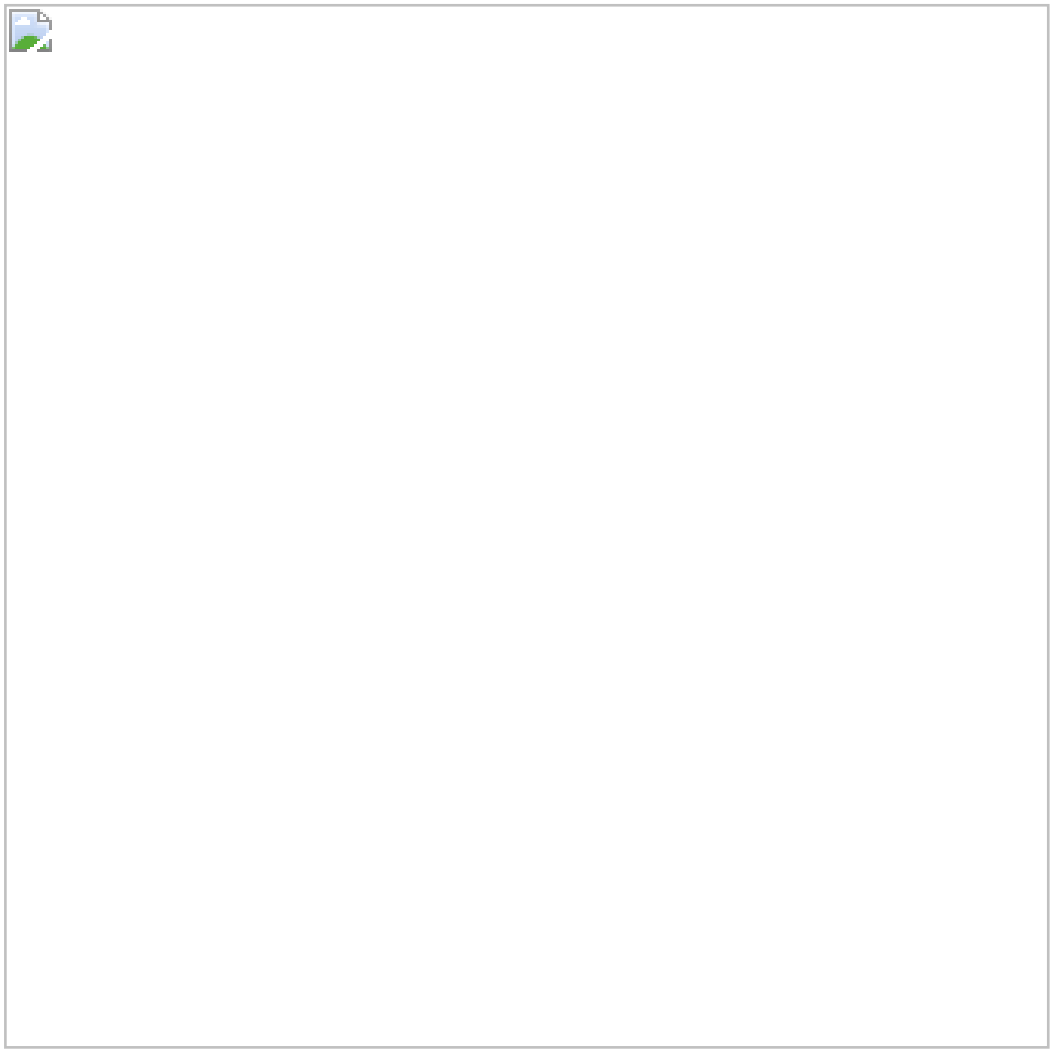

New species of Memecylon (Melastomataceae) from Madagascar: treasures of the TEF Herbarium

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New species of Memecylon (Melastomataceae) from Madagascar: treasures of the TEF Herbarium

Robert Douglas Stone

Abstract

STONE, R.D. (2020). New species of Memecylon (Melastomataceae) from Madagascar: treasures of the TEF Herbarium. *Candollea* 75: 219–239. In English, English and French abstracts. DOI: http://dx.doi.org/10.15553/c2020v752a6

Memecylon L. (*Melastomataceae*, *Olisbeoideae*) is a widespread paleotropical genus of forest shrubs and small trees, and is one of the ten most species-rich genera of woody plants in Madagascar. In a previous treatment, Jacques-Félix recognized 78 species of *Memecylon* on the island, of which all are endemic and most are known from just one or two sites. The present work describes and illustrates nine new species of *Memecylon* from Madagascar (including *Memecylon complanatum* R.D. Stone, *Memecylon convergens* R.D. Stone, *Memecylon fofifa* R.D. Stone, *Memecylon longipetiolatum* R.D. Stone, *Memecylon paraxenum* R.D. Stone, *Memecylon potamicum* R.D. Stone, *Memecylon pseudogaleatum* R.D. Stone, *Memecylon subchartaceum* R.D. Stone, and *Memecylon unguiculare* R.D. Stone), based mainly on material received on loan from the FO.FI.FA Herbarium (TEF). The conservation status of each species is provisionally assessed in accordance with the IUCN Red List Categories and Criteria. Given the extensive anthropogenic deforestation of Madagascar, one must consider the possibility that *Memecylon complanatum*, *Memecylon paraxenum*, and *Memecylon pseudogaleatum* are already extinct since these three species have not been recollected within the last 50–60 years. Work is ongoing towards a comprehensive taxonomic revision of *Memecylon* in Madagascar.

Résumé

STONE, R.D. (2020). Nouvelles espèces de Memecylon (Melastomataceae) de Madagascar: trésors de l'herbier TEF. *Candollea* 75: 219–239. En anglais, résumés anglais et français. DOI: http://dx.doi.org/10.15553/c2020v752a6

Memecylon L. (*Melastomataceae*, *Olisbeoideae*) est un genre forestier d'arbustes et de petits arbres à distribution paléotropicale répandue. A Madagascar, il est l'un des dix genres ligneux les plus riches en espèces. Dans un traitement précédent, Jacques-Félix avait reconnu 78 espèces de *Memecylon* malgache, dont tous sont endémiques et la plupart ne sont connus que d'un ou deux sites. Dans le présent travail, neuf nouvelles espèces de *Memecylon* malgache sont décrites et illustrées, basées principalement sur le matériel reçu en prêt de l'herbier FO.FI.FA (TEF): *Memecylon complanatum* R.D. Stone, *Memecylon convergens* R.D. Stone, *Memecylon fofifa* R.D. Stone, *Memecylon longipetiolatum* R.D. Stone, *Memecylon paraxenum* R.D. Stone, *Memecylon potamicum* R.D. Stone, *Memecylon pseudogaleatum* R.D. Stone, *Memecylon subchartaceum* R.D. Stone, et *Memecylon unguiculare* R.D. Stone). Pour chaque espèce, le statut de conservation est évalué selon les Catégories et Critères de la Liste rouge de l'UICN. A cause de la déforestation anthropogène à Madagascar, *Memecylon complanatum*, *Memecylon paraxenum* et *Memecylon pseudogaleatum* pourraient être éteintes, car ces trois espèces n'ont pas été récoltées depuis 50–60 ans. Les travaux pour une révision complète du genre *Memecylon* à Madagascar se poursuivent.

Keywords

MELASTOMATACEAE – *Memecylon* – Madagascar – Taxonomy – New species

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Introduction

The genus *Memecylon* L. comprises > 350 species of shrubs or small to medium-sized trees (Renner et al., 2020) and has a wide distribution in the Old World tropics, mainly in the understory of evergreen humid forest. In accordance with morphological and recent molecular findings (Jacques-Félix, 1978; Bremer, 1982; Stone, 2006a, 2014; Stone & Andreasen, 2010), 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. The members of *Memecylon* s.str. are characterized by a combination of very hard wood; leaves opposite, estipulate, and apparently 1-nerved; 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. In some *Memecylon* species, the leaves are "subtrinervate", i.e. with the midnerve predominant and lateral nerves conspicuous but weaker, ± intramarginal and forming a series of arches between their points of attachment with the transverse veins (Jacques-Félix et al., 1978; Jacques-Félix, 1983, 1985a).

With regard to *Memecylon* of Madagascar, the most recent revision (Jacques-Félix, 1985a, 1985b) recognized 78 species of which 33 were newly described. In the same work, three previously recognized species were relegated to synonymy, and 11 species originally described in *Memecylon* were transferred to *Lijndenia* or *Warneckea*. More recently, many new collections have become available for study, and much of this additional material appears to represent species new to science (Stone, 2006b, 2012; Stone & Callmander, 2011). *Memecylon* clearly ranks among the ten largest woody genera on the island (see Schatz, 2001), and all of the Malagasy species are endemic with the majority being known from just one or two sites (Stone, 2012).

Work towards another comprehensive revision of Malagasy *Memecylon* is currently in progress, with approximately 1,000 collections (3,350 herbarium sheets) examined thus far (R.D. Stone, unpubl. data). The infrageneric classification is also in need of revision, in view of molecular analyses (Stone, 2014 and unpubl. data) indicating that at least some of the seven sections previously recognized by Jacques-Félix (1985a, 1985b) are not monophyletic. In these molecular results, the Malagasy species are resolved in two clades that are not each other's closest relatives. The first of these groups is rich in species and centered on the island's eastern moist evergreen forests, yet phylogenetically nested within this clade are some endemic lineages of the neighboring Comoro and Mascarene islands (indicating that these originated by dispersal from Madagascar). The second Malagasy clade is phylogenetically nested within the predominantly East and southern African sect. *Buxifolia* R.D. Stone, and consists of at least three species (*M. buxifolium* Blume, *M. multinode* Jacq.-Fél., *M. amplifolium* R.D. Stone) inhabiting the dry deciduous forests in the west and extreme northern parts of the island.

In the present work, I describe nine new species of *Memecylon* from Madagascar, based mainly on material received on loan from the TEF herbarium administered by FO.FI.FA (an acronym for the organization Foibe Fikarohana ampiharina Fampandrosoana ny eny Ambanivohitra, otherwise known as the Centre National de la Recherche Appliquée au Développement Rural). The TEF herbarium currently holds about 60,000 specimens and was established in 1948 as part of the Service Forestier with the aim of preserving a reference collection of the woody flora of Madagascar. The first curator was René Capuron (1921–1971), French botanist who also authored several works on Madagasacar's woody plants, including *Essai d'introduction à l'étude de la flore forestière de Madagascar* (Capuron, 1957). Another former curator is Raymond Rabevohitra (1946–), Malagasy botanist and forestry engineer who co-authored a book on the *Leguminosae* of Madagascar (Du Puy et al., 2002) as well as an important article on Madagascar's littoral forests (Consiglio et al., 2006). To emphasize the importance of the TEF herbarium for the study of *Memecylon* and other woody groups, it should be noted that two of the new species described herein are based solely on material found in this collection (i.e., evidently not duplicated elsewhere).

Additional herbarium material was studied in CAS, K, MO, NU, P, TAN, and WAG. All specimens cited herein have been seen by me. For each species, the conservation status is provisionally assessed in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012), with the Extent of Occurrence (EOO) and Area of Occupancy (AOO) estimated using GeoCAT (2020; see Bachman et al., 2011) with a 4 km² grid cell size. A differential diagnosis is also provided for each species, together with a discussion of affinity in cases where this is known. However, an identification key has not been provided (because it is premature to do so, pending completion of the aforementioned revision of Malagasy *Memecylon*).

Taxonomy

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

Holotypus: Madagascar. Reg. SAVA [Prov. Antsiranana]: au S de Sambava, 9.IV.1967, fl., *Service Forestier 27692* (P [P00500498]!; iso-: P [P04802217]!, TEF!).

Affinis fortasse Memecylon bakeriano Cogn. sed ab eo habitu arborescente (non frutescente), ramulis juvenilibus compressis (non teretibus), foliis coriaceis petiolo robusto c. 1 mm longo insidentibus (non subcoriaceis petiolo 1–2 mm longo), lamina

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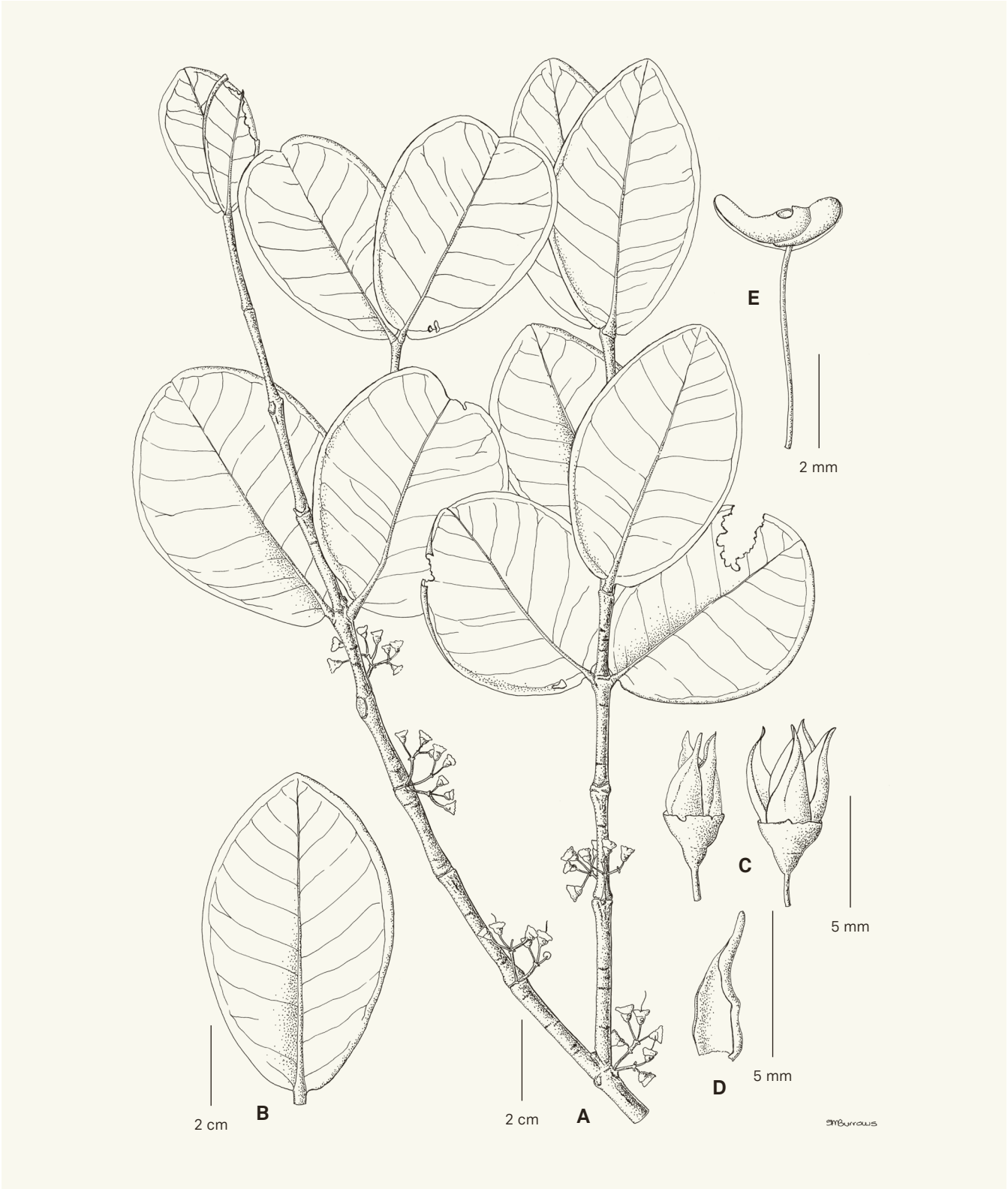

Fig. 1. – *Memecylon complanatum* R.D. Stone. **A.** Flowering branch; **B.** Leaf; **C.** Flowers at start of anthesis; **D.** Petal; **E.** Stamen. [*Service Forestier 27692*, P] [Drawing: S. Burrows]

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foliari ampliore 6.5–8 × 4–5.5 cm (non 4.5–6 × 1.5–2.5 cm) basi anguste rotundato-subcordata (non cuneata), cymis ad nodos defoliatos ramulorum vetustiorum (non ad axillas foliorum) omnino dispositis, pedunculis brevioribus 5–9 mm (non 10–15 mm) longis, pedicellis distinctis 2.5–3.5 mm longis (non brevissimus vel fere absentibus) atque margine calycis truncato alternatim microdentato indentulatoque (non paulo sinuato) differt.

Evergreen *tree*, 7–8 m or more in height; young branchlets dark brown, compressed; older branchlets 3–5 mm in diam., thickened at the nodes, bark grayish white, finely longitudinally fissured; internodes (1.2–)1.8–3(–4.3) cm long. *Leaves* coriaceous, drying brown, paler and yellowish abaxially; petioles short and stout, 1 mm long, 2–4 mm in diam.; blades elliptic to broadly elliptic, (5.7–)6.5–8(–8.4) × (3.5–)4–5.5(–6.4) cm, base narrowly rounded-subcordate (sinus between lobes up to 1.5 mm deep), apex rounded to obtuse (rarely retuse), margins revolute; midnerve clearly visible, canaliculate on the adaxial surface, dark brown and prominent abaxially, up to 3 mm wide at the base becoming progressively narrower towards the apex; intramarginal nerves faintly visible and somewhat prominent on the abaxial surface, forming a series of arches between the 7–10 pairs of transverse veins, these of about the same thickness as the intramarginal nerves, ± prominent on both surfaces, oriented at an oblique angle relative to the midnerve and spaced c. 4–9 mm apart. *Cymes* 2–10-flowered, in fascicles of 2–4 (rarely solitary) at the defoliated nodes of older branchlets; peduncles dark purple, compressed, (2–)5–9 mm long; secondary axes 3–6 in number, 0.5–3(–6) mm long; additional axes when present very short; bracts deciduous, not seen. *Flowers* borne individually at the ends of the inflorescence axes, on pedicels 2.5–3.5 mm long; hypantho-calyx pale brown in dried material, obconic to cupulo-patellate, 2.5 × 3 mm, margin truncate, remotely 4-microdentate alternating with 4 minute, V-shaped sinuses; corolla in bud narrowly conical-acuminate, c. 3.5 mm high; petals reportedly bluish, narrowly triangular in outline, acuminate-acute at apex, 4–4.5 × 1.5–1.75 mm; stamens dolabriform, filaments c. 3 mm long, anthers 2.5 mm long, the connective dark purple, incurved by the small dorsal oil-gland, thecae yellow and positioned at the anterior end, extremity extending 1.5 mm past the gland, narrowly conical then sharply acuminate-acute; style filiform, 8–10 mm long; epigynous chamber deep, with four radial partitions each forked and forming a V-shaped pattern beneath each petal scar. *Fruit* unknown.

Etymology. – The epithet *complanatum* is an adjective meaning "flattened," in reference to the compressed branchlets and peduncles of this species (see Notes).

Distribution and ecology. – The type and only known collection of *M. complanatum* was made on Madagascar's eastern coast, near the city of Sambava (Fig. 2). Habitat in littoral forest on sand.

Conservation status. – *Memecylon complanatum* is known from a single location with an AOO of 4 km^2. The species has not been collected again in more than 50 years, despite recent intensive field-work in Madagascar's eastern littoral forests (Consiglio et al., 2006). Most of these forests are already destroyed with only c. 10 percent of their original area still remaining as small fragments. Given these facts, it is quite possible that *M. complanatum* is already extinct, although additional field-work is needed to confirm this. *Memecylon complanatum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – While *M. complanatum* is certainly a distinct species, its affinity is not well understood. Jacques-Félix annotated the holotype sheet "se rapproche de *M. ambrense* Jacq.-Fél. et de *M. thouarsianum* Naudin, s'en distingue par ses cymes ramifiées". The leaf venation pattern and anthers of *M. complanatum* also look remarkably like those of *M. bakerianum* Cogn., but the latter species has much smaller leaves with leaf-bases cuneate (not narrowly subcordate as in *M. complanatum*), and the cymes may appear in the leaf-axils (vs. restricted to the defoliated nodes of the older branchlets). *Memecylon bakerianum* is furthermore a shrub of Madagascar's central plateau (1000–1700 m elevation), far removed from the littoral forest habitat of *M. complanatum*. Amongst other coastal species, *M. complanatum* might be compared with *M. subcuneatum* H. Perrier (known from further south near Mananara Avaratra in Toamasina province), which has somewhat smaller leaves that are suborbicular to obovate in outline and cuneate at base (not elliptic-subcordate as in *M. complanatum*). Further comparison between *M. complanatum* and *M. subcuneatum* is difficult since the material of the former is lacking fruits, and the flowers of the latter are unknown.

Near the type locality of *M. complanatum* (to the south of Sambava), the only other *Memecylon* species that has been collected in the littoral forest is *M. fernandesiorum* Jacq.-Fél., but that species has young branchlets quadrangular-alate (vs. compressed in *M. complanatum*); very different leaves (blades narrowly elliptic, up to 15 × 5 cm with apex acuminate and transverse veins nearly perpendicular to the midnerve vs. blades elliptic to broadly elliptic, mostly 6.5–8 × 4–5.5 cm with apex rounded to obtuse and transverse veins oblique relative to the midnerve); cymes 1–3-flowered, sessile or on peduncle to 3 mm long (vs. cymes up to 10-flowered, on compressed

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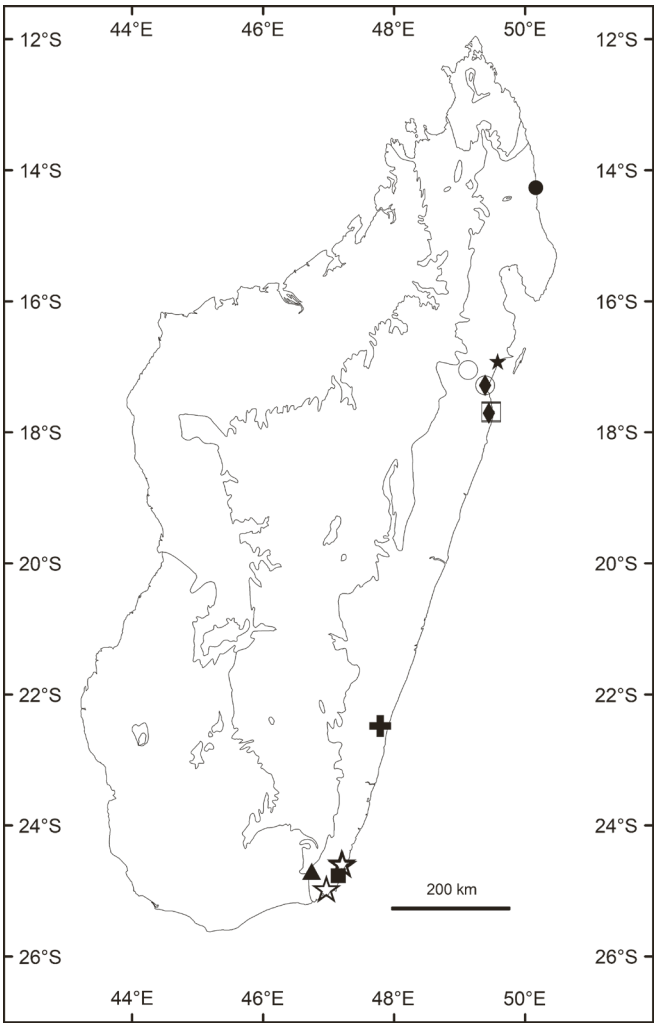

Fig. 2. – Geographic distribution of *Memecylon complanatum* R.D. Stone (closed circle), *M. convergens* R.D. Stone (closed diamonds), *M. fofifa* R.D. Stone (open circles), *M. longipetiolatum* R.D. Stone (open square), *M. paraxenum* R.D. Stone (closed star), *M. potamicum* R.D. Stone (closed triangle), *M. pseudogaleatum* R.D. Stone (closed cross), *M. subchartaceum* R.D. Stone (open stars), and *M. unguiculare* R.D. Stone (closed square), mapped on the bioclimatic zones of Madagascar (after Cornet, 1974 ; see Schatz, 2000).

peduncles mostly 5–9 mm long); and anthers basifixed, lacking a dorsal oil-gland (vs. anthers medifixed, dorsal gland present).

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

Holotypus: Madagascar. Reg. Atsinanana [Prov. Toamasina]: distr. Fénérive [Fenoarivo Atsinanana], village Tanambao Tampolo, Tampolo (parcelle B.3), 3 m, 31.III.1955, fl., *Service Forestier 13079* (TEF!; iso-: P [P05320823]!).

Affinis Memecylon bezavonensi (Jacq.-Fél.) R.D. Stone et M. eglanduloso H. Perrier, sed ab illo fructu corona calycina saepe carente, a hoc fructu bilateraliter asymmetrico, ab ambobus petiolo breviore 1–3 mm longo, floribus minoribus in alabastro c. 6 mm longis, hypantho-calyce 2–2.5 × 4–4.5 mm atque fructu majore 20–25 mm longo differt.

Evergreen *tree* 10–17 m in height; bark grayish, finely longitudinally fissured. Youngest branchlets ± quadrangular or subquadrangular, becoming terete by the second internode below the shoot apex; internodes (1.5–)2–4.5(–7) cm long. *Leaves* coriaceous, bright green and somewhat shining on the adaxial surface, paler abaxially, ± granular in dried material (owing to the presence of columnar sclereids in the leaf mesophyll); petioles robust, 1–3 mm long; blades varying from narrowly elliptic to elliptic to obovate, 4–8 × 1.5–4 cm (roughly 2–2.5× longer than wide), cuneate at base, rounded to attenuate and obtuse at apex; midnerve conspicuous, impressed on the adaxial surface, canaliculate abaxially; intramarginal nerves and transverse veins obscure; margins slightly revolute. *Cymes* c. 1 cm long, unbranched, 1–3-flowered, borne at the defoliated nodes just below the current leaves; peduncles 1–3 mm long, quadrangular; bracts deciduous. *Flowers* relatively large, c. 6 mm long in bud; pedicel robust, 2 mm long; hypantho-calyx obconic to broadly campanulate, 2–2.5 × 4–4.5 mm, thick, coriaceous, the margin entire to shallowly sinuate; petals thick, ovate, 5 × 3 mm; stamens dolabriform, anthers 3.5 mm long, thecae fronto-ventral, convex; connective prolonged c. 2.5 mm past the vestigial dorsal gland, acute at the extremity; filaments 5 mm long; epigynous chamber with thickened calyx limb extending beyond the line of insertion of the petals by c. 1 mm, forming a flat, torus-like margin, the petal- and filament-scars prominent, the interstaminal partitions only slightly pronounced, cruciform; style 10 mm long. *Fruits* ± globose, c. 20–25 mm high × 20–25 mm in diam., developing asymmetrically with the base somewhat gibbous and the apex correspondingly displaced to the opposite side; calycinal crown non-persistent to subprominent.

Etymology. – The epithet *convergens* is an adjective referring to the similarity in vegetative features between this species and *M. infuscatum* Jacq.-Fél., which occurs at the same locality (Tampolo) but has different flowers and fruits (see Notes).

Distribution and ecology. – Known from two localities on the eastern coast of Madagascar, i.e. the Réserve de Tampolo near Fénérive-Est and the Analalava forest near Foulpointe (Fig. 2). The habitat is in littoral forest on sand (Tampolo) or sublittoral forest on laterite (Analalava). Elevation from near sea level to c. 60 m.

Conservation status. – *Memecylon convergens* has two known locations and an estimated AOO of 8 km^2. The species has not been seen for more than 50 years and is perhaps very rare, yet is presumed extant since both locations are within protected

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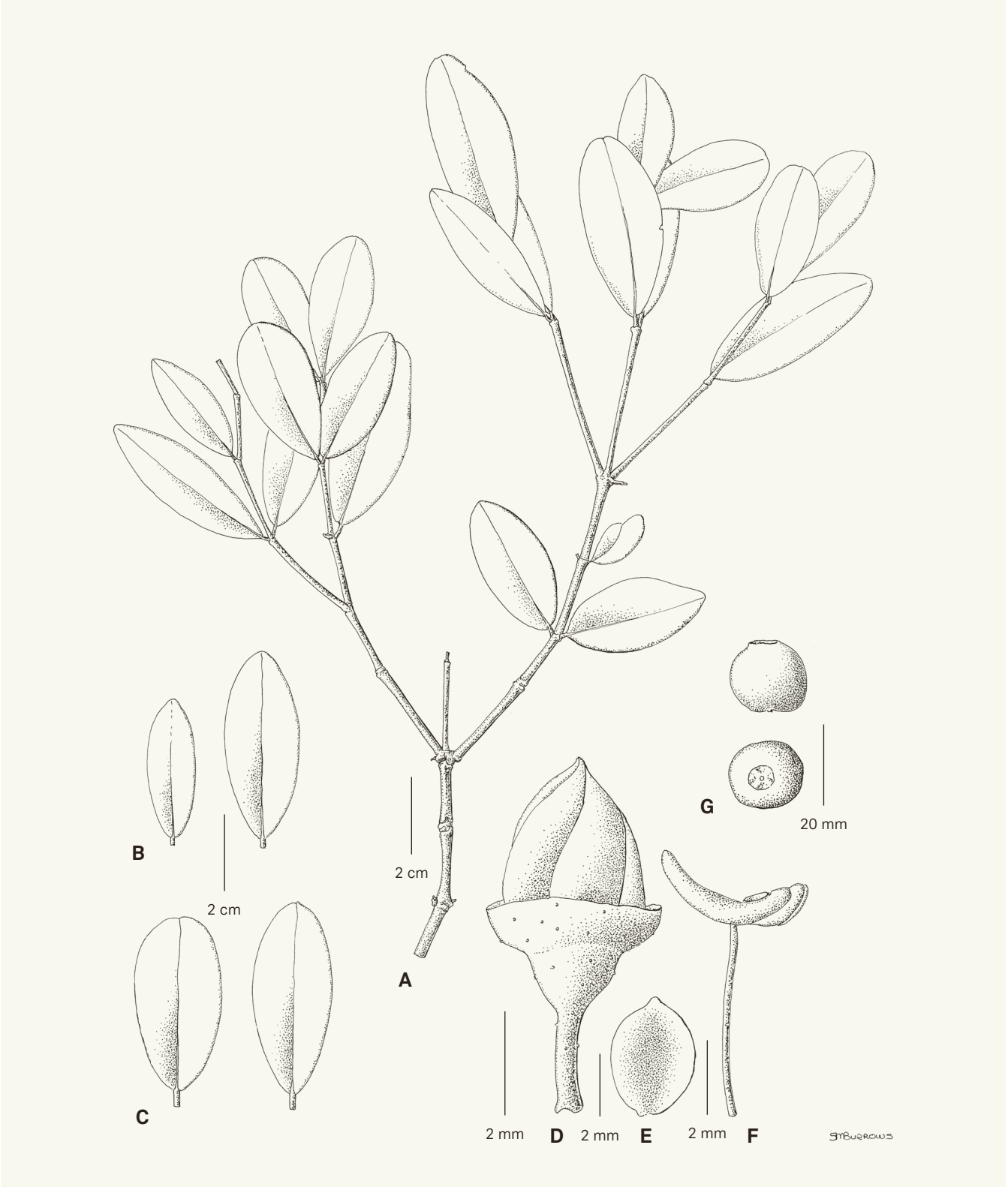

Fig. 3. – *Memecylon convergens* R.D. Stone. **A.** Leafy branch; **B–C.** Leaves; **D.** Floral bud; **E.** Petal; **F.** Stamen; **G.** Fruit. [**A–B, D–F:** *Service Forestier 13079*, TEF; **C, G:** *Service Forestier 16639*, P] [Drawing: S. Burrows]

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areas (the first location at Tampolo was previously managed as a "Station forestière" and re-gazetted in 2006 as a "Paysage Harmonieux Protégé"; the second location at Analalava is currently being protected by the Missouri Botanical Garden). Although threats in these areas are not well-documented, the species is provisionally assessed as "Vulnerable" [VU D2] in accordance with IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – The leaves of *M. convergens* bear a close resemblance to those of *M. infuscatum*, a species having a much wider distribution in the littoral forests of eastern Madagascar from the Masoala Peninsula southward to the vicinity of Tôlañaro (Fort-Dauphin). Both of these species also have their type locality in the Réserve de Tampolo. The fruits of *M. infuscatum* were first described as being 20 mm in diameter (Jacques-Félix, 1985b), based on another collection (*Service Forestier 16639*, P) from the same locality. However, subsequent collections have shown that the authentic *M. infuscatum* has fruits that are much smaller (c. 5 mm in diameter). The true identity of *Service Forestier 16639* remained a mystery until the discovery of additional flowering material in the TEF herbarium revealed that the vegetative similarity between *M. infuscatum* and the large-fruited species described here as *M. convergens* is quite superficial.

The real affinity of *M. convergens* appears to be with the species-group that includes *M. eglandulosum* H. Perrier, *M. bezavonense* (Jacq.-Fél.) R.D. Stone, *M. planifolium* Jacq.-Fél., and *M. tsaratananense* (H. Perrier) Jacq.-Fél., all of which have relatively large flowers for *Memecylon*. According to recent molecular results (R.D. Stone, unpublished data), this group should also include *M. galeatum* H. Perrier and *M. pileatum* Jacq.-Fél., two species having similarly large flowers as well as a calyptrate calyx that completely covers the corolla before anthesis and then becomes detached irregularly from the hypanthium. Within this larger group, the bilaterally asymmetrical fruits of *M. convergens* are seen also in *M. bezavonense* and the newly described *M. pseudogaleatum* R.D. Stone (q.v.).

The collection *Service Forestier 28077*, cited here as a paratype of *M. convergens*, was previously determined as *M. pileatum* (Jacques-Félix, 1985a), but, in comparison with that species, it has very different leaves (dimensions smaller to 8 × 4 cm with apex rounded to attenuate and obtuse, vs. dimensions larger to 14 × 7 cm with apex abruptly short-acuminate). In comparison to material of *M. convergens* from the type locality at Tampolo, the collection *Service Forestier 28077* has internodes longer mostly 3.5–6 cm (vs. internodes shorter mostly 2–3.5 cm) and leaf-blades larger with dimensions 6.5–8 × 3–4 cm (vs. leaf-blades smaller with dimensions mostly 4–5.2 × 1.5–2.2 cm). However, *Service Forestier 28077* fits well within *M. convergens* in the character of its branchlets, shape of its leaves, and its large, ± asymmetrical fruits with calycinal crown reduced. Additionally, the two collecting localities at Tampolo and Analalava are separated by an airline distance of less than 50 km.

Paratypi. – **Madagascar**. **Reg. Atsinanana [Prov. Toamasina]:** Fénérive-Est [Fenoarivo Atsinanana], Ampasina, Tampolo, Jard. Bot. 21, 6.III.1957, fr., *Service Forestier 16639* (MO, P, TEF); forêt d'Analalava, à l'W de Foulpointe [Mahavelona], 19.XII.1967, fr., *Service Forestier 28077* (K, MO, P, TEF).

Memecylon fofifa R.D. Stone, **sp. nov.** (Fig. 4).

Holotypus: Madagascar. Reg. Atsinanana [Prov. Toamasina]: Fénérive-Est, Tampolo, I.1986, fl. & y.fr., *Service Forestier 32781* (TEF!).

Affinis Memecylon cardiophyllo Cogn. sed lamina foliari supra nitida subtus obscura (non utrinque obscura), nervatione supra valde impressa plusminusve bullata (non nervatione sat inconspicua), pedunculis filiformibus 6–15(–24) mm (non 3–7 mm) longis, pedicellis longioribus 3–5 mm longis atque petalis minoribus c. 2 × 1 mm (non c. 3 × 1.8 mm) differt.

Evergreen *shrub* or small *tree* to 5 m high; young branchlets blackish alate-crisped, the wings soon excoriating and the older branchlets subquadrangular to terete with bark grayish brown; nodes densely bristly (bristles up to 3 mm long); internodes 1.4–3.7(–6.4) cm long. *Leaves* subsessile, subchartaceous, dark green and ± glossy adaxially, ± rusty brown abaxially in dried material; blades narrowly triangular-ovate to lance-oblong, (2–)3–5.8(–8.5) × 1.2–2.3(–2.6) cm, base cordate and amplexicaul, attenuate above the middle and ± acuminate at apex, acumen 6–14 mm long, obtuse or acute; midnerve, intramarginal nerves and transverse veins strongly impressed adaxially, prominent abaxially, the leaf thus appearing ± bullate; tranverse veins 6–8 pairs oriented at a slightly oblique angle relative to the midnerve; intramarginal nerves forming a series of shallow arches between the junctions with the transverse veins. *Cymes* (2–)3–5-flowered, solitary in the leaf axils, less often at the defoliated nodes of older branchlets; peduncles very slender, 6–15(–24) mm long; axis often extended by a short internode 2–4 mm above the peduncle; bracts acicular, 0.5–1 mm long, persistent. *Flowers* on slender pedicels 3–5 mm long; hypantho-calyx cupulo-patellate, 1–1.5 × 2 mm, margin truncate and remotely 4-microdentate; petals white, ovate-acuminate, 2 × 1 mm, base truncate to subcordate-auriculate, acumen c. 0.5 mm long, acute, margins scarious; stamens dolabriform, anthers 1.25 mm long, thecae situated fronto-ventrally, connective dorsally keeled and lacking a gland, posterior extremity acute; fully extended filaments not seen; epigynous chamber shallow, top of ovary marked by 8 prominent radial lines; style 5 mm long. *Fruits* globose, 7 mm in diam., lacking a calycinal crown.

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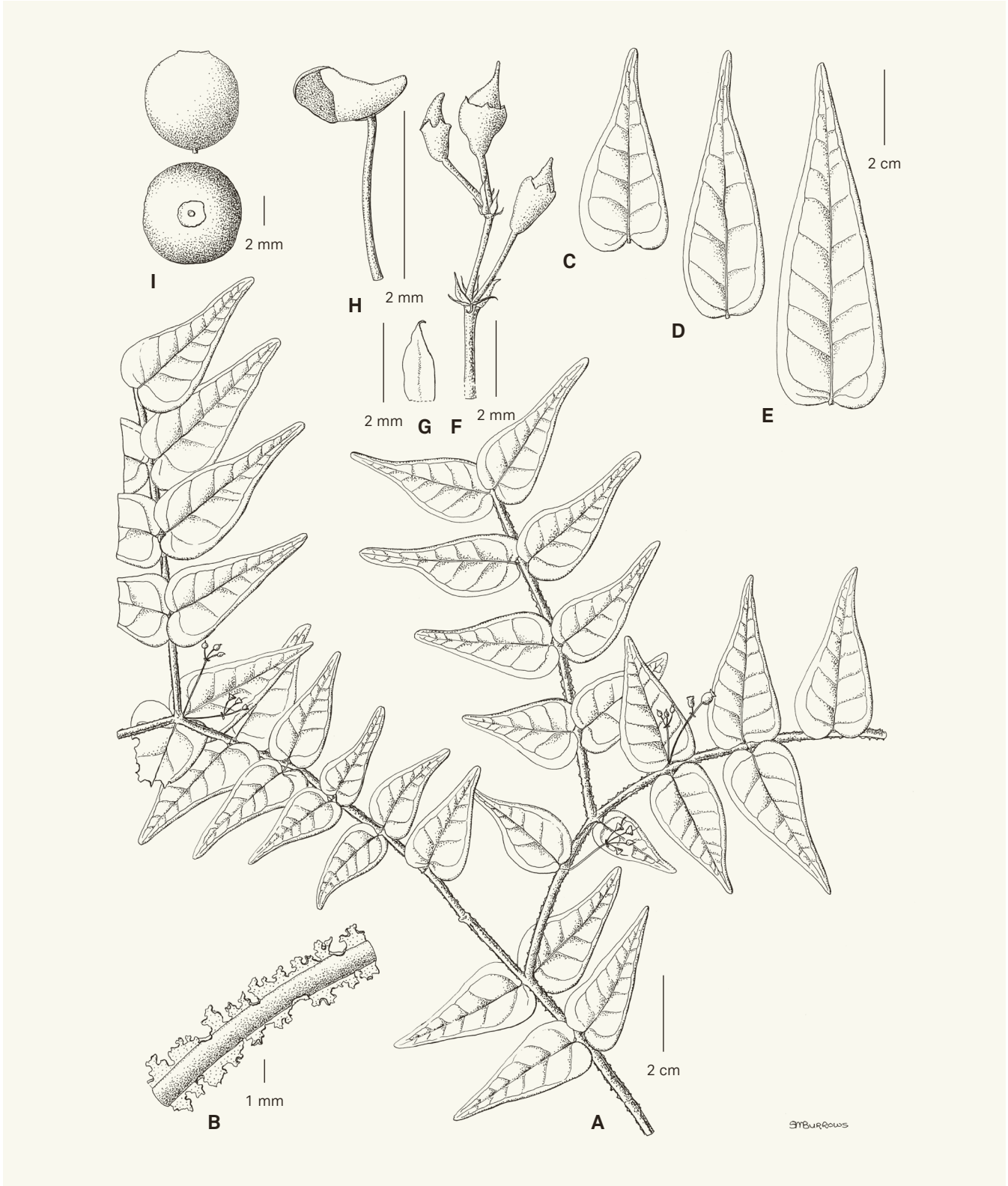

Fig. 4. – *Memecylon fofifa* R.D. Stone. **A.** Flowering branch; **B.** Detail of young branchlet; **C–E.** Leaves; **F.** Inflorescence; **G.** Petal; **H.** Stamen; **I.** Fruit. [**A–C, F–H:** *Service Forestier 32781*, TEF; **D, I:** *Service Forestier 21410*, TEF; **E:** *Service Forestier 32204*, TEF] [Drawing: S. Burrows]

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Etymology. – The epithet *fofifa* is applied here as a noun in apposition, in honor of the FO.FI.FA Herbarium (TEF) where all of the known material of this species is housed.

Distribution and ecology. – Known from two localities in east-central Madagascar, i.e., the Réserve de Tampolo near Fénérive-Est, and another site c. 40 km to the west, at a place called Tsinjoarivo near the village of Tanamarina (Fig. 2). The habitat at Tampolo is in littoral forest on sand. Elevation from near sea level to c. 700 m.

Conservation status. – *Memecylon fofifa* has two known locations and an estimated AOO of 8 km². It is still poorly known and perhaps very rare, yet is presumed extant since the Tampolo forest remains more-or-less intact. Although threats in the Tampolo reserve are not well-documented, the species is provisionally assessed as "Vulnerable" [VU D2] in accordance with IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – The affinity of *M. fofifa* is clearly with *M. cardiophyllum* Cogn., but compared to the material assigned to that species the peduncles and pedicels are much longer. The leaves are also unlike those of *M. cardiophyllum* in being ± bullate on the adaxial surface.

Paratypi. – Madagascar. **Reg. Atsinanana [Prov. Toamasina]:** distr. Fénérive [Fenoarivo Atsinanana], village Tanamarina, Tsinjoarivo, 3.X.1963, fr., *Service Forestier 21410* (P, TEF); Tampolo, 25.III.1981, fr., *Service Forestier 32204* (TEF).

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

Holotypus: Madagascar. **Reg. Atsinanana [Prov. Toamasina]:** W of Foulpointe [Mahavelona], Analalava, 13.XII.1984, fl., *Barnett & Dorr 261* (K!; iso-: MO-3330496!, P [P04802205]!, TAN!).

Ab aliis speciebus Memecylon sect. Pseudonaxiandrae sensu Jacq.-Fél. combinatione foliorum anguste elliptico-ovatorum petiolis 11–16 mm longis insidentium atque pedunculorum filiformium 17–26 mm longorum distinguenda.

Evergreen *shrub* c. 2 m high; young branchlets terete, reddish, very slender; leafy branchlets c. 2 mm in diam., bark blackish brown, nodes somewhat thickened; internodes (2–)2.5–3.5(–4) cm long. *Leaves* subcoriaceous, bright green and glossy on the adaxial surface, paler and dull abaxially; petioles 11–16(–18.5) mm long, channeled adaxially, ± yellowish; blades narrowly elliptic-ovate, (5–)6–8(–8.7) × (1.7–)2–2.6(–3) cm, base cuneate and confluent with the petiole, apex obtuse or vaguely obtuse-acuminate; midnerve clearly visible, impressed on the adaxial surface, prominent and yellowish abaxially; intramarginal nerves obscure; transverse veins faintly visible, subprominent on the abaxial surface, slightly oblique relative to the midnerve; margins slightly revolute. *Cymes* subumbellate, 3–9-flowered, solitary or geminate in the axils of the upper leaves; peduncles very slender, 17–26 mm long; axis often extended by a short internode 1–2(–3) mm above the peduncle; bracts narrowly triangular, 1–1.5 mm long, persistent; bracteoles similar but smaller. *Flowers* on pedicels (2–)2.5–3.5(–4) mm long; hypantho-calyx pale green, campanulate, 2 × 3 mm, margin sinuate-dentate, teeth with narrow scarious margin; corolla in bud twisted, conical-acute, 2.5–3 mm high; petals triangular-ovate, 3 × 1.5 mm, truncate at base, acuminate at apex, acumen c. 1 mm long, acute; fully developed staminal filaments not seen; anthers 2 mm long, connective keeled on the back and lacking an oil-gland, thecae positioned at the anterior end, posterior extremity of connective acute; style 6 mm long; epigynous chamber marked by 8 prominent radial lines. *Fruits* pale green, globose, 5 mm in diam.; calycinal crown persistent, 0.5 mm high, margin truncate.

Etymology. – The adjectival epithet *longipetiolatum* is in reference to the leaves which are borne on remarkably long petioles.

Distribution and ecology. – Known from two localities near the town of Foulpointe, situated on the eastern coast of Madagascar (Fig. 2). Habitat in sublittoral forest at 50–60 m elevation.

Conservation status. – *Memecylon longipetiolatum* has two known locations and an estimated AOO of 8 km². It is still poorly known and perhaps very rare, yet is presumed extant since the type locality at Analalava is currently being protected by the Missouri Botanical Garden. However, the neighboring subpopulation at Mangalimaso has been extirpated by deforestation (R.D. Stone, pers. obs., 17 Nov. 2001). Although threats at Analalava are not well-documented, the species is provisionally assessed as "Vulnerable" [VU D2] in accordance with IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon longipetiolatum* is placed in *Memecylon* sect. *Pseudonaxiandra* sensu Jacques-Félix (1985a) on account of its delicate cymes borne on long, slender peduncles; calyx-margin shallowly sinuate-dentate, the corolla thus well-exposed in bud; and stamens dolabriform with oil-gland absent. However, recent molecular phylogenetic studies have suggested that sect. *Pseudonaxiandra* is not monophyletic and needs to be revised (Stone, 2014, unpubl. data). Other species with similarly long, slender peduncles include *M. alatum* Aug. DC., *M. mocquerysii* Aug. DC., *M. inalatum* Jacq.-Fél., *M. impressivenum* R.D. Stone, and the newly described *M. fofifa*, q.v. From these species, *M. longipetiolatum* is immediately recognizable by its extremely long petioles. *Memecylon*

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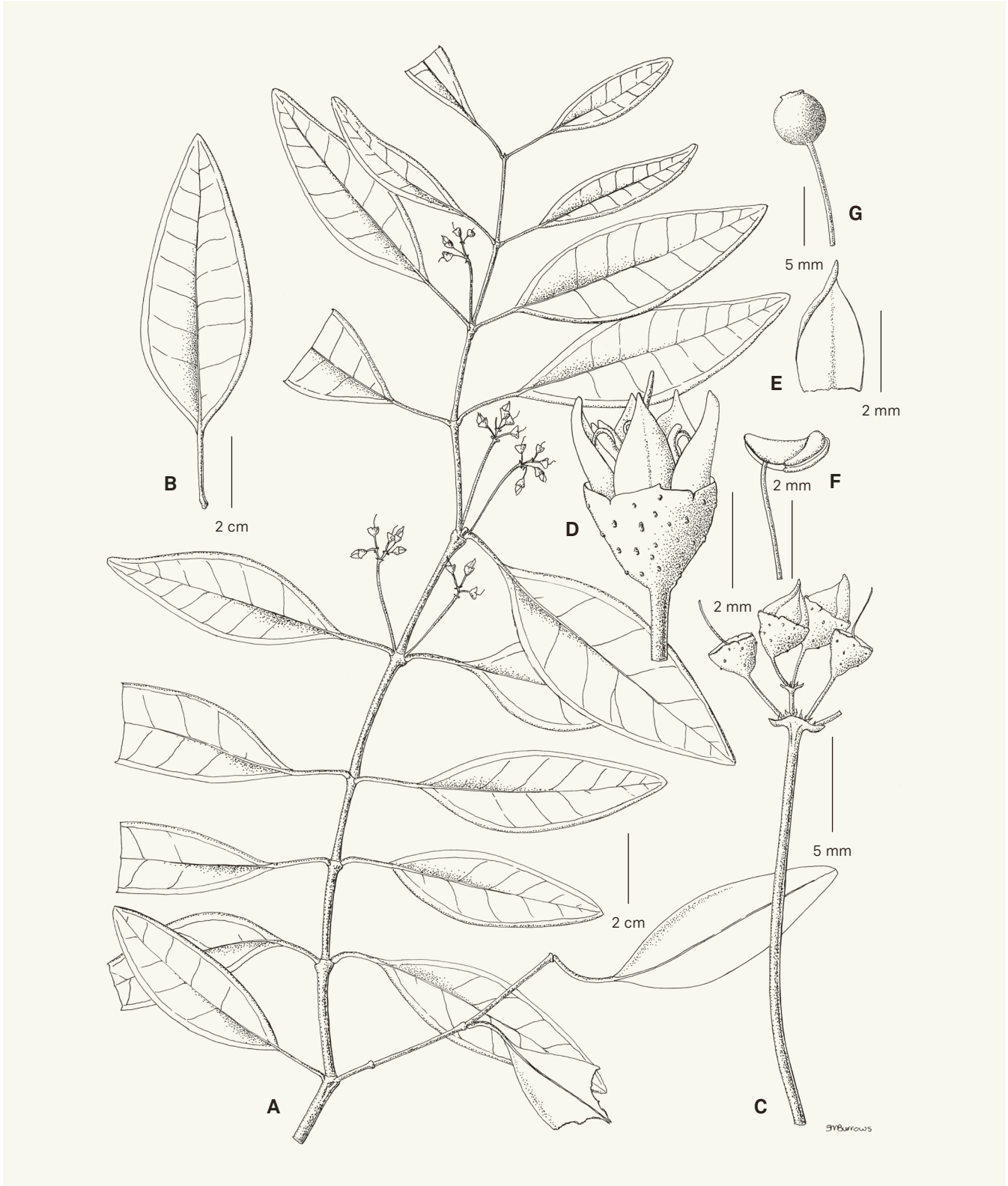

Fig. 5. – *Memecylon longipetiolatum* R.D. Stone. **A.** Flowering branch; **B.** Leaf; **C.** Inflorescence with floral buds; **D.** Flower at start of anthesis; **E.** Petal; **F.** Stamen; **G.** Fruit.
[**A–F:** *Barnett & Dorr 261*, K, MO; **G:** *Service Forestier 22100*, TEF] [Drawing: S. Burrows]

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mangiferoides Jacq.-Fél. also has leaves on long petioles (10 mm vs. 11–18.5 mm in *M. longipetiolatum*), but has longer leaf-blades (to 14 cm vs. mostly 6–8 cm), and the cymes are sessile or short-peduncled at the defoliated nodes of older branches (vs. cymes axillary and with very long and slender peduncles). In *M. longipetiolatum*, the color of the petals and other floral parts is presumably white, although this was not recorded by the collectors.

Paratypus. – Madagascar. **Reg. Atsinanana [Prov. Toamasina]:** forêt de Mangalimaso, à l'W de Foulpointe [Mahavelona], 23.XI.1962, fr., *Service Forestier 22100* (TEF).

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

Holotypus: Madagascar. Reg. Analanjirofo [Prov. Toamasina]: au S de Soanierana-Ivongo, forêt de Sahavolamena, XI.1964, fr., *Service Forestier 23813* (P [P00516065]!; iso-: P [P04802211, P04802212]!, TEF!).

Ob florem ignotum affinitatis incertae, sed a congeneris madagascariensibus mihi cognitis lamina foliari nervis lateralibus validis in dimidio inferiore non arcuatis atque fructu globoso circa magnitudinem pisi bene distincta.

Large *shrub* or small *tree*, evergreen; young branchlets c. 2 mm thick, subquadrangular to terete, the bark tawny white, smooth, rapidly excoriating; older branchlets 3–4 mm in diam., thickened at the nodes, bark brown, finely longitudinally fissured; internodes (3.2–)4–6(–6.7) cm long. *Leaves* coriaceous, dark green and dull adaxially, somewhat paler abaxially; petioles c. 2 mm thick, 4–7 mm long, dark purplish brown to almost black, flattened adaxially, rounded abaxially; blades ovate-lanceolate, (9.3–)10–14.5(–16.4) × (4.1–)4.8–6.2 cm, rounded at base, attenuate above the middle and with apex obtuse or vaguely obtuse-acuminate, the acumen when present (5.5–)9–14 mm long; midnerve conspicuous, impressed on the adaxial surface, prominent abaxially; one pair of lateral nerves also conspicuous but much weaker than the midnerve, curvilinear in outline and situated 4–7 mm from the margin below the middle of the blade, becoming intramarginal and ± evanescent towards the apex; transverse veins nearly invisible, oriented at an oblique angle relative to the midnerve; margin revolute especially toward the base of the blade. *Cymes* subumbellate, solitary in the lower leaf-axils and in fascicles of 2–3 at the defoliated nodes of older branchlets; peduncles ranging from almost absent to 1–8 mm long, ± quadrangular to compressed, dark purplish brown; axis sometimes extended by a short internode 1–2 mm above the peduncle; bracts triangular, 1–1.5 mm long, persistent; bracteoles similar but smaller. *Flowers* unknown. *Fruits* globose, 5–5.5 mm in diam., borne on slender pedicels 3–3.5 mm long. Persistent calycinal crown c. 0.5 mm high, the margin truncate to very shallowly sinuate and 4-microdentate; epigynous chamber shallow, nearly smooth, the top of the ovary marked only by the stylar scar and with eight faint interstaminal lines in the shape of a cross. Embryo with cotyledons leafy, convoluted.

Etymology. – The epithet *paraxenum* is an adjective derived from the Greek word *paraxenos* meaning "strange, bizarre, peculiar, outlandish, quizzical or freakish" in reference to the leaves with strongly developed marginal nerves, which initially led me to suspect this species should be placed in *Lijndenia* and not in *Memecylon* sensu stricto (see Notes).

Distribution and ecology. – The type and only known collection of *M. paraxenum* was made on Madagascar's eastern coast, near the town of Soanierana-Ivongo (Fig. 2). According to the collector, the site is on lateritic soil and the habitat was presumably in sublittoral forest.

Conservation status. – *Memecylon paraxenum* is known from a single location with an AOO of 4 km^2. The coastal forests of the type region have already been largely destroyed or reduced to small remnants, and the forest of Sahavolamena (the type locality) is now severely degraded with only two small, secondary thickets containing forest tree species (R.D. Stone, pers. obs., 13 Jan. 2007). Given the loss of habitat and the fact that *M. paraxenum* has not been seen in more than 50 years, it is quite possible that the species is already extinct, although additional field-work would be needed to confirm this. *Memecylon paraxenum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – The flowers of *M. paraxenum* are unknown, and its affinity remains uncertain. The conspicuously trinervate leaves of the type material (*Service Forestier 23813*) did not at first suggest to me that it should be placed in *Memecylon*, the leaves of which usually appear 1-nerved (obscurely acrodromous) or less often "subtrinervate" (Jacques-Félix et al., 1978; Jacques-Félix, 1983, 1985a). However, the characters of the embryo as described above are certainly those of *Memecylon* and not of *Lijndenia* or *Warneckea* (Jacques-Félix, 1977, 1978, 1985a).

From the type locality of *M. paraxenum* (at Sahavolamena, south of Soanierana-Ivongo), there are collections of five other *Memecylon* species, including *M. pterocarpum* H. Perrier, *M. pileatum* Jacq.-Fél., *M. laureolum* Jacq.-Fél., *M. dolichophyllum* Naudin, and *M. pterocladum* R.D. Stone. Of these, *M. dolichophyllum* is most similar to *M. paraxenum* on account of its non-winged branchlets and relatively large, ± lanceolate leaves with base rounded, apex attenuate-obtuse and transverse veins scarcely visible. However, *M. paraxenum* differs from *M. dolichophyllum* by its noticeably longer petioles (4–7 mm vs. 2–4 mm), smaller fruits (5–5.5 mm vs. 5.5–7 mm in diam.) and shorter calycinal crown (0.5 mm vs. 1–1.5 mm).

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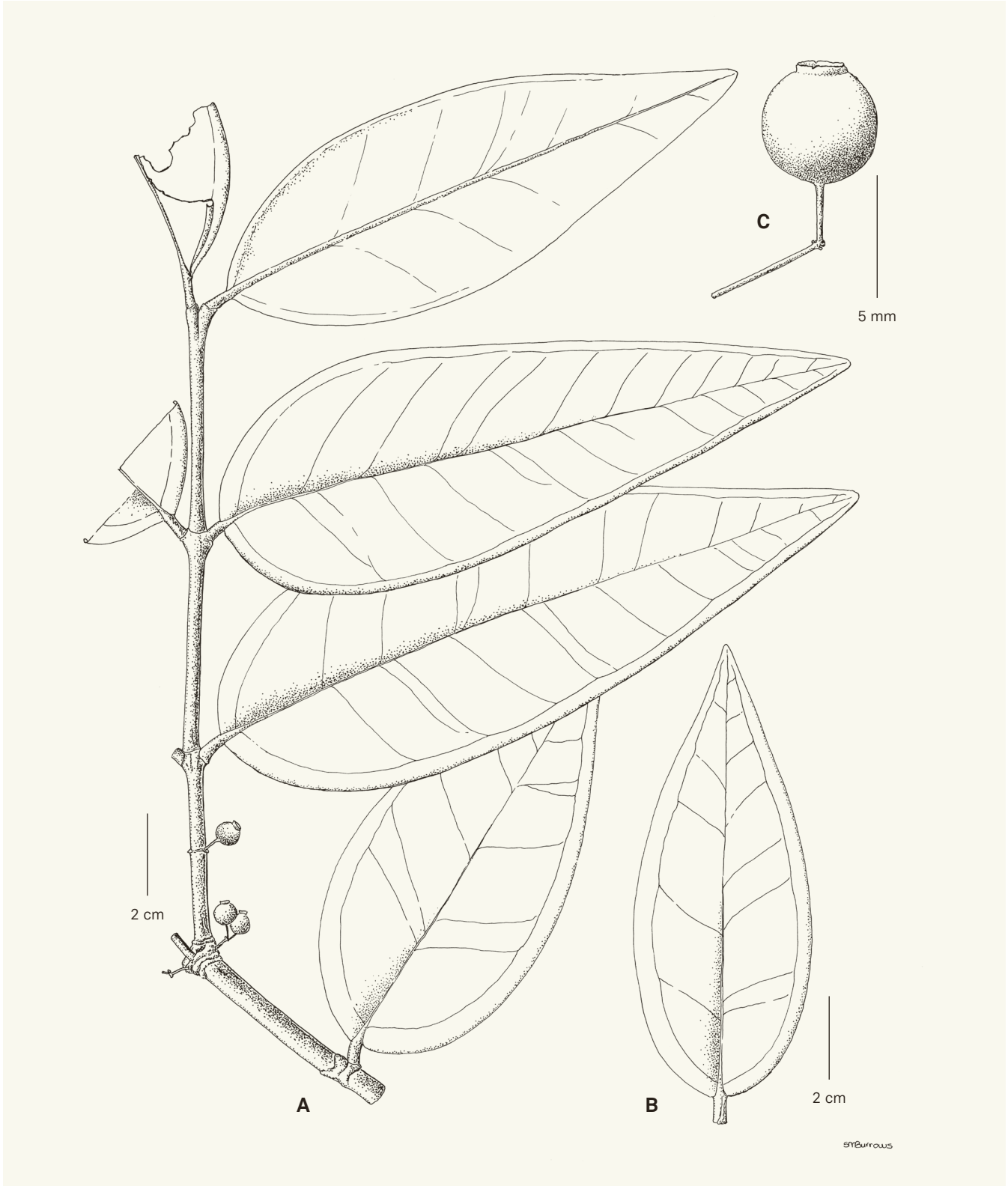

Fig. 6. – *Memecylon paraxenum* R.D. Stone. **A.** Fruiting branch; **B.** Leaf; **C.** Fruit.
[*Service Forestier 23813*, P] [Drawing: S. Burrows]

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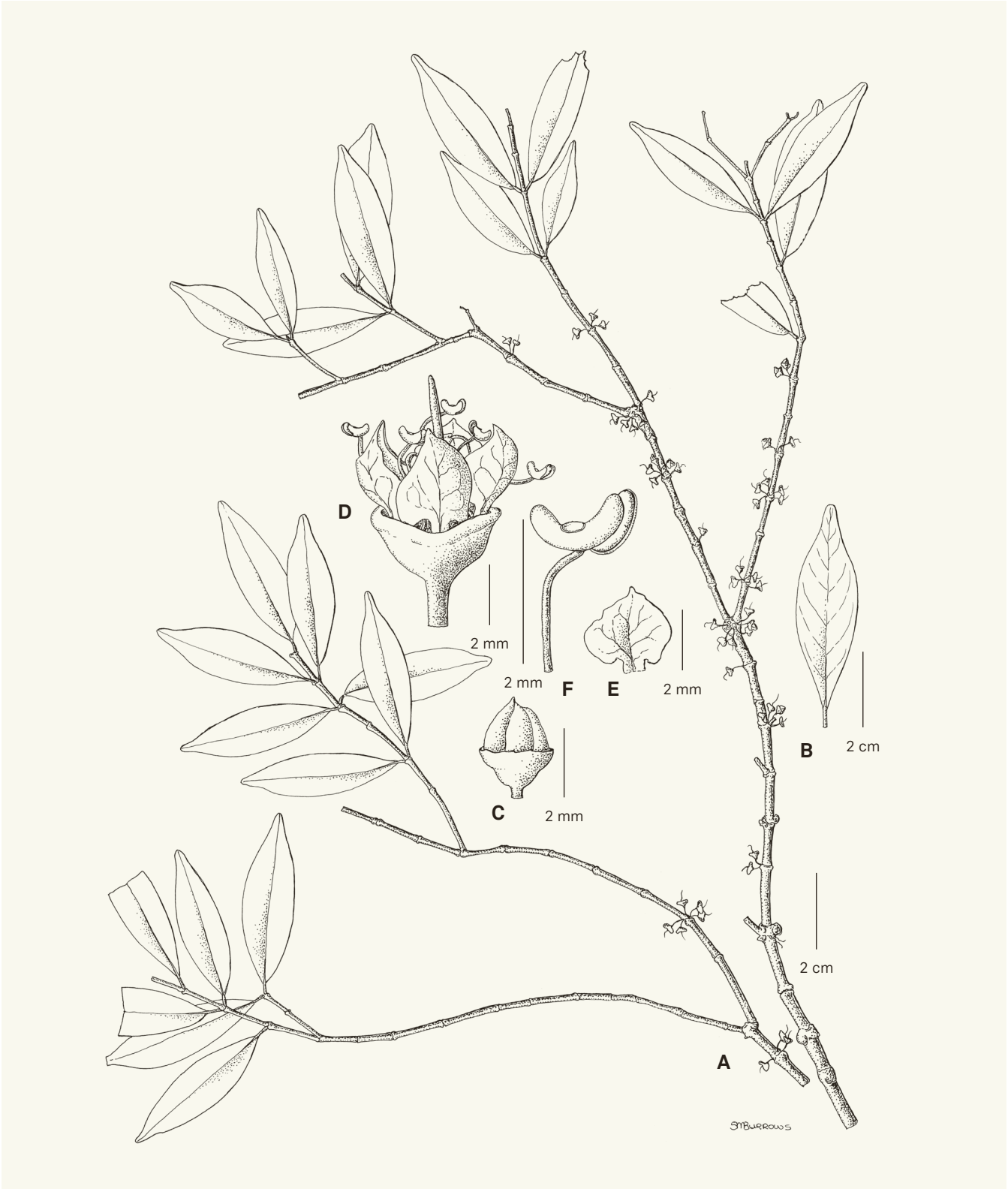

Fig. 7. – *Memecylon potamicum* R.D. Stone. **A.** Flowering branches; **B.** Leaf; **C.** Floral bud; **D.** Open flower; **E.** Petal; **F.** Stamen. [*Service Forestier 25544*, TEF] [Drawing: S. Burrows]

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Memecylon potamicum R.D. Stone, **sp. nov.** (Fig. 7).

Holotypus: Madagascar. Reg. Anosy [Prov. Toliara]: lieu de récolte Antamenaka, abord de la RN XI [parcel 1 of Andohahela National Park], bord de la rivière d'Emanara, 15.II.1965, fl., *Service Forestier 25544* (TEF!).

Affinis Memecylon louveliano H. Perrier sed ab eo internodiis brevibus plerumque 0.8–1.5 cm (non plusminusve 2.5 cm) longis, lamina foliari anguste elliptica 4.3–5.4 × 1.1–1.7 cm (non 5.5–7.5 × 2.5–3.5 cm) in sicco supra laete viridi subtus pallidiore (non obscure viridi vel nigricante) atque floribus minoribus hypantho-calyce 1–1.5 × 2 mm (non c. 2.5 × 2.5 mm) petalis c. 2 × 1.5 mm (non c. 2.8 × 2 mm) differt.

Evergreen *tree*; young branchlets subquadrangular, bark grayish white, with age becoming terete and longitudinally fissured; nodes thickened; internodes mostly 0.8–1.5 cm long (rarely to 2.5 cm). *Leaves* subcoriaceous, brittle when dry (fibrous sclereids very few or very short?), bright green on the adaxial surface, paler abaxially; petioles c. 3 mm long; blades narrowly elliptic, 4.3–5.4 × 1.1–1.7 cm, base cuneate, apex obtusely acuminate, acumen 6(–8) mm long; midnerve finely impressed adaxially, somewhat prominent abaxially; transverse veins ± visible, subprominent on both surfaces (especially beneath), oriented at an oblique angle relative to the midnerve, joined with the faint lateral nerves 1 mm from the margin. *Cymes* 0.5 cm long, glomerulate at the nodes below the leaves, grouping up to 6(–10) flowers per node; peduncle absent or to 1.5 mm long; axes contracted, marked by several pairs of squamiform, imbricate, ± persistent bracts. *Flowers* on slender pedicels 2–4 mm long; hypantho-calyx obconic to cupulo-patellate, 1–1.5 × 2 mm, margin shallowly sinuate-dentate; corolla before anthesis broadly conical to rounded-apiculate, c. 1.5 mm high; petals ± triangular, c. 2 × 1.5 mm, base auriculate above the short claw, apex acuminate-acute, midnerve visible as a dark line on the exterior (abaxial) side; stamens dolabriform, anthers 1.5 mm long, thecae fronto-ventral; connective dorsally incurved by the median oil-gland, posterior extremity acute, filaments 2.5–3 mm long; epigynous chamber shallow but with 8 membranous interstaminal partitions with additional lines beneath the scars of the petals and filaments; style 4.5 mm long. *Fruit* unknown.

Etymology. – The epithet *potamicum* is an adjective derived from Greek word *potamos* meaning "river" (in reference to the habitat of this plant).

Distribution and ecology. – The type and only known collection of *M. potamicum* is from southeastern Madagascar, at the extreme southern end of the central plateau (Fig. 2). This locality is in the vicinity (or on the outskirts) of what is now parcel 1 of the Andohahela National Park. The habitat was evidently in riverine or gallery forest.

Conservation status. – *Memecylon potamicum* is known from a single location with an AOO of 4 km². The species has not been seen for more than 50 years, but is presumed extant because the collecting locality was evidently near or adjacent to a large protected area (parcel 1 of Andohahela National Park). Lacking current data on population status and threats, *M. potamicum* is provisionally assessed as "Vulnerable" [VU D2] in accordance with IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon potamicum* might be confused with *M. louvelianum* (a widespread and somewhat variable species of which there are several collections from the same vicinity, i.e., in or near the Andohahela National Park). The two species are evidently closely related, and one could consider the possibility that the material described here as *M. potamicum* is nothing more than a (rheophytic?) form of *M. louvelianum* with relatively small, narrow, obtusely acuminate leaves. However, *M. potamicum* is further distinguished by several other characters including its shorter internodes, leaves bright green on the adaxial surface in dried material (vs. dark green to blackish in *M. louvelianum*), and smaller flowers.

Memecylon pseudogaleatum R.D. Stone, **sp. nov.** (Fig. 8).

Holotypus: Madagascar. Reg. Atsimo-Atsinanana [Prov. Fianarantsoa]: distr. Farafangana, village Amporoforo, lieu de récolte Boma, 18.II.1955, fl. & fr., *Service Forestier 15244* (TEF!).

Affinis Memecylon galeato H. Perrier sed ab eo ramulis juvenilibus subquadrangularibus teretibusve (non compressis), floribus minoribus hypanthio post anthesin 3–4 × 5.5–7 mm (non 4–5 × 8–11 mm) petalis 4–5 × 4–5 mm obcordatis (non 9 × 7 mm late ovatis) atque fructu bilateraliter asymmetrico differt.

Evergreen *tree* 21 m high, trunk 14 m, d.b.h. 0.5 m; bark fissured; branchlets robust, the youngest subquadrangular to terete; nodes thickened; internodes (3.6–)4.2–5.9(–7) cm long. *Leaves* coriaceous, slightly granular on both surfaces (in dried material), bright green and moderately shining on the adaxial surface, bronzed abaxially; petiole robust, 2–4 mm long; blades elliptic, (6.7–)7.2–9.2(–9.9) × 3.1–4.3(–5) cm, cuneate to angustate at base, ± broadly acuminate at apex, acumen ± acute; only the midnerve clearly visible, finely impressed on the adaxial surface, somewhat prominent abaxially especially towards the base of the blade; transverse veins scarcely visible, ± prominent on the adaxial surface in dried material, oriented at an oblique angle relative to the midnerve, joined to the similarly weak lateral nerves 1–2 mm from the margin. *Cymes* 1-flowered, solitary or geminate in the leaf axils; peduncle robust, 2–3(–7) mm long; bracts and bracteoles c. 2 mm long, the former narrowly triangular, keeled on the back, the latter

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Fig. 8. – *Memecylon pseudogaleatum* R.D. Stone. **A.** Flowering branch; **B.** Leaf; **C.** Floral bud; **D.** Flower after anthesis; **E.** Petal; **F.** Stamen; **G.** Fruit. [*Service Forestier 15244*, TEF] [Drawing: S. Burrows]

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navicular-cucullate, ± clasping the base of the flower. *Flowers* ± sessile (true pedicel absent or nearly so); calyx completely covering the corolla in bud and detaching irregularly at anthesis (sometimes remaining attached to one side); hypanthium cupuliform, 3–4 × 5.5–7 mm, margin ± truncate; petals thick, obcordiform, 4–5 × 4–5 mm, base broadly clawed, apex sharply acute; stamens dolabriform, anthers 4 mm long, thecae frontoventral; connective slightly incurved by the median gland, posterior extremity of connective narrowly conical-acuminate, extending 2 mm past the gland; filaments c. 5 mm long; style c. 13 mm long; epigynous chamber deep, with conspicuous scars at the points of attachment of the staminal filaments and especially of the petals, and with 8 membranous interstaminal partitions radiating from the stylar scar in a cruciform pattern, each partition extending past the petal-scar as a triangular appendage c. 0.5 mm long. *Fruits* 17–18 × 21–22 mm, developing asymmetrically with the base somewhat gibbous and the apex correspondingly displaced to the opposite side; calycinal crown thick, ± truncate, 1–2 mm high.

Etymology. – The adjectival epithet *pseudogaleatum* is in reference to the earlier confusion of this species with the closely related *M. galeatum* (see Notes).

Distribution and ecology. – Known only from near Amporoforo, c. 10 km inland from Madagascar's southeastern coast between the towns of Vohipeno and Farafangana (Fig. 2). Habitat in remnants of humid forest on laterite, elevation c. 25 m.

Conservation status. – *Memecylon pseudogaleatum* is known from a single location with an AOO of 4 km². Given that the forests of the coastal region around Farafangana have been largely destroyed or reduced to small remnants, and that *M. pseudogaleatum* has not been seen in more than 60 years, it is quite possible that the species is already extinct, although additional field-work would be needed to verify this. *Memecylon pseudogaleatum* is thus provisionally assessed as "Critically Endangered" [CR B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – *Memecylon pseudogaleatum* and *M. galeatum* are clearly very close, as evidenced by the fact that the flowering specimen *Service Forestier 15244* (TEF), designated here as the holotype of the new species, was previously annotated by R. Capuron as an unnamed variety of the latter. Compared with typical *M. galeatum*, the material of *M. pseudogaleatum* differs in having young branchlets subquadrangular to terete (not compressed and laterally grooved on the two faces), smaller flowers with petals obcordate (vs. broadly ovate), and fruits bilaterally asymmetrical (in this respect more similar to *M. bezavonense* and the newly described *M. convergens*, q.v.). The type locality of *M. pseudogaleatum* at Amporoforo is also disjunct by 375 km from the nearest known locality of *M. galeatum* (in the Vatomandry district of Toamasina province).

It should be further noted that the P sheet of *Service Forestier 13908*, cited here as a paratype of *M. pseudogaleatum*, was previously determined by M. Jacques-Félix as *M. pileatum*. This material would also key to *M. pileatum* in Jacques-Félix (1985a) on account of having young branchlets terete (not compressed) and fruits 17–18 × 21–22 mm (not 14 × 11 mm as cited by him for *M. galeatum*). However, terete branchlets can no longer be used as a diagnostic character for *M. pileatum* since this feature is shared with *M. pseudogaleatum*. In addition, the dimensions of the fruit are not a good character to distinguish between *M. galeatum*, *M. pileatum* and *M. pseudogaleatum*. For example, the collection *Service Forestier 28157* (K, MO, P, TEF), which was cited by Jacques-Félix (1985a) under *M. galeatum*, has fruits of c. 23 × 23 mm. Additional confirmation that the mature fruits of *M. galeatum* are indeed much larger than was described by Jacques-Félix (1985a) is provided by several recent collections determined by me as belonging to this species (viz. *Razanatsima 170*, K, MO; *Rakotoarivelo et al. 574*, MO, NU; and *Antilahimena 8125*, MO). Even the character of the anther connectives, said by Jacques-Félix (1985a) to be conical in *M. galeatum* and subulate in *M. pileatum*, does not hold up to added scrutiny. On the other hand, the differing leaf dimensions of *M. galeatum* and *M. pileatum* are a seemingly useful character, i.e., leaves smaller 6–9(–12.5) × 3–4.5(–7.5) cm in the former vs. larger 12.5–15.5 × 6.5–7.5 cm in the latter. The leaf dimensions of *M. pseudogaleatum* (as per the above description) fit well within the specified range of *M. galeatum* but are too small to be a good match for *M. pileatum*.

Paratypus. – Madagascar. **Reg. Atsimo-Atsinanana [Prov. Fianarantsoa]:** Amporoforo, Farafangana, 26.VII.1955, fr., *Service Forestier 13908* (P, TEF).

Memecylon subchartaceum R.D. Stone, **sp. nov.** (Fig. 9).

Holotypus: Madagascar. Reg. Anosy [Prov. Toliara]: forêt de Lakandava (station Jirama), 25.I.1990, fr., *Rabevohitra 2207* (CAS-844951!; iso-: MO-3778128!, P [P05207253]!, TEF!).

Ob florem ignotum affinitatis incertae, Memecylon sabuloso Jacq.-Fél. et M. ivohibensi Jacq.-Fél. similis, sed ab eis laminae foliaris textura in sicco insolenter tenui fere papyracea bene distincta.

Evergreen *shrub* or *tree* 3–7 m high; young branchlets very slender, sometimes wiry, subquadrangular to terete; older branchlets somewhat thickened at the nodes, blackish brown; internodes 0.5–2.0(–4.7) cm long, with intervening "aphyllous"

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Fig. 9. – *Memecylon subchartaceum* R.D. Stone. **A.** Fruiting branch; **B–D.** Leaves; **E.** Fruit.
[**A–B, E:** *Rabevohitra 2207*, CAS; **C:** *McPherson et al. 14893*, CAS; **D:** *Birkinshaw et al. 1614*, MO] [Drawing: S. Burrows]

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nodes sometimes also present. *Leaves* thin, subchartaceous in dried material, bright green on the adaxial surface, slightly paler abaxially; petioles ± yellow, 0.5–2(–3) mm long; blades lanceolate to narrowly elliptic, (1.8–)2.7–5(–6.8) × (0.5–)0.7–1.2 (–1.9) cm, base narrowly cuneate, apex acute or ± acuminate, the acumen (4–)6–12(–18) mm; only the midnerve clearly visible, ± yellow, subprominent on adaxial and especially abaxial surfaces towards the base of the blade; intramarginal nerves very thin, faintly visible, ± prominent on both surfaces; transverse veins ± obscure or subprominent like the intramarginal nerves, oriented at an oblique angle relative to the midnerve. *Flowers* not seen. *Fruits* green, globose, about the size of a large pea; calycinal crown very short and somewhat membranous in texture; calyx margin 4-microdentate; epigynous chamber shallow; top of ovary nearly smooth (radial partitions very faint).

Etymology. – The adjectival epithet *subchartaceum* is in reference to the leaves of this species which are unusually thin-textured, almost papery.

Distribution and ecology. – Known from two localities in the Anosy region of southeastern Madagascar, just inland from the coastal city of Tôlañaro (Fort-Dauphin) (Fig. 2). Habitat in humid forest below 300 m elevation.

Conservation status. – *Memecylon subchartaceum* has an EOO of 56 km² and an estimated AOO of 12 km² (assuming a 4 km² grid cell size). The known subpopulations in the Lakandava and Bemangidy-Ivohibe forests are both presumably threatened by shifting agriculture (tavy), although the latter site may receive some degree of protection under a conservation agreement between the IUCN and the Rio Tinto mining company. *Memecylon subchartaceum* is thus provisionally assessed as "Endangered" [EN B2ab(iii)] in accordance with the IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – The flowers of *M. subchartaceum* are still unknown, and its affinity remains uncertain. It has been confused with *M. sabulosum* Jacq.-Fél., which occurs in the same vicinity and has leaves of a similar shape and size (narrowly lanceolate with dimensions 4.5 × 1.2 cm per description). However, in *M. sabulosum* the leaf-blades are dark green and ± rigidly coriaceous while in *M. subchartaceum* they are a paler green and unusually thin-textured. *Memecylon ivohibense* Jacq.-Fél. is also similar but in material of that species the leaves although narrowly lanceolate are smaller (dimensions 3 × 0.6 cm).

In comparison to the collections of *M. subchartaceum* from its type locality near Tôlañaro (Fort-Dauphin), the material from Iabakoho notably differs in having somewhat longer internodes and larger leaves.

Paratypi. – Madagascar. **Reg. Anosy [Prov. Toliara]:** Lakandava forest, 24°58'S 46°58'E, 25.I.1990, y.fr., *McPherson et al. 14893* (CAS, K, MO, P, TEF); Iabakoho, Antsotso Avaratra, Ivohibe, 24°34'17"S 47°12'07"E, 21.V.2006, fr., *Birkinshaw et al. 1614* (CAS, MO, P, TAN); village d'Antsotso Avaratra, forêt de Bemangidy, 24°35'33"S 47°12'52"E, 22.V.2006, fr., *Randriatafika et al. 656* (CAS, NU, P).

Memecylon unguiculare R.D. Stone, **sp. nov.** (Fig. 10).

Holotypus: Madagascar. Reg. Anosy [Prov. Toliara]: sud de Sainte Luce, 24°46'S 47°09'E, I.1990, fl. past anthesis, *Rabevohitra 2164* (MO-3778664!; iso-: K!, TAN!, TEF!, WAG [WAG.1923228]!).

Affinitatis incertae, Memecylon dolichophyllo Naudin similis, sed ab eo ramulis juvenilibus plusminusve quadrangularibus (non teretibus), lamina foliari tenuiore subcoriaceaque (non rigide coriacea) aliquantum minore 9.5–13 × 3.6–4.8 cm (non 15–20 × 4–6 cm) basi subcordata (non solummodo rotunda) atque venis transversalibus utrinque prominentibus (non vix conspicuis) differt.

Evergreen *tree* 5 m high, branched near the base; young branchlets ± quadrangular, the bark dark brown, rapidly excoriating; older branchlets 3–6 mm in diam., thickened at the nodes, bark pale brown, finely longitudinally fissured; internodes (2.2–)2.7–4.2(–5.4) cm long. *Leaves* thinly coriaceous, adaxial surface brown, shining and muricate when dry, abaxial surface somewhat paler and dull; petioles short and stout, 2(–3) mm long, 2 mm in diam., flattened on the adaxial side; blades ovate-lanceolate, 9.5–13 × 3.6–4.8 cm, rounded-subcordate at the base, attenuate towards the apex then obtuse or vaguely acuminate-obtuse; midnerve clearly visible, canaliculate on the adaxial surface, dark brown and prominent abaxially, becoming progressively narrower towards the apex; intramarginal nerves faintly visible and somewhat prominent on both surfaces, forming a series of shallow arches between the c. 8 pairs of transverse veins, these of about the same thickness as the intramarginal nerves, prominent on both surfaces, ± sigmoid in outline, departing at an acute angle from the midnerve, spaced c. 10–16 mm apart. *Cymes* drying dark brown, 1–6-flowered, in fascicles of 2–4 (rarely solitary) at the defoliated nodes of older branchlets, also in the lower leaf-axils; peduncles compressed, (1.5–)3–6 mm long; secondary axes 0–4 in number, 1–4(–6) mm long; additional axes when present of similar dimensions; bracts deciduous, not seen. *Flowers* borne individually at the ends of the inflorescence axes on pedicels 2–4 mm long; hypantho-calyx obconic to cupulo-patellate, 3 × 4 mm, margin truncate, remotely 4-microdentulate alternating with 4 conspicuous, V-shaped sinuses; petals narrowly triangular in outline, acuminate-acute at apex, 4.5 × 1.75 mm; stamens dolabriform, anthers 2.5 mm long, thecae positioned at the anterior end; connective strongly incurved dorsally by the elliptic oil-gland c. ½ mm long, extremity extending 1.75–2 mm past the gland, very narrow then sharply acuminate-acute at apex; filaments 5.5–6 mm long. Fully developed *fruits* unknown;

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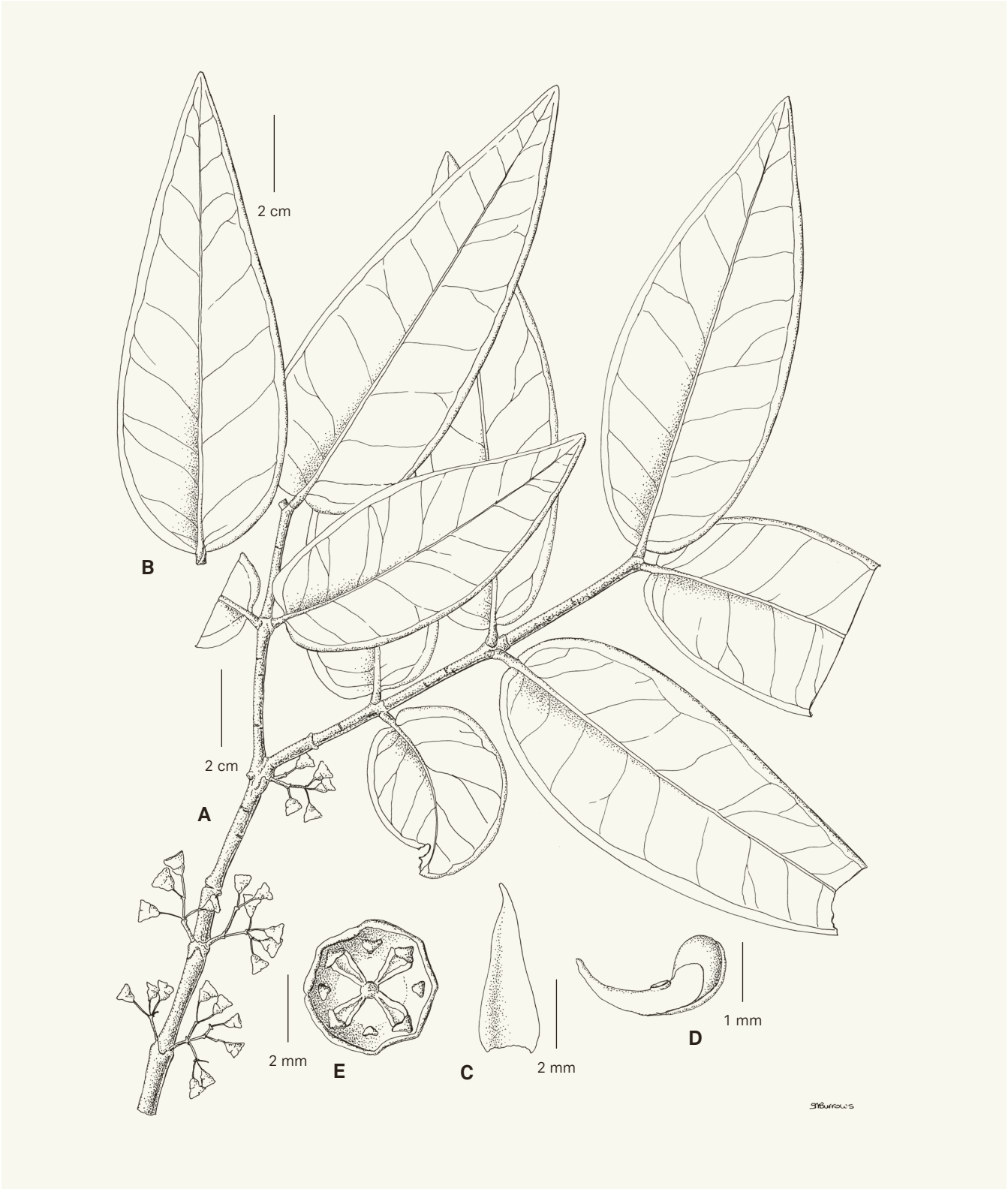

Fig. 10. – *Memecylon unguiculare* R.D. Stone. **A.** Flowering branch; **B.** Leaf; **C.** Petal; **D.** Anther; **E.** Epigynous chamber (top view). [*Rabevohitra 2164*, MO] [Drawing: S. Burrows]

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epigynous chamber deep, with conspicuous scars at the points of attachment of the staminal filaments and especially of the petals, and with 8 membranous interstaminal partitions radiating from the stylar scar, each partition extending past the petal-scar as a triangular appendage c. 0.5 mm long.

Etymology. – The epithet *unguiculare* is in reference to the strongly curved, claw-like shape of the anthers.

Distribution and ecology. – The type and only known collection of *M. unguiculare* was made on Madagascar's southeastern coast, just north of Tôlañaro (Fort-Dauphin) near the village of Sainte-Luce (Fig. 2). Habitat in littoral forest on sand.

Conservation status. – *Memecylon unguiculare* is known from a single location with an AOO of 4 km². The littoral forest of Sainte Luce (c. 16 km²) is one of the last remaining in southeastern Madagascar and has been recommended for protected-area status (Consiglio et al., 2006). The Sainte Luce littoral forest is also one of several areas in the Tôlañaro (Fort-Dauphin) region where QIT Madagascar Minerals (QMM) – Rio Tinto is currently engaged in ilmenite sand-mining operations. Part of the Sainte Luce forest has been designated as a "biodiversity offset," and another small area (0.4 km²) is owned and operated as a private nature reserve. Lacking current data on population status and threats, *M. unguiculare* is provisionally assessed as "Vulnerable" [VU D2] in accordance with IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. – While *M. unguiculare* is certainly distinct, its affinity remains unknown. The type material was previously identified as "*M. dolichophyllum* vel sp. aff.", and it does resemble that species in the broadly lanceolate or oblong-lanceolate shape of the leaves. However, in close comparison with *M. dolichophyllum*, the leaf-blades of *M. unguiculare* are somewhat smaller and thinner in texture (the transverse venation thus more clearly evident). Furthermore, its type locality near Sainte Luce is separated by 900 km from the nearest known locality of *M. dolichophyllum* ("forêt sublittorale de Sahavolamena sur latérites", near Soanierana-Ivongo in Toamasina province). Further comparison between *M. unguiculare* and *M. dolichophyllum* is difficult since the material of the former is lacking mature fruits, and the flowers of the latter are still unknown.

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