

A revision of the genus *Sclerosperma* (Arecaceae)

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Summary. A taxonomic revision of the palm genus *Sclerosperma* (Arecaceae) is presented. Three species are recognised: *S. mannii* H. Wendl., which is relatively widespread from Liberia to the Democratic Republic of Congo; *S. walkeri* A. Chev., which is apparently confined to the interior of Gabon and a band along the Congo River; and *S. profiziana*, a new species previously considered conspecific to *S. mannii* that is found in southwest Ghana, Congo, the Democratic Republic of Congo and Angola. The taxonomic history, morphology, distribution and conservation status of the genus and each species are discussed.

Key Words. Africa, Arecaceae, evergreen rainforest, Lower Guinea, *Sclerosperma*.

Introduction

The first two authors of this paper first met in Rome in 2001 at a FAO workshop on prospects for the conservation and sustainable development of the rattan resource (Dransfield *et al.* 2002). One of us was then working in South-East Asia (Van Valkenburg 1997), the other in West and Central Africa (Sunderland 2000). In 2002, we became neighbours when the first author was appointed head of the Herbarium National du Gabon in Libreville, Gabon; the second author was still working at Limbe, Cameroon. We decided to join forces and focus on the poorly collected rattans of Gabon. During joint palm hunting trips, neither of us initially paid much attention to either *Podococcus* or *Sclerosperma*. It was only when the first author was working on the Arecaceae account for the ‘Checklist of Gabon’ (Van Valkenburg 2006) that he stumbled upon some obscure names. We decided to have a closer look at *Podococcus* and *Sclerosperma*. Two more fieldtrips to Gabon confirmed our ideas with respect to these names, and resulted in some fine collections of some long-forgotten species (Van Valkenburg *et al.* 2007).

Taxonomic History

The genus *Sclerosperma* was first described in 1864 by Gustav Mann and Hermann Wendl. on the basis of material belonging to *S. mannii* H. Wendl. collected by Mann in inundated forest near the Gaboon (now the

Ogooué) River from Point Clara upwards. Another palm species of the forest understorey, *Podococcus barteri* G. Mann & H. Wendl., also from Gabon, was described in the same paper, and the two taxa were presented in a fine illustration of African palms in Tabula 38. It was not until the 1930s that two additional species of *Sclerosperma* were described: *S. dubium* Becc. from Equatorial Guinea was described from a single carpological collection (Martelli 1934) and *S. walkeri* A. Chev. from Gabon was described from an infructescence and a juvenile leaf (Chevalier 1931). However, both species have remained somewhat enigmatic ever since. *Sclerosperma dubium* remained known from the type collections only, and aside from the type specimen in Paris, just one additional collection had been labelled as *S. walkeri*.

With new collections that arrived from West Africa, the circumscription of *S. mannii* in the second edition of the ‘Flora of West Tropical Africa’ (Russell 1968) was widened to include collections that have conspicuous undivided leaves originating from southwest Ghana.

In the Congo, a species of *Sclerosperma* with undivided leaves, known by its vernacular name ‘mabondo’, an appellation used by the inhabitants of the Kisantu region of the Democratic Republic of Congo (Profizi pers. comm.), was listed as *S. mabondo* De Wild. by Renier (1948). This name has been used in connection with the plants from the Congo Basin but appears to have never been validly published (Tuley

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1995). Jean-Pierre Profizi, who has undertaken detailed fieldwork in Congo (Brazzaville) as well as partial herbarium studies of the genus, recognised the name to be invalid and attempted to remedy the situation by preparing a manuscript naming it *S. gilletii*. Unfortunately, *S. gilletii* was also never validly published.

The issue of the taxonomic status of *Sclerosperma* with entire, undivided leaves in Ghana was also raised by Moore (1971) after his visit to both Ghana and Gabon. Consultation by the first author of the extensive herbarium collection of *Sclerosperma* material from Congo at Meise suggested that this material with undivided leaves deserved a distinct taxonomic status, supporting the conclusions of both Moore and Profizi. This was further supported by the examination of material from the Bailey Hortorium and Kew Herbarium and by the recent arrival of new collections from Ghana.

Although elaborately discussed by Raponda-Walker & Sillans (1961), *Sclerosperma walkeri* is merely mentioned as a species of doubtful status in the checklist of vascular plants of Gabon (Van Valkenburg 2006). However, a closer look at the protologue and examination of the type specimen from Paris, and the arrival of further new collections from Gabon, confirmed the status of *S. walkeri* (Van Valkenburg *et al.* 2007). A similar situation exists for *Podococcus acaulis* Hua, another understory palm found in Gabon that was described and then subsequently relegated to synonymy based on an incomplete understanding of the genus (Van Valkenburg *et al.* 2007; Van Valkenburg & Sunderland 2008).

The molecular phylogeny based on three chloroplast markers by Asmussen *et al.* (2006) placed *Sclerosperma* in the *Arecoideae* sub-family, but with no other well-supported relationships to other genera. The position of *Sclerosperma* has to be determined, and the sister genus of *Sclerosperma* still has to be determined.

At the generic level, recent phylogenetic studies have corroborated the unique morphological and palynological characters of *Sclerosperma* and placed the genus in a tribe of its own, *Sclerospermeae* (Dransfield *et al.* 2005).

Morphology

Habit

All species of *Sclerosperma* are small clustering understory palms, 2 – 6(– 12) m tall. They are unarmed, pleoanthic, monoecious palms that grow in tropical lowland rainforest, in swampy sites and, less commonly, on terra firma.

Stem

The stem in *Sclerosperma* is virtually absent and persisting underground, stout and possessing closely ringed leaf scars or extending horizontally and producing suckers, rarely producing a stem of 9 cm diameter and up to 2 m height in *S. profiziana*.

Leaves

The crown consists of numerous leaves, broadly radiating, pointing upwards, that accumulate debris, thereby obscuring the base of the plant. The leaves are reduplicate, undivided or irregularly pinnate, the apex deeply bifid with the rachis continued in a fibre. The petiole is long and slender, and the rachis bears a prominent ridge adaxially. The upper surface of the blade is dark green, whereas the undersurface is glaucous to silvery and with small scales along the veins.

Inflorescences

All *Sclerosperma* species have intrafoliar, solitary, spicate inflorescences, which are protogynous. The inflorescence is enclosed by a peduncular bract that becomes web-like in the median part at anthesis and that has a distal opening. This peduncular bract is somewhat persistent but generally disintegrates when fruits are fully developed. During anthesis of the female flowers, the inflorescence is reported to have an elevated temperature and to be filled with a transparent liquid at the base (Profizi, pers. comm.). Numerous Nitidulæ beetles visit the inflorescence at that time (Profizi, pers. comm.).

Flowers

The flowers are arranged in triads of two distal staminate and a proximal pistillate flower basally, or staminate flowers in the upper part of the rachis.

Pollen

Pollen grains of *Sclerosperma* are reported to be single, triangular, and heteropolar with a triporate, subapical and circular aperture, and to have an average diameter of (37 –) 45.7(– 59) µm (Uhl & Dransfield 1987; Harley 1999; Harley & Dransfield 2003).

Fruits and Seeds

The infructescences are often obscured by accumulated debris. The fruits are 1-seeded, globose and generally depressed apically around a short beak of stigmatic remains. They are dry; purplish to black at maturity. The seeds are globose and somewhat rough, with an elongated hilum, homogenous endosperm and basal embryo. Germination is remote-tubular with a bifid eophyll.

Distribution and Ecology

The genus *Sclerosperma* occurs from western Liberia to the tributary of the Congo River, as far east the border region with Rwanda and southeast into Kasai Orientale in the Democratic Republic of Congo. The distribution in West Africa appears to be rather disjunct with populations in Liberia, southwest Ghana and on both sides of the Nigeria–Cameroon border. *Sclerosperma mannii* is reported as being present on Bioko (Guinea López 1946; Aedo *et al.* 1999), although no specimens are cited from this island.

Sclerosperma is present in lowland evergreen forest (from sea level to 1,400 m) in swampy areas, in periodically flooded forest, in valley bottoms, and along streams and on riverbanks, but it also occurs on terra firma including low hills. The genus is present in old secondary forest dominated by okoumé (*Aucoumea klaineana*) and persists in secondary growth near human habitations, where its leaves are often collected for roof thatching. Preliminary conservation status assessments are provided following IUCN guidelines (IUCN 2001).

Taxonomic Treatment

Sclerosperma G. Mann & H. Wendl. (1864: 427); Wright (1902: 100); Renier (1948: 83); Tomlinson (1962: 103); Russell (1968: 161); Moore (1971: 111); Uhl & Dransfield (1987: 474); Tuley (1995: 93); Dransfield & Uhl (1998: 376). Type species *Sclerosperma mannii* H. Wendl.

Short or acaulescent, clustering, unarmed, pleoanthic, monoecious palms. *Stem*, if evident, creeping or erect, rather stout, closely ringed with leaf scars. *Leaves* undivided or irregularly pinnate, deeply bifid in juveniles, ascending; sheath rather short, splitting opposite the petiole, margins fibrous; petiole long, slender adaxially channelled, abaxially rounded; leaflets, when present, alternate to subopposite, of several narrow folds, midribs prominent, marginal ribs next largest, plication reduplicate, blade adaxially dark green, abaxially glaucous to silvery and with small scales along the veins, folds apically praemorse, margins minutely toothed, transverse veinlets not evident. *Inflorescence* interfoliar, concealed among the leaf bases and sometimes partially obscured by accumulated debris, spicate; peduncle very short, elliptic in cross-section, densely tomentose; prophyll strongly 2-keeled, becoming fibrous; peduncular bract longer than the

prophyll, tubular, forming a fibrous net around the flowers, apparently opening distally and inflorescence becoming partially exerted, two incomplete, pointed peduncular bracts born laterally just below the flowers; rachis longer than the peduncle, but short, bearing a few triads of flowers at the base and numerous rows of staminate flowers distally, triads each subtended by a shallow pointed fibrous bract, the distal staminate flowers by small acute bracts; floral bracteoles present in triads, flat, ± rounded and partially united. *Staminate flowers* in triads ± pedicellate and asymmetrical, distal flowers sessile, symmetrical; sepals 3, distinct, imbricate basally, elongate, tapering, truncate apically or with a short central point; petals 3, distinct, valvate but tips flattened and buds truncate apically, thick. *Stamens* 60 – 100, filaments very short, ± triangular, anthers elongate, basifixed, connective prominent, apiculate; dehiscence latrorse; pollen ± triangular, triporate, with reticulate, tectate exine; pistillode lacking. *Pistillate flowers* larger than the staminate, broadly ovoid; sepals 3, connate in a three-lobed, glabrous cupule or margins of two sepals distinct and imbricate, somewhat angled by mutual pressure; petals 3, distinct, asymmetrical, broadly imbricate with thick valvate tips; staminodes 6 (according to Uhl & Dransfield 1987), very small, triangular; gynoecium ovoid, unilocular, uniovulate, covered in thin brown scales, bearing a large, cap-like, 3-angled stigma; ovule ± pendulous, probably campylotropous. *Fruit* globose to obovoid depressed apically around a short beak of stigmatic remains, purplish to black at maturity; exocarp thin, mesocarp thin, parenchymatous with silica inclusions, endocarp bony, thick, irregularly and shallowly pitted externally, with basal pore region. *Seed* globose to obovoid, somewhat rough, hilum elongate, endosperm homogenous; embryo basal. *Germination* remote-tubular; eophyll bifid.

Key to the species of *Sclerosperma*

- 1a. Short or acaulescent, clustering palm to 6 (–12 m) tall, leaves undivided, petiole 60 – 100(– 400) cm long, rachis 150 – 200(– 400) cm long; blade elongate-cuneate in outline 20 – 60(– 140) cm at its largest width **2. *S. profiziana***
- 1b. Short or acaulescent, clustering palm to 5 m tall, leaves irregularly pinnate, petiole (60 –)150 – 300(– 400) cm long, rachis (80 –)150(– 200) cm long; blade elongate-cuneate in outline 2
- 2a. Leaflets 8 – 17(– 24), of several narrow folds (3 –)6 – 9(– 13) cm wide; rachis of infructescence 3 – 6 cm long, bearing up to 17 fruits, but in generally fewer; fruits 2.5 – 3(– 3.5) cm long, 2.2 – 2.9 cm in diameter..... **1. *S. mannii***
- 2b. Leaflets (20 –)25 – 40, of several narrow folds 1.2 – 6 cm wide; rachis of infructescence 6 – 11 cm long, bearing up to 30 fruits; fruits 4 – 5 cm long, 3 – 3.5 cm in diameter..... **3. *S. walkeri***

1. *Sclerosperma mannii* H. Wendl. in Mann & Wendland (1864: 427); Kerchov de Denterghem (1878: 35); Drude (1895: 136); Hua (1895: 315); Wright (1902: 101); De Wildeman (1928: 309); Pelle-

grin (1938: 56); Guinea López (1946: 246); Renier (1948: 83); Descoings (1961: 47); Russell (1968: 161); Moore (1971: 116) as *Sclerosperma* with dissected leaves; Letouzey (1978: 306); Tuley (1995: 93); Aedo *et al.*

(1999: 377); Govaerts & Dransfield (2005: 203); Valkenburg (2006: 321). Type: Gabon, Estuaire, Cap Santa Clara, 1861, *G. Mann* 1046 (holotype K!).

Sclerosperma dubium Becc. in Martelli (1934); Tuley (1995: 97); Govaerts & Dransfield (2005: 203); **synon. nov.** Type: Equatorial Guinea, Rio Muni, Ntüm Gebiet 1910, *Wölfert s.n.* (lectotype HBG!, isolectotype WAG!, **designated here**); Equatorial Guinea, Rio Muni, Ntüm Gebiet, 1910, *Wölfert s.n.* (paralectotype HBG!, **designated here**).

Short or acaulescent, clustering palm. *Stem*, if evident, very short, rather stout, closely ringed with leaf scars. *Leaves* divided, very large, deeply bifid in juveniles, ascending; sheath to 35 cm, splitting opposite the petiole, margins fibrous; petiole slender, 150–300 cm long, adaxially channelled, abaxially rounded proximally, becoming triangular distally; rachis 80–150 cm long, continuing in the terminal leaflet, abaxially rounded, adaxially with a prominent ridge, leaflets 8–17(–24), sub-opposite to alternate, folds 30–45(–63) × (3–)6–9(–13) cm, the upper leaflet deeply bifid, broadly rhomboid in outline, base of the upper leaflet asymmetrical, 30–45 × (20–)30–45 cm, midribs prominent, marginal ribs next largest, blade adaxially dark green, abaxially glaucous to silvery and with small scales along the veins, folds apically praemorse, margins minutely toothed, transverse veinlets not evident. *Inflorescence* solitary, interfoliar, concealed among the leaf bases and often partially obscured by accumulated debris; peduncle to 12(–19) cm long, elliptic in cross-section to 1.5 cm wide, densely tomentose; prophyll occasionally to 20 cm long; peduncular bract 18–25 cm long; rachis 10–14 cm long. *Staminate flowers* sepals 3, distinct 3–4 mm long; petals 3, distinct 6–8 mm long, elliptical; stamens c. 60, filaments very short, ±triangular; pistillode lacking. *Pistillate flowers* larger than the staminate, broadly ovoid; sepals 3, connate in a 3-lobed, glabrous cupule or margins of 2 sepals distinct and imbricate, somewhat angled by mutual pressure; petals 3, distinct, asymmetrical. Rachis of *infructescence* 3–6 cm long, bearing up to 17 fruits, but generally fewer. *Fruit* 2.5–3(–3.5) × 2.2–2.9 cm. *Seed* globose, 1.5–2.3(–2.5) × 2–2.5 cm (Fig. 1A–E).

DISTRIBUTION. *Sclerosperma mannii* appears to have a rather disjunct distribution with a population in Liberia and from southeast Nigeria southward to Congo and as far east as the border area of Congo and Rwanda. The species was reported to be present on the island of Bioko by Guinea López (1946) quoting Gómez Moreno, but without a specimen citation (no specimens to corroborate its presence on this island have been received from MA). **Map 1.** **LIBERIA.** Lower Margibi, along the Monrovia-Careysburg highway on your right, Zewald junction: LRC

factory, Karfier Clan, Zeor village, 50 m, 15 Dec. 2005, *D. Kwewon* 2005/1 (WAG!); 1904, *M. J. Dinklage s.n.* (HBG!).

NIGERIA. Cross River State, between mile 13–14 along Eket to Oron road, 330 m, 12 Sept. 1972, *Otedoh, M.O.* 7265 (K!); Ikot Opora, 2 Jan. 1965, *P. Tuley s.n.* (K!); Ojo road, 120 m, 4 May 1964, *P. Tuley* 604 (K!); Ojo Road, near Ikot Okpora, 14 July 1963, *P. Tuley* 654 (K!); Oban, S. Nigeria, 1911, *P. A. Talbot* 737 (BM!).

CAMEROON. Central Province, 1 km SW of Ngoumou, 19 Feb. 1977, *J. Lowe* 3167 (K!); about 6 km along the road from Ngoulemakong direction N, village Obégué is 2 km W of the road, about 1 km S of this village, 720 m, 26 Dec. 1997, *X. M. van der Burgt* 312 a (WAG!); **South Province**, Djoum to Sangmelima road at Alouma, 9 Sept. 1999, *T. C. H. Sunderland* 1863 (BR!, K!, MO!); **South-West Province**, South Korup Reserve, bank of Mana River, Map # NB 32 IV Buea-Douala, 50 m, 6 July 1983, *D. W. Thomas* 2247 (MO!); Korup National Park, 50 m, 5 Dec. 1984, *D. W. Thomas* 4143 (MO!); 15 miles W of Mamfe on Ikom road, Kembong F. R., 20 March 1957, *P. B. Tomlinson* 57/1 (BH!); Kembong forest reserve: near junction of Oban-Mamfe and Ikom-Mamfe roads, 16 March 1955, *P. W. Richards* 5215 (K!); Korup National Park, P plot, subplot 26A, 100 m, 3 Dec. 2005, *X. M. van der Burgt* 811 (SCA, WAG!, YA).

EQUATORIAL GUINEA. Rio Muni, Spanish Guinea, Ntüm Gebiet, 1910, *W. Wölfert s.n.* (HBG!, WAG!); 1910, *W. Wölfert s.n.* (HBG!); 1910, *W. Wölfert s.n.* (HBG!); Rio Muni, Litoral, Bata-Mbini Road, 17 km from Bata, 13 March 1997, *T. C. H. Sunderland* 1794 (K!, WAG!); Ndote Forest Reserve, 13 Sept. 1999, *T. C. H. Sunderland* 1868 (K!, WAG!).

GABON. Estuaire, in swampy places near the River Gaboon, from Point Clara upwards, 1 m, 1861, *G. Mann* 1046 (K!); about 89 km from Libreville on road to Mela, Nka'n, and Medouneu, 10 March 1971, *H. E. Moore Jr.* 9899 (BH!); Forêt de Mondah, sentier des conservateurs, 80 m, 27 April 2005, *J. L. C. H. van Valkenburg* 3235 (BR!, LBV!, WAG!); forest in mangrove, c. 17 km NE of Libreville, 5 m, 9 Aug. 1985, *J. M. Reitsma* 1306 (NY); **Ngounié**, road Fougamou to Lambarene near village Kesi, 90 m, 25 April 2005, *J. L. C. H. van Valkenburg* 3234 (BR!, LBV!, WAG!); **Nyanga**, Mayombe, sur la route de Massanga à Moabinako, 21 Oct. 1908, *G. M. P. C. Le Testu* 1428 (BM!, P); chantier SFN, 60 m, 2 Dec. 2003, *J. L. C. H. van Valkenburg* 2682 (K, LBV!, MO, P, SCA, WAG!); **Ogooué-Maritime**, former extraction road system accessible from Peni CBG chantier, 250 m, 24 April 2005, *J. L. C. H. van Valkenburg* 3230 (BR!, LBV!, WAG!).

ANGOLA. Cabinda, Mayombe, Portuguese Congo, Bucu Zau Maiombe, Jan. 1917, *J. Gossweiler s.n.* (BM!); Portuguese Maiombe: Chiluango, 1919, *J. Gossweiler s.n.* (K!); Mayombe, Portuguese Congo,

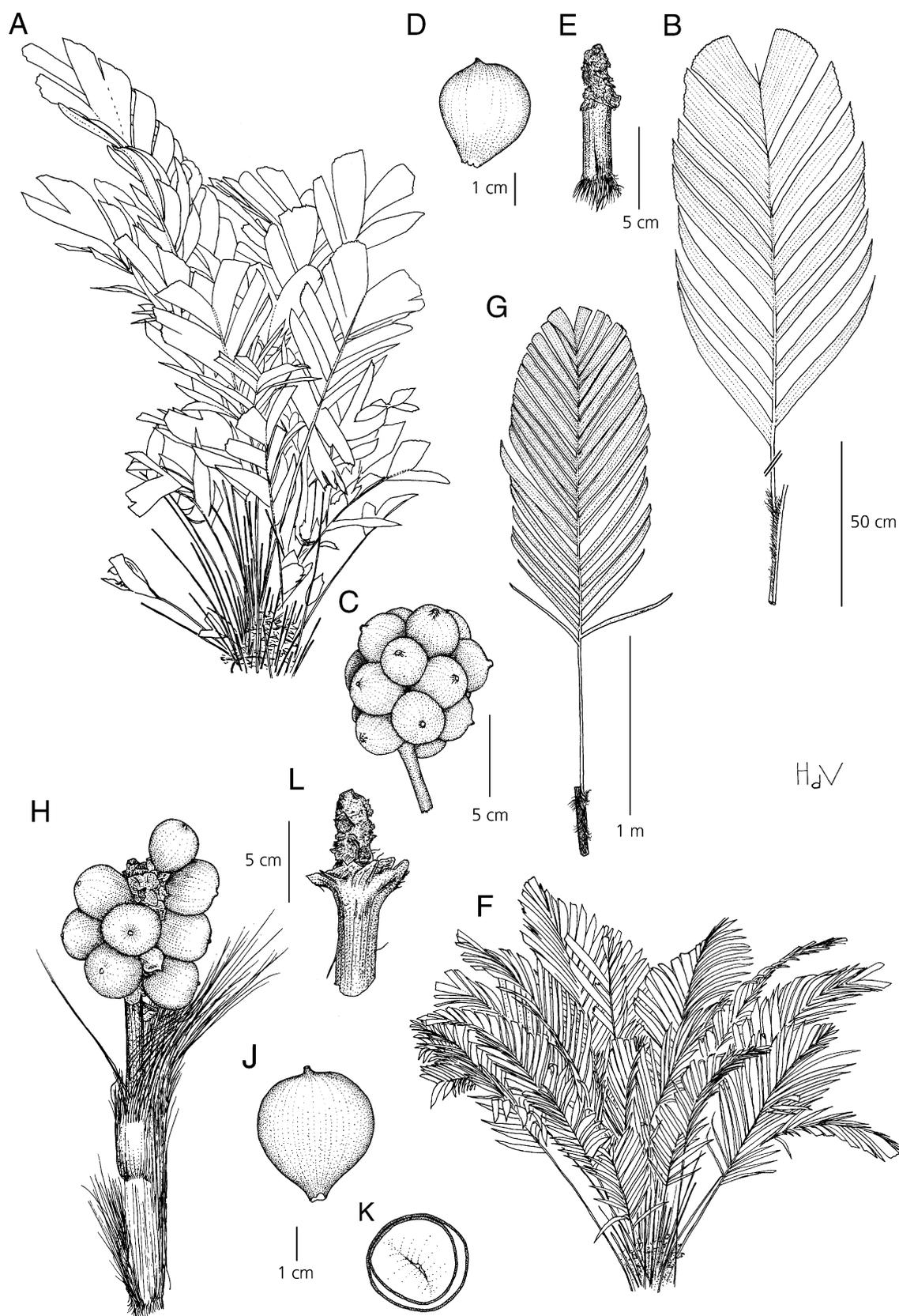
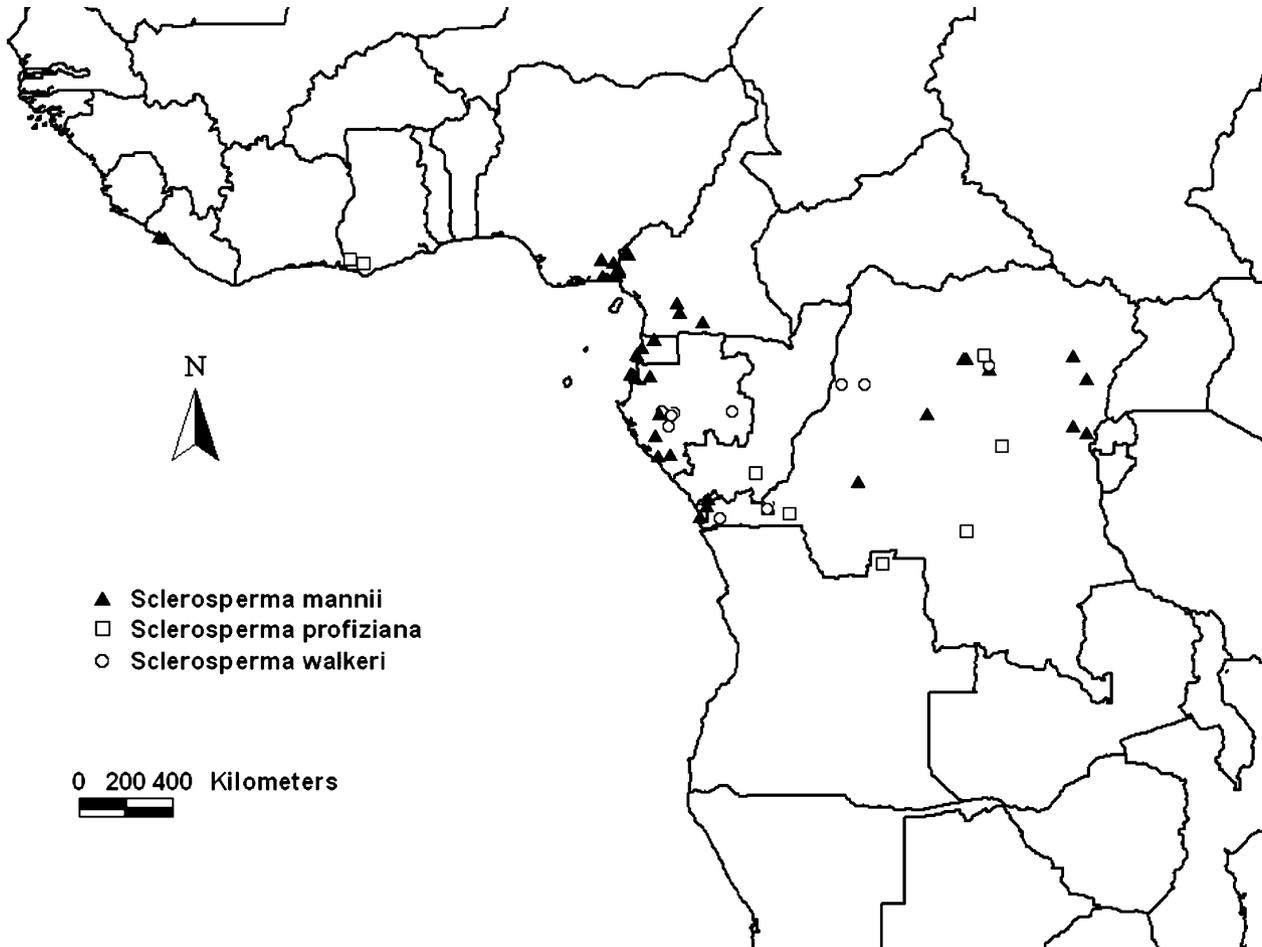


Fig. 1. A – E *Sclerosperma mannii*. A habit; B leaf; C infructescence; D fruit; E remnant of infructescence; F – L *Sclerosperma walkeri*. F habit; G leaf; H infructescence; J fruit; K fruit in cross-section; L remnant of infructescence. A from photo Valkenburg 3234, B, D, E from Valkenburg 3234, C from van der Burgt 312a, F from photo Sunderland 3031, G, L from Wieringa 5281, H – K from Donis 188. DRAWN BY HANS DE VRIES.



Map 1. Distribution of *Sclerosperma mannii*, *S. profiziana* and *S. walkeri*.

Pango Mungo, Jan. 1916, *J. Gossweiler* 6215 (BM!); Mayumbe, Portuguese Congo, Buco Zau Maiombe, 5 Nov. 1918, *J. Gossweiler* 7547 (BM!).

CONGO (KINSHASA). **Bandundu**, Entre la Kamtsha et Ipamu, July 1921, *H. J. R. Vandyerst* 10061 (BR!); **Equateur**, Besoi, 30 March 1991, *M. M. Dhetchuvi* 1117b (BRLU!); **Nord-Kivu**, Mont Bukukuha region Mangurejipa, 1000 m, 3 June 1956, *A. R. Christiaensen* 1749 (BR!); Nyamakombola, 18 Oct. 1989, *Terashima* 84 (BR!); **Orientale**, Ile en aval de Basoko, 11 Jan. 1904, *E. Laurent s.n.* (BR!); 15 km à l'O de Yangambi; entre la piste d'Isangi et le fleuve, 470 m, 11 Oct. 1939, *J. Louis* 16197 (BR!); Bambesa, 17 Nov. 1913, *J. C. C. Bequaert* 1202 (BR!); Tete/Gete (Penghe à Irumu), forêt de l'Ituru, 22 Feb. 1914, *J. C. C. Bequaert* 2659 (BR!); **Sud-Kivu**, Bukumbi, territoire Kalehe. Km 70 route Kavumu–Walikale, 1400 m, 18 June 1955, *A. R. Christiaensen* 908 (BR!).

HABITAT. Shrub layer in lowland evergreen rainforest, ranging from forest just behind the mangrove swamp forest, through periodically flooded forest, to valley bottom forest at higher elevations, persisting in secondary growth; 0 – 1,400 m.

CONSERVATION STATUS. Although this species is geographically widespread, it is highly localised with many disjunctions. As such, the species may be classified as Lower Risk within the sub-category Near Threatened, but given the extent of habitat loss throughout its range, particularly in West Africa, it could become Vulnerable in the medium-term future.

ETYMOLOGY. The species was named after the collector of the type, Gustav Mann (1836 – 1916), a Kew gardener and plant explorer.

VERNACULAR NAME(S). Bia (Baka, Cameroon, South Province), Kia (Bulu, Cameroon, South Province), Akoura (Fang, Rio Muni), Manga (Punu, Nzabi, Lumbu, Gabon), Mangana (Angola, Cabinda), N'Djwa (Turumbu, Congo [Kinshasa], Orientale), Mangobo (Kingwana, Congo [Kinshasa], Orientale), Nbya (Lega, Congo [Kinshasa], Nord-Kivu), Matukulu (Kitembo, Congo [Kinshasa], Sud-Kivu), Mangobo (Kiswahili, Congo [Kinshasa], Sud-Kivu), Mbia (Kir-ega, Congo [Kinshasa], Sud-Kivu).

The following names are listed in 'Les plantes utiles du Gabon' (Raponda-Walker & Sillans 1961) for Gabon: angokolo (Mpongwe); ipovo (Galoa); amanga

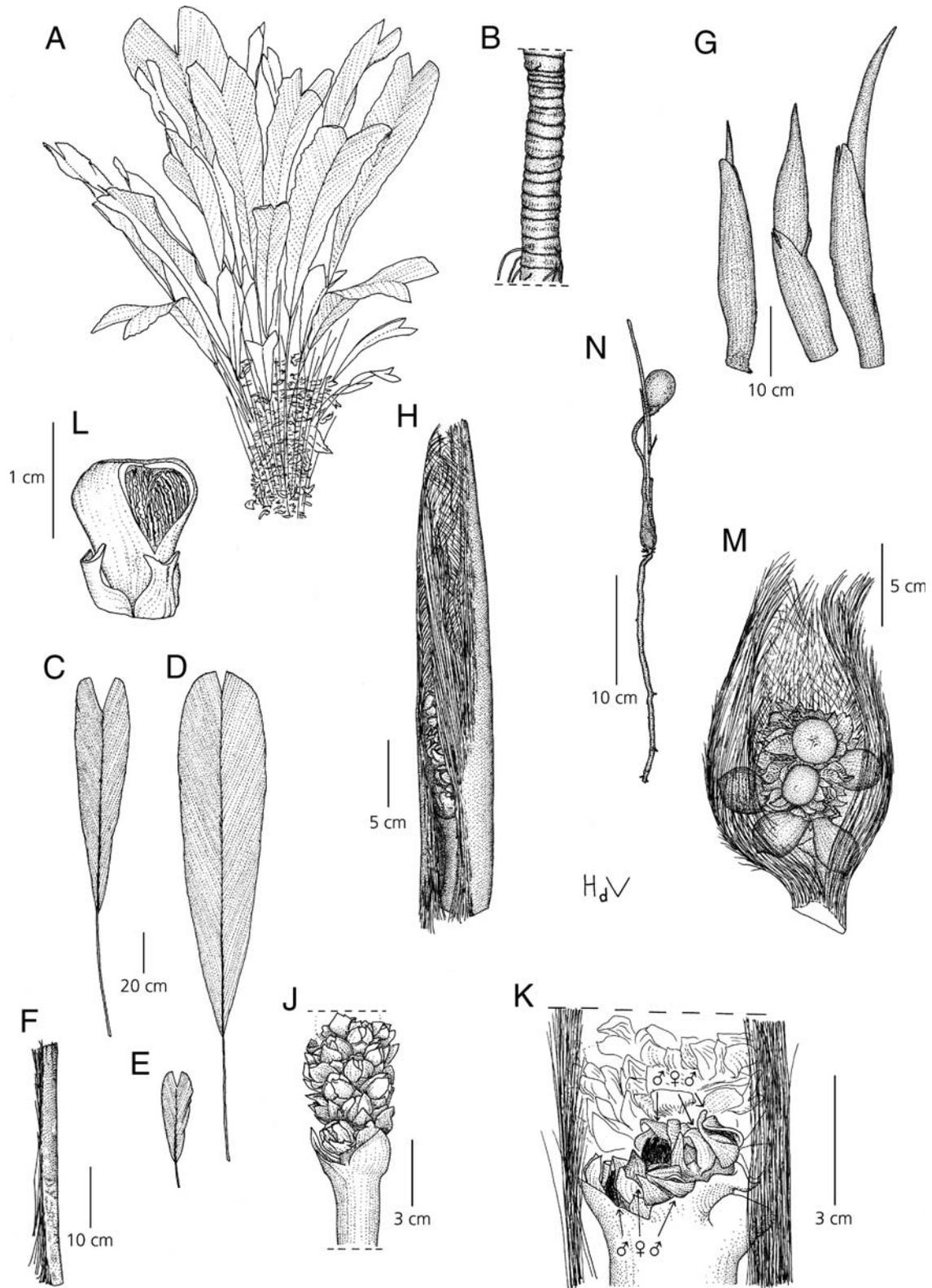


Fig. 2. *Sclerosperma profiziana*. A habit; B detail of trunk; C, D, E leaves; F basal part of petiole with leaf sheath; G various developmental stages of immature inflorescence; H inflorescence with prophyll removed; J detail of inflorescence with very young fruits; K detail of proximal part of inflorescence, peduncular bract partly removed, at staminate anthesis; L staminate flower from distal part of inflorescence at staminate anthesis; M infructescence with immature fruits, peduncular bract opened; N seedling. A from photo Hall & Enti GC 36150, B from photo Moore 9883, C – E, from Profizi 840, F, K, L, N from Gillet 279a (BR), G, M from Laurent 1054, H, J from Gillet 279a (WAG). DRAWN BY HANS DE VRIES.

(Nkomi, Orungu); akóra, mvyè (Fang); manga (Éshira, Bavarama, Bavunugu, Bapunu, Balumbu, Bavili, Baduma, Banzabi, Benga, Masangu, Ngowé); maga (Mindumu, Ambèdè); makaga (Apindji, Bavové); mbègò (Mitsogo); kóndjò (Ivéa); ingutuku (Bakota); mèkutuku, mèkétséké (Bakèlè); and mèngo-kulu, mèkétséké (Béséki).

Some of these refer to *Sclerosperma walkeri*, as no distinction is made between these species by local people. **USES.** The leaves are used for thatch throughout its range either whole or in an admixture with *Raphia* (Burkill 1997). In Gabon, the leaves are specifically used for the entrance of Bwiti temples, because of the silvery indumentum on the underside. In Cameroon, the petioles are reported to be used for mattresses (*van der Burgt* 312a). The young fruits, with the endosperm still relatively soft, are consumed locally.

NOTES. *Sclerosperma dubium* was described on the basis of a carpological collection in the Hamburg museum. Beccari stated that he initially considered the specimen to belong to *S. manni*. However, upon closer examination, he considered it to be sufficiently different with respect to the reticulation on the kernel and the position of the embryo. The botanical museum in Hamburg houses three samples collected by Wölfert, all bearing the same label information, one bottle contains a single fruit with the kernel cut lengthwise that is obviously well developed, 20 × 25 mm. This specimen can easily be matched with *S. manni*, and was identified as such on the label. Two other bottles contain a seemingly identical set of kernels, with *Sclerosperma* sp. written on the label. The dimension and the shape of the seeds match the protologue of *S. dubium*. We therefore consider these specimens to be the syntypes. The seeds in these two samples are on average smaller than those expected for *S. manni*, but it might well be that the seeds are not yet fully developed. Despite the slightly different colour and external aspect of the seeds, we consider them to fall well within the range of *S. manni*, and in the absence of any further diagnostic details, we hereby consider *S. dubium* to be a synonym of *S. manni*.

2. *Sclerosperma profiziana* Valk. & Sunder. sp. nov.

affinis *S. manni* sed caule 0.1 – 2 m altus; folia integra non praemorsa, interdum bifida. Infructescentiae rhachis, 6 – 10 cm longus, fructus c. 30 in quoque.

Typus: Congo (Kinshasa), Bas-Congo, terr. Madimba, Kisantu, '1913', *Gillet* 279a (holotypus WAG!, isotypus BR!, K!)

Gillet & *Pâque* (1910: 49) as Mabondo; *De Wildeman* (1928: 309) as *S. manni*; *Renier* (1948: 83) as *S. mabondo* De Wild.; *Descoings* (1961: 47) as *S. mabondo* De Wild.; *Tuley* (1995: 96) as *S. mabondo*; *Profizi* (manuscript) as *S. gilletii*;

Sclerosperma mabondo De Wild.; **nomen nudum.**

Sclerosperma gilletii Profizi (manuscript); *Harley* (1999: 108); *Harley* & *Dransfield* (2003: 3); **nomen nudum.**

Short or acaulescent, clustering palm to 6 (– 12) m height. *Stem* if evident, 1 – 2 m tall, rather stout, closely ringed with leaf scars. *Leaves*, undivided, very large, deeply bifid in juveniles, ascending; sheath to 40 cm, splitting opposite the petiole, margins fibrous; petiole robust, 60 – 100(– 400) cm long, adaxially channelled, abaxially rounded proximally, becoming triangular distally; rachis 150 – 200(– 450) cm long, abaxially rounded, adaxially with a prominent ridge, blade elongate-cuneate in outline, 20 – 60(– 140) cm at its largest width, undivided except for the bifid apex where the rachis is continued in a fibre and the margins are up to 15 cm long, blade adaxially shining dark green, abaxially glaucous and with small scales along the veins, margins minutely toothed, transverse veinlets not evident. *Inflorescence* solitary, interfoliar, concealed among the leaf bases and sometimes partially obscured by accumulated debris, spicate; peduncle to 15 cm long, elliptic in cross-section to 3 cm wide, densely tomentose; prophyll to 23 cm long; peduncular bract to 45 cm long; rachis at anthesis to 25 cm long, stout. *Staminate flowers* sepals 3, distinct 5 × 6 mm; petals 3, distinct 5 – 8 × 11 – 15 mm, obovate to elliptical; stamens c. 100, filaments very short, ±triangular, anthers elongate; pistillode lacking. *Pistillate flowers* larger than the staminate, broadly ovoid; sepals 3, connate in a 3-lobed, glabrous cupule or margins of two sepals distinct and imbricate, somewhat angled by mutual pressure; petals 3, distinct, asymmetrical. *Rachis of infructescence* 6 – 10 cm long, bearing up to 30 fruits. *Fruit* globose to obovoid, 3 – 3.5 × 3.8 – 4 cm to 4 – 4.5 × 2.5 – 3 cm (not yet mature). *Seed* globose to obovoid 3 × 3.5 cm to 3.5 × 3 cm (Fig. 2).

DISTRIBUTION. *Sclerosperma profiziana* has a clearly disjunct distribution with a population in southwest Ghana, and the other population in the larger tributary of the Congo River. A photographic record for southeast Nigeria of a *Sclerosperma* with undivided or minimally bifid leaves (*Tuley* 1995) is not corroborated by a herbarium voucher and so its presence in Nigeria is awaiting confirmation. Map 1.

GHANA. Western Region, 1 – 2 miles S of Ankasa F. R., 3 March 1971, *H. E. Moore Jr*: 9883 (BH!); Ankasa F. R., 29 June 1966, *J. B. Hall s.n.* (K!); probably 1 – 2 miles S of Ankasa F. R., 1966, *J. B. Hall s.n.* (BH!); Ankasa F. R., 29 Dec. 1966, *J. B. Hall* GC 36150 (BH!, K!); Neung North forest reserve, Adaieye hamlet (few huts), near 'mile 7' by mining road/track that runs W from Tarkwa–Takoradi road, branching W just S of Tarkwa. Fairly close to a huge open mining area,

and to the northern boundary of Neung forest reserve, 15 Nov. 2005, *W. D. Hawthorne* 205C 001 (FHO, WAG!); Enchi, Boi Tano Forest reserve, deep inside Boi Tano forest reserve, about half way toward western boundary and southern boundary with Tano R, from Samreboi. Somewhere in or near comt ?21, 2 Nov. 2000, *W. D. Hawthorne* 200B 183 (FHO!, GC, WAG!).

CONGO (BRAZZAVILLE). Pool, Dist. de Kindamba, N du village Tension, sur la rivière Moukala, 480 m, 2 April 1991, *Profizi, J. P.* 838 (K!); 480 m, 2 April 1991, *Profizi, J. P.* 840 (BR!); 480 m, 2 April 1991, *Profizi, J. P.* 841 (K!).

CONGO (KINSHASA). no date, *J. Gillet s.n.* (BR!); April 1914, *J. Gillet* 351 (BR!); **Bas-Congo**, Terr. Madimba, Kisantu, 1913, *J. Gillet* 279a (BR!, K!, WAG!); Lula Lumene, rivière Lumene, 1902, *J. Gillet* 2288 (BR!); **Kasai Oriental**, Rivière Movo (terr. Bakwanga), 5 Sept. 1957, *L. Liben* 3648 (BR!); **Maniema**, entre Okanga et Bena Camba, Nov. 1896, *A. Dewèvre* 1095 (BR!); **Orientale**, Mogandjo au N de Isangi, 10 March 1906, *M. Laurent* 1054 (BR!).

ANGOLA. Lunda Norte, islands in the Luembe R, 2002, *N. Grobbelaar s.n.* (K!).

HABITAT. *Sclerosperma profiziana* is found on relatively dry patches in swampy areas, in valley bottom forest, in forest that is often waterlogged or along streams.

CONSERVATION STATUS. Although this species is geographically locally common, it is highly localised with many geographical disjunctions. As such we suggest that, while the species may be classified as Lower Risk within the sub-category Near Threatened, given the extent of habitat loss throughout its range, particularly in West Africa, it could become Vulnerable in the medium-term future.

ETYMOLOGY. The species has been named after Jean-Pierre Profizi (8 June 1954 at Marseille) to acknowledge his efforts to clarify the status of this species.

VERNACULAR NAME(S). Tua (Zima, Ghana), Tu (Lari, Téké, Soundi, Congo [Brazzaville] Pool), Tuu (Bambenga, Congo [Brazzaville] Pool), Mabondo (Congo [Kinshasa], Bas-Congo), Mangobo (Congo [Kinshasa], Maniema).

USES. The leaves are widely used for thatch, and preferred to the *Sclerosperma* with divided leaves. In general, smaller leaves are used for thatch, as these are not yet damaged by the wind. In former times, the hard kernel was used to make rings and has been the subject of studies for its use as vegetable ivory for button manufacturing.

NOTES. *Sclerosperma* with undivided leaves was considered as a mere aberrant form of *S. mannii* in Anglophone taxonomic literature (Russell 1968). The circumscription of *S. mannii* in the 'Flora of tropical West Africa' was therefore very broad, accommodating the variation in leaf shape and the occasional formation of a small trunk, as observed in southwest Ghana. This species concept was also

adopted for the 'Genera Palmarum' treatment (Uhl & Dransfield 1987), despite the astonishing pictures of two extremely different leaf shapes (p. 149) based on the collections by Moore in Ghana and Gabon in 1971 (Moore 1971). However, in Francophone literature the name 'mabondo' emerged in the beginning of the 20th century to describe a *Sclerosperma* with undivided leaves from the Congo tributary. This name was used as a species epithet and ascribed to De Wildeman, although he never validly published this name. In 1990 and 1991, Jean-Pierre Profizi made elaborate collections of a *Sclerosperma* with undivided leaves in Congo (Brazzaville). He subsequently linked his material to "*S. mabondo*", prepared a taxonomic treatment of the species and made a first attempt to revise of the genus *Sclerosperma*. However, his manuscript was never published.

The fertile collections available for Ghana are very limited. The inflorescences at male anthesis (*Hall & Enti* GC 36150) appear to be of much more modest dimensions than those of specimens available from Congo. No fruit collections from Ghana are known and, as the infructescence is obviously accrescent, this further hampers delimitation of the species. We therefore consider all collections with undivided leaves that originate from Ghana and the larger Congo tributary to belong to the same species.

The material stored in a box at BR (with the external label 'Gillet 279') is a mixture of various collections, which apparently arrived at different dates. Two sheets, one with field tag 279, the other with an apparent original field label 279, were collected in 1899 (and probably arrived at BR in 1900); these represent a *Sclerosperma* with divided leaves, identified as *S. walkeri*. A third, (at present) unmounted, 'sheet' in a cover represents a *Sclerosperma* with undivided leaves. The species represented by this collection was apparently locally called Mabondo: a separate piece of paper states, "éléments botaniques du *Sclerosperma* sp. 'Mabondo' du frère Gillet de Kisantu pour le Jar Bot de Bruxelles". This leaf strongly resembles the two duplicates of 279 present at K and WAG; on the K and WAG sheet, the collection date mentioned is 1913, but this date does not figure in the BR box. In the K and WAG duplicates, two inflorescences are present; similar inflorescences are found in the BR box. These inflorescences, the single cover sheet with undivided leaf at BR, and the K and WAG duplicates are renumbered to 279a. Also present in the box at BR is a linen bag with a label mentioning the vernacular name 'Niagangu/Magangu', numerous kernels, a single fruit that fits exactly in an unlabelled infructescence, and an unlabelled infructescence with mature fruits attached. This material is renumbered as *Gillet s. n.* and identified as *S. walkeri*.

3. *Sclerosperma walkeri* A. Chev. (1931: 237); Tuley (1995: 96); Govaerts & Dransfield (2005: 203); Valkenburg (2006: 321). Type: Gabon, Ngounié, mission de Sindara, Jan. 1931, *Walker s.n.* (holotype P!).

Short or acaulescent, palm. *Stem* if evident, very short, rather stout, closely ringed with leaf scars. *Leaves*, divided, very large, deeply bifid in juveniles, ascending; sheath to 40 cm, splitting opposite the petiole, margins fibrous; petiole slender, 60 – 100(– 400) cm long, adaxially channelled, abaxially rounded proximally, becoming triangular distally; rachis 150 – 200 cm long, abaxially rounded, adaxially with a prominent ridge, leaflets (20 –)25 – 40, sub-opposite to alternate, folds 37 – 65 × 1.2 – 6 cm, the upper leaflet deeply bifid, broadly rhomboid in outline, base of the upper leaflet asymmetrical, 25 – 33 × 24 – 35 cm, midribs prominent, marginal ribs next largest, blade adaxially dark, abaxially glaucous and with small scales along the veins, folds apically praemorse, margins minutely toothed, transverse veinlets not evident. *Inflorescence* solitary, interfoliar, concealed among the leaf bases and sometimes partially obscured by accumulated debris; peduncle, to 20 cm long, elliptic in cross-section to 2.5 cm wide, densely tomentose; prophyll to 23 cm long; peduncular bract to 27 cm long, rachis more than 13 cm long, stout. *Staminate flowers* sepals 3, distinct 6 × 4 mm; petals 3, distinct 11 × 8 mm, obovate; stamens c. 100, filaments very short, ±triangular. Rachis of *infructescence* 6 – 11 cm long, bearing up to 30 fruits. *Fruit* globose, 4 – 5 × 3 – 3.5 cm. *Seed* globose, 2.1 – 2.6 × 2.6 – 2.9 cm (Fig. 1 1F–L).

DISTRIBUTION. *Sclerosperma walkeri* is found in the interior of Gabon and along the lower reaches of the Congo River and as such confined within the eastern distribution range of *S. mannii*. Map 1.

GABON. Ngounié, mission de Sindara, 5 Jan. 1931, A. A. Walker *s.n.* (P!); Saint Martin, 1938, A. A. Walker *s.n.* (BM!, BR!); Waka National Park, 15 km on the road Evouta to Egoubi forestry camp, 400 m, 5 April 2004, J. J. Wieringa 5281 (LBV!, WAG!); Waka National Park, 4 July 2005, T. C. H. Sunderland 3031 (LBV, WAG!); **Ogooué-Lolo**, Chantier CEB, 6 km on road Lelama to Okondja, E of road Okondja-Franceville, 300 m, 2 Nov. 2005, M. S. M. Sosef 2206 A (LBV, WAG!); 300 m, 2 Nov. 2005, M. S. M. Sosef 2206 B (LBV, WAG!).

CONGO (KINSHASA). Bas-Congo, no date, J. Gillet *s.n.* (BR!); Kisantu, 1899, J. Gillet 279 (BR!); Lusanga Sundi, 350 m, 14 Feb. 1940, C. Donis 188 (BR!); **Equateur**, Djoa, 17 May 1958, C. Evrard 4081 (BR!, K!); Kilemba, 26 May 1913, Broun *s.n.* (BR!); **Orientale**, Près rivière Longwele à 1 jour de Yalibwa (env. Yangambi), 15 Jan. 1948, J. J. G. Léonard 1614 (BR!).

HABITAT. Shrub layer in lowland evergreen rainforest, ranging from swamp forest, periodically flooded forest

to lower slopes on *terra firme*, persisting in secondary growth; 300 – 400 m.

CONSERVATION STATUS. On the basis of its restricted range in Central Gabon and the lower reaches of the Congo River, and the pressures of its native habitat, this species can be considered Vulnerable.

ETYMOLOGY. The species was named after André Raponda-Walker (1871 – 1968), who collected the type specimen.

VERNACULAR NAMES. Manga (Ivili, Gabon Ngounié), Mbègho (Mitsogo, Gabon, Ngounié). Niangu, Magangu (Congo [Kinshasa], Bas-Congo), Lifete, Mpete (Congo [Kinshasa], Equateur).

USES. The leaves are widely used for thatch throughout its range, and locally used also for matting and walls. In areas with large populations of lowland gorilla (*Gorilla gorilla gorilla*), it is rare to find mature infructescences intact because the fruits are consumed by these forest primates.

NOTES. The type specimen in Paris consists of an undeveloped juvenile leaf, a number of immature fruits with decayed kernels, a fruit that has started to germinate, and an infructescence stalk. The fruits differ from those of *S. mannii* in not being depressed apically, a difference that is mentioned as a diagnostic feature. In *S. mannii* collections too, however, fruits can be found that are not apically depressed. These germinating *S. mannii* fruit are reported to have another feature assumed to be diagnostic of *S. walkeri*: a cavity in the kernel. This should be attributed, however, to the mobilisation of the endosperm for germination. Similar cavities were found in germinating seeds of *S. mannii* collected by van Valkenburg. The leaf segments being alternate, as opposed to opposite in *S. mannii*, is equally invalid as a diagnostic feature and was actually contradicted by the illustration accompanying the protologue of *S. mannii* showing both alternate and opposite leaflets. Notwithstanding that the protologue of *S. walkeri* does not contain any valid distinguishing characters, the type specimen retains its value because of the infructescence stalk that is present on the type sheet. This infructescence stalk clearly demonstrates the more robust character of both the peduncle and the rachis, which is also found in other specimens of *Sclerosperma* with divided leaves from the same area and further east; these leaves have significantly more leaf segments than those of true *S. mannii*. Well-developed leaves of *S. walkeri* have 25 – 40 leaf segments, which are relatively narrow (up to 6 cm wide), whereas in *S. mannii*, the leaves have usually 8 – 17 leaf segments that are mostly 6 – 9 cm wide. The infructescence of *S. walkeri* is characterised by a more robust peduncle, its rachis is equally more robust and longer than in *S. mannii*, and its fruits are of larger dimensions.

Sclerosperma Indet

West Africa, no date, A. *Woermann* 603/11 (HBG!) [a single kernel only]; **CONGO (BRAZZAVILLE). Pool**, Village Moussélé, 22 Dec. 1992, M. *Bitsindou* 314 (BRLU!) [incomplete leaf only].

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