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Descriptions of ten new species of *Turraea* L.
(Meliaceae, Turraeae) from Madagascar
with notes on the species described by Buchenau

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Descriptions of ten new species of *Turraea* L. (Meliaceae, *Turraeae*) from Madagascar with notes on the species described by Buchenau

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ABSTRACT

Turraea L. (Meliaceae) is the largest genus of the tribe *Turraeae* (subfamily Melioideae) with c. 68 currently recognized species mostly occurring in Africa and Madagascar. Recent molecular phylogenetic studies show that the endemic Malagasy genera, *Calodecaryia* J.-F. Leroy and *Humbertioturraea* J.-F. Leroy, are better placed as synonyms within an enlarged *Turraea sensu lato*. Ten new species of *Turraea* endemic to Madagascar are described in this article, i.e. *T. bardotiae* Lescot & Callm., sp. nov., *T. flagellata* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. gracilifolia* Callm. & Nusb., sp. nov., *T. lescotiana* Callm. & Nusb., sp. nov., *T. neoleroiyana* Callm. & Nusb., sp. nov., *T. rasolofae* Callm. & Nusb., sp. nov., *T. sambavensis* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. sambiranensis* Callm. & Nusb., sp. nov., *T. tsingycola* Callm. & Nusb., sp. nov., and *T. vohisandrianensis* Callm. & Nusb., sp. nov. Each of the new species is provided with line drawings and a risk of extinction assessment using the IUCN Red List Criteria. We have also examined the original material of *T. fockei* Buchenau and *T. kindtii* Buchenau, the circumscription of which have been problematic. This material, now at BRNU, has enabled us to better understand these species and *T. anomala* (O. Hoffm.) Harms and *T. malifolia* Baker, are now reduced to synonymy.

KEY WORDS

Meliaceae,
Turraea,
Humbertioturraea,
Calodecaryia,
Madagascar,
IUCN Red List,
lectotypifications,
new synonyms,
new species.

RÉSUMÉ

Description de dix espèces nouvelles de Turraea L. (Meliaceae, Turraeaceae) de Madagascar avec des notes concernant les espèces décrites par Buchenau.

Turraea L. (Meliaceae) est le plus grand genre de la tribu des *Turraeaceae* (sous-famille Melioideae) avec environ 68 espèces actuellement reconnues principalement en Afrique et à Madagascar. Des études de phylogénies moléculaires récentes montrent que les genres endémiques malgaches *Calodecaryia* J.-F. Leroy et *Humbertioturraea* J.-F. Leroy devraient être considérés comme synonymes dans un genre *Turraea* élargi. Dix nouvelles espèces de *Turraea* endémiques de Madagascar sont décrites, à savoir *T. bardotiae* Lescot & Callm., sp. nov., *T. flagellata* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. gracilifolia* Callm. & Nusb., sp. nov., *T. lescotiana* Callm. & Nusb., sp. nov., *T. neoleroyana* Callm. & Nusb., sp. nov., *T. rasolofae* Callm. & Nusb., sp. nov., *T. sambavensis* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. sambiranensis* Callm. & Nusb., sp. nov., *T. tsingycola* Callm. & Nusb., sp. nov., et *T. vohisandrianensis* Callm. & Nusb., sp. nov. Chacune des nouvelles espèces est accompagnée de dessins au trait ainsi que d'une évaluation du risque d'extinction selon les critères de la liste rouge de l'UICN. Nous avons également examiné le matériel original de *T. fockei* Buchenau et *T. kindtii* Buchenau, dont la circonscription était problématique. Ce matériel, qui se trouve maintenant au BRNU, nous a permis de mieux comprendre ces espèces et *T. anomala* (O. Hoffm.) Harms et *T. malifolia* Baker sont maintenant considérés comme des synonymes.

MOTS CLÉS

Meliaceae,
Turraea,
Humbertioturraea,
Calodecaryia,
Madagascar,
Liste Rouge de l'UICN,
lectotypifications,
synonymes nouveaux,
espèces nouvelles.

INTRODUCTION

Turraea L. (Meliaceae), comprising *c.* 68 species, is the largest genus of the tribe *Turraeaceae* Harms (subfamily Melioideae). Its center of diversity is in the Afrotropical realm, with *c.* 35 species recognized in continental Africa (African Plant Database 2024) and with currently 22 species in Madagascar (Madagascar Catalogue 2024). The genus also occurs in the Mascarene Islands (9 species) (Scott 1997; Baider & Florens 2016) and in the Indomalayan realm and Tropical Australia with a single widespread species (Mabberley *et al.* 1995).

Recent molecular phylogenetic studies show that the tribe *Turraeaceae* is paraphyletic. (Koenen *et al.* 2015; Joyce *et al.* 2023). Koenen *et al.* (2015) refer to a monophyletic TT clade that includes the tribe *Turraeaceae* and several genera of the *Trichilieae*. The tribe *Turraeaceae* nevertheless forms a monophyletic subclade while the generic delimitation of the genus *Turraea* needs to be addressed regarding the segregated endemic Malagasy genera *Calodecaryia* J.-F. Leroy (Leroy 1960) and *Humbertioturraea* J.-F. Leroy (Leroy 1969) (Koenen *et al.* 2015: fig. S1). For this reason, Heads (2019) recognized an enlarged *Turraea* including both *Calodecaryia* and *Humbertioturraea*. The former was described for the two Malagasy species with their stamens free at least in $\frac{3}{4}$ of their length and for their campylotrope seeds with a sarcotesta (Leroy 1960), while the latter was described for the Malagasy species with indehiscent fruits and non-arillate seeds (Leroy 1969). The morphological combination of features that characterize *Turraea* (as it was previously delimited by Pennington & Styles 1975) will be addressed elsewhere by the authors and collaborators regarding the Malagasy endemic genera, and also with respect to two other small African genera of the tribe *Turraeaceae*, i.e. *Naregamia* Wight & Arn. (Wight & Arnott 1834; see Cheek 1990, 1996) and *Nymanina* Lindb. (Lindberg 1868).

The first author and collaborators have already described four new species in the tribe *Turraeaceae* from Madagascar and several additional new species are still to be published (Callmander *et al.* 2011, 2012; Randrianarivony *et al.* 2017). Names for some of these new taxa had already been coined by Jean-François Leroy (1915-1999) and Michèle Lescot (1939-) in an incomplete and unpublished draft treatment of the family prepared for the *Flore de Madagascar et des Comores* series. This treatment was based mostly on collections made in the 20th century. With the increased number of collections from Madagascar now available, taxonomic circumscription of several of Leroy and Lescot's unpublished names have to be revised (see Callmander *et al.* 2012). Nevertheless, some of the new species described in this present contribution have been recognized by Leroy and Lescot in their unpublished manuscript (see notes under each of the new species). We describe ten new species of *Turraea* endemic to Madagascar, i.e. *T. bardotiae* Lescot & Callm., sp. nov., *T. flagellata* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. gracilifolia* Callm. & Nusb., sp. nov., *T. lescotiana* Callm. & Nusb., sp. nov., *T. neoleroyana* Callm. & Nusb., sp. nov., *T. rasolofae* Callm. & Nusb., sp. nov., *T. sambavensis* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov., *T. sambiranensis* Callm. & Nusb., sp. nov., *T. tsingycola* Callm. & Nusb., sp. nov., and *T. vohisandrianensis* Callm. & Nusb., sp. nov. Each of the new species is provided with line drawings and a risk of extinction assessment.

Lastly, the original material collected by Rutenberg on which Buchenau described *Turraea fockei* Buchenau and *T. kindtii* Buchenau has been studied. This material, now at the herbarium of the Department of Botany and Zoology of the Masaryk University in Czech Republic (BRNU) allows to better understand their taxonomic circumscription and *T. anomala* (O. Hoffm.) Harms and *T. malifolia* Baker are now reduced to synonymy. Three new lectotypes are also designated including one as a second step designation.

MATERIAL AND METHODS

This study is based on the revision of the available literature including the unpublished manuscript by Leroy & Lescot and the examination of herbarium specimens kept at G, K, MO and P. The MO collections were studied using images. Coordinates added post-facto are placed between brackets in the material cited. The preliminary conservation status of each species was assessed using the IUCN Red List Categories and Criteria (IUCN 2012). We calculated EOO and AOO (with a 2 × 2 km grid) using the online “GeoCAT” software (<http://geocat.kew.org>; Bachman *et al.* 2011).

SYSTEMATICS

Family MELIACEAE Juss.

Genus *Turraea* L.

Turraea bardotiae Lescot & Callm., sp. nov.
(Fig. 1)

DIAGNOSIS. — *Turraea bardotiae* sp. nov. is distinguished by its large white flowers (4–6 cm long), its exceptionally long and narrow, linear-oblong (8–10 × 1–2 mm) foliaceous calyx lobes, with apparent venation, and by its staminal tube lacking distal appendices.

TYPUS. — Madagascar • Diana Region [Prov. Antsiranana], Matsaborimanga, Réserve Spéciale d’Ankarana, tsingy au-dessus de la grotte du camp des anglais; 12°54′43″S, 49°06′39″E; 180 m; 12.XII.1997; fl.; *Bardot-Vaucoulon* 1068 (holo-, P[P00701770]!, iso-, G[G00415937]!, K!, MO, P[P00701771, P06773979]!, TAN).

PHENOLOGY. — Flowers in November, fruits in February.

DISTRIBUTION AND ECOLOGY. — *Turraea bardotiae* sp. nov. is known from the cracks of the limestones in the dry deciduous forests growing on the tinging of the Ankarana massif at an elevation of 180 m.

ETYMOLOGY. — The species epithet honours our friend and colleague Martine Bardot-Vaucoulon. Martine collected more than 2000 specimens in the Ankarana massif and studied its vegetation (Bardot-Vaucoulon 1997). She collected many new species in that limestone massif including two of the three collections known of *Turraea bardotiae* sp. nov.

CONSERVATION STATUS. — *Turraea bardotiae* sp. nov. is known only from a single locality in the Ankarana massif. Despite its protection, the massif has seen a zone heavily exploited for sapphire mining and the forest is subject to wild fires (Goodman *et al.* 2018). The new species is therefore preliminarily assessed as “Critically Endangered” [CR 2ab(iii)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Diana Region [Prov. Antsiranana], Matsaborimanga, Réserve Spéciale d’Ankarana, tsingy au dessus de la grotte du camp des anglais; 12°54′45″S, 49°06′39″E; 180 m; 10.XI.1990; fl.; *Bardot-Vaucoulon* 273 (P[P00701761]) • Ankarana RS, close to Camp d’Anglais; 12°33′S, 49°40′E; 180 m; 18.II.1994; *Lewis et al.* 1140 (K[K000469042], MO, P[P06773976, P06773977], TAN).

DESCRIPTION

Sprawling shrub or small tree, 2–4 m tall, branched at base; twigs with light-brown, striated bark. Leaves unifoliolate; leaf

blade obovate to suborbicular, subcoriaceous, tomentose on both sides, (1.5–)3–4(–5) × (1–)1.5–2(–2.5) cm, base obtuse to attenuate, margin entire, sub-revolute sometimes undulate, apex rounded, sometimes slightly attenuate, domatia absent; primary and secondary veins prominent abaxially, slightly visible adaxially; petiole 2–3 mm long, tomentose. Inflorescences pauciflorous, 1–(2) flowers. Flower buds slightly enlarged and obtuse at apex. Flowers 4–6 cm long; pedicel 6–10 mm long, puberulous. Calyx cupuliform, 2 × 3–4 mm, 5-lobed, each lobe extremely developed, foliaceous, linear-oblong, rounded obtuse at the apex, 8–10 × 1–2 mm, with apparent venation, puberulous. Corolla white of 5 spatulate petals, roughly equal to the staminal tube, 35–40 mm long, *c.* 1.5 mm wide at base, 2 mm wide in the proximal part, pubescent with stiff white hairs, erect and sparse along the entire length, denser towards the apex on the outside. Staminal tube somewhat curved, slightly enlarged distally, 30–35 mm long, puberulous; appendices absent; anthers 10, subsessile, oblong, 1.2 × 0.3 mm, apiculate, apicule *c.* 0.5 mm, puberulent; ovary subglobose, *c.* 1 in diam., villose, locules 5, each with 2 collateral ovules; style exerted 5–10 mm, beyond the staminal tube *c.* 0.3 mm in diam. Receptaculum pollinis clavate, 3 × 1.5 mm; stigma discoid, 0.4 × 1.2 mm. Fruits a capsule, subglobose, *c.* 8 mm diam., brownish-green, dehiscent by 5 valved, wrinkled, puberulous; pericarp *c.* 0.2 mm thick; calyx persistent. Seeds centrally grouped, reniform, 4 × 3 mm; testa brownish, smooth; aril present.

NOTES

Turraea bardotiae sp. nov. is very distinctive among the Malagasy *Turraea* species in its exceptionally long and narrow, linear-oblong foliaceous calyx lobes, with apparent venation (Fig. 1).

Only three collections are known in the rather well collected Ankarana massif. This may be explained by its ecology, growing on eroded and lacerated limestones (tsingy) which are difficult to walk on. This species is most likely rare and known only from the tsingy above the cave of the “camp des anglais”.

Turraea flagellata

J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov.
(Figs 2; 3A)

DIAGNOSIS. — *Turraea flagellata* sp. nov. is distinguished by its small white flowers (2–3 cm long), its staminal tube with rudimentary appendices, and its anthers bearing a long filiform (to 15 mm), tapering and twisted distal apicle.

TYPUS. — Madagascar • Melaky Region [Prov. Mahajanga], Tsiampihy, près Soahany, Distr. Antsalova; [18°35′S, 44°14′E]; 25–50 m; 15.X.1932; fl.; *Leandri* 291 (holo-, P[P00263853]!; iso-, G[G00415946]!, K!, MO[MO-2195464] image!, NY, P[P00263852, P00263854]!, TAN, TEF, WAG[WAG.0249063] image!).

PHENOLOGY. — Flowers from October to March.

DISTRIBUTION AND ECOLOGY. — *Turraea flagellata* sp. nov. appears to be endemic to the western dry deciduous forests of Madagascar at an elevation between *c.* 0 to 400 m.



FIG. 1. — *Turraea bardotiae* Lescot & Callm., sp. nov.: **A**, flowering stem; **B**, leaf, adaxial surface; **C**, flower; **D**, calyx; **E**, fruit. **A-D**, *Bardot-Vaucoulon 1018*; **E**, *Lewis et al. 1140*. Drawings: Alain Jouy. Scale bars: A, 4 cm; B, E, 1 cm; C, 15 mm; D, 5 mm.

ETYMOLOGY. — The specific epithet refers to the anthers bearing a long filiform apicle characterizing this species.

CONSERVATION STATUS. — The new species is known from nine localities, six of which are situated within the protected area network (Andranomena, Bemaraha, Complexe Tsimembo Manambolomaty, and Menabe Antimena). Based on its large EOO of 36 333 km²

and an AOO of 36 km², *Turraea flagellata* sp. nov. is therefore preliminary assessed as “Least Concern” [LC] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar** • Melaky Region [Prov. Mahajanga], forêt de Tsiampihy et forêts côtières près de Besaraha, de Bemihia et de Soahanina, Nord de Bemika;



FIG. 2. — *Turraea flagellata* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov.: **A**, flowering stem; **B**, leaf, adaxial surface; **C**, flower; **A, B**, *Onjalalaina et al.* 1063; **C**, *Leandri* 291. Drawings: Alain Jouy. Scale bars: A, 4 cm; B, 15 mm; C, 5 mm.

[18°44'S, 44°20'E]; 0–20 m; 30.XII.1952; fl.; *Leandri et al.* 2277 (G[G00642050], K, MO, P[P06709116, P06709127, P06709128], TAN) • env. de Mahajanga; [15°43'S, 46°19'E]; XII.1903; fl.; *Perrier de la Bâthie* 1663 (P[P06709126, P06709130]) • Bemaraha, Antsalova; [18°41'S, 44°46'E]; 11.I.1959; fl.; *Réserves Naturelles* 10206 (P[P06709121, P06709132]) • *ibid. loco*; 13.I.1959; fl.; *Réserves Naturelles* 10209 (P[P06709120, P06709133]) • Tsimembo,

Antsalova; [18°56'S, 44°27'E]; 20–130 m; fl.; *Service Forestier* 8255 (P[P06709124, P06709131]) • Forêt d'Amboloando, Amboloando, Distr. Maintirano; [18°01'S, 44°06'E]; 23.II.1956; 70 m; fl.; *Service Forestier* 16362 (P[P06709122, P06709123]) • Menabe Region [Prov. Toliara], Morondava, forêt de Marosalaza, 50 km au Nord de Morondava; [20°03'S, 44°38'E]; 0 m; fl.; 28.XII.1973; *Hladik* 42 (P[P06709129]) • 45 km N of Morondava on Belo Tsiribihina



FIG. 3. — Field pictures of *Turraea* L.: **A**, *T. flagellata* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov.; **B**, *T. sambiranensis* Callm. & Nusb., sp. nov. **A**, Onjalalaina et al. 1063; **B**, Manjato et al. 403. Photographs: **A**, Guy Onjalalaina; **B**, Nadiyah Manjato.

road, Kirindy; 20°03'S, 44°38'E; 30 m; 17.XI.1986; fl.; *Nicoll 167* (MO[MO-3188500], P[P06709125]) • Belo sur Tsiribihina, 5 km E of Lambokely; 19°50'26"S, 44°35'51"E; 50 m; 9.III.2016; fl.; *Onjalalaina et al. 1063* (K, MO[MO-3189262], P[P00970733], TAN) • Forêt de Kirindy, N of Marofandilia; 20°01'S, 44°39'E; 50 m; 26.XI.1989; fl.; *Pettersson & Nilsson 463* (K, UPS) • Morondava District, Andranomena Special Reserve; 20°10'12"S, 44°28'12"E; 14 m; 22.II.2018; fl.; *Razafimandimbison et al. 2282* (G[G00642051], MEL, MO[MO-3188728], P[P00948682], S, TAN).

DESCRIPTION

Small tree to 6 m tall; young twigs brownish, puberulent. Leaves unifoliolate; leaf blades chartaceous to subcoriaceous, elliptic, glabrous, (2-)2.5-3(-6) × (1-)1.5-2(-2.5) cm, base acute, margin entire, sometimes undulate, apex acuminate, adaxial surface shiny dark green, abaxial surface light green, dull, domatia absent; primary vein slightly prominent, secondary veins finely prominent on both surfaces; reticulum distinct; petiole 2-3 mm, long, puberulent. Inflorescence pauciflorous, 1-5 flowers. Flower buds yellowish, enlarged and acute-obtuse at the apex. Flowers 2-3 cm long; pedicel 10-12 mm long, puberulent. Calyx grey-green, cupuliform, 3 × 2 mm, 5-lobed, each lobe with a linear tooth 1 × 0.2 mm, finely pubescent on the outside, glabrous on the inside. Corolla white of 5 linear-spatulate petals, longer than the staminal tube, 20-25 mm long, 1 mm wide at base, 1.5 mm wide in the proximal part. Staminal tube cylindrical, 3.5 mm long, 0.8 mm in diam., glabrous outside, densely tomentose inside; rudimentary appendages at the base of each anther, glabrous. Anthers 10, subsessile, oblong, 1.8 × 0.2 mm, with a filiform apicle, tapering and twisted distally, up to 15 mm long, glabrous. Ovary subglobose, 0.8 mm in diam, glabrous, locules 5, each with 2 collateral ovules; style exerted 3-4 mm beyond the staminal tube, 0.2 mm in diam. Receptaculum pollinis oblong, 3 × 1.5 mm; stigma capitate, 0.8 × 0.3 mm. Fruits unknown.

NOTES

This new species is very distinctive among the Malagasy *Turraea* species by its anthers bearing a long and filiform apicle (Figs 2; 3A).

We attribute this name to Leroy & Lescot. Only two collections have been gathered since their unpublished description. Furthermore, the type collection, *Leandri 291*, and several others have been already distributed under that name by Sabine Comtet-Andriamanjatoarivo (1961-2013), back then technician of the P herbarium, when she was curating the Malagasy *Meliaceae* left by Michèle Lescot after her retirement.

Turraea gracilifolia Callm. & Nusb., sp. nov. (Fig. 4)

DIAGNOSIS. — *Turraea gracilifolia* sp. nov. is distinguished by its broadly elliptic acuminate leaf blades that are thin, membranous with domatia in the axils of primary and secondary veins and by its pauciflorous inflorescences with 1-2 large red to fuchsia flowers (4-5 cm long).

TYPUS. — Madagascar • Diana Region [Prov. Antsiranana], Ankarana, close to Camp d'Anglais; 12°54'43"S, 49°06'39"E; 180 m; 18.II.1994; fl., fr.; *Lewis et al. 1135* (holo-, G[G00415935]!; iso-, K[K00159881]!, MO[MO-3188802] image!, P[P06801919]!, TAN, WAG!).

PHENOLOGY. — Flowers in January; fruits in January and March.

DISTRIBUTION AND ECOLOGY. — *Turraea gracilifolia* sp. nov. appears to be endemic to the northern dry deciduous forests of Madagascar at an elevation between c. 100 to 400 m.

ETYMOLOGY. — The specific epithet refers to the slender and delicate leaves of this species.

CONSERVATION STATUS. — The new species is known from eight localities, six of which are situated within the Ankarana protected area. Despite its protection, the massif has seen a zone of heavily exploited for sapphire mining and the forest is subject to wild fires (Goodman *et al.* 2018). Based on an EOO of 437 km², an AOO of 28 km² and serious plausible threats on its habitat, *Turraea gracilifolia* sp. nov. is therefore preliminary assessed as "Vulnerable" [VU B1ab(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Diana Region [Prov. Antsiranana], Anivorano Nord, route d'Ambilobe, km 87, forêt d'Analamahitsy; [12°50'10"S, 49°13'42"E]; 27.I.1960; fr.; *Cours 5492* (P[P06801922]) • Ankarana, near Campement des Anglais; 12°50'47"S, 49°06'18"E; 82 m; 14.I.2002; fl.; *De Block et al. 1228* (BR, MO[MO-3188629], P[P04756245], TAN) • Forêt de Ambatomamo au sud d'Anivorano Nord; [12°51'S, 49°15'E]; 30.I.1960; fr.; *Humbert 32363* (MO, P[P06801918, P06801923], TAN) • Forêt de Marovato, Anivorano Nord; [12°48'S, 49°14'E]; *Humbert 32391* (P[P06801920]) • Ankarana RS, near Campement des Anglais, along path to Matsaborimanga; 12°54'S, 49°08'E; imm. fr.; *Leeuwenberg et al. 14380* (G, P[P00536589], TAN, WAG[WAG0089003]) • Cañyon de l'Ankarana de Diego; [12°54'45"S, 49°06'39"E]; I.1969; fl.; *Morat 3092* (P[P06801908, P06801909]) • Sommet de la Falaise, Ankarana de Diégo; [12°56'30"S, 49°07'12"E]; I.1969; fl.; *Morat 3106* (P[P06801915]) • Forêt d'Analandriana, au nord de Sakaramy; [12°25'S, 49°16'E]; 300 m; 14.II.1962; fr.; *Service Forestier 20958* (P[P06801911, P06801914, P06801917]) • Forêt d'Analamahitsy, entre Anivorano-Nord et Ambondromifehy (PK 84 de la route Diégo-Ambilobe); [12°50'10"S, 49°13'42"E]; 16.II.1962; fr.; *Service Forestier 22022* (P[P06801913, P06801916]) • Massif forestier au sud-ouest de Marotaolana, Anivorano-Nord; [12°48'S, 49°14'E]; 3 and 6.III.1964; fr.; *Service Forestier 23346* (MO, P[P06801910, P06801912]).

DESCRIPTION

Treelet to 7 m; twigs light-brown, striated, glabrous. Leaves unifoliolate; leaf blade very thin, membranous, broadly elliptic, glabrous to puberulent, (3-)4-7(-9) × (1.5-)2-3(-4) cm, base acute, margin entire, apex acuminate, sometimes attenuate, adaxial surface dark green, abaxial surface pale green, domatia present in axils of primary and secondary veins; primary vein prominent, secondary veins slightly visible adaxially, prominent abaxially with reticulum visible; petiole 1-3 cm, glabrous to glabrescent. Inflorescences pauciflorous, 1-2 flowers. Flower buds slightly dilated and obtuse at the apex. Flowers 4-5 cm long, pedicel 8-15 mm long, glabrous. Calyx cupuliform, green, 2 × 3-4 mm, 5-lobed, each lobe with a short apical tooth c. 0.5 mm long, pubescent on margins, puberulent on both sides. Corolla red to fuchsia, 5 petals, roughly equal to the staminal tube, 35-40 mm long, 1.5 mm wide at base, c. 2 mm wide in the proximal part, glabrous, puberulent distally outside,

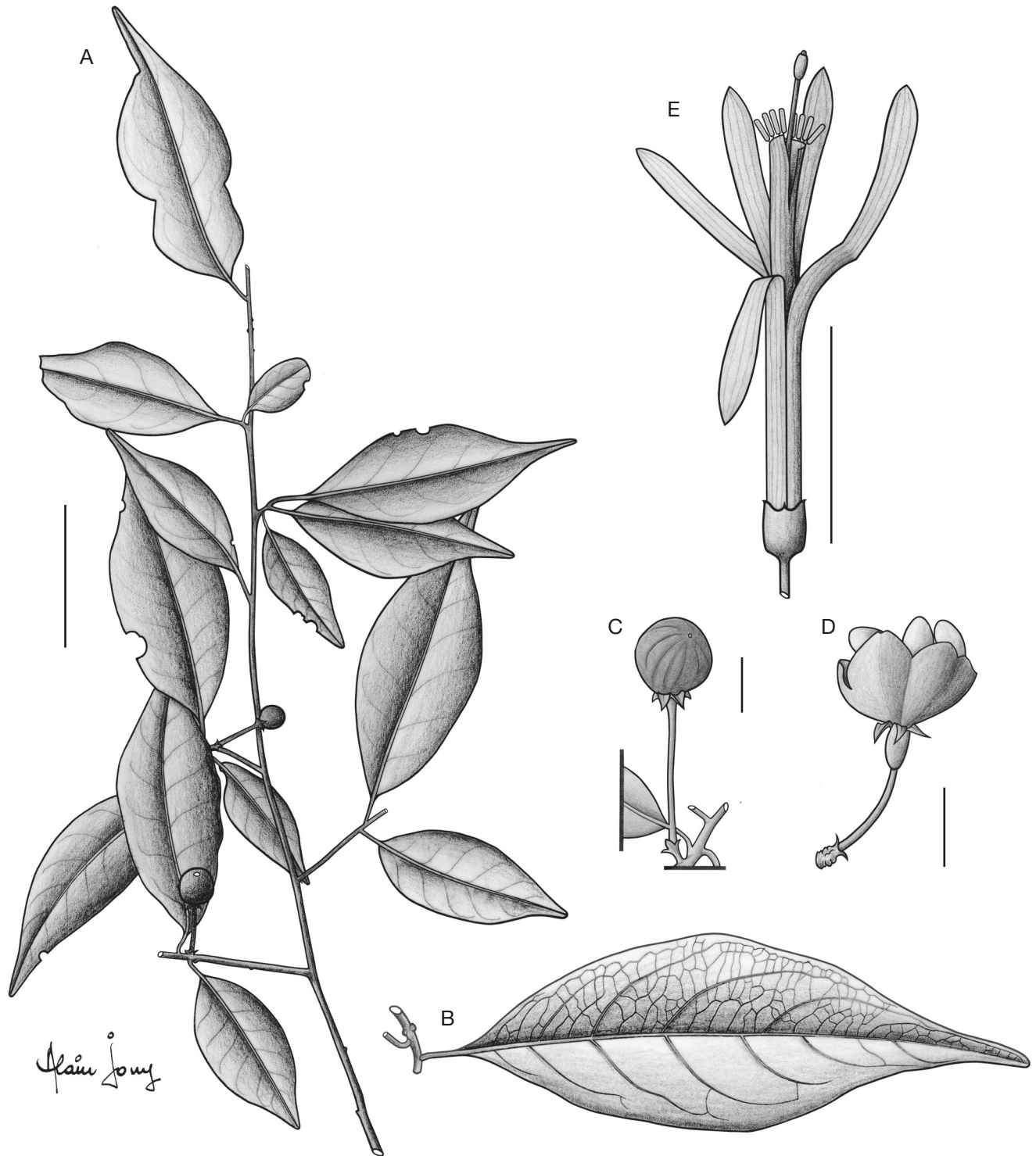


FIG. 4. — *Turraea gracilifolia* Callm. & Nusb., sp. nov.: **A**, fructing stem; **B**, leaf, adaxial surface; **C, D**, fruit; **E**, flower; **A-C**, *Service Forestier 22022*; **D**, *Cours 5492*; **E**, *Lewis et al. 1135*. Drawings: Alain Jouy. Scale bars: A, 4 cm; B, E, 20 mm; C, 5 mm; D, 10 mm.

glabrous on the inside. Staminal tube cylindrical, glabrous outside, papillose and with large papillae towards the apex, hairy with scattered bright white hairs inside; appendages absent; anthers 10, yellow, elliptic, 2.8×0.4 mm, apiculate. Ovary subglobose, 1 mm in diam., villose with bright yellow-white hairs, locules 5 with 2 collateral ovules; style exserted 2-5 mm

beyond the staminal tube, *c.* 0.3 mm in diam. Receptaculum pollinis ellipsoid, 2.8×0.5 mm; stigma discoid, 0.3×0.8 mm. Fruits a capsule, subglobose, 10-12 mm in diam., pale green, dehiscent by (8-)10 valves; pericarp 0.2 mm thick; calyx persistent. Seeds 4-7, centrally grouped, reniform, 0.4×0.2 mm; testa smooth, shiny, aril present.

NOTES

Turraea gracilifolia sp. nov. is characteristic among the Malagasy *Turraea* species by its thin, and membranous leaf blades bearing domatia and by its pauciflorous inflorescences with 1-2 large red to fuchsia flowers.

This species has been identified by several unpublished names before its description above. The collection *Service Forestier* bears the unpublished name “*Turraea diegoensis*” in Leroy’s hand and “*Turraea anivoranensis*” in Capuron’s hand while the name “*Turraea moratii*” appears in the unpublished treatment by Leroy & Lescot.

Turraea lescotiana Callm. & Nusb., sp. nov.
(Fig. 5)

DIAGNOSIS. — *Turraea lescotiana* sp. nov. can be distinguished by its small ([1-]1.5-2 × 1-2 cm), subcoriaceous pubescent leaves, its calyx with a deeply divided apical tooth (*c.* 2 mm long), and its pyriform staminal tubes with the anthers inserted on its distal edge.

TYPUS. — Madagascar • Diana Region [Prov. Antsiranana], plateau terminal et pentes supérieures Nosiravo, Montagne des Français; [12°19'30"S, 49°20'30"E]; 14.XII.1963; fl.; *Service Forestier 23003* (holo-, P[P00263855]); iso-, G[G00408539]!, K[K004160914]!, MO!, P[P00800350]!, TEF).

PHENOLOGY. — Flowers and immature fruits in December.

DISTRIBUTION AND ECOLOGY. — *Turraea lescotiana* sp. nov. appears to be endemic to the northern dry deciduous forests of Madagascar at an elevation between *c.* 200 to 300 m.

ETYMOLOGY. — The specific epithet honours Michèle Lescot, formerly at the Muséum national d’Histoire naturelle. Lescot has worked on several families for the *Flore du Cambodge, du Laos et du Viêt-Nam* and the *Flore de la Nouvelle-Calédonie*. She has also extensively worked on the revision of the *Meliaceae* for Madagascar and described several new species with Leroy. She also took part of the Gazetteer to Malagasy Botanical Collecting Localities (Schatz & Lescot 2003) which is still very useful today in finding localities in Madagascar.

CONSERVATION STATUS. — The new species is known from two localities, both of which are situated within the protected area network (Ankarana, Ambohitr’Antsingy). Despite its protection, the Ankarana and Ambohitr’Antsingy (Montagne des français) forests are threatened. The Ankarana massif is subject to wild fires whereas the montagne des Français forests are under extensive conversion for charcoal (Goodman *et al.* 2018). With a minimum AOO of 8 km² and serious plausible threats on its habitat, *Turraea lescotiana* sp. nov. is therefore preliminary assessed as “Endangered” [EN B1ab(i,iii,i v,v)+2ab(i,iii,iv,v)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMEN EXAMINED. — Madagascar • Diana Region [Prov. Antsiranana], plateau de l’Ankarana, au nord-est d’Ambondromifehy; [12°53'30"S, 49°12'00"E]; 26.XII.1963; fl., imm. fr.; *Service Forestier 23160* (G[G00642053], P[P00853237]).

DESCRIPTION

Shrubs; young twigs puberulent becoming glabrescent. Leaves unifoliate; immature leaf blade ovate to orbicular, subcoriaceous, pubescent becoming puberulent, (1-)1.5-2 × 1-2 cm, base obtuse, margin entire, revolute, apex attenuate to rounded,

surfaces discolorous, brownish, paler abaxially, domatia absent; primary vein prominent, puberulous; secondary veins and reticulum visible on both surfaces; petiole 2-2.5 mm long, pubescent. Inflorescences pauciflorous, 1-3 flowers. Flowers 3-3.5 cm long; pedicel 3 mm long, tomentose. Calyx short cupuliform, 3-3.5 × 4 mm, 5-lobed, each lobe with a deeply divided apical tooth *c.* 2 mm long, tomentose outside, puberulent inside. Corollas white of 5 spathulate petals, as long as the staminal tube, 30-35 mm long, *c.* 1.5 mm wide at base, 3 mm wide in the proximal part, apex acute, puberulent proximally, pubescent distally with long hairs, *c.* 1 mm long outside. Staminal tubes narrowly cylindrical, 30 × 1 mm long, enlarged proximally at anthesis, pyriform, to 3.5 mm large proximally, glabrous; appendices absent; anthers 10, inserted on the distal edge of the staminal tube, elliptic, 1 × 0.5 mm, mucronulate, at anthesis curved backwards on the staminal tube; ovary subobovate, *c.* 1 mm in diam., villose, locules 8, each with 2 collateral ovules; style exerted 1-2 mm, beyond the staminal tube *c.* 0.2 mm in diam. Receptaculum pollinis oblate, 1 × 1.5 mm; stigma patelliform, 3 × 0.2 mm. Mature fruit unknown, immature fruits a capsule, subglobose, *c.* 5 mm diam., villous, calyx persistent. Seeds slightly reniform; testa tuberculate.

NOTES

This new species is very distinctive among the Malagasy *Turraea* species by the anthers inserted on its distal edge of the staminal tube giving a nail-shaped aspect and the enlarged staminal tube proximally at anthesis (Fig. 5).

Turraea lescotiana sp. nov. was left unpublished by Lescot when she retired under the name “*Turraea vidalii*”. We did not know Jules Eugène Vidal (1914-2020) and his wife Yvette Vidal (1928-2017) who studied the southeastern Asian flora. Therefore, we chose to honour Michèle Lescot whom the authors met at her home in 2022 for this distinctive and nice species.

Turraea neoleroyana Callm. & Nusb., sp. nov.
(Fig. 6)

DIAGNOSIS. — *Turraea neoleroyana* sp. nov. is distinguished from *Turraea rasolofae* Callm. & Nusb., sp. nov. by the length of its flowers (3 cm vs 5-7 cm long), its glabrous ovary (vs tomentose), and its smooth berry with a couple of warts (vs ridged, densely verrucose, and tomentose).

TYPUS. — Madagascar • Atsimo-Andrefana Region [Prov. Toliara], 14 km E of Sakaraha, Zombitsy Forest; 22°53'S, 44°40'E; 700 m; 14.X.1990; *Phillipson 3773* (holo-, G[G00415934]); iso-, K[K004160892]!, MO[MO-3188508] image!, P[P06706684]!, TAN).

PHENOLOGY. — Flowers from October to January; fruits in February and March.

DISTRIBUTION AND ECOLOGY. — *Turraea neoleroyana* sp. nov. appears to be endemic to the dry spiny thicket and dry deciduous forests of south-western Madagascar at an elevation between 100 to 800 m.

ETYMOLOGY. — This new species is named in honour of Prof. Jean-François Leroy. Professeur Leroy worked extensively on the

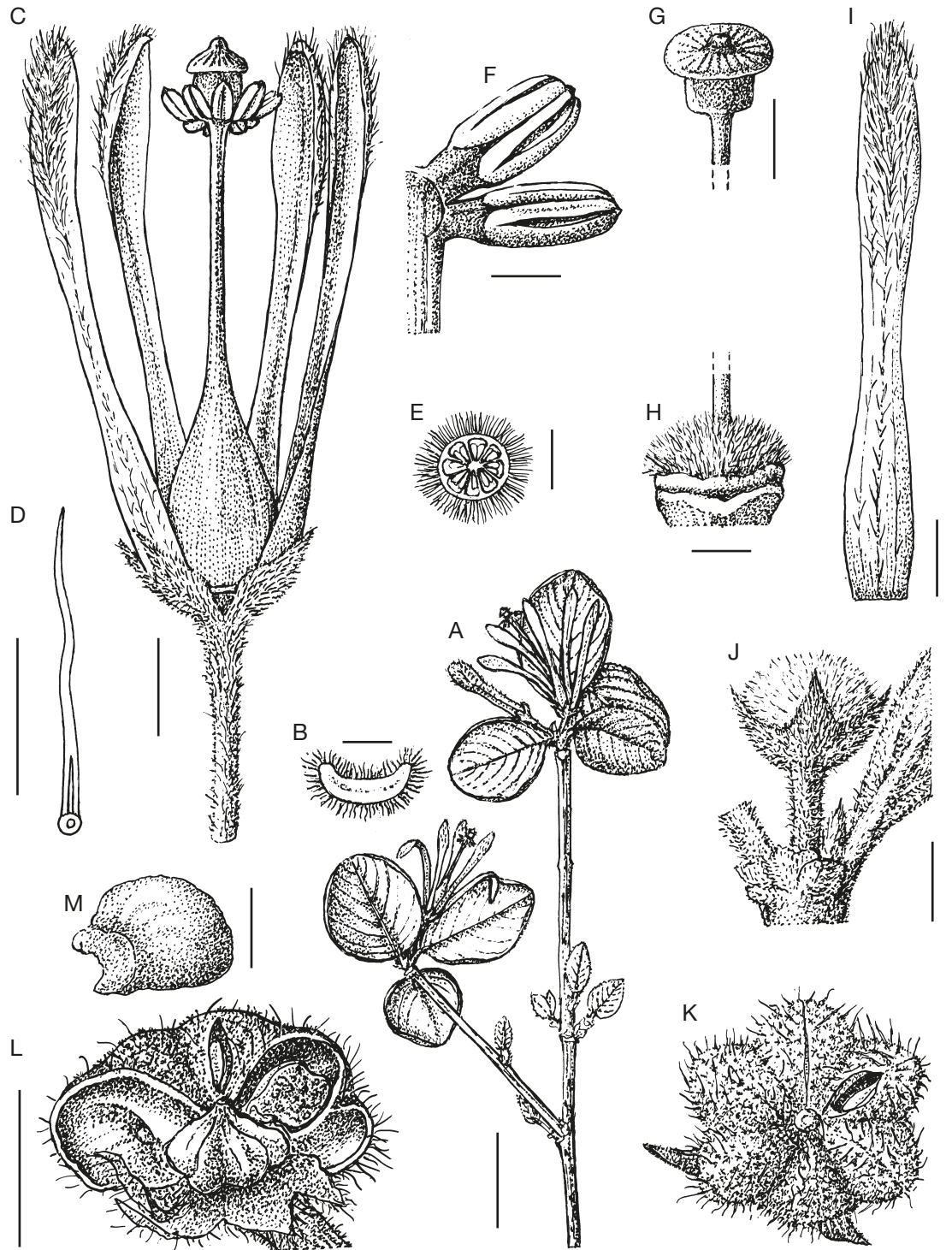


FIG. 5. — *Turraea lescotiana* Callm. & Nusb., sp. nov.: **A**, flowering stem; **B**, section of petiole; **C**, flower with a petal removed and open calyx; **D**, hair on corolla; **E**, transversal section of ovary; **F**, anthers; **G**, stigma; **H**, ovary; **I**, front side view of petal; **J**, immature fruit on the stem; **K**, fruit; **L**, open fruit; **M**, immature seed. **A-M**, *Service Forestier 23003*. Drawings: Jacqueline Lemeux. Scale bars: **A**, 2 cm; **B**, 0.4 mm; **C**, 50 mm; **D**, **H**, **I**, 0.5 mm; **E**, 1 mm; **F**, 5 mm; **G**, **J**, 2 mm; **K**, **L**, 2.5 mm; **M**, 0.75 mm.

Meliaceae of Madagascar and described four new endemic genera, i.e. *Calodecaryia*, *Capuronianthus* J.-F. Leroy (Leroy 1958), *Humbertioturraea*, and *Neobeguea* J.-F. Leroy (Leroy 1970) and another Malagasy regional endemic (also occurring in the Comores and on Aldabra atoll in the Seychelles), *Malleastrum* (Baill.) J.-F. Leroy (Leroy 1964). Leroy further described 37 new *Meliaceae* species endemic to Madagascar (Madagascar Catalogue 2024).

CONSERVATION STATUS. — *Turraea neoleroyana* sp. nov. has a geographic range in the form of an EOO of 7716 km² and an AOO of 24 km². It is known from six localities, two of which are situated within protected area network (Tsinjoriake and Zombitse Vohibasia). Outside of the protected areas, forests are threatened by clearing for agriculture, fire, grazing, and exploitation for firewood, all of which will result in a continuing decline of the habitat and

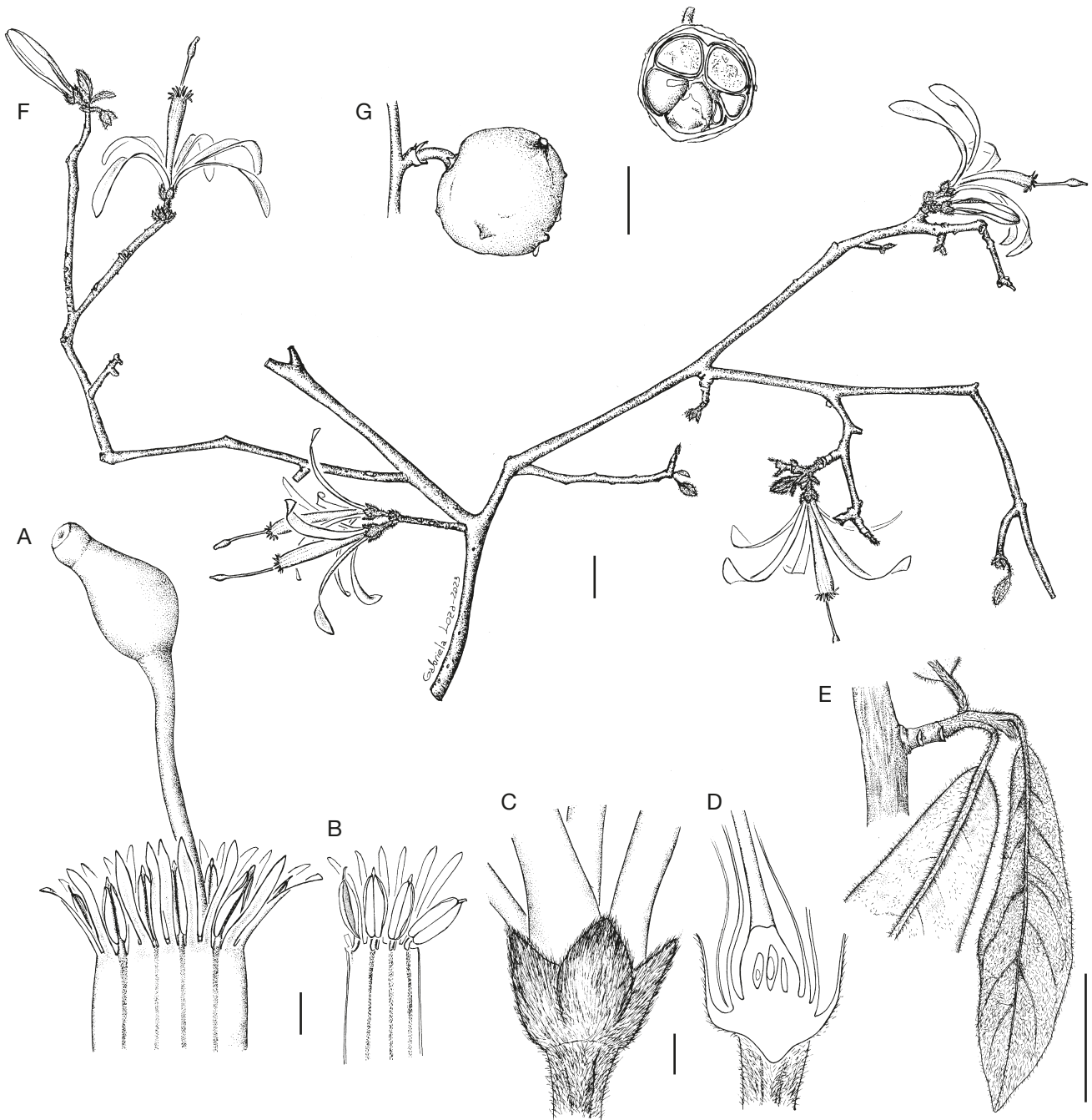


FIG. 6. — *Turraea neoleroiyana* Callm. & Nusb., sp. nov.: **A**, apical view of staminal tube with receptaculum pollinis; **B**, anthers; **C**, calyx; **D**, longitudinal section of ovary; **E**, leaf; **F**, flowering stem; **G**, **H**, fruit and longitudinal section. **A-F**, Phillipson 3773; **G**, **H**, Service Forestier 487. Drawings: Gabriella Loza. Scale bars: A-D, 1 mm; E-G, 1 cm.

number of mature individuals of the species. The new species is therefore preliminarily assessed as “Vulnerable” [VU B1ab(i,iii,iv,v) +2ab(i,iii,iv,v)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — **Madagascar** • Atsimo-Andrefana Region [Prov. Toliara], Ranobe, PK 32, Will’s track; 23°03’36”S, 43°41’39”E; 99 m; 27.XI.2006; fl.; *Andrianjafy 1873* (G[G00642054], K[K001598906], MO[MO-3188452], P, TAN) • La Table, Tuléar; [23°24’S, 43°47’E]; III.1960; fr.; *Bosser 14004* (P[P02090170]) • Vallée de la Sakoa, distr. de Betioky; [23°47’S, 44°46’E]; 21.X.1940; fl.; *Decary 15975* (P[P06709540]) • RN 7

à 15 km au nord-est de Sakaraha; [22°52’S, 44°25’E]; 800 m; 8.XI.1978; fl.; *Lorence 2092* (MO, P[P06709536], TAN) • Env. des charbonnages de la Sakoa; [23°40’S, 44°52’E]; 21.II.1949; fr.; *Service Forestier 487* (P[P06709539]) • Entre la Table et Sarodrano; [23°24’S, 43°47’E]; I.1962; fl.; *Service Forestier 20822* (P[P06709552], TEF).

DESCRIPTION

Shrubs to treelets 2-10 m tall; young twigs puberulent becoming glabrescent; lateral twigs with scars. Leaves unifoliolate; leaf blade narrowly elliptic, softly membranaceous, tomentose on both faces, becoming puberulent, (2-)3-4(4.5) × (0.6)1-1.5(-

2) cm, base attenuate to obtuse, margin entire, subrevolute sometimes undulate, apex obtuse to attenuate, adaxial surface dark green, abaxial surface pale green, domatia absent; primary vein prominent; secondary veins and reticulum marked, especially adaxially; petiole 2-3 mm long, tomentose. Inflorescences pauciflorous, 1-3 flowers. Flower buds enlarged and obtuse at the apex. Flowers *c.* 3 cm long; pedicel 3-5 mm long, puberulous. Calyx cupuliform, 3-4 × 4 mm, 5-lobed, each lobe with an apical tooth *c.* 1.5 mm long, puberulous outside especially distally. Corollas white of 5 spatulate petals, longer than the staminal tube, *c.* 30 mm long, *c.* 1 mm wide at base, 1-5-2 mm wide in the proximal part, apex acute, glabrous on both sides, puberulent proximally on the abaxial side. Staminal tube cylindrical, enlarged distally, 20-25 × 1-2 mm, glabrous; appendices 10, bifid at base, *c.* 2 mm long, glabrous; anthers 10, shortly pedicellate, broadly elliptic, 1-1.5 × 0.5 mm, mucronate; ovary globose to oblate, *c.* 1 in diam., glabrous, locules 10, each with 2 superposed ovules; style exerted 3-4 mm, beyond the staminal tube *c.* 0.3 mm in diam. Receptaculum pollinis ovoid to prolate, 3.5 × 1-1.5 mm; stigma discoid, *c.* 0.5 in diam. Mature fruits unknown; immature fruit an indehiscent berry, 10?-loculate, smooth with a couple of warts, globose, 20 mm diam., glabrous; pericarp *c.* 1 mm thick. Seeds reniform, 10 × 6 mm; testa brown-reddish, smooth.

NOTES

Turraea neoleroyana sp. nov. resembles *Turraea rasolofa* sp. nov. in its pauciflorous inflorescences with white flowers and its staminal tube bearing ten bifid appendices. The new species can be distinguished by its smaller leaves and flowers and its glabrous ovary and berry.

The new species has an indehiscent berry and was treated by Leroy and Lescot in the genus *Humbertioturraea*. It was first recognized as new by Leroy as "*Humbertioturraea parvifolia*" in October 1958 as indicated by a label in his hand on the collection *Service Forestier 487*. "*Humbertioturraea betiokensis*" also appears on *Decary 15975* in Leroy's hand. It finally bears the name "*Humbertioturraea bosseri*" in the unpublished treatment by Leroy & Lescot.

Turraea rasolofa Callm. & Nusb., sp. nov.
(Fig. 7)

DIAGNOSIS. — *Turraea rasolofa* sp. nov. can be distinguished by the pubescence of its twigs, leaves, calyx, ovary and fruits, its large white flowers (5-7 cm long), and its subglobose, ridged, densely verrucose berry.

TYPUS. — Madagascar • Anosy Region [Prov. Toliara], Réserve Naturelle Intégrale d'Andohahela, parcelle 2, 7.5 km ENE de Hazofotsy; 24°49'00"S, 46°36'36"E; 120 m; 13.XII.1995; fl.; Messmer, Rakotomalaza, Andriatsiferana & Helme 191 (holo-, G[G00408900]!; iso-, K[K004160893]!, MO!, P[P00800353]!, TEF, WAG!).

PHENOLOGY. — Flowers from July to December, fruits in December.

DISTRIBUTION AND ECOLOGY. — *Turraea rasolofa* sp. nov. appears to be endemic to the deciduous dry forests of southern Madagascar at an elevation between 50 to 250 m.

ETYMOLOGY. — The species epithet refers to Nathalie Rasolofa (born Messmer) who collected the type. Nathalie has gathered in Madagascar between 1994 and 2000 more than 2000 collections and was working on a vegetation survey of Andohahela while collecting the type (Rakotomalaza & Messmer 1999). Nathalie works at the Conservatoire et Jardin botaniques in Geneva and we are thrilled to dedicate this new species to our colleague and long time friend.

CONSERVATION STATUS. — *Turraea rasolofa* sp. nov. has a geographic range in the form of an EOO of 2815 km² and an AOO of 32 km². It is known from eight localities, three of which are situated within the protected area network (Andohahela, Vohidava-Betsimalaho). Outside of the protected areas, the species is threatened by forest clearing for agriculture, fire, grazing, and exploitation for firewood, which will result in continuing decline of quality of habitat and number of mature individuals. The new species is therefore preliminary assessed as "Vulnerable" [VU B1ab(i,iii,iv,v)+2ab(i,iii,iv,v)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Anosy Region [Prov. Toliara], distr. Ambovombe, Behara; [24°57'S, 46°23'E]; 29.VIII.1924; fl.; *Decary 3078* (P[P06773983, P06773984]) • *ibid. loco*; fl.; *Decary 3080* (P[P06774019]); *ibid. loco*; 2.IX.1924; fl.; *Decary 3139* (P[P06774020]) • *ibid. loco*; fl.; *Decary 3139bis* (P[P02090174]) • *ibid. loco*; fl.; *Decary 3140* (P[P06773985]) • *ibid. loco*; fl.; *Decary 3145* (P[P06773986]) • Amboasary, distr. Ambovombe; [25°08'S, 46°24'E]; 9.X.1924; fl.; *Decary 3191* (P[P06774018]) • Andohahela, parc national, à l'ouest de la rivière Sakaravy, Ambatoabo, Ranopiso; 24°51'S, 46°38'E; 100-138 m; 31.X.1994; fl.; *Eboroke 906* (G[G00642055], K, MO[MO-3188480], TAN) • Bassin supérieur du Mandrare (SE), vallée de la Manambolo; [24°34'S, 46°36'E]; 300-400 m; 23-24.XI.1928; fl.; *Humbert 6797* (P[P00263866]) • Vallée moyenne du Mandrare, près d'Anadabolava; [24°13'S, 46°19'E]; 200-250 m; XII.1933; fr.; *Humbert 12538* (P[P06774021]) • Vallée de la Manambolo, aux env. d'Isomonony, Mont Morahariva; [24°32'S, 46°38'E]; 1000-1200 m; XII.1933; fr.; *Humbert 13192* (P[P06741231]) • Berenty Reserve, forêt d'Anjapolo; 24°53'S, 46°12'E; 50 m; 22.XII.1987; fr.; *Phillipson 2713* (K, MO, P[P06773982], TAN) • *Sine loco*, s.d., *Keraudren 1477* (P[P02090172, P02090173]).

DESCRIPTION

Shrubs 2-5 m tall; young twigs pubescent becoming glabrescent; lateral twigs with scars. Leaves unifoliolate; leaf blade narrowly elliptic to oblong, chartaceous, pubescent becoming puberulent, (3-)4-6 × 1.5-2(-2.5) cm, base rounded to slightly subcordate, margin entire, undulate, apex acute to obtuse, surfaces concolorous, brownish, domatia generally present; primary vein prominent; secondary veins and reticulum visible on both surfaces; petiole 3-6 mm, puberulous. Inflorescences pauciflorous, 1-3(-4) flowers. Flowers 5-7 cm long; pedicel 3-4 mm long, pubescent. Calyx cupuliform, 3 × 4(-5) mm, 5-lobed, each lobe with an apical tooth *c.* 2 mm long, pubescent on both sides. Corollas white to yellowish-green of 5 spatulate petals, longer than the staminal tube, 50-70 mm long, *c.* 1.5 mm wide at base, 2.5 mm wide in the distal part, apex acute, puberulent. Staminal tube cylindrical, 40-60 × 1-2 mm long, slightly enlarged distally, glabrous; appendices 10, bifid at base, *c.* 5 mm long, glabrous; anthers 10, subsessile, narrowly elliptic, 1.5 × 0.3 mm, mucronate, mucron 0.3 mm long; ovary ovoid to oblate, *c.* 1 mm in diam., tomentose, locules 10, each with 2 superposed ovules; style exerted 5-8 mm, beyond the staminal tube *c.* 0.3 mm in

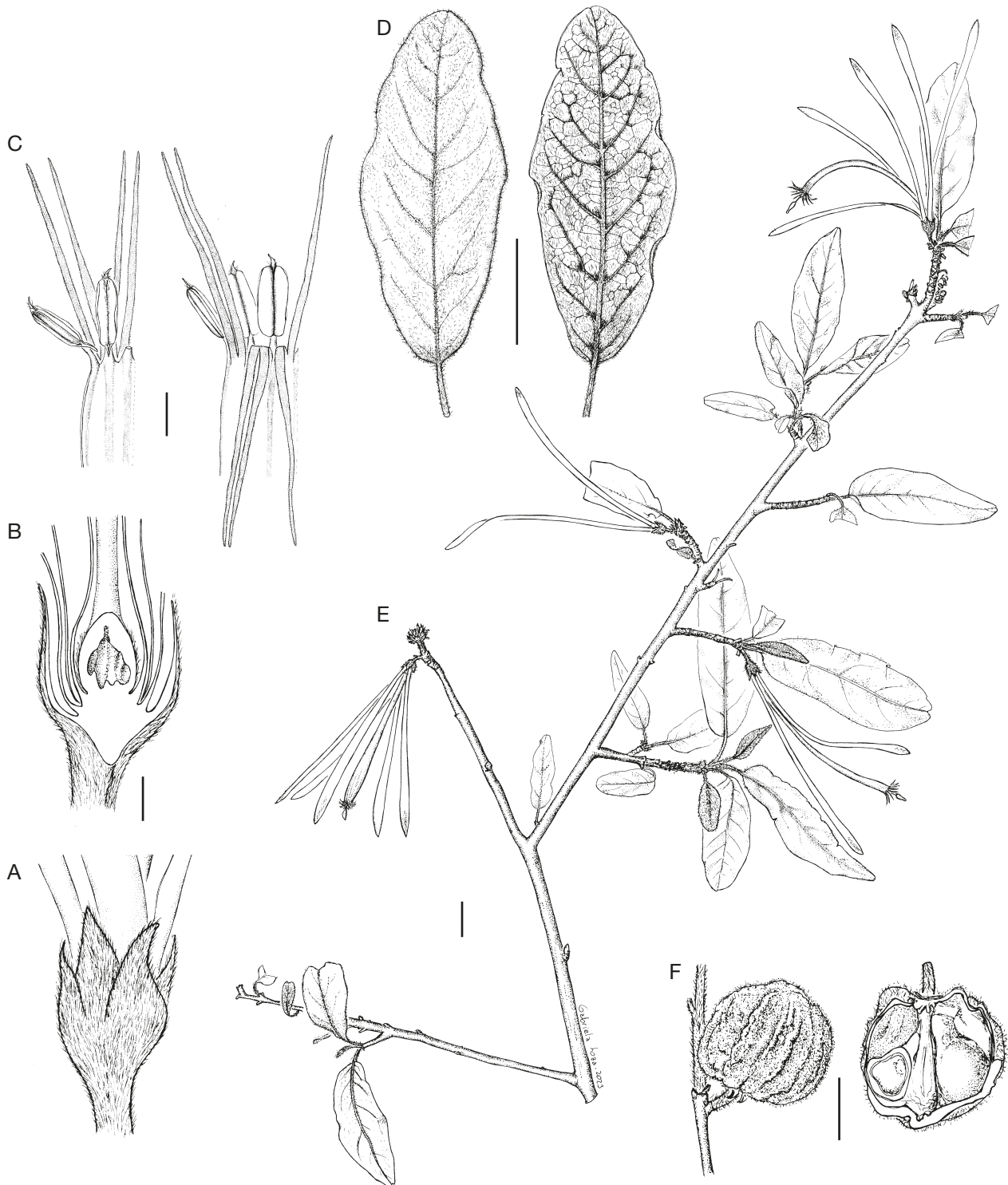


FIG. 7. — *Turraea rasolofae* Callm. & Nusb., sp. nov.: **A**, calyx; **B**, longitudinal section of ovary; **C**, apical view of staminal tube with appendices; **D**, leaf, adaxial and abaxial sides; **E**, flowering stem; **F**, **G**, fruit and longitudinal section; **A-E**, Messmer et al. 191; **F**, **G**, Humbert 12538. Drawings: Gabriella Loza. Scale bars: A-C, 1 mm; D-G, 1 cm.

diam. Receptaculum pollinis ovoid to pyriform, 2.5×1.5 mm; stigma discoid, 0.4×0.8 mm. Fruit an indehiscent berry, 10?-loculate, subglobose, ridged, densely verrucose, c. 20 mm diam., tomentose; pericarp c. 2 mm thick. Seeds reniform, 10×5 mm; testa brow-reddish, smooth.

NOTES

The new species has indehiscent berry and was treated by Leroy and Lescot under the genus *Humbertioturraea*. Leroy previously named this species as “*Humbertioturraea ambovombeensis*” on Decary 3191 and “*Humbertioturraea odorata*” on Humbert 12528.

Turraea sambavensis

J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov.
(Fig. 8)

DIAGNOSIS. — *Turraea sambavensis* sp. nov. can be distinguished by its large flowers (5-7.5 cm long), white becoming sulfur yellow with a sweet fragrance, the length of its staminal tube ([3-]5-5.5[-6] cm long) and appendices (4.5-5 mm long) with a tapering blade, twisted at apex, and by its glabrous capsule.

TYPUS. — Madagascar • Sava Region [Prov. Antsiranana], au Sud de Sambava; [14°18'00"S, 50°11'30"E]; 30.XI-1.XII.1966; fl., imm. fr.; *Service Forestier 27118* (holo-, P[P05275078]!; iso-, G[G00408541]!, MO!, P[P00580369]!, TEF).

PHENOLOGY. — Flowers in September to December, immature fruits in November-December.

DISTRIBUTION AND ECOLOGY. — The new species is restricted to littoral forests at low elevation.

ETYMOLOGY. — The species epithet refers to the city of Sambava where the new species has been collected.

CONSERVATION STATUS. — The new species has not been collected since 1966 and is restricted to highly threatened littoral forests south of Sambava that are under severe pressure from local communities through logging for construction and firewood, slash-and-burn agriculture and large-scale oil palm plantations (Consiglio *et al.* 2006; De Block 2022). The new species has not been collected or observed for more than fifty-five years and could therefore be possibly extinct. With an AOO of 4 km² and two known localities, none situated within a protected area network, *Turraea sambavensis* sp. nov. is therefore preliminary assessed as “Critically Endangered (PE)” [CR (PE)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Sava Region [Prov. Antsiranana], env. de Sambava; [14°15'S, 50°09'E]; 1-5 m; 28.XI-3.XII.1950; *Humbert & Capuron 24387* (P[P05275077]) • Cant. Ambohitlanana, distr. Antalaha; 19.XII.1956; fl.; *Réserves Naturelles 7972* (P[P05275076]) • Au Sud de Sambava; [14°18'00"S, 50°11'30"E]; 3.XII.1950; fl.; *Service Forestier 899* (P[P05275075]) • Sambava; [14°18'00"S, 50°11'30"E]; 29.IX.1954; fl.; *Service Forestier 9247* (G[G00408545], P[P00853200, P00800359], TEF).

DESCRIPTION

Small to medium-sized trees, 10-15 m tall, 15-20 cm in diam.; young stems brownish, longitudinally striated, glabrous. Leaves unifoliolate; leaf blade broadly elliptic to suborbicular, chartaceous to subcoriaceous, glabrous, (2.5-)3.5-5(-7) × (1-)1.5-2.5(-3) cm, base acute to obtuse, margin entire, sub-revolute, apex rounded or obtuse to mucronate, adaxial surface dark green, abaxial surface pale green, domatia present, in pockets at the axils of the secondary veins; primary and secondary veins prominent on both surfaces; reticulum slightly distinct; petiole 3 mm long, puberulent to glabrescent. Inflorescences pauciflorous, 1(-2) flowers. Flower buds enlarged and obtuse at the apex. Flowers 5-7.5 cm long; pedicel 6-10 mm long, glabrous to glabrescent. Calyx cupuliform, 4 × 3.5 mm, 5-lobed, each lobe with an apical tooth 2-2.5 × 1.2 mm, glabrous to glabrescent on the outside, tomentose on the inside. Corolla white becoming sulfur yellow with a sweet fragrance (*Humbert & Capuron 24387*, *Service forestier 899*) of 5 linear-spathulate petals, longer than the staminal

tube, 50-75 mm long, 1 mm wide at base, 2 mm wide in the proximal part, apex acute, puberulent outside, glabrous inside. Staminal tube cylindrical, slightly enlarged distally, (30-)50-55(-60) mm long, glabrous outside, papillose on the inside; appendices 10 with a tapering blade, twisted at apex, bifid at base, 4.5-5 mm long, glabrous; anthers 10, subsessile, oblong, 1 × 0.3 mm, apiculate, apicule *c.* 0.5 mm; ovary obovate to globose, 2 × 1 mm, with sparse hairs, locules (8-)10(-14), each with 2 superposed ovules; style exerted 5-10 mm, beyond the staminal tube 0.3 mm in diam. Receptaculum pollinis ellipsoid, 3 × 1.5 mm; stigma capitate, 0.4 × 1.5 mm. Fruit a capsule, globose ovoid, 10-12 mm diam., blackish, dehiscing by 10 valved, glabrous; pericarp 0.2 mm thick; calyx persistent. Seeds centrally grouped, reniform, 3 × 2 mm; testa brownish, smooth, 0.1 mm thick; aril present.

NOTES

Turraea sambavensis sp. nov. resembles *Turraea geayi* Danguy in its leaves with domatia and staminal tube bearing 10 long appendices. The latter species also occurs in littoral forests of the east coast. The new species can be distinguished by its larger leaves and flowers, and its ovary with (8-)10(-14) locules (vs 5 in *T. geayi*).

We attribute this name to Leroy & Lescot. No new collections have been gathered since their unpublished description.

The recently described *Paracephaelis sambavensis* De Block (Rubiaceae), also “Critically Endangered” and possibly extinct has been collected in the same forest and on the same day as the type of *Turraea sambavensis* sp. nov. by René Capuron (1921-1971).

Turraea sambiranensis Callm. & Nusb., sp. nov.
(Figs 3B; 9)

DIAGNOSIS. — *Turraea sambiranensis* sp. nov. can be distinguished by its large broadly elliptic acuminate leaves ([7-]10-13[-19] × [3-]4-5[-6] cm), its tomentose calyx with acute lobes (1 mm long), its large red flowers (4-5 cm) with petals as long as or slightly longer than the staminal tube, and the style exerted on 5-7 mm beyond the staminal tube.

TYPUS. — Madagascar • Diana Region [Prov. Antsiranana], vallée du Sambirano; [13°06'S, 49°42'E]; 350 m; II.1923; fl., imm. fr.; *Perrier de la Bathie 15464* (holo-, P[P00842556]!; iso-, P[P00842554, P00842555]!).

PHENOLOGY. — Flowers buds in June, Flowers in July, October, and February, immature fruits in February.

DISTRIBUTION AND ECOLOGY. — Known from lowland moist evergreen forests of the Sambirano Domain (Humbert 1951, 1955) at an altitude between 150 to 500 m.

ETYMOLOGY. — The species epithet refers to the Sambirano Domain where the species is restricted.

CONSERVATION STATUS. — *Turraea sambiranensis* sp. nov. is known from four locations, three of which are situated within the protected area network (Ampasindava, Galoko Kalobinono). All four collections are known from an altitude below 600 m where forests are threatened by slash and burn agriculture (Goodman *et al.* 2018).

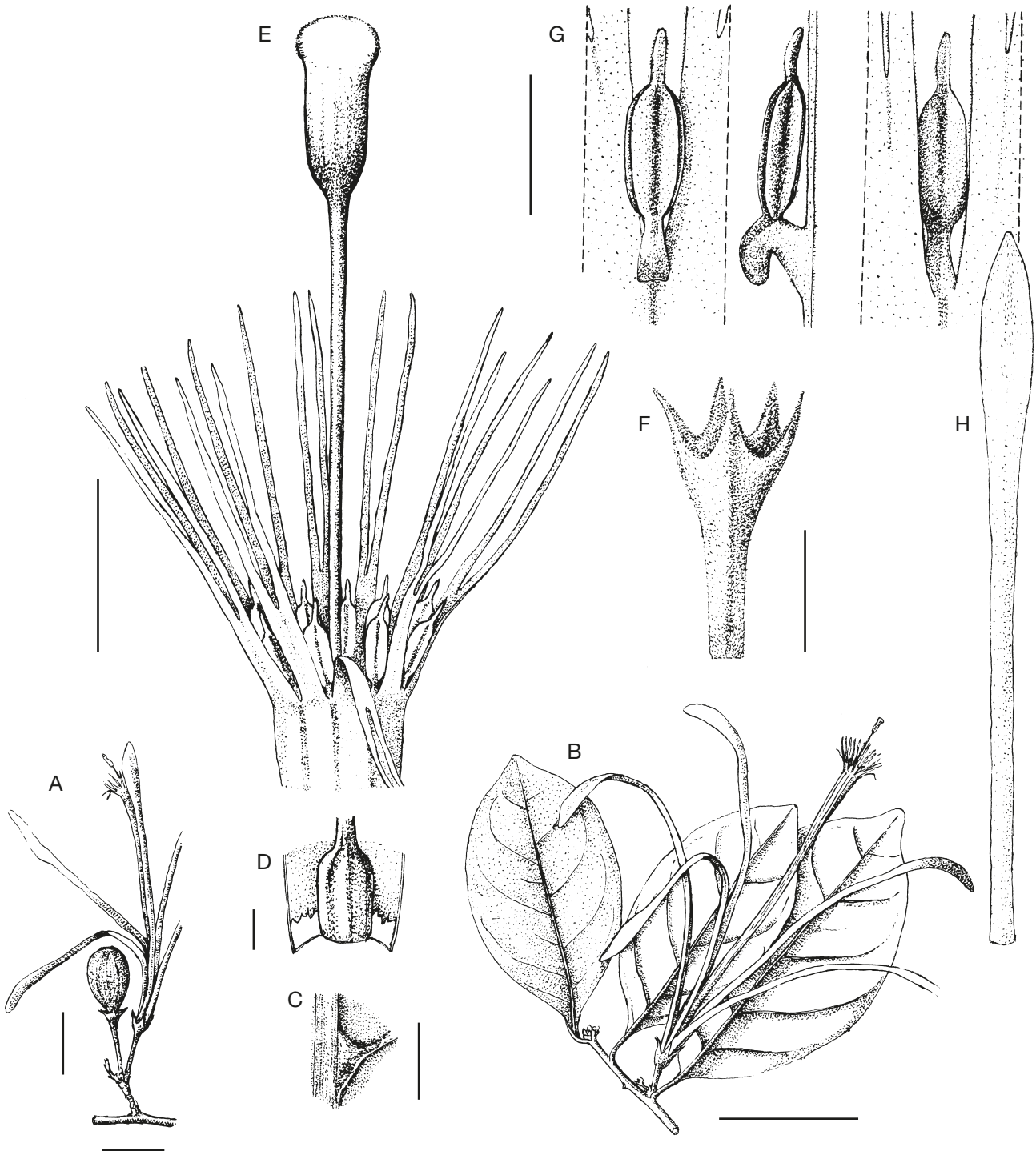


FIG. 8. — *Turraea sambavensis* J.-F. Leroy & Lescot ex Callm. & Nusb., sp. nov.: **A**, immature fruit and a flower; **B**, flowering stem; **C**, domatia; **D**, ovary; **E**, apical view of staminal tube with receptaculum pollinis; **F**, calyx; **G**, various views of stamens; **H**, front side view of petal. **A**, *Service Forestier* 24387; **B-H**, *Service Forestier* 9247. Drawings: Jacqueline Lemeux. Scale bars: A, H, 1 cm; B, 5 cm; C, D, G, 1 mm; E, 3 mm; F, 40 mm.

With an EOO of 1 283 km² and an AOO of 16 km², and serious plausible threats on its habitat, the new species is therefore preliminary assessed as “Endangered” [EN B1ab(i, ii,iii,iv,v)+2ab(i,ii,iii,i v,v)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Diana Region [Prov. Antsiranana], Anketrahe Belinta, forêt de Manongarivo-

Kalobinono; 13°38'18"S, 48°40'29"E; 520 m; 27.IX.2013; fl.; *Manjato et al.* 403 (MO, P[P01059694], TAN) • Ampasindava, forêt de Betsitsika, au bord de la rivière de Belinta; 13°46'31"S, 47°58'03"E; 153 m; 22.VI.2012; buds; *Rasoanaivo & Tabinari-vony* 79 (G[G00406729], K[K004160915], MO, P[P00800354], TEF, WAG) • Beramanja, Anketrahe Belinta, forêt de Galoko; 13°35'23"S, 48°42'43"E; 210 m; 6.X.2013; fl.; *Razakamalala et al.* 7692 (MO, P[P00820312], TAN).



FIG. 9. — *Turraea sambiranensis* Callm. & Nusb., sp. nov.: **A**, flowering stem; **B**, leaf, adaxial surface; **C**, inflorescence; **D**, immature fruits; **A-C**, *Manjato et al.* 403; **D**, *Perrier de la Bâthie* 15464. Drawings: Alain Jouy. Scale bars: A, 6 cm; B, 3 cm; C, 4 cm; D, 1 cm.

DESCRIPTION

Shrubs (0.7-)3.5-5 m tall; young twigs brownish, puberulent. Leaves unifoliolate; leaf blades broadly elliptic, subcoriaceous, glabrous, (7-)10-13(-19) × (3-)4-5(-6) cm, base cuneate to

abruptly attenuate, sometimes asymmetrical, margin entire, slightly undulate, subrevolute, apex acuminate with an acuminate to 2 cm long, adaxial surface glossy green, abaxial surface pale green, domatia absent; primary, secondary veins, and

reticulum prominent on both surfaces, brownish abaxially; petiole 5-10 mm long, puberulent, often blackish. Inflorescences pauciflorous with 1-3 flowers. Flower buds enlarged and obtuse at the apex. Flowers 4-5 cm long; pedicel 4-5 mm long, tomentose. Calyx cupuliform, 3 × 2 mm, 5-lobed, each lobe with an apical acute tooth 1 mm long, tomentose on the outside, glabrous on the inside. Corolla red of 5 linear petals, as long as or slightly longer than the staminal tube, 40-50 mm long, 2 mm wide in the proximal part, apex acute, puberulent. Staminal tube cylindrical, 35 × 2.5 mm, glabrous; appendices 10, bifid at base, shorter than the anthers, glabrous; anthers 10, subsessile, oblong, 1.5 × 0.3 mm, mucronate; ovary obovate, *c.* 1 mm in diam., villose, locules 5, each with 2 collateral ovules; style exerted 5-7 mm, beyond the staminal tube 0.3 mm in diam. Receptaculum pollinis clavate, 3 × 1.5 mm; stigma discoid, 0.4 × 1.5 mm. Fruit mature unknown; immature fruit a capsule, globose to ovoid, 3-4 mm diam., tomentose.

NOTES

Leroy & Lescot intended to describe under the same species epithet a much broader species concept including several high elevation collections from the Tsaratanana and Manongarivo massifs representing a different species: *Turraea buerki* Callm., Phillipson & Lowry (see Callmander *et al.* 2012).

Turraea sambiranensis sp. nov. differs from *T. buerki* Callm., Phillipson & Lowry by the shape of its leaves (broadly elliptic with an acumen to 2 cm long vs elliptic to subovate with apex acute to broadly cuspidate), its smaller calyx (3 × 2 vs 5-7 × 5-7 mm long) and staminal tube (35 vs 40-50 × 3 mm long), the petals as long as or slightly longer than the staminal tube (vs one third to twice the length of the staminal tube), and the style exerted on 5-7 mm beyond the staminal tube (vs 15-30 mm).

Turraea tsingycola Callm. & Nusb., sp. nov. (Figs 10; 11A)

DIAGNOSIS. — *Turraea tsingycola* sp. nov. can be distinguished by its pauciflorous inflorescences with 1-2(-3) small white flowers (1.5-2.5 cm long), the absence of appendices on the distal part of the staminal tube, and its puberulous capsules.

TYPUS. — Madagascar • Melaky Region [Prov. Mahajanga], Tsingy de Bemaraha, north of the Manambolo river; 19°09'S, 44°49'E; 50 m; 29.XI.1996; Jongkind, Andriantiana & Razanatsoa 3284 (holo-, G[G00404139]!; iso-, BR[BR0000005511259] image!, K!, MO[MO-3188638] image!, P[P06709699]!, TAN, WAG[WAG.1099824] image!).

PHENOLOGY. — Flowers in October, November, December, and February, fruits in December and January.

DISTRIBUTION AND ECOLOGY. — The species appears to be endemic to the western dry deciduous forests mostly within the karstic limestones of Beanka and Bemaraha. The species is also known from two localities with fewer karstic areas. *Turraea tsingycola* sp. nov. grows at an altitude between 50 to 300 m.

ETYMOLOGY. — The epithet refers to the limestone geological formation called tsingy where most of the populations of the species have been collected.

CONSERVATION STATUS. — With its large geographical range, an EOO of 31 702 km², and an AOO of 56 km², and fifteen localities, twelve of which are situated within a protected area network (Beanka, Bemaraha, and Complexe Tsimembo Manambolomaty), *Turraea tsingycola* sp. nov. is therefore preliminary assessed as “Least Concern” [LC] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Melaky Region [Prov. Mahajanga], Beanka, partie centrale, Ambinda-Nord; 17°56'49"S, 44°28'37"E; 256 m; 9.II.2012; fr.; Bolliger *et al.* 194 (G[G00340417], K, MO, TEF) • Beanka, partie centrale, Ambinda-Nord; 17°56'46"S, 44°28'54"E; 272 m; 15.XI.2011; fl.; Gautier *et al.* 5617 (G[G00376048], K, MO, P[P00800358], TEF) • Beanka, partie sud, Kinahango; 18°01'24"S, 44°30'33"E; 253 m; 19.XI.2011; Gautier *et al.* 5665 (G[G00376084], MO, P[P00800356], TEF, WAG) • Beanka, sud de la Kimanambolo; 18°06'19"S, 44°34'48"E; 310 m; 5.XII.2012; fr.; Gautier *et al.* 5958 (G[G00377770], K, MO, P, TEF) • Beanka, partie nord, Ambabaky; 17°52'20"S, 44°29'18"E; 206 m; 25.I.2012; fr.; Hanitrarivo *et al.* 108 (G[G00376610], K, MO, P, TEF) • Beanka, partie nord, Ambabaky; 17°53'38"S, 44°29'16"E; 235 m; 26.I.2012; fl.; Hanitrarivo *et al.* 110 (G[G00376608], K, MO, P, TEF) • Beanka, partie centrale, Ambinda-Nord; 17°56'23"S, 44°28'05"E; 310 m; 6.II.2012; fr.; Hanitrarivo *et al.* 148 (G[G00376572], MO, P, TEF) • Tsingy de Bemaraha, rte Antsalova-Tsiandro, Berano, bordure W de la piste; 18°39'S, 44°44'E; 24.XI.1992; fl.; Labat *et al.* 2162 (K, P[P04670438, P04670439], WAG[WAG.1099835]) • Andranoboka, nord de l'Antsingy; [18°24'S, 44°36'E]; 21.XI.1932; Leandri 539 (G, MO, P[P00263850, P00263851], MO) • *ibid. loco*; 22-24.XI.1932; Leandri 544 (P[P04670432, P04670435]) • Nord de la forêt d'Antsingy, clairières d'Amborokontsy; [17°58'13"S, 44°20'15"E]; 5.X.1932; Leandri 140 (P[P04670434]) • Beanka, partie nord, Andranovorimena; 17°51'16"S, 44°29'10"E; 16.XII.2011; fl.; Nusbaumer *et al.* 3148 (G[G00376219], K, MO, P, TEF) • Maintirano, Belitsaky, Antsakoabe, forêt d'Amboloand; 18°04'40"S, 44°31'45"E; 197 m; 10.X.2012; fl.; Rakotovoao *et al.* 6100 (G[G00642056], MO, TAN) • Antsalova, Ouest Andranondahy, près de Berano; [18°39'S, 44°37'E]; 17.X.1966; fl.; Service Forestier 26117 (G, P[P04670436]) • *ibid. loco*; 24.X.1966; fl.; Service Forestier 26218 (P[P04670437]) • Manabe Region [Prov. Toliara], Sofia Region [Prov. Mahajanga], Ambondro-Ampasy, Analalava, Concession Loyseau; [15°01'S, 47°16'E]; 50 m; 29.X-3.XI.1958; fl.; Service Forestier 18858 (G[G00642057], K, MO, P[P04670430, P04670431, P04670433], TAN).

DESCRIPTION

Shrubs 2-4 m tall; twigs slender, young ones light brownish, pubescent. Leaves unifoliolate; leaf blade ovate, chartaceous, glabrous, primary veins puberulent abaxially on young leaves (2-)3.5-6(-7) × (1.5-)2-3(-3.5) cm, base obtuse, margin entire, sometimes undulate, rarely pinnatifid, apex acuminate, adaxial surface glossy green, abaxial surface pale green, domatia absent; primary vein slightly prominent on both surfaces; secondary veins and reticulum visible on both surfaces; petiole 2-5(-8) mm long, puberulous. Inflorescences pauciflorous, 1-2(-3) flowers. Flower buds enlarged and obtuse at the apex. Flowers 1.5-2.5 cm long; pedicel 5-8 mm long, puberulous. Calyx cupuliform, 1.5 × 2.5 mm, 5-lobed, each lobe with an apical tooth *c.* 0.5 mm long, puberulous outside, glabrous inside. Corolla white becoming yellowish of 5 spatulate petals, slightly longer than the staminal tube, 12-16 mm long, *c.* 1 mm wide at base, 2-2.2 mm wide



FIG. 10. — *Turraea tsingycola* Callm. & Nusb., sp. nov.: **A**, flowering stem; **B**, leaf, adaxial surface; **C**, flower; **A, B**, *Leandri* 539; **C**, *Labat et al.* 2162. Drawings: Alain Jouy. Scale bars: A, 4 cm; B, C, 10 mm.

in the proximal part, apex acute, glabrous. Staminal tube cylindrical, 9-10 × 0.6-0.8 mm long, enlarged at apex (1.2 mm wide), glabrous; appendices absent; anthers 10,

subsessile, oblong, 10 × 0.2 mm, minutely mucronate; ovary ovoid to oblate, *c.* 1 mm in diam., glabrous, locules (4-)5, each with 2 collateral ovules; style exserted 6-7 mm,

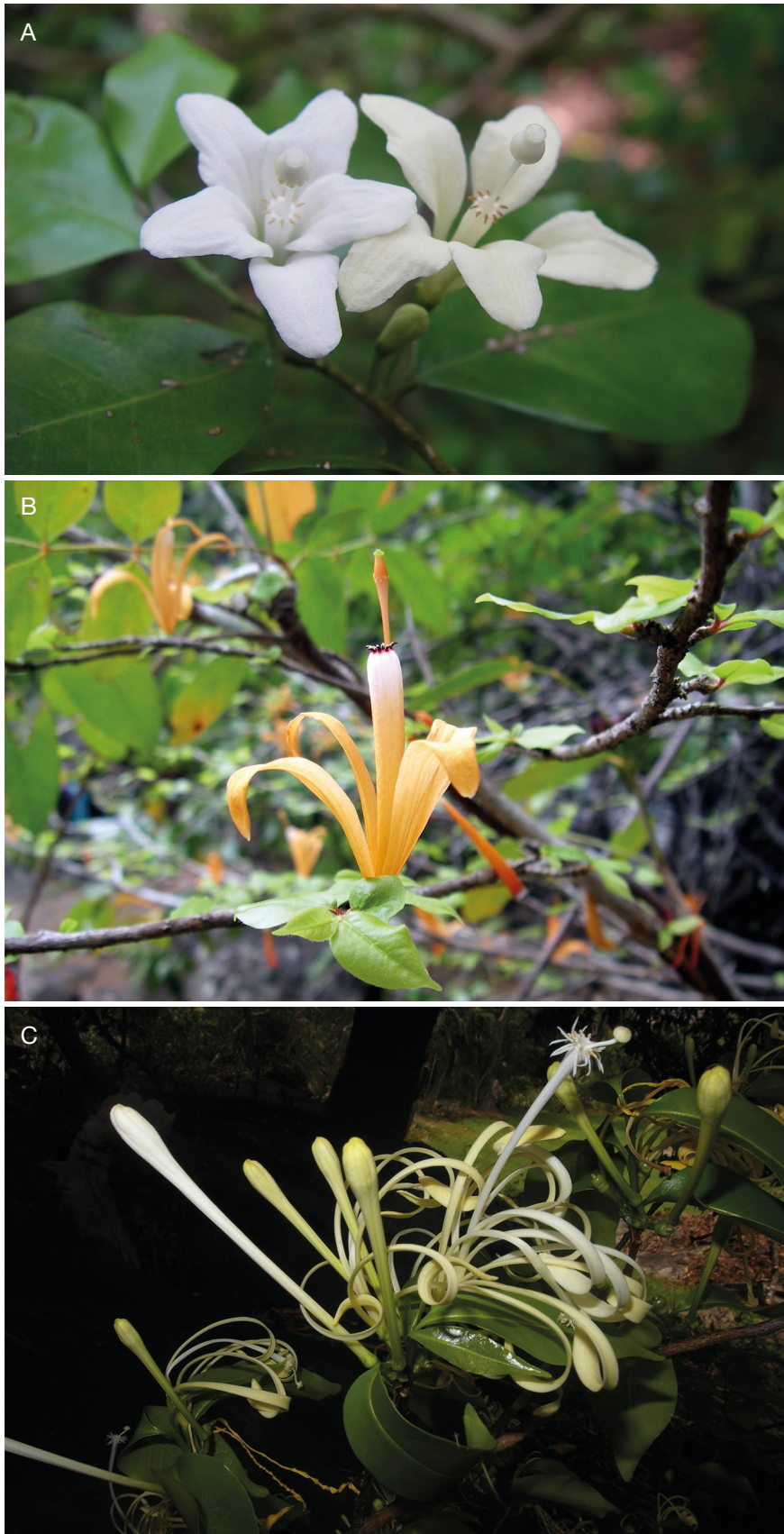


FIG. 11. — Field pictures of *Turraea* L.: **A**, *T. tsingycola* Callm. & Nusb., sp. nov.; **B**, *T. fockei* Buchenau; **C**, *T. kindtii* Buchenau; **A**, Gautier *et al.* 5665; **B**, Razafit-salama 1239; **C**, Antilahimena *et al.* 8647. Photographs: **A**, Laurent Gautier; **B**, Fidy Ratovoson; **C**, Patrice Antilahimena.

beyond the staminal tube *c.* 0.3 mm in diam. Receptaculum pollinis obovoid, 1.5 mm in diam.; stigma discoid, 0.7 × 1 mm. Fruit a capsule, globose ovoid, *c.* 10 mm diam., yellow-gray, dehiscent by 4–5 valves, puberulous; pericarp *c.* 0.1 mm thick; calyx persistent. Seeds centrally grouped, reniform, 5 × 2.5 mm; testa brownish, smooth; aril present.

NOTES

The species has been identified with several unpublished names before its description above. The collection *Labat et al.* 2162 bears the unpublished name “*Turraea sakalavarum*” on labels, *Service Forestier 18858* the name “*Turraea antonibeensis*” in Capuron’s hand and *Service Forestier 26117* the name “*Turraea leandriana*” in Leroy’s hand. Finally, the name “*Turraea parviflora*” appears in the unpublished treatment by Leroy & Lescot.

Turraea tsingycola sp. nov. resembles *T. flagellata* sp. nov. in its pauciflorous inflorescences with small white flowers but can be distinguished by its anthers minutely mucronate (vs bearing a long filiform tapering and twisted distal apicle) and the absence of appendices on the distal part of the staminal tube (vs presence of rudimentary appendices).

Turraea vohisandrianensis Callm. & Nusb., sp. nov. (Fig. 12)

DIAGNOSIS. — *Turraea vohisandrianensis* sp. nov. can be distinguished by its small solitary white flowers (1–1.5 cm long) and comparatively long pedicel (5–15 mm) and exerted style (4 mm), its rudimentary bifid appendices, its subglobose receptaculum pollinis, and its glabrous capsules.

TYPUS. — Madagascar • Anosy Region [Prov. Toliara], pentes inférieures du massif du Vohitsandriana, au sud-ouest de Fort-Dauphin; 100–300 m; [25°10’S, 46°39’E]; 11.I.1963; fl.; *Service Forestier 22385* (holo-, P[P06709140]!; iso-, G[G00413517]!, Kl, MO, P[P06709138, P06709139]!, TAN).

PHENOLOGY. — Flowers and fruits in December to January.

DISTRIBUTION AND ECOLOGY. — *Turraea vohisandrianensis* sp. nov. appears to be endemic to the dry spiny thicket and transition forests growing on granite in the climatic transition zone between the sub-arid south-west to the more mesic east. The new species is known at an elevation between 100 to *c.* 200 m.

ETYMOLOGY. — The specific epithet refers to the Vohisandriana mountain where the species seems to be restricted. The mountain name displays some orthographic variants on Humbert and Capuron’s labels, i.e. “Vohitsandriana” “Vohitsiandriana”. The official 1:100 000 map of the Foiben-Taosarintanin’i Madagasikara [FTM, National Cartography Authority of Madagascar, Map M-62 “Ranopiso”] indicates that this mountain near the sea west of Analapetsa is called Vohisandria. This is most likely since the southern language generally omits the “na” ending (Ramahaimandimby, pers. comm.). We follow here the official FTM map and omit the “t” in the epithet referring to this mountain.

CONSERVATION STATUS. — The new species is restricted to a poorly known mountain west of Tôlanaro and south of Ranopiso,

i.e. the Vohisandriana mountain. Collections from this mountain are known by René Capuron and Henri Humbert (1887–1967) who visited the site together in 1955 during Humbert’s ninth travel to the Island. Capuron later visited the site in 1963 and 1968. The forests of this region are threatened by slash-and-burn agriculture and charcoal production (Goodman *et al.* 2018). Despite extensive inventories by the Missouri Botanical Garden in the nearby Ambototsirongorongo protected area, this species has not been collected since 1968. With a single locality in a habitat under severe threat, *Turraea vohisandrianensis* sp. nov. is therefore preliminarily assessed as “Critically Endangered” [CR B2ab(iii)] in accordance with IUCN Red List Categories and Criteria (IUCN 2012).

ADDITIONAL SPECIMEN EXAMINED. — Madagascar • Anosy Region [Prov. Toliara], versant sud et plateau sommital du massif du Vohitsandriana, au sud de Ranopiso; [25°10’S, 46°39’E]; 180 m; 8.XII.1968; fl., fr.; *Service Forestier 28580* (G[G00642058], P[P00263848, P00263849], TEF).

DESCRIPTION

Treelet; twigs brownish, glabrous. Leaves unifoliolate; leaf blade chartaceous to subcoriaceous, elliptic, (2–)3–4.5(–5) × (0.6–)1–2(–2.5) cm, base acute, margin entire, undulate, apex attenuated-acuminate, glabrous; adaxial surface bright shiny green; abaxial surface dull pale green; primary vein slightly prominent, secondary veins slightly visible on both surfaces; reticulum discrete; petiole 3–5 mm, glabrous to glabrescent. Inflorescences with solitary flower. Flower buds enlarged and obtuse at the apex. Flowers 1–1.5 cm long; pedicel 5–15 mm long, glabrous. Calyx cupuliform, 2 × 3 mm, 5-lobed, each lobe with an apical linear tooth 1 × 0.2 mm, glabrous to glabrescent outside, glabrous inside. Corolla white, with 5 spatulate petals, longer than the staminal tube, reaching the base of the stigma, 9–11 mm long, 1 mm wide at base, 2 mm wide in the proximal part, glabrous. Staminal tube cylindrical, 6 mm long, glabrous outside, hirsute inside; appendages 10, reduced, each with 2 blades rounded at the top, 1.5 mm short, at the base of each anther, glabrous; anthers 10, subsessile, elliptical-oblong, 0.8 × 0.3 mm, apiculate, apicule *c.* 0.2 mm long; ovary ovoid, 1 mm in diam., glabrous, locules 5, each with 2 collateral ovules; style exerted, 4 mm long, 0.15 mm in diam. Receptaculum pollinis subglobose, 1.2 mm in diam.; stigma capitate, 1 × 0.2 mm. Fruit a capsule, globose ovoid, greenish, with 4–5 valves, longitudinally striate, glabrous; pericarp 0.2 mm thick; calyx persistent. Seeds centrally grouped, reniform, 4 × 2.5 mm; testa brownish, granular; aril present.

NOTES

Turraea vohisandrianensis sp. nov. is very distinctive among the Malagasy *Turraea* species by its small solitary flowers and comparatively long exerted style with a subglobose receptaculum pollinis (Fig. 12).

Leroy & Lescot coined this new species under the name “*Turraea breviflora*”. This epithet is already preoccupied in *Turraea* by *T. breviflora* Ridl., an enigmatic species from Peninsular Malaysia now placed in the genus *Munronia* Wight as *M. breviflora* (Ridl.) Mabb. & Muellner (Muellner & Mabblerley 2008).

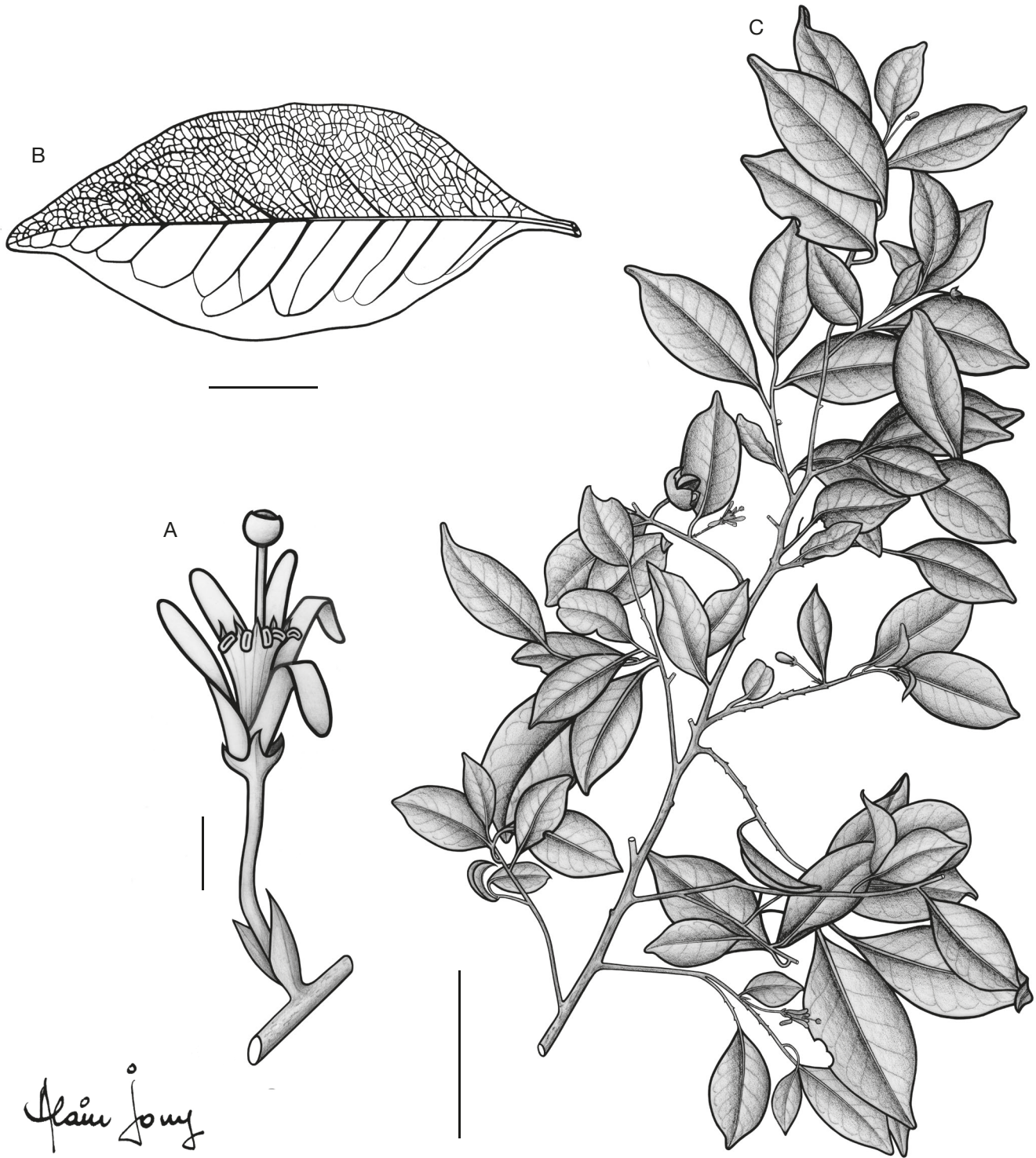


FIG. 12. — *Turraea vohisandrianensis* Callm. & Nusb., sp. nov.: **A**, flower; **B**, leaf, adaxial surface; **C**, fertile stem; **A**, Service Forestier 22385; **B**, **C**, Service Forestier 28580. Drawings: Alain Jouy. Scale bars: A, 4 cm; B, 10 mm; C, 5 mm.

NOTES ON THE SPECIES
DESCRIBED BY BUCHENAU

The Malagasy collections of Diedrich Christian Rutenberg (1851-1878), murdered in Madagascar in 1878 by his porters were eventually shipped to Bremen thanks to Johann

Maria Hildebrandt (1847-1881) (Dorr 1997). The German botanist Franz Georg Philipp Buchenau (1831-1906) issued a series of eight papers entitled “Reliquiae Rutenbergianae” between 1880 and 1889 focusing on the material collected by Rutenberg in Madagascar. Buchenau (1880) described two new *Turraea* species in the first part of his “Reliquiae

Rutenbergianae”, i.e. *T. fockei* Buchenau and *T. kindtii* Buchenau. Rutenberg’s collections were evacuated in 1943 to Mährisch-Schönberg, today Sunperk in Czech Republic (Metzing 1999). They are now deposited at BRNU with some still at the Übersee-Museum Bremen herbarium (BREM). The study of the original material of these two obscure names reveals that they both represent earlier names for accepted species in Madagascar.

Turraea fockei Buchenau
(Figs 11B; 13)

Abhandlungen herausgegeben vom Naturwissenschaftlichen Verein zu Bremen 7: 15 (Buchenau 1880). — Typus: Madagascar • Diana Region [Prov. Antsiranana], “Maevasamba, Nordwest”; 2.VI.1878; fl.; *Rutenberg s.n.* (holo-, BRNU Acc. no. 347830 image!).

Turraea anomala (O. Hoffm.) Harms in Engler A. & Prantl K., *Die Natürlichen Pflanzenfamilien* 3 (Abt. 4): 284 (Harms 1896). — Basionym: *Quivisia anomala* O. Hoffm., *Sertum plantarum mada-gascariensium*: 10. 1881 (Hoffman 1881), **syn. nov.** — Typus: Madagascar • Diana Region [Prov. Antsiranana], “N.W. Madagascar, Statio Ambohitsi (Ambergebirge)”; III.1880; fl.; *Hildebrandt 3391* (lecto-, GOET[GOET007857] image!, designated here; isolecto-, K[K000432016]!, L[L.2162315]!, M[M0108658] image!, P[P00541881]!, designated here).

REMARKS

Turraea fockei can be recognized by its suborbicular leaves with domatia, solitary orange to pink flowers (rarely by two) with four petals and its tomentose calyx with bright yellow hairs (Fig. 11B).

Study of the original material of *Turraea fockei* shows that *T. anomala* first described in the genus *Quivisia* Comm. ex. Juss. by Hoffman (1881) has to be considered as a later synonym. No original material of the name *Quivisia anomala* is extant at B (Paule, pers. comm.). Therefore, the best preserved material at GOET is designated here as the lectotype.

Turraea fockei grows in the western dry deciduous forests of Madagascar. It has a quite large repartition from the tsingy of Bemaraha to the far north, east of Montagne d’Ambre (Madagascar Catalogue 2024).

Turraea kindtii Buchenau
(Figs 11C; 14)

Abhandlungen herausgegeben vom Naturwissenschaftlichen Verein zu Bremen 7: 15. 1880 (Buchenau 1880). Typus. — Madagascar • Sava Region [Prov. Antsiranana], “Andranovaka, zwischen Vohemar und Fassi”; 9.X.1877; fl.; *Rutenberg s.n.* (holo-, BRNU Acc. no. 347831 image!).

Humbertioturraea malifolia (Baker) Cheek, *Kew Bulletin* 44: 369 (Cheek 1989). — Basionym: *Turraea malifolia* Baker, *Journal of the Linnean Society, Botany* 25: 305 (Baker 1889), **syn. nov.** — Typus: Madagascar • Sofia Region [Prov. Mahajunga], “Province of Androna”; s.d.; *Baker 5919* (lecto-, K[K000432164]!); first step designated by Cheek [1989: 369], second step designated here; isolecto-, K[K000815908]!, P[P00263864]!, designated here).

Humbertioturraea ripicola (C. DC.) Cheek, *Kew Bulletin* 44: 369 (Cheek 1989). — Basionym: *Turraea ripicola* C. DC., *Annuaire du Conservatoire et du Jardin botaniques de Genève* 10: 128 (Candolle 1907), **syn. nov.** — Typus: Madagascar • Sofia Region [Prov. Mahajunga], bord du Maddendambo; IX.1897; *Perrier de la Bâthie 323* (lecto-, P[P00541928]!, designated here; isolecto-, P[P00541929, P00541930]!, designated here).

REMARKS

Turraea kindtii can be recognized by its inflorescence in multiflorous fascicles with large, white to yellow flowers reaching 6–8 cm, its staminal tube with finely membranous appendages, 3.5–4 mm long, and its subglobose receptaculum pollinis, 2 mm de diam. (Fig. 11C)

Study of the original material of *Turraea kindtii* shows that *Humbertioturraea malifolia* and *H. ripicola* both initially described in *Turraea* represent the same species and are therefore considered here as later synonyms. A second step lectotypification is necessary for the name *T. malifolia* Baker since two duplicates are extant at K. Therefore, the best preserved material at K is designated here as the lectotype. Three duplicates of original material of the name *T. ripicola* are deposited at P. Therefore, the best preserved material of *Perrier de la Bâthie 323*, P00541928, is designated here as the lectotype.

Turraea kindtii grows in the western and northern dry deciduous forests of Madagascar. It is known from Mahajunga to the far north in the Montagne des Français (Madagascar Catalogue 2024).

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FIG. 13. — Holotype of *Turraea fockei* Buchenau, Rutenberg s.n. in BRNU (Acc. no. 347830; © Herbarium, Department of Botany and Zoology of the Masaryk University, Brno, reproduced with permission).



FIG. 14. — Holotype of *Turraea kindtii* Buchenau, *Rutenberg s.n.* in BRNU (Acc. no. 347831; © Herbarium, Department of Botany and Zoology of the Masaryk University, Brno, reproduced with permission).

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