Exploring for New Localities of *Tahina spectabilis* in North-eastern Madagascar

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***Tahina spectabilis*, the most massive fan palm in Madagascar, was discovered in 2006 in a very remote locality northeast of Mahajanga. Recent field work has documented thirteen additional populations of this globally imperiled palm.**

The plant was described as a new Coryphoid genus in 2008 (Dransfield et al. 2008a) with a statement on the restricted distribution of the species. The IUCN assessment categorized *Tahina spectabilis* as Critically Endangered (CR) (Rakotoarinivo et al. 2012), which triggered the hunt for new populations using the predictive distribution map published in the two first papers on the species (Dransfield et al. 2008a)

A second population of *Tahina spectabilis*, was discovered by researchers from Royal Botanic Gardens Kew (RBG Kew), Parc Botanique et Zoologique de Tsimbazaza (PBZT) and the University of the Sunshine Coast (USC) in 2017, after the first one where the species was described and published in 2008 (Dransfield et al. 2008b). The discovery was sparked off by the recognition of the species from a photo sent by a local guide to the Royal Botanic Gardens Kew office in Antananarivo, the Kew Madagascar Conservation Centre (KMCC). The team mounted an expedition, first visiting the original type population and then visiting the new site where the photo was taken. The plant photographed was checked with local guide communities, recognized as *Tahina spectabilis* (Fig. 1) and published (Gardiner et al. 2017). This new discovery, occurring outside the area predicted in the original paper (Dransfield et al. 2008a) suggested that the palm might be more widespread. Researchers from Royal Botanic Gardens visited a new area to explore for potential populations.

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How it started

The trip to Amparihibe where the second population of *Tahina spectabilis* (Gardiner et al. 2017) was discovered, was an opportunity for RBG Kew team to launch a public awareness campaign with the local community on just how important the discovery of *T. spectabilis* is, and why the species is a natural legacy they have the obligation to take care of, for the present and for future generations. This campaign was followed by the distribution of a *T. spectabilis* poster and T-shirts several months later, with the emblem "let us protect *Tahina spectabilis*" in their own Malagasy dialect, emblazoned under a photo of *T. spectabilis* (Fig. 2).

Talk chains

As community members meet people wearing the *Tahina spectabilis* T-shirt and see the photo of the plant, conversations start with what the

1. *Tahina spectabilis* individual discovered in 2017.

plant is, why it is special and ending with "I know a place where there are some too." The site-based KMCC employee – Theophile Rajaonilaza – collected these "site names" along with the names of individuals linked with the information. He visited them on a later date to talk about the species, check with them if possible or plan a later visit and

2. *Tahina specabilis* T-Shirt created to heighten awareness and initiate discussions about the palm.

distribute the T-shirts to expand the publicity campaign. These same people were the ones to guide the team to the sites when they were available.

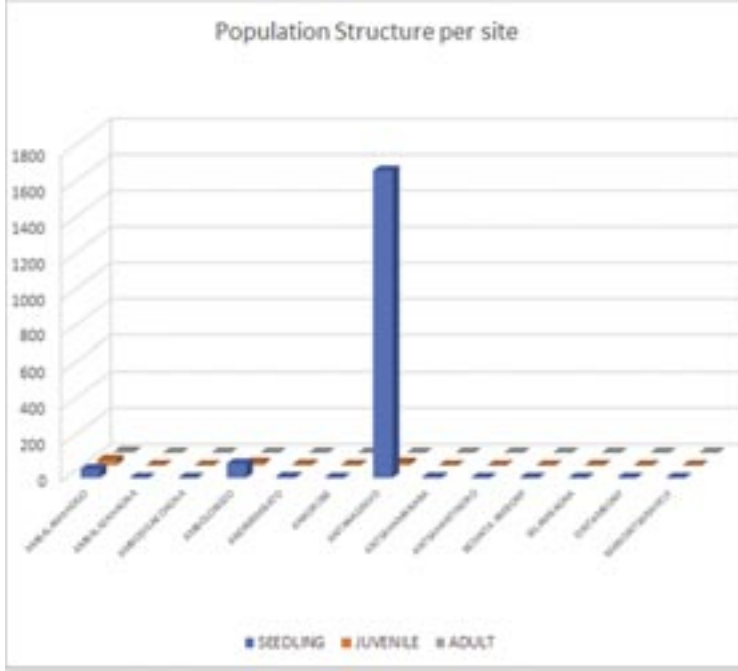
Thirteen new localities

These talk chains amongst community members enabled the recording of thirteen new localities (Fig. 3) – twelve on the eastern side, belonging to the commune of Maromandia, and one, within the commune of Ankaramy on the western side of National Road No. 6, between Befotaka village in the south and Ankaramihely in the north. We took the road as a geographical reference as it is the most obvious landmark for the area. However, the distribution map shows a possible positive correlation with the Ano Malaza River, except for the Antanagnivo population on the western side of the road. These newly discovered localities cover a wide latitude range which will bring an important change in the species' Area of Occupancy and Extent of Occurrence.

Few adults and numerous seedlings

The population structure was categorized into seedlings (S), juveniles (J) and adults (A), with two subcategories each, based on their relative size compared to adult human height for S and J, and the relative height of the trunk for A. This population structure is marked by a very high number of seedlings, ca. 1970, and a low number of juveniles (74) and adults (18) for the thirteen new localities (Fig. 4). The most important concentration of seedlings was recorded in Antanagnivo on the western side

3. Distribution map of the new *Tahina spectabilis* populations. On the left is the map of Madagascar with insets showing the region in the northwest where the palm is found. On the right is enlarged map showing the locations of the 13 newly discovered populations.



4. A graph showing the population structure of *Tahina spectabilis* in the 13 newly documented populations. Size classes are indicated. The number of seedlings in Antanagnivo is striking. The cause of this disparity is not currently known.

of the National Road No. 6, which consists of over 1800 plants and more than 100 individuals per square meter (Fig. 5).

Seeds and Nursery

The RBG Kew team had the luck to observe a flowering *Tahina spectabilis* in the beginning of 2018 in Manerinerina, which produced several hundred seeds (Fig. 6) that the team collected for nursery purposes in collaboration with the PBZT. Unfortunately, too many of the seeds collected dried out before they reached Antananarivo (Fig. 7), and germination was disappointingly low. Parc

5. The high density of seedlings in the population at Antanagnivo.

6. Flowering *Tahina spectabilis* in Manerinerina. The inset at the lower right shows a flower and a developing fruit.

Botanique et Zoologique de Tsimbazaza is now taking care of about 200 nursery seedlings, and about 50 seedlings are held in Theophile's village (Fig. 8).

Further comments

The high concentration of seedlings observed in Antanagnivo suggests a very prolific fruiting

7 (top). Germinating *Tahina spectabilis* seeds. 8 (bottom). *Tahina spectabilis* seedlings thriving in the nursery in Theophile's village.

event but a critical lack of natural dispersers, highlighting the importance of ecosystem interdependence for species survival. A community member living close to several *Tahina spectabilis* individuals in Ambolobozo mentioned seeing fruit bats visiting the fruiting palm and discarding the fleshless seeds, suggesting that bats may be the natural disperser of the palm.

It is also worth mentioning that more than ten site names are known to host *Tahina spectabilis* individuals, but some people are reluctant to allow the visit of strangers for

different reasons that are not yet understood by the RBG Kew Team.

Finally, that *Tahina spectabilis* is a distinct palm different from the co-occurring fan palms *Borassus* spp. and *Bismarckia nobilis* is well understood in a few communities, and the local name, *bilambagna*, comes from the fact that their ancestors used the large leaf of the palm as a mat (*lambagna*) for eating during ceremonies. The KMCC Team is currently running a project which supports the community-led conservation of *Tahina spectabilis* near Maromandia through the promotion of yam cultivation, tree planting, well-drilling and classroom building within villages surrounding the best remaining habitat of the species, with an ultimate goal of implementing a community-managed Protected Area.

Conclusions

The second population of the *Tahina spectabilis* revealed in Amparihibe in 2016 has led researchers from Royal Botanic Gardens Kew to discover thirteen other localities, thanks to sustained collaboration with local communities and a continuous in-the field presence. These discoveries were the result of effective communication and public awareness undertaken – T-shirts and individual communication – to reveal people, localities and other key information. These newly discovered localities confirmed the possibility of a wider distribution of the species in this region and a wider AOO/EOO. Undertaking this research work enables the community to deliver their own knowledge of *Tahina spectabilis* and build a productive trust. These results open the door to further research in genetics and other fields such as history. Finally, researchers at RBG Kew hope to support the creation of a protected habitat for the species and reviewing the IUCN status of *Tahina spectabilis* soon.

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