



The genus *Vitex* (Lamiaceae) in the flora of Cameroon

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Abstract

The revision of the genus *Vitex* L. in Cameroon is presented. Sixteen taxa are accepted in Cameroon (15 species, 1 variety). One new variety is described (*V. gabunensis* var. *daubyi*). Three species are new to the flora of the country (*V. ciliata*, *V. gabunensis*, *V. oxycuspis*). Five new synonyms are proposed. Lectotypes are designated for *V. grandifolia*, *V. bipindensis* and *V. zenkeri*. In the current state of knowledge, two taxa are endemic to Cameroon (*V. lokundjensis*, *V. yaundensis*) and one taxon is a near-endemic, just extending to Nigeria (*V. bogalensis*). Two names remain unplaced because no original material has been found.

Keywords: Central Africa, fruit tree, rainforest, taxonomy, Verbenaceae, *Vitex gabunensis* var. *daubyi* Meerts

Introduction

The genus *Vitex* L. (Linnaeus 1753: 638 « 938 ») comprises some 250 species almost all in tropical regions (Mabberley 2017). Until recently, *Vitex* was classified in Verbenaceae, subfamily Viticoideae (Briquet 1895). Harley *et al.* (2004) conclusively showed that Viticoideae are better placed in Lamiaceae. Recently, subfamily Viticoideae has been restricted to three genera based on new molecular phylogenetic evidence (Li *et al.* 2016). *Vitex* is the only genus of the subfamily present in Africa.

The genus *Vitex* awaits revision in Africa (Cabral 2013). The most useful account for Africa is still Pieper's monograph (Pieper 1928). Moldenke (1955-1958) compiled much information in his "Materials towards a monograph of the genus *Vitex*", which has not always contributed to taxonomic clarification. *Vitex* has been revised for the *Flora of Tropical East Africa* (Verdcourt 1992), for *Flora Zambesiaca* (Sales 2005), and, more recently, for the Democratic Republic of Congo (Meerts 2018).

In Cameroon, Moldenke (1980) listed 29 taxa in the genus *Vitex* i.e., 23 species and 6 varieties, while Onana (2011) recorded 21 species. The World Checklist of Selected Plant Families accepts 20 species (WCSP 2019). Several species of *Vitex* widely distributed in tropical Africa are based on type material collected in Cameroon; therefore, the present revision has implications at a broader geographic scale.

I present here a key to the species, and a check-list with a revised synonymy. A new variety is described. New synonyms are proposed when necessary. Lectotypes are designated for three names.

Material and methods

Herbarium specimens of *Vitex* collected in Cameroon were studied either by visiting and/or through loans from the following herbaria: B, BM, BR, BRLU, COI, HBG, K, LISC, M, P, WAG. Additional specimens were investigated using the JSTOR Global Plants facility (<http://plants.jstor.org>). All cited specimens have been seen (except otherwise indicated). The specimens that have been physically investigated are indicated by "!". Collections in YA have not been seen, but an extract of the database has been obtained and specimens are cited when duplicates have been seen in other herbaria.

Eighteen names have been found that are typified by specimens collected in Cameroon. Many of those original materials were deposited in B and may have been destroyed during World War II. Isotypes have been systematically traced.

Results and discussion

In total, 16 taxa are recognized for the study area, i.e. 15 species and 1 variety.

Three species are new to Cameroon (*V. ciliata*, *V. gabunensis*, *V. oxycuspis*). One new variety is described (*V. gabunensis* var. *daubyi*). Two taxa are endemic to Cameroon (*Vitex lokundjensis* and *V. yaundensis*). Another taxon is subendemic, having most of its range in Cameroon just extending to Nigeria (*V. bogalensis*). Five new synonyms are proposed. A lectotype is designated for three names.

VITEX Linnaeus (1753: 638 [« 938 »])

Type:—*Vitex agnus-castus* Linnaeus (1753: 638 [« 938 »]).

Trees, shrubs or, more rarely, lianas, with sessile glands; stem quadrangular. Leaves opposite or, rarely, 3-whorled, petiolate, palmately compound, (1–)3–7 foliolate; leaflet lamina generally entire, more rarely dentate. Inflorescence of axillary dichasia, or in thyrses in the axils of leaves or grouped in a terminal panicle; bracts small, mostly not exceeding calyx. Flower: calyx campanulate, occasionally slightly bilabiate, 5-lobed to truncate; corolla variable in colour, often whitish to purplish, zygomorphic, bilabiate, with tube straight or curved, upper lip 2-lobed, lower lip 3-lobed; stamens 4, inserted inside the tube, protruding or not; ovary 2-celled at first, soon with 4 uniovulate locules, style terminal. Fruit a drupe (for species in Cameroon), with a 4-celled pit; calyx accrescent, persisting under the fruit.

References:—Aubréville (1950, 1959); Baker (1900); Briquet (1895); Cabral (2013); Huber *et al.* (1963); Lebrun & Stork (1997); Li *et al.* (2016); Lisowski (2009); Meerts (2018); Pieper (1928); Sales (2005); Verdcourt (1992).

Key to the species of *Vitex* in Cameroon

Leaflet size refers to the middle leaflet except otherwise stated; lateral leaflets are smaller in all species.

1. Inflorescence of thyrses; liana or scandent shrub; fruit globose, 6–11 mm diam.2
- Inflorescence of axillary dichasia; shrub or tree; fruit ovoid or obovoid, 9–35 mm long.....3
2. Leaflets 5, the middle one with 5–10 secondary veins on each side.....13. *Vitex thyrsoiflora*
- Leaflets 3, the middle one with 4–5 secondary veins on each side.....1. *Vitex agelaifolia*
3. Leaflet 1 (rarely with a second, vestigial one), lamina obtuse to rounded at base.....10. *Vitex madiensis* subsp. *madiensis* (p.p.)
- Leaflets 3 to 7, the middle one with lamina mostly cuneate or attenuate at base4
4. Ovary hirsute-tomentose at tip5
- Ovary glabrous or glandular at tip.....9
5. Leaflets conspicuously pubescent at least on lower surface of veins.....6
- Leaflet glabrous, or, rarely, sparsely puberulent on lower surface of mid vein7
6. Leaflets entire, 5.5–11(–17) cm long, glabrous on upper surface; secondary veins 11–15 pairs.....6. *Vitex ferruginea*
- Leaflets crenate, 3–6 cm long, tomentose on both surfaces; secondary veins 6–9 pairs2. *Vitex bogalensis*
7. Calyx truncate or with teeth < 0.3 mm long; inflorescence branches glabrous to sparsely puberulent, diverging at a very broad angle (>120°) at each node, with third order branches refracted9. *Vitex lokundjensis*
- Calyx teeth > 0.3 mm long; inflorescence branches densely puberulent to pubescent, diverging at narrower angle, not refracted....8
8. Corolla 8–12 mm long, pale bluish to purplish, whitish at throat; twigs solid or, more rarely, hollow, but neither perforate nor inhabited by ants; savannas and woodlands.....5. *Vitex doniana*
- Corolla 10–15 mm long, yellowish-brown without, yellowish within, brown-veined, reddish at throat; twigs hollow, often perforated under the nodes, inhabited by ants; forests.....8. *Vitex grandifolia*
9. Leaflets dentate to shallowly crenate, at least in upper third10
- Leaflets entire11
10. Leaflets (1–)3; lamina rounded to obtuse at tip, coriaceous, opaque when dry; inflorescence branches and calyx pubescent to villose; savannas and woodlands.....10. *Vitex madiensis* subsp. *madiensis*
- Leaflets (3–)5; lamina acuminate, papery, translucent when dry; inflorescence branches and calyx puberulent or papillose; forests11. *Vitex oxycuspis*

11. Petiole, inflorescence branches, calyx and lower surface of lamina veins villose, with rusty to fulvous spreading hairs 4. *Vitex congolensis*
 - Petiole, inflorescence branches and calyx glabrous, puberulent or thinly pubescent but without rusty to fulvous spreading hairs.... 12
12. Inflorescence on leafless nodes near the end of twigs; peduncle remarkably short (0.5–4.5(–8)) cm..... 7. *Vitex gabunensis*
 - Inflorescence in the axils of leaves; peduncle 4–21 cm 13
13. Calyx sparsely appressed-puberulent; leaflets almost glabrous; secondary veins 6–10(–12) pairs; inflorescence polychasial at part of the nodes..... 15. *Vitex zenkeri*
 - Calyx densely pubescent; leaflets pubescent at least on lower surface of veins (very rarely glabrous: *V. yaundensis*); secondary veins 8–30 pairs; inflorescence strictly dichasial 14
14. Petiolule 5–30 mm; lamina elliptic, ovate-elliptic to obovate-elliptic, with a long acumen; (8–)11–30 pairs of veins; lower surface of veins glabrous or puberulent 15
 - Petiolule 0–4 mm; lamina spatulate, abruptly cuspidate; 8–13 pairs of secondary veins; lower surface of veins with sparse long brownish hairs 3. *Vitex ciliata*
15. Lower surface of lamina with many yellow glands; lamina of middle leaflet 8–18 × 4–6 cm, with (8–)11–20 pairs of secondary veins; calyx 1.5–2(–2.5) mm long, with short straight hairs and many yellow glands 12. *Vitex rivularis*
 - Lower surface of lamina without conspicuous glands; lamina of middle leaflet 14–26 × 6.5–13 cm, with 18–30 pairs of secondary veins; calyx 2.5–3(–3.5) mm long, densely covered with very short greyish-ochraceous crispate hairs, without conspicuous glands..... 14. *Vitex yaundensis*

1. ***Vitex agelaefolia*** Mildbraed ex Pieper (1928: 55; 1929: 162); Moldenke (1955a: 160); Schnell & Grout de Beaufort (1966: 44); Lebrun & Stork (1997: 524); Meerts (2018: 381).

var. *agelaefolia*

Type:—EQUATORIAL GUINEA. Nkolentangan, Maleu, *Tessmann 289* (Lectotype designated by Pieper (1929): B†; isolecto-: BM [barcode BM001209283] (fragm.)).

= *Vitex phaseolifolia* Mildbraed ex Pieper (1928: 55); Pieper (1929: 161); Moldenke (1957: 58); Lebrun & Stork (1997: 525). **Type:**—CAMEROON. Südkameruner Waldgebiet, vor der Station Ebolowa auf freigeschlagenem Gelände, *Mildbraed 7623* (Lectotype designated by Pieper (1929): B†).

= *Vitex wellensii* De Wildeman (1929: 19); Moldenke (1958b: 222); Lebrun & Stork (1997: 526). **Type:**—D.R. CONGO. Kanga, 30 April 1921, *Wellens 110* (Lectotype designated by Meerts (2018): BR [barcode BR0000008905567]!).

A liana up to 10 m in length. Bark corky, peeling off in long thin flakes. Twigs markedly quadrangular, the angles almost winged, hollow (inhabited by ants), with a hole at each node. Leaves: petiole 4–15 cm, generally glabrous, flattened on upper surface; leaflets 3, petiolules 1–10(–30) mm, sharply delimited from lamina, much longer in the middle leaflet than in the lateral ones; lamina broadly elliptic, ovate-elliptic, obovate-elliptic, 6–17 × 3–10 cm, rather coriaceous, abruptly acuminate at apex, attenuate or cuneate at base in the middle leaflet, obtuse, rounded to almost heart-shaped and slightly asymmetric at base in the lateral leaflets, entire, almost glabrous; secondary veins 4–5 on each side, sometimes with intercalary shorter veins perpendicular to main vein; upper surface scabrid, reticulum prominent; lower surface yellow gland-dotted, with veins often tinged purplish-violaceous, reticulum prominent. Inflorescence of thyrses fascicled in the leaf axils and sometimes also grouped in a panicle in the distal nodes, 5–30 cm long, 1–3 cm wide, branches quadrangular, glabrous to puberulent or tomentellose, each cymule comprising 2–10 flowers. Flower: pedicel 1–1.5 mm, puberulous; calyx ca. 2 mm long, cupuliform, almost truncate or with very short teeth (< 0.5 mm long), often tinged purplish, almost glabrous to puberulous; corolla with 3 mm long tube, geniculate or straight, ca. twice longer than calyx, whitish, yellowish to greenish, covered with yellow glands, upper lip subentire, up to 2.5 mm long and wide, white or, more rarely pale pink; stamens with puberulent filaments; ovary glabrous. Fruit globose, 7–11 mm diam., orange-brown, apiculate, subtended by the persistent cupular to patelliform calyx, on drooping infrutescences.

Distribution in Cameroon:—Regions Central, East and South. Not recorded by Onana (2011).

Distribution elsewhere:—Angola, D.R. Congo, Equatorial Guinea, Gabon, R. Congo (Brazzaville).

Habitat:—Secondary forests, mixed semi-deciduous and evergreen forests, forest edges, fallow fields, scrub; 0–800 m. Myrmecophilous species (Schnell & Grout de Beaufort 1966).

Selection of representative specimens:—CAMEROON. **Central:** Mefou Proposed National Park Ndanan 1, 19 October 2002, *Cheek et al. 11184* (BR!, K!, YA, WAG). **East:** Lomié, near catholic mission, 21 April 1961, *Breteler 1269* (BR!, YA); réserve du Dja, Somalomo-Malen, km 1 à 10, 18 April 1993, *Lejoly & Sonké 34* (BRLU!). **South:** près Anmvan (15 km Est de Djoum), 9 November 1966, *Letouzey 8289* (WAG!, YA); Campo Ma’an area, Biboulman, path to Onoyong, 28 November 2002, *Tchouto Péguy 3448* (WAG!).

2. *Vitex bogalensis* Wernham (Rendle *et al.* 1913: 91); Pieper (1928: 74); Moldenke (1955b: 215); Onana (2011: 93).

Type:—CAMEROON. North Cameroon, Bogalo Peak, near summit, 1910, *Talbot 1046* (holo-: BM [barcode BM000839705!]).

Shrub or treelet 1–4(–5) m high, with relatively dense crown. Twigs beige to ferruginous-tomentose. Leaves 3–5 foliolate, petiole 0.6–5 cm, tomentose, petiolule 0–4 mm, longer in the middle leaflet than in the lateral ones; middle leaflet 4–6.5 × 1.7–3.5 cm, obovate, attenuate at base, shortly acuminate to rounded or emarginate at tip, shallowly crenate at least in upper third, rarely entire, softly tomentose and glandular on both surfaces, hairs concentrated on veins on lower surface, 6–9 pairs of veins, impressed above, prominent below. Inflorescence of axillary dichasia, few-flowered and lax, with 1–4 nodes, peduncle ca. 2 cm more or less equaling the subtending petiole, branches tomentose, bracts linear to narrowly obovate-elliptic, 1–1.5 mm wide. Flower: pedicel ca. 5 mm with a pair of linear bracts ca. 1 mm long under the flower; calyx 3–4 mm long, broadly campanulate, brownish, tomentose, the lobes ca. 1.5–2 mm long, triangular to ovate-oblong, patent at anthesis, pubescent on both surfaces; corolla violet or lilac, the middle lobe with a yellow spot near base, ca. 8 mm long, tube much exceeding calyx, curved, with short glandular hairs, upper lip up to 3 mm long, lobes patent to reflexed, pubescent outside especially on the lobes, stamens long exerted (3.5 mm), filament glandular, ovary tomentose at tip, style sparsely pilose. Fruit globose to slightly obovoid, ca. 12 × 10 mm, with a few hairs at tip, subtended by the patelliform persisting calyx ca. 8–10 mm diam.

Distribution in Cameroon:—Regions Far North and North. Subendemic to Cameroon.

Distribution elsewhere:—Nigeria (apparently a new record to Nigeria).

Habitat:—Savanna woodland on rocky soil, hill slopes, wet savannas, granitic rocky hills, hedgerows, 300–800 m.

Selection of representative specimens:—CAMEROON. **Far North:** about 10 km S of Dogba, +/- 20 km NW of Maroua, 8 September 1964, *de Wilde & de Wilde-Duyffes 3140* (P!, WAG, YA); Maroua-Papata, June 1945, *Vaillant 108* (P!); colline de l'aiguille Messengel, près Moutouroua, 28 August 1964, *Letouzey 6494* (BR!). **North:** Ndiam Badi (50 km SE Garoua), 28 May 1974, *Fotius 2011* (BR!, P!, WAG, YA); 2 km E of Tchéboa, 7 August 1975, *Geerling 5483* (BR!, WAG); Poli, pentes sud du Hosséré Godé, 30 September 1967, *Jacques-Félix 8443* (P!, YA); Tchéboa sur la colline, 23 July 1981, *van der zon 1046* (WAG!).—NIGERIA. Yola, s.d., *Dalziel 115* (P!), North Eastern, district Biu, Hong, *Wit, Gbile & Daramola 65067* (BR!, P!).

Discussion:—1. *V. bogalensis* is a very distinct and little variable species. The pubescent ovary, long exerted stamens, and large calyx point to affinity with *Vitex ferruginea*. 2. *V. bogalensis* has a narrow distribution range, in the north of Cameroon, from 9°30' to 11°N, just extending to adjoining regions of Nigeria.

3. *Vitex ciliata* Pierre ex Pellegrin (1927: 268); Moldenke (1955c: 272); Lebrun & Stork (1997: 524); Meerts (2018: 381).

Type:—GABON. Région du Nyanga, Mayombé, Bayaka, Tchibanga, 2 March 1914, *Le Testu 1701* (Lectotype designated by Meerts (2018): P [barcode P00442307!]; isolecto-: P [barcodes P00442308 & P00442309!]).

= *Vitex pseudocuspidata* Mildbraed ex Pieper (1928: 58; 1929: 163); Moldenke (1957: 91); Onana (2011: 93; 2013: 118). **Type:**—CAMEROON. East Region. Südkameruner Waldgebiet, Bez. Molundu [Moloundou] Jukaduma [Yokadouma], 16 March 1911, *Mildbraed 4655* (holo-: B†; iso-: HBG [barcodes HBG513567, HBG513568!], *synon. nov.*

= *Vitex lutea* Exell (Exell *et al.* 1931: 45); Moldenke (1967a: 256). **Type:**—ANGOLA [Cabinda]. Maiombe. Buco Zau, 16 August 1916, *Gossweiler 7250* (holo-: BM [barcode BM001124557!], iso-: K [barcode K000249039!], COI [barcode COI00067389!], *synon. nov.*

Shrub or tree up to 25 m; twigs reddish to maroon, with sparse patent golden-brown hairs. Leaves: petiole 3–15 cm, sparsely pubescent (golden-brown hairs) to almost glabrous; leaflets (3–)5, petiolule 0–2(–4) mm, lamina narrowly obovate, spatulate, broadest in upper 25%, progressively attenuate in lower two thirds, 6–18 × 3–6.5 cm, thinly coriaceous, rounded to truncate at apex, cuspidate, margin entire to slightly crenate near the tip, upper surface shiny dark green, slightly strigulose (short stiff hairs ca. 0.3 mm), with a fringe of long thin golden brown hairs on mid vein, secondary veins 8–13 on each side, more or less impressed, with short subsidiaries perpendicular to the main vein, lower surface yellow gland-dotted, almost appressed yellowish to brownish pubescent on veins, tertiary veins ± forming a ladder pattern, reticulum prominent on both surfaces. Inflorescence of axillary dichasia, 15–25 cm long including 8–15 cm long peduncle, equaling or exceeding the subtending leaf, profuse and many-flowered, with 6–8 levels of branching; branches with long fine golden-brown hairs; bracts 2–8 mm long, filiform, villose. Flower: pedicel

1–2 mm, pubescent, calyx 1.5–2 mm long including 0.5 mm lobes, with golden yellow to fulvous straight hairs, more or less appressed; corolla (3–)4–5 mm long, white to cream, lower lip often tinged violet; stamens exerted, filament pilose; ovary glabrous, pointed and glandular at tip. Fruit obovoid, 10–15 × 7–10 mm, subtended by cupuliform calyx 7–8 mm diam.

Distribution in Cameroon:—Regions East, Southwest, South, Littoral. New to Cameroon (not recorded in Onana (2011)).

Distribution elsewhere:—Angola [Cabinda], R. Congo (Brazzaville), D.R. Congo, Equatorial Guinea, Gabon.

Ecology:—Forests of various types; primary forests on well drained sandy soil.

Representative specimens:—CAMEROON. **South:** Kribi, behind Catholic Mission, Kienke River, 10 April 1969, *Bos 4332* (BR!, P!, WAG, YA); S bank Lobé River, about 8 km S of Kribi, 12 June 1969, *Bos 4806* (BR!, P!, WAG!); 22 km on road Kribi to Campo, 12 km past Gross Batanga, 24 February 1994, *Wieringa & Haegens 2329* (BR!, WAG!); About 20 km SE of Kribi, high forest exploitation, 23 July 1970, *Bos 7123* (BR!, P!, WAG, YA); 17 km S of the Lobé River, along the road to Campo, 18 March 1975, *de Wilde 8089* (BR!); station du Cacaoyer de N’Koemvone, 14 km on the road from Ebolowa to Ambam, 29 October 1974, *de Wilde 7664* (BR!, MA). **Southwest:** près Kendonge (Réserve forestière de Bakundu), 13 km SSW Kumba, 20 April 1976, *Letouzey 14635* (BR!, COI!, K!, WAG, YA); Korup national Park, 12 April 2005, *van der Burgt 744* (BR!, G, K!, P!, WAG); Mount Cameroon, Mabeta, 15 April 1992, *Wheatley 174* (K!). **Littoral:** Forêt de Bakaka, km 4 Eboné-Ekomtolo road (Eboné situated km 11 Nkongsamba Loum road), 23 August 1971, *Leeuwenberg 8172* (BR!, YA).

Taxonomic note:—The type specimens of *Vitex pseudocuspudata* show the diagnostic traits of *V. ciliata*.

4. *Vitex congolensis* De Wildeman & Durand (Durand & De Wildeman 1899: 134); Baker (1900: 325); Pieper (1928: 59); Aubréville (1950: 500); Moldenke (1955d: 301); Lebrun & Stork (1997: 524); Onana (2011: 93); Meerts (2018: 381).

Type:—D.R. CONGO. Bas-Congo, Bokakata, February 1896, *Dewèvre 770a* (Lectotype designated by Meerts (2018): BR [barcode BR0000008905918]!, isolecto-: BR [barcode BR0000008905871]!).

4a. *Vitex congolensis* var. *congolensis* (Meerts 2018: 381)

= *Vitex aesculifolia* Baker (1900: 325). Type:—D.R. CONGO. Lande der Monbuttu, bei Munsu, 7 April 1870, *Schweinfurth 3442* (holo-: K [barcode K000192757]!).

= *Vitex gillettii* Gürke (1903: 298); Lebrun & Stork (1997: 524). ≡ *Vitex congolensis* De Wild. & T. Durand var. *gillettii* (Gürke) Pieper (1928: 59). Type:—D.R. CONGO. Kimuenza, May 1901, *Gillet 2163* (Lectotype designated by Meerts (2018): BR [barcode BR0000008903662]!).

= *Vitex seretii* De Wildeman (1909: 130); Pieper (1928: 59); Lebrun & Stork (1997: 526). Type:—D.R. CONGO. Nala, March 1907, *Seret 847* (Lectotype designated by Meerts (2018): BR [barcode BR0000008906229]!, iso-: BR [barcode BR0000008906212]!).

= *Vitex thonneri* De Wildeman (1911: 246); Pieper (1928: 59); Lebrun & Stork (1997: 526). Type:—D.R. CONGO. Ubangui, Banzyville [Mobayi-Mbongo], à 450 m d’altitude dans les broussailles, parmi les rochers, 8 March 1909, *Thonner 263* (Lectotype designated by Meerts (2018): BR [barcode BR0000008906540]!, iso-: BR [barcode BR0000008906243; BR0000008906250]!, W [barcode W 1911-0005189], K [barcode K000192755 & K000192756]!).

= *Vitex phaeotricha* Mildbraed ex Pieper (1928: 58 [*“phaeotricha”* sphalm.]; 1929: 161); Huber *et al.* (1963: 447); Moldenke (1967b: 321); Hawthorne & Jongkind (2006: 428). Type:—CAMEROON. Kampo-Gebiet, Weg nach Alen, *Tessmann 876* (Lectotype designated by Pieper (1929): B†).

= ? *Vitex thonneri* var. *tibatensis* Pieper (1928: 59); (Moldenke 1958a: 151); Onana (2011: 94; 2013: 118). Type:—CAMEROON. Tibati, *Ledermann 2471* (holo-: B†).

= *Vitex monroviae* Pieper (1928: 58; 1929: 163). Type:—LIBERIA. Monrovia, Whiteplains, 7 May 1906, *Dinklage 2194* (syn-: B [barcode B 10 0165137, B 10 0165136, B 10 0165135])

= *Vitex rufa* A. Chevalier ex Hutchinson & Dalziel (1931: 275); Cavaco (1955: 91); Aubréville (1959: 232). Type:—IVORY COAST. Grabo, 3 August 1907, *Chevalier 19712* (P, not seen).

Tree or shrub up to 15 m; twigs tomentose, with long patent fulvous or ferruginous hairs. Leaves: petiole 5–15 cm, tomentose, with long patent fulvous or ferruginous hairs, and very short papilliform hairs; leaflets 5, petiolule 0–5 mm, lamina narrowly obovate to obovate elliptic, 9–20 × 3–6(–10) cm, attenuate in the lower half, more or less abruptly acuminate, margin entire, very rarely somewhat crenate, upper surface dark green, hirsute, rarely subglabrous, median vein with a fringe of fulvous hairs, lower surface villose, with pale fulvous soft hairs, denser on veins, secondary veins

12–16 on each side, reticulum slightly prominent on both surfaces. Inflorescence of axillary dichasia, 10–25 cm long including 5–15 cm peduncle, villose, with fulvous to ferruginous hairs, and very short papilliform hairs; bracts linear, villose. Flower: calyx 1.5–2.5 mm long, villose, with fulvous to ferruginous hairs 0.5–1 mm long, the lobes usually shortly pubescent within; corolla 5–7 mm long, white, lower lip tinged purplish to violet; stamen filaments pilose, ovary glandular at tip, glabrous or with a few very short stiff hairs. Fruit ca. 15 × 10 mm, subtended by the cupuliform accrescent calyx.

Distribution in Cameroon:—Regions East, Central and West.

Distribution elsewhere:—Angola, Gabon, Ivory Coast, Liberia, Central African Republic, R. Congo (Brazzaville), D. R. Congo, Sierra Leone, South Sudan.

Ecology:—Dense humid semi-deciduous forests, secondary forests, wooded savannas; 0–1500 m.

Representative specimens:—CAMEROON. **East:** Ouessou, 21 March 1927, *Hédin 419* (P!). **Central:** près Ouassa Bamvele, 24 February 1959, *Letouzey 1526* (P!, YA); Mbam-et-Kim, 7 December 1959, *Letouzey 2443bis* (P!); Bipinde, Urwaldgebiet, Hermannshoff, *Zenker 4191* (B, not seen); Bordures de la Sanaga, Nanga-Eboko, 18 March 1967, *Mezili 70* (COI!, YA); Village Ndoksom, 10 km S Ndikinimeki, 5 March 1984, *Satabié 757* (COI!, YA). **West:** Fouban à Banyo, February 1939, *Jacques-Félix 3192* (COI!, K!, P!, WAG).

Taxonomic discussion:—This species is very variable for indumentum color, length and density. The binome *V. phaeotricha* has been applied to the most pubescent morphs, but the variation is continuous and without taxonomic significance. Much material had been hitherto misidentified as *Vitex ferruginea* or *V. cuspidata*. For *Vitex thonneri* var. *tibatensis*, the original materials have not been found; based on the protologue, it may have been a teratological form of *V. congolensis*, with “leaf margin occasionally irregularly dentate; calyx teeth sometimes as many as 7” (Pieper 1928, 1929). *V. congolensis* was erroneously referred to as “*V. cienkowskii*” by Satabié (1994).

5. *Vitex doniana* Sweet (1826: 323); Baker (1900: 323); Pieper (1928: 64); Huber *et al.* (1963: 446); Adam (1975: 1475); Geerling (1982: 330); Verdcourt (1992: 62); Satabié (1994: 164); Lebrun & Stork (1997: 524); Sales (2005: 85); Hawthorne & Jongkind (2006: 428); Eyog Matig *et al.* (2006: 163); Lisowski (2009: 367); Onana (2011: 93); Meerts (2018: 385).

Type:—SIERRA LEONE. *Don s.n.* (holo-: BM [barcode BM000839716]!).

= *Vitex cuneata* Thonning & Schumacher (Schumacher 1827: 289); Baker (1900: 328); Pieper (1928: 71); Aubréville (1950: 504; 1959: 230). **Type:**—GUINEA [GHANA], *Thonning 244* (syn-: C [barcode C10004694]; isosyn-: S [barcode S10-29263]; LE [barcode LE00016530]).

= *Vitex cienkowskii* Kotschy & Peyritsch (1867: t. 12); Baker (1900: 328). **Type:**—SOUTH SUDAN. Ad Mischra Req prope Bahr Ghasal, April 1863, *von Heuglin 41* [sphalm. “43” in protologue] (Lectotype designated by Cabral (2013): W [W 2004-0012683]; iso-: W [W 2004-0012682, W 2004-0012684, W 2004-0012681]).

= *Vitex pachyphylla* Baker (1900: 328); Pieper (1928: 71); Aubréville (1950: 500). **Type:**—GABON. Banks of the Gaboon River, *Mann 994* (holo-: K [barcode K000241365]!).

= *Vitex cuneata* var. *parvifolia* Engler ex Pieper (1928: 73); Moldenke (1955d: 326). **Type:**—CAMEROON. Am Benue, *Ledermann 4765* (syn-: B†), Garua, *Ledermann 3437, 4536* (syn-: B†), Boki, *Ledermann 3675* (syn-: B†).

Tree up to 15(–30) m high; twigs glabrous, grayish or fulvous-puberulent or pubescent near the tip. Leaves occasionally 3-whorled; petiole 5–15 cm, glabrous, stiff; leaflets 5–7, petiolule 5–15(–20) mm, lamina elliptic to obovate-elliptic, 5–18 × 4–8(–10) cm, coriaceous, rounded, emarginate, or, more rarely, triangular to bluntly acuminate at tip, cuneate at base, glabrous or, more rarely, sparsely puberulent on lower surface of midvein, upper surface shiny, lower surface without conspicuous glands; secondary veins 8–12(–16) on both sides, reticulum inconspicuous on both surfaces. Inflorescence of axillary dichasia, 4–12(–18) cm long including 2–6(–12) cm peduncle, generally much shorter than subtending leaf, branches angulose or flattened, shortly grayish to pale fulvous appressed pubescent. Flower: calyx (2–)3–4 mm long, with short indumentum of appressed greyish to fulvous hairs, the lobes ca. 1 mm long; corolla 8–12 mm long, whitish-cream with lower lobe violet, often with a yellow spot in the throat; stamens slightly protruding; ovary densely hairy at tip; style gibbous at base, curved near insertion. Fruit ovoid, ± 15–30 × 10–20 mm, blackish, subtended by spreading calyx.

Distribution in Cameroon:—Widespread throughout the whole country.

Distribution elsewhere:—Widespread in tropical Africa, including Comores, Seychelles and Madagascar.

Ecology:—Savannas, shrub and wooded savannas, gallery forests, semi-deciduous rainforests, more rarely dense forests; 0–1633 m.

Uses:—An important fruit tree in Cameroon (Eyog Matig *et al.* 2006; Mapongmetsem *et al.* 2012).

Selection of representative specimens:—CAMEROON. **Far North:** c. 5 km W of Méri, 14 September 1964, *de Wilde & Wilde-Duyffes 3255* (WAG!, YA); 7 km NE of Mogodé, 10 October 1972, *Leeuwenberg & van Beek 10524* (BR!, WAG, YA); 8 km E Mogodé, 25 November 1989, *Villiers 4693* (P!, YA); km 84 Roumsiki-Garoua road, N of Dourbey, 26 January 1966, *Leeuwenberg 7581* (BR!, YA). **North:** Garoua, *de Wit 7255* (WAG!); 16 km N of Banyo, along road to Mba, 29 February 1972, *Leeuwenberg 9433* (BR!, WAG, YA); 2 km N of Banyo, 1100 m, 5 July 1972, *Leeuwenberg 10144* (BR!, YA). **Northwest:** Mezam, Bali Ngemba F.R., Bali Ngemba, northeast of Mantum, 12 April 2007, *Etuge et al. 5374* (WAG!). **Adamaoua:** grounds of the cattle breeding centre at Wakwa, 10 km south of Ngaoundéré, 14 October 1960, *Breteler 493* (BR!, WAG, YA). **West:** km 33 Melong-Dschang road, 1 February 1972, *Leeuwenberg 9431* (BR!). **East:** Yokadouma, Route de Yokadouma à Batouri vers km 120, 16 March 1981, *Meijer 15112A* (WAG!, YA); 30 km ENE de Eta, 53 km SE Ngoila, 17 February 1973, *Letouzey 11962* (BR!). **Central:** N’Kolbisson, 8 km W Yaoundé, 17 February 1964, *de Wilde & de Wilde-Duyffes 1924* (BR!, WAG, YA); about 50 km S of Badjob, SW of Eséka, along the Nyong-River, near the large bridge, 29 January 1964, *de Wilde & de Wilde-Duyffes 1730* (BR!, WAG!, YA); Nanga Eboko, 24 February 1959, *Letouzey 1505* (P, YA). **South:** Campo-Ma’an area, Bibabimvoto, Forest around the Bongola river, 10 March 2000, *Tchouto Mbatchou et al. 2661* (WAG!); Kribi, beach south of the Kienke river mouth, September 1997, *van der Burgt 220* (WAG!).

Note:—For a discussion of the relations between *V. doniana* and *V. grandifolia*, see under the latter species.

6. *Vitex ferruginea* Schumacher & Thonning (Schumacher 1827: 228); Baker (1900: 324); Pieper (1928: 70); Aubréville (1950: 500); Moldenke (1955d: 334); Huber *et al.* (1963: 447); Adam (1975: 1475); Verdcourt (1992: 66); Lebrun & Stork (1997: 524); Sales (2005: 81); Hawthorne & Jongkind (2006: 428); Lisowski (2009: 367); Cabral (2013: 211); Meerts (2018: 386).

Type:—GHANA. Near Aquapim, *Thonning 265* (Lectotype designated by Meerts (2018): C [barcode C10004696], iso-: C [barcode C10004697 & C10004695], FI [barcode FI011043], S [S11-26315]).

= *Vitex welwitschii* Gürke (1893: 166); Baker (1900: 329); Pieper (1928: 69); Moldenke (1958b: 223); Lebrun & Stork (1997: 526); Onana (2011: 94). **Type:**—ANGOLA. Golungo Alto, *Welwitsch 5644* (Lectotype designated by Cabral (2013): K [barcode K000249101]).

= *Vitex fosteri* C.H. Wright (1908: 437); Pieper (1928: 68); Aubréville (1959: 233); Moldenke (1956a: 362). **Type:**—NIGERIA. Lagos, *Foster 34* (K [barcode K000241369, K000241368]).

Shrub or tree 5–25 m high; young twigs ochraceous to fulvous tomentose, occasionally only shortly pubescent. Leaves: petiole 3–13 cm, shortly ochraceous to fulvous pubescent, grooved; leaflets (3–)5–7, petiolule 3–12 mm, channelled, lamina elliptic to narrowly obovate-elliptic, 5.5–11(–17) × 2–5(–6.8) cm, acuminate at tip, attenuate at base, margin entire, upper surface glabrous except main vein, smooth, turning dark blackish-green in herbarium, main vein canaliculate, secondary veins 11–15(–17) on both sides, slightly impressed, reticulum inconspicuous; lower surface shortly ochraceous to pale yellowish pubescent mostly on veins (hairs ca. 0.3 mm), minutely yellow gland-dotted; reticulum dense, dark green. Inflorescence of axillary dichasia, generally formed before the leaves, 2–5(–10) cm long including 1–4 cm peduncle, lax, mostly much shorter than subtending leaf; branches yellowish-ochraceous pubescent or tomentose; bracts narrowly obovate-elliptic, 1–2 mm broad, markedly discolorous, upper surface glabrous, dark blackish green in herbarium, lower surface ochraceous to fulvous tomentose. Flower: calyx (2.5–)3–5 mm long, densely fulvous to ochraceous tomentose, lobes 1–2 mm long, blackish within; corolla 8–12 mm long, shortly ochraceous pubescent, creamy with lower lip pale violet; stamens long protruding, filament papillose, anther violet; ovary tomentose at tip; style papillose. Fruit globose to obovoid, 15–25 mm diam., apex generally apiculate and with a few hairs, subtended by persistent patelliform calyx.

Distribution in Cameroon:—Mostly in the south of the country (regions South, East, Central). Not recorded in Onana (2011).

Distribution elsewhere:—Widespread in tropical Africa, from Benin to Somalia eastwards and to South Africa southwards.

Ecology:—Various types of forests, fallow fields, savannas; 100–1200 m. In Takamanda forest reserve, dominant in the mid-elevation forest with *Vitex doniana* (Sunderland *et al.* 2003).

Selection of representative specimens:—CAMEROON. **East:** 8 km W of Mbol = 20 km W of Yokadouma, right bank Landjwé R., 17 July 1965, *Leeuwenberg 6182* (WAG!); 7 km E of Lomié, along road to Eschienbot, E of Poempoum, 4 September 1965, *Leeuwenberg 6707* (BR!, WAG); près ETA, 40km SSE Ngoila (axe Lomie-Souanke),

20 February 1973, *Letouzey 11998* (BR!, WAG, YA); rives du Dja, entre les rivières Meu et Edjune, 12 April 1961, *Letouzey 3782* (BR!, WAG, YA); subdivision Bertoua, sur la route de Deng Deng, 28 April 1955, *Nana 54* (P!, YA); Inselberg Bouamir, réserve du Dja, 31 January 2001, *Parmentier 3881* (BRLU!); Djolimpoun, entre Somalomo et Malen, 10 August 1993, *Sonké 524* (BRLU!). **South:** près Anmvan (15 km Est de Djoum), 5 November 1966, *Letouzey & Mpom 8290* (P!, WAG). **Central:** near top of hill 'Akondoï' NW of handicapped center, Etoug Ebe, Yaoundé, 3 June 1987, *Manning 1907* (WAG!, YA); Yaoundé, March 1940, *Jacques-Félix 5084* (P); entre M'Akan-Mbonde et Mangon (30 km NO de Linté), 27 September 1966, *Letouzey 8019* (BR!, P!, YA).

Variation:—*V. ferruginea* is variable for indumentum. Some forms have unusually inconspicuous indumentum and long acuminate leaflets (e.g. *Sonké 524*). When sterile, such forms are deceptively similar to *V. rivularis*; the upper leaf surface (smooth in *V. ferruginea*, scaberulose to strigulose in *V. rivularis*) is discriminant.

7. *Vitex gabunensis* Gürke (1893: 167); Baker (1900: 327); Pieper (1928: 56); Lebrun & Stork (1997: 524).

Type:—GABON. Wald bei der Sibangefarm, 14 January 1881, *Soyaux 163* (B [barcode B 18 0010227], K [barcode K000192754]!). = *Vitex impressinervia* Mildbraed ex Pieper (1928: 44, 57; 1929: 162); Onana (2011: 93; 2013: 118). **Type:**—CAMEROON. Südkameruner Waldgebiet, Beson 45 km östl. Gross Batanga, 22 July 1911, *Mildbraed 6074* (holo-: B†, iso-: HBG [barcode HBG513561]!), *synon. nov.*

Shrub or treelet 0.8–4(–5) m high; twigs glabrous, tinged violaceous to purplish when young, ca. 0.5 cm diam. at the level of inflorescence. Leaves: petiole (1–)9–18(–22) cm, 2–2.5 mm thick, stiff, glabrous to sparsely puberulent; leaflets (1–)3–5(–7); petiolules channelled, (0–)5–20(–30) mm, glabrous to sparsely puberulent, shorter in lateral leaflets (0–5 mm); lamina (9–)13–28(–35) × 3–8(–12) cm, obovate-elliptic, thin but somewhat coriaceous, contracted in an acumen 0.5–2 cm long, long attenuate at base, margin entire, slightly recurved, (5–)7–15(–18) secondary veins on both sides, distally anastomosing in arches; upper surface shiny dark green when fresh, glabrous, veins impressed, reticulum inconspicuous; lower surface paler, with or without yellow glands, wholly glabrous or sparsely puberulent on veins (short appressed hairs); veins often purplish, reticulum prominent or not, domatia present in the axils of secondary veins, pocket-like or with round opening. Inflorescence 1–4 pairs of dichasia near the apex of twigs, on leafless nodes; dichasia 2–7(–13) × 3–7(–8.5) cm, peduncle 0.5–4.5(–8) cm, with 3–4 levels of branching; branches more or less flattened, sparsely puberulent; bracts linear to narrowly triangular, the lowest ones ca. 8 mm long, the floral ones 1 mm, ciliate. Flower: pedicel 1–4 mm, calyx 1.5–3.0 mm long, campanulate, obtuse to rounded at base, glandular at tip, sparsely and shortly appressed-puberulent (hairs 0.1 mm), lobes (0.2–)0.5(–1) mm long, triangular, generally obtuse; corolla 7–15 mm, grayish, greenish yellow to dull dirty pinkish without, dark purplish red on the inner side of lobes, yellowish in the throat, with very short appressed pale fulvous in part papilliform hairs on the tube, tube more or less geniculate; stamens slightly protruding, filament glandular; ovary flat to convex and with scattered golden yellow glands at tip, rarely with a few short hairs. Fruit obovoid, 10–26 × 8–18 mm, flat to slightly depressed at tip, glabrous, yellow-orange, often white-spotted; fruiting calyx flat to slightly concave, 7–12 mm diam., glabrous.

Distribution in Cameroon:—Regions South and Southwest; new to Cameroon (not in Onana (2011)).

Distribution elsewhere:—Gabon, R. Congo (Brazzaville).

Habitat:—Primary rainforest, secondary forests, 50–700 m.

Taxonomic discussion:—*V. gabunensis* has been overlooked ever since its original description, being confounded with *V. grandifolia*. Both species occur in the rainforest and share superficial resemblance, having short inflorescences grouped near the apex of twigs. However, *V. gabunensis* is quite distinct in having glabrous ovary, smaller calyx, and leaves with domatia. Moreover, *V. gabunensis* is never associated to ants. See also note under *V. zenkeri*.

Key to the varieties

1. Lower surface of lamina without glands or with very sparse inconspicuous glands; veins glabrous on lower surface; dichasia < 3 × 4 cm.....var. *gabunensis*
- Lower surface of lamina conspicuously yellow gland-dotted; veins puberulent on lower surface; dichasia > 3 × 4 cm.....var. *daubyi*

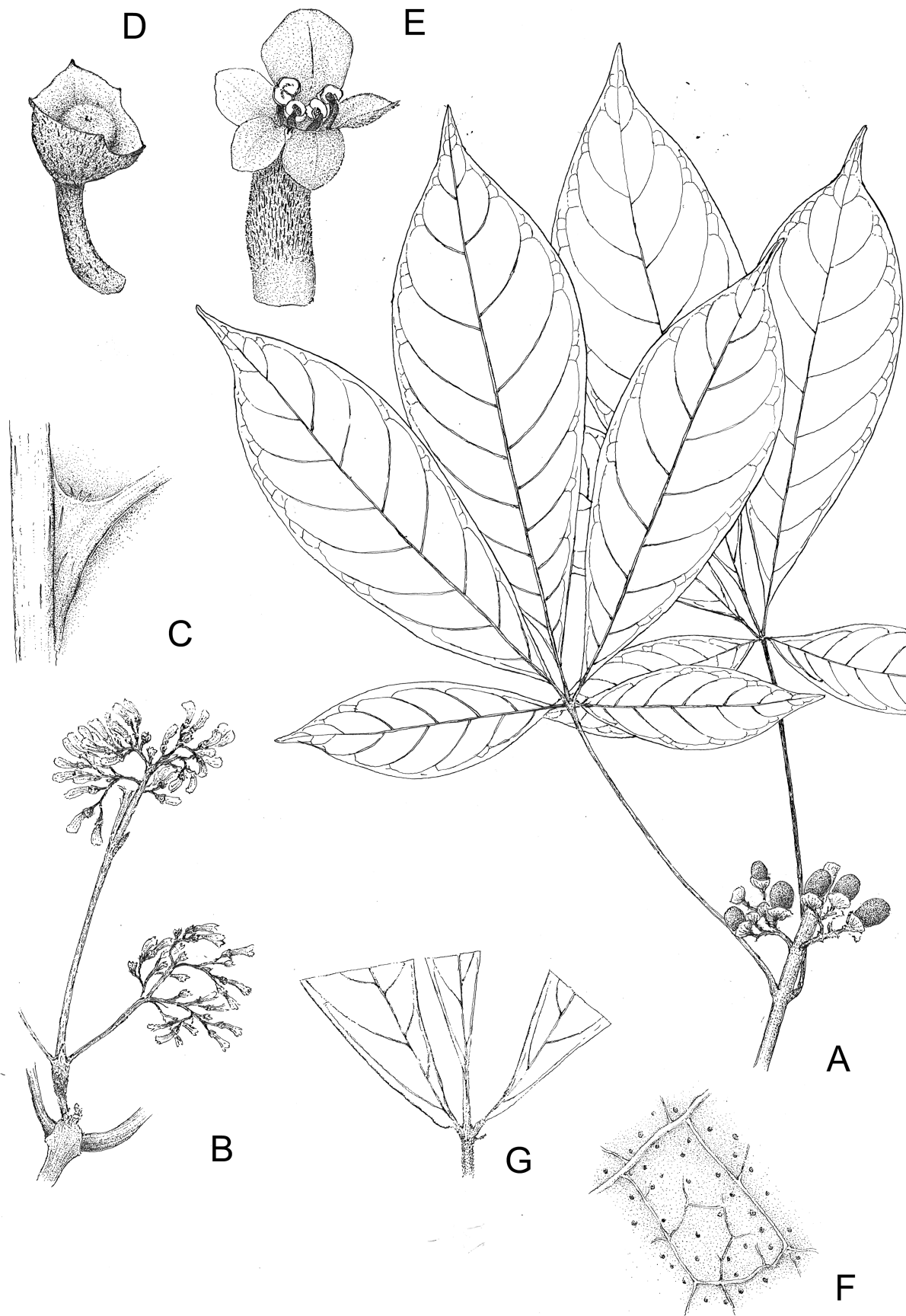


FIGURE 1. *Vitex gabunensis*. **A–E.** var. *gabunensis*. **A.** Fruiting branch. **B.** Part of flowering branch. **C.** Domatia. **D.** Calyx and ovary (corolla removed). **E.** Corolla. **F–G.** var. *daubyi*. **F.** Part of 3-foliolate upper leaf. **G.** Lower surface of leaflet. Drawing by Antonio Fernandez (Botanic Garden Meise).

7a. *Vitex gabunensis* var. *gabunensis*

Diagnosis:—Lower surface of lamina without glands or with very sparse inconspicuous glands; reticulum glabrous and not prominent on lower surface; leaflets 5(–7); dichasia smaller than 3 × 4 cm, relatively dense.

Distribution in Cameroon:—Region South.

Distribution elsewhere:—Gabon, R. Congo (Brazzaville).

Habitat:—Primary rainforest, secondary forests, 50–700 m.

Selection of representative specimens:—CAMEROON. **South:** Près Ebianemeyong, 5 km W Nyabessan, 26 November 1982, *Ngongmeneck 356* (P!, YA); Mvini, 35 km east of Campo, 1 December 1983, *Kaji 201* (P!, YA); réserve de faune de Campo, 26 March 1983, *Ngongmeneck 468* (P!, YA).

7b. *Vitex gabunensis* var. *daubyi* Meerts var. *nov.*

Type:—GABON. Mondah Forest, 25 km along the road from Libreville to Cape Esterias, 2 September 1978, *Breteler & de Wilde 392* (holo-: WAG [barcode WAG0303484]!, iso-: BR [barcode BR0000018438734]!, WAG [barcodes WAG0303483, WAG0303485]!, P [barcode P00486952]!).

= ? *Vitex dinklagei* Gürke (1903: 294); Onana (2011: 93; 2013: 118), *pro parte*, quoad isosyntype *Dinklage 852* (HBG [barcodes HBG-513555, HBG-513556] !). **Type:**—Cameroon. Batanga, January 1890, *Dinklage 493* (syn-: B†, isosyn-: HBG [barcode HBG-513558]!), September 1890, *Dinklage 805* (syn-: B†, isosyn-: HBG [barcodes HBG-513559, HBG-513560]!), Gross-Batanga, auf feuchtem, schattigem Waldboden, September 1890, *Dinklage 852* (syn-: B†, isosyn-: HBG [barcodes HBG-513555, HBG-513556, HBG-513557]!), bei Batanga, auf trockenem Waldboden, September 1891, *Dinklage 1341* (syn-: B†), *Dinklage 1394* (syn-: B†).

= *Vitex klainei* Pierre in *schedis*, unpublished designation.

Diagnosis:—Differs from the type variety by the lower surface of leaflets conspicuously yellow gland-dotted, with the veins puberulent; upper leaves occasionally with 1–3 leaflets, often with reduced petiolule; dichasia larger and more lax, on a longer peduncle.

Distribution in Cameroon:—Regions South and Southwest.

Distribution elsewhere:—Gabon, R. Congo (Brazzaville).

Habitat:—Primary rainforest, secondary forests.

Other representative specimens:—CAMEROON. **South:** Mt Elephant, SE Kribi, 13 March 1970, *Bos 6553* (P!, WAG!); Mt Elephant, SE Kribi, 28 April 1970, *Bos 6869* (WAG!); 2 km N of Kribi-Lolodorf, 1 juillet 1970, *Bos 7009* (BR!, P!, WAG!); 6 km S Kribi, 2–4 km E de la route Gr. Batanga, 26 February 1969, *Bos 5415* (P!, WAG, YA); massif des Mamelles, région de campo Ma'an, 280 m, 18 avril 2002, *Tchouto Péguy et al. 3248* (WAG!). **Southwest:** Bassin du Mungo, entre Ndu sur le Mungo et la gare de Muyuka au km 59 sur le chemin de fer du nord, juin 1917, *Fleury* in herb. *Chevalier 33403* (P!).—GABON. Nyanga, ca. 1 km du village Dougni, 7 km de Malounga 1, 22 October 2009, *Bissiengou et al. 452* (WAG!); NNW Ndjolé, 11 November 1991, *Breteler & Jongkind 10383* (WAG!); environs de Libreville, 13 août 1901, *Klaine 2297* (P!); Moukout, 16 November 1990, *van Nek 312* (WAG!); Pechaud West, 24 November 1990, *van Nek 404* (WAG!); près de Rabi, à l'est de l'ancien camp, 15 January 1991, *van Nek 568* (WAG!); ca. 15 km N of Libreville, 18 March 1987, *J.M. & B. Reitsma 3180* (BR!); Estuaire, Forêt classée de la Mondah, 20 January 2007, *Ella & Niangadouma 7* (BR!).

Eponymy:—The variety is dedicated to the Belgian botanist Gilles Dauby, who has made important contributions to the flora of tropical Africa.

Taxonomic discussion:—1. Some specimens are intermediate between the two varieties, e.g. *Louis 2735* (WAG!). 2. *V. zenkeri* and *V. gabunensis* are closely related species. Some specimens of *V. gabunensis* var. *daubyi* are puzzling, having the inflorescence with a longer peduncle, in the axils of uppermost leaves and occasionally with polychasial branching. Such forms can be interpreted as intermediates between *V. zenkeri* and *V. gabunensis* var. *daubyi*. Molecular markers are needed to resolve the taxonomy of this group. See also note under *Vitex zenkeri*. 3. *V. dinklagei* Gürke is a critical taxon in the *V. gabunensis*-*V. zenkeri* complex. Much of the original materials (*Dinklage 493, 805, 852, 1341, 1394*) have been lost. The remaining isosyntypes in HBG are apparently an admixture of several taxa. *Dinklage 852* is very near *V. gabunensis* var. *daubyi*; *Dinklage 493* and *Dinklage 805* are more or less intermediate between *V. zenkeri* and *V. gabunensis* var. *daubyi*. The protologue is not precise enough to allow designating a lectotype in that material.

8. *Vitex grandifolia* Gürke (1893: 169); Baker (1900: 324); Pieper (1928: 73); Moldenke (1956a: 385); Aubréville (1959: 234); Huber *at al.* (1963: 446); Schnell & Grout de Beaufort (1966: 45); Adam (1975: 1476); Satabié (1994:

161); Lebrun & Stork (1997: 524); Yédomonhan & Agbani (2006: 994); Hawthorne & Jongkind (2006: 428); Eyog Matig *et al.* (2006: 165); Lisowski (2009: 367); Onana (2011: 93).

Type:—GABON. In ditone Munda, Sibangefarm, im Wald, 18 February 1881, *Soyauy* (sic) [sphalm. Soyaux] 215 (**Lectotype designated here**: K [barcode K000192761]!, isolecto-: P [barcode P00464233]!, B not seen).

= *Vitex bipindensis* Gürke (1903: 295). **Type**:—CAMEROON. Bipindi, am Lokundje Ufer auf feuchtem Laterit, July 1897, *Zenker 1351* (**Lectotype designated here**: P [barcode P00464230]!, isolecto-: BR [barcode BR0000008905505]!, BM [barcode BM000834609]!, COI!, G [barcodes G00016801 & G00016802, G00023707], HBG [barcode HBG513549]!, K [barcode K000192762]!, KFTA [KFTA0002109], L [barcode L.2765533], M [barcode M0105028], MO [MO-391105], NYBG [barcodes NY00138424, NY00138425]!, P [barcodes P00486908, P00464222]!, WAG [barcode WAG0003483]!, WU [WU0037922], W [W 1898-0006743]).
≡ *V. grandifolia* Gürke var. *bipindensis* (Gürke) Pieper (1928: 73).

Tree 6–10(–30) m; twigs glabrous, angulose, generally dark red, lenticellate, ca. 1 cm diam. at the level of inflorescence, internodes hollow, perforated under the nodes, inhabited by ants. Leaves: petiole 10–30 cm, 2.5–4 mm thick, stiff, flattened above, often with two prominent ridges, glabrous or rarely puberulent; leaflets 5(–7), petiolules 0–15 mm, channelled, not clearly delimited from lamina, lamina narrowly obovate-elliptic, 12–40(–50) × 4–15(–22) cm, coriaceous, turning brownish or livid in herbarium, shortly acuminate at tip, long attenuate near base and prolonged into the petiolule, margin entire, wholly glabrous, upper surface dark green, lower surface markedly paler, without glands, main vein generally carinate on lower side, domatia lacking; secondary veins 10–15 on both sides, arching near the margin, reticulum inconspicuous on upper surface, lax and not prominent on lower surface. Inflorescence of axillary dichasia, localised at the two apical nodes of twigs, 4–8(–12) cm long including 1–4(–6) cm peduncule, shorter than the petiole of subtending leaf; branches markedly angulose-flattened, puberulent; bracts narrowly triangular, the lower ones 3–4 mm long. Flower: pedicel 0–1 mm, calyx 3–4.5(–6) mm long, including ca. 0.3–0.5 mm long lobes, shortly greyish appressed pubescent; corolla 10–15 mm long, dull brownish-yellow pubescent outside, yellow inside with brownish veins, reddish at throat; stamens slightly exerted, filaments pubescent at base; ovary with a conical hirsute tip; style gibbous at base, curved near insertion. Fruit ovoid, ca. 15–20 × 9–12 mm, often with a few short hairs at tip, blackish, persistent calyx patelliform.

Distribution in Cameroon:—Regions South, Central, Southwest and Littoral; see Satabié (1994) for a distribution map.

Distribution elsewhere:—Western tropical Africa from Guinea to R. Congo (Brazzaville).

Habitat:—Primary rainforests, gallery forests, submountain forests; late-secondary forest with *Piptadeniastrum africanum*, *Ricinodendron heudelotii* subsp. *africanum* (Sunderland *et al.* 2003). Indicating high soil phosphorus at Korup National reserve (Gartlan *et al.* 1986). Fruit eaten and dispersed by at least six species of monkeys in the Dja Reserve (Poulsen *et al.* 2001). Myrmecophilous species (Schnell & Grout de Beaufort 1966).

Uses:—An important fruit tree in Cameroon (Eyog Matig *et al.* 2006). Used in cocoa agroforestry (Jagoret *et al.* 2014).

Selection of representative specimens:—CAMEROON. **South**: about 3 km. on the road from N’Koemvone to Akoakas, counting from the crossing at N’Koemvone, 13 January 1975, *de Wilde 7896* (BR!); riverine forest of tributary to Kienke R., just E. of Kribi, 02 December 1969, *Bos 5750* (BR!, P!, YA); Bipinde, 1899, *Zenker 1915a* (M); Maan (24 km ESE Nyabessan), entre le poste de douanier et le Ntem, 5 March 1963, *Raynal & Raynal 10231* (P!, YA). **Central**: Ndanan 1, 9 March 2004, *Cabral & Nana 104* (K!); 40 km E of Mbalmayo, between Emamemuum and Kondesson, 23 June 1972, *Letouzey 11349* (P!, BR!, WAG!, YA); 23 km West of Yaoundé, along road to Douala, 7 July 1961, *Breteler 1559* (P!, WAG!, YA); km 154 sur le chemin de fer du Centre, Bidjoka, 6 August 1927, *Hédin 1534* (P!). **Southwest**: Korup National Park, Science Camp, 22 March 2004, *van der Burgt & Eyakwe 676* (BR!, WAG!); secondary forest near Ngusi village, north of Nyassosso, 26 April 1986, *Etuge & Thomas 55* (BR!, YA); Kupe-Muanenguba, 21 May 1996, *Etuge 1920* (MA); Bassin du Mungo, entre Ndu sur le Mungo et la gare de Muyuka au km 59 sur le chemin de fer du nord, July 1917, *Fleury* in herb. *Chevalier 33158* (P!); left bank Mungo river, near bridge in Kumba-Loum road, 12 November 1971, *Leeuwenberg 8696* (BR!, K!, YA). **Littoral**: forêt de Bakaka, 3 km E of Eboné (a village on km 11 Nkongsamba-Loum road), 30 May 1972, *Leeuwenberg 9925* (BR!, YA).

Taxonomic discussion:—1. Large-leaved specimens of *V. doniana* resemble *V. grandifolia* when sterile; however, *V. doniana* is never associated to ants. When flowering, the two species cannot be confounded; *V. grandifolia* has the corolla dull brownish without, yellow within with brownish veins, reddish in the throat, while *V. doniana* has pale lilac corolla, white in the throat. 2. Many collections hitherto referred to as *V. grandifolia* are misidentifications for *V. gabunensis* (see note under the latter species).

Lectotypification of *Vitex grandifolia* Gürke. The protologue (Gürke 1893) cited *Mann 880* and *Soyaux 215*. No original material was found in B. I select as the lectotype the specimen *Soyaux 215* (K barcode K000192761) which has one complete leaf attached on a twig, and an inflorescence with flowers and very young fruits. Remaining syntypes:—SIERRA LEONE. Bagroo river, April 1861, *Mann 880* (syn-: B not seen, isosyn-: K [barcodes K000241366, K000241367]!, P [barcode P00486890]!).

Lectotypification of *Vitex bipindensis* Gürke. The protologue (Gürke 1903) cited five syntypes, i.e. *Zenker 1351*, *1893*, *1915*, *1915a*, *2164*. Many duplicates have been distributed, but most of them are fragmentary, generally consisting of detached leaflets and flowers. The protologue describes flowers and these provide important diagnostic traits. The specimen *Zenker 1351* (P [barcode P00464230]) is selected as the lectotype because it has a complete leaf and a complete inflorescence with corollas. Remaining syntypes:—CAMEROON. Bipindi, August 1898, *Zenker 1893* (BR [barcodes BR0000008905468, BR0000008905499]!, BM [barcode BM000834610]!, COI!, E [barcode E00193462], G [barcode G00016802], HBG [barcode HBG513548], LL [barcode LL.2765536], M [barcode M0105024], P [barcode P00486907]!, S [S08-10970], WAG [barcode WAG0003482]!, W [W 1899-0006231], WU [WU 0037922]; Bipindi, im Urwald bei 150 m ü. M., November 1898, *Zenker 1915* (B [barcode B 18 0010219], BM [barcode BM000834612]!, BR [barcode BR0000008905512]!, COI!, G [barcodes G00023658, G00023659, G00016800, G00023706], HBG [barcode HBG513551], K [barcode K000192763]!, KFTA [barcode KFTA0002110], M [barcode M0105028], MO [MO-391104], P [barcode P00486908]!, W [W 1899-0006233], WAG [barcode WAG0003481]!, WU [WU 0037918]; *Zenker 1915a* (BM [barcode BM000834611]!, HBG [barcode HBG513550], M [barcode M0105027], W [W 1899-0006232], WU [WU 0037919]; Bipindi, August 1899, *Zenker 2164* (G barcodes [G00023708 G00023657] HBG [barcode HBG513552], LL [barcode LL00375270], M [barcode M0105025], S [S-G-6383], W [W 1901-0000712], WU [WU 0037920]).

9. *Vitex lokundjensis* Pieper (1928: 71; 1929: 165); Moldenke (1956b: 443); Lebrun & Stork (1997: 525); Onana (2011: 93; 2013: 118).

Type:—CAMEROON. Bipinde, Urwaldgebiet, 1909, *Zenker 3899* (holo-: B†, iso-: BM [barcode BM000834536]!, BR [barcode BR0000008905444]!, E [barcode E00193461], HBG [barcode HBG513563], K [barcode K000192760]!, L [barcode L0003969], P [barcode P00464234]!, M [barcode M0105021], MO [MO-391075], NY [barcode NY00138448], S [barcode S11-26320], US [barcode US00119266], W [W 1911-0000163], WU [WU 0037917]).

? = *Vitex lokundjensis* var. *kruckei* Pieper (1928: 71). **Type:**—CAMEROON. Edea, *Krucke 14* (holo-: B†).

Tree up to 30 m high, with spreading crown; twigs glabrous. Leaves: petiole (2.5–)5–12 cm, glabrous; leaflets (3–)5(–6); petiolules 5–15 mm, channeled; lamina narrowly obovate, 9–12(–18) × 3–5(–6) cm, slightly glossy on both surfaces, acuminate, long attenuate at base, margin undulate, glabrous, 10–13 veins on each side, prominent on upper surface. Inflorescence of axillary dichasia, 5–12 cm long, including 2–6 cm peduncle, typically shorter than or equalling petiole, glabrous or, more rarely, puberulent; cyme branched at (2–)4–6 nodes, very lax, branchlets at second and third node diverging at very open angle (> 150°), generally refracted as well as pedicels; bracts subulate, glabrous. Flower: pedicel 0–4 mm, calyx 2–3 mm long, broadly campanulate, truncate, slightly dilated at mouth, teeth obsolete, glabrous to sparsely puberulent, pinkish green to maroon-brown; corolla white or pale yellow, tube and margin of lower lobe brown-tinged at anthesis, ca. 6–7 mm long, tube 2–3 times longer than calyx, geniculate; upper lip shortly bilobed, shortly appressed pubescent, stamens long protruding, purplish; ovary obovoid, hirsute at tip; style gibbous at base, curved near insertion. Fruit ca. 15 mm long, green (ripe?), persistent calyx shallowly cup-shaped, ca. 9 mm diam.

Distribution in Cameroon:—Regions South, Southwest and Littoral.

Distribution elsewhere:—Endemic to Cameroon. Records from other countries in Moldenke (1956b) are errors.

Habitat:—Rainforest, for example dominated by *Microberlinia bisulcata*, *Tetraberlinia bifoliolata* and *T. korupensis*; regenerating in light gaps (Newbery *et al.* 2013).

Other representative specimens examined:—CAMEROON. **South:** 15 km SE Kribi, between airstrip and Mount Elephant, 26 March 1970, *Bos 6640* (BR!, P!, WAG!, YA); Bipinde [Bipindi], *Zenker 3899* (BM!, BR!, E, HBG, K!, L, M, NY, P!, S, US, WU). **Southwest:** in area just approximately SW of old Mbu village, 27 October 1986, *Manning 630* (WAG!, YA); South Korup reserve, rocky river banks of Mana river, July 1983, *Thomas 2253* (WAG!, YA); forest along bank of Ndian river, Korup national park, 24 February 1985, *Thomas 4403* (BR!, P!, WAG!, YA); Ndian national park, 05 March 2003, *van der Burgt & Eyakwe 626* (BR!, P!, WAG!); Ekombe-Mofako Forest, 23 May 1994, *Watts 1159* (K!). **Littoral:** Edea, concession Lutz-Tsanagu, April 1946, *Vaillant 1118* (P!).

Discussion:—1. *V. lokundjensis* is a very distinct species, related to *V. doniana* (ovary hirsute at tip, glabrous leaves), confirmed by molecular markers (Bramley *et al.* 2009). 2. No type material has been found for *V. lokundjensis* var. *kruckei* W.Pieper. It is said to differ from the type in having larger leaflets (up to 18 × 6 cm) and puberulent inflorescence and calyx (Pieper 1928, 1929).

10. *Vitex madiensis* Oliver (1875: 134, Pl. 131); Baker (1900: 322); Pieper (1928: 61); Aubréville (1950: 504); Huber *et al.* (1963: 447); Geerling (1982: 331); Verdcourt (1992: 60); Lebrun & Stork (1997: 525); Sales (2005: 83); Hawthorne & Jongkind (2006: 428); Lisowski (2009: 367); Meerts (2018: 387).

Type:—UGANDA. Madi, December 1862, *Grant 649* (holo-: K [barcode K000192783]!).

Vitex madiensis subsp. *madiensis* (Verdcourt 1992: 60; Sales 2005: 84)

= *Vitex barbata* Planchon ex Baker (1900: 323); Pieper (1928: 61). Type:—SENEGAL. *Heudelot 30* (syn-: P [barcodes P04050035, P04050036]!), Senegambia, *Heudelot s.n.* (syn-: K, not seen), Sierra Leone. Talla hill, in bush half way up Gonkwi, *Scott-Elliott 4881* (syn-: K, not seen).

= *Vitex schweinfurthii* Gürke (1893: 170). ≡ *Vitex madiensis* var. *schweinfurthii* (Gürke) Pieper (1928: 63). Type:—SOUTH SUDAN. Ghasalquellengebiet, Lande der Bongo, bei der grossen Seriba Ghattas, 7 July 1869, *Schweinfurth 2030* (syn-: K [barcode K000192766]!); bei Mvolo im Lande der Mittu, 20 December 1869, *Schweinfurth 2848* (syn-: B, not seen).

= *Vitex simplicifolia* Oliver (1875: 133); Baker (1900: 320); Pieper (1928: 64); Huber *et al.* (1963: 447); Geerling (1982: 331); Eyog Matig *et al.* (2006: 166). Type:—UGANDA. Madi, Feb 1863, *Speke & Grant 701/5* (holo-: K [barcode K000192767]!).

= *Vitex vogelii* Baker (1900: 319). ≡ *Vitex simplicifolia* var. *vogelii* (Baker) Pieper (1928: 65). Type:—NIGERIA-CAMEROON BORDER [Upper Guinea], Southern Bornu, Musgu, *Vogel 97* (holo-: K [barcode K000192752]!).

= « *Vitex cordata* » Aubréville (1950: 504), invalid name.

Shrub, treelet or tree 0.5–8 m, rarely a suffrutex; young twigs tomentose to villose, indumentum of soft, more or less crispate, hairs, glabrescent. Leaves opposite (forms with 3 leaflets) or 3-whorled (forms with 1 leaflet), petiole 2–8 cm, pubescent, hairs crispate in part, leaflets 1–3, the middle one much larger and with longer petiolule (5–25 mm) than the laterals (petiolule 1–5 mm), lamina (5–)8–12(–15) × (2.5–)4–9 cm; in the unifoliolate forms, lamina ovate to ovate-elliptic, obtuse to rounded at base, margin entire to undulate; in the 3-foliolate forms, lamina of the middle leaflet obovate-elliptic to obovate-spatulate, rounded to subtruncate at tip, sometimes cuspidate, grossly crenate or dentate in upper half, more rarely entire, coriaceous, upper surface sparsely pubescent, tomentose on veins, lower surface shortly pubescent to tomentose mostly on veins, or more or less uniformly beige-tomentose (only in 1-foliolate forms); secondary veins 5–12 on each side. Inflorescence of axillary dichasia, 5–20(–27) cm long (including 3–15 cm peduncule), bifurcate at 2–4 nodes; branches pubescent, with thin soft hairs, crispate in part, bracts linear. Flower: calyx broadly campanulate, slightly bilabiate, 2.5–3.5(–4) mm long, often purplish-tinged, cream to brownish-tomentose, sometimes only sparsely pubescent, with broadly triangular teeth 0.5(–1) mm long, subobtusate at tip; corolla 6–8 mm long, whitish or greenish without, violet to purplish within, lobes with white margin; stamens hardly exerted, filament bearded; ovary glabrous. Fruit ovoid, 25–30 × 15–20 mm; persistent calyx patelliform to shallowly cupuliform.

Distribution in Cameroon:—Regions North, Central, East.

Distribution elsewhere:—Widespread in all regions of tropical Africa with a dry season climate, from Senegal to Angola and Mozambique.

Habitat:—Savannas, wooded savannas, shrub savannas, thickets; 0–1000 m.

Uses:—An important fruit tree in Cameroon (Eyog Matig *et al.* 2006; Mapongmetsem *et al.* 2012). Domestication trials of *V. madiensis* have been conducted in the Adamaoua Highlands (Mapongmetsem 2006).

Selection of representative specimens:—CAMEROON. **North:** Tinguelin, 16 October 1974, *Geerling & Mayouo 5691* (WAG!); km 5 of Mogodé-Mokolo road, 25 January 1966, *Leeuwenberg 7566* (BR!, P!, WAG!, YA); près Garoua, 4 April 1981, *Meijer 15477* (WAG!, YA); Mayo Lidi, 5 March 1933, *Lhoté 75* (P!). **East:** 13 km NW of Bétaré Oya, W of the Lom river, 21 February 1961, *Breteler 1089* (BR!, WAG!); Mboulaye (Bertoua), 7 February 1972, *Ekema 140* (BR!, WAG!, YA). **Central:** Mt Ngoro à 58 km SW de Linte, 17 April 1982, *Nkongmeneck 261* (P!, YA), village Ndema, 12 km S NdiKinimeki, March 1984, *Satabié 760* (P!, YA); Yoko, near catholic mission, 27 February 1972, *Leeuwenberg 9396* (BR!, WAG!, YA).

Taxonomic discussion:—1. *Vitex madiensis* subsp. *madiensis* is probably the most polymorphic *Vitex* taxon in tropical Africa. Unifoliolate morphs with smooth leaflet margin are particularly striking; they are widespread in

the Sudanian region, and have been given formal taxonomic recognition at species level (*V. simplicifolia* Oliv., *V. vogelii* Baker). Such forms often have leaves in whorls of three, with indumentum of lower surface more developed than in 3-foliolate forms. However, considering the existence of many intermediates (e.g. in Cameroon: *Lhoté* 75), recent authors generally consider only one species (Sales 2005; Verdcourt 1992). 2. Suffrutescent specimens occur in Cameroon (e.g. *Raynal* 12843 (P, YA)); they tend to have rusty tomentose inflorescence branches and might deserve formal taxonomic recognition; more materials are needed.

11. *Vitex oxycuspis* Baker (1900: 326); Pieper (1928: 56); Moldenke (1957: 31; 1967: 314); Aubréville (1959: 232); Huber *et al.* (1963: 446); Adam (1975: 1477); Lebrun & Stork (1997: 525); Hawthorne & Jongkind (2006: 428); Lisowski (2009: 368); Meerts (2018: 388).

Type:—NIGERIA. Old Calabar River, February 1863, *Mann* 2243 (holo-: K [barcode K000192745]!).

Tree or shrub (1–)2–6(–12) m; twigs almost glabrous, papillate, more rarely pubescent with soft patent hairs. Leaves: petiole 3–15 cm, slender, with short papilliform hairs, sometimes intermingled with long hairs; leaflets 3–5, petiolule (0–)5–18 mm, sharply delimited from lamina, lamina 10–22 × 2.5–7.5(–9) cm, narrowly obovate to obovate-elliptic, papery, generally translucent when dry, acuminate at tip, cuneate at base, margin crenate to coarsely dentate, at least in the upper half, occasionally almost entire, veins often tinged dark red, upper surface glabrous or occasionally strigulose (hairs 0.3 mm), veins shortly puberulent, lower surface glabrous, except veins, papillate or, more rarely, pubescent; secondary veins 6–15 on each side; domatia present in the axil of secondary veins. Inflorescence of axillary dichasia, 4–15(–22) cm long, including 2–11(–15) cm peduncle, slender, lax, branched at 3–4 nodes, few-flowered; branches with papilliform hairs and glands. Flower: calyx broadly campanulate, 2–3 mm long, lobes broadly triangular, 0.5–1 mm long, sparsely puberulent; corolla 5–9 mm long, whitish to yellowish-brown (?); stamens exserted; ovary glabrous, glandular at tip. Fruit obovoid, ca. 9 × 7 mm; persistent calyx cupuliform.

Distribution in Cameroon:—Rare, present only in the Southwest region. Apparently a new record to Cameroon (not recorded in Onana (2011)).

Distribution elsewhere:—Western tropical Africa, from Guinea to Angola.

Habitat:—Primary rainforests with *Cynometra hankei*, secondary forests, degraded forests, 200–450 m.

Selection of representative specimens:—CAMEROON. **Southwest:** Korup reserve, Ikasa, 28 July 1964, *Thomas* 552 (P!, K!); Trail to Kourup [sic] National Park, 2 km W of Kondotiti-Mundemba road, 11 November 1985, *Gentry & Thomas* 52695 (WAG!).

Note:—Three other collections from the same region depart from the type in having leaflets almost entire with reticulum prominent on upper surface (*Thomas & Mambo* 4254 (BR!, K!, P!, YA); *Thomas* 4828 (P!, YA); *Thomas* 4847 (BR!, P!, WAG, YA)); more material is needed.

12. *Vitex rivularis* Gürke (1903: 297); Pieper (1928: 56); Aubréville (1959: 233); Huber *et al.* (1963: 446); Moldenke (1968: 34); Adam (1975: 1477); Lebrun & Stork (1997: 526); Hawthorne & Jongkind (2006: 428); Lisowski (2009: 368); Onana (2011: 93); Meerts (2018: 389).

Type:—CAMEROON. Bipinde, am Lokundje-Ufer, 80 m ü. M., April 1897, *Zenker* 1333 (holo-: B†, iso-: P [barcodes P00442317, P00442318 & P00442319]!, BM [barcode BM000834558]!, E [barcodes E00214021, E00193458], G [barcodes G00023655, G00023656], W [barcode W 1898-0006745], HBG [barcode HBG513570], K [barcode K000192753]!, LISC [barcode LISC011440]!, MO [MO-391148], WU [WU 0069994], KFTA [barcode KFTA 0002112]).

= *Vitex longipetiolata* Gürke (1903: 295); Pieper (1928: 60); Lebrun & Stork (1997: 525); Onana (2011: 93; 2013: 118). **Type:**—CAMEROON. Im Urwald bei Bipindi, August 1898, *Zenker* 1888 (B [barcode B 10 0165138], E [barcode E00193460], G [barcodes G00023705, G00023704], GOET [barcode GOET011543], HBG [barcode HBG513562], K [barcode K000192759]!, M [barcode M0105015], P [barcode P00442314]!, S [barcode S10-29260]), *synon. nov.*

Shrub or tree to 18 m; very young twigs pale fulvous pubescent, soon glabrescent, usually with a few patent long thin hairs persisting at the nodes, occasionally very shortly puberulent-papillose. Leaves: petiole (4–)10–20 cm, puberulent to almost glabrous with sparse patent hairs especially near the tip, papilliform hairs occasionally present; leaflets 5–7, petiolule 5–25 mm, sharply delimited from lamina, puberulent, with a tuft of long thin hairs at the joint of petiole and petiolule, lamina elliptic to obovate-elliptic or narrowly ovate-elliptic, 8–18 × 3–6 cm, membranaceous, abruptly contracted into a long narrow acumen (2–3 cm in some leaflets), cuneate at base, margin entire, upper surface dull dark

green, generally scaberulous to strigulose, glabrous except veins with sparse thin hairs, secondary veins (8–)11–20 on each side, reticulum slightly prominent; lower surface subglabrous, conspicuously golden yellow gland-dotted, veins thinly appressed pubescent (hairs 0.5–1 mm), more rarely only puberulent or papillose. Inflorescence of axillary dichasia, fragrant, ample, profuse, many-flowered, up to 25 cm long including 9–20 cm peduncule, branched at 7–9 nodes; branches sparsely puberulent or papillate, nodes usually with a tuft of long pale fulvous hairs. Flower: calyx 1.5–2(–2.5) mm long including 0.5 mm lobes, with many golden-yellow glands not masked by the short appressed hairs; corolla ca. 4 mm long, whitish, lower lip tinged purplish to bluish, shortly pubescent, with conspicuous golden yellow glands; ovary glabrous, glandular at tip. Fruit obovoid, (12–)20–30 × (7–)18–20 mm, persistent calyx cupuliform.

Distribution in Cameroon:—Regions East, South, Southwest.

Distribution elsewhere:—Western tropical Africa, from Guinea to Angola.

Habitat:—Rainforests.

Selection of representative specimens:—CAMEROON. **East:** Concession forestière Pallisco-Mindourou I – UFA10041, 15 May 2015, *Libalah et al. 1670* (BRLU!); Parc National de Deng Deng, 14 August 2014, *Libalah et al. 1272* (BRLU!). **South:** Bidou, km 28 Kribi-Lolodorf, forest halfway up W slope of calvary, 18 March 1970, *Bos 6604* (WAG!); Mvila, Ebom, 20 February 1996, *Elad 438* (BR!, WAG); près km 115, route Mbalmayo-Sangmelima, 6 April 1949, *S.R.F.K. 1283* (P!); Ngovayang hills, 11 October 2017, *van der Burgt 2141* (K!). **Southwest:** Ikiliwindi, mile 14, N of Kumba on Mamfe road, 4 March 1987, *Etuge & Thomas 514* (WAG!).

Notes:—1. The type specimen of *V. longipetiolata* Gürke fits in the variation range of *V. rivularis* Gürke. 2. See note under *V. ferruginea*.

13. *Vitex thyrsoiflora* Baker (1895: 152); Baker (1900: 319); Pieper (1928: 54); Aubréville (1950: 502; 1959: 233); Moldenke (1958a: 152; 1968: 43); Huber *et al.* (1963: 446); Schnell & Grout de Beaufort (1966: 45); Adam (1975: 1477); Lebrun & Stork (1997: 526); Hawthorne & Jongkind (2006: 428); Lisowski (2009: 368); Onana (2011: 94); Meerts (2018: 389).

Type:—NIGERIA. Interior of western Lagos, 1893, *Rowland* s.n. (Lectotype designated by Meerts (2018): K [barcode K000192742]!). = *Vitex thyrsoiflora* var. *laxiflora* Pieper (1928: 54). **Type:**—CAMEROON. Südkameruner Waldgebiet, Bezirk Lomie, Assobam am Bumba & Station Lomie, 28 April 1911, *Mildbraed 5097* (holo-: B†; iso-: HBG [barcodes HBG513576, HBG513577]). = *Vitex staudtii* Gürke (1903: 299); Bequaert (1922: 445). **Type:**—CAMEROON. Im lichten Urwald, auf alten Plantagen bei der Yaunde-Station, September 1893, *Zenker & Staudt 18* (syn-: B†); an sonnigen, lichten Stellen, auf Laterit, bei der Yaunde-Station, Mai 1894, *Zenker & Staudt 355* (syn-: B [barcodes B 10 0165133, B 10 0165134]); Yaunde-Station, *Zenker 1412a* (syn-: B†).—TOGO. May 1895, *Bauman 564* (syn-: B†).

Scandent shrub or liana, much branched, up to 10(–35) m; twigs hollow, inhabited by ants, with a hole at each node, strongly quadrangular, angles almost winged. Leaves: petiole 10–18 cm, almost glabrous; leaflets (3–)5, petiolule 5–10 mm, sharply delimited from lamina, lamina elliptic to obovate-elliptic, 10–18 × 4–9 cm, thinly coriaceous, abruptly contracted in a narrow acumen, rounded to cuneate at base, margin entire, upper surface dark green, scaberulous (very sort hairs dilated at base), lower surface pale green, yellow gland-dotted, glabrous except for papillate or puberulous veins; secondary veins (5–)7–8(–12) on each side, often dark red beneath, reticulum prominent above. Inflorescence of thyrses, in the axils of leaves and grouped in a large terminal panicle; branches quadrangular, glabrous to shortly pubescent. Flower: calyx cup-shaped, 2–3 mm long, truncate or with very short teeth, dark green, with many yellow glands; corolla 4–6 mm long, glandular, tube curved, pale green, lobes cream, stamens included. Fruit globose, ca. 7 mm diam., slightly depressed, stipitate, orange-yellow, persistent calyx patelliform ca. 6 mm diam.

Distribution in Cameroon:—Regions North, East, Central, Littoral.

Distribution elsewhere:—Western and central tropical Africa, from Guinea to D.R. Congo.

Habitat and ecology:—Rainforest, old secondary forest, gallery forest. Myrmecophilous species, in symbiosis with the ant *Tetraponera tessmannii* (Bequaert 1922; Schnell & Grout de Beaufort 1966; Djiéto-Lordon *et al.* 2005).

Selection of representative specimens:—CAMEROON. **North:** à 80 km au SO de Banyo, Plaine Tikar, 27 June 1967, *Biholong 229* (P!, WAG, YA). **East:** Sémbé, 14 July 2000, *Betti 2100* (BRLU!); Yokadouma, near Catholic Mission. 18 June 1961, *Breteler 1497* (BR!, WAG!, YA); 2 km NE Nguélémendouka, road to Bika, along Bamo river. 22 November 1961, *Breteler 2112* (WAG!, YA); 12 km N of Ndemba II = 32 km N of km 29 of road Bertoua-Nanga Eboko, 17 June 1965, *Leeuwenberg 5936* (BR!, WAG!, YA); near Garéssingo, 4 km N of Yokadouma, S of Aliak Lapiènd R., 27 July 1965, *Leeuwenberg 6266* (WAG!); Inselberg de Bouamir, parc du Dja, 31 January 2001, *Parmentier & Kouob 1150* (BRLU!). **Central:** Centre agronomique N’Kolbisson, 8 km W of Yaoundé, 6 June 1964,

de Wilde & De Wilde-Duyffes 2642 (BR!, WAG!, YA); 35 km E of Yaoundé, along road to Ayos, 04 June 1965, *Leeuwenberg 5785* (BR!, WAG!, YA). **Littoral:** Manengouba Mts. base, 4 km WNW of Nkongsamba 9 May 1972, *Leeuwenberg 9846* (BR!, K!, YA); forêt de Bakaka, 3 km E of Eboné (a village on km 11 Nkongsamba - Loum Road), 25 May 1972, *Leeuwenberg 9905* (BR!, WAG!, YA).

Taxonomic discussion:—No original materials were found for *Vitex thyrsoiflora* var. *kruckei* W.Pieper., but the description in the protologue leaves no doubt that it was a variant of *V. thyrsoiflora* without taxonomic value.

14. *Vitex yaundensis* Gürke (1903: 296); Bequaert (1922: 446); Pieper (1928: 59); Moldenke (1958b: 227); Schnell & Grout de Beaufort (1966: 45); Lebrun & Stork (1997: 526); Onana (2011: 93; 2013: 118).

Type:—CAMEROON. Im Urwald bei dem Yaunde-Station, 800 m ü. M., June 1897, *Zenker 1412* (holo-: B†; iso-: BM barcode [BM000834566]!, E barcode [E00193457], G barcode [G00023646 G00023645], HBG [barcode HBG513572], K barcode [K000192758]!, KFTA [barcode KFTA0002113], L [L.2778184], LL [LL00375289] (fragm.), M [barcode M0105017], MO (MO-391078), NY [barcode NY00138472], P [barcodes P00442325, P00442326, P00442327]!, S [S-G-6399], WAG [barcode WAG0003487]!).

Tree up to 30 m; twigs subglabrous, with a hole at each node, hollow, inhabited by ants. Leaves: petiole 15–22 cm, 3 mm diam., almost glabrous, flat on upper side; 5–7 leaflets, petiolule 1–2.5 cm; lamina elliptic to ovate-elliptic, papyraceous, 14–26 × 6.5–13 cm, thinly coriaceous, blackening in herbarium, acuminate at tip, progressively attenuate at base, upper surface almost glabrous or slightly scaberulose, puberulent or papillose on veins, lower surface glabrous except for papillose veins, glands inconspicuous, margin entire, secondary veins 20–30 pairs, remarkably straight and parallel, prominent on upper side, tertiary veins forming a ladder-like pattern. Inflorescence of axillary dichasia, lax, multiflorous, up to 35 cm long and 25 cm wide, including peduncle 16–21 cm, branched at 6–8 nodes, branches long, shortly ochraceous crispate pubescent, bracts narrowly obovate-elliptic, 1–1.5 mm wide, the lowermost ones up to 15 mm long, the floral ones ca. 5 mm long, very shortly ochraceous pubescent. Flower: pedicel 0–1.5 mm, calyx campanulate, 2.5–3(–3.5) mm long including 1 mm long triangular teeth, with a very short tomentum of greyish-ochraceous crispate hairs; corolla greenish yellow, lower lip tinged violet, tube ca. 4 mm, shortly pubescent. Fruit ovoid, black, 15–20 × 12–15 mm, persistent calyx ca. 7–9 mm diam., cupuliform.

Distribution in Cameroon:—Central region and Southwest region. Endemic to Cameroon.

Distribution elsewhere:—Not known elsewhere.

Ecology:—Rainforest; semi-deciduous forest. Myrmecophilous species (Gürke 1903; Bequaert 1922; Schnell & Grout de Beaufort 1966).

Specimens examined:—CAMEROON. **Central:** 10 km SW Yaunde, Mont Eloumden, 1000 m, 31 January 1985, *Satabié 788* (COI!, P!, YA) & 12 June 1986, *Satabié 822* (P!, YA); s. loc. (Yaoundé?) 1935, *Foury 32* (COI!, P!). **Southwest:** Meme, Mungo River, South of Kumba-Tombel road, 25 November 1999, *Cheek 10139* (K!).

Conservation note:—This species has a very restricted range. It had long been known from a single locality near Yaunde; a second locality was discovered in 1999 ca. 200 km in the NW. Its conservation status is evaluated as CR (critically endangered) in the IUCN red list (Pollard 2004, 2011).

15. *Vitex zenkeri* Gürke (1903: 293); Pieper (1928: 57); Moldenke (1958b: 230); Onana (2011: 94; 2013: 118).

Type:—CAMEROON. Im halbschattigen Urwald bei Bipinde, 80 m ü. M., April 1896, *Zenker 839* (**Lectotype designated here:** P [barcode P00442328]!; isolecto-: BM [barcode BM001209282]!, E [barcode E00193456], G [barcode G00023647], G [barcode G00023648], GOET [barcode GOET011548], HBG [barcode HBG513574], M [barcode M0105018, M0105019], P [barcode P00442329]!, S [S11-26333], W [1897-0004597]).

= *Vitex lehmbachii* Gürke (1903: 297); Engler (1910: 759); Pieper (1928: 56); Moldenke (1956b: 435); Huber *et al.* (1963: 446); Onana (2011: 93; 2013: 118). **Type:**—CAMEROON. Bei Buea, häufig im Busch, 960 m ü. M., April 1897, *Lehmbach 11* (holo-: B†; iso-: M [barcode M0105022], LL [LL00375278] (fragm.)), *synon. nov.*

Shrub 1.5–3 m or, more rarely, treelet up to 8 m; twigs almost glabrous, generally purplish tinged. Leaves: petiole 4–18 cm, almost glabrous, leaflets (3–)5–7, petiolules 2–15(–20) mm, poorly delimited from lamina, lamina obovate-elliptic, 8–20(–24) × 3–7(–10) cm, moderately coriaceous, abruptly acuminate at tip, long attenuate in lower half into the petiolule, almost glabrous, margin entire, upper surface glossy dark green, glabrous except for papillae on midvein, lower surface remarkably discoloured, pale greyish green, sparsely scattered with dark dots, occasionally sparsely

puberulent on veins, midvein crenate, often mauve tinged, secondary veins 6–10(–12) on each side, anastomosing in arches, reticulum inconspicuous above, domatia in the axils of secondary veins on lower surface. *Inflorescence* of axillary dichasia, (4–)8–25 cm long, including (2–)7–16 cm peduncule, generally with 3–4 branches at some nodes, few-flowered; branches glabrous to sparsely puberulent, generally strongly flattened, often mauve-tinged. Flower: pedicel 2–5 mm; calyx broadly campanulate, often slightly zygomorphic, sparsely puberulous, (2.5–)3–4 mm long, including 0.5–1.5 mm triangular teeth; corolla ca. 8 mm long, greenish white to pale yellow or dirty cream, lower lip purplish-pink blotched, stamens exerted, ovary glabrous, glandular at tip. Fruit obovoid, ca. 9–15 × 6–11 mm, dark violet, persistent calyx cupuliform with conspicuous teeth.

Distribution on Cameroon:—Regions Littoral, South, Central, Southwest.

Distribution elsewhere:—Gabon, D. R. Congo.

Habitat:—Primary rain forest, periodically flooded forests.

Selection of representative specimens:—CAMEROON. **Littoral:** Lake Tissongo, 16 km EES of Mouanko, 13 September 1983, *Asonganyi 657* (P!, YA); Mont Nlonako, 1400 m, 25 December 1967, *Bamps 1566* (BR!); ca. 50 km NW of Eséka, W of Yaunde, 25 November 1963, *de Wilde & de Wilde-Duyffes 1350* (WAG!, YA); Ngola, 8 km est de l'embouchure de la Sanaga, 7 January 1974, *Letouzey 12635* (P!, YA). **South:** about 16 km on the road from Ebolowa to Minkok, just passing the village of Nguet, 5 August 1975, *de Wilde 8410a* (WAG!); bordure du Kom, 25 km E du confluent Ntem-Kom, 5 March 1970, *Letouzey 10090* (BR!, P!, YA). **Central:** Makak, November 1938, *Jacques-Félix 2269* (P!); 40 km NW of Eseka, W of Yaunde, 12 December 1963, *de Wilde & de Wilde-Duyffes 1435* (BR!, WAG!, YA); from Ndanan I down to water source behind village (path running SE), 16 October 2002, *Harvey et al. 181* (K!, WAG!). **Southwest:** Buea, pente Est du Mt. Etinde (ou Petit Mt Cameroun), 10 km NW Victoria, 26 May 1976, *Letouzey 15013* (BR!, K!, P!, YA); near Mbu village, 10 km W of Wone which is on the Kumba-Mamfe road, 15 April 1986, *Mambo & Thomas 10* (BR!, YA); bassin du Mungo: entre Ndô sur le Mungo et la gare de Mujuka, au km 59 sur le chemin de fer du nord, June 1917, *Chevalier 33403* (P!).

Taxonomic discussion:—1. The polychasial inflorescence, a very unusual trait in *Vitex*, is a good diagnostic trait of this species, especially in combination with the large calyx. *Lehmbach II*, the type specimen of *V. lehmbachii* Gürke shows both traits and is certainly conspecific. Both names have been published at the same time; it is preferable to give priority to the name *V. zenkeri* because the type materials have been much more broadly distributed. 2. The species is relatively variable; sterile specimens can be difficult to discriminate from *V. gabunensis*. For a discussion of the relationships between *V. zenkeri* and *V. gabunensis*, see under the latter species.

Lectotypification of *Vitex zenkeri* Gürke. Three specimens are cited in the protologue (*Zenker 839, 1006, 1545*), all collected in Bipinde. Inflorescence provides important diagnostic characters (long calyx, and polychasial inflorescence, in particular). Only *Zenker 839* has flowers. The specimen *Zenker 839* (P [barcode P00442328]) is chosen as the lectotype because it has a complete shoot with well preserved inflorescences and leaves. Remaining syntypes:—CAMEROON. June 1896, *Zenker 1006* (BM [barcode BM001209280]!, G [barcode G00023651]); September 1897, *Zenker 1545* (B [barcode B 18 0010234], BM [barcode BM001209281]!, G [barcode G00023650], HBG [barcode HBG513573], KFTA [KFTA0002114], L [L.2771695], LL [LL00375290] (fragm.), MO [MO-391149], P [barcodes P03517823 & P03517826]!, S [S11-26336], W [W 1898-0006746], WAG [barcode WAG0003488]!).

Unplaced names

For the following names, no material was found; these names remain unplaced.

Vitex benuensis Engler ex Pieper (1928: 66); Moldenke (1955b: 211); Onana (2011: 93; 2013: 118). Type:—CAMEROON. Am Benue, Lagdo, *Ledermann 4400* (syn-: B†); Kokumiberge, *Ledermann 4778, 4764a, 4743* (syn-: B†).

Vitex nlonakensis Engler ex Pieper (1928: 56; 1929: 162); Moldenke (1957: 21); Onana (2011: 93). Type:—CAMEROON. Am Nlonako, *Ledermann 6185* (holo-: B†).

The large calyx, glabrous ovary and polychasial inflorescence suggest it may have been *V. zenkeri*.

Excluded taxon

Vitex micrantha Gürke (1893: 170) was reported for Cameroon by Onana (2011: 93); no material was found in the collections and this species has to be excluded from the flora of Cameroon.

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