

# *Talbotiella couteronii* (Leguminosae: Detarioideae), a new gregarious tree species from Cameroon

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## Abstract

**Background and aims** – For some time now, the forests of the Sanaga basin in Cameroon have been threatened by the construction of numerous hydroelectric dams. In anticipation to this construction work, botanical surveys were carried out, resulting in the discovery of many species new to science. One of these certainly belongs to the genus *Talbotiella* in Leguminosae.

**Material and methods** – This study is based on morphological observations on herbarium specimens, through detailed examination of 28 specimens of the new tree species as well as specimens of existing species of *Talbotiella*.

**Key results** – *Talbotiella couteronii* is described and illustrated. The new species resembles *Talbotiella batesii* but has fewer leaflets, 5–10 pairs; an inflorescence usually with fewer flowers, 5–12; and flowers with longer pedicels, 10–20 mm long. *Talbotiella couteronii* is endemic to Cameroon, where it is restricted to the middle Sanaga basin in the Central Region and the Littoral Region. It occurs gregariously in periodically flooded riverine forests. *Talbotiella couteronii* is preliminarily assessed as Endangered following the IUCN Red List categories and criteria. The genus *Talbotiella* now consists of 10 species; of which six species are endemic to Cameroon. A comparative table summarizes the main vegetative characteristics of the 10 species. This treatment also includes an update of the description of *T. bakossiensis*.

## Keywords

Cameroon, conservation, Endangered species, IUCN Red List assessment

## INTRODUCTION

Baker (1914) described the monotypic genus *Talbotiella* Baker f. to accommodate a new species, *T. eketensis* Baker f., from SE Nigeria. In 1928, the second species for the genus, *T. gentii* Hutch. & Greenway, was described from Ghana (Hutchinson and Dalziel 1928). *Talbotiella batesii* Baker f., from Cameroon, was the third species published

by Baker (1929). Since then, doubts persisted as to the generic status of *Talbotiella* in view of its close affinity to *Hymenostegia* Harms (Léonard 1951, 1957; Cowan and Polhill 1981). Mackinder et al. (2010a) confirmed the separation of the two genera, based on the absence of petals and pollen with narrow apertures in *Talbotiella*, while in *Hymenostegia*, petals are present and the pollen has broad apertures. Once this doubt had been clarified,

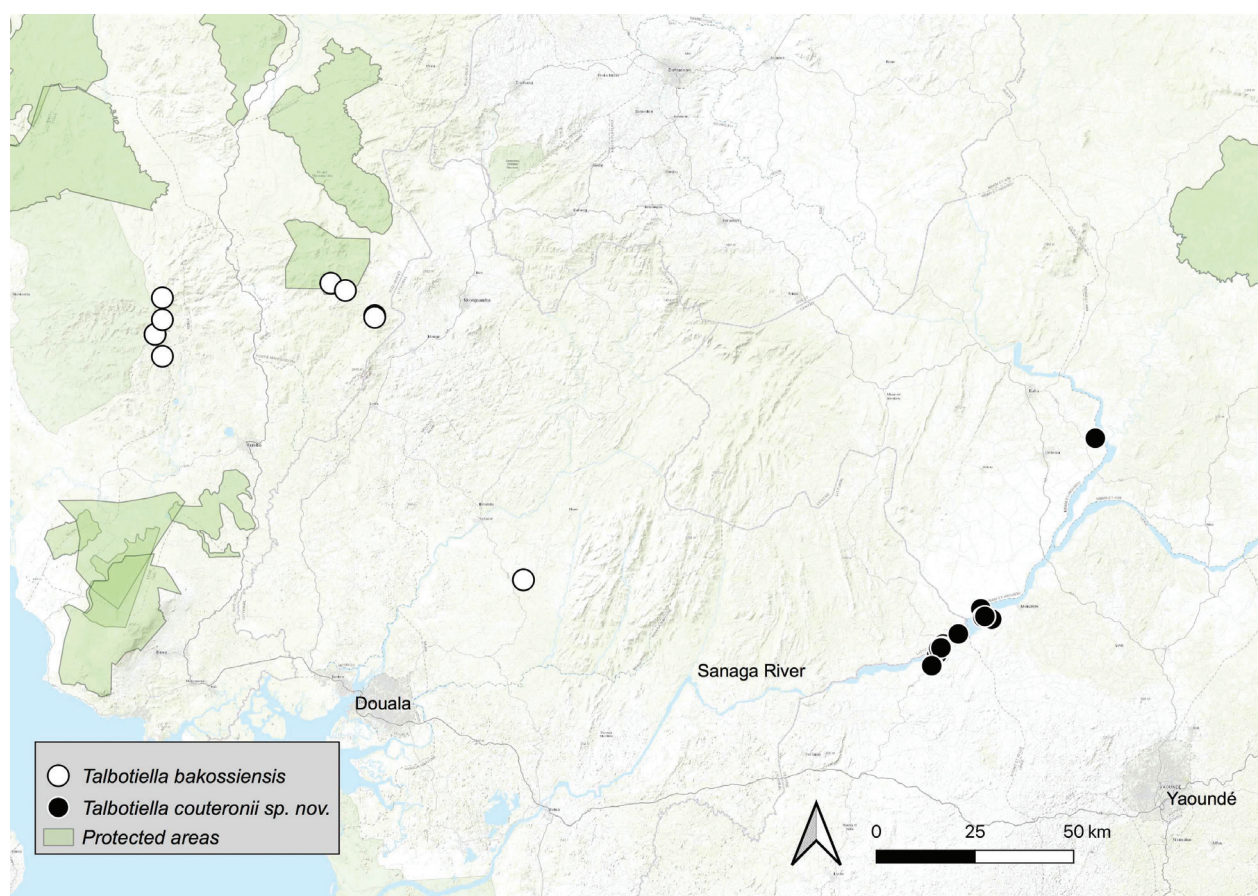
four new species were described and a new combination was made, bringing the number of *Talbotiella* species to eight (Mackinder et al. 2010b). The genus *Talbotiella* now consists of 10 species; the eight species accepted by Mackinder et al. (2010b), *T. cheekii* published by van der Burgt et al. (2018), and the new species published here. Herbarium collections of *Talbotiella* species may be named by comparing the leaf characters with the measurements of the 10 *Talbotiella* species summarized in Table 1. The genus *Talbotiella* is characterized by the unique combination of paripinnate leaves, leaflets lacking translucent dots but with a few small glands on the distal half of the lower surface midway between the primary vein and margin, imbricate bud scales, persistent or sometimes caducous petaloid bracteoles that do not envelop the flower bud, 4 sepals, the absence of petals, 10 free stamens, and a pubescent ovary (Aubréville 1968; Mackinder et al. 2010b).

The extensive and ongoing botanical survey undertaken in recent years in Cameroon by the team supervised by Bonaventure Sonké, has led to the discovery of many novelties from this country (Zemagho et al. 2014; Janssens et al. 2015; Cheek et al. 2018; Mogue Kamga et al. 2018; Lachenaud et al. 2020; Quintanar et al. 2023). In 2021, an Environmental and Social Impact Assessment (ESIA) for a hydroelectric project at Kikot, along the Sanaga River, was initiated by a team composed of scientists from the French Institut de Recherche pour le Développement, the

Plant Systematics and Ecology Laboratory (University of Yaoundé I), Biotopie (an environmental consultancy based in France), and the Missouri Botanical Garden. In November 2021, in the context of this ESIA, we came across a gregarious stand of a tree species, which in the absence of flowers was identified as a potentially new species of *Hymenostegia*. In March 2024, the first flowering collections of this taxon were made, which revealed the absence of petals, and allowed us to place it in the genus *Talbotiella*. Detailed examination of the available specimens and recent literature (Mackinder et al. 2010b; van der Burgt et al. 2018) confirmed that the collected material belongs to an undescribed species.

## MATERIAL AND METHODS

The description presented here, as well as the information about the distribution, habitat, and phenology, are based on the study of 28 collections of the new species from the herbaria BR, BRLU, E, K, M, MA, MO, P, WAG, and YA (acronyms according to Thiers 2024), all of them collected in Cameroon. In addition, five new specimens available at K (see Results section) and the image of the isotype WAG0248233 of *Talbotiella bakossiensis* Cheek ex Mackinder, Wieringa & Burgt were studied. Measurements, colours, and some other information about details given in the descriptions are based on



**Figure 1.** Distribution of *Talbotiella couteronii* and *T. bakossiensis* in Cameroon.

**Table 1.** Leaf characteristics of the 10 species of *Talbotiella*. The species are sorted by number of leaflet pairs. Leaflet length and leaflet width were measured on the largest pair of leaflets because leaflet size varies considerably depending on the position of the leaflet. Adapted from Table 1 in Mackinder et al. (2010b); the leaflet characteristics were now measured only on leaves of fertile branches; and the measurements of several newly determined collections are included.

<i>Talbotiella</i> species	No. of leaflet pairs	Leaflet length (mm)	Leaflet width (mm)	Distribution	Altitude
<i>T. breteleri</i>	2(–3)	35–95	16–35	Cameroon, Central Region	900–1200 m
<i>T. gentii</i>	4–7	15–24	7–11	Ghana	70–350 m
<i>T. couteronii</i>	5–10	13–23	5–9	Cameroon, Central and Littoral Regions	320–420 m
<i>T. ebo</i>	8–11	25–38	7–10	Cameroon, Southwest and Littoral Regions	100–900 m
<i>T. batesii</i>	9–13	12–19	4–5	Cameroon, South Region; Gabon, Congo (Brazzaville)	500–900 m
<i>T. cheekii</i>	9–14	12–20	4–6	Guinea	100–600 m
<i>T. eketensis</i>	12–16	9–15	3–4	Nigeria	0–100 m
<i>T. velutina</i>	14–20	14–22	3–6	Cameroon, Southwest Region	50–100 m
<i>T. korupensis</i>	16–22	16–30	5–8	Cameroon, Southwest Region	50–600 m
<i>T. bakossiensis</i>	21–27	8–14	2–3	Cameroon, Southwest and Littoral Regions	100–1350 m

living material, spirit and herbarium specimens, and data from field notes. Specimens examined only as digital images are indicated by the addition of the word “image” after their herbarium codes; for those that could not be examined “n.v.”, i.e. non visus, was added. The descriptive terminology follows Mackinder et al. (2010b) and van der Burgt et al. (2018). Specimens with coordinates from labels were mapped using QGIS v.3.14 (QGIS Development Team 2024) with the coordinate system as WGS84/Pseudo-Mercator. Many of the specimens included in this work have been studied in situ by the authors. Chorology follows White (1979) but with his chorological categories (“regional (sub)centre of endemism” and other) simplified into Region and Domain. Preliminary extinction risk assessments were made using the IUCN Red List Categories and Criteria (IUCN 2012; IUCN Standards and Petitions Committee 2022). The geographical parameters, Area of Occupancy (AOO) estimated using a 2 × 2 km grid and Extent of Occurrence (EOO), were calculated using GeoCAT (Bachman et al. 2011).

RESULTS

A description of *Talbotiella* was published by Mackinder et al. (2010b); this description does not change with the publication of the two new species published since 2010, with the exception that the bracteoles are not always persistent; they are caducous in *T. couteronii*.

Since the revision of *Talbotiella* was published (Mackinder et al. 2010b), new collections have appeared for most of the eight species revised there. For *T. bakossiensis*, 23 herbarium sheets representing seven collections are cited in Mackinder et al. (2010b). At present, none of these 23 herbarium sheets is available on

GBIF (2024). A single isotype, WAG0248233, is present on JSTOR (2024), but the collection is sterile. All seven collections are cited to be at K, YA, but none has been found up to the present. However, five new collections have been identified as *T. bakossiensis*: a flowering collection (van der Burgt 1889), a fruiting collection from the same tree (van der Burgt 2356), two sterile collections (Thomas 7449 & 10302), and a flowering and fruiting collection (Thomas 10443). Study of the only available isotype image and the five new collections revealed that the leaflet sizes given by Mackinder et al. (2010b) are confusing, because the measurements of these authors pertain to fertile collections as well as sterile collections from juvenile trees; the latter may have leaflets up to twice as large. Two of the five new collections of *T. bakossiensis* are the first collections having fruits. These new data enabled us to update the description of *T. bakossiensis*.

TAXONOMIC TREATMENT

*Talbotiella bakossiensis* Cheek ex Mackinder, Wieringa & Burgt

Fig. 1, Table 1

**Type.** CAMEROON – **Southwest Region** • Bakossi Mts, Mwanzum to Kodmin between hut 1 and 2; 4°59’N, 9°40’E; 1350 m; 18 Nov. 1998; *Cheek* 9688; holotype K n.v.; isotypes: P n.v., WAG [WAG0248233] image, YA n.v. **Description.** Tree up to 29 m high, stem up to 74 cm diameter; bole weakly 5-fluted (*Cheek* 10382; see original description), base with small buttresses; bark smooth to slightly rough; outer slash thick with dark outer line, dull orange, granular-sandy; inner slash pale orange-yellow, fibrous; crown dense. Twigs moderately to densely pubescent, hairs 0.5–1 mm long. Bud scales



5–10, caducous, distichous, brown, coriaceous, not keeled, outer and inner surface glabrous, proximal scale orbicular, ca 1.5 mm diam.; distal scales becoming progressively longer and relatively narrower; apical scale obovate, 12 × 8 mm, leafy, not keeled, pubescent along midrib. Stipules early caducous, in pairs, free, auriculate at base, the auricle suborbicular, up to 0.2 mm long, with 2–6 acute triangular lobes, glabrous on both surfaces but margins ciliate; upper part of stipule narrowly lanceolate, 8–17 × 1.5–2 mm; outer surface densely pubescent along the midrib, veins sparsely pubescent, margins ciliate, inner surface glabrous, apex acute. Leaves alternate, paripinnate, 4.5–8.5 × 1.6–2 cm; petiole 1–2 mm; leaf rachis 4–8 cm long (up to 12 cm in saplings), moderately pubescent, with a tuft of longer hairs at the insertion of leaflets; leaflets sessile, in 21–27 pairs, upper and middle pairs opposite, lower 3–5 pairs subopposite, 8–14 mm × 2–3 mm (up to 22 × 6 mm in saplings), narrowly oblong, base asymmetric, proximal margin tapering towards the apex, glabrous above, lower surface appearing glabrous with a hand lens but moderately appressed puberulous under a microscope, fringing hairs 0.5–0.75 mm long, present particularly on the lower margins on young leaflets but scattered or absent on mature foliage, midvein central, prominent above and below for most of its length, becoming obscure just before the apex; small glands 1–2(–3), not visible with a hand lens but visible under a microscope, present on the distal half of the lower surface, positioned about midway between midvein and margin, always present on basal pair, present or absent on middle pairs, not seen on uppermost pair. Inflorescence a 7–15-flowered raceme, axis 2.3–3.5 cm long, with a moderate to dense indumentum of golden patent hairs, ca 0.6–1.5 mm long, floral bracts slightly spatulate, 6–10 × 1–3 mm, outer surface densely appressed tomentose, inner surface glabrous, persistent; pedicels with moderately spreading hairs 0.3–0.5 mm long, portion of pedicel below bracteoles 2–4 mm long, bracteoles subopposite to opposite, narrowly oblong, ca 5 × 1.2–1.5 mm, tapering towards the apex in upper third, mostly glabrous but with margins ciliate at least in the lower half and along the basal part of the midvein, with a tuft of hairs at the apex, portion of pedicels above bracteoles ca 2 mm. Hypanthium narrowly campanulate, 1–1.5 mm deep, puberulous at the mouth, otherwise glabrous on both surfaces. Sepals 4, obovate, white, subequal, cucullate, 5–7 × 2.5–3 mm, glabrous on both surfaces except for scattered marginal pubescence on upper third with tuft of hairs 0.2–0.3 mm long at the rounded apex. Petals absent. Stamens 10; filaments free, 7–9 mm long, glabrous; anthers elliptic, ca 1.2 mm long. Ovary oblong, 2.3–2.7 × 1.1–1.5 mm, densely golden to red-brown tomentose, on a glabrous stipe 1.5–2 mm long, fused with the hypanthium near its apex, free part of stipe very short; ovules 2; style ca 3–4 mm long, moderately to densely pubescent for most of its length, becoming glabrous just under the stigma, stigma capitate. Pod obovate-triangular, 4.5–6.7 × 2–2.5 cm, upper suture slightly broadened, surfaces and suture

moderately golden puberulous. Seeds discoid, 1–2 per fruit, 9–10 × 9–10 × 2–3 mm.

**Distribution and chorology.** *Talbotiella bakossiensis* is currently known only from the Southwest and Littoral Regions in Cameroon (Fig. 1). Lower Guinea Domain of the Guineo-Congolian Region.

**Habitat.** *T. bakossiensis* occurs in lowland to submontane forest at 100–1350 m altitude.

**Phenology.** Flowering specimens were collected in February, October, and November, and fruiting specimens in February and December.

#### **Preliminary IUCN conservation assessment.**

*Talbotiella bakossiensis* is assessed as Endangered B1ab(i,ii,iii,v)+2ab(i,ii,iii,v) on the IUCN Red List (Cheek et al. 2022). Nevertheless, this published assessment does not take into account five collections recently named as this species. The main threats mentioned by the published assessment include shifting agriculture and logging. Including the five recently named collections, the extent of occurrence is now calculated at 2580 km<sup>2</sup> and the estimated area of occupancy as 32 km<sup>2</sup>, on the basis of a 2 × 2 km grid size. We believe the threats mentioned by the original assessment are still applicable, and the total of estimated locations reaches five when including the five collections recently named as this species. As a consequence, the assessment of *T. bakossiensis* remains Endangered B1ab(i,ii,iii,v)+2ab(i,ii,iii,v).

#### **Additional material. CAMEROON – Littoral Region •**

Along the road from Djoukou to Yabassi, 3 km on a side road to Yingui; 4°19'26.3"N, 10°04'18.5"E; 100 m; 10 Oct. 2015; *van der Burgt* 1889; B, BM, BR [BR0000015256874V] n.v., C n.v., E n.v., EA n.v., ETH n.v., F n.v., FI n.v., FHO n.v., G n.v., GH n.v., H n.v., HBG n.v., K, LBV n.v., LE n.v., LISC n.v., MA n.v., MO n.v., MPU n.v., NY n.v., O n.v., P n.v., PRE n.v., S n.v., SCA n.v., SING n.v., US n.v., W n.v., WAG n.v., YA n.v. • Along the road from Djoukou to Yabassi, 3 km on a side road to Yingui; 4°19'26.3"N, 10°04'18.5"E; 100 m; same tree; 2 Dec. 2019; *van der Burgt* 2356; B n.v., BR n.v., G n.v., K, LISC n.v., MO n.v., P n.v., WAG n.v., YA n.v. – **Southwest Region •** Kupe-Mwanenguba, Nyale; 5°00'N, 9°38'E; 18 Nov. 1998; *Cheek* 9678; K n.v., WAG n.v., YA n.v. • Kupe-Mwanenguba, Ngomboku, Abang road and then right to forest; 4°55'N, 9°44'E; 11 Dec. 1999; *Cheek* 10326; K n.v., YA n.v. • Kupe-Mwanenguba, Ngomboku, forest ridge S of Abang track; 4°55'N, 9°44'E; 15 Dec. 1999; *Cheek* 10382; K n.v., YA n.v. • 35 km NNW Kumba, 2 km SW Dikome Balue, Rumpi Mts, Mt Rata; 4°54'N, 9°14'E; 24 Mar. 1976; *Letouzey* 14546; BR n.v., HBG n.v., K n.v., P n.v., WAG n.v., YA n.v. • Same data as for preceding; *Letouzey* 15185; BR n.v., K n.v., P n.v., WAG n.v., YA n.v. • Rumpi Hills, near Dikome (Bakume) Balue; 4°54'N, 9°16'E; Nov. 1991; *McKey Rh2/43*; K [K000093017] n.v., WAG n.v. • Rumpi Hills; 4°50'N, 9°15'E; 1000–1200 m; 7 May 1987; *Thomas* 7449; K, MO n.v. • Rumpi Hills; 4°55'N, 9°15'E; 10 Feb. 1995; *Thomas* 10302; K, WAG n.v., YA n.v. • Rumpi Hills near Madie River; 4°58'N, 9°15'E; 22 Feb. 1995; *Thomas* 10443; BR n.v., K, MO n.v., P n.v., WAG n.v., YA n.v.

**Notes.** *Talbotiella bakossiensis* resembles *Hymenostegia neoaubrevillei* J.Léonard, a species endemic to Gabon. The most important morphological difference is that petals are absent in *T. bakossiensis*, while there are 2 petals in *H. neoaubrevillei*. However, the Flore du Gabon (Aubréville 1968) described the petals of *H. neoaubrevillei* as “petals 2, sometimes very reduced or even none at all”. Many of the collections of *T. bakossiensis*, including the holotype, have not been seen by us (see Introduction). Our study of the available material reveals several additional differences between the two species. *Talbotiella bakossiensis* has the leaf rachis slightly winged, with flattened, patent margins; the lower leaflets are alternate or subopposite and the bud scales pubescent outside. *Hymenostegia neoaubrevillei* has the leaf rachis canaliculate with margins erect, the leaflets opposite and the bud scales mostly glabrous, pubescent only at the base.

***Talbotiella couteronii* Sonké, M.Simo & Burgt, sp. nov.**  
 urn:lsid:ipni.org:names:77352171-1  
 Figs 1–5, Table 1

**Type.** CAMEROON – Central Region • Mbébé (Silobé); 4°07'45.5"N, 11°00'11.6"E; 19 Mar. 2024; fl.; Sonké & Ngoula 7886; holotype: BRLU; isotypes: BR, BRLU, E, K, M, MA, MO, P, WAG, YA.

**Diagnosis.** This species closely resembles *T. batesii*, from which it differs by the number of bud scales (11–17 vs 3–5), narrower stipules (9–15 × 1–1.5 mm vs 13–15 × 2–2.5 mm) that are glabrous on both surfaces (vs pubescent outside along the midrib), usually fewer leaflets ((5–)6–9(–10) pairs vs 9–13 pairs), looser inflorescence with longer pedicels (10–20 mm vs 3–8.5 mm) and usually fewer flowers (5–12 vs 10–18), larger ovary (4–6 × 2–3 mm vs 1.5–3.5 × 1–1.3 mm), and larger seeds (14–21 × 10–15 × 2–3 mm vs 9–10 × 9–10 × 2–3 mm).

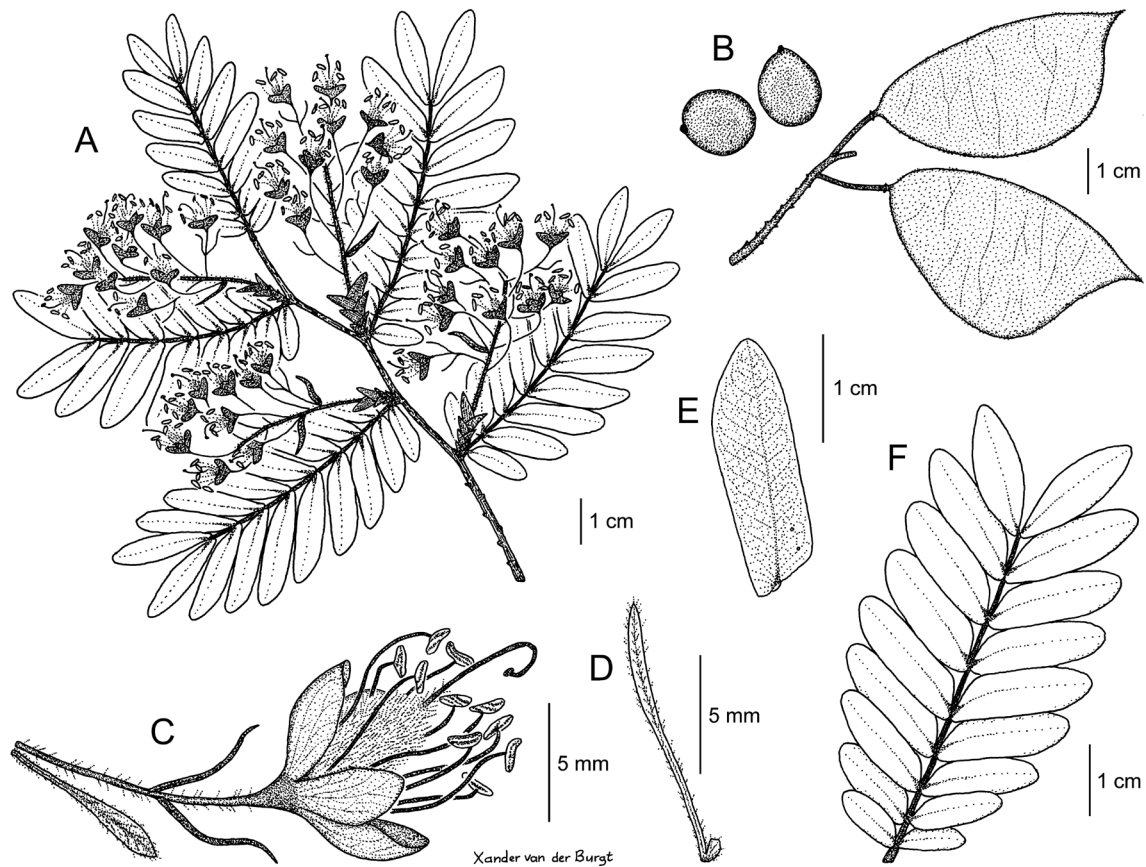
**Description.** Small to medium-sized tree 5–25 m, dbh 6–60 cm; slightly fluted trunk, with slight buttresses; bark smooth on younger individuals, peeling off in small longitudinal patches, grey-brown (Fig. 3). **Twigs** sparsely to moderately pubescent, hairs ca 0.5 mm long; mature twigs glabrescent. **Bud scales** 11–17, caducous, distichous, brown, coriaceous, not keeled, outer and inner surface glabrous; proximal scale orbicular, ca 1.5 mm diam.; distal scales becoming progressively longer and relatively narrower, apical scale obovate, ca 7–4 mm. **Stipules** rapidly deciduous (seen in young foliage, Sonké & Ngoula 7895, Fig. 4C) in pairs, free, auriculate at base; the auricle to 1 × 1 mm; upper part of stipule narrowly lanceolate to spatulate; 9–15 × 1–1.5 mm; glabrous on both surfaces, edge ciliate. **Leaves** alternate, paripinnate, 5.2–8(–9) × 2.2–4 cm; petiole 1–3 mm long, leaf rachis 3–6 cm long, canaliculate, shortly hairy to glabrescent; leaflets sessile, narrowly oblong, in (5–)6–9(–10) pairs, opposite, the lowest ones subopposite, 13–23 × 5–8(–9) mm; base asymmetric, proximal margin tapering towards apex, glabrous above, lower surface appearing glabrous with a hand lens but sparsely appressed puberulous under

a microscope; fringing hairs present particularly on the lower margins of young leaflets but absent in mature foliage; midvein central, prominent above and below for most of its length; glands 0–3, present on the distal half of the lower surface near the petiolule, positioned about midway between midvein and margin. **Inflorescence** a 5–12-flowered axillary raceme; peduncle and rachis together 2.5–4 cm long, light green, with a dense indumentum of golden patent hairs up to 1 mm long; bud scales 8–12, caducous, distichous, brown, coriaceous, not keeled, outer and inner surface glabrous; proximal scale orbicular, ca 1.5 mm diam.; distal scales becoming progressively longer and relatively narrower; apical scale obovate, 8 × 5 mm, leafy, not keeled, pubescent along midrib, pale green; floral bracts obovate to spatulate, 7–9 × 1–2 mm, pale green, densely hairy outside and sparsely so inside, margin ciliate; pedicels white to pink, 10–20 mm long, sparsely pubescent, hairs up to 0.5 mm long; bracteoles caducous, inserted on the pedicel just above the middle, opposite or sub-opposite, linear to narrowly oblong, 4–7 × 0.3–0.5 mm, tapering towards the apex, white, glabrous or with a few scattered hairs outside. **Hypanthium** narrowly campanulate, white, 1–1.5 mm long, glabrous, inner surface glabrous. **Sepals** 4, obovate, white, cucullate, glabrous, 5–6 × 2–4 mm. **Petals** absent. **Stamens** 10; filaments free, 8–13 mm long, white, glabrous; anthers oblong-elliptic, ca 2 mm long, orange. **Ovary** oblong, 4–6 × 2–3 mm, pale pink, densely pubescent with white hairs up to 1 mm long that become golden when dry, on stipe ca 1 mm long; partly fused to the adaxial side of the hypanthium up to ca 2 mm; ovules 2–3; style 6–8 mm long, reddish at the base and greenish white towards the top, with a few long hairs in the lower third, otherwise glabrous, stigma capitate, pale yellow. **Pod** flattened (Fig. 4D), 3.3–6.4 × 1.5–3.3 cm, obovate-triangular, upper suture slightly broadened, 3–4 mm wide (both valves included), surfaces and suture moderately golden puberulous, beak 5–6 mm long. **Seeds** discoid, 1–2 per fruit, 14–21 × 10–15 × 2–3 mm; testa deep reddish brown (Sonké & Ngoula 7889, Fig. 4E).

**Distribution and chorology.** *Talbotiella couteronii* is currently known only from Cameroon. It is an endemic of the middle Sanaga basin (Fig. 1). Lower Guinea Domain of the Guineo-Congolian Region.

**Habitat and ecology.** Riverine forest on the banks of the Sanaga River, on sandy soils with a shallow water table, with tree heights ranging from 15 to 20 m. Other tree species include *Albizia adianthifolia* W.Wight, *Macaranga spinosa* Müll.Arg., *Myrianthus arboreus* P.Beauv., and *Lindackeria dentata* Gilg. The undergrowth is relatively open, composed mainly of herbaceous plants of the genus *Thunbergia* Retz., and shrubs of the genera *Psychotria* L. and *Rinorea* Aubl. The riverine forest along the Sanaga River may be flooded during the rainy season, without the water remaining for very long. This forest is located at 320–420 m a.s.l. *Talbotiella couteronii* is a gregarious species (Fig. 5); the species may occur almost monodominant.





**Figure 2.** *Talbotiella couteronii*. **A.** Flowering branch. **B.** Inflorescence with two pods; two seeds. **C.** Flower with a single bract, two bracteoles, four sepals and 10 stamens. **D.** Stipule. **E.** Leaflet lower side, with two glands. **F.** Leaf upper side, with nine pairs of leaflets. A, E, F drawn from Sonké & Ngoula 7886 (K); B from Sonké & Ngoula 7889 (K); C from Sonké & Ngoula 7887 (K); D from Sonké & Ngoula 7888 (K). Drawing by Xander van der Burgt.



**Figure 3.** *Talbotiella couteronii*. **A.** Trunk in low-angle view. **B.** Base of trunk showing bark detachment in patches. Photographed at Île principale, Kikot by Bonaventure Sonké.



**Phenology.** *Talbotiella couteronii* flowers and leaf flushes in March, at the start of the rainy season. All the flowers in an inflorescence open at almost the same time (Fig. 4B). In April, fruits are maturing and seeds are dispersed (Fig. 4D–E).

**Etymology.** This new species is named after Dr Pierre Couteron (Institut de Recherche pour le Développement, Montpellier, France) in recognition for his constant support to the first author.

**Preliminary IUCN conservation assessment.** *Talbotiella couteronii* is known from 28 collections representing 26 unique occurrences and two or three subpopulations. Its extent of occurrence (EOO) is calculated as 288 km<sup>2</sup>, whereas its area of occupancy (AOO) is estimated as 44 km<sup>2</sup>, both fall within the limits for the Endangered category under criterion B. Eight occurrences located downstream of the Kikot hydroelectric dam project are threatened by shifting agriculture (one location) and are not expected to be threatened by the dam project (not a regulating dam). Nine occurrences are located in the future hydroelectric dam reservoir at Kikot, while one occurrence is on the future construction site of the dam itself; these ten occurrences are threatened by the hydroelectric dam project whose implementation will lead to their disappearance; they all represent one location. One occurrence located on the site of the proposed Binoum quarry will also disappear; it represents one location,

different from the location associated with the dam itself, as the threat is of different nature. We did not identify any threat to seven occurrences located upstream from the dam project, including six at Ntol-Lébanga and one at Badissa; these seven occurrences represent two locations. With regard to the most serious plausible threats, which are the Kikot hydroelectric dam construction project and the Binoum quarry, the 26 occurrences represent five locations, which is at the upper limit of the Endangered category according to criterion B. We believe that the various threats have led to and will continue to lead to the decline in the habitat quality of this species. In addition, the disappearance of occurrences at the dam construction site, its reservoir and the Binoum quarry site will lead to a continued decline in EOO, AOO, the number of locations, and the number of mature individuals of the species. For all these reasons, *Talbotiella couteronii* is assessed as Endangered: EN B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v).

**Additional material examined.** CAMEROON • Kikot, en aval du grand pont sur la Sanaga; 4°10'11.5"N, 11°0'57"E; 11 Oct. 2022; *Nzoyeuem D 136*; BRLU, YA • Tombi; 4°09'48.7"N, 11°01'17.9"E; 18 Mar. 2022; *Tcheferi 42*; BRLU, YA • Badissa, 4°38'47.9"N, 11°22'25.2"E; 23 Jan. 2024; *Relevé, Cameroun 353*; BRLU, YA • Kikot, 4°10'34.4"N, 11°01'26.1"E; 1 Aug. 2022; *Sonké & Ngoula 7035*; BRLU, MO, YA • Kikot, île principale; 4°10'39.4"N, 11°01'38.4"E; 5 Apr. 2023; *Sonké & Simo 7327*; BR, BRLU,



**Figure 4.** *Talbotiella couteronii*. A. Opened flowers. B. Twig with inflorescences. C. Young leaves with stipules. D. Infructescence with two fruits. E. Immature fruits and five unripe seeds. A from *Sonké & Ngoula 7888*; B from *Sonké & Ngoula 7886*; C from *Sonké & Ngoula 7895*; D, E from *Sonké & Ngoula 7889*.



K, M, MO, P, YA • Nkolmelen; 4°14'03.8"N, 11°08'16.1"E; 5 Jul. 2023; *Sonké & Simo* 7462; BR, BRLU, MO, YA • Nkolmelen; 4°15'29.4"N, 11°06'47.2"E; 30 Jul. 2023; *Sonké* 7483; BR, BRLU, MO, P, YA • Nkolmelen; 4°14'26.9"N, 11°07'21.4"E; 31 Jul. 2023; *Sonké* 7488; BR, BRLU, MO, P, YA • Nkolmelen; 4°14'23.9"N, 11°07'16.4"E; 1 Aug. 2023; *Sonké* 7502; BR, BRLU, MO, YA • Nkolmelen; 4°14'19.1"N, 11°07'04.3"E; 1 Aug. 2023; *Sonké* 7505; BRLU, MO, YA • Mbébé; 4°09'12.6"N, 11°00'46.2"E; 19 Aug. 2023; *Sonké & Simo* 7535; BR, BRLU, MO, P, YA • Mbébé; 4°09'12.6"N, 11°00'46.2"E; 22 Aug. 2023; *Sonké & Simo* 7578; BR, BRLU, K, M, MO, P, WAG, YA • Mbébé (Silobé); 4°07'42.1"N, 11°00'05.1"E; 19 Mar. 2024; *Sonké & Ngoula* 7884; BR, BRLU, K, M, MO, P, YA • Mbébé (Silobé); 4°07'42.3"N, 11°00'06.6"E; 19 Mar. 2024; *Sonké & Ngoula* 7885; BR, BRLU, K, M, MO, P, YA • Same data as for preceding; 29 Apr. 2024; *Sonké & Ngoula* 7889; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'04.2"N, 11°01'02.0"E; 19 Mar. 2024; *Sonké & Ngoula* 7887; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'03.8"N, 11°01'00.9"E; 19 Mar. 2024; *Sonké & Ngoula* 7888; BR, BRLU, K, M, MO, P, YA • Same data as for preceding; 29 Apr. 2024; *Sonké & Ngoula* 7891; BR, BRLU, K, M, MO, P, YA • Mbébé (Silobé); 4°07'45"N, 11°00'12"E; 29 Apr. 2024; *Sonké & Ngoula* 7890; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'04.0"N, 11°01'01.9"E; 29 Apr. 2024; *Sonké & Ngoula* 7893; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'13.8"N, 11°01'27.7"E; 29 Apr. 2024; *Sonké & Ngoula* 7894; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'15.4"N, 11°01'32.2"E; 29 Apr. 2024; *Sonké & Ngoula* 7895; BR, BRLU, K, M, MO, P, YA • Île principale, Kikot; 4°10'09"N, 11°01'20.2"E; 29 Jan. 2022; *Transect, Cameroun* 248; BRLU, YA • Kikot; 4°09'46.2"N, 11°00'04.46"E; 21 Apr. 2022; *Transect, Cameroun* 472; BRLU, YA • Ntol-Lébanga (île de Ponis); 4°14'26.5"N, 11°07'20.3"E; 30 Jul. 2023; *Transect, Cameroun* 825; BRLU, YA • Mbébé, 4°07'42.2"N, 11°00'4.7"E; 21 Aug. 2023; *Transect, Cameroun* 933; BRLU, YA • Ntol-Lébanga,

en amont du site du projet de construction du barrage de Kikot; 4°14'17.9"N, 11°07'13.6"E; 12 Jan. 2024; *Relevé, Cameroun* 146; BRLU, YA.

**Notes.** The specimens *Sonké & Ngoula* 7885 and 7889 were collected from the same tree. Similarly, *Sonké & Ngoula* 7888 and 7891 were collected from the same tree.

## DISCUSSION

The forests of Cameroon are part of the Lower Guinea Domain and are among the richest in tropical Africa. The discovery of *Talbotiella couteronii* confirms Cameroon as the centre of diversity of the genus *Talbotiella*, with seven of the 10 species occurring in the country, six of them being endemic (Mackinder et al. 2010b; this study). Other genera with their centre of diversity in Cameroon (at least as far as African species are concerned) include *Tricalysia* A.Rich. (Robbrecht 1987), *Ixora* L. (De Block 1998), *Oxyanthus* DC. (Sonké 1999), *Psychotria* (Lachenaud 2019), all belonging to the Rubiaceae family, and *Medusandra* Brenan, belonging to Peridiscaceae (Letouzey 1985). De Block (1998) pointed out that this high diversity is related to the diversity of habitats.

The increasing number of dam sites in the Sanaga basin is a real additional threat to species with restricted distribution such as *Talbotiella couteronii*. This species and many other ones known only from the dam site could become extinct unless conservation measures are taken. Cameroon has the highest number of globally extinct plant species of all countries in continental tropical Africa (Humphreys et al. 2019). Murphy et al. (2023) and Cheek and Sonké (in press) have recently indicated that Banyang Mbo Wildlife Sanctuary counts five globally Critically Endangered, 17 Endangered, and 21 Vulnerable plant species. Cheek and Sonké (in press) believe that this number is likely to grow if botanical survey work continues, since only a small fraction of the area of the



**Figure 5.** A forest dominated by *Talbotiella couteronii*. Photographed at Nkolmelen, Île de Ponis by Bonaventure Sonké.



Banyang Mbo Wildlife Sanctuary has been surveyed, these parts being in the south while the remainder is botanically unknown. The Sanaga basin could be in a similar situation, given the existence of numerous species new to science and known only from this region (e.g. new species in the genera *Ledermanniella*, *Nectaropetalum*, *Phragmanthera*, *Synsepalum*, *Turraea*, etc.). Clearly, botanical surveys in this region need to be stepped up to avoid losing species that are new to science and as yet undetected.

Flowers remain the essential element for separating species of the genus *Hymenostegia* from those of the genus *Talbotiella*. Monitoring the phenology of *Talbotiella couteronii* in order to obtain flowering and fruiting material was not straightforward. Despite its gregarious nature (Fig. 5), only a few mature individuals of *T. couteronii* have been observed with flowers at the time of flowering in March. This flowering period is very short, lasting no more than two weeks. In May, there was no fruit left on the trees that had flowered in March. Like all other known species of *Talbotiella*, *T. couteronii* disperses its fruit ballistically (Mackinder et al. 2010b; van der Burgt et al. 2018). Van der Burgt et al. (2018) postulated that the gregarious tendency of some Detarioideae tree species is probably related to the relatively short and strictly limited maximum dispersal distance of the ballistic seed dispersal within a forest environment. In the same vein, Rietkerk et al. (1996) also suggested that certain species of Caesalpinioidae captured in forest refuges during the last glacial age were not or hardly capable of migrating due to their extreme low dispersibility.

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