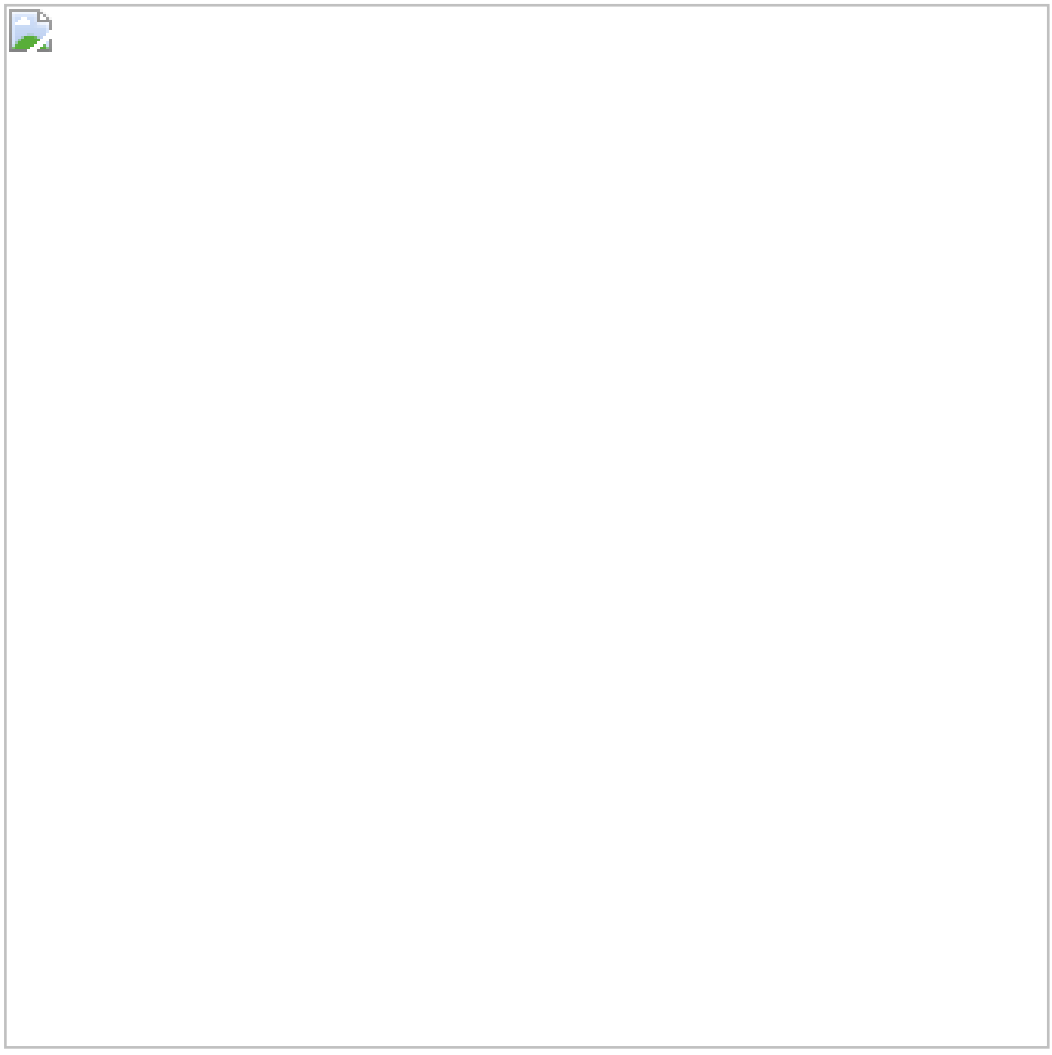

A revision of Homalium sect. Rhodonisa (Salicaceae) endemic to Madagascar

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A revision of Homalium sect. Rhodonisa (Salicaceae) endemic to Madagascar

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Abstract

APPLEQUIST, W.L. (2020). A revision of Homalium sect. Rhodonisa (Salicaceae) endemic to Madagascar. *Candollea* 75: 245–268. In English, English & French abstracts. DOI: http://dx.doi.org/10.15553/c2020v752a8

Homalium sect. *Rhodonisa* (Tul.) Sleumer is endemic to Madagascar and has included three recognized species. A new revisionary treatment of the section is presented and an identification key is provided. Twelve species are recognized, of which seven are newly described: *Homalium analavelonae* Appleq., *Homalium ihosyense* Appleq., *Homalium megaphyllum* Appleq., *Homalium phillipsonii* Appleq., *Homalium pseudoracemosum* Appleq., *Homalium rakotovaoi* Appleq., and *Homalium vohitsiandrianense* Appleq. Two lectotypes are designated. Taxonomic novelties are provided with line drawings or scans of their holotypes. Risk of extinction assessments indicate that two taxa are "Critically Endangered", one is "Endangered" and four "Vulnerable". Occasional hybridization is observed. Some specimens are not classifiable and it is possible that other unrecognized species exist.

Résumé

APPLEQUIST, W.L. (2020). Révision de Homalium sect. Rhodonisa (Salicaceae) endémique de Madagascar. *Candollea* 75: 245–268. En anglais, résumés anglais et français. DOI: http://dx.doi.org/10.15553/c2020v752a8

Homalium sect. *Rhodonisa* (Tul.) Sleumer est endémique de Madagascar et comprenait trois espèces reconnues. Une nouvelle révision de la section est presentée et une clé de détermination est proposée. Douze espèces sont reconnues dont sept sont nouvellement décrites: *Homalium analavelonae* Appleq., *Homalium ihosyense* Appleq., *Homalium megaphyllum* Appleq., *Homalium phillipsonii* Appleq., *Homalium pseudoracemosum* Appleq., *Homalium rakotovaoi* Appleq., and *Homalium vohitsiandrianense* Appleq. Deux lectotypes sont désignés. Les nouveautés taxonomiques sont accompagnées de dessins au trait ou de scans de leur holotype. Une évaluation du risque d'extinction indique que trois taxons sont «En danger critique», un «En danger» et quatre sont «Vulnérable». L'hybridation est observée occasionnellement. Quelques échantillons ne peuvent pas être classés et il est possible que d'autres espèces non reconnues existent.

Keywords

SALICACEAE – *Homalium* – *Rhodonisa* – Madagascar – Taxonomy

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Introduction

Homalium Jacq. (*Salicaceae*) is a pantropical woody genus, historically included within the polyphyletic family *Flacourtiaceae* (Chase et al., 2002). The genus is distinguished by two perianth whorls, a large gland on the adaxial base of each sepal, a semi-inferior ovary and oppositipetalous stamens arranged either singularly or in fascicles. In a recent revision ten sections were recognized, correcting the synonymization of sect. *Polyanthera* Warb. with sect. *Eumyriantheia* Warb. by Sleumer (1973), and the two subgenera formerly recognized were not upheld, as the distinguishing feature of a solitary stamen per petal (subg. *Blackwellia* (Benth.) Warb.) vs. fasciculate stamens (subg. *Homalium*) appears to be homoplasious (Applequist, 2016a). Before recent re-evaluation of the Malagasy species, about 150 species had been recognized within the genus (Applequist, 2013).

Madagascar and Malesia are the two primary centers of diversity for *Homalium*. The greatest sectional diversity is ascribed to Madagascar, with six sections, five of which are considered endemic following the restriction of sect. *Eumyriantheia* to only Malagasy species (Applequist, 2016a). The Malagasy species were revised by Sleumer (1973), who recognized a total of 28 species in Madagascar. However, that treatment had become obsolete due to the great increase in available herbarium material during the intervening 45 years. Recent revisionary studies have described multiple new species in every section treated (Applequist, 2016b, 2018a, 2018b; Wassel & Applequist, 2020), including sects. *Eumyriantheia, Blackwellia* Benth., *Odontolobus* Warb., and *Nisa* (Noronha ex Thouars) Baill. ex Warb. The endemic sect. *Antinisa* (Tul.) Baill. ex Warb. contains one species, *H. involucratum* (DC.) O. Hoffm., within which three geographic variants are recognized as forms (Sleumer, 1973) that probably merit recognition at a higher level.

The final section in need of substantial revision is the Malagasy endemic *Homalium* sect. *Rhodonisa* (Tul.) Sleumer, which is treated herein. This section is distinguished by solitary stamens, petals usually accrescent and larger than the sepals (in contrast to sect. *Nisa*, where the opposite is true), and persistent bracts and bracteoles (Applequist, 2016a). The last taxonomic revision of sect. *Rhodonisa* (Sleumer, 1973) reported it to include three species. However, *H. albiflorum* (Boivin ex Tul.) O. Hoffm. was circumscribed to include four species-level taxonomic synonyms and a suspiciously broad range of ecological diversity, so, as for *H. nudiflorum* (DC.) Baill. in sect. *Nisa* (Wassel & Applequist, 2020), it appeared evident that this species was much too broadly defined.

Materials and Methods

Materials examined included herbarium specimens at MO, duplicates of MO collections not yet distributed, and specimens from P seen during a visit, with a few potential types received on loan. In addition, images of types held by other institutions available through the JSTOR Plants website [https://plants.jstor.org] were observed, and images of some specimens were obtained from G. Standard taxonomic procedures were followed, consistent with the recent revision of other sections of *Homalium* in Madagascar (Applequist, 2016a, 2018a, 2018b; Wassel & Applequist, 2020).

Special comment is necessary regarding certain morphological features in this section. Bark characteristics and floral color are reported whenever label data have provided them. For convenience, atypical characters seen in only one species are noted only in the description of that species. Inflorescences are always exclusively lateral, largely borne in axils of leaves, unless otherwise stated. The petal length increases during the process of floral and fruit maturation, sometimes greatly. Although there are significant differences among species in initial and final corolla size, this character should be used to aid in specimen identification only with caution, because the stage of development can be difficult to determine. As in other sections, fruits that might be considered mature are rarely seen, because the entire flower is quickly deciduous as the unit of dispersal. Therefore, no seed characters are known well enough to be useful, and only vegetative and floral characters and those of the fruiting perianth can be used for identification. Specimens marked as fruiting are identified as such by their expanded perianth and sometimes lost anthers; the ovary may not be significantly expanded.

To save space, locality data are not provided for all specimens seen of the most common taxa, and those that are provided are edited for brevity, especially where more complete label data are available from Tropicos (2020). "Fkt." is used throughout as an abbreviation for "fokontany". A distribution map showing representative localities of species in the *Homalium albiflorum* complex, approximated as necessary, was produced using QGIS 3.10.7 (QGIS Development Team, 2019) and the Madagascar ecoregions shapefile of Vielledent et al. (2016). A complete index of specimens seen is provided as an appendix. Maps of georeferenced specimens that are data-based in Tropicos may be viewed within the *Catalogue of the Plants of Madagascar* (Madagascar Catalogue, 2020), which is continually updated with new determinations and specimens.

A preliminary, unofficial assessment of conservation status using the categories and criteria of IUCN (2012) is provided for each taxon recognized. If the Extent of Occurrence [EOO] and Area of Occupancy [AOO] could affect the assessed status, GeoCAT (Bachman & Moat, 2012) was used to estimate those values. Geographic coordinates were taken from label data or approximated from the Missouri Botanical Garden's gazetteers or coordinates estimated in prior georeferencing efforts (Tropicos, 2020). If coordinates for a specified locality could not be obtained, coordinates for the closest locatable population center mentioned on the label were used,

or databased centroid coordinates for some protected areas from ANGAP (now Madagascar National Parks, MNP).

Taxonomic treatment

Homalium sect. ***Rhodonisa*** (Tul.) Sleumer in Bull. Jard. Bot. Natl. Belg. 43: 300. 1973.

≡ *Nisa* [unranked] *Rhodonisa* Tul., as "*Rhodonisae*" in Ann. Sci. Nat., Bot. sér. 4, 8: 70. 1857.

Typus (designated by Sleumer, 1973: 300): *Nisa sanguinea* Boivin ex Tul. (≡ *Homalium sanguineum* (Boivin ex Tul.) Baill.).

Stipules axillary, free, usually rapidly caducous. *Inflorescences* axillary, spiciform to racemose or paniculate; bracts broad (sometimes rather short), bracts and bracteoles persistent. *Flowers* short-pedicellate, with pedicels articulated usually just below the receptacle, to subsessile or sessile; perianth 4–5(–6)-merous; sepals oblong, sometimes broadly or narrowly, to somewhat obovate, ovate, or elliptical (seldom to oblanceolate or lanceolate), slightly accrescent and usually curving over the fruit; calyx tube tubular with a narrowed base, often visibly ribbed or grooved, to funnelform, in fruit tubular to turbinate or ellipsoid; petals obovate to oblanceolate with rounded (to obtuse) apex, much longer than sepals, ascending (spreading), at least slightly accrescent (where known); sepals and petals ciliate, usually shortly, or not; sepal glands of moderate size, broadly elliptical to rounded (somewhat oblong or trapezoid), glabrous; stamens 1 per petal, inserted between glands; anthers varying from broadly oblong-elliptical with oblong-elliptical locules, the slits of dehiscence nearly parallel, to small, transversely elliptical with subglobose locules, widely separated lateral slits towards apex (sometimes apparently or nearly basifixed with connective not prominent); upper surface of ovary sometimes quite narrow, nearly flat to shallowly conical in flower, in fruit convex to conical (or little expanded); styles (3–)4–5, usually fused (or connivent) for at least half of length (sometimes only shortly). Locule of *fruit* narrowly cylindrical or ellipsoid (to narrowly obovoid), pubescent throughout; seeds 2–4 per fruit, small (possibly no mature seeds seen).

Notes. – Adequate molecular data to elucidate relationships among the very diverse, probably paraphyletic lineages of *Homalium* do not exist. The relationships of species of sect. *Rhodonisa* would be of particular interest. The genus as now circumscribed has an apparent division between *Homalium* sect. *Homalium* and similar sections (e.g., in Madagascar, *Eumyriantheia* and *Nisa)* and sect. *Blackwellia* Benth. and related sections (primarily *Polyanthera).* Species that are typical of the former group have relatively few (4–7) broad sepals and petals; relatively large, broadly elliptical anthers; large sepal glands; and broadly funnelform calyx cups in flower. Sepals and petals are usually different in shape and may differ in size or accrescence. Typical species of sects. *Blackwellia* and *Polyanthera* have often more numerous, narrow sepals and petals, which usually are similar in shape; often small broad anthers with subglobose locules (though broadly elliptical anthers are also seen); and often narrowly funnelform to tubular, ridged calyx cups. The upper surface of the ovary is often prominently conical. Sect. *Rhodonisa* includes species that have relatively few, broad petals and sepals, like sects. *Eumyriantheia* and *Nisa,* but often elongated, narrow, ridged calyx cups, and sometimes also small "*Blackwellia*-like" anthers with subglobose locules. These species are not easily classed as belonging to either group of sections, which is one reason for this author's preference not to recognize subgenera (Applequist, 2016a).

Sleumer (1973) recognized two red-flowered species, *H. sanguineum* (Boivin ex Tul.) Baill. and *H. rubriflorum* Sleumer, and one white-flowered species, *H. albiflorum*, within sect. *Rhodonisa.* Red flowers are rather unusual in *Homalium*, though not unknown from other sections, and the two red-flowered species are also distinguished from the *H. albiflorum* complex in having long-branched paniculate inflorescences and flowers borne only 1 or 1–2 per node and bract (rather than in clusters of 2 or more). The taxonomy of the red-flowered species is not problematic, and no undescribed similar species were identified.

However, the populations with clustered whitish (occasionally to yellowish or greenish) flowers, which Sleumer (1973) subsumed within *H. albiflorum*, appear actually to represent no fewer than ten distinct taxa. These seem to fall roughly into two clusters. *Homalium albiflorum* s.str. (Fig. 1) and three new species, *H. analavelonae* Appleq., *H. ihosyense* Appleq., and *H. phillipsonii* Appleq., have usually five petals (varying to four or six); the outer surfaces of the sepals are sparsely pubescent or pilose, and the petals are at least sparsely pubescent (to pilose or glabrescent) with ciliate margins. Two previously described segregate species, *H. leucophloeum* (Tul.) Baill. and *H. baillonii* Scott-Elliot, and four new species, *H. megaphyllum* Appleq., *H. pseudoracemosum* Appleq., *H. rakotovaoi* Appleq., and *H. vohitsiandrianense* Appleq., have usually four petals (seldom to five in two species), glabrous or glabrate sepals, and glabrous petals without ciliate margins (except that in *H. pseudoracemosum* sepals are sometimes sparsely pubescent and petal margins are sometimes ciliate). These groups differ in ecological preferences, with the *H. albiflorum* group preferring arid to subhumid western and northern habitats and the *H. leucophloeum* group mostly in central and eastern (or extreme northern) forests that are humid or at least less arid (Fig. 2). An outlier is *H. pseudoracemosum*, a western species which is morphologically more similar to *H. albiflorum* than others in this group, and which may represent a transitional form between the two groups.

Fig. 1. – *Homalium albiflorum* (Boivin ex Tul.) O. Hoffm. s.str. [*Schatz 4235*] [Photo: G.E. Schatz]

Key to the species of Homalium sect. Rhodonisa

1. Inflorescences usually panicles with well-developed branches (reduced to racemes); flowers borne singly or 1–2 per node; petals red 2
1a. Inflorescences racemes, spikes, or short-branched racemiform panicles; flowers mostly borne in clusters of at least 2–3 per node (very rarely, most borne singly); petals whitish (to yellow or pale green) 3
2. Leaves elliptical to broadly (narrowly) elliptical, (4.5–)5–16 × 2.1–5.5(–8) cm with petiole 4–8(–10) mm; flowers 1–2 per node, pedicellate; petals 2.4–4 mm, sparsely appressed-pubescent on abaxial surface mostly towards base; Alaotra-Mangoro, mid-elevation forests .... 10. ***H. rubriflorum***
2a. Leaves broadly elliptical (elliptical, somewhat obovate), (5.6–)7.7–11.7 × (3.8–)4.2–8.2 cm with petiole (9–)12–22 mm; flowers 1 per node, sessile; petals 4.4–6.3 mm, glabrous except for sometimes ciliate margins; Analanjirofo, low-elevation forests .... 11. ***H. sanguineum***
3. Young twigs pilose; leaves pilose, especially on veins; secondary veins strongly prominent, sometimes with small domatia in vein axils ..... 7. ***H. phillipsonii***
3a. Young twigs glabrous (rarely pubescent); leaves glabrous (rarely sparsely pubescent); secondary veins moderately to little prominent, almost always without (very rarely with) domatia 4
4. Inflorescences at least partly short-branched racemiform panicles 5
4a. Inflorescences racemose to spicate 6
5. Leaves usually mostly lanceolate to ovate, to narrowly elliptical or elliptical; inflorescences consistently racemiform panicles; rachis glabrous or glabrate (branches may be sparsely pubescent); petals 4(5), 3–5.5 mm, glabrous except margins sometimes sparsely short-ciliate .... 8. ***H. pseudoracemosum***
5a. Leaves elliptical to broadly elliptical (ovate, perhaps very rarely lanceolate or narrowly elliptical); inflorescences usually mostly racemose; portions of rachis moderately to densely pubescent; petals 5(6), 2.6–8 mm, sparsely to moderately short-pubescent on both surfaces (rarely glabrescent) ..... 1. ***H. albiflorum***
6. Free portions of sepals sparsely pubescent or pilose; petals pubescent (or pilose), usually sparsely (rarely glabrescent), the margins ciliate 7
6a. Free portions of sepals glabrous or glabrate except for sometimes ciliate margins; petals glabrous, the margins not ciliate (in *H. leucophloeum* rarely sparsely ciliate) ... 9
7. Peduncles (0.6–)2.5–6 cm; rachis at least partly pubescent; anthers transversely (to broadly) elliptical; widespread ... . 1. ***H. albiflorum***
7a. Peduncles < 0.6 cm, bracts and usually flowers borne to near base of inflorescence; rachis villous or pilose to glabrate; anthers broadly elliptical; endemic to southern regions 8
8. Leaves broadly elliptical to elliptical or broadly obovate, 5.4–12.2 × 3–7.5 cm, relatively thin-textured; immature racemes 2–4 cm with rachis villous, possibly zigzag; pedicels 1–2 mm; sepals at anthesis oblong-ovate to oblong-lanceolate, 1.5–1.7 mm, sparsely pubescent with few long appressed hairs outside, long-ciliate; petals at anthesis 3–3.7 mm, accrescence unknown, sparsely appressed-pubescent with sometimes long trichomes; Analavelona ..... 2. ***H. analavelonae***
8a. Leaves elliptical (to somewhat obovate or broadly elliptical), (4.7–)6.7–14 × (3–)4–6.3 cm, thick-textured; racemes (3–)4.5–11 cm with rachis moderately pilose to glabrate; pedicels 0.5–4.5 mm; sepals narrowly oblong, 1.8–3 mm, sparsely pilose outside, ciliate; petals 3.5–12 mm, strongly accrescent, sparsely pubescent to sparsely pilose; near Ihosy ..... 4. ***H. ihosyense***

9. Leaves ovate to broadly ovate (to lanceolate, elliptical), with margins irregularly and shallowly crenulate to crenate or crenate-denticulate (somewhat revolute); pedicels (1–)2.5–6(–8.5) mm 10
9a. Leaves elliptical, broadly elliptical or oblong-elliptical (to narrowly elliptical, ovate) with margins subentire to shallowly repand or undulate; pedicels short, 0.5–1 mm, or flowers sessile 11
10. Leaves ovate (lanceolate to elliptical), (5.5–)6.7–15.7 × (2.8–)3.5–6.5 cm with acuminate (acute, obtuse, or emarginate) apex; racemes (3–)5–16 cm; sepal glands 0.4–0.6 × 0.3–0.4 mm; northern Madagascar .... 9. ***H. rakotovaoi***
10a. Leaves of type ovate to broadly ovate (aberrantly broadly elliptical), (4–)5–7.8 × (2–)2.6–4.8 cm with acute (rounded, emarginate) apex; racemes (1.7–)3–4 cm; sepal glands 1.2–1.3 × 0.8–0.9 mm; southeastern Madagascar (Vohitsiandriana) ..... 12. ***H. vohitsiandrianense***
11. Leaves elliptical to oblong-elliptical (narrowly elliptical, ovate), 13–35 × (5–)5.7–11.5 cm, usually thin-textured in proportion to their size (to moderately thick); inflorescences often partly cauliflorous on twigs below leaves; northern Madagascar ..... 6. ***H. megaphyllum***
11a. Leaves elliptical or broadly elliptical to broadly obovate (obovate), (4.3–)5.2–12(–15) × 2.1–8.5 cm, moderately thick-textured; inflorescences usually all borne in leaf axils, on distal portions of twigs; southern or central Madagascar 12
12. Tree to 12(–20) m or shrub; leaves broadly elliptical to elliptical, (5.3–)6.2–12(–15) × (2.8–)3.5–8.5 cm, with petiole (10–)14–28(–33) mm; flowers short-pedicellate or sessile; southeastern Madagascar, littoral or low-elevation forests ..... 3. ***H. baillonii***
12a. Tree to 30 m; leaves elliptical (ovate, narrowly elliptical), (4.3–)5.2–10(–12.4) × 2.1–4.5(–5.8) cm, with petiole (6–)9–14(–27) mm; flowers normally sessile (in rare individuals short-pedicellate); central to south-central Madagascar, mid-elevation forests ..... 5. ***H. leucophloeum***

Taxonomy

1. ***Homalium albiflorum*** (Boivin ex Tul.) O. Hoffm., Sert. Pl. Madagasc.: 18. 1881.

≡ *Nisa albiflora* Boivin ex Tul. in Ann. Sci. Nat., Bot. sér. 4, 8: 71–72. 1857.

Holotypus: Madagascar. **Reg. DIANA [Prov. Antsiranana]:** Nossi-bé, s.d., fl., *Pervillé 480* (P [P04679107]!; iso-: L [L0010874 fragment] image seen).

= *Homalium hoffmannianum* Baill. in Bull. Mens. Soc. Linn. Paris 1: 575. 1886. **Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]:** "ins. Sakatía prope Nosi-bé", II.1880, fl., *Hildebrandt 3357* (P [P04679110]!; iso-: B [B10 0153999 fragment] image seen, BM, G [G00018422, G00018423] images seen, GOET, K [K000231487] image seen, L [L0010873] image seen, M [M0109536, M0109537] images seen, WU).

Tree to 15(–20?) m tall, 15 cm dbh, or spreading shrub; bark gray or mottled green, gray and white, caducous in plaques or smooth; twigs pale to grayish (dark) brown, glabrous (sparsely to moderately short-pubescent). *Leaves* elliptical to broadly elliptical (ovate, very rarely narrowly elliptical to lanceolate), (4.5–)5–16.5 × (1.9–)2.8–8 cm, relatively thin-textured and often appearing slightly wrinkled; margin crenate to crenulate (subentire, crenate-serrulate); base convex to rounded (rarely rounded-truncate, shallowly cordate); apex acuminate to cuspidate, seldom acute (partly obtuse, rounded, or emarginate); both surfaces glabrous (rarely sparsely short-pubescent especially on midrib abaxially, then sometimes also along veins adaxially), drying brown or less often green, the adaxial surface darker to blackened; secondary veins moderately prominent, tiny domatia rarely present; petiole sometimes red, (1–)5–18(–25) mm, glabrous (rarely sparsely to moderately short-pubescent). *Inflorescences* racemose (partly short-branched paniculate), (3.5–)6–10(–15) cm; peduncle (0.6–)2–5(–6) cm; rachis above peduncle moderately to densely pubescent at least in patches; flowers usually (2)3(4) per node; pedicels (0.5–)1–2(–3) mm, densely pubescent (pilose). *Flowers* 5(6)-merous, white to cream; sepals narrowly oblong (ovate), (0.6–)1–1.8(–2.5) mm, sparsely pubescent (sparsely pilose) outside, margins minutely ciliate; sepal glands orbicular to irregularly trapezoid (broadly elliptical), (0.3–)0.5–0.6(–0.8) × (0.3–)0.5–0.6 mm; calyx cup densely to moderately pubescent (sparsely pubescent, sparsely pilose); petals obovate, 2.6–8 mm, accrescent, sparsely to moderately short-pubescent on both surfaces (to moderately at base, rarely glabrescent), margins minutely ciliate; filaments 0.8–2.5 mm; anthers transversely elliptical, 0.2 mm high (seldom broadly elliptical, to 0.3 mm, especially in northern populations).

Vernacular names. – "Gaviala" (*Randrianarivelo et al. 188*); "Hazoadala" (*Service Forestier 8330*); "Hazoambo" (*Randrianaivo et al. 1159*, *Service Forestier 7019*).

Distribution, ecology and conservation status. – As herein circumscribed, *H. albiflorum* is restricted to populations from northern and western Madagascar (Fig. 2). It is still a fairly widespread species, occurring in dry forests, or occasionally in low-altitude humid or transitional forests in the north, on sand and limestone. It has been reported to occur along stream

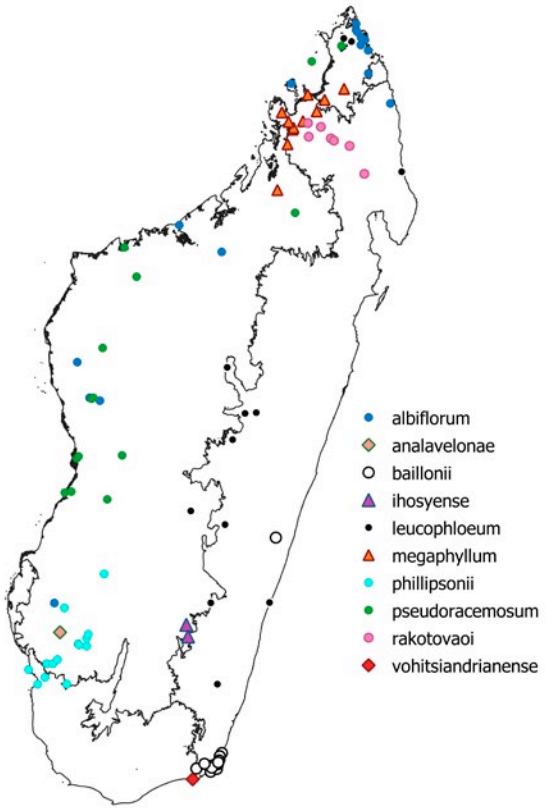

Fig. 2. – Map of representative distributions of species in the *Homalium albiflorum* complex, approximated as necessary.

margins and to be locally frequent. It occurs in protected areas including Analamerana, Oronjia, Montagne des Français, Bemaraha, and possibly Ankarafantsika. Its conservation status is estimated as "Least Concern" [LC].

Notes. – As previously circumscribed (Sleumer, 1973), *H. albiflorum* encompassed a great range of morphological character states and was distributed almost throughout the entire country of Madagascar (Fig. 2). It is herein restricted to populations with usually elliptical to broadly elliptical leaves, well-developed peduncles, partly pubescent rachises, at least sparsely pubescent perianths, and 5(6)-merous flowers (Fig. 1).

Homalium albiflorum continues to encompass a broad range of morphological variation, possibly due in part to hybridization with or introgression from related species. In northern populations it sometimes has narrow leaves, broadly elliptical anthers, sparse pubescence on the abaxial leaf surface, and/or occasional domatia. The specimens *Afzelius s.n.* and *Noyes et al. 1061* are identified below as suspected hybrids involving *H. pseudoracemosum*, but it is possible that they represent aberrant individuals of *H. albiflorum*. A few other northern collections identified as *H. albiflorum* have unusually narrow leaves. Below, northern collections with pilose indument that appear morphologically consistent with *H. phillipsonii* or intermediates between that species and *H. albiflorum* are noted under that species.

The publication of *Nisa albiflora* (Tulasne, 1857: 72) cited the collection numbers *Pervillé 480* and *Boivin 2124* (said to come from "*in Macroneso adjacenti*"). The only known complete specimen has a handwritten label stating that it was collected by Pervillé under the number 480; below that on the same label is the notation "2124. Nossi-bé. Bernier comm. 1846". A preprinted label referring to Boivin's 1847–1852 voyage was applied in Paris with the handwritten annotation "2124". This appears to be the origin of an incorrect citation by Tulasne of Boivin. Thus, the name was based only on the single sheet of *Pervillé 480* at P (the fragmentary material obtained by L clearly not having the status of a second duplicate). The P specimen was designated as lectotype by Perrier de la Bâthie (1940: 925) but the designation was unnecessary as it is properly regarded as a holotype.

Afzelius s.n. and *Noyes et al. 1061* have abnormally narrow leaves and are from the western portion of the range, sympatric with the probably closely related *H. pseudoracemosum*. They are suspected of having hybrid ancestry.

Additional material examined. – Madagascar. **Reg. Boeny [Prov. Mahajanga]:** env. de Majunga, 2–15 m, 28–30.XII.1924, fl., *Humbert 4054* (G, P); Majunga, I.1919, fl., *Perrier de la Bâthie 12350* (P); RN 7 [Ankarafantsika], canton Tsaramandroso, distr. Ambato-Boeni, 20.II.1953, fr., *Réserves Naturelles 5137* (P); "Ankarafantsika?", s.d., fl. & fr., *Service Forestier 88* (P); Analabe, Soalala, 26.I.1956, fl., *Service Forestier 15912* (P). **Reg. DIANA [Prov. Antsiranana]:** Réserve Spéciale d'Analamerana, near Antafiamantsina at the mouth of the Irodo River, valley of the Ampondrakely river, 12°41'46"S 49°34'30"E, 100 m, 20.III.1994, fl., *Du Puy et al. M743* (MO, P); env. de Diego-Suarez, forêt d'Orangea, 1–100 m, 22.I.1960, fl., *Humbert & Cours 32287* (P); *ibid. loco,* s.d., fl., *Humbert & Cours 32288* (P); Orangea, 12°15'01"S 49°21'39"E, 50 m, 20.I.2003, fr., *Miller et al. 10725* (MO, G); 2 km W d'Ambolobozobe, forêt d'Ankonahona, 12°31'26"S 49°31'29"E, 20 m, 25.I.2007, fl. & fr., *Rakotonandrasana et al. 1084* (G, MO); 1 km NW d'Ambolobozobe, 12°31'S 49°31'E, 26.XII.2007, fl., *Rakotonandrasana 1231* (MO); Montagne des Français, forêt d'Ampitiliantsambo, 12°23'13"S 49°23'04"E, 205 m, 14.I.2005, fl., *Randrianaivo et al. 1159* (MO, P); Fkt. Andranomanitra, campement Antafiankovoka, Montagne des Français, 12°21'15"S 49°21'40"E, 166 m, 3.II.2005, fl., *Randrianarivelo et al. 188* (G, MO); Mont Andrahona, 3 km NE d'Andrafiabe, 12°28'49"S 49°26'56"E, 400 m, 31.I.2005, fl., *Ratovoson et al. 826* (G, MO, P); 1 km NE d'Ambolobozobe, forêt d'Ampanasagna, 12°31'01"S 49°32'14"E, 50 m, 1.II.2005, fl., *Ratovoson et al. 834* (MO, P); Sadjoavato, forêt de Sahafary, 12°36'26"S 49°26'43"E, 280 m, 8.I.2007, fl., *Ratovoson et al. 1214* (MO, P); Orangea, fkt. Ramena, 12°14'39"S 49°22'47"E, 12.II.2005, fr., *Schatz et al. 4235* (MO); forêt de Sahafary, 27.II.1953, fl., *Service Forestier 7019* (MO, P); Massif d'Ampitiliantsambo, 19.II.1954, fl., *Service Forestier 8330* (P). **Reg. Melaky [Prov. Mahajanga]:** Beanka, partie S, Sarodrano, 18°03'29"S 44°30'53"E, 337 m, 4.III.2012, fr., *Hanitrarivo et al. 246* (MO); Tsingy du Bemaraha, 1932–1933, fl., *Leandri 357* (P); calcaires de l'Antsingy, vers Ambodiriana (E d'Antsalova), 100–150 m, 21–27.I.1960, fl., *Leandri & Saboureau 2693* (MO, P); Distr. Antsalova, 22.I.1959, fl., *Réserves Naturelles 10234* (P); Bemaraha, aux env. de Tsiandro, 26.XI–3.XII.1952, fl., *Service Forestier 6776* (P [2 sheets]); forêt Ambereny, distr. Antsalova, 11.VIII.1954, fl., *Service Forestier 10555* (P). **Reg. Menabe [Prov. Toliara]:** Kirindy, 22°10'S 44°05'E, 17–18.IX.1994, fl.,

Randriamarosoa et al. 194 (P). **Reg. SAVA [Prov. Antsiranana]:** Daraina, forêt de Solaniampilana-Maroadabo, 13°05'19"S 49°35'05"E, 140 m, 11.III.2004, fl., *Gautier et al. 4565* (P); Vohémar, Amboay 6 km SW de Fanambana, forêt de Analalava, 13°35'35"S 49°58'38"E, 260 m, 24.XI.2000, fl., *Randrianaivo et al. 607* (G, P); Analafiana, Vohémar, 14.XII.1955, fl., *Service Forestier 15670* (P). **Reg. unknown:** *sine loco*, s.d., fl., *Petit-Thouars s.n.* (P [3 sheets]).

Possible hybrid specimens. – Madagascar. **Reg. Boeny [Prov. Mahajanga]:** Majunga, 16.VI.1912, fl., *Afzelius s.n.* (MO [2 sheets], P). **Reg. Menabe [Prov. Toliara]:** 55 km NE Morondava, CFPF forestry concession, Kirindy Forest, 20°04'S 44°40'E, 35 m, 23–24.III.1992, fl., *Noyes et al. 1061* (MO, P).

2. ***Homalium analavelonae*** Appleq., **sp. nov.** (Fig. 3).

Holotypus: Madagascar. Reg. Atsimo-Andrefana [Prov. Toliara]: forêt d'Analavelona au N du Fiherenana, 950–1250 m, III.1934, fl., *Humbert 14236* (P [P04679164]!; iso-: G [G00341928] image seen, P [P04679167, P04679171, P04679172]!).

Homalium analavelonae Appleq. differs from H. albiflorum (Boivin ex Tul.) O. Hoffm. in its short peduncles, villous rachises, and usually larger anthers.

Tree to 12 m tall; twigs dark gray, glabrous. *Leaves* broadly elliptical to elliptical or broadly obovate, 5.4–12.2 × 3–7.5 cm, relatively thin-textured; margin shallowly or inconspicuously crenulate; base rounded (convex); apex cuspidate to emarginate (rounded-obtuse); both surfaces glabrous, drying greenish to pale brown, sometimes discolored adaxially; secondary veins somewhat prominent; petiole 11–21 mm, glabrous. *Inflorescences* racemose, immature 2–4 cm with possibly zigzag rachis; peduncle 0.2–0.6 cm; rachis villous; flowers 2–3 per node; pedicels 1–2 mm, pilose. *Flowers* probably 4–5-merous, white; sepals in early flower oblong-ovate to oblong-lanceolate, 1.5–1.7 mm, sparsely pubescent with few long appressed hairs outside, inside sometimes glabrate, margins long-ciliate; sepal glands c. 0.4 × 0.3 mm; calyx cup pilose; petals obovate, in early flower 3–3.7 mm, accrescence unknown, sparsely appressed-pubescent with sometimes long trichomes on both surfaces, margins short-ciliate; filaments 0.6–0.8 mm; anthers broadly elliptical, 0.3 mm high.

Distribution, ecology and conservation status. – *Homalium analavelonae* is known only from one collection from the southwestern massif of Analavelona (Fig. 2). Analavelona is a sacred forest and has some level of protection. Because this forest is subhumid, while forests in surrounding areas are dry (and highly degraded or lost), the species is unlikely to occur anywhere else. This means that the species is vulnerable to having its entire population affected by a single event, so a preliminary assessment of its conservation status is "Vulnerable" [VU D2].

Notes. – *Homalium analavelonae* is presumed to be closely related to *H. albiflorum* s.str. That species has elliptical to broadly elliptical (or rarely ovate or narrow) leaves, longer racemes with well-developed peduncles and pubescent indument, and usually smaller transversely elliptical anthers (especially in its southern distribution). Its pedicels and calyx are usually pubescent (though rarely pilose) and the indument on the petals sometimes moderately dense but short. Many leaves of the type collection of *H. analavelonae* are damaged or irregularly shaped.

3. ***Homalium baillonii*** Scott-Elliot in J. Linn. Soc., Bot. 29: 23. 1891.

Holotypus: Madagascar. Reg. Anosy [Prov. Toliara]: Fort Dauphin, VI.s.a., fl., *Scott Elliot 2853* (K [K000231483] image seen; iso-: BM, P [P04679196]!).

Tree to 12(–20) m or *shrub*; twigs pale, grayish (dark brown), glabrous. *Leaves* broadly elliptical to elliptical, (5.3–)6.2–12(–15) × (2.8–)3.5–8.5 cm, fairly thick-textured; margin subentire to very shallowly repand; base broadly convex (rounded, often minutely attenuate at extreme base); apex cuspidate (partly obtuse, rounded, or emarginate); both surfaces glabrous, drying greenish or brownish, the adaxial surface usually darker (to blackened); secondary veins little prominent; petiole sometimes red, (10–)14–28(–33) mm, glabrous. *Inflorescences* racemose, (2.5–)5–15 cm; peduncle 0.1–0.6(–1.2) cm; rachis glabrous; flowers (1)2–3(4) per node; pedicels 0.5–1 mm, sparsely pubescent to glabrate, or flowers sessile. *Flowers* 4-merous, whitish (pinkish white); sepals oblong to broadly oblong (slightly obovate), 1.8–2.6 mm, glabrous except margins sparsely short-ciliate; sepal glands broadly oblong or elliptical to orbicular, 0.5–0.7 × 0.4–0.5 mm; calyx cup glabrous (sparsely short-pubescent); petals narrowly obovate, 4–8.5(–10.3) mm, accrescent, glabrous, margins not ciliate; filaments 0.9–1.3 mm; anthers broadly elliptical (or transversely elliptical?), 0.3 mm high.

Vernacular names and uses. – "Hazoala" (*Randrianaivo et al. 2364*); "Lalampito" (*Service Forestier 7775*); "Lampivahatry" (*Randrianaivo et al. 2364*); "Lapivahatra" (*Ramison & Armand 313*); "Lohariana" (*Réserves Naturelles 3813*); "Menaky" (*Ludovic 1584*); "Takonandro" (*Service Forestier 1553, 5324*); "Tapinandro" (*Ludovic 1697,1763*); "Tsihanimposa" (*Ratovoson 1901*); "Tsitakonandro" (*Service Forestier 7775*); "Tsivalandra" (*Réserves Naturelles 7471*); "Tsivalandravy" (*Réserves Naturelles 7470*); "Voankazonala" (*Randriantafika 61*).

Wood is used for domestic heating (*Ludovic 1584, 1763*) and trunks are used for construction of traditional houses (*andavany; Ludovic 1697, 1744, 1763*) and planks used to make household furnishings (*Ludovic 1763).*

Distribution, ecology and conservation status. – *Homalium baillonii* is endemic to southeastern Madagascar (Fig. 2). It occurs in littoral forest or low-altitude humid forest, on sand. Its habitat includes the protected areas of Mandena, Ste. Luce, and Andohahela. The EOO is estimated as 10,895 km², and the AOO as 64 km². However, the large majority of accurately located collections occur in a very small area, and it is not evident that more than ten distinct populations exist. Because the unprotected portions of the habitat are suffering ongoing anthropogenic degradation and loss, a preliminary estimate of the species' conservation status is "Vulnerable" [B1ab(iii)+B2ab(iii)]. The species was collected outside the Anosy region once in 1954 and never again since then, despite repeated botanical collections in remaining low-altitude and coastal forests. If that population were excluded as probably extinct, the EOO would be estimated as 1403 km² and the AOO as 60 km².

Notes. – *Homalium baillonii*, which was lumped by Sleumer (1973) into *H. albiflorum*, is herein reinstated as a distinct species. It is distinguished by many characters, including its thick-textured leaves often with subentire margins and proportionally long petioles; short-peduncled, glabrous inflorescences; flowers tetramerous and very short-pedicellate or sessile; and glabrous sepals and petals (except for ciliate sepal margins). Additionally, it is native to southeastern Madagascar and has clearly different ecological preferences (Fig. 2). It is much more similar to *H. leucophloeum*, also herein removed from *H. albiflorum*, which almost always has sessile flowers and has proportionately narrower and on average somewhat shorter leaves, which usually have shorter petioles than those of *H. baillonii* and slightly more prominent veins. That species occurs farther north than *H. baillonii,* and at least usually at higher elevations.

Additional material examined. – Madagascar. **Reg. Anosy [Prov. Toliara]:** Fort Dauphin, VII.1890, fl., *Catat 4317* (P); Fort-Dauphin, 28.VI.1926, fl., *Decary 4182* (P); Fort-Dauphin, 1.VII.1926, fl., *Decary 4245* (P); Pointe Itaperina, distr. de Fort-Dauphin, 13.VII.1932, fl., *Decary 10126* (P); Mandena, 24°57'S 47°00'E, 0–10 m, 17.IV.1989, fr., *Dumetz et al. 684* (P); Mandena, 24°57'S 47°00'E, 0–10 m, 25.X.1989, fr., *Dumetz et al. 790* (MO, P); Andohahela RNI, près du village Taviala-Andohavondro, 24°59'S 46°43'E, 175–200 m, 28.VI.1995, fl., *Eboroke & Paul 1042* (G, MO, P); N side of Antorendrika River 22 km NE Tôlanaro, 0–20 m, 22.III.1989, fr., *Gereau et al. 3308* (MO, P); Entre le pic St Louis et la mer, 1–5 m, 20.IX–6.X.1928, fr., *Humbert 5985* (P); forêt de Fasimalandy, 24°42'41"S 47°11'18"E, 15 m, 31.VIII.2012, fl., *Ludovic 1567* (MO); forêt d'Ampasipotsy, 24°43'03"S 47°11'09"E, 17 m, 3.IX.2012, ster., *Ludovic 1584* (MO); forêt d'Angiritso, 24°49'36"S 47°08'37"E, 26 m, 10.IX.2012, fr., *Ludovic 1697* (MO); forêt d'Ankatafamamy, 24°54'17"S 47°07'01"E, 20 m, 14.IX.2012, fr., *Ludovic 1744* (MO); forêt d'Ambatomena, 24°49'36"S 47°08'37"E, 26 m, 16.IX.2012, fr., *Ludovic 1763* (MO); Ste. Luce, 24°46'S 47°09'E, 10 m, 20.X.1989, fl., *Rabevohitra 2056* (MO, P); Mahatalaky, 24°50'19"S 47°08'14"E, 6 m, 8.VIII.2012, fl., *Rakotonirina et al. 881* (MO); Sainte Luce, Malailay be, 24°50'09"S 47°08'12"E, 6 m, 7.VIII.2012, fl., *Ramananjanahary et al. 686* (MO); Mandromondromotra, Site IV, 24°55'22"S 47°01'30"E, 62 m, 18.VI.1997, fl. & fr., *Ramison & Armand 313* (MO); Ampasy Nahampoana, forêt Omega, 24°57'52"S 47°00'13"E, 22 m, 24.VIII.2013, fr., *Randrianaivo et al. 2364* (G, MO); Mandena, 24°57'08"S 47°00'11"E, 96 m, 12.VI.1999, fl., *Randriatafika 61* (MO, P); Tapatany, 3 km E de Belavenoka, 24°52'21"S 47°07'21"E, 50 m, 4.VIII.2012, fl., *Ratovoson 1901* (MO); Mandena, 24°57'S 47°00'E, 0 m, 22.VI.1996, fl., *Razafimandimbison 220* (G, K, MO, P); Mahatalaky, Belavenoky, 24°51'29"S 47°07'12"E, 27 m, 9.VIII.2012, *Razakamalala et al. 6914* (MO); Andohahela, Ifarantsa, 21.IV.1952, fl., *Réserves Naturelles 3813* (P [2 sheets]); Ifarantsa, 26.V.1955, fl., *Réserves Naturelles 7470* (P); Fenoro, Ifarantsa, 28.IV.1954, fl., *Réserves Naturelles 7471* (P); Enaniliha, Fort-Dauphin, 8.I.1956, fl., *Réserves Naturelles 8537* (P); forêt de Mandena, 17.IX.1950, fl., *Service Forestier 1553* (P); *ibid. loco*, 12.VI.1952, fl., *Service Forestier 5324* (P); *ibid. loco*, VIII.1953, fl., *Service Forestier 7775* (P); *ibid. loco*, 24°57'S 47°02'E, 10 m, 22.V.1991, fl., *Zarucchi et al. 7446* (MO, P). **Reg. Vatovavy-Fitovinany [Prov. Fianarantsoa]:** Ambodiramiavona, Mananjary, 17.VI.1954, fr., *Service Forestier 14717* (P).

4. ***Homalium ihosyense*** Appleq., **sp. nov.** (Fig. 4).

Holotypus: Madagascar. **Reg. Ihorombe [Prov. Fianarantsoa]:** Vallée de la Menarahaka, à l'E d'Ihosy, II.1955, fl., *Service Forestier 11627* (P [P04679113]!; iso-: P [P04679040]!]).

Homalium ihosyense Appleq. differs from H. analavelonae Appleq. in having thick-textured, usually elliptical leaves, longer racemes with peduncle very reduced, rachis pilose to glabrate, pedicels often longer (0.5–4.5 mm vs. 1–2 mm), and filaments longer (1.3–1.7 mm vs. 0.6–0.8 mm).

Tree to 8 m tall; twigs dark brown when young, becoming gray, glabrous. *Leaves* elliptical (to somewhat obovate or broadly elliptical), (4.7–)6.7–14 × (3–)4–6.3 cm, thick-textured; margin inconspiculously crenulate; base convex to rounded; apex cuspidate to short-acuminate (obtuse, rounded); both surfaces glabrous, drying greenish (the upper surface sometimes mottled) to grayish (dark brown); secondary veins slightly prominent; petiole 13–30 mm, glabrous. *Inflorescences* racemose, (3–)4.5–11 cm; peduncle virtually absent; rachis moderately pilose to glabrate; flowers 2–3 per node; pedicels 0.5–4.5 mm, short-pilose. *Flowers* 5-merous, white; sepals narrowly oblong, 1.8–3 mm, sparsely pilose outside, margins ciliate; sepal glands broadly elliptical, c. 0.6 × 0.5 mm; calyx cup sparsely pilose; petals oblanceolate, 3.5–12 mm, strongly accrescent, sparsely soft-pubescent to sparsely pilose on both surfaces, margins ciliate; filaments 1.3–1.7 mm; anthers broadly elliptical, 0.3 mm high.

Vernacular names. – "Sely" (*Service Forestier 13729*); "Tratramborondreo" (*Service Forestier 13788*).

Distribution, ecology and conservation status. – *Homalium ihosyense* is (or was) endemic to the valley of the Menarahaka near Ihosy (Fig. 2); it was reported to occur in mid-elevation dry forest on sand. The single known population has not been recollected for several decades. The large majority of the

Fig. 3. – *Homalium analavelonae* Appleq. **A.** Flowering branch; **B.** Inflorescence; **C.** Inflorescence nodes with flowers before full anthesis. [*Humbert 14236*, P] [Drawings: R.L. Andriamiarisoa]

native vegetation in this area was unprotected and has been lost since the historical collections were made. This species is certainly to be assessed as "Critically Endangered" [CR B1ab(iii)+B2ab(iii)], if indeed it is not "Extinct in the wild".

Notes. – *Homalium ihosyense* belongs to a group of species including *H. albiflorum* and *H. analavelonae*. It is most similar to the latter, which is likewise endemic to a small region of southern Madagascar. Though *H. analavelonae* is poorly known, it appears to have often broadly elliptical or broadly obovate leaves with usually rounded bases and proportionately shorter petioles; its inflorescence has a short (to 0.6 cm) peduncle, a villous rachis, pedicels to 2 mm long, and long appressed rather than pilose pubescence on the sepals and petals. It may have smaller flowers and smaller sepal glands, but material is too limited to allow conclusions.

Paratypi. – Madagascar. **Reg. Ihorombe [Prov. Fianarantsoa]:** Haute vallée de la Menarahaka à l'E d'Ihosy, 700–800 m, 28.I & 10.IV.1955, fl., *Humbert 28610* (G, P); *ibid. loco*, 28.I.1955, fl., *Service Forestier 13729* (P); *ibid. loco*, 20.III.1955, ster., *Service Forestier 13788* (P); bassin de la Menarahaka, près du carrefour des route d'Ihosy à Ivohibe et Iakora, 650 m, 10.II.1963, fl., *Service Forestier 22629* (G, P [2 sheets]).

5. ***Homalium leucophloeum*** (Tul.) Baill. in Bull. Mens. Soc. Linn. Paris 1: 576. 1886.

   ≡ *Nisa leucophloea* Tul. in Ann. Sci. Nat., Bot. sér. 4, 8: 72. 1857. ≡ *Homalium albiflorum* var. *leucophloeum* (Tul.) Baill. ex H. Perrier in Mém. Mus. Natl. Hist. Nat. 13: 295. 1940.

   Holotypus: Madagascar. Reg. Analamanga [Prov. Antananarivo]: env. de Tananarivo, 1840, fl., *Goudot s.n.* (G [G00018421] image seen; iso-: P [P04679197 fragment]!).

   = *Homalium tetramerum* Baker in J. Bot. 20: 110. 1882. **Holotypus: Madagascar:** "Central Madagascar", VIII.1880 [com.], fl., *Parker s.n.* (K [K000231485] image seen).

Tree to 15(–30) m tall, 40[–48] cm dbh; bark gray to black; twigs pale to grayish (dark) brown, glabrous. *Leaves* elliptical (ovate, narrowly elliptical), (4.3–)5.2–10(–12.4) × (1.6–)2.1–4.5 (–5.8) cm, moderately thick-textured; margin shallowly repand to subentire (entire); base convex to rounded (short-attenuate); apex short-acuminate to rounded-cuspidate (acute, rounded, emarginate); both surfaces glabrous, usually drying green at least abaxially (rarely brown), darker to blackish adaxially (rarely darker abaxially); secondary veins slightly prominent; petiole sometimes red, (6–)9–14(–27) mm, glabrous. *Inflorescences* racemose, (1.5–)5–10(–14) cm; peduncle 0.2–1.4(–2.2) cm; rachis glabrous; flowers (1)2–3 per node; flowers sessile (in *Cours 5205* pedicels 0.5–1 mm, pubescent). *Flowers* 4(5)-merous, white to greenish or yellowish white; sepals oblong to broadly oblong, 1.4–2.3[–2.8] mm, glabrous except margins ciliate; sepal glands orbicular or nearly so, 0.5–0.8 × 0.5–0.8 mm; calyx cup short-pubescent (glabrous); petals narrowly obovate, 3–5.6(–6.7[–8]) mm, moderately accrescent, glabrous, margins not ciliate [rarely sparsely short-ciliate]; filaments 1–1.4 mm; anthers broadly elliptical, 0.3 mm high.

Vernacular names and uses. – "Bemahova" (*Andrianjafy et al. 1313*); "Fandrianakanga" (*Service Forestier 2243*); "Hazoambo" (*Service Forestier 2243*); "Hazoambou" (*Campenon s.n.*); "Hazomainty" (*Alleizette 1214*); "Hazombato" (*Lehavana et al. 257*, *Ursch 164a*, *164b*); "Hazomby" (*Decary 6243*, *Parker s.n.*, *Perrier de la Bâthie 6707*, *6708*, *6709*); "Taimboalavo" (*Cours 5205*); "Zahana à grandes feuilles" (*Service Forestier 15063*).

Wood is reported to be hard but easy to work, used for construction and for heating and charcoal production (*Cours 5205, Service Forestier 16187*). An unspecified preparation of the plant is reported to be used to calm the stomach and as a diuretic (*Alleizette 1214*).

Distribution, ecology and conservation status. – *Homalium leucophloeum* is native to southeastern to northern humid forests, at least usually mid-elevation to high-elevation, and forests of the central plateau (Fig. 2). It has been reported on limestone, marble, and rocky substrate. It is known from over 10 historical populations, including several protected areas (Itremo, Ankafobe, Ankaratra-Manjakatompo, Andringitra, possibly Midongy du Sud and Montagne d'Ambre). Its conservation status is therefore assessed as "Least Concern" [LC]. However, it is of concern that recent collections are so few in number, perhaps because of past exploitation for wood.

Notes. – *Homalium leucophloeum* was accepted by Sleumer (1973) as a variety of *H. albiflorum* but is herein reinstated as a species. As for several other segregate species, it is differentiated from *H. albiflorum* s.s. by its usually 4-merous flowers with glabrous sepal and petal surfaces. Additionally, *H. albiflorum* has often larger, thin-textured leaves and the flowers are short-pedicellate; its distribution is northern and western, and it occurs at lower altitudes.

The few specimens from the extreme north (DIANA and SAVA regions) have relatively large elliptical, greenish, subentire leaves, sparsely ciliate petals, and in one case larger flowers than any other specimen (extremes of ranges marked with brackets above). These specimens are the only ones in this species or the group of related species that have ciliate petals, and the possibility that they are distinct or, contrarily, reflect some small degree of gene flow from *H. albiflorum* should be considered. One collection from very high altitude in the southeastern part of the distribution (*Rogers 675*) is of unusual appearance, with narrow, very long-petioled leaves and numerous racemes; this population may also be genetically distinct.

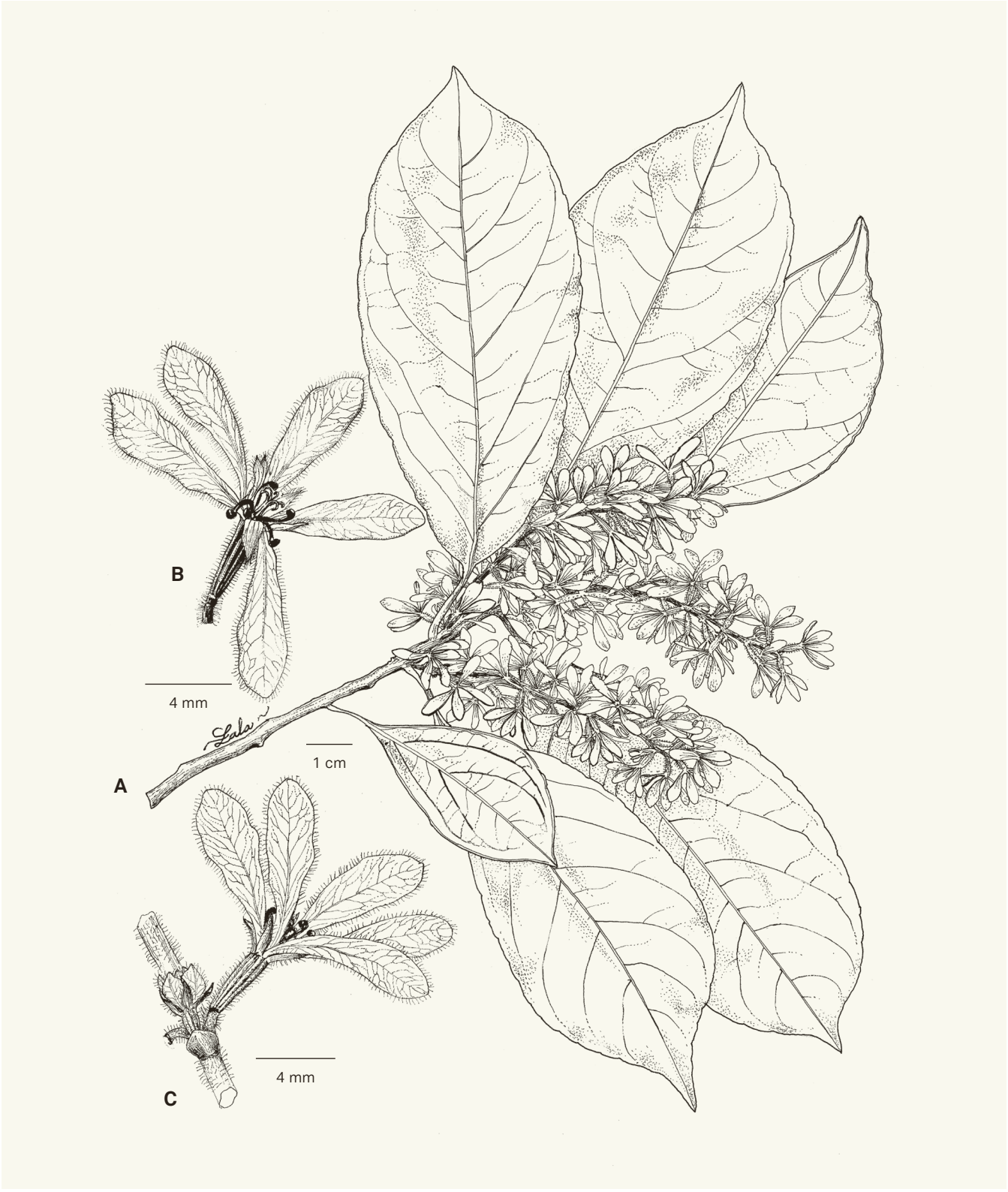

Fig. 4. – *Homalium ihosyense* Appleq. **A.** Flowering branch; **B.** Flower; **C.** Inflorescence node.
[*Service Forestier 11627*, P] [Drawings: R.L. Andriamiarisoa]

The isotype at P is marked "Emirna" [Imerina] and gives a date of February 1840, rather than just 1840. Its fragmentary nature strongly suggests that it is a duplicate of the holotype, but the inconsistency of labeling may make this uncertain.

Baron 5551, with modest-sized elliptical leaves, flowers paired in small bracts, glabrous petals, and ciliate sepals, has clear affinities to *Homalium leucophloeum* (or potentially *H. baillonii*). However, it also has 3 mm, relatively densely pubescent pedicels, an unexpected character in either of those eastern species. This is likely to be a hybrid, but the absence of any locality data hinders speculation regarding its parentage.

Additional material examined. – Madagascar. **Reg. Amoron'i Mania [Prov. Fianarantsoa]:** env. d'Ambatofitor[ah]ana au S d'Ambositra, 1500 m, VI.1912, fr., *Perrier de la Bâthie 6710* (P); Itremo, Ambatofinandrahana, forêt d'Atsorakambiaty, 20°35'30"S 46°33'40"E, 1000 m, 7–8.III.1999, fl., *Rabenantoandro et al. 68* (P). **Reg. Analamanga [Prov. Antananarivo]:** Parc de Tsimbazaza, 18°55'S 47°31'E, 13.II.1985, fr., *Barnett et al. 460* (P); Km 26 de la route de Tamatave, 18.X.1951, fl., *Benoist s.n.* (P); Ambatovory, env. de Tananarive, IV.1957, fl., *Bosser 11060* (MO, P); Carion [Nandihizana], 1100 m, 30.X.1927, fl., *Decary 6026* (P); env. de Tananarive (Anosivato), 22.IV.1928, fr., *Decary 6243* (MO, P); Ankazobe, forêt d'Ankafobe, 18°08'11"S 47°11'12"E, 1509 m, 23.II.2005, fl., *Lehavana et al. 257* (G, K, MO, P); jardins et parcs à Tananarive, IV.1913, fl., *Perrier de la Bâthie 6707* (P); Parc de Tananarive, IV.1913, fl., *Perrier de la Bâthie 6708* (P); jardins et parcs à Tananarive, IV.1913, fl. & fr., *Perrier de la Bâthie 6709* (P); sommet du rocher d'Ambatovory, distr. de Tananarive, 16.IV.1949, fl., *Service Forestier 610* (P). **Reg. Atsimo-Atsianana [Prov. Fianarantsoa]:** Midongy du Sud, 2 km S du village de Beharena II, 23°32'23"S 47°05'07"E, 584 m, 16.IX.2005, fl., *Andrianjafy et al. 1313* (MO); massif de l'Ivakoany, montagne Analanavelo, s.d., fr., *Cours 5205* (P); village le plus proche Vohilava, Ambomindriha, 13.IV.1956, fl., *Service Forestier 16187* (P). **Reg. DIANA [Prov. Antsiranana]:** E de la forêt d'Ambre, IX.1926, fr., *Perrier de la Bâthie 17699* (P); forêt d'Ambavahibe, IX.s.a., fr., *Ursch 164a* (G, P); forêt d'Analamera, s.d., fr., *Ursch 164b* (P). **Reg. Haute Matsiatra [Prov. Fianarantsoa]:** Sud-Betsiléo, "wald von Ankafina", II.1881, fl., *Hildebrandt 3928* (G, P); Andringitra National Park, 22°09'19"S 46°56'41"E, 1750 m, 26.V.2004, fr., *Rogers 675* (G, MO). **Reg. Ihorombe [Prov. Fianarantsoa]:** Melohavary, Farafangana, 23.V.1950, fl., *Service Forestier 2243* (P). **Reg. SAVA [Antsiranana]:** Ampahana, Antalaha, 7.IX.1955, fr., *Service Forestier 15063* (P). **Reg. Vakinankaratra [Prov. Antananarivo]:** Versant E du massif de l'Ankaratra, forêt de Manjakatompo, 24–26.III.1958, fl., *Service Forestier 18503* (P). **Reg. Vatovavy-Fitovinany [Prov. Fianarantsoa]:** Ambakobe, 1100–1200 m, 9.VI.1881, fl., *Lantz s.n.* (P); Manakara, s.d., buds, *Service Forestier 2738* (P). **Reg. unknown:** Imerina Nord, Ambohitraza, s.d., fl., *Campenon s.n.* (P); Tsarinandriano, VII.1906, fr., *Alleizette 1214* (P); *sine loco*, s.d., fl., *Baron 858* (P).

Specimen incertae sedis. – Madagascar: *sine loco,* s.d., fr., *Baron 5551* (P).

6. ***Homalium megaphyllum*** Appleq., **sp. nov.** (Fig. 5).

Holotypus: Madagascar. Reg. DIANA [Prov. Antsiranana]: Behefaka, Anjahana, 13°21'32"S 49°10'10"E, 123 m, 5.VI.2005, fr., *Hong-Wa et al. 296* (MO-6175072!; iso-: G [G00341931] image seen, P [P04734804]!, TAN).

Homalium megaphyllum Appleq. differs from H. leucophloeum (Tul.) Baill. in its much larger, usually elliptical to oblong-elliptical leaves with usually subentire margins, inflorescences often cauliflorous on twigs below leaves, and flowers often short-pedicellate.

Tree to 20 m tall, 30 cm dbh; twigs dark brown, glabrous. *Leaves* elliptical to oblong-elliptical (narrowly elliptical, ovate), 13–35 × (5–)5.7–11.5 cm, relatively thin-textured (moderately thick); margin subentire, often slightly undulate; base rounded to convex or somewhat oblique; apex cuspidate to short-acuminate or acute (rounded, emarginate); both surfaces glabrous, drying brown or green abaxially, dark brown to blackish (seldom greenish) adaxially; secondary veins slightly prominent; petiole sometimes red, (11–)13–20(–29) mm, glabrous. *Inflorescences* often mostly cauliflorous on twigs below leaves, racemose, (4.5–)8–15(–23) cm; peduncle 0.3–1.3(–3) cm; rachis glabrous (short-pubescent); flowers (1)2–4 per node; pedicels 0.5–1 mm, short-pubescent, or flowers sessile. *Flowers* 4-merous, white; sepals oblong to somewhat obovate, 1.3–3.5 mm, glabrous except margins short-ciliate; sepal glands suborbicular, 0.5–0.6 × 0.5 mm; calyx cup sparsely pubescent; petals narrowly obovate, 3.5–7 mm, moderately accrescent, glabrous, margins not ciliate; filaments 0.6–0.9 mm; anthers transversely elliptical, c. 0.3 mm high.

Etymology. – *Homalium megaphyllum* is so named for its exceptionally large leaves.

Vernacular names. – "Hazoadala" (*Antilahimena et al. 370*, *463*, *Gautier & Be 2905*, *Réserves Naturelles 1449*, *2954*, *4362*, *Service Forestier 7690*, *9293*, *13388*); "Hazoanolalana" (*Service Forestier 3054*).

Distribution, ecology and conservation status. – *Homalium megaphyllum* is confined to northern Madagascar, primarily the DIANA region (Fig. 2). It is frequently reported to occur along the banks of rivers or streams, including seasonal temporary streams, and once to grow in deep red soil. It has been collected in degraded, or secondary, savoka forests. More than ten probably distinct populations have been collected, and it occurs in the protected areas of Manongarivo, Tsaratanana and Lokobe. Its conservation status is tentatively assessed as "Least Concern" [LC].

Notes. – *Homalium megaphyllum* is certainly more closely related to *H. leucophloeum* and *H. baillonii* than to *H. albiflorum* s.str., as evidenced by its 4-merous flowers with glabrous sepal and petal surfaces. It has a much larger maximum leaf size than any other species of the section, and is also unique in having most inflorescences borne proximally on mature twigs, rather than in leaf axils.

Paratypi. – Madagascar. **Reg. DIANA [Prov. Antsiranana]:** Ambato classified forest, river Bevoay, trail to Ankarefo, 13°28'03"S 48°32'22"E, 0–100 m, 28.V.1998, fl., *Antilahimena et al. 370* (G, K, MO, P); Tsaratanana

Fig. 5. – *Homalium megaphyllum* Appleq. **A.** Flowering branch; **B.** Flower post-anthesis; **C.** Inflorescence. [*Hong-Wa 296*, TAN] [Drawings: R.L. Andriamiarisoa]

Massif, Antsahabe-Mandrizavona, 13°43'12"S–13°48'S 48°39'25"E–48°45'E, 150–750 m, 12.IV.2000, fl., *Antilahimena et al. 463* (BR, G, K, MO, P); env. de Maromandia (Kapany), 9.IV.1923, fl., *Decary 1676* (G, P); Besinkara, 14°04'S 48°17'E, ch. d'Ambalafary à Ambodisakoana, 350 m, 26.III.1996, fl., *Gautier & Be 2905* (G, MO, P); SW d'Ambilobe, 10 m, III.1951, fr., *Humbert & Capuron 25589* (P); Vallée de l'Ifasy en aval d'Anaborano, distr. d'Ambilobe Nord, 50–200 m, 31.III.1951, fr., *Humbert & Capuron 25880* (P); env. de Mt. Bekolosy, massif de Manongarivo, III.1909, fl. & fr., *Perrier de la Bâthie 6718* (P [2 sheets]); presqu'île d'Ampasindava, 13°46'30"S 48°05'35"E, 215 m, 7.V.2012, fr., *Rasoanaivo & Tahinarivony 28* (MO); Tsaratanana, rive droite du Sambirano, au delà du village Beangona, 21.V.1948, fr., *Réserves Naturelles 1449* (P [3 sheets]); Lokobe, Nossi Be, 22.IX.1952, fl., *Réserves Naturelles 4362* (P [2 sheets]); Andrahibo, Ambanja, 16–30.III.1951, fl., *Service Forestier 2954* (P); entre Ambatobe et [illegible], distr. d'Ambilobe, 12.III.1951, fl., *Service Forestier 3054* (P); Benavony, Ambanja, 25.III.1954, fr., *Service Forestier 9293* (P); Manongarivo RS, Anketraka Be, Bas Ambahatra, cours inférieur du bassin-versant de rano Ambahatra (13°55'16"S, 48°27'47"E), 180 m, 22.VII.1998, fr., *Wohlhauser & Andrianjaka 60016* (G, MO, P). **Reg. Sofia [Prov. Mahajanga]:** Analalava, Bekaraka, env. 40 km S d'Ambanja le long de la RN6, 13°56'09"S 48°12'45"E, 195 m, 21.V.2006, fl., *Rakotoarisoa & Andriamahay 436* (MO); Ambodisaina, Ambanja, 17.IX.1953, fr., *Service Forestier 7690* (P); Ampondralava, Antsohihy, 25.IV.1955, fr., *Service Forestier 13388* (P). **Reg. unknown:** *sine loco,* s.d., fr., *Baron 6224* (P).

7. ***Homalium phillipsonii*** Appleq., **sp. nov.** (Fig. 6).

Holotypus: Madagascar. Reg. Atsimo-Atsinanana [Prov. Toliara]: near Sakaraha, forêt de Zombitsy, 22°52'S 44°31'E, 750 m, 6.I.1989, fl., *Phillipson 3095* (MO-3762461!; iso-: G [G00341926] image seen, P [P04679124]!, TAN).

Homalium phillipsonii Appleq. differs from H. albiflorum (Boivin ex Tul.) O. Hoffm. in having pilose indument on all parts, leaves sometimes narrower, with strongly prominent secondary veins, sometimes with apparent small domatia in axils, and often asymmetrical apices, and larger anthers.

Tree to 15 m tall or shrub; bark caducous in plaques; twigs pale (dark) brown when young, becoming dark to grayish, pilose. *Leaves* elliptical to obovate, oblong-elliptical or narrowly elliptical (to oblanceolate), (4–)5.5–14 × (1.8–)2.4–6 cm, relatively thin-textured; margin shallowly crenate to crenate-serrulate; base convex (to rounded); apex short-acuminate to cuspidate (long-acuminate), often asymmetrical at tip, to acute (obtuse, emarginate, rounded-obtuse); both surfaces pilose especially over veins, more sparsely short-pilose adaxially, drying green or brown, the adaxial surface darker (seldom dark grayish); secondary veins strongly prominent, sometimes apparently with small domatia in axils; petiole sometimes red, (5–)7–14 mm, pilose. *Inflorescences* racemose, (2.5–)5–12(–16.5) cm; peduncle 1–3.5 cm; rachis short-pilose; flowers 2–3(4) per node; pedicels 0.5–2 mm, pilose. *Flowers* 5-merous, white; sepals obovate-oblong to oblong-elliptical or narrowly oblong, 0.9–2.4 mm, short-pilose to appressed-pubescent on outer surface and apical part of inner surface, margins ciliate; sepal glands broadly elliptical (orbicular), 0.4–0.7(–0.8) × 0.4–0.6 mm; calyx cup pilose; petals obovate with a narrowed base to oblanceolate, 1.5–8 mm, strongly accrescent, sparsely short-pubescent on both surfaces, margins ciliate; filaments 0.7–1 mm; anthers broadly elliptical, 0.35 mm high.

Etymology. – *Homalium phillipsonii* is named for Peter B. Phillipson, collector of the type, to honor his many contributions to the botany of Madagascar.

Vernacular names. – "Lalimpitonala" (*Service Forestier 4570*); "Lalipitonala" (*Service Forestier 4989*); "Lalipitonantro" [?] (*Service Forestier 3401*); "Lalipotonala" (*Service Forestier 2818*).

Distribution, ecology and conservation status. – *Homalium phillipsonii* as herein described is native to the Atsimo-Andrefana region of southwestern Madagascar (Fig. 2). [As noted below, there are similar populations in northern Madagascar, but the status of these is doubtful]. It occurs in dry deciduous forest and bush, on sand and rocky limestone substrates. Based on historical collections, the EOO is estimated as 11,806 km², and the AOO as 72 km². It appears that more than ten distinct populations have existed. However, in recent decades all collections but one (*Razakamalala 6111*) have been made in the protected area of Zombitsy. The vast majority of the habitat is unprotected, has suffered severe damage since the time when historical collections were made (with all woody species suitable for use as charcoal virtually extirpated in many areas), and continues to be subject to ongoing anthropogenic damage. Therefore, it is considered very likely that some of the historical populations are now extinct, and that the species should be assessed as "Vulnerable" [VU B2ab(iii)].

Notes. – *Homalium phillipsonii* is most readily distinguished from *H. albiflorum* s.str. by the pilose indument of its leaves, twigs, petioles, and portions of the calyx. In *H. albiflorum*, the pedicels and calyx are occasionally pilose but the leaves, twigs, and petioles, though rarely pubescent, are not pilose. *Homalium phillipsonii* has more strongly prominent secondary veins than any related species, and more frequently has small structures interpreted as domatia. The inflorescences also seem subjectively to appear thicker and less pendent than those of *H. albiflorum,* and the anthers are larger and narrower than usual for that species (whose morphology is variable).

A few specimens that key out as *H. phillipsonii*, noted below as "*incertae sedis*", are from much farther north, even from the extreme north. There are no specimens of *H. phillipsonii* known from the intervening regions, so if those populations were *H. phillipsonii* the species would have a highly disjunct distribution. These sometimes have a sparser indument on various parts than typical *H. phillipsonii* and might be viewed as transitional forms between *H. phillipsonii* and *H. albiflorum*, which does occur in that range. However, material of *H. albiflorum* from the southernmost portion of

Fig. 6. – *Homalium phillipsonii* Appleq. **A.** Flower; **B.** Flowering branch; **C.** Inflorescence; **D.** Detail of leaf venation. [*Phillipson 3095*, TAN] [Drawings: R.L. Andriamiarisoa]

the distribution of that species (the regions of Menabe and Melaky) does not appear to intergrade with *H. phillipsonii*, farther to the south, at all. It is therefore questionable whether gene flow between the species is possible. The northern populations may well be genetically distinct, although they are not strongly distinguished morphologically; further collections from the region might help to resolve their status.

Paratypi. – Madagascar. **Reg. Atsimo-Andrefana [Prov. Toliara]:** Manasoa Tanosy, 11.I.1913, fl., *Afzelius s.n.* (MO [2 sheets], P); Andoharanomaitso, Parc de Zombitse, partie SE, 22°54'22"S 44°40'22"E, 800 m, 25.XII.2004, fl., *Andriamihajarivo et al. 540* (MO); Parc National de Zombitse, NW du village de dika, lieu dit Poakafo, 22°46'09"S 44°40'15"E, 531 m, 10.IV.2006, fr., *Andriamihajarivo et al. 921* (MO, P); Sakaraha, II.1956, fl., *Bosser 9111* (MO, P); Tsarasao S de Sakaraha, 14.II.1970, fl., *Bosser 19913* (P); Baie de St. Augustin (Tulear), 8.II.1957, fl., *Descoings 2406* (MO); Basse vallée du Fiherenana, 50–200 m, XI.1933, fl., *Humbert 11557* (G, P [2 sheets]); Bassin moyen du Fiherenana entre Lambomakandro et Sakaraha, 400 m, 10.XII.1946, fl., *Humbert 19683* (G, P); Gorges du Fiherenana entre Beantsy et Anjamala, 30–300 m, 16–19.I.1947, fl., *Humbert 19920* (P); Plateau au S des gorges du Fiherenana entre Andranohinaly et Andranovory, 300–400 m, 3–4.II.1947, fl., *Humbert 20112* (P); forêt de Zombitsy (entre Ranohira et Sakaraha), III.1960, fl., *Keraudren 484* (P [2 sheets]); 20 km S de Sakaraha, Tsaramasao, III.1970, fl., *Morat 3503* (MO, P [6 sheets]); Zombitsy, 1 km N du village d'Andranomaintso, 22°53'23"S 44°38'36"E, 600–700 m, 3.II.1999, fr., *Randrianaivo et al. 312* (MO, P); Fkt. Betorabato, Ambalamanga, forêt Akolitsika, 21°40'22"S 44°59'36"E, 286 m, 21.I.2011, fl., *Razakamalala 6111* (MO); rte Tulear Sakaraha, 23.II.1949, fl., *Service Forestier 517* (P); Analamary, Sakaraha, 22.I.1951, ster., *Service Forestier 2818* (P); Andranovory, Tuléar, 19.III.1951, fr., *Service Forestier 3401* (P); Lambomakandro, Tuléar, 23.I.1953, fl., *Service Forestier 4570* (P); Soaserana, Sakaraha, 21.II.1952, fl., *Service Forestier 4989* (P); forêt Anadabovalo, Ambohimahavelona, Tuléar, 27.I.1955, fl., *Service Forestier 13064* (P); forêt d'Hera [Ihera], au N de Mitia dans le haut bassin de l'Ilona (au NE du massif de l'Analavelona), 600–700 m, 16.XII.1962, fl., *Service Forestier 22216* (P).

Specimens incertae sedis: Madagascar. **Reg. Boeny [Prov. Mahajanga]:** Bemazava, près de l'embouchure de la Mahavavy (Ambongo), VI.1903, fl., *Perrier de la Bâthie 2264* (P); forêt de Bekapika, sur le plateau d'Antanimena (Boina), 12–14.XI.1957, fl., *Service Forestier 18432* (P). **Reg. SAVA [Prov. Antsiranana]:** Daraina, forêt de Ambilondomba, 13°09'S 49°38'E, 480 m, 27.I.2004, fl., *Ranirison et al. 323* (MO, P). **Reg. Sofia [Prov. Mahajanga]:** distr. Analalava, forêt d'Ambondro-Ampasy (Exploitation Loyseau), 29.X–3.XI.1958, fl., *Service Forestier 18835* (MO, P).

8. ***Homalium pseudoracemosum*** Appleq., **sp. nov.** (Fig. 7).

Holotypus: Madagascar. Reg. Sofia [Prov. Mahajanga]: forêt de Betsitindry, Ambato, distr. Befandriana, 24.X.1956, fr., *Service Forestier 16408* (MO-2818801!; iso-: P [P04679193]!).

Homalium pseudoracemosum Appleq. differs from H. albiflorum (Boivin ex Tul.) O. Hoffm. in having usually mostly lanceolate to ovate leaves, consistently short-branched racemiform panicles with glabrous or glabrate rachises, and flowers smaller, usually 4-merous, with petals glabrous except margins sometimes sparsely ciliate.

Tree to 20 m tall, 38 cm dbh; twigs dark brown later becoming pale brown, glabrous. *Leaves* lanceolate to ovate, narrowly elliptical, or elliptical, (4.8–)6–13.5(–14) × 2.4–5.5(–5.8) cm, thin-textured; margin irregularly crenulate (to crenate-serrulate) or subentire; base convex (often short-attenuate at extreme base); apex short-acuminate (to acute, rounded, or obtuse); both surfaces glabrous, drying brown, often darker (to blackish) adaxially (rarely greenish adaxially); secondary veins slightly prominent; petiole (7–)9–14(–17) mm, glabrous. *Inflorescences* short-branched paniculate, (3.5–)6–13.5 cm; peduncle 0.7–3.5 cm; rachis glabrous or glabrate (branches sometimes sparsely minutely pubescent); flowers mostly in clusters of 2–4(–5), many or most clusters borne on small inconspicuous branches; pedicels 0.5–3 mm, short-pubescent. *Flowers* 4(5)-merous, greenish to yellow; sepals oblong to broadly ovate (suborbicular), (1.3–)1.5–2.5 mm, sparsely pubescent outside or glabrous, margins ciliate; sepal glands broadly elliptical, 0.6–0.8(–1) × 0.5–0.7 mm; calyx cup sparsely short-pubescent; petals obovate, 3–5.5 mm, little accrescent, glabrous except margins sometimes sparsely short-ciliate; filaments 1–1.5 mm; anthers broadly elliptical (to transversely elliptical?), 0.2–0.3 mm high.

Etymology. – *Homalium pseudoracemosum* is so named because its inflorescences appear on casual observation to be racemose, but are actually paniculate.

Vernacular names and uses. – "Ampimba" (*Reserves Naturelles 2137*); "Apimba" [?] (*Service Forestier 3994*); "Ampiniba" (*Reserves Naturelles 4229*); "Hazoamboa" (*Louvel 168*); "Hazomby" (*Service Forestier 3917*); "Lalipito" (*Service Forestier 4445*); "Mampisaraka" (*Service Forestier 7796*); "Revy" (*Service Forestier 10517*); "Saripapy" (*Service Forestier 10875*); "Taindalitra" (*Service Forestier 15143*); "Trongindambo" (*Service Forestier 12026*, *26203* [Sakalava dialect]).

Wood is used for construction and manufacture of planks (*Service Forestier 16408*, *26203*).

Distribution, ecology and conservation status. – *Homalium pseudoracemosum* has been widespread in the dry western regions of Madagascar, with a latitudinal range extending from Menabe to Sofia and possibly DIANA (Fig. 2). The two specimens from the DIANA region in the extreme north are atypical and are tentatively placed here. The species is reported to occur on limestone.

Homalium pseudoracemosum has probably occurred in more than ten populations, though locality data are poor in many cases, and in protected areas including the Bemaraha reserve, Namoroka, and (an atypical specimen) Montagne d'Ambre. Therefore, by standard application of the IUCN criteria, its conservation status would be assessed as "Least Concern". However, the fact that only one atypical recent collection

Fig. 7. – *Homalium pseudoracemosum* Appleq. **A.** Flowering branch; **B.** Portion of inflorescence; **C.** Flower. [*Service Forestier 16408*, P] [Drawings: R.L. Andriamiarisoa]

exists is of great concern. The case of this species may be compared to that of *H. albiflorum*, which has a similarly broad western-to-northern distribution, but has been collected from four regions since 1990. From historical data, the EOO of *H. pseudoracemosum* would be estimated as 140,994 km² (including the DIANA populations) and the AOO as 72 km². The vast majority of the potential habitat is unprotected and has been destroyed or severely degraded by human activity since the 1940s and 1950s, when most collections were made. As in the case of *H. phillipsonii*, it is probable that several of the historically collected populations no longer exist. Therefore, it is suggested that the conservation status of this species should be estimated as, minimally, "Vulnerable" [VU B2ab(iii)] because of the small AOO, presumably fewer than 10 surviving populations, and severe, continuing decline in area and quality of habitat.

Notes. – *Homalium pseudoracemosum* is distinguished by its short-branched racemiform panicles and lanceolate to ovate or elliptical leaves. Elliptical leaves (as on the atypical *Andrianantoanina & Bezara 857*) are often at the lower end of the size range, suggesting that they could be immature. The maximum size of the flowers appears to be smaller than in most species of this section, with the petals less strongly accrescent than most. This species occurs in much of the same range as *H. albiflorum*, which has usually elliptical leaves, usually racemose (though occasionally narrowly paniculate) inflorescences, pubescent rachises and flowers, and usually 5, somewhat larger petals. *Homalium albiflorum* is the only other species that ever has panicles of this form. The two are suspected to be closely related and to hybridize. However, *H. pseudoracemosum* also shows possible affinities to the *H. leucophloeum* group of mostly eastern species in its usually 4-merous, nearly glabrous sepals, petals, and inflorescences. Thus *H. pseudoracemosum* appears in some ways to represent an intermediate between these species groups.

Species of the *H. albiflorum* complex are generally described as having white or whitish flowers, when the color is reported, although *H. leucophloeum* is said to have pale greenish to pale yellowish flowers. *Andrianantoanina & Bezara 857*, one of the atypical extreme-northern specimens of *H. pseudoracemosum*, has label data reporting that the calyx is green and the corolla yellow. It is unclear whether this unusual report is due to life stage or differing interpretations of lightly pigmented petals, or whether this species indeed has a significantly different and darker flower color than most of its relatives. If the latter, it would provide another distinguishing feature in the field.

Several specimens appear morphologically intermediate between *H. pseudoracemosum* and *H. albiflorum*. Those from Ankarana have quite narrow leaves, inconsistently branched inflorescences with pubescent rachises, and pubescent flowers. Other narrow-leaved specimens possibly representing introgression between the two species are treated above under *H. albiflorum. Leandri 356* was probably collected around the same time as *Leandri 357,* which is identified as *H. albiflorum.* This specimen has some features that are more consistent with *H. pseudoracemosum,* including sometimes narrow leaves, usually (but not always) glabrous rachises, and petals glabrous except for cilia. The bracts are cup-shaped and unusually large for either species (a feature also sometimes seen in the Ankarana specimens). No other possible parental species are known from near Bemaraha.

Paratypi. – Madagascar. **Reg. Boeny [Prov. Mahajanga]:** Plateau d'Ankara, VIII.1900, fr., *Perrier de la Bâthie 1090* (P); Andrengy [Namoroka], Soalala, 21.I.1950, fl. & fr., *Réserves Naturelles 2137* (G, P [2 sheets]); R.N. 8 [Namoroka], Andranomavo, Soalala, 5.VIII.1952, fr., *Réserves Naturelles 4229* (P [2 sheets]); Belalanda, Soalala, 9.VIII.1951, fl., *Service Forestier 3994* (P). **Reg. DIANA [Prov. Antsiranana]:** Montagne d'Ambre, 8 km E de Bobakilandy (Antsanavo), 12°37'37"S 49°06'40"E, 533 m, 11.VII.1995, fl., *Andrianantoanina & Bezara 857* (BR, G, K, MO, P); Nosy Mitsio, X.1952, fr., *Perrier de la Bâthie 18767* (P). **Reg. Melaky [Prov. Mahajanga]:** E du Bemaraha, VIII.1943, fr., *Herb. Jard. Bot. [Cours] 6192* (P [2 sheets]); Antsingy, Antsalova, 29.X.1954, fr., *Service Forestier 12096* (P); Antanimbaribe, Morafenobe, 6.VIII.1955, fr., *Service Forestier 15143* (P); Forêt de Beandrao, Ankazomandiladongo, canton and distr. Antsalova, 23.IX.1966, fr., *Service Forestier 26203* (P). **Reg. Menabe [Prov. Toliara]:** Bassin de la Tsiribihina au N de Morondava, s.d., fl., *Louvel 168* (P); Dabora, Morondava, 18.VIII.1951, fr., *Service Forestier 3917* (P); Marofototra, Marovoay, Morondava, 15.XII.1951, fr., *Service Forestier 4445* (P); Ankilimidahy, Belo/Tsiribihina, 1.VII.1953, fr., *Service Forestier 7796* (P); Torrent à une trentaine de km à l'W du Betafo, sur la route de Miandrivazo, 26.VIII.1953, fl., *Service Forestier 8429* (P); Ankilizato, distr. de Mahabo, 26.VI.1954, fl., *Service Forestier 10517* (P); forêt d'Antabefotsy, Ankazomanga, Miandrivazo, 14.IX.1954, fr., *Service Forestier 10875* (P).

Possible hybrid specimens. – Madagascar. **Reg. DIANA [Prov. Antsiranana]:** Ankarana RS, N of Ambilobe, 12°56'S 49°07'E, 100–300 m, 20.III.1993, fl., *Andrianantoanina & Du Puy 27* (MO); Ankarana, Sentier Botanique, 17 km NE de Mahamasina, 12°50'47"S 49°06'18"E, 82 m, 17.I.2002, fl., *De Block et al. 1277* (G, MO). **Reg. Melaky [Prov. Mahajanga]:** Tsingy du Bemaraha (9e Réserve), 1932–1933, fl., *Leandri 356* (MO, P [3 sheets]).

9. ***Homalium rakotovaoi*** Appleq., **sp. nov.** (Fig. 8).

Holotypus: Madagascar. Reg. SAVA [Prov. Antsiranana]: Andapa, Doany, Andranomilolo, env. 13 km à l'W d'Andranopositra, 14°19'44"S 49°16'57"E, 841 m, 2.XI.2006, fr., *Rakotovao et al. 3228* (MO-6175072!; iso-: G [G00341925] image seen, MO-6175714!, P [P05529033]!, TAN).

Homalium rakotovaoi Appleq. differs from H. leucophloeum (Tul.) Baill. in its often larger, ovate leaves with crenate to crenulate, often revolute margins, racemes with (1–)3–7 flowers per node, and well-developed pedicels.

Tree to 25 m tall or *shrub*; twigs dark brown with conspicuous pale lenticels, glabrous. *Leaves* ovate (lanceolate to elliptical), (5.5–)6.7–15.7 × (2.8–)3.5–6.5 cm, variably thickish

Fig. 8. – *Homalium rakotovaoi* Appleq. **A.** Flowering branch; **B.** Inflorescence; **C.** Flower.
[*Rakotovao et al. 3228*, TAN] [Drawings: R.L. Andriamiarisoa]

to thin-textured; margin irregularly and shallowly crenate to crenulate (sometimes slightly undulate), often somewhat revolute; base rounded (often minutely attenuate at petiole junction) to convex, slightly oblique (very broadly cuneate); apex acuminate (acute, obtuse, or emarginate); both surfaces glabrous, drying brown to greenish, the upper surface usually brown, darker; secondary veins very little prominent; petiole sometimes (but not consistently) red, 9–16(–22) mm, glabrous. *Inflorescences* racemose, (3–)5–16 cm; peduncle 0.3–1.2(–2.7) cm; rachis glabrous (sparsely pubescent); flowers (1–)3–7 per node; pedicels (1.5–)2.5–6(–8.5) mm, moderately pubescent. *Flowers* 4-merous, white; sepals oblong (slightly obovate), 1.4–2.2 mm, glabrous or glabrate, margins not ciliate; sepal glands broadly elliptical (orbicular), 0.4–0.6 × 0.3–0.4 mm; calyx cup sparsely pubescent; petals obovate, 2.7–6.2 mm, glabrous, margins not ciliate; filaments 0.8–1.5 mm; anthers broadly elliptical, 0.3 mm high.

Etymology. – *Homalium rakotovaoi* is named for Charles Rakotovao, collector of the type, to honor his many contributions to botany in Madagascar.

Vernacular names. – "Azoadala" (*Reserves Naturelles 6017*); "Hazoadala" (*Randrianarivelo et al. 442*, *Saboureau s.n.*, *Service Forestier 9280*); "Hazoadala (p.[etites] f.[euilles])" (*Reserves Naturelles 4182*); "Janganita fotsy" (*Reserves Naturelles 1751*); "Malazovoavy" (*Decary 1030*).

Distribution, ecology and conservation status. – *Homalium rakotovaoi* is native to northern Madagascar (Fig. 2). It has been reported to occur in mid-altitude humid forest (though much of the potential range is probably subhumid) and to occur near rivers or on slopes, once on limestone. The EOO is estimated as 3434 km^2, and the AOO as 36 km^2, with some collections' localities estimated with a low degree of accuracy, but with fewer than ten distinct populations known. Several collections are from various portions of the protected area of Tsaratanana. The conservation status is tentatively estimated as "Least Concern" [LC].

Notes. – *Homalium rakotovaoi* has usually ovate leaves with often conspicuously crenate to wavy (though sometimes subentire) margins, large clusters of long-pedicellate flowers, narrow acute sepals, and 4-merous flowers that are glabrous or glabrate except for sparse pubescence on the calyx cup, the sepals and petals without ciliate margins. The latter floral characters indicate a closer relationship to the *H. leucophloeum* group than to *H. albiflorum* s.s. Most of the species in that group have usually more or less elliptical leaves with often entire margins and flowers in groups of up to 3 or 4, with short pedicels or sessile. Two species, *H. rakotovaoi* and *H. vohitsiandrianense* Appleq. (see below), have usually ovate leaves, well-developed pedicels, and flowers sometimes in larger groups (in this species, at the extreme, up to 7). They are presumed to be sister species. *Homalium vohitsiandrianense*, which is known only from a southeastern massif, has smaller, sometimes broadly ovate leaves with usually acute apices, shorter racemes, and huge sepal glands.

Ranirison & Nusbaumer 914 has large (to over 15 cm long, 8 cm broad), glabrous leaves with often acuminate apices and flowers in clusters of several with well-developed pedicels. However, the leaves are elliptical and it has long-peduncled pubescent inflorescences and large pentamerous flowers with pilose calyces (with unusually long narrow sepals) and pubescent petals. It is plausibly interpreted as a hybrid of *H. rakotovaoi* and *H. albiflorum*. Although *H. rakotovaoi* has not been collected near Daraina, its presence in that region is predicted based on the existence of this intermediate. However, an alternative possibility is that this collection is a distinct, locally endemic species that happens by coincidence to have intermediate morphology. Further collections from Daraina would be desirable.

Paratypi. – Madagascar. **Reg. DIANA [Prov. Antsiranana]:** Tsaratanana, Antsahabe riv, 14°00'45"S 48°46'40"E, 700–1200 m, 27.VII.2000, fl., *Antilahimena et al. 506* (BR, K, MO, P); Tsaratanana Massif, path from Mahatsabory Mica and Mangindrano, W of Befosa River, 14°12'22"S 48°57'14"E, 1400 m, 21.X.2001, fl. & fr., *Birkinshaw et al. 993* (G, MO, P); env. de Mt. Tsaratanana, 1700 m, XI.1912, fr., *Perrier de la Bâthie 6703* (P); *ibid. loc.*, 1500 m, XI.1912, fr., *Perrier de la Bâthie 6704* (P); 10 km NE de Mangindrano, forêt d'Antsahivo, 14°14'34"S 49°00'31"E, 1249 m, 29.XI.2005, fr., *Randrianarivelo et al. 442* (MO, P, G); Marovato, Ambanja, 28.IX.1948 or 29.VIII.1948, fl., *Réserves Naturelles 1751* (P [2 sheets]); *ibid. loco*, 19.VII.1952, fl., *Réserves Naturelles 4182* (P [2 sheets]); Andavaka, Ambanja, s.d., fl., *Saboureau s.n.* (P); Andavaka, 20.X.1949, fl., *Service Forestier s.n. (Rakoto 6)* (MO). **Reg. SAVA [Prov. Antsiranana]:** Ampoanaomby [Amponaomby], Andapa, 3.XII.1953, fl. & fr., *Service Forestier 9280* (P, G). **Reg. Sofia [Prov. Mahajanga]:** Maromandia (Bemaneviky), 23.IX.1922, fl., *Decary 1030* (P); 7 km NE Mangindrano près de la rivière Antsahivo, 14°14'27"S 49°00'18"E, 1233 m, XI.2005, fr., *Rakotovao & Jaovazaha 2628* (MO, P); Tsaratanana, sommet, 1.VII.1953, fl., *Réserves Naturelles 6017* (P).

Probable hybrid specimen. – Madagascar. **Reg. SAVA [Prov. Antsiranana]:** Daraina, forêt de Bobankora, 13°13'36"S 49°45'31"E, 320 m, 26.I.2005, fl., *Ranirison & Nusbaumer 914* (G, MO, P, TEF).

10. ***Homalium rubriflorum*** Sleumer in Bull. Jard. Bot. Natl. Belg. 43: 302. 1973.

Lectotypus (designated here): Madagascar. **Reg. Alaotra-Mangoro [Prov. Toamasina]:** Analamazaotra, Perinet, 9.III.1954, fl., *Service Forestier 8365* (P [P00375175]!; isolecto-: G [G00341927] image seen, L [L0011009] image seen, MO-2818814!, P[P04734390, P04734382]!, PRE [PRE0594538-0] image seen, TEF [TEF000234] image seen).

Tree to 35 m tall, 80 cm dbh; bark reddish, caducous in plaques; twigs light brown, minutely pubescent to glabrous. *Leaves* elliptical to broadly (narrowly) elliptical, (4.5–)5.5–16 × 2.1–5.5(–8) cm, thin-textured; margin subentire, often slightly undulate, to crenulate-serrulate; base convex (rounded); apex acuminate to cuspidate (acute, obtuse, rounded or emarginate); both surfaces glabrous (seldom sparsely appressed-pubescent, mostly on midrib abaxially), drying brown abaxially, dark brown to blackish adaxially (rarely greenish); secondary veins slightly prominent; petiole 4–8(–10) mm, glabrous (sparsely minutely pubescent). *Inflorescences* sometimes partly terminal, long-branched peduncles (reduced to racemes), (3.7–)6–16(–20) cm; peduncle 0.6–2.4(–3.2) cm; rachis short-pubescent; flowers 1–2 per node; pedicels (1–)1.4–3(–5) mm, short-pubescent (sometimes densely). *Flowers* 5-merous, red; sepals oblong-ovate to oblong, 0.7–1.3 mm, sparsely appressed-pubescent outside, margins minutely ciliate; sepal glands irregularly broadly elliptical, 0.3–0.5 × 0.3 mm; calyx cup short-pubescent; petals obovate, 2.4–4 mm, little accrescent, sparsely appressed-pubescent on outer surface mostly towards base, margins ciliate; filaments 0.3–0.6 mm; anthers biglobose, c. 0.1 mm high.

Vernacular names. – "Zahana" (*Cours 4437*); "Zanahy" (*Service Forestier 26*); "Zandambo" (*Service Forestier 9779, 28753*).

The wood is reported to be very hard and used in construction (*Cours 4437*).

Distribution, ecology and conservation status. – *Homalium rubriflorum* is native to mid-elevation humid forests in the Alaotra-Mangoro region of northeastern Madagascar. The EOO is estimated as 5612 km², and the AOO as 32 km². As few as four clearly distinct populations have been collected. Two of these, which supply almost all of the collections, have been widely distributed in the protected areas of Analamazaotra or Perinet (now Andasibe-Mantadia) and Zahamena. Therefore, the species is not expected currently to be experiencing severe declines in available habitat, and its conservation status is estimated as "Least Concern" [LC]. However, it is of concern that the only recent collections have been from a single area, that of Zahamena.

Notes. – Sleumer saw two duplicates of the type collection at P [P00375175, P04734390]. Both sheets were marked by Sleumer as "holotype", but only the former is treated as a type by the Paris herbarium. Since Sleumer did not distinguish between these two sheets in labeling or in print, they are to be treated as syntypes (Art. 40, Note 1 of the ICN; Turland et al., 2018) and one should be chosen as lectotype. The sheet previously labeled as the type is herein designated as lectotype because it is a better specimen and has both the original collector's label and additional material in a fragment packet.

Additional material examined. – Madagascar. **Reg. Alaotra-Mangoro [Prov. Toamasina]:** d'Andasibe à Andapabe, 900 m, 16.III.1951, fl., *Cours 4437* (P [2 sheets]); Ambatovola, I.1928, fl., *Perrier de la Bâthie 18411* (P [2 sheets]); Parc National de Zahamena, Vohitsingitry, 17°39'31"S 48°39'20"E, 1085 m, 21.II.2000, fl. & fr., *Rakotonandrasana et al. 401* (MO, P); Parc National de Zahamena, Ankosy, piste vers Bemoara, 17°28'58"S 48°44'10"E, 997 m, 14.VII.2000, fl., *Rakotonandrasana et al. 420* (MO, P); Im[er]imandroso, Ambatondrazaka, 16.IV.1956, fl., *Réserves Naturelles 8712* (P); Analamazaotra, s.d., fl. & fr., *Service Forestier (Louvel) 26* (P); Ambatomasina, Antandrokomby, 15.III.1954, fl., *Service Forestier 9779* (MO [2 sheets], P [2 sheets]); Versant W du Massif de l'Ampahana, à l'E de Fierenena (Moramanga), 950–1300 m, 10–16.III.1969, fl., *Service Forestier 28753* (P [2 sheets]).

11. ***Homalium sanguineum*** (Boivin ex Tul.) Baill. in Bull. Mens. Soc. Linn. Paris 1: 575. 1886.

≡ *Nisa sanguinea* Boivin ex Tul. in Ann. Sci. Nat., Bot. sér. 4, 8: 70–71. 1857.

Lectotypus (designated here): Madagascar. **Reg. Analanjirofo [Prov. Toamasina]:** Ile Ste. Marie, bords de la mer un près de Tanambo [Tanambao], V.1847, fl. & fr., *Boivin 1846* (P [P04734378]!; isolecto-: BM, G [G0001388, G0001389] images seen, L [L0011012 fragment] image seen, P [P04734379, P04734380 and attached sheet of fragments]!, W).

Tree to 20 m tall with main trunk to 12 m, dbh 25 cm; twigs pale gray, glabrous. *Leaves* broadly elliptical (elliptical, somewhat obovate), (5.6–)7.7–11.7 × (3.8–)4.2–8.2 cm, thin-textured; margin subentire; base broadly convex, at extreme base short-attenuate; apex rounded to emarginate or cuspidate; both surfaces glabrous, drying dark brown; secondary veins slightly prominent; petiole (9–)12–22 mm, glabrous. *Inflorescences* sometimes partly terminal, panicles with well-developed branches (partly reduced to racemes), (7.5–)10–24 cm; peduncle (1–)2.3–7(–15) cm; rachis short-pubescent distally; flowers 1 per node; flowers sessile. *Flowers* (4)5-merous, red; sepals narrowly oblong-ovate to ovate, 1.4–2.4 mm, sparsely short-pubescent outside, margins usually short-ciliate; sepal glands irregularly broadly elliptical, 0.5–0.6 × 0.4 mm; calyx cup sparsely short-pubescent; petals oblanceolate to obovate, 4.4–6.3 mm, probably accrescent, glabrous, margins sometimes sparsely and minutely ciliate; filaments c. 1.1–1.2 mm; anthers broadly elliptical, 0.3 mm high.

Vernacular names and uses. – "Hafotrantsotry vavy" (*Raharimalala 269*); "Tanatanam-potsy" (*Antilahimena et al. 911*, *Rabehevitra 38*).

"Matière végétale", presumably leaves, are used in the making of Malagasy rum (*Rabehevitra 38*).

Distribution, ecology and conservation status. – *Homalium sanguineum* is native to low-altitude humid forests in a small portion of northeastern Madagascar. Only three distinct populations have been collected, and the species appears to

be rare. The EOO is estimated as 240 km², and the AOO as 12 km² (the three populations are clearly separated, but are arranged in almost a linear pattern, making the calculated EOO low). One collection was made in the protected area of Mananara-Nord. However, most of the habitat is unprotected and continues to suffer anthropogenic damage. Therefore, the estimated conservation status of this species is "Endangered" [EN B1ab(iii)+B2ab(iii)].

Notes. – The holotype of *Nisa sanguinea* has been reported to be at P (Sleumer, 1973: 301, with the collection number misstated as the year of collection). Since three sheets of the type collection are present at P and no distinction among them has been published, these are syntypes and one must be selected as lectotype. The sheet numbered P04734378 is by far the best, so is chosen here. Two un-numbered *Boivin* collections at P have been marked as probable or questionable type material, but their status is unclear, and the specimen said to have been cultivated outside Madagascar, in the botanical garden on the island of Bourbon, certainly is not type material.

Additional material examined. – Madagascar. **Reg. Analanjirofo [Prov. Toamasina]:** Fkt. Rantabe, 15°42'39"S 49°37'39"E, 24.II.2002, fl., *Antilahimena et al. 911* (MO); rte entre Rantabe et Morafeno, 15°42'39"S 49°37'51"E, 24–25.II.2002, fl., *Rabehevitra 38* (MO, P); Mananara-Nord, forêt d'Antsanatribe à 3 km d'Antanambe, sur piste Ambodihazovola, 12.II.1990, fl. & fr., *Raharimalala 269* (P [3 sheets]). **Reg. unknown:** *sine loco*, s.d., fl., *Boivin s.n.* (P); Jard. Bot. de Bourbon [cultivated], 15.IV.1847, fl., *Boivin s.n.*(P).

12. ***Homalium vohitsiandrianense*** Appleq., **sp. nov.** (Fig. 9).

Holotypus: Madagascar. Reg. Anosy [Prov. Toliara]: massif de Vohitsiandriana au N du Cap Andrahomana, 500 m, III.1955, fl., *Service Forestier 11837* (P [P04679046]!).

Homalium vohitsiandrianense Appleq. differs from H. rakotovaoi Appleq. in its smaller, often proportionately broader leaves with acute (to rounded or emarginate) apices, shorter racemes, minute but often dense pubescence on pedicels and calyx cups, and very large sepal glands.

Tree to 10 m tall; twigs pale to medium brown, glabrous. *Leaves* ovate to broadly ovate (aberrantly broadly elliptical), (4–)5–7.8 × (2–)2.6–4.8 cm, relatively thin-textured; margin irregularly and shallowly crenulate to crenate-denticulate; base convex to rounded; apex acute (rounded, emarginate); both surfaces glabrous, drying pale greenish brown abaxially, mottled dark brown (green adaxially, glossy); secondary veins slightly prominent; petiole 10–16 mm, glabrous. *Inflorescences* racemose, (1.7–)3–4 cm; peduncle 0.3–1.3 cm; rachis glabrous; flowers (1–)3–5 per node; pedicels 3–6 mm, minutely but often densely pubescent. *Flowers* 4-merous; sepals broadly oblong, 1.5–1.7 mm on type, glabrous or glabrate, margins sparsely short-ciliate; sepal glands broadly elliptical and flattened, 1.2–1.3 × 0.8–0.9 mm; calyx cup minutely but rather densely pubescent; petals obovate, 3.4–4.2 mm on type, accrescence unknown, glabrous, margins not ciliate; filaments 1.8–2.4 mm; anthers broadly elliptical, 0.3 mm high.

Distribution, ecology and conservation status. – *Homalium vohitsiandrianense* is known only from a single 1955 collection on the southeastern massif of Vohitsiandriana (Fig. 2). The potential habitat will have been substantially reduced in the following 64 years by anthropogenic damage. If the population still exists, the appropriate assessment of its conservation status is "Critically Endangered" [CR B1ab(iii)+B2ab(iii)].

Notes. – Though *H. vohitsiandrianense* is known only from the type, it is quite distinct from other species occurring in the region. It is notable for its ovate leaves, racemes with flowers often in clusters of up to 5, long pedicels, broad sepals, and very large sepal glands. The plant is mostly glabrous except for minute, almost long-papillate, but often dense pubescence on the pedicels and calyx cup. It is presumed to be the sister species of *H. rakotovaoi*, a northern species that shares usually ovate leaves and 4-merous, long-pedicelled flowers often borne in clusters of several. That species has larger, proportionately narrower leaves, longer racemes, and much smaller sepal glands.

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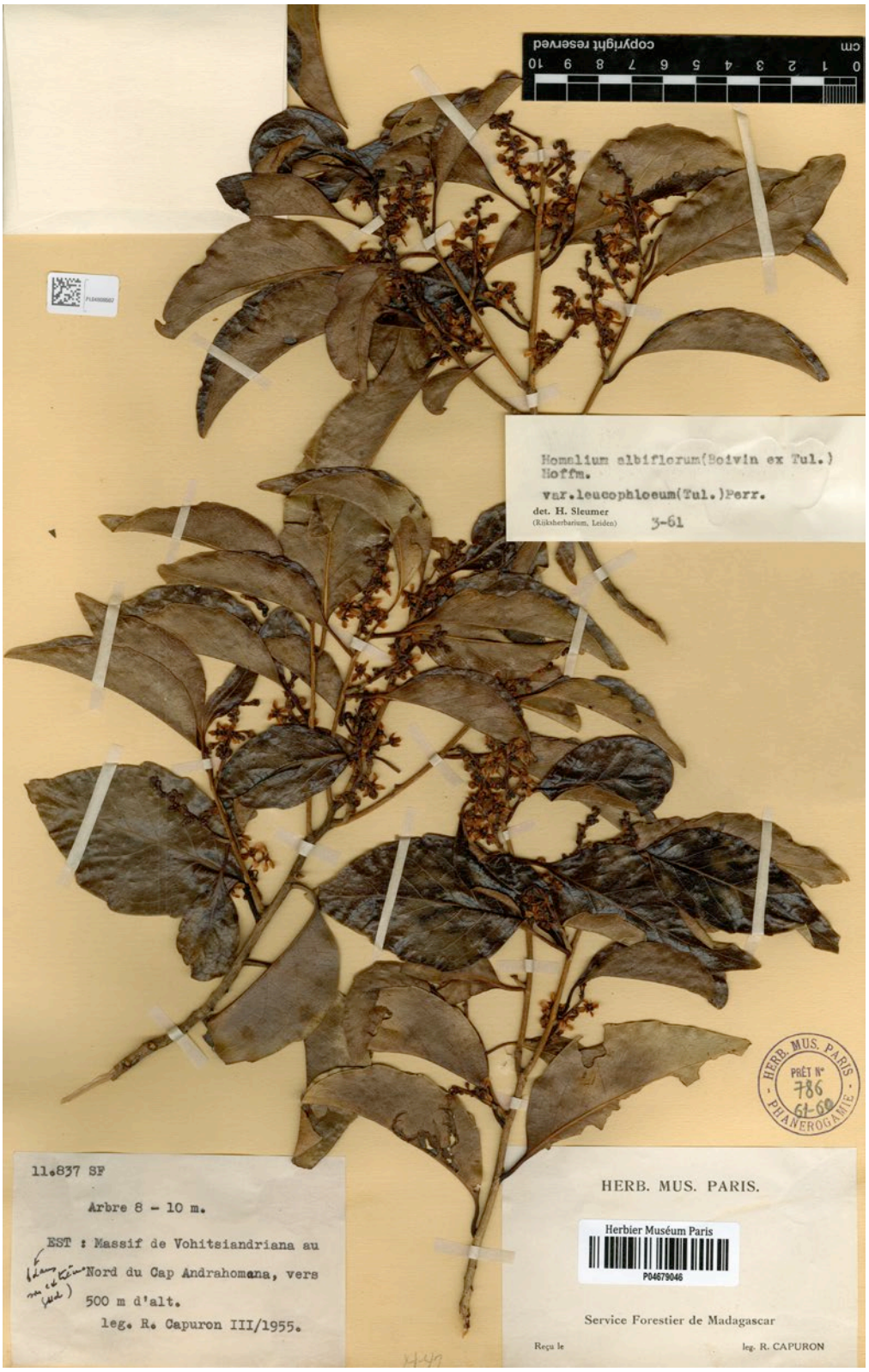

Fig. 9. – Holotype of *Homalium vohitsiandrianense* Appleq.
[*Service Forestier 11837*, P] [© Missouri Botanical Garden, Saint Louis]

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Appendix

Index to collectors. Collections are listed alphabetically by first collector's last name, with determinations indicated by numbers corresponding to those of species in the taxonomic treatment; types are indicated in boldface.

Afzelius s.n. (1×8?), *s.n.* (7); *Alleizette 1214* (5); *Andriamihajarivo 540* (7), *921* (7); *Andrianantoanina 27* (8 *857* (8×1?); *Andrianjafy 1313* (5); *Antilahimena 370* (6), *463* (6), *506* (9), *911* (11).

Barnett 460 (5); *Baron 858* (5), *5551* (inc. sed.), *6224* (6); *Benoist s.n.* (5); *Birkinshaw 993* (9); *Boivin s.n.* (11), *s.n.* (11), *1846* (**11**); *Bosser 9111* (7), *11060* (5), *19913* (7).

Campenon s.n. (5); *Catat 4317* (3); *Cours 4437* (10), *5205* (5), *6192* (8).

De Block 1277 (8×1?); *Decary 1030* (9), *1676* (6), *4182* (3), *4245* (3), *6026* (5), *6243* (5), *10126* (3); *Descoings 2406* (7); *Du Puy M743* (1); *Dumetz 684* (3), 790 (3).

Eboroke 1042 (3).

Gautier 2905 (6), *4565* (1); *Gereau 3308* (3); *Goudot s.n.* (**5**).

Hanitrarivo 246 (1); *Hildebrandt 3357* (1), *3928* (5); *Hong-Wa 296* (**6**); *Humbert 4054* (1), *5985* (3), *11557* (7), *14236* (**2**), *19683* (7), *19920* (7), *20112* (7), *25589* (6), *25880* (6), *28610* (4), *33287* (1), *33288* (1).

Keraudren 484 (7).

Lantz s.n. (5); *Leandri 356* (8×1?), *357* (1), *2693* (1); *Lehavana 257* (5); *Louvel 168* (8); *Ludovic 1567* (3), *1584* (3), *1697* (3), *1744* (3), *1763* (3).

Miller 10725 (1); *Morat 3503* (7).

Noyes 1061 (1×8?).

Parker s.n. (5); *Perrier de la Bâthie 1090* (8), *2264* (aff. 7), *6703* (9), *6704* (9), *6707* (5), *6708* (5), *6709* (5), *6710* (5), *6718* (6), *12350* (1), *17699* (5), *18411* (10), *18767* (8); *Perville 480* (**1**); *Petit-Thouars s.n.* (1); *Phillipson 3095* (**7**).

Rabehevitra 38 (11); *Rabenantoandro 68* (5); *Rabevohitra 2056* (3); *Raharimalala 269* (11); *Rakotoarisoa 436* (6); *Rakotonandrasana 401* (10), *420* (10), *1084* (1), *1231* (1); *Rakotonirina 881* (3); *Rakotovao 2628* (9), *3228* (**9**); *Ramananjanahary 686* (3); *Ramison 313* (3); *Randriamarosoa 194* (1); *Randrianaivo 312* (7), *607* (1), *1159* (1), *2364* (3); *Randrianarivelo 188* (1), *442* (9); *Randriatafika 61* (3); *Ranirison 323* (aff. 7), *913* (9×1?); *Rasoanaivo 28* (6); *Ratovoson 826* (1), *834* (1), *1214* (1), *1901* (3); *Razafimbandimbison 220* (3); *Razakamalala 6111* (7), *6914* (3); *Réserves Naturelles 1449* (6), *1751* (9), *2137* (8), *3813* (3), *4182* (9), *4229* (8), *4362* (6), *5137* (1), *6017* (9), *7470* (3), *7471* (3), *8537* (3), *8712* (10), *10234* (1); *Rogers 675* (5).

Saboureau s.n. (9); *Schatz 4235* (1); *Scott Elliot 2853* (**3**); *Service Forestier s.n. (Rakoto 6)* (9), *(Louvel) 26* (10), *88* (1), *517* (7), *610* (5), *1553* (3), *2243* (5), *2738* (5), *2818* (7), *2954* (6), *3054* (6), *3401* (7), *3917* (8), *3994* (8), *4445* (8), *4570* (7), *4989* (7), *5324* (3), *6776* (1), *7019* (1), *7690* (6), *7775* (3), *7796* (8), *8330* (1), *8365* (**10**), *8429* (8), *9280* (9), *9293* (6), *9779* (10), *10517* (8), *10555* (1), *10875* (8), *11627* (**4**), *11837* (**12**), *12096* (8), *13064* (7), *13388* (6), *13729 (4), 14717* (3), *15063* (5), *15143* (8), *15670* (1), *15912* (1), *16187* (5), *16408* (**8**), *18432* (aff. 7), *18503* (5), *18835* (aff. 7), *22216* (7), *22629* (4), *26203* (8), *28753* (10).

Ursch 164a (5), *164b* (5).

Wohlhauser 60016 (6).

Zarucchi 7446 (3).