

RED LIST FOR SPECIES IN MALAGASY ENDEMIC PLANT FAMILIES

III: *Leptolaena sensu stricto* (SARCOLAENACEAE)



Leptolaena masoalensis – photo Cynthia Hong-Wa

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Introduction

Nowhere in the World can rival Madagascar in terms of the diversity and uniqueness of its flora. Estimates of the total number of plant species in the country continue to climb and now it is thought that at least 13,000 species of higher plant grow in the country (pers. comm. P. Phillipson). This remarkable diversity is especially important given that nearly all these species (around 90% - Schatz 1999) grow only in Madagascar. Sadly Madagascar's exceptional flora is highly threatened and an alarming number of plant species are now on the very brink of extinction. We must now choose whether to make strenuous efforts to conserve the Malagasy flora or accept, within the next few decades, the loss of a large number of plant species. Now is the last chance to make this choice.

An important part of effective conservation is prioritization: the relatively small amount of money available for conservation must be used where it will have most impact. To assist with the prioritization of conservation actions for the Malagasy flora a series of documents will be produced containing risk of extinction estimates for species in selected Malagasy plant families.

The research presented here was conducted as a collaborative project between Missouri Botanical Garden (MBG), Antananarivo University and Madagascar's National Association for the Management of Protected Areas (ANGAP).

Methods for estimating risk of extinction

The identification of the species with the highest priority for conservation action is based on estimates of their likelihood of becoming extinct in the next few decades. However before the risk of extinction of a species can be investigated it is necessary to ensure that it has been delimited using a taxonomic framework that closely reflects the real distribution of variation (that in turn reflects underlying evolutionary history) within the genus/family to which the species belongs. In an endeavor associated with our study the taxonomic framework of each of Madagascar's endemic families was examined by scientists from Missouri Botanical Garden and the National Museum of Natural History in Paris and those judged inadequate were revised. These revisions were published as a series of articles in the journal *Adansonia* and resulted in new species being delimited, previously recognized species being re-circumscribed, and others placed in synonymy.

Information on the risk of extinction of each species was obtained from the analysis of its distribution and from observations made in the field. Most of this work was conducted by Malagasy students as part of their DEA (= Masters) studies. Species distribution was estimated using geo-referenced locality data obtained from herbarium specimens in the five herbaria (K, MO, P, TAN, TEF) with large holdings of Malagasy plants. Most recent herbarium specimens include precise longitude and latitude coordinates of the collection location obtained using a GPS, but many older specimens do not, necessitating *post facto* allocation of coordinates by locating the collection site on maps with the aid of MBG's Madagascar gazetteer (available on line at (<http://www.mobot.org/MOBOT/Research/madagascar/gazetteer>)). The collection sites were mapped and analyzed using ArcView Geographic Information System (GIS) software. The resultant species distribution was quantified in terms of extent of occurrence, area of occupancy, and number of subpopulations. The analysis of each species' distribution in relation to various environmental base maps provided information on the habitat of the species in terms of geology, vegetation type, bioclimate and elevation.

Information on the habitat, abundance, pollination, seed dispersal, regeneration, threats, uses and vernacular name for each species was obtained by locating and studying at least one population in

the wild. The best method of locating species proved to be with the assistance of local people living close to previous collection sites. Information on the vernacular name and uses of the species were also obtained from the labels of herbarium specimens.

Further information on the methods used in the study are provided in Table 1.

The information collected for each species is summarized in a Risk of Extinction Datasheet

Table 1. Methods for the collection of information presented in each of the data fields of the Species Conservation Priority Datasheet.

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| <p>Species name and author: name of species according to the most recent taxonomic revision and name of author(s) who defined the species</p> | <p>Risk of extinction: based on the application of criteria presented in IUCN (2001)</p> |
| <p>Vernacular names: from information collected in the field and captured from herbarium specimens.</p> | <p>Conservation recommendations: our recommendations for actions to reduce the risk of extinction of the species.</p> |
| <p>Description: based on information in the literature and our own observations of herbarium specimens and living plants in the field.</p> | |
| <p>Habitat:</p> <ul style="list-style-type: none"> • Vegetation type: defined by observations in the field and analysis of the distribution of the species related to the vegetation map of DuPuy & Moat (1996) • Bioclimate: defined by the analysis of the distribution of the species related to the bioclimate map of Cornet (1974) • Geology: defined by observations in the field and analysis of the distribution of the species related to the geology map of DuPuy & Moat (1996) • Altitude: based on field observations and information captured from the notes accompanying herbarium specimens | |
| <p>Biology:</p> <ul style="list-style-type: none"> • Pollination: probable pollinator identified from characteristics of flower and observations in the field • Seed dispersal: probable method of seed dispersal identified from characteristics of fruit and observations in the field | |
| <p>Uses: based on information collected by interviewing local people in the field and captured from the literature and notes on herbarium specimens.</p> | |
| <p>Distribution: distribution of the species represented by the locations of the collection sites of the herbarium specimens attributed to the species in the five herbaria with large collections from Madagascar. Map created using Arcview 3.2 software.</p> | <p>Observations of study population(s) Location: study site with geo-reference</p> <ul style="list-style-type: none"> • Regeneration observed: presence of regeneration assumed from the presence at the site of individuals representative of all size classes. • Tolerant to disturbance: presence of regenerating populations of the species in severely degraded vegetation (>50% of original biomass lost). • Density: average number of mature individuals of the species per ha of appropriate habitat based on counts in replicated plots or along transects. • Abundance: estimated number of mature individuals at the study site based on the density of the species at the site and an estimate of the area of suitable habitat available (abundance classes based on thresholds used in IUCN (2001)). |
| | <p>Predicted future decline:</p> <ul style="list-style-type: none"> • Due to habitat loss: estimate of decline of population based on observations of tolerance of species to habitat perturbation and estimates of rate of loss of primary vegetation from (FAO 1993, Green & Sussman 1990, Steininger et al. 2002). Classes of population decline (i.e. 0-30%, ≥30-50%, ≥50-80%, ≥80%) relate to thresholds used in the IUCN (2001). • Due to exploitation or poor regeneration: in addition to loss of habitat it is possible that populations may decline because of selective exploitation or poor regeneration resulting for example from the increasing rarity of pollinators or seed dispersers. Although we were unable to quantify these factors, their possible significance is noted. |
| | <p>Distribution attributes for total population: (These analyses made using ArcView 3.2)</p> <ul style="list-style-type: none"> • Extent of occurrence: estimated as the area contained within the shortest continuous imaginary boundary drawn to encompass all the collection locations for the species. • Area of occupancy: estimated as the area of suitable habitat (defined in terms of vegetation type, bioclimate, altitude and geology) for the species within the extent of occurrence. • Number of subpopulations: estimated as the number of collection locations but combining locations that are separated by less than 5 km. |
| | <p>Representation in protected areas: Protected areas are defined as National Parks (PN), Special Reserves (RS), Nature Reserves (RNI), Biosphere Reserves (RB).</p> <ul style="list-style-type: none"> • Number of subpopulations: number of data points within protected areas but combining locations separated by less than 5 km. • Protected areas: list of protected areas where the species has been recorded. |
| <p>Herbarium specimens examined: list of herbarium specimens examined for this study</p> | |

Sarcolaenaceae Caruel
(from Schatz 2001)

Endemic family with 8 genera and ca. 44 species.

Hermaphrodite shrubs to large trees, often with stellate pubescence. Leaves alternate, simple, entire, penninerved or rarely pseudo-triplinerved by virtue of induplicate vernation traces, with caducous stipules. Inflorescences umbelliform or paniculate cymes, for sometimes flowers solitary, flowers small to often large and showy, regular, 5-merous, subtended by an involucre of bracts which are sometimes fused to form a cup; sepals 3 (-5), imbricate; petals 5 (-6), free, or slightly fused at their base, twisted in bud; nectary disc present or not; stamens 5-numerous, sometimes slightly fused at their base into 5 fascicles, filaments slender, anthers bilocular, longitudinally dehiscent; ovary superior, 1-5-locular, style terminal, stigma 3-5-lobed; ovules 2-many per locule. Fruit a dehiscent capsule or indehiscent and somewhat woody, often surrounded partially or completely by the involucral bracts or cup; endosperm present.

Key to genera of Sarcolaenaceae

1. Leaves with longitudinal lines (vernation traces) on either side of the midrib as a result of folding in bud, resembling veins and thus the venation superficially triplinerved to 3-palmatinerved, rarely the traces absent (*S. isaloensis*)*Sarcolaena*
- 1'. Leaves lacking vernation traces on either side of the midrib, never superficially triplinerved or palmatinerved.
 2. Leaves with mixture of stellate and lepidote indument, often dense; involucre very small at anthesis, very late accrescent in fruit or not at all.
 3. Fruit indehiscent, surrounded by accrescent, entire involucre; ovary 2-locular*Perrierodendron*
 - 3'. Fruit dehiscent, the involucre accrescent or not, lobed; ovary 3-5-locular.
 4. Sepals strongly unequal, the outer 2 much smaller; petals strongly contorted in bud; ovary 3-locular; ovules 2 per locule*Eremolaena*
 - 4'. Sepals more or less equal; petals slightly contorted in bud; ovary 5-locular; ovules 4-6 per locule*Pentachlaena*
 - 2'. Leaves glabrous or with simple indument; involucre well-developed at anthesis or not, accrescent in fruit.
 5. Flowers with involucre well-developed at anthesis, deeply cup- or urn-shaped, partially or completely enclosing the flower in bud.
 6. Involucre only partially enclosing the flower in bud; stamens arranged in 5 fascicles; ovules many per locule; involucre in fruit very large, bell-like, woody, narrowly ellipsoid, thick-walled, with a circular opening at the apex, the fruit at the base*Xyloolaena*
 - 6'. Involucre completely enclosing the flower in bud; stamens not in fascicles; ovules 2 (-4) per locule; involucre only slightly accrescent in fruit, not thick walled and bell-like with the fruit at the base*Leptolaena* (and *Sarcolaena isaloensis*)
 - 5'. Flowers with involucre small at anthesis, not deeply cup- or urnshaped and partially or completely enclosing the flower.
 7. Sepals 5, the outer 2 smaller; flowers large, pendulous, the petals showy pink-violet forming a funnel-shaped corolla; involucre late accrescent in fruit, fleshy but not viscous, lobed but never spiny*Rhodolaena*
 - 7'. Sepals 3; flowers small to large, petals white to cream-yellow, rarely pink, spreading, not forming a funnel-shaped corolla; involucre strongly accrescent in fruit, viscous and fleshy, entire or laciniate or with fleshy spines*Schizolaena*

Leptolaena Thouars, Hist. Vég. Iles Austrl. Afriq.: 41. 1805.

Shrubs to trees to 15 tall. Leaves often quite small, stipules fused or free, visible only on very young branches, covering the terminal bud. Inflorescences terminal cymes or panicles, flowers small; involucre well-developed, cup-like, completely enveloping the flower in bud, the rim toothed, becoming fleshy to woody in fruit; sepals 3, persistent; petals 5, white; disc annular with toothed to crenulate margin; stamens 10 (-15) to numerous; ovary 3-5-locular, style distinct, stigma 3-5-lobed; ovules 2-3 per locule. Fruit tardily dehiscent 3-lobed capsule surrounded by fleshy to woody accrescent involucre, with 1-3 seeds per locule.

Leptolaena is distributed in humid to subhumid evergreen forest including the Sambirano region, from sea level to 1,500 m elevation, as well as dry semi-deciduous forest from the Ambongo-Boina region northwards. It is very closely related to *Sarcoalaena*, with which it could well be merged. In general, *Leptolaena* can be distinguished from *Sarcoalaena* by smaller leaves that lack vernation traces, smaller flowers, and a drier, more woody involucre in fruit.

Vernacular names: *amaninombilahy*, *amaninombilahy mena*, *anivoravina*, *anjananjana*, *dilatra*, *fonto*, *fontona*, *foto*, *fotona*, *fotonalahy*, *fotondahy*, *haronganipanihy*, *hary*, *hazomasy*, *helana*, *kotika*, *laro*, *madiorano*, *marosirala*, *milaliambomadinika*, *sarifatra*, *taimbarika*, *vandroza*, *vandrozana*, *vatsikana*, *voalaro*, *vondrozo*, *zahana*, *zana*, *zanalalahy*

***Leptolaena sensu stricto*.**

Currently, the taxonomic framework for the *Leptolaena-Sarcoalaena* complex is confused and species currently classified within *Leptolaena sensu lato* (as defined by Cavaco 1952a, b) are probably polyphyletic. However, within this taxa a sub-group of 8 species, classified in *Leptolaena sensu stricto*, are almost certainly monophyletic and have been made the subject of a recent taxonomic revision (Schatz *et al.* 2001): it is these that are included in this Red List treatment. An estimation of the risk of extinction of the remaining species currently classified as *Leptolaena* s.l. will be made once their taxonomy has been clarified.

Species within *Leptolaena* s.s. differ from other species of *Leptolaena* s.l. by their smaller flowers and smaller number of stamens.

**Key to species of *Leptolaena sensu stricto*
(from Schatz et al. 2001)**

1. Leaves small, the largest blades usually < 2 cm long (occasionally to 4.5 cm), broadly ovate to circular or rhombic; inflorescences composed of 1-5 flowers.....*L. pauciflora*
- 1'. Leaves larger, the largest blade > 3 cm long, lanceolate, obovate or narrowly to broadly ovate or elliptic; inflorescences composed of 7-50 flowers (2-8 *L. masoalensis*)2
2. Leaf apex obtuse to rounded, sometimes emarginated3
- 2'. Leaf apex acute to acuminate.4
3. Involucre urceolate, 3 mm tall, covered with dense granular ferruginous indumentum ; sepals exerted 1-1.5 mm beyond involucre; leaves narrowly to broadly elliptic, secondary veins (8-)11-13 per side.....*L. delphinensis*
- 3'. Involucre ellipsoid to oblong, 7 mm tall, covered with sparse, short white indumentum ; sepals completely included within involucre; leaves elliptic to slightly obovate, secondary veins usually 8 per side*L. masoalensis*
4. Leaves sparsely to moderately sericeous below, with both short appressed trichomes and longer slightly raised trichomes often exceeding 1 mm long (older leaves occasionally subglabrous), margins distinctly revolute*L. raymondii*
- 4'. Leaves glabrous below or with indumentum restricted to the midvein, margins weakly revolute to flat, sometimes minutely thickened5
5. Leaf blades with evident indumentum on the midvein below6
- 5'. Leaf blades completely glabrous (rarely a few trichomes at the base of the midvein below)7
6. Involucre usually < 3 mm tall, densely golden yellow granular farinose, rounded at the base with a distinct peduncle 1 mm long; petals 7-9 x 1-1.5 mm; leaves lanceolate to ovate, apex distinctly cuspidate.....*L. cuspidata*
- 6'. Involucre 3-3.5 mm tall, densely ferruginous granular farinose, usually also with slightly erect whitish trichomes 0.5 mm long, especially in the lower portion, evenly tapering to a cuneate base, with an indistinct peduncle <0.5 mm long ; petals 10.5-12 x 1.5-2 mm; apex acute to acuminate, rarely cuspidate.....*L. gautieri*
7. Leaves narrowly ovate, usually strongly falcate and inequilateral, often drying reddish black, apex distinctly acuminate to cuspidate, largest blades 2.5-4.5 (-5.5) cm long ; sepals at anthesis equal to involucre teeth or exceeding them by < 0.5 mm.....*L. abrahamii*
- 7'. Leaves elliptic, usually equilateral to somewhat inequilateral, rarely a few somewhat falcate, drying brownish to olive green, largest blades greater than (3-) 5.5 cm long ; sepals at anthesis exceeding the involucre teeth by (0.8)1-1.8 mm.....*L. multiflora*



Leptolaena cuspidata – photo by Cynthia Hong-Wa



Leptolaena masoalensis – photo by Cynthia Hong-Wa



Leptolaena multiflora – photo Cynthia Hong-Wa



Leptolaena pauciflora – photo Cynthia Hong-Wa


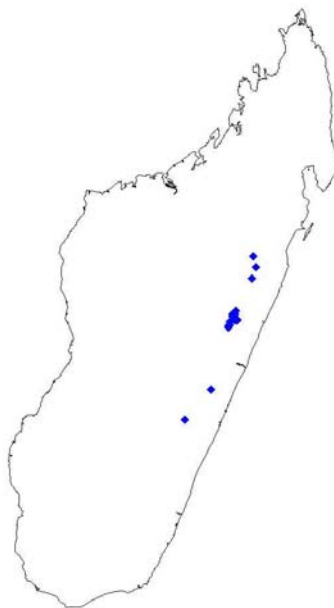


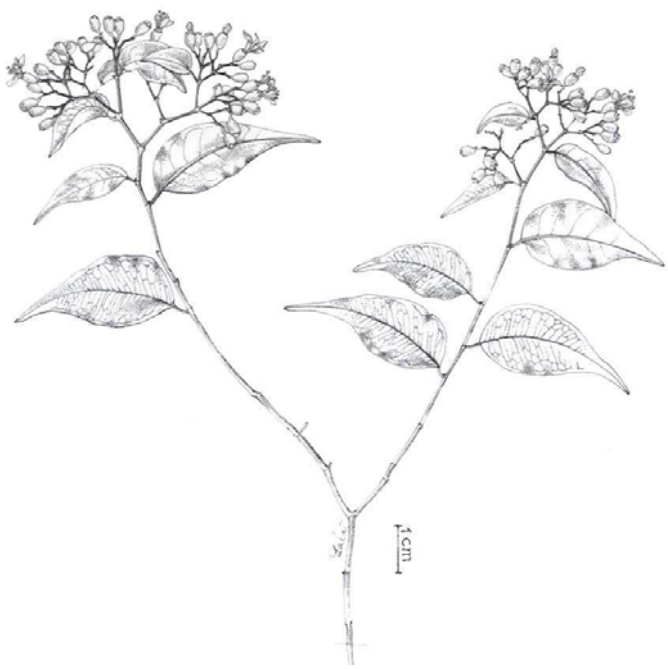

Leptolaena raymondii – photo Cynthia Hong-Wa

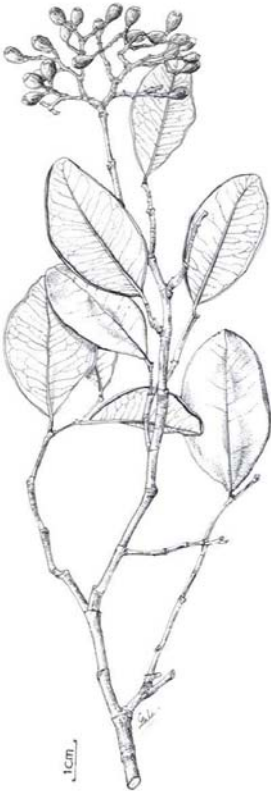




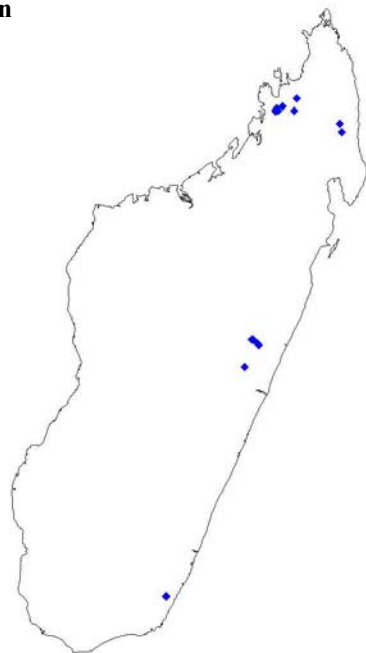
Leptolaena cuspidata fruits – photo Cynthia Hong-Wa



RISK OF EXTINCTION DATASHEETS

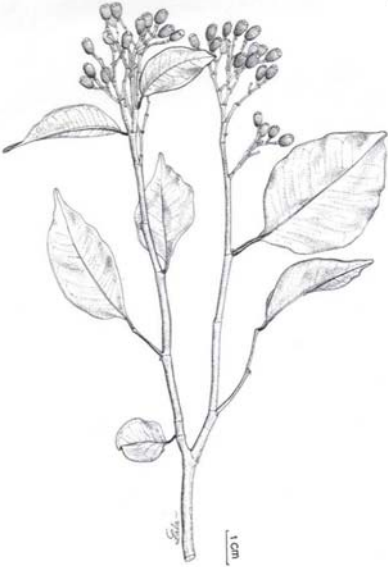

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| <p><i>Leptolaena abrahamii</i> G.E. Schatz & Lowry</p> | <p>Risk of extinction: east Least Concern (although this species has a high predicted population decline it has several large and apparently secure sub-populations within protected areas).</p> |
| <p>Vernacular names : Anjananjana beravina</p> | <p>Conservation Recommendations: good management of protected areas</p> |
| <p>Description: Medium tree. Leaf small (medium), lanceolate, strongly falcate, curved, asymmetrical, base acute/obtuse, apex acuminate/cuspidate, papery, hairless when mature; petiole glabrous. Inflorescence with 6-23 flowers. Sepals equal to (or barely exceed) teeth of involucre. Petals pale yellow. Flower stalk 1-1.5 mm. Fruit ovoid/globose, 2 mm longer than fleshy involucre.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: mid-elevation evergreen forest • Bioclimate: humid, subhumid • Geology: basement rock • Altitude: 800-1,200 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably insects (bees seen visiting flowers at Sahamaloto)) • Seed dispersal: probably birds and lemurs (at Sahamaloto fruits reported to be eaten by various birds (<i>Hypsipetes madagascariensis</i>, <i>Treron australis</i>) and <i>Varecia variegata</i>). | |
| <p>Uses Timber (posts and house frames), bark used for manufacture of toaka gasy (alcoholic drink)</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Sahamaloto (19°03'11''S, 48°12'34''E) • Regeneration observed: yes • Tolerant to disturbance: no • Abundance: 2,500-10,000 mature individuals <p>Predicted future decline:</p> <ul style="list-style-type: none"> • due to habitat loss : 50-80% (cause of loss = tavy) • because of exploitation or poor regeneration: decline possible because of selective exploitation for timber and reduction in populations of possible seed dispersers and selective exploitation. <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 10,080 km² • Area of occupancy: 3,329 km² • Number of subpopulations: 14 <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 3 • Protected areas: Analamazaotra RS, Zahamena PN, Ranomafana PN |
| <p>Herbarium specimens examined: Fianarantsoa: Ranomafana PN, SF(Rahahova) 14241, Ampasinambo, SF 13718, Toamasina: Ampasimpotsy, SF(Ratovoarison) 3497, Analamazaotra-Périnet RS, Mamisoa N. Andrianjafy & Y.F. Razafindrakoto 28, Analamazaotra-Perinet RS, James S. Miller, J. Bradford, F. Rakotonasolo & A. Randrianasolo 8746, Farizana, SF(Paina) 5070 Perinet-Analamazaotra RS, SF(Ratovoarison) 14959, Perinet-Analamazaotra RS, SF(Ramaroson.A.) 6242, Sandrangato, SF(Rabenaivo.G.R.) 25441, Perinet-Analamazaotra RS, SF(Sampana.J.P.) 7564, [Sandrangato, SF(Ranaivojoana.N.) 21898, Sandrangato, SF(Abraham) 21955, Perinet-Analamazaotra RS, SF(Station forestière d'Analamazaotra) 21244, Antsahapandrano, SF(Ratovoarison) 21282, Analamazaotra-Perinet RS, SF(Razafimandimby.M.) 10348, Ambatovy, Gordon McPherson 17523, Périnet-Analamazaotra, G.E. Schatz & J. Rabenantoandro 3991, Périnet-Analamazaotra, G.E. Schatz 3993, Analamazaotra-Perinet RS, M. Louvel 33, Ambatovy, Ph. Morat 3218, Zahamena RNI, RN(Botoalina) 12684, Analamazaotra-Perinet RS, RN(Goulbert Andrianavo) 15, Analamazaotra-Perinet RS, SF 7509, Analamazaotra-Perinet RS, SF 3773, Nangarana, SF(9-R-FAO) 26927, Nangarana, SF(50-R-FAO) 26968, Analamazaotra-Perinet RS, R. Viguier & H. Humbert 851, Analamazaotra-Perinet RS, H. Perrier de la Bâthie 5336, Zahamena RNI, RN(Botoalina) 3169, Périnet-Analamazaotra RS, Mabberley 813, Périnet-Analamazaotra RS, SF 17932, Zahamena RNI, SF 26096, Zahamena RNI, RN(Laibosaka) 10953, Analamazaotra-Périnet RS, SF(A. Fauchère) 12, Bemainty, G. Cours 4230, Nonokambo, (G. Cours) 1206, Analamazaotra-Périnet RS, E. Thouvenot (Ramanantoavolana) 12, Analamazaotra-Périnet RS, SF(Ratovoarison F. d'Assise) 124-B-R-172, Analamazaotra-Périnet RS, SF(Ratovoarison F. d'Assise) 105-B-R-172, Zahamena, N.M. Andrianjafy et al. 255.</p> | |

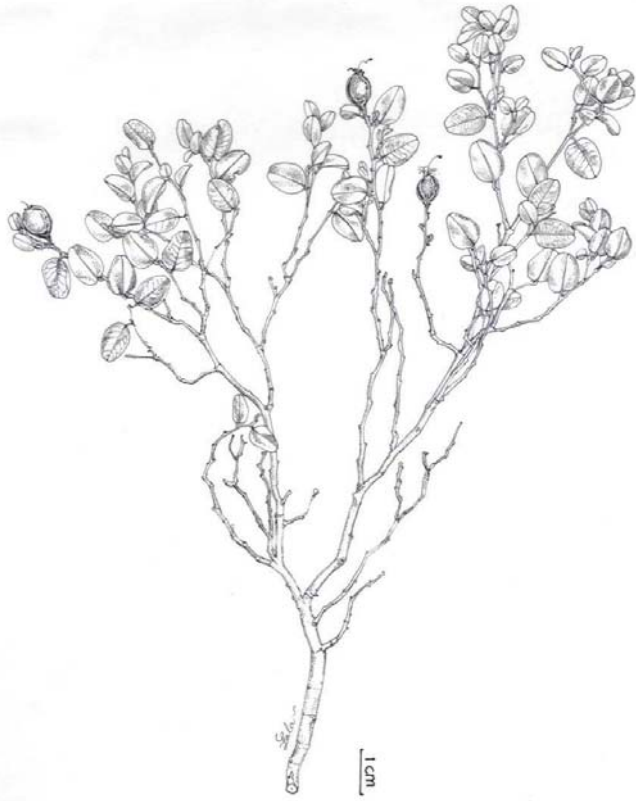
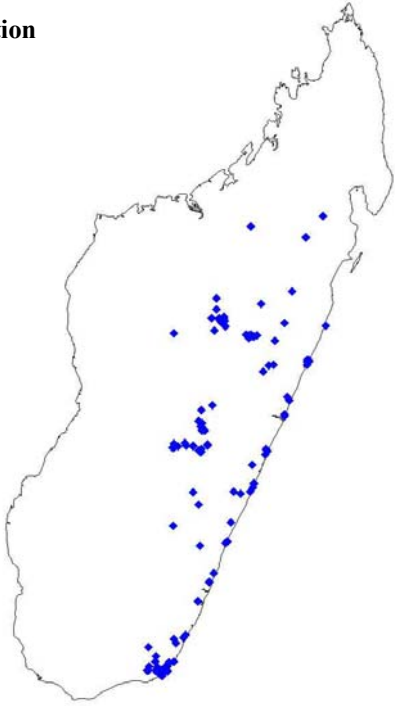
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| <p><i>Leptolaena cuspidata</i> Baker</p> | <p>Risk of extinction: Least Concern (although this species is expected to decline it has several large and apparently secure sub-populations within protected areas it is also somewhat tolerant to degradation of its habitat).</p> |
| <p>Vernacular names : Zahana</p> | <p>Conservation Recommendations: good management of protected areas</p> |
| <p>Description: Shrub or small tree. Leaf small, lanceolate/ovale with rounded base and long cuspidate apex, papery, hairless at maturity, mid-rib evident on lower surface and covered with small brown hairs, petiole hairy. Inflorescence with 14-27 flowers. Flower stalk 1 mm. Involucre < 3 mm long, urn-shaped, covered with yellowish powder. Sepals exceed involucre by 2 mm. Petals greenish white. Fruit ovoid and exceeding fleshy involucre by 1.5 mm.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: low-elevation evergreen forest, dry deciduous forest • Bioclimate: subhumid, dry • Geology: sandstone, lava, basement rocks, Mesozoic limestone, unconsolidated sands, alluvial and lake deposits • Altitude: 20-800 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably insects (bees, beetles and butterflies seen visiting the flowers at Analavory) • Seed dispersal: probably birds and lemurs (<i>Hypsipetes madagascariensis</i>, <i>Treron australis</i> and <i>Eulemur macaco</i> reported to eat fruit at Analavory) | |
| <p>Uses Timber for construction, bark and leaves used for medicine</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Analavory (13°45'36''S, 48°31'40''E) • Regeneration observed: yes • Tolerant to disturbance: yes • Abundance: >10,000 mature individuals <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss: 30-50% (cause of habitat loss = tavy) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate dispersers and selective exploitation. <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 12.319 km² • Area of occupancy: 2.571 km² • Number of subpopulations: 21 <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 3 • Protected areas: Ankaranana RS, Manongarivo RS, Tsaratanana RNI |
| <p>Herbarium specimens examined: Antsiranana: Antsatsaka, Chris Birkinshaw 1, Beramanja, Pete Phillipson 2017, Beramanja, SF(R. Capuron) 3078, Andilamboay, SF(Gachet) 3142, Tsaratanana RNI, SF(Gachet) 3171, Anjakely, SF(Petit-Marie.J.) 8225, Ambilobe, SF(Marohavina) 10434, Manongarivo RS, SF(R. Capuron) 11486, Manongarivo RS, P. Derleth 89, Manongarivo RS, S. Totozafy Be 563, Ambato FC, H. Ravololonanahary et al. 37, Ampasindava, J. Bosser 20152, Ambilobe, SERVICE FORESTIER 36016, Ambanja, R. Randrianaivo et al. 261, Ambohipiraka, H. Humbert & G. Cours 32873, Anjakely, SF 12987 Ambohipiraka, G. Cours & H. Humbert 5674, Ambilobe, H. Humbert & R. Capuron 25580, Ankarana RS, H. Humbert & G. Cours 32649, Ambohipiraka, H. Perrier de la Bâthie 5340, Maromandia, H. Perrier de la Bâthie 3023, Ambanja, H. Perrier de la Bâthie 3021, Ambilobé, R. Decary 14775, Ambilobé, R. Decary 14794, Manongarivo RS, Stiefel, S.-L. 68, Andilamboay, SF(Gachet) 3141, Mahajanga, between Ambandamanga-Manambaliha and Ambodigavo, D. Baum 333</p> | |

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| <p><i>Leptolaena delphinensis</i> G.E. Schatz & Lowry</p> | <p>Risk of extinction: Critically Endangered (A3c)</p> |
| <p>Vernacular names : Fotona, Foto, Fotondahy</p> | <p>Conservation Recommendations: a) inclusion in new protected area, b) use in restoration of land following QMM mining activities at Mandena</p> |
| <p>Description: Medium tree. Leaf medium, elliptical/obovate with obtuse base and rounded/obtuse apex, edge slightly or strongly recurved, papery; petiole hairless. Inflorescence with 20-65 flowers. Involucre urn-shaped, 3 mm long, densely covered with tiny brownish hairs. Sepals exceeding involucre by 1-1.5 mm. Petals white. Fruit globose and included within involucre.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: littoral forest • Bioclimate: Humid • Geology: unconsolidated sand, basement rock, alluvial and lake deposits • Altitude: 0-10 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably by insects (bees, beetles and butterflies seen visiting flowers at Mandena) • Seed dispersal: probably birds and lemurs (<i>Cheirogaleus</i> sp. reported to eat fruits at Mandena) | |
| <p>Uses Timber for construction, bark used as a bittering agent in toaka gasy (a locally-made alcoholic drink), exploited as fire wood.</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Mandena (24°57'14''S, 47°00'00''E) • Regeneration observed: yes • Tolerant to disturbance: yes (abundant on degraded land) • Abundance: >10,000 mature individuals |
| | <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss : >80% (reason for loss = tavy, burning, mining) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate dispersers and selective exploitation. |
| | <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 221 km² • Area of occupancy: 14 km² • Number of subpopulations: 5 |
| | <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 0 • Protected areas: none |
| <p>Herbarium specimens examined: Toliara: Mandena SF, N. Dumetz 683, Mandena, G. McPherson & N. Dumetz 14665, Ste. Luce, G. McPherson, et al. 14835, Mandena, G. McPherson, et al. 14142, Ste. Luce, R. Rabevohitra 2053, Ste. Luce, G. McPherson, et al. 14222, Mandena, James L. Zarucchi et al. 7504, Mandena SF, SF(Lamarque,P.) 8207, Mandena, SF(R. Capuron) 399, Mandena SF, SF(Ranjatson,E.) 14597, Mandena SF, W.G. Johnson WII 37, Mandena FC, Johny Rabenantoandro et al. 308, Manafiafy(=Sainte Luce), SF(R. Capuron) 28656, Mandena SF, R. Rabevohitra et al. 3701, Mandena, J. Rabenantoandro et al. 271, Mandena, J. Rabenantoandro et al. 272, Mandena SF, R. Rabevohitra et al. 3671, Mandena SF, R. Rabevohitra et al. 3683, Mandromodromotra, R. Rabevohitra et al. 3739, Sainte Luce, L. Faliniaina, J. Rabenantoandro & E. Ramisy 38, Mandena SF, H. Jacquemin 1149, Ambinanibe, R. Decary 10064, Mandena, L. Faliniaina et al. 80, Mandena STF, Faly Randriantafika & E. Ramisy 261, Mandena STF, Faly Randriantafika, S.C. Hery & E. Ramisy 310</p> | |



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| <p><i>Leptolaena gautieri</i> G.E. Schatz & Lowry</p> | <p>Risk of extinction: Least Concern (although this species is expected to decline it has several large and apparently secure sub-populations within protected areas).</p> |
| <p>Vernacular names : Anjananjana</p> | <p>Conservation Recommendations: Good management of protected areas</p> |
| <p>Description: Medium tree. Leaves medium, ovate with rounded base and acute/acuminate apex, papery, midvein hairy on lower surface of leaf; petiole hairy. Inflorescence with 8-29 flowers. Involucre urn-shaped, 3-3.5 mm long, densely covered with tiny red-brown hairs. Sepals exceed involucre by 1.5 mm. Petals white. Fruit ovate/globose, entirely included within involucre.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: mid-elevation evergreen forest • Bioclimate: humid, subhumid • Geology: basement rocks, ultrabasic rock, sandstones • Altitude: 300-1,250 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably by insects (bees seen visiting flowers at Ambatovy) • Seed dispersal: probably by birds and lemurs (<i>Treron australis</i> and <i>Varecia variegata</i> reported to eat fruits at Ambatovy). | |
| <p>Uses Timber used for construction</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Ambatovy (18°51'S, 48°18'E) • Regeneration observed: Yes • Tolerant to disturbance: No • Abundance: >10,000 mature individuals |
| | <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss : 50-80% (tavy, mining) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate dispersers and selective exploitation. |
| | <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 94.706 km² • Area of occupancy: 18.908 km² • Number of subpopulations: 11 |
| | <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 6 • Protected areas: Manongarivo RS, Marojejy RNI, Tsaratanana RNI, Analamazaotra RS |
| <p>Herbarium specimens examined: Antsiranana: Manongarivo RS, G.E. Schatz 3233, Marojejy RNI, A. Randrianasolo 307, Marojejy RN, A. Randrianasolo 325, Manongarivo RS, P.J. Rakotomalaza 48, Manongarivo RS, G. McPherson & H. van der Werff 16359, Manongarivo RS, G. McPherson & H. van der Werff 16396, Manongarivo RS, S. Malcomber & L. Rakotomalala 2608, Manongarivo RS, L. Gautier & S. T. Be 2920, Manongarivo RS, L. Gautier & C. Chatelain 2361, Manongarivo RS, L. Gautier, N. Messmer & F. Andriatsiferana 3510, Tsaratanana RNI, RN(Sajy) 2237, Tsaratanana RNI, Rakotozafy 336, Antongondriha, H. Humbert & R. Capuron 24147, Manongarivo RS, L. Gautier et C. Chatelain 2344, Toamasina: Mantady PN, Michel Randriambololona et al. 17, Ambatovy, P.J. Rakotomalaza et al. 1279, Ambatovy, P.J. Rakotomalaza et al. 1286, Ambatovy, P.J. Rakotomalaza et al. 1309, Analamazaotra-Périnet RS, Mamisoa N. Andrianjafy 31, Ambatovy, P.-J. Rakotomalaza et al. 1046, Ambatovy, Gordon McPherson 17467, Analamazaotra-Périnet RS, J.-N. Labat et al. 3068, Analamazaotra-Périnet RS, Toliara: Vohimavo, H. Humbert 20704</p> | |

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| <p><i>Leptolaena masoalensis</i> G.E. Schatz & Lowry</p> | <p>Risk of extinction: Critically Endangered (D)</p> |
| <p>Vernacular names : Non rapporté</p> | <p>Conservation Recommendations: a) inclusion of Ambato Massif inside Masoala PN, b) search for new populations, c) conservation ex-situ</p> |
| <p>Description: Shrub. Leaf small, elliptic/obovate with symmetrical rounded/cuneate base and rounded apex, upper surface dark green, lower surface white-green, margins very revolute, leathery, hairless; petiole hairless. Inflorescence with 2-12 flowers. Involucre ellipsoid/oblong, 7 mm long, with sparse white hairs. Sepals completely included within involucre. Petals white. Fruit globose/ovoid, included within involucre.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: low elevation evergreen forest, thicket • Bioclimate: humid • Geology: basement rock • Altitude: 380 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably insects (no observations made but the floral characteristics and nature of visitors to the flowers of other species suggest insect pollination). • Seed dispersal: probably by lemurs and birds | |
| <p>Uses None known</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Ambato-Masoala (15°16'18''S, 50°20'35''E) • Regeneration observed: Yes • Tolerant to disturbance: No • Abundance: <50 mature individuals <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss : 0-30% (although outside the Masoala PN this population is far from human habitations) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate seed dispersers <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 0.00126 km² • Area of occupancy: 0.00126 km² • Number of subpopulations: 1 <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 0 • Protected areas: 0 |
| <p>Herbarium specimens examined: Antsiranana: Masoala PN, G. Rahajasoja, J. Rabe & R. Bernard 790</p> | |

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| <i>Leptolaena multiflora</i> Thouars | Risk of extinction: Least Concern (although this species has a high predicted population decline it has several apparently secure sub-populations within protected areas). |
| Vernacular names: Amaninaombilahy | Conservation Recommendations: a) good management of protected areas, b) creation of new littoral forest protected areas |
| Description: Medium (large) tree. Leaf blade medium (small), elliptic, somewhat falcate with acute apex, papery to leathery, hairless. Inflorescence with 9-47 flowers. Involucre urn-shaped/cup-shaped. Sepals exceeding involucre by 1-1.8 mm. Petals white. Fruit small, ovoid, entirely included within the involucre. |  |
| Habitat: • Vegetation type: littoral forest, low elevation evergreen forest • Bioclimate: humid • Geology: unconsolidated sand, lavas, alluvial and lake deposits, basement rocks • Altitude: 0-1,400 m | |
| Biology; • Pollination: probably by insects (bees seen visiting flowers at Mahatsara). • Seed dispersal: probably birds and lemurs (<i>Hypsipetes madagascariensis</i> and <i>Haplemurs griseus</i> reported to eat fruit at Mahatsara) | |
| Uses: timber for construction and bark for medicine | |
| <p>Distribution</p>  | <p>Observations of study population(s)</p> <ul style="list-style-type: none"> • Location 1: Mahatsara STF (17°38'21"S, 49°29'02"E) • Regeneration observed: yes • Tolerant to disturbance: yes • Abundance: 50-250 mature individuals • Location 2: Tampolo F.C. (49°24', 17°16') • Regeneration observed: yes • Tolerant to disturbance: yes • Abundance: 1000-2,500 mature individuals <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss: 50-80% (cause of loss = tavy and fire) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate dispersers and selective exploitation. <p>Distribution attributes for total population</p> <ul style="list-style-type: none"> • Extent of occurrence: 180 310 km² • Area of occupancy: 29 691 km² • Number of subpopulations: 42 <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 4 • Protected areas: Masoala PN, Mananara RB, Manombo RS, Zahamena RN |
| <p>Herbarium specimens examined: Antsiranana: [Masoala], SF(Roberson) 7494 .Masoala PN, G. Rahajaso, R. Bernard & J. Rabe 424.Masoala PN, G. Rahajaso, R. Bernard & J. Rabe 522.Masoala PN, Roger Bernard 372. Beankoraka, J. Rabe 157. Masoala RNI, RN(A.Tata) 2746. Masoala RNI, RN(Tsilily) 5514. Sahamalaza (Masoala), Service Forestier 34575. Masoala RNI, RN(P. Naivo) 9124 . Masoala RNI, RN (Ranjokiny) 9113 . Masoala RNI, RN (Ranjokiny) 9310. Masoala RNI, RN(Zata) 3403 .Nosy-Be, Ch. d'Alleizette 268 . Andohan'Ifosa, R. Randrianaivo et al. 613, Ankarana, Lalao Jérmi Razafitsalama & R. Ludovic 28. Fianarantsoa : Manombo RS, SF(Girard) 15302 . Andrazaha, SF(Ratsirahonana) 15378 .Manombo SF, SF(Andriantsiferana.H.) 12929 . Amporofo, SF(Rakotomanana) 12401 Manombo SF, SF(Ratsimbazafy) 21493 . Amporofo, SF(Bora.FI) 13906 .Ifanirea, SF(Razanakolona) 14504 .Tohakandra, SF 3680 .Analavory, SF 15493 .Evato, SF 16215 . Ampangalana Atsimo, SF 19535 .Ifanirea, SF 4813 . Ampangalana Atsimo, SF 9501 .Ambazato, SF 16118 .Misevo, Service Forestier 3809 .Ifandana, R. Decary 5198 .Mahabo, R. Rabevohitra & J. Rabenantoandro 3808 .Manampano, SF(M. Jonarson) 89-R-303 .Vohitrakora, SF(A. Rakoto) 29-R-273 .Mahabo, G. McPherson & J. Rabenantoandro 18317 .Mahabo, Johny Rabenantoandro & G. McPherson 677 . Toamasina: Soanierano Ivongo, SF(Rakoto.J.D.) 2414 : [Mananara RB, C. Birkinshaw et al. 354 .Ambila Lemaitso SF, SF(Lemanivo) 1616 .Foulpointe, SF(Kiener.A.) 5677 .Vohibola, SF(R.Capuron) 18082 .Tampolo SF, SF(Zavah.P.) 15215 .Rantabe, SF(Ch. Randriamanga) 6252 .Antetezana STF, SF(Todivelona) 7510 .Tampolo SF, SF(Laisonoa) 10076 : Ambila-Lemaitso SF, SF(Andre) 21217 .Tampolo SF, A. Randrianasolo 458 .Tampolo STF, L.C. Raholivelo & G.E. Schatz 37 . Rantabe, N. Mamihoa Andrianjafy, F.Y. Razafindrakoto & R. Jaovita 66 .Tampolo SF, SF 10053 .Tampolo SF, SF 16472 .Antetezana, SF 4679 .Zahamena RN, RN(R. Laibosaka) 12429 .Rantabe, SF(R.Capuron) 8901 .Ambila-Lemaitso, SERVICE FORESTIER 29892 .Mahatsara, SERVICE FORESTIER 32831 .Tampolo SF, SF 17820 .Lakato, SERVICE FORESTIER 29717 .Mahatsara, SERVICE FORESTIER 34550 .Mahatsara, SERVICE FORESTIER 35140 .Tampolo SF, SERVICE FORESTIER 29860 .Tampolo SF, SERVICE FORESTIER 19172 .Ambila-Lemaitso SF, SF(L. Bégué) 745-R-1 .Antetezana SF, SF(A. Kiener) 4-R-7 .Tampolo SF, SF 19173 (P). Tampina, SF(Dumazer) s.n. .Tampina, E. Ursch 116 .Foulpointe, L.-H. Boivin s.n. .Mahanoro, H. Perrier de la Bâthie 14186 .Mahatsara STF, Johny Rabenantoandro et al. 563 .Tampolo STF, S.G. Razafimandimbison 150 .Tampolo STF, Johny Rabenantoandro et al. 536 .Tampolo STF, Richard Razakamalala et al. 142 .Mahatsara STF, Richard Razakamalala et al. 151 .Tampolo STF, Reza Ludovic & L.J. Razafintsalama 78 .Antetezana STF, Reza Ludovic et al. 124 .Tampolo STF, F. Y. Razafindrakoto et al. 61</p> | |

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| <p><i>Leptolaena pauciflora</i> Baker</p> | <p>Risk of extinction: Least Concern (although this species has a high predicted population decline it has several apparently secure sub-populations within protected areas and is also somewhat tolerant of burning).</p> |
| <p>Vernacular names : Fotona, Foto</p> | <p>Conservation Recommendations: Good management of protected areas</p> |
| <p>Description: Shrub. Leaves small, round/ovate with rounded base and obtuse apex, somewhat leathery, hairless at maturity; petiole with small hairs. Inflorescence with 10-30 flowers. Involucre with 1-5 flowers. Sepals exceeding involucre by 1-1.5 mm. Petals green-white. Fruit ovoid, enclosed within involucre.</p> |  |
| <p>Habitat</p> <ul style="list-style-type: none"> • Vegetation type: littoral forest, low and mid elevation evergreen forest • Bioclimate: humid, subhumid, dry • Geology: basement rocks, unconsolidated sands, lake and alluvial deposits, cipolin, quartzites, sandstones, lava • Altitude: 0-2300 m | |
| <p>Biology</p> <ul style="list-style-type: none"> • Pollination: probably insects (bees seen visiting flowers at Lakandava) • Seed dispersal: probably birds and lemurs (<i>Foudia madagascariensis</i> and <i>Merops superciliosus</i> reported or seen eating fruit at Lakandava – but neither of these species is normally considered to be a seed disperser) | |
| <p>Uses Roots used for beauty mask, bark used in the manufacture of toaka gasy (a locally-made alcoholic drink), fruit eaten, fire wood.</p> | |
| <p>Distribution</p>  | <p>Observations of study population(s):</p> <ul style="list-style-type: none"> • Location: Lakandava (24°57'16''S, 46°58'54''E) • Regeneration observed: Yes • Tolerant to disturbance: somewhat tolerant of fire • Abundance: 50-250 mature individuals <p>Predicted future decline:</p> <ul style="list-style-type: none"> • because of habitat loss : 50-80% (cause of loss = tavy) • because of exploitation or poor regeneration: decline possible because of increasing rarity of vertebrate dispersers <p>Distribution attributes for total population:</p> <ul style="list-style-type: none"> • Extent of occurrence: 199.029 km² • Area of occupancy: 35.374 km² • Number of subpopulations: 84 <p>Representation in protected areas:</p> <ul style="list-style-type: none"> • Number of subpopulations: 8 • Protected areas: Ambohitantely RS, Andringitra RNI, Andohahela RNI, Analamazaotra RS, Manombo RS, Zahamena RNI |

Herbarium specimens examined: Antananarivo: Anjozorobe, [D.K. Harder, M.C. Merello & S.G. Razafimandimbison 1536](#) Anjozorobe, [G.E. Schatz et al. 2961](#): Anjozorobe, [P. P. Lowry II & J. Randrianasolo 4375](#) Anjozorobe, [P. P. Lowry II & J. Randrianasolo 4397](#) Anjozorobe, [James L. Zarucchi et al. 7345](#) Anjozorobe, [A. Rakotozafy, P. Phillipson, S. Malcomber & S. Razafimandimbison 2682](#) Ambohitantely RS, [SF 34023](#) Anjozorobe, [R.E. Gereau, P.-J. Rakotomalaza, T. Razafindrabeaza, G. Rafamatantsoa & F. Andriatsiferana 5690](#) Anjozorobe, [James S. Miller, J. Bradford, F. Rakotonasolo & A. Randrianasolo 8777](#) Manankazo-Ankazobe SF [SF\(Ecol.Forest.\) 16806](#) Ankafobe, [G.E. Schatz, F.Y. Razafindrakoto, N. M. Andrianjafy & J. Rabenantoandro 3955](#). Andranofeno-Sud, [Mamisoa N. Andrianjafy et al. 11](#) Ambohitantely RS, [Reserves Naturelles 6706](#): Sahatsio, [H. Humbert 7111](#) Tampoketsa d'Ankazobe, [J. Bosser 7944](#) Tampoketsa, [J. Bosser 15978](#) Ambohitantely RS, [G. Cremers 1624](#) Ambohitantely RS, [G. Cremers 2020](#) Sahatsio, [J. Bosser 9969](#) Col des Tapia, [J. Bosser 18772](#) Ambohitantely RS, [SERVICE FORESTIER 3-R-3](#) Ambohitantely RS, [SERVICE FORESTIER 34202](#) Ambohitantely RS, [Service Forestier 19874](#): Ambohitantely RS, [R. Decary 7473](#) Fianarantsoa: Ivato, [A. Randrianasolo 232](#) Ambohimanjaky, [C.H. Jongkind & Solo Rapanarivo 828](#) Ambohimanjaka, [C.H. Jongkind & Solo Rapanarivo 932](#) Ambohimanjaka, [L.J. Dorr, L.C. Barnett, M.R. Cheek, A. Rakotozafy & N. Razafimalala 3842](#): Mont Ibity, [L. Barnett 502](#) Ampandrambato, [SF\(L.Bégué\) 2708](#): between Ivato and Itremo, [Leeuwenberg, A.J.M. & G.R. Rafamantanantsoa 14443](#) Marohita, [SF\(Razafy.G.\) 5631](#): Vohipaho, [SF\(Tovolahy.A.\) 5625](#): Ambohimananana, [SF\(Ranaivo.E.\) 19695](#) Mananjary, [SF\(Dinard.A.\) 7035](#) Misevo, [SF\(Randrianasolo.G.\) 7292](#) Ampangalana Atsimo, [SF\(Jonanson.M.\) 13701](#) Itremo, [J. Rabenantoandro et al. 62](#): Itremo, [N. Messmer & F. Andriatsiferana 781](#) Ambatofinandrahana, [M. Keraudren-Aymonin & G. Aymonin 25712](#) Itremo, [G.E. Schatz, F.Y. Razafindrakoto, N.M. Andrianjafy & J. Rabenantoandro 3964](#) Ambohimanjaka, [J.-N. Labat et al. 3010](#) Andringitra RN, [RN\(Rakoto J. de la C.\) 6507](#) Ivato, [Morat 3315](#): between Ivato and Ambatofinandrahana, [G. Cremers 2052](#) Faliarivo, [R. Decary 14023](#) Mangatsiatra, [SF 4829](#) Fiadanana, [J. Peltier & M. Peltier 2159](#): Anjoma, [J. Peltier & M. Peltier 2184](#): Anosivelo, [SF 3811](#): Analalava, [SF 14670](#) Ankangaratana, [SF 16113](#) Ankijana, [SF 14763](#) Ankijana, [SF 13472](#) Marohita, [SF 9540](#) Antanambao, [Service Forestier 14047](#) Nosy-Varika, [SF 14661](#) Androrangalava, [SF 16119](#): Andringitra RNI, [RN \(Rakotovo\) 7166](#) Andringitra RNI, [RN \(Rakotoson\) 11691](#) Andringitra RNI, [RN \(Rakoto, J.C.\) 706](#) Itremo, [Croat, T.B. 29910](#) Mananjary, [F. Geay 7707](#) Mananjary, [F. Geay 8708](#): Mananjary, [F. Geay 7926](#): Faliarivo, [SF\(R. Capuron\) 11542](#) Ambatofinandrahana, [R. Decary 13226](#) Ambatofinandrahana, [H. Humbert & R. Capuron 28059](#) Itremo, [H. Humbert 29938](#) Andringitra RNI, [H. Perrier de la Bâthie 3004](#) Mananjary, [F. Geay 7618](#) Mananjary, [F. Geay 7507](#) Faliarivo, [H. Humbert 14477](#): Itremo, [M. Keraudren-Aymonin & G.G. Aymonin 26009](#) Vatovavy, [H. Perrier de la Bâthie 4488](#) Ambila, [H. Perrier de la Bâthie s.n.](#) Ambatofinandrahana, [H. Perrier de la Bâthie 3007](#) Matatana, [H. Perrier de la Bâthie 3012](#) Ambositra, [R. Decary 17403](#) Ambositra, [R. Decary 17311](#) Col des Tapia, [H. Humbert & C.F. Swingle 4640](#): Faliarivo, [R. Decary 14036](#) Ambatofinandrahana, [R. Decary 13063](#): Ambatofinandrahana, [R. Decary 17333](#) Itremo, [SF 54-R-10](#) Mahabo, [R. Rabevohitra & J. Rabenantoandro 3770](#) Mahabo, [G. McPherson & J. Rabenantoandro 18281](#) Mahajanga: Manandona, [SF\(R.Capuron\) 232](#) Antsiasiaika, [Ph. Morat 4512](#): Sahavoay, [SF 15806](#): Beveromay, [H. Perrier de la Bâthie 13213](#) Ilaka-Est, [A. Randrianasolo 292](#) Toamasina: Ambila-Lemaitso, [G. E. Schatz & P. P. Lowry 1320](#) Ambila-Lemaitso, [Pete Phillipson 1850](#): Ambila-Lemaitso, [James L. Zarucchi et al. 7411](#) Ambila-Lemaitso, [A. Randrianasolo 224](#) Ambila-Lemaitso SF, [SF\(Verdet\) 3259](#) Mahanoro, [SF\(Tefamila\) 3267](#) Ambila-Lemaitso, [B. Lewis & S. Razafimandimbison 728](#) Ambila-Lemaitso SF, [SF\(Ecol.Forest.\) 1122](#) Ambila-Lemaitso SF, [SF\(L.Bégué\) 1569](#): Ambila-Lemaitso SF, [SF\(Verdet\) 5737](#): Fierenana, [SF\(Abraham\) 7598](#): Ambila-Lemaitso SF, [SF\(Andre\) 7258](#) Ambila-Lemaitso SF, [SF\(Rakotozafy.Pau.\) 13180](#): Ambila-Lemaitso SF, [G. Cours 2981](#) Ambila-Lemaitso SF, [SF 4887](#) Marosiky, Ambila-Lemaitso SF, [A.J.M. Leeuwenberg & R. Ranaivojoana 14589](#): Ambila-Lemaitso SF, [SF 4157](#) Ambila-Lemaitso SF, [SF 4711](#) Ambila-Lemaitso SF, [SF 4908](#) Ambila-Lemaitso SF, [SF 4707](#) Ampangalana Atsimo, [SF 9506](#): Ambila-Lemaitso, [SERVICE FORESTIER 32214](#): Ambila-Lemaitso SF, [SF 9647](#) Iamboala, [SF 19626](#) Didy, [G. Cours 4646](#): Ambila-Lemaitso SF, [R. Decary 6388](#): Ampasimpotsy SF, [SF 25366](#): Manohilahy, [SF\(R.Capuron\) 18771](#): Ambila-Lemaitso SF, [R. Decary 6502](#): Ambila-Lemaitso SF, [RN\(E. Rakoto\) 1499](#) Zahamena RNI, [RN\(Rakotovo\) 11247](#): Mahanoro, [Perrier de la Bâthie s.n.](#) Andranomandry, [SF\(J. P. Abraham\) 25298](#): Brickaville, [SF\(J. P. Abraham\) 30851](#): Antanambao (Tanambao), [SF\(R. Rabevohitra\) 34662](#): Ambila - Lemaitso, [SF\(R. Rabevohitra\) 29895](#): Ambila-Lemaitso, [S.G. Razafimandimbison 179](#): Zahamena PN, [F. Ratovoson et al. 524](#) Toliara: Andohahela RN, [A. Randriamanantena & J. Durbin 119](#): Manantantely, [A. Randrianasolo 283](#): Analalava, [G. McPherson 14278](#): Evatra, [R.E. Gereau, N. Dumetz, & R. Rabevohitra 3294](#) Ste. Luce, [G. McPherson, et al. 14164](#): Andohahela RN, [Beberonn Randriamampionona 331](#) Andohahela RN, [Beberonn Randriamampionona 569](#): Andohahela RNI, [Ph. 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Scott-Elliott 2713bis](#): Fort Dauphin, [M. Keraudren-Aymonin & G.G. Aymonin 24997](#) Mandromodromotra, [H. Jacquemin 1158](#): Ambaravano, [H. Jacquemin 934](#) Pic Saint Louis, [R. Decary 10011](#): Pic St. Louis, [H. Humbert 5899](#): Imonty, [H. Humbert 14080](#): Andohahela RNI, [H. Humbert 13835](#): Mandena, [Porter P. Lowry II, R. Rabevohitra & J. Rabenantoandro 5215](#) Mandena, [Faly Randriantafika & G. Sehatrefy 247](#):

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|--|--|
| <i>Leptolaena raymondii</i> Schatz & Lowry | Risk of extinction: Critically Endangered (A3, B1ab, B2ab, C2aii) |
| Vernacular names: Amaninaombilahy | Conservation Recommendations: a) good management of Mahatsara Forestry Station, in particular, protection of the site against fire; b) reinforcement of the population at Mahatsara and possible reintroduction to a neighbouring site c) conservation ex-situ. |
| Description: Small (medium) tree. Leaves small, ovate with acuminate falcate apex, somewhat asymmetrical, long hairs on lower surface, margin strongly revolute, papery; petiole with tomentum. Inflorescence with, 6-25 flowers. Involucre urn-shaped. Petals white/pale yellow. Fruit globose, exceeding the involucre. |  |
| Habitat • Vegetation type: littoral forest • Bioclimate: humid • Geology: unconsolidated sand • Altitude: 0-5 m | |
| Biology • Pollination: probably by insects (bees, beetles, and hornets seen visiting flowers at Mahatsara) • Seed dispersal: probably by birds and lemurs (no observations available but fruit characteristics and observations of animals eating the fruits of other <i>Leptolaena</i> species suggests species animal dispersed) | |
| Uses Timber used for construction and leaves used medicinally. | |
| Distribution  | Observations of study population(s) • Location: Mahatsara STF (17°38'21"S, 49°29'02"E) • Regeneration observed: Yes • Tolerant to disturbance: No • Abundance: 50-250 mature individuals |
| | Predicted future decline: • because of habitat loss: > 80% (cause of habitat loss = fire) • because of exploitation or poor regeneration: decline possible because of increasing rarity of large vertebrate dispersers and selective exploitation. |
| | Distribution attributes for total population • Extent of occurrence: 0,17 km ² (17 ha) • Area of occupancy: 0,17 km ² (17 ha) • Number of subpopulations: 1 |
| | Representation in protected areas: • Number of subpopulations: 0 • Protected areas: none |
| Herbarium specimens examined: Toamasina: Mahatsara, SF 34104 Mahatsara STF, Armand Randrianasolo & R. Ranaivojaona 638). Mahatsara STF, SF(Comtet) 34407 Mahatsara SF, SERVICE FORESTIER 35141 . Mahatsara SF, SERVICE FORESTIER 34554 . Mahatsara STF, SERVICE FORESTIER 32648 Mahatsara STF, Johny Rabenantoandro et al. 562 | |

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