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Revised treatment of Memecylon section Buxifolia (Melastomataceae) in Madagascar

Robert Douglas Stone

Abstract

STONE, R.D. (2022). Revised treatment of Memecylon section Buxifolia (Melastomataceae) in Madagascar. *Candollea* 77: 173–191. In English, English and French abstracts. DOI: http://dx.doi.org/10.15553/c2022v772a5

Memecylon sect. *Buxifolia* R.D. Stone (*Melastomataceae*, *Olisbeoideae*) is a group of forest shrubs and small understory trees distributed from tropical East Africa (Kenya and Tanzania) to eastern South Africa and with a disjunct occurrence in western and northern Madagascar. In a previous treatment, three endemic Malagasy species of this section were recognized: *M. amplifolium* R.D. Stone, *M. buxifolium* Blume (= *M. perrieri* Danguy), and *M. multinode* Jacq.-Fél. The present work describes and illustrates six new species from Madagascar belonging to this section: *M. ambilobense* R.D. Stone, *M. angustatum* R.D. Stone, *M. leptophyllum* R.D. Stone, *M. minutifolium* R.D. Stone, *M. oblanceolatum* R.D. Stone, and *M. reductum* R.D. Stone. With these revisions, the flora of Madagascar now holds nine species of *Memecylon* sect. *Buxifolia*, for which a formal taxonomic treatment is provided including a dichotomous key. The conservation status of each species is provisionally assessed in accordance with the IUCN Red List Categories and Criteria.

Résumé

STONE, R.D. (2022). Traitement révisé de Memecylon section Buxifolia (Melastomataceae) à Madagascar. *Candollea* 77: 173–191. En anglais, résumés anglais et français. DOI: http://dx.doi.org/10.15553/c2022v772a5

Memecylon sect. *Buxifolia* R.D. Stone (*Melastomataceae*, *Olisbeoideae*) est un groupe d'arbustes et de petits arbres forestiers distribué de l'Afrique de l'Est tropicale (Kenya et Tanzanie) à l'Est de l'Afrique du Sud avec une occurrence disjointe dans l'ouest et le nord de Madagascar. Dans un traitement précédent, trois espèces de cette section étaient reconnues endémiques de Madagascar: *M. amplifolium* R.D. Stone, *M. buxifolium* Blume (= *M. perrieri* Danguy) et *M. multinode* Jacq.-Fél. Dans ce travail, six nouvelles espèces malgaches appartenant à cette section sont décrites et illustrées: *M. ambilobense* R.D. Stone, *M. angustatum* R.D. Stone, *M. leptophyllum* R.D. Stone, *M. minutifolium* R.D. Stone, *M. oblanceolatum* R.D. Stone et *M. reductum* R.D. Stone. Avec ces révisions, la flore de Madagascar comprend actuellement neuf espèces dans *Memecylon* sect. *Buxifolia*. Nous en proposons un traitement taxonomique, avec une clef d'identification. Pour chaque espèce, le statut de conservation est évalué selon les Catégories et Critères de la Liste rouge de l'UICN.

Keywords

MELASTOMATACEAE – *Memecylon* – Madagascar – New species – Plant conservation – Plant taxonomy

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Introduction

The genus *Memecylon* L. comprises > 350 species of shrubs or small to medium-sized trees (Renner et al., 2022) and has a wide distribution in the Old World tropics, mainly in the understory of evergreen humid forest. It is now circumscribed to exclude the monospecific western and central African genus *Spathandra* Guill. & Perr., the paleotropical *Lijndenia* Zoll. & Moritzi, and the African-Malagasy *Warneckea* Gilg, in accordance with morphological and molecular findings (Jacques-Félix, 1978; Bremer, 1982; Stone, 2006a, 2014; Stone & Andreasen, 2010; Stone, 2022a). The members of *Memecylon* s.s. are characterized by a combination of very hard wood; leaves opposite, estipulate, and apparently 1-nerved (less often "subtrinerved" sensu Jacques-Félix et al., 1978; Jacques-Félix, 1983, 1985a); a general lack of indumentum; flowers small and 4-merous; anther connectives enlarged and with a dorsal oil-gland (or with gland reduced or absent in some species or species-groups); and fruits baccate with 1-few large seeds and embryo foliaceous and convoluted.

On the island of Madagascar, *Memecylon* currently holds 112 species plus many others still to be described (Jacques-Félix, 1985a, 1985b; Stone, 2006b, 2020, 2022b; R.D. Stone, unpubl. data). Recent molecular and biogeographic studies (Stone, 2014; Amarasinghe et al., 2021a) have revealed that this remarkable diversity is the result of two independent colonizations of Madagascar from the African continent, the first of these originating in the Oligocene and leading to the radiation of the species-rich "eastern rainforest" clade. The second colonization evidently took place during the Miocene, involving a smaller species-group known as *Memecylon* sect. *Buxifolia* R.D. Stone. This section (currently with 23 species) has an overall range encompassing East Africa (Kenya and Tanzania) westwards to Malawi (Mt. Mulanje), southwards to Mozambique and eastern South Africa and disjunctly in the dry forests of western and northern Madagascar (Stone, 2014; Stone et al., 2017a, 2017b, 2019; Amarasinghe et al., 2021b). Members of *Memecylon* sect. *Buxifolia* are diagnosed by the combination of nodes "aphyllous" (i.e. branchlets usually with successive nodes alternating between normal leaves and reduced, often inflorescence-bearing bracts), leaves drying brownish, corolla white and rounded to apiculate in bud, petals broadly elliptic to broadly ovate or suborbicular, and anther connectives bearing a dorsal oil-gland.

Here I describe six new species of *Memecylon* sect. *Buxifolia* from Madagascar, based on recent collections and comparative studies of herbarium material. Field work and collecting were done in January to February 2007 and 2008. Except for the widely distributed *M. buxifolium* Blume, the species in this group are all localized endemics of the extreme north (DIANA and SAVA regions), an area representing the transition between western dry forests and eastern rainforests characterized by steep environmental gradients superimposed on high topographic and substrate diversity (Nusbaumer et al., 2010, Nusbaumer, 2011). The members of *Memecylon* sect. *Buxifolia* in Madagascar are ± invariant in their floral and fruit morphology as well as their inflorescence position, meaning that the species are delimited by a combination of vegetative characters (young branchlets quadrangular vs. terete, internode length, "aphyllous" nodes present vs. absent, and leaf texture, size, and shape; see Table 1). In several cases, members of this species-group are known to co-occur without any morphological intermediates, indicating that the variation between morphotypes must have a genetic basis (not due to phenotypic plasticity).

With this revision, the flora of Madagascar now holds nine endemic species of *Memecylon* sect. *Buxifolia* for which I provide a formal taxonomic treatment including a dichotomous key. The conservation status of each species is provisionally assessed according to the IUCN Red List Categories and Criteria (IUCN, 2012), with the Extent of Occurrence (EOO) and Area of Occupancy (AOO) estimated using GeoCAT (2022) assuming a 4 km² grid-cell size. All specimens cited have been seen by me.

Key to the species of Memecylon sect. Buxifolia in Madagascar

1. Internodes between normal leaves generally 1–3(–8) cm long; "aphyllous" nodes generally present and alternating with the leafy nodes; leaves generally at least 2 × 1 cm ... 2
1a. Internodes 0.2–1.5 cm long; most or all nodes bearing normal leaves ("aphyllous" nodes completely lacking or nearly so); leaves < 2 × 1 cm ... 7
2. Leaves generally < 2 cm wide ... 3
2a. Leaves generally > 2 cm wide ... 5
3. Leaves narrowly elliptic or oblanceolate, (3.2–)4–5.2 × 0.5–0.9(–1.2) cm, 4.5–7 times longer than broad ... 5. ***M. leptophyllum***
3a. Leaves elliptic to elliptic-lanceolate or oblanceolate, mostly 2.5–4 × 1–1.7 cm, 2–3 times longer than broad ... 4
4. Leaves subcoriaceous, generally broadest above the middle, base ± angustate ... 3. ***M. angustatum***
4a. Leaves coriaceous, generally broadest at the middle or below, base cuneate ... 4. ***M. buxifolium***
5. Young branchlets terete; leaves obovate to broadly elliptic, mostly 5.5–6.5 × 2.5–3.3 cm ... 2. ***M. amplifolium***
5a. Young branchlets quadrangular; leaves ± oblanceolate or if broadly elliptic then less than 4.5 cm long ... 6
6. Leaves broadly elliptic to suborbicular, (3.2–)3.8–4.2 × 2.3–2.9(–3.2) cm, base ± rounded ... 1. ***M. ambilobense***
6a. Leaves ± oblanceolate, (4.4–)5.2–7.4(–8.9) × 1.8–2.8(–3.5) cm, base attenuate ... 8. ***M. oblanceolatum***

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7. Leaves broadly elliptic to suborbicular, apex vaguely obtuse-acuminate ..... 9. ***M. reductum***
7a. Leaves narrowly elliptic to elliptic-lanceolate, apex acute-cuspidate 8
8. Leaves 0.5–0.7 × 0.2–0.25(–0.3) cm .... 6. ***M. minutifolium***
8a. Leaves 1.6–1.8(–1.9) × 0.6–0.7 cm ..... 7. ***M. multinode***

Taxonomy

Memecylon sect. ***Buxifolia*** R.D. Stone in Taxon 63: 557. 2014.

Typus: *Memecylon buxifolium* Blume

Shrubs or small *trees*, evergreen, 1–8 m high (rarely to 17 m); branchlets with successive nodes alternating between normal leaves and reduced, often inflorescence-bearing bracts (this feature absent in some Malagasy species with short internodes); young branchlets rounded to quadrangular or narrowly quadrangular-alate. *Leaves* subcoriaceous to coriaceous, subsessile or petiolate, drying brownish, apparently 1-nerved or ± conspicuously 3-nerved from the base, transverse veins obscure. *Cymules* 1–2 cm long, 1–3(–9)-flowered, solitary or geminate in the leaf axils, at the intervening bracteate nodes, or at the recently defoliated nodes below the leaves. *Flowers* with corolla white, in bud with apex rounded to apiculate or subacute; petals broadly elliptic to broadly ovate or suborbicular; anthers versatile, yellow (white in some South African species), dorsal oil-gland present on anther connectives. *Fruits* varying from distinctly ellipsoid to ± globose.

1. ***Memecylon ambilobense*** R.D. Stone, **sp. nov.** (Fig. 1).

Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: 5 km SE of Ambilobe, E of road to Daraina (RN nº 5A), 13°12'00"S 49°04'45"E, 50 m, 11.II.2007, imm. fr., *Stone et al. 2637* (CAS-1104650!; iso-: CAS-1104649!, G [G00416979]!, K!, MO-6150699!, P [P05320680]!, TAN!).

Affine Memecyloni buxifolio Blume et M. amplifolio R.D. Stone, sed a primo laminis foliaribus latioribus (plerumque 3.8–4.2 × 2.3–2.9 cm non 2.5–4 × 1–1.6 cm) late ellipticis vel suborbicularis (nec ellipticis nec elliptico-lanceolatis) ad basin rotundatis (non cuneatis) ad apice rotundatis vel obscure acuminatis (non acutis); a secundo ramulis juvenilibus quadrangularibus (non teretibus), laminis foliaribus brevioribus (plerumque 3.8–4.2 × 2.3–2.9 cm non 5.5–6.5 cm × 2.2–2.9 cm) differt.

Shrubs c. 2 m high; branchlets slender, quadrangular when young, becoming terete with age; successive nodes alternately bearing normal leaves and floral bracts (these rapidly deciduous and not seen); internodes between normal leaves (1–)1.3–2.9(–4.6) cm long. *Leaves* coriaceous, dark green and shining on the upper surface, paler and dull on the lower, minutely rugose to granular on both surfaces when dry; petioles c. 2 mm long; blades broadly elliptic to suborbicular, (3.2–)3.8–4.2 × 2.3–2.9(–3.2) cm, base rounded then shortly cuneate above the petiole, apex rounded to vaguely acuminate and obtuse-apiculate; only the midnerve clearly visible, finely impressed on the upper surface, somewhat prominent on the lower especially toward the base; one pair of lateral nerves faintly visible on both surfaces, the course curvilinear and 2–4 mm from the margin in the basal half of the blade; transverse veins ± obscure. *Cymules* c. 1 cm long, borne in the leaf axils and at the intervening "aphyllous" nodes; peduncles mostly 1–3 mm long; secondary axes 1–3(–4) mm long; bracts deciduous. *Flowers* on pedicels c. 1 mm long or less; hypantho-calyx campanulate, 2 × 3 mm, margin shallowly sinuate-dentate (teeth broad and rounded); corolla in bud 1.5 mm high, apex rounded-apiculate; petals very broadly ovate to ± rhombic, 1.5 × 2 mm wide, base truncate (claw absent), apex rounded-apiculate; staminal filaments 3–4 mm long; anthers 1–1.2 mm long, connective dorsally incurved around the median, elliptic gland; thecae positioned at the anterior end, posterior extremity obtuse; style 6 mm long, filiform. *Fruits* ellipsoid, 9–11 × 5–6 mm, borne on pedicels c. 1 mm long; calycinal crown spreading, 1 mm long, margin sinuate; epigynous chamber with partitions joined in pairs beneath the petal scars, each pair then joined to the center by a line.

Etymology. – The epithet *ambilobense* refers to the town of Ambilobe (DIANA region) near the type locality.

Distribution and ecology. – Northern Madagascar (DIANA region), restricted to Ambohipiraka mountain, an inselberg located c. 3–6 km east and northeast of Ambilobe and north and east of Route Nationale nº 5A from Ambilobe to Vohémar. Habitat in scrub forest on calcareous rocky slope, at elevations of 50–75 m.

Conservation status. – *Memecylon ambilobense* is known from two locations with an estimated EOO of 0.241 km² and AOO of 8 km². These locations are both unprotected, although the location at Ankariera is c. 3 km from the southern boundary of the Paysage Harmonieux Protégé d'Andrafiamena Andavakoera, based on the GPS coordinates provided by the collector (*Rabarijaona et al. 315*, K). Ongoing anthropogenic pressures in this area include slash-and-burn agriculture (especially around mineral exploitation sites), destruction of forested habitat related to illegal gold mining and sapphire extraction, uncontrolled fires, exploitation of hardwoods, and collection of non-woody forest products (Goodman et al., 2018). The type locality at Ambohipiraka is also close to the town of Ambilobe, adjacent to the Route Nationale nº 5A, and

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possibly threatened by active limestone quarrying that is taking place close by (R.D. Stone, pers. obs.). Based on its few known locations, limited EOO and AOO, and the apparent threats, *M. ambilobense* is provisionally assessed as "Endangered" [EN B1ab(iii)+B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – Morphological and molecular analyses (Stone et al., 2017a) clearly place *Memecylon ambilobense* in *Memecylon* sect. *Buxifolia*. It differs from the other Malagasy members of this section by its broadly elliptic to suborbicular leaves < 4.5 cm long and > 2 cm wide. At the type locality, it co-occurs with *M. buxifolium*, but that species has smaller and narrower leaves, and there is no morphological evidence of intergradation between the two. Among the additional material (paratypes) of *M. ambilobense* cited below, there is one collection (*Perrier de la Bâthie 18761*, P) that was previously identified as *M. amplifolium* R.D. Stone (Stone, 2006b). However, *M. amplifolium* differs from *M. ambilobense* in having longer leaves and young branchlets terete (not quadrangular).

Additional specimens examined. – **Madagascar. Reg. DIANA [Prov. Antsiranana]:** Ambohipiraka, X.1932, fr., *Perrier de la Bâthie 18761* (P); Iharana (Vohémar), Ambilobe, Ankariera, 13°11'59"S 49°04'40"E, 63 m, 13.IX.2013, fr., *Rabarijaona et al. 315* (K); à 3 km E d'Ambilobe, 13°11'57"S 49°04'44"E, 72 m, 23.I.2007, fl., *Rakotonandrasana et al. 1070* (CAS, MO).

2. ***Memecylon amplifolium*** R.D. Stone in Adansonia, sér. 3, 28: 350. 2006.

   Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: camp 2 km before Anjahakely, 12°53'43"S 49°18'27"E, c. 550 m, 27.V.1997, fr., *Andrianantoanina & Bezara 1065* (CAS-973439!; iso-: G [G00424853]!, K [K000880895]!, MO-6260009!, P [P00257993]!, TAN!).

Shrubs or small *trees* to 5 m high; young branchlets terete (not quadrangular), thickened at the nodes; successive nodes alternately bearing normal leaves and floral bracts (these rapidly deciduous and not seen); internodes between normal leaves (2.1–)2.6–3.6(–4.1) cm long. *Leaves* coriaceous, dark green and shining on the upper surface, paler and dull on the lower, drying brownish and rugose on both surfaces; petiole distinct but very short, robust, flattened on the adaxial side; blades obovate to broadly elliptic, 5.5–6.5(–7) × (2.1–)2.5–3.3(–3.9) cm, cuneate at base, broadly short-acuminate and acute at apex (the acumen up to 5 mm long); midnerve impressed on the upper surface, ± prominent on the lower (especially toward the base); one pair of lateral nerves faintly visible on both surfaces, the course curvilinear and 3.5–5 mm from the margin in the basal half of the blade; transverse veins ± obscure. *Cymules* c. 1 cm long, generally solitary at the nodes below the current leaves or the "aphyllous" nodes alternating with those bearing normal leaves; peduncles 1–3 mm long, secondary axes 1–3(–4) mm long; bracts deciduous. *Flowers* not seen. *Fruits* ellipsoid, 7–9 × 5.5–6 mm in diam., on pedicels 1.5–2 mm long; calycinal crown spreading, 1 mm long, the margin thin and 4-emarginate between the ± truncate lobes.

Distribution and ecology. – Northern Madagascar (DIANA region), evidently restricted to the Ankarana plateau and the Andrafiamena mountain chain. Habitat in dry, semi-deciduous forest (always on limestone?), at elevations c. 230–550 m.

Conservation status. – *Memecylon amplifolium* is known from two locations with an estimated AOO of 8 km². The type locality near Anjahakely is in the northern part of the Paysage Harmonieux Protégé d'Andrafiamena Andavakoera (73,710 ha) currently managed by Association Fanamby. However, between the years 1996 and 2016, this area sustained a major loss of 4,865 ha (28%) of total forest cover (Goodman et al., 2018), and *M. amplifolium* could not be found during field-work there in February 2008, suggesting that the species may be locally extirpated (R.D. Stone, pers. obs.). Ongoing anthropogenic pressures include slash-and-burn agriculture (especially around mineral exploitation sites), destruction of forested habitat related to illegal gold mining and sapphire extraction, uncontrolled fires, exploitation of hardwoods, and collection of non-woody forest products (Goodman et al., 2018). The second locality near Ambondromifehy has low precision but may be in the Réserve Spéciale d'Ankarana. Based on its few known locations, limited AOO and the apparent threats, *M. amplifolium* is provisionally assessed as "Endangered" [EN A2(c)+B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012). The possibility exists that this species is already extinct, although there are some recent examples of so-called "forest phantoms" being rediscovered after not being seen for many years (Schatz et al., 1998; Stone, 2012).

Notes. – The leaves of *Memecylon amplifolium* are distinctly larger than those of *M. buxifolium* (= *M. perrieri* Danguy); also characteristic are its terete young branchlets (vs. quadrangular). At the locality near Ambondromifehy, it has been found growing together with *M. buxifolium* (based on *Service Forestier 24558* and *24729*). Another collection, *Perrier de la Bâthie 18761* from Ambohipiraka mountain, was originally placed in *M. amplifolium* (Stone, 2006b) but corresponds to *M. ambilobense* (see above).

Additional specimen examined. – **Madagascar. Reg. DIANA [Prov. Antsiranana]:** calcaires lapiazés de l'Ankarana, près d'Ambondromifehy, 28.IV.1966, *Service Forestier 24729* (P, TEF).

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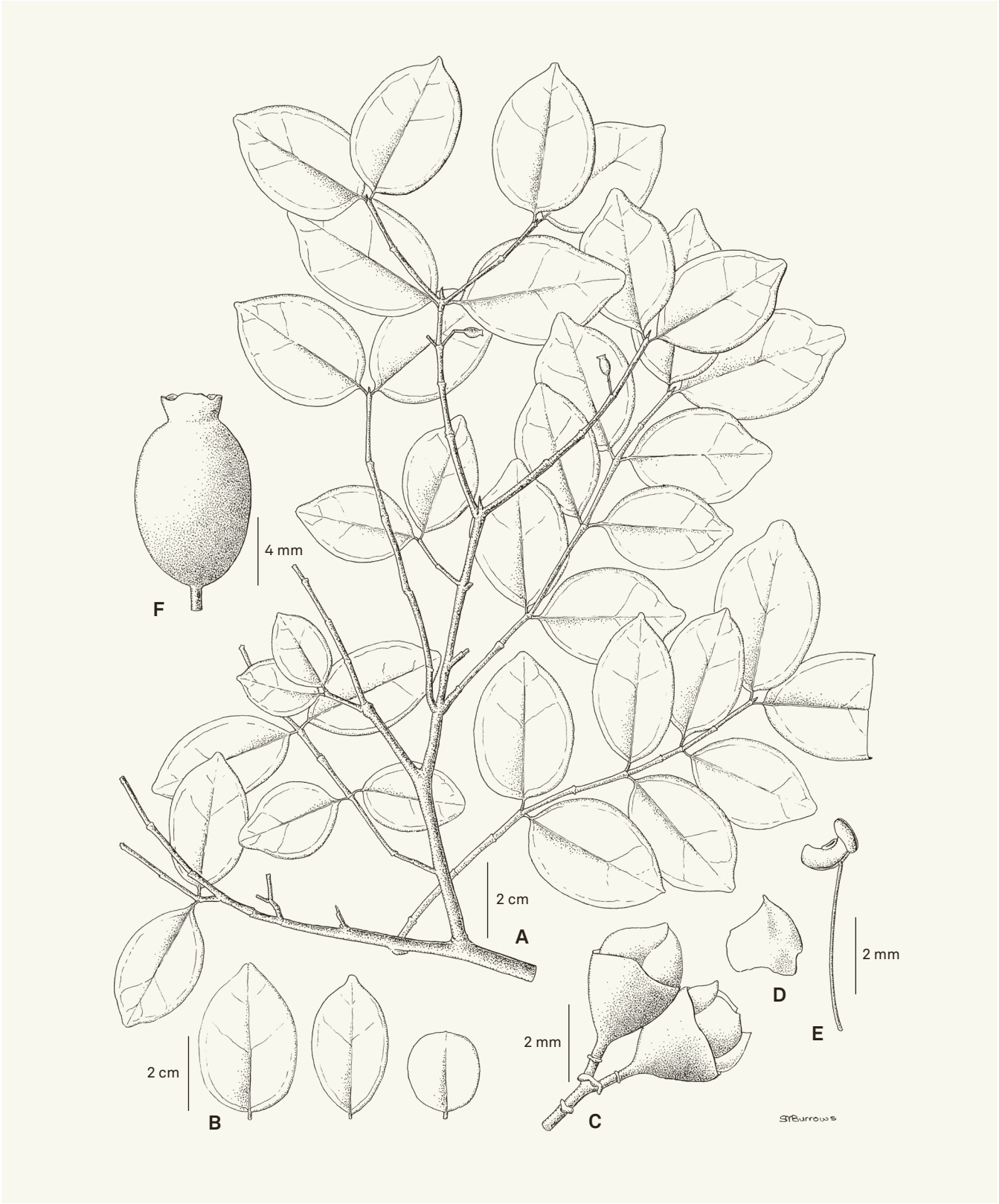

Fig. 1. – *Memecylon ambilobense* R.D. Stone. **A.** Fruiting branch; **B.** Leaves; **C.** Inflorescence and floral buds; **D.** Petal; **E.** Stamen; **F.** Fruit. [**A, B:** *Stone et al. 2637*, CAS; **C–E:** *Rakotonandrasana et al. 1070*, MO; **F:** *Perrier 18761*, P] [Drawing: S. Burrows]

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3. ***Memecylon angustatum*** R.D. Stone, **sp. nov.** (Fig. 2).

Holotypus: Madagascar. Reg. SAVA [Prov. Antsiranana]: Vohémar, Nosy be, Anjiabe, forêt d'Analabe, 13°04'14"S 49°53'40"E, 26.II.2003, fl., *Rabevohitra et al. 4549* (P [P00516001]!; iso-: CAS-1065497!, G [G00074547]!, MO-4856428!, TEF!).

Affine Memecyloni buxifolio Blume, sed ab eo laminis foliaribus tenuioribus subcoriaceisque plerumque latissimis supra medium (non in medio vel infra) basi plusminusve angustatis supra petiolum indistinctum (non basi cuneatis petiolis distinctis) differt.

Shrubs or small *trees* 1.5–5 m high; branchlets slender, quadrangular when young, becoming terete with age; successive nodes alternately bearing normal leaves and floral bracts (these rapidly deciduous and not seen); internodes between normal leaves (0.6–)0.9–1.8(–2.8) cm long. *Leaves* thinly coriaceous, bright green and shining on the upper surface, paler and dull on the lower, minutely granular-roughened on both surfaces when dry; blades elliptic to oblanceolate, mostly 2.7–3.8 × 1–1.7 cm, ± angustate at base and confluent with the petiole 1.5–3 mm long, generally cuneate-apiculate at apex but sometimes broadly and vaguely acuminate; only the midnerve clearly visible, finely to deeply impressed on the upper surface, ± prominent on the lower surface (especially toward the base); margins ± revolute. *Cymules* up to 1 cm long, 1–3(–5)-flowered, solitary in the leaf axils, at the intervening "aphyllous" nodes and also at the uppermost leafless nodes; peduncles 1–4(–4.8) mm long; additional axes 1–2.5 mm long; bracts narrowly triangular-acuminate, 1 mm long, cucullate, keeled on the back, soon deciduous. *Flowers* borne individually at the end of the inflorescence axes, on pedicels 0.5–1.5(–2) mm long; hypantho-calyx green, obconic to campanulate, 1.75–2 × 2.75 mm, margin shallowly sinuate-dentate, lobes broadly rounded, scarious-margined; corolla rounded in bud; petals white, suborbicular, 2 × 2 mm, base truncate-subauriculate above the claw 0.5 × 0.5 mm, apex rounded and apiculate; stamens yellow, on filaments 4 mm long; anthers dolabriform, 1–1.25 mm long, the connective strongly incurved by the dorsal oil-gland, thecae positioned at the anterior end, posterior extremity obtuse; style 5 mm long. *Fruits* ellipsoid, 7–10(–12) × 5–7.5 mm; persistent calycinal crown c. 1 mm high.

Etymology. – The epithet *angustatum* is an adjective meaning "narrowed", in reference to the shape of the lower part of the leaf blades.

Distribution and ecology. – Northeastern coast of Madagascar (SAVA region), near the village of Anjiabe and lac Sahaka c. 34 km N of Vohémar. Habitat in littoral forest on sand, at elevation c. 25 m.

Conservation status. – *Memecylon angustatum* is known from a single location with an estimated EOO of < 2 km² and an AOO of 8 km². As far as it is known, the entire population resides within the 3,000 ha Lake Sahaka-Analabe new protected area (NPA) and extension (BirdLife International, 2021), which is a part of the Paysage Harmonieux Protégé de Loky Manambato gazetted in 2015 and managed by the Association Fanamby (Goodman et al., 2018). Within Loky Manambato, the decline in area of littoral forest was zero (0%) between the years 1996 and 2006, and 135 ha (3.6%) between 2006 and 2016 (Goodman et al., 2018). The Lake Sahaka-Analabe littoral forest is nevertheless subjected to ongoing anthropogenic pressures including slash-and-burn agriculture, removal of hardwood timber, pasturage of "zébu" cattle, and grassland fires which can sometimes penetrate into the forest (Rakotondravony, 2006; Goodman et al., 2018; BirdLife International, 2021). *Memecylon angustatum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – Morphological and molecular analyses (Stone et al., 2017a) clearly place *Memecylon angustatum* in *Memecylon* sect. *Buxifolia*. Its "aphyllous" nodes and larger leaves distinguish it from *M. multinode* Jacq.-Fél. The leaves are similar in size to those of *M. buxifolium* but differ in being thinly coriaceous and with base ± angustate (narrowed gradually and concavely) and confluent with the petiole. There is also a strong geographic separation between the two species (*M. buxifolium* being widely distributed in dry forests of western Madagascar, the new species being restricted to littoral forest in the northeast).

The following collection from the Binara forest (Daraina region) appears close to *Memecylon angustatum* but remains unplaced to species pending further study: *Gautier & Ravelonarivo 4064* (CAS, G, MO).

Additional specimens examined. – **Madagascar. Reg. SAVA [Prov. Antsiranana]:** Vohémar, Nosy be, Anjiabe, Analabe, 13°04'43"S 49°54'04"E, 11.V.2004, fr., *Rabehevitra et al. 971* (CAS, MO, P); Vohémar, Nosibe, Anjiabe, Anaborano près du Lac Sahaka, 13°04'42"S 49°54'13"E, 25 m, 2.XI.2002, fr., *Rabenantoandro et al. 1090* (MO, P, TEF); Vohémar, Nosy be, Anjiabe, Analabe, 13°04'56"S 49°54'35"E, 24.II.2003, fr., *Rabevohitra et al. 4527* (CAS, G, MO, P, TEF); Vohémar, Nosibe, Anjiabe, village Anaborano, campement Andrainginalo, 10 km à l'E d'Anaborano, forêt d'Analabe, 13°04'09"S 49°54'08"E, 18 m, 11.X.2004, fl., *Randrianarivelo et al. 151* (CAS, MO); Vohémar, Nosy be, près du village d'Analabe et du lac Sahaka, 13°05'20"S 49°54'47"E, 10.VII.2003, fr., *Razakamalala et al. 533* (CAS, G, MO, P, TEF); Vohémar, Nosy be, Anjiabe, Analabe E of Lac Sahaka, 13°05'04"S 49°54'03"E, 6.II.2008, fr., *Stone et al. 2669* (BR, CAS, K, MO, NU, P, TAN, WAG).

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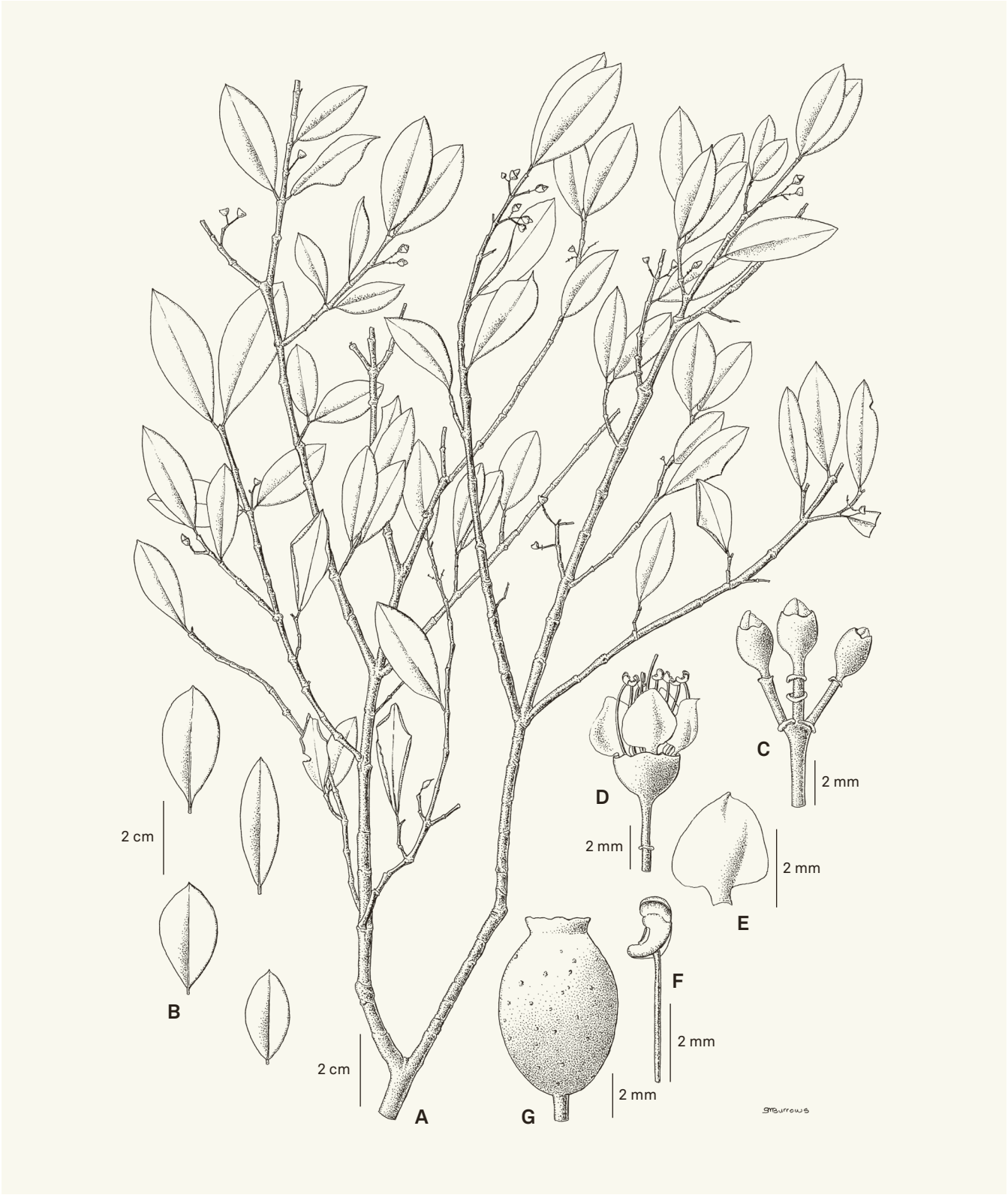

Fig. 2. – *Memecylon angustatum* R.D. Stone. **A.** Flowering branch; **B.** Leaves; **C.** Inflorescence and floral buds; **D.** Open flower; **E.** Petal; **F.** Stamen; **G.** Fruit.
[**A**, **C**–**F:** *Rabevohitra et al. 4549*, CAS, P; **B:** *Stone et al. 2669*, CAS; **G:** *Rabehevitra et al. 971*, CAS] [Drawing: S. Burrows]

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4. ***Memecylon buxifolium*** Blume in Mus. Bot. 1: 363. 1851.

Lectotypus (designated by Jacques-Félix, 1985b: 31): **Madagascar. Reg. DIANA [Prov. Antsiranana]:** île de Nossibé [Nosy Be], 4.XI.1840, ster., *Pervillé 344* (L [L.2543432]!; isolecto-: BR [BR0000006260873]), K [K000313579]!, P [P00057733, P00057734, P00057735]!).

≡ *Memecylon dumosum* Naudin in Ann. Sci. Nat., Bot., sér. 3, 18: 270. 1852 [nom. illeg.].

= *Memecylon perrieri* Danguy in Compt. Rend. Assoc. Franç. Avancem. Sci. Assoc. Sci. France [45e session, Rouen 1921]: 545. 1922. **Holotypus: Madagascar. Reg. Betsiboka [Prov. Mahajanga]:** Belambo, III.1900, fl., *Perrier de la Bâthie 1048* (P [P00062681]!; iso-: P [P00062682]!).

Shrubs or small *trees* 1–5 m high; branchlets slender, quadrangular when young, becoming terete with age; successive nodes alternately bearing normal leaves and floral bracts (these c. 3 mm long, lance-linear, rapidly deciduous); internodes between normal leaves (0.8–)1.1–2.5(–5.8) cm long. *Leaves* coriaceous, bright green and shining on the upper surface, paler and dull on the lower, drying brownish and minutely granular-roughened on both surfaces; petioles 1–3(–4) mm long; blades elliptic to elliptic-lanceolate, (2–)2.5–4(–5.7) × (0.7–)1–1.6(–2.2) cm, mostly 2–3 times longer than broad, cuneate at base, generally acute at apex but sometimes obtuse-apiculate or vaguely acuminate-obtuse; only the midnerve clearly visible, finely impressed on the upper surface, somewhat prominent on the lower; one pair of lateral nerves faintly visible on both surfaces (especially in larger leaves and in fresh material), the course curvilinear and 1–2 mm from the margin in the basal half of the blade; transverse veins ± obscure. *Cymules* up to 1(–1.5) cm long, 1–2(–3)-flowered, borne in the leaf axils and at the intervening "aphyllous" nodes; peduncles 0.5–6 mm long; secondary axes 0.5–4 mm long; bracts deltoid, c. 1 mm long, soon deciduous. *Flowers* on pedicels 0.5–1(–2) mm long; hypantho-calyx green, campanulate, 2 × 2.5 mm, margin sinuate; corolla rounded in bud; petals white, suborbicular, 2 × 2 mm, base broadly short-unguiculate; staminal filaments slender, 3 mm long; anthers 1.2 mm long, connective dorsally incurved by the median gland, thecae positioned at the anterior end, extremity obtuse; style 5–7 mm long; ovary 8–10-ovuled. *Fruits* ellipsoid, 7–10(–11) × 5–6 mm; calycinal crown spreading, 1 mm long; epigynous chamber with partitions joined in pairs to form V-shaped structures beneath the petal scars, each then joined to the center by a line.

Distribution and ecology. – Western Madagascar, in scattered locations from the extreme north (DIANA region) southward through the Sofia, Boeny, Betsiboka, and Melaky regions to near Morondava (Menabe region). Habitat in dry, deciduous forest, on various substrates, or in littoral forest or thicket on sands, at low elevations c. 0–250 m.

Conservation status. – *Memecylon buxifolium* is known from 30 locations with an estimated EOO of 115,436 km² and an AOO of 120 km². Roughly half of the known locations are in protected areas including the Réserve Spéciale d'Ankarana, the Paysage Harmonieux Protégé de Beanka, the Parc National de Tsingy de Bemaraha, and the Paysage Harmonieux Protégé de Menabe Antimena (Goodman et al., 2018). Dry forests in western Madagascar have been reduced by almost 40% since the 1970s, and the rate of deforestation between the years 2000 and 2005 was 0.42% per year (Waeber et al., 2015, and references cited therein). Dry forests in unprotected areas are under pressure from clearing for subsistence and commercial agriculture, collecting of firewood and charcoal production, grazing of zebu cattle, and mining or oil exploration (Waeber et al., 2015). Among the protected areas, there has been an acute loss of dry forest cover in Menabe Antimena (18,637 ha or 22.7% between the years 2006 and 2016; Goodman et al., 2018). Anthropogenic fires have increased in recent years in both Menabe Antimena and Bemaraha (Goodman et al., 2018). Based on its limited AOO and the apparent threats, *M. buxifolium* would meet the criterion B for listing as "Endangered" [EN] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012), but it might be better assessed as "Near Threatened" [NT] contingent upon the continued effectiveness of habitat-specific conservation and management measures (IUCN, 2019).

Notes. – *Memecylon buxifolium* as presently circumscribed is the most common and widely distributed member of *Memecylon* sect. *Buxifolia* in Madagascar. It is also the most variable in terms of the size of the leaves. No specimens were cited in the protologue (Blume, 1851), and the later statement by Jacques-Félix (1985b: 31) that the holotype is in L is accepted here as an implicit lectotypification.

The type locality of *Memecylon perrieri* was given by Perrier de la Bâthie (1951) as Belambo, rive gauche de l'Ikopa, en amont de Maevatanana (Boina). Jacques-Félix (1985b) erroneously characterized the fruit of *M. perrieri* as globose, based on a specimen from the sand dunes at Ambongo (*Pervillé 542*, P) later excluded from that species (Stone, 2006b). Jacques-Félix (1985b) also circumscribed *M. buxifolium* narrowly to include only the plants from Nosy Be. In comparing the original material of *M. buxifolium* and *M. perrieri*, one sees that the leaves of the latter are indeed larger, but with subsequent collections it is clear that both of these types are part of a ± continuous range of interpopulational variation (data not shown). In conclusion, there seems to be no objective basis for maintaining *M. perrieri* as a separate species.

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Memecylon buxifolium includes most of the material previously assigned to *M. ankarense* H. Perrier (Jacques-Félix, 1985b), but not the type of that species. Stone (2006b) made an error in stating that *M. perrieri* and *M. ankarense* were conspecific. Currently, *M. ankarense* is seen as more closely related to *M. boinense* H. Perrier (fide Jacques-Félix, 1985b), the latter species belonging to the Malagasy clade sensu Stone (2014) and not a member of *Memecylon* sect. *Buxifolia*.

The collection *Bernardi 11919* from Nosy Komba has floral bracts that are large and foliaceous (in fact having the appearance of small leaves, including a distinctly petiolar base). The same unusual feature is seen in some populations from the mainland of western Madagascar (e.g. *Réserves Naturelles 10200*, *Stone 2644*).

The following collections from the Oronjia protected area and the forêt de Belamoty (DIANA region near Antsiranana city) appear close to *Memecylon buxifolium* but have leaves obovate, mostly 1.7–2.3 × 1–1.6 cm (1.5–2 times longer than broad) and ± rounded at the apex. These populations remain unplaced to species pending further study: *Rabenantoandro & Razanatsoa 624* (MO, P), *Be et al. 78* (K, MO, NY, P), *Ratovoson et al. 1150* (CAS, MO, P), *Ratovoson et al. 2080* (MO).

Additional specimens examined. – **Reg. DIANA [Prov. Antsiranana]:** Nossi-bé [Nosy Be]-Tafondro, 15.XII.1967, fr., *Bernardi 11905* (G, K, L, P); Nossi-Komba, 16.XII.1967, fl., *Bernardi 11919* (K, L, P); Nossibé [Nosy Be], bord de la mer à Ampombilava, II–III.1851, fl. & fr., *Boivin* (P); Ankarana du Nord, I–II.1960, fr., *Humbert 32555* (MO, P); forêt d'Ampiho, 2 km au N d'Ambodivahibe, 12°21'45"S 49°25'50"E, 5 m, 24.VII.2007, fr., *Ratovoson et al. 1304* (CAS, MO); Ambariobe (île déserte), N de Nosy-Komba, 09.V.1950, fr., *Service Forestier 1231* (TEF); plateau de l'Ankarana, près d'Ambondromifehy, 05.II.1966, *Service Forestier 24558* (G, K, MO, P, TEF, WAG); 5 km SE of Ambilobe on RN nº 5A toward Ambakirano and Daraina, 13°12'00"S 49°04'45"E, 50 m, 11.II.2007, imm. fr., *Stone et al. 2636* (CAS, K, MO, P, TAN); RS de l'Ankarana, between Perte de Rivière and deviation toward Tourelles de Tsingy, 12°57'10"S 49°07'38"E, 150 m, 17.II.2007, ster., *Stone et al. 2643* (CAS, MO, P, TAN); east of RN nº 6 and N of Ambondromifehy, 12°52'13"S 49°13'46"E, 250 m, 18.II.2007, imm. fr., *Stone et al. 2644* (CAS, K, MO, P, TAN). **Reg. Sofia [Prov. Mahajanga]:** Sofia, Antsohihy, Antonibe, Anjajavy, 15°02'27"S 47°15'43"E, 24 m, 17.VIII.2007, imm. fr., *Rasoafaranaivo et al. 241* (MO, NU). **Reg. Boeny [Prov. Mahajanga]:** Manongarivo (Ambongo), X.1903, fl., *Perrier de la Bâthie 6524* (P); dunes de Majunga, I.1921, fl., *Perrier de la Bâthie 13457* (P); Ambato-Boina, Bevazaka, 12.II.1949, fl., *Réserves Naturelles 1866* (MO, P). **Reg. Betsiboka [Prov. Mahajanga]:** Maevatanana, Mahatsinjo, Pont Betsiboka, 16°56'19"S 46°56'52"E, 144 m, 08.VII.2005, fr., *Hong-Wa et al. 404* (MO, NU, P); île de l'Ikopa, Ambodiroka, 1896, fr., *Perrier de la Bâthie 32* (P); Mahajanga II, Cirque rouge, N of Amborovy, 15°38'04"S 46°20'28"E, 20 m, 20.III.2010, fr., *Rakotonasolo et al. 1611* (BR, K); Maevatanana, Ambalanjanakomby, Ambatomitsangana, 19.XII.1953, fl., *Service Forestier 8165* (TEF). **Reg. Melaky [Prov. Mahajanga]:** pents E du Bemaraha, VIII.1943, fr., *Herb. Jard. Bot. Tananarive 6171* (P); Beanka forest, Bokarano, 17°54'41"S 44°28'37"E, 176 m, 23.X.2009, ster., *Letsara et al. 906* (CAS); Beanka forest, Manomba, 17°52'90"S 44°29'15"E, 156 m, 24.X.2009, ster., *Letsara et al. 909* (CAS, MO); Beanka forest, Kinahengo, 18°01'17"S 44°30'44"E, 225 m, 26.X.2009, fr., *Letsara et al. 933* (CAS, NU); P.K. 5, route d'Antsalova, 13.VII.1970, fr., *Rakotozafy 1028* (TAN); Antsalova, 8 km from Andranondahy, 18°47'42"S 44°47'26"E, 19.X.2006, fr., *Ralimanana et al. 802* (K); Antsalova [= R.N.I. Bemaraha], 11.I.1959, fl., *Réserves Naturelles 10200* (MO, P, TEF). **Reg. Menabe [Prov. Toliara]:** forêt de Marosalaza, 50 km au Nord de Morondava, 01.IV.1974, ster., *Abraham 14* (MO, P); Kirindy forest, 20°03'16"S 44°40'58"E, 89 m, 19.I.2007, fl., *De Block et al. 2183* (BR); ibid. loco, 4.5 km E of rte 8 along S boundary of forestry block CN4, 20°04'S 44°40'E 35 m, 25.III.1992, fr., *Noyes et al. 1070* (MO, P, WAG); Morondava, 1990, fr., *Rahanyamalala s.n.* (P); Kirindy forest, 20°04'04"S 44°39'38"E, 57 m, 11.IV.2013, fr., *Randrianaivo et al. 2308* (MO); ibid. loco, 20°05'S 44°38'E, 45 m, X.1990, fr., *Schatz 2989* (CAS, MO, P, TAN); village Marofandilia, lieu Kirindy, 27.II.1988, fr., *Service Forestier 31899* (TEF). Sine loco: II.1955, fl. & fr., *Descoings 400* (MO, TAN).

5. ***Memecylon leptophyllum*** R.D. Stone, **sp. nov.** (Fig. 3, 4).

Holotypus: Madagascar. Reg. SAVA [Prov. Antsiranana]: sous-préfecture de Vohémar, commune rurale de Daraina, forêt d'Antsaharaingy, 12°54'15"S 49°39'26"E, 65 m, 27.II.2005, fl., *Nusbaumer & Ranirison 1502* (CAS-1105061!; iso-: G [G00019523]!, MO!, P!, TEF).

Affine Memecyloni oblanceolato R.D. Stone, sed ab eo laminis foliaribus minoribus angustioribusque plerumque 4–5.2 × 0.5–0.9 cm (non 5.2–7.4 × 1.8–2.8 cm) ad marginem revolutis differt.

Shrubs c. 3.5 m high; bark of branchlets whitish gray; young branchlets ± compressed and laterally grooved then quadrangular; successive nodes alternately bearing normal leaves and floral bracts; internodes between normal leafy nodes 1–1.6(–2) cm long. *Leaves* coriaceous, dark green on adaxial surface, paler abaxially; petioles black, c. 5 mm long; blades narrowly elliptic or oblanceolate, (3.2–)4–5.2 × 0.5–0.9(–1.2) cm, base cuneate, apex acute-cuspidate, margins revolute; midnerve deeply impressed on adaxial surface, prominent abaxially; intramarginal nerves and transverse veins invisible. *Cymules* up to 8 mm long, 1-flowered, solitary in leaf axils, at intervening "aphyllous" nodes and also at uppermost leafless nodes; peduncles 0.5–1.5 mm long, additional axis 0.5–1.5 mm long; bracts narrowly triangular-acute, 0.75 mm long, early deciduous. *Flowers* on pedicels 0.75–1.25 mm long; hypantho-calyx yellowish green, campanulate to cupulo-patellate, 2 × 3 mm, margin shallowly sinuate-dentate, lobes broadly rounded, scarious-margined; corolla rounded-apiculate in bud; petals white, broadly elliptic, 2 × 2 mm, base truncate-subauriculate with claw 0.5 × 1 mm, apex acute; staminal filaments white, 6 mm long; anthers orange, dolabriform, 1.25 mm long, connective strongly incurved by dorsal oil-gland, thecae positioned at anterior end, posterior extremity obtuse; style white, 7 mm long; epigynous chamber with membranous interstaminal partitions forming a V-shaped structure beneath each petal scar. *Fruits* unknown.

Etymology. – The epithet *leptophyllum* is a compound derived from the Greek adjective *leptós* meaning "narrow" and the noun *phúllon* meaning "leaf". It functions as an adjective and means "narrow-leaved".

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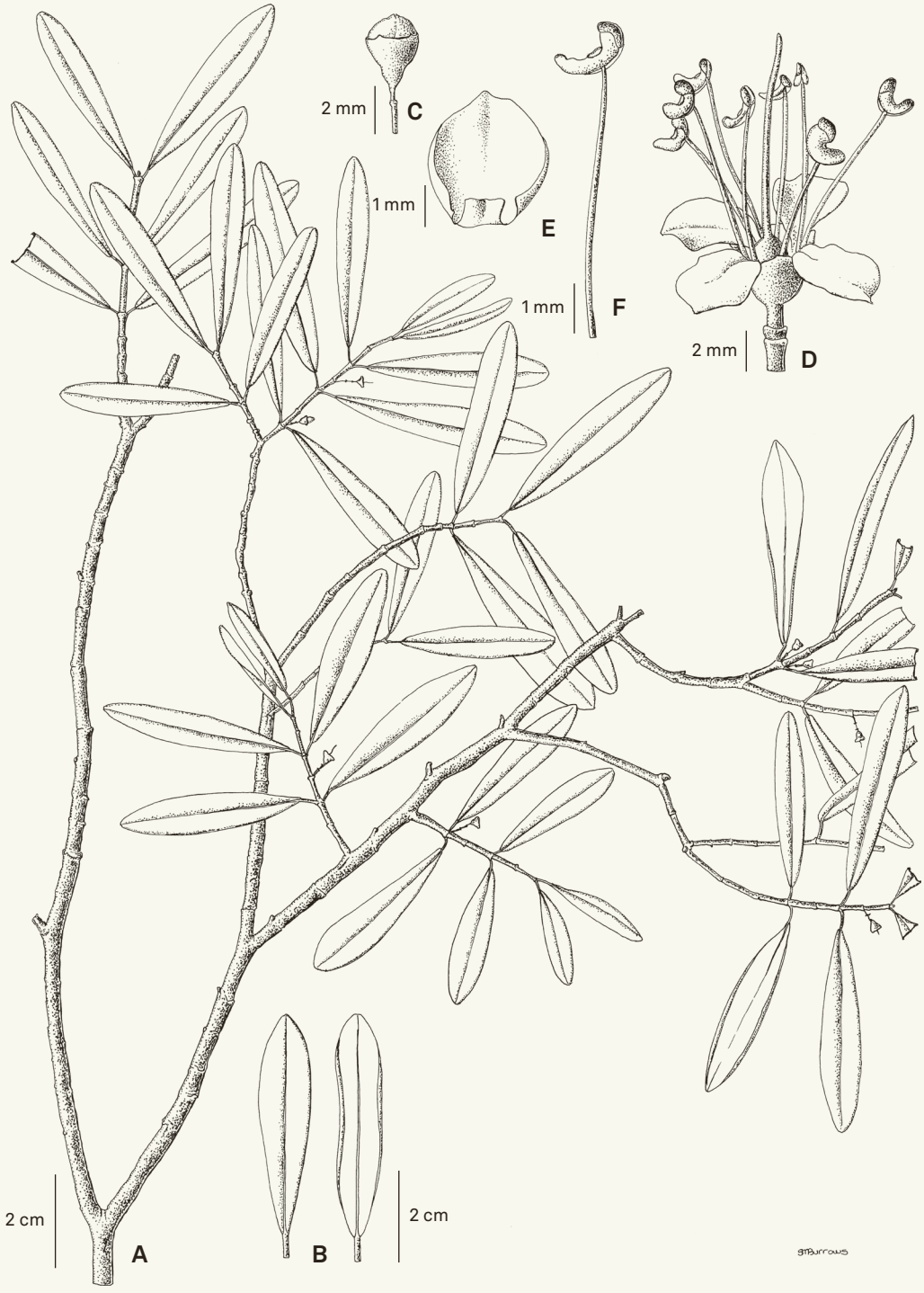

Fig. 3. – *Memecylon leptophyllum* R.D. Stone. **A.** Flowering branch; **B.** Leaves; **C.** Floral bud; **D.** Open flower; **E.** Petal; **F.** Stamen. [**A–F:** *Nusbaumer & Ranirison 1502*, CAS] [Drawing: S. Burrows]

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Fig. 4. – *Memecylon leptophyllum* R.D. Stone.
A. Unusual 5-merous flower; **B.** Normal 4-merous flowers.
[Photos: L. Nusbaumer]

Distribution and ecology. – Northeastern Madagascar (SAVA region), known only from the type collection made in the Antsaharaingy forested bloc, c. 33 km due north of the town of Daraina. Habitat in dry, semi-deciduous forest, at elevation c. 65 m.

Conservation status. – *Memecylon leptophyllum* is known from a single location with an estimated AOO of 4 km². The Antsaharaingy forest where it occurs is a part of the Paysage Harmonieux Protégé de Loky Manambato gazetted in 2015 and managed by the Association Fanamby (Goodman et al., 2018). Within Loky Manambato, the decline in area of dry forest was zero (0%) between the years 1996 and 2006, and 330 ha (1.1%) between 2006 and 2016 (Goodman et al., 2018). This species and its habitat are nonetheless subjected to ongoing anthropogenic pressures, e.g., by grassland fires which can sometimes penetrate into the forest (Goodman et al., 2018). *Memecylon leptophyllum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon leptophyllum* clearly belongs to *Memecylon* sect. *Buxifolia*, where it is seemingly close to the newly described *M. oblanceolatum* (see below). Not only are these two species separated geographically, there is also no overlap in the width of the leaves, those of *M. leptophyllum* being much narrower (0.5–0.9 vs. 1.8–2.8 cm wide) and with revolute margins. One photo of this species (Fig. 4A) shows a 5-merous flower, which is otherwise unknown in the genus *Memecylon*. However, this must be regarded as an aberrant form, because a second photo (Fig. 4B) shows two characteristically 4-merous flowers.

6. ***Memecylon minutifolium*** R.D. Stone, **sp. nov.** (Fig. 5).

Holotypus: Madagascar. Reg. SAVA [Prov. Antsiranana]: sous-préfecture de Vohémar, commune rurale de Daraina, forêt d'Ambilondomba, 13°09'52"S 49°38'49"E, 360 m, 26.I.2004, fl. buds, *Ranirison, Nusbaumer & Wohlhauser 308* (CAS-1104898!; iso-: G [G00028156]!, MO!, P!, TAN).

Affine Memecyloni multinodi Jacq.-Fél., sed ab eo foliis multo minoribus 5–7 × 2–2.5 mm (non 16–18 × 6–7 mm) facile distinguitur.

Shrubs 2–3.5 m high; bark of branchlets whitish gray; young branchlets quadrangular and narrowly alate; internodes short, 2–15 mm long, "aphyllous" nodes virtually absent (most nodes bearing normal leaves). *Leaves* coriaceous, bright green and shining on adaxial surface, paler and dull abaxially, minutely rugose on both surfaces in dried material; petioles slender, short but distinct, 1–1.5 mm long; blades narrowly elliptic, 5–7 × 2–2.5(–3) mm, base cuneate, apex acute-cuspidate, margins revolute; midnerve invisible on adaxial surface, slightly visible and not prominent abaxially. *Cymules* up to 1 cm long, 1-flowered, solitary in leaf axils, at intervening "aphyllous" nodes and also at uppermost leafless nodes; peduncles (0.75–)1.25–2.5(–3) mm long; additional axis (1.25–)1.5–2.25(–2.5) mm long; bracts early deciduous, not seen.

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Flowers subsessile or on slender pedicels to 0.75(–1) mm long; hypantho-calyx obconic to narrowly campanulate, 2 × 2 mm, margin shallowly sinuate-dentate, lobes broadly rounded, scarious-margined; corolla in bud obconic, apex obtuse; open flowers not seen. Anthers c. 1 mm long, thecae positioned at anterior end, dorsal oil-gland present. *Fruits* ± elliptic, 5 × 4 mm; persistent calycinal crown c. 0.75 mm high.

Etymology. – The epithet *minutifolium* is a compound derived from the Latin adjective *minutus* meaning "very small" and the noun *folium* meaning "leaf". It functions as an adjective and means "very small-leaved".

Distribution and ecology. – Northeastern Madagascar (SAVA region), known only from the Ambilondambo and Ampondrabe forested blocs, c. 5–25 km north of the town of Daraina. Habitat in transitional to dry, semi-deciduous forests, at elevations of 125–360 m.

Conservation status. – *Memecylon minutifolium* is known from two locations with an estimated AOO of 8 km². The Ambilondambo and Ampondrabe forests are both part of the Paysage Harmonieux Protégé de Loky Manambato gazetted in 2015 and managed by the Association Fanamby (Goodman et al., 2018). Within Loky Manambato, the decline in area of dry forest was zero (0%) between the years 1996 and 2006, and 330 ha (1.1%) between 2006 and 2016 (Goodman et al., 2018). This species and its habitat are nonetheless subjected to ongoing anthropogenic pressures including slash-and burn-agriculture, removal of hardwood timber, pasturage of "zébu" cattle, and grassland fires which can sometimes penetrate into the forest (Rakotondravony, 2006; Goodman et al., 2018). *Memecylon minutifolium* is thus provisionally assessed as "Endangered" [EN B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon minutifolium* clearly belongs to *Memecylon* sect. *Buxifolia*, where it appears most closely related to *M. multinode*. Both of these species have acute-cuspidate leaves and lack the character of "aphyllous" nodes shared by other members of this species-group (Stone, 2014).

The extremely small leaves of *Memecylon minutifolium* are its most distinctive character. The paratype collection *Ratovoson et al. 1078* cited below was initially identified as *M. minimifolium* H. Perrier, which has similarly small leaves but of a very different shape [c. 6 × 4 mm, broadly ovate to elliptic or nearly orbicular with apex rounded vs. 5–7 × 2–2.5(–3)] mm, narrowly elliptic with apex acute-cuspidate in *M. minutifolium*). Molecular analyses further indicate that *M. minimifolium* belongs to the Malagasy clade sensu Stone (2014) and is not a member of *Memecylon* sect. *Buxifolia* (R.D. Stone, unpubl. data).

Additional specimen examined. – **Madagascar. Reg. SAVA [Prov. Antsiranana]:** Vohémar, Ampisikinana, Tsaratanana, Ambarilao, forêt d'Ampondrabe Antsiraka, 5 km à l'W d'Ambarilao, 12°58'26"S 49°41'50"E, 125 m, 6.XI.2005, fr., *Ratovoson et al. 1078* (G, MO, P).

7. ***Memecylon multinode*** Jacq.-Fél. in Bull. Mus. Natl. Hist. Nat., B, Adansonia 7: 28. 1985.

   Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: forêt d'Analafondro, base du plateau de Sahafary, rive gauche du Rodo inférieur, 01.V.1966, fl. & fr., *Service Forestier 24711* (P [P00062662]!; iso-: TEF [TEF000323]!).

Shrub, many-branched; branchlets slender, quadrangular when young, becoming terete with age; internodes 4–6(–7) mm long, "aphyllous" nodes lacking (all nodes bearing normal leaves). Leaves coriaceous, opaque, bright green and shining on the upper surface, paler and dull below, minutely rugose on both surfaces when dry; petioles slender, 1.5–2 mm long; blades lanceolate to elliptic, 1.6–1.8(–1.9) × 0.6–0.7 cm, cuneate at base, acute-cuspidate at apex; midnerve invisible on adaxial surface, slightly visible and not prominent abaxially; margin narrowly thickened, subrevolute. *Cymules* discrete, axillary, 1-flowered; peduncle 1–4 mm long, often with an internode 1–3 mm long. Pedicels 1–2 mm long; floral buds ellipsoid-globose, corolla rounded; hypantho-calyx obconic, 2 × 2.5 mm, lobes scarcely pronounced; petals thickened on the abaxial side, suborbicular, 2.5 × 2.2 mm, claw short; anthers 1.2 mm long, anther sacs lateral; connective obtuse, moderately incurved by the median, elliptic gland; filaments 2.5 mm long; epigynous chamber deep, partitions joined in pairs to form V-shaped structures beneath the petal scars, each then joined to the center by a line; style 7 mm long. *Fruits* ellipsoid-globose, 6 × 5 mm; crown spreading, 1.5 mm long.

Distribution and ecology. – Extreme northeastern Madagascar (DIANA region), known only from the type collection.

Conservation status. – *Memecylon multinode* is known from a single location with an estimated AOO of 4 km². The lower Irodo valley has been largely deforested since the type collection was made in 1966, and the species could not be found there during field-work in February 2008, suggesting that it may already be extinct or at least locally extirpated (R.D. Stone, pers. obs.). With additional field-work, it might be rediscovered in the nearby Réserve Spéciale d'Analamerana. *Memecylon multinode* is thus provisionally assessed as "Critically Endangered" [CR A2(c)+B2(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – In the protologue, Jacques-Félix (1985b) compared this species with *Memecylon boinense*, but it clearly belongs to *Memecylon* sect. *Buxifolia*, on account of its leaf

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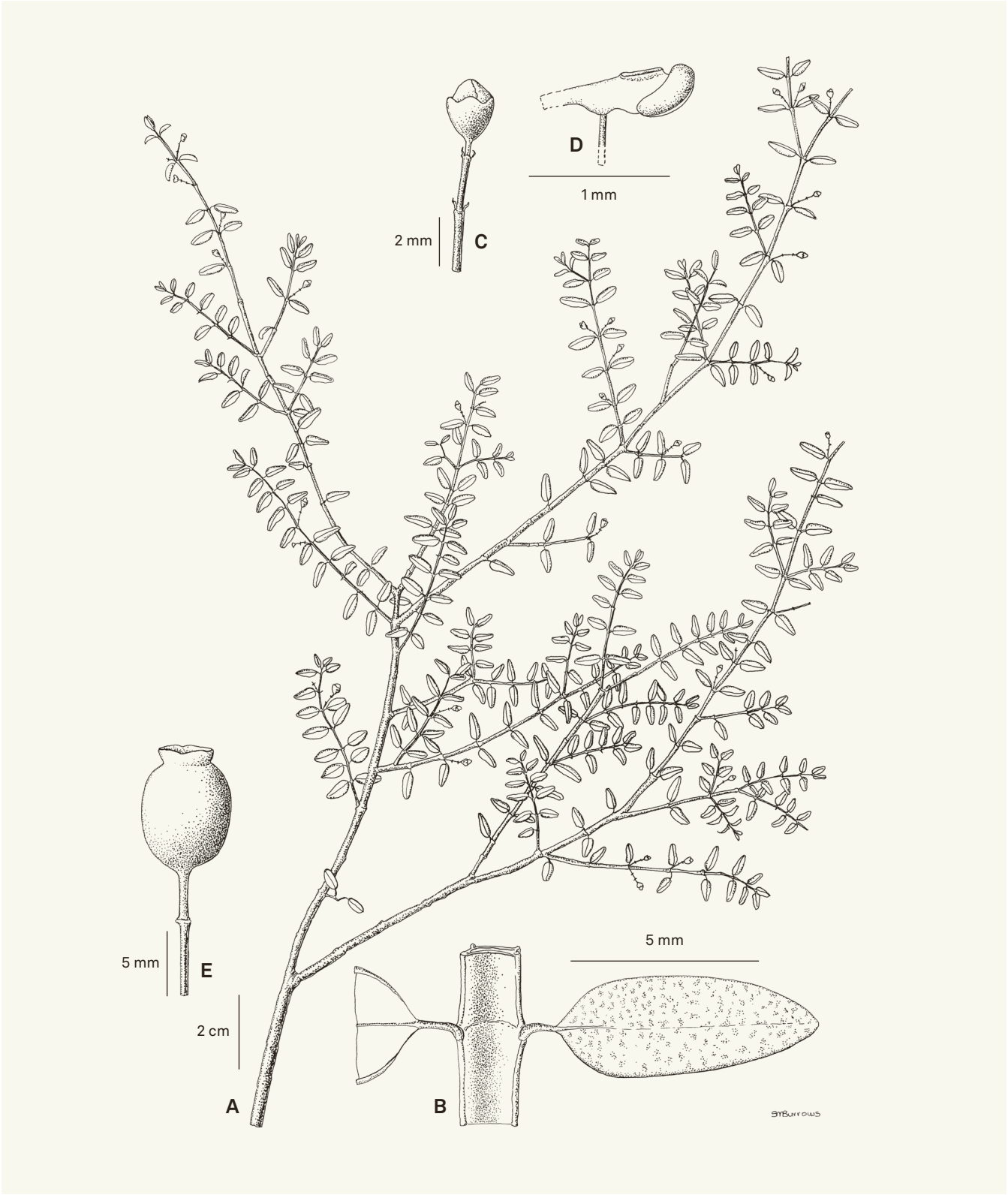

Fig. 5. – *Memecylon minutifolium* R.D. Stone. **A.** Flowering branch; **B.** Section of branchlet and node with pair of leaves; **C.** Inflorescence with floral bud; **D.** Anther; **E.** Fruit.
[**A, C, D:** *Ranirison et al. 308*, CAS; **B, E:** *Ratovoson et al. 1078*, MO] [Drawing: S. Burrows]

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apices acute-cuspidate, corolla rounded in bud, petals suborbicular, epigynous chamber with interstaminal partitions forming a V-shaped structure beneath each petal scar, and fruits ± ellipsoid. However, *M. multinode* lacks the "aphyllous" nodes characterizing most other species in this group (Stone, 2014). The numerous, short internodes and small leaves are also quite distinctive. It is most similar to *M. minutifolium*, which has even smaller leaves.

8. ***Memecylon oblanceolatum*** R.D. Stone, **sp. nov.** (Fig. 6, 7A).

Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: forêt de Sahafary (bassin de la Saharenana), 7.II.1966, fl., *Service Forestier 24506* (P [P00258012]!; iso-: CAS-1062098!, MO-4598292!, P [P00258013]!, TEF!, WAG [WAG.1923210]!).

Affine Memecyloni buxifolio Blume et M. amplifolio R.D. Stone, sed a primo laminis foliaribus majoribus plerumque 5.2–7.4 × 1.8–2.8 cm (non 2.2–4.1 × 1.0–1.6 cm), a secundo ramulis juvenilibus quadrangularibus (non teretibus), laminis angustioribus (non 5.5–6.5 × 2.5–3.3 cm), ab ambobus laminis foliaribus oblanceolatis vel plus minusve ellipticis supra medium latissimis differt.

Shrubs or small *trees* 2.5–3 m high; branchlets slender, ± quadrangular when young, becoming terete with age; successive nodes alternately bearing normal leaves and floral bracts (these early deciduous and not seen); internodes between normal leaves (0.6–)1.3–4.1(–8) cm long. *Leaves* coriaceous, dark green and shining on adaxial surface, paler and dull abaxially, drying brownish and minutely granular-rugose on both surfaces; petioles 1.5–3 mm long; blades broadly oblanceolate (when ± elliptic, then definitely widest above middle), (4.4–)5.2–7.4(–8.9) × 1.8–2.8(–3.5) cm, attenuate at base, generally cuneate and acute at apex but sometimes rounded-obtuse or vaguely broad-acuminate; only midnerve clearly visible, finely impressed on adaxial surface; one pair of lateral nerves faintly visible on both surfaces, course curvilinear and 1–3 mm from margin in basal half of blade; transverse veins obscure. *Cymules* up to 1.2 cm long, 1–3-flowered, solitary or geminate in leaf axils, at intervening "aphyllous" nodes and also at uppermost leafless nodes; peduncles 0.5–3(–6) mm long; additional axes 0.5–3 mm long; bracts triangular-acute, to 1 mm long, early deciduous. *Flowers* borne individually at ends of inflorescence axes, on pedicels 0.3–1.5 mm long; hypantho-calyx green, obconic to cupulo-patellate, 1.75–2 × 2.5–2.75 mm, margin shallowly sinuate-dentate, lobes broadly rounded, scarious-margined; corolla rounded-apiculate in bud; petals white, suborbicular, 2 × 2 mm, base truncate-subauriculate with claw 0.5 × 0.5 mm, apex rounded and apiculate; staminal filaments white, 4 mm long; anthers yellow, dolabriform, 1.25 mm long, connective strongly incurved by dorsal oil-gland, thecae positioned at anterior end, posterior extremity obtuse; style white, 6–7 mm long; epigynous chamber deep, with membranous interstaminal partitions forming a V-shaped structure beneath each petal scar. *Fruits* ellipsoid, 6 × 5 mm; persistent calycinal crown 1 mm high.

Etymology. – The epithet *oblanceolatum* is an adjective referring to the shape of the leaves, i.e., more than twice as long as wide and with the widest part above the middle.

Distribution and ecology. – Extreme northern Madagascar (DIANA region), known only from the Sahafary plateau c. 33 km southeast of the city of Antsiranana and east of the Route nationale nº 6 at Andranomena Antsiranana. Habitat in dry, deciduous forest on sand, at elevations of 200–280 m.

Conservation status. – *Memecylon oblanceolatum* is known from a single location on the Sahafary plateau and has an estimated EOO of 2 km² and an AOO of 12 km². The forest in this area has been severely degraded and evidently remains unprotected (Ranaivoarisoa et al., 2013). *Memecylon oblanceolatum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon oblanceolatum* is placed in *Memecylon* sect. *Buxifolia* based on the results of morphological and molecular analyses (Stone et al., 2017a; R.D. Stone, unpubl. data). This population from extreme northern Madagascar (Sahafary forest) was previously included by Jacques-Félix (1985b) in his concept of *M. perrieri*. However, *M. perrieri* is now treated as a taxonomic synonym of *M. buxifolium* Blume (Stone, 2014), which as presently circumscribed is a morphologically variable species with a wide distribution in the dry forests of western and northern Madagascar. *Memecylon oblanceolatum* is geographically separated from *M. buxifolium* and also differs from that species by the larger size and unusual shape of its leaves. It differs from *M. amplifolium* in having young branchlets quadrangular (vs. terete) and leaf blades broadly oblanceolate and attenuate at the base (vs. broadly obovate to elliptic and cuneate).

The following collections are close to *Memecylon oblanceolatum* but are from outside the type region and remain unplaced to species pending further study: *Gautier et al. 4598* (G, K, MO, P) and *Rakotondrafara et al. 403* (G, MO, P).

Additional specimens examined. – **Madagascar. Reg. DIANA [Prov. Antsiranana]:** forêt de Sahafary, 12°36'26"S 49°26'43"E, 280 m, 8.I.2007, fr., *Ratovoson et al. 1225* (CAS, MO, P); ibid. loco, 12°35'17"S 49°26'05"E, 210 m, 15.II.2005, fl., *Schatz et al. 4320* (MO); ibid. loco, 7.II.1966, fl., *Service Forestier 24494* (P, TEF); ibid. loco, 12°35'02"S 49°26'59"E, 200 m, 6.II.2007, fl., *Stone et al. 2620*, *2622*, *2624* (CAS, G, K, MO, P, TAN).

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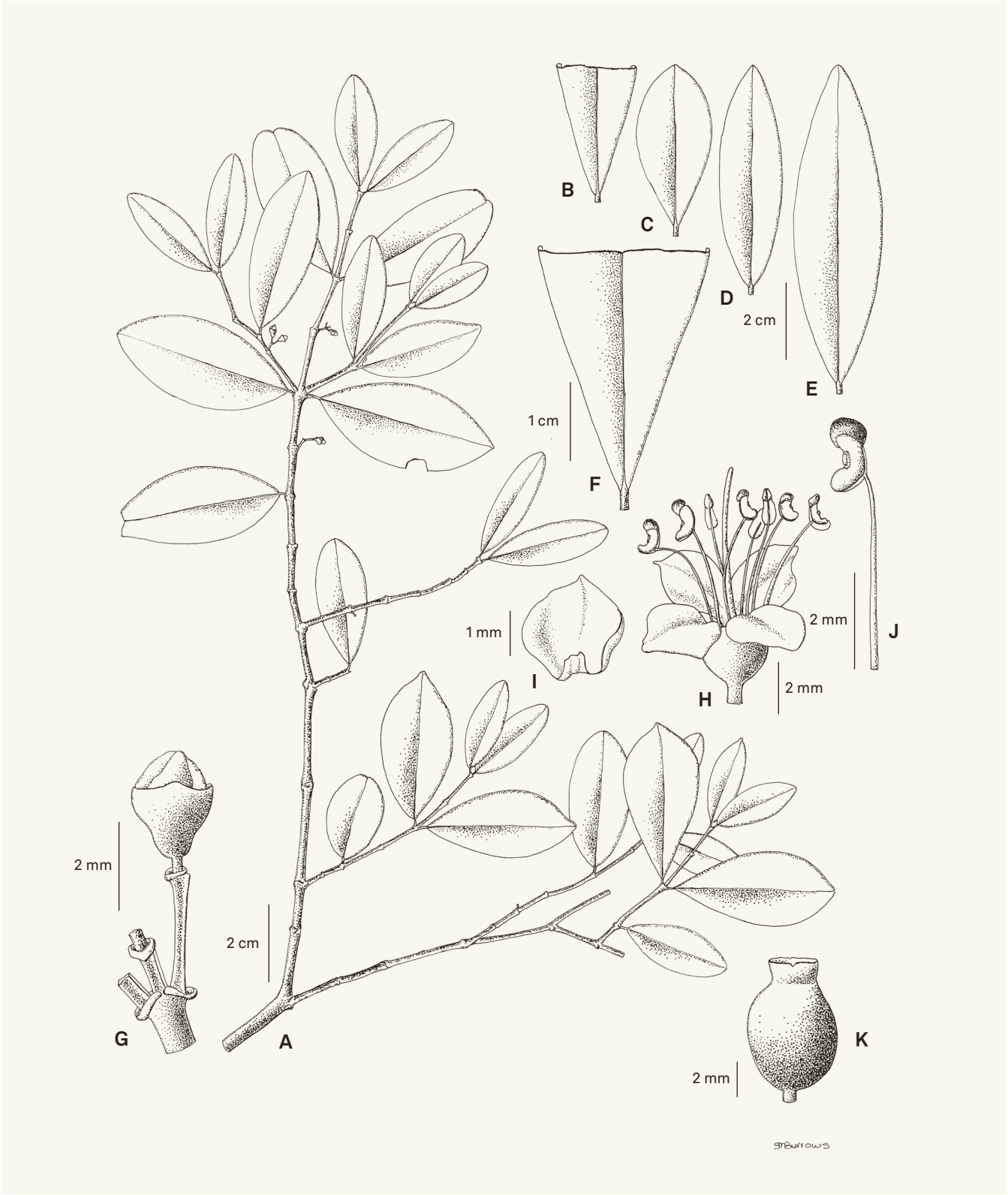

Fig. 6. – *Memecylon oblanceolatum* R.D. Stone. **A.** Flowering branch; **B–F.** Leaves; **G.** Inflorescence with floral bud; **H.** Open flower; **I.** Petal; **J.** Stamen; **K.** Fruit.
[**A, E, G–J:** *Service Forestier 24506*, P; **B–D, F:** *Service Forestier 24494*, P; **K:** *Ratovoson et al. 1225*, CAS] [Drawing: S. Burrows]

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9. ***Memecylon reductum*** R.D. Stone, **sp. nov.** (Fig. 7B, 8).

Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: Antsiranana II, Andrafiabe, Saharenana, lieu Andranomadio-Sahafary, 3 km au SE du village de Saharenana, 12°36'26"S 49°26'21"E, 27 m, 10.XI.2004, fr., *Rakotondrajaona et al. 345* (P [P05206947]!; iso-: MO-5902547!, WAG [WAG.1306064]!).

Affine Memecyloni multinodi Jacq.-Fél., sed ab eo laminis foliaribus minoribus 0.35–0.55 × 0.3–0.45 cm late ellipticis vel suborbicularis (non 1.6–1.8 × 0.6–0.7 cm anguste ellipticis vel lanceolatis) ad basin late cuneatis vel rotundato-subcordatis (non cuneatis) ad apice obscure obtuso-acuminatis (non acuto-cuspidatis) differt.

Shrub 1 m high; branchlets slender, bark whitish gray; young branchlets compressed and dorso-ventrally 2-grooved, becoming subquadrangular and finally terete with age; nodes minutely thickened, internodes very short, c. 2 mm long, "aphyllous" nodes absent (all nodes bearing normal leaves). *Leaves* coriaceous, bright green and shining on the upper surface, paler beneath, minutely rugose on both surfaces when dry; petiole slender, c. 1 mm long; blades broadly elliptic to broadly ovate or suborbicular, 3.5–5.5 × 3–4.5 mm, base broadly cuneate to rounded-subcordate, apex vaguely obtuse-acuminate; midnerve faintly impressed adaxially, clearly visible but not prominent abaxially, intramarginal nerves and transverse veins obscure. *Flowers* unknown. *Infructescences* solitary in the leaf axils, unbranched; peduncles 1–1.5 mm long; additional axis (1–)1.3–1.8 mm long; bracts rapidly deciduous, not seen. *Fruits* on pedicels 1(–1.5) mm long, subglobose to ± ellipsoid, 5.5–6 × 5–6 mm, purplish when ripe; persistent calycinal crown 1 mm high.

Etymology. – The epithet *reductum* refers to the very small leaves of this species.

Distribution and ecology. – Extreme northern Madagascar (DIANA region), known only from the type collection made on the Sahafary plateau c. 33 km southeast of the city of Antsiranana and east of the Route nationale nº 6 at Andranomena Antsiranana. Habitat in dry, deciduous forest at elevation c. 230 m.

Conservation status. – *Memecylon reductum* is known from a single location with an estimated AOO of 4 km². The forest in this area has been severely degraded and evidently remains unprotected (Ranaivoarisoa et al., 2013). *Memecylon reductum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Fig. 7. – A. *Memecylon oblanceolatum* R.D. Stone, open flower and floral buds. **B.** *Memecylon reductum* R.D. Stone, habit and fruiting branchlets.
[Photos: **A:** G. Schatz; **B:** R. Randrianaivo]

Notes. – This species clearly belongs to *Memecylon* sect. *Buxifolia*, sharing with *M. multinode* the character of lacking "aphyllous" nodes and differing by its unusually small leaves. It has previously been confused with the distantly related *M. minimifolium*, differing from that species by its whitish gray branchlets (vs. brownish), shorter internodes (2 vs. 3–5 mm), shorter petioles (1 vs. 1.5 mm), somewhat smaller leaves (3.5–5.5 × 3–4.5 vs. 6 × 4 mm), pedicels present, 1–1.5 mm long (vs. absent, flowers sessile), and ± ellipsoid fruits (vs. subglobose). Molecular analyses further indicate that *M. minimifolium* belongs to the Malagasy clade sensu Stone (2014) and is not a member of *Memecylon* sect. *Buxifolia* (R.D. Stone, unpubl. data).

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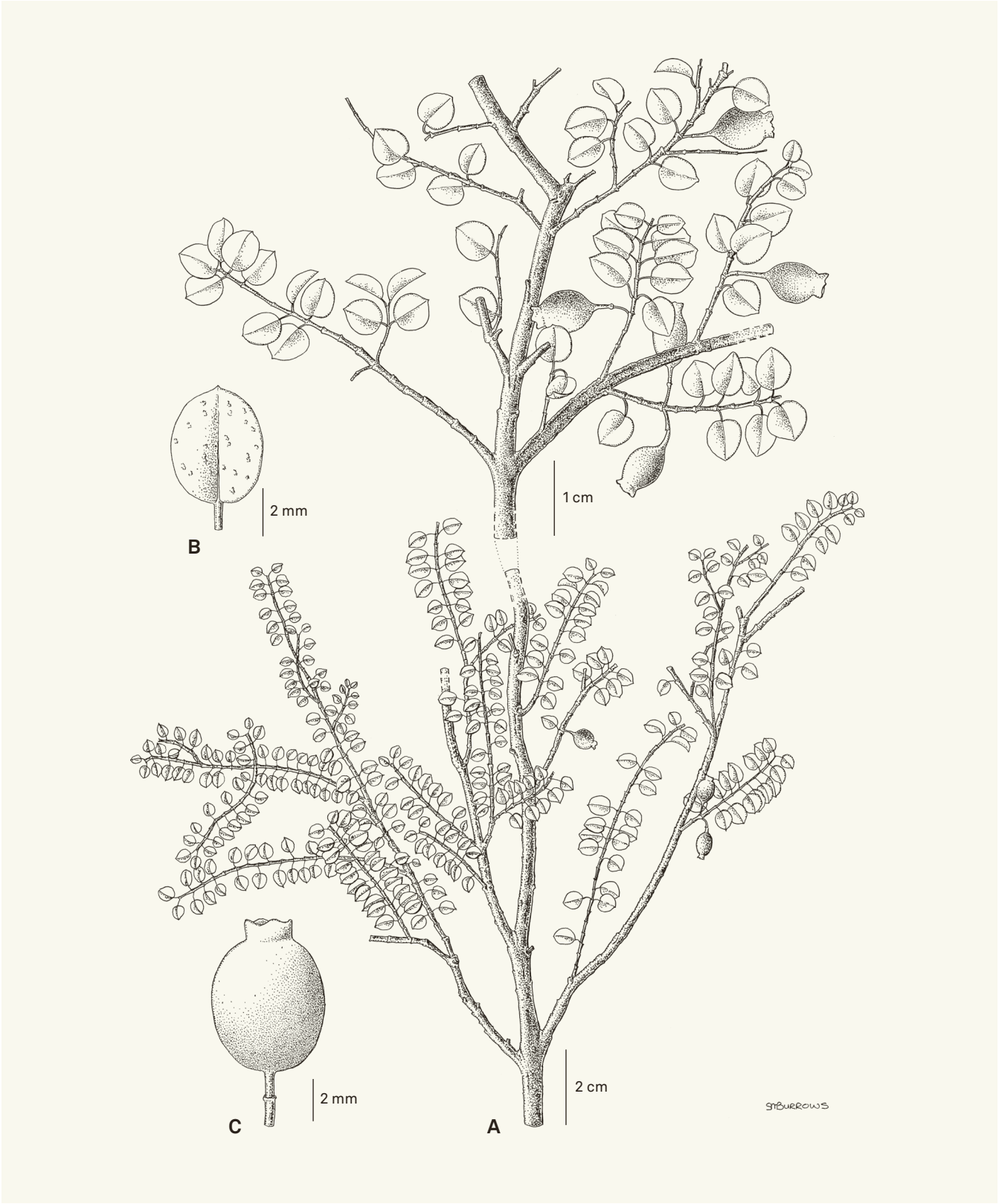

Fig. 8. – *Memecylon reductum* R.D. Stone. **A.** Fruiting branch. **B.** Leaf. **C.** Fruit.
[**A–C:** *Rakotondrajaona et al. 345*, MO] [Drawing: S. Burrows]

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