EDINBURGH JOURNAL OF BOTANY 65 (3): 407–424 (2008)

doi:10.1017/S0960428608005040

NOVITATES GABONENSES 68. THE GENUS *CASSIPOUREA* (*RHIZOPHORACEAE*) IN CONTINENTAL TROPICAL AFRICA WITH EMPHASIS ON GABON: SUBGENERIC DIVISION, IDENTIFICATION KEYS, AND DESCRIPTION OF TWO NEW SPECIES

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Cassipourea (*Rhizophoraceae*) is represented in Gabon by 11 species, of which *C. nana* Breteler and *C. ndambiana* Breteler are described as new and *C. carringtoniana* Mendes, *C. gummiflua* Tul. and *C. ruwensorensis* (Engl.) Alston are reported from this country for the first time. The subgeneric classification is discussed. An adapted key to the subgenera and a key to the Gabonese species is presented. A synopsis of the subgenera and of the Gabonese species is also given. The new species and *Cassipourea carringtoniana* are fully illustrated. A few illustrations of some other species to elucidate characters of the subgenera are provided.

Keywords. *Cassipourea*, continental tropical Africa, Gabon, new species, *Rhizophoraceae*, subgeneric classification.

Introduction

The genus *Cassipourea* Aubl. (*Rhizophoraceae*) has been studied prior to a treatment of the family for the Flora of Gabon which has very limited space for detailed taxonomic and nomenclatural information. In the introduction to the publication of the new species *Cassipourea alternifolia* Breteler from Cameroon (Breteler, 2007) a brief overview of the genus was given. For this paper, the taxonomic study of the genus in tropical continental Africa was intensified in order to delimitate the species present in Gabon and to classify them in the subgeneric division of Floret (1988). The seven subgenera he distinguished are maintained but his key to these subgenera does not work when one considers the placement of these species: *Cassipourea carringtoniana* Mendes, *C. korupensis* Kenfack & Sainge and *C. letestui* Pellegr. Other flower characters are emphasised. As a consequence two of these three species are transferred to other subgenera. The variation at the specific level is most apparent in the widespread *Cassipourea congoensis* DC. Within the framework of the

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flora treatment for Gabon, however, this variation is dealt with in a restricted way that meets the needs of the Flora.

Subgeneric Classification

Key to the subgenera

1a. Anthers hairy ____ 2
1b. Anthers glabrous ____ 4

2a. Stamens at least three times as many as calyx lobes (Fig. 1E) ____ **4. Lasiopetalum**
2b. Stamens twice as many as calyx lobes ____ 3

3a. Petal lobes thread-like (Fig. 1C) ____ **3. Dinklageoweihea**
3b. Petal lobes ribbon-like (Fig. 1F) ____ **7. Zenkeroweihea**

4a. Petals subdivided in hairy, thread-like lobes (Fig. 1B) ____ **1. Cassipourea**
4b. Petals subdivided in ribbons (Fig. 1D) or in glabrous thread-like lobes (Fig. 1A) ____ 5

5a. Stamens twice as many as calyx lobes ____ **2. Dactylopetalum**
5b. Stamens at least three times as many as calyx lobes ____ 6

6a. Anthers apiculate ____ **5. Pumiloweihea**
6b. Anthers not apiculate ____ **6. Weihea**

Discussion

Compared with Floret (1988) this key is much simplified and restricted to the features of two elements: the petals and the stamens. These are presented diagrammatically in Table 1.

The inside of the calyx, either glabrous or glabrescent vs. having a dense and silky, persistent indumentum, is used by Floret as the principal character in his key. This system is abandoned here. In Floret's key a species with such a silky indumentum (e.g. *Cassipourea carringtoniana*) does not fit in *Cassipourea* subgenus *Weihea*, where it belongs with regard to all other characters such as the shape of the petals and the number of stamens. Also, based on its calyx indumentum, *Cassipourea letestui* is classified, as a diplostemonous exception, in *Cassipourea* subgenus *Lasiopetalum* even though on other characters it fits much better in *Cassipourea* subgenus

Fig. 1. *Cassipourea* flowers of six subgenera. A, 1–2: *C. barteri* (Hook.f. ex Oliv.) Engl. & Brehmer, subgenus *Dactylopetalum*; B, 1–3: *C. plumosa* (Oliv.) Alston, subgenus *Cassipourea*; C, 1–3: *C. dinklagei* (Engl.) Alston, subgenus *Dinklageoweihea*; D: *C. carringtoniana* Mendes, subgenus *Weihea*; E, 1–2: *C. ndambiana* Breteler, subgenus *Lasiopetalum*; F, 1–3: *C. nana* Breteler, subgenus *Zenkeroweihea* (A, *A.M. Louis* 1727; B, *A.M. Louis* 1822; C, *Bos* 7164; D, *Wieringa* 1281; E, *Breteler et al.* 13274; F, *J.J. de Wilde et al.* 8985). Drawing by H. de Vries.

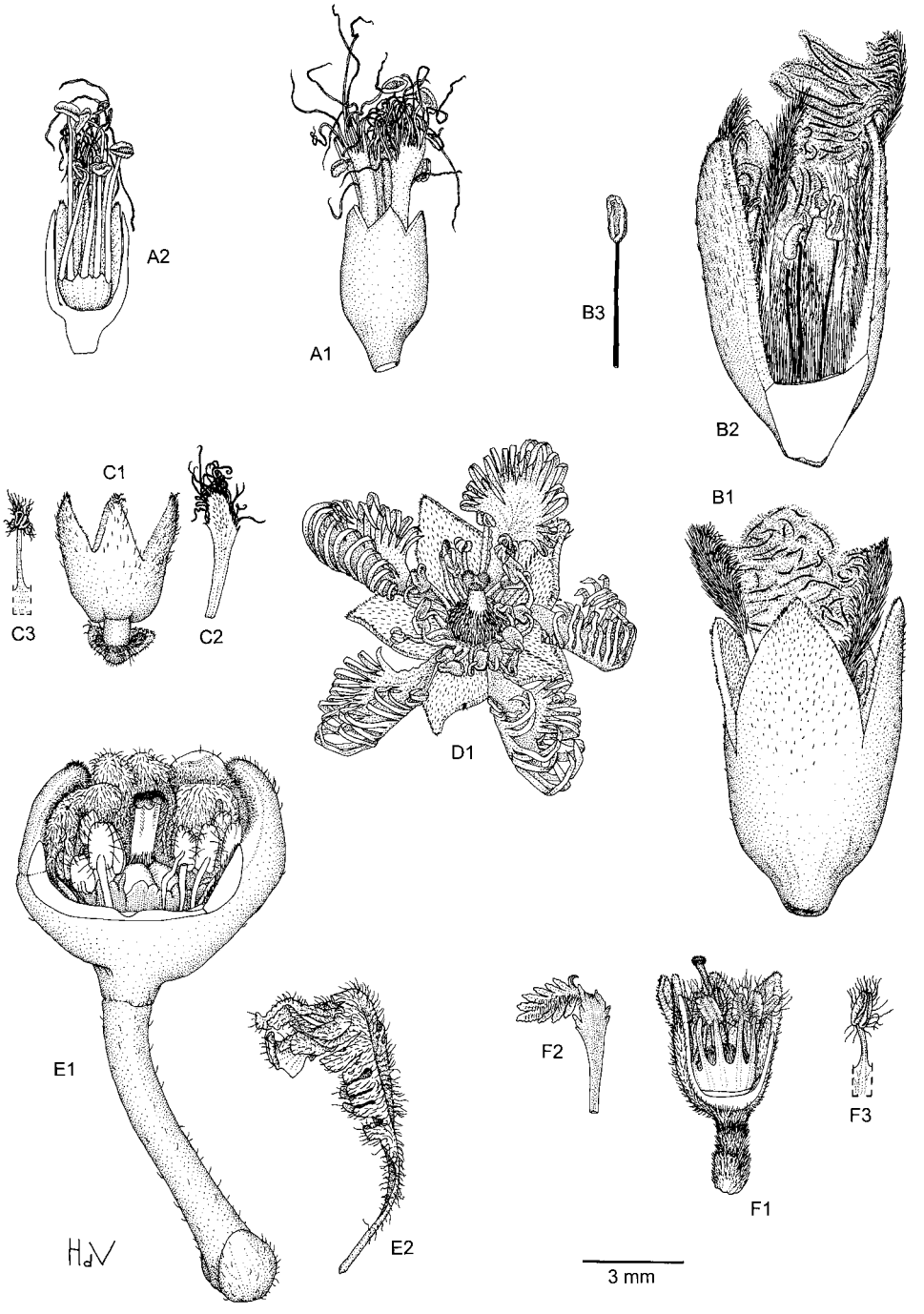

A2
A1
B3
B2
C1
C3
C2
D1
B1
E1
E2
F2
F1
F3
3 mm

TABLE 1. Diagrammatic presentation of the main characters of the subgenera of *Cassipourea*

Subgenera in alphabetical order	Petal lobes				Stamen number		Anthers		Number of species in continental tropical Africa
	Threads	Ribbons	Glabrous	Hairy	$2n$	$\geq 3n$	Glabrous	Hairy	
1. *Cassipourea*	x	–	–	x	x	x	x	–	3
2. *Dactylopetalum*	x	–	x	–	x	–	x	–	3
3. *Dinklageoweihea*	x	–	x	–	x	–	–	x	1
4. *Lasiopetalum*	–	x	–	x	–	x	–	x	4–5
5. *Pumiloweihea*	–	x	x	–	–	x	x	–	1
6. *Weihea*	x	x	x	–	–	x	x	–	7–21
7. *Zenkeroweihea*	–	x	x	x	x	–	–	x	3

Zenkeroweihea. It is even closely related to the type species of *Cassipourea* subgenus *Zenkeroweihea*, *C. zenkeri* (Engl.) Alston. The shape of the calyx, campanulate (i.e. narrow and with short lobes) or wider with long lobes, is also abandoned as a key character. Based on Alston's (1925) key, and using the same calyx characteristics as in Floret's key, Mendes (1962) classified his *Cassipourea carringtoniana* in *Cassipourea* subgenus *Cassipourea*. However, based on its petals, it belongs to *Cassipourea* subgenus *Weihea*.

The petals provide useful characters for subgeneric classification. However, they are often missing on flowering specimens as they usually shed soon after anthesis. Also, the distinction between ribbons and threads is not always clear-cut in *Cassipourea* subgenus *Weihea*. From Table 1 it may be concluded that *Cassipourea korupensis* with a large number of stamens with hairy anthers, but published without knowing its petals, belongs to *Cassipourea* subgenus *Lasiopetalum*, thereby confirming the classification by its authors. One could predict that its petal lobes will be hairy and ribbon-like.

The number of stamens is more or less constant (deviation ± 1) in the diplostemonous species but is usually variable in species with a higher multiple of stamens. In the widespread *Cassipourea congoensis* DC. of *Cassipourea* subgenus *Weihea* most specimens have a stamen multiple of four, but five times as many stamens as calyx lobes may occur. In the closely related *Cassipourea ruwensorensis* (Engl.) Alston the multiple is often five but, on account of the classification by Lewis (1956), it must be accepted that a multiple of four also occurs. For *Cassipourea mollis* (R.E.Fr.) Alston, also a species of *Cassipourea* subgenus *Weihea*, Lewis (1956) reports up to (26–)35–40(–45) stamens. For this species the multiple varies between seven and nine. This variation may sometimes be seen within a single flower, from one sepal to the other. In *Cassipourea ndambiana* Breteler and in *C. schizocalyx* C.H.Wright, both belonging to *Cassipourea* subgenus *Lasiopetalum*, the high number of stamens shows more or less the same variation as in *C. mollis*, varying between specimens but also between flowers of a single specimen. It seems that the variation results from the development of a variable number of staminodes into perfect stamens.

According to most authors (e.g. Bentham & Hooker, 1862; Oliver, 1871; Engler, 1907; Pellegrin, 1952; Lewis, 1956; Liben, 1987; Floret, 1988) the flowers of *Cassipourea* have a disc on which the filaments are inserted. This disc, also called a collar (Alston, 1925), may be adnate to the calyx tube, and is, according to authors, present in all species that are treated. Nevertheless this collar or disc is indistinct, as Floret (1982) described it, for *Cassipourea malosana* (Baker) Alston (p. 471) and for *C. leptoneura* Floret (p. 475). It is unclear why this collar at the base of the stamens, whether being distinct or not, is called a disc and not a staminal tube. The occurrence of filaments united at the base is quite common, especially so when their number is twice the number of sepals and petals or higher. Within a genus, whether the stamens are slightly united at the base or free is mostly treated as a character at the specific or infraspecific level. Whether a disc is present or absent is usually treated above this level. Floret (1974) described the androecium for his new genus of *Rhizophoraceae*,

Comiphyton, as follows: 'staminibus 8, exsertis, in disco 8 lobato, alternatim insertis', following the usual concept, but also as 'collerette staminal' (p. 504). When this disc is more elongated as in the related genus *Anopyxis* it is called a lobed staminal tube with sessile anthers (Liben, 1987) and the disc has disappeared. In the new species *Cassipourea nana* Breteler, described in this paper, the stamens are united at the base and there is no disc whatsoever (Fig. 3D). To describe this as a disc with the filaments inserted on it would be absurd.

The ovary is 2-locular in species of *Cassipourea* subgenus *Dactylopetalum* and 2–3-locular in species of the subgenera *Cassipourea* and *Zenkeroweihea*. It is 3-locular in the single species of *Cassipourea* subgenus *Dinklageoweihea* and 3–5-locular in the remaining subgenera. It may be glabrous or variously covered by hairs, sometimes even very variable within a single species as in *Cassipourea congoensis*. (See also Lewis (1955: 159) concerning *Cassipourea barteri* (Hook.f. ex Oliv.) Engl. & Brehmer and ibid.: 144 concerning *C. malosana*.)

Mature fruits are often missing. The available fruits have been studied but not thoroughly.

Synopsis of the Subgenera of *Cassipourea*

1. Subgenus **Cassipourea**. – Type: *Cassipourea guianensis* Aubl., Pl. Guian. 1: 529, t.211 (1775).

Distribution. Africa (Upper and Lower Guinea) and Latin America.

Number of species. 10–20 (25 names are published). Alston (1925) recognises 9 species; 11 species have been published since. Prance *et al.* (1975) treat 3 species for Amazonia. The following species are African: *Cassipourea afzelii* (Oliv.) Alston, *Cassipourea eketensis* Baker f., *Cassipourea plumosa* (Oliv.) Alston. The first two species seem to be closely related.

2. Subgenus **Dactylopetalum** (Benth.) Alston, Bull. Misc. Inform. Kew 1925: 271 (1925). – *Dactylopetalum* Benth., J. Linn. Soc. 3: 79 (1858). – Type: *Dactylopetalum sessiliflorum* Benth. (= *Cassipourea gummiflua* Tul.).

Distribution. Continental Africa, Madagascar and the Mascarenes.

Number of species. c.6. For continental Africa Lewis (1955), who grouped many names under *Cassipourea gummiflua*, is followed. The following remain: *Cassipourea barteri* (Hook.f. ex Oliv.) Engl. & Brehmer, *Cassipourea gummiflua* Tul., *Cassipourea nialatou* Aubrév. & Pellegr.

Notes. In the *Flore de Madagascar* (Arènes, 1954) *Dactylopetalum* is treated at the original, generic level. Schatz (2001) reduced it to a synonym of *Cassipourea*. Floret (1976: 44) observed that 'la réhabilitation du genre de Bentham est à envisager', but in his treatment of the subgenera from 1988 he maintained it at the subgeneric level.

In his cladogram (fig. 5) in the latter paper, however, it is classified close to the genera *Comiphyton* and *Blepharistemma*, quite distantly from the clade with the other subgenera. This classification of *Dactylopetalum* in a clade separate from the other subgenera is confirmed by Schwarzbach & Ricklefs (2000). In this study, however, only two species of the subgenera *Cassipourea* and *Dactylopetalum* and one of the subgenus *Weihea* are taken into account. *Comiphyton* is not studied. Nevertheless a rehabilitation of Bentham's genus may be considered on other grounds such as the presence of gum (not observed elsewhere in the genus *Cassipourea*) and the small, deltoid, appressed stipules. Both characters have, so far, not been taken into account in any study.

3. Subgenus **Dinklageoweihea** (Engl.) Floret, Bull. Mus. Natl. Hist. Nat., B, Adansonia 10: 36 (1988). – *Weihea* Spreng. section *Dinklageoweihea* Engl., Pflanzenw. Afr. 3(2): 672 (1921). – Type and only species: *Weihea dinklagei* Engl. (= *Cassipourea dinklagei* (Engl.) Alston).

Distribution. Southern Cameroon.

4. Subgenus **Lasiopetalum** Alston, Bull. Misc. Inform. Kew 1925: 263 (1925). – *Weihea* section *Cassipoureopsis* Engl., Pflanzenw. Afr. 3(2): 672 (1921). – Type: *Weihea sericea* (Engl.) Engl. (lecto, designated here) (= *Cassipourea schizocalyx* C.H.Wright).

Distribution. Continental Africa (Upper and Lower Guinea, Congolia).

Number of species. 4–5: *Cassipourea firestoneana* Hutch. & Dalzell ex Cooper & Record, *Cassipourea hiotou* Aubrév. & Pellegr. (= ?*Cassipourea firestoneana*), *Cassipourea korupensis* Kenfack & Sainge, *Cassipourea ndambiana* Breteler, *Cassipourea schizocalyx* C.H.Wright.

5. Subgenus **Pumiloweihea** Floret, Bull. Mus. Natl. Hist. Nat., B, Adansonia 10: 42 (1988). – Type and only species: *Cassipourea pumila* Floret.

Distribution. Gabon.

6. Subgenus **Weihea** (Spreng.) Alston, Bull. Misc. Inform. Kew 1925: 250 (1925). – *Weihea* Spreng. section *Euweihea* Engl., Pflanzenw. Afr. 3(2): 665 (1921). – Type: *Weihea madagascariensis* (Poir.) Spreng. (as *W. madagascarensis*) (= *Cassipourea madagascariensis* (Poir.) DC. (see note)).

Distribution. Tropical Africa, Madagascar, the Mascarenes, South India, and Sri Lanka.

Number of species. The number of species in tropical Africa is unknown, but when one considers the number of species treated in the different national and regional Floras, together with the new species published thereafter, it is 21. Of these only seven species can be satisfactorily distinguished and are presented in the following key.

1a. Petal lobes 10 or fewer ____ 2
1b. Petal lobes 12 or more ____ 4

2a. Inflorescence shortly (1–3 mm long) but distinctly pedunculate; pedicel (5–)7–11(–12) mm long; sepal lobes 5–7 mm long ____ 4. *C. leptoneura*
2b. Inflorescence sessile or nearly so; pedicel ≤ 5mm long; sepal lobes up to 5(–7) mm long ____ 3

3a. Calyx glabrous inside or nearly so; ovary and fruit glabrous or with a few hairs apically near base of style, and/or along the sutures or hairy in upper part ____ 3. *C. congoensis*
3b. Calyx hairy inside; ovary completely hairy, usually less densely so in fruit ____ 7. *C. ruwensorensis*

4a. Stamens 7–9 times as many as calyx lobes ____ 5. *C. mollis*
4b. Stamens 4 times as many as calyx lobes ____ 5

5a. Calyx densely silky felted inside ____ 2. *C. carringtoniana*
5b. Calyx appressed-puberulous to glabrous or glabrescent inside ____ 6

6a. Inflorescence distinctly stalked, distinctly dichotomously branched; petal lobes thread-like; leaves always opposite ____ 6. *C. ndando*
6b. Inflorescence sessile or nearly so, indistinctly branched, few-flowered; petal lobes ribbon-like; leaves usually alternate on the plagiotropic branches ____ 1. *C. alternifolia*

Notes. All species of this subgenus accepted in various Floras but not mentioned in this key will key out under *Cassipourea congoensis*. This makes it a very variable species but with some constant elements such as the petals with 10 lobes or fewer and nearly always with four times as many stamens as sepal lobes. The characters used to separate it from *Cassipourea ruwensorensis* are rather weak (see also Lewis, 1956: 14). These characters, and the frequently used shape of the ovary, may be too variable to be used for segregating species (see also Lewis, 1955: 144, 146, concerning *Cassipourea malosana* (Baker) Alston). The distinction between *Cassipourea leptoneura* and *C. congoensis* is also not very clear-cut. A more thorough study will be needed to see whether *Cassipourea* subgenus *Weihea* in tropical continental Africa is indeed restricted to the seven species of this key. Lewis (1955: 147) observed the following: 'It is the author's unconfirmed belief that among the ''species'' of the subgenus *Weihea* there lurks a large species complex as is postulated below in the subgenus *Dactylopetalum*'.

The authorship of the combinations *Weihea madagascariensis* and *Cassipourea madagascariensis* has been changed. In the respective protologues Sprengel (1825) and De Candolle (1828) refer to Du Petit Thouars' publication (1806) of the generic name *Richaeia* but no reference was made to the combination *Richeia madagascariensis* Poiret from 1816, also referring back to Du Petit Thouars' name and published with a description. Poiret's name has to be taken as the basionym of the combinations by Sprengel and De Candolle.

7. Subgenus **Zenkeroweihea** (Engl.) Floret, Bull. Mus. Natl. Hist. Nat., B, Adansonia 10: 39 (1988). – *Weihea* Spreng. sect. *Zenkeroweihea* Engl., Pflanzenw. Afr. 3(2): 672 (1921). – Type: *Weihea zenkeri* Engl. (= *Cassipourea zenkeri* (Engl.) Alston).

Distribution. Africa (Lower Guinea).

Number of species. 3: *Cassipourea letestui* Pellegr., *Cassipourea nana* Breteler, *Cassipourea zenkeri* (Engl.) Alston.

Key to the species in Gabon

1a. Stamens twice as many as calyx lobes _____ 2
1b. Stamens at least three times as many as calyx lobes _____ 5

2a. Anthers hairy (subgenus *Zenkeroweihea*) _____ 3
2b. Anthers glabrous (subgenus *Dactylopetalum*) _____ 4

3a. Midrib of leaves glabrous above or nearly so; pedicels 7–15 mm long _____ **5. C. letestui**
3b. Midrib of leaves strigose above (Fig. 3B); pedicels c.1 mm long _____ **6. C. nana**

4a. Large shrub or small tree of coastal areas with swollen nodes; ovary pubescent _____ **1. C. barteri**
4b. Inland forest tree; nodes usually not swollen; ovary usually glabrous _____ **4. C. gummiflua**

5a. Anthers hairy (subgenus *Lasiopetalum*) _____ 6
5b. Anthers glabrous _____ 7

6a. Ovary glabrous, 3–5-locular; fruit glabrous, deeply sulcate _____ **7. C. ndambiana**
6b. Ovary velutinous, 3-locular; fruit hairy, not deeply sulcate _____ **11. C. schizocalyx**

7a. Calyx lobes 4, slightly shorter than the calyx tube; petal lobes hairy, thread-like _____ **8. C. plumosa**
7b. Calyx lobes (4–)5(–6), at least as long as the calyx tube; petal lobes glabrous, ribbon- or thread-like _____ 8

8a. Anthers apiculate (subgenus *Pumiloweihea*) _____ **9. C. pumila**
8b. Anthers not apiculate (subgenus *Weihea*) _____ 9

9a. Sepals densely silky hairy inside; petal lobes more than 15; ovary appressed-puberulous; style c.1 mm long _____ **2. C. carringtoniana**
9b. Sepals glabrous to subappressed-hairy inside, not densely silky; petal lobes 10 or fewer; ovary glabrous to hirsute-strigose; style ≥ 3 mm long _____ 10

10a. Calyx glabrous inside or nearly so; ovary and fruit glabrous or with a few hairs apically near base of style, and/or along the sutures or hairy in upper part ___ _____ **3. C. congoensis**
10b. Calyx hairy inside; ovary completely hairy, usually less densely so in fruit ___ _____ **10. C. ruwensorensis**

Synopsis of the Gabonese Species of *Cassipourea*

1. Cassipourea barteri (Hook.f. ex Oliv.) Engl. & Brehmer, Bot. Jahrb. Syst. 54: 369 (1917), as *Cassipourea barteri* (Hook.f.) N.E.Br. (see note). – *Dactylopetalum barteri* Hook.f. ex Oliv., Fl. Trop. Afr. 2: 421 (1871). – Type: Nigeria, Nun R., 1857–1859, *Barter* 2133 (lecto, designated here, K!; iso U!).

Note. Lewis (1955: 159) noted about this species that it might well be considered as a subspecies of *Cassipourea gummiflua* Tul. Its authorship is usually given as '(Hook.f. ex Oliv.) N.E.Br.' or '(Hook.f.) N.E.Br.'. However, N.E. Brown (1894) never made this combination, he only considered that the species of *Dactylopetalum* should be transferred to *Cassipourea*. The first authors who used this combination were Engler & von Brehmer in 1917, although referring it to N.E. Brown.

2. Cassipourea carringtoniana Mendes, Trab. Centro Bot. Junta Invest. Ultramar 1: 15 (1962); Consp. Fl. Angol. 4: 37 (1970). – Type: Angola, Cabinda, Buco Zau, 9 viii 1916, *Gossweiler* 6572 (holo COI!; iso BM!, LISC!). **Fig. 2.**

Note. Formerly known only from the type locality but recently also found in NW Congo-Brazzaville (*Sita* 3742 (P!)) and in SW Gabon (*Harris et al.* 8341 (WAG!), *Mouandza* 301 (WAG!), *Wieringa* 1281 (P!, WAG!), *Wieringa & Haegens* 2599 (WAG!)).

3. Cassipourea congoensis DC., Prodr. 3: 34 (1828). – Type: Angola or Congo-Kinshasa, Congo R., *Chr. Smith* s.n. (holo BM, not found; iso C?, LE?, MO?).

Notes. This is the most common and also the most widespread species of the African continent. Therefore, it might also be the most variable species (see notes under *Cassipourea* subgenus *Weihea*). Usually this species is given with the author names 'R.Br. ex DC.'. This is not correct as Robert Brown (1818) never used this combination. He referred to a new species of *Legnotis* but did not publish the

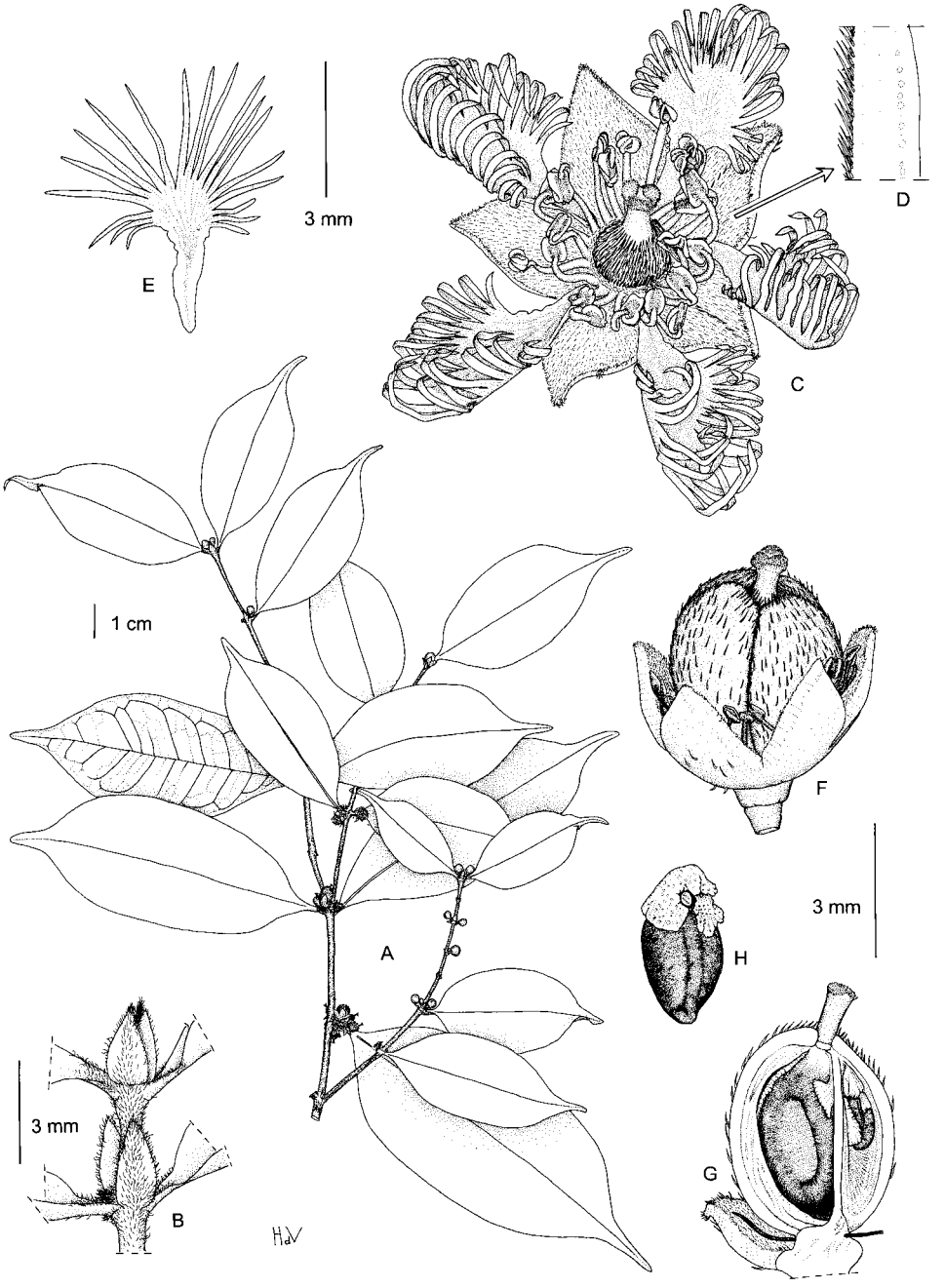


FIG. 2. *Cassipourea carringtoniana* Mendes. A, flowering branch; B, apical part of shoot showing stipules; C, flower; D, indumentum of the calyx inside; E, petal; F, immature fruit; G, immature fruit in longitudinal section; H, seed (A–C, E–H, *Wieringa* 1281; D, *Mouandza* 301). Drawing by H. de Vries.

combination. It is this *Legnotis* species that De Candolle named *Cassipourea congoensis*. I have followed Lewis (1956) and Mendes (1970) who attributed this name to De Candolle only. As regards the origin of the type, it is known only that it was collected by Smith on the side of the Congo River, but in which country now bordering that river is not known.

The specimens *Le Testu* 7926 and 8042, paratypes of, respectively, *Cassipourea acuminata* Liben and *C. louisii* Liben, are placed under *C. congoensis*. The two specimens cannot be distinguished from other *Cassipourea congoensis* material from Gabon.

4. Cassipourea gummiflua Tul., Ann. Sci. Nat., Bot., sér. 4, 6: 123 (1856); Lewis, Kew Bull. 10: 147 (1955). – Type: Madagascar, Nossi Bé, Crête de Loucoubé, iii 1851, *Boivin* s.n. (holo P; iso K).

Note. In continental tropical Africa this forest species is known from West, Central and East Africa. I have followed Lewis (1955) as regards the synonymy of this species but without distinguishing varieties.

5. Cassipourea letestui Pellegr., Not. Syst. 14(4): 296 (1952); Bull. Mus. Natl. Hist. Nat., B, Adansonia 10: 30 (1988). – Type: Gabon, region de Lastoursville, Sacamicanda, 9 xii 1929, *Le Testu* 7752 (holo P!; iso BM!, WAG!).

Note. Only known from five collections from Central Gabon.

6. Cassipourea nana Breteler, **sp. nov. Fig. 3.**
Cassipoureae pumilae Floret habitu similis, sed ab ea differt floribus 10 antheras pilosas non apiculatas et ovarium 2-loculare praebentibus. – Type: Gabon, Doudou Mts., 60 km WNW of Doussala, 27 xi 1986, *J.J. de Wilde, Arends & de Bruijn* 8985 (holo WAG!; iso P!).

Shrublet c.50 cm tall with densely appressed pubescent branchlets. *Stipules* narrowly triangular, 3–4 × 1–1.5 mm, appressed pubescent outside, glabrous inside. *Leaves*: petiole subterete, grooved above, 2–5(–7) mm long, hairy as on branchlets; lamina thin, papery to herbaceous, narrowly elliptic, (2.5–)3–4 times as long as wide, 7–11 × 2–3 cm, rounded at base, acute to acuminate at apex, the acumen 0.5–1 cm long, glabrous above except for the prominent, strigose midrib, beneath sparsely subappressed pubescent mainly on the prominent midrib and the slightly prominent, main lateral nerves, these 7–9 pairs, margin entire, strigose, glabrescent. *Flowers* 5-merous, axillary, arranged in a 1–2(–3)-flowered, compact, shortly pedunculate, pubescent inflorescence. *Bracts* and bracteoles ovate-triangular, 1–2 mm long. *Pedicel* 1–2 mm long, the part above the articulation < 0.5 mm long. *Calyx* pale-green, tubular, 3.5–4 mm long, c.3 mm wide, appressed puberulous outside, sparsely so inside; lobes ± erect, triangular, 1 mm long. *Petals* oblanceolate in outline,

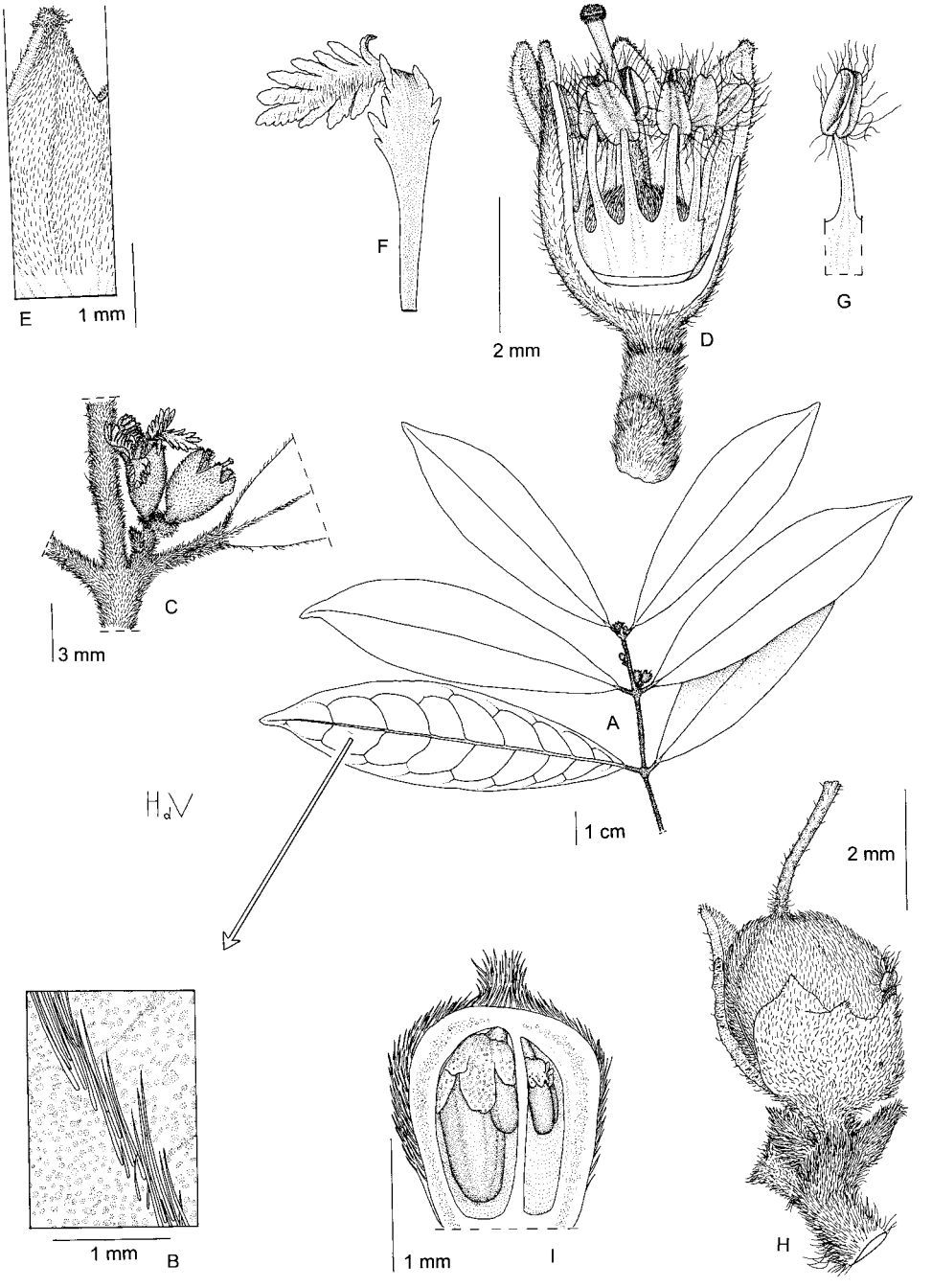


FIG. 3. *Cassipourea nana* Breteler. A, flowering branchlet; B, detail of midrib indumentum of leaf upperside; C, leaf axil with flowers; D, flower, without petals, one sepal removed; E, detail of sepal inside; F, petal; G, stamen; H, immature fruit; I, immature fruit cut lengthwise. After *J.J. de Wilde et al.* 8985. Drawing by H. de Vries.

5–6 × c.1 mm, pinnately lobed in upper two-thirds, sparsely appressed puberulous, lobes ribbon-like. *Stamens* 10, 2.5–3.5 mm long, united at base for 0.5–1 mm; filaments glabrous; anthers c.1 mm long, sparsely long-hairy. *Pistil* 4–4.5 mm long, subappressed puberulous. *Ovary* subglobose, 1–1.5 mm long, bilocular. *Immature fruit* subellipsoid, c.4 × 3 mm, sparsely appressed puberulous.

Distribution. Gabon; known only from the type collection.

Habitat and ecology. In undergrowth of primary rain forest; altitude c.200 m.

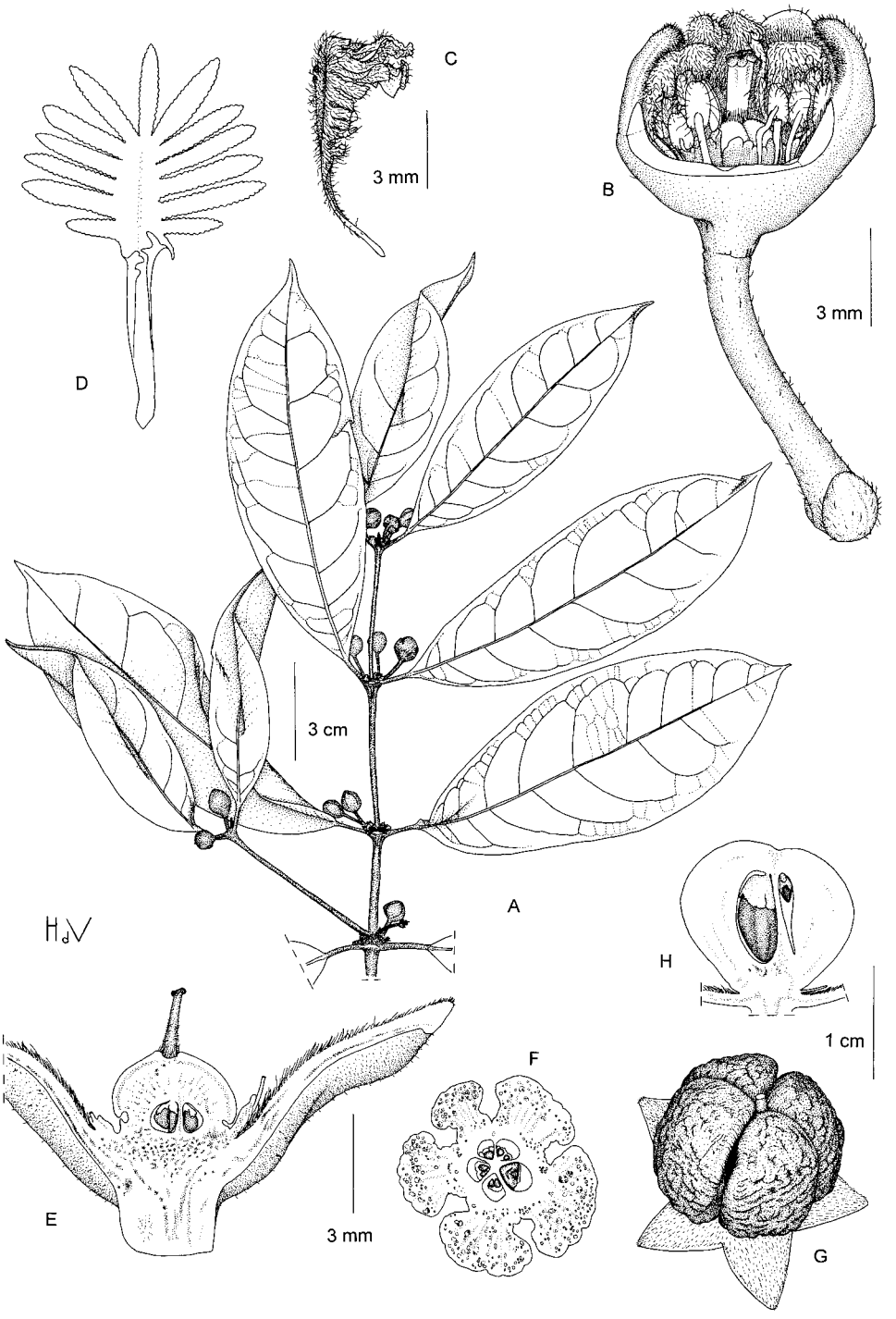
7. Cassipourea ndambiana Breteler, **sp. nov. Fig. 4.**

Cassipourea mezilii Floret, nomen in sched., *Mezili* 129 in Herb. Paris.

Cassipourea schizocalycis C.H.Wright maxime similis amplitudine et forma florum, sed ab ea differt foliis coriaceis fere glabris, ovario glabro et fructu glabro profunde sulcato. – Type: Gabon, E of Ndambi, c.70 km E of Lastoursville, 27 xi 1993, *F.J. & B.J.M. Breteler* 12377 (holo WAG!; iso B!, BR!, E!, G!, LBV, MA!, MO!, P!).

Small tree up to 15 m tall and 20 cm in diameter; branchlets sparsely appressed puberulous, glabrescent. *Stipules* caducous, triangular, 4–10 mm long, sparsely appressed puberulous to glabrous outside, glabrous inside and at base with a dense row of colleters. *Leaves*: petiole semi-terete, (4–)6–11(–14) mm long, glabrous or with a few, appressed hairs; lamina coriaceous, smooth, elliptic, 2–3 times as long as wide, 10–14(–22) × (3–)4–6(–9) cm, rounded to cuneate at base, acuminate at apex, acumen 0.5–1.5 cm long; glabrous both sides except for the sparsely puberulous midrib beneath; main lateral nerves 6–8 pairs, ± indistinct; midrib plane to very slightly impressed above, prominent beneath; margin entire. *Flowers* 5-merous, 2–3(–4) together in a sessile or very shortly (≤ 1 mm) pedunculate fascicle; bracts and bracteoles triangular-ovate, 1–1.5 mm long, ± appressed puberulous, inside often with a dense row of colleters at base. *Pedicel* subterete, (5–)7–20(–25) mm long, sparsely puberulous to glabrous, articulate near calyx, the upper part 1–2 mm long. *Calyx* 7–10 mm long, the tubular part shorter than the (4–)5–7 mm long, spreading lobes, sparsely appressed-puberulous to glabrous outside, densely sericeous inside. *Petals* inflexed in bud, oblanceolate in outline, c.11 × 4–5 mm, pubescent, pinnately lobed mainly in upper half, lobes ribbon-like. *Stamens* 35–45, 3–5 mm long; filaments glabrous, at base united into a 0.5–1 mm high lobulate collar; anthers 1.5–2 mm long, pilose. *Pistil* up to 6 mm long. *Ovary* subglobose, c.2 mm long, 3–5-locular, glabrous or with a few hairs apically near base of style; style 4 mm long, glabrous, apically with 3–5 stigmas. *Immature fruit* subglobose, deeply 3–5-sulcate, c.1.5 cm in diameter, glabrous.

FIG. 4. *Cassipourea ndambiana* Breteler. A, branchlet with flower buds; B, flower bud opened up, two sepal lobes removed; C, petal; D, petal expanded, hairs omitted; E, calyx with pistil cut lengthwise; F, ovary in transverse section; G, immature fruit; H, immature fruit cut lengthwise (A–B, *Breteler et al.* 13274; C–H, *Breteler c.s.* 12377). Drawing by H. de Vries.


C
3 mm
B
3 mm
D
3 cm
A
H
1 cm
E
3 mm
F
G

Distribution. Cameroon, Gabon.

Habitat and ecology. Rain forest; altitude up to c.300 m.

Other specimens examined. CAMEROON. 27 km Edea-Kribi Rd., 22 iv 1968, *Mezili* 129 (P!, WAG!). GABON. 34 km WSW of Bambidie, 14 x 1994, *Breteler, Nzabi & Wieringa* 13274 (B!, BR!, E!, G!, K!, LBV, MA!, MO!, P!, WAG!).

8. Cassipourea plumosa (Oliv.) Alston, Bull. Misc. Inform. Kew 1925: 266 (1925). – *Weihea plumosa* Oliv., Fl. Trop. Afr. 2: 411 (1871). – Type: Gabon, Kongui R., ix 1862, *Mann* 1818 (holo K!; iso P!).

Note. Known from the type and the following few collections. GABON: near Cap Esterias, 14 ii 1985, *A.M. Louis* 1699 (WAG!); Malibé, 2 x 1985, *A.M. Louis* 1822 (WAG!); 25 km N of Libreville, 13 vii 1985, *J.M. & B. Reitsma* 1259 (P!, WAG!). CONGO-BRAZZAVILLE: Région de Les Saras, 9 vi 1966, *Sita* 1395 (P!).

9. Cassipourea pumila Floret, Bull. Mus. Natl. Hist. Nat., B, Adansonia 10: 39 (1988). – Type: Gabon, region de l'Estuaire, Abanga, Monts de Cristal, 11 vi 1963, *N. Hallé* 2444 (holo P!).

Note. Apart from the type only known from one other collection, made by *N. Hallé* (no 2268) also in the Crystal Mts of Gabon.

10. Cassipourea ruwensorensis (Engl.) Alston, Bull. Misc. Inform. Kew 1925: 263 (1925); Liben, Rhizophoraceae, Fl. Afr. Centr.: 30 (1987). – *Weihea ruwensorensis* Engl. in Mildbraed, Wiss. Erg. Deutsch. Zentr.-Afr. Exped. 1907–1908, 2: 579 (1913). – Type: Congo-Kinshasa, Ruwenzori, Butagu Valley, mountain forest at 2500 m altitude, xi 1908, *Mildbraed* 2515 (holo B†). Neotype: Congo-Kinshasa, Penghe, 1 iii 1914, *Bequaert* 2675 (neo BR!, designated here); see note.

Cassipourea mawambensis (Engl.) Alston, Bull. Misc. Inform. Kew 1925: 262 (1925). – *Weihea mawambensis* Engl. in Mildbraed, Wiss. Erg. Deutsch. Zentr.-Afr. Exped. 1907–1908, 2: 579 (1913). – Type: Congo-Kinshasa, Ituri, between Irumu and Mawambi in high forest near Wambutti, iii 1908, *Mildbraed* 2898 (holo B†). Neotype: Congo-Kinshasa, Epulu, 21 ii 1914, *Bequaert* 2596 (neo BR!, designated here).

Cassipourea mildbraedii (Engl.) Alston, Bull. Misc. Inform. Kew 1925: 262 (1925). – *Weihea mildbraedii* Engl. in Mildbraed, Wiss. Erg. Deutsch. Zentr.-Afr. Exped. 1907–1908, 2: 578 (1913). – Type: Congo-Kinshasa, Beni, in high forest near Muera, i 1908, *Mildbraed* 2374 (holo B†). Neotype: Congo-Kinshasa, Pioli (Panga), 24 xii 1913, *Bequaert* 1620 (neo BR!, designated here).

Notes. Liben (1987) united the three *Weihea* species, which were simultaneously published by Engler in 1913, under the name *Cassipourea ruwensorensis*. The type material of all three names was lost in the destruction of the Berlin herbarium and

they are neotypified here by *Bequaert* specimens that were collected in the same region as the *Mildbraed* specimens.

In Gabon it is known only from a single collection from the Bélinga Mt. in NE Gabon: *N. Hallé & Le Thomas* 135 (P!, WAG!).

11. Cassipourea schizocalyx C.H.Wright, Bull. Misc. Inform. Kew 1901: 122 (1901). – Type: Gabon, Mfoa, ix 1896, *Bates* 514 (holo K!; iso BM!, P!).

Cassipourea kamerunensis (Engl.) Alston, Bull. Misc. Inform. Kew 1925: 264 (1925), **syn. nov.** – *Weihea kamerunensis* (Engl.) Engl., Bot. Jahrb. Syst. 54: 363 (1917). – *Dactylopetalum kamerunense* Engl., Bot. Jahrb. Syst. 40: 55 (1907). – Type: Cameroon, Bipindi, near Nkuambe, v 1904, *Zenker* 3059 (holo B†; lecto P!, designated here).

Cassipourea sericea (Engl.) Alston, Bull. Misc. Inform. Kew 1925: 263 (1925), **syn. nov.** – *Weihea sericea* (Engl.) Engl., Bot. Jahrb. Syst. 54: 363 (1917). – *Dactylopetalum sericeum* Engl., Bot. Jahrb. Syst. 40: 35 (1907). – Type: Gabon, Sibange-Farm, 27 xi 1881, *Soyaux* 318 (holo B†; lecto P!, designated here).

Note. From notes by Floret dated 27.5.86 attached to the collection *Breteler & de Wilde* 190 (WAG!) from Gabon, it is clear that he located Mfoa, the type locality of *Cassipourea schizocalyx*, in Cameroon, not in Gabon as indicated by Wright. Most collections by *Bates* are indeed from Cameroon but the oldest collections were made in Gabon (see also Obiang-Mbomio & Breteler (2007: 72), concerning the type of *Eurypetalum batesii* Baker f.).

Acknowledgements

I am very grateful to my wife B. J. M. Breteler-Klein Breteler for preparing the electronic version of the manuscript and to Mr H. de Vries for the excellent illustrations. Dr R. H. M. J. Lemmens is kindly acknowledged for the translation of the species diagnoses into Latin.

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Received 23 November 2007; accepted for publication 17 April 2008