Uroplatus sikorae

Photograph by Lisa Carrier

AZAFADY
people community environment

Azafady Conservation Programme (ACP)

Herpetology Report 2012

'Madagascar contains the richest diversity of amphibian and reptile species in the world with 314 of the 340 known species of reptile being endemic...' **Durrell Wildlife Conservation Trust**

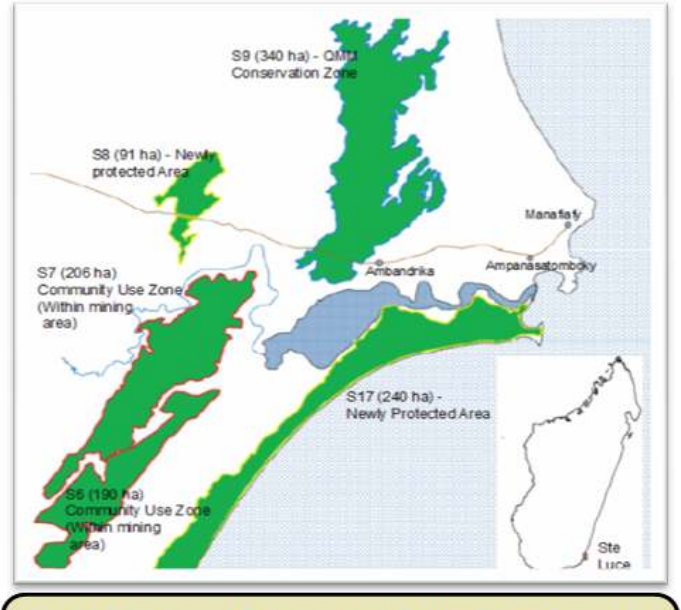
Sainte Luce

Ste Luce contains some of the last remaining tracts of littoral forest in Madagascar and is widely considered a national conservation priority. The ecosystem of the littoral forest is defined by it's sandy soils, close proximity to the sea and low altitude, giving rise to a unique floral and faunal composition and exceptional levels of endemicity. The forest of Ste Luce is fragmented into 15 different sections, with a further 2 fragments having already been totally deforested and reduced to farmland. The species diversity is remarkably high for both amphibians (33) and reptiles (39) despite the extremely fragmented state of the habitat. These species also face further threats such as deforestation, cattle grazing, mining and 'Tavy' (traditional farming methods), highlighting the urgency for herpetological research in these forests.

During 2012 research carried out by ACP volunteers focused on gaining a better understanding of the ecology, species composition and distribution of the remarkable herpetofauna in Sainte Luce. In particular, given that many of the species in Ste Luce are regionally and even locally endemic to the area, emphasis was placed on identifying species or taxa that were vulnerable to the ongoing habitat degradation. ACP volunteers were trained by the Research Assistants and guides in basic species identification, handling specimens, research techniques and skills for working with species that are cryptic and rarely seen.

Some of the species found in Ste Luce.
Left to Right: Plethodontohyla bipunctata, Furcifer verrucosus, Stenophis carletti, Phelsuma antanosy

Over the last 2 years, the ACP has collected an incredible and extensive dataset, updating species lists for two of the protected areas (S9 and S8) and revealing 9 species range extensions for Sainte Luce. During 2013, in addition to completing work in S9 and S8, volunteers will turn their attention to conducting vital herpetological surveys in S6 and S7 forest fragments yet to be explored.



Map of the forest fragments in Sainte Luce. *Most of ACP's research throughout 2012 has been focused in S8 and S9 and we are now working in S7*

Species composition

Throughout the past 3 years intensive nocturnal and diurnal surveys have been conducted in S8 and S9. Habitats suitable for amphibians and reptiles i.e. swamps and marshes, were surveyed to obtain a complete and up to date inventory of species for this area. When this data was analysed at the end of 2011, 9 new species were discovered for the area. As the species accumulation curve reached its peak in S8 and S9 ACP switched focus to investigate species in different fragments. S6 and S7 are highly degraded forest fragments with no protection and are within the Rio Tinto/QMM mining path with potential negative impacts on the flora and fauna in these fragments. It is vital that intensive research occurs here to update the species list and formulate management plans that best accommodate the needs of the most vulnerable species.

An ACP volunteer handling a ground boa, Acrantophis.
Photograph by Lisa Carrier

In October 2012, a permanent satellite camp was set up by the Azafady construction team on the edge of S7 fragment. Since then ACP volunteers have made 3 excursions to the newly established campsite to set up 4 transects running throughout the S7 forest fragment. These transects are essential for the ACP to collect baseline data for population and distribution estimates for herpetofauna and to build a comprehensive species inventory for this unique fragment. There are plans to set up similar transects in the more degraded S6 fragment in 2013.

Separated from the other fragments by a river and swamp network, S7 and S6 have the potential to offer species that have not been found in the other fragments. With mining threatening the future of S6 and S7, research is urgently required to determine the impacts to biodiversity if these forests were to be lost.

Habitat sampling

ACP collected baseline vegetation data in S8 and S9 fragments throughout 2011. In 2012 this work expanded into S7 and we hope that this work will be completed in early 2013 along with further investigation in the more degraded S6 fragment. This vegetation data is vital for us to be able to make comparisons across the fragments in terms of levels of disturbance, food availability and edge tolerance, allowing us to determine which species or specific habitats need to be prioritised in management plans.

Ieioheterodon madagascariensis; a snake species so far only found in S7 fragment highlighting the uniqueness of each area

The case of the critically endangered *Phelsuma antanosy*

Phelsuma antanosy is a Critically Endangered species of day gecko found only in two locations in Madagascar: Ambatotsirongorongo and Sainte Luce (IUCN, 2011). The species population is threatened by a combination of factors, in particular: loss of habitat through logging, fragmented and isolated populations and mining. The species is not currently kept in captivity and there is no established breeding programme – something which could safeguard the species against extinction. In September 2011, the ACP started conducting behavioural studies and microhabitat and macro-ecology surveys to determine the life history and behavioural ecology of the species. The aim of this study was to acquire a sufficient amount of information that would support captive breeding of the species in a well-established facility. Behavioural studies revealed new information for the species such as diet, egg deposition sites and territorial behaviours.

Left to right: ***P. antanosy* male on a dry *Pandanas spp.* leaf** (males have the more distinct red fork markings on their backs whereas females are less brightly coloured with indistinct markings on the back); **a female who is gravid with 2 eggs; 2 *P. antanosy* found nestled on a *Pandanus* species**. The two eggs are cemented together and wedged within the leaf axils.

In June 2012 a symposium concerning the future management of *Phelsuma anatanosy* was held in Fort Dauphin and attended by various organisations including Madagasikara Voakajy (a conservation NGO), QMM mining company, COBA (the local forest management committee) and DREF (the Regional Ministry of *Forests* and Environment). Representatives from Azafady were

invited to contribute and present their findings from the studies carried out in 2011-2012. Following the findings from the meeting a Conservation Platform was established and a 5-year management strategy was put in place with 3 main goals:

- **Goal 1:** Involving all relevant stakeholders in the sustainable management of natural resources.
- **Goal 2:** Increase numbers of *P. antanosy*. Conserving and managing its habitats in a sustainable way.
- **Goal 3:** Conserve Biodiversity, inc. *P. antanosy* in order to contribute to the regional development

The ACP team have not only played an important role in this management plan by providing information from their studies but they will also play a substantial role in the forthcoming management of the population over the next 5 years. The ACP will contribute in areas such as educating the community through our Conservation Club, Environmental Education lessons and events such as World Environment Day, providing alternative livelihoods such as the 'STITCH Ste Luce' embroidery project, training local guides in frog and reptile identification and with ongoing botanical and ecological research in the habitats where *P.antanosy* is found.

In 2013, ACP volunteers will play a central role in conducting vital research on *pandanus* species, a plant that *P.antonosy* spends the majority of its lifecycle inhabiting. This spiky plant is adapted to collect water in its leaf axils attracting insects therefore providing a food source for *P.antanosy* whilst also providing a sanctuary protected from predators. Understanding *P.antanosy's* exact habitat requirements, including its strong association with Pandanus, will be a focus for ACP team over the next 12 months. This information will be shared with the *Phelsuma antanosy* Conservation Platform formed in June (2012).

Pandanus: Hotspots for Herpetofauna

It is not only *P. antanosy* that emphasises the importance of Pandanus for the remarkable herpetofauna of Sainte Luce. Many frog species, such as *Guibemantis spp.,* spawn in the water that collects in the leaf axils and feed from the insects attracted to the plant. Snake species such as *Madagascarorphis colubrinus* and *Ithycythus oursi* use Pandanus as hunting patches to catch frogs and gecko species.

In Sainte Luce there are 7 species of *pandanus* all with their own distinct morphology and ecology. Observations suggest that each Pandanus species may be a home to specialist herpetofauna (e.g. *P. antanosy* commonly seen on *Pandanus longistylus).* These unique

One of the species on Pandanus found in the forests of Sainte Luce.
Photograph by L. Carrier

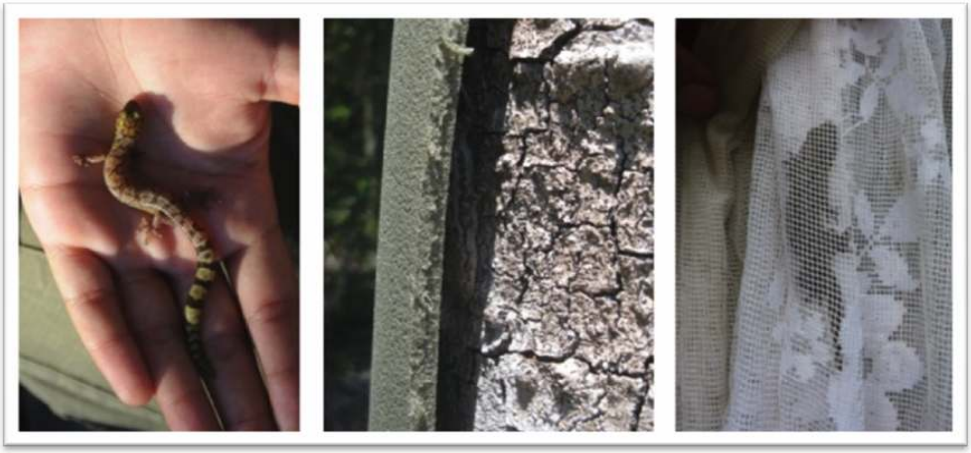
plant species continue to reveal themselves as vital habitats for Sainte Luce's endemic fauna and understanding these unique relationships is becoming an increasing priority for the ACP team.

***Matoatoa spannringi*: The Ghost Gecko of Madagascar[1]**

In February of 2011 ACP found an individual of this species in one of the forest fragments of Sainte Luce – an area 350km from its previous known range in Fiadana. This was a remarkable discovery, as this extremely cryptic species of gecko was thought to be extinct in the wild. This discovery was repeated when a student from the School of International Training (SIT) also found *M. spannringi* during her independent study supervised by the ACP.

In April 2012 a paper reporting the presence of this species in Sainte Luce was accepted in herpetology notes – a free access, online, peer reviewed journal. The article reported the distribution and range extension for this species, adding greatly to the conservation value of this area.

A pilot project began in October 2012 to further investigate the presence of this species in Sainte Luce. The methodology used is based on the knowledge that *Matoatoa spannringi* is most likely to inhabit cracks in the loose bark of certain tree species. This assumption is supported by its unique slender morphology and the fact that there have been several reports from local lumberjacks who have seen a similar looking gecko under the bark of felled trees. ACP volunteers have erected foam covers around tree trunks to simulate this microhabitat, with the aim that *M. spannringi* will seek refuge under the covers during the day, as the species is thought to be nocturnal.



Left to Right: A *Matoatoa spannringi* individual being handled for morphological measurements, a lizard hiding under a foam cover, a fish scaled gecko, *Geckoleptis spp.* caught in the net which is placed around the foam cover. *Photographs by S. Funnell, A. Blandon and L. Carrier*

The covers are left for 2-4 weeks to allow individuals to acclimatise to them. ACP volunteers secure a net around the cover before peeling it back to check under the foam cover to see if

[1] Funnell, S., Shrum, M., Ellis, E. & Andreone, F. (2012). A new record of the phantom gecko *Matoatoa spannringi* from Saint Luce, SE Madagascar augments the species' known range. *Herpetology notes*, 5, 151-153.

there are any specimens underneath. To date no *M. spannringi* have been found but many other species such as the rare *Geckolepis sp* (fish-scaled gecko*), Lygodactylus spp., Ebenivia inunguis and Hemidactilys spp.* have been found. This information will be used in future studies when estimating relative abundance and species distribution. The ACP will continue to check the foam traps throughout 2013.