb. 1900 (P).

GUINEA: Los Islands, Chevalier 12250 (P, cited by Chevalier as *A. procera* var. *umbellata*); road of Conakry, MacIaud 28 (P); Ymbo, bank of Kosikouré R., Chevalier (Caille) 14759 (P, photograph: K, cited by Chevalier as *A. procera* var.

parviflora); between Santa R. and Timbo, Chevalier 12613 (P, photograph in K, cited by Chevalier as *A. procera* var. *umbellata*); Macenta, Roberty 7150 (G).

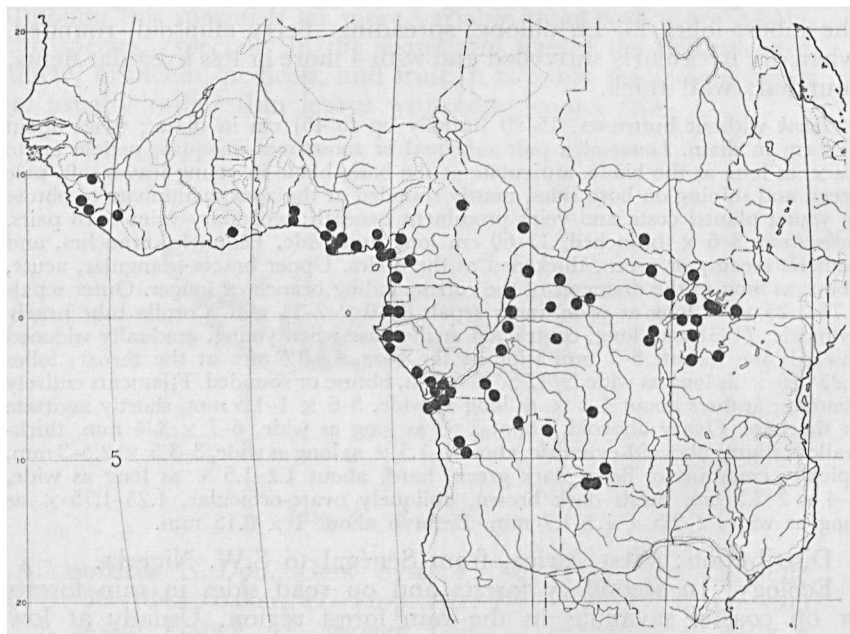
SIERRA LEONE: Mt. Loma, Jaeger 1577 (K), 1641 (K); Talla Hills, Scott Elliot 5053 (K, BM); Karene District, Scott Elliot 5872 (K); Freetown, Dalziel 984 (BOL, K, Z); Sugarloaf Mt., Barter 5-57 (K); Njala, Deighton 512 (K, BM); Bagroo R., Mann anno 1861 (K, P, type of *A. parviflora*); Kangahun, Deighton 6146 (K); sin. loc.: Afzelius anno 1798 (LINN-J. E. Smith 1148, "*A. nigrescens*"); s.n. (BM); G. Don s.n. (BM, type); Hepper 2526 (K); C.E.L.P. 15, Sierra Leone Herb. (K); Thomas anno 1914 (K).

LIBERIA: Gbanga, Linder 542 (K); Peahtah, Linder 1021 (A, K); Gbarnga, Okeke 243 (MO, BM, BR, COI, G); Monrovia, Dinklage 2420 (B); Dukwai R., Monrovia, Cooper 190 (BM, GH, K, S), 380 (BM, GH, K), 428 (GH, K); Grand Bassa, Baldwin 11197 (K); sin. loc., Harley 637 (K).

IVORY COAST: Mt. Tonkouï, diapositive in Wageningen, taken by Leeuwenberg; 75 km E. of Toulépleu, Photograph 3; 25 km N. of Taï, Photograph 2; 52 km E.N.E. of Sassandra, Leeuwenberg 3084 (WAG, juv.); Agboville, Chevalier 22340 (P, WAG); Yapo, Roberty 12118 (G, juv.); Dabou, Chevalier 16196 (P); ibid., Leeuwenberg 2322 (WAG, with fl. in spirit coll., BR); between Dabou and Akouaho, Jolly 41 (P); Adiopodoumé, 17 km W. of Abidjan, Herb. I.D.E.R.T. 3172 (ABI); ibid., Leeuwenberg 1921 (WAG, BR, K, LISC, MO, P, Z); Banco, Aubréville 407 (P); Abidjan, Chevalier 17327 (P); Bingerville, Chevalier 16094 (P); ibid., Leeuwenberg 3168 (WAG, UC); ibid., de Wilde 496 (WAG); Aboisso, Chevalier 16291 (P); near Abé, station of Makougnie, Chevalier 16156bis (P, K); sin. loc., Aubréville 922 (P).

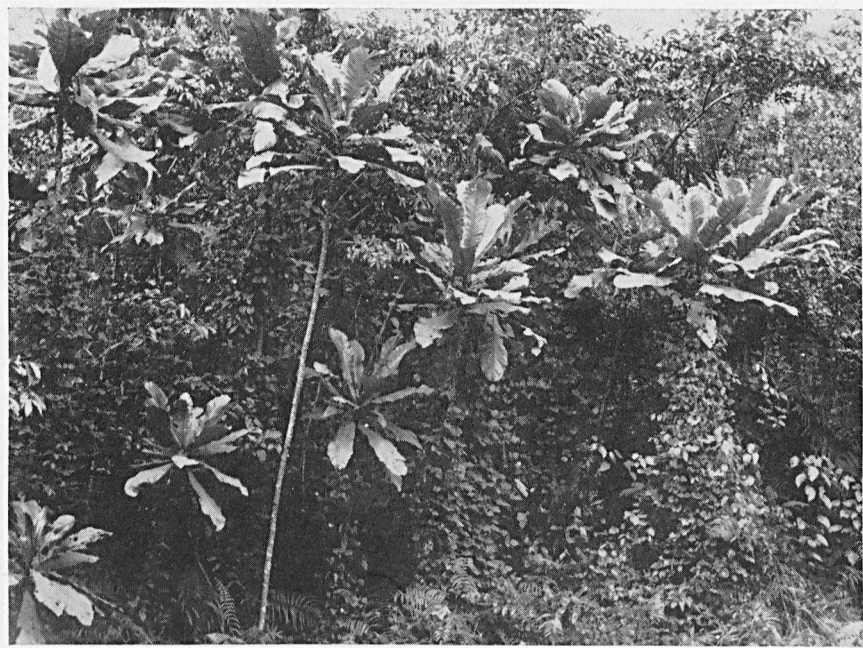
GHANA: Jemma, W. frontier, Chipp 354 (K); 25 km N.W. of Prestea, Vigne 1270 (K); near Axim, Irving 2198 (E, K); ibid., Morton A 2221 (K).

NIGERIA: Ibadan, Onochie FHI 34913 (K).



Map 5. *A. vogelii*.

5. *A. vogelii* Planch. in W. J. Hooker, Icon. 8: tt. 793-794. 1848; W. J. Hooker, Niger Fl. 459, t. 43-44. 1849; Solereder in Engl. Prantl, Nat. Pflanzenf. 4(2): f. 24 A-E. 1892; Hutchinson & Dalziel,



Photograph 3. *A. nobilis*, young trees, 75 km east of Toulépleu, along road to Guiglo, Ivory Coast.



Photograph 4. *A. djalensis*, flowering and fruiting branch, 25 km west of Bouaké, Ivory Coast (Leeuwenberg 3285 of which seedlings in the greenhouse in Wageningen).



Photograph 5. Young plants of *A. djalensis* (Leeuwenberg 3167) on foreground and *A. nobilis* on background right side, east of Bingerville, Ivory Coast; edge of coffee plantation.



Photograph 6. *A. procera*, fruiting branch (Leeuwenberg 3178).

Fl. W. Trop. Afr. 2: 18. 1931; Aubréville, Fl. For. Cot. Iv. 3: 154. 1936; op. cit. 2nd. ed. 3: 184. 1959; Bruce, Kew Bull. 1955: 48; Bruce & Lewis, in Fl. Trop. E. Afr., Loganiaceae 8. 1960.

Fig. 7; Map 5

Type: Nigeria: Niger Delta, Aboh (Ibu), T. Vogel 51 (K, 3 sheets). Heterotypic synonyms: ? *A. buchneri* Gilg in Engl. Bot. Jahrb. 17: 576. 1893. Type: Angola: Lunda, banks of the Luachimo R., Buchner 618 (holotype not seen, destroyed in B). Topotype: Marques 267 (COI, LISU = *A. vogelii*!).

A. kalbreyeri Bak., Kew Bull. 1895: 99; in Fl. Trop. Afr. 4(1): 540. 1903. Type: S. Nigeria: Banks of R. Bonny, Kalbreyer 61 (BM, holotype).

A. zenkeri Gilg in Engl. Bot. Jahrb. 28: 124. 1899; Baker, l.c. p. 539; De Wildeman, Bull. Herb. Boiss. Sér. 2.1: 831. 1901. Type: Cameroun: Bipindi, Zenker 1965 (holotype not seen, destroyed in B; isotypes: A!, BM!, BR, 2 sheets!, COI!, E!, G!, GOET!, HBG!, K!, L!, M!, MO!, P, 2 sheets!, S!, WU!, Z!).

? *A. lanceolata* Gilg in op. cit. 28: 125. 1899; Bruce, Kew Bull. 1955: 57. Type: Cameroun: Batanga, Dinklaga 1114 (holotype not seen, destroyed in B; no isotype seen).

A. auriculata De Wild., Ann. Mus. Congo Sér. 5. 3: 250, t. 31. 1910. Type: Congo: Equateur, near Coquilhatville, Eala, Peynaert 937 (BR, 3 sheets; photographs of 2 sheets in K).

A. talbotii Wernham in Cat. Talbot's Nigerian Pl. 68. 1913. Lectotype: S. Nigeria: Calabar, Oban, Talbot 2037 (BM, lectotype; isotype: K).

A. bequaertii De Wild., Rev. Zool. Afr. 10. Suppl. Bot. 8. 1922. Type: Congo: Orientale, Irumu, Bequaert 4904 (BR, 2 sheets; photograph of one sheet in K).

A. macrantha Gilg in Engl. Bot. Jahrb. 17: 578. 1893; Hiern, Cat. Welw. Afr. Pl. 1: 700. 1898. Lectotype: Angola: Golungo Alto, near Quilombo, Bumba and Queta, Welwitsch 6021 (BM, lectotype; isotypes: BM, 4 sheets, C, COI, G, K, LISU, 8 sheets, P). Aberrant large-flowered form (see remarks).

Misapplied name: *A. nobilis* Baker, l.c. p. 538, quoad spec. Vogel 51, non G. Don.

Tree, 6–20 m high or more (?). Twigs with 2(–4) spines which are divergent and confluent at the base or occasionally unarmed. Leaves sessile or very shortly petiolate; blade dark green and often glossy above, pale glaucous beneath, when dry dark brown above, paler beneath, brittle, papyraceous to coriaceous, oblong-obovate or oblanceolate, in young plants usually narrower, 1.75–3.5 (usually about 2, in young plants up to 4) × as long as wide, usually broader than in *A. nobilis*, 15–45 × 6–24 cm, up to 150 × 45 cm in young plants, narrowed to the auricles or decurrent into the petiole, if petiolate cordate at the very base; margin usually recurved as in *A. nobilis*. Sepals pale green, occasionally partially orange, rounded, when dry more or less rugulose and somewhat spreading or not, the outer ones orbicular or broader than long, 1–1½ × as broad as long,

4–12 × 7–15 mm, the inner ones usually larger, up to about 2 × as long as the others, often partially torn by the development of the corolla. Corolla in the young bud at the apex as in the mature bud or sometimes obtuse, in the mature bud $2\frac{1}{2}$ –4 × as long as the calyx, 23–37 mm¹⁾ long, and rounded or subtruncate at the apex, creamy or sometimes pale yellow, the tube darker than the lobes; tube 1.25–2 × as long as the calyx, 0.9–1.5(1.7) × as long as the lobes; lobes 13–16, oblong-lanceolate, spreading. Berry thick-walled, globose or ellipsoid, rounded at the apex, when dry and mature occasionally apiculate, but not shrivelled, occasionally so when dry and immature.

Trunk 15–55 cm in diam., sometimes with stilt-roots; twigs about 1–2 cm in diam. *Leaves* of a pair subequal or sometimes unequal; petiole—if present—about $\frac{1}{30}$ × as long as the blade, auriculate at the base; blade shining on both sides when young, mostly rounded at the apex, acuminate to obtuse in young plants; costa and veins prominent beneath; secondary veins 9–22 pairs. *Inflorescence* 3–5 × branched, about 30–50 cm long and wide. Peduncle, branches, and pedicels sometimes yellowish-green or orange, thickened at the nodes. Upper bracts triangular, 1–2 × as long as the diameter of the corresponding branch, acute or rounded. Corolla tube amply infundibuliform, 12–18 mm long, contracted at the base when young, gradually widened towards the throat, 5–10 mm wide at the base, 13–16 mm at the throat; lobes 2–3 × as long as wide, 12–19 × 5–10 mm, obtuse. Filaments entirely connate or sometimes only for two-thirds of their length; anthers whitish-green, 4–5 × as long as wide, 6–8 × 1.5–2 mm, shortly sagittate at the base. Ovary ovoid-cylindric or ovoid-conical, about 1–2 × as long as wide, 5–7 × 2.5–6 mm, thick-walled; stigma obovoid-cylindric, about $1\frac{1}{2}$ × as long as wide and slightly laterally compressed, 3–6 × 2–4.5 × 2–3 mm, apically bilobed. Berry green or yellowish (*teste* Milne-Redhead 2846), about 1–1.3 × as long as wide, 2.5–4.5 × 2–3.5 cm. Seeds dark brown, obliquely ovate-orbicular, about 1–1.7 × as long as wide, about 2–2.5 × 1.5–2 mm. Embryo 0.6 × 0.2 mm.

Distribution: Tropical Africa, from Sierra Leone to Uganda in the North and Angola and Northern Rhodesia in the South.

Ecology: Usually in moist places, in swamps, in *Raphia* groves, on river banks; in primary rain or secondary forests. Alt. 0–1500 m.

SIERRA LEONE: near Kolia, Deighton 3204 (BR, K, juv.); Kangahun, Deighton 6148 (K, with fr. in spirit coll.); *ibid.*, Jordan 2131 (K, with fl. buds in spirit coll.); Baoma, Deighton 3203 (K, juv.).

LIBERIA: Mecca, Boporo District, Baldwin 10435 (K); Gbanga, Linder 533 (A, K).

GHANA: Kwaben, Vigne 1295 (OXF ?, not seen, cited by miss Bruce).

NIGERIA: Ibadan, Onochie FHI 40448 (BR, K, with fl. and fr. in spirit coll.); Oyo Road near Mile 116, side of Ibadan, Meikle 1311 (K, with fl. in spirit coll.); Lagos, Bels 28 (U); Lagos Lagoon, Ejirin, Onochie FHI 34142 (K); Benin City, Palisot de Beauvois XVII (G); Warri (?) and Benin Provinces, Palisot de Beauvois s.n. (G); Niger Delta, Barter 2104 (K, P); Aboh (Ibu), Niger Delta, Vogel 51 (K, 3 sheets, type); banks of Nun R., Mann 471 (GH, K, P); banks of Bonny R., Kalbreyer 61 (BM, holotype of *A. kalbreyeri*); Akamkpa Rubber Estate, Dukwe Division, Calabar R., Calabar District, Latilo FHI 41311 (K); Oban, Calabar Province, Talbot 177 (BM, paratype of *A. talbotii*), 2077 (BM, K, lectotype of *A. talbotii*).

CAMEROONS: Ambas Bay, Mann XVI (K, P); Victoria District, Maitland 362 (K); near Victoria, Deistel 181 (M).

OUBANGUI-CHARI: between Dékoua and Nana R., Chevalier 6221 (P).

¹⁾ In Welwitsch 6021: corolla: mature bud up to 47 mm long; tube 26 mm long; throat 22 mm wide; lobes 21 mm long.

CAMEROUN: Kongola, Mbassa, Mildbraed 9107 (K); Compenda, near Mundame, Büsgen 23 (B); between Foumban and Banyo, Jacques Félix 3163 (P); Yaoundé, Foury 97 (P); Bipindi, Zenker 1965 (A, BM, BR, 2 sheets, COI, E, G, GOET, HBG, K, L, M, MO, P, 2 sheets, S, WU, Z, isotypes of *A. zenkeri*).

GABON: near Libreville, Chevalier 33630 (P); *ibid.*, Jolly 145 (P); *ibid.*, Klaine 28 (P); near Kango, Komo R., Chevalier (Fleury) 26683 (P, WAG); Lake Anengue, SE of Port Gentil, Krukoff 120 (A); Achouka, Dybowski 113 (P); Tchibanga, Le Testu 1084 (IFAN, P); *sin. loc.*, Duparquet *s.n.* (P).

MOYEN CONGO: Kouilou R., Sargos 120 (P).

CONGO: LEOPOLDVILLE: Nioki, Kutu Territory, Flamigni 9039ter (BR); Luki R., Moanda, Boma, Wagemans 660 (BR); between Boma and Bananene, Wagemans 176 (BR, K); Mayombé, de Briey 230 (BR); *ibid.*, Panga Munga, Gossweiler 6482 (BM, COI); Bundi R., Matadi Territory, Compère 356 (BR); near Pic Cambier, near Matadi, Dacremont 311 (BR); Samu Zambi, mouth of Congo R., Donis 2401 (BR); Wamba R., Dibaya Territory, Liben 3184 (BR); Kwango R., Devred 2513 (BR, WAG); *ibid.*, Kahemba, Devred 2993 (BR).

EQUATEUR: Bodangabo, Gbelu R., east of Gemena, Evrard 264 (BR); Dundusana, Bumba Territory, Mortehan 690 (BR); Ngiri R., Bomboma Territory, Léontovitch 73 (BR, WAG); Eala, near Coquilhatville, Corbisier-Baland 1235 (B, BR, K, P), 1960 (BR); *ibid.*, Pynaert 937 (BR, 3 sheets, type of *A. auriculata*); between Bikoro and Coquilhatville, Germain 8420 (BR, K); Befale Territory, Evrard 3481 (BR, WAG), 5124 (BR); Monkoto, Evrard 4452 (BR, WAG); Ingende Territory, Evrard 6087 (BR, WAG).

ORIENTALE: Monbutt, Munsa, near Niangara, Schweinfurth 3376 (K); between Yambao and Mongandjo, Limbete R., Evrard 2108 (BR); Yangole, west of Yangambi, Louis 12023 (BR, *juv.*); Gazi, Louis 10953 (BR); *ibid.*, Ikele R., Louis 13544 (BR, WAG); Yangambi, Germain 79 (BR); *ibid.*, Louis 16411 (BR); *ibid.*, A. Léonard 1146 (BR); left bank Yandja Lake, Isangi Territory, Germain 422 (BR, WAG); Irumu, Bequaert 4904 (BR, 2 sheets, type *A. bequaertii*).

KIVU: Loso R., Masisi Territory, Ghesquière 4943 (BR, WAG); Bukombo, Masisi Territory, Gutzwiller 829 (BR), 3306 (BR); Kiluluma, Walikale Territory, A. Léonard 2063 (BM).

KASAI-KATANGA: Kanda Kanda-Kaniama Territories, Société Saçomintra, Quarré 2194 (BR).

KATANGA: Tshibili R., west of Kolwezi, Schmitz 3073 (BR).

ANGOLA: Congo Iala, Zaire District, Gossweiler 8636, *p.p.* (LISU); Sumba, Peco, Congo District, near Zaire R., Gossweiler 8680 (BM, K); between Machinge and Malinda(?), Luachimo R., Marques 267 (COI, LISU); Golungo Alto, Welwitsch 6021 (BM, 5 sheets, with *juv. spec.*, C, COI, G, K, LISU, 8 sheets, with *juv. spec.*, P, lectotype of *A. macrantha*); Pungo Andongo, Welwitsch 6022 (BM, C, COI, G, K, LISU, 3 sheets, P, paratype of *A. macrantha*).

N. RHODESIA: Matonchi R., below dam, Mwinilunga District, Milne-Redhead 2846 (BM, BR, K, with fl. buds in spirit coll.); Zambesi R., north of Kalene Hill, Mwinilunga District, Western Province, Angus 557 (K); near the headwaters of the Lunga R., Mwinilunga-Kolwezi Road, Mwinilunga District, Angus 574 (BM, BR, K).

TANGANYIKA: west of Bukoba, Bukoba District, Lake Province, Eggeling 6251 (EA, K); Nyakato, Bukoba District, Gillman 265 (EA, K); between Kibondo and Mabamba, Kibondo District, Western Province, Procter 593 (EA, K).

KENYA: Kakamega, North Kavirondo District, Feltham 10290 (EA).

UGANDA: Logiri, West Nile, Buganda Province, Eggeling 1858 (F.D. 1660) (K); near Hoima, Bunyoro, Bagshawe 1459 (BM); south of Buddu, Masaka District, Fyffe 14 (K); Mengo District, Dümmer 2970 (BM, K); Ruampara, Rwoho, Ankole District, St. Claire Thompson 1815 (EA, K, MO); near Kampala, Wilson 259 (A).

SUDAN: bank of Nabagoon R., Yambio District, Andrews A. 1568 (K).

A. vogelii differs from *A. nobilis* mainly by the comparatively shorter corolla tube. The leaves of *A. nobilis* are usually comparatively narrower and drying black; the fruits are shrivelled when dry. In *A. vogelii* the peduncles and the branches are stouter, and the fruits

not shrivelled when dry. Ecologically they are separated, as *A. vogelii* grows in swamps and *A. nobilis* in dry places.

Some plants of *A. schweinfurthii* may have spines, but can be distinguished from *A. vogelii* by their leaves which are usually petiolate and have no revolute margin. But the most typical feature of *A. schweinfurthii* is the characteristic tapering flower bud.

Remarks: *A. buchneri* falls entirely within the variation of *A. vogelii* according to its description. Partially united filaments occur only in some specimens (Bels 28, Louis 13544, and Marques 267) which belong certainly to *A. vogelii* as shown by all other characters.

A. lanceolata falls also within the variation of *A. vogelii* according to its description, except for its comparatively narrow leaves which are about $6 \times$ as long as wide.

The type of *A. macrantha* has in its flowers the same proportions as *A. vogelii* but the corolla is larger; besides it has incipient spines or unarmed branches. Some other specimens of *A. vogelii* have very short spines, as for instance Ghesquière 4943, Gutzwiller 829, and Onochie FHI 40448, which fall in all other characters within the variation of the species.

The specimen St. Claire Thompson 1815, discussed by Miss BRUCE (1955), has a proportionally long corolla tube which does not fall outside the variation of the species. The same is true for Corbisier-Baland 1235, 1960, and Donis 2401.

6. ***A. djalonensis*** A. Chev., Bull. Soc. Bot. Fr. 54. Mém. 8: 47. 1908; Bruce, Kew Bull. 1955: 49; Aubréville, Fl. For. Cot. Iv. 2nd. ed. 3: 184. 1959.

Figs. 8-10; Map 6

Lectotype: French Guinea: Kollangui, Chevalier 12221 (P, 2 sheets).

Heterotypic synonym: *A. kerstingii* Gilg ex Volkens, Notizbl. Bot. Gart. Berlin App. 22: 33. 1909; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931, p.p. excl. Kersting A 627; Aubréville, op. cit. 1st. ed. 3: 154. 1936. Type: Togo: Sokode, Kersting A 18 (holotype not seen, destroyed in B; isotypes: E!, K!).

Misapplied names: *A. nobilis* Hutch. et Dalz., l.c., quoad syn. *A. djalonensis* A. Chev., non G. Don.

A. procera Leprieur ex A. Chev., Expl. Bot. 441. 1920, non ex Bureau.

A. procera Leprieur ex A. Chev., l.c., var., non ex Bureau.

Tree, 8-15 m high. Twigs with or without 2 erect or slightly divergent confluent spines or single small cushions above the leaf-axils. Leaves petiolate; blade pale to dark green above, paler and with pale yellowish-green midrib and veins beneath, slightly shining on both sides, coriaceous or in young plants softly subcoriaceous, brittle, when dry greenish-brown and coriaceous to papyraceous, oblong-elliptic or obovate-elliptic, in young plants usually narrower, $1.5-3.5 \times$ as long as wide, $9-35 \times 4.5-17$ cm, in young plants and low-level branches up to 115×50 cm, obliquely cordate, rounded,

or cuneate at the base or decurrent into the petiole; veins not very conspicuous; margin not recurved. Sepals pale green, rounded, the outer ones orbicular, 6–10 mm long, more or less rugulose and not or scarcely spreading when dry, the inner ones of about the same size and shape, becoming retuse by the development of the corolla. Corolla in the young bud at the apex as in the mature bud or slightly tapering, in the mature bud 5.5–6 × as long as the calyx, 30–50 mm long and rounded or subtruncate at the apex, white or creamy, the limb paler than the tube; tube 3–4 × as long as the calyx, 2–3 × as long as the lobes; lobes 11–14, oblong-lanceolate, spreading. Berry ellipsoid, when dry not shrivelled and rounded at the apex.

Trunk cylindric, without buttresses, 15–40 cm in diam.; twigs about 1–2 cm in diam. *Leaves* of a pair subequal or unequal (the larger one up to twice as long as the other); petiole 0.1–0.25 × as long as the blade, auriculate at the base; blade more shining when young, mostly rounded at the apex, acuminate to obtuse in young plants; costa and veins prominent beneath; secondary veins 7–19 pairs. *Inflorescence* 3–4 × branched, dichasial or sometimes by development of descending serial axillary branches partially 4-chasial, about 15–50 cm long and wide. Peduncle, branches, and pedicels greenish-white or pale green and with darker green dots, thickened at the nodes. Upper bracts triangular, about as long as or shorter than the diameter of the corresponding branch, acute. Corolla tube nearly cylindric, 20–32 mm long, contracted at the base when young, gradually widened towards the throat, 4–5 mm wide at the base, 10–12 mm at the throat; lobes 2.5–4 × as long as wide, 10–18 × 4–6 mm, obtuse. Filaments entirely connate; anthers creamy or sometimes buff-yellow, about 4.5 × as long as wide, 7 × 1.5 mm, sagittate at the base. Ovary obovoid, about 2 × as long as wide, 6–7 × 3.5 mm, thick-walled; stigma obovoid-cylindric, about 2 × as long as wide, 5–6 × 2.5–3 mm, apically bilobed. Berry dark green, hard, rounded at the apex, about 1.2–1.7 × as long as wide, 3.5–5 × 2–3.5 cm; wall 3 mm thick; septa about 0.75 mm thick. Seeds medium brown, obliquely ovate or ovoid, 2.5 × 1.5–1.7 × 1 mm.

Distribution: Tropical West Africa, from Portuguese Guinea to Cameroun.

Ecology: In rather dry places, in savannas or thickets. Alt. 0–500 m.

PORTUGUESE GUINEA: Teixeira Pinto, Orey 130 (K, LISC); Gabu, Espírito Santo 274 (COI); Piche-Pansor, Espírito Santo 3425 (COI); near Fulacunta, Orey 211 (COI, K).

GUINEA: Kollangui, Chevalier 12221 (P, 2 sheets, lectotype; photograph of one sheet in K), 12222 (P, paratype; photograph in K), 12873 (P); Santa Valley, Chevalier 12773 (P); between Santa R. and Timbo, Chevalier 12801 (P, juv.); Kaloum, Conakry, Maclaud 40 (P); Kindia, Chevalier 13390 (P).

SIERRA LEONE: Musaia, Deighton 4215 (K), 4827 (K, BR, EA).

IVORY COAST: near Séguéla, Leeuwenberg 3273 (WAG); 25 km west of Bouaké, Leeuwenberg 3285 (WAG, with fr. in spirit coll.; Photograph 4; seedlings of this number in the greenhouses in WAG, BR, K, L, U); 9 km south of Bouaké, Leeuwenberg 3315 (WAG); 11 km south of Bouaké, Leeuwenberg 3316 (WAG, with fl. and fr. in spirit coll., L); Forêt de l'Angédédou, northwest of Abidjan, Herb. I.D.E.R.T. 3671 (ABI); Adiopodoumé, 17 km west of Abidjan, Ake Assi Herb. I.D.E.R.T. 5412 (P, WAG); Lagune Ono, near Grand Bassam, Chevalier 33055 (P); east of Bingerville, Leeuwenberg 3167 (WAG, Photograph 5); Tafiré-Soba, Aubréville 1393 (P); Ferkessedougou, Aubréville 1538 (P), 2610 (P).

UPPER VOLTA: between Soukourouba and Bobo-Dioulasso, Guiri, Chevalier 886 (P, K).

GHANA: Ejura, Vigne 2029 (BM, EA); Kwahu, between Kwahu and Tafo, Irvinge 1669 (E, K).

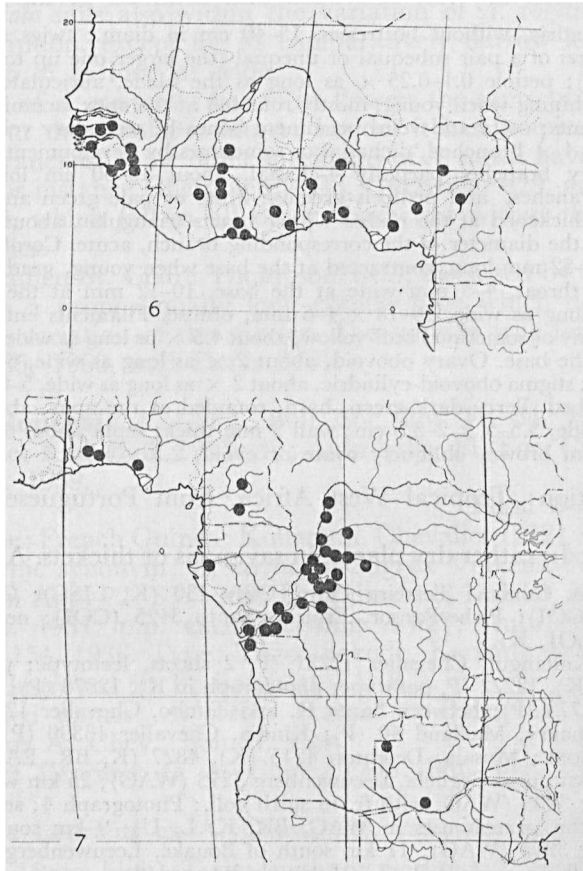
TOGO: Sokode, Kersting A 18 (E, K, isotypes of *A. kerstingii*); Lenso (?), Kersting A 355 (BO).

DAHOMY: Adja, Ouéré, Le Testu 296 (P); Godomey, Poisson July 1902 (P).

NIGERIA: near Ibadan, road to Oyo, Meikle 1309 (K, with fl. buds in spirit coll.); Oyo Province, Lapido FHI 3086 (K); *ibid.*, Ibadan Government College, Keay FHI 26734 (K); *ibid.*, Hamblar 7 (K); Ibadan, Onochie FHI 38332 (K, WAG); Olokemeji Reserve, Ross 39 (K); between Onitsha and Uke, Onochie FHI 35775 (K); Onitsha Province, Akpaka Forest Reserve, Onochie 40433 (K, with fr. in spirit coll.); Abinsi, Benue Province, Dalziel 638 (K); Bauchi Province, Tangale Waje District, Kennedy FHI 7275 (K); North of Orukram (?), Dundas 1933/21 (A); S. Nigeria, *sin. loc.*, Rosevear 50/29 (K).

CAMEROONS: Jamtari, between Jamtari and Karamti, Latilo & Daramola FHI 28928 (K).

CAMEROUN: *sin. loc.*, Aubréville 166 (P, WAG).



Map 6. *A. djalonensis*; Map 7. *A. liebrechtsiana*.

7. ***A. liebrechtsiana*** De Wild. et Dur., Compt. Rend. Soc. Bot. Belg. 38(2): 96. 1899; Baker in Fl. Trop. Afr. 4(1): 540. 1903.

Fig. 11; Map 7

Type: Congo: Equateur, Lukolela, Dewèvre 829 (BR, 2 sheets; photographs of both in K).

Heterotypic synonyms: *A. baertsiana* De Wild. et Dur., Bull. Herb.

Boiss. Sér. 2. 1: 829. 1901; Baker, l.c. p. 625. 1904. Type: Congo: Leopoldville, Kisantu, Gillet 56 (BR, 9 sheets; photographs of 2 sheets in K).

A. gossweileri Exell, Journ. Bot. 67. Suppl. 2: 101. 1929. Type: Angola: Zaire District, Congo Iala, Gossweiler 8636, p.p. (BM, holotype; isotypes: BM, K; the LISU sheet is *A. vogelii*).

Tree or few-stemmed (?) shrub, 1.50–12 m high; without spines. Leaves petiolate; blade dark green above, pale greyish-green beneath, drying greenish-brown and coriaceous, oblanceolate to linear or sometimes oblong-obovate, $2\frac{1}{2}$ –10 (usually about 4–7) \times as long as wide, 11–75 \times 3–15 (usually about 15–40 \times 3–8) cm, long-decurrent into the petiole; costa prominent and acutely triangular beneath; secondary veins rather inconspicuous; margin not recurved nor revolute. Sepals pale green, rounded, also when dry strongly appressed to the base of the corolla tube which therefore is slightly contracted and later to the fruit, smooth and shining, the outer ones broadly ovate or orbicular, 4–8 \times 4–8 mm, the inner ones slightly larger and becoming torn by the development of the corolla. Corolla in the mature bud $4\frac{1}{2}$ –7 \times as long as the calyx, 32–54 mm long, and as in the young bud rounded or somewhat tapering at the apex, white, the limb paler than the tube which is usually greenish-white; tube 3–5 \times as long as the calyx, 1.8–3 \times as long as the lobes; lobes 10–12, oblong-lanceolate, spreading. Berry globose or ovoid, when dry irregularly shrivelled, thin-walled; wall about 1 mm thick.

Trunk 10–30 cm in diam. or more(?), without buttresses(?); twigs about 0.5–1.5 cm in diam. *Leaves* of a pair subequal; petiole $\frac{1}{15}$ – $\frac{1}{5}$ \times as long as the blade, up to 9 cm long, auriculate, obscurely ligulate at the base; blade mostly rounded at the apex, acuminate to obtuse in young plants; secondary veins 7–19 pairs. *Inflorescence* 3–5 \times branched, 10–35 cm long and wide. Peduncle, branches, and pedicels not or scarcely thickened at the nodes. Upper bracts triangular, about as long as wide, about 1–2 \times as long as the diameter of the corresponding branch, obtuse. Outer sepals 0.8–1.2 \times as long as wide. Corolla tube narrowly infundibuliform, 22–34 mm long, contracted at the base, especially when young, gradually widened towards the throat, 3–5 mm wide at the base, 6–10 mm at the throat; lobes $2\frac{1}{2}$ –3 \times as long as wide, 10–18 \times 4–6 mm, obtuse. Filaments entirely connate; anthers $4\text{--}5\frac{1}{2}$ \times as long as wide, 7–8 \times 1.5–2 mm, sagittate at the base. Ovary obovoid, about 2 \times as long as wide, 5–7 \times 3–4 mm, with a rather thick wall; stigma obovoid-cylindric, about 2 \times as long as wide, 3.5–5 \times 2–2.5 \times 1.5–2 mm, emarginate at the apex. Berry green or pale yellow, 1–1 $\frac{1}{2}$ \times as long as wide, 15–27 \times 10–18 mm, rounded at the apex, when dry often acuminate, dull. Seeds medium brown, obliquely ovate or roughly polyhedral, $1\frac{1}{2}$ –2 \times as long as wide, 1.5–2.5 \times 1–1.5 mm. Embryo about 1.5 \times 0.2 mm.

Distribution: From Togo to Angola and in Northern Rhodesia.

Ecology: In open places in swamps or in the water, in usually periodically inundated forests. Alt. 0–400 m.

DAHOMÉY: between Massi and Goutyssa, Abomey District, Chevalier 23269 (P); banks of Lower Ouémé R., between Dogba and Affamé, Chevalier 23472 (P).

NIGERIA: Siluko, bank of Siluko R., Benin District, Onochie FHI 40423 (K, with fl. and fr. in spirit coll., WAG).

CAMEROON: Ayos, Jaques Félix 4862 (P, immature fruits only); S. Kongola, Mildbraed 9001 (K).

GABON: near Atsié R., near Lambaréné, Chevalier (Fleury) 26305 (P); near Brazzaville, Pobéguin 2 (P); *ibid.*, J. de Brazza 136 (P).

CONGO: LEOPOLDVILLE: Kiri R., near Lake Léopold II, Laurent 5 Nov. 1903 (BR); Lake Léopold II, Jans 249 (BR); *ibid.*, Bokebeni, Flamigni 6395 (BR, with juv. spec.); Ebu R., Banningville Territory, Jans 910 (BR); Lower Kasai R., Bokala, Vanderyst 4785 (BM, BR); Léopoldville, Bequaert 7312 (BR); *ibid.*, Gillet 2543 (BR); Kisantu, Gillet 56 (BR, 9 sheets, type of *A. baertsiana*); Kitobola (= Kito), southeast of Thysville, Flamigni 147 (BR); Zambi, mouth of Congo R., Bequaert 7904 (BR).

EQUATEUR: between Libenge and Dongo, near Ubangi R., Lebrun 1672 (BR); Bombura, Lua-Vindu R., Evrard 936 (BR); Bomana, Giri R., Sapin anno 1912 (BR); Ukatoraka, Laurent 22 Jan. 1904 (BR, photograph in K); Eala, Coquilhatville Territory, Corbisier-Baland 1815 (BR, WAG); *ibid.*, Evrard 3698 (BR, WAG); *ibid.*, Germain 1603 (BR); *ibid.*, Leemans 219 (BR), 280 (BR), 382 (BR); *ibid.*, Pynaert 548 (BR); *ibid.*, Vermoesen 2352 (BR, PR); near Eala, Yali R., Robijns 550 (BR); Ruki R., Eala, Coûteaux 31 (BR), 128 (BR, K); *ibid.*, Lebrun 378 (BR); *ibid.*, J. Léonard 182 (BR, WAG); Bonkele R., between Bamanian and Ilenge, near Eala, J. Léonard 971 (BR); Bikoro, Evrard 3751 (BR, WAG); Bamanian, Hulstaert 863 (BR); Bokuma, left bank Ruki R., Hulstaert 183 (BR); between Bantoie and Bojeka, left bank Ruki R., Louis 1893 (BR, K); Bokote, Busira R., Hulstaert 329 (BR), 822 (BR); Gombé, Sapin anno 1912 (BR); Lukolela, Dewèvre 829 (BR, 2 sheets, type); Elua Island, Lake Tumba, J. Léonard 675 (BR); Bikoro, between Lake Tumba and Mabali, Thonnet 52 (BR); Boleke, Bolamba Territory, L. Dubois 305 (BR, WAG); between Kutu and Lukolela, Lebrun 6622 (BR, K).

CONGO: *sin. loc.*, Greshoff 2 (L).

ANGOLA: Congo Iala, near Congo R., Gossweiler 8636, p.p. (BM, 2 sheets, K, type of *A. gossweilerii*).

N. RHODESIA: north of Chavuma, Balovale District, Western Province, Angus 642 (BM, BR, K), 642A (K); Katombora, Southern Livingstone, Brenan & Morze 7740 (EA, K).

A. liebrechtsiana has narrow leaves, drying pale greenish-brown, and the very small calyx by which it can be distinguished from *A. schweinfurthii*.

From *A. djalensis* it can be separated also by its narrow leaves, the blade never being cordate at the base, and the small calyx clasping the corolla also when dry. Moreover *A. liebrechtsiana* has never spines and grows in moist places, and its fruits have a thin wall.

8. ***A. schweinfurthii*** Gilg in Engl. Bot. Jahrb. 17: 579. 1893; Baker in Fl. Trop. Afr. 4(1): 541. 1903; Bruce, Kew Bull. 1955: 51; Bruce & Lewis in Fl. Trop. E. Afr., Loganiaceae 11. 1960.

Fig. 12; Map 8

Lectotype: Congo: Orientale, Niamniam, Brwole R., Niangara Territory, Schweinfurth 3726 (K, 4 sheets, lectotype; isotypes: S, WU).

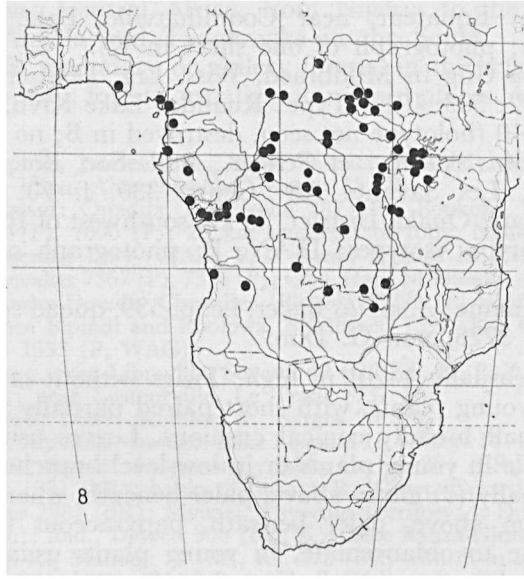
Heterotypic synonyms: *A. niamniamensis* Gilg, l.c. p. 580. Type: Sudan: Niamniam, Nabambisso R., Boddo R., Schweinfurth 3037 (holotype not seen, destroyed in B; isotype: K!).

? *A. stuhlmannii* Gilg, l.c. p. 580; Baker, l.c. p. 540. Type: Tanganyika: Lake Province, Bukoba, Stuhlmann 3737 (holotype not seen, destroyed in B; no isotype seen). Topotype: Eggeling 6237 (EA, K, = *A. schweinfurthii*!).

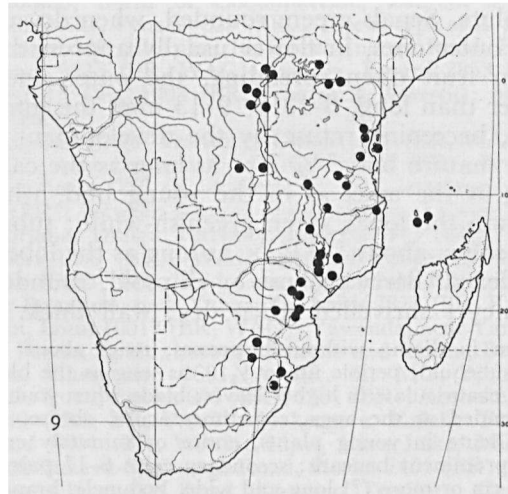
A. magnifica Gilg, l.c. p. 581; Baker, l.c. p. 541. Type: Gabon: Munda, near Libreville, Sibange Farm, Soyaux 49 (holotype not seen, destroyed in B; isotypes: GOET!, K!, P!, Z, 2 sheets!).

? *A. kamerunensis* Gilg in op. cit. 28: 125. 1899; Baker, l.c. p. 538. Type: Cameroun: Batanga, Dinklage 1361 (holotype not seen, destroyed in B; no isotype seen).

A. squamata De Wild. et Dur., Bull. Herb. Boiss. Sér. 2. 1: 830. 1901; Baker, l.c. p.625. 1904. Type: Congo: Leopoldville, Kimuenza, Gillet 1773(BR, holotype; photographs: EA, K).



Map 8. *A. schweinfurthii*.



Map 9. *A. grandiflora*.

A. insulana S. Moore, Journ. Linn. Soc. 37: 186. 1905. Type: Uganda: Buganda Province, Mengo District, Lake Victoria, Buvuma Island, Bagshawe 638(BM, holotype).

A. laurentii De Wild., Miss E. Laurent 1: 262. 1906. Type: Congo: Equateur, near Lukolela, Em. & M. Laurent 13 Dec. 1903 (BR, holotype, corollas are *A. schweinfurthii*!; leaves may be *A. liebrechtsiana*).

A. pynaertii De Wild., Ann. Mus. Congo Sér. 5. 3: 251. 1910. Type: Congo: Equateur, near Coquilhatville, Eala, Pynaert 855 (BR, 2 sheets; photograph of one sheet in K).

? *A. gigantea* Gilg in Mildbraed, Wiss. Erg. Deutsch. Centr. Afr. Exp. 1907-8. 2: 533. 1913. Type: Ruanda: Lake Kivu, Wau Island, Mildbraed 1140 (holotype not seen, destroyed in B; no isotype seen).

A. oubanguiensis Aubrév. et Pellegr., Bull. Soc. Bot. Fr. 100: 25. 1935; Sillans, Les Savanes Afr. Centr. 330, f. 70. 1958. Type: Oubangui-Chari: Ouaka District, 25 km southwest of Ippy, Tisserant 1934 (P, holotype; isotypes: IFAN, P; photograph of one P sheet in K).

Misapplied name: *A. nobilis* Baker, l.c. p. 539, quoad spec. Schweinfurth 3037 et 3726, non G. Don.

Tree 3-30 (usually 4-20) m high. Twigs without or occasionally, especially in young plants, with short paired partially united spines, often with small broadly conical cushions. Leaves usually petiolate but often sessile in young plants or in low-level branches; blade dark green and usually (?) glossy above, paler beneath, when dry medium to dark brown above, paler beneath, papyraceous to coriaceous, oblong-obovate to oblanceolate, in young plants usually narrower, 1.75-3.5 × as long as wide, 7-45 × 3.5-18 cm, in young plants up to 100 × 30 cm or more (?), cuneate at the base; costa more or less acute beneath; tertiary veins inconspicuous; margin not recurved, but often revolute. Sepals green, rounded, when dry usually smooth, especially the outer ones, in flower usually appressed to the base of the corolla, in fruit often spreading, the outer ones orbicular or slightly broader than long, 8-13 × 9-13 mm, the inner ones usually slightly larger, becoming retuse by the development of the corolla. Corolla in the mature bud 5½-7 × as long as the calyx, 55-61 mm long, tapering at the apex as in the young bud, white or creamy, tube darker than the lobes, often greenish-white; tube about 3-4 × as long as the calyx, about 1-1½ × as long as the lobes; lobes 10-11, lanceolate, reflexed. Berry globose or ellipsoid, rounded or apiculate at the apex, never shrivelled when dry; wall thick.

Trunk 8-70 cm in diam., without buttresses; twigs about 1-2 cm in diam. *Leaves* of a pair subequal; petiole up to ¼ × as long as the blade, auriculate at the base or often exauriculate in higher leaves; blade when young shining on both sides, mostly rounded at the apex, sometimes acute, obtuse, retuse, or shortly apiculate, more acute in young plants, entire or minutely crenate; costa and secondary veins prominent beneath; secondary veins 6-17 pairs. *Inflorescence* 4 × branched, 12-30 cm or more (?) long and wide. Peduncle, branches, and pedicels thickened at the nodes. Upper bracts about 2-6 × as long as the diameter of the corresponding branch, ovate or oblong-ovate, about 1-2 × as long as wide, 4-9 × 3-5 mm, rounded. Corolla tube nearly cylindric, 25-37 mm long, contracted at the base when young, gradually widened towards the throat, 6-8 mm wide at the base, 12-14 mm at the throat; lobes 3-4½ × as long as wide, 21-28 × 5-8 mm, obtuse. Filaments entirely connate; anthers about 5 × as long as wide, 7.5-10 × 1.5-2 mm, sagittate at the base. Ovary ovoid or nearly so, about

7 × 3.5 mm, thick-walled; stigma obovoid-cylindric, about as long as wide, 3–5 × 3–4 mm, apically emarginate. Berry green or yellow, hard, 1–1.2(1.5) × as long as wide, 25–45 × 20–30 mm, up to at least 70 mm long (*teste* Dawkins 846). Seeds medium brown, obliquely ovate-orbicular, about 2 × 1.5 mm.

Distribution: Central Africa, from Nigeria to the Sudan in the North and Angola and Tanganyika in the South.

Ecology: In secondary or gallery forests, in thickets, or sometimes in savannas or rain forests, usually not in moist places. Alt. 400–1800m, or less (?).

NIGERIA: Sapoba, Jamieson R., Benin District, Kennedy 2136 (K, P).

CAMEROONS: Johan Albrechtshöhe, Büsgen 15 (B).

OUBANGUI-CHARI: Ouadda, Aubréville 387 (P); Boukoko, north of Bangui, Tisserant 1037 (P), 1800 (P); 25 km southeast of Ippy, Ngukpwanga R., near Ouaka R., Tisserant 1934 (IFAN, P, 2 sheets, type of *A. oubanguiensis*); Upper Kourou R., Chevalier 7367 (P), 7376 (P); Obo, Haut M'Bomou, Aubréville 542 (P).

CAMEROON: near Douala, Chevalier (Fleury) 33292 (P, WAG), *ibid.*, Winkler 737 (Z); between Bipindi and Ebolowa, Mildbraed 7591 (K); Coupe Malo, near Bipindi, Hedin 1533 (P, WAG).

GABON: Sibang, near Libreville, Soyaux 49 (GOET, K, P, Z, 2 sheets, isotypes of *A. magnifica*); near Lastourville, Le Testu 7737 (P).

MOYEN CONGO: Lower Kouilou R., Sargos 20 (P).

CONGO: LEOPOLDVILLE: Inongo, Lake Léopold II, Gilbert 14147 (K); Kimuenza, Gillet 1773 (BR, type of *A. squamata*); *ibid.*, Carlier 304 (BR, K, M); *ibid.* (?), Gillet (Butaye) 1831 (BR); banks of Lukaya R., Gillet (Gérard) Jan. 1900 (BR); Kisantu, Callens 2981 (BR); Mvuazi, Thysville Territory, J. Dubois 28 (BR, with fl. in spirit coll.); *ibid.*, Devred 300 (BR, K); Seke Banza-Gimbi Road, Compère 193 (BR); Luki R., Madoux 53 (BR, K), 223 (BR, with fl. in spirit coll., WAG); *ibid.*, Toussaint 2011 (BR); Ludio R., left bank Kwango R., Germain 2728 (BR, P); between Mazia and M'Pata, Dibaya Territory, Liben 3216 (BR); Lutshima, Sapin July 1907 (BR).

EQUATEUR: Bolombo, north of Coquilhatville, Laurent 2 Jan. 1904 (BR); Eala, near Coquilhatville, Pynaert 855 (BR, 2 sheets, type of *A. pynaertii*); Mondjo, Ikelemba, J. Léonard 510 (BR); km 10, Bikoro-Inongo Road, Evrard 2664 (BR); Mondombe, Evrard 5513 (BR, WAG); Isandja, Evrard 2853 (BR, WAG); near Lukolela, Laurent 13 Dec. 1903 (BR, type of *A. laurentii*); near Busira R. (?), Hulstaert 1369 (BR).

ORIENTALE: Tukpwo, Ango Territory, Gilbert 417 (BR, WAG); *ibid.*, Gérard 1200 (K); Kumbu, near Doruma R., De Graer 594 (BR); Brwole R., Niangara Territory, Schweinfurth 3726 (K, 4 sheets, S, WU, lectotype); Bambesa, Gérard 203 (BR), 3844 (BR); between Boruma and Niangara, Lebrun 3186 (BR, WAG); Madili, near Doruma, Dungu Territory, Leclercq 141 (BR); Yambao, north of Yangambi, Gilbert 1399 (BR); Weko, north of Yangambi, Louis 14069 (BR); Yangambi, Louis 16425 (BR); *ibid.*, near Lusambila R., Louis 3100 (BR, K), 9521 (BR); near Busukuru, near Yangambi, Louis 7873 (BR, K); Yalibwa, northwest of Yangambi, Louis 10017 (BR, WAG); Yawenda, near Yangambi, Gutzwiller 566 (BR); Ituri Forest, Epuhi, between Penghe and Irumu, Bequaert 2598 (BR). Kivu: Rutshuru, Ghesquière 3691 (A, BR, K, MO, P, U); Bitale, km 48 Kavumu-Walikale Road, Pierlot 603 (BR), 1531 (BR); Kasheke, Kalehe Territory, A. Léonard 1249 (BM, BR, WAG); Makengere, Kalehe Territory, near Kivu Lake, A. Léonard 4601 (BR, WAG); Idjwi, Kivu Lake, Michelson 307 (BR); Mulanga, km 128 Bukavu-Shabunda Road, Pierlot 2451 (BR), 2541 (BR, WAG); Kabumba, Lumana-Nyangwe Road, Kasongo Territory, Germain 7704 (BR). KASAI: Okoka, T. Lodja-Sankuru, Germain 7578 (BR, with fl. in spirit coll., K); Miambi Road, Bakwanga Territory, Liben 1946 (BR).

KATANGA: Kamunza, Schmitz 5763 (BR); Elisabethville, Salèsiens S. 1061 (BR); *ibid.*, Burt-Davy 17972 (BM, K); *ibid.*, Schmitz 2294 (BR); Keyberg, southeast of Elisabethville, Schmitz 2842 (BR, K), 3332 (BR); Katuba, southeast of Elisabethville, Quarré 4301 (BR, K); *sin. loc.*: Ringoet 30 Nov. 1916 (K); Delvaux 695 (Letieshe 164) (BR).

CONGO: sin. loc., Chr. Smith s.n. (BM, K).

ANGOLA: Porto Amboim, Capir, Gossweiler 10070 (BM, K, both corollas only); Cuaza Sul District, Gossweiler 5984 (BM, COI, LISU, aberrant); between Vila Henrique de Carvalho and Muriège, Lunda, Exell & Mendonça 791 (BM, COI).

N. RHODESIA: near Samfya, Lake Bangweulu, Fort Roseberry District, Angus 276 (BR, K, with fr. in spirit coll.), 291 (BM, BR, K, with fr. in spirit coll.); Zambesi R., north of Kalene Hill, Mwinilunga District, Angus 557A (K); Ndola District, Fanshawe 1684 (BR, K), 2308 (K, young seedling); sin. loc., Holmes 899 (K, with fr. in spirit coll.).

TANGANYIKA: Rubare, Bukoba, Bukoba District, Eggeling 6237 (EA, K, topotype of *A. stuhlmannii*); ibid., Procter 806 (EA, K); Ukara Island, Lake Province, A. Smith 1 (EA); Mahali Mts., Kigoma District, Jefford & Newbould 2602 (K); Malagarasi Pontoon Camp, Kibondo Road, Buha District, Bullock 3223 (K).

UGANDA: Bwamba, Toro District, Eggeling 4061 (K); Entebbe, Dawe 950 (K, P); Mengo District, Buvuma Island, Bagshawe 638 (BM, holotype of *A. insulana*); Chuzezi (?), Bagshawe 122 (BM); Katera, Masaka District, Drummond & Hemsley 4504 (BR, EA, FI, K, with fr. in spirit coll., S); Kalangala, Bugula Island, Buganda Province, Philip 433 (EA, MO); near Sozi Point, Sese Island, Masaka District, Eggeling 89 (F.D. 262) (BR, EA, K); ibid., Maitland 643 (K); Nkose Island, Lake Victoria, Buganda Province, Dawkins 846 (BM, EA, K, fl. and fr. in spirit coll.), 883 (BM, EA, K).

SUDAN: Niamniam, Nabambisso R., Boddo R., Schweinfurth 3037 (K, isotype of *A. niamniamensis*); Aba, Aloma Plateau, Yei District, Meyers 10228 (K); Lado, Yei R., Sillitoe 307 (K, P).

Remark: After comparison of the specimens studied by Miss BRUCE (1955) and many others, several of which had been collected after her publication, her conclusions about synonymy could be confirmed. *A. gigantea* and *A. kamerunensis* fall also within the variation of this species, judging from their descriptions.

9. *A. grandiflora* Gilg in Engl. Bot. Jahrb. 17: 582. 1893.

Fig. 13 (8-13); Map 9

Type: Comores: Corani Region, Schmidt 240 (holotype not seen, destroyed in B; no isotype seen). Neotype: Comores: sin. loc., Humblot 311 (P, neotype; isoneotypes: BM, K, P, 5 sheets).

Heterotypic synonyms: *A. zambesiaca* Bak., Kew Bull. 1895: 99 (April 1895); Fl. Trop. Afr. 4(1): 540. 1903; Prain & Cummins in Fl. Cap. 4(1): 1049. 1909; Bruce, Kew Bull. 1955: 54; Bruce & Lewis in Fl. Trop. E. Afr., Loganiaceae 10, f. 2. 1960. Type: Nyasaland: Shire Highlands, Buchanan 84 (K, holotype; isotypes: E, K).

A. insignis Galpin, Kew Bull. 1895: 150 (June-July 1895). Type: Swaziland: Horo Forest, Leyson 1358 (K, 6 sheets, holotype; isotype: BOL, 3 sheets).

A. orientalis Gilg in Engler, Pfl. Ost-Afr. C: 312. 1895 (Aug. 1895); Baker in Fl. Trop. Afr. 4(1): 539. 1903; Engler & Drude, Veg. der Erde 9(1): 296. f. 262. 1910. Type: Tanganyika: Eastern Province, Uzaramo, Vikindu, Stuhlmann 6092 (holotype not seen, destroyed in B; no isotype seen).

A. scheffleri Gilg ex Scheffler, Notizbl. Bot. Gart. Berlin 3: 143, 144. 1901 (21 Oct. 1901) (with description of living plant); Baker, l.c. p. 542. Type: Tanganyika: Tanga Province, Usambara Mts., Nguelo, Scheffler 55 (holotype not seen, destroyed in B; isotype: E!).

A. pulcherrima Gilg in Engl. Bot. Jahrb. 30: 375, t. 17. 1901 (19 Nov. 1901); Baker, l.c. p. 540. Type: Tanganyika: Southern

Highlands Province, Rungwe District, Umuaba and Yunguru Crater Lake, Goetze 1313 (holotype not seen, destroyed in B; no isotype seen).

A. keniensis Summerhayes, Kew Bull. 1926: 244. Type: Kenya: Nyanza Province, Kericho District, Sotik, Battiscombe 1301 (K, holotype; isotypes: EA, 2 sheets, K, 2 sheets).

Tree, 5–35 m high, unarmed. Leaves sessile, those of larger trees sometimes petiolate; blade medium to dark green above, paler beneath, when dry greenish, medium to dark brown, paler beneath, brittle, often thinly papyraceous to coriaceous, oblong-obovate or oblanceolate, in young plants usually narrower, 1.75–3.5 (in young plants up to 5) \times as long as wide, 15–70 \times 7–25 cm, up to 135 \times 50 cm in young plants or low-level branches, narrowed to the auricles or long-decurrent into the petiole; veins conspicuous; margin not recurved. Sepals green, rounded, usually spreading when dry, the outer ones orbicular or broadly ovate, 5–8 \times 5–8 mm (up to 14 \times 9 mm in Dawe 472), when dry rugulose outside and often pointed, the inner ones usually slightly larger. Corolla in the young bud rounded or tapering, in the mature bud 5–10 \times as long as the calyx, 35–60(70) mm long, tapering at the apex, white, the limb paler than the tube which is slightly greenish outside; tube 3.8–6.5 \times as long as the calyx, 1.25–2.5 \times as long as the lobes; lobes 11–13, lanceolate, spreading or recurved. Berry ellipsoid, when dry irregularly shrivelled, conspicuously rugulose, acuminate.

Trunk 25–55 cm in diam.; twigs about 1–2 cm in diam. *Leaves* of a pair subequal or unequal; petiole—if present—up to $\frac{1}{8}$ \times as long as the blade, auriculate at the base; blade with yellow midrib and veins on both sides (*teste* Maas Geesteranus 5751), mostly rounded at the apex, more acute in young plants, entire or minutely crenate; costa rounded and like the veins prominent beneath; secondary veins 8–17 pairs. *Inflorescence* 3–5 \times branched, 15–45 cm long and wide. Peduncle, branches, and pedicels thickened at the nodes. Upper bracts broadly triangular, about 1–2 \times as long as the diameter of the corresponding branch, acute or rounded. Outer sepals 0.75–1.25 \times as long as wide. Corolla tube nearly cylindric, 22–37(45) mm long, contracted at the base when young, almost gradually widened towards the throat, 3–7(10) mm wide at the base, 6–12 mm at the throat; lobes 2.2–4 \times as long as wide, 13–22 \times 5–10 mm, obtuse. Filaments entirely connate; anthers buff (*testibus* Drummond & Hemsley 3020), about 5 \times as long as wide, 7–10 \times 1.5–2 mm, sagittate at the base. Ovary ovoid- or obovoid-cylindric, about 2–2.7 \times as long as wide, 7–9 \times 3–3.5 mm, thick-walled; stigma globose or nearly so, about as long as wide, 2–4 mm long, obscurely retuse at the apex. Berry green, 1.5–1.9 \times as long as wide, 30–42 \times 17–26 mm, rounded at the apex, smooth, when dry entirely changed (see above). Seeds dark brown, obliquely ovate-orbicular, about 1–1.5 \times as long as wide, about 2.5 \times 1.5–2.5 mm.

Distribution: East Africa, from Uganda and Kenya to Transvaal, and in Zanzibar and on the Comores.

Ecology: In open often swampy places, in rain forests, or in gallery forests, mostly in the mountains. Alt. 0–2300 m.

CONGO: Kivu: Ruwenzori Mts., Muboka Valley, Lebrun 4421 (BR, K); Goma, Mushari-Est, Rubona Hills, Spitaels 455 (BR); Rushekero-Katyazo, Mushari, Spitaels 648 (BR); Biwito (= Bwito), Rutshuru Territory, Deru 458 (BR); between Walikale and Kalehe, Lebrun 5374 (BR); Kirumbu-Muero Road, Masisi Territory, Gutzwiller 1944 (BR); Biega, near Masisi, Hendrikx 4098 (BR, K); Idjwi Island,

Lake Kivu, Loveridge 534 (K); Kalwazi Mt., Kabare Territory, near Lake Kivu, Pierlot 379 (BR).

KATANGA: P. N. Upemba, Robijns 3599 (BR); Mwango Plateau, Marungu Mts., Van den Brande 181 (BR).

RUANDA-URUNDI: km 104 Astrida-Shangugu Road, Shangugu Territory, Reynders 308 (BR).

S. RHODESIA: Inyanga, near Hyamingura R., Phipps 1250 (BR, EA); Pungwe R., southeast of Inyangani, Chase 830 (BM); Bikita District, Wild 4379 (K, MO); Chirinda Forest, Chase 379 (BM).

MOÇAMBIQUE: between Mueda and Chomba, Niassa District, Gomes Pedro 5352 (LISU); Gurué, Zambézia District, Campos Andrada 1842 (COI, LISC); *ibid.*, Medonça 2196 (LISC); Massingire, Morumbala Mts., Zambézia District, Torre 4548 (LISC); Bárue, Choa Mts., Vila Gouveia, Manica E Sofala District, Mendonça 287 (LISC); Chimoio, Manica E Sofala District, Simão 526 (LISC); Marongo, Manica E Sofala District, Simão 412 (LISC); Dombe, between Dombe and Sanguene, Manica E Sofala District, Gomes Pedro 4490 (K); Cheringoma Manica E Sofala District, Mendonça 4450 (LISC); *ibid.*, Durundi Mts., Torre 3080 (LISC), 4202 (LISC); Chiniziua, near Chengo R., near Beira, Gomes E Sousa 4366 (K); Mufucia Forest, Dawe 472 (K); Maruma Mt., Sul Do Save District, Swynnerton 27 (BM, K); *sin. loc.*, Gomes E Sousa 4260 (BR, EA, K).

NYASALAND: Nchisi, Kota-kota District, Brass 17072 (BM, BR, EA, K, MO); Zomba, Clements 285 (A), 317 (K); Shire Highlands, Buchanan 84 (E, K, type of *A. zambeiaca*); Cholo Mt., Cholo District, Brass 17854 (BR, K, MO); Nelungusi R., Johnston 5 (K).

ZANZIBAR: Tozani Forest, Vaughan 997 (EA, K); New Forest, Burt Davy 22641 (A).

TANGANYIKA: Nguelo, Usambara Mts., Scheffler 55 (E, isotype of *A. scheffleri*); E. Usambara Mts., Drummond & Hemsley 3020 (K, with fl. in spirit coll.), 3458 (K, with fl. and fr. in spirit coll.); *ibid.*, Peter 3474 (B), 13898 (B), 23265 (B, juv.); *ibid.*, Verdcourt 225 (EA, K, MO); *ibid.*, near Amani, Peter 3751a (B), 21498 (B); *ibid.*, Braun 1082 (EA, FI); *ibid.*, Bryce 51 (EA); *ibid.*, Tanner 3001 (BR, K); Kombola, Unguru Mts., Schlieben 4099 (B, K, LISC, MO); Mtibwa Forest Reserve, Morogoro District, Semsei 1510 (EA, K); Mgeta R., Morogoro District, Drummond & Hemsley 1672 (BR, EA, K, LISC, S); Mahenge, Eastern Province, Schlieben 1991 (BR, G, Z); Kyimbila, Rungwe District, Stolz 497 (B, C, G, HBG, K, L, LD, M, S, U, WAG, Z); between Tukuyu and Kiwera, Southern Highlands Province, Davies 895 (EA, K).

KENYA: near Mutonga R., Meru/Embu District, Fries 1902 (K, S); Kericho District, Battiscombe 698 (EA, K, paratype of *A. keniensis*), 1301 (EA, K, type of *A. keniensis*); Kericho District, Southwestern Mau Forest Reserve, Maas Geesteranus 5751 (BR, COI, K, L, MO, S).

UGANDA: Ruwenzori Mts., Mubuku Valley, Eggeling 1257 (EA); Mt. Elgon, Dale U 78 (BR, K); *ibid.*, St. Claire Thompson E. 3945 (K); *ibid.*, Bulago, Snowden 517 (BM, K, MO).

TRANSVAAL: The Downs, Pietersburg District, Moss & Rogers 248 (K, S, Z); between Sibasa and Zoutpansberg, Rodin 4105 (K, MO, S); Zoutpansberg, Brady 17 Oct. 1905 (BM); Burt Davy 163 (BOL); *ibid.*, Kruger National Park, Punda Maria, v. d. Schyff 1025 (K); Debegeni Fall, De Hock, Kräusel 15 (M).

SWAZILAND: Horo Forest, Leyson 1358 (K, 6 sheets, BOL, 3 sheets type of *A. insignis*).

COMORES: ANJOUAN: Boivin May 1850 (P).

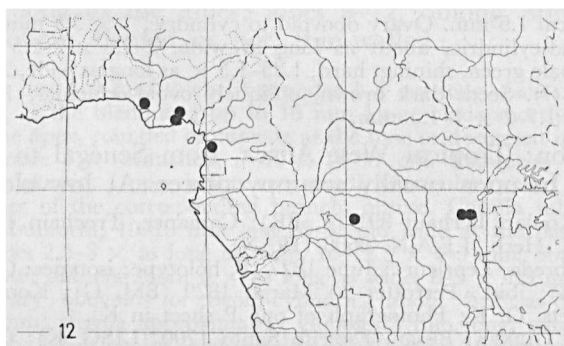
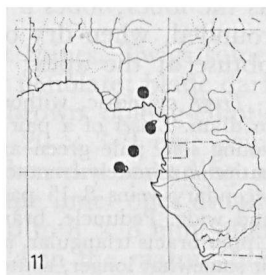
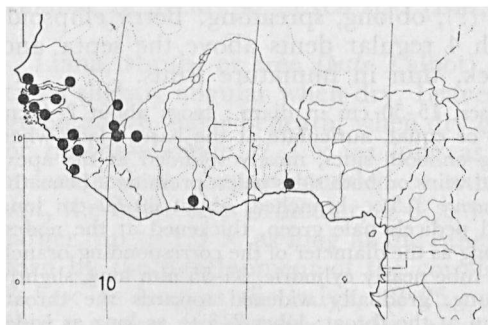
MOHELI: Kirk 340 (K).

Sin. loc.: Humblot 311 (BM, K, P, 6 sheets, neotype).

Remark: Humblot 311 which has been collected near the type locality of the species agrees in all details, also in the calyx, with the type of *A. zambeiaca*. In many specimens of this species the sepals are conspicuously rugulose and spreading when dry, but not in Buchanan 84, the type of *A. zambeiaca*, Humblot 311, and some other specimens of this species. As the latter has been collected near the type locality it has been selected as neotype.

10. ***A. procera*** Leprieur ex Bureau, Thèse Logan. 15, 74-77, f. 60-62. 1856; Baker in Fl. Trop. Afr. 4(1): 539. 1903; Bruce, Kew Bull. 1955: 56; Aubréville, Fl. For. Cot. Iv. 2nd. ed. 3: 184. 1959.

Fig. 13 (1-7); Map 10



Map 10. *A. procera*; Map 11. *A. microphylla*; Map 12. *A. obanensis*.

Type: Gambia: near Albreda, Leprieur 5 June 1827 (P, holotype; isotypes: G, 4 sheets, P, 2 sheets), not Heudelot 109 which had been annotated neither by Leprieur nor by Bureau.

Heterotypic synonym: *A. frezoulsii* A. Chev., Bull. Soc. Bot. Fr. 54. Mém. 8: 47. 1908; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931; Aubréville, op. cit. 1st. ed. 3: 154. 1936. Type: Guinea: Conakry, Chevalier 12162 (P, holotype).

Misapplied name: *A. nobilis* Bak., l.c. p. 538, quoad spec. Leprieur 5 June 1827, non G. Don.

Tree, 6-20 m high, without spines. Leaves sessile; blade medium green above, paler beneath, hardly shining, drying greenish-brown, coriaceous, brittle, when dry coriaceous to papyraceous, oblong-obovate or oblanceolate, $2-2\frac{1}{2} \times$ as long as wide, about $40-45 \times 20$ cm, in young plants and low-level branches up to 145×45 cm, gradually narrowed to the auricles, veins conspicuous; margin not revolute. Sepals pale green, rounded, the outer ones rugulose outside and often somewhat spreading when dry, orbicular or broadly ovate,

9–10 × 7–8 mm, the inner ones wider, becoming retuse by the development of the corolla. Corolla in the young bud at the apex as in the mature bud or rounded, in the mature bud $4\frac{1}{2}$ – $6\frac{1}{2}$ × as long as the calyx, 45–65 mm long, tapering and acute to obtuse, white, slender; tube $3\frac{1}{2}$ – $5\frac{1}{2}$ × as long as the calyx, $3\frac{1}{2}$ × as long as the lobes; lobes 9 or more (?), oblong, spreading. Berry ellipsoid, rounded, when dry often with 4 regular dents above the septa and obtuse at the apex; wall thick, thin in immature fruits.

Trunk cylindric, without buttresses, 15–50 cm in diam.; twigs about 2–4 cm in diam. *Leaves* of a pair subequal or equal, auriculate at the base; blade when young soft, pale green and shining on both sides, mostly rounded at the apex, entire or minutely crenate; costa and veins on both sides paler, prominent beneath; secondary veins 8–15 pairs. *Inflorescence* 3–5 × branched, about 30–60 cm long and wide. Peduncle, branches, and pedicels pale green, thickened at the nodes. Upper bracts triangular, about as long as the diameter of the corresponding branch or somewhat longer, acute. Corolla tube nearly cylindric, 35–55 mm long, slightly contracted at the base when young, gradually widened towards the throat, 4.5–5.5 mm wide at the base, 8 mm at the throat; lobes 2–3 × as long as wide, 10–15 × 5–6 mm, obtuse. Filaments entirely connate; anthers about 5 × as long as wide, 7 × ca. 1.5 mm. Ovary obovoid to cylindric, 7 × 3.5 mm, thick-walled; stigma obovoid-cylindric, about as long as wide, 2–2.5 × 2–2.5 mm, apically retuse. Berry pale green, shining, hard, 1.25–1.5 × as long as wide, 28–30 × 17–22 mm or more (?). Seeds dark brown, obliquely ovoid-orbicular, 1.25–1.75 × as long as wide, 1.7–2 × 1–1.5 mm.

Distribution: Tropical West Africa, from Sénégal to Nigeria.

Ecology: In open usually swampy places. At low elevations.

SÉNÉGAL: Koular, Berhaut 891 (P, BR); Camance, Trochain 1396 (P); near Tambacounda, Herb. I.F.A.N. 8608 (IFAN).

GAMBIA: Albreda, Leprieur 5 June 1827 (P, holotype; isotypes: G, 4 sheets, P), anno 1833 (G); *ibid.*, Perrottet 20 March 1829 (BM, G); Kombo, Heudelot 109 (P, 4 sheets, G, K; Photograph of one P sheet in K).

PORTUGUESE GUINEA: Bissau, Espírito Santo 1700 (LISC, K); Gabú, Espírito Santo 284 (COI); between Fulacunda and Bedanda, Orey 254 (K); between Cabuchangue and Quebu, Espírito Santo 2071 (COI, LISC).

SOUDAN: Kita, Bouiko, Dubois 158 (P, B).

GUINEA: Conakry, Martine 130 (= Chillou 2833) (IFAN); *ibid.*, Chevalier 12152 (P, WAG), 12162 (P, 2 sheets, type of *A. frezoulsii*); *ibid.*, cult. in garden, Chevalier 13037bis (P); Kaloum, Conakry, Maclaud 39 (P); between Timbo and Conakry, near Kora R., Pobéguin 765 (P); Fouta Djallon, Pobéguin 1918 (P); between Konkauré and Timbo, Chevalier 12453 (P); Kouroussa, Pobéguin 841 (P).

SIERRA LEONE: Musaia, Deighton 5481 (K, MO); *ibid.*, Miszewski 6 (K); Njala, Deighton 5960 (K, with fl. in spirit coll.); *sin. loc.*, Deighton 1809 (K).

IVORY COAST: Forêt de l'Agnéby, W. of Dabou, Herb. I.D.E.R.T. 3140 (ABI), 3672 (ABI); *ibid.*, Leeuwenberg 3178 (WAG).

NIGERIA: Lagos, Imp. Inst. 10 (K).

11. **A. microphylla** Wernham in Cat. Talbot's Nigerian Pl. 67. 1913; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931.

Fig. 14; Map 11

Type: Nigeria: Calabar, Oban, Talbot 304 (BM, holotype).

Heterotypic synonyms: *A. micrantha* Gilg et Mildbr. ex Hutch. et Dalz., l.c. (in clavi); Gilg & Mildbr. in Wiss. Ergebn. Deutsch. Zentr. Afr.-Exped. 1910–11. 2: 189. 1922 (nomen). Type: Fernando Po: Mildbraed 6434 (holotype not seen, destroyed in B; isotype: one corolla in BM!).

A. macrocalyx Philipson in Exell, Cat. Vasc. Pl. S. Tomé 245, f. 17. B. 1944, p.p. excl. Chevalier 13690 and 13691; Monod, Bull. I.F.A.N. Sér. A. 22: pl. 3. 1960. Type: São Tomé: between Vanhulst and S. Nicolau, Exell 304 (BM, holotype; isotypes: BR, COI).

A. stenantha Philipson, l.c. p. 247, f. 17. A. Type: São Tomé: above Infante D. Henrique, Exell 626 (BM, holotype; isotype: COI).

Liana, shrub, or tree (*teste* Talbot), without spines. Twigs sometimes slightly angular when dry. Leaves shortly petiolate; blade dark green above, paler beneath, when dry greenish-brown, oblong-elliptic or oblong-obovate, $2-3 \times$ as long as wide, $7-20 \times 3-9$ cm; veins inconspicuous. Sepals rounded or truncate, when dry spreading or not, the outer ones orbicular, $4-8 \times 4-8$ mm, the inner ones usually larger, up to $1.5 \times$ as long as the others and up to 8×8 mm, often torn by the development of the corolla. Corolla in the mature bud $3-5 \times$ as long as the calyx, 22–25 mm long, and as in the young bud tapering at the apex, white; tube $1.5-3 \times$ as long as the calyx, $1-1.2 \times$ as long as the lobes; lobes 9–12, oblong, spreading. Dry berry subglobose, dented or not, thin-walled.

Twigs when dry 3–9 mm thick; internodes 1–6 cm long. *Leaves*: petiole up to $0.1 \times$ as long as the blade and up to 18 mm long; blade shortly acuminate or apiculate at the apex, rounded or cuneate at the base or decurrent into the petiole, entire. *Inflorescence* $3 \times$ branched, $7-10 \times 10-14$ cm. Peduncle, branches, and pedicels not thickened. Upper bracts very small, triangular, about $1-2 \times$ as long as the diameter of the corresponding branch, obtuse. Corolla tube cylindric or amply infundibuliform, 10–13 mm long, 3–4 mm wide at the base, 4–8 mm at the throat; lobes $2.5-3 \times$ as long as wide, $10-12.5 \times 4-5$ mm, obtuse. Filaments entirely connate; anthers about $6 \times$ as long as wide, $8-9 \times 1.5$ mm, sagittate at the base. Ovary obovoid- or ovoid-cylindric, about $2 \times$ as long as wide, $6-7 \times 2.5-3$ mm; stigma approximately globose, 3 mm long, emarginate at the apex. Dry berry $1.2-1.5 \times$ as long as wide, $20-30 \times 15-20$ mm, apiculate. Seeds dark brown, obliquely ovate-orbicular, about $1.2-2 \times$ as long as wide, $1.5-2 \times 1-1.5$ mm.

Distribution: S. Nigeria, Fernando Po, Principe, São Tomé.

Ecology: Secondary forests. Alt. 400–1000 m or less (?).

NIGERIA: Calabar, Oban, Talbot 304 (BM, holotype).

FERNANDO PO: Mildbraed 6434 (BM, isotype of *A. micrantha*).

PRINCIPE: above Infante D. Henrique, Exell 626 (BM, COI, type of *A. stenantha*).

SÃO TOMÉ: S. Thalmó, Watt 7125 (BM, paratype of *A. macrocalyx*); Nova Moka, Espírito Santo 153 (COI, BM); West of Pico, Monod 11897 (BM, BR); between Vanhulst and S. Nicolau, Exell 304 (BM, BR, COI, type of *A. macrocalyx*); Porto Alegre, Chevalier 14187 (P, paratype of *A. macrocalyx*); s.n. (P, paratype of *A. macrocalyx*); southwest region, Chevalier 14492 (P, paratype of *A. macrocalyx*); sin. loc., Henriques 10 (COI, paratype of *A. macrocalyx*).

In all specimens examined the number of the corolla lobes was never less than 9. As the leaves and the sepals do not give differential characters either, the present author reduces *A. micrantha*, *A. macrocalyx*, and *A. stenantha* to synonymy. Moreover the relation of the corolla tube and lobes varies independently from the width of the corolla tube, and the size of the sepals.

12. **A. scandens** J. D. Hook., Journ. Linn. Soc. 6: 16. 1862; Baker in Fl. Trop. Afr. 4(1): 542. 1903; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931.

Fig. 15 (1-3)

Type: Fernando Po: Clarence Peak, Mann 623 (K, holotype).

Heterotypic synonym: *A. exelliana* Monod, Bull. I.F.A.N. Sér. A. 19: 347, f. 1-30. 1957; op. cit. 22: 54, pl. 4. 1960. Type: São Tomé: Monte Calvario, Monod 11839 (BM, 2 sheets, holo- and isotype).

Liana or tree (*teste* Exell), 6-15 m high, without spines. Twigs quadrangular when dry. Leaves petiolate; blade dark green above, hardly paler beneath, oblong-elliptic or oblong-obovate, 1.7-2.2 × as long as wide, 6-20 × 2.5-11 cm; veins inconspicuous. Sepals large, green, rounded, not spreading when dry, orbicular, 2-3 × 2-3 cm, torn by the development of the corolla. Corolla in the mature bud 2.5 × as long as the calyx, 50-75 mm long, and as in the young bud tapering at the apex, white; tube 1.5-1.75 × as long as the calyx, 1.5 × as long as the lobes; lobes 11-14 (28 in Exell 328), oblong, spreading. Dry berry subglobose, apiculate or not, thick-walled.

Twigs 4-10 mm in diam. when dry. *Leaves*: petiole short, 10-30 mm long; blade apiculate or rounded at the apex, cuneate at the base or decurrent into the petiole, entire; secondary veins 6-8 pairs. *Inflorescence* 1-3 × branched, about 1.5-2 × as wide as long, 5-10 × 9-15 cm. Peduncle, branches, and pedicels often lenticellate, short, not thickened. Upper bracts 1-3 × as long as the diameter of the corresponding branch, about 1-1.5 × as long as wide, 7-15 × 7-10 mm. Calyx often subtended by one pair of bracteoles like the upper bracts. Corolla tube 30-45 mm long, gradually widened, about 10 mm wide at the base, about 15-20 mm at the throat; lobes 2.5 × as long as wide, 20-30 × 8-12 mm, obtuse. Filaments entirely connate; anthers linear-lanceolate, 6-7 × as long as wide, 13-19 × 1.5-3 mm, sagittate at the base. Ovary ovoid-conical, about 1.5-1.7 × as long as wide, 9-10 × 5-7 mm; stigma globose, 2.5-3 mm in diam., emarginate. Dry berry hard, 4.5 × 4.1 mm, rugulose, dented or not.

Distribution: Cameroons, Fernando Po, São Tomé.

Ecology: In montane rain forests. Alt. 1200-1800 m.

CAMEROONS: Bamenda Province, Bafut-Ngamba Forest Reserve, Onochie FHI 34852 (K); *ibid.*, Daramola FHI 40516 (K).

FERNANDO PO: Clarence Peak, Mann 623 (K, type); Moka, Exell 814 (BM).

SÃO TOMÉ: Mt. Calvario, Exell 320 (BM), 328 (BM, corolla only); *ibid.*, Monod 11839 (BM, 2 sheets, type of *A. exelliana*); W. of Pico, Monod 11997bis (BM); Pico, Mann 1067 (K, P); Vanhulst, Macambarará, Exell 416 (BM, COI, both corollas only); Lagôa Amelia, Exell 223 (BM); Porto Alegre, Chevalier 13690 (P, veg., paratype of *A. macrocalyx*), 13691 (P, veg., paratype of *A. macrocalyx*).

In all characters *A. exelliana* falls within the individual variation of *A. scandens* and cannot be maintained as a distinct species.

13. **A. obanensis** Wernham in Cat. Talbot's Nigerian Pl. 67. 1913; Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 18. 1931.

Fig. 16; Map 12

Type: Nigeria: Calabar, Oban 305 (BM, holotype; isotypes: K, Z).

Liana, climbing shrub, or tree (*testibus* Talbot 305 et Gutzwiller 2584), unarmed. Leaves shortly petiolate; blade dark green and glossy above, paler beneath, oblong-obovate or oblong-lanceolate,

2–4.5 × as long as wide, 4.5–19 × 1–7 cm; veins inconspicuous. Sepals oblong, 1.5–2 × as long as wide, 12–17 × 6–11 mm, conspicuously concave, rounded, torn and often losing the apex by the development of the corolla, appressed to the corolla and later to the fruit when dry. Corolla in the young bud pale yellow and tapering at the apex, in the mature bud about 2–2.3 × as long as the calyx, 24–30 mm long, and tapering, white (?); tube 1.3–1.8 × as long as the calyx, 2 × as long as the lobes; lobes 10, oblong, spreading. Dry berry ellipsoid, rugulose or not, rather thick-walled.

Twigs 3–7 mm in diam. when dry. Internodes 1.5–8 cm long. *Leaves*: petiole up to 12 mm long; blade acuminate or apiculate at the apex, cuneate at the base or decurrent into the petiole, entire. *Inflorescence* 2–3 × branched, 4–10 cm long. Peduncle, branches, and pedicels short, thick, usually lenticellate. Upper bracts oblong-triangular, 2–4 × as long as the corresponding branch, obtuse. Calyx subtended by a pair of bracteoles of about the same size and shape as the bracts. Corolla tube conspicuously widened above the calyx, 16–20 mm long, 5–6 mm wide at the base, 7–10 mm at the throat; lobes 2 × as long as wide, 8–10 × 4–5 mm, rounded at the apex. Filaments entirely connate; anthers about 5 × as long as wide, about 6 × 1.2 mm, sagittate at the base. Ovary ovoid-cylindric, about 5 × 2.5 mm; stigma subglobose, 2 × 2 mm, emarginate at the apex. Dry berry about 1.3 × as long as wide, 22–25 × 16–18 mm, apiculate. Seeds medium brown, obliquely ovate-orbicular, 1.2–2 × as long as wide, 1.5–2 × 1–1.2 mm.

Distribution: S. Nigeria, Cameroun, Congo.

Ecology: In moist places, swamps or on river banks, in rain forests.

Alt. up to 1650 m.

NIGERIA: Benin: Sapoba, Jamieson R., Keay FHI 28079 (K, with fl. buds in spirit coll.); ibid., Onochie FHI 34272 (K); Calabar: Oban, Talbot 305 (BM, K, Z, type); from Oron to Eket, Talbot 3025 (BM, K); Eket District, Talbot 3105 (BM).

CAMEROUN: Bipindi, Zenker 1952 (HBG, K).

CONGO: EQUATEUR: Monkoto, Tshuapa District, Dubois 118 (BR).

KIVU: Walikale Territory: Kishanga, Léonard 2496 (BR); Muyilya, Mutongo, Gutzwiller 2584 (BR); near Bitso, Luindi R., Pierlot 1915 (BR).

14. **A. laxiflora** Bak., Kew Bull. 1895: 99; in Fl. Trop. Afr. 4(1): 542. 1903. **Fig. 15 (4-6)**

Type: Rio Muni: near Kougué R., Mann 1802 (K, holotype; isotypes: K, P).

Climbing shrub, 4.50 m high, without spines. Leaf-blade dark (?) green above, paler beneath, when dry greenish-brown, dull. Sepals connate at the base, oblong-triangular, 15 × 10 mm, acute, keeled. Flower bud covered by the outer sepals which are closed like a beak. Corolla and stamens unknown. Dry berry globose, 2 cm long, apiculate, smooth.

Twigs lenticellate, about 5 mm in diam. when dry. Internodes conspicuous. *Leaves* decussate, shortly petiolate; petiole 8–12 mm long; blade oblong, 2.5–3 × as long as wide, 12–20 × 5–7 cm, shortly acuminate, rounded or cuneate at the base, entire. *Inflorescence* 3 × branched, 15–20 cm long. Peduncle, branches, and pedicels lenticellate, not or scarcely thickened at the nodes. Upper bracts triangular, about 1–2 × as long as the diameter of the corresponding branch, acute. Seeds obliquely ovate-orbicular.

Distribution: Once collected in Rio Muni.

RIO MUNI: near Kougué R., Mann 1802 (K, holotype; isotypes: K, P).

In *Anthocleista* hybrids may occur. A few specimens are intermediate between two species, but as they are usually incomplete their identity remains often doubtful.

Plants which differ only from the typical *A. schweinfurthii* by having spines are considered as to belong to this species.

One specimen, Louis 15602 from Congo bearing flower buds, is intermediate between *A. schweinfurthii* and *A. vogelii* by the following characters:

One thick spine above each leaf axil. Leaves sessile; blade narrowed to the auriculate base; margin not recurved. Sepals smooth, appressed to the corolla. Buds rounded or slightly tapering.

Kennedy 2131 from South Nigeria may be a hybrid of *A. schweinfurthii* and *A. djalensis*. It has only flower buds which are approximately like those of *A. djalensis*. In the other characters it does not differ from *A. schweinfurthii*.

Deighton 3202 from Sierra Leone consists of a vegetative branch with spines like those of *A. vogelii* but in its leaves resembles *A. procera*. Both *A. procera* and *A. vogelii* are swamp-inhabiting species. Deighton 3202 was collected in a similar locality.

Kersting A 627 from Togo has the branches and leaves of *A. djalensis* but the calyces of *A. liebrechtsiana*.

CONGO: ORIENTALE: Yangambi, Louis 15602 (BR), *A. schweinfurthii* × *A. vogelii*?

S. NIGERIA: Benin, near Jamieson R., Sapoba, Kennedy 2131 (A, BM, MO), *A. schweinfurthii* × *A. djalensis*?

SIERRA LEONE: Baoma, Deighton 3202 (K), *A. vogelii* × *A. procera*?

TOGO: Ikuwondem (?), Kersting A 627 (Z), *A. djalensis* × *A. liebrechtsiana*?

Doubtful species

A. inermis Engl. in Engl. Bot. Jahrb. 8: 63. 1887; Baker in Fl. Trop. Afr. 4(1): 541. 1903, p.p. quoad typum; Bruce, Kew Bull. 56. 1955.

Type: Angola: Zaire District, Island near Ponta de Lenha, Naumann 6 Sept. 1874 (holotype not seen, destroyed in B; no isotype seen).

This species could be identical with *A. liebrechtsiana* by the size of the sepals and the habitat. In the other characters its description agrees also with *A. schweinfurthii*. As there is no conclusive evidence, the present author follows Miss BRUCE in treating it as a *nomen dubium*.

Excluded species

A. brieyi De Wild., Miss. de Briey 210. 1920 = *Brenania* sp., 3 corollas preserved in spirit are *A. schweinfurthii*; herbarium specimens are *Brenania* (see Petit, Bull. Jard. Bot. Brux. 1961).

Nomina nuda

A. gabonensis hort. ex Gentil, Pl. Cult. Serres Jard. Bot. Brux. 18. 1907.

A. nigrescens Afzel. ex Gilg in Engl. Bot. Jahrb. 17: 575. 1893 = *A. nobilis* G. Don.

A. procera Leprieur ex A. Chev. var. *parviflora* A. Chev., Expl. Bot. 441. 1920, non ex Bureau = *A. nobilis* G. Don.

A. procera Leprieur ex A. Chev. var. *umbellata* A. Chev., l.c., non ex Bureau = *A. nobilis* G. Don.

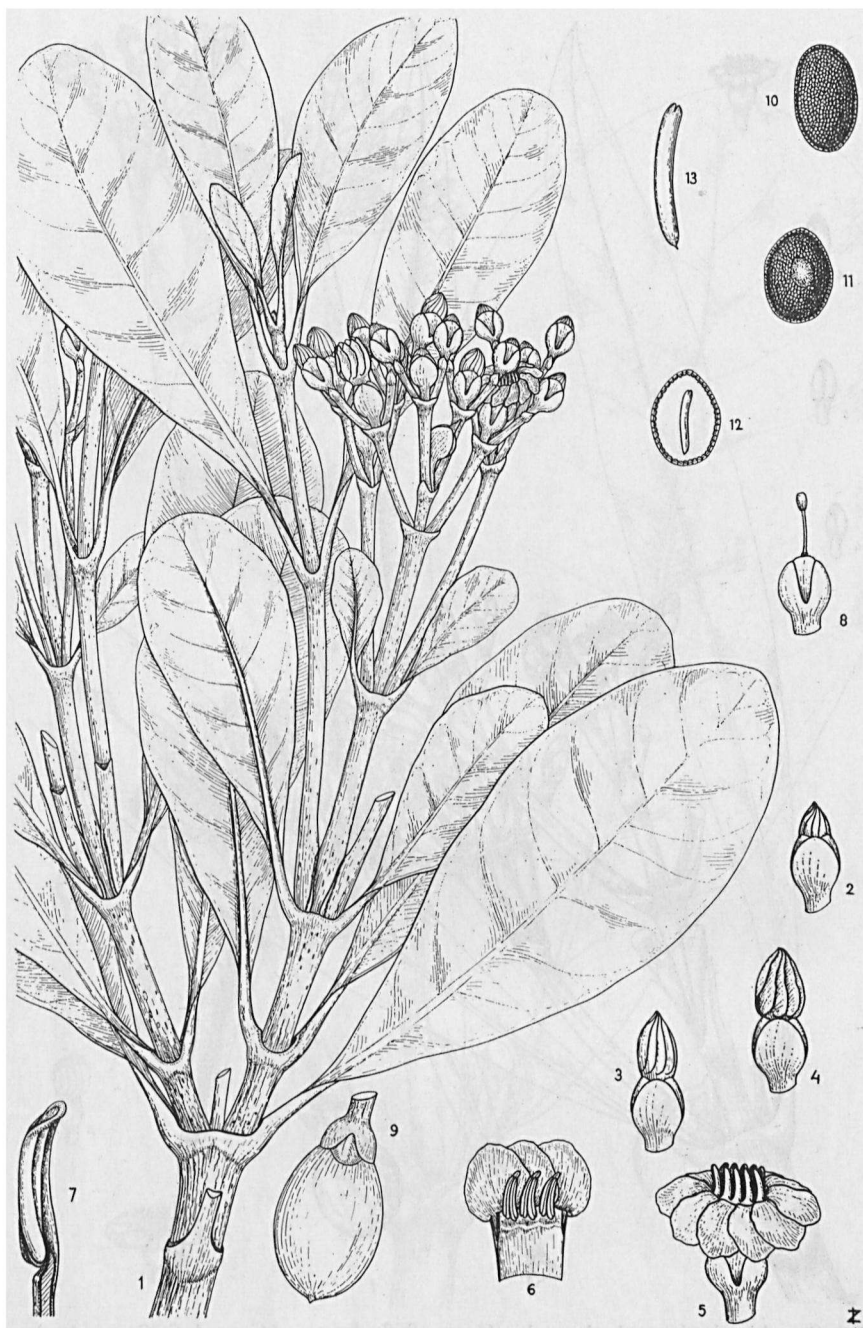


Fig. 1. *A. madagascariensis*: 1. branch, $\frac{1}{2} \times$; 2-3. young flower buds, $1 \times$; 4. mature bud, $1 \times$; 5. flower, $1 \times$; 6. portion of corolla inside, $1 \times$; 7. anther, $4 \times$; 8. calyx with pistil, $1 \times$; 9. fruit, $\frac{1}{2} \times$; 10. seed above, $4 \times$; 11. seed beneath, $4 \times$; 12. longitudinal section of seed, $4 \times$; 13. embryo, $12 \times$. 1 (Humbert 12196 and Viguiet & Humbert 1115); 2-7 (Humbert 23018); 8 (Viguiet & Humbert 1115); 9-13 (Serv. Eaux For. 7609).

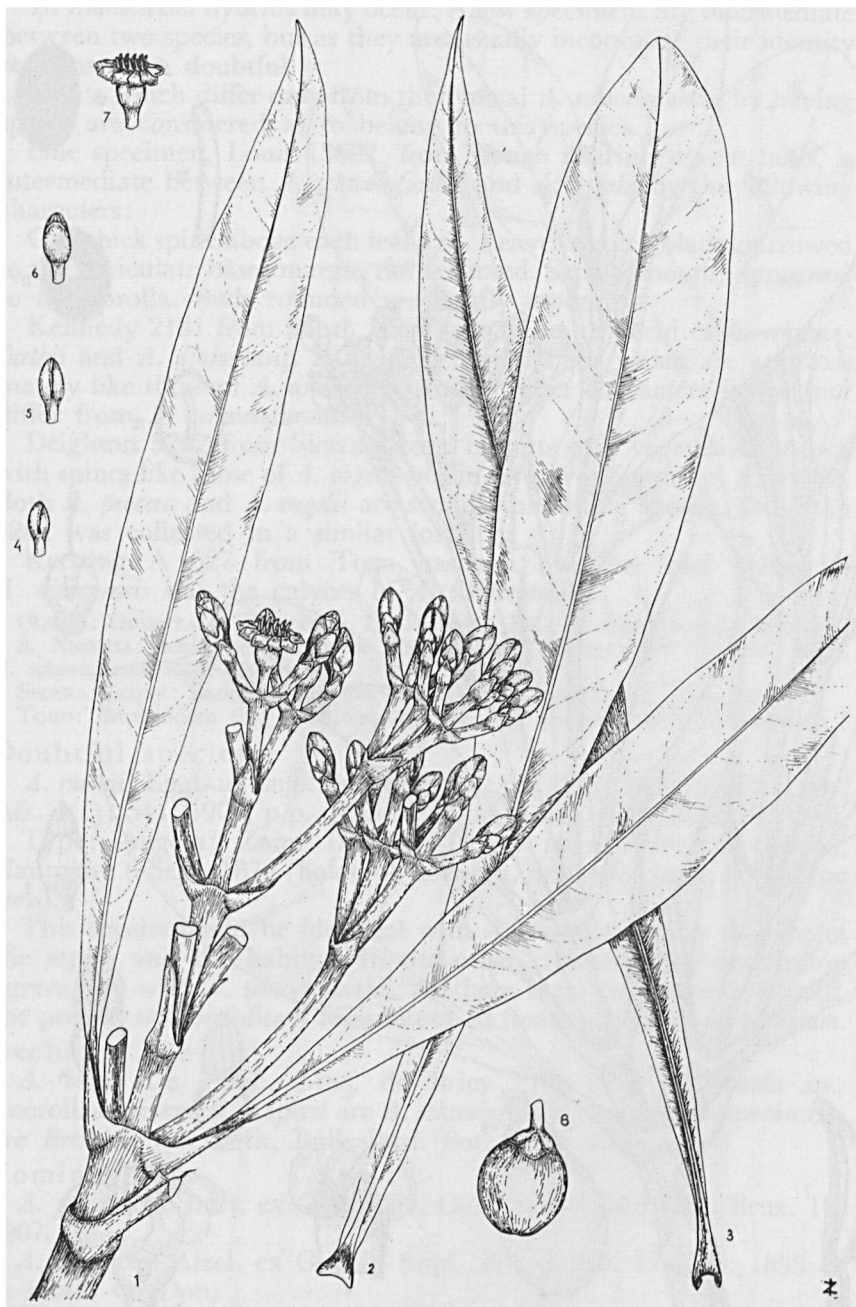


Fig. 2. *A. urbaniana*: 1. branch, $\frac{1}{2} \times$; 2-3. leaves, $\frac{1}{4} \times$; 4-6. flower buds; 7. flower; 8. fruit. 4-8, $\frac{1}{2} \times$. 1-2, 4-7 (Lam & Meeuse 5805); 3 (Service des Eaux et Forêts 393); 8 (Serv. Eaux For. 2369).



Fig. 3. *A. amplexicaulis*: 1. inflorescence; 2-3. young flower buds; 4. expanding bud; 5. flower; 6. fruit; 7. portion of inflorescence. 1-7, $\frac{1}{2} \times 1$ (Baron 3795); 2 (Decary 7393); 3 (Serv. Eaux For. 686); 4-5 (Serv. Eaux For. 7388); 6 (Lam & Meeuse 5666); 7 (Perrier de la Bâthie 8600).



Fig. 4. *A. nobilis*: 1. inflorescence (de Wilde 496); 2. branch (Leeuwenberg 3168); 3-4. young flower buds; 5. mature bud; 6. flower; 7. calyx with pistil (very young fruit); 8. fruit. 3-8 (Leeuwenberg 2322). 1-8, $\frac{1}{2}\times$.

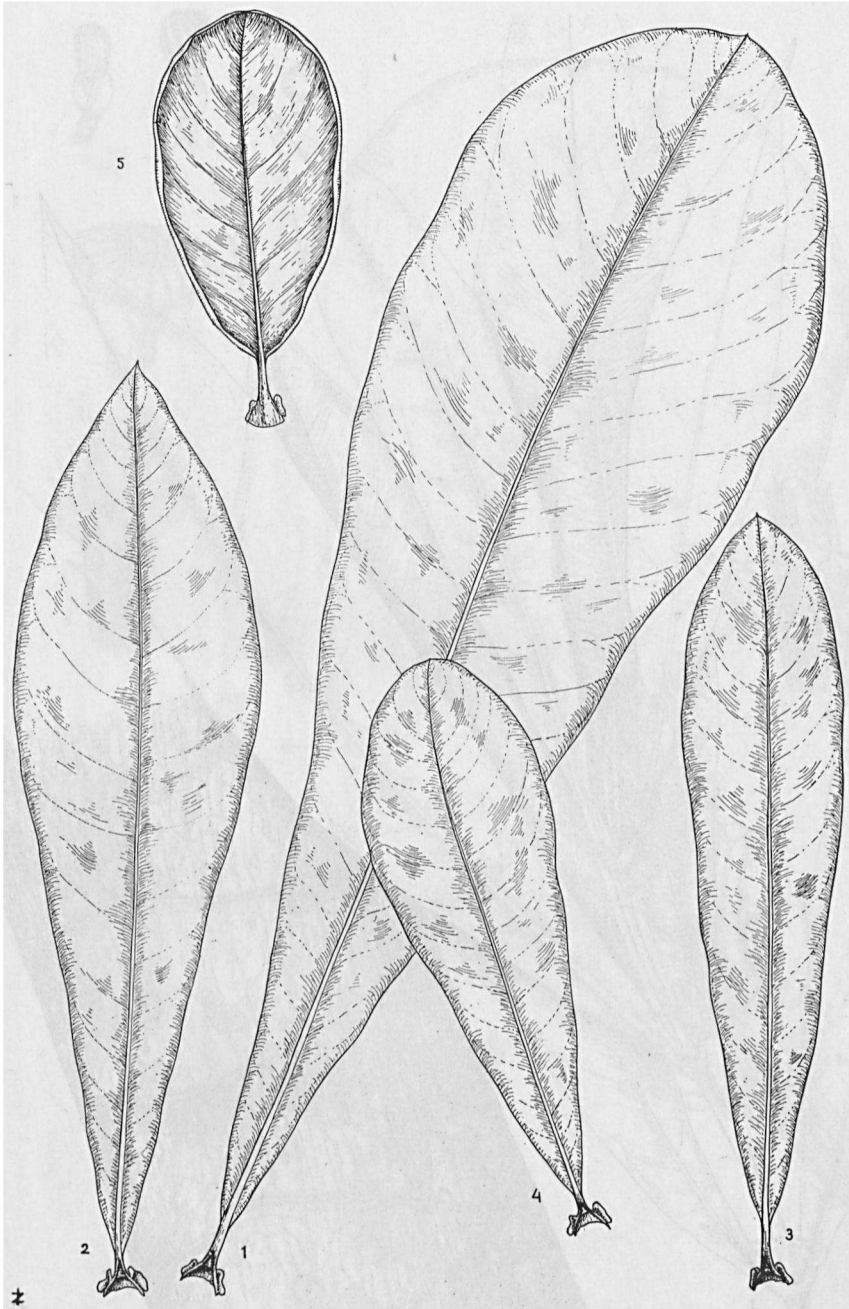


Fig. 5. *A. nobilis*: leaves, $\frac{1}{4} \times$, 1-3. above (Leeuwenberg 1921), 4. beneath (Leeuwenberg 3168). See also Photographs 2, 3, and 5.



Fig. 6. *A. nobilis*: 1. apex of young plant, $\frac{1}{2} \times$ (Leeuwenberg 3084); 2. portion of trunk, $\frac{1}{2} \times$ (Leeuwenberg 2322).

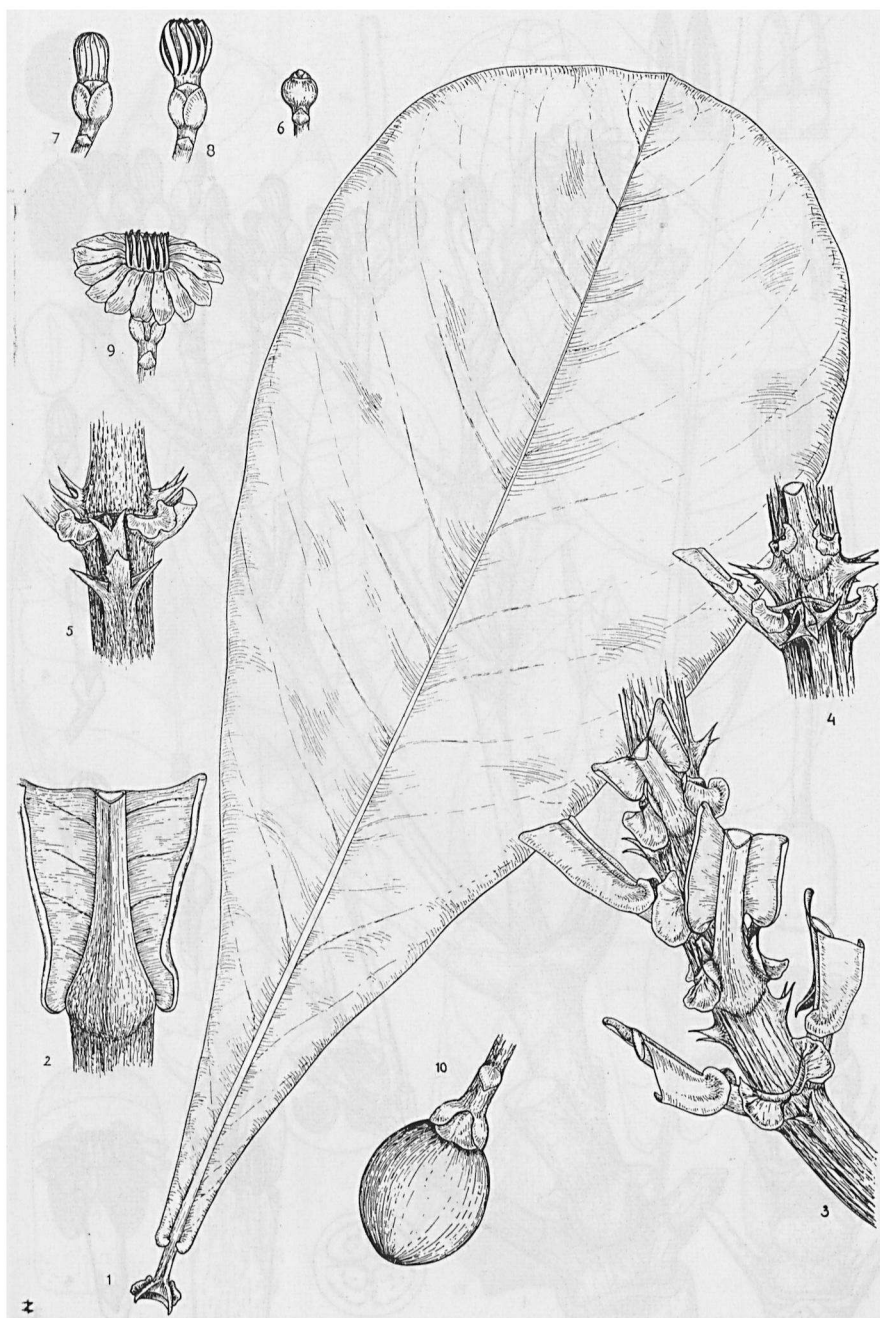


Fig. 7. *A. vogelii*: 1. petiolate leaf; 2. base of sessile leaf beneath; 3. branch with leaf bases; 4-5. branch with developing axillary buds; 6. young flower bud; 7. nearly mature bud; 8. expanding bud; 9. flower; 10. fruit. 1-10, $\frac{1}{2} \times$. 1, 4-5 (Zenker 1965); 2, 6-10 (Ghesquière 4943); 3 (Louis 13544).

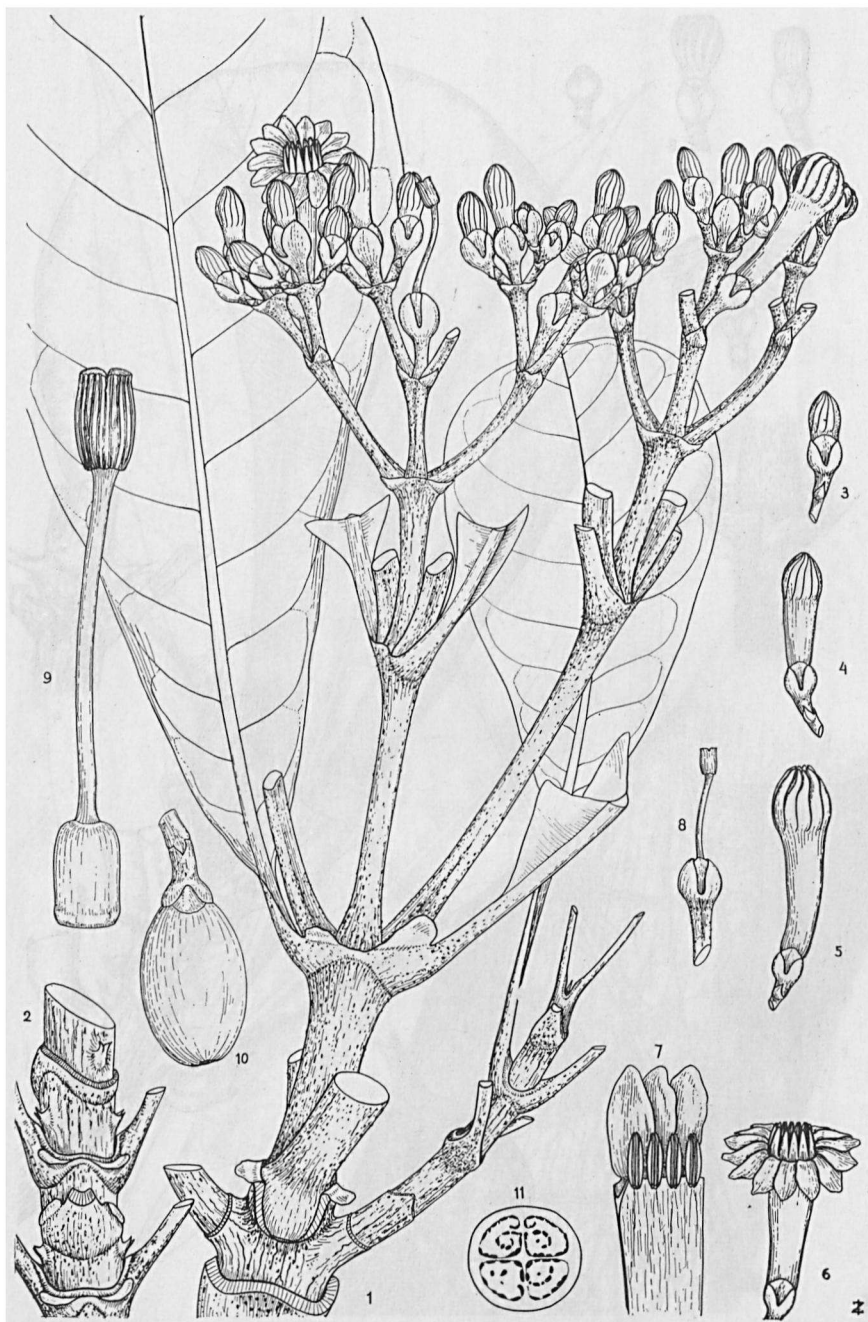


Fig. 8. *A. djalonensis*: 1. branch; 2. portion of branch; 3-4. young flower buds; 5. mature bud; 6. flower; 7. portion of corolla inside; 8. calyx with pistil; 9. pistil; 10. fruit; 11. transverse section of fruit. 1-6, 8, 10-11, $\frac{1}{2} \times$; 7, $1 \times$; 9, $2 \times$. 1-2 (Leeuwenberg 3315); 3-7, 10 (Leeuwenberg 3316); 8-9, 11 (Leeuwenberg 3285). See also Photographs 4 and 5.

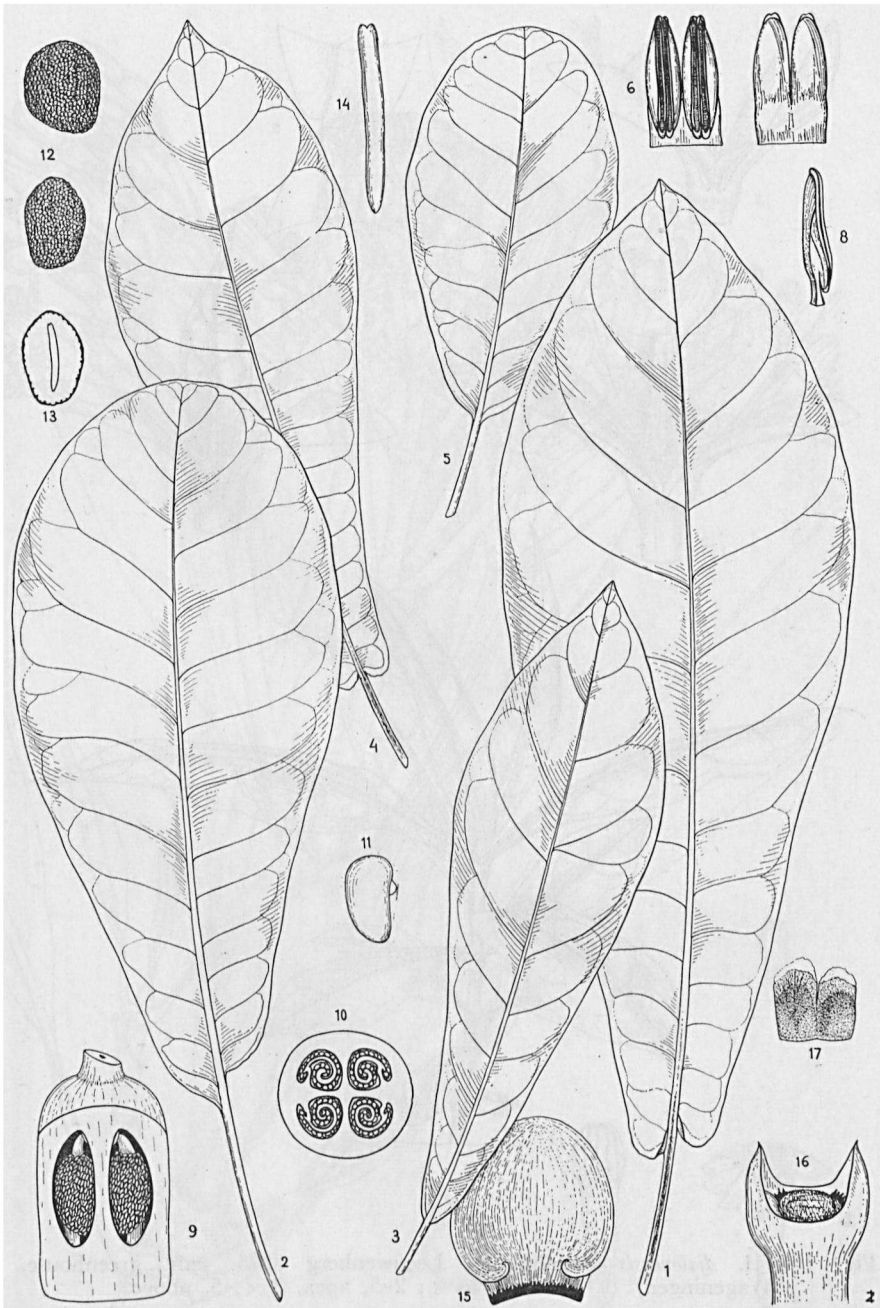


Fig. 9. *A. djalonensis*: 1-5. leaves, $\frac{1}{4} \times$; 6-8. anthers, 3 sides, $2 \times$; 9. longitudinal section of ovary, $4 \times$; 10. transverse section of ovary, $4 \times$; 11. ovule, $40 \times$; 12. seeds, $4 \times$; 13. longitudinal section of seed, $4 \times$; 14. embryo, $12 \times$; 15. sepal inside, with colleters, $4 \times$; 16. bracts with colleters inside, $4 \times$; 17. colleters, $20 \times$. 1, 4 (Leeuwenberg 3167); 2-3, 5 (Leeuwenberg 3315); 6-8, 10, 15-17 (Leeuwenberg 3316); 9, 11-14 (Leeuwenberg 3285).

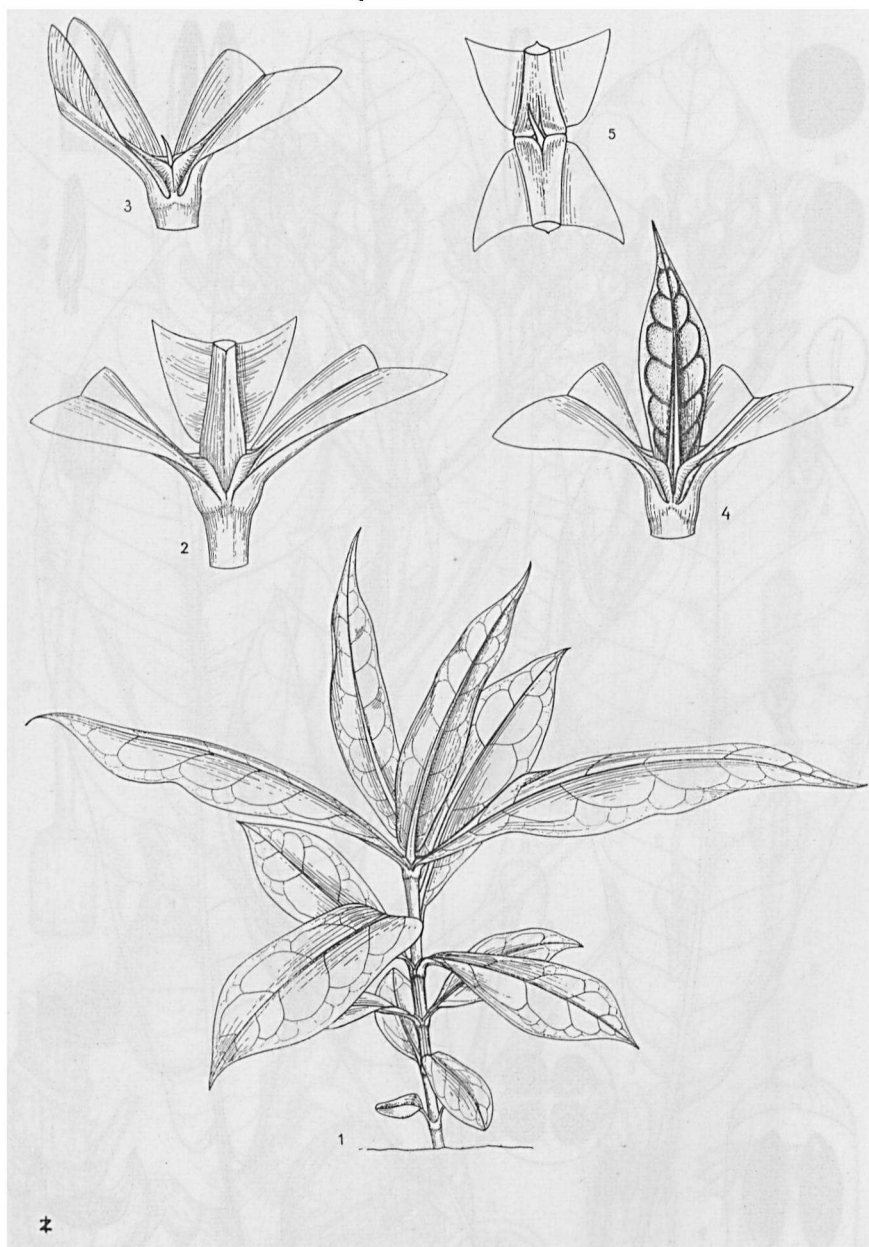


Fig. 10. *A. djalensis* (seedling of Leeuwenberg 3285, cult. greenhouse, Wageningen): 1. seedling, $\frac{1}{2} \times$; 2-5, apex, $2 \times$, 5. above.

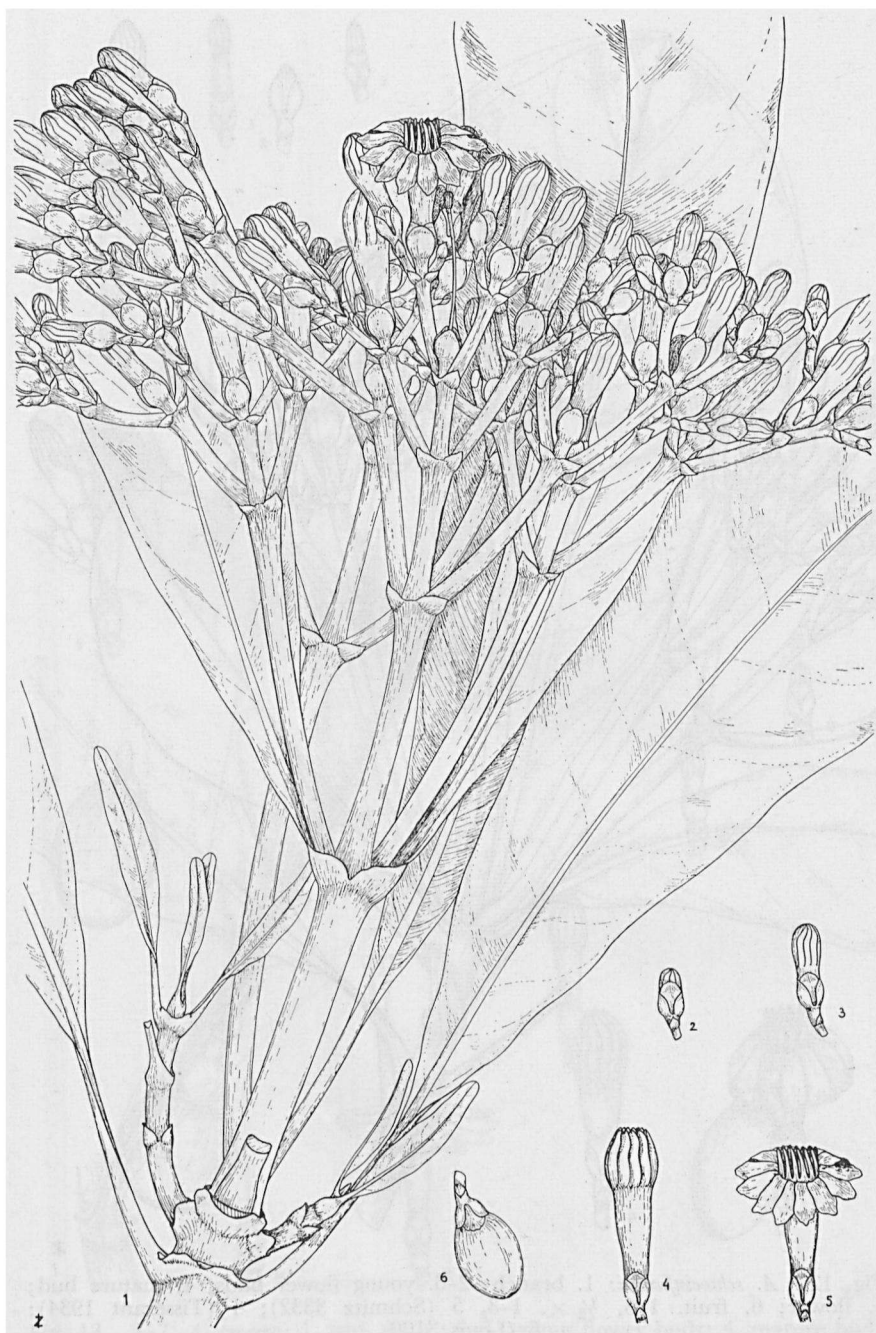


Fig. 11. *A. liebrechtsiana*: 1. branch; 2-3. young flower buds; 4. expanding bud; 5. flower; 6. fruit. 1-6, $\frac{1}{2} \times$. 1-3 (Lebrun 1672); 4-5 (Leemans 219); 6 (J. Léonard 675).



Fig. 12. *A. schweinfurthii*: 1. branch; 2-3. young flower buds; 4. mature bud; 5. flower; 6. fruit. 1-6, $\frac{1}{2} \times$. 1-3, 5 (Schmitz 3332); 4 (Tisserant 1934); 6 (Louis 3100).

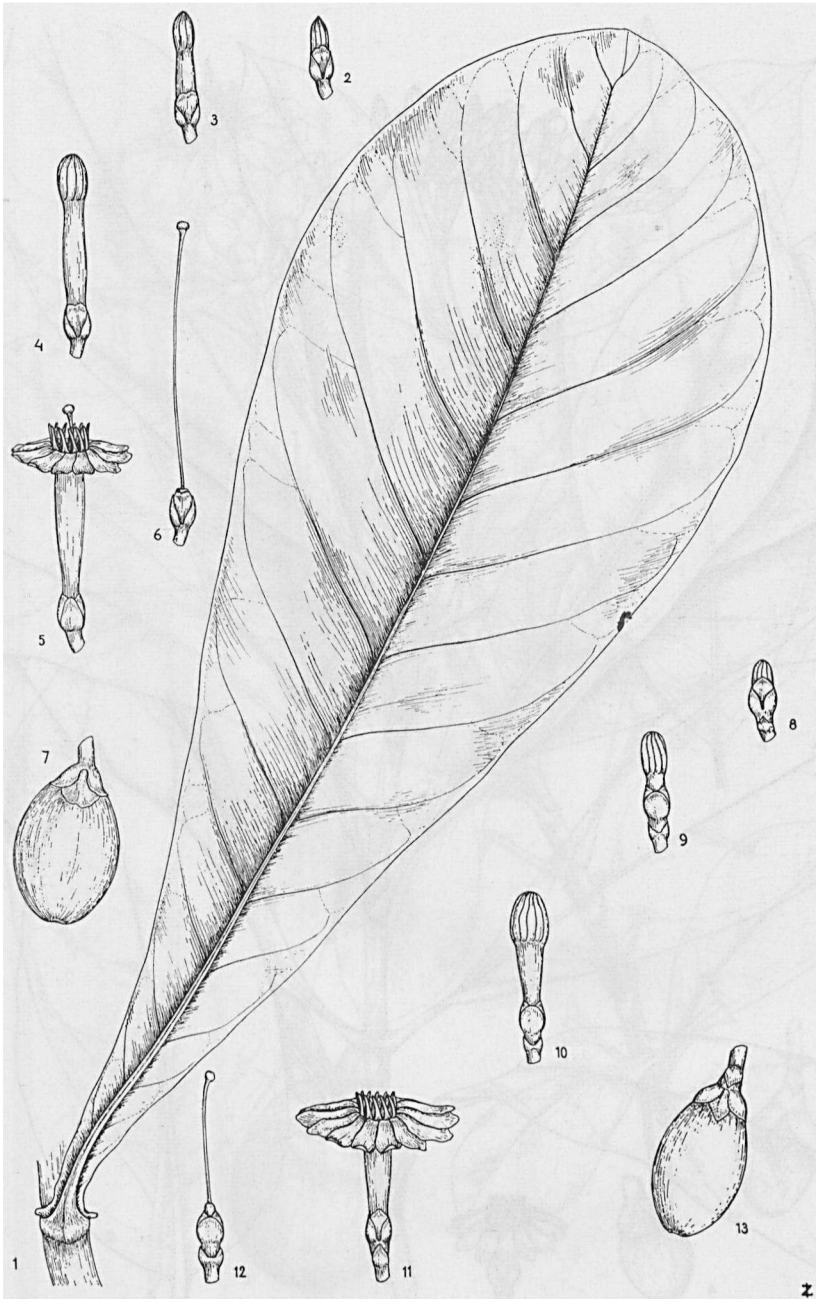


Fig. 13. 1-7. *A. procera*: 1. leaf, $\frac{1}{4} \times$; 2-3. young flower buds; 4. mature bud; 5. flower; 6. calyx with pistil; 7. fruit. 1 (Leeuwenberg 3178); 2 (Leprieur 5 June 1827); 3-6 (Chev. 12152); 7 (Dubois 158). See also Photographs 1 and 6. 8-13. *A. grandiflora*: 8-9. young buds; 10. mature bud; 11. flower; 12. calyx with pistil; 13. fruit. 8-9 (Humblot 311); 10-11 (Mendonça 287); 12 (Buchanan 84); 13 (Lebrun 4421). 2-13, $\frac{1}{2} \times$.

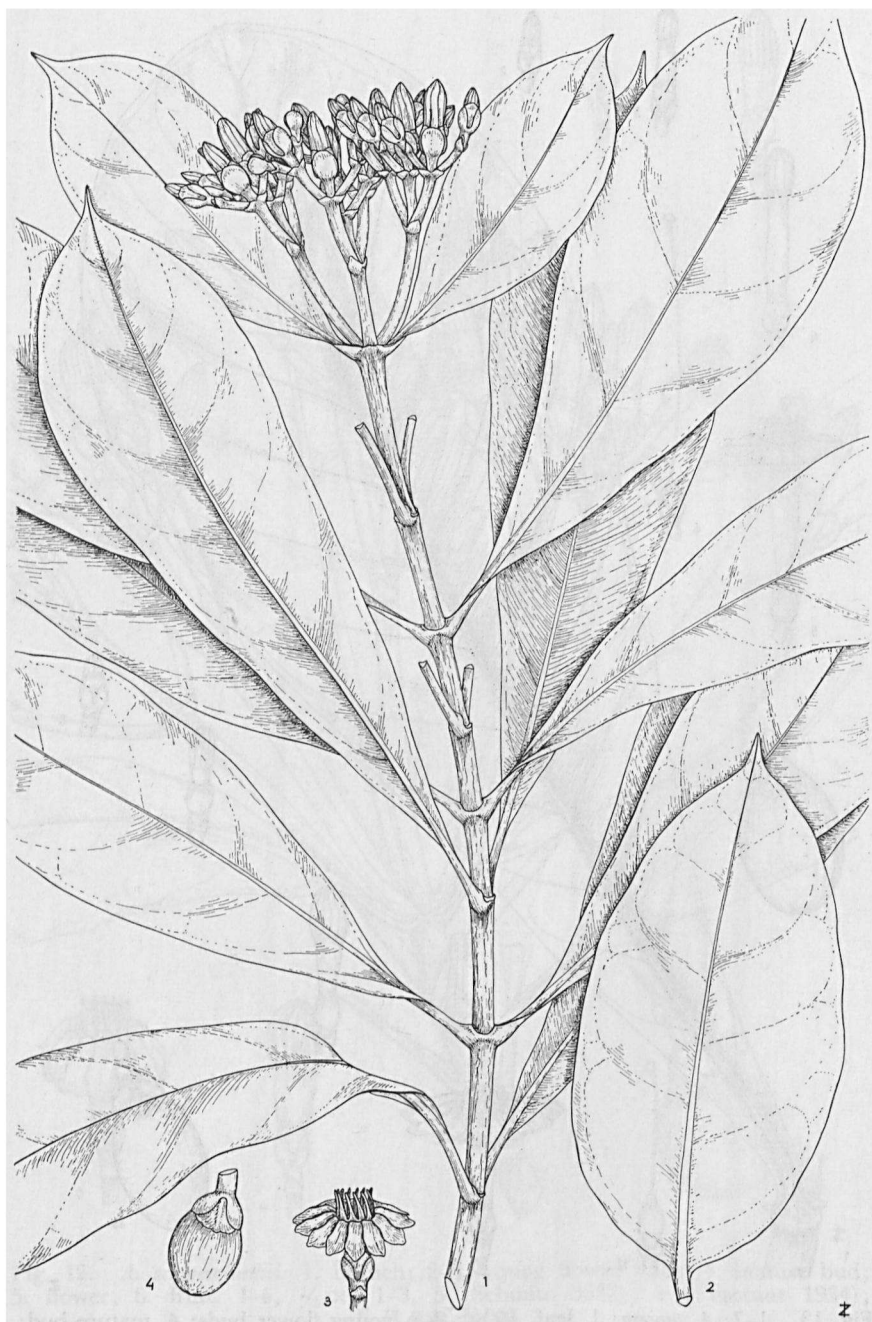


Fig. 14. *A. microphylla*: 1. branch; 2. leaf; 3. flower; 4 fruit. 1-4, $\frac{1}{2} \times$.
1 (Exell 626); 2-3 (Monod 11897); 4 (Espírito Santo 153).



Fig. 15. 1-3. *A. scandens*: 1. branch; 2. leaf; 3. fruit. 1 (Mann 623); 2 (Onochie FHI 34852); 3 (Monod 11997bis). 4-5. *A. laxiflora*: 1. leaf; 2. fruit. 1-2 (Mann 1802). 1-5, $\frac{1}{2} \times$.



Fig. 16. *A. obanensis*: 1. branch; 2. inflorescence; 3-5. flower buds; 6. flower; 7. calyx with pistil; 8-9. immature fruits; 10. fruit; 11-12. leaves. 1-12, $\frac{1}{2} \times$. 1 (Onochie FHI 34272 and Talbot 305); 2-4 (Keay FHI 28049); 5-6 (Talbot 305); 7, 9 (Dubois 118); 8, 12 (Talbot 3025); 10 (Pierlot 1915); 11 (A. Léonard 2469).

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