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RESEARCH ARTICLE

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A synopsis of *Mendoncia* (*Acanthaceae*) in continental Africa including the description of two new species from western Central Africa and a new subspecies from West Africa

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Key words

Cameroon
Gabon
key
Mendoncia
new species
new subspecies
taxonomy

Abstract The amphi-atlantic genus *Mendoncia* of the *Acanthaceae* counts c. 80 species. In tropical Africa it is represented by 14 species, eight in continental Africa and six in Madagascar. The remaining species occur in tropical America. The new species *Mendoncia camerounensis* and *M. rabiensis* are described and illustrated. *Mendoncia floribunda* is resurrected, fully described, and illustrated as well. *Mendoncia iodioides,* reduced to a variety of *M. phytocrenoides* in the Flore du Gabon, is restored as a distinct species. The isolated western population of *Mendoncia gilgiana* is recognised as a new subspecies. The conservation status of all species is assessed. Only a few of them are classified as Least Concern, the others as ranging from Critically Endangered to Vulnerable. Since we resurrect two species and add two new species and a new subspecies, a synopsis of and a key to all continental African species is presented.

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INTRODUCTION

Mendoncia belongs to the *Thunbergioideae* of the *Acanthaceae*. This subfamily is divided in two major clades, one comprising *Pseudocalyx* and *Thunbergia,* the other *Anomacanthus* and *Mendoncia* (Borg 2012). The phylogenetic position of the fifth genus of this subfamily, *Meyenia*, is not yet clear. *Anomacanthus* and *Mendoncia* differ from *Meyenia*, *Pseudocalyx*, and *Thunbergia* by their drupaceous fruits, a unique character in the *Acanthaceae*. Heine (1966) in the Flore du Gabon distinguished *Mendoncia* from *Pseudocalyx* by the anther opening: slits in the former, apical pores in the latter. However, both genera share the character of anthers that open by apical pores, as is correctly depicted in Planche 14 part 6 for *Mendoncia gilgiana* (Lindau) Benoist and in Planche 15 part 6 for *M. phytocrenoides* (Gilg ex Lindau) Benoist. For Madagascar *Mendoncia* was recently enriched by three new species bringing its total number to six (Magnaghi & Daniel 2014). The continental African species of *Mendoncia* like *M. gilgiana*, *M. iodioides* (S.Moore) Heine, *M. lindaviana* (Gilg ex Lindau) Benoist, and *M. phytocrenoides* were first described in *Afromendoncia* Gilg ex Lindau (1893), then transferred by Moore (1929) to the older genus *Monachochlamys* Baker (1883), described from Madagascar, and finally to *Mendoncia* by Benoist (1944).

A second cauliflorous species of *Mendoncia,* next to *M. lindaviana*, found in Gabon by the first author, was at first considered to be new to science. By its hairy branchlets and leaves the material differs remarkably from *M. lindaviana* which species is completely glabrous. A formal description was made by the first author and an illustration produced. Later on, however, the new material of this distinct species proved to be conspecific with *M. floribunda* (Pierre) Benoist, described from a poor Jolly collection from Gabon and placed in synonymy of *M. lindaviana* by Heine (1966). A collection from Cameroon by the second author could not be named with any of the existing literature. Further study revealed it to be a new species. Among the unidentified or wrongly placed *Mendoncia* specimens at WAG another new species was found, represented by two specimens from Gabon. We then decided to take all species of *Mendoncia* from continental Africa into account and present a synopsis with key of these species. Early 2017 we discovered that simultaneously with our study, Magnaghi and Daniel were working on an overview of *Mendoncia* for the Old World. Their study (Magnaghi & Daniel 2017) includes continental Africa, but since they recognise only four species in continental Africa, while our study resulted in eight species of which one is divided into two subspecies, we decided our paper should still be published in full. Because we have seen more material, identified some specimens differently from that study and because of some major differences caused by segregation of taxa, we decided to include new maps as well. We provide descriptions for the species new to science, and one for *M. floribunda*, because the latter was previously only known from rather scarce material and not recognised, and hence not described, in recent treatments like Heine (1966) and Magnaghi & Daniel (2017).

METHODS

Normal practices of herbarium taxonomy have been applied to study all herbarium material available from BR, K, L, MO, P, U, and WAG. The relevant collecting data are stored in the Naturalis – NHN database. Specimens cited but not physically examined are marked with an asterisk (*). The distribution maps have been produced using ArcMap 10.2.2. Our red list assessments follow the guidelines of the IUCN (2011); AOO and EOO were calculated using the online GeoCAT tool (Bachman et al. 2011).

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KEY TO THE CONTINENTAL AFRICAN SPECIES OF *MENDONCIA*

1. Branches and leaves glabrous; plant cauliflorous, rarely also flowers on the leafy shoots. — Cameroon, Equatorial Guinea (?), Gabon, Congo (Brazzaville), Congo (Kinshasa) . . . . . 6. *M. lindaviana*
1. Branches and leaves hairy, at least sparsely and/or partly so; flowers axillary and/or plant cauliflorous 2
2. Pedicel glabrous; bracteoles glabrous outside, caducous usually soon after flowering; plant cauliflorous. — Gabon . . . . . 3. *M. floribunda*
2. Pedicel hairy; bracteoles hairy outside, at least sparsely and/or partly so, persistent in fruit; flowers axillary, sometimes also cauliflorous 3
3. No simple hairs present, indumentum consists only of stellate and/or branched hairs. — Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana . . . . . 2. *M. combretoides*
3. Indumentum of long, simple, ± hispid or flexible hairs mixed or not with shorter simple hairs or with stellate and/or branched hairs 4
4. Indumentum of long (sometimes with shorter underneath) simple hairs only. — From Guinea to Ghana and from Cameroon to South Sudan and Tanzania . . . . . 4. *M. gilgiana*
4. Indumentum of long, simple hairs mixed with shorter stellate and/or branched hairs 5
5. Flowers solitary; leaves ≤ 10 cm long; fruits glabrous . . . . . 8. *M. rabiensis*
5. Flowers usually several together, fasciculate, rarely solitary (in *M. camerounensis*); leaves (6–)12–20(–28) cm long; fruits hairy (unknown for *M. iodioides*) 6
6. Bracteoles predominantly hispid-hairy; pedicel 5–10(–15) mm long. — South Cameroon, Equatorial Guinea, Gabon, Congo (Kinshasa) . . . . . 7. *M. phytocrenoides*
6. Bracteoles predominantly stellate- and/or branched-hairy; pedicel ≥ 15 mm long 7
7. Bracteoles broadly elliptic, 12–15(–18) by (8–)12–18 mm, prominently palmately veined; pedicel (15–)20–25(–30) mm long; calyx glabrous. — SE Nigeria, Southwest Cameroon . . . . . 5. *M. iodioides*
7. Bracteoles ovate, 25–30 by 18–20 mm, pinnately veined; pedicel 20–40(–50) mm long; calyx stellate-hairy. — Cameroon, Southwest and Littoral Regions . . . . . 1. *M. camerounensis*

SYNOPSIS OF THE CONTINENTAL AFRICAN SPECIES OF *MENDONCIA*

1. *Mendoncia camerounensis* Breteler & Wieringa, *sp. nov.* — Fig. 1; Plate 1; Map 1

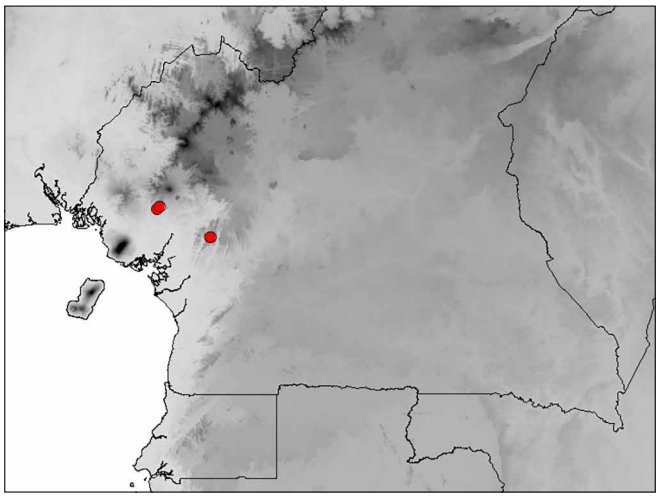
Resembling most *Mendoncia iodioides* (Moore) Heine, differing from this species by the longer pedicels, the larger, pinnately veined bracteoles, and the stellate-hairy calyx. — Type: *J.J. Wieringa, Mackinder & Nana 5855* (holo WAG 2 sheets, WAG0237438 & WAG0237439; iso K, YA), Cameroon, Littoral Region, in the proposed Ebo F.R., N4°21.53' E10°25.07', alt. 910 m, 9 Mar. 2007.

Liana, climbing to canopy. Branchlets, leaves, inflorescences (bracteoles outside) hispid-hairy mixed with shorter, stellate and/or branched hairs. *Leaves* opposite: petiole ± terete, slightly grooved above, 25–40(–50) mm long; lamina broadly ovate-elliptic, 1.2–1.5 times as long as wide, 5.5–16 by 4–12 cm, rounded to subcordate at base, rounded to acute at apex, glabrescent, more rapidly so above; main lateral nerves 5–6(–7) pairs. *Inflorescence* axillary, fasciculate, (1–)3–4-flowered. *Pedicel* 20–40(–50) mm long. *Bracteoles* ovate, 25–30 by 15–20 mm, pinnately, reddish purple veined, obtuse at base, 2–3 mm apiculate at the apex, minutely pustulate inside. *Flowers* only partly known; calyx shallowly lobed, 1.5–2.5 mm long, stellately hairy outside; corolla (not seen by us) white-yellow (*Cable et al. 3884*); disc cupular, c. twice as long as the calyx, glabrous; ovary ellipsoid, c. 9 mm long, appressed-pubescent. *Fruits* ellipsoid, c. 2 cm long, velutinous, black at maturity.

Habitat & Distribution — Tropical submontane rain forest in Cameroon, Littoral and SW Regions. Altitude 700–910 m.

Additional specimens studied. Cameroon, **South-West Region**, *Cable et al. 3884* (BR, K, P, WAG), Kupe Mt, SW Kupe village, 17 July 1996; *Etuge 2769* (BR, K, P, WAG), ibid., 12 July 1996; *Schönenberger et al. 50* (BR, K, WAG), Kupe Mt, SW slope, N4°45' E9°41', 8 Nov. 1995. **Littoral Region**, *Osborne & Beheng 118* (K), Ebo Forest proposed National Park, near research station, 2006; *Van der Burgt & Ngansop 1700* (BR, K, MO*, P, SCA*, WAG, YA*), Ebo proposed National Park, trail to Iboti, 2 Dec. 2013.

Plate 1 *Mendoncia camerounensis* Breteler & Wieringa. Node with leaf and young fruit hidden by bracteoles. — Photo by Xander van der Burgt of *X.M. v.d. Burgt 1700*.



Map 1 Distribution of *Mendoncia camerounensis* Breteler & Wieringa.

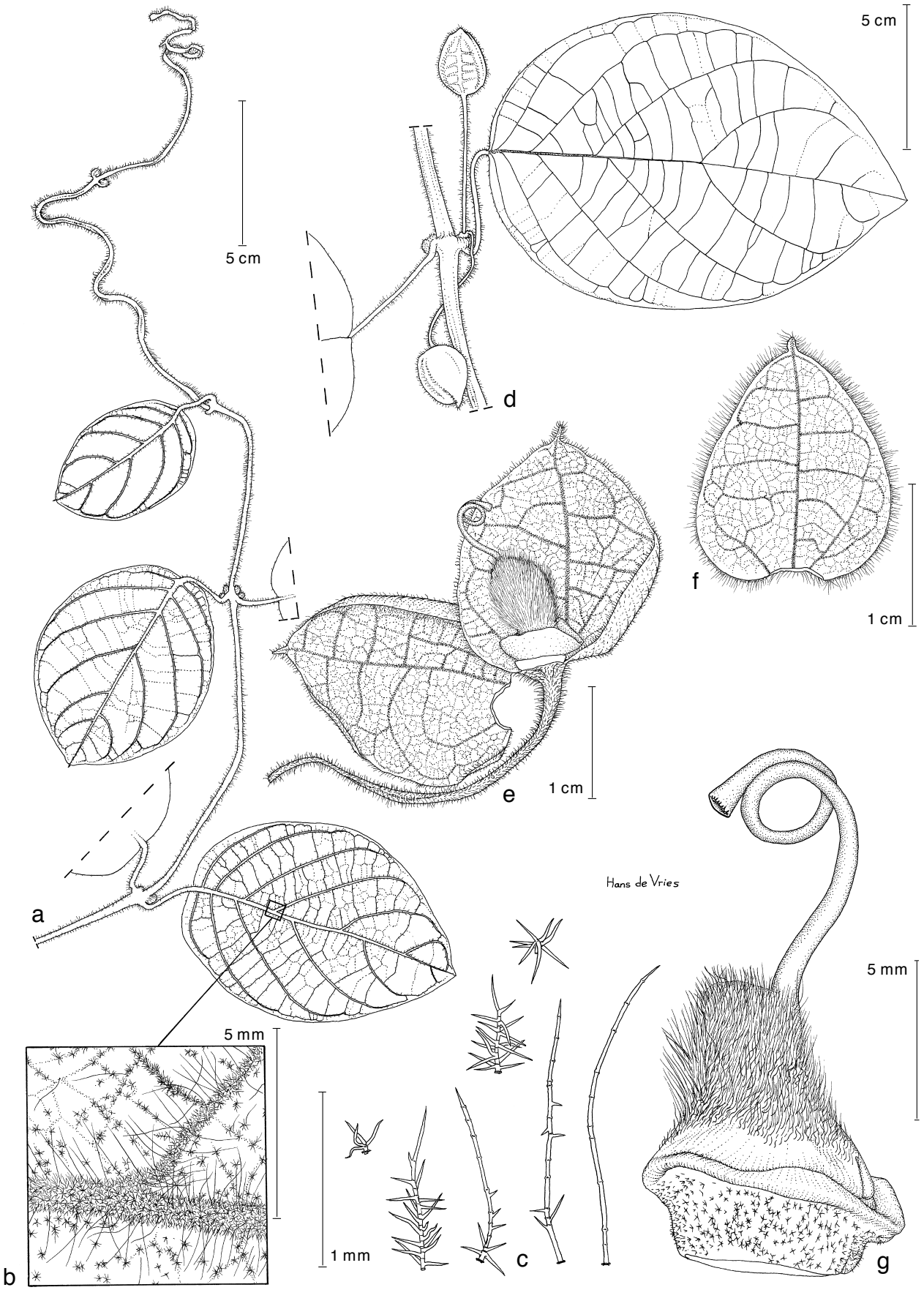


Fig. 1 *Mendoncia camerounensis* Breteler & Wieringa. a. Habit, top of lianescent branch; b. detail of indumentum of leaf lower surface; c. variation of hairs from lower leaf surface; d. leaf with 2 floral buds in axil; e. pistil with bracteoles; f. bracteole inner side showing nervation; g. pistil and stellate-hairy calyx (all: *Wieringa et al. 5855*, WAG). — Drawing by Hans de Vries.

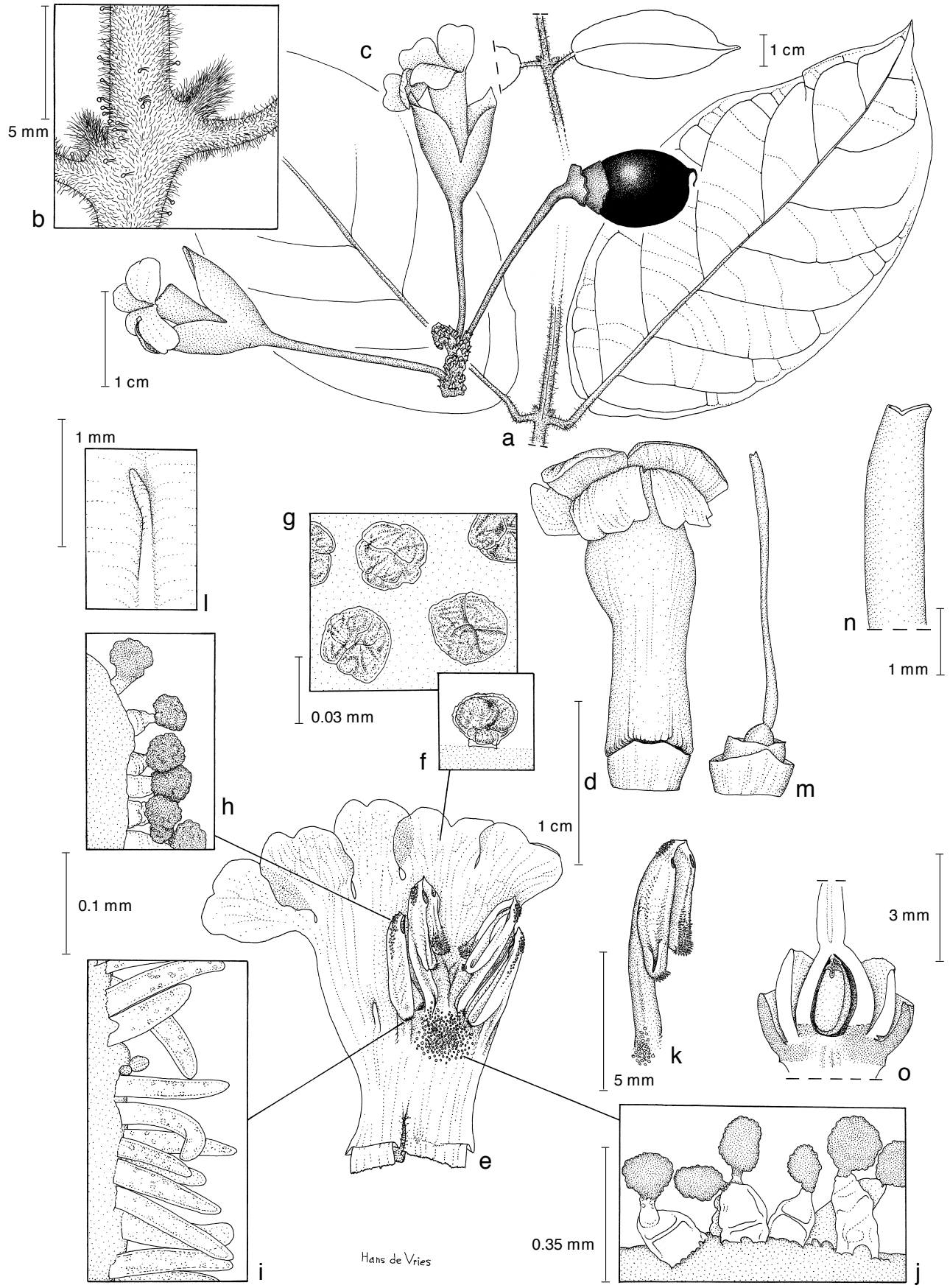


Fig. 2 *Mendoncia floribunda* (Pierre) Benoist. a. Habit, two parts of a leafy branch; b. detail of indumentum at node; c. inflorescence with two flowers and a fruit; d. flower, bracteoles removed; e. corolla opened up with stamens from inside; f. detail of hair on corolla lobe from aside; g. detail of hairs on corolla lobe from above; h. detail of hairs on the apex of the anther; i. detail of hairs on base of anthers; j. detail of hairs on inner side of corolla tube just below base of filaments; k. anther; l. staminode; m. calyx and pistil, bracteoles and corolla removed; n. detail of style apex showing unequal stigma lobes; o. cross-section of flower base showing the ovule (all: *F.J. Breteler et al. 14049*, WAG). — Drawing by Hans de Vries.

Conservation status — Both the EOO (271 km²) and AOO (16 km²) indicate Endangered. Since none of the localities is currently protected while there is extensive logging in Cameroon, and the number of subpopulations is only two which could be considered, depending on a likely difference in logging pressure, as either 1–2 locations, we assess this species as Endangered (EN B1ab(i-v) & 2a, b(i-v)). In case the areas where this species occurs would be protected as National Parks, its status should be reconsidered to become Vulnerable (VU D2).

Note — *Schönenberger 50* was used in the phylogenetic study of the *Thunbergioideae* by Borg et al. (2008), identified as *M. phytocrenoides.* Magnaghi & Daniel (2017) have also identified specimens of this consistently as *M. phytocrenoides*. However, the distinct venation of the bracteoles and general indumentum distinguish this species from both *M. iodioides* and *M. phytocrenoides*.

2. *Mendoncia combretoides* (A.Chev.) Benoist — Map 2

Mendoncia combretoides (A.Chev.) Benoist (1944) 143; Heine (1963) 403; Hawthorn & Jongkind (2006) 442. — *Thunbergia combretoides* A.Chev. (1920) 490. — Type: *Chevalier 19745* (lecto P, P00435313, designated by Magnaghi & Daniel 2017; isolecto P 2 sheets), Côte d'Ivoire, bassin du Cavally, pays des Tépos, village de Grabo, 4 Aug. 1907.

Distribution — Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana.

Conservation status — The EOO (252749 km²) indicates Least Concern, the AOO (160 km²) Endangered. With at least 15 subpopulations, of which some in protected areas or with recent collections, we assess this species as Least Concern, but with the continuation of habit loss in West Africa it might have to be moved to Vulnerable.

Note — Magnaghi & Daniel (2017) did not record this species for Sierra Leone, our record is based on *Jaeger 7539* (P) which is indeed not cited by them.

3. *Mendoncia floribunda* (Pierre) Benoist — Fig. 2; Map 3

Mendoncia floribunda (Pierre) Benoist (1944) 143; Heine (1966) 68, in synonymy of *M. lindaviana*. — *Lirayea floribunda* Pierre (1896) 342. — *Afromendoncia floribunda* (Pierre) Burkill (1899) 6. — *Monachochlamys floribunda* (Pierre) S.Moore (1929) 226. — Type: *Jolly 101-bis* (holo P), Gabon, near Libreville, 15 Oct. 1891, see notes.

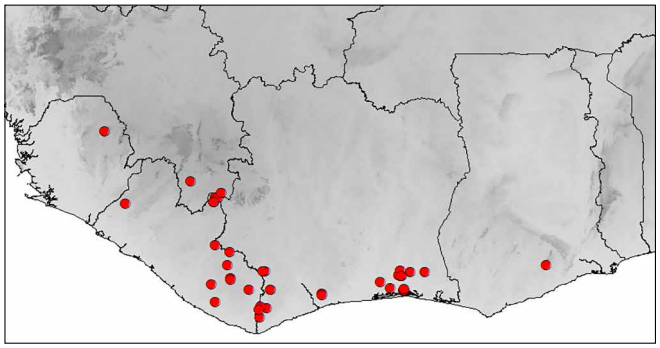
Cauliflorous *liana*, at least 10 m high climbing. Branchlets velutinous-pilose to hispidulous, mixed with some glandular hairs, the same indumentum except for the glandular hairs, present on petioles and midrib and main lateral nerves of the leaves beneath. *Leaves* ± opposite: petiole sharply bent in adult leaves, 12–19 mm long; lamina firmly papery to coriaceous, elliptic to obovate, 1.5–2 times as long as wide, 9–18 by 5.5–10 cm, rounded to cordate at base, acute to 0.5–1 cm acuminate at apex, brown-hairy on midrib and, to a lesser extent, on the 7–8 pairs of main lateral nerves above when young. *Inflorescence* pseudo-fasciculate on the main stem up to c. 2 m high, flowers on short rachises, up to at least 10 rachises present on each node, 1–3 flowers per season per rachis, the rachises bear scars of more flowers from previous seasons. Flowers glabrous. *Pedicel* 20–22 mm long, slightly thickened towards the apex, glabrous. *Bracteoles* concave, elliptic, 12–15 by 7–9 mm, acute to apiculate at apex, glabrous both sides, deciduous in fruit. *Calyx* cupular, 2–3 mm long, glabrous, margin entire to somewhat undulate to shallowly dentate. *Corolla* white, tubular, glabrous, outside, c. 2 cm long, lobes 4–5 mm long, apically reflexed with ± sessile glands inside; tube c. 15 mm long, at base slightly bulging over the calyx edge, with stalked glands inside below stamen attachment. Fertile stamens 4; filaments glabrous, 1–3 mm free from corolla tube; anthers 4–6 mm long, often with thecae unequal in length, apically with stalked glands and with papillose hairs at base. Staminode apically free from corolla tube, ± oblongoid, glabrous. *Disc* cupular, c. 2 mm long, glabrous. *Pistil* c. 20 mm long, glabrous; ovary 2–3 mm long, 1–2-locular, with 1–2 ovules per locule; style shallowly and slightly unequally bilobed apically. *Fruit* (immature) obovoid-ellipsoid, slightly laterally compressed, 14 by 10 by 5–6 mm, glabrous.

Habitat & Distribution — Tropical rain forest in Gabon. Altitude up to c. 300 m.

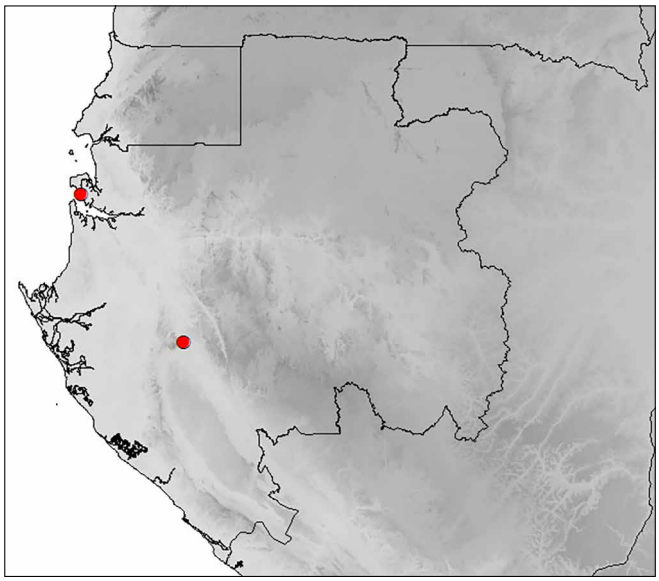
Additional specimen studied. Gabon, Ngounié, *Breteler et al. 14049* (BR, BRLU, E, K, LBV, MO, WAG), between Yombi and Fougamou, eastern slope of Koumounabouali ridge, S1°20' E10°40', in disturbed primary forest, 22 Sept. 1997.

Conservation status — *Mendoncia floribunda* has only been collected twice, resulting in an AOO of 8 km². The type was collected 125 years ago in present day Libreville and this subpopulation should be considered lost, resulting in a current AOO of 4 km². The other known locality does not have any protected status, while there is continuous logging in this area. We therefore assess this species as Critically Endangered (CR, B2a, b(ii, iii)).

Note — *Lirayea floribunda* of Pierre was based on *Jolly 101-bis*, a specimen consisting of a few inflorescences attached to a part of a stem and a single, separate leaf. The inflorescence is like that of *M. lindaviana,* but the hairy leaf is not, because *M. lindaviana* has glabrous leaves. Pierre (1896) did not want to describe this leaf as belonging to his *Lirayea floribunda,* because it was not attached to the flowering element of his



Map 2 Distribution of *Mendoncia combretoides* (A.Chev.) Benoist.



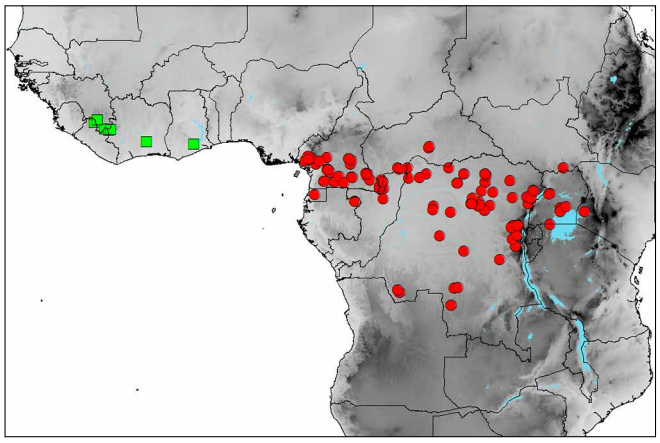
Map 3 Distribution of *Mendoncia floribunda* (Pierre) Benoist.

type material. Flowering or fruiting herbarium material of the cauliflorous *M. lindaviana* for instance, is very rarely found attached to a leafy branch, because these elements are, in nature, usually separated by several meters. When only the flowering element of *Jolly 101-bis* is taken into account, it is understandable that Heine (1966) synonymised Pierre's name under *Mendoncia lindaviana.* In his reasoning, however, Heine made a mistake in notifying that *Zenker 965*, to which Pierre's type material was compared, is an isotype of *Afromendoncia lindaviana.* The latter is only based on *Soyaux 156*, *Zenker 965* was not yet collected. The collection *Breteler et al. 14049* shows that a cauliflorous *Mendoncia* like *M. lindaviana* but with hairy leaves does exist. Collecting of this specimen was carefully executed by climbing the supporting tree in order to assure that the leafy branchlets were collected from the same individual as the flowering elements. The hairy leaves have been compared with the single leaf of *Jolly 101-bis* with the inevitable conclusion that both collections belong to the same species: *Mendoncia floribunda,* distinct from *M. lindaviana.* The type specimen of *Mendoncia floribunda* in P does not show any corolla's, although Pierre (1896) described them in his protologue and they are depicted in the accompanying illustration by Delpy. They may have been lost. The type material is numbered *Jolly 101-bis* and Delpy refers to it as such on the illustration. Pierre in his protologue of the basionym *Lirayea floribunda,* however, refers to it as *Jolly 101*.

4. *Mendoncia gilgiana* (Lindau) Benoist — Fig. 3; Map 4

Mendoncia gilgiana (Lindau) Benoist (1939) 679. — *Afromendoncia gilgiana* Lindau (1894) 1. — *Monachochlamys gilgiana* (Lindau) S.Moore (1929) 227. — Type: *Preuss 481* (lecto K, K000393683, designated by Magnaghi & Daniel 2017; isolecto BM*, K, P), Cameroon, between Barombi-ba-Mbu and Kake, 4 Sept. 1890.

Notes — This species is the most widespread of all continental African species, ranging from Guinea in the west eastwards to South Sudan, Kenya and Tanzania. However, it does not occur in Togo, Benin and Nigeria making its distribution disjunct. The western populations are restricted to an area in the Guinea Highlands on and around Mt Nimba and Ziama Mts, covering parts of Guinea, Liberia, to Ivory Coast in the Orumbo Boka Mt in central Ivory Coast, and to the Atewa Range in Ghana. It is widely separated from the eastern population in Cameroon and further east- and south-eastwards. Specimens from this well separated area differ also slightly in morphological aspects. These two elements together, small morphological differences and geographical separation, are the reason to distinguish both groups of populations of *Mendoncia gilgiana* as two different subspecies as follows:



Map 4 Distribution of *Mendoncia gilgiana* (Lindau) Benoist; subsp. *gilgiana* (●); subsp. *occidentalis* Breteler & Wieringa (■).

– Bracteoles ovate-elliptic, rounded to obtuse at base, (10–)12–15(–18) by 8–10(–15) mm; part of pedicel above attachment of bracteoles ≤ 1mm long. — Cameroon, Equatorial Guinea, Gabon, Central African Republic, South Sudan, Uganda, Kenya, Congo (Brazzaville), Congo (Kinshasa), Tanzania . . . . . a. subsp. *gilgiana*
– Bracteoles triangular-ovate, cordate at base, (15–)17–20(–22) by 14–15 mm; part of pedicel above attachment of bracteoles ≥ 1.5 mm long. — Guinea, Liberia, Ivory Coast, Ghana . . . . . b. subsp. *occidentalis*

a. subsp. *gilgiana* — Fig. 3a; Map 4

Mendoncia gilgiana Lindau (Benoist) var. *tisserantii* Benoist (1939) 679; Heine (1963) 403; Hawthorn & Jongkind (2006) 442, p.p. — Type: *Tisserant 2055* (holo P), Central African Republic, Ouaka region, 20 km N of Bambari, 10 Oct. 1925.

Habitat & Distribution — Semi-deciduous forests in Cameroon, Central African Republic, Equatorial Guinea, Gabon, Congo (Brazzaville), Congo (Kinshasa), South Sudan, Uganda, Kenya, Tanzania. Altitude 300–1570 m. See notes.

Conservation status — With an EOO of 2 859 240 km² and an AOO of 448 km² but from a range of countries and partly from protected areas resulting in many different locations, this subspecies is considered as Least Concern (LC).

Notes — Benoist distinguished *M. gilgiana* var. *tisserantii* from the type variety by the hairiness of its branches, petioles, and bracteoles, being 'parce pilosis' in contrast to the densely hairy type specimen. Heine (1963), followed by Hawthorn & Jongkind (2006) described *M. gilgiana* specimens from West Africa as entirely glabrous and classified them under var. *tisserantii*. The type of var. *tisserantii* originates from the eastern part of the distribution area of *M. gilgiana* where sparsely hairy specimens do occur, but we have never seen a single glabrous one from that area. In his treatment of *Mendoncia* for the Flore du Gabon, Heine (1966) did not maintain var. *tisserantii* as a distinct taxon, nor was it recognised by Magnaghi & Daniels (2017).

Magnaghi & Daniel (2017) claim to have seen only photographs of this taxon from southern Congo (Kinshasa) and discuss how it might be distinct. However, at least one of the specimens they cite (*Callens 3436*, from Panzi) is also from that area, but they have mapped this specimen to another location named Panzi, and they did not see several other collections of this species in BR.

The distribution of *M. gilgiana* subsp. *gilgiana* in western Central Africa, notably in Gabon, is, so far, restricted to the area north of the equator. The only collection from this country is from Mékambo in the northeast where the forests are semi-deciduous in contrast to the more evergreen forests in west and central Gabon. In the adjacent Congo (Brazzaville) *M. gilgiana* subsp. *gilgiana* is known from three collections: *Mildbraed 3820* from Likilambe on the Sangha river and *Ndolo Ebika 198* and *906* collected SE of Bomassa respectively at Bomassa. Further eastwards, in Congo (Kinshasa), the subspecies *gilgiana* is known from a much larger area, from above and below the equator, up to an altitude of 1 400 m. The distribution pattern in Gabon and eastwards would suggest the species evades the wettest forests, however, in Cameroon it seems to occur also in the wetter parts, but always above 500 m altitude, possibly in areas with a rain shadow. Also, in Cameroon it has not been found in the wettest areas like around Kribi and Mt Cameroon.

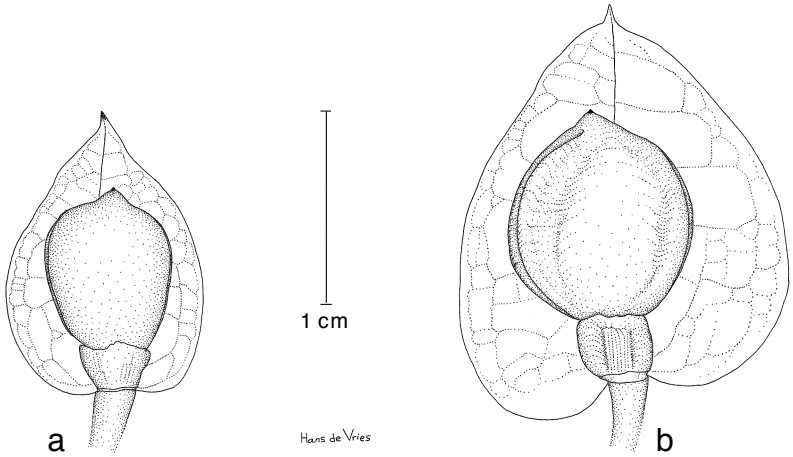


Fig. 3 a. *Mendoncia gilgiana* (Lindau) Benoist subsp. *gilgiana*. Fruit with one bracteole removed. — b. *Mendoncia gilgiana* (Lindau) Benoist subsp. *occidentalis* Breteler & Wieringa. Fruit with one bracteole removed (a: *F.J. Breteler 767*, WAG; b: *X.M. v.d. Burgt 1290*, WAG). — Drawing by Hans de Vries.

b. subsp. ***occidentalis*** Breteler & Wieringa, *subsp. nov.* — Fig. 3b; Map 4

Mendoncia gilgiana Lindau (Benoist) var. *tisserantii* auct. non Benoist; Adam (1981) 2032, pl. 1031; Hawthorn & Jongkind (2006) 442.

Differing from *Mendoncia gilgiana* (Lindau) Benoist subsp. *gilgiana* by the larger cordate bracteoles and a longer pedicel part above the attachment of the bracteoles. In general, this subspecies is more glabrous than the typical subspecies. — Type: *X.M. van der Burgt 1290* (holo WAG; iso K), Guinea, Ziama Mts., N8°22'35" W9°19'36", alt. 960 m, 11 Sept. 2008.

Habitat & Distribution — Submontane rain forest or semi-deciduous forest in Guinea, Liberia, Ivory Coast, and Ghana. Altitude 520–960 m.

Additional specimens studied. Ghana, Eastern Region, Atewa Range F.R., 4 Apr. 1969, *Hall & Enti GC 39461* (K). – Guinea, Nzérékoré, *Cheek et al. 13865* (K, WAG), Ziama Mts, alt. 543 m, 24 Oct. 2008. *Goman et al. 97* (K, WAG), ibid., alt. 520 m, 21 Oct. 2008. – Ivory Coast, **Danané**, *Aké Assi 5424* (K), between Danané and Nzo, 24 Aug. 1958; *Aké Assi 7047* (P), Nimpleu, near Mont Momy, Oct. 1961; **Toumodi**, *Farron 566* (WAG), Orumbo-Boka, 19 Sept. 1981. – Liberia, **Lofa**, *Baldwin 9971* (K), Vonjama Distr., Nekabozu, 24 Oct. 1947; **Nimba**, *Adam 29700* (P*), Granga Mt, 1 Oct. 1975. – Unknown, *Nozeran s.n.* (P), border Ivory Coast with Guinea, Sept. 1955.

Conservation status — *Mendoncia gilgiana* subsp. *occidentalis* has an EOO of 66 377 km² and an AOO of 32 km² from six or seven subpopulations in a region where there is an enormous pressure from population growth and logging. Considering the species occurs in four different countries which each their own forestry laws and dynamics, we consider the number of localities to be four or five. We assess this subspecies as Endangered (EN: B2a, b(i,ii,iii,iv,v)). This species has quite specific habitat requirements (submontane forests) and is not likely to be much more widespread than is currently known.

5. *Mendoncia iodioides* (S.Moore) Heine — Map 5

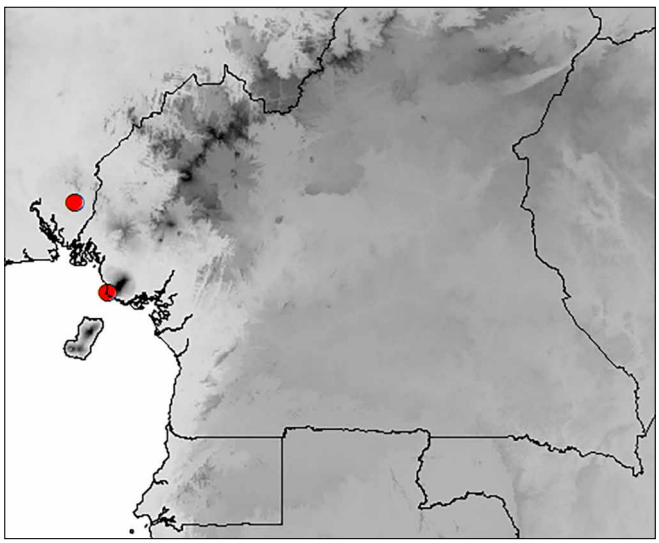
Mendoncia iodioides (S.Moore) Heine (1962) 180. — *Afromendoncia iodioides* S.Moore (1913) 74. — *Monachochlamys iodioides* (S.Moore) S.Moore (1929) 226. — *Mendoncia phytocrenoides* (Gilg ex Lindau) Benoist var. *iodioides* (S.Moore) Heine (1966) 74 (as '*ioides*'), partly, see note. — Type: *P.A. & D.A. Talbot 388* (holo BM; iso K), Nigeria, Oban, 1911.

Distribution — SE Nigeria, SW Cameroon.

Additional specimens studied. Cameroon, South-West Region, *Van Andel et al. 3729* (WAG), Cameroon Mt, Njonje, 20 June 2001.

Conservation status — The areas of occupancy (AOO) is 8 km² while the extent of occurrence (EOO) cannot be calculated for only two collections. The species is evaluated as Critically Endangered because the recent collection originates from the very margin of a protected area in an area with high population pressure, while the collection by Talbot is over a century old, from an unprotected site, and it has not been found in Nigeria since, so we infer past and future decline of habitat and population size (CR, B2a,b(i, ii, iii, iv, v)).

Note — Heine (1966) reduced *M. iodioides* to a variety of *M. phytocrenoides*, but consequently, in Flore du Gabon as well as on his identification slips in the Paris herbarium , used *ioides* instead of *iodioides*. This is not permissible when referring to Moore's specific epithet, and it is in this paper treated as an orthographic error. The character by which Heine distinguished his two varieties in the Flore du Gabon (Heine 1966) is found in the type of indumentum, mainly composed of stellate hairs for the type variety and mainly of simple hairs for var. *iodioides.* This difference in indumentum indeed exists, but should be attributed the other way around, *M. phytocrenoides* has an indumentum of mainly simple hairs. The illustration on p. 75 of the Flore du Gabon shows the type variety with mainly simple hairs and not var. *iodioides.* Moreover, *Mann 1839*, the type of *M. phytocrenoides,* is not the only collection of the type variety as Heine (1966) claimed. Here again he confounded the two varieties because at that time it was var. *iodioides* that was



Map 5 Distribution of *Mendoncia iodioides* (S.Moore) Heine.

known only by the type. Magnaghi & Daniel (2017) consider *iodioides* as a synonym of *phytocrenoides* because they found the pubescence character to be not consistent, but also because they state that the varieties overlap geographically. But besides the difference in indumentum, there are more characters to differentiate between these two species, notably the size and shape of the bracteoles and the length of the pedicel, and in our delimitation their distributions do not overlap. Therefore, *Mendoncia iodioides* is here reinstated as a distinct species. Moore (1913) described the style of *Afromendoncia iodioides* as hairy. Investigation of the holotype from BM revealed a glabrous style like in *Van Andel 3729* (WAG), the second collection of this species. At present fruits of *M. iodioides* are unknown.

6. *Mendoncia lindaviana* (Gilg ex Lindau) Benoist — Map 6

Mendoncia lindaviana (Gilg ex Lindau) Benoist (1944) 142; Heine (1966) 68, p.p., see note under *M. floribunda*. — *Afromendoncia lindaviana* Gilg ex Lindau (1893) 112. — *Monachochlamys lindaviana* (Gilg ex Lindau) S.Moore (1929) 226. — Type: *Soyaux 156* (holo B†; lecto K, designated by Magnaghi & Daniel (2017); iso P), Gabon, Sibange Farm, Dec. 1880, see note under *M. floribunda*.

Distribution — Cameroon, (Equatorial Guinea?), Gabon, Central African Republic, Congo (Brazzaville), Congo (Kinshasa).

Conservation status — The EOO of this species is 1 792 644 km², and the AOO based on herbarium vouchers using 2 km squares is 312 km². Some of the records are from protected areas, and this species occurs over a range of countries and different forest types which will have different logging pressures. This results in our assessment of at least 20 locations, and hence we consider it Least Concern (LC).

Note — We have not seen any specimens from Equatorial Guinea, but given its presence along the northern, eastern and southern borders just inside Cameroon and Gabon we find it very likely it occurs in mainland Equatorial Guinea as well.

7. *Mendoncia phytocrenoides* (Gilg ex Lindau) Benoist — Map 7

Mendoncia phytocrenoides (Gilg ex Lindau) Benoist (1944) 143; Heine (1966) 72, p.p., see note under *M. iodioides*. — *Afromendoncia phytocrenoides* Gilg ex Lindau (1893) 112. — *Monachochlamys phytocrenoides* (Gilg ex Lindau) S.Moore (1929) 227. — Type: *Mann 1839* (lecto K, designated by Magnaghi & Daniel 2017; iso K, P, S*, W*), probably nowadays Equatorial Guinea, 'Gaboon, Muni River', 1862.

Mendoncia letestui Benoist (1944) 133; Heine (1966) 74, under *M. phytocrenoides* var. *iodioides*. — Type: *Le Testu 8250* (lecto P, designated by Magnaghi & Daniel 2017; iso BR, IFAN*, P, K*), Gabon, Lastoursville region, Mougouda, 14 Aug. 1930.

Distribution — Cameroon, Equatorial Guinea, Gabon, Congo (Kinshasa).

Conservation status — Our currently known distribution results in an EOO of 790 730 km² and an AOO (based on 2 km squares) of 68 km². We estimate the number of subpopulations to be about 12. Several of these subpopulations (partly) occur in currently protected areas, and the unprotected ones are located in different zones in different countries, facing different potential threats (logging, mining). We assess the number as locations as 11, and only a part of them to have a direct threat of habitat loss. We therefore assess this species as Least Concern (LC).

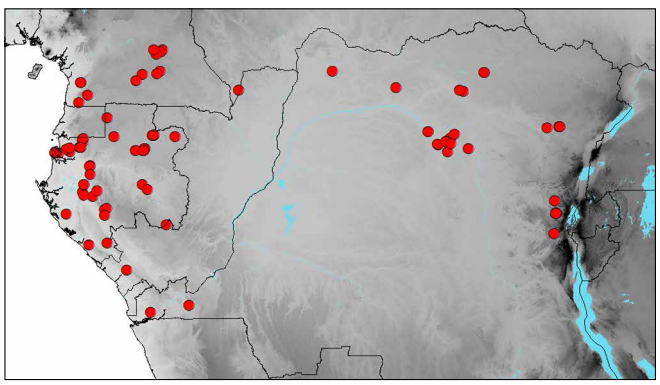
Note — The distribution of *M. phytocrenoides* is highly disjunct, because there is no collection known from the area between Lastoursville and Bélinga in Gabon on the one hand and Kiaselala in eastern Congo (Kinshasa) (*A. Léonard 3905*, BR, P) on the other hand. Analysis of the most eastern collection did not reveal any character by which it differs from the Gabon material. We did not have access to two other collections from this region that are cited by Magnaghi & Daniel (2017). More or less similar disjunct distributions are reported for *Dichapetalum dewildei* Breteler (Breteler 1978), *Protomegabaria meiocarpa* J.Léonard (Breteler 2012, 2014), *Sorindeia winkleri* Engl. (Breteler 2003), and *Stapfiella lucida* Robyns (Leal & Sosef 2011). The explanation of these disjunctions might be the very high precipitation in this part of eastern Congo, similar to that of Gabon, which was not known until recently satellite rainfall data became available (Deblauwe et al. 2016).

8. *Mendoncia rabiensis* Breteler & Wieringa, *sp. nov.* — Fig. 4; Map 8

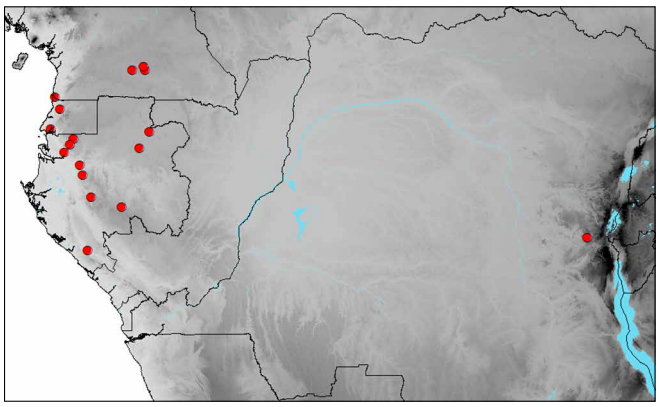
By its small leaves resembling *Mendoncia gilgiana* Benoist subsp. *gilgiana,* differing by its single-flowered inflorescences and by its indumentum of hispid hairs mixed with some stellate/branched hairs. — Type: *Schoenmaker 177* (holo WAG 2 sheets WAG0088063 & WAG0088064), Gabon, Ogooué-Maritime, Rabi-Kounga, c. S1°45' E9°57', 22 Nov. 1991.

Liana. Branchlets hispid mixed with some smaller, stellate and/or branched hairs, glabrescent and corky ribbed lengthwise when older. Leaves opposite: petiole semi-terete, grooved above, 6–12 mm long, hairy like branchlet; lamina ovate-elliptic, (4–)6–10 by (2–)3–4 cm rounded at base, acutely 0.5–1.5 cm acuminate at apex, sparsely pubescent both sides on midrib and the 3–4 pairs of main lateral nerves, the latter distinct beneath, glabrescent. Flowers axillary, solitary. *Pedicel* (in fruit) 20–25 mm long, hairy like branchlet. *Bracteoles* (in fruit) ovate-elliptic, c. 25 by 15 mm, palmately 4–5 nerved, strigose hispidulous mixed with stellate and/or branched hairs outside, glabrous inside. *Calyx* in fruit c. 2 mm long, glabrous. Corolla and stamens unknown. *Fruit* ovoid, 17 by 11 mm, glabrous.

Habitat & Distribution — Tropical rain forest in West Gabon. Altitude 0–100 m.



Map 6 Distribution of *Mendoncia lindaviana* (Gilg ex Lindau) Benoist.



Map 7 Distribution of *Mendoncia phytocrenoides* (Gilg ex Lindau) Benoist.

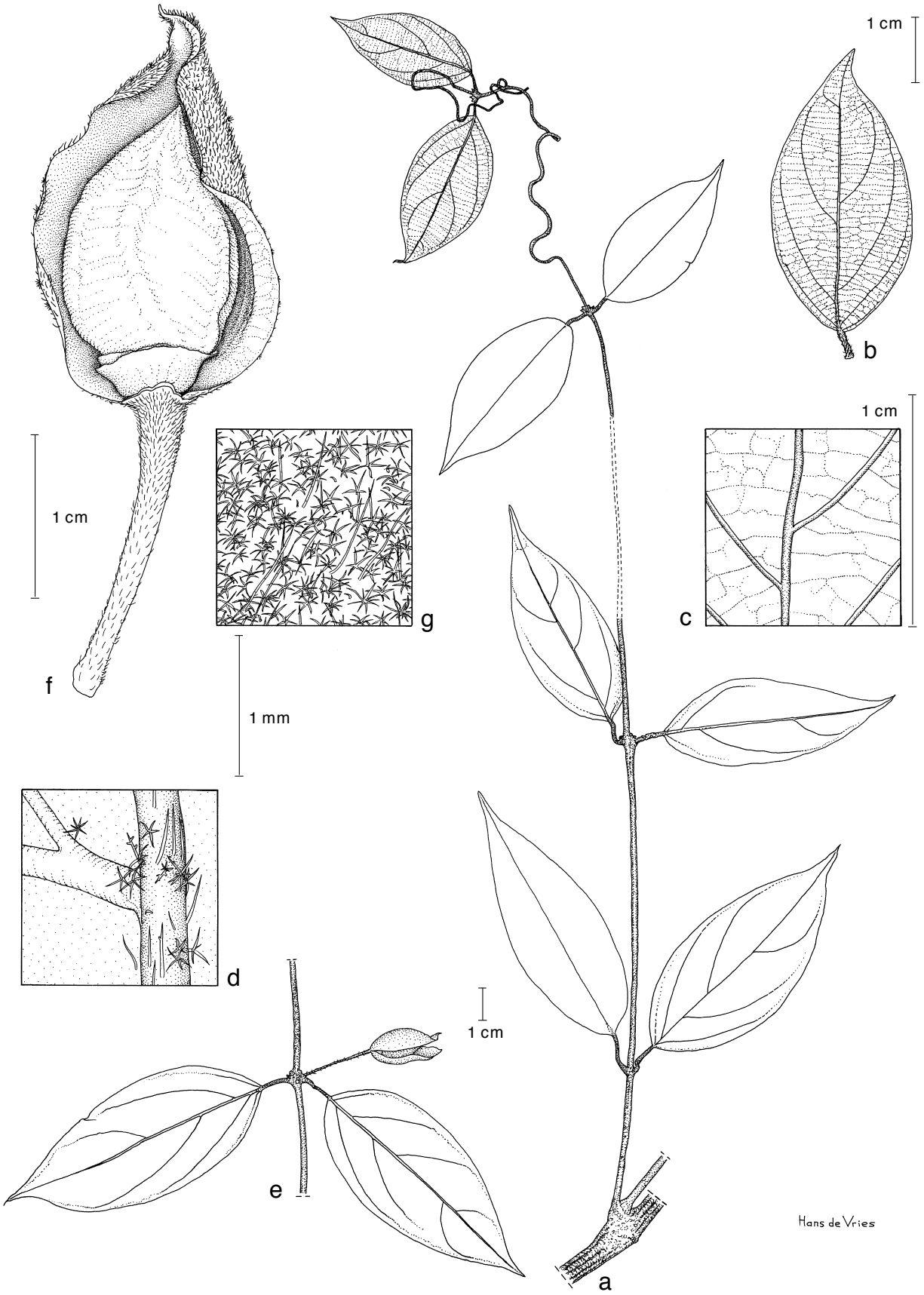
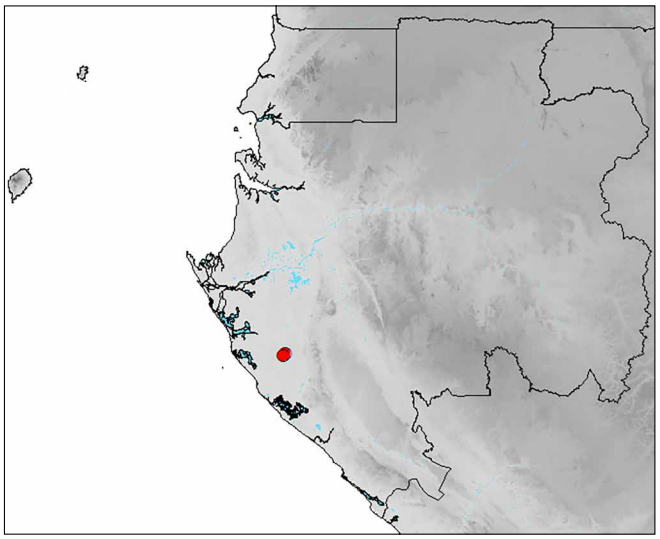


Fig. 4 *Mendoncia rabiensis* Breteler & Wieringa. a. Habit, leafy shoot; b. leaf, under side; c. detail of leaf lower surface; d: detail leaf lower surface at midrib with indumentum; e. leaf pair with young fruit; f. young fruit, one bracteole removed; g. detail of indumentum on bracteole (all: *J. Schoenmaker 177*, WAG). — Drawing by Hans de Vries.



Map 8 Distribution of *Mendoncia rabiensis* Breteler & Wieringa.

Additional specimen studied. Gabon, Ogooué-Maritime, *McPherson 15543* (K), Rabi-Kounga, c. S1°45' E9°57', 22 Nov. 1991.

Conservation status — *Mendoncia rabiensis* is only known from a single population with probably only a single individual sampled (see notes), in an area that is currently not formally protected. There is some logging in the area, but when Shell will abandon their oil exploitation (as is expected in the short term), and with the construction of a new road from Port-Gentil to the South, the area will be under more severe pressure by wood extraction and settlers. Therefore, the species is assessed as Critically Endangered (CR; 2a, b(ii,iii,v)).

Notes — *McPherson 15543* (K) resembles the holotype in all aspects. It has been collected on the same day, at the same locality, and with the same field notes: 'liana, bracts and fruits pale green'. We consider it likely the material is derived from the same plant.

Magnaghi & Daniel (2017) saw *McPherson 15543* in K bearing already a new annotation label of *M. rabiensis* by the first author and discuss why they think it fits *M. combretoides*. It indeed shares with that species relatively small leaves and branched trichomes, however, *M. combretoides* does not have simple fairly long hispid hairs as are found in *M. rabiensis*, and it usually has several flowers per axil where *M. rabiensis* has only one. According to Magnaghi & Daniel (2017) *M. combretoides* may have small simple appressed hairs as well, but we could not find these. Also, the difference in geography (Upper Guinea vs Gabon) should not easily be put aside.

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REFERENCES

Adam JG. 1981. Flore descriptive des Monts Nimba (Côte d'Ivoire, Guinée, Liberia) 5: 2032, planche 1031, Paris, Édition CNRS.

Bachman S, Moat J, Hill A, et al. 2011. Supporting Red List threat assessments with GeoCAT: Geospatial Conservation Assessment Tool. ZooKeys 150: 117–126. doi: https://doi.org/10.3897/zookeys.150.2109.

Baker JG. 1883. Contributions to the Flora of Madagascar Part II. Monopetalae. Journal of the Linnean Society, Botany 20: 159–236, pl. 24–37.

Benoist R. 1939 '1938'. Nouvelles Acanthacées africaines et malgaches. Bulletin de la Société Botanique de France 85: 678–686.

Benoist R. 1944. Contribution a la connaissance des Acanthacées africaines et malgaches. Notulae Systematicae 11, 4: 137–151.

Borg AJ. 2012. Evolutionary relationships in Thunbergioideae and other early branching lineages of Acanthaceae. Stockholm, Stockholm University. http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-71080.

Borg AJ, McDade LA, Schönenberger J. 2008. Molecular phylogenetics and morphological evolution of Thunbergioideae (Acanthaceae). Taxon 57: 811–822.

Breteler FJ. 1978. The African Dichapetalaceae IV. Mededelingen Landbouwhogeschool Wageningen 78–10.

Breteler FJ. 2003. The African genus Sorindeia (Anacardiaceae): A synoptic revision. Adansonia, sér. 3, 25, 1: 93–113.

Breteler FJ. 2012. Phyllanthaceae. In: Flore du Gabon 43: 1–107. Weikersheim, Margraf Publishers & Leiden, Backhuys Publishers.

Breteler FJ. 2014. Protomegabaria Hutch. (Phyllanthaceae): some observations concerning its morphology, taxonomy, and geography. Adansonia, sér. 3, 36, 1: 103–112.

Burkill IH. 1899. Afromendoncia (Acanthaceae). In: Oliver D (ed), Flora of Tropical Africa 5: 6. London, Reeve & Co.

Chevalier A. 1920. Exploration Botanique de l'Afrique Occidentale Francaise 1. Paris, Paul Lechevallier.

Deblauwe V, Droissart V, Bose R, et al. 2016. Remotely sensed temperature and precipitation data improve species distribution modelling in the tropics. Global Ecology and Biogeography 25, 4: 443–454.

Hawthorne W, Jongkind C. 2006. Woody plants of Western African forests. Kew, Kew Publishing, Royal Botanic Gardens.

Heine H. 1962. Tropical African Plants: XXVI, some West African Acanthaceae. Kew Bulletin 16, 2: 161–183.

Heine H. 1963. Acanthaceae. In: Hutchinson J, Dalziel JM (eds), Flora of West Tropical Africa, ed. 2, 2: 391–432. London, Crown Agents.

Heine H. 1966. Acanthaceae. In: Aubréville A (ed), Flore du Gabon 13: 1–250. Paris, Muséum National d'Histoire Naturelle.

IUCN. 2011. Species Survival Commission (2001) IUCN Red List categories and Criteria. Version 3.1. Gland, Switserland and Cambridge, U.K.

Leal ME, Sosef MSM. 2011. Turneraceae. In: Flore du Gabon 42: 87–90. Leiden, NCB Naturalis, NHN Leiden.

Lindau G. 1893. Acanthaceae Africanae I. Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 17: 88–113.

Lindau G. 1894. Acanthaceae Africanae II. Botanische Jahrbücher für Systematiek, Pflanzengeschichte und Pflanzengeographie 20: 1–76.

Magnaghi EB, Daniel TF. 2014. Three new species of Mendoncia (Acanthaceae) from Madagascar. Novon 23: 187–196.

Magnaghi EB, Daniel TF. 2017. Systematics of Mendoncia (Acanthaceae: Thunbergioideae) in the Paleotropics. Proceedings of the California Academy of Sciences, series 4, 64: 37–94.

Moore S. 1913. Acanthaceae. In: Rendle AB, Baker EG, Wernham HF, et al. (ed), Catalogue of the plants collected by Mr. & Mrs P.A. Talbot in the Oban District, South Nigeria: 73–90. London, Trustees of the British Museum.

Moore S. 1929. Alabastra Diversa XXXVI. Some new or rare African Acanthaceae. Journal of Botany 67: 225–231.

Pierre L. 1896. Sur le genre Lirayea de la tribu des Mendoncieés de la famille des Acanthacées. Bulletin du Muséum National d'Histoire Naturelle 2: 340–342.

INDEX OF EXSICCATES

Initials of collectors are only added for surnames that might be confusing in an African context; additional collectors are only printed in case this makes a separate series. After each collection number the first 3 characters of the species epithet is given, for subspecies followed by the first 3 of the subspecific name.

Adam 24131: com; 27577: com; 29700: gilocc – Aké Assi 5424: gilocc; 7047: gilocc – Auquier 2126: lin – Azizet Issembé 193: phy.

Badré 55: gilgil – Baldwin 6764: com; 9971: gilocc – Bamps 1517: gilgil – Bates 958: gilgil – Bequaert 1534: gilgil; 2275: gilgil – Bidault 900 bis: lin; 993: lin – Bidgood 4858: gilgil – Bissiengou 411: lin – Blomme 143: gilgil – Bokdam 4182: gilgil – Bolema 777: gilgil – Boussiengui Nongo 176: phy – Breteler 767: gilgil; 1383: gilgil; 1489: gilgil; 1496: gilgil; 1790: gilgil; 1834: gilgil; 1858: lin; 1953: gilgil; 2620: lin; 5791: lin; 8106: lin; 10386: lin; 10531: phy; 12893: phy; 13032: lin; 14049: flo – Breteler & J.J.F.E. de Wilde 234: lin; 723: lin – E. Brown 314: gilgil – Bujo Dhego 821: lin – Bytebier 3293: gilgil.

Cable 3884: cam – Callens 2689: gilgil; 3436: gilgil – Carvalho 5376: gilgil; 5656: phy – Champluvier 6180: lin – Chandler 1898: gilgil – Chatelain 712: com – Cheek 5660: gilgil; 7092: gilgil; 7487: gilgil; 9366: gilgil; 13865:

gilocc – Chevalier 19600: com; 19745: com – Christiaensen 1847: gilgil – Claessens 269: gilgil; 668: lin – Compère 228: lin – Corthay 201: com – Cremers 556 A!: com.

De Giorgi 751: gilgil; 858: gilgil – De Koning 1163a: com; 2049: com; 4666: com; 5115: com; 5907: com; 6662: com; 6767: com; 6779: com – De Kruif 688: com; 739: gilgil – J.J.F.E. de Wilde 7519: gilgil; 7888: gilgil – W.J.J.O. de Wilde 1190: gilgil – De Wulf 135: gilgil – Dorr 4241: lin – Dümmer 5568: gilgil.

Etuge 2515: gilgil; 2769: cam – Evrard 687: gilgil; 749: lin; 1280: gilgil; 2830: gilgil; 3055: gilgil; 4173: gilgil.

Farron 566: gilocc; 958: com; 1288: com – J.M. Fay 8501: gilgil; 8805: gilgil – Flamigni 98: lin – Florence 812: lin – Floret 1368: lin.

Geerling 757: com – Gentry 33450: lin – Gérard 2113: gilgil; 2825: gilgil; 2863: lin; 3286: gilgil; 3305: lin; 4001: gilgil; 4155: gilgil; 4567: gilgil; 4576: gilgil; 5368: gilgil; 5537: lin – R.G.A. Germain 4883: lin; 5297: gilgil; 8620: gilgil; 8697: lin; 8757: lin – G.C.C. Gilbert 2432: gilgil – M.G. Gilbert 6886: gilgil – Gille 261: gilgil – Goman 97: gilocc – V.G. Goossens 3036: lin; 3038: lin – Gutzwiller 1587: gilgil; 2274: gilgil; 2616: gilgil; 2791: gilgil; 3086: gilgil; 3314: gilgil.

J.B. Hall GC 39461: gilocc – N. Hallé (Ivory Coast series) 796: com – N. Hallé 878: lin; 892: phy; 1078: lin; 2595: gilgil; 2599: lin; 2654: phy; 2655: lin; 3005: lin; 3041: lin; 3240: lin; 3358: phy; 3393: lin – N. Hallé & Le Thomas 20: lin – D.J. Harris 2576: gilgil; 3523: gilgil; 4070: gilgil; 5029: lin; 5047: gilgil; 5393: gilgil – Hart 727: lin; 925: lin – Hladik 1396: lin; 2485: lin.

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M'Boungou 421: lin – Madidi 332: lin – Mann 1839: phy – McPherson 15543: rab; 17918: lin – Menzies 293: com; 345: com – Mildbraed 3820: gilgil – Morton 3082: com – Moutsamboté 6458: lin.

Ndolo Ebika 198: gilgil; 906: gilgil – Ngok Banak 155: lin; 222: lin – Nguema Miyono 1279: lin – Nguembou Kamgang 181: phy – Nimba Botanic Team JC 601 A: com – Nkongmeneck 1478: lin – Nsola 1115: gilgil – Nzooh Dongmo 553: gilgil.

J. Osborne 118: cam; 166: gilgil – Overlaet 1046: gilgil; 1212: gilgil.

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Reygaert 214: lin; 837: gilgil; 1367: gilgil; 1426: gilgil – Rouw 537: com – Rwaburindore 3814: gilgil.

R.G. Sangster 15: gilgil – Schoenmaker 177: rab; 188: lin – Schönenberger 1: gilgil; 50: cam; 51: gilgil – Sidwell 384: gilgil – Sita 5050: lin – Sonké 1399: phy – Soyaux 156: lin – Strijk 274: lin; 359: phy.

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Yafunga 194: gilgil – Yallah 122: com.

Zenker 965: lin; 1801: lin; 3124: lin.