
Ancistrocladus korupensis (Ancistrocladaceae): A New Species of Liana from Cameroon

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ABSTRACT. *Ancistrocladus korupensis*, a species here described from the Southwest Province of Cameroon and adjacent Nigeria, is distinguished within the genus by sessile leaves, short petals, and long-winged fruits. The new species was investigated after michellamine B, a unique naphthyl isoquinoline alkaloid isolated from a sterile *Ancistrocladus* leaf collection, showed *in vitro* activity against HIV-1 and HIV-2. Subsequent collections showed that the liana was undescribed and apparently narrowly endemic to the Korup area.

Ancistrocladus Wallich (nom. conserv.) is a genus of 19 known species: 9 in tropical Asia (Dyer, 1874; Gagnepain, 1909; Craib, 1925; Steenis, 1948; Ramamoorthy, 1976; Harriman, 1987) and 10 in tropical Africa (Pellegrin, 1951; Hutchinson & Dalziel, 1954; Léonard, 1982, 1986). The resemblance of the winged fruits of *Ancistrocladus* spp. to those of the Dipterocarpaceae Blume has led some authors (e.g., Oliver, 1868; Dyer, 1874) to include the genus in the latter family. However, Gilg (1925) noted that the resemblance is strictly superficial and considered the Ancistrocladaceae Walpers (nom. conserv.) to be a monogeneric family in the Parietales. The results of anatomical (Metcalfe, 1952; Schmid, 1964; Gottwald & Parameswaran, 1968) and palynological (Erdtman, 1958) investigations support an affinity between Ancistrocladaceae and the endemic African family Dioncophyllaceae Airy Shaw; Cronquist (1981, 1988) treated the two as closely allied families of the Violales.

The Ancistrocladaceae are distinguished within the Violales (Cronquist, 1981) and among all of the dicotyledonous families of central Africa (Robyns, 1958) by the following diagnosis: plants lianas, not succulent, climbing by hooked apices of sympodial branches; leaves alternate (but often crowded in rosettes on flowering shoots), simple, entire, not sheathing at base, the blades symmetric; stipules present, very small and caducous; flowers in ra-

ces, spikes, or dichotomously branched panicles; sepals 5, accrescent and winglike in fruit; petals distinct or slightly connate at base; extrastaminal corona lacking; stamens 5 or 10–15, erect in bud, the filaments slightly connate at base; ovary half-inferior, unilocular; ovule solitary, basilateral; fruit dry, indehiscent; endosperm present, ruminant. *Ancistrocladus* can sometimes be confused with the unrelated genus *Hugonia* L. (Hugoniaceae or Linaceae), but species of the latter genus can be vegetatively distinguished by the usually pale stems, leaves usually toothed, less crowded, and with numerous more prominent secondary veins, and hooks borne on normal branches.

Of the ten species of *Ancistrocladus* previously described from tropical Africa, six occur in the evergreen forests near the Atlantic coast from Gabon to Sierra Leone (Pellegrin, 1951; Hutchinson & Dalziel, 1954), three are apparently restricted to central and northern Zaïre (Léonard, 1982), and one is endemic to the Buda Forest of coastal Kenya (Léonard, 1986). The new species herein described is apparently endemic to the immediate vicinity of the Korup National Park in the Southwest Province of Cameroon, including the adjacent part of Cross River State of southeastern Nigeria.

Ancistrocladus korupensis D. W. Thomas & Gereau, sp. nov. TYPE: Cameroon. Southwest Prov.: Ndian Division, 0.6 km E of confluence of Mededibe (Moliba) and Ndian (Mana) Rivers, 90 m, 5°02'N, 8°53'E, 4 Mar. 1993, Gereau, Thomas, F. Namata & E. Jato 5180 [infructescences and fallen fruits] (holotype, MO; isotypes, K, P, SCA, YA). Figure 1.

Plantae omnino glabrae. Caules adulti parce ramosi; ramis principalibus elongatis, rectis subcurvatisve; ramis lateralibus extra-axillaribus, uncos gerentibus. Folia adulta sessilia, ex formis duabus constantia: folia ramorum principalium remote disposita, ex ellipticis oblonga, basi cuneata, apice rotundata, venis secundariis paucijugis; folia

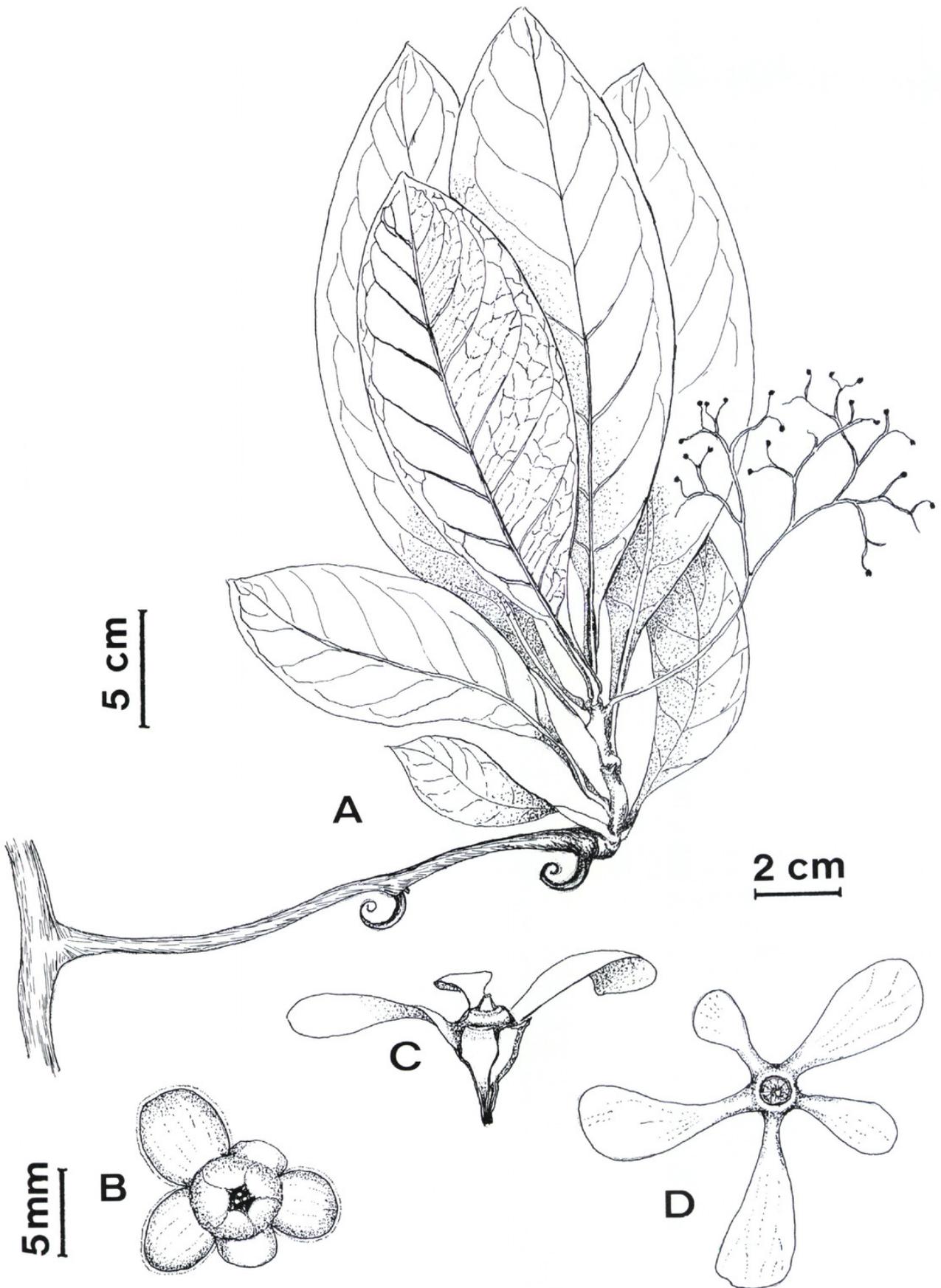


Figure 1. *Ancistrocladus korupensis* D. W. Thomas & Gereau. —A. Lateral branch with rosette leaves and inflorescence. —B. Flower. —C, D. Fruit. Based on: A, B, *Jato s.n.* (Nov. 1992); C, D, *Gereau et al. 5177*.

ramorum lateralium in rosulas apicales crebra, oblanceolata, (8–)14.5–33.1 × (2.9–)4.6–8.5 cm, basi ex anguste cuneatis ad longe cuneata, apice ex acutis rotundata, margine prope basim valde revoluta, sursum nonnihil revoluta, venis secundariis paribus 8–18 dispositis, brochidodromis; foliorum omnium costa infra prominente, in herbario supra parum impressa, venis secundariis utrinque prominulis, venis tertiariis tenue reticulatis. Inflorescentia ex panicula dichotoma laxa inter rosulas foliorum portata constans; pedunculo extra-axillari, (4–)5.5–9.8 cm longo; pedicellis 6.5–8.5 mm longis, sub calyce ca. 2 mm articulatis. Flores sepalis ex suborbicularibus oblongis, manifeste dimorphis, majoribus tribus ca. 5 × 4 mm, minoribus duobus ca. 2.5 × 3.5 mm, basi truncatis, apice rotundatis, sub anthesi ad ovarii basim breve decurrentibus; petalis suborbicularibus quam sepalis brevioribus, prope basim convexis incrassatisque; staminibus 10 in verticillos duos dispositis, filamentis validis, internis ca. 1 mm longis, externis perbrevibus, antheris ca. 1 mm longis; stylis 3, distinctis, ca. 2 mm longis, distaliter incrassatis. Fructus hebetate brunneus; sepalis tenuibus, inaequalibus, majoribus spathulatis 3.4–4.8 × 1.3–2.1 cm, minoribus ex anguste oblongis spathulatis 1.1–2.8 × 0.5–1.1 cm, alarum marginibus 5 ad basim fructus decurrentibus costas prominentes 5 forantibus; fructus corpu turbinate, receptaculo supra alas inflato tholiformique; styli basi persistente accrescente conica; pericarpio crasso sicco coriaceo; semine diametro ca. 8 mm.

Plants glabrous throughout. Saplings unbranched or very sparingly branched, to 4 m high, lacking hooked lateral branches; sapling leaves long-lived, in dense terminal rosettes, 38.8–75.1 × 11.0–13.8 cm (L/W = 3.5–5.4), the secondary veins in 25–32 pairs; saplings becoming lianas by branching from lateral bud some distance below leaf rosette, this “main branch” long and scandent, bearing hook-producing lateral branches. Adult stems climbing to 20 m, to 10.4 cm maximum diameter, sparingly branched, not normally rooting when in contact with ground, terete, with outer bark purplish brown, inner bark red and fibrous; main branches elongate, straight or somewhat curving, not twining; lateral branches extra-axillary, to ca. 50 cm long, bearing 1–several hooks in a single plane. Adult leaves sessile, of 2 kinds: leaves of main branches widely spaced, elliptic to oblong (ca. 12 × 5 cm in type), cuneate at base, rounded at apex, with as few as 7 pairs of secondary veins; leaves of lateral branches crowded in rosettes produced near apex of current year’s growth and persisting up to three years, oblanceolate, (8–)14.5–33.1 × (2.9–)4.6–8.5 cm (L/W = 2.9–4.2), narrowly cuneate to long-attenuate at base, acute to rounded at apex, the margin strongly revolute near base, somewhat revolute distally, the secondary veins in 8–18 pairs, brochidodromous, forming an intramarginal vein 2–4 mm from margin; all leaves drying dull dark green above, yellow-green beneath, the midrib extending to apex, terminating in a gland, prominent beneath, slightly impressed above in herbarium specimens, the secondary veins prominulous

on both surfaces, shortly decurrent on midrib, the tertiary veins finely reticulate, rather obscure. Inflorescence a lax, dichotomously branched panicle, borne among leaf rosettes, sometimes bearing hooks; peduncle extra-axillary, (4–)5.5–9.8 cm; pedicels 6.5–8.5 mm long, articulated ca. 2 mm below calyx. Flowers with sepals suborbicular to oblong, distinctly dimorphic, the larger three ca. 5 × 4 mm, the smaller two ca. 2.5 × 3.5 mm, pale yellow-green with fine brownish veins, truncate at base, rounded at apex, shortly decurrent on base of ovary at anthesis; petals suborbicular, shorter than sepals, pale yellow, entire, convex and thickened toward base; stamens 10 in 2 whorls, the filaments stout, those of inner stamens ca. 1 mm long, those of outer stamens very short, the anthers ca. 1 mm long with thecae separated by well-developed connective; styles 3, distinct, ca. 2 mm long, distally thickened, each terminating in a broad flattened stigma. Fruit dull brown; sepals thin, dry, brittle, unequal, the larger spathulate, 3.4–4.8 × 1.3–2.1 cm, the smaller narrowly oblong to spathulate, 1.1–2.8 × 0.5–1.1 cm, with both margins of smaller wings and one margin of one larger wing decurrent on base of fruit, forming 5 prominent ribs; fruit body turbinate, broadest at level of wings with diameter of 1.0–1.2 cm, the receptacle inflated and domelike above wings; scars of fallen petals and stamens forming a pale annulus 1–2 mm above wings; style base persistent, enlarged, conical; pericarp thick, dry, coriaceous; seed ca. 8 mm diam., with cerebriform-ruminant endosperm evident through thin testa; germination epigeal in moist litter layer, the cotyledons remaining inside fruit.

The following preliminary key serves to distinguish *Ancistrocladus korupensis* from the other species of *Ancistrocladus* in Africa:

- 1a. Adult leaves pseudopetiolate
 - A. abbreviatus* Airy Shaw, *A. barteri* Scott-Elliot, *A. congolensis* J. Léonard, *A. ealaensis* J. Léonard, *A. letestui* Pellegrin, *A. uncinatus* Hutchinson & Dalziel
- 1b. Adult leaves sessile.
 - 2a. Petals equaling or longer than sepals
 - A. guineensis* Oliver, *A. pachyrrhachis* Airy Shaw, *A. robertsoniorum* J. Léonard, *A. sp. nov.* ined. [*Cheek & Ndumbe 3915*, *Thomas 9016*]
 - 2b. Petals shorter than sepals.
 - 3a. Longer sepals 3.4–4.8 cm long in fruit *A. korupensis*
 - 3b. Longer sepals 0.8–1.2 cm long in fruit *A. likoko* J. Léonard

Additional material examined. CAMEROON. **South-west Prov.:** Ndian Div., ca. 10 km NW of Mundemba on Ekundu Kundu Rd., in disturbed primary forest on sandy clay soil, 90 m, 5°01'N, 8°52'E, 28 Feb. 1993, *Gereau et al. 5172* [sterile] (K, MO, P, SCA, YA); Korup

National Park, Science Camp 1, 50 m, 5°01'N, 8°48'E, 1 Mar. 1993, *Gereau et al. 5175* [fallen fruits and infructescences] (K, MO, P, SCA, YA); 1.2 km E of Science Camp 1 on trail to Ndian (Mana) River, 80–100 m, 5°02'N, 8°49'E, 1 Mar. 1993, *Gereau et al. 5177* [fallen fr & infr] (K, MO, P, SCA, YA); type locality, 4 Mar. 1993, *Gereau et al. 5179* [sterile sprouts from fallen stem] (K, MO, P, SCA, YA); type locality, 4 Mar. 1993, *Gereau et al. 5181* [seedlings] (K, MO, P, SCA, YA); near S bank of Six Cup Garri Creek less than 1 km E of confluence with Ndian (Mana) River, 90 m, 5°03'N, 8°53'E, 7 Mar. 1993, *Gereau et al. 5200* [sterile sapling] (K, MO, P, SCA, YA); Korup National Park, ca. 2 km N of Ikassa Last Bush, 60 m, 4°57'N, 8°50'E, 9 Mar. 1993, *Gereau et al. 5203* [fallen fr] (K, MO, P, SCA, YA); ca. 10 km NW of Mundemba on Ekundu Kundu Rd., 90 m, 5°01'N, 8°52'E, 10 Mar. 1993, *Gereau & Thomas 5204* [flowers and buds from sapling flowering out of season] (K, MO, SCA, YA); forest ca. 6 km NW of Mundemba, 70 m, 5°01'N, 8°53'E, Nov. 1992, *Jato s.n.* [fls] (MO); Korup National Park, primary rainforest, 60 m, 5°02'N, 8°50'E, 28 Mar. 1987, *Thomas 6889* [sterile] (MO, YA), Mar. 1991, *Thomas 8505* [sterile] (MO); forest ca. 6 km NW of Mundemba, 60–70 m, 5°01'N, 8°53'E, Apr. 1992, *Thomas 9020* [old infr] (K, MO, P, SCA, YA). NIGERIA. **Cross River State:** Oban, *Talbot 1726* [sterile] (BM).

PHYSICAL ENVIRONMENT

The area in which *Ancistrocladus korupensis* is known to grow supports closed-canopy evergreen forest with areas of secondary growth following human disturbance (Gartlan et al., 1986). The area lies at 50–100 m above sea level and is flat to gently undulating with numerous small creeks in shallow valleys. There are occasional outcrops and boulders of the hard, acidic metamorphic rocks of the African basement complex. The autochthonous soils are highly acidic (pH ca. 3.9–4.5), leached, and infertile, with a high to very high sand content (60–91%) and the clay fraction greatly depleted near the surface. The rainfall pattern is pseudo-equatorial, with only a single wet and dry season rather than the two wet and two dry seasons found further south. Rainfall at the nearby Ndian oil palm plantation averaged 5,460 mm annually in the period 1963–1983. The single long wet season peaks in July–September; November–March is the dry season, with January the driest month. There is little annual variation in mean temperatures.

VEGETATION

Letouzey (1985) classified the vegetation of the area as Atlantic–Biafran evergreen forests, rich in Caesalpiniaceae. This forest type is widespread at low elevations near the coast in Cameroon; however, the forest on low-lying sandy clay soils in which *Ancistrocladus korupensis* occurs has a unique and distinctive vegetation.

Ancistrocladus korupensis occurs in forests of well-defined physical structure with a high degree of local endemism. Common or locally dominant trees of the upper canopy include *Azelia bipindensis* Harms, *Berlinia bracteosa* Benth, *Didelotia africana* Baillon, *Erythrophloeum ivorense* A. Chevalier, *Julbernardia seretii* (DeWildeman) Troupin, *Microberlinia bisulcata* A. Chevalier, *Tetraberlinia bifoliolata* (Harms) Hauman (Caesalpiniaceae), *Lecomptodoxa klaineana* (Pierre ex Engler) Dubard (Sapotaceae), and *Lophira alata* Banks ex Gaertner (Ochnaceae). The lower canopy is dominated by *Oubanguia alata* Baker f. (Scytropetalaceae), apparently common only in the Korup area; other common smaller trees include *Dichostemma glaucescens* Pierre, *Klaineanthus gaboniae* Pierre ex Prain, *Mareyopsis longifolia* (Pax) Pax & K. Hoffmann (Euphorbiaceae), *Diogoia zenkeri* (Engler) Exell & Mendonça, *Strombosia pustulata* Oliver (Olacaceae), *Diospyros gabunensis* Gürke (Ebenaceae), *Hymenostegia afzelii* (Oliver) Harms (Caesalpiniaceae), and *Tabernaemontana brachyantha* Stapf (Apocynaceae). The genus *Cola* Schott & Endlicher (Sterculiaceae) is well represented in the understory, which is dominated by *C. semecarpophylla* K. Schumann, a monocaulous tree with rosettes of very large leaves; *C. cauliflora* Masters, *C. lateritia* K. Schumann, *C. megalophylla* Brenan & Keay, and *C. rostrata* K. Schumann are also common. *Deinbollia unijuga* D. W. Thomas (Sapindaceae) appears to be limited to the same area as *A. korupensis*, and additional narrow endemics to be described from Korup collections include new species of *Corymborkis* Thouars (Orchidaceae), *Uvariopsis* Engler (Annonaceae), and *Vepris* Commerson ex A. Jussieu (Rutaceae).

The area is rich in species of lianas. *Ancistrocladus guineensis* occurs in the same area as the new species, while *A. abbreviatus* is common in nearby seasonally flooded forests. *Ancistrocladus letestui* occurs on nearby hills, while *A. uncinatus* is known only from Cross River State, Nigeria, adjacent to the Korup area. Other climbers include many species in the genus *Strychnos* L. (Loganiaceae) and in the families Annonaceae, Apocynaceae, Connaraceae, Fabaceae, Icacinaceae, and Menispermaceae.

COLLECTING HISTORY AND PHYTOCHEMISTRY

Ancistrocladus korupensis was apparently first collected near Oban in the Cross River State of southeastern Nigeria (*Talbot 1726*, BM); this sterile specimen was identified only as *Ancistrocladus* sp. The second collection, *Thomas 6889* (MO, YA), was collected in 1987 in the Korup National Park,

probably about 50 km from Talbot's locality; this collection, also sterile, was tentatively identified as the widespread species *A. abbreviatus*. The Thomas collection was a voucher for a 0.5-kg sample of dried stems and leaves, collected under Contract No. N01-CM-67923 between the Missouri Botanical Garden and the Developmental Therapeutics Program of the United States' National Cancer Institute (N.C.I.). Extracts of this sample tested for *in vitro* biological activity were found to inhibit the destruction of cultured human lymphocytes by both HIV-1 and HIV-2 (Manfredi et al., 1991).

Before it was realized that a new species was involved, the new alkaloids that inhibit HIV had been isolated and named michellamine A and B. These are apparently dimers of other naphthyl isoquinoline alkaloids (Bringmann, 1986) previously identified from the genus (references in Léonard, 1982, 1986). At this point, the N.C.I. requested more material for further testing; samples of *A. abbreviatus* from Gabon, however, showed no inhibitory activity against HIV. When the original population from which the biologically active samples had been taken was relocated in Korup, it became clear that the plants belonged to a new species, apparently narrowly endemic to the Korup area. With the discovery of flowers and fruits, we have been able to complete the description of this species; the initial impetus for this task came from the plant's pharmaceutical potential.

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