Rediscovery of *Ravenea latisecta* Jum. (Arecaceae) after a century, and the conservation implications

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Abstract Rediscoveries of endemic plant species previously believed lost recalibrate conservation priorities by revealing relict populations and underscore the need for botanical surveys. Since its description in 1927, *Ravenea latisecta*, a palm species endemic to Madagascar, had been considered lost for nearly a century. Numerous palm collections failed to find wild populations, raising doubts about its existence. During a 2024 botanical survey in the Andasibe region, we rediscovered the species in Vohimana Reserve, Analamazoatra–Mantadia National Park and Vakona Forest private reserve. We recorded a total of 28 individuals within a limited area of c. 50 km². Our findings suggest a provisional categorization as Critically Endangered on the IUCN Red List. All known individuals are located within protected areas, under various management regimes. Monitoring will be essential to evaluate potential threats, track population dynamics and study the species' reproductive biology. This rediscovery highlights the critical role of fieldwork in Madagascar, where species believed lost may persist in overlooked forest patches. Our rediscovery shows that conserving even small forest remnants can safeguard species, and has conservation implications: integrated strategies are needed to secure the future of narrowly endemic palm species.

Keywords Endemic species, IUCN red list, Madagascar, Madagascar National Parks, palm conservation, *Ravenea latisecta*, rediscovery, threatened species

Madagascar is a recognized biodiversity hotspot, and home to a highly endemic palm flora (Callmander et al., 2011; Antonelli et al., 2022). Of the 208 native palm species, 98% are endemic, making them an integral part of the island's unique ecosystems (Rakotoarinivo et al., 2014). However, ongoing habitat loss as a result of deforestation, *tavy* (slash-and-burn agriculture) and illegal logging have placed many of these species at risk (Green & Sussman, 1990; Ralimanana et al., 2022) and 83% of Madagascar's palm species are threatened with extinction (Rakotoarinivo



Plate 1 (a) Habit of *Ravenea latisecta,* and (b) the species' typical habitat in southern Mantadia forest, within the Vakona Forest private reserve. Photographs: L. Aureglia.

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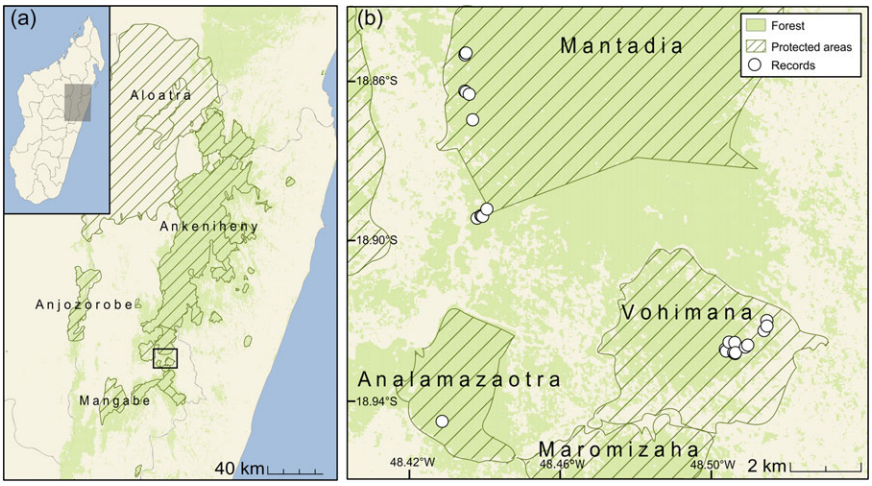


FIG. 1 (a) Regional context for the location of *Ravenea latisecta* in central-eastern Madagascar, with forest and protected areas for reference. (b) The 28 records of the species in Andasibe, mostly within protected areas in the Mantadia–Vohimana region. Protected area boundaries and forest cover are based on UNEP-WCMC & IUCN (2025) and Hansen et al. (2013), respectively.

et al., 2014). Palms are used for food, construction and crafts, often through destructive harvesting that threatens species (Dransfield & Beentje, 1995), including some *Ravenea* species documented to have traditional uses (Decary, 1964; Hogg et al., 2013; Bussmann et al., 2015).

Ravenea latisecta Jum., described in 1927 from a single specimen collected by Perrier de la Bâthie in the Analamazaotra forest at c. 900 m elevation (H. Perrier de la Bâthie 12008: MARS), had not been confirmed in the wild since its original discovery (Jumelle, 1927). With no evidence of its continued existence and no individuals in cultivation, it fitted the definition of a lost species (Long & Rodríguez, 2022). Although some collections were labeled as *R. latisecta* (H.J. Beentje & H.R. Andriampaniry 4686, 4776: K, TAN; H.J. Beentje, J. Dransfield & H.R. Andriampaniry 4657: K, P, TAN), our examination revealed these are *Ravenea madagascariensis* Becc. or *Ravenea robustior* Jum. & H. Perrier. Only one specimen, with broad leaflets, remains uncertain, collected in 1992 in Mantadia (H.J. Beentje, J. Dransfield & H.R. Andriampaniry 4652: K, TAN). However, the field notes are brief, and no inflorescences were observed; it may correspond to a small *R. robustior*. According to Jumelle (1927), *R. latisecta* is distinguished, among other criteria, by its inflorescence morphology and leaflets. Male inflorescences are large, featuring long rachillae measuring 15–20 cm, females have a long peduncle (c. 60 cm) with rachillae 35–45 cm long, and the broad median leaflets measure 5–7 cm.

During fieldwork in April and May 2024, we rediscovered *R. latisecta* at four sites (Plate 1, Fig. 1): Vohimana Reserve, Analamazoatra National Park, Mantadia National Park and Vakona Forest private reserve (south-west Mantadia). These sites, in Madagascar's eastern humid forests at 800–1,200 m, match the habitat described in Perrier's original diagnosis of *R. latisecta*. Such refuges far from human habitation often harbour species presumed extinct as a result of anthropogenic pressure (Crowley, 2011). In total, we found 28 *R. latisecta* in the Andasibe region and surrounding areas, most of them within protected areas (Fig. 1); we collected 11 specimens (L. Aureglia & B. Vila LA246, LA280, LA281, LA301, LA302, LA318, LA322, LA329, LA330, LA332, LA333: MARS, TAN). Identification of *R. latisecta* was based on morphological characteristics, particularly its notably broad leaflets, a key diagnostic feature, as well as observations of male and female specimens in the field (Plate 2).

We recorded each subpopulation in the four sites in an area of < 5 km². GeoCAT analysis (Bachman et al., 2011) gave an extent of occurrence of 50.2 km² and an area of occupancy of 28.0 km². As < 50 mature individuals are known, we recommend the species be categorized as Critically Endangered based on criterion D (IUCN Standards and Petitions Committee, 2024). Should future surveys locate > 50 mature plants, it could then meet the thresholds for Endangered under criteria B1ab(iii)+2ab(iii), extent of occurrence < 100 km² (B1), area of occupancy < 500 km² (B2), a small number of locations (a) and a continuing decline in habitat quality (b)(iii). These small populations remain vulnerable to threats such as *tavy* and illegal exploitation, which sometimes occur even within reserve boundaries. Although we observed no local use, the vulnerability of palms and documented use of other Malagasy species make future impacts plausible (Rakotoarinivo et al., 2020; Frappier-Brinton & Lehman, 2022). Further fieldwork is needed to confirm the full extent of the distribution, population structure and any threats. Nonetheless, the available information points to high conservation concern for *R. latisecta*.

Although fire is less frequent inside protected areas, edge effects and limited management still pose risks (Waeber et al., 2020; Frappier-Brinton & Lehman, 2022), but the presence of *R. latisecta* across national parks, community-managed and private reserves is encouraging for its conservation. To secure its long-term survival, the priorities are to investigate flowering phenology and population-level sex ratios in this dioecious palm, as the

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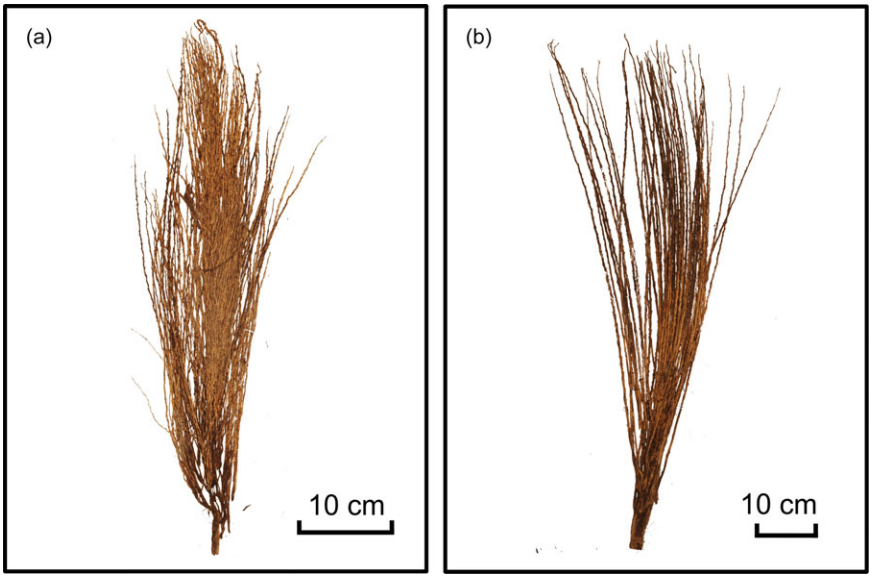


PLATE 2 (a) Male inflorescence (LA246) and (b) female inflorescence (LA333) of *R. latisecta*, shown without peduncles, displaying only the rachillae.

current absence of fruiting individuals constrains ex situ conservation. In parallel, an integrated strategy, strengthening in situ protection, ex situ seed-banking, and engagement of local communities, follows approaches advocated for other extremely narrowly endemic plants (Wu et al., 2023). The rediscovery of *R. latisecta* highlights Andasibe's overlooked botanical richness and demonstrates the value of targeted surveys in other priority Key Biodiversity Areas where additional species presumed lost may persist (Rakotoarinivo et al., 2020). *Ravenea latisecta* could serve as a local flagship for ecotourism and conservation. The conservation implications of our rediscovery include the need to strengthen management of protected areas, pursue ex situ propagation and engage local communities to mitigate threats such as *tavy* and illegal exploitation.

Author contributions Study design, fieldwork: LA, BV; data analysis, writing: all authors.

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Conflicts of interest None.

Ethical standards This research complied with the *Oryx* ethical standards. Permission for plant collection and export was granted by Madagascar National Parks and the Madagascan Ministry of the Environment under permit No. 085/24/MEEF/SG/DGGE/DAPRNE/SCB.Re.

Data availability The occurrence data for *R. latisecta* have been shared with the management teams of all protected areas where the species was recorded. Location data are not publicly available, to preserve the species, but can be provided upon reasonable request.

References

ANTONELLI, A., SMITH, R.J., PERRIGO, A.L., CROTTINI, A., HACKEL, J., TESTO, W. et al. (2022) Madagascar's extraordinary biodiversity: evolution, distribution, and use. *Science*, 378, eabfo869.

BACHMAN, S., MOAT, J., HILL, A., DE LA TORRE, J. & SCOTT, B. (2011) Supporting Red List threat assessments with GeoCAT: geospatial conservation assessment tool. *ZooKeys*, 150, 117–126.

BUSSMANN, R.W., PANIAGUA ZAMBRANA, N., KUHLMAN, A., RAKOTOARIVONY, F., RAZANATSIMA, A., RAKOTOARIVELO, N. et al. (2015) Palms and palm use in Ambalabe, a community in eastern Madagascar. *Ethnobotany Research and Applications*, 14, 017.

CALLMANDER, M.W., PHILLIPSON, P.B., SCHATZ, G.E., ANDRIAMBOLOLONERA, S., RABARIMANARIVO, M., RAKOTONIRINA, N. et al. (2011) The endemic and non-endemic vascular flora of Madagascar updated. *Plant Ecology and Evolution*, 144, 121–125.

CROWLEY, B.E. (2011) Extinction and rediscovery: where the wild things are: commentary. *Journal of Biogeography*, 38, 1633–1634.

DECARY, R. (1964) Les utilisations des Palmiers à Madagascar. *Journal d'agriculture tropicale et de botanique appliquée*, 11, 259–266.

DRANSFIELD, J. & BEENTJE, H.J. (1995) *The Palms of Madagascar*. Royal Botanic Gardens, Kew, London, UK, and The International Palm Society.

FRAPPIER-BRINTON, T. & LEHMAN, S.M. (2022) The burning island: spatiotemporal patterns of fire occurrence in Madagascar. *PLOS One*, 17, e0263313.

GREEN, G.M. & SUSSMAN, R.W. (1990) Deforestation history of the eastern rain forests of Madagascar from satellite images. *Science*, 248, 212–215.

HANSEN, M.C., POTAPOV, P.V., MOORE, R., HANCHER, M., TURUBANOVA, S.A., TYUKAVINA, A. et al. (2013) *Hansen Global*

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Forest Change v1.12 (2000-2019). University of Maryland, College Park, USA. developers.google.com/earth-engine/datasets/catalog/UMD_hansen_global_forest_change_2024_v1_12 [accessed 17 March 2025].

Hogg, F., Funnell, S., Shrum, M., Ellis, E.R. & Tsimijaly, L.H. (2013) The useful palms of Sainte Luce: implications for local resource availability and conservation. *Palms*, 57, 133–144.

IUCN Standards and Petitions Committee (2024) *Guidelines for Using the IUCN Red List Categories and Criteria*. IUCN, Gland, Switzerland.

Jumelle, H. (1927) Ravenea et Louvelia, palmiers de Madagascar. *Annales du Musée Colonial de Marseille*, 5, 34–37.

Long, B. & Rodríguez, J.P. (2022) Lost but not forgotten: a new nomenclature to support a call to rediscover and conserve lost species. *Oryx*, 56, 481–482.

Rakotoarinivo, M., Andriambololonera, S.R., Beentje, H.J., Couvreur, T.L., Rafidison, V.M., Rahanitriniaina, V. et al. (2020) *Strategy for the Conservation and Sustainable Use of the Palms of Madagascar*. Sud Expert Plantes Développement Durable, Antananarivo, Madagascar.

Rakotoarinivo, M., Dransfield, J., Bachman, S.P., Moat, J. & Baker, W.J. (2014) Comprehensive Red List assessment reveals exceptionally high extinction risk to Madagascar palms. *PLOS One*, 9, e103684.

Ralimanana, H., Perrigo, A.L., Smith, R.J., Borrell, J.S., Faurby, S., Rajaonah, M.T. et al. (2022) Madagascar's extraordinary biodiversity: threats and opportunities. *Science*, 378, eadf1466.

UNEP-WCMC & IUCN (2025) *Protected Planet: The World Database on Protected Areas*. UNEP–WCMC, Cambridge, UK. protectedplanet.net/en [accessed 17 March 2025].

Waeber, P.O., Rafanoharana, S., Andry Rasamuel, H. & Wilmé, L. (2020) Parks and reserves in Madagascar: managing biodiversity for a sustainable future. In *Protected Areas, National Parks and Sustainable Future* (eds A. Naqiyuddin Bakar & M. Nazip Suratman), pp. 1–20. IntechOpen, London, UK.

Wu, Z., Wu, Y. & Zhang, N. (2023) Rediscovery of the Critically Endangered *Primula esquirolii*, a karst cave species with an extremely small population endemic to China. *Oryx*, 57, 540–542.

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