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Nightly Encounters: Understanding the social system and the vocal communication of the Critically Endangered Sahamalaza sportive lemur, *Lepilemur sahamalazensis*, in north-west Madagascar to aid conservation efforts

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THE SAHAMALAZA SPORTIVE LEMUR AND THE PROBLEMS IT FACES

The Sahamalaza sportive lemur *Lepilemur sahamalazensis*, first described in 2006 (Andriaholinirina et al. 2006), was ranked "Critically Endangered" by the IUCN due to low population numbers and a vanishing habitat. A population survey in 2007 estimated that this species has an approximate remaining population of about 3000 individuals in the only known habitat of this lemur: the remaining forest fragments of the Ankarafa Forest, located inside the Sahamalaza – Iles Radama National Park, on the Sahamalaza Peninsula, north-west Madagascar (Fig. 1; Olivieri et al. 2005; Ruperti 2007). This area is known for its highly

seasonal climate with a dry and colder season between May and October and a hotter, humid period from November until April. The forest is subject to frequent bushfires and illegal logging and the lemurs are evidently hunted for food by local people (Olivieri et al. 2007; Seiler et al. 2012). Despite these pressing issues very little is known about the ecology and behaviour of this species. Consequently, there are no direct conservation actions targeting this primate specifically.

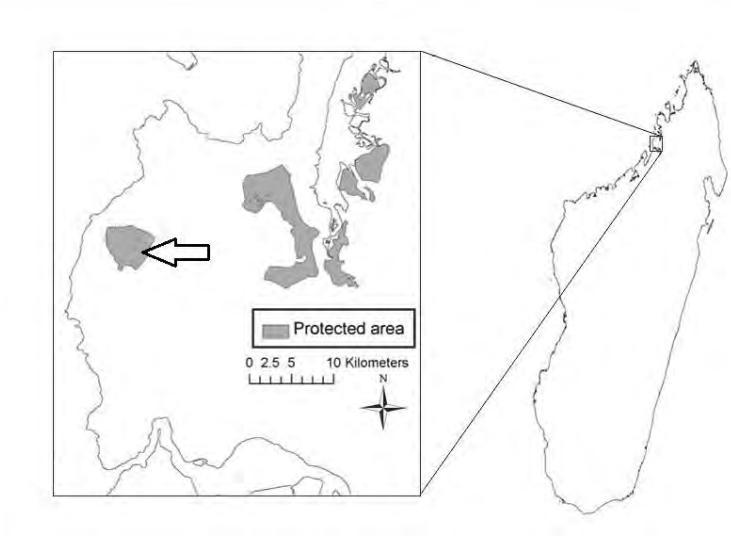

Fig. 1. Project location in Madagascar.

SPECIFIC AIMS OF THIS PROJECT

- Provide detailed data on the social system of the Sahamalaza sportive lemur, including information on year-round social relationships and mating behaviour to support conservation management by the *Association Européenne pour l'Etude et la Conservation des Lémuriens* (AEECL) as part of the IUCN Primate Specialist Group's Lemur Conservation Strategy 2013–2016.
- Provide information on this species' home range ecology, spatial requirements and possible edge effects to initiate a reforestation project of the area.
- Describe the full vocal repertoire to 1) understand intraspecific communication and 2) provide a low cost, non-invasive method of acoustic species recognition for monitoring, enabling further investigation of the species' range boundaries.

IMPLEMENTATION and METHODOLOGY

The goal of this study was to provide a basis for immediate, direct conservation actions necessary for the protection of this Critically Endangered primate through long-term research and support at the Ankarafa Research Station. The information gained through this study will facilitate conservation actions and initiate further studies as well as enable a long-term monitoring and management scheme for this species.

Fig.2. Sahamalaza sportive lemur at a resting site during the night.

What is the social structure and organisation?

Over the past year I radio-collared and monitored a group of Sahamalaza sportive lemurs (Fig. 2) in one of the forest fragments of the Ankarafa Forest. We followed and observed the lemurs for over 740 hours during the night, marked used vegetation and recorded GPS points for home range and habitat use. I recorded all social interactions as well as vocalisations where possible with the identity of the caller and the behaviour displayed during the call. Sleeping sites were visited regularly, checking for sleeping associations between individuals.

Are they negatively influenced by the increase in forest edge?

To further investigate whether the severe fragmentation, and the subsequent increase in edge area, has a negative impact on habitat use in this species. We established how far into the small fragment (~56ha) the influence from the outside non-forest matrix reaches by measuring abiotic and biotic variables from the edge to the interior (Harper et al. 2005; see McGoogan, 2011 for detailed methodology). We then investigated which individuals inhabit the edge area and compared their home ranges and activity with that from the core area inhabitants.

Vocalisations as a conservation tool.

Playback experiments were conducted throughout the year with both males and females to provide more insight into the call function of two call types and the social structure. Reactions towards the playbacks were recorded before, during and after the playback to look for any changes in behaviour. The applicability of playback experiments as a conservation tool was assessed for this species (Dacier et al. 2008).

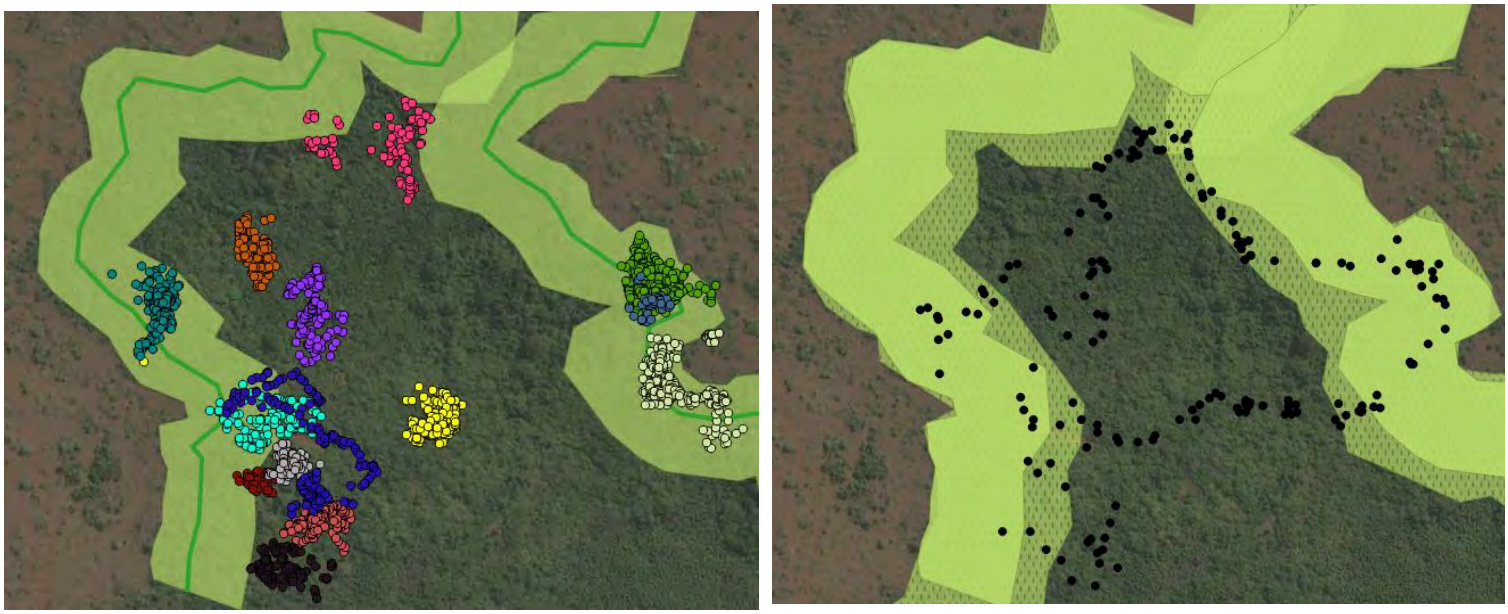

Fig. 3. Home ranges of individual study animals plotted in the study fragment. The green "buffer zone" indicates the edge area as inferred from the data on microclimatic and biotic variables. Half of all study animals inhabit the edge area at least partially. Black dots are additional lemur sightings.

RESULTS and CONSERVATION MANAGEMENT

Home range overlap and the low social interaction rates observed for this species suggest that Sahamalaza sportive lemurs are mainly solitary, but their behaviour is strongly influenced by seasonal factors. Their numbers seem to have increased since 2007, but more forest management is necessary for the population to stay sustainable.

The lemurs do not avoid edge areas in the study fragment (Fig. 3) and seem to be very generalist when it comes to feeding plants, resting sites or locomotor support. Sleeping sites during the day are an important resource however, and future forest management should be practised to avoid excessive removal of suitable trees.

Vocalisations that were recorded will be compared between this and a closely related species, *L. mittermeieri*, to identify whether they can be used for non-invasive and fast species recognition in areas where it is unclear which species is present. Playbacks are not suitable as a conservation tool for species presence/absence studies as the animals did not respond

vocally to the playbacks. They were, however, a good way to assess call function.

The knowledge gained here is being reported to the IUCN Primate Specialist Group and local groups and authorities in Madagascar (AEECL, MNP, Ministry of Environment and Water). Amongst others following suggestions have been made:

- Train local guides and researchers to monitor the remaining population through transect surveys and plot searches.
- Improve reforestation by focusing on the preferred tree species used by this primate and by enlarging the actual fragments rather than building corridors between them.
- Use acoustic monitoring for absence/presence studies as they can be reproduced easily and can indicate population trends. As Sahamalaza sportive lemurs are highly seasonal when it comes to vocalising, these studies should be performed in the wet season to get the best results.

The future of this species is very dependent on how the forest and the surrounding areas are managed. More scientific interest is crucial for its survival!

The research team at the Ankarafa Research Station, August 2016. Photos by Martin Jörgensen.

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