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Casearia razakamalalae (Salicaceae), a new species endemic to southeastern Madagascar

Laurel Philpott & Wendy L. Applequist

Abstract

PHILPOTT, L. & W.L. APPLEQUIST (2023). *Casearia razakamalalae* (Salicaceae), a new species endemic to southeastern Madagascar. *Candollea* 78: 27–32. In English, English and French abstracts. DOI: <http://dx.doi.org/10.15553/c2023v781a4>

Casearia Jacq. (*Salicaceae*) has relatively few species in Madagascar, but its taxonomy has not yet been well resolved. A new species, *C. razakamalalae* Philpott & Appleq., is herein recognized. *Casearia razakamalalae* is notable for its papillate indument on several parts and its usually thin, pale-drying leaves on which even the smallest veinlets are clearly visible. It is endemic to humid forests of southeastern Madagascar and is found mostly within the Andohahela National Park. It is assessed as “Endangered” based on IUCN criteria.

Résumé

PHILPOTT L. & W.L. APPLEQUIST (2023). *Casearia razakamalalae* (Salicaceae), une espèce nouvelle endémique du sud-est de Madagascar. *Candollea* 78: 27–32. En anglais, résumés anglais et français. DOI: <http://dx.doi.org/10.15553/c2023v781a4>

Casearia Jacq. (*Salicaceae*) possède relativement peu d'espèces à Madagascar, mais sa taxonomie n'a pas encore été bien résolue. Une nouvelle espèce, *C. razakamalalae* Philpott & Appleq. est reconnue ici. *Casearia razakamalalae* se distingue par son indument papillaire sur plusieurs parties. Ses feuilles sont généralement fines, pâles en séchant où même les plus petites veinules sont clairement visibles. Elle est endémique des forêts humides du sud-est de Madagascar et se trouve principalement dans le Parc National d'Andohahela. Elle est considérée comme étant «En Danger» selon les critères de l'IUCN.

Keywords

SALICACEAE – *Casearia* – Madagascar – New Species

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Introduction

Casearia Jacq. is a pantropical woody genus of c. 200 species that is most diverse in the Neotropics. It is generally placed in *Salicaceae* (e.g. CHASE et al., 2002; APG IV, 2016), though ALFORD (2005) proposes a plausible classification that would segregate *Casearia* and about a dozen other genera of *Salicaceae* into *Samydaceae*.

All the Malagasy and African species of *Casearia* belong to sect. *Casearia* as defined by SLEUMER (1980). The first treatment of the genus in Madagascar was by TULASNE (1868), who described five species. PERRIER DE LA BÂTHIE (1940) described three varieties within *C. nigrescens* Tul. (all of which are in fact too distinct to be comfortably placed within that species [Wang & al., unpubl. data]) and a form and a variety within *C. elliptica* Tul. These taxa were also accepted in his *Flore de Madagascar et des Comores* treatment (PERRIER DE LA BÂTHIE, 1946), with one nomenclatural change.

The most recent treatment, by SLEUMER (1971), inappropriately lumped all Malagasy taxa into *Casearia nigrescens* because of their similar flowers, which are very small and have few distinguishing characters. Within that species he recognized two varieties: var. *nigrescens* and var. *lucida* (Tul.) Sleumer, which were distinguished primarily by the fact that the pedicels and parts of the tepals were minutely pubescent in var. *lucida*. His var. *nigrescens*, in particular, was very heterogeneous, including multiple species with conspicuously different vegetative morphologies. Both “varieties” had very large latitudinal ranges extending from northern to southeastern Madagascar, but var. *nigrescens* was found in eastern forests relatively close to the coast, while var. *lucida* usually occurred farther inland and at higher elevations.

As explained in APPLEQUIST & GATES (2020), this has left botanists falling back on Perrier de la Bâthie’s classification, which is obsolete because the amount of herbarium material available to him was so small in comparison to modern collections. There are uncertainties regarding the circumscription and proper status of taxa recognized in that treatment, and material in herbaria likely represents several additional taxa that had never been collected when that treatment was prepared, leaving a great need for modern taxonomic work. One step towards dealing with the modern material was taken by the recent publication of two narrowly endemic small-leaved species (APPLEQUIST & GATES, 2020).

In this paper, an additional step is taken by the description of a previously undescribed species endemic to southeastern Madagascar, *Casearia razakamalalae* Philpott & Appleg., whose papillate indument on several parts associates it with the *C. lucida* Tul. species complex.

Material and methods

This study was based on specimens of Malagasy *Casearia* deposited at MO, loans of specimens from G and P, and type images available from the JSTOR Plants website [https://plants.jstor.org]. Standard herbarium taxonomic methods were followed. Leaf descriptive terminology follows ELLIS et al. (2009). A preliminary assessment of conservation status using the Categories and Criteria of IUCN (2022) is provided for the new species. GeoCAT (BACHMAN & MOAT, 2012) was used to estimate Extent of Occurrence [EOO] and Area of Occupancy [AOO], with coordinates taken from label data or, for older specimens, from post-facto estimated coordinates in Tropicos [https://www.tropicos.org].

Taxonomic treatment

Casearia razakamalalae Philpott & Appleg., **sp. nov.** (Fig. 1, 2A, B).

Holotypus: MADAGASCAR. Reg. Anosy [Prov. Toliara]: Fort-Dauphin, Ifarantsa, Ivorona, forêt de Mamoareny [Tsitongambarika], 24°49'S 46°56'E, 706 m, 30.XI.2009, post-fl./y.fr., *Razakamalala et al.* 5006 (MO-6429386!; iso-: G [G00415705]!, P, TAN).

Casearia razakamalalae Philpott & Appleg. differs from *C. lucida* Tul. in its minutely papillate (vs. glabrous, seldom sparsely pubescent or papillate) twigs and pedicels, thinner-textured, usually green-drying leaves with smallest veinlets conspicuously visible abaxially, inflorescences with 3–12 flowers per node (vs. variable numbers, up to 50), less pubescent filaments, and moderately to sparsely pubescent style.

Trees to 11 m high, 15 cm dbh, sometimes flowering at 2 m; bark grey with raised pale lenticels; young twigs usually shallowly ridged, often with small raised pale lenticels, minutely papillate, often glaucous and peeling, internodes of leafy twigs 1.1–3(–4) mm diam. Leaves elliptical to ovate-elliptical (to broadly elliptical or ovate or narrowly elliptical), sometimes slightly (or aberrantly) asymmetrical, (3.5–)6–10.5(–12.5) × (1.8–)2.4–4.4(–5.9) cm, usually membranaceous (sometimes somewhat coriaceous), green with yellow veins above, pale green below, drying green to pale greenish brown, brown, or dark brown adaxially, often paler abaxially, the midrib and secondary veins often pale on both surfaces; pellucid dots lacking, pits on adaxial surface absent; base angle acute to obtuse, shape convex to concavo-convex or rounded; apex angle acute with shape acuminate, or obtuse with shape rounded, often minutely retuse, to convex (seldom straight), often weakly asymmetrical (some intermediate leaves having one side shortly acuminate and one side convex); margin entire; both surfaces glabrous (or abaxial surface with minute papillae along midrib); venation pinnate with primary vein monopodial, major secondaries 6–9(–12),



Fig. 1. – *Casearia razakamalalae* Philpott & Appleq. **A.** Flowering branch; **B.** Flower post-anthesis in early fruit development; **C.** Detail of abaxial leaf surface with conspicuous reticulated higher-order venation; **D.** Inflorescence. [Razakamalala et al. 5006, TAN] [Drawings: R.L. Andriamiarisoa]

decurrent, variably eucamptodromous, especially proximally, to brochidodromous, spacing irregular and often asymmetrical, slightly raised on abaxial surface, tertiary venation mostly more or less percurrent, with short intersecondary veins of highly variable angles often present in medial part of leaf and then pigmented like secondary veins, tertiary and sometimes quaternary venation visible on adaxial surface, all higher-order venation to smallest veinlets only slightly prominent but easily visible on abaxial surface under magnification even when leaves are relatively coriaceous; petiole canaliculate, 5–13 mm long, minutely papillate on part of surface; stipules deltate to ovate, usually broadly so, (0.7–)1–1.7(–1.9) mm long, often relatively persistent. *Flowers* (1–)3–12 per node, in a cluster lateral to the petiole, often partly or mostly lost, whitish to pale green, unscented; pedicel c. 3.5–5.5 mm long, c. 0.3–0.5 mm diam., minutely papillate (or with trichomes elongated into tiny hairs); sepals 5, (1.6–)2–2.6(–2.9) mm long, abaxial surface usually minutely papillate to short-pubescent at base, often glabrous above, adaxial surface sometimes minutely pubescent, margins usually irregularly short-ciliate; stamens c. 7; filaments 0.6–1(–1.2) mm, sparsely long-pubescent; staminodes densely villous apically; style elongating after anthesis, moderately to sparsely pubescent, stigma capitate, sometimes short-pubescent. Young *fruit* green, ellipsoid, with persistent style; pedicel in fruit (4.5–)5.5–7(–9) mm long, 0.4–0.6 mm diam.; mature fruit orange to yellow, broadly ellipsoid with a persistent narrowed point at apex, 12–16 mm. *Seeds* c. 4–10 per fruit, (4.2–)4.5–5.5 × 2.6–4.2 mm, broadly ellipsoid, mostly dorsiventrally compressed with slightly concave sides, sometimes plump, then often roughly triangular in cross-section with a prominent longitudinal ridge on one surface (to broadly turbinate), with red arils, yellowish when dried often with pale brown spots or streaks; base narrowed, truncate at a shallow angle; apex rounded-obtuse, often with a minute bent tip; surface glabrous, moderately glossy.

Etymology. – *Casearia razakamalalae* is named for Richard Razakamalala, the botanist who collected the type specimen, and an expert in the flora of Madagascar who has made over 9,000 collections.

Vernacular name. – “Malainarety” (*Randriamampionona* 95).

Phenology. – *Casearia razakamalalae* has been collected in flower or pre- or post-anthesis in October through December and in February (on a plant also having opened fruits) and with mature, nearly mature, or dehiscent fruits in November through March.

Distribution and ecology. – *Casearia razakamalalae* is endemic to southeastern Madagascar in the Anosy Region, in lowland moist evergreen forests (sensu GAUTIER et al., 2018)

on gneiss or “laterite de gneiss” at reported elevations from 200 to 706 m. Most collections were made in or near Parcel 1 of Andohahela National Park. One collection is from Tsitongambarika Forest Reserve, slightly to the east, and another historical collection (*Humbert & Capuron 29044*) represents a disjunct subpopulation to the south, near the bay of Ranofotsy.

Conservation status. – The EOO and AOO are estimated as 606 km² and 44 km² respectively. Several collections from the area of Andohahela are mapped as being outside the boundaries of the park; however, most are from the pre-GPS era, so that coordinates were assigned only to the minute with likely inaccuracies. Some of these were stated to come from the reserve, though one was from “près de la réserve [near the reserve]” and another from the boundary of the reserve. There are four locations with regard to the threat of land clearing: the protected areas of Andohahela and Tsitongambarika, unprotected land around these reserves, and the historical subpopulation from unprotected land near the coast. The latter area is unprotected and adjacent to the city of Tôlanaro, and the subpopulation has not been recollected since 1955; there is a good chance that it is extinct. GOODMAN et al. (2018) report that while recent forest loss within Andohahela Parcel 1 is minor, the land outside the park’s boundary has suffered severe anthropogenic damage, and any remaining natural vegetation must be presumed under threat; also, forest clearing has continued to be a problem within the boundaries of Tsitongambarika. Therefore, decline in the extent or quality of habitat has been occurring and may be expected to continue, justifying a preliminary assessment of conservation status of “Endangered” [EN B1ab(iii)+B2ab(iii)] in accordance with IUCN Red List Categories and Criteria.

Notes. – *Casearia razakamalalae* is readily recognized by its thin-textured, usually elliptical to ovate-elliptical leaves, often with short-acuminate apices and with unusually conspicuous venation, that usually remain greenish on drying. It has minute papillate indument on portions of twigs and petioles (typically not present on the entire surface of these structures) and throughout the pedicels and on portions of the sepals. This character, unusual in Malagasy *Casearia*, indicates an affiliation to the *C. lucida* complex, rather than to the *C. nigrescens* complex. *Casearia lucida* as presently circumscribed extends from extreme northern to southeastern Madagascar, raising suspicion that it may contain additional unrecognized heterogeneity; its type (*Bojer s.n.*, P [P00077475]) came from the Central Highlands near Antananarivo. It is most commonly found in subhumid forests at mid- to high elevations (to 1700 m).

The leaves of *Casearia lucida* are coriaceous, on average a bit larger than those of *C. razakamalalae* (though the maximum size is little different), and the margins are often, though not

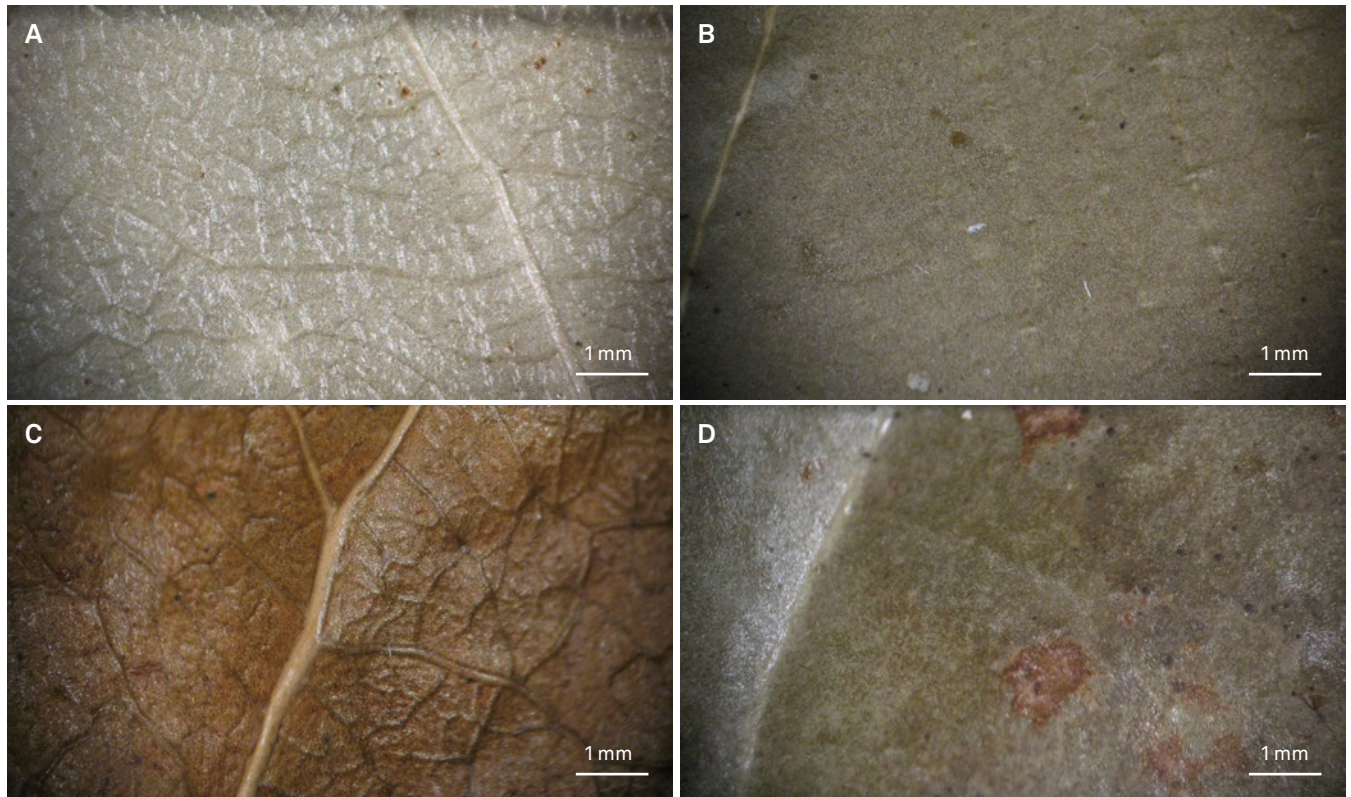


Fig. 2. – *Casearia razakamalalae* Philpott & Appleg.: **A.** Adaxial leaf surface; **B.** Abaxial leaf surface. *Casearia lucida* Tul.: **C.** Adaxial leaf surface; **D.** Abaxial leaf surface.

[**A, B:** Razakamalala et al. 5006, MO; **C, D:** Service Forestier 24824, P]

always, revolute. On drying they may be brown to dull or greyish green (sometimes dark-mottled) or very dark brown. The secondary venation frequently appears in part festooned brochidodromous, though with the outer loops distinctly of narrower gauge; venation to the quaternary level is observable beneath as elevated wrinkles in the leaf surface, but the network of smaller veins is much less clearly visible than in *C. razakamalalae*. The distinctness of the higher-order venation is a particularly useful character for distinguishing these species (Fig. 2). Twigs and petioles of *C. lucida* are usually glabrous, but a few individuals bear some minute hairs, rarely reduced to papillae; stipules are often more caducous. While some plants have small inflorescences, it is common for collections in early flower to have 30–50 flowers per node. Flowers of *C. lucida* are sometimes larger than those of *C. razakamalalae* and its pedicels are often shorter (2–4 mm long), though there is much overlap between the two species; the pedicels and sepals are usually short-pubescent, with the trichomes better developed though still very small, and the sepals ciliate. The filaments are more densely pubescent than those of *C. razakamalalae* but the style is glabrous or sparsely pubescent, mostly basally. Fruits are sometimes larger but not, apparently, consistently so.

A small group of specimens belonging to the *Casearia lucida* complex from littoral forests in Anosy (Sainte Luce, Mandena) have sometimes pale-drying leaves on which higher-order venation is often clearly visible even though the leaves are coriaceous; the veins sometimes have an unusual, inflated appearance. These specimens have patterns of indument similar to *C. razakamalalae* rather than to *C. lucida*, though with trichomes perhaps better developed, and their leaves are often small and have a shape not consistent with either species: narrowly elliptical to oblanceolate (seldom to elliptical) with narrowly convex to concave (attenuate), often weakly asymmetrical leaf bases, apices often cuspidate or rounded at the tip or overall, and margins often strongly revolute. We believe that this is likely to be another locally endemic species that should be segregated from *C. lucida*. Unfortunately, material is limited and somewhat variable and no flowering specimens have been seen, so we are hesitant to formally name it at this point.

Additional species present in the Anosy Region, likewise found most often in coastal forests, are the small-leaved endemic *Casearia anosyensis* Appleg. & M.T. Gates and populations of the inadequately-resolved *C. nigrescens*/*C. elliptica* complex. All of these have glabrous twigs and flowers.

Additional specimens examined. – MADAGASCAR. Reg. Anosy [Prov. Toliara]: Andohahela Parcel 1, path to Iminiminy, 24°46'S 46°50'E, 500 m, 7.XII.1989, *Du Puy et al. MB532* (G [2 sheets], P); col de Maningotry, 29.I.1990, *Dumetz 1272* (MO); massif de l'Andohahelo (SE), vallée de Ranohela, 200–400 m, 18–26.X.1928, *Humbert 6248* (G, MO, P); Mont Ankazovandamena, près de la Baie des Galions (Ranofotsy) SW de Fort-Dauphin, 100–450 m, 21.II.1955, *Humbert & Capuron 29044* (G, P); Ankatsaka, forêt d'Analavelo, 24°47'S 46°43'E, 679 m, XII.2004, *Ludovic 1025* (G, MO); Andohahela parcelle 1, 24°48'S 46°08'E, c. 500 m, 5–8.XII.1991, *Malcomber & Leeuwenberg 1169* (MO); Andohahela, Parcelle 1, 24°46'S 46°51'E, 200 m, 24.XII.1988, *Phillipson 2966* (MO); Andohahela, Parcelle 1, Eminiminy, 24°40'S 46°48'E, 200–700 m, 13–25.I.1993, *Randriamampionona 95* (MO); Andohahela, Parcelle 1, Isaka Ivondro, 24°48'S 46°52'E, 100–500 m, 16–24.III.1993, *Randriamampionona 233* (MO); forêt d'Ifamonta près d'Andohahela (parcel 1), 3 km N Isaka Ivondro, 24°47'32"S 46°51'56"E, 300 m, 26.XI.2002, *Randrianaivo et al. 842* (MO); road along E boundary of Parcel 1, Andohahela, 24°47'S 46°52'E, 150–700 m, 15.III.1987, *Schatz & Nicoll 1249* (MO).

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Literature Cited

- ALFORD, M.H. (2005). *Systematic studies in Flacourtiaceae*. Ph.D. Dissertation, Cornell University, Ithaca.
- APG [ANGIOSPERM PHYLOGENY GROUP] IV (2016). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Bot. J. Linn. Soc.* 181: 1–20.
- APPLEQUIST, W.L. & M.T. GATES (2020). Two new small-leaved species of *Casearia* (Salicaceae) from Madagascar. *Novon* 28: 256–262.
- BACHMAN, S. & J. MOAT (2012). GeoCAT – an open source tool for rapid Red List assessments. *Bot. Gard. Conservation Int. J.* 9. [<https://geocat.kew.org>]
- CHASE, M.W., S. ZMARZTY, M.D. LLEDÓ, K.J. WURDACK, S.M. SWENSEN & M.F. FAY (2002). When in doubt, put it in Flacourtiaceae: a molecular phylogenetic analysis based on plastid *rbcL* DNA sequences. *Kew Bull.* 57: 141–181.
- ELLIS, B., D.C. DALY, L.J. HICKEY, K.R. JOHNSON, J.D. MITCHELL, P. WILF & S.L. WING (2009). *Manual of leaf architecture*. Cornell University Press, Ithaca.
- GAUTIER, L., J.A. TAHINARIVONY, P. RANIRISON & S. WOHLHAUSER (2018). Vegetation. In: Goodman, S.M. et al. (ed.), *The terrestrial protected areas of Madagascar: Their history, description, and biota*: 207–242. Association Vahatra, Antananarivo.
- GOODMAN, S., M.J. RAHERILALAO & S. WOHLHAUSER (2018). *Les aires protégées terrestres de Madagascar: leur histoire, description et biote / The terrestrial protected areas of Madagascar: their history, description, and biota*. Association Vahatra, Antananarivo.
- IUCN (2022). *Guidelines for using the IUCN Red List Categories and Criteria*. Version 15.1. Prepared by the Standards and Petitions Committee. IUCN, Gland and Cambridge. [<https://www.iucn-redlist.org/resources/RedListGuidelines>]
- PERRIER DE LA BÂTHIE, H. (1940). Révision des Flacourtiacées de Madagascar et des Comores. *Mém. Mus. Natl. Hist. Nat.* 13: 261–301.
- PERRIER DE LA BÂTHIE, H. (1946). Flacourtiacées. *Fl. Madagascar Comores* 140.
- SLEUMER, H. (1971). Le genre *Casearia* Jacq. (Flacourtiaceae) en Afrique, à Madagascar et aux Mascareignes. *Bull. Jard. Bot. Nat. Belg.* 41: 397–426.
- SLEUMER, H. (1980). Flacourtiaceae. *Fl. Neotropica* 22: 1–499.
- TULASNE, L.-R. (1868). *Florae Madagascariensis fragmenta. Fragmentum tertium. Violarieae, Sauvagesieae, Turneraceae, Samydeae, et Bixaceae*. *Ann. Sci. Nat., sér. 5*, 9: 298–344.