New species of *Memecylon* L. and *Warneckea* Gilg (Melastomataceae) from Madagascar and Mayotte

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Melastomataceae,
Memecylon,
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new species.

ABSTRACT
Eight new species of *Memecylon* L. are described and illustrated from Madagascar (*M. acrogenum*, *M. sejunctum*, *M. pterocladum*, *M. xiphophyllum*, *M. perditum*, *M. impressivenum*, *M. interjectum*, *M. amplifolium*) together with one new species of *Warneckea* Gilg (*W. masoalae*). Also described is *Memecylon mayottense*, a new species from Mayotte (Comoro islands).

MOTS CLÉS
Melastomataceae,
Memecylon,
Warneckea,
Madagascar,
Comores,
Mayotte,
espèces nouvelles.

RÉSUMÉ
Nouvelles espèces de Memecylon *L. et* Warneckea *Gilg (Melastomataceae) de Madagascar et de Mayotte.*
Huit nouvelles espèces malgaches de *Memecylon* L. sont décrites et illustrées (*M. acrogenum*, *M. sejunctum*, *M. pterocladum*, *M. xiphophyllum*, *M. perditum*, *M. impressivenum*, *M. interjectum*, *M. amplifolium*) ainsi qu'une nouvelle espèce de *Warneckea* Gilg (*W. masoalae*). De plus, une nouvelle espèce de Mayotte (îles Comores), *Memecylon mayottense*, est décrite.

INTRODUCTION

It has been more than 20 years since Jacques-Félix (1985a, b) published *Les Memecyleae (Melastomataceae) de Madagascar*. His treatments of *Memecylon* L. (78 species), *Lijndenia* Zoll. & Moritzi (6 species), and *Warneckea* Gilg (9 species) are in accord with revised generic concepts based largely on patterns of leaf venation (Jacques-Félix *et al.* 1978), aspects of leaf anatomy, especially the morphology of sclereid idioblasts (Rao & Jacques-Félix 1978; Rao *et al.* 1983), and features of the embryo and germination of the seedling (Jacques-Félix 1977, 1978; Bremer 1981, 1982). Added support for this classification is provided by molecular phylogenetic analyses (Stone 2006).

Memecylon itself is one of the most species-rich groups among the woody plants of Madagascar (cf. Schatz 2001). In the eastern forests it forms a characteristic element of the "sous-bois" (understory), and one commonly finds several species growing in close proximity. Many (perhaps most) of these species are regional or even localized endemics (Perrier de la Bâthie 1932: 223; Jacques-Félix 1985a: 391-392). Although the genus is widely distributed in the Old World tropics, outside of Madagascar there is no region that has such a large number of species in such a limited area (R. D. Stone unpubl. data). Molecular phylogenetic analyses further suggest that the remarkable diversification of Madagascan *Memecylon* followed a single colonization event from the African continent (Stone 2004).

As a result of recent field and herbarium studies, proposed here are eight new species of *Memecylon* from Madagascar and one from the neighbouring island of Mayotte. A new Madagascan *Warneckea* species is described as well. This work is intended as the first contribution toward a comprehensive revision of the Melastomataceae of Madagascar (a longer-term project being planned in collaboration with Drs Frank Almeda and Jack Regalado). For each new taxon, information is provided on its similarities, differences, and possible affinities with other known species, but references to the infrageneric classification of Jacques-Félix (1985a, b) are avoided because of evidence from molecular analyses that these sections are perhaps not indicative of evolutionary relationships (Stone 2004). In the citation of collection numbers, the abbreviation SF stands for "Service des Eaux et Forêts", and the abbreviation RN stands for "Réserves naturelles".

SYSTEMATICS

Genus *Memecylon* L.

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

Affinis M. cotinifolioidi (H.Perrier) Jacq.-Fél. *sed laminis foliorum longioribus et anguste obovatis vel ellipticis ad apices late obtuseque breviacuminatis, pedunculis longioribus differt.*

TYPUS. — **Madagascar.** Toamasina province, Andasibe (Périnet), north of road from Antananarivo to Tamatave, along trail southwest of old C.T.F.T. sawmill at Analamazaotra, alt. 920 m, nearly undisturbed remnant forest, 1.IV.1987, *Lowry & Schatz 4266* (holo-, MO; iso-, K, P).

PARATYPES. — **Madagascar.** Toamasina province, Analamazaotra near Périnet [Andasibe], alt. 800 m, dense forest, lateritic soil, 4.IV.1958, *SF-17940* (P). — Antsiranana province, Réserve spéciale d'Anjanaharibe-Sud, 14°44'42"S, 49°27'42"E, alt. 1185-1335 m, 3.XI.1994, *Ravelonarivo & Rabesonina 535* (CAS, MO, P).

DESCRIPTION

Evergreen tree up to 12 m high; youngest branchlets compressed and grooved on the 2 faces near the apex, the older terete and thickened at the nodes; internodes 1-5 cm long. Leaves coriaceous, dark green and somewhat shiny on the upper surface, yellowish and dull on the lower, granular-rugose when dry on both surfaces (especially the lower); petioles robust, 2-3 mm long; blades narrowly obovate to elliptic, 4-6 cm long, 2-3 cm wide, narrowly cuneate at base and decurrent with the petiole, the apex with a short, obtuse acumen; mid-nerve canaliculate on upper surface, somewhat prominent on the lower; transverse veins not visible on lower surface, faintly so on the upper, oblique relative to the mid-nerve, irregularly spaced; margins narrowly revolute. Cymes in fascicles of 1-3 at the terminal and subterminal nodes, 3-4.5 cm long, on

FIG. 1. — *Memecylon acrogenum* R.D.Stone: **A**, habit; **B**, infructescence; **C**, fruit (apical view showing epigynous chamber). A, *Lowry & Schatz 4266*; B, C, *SF-17940*. Scale bars: A, 5 cm; B, 1 cm; C, 2 mm.

compressed peduncles (1-)2-3.5 cm long, generally branched once or twice, the axes quadrangular, short (mostly 3-5 mm long), articulated at the base of the pedicels; bracts deciduous. Flowers not seen. Fruits globose, reddish at maturity, 7.5-9 mm in diameter, on pedicels 1-2 mm long; calycinal crown 1 mm long, the margin shallowly 4-dentate or truncate and 4-microdentate; epigynous chamber deep, the partitions forming V-shaped structures beneath the petal scars, each then joined to the central style scar by a linear structure.

REMARKS

The specimen *SF-17940* was cited by Jacques-Félix (1985b: 36), but he chose not to describe it for lack of flowers. Now that additional collections are at hand, the species is proposed with the caveat that the description must be emended once flowering material is obtained. *Ravelonarivo & Rabesonina 535* has somewhat smaller leaves but agrees in other respects with the type.

Memecylon acrogenum is closely related to *M. cotinifolioides*, and the two taxa appear to have overlapping distributions in the mountains of east-central and northeastern Madagascar. In addition to their terminal inflorescences, they share several other characteristics including branchlets and peduncles compressed, fruits globose, and leaves yellowish and conspicuously roughened on the lower surface when dry (owing to the presence of columnar sclereids in the mesophyll; cf. Jacques-Félix 1985b: 16, 36). Yet *M. cotinifolioides* notably differs in having shorter leaves that are broadly obovate in outline and rounded to retuse at the apex (acumen lacking); its peduncles are also shorter (8-16 mm, rarely more than 20 mm long).

Two other *Memecylon* species with terminal inflorescences, *M. corymbiforme* H.Perrier and *M. faucherei* Danguy, inhabit the same region as *M. acrogenum* in the montane forests near Moramanga (east-central Madagascar), but both appear less closely related to *M. acrogenum* when compared with *M. cotinifolioides*. In *M. corymbiforme* the leaves are relatively broad (obovate to oblanceolate) in outline, obtuse to rounded at the apex, and less conspicuously roughened below. In *M. faucherei* the leaves are borne on relatively long petioles (6-8 mm) with blades lanceolate in outline, rounded at the base, narrowly acuminate at the apex, and obscurely roughened on the lower surface; in addition its peduncles are much shorter (*c.* 10 mm).

Memecylon sejunctum R.D.Stone, sp. nov. (Fig. 2)

Affinis M. infuscato Jacq.-Fél. *sed habitu plus minusve fruticoso, laminis foliorum brevioribus angustioribusque differt.*

TYPUS. — **Madagascar.** Toamasina province, Parc national d'Andasibe-Mantadia, 14 km by road past the graphite mine, 18°53'S, 48°27'30"E, alt. 1100 m, short-statured, relatively open forest on steep, west-facing slope, 13.XI.2001, *Stone et al. 2380* (holo-, CAS; iso-, G, K, MO, P, TAN, TEF, UC, US; flowers in spirit collection at CAS).

PARATYPES. — **Madagascar.** Toamasina province, near Andasibe, Mantadia forest, beyond graphite mine, 18°55'S, 48°25'E, alt. 950-1150 m, 7.XI.1994, *McPherson & Van der Werff 16529* (CAS, MO). — Type loc., 13.XI.2001, *Stone et al. 2379* (CAS, G, K, MO, P, TAN, WAG; flowers in spirit collection at CAS). — Toamasina province, Parc national d'Andasibe-Mantadia on trail to Belle Vue and eastward along ridgetop, 18°47'42"S, 48°25'46"E, alt. 910-1050 m, wet mossy forest, 25.III.2004, *Almeda et al. 8764* (CAS). — Antsiranana province, Vohemar [Iharana] sub-prefecture, Daraina rural district, Ankijabe village, Binara forest, 13°15'S, 49°37'E, alt. 1050 m, low forest on exposed ridge, 4.XI.2001, *Gautier & Ravelonarivo 4023* (CAS, G). — Same locality, alt. 910 m, low open dry forest on ridge, 10.XI.2001, *Gautier & Ravelonarivo 4159* (CAS, G).

DESCRIPTION

Evergreen large shrub or many-branched small tree up to 6 m high; youngest branchlets quadrangular and narrowly 4-winged, the older becoming terete and thickened at the nodes; internodes (1-)1.5-2.5(-3) cm long; bark whitish. Leaves coriaceous, dark green on the upper surface, paler green on the lower, finely granular-rugose on both surfaces; petioles 2-4 mm long; blades narrowly elliptic to oblanceolate, 3-5 cm long, 1.2-1.9 cm wide, narrowly cuneate at base and decurrent with the petiole, apex obtuse to rounded and often retuse; mid-nerve impressed on upper surface, somewhat prominent on the lower; transverse veins obscure; margins slightly revolute.

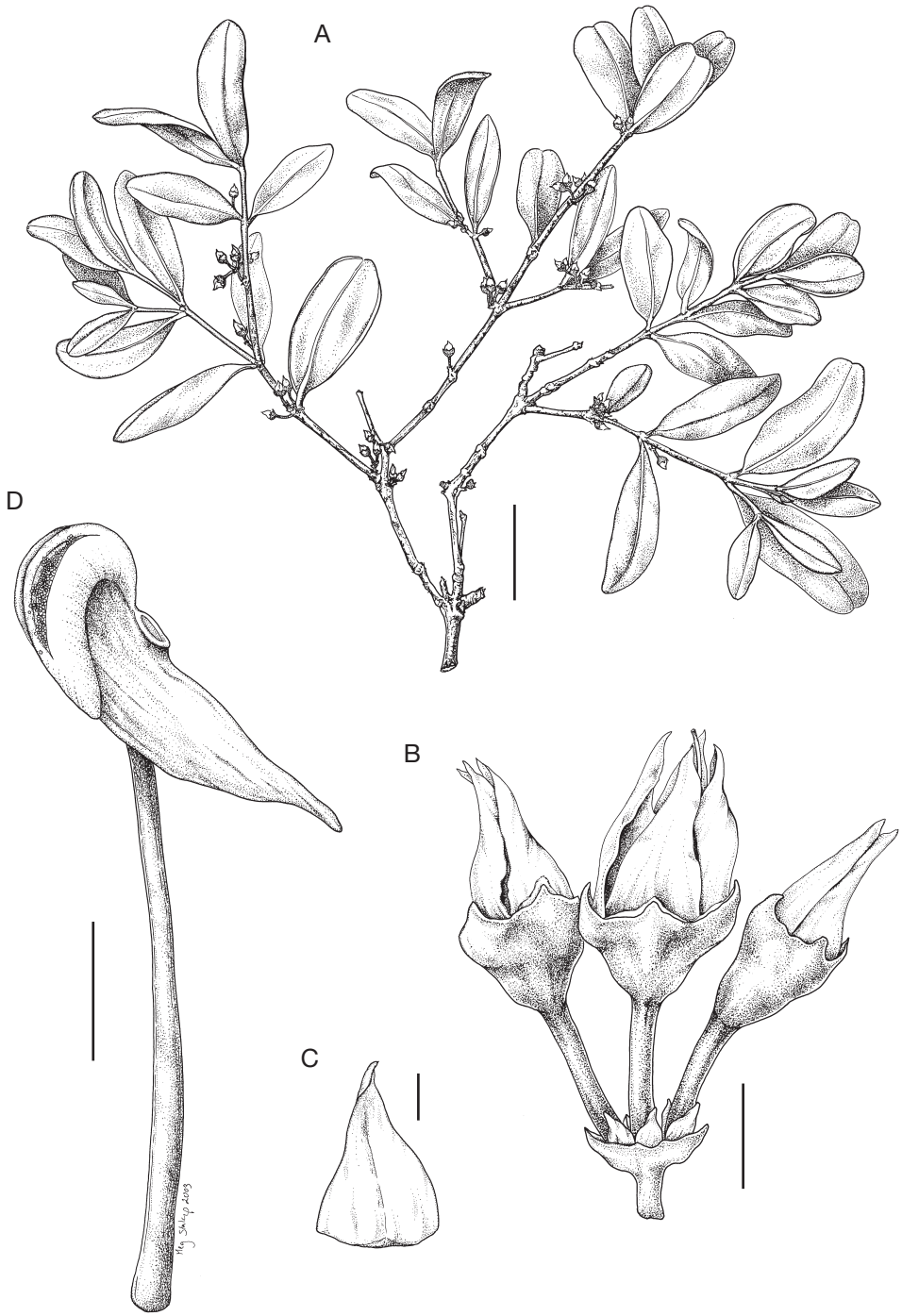

FIG. 2. — *Memecylon sejunctum* R.D.Stone: **A**, habit; **B**, inflorescence just before anthesis; **C**, petal; **D**, stamen. *Stone et al. 2380*. Scale bars: A, 3 cm; B, 2 mm; C, D, 1 mm.

Cymes ± contracted, less than 1 cm long, 1-4-flowered, solitary or fasciculate in the axils and at the nodes below the leaves, sessile or with a peduncle up to 1.5(-2) mm long; bracts up to 0.8 mm long, squamiform, several pairs imbricated at the base of the pedicels, persistent. Flowers on pedicels 1.5-2 mm long; hypantho-calyx campanulate, 2 mm long, 3 mm wide, the margin 4-denticulate. Corolla acute in bud; petals violet (or white), triangular-acuminate, 3.5-4 mm long, 3 mm wide, apex acute, base sessile (not clawed), broadly rounded to shallowly cordate. Anthers 2.5-3 mm long; connective ± straight (not incurved), the extremity long-acuminate, the pollen sacs lateral (anterior), the dorsal surface depressed by a gland situated near the pollen sacs; filaments 4 mm long. Style 4.5-6 mm long; ovules 12. Fruits (immature) globose, *c.* 5 mm in diameter, the calycinal crown *c.* 1 mm long, erect.

REMARKS

This new species is known from east-central and northeastern Madagascar (the Moramanga and Daraina districts respectively). It is closely related to *M. infuscatum*, a small tree found along the eastern coast from Masoala peninsula southward to near Nosy Varika (Fianarantsoa province). Similarities between the two species include leaf apices rounded and often retuse; inflorescences contracted and borne mostly at the defoliated lower nodes; bracts imbricate, squamiform, and persistent; hypantho-calyx campanulate with margin conspicuously 4-dentate; corolla acute in bud; and anther gland situated near the thecae. They differ not only in habit and leaf dimensions but also in distribution and ecology (littoral forest for *M. infuscatum*, montane forest for *M. sejunctum*).

The fruits of *M. infuscatum* were first described as globose and 20 mm in diameter (Jacques-Félix 1985b), but with additional collections it is evident that they are really much smaller (*c.* 5 mm) and more-or-less identical to those of *M. sejunctum*. The fruiting specimen *SF-16639* (MO, P), on which the earlier description was based, should no longer be included in *M. infuscatum* although its proper taxonomic disposition is unknown.

The leaves of *M. sejunctum* superficially resemble those of *M. bakerianum* Cogn., a species mainly of Madagascar's central plateau that has been collected several times in the montane forest region (once near Moramanga, *Andriatsiferana et al. 2173*, MO, P). *Memecylon bakerianum* differs however by its cymes with peduncles 10-15 mm long and deciduous bracts, larger flowers with calyx margin sinuate and anther gland situated medially, and leaves with transverse veins usually visible on the lower surface. Another narrow-leaved species occurring in the same region is *M. myricoides* Naudin, but its habitat is always bordering streams, and the cymes are mainly axillary, the peduncles are 10 mm long, the calyx is truncate-margined, and the anthers lack a dorsal gland.

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

A M. dolichophyllo Naudin *ramulis junioribus valde quadrialatis non teretibus, petiolis perfecte nullis, laminis ad bases conspicue cordatis, venis transversis ad costam plus minusve perpendicularibus non obliquis, pedicellis brevioribus differt.*

TYPUS. — **Madagascar.** Toamasina province, south of Soanierana-Ivongo, Sahavolamena forest, on laterite, 21.XII.1967, *Capuron SF-28110* (holo-, P, barcode no. 257960; iso-, P).

PARATYPES. — **Madagascar.** Toamasina province, 7.5 km south of Ambila-Lemaitso, Andavakimena forest near Lac Andobobe, 18°54'S, 49°07'20"E, alt. 10 m, deeply shaded understory of littoral forest on sand, 14.XI.2001, *Stone et al. 2385* (CAS, MO, P, TAN). — Toamasina province, 8 km west of Foulpointe [Mahavelona], Analalava forest, 17°42'30"S, 49°26'50"E, alt. 60 m, north-facing slope in deeply shaded understory of evergreen rain forest on laterite, 17.XI.2001, *Stone et al. 2391* (CAS, G, K, MO, P, TAN, TEF, US).

DESCRIPTION

Evergreen shrub or small tree up to 5 m high; branchlets virgate, leafy toward the apex, up to 4 mm in diameter; young branchlets strongly 4-winged (wings greater than 1 mm wide), the older rapidly excoriating and becoming terete, thickened at the nodes; internodes 3-12 cm long. Leaves subcoriaceous, sessile, yellowish green on the upper surface (when dry), bright to pale green or violaceous on the lower, finely rugose on both surfaces; blades

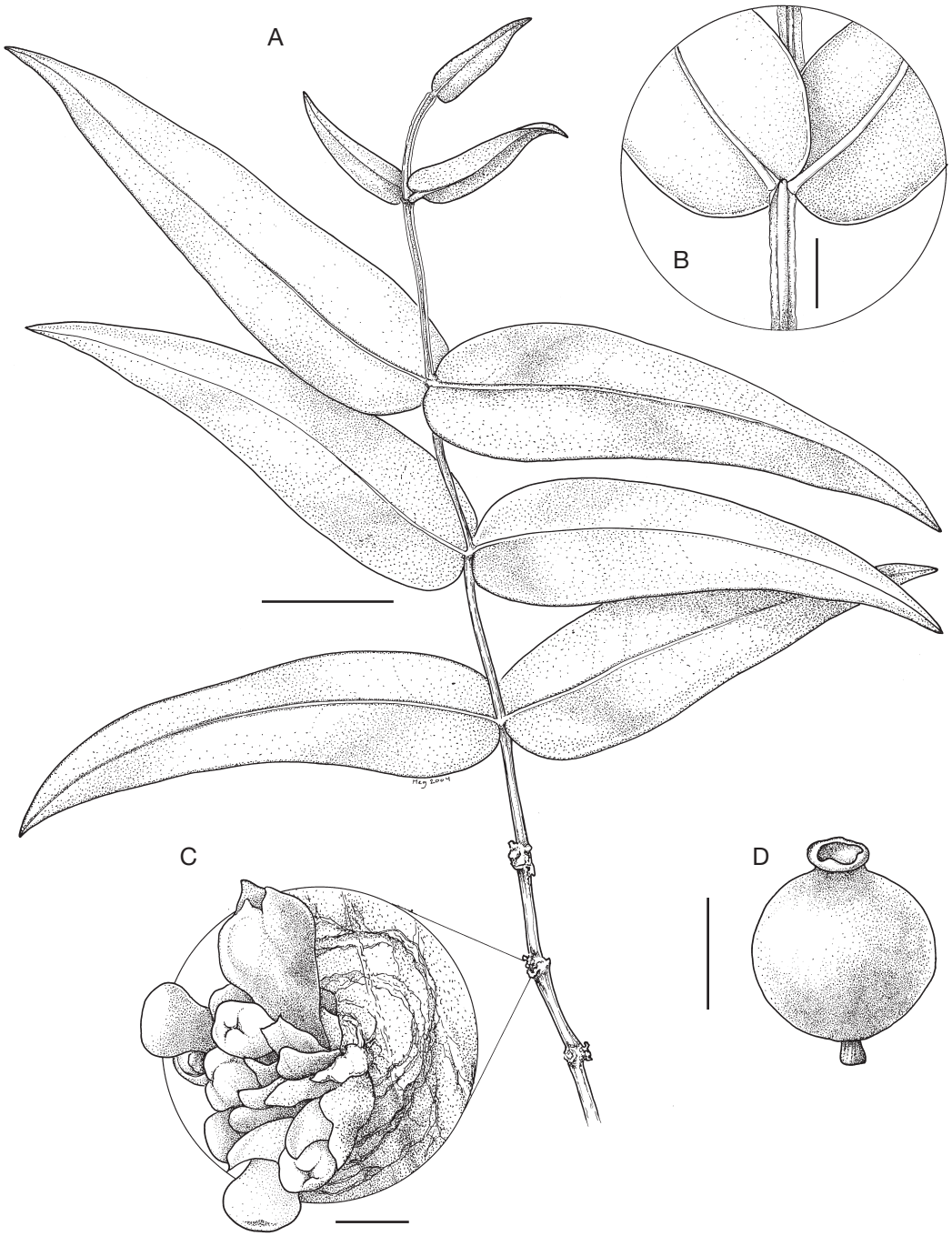

FIG. 3. — *Memecylon pterocladum* R.D.Stone: **A**, habit; **B**, detail of young branchlet and leafy node; **C**, inflorescence with flower buds; **D**, fruit. A, D, *Capuron SF-28110*; B, *Stone et al. 2385*; C, *Stone et al. 2391*. Scale bars: A, 5 cm; B, 2 cm; C, 1 mm; D, 5 mm.

broadly lanceolate, 10-30 cm long, 3.3-7 cm wide, rounded and narrowly cordate at base, attenuate and acute at apex; only the mid-nerve clearly visible, canaliculate on the upper surface, prominent on the lower, very wide at the base (up to 4 mm), becoming progressively narrower toward the apex; transverse veins obscure on the upper surface, ± visible on the lower, perpendicular or slightly oblique relative to the mid-nerve, ± straight or occasionally forked; lateral veins situated 2-3 mm from the narrowly revolute margin; young leaves strongly violaceous. Cymes contracted, ± sessile, 1-3-flowered, fascicled at the nodes below the current leaves; bracts broadly ovate, auriculate at base, ± cucullate, 0.8 mm long, persistent; bracteoles similar but smaller. Flowers at anthesis not seen, in bud with hypantho-calyx obconic, the margin 4-lobed, the lobes broadly triangular and apiculate, the corolla acute. Fruits globose, 8 mm in diameter, on pedicels *c.* 1-2 mm long; calycinal crown 1 mm long, spreading, the margin sinuate and 4-microdentate; epigynous chamber deep, lacking radial partitions.

REMARKS

The type is a fruiting specimen that was previously cited but not described in detail (Jacques-Félix 1985b: 36). In addition there are two recent collections including one (*Stone et al. 2391*) with flower buds but no fully developed flowers. The prominently winged young branchlets of *M. pterocladum* resemble those seen in *M. capuronii* Jacq.-Fél., *M. pterocarpum* H.Perrier, and *M. fernandesiorum* Jacq.-Fél. The new species is also somewhat similar to *M. subsessile* H.Perrier, which notably differs in its slender, terete branchlets; papyriferous, short-petioled leaves that are smaller and strongly acuminate at the apex; and axillary cymes.

A collection of *M. dolichophyllum* (*Capuron SF-28114*, P) from the type locality of *M. pterocladum* suggests that the two species are at least partially sympatric. Their fruits are identical; they also resemble one another in having subcoriaceous leaves and cymes borne at the nodes below the current leaves. They are however quite different since *M. dolichophyllum* has petiolate leaves that are merely rounded (not cordate) at the base and with transverse veins oblique; its fruiting pedicels are also 3-4 mm long.

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

A M. subsessili H.Perrier *ramulis crassioribus, laminis foliorum multo longioribus (usque ad 40 cm) ad apices acutis non conspicue acuminatis, cymulis ad nodos strumosos ramulorum vetustiorum non in axillis foliorum, floribus grandioribus, bracteis caducis non persistentibus differt.*

TYPUS. — **Madagascar.** Toamasina province, 8 km west of Foulpointe [Mahavelona], Analalava forest, 17°42'30"S, 49°26'50"E, alt. 60 m, north-facing slope in deeply shaded understory of evergreen rain forest on laterite, 17.XI.2001, *Stone et al. 2393* (holo-, CAS; iso-, G, K, MO, P, TAN, US; flower buds in spirit collection at CAS).

DESCRIPTION

Evergreen small tree; branchlets terete and thick (up to 7 mm in diameter), leafy only at the apex, with age becoming conspicuously swollen at the nodes; internodes 5-7 cm long. Leaves subcoriaceous, sessile or nearly so, yellowish green on the upper surface (when dry), bright to pale green or violaceous on the lower, very finely granular-rugose on both surfaces; blades narrowly lanceolate, 20-40 cm long, 4-6.5 cm wide, rounded and narrowly cordate at base, long-attenuate and sharply acute at apex; mid-nerve canaliculate on the upper surface, dark and prominent on the lower, very wide at the base (up to 4.5 mm), becoming progressively narrower toward the apex; transverse veins clearly visible on both surfaces (especially the lower), perpendicular to the mid-nerve and spaced 6-10 mm apart, ± straight or occasionally forked; lateral veins situated 2-3 mm from the margin; young leaves strongly violaceous. Cymes contracted, *c.* 1 cm long, generally 3-flowered, fascicled at nodes well below the leaves; peduncles *c.* 2 mm long, axes 1-2 mm long (true pedicels lacking); bracts early deciduous, the bracteoles 1.5 mm long, lanceolate, carinate. Flowers at anthesis not seen; hypantho-calyx obconic in bud, 6.5 mm long, 4.5 mm wide, minutely granular on the outer surface, the margin 4-lobed, the lobes *c.* 1 mm long, broadly rounded, apiculate. Corolla acute; petals violet, ovate, 2.5 mm long, 2 mm wide, base broadly rounded, apex attenuate and acute. Anthers 2 mm long, the extremity of the connective abruptly and narrowly conical, the dorsal gland crateriform and medially positioned,

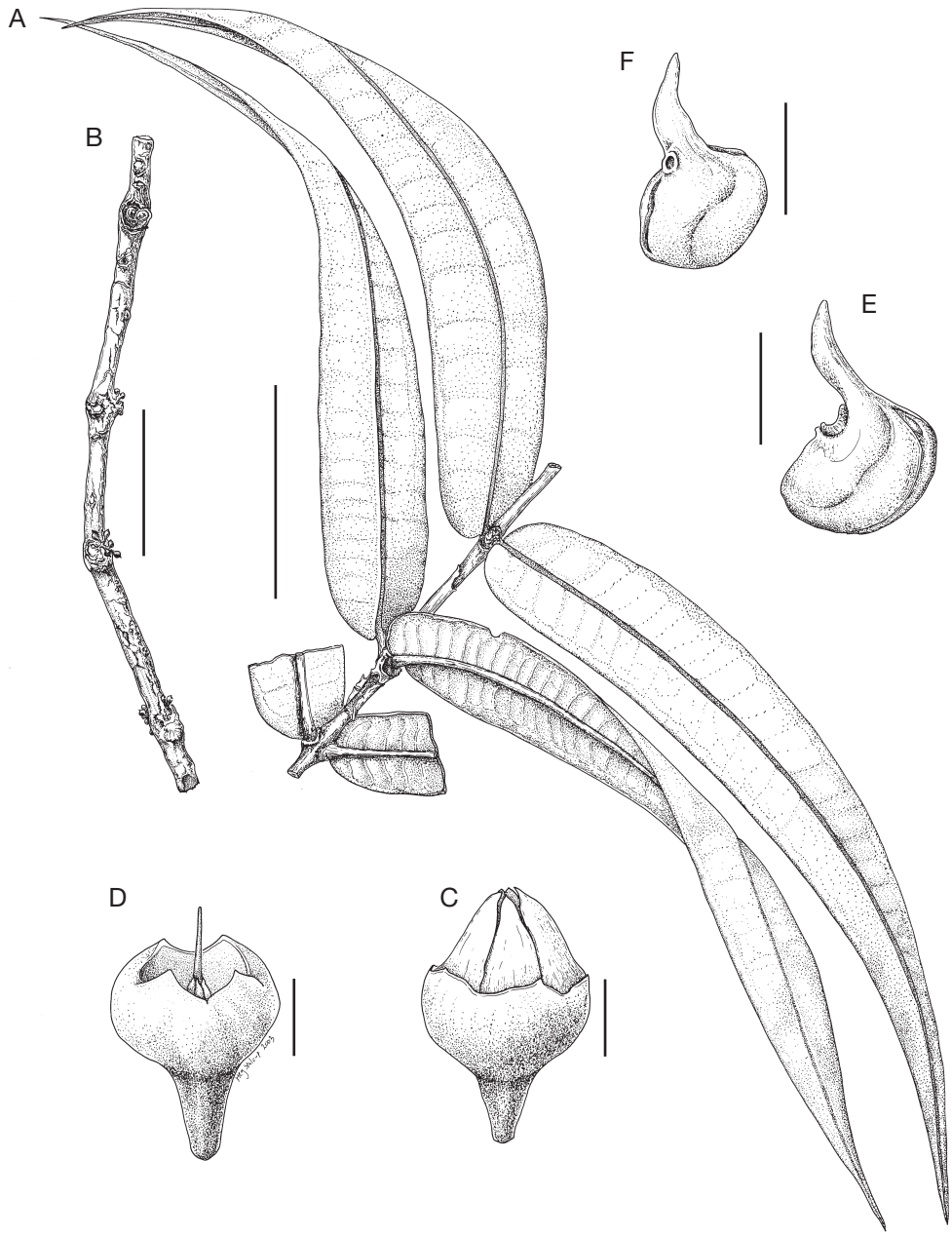

FIG. 4. — *Memecylon xiphophyllum* R.D.Stone: **A**, leafy branchlet; **B**, flowering branchlet; **C**, flower bud just before anthesis; **D**, same flower bud with petals and stamens removed; **E**, anther (side view); **F**, anther (oblique view of dorsal face). *Stone et al. 2393*. Scale bars: A, 10 cm; B, 5 cm; C, D, 2 mm; E, F, 1 mm.

the pollen sacs occupying greater than half the length on the ventral side; filaments short. Style *c.* 2 mm long; ovules 9. Fruit unknown.

REMARKS

Memecylon xiphophyllum is known only from the type collection. It somewhat resembles *M. subsessile*,

notably in its terete branchlets, narrowly lanceolate and basally cordate leaves, and transverse veins more or less perpendicular to the mid-nerve. The details of the hypantho-calyx and the anthers are also similar in the two species. *Memecylon subsessile* differs however in its slender branchlets, much smaller leaves that are short-petioled at the base and strongly acuminate at the apex, and smaller flowers borne in axillary cymes with bracts persistent.

The thick branchlets and foliar mid-nerves of *M. xiphophyllum* are similar to those of *M. crassinerve* Blume (an endemic of Nosy-Be island off the northwestern coast of Madagascar), but the broadly oblong and apically rounded leaves of *M. crassinerve* are completely different.

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

A speciebus ceteris Memecyli madagascariensis *combinatione foliorum obovatorum, cymularum breviter pedunculatarum ad axillas foliorum vel nodos aphyllos defoliatosve, florum usque 3 subsessiliumque ad par bractearum cucullatarum subtentorum cum floribus centralibus itidem bibracteolatis, connectivo antherarum dorsaliter glanduloso, fructuum globosorum 6 mm diametro distinguenda.*

Typus. — **Madagascar.** Antsiranana province, Masoala peninsula, valley of Iketra river, affluent to the Anaovandrano, along foot path between Iketra and Antanambao Rantavato (valley of Ampanavoana river), 15°43'05"S, 50°13'05"E, alt. *c.* 50 m, understory of evergreen rain forest, 6.XII.2001, *Stone et al. 2402* (holo-, CAS; iso-, CAS, K, MO, P, TAN).

Paratypes. — **Madagascar.** Antsiranana province, Besamatrakely forest, Ambanja, XII.1963, *Rakotozafy 341* (P). — Antsiranana province, Réserve naturelle intégrale de Marojejy, near summit of Ambatosoratra, 14°32'S, 49°42'E, alt. 1583 m, VI.1994, *Ravelonarivo et al. 229* (CAS, P).

Description

Evergreen shrub or tree 5-30 m high; branchlets terete and becoming ± thickened at the nodes; successive nodes alternately bearing normal leaves and floral bud scales (modified leaves); internodes 1-2.5 cm long. Leaves with petioles 3-7 mm long; blades thinly coriaceous, granular-rugose on both surfaces (when dry), obovate, 3.5-6 cm long, 1.7-3.3 cm wide, attenuate at base then decurrent with the petiole, rounded and obtuse or even slightly retuse at apex; only the mid-nerve clearly visible, canaliculate on the upper surface, ± prominent on the lower toward the base; transverse veins obscure or faintly visible on the lower surface, oblique relative to the mid-nerve. Cymes contracted, less than 1 cm long, 1-3-flowered, borne either in the leaf axils, at the intervening (scale-bearing) nodes, or at the defoliated nodes of older branchlets; peduncles 1-2.5 mm long, axes absent or very short; bracts persistent, lanceolate, *c.* 1 mm long, acute to apiculate at apex, cucullate, connate at base; bracteoles subtending only the central flower, approximately the same length and shape as the bracts. Flowers subsessile (pedicels up to 0.5 mm long); hypantho-calyx white, cupuliform to slightly urceolate or obconic, *c.* 3 mm long and 2-3 mm wide; calyx 4-lobed in bud, the margin becoming broadly sinuate and 4-microdentate at anthesis. Corolla acute to shortly acuminate in bud; petals violet, lanceolate-acuminate, 3.5 mm long, *c.* 1 mm wide, the base distinctly auriculate then short-unguiculate (claw to 0.5 mm long). Anthers *c.* 2 mm long, the connective narrowly conic-acute, the pollen sacs frontal and extending for about half the length of the connective on the ventral side, the dorsal gland elliptic and medially positioned; filaments not seen. Style 6-7 mm long; ovules 16. Fruits slightly oblong when immature but becoming globose, 6 mm in diameter, with persistent calycinal crown; epigynous chamber lacking radial partitions.

Remarks

In Jacques-Félix (1985a), *M. perditum* would key to the group of species that includes *M. bernieri* Cogn., *M. peracuminatum* H.Perrier, and *M. bracteatum* Jacq.-Fél., on account of the anther connectives bearing a dorsal gland and the subsessile flowers each immediately subtended by a pair of bracts or bracteoles. The inflorescences of *M. perditum* appear most similar to those of *M. bracteatum*, except that in *M. bracteatum* the bracteoles subtending the central flower are larger (2.5 × 2 mm) and ovate to suborbicular (not lanceolate). The leaves of *M. bracteatum* are also very different in being lanceolate-acuminate (as are those of *M. peracuminatum*).

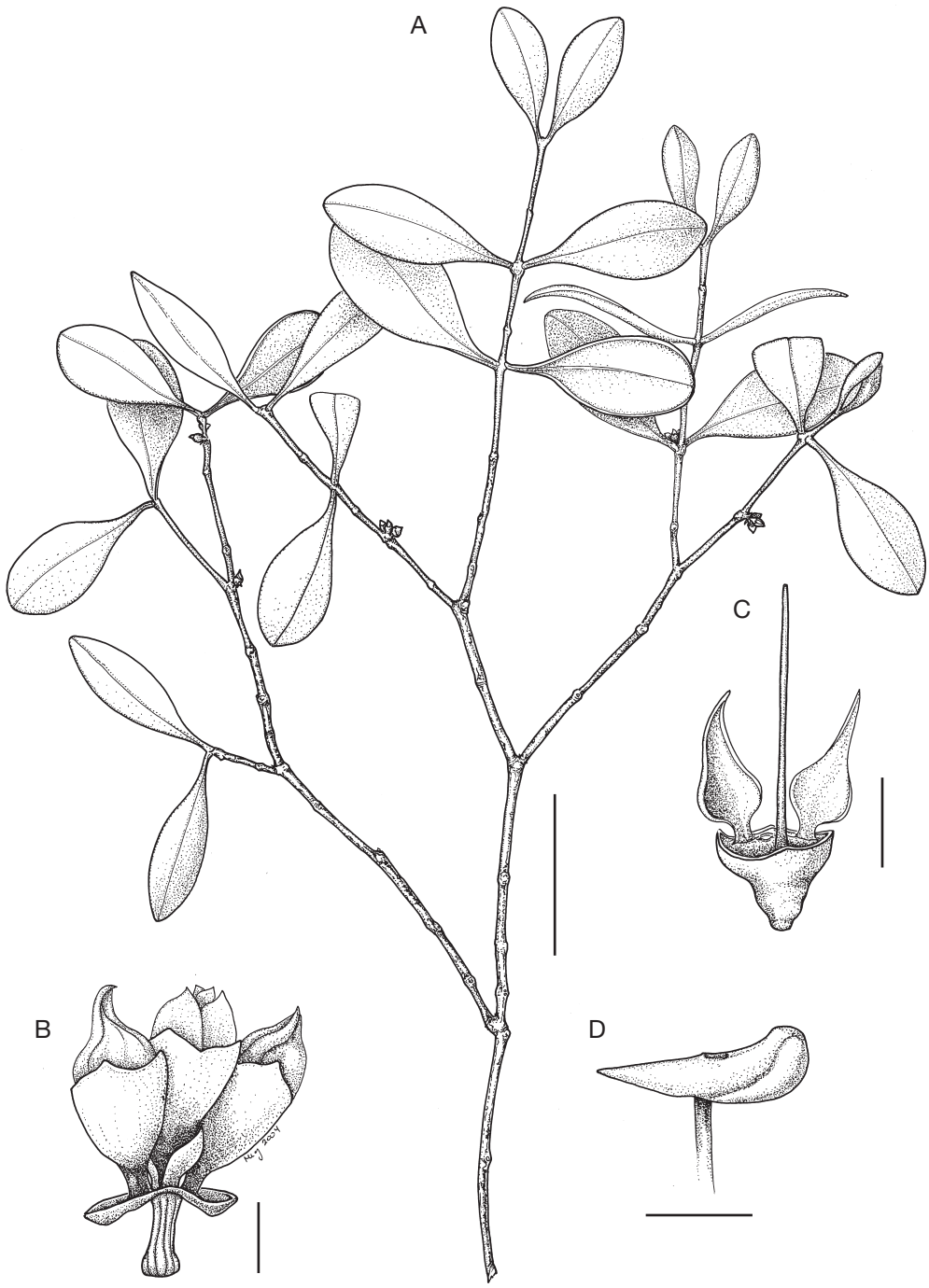

FIG. 5. — *Memecylon perditum* R.D.Stone: **A**, habit; **B**, inflorescence with flower buds; **C**, open flower with stamens and two petals removed; **D**, anther and part of filament. *Stone et al. 2402*. Scale bars: A, 5 cm; B, C, 2 mm; D, 1 mm.

Memecylon bernieri is like *M. perditum* in having leaves that are rounded at the apex, but its blades are narrowly oblanceolate (not obovate). The small, squamiform bracts and bracteoles of *M. bernieri* also differ from those of *M. perditum*.

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

Similis M. inalato Jacq.-Fél. *a quo ramulis junioribus anguste quadrialatis non teretibus, foliis parvioribus ad apices late obtuseque acuminatis, venis transversis in paginis superioribus foliorum conspicue impressis, pedunculis brevioribus, floribus subsessilibus differt.*

TYPUS. — **Madagascar.** Antsiranana province, Masoala peninsula, canyon of the Ampanavoana river, 15°40'45"S, 50°09'35"E, alt. *c.* 150 m, understory of evergreen rain forest, relatively dry site on small spur ridge west of river, 8.XII.2001, *Stone et al. 2406* (holo-, CAS; iso-, CAS, G, K, MO, P, TAN, TEF, UC, US, WAG).

DESCRIPTION

Evergreen shrub 2-3 m high; branchlets quadrangular and narrowly 4-winged when young (the wings ± straight to slightly crisped), becoming terete with age and thickened at the nodes; internodes 2-4 cm long. Leaves subcoriaceous, sessile or nearly so (petioles up to 1 mm long), dark green and somewhat shining on the upper surface, paler and dull beneath, rugose on both surfaces (when dry); blades elliptic-ovate, 3.5-5.5 cm long, 1.5-2.5 cm wide, gradually rounded toward the base then narrowly subcordate above the petiole, apex broadly acuminate (the acumen *c.* 5 mm long, obtuse); mid-nerve impressed on upper and lower surfaces; transverse veins oriented at an oblique angle relative to the mid-nerve, conspicuously impressed on the upper surface, obscure on the lower; lateral nerves situated 1-1.5 mm from the margin; young leaves strongly violaceous. Cymes umbelliform, 1-5-flowered, axillary and solitary but often opposite, often hidden beneath the leaves; peduncles filiform, 1-2 cm long, quadrangular and narrowly 4-winged; bracts lanceolate, 1-2 mm long, the bracteoles similar but smaller. Flowers subsessile, ochroleucous; hypantho-calyx campanulate, *c.* 2 mm long and 2.8 mm wide; calyx shallowly 4-lobed, the lobes broadly rounded. Corolla rounded and apiculate in bud; petals suborbicular, 2 mm long, 1.5 mm wide, apiculate, the margins scarious. Anthers 1.5 mm long, the connective shortly conical and ± incurved but lacking a dorsal gland, the pollen sacs occupying more than half the length on the ventral side; filaments *c.* 1.5 mm long. Style *c.* 3 mm long. Fruits not seen.

REMARKS

This species is known only from the type collection. The long, slender peduncles and anthers lacking a dorsal gland suggest a close relationship with *M. alatum* Aug.DC., *M. mocquerysii* Aug.DC., and *M. inalatum*. It is perhaps most similar to *M. inalatum* which is based on a fruiting specimen (*Capuron SF-24056*, P) from Toamasina province, Analalava forest on laterite west of Foulpointe (approximately 230 km to the south). A recent collection from the eastern Masoala peninsula, *Aridy 123* (CAS, MO, P, TAN), is tentatively included in the circumscription of *M. inalatum*, although it differs from the type in some details (i.e. the somewhat smaller leaves with transverse veins obscure and the peduncles which are less than 3 cm long and quadrangular in cross-section). *Aridy 123* has mainly fruits, but the specimen at CAS also has flower buds that are identical to those of *M. impressivenum*.

Another species with umbellate cymules on long, axillary peduncles is the Tanzanian *M. cogniauxii* Gilg, under which *M. mocquerysii* was previously placed as a synonym (Jacques-Félix 1985a: 432). While these two species superficially resemble one another, their branchlets and floral characteristics are remarkably different, and phylogenetic analyses of DNA sequences place *M. cogniauxii* in a separate group along with most of the other east-African species sampled thus far (Stone 2004 and unpubl. data).

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

Similis M. perangusto Jacq.-Fél. *sed laminis latioribus, inflorescentiis plerumque ad nodos inferiores defoliatos non in axillis foliorum, bracteis brevibus squamiformibusque non acicularibus, pedicellis longioribus differt.*

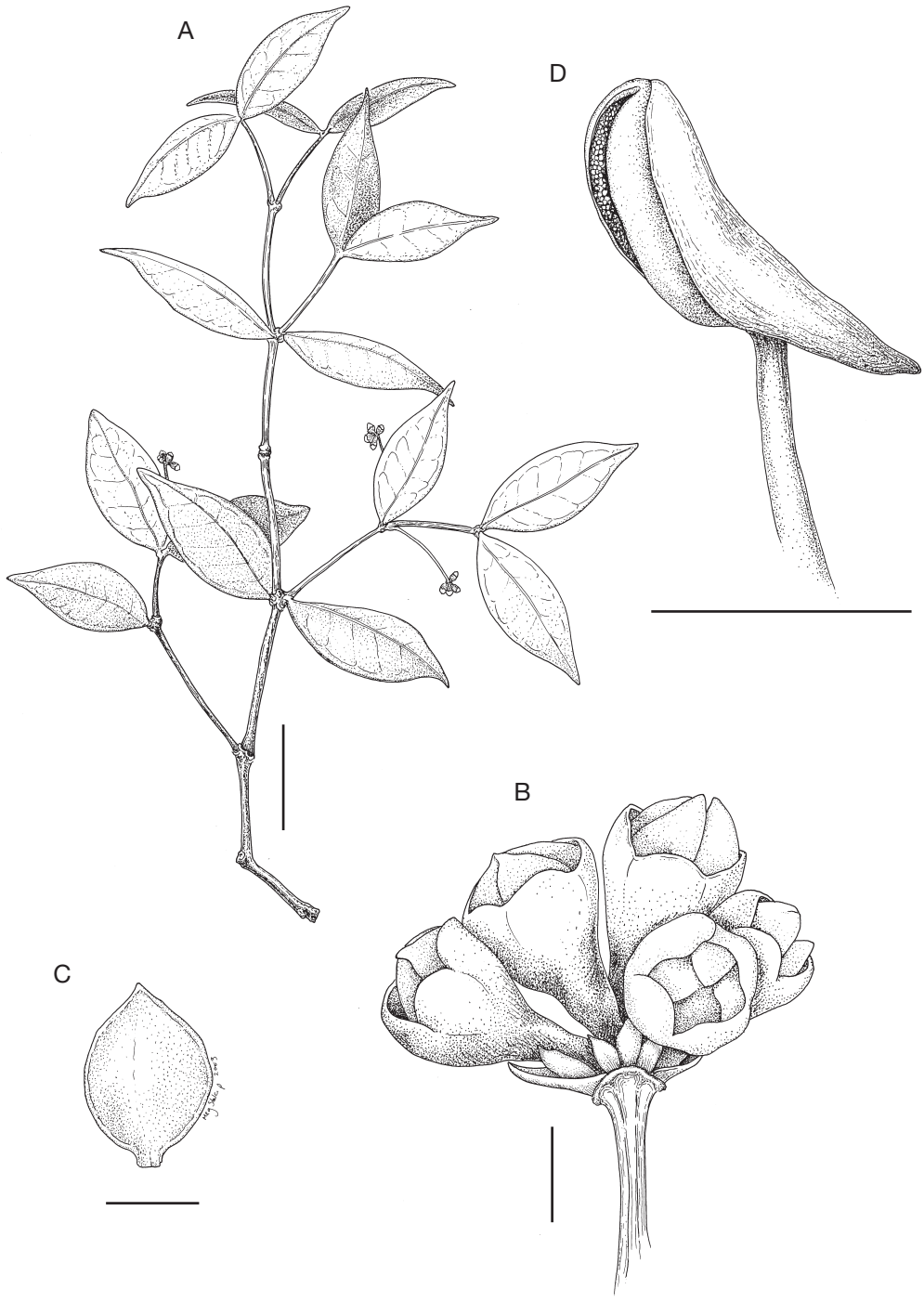

FIG. 6. — *Memecylon impressivenum* R.D.Stone: **A**, habit; **B**, inflorescence with flower buds; **C**, petal; **D**, anther and part of filament. *Stone et al. 2406*. Scale bars: A, 3 cm; B, 2 mm; C, D, 1 mm.

TYPUS. — **Madagascar.** Antsiranana province, Masoala peninsula, canyon of the upper Ampanavoana river, 15°37'40"S, 50°04'30"E, alt. *c.* 250 m, shallow soil of steep, east-facing rock outcrop on west side of river, 10.XII.2001, *Stone et al. 2408* (holo-, CAS; iso-, CAS, G, K, MO, P, TAN, TEF, UC, US, WAG; fruits in spirit collection at CAS).

DESCRIPTION

Shrub 2 m high; branchlets narrowly 4-winged when young (the wings often slightly crisped), becoming terete with age; internodes 1.5-3.5 cm long; axils with a small tuft of persistent bristles 1.5-2 mm long. Leaves thin but firm (neither coriaceous nor papyriferous), bright green on the upper surface (when dry), somewhat paler below, both surfaces dull and finely granular-rugose; petioles 1.5-2.5 mm long; blades broadly lanceolate, 5-8 cm long, 1.5-2.4 cm wide, cuneate at base, attenuate and acute or ± acuminate at apex; mid-nerve impressed on the upper surface, prominent and yellow-coloured on the lower; transverse veins scarcely visible, oriented at an oblique angle relative to the mid-nerve. Cymes 1.5 cm long, mostly 5-flowered, umbelliform or with a short axis above the peduncle, solitary or fascicled in the lower axils and also at the nodes below the current leaves; peduncles (1-)2-3(-4) mm long; bracts squamiform, deciduous; pedicels slender, 4-6 mm long. Flowers not seen. Fruits globose, 5 mm in diameter; calycinal crown erect, 4-microdentate; epigynous chamber with partitions cruciform, scarcely pronounced.

REMARKS

This species is known only from the type collection. It has the acute leaf apices of *M. perangustum* but differs conspicuously from that species by its wider leaves (which in *M. perangustum* are mostly 0.9-1.5 cm wide, rarely to 1.9 cm). Another seemingly close relative, *M. gracilipedicellatum* Jacq.-Fél., differs from both of the aforementioned species in having leaf blades less than three times longer than wide with apices obtuse.

Here it must be mentioned that *M. perangustum* is somewhat variable in its leaf morphology. The type (*Rakotoniaina RN-2365*, P) has narrowly lanceolate leaves that are abruptly rounded and then narrowly cordate at the base, as does one other collection (*Rakotoniaina RN-5928*, P). In four other specimens from the type region, the leaf bases are gradually narrowed to the petiole and not at all rounded or cordate (*Rakotoniaina RN-2431*, *Rakotoniaina RN-2634*, *Rakoto Jean de la Croix RN-7718*, and *Razanaparany RN-8748*; all at P). A recent collection from the Réserve naturelle intégrale de Betampona (*Andrianarisata 151*, CAS, MO, P) has leaves less than six times longer than wide; these specimens do not key cleanly to *M. perangustum* in Jacques-Félix (1985a) and superficially resemble *M. interjectum*, but their acicular inflorescence bracts and short pedicels nonetheless identify them as *M. perangustum*.

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

Affinis M. perrieri Danguy *sed laminis foliorum grandioribus (plerumque 5-7 × 2.5-4 non 3.5-4.5 × 1.5 cm) et late ellipticis differt.*

TYPUS. — **Madagascar.** Antsiranana province, 79 km south of Antsiranana on Route nationale 6, 14.5 km east of the old building site of Colas à Marotaolana, camp 2 km before Anjahakely, 12°53'43"S, 49°18'27"E, alt. *c.* 550 m, dry semi-deciduous forest, 27.V.1997, *Andrianantoanina & Bezara 1065* (holo-, CAS; iso-, MO, P).

PARATYPES. — **Madagascar.** Antsiranana province, Ambohipiraka, X.1932, *Perrier 18761* (P). — Antsiranana province, calcaires lapiazés de l'Ankarana, près d'Anbondromifehy, 28.IV.1966, *Capuron SF-24729* (P).

DESCRIPTION

Evergreen shrub to small tree 5 m high; branchlets terete, thickened at the nodes; internodes *c.* 1-2 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, (4-)5-7 cm long and (2-)2.5-3.9 cm wide, cuneate at base, broadly short-acuminate and acute at apex (the acumen up to 5 mm long); mid-nerve impressed on the upper surface, ± prominent on the lower (especially toward the base); one pair of lateral nerves faintly visible on both surfaces, the

FIG. 7. — *Memecylon interjectum* R.D.Stone: **A**, habit; **B**, infructescence. *Stone et al. 2408*. Scale bars: A, 5 cm; B, 5 mm.

course curvilinear and 3.5-5 mm from the margin in the basal half of the blade; transverse veins ± obscure. Cymules contracted, *c.* 1 cm long, generally solitary at the nodes below the current leaves or the "aphyllous" (scale-bearing) nodes alternating with those bearing normal leaves; peduncles 1-3 mm long, axes 1-3(-4) mm long; bracts deciduous. Flowers not seen. Fruits (immature?) ellipsoid, 7-9 mm long, 5.5-6 mm in diameter, on pedicels 1.5-2 mm long; calycinal crown spreading, 1 mm long, the margin thin and 4-emarginate between the ± truncate lobes.

REMARKS

This species belongs to a group of ellipsoid-fruited taxa that inhabit the dry forests of western and northern Madagascar. Others in this group include the widely distributed *M. perrieri* and the localized endemics *M. buxifolium* Blume and *M. multinode* Jacq.-Fél. Additional characters shared by these species are their coriaceous leaves drying brownish and their deciduous bracts.

Danguy (1922) described *M. perrieri* from a single flowering collection (*Perrier 1048*, P), but the taxonomy of this species has been in a confused state ever since. This is mainly because the species concept of Perrier de la Bâthie (1932, 1951) was based on discordant elements. He described the fruits of *M. perrieri* as oblong (11 mm long, 5 mm wide), but his circumscription included specimens in which the fruits are ellipsoid (*Perrier 32*, P) or globose (*Pervillé 542*, P). Jacques-Félix (1985b) later characterized the fruit of *M. perrieri* as globose, again based on *Pervillé 542* (which is furthermore part of the original material of *M. myrtiforme* Naudin). Although the proper determination of the *Pervillé* specimen remains unclear, it is entirely different from *M. perrieri* and must be excluded from that species. It is also different from *M. myrtiforme* (lectotypified by Wickens [1976], based on *Du Petit-Thouars s.n.*, P, barcode no. 62664).

As now conceived, *M. perrieri* includes several specimens with fruits that are clearly ellipsoid (*Perrier 32*, P; *Herb. Jard. Bot. Tananarive 6171*, P; *Humbert 32555*, MO, P; *Rahanyamalala s.n.* in 1990, P; *Schatz 2989*, CAS, MO, P; *Noyes et al. 1070*, MO, P). Its circumscription also includes all of the material previously assigned to *M. ankarense* H.Perrier. The fruit of *M. ankarense* has been described as globose and 15 mm in diameter (Perrier de la Bâthie 1932, 1951; Jacques-Félix 1985b), but this was based on a single example in very poor condition, found in an envelope on an isotype sheet (*Perrier 1191*, P, barcode no. 57714). In all other respects the type of *M. ankarense* is indistinguishable from *M. perrieri*, and there is no doubt that the two are conspecific.

Although *M. amplifolium* might be regarded as a large-leaved form of *M. perrieri*, there are two factors that argue against this. First, the leaves of *M. amplifolium* are distinctly larger and do not seem to represent one extreme in a continuous range of variation in *M. perrieri*. Second, one does not find these large-leaved plants occasionally throughout the distribution of *M. perrieri*; they have instead a coherent range in a limited area of Antsiranana province. Additional collections from the Sahafary forest, Saharenana river basin (*Capuron SF-24494*, *24506*, P), previously included in *M. perrieri* (Jacques-Félix 1985b), are similar to *M. amplifolium* except that the leaf blades are broadly oblanceolate with the bases attenuate. It may eventually be necessary to include these specimens in the circumscription of *M. amplifolium*, or alternatively the Sahafary population could warrant recognition as yet another localized endemic.

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

Species in insula dicta "Mayotte" endemica a congeneribus madagascariensis combinatione ramulorum juvenium quadrangularium vel quadrialatorum, foliorum brevipetiolatorum cum laminis coriaceis 4-6 cm longis 2-3.3 cm latisque, cymularum umbellatarum ad nodos strumosos ramulorum vetustiorum, bractearum squamatarum persistentiumque, corollarum albarum in alabastro rotundatarum, antherarum cum connectivo dorsaliter glanduloso, fructuum subglobosorum 15 mm diametro diversa.

TYPUS. — **Mayotte.** Sohoa, 12°48'39"S, 45°06'20"E, 19.IV.1999, *Pignal 1216* (holo-, P, barcode no. 176742; iso-, B, BR, K, MA, MO, PR).

PARATYPES. — **Mayotte.** Dapani, 17.I.1996, *Pascal 343* (K, P). — Sohoa, alt. 200 m, 2.IV.1996, *Pascal 449* (G, K,

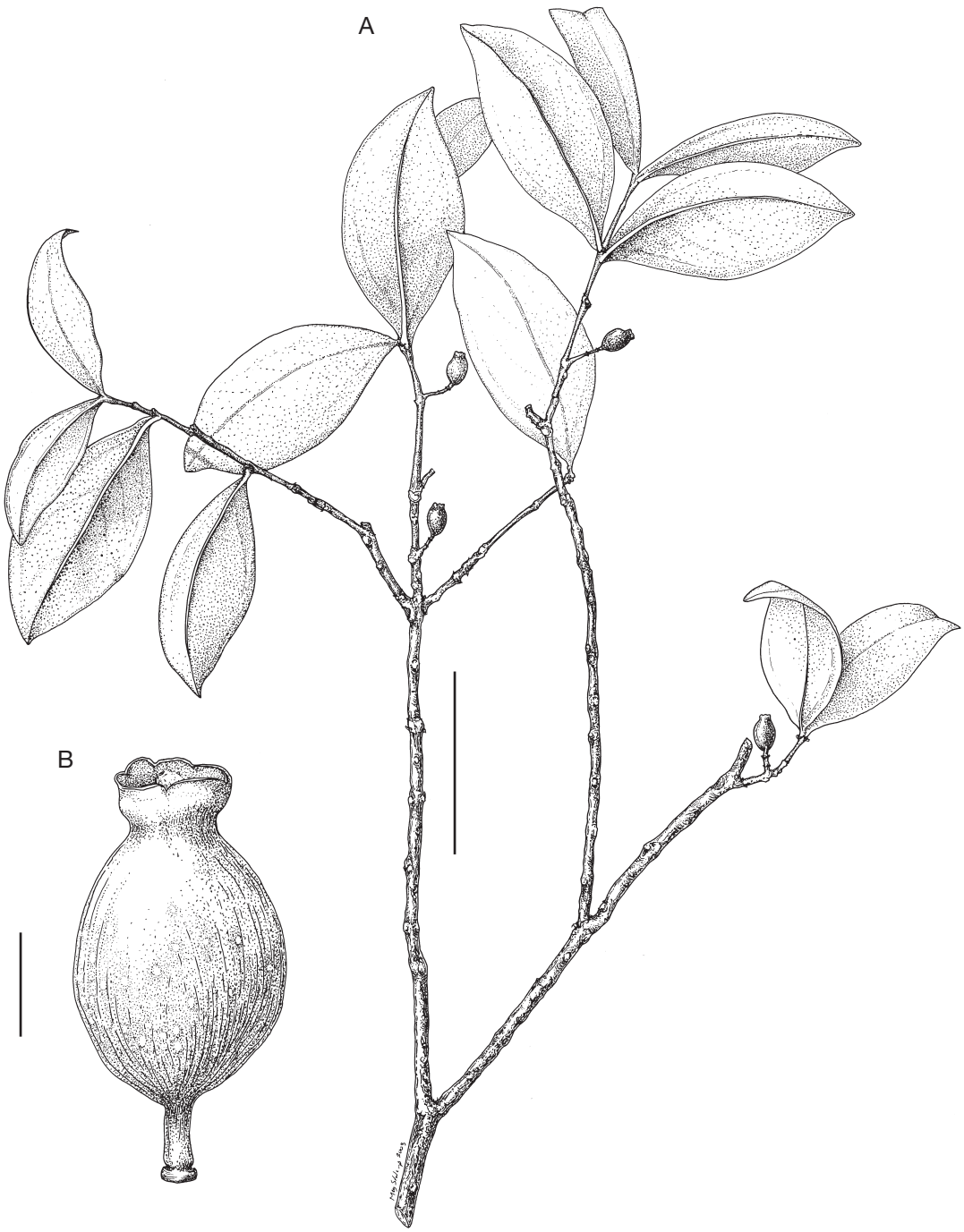

FIG. 8. — *Memecylon amplifolium* R.D.Stone: **A**, habit; **B**, fruit. A, *Andrianantoanina & Bezara 1065*; B, *Capuron SF-24729*. Scale bars: A, 5 cm; B, 3 mm.

MO, P, WAG). — Dapani, alt. 200 m, 23.X.1996, *Pascal 735* (CAS, G, K, MO, P, WAG). — Dapani, alt. 150 m, 11.II.1997, *Pascal 888* (P). — Grande Terre, Kani Kéli, bas du GR Choungui, 11.IX.2001, *Pignal et al. 1878* (G, K, MO, P, herb. Mayotte). — Grande Terre, Choungui, côté hors du GR, 21.IX.2001, *Pignal et al. 1920* (G, P, herb. Mayotte). — Grande Terre, Réserve forestière de Sohoa, 10.XI.2001, *Barthelat & M'Changama 541* (K, MO, P, herb. Mayotte). — Grande Terre, road leading to summit of Mont Choungui, 3.III.2004, *Barthelat et al. 1314* (P, herb. Mayotte).

DESCRIPTION

Evergreen shrub or small tree 2-12 m high; branchlets quadrangular and sometimes narrowly 4-winged when young, becoming terete with age and swollen at the nodes; internodes 1-4 cm long; bark whitish. Leaves coriaceous and ± discoloured, dark green and shining on the upper surface, paler or yellowish and dull on the lower, finely granular-rugose on both surfaces (when dry); petioles 1-3 mm long; blades mostly broadly ovate-elliptic, 4-6 cm long, 2-3.3 cm wide, rounded at the base and abruptly narrowed above the petiole, rounded and often retuse at the apex, varying to narrowly elliptic and broadly and obtusely short-acuminate at apex or even cuneate-oblanceolate to -obovate; mid-nerve impressed on the upper surface, prominent on the lower (especially toward the base); transverse veins occasionally visible on the lower surface, oriented at an oblique angle relative to the mid-nerve, ± regularly spaced at intervals of *c.* 4 mm; margins slightly and narrowly revolute. Cymes umbelliform, *c.* 1.5 cm long, (1-)3-7-flowered, in fascicles of 1-3(-4) at the nodes below the current leaves; peduncles mostly 5-7 mm long, quadrangular or narrowly 4-winged; bracteoles triangular-ovate, apiculate, *c.* 0.8 mm long, persistent. Flowers on pedicels *c.* 3 mm long; hypantho-calyx campanulate, 2.5 mm long, 3.5 mm wide, the margin slightly scarious and 4-sinuate. Corolla ± rounded in bud; petals white, broadly ovate-deltate, 3 mm long, 2.5 mm wide, with conspicuous mid-nerve, apex ± acute, base auriculate and broadly short-unguiculate. Anthers *c.* 1.3 mm long, the connective narrowly conic-acute and strongly incurved around the large, elliptical gland, this occupying about half the length on the dorsal side; pollen sacs lateral (anterior); filaments dark violet, 5 mm long. Style *c.* 6 mm long. Fruits subglobose (sometimes ± asymmetrical), dark-mottled becoming violet at maturity and 17 mm long, 15 mm wide; calycinal crown *c.* 1 mm long, slightly spreading or ± erect; epigynous chamber rather shallow, lacking partitions.

REMARKS

Sequences from the ITS and ETS regions of nuclear ribosomal DNA, obtained from the type material, indicate that *M. mayottense* belongs to the Madagascan clade and is not closely related to the east-African species (R. D. Stone unpubl. data). Yet among the known Madagascan species its affinities are not clearly evident. In Jacques-Félix (1985a), *M. mayottense* would key to the group that includes *M. infuscatum*, *M. louvelianum* H.Perrier, and *M. dalleizettei* H.Perrier, on account of the dorsal gland on the anther connectives and the cymules with several pairs of imbricated, persistent bracts. It appears most similar to *M. louvelianum*, in particular to the atypical form with coriaceous, rounded leaves and larger fruits that has been collected several times on calcareous substrates in Antsiranana and Mahajanga provinces (*Rakotovao RN-6153*, MO, P; *SF-10670*, P; *Bardot-Vaucoulon 900*, *973*, P). *Memecylon louvelianum* notably differs from *M. mayottense* in its terete branchlets, shorter peduncles, somewhat smaller flowers with corolla narrowly acute-acuminate in bud, violet petals, and ellipsoid fruits with a cushion-like peristyle inside the calicinal crown.

Genus *Warneckea* Gilg

Warneckea masoalae R.D.Stone, sp. nov. (Fig. 10)

Species insignis habitu trunciflоro et nervis lateralibus foliorum invalidis plus minusve intramarginalibus, a congeneribus mihi cognitis bene distincta.

TYPUS. — **Madagascar.** Antsiranana province, Masoala peninsula, canyon of Ampanavoana river, 15°40'45"S, 50°09'35"E, alt. 75 m, understory of evergreen rain forest on south side of river, 8.XII.2001, *Stone et al. 2407* (holo-, CAS; iso-, CAS, G, K, MO, P, TAN, TEF, US; flowers and fruits in spirit collection at CAS).

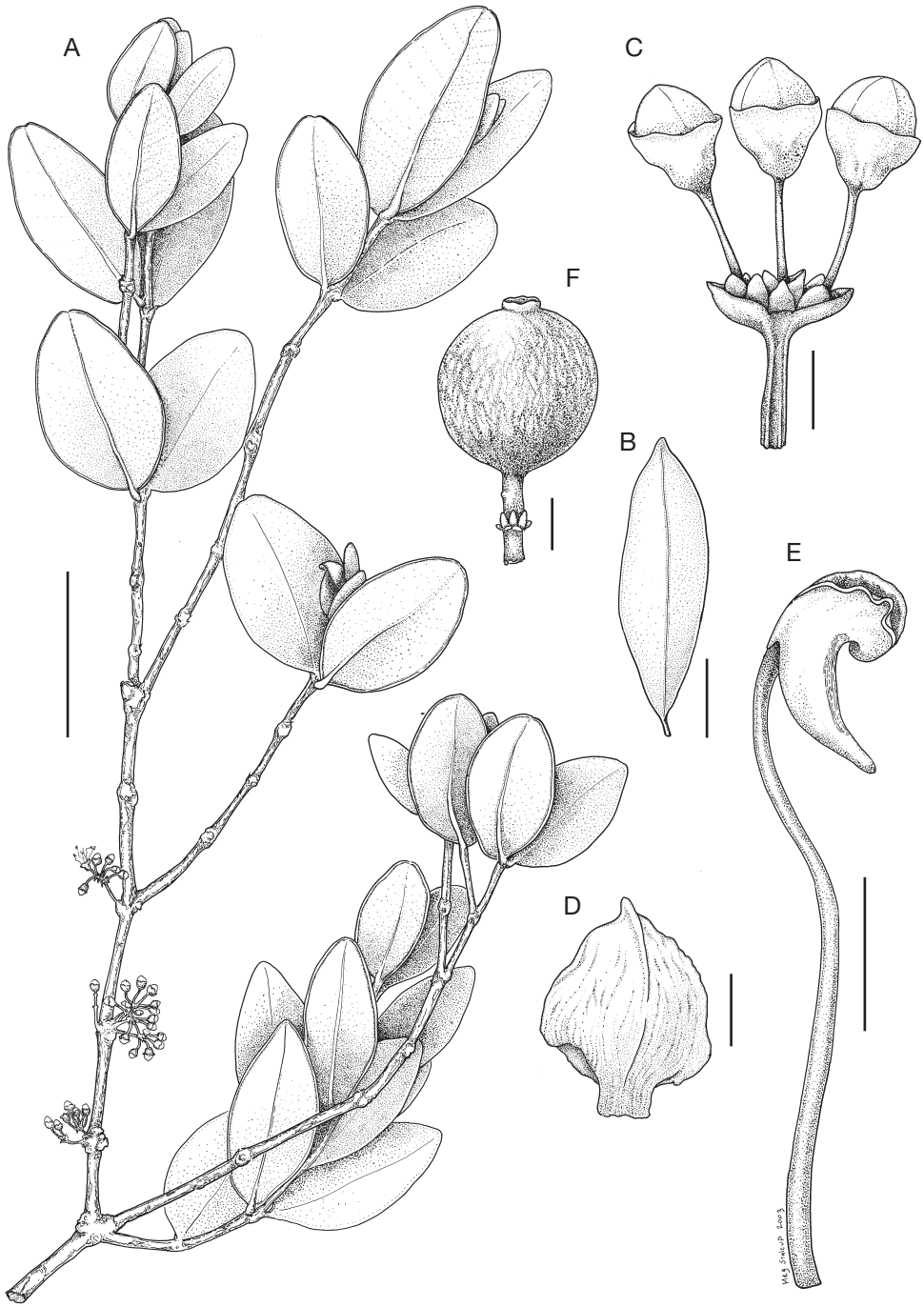

FIG. 9. — *Memecylon mayottense* R.D.Stone: **A**, habit; **B**, leaf (adaxial view); **C**, inflorescence with flower buds; **D**, petal; **E**, stamen; **F**, fruit. A, *Pascal 888*; B, *Pascal 449*; C-E, *Pignal 1216*; F, *Pascal 735*. Scale bars: A, 5 cm; B, 2 cm; C, 3 mm; D, E, 1 mm; F, 5 mm.

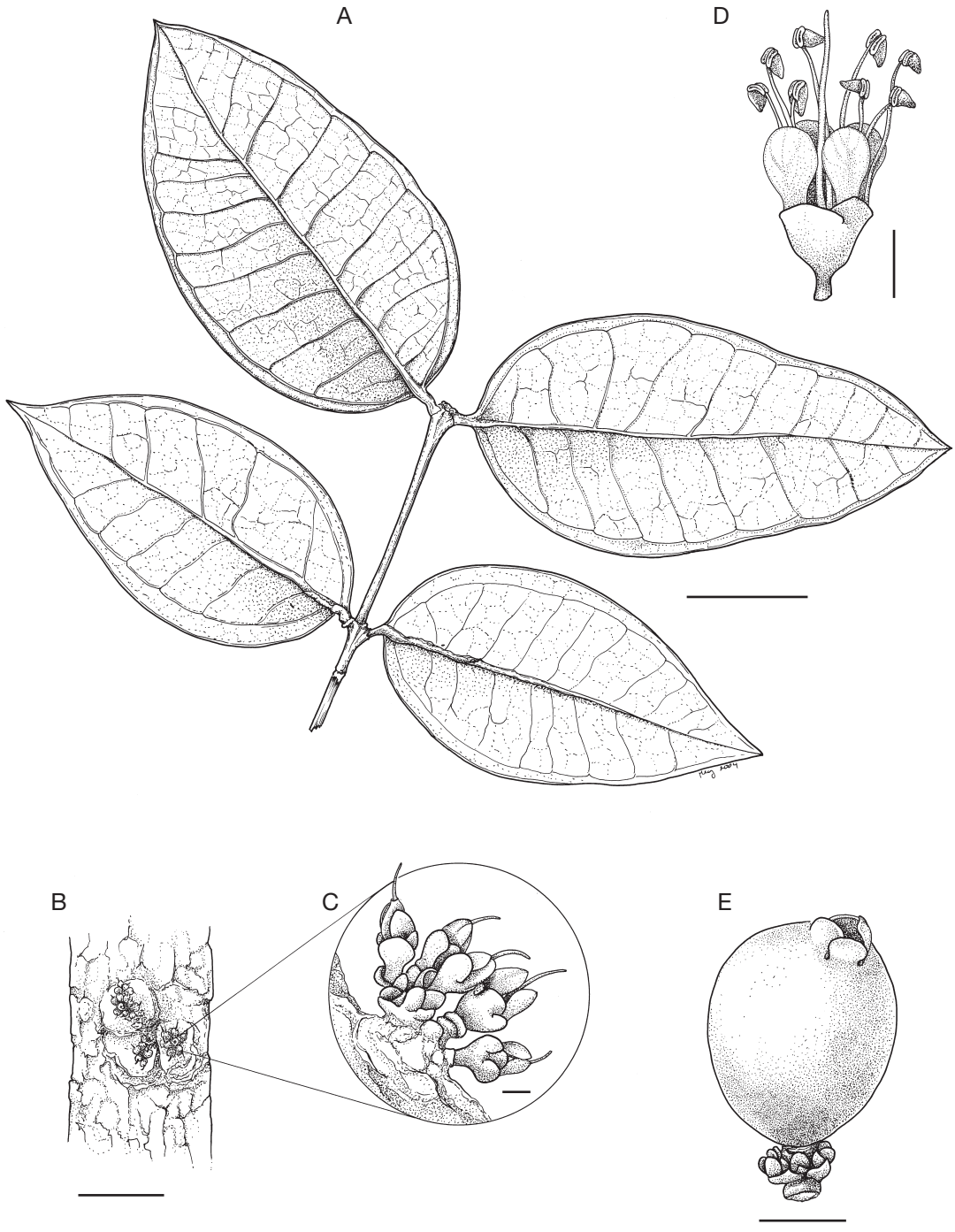

FIG. 10. — *Warneckea masoalae* R.D.Stone: **A**, leafy branchlet; **B**, part of trunk showing pulvinate inflorescence; **C**, detail of inflorescence with flower buds; **D**, open flower; **E**, fruit. *Stone et al. 2407*. Scale bars: A, 5 cm; B, 2 cm; C, 2 mm; D, 3 mm; E, 5 mm.

DESCRIPTION

Evergreen small tree 4 m high; branchlets terete, the youngest subquadrangular; internodes 5-12 cm long. Leaves subcoriaceous, light green on both surfaces (when dry); petiole robust, 6-12 mm long, ± flattened or canaliculate on the adaxial side; blades ovate to lance-ovate, (12-)16.5-22.5 cm long, (5.5-)8.0-11.9(-12.8) cm wide, broadly rounded at the base and sometimes subcordate above the petiole, attenuate-rounded in the upper third and abruptly acute or broadly short-acuminate at the apex (acumen up to 1 cm long); mid-nerve canaliculate on the upper surface, very prominent on the lower and wide at the base (up to 2.5 mm), becoming progressively narrower toward the apex; lateral nerves one pair, diverging from the mid-nerve at the base of the blade, much weaker than the mid-nerve but somewhat prominent on both surfaces, ± intramarginal (distance 2-9 mm from margin in the basal half of the blade), confluent with the transverse veins and forming a series of shallow loops for ± the entire length of the blade (sometimes curvilinear near the base); transverse veins like the lateral nerves or slightly thinner, their orientation ± perpendicular to the mid-nerve or somewhat oblique; reticulate tertiary veinlets evident on both surfaces (especially the lower). Cymules agglomerated in compact, ligneous cushions 1-2(-3) cm in diameter at well spaced intervals along the trunk. Flowers sessile or nearly so (pedicels rarely up to 1 mm long), each subtended by three pairs of imbricate, orbicular, cucullate bracts *c.* 1 mm long. Hypantho-calyx green, obconic, 3 mm long, 4 mm wide, the lobes broadly rounded, *c.* 1 mm long and 2 mm wide, scarious margined, the two external lobes auriculate and amplective at the base. Petals white, spatulate, 4-4.5 mm long, 1.8-2 mm wide. Anthers ochroleucous, 2 mm long (1.5 mm when dry), the connective conic with the extremity abruptly acute, the dorsal side keeled and lacking a gland; pollen sacs lateral (anterior), well separated from each other; filaments blue, 8 mm long. Style protruding by *c.* 2-3 mm from the corolla in bud, 9-10 mm long at anthesis; ovary imperfectly bilocular; ovules 8. Fruits subglobose, 12 mm long, 11-12 mm wide, crowned by the erect, persistent calyx; epigynous chamber smooth, marked only by the petal and filament scars. Embryo with a short radicle and lacking a hypocotyl, the outer cotyledon fleshy, globose, filling the entire seminal cavity, the inner cotyledon rudimentary, *c.* 0.5 mm long.

REMARKS

This new *Warneckea*, known only from the type collection, is so distinctive that it cannot be closely compared with any other currently recognized species. It is most remarkable for its trunciflorous habit and leaves with lateral nerves rather weak and intramarginal, in the latter respect superficially resembling *Memecylon*. Yet it is clearly a *Warneckea* on account of the smooth leaf surfaces with evident reticulum of small veins, the auriculate-amplexate calyx lobes, and the embryo morphology.

Warneckea masoalae might be confused with *W. pulviniflora* Jacq.-Fél. which has cymules in smaller cushions (up to 1 cm in diameter) at the defoliated nodes of robust branchlets (not down the trunk). The latter species also differs by its shorter petioles, smaller leaf blades, primary lateral nerves strongly curvilinear and suprabasilar (diverging from the mid-nerve *c.* 1 cm above the base), smaller flowers, longer style, and somewhat larger fruit.

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