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South African Journal of Botany 78 (2012) 257–265
SOUTH AFRICAN JOURNAL OF BOTANY
www.elsevier.com/locate/sajb

Short communication

A morphological re-evaluation of the taxonomic status of the genus *Pellegriniodendron* (Harms) J. Léonard (Leguminosae–Caesalpinioideae–Detarieae) and its inclusion in *Gilbertiodendron* J. Léonard

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Received 9 March 2011; received in revised form 8 April 2011; accepted 18 April 2011

Abstract

The taxonomic status of the genus *Pellegriniodendron* J. Léonard (Leguminosae, Caesalpinioideae), which consists in one tree species endemic to West Central tropical Africa, is re-evaluated. Based on our morphological comparison and on published phylogenetic studies, we conclude that *P. diphyllum* should be included within the genus *Gilbertiodendron* J. Léonard, and the new combination *Gilbertiodendron diphyllum* (Harms) Estrella & Devesa is proposed. A lectotype for *Macrolobium reticulatum*, synonym of *G. diphyllum*, is also designated. The species is fully described and illustrated, and a distribution map is also presented.

Keywords: Caesalpinioideae; Fabaceae; *Gilbertiodendron*; *Pellegriniodendron*; Taxonomy; Tropical Africa

1. Introduction

Macrolobium Schreb. (Caesalpinioideae: Detarieae), with ± 70–80 spp., is now well established as strictly tropical American. African species previously treated in *Macrolobium* are now accommodated in the four genera *Anthonotha* P. Beauv. (17 spp.), *Gilbertiodendron* J. Léonard (25–30 spp.), *Paramacrolobium* J. Léonard (1 sp.) and *Pellegriniodendron* J. Léonard (1 sp.) (Léonard, 1952, 1954, 1955). All of these genera belongs to the *Macrolobieae* sensu Bruneau et al. (2001) whereas more recently published phylogenies (Bruneau et al., 2008) considered *Paramacrolobium* as part of the *Brownea* clade whilst *Anthonotha*, *Gilbertiodendron* and *Pellegriniodendron* are placed within the *Berlinia* clade.

Anthonotha and two related genera *Englerodendron* Harms (1 sp.) and *Isomacrolobium* Aubréville & Pellegrin (12 ssp.), have been recently revised by Breteler (2006, 2008, 2010 and 2011). *Paramacrolobium* is easily differenciated from the other African genera which were previously recognized within *Macrolobium* by the combination of eglandular leaflets and flowers with one large, two medium-sized and two reduced petals (Léonard, 1957). By contrast, the monotypic *Pellegriniodendron* and *Gilbertiodendron* share glandular leaflets and a similar flower structure. Léonard himself (1957: 236) stated that when new and more complete material becomes available new combinations or delimitations would be necessary within the genus *Gilbertiodendron*. Both genera are in need of a thorough revision and *Pellegriniodendron* appear to be nested in *Gilbertiodendron* acording with recently published phylogenies (Bruneau et al., 2008) in which *P. diphyllum* appear in the same clade than *G. brachystegioides* and *G. klainei* (with a bootstrap support value of 98) suggesting that they are probably not distinct from each other (Bruneau et al., 2000; Mackinder, 2005).

During our ongoing taxonomic study of the genus *Gilbertiodendron* we have studied most of the available collections of *Pellegriniodendron* and several species of *Gilbertiodendron*. We

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doi:10.1016/j.sajb.2011.04.006

re-evaluate the circumscriptions of these two genera, based on the generic limits proposed by Léonard (1957).

2. Materials and methods

2.1. Materials

Key characters proposed by Léonard (1957) for the generic delimitation *Gilbertiodendron* and *Pellegriniodendron* were examined on all available specimens of *P. diphyllum* and seven species of *Gilbertiodendron* (Appendix A). The following herbaria were consulted: B, BM, BR, C, E, G, HBG, HUH, K, L, M, MA, MO, NY, PR, PRE, S, U, UPS, USA, WAG, WU, and Z. Material of additional species examined during the study were not measured but contributed to validating our final conclusion.

2.2. Methods

Relevant quantitative characters were recorded and measured using a Mitutoyo CD-15CD digital calliper (Tokyo, Japan). These characters were used to perform a complete morphological description of the species, along with a distribution map based on available herbarium records. The information provided on uses and vernacular names was extracted from specimen labels and literature.

Characters used by Léonard (1957) and Polhill and Raven (1981) for the generic delimitation between *Pellegriniodendron* and *Gilbertiodendron* were tabulated and compared with the findings of this study.

3. Results

3.1. Generic delimitation

Several of the characters used by Léonard (1957) and Polhill and Raven (1981) to distinguish between *Pellegriniodendron* and *Gilbertiodendron* were found to be of weak or no value (Table 1). *Pellegriniodendron* was characterised by the presence of stipels within leaflets (stipels absent in *Gilbertiodendron*) but we found several mature specimens of *Gilbertiodendron unijugum* with "stipels" present at the base of the petiolules and also in seedlings of other species (Fig. 1). Although identified as stipels, these structures could also be regarded as strongly reduced leaflets. Observations made by us on seedlings of *Wieringa & Haegens 2098* showed that the "stipels" of living specimens (see Fig. 1) were comparable in shape and colour with the apical gland of a leaflet. Visits by ants to these structures emphasises their glandular nature. We therefore conclude that the "stipels" in *G. unijugum* and thus in *Pellegriniodendron* could be an additional basal pair of reduced leaflets, where the petiolule and leaf lamina have completely disappeared and only the apical gland remains.

The segregation of *Pellegriniodendron* on leaflet number has never been strong in the first place, since at least one species of *Gilbertiodendron* is unjugate as well. Moreover, in most of the other genera of the 'Macrolobieae'-clade sensu Bruneau et al. (2000, 2001) the number of leaflet pairs also varies from one to many: *Aphanocalyx* (1–57), *Bikinia* (1–36), *Julbernardia* (1–7), *Tetraberlinia* (1–34) (Wieringa, 1999); *Didelotia* (1–35) (Oldeman, 1964); *Isomacrolobium* (1–7) (Breteler, 2011). The petiolule and midrib form is quite variable among the species of *Gilbertiodendron*, and probably of little value in segregating the different species.

Flowers and inflorescences in *Gilbertiodendron* and *Pellegriniodendron* are essentially equal. Flowers in both genera have one large adaxial petal, which is bilobed, plus four reduced petals. In most species flowers have 3 fertile, exserted stamens plus 6 staminodes located in an inner whorl (*G. splendidum* is exceptional in having 9 fertile stamens).

Pods characters have been used in the generic delimitation, with *Gilbertiodendron* defined by the possession of one or more lateral longitudinal nerves. We have, however, found such longitudinal nerves in some pods of *Pellegriniodendron* specimens.

In summary, we conclude that the presence and shape of glands within leaflets differentiates *Pellegriniodendron* from

Table 1
Generic delimitation of *Gilbertiodendron* and *Pellegriniodendron* as proposed by Léonard (1957). New collections allow us to better describe the characteristics of *Pellegriniodendron diphyllum*. In boldface is showed the unique characters that would support the generic segregation.

*Gilbertiodendron**	*Pellegriniodendron**	*This study*
Leaves usually multifoliate	Leaves unijugate	*G. unijugum* presents only one pair of leaflets
Midrib usually not canaliculated	Midrib canaliculated	Many specimens of *Gilbertiodendron* presents canaliculated midribs
Without stipels	With stipels	At least there are stipels within *G. unijugum*
Petiolules not twisted	Petiolules twisted	Some specimens of *Gilbertiodendron* presents twisted petiolules
Base of leaflets ± asymmetric with lamina sides inserted at different level	Base of leaflets ± asymmetric with lamina sides inserted at different level	Base of leaflets ± asymmetric, some sp presents lamina sides inserted at same level
Marginal leaflets glands	**Submarginal leaflets glands**	**OK**
Inflorescence raceme or panicles	Inflorescence raceme or panicles	OK
Petals 1+4	Petals 1+4	OK
Stamens fertile 3 (4, 5 or 9)+6 (0) staminodes	Stamens fertile 3+6 staminodes	OK
Fertile stamens exerted, staminodes intrastaminal tube	Fertile stamens exerted, staminodes intrastaminal tube	OK
Ovary stipe exerted	Ovary stipe exerted	OK
Longitudinal and transversal nerves in pods	Transversal nerves in pods	Longitudinal and transversal nerves in pods of *P. diphyllum*

* Generic delimitation based on Léonard (1957) and Polhill and Raven (1981).

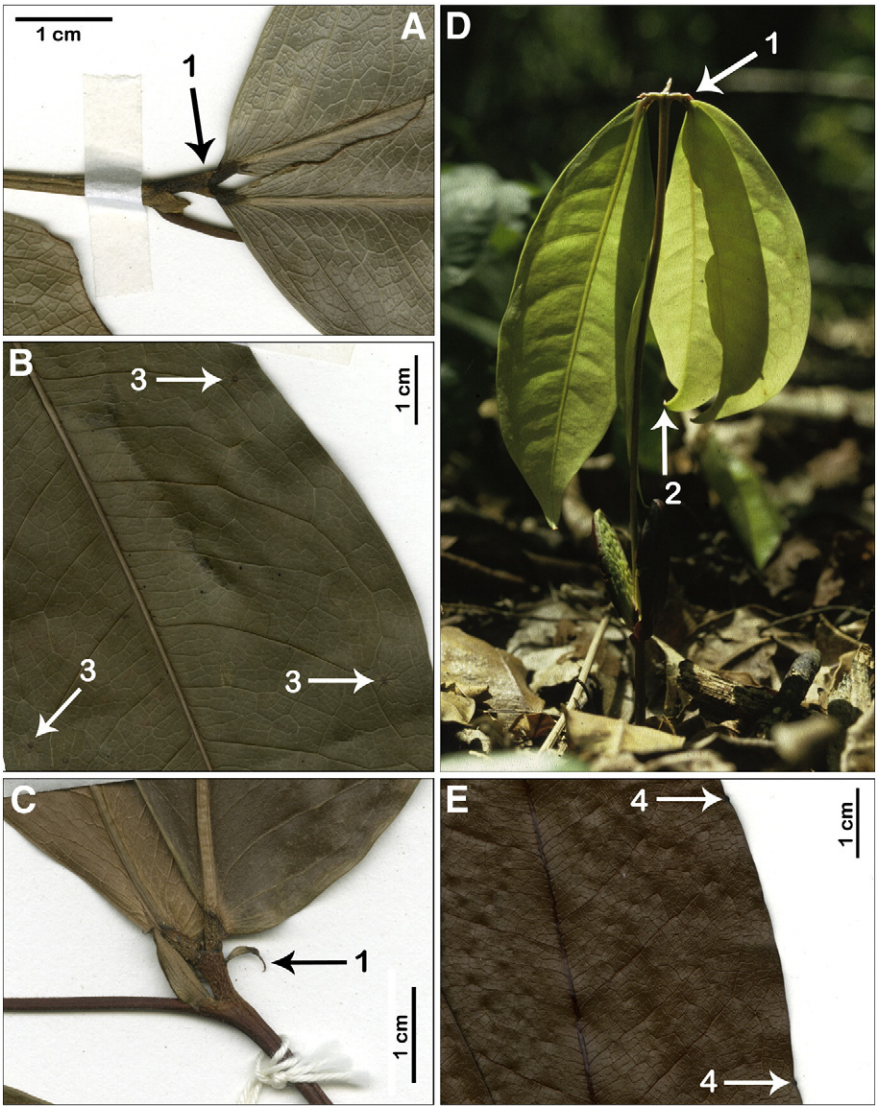

Fig. 1. Photographs of key characters in *Gilbertiodendron* (A) "stipels" (a reduced basal leaflet pair) (1) in *Gilbertiodendron diphyllum*; (B) submarginal glands (3) within leaves of *Gilbertiodendron diphyllum*; (C) reduced basal leaflet ("stipel") (1) in *Gilbertiodendron unijugum*; (D) "stipels" (1) and apical leaflet gland (2) within a seedling of Gilbertiodendron diphyllum; (E) marginal glands (4) in a leaflet of *Gilbertiodendron unijugum* [sources. A: *F.J. Breteler et al. 9564* (WAG 0164272). B: *T. van Andel et al. 3502* (WAG0145996). C: *F.J. Breteler & B.J.M. Breteler 12633* (WAG 0267064). D: Photograph of *Wieringa & Haegens 2098* (WAG). E: *J.J. Wieringa & R.M.A.P. Haegens 2425* (WAG 0030467)].

Gilbertiodendron. These glands are marginally located in *Gilbertiodendron* and submarginally within a stellate nervation pattern in *Pellegriniodendron*.

This weak morphological distinction, in concert with the results of previous phylogenetic works (Bruneau et al., 2000, 2001 and 2008), suggests that *Pellegriniodendron diphyllum* should be included within the genus *Gilbertiodendron* (Bruneau et al., 2000) and we therefore expand the circumscription of *Gilbertiodendron* to include *Pellegriniodendron*, and also propose the necessary new combination.

3.2. Taxonomic treatment

Gilbertiodendron J. Léonard in Bulletin du Jardin Botanique de l'État 22: 188 (1952).

Type species: *Gilbertiodendron demonstrans* (Baill.) J. Léonard in Bulletin du Jardin Botanique de l'État 22: 190 (1952). *Vouapa demonstrans* Baill. in Adansonia 6: 180, pl. 3 (1865). *Macrolobium demostrams* (Baill.) Oliv., Flora of Tropical Africa 2: 299 (1871). Type: Gabon. 1864, *Griffon du Bellay cat.4, n°299* [lectotype designated by Léonard: 236 (1957), P! (photo seen)].

Pellegriniodendron J. Léonard in Bulletin du Jardin Botanique de l'État 25: 203 (1955), ***syn nov***.

Type species: *Pellegriniodendron diphyllum* (Harms) J. Léonard [= *Gilbertiodendron diphyllum* (Harms) Estrella & Devesa].

Small to large trees. Leaves alternate, pulvinate, paripinnate, 1–11-jugate; stipules compound, foliaceous with reniform appendages, each part persistent or caducous; rachis channeled in adaxial face, petiolule pulvinate, with or without stipels;

leaflets opposite, coriaceous, with one to several glands present at margins or with submarginal glands connected by stellate venation to secondary on the abaxial face, apex acuminate, base asymmetric. Inflorescence a compound or double compound raceme, flowers spirally arranged; bracts persistent, protecting the flower in bud, convex. Receptacle pubescent to glabrous. Sepals 5, reduced, two adaxial ones shortly united. Petals 5, differing in size and shape, adaxial petal large, deeply bilobed, with a long claw, remaining petals reduced, subequal and similar to sepals. Fertile stamens 3(−9), alternating with abaxial petals, free, staminodes 6(−0), filiform, fused in an intrastaminal tube; anthers dorsifixed, opening by longitudinal slits.

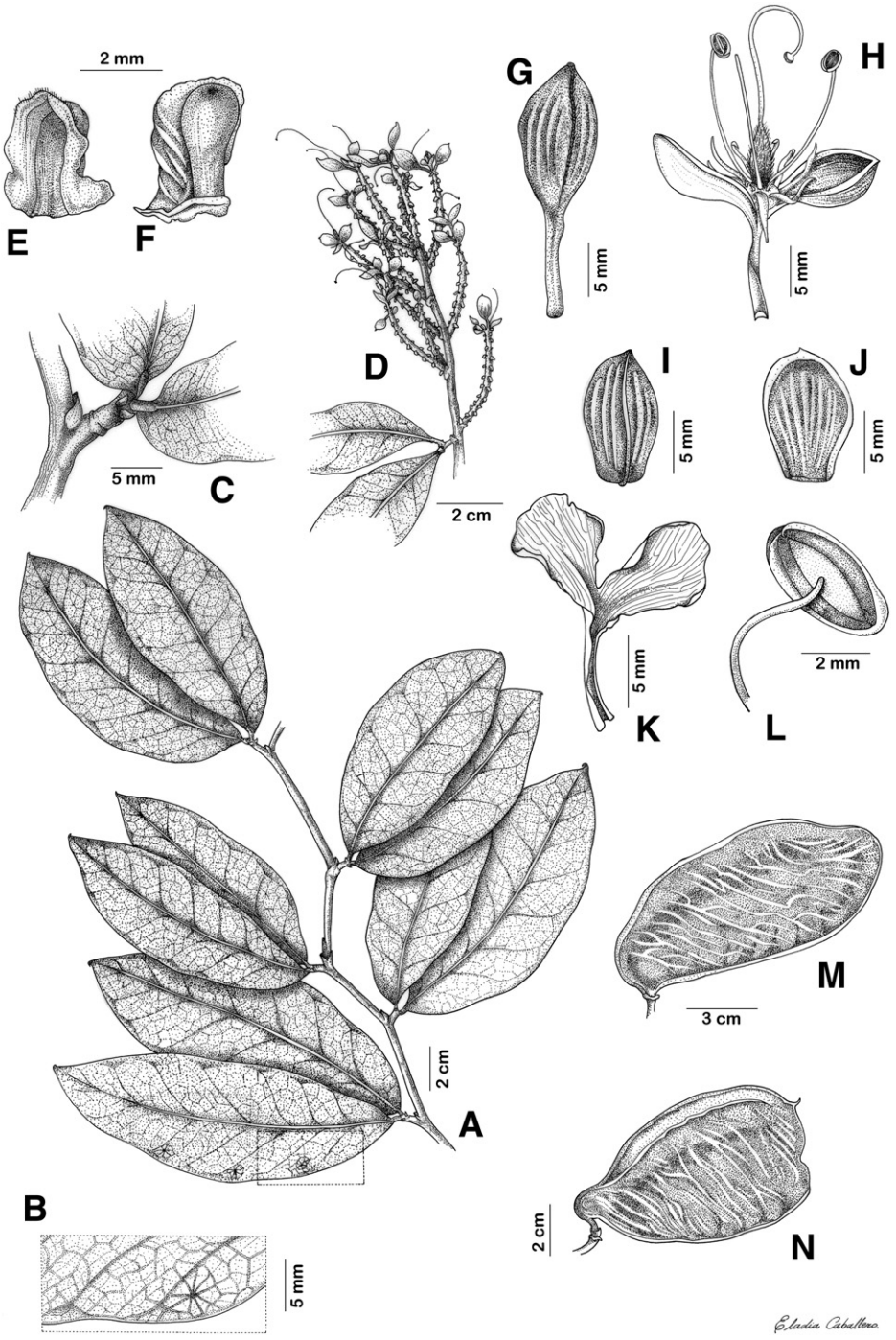

Fig. 2. *Gilbertiodendron diphyllum*. a. Twig with leaves. b. Leaflet gland, abaxial surface. c. Stipels at leaflets insertion. d. Inflorescence. e. Bract seen from interior. f. Bract seen from exterior. g. Futional flower bud. h. Flower open without one anther and adaxial petal. i. Bracteole seen from exterior. j. Bracteole seen from interior. k. Adaxial petal seen from interior. l. Anther. m & n. Pod. [Based on: a–b, *T. van Andel, P. Maas, H. Maas & M. Jansen-Jacobs 3502* (WAG 0145995); c, *F.J. Breteler & B.J.M. Breteler 12633* (WAG 0267064); d, g, *J. de Koning 2839* (WAG 0009631); e–f, h–l, *J.J. Wieringa, P.H. Hoekstra, R. Niangadouma & J.N. Boussiengui 6218* (WAG 0316827); m, *J.J. Bos 3481* (WAG 0688635); n, *F.J. Breteler, Jongkind & Wieringa 11393* (WAG 0267058)].

Ovary stipitate, stipe short, style long, stigma capitate. Pods woody, dehiscing into 2 valves, curling inwards when mature, with 0–3 longitudinal nerves along with transversal ribs. Seed testa thin, papery.

Gilbertiodendron diphyllum (Harms) Estrella & Devesa, ***comb. nov.*** *Macrolobium diphyllum* Harms in Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 30: 84 (1901). *Pellegriniodendron diphyllum* (Harms) J. Léonard in Bulletin du Jardin Botanique de l'État 25: 203 (1955). Type: Cameroon. Bipinde, Safoa-Dorf, Igiliwindifluss, Urwald, April 1900, *Zenker 2277* [lectotype designated by Léonard: 245 (1957), K!; isolectotypes, BM!, E!, G!, GOET, L!, M!, MO!, P, S, WAG!, WU!, Z!].

Synonyms: *Macrolobium reticulatum* Hutch. ex Chipp, A List of Trees, Shrubs and Climbers of the Gold Coast, Ashanti and the Northern Territories: 20 (1913). Type: Ghana. Tamosu, 4 December 1911, *T.F. Chipp 35* (lectotype here designated, BM!; isolectotype, K!).

Tree c. 35 m tall and 120 cm dbh (diameter at breast high). Twigs and branches glabrous; stipules deltoid, completely fused, 1.5–4.0 × (0.8–)1.5–2.9 mm, glabrous on external face, densely set with parallel nerves, sparsely ciliate and densely pubescent at inner face, subpersistent. Leaves alternate, unijugate, (6.5–)11.0–27.5 × 5–16(−23) cm, leaves asymmetric, proximal semilimb broadest at base, distal semilimb narrower, both margins inserted at different level on petiolule; petiole ± terete, 2.0–5.5 mm long, 1.5–3.5 mm diam., glabrous; "stipels" ± thick-textured with swollen base, acute to apiculate, 0.8–2.2 mm long; petiolules 1–5 mm long; leaflets opposite, 6–26 × (1.5–)2.5–9.0 cm, oblong–lanceolate or sometimes slightly falcate, coriaceous to papyraceous, acuminate (sometimes obtuse or emarginate), acumen 2–7.5 mm long, terminating in gland at apex of midrib, with 7–25 pairs of main lateral veins merged in a sub-marginal nerve, abaxial surface glabrous but covered with gland dots, and with 1–6 submarginal glands connected by stellate venation to secondary venation, midrib prominent on both faces. Inflorescence 5–28 cm long, a compound or double compound raceme, axillary or terminal, sessile or shortly pedunculate, peduncle up to 15 mm long, rachis glabrous to densely covered with hairs, with 5–30 lateral branches, each 15–31 mm long and 9–22-flowered; bracts 1.5–3.8 × 1–1.5 mm, caducous, dimorphic, basal bracts deltoid, with marked nerves on external face, apical bracts cucullate, with two beaks in margins and topped with a crateriform gland, glabrous to densely pubescent on abaxial face, ciliate and pubescent in the adaxial face; pedicel 3.5–10 mm long, 0.5–1.3 mm diam., with 4 ridges, glabrous to densely pubescent; bracteoles 6.5–10 × 3–5.6 mm, caducous, oblong, cupuliform, with a beak 0.2–0.9 mm long, cream-green to dark red-pink inside, glabrous to shortly hairy outside, glabrous to sparsely lanate inside (more densely so towards apex), margins glabrous. Receptacle 0.8–2 × 1.3–2.5 mm, glabrous to slightly pubescent; functional bud (including bracteoles) 3.7–5.3 mm wide. Sepals 5, red-pink, two adaxial sepals triangular–lanceolate, 2.9–5.7 × 0.7–1.4 mm, glabrous, united in basal 0.5 mm, remaining 3 sepals free, 3.4–4.1 × 1.2–1.5 mm. Petals 5, adaxial largest, deeply bilobed, 7.5–15.0 × 9–17 mm, white with pink-red claw 2.8–6 × 0.6–1.4 mm long, glabrous; remaining petals subequal, triangular to oblong–lanceolate, 2.8–4.5 × 0.4–1.2 mm, glabrous. Fertile stamens 3, alternating with abaxial petals, filaments 9.5–20 mm long, glabrous; anthers 2.5–4 × 1.2–2 mm, glabrous; staminodes 6, 0.3–0.9 mm long, filiform, fused in an intrastaminal tube, glabrous. Ovary rectangular–rombic, 2.4–4.6 mm long, glabrous to tomentose at margins; stipe 0–0.4 mm long, glabrous to tomentose; style 15–21 mm long, glabrous or with few dispersed hairs at base; stigma 0.3–0.6 mm in diameter, capitellate, cup-shaped. Pod oblong–obovate, 6–10 × 2.5–5.0 cm, broadly beaked, glabrous with few dispersed hairs at margins, generally with transversal nerves but some specimens also with one longitudinal nervure along upper suture 1–5 mm from margin. Seeds, subdiscoid, ca. 23 × 19 × 6.7 mm, wrinkled, brown-garnet. Fig. 2.

3.3. Distribution and habitat

The species has a rather disjunct distribution pattern, which is quite rare for a Detarieae. In the West it has been recorded in Liberia, around Abidjan in Ivory Coast, and in western Ghana; in Central Africa it occurs more or less continuously from southern Cameroon over Equatorial Guinea to Gabon. It occurs in primary and secondary forest, on riverbanks, in swampy areas and even mangroves and beaches, from 0 to 750 m altitude (Fig. 3).

3.4. Phenology

Flowering and fruiting periods for a species with such wide distribution is hard to find (Wieringa, 1999) as the climatic conditions could significantly vary between the extremes of that area. In Table 2 we present the flowering and fruiting months related with the dry and wet seasons in West and West Central Africa. Probably the clearer pattern found in West Africa, with a flowering period starting at the end of the wet season, whilst in Cameroon, Equatorial Guinea and Gabon, where are two shorter alternative wet seasons, flowering period is not so clear and specimens with flowers has been recorded along the most part of the year.

3.5. Vernacular names

Ghana: *Fetefele*, *Nzima*. Ivory Coast: *Medjilagba*. Cameroon: *Ekop* (Pellegrin, 1949: 48). Gabon: *Abum*, *Abom* (Pellegrin, 1949: 48).

3.6. Uses

The wood is used for joinery (Burkill, 1995: 142).

3.7. Specimens examined

3.7.1. Cameroon:

CENTRE: bank Nyong River, near the new bridge, ca. 65 km SSW of Eséka, 3°28' N, 10°30' E, *W.J.J.O. de Wilde & B.E.E. de Wilde-Duyfjes 2750a* (BR, B, K, PRE, WAG, Z), *2750b* (BR, K, PRE, WAG). LITORAL: Bank of the Sannaga river by crossing, Sakbayema, 4°02' N, 10°34' E, *G.L. Bates 1697*

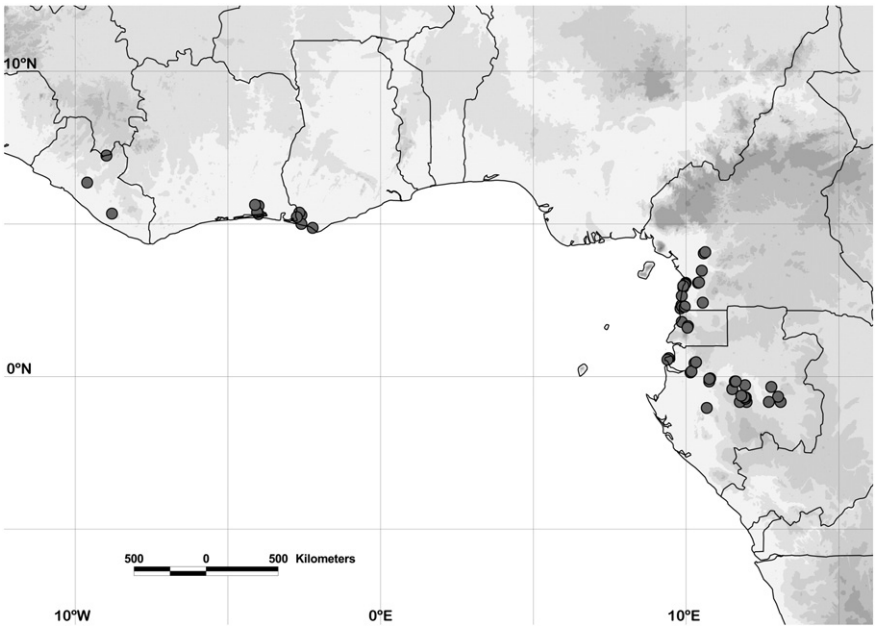

Fig. 3. Distribution of *Gilbertiodendron diphyllum* (circles).

(BM). SOUTH PROVINCE: 2 km S of Kribi, 2°55' N, 9°54' E, *J.J. Bos 3481* (C, K, WAG), 1 km NE of Longii, 3°4' N, 9°59' E, *J.J. Bos 5078* (WAG); Department Ocean, Mpolongwe. 8 km North of Kribi, 3°2' N, 9°58' E, *M. Elad 527* (BR, WAG); 85 km WNW Ambam, Rivière Mvi'Illi, near Asseng on road Meyo Centre - Nyabizan, 2°25' N, 10°32' E, *R. Letouzey 15275* (WAG); Campo Ma'an area, Bibabimvoto, rheophyte along the Bongola River, 2°16' N, 9°57' E, *Tchouto Mbatchou & al. 3399* (WAG); 15 km N of Kribi, 3°5' N, 9°59' E, *D. Thomas 3439* (NY); Kribi, Mahale, beach north of Kribi, near Nigerian fishermen village, 2°58' N, 9°54' E, *T. van Andel, P. Maas, H. Maas & M. Jansen-Jacobs 3502* (WAG); Campo Ma'an area, Mabiogo Bongola River bank, Dipikar island side, 2°17' N, 9°52' E, *T. van Andel, B. Mva & D. Mamia 4111* (WAG); Kribi, 7 km N of Kribi, 3°0' N, 9°56' E, *J.J. Wieringa & R.M.A.P. Haegens 2097* (G, WAG), Kribi, 7 km N of Kribi, 3°0' N, 9°57' E, *J.J. Wieringa & R.M.A.P. Haegens 2098* (WAG), Campo, Ipono, 2°20' N, 9°51' E, *J.J. Wieringa & R.M.A.P. Haegens 2259* (WAG); 38 km on the road from Kribi to Campo, 2°38' N, 9°51' E, *J.J.F.E. De Wilde 7780* (BR, K, MA, PRE, WAG); about 8 km N of Kribi, 3°1' N, 9°57' E, *W.J.J.O. de Wilde & B.E.E. de Wilde-Duyfjes 2908* (WAG); Bipinde, Urwaldgebiet, 3°5' N, 10°25' E, *G. G. Zenker 2531* (B, BM, E, G, K, L, MA, PR, PRE, WAG, WU, Z), *Zenker 2277a* (BM, G, WU), *G. Zenker 3828* (BM, E, K, L, M, PRE, S, USA, Z, WU). UNKNOWN PROVINCE: 60 km ENE Edea, Sanaga riverbank, between Kahn and Songmbengué, *R. Letouzey 11113* (K).

3.7.2. Equatorial Guinea:

LITORAL: Bata-Bicomo, Hydroelectric power station over Ecucu river, road km 22, 1°47' N, 9°51' E, *Carvalho 4985* (B, G, MA, NY, WAG); c. 2 km NE of Elende, Cocoloondo Riverside, 2°13.7'

Table 2
Gilbertiodendron diphyllum flowering and fruiting periods related with the climate from the two centers of distribution: West Africa (Ghana, Guinea, Ivory Coast and Liberia) and West Central Africa (Cameroon, Equatorial Guinea and Gabon).

Months	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
West Africa	▦	▦	▦	▦							▦	▦
Flowering	×		×		×					×	×	×
Fruiting	×	×	×		×				×	×	×	×
West C. Africa	▦	▦					▦	▦	▦			▦
Flowering	×	×		×	×	×	×	×		×	×	×
Fruiting	×	×			×	×	×	×				×

Wet months ▦ Dry months

N, 9°48.5' E, *J.J. Wieringa & R.M.A.P. Haegens 2265* (WAG). CENTRO SUR: P.N. Monte Alén, waterfalls Laña river, Mosumu, 1°36' N, 10°2' E, *R. Pérez Viso 1612* (MA).

3.7.3. Gabon:

ESTUAIRE: Plantation Stéphane, sur la Bokoué, 0°10' N, 10°10' E, *A. Chevalier 26996* (WAG); Ninghé-Ninghé plantation upon Kokoué River, near Kango upon the Komo, 0°8' N, 10°8' E, *F. Fleury in A. Chevalier 26689* (WAG); Malibé, 0°33' N, 9°23' E, *A.M. Louis 2240* (WAG); Libreville - Cap Esterias, Mamboubé River bank, 0°36' N, 9°26' E, *A.M. Louis 2481* (WAG); Crystal Mountains, 100 m on transect G33, 0°28' N, 10119' E, *N.S. Nguema Miyono 1880* (WAG); Kinguéle dam, downstream of the hydroelectric power station, 0°26' N, 10°16' E, *J.J. de Wilde, J.C. Arends & J. de Bruijn 8864* (WAG). HAUT-OGOOUÉ: 0°50' S, 12°42' E, *M.G. Le Testu 7569* (BM, S). MOYEN-OGOOUÉ: about 10 km NNW of Ndjolé, 0°04' S, 10°47' E, *F.J. Breteler & B.J.M. Breteler 13010* (WAG); 5–15 km NNW of Ndjolé, 0°05' S, 10°45' E, *F.J. Breteler & C. Jongkind 10480* (WAG); Border of Missanga river near Ndjolé, 0°7' S, 10°45' E, *F.J. Breteler, Jongkind & Wieringa 11393* (WAG); N'Djolé, 0°10' S, 10°45' E, *M. Thollon 71* (HUH, K, WAG); Lopé, Mike Harrisons transect, 0°10' S, 11°35' E, *C. Wilks 911* (WAG). NGOUNIÉ: Sindara, 1°2' S, 10°40' E, *M.G. Le Testu 5800* (BM, MA, WAG). OGOOUÉ-IVINDO: Mitendi, *M.E. Leal 205* (WAG); Forêt des Abeilles, about 50 km SE of Achouka, 0°17' S, 11°55' E, *A.M. Louis, F.J. Breteler & J. de Bruijn 746* (B, C, K, MA, PRE, WAG); South of Ayem; western border of Lopé-Okanda Reserve; along roads of SEEF chantier, 0°25' S, 11°30' E, *G. McPherson 15684* (WAG); eastern border of Lopé-Okanda, Reserve, along SEG lumber roads east of Offoué river, 0°40' S, 11°50' E, *G. McPherson 16082* (MO, PRE, WAG); Tsetse beach, 0°10' S, 11°37' E, *L. White & Abernathy 1561* (MO, WAG). OGOOUÉ-LOLO: about 40 km E of Lastoursville, 0°50' S, 13°5' E, *F.J. Breteler & B.J.M. Breteler 12633* (WAG); Makande surroundings, about 65 km SSW of Booué, 0°41' S, 11°55' E, *F.J. Breteler, Caballé, Issembé, Moussavou, Pascal & Lemmens 15014* (WAG); Lastoursville, 0°50' S, 12°42' E, *M.G. Le Testu 7654* (B, BM, K); Forêt des Abeilles, Makandé, 4 km E of Makandé campsite, 0°41' S, 11°57' E, *J.J. Wieringa, C.C.H. Jongkind, J.G. Schoonhoven & M. Mbombet 4105* (WAG); c. 55 km N of Lastoursville, CEB forestry concession "Milolé" (UFA2-UFG2-lot2), foothills of Ngota Mountain, 0°20' S, 12°47' E, *J.J. Wieringa, P.H. Hoekstra, R. Niangadouma & J.N. Boussiengui 6218* (WAG); Foret des Abeilles; 13 km SE of confluence Gongue-Offoue, 0°50' S, 11°58' E, *C. Wilks 2713* (MO, WAG).

3.7.4. Ghana:

WESTERN: Ankassa, W of Apollonia, 5°0' N, 2°36' W, *T.F. Chipp 327* (K), Tano Rapids, *T.F. Chipp 376* (K); Ankasa Forest Reserve, 5°17' N, 2°35' W, *A.A. Enti & P.K. Awnah? R1160* (BR, NY); Near Axim, 4°52' N, 2°16' W, *F.R. Irvine 2182* (E, K); Western Region, Ankasa Resource Reserve, at Ankasa Camp next to quarters, 5°16' N, 2°38' W, *M.P.E. Parren 306* (WAG).

3.7.5. Ivory Coast:

LAGUNES: Banco Forest, 5°23' N, 4°03' W, *L. Aké Assi 9745* (G), Abidjan, in botanical Garden of the University, 5°20' N, 4°01' W, *L. Aké Assi 10884* (G), Forêt d'Adiopodoumé 5°20' N, 4°08' W, *L. Aké Assi 17771* (G, PRE); Banco, 5°23' N, 4°03' W, *M. Aubréville 509* (HUH); Abidjan, in botanical Garden of the University, 5°20' N, 4°01' W, *F.J. Breteler 13402* (WAG), Abidjan, Botanical Garden of Cocody University, 5°20' N, 4°01' W, *F.J. Breteler 13734* (WAG); Université d'Abidjan, 5°20' N, 4°01' W, *A. Fx 169* (G); Forest of Téké, 30 km north of Abidjan, 5°33' N, 4°00' W, *J. de Koning 160* (WAG); Abidjan, N.P. Banco Forest, near Chaumiere du Banco, 5°23' N, 4°3' W, *J. de Koning 2789* (WAG), *2839* (WAG), Abidjan, experimental station ORSTOM, Adiopodoume\é, 5°20' N, 4°07' W, *J. de Koning 3040* (WAG), *3131* (WAG), *3231* (WAG), *3539* (WAG), Banco Forest, route Martineau, 5°23' N, 4°03' W *J. de Koning 4702* (WAG), Banco Forest Reserve, near Esso station, 5 23' N, 4°03' W, *J. de Koning 6092* (WAG), Banco Forest Reserve, 5°23' N, 4°03' W, *J. de Koning 4995* (WAG), *5365* (WAG), *6951* (WAG), Abidjan, National Park Banco Forest, 5°23' N, 4°03' W, *J. de Koning 3467* (WAG) *3777* (WAG); Abidjan, 5°20' N, 4°01' W, *J. Miége s.n.* (BR); Banco, 5°23' N, 4°03' W, *Services Forestiers de la Côte d'Ivoire 368* (K).

3.7.6. Liberia:

GRAND BASSA: Ganta, 5°38' N, 9°48' W, *A.G. Voorhoeve s.n.* (WAG0018534). SINOE: Sapo National Park, 5°19.9' N, 8°48.3' W, *Jongkind 9311* (WAG). UNKNOWN PROVINCE: Bassa n° III, LACO compound, *A.G. Voorhoeve 675c* (WAG).

3.8. Nomenclatural comments

When Harms (1901: 84) described *Macrolobium diphyllum*, he stated: "Kamerun: Bipinde, Safoa-Dorf, Igiliwindifluss, Urwald (G. Zenker 2277. – Blühend im April 1900". Since Harms worked in B, the original sheet at B, with the more detailed label data by Zenker, constituted the holotype of this species. Since this holotype could not be traced in Berlin (also the not destroyed spirit collection has been checked), it should be assumed to be lost. Léonard (1957: 245) wrote that the type material of this species was stored in "K!" which should be considered as effective lectotypification.

Chipp (1913: 20) published *Macrolobium reticulatum* indicating that the author of this new species was Hutchinson, thus the correct authorship of *M. reticulatum* is Hutch. ex Chipp. In the protologue the author cited three specimens (*Chipp 35*, *Chipp 327* and *Chipp 376*). After the study of these specimens kept at K and BM, we found that *Chipp 35* (BM) presented a hand written label with the identification: "*Macrolobium reticulatum* Hutchinson sp. nov." and it is also stated within the label that it was a type. Since Chipp (1913: 20) did not designate a type for the name, here we select as lectotype *Chipp 35* (lectotype: BM; isolectoype: K).

Acknowledgements

The authors wish to thank the staff of the cited herbaria for their support on our visit and/or loan of material. We are also indebted for the comments by the editor J. Manning and two anonymous reviewers, which improved a previous version of

the manuscript. This work was financed by the Spanish Science and Innovation Ministry (CGL2008-02982-C03-03/CLI and CGL2009-07405/BOS). Manuel de la Estrella was funded by a Juan de la Cierva grant (JCI-2009-05243) also of the Spanish Ministry of Science and Innovation and visited K herbarium thanks to the Bentham-Moxon funds.

Appendix A

List of specimens of *Gilbertiodendron* used for the morphological study of the generic limits between *Gilbertiodendron* and *Pellegriniodendron*.

Species	**Collections studied**

Gilbertiodendron aylmeri (Hutch. & Dalziel) J. Léonard

Liberia: Lofa, Gola Forest, *C.C.H. Jongkind & al. 7003* (WAG); Gola Yoma National Forest, *P.P.C. van Meer 266* (WAG); Bong, Range, 20 miles N of Kakata, *A.G. Voorhoeve 69* (WAG), Bong Range, *A.G. Voorhoeve 1249* (B, MO, WAG).

Gilbertiodendron ivorense (A. Chev.) J. Léonard

Ivory Coast: road of Tabou, between Nigré and Guiroutou, *L. Aké Assi 4818* (G, MO); km 36 Sassandra-San Pedro road, *F.J. Breteler 6036* (MO, WAG); lowland between Biebé-Patalla and Diovéré, road Taï Tabou, *J.L. Guilloumet 038* (G); road Gagnoa-Sassandra, *J.J.F.E. de Wilde 168* (WAG), *371* (WAG); c. 64 km NW of Sassandra, c. 5 km W of Niapidou, *W.J.J.O. de Wilde 247* (WAG). **Liberia:** Eastern province, Webo District, Jabroke (Palipo), *J.T. Baldwin 6426* (MO); along Dukwai (near Firestone plantations), *C.P. Cooper 427* (HUH, NY); Montserrado, division 16, Firestone Plantations, Harbel, *J. Kokulo 5* (WAG); Firestone Plantation, Division, *F.S.C. Stoop & v.d. Kasteele 19* (WAG); Mount Coffee area, c. 30 miles N.E. of Monrovia, *A.G. Voorhoeve 469* (WAG).

Gilbertiodendron limba (Scott-Elliot) J. Léonard

Ghana: Eastern, Esen Epam Forest Reserve, *C.C.H. Jongkind, D.K. Abbiw & C.M.J. Nieuwenhuis 1438* (USA, WAG). **Ivory Coast:** deforest near Bakanou, *L. Aké Assi 8546* (G), Banco Forest, *L. Aké Assi 10633* (G); Abidjan, *Aubréville 27* (HUH); Abidjan, National Park Banco Forest, *J. de Koning 1889* (WAG), *6888* (WAG), Abidjan, National Park Banco Forest, near Chaumiere du Banco, *J. de Koning 2790* (WAG), PN Banco, *P. Poilecot 659CI* (G). **Sierra Leone:** on Mount Gonkwi, near Ninia, Talla Hills, *S. Elliot 4994* (HUH).

Gilbertiodendron preussii (Harms) J. Léonard

Cameroon: Longji (=Lodji), R. Mouth, 20 km N of Kribi, *A.J.M. Leeuwenberg 5652* (B, MO); Sud Province, 23 km SE of Kribi, along the road to HEVECAM, *J.J. Wieringa & R.M.A.P. Haegens 2116* (G). **Ivory Coast:** road of Tiassalé, between Dabou and Abiéhoui, *L. Aké Assi 9401* (G, MO); c. 18 km S. of Gueyo (between Gagnoa & Sassandra), *J.J.F.E. de Wilde 3346* (B, MO). **Liberia:** 15 miles E of Kakata, along the road to Bolola, *J.W.A. Jansen 1640* (MO).

Gilbertiodendron robynsianum Aubrév. & Pellegr.

Ivory Coast: between Grabo and Tabou, forest near Mahina, *L. Aké Assi 7930* (G); road V. Balet Tabou Oladio, near of Né, *J.L. Guillaumet 800* (G); San Pedro, Marécage between Kago and Nerobrousse, 20 km at N of Neromer, *J.L. Guillaumet 1275* (WAG), edge of Marigot, track Gallé à Toukou 100 km of Tahou to Taï, *J.L. Guillaumet 1821* (WAG); Tabou, along the road from Olodio to Clodio, *C.C.H. Jongkind 4942* (WAG); Tabou, FC de la Ht. Dodo, *C.C.H. Jongkind & al. 4525* (WAG). **Liberia:** Grand Bassa, Cestos-Sanguin area, Logging Consession of the Cooper's, Sudan Section, *C.C.H. Jongkind 5644* (WAG).

Gilbertiodendron splendidum (A. Chev. ex Hutch. & Dalziel) J. Léonard

Ghana: along Takoradi-Eludo road, between 9.5 and 23.5 km E of Elubo, *M. Merello & al. 1294* (WAG). **Ivory Coast:** Arboretum of Banco, *L. Aké Assi 10769* (G), Abidjan, Botanical Garden of the University, *L. Aké Assi 13751* (G); Tabou, Massa-Mé, *A. Aubréville 136* (WAG); Abidjan, in botanical Garden of the University, *F.J. Breteler 13403* (WAG); Guiglo, Taï. P.N. de Taï, *C. Chatelain, H. Téheé & P. Hainard 858* (G); San Pedro, Marécage over the road Kago to Nerobrousse, 20 km at N. of Neromer, *J.L. Guillaumet 1273* (WAG); Guiglo, PN de Taï, *P. Poilecot 469CI* (G); Guiglo, Taï, *Stäuble NS0319* (G, MO). **Liberia:***F. Blyden 91* (WAG), Grand Gedeh, Swedru-Tchien area, *F. Blyden 922* (WAG); road Chien-Putu, *A.G. Voorhoeve 293* (WAG). **Sierra Leone:** Bagbe, Gora forest, *D. Small 421* (B).

Gilbertiodendron unijugum (Pellegr.) J. Léonard

Gabon: Ogooué-Maritime, Rabi-Kounga, Marécage, *H.P. Bourobou, G. Nang-Essouma & T. Nzabi 662* (WAG); Ogooué-Maritime, between Rabi and Echira, *F.J. Breteler, C.C.H: Jongkind, J.J. Wieringa & Moussavou 9564* (G, WAG); on left bank of the Mbé river, just beneath the Hydroelectric power station at Kinguélé, *F.J. Breteler & J.J.F.E. de Wilde 346* (C, WAG); Ogooué-Maritime, Rabi-Kounga, near Rabi, *X.M. van der Burgt 73* (WAG); Woleu-Ntem, *G. Le Testu 9520* (B, HBG, MO); Estuaire, N of Libreville, c. 10 km on road to Cap Esterias, *G. McPherson 15525* (MO, WAG), *15847* (MO, WAG), Ogooué-Ivindo, Setté Cama, *G. McPherson 16862* (G, MO, MA, UPS, WAG); Nyanga, Kwassa Fishing Camp, 70 km S of Mayumba; 35 km N of Ndindi. Lack Banio, *G. Walters, J. Stone, T. Nzabi & T. Boumbou 667* (MA, MO, WAG); Ogooué-Maritime, Rabi area, 19 km E of Shell-camp, NE Divangui, *J.J. Wieringa & R.M.A.P. Haegens 2425* (WAG); Nyanga, 15 km E of Gamba airport, *J.J. Wieringa & H.M. van de Poll 1375* (WAG); Ogooué-Maritime, Rabi, Shell/Gabon, just N of Airstrip, *J.J.F.E. de Wilde & van der Maesen 10974* (WAG).

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Edited by JC Manning