

# *Memecylon afroschismaticum* sp. nov. (Melastomataceae–Olisbeoideae) endemic to the East African Rift region of Rwanda, Burundi and western Tanzania

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**Background** – A new species of *Memecylon* (Melastomataceae–Olisbeoideae) from Rwanda, Burundi and western Tanzania is described in connection with preparing the family treatment for the *Flore d’Afrique centrale*.

**Methods** – Standard herbarium practices were applied.

**Key results** – *Memecylon afroschismaticum* R.D.Stone is described and illustrated. This new species is remarkable for being endemic to forests of the East African Rift region avoided by all but a few other species of African *Memecylon*. A close relationship with *M. flavovirens* Baker (type of *M. sect. Obtusifolia* Engl.) is suggested by its corolla being narrowly conical-acute in bud and anther connectives with dorsal oil-gland and acute posterior extremity. However, its elliptic-ovate and distinctly acuminate leaves resemble those of *M. myrianthum* Gilg (of *M. sect. Polyanthema* Engl.) and *M. verruculosum* Brenan (of *M. sect. Buxifolia* R.D.Stone). The known location in western Tanzania is formally protected within the Mahale Mountains National Park, but the subpopulations in Rwanda and Burundi are unprotected and presumably threatened by high human population density and subsistence agriculture. The estimated area of occupancy is also quite small (12 km<sup>2</sup>). *Memecylon afroschismaticum* is thus provisionally assessed as Endangered [EN B1ab(iii)+B2ab(iii)] in accordance with IUCN criteria.

**Keywords** – Burundi; East African Rift; Melastomataceae; *Memecylon afroschismaticum*; new species; plant taxonomy; Rwanda; Tanzania.

## INTRODUCTION

The genus *Memecylon* L. comprises > 350 species of shrubs or small to medium-sized trees (Renner et al. 2007 onwards), widely distributed in the palaeotropics and mainly occurring in the understorey of evergreen forest. In accordance with morphological and recent molecular findings (Jacques-Félix 1978; Bremer 1982; Stone 2006, 2014a; Stone & Andreasen 2010), it is now circumscribed to exclude the monospecific western and central African genus *Spathandra* Guill. &

Perr., the palaeotropical *Lijndenia* Zoll. & Moritzi, and the African/Madagascan *Warneckea* Gilg.

On the African continent, *Memecylon sensu stricto* currently holds 69 species including 17 recently described (Stone et al. 2006, 2008, 2017, 2019; Stone 2014b, 2015a, 2015b). This diversity is divided between the subgenus *Mouririoidea* (Jacq.-Fél.) R.D.Stone, a group with ovary 4-loculed and four species of western and central Africa, and subgenus *Memecylon* with ovary 1-loculed and 65 African species in 12 sections (Stone 2014a).

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Within subgenus *Memecylon*, the species-groups in eastern and southern Africa are only distantly related to those of the Guineo-Congolian region (*sensu* White 1983), suggesting an ancient split with limited opportunities for subsequent dispersal (Stone 2014a). The geographic disjunction between the East African and Guineo-Congolian groups coincides with an “arid corridor” extending from the Horn of Africa to Namibia (including the Kenyan and Tanzanian interior) and defined by rainfall less than 10 mm per month in at least three consecutive months (Werger 1978).

Until the present work, only two species of the Guineo-Congolian species-group were known to occur in East Africa. First, *M. myrianthum* Gilg (of sect. *Polyanthema* Engl.) is widely distributed in forests of the Congo Basin but also extends to Rwanda (*Troupin 16273*, BR) and near Lake Victoria in Tanzania and Uganda (Fernandes & Fernandes 1960; Wickens 1975; Maquet 1983). Second, *M. flavovirens* Baker (of sect. *Obtusifolia* Engl.) inhabits seasonally dry, fire-prone “miombo” woodlands in south-central Africa (Angola, Zambia, Democratic Republic of the Congo [Katanga], and Malawi) but has also been collected in Burundi (*Reekmans 2753*, BR, EA, MO), and its distribution extends to western Tanzania and northwestern Mozambique (Wickens 1975; Stone et al. 2017; Burrows et al. 2018).

In preparing the Melastomataceae treatment for the *Flore d’Afrique centrale* (Sosef 2016), a new species was encountered, occurring in Rwanda, Burundi and western Tanzania, which is here described as *Memecylon afroschismaticum* R.D.Stone. This species was previously confused with *M. myrianthum* and the East African *M. verruculosum* Brenan, but has been recognised informally in the *Flora of Tropical*

*East Africa* (as *Memecylon* sp. B; Wickens 1975: 90) and the *Flore du Rwanda* (as *Memecylon* sp. A; Maquet 1983: 525). It is not only rare, but also unique in the sense that it is endemic to the East African Rift region (Chorowicz 2005) avoided by other *Memecylon* species except the widespread *M. myrianthum* and *M. flavovirens* (fig. 1).

## MATERIAL AND METHODS

Herbarium material was studied in BM, BNRH, BR, CAS, DSM, E, EA, G, G-DC, K, L, LISC, LMA, LMU, M, MO, NU, NY, P, PRE, PRU, S, UC, UPS, WAG and YA. All cited specimens were seen, unless stated otherwise (“n.v.”). The extent of occurrence (EOO) and area of occupancy (AOO) were estimated using GeoCAT (Bachman et al. 2011), and the conservation status was assessed in accordance with the IUCN Red List Categories and Criteria (IUCN 2012, IUCN Standards and Petitions Subcommittee 2019).

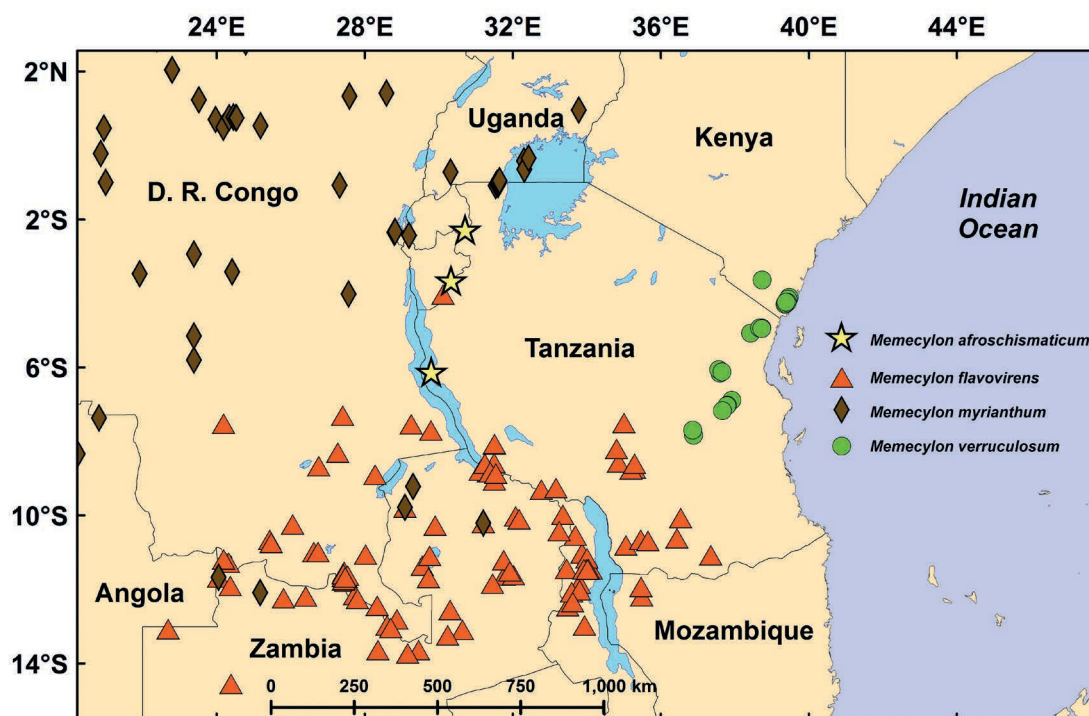
## RESULTS AND DISCUSSION

### *Memecylon afroschismaticum* R.D.Stone, *sp. nov.*

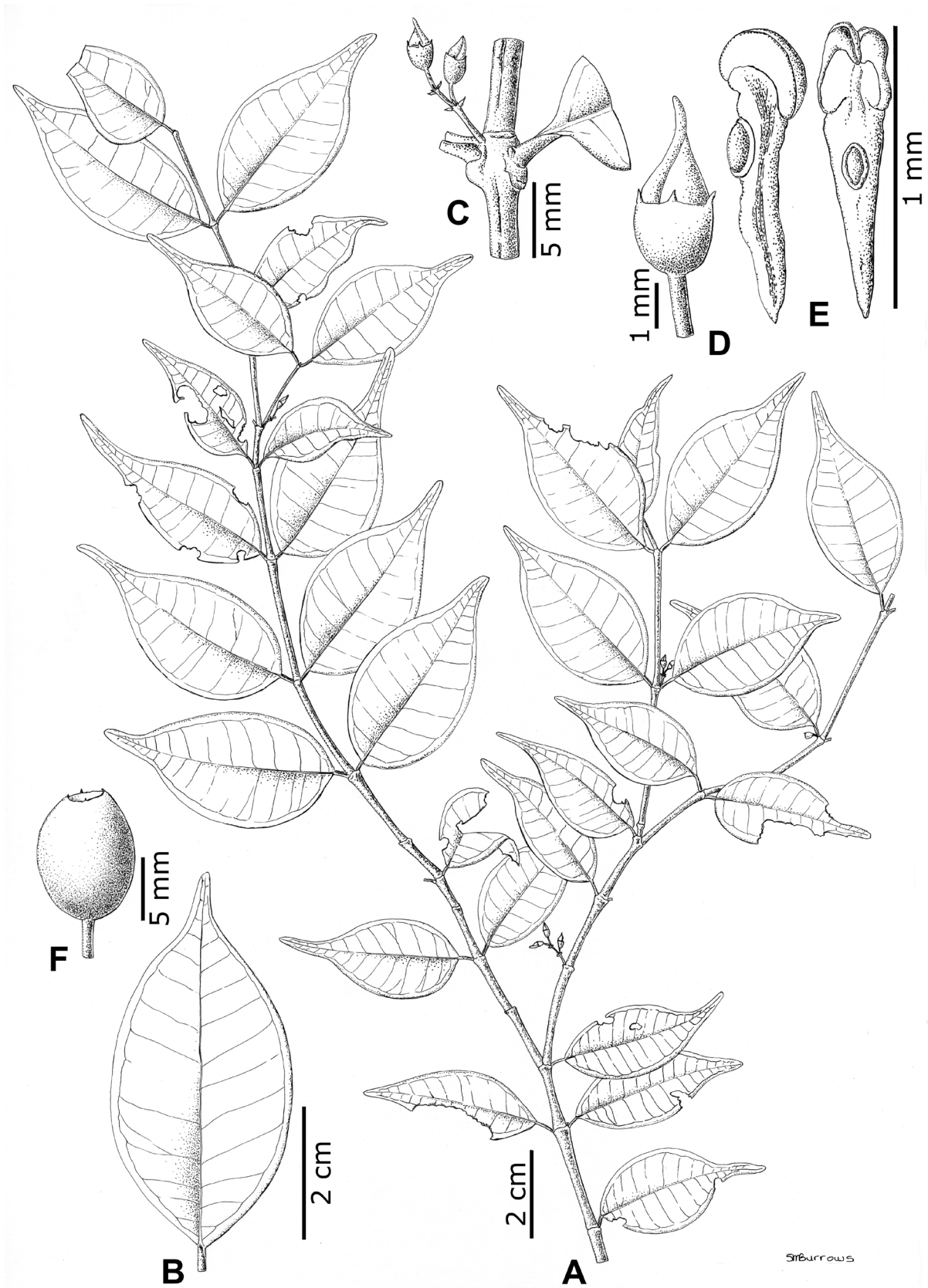
Fig. 2

**Type** – Rwanda, East Province, Kibungo Prefecture, Rusumo, downstream from the bridge, near the customs house, elev. 1350 m, gallery forest, 24 Jan 1980, *Runyinya 935* (holotype: K; isotypes: BR, EA).

**Description** – **Shrub** up to 4.5 m high with slender branches, the youngest branchlets bisulcate to quadrangular or narrowly



**Figure 1** – Geographic distribution of *Memecylon afroschismaticum* in comparison to that of *M. flavovirens*, *M. myrianthum* and *M. verruculosum*. Map created by the author using ArcGIS 10.4 software (ESRI 2016) and Natural Earth (2019) base.



**Figure 2** – *Memecylon afroschismaticum*. A. Flowering branch. B. Leaf. C. Section of branchlet showing axillary cyme. D. Floral bud. E. Anther dissected from floral bud, side view (left), top view (right). F. Fruit. A from *Bridson 287* (BR); B–E from *Runyinya 935* (K); F from *Harley 9597* (K). Drawn by Sandie Burrows.

quadrangular-alate; nodes scarcely thickened; internodes (1–)1.5–3(–5.3) cm long; bracts of “aphyllous” nodes narrowly triangular-acute, c. 2 mm long, soon deciduous. **Leaves** subcoriaceous, dark green and shining on the adaxial surface, paler and dull abaxially; petioles slender, 2–3.5(–4) mm long; blades elliptic to ovate, (3.1–)3.8–5.2(–5.9) cm long, (1.2–)1.6–2.5(–2.8) cm wide, base cuneate to rounded, apex distinctly acuminate with acumen (5–)8–11(–14) mm long, acute; midnerve impressed above, subprominent beneath; transverse veins scarcely visible, 6–7 pairs oriented at an oblique angle relative to the midnerve, faintly prominent on both surfaces in dried material, confluent with the equally weak intramarginal nerves. **Cymes** up to c. 1 cm long, subumbellate, (1–)3(–5)-flowered, solitary or geminate in the leaf axils or sometimes at the “aphyllous” (bracteate) nodes alternating with the normal, leafy nodes; peduncles (0.5–)1–3(–3.5) mm long; axis often extended by a short internode 0.5–1.5(–2) mm long above the peduncle; bracts narrowly triangular-acute, c. 1 mm long, rapidly deciduous; pedicels c. 1 mm long. **Flowers** mauve (in bud white tinted with violet); hypantho-calyx campanulate, 1.5 mm high × 1.5 mm wide, margin sinuate-dentate, teeth deltate-acute, with margins scarious; corolla twisted in bud, narrowly conical-acuminate, c. 2 mm high; anthers in bud c. 1 mm long, connective with thecae positioned at the anterior end, a conspicuous dorsal oil-gland, and posterior extremity narrowly conical-acute; open flowers not seen. **Fruits** ellipsoid, 7.5–9 mm long × 6–7.5 mm wide, reportedly blackish red when mature; top of ovary in fruit broadly rounded, projecting c. 0.5 mm past the appressed calyx margin, persistent calycinal crown absent; fruiting peduncles 2.5–3.5 mm long; fruiting pedicels 1.5–3 mm.

**Etymology** – The epithet *afroschismaticum* is a neuter adjective meaning “of the East African Rift region.”

**Distribution** – Southeastern Rwanda, east-central Burundi and extreme western Tanzania (fig. 1).

**Habitat** – Riverine gallery forest and montane forest at elevations of 1300–2250 m. Associated with *Drypetes gerrardii* Hutch. at the riverine location in Rwanda, and with miombo (*Brachystegia* Benth.) at the location in Burundi.

**Additional collections examined (paratypes)** – **Rwanda:** East Province, Kibungo Prefecture, Rusumo, falls of the Akagera [Kagera] river, elev. 1300 m, gallery forest, 24 Jan. 1980, *Bridson 287* (BR, EA, K, WAG).

**Burundi:** Kininya [= Kinyinya], Mosso, massif forestier fermé, 10 May 1952, *Michel & Reed 1941* (BR, COI n.v., YBI n.v.).

**Tanzania:** Kigoma Region, Kungwe-Mahali [Mahale] Peninsula, below Kungwe Mountain, c. 6°S, 30°E, elev. 2250 m, steep side of rocky ridge, dense forest, 11 Sep. 1959, *Harley 9597* (BR, K, S).

**Preliminary IUCN Red List assessment** – *Memecylon afroschismaticum* has an EOO of 1,296 km<sup>2</sup> and an estimated AOO of 12 km<sup>2</sup> (assuming a 4 km<sup>2</sup> grid cell size). Of the three known localities, only the one in western Tanzania is formally protected within the Mahale Mountains National Park. The subpopulations in Rwanda and Burundi are evidently unprotected and also threatened by the high human population density and intensity of agricultural conversion

in these two countries (Vedder 1992; Ntore et al. 2018). At the location near Kinyinya in eastern Burundi, the species was noted as “very abundant” in 1952, but recent satellite imagery (Google Earth Pro 2019) shows a patchwork of residences and smallholder farms with no sign of the closed forest described by the collectors. The Burundian subpopulation thus might be already extirpated. At the location near Rusumo in southeastern Rwanda, relatively intact vegetation can be seen along the banks of the Akagera River (Google Earth Pro 2019), and the species is presumed extant at this locality. The limited EOO and AOO of *M. afroschismaticum*, together with the above-described threats, would seem to indicate a status of Endangered [EN B1ab(iii)+B2ab(iii)] for this species.

**Diagnostic characters and similar species** – A morphological comparison between *M. afroschismaticum*, *M. flavovirens*, *M. myrianthum* and *M. verruculosum* is presented in table 1. Of *M. afroschismaticum*, the narrowly conical-acuminate floral buds and anther connectives with conspicuous dorsal oil-gland and acute posterior extremity suggest a close relationship with *M. flavovirens* (type of *M. sect. *Obtusifolia**). However, the leaves of these two species are quite different (elliptic-ovate and acuminate in *M. afroschismaticum* vs. ± obovate and apically rounded, truncate or emarginate in *M. flavovirens*). They also differ in their inflorescence position (axillary or at intervening “aphyllous” nodes vs. mainly on recently defoliated nodes of upper branchlets), pedicel length (c. 1 mm vs. 2–6 mm) and petal colour (mauve vs. white). The fruits of *M. flavovirens* are variable (ellipsoid to ovoid or depressed-globose, 12–14 × 8–15 mm with persistent calycinal crown present or absent), but they are consistently larger and often differently shaped in comparison to those of *M. afroschismaticum* (fruits ellipsoid, 7.5–9 × 6–7.5 mm and lacking a calycinal crown).

The leaves of *M. afroschismaticum* resemble those of *M. myrianthum* in section *Polyanthema* as well as *M. verruculosum* in section *Buxifolia* R.D.Stone. The sterile collection *Michel & Reed 1941*, cited here as a paratype of *M. afroschismaticum*, was previously determined as *M. myrianthum* (Fernandes & Fernandes 1960: 85), and the paratype *Harley 9597* was initially identified as *M. verruculosum*. However, the new species differs from *M. myrianthum* in several characters including the number of flowers per inflorescence (inflorescence subumbellate and mostly 3-flowered in *M. afroschismaticum* vs. inflorescence branched 2–4 times and many-flowered in *M. myrianthum*), peduncle length (mostly 1–3 mm vs. 5–25 mm), pedicel length (c. 1 mm vs. 2–7 mm), petal colour (mauve vs. white), and fruit shape (ellipsoid with top of ovary projecting 0.5 mm past the appressed calyx margin vs. globose with calycinal crown distinct). It differs from *M. verruculosum* in petiole length (mostly 2–3.5 mm vs. leaves sessile or petioles up to 1.5 mm), number of flowers per inflorescence (mostly 3 vs. 1), shape of corolla in bud (narrowly conical-acuminate vs. rounded-apiculate), pedicel length (c. 1 mm vs. 0.1–0.5 mm), petal colour (mauve vs. white), and fruit shape (ellipsoid with top of ovary projecting 0.5 mm past the appressed calyx margin vs. globose with calycinal crown distinct). In addition, *M. afroschismaticum* is found only in the region of the East African Rift and is wholly allopatric from *M. verruculosum* (of the

**Table 1 – Morphological comparison between *Memecylon afroschismaticum* and other African *Memecylon* species (including its presumed closest relative *M. flavovirens* as well as two others, *M. myrianthum* and *M. verruculosum*, with which it has been previously confused).**

Note: the geographic distribution of each species is plotted in fig. 1.

| Character                  | <i>M. afroschismaticum</i>  | <i>M. flavovirens</i>   | <i>M. myrianthum</i>   | <i>M. verruculosum</i>  |
|----------------------------|---|---|--|---|
| Habit                      | shrub to 4.5 m  | shrub or much-branched tree to 7.5 m  | shrub or tree 2–12(–22) m  | shrub to 3 m  |
| Bark                       | unknown   | thick, deeply longitudinally fissured   | thin, finely longitudinally fissured                                 | thin  |
| Young branchlets           | bisulcate to quadrangular or narrowly quadrangular-alate  | quadrangular  | terete to subquadrangular  | quadrangular  |
| Leaf shape                 | elliptic to ovate   | obovate (rarely obovate-oblong to elliptic or narrowly elliptic)                            | elliptic   | ovate   |
| Leaf dimensions            | mostly 3.8–5.2 × 1.6–2.5 cm   | mostly 2.5–8.5 × 1–5.5 cm   | 3.5–12 × 2.5–6 cm  | 2–3.8 × 0.8–2 cm (to 5 × 3 cm in large-leaved form in Eastern Arc Mts of Tanzania)            |
| Leaf base                  | cuneate to rounded  | cuneate   | cuneate  | rounded to subcuneate   |
| Leaf apex                  | acuminate   | rounded, truncate or emarginate   | acuminate  | acuminate   |
| Petiole length             | 2–3.5(–4) mm  | ± absent (leaves subsessile) or to 2 (–4) mm  | 2–5(–7) mm   | ± absent (leaves subsessile) or to 1.5 mm   |
| Inflorescence position     | axillary or sometimes at the “aphyllous” (bracteate) nodes alternating with those bearing normal leaves | mainly on the recently defoliated nodes of upper branchlets                                 | at both leafy and defoliated nodes                                   | axillary or at the “aphyllous” (bracteate) nodes alternating with those bearing normal leaves |
| No. of flowers per infl.   | (1–)3(–5)   | 3(–5)   | many (infls. branched branched 2–4×)                                 | 1   |
| Peduncle length (mm)       | mostly 1–3 mm   | ± absent (infls. subsessile) or to 3(–8) mm   | 5–25 mm  | 1–4 mm  |
| Shape of corolla in bud    | narrowly conical-acuminate  | narrowly conical-acuminate  | conical-acute  | rounded-apiculate   |
| Pedicel length             | c. 1 mm   | 2–6 mm  | 2–7 mm   | 0.1–0.5 mm  |
| Petal colour               | mauve   | white   | white  | white   |
| Anthers                    | colour unknown, dorsal gland conspicuous, posterior extremity narrowly conical-acute                    | deep purple in colour, dorsal gland conspicuous, posterior extremity narrowly conical-acute | bright blue in colour, dorsal gland present, posterior conical-acute | white in colour, dorsal gland present, posterior extremity obtuse                             |
| Fruit shape                | ellipsoid   | ellipsoid to ovoid or depressed-globose   | globose  | globose   |
| Fruit size                 | 7.5–9 × 6–7.5 mm  | 12–14 × 8–15 mm   | diam. 6–8 mm   | diam. 5–6 mm  |
| Persistent calycinal crown | absent, top of ovary projecting 0.5 mm past the appressed calyx margin                                  | variably present or absent  | present  | present   |

Shimba Hills and vicinity in southeastern Kenya with relatively large-leaved forms occurring in the Eastern Arc Mts of Tanzania; see fig. 1).

The sharply acuminate leaves of *M. afroschismaticum* also resemble those of an as-yet undetermined *Memecylon* from the Ituri forest in northeastern D.R. Congo (represented by the sterile collection *Bytebier et al.* 3281, BR, EA). This collection has been misidentified as *M. nodosum* (Engl.) Gilg ex Engl. or *M. accedens* R.D.Stone, Ghogue & Cheek (both of *M. sect. Afzeliana* Jacq.-Fél.), but in my nrETS and ITS analyses it was resolved as sister to *M. flavovirens* (Stone 2014a). In view of these morphological and molecular findings, *M. afroschismaticum* is provisionally placed near to *M. flavovirens* in section *Obtusifolia*. Possibly also belonging to this section is *M. poggei* Gilg, a poorly known Congolian species with type material (*Pogge 1066*) kept in B and evidently destroyed during WWII.

Further evaluation of the affinities of *M. afroschismaticum* must await additional collections, especially of DNA samples and material with open flowers. As of this writing, the Burundian collection is sterile, the Tanzanian material has only fruits, and the two collections from Rwanda have only floral buds in a fairly early stage of development.

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