

Hemandradenia Stapf

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Reprint from 1976 with additional information on new collections by
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History and delimitation of the genus

Hemandradenia is characterized by unifoliolate leaves and non-stipitate, indehiscent fruits.

Stapf (1908) described it on the basis of two different specimens collected in Ivory Coast and Equatorial Guinea and expressed some doubt whether his new genus was sufficiently distinct from the formerly Asiatic genus *Ellipanthus* Hook.f. He, however, clearly indicated the main differences between the two genera as found in the fruits and seeds. He described two species based on the material at his disposal as *H. mannii* and *H. chevalieri*.

Schellenberg (1938) selected *H. mannii* as the type species and described a third one: *H. madagascariensis*. As the latter species had no fruits, he could not vouch for its true identity in *Hemandradenia*.

Leenhousts (1958-b) reduced *Hemandradenia* to a synonym of *Ellipanthus*, but did not make the necessary new combinations.

In the same year Aubréville and Pellegrin described a fourth species from Ivory Coast: *H. glomerata*. Capuron in Keraudren's revision of the family for Madagascar (1958) transferred Schellenberg's species to *Ellipanthus*.

The genera *Hemandradenia* and *Ellipanthus* are indeed closely related, in that both share unifoliolate leaves, flowers with mostly 5 stamens and 5 staminodes, and a single carpel. The carpel, however, is stipitate in *Ellipanthus* and sessile in *Hemandradenia*, which makes it possible to distinguish between the two genera with flowering material only. The fruits of the former are true follicles, but indehiscent in the latter. The sarcotesta present in both genera, is restricted to a part of the seed in *Ellipanthus*, whereas in *Hemandradenia* the entire outer layer of the seed coat is fleshy.

The main distinguishing characters of the two genera may be summarized thus:

Hemandradenia

- Carpel not stipitate.
- Fruit indehiscent.
- Fruit wall thinly crustaceous.
- Seed coat completely fleshy.

Ellipanthus

- Carpel stipitate.
- Fruit dehiscent (true follicle).
- Fruit wall woody.
- Seed coat partly fleshy.

In view of these differences *Hemandradenia* is maintained here as a distinct genus within the *Connaraceae*.

Description of the genus

Hemandradenia Stapf, 1908: 288; Schellenberg, 1910: 21, 103; 1938: 64; Thonner, 1915: 244; Leenhousts, 1958b: 520; Aubréville, 1959: 194; Hutchinson, 1964: 168; Dickison, 1973a: 121-138.

Type species: *H. mannii* Stapf.

Shrubs or small trees. Leaves alternate, entire, unifoliolate. Petiole terete and jointed to a petiolule, each with a pulvinus. Inflorescences axillary, glomerate or paniculate. Bracts minute, subtriangular. Flowers small, subsessile, predominantly 5-merous, bisexual. Sepals 5, basally connate, slightly imbricate to valvate. Petals 5, shortly coherent in the lower part to completely free, valvate to slightly imbricate. Stamens usually 5 fertile, opposite the sepals, alternating with 5 staminodes opposite the petals, both shortly connate at the base into a ring. Pistil 1; ovary sessile, ovoid to ellipsoid, with 2 collateral ovules; style short and fairly stout or long and filiform; stigma capitate to lobulate. Fruits ellipsoid, ovoid or obovoid, indehiscent, tomentose, yellow to brownish when ripe. Calyx persistent in fruit. Fruit wall thinly crustaceous. Seed 1, outer layer of seed coat fleshy (sarcotesta), inner layer thin; endosperm thin to copious; embryo with flat cotyledons. Germination epigeous.

Distribution: 2 species in West and Central Africa.

Note: The endosperm is very thick in *H. mannii* (Fig. 133:16) and the cotyledons are thin and narrow, whereas in *H. chevalieri* the figure shows that the endosperm is thin and cotyledons are very thick. This discrepancy may be attributed to differences in state of maturity of the seeds. *H. mannii* seeds as shown are probably less mature than *H. chevalieri* seeds, although the former had, at collecting time, already the colour of mature fruits.

Key to the species

Leaf margin not revolute; flowers in panicles, axillary and subterminal; sepals 1-2 mm long; petals free; fruits obovoid *H. chevalieri*

Leaf margin revolute near base; flowers in axillary glomerules; sepals 3-4.5 mm long; petals coherent in lower part; fruits ellipsoid or ovoid . . . *H. mannii*

The seedlings of the two species can easily be distinguished as follows (see Fig. 27):

Hypocotyl shorter than epicotyl; cotyledons completely glabrous; first leaves cordate at base *H. chevalieri*

Hypocotyl longer than epicotyl; cotyledons hairy at inner base; first leaves obtuse at base *H. mannii*

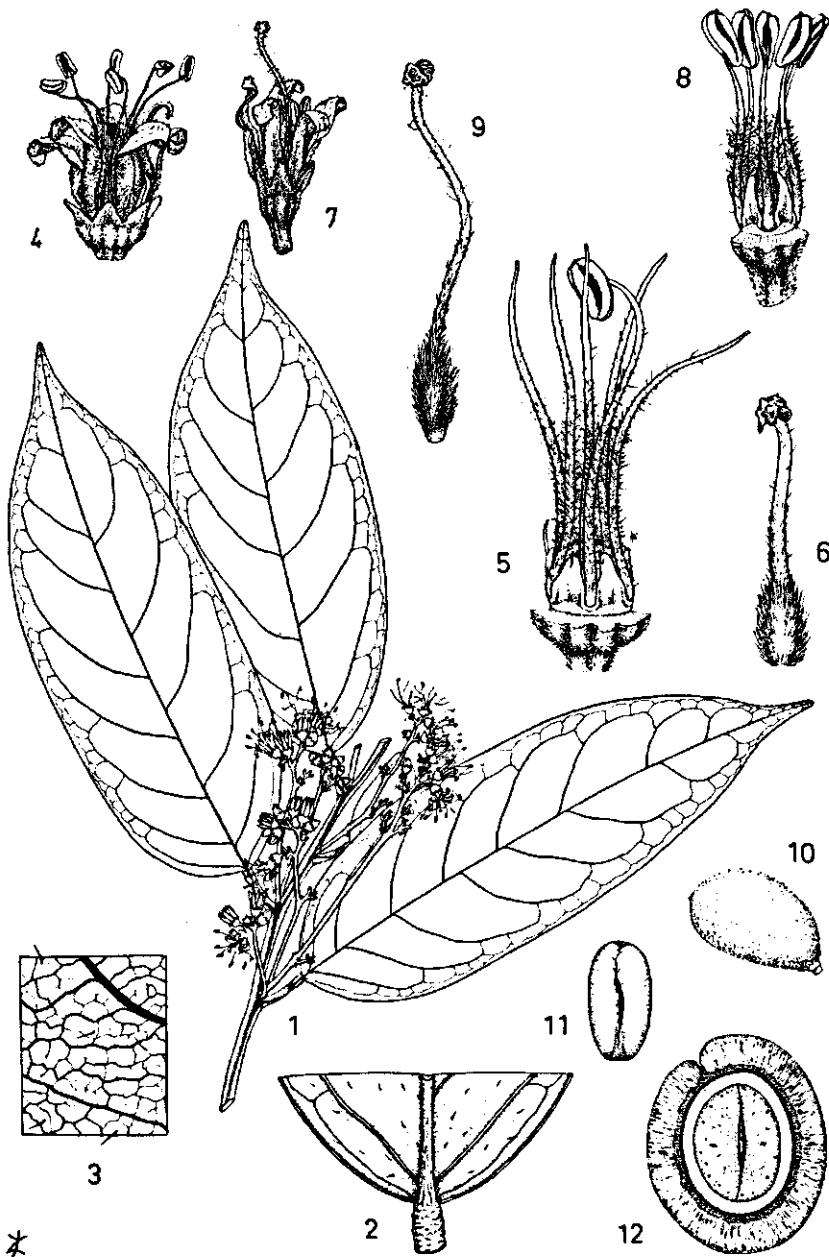


Fig. 131. *Hemandradenia chevalieri*: 1. flowering branch, $2/3 \times$; 2. leaf base beneath, $2 \times$; 3. detail of venation, $4 \times$; 4. stamen-dominant flower, $4 \times$; 5. long stamens with staminodes, $8 \times$; 6. short pistil, $8 \times$; 7. pistil-dominant flower, $4 \times$; 8. short stamens with staminodes, $8 \times$; 9. long pistil, $8 \times$; 10. fruit, $2/3 \times$; 11. seed, $2/3 \times$; 12. cross section seed, $2 \times$. (1, 3-6. Chevalier 19968; 2. de Wit 9020; 7-9. Aubréville 1495; 10-12. de Koning 6169).

H. chevalieri Stapf, 1908: 289; Schellenberg, 1938: 65; Hepper, 1958: 749; Aubréville, 1959: 194.

Type: Ivory Coast, basin of Cavally R., shore between Tabou and Béréby, Chevalier 19943 (holo: P).

Shrub or small tree. *Branches* dark-brown, with few scattered or many lenticels. *Branchlets* pale-brown tomentose, soon glabrescent. *Leaves*: petiole 5-7 mm long, terete pale-brown tomentose, glabrescent; petiolule terete, sometimes grooved above, 2.5-3 mm long, pale-brown tomentose, glabrescent; blade thinly coriaceous, oblong-elliptic, sometimes narrowly so, (7.5-)9-14(-18) cm long, (2-)3-6 cm broad; glabrous above, sparsely appressed-pubescent beneath; usually rounded, rarely broadly cuneate and subpeltate at base, apex acuminate; acumen c. 0.5-1.3(-2) cm long, with rounded or rarely truncate tip; leaf margin thickened, very slightly undulate; midrib prominent beneath with 5-9(-10) rather prominent lateral nerves; areolation large (see Fig. 131). *Inflorescences* paniculate, many-flowered, subterminal and/or in the axils of the upper leaves, c. 2-7(-10) cm long; peduncles up to 4 cm long, pale-brown tomentose. *Flowers* 5(-7)-merous, 5-8 mm long, subsessile; pedicel up to 1.5 mm long, pale-brown tomentose. *Sepals* slightly spreading or erect, triangular, c. 1.5 mm long, shortly connate at base, valvate, pale-brown tomentose outside, glabrous inside, apex acute. *Petals* free, imbricate, erect or slightly spreading and finally reflexed and once or twice coiled, narrowly elliptic, 5-5.5 mm long, c. 1 mm broad, finely tomentose both sides, apex acute. *Stamens* 3.5-7 mm long; filaments filiform, pubescent up to c. 1 mm below anther. *Anthers* cordate, c. 1 mm long. *Staminodes* 5, narrowly ovate to narrowly elliptic, c. 1.5 mm long, glabrous, entire or shortly dichotomously branched and slightly beaked. *Staminal ring* usually puberulous inside, sometimes glabrous, generally glabrous outside. *Pistil* 3.5-7 mm long; stigma capitate to lobulate, exserted or not; style appressed-pubescent, occasionally only lower half and then upper half puberulous to glabrous; ovary ellipsoid, densely hirsute. *Fruit* obovoid, 2.6-2.9 cm long, 1.5-1.8 cm in diameter, densely tomentose, yellowish to brownish when ripe. *Seed* obovoid, 1.8-2.4 cm long, 0.9-1.2 cm in diameter; inner seed coat thin and brittle; endosperm cartilaginous; radicle short and stout, 3 mm long, 2 mm in diameter, protruding at the micropylar end, slightly beyond the endosperm; cotyledons obovoid, cream coloured, turning reddish-brown on exposure, up to 2.3 cm long, 1.0 cm broad, c. 6 mm thick, rather mealy.

Seedling: Viable seeds germinate in 2-3 weeks. *Primary root* well developed. *Hypocotyl* (2-)3-5.6 cm long, pale-brown appressed-pubescent. *Cotyledons* obovate, c. 2.4 x 1.1 cm, equal, opposite, horizontally spread, very shortly petiolate, swollen at inner base, glabrous, red outside, greenish-yellow inside, soon completely reddish. *Epicotyl* 7-9.7(-11) cm long, terete, pale-brown appressed-pubescent. *First leaves* opposite, unifoliolate; petiole and petiolule together 1-1.6 cm long, pale-brown appressed-pubescent. Blade ovate, 4.5-7 x 3.9-5.1 cm, top

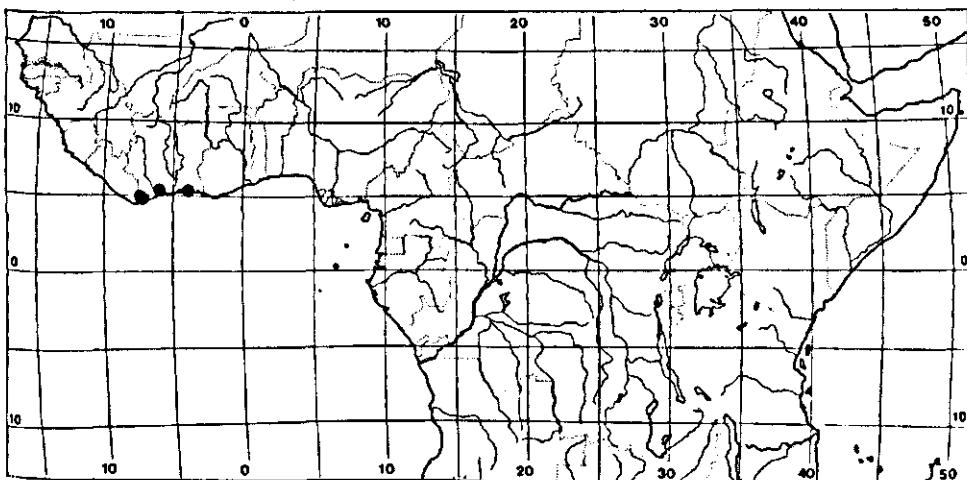


Fig. 132. Distrubution of *Hemandradenia chevalieri*

acuminate to subcaudate, cordate at base, glabrous above, sparsely appressed-pubescent beneath, more densely so on the midrib and main lateral nerves. Subsequent leaves alternate, both petiole and petiolule 2-2.8 cm long; blade ovate to elliptic, 5.8-6.5 × 4-4.3 cm, obtuse at base; otherwise similar to the first leaves.

Distribution: Ivory Coast.

Ecology: Rain forest and semi-deciduous forest.

Specimens examined:

Ivory Coast: Port-Bouët, Aubréville 1495 (BR, P); (fr. April) 1636 (P); Embouchure du Sassandra (fr. April) Aubréville 2803 (BR, P); between Tabou and Béréby (fl. Aug.) Chevalier 19943 (P, type); (fl. Aug.) 19968 (BR, P); Banco Forest, Cremers 395 (BR); 445 (P); (fr. Nov.) De Koning 6169 (WAG); (fr. Jan.) De Wit 9020 (WAG); Toilliez 334 (BR); 347 (BR).

Cult. Wageningen: Einunjeze s.n. (motherplant De Koning 6169) (WAG, seedling); De Wit et De Brujin We 28 (WAG, seedling).

Note: Herbarium records show that this species has been collected in Banco forest reserve. This is not shown on the distribution map, because according to Mr. J. de Koning, *H. chevalieri* does not occur naturally in the Banco forest reserve, but it is present only in cultivation in the Banco forest Arboretum.

Hemandradenia mannii Stapf

Fig. 133, 134

H. mannii Stapf, 1908: 288; Schellenberg, 1910: 21, 103; 1938: 64; Hepper, 1958: 749; Dickison, 1973a: 121-138.

Type: Equatorial Guinea, Muni river, Mann 1763 (holo: K).

H. glomerata Aubréville et Pellegrin, 1958: 35; Aubréville, 1959: 194. Type: Ivory Coast, Haute-Niouniourou, Aubréville 4123 (holo: P; iso: WAG).

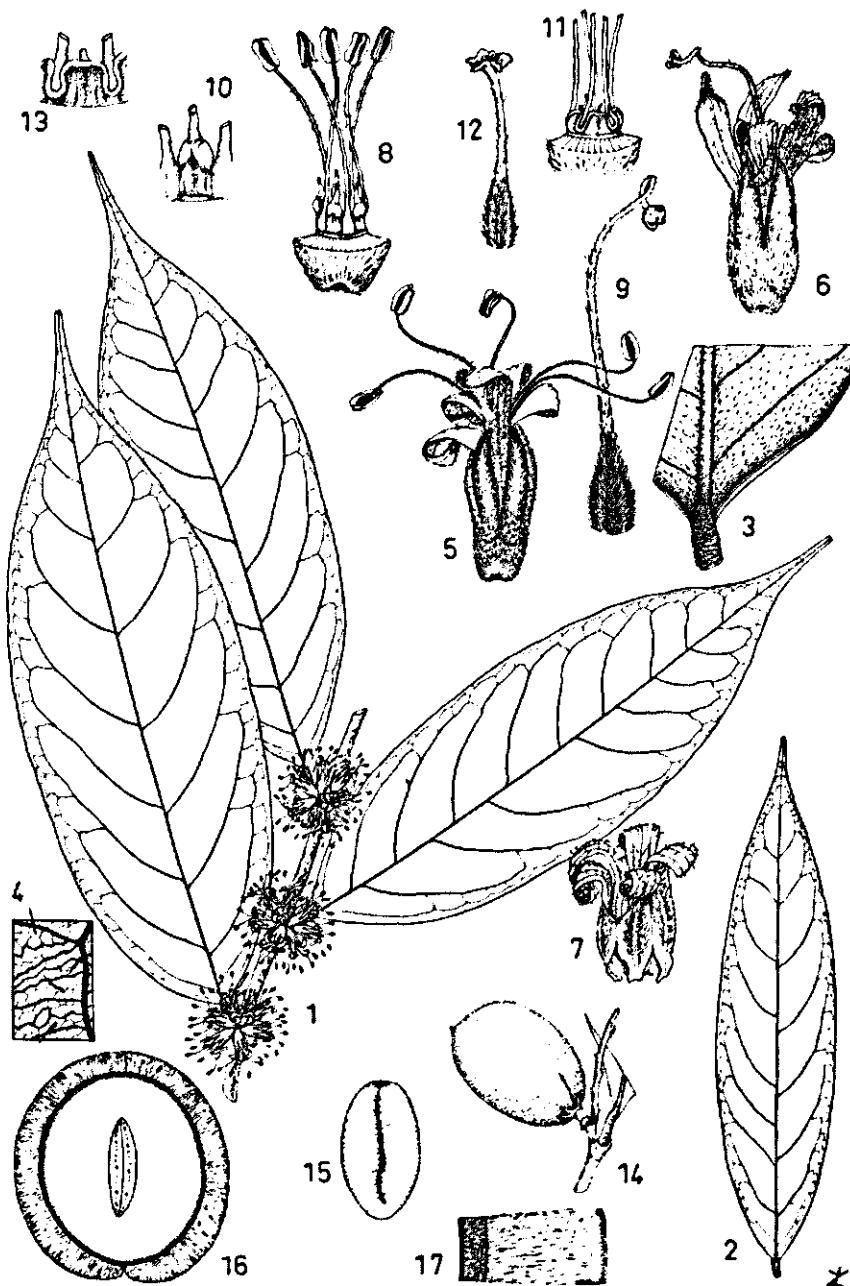


Fig. 133. *Hemandradenia manni*: 1. flowering branch, $2.3 \times$; 2. leaf beneath, $2.3 \times$; 3. revolute leaf base, beneath, $2 \times$; 4. detail of venation, $4 \times$; 5. stamen-dominant flower, $4 \times$; 6. pistil-dominant flower, $4 \times$; 7. corolla, $4 \times$; 8. stamens and staminodes, $6 \times$; 9. long pistil, $6 \times$; 10. detail staminode pistil-dominant flower, $12 \times$; 11. staminodes stamen-dominant flower, $6 \times$; 12. short pistil, $6 \times$; 13. detail staminode stamen-dominant flower, $12 \times$; 14. fruiting branchlet, $2.3 \times$; 15. seed, $2/3 \times$; 16. cross section of seed, $2 \times$; 17. detail of seed-coat, $10 \times$. (1, 3-5, 11-13. *Equipe Tisserant* 316; 2. *J. Léonard* 583; 6, 8-10. *Germain* 7450; 7. *Latilo* FHI 30960; 14-17. *Breteler* 6116).

Shrub or small tree 3-15 m tall and up to 8 cm in diameter. *Branchlets* terete, pale-brown appressed-pubescent, glabrescent. *Leaves*: petiole (3-)4-7 mm long, petiolule 2-3.5 mm long, both usually terete, sometimes grooved above, mostly pale-brown appressed-pubescent in young leaves and puberulous or glabrescent in older ones; blade thinly coriaceous, narrowly elliptic or elliptic, 7-18.5 cm long, 1.5-6.5 cm broad, glabrous above, pale-brown appressed-pubescent and finally glabrescent beneath; obtuse to cuneate at base, slightly caudate to acuminate at apex; margin thickened, slightly undulate, revolute in the basal part; acumen c. (0.2)0.4-1.8 cm long, usually rounded, very rarely faintly emarginate at the tip; main lateral nerves 6-10(-11) pairs, areolation small and distinct (see Fig. 133). *Inflorescences* glomerate, few to many-flowered, pale-brown appressed-pubescent. *Flowers* (4-)5-merous, subsessile, pedicel up to 1 mm long, appressed-pubescent. *Sepals* erect or slightly spreading, slightly imbricate or valvate, narrowly triangular, 3-4.5 mm long, c. 1 mm broad, pale-brown appressed-pubescent outside, glabrous inside, apex acute. *Petals* slightly spreading, narrowly ovate to narrowly obovate or narrowly elliptic, (5-)6-8 mm long, coherent in the lower part for 2-3 mm length, apical part erect or reflexed and once or twice coiled, pale-brown appressed-pubescent outside, inside glabrous or tomentulose to puberulous or partly so. Corolla often detaching as a unit at the end of anthesis. *Stamens* usually 5 fertile, 5-9(-10.5) mm long, filaments filiform, variously partly pubescent, rarely completely pubescent or glabrous. *Staminodes* 5, 1-1.5(-3.5) mm long, usually triangular, rarely oblong and beaked, or occasionally with broad base and upper half filiform and beaked, in the latter case thickened glands between the stamens and staminodes may be observed. *Anthers* yellow c. 1 mm long, usually ovate, rarely elliptic, occasionally the base and/or connective pilose. *Pistil* 3.5-6.5(-11) mm long, stigma capitate to lobulate, exserted in long-styled flowers; style short and fairly stout in short-styled flowers, long and filiform in long-styled flowers, pale-brown appressed-pubescent, often sparsely so in the upper half; ovary ovoid to obovoid, densely hirsute, rarely appressed-pubescent. *Fruits* ellipsoid or ovoid, 3.3 cm long, 2 cm in diameter, densely tomentose, yellowish-brown when ripe. Fruit wall crustaceous, 1.5 mm thick, glabrous inside. *Seed* ellipsoid or ovoid, c. 2.3 cm long, c. 1.3 cm in diameter; sarcotesta greyish-violet or cream; endosperm very hard. Radicle short and stout, 3.5 mm long, 2.5 mm in diameter, cotyledons thin, flat and narrow, 17 mm long, 7 mm broad.

Seedlings: Primary root well developed. *Hypocotyl* 7.5-8 cm long, terete, densely pale-brown appressed-pubescent. *Cotyledons* elliptic, c. 1.3 x 0.8 cm, horizontally spread, equal, opposite, fleshy, very shortly petiolate, hirsute at inner base. *Epicotyl* c. 4.5 cm long, terete, densely pale-brown appressed-pubescent. *First leaves* opposite, unifoliolate, petiole and petiolule together 0.7-1 cm long, densely pale-brown appressed-pubescent. Blade elliptic, c. 7.5 x 5 cm, obtuse at base, caudate at apex, glabrous above, appressed-pubescent beneath, more densely so on the midrib and main lateral nerves.

Distribution: Ivory Coast, Nigeria, Cameroun, Central African Republic, Equatorial Guinea, Gabon and Zaïre.

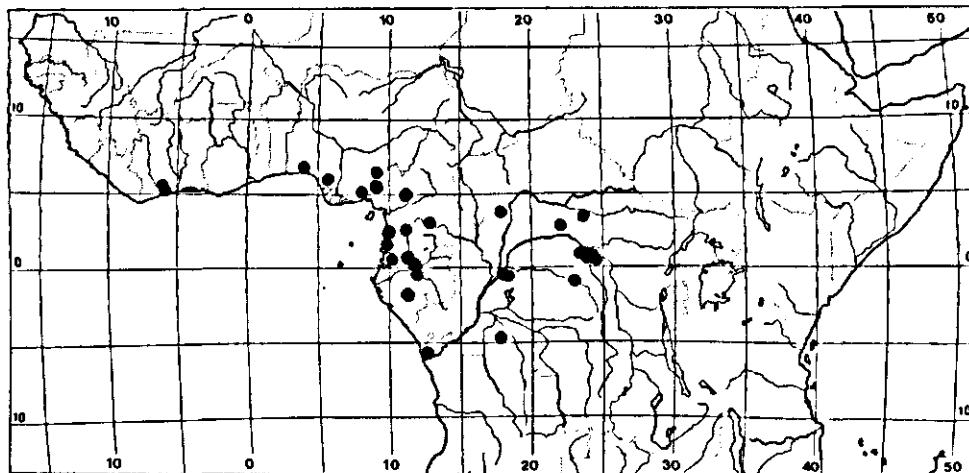


Fig. 134. Distribution of *Hemandradenia mannii*

Ecology: Rain forests and semi-deciduous forests at low and medium altitudes.

Specimens examined:

Ivory Coast: Haute-Niouniourou (fl. Feb.) *Aubréville* 4123 (P, WAG, type of *H. glomerata*); 38 km N.E. of Sassandra (fr. Nov.) *Breteler* 6116 (WAG).

Nigeria: Benin, Okomu F.R. (fr. Dec.) *Brenan* 8561 (BM, BR, FHI, K); 9160 (FHI); (fr. Feb.) *Brenan* and *Onochie* 9026 (FHI, K); Obudu, Okwangwo F.R. (fl. May) *Latilo* FHI 30960 (K); Eluji, Shasha F.R. (fl. April) *Ross* 193 (BM, BR); Calabar, Ikoromo (fr. July) *Ujor* FHI 31629 (FHI).

Cameroun: Bitye nr. R. Dja (fl. Sept.) *Bates* 1881 (BR, K); Akonekye, 15 km N.W. d'Ambam (fr. March) *Letouzey* 10206 (P).

Central African Republic: Mbaiki and Boukoko Region (fl. Oct.) *Tisserant (Equipe)* 316 (P); (fl. Oct.) 1157 (P); (fl. Sept.) 1891 (P); (fr. Jan.) 2337 (P).

Equatorial Guinea: River Muni, *Mann* 1763 (K, type).

Gabon: Monts de Cristal, River Sanga (fr. Feb.) *Hallé* and *Villiers* 5287 (P); Lastoursville (fl. June) *Le Testu* 8867 (BM, P).

Zaire: Binga, *Croeguert* 46 (BR); Ikela (fr. May) *Dubois* 823 (BR); Tumba Lake, Elema Isl. (fl. March) *Evrard* 3779 (BR, K); 3786 (BR); Kimbili Mts, *Flamigni* 10446 (BR); between Yasela and Yandjali (fl. and fr. Dec.) *Germain* 4559 (BR); Yabibi, towards Basoko (fr. Oct.) *Germain* 4637 (BR); Yandjali, between Isangi and Ligasa, *Germain* 4924 (BR); Ikela, (fl. June) *Germain* 7413 (BR); R. Lukenzu, Ikela (fl. June) *Germain* 7450 (BR); Yangambi, *Gilbert* 7869 (BR); 8255 (BR); Mpotia, Tumba Lake (fl. fr. Sept.) *Léonard* 583 (BR, L, WAG); Basukutu, nr. Lubilu (fl. Nov.) *Léonard* 1547 (BR); Dundusana, *Mortehan* 504 (BR); (fl. Dec.) 877 (BR); Gimbi, Fuka Valley (fl. Feb.) *Toussaint* 842 (BR); Inéac, Gimbi (fl. Jan.) *Wagemanns* 466 (BR); (fr. Jan.) 467 (BR, WAG).

Cult. Wageningen: *De Bruijn* 2038 (WAG, seedling of *Breteler* 6116).

Additional material examined:

Cameroun: km 26 Ipono-Dipikar I., bank of Northern Ntem R. (fl., fr. June) *J.J. de Wilde* 8321 (WAG); near Akonetye, S of Ebolowa (fr. Aug.) *Koufani* 153 (WAG, YA); 26 km NW NGuti (fr. June) *Letouzey* 13815 (WAG); N of Banda (fr. Apr.) *J. & A. Raynal* 10751 (YA).

Gabon: near Koumameyong (fl., fr. juv. Apr.) *Breteler et al.* 8980 (WAG); Lara R. near Mitzic-

éدونné Rd (fr. Nov.) *Louis et al.* 475 (LBV, WAG); 40 km N of Lébamba (fr. Nov.) *Louis et al.* 1042 (LBV, WAG).

Zaire: La Kulu (fl. b.) *Van den Brande* 239 (BR); *ibid.* (fl. Sept.), *Van den Brande* 696 (BR); Gimbi (fr. July) *Wagemans* 1543 (BR).

Note: Comparative studies of the holotype and isotype of *H.glomerata* (Aubréville 4123) with material of *H.mannii* showed that the former only represents a short-styled (stamen-dominant) specimen of *H.mannii*, and in conjunction with other characters, perfectly fits into the variability of *H.mannii*.

Additional Note: The material from Cameroun and Gabon is slightly aberrant in having distinctly apiculate to beaked fruits. *J.J. de Wilde* 8321 from the former country is also differing by its large oblong leaves (up to 25 × 8 cm) which are densely brown-floccose beneath when young.

Excluded species

Hemandradenia madagascariensis Schellenberg (1938) = *Ellipanthus madagascariensis* (Schellenb.) Capuron (1958).

Note: Examination of the type material (*Baron* 5626) preserved in the Kew Herbarium leaves no doubt that this material belongs in *Ellipanthus*.