



Polysciadis (Araliaceae) species nova e Madagascaria in honorem Luciani Bernardii felsinei nominata

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Polysciadis (Araliaceae) species nova e Madagascaria in honorem Luciani Bernardii felsinei nominata

Porter P. Lowry II, Martin W. Callmander & Rodolphe Spichiger

Abstract

LOWRY II, P.P., M.W. CALLMANDER & R. SPICHIGER (2020). Polysciadis (Araliaceae) species nova e Madagascaria in honorem Luciani Bernardii felsinei nominata. *Candollea* 75: 107–114. In English, English and French abstracts. DOI: <http://dx.doi.org/10.15553/c2020v751a11>

Polyscias bernardiana Lowry & Callm., an easily recognized new species from east-central Madagascar, including the Ambatovy mine site and several protected areas, is described in honor of Luciano Bernardi (1920–2001), a 20th century explorer–naturalist who has contributed more to our knowledge of Indian Ocean *Araliaceae* than any other botanist. This new species most closely resembles *Polyscias duplicata* (Thouars ex Baill.) Lowry & G.M. Plunkett from Madagascar and the Comoro Islands in forming monocaulous trees with a terminal cluster of large leaves surrounding a globose inflorescence, and in having flowers and fruits with 8–10(–12) carpels and styles, but differs in having an articulated pedicel (vs. unarticulated in *P. duplicata*) and lacking auxiliary leaflets (vs. a second leaflet often inserted in the axil of the main leaflets in *P. duplicata*). *Polyscias bernardiana* is illustrated by line drawings and color photos, and a risk of extinction assessment is provided based on the IUCN Red List criteria, which indicates a conservation status of “Least Concern”.

Résumé

LOWRY II, P.P., M.W. CALLMANDER & R. SPICHIGER (2020). Polysciadis (Araliaceae) species nova e Madagascaria in honorem Luciani Bernardii felsinei nominata. *Candollea* 75: 107–114. En anglais, résumés anglais et français. DOI: <http://dx.doi.org/10.15553/c2020v751a11>

Polyscias bernardiana Lowry & Callm., une nouvelle espèce facilement reconnaissable du centre-est de Madagascar, incluant le site minier d'Ambatovy et plusieurs zones protégées, est décrite en l'honneur de Luciano Bernardi (1920–2001), un explorateur–naturaliste du 20^e siècle qui a plus que tout autre botaniste contribué à notre connaissance de la famille des *Araliaceae* de l'océan Indien. Cette nouvelle espèce ressemble à *Polyscias duplicata* (Thouars ex Baill.) Lowry & G.M. Plunkett de Madagascar et des îles Comores par son port arborescent monocaule couronné par un mouchet terminal de grandes feuilles entourant une inflorescence globuleuse, et par ses fleurs et ses fruits munis de carpelles et de styles au nombre de 8–10(–12), mais en diffère par un pédicelle articulé (vs non articulé chez *P. duplicata*) et dépourvu de folioles auxiliaires (par rapport à une deuxième foliole souvent insérée à l'aisselle des folioles principales de *P. duplicata*). *Polyscias bernardiana* est illustré par des dessins au trait et des photos en couleur, et une évaluation du risque d'extinction est fournie sur la base des critères de la Liste rouge de l'UICN, qui indique un état de conservation de «Préoccupation mineure».

Keywords

ARALIACEAE – *Polyscias* – Madagascar – Luciano Bernardi – New species

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Introduction

Over the last 35 years, Madagascar has been the focus of an extensive, multi-institutional effort involving Malagasy and international botanists to document this island nation's remarkable flora, which is currently estimated to comprise at least 14,000 species of vascular plants, c. 87% of which are endemic (LOWRY et al., 2018). During this time, almost 200,000 collections have been made from throughout the island (LOWRY et al., 2018), nearly tripling the total amount of material available for botanical research. Significant effort was made during this period to explore previously unknown parts of the island, leading to the discovery of hundreds of new species, but extensive collecting also targeted areas that had previously been the foci of botanical inventory work, generating many additional novelties. However, the part of the island with the best documented flora is the Ambatovy mine site, located in east-central Madagascar, c. 12 km north-northwest of the town of Moramanga, which has been the target of intensive botanical field work, initially in support of a detailed environmental impact assessment, and then as part of a program to identify and manage key flora elements within the mining concession and an adjacent area managed as a conservation zone. More than 21,000 collections have been made to date from the Ambatovy area (LOWRY et al., 2018; MADAGASCAR CATALOGUE, 2020), representing nearly 1,600 species (PHILLIPSON et al., 2010; MADAGASCAR CATALOGUE, 2020), or about 11.5% of the entire Malagasy flora.

The family *Araliaceae* is well represented at Ambatovy, comprising a total of 18 species, including three species of *Neocussonia* (Harms) Hutch. and 10 species of *Polyscias* J.R. Forst. & G. Forst., along with five additional species of *Polyscias* that remain to be described (PHILLIPSON et al., 2010; MADAGASCAR CATALOGUE, 2020). Among these new species of *Polyscias*, one is particularly striking and frequently encountered at Ambatovy, forming tall, unbranched trees with a terminal tuft of large leaves and an expansive inflorescence. In the present paper, we describe this distinctive new *Polyscias* in honor of Luciano Bernardi, one of the most important 20th century students of *Araliaceae*, who has contributed more to our knowledge of the family in Madagascar than any other botanist.

Luciano Bernardi was born in Bologna, Italy, in 1920, and died in Geneva, Switzerland, in 2001. As a young man, after the Second World War, he emigrated to Venezuela, where his collections formed the nucleus of the Merida herbarium, which he founded in 1952. Starting in 1961, Bernardi assumed a Curator position at the Conservatory and Botanical Garden in Geneva, where he studied many groups of plants, including *Cunoniaceae*, *Lauraceae*, *Polygalaceae*, and *Sapotaceae*. Starting in 1965, he devoted his work to *Araliaceae*, traveling to New Caledonia, Madagascar, La Réunion, Australia, Tasmania, New Zealand, Fiji, Vanuatu, and Indonesia (Celebes) (BERNARDI, 1965–1975) to study and collect material, and beginning in the

late 1960s, he regularly published on the family, focusing in particular on Madagascar. *Valet notare quod fere omnes eius libri in lingua latina scripti sunt* [It is worth noting that nearly all of his works were written in Latin.] In parallel with his work on *Araliaceae* and until his death, Bernardi continued to collect throughout the world; he traveled to almost all countries in sub-Saharan Africa, and throughout much of South America, especially Paraguay and Peru. His herbarium collections have been widely used by systematists and are regularly cited in taxonomic publications. Bernardi was also a specialist in the history of botany and botanists, and he corresponded frequently with the greatest plant scientists of his time.

Bernardi published ten papers on *Araliaceae* over a period from 1966 to 1980. These included descriptions of new species from Réunion Island (BERNARDI, 1974a), comments on members of the family in the Mascarene archipelago as a whole (BERNARDI, 1974b), and a review (in English) of *Araliaceae* in New Caledonia and their relationships with representatives in Oceania and Indonesia (BERNARDI, 1979), but his most important contributions concerned Madagascar and the Comoro Islands. In his first paper on Malagasy *Araliaceae*, BERNARDI (1966) described 13 new species, including four in the genus *Cuphocarpus* Decne. & Planch. (now included in *Polyscias*; see LOWRY & PLUNKETT, 2010), two species and one variety of *Cussonia* Thunb. (which he later transferred to *Schefflera* J.R. Forst. & G. Forst.; BERNARDI, 1969), and seven new species of *Polyscias*. This was followed by a revision of the genus *Schefflera* in Madagascar and the Comoros (BERNARDI, 1969), including the description of three new species and two new varieties, along with eight new combinations in this genus, for which he adopted a broad circumscription that preceded the expansion of the genus by FRODIN (1975), but that has since been massively reduced (see PLUNKETT et al., 2005), with the species from Africa and the Indian Ocean now treated in the recently resurrected genera *Astropanax* Seem. and *Neocussonia* (LOWRY et al., 2017; MADAGASCAR CATALOGUE, 2020). Two years later, BERNARDI (1971) published a revision of *Polyscias* in Madagascar and the Comoros in which nine new species and three new varieties were described, and six new combinations were made. This paper also represented an important advance in the delimitation of this paleotropical genus, as Bernardi made a convincing case for adopting a broad concept that included many segregate genera recognized by other authors over the preceding century, an interpretation that has since been validated and expanded further (see LOWRY & PLUNKETT, 2010; PLUNKETT & LOWRY, 2010). Over the course of the next several years, Bernardi published two new species of *Schefflera* (BERNARDI, 1973, 1980a) and one of *Polyscias* (BERNARDI, 1974c), followed by a remarkable and innovative synthetic work (BERNARDI, 1980b) in the form of an illustrated diagnostic key (in French) to the 58 species and six varieties of *Araliaceae* he recognized from Madagascar

and the Comoros, including five species of *Cuphocarpus*, one of *Cussonia* (restricted to the Comoros), and one of *Gastonia* Comm. ex Lam. (a genus now included in *Polyscias*), along with 35 species and 3 varieties of *Polyscias*, and 16 species and 3 varieties of *Schefflera*. In all, Bernardi described 31 species of *Araliaceae* from the Indian Ocean region, all but one of which are recognized today (MADAGASCAR CATALOGUE, 2020), a fact that attests to the quality and accuracy of his work on this structurally complex and notoriously difficult family in a part of the world where it is particularly rich and diverse.

Taxonomy

Polyscias bernardiana Lowry & Callm., sp. nov. (Fig. 1, 2).

Holotypus: MADAGASCAR. Reg. Alaotra-Mangoro [Prov. Toamasina]: Ambatovy, NE of Moramanga, just below Ambatovy mine pumping station, 18°50'19"S 48°19'20"E, 1080 m, 20.IV.2009, y.fr., Lowry 7065 (MO [6 sheets: acc. no. MO-6564638, MO-6564639, MO-6564640, MO-6564641, MO-6564642, MO-6564643]!; iso-: G [5 sheets: G00341883]!, K [5 sheets]!, P [5 sheets: P00967621, P00967622, P00967623, P00967624, P00967625]!, TAN!).

Haec species quoad habitum monocaulem caule in foliorum fasciculum grandem ac inflorescentiam terminalem desinente atque flores fructusque carpellis stylisque 8 ad 10 (ad 12) praeditis Polysciadem duplicatam (Thouars ex Baill.) Lowry & G.M. Plunkett arctius simulans, sed ab ea pedicellis proxime infra ovarium manifeste articulatis (vs. inarticulatis) atque foliis foliolis auxiliariis ad axillas foliolorum principalium carentibus (vs. eis saepe praesentibus) distinguitur.

Tree, unarmed, 7–18 m tall, 10–30 cm dbh, monocaulous or rarely sparsely branched at top, hermaphroditic, evergreen. *Leaves* imparipinnately compound, 55–95 cm long. *Leaflets* 15 to 21, lateral ones opposite, blades dark green above, venation lighter, slightly paler beneath, venation darker *in vivo*, usually shiny above *in sicco*, thick chartaceous, elliptic to broadly elliptic, ovate or obovate, (6–)6.5–11 × (9–)13–21 cm (proximal ones usually smaller), glabrous, secondary veins 7 to 13 per side, often with inter-secondaries, distinctly raised above, slightly less so beneath, tertiary venation usually visible, often impressed above, raised beneath, base broadly cuneate to nearly rounded, lateral blades usually asymmetric, margins entire, minutely revolute, apex rounded or broadly acute; petiolules 3–15 mm long, 1–3.5 mm in diam.; rachis distinctly articulated at petiolule bases; petiole (4–)5–15 cm long, 6–10 mm in diam., the clasping base with scattered circular lenticels, rarely with a slightly scarious margin to 1 mm wide. *Inflorescence* terminal, a panicle of umbellules, glabrous, primary axis erect, 8.5–16 cm long; secondary axes c. 10 to 25, c. 35–50 cm long, proximal and distal ones nearly equal in length, each with 9 to 28 tertiary axes

(peduncles) borne evenly throughout their length, terminating in an umbellule, the proximal ones often apparently abortive, leaving an evident scar; peduncles (2–)4–8 cm long in flower, to 20 cm in fruit, distal ones progressively shorter, each with an evident bract scar at the base; umbellules with (6 to) 12 to 21 protandrous flowers, each subtended by a caducous bract that falls well before anthesis (not seen), leaving a small scar; involucre caducous, bracts broadly ovate; pedicels 1–12 mm long, 1 mm in diam. in flower, to 23 mm long in fruit, thickening to circa 1.5 mm in diam., glabrous, with an evident articulation at the point of insertion of the ovary. *Calyx* a narrow scarious rim, entire or slightly erose, tinged brownish purple. *Corolla* globose in early bud, hemispherical to somewhat ovoid at anthesis, c. 4–5 mm in diam., sometimes to 6 mm tall; petals 8–10(12), broadly to narrowly ovate or nearly triangular, c. 5 mm long, 3–3.5 mm wide, white to yellow. *Stamens* 8–10(12); filaments white, anthers pink to light purple. *Ovary* 8–10(–12)-carpellate, green, slightly darker than pedicels, glabrous, urceolate in flower, styles erect prior to anthesis, then spreading. *Fruit* a drupe, widely ovoid to globose, urceolate, 8–10 mm high, 7–8 mm in diam., yellow green when immature, turning purple at maturity, contrasting with the whitish pedicel, glabrous, unribbed *in vivo*, distinctly ribbed *in sicco*, base and apex rounded, articulation forming a ring at the point of insertion of the pedicel, calyx in fruit a low rim c. 1.5 mm high, disc flat, whitish turning purple at maturity, styles 8–10(–12), arranged in an ellipse or occasionally a circle, divergent to nearly patent, c. 1 mm; pyrenes 8–10(–12), each 1-seeded.

Etymology. – The species epithet honors Luciano Bernardi (1920–2001), a 20th century explorer-naturalist (Fig. 3). He made c. 21,000 collections, duplicates of which are distributed in dozens of herbaria, including Geneva. Many of the expeditions led by Luciano Bernardi were conducted in extremely difficult and sometimes dangerous conditions. One can't help but think that his drive to produce results and his willingness to subject himself to considerable risk were related to his wartime experience as an officer in the paratroops of the Italian army, of which he was so proud. He also prided himself on studying only difficult plant groups, looking for challenges and disregarding the beaten track. His broad and deep scientific knowledge and culture did not prevent him from being interested in other things: for example, he knew the general and anecdotal history of all the regions he explored. Bernardi also respected botanical tradition, to the point of almost exclusively using Latin for his notes and writings, even when it was not compulsory. Deeply rooted in European religious tradition, culture and philosophy, Luciano Bernardi's existence is reminiscent of that of Guillaume d'Occam, the hero of *Il nome della rosa* [*The Name of the Rose*] by Umberto Eco, to which Luciano liked to refer (see SPICHTER, 2002 for a more detailed necrology).



Fig. 1. – *Polysciadis bernardiana* Lowry & Callm. A. Inflorescence held by the first author; B. Immature infructescence; C. Detail of a flower; D. Branch with terminal leaves; E. Detail of an umbellule with mature fruits.

[A: Lowry et al. 7065; B–C: Rasoazanany 480; D–E: A. Randrianasolo 1109] [Photos: A–C: P. Antilahimena; D–E: A. Randrianasolo]



Fig. 2. – *Polysciadis bernardiana* Lowry & Callm. **A.** Inflorescence; **B.** Leaflet; **C.** Detail of leaf petioles; **D.** Branch with terminal leaves; **E.** Detail of an umbellule with mature fruits; **F.** Portion of an immature infructescence.

[**A:** Lowry et al. 7065, TAN; **B, D:** A. Randrianasolo 1109, TAN; **C:** Rasoazanany 380, TAN; **E:** Antilahimena 6218, TAN; **F:** Rasoazanany 480, TAN] [Drawing: R.L. Andriamiarisoa]

Distribution and ecology. – *Polyscias bernardiana* is predominantly known from medium altitude moist evergreen forest in east-central Madagascar between 800 to 1200 m elevation (MADAGASCAR CATALOGUE, 2020), although two collections were made below 800 m in lowland moist evergreen forest, one from the Zahamena protected area (*Rakotonandrasana 496*) and another from the Corridor Ankeniheny Zahamena protected area (*Razanatsima 212*). Our new species appears to grow on ultramafic substrate at some localities within the Ambatovy mine concession but occurs primarily on soils derived from paragneiss and schist elsewhere in its range (ROIG et al., 2012).

Conservation status. – *Polyscias bernardiana* is known from 18 localities along the eastern escarpment of Madagascar (MADAGASCAR CATALOGUE, 2020), eight of which are encompassed within the protected areas network (Analamazaotra, Corridor Ankeniheny Zahamena, and Zahamena), whereas most or all of the others are in areas impacted either by habitat degradation and loss due to land clearing for subsistence agriculture or by forest removal associated with mining. With an EOO of c. 4,600 km² and an AOO of 72 km², *P. bernardiana* falls below the threshold for Endangered status under Criterion B of the IUCN Red List Categories and Criteria (IUCN, 2012), but despite the extirpation of at least three subpopulations at Ambatovy, it nevertheless persists at 15 locations (sensu IUCN, 2012) with respect to the most serious threat, land clearing for agriculture, and is therefore assessed as Least Concern [LC].

Notes. – *Polyscias bernardiana* resembles *P. duplicata* (Thouars ex Baill.) Lowry & G.M. Plunkett from Madagascar and the Comoro Islands in almost always forming monocaulous trees (rarely sparsely branched) that terminate in a cluster of large leaves surrounding a large, globose inflorescence/infertescence. These two species also have flowers and fruits with 8–10(–12) carpels and styles (rarely as few as 6 or 7 in *P. duplicata*) and generally 8–10(–12) petals and stamens, a feature shared with an as-yet undescribed species of *Polyscias* from the Col de Maningotry in extreme southeastern Madagascar. By contrast, most other members of the genus in Madagascar have a 5-carpellate gynoeceum and 5 stamens, although a few have just 2, 3 or 4 carpels, styles, and stamens. *Polyscias bernardiana* can easily be distinguished from *P. duplicata* by the evident articulation on its pedicel at the point of insertion of the ovary, a feature found in all other species in Madagascar with the exception of *P. duplicata*, which has unarticulated pedicels and was therefore long placed in the segregate genus *Gastonia*, including by BERNARDI (1971, 1980b). Our new species also has strictly pinnately compound leaves whereas *P. duplicata* often has a somewhat smaller auxiliary leaflet borne in the axil of most of its main leaflets, such that 4 (rather than 2) leaflets are thus inserted at most nodes along the rachis, a feature reflected in the specific epithet.



Fig. 3. – Luciano Bernardi photographing the corky bark of a fire-resistant tree in the campo cerrado of Canindeyú Department (NE Paraguay) during a 1980 expedition conducted for the *Coopération Technique Suisse*. [Photo: R. Spichiger]

While the geographic range of *Polyscias bernardiana* is rather restricted, it is often quite abundant in the areas where it grows and generally stands out due to its distinctive habit. It is thus surprising that only three fragmentary gatherings were made until the late 20th century even though *P. bernardiana* occurs at Andasibe (Perinet), one of the most easily accessible and frequently visited collecting sites in the country. BERNARDI (1971, 1980b) associated one of these collections as well as several others with *P. repanda* (DC.) Baker, a species endemic to Réunion Island that only vaguely resembles *P. bernardiana* (MARAIS, 1984, 1990), although given the poor quality of the Malagasy material available to him, this error is perhaps understandable and is in any case one of the very few details of Indian Ocean *Araliaceae* that Bernardi did not get right.

Paratypi. – MADAGASCAR. Reg. Alaotra-Mangoro [Prov. Toamasina]: Moramanga, Ambatovy, 18°49'S 48°18'E, 3–5.II.2004, y.fr., *Andriatsiferana 2504* (MO [2 sheets], P, TAN); *ibid. loco*, 18°49'45"S 48°18'59"E, 1240 m, 20.XII.2004, bud, *Antilabimena 3075* (MO [3 sheets], P [2 sheets], TAN); *ibid. loco*, 18°49'19"S 48°20'08"E, 1094 m, 3.II.2005, y.fr., *Antilabimena 3291* (MO, TAN); *ibid. loco*, 18°50'10"S 48°19'32"E, 1093 m, 11.II.2005, y.fr., *Antilabimena 3371* (MO [2 sheets], P [2 sheets], TAN); *ibid. loco*, 18°49'38"S 48°18'48"E, 1250 m, III.2005, y.fr., *Antilabimena 3727* (MO [2 sheets], P [2 sheets], TAN); *ibid. loco*, 18°50'14"S 48°18'39"E, 1154 m, 19.I.2007, fl., *Antilabimena 5151* (MO [2 sheets], P [2 sheets], TAN); *ibid. loco*, 18°50'18"S 48°18'36"E, 1167 m, 12.III.2007, y.fr., *Antilabimena 5479* (MO [2 sheets], P [2 sheets], TAN); *ibid. loco*, 18°50'12"S 48°19'57"E, 1177 m, 23.V.2008, fr., *Antilabimena 6213* (MO); *ibid. loco*, 18°50'10"S 48°19'10"E, 1141 m, 2.IV.2010, ster., *Antilabimena 7448* (MO, TAN); Lakato, Ambodigavo, forêt d'Andranotelo à 2 km W du village d'Ambodigavo, 19°03'11"S 48°21'34"E, 1063 m, 22.XII.2004, y.fr., *Lehavana 237* (MO, P [3 sheets], TAN); *ibid. loco*, fl., *Lehavana 238* (MO [2 sheets], P [3 sheets], TAN); along road to Lakato, c. 15 km S of RT 2, 1100 m, 17.X.2004, bud, *Lowry 6539* (MO [4 sheets]); forêt d'Analamazaotra, [18°56'S 48°26'E], 800 m, s.d., bud, *Perrier de la Bâtbie 6840* (P [4 sheets]); Andasibe (Perinet), forest NE of graphite mine, [18°53'S 48°28'E], 1000 m, 23.VII.1987, fr., *Phillipson 2136* (MO [4 sheets], P [2 sheets]); Ambatovy Mining Site, c. 13 km NE of Moramanga, Ankitrokely forest, along road to Analamay conservation zone, 18°49'51"S 48°18'50"E, 1194 m, 16.XII.2009, bud, *Plunkett 2408* (MO, NY, P, TAN); Phelps Dodge project site, c. 15 air-km NE of Moramanga, c. 11 km E of Antanambao, Ambatovy, 18°51'07"S 48°18'47"E, 1100 m, 30.I.1997, bud, *Rakotomalaza 1050* (MO [2 sheets], P, TEF); between Ambatovy-South and Analamay-East, Torotorofotsy River, Berano, 18°50'S 48°19'E, 1100 m, 20.II.1997, fr., *Rakotomalaza 1141* (MO, P, TAN); *ibid. loco*, 18°50'01"S 48°18'47"E, 1180 m, 14.V.1997, fr., *Rakotomalaza et al. 1314* (MO [2 sheets]); Vavantenina, Savaharina, Zahamena PN, à côté de la rivière Ihofika, 17°41'08"S 48°59'43"E, 650 m, 14.VI.2001, fl., *Rakotonandrasana 496* (MO, P, TAN); C^{ne} Manakambahiny Est, Andranohofa, à 15 km au NE d'Androrangabe, piste vers Ambodivoahangy, [17°41'S 48°49'E], 800–900 m, 24.VII.2003, y.fr., *Rakotonandrasana 712* (MO, P, TAN); Ambatovy, zone de conservation, 18°50'40"S 48°18'33"E, 1126 m, 22.VI.2008, ster., *Rakotonandrasana 1362* (MO); *ibid. loco*, 18°50'40"S 48°18'34"E, 1106 m, 26.IX.2008, bud, *Rakotonandrajaona 577* (MO, TAN); C^{ne} Ambalabe, Fkt. Ambinanindrano II, Ambinanin'ny Ampotamena stream, 19°09'01"S 48°34'55"E, 6.X.2009, 604 m, bud, *A. Randrianasolo 1109* (MO [2 sheets], P); Moramanga, Andasibe, corridor forestier Analamay Mantadia, 18°47'15"S 48°24'43"E, 996 m, 24.IV.2012, y.fr., *Rasoazanany 95* (MO, P [2 sheets], TAN); Analamazaotra-Périnet PN, Barika-Amboasary, limite SE, 18°56'55"S 48°26'18"E, 1081 m, 13.III.2013, y.fr., *Rasoazanany et al. 480* (MO [3 sheets], P [3 sheets], TAN); Ambatovy, 18°52'08"S 48°20'34"E, 1019 m, 21.I.2010, *Razafimelison 3* (MO [2 sheets], TAN); *ibid. loco*, 18°49'20"S 48°20'07"E, 1071 m, 2005, fl., *Razafindraibe & Antilabimena 65* (MO [2 sheets], P [2 sheets], TAN); C^{ne} Ambohivary, Fkt. Menalamba, forêt Ampangadiatrandraka, 18°51'52"S 47°59'05"E, 1063 m, 7.XII.2006, y.fr., *J. Razanatsoa 231* (MO [2 sheets], P [2 sheets], TAN); Analamazaotra, Andasibe RS, [18°56'S 48°26'E], 23.III.1949, fr., *Service Forestier 572* (P [3 sheets]); *ibid. loco*, 23.III.1949, fr., *Service Forestier 577* (P [3 sheets]); Perinet, [18°56'S 48°26'E], 31.III.1954, y.fr., *Service Forestier 10342* (P [3 sheets]); Berano village to the crossroad to Ambatovy, 18°50'16"S 48°19'19"E, 965 m, 11.IV.2007, fr., *Wen 9690* (MO [4 sheets], US). **Reg. Atsinanana [Prov. Toamasina]:** Brickaville, Ambodilendemy, vers le sommet d'Ankerana, 18°25'37"S 48°47'02"E, 842 m, 20.III.2011, fr., *Ravelonarivo 3732* (MO [3 sheets], P [3 sheets], TAN); Vatoman-dry, Vodiriana village au NW du Toby Lemazava, 19°09'48"S 48°32'14"E, 758 m, 11.II.2007, fl., *Razanatsima 212* (MO, P [2 sheets], TAN).

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