A conspectus of *Combretum* (Combretaceae) in southern Africa, with taxonomic and nomenclatural notes on species and sections

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**Keywords:** Combretaceae, *Combretum* Loefl., lectotypification, phylogeny, sections, southern Africa, taxonomy

**Abstract**

Two subgenera of *Combretum* Loefl. occur in the *Flora of southern Africa* (FSA) region. Previous sectional classifications were assessed in view of molecular evidence and accordingly modified. Ten sections in subgen. *Combretum*, 25 species and eight subspecies are recognized. Subgen. *Cacoucia* (Aubl.) Exell & Stace comprises four sections and seven species. *C. engleri* Schinz, *C. paniculatum* Vent. and *C. tenipes* Engl. & Diels are reinstated as distinct species separate from *C. schumannii* Engl., *C. microphyllum* Klotzsch and *C. padaoides* Engl. & Diels, respectively. *C. schumannii* occurs outside the FSA region. Records of *C. adenogonium* Steud. ex A.Rich., *C. platypetalum* Welw. ex M.A.Lawson subsp. *oatesii* (Rolfe) Exell and subsp. *baumii* (Engl. & Gilg) Exell in Botswana are doubtful. *C. celastroideas* Welw. ex M.A.Lawson subsp. *orientale* Exell is elevated to species level as *C. patelliforme* Engl. & Diels. *C. grandifolium* F.Hoffm. is reduced to *C. psidioideas* Welw. subsp. *grandifolium* (F.Hoffm.) Jordaan. Twenty-six names are lectotypified. The type, a full synonymy, other nomenclatural and taxonomic information, the full distribution range and a distribution map are provided for each taxon. Selected specimens examined are given for poorly known species. Keys to subgenera, sections and species are provided.

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**INTRODUCTION**

*Combretum* Loefl. belongs to Combretaceae, one of the 14 core families of the Myrtales (Dahlgren & Thorne 1984; Sytsma et al. 2004), one that is characterized by mainly opposite leaves and the absence of stipules or stipules being rudimentary (Stace 2007). Combretaceae is sister to all the other 13 families combined, and diverged early in the evolution of the Myrtales (Angiosperm Phylogeny website—APweb). *Combretum* (excluding *Quisqualis* L.) comprises about 250 species (Bredenkamp 2000) and occurs in tropical and subtropical regions (America, Africa, Madagascar, India, Asia, Malesia, Australia), but is absent from the Pacific Islands (Stace 2007). Although Bredenkamp (2000) gives the distribution as excluding Australia, *C. trifoliatum* Vent., a vigorous woody climber, was discovered in northern Australia in the 1980s (Clarkson & Hyland 1986; Pedley 1990). The greatest species diversity occurs in Africa, namely 163 in sub-Saharan Africa (Klopper et al. 2006), with 43 in Gabon (Jongkind 1999), 36 in Cameroon (Liben 1983), and about 30 in southern Africa (Jordaan 2003). It is widespread in the FSA region in all countries and provinces, except in the Free State (rare), Lesotho and Western Cape (Bredenkamp 2000).

*Combretum* Loefl. are mostly deciduous or semi-deciduous (rarely evergreen) trees, shrubs, scandent shrubs (scramblers), subshrubs with woody rootstocks (so-called geoxylie suffrutesces; rare in southern Africa) or woody climbers (lianas), sometimes with spine-tipped lateral shoots (*C. imberbe* Wawra). Bark on young stems is often flaking and peeling in stringy strips or threads in most species or in large ± cylindrical or hemicylindrical pieces revealing an exposed cinna-nom-red surface (*C. psidioideas* group). Leaves are opposite, subopposite (or locally alternate), sometimes 3- or 4-whorled, exstipulate, simple and the margins are
always entire, rarely crenulate, or sometimes undulate (C. elaegnoides Klotzsch, C. petrophilum Retief and C. teunipipes Engl. & Diels). Indumentum on leaves, flowers and fruit consists of unicellular, compartmented or combretaceous hairs (sharp-pointed, thick-walled with a bulbous base), multicellular stalked glands and multicellular scales. Mature scales can be classified into three major groups and have proved to be important in assessing taxon boundaries and phylogenetic relationships (Exell & Stace 1972). Leaves are pinnately veined where the lateral veins are arranged parallel to each other, somewhat spaced and looping before they reach the margin (brochidromous). Hair-tuft domatia (marupiform) in the axils of the veins below are present in a number of species (Stace 1966). Bases of leaf petioles may persist as straight spines or recurved hooks as in C. bracteosum (Hochst.) Brandis, C. mossambicense (Klotzsch) Engl. and C. microphyllum Klotzsch. Flowers are bisexual and are borne in axillary or terminal branched or unbranched spikes, sometimes subcapitate, and are bracteate. Flowers are 4- or 5-merous and usually sweetly scented. Petals vary from white, cream-coloured, yellow, yellow-green in most species, but are sometimes pale to deep pink or bright red as in C. bracteosum, C. microphyllum, C. paniculatum Vent., C. platypetalum Welw. ex M.A.Lawson and C. wattii Exell. In deciduous species, the flowers appear before or with the new leaves, e.g. C. elegagoides Klotzsch, C. microphyllum, C. platypetalum, C. psidioides and C. zeyheri Sond. The calyx is produced into a short, campanulate or cup-shaped limb above the inferior ovary. Stamens are inserted on the hypanthium, usually twice as many as the sepals or petals, and usually exserted beyond the petals. The stamens vary in colour from yellow, orange, pinkish, crimson or reddish to red-brown. A glabrous or pilose, green or red, well-developed nectariferous disc is often present at the base of the upper hysanthium. Nectar production is indicative of flowers that are pollinated through a wide range of insects or birds (Stace 2007). The ovary is inferior and 1-locular with two pendulous anatropous ovules of which only one develops into a seed. The fruit is glabrous or covered with scales and/or hairs and is mainly a 4-winged, or occasionally 5-winged (C. mossambicense, C. oxystachyum, C. wattii) indehiscent samara, except in C. bracteosum which has wingless fruit (nuts). In most cases winged fruit are wind-dispersed and the wingless fruit seem to be an adaptation to water dispersal (Exell & Stace 1972).

Despite extensive taxonomical and anatomical studies on Combretum in tropical and southern Africa by Engler & Diels (1899), Dümmer (1913), Stace (1961; 1965; 1969; 1980; 1981), Exell (1968; 1978), Verhoeven & Van der Schijff (1973), Wikens (1973), Van Wyk (1984), Carr (1988), Rodman (1990) and Tilney (2002), there are still taxonomic and nomenclatural problems remaining, as well as new taxa to be described. Some names are misapplied and the identity of some taxa in southern African herbaria is uncertain. Recent molecular work (Maurin et al. 2010) has indicated that taxon boundaries need revising to reflect more accurately the phylogeny of Combretum and its allies. Maurin et al. (2010) deal mostly with the subgeneric, sectional and generic delimitation of Combretum, whereas the present paper deals with species delimitation, the status elevation of infraspecific taxa and lectotypification of some names.

MATERIALS AND METHOD

All material of Combretum in the National Herbarium, Pretoria (PRE) and H.G.WJ Schweickerd Herbarium, University of Pretoria (PRU) was examined. Two websites were consulted for type material: 1, www.aluka.org and 2, the Zürich Herbarium: www.zuerichherbarien.unizh.ch. Types seen electronically are cited as e! Where the holotype was destroyed in the Berlin Herbarium (B) during World War II, lectotypification is covered by Article 9.15 of the Code (McNeill et al. 2006) which provides for narrowing the lectotype to a single specimen. Acronyms of herbaria where types are housed follow Holmgren et al. (1990).

Sectional classifications of Engler & Diels (1899), Exell (1978) and Stace (1981) were assessed in view of the phylogenetic studies done by Maurin et al. (2010) and adjusted where necessary. Sections are arranged from ancestral to derived according to the mentioned molecular studies. C. nkuense is treated as belonging to sect. Spathulipetala. Species are arranged alphabetically within each section. An index is provided at the end for easy access to species. The following species are widespread, well defined and well known or recently described and no voucher specimens are cited for them: C. apiculatum Sond. subsp. apiculatum, C. erythrophylum (Burch.) Sond., C. hereroense Schinz, C. inerbe, C. kraussii Hochst., C. molle R.Br. ex G.Don, C. vendae A.E.van Wyk and C. zeyheri Sond. Geographical distributions mentioned in the keys refer primarily to the FSA region, namely Botswana, Lesotho, South Africa (RSA: Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and North-West), Namibia and Swaziland. Species occurring north of the FSA region are indicated by an arrow on the distribution maps. Full range distribution, including all countries and the relevant provinces of South Africa, is given alphabetically under each species.

TAXONOMY

Subgeneric classification

Combretum is divided into three subgenera, namely subgen. Combretum, subgen. Cacoucia (Aubl.) Exell & Stace and subgen. Apetalanthum Exell & Stace (Stace 1981). The last-named is represented by only one species, C. apetalum Wall. ex Kurz which is restricted to

Key to the southern African subgenera of Combretum as modified from Exell (1978)

1a Scales present though sometimes inconspicuous or hidden by hairs; microscopic stalked glands absent; flowers and fruit usually 4-merous; petals cream-coloured, white, yellow or greenish, usually not red, < 3.5 mm long, subgen. Combretum (p. 137)
1b Scales absent; microscopic stalked glands present; flowers and fruit 5-merous or if 4-merous then petals red; petals > 4 mm long, subgen. Cacoucia (p. 152)
Asia. It has leaves with scales and stalked glands, petals are absent and it has 10 stamens in two whorls. The first two subgenera have scales or stalked glands, petals are present, although sometimes reduced and they have eight stamens in one or two whorls. Subgenera are mainly based on the presence or absence of petals, presence or absence of scales on the leaves, presence or absence of stalked glands, the flowers being 4- or 5-merous, colour of the flowers and length of petals.

A. Combrétum Loefl. subgen. Combrétum

Scales present, although sometimes inconspicuous or hidden by combrétaceous hairs; microscopic stalked glands absent; flowers usually 4-merous; petals usually not red; stamens usually 8, in 1 or 2 whorls; fruit usually 4-winged. The structure and arrangement of scales are of great taxonomic significance (Stace 1965). The southern African material is divided into ten sections (Engl. & Diels 1899; Wickens 1973; Exell 1978; Stace 1980, 1981; Rodman 1990) which fall into two groups. The sectional grouping is based on the size of the scales on the leaves and the resultant two groups are congruent with the two major groups recovered in phylogenetic analyses (Maurin et al. 2010). Each group is represented by five sections. The first five sections treated here belong to the group with small, inconspicuous scales, usually smaller than 100 μm, ± circular in outline or slightly scalloped in sect. Ciliatipetala and divided by few radial and tangential walls. Sometimes the tangential walls are absent as in sect. Angustimarginata, sect. Glabripetala and sometimes in sect. Ciliatipetala. (Figure 1). The last five sections have conspicuous scales, usually larger than 100 μm, scalloped or irregularly undulate in outline and the scales are divided by many radial and tangential walls (Figure 2). C. imberbe is placed in its own section, sect. Plumbea (Maurin et al. 2010). Note that although 100 μm is taken as the cut-off measurement to separate the two groups, intermediates do occur.

Key to sections of subgen. Combrétum in FSA region

1a Scales inconspicuous, usually < 100 μm in diam.; scales divided by few radial and tangential walls (tangential walls sometimes absent); stamens 1-seriate (Group 1, p. 137) (Figure 1):

2a Petal apex ciliate or pilose; petals small, 0.5-1.5 mm long (if apex not ciliate then petals < 1 mm long as in C. petrophilum); leaf apices often apiculate; fruit 15-30 mm long ........................................... V. sect. Ciliatipetala (p. 143)

2b Petal apex glabrous; petals 1.5-2.5 mm long; leaf apices not apiculate; fruit 15-50(-100) mm long:

3a Fruit up to 22 mm long; often with hair-tuft domatia in axil of veins below (except in C. cryorthyrium and C. vendae):

4a Spring leaves at least partly cream-coloured and autumn leaves not reddish; petals narrowly spatulate; disc margin pilose; style without expanded stigma; fruit green, glabrous and glutinous, yellowish green, with reddish brown scales, giving it a satiny sheen, wings papery; stipe up to 10 mm long ................................................................. III. sect. Macrosmithiaceae (p. 142)

4b Spring leaves not cream-coloured and autumn leaves not reddish; petals broadly spatulate; disc glabrous with only a very short free margin; style sometimes with expanded stigma; fruit green, glabrous and glutinous, yellowish green, with reddish brown scales, giving it a satiny sheen, wings papery; stipe up to 10 mm long ................................................................. III. sect. Macrosmithiaceae (p. 142)

5a Leaves large, 100-200 mm long; style without swollen apex; fruit up to 35 mm long; glabrous when young, yellowish green, tinged reddish brown; stipe up to 7 mm long:

5b Leaves medium-sized, 30-100 mm long; style with swollen apex; fruit up to 50(-100) mm long, pale green, glutinous only on body, sparsely hairy or glabrous, drying pale brown, straw-coloured or limegreen; stipe 10-30 mm long .................................. IV. sect. Glabripetala (p. 143)

1b Scales conspicuous and large, usually > 100 μm in diam. (84-160 μm in sect. Brevisanctoria); scales divided by many radial and tangential walls; stamens 1-2-seriate (Group 2, p. 147) (Figure 2):

6a Trees, petal subcircular; fruit brown dark to reddish grey to dark purple, glabrous to densely hairy, metallic in appearance, often acute at apex; disc with free pilose margin; cotyledons arising below soil level on a stalk formed by connate pedicles ........................................ VII. sect. Metallium (p. 149)

6b Trees, shrubs, scrambling shrubs or woody climbers; petals linear-elliptic, obovate to spatulate; fruit densely fleshy, golden or silvery lepidote, otherwise glabrous; disc without free margin; cotyledons arising above or below soil level:

7a Inflorescences usually terminal panicles of spikes or branched spikes; upper hypanthium little developed, flattened; stamens 2-seriate; fruit < 20 mm long; stipe 1-3 mm long; stamens arising above or below soil level; scales contiguous or not:

8a Scrambling shrubs or woody climbers, usually multi-stemmed, not with spine-tipped short branches; disc glabrous or pilose at least on margin; style without stalked scales; fruit not densely silvery lepidote; stipes < 2 mm long; cotyledons borne above soil level; scales conspicuous but not contiguous or overlapping ................................................ VI. sect. Hypocrotanthes (p. 147)

8b Erect trees up to 15 m, occasionally up to 30 m tall, single-stemmed, with short lateral branches often spine-tipped; disc margin densely tomentose; style with stalked scales; fruit densely silvery lepidote; stipe 2-3 mm long; cotyledons arising below soil level; scales conspicuous, contiguous and or overlapping ................................................ X. sect. Plumbea (p. 152)

7b Inflorescences usually axillary unbranched spikes; upper hypanthium well developed, campylanthe or cup-shaped, not flattened; stamens 2-seriate; fruit 20-35 mm long; stipe up to 35 mm long; cotyledons arising above soil level; scales contiguous or overlapping:

9a Leaves with 3 or 4(5) pairs of primary lateral veins; reticulate venation conspicuous below; hair-tuft domatia absent in axils of veins below; leaf margin flat, usually ciliate; flowers long hairy, not conspicuously lepidote; disc with free pilose margin; fruit densely reddish or golden lepidote ......... VIII. sect. Brevisanctoria (p. 151)

9b Leaves with 9-13 pairs of primary lateral veins; only midrib and primary lateral veins conspicuous and prominently raised below; hair-tuft domatia in axil of veins below; leaf margin often undulate, glabrous; flowers not hairy but densely and conspicuously lepidote; disc without free margin; fruit silvery lepidote .................. IX. sect. Canepeta (p. 151)

GROUP 1

Species with small scales, usually smaller than 100 μm, divided by few radial and tangential walls or tangential walls sometimes absent (Figure 1).


This section is a natural taxon of six closely related species restricted to Zimbabwe, Mozambique, Botswana,
Other diagnostic characters based on field observations are: the bark is ± smooth or flaking in small, rather papery pieces in older specimens; the first spring leaves are often partly or completely cream-coloured or at least some leaves turning red in autumn; the flowers have calyx lobes tinged reddish purple; the mature fruits are usually partly or completely tinged pink to dark red (Van Wyk 1984). The secondary xylem of older stems has islands of interxyphial phloem (Verhoeven & Van der Schijff 1973).


1a Leaves glabrous below when mature, often with hair-tuft domatia:

2a Flowers in laxly elongated spikes (25-)35-60(-85) mm long:

3a Leaf lamina with secondary lateral veins raised but intersecondary veins ± plane below; scales with 8-10 radial cells; trees; forest; widespread ............... 3. C. kraussii

3b Leaf lamina with both secondary and intersecondary veins conspicuously raised below; scales with 10-16 radial cells; trees, shrubs or climbers; forest and savanna; Limpopo Province, Mpumalanga, KwaZulu-Natal and Swaziland ................. 6. C. woodii

South Africa and Swaziland. It is characterized by their 4-merous flowers; upper hypanthium cupuliform to campanulate; petals subcircular, obovate, spathulate or narrowly elliptic, glabrous, margins not ciliate; stamens 8, I-seriate, inserted shortly above margin of disc; disc glabrous with a pilose margin very shortly free for up to 0.5 mm; style not expanded; fruit 4-winged; scales inconspicuous, often obscured by hairs and/or glutinous secretions, ± 50-75 μm in diam., weakly scalloped, delimited by 8-16 primary radial walls alone; cell walls very thin (Exell 1970, 1978).
2b Flowers in congested subcapitate spikes (10-)15-20(-35) mm long:
4a Usually shrubs; leaves elliptic, obovate-elliptic or obovate; flowers with upper hypanthium divided into a lower ± campanulate part containing the disc, and an expanded ± cupuliform upper part; Limpopo Province and Mpumalanga ......... 4. C. nelsonii

4b Usually trees; leaves narrowly elliptic or lanceolate; flowers with upper hypanthium ± cupuliform, not divided into a lower and upper part; Eastern Cape ......... 2. C. cajjrum

1b Leaves distinctly hairy below when mature, at least on midrib and lateral veins:
5a Reticulate venation of leaf lamina conspicuously raised below; Venda (Limpopo Province) 5. C. vendae

5b Reticulate venation of leaf lamina plane or slightly raised below; widespread along watercourses ......... 2. C. erythrophyllum

1. Combretum caffrum (Eckl. & Zeyh.) Kuntze, Revisio generum plantarum 3,2: 87 (1898); J.D.Carr: 40 (1988); M.Coates Palgrave: 797 (2002). Type: South Africa, Eastern Cape, ‘ad ripas fluminum Kat et Vischrivier (Albany), Zondagsrivier (Uitenhage), Keyskamma et Keyrivier (Caffraria)’, Ecklon & Zeyher 421 [SAM0036373-2, lecto. e!, designated here; FR e!, HBG e!, K e!, MO e!, SAM e!, W e!, isolecto.].


D. conglomerata Eckl. & Zeyh.: 55 (1834–1835). Type: South Africa, Eastern Cape, ‘ad ripas fluminum Kat et Vischrivier (Albany), Zondagsrivier (Uitenhage), Keyskamma et Keyrivier (Caffraria)’, Ecklon & Zeyher 421 [SAM0036373-2, lecto. e!, designated here; FR e!, HBG e!, K e!, M e!, W e!, isolecto.].

C. dregeanum C.Presl: 73 (1844). Type: South Africa, Eastern Cape, Klein Winterhoek between Zoutpanskne and Enon, Drége 6894a (TPR, holo.; BM e!, HBG e!, K e!, MO e!, SAM e!, W e!, iso.).

Note: Ecklon & Zeyher 421, 422, both at SAM, are chosen as lectotypes for Combretum caffrum (= Dodonaea caffra), and D. conglomerata respectively, because they have the protologues and annotations attached to the specimens.

Distribution: RSA: Eastern Cape (Figure 4).

2. Combretum erythrophyllum (Burch.) Sond. in Linnaea 23: 43 (1850); Sond.: 509 (1862); Engl. & Diels: 26 (1899); Dümmier: 140 (1913); Bews: 146 (1921); Exell & Roessler: 8 (1966); Exell: 7 (1968); Exell: 112 (1978); J.D.Carr: 69 (1988); Pooley: 356 (1993); A.E.van Wyk & P.van Wyk: 330 (1997); McClelland: 460 (2002); M.Coates Palgrave: 802 (2002). Type: South Africa, Northern Cape, ‘on the banks of the Kygartipp’ (Griqualand West, Kalahari region, Herbert Div., right bank of the Vaal River at Blauwboch Drift), Burchell 1749 (K, holo. e!; PRE, iso.).

Terminalia erythrophylla Burch.: 400 (1822).

C. glomeratiflorum Sond.: 47 (1850); Sond.: 509 (1862); Engl. & Diels: 26 (1899); Burtt Davy: 247 (1926); Codd: 130 (1951). Type: South Africa, Natal [KwaZulu-Natal], Port Natal [Durban], Gueiwilus 62 (7S, holo.; HBG e!, K e!, P e!, W e!, iso.).

C. riparium Sond.: 47 (1850); Sond.: 511 (1862). C. glomeratiflorum Sond. var. riparium (Sond.) Burtt Davy: 247 (1926); O.B.Mill.: 42 (1948). Type: South Africa, [Gauteng], ‘On Magalisriver’, Zeyher 349 (S, holo. e!; BM, K e!, SAM, iso.).

3. **Combretum kraussii** Hochst. in Flora 27: 424 (1844); Sond.: 510 (1862); Dümmer: 164 (1913); Bews: 147 (1921); Burtt Davy: 246 (1926); Exell: 7 (1968); Exell: 114 (1978); J.D.Carr: 89 (1988); Pooley: 358 (1993); A.E.van Wyk & P.van Wyk: 332 (1997); McCleland: 462 (2002); M.Coates Palgrave: 804 (2002). Type: South Africa, Natal [KwaZulu-Natal], Port Natal [Durban], 'in sylvis primitivis circa Umlaas River', Oct. 1839, Krauss 253 [B, holo.; K00022663, lecto. e!, designated here; BM e!, M e!, MO e!, OXF, TCD e!, W e!, Z e!, islecto.].


near Muledzhi Village, *Van Wyk 3913* (PRU, holo.); K e!, P e!, PRE!, iso.).

**Distribution:** RSA: Limpopo Province (Figure 4).


**Note:** Dümmer (1913) mentioned two specimens in his protologue, *Wood 522* and *Galpin 1176*. The latter syntype in Kew where Dümmer worked for a few years is chosen, because it comprises flowers and fruit, and duplicates are housed in many other herbaria. This specimen (lectotype here chosen) shows the distinguishing characters which separate *Combretum woodii* from *C. kraussii*: leaves membranous, widest in the middle, folded along the midrib, and narrower elliptic fruit which are totally glabrous. The syntype *Wood 522* in BM was not examined and is not available on the Aluka website, but a duplicate exists in the Zürich Herbarium, which does not show the leaves folding along the midrib as clearly as the Galpin specimens.

**Distribution:** probably Mozambique; RSA: KwaZulu-Natal, Limpopo Province, Mpumalanga; Swaziland (Figure 4).

II. *Combretum* sect. *Spathulipetala* Engl. & Diels (1899)

This section is characterized by leaves with hairy petioles, usually hair-tuft domatia in axils of veins below; 4-merous flowers; petals obovate-spathulate to spathulate, glabrous; stamens 8, 1-seriate, inserted at margin of disc; disc with pilose margin free for up to 2 mm; style with swollen apex; fruit 4-winged, large in genus, usually up to 50 × 50 mm and occasionally up to 100 × 80 mm, with rigid wings; stipe up to 20-25 mm long; scales ± 40-85 μm in diam., circular but slightly convexitly scaloped; cells delimited by 7-9 radial walls and additional few tangential and extra radial walls; marginal cells 7-12 (Exell 1978).

Members of this section show two distinct types of germination (Figure 3) suggesting that the group is probably not a natural one. Four main types of germination are known in *Combretum*, the taxonomic significance of which is not clear (Exell & Stace 1972). *C. zeyheri* is unusual in also having the cotyledon blades fused into a subcircular peltate structure. According to Exell & Stace (1972) the fruit are adapted for blowing along by wind at ground level.

Although provisional molecular data have indicated that a re-evaluation of the taxonomic concepts of sections *Spathulipetala* and *Macrostigmatea* are needed (Maurin et al. 2010), formal taxonomic adjustment must await further phylogenetic analyses based on more taxa and more gene sequences. This should also take into account the data derived from all other fields, including micro- and macromorphology, vegetative and reproductive characters, phytogeography and chemis-
silvis montis Magalisberg’, Zeyher 552 (S, holo. e!; BM, K e!, MEL, P e!, SAM e!, TCD, W e!, Z e!, iso.).

C. tictorum Welw. ex M.A. Lawson: 430 (1871); Engl. & Diels: 30 (1899). Type: Angola, Cuanza Norte, Cacuco, Pedras de Guinga, Welwitsch 4373 (LISU, holo. e!; BM e!, COI, K e!, P e!, iso.).

C. oblongum F.Hoffm.: 34 (1889). Type: [Tanzania], Tabora Dist., Kakoma, Boëhm 872a (B, holo. t; K, fragment e!).


C. odontotetala Engl. & Diels: 60 (1899); De Wild.: 139 (1921). Type: [Namibia], ‘Amboland, Omupanda, Unkuuyama’, Wulffhorst 14 (Z, lecto. e!, designated here; K, isolecto. e!).

C. lopoleolea Engl. & Diels: 502 (1907); De Wild.: 138 (1921). Type: Angola, Benguela-Lopol., Dekindt 48 (B, holo. t; BM e!, K e!, iso.).

C. calocarpum Gilg ex Dinter: 169 (1919); Suess.: 336 (1953). Type: [Namibia], ‘Hereroland’, Neitsas, Dinter 795 (SAM, lecto. e!, designated here; BM, E e!, isolecto.).

Note: both syntypes of Combretum odontotetala, Schinz 1050 and Wulffhorst 14, are housed in the Zürich Herbarium, but only the Wulffhorst specimen has a duplicate in another herbarium, namely in Kew, and is therefore chosen as the lectotype.

Dinter (1919) mentioned syntypes in his protologue of Combretum calocarpum: Dinter s.n., Dinter 795 and Dinter 2877. The large fruit, the most distinctive characters as they differ in habit and geographical distribution.

Dinter (1919) published the name Combretum parvifolium, but the epithet was antedated by C. parvifolium Engl. (1895). Schinz’s ‘engleri’ is, however, the earliest. Exell (1970) keeps C. engleri and C. schumannii as two separate species, but Wickens (1973) and Exell (1978) consider C. engleri to be conspecific with C. schumannii on the basis that the flowers of both entities have a glabrous nectariferous disc with a short free margin and the fruit are glabrous except for peltate scales. However, Carr (1988) maintains these two entities as separate species as they differ in habit and geographical distribution.

He also points out that C. schumannii has been successfully propagated from seed in cultivation, whereas all attempts to germinate seed of C. engleri have failed. Based on flower and scale morphology, Hennessy & Rodman (1995) also concluded that C. engleri and C. schumannii are separate species. Engler (1895) based C. schumannii on a Holst specimen collected in Lushoto District, Tanzania. C. engleri is a multi-stemmed shrub up to 4 m tall, growing in mixed woodland and savanna, often semi-arid and on Kalahari sands in Angola, Zambia, Namibia, Botswana and western Zimbabwe (Wankie District). After viewing the type on the Aluka Digital Library, it is clear that C. schumannii does not occur in the FSA region and it is therefore a misapplied name in this region. Specimens from Namibia and Botswana previously named C. schumannii are all C. engleri. Carr (1988) mentions that C. schumannii is a tree up to 18 m tall with flaky bark, occurring in coastal and inland forest in Kenya, Tanzania, Malawi and northern Mozambique. There are enough morphological distinctions between these two species to keep them separate (Carr 1988; Hennessy & Rodman 1995).


C. parvifolium Dinter: 170 (1919), nom. illegit.

C. myrtillifolium Engl.: 695 (1921). Type: [Namibia], Naruchas, Dünnen, Dinter 7278 (PRE, lecto., designated here; BOL, K e!, isolecto.) & [Namibia], Neitsas, Dinter 668 (BM, fragment e!, SAM, paralacto. e!).


Note: Dinter (1919) mentioned two specimens in his protologue of Combretum parvifolium, Dinter 668 and 7278, collected in Namibia. This name is a later homonym and therefore illegitimate and Engler (1921) chose the new name C. myrtillifolium. The PRE specimen of Dinter
While working on the *Flora of Ethiopia*, Vollesen (1986) realized that *Combretum adenogonium* is an earlier name for *C. fragrans* F.Hoffm. Wickens (1973) considers *C. adenogonium* (= *C. fragrans*) as occurring from Ethiopia in the north through Uganda, Kenya, Tanzania, Malawi, Zimbabwe, Mozambique, Zambia, Malawi, southwards to Zimbabwe and Botswana and westwards to Burkina Faso, Benin, Nigeria and the Congo. It is characterized by relatively large leaves, up to 180 x 90 mm, and glabrous leaves and fruit. The presence of this taxon in the FSA region is indicated by two old specimens in PRE, both dated pre-1950 and collected in Botswana. It needs to be re-collected to confirm the existence of this species in the FSA region.


*C. fragrans* F.Hoffm.: 31 (1889); Engl.: 289 (1895); Wickens: 29 (1973); Exell: 183 (1970); Exell: 120 (1978); Liben: 18 (1983). Type: Ethiopia, Sabra, May 1840, *Schimper 1289* (P, holo. e!; BR e!, K e!, MO e!, W e!, Z e!, iso.).

### Distribution:

Benin, Botswana, Burkina Faso, Central African Republic, Cameroon, Cote d'Ivoire, DRC, Ethiopia, Ghana, Guinea-Bissau, Kenya, Malawi, Mozambique, Nigeria, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe (Figure 7).

V. *Combretum* sect. *Ciliatipetala*Engl. & Diels (1899)

This section comprises about 60 species and is the largest in the genus. Although the species are morphologically diverse they do seem to form a natural group. All members of this section have small petals which are ciliate or pilose at the apex, except in *Combretum petrophilum*, and the disc has a short, free, pilose margin. The scales are relatively small, 40–130 μm in diameter, ± circular, scolpoded at the margin with radial and tangential walls. Stace (1969) separates this section into two large aggregates centred on *C. apiculatum* and *C. molle*, but these two groups are not supported as natural entities by molecular evidence (Maurin et al. 2010).

Leaves in the section vary from very glabrous, glabrous and always with apiculate apices in *C. apiculatum* subsp. *apiculatum* and *C. petrophilum*, with hairs only on the margin and main vein and with acute to rounded apices in *C. edwardsii* Exell, to very hairy leaves in *C. albopunctatum* Suess., *C. apiculatum* subsp. *leutweinii* (Schinz) Exell (apiculate apices), *C. moggi* Exell, *C. molle* and *C. psidioideae*. Apices of leaves in *C. molle* are usually round, emarginate to abruptly acuminate with a long acumen or mucron, but are occasionally apiculate.

*Combretum apiculatum* subsp. *apiculatum* is widespread in Angola, Namibia, Botswana, the northern parts of South Africa, Zimbabwe, Zambia, Malawi and Mozambique and grows in savanna woodland, often on Kalahari sands, whereas subsp. *leutweinii* has a more restricted range in Namibia and Botswana, mainly in karstved and mopaneved. *C. apiculatum* subsp. *boreale* Exell is reinstated for the narrow-leaved form of *C. apiculatum* mainly from Tanzania and Kenya. Wood (1908) mentions *C. glutinosum* Guill. & Perr. ex DC. as occurring in *KwaZulu-Natal*, but it is a west African species that does not occur in southern Africa.

*Combretum moggi* and *C. molle* are both very hairy, especially their leaves and young stems. *C. moggi* is usually a multi-stemmed, small shrub up to 3–5 m tall growing in sandy soil in the crevices between outcrop quartzite rocks (Carr 1988). It has a smoother bark, smaller and narrower leaves with more silky hairs and longer inflorescences than *C. molle*. The latter is usually a single-stemmed tree up to 9 m tall, with main branch commencing 1.5–3.0 m above ground level (Carr 1988). Besides the former *Transvaal* records of *C. moggi* (Exell 1968; Carr 1988; Hennessy 1991a) additional localities were recorded in Swaziland (Loffler & Loffler 2005) and northern *KwaZulu-Natal* (Figure 12).

*Combretum molle* has a very wide distribution, from Saudi Arabia, Yemen and Ethiopia, from where the type is, in the north to *KwaZulu-Natal* (= *C. gueinzii* Sonn.) in the south and westwards to *West Africa*, DRC and Angola, but it is absent from Namibia and most parts of Botswana. Exell (1978) points out that there is a great deal of variation in leaf shape, size and indumentum.
and that the species grows in various ecological habitats. A polymorphic species, *C. molle* is one of the aggregate groups of *Combretum* in Africa that needs to be investigated further for the possibility of recognizing distinct subspecies. Wickens (1973) for instance, recognized three forms of *C. molle* in East Africa.

*Combretum petrophilum*, as currently defined, comprises populations from the Strydom Tunnel in the Abel Erasmus Pass, Mariepskop, Loskop Dam, Doornkop and Mogol Nature Reserve. Leaves have an undulate margin, the base is often asymmetric and subcordate; the often twisted apex tapers to a long, narrow acumen with a micro and is therefore described as apiculate.

Engler & Diels (1899) placed *Combretum psidioides* in sect. *Glabripetalae*, but Exell & Garcia (1970) and Stace (1981) later transferred it to sect. *Ciliatipetala*. Maurin et al. (2010) support the latter placement. In the *FSA* region, *C. psidioides* is represented by two subspecies: the typical one which occurs in northern Botswana and Namibia (Caprivi), and subsp. *dinteri* (Schinz) Exell from Angola, Namibia and Zimbabwe. Wickens (1971b) described a third subspecies, subsp. *psilophyllum*. The isotype of subsp. *psilophyllum*, Haerdi 174/87 in PRE, shows that the leaves are large, obovate, up to 80-125 x 32-65-115 mm, with narrowly cuneate bases and are totally glabrous on both sides, except for scales, and with reticulate venation prominently raised on both sides. Specimens from the Chimanimani Mountains, Mozambique side, (T. Muller 1239 in SRGH) (Meg Coates Palgrave pers. comm.) and Tunduru Dist., Tanzania (Greenway & Hoyle 8340 in PRE), belong to this taxon. They also match *Busse 325* (HBG, K), the type of *C. anacardifolium* from Tanzania, but this is an unpublished manuscript name used by Adolf Engle.

Wickens (1971b) placed *Combretum grandifolium* F.Hoffm. in synonymy under *C. psidioides* subsp. *psidioides*. The holotype of the former, Böhm 36a, was destroyed in World War II in Berlin, but a fragment of the isotype survived in the Zürich Herbarium. The isotype shows large leaves which match specimens in the National Herbarium (PRE) and Harare Herbarium (SRGH). These specimens are of tall trees with very rough, grey, thick, corky and deeply fissured bark, and with large leaves, (110-120-240(300) x (80-130-160-200) mm, densely hairy on midrib and veins, but glabrous on the areoles. The leaf bases are usually cordate to truncate, but sometimes (as in the isotype) are broadly cuneate. The fruits are up to 36 x 28 mm, with scales and a few scattered hairs. Young leaves are sparsely glabrous and glabrescent. This form, which ranges from Tanzania, through Malawi, Zambia and Zimbabwe to Mozambique, is here proposed as a distinctive subspecies of *C. psidioides*. See key to sect. *Ciliatipetala*.

Nearly all specimens of the *Combretum psidioides* complex examined in PRE are either sterile or crimson to blood-red in fruit. An exception are collections from northern Zambia and the DRC (Milne-Redhead 2728, Robertson 138, Robson 142, Van Meel 4158), all with flowers only. The leaves, 62-115 x 30-48 mm, are very thickly tomentose on both sides, whereas the midrib and lateral veins are very prominently raised on both sides, with reticulate venation inconspicuous above, the apices tapering to an acute to acuminate point or, when rounded, with a micro, and the bases are broadly cuneate to rounded. These specimens represent a distinct entity and either represent a new subspecies of *C. psidioides* or belong to *C. brachypetalum* R.E.Fr.

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**Key to species of *Combretum* sect. *Ciliatipetala*, partly from Wickens (1971b) and Exell (1978)**

1a Leaf apex usually apiculate and often twisted:

2a Leaf sparsely to densely pubescent on both surfaces; Namibia and Botswana. ........................................ 12b. *C. apiculatum* subsp. *leuatweini*

2b Leaves glabrous, or only margin and midrib with hairs, glossy, glutinous and sometimes sticky when young:

3a Most leaves with apiculate apices, leaf margin flat, often with hair-tuft domatia in axils of veins below, leaf base symmetrical, reticulate venation not prominent below; upper hypalthrium 2-3 mm long; petal margin ciliate; fruit 17-28 mm long; widespread ................ 12a. *C. apiculatum* subsp. *apiculatum*

3b Only few leaves with apiculate apices, but margins often undulate, without hair-tuft domatia in veins below, leaf base asymmetrical, rounded to subcordate, reticulate venation very prominent below; upper hypalthrium up to 1.5 mm long; petal margin glabrous, not ciliate; fruit 16-19 mm long; Limpopo and Mpumalanga .................................................. 16. *C. petrophilum*

1b Leaf apex round, obtuse, acute to acuminate, rarely apiculate:

4a Woody climbers ........................................ 13. *C. edwardsii*

4b Multi-stemmed shrubs or single-stemmed trees:

5a Fruit glabrous except for scales, sometimes glutinous; bark of branchlets peeling off in large cylindrical or hemicylindrical pieces revealing an exposed cinnamon-red surface:

6a Leaves obovate, bases cuneate, glabrous on both sides; Tanzania and Mozambique .................. 17c. *C. psidioides* subsp. *psilophyllum*

6b Leaves oblong to oblanceolate to elliptic, bases broadly cuneate, or cordate to truncate, variously hairy on both sides; *FSA* region and tropical Africa:

7a Leaves usually > 110 mm long ........................ 17d. *C. psidioides* subsp. *grandifolium*

7b Leaves usually < 105 mm long, base cuneate: 8a Leaves pubescent on reticulation below, but glabrous on areoles when mature ................................ 17a. *C. psidioides* subsp. *psidioides*

8b Leaves shortly tomentose on reticulation and on areoles below when mature ............................ 17b. *C. psidioides* subsp. *dinteri*

5b Fruit densely to sparsely hairy, sometimes only on body or sometimes glabrous; bark of branchlets peeling off in untidy, irregular, fibrous strips or threads:

9a Scales glistening; stipe up to 8 mm long; northern parts of Botswana and Namibia .................. 11. *C. albopunctatum*

9b Scales not glistening; stipe up to 3(-5) mm long; southeastern parts of Botswana, Swaziland and South Africa:

10a Plants with silky appearance; usually multi-stemmed shrubs growing on rocks; leaves usually shorter than 60 mm, reticulate venation not prominently raised below; fruit densely covered with longish appressed hairs over whole surface ............................. 14. *C. moggii*

10b Plants without silky appearance; usually single-stemmed trees; leaves usually longer than 60 mm, reticulate venation prominently raised below; fruit very sparsely hairy mainly on the body or glabrous, but densely covered with scales ........................................ 15. *C. molle*

Note: Suessenguth, curator of the Botanische Staatssammlung, München from 1927-1955 (Stafleu & Cowan 1986), mentioned two collections in the protologue of *C. albopunctatum*, namely Volk 2119 and 2105, which he must have examined in the München Herbarium (M). Both syntypes were collected in Namibia, at the Popa Falls. Volk 2105 (two specimens in M) are available on the Aluka Library website and the better of the two (MOI06663), which shows the characters described the best, is here selected as the lectotype. An isosyntype, Volk 2119 is housed in PRE, but unfortunately there is no specimen of the original syntype at M available on the Aluka Library.

Distribution: Botswana, Namibia, Zambia, Zimbabwe (Figure 9).

12a. Combretum apiculatum Sond. subsp. *apiculatum* in Linnaea 23: 45 (1850); Sond.: 510 (1862); Dummer: 164 (1913); Bews: 146 (1921); Burtt Davy: 245 (1926); O.B.Mill.: 42 (1948); Exell: 3 (1961); Stace: 13 (1961); Exell & Roessler: 7 (1966); Exell: 7 (1968); Liben: 65 (1968); Exell & J.G.Garcia: 61 (1970); Wickens: 35 (1973); Exell: 19 (1968); Vollesen: 53 (1980); J.D.Carr: 32 (1988); Pooley: 352 (1993); A.E. van Wyk & P van Wyk: 328 (1997); McCleland: 416 (2002); Exell: 19 (1968); Curtis & Mannheimer: 469 (2005). Type: [South Africa, ?Gauteng], Magaliesberg, Zeyer 553 (S, holo. e!; BM e!, K e!, P e!, SAM e!, TCD e!, W e!, iso.).


Note: Buchanan 1263 in Kew (K) is the only extant specimen of *Combretum Buchananii* and is chosen here as the lectotype.

Distribution: Angola, Botswana, DRC, Kenya, Malawi, Mozambique, Namibia; RSA: Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga, North-West; Swaziland, Tanzania, Zambia, Zimbabwe (Figure 10).


C. *leutweinii* Schinz: 878 (1901).

C. *kwebeusa* N.E.Br.: 111 (1909); O.B.Mill.: 43 (1948). Type: [Botswana], Ngamiland, Kwebe Hill, Lugard 48 (K, holo. e!).

Distribution: Botswana, Malawi, Mozambique, Namibia, Zambia, Zimbabwe (Figure 11).


Distribution: RSA: KwaZulu-Natal, Limpopo Province, Mpumalanga (Figure 9).

**Distribution:** RSA: Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga, Swaziland (Figure 12).


**C. gueinzii** Sond.: 43 (1850); Sond.: 509 (1862); Engl. & Diels: 38 (1899); Dümmer: 116 (1913); Bew.: 147 (1921); F.W.Andrews: 202 (1950). Type: South Africa, [KwaZulu-Natal], Port Natal [Durban], 'in silvis', *Gueinzia 567* (S, holotype; K e!, SAM e!, TCD e!, iso.).

**C. holoisericenum** Sond.: 44 (1850); Sond.: 510 (1862); M.A.Lawson: 430 (1871); Dümmer: 116 (1913); Burtt Davy: 247 (1926); O.B.Mill.: 43 (1948). Type: *C. gueinzii* var. *holosericenum* (Sond.) Exell ex Rendle: 93 (1932). Type: South Africa, [*Gauteng*, 'Magalisberg', *Zeyher 575* (S, holotype; K e!, BM e!, fragment e!, PRE!, SAM e!, WU, fragment e!, iso.).

**C. splendidum** Engl.: 289 (1895); Engl. & Diels: 37, t. 11/D (1899). Type: Nyassaland [Malawi], 'locality unknown, Buchan 859 (K, lectotype, designated here).

**C. welwitschii** Engl. & Diels: 40 (1899). Type: Angola, Cuanza Norte, Golongo Alto, near banks of rivulet Quiopsa, not far from Canguerasange, *Welwitsch 4318* [LISU, lectotype, designated by Garcia (1961); BM e!, BR e!, G e!, P e!, iso.).

**C. galpinii** Engl. & Diels: 41 (1899); Dümmer: 147 (1913); Burtt Davy: 246 (1926). Type: South Africa, [Mpumalanga], Barberton Dist., Avoca, near Barberton, *Galpin 112* (Z, lectotype, designated here; BOL, K e!, NH e!, PRE!, SAM e!).


**C. aengense** Sim: 62, t. 63, fig. B (1909). Type: Mozambique, Maganja da Costa, *Sim 5916* (probably = *Sim 20902*) (NU, holotype; PRE, iso.).

**C. ellipticum** Sim: 63, t. 63, fig. D (1909). Type: Mozambique, without precise locality, *Sim 6068* (NU, holotype; K e!, PRE!, iso.).

**Note:** in their protologue of *Combretum galpinii*, Engler & Diels (1899) mentioned *Galpin 112* in the Zürich Herbarium (Z) and *Wood 6547* in Berlin Herbarium (B). The Galpin specimen in Z is the only specimen that survived. It was examined by Engler & Diels and is therefore chosen as lectotype.

Engler (1895) cites syntypes from Tanzania and Malawi in his protologue of *C. splendidum*, but only an isotype of Buchanan survived in Kew, which is here chosen as the lectotype.

**Distribution:** Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, DRC, Ethiopia, Ghana, Guinea, Guinea-Bissau, Kenya, Malawi, Mozambique, Nigeria; RSA: Free State, Gauteng, KwaZulu-Natal, Limpopo Province, Mpumalanga, North-West; Rwanda, Saudi Arabia, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Uganda, Yemen, Zambia, Zimbabwe (Figure 11).


**Distribution:** RSA: Limpopo Province (Figure 13).

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**FIGURE 11.**—Known distribution in RSA region of *Combretum apiculatum* subsp. leutevindii, ○; and *C. molle*, ▲.

**FIGURE 12.**—Known distribution of *Combretum moggi*. 


Distribution: Malawi, Mozambique, Tanzania, Zambia, Zimbabwe.

GROUP 2

Species with large scales, usually larger than 100 μm, divided by many radial and tangential walls (Figure 2).


Engler & Diels (1899) described two species: 1, Combretum teniipes from a plant collected at Low’s Creek in the Barberton District and 2, C. padoides from a plant collected in Mozambique. C. teniipes was subsequently placed in synonymy with C. padoides by Exell (1968, 1970, 1978), Wickens (1973), Carr (1988) and Rodman (1990). Rogers (1989) conducted chemotaxonomic studies on the leaves of C. padoides (his ‘coastal form’) and C. teniipes (his ‘inland form’). He found significant differences between the oxidation states of some of the compounds isolated from coastal and inland trees and suggested that the differences could be due to geographic or genetic factors and needed to be investigated further. Rogers’s samples of his ‘inland species’ came from a plant growing in the Pretoria National Botanic Garden, which is without any doubt C. teniipes. Samples of his ‘coastal species’ came from a tree in Durban, grown from seed originating from a tree growing in the National Botanic Garden, Harare, Zimbabwe. C. teniipes is confined to the Barberton Centre of Endemism.

FIGURE 13.—Known distribution in FSAC region of Combretum petrophilum, ■; C. psidioides subsp. psidioides, ○; and C. psidioides subsp. dinteri, ▲.
(Van Wyk & Smith 2001), whereas C. padoides grows in
eastern tropical Africa, from Kenya southwards to Tan-
zania, Malawi, Zambia, eastern Zimbabwe and Mozam-
bique, as well as the DRC, and just enters South Africa
in the northernmost part of Limpopo Province. Pooley
(1993) included C. padoides as occurring in KwaZulu-
Natal and the accompanying photos to illustrate the
species were taken in the Pretoria National Botanical
Garden; this means that the photos depict C. tenui-
pes. Combretum padoides has not yet been recorded in Kwa-
Zulu-Natal, but there is a new, undescribed species of
Combretum growing as a climber in the sand forest of
Maputaland with which it may be confused. However,
this new species does not belong to sect. Hypocra-
teropsis. Combretum tenuiipes and C. padoides are here
rein-

ated as separate species since there are several differ-
ences, including geographical, molecular (Maurin et al.
2010) and morphological ones (see the key) to distin-
guish between them.

Exell (1968) described a third subspecies of
Combretum celastroides, namely C. celastroides subsp. ori-

tentale based on a plant from Mozambique, collected by
Schlechter at Maputo [Delagoa Bay]: Schlechter
11957. This is also one of the syntypes of C. patell-
iforme Engl. & Diels (1899). The other syntype of C.
patelliforme is from Angola, namely Antunes A153,
which was destroyed in World War II, but this belongs
to subspp. celastroides. The two subspecies of C. celas-
troides in the FSA region, the typical subspecies and
subsp. orientale, are quite different morphologically, and
this is supported by molecular evidence (Maurin et al.
2010) and by the fact that the two taxa are geographi-
cally disjunct. Hence C. celastroides subsp. orientale is
elevated to species level as C. patelliforme Engl. &
Diels. See the key for differences between it and subspp.
celastroides. C. celastroides subsp. laxiflorum (Welw.
ex M.A.Lawson) Exell has larger flowers than the other
subspecies, the leaves are nearly glabrous, and it is usu-
ally a tree. It occurs in Zambia, Angola, Tanzania and
DRC.

Key to species of Combretum sect. Hypocenetropsis
based on Exell (1978)

1a Disc glabrous;

1b Disc pilose:

2a Leaves pilose on entire leaf surface below; disc up to
4 mm diam.; fruit ± 18–20 × 17–22 mm; ped ± 1.0–2.5
mm long: Capriv, Botswana ............... 18. C. celastroides
2b Leaves almost glabrous below (except for hair-tuft domi-
nants in axils of veins below); disc 2.0–2.5 mm diam.; fruit
± 15 × 15 mm; ped up to 1 mm long: Limpopo Province,
KwaZulu-Natal ......................... 20. C. patelliforme
3a Ultimate twigs hairy; leaves narrowly elliptic, usually
longer than 55 mm, margin flat, principal lateral veins in
± 5–8 pairs; fruit usually larger than 17 × 17 mm: Limp-
opo Province ......................... 19. C. padoides
3b Ultimate twigs glabrous; leaves ovate, usually shorter
than 45 mm, margin markedly wavy, principal lateral veins in
3(4) pairs; fruit usually ± 15 × 15 mm or smaller: Mpu-
mapulanga and Swaziland (Barberton Centre of Endemism)
.......................... 21. C. tenuiipes

18. Combretum celastroides Welw. ex M.A.Lawson
in Flora of tropical Africa 2: 422 (1871); Engl. & Diels: 12
(1899); O.B.Mill.: 42 (1948); F.White: 284 (1962); Exell
& Roessler: 8 (1966); Exell: 16 (1968); Exell: 168 (1970);
Exell & J.G.Garcia: 50 (1970); Wickens:17 (1973); Exell:
107 (1978); J.D.Carr: 45 (1988); M.Coates Palgrave: 798
(2002); Curtis & Mannheimer: 472 (2005). Type: Angola,
Huila, Welwitsch 4370 [LISU, lecto., designated by Exell &
Garcia (1970); BM e!, BR e!, COI, K e!, P e!, PRE!, iso-
lecto.].

C. patelliforme Engl. & Diels: 12, t. 1, fig. C (1899) pro parte
as type species of Antunes A153 (Bl.).

Distribution: Angola, Botswana, Mozambique, Na-
mibia, Tanzania, Zambia, Zimbabwe (Figure 14).

19. Combretum padoides Engl. & Diels in Mono-
graphien afrikanischer Pflanzenfamilien und Gattungen
3: 13 (1899); Exell: 7 (1968); Liben: 40 (1968); Exell:
168 (1970); Wikcens: 17 (1973); Exell: 107 (1978);
Vollesen: 53 (1980); J.D.Carr: 17 (1988); Thulin: 248
(1993); Pooley: 354 (1993); McCleland: 468 (2002),
pro parte; M.Coates Palgrave: 808 (2002). Type: Mozam-
bique, Zambesi, Boroma, Menyharth 878 [Z, lecto. e!,
designated by Exell (1970); K e!, WU e!, isoleceto.].

C. hombeii De Wild.: 196 (1914). Type: Democratic Republic of
the Congo, Katanga, Kapiri Valley, 1913, Homble 113 (BR, holo. e!;
BM, fragment, iso. e!).

C. miniftorum Exell: 245 (1930). Type: Tanganjika [Tanzania],
Kilosa Dist., Kipera [Kipela]. Oct. 1921, Swynnerton S.n. (BM, holo. e!).

Distribution: DRC, Kenya, Malawi, Mozambique, RSA: Limpopo Province; Somalia, Tanzania, Zambia, Zimbabwe (Figure 15).

20. Combretum patelliforme Engl. & Diels in Mono-
graphien afrikanischer Pflanzenfamilien und Gattungen
3: 12, t. 1, fig. C (1899); Dümmer: 183 (1913). Type:
Mozambique, Delagoa Bay [Maputo], Schlechter
11957 [BM, lecto. e!, designated by Exell (1968); BOL,
BR e!, COI, E e!, HBG e!, K e!, L e!, MO e!, P e!, PRE!,
SAM, WAG e!, Z e!, iso. e!].

C. celastroides Welw. ex M.A.Lawson subsp. orientale Exell: 16
(1968); Wickens: 17 (1973); Exell: 107 (1978); J.D.Carr: 45 (1988);

Note: Engler & Diels (1899) described three species in this section, Combretum patelliforme, C. padoides and C. tenuiipes. In the protologue of C. patelliforme, two syntypes are cited: Antunes A153 from Angola and Schlechter 11957 from Mozambique. The speci-
men from Angola belongs now to C. celastroides subsp.
celastroides and Mozambique specimen to C. patell-
iforme, pro parte. Exell (1968) reduced this name to sub-
specific level and used a new epithet, namely orientale and lectotypified this name with the Schlechter speci-
men. Once this taxon is elevated now to species level the old epithet patelliforme must be used, because no name has priority outside its rank according to the Interna-
tional Code of Botanical Nomenclature (Vienna Code):
11.2 (McNeill et al. 2006).

Distribution: Mozambique, RSA: KwaZulu-Natal,
Limpopo Province; Tanzania, Zambia, Zimbabwe (Figure
14).

21. Combretum tenuiipes Engl. & Diels in Mono-
graphien afrikanischer Pflanzenfamilien und Gattungen
3: 13, t. 3, fig. b (1899); Dümmer: 182 (1913); Burtt:
Pooley (1993) gives a group of records for *Combretum collinum* subsp. *suluense* from around False Bay and Mkuz Game Reserve, but specimens growing in these sand forest areas belong to an undescribed species. There is, however, one specimen in the KwaZulu-Natal Herbarium collected in the mountains north of Vryheid which gives the distribution for subsp. *suluense* as far north as Kenya and southwards as far south as Swaziland and far northern KwaZulu-Natal. *C. collinum* subsp. *ondongense* (Engl. & Diels) Okafor is confined to the Kalahari sands of Angola, Namibia, Botswana, Zambia and the eastern fringe of Zimbabwe, and has not been recorded in South Africa. The holotype of subsp. *taborensis* is based on Stuhlmann 506, collected in Tabora, Tanzania, but was destroyed in World War II and no isotypes seem to exist. Okafor was confident enough to use this name despite the lack of type material. In the absence of good material from Tanzania in the National Herbarium in Pretoria, we have refrained from selecting a neotype for this taxon.

**Key to subspecies of *Combretum collinum***

1a Leaves densely grey-hairy below; fruit glabrous; Namibia, Botswana, Limpopo Province and Mpuamulanga .......................... 22a. *C. collinum* subsp. gazense

1b Leaves glabrous below, except for hairs in axils of veins; fruit glabrous or hairy: 

2a Fruit densely hairy, red scales conspicuous .......................... 22c. *C. collinum* subsp. *suluense*

2b Fruit glabrous: 

3a Leaf apices acute to acuminate to apiculate, lamina silvery below, with conspicuous darker venation; Limpopo Province and Mpuamulanga .......................... 22d. *C. collinum* subsp. *taborensis*

3b Leaf apices rounded to subacute, lamina yellowish below, without conspicuous darker venation; Namibia, Botswana .......................... 22b. *C. collinum* subsp. *ondongense*


*C. coriaceum* Schinz: 247 (1888); Dinter: 169 (1919); O.B.Mill.: 42 (1948). Type: [Namibia]. Ngamigebiet, 1888, Flick 422a (Z, hol. *e!; K, iso. e!).

*C. bajonense* Sim: 63, t. 63 (1909). Type: [Namibia]. Magenja, 1888, Eys 849 (BM, hol. e!; K, iso. e!).

*C. eylesii* Exell: 170 (1939). Type: [Zimbabwe]. Salisbury [Harare], Eys 849 (BM, hol. e!; K, iso. e!).

**Distribution:** Botswana, DRC, Malawi, Mozambique, Namibia; RSA: Limpopo Province, Mpuamulanga; Tanzania, Zambia, Zimbabwe (Figure 16).

22b. subsp. *ondongense* (Engl. & Diels) Okafor in Boletim da Sociedade Broteriana, sér. 2, 41: 147 (1967); Exell: 120 (1978); J.D.Carr: 50 (1988); M.Coates Pal-
Distribution: Botswana, Namibia, Zimbabwe (Figure 17).


*C. schizæi* Engl. & Diels: 56 (1899).


*C. schizæi* Engl. ex Engl. & Diels: 54 (1899). Type: Namibia, Onkumbi, Sep. 1885, Schinz 1037 (B, holo.; Z, iso. e!).

Distribution: Angola, Kenya, Malawi, Mozambique; RSA: Limpopo Province, Mpumalanga; Swaziland, Tanzania, Zambia, Zimbabwe (Figure 17).

Note: the holotype of *Combretum angustilanceolatum* was destroyed and from the two extant isotypes in BM and K, the first-mentioned specimen is chosen as lectotype, because it is the better one of the two.

The holotype, Scheffler 210, of *C. makindense* was destroyed and the Kew specimen, the best of all the duplicates, is the only one seen by Wickens (1968) and identified by him. It is here chosen as lectotype.

Distribution: Angola, Kenya, Malawi, Mozambique, ?Namibia; RSA: Limpopo Province, Mpumalanga; Swaziland, Tanzania, Zambia, Zimbabwe (Figure 17).


Note: Diels (1907) described two species, *Combretum goetzenianum* and *C. psammophillum*, based on Busse's specimens he collected in Tanzania. Both species proved to be *C. collinum* subsp. *taborense*. The holotypes of both names was destroyed and the isotypes in the East African Herbarium (EA) in Kenya are chosen here as lectotypes. The material in BM are merely fragments.

Distribution: DRC, Malawi, Mozambique; RSA: Limpopo Province, Mpumalanga; Tanzania, Zambia, Zimbabwe (Figure 17).

**Combretum hereroense** Schinz belongs to this section. It often has dichotomously branched stems; leaves mostly with only 3 or 4(5) pairs of principal lateral veins; 4-merous flowers; upper hynanthium campante to infundibuliform; petals spatulate to broadly obovate or obovate or subcircular and glabrous; disc with a pilose free margin; fruit up to 35 mm long and glabrous; scales very densely packed, contiguous, sometimes hidden by dense indumentum of combretaceous hairs on leaves below, (50–)75–120(–160) μm diam., irregular in outline, delimited usually by 8 primary radial walls with up to 8 tangential and up to 4 partial radial walls.

**Combretum hereroense** is extremely variable in leaf shape and indumentum and sometimes in the size of the fruit. The indumentum varies from densely tomentose to nearly glabrous. Wickens (1971a) subdivided **C. hereroense** into three subspecies, and subsp. *hereroense* into two varieties on account of their hairiness. Only the typical subspecies occurs in our area. We do not recognize these varieties.

**Combretum hereroense**, *C. imberbe* and *C. elaeagnoides* are clearly related according to the molecular analysis by Maurin et al. (2010), although currently placed in three different sections. They are characterized by 4-merous flowers in dense often subcapitate axillary spikes, a glabrous disc and lepidote fruit. Leaves in all these species are densely lepidote with scales contiguous or overlapping, silver or golden or rust-brown with cells divided by numerous radial and tangential walls. All three species are deciduous trees, although *C. elaeagnoides* has a tendency to scramble. Young stems of *C. imberbe* have short, opposite, spine-tipped lateral shoots.


* C. elokeramum Schinz: 246 (1888); Engl. & Diels: 61 (1899); O.B. Mill.: 42 (1948). Type: South West Africa [Namibia], Kunene, Schinz 420 (Z, holotype).

* C. transvaalense Schinz: 202 (1894); Dümmér: 201 (1913); Burt Davy: 466 (1926); O.B. Mill.: 43 (1948); Brenan: 139 (1949). Type: South Africa, [Limpopo Province], Makapansberge, Rautanen 5470 (Z, holotype).


Note: *Menydháth 892b*, collected in Mozambique, is the type of *Combretum sambesiaca* (Engler & Diels 1899). The only acceptable extant specimen is housed in the Zürich Herbarium which is chosen as the lectotype. Specimens in K and WU are merely fragments. Engler & Diels (1899) mentioned *Rautanen 199* and three specimens of Fleck in their protologue of *Combretum rautanenii*. None of the Fleck specimens are available on the Zürich Herbarium website, only *Rautanen 199*, after which the species was named.

**Distribution**: Angola, Botswana, Kenya, Malawi, Mozambique, Namibia; RSA: Gauteng, KwaZulu-Natal, Limpopo Province, Mupumalanga, North-West; Swaziland, Tanzania, Uganda, Zambia, Zimbabwe (Figure 18).


Exell (1978) placed *C. elaeagnoides* Klotsch in sect. *Elaeagnoidae* Engl. & Diels, but Stace (1981) sank it under sect. *Campestria*, stating that there are four species in Africa belonging to this section. Of these, *C. elaeagnoides* is the only species south of the Zambezi River where it is restricted to the *Flora zambesiaca* region (including the Caprivi Strip in Namibia). It has a peculiar type of scales and the leaves, flowers and fruit are densely silvery lepidote. The flowers are 4-merous, arranged in dense, often subcapitate axillary spikes; the disc is without a free margin. *C. elaeagnoides* grows in the Zambezi Valley often forming dense thickets and is known in Zimbabwe as jessey-bush.

*C. prunifolium* Engl. & Diels: 28 (1899), pro parte. Type: Mozambique, Boroma, Menyharth 893 (Z, holotype; WU, iso.).

*C. stevensonii* Exell: 171 (1939); O.B.Mill.: 44 (1948). Type: Zambia, Mazabuka, Oct. 1929, Stevenson 99 (BM, holotype; FHO, iso.).

Note: the type of *Combretum prunifolium* Engl. & Diels, Menyharth 893 (Z), consists of three specimens, the two upper ones being *C. elaeagnoides* and the lower one *C. hereroense* (Exell 1978).

**Distribution:** Botswana, Mozambique, Namibia, Zambia, Zimbabwe (Figure 17).

X. **Combretum** sect. **Plumbea** Jordaan, A.E.van Wyk & O.Maurin in Maurin et al. (2010)

This section is named *Plumbea*, derived from the Latin word *plumbum* which means lead, referring to the heartwood of *Combretum imberbe* which is extremely hard, heavy and durable; hence the common name leadwood.

Exell (1978) placed *Combretum imberbe* Wawra in sect. *Hypocrateropsis* but separated it from all the other species in this section by its very densely lepidote leaves with scales mostly contiguous. It has rather large scales, 120–300 µm in diameter, roughly circular, cells very numerous and small, divided by radial and tangential walls. A molecular phylogenetic study (Maurin et al. 2010) shows that *C. imberbe* is more closely related to *C. elaeagnoides* and *C. hereroense* than to the other members of sect. *Hypocrateropsis* and is treated here in a section of its own. In young growth, the branches are decussate and short lateral shoots end in a spinescent tip. The fruit is very small, less than 0.18 mm long and densely covered with silvery scales.


**Distribution:** Botswana, Mozambique, Namibia, Zambia, Zimbabwe (Figure 17).

B. **Combretum** subgen. **Cacoucia** (Aubl.) Exell & Stace (Exell & Stace 1966 Wickens 1973)

*Cacoucia* Aubl.: 450, t. 179 (1775).

This subgenus is characterized by the absence of scales but the presence of microscopic (and sometimes macroscopic) stalked glandular hairs. The flowers are usually 5-merous (4-merous in sect. *Conniventia*).

Four sections are recognized.

Key to sections of subgen. *Cacoucia*

1a Scrambling shrubs or woody climbers, with persistent petiole bases developing into curved spines; leaf lamina densely covered with translucent crystalliferous idioblasts; flowers orange to scarlet-red or white tinged pink; petals minutely hairy or pilose; fruit hairy or glabrous, with wings or winglets..................sect. XI. *Poivrea* (p. 153)

1b Scrambling shrubs, erect shrubs or suffrutescent, without persistent petiole bases developing into curved spines; leaf lamina without crystalliferous idioblasts; flowers red, grey-green or white; petals glabrous or velvety; fruit sparsely hairy to velvety, always with wings:

2a Climbers, shrubs or suffrutescent; flowers red; petals glabrous; fruit sparsely hairy on body only; Botswana, northern provinces of South Africa, Swaziland and KwaZulu-Natal....................sect. XII. *Conniventia* (p. 153)

2b Scrambling shrubs; flowers not red; fruit with velvety covering all over; endemic to or centred on the Kaokoveld Centre of Endemism (Namibia and Angola):

3a Leaves opposite or in whorls of three, not longitudinally folded; flowers grey-green with a pinkish or reddish tinge..................sect. XIII. *Megalantherum* (p. 155)

3b Leaves opposite, longitudinally folded; flowers white with crimson to reddish brown stamens..................sect. XIV *Oxystacum* (p. 155)
XI. Combretum sect. Poivrea (Comm. ex DC.) G.Don (1832); Wickens: 57 (1973); Exell: 154 (1978)

Combretum mossambicense and C. bracteosum belong to this section. They are characterized by the lack of epidermal scales and the presence of gland-tipped hairs on the midrib and lateral veins, hairy pockets in the axils of veins below and translucent gland dots in the leaf lamina. Species in this section have relatively large and showy flowers, usually 5-merous and up to 10 mm long with protruding stamens. The fruit are usually 5-winged or 5-angled. C. mossambicense has white or pinkish flowers and is one of the few species of Combretum in southern Africa with hairy fruit. The only other species of Combretum with pubescent or woolly fruit in our region belong to other sections, namely C. albo-punctatum, C. collinum subsp. sulcense, C. hereroense, C. mossii, C. oxystachyum and C. wattii. Combretum bracteosum and C. mossambicense have petioles which persist as a recurved woody spine or hook. Similarch as recurved hooks are found in Quisqualis parviflora Sond. Combretum bracteosum is a woody, much-branched, many-stemmed shrub, but may climb on other vegetation. It has scarlet or red flowers, but differs from the other southern African species of Combretum in having wingless fruit.


Combretum mossambicense, in Engl. & Prantl, Die narurlichen Pflanzenfamilien dis BM000902273, 3,7: 125 (1893); Engl. & Diels: 95 (1899); Dümmer: 68 (1913); Bews: 146 (1921); J.D.Carr: 37 (1988); Hennessy: t. 2028 (1991b); Pooley: 354 (1993); M.Coates Palgrave: 796 (2002). Type: South Africa, [KwaZulu-Natal], 'in sylvis prope--fl. Umlaas', Krauss 350 (B, holotype; BM000902273, lecto. e!, designated here; G e!, isolecto. e!, designated here; G e!, W e!, isolecto. e!).

Poivrea bracteosa Hochst.: 424 (1844); Sond.: 512 (1862); Sin: 223 (1907).

Note: Krauss 350 in the British Museum (BM), type of Combretum bracteosum, is an acceptable flowering specimen chosen here as the lectotype; the isotypes in the other herbaria are merely fragments.

The name Codonocroton triphyllum does not seem to be validly published and only appeared in Meyer's, Zwei pflanzengeographische Documente von J.F. Drège (1843), collected by Drège in the Eastern Cape, a year before Hochstetter published the name Poivrea bracteosa, based on a specimen from KwaZulu-Natal. The Drège specimen at Stockholm Herbarium has a handwritten label and was mounted on the same sheet as S08-899, the type of Poivrea bracteosa, the name under which it is filed.

Distribution: RSA: Eastern Cape, KwaZulu-Natal (Figure 20).


Combretum ukambense Engl.: 291 (1895). Type: Kenya, Kitui in Ukamba, Hildebrandt 2779 (B, holotype; K, lectotype, designated here; M e!, P e!, W e!, isolectotype).


C. guangense Engl. & Diels: 98 (1899). Type: Angola, Cuanza Norte, Golungo Alto, Welwitsch 4282 [BM, lectotype, designated by Exell & Garcia (1970); COI, G e!, K e!, LISU e!, P e!, isolectotype].


C. detinens Dinter: 170 (1919). Type: [Namibia], between Franzfontein and Outjo, Dinter 2645 (SAM, isolectotype).

Note: the holotype of Combretum ukambense was destroyed and of the four extant isotypes, the one in Kew has the best preserved flowering material and is therefore chosen as the lectotype.

Distribution: Botswana, DRC, Kenya, Malawi, Mozambique, Namibia; RSA: Limpopo Province, Mpumalanga; Tanzania, Uganda, Zambia, Zimbabwe (Figure 20).

XII. Combretum sect. Conniventia Engl. & Diels (1899)

This section falls under subgen. Cacoucia because scales are absent but the leaves have stalked glandular...
hairs. Flowers are red, 4-merous and the petals are glabrous. Ventenat (1808) described \textit{Combretum paniculatum} from a plant collected in Senegal, West Africa and \textit{C. microphyllum} was described by Klotzsch (1861) from a plant collected in Mozambique. Wickens (1971c, 1973) reduced \textit{C. microphyllum} to a subspecies of \textit{C. paniculatum}. Exell (1968, 1978) raised \textit{C. microphyllum} to species level. Coates Palgrave (1977) placed \textit{C. microphyllum} under \textit{C. paniculatum} and therefore considers this as an aggregate species occurring in most parts of tropical and subtropical Africa. Exell (1978) and Carr (1988) consider \textit{C. paniculatum} and \textit{C. microphyllum} as two distinct species and there seems to be enough molecular evidence (Maurin et al. 2010) to maintain these two species. Chemotaxonomic studies conducted by Carr & Rogers (1987), however, found identical extracts for these two species suggesting that they are closely related, but they unfortunately did not include \textit{C. platypetalum} Welw. ex M.A.Lawson in their studies, a species from the \textit{Flora zambesiaca} region and further north, which forms part of this complex (see below). \textit{C. paniculatum} flowers usually in autumn (March-May) and the leaves remain on the plant when in flower. The leaves and flowers are larger than in \textit{C. microphyllum}, a deciduous species that flowers usually in spring (September and October) when no leaves are visible on the plants. Exell (1978) pointed out that, although it is difficult to separate \textit{C. microphyllum} and \textit{C. paniculatum} in the herbarium, the two species are different in the field and they are also ecologically distinct. \textit{C. paniculatum} occurs in forest and forest edges in the Soutpansberg region of South Africa. \textit{C. microphyllum} grows on river banks of, for example, the Limpopo, Letaba, Olfants, Crocodile, Sabi, Komati, Ngwavuma, Pongola and Mkuze Rivers in South Africa in open lowveld savanna in full sun. It has become a popular garden plant in sub-tropical gardens. Flowers of both species are rich in nectar and passerine birds. The flowers are also visited by honeybees.

\textit{Combretum platypetalum} is a multi-stemmed, sparsely branched to virgate dwarf shrub (geoxyllic suffrutex) up to 1.5 m high (subsp. \textit{oatesii} does not exceed 500 mm) with a thick woody rhizome, occurring in the \textit{Flora zambesiaca} region as well as Namibia, Botswana, DRC, Angola and Tanzania. The differences between subsp. \textit{platypetalum} and subsp. \textit{baumii} (Engl. & Gilg) Exell are not clear because both have hairy leaves and flowers, and we accept the view of Exell (1978) and Carr (1988) that only the typical subspecies occurs in northeastern Namibia crossing the border into Botswana. Subsp. \textit{oatesii} (Rolfe) Exell differs from the other two subspecies by its glabrous leaves. Exell (1978) cites one specimen from Botswana, Rogers 6109 (SRGH), collected at Lobatsi, under \textit{C. platypetalum} subsp. \textit{oatesii} (Rolfe) Exell. No specimen of this taxon has been located in the National Herbarium, Pretoria (PRE) and it is doubtful whether subsp. \textit{oatesii} actually occurs in southeastern Botswana. Further investigation is needed to confirm its presence in southern Africa.


\begin{figure}[h!]
\centering
\includegraphics[width=\textwidth]{figure21.png}
\caption{Known distribution in RSA region of \textit{Combretum platypetalum} subsp. \textit{platypetalum}. □: \textit{C. microphyllum}, ▲: and \textit{C. oxytachylum}.}
\end{figure}


\textbf{Note:} the holotype of \textit{Combretum microphyllum} was destroyed in Berlin and the only extant isotype is in BM, although merely a fragment.

\textbf{Distribution:} Botswana, Malawi, Mozambique; RSA: KwaZulu-Natal, Limpopo Province, Mpalulanga; Swaziland, Tanzania, Zambia, Zimbabwe (Figure 21).


\textit{C. ramosissimum} Engl. & Diels: 72 (1899). Type: Sierra Leone, Afzelius s.n. (B, syn.); Bioko, Mam 203 (B, syn.); K. Pisosisyn.); Gabon, Soyaux 86 (B, syn.); C. Cameron, Zener 210 (B, syn.); Cameron, Zener & Staudt 177 [B, syn.]; K. lecto., designated by Jongkind (1999), BM, isoleto. e!

\textbf{Distribution:} Angola, Benin, Bioko, Burkina Faso, Cameroun, Cote d'Ivoire, DRC, Ethiopia, Gambia, Guinea, Guinea-Bissau, Kenya, Liberia, Malawi, Mali, Mozambique, Nigeria; RSA: Limpopo Province; Sao Tome, Senegal, Sierra Leone, Sudan, Tanzania, Uganda, Zimbabwe (Figure 22).

FIGURE 22.—Known distribution in FSA region of Combretum watti, and C. paniculatum, ▲.


Distribution: Angola, Namibia (Figure 22).

XIII. Combretum sect. Megalantherum Exell (1968)

Only one very distinct species, Combretum watti Exell endemic to the Kaokoveld Centre of Endemism in northwestern Namibia and southwestern Angola (Van Wyk & Smith 2001), belongs to this section. It has leaves in pairs or in whorls of three and the foliage is confined mainly to short lateral shoots emerging from older wood. A single flower terminates the lateral shoots, accompanied by a few flowers in one or two sets of distal axils, up to five flowers per lateral shoot. The colour of the flowers is unusual in being grey-green with a pinkish or reddish tinge. They have a nectariferous disc and are densely pubescent with dark brown stalked glands. The stems and style are exserted beyond the petals, at first green, becoming reddish. The fruits are 5-winged.


Distribution: Angola, Namibia (Figure 21).

FIGURE 22.—Known distribution in FSA region of Combretum watti, and C. paniculatum, ▲.

XIV. Combretum sect. Oxystachya Exell (1968)

Only one species from the FSA region, C. oxystachyum Welw. ex M.A.Lawson from the Kaokoveld and adjacent parts of Namibia, belongs to this section. It is a scrambling shrub or climber and the leaves are longitudinally folded, with dense white hairs and stalked glands. The flowers are white with crimson to reddish brown stamens. The fruit is 5-winged.

SPECIMENS EXAMINED

Specimens are held at PRE, unless otherwise indicated. The numbers in brackets are the species numbers as used in the text.

Abbott 82 (13); Acoks 9132 (1); 12985 (6); Archer 494 (27); Archibald 3599 (1).

Babich 9 (27); Babich & Cadman 1478 (13); Banks 25 (27); 58 (12b).

Barrett 12 (28); Bayliss 677 (1); Baytopp 156 (28) UNIN (fide Miller 1948, Setschung & Ventura 2003; 275). Biegel. P.ope & Gibbs Russell 4943 (27); 4949 (12a). Biggs 273 (11), Bodenstein 619 (18).

Bokelman s.n. (26), Boshoff & Mason 257 (12b); 283 (9); 301 (22a), Boss TLM4971 (22a). D.J. Bothe 3401 (20); 5522 (28). M.M. Botha FDH2889 (13). Botha & Bredekamp 3608 (22a), Botha & Cilliers 3678 (27b). Bowbrick BA625 (17d) SRGH. Bowler 9148 (22a). Braun 153 (28). Breuer TRV10604 (28). Brown 7966 (9); 8711 (13). Brussel 6370 (22a), Brynard & Geldenhuys 4304 (22b), Breynego 862 (22c); 911 (22a); 1257 (13).

Burger 596 (14); 1260 (27), Burgoyne 3262 (9); 3358, 3417 (22a).

Carr 72 (22b); 73, 98 (22a); 70, 107 (11); 96, 115 (17a); 99 (9); 146 (12b); 192 (7), Coward, & Ward 922 (19a). Codd, 3023, 3434, 3464 (22b); 4444, 5726 (27); 6051, 2091 (6); 7079 (22a); 10236 (14). Codd & Dyer 4555 (20a). Coetsee 1195 (4); 1342 (22c), Cole 978 (27), Comans 1715 (1). Compton 26036, 26832, 32366 (22c); 30065 (6); 30145 (28). Creswell 34 (22a), Culverwell 654, 955 (6); 709, 787 (22c). Curr 119 (10). Curtis 962a, 1022 (17b); 966 (22b); 996, 1081 (9); 1043 (22a).

Deluing RWMD4913 (4). De Winter 3464, 3850, 9147 (22a); 3726, 3854 (17b); 3734, 4778 (9); 3861 (12b); 3923 (30); 5769 (31); 6098 (14); 9220, 9247 (24a). De Winter & Giess 6953 (9); 6954, 7000 (22b); 6961 (17a); 6999 (17b); 7106 (32). De Winter & Leitner 5392, 5906 (32). De Winter & Marcus 4593 (27). De Winter & Wiss 4204 (22a). 4267 (17a); 4268 (30). Duijssen 279 (14). Du Preez & Steenkamp 10424 (22a). G.J. du Toit 5163 (27). P.C.V. du Toit 875 (28). Dyer 26 (1); 4349 (6).

Edwards 1855, 4115 (6); 5139, 5147, 5330 (13); 4337, 4499 (18); 4339, 4395, 4405 (22a); 4506, 4416 (9); 4404, 4446 (17b). Erens 365 (25). Esterhuyse 441 (18).

Fourie 1332 (14). Foye 14 (28). Friederichs FR1277 (17b); FR1279 (22a).

Galpin 2977, 8116, 11554 (1); 13697, 13853 (28). Geldenkamp 328, 334 (9). Germain-Huizlein 949 (14); 6107 (22c). Gerstner 5087 (25).

Gibbs Russell 4007 (1). Giess 8967, 12835, 14795 (12b); 9306, 9311, 9469, 9478, 9515, 9790, 10003, 10412, 10414, 11473, 12263, 15108 (22a); 9793 (9); 9881 (17a); 9891, 10139, 10146a, 12635, 14803 (17b); 10114 (30); 10504, 15463 (27), 10505 (31); 14898 (11). Giss & Leippert 7004 (22c). 7581 (18). Giess & Loutit 1411 (27). 14166 (9). Giess & Van der Walt 12635 (32). Giess, Voigt & Blesnner 6571 (12b). Gillet 1034 (28). Glen 1827 (22a); 3743 (14). Goosen

Distribution: Angola, Namibia (Figure 21).
ACKNOWLEDGEMENTS

We would like to thank Hester Steyn for the distribution maps, Daleen Roedt for the line drawings and Meg Coates Palgrave for checking certain specimens in the Harare Herbarium (SRGH).

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mossambicensis Klotzsch, 153
Spathulipetala Engl. & Diels, sect., 141
Terminalia erythrophylla Burch., 139