

A REVISION OF CALLICHILIA STAPF (APOCYNACEAE)

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(Received 27-X-1977)

Published 24-II-1978

INTRODUCTION

The genus is restricted to Africa; the present author had the opportunity to study *C. subsessilis* both in the field and in cultivation, in the Ivory Coast. Furthermore, this publication is based on the available herbarium material, among which all type specimens.

HISTORY OF THE GENUS

In 1902 STAPF described the genus *Callichilia*, based on 5 species, some of which he removed from *Tabernaemontana*.

MARKGRAF (1923) reduced its size by separating *Ephippiocarpa*, based on *C. orientalis*; PICHON (1948) reduced *Callichilia* by placing *C. barteri* in the monotypic genus *Hedranthera*.

The present author, however, reinstates the original genus concept of STAPF.

GEOGRAPHICAL DISTRIBUTION AND ECOLOGY

Most *Callichilia* species occur in the rain forest belt of Central Africa from Nigeria to Zaïre, where *C. bequaertii* is the most widely distributed species. *C. monopodialis* is endemic in a mountainous region in Cameroun, while *C. subsessilis* occurs in the rain forests of West Africa. The six species from Central and West Africa are either understory shrubs or lianas, and are easily recognized by their large, conspicuous white flowers.

These plants have a rather long flowering season, and as they are easy to collect, they are comparatively well represented in herbaria.

C. orientalis differs both in distribution and ecology from all other *Callichilia* spp. It is known from southeastern Africa and from a single locality in Somalia, and occurs in dune forests along the coast.

RELATIONSHIP TO OTHER GENERA

Callichilia belongs to the tribe of the *Tabernaemontaneae*, which was discussed by PICHON (1948) and LEEUWENBERG (1976), and for the time being the present author prefers to follow their delimitation.

The genus shows an obvious resemblance to *Stemmadenia* Benth. in flowers and fruits, but it has also affinities to *Calocrater* K. Schum. and, particularly by leaves and corolla, to *Crioceras* Pierre.

CYTOLOGY

The somatic chromosome number of *C. subsessilis* is $2n = 22$ (MANGENOT 1965, no voucher specimen preserved).

PHYTOCHEMISTRY

Alkaloids of *C. barteri* and *C. subsessilis* have been analyzed, and some structures were found, peculiar to those species. Of these, only the alkaloid vobtusine was found in both species. A separate list of literature on phytochemistry and anatomy is added at the end of the revision.

GENUS DIAGNOSIS

Callichilia Stapf, Fl. Trop. Afr. 4 (1): 130 (1902); Pichon, Mém. Mus. Hist. Nat., Paris, n. sér. 27: 224 (1948).

Lectotype species: *C. subsessilis* Stapf, designated by Bullock, Kew Bull. 15: 395 (1962).

Heterotypic synonyms: *Ephippiocarpa* Mgf., Notizbl. Bot. Gart. Mus. Berl. 8 (74): 310 (1923); Codd in Fl. S. Afr. 26: 272 (1963). Type species: *E. orientalis* (S. Moore) Mgf. (= *C. orientalis* S. Moore).

Hedranthera Pichon, Mém. Mus. Hist. Nat., Paris, n. sér. 27: 225 (1948). Type species: *H. barteri* (Hook. f.) Pichon (= *C. barteri* (Hook. f.) Stapf).

Erect glabrous shrubs or lianas, with white latex in every part of the plant, except in the corolla-lobes. Branches unarmed, terete, lenticellate.

Leaves opposite, those of one pair equal or unequal, subsessile or petiolate; the petioles of one pair joined at the very base by a stipular line; stipules intrapetiolar, adaxially near their base with several rows of minute glands; petiole channeled above; blade medium to dark green, paler beneath, thinly coriaceous, oblong, ovate, or obovate, acuminate or acute at the apex, subcordate to cuneate at the base; secondary veins 5–16 on each side; costa slightly prominent with a groove above, veins slightly prominent, both distinctly prominent beneath, tertiary venation not very conspicuous beneath, except in *C. orientalis*.

Inflorescences one or two, in the axils of deciduous scale-like bracts at the apex of a branch just below its bifurcate ramification, pendulous, one- to several-flowered, cymose, congested; peduncle terete; pedicels terete; bracts entire, narrowly to broadly triangular, acute at the apex, amplexicaule at the base, inside near their base with 6–15 minute glands.

Flowers 5-merous, actinomorphic or with only the sepals unequal, often fragrant.

Sepals connate at their very base only, green or greenish white, papyraceous to fleshy, subequal or unequal, imbricate-quincuncial, much shorter than the corolla, linear to broadly obovate, persistent under the fruit, inside near the base with 1–4 rows of minute glands.

Corolla in the mature bud oblong; tube greenish white to white, fleshy, glabrous inside, except for 5 pilose ridges extending downwards from the base of the filaments; tube cylindrical below the insertion of the stamens, abruptly widened at the point of insertion to a wider cylindrical or funnel-shaped part and campanulate just below the mouth; lobes contorted in bud, white, inside near the base yellow, membranaceous, obtriangular, oblique, with two apices, one acute and one rounded.

Stamens included, connivent in a cone; filaments glabrous, shorter than the anthers; anthers introrse, narrowly oblong, glabrous, basifixed, sometimes with a dorsal callus, apiculate or (only in *C. orientalis*) obtuse at the apex, auriculate at the base; auriculae rounded at the base, sterile, solid, almost horny; cells two, discrete, parallel, dehiscent by a longitudinal slit.

Pistil glabrous; carpels 2, connate at their very base only, ovoid, abruptly narrowed into the style, surrounded by a low, fleshy, shallowly lobed, annular, almost free disk; style slender, consisting of 2 connate strands, reaching the insertion of the filaments; clavuncula 5-ribbed or -winged, each rib or wing lying between the auriculae of an anther; stigma obscure or as long as the clavuncula, slender, papillose, and partly bifid; placentae central, peltate, ovuliferous outside only, with several rows of 5–10 ovules.

Fruit berry-like, many-seeded; the two mericarps free, or only in *C. orientalis* half syncarp, rarely connate at the apex, yellow to orange, sometimes dotted with white, ovoid to ellipsoid, rarely narrowly ovoid, beaked, smooth with (except in *C. monopodialis*) 2 lateral ridges, dehiscent by a single ventral slit, supposedly dehiscing (as was observed in *C. subsessilis*) after the fruit is shed; wall thin, pulp juicy, fleshy; arill very thin.

Seeds ovoid; testa dark brown, reticulate, deeply pitted, with the pits in longitudinal rows; endosperm copious, white, horny, slightly ruminant, surrounding the straight embryo.

Distribution: 7 species in West, Central, East and Southeast Africa.

Note: The branches of fresh material of *C. subsessilis* are sulcate, just as they are in dry material of all specimens of the genus seen.

KEY TO THE SPECIES

1. Leaves rounded to subcordate at the base. 2
 - Leaves cuneate at the base. 3
2. Corolla lobes, as seen from the outside, overlapping to the right; peduncle one; shrubs; upper corolla tube cylindrical 7. **C. subsessilis**
 - Corolla lobes, as seen from the outside, overlapping to the left; peduncles two, rarely one; lianas; upper corolla tube funnel-shaped. 4. **C. inaequalis**
3. Anthers inserted in the upper half of the corolla tube, without a dorsal callus 4
 - Anthers inserted in the lower half of the corolla tube, with a dorsal callus 6
4. Carpels half syncarp, ovoid, twice as long as wide; style up to 12 mm long; tertiary venation clearly visible beneath; dune forest of East and Southeast African coast. 6. **C. orientalis**
 - Carpels free, divaricate, narrowly ovoid, 3-5 × as long as wide; style > 15 mm; tertiary venation inconspicuous; Nigeria, Cameroun. 5
5. Corolla 55-90 mm long, lobes wider than 19 mm; peduncle closely covered with bracts from 1 cm from the base; fruits not ridged; secondary veins dividing about 1 cm from the leaf-margin. 5. **C. monopodialis**
 - Corolla 30-40 mm long, lobes up to 12 mm wide; peduncle with some bracts near the apex; fruits ridged; secondary veins looping close to the leaf-margin. 2. **C. basileis**
6. Corolla tube 2.5-5 cm long; anthers inserted at the lower $\frac{1}{3}$ to $\frac{1}{2}$ of the corolla tube; sepals green, subequal, 5-12 mm long; bracts few, only at the apex of the peduncle. 1. **C. barteri**
 - Corolla tube 6-10 cm long; anthers inserted at the lower $\frac{1}{16}$ to $\frac{1}{4}$ of the corolla tube; sepals green, dotted with white, unequal, 10-45 mm long; bracts many, closely covering the peduncle from 1 cm from the base. 3. **C. bequaertii**

Specimens bearing only fruit present some difficulties in identifying. *C. subsessilis* and *C. inaequalis* can be identified according to the general key, and *C. orientalis* is the only species bearing half syncarp fruit; but the other species cannot be distinguished so easy.

A tentative key follows, but one should bear in mind that the characters used are not absolute.

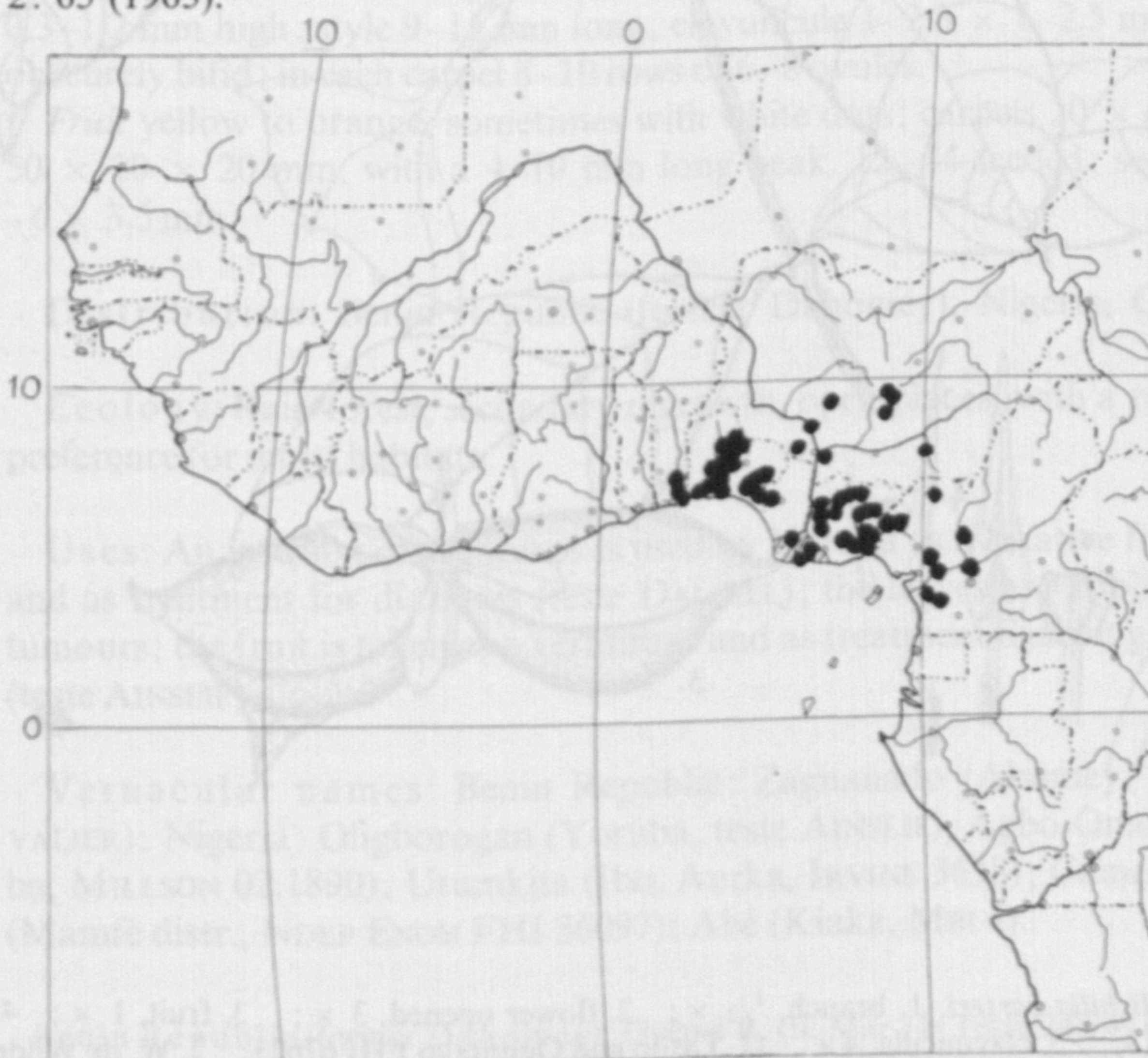
- 1. Carpels not ridged; sepals unequal, 5–18 mm long. **C. monopodialis**
 Carpels ridged. 2
- 2. Peduncle short, seldom longer than 3.5 cm; sepals equal, 2–17 mm long.
 **C. barteri**
 Peduncle mostly longer. 3
- 3. Peduncle closely covered with bracts; sepals unequal, 5–45 mm long.
 **C. bequaertii**
 Peduncle with only a few bracts near the apex; sepals equal, 5–9 mm long.
 **C. basileis**

1. **Callichilia barteri** (Hook. f.) Stapf, Fl. Trop. Afr. 4(1): 133 (1902); Hutchinson and Dalziel, Fl. W. Trop. Afr. 2: 39 (1931).

Basionym: *Tabernaemontana barteri* Hook. f., Bot. Mag. 96, t. 5859 (1870).

Type: Nigeria, Cross R. State, Old Calabar, Thomson 80 (E, lectotype; isotype: K).

Homotypic synonym: *Hedranthera barteri* (Hook. f.) Pichon, Mém. Mus. Hist. Nat., Paris, n. sér. 27: 225 (1948); Huber in Fl. W. Trop. Afr. 2nd. ed., 2: 65 (1963).



MAP. 1. *Callichilia barteri*.

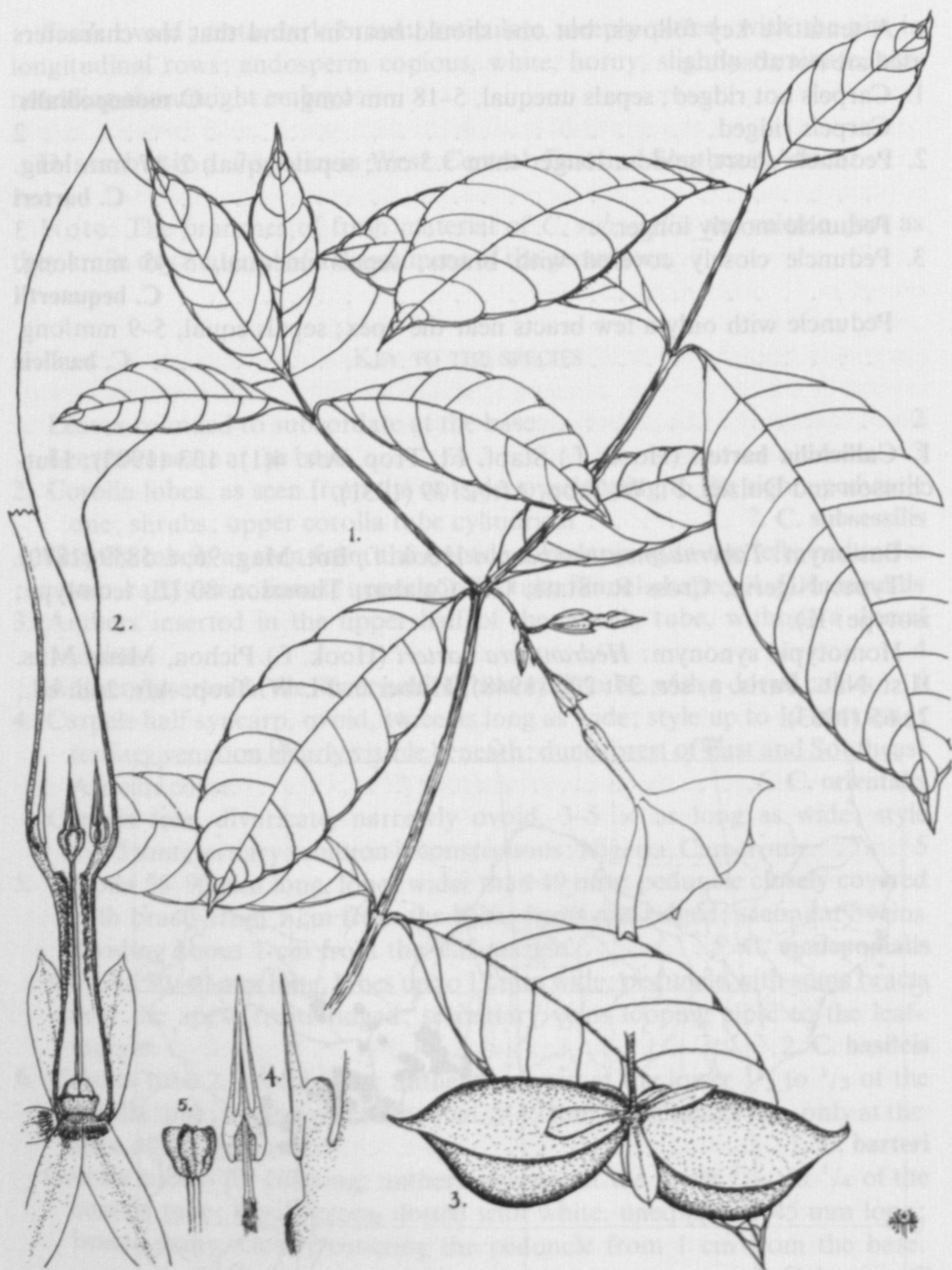


FIG. 1. *Callichilia barteri*: 1. branch, $\frac{1}{2} \times$; 2. flower opened, $3 \times$; 3. fruit, $1 \times$; 4. stamen, $4 \times$; 5. clavuncula, $4 \times$. (1. Latilo and Oguntayo FHI 67623; 2. W. de Wilde 1551; 3. Mann 2271; 4, 5. Beentje 1413). All drawings by the author.

Erect shrub, 0.75–3 m high. Branches pale brown.

Leaves: petiole 2–10 (–15) mm long; blade medium green and shiny above, paler beneath, thinly coriaceous, elliptic to narrowly ovate, 1.5–5 × as long as wide, 3.5–21 × 1–9 cm, acuminate or less often acute at the apex (acumen acute, up to 15 mm long), cuneate at the base or decurrent into the petiole; secondary veins 6–11.

Inflorescence solitary or occasionally paired (observed only once); peduncle pale brown, 5–35 (–43) mm long, with a few bracts near the apex, bracts distant, 2–8 × 1.5–3 mm; pedicel 4–14 mm long.

Flowers fragrant at night.

Sepals subequal or equal, pale green, papyraceous, broadly to narrowly obovate, 1–5 × as long as wide, 2–17 × 2–7 mm, rounded and with a small mucro to acute at the apex, inside near the base with 9–23 glands in 2 rows.

Corolla in the mature bud 4–8 × as long as the calyx, (36–) 45–89 mm long, white, greenish white near the base of the tube; tube 3–6 × as long as the calyx, 1–2.5 × as long as the lobes, 24–52 mm long, cylindrical, inside with 4–7 mm long pilose ridges; lobes overlapping to the left, 1–1.3 × as long as wide, 11–39 × 11–30 mm.

Stamens inserted at the lower one-third to one-half of the corolla-tube, with a large dorsal callus; anthers 2.5–6 × as long as the filaments, 4–6.5 × as long as wide, 5–6.5 × 1–1.4 mm, with 0.3–0.8 mm long auricles.

Pistil 11.8–20.3 mm long; ovary 1.2–2.1 × 1.2–2.3 × 0.6–1.3 mm; disk 0.3–1.2 mm high; style 9–15 mm long; clavuncula 1–2.3 × 1–2.5 mm; stigma obscurely bifid; in each carpel 8–10 rows of 6–8 ovules.

Fruit yellow to orange, sometimes with white dots; carpels 20 × 12 × 12–50 × 20 × 20 mm, with a 4–10 mm long beak, 12–44-seeded; seeds 4 × 3–6 × 3.5 mm.

Distribution: Benin Republic (former Dahomey), Nigeria, Cameroun.

Ecology: Rain forest, secondary regrowth, open places, with a presumable preference for moist habitats.

Uses: An infusion of the leaves is used by Yoruba as a laxative for children and as treatment for dizziness (teste DALZIEL); the leaves are applied against tumours; the fruit is taken as a vermifuge and as treatment against gonorrhoea (teste AINSLIE).

Vernacular names: Benin Republic: Zagnanado (Abomey, teste CHEVALIER); Nigeria: Oligborogan (Yoruba, teste AINSLIE), Agbo Omode (Yoruba, MILLSON 02.1890); Utumkita (Ibo, Aurka, IRVINE 3618); Cameroun: Abé (Mamfé distr., NDEP ENOH FHI 36097); Abé (Kiaka, MBI 4).

Benin Republic (former Dahomey): Ouémé R. (fl. Mar.) le Testu 245/49 (P); between Goutyssa and Auanditomé, Ouémé R. bank (fl. fr. Mar.) Chevalier 23282 (P); between

Porto Novo lagoon and the sea (fl. fr. Jan.) Chevalier 22779 (P); S of Gbekon (fl., y. fr. Aug.) van der Zon 428 (WAG).

Nigeria: Kaduna State: Samban Kwoi (fl. Apr.) Wimbush 10 (FHI, K); Jemaa div. (buds Mar.) Tuley 2290 (K); Sanga R. For. Res., Kurmi (fr. Dec.) Idorun & Emi FHI 55674 (FHI); Plateau State: between Lafia and Jemaa (fl. Apr.) Hepburn 44 (K, P); Niger State: Idu For. Res., Abuja (fl. May) Eimunjeze c.s. FHI 66456 (FHI, K); Baro (fl. fr. Mar.) Daramola & Binuyo FHI 61940 (FHI); Kwara State: N. Abuja Kunni (fl. fr. May) Lowe 1321 (FHI); Esie For. Res. (fl. Jan.) Latilo FHI 18219 (FHI); road Olle-Kabba (fr. Oct.) Daramola & Adebusuyi FHI 38427 (FHI, K); Oyo State: Oba Hills For. Res. (fl. Feb.) Wit & Oguntayo 1213 (FHI, WAG); *ibid.* (fl. Apr.) Adebusuyi FHI 40943 (FHI, P); Ibadan-Badeku (fl. Apr.) Hall FHI 27436 (FHI, WAG); Kupalo, Ibadan (fl. Apr.) Hall FHI 27459 (FHI, WAG); Ibadan, Bernard 8821 (G); *ibid.* (fl. Mar.) Jones FHI 3061 (FHI); Ibadan, Forestry Hill (fl. Apr.) Daramola FHI 34695 (FHI, K); Ibadan, near University (fl. Apr.) Meikle 1404 (K, P); *ibid.* (fr. May) Stanfield FHI 45945 (FHI); Ibadan, Jericho Res. (fl. Apr.) Lowe 2177 (GC, FHI); Ibadan For. Res. (fr. Sept.) Daramola FHI 34212 (FHI); *ibid.* (fr. Oct.) Binuyo & Emwiogbon FHI 55444 (FHI); Ibadan (fr. Nov.) Latilo FHI 13644 (FHI); Idi-Iroko, near Ibadan (fl. Apr.) Fagberni FHI 31377 (FHI); N. Shasha For. Res. near Ondu enclave (buds Feb.) Jones & Onochie FHI 17542 (FHI); Ile-Ife Campus (fr. June) Evrard 6946 (BR); N. Aseyire R. bank (fr. May) Gbile FHI 71249 (FHI); Gambari For. Res., W of Busogboro (buds, fr. Feb.) Onochie FHI 34977 (FHI); Gambari For. Res. (fl. Mar.) McGregor FHI 9651 (FHI); *ibid.* (fl. Mar.) Hepper 2278 (K); Ikirun (fl. Feb.) Millson 02.1890 (K); Ijaiye, Barter 3357 (K); Ogun State: Omo For. Res., along Omo R. (fl. Mar.) Awunti FHI 42202 (FHI); W Lagos, Interior, Rowland s. n. (K); *ibid.*, Abeokuta (fl. Jan.) Rowland 01.1890 (P); S. of Owode, km 6 Otta-Abeokuta road (fl. fr. Apr.) Leeuwenberg 11327 (WAG); Olokemeji For. Res. (fr. June) Wit 2109 (FHI); Abeokuta, Irving 132 (K); Ijebu Ode (fl. Feb.) Kennedy 128 (FHI); Lagos State: Ikorudu, Schlechter 12301 (BR, K, Z*); Lagos, Lokomedji, Chevalier 13999 (P); Eppah, Barter 3284 (K, P); Ondo State: Idanre For. Res. (fr. May) Onyeachusim c.s. FHI 69199 (FHI); Agbaye, Ikale Aye Distr. (fl. Nov.) Emwiogbon FHI 43949 (FHI, K); Onishere For. Res. (fl. Mar.) Odukwe FHI 34705 (FHI); N Akinyari (fl. Apr.) Jones FHI 3128 (FHI); Akure For. Res. (fl. Feb.) Gbile c.s. FHI 20566 (FHI); Bendel State: road Lagos-Benin City, Osse R. bank (fl. Mar.) Onochie FHI 38324 (FHI); Okomu For. Res. (buds Jan.) Brenan & Jones 8871 (BR, FHI); *ibid.* (fl. Mar.) Akpabla 1105 (GC, K); Utunkita, Ibo, Aurka (fl. fr. Mar.) Irvine 3618 (B, BR, K); Benue State: Acharane For. Res. (fr. Dec.) Latilo FHI 60570 (FHI); Anambra State: Onitsha, Barter 1653 (K); Nnewi-Nkpor For. Res. (fr. Feb.) Emwiogbon FHI 66021 (FHI); Onitsha, Ogbedu (fr. Apr.) Onochie FHI 7183 (FHI); Onitsha, 4 m from Ummezen (fl. Feb.) Jones 2689 (FHI); Mamu R. For. Res. (fl. Mar.) Emwiogbon & Akagu FHI 73139 (FHI); *ibid.* (fl. Mar.) Jones FHI 6922 (FHI); Osumane For. Res., Oseakwa (fl. May) Emwiogbon & Onyeachusim FHI 46411 (FHI); mile 19, Enugu-Awgu road (fr. May) Nwosu FHI 58758 (FHI); Idodo R. bank, Nkanu-Enugu distr. (buds Feb.) Emwiogbon & Akagu FHI 72226 (FHI); Iva For. Res. (fr. Dec.) Emwiogbon FHI 66216 (FHI); *ibid.*, Juju Groove (buds Dec.) Emwiogbon & Chiaha FHI 72198 (FHI); Oji R. bank, Udi distr. (fr. June) Emwiogbon FHI 58884 (FHI); Enugu-Abakaliki road near Amechi (fl. Feb.) Latilo & Oguntayo FHI 67623 (FHI, K); Abakaliki (fl. fr. May) Nwosu FHI 58346 (FHI); *ibid.*, Abia R. bank (fl. Apr.) Kitson 07.04. 1909 (BM); Imo State: N. Ovum, Okigwi, Owerri (fl. Dec.) Jones FHI 6204 (FHI); Rumbara, Owerri (buds Nov.) Jones FHI 770 (FHI); Rivers State: Bomadi, opp. Niger R. (fl. fr. Jan.) Daramola FHI 46940 (FHI); Degema distr., Talbot 3831 (BM); *ibid.*, Talbot anno 1916 (BM); Brass, Barter 86 (K); Cross River State: Old Calabar, Thomson 80 (E, K, type) Old Calabar R. bank (fl. fr. Feb.) Mann 2271 (K, P); N of Kembong N. A. Res. (fr. Sept.) Tiku FHI 22187 (FHI, K); Orem-Oban For. Res., mile 66 Calabar-Mamfé road (fl. fr. Feb.) Onochie FHI 36407 (FHI); Orem-Oban For. Res. (fl. fr. Feb.) Latilo FHI 45820, 45821 (FHI, WAG); *ibid.* (fl. May)

* Specimens marked with an asterisk were seen by Dr. A. J. M. LEEUWENBERG, not by H. J. BEENTJE.

van Meer 1548 (FHI, WAG); Lower Enyong For. Res., 35 km NNW of Oyo (fr. Apr.) van Meer 1241 (FHI, WAG); Ukpom-Bende For. Res. (fl. fr. Mar.) Emwiogbon FHI 73441 (FHI); *ibid.* (fr. Aug) Okeke c.s. FHI 72653 (FHI); *ibid.* (fl. Mar.) Emwiogbon FHI 63907 (FHI); Umuda Ofeme, Umuahia distr. (buds Jan.) Odewo FHI 70515 (FHI); Afikpo (fl. Apr.) Jones 1412 (FHI); Cross R. For. Res., van Meer 1677 (FHI); *ibid.* (fr. May) van Meer 1700 (FHI, WAG); *ibid.* (fr. June) Oguntayo & Ighanesebhor FHI 65252 (FHI); *ibid.* (fl. July) Anonym. 07.1888 (K); Iyamoyong For. Res. (buds fr. May) Binuyo FHI 41360 (BR, FHI, WAG); Ukpon E. For. Res. (fr. July) Emwiogbon FHI 60207 (FHI); Appiapun-Obubra path (fr. Apr.) Jones FHI 6265 (FHI); Odonget, Ikom distr. (fr. Aug.) Ekwuno c.s. FHI 67085 (FHI); Abia, bank of river on Abia-Bendhege road, Ikom distr. (fl. fr. Feb.) Latilo & Oguntayo FHI 67708 (BR, FHI). Location uncertain: Oba R. bank (fl. Jan.) Kitson 01.1909 (BM); Kpanaw (fl. Mar.) Kitson 07.03.1910 (BM); Essa Egure (fl. Mar.) Millson 88 (K); without precise location: Kennedy 2520 (E); *idem*, Emwiogbon FHI 63141 (FHI); *idem*, Millson 61 (Z*).

Cameroun: Donga Plain near Abonshe (fl. Feb.) Brunt 1005 (K); Afu, 30 km N of Nkambé, near Assamu R. (fr. Nov.) Letouzey 13161 (YA); Yabwa R. Valley between Essu and Munkep (fr. July) Letouzey 13980 (WAG); Otu, Mamfé Distr., Mbi 4 (FHI); Mamfé Distr. (buds, fr. Apr.) Ndep Enoh FHI 36097 (FHI); between Okurikang and Araru (fr. May) Letouzey 13576 (WAG); near Sérère (fr. Sept.) Letouzey 7799 (P); confluence of Ndé and Noun R. (fl. Feb.) Letouzey 11254 (WAG); Sanaga R. bank near Nkongwala (fl. Dec.) Letouzey 10768 (WAG); confluence of Sanaga and Mbam R. (fl. Jan.) Letouzey 9824 (BR, P. WAG); Nachtigal, Sanaga R. bank (fl. fr. Apr.) J. and A. Raynal 10795 (P); Dihani (fl. fr. June) Annet 474 (P); Mbsuga, between Ayos and Akonolinga (buds Mar.) Letouzey 4905 (P); 40 km S of Badjob (fl. Dec./fr. Dec.) W. de Wilde c.s. 1550 & 1551 (WAG/BR, WAG); bank Nyong R., 65 km SSW of Eséka (fr. June) W. de Wilde c.s. 2715 (BR, FHI, WAG, Z).

Gabon or Congo: Bibondi (?) (fl. Nov.) Thollon 673 (P).

Cultivated: Benin Republic, Porto Novo Station, planted in court-yard (fl., y. fr. Jan.) Chevalier 22721 (P); Netherlands, Wageningen, cult. in conservatory from seeds collected by van Meer in Nigeria, de Wit 12733 (WAG); *ibid.*, Beentje 1413 (WAG).

Notes: The differences between *Hedranthera* and *Callichilia* reported by PICHON, do not hold true in all cases:

– according to PICHON the anthers of *Hedranthera* are sessile, adnate to the corolla, and provided with a large dorsal callus, while those of *Callichilia* are basifix with a distinct filament. As is observed by the present author, the anthers of *Hedranthera* do have a short filament, which is hidden from view by the callus.

– he described the anthers of *Hedranthera* as provided with a distinct terminal acumen, and those of *Callichilia* with a minute mucro. It turned out that all *Callichilia* spp., inclusive of *C. barteri*, but exclusive of *C. orientalis*, are distinctly acuminate.

– PICHON's remarks on the pollen of *C. barteri* are not yet verified. Dr. S. NILSSON (Stockholm) is at present studying the pollen of all *Callichilia* spp.

– according to PICHON the disk of *Hedranthera* is free, while that of *Callichilia* is adnate to the ovary to at least halfway. The present author found that the disk may be partly free, and that in this respect there is a certain individual variation within both *C. barteri* and other *Callichilia* spp.

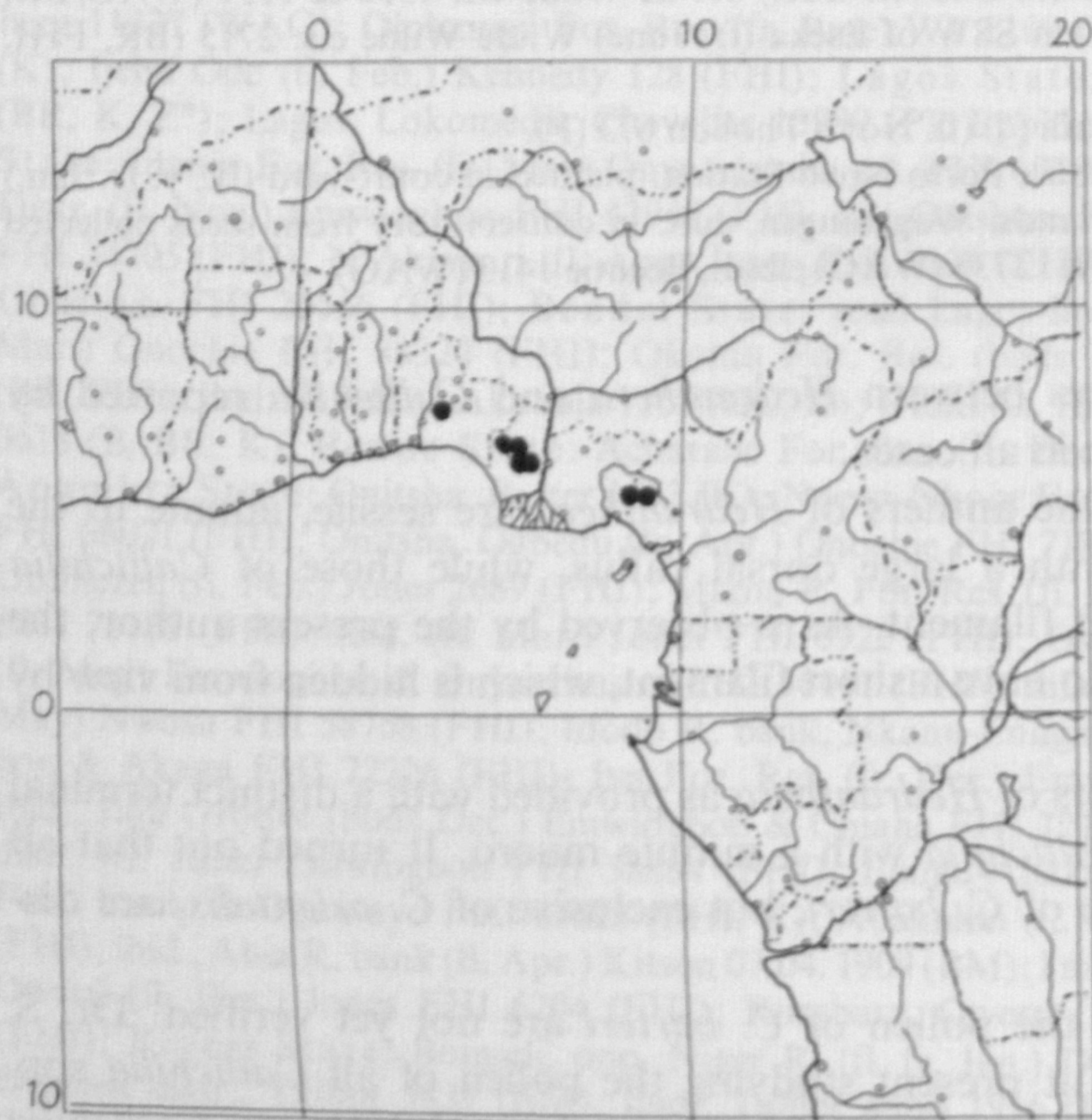
– the carpels of *Hedranthera* are free and those of *Callichilia* are syncarpous at their base, according to PICHON. It was established that the carpels in the

ovary are always, to a slight degree, syncarp at their extreme base.

The flowers of *C. barteri* vary much in size: the smallest (36 mm long) are found in KENNEDY 2520, and the largest (88 mm long) in ROWLAND s.n. The flowers open two weeks after the bud emerges from the calyx. They open only in the evening, and become fragrant by that time. At dawn the flowers wither, and fall off some time after.

2. *Callichilia basileis* Beentje, sp. nov.

Frutex ramis inermibus lenticellatis. Folia glabra breviter petiolata laminis coriaceis obovatis apice acuminatis basi cuneatis. Inflorescentia solitaria inter ramificationem pedunculo pedicellisue glabris. Flores pentameri magni. Sepala oblonga glabra apice acuta intus basi glandis parvis profulta. Corolla extus glabra intus pilosa sub staminum insertione, tube calice lobisque longiore, lobis sinistrorsis tectis. Stamina inclusa antheris oblongis glabris basi auriculatis. Pistillum glabrum ovario biloculari stigmate bifido. Fructus ovoideus apice longe acuminatus polyspermus. Semen ovoideum scabrum.



MAP. 2. *Callichilia basileis*.

Type: Nigeria, Bendel State, Usonigbe For. Res., Keay FHI 37016 (K, holotype; isotypes BR, FHI).

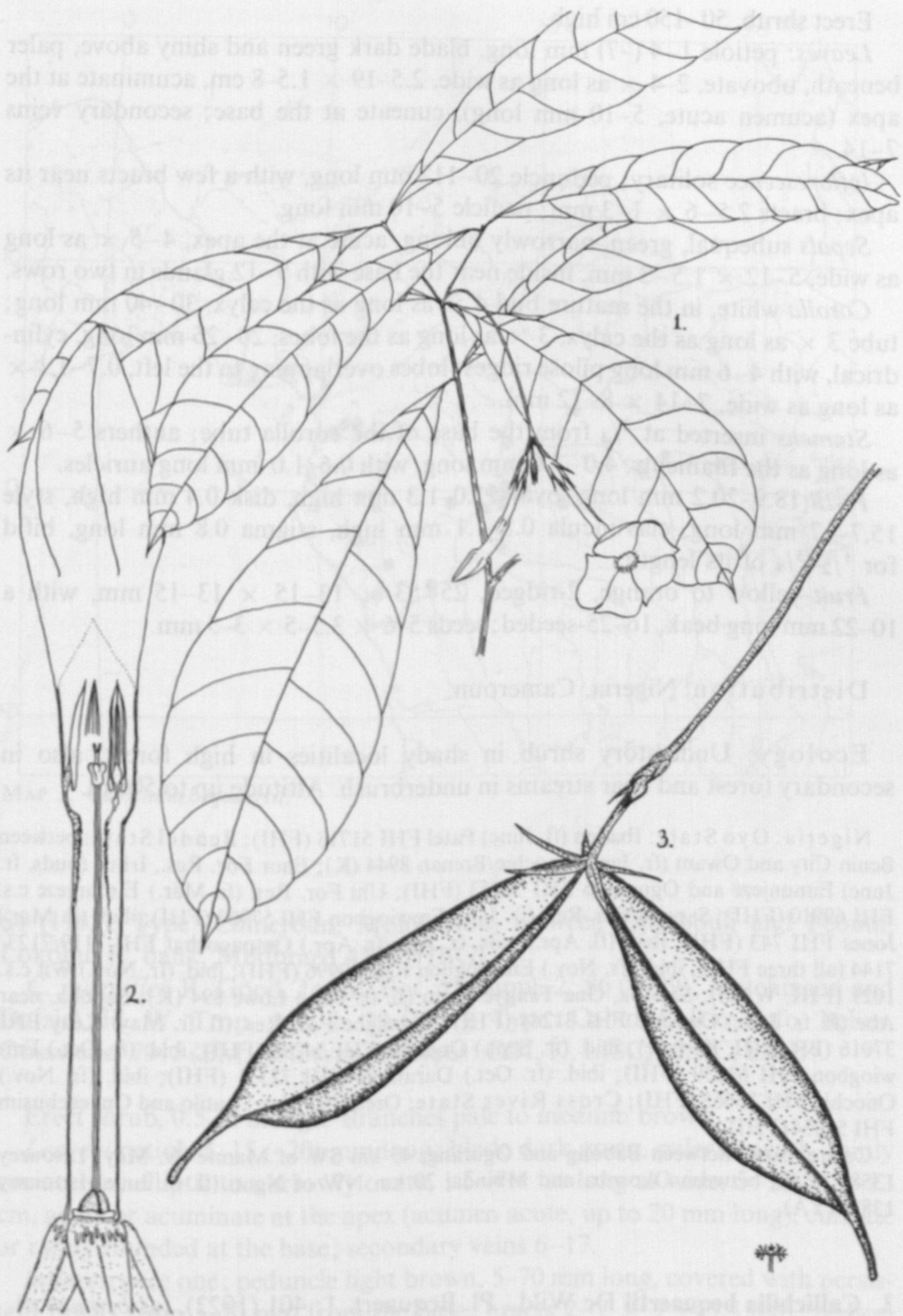


FIG. 2. *Callichilia basileis*: 1. branch, $\frac{1}{2} \times$; 2. bud opened, $3 \times$; 3. fruit, $1 \times$. (1, 2. Keay FHI 37016; 3. Latilo and Onyeachusim FHI 54254).

Erect shrub, 50–150 cm high.

Leaves: petiole 1–4 (–7) mm long. blade dark green and shiny above, paler beneath, obovate, 2–4 × as long as wide. 2.5–19 × 1.5–8 cm, acuminate at the apex (acumen acute, 5–10 mm long), cuneate at the base; secondary veins 7–14.

Inflorescence solitary; peduncle 20–112 mm long, with a few bracts near its apex; bracts 2.5–6 × 1–3 mm; pedicle 5–10 mm long.

Sepals subequal, green, narrowly oblong, acute at the apex, 4–5 × as long as wide, 5–12 × 1.5–3 mm, inside near the base with 9–12 glands in two rows.

Corolla white, in the mature bud 4 × as long as the calyx, 30–40 mm long; tube 3 × as long as the calyx, 3 × as long as the lobes, 20–26 mm long, cylindrical, with 4–6 mm long pilose ridges; lobes overlapping to the left, 0.7–1.1 × as long as wide, 7–14 × 8–12 mm.

Stamens inserted at $\frac{2}{3}$ from the base of the corolla tube; anthers 5–6 × as long as the filaments, 4.0–4.6 mm long, with 0.6–1.0 mm long auricles.

Pistil 18.9–20.2 mm long, ovary 1.0–1.3 mm high, disk 0.4 mm high, style 15.7–17 mm long, clavuncula 0.8–1.1 mm high, stigma 0.8 mm long, bifid for $\frac{1}{2}$ – $\frac{3}{4}$ of its length.

Fruit yellow to orange, 2-ridged, 25–53 × 13–15 × 13–15 mm, with a 10–22 mm long beak, 16–25-seeded; seeds 5–6 × 3.5–5 × 3–5 mm.

Distribution: Nigeria, Cameroun.

Ecology: Understory shrub in shady localities in high forest, also in secondary forest and near streams in underbrush. Altitude up to 500 m.

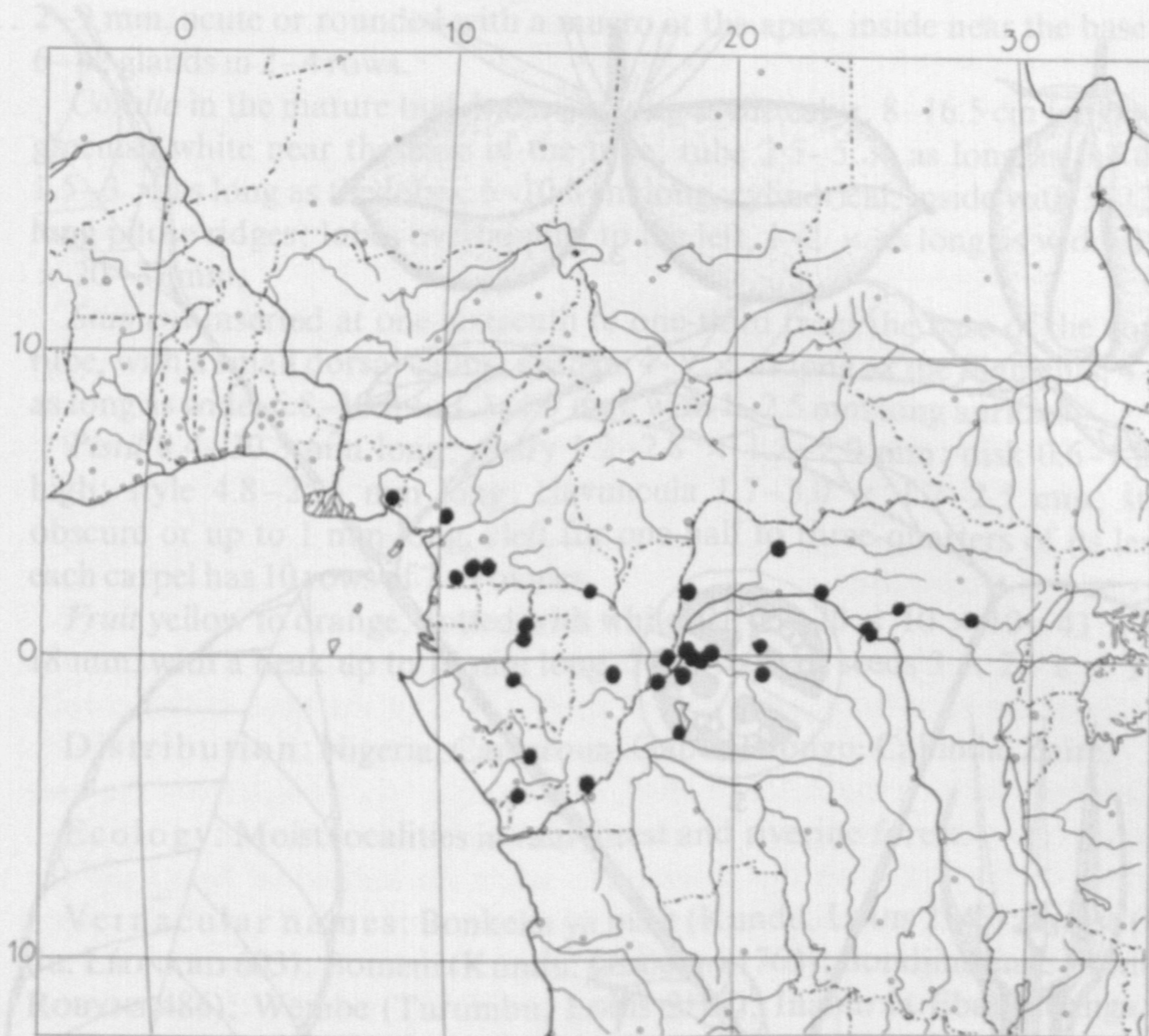
Nigeria: Oyo State: Ibadan (fl. June) Patel FHI 51718 (FHI); Bendel State: between Benin City and Owam (fr. Jan.) Onochie/Brenan 8944 (K); Ehor For. Res., Irhue (buds, fr. June) Eimunjeze and Oguntayo FHI 72753 (FHI); Uhi For. Res. (fr. Mar.) Eimunjeze c.s. FHI 69910 (FHI); Sapoba For. Res. (fr. Jan.) Emwiogbon FHI 57903 (FHI); *ibid.* (fl. Mar.) Jones FHI 743 (FHI); *ibid.* (fl. Apr./buds, fr. Apr./fr. Apr.) Ompagochat FHI 7119/7123/7144 (all three FHI); *ibid.* (fr. Nov.) Emwiogbon FHI 40996 (FHI); *ibid.* (fr. Nov.) Wit c.s. 1021 (FHI, WAG); Sapoba, Ona Tangye Farm (fl. fr. Feb.) Lowe 894 (K); Sapoba, near Abe (fl. fr. June) Onochie FHI 31244 (FHI); Usonigbe For. Res. (fl. fr. May) Keay FHI 37016 (BR, FHI, K, type); *ibid.* (fr. Sept.) Onochie FHI 34298 (FHI); *ibid.* (fr. Oct.) Emwiogbon FHI 61139 (FHI); *ibid.* (fr. Oct.) Daramola FHI 72331 (FHI); *ibid.* (fr. Nov.) Onochie FHI 35665 (FHI); Cross River State: Orem (fr. Mar.) Latilo and Onyeachusim FHI 54254 (FHI).

Cameroun: Between Babong and Ogurang, 45 km SW of Mamfé (fr. May) Letouzey 13583 (YA); between Okoroba and Mbinda, 20 km NW of Nguti (fl. fr. June) Letouzey 13828 (YA).

3. ***Callichilia bequaertii*** De Wild., Pl. Bequaert. 1: 401 (1922), (as *bequaerti*).

Type: Zaïre, Banalia, Mandindi, Bequaert 1450 (BR).

Heterotypic synonyms: *C. macrocalyx* Schellenberg ex Mgf., Notizbl. Bot. Gart. Mus. Berl. 8: 310 (1923); Huber in Fl. W. Trop. Afr. 2nd. ed., 2:



MAP 3. *Callichilia bequaertii*.

64 (1963). Type: Cameroun, Moloundou, between Djimbouli and Peoum, Lokomo R. bank, Mildbraed 4314 (HBG).

C. magnifica R. Good, Journ. Bot. 67, suppl. 2: 86 (1929); Hutchinson and Dalziel, Fl. W. Trop. Afr. 2: 39 (1931). Type: Cabinda, Rio Lufo, Belize, Gossweiler 7915 (BM, lectotype; isotypes: COI, K, LISC, LISJC, LISU).

Erect shrub, 0.5–4 m high. Branches pale to medium brown.

Leaves: petiole 1–15 (–20) mm long; blade dark green, paler beneath, thinly coriaceous, elliptic to narrowly ovate, 1.5–4 × as long as wide, 5–28 × 2–13 cm, acute or acuminate at the apex (acumen acute, up to 20 mm long), cuneate or rarely rounded at the base; secondary veins 6–17.

Inflorescence one; peduncle light brown, 5–70 mm long, covered with persistent bracts from 5–20 mm from the base; bracts 2–7 × 1.5–5.5 mm; pedicel 4–18 mm long.

Flowers fragrant.

Sepals unequal, greenish white with white to grey dots, papyraceous when dry, narrowly oblong to narrowly ovate, 2.5–10 × as long as wide, 5–45 ×

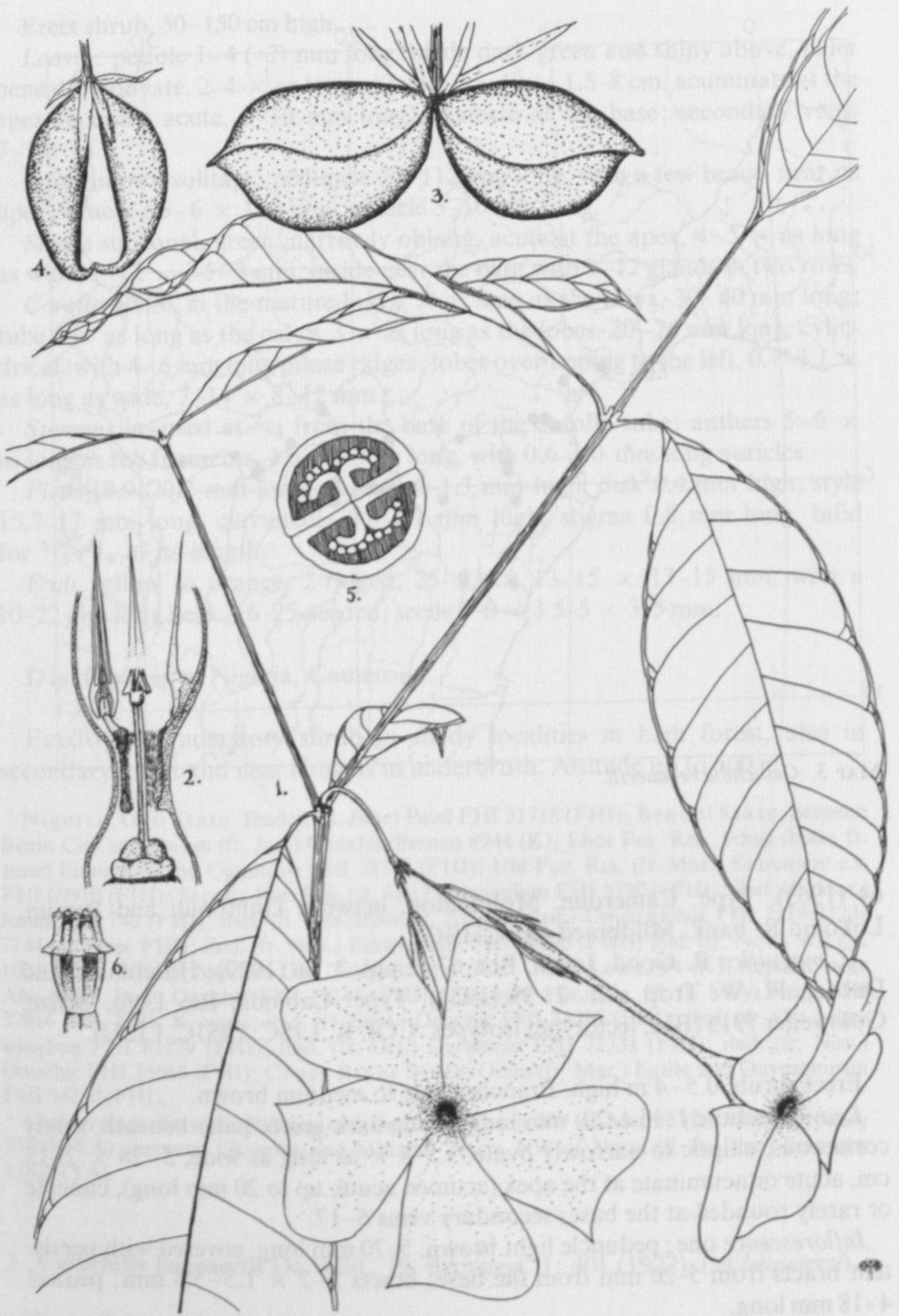


FIG. 3. *Callichilia bequaertii*: 1. branch, $\frac{1}{2} \times$; 2. flower opened, $3 \times$; 3, 4. fruit, $1 \times$; 5. ovary, cross section, $10 \times$; 6. clavuncula, $8 \times$. (1. W. de Wilde 1940; 2. Robyns 486; 3. Louis 8902; 4. Germain 8523; 5. Robyns 766; 6. Leeuwenberg 9083, alc. mat.).

2–9 mm, acute or rounded with a mucro at the apex, inside near the base with 6–42 glands in 2–4 rows.

Corolla in the mature bud 4–7 × as long as the calyx, 8–16.5 cm long, white, greenish white near the base of the tube; tube 2.5–5 × as long as the calyx, 1.5–3 × as long as the lobes, 6–10.8 cm long, cylindrical, inside with 3–12 mm long pilose ridges; lobes overlapping to the left, 1–2 × as long as wide, 25–66 × 20–37 mm.

Stamens inserted at one-sixteenth to one-third from the base of the corolla-tube, with a small dorsal callus; anthers 4–9 × as long as the filaments, 4–5 × as long as wide, 6.8–10.2 × 1.3–1.9 mm, with 1–2.5 mm long auricles.

Pistil 8.4–30.3 mm long; ovary 1.2–2.8 × 1.2–2.0 mm; disk 0.6–1.2 mm high; style 4.8–25.1 mm long; clavuncula 1.7–3.0 × 1.2–2.5 mm; stigma obscure or up to 1 mm long, cleft for one-half to three-quarters of its length; each carpel has 10 rows of 7–9 ovules.

Fruit yellow to orange, dotted with white, carpels 20 × 10 × 10–43 × 20 × 18 mm, with a beak up to 10 mm long, 5–24-seeded; seeds 3 × 2–8 × 5 mm.

Distribution: Nigeria, Cameroun, Gabon, Congo, Cabinda, Zaïre.

Ecology: Moist localities in rain forest and riverine forest.

Vernacular names: Bonkeka ya maie (Kundu, LOUIS 2146); Inse (Kundu, LÉONARD 603); Bomeni (Kundu, GERMAIN 1763); Bondjindjinge (Bomgala, ROBYNS 486); Wembe (Turumbu, LOUIS 2187); Inaolo la Ebangabanga (Turumbu, LOUIS 1571, 8902, 9045. This means 'the cousin of *Conopharyngia*').

Nigeria: Cross River State, Oban, Talbot anno 1909 (BM).

Cameroun: 7 km E of Yingui (fl. Jan.) Leeuwenberg 9083 (WAG); Hill W of Ebolowa (fl. Mar.) Raynal 10346 (P, YA); Nkolowon (fl. Mar.) Letouzey 10137 (P*, YA); Nkolandom (fl. Dec.) J. de Wilde 7834 (WAG); Nkoemvone (buds Feb.) Raynal 9651 (P*, YA); *ibid.* (buds, fr. Feb.) Raynal 10031 (P); 15 km S of Ebolowa (fl. fr. Feb.) W. de Wilde 1940 (BR, P*, WAG, YA); *ibid.*, W. de Wilde 7554 (WAG); Maan (fl. Mar.) J. Raynal 10225 (P, YA); Lokomo R. bank, Moloundou (buds Jan.) Mildbraed 4314 (HBG, type of *O. macrocalyx*); Moloundou, opp. mouth of Bumba R. (buds Nov.) Mildbraed 3937 (HBG).

Gabon: Ipresso, 10 km S of Makokou (fl. Apr.) Hladik 2089, 2090 (P); *ibid.* (fr. June) Hladik 2322 (P); Lastoursville (fl. fr. Apr.) Le Testu 7047 (BM, BR, P*), 7237 (BM, P); 4 km W of Lastoursville (fl. Sept.) Breteler 6708 (WAG); Mboundou (fl. fr. Feb.) N. Hallé 1338 (P).

Congo: Kouyou R. bank near Ft. Rousset (fr. Dec.) Sita 3004 (P); km 3, N'Tiétié – Ngongo road (buds, fr. Feb.) Sita 368 (P); Komono (buds Jan.) Bouquet 943 (P); Brazzaville, de Brazza 141 (P); *ibid.*, Thollon 136 (P); Ndjoundou (fl. fr. Dec.) Chevalier 11005 (P).

Cabinda: Lufo R. bank, Belize (fl. Mar.) Gossweiler 7915 (BM, COI, K, LISC, LISJC, LISU, type of *C. magnifica*).

Zaïre: Mongolo R. bank, Businga (fl. fr. Jan.) Lebrun 1991 (BR); Imésé (fr. Dec.) Laurent 22.12.1903 (BR); Itimbiri R. bank, Bokata (fr. Feb.) Germain 8523 (BR); Momgayiolo Isl., Ruki R. (fl. fr. Sept.) Robyns 486 (BR); Elema Isl., Tumba Lake (fr. Mar.) Evrard 3776 (BR); Tumba Lake bank, Mpotia (fl. fr. Sept.) J. Léonard 603 (BR); near Monsambi (fl. Aug.) Peynaert 849 (BR); Ruki R. bank, Bolombo station (fl. fr. Oct.) Robyns 845 (BR); near Mbandaka (fl. Sept.) Robyns 766 (BR); Ruki R. bank, Eala (buds, fr. Oct.) Peynaert

582 (BR); *ibid.* (fl. fr. Dec.) Germain 1763 (BR, WAG); Ruki R. bank, opp. Boyeka (fl. fr. June) Louis 2146 (BR); Kombo, Kundu Terr. (fl. fr. Dec.) Dubois 225 (BR); Lusako, Ingende Terr. (fr. Apr.) Evrard 6085 (BR); Busira R., island downstream from Loolo (fr. Mar.) Evrard 3613 (BR, P*, WAG); Watsi-Kengo (fl. Nov.) Evrard 2959 (BR, L, SRGH); between Lukolela and Ngombi (fr. Feb.) Dewevre 793 (BR); Kutu, Leopold II Lake (fl. Dec.) Lebrun 6674 (BR); Bevale, Ifale R. (fl. fr. Oct.) Evrard 2898 (BR, SRGH); Yangambi (fr. Jan.) Devred 4016 (BR); *ibid.* (fr. Apr.) Louis 8902 (BR); *ibid.* (fr. Aug.) A. Leonard 1058 (BR); *ibid.* (buds Oct.) Bolema 123 (BR); *ibid.* (fl. Dec.) Germain 4537 (BR); INEAC For. Res., Yangambi, Gilbert 7734 (BR); Isalowe Res., Yangambi (fl. Jan.) Louis 7496 (BR); *ibid.* (fr. Feb.) Denis in herb. Louis 1284 (BR, WAG); *ibid.* (fr. Apr.) Louis 9045 (BR); Tutuku Isl., Yangambi (fl. June/fr. Dec./fl. Aug.) Louis 9691 (BR, SRGH, WAG)/12887 (BR, WAG)/15933 (BR); Esali Isl., Yangambi (fl. fr. Apr.) Louis 14614 (BR); Weko, Yangambi (buds, fr. Feb.) Germain 8216 (BR); Lilande, Yangambi (fl. Aug.) Louis 10816 (BR); 8 km NW of Yangambi, Louis 2817 (BR); km 7 Yangambi-Ngazi road (buds Apr.) Louis 1571 (BR); Yalibwa, Louis 10029 (BR); Banalia, Mandindi (fl. Dec.) Bequaert 1450 (BR, type); Banalia, Avakubi (fr. Jan.) Bequaert 1936 (BR); without precise location: Goossens 2902 (BR); Peynaert 341 (BR).

Notes: The anthers may be inserted in two distinct levels. Those of the majority of the specimens are inserted at about $\frac{1}{4}$ of the base of the corolla tube, but those of specimens collected in the central part of the distribution area are inserted at a much lower level, i.e. at about $\frac{1}{10}$ to $\frac{1}{16}$ from the base of the corolla tube. The length of the pilose ridges and the length of the pistil naturally correspond with this distinction, while the individual lengths of the corolla tube, sepals and anthers are less distinctly correlated. These differences, however, seem to be too small to justify a subdivision into subspecies.

The first descriptions of *C. bequaertii* De Wild. (1922), *C. macrocalyx* Schellenb. ex Mgf. (1923) and *C. magnifica* R. Good (1929) concur, and the respective types are clearly conspecific.

4. *Callichilia inaequalis* Stapf, Fl. Trop. Afr. 4(1): 132 (1902).

Type: Gabon, near Libreville, Klaine 1040 (P, lectotype; isotype: K).

Heterotypic synonym: *C. mannii* Stapf, Fl. Trop. Afr. 4(1): 132 (1902); Hutchinson and Dalziel, Fl. W. Trop. Afr. 2: 39 (1931); Huber in Fl. W. Trop. Afr. 2nd. ed., 2: 64 (1963). Type: Cameroun, Ambas Bay, Mann 2152 (K, lectotype; isotype: P).

Woody climber, up to 10 m long. Branches pale brown.

Leaves subsessile, petiole up to 4 (-7) mm long, blade dark green and shiny above, paler beneath, thinly coriaceous, elliptic to obovate, 2-3 × as long as wide, 3-20 × 1-10 cm, rather abruptly acuminate at the apex (acumen acute, up to 12 mm long), rounded to subcordate at the base; secondary veins 5-14.

Inflorescences paired, rarely solitary; peduncle light green to pale brown, 1-18 (-23) cm long; bracts few at the apex of the peduncle, or, if the peduncle is longer than 10 cm, numerous and covering the upper part of the peduncle, 1-3.5 × 1.5-3.5 mm; pedicel pale green, 3-19 mm long.

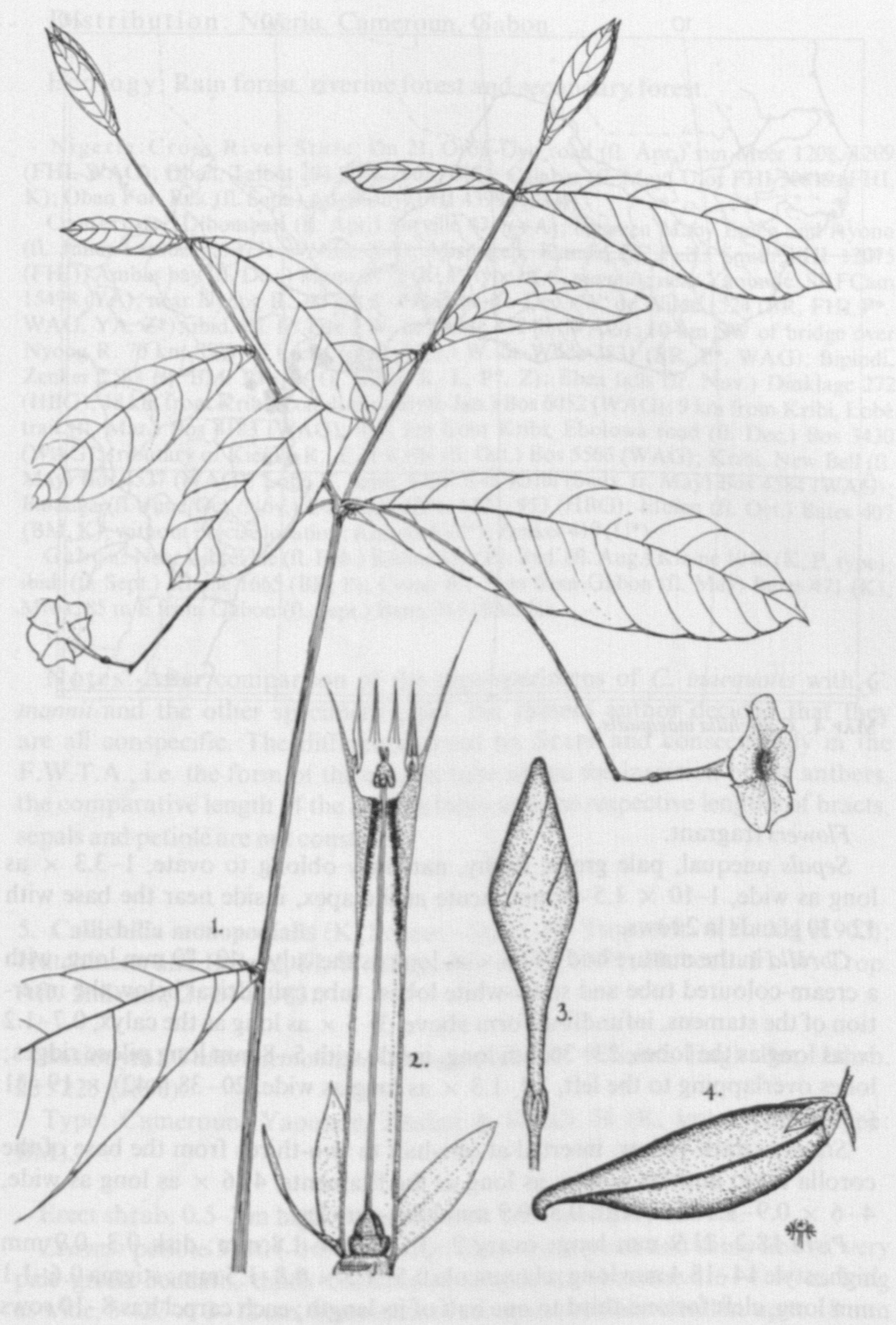
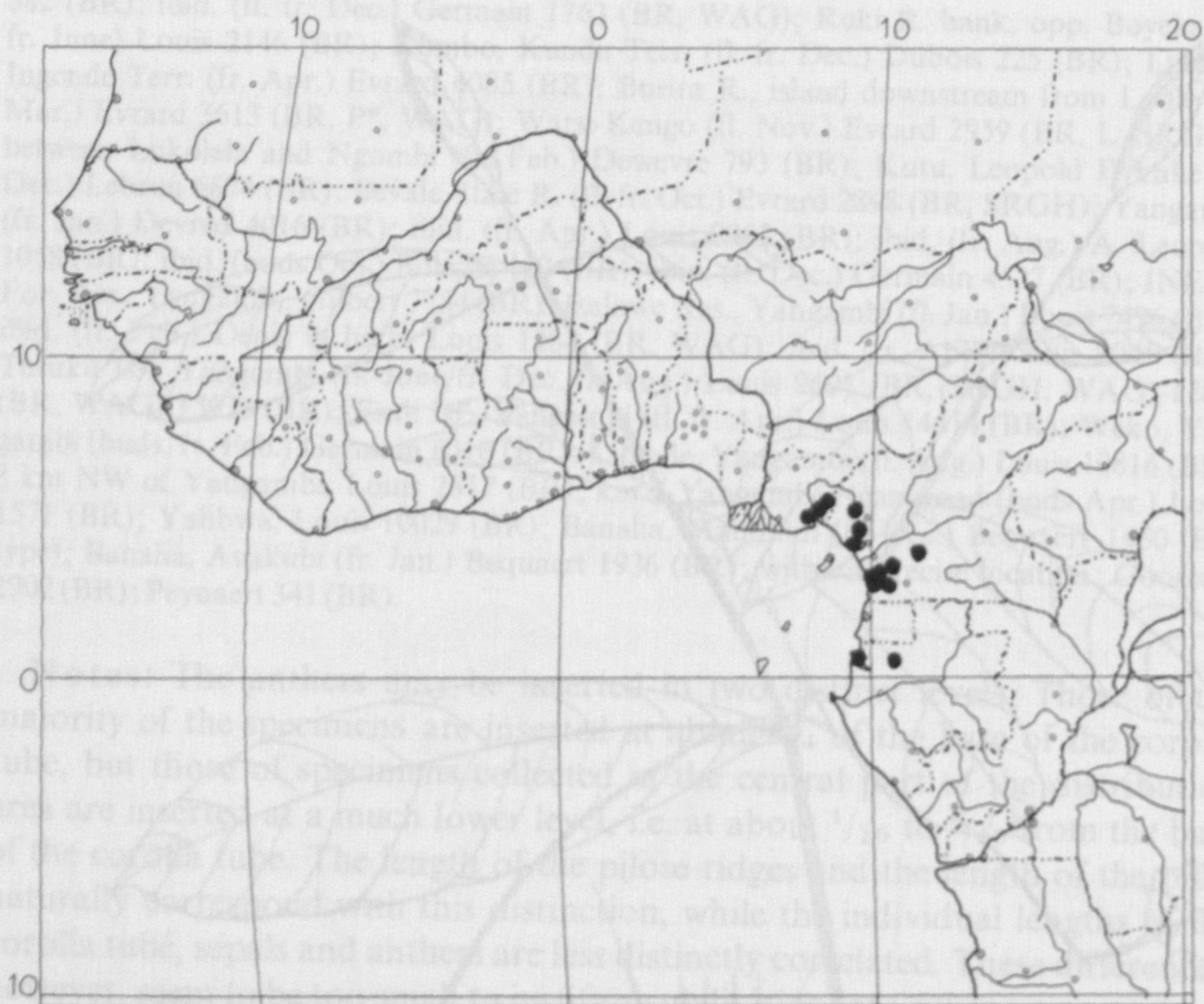


FIG. 4. *Callichilia inaequalis*: 1. branch, $\frac{1}{2} \times$; 2. flower opened, $3 \times$; 3. mature bud, $1 \times$; 4. young fruit, $1 \times$. (1. Bos 4183; 2. Ujor FHI 30819; 3. W. de Wilde 3831; 4. Bos 4584).



MAP 4. *Callichilia inaequalis*.

Flowers fragrant.

Sepals unequal, pale green, fleshy, narrowly oblong to ovate, $1-3.3 \times$ as long as wide, $1-10 \times 1.5-4$ mm, acute at the apex, inside near the base with 12-30 glands in 2 rows.

Corolla in the mature bud $7-10 \times$ as long as the calyx, 40-70 mm long, with a cream-coloured tube and snow-white lobes; tube cylindrical below the insertion of the stamens, infundibuliform above, $3-5 \times$ as long as the calyx, $0.7-1.2 \times$ as long as the lobes, 23-36 mm long, inside with 5-8 mm long pilose ridges; lobes overlapping to the left, $1.1-1.3 \times$ as long as wide, $20-38 (-42) \times 19-31 (-35)$ mm.

Stamens dark yellow, inserted at one-half to two-thirds from the base of the corolla tube; anthers $3-6 \times$ as long as the filaments, $4-6 \times$ as long as wide, $4-6 \times 0.9-1.1$ mm, with 0.3-0.9 mm long auricles.

Pistil 18.2-21.9 mm long; ovary $2-3.1 \times 1.4-1.8$ mm; disk 0.3-0.9 mm high; style 14-18.4 mm long; clavuncula $0.5-1.5 \times 0.8-1.5$ mm; stigma 0.6-1.1 mm long, cleft for one-third to one half of its length; each carpel has 8-10 rows of 8-10 ovules.

Fruit yellow to orange (?), carpels up to 5 cm long, with an up to 1 cm long beak (only 5 fruits were seen, of which 4 were probably immature).

Distribution: Nigeria, Cameroun, Gabon.

Ecology: Rain forest, riverine forest and secondary forest.

Nigeria: Cross River State: km 21, Oron-Uyo road (fl. Apr.) van Meer 1208, 1209 (FHI, WAG); Oban, Talbot 291, 293, 2063 (BM); Calabar (fl. May) Ujor FHI 30819 (FHI, K); Oban For. Res. (fl. Sept.) Adebusuyi FHI 43996 (FHI).

Cameroun: Dibombari (fl. Apr.) Surville 474 (YA); between Maby Emen and Ayono (fl. June) Letouzey 13771 (WAG, YA); Misongeli, Kumba (fl. Feb.) Smith FHI 12075 (FHI); Ambas bay (fl. Dec.) Mann 2152 (K, P, type of *C. mannii*); near Yaoundé, SRFCam 15498 (YA); near Nyong R., 40 km S of Badjob (fl. Dec.) W. de Wilde 1524 (BR, FHI, P*, WAG, YA, Z*); *ibid.* (fl. fr. Dec.) W. de Wilde 1524b (WAG); 10 km SW of bridge over Nyong R. 70 km SSW of Eseka (fl. fr. Nov.) W. de Wilde 3831 (BR, P*, WAG); Bipindi, Zenker 2583 (B, BM, BR, E, G, HBG, K, L, P*, Z); Ebea falls (fr. Nov.) Dinklage 272 (HBG); 18 km from Kribi, Lolodorf road (fl. Jan.) Bos 6052 (WAG); 9 km from Kribi, Lobé trail (fl. Mar.) Bos 4183 (WAG); 4¹/₂ km from Kribi, Ebolowa road (fl. Dec.) Bos 3430 (WAG); tributary of Kienke R., E of Kribi (fl. Oct.) Bos 5566 (WAG); Kribi, New Bell (fl. May) Bos 4527 (WAG); Lobé R. bank, 8 km S of Kribi (buds, fr. May) Bos 4584 (WAG); Batanga (fl. June/Oct./Nov.) Dinklage 1251, 1373, 953 (HBG); Efulen (fl. Oct.) Bates 407 (BM, K); without precise location: Rudatis 5 (Z*); Zenker 419 (U*).

Gabon: Near Libreville (fl. Feb.) Klaine 337 (P); *ibid.* (fl. Aug.) Klaine 1040 (K, P, type); *ibid.* (fl. Sept.) Klaine 1665 (BR, P); Como R., 75 m from Gabon (fl. May) Bates 471 (K); Mfoa, 85 m E from Gabon (fl. Sept.) Bates 515 (BM, K).

Notes: After comparison of the type-specimens of *C. inaequalis* with *C. mannii* and the other specimens cited, the present author decided that they are all conspecific. The differences cited by STAPF and consecutively in the F.W.T.A., i.e. the form of the corolla tube above the insertion of the anthers, the comparative length of the corolla lobes and the respective lengths of bracts, sepals and petiole are not constant.

5. ***Callichilia monopodialis*** (K. Schum.) Stapf, Fl. Trop. Afr. 4(1): 131 (1902); Hutchinson and Dalziel, Fl. W. Trop. Afr. 2: 39 (1931); Huber in Fl. W. Trop. Afr. 2nd. ed., 2: 64 (1963).

Basionym: *Tabernaemontana monopodialis* K. Schum., Engl. Bot. Jahrb. 23: 225 (1896).

Type: Cameroun, Yaoundé, Zenker & Staudt 76 (K, lectotype; isotype: BM).

Erect shrub, 0.5–2 m high. Branches pale brown to grey-brown.

Leaves: petiole 3–10 (–16) mm long; blade dark green and shiny above, very pale green beneath, thinly coriaceous, elliptic to obovate, 1.6–4 × as long as wide, 5–27 × 3–12 cm, acuminate at the apex (acumen slender, up to 18 mm long), cunate at the base; secondary veins 5–16, with loops starting clearly 1 cm from the leaf-margin (see figure).

Inflorescence solitary or rarely paired; peduncle light brown, 5–50 mm long,

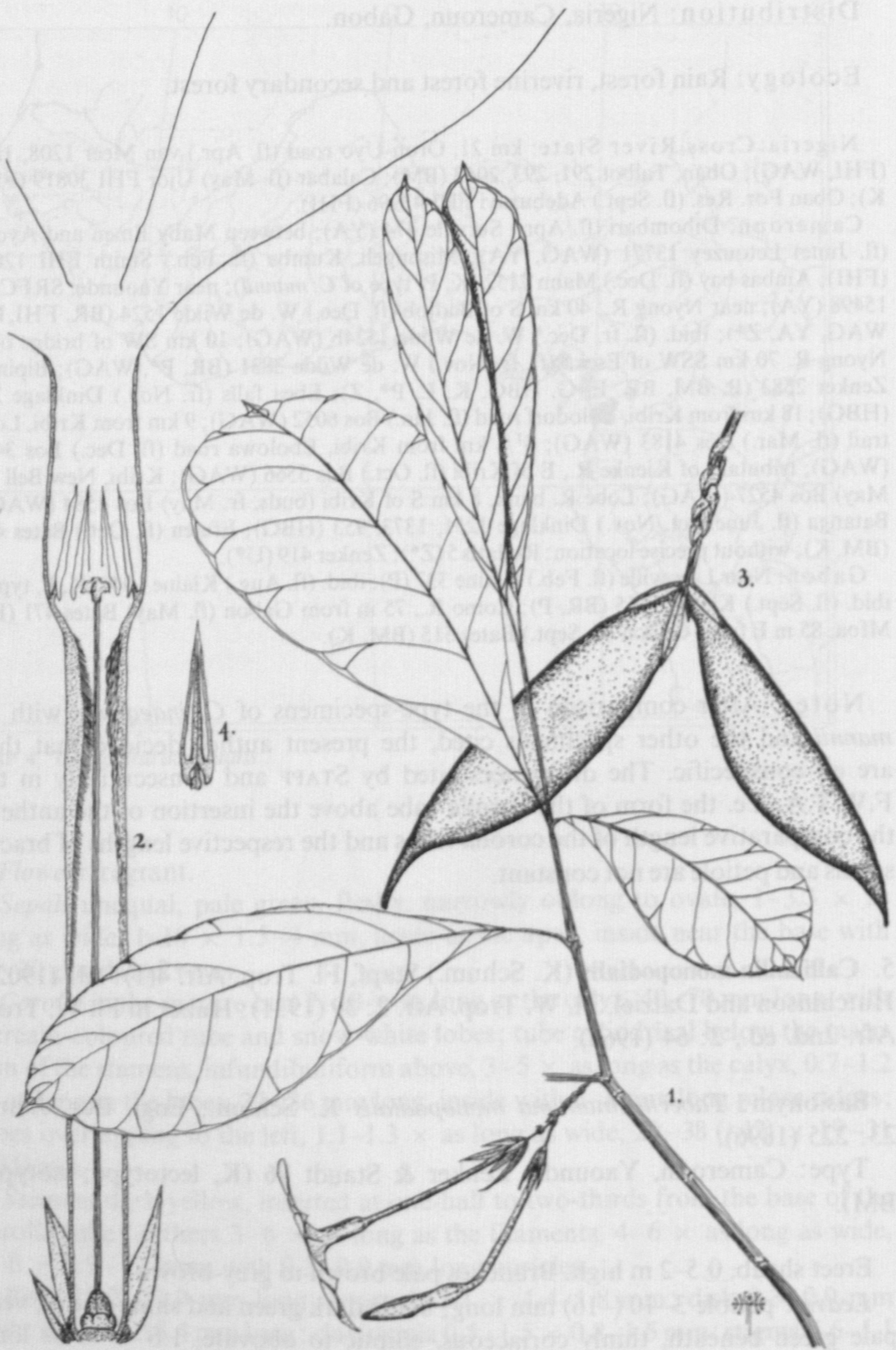
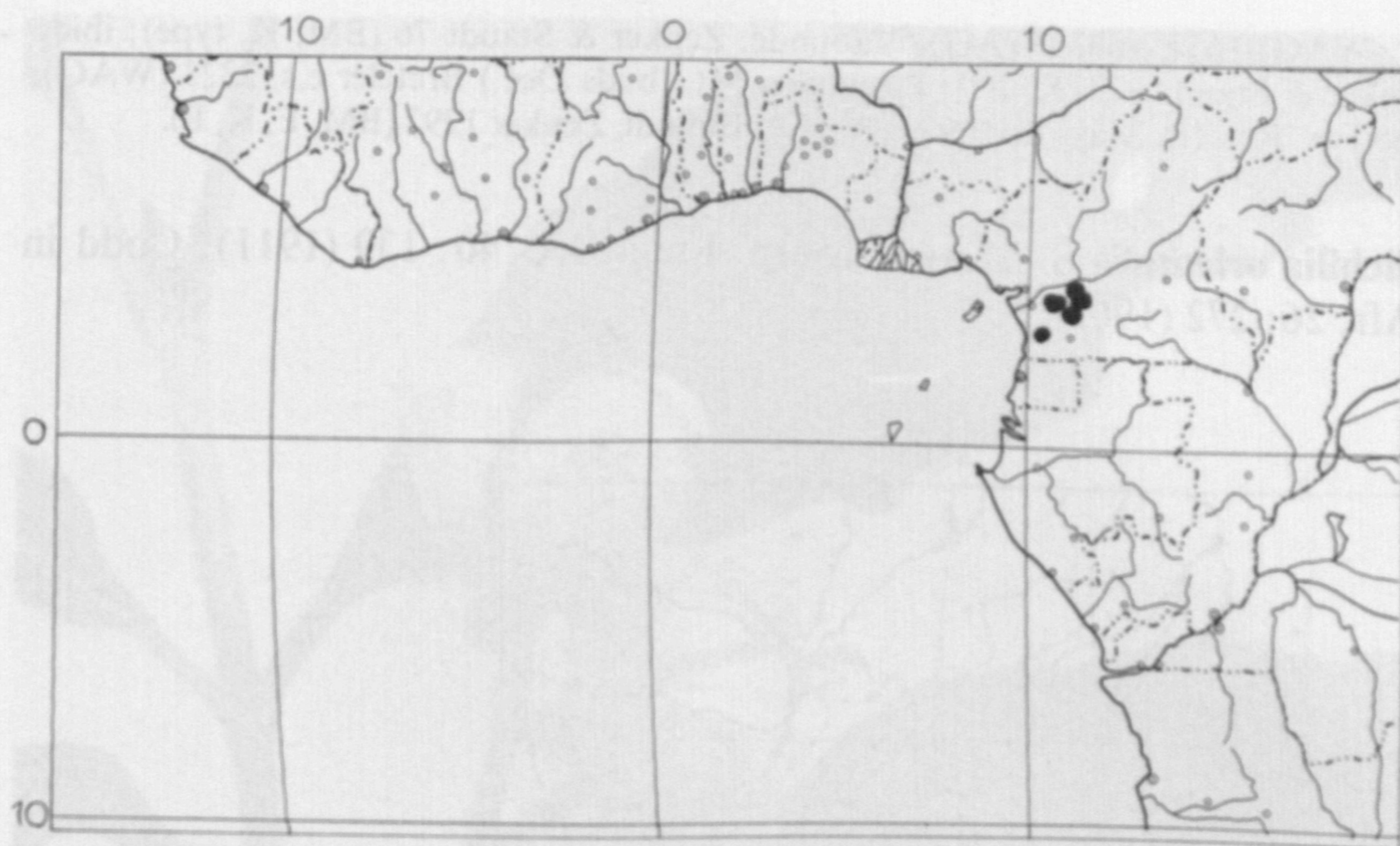


FIG. 5. *Callichilia monopodialis*: 1. branch, $\frac{1}{2} \times$; 2. flower opened, $3 \times$; 3. fruit, $1 \times$; 4. stamen, $4 \times$. (1. W. de Wilde 1443; 2. Letouzey 9829; 3. W. de Wilde 1683; 4. Zenker 1292).



MAP 5. *Callichilia monopodialis*.

sometimes branched, covered with persistent bracts from 1 cm from the base; bracts $2-5 \times 2-3$ mm; pedicel pale green, 3-10 mm long.

Flowers fragrant.

Sepals unequal, the outermost smallest, pale green, papyraceous, linear to narrowly ovate, acute at the apex, $3-6 \times$ as long as wide, $5-18 \times 1.5-3$ mm, inside near the base with 5-15 glands in 2 rows.

Corolla curved, in the mature bud $6-8 \times$ as long as the calyx, 55-90 mm long, white; tube $3.3-5.8 \times$ as long as the calyx, $1.5-2.7 \times$ as long as the lobes, 42-63 mm long, cylindrical, inside with 18-20 mm long pilose ridges; lobes overlapping to the left, $0.8-1.5 \times$ as long as wide, $17-30 \times 20-22$ mm.

Stamens inserted at two-thirds to three-quarters from the base of the corolla tube; anthers $3.5-5 \times$ as long as the filaments, $4-5 \times$ as long as wide, $4.4-5 \times 0.9-1.1$ mm, with 0.5-0.9 mm long auricles.

Pistil 31.3-47.8 mm long; ovary $1.3-1.9 \times 0.5-1.3$ mm; disk 0.3-1 mm high; style 28-45 mm long; clavuncula $0.9-1.1 \times 1.1-2$ mm; stigma obscure; each carpel has 4-5 rows of 5-6 ovules.

Fruit yellow to orange, dotted with white or yellow, carpels $35 \times 8 \times 6-58 \times 12 \times 10$ mm, with an up to 12 mm long beak, 10-16-seeded; seeds $7 \times 4-9 \times 5$ mm.

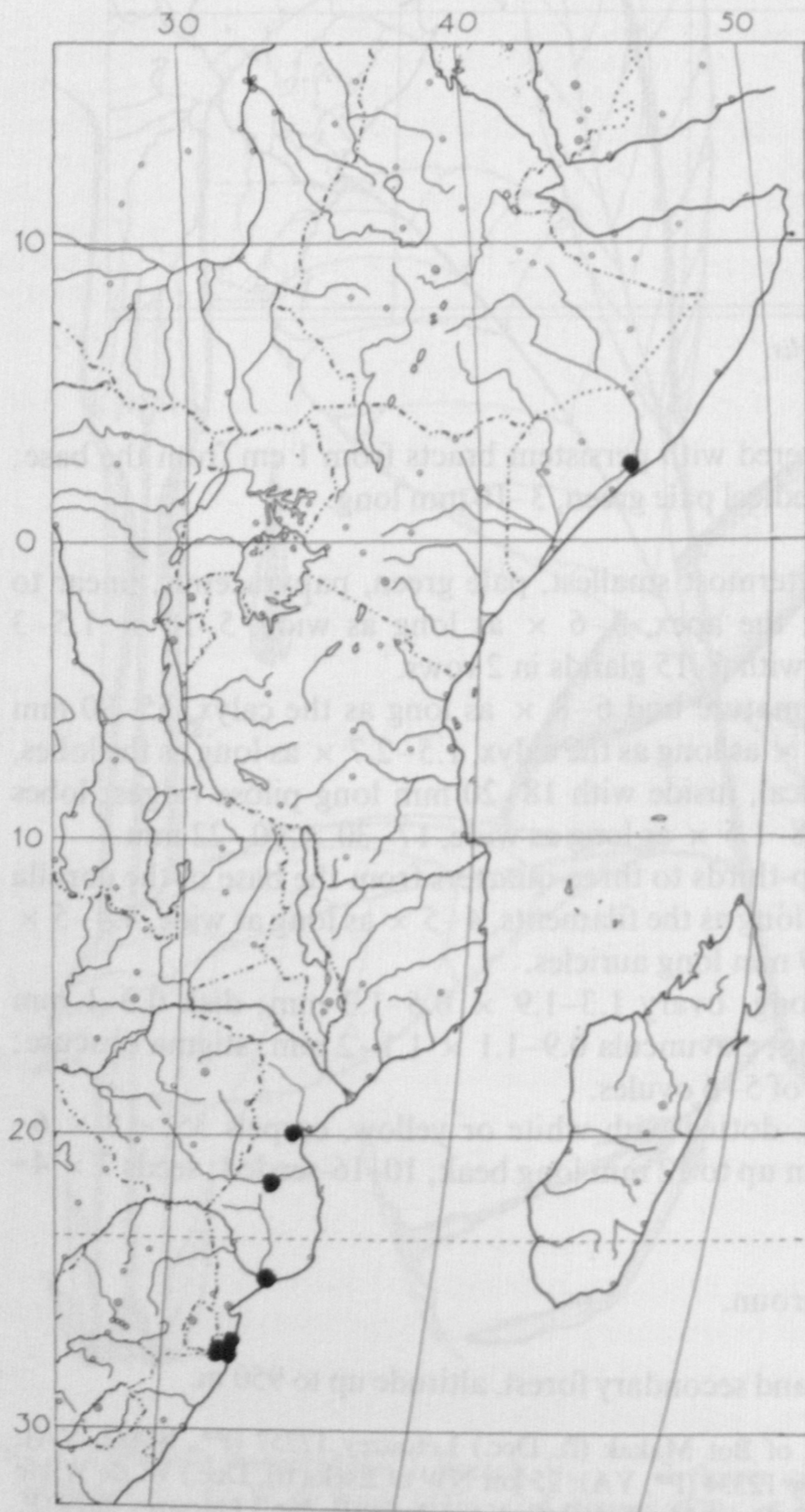
Distribution: Cameroun.

Ecology: Rain forest and secondary forest, altitude up to 950 m.

Cameroun: Inselberg, W of Bot Makak (fl. Dec.) Letouzey 12257 (P*, WAG, YA); near Ngong (fl. Dec.) Letouzey 12334 (P*, YA); 25 km NW of Eseka (fl. Dec.) W. de Wilde 1443 (P*, WAG); Mt. Kala (fl. Dec.) Mezili 167 (P, YA); Ayos (fl. Jan.) Letouzey 9829 (P, YA); N'Kolbisson (buds Nov./buds, fr. Dec./buds, fr. Dec./fr. Jan.) W. de Wilde 1181 (WAG)/

1365 (P*, WAG)/1637, 1683 (WAG); Yaoundé. Zenker & Staudt 76 (BM, K. type); *ibid.*, *ibid.*, Zenker & Staudt 629 (K, P*); Eloumden Mt. (buds Dec.) Breteler c.s. 2323 (WAG); Ottotomo For. Res. (fr. May) Bos 6929 (WAG); Bipindi, Zenker 1292 (BM, E, K, P).

6. ***Callichilia orientalis*** S. Moore, Journ. Linn. Soc. 40: 139 (1911); Codd in Fl. S. Afr. 26: 272 (1963).



MAP. 6. *Callichilia orientalis*.

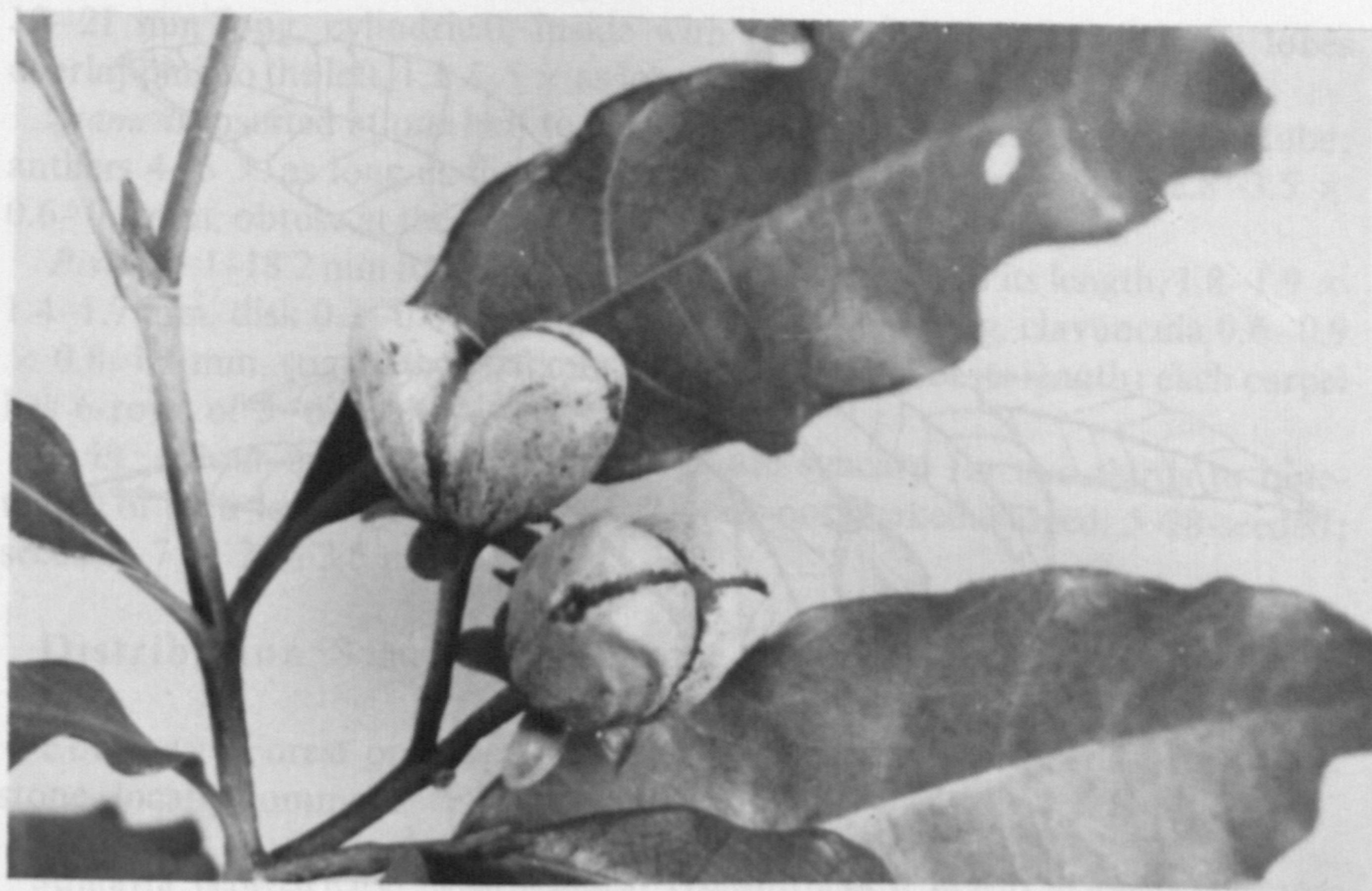


Photo 1. *Callichilia orientalis* (Jenkins s.n., Lake Sibayi)

Type: Mozambique, Boka, lower Buzi R. bank, Swynnerton 1148 (BM, holotype; isotype: K).

Homotypic synonym: *Ephippiocarpa orientalis* (S. Moore) Mgf., Notizbl. Bot. Gart. Mus. Berl. 8 (74): 310 (1923).

Heterotypic synonym: *Conopharyngia humilis* Chiovenda, Atti Soc. Nat. Mat. Modena, 66: 10 (1935). Type: Somalia, between Mogadiscio and Balad: Damero, Chiovenda 15.03.1933 (FI); homotypic synonym: *Ephippiocarpa humilis* (Chiovenda) Boiteau, Adans. ser. 2, 16 (2): 280 (1976).

Erect shrub, 1–3 m high. Branches pale brown, brittle.

Leaves: petiole 4–11 mm long; blade medium green and shiny above, paler beneath, papyraceous to thinly coriaceous, narrowly ovate, 2.5–4 × as long as wide, 4–12 × 1–4 cm, acute to acuminate at the apex (acumen obtuse with a mucro, 5–15 mm long), cuneate at the base; secondary veins 8–16, tertiary venation conspicuous on both sides.

Inflorescence solitary; peduncle 4–23 mm long with a few bracts at the apex, bracts narrowly oblong, acute at the apex, 1–4 × 1–2 mm; pedicel 7–19 mm long.

Flowers fragrant.

Sepals unequal or subequal, green, elliptical, rounded at the apex, 2–3 × as long as wide, 4–9 × 2–4 mm, inside near the base with 12–18 glands in 2 rows; calyx reflexed in fruit.

Corolla in the mature bud 3–7 × as long as the calyx, 23–38 mm long, white; tube 2–4.2 × as long as the calyx, 1.1–1.9 × as long as the lobes,

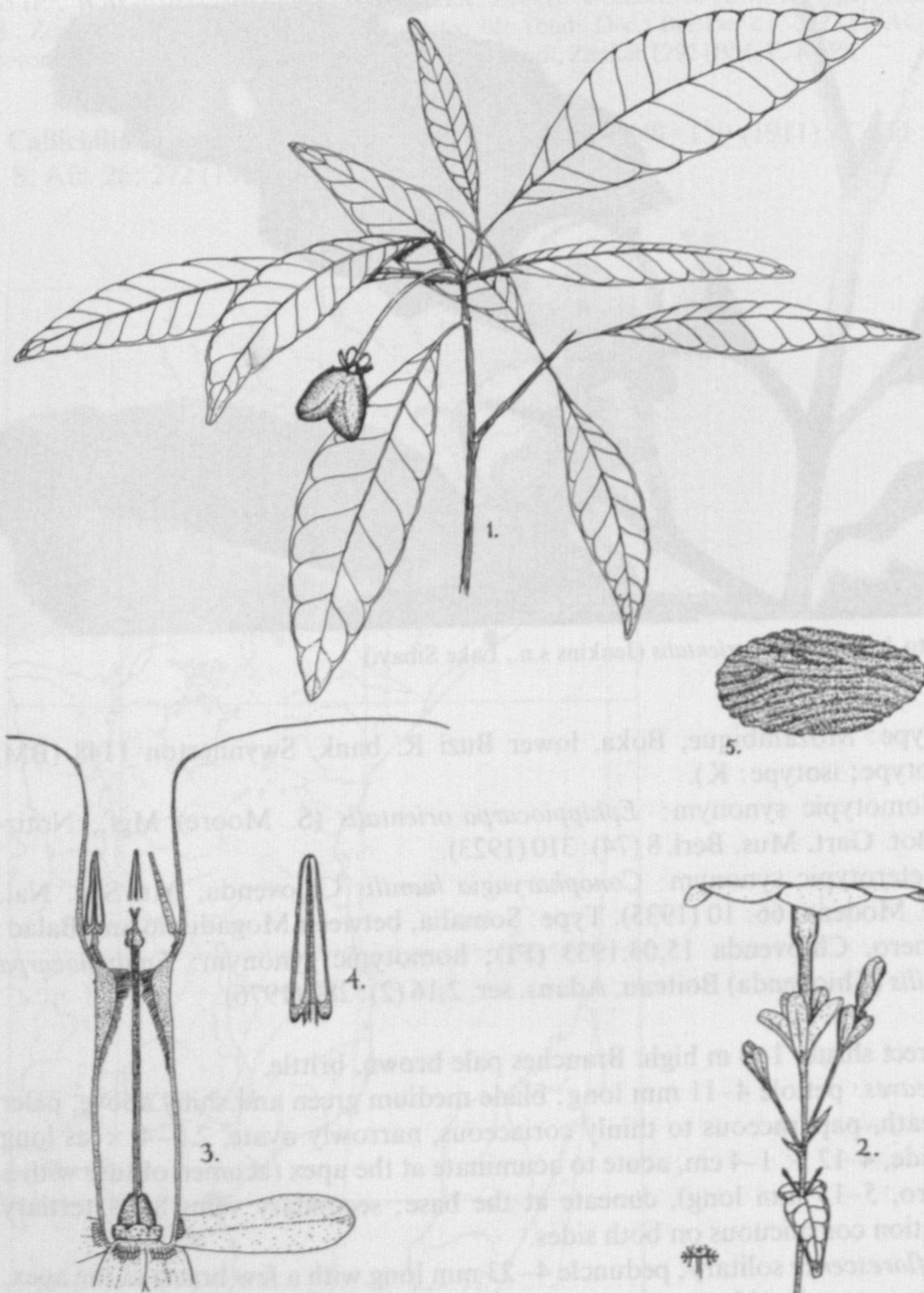


FIG. 6. *Callichilia orientalis*: 1. branch, $\frac{1}{2} \times$; 2. flower, $1 \times$; 3. flower opened, $3 \times$; 4. stamen, $6 \times$; 5. seed, $4 \times$. (1. Vahrmeyer 434; 2-4. Tinley 317; 5. Tinley 213).

13–21 mm long, cylindrical, inside with pilose ridges 4–5 mm long; lobes overlapping to the left, $1.1\text{--}1.5 \times$ as long as wide, $8\text{--}18 \times 7\text{--}15$ mm.

Stamens inserted at one half to two-thirds from the base of the corolla tube; anthers $4\text{--}6 \times$ as long as the filaments, $3.5\text{--}4 \times$ as long as wide, $2.8\text{--}3.5 \times 0.6\text{--}0.9$ mm, obtuse at the apex, with $0.2\text{--}0.4$ mm long auricles.

Pistil 13.1–18.2 mm long; ovary syncarp for $1/6$ to $1/2$ of its length, $1.8\text{--}1.9 \times 1.4\text{--}1.7$ mm, disk $0.3\text{--}0.6$ mm high, style $8.4\text{--}11$ mm long, clavuncula $0.6\text{--}0.9 \times 0.8\text{--}1.1$ mm, stigma $0.4\text{--}0.9$ mm high, bifid for $3/4$ of its length; each carpel has 6 rows of 5–6 ovules.

Fruit: colour unknown; the mericarps are syncarp for two-thirds to nine-tenths of their length, $1.3\text{--}2.3 \times 1.5\text{--}2.3$ cm, not beaked, ridged, 5–28-seeded; seeds $5\text{--}7 \times 2.5\text{--}3.5$ mm.

Distribution: Somalia, Mozambique, South Africa.

Ecology: Forest on coastal dunes, near lakes, on sandy soil or on limestone, locally common.

Somalia: between Balad and Mogadiscio: Damero (buds, fr. Mar.) Chiovenda 15.03.1933 (FI, type of *Conopharyngia humilis*).

Mozambique: S of Save R. between Morrumbene and Massinga (fl. fr. Feb.) Exell c.s. 659 (SRGH); Boka on lower Buzi R. (fl. Dec.) Swynnerton 1148 (BM, K, type); Chachuene forest, Chipenhe, João Belo (fl. Nov.) G. Barbosa & de Lemos 8102 (K).

South Africa: Natal: Ingwavuma, Manzengwenga For. station (fr. Mar.) Vahrmeyer 434 (K, PRE*); Manguzi forest W of Maputa (fl. Nov.) Tinley 317 (K, PRE); *ibid.* (fl. Dec.) Ward 3225 (PRE); Ubombo, Lake Sibayi (fl. Jan.) Garland PRE 50780 (PRE*); *ibid.* (fl. Jan.) Strey 5124 (PRE); *ibid.* (fr. Mar.) White 10440A (PRE); *ibid.* (fr. Mar., Apr.) Tinley 196, 213 (PRE); *ibid.* (fr. May) Jenkins-Palmer PRE 50778, 50779, 55825 (PRE); *ibid.* (fl. Nov.) Strey and Moll 3967 (PRE*); *ibid.* (fl. Dec.) Moll 4910 (PRE*, SRGH); Lake Sibayi, Mandozi (buds, fr. Feb.) Vahrmeyer & Hardy 1611 (PRE*); Lake Sibayi, E shore (buds Nov.) Stephen 41 (PRE*); Lake Sibayi, Manzingueni (fl. Dec.) Vahrmeyer & Tölken 237 (PRE*); Ubombo, Sordwana Bay Nat. Park (fr. Dec.) Ward 3365 (PRE*); Lalanek (buds, fr. Nov.) Strey 10316 (E, K, PRE*); St. Lucia system, NE of Fanies Isl. (fr. Jan.) Feely & Ward 28 (PRE).

Unknown locality: Machisugu (fl. Nov. 1911) Schlechter 12117 (BM).

Notes: MARKGRAF based the segregation of *Ephippiocarpa* from *Callichilia* mainly on the semi-syncarpy of the fruit. However, in other genera in *Apocynaceae* syncarpy and apocarpy occur side by side in a single genus (e. g. *Alafia*).

MARKGRAF stated also that the leaf apex of *Ephippiocarpa* is longer than that of *Callichilia*, but after comparing many specimens of both taxa, the present author cannot agree with him.

MARKGRAF considered the flowers of *Ephippiocarpa* as terminal and stated that they are more numerous than those of *Callichilia* spp. The present author found that the number of flowers of *C. orientalis* is variable, but not outside the range in *Callichilia*, and that the flowers arise, like those in other *Callichilia* spp., from a bifurcate ramification near the apex of the shrub.

The only differences which give this species a somewhat isolated position in

Callichilia are the blunt apices of the anthers, the semi-syncarpy of the fruits, and the more distinct tertiary venation. The similarity in general appearance, especially of the flowers, justify, I think, the reduction of *Ephippiocarpa* to a synonym of *Callichilia*.

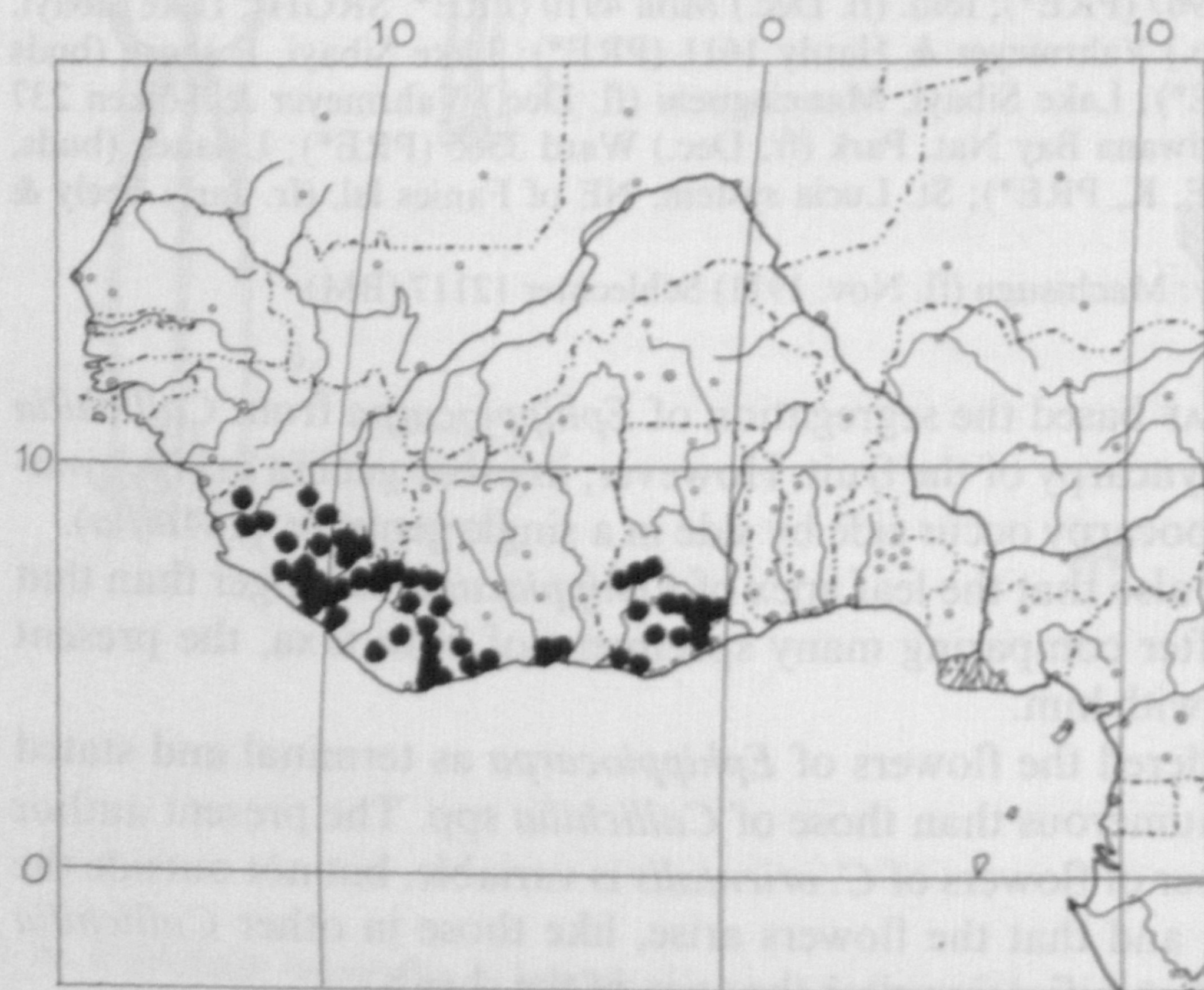
CHIOVENDA's description of *Conopharyngia humilis* (i.e. the single base of BOITEAU's combination in *Ephippiocarpa*) agrees in most respects with that of *C. orientalis*; the only differences are that CHIOVENDA describes the inflorescence as terminal (see above), the calyx as eglandular, and the flowers as much smaller than those of *C. orientalis*. The present author concluded, after thorough investigation of the type-specimen, that its calyx is glandular, and that the description of the flowers was based on immature buds. In all other aspects, e.g. stem, leaves and fruit, the type agrees perfectly with *C. orientalis*, although its locality is curiously remote from that of all other specimens known so far.

7. ***Callichilia subsessilis*** (Benth.) Stapf, Fl. Trop. Afr. 4 (1): 132 (1902) excl. Mann 2152; Johnston, Liberia 2: 626 (1906); Hutchinson and Dalziel, Fl. W. Trop. Afr. 2: 39 (1931); Huber in Fl. W. Trop. Afr. 2nd. ed., 2: 64 (1963); Mangenot, Icones Plantarum Africanarum 7: 147 (1965).

Basionym: *Tabernaemontana subsessilis* Benth., Flora Nigritiana: 449 (1849).

Type: Liberia, Vogel 5 (K).

Heterotypic synonym: *Callichilia stenosepala* Stapf, Fl. Trop. Afr. 4 (1): 602 (1904); Johnston, Liberia 2: 626 (1906); Hutchinson and Dalziel, Fl. W.



MAP 7. *Callichilia subsessilis*.

Trop. Afr. 2: 39 (1931): Huber in Fl. W. Trop. Afr. 2nd. ed., 2: 64 (1963). Type: Liberia, Grant's farm on the Sinoe R., Whyte anno 1904 (K, lectotype; isotype: BM).

Erect shrub, 0.5–2 m high. Roots pale brown. Branches pale brown.

Leaves subsessile; petiole up to 4 mm long; petiolar glands 30–45 in 3 rows; blade medium to dark green and shiny above, paler beneath, thinly coriaceous, elliptic to obovate, 2–4 × as long as wide, 3–25 × 2–10 cm, acuminate at the apex (acumen acute, up to 22 mm long), rounded to subcordate at the base; secondary veins 5–16.

Inflorescence solitary; peduncle dark green, 8–120 mm long, with a few bracts at the apex, bracts 2–8 × 1.5–5 mm; pedicel 2–10 (–17) mm long.

Flowers: no fragrance detected.

Sepals subequal or equal, pale green, papyraceous, ovate, 1.1–4.2 × as long as broad, 3–14 × 1.5–7 mm, acute at the apex, inside near the base with 5–26 glands in 2 rows.

Corolla in the mature bud 3.5–10 × as long as the calyx, 34–76 mm long, white; tube pale yellow inside, 3–8 × as long as the calyx, 1.2–2.5 × as long as the lobes, 22–49 mm long, cylindrical, inside with 4–9 mm long pilose ridges; lobes overlapping to the right, 0.7–1.5 × as long as wide, 10–32 × 12–26 mm.

Stamens pale brown, inserted at one-third to one half from the base of the corolla tube; anthers 2.5–5 × as long as the filaments, 4–6 × as long as wide, 4–5.7 × 0.8–1.2 mm, with 0.3–0.8 mm long auricles.

Pistil 13.2–20.5 mm long; ovary pale green, 1.2–2.4 × 1.1–1.9 mm, disk white, 0.2–0.8 mm high; style pale brown, 9.5–16 mm long; clavuncula white, 0.6–1.3 × 0.8–1.3 mm; stigma white, 0.4–1.3 mm long, cleft for one half to three-quarters of its length; each carpel has 6 rows of about 6 ovules.

Fruit yellow to orange, paler at the ventral side, 22 × 14 × 12–60 × 16 × 15 mm, with a 5–15 mm long beak, 4–36-seeded; seeds 4 × 3–6 × 3.5 mm.

Somatic chromosome number: $2n = 22$ (teste MANGENOT, no voucher specimen preserved).

Distribution: Sierra Leone, Liberia, Guinée, Ivory Coast, Ghana.

Ecology: Understory shrub in rain forest, secondary forest or gallery forest, with a preference for moist, shady localities, but flowering near clearings. Observed by the author in small groups of up to 20 specimens. Altitude 0–750 m.

Vernacular names: Sierra Leone: Nglahokpie (Mendi, DAWE 553).

Sierra Leone: Njala (fl. Jan.) Dalziel 8098 (E); Magoso (fl. fr. Aug.) Thomas 1408 (K); Mano, Thomas 9853 (BM); Souradou, near sources of Niger R. (fl. fr. Jan.) Chevalier 20577 (P); Panguma, Konno Distr., (fl. July-Aug.) Dawe 553 (K); Matotoka (buds, fr.

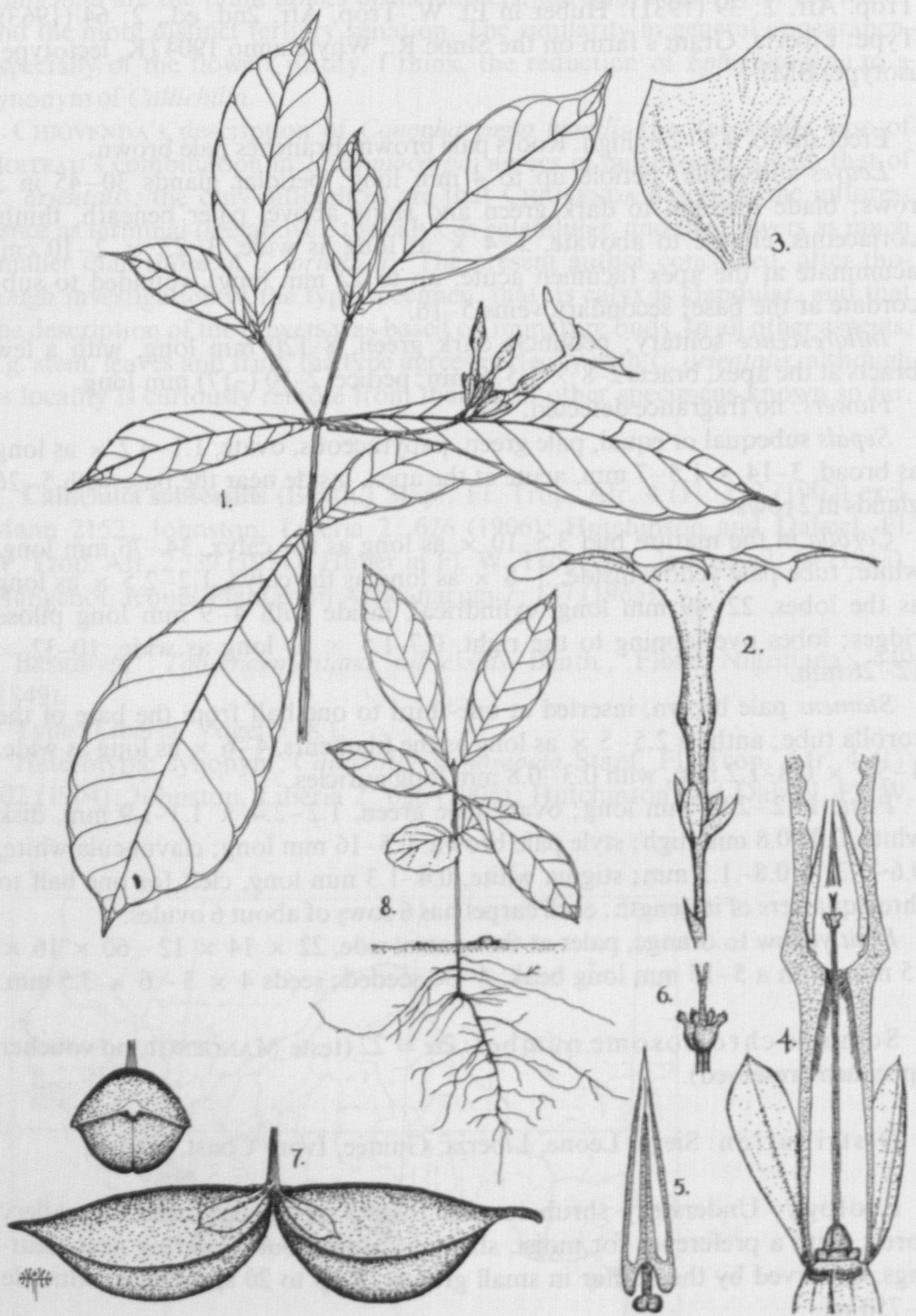


FIG. 7. *Callichilia subsessilis*: 1. branch, $\frac{1}{2} \times$; 2. flower, $1 \times$; 3. corolla lobe, seen from above, $1 \times$; 4. flower opened, $3 \times$; 5. stamen, $6 \times$; 6. clavuncula and stigma, $6 \times$; 7. fruit, $1 \times$; 8. seedling, $\frac{1}{2} \times$. (1. Schnell 2558; 2-4. Beentje 854; 5. Beentje 709; 6. Beentje 148; 7. Voorhoeve 21; 8. Beentje 1073).

July) Thomas 1337 (P); Mayogbo, Gbawema path (fl. Jan.) Marmo 155 (K); Limba, Kahreni, Scott Elliot 5590 (BM); Limba, near Madina, Scott Elliot 5565 (BM); Batkanu (?) (fr. Apr.) Thomas 81 (BR); locality unknown, Thomas 5791 (Z*).

Guinée: Gueckédou region (fl. fr. May) Schnell 2558 (P); N'Zérékoré-Sérédou road (fl. May) Anonym. 2390 (ABI); Macenta (fl. May) Collenette 13 (K); Ziama Mts. (fl. May) Schnell 2673 (P); without precise location (fl. Jan.) Adam 3472 (P).

Liberia: along Mano R. (fl. Feb.) Jansen 1794 (WAG); Makumf (?) (fl. July) Thomas 908 (BR); Massambolahun, 6 m SE of Bolahun (fl. Jan.) Konneh 611 (BR); S of Zorzor (fl. July) Bos 2116 (WAG); Loffa country, between Zorzor and Voinjama, on Loffa R. bank (fl. fr. Dec.) Bos 2606 (BR, WAG); Salala Distr., Peahtah (fl. Dec.) Baldwin 10607 (K); NW Gola forest, N of Gene (fl. Apr.) Bunting 02.04.1910 (BM); Gola, Yambo (fl. Apr.) Bunting 14.04.1910 (BM); Gbama-Loffa R. road, behind Bomi Hills (fl. Oct.) van Harten 168 (WAG); W part of Bong Range, between Waimu and Bagoleta (fl. fr. Apr.) de Wilde and Voorhoeve 3872 (BR, P*, WAG); Bong Range (fr. July) Voorhoeve 21 (WAG); 15 m E of Kakata (fl. Feb.) Jansen 1624 (WAG); Monrovia (fl. Jan.) Dinklage 2411 (B); *ibid.* (buds Feb.) Delafosse 01.02.1897 (P); *ibid.* (fl. fr. Mar.) Dinklage 2163 (B, E); Monrovia-Bopolu road, mile 10 (fl. fr. Aug.) van Meer 136 (WAG); 16 m N of Monrovia (fl. fr. May) Jansen 1648 (WAG); Monrovia-Paynesville road (fl. May) Dinklage 2777 (B, HBG); Monrovia-Kakata road, mile 6, Whyte s.n. (1904?) (BM, K); Monrovia-Ginda road, mile 20 (fl. fr. Nov.) van Harten 203 (WAG); banks of St. John R., Begwai, Bunting 113 (BM); Ganta-Tapita road, near Gloie (fl. Jan.) Bos 2673 (WAG); Ganta (fl. Jan.) Harley H 188 (WAG); Nimba Range (fl. Dec.) Adames 845 (K, P); Yéképa, Granfield Nimba, Yah. R. bank (fl. June) Adam 27405 (BR); Nimba (fl. Jan.) van Meer 306 (WAG); Gletown, Tchien Distr. (fl. July) Baldwin 6756 (P); Sinoe, Juarzon (fl. Mar.) Baldwin 11469 (K); Sinoe R., Grant's farm, Whyte s.n. (BM, K, type of *C. stenosepala*); Cavally R. opp. Tai (fl. Mar.) Bernard 8418 (G, P); without further location: Vogel 4, 5 (K, type); Harley 1157 (WAG); Barker 1255 (K).

Côte d'Ivoire: Guerzé country, Mt. Nzo (fl. Mar.) Chevalier 21004 (P); Nzo-Danané (fl. Dec.) Roberty 6684 (G); Man-Duékoué road, bank of Ko R. (fl. Apr.) Leeuwenberg 3876 (WAG); *ibid.* (fl. fr. May) Beentje 349 (UCI, WAG); Tiapleu forest (fl. Aug.) Aké Assi 10831 (UCI); Nipi R. bank, E of Péhé, Beentje 904 (UCI, WAG); 2 km E of Duékoué, Beentje 1060 (UCI, WAG); Sakré, Tabou (fl. Apr.) Prévost 28.04.1970 (ABI); Cavally basin, Oubi country, Kéeta (fl. July) Chevalier 19334 (P); 3 km N of Tai, bank N'Cé R. (fl. Mar.) Leeuwenberg 3047 (WAG); Gouléako-Tai road (fl. Jan.) Anonym. 2710 (UCI); Cavally forest (fl. Jan.) Anonym. 2773 (ABI); between Djiroutou and Veka (buds Dec.) Aké Assi 10959 (UCI); Hana R., between Ft. Binger and Mt. Niénokué (fl. fr. Aug.) Chevalier 9513, 9514 (P); 2 km N of Djiroutou (fl. Sept.) Beentje 857 (UCI, WAG); Tabou-Tai road, Maheino R. bank, Beentje 854 (UCI, WAG); km 2 Grabo-Fété road (fl. Apr.) Breteler 7344 (WAG); tributary of Cavally R. 22 km WNW of Tabou (fl. fr. Aug.) Beentje 758 (UCI, WAG); Béréby (fl. May) Pobéguin 44 (P); near Néro R., Néromer (fr. May) Guillaumet 1294 (UCI); Néro R. bank 1 km N of Houbo (fl. fr. May) Guillaumet 1378 (ABI, UCI); Soubré (fl. fr. May) Anonym. 3114 (UCI); Niégré Forest (fl. fr. Sept.) Nozeran 09.1955 (P); 23 km NW of Sassandra (fl. fr. Oct.) Breteler 5826 (WAG); isle in Sassandra R., near Louga (fl. Apr.) de Koning 1245 (WAG); 18 km NW of Sassandra (fl. fr. Feb.) Leeuwenberg 2869 (BR, FHI, GC, L, WAG); *ibid.* (fl. Apr.) Beentje 11 (WAG); *ibid.* (fl. May) Beentje 13, 16 (WAG); *ibid.* (fl. fr. June) W. de Wilde 191 (BR, P*, WAG, Z*); *ibid.* (fl. Aug.) J. de Wilde 347 (WAG); *ibid.* (fl. Nov.) de Koning 2645 (WAG); 10 km NW of Sassandra, near Sassandra R. (fl. May) Beentje 144, 148 (WAG); 14 km WSW of Kpata-Aidou (fl. fr. May) Beentje 132 (WAG); Bingerville-Abidjan-Dabou, Chevalier 15510 (P); Agnéby Valley, Guébo (fl. Feb.) Chevalier 17027 (P); Agnéby Valley, Accrediou (fl. Feb.) Chevalier 17065 (P); Anguédédou Forest, near Adiopodoumé (fl. fr. Aug.) Aké Assi 1032 (ABI, UCI); *ibid.* (fl. Aug.) Thyssen 254 (WAG); *ibid.*, de Wit 8272 (WAG); Anguédédou Forest, 14 km W of Abidjan, Beentje 723 (UCI, WAG); Banco For. Res. (fl. Feb.) Aké Assi 6719 (UCI); *ibid.* (fl. Mar.) Raynal 13561 (BR, P*); *ibid.* (fl. May) de Koning 4082 (WAG); *ibid.* (fl. Aug.) Beentje 680, 707, 709, 710 (the four UCI, WAG); *ibid.* (fl. fr. Oct.) de Koning 6886 (WAG).

Ghana: Mpameso For. Res., 19 m S of Dormaa-Ahenkro (buds, fr. Dec.) Adams 2944

(GC); Gonokrom, near Dormaa-Ahenkro (fl. Dec.) Adams 2983 (GC); Sunyani (fr. Dec.) Adams 5309 (GC); Boinso (fr. Jan.) Akpabla 432 (GC); Awaso, Sefwi, Afao Hills For. Res. (buds, fr. Dec.) Adams 2058 (GC); Ankasa For. Res. (fl. fr. Jan.) Hall GC 39145 (GC); ibid. (fr. Jan.) Enti and Hall GC 39134 (GC); Tarkwa (fl. Dec.) Miles 4 (K); Prankese (fl. Jan.) de Wit & Morton A 2964 (GC); Pra-Suhien For. Res. (fr. Feb.) Enti GC 42070 (GC); ibid. (buds Nov.) Hall GC 37434 (GC); Asin-Nyankumasi, Cummins 48-90, 235 (K); Dunkwa Distr., Denyau For. Res., Enti FH 7871 (BR, P*); Juaso (fr. Feb.) Akpabla 246 (GC); Juaso Distr., Bobiri For. Res. (fl. June) Enti FHI 7176 (K); Esukawkaw For. Res. near Asuom (fr. Nov.) Hall and Abbiw GC 43810 (GC); Kade ARS (fl. Mar.) Lock GC 42862 (GC, P*); ibid. (fl. Mar.) Hall GC 43447 (GC); ibid. (fr. Mar.) Agyakwa GC 40147 (GC); ibid. (fl. Dec.) Hossani and Enti GC 37236 (GC); mile 65, Kade road (fr. July) Enti GC 39870 (GC); Kibi (fl. June) Johnson 762 (GC); Sajumasi, Kibi area (fr. Dec.) Morton 8125 (GC); Atewa Range For. Res. (buds, fr. May) Agyakwa GC 36413 (GC); ibid. (fr. Dec.) Enti GC 37145 (GC); 3 m from Begoro, waterfall near Akrum R. (fl. Oct.) Adams 424 (GC); ibid. (fl. Nov.) Morton s.n. (GC); ibid. (fr. Nov.) Adams 447 (GC); Asiakwa to Boma (fl. fr. Dec.) Morton GC 8174 (GC); without further location: GC 3138 (GC); Vigne 1046 (BM).

Cultivated: Côte d'Ivoire, Adiopodoumé (fl. Feb.) Cremers 556 (BR, P*); ibid., Cremers 526 (ABI, BR, seedling); ibid. (fl. fr. June, July) Beentje 185, 233 (WAG); ibid., Beentje 1073 (WAG, seedling of Beentje 233).

Notes: *C. stenosepala* was described by STAPF (1904) in the Flora of Tropical Africa under addenda, and therefore it was not included in the key to the species. *C. stenosepala* was distinguished from *C. subsessilis* Stapf by 'the very narrow sepals'. The two additional differential characters which he gave, i.e. the higher insertion of the stamens and the shortness of the corolla lobes, disqualify to be of diagnostic value after analysis of all the available material of *C. subsessilis*. Only the width of the sepals of the *C. stenosepala* specimens is smaller than that of all other *C. subsessilis* material, consequently this character ought to be considered as an extreme within the range of *C. subsessilis*.

On 5- and 7-year old plants, cultivated in a secondary forest in Adiopodoumé, Ivory Coast, the following observations were made:

– Flowering took place continuously from May to November, but somewhat less during the month after the peak of the second rainy season (November). According to herbarium specimens collected near Adiopodoumé and personal communication the present author concluded that this species flowers the year around, possibly excepting some weeks around new year.

– Usually only a single flower is open at the time, rarely two; after emerging from the calyx, the bud needs two weeks before anthesis, which last 2-3 days.

– The fruit reaches full size in six to eight weeks, but it usually matures and is shed only towards the end of the second rainy season. Thus, flowers and fruit may occur simultaneously on a single inflorescence.

– The primary roots were observed to descend to about one third of the height of the plant. Secondary roots were, with few exceptions, concentrated in a circle of 30 cm diameter at a depth of roughly 10-15 cm, just above a distinct bend in the main root. This bend is characteristic of seedlings as well; below the bend only much shorter secondary roots may be observed.

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ACKNOWLEDGEMENTS

I would like to thank everybody at the Laboratory of Plant Taxonomy and Plant Geography of Wageningen, and especially Dr. A. J. M. LEEUWENBERG for his supervision and guidance through the pitfalls of taxonomy, to Ir. J. J. BOS for his correction of the text, to Mr. G. BOELEMA for his help in correcting the manuscript and proofs, and to Prof. Dr. H. C. D. DE WIT who made the arrangements for my stay in Ivory Coast. Also I am very grateful to Ir. J. DE KONING, formerly of the Centre Néerlandais of Adiopodoumé, Ivory Coast (after whom *C. basileis* was named), and to Mr. BOULABA SAVADOGO of the Centre Néerlandais, for my introduction to the tropical rain forest; to the directors and keepers of all herbaria who so kindly put their material at my disposal, to Dr. B. DE WINTER of Pretoria for his permission to publish the photo of *C. orientalis*, and especially to everybody at the herbaria of Abidjan, Accra, Ibadan and Yaoundé where I could study the collections in situ.

REGISTER

New name in **bold face**. Synonyms are in *italics*. Page number of principal entries in **bold face**; those of figures in *italics*. New synonyms are listed as **syn. nov.**

Alafia Thouars	25
Callichilia Stapf	2, 9, 25, 26
barteri (Hook. f.) Stapf	2, 5, 6, 9, 10
basileis Beentje, sp. nov.	10, 11, 32
bequaertii De Wild.	12, 13, 14, 16
inaequalis Stapf	16, 17, 18
<i>macrocalyx</i> Schellenb. ex Mgf., syn. nov.	12, 15, 16
<i>magnifica</i> R. Good, syn. nov.	13, 15, 16
<i>mannii</i> Stapf, syn. nov.	16, 19
monopodialis (K. Schum.) Stapf	3, 19, 20, 21
orientalis S. Moore	3, 22, 23, 24, 25, 26
<i>stenosepala</i> Stapf, syn. nov.	26, 29, 30
subsessilis (Benth.) Stapf	3, 26, 28, 30
Conopharyngia G. Don	15
<i>humilis</i> Chiovenda	23, 25, 26
Ehippiocarpa Mgf., syn. nov.	2, 25, 26
<i>humilis</i> (Chiovenda) Boiteau, syn. nov.	23
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