



## Taxonomic novelties in the genus *Campylospermum* (*Ochnaceae*)

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### Key words

Africa  
*Campylospermum*  
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*Gomphia*  
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*Ochnaceae*  
*Ouratea*  
taxonomy

**Abstract** Four new species, one with two subspecies, of the genus *Campylospermum* are described, all endemic or sub-endemic to Gabon. These are *C. auriculatum*, *C. gabonensis*, *C. gabonensis* subsp. *australis*, *C. glaucifolium* and *C. occidentalis*. Distribution maps and scans of the holotypes are provided as well as preliminary IUCN Red List assessments. New combinations for nine species formerly assigned to the genus *Ouratea* and/or *Gomphia* are proposed: *C. andongensis*, *C. glomeratum*, *C. longestipulatum*, *C. lunzuensis*, *C. lutambensis*, *C. nutans*, *C. pliscatum* and *C. warneckei*. Finally, one taxon is raised from the variety to species level, leading to the new combination *C. costatum*.

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### INTRODUCTION

The genus *Campylospermum* has about 50 species occurring in continental Africa, Madagascar, extending east to China and the Malasian region. It belongs to the subfamily *Ochnoideae*, tribe *Ochneae*, subtribe *Ouratinae* (Kanis 1968). This subtribe contains three other genera: *Rhabdophyllum* Tiegh. (Africa, 8 species), *Ouratea* Aubl. (Neotropics, c. 140 species) and *Idertia* Farron (Africa, 3 species; Farron 1985, Kanis 1968, Sastre 1988, Sosef 2008). In contrast to *Ochnaceae* specialists who recognized these genera as being distinct, generalists more often preferred a broader genus concept in which *Ouratea* comprises the genera *Campylospermum* and *Idertia* (e.g. Hutchinson et al. 1954), and sometimes even *Rhabdophyllum* (e.g. Aké Assi & Gautier 2000, Verdcourt 2005).

The new species published here are part of our on-going research efforts on the systematics of *Ouratinae* in cooperation with the Senckenberg Research Institute at Frankfurt. *Rhabdophyllum* was revised recently (Sosef 2008), but notably the taxonomy of *Campylospermum* is still unclear. The first author is preparing her PhD thesis on the taxonomy, phylogeny and biogeography of *Ochnaceae*, with an emphasis on *Campylospermum*. Most of the novelties resulting from her taxonomic work on the continental African representatives are presented here. Molecular phylogenetic work in progress (Bissiengou, unpubl. data) has not yet led to sufficient resolution in the phylogenetic tree and hence does not yet allow resolving the relationships among the four *Ouratinae* genera. Being unable to anticipate future phylogenetic results, for now we adopt a conservative approach and adhere to generic concepts based on morphology.

The generic name *Gomphia* Schreb. [1789] is to be regarded as a synonym of the older *Ouratea* Aubl. [1775], following a

complex lectotypification (Kanis 1967, Bittrich & Amaral 1994). Unfortunately, the latter publication was apparently missed by Verdcourt (2005), who followed Kanis (1967) and thus erroneously re-introduced the genus name *Gomphia* in African botanical literature.

Tropical African *Ochnaceae* have been treated in various Flora's (Bamps & Farron 1967, Hutchinson et al. 1954, Robson 1963, Verdcourt 2005). However, species occurring in the Lower Guinean area (part of the Guineo-Congolian floristic region, or phytochorion; White 1979) remain without a proper taxonomic treatment to date. Although Farron (1965, 1968, 1985) published important contributions to the taxonomy of African *Ouratinae*, relevant for this area, our knowledge about this group remains highly incomplete. This information gap is seen in many other plant groups and is especially relevant in the light of the fact that the lowland rain forests of the Lower Guinean region (notably those in Cameroon and Gabon) are regarded as the most species-rich of tropical Africa (Mutke et al. 2001, Linder 2001, Küper et al. 2004, Sosef et al. 2006, Estrella et al. 2012, Linder et al. 2012). For this area, taxonomic revisions are indispensable, since in some cases they directly contribute to datasets that help prioritize conservation efforts (e.g. Burgess et al. 2005). The Flore du Gabon production tries to address the knowledge gap (Sosef & Florence 2007), but its existence as well as the extraordinary species richness of Lower Guinea is further emphasized by the fact that all species in African *Ouratinae* that have been described during the past 25 years (e.g. Sosef et al. 2007, Bissiengou & Sosef 2008, this publication) are endemic or sub-endemic to Gabon. Along with the fact that the botanical exploration of Gabon is far from complete (Sosef et al. 2006), this means that still many other novelties may be expected to emerge from Gabon's lush vegetation (see for example Walters et al. 2011).

### MATERIALS AND METHODS

To perform the taxonomic revision of the genus *Campylospermum*, herbarium material from the following herbaria has been consulted (acronyms follow Thiers 2012): A, B, BAS, BM, BR,

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BRLU, C, COI, E, EA, FHO, G, K, L, LBV, LISU, LY, MA, MO, NEU, P, PRE, S, SRGH, US, WAG, Z.

All specimen data have been entered into the BRAHMS (Botanical Research and Herbarium Management System) database of the National Herbarium of the Netherlands (now part of the Naturalis Biodiversity Center). To perform an assessment of the IUCN category of threat for each taxon, the BRAHMS software was used in combination with ArcView 3.3 and the IUCN Red List add-in script developed by Moat (2007). Assignments follow the IUCN guidelines (IUCN Standards and Petitions Subcommittee 2011), but not the advice to set the cell width/height to 2 km. Instead, a sliding scale grid cell width is applied, which is deemed more appropriate for herbarium record data (Moat 2007). We define a 'location' as a single grid cell. All assignments will be sent to IUCN for approval in the near future, which is why we characterize them as 'preliminary' for now.

## NEW TAXA

### *Campylospermum auriculatum* Biss., *sp. nov.* — Fig. 1; Map 1

**Diagnosis** — This species resembles *C. schoenleinianum* (Klotzsch) Farron because of its auriculate to deeply cordate leaf base, but differs by the leaf blade being broader in the basal part, and by having caducous stipules, a serrate leaf margin, a flattened peduncle and shorter and more compact racemes of 3–11 cm long.

**Type.** *Strijk 73* (holo WAG; iso LBV), Gabon, Woleu-Ntem, Bordamur concession area, some 40 km from WWF-station, N1°14', E11°53', 10 Oct. 2002.

Understorey treelet up to 6 m tall. *Stipules* caducous, 3–5 mm long. *Leaves*: petiole 0–2 mm long; leaf blade elliptic-obovate to oblanceolate, (9–)14–24(–31) by (4–)6–8(–11) cm, base auriculate to deeply cordate, often clasping the twig, apex acute, coriaceous to thick leathery, margin serrate, upper surface glossy green, lower surface dull paler green; midrib flattened

above, prominent below, main lateral veins 10–20 mm apart, 16–19 on either side, curved upward to run parallel to the margin, intermediate lateral veins prominent on both sides, 0–2 in between each pair of main laterals, tertiary venation scalariform, very distinct on both sides. *Inflorescences* terminal or rarely axillary, its main axis 12–15(–18) cm long, flattened; racemes 1–6, 3–9(–11) cm long; pairwise scales absent; bracts persistent at the base of the raceme and pedicel, triangular, c. 3–5 mm long; cymules 5–9 mm apart, 2–4(–6)-flowered. *Flowers*: pedicel 5–7 mm, articulated at 2–3 mm from the base; sepals 5, ovate, in flower 7–8 by 2–3 mm, yellowish green, in fruit persistent and accrescent, 9–10 by 3–4 mm, bright red; petals 5, obovate, 7–12 by 3–4 mm, cuneate at base, rounded at apex, bright yellow; stamens 10, caducous, orange-yellow, filaments less than 1 mm long, anthers 3–4 mm long, transversely wrinkled, poricidal; ovary c. 2 mm wide; style c. 4 mm long, curved, yellow. *Fruits*: receptacle a ± flattened-globose shape, c. 5 mm wide, orange-red; drupelets 1–3 well developed per receptacle, reniform, c. 8 by 5 mm, black at maturity; cotyledons incumbent, dissimilar in size with a small outer cotyledon.

**Distribution** — Equatorial Guinea (Rio Muni) and Gabon (Woleu-Ntem province).

**Ecology** — In primary or secondary forest; on brown clay soil; at 475–600 m altitude.

**Phenology** — Flowers and mature fruits collected from October to November, flowers also observed in April, which coincides with the two rainy seasons.

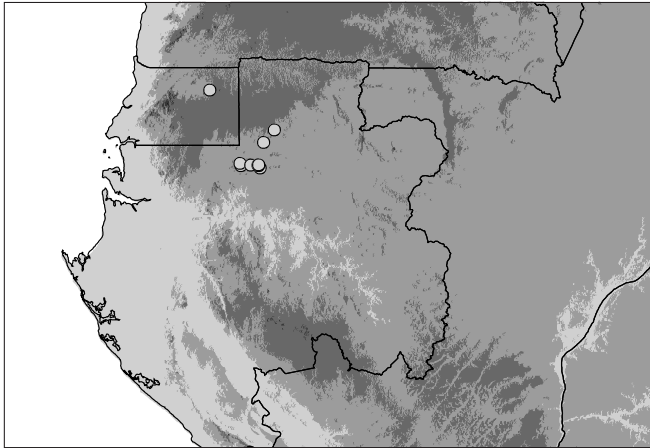
**Preliminary IUCN conservation status** — VU B1/B2ab(ii, iii, iv). EOO = 6098 km<sup>2</sup>, AOO = 1653 km<sup>2</sup>, locations = 7 (cell width = 15.37 km). All collections have been made recently (the oldest one is from 1983). The only collection from Equatorial Guinea is from within a protected area (Inselberg at Akuom). The other ten collections from Gabon are from a fairly restricted area where logging companies operate which may lead to a decline in the AOO and/or extent of suitable habitat and hence we propose the 'Vulnerable' category.



**Fig. 1** a. *Campylospermum auriculatum* Biss. (*Strijk 73*, holotype WAG); b. *Campylospermum auriculatum* in fruit. — Photo by Y. Issembé.



Fig. 2 a. *Campylosperrum gabonensis* Biss.; b. *C. gabonensis* subsp. *australis* Biss.; c. *C. glaucifolium* Biss. d. *C. occidentale* Biss. (a: Breteler 13124; b: Wieringa 2852; c: J.J. de Wilde 10165; d: Haegens 106; all holo WAG).



**Map 1** Distribution of *Campylospermum auriculatum* Biss. Background indicates altitude.

**Additional material.** EQUATORIAL GUINEA, Rio Muni, Wele Nzas: *Parmen-tier 358* (BRLU), Inselberg d'Akuom, à 1h30 de marche (6 km) du village de Nzuameyong, à 25 km d'Anisoc, N1°50' E10°55', 600 m, 13 June 1999 (st). – GABON, Woleu-Ntem: *Bissiengou 667* (LBV, WAG), c. 8 km SSW of Mitzic, FOREENEX forest exploitation, N0°42.9' E11°32.0', 547 m, 6 Nov. 2009 (fr); *Bissiengou 707* (LBV, WAG), 8.5 km SSW of Mitzic, FOREENEX forest exploitation, N0°42.5' E11°31.9', 501 m, 6 Nov. 2009 (fl); *Bissiengou 714* (LBV, WAG), 13 km SE of Mitzic, FOREENEX forest exploitation, road from forestry camp to Madouaka village, N0°42.4' E11°38.2', 480 m, 7 Nov. 2009 (fl); *Bissiengou 730* (LBV, WAG), 13 km SE of Mitzic, FOREENEX forest exploitation, road from forestry camp to Madouaka village, N0°42.1' E11°38.8', 490 m, 7 Nov. 2009 (fr); *Bissiengou 769* (LBV, WAG), 35 km NNE of Mitzic, forestry road in Bordamur forest exploitation, 2 km from forestry camp, N1°02.8' E11°43.3', 545 m, 8 Nov. 2009 (st); *Breteler 8797* (LBV, WAG), 30–40 km NE of Saint Germain, E of Okano River, c. N0°40' E11°40', 475 m, 18 Apr. 1988 (fl, fr); *A.M. Louis 377* (K, LBV, WAG), Oveng, 65 km N of road Benguie-Lalara, forest exploitation camp, N0°42' E11°23', 500 m, 5 Nov. 1983 (fl, fr); *Maas 10052* (LBV, WAG), RN 2, S of Mitzic, FOREENEX-concession, N0°42.8' E11°38.9', 503 m, 30 Oct. 2011 (fl); *Reitsma 2493* (WAG), Inventory Oveng, c. 25 km WSW of Mitzic, N0°44' E11°22', 6 Nov. 1986 (fl, fr).

**Note** — Especially the auriculate to deeply cordate leaf base is highly reminiscent of *C. schoenleinianum*, a species confined to western tropical Africa (from Guinea to Ghana).

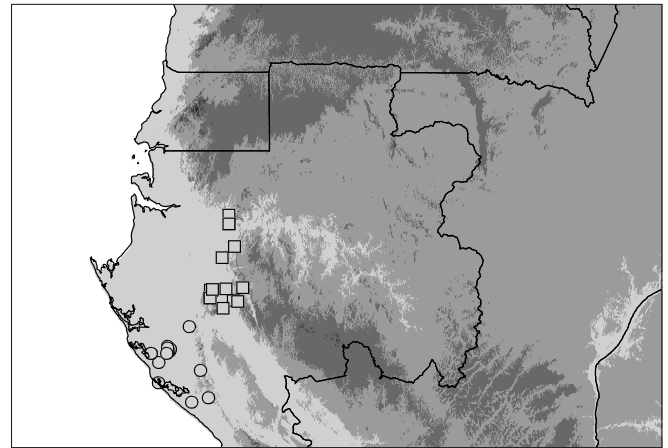
### *Campylospermum gabonensis* Biss., sp. nov.

**Diagnosis** — A species resembling *C. claessensii* (De Wild.) Farron, but with persistent, 7–15 mm long, stipules and an unbranched and compact inflorescence.

**Type.** *Breteler & Breteler-Klein Breteler 13124* (holo WAG; iso LBV, WAG), Gabon, Moyen-Ogooué, c. 20–30 km NNW of Ndjolé, N0°03' E10°45', 2 Oct. 1994.

subsp. ***gabonensis*** — Fig. 2; Map 2

Tree or treelet, up to 7 m tall. *Stipules* persistent, narrowly triangular, 7–15 cm long. *Leaves*: petiole canaliculated above, 3–7 mm long; leaf blade narrowly elliptic to narrowly elliptic-obovate, 16–30(–35) by 6–10(–11) cm, base cuneate to tapering, apex acuminate or sometimes acute, thick leathery to coriaceous, margin serrulate or sometimes entire toward the base, rarely entire, upper surface flat or rarely bullate, dark green, lower surface paler green, both sides glossy, young leaves purple-red; midrib flattened above, prominent below, main lateral veins 6–23 mm apart, 14–27 on either side, prominent on both sides, curved upward to run parallel to the margin, intermediate lateral veins not to slightly prominent on both sides, 0–2 in between each pair of main laterals, tertiary venation scalariform, running perpendicular to the midrib, indistinct on the upper side, slightly distinct on the lower. *Inflorescences* terminal, unbranched, erect, compact, 3–13 cm long; peduncle robust; pairwise scales



**Map 2** Distribution of *Campylospermum gabonensis* Biss. subsp. *gabonensis* (□) and subsp. *australis* Biss. (○). Background indicates altitude.

persistent at the base of the peduncle, narrowly triangular; bracts persistent at the base of the cymule, triangular, 2–3 mm long; cymules 3–5(–10) mm apart, 4–8-flowered. *Flowers*: pedicel 5–15 mm, articulated at 3–9 mm from the base, pale green; sepals 5, ovate, in flower 7–9 by 2–3 mm, greenish, in fruit 9–10 by 3–4 mm, persistent and accrescent, red; petals 5, obovate, yellow, 10–15 by 5–9 mm, cuneate at base, rounded at apex; stamens 10, pale yellow, filaments less than 1 mm long, anthers 5–7 mm long, transversely wrinkled, poricidal; ovary c. 2 mm wide; style 6–7 mm long, curved. *Fruits*: receptacle a ± flattened-globose shape, 3–4 mm wide, red; drupelets 1–2 well developed per receptacle, ellipsoid, c. 7 by 5 mm, black at maturity; cotyledons incumbent, dissimilar in size with a smaller outer cotyledon.

**Distribution** — Endemic to Gabon (Moyen-Ogooué and Ngounié provinces).

**Ecology** — In primary and secondary forest, sometimes along rivers or streams; at 70–400 m altitude.

**Phenology** — Flowers observed from August to November and in April; fruits collected from October to January.

**Preliminary IUCN conservation status** — VU B1ab(iii, iv). EOO = 4476 km<sup>2</sup>, AOO = 2348 km<sup>2</sup>, locations = 10 (cell width = 15.32 km). All known records of this taxon are from areas exposed to mining and/or logging activities rendering a projected decline in its AOO and/or quality of the habitat most likely and hence we propose the 'Vulnerable' category.

**Additional material.** GABON, Moyen-Ogooué: *Azizet Issembé 176* (LBV, WAG), Camp Mboumi, Base, c. S0°25' E10°50', 16 Aug. 1999 (fl); *Breteler 10375* (LBV, WAG), Missanga, 5–15 km NNW of Ndjolé, c. E0°05' E10°45', 11 Nov. 1991 (fl); *Breteler 10983* (WAG), 5–30 km NNW of Ndjolé, c. S0°05' E10°45', 21 Apr. 1992 (fl); *Breteler 14655* (WAG), M'Boumi, chantier SHM, c. 30 km S of Ndjolé, on border of the Ogooué river near Ndjolé, S0°25' E10°50', 17 Nov. 1998 (st); *Breteler 14658* (LBV, WAG), idem; *Dibata 66* (LBV, MO, WAG), ENE de Belle Vue, Layon x, S0°35' E10°39', 23 Jan. 1987 (fl). Ngounié: *Bissiengou 610* (LBV, WAG), along a forestry road of chantier EFT (Exploitation Forestière de Tsanba) starting at Ndjemba village on Fougamou-Lambaréné road, S1°03.7' E10°28.6', 129 m, 29 Oct. 2009 (fl); *Bissiengou 627* (LBV, WAG), idem, S1°10.9' E10°28.4', 165 m, 29 Oct. 2009 (fl); *Bissiengou 628* (LBV, WAG), idem; *Bissiengou 1432* (LBV, WAG), Sindara, après village Matadi 7 route exploitation forestière EGG (ancien IFL), S1°02.76' E10°42.50', 72 m, 22 June 2011 (st); *Bissiengou 1451* (LBV, WAG), Fougamou, village Nzemba route du chantier forestier EGBD, entrée école, S1°03.06' E10°30.37', 97 m, 24 June 2011 (st); *Bissiengou 1452* (LBV, WAG), idem; *Breteler 5725* (WAG), 50 km SE of Lambaréné, c. S1°04' E10°30', 28 Sept. 1968 (fl); *Breteler 14052* (WAG), between Yombi and Fougamou, E slope of Koumounabouali ridge, c. S1°20' E10°40', 22 Sept. 1997 (st); *Leeuwenberg 13617* (WAG), right bank Ngounié R., SE of Sindara, km 17 SW of Chantier Waka, S1°13' E10°49', 400 m, 22 Sept. 1985 (fl); *A.M. Louis 1324* (WAG), 2–3 km SE of Forestry Camp Waka situated ± 32 km SE of Sindara, Waka R. Basin, c. S1°14' E10°53', 350 m, 12 Dec. 1983 (fr); *Wieringa 4402* (WAG), 2 km on the road branching off near Ikobey to Magonga, S1°01.67' E10°57.46', 200 m, 25 Nov. 2001 (fr).

subsp. ***australis*** Biss., *subsp. nov.* — Fig. 2; Map 2

**Diagnosis** — Like the typical subspecies, but the leaf blade bullate between the lateral veins or rarely flat and the scalariform tertiary veins running perpendicular to the main lateral veins.

**Type.** *Wieringa 2852* (holo WAG; iso BR, LBV, MO), Gabon, Ogooué-Maritime, Rabi, 0.6 km on the road to platform Rabi 78, S1°55.1', E9°50.8', 4 Oct. 1994.

**Distribution** — Endemic to Gabon (Ogooué-Maritime, western Ngounié and Nyanga provinces).

**Ecology** — In primary, moist and wet forest, in valleys with small streams; on sandy soil; at 3–350 m altitude.

**Phenology** — Flowers observed from October to December; fruits collected from October to January.

**IUCN conservation status** — VU B1/B2ab(ii, iii, iv). EOO = 6862 km<sup>2</sup>, AOO = 1545 km<sup>2</sup>, locations = 10 (cell width = 12.43 km). This taxon is known only from 15 recent collections, five of which fall within the Loango National Park and the Moukalaba-Doudou National Park. The remaining ten collections originate from logging and oil concessions while even the Loango park is under development threat from Chinese mining companies. Therefore this subspecies is best placed in the category 'Vulnerable'.

**Additional material.** GABON, Ngounié: *Le Testu 5834* (BR, P), Agouma, c. S1°36' E10°10', Dec. 1925 (st). Nyanga: *Jongkind 5734* (LBV, WAG), Doudou Mountains, Chantier SFN-Bakker, S2°39.2' E10°27.0', 180 m, 22 Nov. 2003 (st). Ogooué-Maritime: *Arends 635* (WAG), Monts Doudou, W of Dousala and Réserve de Faune de Moukalaba, c. S2°15' E10°20', 350 m, 5 Dec. 1984 (fr); *van Bergem 126* (WAG), savannah road to Vera, 32 km E from junction to Mayonami, S2°43.4' E10°12.2', 70 m, 21 Nov. 1995 (fr); *Breteler 10152* (WAG), Rabi-Kounga, Echira road, c. S2°00' E9°50', 27 Oct. 1991 (fl); *Farron 7416* (P), Koumouloundou, route d'accès au Rembo-Rabi, S2°00' E9°36', 10 June 1970 (fl); *Haegens 89* (WAG), Rabi, W of Shell platform 76, S1°57' E9°51', 30 m, 2 Dec. 1993 (fl); *van Nek 117* (WAG), Rabi-E, N of Pechoud Camp, S1°56.5' E9°52.9', 26 Oct. 1990 (st); *van Nek 289* (LBV, MO, WAG), Rabi-NW, near Rembo Rabi, NW of Rabi site, S1°53.7' E9°50.7', 13 Nov. 1990 (fl); *van Nek 560* (LBV, WAG), near Rabi, S1°57.6' E9°52.8', 11 Jan. 1991 (fr); *Schoenmaker 34* (WAG), Rabi-Kounga, opposite Buzzichelli, S1°56' E9°53', 15 Oct. 1991 (fl); *Schoenmaker 134* (WAG), Rabi-Kounga, direction Echira, c. S1°59' E9°51', 11 Nov. 1991 (fl); *J.J.F.E. de Wilde 9843* (LBV, WAG), 30 km S of Rabi, high bank of an affluent of the Echira River, S2°08' E9°43', 15 m, 28 Nov. 1989 (fr); *J.J.F.E. de Wilde 11363* (LBV, WAG), Gamba, N'Dogo Lagoon, near Sounga, S2°25.9' E9°42.7', 3 m, 10 Dec. 1994 (fl).

**Notes** — This subspecies can be added to the list of taxa endemic to the greater Loango-Rabi area (Wieringa & Mackinder 2012). It is also an addition to the recently published checklist of Loango National Park (Harris et al. 2012), and provides further evidence for the unique vegetation in this part of Gabon (Wieringa & Sosef 2011).

Apart from the fact that the material shows a scalariform venation different from that of the typical subspecies, and a tendency to have more obviously bullate leaves, there seem to be no other differentiating characters. This, together with the parapatric distribution of the two entities, made us decide to distinguish the taxon at the subspecies level.

***Campylospermum glaucifolium*** Biss., *sp. nov.* — Fig. 2; Map 3

**Diagnosis** — A species resembling *C. calanthum* (Gilg) Farron, but with a glaucous upper leaf surface (at least when dry), longer petiole, and a pendulous inflorescence that carries 0–2(–3) racemes.

**Type.** *J.J. de Wilde et al. 10165* (holo WAG; iso LBV), Gabon, Estuaire, 1 km W of Nkan, along the road from Assok to Méla, N0°40', E10°19', 23 Jan. 1991.

Treelet up to 2 m tall. *Stipules* caducous, 2–3 mm long. *Leaves:* petiole 7–15(–20) mm long, canaliculate above; leaf blade narrowly elliptic to narrowly elliptic-obovate, 13–25(–30) by 4–7(–8) cm, base cuneate, apex acuminate, leathery to coriaceous,

margin serrulate, upper surface glossy, dark green but turning glaucous when dry, lower surface pale green, young leaves reddish; midrib generally prominent on both sides, main lateral veins 10–15 mm apart, 14–16 on either side, slightly prominent above, prominent below, curved upward to run parallel to the margin, tertiary venation scalariform, running perpendicular to the midrib thus causing the formation of a decreasing series of intermediate lateral veins, indistinct above, distinct below. *Inflorescences* terminal, pendulous, (9–)15–33 cm long; peduncle slender; racemes 0–2(–3), 3–6(–10) cm long; pairwise scales persistent at the base of peduncle; bracts caducous, triangular, c. 2–3 mm long; cymules 0.5–1(–1.5) cm apart, 1–4-flowered. *Flowers:* pedicel 3–12 mm, articulated at 1–3 mm from the base; sepals, ovate, in flower 6–7 by 2–3 mm, green-yellowish, in fruit 8–9 by 3–4 mm, persistent and accrescent, bright red; petals obovate, 7–9 by 4–5 mm, shortly clawed at base, rounded at apex, bright yellow; stamens 10, filaments less than 1 mm long, anthers 5–6 mm long, transversely wrinkled, poricidal; ovary c. 2 mm wide; style slender, 6–7 mm long. *Fruits:* receptacle a ± flattened-globose shape, c. 3 mm wide, red; drupelets 1–4 well developed per receptacle, reniform, black at maturity; cotyledons accumbent, similar in size.

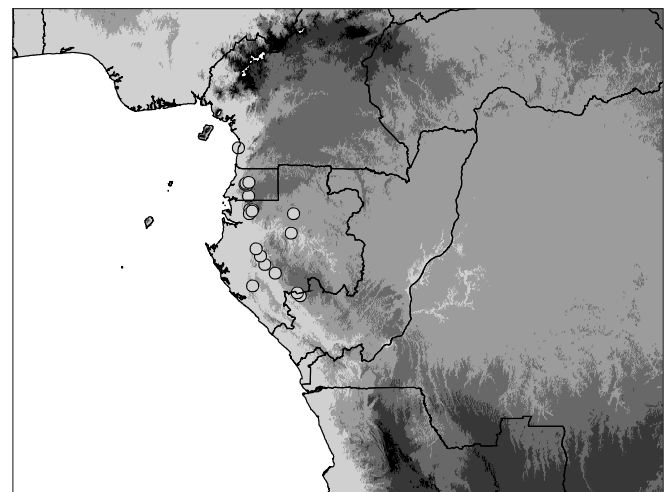
**Distribution** — Continental Equatorial Guinea (Rio Muni), Gabon and south-western Republic of the Congo (Niari).

**Ecology** — In primary and secondary forest, on creek banks and adjacent to swampy areas; at 210–1000 m altitude.

**Phenology** — Flowers collected in January, April, July and August; fruits collected from March to May and in August.

**Preliminary IUCN conservation status** — LC. EOO = 72,683 km<sup>2</sup>, AOO = 23,157 km<sup>2</sup>, locations = 9 (cell width = 50.79 km). This species, although being sub-endemic to Gabon, has a fairly wide distribution and hence its EOO and AOO are comparatively large, and above the IUCN thresholds. Potential future threats could come from habitat destruction (logging or land transformation) but a fair number of populations are located within protected areas (PN de Monte Alén, Monts de Cristal NP, Waka NP, Lopé Reserve). Therefore, the category of 'Least Concern' is here proposed.

**Additional material.** CONGO (BRAZZAVILLE), Niari: *Bissiengou 1326* (LBV, WAG), route Malinga-Divénié, 4 km du village Mollo, S2°29.64' E12°09.61', 480 m, 13 June 2011 (st). — EQUATORIAL GUINEA, Rio Muni, Centro Sur: *Desmet, G. 242* (BRLU), Mundung 'Les 4 montagnes', N1°38' E10°11', 1000 m, 8 Jan. 2003 (fr); *Ngomo 418* (BRLU), Parc National de Monte Alén, c. N1°40' E10°17', 30 July 1998 (fl); *Pérez Viso 1139* (MA), Parque Nacional de Monte Alén, Esamalang, camino hacia Mondung, c. N1°33' E10°12', 13 May 1999 (fr); *Senterre 4122* (BRLU), Parc National de Monte Alén, 11 km à l'Est de la cabaña de Mosumo, N1°36.4' E10°08.5', 12 July 2003 (st); *Wilks 1796* (LBV, WAG), Monts de Cristal, 10 km ENE d'Okuamkos, N1°10' E10°16', 12 Aug. 1988 (fl). — GABON, Estuaire: *J.J.F.E. de Wilde 10257* (LBV, WAG),



**Map 3** Distribution of *Campylospermum glaucifolium* Biss. Background indicates altitude.

Crystal Mountains, 25 km on the road Tchimbélé-Kinguélé, N0°31' E10°18', 360 m, 26 Jan. 1991 (fl). Ngounié: *A.M. Louis 3058* (LBV, WAG), route chantier Leroy Massika entre Mouila et Yeno, S1°40' E11°15', 600 m, 27 Apr. 1989 (fr); *Bissiengou 1343* (LBV, WAG), route Malinga-Rebé, S2°23.07' E12°03.35', 489 m, 14 June 2011 (st); *Bissiengou 1436* (LBV, WAG), Sindara, après village Matadi 7 route exploitation forestière EGG (ancien IFL), S1°02.26' E10°42.47', 49 m, 22 June 2011 (st); *Wieringa 5192* (LBV, WAG), upper Waka area, 13 km on IFL forestry road B2, S1°20.5' E10°52.2', 180 m, 31 Mar. 2004 (fr). Ogooué-Ivindo: *Bissiengou 1056* (LBV, WAG), Nord-Est du parc de la Lopé, 25 km du carrefour qui mène à l'ancien Bououé Bac, S0°11.42' E11°50.05', 251 m, 6 Mar. 2010 (fr); *Dibata 117* (MO, WAG), Chantier Koumameyong, côté rivière-Marécage à raphia, c. N0°31' E11°55', Mar. 1987 (fr). Ogooué-Maritime: *van Valkenburg 3162* (BR, LBV, MO, WAG), old logging road leading southward from chantier CBG Peni, S2°07.76' E10°24.95', 210 m, 22 Apr. 2005 (fl). Woleu-Ntem: *Bissiengou 967* (LBV, WAG), Parc des Monts de Cristal, le long de la rivière Mbé, piste après la case picnic sur la droite, c. N0°37' E10°24', 13 Feb. 2010 (st); *Wieringa 500* (BR, C, LBV, MO, PRE, WAG), Crystal mountains, 5.5 km NNE of Tchimbélé, N0°40' E10°25', 31 Jan. 1990 (fl).

***Campylospermum occidentale* Biss., sp. nov.** — Fig. 2; Map 4

**Diagnosis** — A species similar to *C. paucinervatum* Sosef, but leaf blade papery, with an acuminate apex, entire to serrulate margin and 7–11 main lateral veins on either side of the midrib; inflorescence lax, 4–8(–12) cm long, with 1–4(–6) racemes of 1–7(–11) cm long; pedicels 10–15 mm, articulating at 2–5 mm from the base.

**Type.** *Haegens & v.d. Burgt 106* (holo WAG; iso LBV), Gabon, Ogooué-Maritime, Rabi-Kounga, road to Divangui, S1°54', E9°55', 6 Dec. 1993.

Treelet up to 4 m tall. *Stipules* caducous, 2–3 mm long. *Leaves*: petiole 2–5 mm long; leaf blade narrowly elliptic to narrowly elliptic-obovate, 6–15 by 1.5–4.5 cm, base cuneate, apex acuminate, papery, margin entire to serrulate, glossy dark green above, paler green below; midrib slightly prominent above, prominent below, main lateral veins 9–10 mm apart, 7–11 on either side, curved upward to run parallel to the margin, tertiary venation distinct on both sides, scalariform, running perpendicular to the midrib thus causing the formation of a series of slightly prominent intermediate lateral veins. *Inflorescences* terminal, lax, 4–8(–12) cm long; peduncle slender; racemes 1–4(–6), 1–7(–11) cm long, held ± horizontally, not seldom with secondary branches; pairwise scales at the base of peduncle absent; bracts early caducous; cymules (5–)10–15 mm apart, 1–2(–3)-flowered. *Flowers*: pedicel 4–10(–15) mm, articulated at 1–6 mm from the base; sepals ovate, in flower 5–7 by 2–3 mm, greenish yellow, in fruit 6–7 by 3–3.5 mm, persistent and accrescent, red; petals obovate, 5–11 by 4–7 mm, cuneate at base, rounded to emarginate at apex; stamens 10, yellow-orange, filaments less than 1 mm long, anthers 3–4 mm long;

ovary c. 2 mm wide; style slender, curved, c. 4 mm long. *Fruits*: receptacle a ± flattened-globose shape, c. 3 mm wide, red; drupelets 1–3 well developed per receptacle, ellipsoid, c. 8 by 5 mm, orange to orange-red at maturity; cotyledons incumbent, similar in size.

**Distribution** — Endemic to Gabon, only found in the coastal plain, in the Ogooué-Maritime (Rabi-Kounga) and Estuaire (Mondah forest and Bikele) provinces.

**Ecology** — Primary and secondary, moist forest, near swampy areas; on sandy soil; at 5–30 m altitude.

**Phenology** — Flowers collected from August to November, coinciding with the end of the long dry season and start of the main rainy season; mature fruits from November to December.

**IUCN conservation status** — VU. B1ab(ii, iii, iv). EOO = 5959 km<sup>2</sup>, AOO = 3388 km<sup>2</sup>, locations = 4 (cell width = 29.10 km). This species seems to have a disjunct distribution, but this is uncertain because the area between the two occupied areas is not well explored. In a situation involving a disjunct distribution the sliding scale grid size method leads to an overly large estimation of especially the AOO. Some of the occurrences in the vicinity of the capital Libreville are under threat of habitat destruction due to urbanization and overexploitation. This is likely to lead to a decline in the area of occupancy and/or number of populations or even extent of suitable habitat and hence we propose the category 'Vulnerable'.

**Additional material.** GABON, Estuaire: *A.M. Louis 1201* (WAG), secondary forest ± 17 km E of Libreville, S of Bikelé village, N0°23' E9°35', 7 Dec. 1983 (fr); *Bissiengou 815* (LBV, WAG), Mondah forest, parcelle des conservateurs, N0°35' E9°20', 10 Nov. 2009 (fl); *Breteler & J.J.F.E. de Wilde 386* (BR, C, K, LBV, MO, P, PRE, SRGH, WAG), Mondah forest, 25 km along the road Libreville-Cap Esterias, N0°32' E9°23', 5 m, 2 Sept. 1978 (fl); *de Saint Aubin 2076* (P), 18 km E de Libreville, c. N0°24' E9°34', Oct. 1961 (fl); *Reitsma 1328* (MA, WAG), between Cap Santa Clara and Cap Esterias, N0°34' E9°22', 15 Aug. 1985 (fl); *Wilks 1632* (MO, WAG), Forêt de Mondah, N0°35' E9°20', 16 Sept. 1987 (fl, fr); *Wilks 2090* (LBV, MO, P, WAG), Nyonyie survey, around 1600 m on transect S, S0°02.9' E9°23.0', 3 July 1990 (fl, fr); *Wilks 2097* (MO, WAG), Nyonyie survey, 2710 m on transect S, S0°03.5' E9°23.0', 4 July 1990 (fl). Ogooué-Maritime: *Breteler 10161* (LBV, WAG), Rabi-Kounga, Echira road, c. S2°00' E9°50', 27 Oct. 1991 (fl); *J.J.F.E. de Wilde 9725* (WAG), 1 km on the road Rabi-Divangui, S1°54' E9°53', 25 Nov. 1989 (fr); *Schoenmaker 135* (WAG), Rabi-Kounga, direction Echira, c. S1°59' E9°51', 11 Nov. 1991 (fl).

## NEW COMBINATIONS

***Campylospermum andongensis* (Hiern) Biss., comb. nov.**

*Ouratea reticulatum* (P.Beauv.) Engl. ex Gilg var. *andongensis* Hiern, Cat. Afr. Pl. 1 (1896) 122. — *Monelasmum andongensis* (Hiern) Tiegh. (1902) 328. — *Ouratea andongensis* (Hiern) Exell (1927) 58. — Type: *Welwitsch 4604* (holo LISU; iso BM), Angola, Pungo Andongo, 1857.

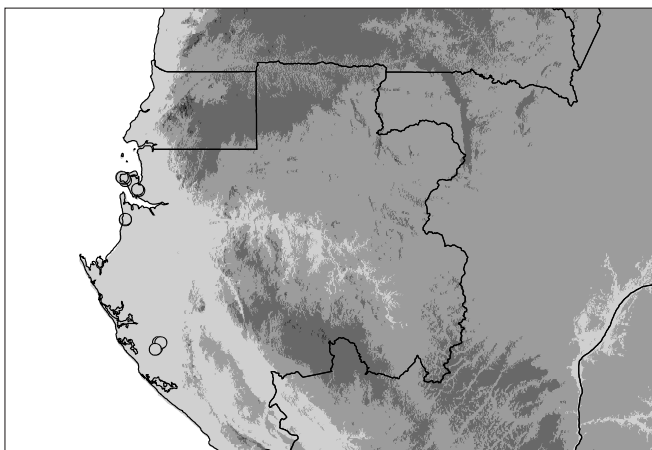
***Campylospermum costatum* (Tiegh.) Biss., comb. nov.**

*Monelasmum costatum* Tiegh., Ann. Sci. Nat., Bot., ser. 8, 16 (1902) 333. — *Campylospermum vogelii* (Hook.f.) var. *costatum* (Tiegh.) Farron (1965) 403. — Type: *Zenker 1762* (holo P; iso B, COI, G, K, L, LY, P, S, WAG), Cameroon, Bipinde, 1898.

***Campylospermum glomeratum* (Tiegh.) Biss., comb. nov.**

*Monelasmum glomeratum* Tiegh., Ann. Sci. Nat., Bot., ser. 8, 16 (1902) 330. — Type: *Thollon 140* (holo P; iso A, FHO, K), Gabon, Haut Ogooué, Feb. 1895.

**Note** — The name *Ouratea dusenii* Engl. & Gilg, published in 1903, has been used most often in literature as the correct name for this species. Recently, Bissiengou & Sosef (2008) transferred that name to the genus *Campylospermum*. However, it now turns out that the name *Monelasmum glomeratum* Tiegh. (with type specimen *Thollon 140*) refers to the same taxon and is thus also available. Since it was published in 1902, hence one year before *O. dusenii*, *Monelasmum glomeratum* Tiegh. has priority which necessitates the new combination *C. glomeratum* (Tiegh.) Biss.



**Map 4** Distribution of *Campylospermum occidentale* Biss. Background indicates altitude.

***Campylosperrum longestipulatum* (De Wild.) Biss., comb. nov.**

*Ouratea longestipulata* De Wild., Pl. Bequaert. 4 (1929) 492. — Type: *Zenker 3577* (holo BR; iso E, G, S, US), Cameroon, Bipinde, 1908.

***Campylosperrum lunzuensis* (N.Robson) Biss., comb. nov.**

*Ouratea lunzuensis* N.Robson, Bol. Soc. Brot., ser. 2, 36 (1962) 38. — *Gomphia lunzuensis* (N.Robson) Verdc. (2005) 47. — Type: *Bullock 3877* (holo K; iso BR, K), Zambia, Lunzua River, 19 miles W of Abercorn, 1951.

***Campylosperrum lutambensis* (Sleumer) Biss., comb. nov.**

*Ouratea lutambensis* Sleumer, Repert. Spec. Nov. Regni Veg. 39 (1936) 278. — *Gomphia lutambensis* (Sleumer) Verdc. (2005) 52. — Type: *Schlieben 6110* (holo B†; iso BR, G, Z), Tanzania, 50 km W. Lindi, Lake Lutamba, Noto Plateau, 9 Mar. 1935.

***Campylosperrum nutans* (Hiern) Biss., comb. nov.**

*Ouratea reticulata* (P.Beauv.) Engl. ex Gilg var. *nutans* Hiern, Cat. Afr. Pl. 1 (1896) 123. — *Monelasmum nutans* (Hiern) Tiegh. (1902) 328. — *Ouratea nutans* (Hiern) Exell (1927) 59. — Type: *Welwitsch 4606* (holo BM; iso K), São Tomé and Príncipe, Pico de Papagaio, Sept. 1853.

***Campylosperrum plicatum* (Tiegh.) Biss., comb. nov.**

*Monelasmum plicatum* Tiegh., J. Bot. (Morot) 16 (June 1902) 202. — Type: *Griffon du Bellay 296* (holo P), Gabon, Pyrat, Oct. 1863.

***Campylosperrum warneckeii* (Gilg ex Engl.) Biss., comb. nov.**

*Ouratea warneckeii* Gilg ex Engl., Veg. Erde 9, Die Pflanzenwelt Afrikas 3, 2 (1921) 490. — Type: *Warnecke 468* (holo Z; iso BM, E, EA, K), Tanzania, Amani, 1907.

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