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A note on *Combretum* subgenus *Combretum* section *Macrostigmatea* (Combretaceae)

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Keywords: *Combretum*, section *Macrostigmatea*, southern Africa, taxonomy

ABSTRACT

The history of *Combretum* section *Macrostigmatea*, its circumscription and its representation in the *Flora of southern Africa* region are provided. A specimen from northern Botswana, *Miller B/1199*, initially misidentified as *C. engleri*, is shown to be *C. kirkii*, the first record of this taxon in the *FSA* region. *Combretum mkuzense* is placed in synonymy in *C. zeyheri* section *Spathulipetala*.

UITTREKSEL

Die geskiedenis van *Combretum* seksie *Macrostigmatea* en die omskrywing en verteenwoordiging daarvan in die gebied van die *Flora van suidelike Afrika* word voorsien. Daar word aangetoon dat 'n eksemplaar uit noordelike Botswana, *Miller B/1199*, wat aanvanklik verkeerd as *C. engleri* geïdentifiseer is, *C. kirkii* is, die eerste rekord van hierdie takson in die *FSA*-gebied. *Combretum mkuzense* word in sinonimie in *C. zeyheri* seksie *Spathulipetala* geplaas.

INTRODUCTION

Section *Macrostigmatea* of *Combretum* was erected by Engler & Diels in 1899 to accommodate two taxa, *C. macrostigmateum* Engl. & Diels (1899) and *C. kirkii* M.A. Lawson (1871). Both taxa have the distal part of the style expanded, markedly so in *C. schumannii*, less obviously so in *C. kirkii*. In habit and distribution these taxa differ, *C. schumannii* being a tree or shrub known from Kenya, Tanzania, Malawi, Zimbabwe and Mozambique, and *C. kirkii* a scandent shrub or liana known to occur only in the drainage basin of the Zambezi River system and hitherto recorded from Zambia, Zimbabwe, Malawi and Mozambique.

A third taxon, *C. engleri* Schinz (1901), a multistemmed virgate shrub, was described from northern Namibia. This entity has since been recorded in Angola, southwestern Zambia and northern Botswana, growing in substrata derived from Kalahari sands. Liben (1965) described a fourth member of the section, *C. gillettianum* from material collected by Glover in northern Zambia. Plants assigned to this taxon are small trees or shrubs which to date have been recorded from Zaïre, northern Zambia and Tanzania.

Of these four taxa, two, *C. schumannii* and *C. engleri*, (Figure 1A, B) have flowers with a glabrous nectariferous disc, whereas the flowers of *C. kirkii* and *C. gillettianum* (Figure 1C, D) have a pilose disc margin.

Exell (1970) recognized the four taxa enumerated above as constituting section *Macrostigmatea*, at the same time expressing the opinion that *C. schumannii* and *C. engleri* might prove to be conspecific, a view shared by Wickens (1973). Subsequently Exell (1978) formally reduced *C. engleri* to conspecificity in *C. schumannii* on the basis that the flowers of both entities have a glabrous nectariferous disc with a very short (less than 1 mm) free margin, the fruit of both is glabrous except for peltate secretory scales and of similar dimensions, and the shrub habit is common to both.

DISCUSSION

Section *Macrostigmatea* in southern Africa

Since, of the four entities recognized as species in 1970, only one, *C. engleri*, has been recorded from the *Flora of southern Africa (FSA)* region, it was necessary to decide whether to follow Exell's (1978) treatment or to maintain *C. engleri* as a species. It was therefore necessary to examine flowering, fruiting and vegetative material of *C. engleri sensu lato* and of *C. schumannii sensu stricto*. Of the material labelled *C. engleri* borrowed from or seen *in situ* in southern African herbaria, only a single specimen, *Miller B/1199* from Serondela, Chobe District in northern Botswana, bore flowers. This specimen, described as a straggling shrub, was cited by Exell (1970) as *C. engleri* and by Exell (1978) as *C. schumannii*. When we dissected flowers we found them to have a pilose disc margin (Figure 1C), a character which immediately excluded the specimen from *C. engleri* and *C. schumannii*.

Examination of peltate secretory scales of the specimen (Figure 2A–C) showed that these were structurally similar to those described (Stace 1969) for *C. kirkii* and different from those of a specimen of *C. engleri*, *Maguire 1597*, collected in the Caprivi Strip (Figure 3A). Subsequent examination of peltate secretory scales from type material of *C. kirkii*, *Kirk s.n.* (Figure 2D) and *Menyharth s.n.*,

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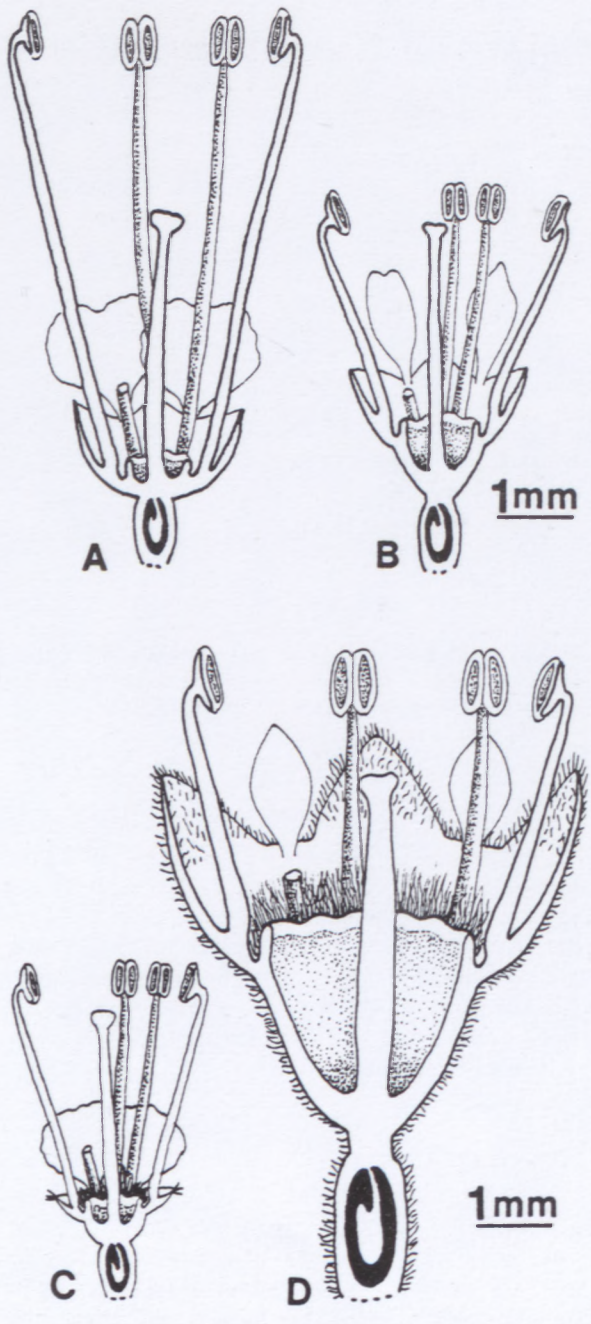

FIGURE 1.—Half-flower drawings, × 10: A, *Combretum schumannii, Burtt 3826*; B, *C. engleri, Gossweiler 3241*; C, *C. kirkii, Miller B1199*; D, *C. gillettianum, Brenan 8172.*

confirmed that, despite its smaller than average flowers, the depauperate specimen *Miller B/1199* should be assigned to *C. kirkii* M.A. Lawson. The locality from which it was collected, which lies within the drainage basin of the Zambezi River system, and the straggling shrubby habit are appropriate for this species. This taxon has not previously been recorded from the *FSA* region. It is imperative to note that without examination of flowers and fruit and, in particular, without microscopic examination of peltate secretory scales at magnification of at least 400 ×, it is all too easy to fail to recognize the shrubby form of *C. kirkii*. The peltate secretory scales of *C. gillettianum* (Figure 2E–G) are less divided and mostly smaller than those of *C. kirkii*.

All other specimens labelled *C. engleri* from the *FSA* region, all described as shrubs, lacked flowers. Some bore fruit, some were sterile, but the peltate secretory scales of all which were examined microscopically were structurally alike and it was therefore concluded that all were representatives of a single taxon. Specimens of *C. engleri*, among them *Gossweiler 3241* (holotype of *C. chlorocarpum* Exell) and *Exell & Mendonça 1325* were examined and found to have scales of the same kind (Figure 2J–M) as those of specimens labelled *C. engleri* from the *FSA* region (Figure 3A).

Exsiccata of *C. schumannii* collected in Tanzania and Malawi, including an isotype, *Holst 2375*, were examined at K and BM. The material of *C. schumannii* and *C. engleri* was compared (Table 1).

Carr (1988) made the significant point that whereas *C. schumannii* has been successfully propagated from seed in cultivation, all attempts to germinate seed of *C. engleri* in cultivation to date have failed. All these observations, together with the fact that as far as one can tell from existing records there is no overlap in the distribution ranges of *C. schumannii* and *C. engleri*, lead to the conclusion that these taxa are not conspecific and therefore the name *C. engleri* should be retained, at least until such time as germination tests have been carried out on material from Mozambique which is reported to be intermediate between *C. schumannii* and *C. engleri*.

The status of *C. mkuzense* J.D. Carr & Retief

The reasons for the establishment of *C. mkuzense* as a discrete taxon and for its placement in section *Macrostigmatea* (Carr & Retief 1989) are unclear since the type material, *Carr 187* (PRE), is patently a specimen of *C. zeyheri* Sond. (section *Spathulipetala*). Carr & Retief (1989) state that the peltate epidermal scales of *C. mkuzense* agree well with those of other representatives of section *Macrostigmatea*. They fail to mention that the scales of *C. mkuzense* and those of *C. zeyheri* are structurally identical (Figure 3B, C; Table 2), yet they note that *C. zeyheri* is present in the area where the specimen *Carr 187* was collected and that the fruit of *C. zeyheri* and that of *C. mkuzense* are alike. They do, however, point out that *C. zeyheri* is a small to medium-sized tree, whereas *C. mkuzense* is a scrambling shrub. Carr & Retief in referring to analyses by Rogers of triterpenoid and flavonoid-type compounds of local *Combretum* spp. (Carr & Rogers 1987) state that 'examination of the profiles of *C. mkuzense* and *C. kirkii* shows similarities but no significant difference', yet there is no mention in Carr & Rogers's (1987) paper of *C. kirkii*! They fail to point out that in the same paper Rogers records that the leaves of *C. mkuzense* and *C. zeyheri* contain exactly the same triterpenoids and flavonoid-type compounds in the same relative concentrations. Based on these comments and on analysis of selected, taxonomically important characters performed by the second author (Table 2), we conclude that *C. mkuzense* cannot be maintained as a discrete taxon, but must be reduced to synonymy in *C. zeyheri* Sond.

Combretum *Loefl.* subgenus **Combretum** section **Macrostigmatea** *Engl. & Diels* in Engl., Monographieen afrikanischer Pflanzenfamilien und Gattungen 3: 24 (1899); Stace: 158 (1969); Exell: 176 (1970); Wickens: 21 (1973); Exell: 115 (1978); Stace: 336 (1981). Lectotype: *Combretum*

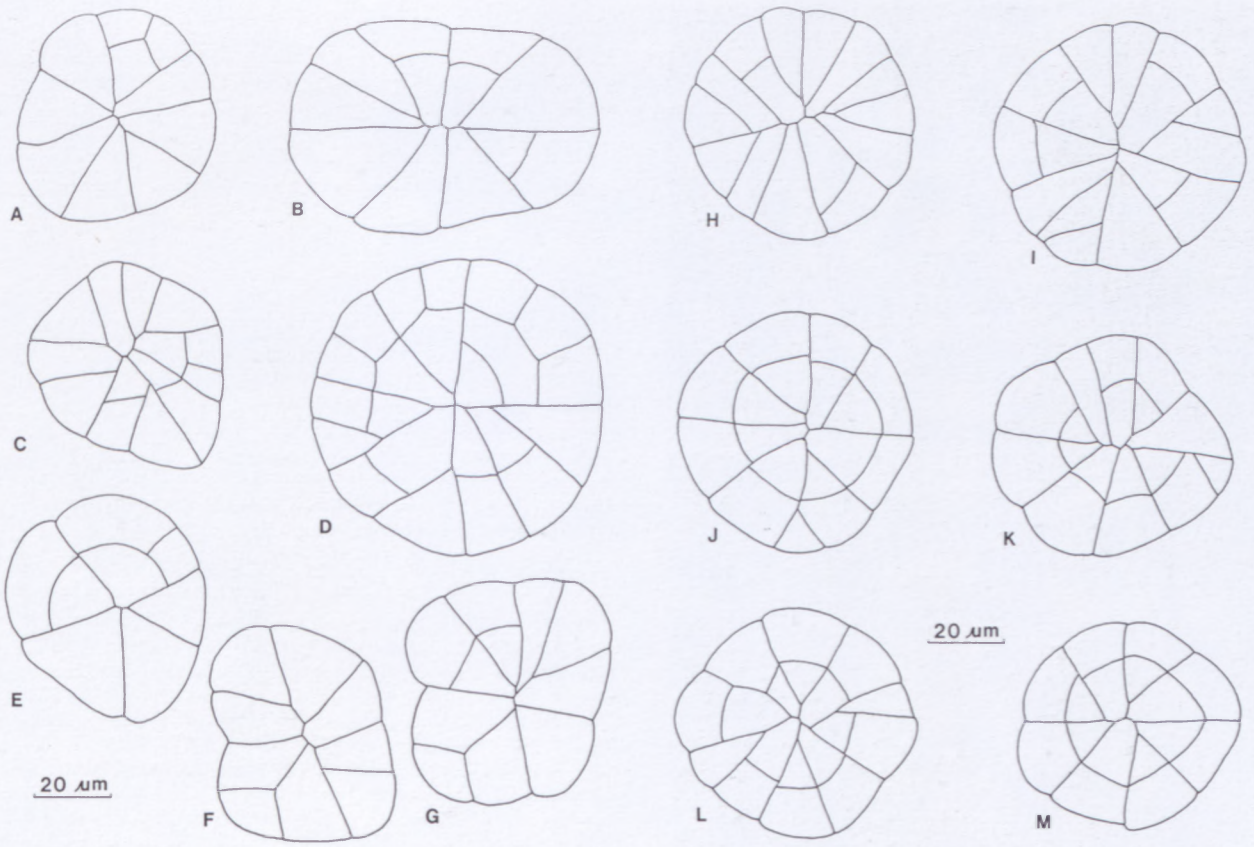

FIGURE 2.—Peltate secretory scale heads. A–D, *Combretum kirkii*: A–C, *Miller B/1199*; D, *Kirk s.n.*. E–G, *C. gillettianum, Hutchinson & Gillett 3956*; H, I, *C. schumannii, Burtt 3940*. J–M, *C. engleri*: J, K, *Gossweiler 3241*; L, M, *Exell & Mendonça 1325*.

macrostigmateum Engl. & Diels = *C. schumannii* Engl., designated by Stace (1981).

Small tree, shrub, scandent shrub or liana. *Inflorescence* an elongate, subcapitate or capitate spike. *Flowers* tetramerous; *hypanthial tube* cupuliform or broadly infundibuliform, broader than long; *petals* ovate to subcircular with entire or emarginate apex, glabrous; *stamens* 8, insertion uniseriate near rim of nectariferous disc; *disc* concealed within hypanthial tube, the narrow free rim glabrous or pilose; *style* expanded (markedly or slightly) at apex. *Fruit* samaroid, medium-sized to large, 22–55 × 21–50 mm with 4 thinly chartaceous wings and slender stipe 7–30 mm long; *germination* epigeal with cotyledons arising above soil level (where known); *mature peltate secretory scale-heads* (35–) 45–85 µm in diameter divided by 8 primary radial walls, 1–several secondary and partial radial walls and several tangential walls to form 1–2(–3) concentric zones of cells.

CONCLUSIONS

Two species of *Combretum* subgenus *Combretum* section *Macrostigmatea* are currently recorded in the *FSA* region, *C. engleri* Schinz (which is maintained as distinct from *C. schumannii* Engl.) and *C. kirkii* M.A. Lawson which is recorded in this region for the first time. The entity described by Carr & Retief (1987), *C. mkuzense*, is shown to be neither a discrete species nor a member of section *Macrostigmatea*, but a misidentified specimen of *C. zeyheri* Sond., section *Spathulipetala*.

TABLE 1.—A comparison of taxonomically important characters of *Combretum schumannii* and *C. engleri*

	C. schumannii	*C. engleri*
Habit	tree	shrub
Mature leaf size	75–110 × 33–45	18–40 × 18 mm
Mature fruit size	30–34 × 27–31	22–32 × 21–30 mm
Hypanthial tube shape	cupuliform (Figure 1A)	broadly infundibuliform (Figure 1B)
Sepal indumentum	glabrous	apex ciliate
Petal proportions	as broad as long	longer than broad
Style apex	greatly expanded	slightly expanded
Secretory scales:		
diameter	62–68 µm	60–65 µm
no. of cells	± 16	± 16–18
no. of radial walls	± 12–13	± 8–10
no. of tangential walls	± 1–4 (Figure 2H, I)	± 7–8 (Figure 2J–M)

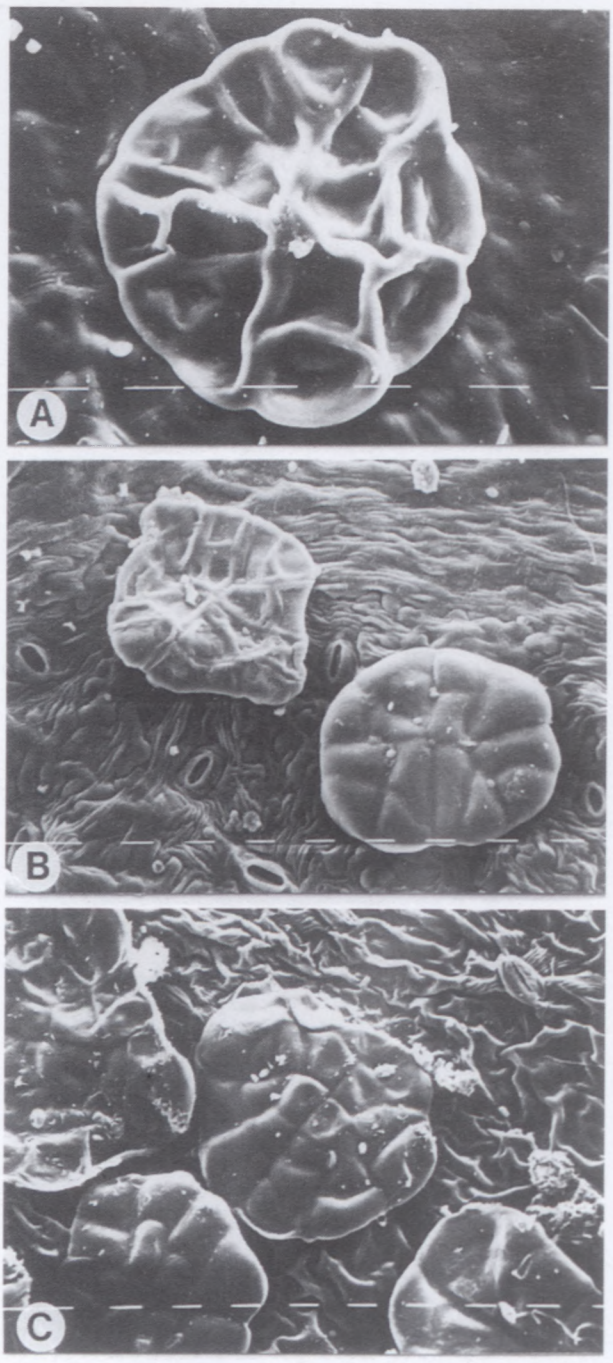

FIGURE 3.—Peltate secretory scales on abaxial surface of lamina. A, *Combretum engleri*, *Maguire 1597*; B, *C. mkuzense* (synonym of *C. zeyheri*), *Carr 187*; C, *C. zeyheri*, *Ward 3165*. Scale bars: 10 µm.

SPECIMENS EXAMINED

Combretum schumannii

TANZANIA.—0438: Lushoto Dist., Simbili, *Holst 2375* (K, iso.!). 0636: Mpwapwa (flowering material), *Hornby 311* (BM). Grid ref. unknown, flowering material: *Burtt 3826, 3940* (BM).

MALAWI.—1435: Fort Johnston, *Burtt 5986* (BM, K).

C. gillettianum

ZAMBIA.—0831 (Abercorn Dist.): 1.6 k E of Mpulungu, *Angus 773A* (BM); flowering material, *Brenan & Greenway sub Brenan 8172* (K); Mpulungu, *Hutchinson & Gillett 3956* (K); flowering material, *Richards 18416* (K).

C. kirkii

MOZAMBIQUE.—Grid ref. unknown: 14°–19°S, Tete, *Kirk s.n.* (K, holo.!); Sambesi, Boroma (Chnore), *Menyharth s.n.* (K, fragment of holo.! of *C. menyhartii* Engl. & Diels).

ZIMBABWE.—1628: Kariba, *Goldsmith 23/59* (BM, K).

BOTSWANA.—1824 (Kachikau): Serondela, Chobe Dist., flowering material, *Miller B/1199* (PRE).

C. engleri

ANGOLA.—Northeastern region, Lunda Province: Biula, Chicoso R., *Exell & Mendonça 1325* (BM); R. Coxi, *Exell & Mendonça 1362* (BM). Southern region, Huila Province: Baixo Cunene, Rocadas, ao km 200 da estrada Sa da Bandeira-Rocadas, *Borges 287* (BM, K); Distrito da Huila Rocadas, Centro de Estudos do Cunene, *Da Silva 2943* (K); Gambos, Chibemba no Tchimbolelo, *Menezes 569* (K); Mucope, desta para Bicuar, flowering material, *Menezes 3472* (K). Cuando Cubango Province: between Kuiriri and Kuito, flowering material, *Gossweiler 3241* (BM, holo.! of *C. chlorocarpum* Exell).

NAMIBIA.—1714 (Ruacana Falls): 8 Meilen südlich Otjehua, Kaokoveld, (–CA), *Giess & Leippert 7581a* (NBG). 1715 (Ondangwa): bordering Angola near Oshikango, Ovamboland, about 32 miles (51.2 km) east at Eenhana, (–BD), *Rodin 2669* (K). 1716 (Eenhana): south of airstrip at Eenhana, (–AD), *Roux 151* (NBG); Amboland, Ombalambuenge, Ondonga, (–CA), *Rautanen 236* (BM, photo.! of holo. ex Z). 1719 (Rundu): Runtu, near Okavango River, Okavango Native Reserve, (–DD), *Maguire 1597* (NBG). 1721 (Mbambi): Kavango, 2 km W of Mbambi, (–CC), *Mueller & Giess 585* (K). 1723 (Singalamwe): Wes Caprivi, Olifantkamp, (–CD), *Pienaar & Vahrmeijer 483* (K). 1820 (Tarikora): Okavango Native Territory, 15 m (24 km) W of Nyangana on road to Runtu, (–BA), *De Winter & Marais 4589* (K). 1821 (Andara): Okavango Native Territory, 14.8 m (23.7 km) E of Nyangana Mission Station, (–AA), *De Winter & Marais 4778* (K); Okavango Native Territory, Andara Mission Station, (–AB), *De Winter 4242* (K); Grootfontein-Nord/Caprivizipfel, an der Pad von Andara nach Bagani, (–AB/BA), *Merxmueller & Giess 2002* (BM). 1918 (Grootfontein): Neitsas, Dünen, (–BC), *Dinter 668* (BM, fragment of syn.! of *C. myrtillifolium* Engl.); Neitsas, Dünen, *Dinter 7278* (BM, isosyn.!); Hereroland, Otjituuo Reserve 236, 4 km S of Otjituuo depot in Omatako Omuramba, (–DA), *D. Edwards 04398* (K). 2120 (Rietfontein): Hereroland, Epukiro Go 329 Reserve, 10 km S of Rooiboklaagte Omuramba along red line fence, (–AA), *D. Edwards 04416* (K).

BOTSWANA.—1821 (Andara): Ngamiland, 25 km NE of Tsodilo Hill, (–DA/DB), *Mueller & Biegel 2299* (K); northern base of second highest of Tsodilo Hills, *Mueller & Biegel* 2322 (K); slopes of Mount Female, Tsodilo Hills, Ngamiland, (–DB), *Banks 31* (PRE). 1822 (Kangara): near Samoqoma lediba, flowering material, (–CD), *P.A. Smith 2864* (K). 1823 (Siambisso): 'rhino thicket' near Xauna Pan, (–AA), *P.A. Smith 322* (K). 1920 (Tsumkwe): 38 km north of Aha Hills, (–DB), *Wild & Drummond 6986* (K). 2022 (Lake Ngami): 28 m (44.8 km) W of Mabele Pudi Hills, (–CD), *Blair Rains & Yalala 10* (K); Mabelepudi Hills, (–CD), *Story 5093* (K).

C. zeyheri

NORTH-WEST.—2527 (Rustenburg): 'Macalisberg', (–DA/DB), *Zeyher 552* (SAM, iso.!).

KWAZULU-NATAL.—2632 (Bela Vista): Ndumu Hill, Ndumu Game Reserve, (–CD), *Pooley 479* (NU); Mkonyane, Ndumu Game Reserve, *Pooley 676* (NH). 2732 (Ubombo): Ingwavuma Hills, (–AA), *Strey 8170* (NH); 4 m (6.4 km) south of Ingwavuma, *Ward 2048* (NH); Ingwavuma Dist., *Ward 3165* (NH); Ingwavuma, (–AC), *Ward 5661* (NH, UDW); Mkuze Game Reserve, African staff quarters area, (–CA), *Carr 187* (PRE, holo.! of *C. mkuzense* Carr & Retief); Mkuze Game Reserve, Msinga Sand Forest, *White 10388* (PRE); Mkuze Game Reserve, (–CA/CB), *Ward 3568* (PRE); east side of farm, 'Shotton 13810', (–CD), *Ward 8793* (PRE).

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TABLE 2.—A comparison of taxonomically important characters of *Combretum zeyheri* and *C. mkuzense*. Only personally observed characters have been used in table construction

	C. zeyheri	*C. mkuzense*
Inflorescence type	elongated spike	elongated spike
Upper hypanthium shape	campanulate	campanulate
Sepals	ciliate	ciliate
Petals:	non-ciliate	non-ciliate
shape	spathulate (not broadly)	spathulate (not broadly)
distal margin	rounded, pointed, toothed or truncated	rounded, pointed, toothed or truncated
Stigma	slightly expanded	slightly expanded
Disc outer hairs	dense	dense
Scales:		
diameter	60–80 µm	60–90 µm
no. of cells	± 15	± 16
no. of radial walls	± 9	± 10
no. of tangential walls	± 15	± 15–18
outline	smooth or slightly scalloped	smooth or slightly scalloped
Fruit:		
length	exceeding 35 mm	exceeding 35 mm
wing and body hair distribution	sparse	sparse

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