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Re-evaluating the Upper Guinean species of *Triclisia* (*Menispermaceae*)

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Abstract: In Upper Guinea in Africa three species of *Triclisia* Benth. (*Menispermaceae*) are recognized: *T. dictyophylla* Diels, *T. patens* Oliv. and *T. subcordata* Oliv. *Triclisia dictyophylla* and *T. subcordata*, as delimited in the revision of this genus by Troupin (1962), each include more than one distinct species. On the basis of a comparative morphological analysis, *T. dictyophylla* is split here into *T. dictyophylla* s.s. and *T. gilletii* (De Wild.) Staner and *T. subcordata* is split into *T. angolensis* Exell, *T. hypochrysea* Diels and *T. subcordata* s.s. No new names have to be published. Illustrations are provided along with distribution maps.

Key words: Africa, *Menispermaceae*, taxonomy, *Triclisia*, tropical forest, Upper Guinea

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Introduction

Triclisia Benth. is a genus of *Menispermaceae* with c. 16 liana species endemic to Africa including Madagascar; all species are dioecious. In Upper Guinea (sensu White 1979), three species are recognized: *T. dictyophylla* Diels, *T. patens* Oliv. and *T. subcordata* Oliv. (Hawthorne & Jongkind 2006). Only *T. patens* is endemic to Upper Guinea. In Upper Guinea the male flowers and fruits of *T. dictyophylla*, *T. patens* and *T. subcordata* are clearly different from each other. *Triclisia dictyophylla* has male flowers with six stamens (Fig. 1A–E) and almost glabrous fruit carpels of 3–4.5 × 2.5–3.5 cm, while *T. patens* has male flowers with only three stamens (Fig. 1H–M, Fig. 2) and pubescent fruits 1–2 cm in diameter. The third species, *T. subcordata*, has male flowers with six stamens (Fig. 3) and is

smaller than the other two in habit, leaf, inflorescence, flower and fruit (Table 1).

Part of the herbarium specimens from outside Upper Guinea, included in *Triclisia dictyophylla* and *T. subcordata* in the last revision of the African *Menispermaceae* (Troupin 1962), have flower and fruit characters that are clearly different from those in Upper Guinea. Because of that, these two species are re-evaluated here. Three species, *T. angolensis* Exell, *T. gilletii* (De Wild.) Staner and *T. hypochrysea* Diels, which were earlier made synonym by Troupin, are resurrected here as a result.

This paper is a first step to a new revision of *Triclisia* for continental Africa. More problems have to be solved before a complete revision can be published. Several more *Triclisia* species, in the way they are used by Troupin (1962) in his revision of the *Menispermaceae* for Africa, are clearly a mixture. Solving the complete *Tri-*

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Table 1. Summary of diagnostic characters for the species of *Triclisia* treated here.

<i>Triclisia</i>	<i>dictyophylla</i>	<i>gilletii</i>	<i>patens</i>	<i>angolensis</i>	<i>hypochrysea</i>	<i>subcordata</i>
Leaf blade size	to 36 cm wide	to 32 × 27 cm	10–18 × 6–12 cm	7–9.5 × 3–5.5 cm	7–9 × 6–6.5 cm	5–11 × 3.5–8 cm
Petiole length	5–20 cm	5–22 cm	5–12 cm	3–4 cm	2.5–3 cm	1.6–3.2 cm
Male flower innermost sepal length	3–4 mm	c. 6 mm	c. 3 mm	c. 7 mm	–	3–4 mm
Stamens number	6	6	3	6	–	6
Stamens length	c. 2 mm	4–5 mm	2–2.5 mm	c. 4 mm	–	2.5–3 mm
Fruit carpel size	3–4.5 × 2.5–3.5 cm	2–2.5 × c. 2 cm (excluding beak)	1.5–2 cm in diam.	c. 1 cm in diam.	–	1–1.5 cm in diam.
Fruit carpel indumentum	glabrous	hairy	hairy	hairy	–	hairy

clisia puzzle is hampered by several accepted names that are only represented by incomplete collections.

Material and methods

The morphological characters of all continental African *Triclisia* species in the BM, BR, K, P and WAG herbaria were studied and the three Upper Guinean species were also studied in the field. The herbaria are indicated by the international code registered in Index Herbariorum (Thiers 2017+). The African Plant Database (2015+) was checked for more information on the species and the genus. The distribution maps are based only on herbarium specimens.

Results

When specimens of *Triclisia dictyophylla* from all over its distribution area are compared, conspicuous differences in the shape and size of flowers and fruit carpels can be seen. The exceptional large, for *Triclisia*, fruit carpels from the specimens west of Cameroon were already described by Keay & Troupin (1954: 71, as *T. gilletii*). In publications on Central Africa the fruit carpels of the same species were described by Troupin (1951: 216, fig. 17; 1962: 91) as being about half that size and ending in a conspicuous beak. Both descriptions are correct for the specimens of that area. It is clear that Troupin included two species in *T. dictyophylla* with conspicuously different fruits and flowers. The species involved are *T. dictyophylla* s.s., from Guinea to Angola, with small flowers (Fig. 1A–E) and large fruit carpels (Fig. 5), and *T. gilletii*, from Cameroon, Central African Republic, Gabon, Congo Kinshasa and Angola, with large flowers (Fig. 1F, G) and relatively small fruit carpels (Fig. 6) (see also Table 1). The fruits of *T. dictyophylla* are usually found on the bigger stems closer to the forest floor while the fruits of *T. gilletii* are often found on the smaller branches. *Triclisia gilletii* is the only *Triclisia* species with fruit carpels that are conspicuously

beaked. This beak was also mentioned by Exell (1935: 8) for *T. flava* Exell, here a synonym of *T. gilletii*.

Another name presented by Troupin as synonym of *Triclisia dictyophylla*, *T. trichantha* Diels from Cameroon, cannot be placed yet with certainty; it might not be a *Triclisia* species.

In the *Flora of West Tropical Africa* (Keay & Troupin 1954: 72), *Triclisia subcordata* was still restricted to Ghana, Togo, Benin and Nigeria, but was later united by Troupin with *T. angolensis* Exell from Angola and *T. hypochrysea* Diels from Gabon (Troupin 1962: 86). This lumping does not seem correct because the flowers and fruits from *T. subcordata* s.s. and *T. angolensis* are clearly different. The type and only known specimen of *T. hypochrysea*, the third species included by Troupin in *T. subcordata*, is sterile.

Triclisia angolensis and *T. subcordata* s.s. (Table 1) are in fact distinct species. The innermost sepals in the male flower of *T. angolensis* are more than twice as long as wide (Exell 1926: 13), while these sepals in *T. subcordata* s.s. (Fig. 3C–G) are almost equal in length and width (Keay & Troupin 1954: 71). The fruit carpel and endocarp of *T. subcordata* s.s. are also conspicuously different from those of *T. angolensis* and from all other species in the genus. To show this, these fruit characters are illustrated here for five different *Triclisia* species, including four *T. subcordata* s.s. examples from different countries (Fig. 4). The shape of the fruit carpel and endocarp of *T. angolensis* is more or less equal to that of most other species of the genus, with the style relatively close to the stipe (Fig. 4A1–3). The orientation of the endocarp in the fruit carpel of *T. subcordata* s.s. is different from that in all the other *Triclisia* species, resulting in a style that is situated almost opposite to the stipe (Fig. 4B–E, Fig. 7).

There is a large geographical gap between *Triclisia angolensis* and *T. subcordata* s.s. The type and only specimen of *T. hypochrysea*, the third species included by Troupin, was collected in between the areas of these other two species (Fig. 10). This type specimen is sterile and the leaf shape and indumentum do not link it

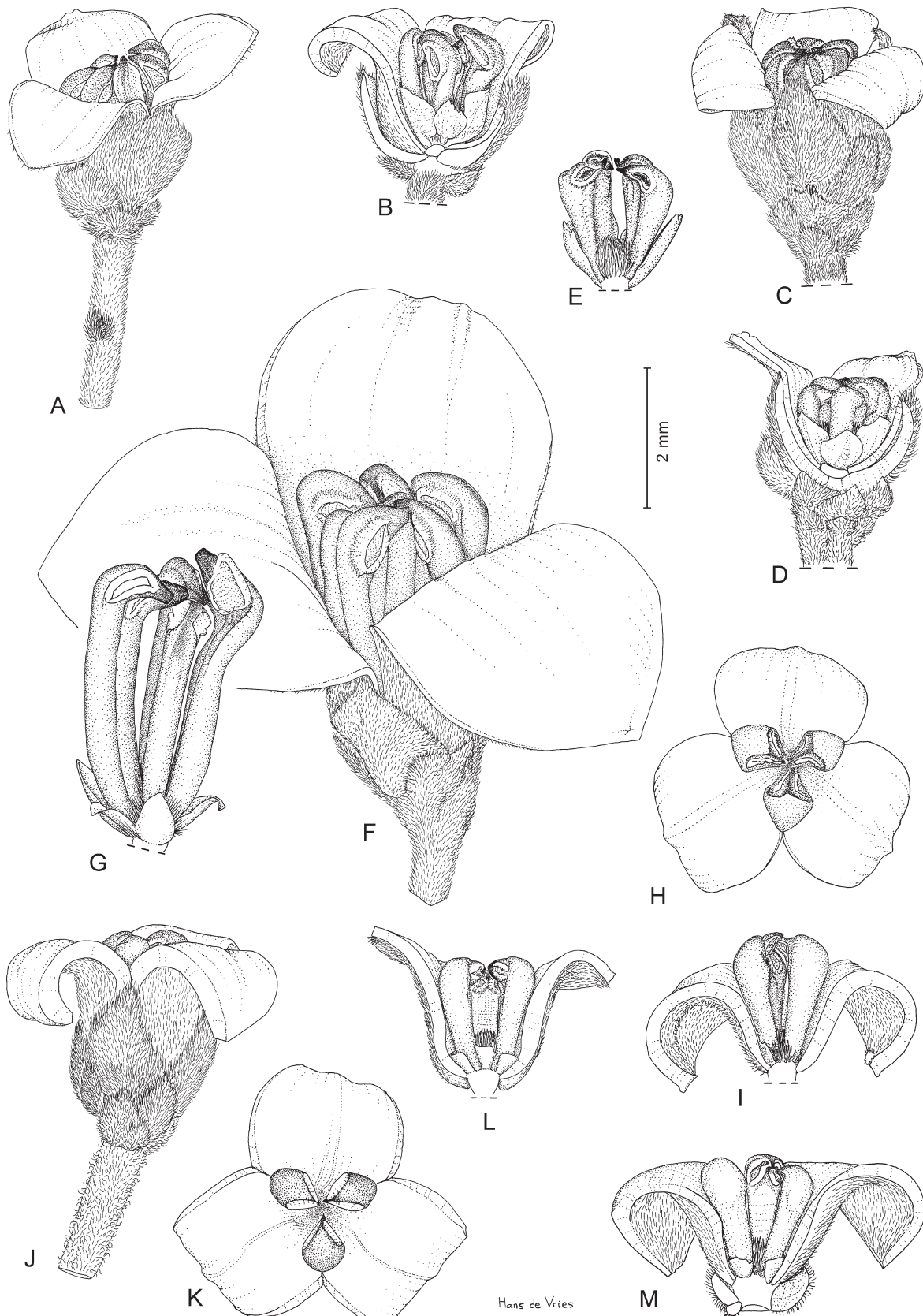


Fig. 1. A–E: *Triclisia dictyophylla*; A, C: flowers; B, D: flowers opened to show petals and stamens; E: stamens. – F, G: *T. gilletii*; F: flower; G: petals and stamens. – H–M: *T. patens*; H, K: flowers from above; I, L, M: flowers, longitudinal section; J: flower. – Source: A, B: Ivory Coast, *Leeuwenberg 3725* (WAG); C, D, E: Gabon, *Wieringa 5115* (WAG); F, G: Congo Kinshasa, *Casier 416* (BR); H, I: Ivory Coast, *J. J. F. E. de Wilde 480* (WAG); J, K, L: Ghana, *Jongkind 1368* (WAG); M: Ivory Coast, *de Koning 639* (WAG). – All drawn by Hans de Vries, November 2014.



Fig. 2. *Triclisia patens* – A, B: stem of big liana with cauliflorous male flowers (stamens alternating with inner sepals). – Liberia, 2010, Jongkind & al. 9461, photographed by Carel Jongkind.



Fig. 3. *Triclisia subcordata* – A: flowering branch; B: inflorescence; C: flower; D–G: sepals; H: petal; I: stamen; J: petals and androecium; K: petal and stamen. – Source: Togo, Warnecke 327 (B). – Previously published in *Das Pflanzenreich* (Diels 1910: 72).

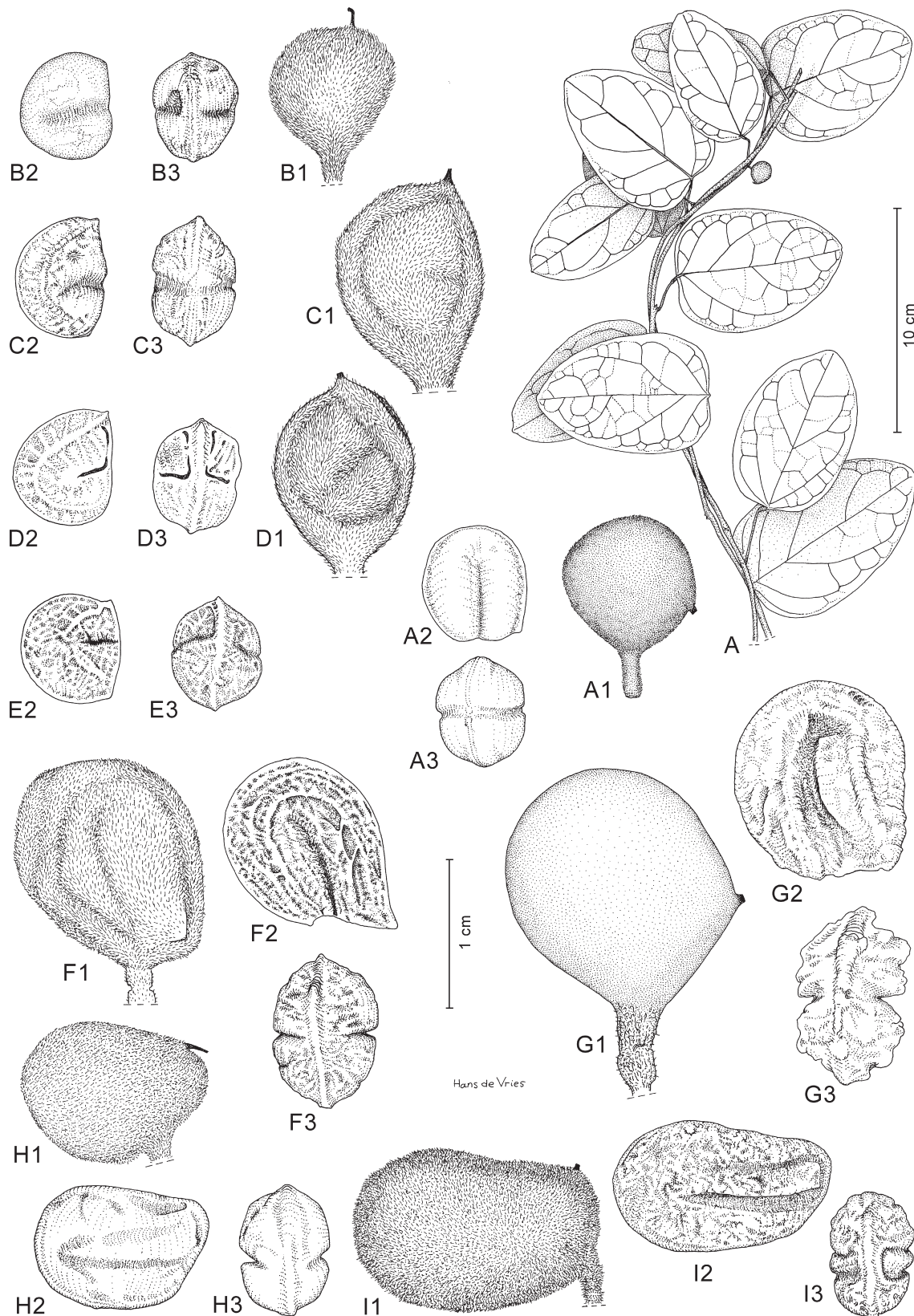


Fig. 4. *Triclisia* fruit carpel and endocarp details: 1: dry fruit carpel; 2: endocarp, lateral view; 3: endocarp, from below. – A: *T. angolensis*, also showing branch with leaves and fruit. – B–E: *T. subcordata*. – F, G: *T. patens*. – H: *T. lanceolata* Troupin. – I: *T. riparia* Troupin. – Source: A: Angola, Gossweiler 8435 (BM); B: Nigeria, Geerling 4194 (WAG); C: Benin, Akoègninou & Bada 3038 (WAG); D: Togo, Breteler 7199 (WAG); E: Ivory Coast, J. J. de Wilde 263 (WAG); F: Liberia, Jongkind 5401 (WAG); G: Liberia, Jongkind 6070 (WAG); H: Congo Kinshasa, Compère 1239 (BR); I: Congo Kinshasa, Evrard 679 (BR). – All drawn by Hans de Vries, April 2017.



Fig. 5. *Triclisia dictyophylla*, fruit carpels. – A: Liberia, 2005, Jongkind & al. 6450; B: Guinea, 2012, Jongkind & Bilivogui 11470; both photographed by Carel Jongkind.

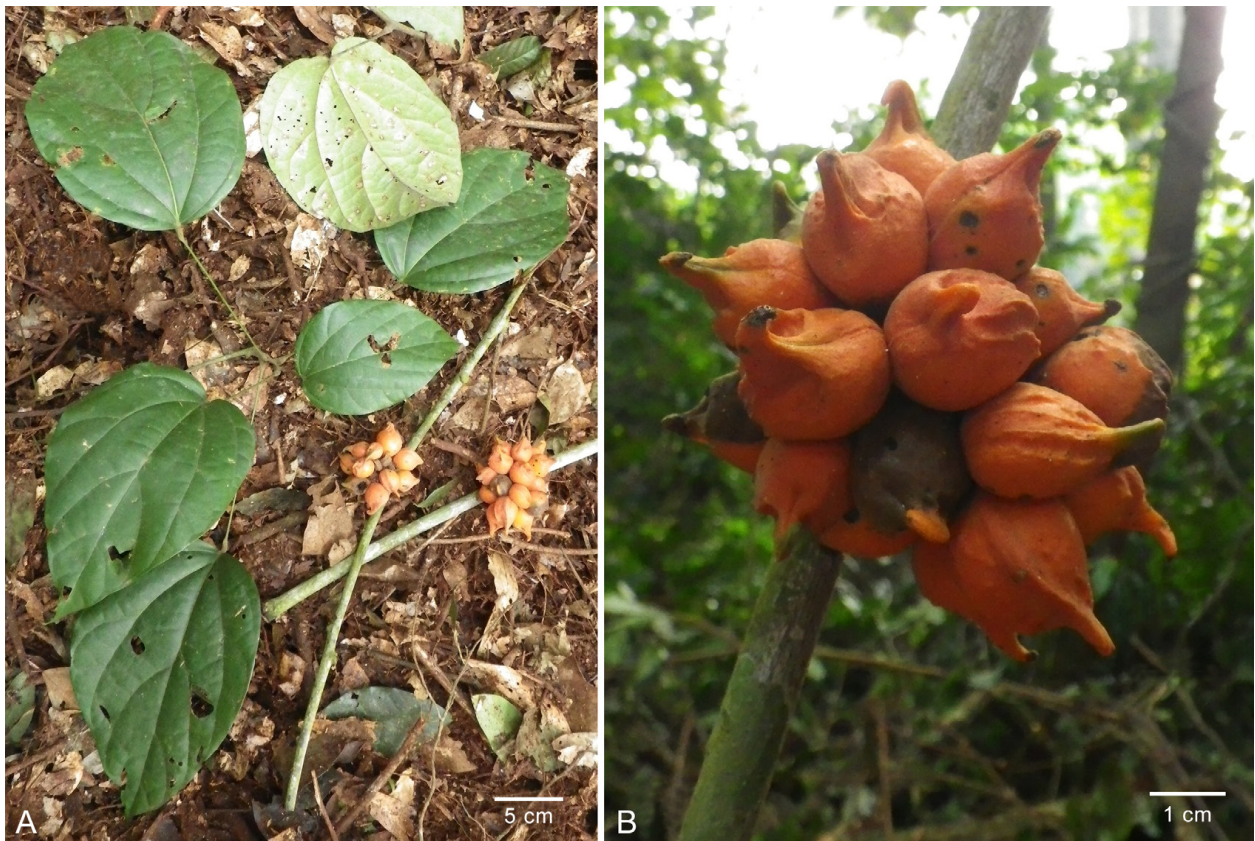


Fig. 6. *Triclisia gillettii* – A: branches with fruits; B: fruit carpels showing characteristic beak. – A, B: Congo Kinshasa, 2011, X. van der Burgt 1510, photographed by Xander van der Burgt.



Fig. 7. *Triclisia subcordata* – A: branch with leaf from below and immature but fully grown fruit carpels showing style at apex; B: same branch with leaf from above. – A, B: Ivory Coast, 2015, Mertens & Jongkind 198, photographed by Jan Mertens.

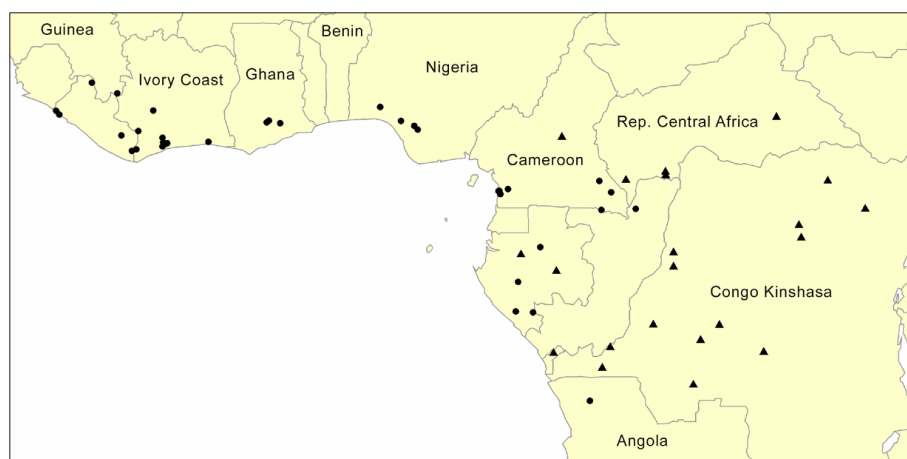


Fig. 8. Distribution map of *Triclisia dictyophylla* (●) and *T. gillettii* (▲).

to *T. angolensis* or to *T. subcordata*, making it hard to place this species. In the protologue, Diels keyed out *T. hypochrysea* using the characters of the flowers (Diels 1910: 69, 71), which is surprising because in the same publication he wrote that his type and only specimen is sterile. *Mildbraed 8726* from Cameroon, a specimen with flower buds also cited by Troupin under *T. subcordata*, might belong to *T. hypochrysea*. Looking at indumentum and leaf shape, there could also be a connection with *T. lucida* Exell & Mendonça from Angola.

After separating *Triclisia subcordata*, *T. angolensis* and *T. hypochrysea*, *T. subcordata* is here restricted to West Africa again, it is found from Ivory Coast to Nigeria (Fig. 10). There it is found only in drier forest types such as semi-deciduous forest (Hall & Swaine 1981: 310). *Triclisia angolensis* is again endemic to

the north of Angola. Only a few herbarium specimens of *T. angolensis* exist but, according to Exell (1926: 13), it was not uncommon early last century in rocky situations around Cazengo in the north of Angola.

The distribution of none of the three species from Upper Guinea goes all the way to E Africa. In the *Flora of Tropical East Africa*, Troupin (1956: 5–7) recognized three species of *Triclisia* for East Africa: *T. sacleuxii* (Pierre) Diels, *T. sp. A* (based on *Faulkner 769*) and *T. sp. B* (based on *Loveridge 244*). *Faulkner 769* (*T. sp. A*) became the type of *Anisocyclea blepharosepala* subsp. *tanzaniensis* Vollesen (Vollesen 1981). *Loveridge 244* (*T. sp. B*) in the Kew herbarium is in the present study identified as *Syrrheonema fasciculatum* Miens. This means that *T. sacleuxii* is the only species of *Triclisia* that is found in East Africa.

No new names have to be published here, all species have already published names. The number and names of the species in Upper Guinea stays the same: *Triclisia dictyophylla*, *T. patens* and *T. subcordata*.

List of species with synonyms, types and vouchers

Triclisia angolensis Exell in J. Bot. 64 (Suppl. 1): 12. 1926. – Holotype: Angola, Cuanza Norte, Cazengo, Granja de S. Luis, fl., Nov 1909, *Gossweiler 4892* (BM; isotypes: COI, K, LISC). – Table 1, Fig. 4A, Fig. 10.

Additional specimens seen — ANGOLA: Cuanza Norte, proximum flumen Zenza, fr., 20 Oct 1922, *Gossweiler 8435* (BM); Cuanza Norte, Cazengo, Granja de S. Luis, fl., *Gossweiler 10356* (BM).

Triclisia dictyophylla Diels in Engler, Pflanzenreich IV. 94 (Heft 46): 70. 1910. – Holotype: Angola, Bembe, fl., Apr 1873, *J. J. Monteiro s.n.* (K). – Table 1, Fig. 1A–E, Fig. 5, Fig. 8.

Additional specimens seen — GUINEA: N'Zérékoré, Nimba Mts, fr. 11 Jul 2012, *Jongkind & Bilivogui 11470* (MO, WAG). — LIBERIA: Grand Gedeh, Diebla, fr. 2 Jul 1947, *Baldwin 6327* (K); Putu Hills, fr., 28 May 2005, *Jongkind & al. 6450* (BR, G, K, WAG). — IVORY COAST: along road from Dakpadou to Sago, fl., 30 Mar 1968, *Geerling & Bokdam 2349* (WAG); Sassandra, Forêt Classée Niègre, fl., 23 Mar 2000, *Jongkind & al. 4679* (WAG); Sassandra, 25 km SW of Guéyo, fl., 24 Mar 1962, *Leeuwenberg 3725* (K, WAG). — GHANA: Eastern Region, Asiakwa, fr., 2 Jul 1995, *Harder & al. 3313* (K, MO). — NIGERIA: Okomu Forest Reserve, 5 Jan 1948, *Brenan & Onochie 8809* (K, P); Ijebu Prov., Omo Forest Reserve, fr., 28 Apr 1946, *Tamajong FHI 16923* (K). — CAMEROON: km 36 piste Yokadouma-Lomie, fr., 16 Jun 1963, *Letouzey 5282* (P); c. 40 km WNW de Moloundou, fl., 16 Mar 1973, *Letouzey 12117* (P). — GABON: Nyanga, Milandou, fl., 24 Sep 1908, *Le Testu 1383* (BM, P); Ngounié, upper Waka area, fl., fr., 28 Mar 2004, *Wieringa & al. 5115* (BR, LBV, MO, WAG). — CONGO KINSHASA: 40 km E-SE de Bomassa, fl., 27 Feb 2011, *Ndolo Ebika & Koni 504* (E, WAG).

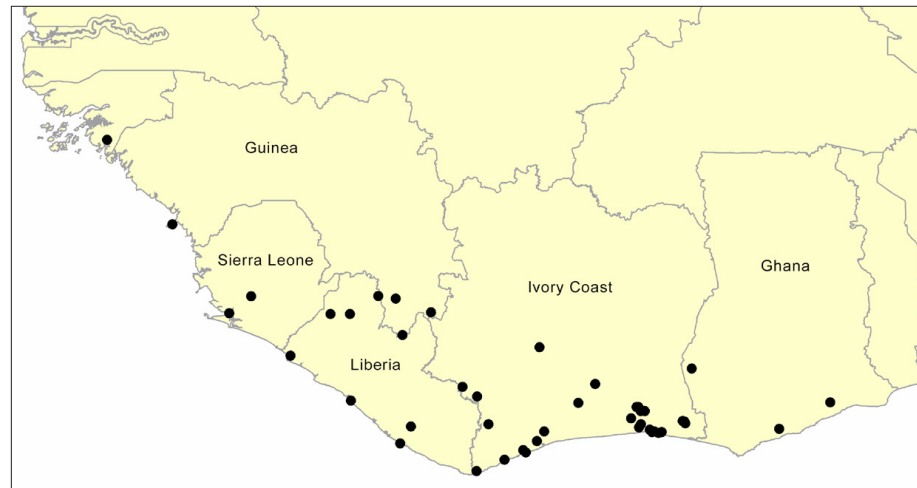


Fig. 9. Distribution map of *Triclisia patens*.

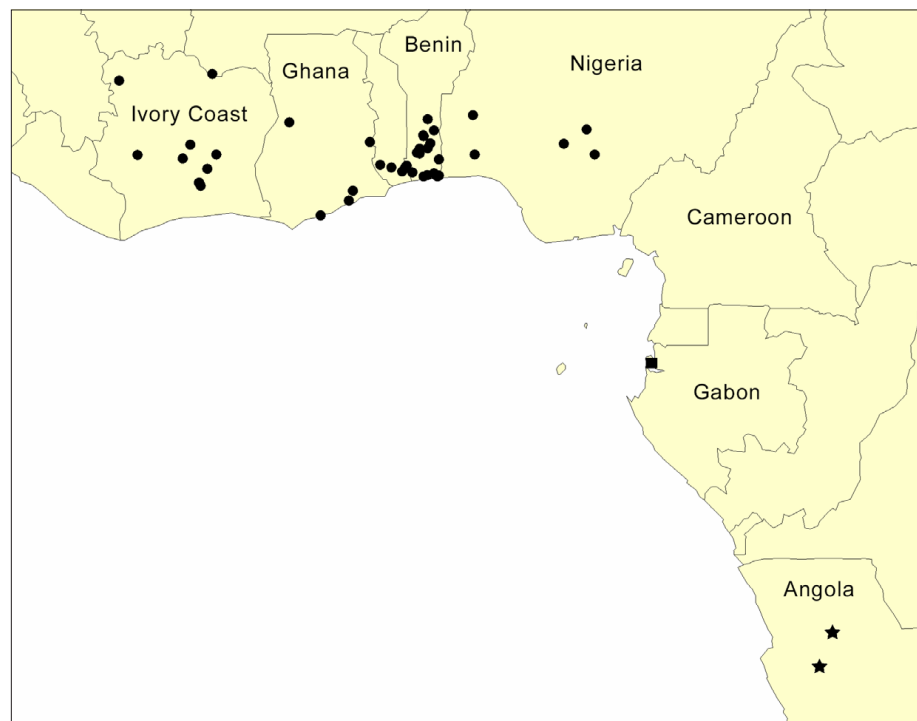


Fig. 10. Distribution map of *Triclisia subcordata* (●), *T. hypochrysea* (■) and *T. angolensis* (★).

Triclisia gillettii (De Wild.) Staner in Bull. Séances Inst. Roy. Colon. Belge 4: 430. 1933 ≡ *Tiliacora gillettii* De Wild. in Bull. Jard. Bot. État. Bruxelles 3: 255. 1911. — Lectotype (designated by Troupin 1951: 216): Congo Kinshasa, Mogandjo, 1 Jan 1906, *Laurent 1876* (BR). — Table 1, Fig. 1F, G, Fig. 6, Fig. 8. = *Triclisia flava* Exell in J. Bot. 64(Suppl. 1): 12. 1926. — Holotype: Angola, Maiombe, Sub-Luali, 5 May 1919, *Gossweiler 8046* (BM; isotypes: COI, K, LISJC, LISU).

Additional specimens seen — CAMEROON: piste Guere — Manjou, fr., 8 Feb 1961, *Letouzey 3429* (P). — CEN-

TRAL AFRICAN REPUBLIC: 15 km SW de Mbaiki, fr., 14 May 1968, *Badre 29* (P); Yalinga, fl., 9 Jan 1923, *Le Testu 4474* (BR, P); Lobaye, fr., 5 Feb 1948, *Tisserant 672* (BR, P). — GABON: Lastoursville, 7 May 1929, *Le Testu 7273* (BM, P); Lastoursville, 8 Nov 1930, *Le Testu 8503* (BM, P); Moyen-Ogooué, Okano River, fl., fr., 11 Mar 2015, *Simons & al. 1497* (WAG). — CONGO KINSHASA: Asongo Hill, fr., 24 Jul 2011, *X. van der Burgt 1510* (K); Kimuenza, fr., Nov 1956, *Carlier 289* (BR, K); Kasayi Muetshi, fl., 2 Feb 1983, *Casier 416* (BR); Lolifa prés Eala, fr., 17 May 1907, *Coûteaux 228* (BR); km 26, route Bikoro, fr., 28 Aug 1964, *Leonard 446* (BR, K, P); Kisanji, 17 Dec 1945, *Renier 120* (BR); Ipamu, fr., Sep

1922, *Vanderyst 12219* (BR). — ANGOLA: Cabinda, Pango Munga, fr., Feb 1916, *Gossweiler 6246* (BM, LISC); Buco Zau, fl., fr., 24 Oct 1916, *Gossweiler 6785* (BM, LISC).

Triclisia hypochrysea Diels in Engler, Pflanzenreich IV. 94 (Heft 46): 71. 1910. — Holotype: Gabon, Sibangefarm, 1890, *Dinklage 592* (B). — Table 1, Fig. 10.

Known only from the sterile type specimen.

Triclisia patens Oliv., Fl. Trop. Afr. 1: 49. 1868. — Holotype: Sierra Leone, Bagroo River, fl., Apr 1861, *Mann 797* (K). — Table 1, Fig. 1H–M, Fig. 2, Fig. 4F, G, Fig. 9.

Additional specimens seen — GUINEA BISSAU: Região de Tombali, Cantanhez, 11 May 2000, *Catarino & Bancessi 988* (LISC, WAG). — GUINEA: Conakry, fl., Feb 1905, *Chevalier 12077* (P); Rio Nunez, fl., Jan 1837, *Heudelot 740* (G, P). — SIERRA LEONE: Mano, fl., Mar 1928, *Deighton 1107* (K). — LIBERIA: Sapo NP, around Jelaytown, fr., 24 Nov 2002, *Jongkind & Blyden 5401* (WAG); N of Lake Piso, fr., 22 Jul 2004, *Jongkind & al. 6070* (BR, WAG); Lofa, near Ziggida, fl., 12 Feb 2010, *Jongkind & al. 9461* (BR, K, WAG). — IVORY COAST: Yapo forest, fr., 21 May 1875, *van den Burg 442* (WAG); along Tabou–Prolo road, fr., 10 Apr 2000, *Jongkind & Assi-Yapo 5058* (WAG); between Adidjan and Grand Bassam, fl., 9 Sep 1956, *J. J. de Wilde 480* (WAG). — GHANA: Eastern Region, Aiyola Forest Reserve, fl., 24 Mar 1994, *Jongkind & Nieuwenhuis 1368* (K, MO, WAG); foot of Aburi scarp, fl., 27 Feb 1961, *Morton A 4135* (K, WAG).

Triclisia subcordata Oliv., Fl. Trop. Afr. 1: 49. 1868. — Lectotype (designated by Troupin 1962: 86): Nigeria, Nupe, 1858, *Barter 1146* (K). — Table 1, Fig. 3, Fig. 4B–E, Fig. 7, Fig. 10.

= *Triclisia dielsii* Hutch. & Dalziel in Bull. Misc. Inform. Kew. 1927: 155. 1927. — Holotype: Togo, prope Lome, 1900/1902, *Warnecke 327* (K; isotypes: B, BM, BR).

Additional specimens seen — IVORY COAST: Koffie-Yaboué, fl., fr., 17 May 1971, *Audru 4174* (P); Ahouaty, fr., 24 Sep 1983, *César 1809* (P); SE of Akakro, fr., 11 Apr 2015, *Mertens & Jongkind 198* (BR, K). — BURKINA FASO: 50 km S Foronzo, fr., 27 Mar 2007, *Bako BUR 541* (K). — GHANA: Kadjebi, 18 Mar 1943, *Box 3440* (K); Legon, fl., 28 Mar 1994, *Jongkind & Nieuwenhuis 1381* (MO, WAG); between Tainboi and Bamboi, 15 Nov 1997, *Jongkind 4032* (WAG). — TOGO: Avétonou, fr., 17 Sep 1971, *Breteler 7176* (WAG); Gamé, fr., 30 Sep 1971, *Breteler 7199* (B, BR, MO, WAG). — BENIN: Dévé, 18 Feb 1999, *Essou 1474* (BR, WAG); Djègbé, fr., 9 Aug 2001, *Sokpon 2232* (WAG). — NIGERIA: Ibadan Distr., fr., 7 Apr 1949, *Chizea FHI 24489* (K); Ibu-Iya,

Upper Ogun Game Reserve, fr., 15 Sep 1971, *Geerling 4194* (WAG).

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