



Dypsis saintelucei,
IUCN Critically
Endangered,
Photo by Dave
Meyer



Azafady Conservation Programme (ACP)

Botanical Report 2011

'The littoral forest is extremely rich and diverse, with over 900 recorded plant species of which over 60 are locally endemic.'
The Royal Botanical Gardens, Kew

Habitat Sampling

The botanical composition and structure of the Sainte Luce littoral forest fragments is unique and complex, containing plant species found nowhere else (Rabenantoandro et al., 2008). During early 2011 (Jan – Mar) ACP volunteers completed habitat sampling research in fragments S8 and S9 to determine the overall vegetative composition of the fragments by recording variables within representative plots throughout each forest – a project that started in 2010. This baseline information is a useful reference point when investigating distribution of fauna and can help in identifying habitat requirements for individual species. Notably, habitat preferences will also be determined for species of flora found in Sainte Luce, including the two Critically Endangered palms that the ACP studies.



The edge of the littoral forest at Sainte Luce facing the encroaching agricultural fields of cassava. Photograph by Dave Meyer

The process of fragmentation, alongside direct habitat loss, is a major threat to global biodiversity, and Madagascar is no exception. Fragmentation and increased 'edge effects' go hand in hand. Along the edge, or border, of a forest, environmental (abiotic) factors such as wind, light penetration, humidity and temperature are different to those affecting the core, or interior, of the forest. Some fauna and flora cannot survive within this perimeter or edge and therefore their distribution is restricted to the core area of forest (though note that some species thrive along these edges). Edge effects are a normal phenomenon, especially among naturally heterogeneous landscapes, but problems are compounded by fragmentation as the surface area to edge ratio decreases.

Methodology - The goals of the project were to produce a baseline habitat record, representative of each fragment (S8 and S9). Quadrants measuring 10m² were set out either side of transects every 100m. Habitat data was recorded in each quadrant to quantify the forest profile and habitat variances through the littoral forest.

Mapping *Dypsis Saintelucae* and *Beccariophoenix madagascariensis*

'The Malagasy palm flora is especially vulnerable to extinction. The main threat stems from the clearing of primary forest for agriculture, a process taking place at an alarming rate' (Green & Sussman, 1990)

In addition to the completion of the botanical habitat sampling, the ACP has been focusing its research effort on two specific palms.



Beccariophoenix madagascariensis is a Critically Endangered palm found in the littoral fragments of Sainte Luce. Several other populations exist (Farafangana, Manantenina and Mantadia) but the Sainte Luce population is important for conservation due its remarkably high genetic diversity despite its limited numbers (Shapcott et al., 2007). *Dypsis saintelucae* is also a Critically Endangered palm and harvesting for its many local uses has devastated the Sainte Luce population. The leaf rachis [central axis] (for lobster trap construction), the palm hearts (for food) and the trunks (for construction) are exploited by members of the nearby communities. Overall, very little is known about the ecology of either palm including seed dispersal and life history. Conservation statuses for both species need updating according to the IUCN (IUCN, 2011).

Methodology - During 2011, the ACP completed a revised and extensive mapping project of these two palm species in three of the most significant remaining fragments in Sainte Luce: S7, S8 and S9. Previous mapping efforts utilised transect belts and thus were not representative of the patchy distribution of these palm species. The ACP employed a complete forest cover search methodology that involved sweeping east-west and north-south through each fragment.

The goals of this mapping effort were to collect accurate population sizes, distributions, demographic structure and life history data. Flagging tape labelled with specific information was tied to each individual enabling re-identification during future monitoring projects. Mapping of *D. saintelucae* and *B. madagascariensis* in S9, S8 and S7 was completed by Nov 2011, after 120 hours of research. Some of the results from the mapping efforts can be seen below. Monitoring efforts of these subpopulations will be completed annually to track extraction rates, follow reproductive cycles, inform the forest management committees and raise awareness in the community.



Photograph A: *B. madagascariensis* standing in Tavy (slash and burn) fields outside forest fragment S8. By Dave Meyer

Photograph B: *D. saintelucae* – one of 27 adults left in S8. By Forrest Hogg

<i>Beccariophoenix Madagascariensis</i>		
Fragment	Number of mature individuals	Total individuals
S7	13	154
S8	30	347
S9	2	2
TOTAL	45	503

<i>Dypsis saintelucae</i>		
Fragment	Number of mature individuals	Total individuals
S7	109	223
S8	27	278
S9	1	293
TOTAL	137	794

A Rare Dwarf Palm: Remarkable Densities from Sainte Luce

Dypsis brevicaulis is an unusual palm. It is a short-stemmed dwarf palm with entire bifid leaves and is incredibly rare - only found amongst the lowland coastal forests of southeastern Madagascar; more specifically, Manantenina, Tsitongambarika and Sainte Luce. Only fifty individuals have been seen in the wild. *Dypsis brevicaulis* is listed as Critically Endangered by the IUCN Red List and is subject to ongoing threats of habitat loss and fragmentation.



Phelsuma eggs laid in *D. brevicaulis* By F. Hogg

The ACP, after initial surveys, discovered an abundant population in the northern fragment of S8. Mapping of individuals commenced in October 2011 and surprisingly high numbers were found and recorded. The mapping methodology followed the same approach as for the two larger palm species (*D. saintelucei* and *B. madagascariensis*). The aims of this study were to understand population size, demographics and distribution, and gain insights in ecology.

From October through to the end of the year a remarkable 409 adults have been mapped and recorded during 38 hours of research. There have been some fascinating observations; gecko eggs in the crown (*Phelsuma spp*) (see photograph above), a host of epiphytic orchids, as well as insights into flowering times and morphology.

ACP adds another Palm to the Sainte Luce Inventory: *Dypsis Psammophila*

The ACP has extended the distribution range of *Dypsis psammophila* (CR) to Sainte Luce, its previous distribution according to Dransfield & Beentje (1995) was restricted to Ambila-Lemaitso – 600km to the north of Sainte Luce. In 2010 a comprehensive biodiversity report found this species in the mountainous forests (Tsitongambarika) to the west, suggesting that this species distribution is actually much wider than initially thought (Pilgrim et al., 2011).

During October the ACP gathered morphological descriptions and photographs to be sent to an expert at KEW Botanical Gardens for identification. The response confirmed the palm to be *Dypsis psammophila*, up till now unrecorded in Sainte Luce. This is an exciting discovery but further work needs to be carried out on its population status, local distribution and local uses by the villages. Descriptions were taken from individuals found in S8.



Dypsis psammophila, a slender clustering palm and is well adapted for life on the sandy soils of Sainte Luce. Its name (*psammophila*) means sand-loving. Photo by F. Hogg

The Sainte Luce Tree Nursery

During 2011, the ACP has worked alongside the Tree Nursery Manager to aid the general running of the Tree Nursery at Sainte Luce. Common activities include pot packing, watering, seed and seedling collection, and seed cultivation. Following on from the mapping activities, volunteers have been visiting individual palms (*D. saintelucei* and *B. madagascariensis*) in fruit to collect the seeds or saplings for cultivation. In 2011, the ACP aided in the cultivation of over 2000 palms in the Sainte Luce Tree Nursery.

A Field Guide to the Palms of Sainte Luce

Sainte Luce is home to 9 species of palm (Arecaceae) and this plant family is remarkable for several reasons. They play an important role in the littoral forest ecosystems, providing food for red-collared brown lemurs in the lean season (*Dypsis prestoniana*), egg laying sites for day geckos (*Dypsis brevicaulis*) and microhabitats for several tree ferns and epiphytic orchids (*Beccariophoenix madagascariensis*). Furthermore, palms are important Non-Timber Forest Products (NTFP) for the local communities. Their applications are diverse and play integral roles in livelihood activities, from food sources to weaving materials. Since the demand for these palms is high the palm populations have suffered, and continue to suffer, from selective harvesting.

Although numbers are diminishing, the diversity and beauty of these plants is exceptional. In October 2011, the ACP began to compile information and photos on the different species with the goal of producing a field guide to the palms of Sainte Luce in 2012. This will be an extremely useful resource for the ACP, members of the local community, and other stakeholders to promote the conservation of these plants.

Knowledge acquired during the palm mapping programmes and from working closely with the Sainte Luce Tree Nursery, as well as interviews with the fishermen on forest resource usage, has provided incredible insights into the palm flora and its close relationship with the local people.



Beccariophoenix madagascariensis, outside forest fragment S8, by
D. Meyer