An analysis of the Angiosperm flora of the Paysage Harmonieux Protégé d'Andrafiamena-Andavakoera, northern Madagascar, with a provisional checklist

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Abstract

We present the analysis of a preliminary checklist to the flowering plants of the Andrafiamena-Andavakoera protected area based on 1002 herbarium collections, the oldest dating back to 1909, and 74.5% of the specimens identified to species level. Floristic richness to date is 490 species, including 376 identified to species and 114 morphospecies, 284 genera and 94 families. These relatively low figures should not be interpreted as indicative of low specific diversity in the area but rather as a consequence of a low density of plant collections and of a certain number of collections for which identification is incomplete. The family Sapotaceae received particular attention during two main field expeditions to the area, which also included some sterile specimens, and the region is likely home to a high floristic diversity of this family, with possibly 17 species. The richest families in terms of both genera and species are Rubiacaeae, Fabaceae, Euphorbiaceae, and Apocynaceae. Richest genera are *Diospyros* L., *Croton* L., *Dalbergia* L. f., and *Grewia* L. Overall, the known flora has 80.9% of the species endemic to Madagascar. The region's substrate consists mainly of non-calcareous substrate, but a few limestone (*tsingy*) hills are found on its northwestern part of the protected area. The species found on limestone rarely overlap with those from non-calcareous substrates, highlighting a marked ecological distinction driven by underlying geology. Most species are shared with the Western phytogeographic Domain (especially its Northern Sector) and the Sambirano Domain. The species shared with the Centre or Eastern Domain consists mostly of generalist taxa that are also found in the Western and Sambirano Domains. Among the species that are endemic to the north of Madagascar, those found on limestone belong mostly to flora of the Northern Sector of the Western Domain, while among those collected on other substrates there are also species from the Sambirano Domain. With further study, it is anticipated that the Sambirano proportion in the untouched non-calcareous portions of Andrafiamena-Andavakoera will increase.

With 37.9% of the plant species occurring in Andrafiamena-Andavakoera considered as threatened, the protected area deserves much conservation attention. Given its position towards the southwest within the main protected areas of the northern portion of the island, including neighboring Analamerana, Ankarana, Loky Manambato, and Montagne d'Ambre, it represents a critical transition towards the protected areas of the Sambirano, especially Galoko-Kalobinono found 45 km to the southwest and in a continuous sandstone mountain chain. Within the Andrafiamena-Andavakoera protected area, it is particularly the moist semi-deciduous forests of the two sandstone ranges of the Andrafiamena and Andavakoera Massifs that deserve enforced protection, as they host eight of the nine Critically Endangered species known from the site. Several further new and likely highly threatened narrow endemic tropophilous species can be expected from these ranges, which hold some of the rare remnants of the Malagasy semi-deciduous forest.

Keywords: Andavakoera, Andrafiamena, endemism, phytogeography, Sambirano Domain, Western Domain, Sapotaceae

Résumé détaillé

Le Nord de Madagascar constitue un "hotspot" de diversité floristique, conséquence de la superposition d'un gradient climatique sur une orographie variée, se déclinant sur une grande variété de substrats. Comparé à d'autres aires protégées voisines relativement bien prospectées comme la Montagne

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d'Ambre ou l'Ankarana, le Paysage Harmonieux Protégé d'Andrafiamena-Andavakoera a une position très méridionale dans le Secteur Nord du Domaine de l'Ouest et jouxte les limites du Domaine du Sambirano dans son acceptation étendue. Sur bien des aspects, il reste encore assez mal connu. Nous proposons ici un inventaire floristique préliminaire des plantes à fleurs, basé sur les récoltes enregistrées dans les bases de données de trois herbiers (G, MO et P), totalisant 725 occurrences auxquelles s'ajoutent 277 récoltes effectuées dans la mission de fin 2023 faisant un total de 1002 récoltes. L'étude a été coordonnée par le Conservatoire et Jardin Botaniques de la Ville de Genève, en collaboration avec des botanistes et taxonomistes spécialisés dans la flore malgache, issus de divers herbiers internationaux. A ce stade, les identifications restent incomplètes : 74,6 % des récoltes sont identifiées au niveau spécifique. Au total, 490 différentes espèces (dont 376 complètement identifiées) appartenant à 94 familles et 284 genres ont été recensées. Ces chiffres, comparés à des inventaires menés selon une méthode similaire ailleurs à Madagascar, sont bas. Ils ne doivent toutefois pas être interprétés comme une richesse floristique médiocre, mais révèlent avant tout l'insuffisance de l'effort d'inventaire mené jusqu'à présent.

En effet, à la faveur d'un projet de révision des Sapotaceae de Madagascar en cours, lors de récentes campagnes de collecte sur le terrain, un effort particulier a été mis sur cette famille, pour laquelle l'échantillonnage ne s'est pas limité aux échantillons fertiles. Il est estimé que 17 espèces de Sapotaceae pourraient être présentes dans l'aire protégée : huit espèces connues et décrites parmi lesquelles deux sont des endémiques locales connues uniquement de l'aire protégée et En danger critique d'extinction ; une espèce nouvelle pas encore publiée mais validée génétiquement et circonscrite comme étant une endémique régionale partagée avec le Sambirano ; huit nouvelles morphologies dont le statut comme espèce distincte, tout en étant fortement soutenu par la morphologie, doit encore être validé par les études moléculaires. Cette richesse spécifique en Sapotaceae est nettement plus élevée que celle des autres inventaires, elle laisse penser que l'Andrafiamena-Andavakoera est *a minima* aussi riche que celle des autres aires protégées comparées. Les familles les plus riches en genres et espèces sont les Rubiacaeae, les Fabaceae, les Euphorbiaceae et les Apocynaceae. Les genres les plus riches sont *Diospyros* L., *Croton* L., *Dalbergia*, L. f. et *Grewia* L.

Parmi les 490 différentes espèces recensées (identifiées ou non) 150 (30,6 %) n'ont été trouvées que sur substrat calcaire, 307 (61,2 %) uniquement hors-calcaire ; seules 41 espèces (8,2 %) étant partagées.

En ce qui concerne leur distribution, 80,9 % des espèces sont endémiques à Madagascar ; 6,5 % partagées avec les archipels voisins de l'Ouest de l'Océan Indien et 8,1 % avec l'Afrique tropicale au sens large, les 4,4 % restant ayant une distribution plus large.

Sur le plan de leur aire de distribution à Madagascar, neuf espèces sont des endémiques locales, connues aujourd'hui uniquement d'Andrafiamena-Andavakoera, un chiffre susceptible d'augmenter avec l'avancement des recherches. Les autres espèces de l'aire protégée sont en majorité partagées avec les Domaines de l'Ouest et du Sambirano, la plupart des espèces partagées avec les autres domaines étant des espèces généralistes à large distribution. Cent-huit espèces (28,2 %) sont endémiques du Nord (défini ici comme l'union du Secteur Nord du Domaine de l'Ouest et du Domaine du Sambirano). Parmi celles-ci, les espèces qui poussent sur les substrats calcaires des *tsingy* sont aux trois quarts des espèces sèches du Secteur Nord du Domaine de l'Ouest, alors qu'aucune n'est du Sambirano. Sur les grès des massifs de l'Andavakoera et de l'Andrafiamena, leur proportion n'est plus que d'un tiers, alors qu'on observe une part conséquente (un quart) d'espèces du Sambirano, qui sont des tropophiles rattachées à la flore des forêts semi-décidues. Il est vraisemblable que ce soient les plus mal connues et que leur proportion soit susceptible d'augmenter avec un effort de récolte et d'identification supplémentaire.

Concernant le statut de conservation, la flore d'Andrafiamena-Andavakoera comprend 97 espèces menacées, dont neuf En danger critique d'extinction (CR), 30 En danger (EN) et 58 Vulnérables (VU). Il est à noter que sur les neuf CR, huit sont exclusivement sur grès, et une seule sur calcaire. Les proportions des EN sont plus équilibrées, mais avec tout de même deux tiers sur grès. Ces résultats permettent d'avancer que c'est avant tout sur les forêts denses humides semi-décidues des deux chaînes de l'Andrafiamena et de l'Andavakoera que les efforts de conservation doivent être investis. Chez les Sapotaceae, c'est en effet là qu'ont été récemment découvertes deux espèces CR (*Capurodendron*

andrafiamenae et *Donella ranirisonii*) qui ont été choisies pour être intégrées aux programmes de suivi écologique du gestionnaire de l'aire protégée, ainsi que six autres espèces potentiellement nouvelles. C'est donc vraisemblablement dans ces forêts qu'il faut s'attendre à trouver d'autres nouvelles espèces de la flore tropophile, devenue si rare à Madagascar avec la raréfaction des forêts-semi-décidues.

Introduction

The flora and vegetation of northern Madagascar are becoming increasingly known and include a previously unsuspected diversity in several recently revised plant groups, including *Noronhia* Thouars, Oleaeae (Hong-Wa, 2016), *Capurodendron* Aubrév., Sapotaceae (Boluda *et al*., 2022, 2024), and *Memecylon* L., Melastomataceae (R. D. Stone, pers. comm.). This high level of diversity has often been attributed to the region's complex underlying substrate and interwoven with strong climatic gradients. In the case of the Paysage Harmonieux Protégé d'Andrafiamena-Andavakoera, the limestone hills of the northwestern side contrasts strongly with sandstone of the two main SW-NE parallel ridges of Andrafiamena and Andavakoera. It is demonstrated elsewhere in this monograph (Tahinarivony & Gautier, 2025) that substrate is critical in forest physiognomy, with a strong difference in deciduousness between limestone and sandstone bedrock, the former being almost completely deciduous.

With altitudes within the Andrafiamena-Andavakoera protected area ranging from 30 to 750 m, influence of climate on the diversity of environmental conditions probably plays a critical role in the configuration of the flora. On the bioclimatic map of Cornet (1974), a major part of the area, including the Andavakoera range, is in the S1b zone (seven months of dry season, annual cumulated hydric deficit between 300 and 400 mm, mean temperature of the coldest month between 16°C and 18°C), whereas Andrafiamena range is classified as Hhd (0 months of dry season, no hydric deficit, mean temperature of the coldest month between 10°C and 13°C), probably on account of its relatively higher elevation, as an extension of the climate of the lower altitudes of the neighboring Montagne d'Ambre. However, Cornet's map is at country scale and although it gives an indication of the possible extremes of the climatic conditions, no serious spatial inference should be drawn, especially in a region as heterogeneous as northern Madagascar.

Compared with other neighboring protected areas, Andrafiamena-Andavakoera consists mostly of transformed landscapes, with cultivated lands and extensive areas of various types of secondary habitats, ranging from secondary forests to thickets, scrub, and seasonally burned grasslands with limited tree cover (Tahinarivony & Gautier, 2025, herein). However, old-growth forest is also present, both on limestone (e.g. on the isolated Antsahabe Massif) and sandstone in both the Andrafiamena and Andavakoera ranges.

The flora of Andrafiamena-Andavakoera is here studied based on herbarium collections gathered by different teams since the early 20th century. Beyond documenting the flora of an under prospected area, this contribution also addresses the issue of phytogeographical transition between the Sambirano Domain and the Northern Sector of the Western Domain. The theoretical limit (Figure 1) has been designated by Humbert (1955) as c. 30 km to the southwest of what would become the Andrafiamena-Andavakoera protected area at the eastern end of the Ambaro Bay (next to Beramanja on RN 6). It has since been proposed (Du Puy & Moat, 1999) that this limit should be shifted to the northeast, from Mahavavy Delta, to Ambilobe, Betsihaka, and the Loky River along the southwestern border of the Loky Manambato protected area, i.e. at the western border of Andrafiamena-Andavakoera. This significant increase in surface area, together with a slight shift of its southern border, nearly doubles the area of the Sambirano Domain and as such, it encompasses not only the moist evergreen lowland forests of the Ampasindava Peninsula, the volcanic islands of Nosy Be and Nosy Komba, the Galoko-Kalobinono mountain complex, and the foothills of the Manongarivo Massif, but extends on both sides to more tropophilous moist semi-deciduous forests. Towards the southwest, the limit is the area of Maromandia and Bezofo, unfortunately very much degraded and where most of the original forest is now gone. Towards the northeast, the extension follows the continuous sandstone range beyond the Mahavavy River, where the proposed limit of Du Puy and Moat (1999) is the Andavakoera Massif, home to substantial stands of largely untouched forest. Further tropophilous forest is to be found in the parallel range of Andrafiamena. In this respect, a floral inventory of the Andrafiamena-Andavakoera protected area can provide further insight on the limits of the Sambirano Domain. In this contribution,

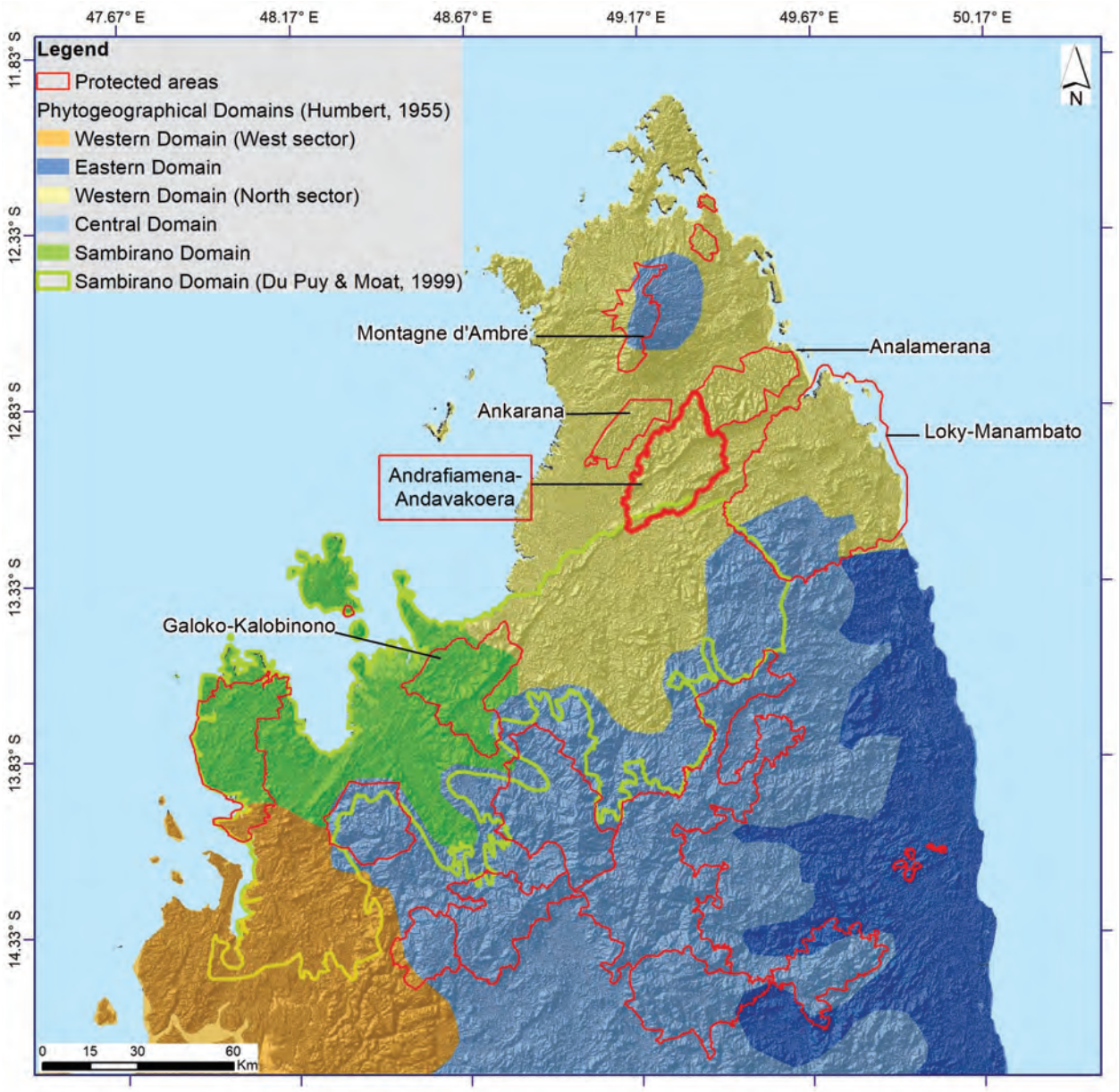

Figure 1. Map of northern Madagascar with shaded relief, showing the limits of the protected areas (red, following Goodman *et al.,* 2018) and the phytogeographical context (background colors, following Humbert, 1955). The limits of the extended Sambirano Domain (green, following Du Puy & Moat, 1999) is also shown.

we propose a phytogeographical analysis of this flora, based on all identified angiosperms.

With a strategy that combines slow growing and delayed reproduction, Sapotaceae species in general are considered as being adequate markers of old-growth forest, and providing valuable phytogeographic signal to original forest formations. They are highly regarded for their timber, and, hence, are generally heavily threatened (Gautier *et al*., 2022). In this contribution, we highlight the family Sapotaceae, for which the authors are familiar based on several past and ongoing studies. During the 2010 and 2023 field trips to Andrafiamena-Andavakera, the family received special attention. Unlike usual practice in such inventories, sterile specimens were also collected. This allowed better insights into aspects linked with species richness and phytogeography.

Our aim with the checklist included herein is to document the known flora of the Andrafiamena-Andavakoera protected area, to contribute to a better understanding of the origin and evolution of the exceptionally rich flora of northern Madagascar, and more specifically to address the increasingly rare but still poorly known semi-deciduous forests of this part of the island.

Materials & Methods

Information on collections of flowering plants form the Andrafiamena-Andavakoera protected area were assembled by merging floristic data extracted from the herbaria of the Muséum national d'Histoire naturelle, Paris (P, Sonnerat database), Missouri Botanical Gardens (MO, Madagascar Plant Catalog in Tropicos), Conservatoire et Jardin botaniques de la Ville de Genève (G, Système d'Information Botanique), and California Academy of Sciences (CAS). Queries were based both on keywords and on geographic coordinates. All data extractions were standardized to a shared common format between the four herbaria databases, and duplicate specimens were reconciled and suppressed. For all entries without or with approximate geographic coordinates, we attempted to increase georeferencing precision by interpretation of locality details associated with each collection. Occurrences outside limit values of latitude and longitude were removed (mainly topographic homonyms) and all remaining occurrences were plotted on Google Earth to check that they were within the defined limits of the protected area. All entries outside were not included herein.

Although we were most probably able to retrieve all recent databased collections in MO, G, and CAS, we are aware that data extraction from the P herbarium is far from complete as the majority of specimens in the available database are only accessible through a species name and not associated with geographic information, with the exception of a restricted number of families (e.g. Fabaceae) for which coordinates were captured in detail. It was not uncommon that while identifying specimens and specimen images, as well as consulting floras or floristic treatments, a new occurrence could be added to the protected area's list. Once such an occurrence was retrieved, databases were systematically checked for neighboring collector numbers, and this sometimes also led to the addition of other new occurrences.

Fieldwork conducted in 2023 involved further collecting of specimens by four of the five authors of this contribution, in three different areas associated with other groups presented in this monograph (orange dots on Figure 2). The first site was the Binara Forest on the Andavakoera Range, c. 6 km north of the village of Betsiaka on RN 5A, between 17 and 23 November 2023. The second and third sites were in the vicinity of the village of Anjakely, which is c. 20 km SSE of Anivorano-Nord; they are located in the forests of Antsahabe and Andrafiamena, west and southeast of the village, respectively (Tahinarivony & Goodman, 2025, herein).

Collections data were linked to species names based on their identifications within these different databases. Identifications retrieved from databases were accepted without verification unless the occurrence represented an outlier (> 50 km) to the species' known geographic range. In that case, identification was accepted if it was done by a taxonomist specialist of the respective plant group. If not, we tried to verify the identification either by accessing the specimens in G herbarium, which hosts many MO and P duplicates, or through a digital image in the CAS, MO, and P databases. If not, the identification was considered as uncertain, i.e. cited as "cf." in the list and not considered for the analyses.

The 2023 collections were identified mostly by the authors of this contribution, as well as specialists in the G herbarium. For some groups, field images and/or herbarium images were sent to specialists for identification (cited in the acknowledgements), as time constraints associated with the publication of this monograph did not allow specimens to be sent to them. All these occurrences were added to the ones accumulated through database queries. All occurrences were then assigned a binary substratum variable (limestone/non-limestone), based on a visual interpretation of satellite imagery available through Google Earth and/or on indications on the specimen labels.

The list of plant species has been produced by listing alphabetically all taxa by family, genus, and species. Unidentified specimens at the family level are presented at the end of the list. Unidentified specimens at the generic level are listed at the end of their respective family. Unidentified specimens at the specific level are listed at the end of their respective genera. If an unidentified specimen (or a group of unidentified specimens) was morphologically different from all identified species in the genus it was attributed to a morphospecies, which are numbered sequentially (sp. 1, sp. 2, etc.). If unidentified specimens were not available physically or only through digital images, they were simply listed as "sp." with the mention "(nv)" for "non vidit" and were not counted in the measures of floristic diversity, unless they represented the only occurrence of a genus. Presence on limestone and on non-limestone substrate has been added for each species based on the corresponding values of all its occurrences. Worldwide distribution of the identified species has been assessed using the Madagascar Catalogue,

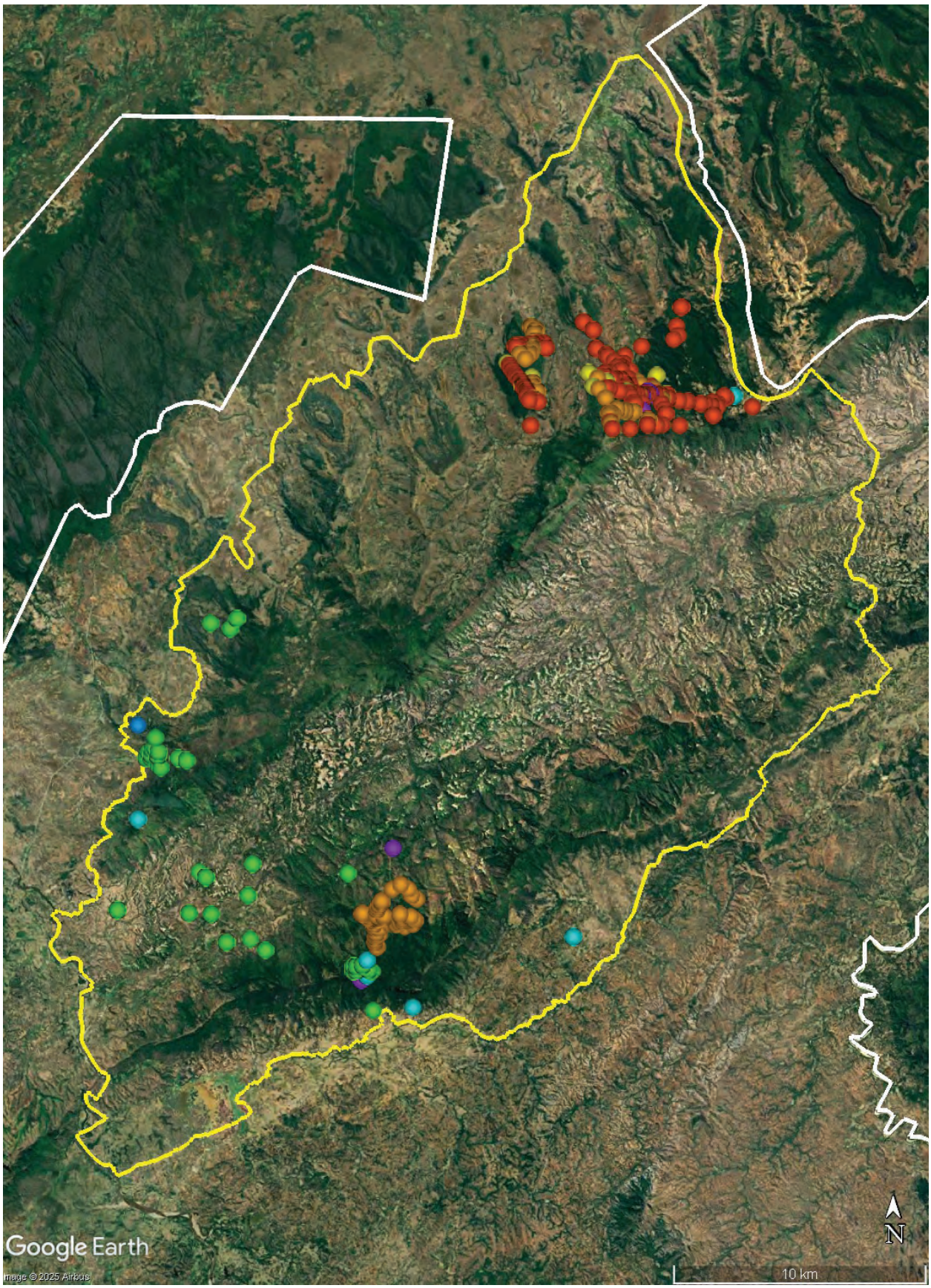

Figure 2. Satellite image (Google Earth) of the Andrafiamena-Andavakoera protected area with limits in yellow (limits of other protected areas in white); color dots indicating location of botanical collections. Violet: H. Perrier de la Bâthie (1909-1913); cyan: Service forestier de Madagascar (1958-1966); green: Missouri Botanical Garden (2004-2007); yellow: R. Letsara (2007); red: Conservatoire et Jardin botaniques de Genève (2010-2011); orange: Association Vahatra expedition (2023).

supplemented by *Plants of the world online* or POWO (2025). Presence/absence was recorded for each of the following geographic regions: Comoros, Mascarenes, Seychelles, tropical continental Africa, Australasia, Americas, and Holarctic. The various combinations of presence/absence in these categories were synthetized in the following Russian dolls categories (a given category always including the preceding area): Madagascar endemic; western Indian Ocean; Africa *sensu lato*, Paleotropical, Pantropical, and Cosmopolitan.

Presence/absence of each identified species has been recorded for each of the phytogeographic domains of Humbert (1955), with the following adaptations: i) the *Domaine des Hautes Montagnes* has been merged into the *Domaine du Centre* as recommended by Guillaumet *et al*. (2008); ii) the *Domaine de l'Ouest* has been separated into its Northern and Western sectors; iii) the geographic extension of the Domains follows the revised map of Du Puy and Moat (1999) discussed above. Presence/absence was assessed using the Madagascar Catalogue (2025), *Flore de Madagascar et des Comores* (Humbert, 1936 and subsequent publications in the series), and posterior taxonomic treatments, as well as specimens examined either physically at Geneva or through the images from the Paris Sonnerat database. As one of the goals of this analysis was to assess the phytogeographical affinities of Andrafiamena-Andavakoera, specifically if the affinities of the identified species were associated with Northern Sector of the Western Domain or the Sambirano Domain, only the occurrences outside the protected area were considered. As a general rule, the affinities of taxa assigned to morphospecies were not scored, with the rare exception of some unpublished but clearly circumscribed species for which a specialist could provide confirmed range information and, hence, which of the domains it was associated with.

Due to the taxonomical focus of three of the authors of this contribution, the family Sapotaceae has received special attention during the field activities of 2010-11 and 2023. Consequently, this family probably shows a bias towards a better occurrence coverage. At the same time, we have access to more exhaustive sampling information for members of this family across the island for all the main herbaria housing Malagasy material for ongoing systematic revisions: G, K (Kew Botanical Gardens), MO, P, TAN (Parc Botanique et Zoologique de Tsimbazaza, TEF (FOFIFA or Centre National de la Recherche Appliquée au Développement Rural, Foibem-pirenena momba ny Fikarohana ampiharina amin'ny Fampandrosoana ny eny Ambanivohitra). The Sapotaceae specimens gathered during our field inventories have been identified with as much taxonomic precision as possible, and the remaining collections have been grouped into morphospecies that represent species hypotheses that will be ultimately tested using molecular data. The distributions of all Malagasy Sapotaceae identified species in Andrafiamena-Andavakoera have been plotted on a Google Earth background using the Madagascar Catalogue (2025) as the interface.

For all identified species in the checklist, threat categories as defined by IUCN (2012) were also recorded if available, based on either the Madagascar Catalogue (2025), or the IUCN Red List website (IUCN, 2025).

Results

History of botanical prospection in the Andrafiamena-Andavakoera protected area

The first documented collections from the area are those of Henri Perrier de la Bâthie in 1909 and 1913. Although many more might be held in P, our database includes eight of his collections, two from Andavakoera, one dated October 1909, the second undated (although 1932 is mentioned in the P database, this is an accession year, as Perrier did not collect that year in north Madagascar), five from Andrafiamena in November 1909, the last one from the plains of the Mananjeba in Andavakoera in July 1913. These include the types of four species with restricted distributions, including *Valiha perrieri* (A. Camus) S. Dransfield, a bamboo (Poaceae) that has never been recollected to date and assessed as Critically Endangered. Apart from the mountain range name, all eight collections are poorly documented geographically, four of them being mentioned as growing on sandstone.

During subsequent periods of the French colonial era, the next series of collections has been made by the Service Forestier de Madagascar from which we have 28 records, made on 19 January 1954, 17 July 1954, from 10 to 11 November 1958, 2 March 1964, 3 May 1966, and 8 February 1968. These include the type collection of *Foetidia rubescens* Bosser (Lecythidaceae), a rare species assessed as Critically Endangered. We have only vague indications where these specimens were collected. Here again, our records certainly represent only a small proportion of

the Service Forestier de Madagascar specimens held in P and TEF.

The next botanists known to have collected in what is now the Andrafiamena-Andavakoera protected area, are field groups associated with the Missouri Botanical Garden and prospecting for the U.S. National Cancer Institute (NCI) on several short collecting trips from September 2004 to March 2007. We have recorded 280 specimens, a figure that certainly approaches what was collected. These collections were made first in the secondary landscapes at the southwestern corner of the protected area between the ridges of the Andrafiamena and Andavakoera Massifs, then on limestone outcrops a few km northeast and southeast of Ambilomagodro along the RN 6. This first set of collections were made by (in chronological order) Richard Randrianaivo, Sennen Randrianasolo, Fidy Ratovoson, and Stéphan Rakotonandrasana. Later, the MBG team reached what is referred to herein as the Binara Forest in the Andavakoera Range (probably approached from the south from Betsiaka on RN 5A) and was composed of Jean Berthieu Léopold, Riri Guittou, and Jérémie Razafitsalama, who made a total of 67 collections from 9 to 11 January 2006, followed by Richard Randrianaivo and Andriamalala Rakotondrafara with 15 further collections on 7 March 2007. These specimens were obtained in old growth moist semi-deciduous forests and many of field identifications remain at the genus level, some of the identified specimens are of local endemics, certain recently described, and others still unpublished. It would not be surprising that several further new species should emerge from this material.

In 2007, when the ONG Fanamby was taking the first steps in establishing the protected area with the support of the Prince Albert II de Monaco Foundation, collections were made near “Anjahankely” (herein referred to as Anjakely), accessing the Andrafiamena Range from the north. Sébastien Wohlhauser collected a new Gentianaceae: *Exacum alberti-grimaldii* Wohlh. & Callm., still known only from the type. In June of 2007, Rokiman Letsara made at least 81 collections, mostly on the sandstone of the Andrafiamena Ridge, but also on the limestone of the Antsahabe Massif, where he was probably the first to collect. The Binara Forest was briefly visited by a team from the University of Michigan -- Benjamin van Ee and four colleagues collected three *Croton* specimens.

Between 6 November 2010 and 25 January 2011, a substantial collection effort was conducted by a team of the Conservatoire et Jardin botaniques de Genève, comprised of Laurent Gautier and Zuzana Burivalova (a Czech Master’s student studying in the University of Geneva), in partnership with Patrick Ranirison from the University of Antananarivo, who was at that time head of Fanamby in Andrafiamena-Andavakoera. A total of 324 collections were made in the forests around Anjakely, both on sandstone of the Andrafiamena Range and on limestone of the Antsahabe Forest. These collections lead to the description of four new species: two Sapotacaeae: *Donella ranirisonii* L. Gaut. & Mackinder and *Capurodendron andrafiamenae* L. Gaut. & Boluda, both narrow-endemics and assessed as Critcally Endangered, as well as two orchids: *Cynorkis sanguinolenta* Hermans, L. Gaut. & P. J. Cribb and *C. windsorensis* Hervouet (also found on Windsor Castle in the extreme north of Madagascar) that have not yet been assessed. Several more novelties are expected.

A team from the California Academy of Sciences (Thomas F. Daniel, Rockiman Letsara, Heritiana Ranarivelo, and Jacqueline Razanatsoa) briefly visited on 2 May 2011 and made two collections of a new species: *Anisotes subcoriaceus* T. F. Daniel, Letsara & Martín-Bravo (Acanthaceae). The last collections before the 2023 Vahatra expedition were made on 2 June 2022, when a Missouri Botanical Garden team (Aimé Karatra, Peter B. Phillipson, Nicholas Wilding & Rokiman Letsara) working on taxonomy and conservation of precious woods collected six specimens of *Dalbergia* in the Andrafiamena Range, near Anjakely. Before the 2023 expedition, a minimum of 725 plant collections had accumulated from the site, to which the expedition added 278 more, making a total of 1002 occurrences that are plotted on Figure 2.

Key figures of floristic richness

Identification was completed for 747 collections (74.6%) at the species level, and for 240 collections at the genus level (24.0%). Ten (1.0%) collections are identified only to family, and five collections (0.5%) remain completely unidentified. The derived list of the flowering plant species of the Andrafiamena-Andavakoera protected area is provided in Appendix 1.

In total, 490 different flowering plant species have been recorded, including 376 fully identified species, seven clearly circumscribed new species to science awaiting publication, and 107 morphospecies (an unidentified species, generally belonging to a known genus and sufficiently different morphologically from any other species in the genus to be counted as a

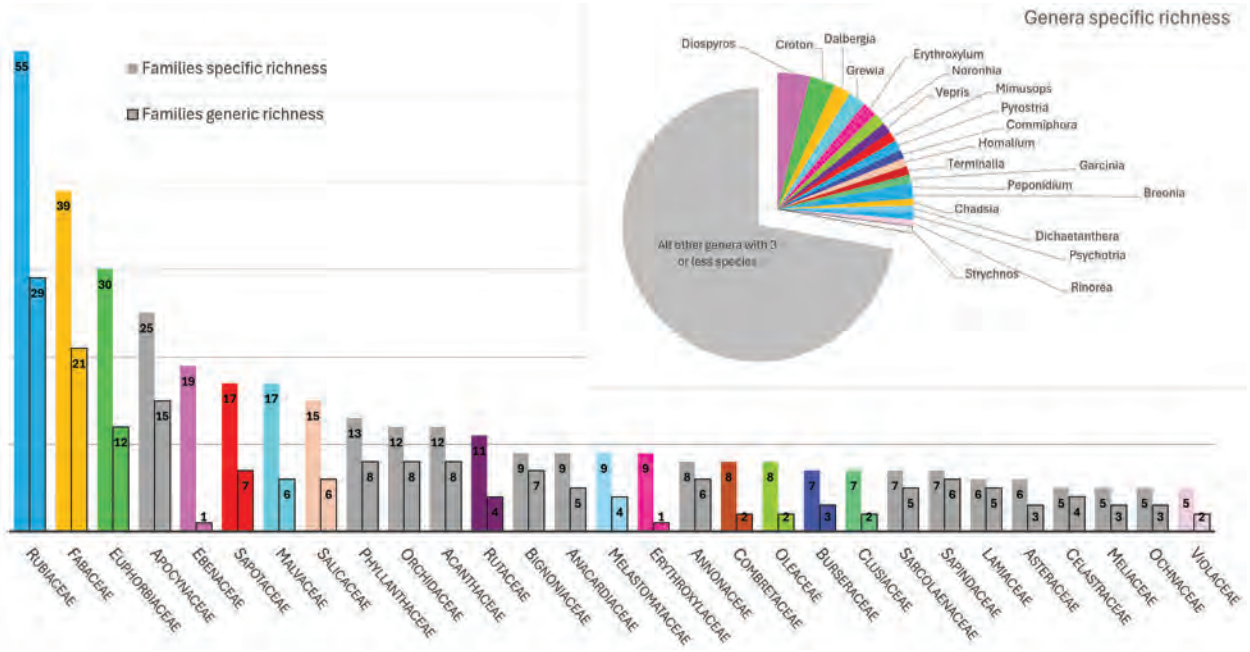

Figure 3. Angiosperm richness of Andrafiamena-Andavakoera protected area: number of genera and species in families with at least 5 species (histogram) and number of species in genera with at least 4 species (circle chart, upper right). Sector and bar colors are conserved between the two graphs and grey is used for families that appear on one graph only.

different species). Out of these 490 species, 150 (30.6%) were found only on limestone, 300 (61.2%) only on non-limestone substrates, and 40 (8.2%) on both. These 490 species belong to 94 families and 284 genera. In Figure 3, we present a histogram of the recorded specific and generic richness of the families with at least five species, as well as a circle plot of the genera with at least four species, based on the 490 species recorded.

Regarding specific richness, the most diverse families are Rubiaceae (55 species), Fabaceae (39), Euphorbiaceae (30), Apocynaceae (25), and Ebenaceae (19). Altogether, the 29 families with 5 species or more account for 78.5% of specific richness; there are 39 families with a single species.

Regarding generic richness, the most diverse families are Rubiaceae (29 genera), Fabaceae (21), Apocynaceae (15), Euphorbiaceae (12), and Phyllanthaceae, Orchidaceae, and Acanthaceae (each with 8 genera). The 20 families with four genera or more account for 60.2% of generic richness; there are 48 families with a single genus.

The richest genera are *Diospyros* L. (19 species), *Croton* L. (15), *Dalbergia* L. f. (10), and *Grewia* L. and *Erythroxylum* P. Browne (both 9). Genera with four species or more account for 27.7% of the specific diversity, and there are 174 genera with a single species.

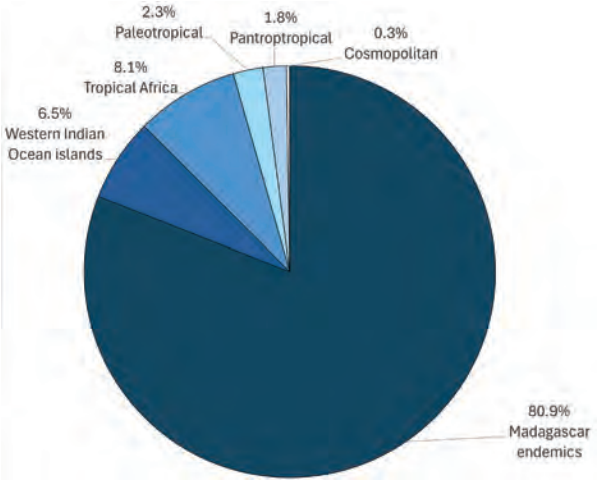

Figure 4. Worldwide distribution of the species identified from the Andrafiamena-Andavakoera protected area.

Worldwide distribution of identified species

The distribution pattern of the 383 circumscribed species (376 plus seven awaiting description but for which their distribution is known) is provided in Figure 4. Madagascar endemic species comprise 80.9% of the taxa, those also found on at least one neighboring western Indian Ocean Islands include 6.5%, and those shared with continental tropical Africa 8.1%. More widespread species are rarer, with only 2.3% of Paleotropical and 1.8% of Pantropical species. Only one species (0.3%), the sedge *Rhynchospora rugosa*

(Vahl) Gale (Cyperaceae), has a cosmopolitan range that extends to temperate latitudes.

Madagascar distribution of identified species

Nine species are thus far only known from the Andrafiamena-Andavakoera protected area and are considered local endemics:

- *Capurodendron andrafiamenae*
- *Dichaetanthera brevicauda* Jum. & H. Perrier (Melastomataceae)
- *Donella ranirisonii*
- *Exacum alberti-grimaldii*
- *Foetidia rubescens*
- *Homalium ovatifolium* Appleq. (Salicaceae)
- *Memecylon* sp. 1 (D. Stone, pers. comm.)
- *Polystachya* sp. 1 (J. Hermans, pers. comm.) (Orchidaceae)
- *Valiha perrieri*

The Madagascar distribution of the checklist's 383 circumscribed species is first illustrated by a histogram providing for each phytogeographic territory (domain or sector), the number of species that have at least one occurrence in the territory (Figure 5). If all species are considered (left), the vast majority of the flora of the Andrafiamena-Andavakoera protected area is shared with the Western Domain (especially its Northern Sector) and the Sambirano Domain. The protected area has less species in common with the other humid forest domains (Center and East). The subarid Southern Domain shares only 30 species with Andrafiamena-Andavakoera. When confining the analysis to species found on limestone (top right), the phytogeographic affinity is more clearly dominated by the two sectors of the Western Domain, while the number of species shared with the Sambirano decreases to a value approaching

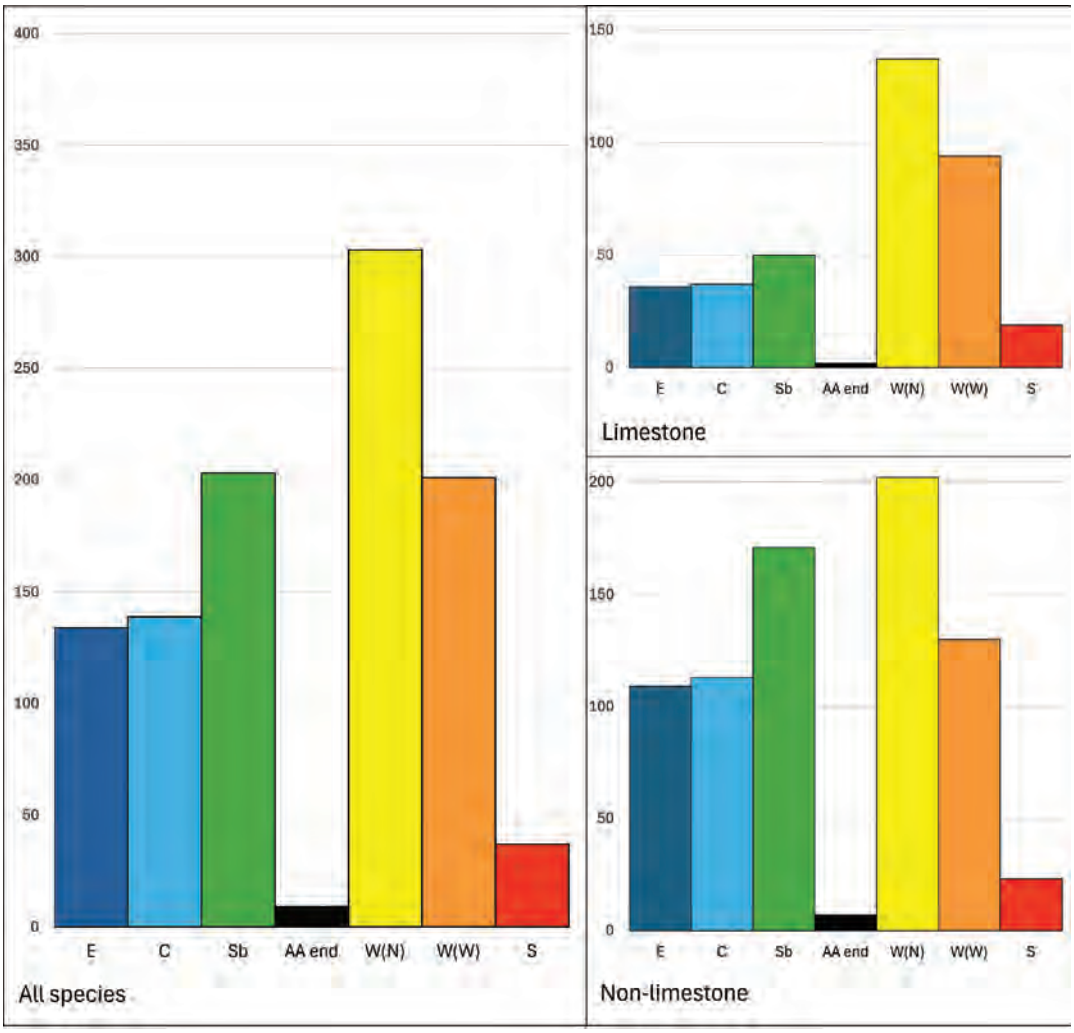

Figure 5. Representation of the identified species from the Andrafiamena-Andavakoera protected area with reference to phytogeographic territories. Left: all species; top: species found on limestone; and right, bottom: species found on other substrates. AA end: local endemics to Andrafiamena-Andavakoera; Sb: Sambirano Domain; E: Eastern Domain; C: Central Domain; W(N): Northern Sector of the Western Domain; W(W): Western sector of the Western Domain; S: Southern Domain.

those of the two other humid Domains. If only the non-limestone substrates are considered (bottom right), then the contribution of the Sambirano flora is proportionally more important and approaches the one of the Northern Sector of the Western Domain. Out of the nine local endemic plant species recorded only from Andrafiamena-Andavakoera, only two are found on *tsingy* limestone: *Homalium ovatifolium* and *Memecylon* sp. 1.

Most of the species of the protected area are not restricted to a single phytogeographic territory. Out of the 64 possible permutations of presence/absence in the six domains/sectors considered, 39 have been found in our species list. We have chosen to group them in 10 distribution categories explained in Table 1. Examples of these distribution categories are shown using species of the family Sapotaceae (Figure 6).

Table 1. Circumscription of the10 phytogeographical categories based on the various permutation of presence/absence in the six phytogeographical domains/sectors associated in the distribution of the species of the Andrafiamena-Andavakoera protected area. Local endemics represent an 11th category. AA end: local endemics to Andrafiamena-Andavakoera; Sb: Sambirano Domain; E: Eastern Domain; C: Central Domain; W(N): Northern Sector of the Western Domain; W(W): Western sector of the Western Domain; S: Southern Domain. Color of categories is same as for Figure 7.

Presence/Absence in the phytogeographic domains/sectors						Phytogeographic Categories	Distribution	
E	C	Sb	W(N)	W(W)	S			
			1			W(N)	Restricted to the Northern Sector of the Western Domain	North Madagascar endemics
						AA end	Andrafiamena-Andavakoera local endemics	
		1				Sb	Restricted to the Sambirano Domain	
		1	1			W(N) + Sb	Sambirano and Northern Sector of the Western Domain	
		1		1		W + Sb	Western and Sambirano Domains (excluding North Madagascar endemics)	
		1	1	1				
		1	1	1	1			
				1		W	Western Domain only (excluding North Madagascar endemics)	
			1	1				
			1		1	W + S	Western and Southern Domains (Dry to Subarid)	
			1	1	1			
	1		1	1	1	E/C/Sb + W + S	Western and Southern Domains and at least one of the humid Domains	
1			1	1	1			
1		1	1	1	1			
1	1	1		1	1			
1	1	1	1	1	1			
	1			1		E/C/Sb + W	Western Domain and at least one of the humid Domains	
	1		1					
	1		1	1				
	1	1		1				
	1	1	1					
	1	1	1	1				
1			1					
1			1	1				
1		1		1				
1		1	1					
1		1	1	1				
1	1			1				
1	1		1					
1	1		1	1				
1	1	1		1				
1	1	1	1					
1	1	1	1	1				
	1					E/C	Eastern and/or Central Domain, absent from Sambirano	
1								
1	1							
	1	1				Sb + E/C	Eastern and/or Central Domains, present in Sambirano	
1		1						
1	1	1						

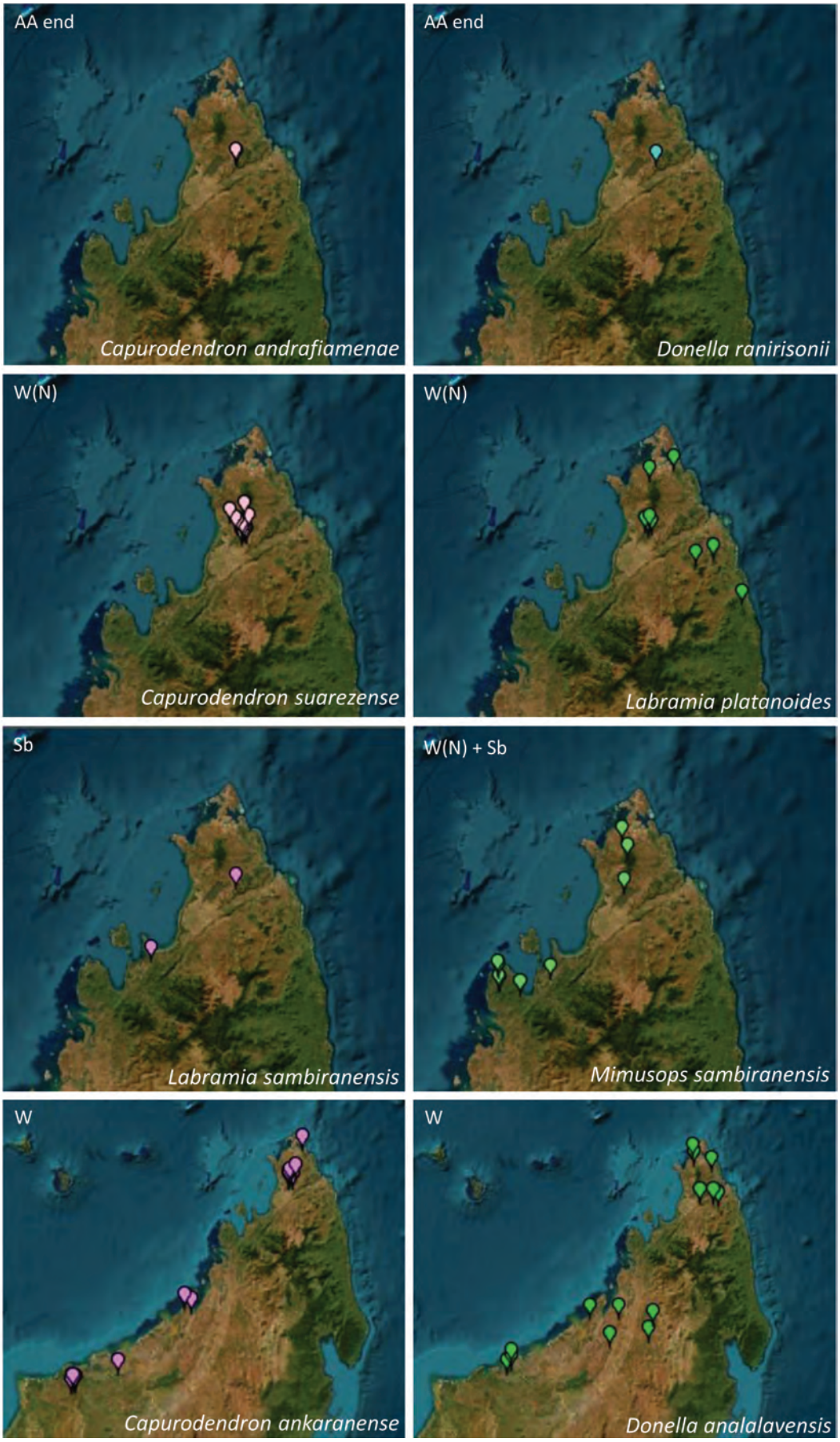

Figure 6. Distribution patterns of species in the family Sapotaceae from the Andrafiamena-Andavakoera protected area. Top row: narrow endemics; second row: species restricted to the Northern Sector of the Western Domain; third row: species shared with the Sambirano Domain; and bottom row: species shared with both sectors of the Western Domain.

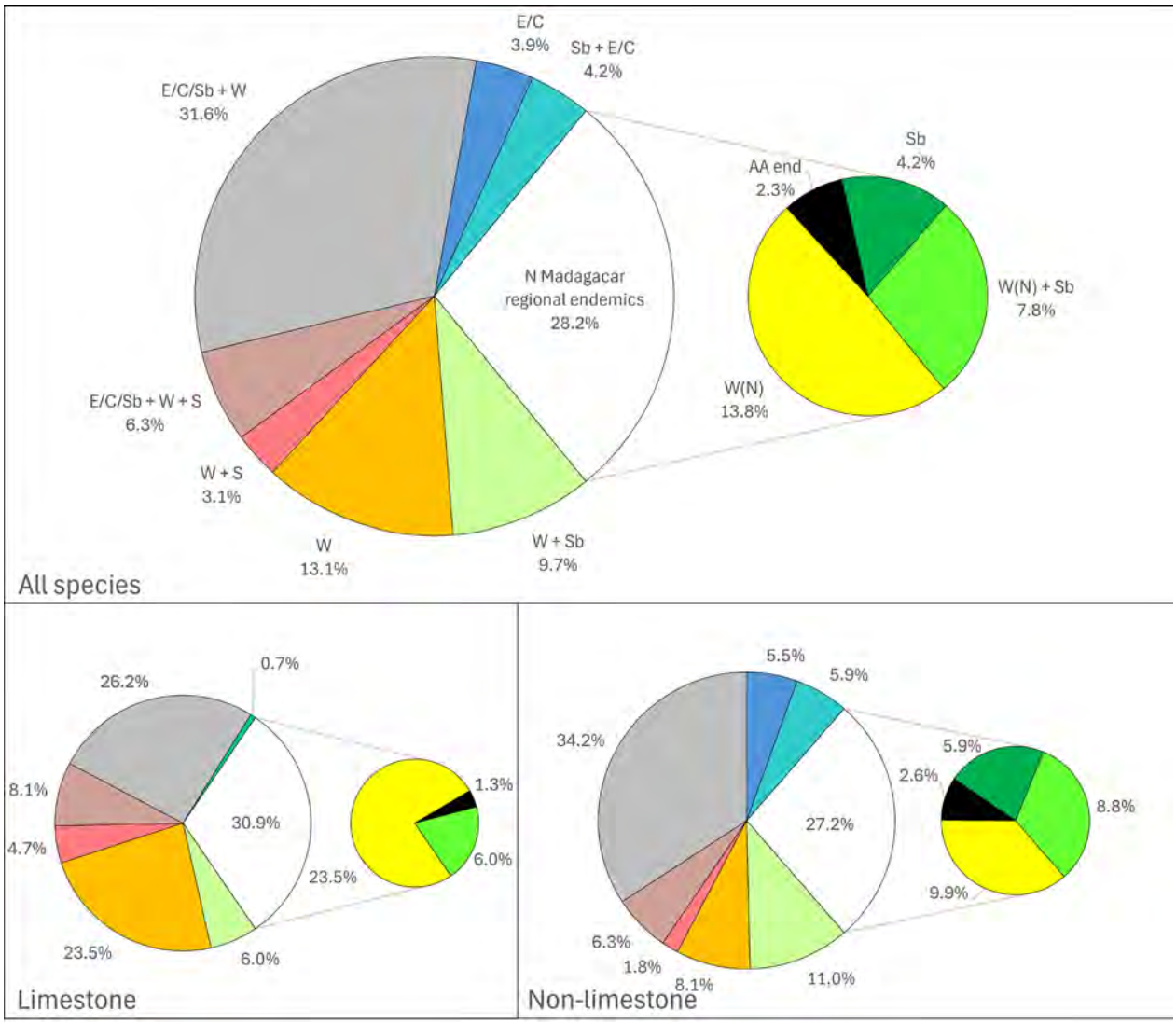

Figure 7. Distribution of the identified species of the Andrafiamena-Andavakoera protected area based on the phytogeographic categories as defined in Table 1. Top: all species; lower left: species found on limestone; and lower right: species found on other substrates. Color of categories is same as for Table 1.

In Figure 7 is presented the distribution of each identified species in one of these distribution categories. Species occurring only in the North (Sambirano and/or northern Sector of the Western Domain) are considered north Madagascar endemics and represented on the right-hand side in a subsidiary pie chart.

If all identified taxa are considered (Figure 7, top), a little less than three quarters of the flora of the Andrafiamena-Andavakoera is composed of species that have a wide latitudinal distribution on Madagascar, with almost half of them being generalists (grey) found in both humid and dry environments. The site also has significant portion of its species that are restricted to humid (blue, c. 8%) or dry (red to orange, c. 16%) territories. Among the 28.2% that are endemic to the north (right pie chart), the W(N) endemics (yellow) represent almost half of the species, and the Sambirano endemics (dark green) one sixth.

If only the species found on limestone are considered (Figure 7, bottom, left), the humid categories (blue) are almost absent on the main pie chart, while the dry categories share (red to orange) increases. There are no Sambirano endemics on limestone (right pie chart): the c. 30% of northern endemics is three-quarters occupied by endemics of the Northern Sector of the Western Domain (yellow).

If only the species collected on the non-limestone substrates are considered (Figure 7, bottom, right), the changes compared with the all-species graph are the opposite: on the wide latitudinal ranges (left pie chart), the share of humid species increases and that of dry species decreases. Among the northern

endemics (right pie chart), Sambirano endemics increase to one fifth, while Northern Sector of the Western Domain endemics decrease to one third.

IUCN threat categories

Out of the 383 identified species, 254 (67.2%) have published conservation assessments. Among these species (Figure 8), 95 (38.0%) are in a threatened category and distributed as follows: nine (3.5%) are Critically Endangered, 30 (11.7%) are Endangered, and 57 (22.7%) are Vulnerable. The rest of the species are either Near Threatened (16 species, 6.3%) or Least Concern (142 species, 55.9%).

Critically Endangered species:

- *Capurodendron andrafiamenae*
- *Diospyros subtrinervis* H. Perrier (Ebenaceae)
- *Donella ranirisonii*
- *Foetidia rubescens*
- *Grewia sely* R. Vig. (Malvaceae)
- *Homalium ovatifolium*
- *Labramia sambiranensis* Capuron ex Aubrév. (Sapotaceae)
- *Polystachya* sp. 1
- *Valiha perrieri*

Endangered species:

- *Calophyllum vernicosum* P. F. Stevens (Calophyllaceae)
- *Capurodendron suarezense* Aubrév.
- *Carlephyton madagascariense* Jum. (Araceae)
- *Chadsia longidentata* R. Vig. (Fabaceae)

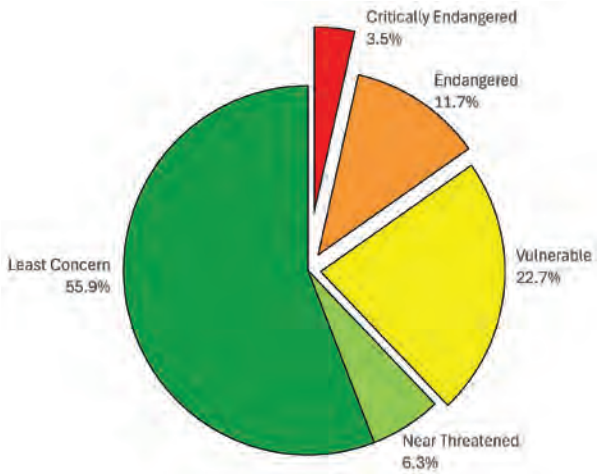

Figure 8. IUCN threat categories spectrum of the Angiosperm species of the Andrafiamena-Andavakoera protected area, based on 256 species that have published conservation assessments (out of a total of 383 identified species).

- *Cleistanthus suarezensis* Leandri (Phyllanthaceae)
- *Colea ratovosonii* (Callm. & Phillipson) Callm. Phillipson & Buerki (Bignoniaceae)
- *Croton scoriarum* Leandri (Euphorbiaceae)
- *Cynorkis windsorensis*
- *Dalbergia urschii* Bosser & R. Rabev. (Fabaceae)
- *Dioscorea buckleyana* Wilkin (Dioscoreaceae)
- *Diospyros perglauca* H. Perrier
- *Euphorbia haevermansii* X. Aubriot & Lowry (Euphorbiaceae)
- *Fagaropsis glabra* Capuron (Rutaceae)
- *Grewia madagascariensis* Capuron
- *Ludia wikstroemiifolia* Sleumer (Salicaceae)
- *Memecylon bezavonense* (Jacq.-Fél.) R. D. Stone
- *Mimusops sambiranensis* Aubrév. (Sapotaceae)
- *Nesogordonia fertilis* H. Perrier (Malvaceae)
- *Noronhia rostrata* Hong-Wa
- *Symphonia oligantha* Baker (Clusiaceae)
- *Tambourissa nitida* Danguy (Monimiaceae)
- *Terminalia exsculpta* Tul. (Combretaceae)
- *Tisonia rubescens* Danguy (Salicaceae)
- *Turraea lescotiana* Callm. & Nusb. (Meliaceae)
- *Xylopia ambanjensis* Cavaco & Keraudren (Annonaceae)

Focus on Sapotaceae

We are aware of 36 collections of Sapotaceae from the Andrafiamena-Andavakoera protected area. These have been attributed to seven of the 11 genera known on Madagascar. They represent 17 different morphospecies (Table 2), eight match described species, one is a new species confirmed by molecular studies (Randriarisoa, 2023), and eight representing putative new species (two of which might correspond to described infraspecific taxa deserving specific rank).

The distribution of the eight identified species is shown on Figure 6. In the first row are the two recently described species based on the 2010 material and to date both taxa have not been recorded outside the Andrafiamena-Andavakoera protected area, where they are found on sandstone in the semi-deciduous forests southwest of Anjakely. *Capurodendron andrafiamenae* is a distinctive species that has been found on several parts of the forest, always close to rivers or streams. *Donella ranirisonii* is close to the sympatric *D. analalavensis*, and the only sequenced specimen of the former has been retrieved basal to the latter (Kiedaisch *et al.*, submitted). Further genetic study is needed to confirm they are different species. Five of the putative new species are also known only

Table 2. The 17 identified species and morphospecies of Sapotaceae found in Andrafiamena-Andavakoera protected area. Distribution: AA end: Andrafiamena-Andavakoera local endemic; Sb: Sambirano; W(N): Northern Sector of the Western Domain; and W(W): Western Sector of the Western Domain. IUCN threat categories codes as in IUCN (2012); for the NE (not evaluated) species, a provisional unpublished threat category is given in parentheses.

Species	Distribution	Habitat	IUCN
Capurodendron andrafiamenae	AA end	Moist semi-deciduous forest	CR
Capurodendron ankaranense	W(N); W(W)	Dry deciduous forest on limestone	VU
Capurodendron suarezense	W(N)	Dry deciduous forest on limestone	EN
Donella analalavensis	W(N); W(W)	Dry deciduous forest	EN
Donella ranirisonii	AA end	Dry deciduous forest	CR
Labourdonnaisia sp. 1	Sb	Lowland moist evergreen to semi-deciduous forests	NE (EN)
Labramia platanoides	W(N)	Dry deciduous and subhumid forest	NT
Labramia sambiranensis	Sb	Lowland moist evergreen to semi-deciduous forests	CR
Labramia sp. 1 (aff. *L. platanoides*)	AA end	Moist semi-deciduous forest	NE (CR)
Manilkara sp. 1 (aff. *M. capuronii*)	AA end	River margin in moist semi-deciduous forest	NE (CR)
Mimusops sambiranensis	W(N), Sb	Lowland moist evergreen to semi-deciduous forests	EN
Mimusops sp. 1	W(N)	Dry deciduous forest on limestone	NE (VU)
Mimusops sp. 2	AA end	Moist semi-deciduous forest	NE (CR)
Mimusops sp. 3	AA end	Moist semi-deciduous forest	NE (CR)
Mimusops sp. 4 (cf. *M. capuronii* f. *tomentosa*)	W(N)	Dry deciduous and moist semi-deciduous forest	NE (VU)
Mimusops sp. 5 (cf. *M. capuronii* f. *salicifolia*)	Sb	Lowland moist evergreen to semi-deciduous forests	NE (EN)
Sideroxylon sp. 1	AA end	River margin in dry deciduous forest	NE (CR)

from the protected area. In the second row are two examples of species found only in the dry deciduous forests of the Northern Sector of the Western Domain. On the left is *Capurodendron suarezense*, an example of a species restricted to limestone and also known from the Ankarana *tsingy*. On the right is *Labramia platanoides* Capuron ex. Aubrév.*,* a species found throughout the Northern Sector on various substrates: limestone, sandstone or basalts at the base of Montagne d'Ambre. In the third row are species that are shared with the Sambirano Domain. On the left *Labramia sambiranensis*, for a long time only known from the type collected in 1954 in Ambaliha, northwest of the Kalobinono. The species was recovered in 2010 in the Andrafiamena-Andavakoera protected area on sandstone near Anjakely. This distribution pattern is shared with the confirmed new species *Labourdonnaisia* sp. 1, and probably also with two putative species *Mimusops* sp. 5, which has very distinctive linear leaves and could match with *M*. *capuronii* f. *salicifolia* Aubrév. only known from the forests in the vicinity of the lower Sambirano River. On the right is *Mimusops sambiranensis*, a species that is also found in the Northern Sector, on the limestones of Ankarana, and on basalt at the base of Montagne d'Ambre. In fourth row are two species found throughout the Western Domain, in both sectors North and West that flank the Sambirano Domain, where it has yet to be recorded. On the left is *Capurodendron ankaranense*, a species restricted to limestone, found on a row parallel to the western, from Namoroka northeast to Montagne des Français. On the right is a similar case, but for *Donella analalavensis* Aubrév., a species not restricted to limestone.

Conservation assessments of Sapotaceae (taking into account provisional estimation of threat for putative new species) shows eight species assessed as CR, five EN, and three VU. In summary, 94% of the locally occurring Sapotaceae are threatened, with the exception of only one species, which is nonetheless considered NT.

Discussion

Floristic richness of the Angiosperm flora

Since the last published review of the Andrafiamena-Andavakoera protected area (Phillipson *et al*., 2018), substantial progress has been made, with the known vascular plant species diversity rising from 182 species to 490. Table 3 provides comparisons with other plant inventories conducted on Madagascar using largely the same field techniques. With a richness of 490 species (including morphospecies), 284 genera, and 94 families, our inventory of the protected area is certainly far below any expected value for the site, including comparisons to surface area. Species richness is only 45% of the average value of other sites listed, generic richness 57%,

Table 3. Comparative richness of the Angiosperm flora at family, genus, and species levels (with number of identified species in brackets), and specific richness of Sapotaceae for several inventories conducted on Madagascar, with surface area and number of collections considered (w/Pt = including pteridophytes).

Inventory	Area (km^2)	Collections	Families	Genera	Species	Sapotaceae species
Manongarivo (Gautier, 2002)	516	3836	145	588	1433 (1095)	11
Montagne d'Ambre (Trigui, 2010)	305	3521 (w/Pt)	151	564	1250 (912)	13
Ampasindava (Ammann, 2011)	1450	1908 (w/PT)	123	385	852 (787)	9
Beanka (Bolliger, 2014)	172	2358 (w/Pt)	118	463	964 (665)	9
Andohahela (Rapp, 2025)	621	2804	120	509	993 (896)	11
Andrafiamena-Andavakoera (herein)	733	1002	94	284	490 (376)	17

and family richness 72%. With Andrafiamena-Andavakoera comprising a nearly 700 m elevational band and quite a variety of geological substrates, these low values cannot be attributed to low habitat diversity and are most probably related to the low number of collections made at the site, as well as to the low percentage of remaining original forest. In any case, further inventory efforts are needed to better evaluate the respective impact of these two interpretations.

As mentioned earlier, the Sapotaceae received special attention in the fieldwork at the site in 2010-11 and 2023. In this respect the figures for the family can cast some light on the level of coverage of the flora of the Andrafiamena-Andavakoera protected area as we know it today. Half of the 17 putative species of this family are only known from sterile collections and would not have been collected if the field team was not especially focused on them. Like other tree families, Sapotaceae comprise a poorly known group. The current estimate of increase in species for Sapotaceae is quite in alignment with other woody plant groups under revision like *Diospyros* or *Memecylon*. Nevertheless, it would be speculative to infer that the diversity figure for the whole Andrafiamena-Andavakoera flora should be multiplied by a factor of 2, but the figures presented herein clearly demonstrate how much further inventory effort is needed in the protected area.

Floristic richness of families and genera can be compared with the figures of the Angiosperm flora of Madagascar (Gautier *et al*., 2013). The richest families in terms of species and genera are globally the same, namely Rubiaceae, Fabaceae, Apocynaceae, and Euphorbiaceae. Notable exceptions are Poaceae and Asteraceae that have proportionally much fewer species in our checklist, and Ebenaceae and Sapotaceae that have more species. Further, Poaceae and Cyperaceae have proportionally fewer genera, as compared to Bignoniaceae, Sapotaceae, and Annonaceae that have more. Poaceae low richness might be a sampling artifact resulting from grasslands being less prospected, and that could also be the case of Cyperaceae. Asteraceae are clearly a family that is much more distributed in altitude biomes that are not present in Andrafiamena-Andavakoera. Ebenaceae have undergone a dramatic increase in species richness since the figures of whole Madagascar have been published, on account of a large-scale revision of its only Malagasy genus *Diospyros* (e.g. Schatz *et al*., 2022; Linan *et al*., 2024). This is also the case in Sapotaceae (e.g. Boluda *et al*., 2022, 2024), and this is associated with more extensive sampling for this family. Apart from *Diospyros*, diverse genera that are also rich across Madagascar include *Croton*, *Grewia*, and *Dalbergia*. Other species-rich genera in Andrafiamena-Andavakoera include a series of dry deciduous forest specialists like *Commiphora*, but also genera present in more humid forest biomes like *Erythroxylum*, *Noronhia*, and *Mimusops*.

Worldwide distribution of plant species known from the Andrafiamena-Andavakoera protected area

The figure of 80.1% for endemic Malagasy plant species within the protected area can be considered high compared to similar site inventories: 67.9% for Manongarivo (Gautier, 2002) and 63.9% for Beanka (Bolliger, 2014). Although an endemism level of 82% is the current estimate for the Madagascar flora (Madagascar Catalogue), percentages of Malagasy endemics for sites of the same approximate size as the Andrafiamena-Andavakoera protected area are often notably lower. This can be easily understood as non-endemic species are generally more frequent and widely dispersed in Madagascar then endemic species. Consequently, they represent a higher percentage in local checklists than for Madagascar as a whole. With this in mind, the high value for Andrafiamena-Andavakoera is somewhat surprising, and can probably be attributed to a bias of previous

botanical prospection. Given time constraints, as is the case for most of expeditions to protected areas, collectors generally focus on undisturbed environments. In this respect, the extremely low richness for Poaceae discussed above is indicative that secondary areas with grasslands have been poorly prospected.

Madagascar distribution of Andrafiamena-Andavakoera protected area plant species

If we keep aside the widely distributed species that are found across much of the island in a variety of environments, the original flora of the Andrafiamena-Andavakoera protected area clearly points to two main plant domains as source areas. On one side it contains the dry flora of the Northern Sector of the Western Domain, with its impressive diversity that has probably been shaped by the climatic gradients superimposed on the mosaic of substrates and bedrocks. On the other side, there is a clear Sambirano Domain element that, although never dominant, occupies substantial parts of the species spectrum.

When attributing species to a phytogeographic category, we have deliberately discarded the occurrences from the protected area, in order not to accept *a priori* the classification of the area within the Northern Sector of the Western Domain. Consequently, the nine local endemic species are not attributed to any category and are listed separately as local endemics. The fact that seven of them are found on the sandstone of the Andavakoera or Andrafiamena Mountain Ranges and only two on the limestone *tsingy* of Antsahabe, link them more to the humid Sambirano Domain component of the flora than to the dry Northern Sector of the Western Domain.

Our comparisons clearly indicate that the flora of the protected area originates from two different floristic units. Although the inventory presented here is far from exhaustive, there is little overlap between the two sources of the local flora. The limestone plateaus of the northwest of the reserve belong to the Northern Sector of the Western Domain, specifically Ankarana, which is only a few kilometers distant. Phillipson *et al*. (2018) cite seven species from Andrafiamena-Andavakoera that are shared only with the Ankarana Special Reserve. The absence of Sambirano species on the limestone substrates of the protected area also reflects the scarcity of limestone substrate in the Sambirano Domain.

For the non-limestone part of Andrafiamena-Andavakoera, a portion of the flora indicate that its phytogeography affinity is also in majority with the Northern Sector of the Western Domain. However, a larger proportion is shared with the Sambirano. Several aspects must be considered before a conclusion can be drawn:

1) The moist semi-deciduous forests, with their limited extent, are certainly among the less known vegetation formations of Madagascar. They are constituted of humid evergreen species, of dry deciduous species, but also of original so-called tropophilous species that are otherwise only known from the Sambirano Domain. It would not be surprising that with further botanical prospection of the protected area, associated identification and description work, many so far unrecorded species of this group will be identified in the local forests, as it seems to be the case for two putative species in the Sapotaceae (*Labourdonnaisia* sp. 1 and *Mimusops* sp. 5). It can also be expected that several other new species will be discovered (in Sapotaceae: five putative new species on sandstone, one on limestone, and one found on both substrates). These species are likely to be either narrow endemics or shared with the Sambirano, increasing this domain's representation in the Andrafiamena-Andavakoera protected area.
2) It has been documented since the early phytogeographic work on Madagascar (Humbert, 1955) that the secondary forests of the Sambirano were generally composed of species from drier environments that were originating from the neighboring Western Domain (from both Northern and Western Sectors). Following successive shifting cultivation cycles, the more degraded the environment becomes, the more important the encroachment of these Western Domain species is.

Tahinarivony and Gautier (2025) while analyzing the Andrafiamena-Andavakoera protected area landscape, were able to quantify the considerable proportion of land that had been transformed by deforestation probably several centuries earlier. It is thus not surprising that the more xerophilous western species make up such an important part in the protected area's current flora. Further, such plants are more readily collected, being found in transformed vegetation types in less remote areas. However, more detail prospection of the non-limestone substrate flora, particularly out of human-disturbed

zones, is essential to better document the local plant composition and understand phytogeographic relationships.

Conservation

The proportion of the Andrafiamena-Andavakoera protected area flora that has been assessed with respect to IUCN conservation statutes is 66.8%. This is high and rather exceptional with respect to previously published inventories from other sites, which range from between 10 to 20%. It is the direct consequence of the recent publication of the *Red list of trees of Madagascar* (Beech *et al*., 2021), which has boosted the assessment for forest trees.

With 37.9% of its assessed plant species considered as threatened, Andrafiamena-Andavakoera deserves much conservation attention. It is worth noting that only one of the nine Critically Endangered species occur on limestone. Six of these taxa are narrow endemics only known from Andrafiamena-Andavakoera (the three other narrow endemics have not been evaluated) and one extends to the Sambirano. The remaining two species have widely disjoint distributions, with one occurring in the west (south of Maevatanana) and the other one in the extreme south (near Baie des Galions). It should be emphasized that among these CR species, two Sapotaceae species that have received special attention in the survey have been added by Fanamby to their monitoring target species.

Regarding the 30 species in the Endangered category, two species are found both on limestone and other substrates, nine are restricted to limestone, and 19 found only on non-limestone substrates. Outside the protected area, their distribution mainly extends to the Northern sector of the Western Domain (24 species), and to the Sambirano Domain (12 species). With 94% of its species being threatened, the Sapotaceae is by no means representative of the flora of the protected area as a whole, this high figure is not exceptionnal for the family across the island (Gautier *et al*., unpublished data).

Although we cannot exclude that the dry deciduous forest on limestone is floristically of interest, it is well represented in the neighboring Ankarana Special Reserve. Given the amount of botanical prospection at the latter site, this portion of the flora in Andrafiamena-Andavakoera is reasonably well-known. In this respect, the *droit d'usage* for local populations on the Antsahabe Massif appears a sound decision. In turn, a high priority effort is needed to reinforcement concrete conservation actions and further research in the remaining fragments of moist semi-deciduous forest on sandstone of the Andavakoera and Andrafiamena mountain ranges. Our results show that this vegetation type contains the most unique element of the flora of Andrafiamena-Andavakoera, related with the contiguous Sambirano Domain. Its conservation is of primary importance, given how few relatively intact forest fragments remain of this formation, which are increasingly scattered along the sandstone range that used to link Andavakoera-Andrafiamena forests with those of the Galoko and Kalobinono Massifs.

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Appendix 1. List of the angiosperms of the Paysage Harmonieux Protégé d'Andrafiamena Andavakoera with (for identified species): IUCN threat category; worldwide distribution; and distribution in main phytogeographic territories of Madagascar (abbreviations and explanations in the text). Nomenclature and author standard abbreviations follow the Madagascar Catalogue. Occurrences with collector number, altitude, and * for collections on limestone. Abbreviation of main collectors as follows: CGB: Carlos Galan Boluda; LG: Laurent Gautier; SF: Service forestier; TAJ: Jacquis Andonahary Tahinarivony; ZB: Zuzana Burivalova.

Acanthaceae

***Anisotes* Nees**

Anisotes subcoriaceus T. F. Daniel, Letsara & Martín-Bravo — **NE** — M [Sb]
Daniel 11878, 500 m; Daniel 11879; Letsara 127, 317 m.

Anisotes sp. 1
ZB 41, 637 m.

***Asystasia* Blume**

Asystasia gangetica (L.) T. Anders. — **NE** — M [E, C, Sb, W(N), W(W)]; Paleotrop.
Razafitsalama 724, 101 m.

***Dyschoriste* Nees**

Dyschoriste clarkei (Vatke) Benoist — **NE** — M [Sb]
Letsara 280, 328 m*.

***Hypoestes* Salisb.**

Hypoestes sp. 1
Letsara 210, 494 m*.

Hypoestes sp. 2
Letsara 212, 494 m*.

***Isoglossa* Oerst.**

Isoglossa sp. (nv)
ZB 110, 431 m*; ZB 77, 376 m*.

***Justicia* L.**

Justicia sp. 1
Letsara 149, 317 m; Letsara 231, 494 m.

Justicia sp. 2
Letsara 208, 494 m*.

Justicia sp. 3
Letsara 253, 583 m.

***Lankesteria* Lindau**

Lankesteria glandulosa Benoist — **NE** — M [W(N), W(W)]
Letsara 135, 317 m; Razafitsalama 721, 101 m.

Appendix 1. (continued)

Acanthaceae – suite

***Mendoncia* Vell.**

Mendoncia vinciflora Benoist — **LC** — M [E, C, W(N)]
Razafitsalama 887, 508 m.

***Populina* Baill.**

Populina richardii Baill. — **NE** — M [W(N)]
Letsara 209, 494 m*.

***Ruellia* L.**

Ruellia sp. (cf.)
ZB 180, 421 m.

Genus indet.
Razafitsalama 711, 101 m (nv); ZB 63, 497 m (nv).

Achariaceae

***Prockiopsis* Baill.**

Prockiopsis hildebrandtii Baill. — **NT** — M [Sb, W(N), W(W)]
LG 7075, 360 m; LG 7086, 420 m; LG 7089, 425 m.

Anacardiaceae

***Abrahamia* Randrian. & Lowry**

Abrahamia capuronii Randrian. & Lowry — **VU** — M [E, C, W(N)]
LG 5432, 465 m; LG 5468, 390 m; TAJ 1705, 310 m*.

Abrahamia nitida (Engl.) Randrian. & Lowry — **NT** — M [E]
Letsara 145, 317 m; Letsara 276, 560 m.

Abrahamia sambiranensis Randrian. & Lowry — **VU** — M [Sb]
Letsara 191, 317 m; Letsara 277, 560 m; LG 5383, 410 m; Randrianaivo 1201, 50 m; SF 18947; TAJ 1737, 600 m.

Abrahamia sp. (nv)
Guittou 236, 454 m.

***Operculicarya* H. Perrier**

Operculicarya gummifera (Sprague) Capuron — **LC** — M [C, W(N), W(W), S]; Com.; Seych.
CGB 18026, 380 m; TAJ 1685, 385 m*.

***Poupartia* Comm. ex Juss.**

Poupartia silvatica H. Perrier — **LC** — M [Sb, W(N), W(W), S]
CGB 18059, 345 m; LG 7127, 435 m*.

Appendix 1. (continued)

Anacardiaceae – suite

Poupartia sp. 1 ZB 112, 552 m*.		
***Rhus* L.**		
Rhus perrieri (Courchet) H. Perrier LG 5422, 565 m*.	**LC**	M [W(N), W(W), S]
Rhus thouarsii (Engl.) H. Perrier LG 5469, 390 m; SF 18939; SF 18940; SF 19572.	**LC**	M [E, C, Sb, W(N)]
***Spondias* L.**		
Spondias dulcis Parkinson ZB 47, 570 m*.	**LC**	M [W(N), W(W)]; Pantrop.

Annonaceae

***Ambavia* Diels**		
Ambavia gerrardii (Baill.) Le Thomas LG 5380, 410 m; Randrianaivo 1196, 50 m; Razafitsalama 709, 101 m; TAJ 1736 bis, 600 m.	**LC**	M [E, C]
***Artabotrys* R.Br.**		
Artabotrys mabifolius Diels TAJ 1669, 440 m*.	**NE**	M [E, C, Sb, W(N)]
***Huberantha* Chaowasku**		
Huberantha henrici (Diels) Chaowasku Léopold 152, 455 m; LG 7119, 325 m*.	**LC**	M [W(N), W(W)]
***Monanthotaxis* Baill.**		
Monanthotaxis caesia (Diels) Verdc. ZB 155, 368 m*.	**NE**	M [Sb, W(N), W(W)]
Monanthotaxis pilosa (Baill.) Verdc. LG 7091, 450 m; Razafitsalama 715, 101 m.	**NE**	M [E, Sb, W(N), W(W)]
Monanthotaxis sp. (nv) Razafitsalama 881, 508 m.		
***Uvaria* L.**		
Uvaria lombardii L. Gaut. & Deroin CGB 18016, 325 m; ZB 79, 492 m*.	**NE**	M [Sb, W(N), W(W)]
Uvaria sp. (nv) ZB 107, 376 m*.		

Appendix 1. (continued)

Annonaceae – suite

***Xylopia* L.**

Xylopia ambanjensis Cavaco & Keraudren — **EN** — M [Sb, W(N)]
Letsara 238, 494 m; LG 5471, 315 m.

Xylopia bemarivensis Diels — **NT** — M [Sb, W(N)]
ZB 157, 368 m.

Aphloiaceae

***Aphloia* (DC.) Benn.**

Aphloia theiformis (Vahl) Benn. — **LC** — M [E, C, Sb, W(N)]
Leopold 109, 273 m; Léopold 128, 432 m; Letsara 134, 317 m; ZB 3, 310 m.

Apocynaceae

***Carissa* L.**

Carissa spinarum L. — **LC** — M [E, C, Sb, W(N), W(W)]; Paleotrop.
CGB 18012, 385 m; Léopold 135, 432 m; LG 5390, 605 m; Rakotondrafara 494, 528 m; Randrianaivo 1225, 54 m; TAJ 1698, 500 m; TAJ 1725, 360 m*; ZB 67, 422 m; ZB 9, 381 m.

***Cerbera* L.**

Cerbera manghas L. — **LC** — M [E, C, Sb, W(N), W(W), S]; Paleotrop.
Guittou 152, 45 m*; LG 5426, 495 m*; TAJ 1654, 345 m*; TAJ 1756, 320 m*; ZB 111, 552 m*; ZB 45, 507 m*.

Cerbera sp. (nv)
Razafitsalama 914, 174 m*.

***Cryptostegia* R.Br.**

Cryptostegia madagascariensis Bojer ex Decne. — **NE** — M [Sb, W(N), W(W)]
ZB 87, 339 m*.

***Cynanchum* L.**

Cynanchum sp. 1 (cf. *implicatum* (Jum. & H. Perrier) Jum. & H. Perrier)
TAJ 1747, 350 m*.

Cynanchum sp. 2
CGB 18008, 455 m.

***Landolphia* A.DC.**

Landolphia exilis Jum. & H. Perrier — **NE** — M [C, Sb]
Perrier 18637; Randrianaivo 1219, 54 m; Razafitsalama 700, 58 m.

Appendix 1. (continued)

Apocynaceae – suite

Landolphia sp. 1 (cf. *myrtifolia* (Poir.) Markgr., based on viewed image)
Guittou 238, 454 m.

Landolphia sp. 2 (based on viewed image)
Léopold 138, 432 m; Letsara 142, 317 m; Letsara 202, 317 m.

***Leptadenia* Decne.**

Leptadenia madagascariensis Decne. **NE** M [C, W(N), W(W), S]; Com.
LG 5454, 415 m*.

***Mascarenhasia* A.DC.**

Mascarenhasia angustifolia A. DC. **NE** M [Sb, W(W)]
LG 5409, 360 m.

Mascarenhasia arborescens A. DC. **NE** M [E, C, Sb, W(N), W(W)]; Com.; Seych.; Aft
Guittou 249, 505 m; Léopold 131, 432 m; Letsara 243, 494 m; Letsara 267, 560 m; LG 7068, 330 m; Ratovoson 894, 100 m.

Mascarenhasia lanceolata A. DC. **LC** M [Sb, W(N)]
Leopold 103, 249 m.

***Pachypodium* Lindl.**

Pachypodium rutenbergianum Vatke **LC** M [W(N), W(W)]
Letsara 205, 470 m*.

***Petchia* Livera**

Petchia erythrocarpa (Vatke) Leeuwenb. **LC** M [E, C, Sb, W(N), W(W)]; Com.
Letsara 236, 494 m; ZB 31, 567 m.

***Plectaneia* Thouars**

Plectaneia thouarsii Roem. & Schult. **NE** M [E, C, Sb, W(N), W(W), S]
LG 7083, 445 m; ZB 30, 566 m.

Plectaneia sp. 1
LG 5396, 350 m.

***Rauvolfia* L.**

Rauvolfia obtusiflora A. DC. **LC** M [Sb, W(N)]
CGB 18030, 360 m; LG 5401, 485 m; Ratovoson 890, 100 m; TAJ 1703, 310 m*; ZB 151, 368 m.

***Secamone* R.Br.**

Secamone linearifolia Klack. **NE** M [E, C, Sb, W(N)]
ZB 153, 368 m.

Appendix 1. (continued)

Apocynaceae – suite

Secamone sp. 1 (cf. *oleifolia* Decne.)
LG 5397, 350 m.
Secamone sp. 2
TAJ 1755, 320 m*.

***Stephanostegia* Baill.**

Stephanostegia hildebrandtii Baill. **LC** M [Sb, W(N), W(W)]
Randrianaivo 1467, 81 m; Ratovoson 898, 100 m; SF 24551; TAJ 1683, 385 m*; ZB 212, 304 m.
Stephanostegia sp. 1
CGB 18088, 420 m.

***Strophanthus* DC.**

Strophanthus boivinii Baill. **LC** M [W(N), W(W), S]
TAJ 1724, 360 m*; ZB 85, 339 m*.

***Tabernaemontana* L.**

Tabernaemontana calcarea Pichon **LC** M [W(N), W(W)]
Ratovoson 891, 100 m; ZB 76, 592 m*.
Tabernaemontana coffeoides Bojer ex A. DC. **LC** M [E, C, Sb, W(N), W(W), S]; Com.; Seych.
Perrier 8932.

Aptandraceae

***Anacolosa* Blume**

Anacolosa pervilleana Baill. **LC** M [Sb, W(N), W(W)]
TAJ 1713, 310 m*.

Araceae

***Amorphophallus* Blume ex Decne.**

Amorphophallus ankarana Hett. & Ittenb. & Bogner **VU** M [W(N), W(W)]
TAJ 1722, 360 m*; ZB 73, 554 m*.

***Carlephyton* Jum.**

Carlephyton madagascariense Jum. **EN** M [Sb, W(N)]
TAJ 1723, 360 m*.

Appendix 1. (continued)

Araliaceae

***Polyscias* J.R.Forst. & G.Forst.**

Polyscias boivinii (Seem.) Bernardi — **LC** — M [W(N), W(W)]
CGB 18024, 380 m; Léopold 127, 432 m; LG 5453, 340 m*; ZB 168, 365 m.

Polyscias nossibensis (Drake) Harms — **NT** — M [C, Sb]
Guittou 245, 552 m; LG 5438, 720 m.

Arecaceae

***Dypsis* Noronha ex Mart.**

Dypsis sp. 1
ZB 98, 470 m.

Asparagaceae

***Asparagus* L.**

Asparagus sp. 1 (aff. *vaginellatus* Bojer ex Baker (nv)).
Guittou 254, 505 m.

***Dracaena* Vand. ex L.**

Dracaena sp. 1
CGB 18022, 310 m; CGB 18062, 385 m; Letsara 178, 317 m; ZB 123, 576 m*; ZB 48, 570 m*.

Dracaena sp. 2
CGB 18095, 735 m*.

Dracaena sp. (nv)
Guittou 237, 454 m; Leopold 99, 249 m.

Asteraceae

***Brachylaena* R.Br.**

Brachylaena merana Humbert — **LC** — M [C, Sb, W(N), W(W)]
Letsara 190, 317 m; TAJ 1689, 380 m.

Brachylaena ramiflora (DC.) Humbert — **LC** — M [E, C, W(W)]; Com.
ZB 53, 560 m*.

Brachylaena sp. 1 (aff. *microphylla* Humbert)
TAJ 1731, 600 m.

***Psiadia* Jacq. ex Willd.**

Psiadia serrata (Humbert) Humbert — **NE** — M [E, C, Sb, W(N)]
Letsara 117, 317 m.

Appendix 1. (continued)

Asteraceae – suite

***Vernonia* Schreb.**

Vernonia cephalophora Oliv. **NE** M [Sb, W(N)]
Letsara 140, 317 m; LG 7076, 385 m; Perrier 3154; Razafitsalama 706, 58 m.

Vernonia sp. 1 (aff. *latisquamata* (Humbert) Humbert)
Letsara 116, 317 m.

Asteropeiaceae

***Asteropeia* Thouars**

Asteropeia amblyocarpa Tul. **LC** M [Sb, W(N)]
LG 5443, 550 m; Randrianaivo 1222, 54 m; Ratovoson 904, 100 m.

Balsaminaceae

***Impatiens* L.**

Impatiens tuberosa H. Perrier **NE** M [W(N)]
ZB 125, 574 m*.

Bignoniaceae

***Colea* Bojer**

Colea ratovosonii (Callm. & Phillipson) Callm. Phillipson & Buerki **EN** M [Sb, W(N)]
ZB 32, 513 m.

Colea sp. 1
LG 7073, 345 m.

***Fernandoa* Welw.**

Fernandoa sp. 1 **NE** M [W(N)]
ZB 50, 563 m*.

***Perichlaena* Baill.**

Perichlaena richardii Baill. **NE** M [Sb, W(N)]
ZB 37, 500 m*.

***Phyllarthron* DC.**

Phyllarthron sp. 1
ZB 141, 390 m; ZB 35, 439 m.

***Phylloctenium* Baill.**

Phylloctenium bernieri Baill. **NE** M [W(N)]
LG 7071, 340 m.

Appendix 1. (continued)

Bignoniaceae – suite

***Rhodocolea* Baill.**

Rhodocolea boivinii (Baill.) H. Perrier — **VU** — M [E, Sb, W(N), W(W)]
LG 7077, 315 m; ZB 62, 474 m.

***Stereospermum* Cham.**

Stereospermum hildebrandtii (Baill.) H. Perrier — **VU** — M [Sb, W(N)]
Guittou 253, 505 m; TAJ 1726, 360 m*.

Stereospermum longiflorum Capuron — **VU** — M [W(N)]
LG 7123, 380 m*; ZB 75, 592 m*.

Burseraceae

***Ambilobea* Capuron**

Ambilobea madagascariensis (Capuron) Thulin, Beier & Razafim. — **VU** — M [Sb, W(N)]
CGB 18025, 380 m; LG 5403, 505 m; SF 19575; SF 19576.

***Canarium* L.**

Canarium multiflorum Engl. — **LC** — M [Sb, W(N), W(W)]
LG 7108, 320 m; Randrianaivo 1456, 454 m; SF 21-R-289; ZB 210, 703 m.

***Commiphora* Jacq.**

Commiphora ankaranensis (J.-F. Leroy) Cheek & Rakot. — **VU** — M [W(N)]
CGB 18049, 335 m; LG 5411, 360 m; LG 7103, 405 m; LG 7125, 390 m*; Randrianasolo 499, 87 m; TAJ 1671, 440 m*; ZB 49, 563 m*.

Commiphora arafy H. Perrier — **VU** — M [W(N), W(W)]
Randrianaivo 1345*. Specimen associated with doubt: Razafitsalama 911, 174 m*.

Commiphora capuronii Bardot-Vaucoulon — **VU** — M [W(N)]
LG 7126, 400 m*.

Commiphora grandifolia Engl. — **LC** — M [W(N), W(W), S]
LG 7098, 385 m.

Commiphora lasiodisca H. Perrier — **NT** — M [Sb, W(N), W(W)]
Randrianaivo 1096, 155 m; TAJ 1750, 340 m*.

Commiphora sp. (nv)
Razafitsalama 708, 58 m.

Buxaceae

***Didymeles* Thouars**

Didymeles sp. 1
ZB 40, 637 m.

Appendix 1. (continued)

Calophyllaceae

***Calophyllum* L.**

Calophyllum recedens Jum. & Perrier — **VU** — M [Sb, W(N), W(W)]
Letsara 196, 317 m.

Calophyllum vernicosum P. F. Stevens — **EN** — M [Sb, W(N), W(W)]
CGB 18009, 455 m; LG 5393, 585 m; Randrianaivo 1098, 44 m; Ratovoson 899, 100 m; Ratovoson 901, 100 m.

***Mammea* L.**

Mammea punctata (H. Perrier) P. F. Stevens — **NE** — M [Sb, W(N), W(W)]
LG 5384, 410 m. Specimen associated with doubt: Letsara 268, 560 m.

Mammea sp. (nv)
Léopold 134, 432 m.

Canellaceae

***Cinnamosma* Baill.**

Cinnamosma sp. 1 — **NE** — M [W(N), W(W)]
CGB 18023, 380 m; LG 5418, 540 m*; ZB 56, 560 m*.

Cinnamosma sp. (nv)
SF 18946.

Cannabaceae

***Celtis* L.**

Celtis bifida Leroy — **LC** — M [W(N), W(W)]
Letsara 213, 494 m*.

***Trema* Lour.**

Trema orientale (L.) Blume — **LC** — M [E, C, Sb, W(N), W(W), S]; Paleotrop.
ZB 134, 512 m.

Capparaceae

***Maerua* Forssk.**

Maerua cylindrocarpa Hadj-Moust. — **NE** — M [W(N), W(W)]
Letsara 215, 494 m*; Randrianasolo 525, 57 m*.

***Thilachium* Lour.**

Thilachium sp. (cf.)
Letsara 192, 317 m.

Appendix 1. (continued)

Celastraceae

***Brexia* Noronha ex Thouars**

Brexia sp. 1
ZB 197, 525 m*.

Brexia sp. (nv)
Razafitsalama 893, 508 m.

***Mystroxylon* Eckl. & Zeyh.**

Mystroxylon aethiopicum (Thunb.) Loes. **LC** M [E, C, Sb, W(N), W(W)]; Com.; Aft
Letsara 141, 317 m; Letsara 263, 557 m; LG 5425, 510 m*.

***Polycardia* DC.**

Polycardia lateralis O. Hoffm. **NE** M [Sb, W(N), W(W)]
Letsara 131, 317 m.

Polycardia libera O. Hoffm. **LC** M [E, C, Sb, W(N)]
CGB 18089, 420 m; Letsara 284, 317 m; LG 5412, 360 m.

***Salacia* L.**

Salacia madagascariensis (Lam.) DC. **NE** M [E, C, Sb, W(N), W(W)]; Aft
TAJ 1707, 310 m*.

Genus indet.

Celastraceae indet. 1
LG 5455, 415 m*; LG 7133, 535 m*.

Chrysobalanaceae

***Grangeria* Comm. ex Juss.**

Grangeria porosa Boivin ex Baill. **LC** M [Sb, W(N), W(W)]
CGB 18077, 310 m; Ratovoson 887, 100 m; ZB 159, 380 m.

***Thelira* Thouars**

Thelira sp. 1 **NE** M [Sb, W(N), W(W)]
CGB 18014, 330 m; LG 5394, 435 m; Randrianaivo 1195, 49 m; Razafitsalama 718, 101 m.

Clusiaceae

***Garcinia* L.**

Garcinia calcicola (Jum. & H. Perrier) P. W. Sweeney & Z. S. Rogers **LC** M [W(N), W(W)]
ZB 203, 558 m*.

Garcinia evonymoides (Planch. & Triana) P. Sweeney & Z. S. Rogers **VU** M [E, Sb, W(N)]
Leopold 113, 65 m; Randrianaivo 1200, 50 m.

Appendix 1. (continued)

Clusiaceae – suite

Garcinia pervillei (Planch. & Triana) Vesque Letsara 153, 317 m; ZB 183, 713 m.	**NT**	M [E, Sb, W(N), W(W)]
Garcinia verrucosa Jum. & H. Perrier Léopold 145, 455 m; ZB 42, 637 m.	**LC**	M [E, C, Sb, W(N)]
Garcinia sp. 1 (aff. *dauphinensis* P. Sweeney & Z. S. Rogers) Rakotondrafara 489, 528 m.		
***Symphonia* L.f.**		
Symphonia linearis H. Perrier CGB 18091, 395 m; ZB 97, 470 m.	**VU**	M [E, C, Sb, W(N)]
Symphonia oligantha Baker LG 5445, 353 m; LG 7078, 320 m.	**EN**	M [C, Sb]
Symphonia sp. (nv) Léopold 143, 432 m.		
Genus indet. Ratovoson 902, 100 m. (nv)		

Combretaceae

***Combretum* Loefl.**		
Combretum coccineum (Sonn.) Lam. Ratovoson 892, 100 m.	**NE**	M [E, C, Sb, W(N), W(W)]; Masc.
Combretum subumbellatum (Baker) Jongkind ZB 196, 364 m*; ZB 91, 373 m*.	**NE**	M [C, W(W)]
Combretum sp. 1 CGB 18052, 345 m.		
***Terminalia* L.**		
Terminalia calcicola H. Perrier Guittou 154, 45 m*. Specimen associated with doubt: TAJ 1739, 310 m.	**LC**	M [W(N), W(W)]
Terminalia exsculpta Tul. Guittou 163, 76 m*; Rakotondrafara 309, 40 m; Randrianasolo 500, 87 m; SF 18945.	**EN**	M [Sb]
Terminalia tropophylla H. Perrier Randrianaivo 1397, 52 m; TAJ 1751, 340 m*.	**LC**	M [W(N), W(W), S]
Terminalia sp. 1 LG 7130, 495 m*.		
Terminalia sp. 2 CGB 18086, 515 m; TAJ 1738, 310 m.		

Appendix 1. (continued)

Commelinaceae

***Commelina* L.**

Commelina sp. 1 (aff. *erecta* L.)
ZB 201, 558 m*.

***Murdannia* Royle**

Murdannia simplex (Vahl) Brenan — **LC** — M [E, C, W(N), W(W)]; Paleotrop.
ZB 179, 418 m*.

Connaraceae

***Agelaea* Sol. ex Planch.**

Agelaea pentagyna (Lam.) Baill. — **NE** — M [E, C, Sb, W(N)]; Com.; Masc.; Aft
Léopold 122, 432 m.

***Cnestis* Juss.**

Cnestis polyphylla Lam. — **LC** — M [E, C, Sb, W(N)]; Aft
LG 5379, 410 m; LG 5472, 340 m.

Cnestis sp. (nv)
Guittou 241, 454 m.

***Ellipanthus* Hook.f.**

Ellipanthus sp. 1
CGB 18038, 325 m; Léopold 98, 249 m; Rakotonandrasana 927, 40 m.

***Rourea* Aubl.**

Rourea orientalis Baill. — **LC** — M [Sb, W(N), W(W)]; Aft
LG 7069, 335 m; Ratovoson 907, 100 m; TAJ 1659, 340 m*; ZB 132, 514 m.

Convolvulaceae

***Bonamia* Thouars**

Bonamia spectabilis (Choisy) Hallier f. — **NE** — M [C, Sb, W(N), W(W)]; Aft
Razafitsalama 704, 58 m.

Cunoniaceae

***Pterophylla* R.Br.**

Pterophylla bojeriana (Tul.) J. Bradford & Z. S. Rogers — **LC** — M [E, C, Sb]
LG 5436, 720 m.

Appendix 1. (continued)

Cyperaceae		
***Carex* L.**		
Carex sp. 1		
LG 5477, 415 m.		
***Rhynchospora* Vahl**		
Rhynchospora rugosa (Vahl) Gale	**LC**	M [E, C]; Cosm.
LG 5408, 380 m.		
***Scleria* P.J.Bergius**		
Scleria rosea Cherm.	**LC**	M [E, C, Sb, W(N)]
LG 5407, 380 m; LG 7118, 415 m.		
Scleria secans (L.) Urb.	**LC**	M [E, C, Sb]; Pantrop.
Sight record (image C. Boluda).		
Dichapetalaceae		
***Dichapetalum* Thouars**		
Dichapetalum madagascariense Poir.	**LC**	M [E, C, Sb, W(N), W(W)]; Com.; Aft
LG 7080, 400 m.		
Dilleniaceae		
***Tetracera* L.**		
Tetracera rutenbergii Buchenau	**LC**	M [W(N), W(W)]
Ratovoson 903, 100 m; ZB 143, 311 m.		
Dioscoreaceae		
***Dioscorea* L.**		
Dioscorea buckleyana Wilkin	**EN**	M [W(N)]
Guittou 255, 505 m.		
Ebenaceae		
***Diospyros* L.**		
Diospyros antsirananae G. E. Schatz & Lowry	**VU**	M [W(N)]
ZB 44, 525 m*.		
Diospyros bernieriana (Baill.) H. Perrier	**LC**	M [Sb, W(N), W(W)]; Com.
Léopold 142, 432 m.		
Diospyros chitoniophora Capuron ex A. G. Linan, G. E. Schatz & Lowry	**VU**	M [W(N)]
Randrianaivo 1350, 208 m*; ZB 118, 570 m*.		

Appendix 1. (continued)

Ebenaceae – suite

Diospyros comorensis Hiern Randrianaivo 1107, 57 m; TAJ 1684, 385 m*.	**NE**	M [Sb, W(N), W(W)]; Com.
Diospyros crassifolia G. E. Schatz & Lowry CGB 18028, 370 m; LG 7067, 330 m.	**VU**	M [W(N)]
Diospyros haplostylis Boivin ex Hiern Guittou 234, 454 m; Leopold 110, 273 m; SF 18950.	**LC**	M [E, C, Sb, W(N), W(W)]
Diospyros malandy H. N. Rakouth, Randrianaivo, G. E. Schatz & Lowry Rakotondrajaona 387, 206 m*; TAJ 1749, 350 m*.	**EN**	M [W(N)]
Diospyros occlusa H. Perrier LG 5385, 410 m; TAJ 1687, 380 m.	**LC**	M [E, C, Sb, W(N)]
Diospyros olacinoides (H. Perrier) G. E. Schatz & Lowry ZB 18, 422 m. Specimen associated with doubt: Léopold 150, 455 m (based on viewed image)	**LC**	M [W(N), W(W)]
Diospyros perglauca H. Perrier Léopold 151, 455 m.	**EN**	M [Sb, W(W)]
Diospyros quadrangularis G. E. Schatz & Lowry ZB 33, 511 m.	**LC**	M [E, C]
Diospyros randrianaivoi G. E. Schatz, Lowry & Mas Léopold 97, 249 m; Randrianaivo 1101, 44 m.	**NE**	M [Sb]
Diospyros subtrinervis H. Perrier ZB 12, 445 m.	**CR**	M [W(W)]
Diospyros sp. 1 LG 7093, 335 m. Specimen associated with doubt: LG 7100, 360 m.		
Diospyros sp. 2 LG 7094, 340 m.		
Diospyros sp. 3 LG 7102, 395 m.		
Diospyros sp. 4 TAJ 1734, 600 m.		
Diospyros sp. 5 TAJ 1672, 440 m*.		
Diospyros sp. 6 Randrianaivo 1105, 57 m; Randrianaivo 1471, 81 m.		
Diospyros sp. (nv) Letsara 162, 317 m; Letsara 163, 317 m; Letsara 168, 317 m.		

Appendix 1. (continued)

Ehretiaceae		
***Bourreria* P.Browne**		
Bourreria labatii (J. S. Mill.) J. S. Mill. & Gottschling Rakotondrajaona 388, 206 m*.	**VU**	M [W(N), W(W)]
***Ehretia* P.Browne**		
Ehretia cymosa Thonn. ZB 114, 349 m*.	**LC**	M [E, C, Sb, W(N), W(W)]; Com.; Masc.; Aft
Erythroxylaceae		
***Erythroxylum* P.Browne**		
Erythroxylum coffeifolium Baill. LG 5464, 545 m*; ZB 198, 526 m*; ZB 84, 551 m*.	**VU**	M [Sb, W(N)]
Erythroxylum gerrardii Baker subsp. *ankaranaense* H. Perrier ZB 129, 470 m.	**NE**	M [E, C, W(N), W(W)]
Erythroxylum platyclados Bojer Ratovoson 893, 100 m; ZB 104, 325 m*; ZB 144, 311 m.	**LC**	M [E, Sb, W(N), W(W)]; Com.; Aft
Erythroxylum xerophilum H. Perrier LG 7092, 335 m.	**NE**	M [C, W(N), W(W)]
Erythroxylum sp. 1 ZB 207, 563 m*.		
Erythroxylum sp. 2 (aff. *pervillei* Baill.) LG 7121, 380 m*.		
Erythroxylum sp. 3 (aff. *corymbosum* Baill.) ZB 204, 558 m*.		
Erythroxylum sp. 4 (aff. *lanceum* Bojer) TAJ 1745, 350 m*.		
Erythroxylum sp. 5 (aff. *ferrugineum* Cav.) CGB 18032, 360 m.		
Erythroxylum sp. (nv) Léopold 129, 432 m; Léopold 140, 432 m.		
Euphorbiaceae		
***Acalypha* L.**		
Acalypha menavody (Leandri) I. Montero & Cardiel CGB 18047, 335 m.	**NE**	M [W(N)]

Appendix 1. (continued)

Euphorbiaceae – suite

Acalypha urophylla Boivin ex Baill. LG 7059, 405 m; ZB 21, 468 m.	**NE**	M [E, C, Sb, W(N), W(W)]; Com.
***Adenochlaena* Boivin ex Baill.**		
Adenochlaena leucocephala Baill. ZB 178, 418 m*.	**NE**	M [Sb, W(N), W(W)]; Com.
***Argomuellera* Pax**		
Argomuellera integra McPherson CGB 18019, 340 m; Letsara 211, 494 m*; LG 7107, 455 m.	**VU**	M [W(N), W(W)]
***Croton* L.**		
Croton argyrodaphne Baill. Leopold 115, 65 m.	**LC**	M [E, Sb, W(N), W(W)]
Croton bemaranus Leandri TAJ 1660, 340 m*; ZB 68, 563 m*.	**NE**	M [W(N), W(W)]
Croton bernieri Baill. Letsara 221, 494 m*; LG 7122, 380 m*; TAJ 1658, 335 m*; TAJ 1709, 310 m*.	**LC**	M [W(N), W(W)]
Croton boivinianus (Baill.) Baill. Letsara 130, 317 m.	**NE**	M [C, W(N)]
Croton nudatus Baill. van Ee 1127, 500 m; ZB 137, 512 m; ZB 34, 361 m. Specimen associated with doubt: Letsara 261, 557 m (based on viewed image).	**NE**	M [W(N)]
Croton sahafariensis Kainul. & P. E. Berry van Ee 1125, 500 m.	**NE**	M [W(N)]
Croton scoriarum Leandri van Ee 1126, 500 m.	**EN**	M [C, W(N)]
Croton sp. 1 ZB 92, 402 m*.		
Croton sp. 2 (cf. *brevispicatus* Baill.) CGB 18074, 340 m.		
Croton sp. 3 (aff. *jennyanus* Griseb. ex Baill.) ZB 186, 726 m.		
Croton sp. 4 LG 7099, 385 m.		
Croton sp. 5 TAJ 1695, 500 m.		

Appendix 1. (continued)

Euphorbiaceae – suite

Croton sp. 6 (cf. *cupreolepis* P. E. Berry, B. W. van Ee & Kainul.) Letsara 133, 317 m; Letsara 246, 494 m.		
Croton sp. 7 TAJ 1714, 310 m*.		
Croton sp. 8 (cf. *mongue* Baill. (based on viewed image)) Letsara 132, 317 m.		
Croton sp. (nv) LG 5478, 415 m; Ratovoson 884, 100 m; Razafitsalama 888, 508 m.		
***Dalechampia* L.**		
Dalechampia clematidifolia Baill. ZB 169, 398 m.	**NE**	M [C, W(N), W(W), S]
Dalechampia subternata Müll. Arg. Ratovoson 896, 100 m.	**NE**	M [C, W(N), W(W), S]
***Euphorbia* L.**		
Euphorbia haevermansii X. Aubriot & Lowry Razafitsalama 900, 508 m; TAJ 1666, 450 m*; ZB 46, 570 m*.	**EN**	M [W(N)]
Euphorbia sp. 1 TAJ 1657 a, 335 m*.		
***Excoecaria* L.**		
Excoecaria madagascariensis (Baill.) Müll. Arg. ZB 115, 349 m*.	**NE**	M [E, Sb, W(N)]
Excoecaria sp. 1 TAJ 1664, 425 m*.		
***Givotia* Griff.**		
Givotia stipularis Radcl.-Sm. TAJ 1743, 350 m*.	**NT**	M [W(N), W(W)]
***Grossera* Leandri**		
Grossera perrieri Leandri CGB 18058, 345 m; ZB 93, 384 m*.	**LC**	M [W(N), W(W)]
***Macaranga* Thouars**		
Macaranga boutonioides Baill. LG 5402, 485 m; SF 10595, 564 m.	**LC**	M [E, C, Sb, W(N), W(W)]

Appendix 1. (continued)

Euphorbiaceae – suite

***Mallotus* Lour.**		
Mallotus oppositifolius (Geiseler) Müll. Arg.	**LC**	M [Sb, W(N), W(W)]; Aft
CGB 18064, 350 m.		
Mallotus sp. 1		
ZB 106, 376 m*.		
***Sapium* Jacqu.**		
Sapium sp. (nv)		
Razafitsalama 714, 101 m.		
***Suregada* Roxb. ex Rottler & Willd.**		
Suregada boiviniana Baill.	**LC**	M [E, C, Sb, W(N), W(W)]
LG 7065, 320 m; LG 7101, 340 m; Razafitsalama 897, 508 m.		

Fabaceae

***Alantsilodendron* Villiers**		
Alantsilodendron villosum (R. Vig.) Villiers	**NE**	M [W(N)]
Perrier 3086.		
***Albizia* Durazz.**		
Albizia boinensis R. Vig.	**LC**	M [W(N), W(W)]
TAJ 1653, 345 m*; TAJ 1682, 385 m*; ZB 55, 560 m*.		
Albizia boivinii E. Fourn.	**LC**	M [Sb, W(N), W(W)]
CGB 18048, 335 m; ZB 64, 385 m.		
Albizia mainaea Villiers	**LC**	M [Sb, W(N), W(W)]
LG 5414, 500 m*.		
***Baudouinia* Baill.**		
Baudouinia fluggeiformis Baill.	**LC**	M [W(N), W(W)]
LG 7116, 350 m; TAJ 1655, 335 m*; TAJ 1668, 440 m*; TAJ 1686, 380 m.		
***Bauhinia* L.**		
Bauhinia grevei Drake	**LC**	M [W(W)]
Rakotondrajaona 386, 206 m*.		
Bauhinia hildebrandtii Vatke	**LC**	M [Sb, W(N), W(W)]
Razafitsalama 699, 699 m; TAJ 1717, 310 m*; ZB 120, 570 m*.		
***Chadsia* Baill.**		
Chadsia coluteifolia Baill.	**NE**	M [W(N)]
TAJ 1657, 335 m*.		

Appendix 1. (continued)

Fabaceae – suite

Chadsia longidentata R. Vig. Perrier 4148.	**EN**	M [W(N)]
Chadsia racemosa Drake SF 24736.	**NE**	M [Sb, W(N)]
Chadsia salicina Baill. LG 5449, 330 m*; TAJ 1716, 310 m*; ZB 195, 397 m*.	**LC**	M [Sb, W(N), W(W)]
***Cordyla* Lour.**		
Cordyla madagascariensis R. Vig. subsp. *tamarindoides* (Capuron) Du Puy & Labat LG 7128, 450 m*; Rakotondrajaona 383, 206 m*; TAJ 1721, 350 m*.	**NT**	M [W(N), W(W), S]
***Crotalaria* L.**		
Crotalaria pervillei Baill. Razafitsalama 722, 101 m.	**NE**	M [W(N), W(W)]
Crotalaria sp. (nv) Randrianaivo 1469, 81 m.		
***Dalbergia* L.f.**		
Dalbergia bracteolata Baker Guittou 244, 552 m.	**LC**	M [Sb, W(N), W(W), S]; Aft
Dalbergia densicoma Baill. Karatra 566, 447 m; LG 7084, 445 m; Randrianaivo 1091, 50 m; SF 18937.	**NE**	M [Sb, W(N), W(W)]
Dalbergia glaberrima Bosser & R. Rabev. subsp. *ankaranensis* Bosser & R. Rabev. Karatra 563, 440 m; Karatra 564, 440 m; LG 7117, 320 m.	**VU**	M [W(N), W(W)]
Dalbergia karatrae N. Wilding, Phillipson & Crameri Guittou 155, 45 m*.	**NE**	M [W(N)]
Dalbergia rajeryi N. Wilding, Phillipson & Crameri Rakotondrafara 490, 528 m.	**NE**	M [W(N), W(W)]
Dalbergia urschii Bosser & R. Rabev. Karatra 565, 447 m; Letsara 251, 583 m.	**EN**	M [W(N)]
Dalbergia viguieri Bosser & R. Rabev. Guittou 252, 505 m; LG 7070, 335 m.	**VU**	M [E, W(N)]
Dalbergia sp. 1 (aff. *monticola* Bosser & R. Rabev.) LG 5435, 720 m.		

Appendix 1. (continued)

Fabaceae – suite

Dalbergia sp. 2		
TAJ 1736, 600 m.		
Dalbergia sp. 3		
TAJ 1748, 350 m*.		
Dalbergia sp. (nv)		
Karatra 562, 448 m; Karatra 567, 448 m; Letsara 199, 317 m.		
***Delonix* Raf.**		
Delonix boiviniana (Baill.) Capuron	**LC**	M [C, W(W)]
LG 5462, 530 m*; Rakotondrajaona 384, 206 m*; TAJ 1656, 335 m*.		
Delonix regia (Hook.) Raf.	**LC**	M [C, W(W)]
ZB 192, 397 m*.		
***Dichrostachys* (DC.) Wight & Arn.**		
Dichrostachys akataensis Villiers	**NE**	M [W(N)]
ZB 52, 563 m*.		
Dichrostachys myriophylla Baker	**VU**	M [W(N)]
Randrianaivo 1455, 454 m; TAJ 1719, 350 m*; ZB 94, 522 m*.		
***Entada* Adans.**		
Entada pervillei (Vatke) R. Vig.	**VU**	M [Sb]
Rakotonandrasana 916, 49 m.		
***Gagnebina* Neck. ex DC.**		
Gagnebina commersoniana (Baill.) R. Vig.	**LC**	M [W(N), W(W), S]
Razafitsalama 882, 508 m.		
***Millettia* Wight & Arn.**		
Millettia richardiana (Baill.) Du Puy & Labat	**LC**	M [Sb, W(N), W(W), S]
Leopold 101, 249 m; LG 7120, 325 m*; TAJ 1691, 450 m; ZB 5, 343 m.		
***Mimosa* L.**		
Mimosa hildebrandtii Drake	**NE**	M [E, C, W(W)]
ZB 60, 507 m*.		
***Parkia* R.Br.**		
Parkia madagascariensis R. Vig.	**VU**	M [Sb]
LG 7056, 380 m; Randrianasolo 501, 87 m; ZB 2, 416 m.		
***Senegalia* Raf.**		
Senegalia pervillei (Benth.) Boatwr.	**NE**	M [Sb, W(N), W(W)]
CGB 18057, 350 m.		

Appendix 1. (continued)

Fabaceae – suite

***Senna* Mill.**

Senna petersiana (Bolle) Lock — **LC** — M [Sb, W(N)]; Aft
ZB 214, 592 m*.

***Tamarindus* L.**

Tamarindus indica L. — **NE** — M [E, W(N), W(W), S]; Pantrop.
LG 5452, 340 m*; TAJ 1715, 310 m*; ZB 59, 507 m*.

***Viguieranthus* R.Vig.**

Viguieranthus glaber Villiers — **NE** — M [W(N), W(W)]
TAJ 1675, 440 m*; ZB 113, 349 m*.

Viguieranthus pervillei (Drake) Villiers — **LC** — M [E, Sb, W(N)]
LG 7072, 340 m.

***Xanthocercis* Baill.**

Xanthocercis madagascariensis Baill. — **LC** — M [E, Sb, W(N), W(W)]
LG 5458, 370 m*.

***Xylia* Benth.**

Xylia fraterna (Vatke) Drake — **VU** — M [Sb, W(W)]
Letsara 281, 328 m; LG 7112, 355 m; Perrier 3087; TAJ 1709 b, 310 m*; ZB 27, 566 m.

Gelsemiaceae

***Mostuea* Didr.**

Mostuea brunonis Didr. — **NE** — M [E, C, Sb, W(N), W(W)]; Aft
var. *brunonis*
ZB 69, 563 m*.

Gentianaceae

***Exacum* L.**

Exacum alberti-grimaldii Wohlh. & Callm. — **NE** — M [local endemic]
SW 803, 650 m.

Exacum sp. 1
LG 5474, 415 m.

***Tachiadenus* Griseb.**

Tachiadenus pervillei Humbert ex Klack. — **NE** — M [Sb]
LG 5389, 605 m; LG 5440, 740 m; ZB 187, 699 m.

Appendix 1. (continued)

Hypericaceae

***Psorospermum* Spach**

Psorospermum cerasifolium Baker — **VU** — M [E, C, Sb, W(N), W(W)]
CGB 18084, 485 m; TAJ 1676, 440 m*; ZB 15, 359 m; ZB 36, 500 m*.

Psorospermum sp. 1
ZB 156, 368 m.

Psorospermum sp. (nv)
Razafitsalama 885, 508 m.

Lamiaceae

***Capitanopsis* S.Moore**

Capitanopsis magentea (Hedge) Mwany., A. J. Paton & Culham — **VU** — M [W(N)]
LG 5481, 380 m.

***Clerodendrum* L.**

Clerodendrum sp. (nv)
Razafitsalama 913, 174 m*.

***Karomia* Dop**

Karomia humbertii (Moldenke) R. Fern. — **VU** — M [W(N)]
Randrianaivo 1464, 54 m.

Karomia sp. (nv)
Ratovoson 889, 100 m.

***Plectranthus* L'Hér.**

Plectranthus sp. 1
ZB 171, 409 m*.

***Rotheca* Raf.**

Rotheca nudiflora (Moldenke) Callm. & Phillipson — **NE** — M [W(N), W(W), S]
ZB 43, 574 m*.

***Vitex* L.**

Vitex beraviensis Vatke — **LC** — M [E, Sb, W(N), W(W), S]
Letsara 225, 494 m*.

Vitex waterlotii Danguy — **NE** — M [Sb, W(N)]
CGB 18011, 385 m; Randrianaivo 1099, 44 m; Ratovoson 888, 100 m; ZB 4, 310 m.

Vitex sp. (nv)
Randrianaivo 1470, 81 m.

Appendix 1. (continued)

Lamiaceae – suite		
Genus indet.		
Lamiaceae indet. 1		
ZB 17, 389 m.		
Lauraceae		
***Cryptocarya* R.Br.**		
Cryptocarya septentrionalis van der Werff	**VU**	M [W(N)]
Randrianaivo 1396, 52 m.		
***Potameia* Thouars**		
Potameia sp. 1 (cf. *capuronii* Kosterm.)		
Letsara 262, 557 m; LG 5399, 460 m; LG 5467, 430 m.		
Lecythidaceae		
***Foetidia* Comm. ex Lam.**		
Foetidia rubescens Bosser	**CR**	M [local endemic]
SF 24740, 100 m.		
Foetidia sp. (nv)		
Ratovoson 895, 100 m.		
Linaceae		
***Hugonia* L.**		
Hugonia sp. 1		
CGB 18037, 355 m.		
Loganiaceae		
***Strychnos* L.**		
Strychnos diplotricha Leeuwenb.	**NE**	M [E, C, W(N)]
Randrianaivo 1220, 54 m.		
Strychnos panganensis Gilg	**NE**	M [Sb, W(N)]; Aft
Rakotondrafara 488, 528 m; ZB 10, 418 m.		
Strychnos spinosa Lam.	**LC**	M [E, C, Sb, W(N), W(W), S]; Com.; Masc.; Seych.; Aft
ZB 163, 316 m.		
Strychnos usambarensis Gilg	**NE**	M [E, W(N)]
LG 5456, 370 m*; Razafitsalama 716, 101 m*.		
Strychnos sp. (nv)		
Randrianaivo 1343, 208 m*; Randrianaivo 1349, 208 m*.		

Appendix 1. (continued)

Loranthaceae

***Bakerella* Hook.f.**

Bakerella clavata (Desr.) Balle — **NE** — M [E, C, Sb, W(N), W(W)]
LG 5400, 485 m; LG 7063, 405 m.

Bakerella sp. (nv)
Léopold 146, 455 m; Razafitsalama 883, 508 m.

Malpighiaceae

***Acridocarpus* Guill. & Perr.**

Acridocarpus perrieri Arènes — **LC** — M [W(N)]
LG 5447, 330 m*; Rakotondrajaona 397, 84 m; ZB 54, 560 m*.

***Microsteira* Benth.**

Microsteira chorigyna (Baill.) Dubard & Dop — **NE** — M [Sb, W(N), W(W)]
CGB 18027, 370 m.

***Tristellateia* Thouars**

Tristellateia bojerana A. Juss. — **NE** — M [W(N), W(W)]
TAJ 1740, 310 m.

Malvaceae

***Byttneria* Loefl.**

Byttneria baronii Arènes — **NE** — M [W(N), W(W)]
TAJ 1753, 340 m*.

Byttneria sp. (nv)
Guittou 256, 505 m.

***Dombeya* Cav.**

Dombeya hildebrandtii Baill. — **VU** — M [W(N), W(W)]
Rakotonandrasana 917, 49 m; Razafitsalama 723, 101 m.

Dombeya sp. 1
Letsara 217, 494 m*.

***Grewia* L.**

Grewia brideliifolia Baill. — **LC** — M [E, C, Sb, W(N)]
SF 24547, 759 m.

Grewia cuneifolia Baker — **LC** — M [E, C]; Com.
ZB 130, 453 m. Specimens associated with doubt: CGB 18060, 345 m; ZB 191, 713 m.

Grewia madagascariensis Capuron — **EN** — M [E, C, W(N), W(W)]
Randrianaivo 1352, 208 m*.

Appendix 1. (continued)

Malvaceae – suite

Grewia picta Baill. ZB 128, 554 m*.	**LC**	M [W(N), W(W)]; Com.
Grewia sambiranensis Capuron Razafitsalama 701, 58 m.	**LC**	M [Sb, W(N), W(W)]
Grewia sely R. Vig. ZB 148, 311 m.	**CR**	M [W(N), S]
Grewia triflora (Bojer) Walp. LG 5450, 340 m*.	**NE**	M [W(N), W(W)]; Aft
Grewia sp. 1 “septentrionalis” SF 18938.	**NE**	M [C, W(N), W(W)]
Grewia sp. 2 TAJ 1712, 310 m*.		
Grewia sp. (nv) Guittou 257, 505 m.		
***Hibiscus* L.**		
Hibiscus bernieri Baill. Leopold 117, 154 m; ZB 161, 304 m*.	**NE**	M [W(N)]
Hibiscus sp. 1 ZB 211, 351 m.		
***Hildegardia* Schott & Endl.**		
Hildegardia erythrosiphon (Baill.) Kosterm. CGB 18063, 350 m; LG 5423, 565 m*.	**LC**	M [Sb, W(N), W(W), S]
***Nesogordonia* Baill.**		
Nesogordonia fertilis H. Perrier Leopold 116, 154 m; Letsara 174, 317 m; Randrianaivo 1110, 57 m; Randrianaivo 1203, 154 m; SF 24743, 360 m; TAJ 1735 bis.	**EN**	M [Sb, W(N)]
Genus indet. Razafitsalama 884, 508 m (nv)		

Maranthaceae

***Maranthochloa* Brongn.**		
Maranthochloa comorensis Brongn. ex Gris CGB 18072, 455 m.	**NE**	M [E, C, Sb, W(N), W(W)]; Com.

Appendix 1. (continued)

Melastomataceae		
***Dichaetanthera* Hook.f.**		
Dichaetanthera articulata Endl. Ratovoson 897, 100 m.	**VU**	M [E, C, W(W)]
Dichaetanthera bifida Jum. & H. Perrier LG 7079, 355 m; ZB 146, 311 m.	**VU**	M [C]
Dichaetanthera brevicauda Jum. & H. Perrier Randrianaivo 1223, 54 m.	**NE**	M [local endemic]
Dichaetanthera sp. 1 (aff. *crassinodis* Baker) TAJ 1735, 600 m; ZB 20, 468 m.		
Dichaetanthera sp. (nv) Guittou 247, 505 m.		
***Gravesia* Baill.**		
Gravesia sp. 1 LG 5413, 390 m.		
***Memecylon* L.**		
Memecylon amoenum Jacq.-Fél. LG 7095, 405 m; Randrianaivo 1095, 155 m.	**NE**	M [E, W(N)]
Memecylon bezavonense (Jacq.-Fél.) R. D. Stone LG 5429, 435 m.	**EN**	M [W(N)]
Memecylon sp. 1 LG 5416, 510 m*.	**NE**	M [local endemic]
Memecylon sp. (nv) Leopold 100, 249 m.		
***Tristemma* Juss.**		
Tristemma mauritianum J. F. Gmel. ZB 101, 472 m.	**NE**	M [E, Sb, W(N), W(W)]; Com.; Aft
Meliaceae		
***Malleastrum* J.-F.Leroy**		
Malleastrum sp. 1 (cf. *letouzeyanum* J.-F. Leroy) LG 5398, 460 m; Rakotondrajaona 382, 206 m*.		
***Neobeguea* Capuron**		
Neobeguea ankaranensis J.-F. Leroy LG 5424, 545 m*; LG 7124, 390 m*; ZB 126, 547 m*.	**VU**	M [W(N)]

Appendix 1. (continued)

Meliaceae – suite

***Turraea* L.**

Turraea lescotiana Callm. & Nusb. — **EN** — M [W(N)]
TAJ 1677, 470 m*.

Turraea rhombifolia Baker — **NE** — M [C, W(N), W(W)]
ZB 82, 551 m*.

Turraea sp. 1
ZB 80, 492 m*.

Turraea sp. (nv)
Guittou 161, 76 m*.

Menyanthaceae

***Nymphoides* Ség.**

Nymphoides indica (L.) Kuntze — **LC** — M [E, C, Sb, W(W)]; Pantrop.
Randrianaivo 1466, 54 m.

Metteniusaceae

***Apodytes* E.Mey. ex Arn.**

Apodytes dimidiata E. Mey. ex Arn. — **LC** — M [E, C, W(N)]; Com.; Masc.; Aft
LG 5430, 465 m; LG 5433, 465 m; LG 7064, 405 m.

Monimiaceae

***Tambourissa* Sonn.**

Tambourissa nitida Danguy — **EN** — M [Sb]
LG 5388, 605 m.

Montiniaceae

***Grevea* Baill.**

Grevea madagascariensis Baill. — **NE** — M [W(N), W(W)]
subsp. *madagascariensis*
Randrianaivo 1351, 208 m*; TAJ 1710, 310 m*; TAJ 1752, 340 m*; ZB 116, 349 m*.

Moraceae

***Ficus* L.**

Ficus sp. (nv)
Guittou 250, 505 m; ZB 167, 365 m.

Appendix 1. (continued)

Moraceae – suite

***Maillardia* Leandri**

Maillardia montana Leandri — **LC** — M [E, C, Sb, W(N), W(W)]; Com.; Seych.
CGB 18066, 340 m; Randrianaivo 1097, 155 m.

***Trilepisium* Thouars**

Trilepisium madagascariense DC. — **LC** — M [E, C, Sb, W(N), W(W)]; Seych.; Aft
CGB 18035, 355 m; Randrianaivo 1452, 454 m.

Genus indet.
ZB 216* (nv)

Myrtaceae

***Eugenia* L.**

Eugenia sp. (nv)
ZB 96, 678 m*.

***Syzygium* Gaertn.**

Syzygium cumini (L.) Skeels — **LC** — M [E, C, W(W)]; Pantrop.
Randrianaivo 1100, 44 m.

Syzygium sakalavarum (H. Perrier) Labat & G. E. Schatz — **LC** — M [E, C, Sb, W(N), W(W), S]
Randrianaivo 1398, 52 m.

Syzygium sp. (nv)
LG 5480, 415 m; ZB 158, 380 m.

Ochnaceae

***Brackenridgea* A.Gray**

Brackenridgea madecassa (H. Perrier) Callm. — **LC** — M [E, Sb]
CGB 18010, 455 m; CGB 18083, 485 m; Randrianaivo 1089, 50 m; ZB 29, 566 m; ZB 6, 351 m.

***Campylospermum* Tiegh.**

Campylospermum anceps (Baker) H. Perrier — **NE** — M [E, C]
Ratovoson 906, 100 m.

***Ochna* L.**

Ochna ciliata Lam. — **LC** — M [E, C, Sb, W(N), W(W)]
ZB 139, 388 m; ZB 95, 559 m*.

Ochna madagascariensis DC. — **NE** — M [E, Sb, W(N)]
Ratovoson 909, 100 m.

Ochna pervilleana Baill. — **NE** — M [E, C, Sb, W(N), W(W)]
Rakotonandrasana 918, 49 m; Ratovoson 882, 100 m.

Appendix 1. (continued)

Ochnaceae – suite

Ochna sp. (nv)
Leopold 121, 154 m.

Olacaceae

***Olax* L.**

Olax dissitiflora Oliv. — **LC** — M [C, W(N), W(W)]; Aft
LG 7106, 405 m; Randrianaivo 1103, 57 m; ZB 152, 311 m.

Oleaceae

***Noronhia* Stadman & Michx.**

Noronhia candicans H. Perrier — **VU** — M [W(N), W(W)]
Leopold 119, 154 m; LG 5382, 410 m; ZB 140, 390 m.

Noronhia humbertiana H. Perrier — **NT** — M [W(N)]
Guittou 156, 45 m*; Randrianaivo 1204, 100 m*.

Noronhia longipedicellata H. Perrier — **VU** — M [W(N)]
LG 5415, 510 m*.

Noronhia pervilleana (Knobl.) H. Perrier — **LC** — M [C, Sb, W(N), W(W)]
LG 7053, 380 m; LG 7066, 325 m.

Noronhia rostrata Hong-Wa — **EN** — M [Sb, W(N)]
LG 5381, 410 m; ZB 11, 433 m.

Noronhia variabilis Hong-Wa — **VU** — M [C, Sb, W(N)]
LG 5405, 485 m.

Noronhia sp. 1 (cf. *obtusifolia* (Lam.) Hong-Wa & Besnard)
Leopold 105, 249 m; Leopold 106, 249 m.

Noronhia sp. (nv)
Randrianaivo 1092, 50 m.

***Olea* L.**

Olea capensis L. — **LC** — M [E, C, Sb, W(N)]; Com.; Aft
subsp. *macrocarpa* (C. H. Wright) I. Verd.
Randrianaivo 1202, 100 m.

Orchidaceae

***Angraecum* Bory**

Angraecum leonis (Rchb. f.) André — **NE** — M [C, W(N), W(W)]
TAJ 1744, 350 m*.

Appendix 1. (continued)

Orchidaceae – suite

***Bulbophyllum* Thouars**		
Bulbophyllum hildebrandtii Rchb. f. CGB 18021, 440 m; LG 5441, 740 m.	**NE**	M [C, Sb, W(N), W(W)]
***Cynorkis* Thouars**		
Cynorkis boinana Schltr. ZB 58, 507 m*.	**NE**	M [W(N), W(W)]
Cynorkis sanguinolenta Hermans, L. Gaut. & P. J. Cribb Guittou 251, 505 m; ZB 182, 694 m.	**NE**	M [W(N)]
Cynorkis windsorensis Hervouet ZB 109, 431 m*.	**EN**	M [W(N)]
***Microcoelia* Lindl.**		
Microcoelia decaryana L. Jonss. LG 5428, 480 m*.	**NE**	M [W(W)]
***Nervilia* Comm. ex Gaudich.**		
Nervilia sp. 1 (cf. *leguminosarum* Jum. & H. Perrier) TAJ 1754, 340 m*.		
***Oeceoclades* Lindl.**		
Oeceoclades calcarata (Schltr.) Garay & P. Taylor ZB 71, 563 m*.	**NE**	M [W(N), W(W), S]
Oeceoclades perrieri (Schltr.) Garay & P. Taylor ZB 74, 554 m*.	**NE**	M [C, W(W)]
Oeceoclades petiolata (Schltr.) Garay & P. Taylor Sight record (image C. Boluda), 335 m.	**NE**	M [Sb, W(N), W(W)]; Com.
***Polystachya* Hook.**		
Polystachya sp. 1 ZB 188, 729 m.	**CR**	M [local endemic]
***Vanilla* Mill.**		
Vanilla madagascariensis Rolfe ZB 19, 459 m.	**NE**	M [E, Sb, W(N), W(W), S]

Oxalidaceae

***Biophytum* DC.**		
Biophytum albizzioides (O. Hoffm.) Guillaumin CGB 18068, 365 m; LG 5476, 415 m.	**NE**	M [E, Sb, W(W)]

Appendix 1. (continued)

Pandanaceae

***Pandanus* Parkinson**

Pandanus analamerensis Huynh — **VU** — M [W(N)]
LG 5419, 540 m*; LG 7085, 440 m.

Pandanus biceps B. C. Stone & Guillaumet — **EN** — M [W(N)]
Rakotondrajaona 385, 206 m*.

Pandanus sp. (nv)
LG 5465, 565 m*.

Passifloraceae

***Adenia* Forssk.**

Adenia stylosa (H. Perrier) Hearn — **NE** — M [E, C, W(N)]
LG 5420, 550 m*.

***Paropsia* Noronha ex Thouars**

Paropsia grandiflora Sleumer — **VU** — M [C, W(N)]
LG 7087, 420 m; TAJ 1661, 340 m*; ZB 105, 592 m*; ZB 57, 560 m*.

Paropsia sp. (nv)
Randrianasolo 502, 87 m.

Pedaliaceae

***Uncarina* Perrier**

Uncarina peltata (Baker) Stapf — **NE** — M [W(N), W(W)]
TAJ 1667, 390 m*; ZB 70, 563 m*.

Phyllanthaceae

***Antidesma* L.**

Antidesma madagascariense Lam. — **LC** — M [E, C, Sb, W(N), W(W), S]; Com.; Masc.
LG 5451, 340 m*; TAJ 1711, 310 m*; ZB 51, 563 m*.

***Cleistanthus* Hook.f.**

Cleistanthus sp. 1
ZB 121, 576 m*.

Cleistanthus sp. 2
TAJ 1730, 325 m*.

***Flueggea* Willd.**

Flueggea virosa (Roxb. ex Willd.) Royle — **LC** — M [W(N), W(W), S]; Paleotrop.
ZB 86, 339 m*.

Appendix 1. (continued)

Phyllanthaceae – suite

***Lingelsheimia* Pax**		
Lingelsheimia fiherenensis (Leandri) Radcl.-Sm. CGB 18040, 235 m.	**EN**	M [W(W)]
***Margaritaria* L.f.**		
Margaritaria anomala (Baill.) Fosberg Randrianaivo 1104, 57 m.	**NE**	M [E, W(N), W(W)]; Com.; Seych.
Margaritaria sp. 1 CGB 18043, 270 m.		
***Phyllanthus* L.**		
Phyllanthus casticum P. Willemet CGB 18070, 430 m; TAJ 1700, 500 m; ZB 145, 311 m.	**LC**	M [E, C, Sb, W(N), W(W), S]; Com.; Masc.
Phyllanthus pervilleanus (Baill.) Müll. Arg. LG 5442, 720 m; Randrianasolo 526, 57 m*.	**LC**	M [C, Sb, W(N), W(W)]; Com.; Seych.
***Uapaca* Baill.**		
Uapaca amplifolia Denis Letsara 176, 317 m.	**VU**	M [Sb]
Uapaca ferruginea Baill. CGB 18087, 420 m; LG 5437, 720 m.	**LC**	M [E, C, Sb]
***Wielandia* Baill.**		
Wielandia bemarensis (Leandri) Petra Hoffm. & McPherson TAJ 1681, 385 m*.	**LC**	M [E, C, Sb, W(N), W(W)]
Wielandia tanalorum (Leandri) Petra Hoffm. & McPherson ZB 65, 497 m.	**VU**	M [E, C, Sb, W(N)]
***Meineckia* Baill.**		
Meineckia sp. (cf.) CGB 18054, 345 m.		

Physenaceae

***Physena* Noronha ex Thouars**		
Physena madagascariensis Thouars ex Tul. Razafitsalama 891, 508 m.	**LC**	M [E, C, Sb, W(N)]
Physena sessiliflora Tul. TAJ 1673, 440 m*; ZB 175, 450 m*.	**LC**	M [W(N), W(W), S]

Appendix 1. (continued)

Picrodendraceae		
***Aristogeitonia* Baill.**		
Aristogeitonia sp. 1 (aff. *lophirifolia* Radcl.-Sm.) CGB 18069, 415 m.		
Piperaceae		
***Piper* L.**		
Piper umbellatum L. ZB 184, 755 m.	**NE**	M [E, C, Sb, W(N), W(W)]; Pantrop.
Pittosporaceae		
***Pittosporum* Banks ex Gaertn.**		
Pittosporum polyspermum Tul. var. *leianthum* Cufod. Randrianaivo 1453, 454 m.	**LC**	M [E, C, Sb]
Pittosporum senacia Putt. subsp. *pervillei* (Blume) Cufod. Letsara 119, 317 m; Razafitsalama 720, 101 m.	**LC**	M [E, C, Sb, W(N)]
Pittosporum sp. (nv) Guittou 233, 454 m; Léopold 133, 432 m.		
Poaceae		
***Neyraudia* Hook.f.**		
Neyraudia arundinacea (L.) Henrard ZB 28, 566 m.	**NE**	M [E, C, Sb, W(W), S]; Paleotrop.
***Valiha* S.Dransf.**		
Valiha perrieri (A. Camus) S. Dransf. Perrier 11283.	**CR**	M [local endemic]
Polygalaceae		
***Polygala* L.**		
Polygala subdioica H. Perrier TAJ 1708, 310 m*; ZB 78, 376 m*.	**NE**	M [Sb, W(N), W(W)]
Polygonaceae		
***Oxygonum* Burch. ex Campd.**		
Oxygonum tristachyum (Baker) H. Perrier LG 5470, 330 m; ZB 166, 334 m.	**NE**	M [C, W(N)]

Appendix 1. (continued)

Primulaceae

***Oncostemum* A. Juss.**

Oncostemum sp. (nv)
Léopold 132, 432 m.

Putranjivaceae

***Drypetes* Vahl**

Drypetes capuronii Leandri — **LC** — M [E, C, Sb, W(N), W(W)]
SF 23246.

Drypetes perrieri Leandri — **LC** — M [E, C, Sb, W(N), W(W), S]; Com.
Léopold 125, 432 m; LG 7096, 405 m; Razafitsalama 899, 508 m; SF 18949; ZB 206, 563 m*.

Rhamnaceae

***Bathiorhamnus* Capuron**

Bathiorhamnus dentatus (Capuron) Callm., Phillipson & Buerki — **VU** — M [Sb, W(N)]
TAJ 1729, 325 m*.

***Gouania* Jacq.**

Gouania lineata Tul. — **LC** — M [W(N), W(W), S]
Leopold 120, 154 m.

Gouania zebrifolia Buerki, Phillipson & Callm. — **NE** — M [W(N)]
ZB 177, 418 m*.

Rhizophoraceae

***Cassipourea* Aubl.**

Cassipourea sp. 1
TAJ 1670, 440 m*.

Cassipourea sp. 2
CGB 18029, 360 m.

***Macarisia* Thouars**

Macarisia ellipticifolia Arènes — **NE** — M [E, Sb, W(N), W(W)]
Letsara 146, 317 m; Razafitsalama 705, 58 m.

Rubiaceae

***Bertiera* Aubl.**

Bertiera longithyrsa Baker — **LC** — M [C, Sb]
Léopold 147, 455 m; Randrianaivo 1454, 454 m; ZB 39, 637 m.

Appendix 1. (continued)

Rubiaceae – suite

***Bremeria* Razafim. & Kainul.**		
Bremeria pervillei (Wernham) Razafim. & Alejandro	**LC**	M [C, Sb]
Guittou 232, 454 m; Randrianaivo 1465, 54 m; Ratovoson 883, 100 m; ZB 147, 311 m.		
***Breonadia* Ridsdale & Bakh.f.**		
Breonadia salicina (Vahl) Hepper & J. R. I. Wood	**LC**	M [E, C, Sb, W(N), W(W)]; Aft
Guittou 248, 505 m; Randrianaivo 1457, 454 m.		
***Breonia* A.Rich. ex DC.**		
Breonia capuronii Razafim.	**VU**	M [C, Sb, W(N)]
LG 5461, 530 m*; ZB 194, 397 m*.		
Breonia chinensis (Lam.) Capuron	**LC**	M [E, C]
ZB 66, 497 m.		
Breonia fragifera Capuron ex Razafim.	**LC**	M [E, C]
Randrianaivo 1108, 57 m; TAJ 1690, 410 m.		
Breonia perrieri Homolle	**LC**	M [Sb, W(N), W(W)]
Letsara 226, 494 m*; Razafitsalama 915, 174 m*; TAJ 1680, 440 m*.		
***Chassalia* Comm. ex Poir.**		
Chassalia bojeri Bremek.	**LC**	M [E, C, W(N), W(W)]
Leopold 104, 249 m.		
Chassalia densiflora Bremek.	**NE**	M [C]
Léopold 136, 432 m.		
Chassalia princei (Dubard & Dop) Bremek.	**LC**	M [E, W(N), W(W)]
ZB 213, 304 m.		
***Coffea* L.**		
Coffea boiviniana (Baill.) Drake	**NT**	M [W(N), W(W)]
ZB 117, 349 m*.		
Coffea dubardii Jum.	**NT**	M [W(N)]
LG 7055, 380 m.		
Coffea sp. 1 (cf. *sahafariensis* J.-F. Leroy)		
LG 7131, 535 m*.		
***Coptosperma* Hook.f.**		
Coptosperma supra-axillare (Hemsl.) Degreef	**LC**	M [E, C, Sb, W(N), W(W)]; Com.; Aft
LG 5446, 450 m; ZB 16, 381 m.		

Appendix 1. (continued)

Rubiaceae – suite

Coptosperma sp. 1
Letsara 197, 317 m.

Coptosperma sp. (nv)
Léopold 137, 432 m; Randrianaivo 1468, 81 m.

***Craterispermum* Benth.**

Craterispermum sp. 1 (cf. *mottleyanum* De Block. & Randriamb.)
Letsara 166, 317 m; LG 5392, 605 m; TAJ 1692, 450 m; ZB 100, 470 m; ZB 23, 519 m.

***Gaertnera* Lam.**

Gaertnera nitida C. M. Taylor **NE** M [Sb, W(W)]
Léopold 126, 432 m; LG 7082, 410 m.

Gaertnera sp. 1
LG 5391, 605 m; ZB 154, 368 m; ZB 22, 494 m.

***Gardenia* J.Ellis**

Gardenia brevicalyx Rakoton. & A. P. Davis **VU** M [Sb, W(N)]
Guittou 242, 454 m; Leopold 107, 273 m; Léopold 130, 432 m; LG 5439, 720 m; Randrianaivo 1226, 54 m; TAJ 1694, 450 m; ZB 142, 390 m.

***Helictosperma* Bremek.**

Helictosperma poissoniana De Block **NT** M [W(N), W(W)]
Randrianaivo 1346, 208 m*; ZB 172, 409 m*.

***Hymenodictyon* Wall.**

Hymenodictyon antakaranensis Razafim. & B. Bremer **EN** M [W(N)]
Guittou 158, 104 m*; Randrianaivo 1205, 100 m*; TAJ 1678, 470 m*.

Hymenodictyon septentrionale Cavaco **LC** M [W(N)]
Ratovoson 885, 100 m.

***Hyperacanthus* E.Mey. ex Bridson**

Hyperacanthus sp. 1
ZB 170, 398 m.

Hyperacanthus sp. 2
Letsara 232, 494 m.

Hyperacanthus sp. (nv)
Guittou 157, 104 m*; Leopold 111, 65 m; Randrianaivo 1198, 50 m; Randrianaivo 1344, 208 m*; Razafitsalama 717, 101 m.

***Ixora* L.**

Ixora pedalis De Block **NE** M [E, C]
LG 5475, 415 m.

Appendix 1. (continued)

Rubiaceae – suite

Ixora platythyrsa Baker	**NE**	M [Sb]; Com.
Guittou 235, 454 m; Leopold 118, 154 m; Léopold 141, 432 m; Letsara 121, 317 m; Letsara 237, 494 m; LG 7062, 405 m; Ratovoson 886, 100 m; TAJ 1704, 310 m*; ZB 24, 544 m.		
***Mantalania* Capuron ex Bosser**		
Mantalania sambiranensis Capuron ex J.-F. Leroy	**LC**	M [Sb]
Guittou 246, 552 m; Letsara 230, 494 m; LG 5473, 495 m; Randrianaivo 1458, 454 m; Razafitsalama 702, 58 m; TAJ 1688, 380 m; ZB 136, 512 m.		
***Melanoxerus* Cavaco**		
Melanoxerus antsirananensis Kainul.	**LC**	M [W(N)]
CGB 18042, 270 m; ZB 176, 450 m*.		
***Paederia* L.**		
Paederia sambiranensis Homolle ex Puff	**VU**	M [Sb, W(N)]
Ratovoson 880, 100 m; TAJ 1699, 500 m; ZB 150, 368 m.		
Paederia sp. (nv)		
Léopold 148, 455 m.		
***Paracarphalea* Cavaco**		
Paracarphalea angulata (Baill.) Razafim., Ferm, B. Bremer & Kårehed	**LC**	M [Sb, W(N)]
Leopold 102, 249 m; Letsara 128, 317 m; Randrianaivo 1451, 454 m; Ratovoson 900, 100 m.		
Paracarphalea kirondron (Baill.) Razafim., Ferm, B. Bremer & Kårehed	**LC**	M [C, Sb, W(W)]
ZB 189, 729 m.		
***Paracephaelis* Baill.**		
Paracephaelis russata De Block	**EN**	M [W(N)]
Leopold 112, 65 m; Letsara 250, 494 m.		
***Paracorynanthe* Capuron ex Bosser**		
Paracorynanthe antankarana Capuron ex J.-F. Leroy	**VU**	M [W(N)]
Randrianaivo 1341, 208 m*; ZB 193, 397 m*.		
***Peponidium* Baill.**		
Peponidium flavum Homolle ex Arènes	**VU**	M [Sb, W(N)]
ZB 124, 678 m*; ZB 185, 726 m.		
Peponidium pervilleanum (Baill.) Homolle ex Arènes	**VU**	M [C, Sb]
Razafitsalama 892, 508 m.		
Peponidium sakalavense Razafim., Lantz & B. Bremer	**NE**	M [C]
Razafitsalama 898, 508 m.		

Appendix 1. (continued)

Rubiaceae – suite

Peponidium sp. 1		
TAJ 1720, 350 m*.		
Peponidium sp. 2		
LG 7113, 340 m; TAJ 1697, 500 m.		
***Polysphaeria* Hook.f.**		
Polysphaeria lepidocarpa Verdc.	**LC**	M [W(N)]
Guittou 153, 45 m*; TAJ 1665, 425 m*; ZB 108, 376 m*; ZB 122, 576 m*; ZB 61, 507 m*.		
***Psychotria* L.**		
Psychotria ancaranensis (Bremek.) A. P. Davis & Govaerts	**NE**	M [Sb, W(N)]
LG 7081, 410 m; Perrier 6912; TAJ 1733, 600 m.		
Psychotria parkeri Baker	**LC**	M [C]
ZB 99, 470 m.		
Psychotria sp. 1		
ZB 83, 551 m*.		
Psychotria sp. 2		
Letsara 123, 317 m.		
Psychotria sp. (nv)		
Razafitsalama 703, 58 m.		
***Psydrax* Gaertn.**		
Psydrax occidentalis (Cavaco) A. P. Davis & Bridson	**NE**	M [W(N), W(W)]
Razafitsalama 912, 174 m*.		
Psydrax sp. 1		
LG 7132, 535 m*.		
***Pyrostria* Comm. ex A.Juss.**		
Pyrostria andilanensis Cavaco	**VU**	M [Sb, W(N)]
ZB 135, 512 m; ZB 209, 703 m.		
Pyrostria ankaranensis (Cavaco) Razafim., Lantz & B. Bremer	**NE**	M [W(N)]
TAJ 1718, 350 m*.		
Pyrostria sp. 1		
CGB 18051, 340 m.		
Pyrostria sp. 2		
CGB 18050, 340 m.		

Appendix 1. (continued)

Rubiaceae – suite

Pyrostria sp. 3
CGB 18034, 360 m.
Pyrostria sp. 4
ZB 173, 409 m*.
***Saldinia* A. Rich.**
Saldinia sp. (nv)
Léopold 124, 432 m.
***Tarenna* Gaertn.**
Tarenna madagascariensis (Ten.) I. M. Turner — **LC** — M [E, Sb, W(N), W(W), S]; Com.; Seych.
CGB 18071, 430 m; Guittou 159, 76 m*; ZB 164, 334 m.
***Triainolepis* Hook.f.**
Triainolepis sp. 1
ZB 133, 514 m.
***Tricalysia* A.Rich. ex DC.**
Tricalysia boiviniana (Baill.) Randriamb. & De Block — **LC** — M [Sb, W(N), W(W)]; Masc.; Aft
Randrianaivo 1224, 54 m; SF 24738.
***Vangueria* Juss.**
Vangueria madagascariensis J. F. Gmel. — **LC** — M [E, C, Sb, W(N)]; Masc.; Aft
ZB 190, 729 m.
Genus indet.
Guittou 258, 505 m (nv); Léopold 149, 455 m (nv).

Rutaceae

***Cedrelopsis* Baill.**
Cedrelopsis trivalvis J.-F. Leroy — **LC** — M [Sb, W(N), W(W)]
Léopold 144, 432 m.
Cedrelopsis sp. (nv)
Letsara 177, 317 m.
***Fagaropsis* Mildbr.**
Fagaropsis glabra Capuron — **EN** — M [E, W(N)]
TAJ 1746, 350 m*.
***Vepris* Comm. ex A.Juss.**
Vepris boiviniana (Baill.) Mziray — **NE** — M [E, C, Sb, W(N), W(W)]; Com.
CGB 18041, 270 m.

Appendix 1. (continued)

Rutaceae – suite

Vepris madagascarica (Baill.) H. Perrier ZB 200, 526 m*. Specimen associated with doubt: LG 5404, 515 m.	**VU**	M [W(N)]
Vepris nitida (Baker) I. Verd. Letsara 154, 317 m.	**LC**	M [E, C, Sb, W(N)]
Vepris unifoliolata (Baill.) Labat, M. Pignal & O. Pascal ZB 119, 570 m*.	**LC**	M [E, C, Sb, W(N), W(W), S]; Com.
Vepris sp. 1 ZB 174, 409 m*.		
Vepris sp. 2 (aff. *spathulata* (Engl.) H. Perrier) Letsara 275, 560 m.		
Vepris sp. (nv) Razafitsalama 894, 508 m.		
***Zanthoxylum* L.**		
Zanthoxylum tsihanimposa H. Perrier LG 7129, 450 m*.	**NT**	M [W(N), W(W)]
Zanthoxylum sp. 1 LG 7105, 405 m.		

Salicaceae

***Calantica* Jaub. & Spach**		
Calantica biseriata H. Perrier SF 24545, 759 m.	**LC**	M [W(N), W(W)]
Calantica cerasifolia (Vent.) Tul. Randrianasolo 498, 87 m.	**LC**	M [E, C, Sb, W(N), W(W)]
Calantica olivacea Appleq., Phillipson & G. E. Schatz Randrianasolo 498A, 87 m; TAJ 1708 bis, 310 m*; ZB 160, 380 m.	**LC**	M [C, Sb, W(N), W(W)]
***Casearia* Jacq.**		
Casearia nigrescens Tul. var. *lucida* (Tul.) Sleumer Ratovoson 879, 100 m.	**LC**	M [E, C, Sb, W(N)]
***Flacourtia* Comm. ex L'Hér.**		
Flacourtia ramontchi L'Hér. ZB 103, 325 m*.	**NE**	M [E, Sb, W(N), W(W)]; Paleotrop.

Appendix 1. (continued)

Salicaceae – suite

***Homalium* Jacq.**

Homalium erianthum (Tul.) Baill. SF 24548, 759 m.	**VU**	M [E, Sb, W(N), W(W)]
Homalium involucratum (DC.) O. Hoffm. CGB 18013, 365 m; TAJ 1701, 440 m.	**LC**	M [E, C, Sb]
fo. *hildebrandtii* (Baill.) H. Perrier Rakotondrafara 492, 528 m.		
Homalium micranthum (Boivin ex Tul.) O. Hoffm. TAJ 1674, 440 m*; TAJ 1742, 350 m.	**VU**	M [E, C, Sb]
Homalium nudiflorum (DC.) Baill. Leopold 108, 273 m; Randrianaivo 1221, 54 m; Ratovoson 881, 100 m.	**LC**	M [E, C, Sb]
Homalium ovatifolium Appleq. Guittou 160, 76 m*; Randrianaivo 1206, 100 m*.	**CR**	M [local endemic]

***Ludia* Comm. ex Juss.**

Ludia dracaenoides H. Perrier ZB 72, 563 m*.	**VU**	M [W(N)]
Ludia scolopioides Capuron & Sleumer Léopold 139, 432 m.	**LC**	M [E, C, Sb]
Ludia wikstroemiifolia Sleumer ZB 199, 526 m*.	**EN**	M [E, W(N), W(W)]

***Tisonia* Baill.**

Tisonia baronii Danguy SF 8224.	**NT**	M [Sb, W(N)]
Tisonia rubescens Danguy CGB 18033, 360 m; LG 5444, 605 m; LG 7061, 410 m; TAJ 1735 bis, 305 m.	**EN**	M [C, Sb]
Tisonia sp. (nv) Léopold 123, 432 m.		

Santalaceae

***Viscum* L.**

Viscum cuneifolium Baker LG 7060, 410 m.	**NE**	M [E, C, Sb, W(W), S]

Appendix 1. (continued)

Sapindaceae

***Doratoxylon* Thouars ex Hook. f.**

Doratoxylon sp. 1
ZB 205, 563 m*.

***Filicium* Thwaites**

Filicium decipiens (Wight & Arn.) Thwaites — **LC** — M [E, C]
Rakotondrafara 491, 528 m.

***Lepisanthes* Blume**

Lepisanthes perrieri (Choux) Buerki, Callm. & Lowry — **LC** — M [W(N), W(W)]
Randrianaivo 1093, 155 m; ZB 88, 339 m*.

***Macphersonia* Blume**

Macphersonia gracilis O. Hoffm. var. *hildebrandtii* (O. Hoffm.) Capuron — **LC** — M [E, C, Sb, W(N), W(W)]; Com.; Aft
LG 7074, 360 m; TAJ 1679, 470 m*; ZB 127, 547 m*.

Macphersonia madagascariensis Blume — **LC** — M [E, C, W(W)]
Rakotondrafara 493, 528 m; Randrianaivo 1347, 208 m*; Randrianaivo 1348, 208 m*.

***Majidea* J.Kirk ex Oliv.**

Majidea zanguebarica J. Kirk ex Oliv. — **NE** — M [E, Sb, W(N), W(W)]; Aft
Guittou 162, 76 m*.

Majidea sp. (nv)
Guittou 243, 454 m.

***Molinaea* Comm. ex Juss.**

Molinaea retusa Radlk. — **NE** — M [E, Sb, W(N), W(W)]
CGB 18036, 355 m; CGB 18085, 500 m; Randrianaivo 1102, 44 m; Ratovoson 910, 100 m; TAJ 1706, 310 m*; ZB 208, 713 m.

Sapotaceae

***Capurodendron* Aubrév.**

Capurodendron andrafiamenae L. Gaut. & Boluda — **CR** — M [local endemic]
CGB 18076, 360 m; CGB 18090, 415 m; LG 5395, 360 m; LG 7110, 335 m; LG 7111, 335 m; TAJ 1696, 500 m; ZB 138, 540 m.

Capurodendron ankaranense Aubrév. — **VU** — M [W(N), W(W)]
TAJ 1652, 345 m*.

Capurodendron suarezense Aubrév. — **EN** — M [W(N)]
TAJ 1663, 340 m*. Specimen associated with doubt: TAJ 1741, 310 m.

***Donella* Pierre**

Donella analalavensis Aubrév. — **EN** — M [W(N), W(W)]
LG 7088, 425 m; SF 18935.

Appendix 1. (continued)

Sapotaceae – suite

Donella ranirisonii L. Gaut. & Mackinder — **CR** — M [local endemic]
CGB 18080, 425 m; LG 5387, 410 m. Specimens associated with doubt: CGB 18046, 410 m; CGB 18081, 425 m.

***Labourdonnaisia* Bojer**

Labourdonnaisia sp. 1 — **NE** — M [Sb]
LG 5431, 465 m; Randrianaivo 1106, 57 m.

***Labramia* A.DC.**

Labramia platanoides Capuron ex Aubrév. — **VU** — M [W(N)]
LG 5417, 510 m*; LG 5463, 545 m*; LG 7057, 380 m.

Labramia sambiranensis Capuron ex Aubrév. — **CR** — M [Sb]
CGB 18082, 450 m; Letsara 219, 494 m*; LG 5466, 440 m; LG 7109, 335 m.

Labramia sp. 1 (aff. *platanoides* Capuron ex Aubrév.)
CGB 18044, 285 m; CGB 18045, 365 m; LG 7058, 385 m; LG 7090, 440 m; LG 7115, 335 m; LG 7134, 535 m*.

***Manilkara* Adans.**

Manilkara sp. 1
CGB 18065, 340 m; CGB 18092, 385 m; CGB 18093, 385 m.

***Mimusops* L.**

Mimusops sambiranensis Aubrév. — **EN** — M [Sb, W(N)]
CGB 18017, 340 m; CGB 18039, 265 m.

Mimusops sp. 1
LG 5459, 390 m*; LG 5460, 505 m*; TAJ 1662, 340 m*.

Mimusops sp. 2
CGB 18015, 325 m; CGB 18031, 360 m; CGB 18053, 345 m; CGB 18073, 420 m; LG 7097, 410 m.

Mimusops sp. 3
LG 7054, 380 m.

Mimusops sp. 4
CGB 18018, 325 m; CGB 18078, 425 m; LG 5386, 410 m; LG 5406, 485 m; LG 7114, 335 m.

Mimusops sp. 5
CGB 18020, 355 m; CGB 18079, 425 m.

***Sideroxylon* L.**

Sideroxylon sp. 1
CGB 18055, 350 m.

Appendix 1. (continued)

Sarcolaenaceae

***Leptolaena* Thouars**

Leptolaena cuspidata Baker — **LC** — M [E, Sb, W(N)]
Guittou 240, 454 m; Letsara 136, 317 m; Letsara 248, 494 m; TAJ 1732, 600 m; ZB 1, 315 m.

***Mediusella* Cavaco**

Mediusella arenaria (F. Gérard) Hong-Wa — **NT** — M [Sb, W(W)]
Letsara 137, 317 m; Randrianaivo 1197, 50 m; Razafitsalama 712, 101 m; ZB 149, 368 m; ZB 7, 351 m.

***Sarcolaena* Thouars**

Sarcolaena codonochlamys Baker — **NT** — M [Sb, W(N)]
Guittou 239, 454 m; Letsara 118, 317 m; Letsara 228, 494 m; Letsara 249, 494 m; Ratovoson 905, 100 m; Razafitsalama 710, 101 m; SF 18948; TAJ 1702, 460 m; ZB 8, 374 m.

***Schizolaena* Thouars**

Schizolaena parviflora (F. Gérard) H. Perrier — **VU** — M [Sb]
Letsara 115, 31 m; Randrianaivo 1109, 57 m.

Schizolaena viscosa F. Gérard — **VU** — M [Sb]
Leopold 114, 65 m; Letsara 144, 317 m; Letsara 247, 494 m; Randrianaivo 1090, 50 m; Randrianaivo 1199, 50 m; Razafitsalama 719, 101 m; TAJ 1693, 450 m; ZB 14, 359 m.

***Xyloolaena* Baill.**

Xyloolaena perrieri F. Gérard — **VU** — M [W(N), W(W)]
Razafitsalama 707, 58 m.

Xyloolaena richardii (Baill.) Baill. — **LC** — M [E, C]
Letsara 138, 317 m; ZB 13, 359 m; ZB 181, 523 m.

Xyloolaena sp. (nv)
Razafitsalama 713, 101 m.

Stilbaceae

***Nuxia* Comm. ex Lam.**

Nuxia involucrata Aug. DC. — **LC** — M [E, C, Sb, W(N)]
LG 5410, 360 m.

Taccaceae

***Tacca* J.R.Forst. & G.Forst.**

Tacca leontopetaloides (L.) Kuntze — **LC** — M [E, C, Sb, W(W)]; Paleotrop.
ZB 102, 325 m*.

Appendix 1. (continued)

Thymeleaceae

***Stephanodaphne* Baill.**

Stephanodaphne geminata H. Perrier ex Leandri — **LC** — M [E, C, Sb, W(N), W(W)]
Randrianaivo 1340, 208 m*.

Turneraceae

***Arboa* Baill.**

Arboa berneriana (Tul.) Thulin & Razafim. — **NE** — M [W(N)]
LG 5479, 415 m; ZB 81, 522 m*.

Urticaceae

***Obetia* Gaudich.**

Obetia radula (Baker) Baker ex B. D. Jacks. — **NE** — M [C, Sb, W(N), W(W)]; Com.; Aft
LG 5457, 370 m*.

Verbenaceae

***Stachytarpheta* Vahl**

Stachytarpheta jamaicensis (L.) Vahl — **NE** — M [E, C, W(N)]; Pantrop.
ZB 162, 304 m*.

Violaceae

***Afrohybanthus* Flicker**

Afrohybanthus danguyanus (H. Perrier) Flicker — **NE** — M [E, W(N), W(W)]
Razafitsalama 886, 508 m.

***Rinorea* Aubl.**

Rinorea angustifolia (Thouars) Baill. — **NE** — M [E, C, Sb, W(N), W(W)]
CGB 18056, 350 m; Razafitsalama 890, 508 m; ZB 131, 455 m.

Rinorea arborea (Thouars) Baill. — **LC** — M [E, C, Sb, W(N), W(W)]; Com.; Aft
Randrianaivo 1094, 155 m.

Rinorea longipes (Tul.) Baill. — **NE** — M [Sb, W(N)]
LG 5448, 330 m*; Razafitsalama 896, 508 m; ZB 202, 558 m*.

Rinorea squamosa (Boivin ex Tul.) Baill. — **NE** — M [E, Sb, W(N), W(W)]
Razafitsalama 895, 508 m; ZB 90, 373 m*.

Rinorea sp. (nv)
Razafitsalama 889, 508 m.

Appendix 1. (continued)

Vitaceae

***Cyphostemma* (Planch.) Alston**

Cyphostemma pachypus Desc. — **NE** — M [W(N)]
LG 5421, 565 m*.

Cyphostemma sambiranense Rabarij. & L. M. Lu — **NE** — M [Sb, W(N)]; Com.
CPG 39702.

Cyphostemma villosum Rabarij. & L. M. Lu — **NE** — M [W(N)]
LG 5427, 495 m*.

***Leea* D.Royen ex L.**

Leea guineensis G. Don. — **NE** — M [E, C, Sb, W(N), W(W)]; Com.; Aft
LG 7104, 405 m; ZB 165, 365 m.

Zingiberaceae

***Aulotandra* Gagnep.**

Aulotandra trigonocarpa H. Perrier — **LC** — M [W(N), W(W)]
Randrianaivo 1342, 208 m*.

Family indets.

LG 5434, 585 m; Razafitsalama 880, 508 m (nv); SF 18941; SF 18942 (nv); ZB 215*.