

# PSGB REPORT

## First assessment of the population of two sympatric lemurs in fragmented forests of South-eastern Madagascar

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### Summary of proposal:

#### 1) Aims

To make a preliminary assessment of demography of the population of collared and ring-tailed lemur populations of Ambatotsirongorongo forests in South Eastern Madagascar.

To locate few groups of the two species for a longer-term study of the ecological interactions between these two species

To make a preliminary survey of the vegetation and habitats.

#### 2) Background and methods

##### Prior research

The well-known study of the ecology and behaviour of 2 sympatric lemur species (*Eulemur rufus* and *Lemur catta*) was done at Antserananomby (Sussman, 1972). In western Madagascar, where these two species exist in natural sympatry, studies indicated that they overlap little in diet or habitat use (Sussman, 1972; 1974). In contrast, preliminary data at Berenty where native ring-tailed and introduced brown lemurs occur together, indicated broad interspecific overlap (Pinkus et al., 2006; Razafindramanana. In prep). Another fragmented forest where collared (*Eulemur collaris*) and ring-tailed lemurs (*Lemur catta*) live in natural sympatry was recently identified at Ambatotsirongorongo, 50 km southeast of Berenty (Andrinarimisa and al., 2005). Following deforestation at the Antserananomby site (Jolly, pers com.), this is now the only known site where we can find both species together naturally. No research about this site has been undertaken before. Ecological and behavioural data from this specific cohabitation of lemur species from humid and dry forests are urgently needed for conservation purposes of this special fragmented forest sheltering 2 different species from different habitats (QMM, 2005). This study was the first investigation on the site to assess the population density, distribution of both species and to study the ecology of these species occurring in natural sympatric.

##### Study site

Working with a local Malagasy team (see below), we will focus on three fragments that constitute Ambatotsirongorongo forest: Lavasoa in the Southeast part, Ambatotsirongorongo in the Northeast part, and Vohisampa in the middle of these 2 fragments.

The mountain of Ambatotsirongorongo is in the village of Sarisambo in the southeast of Madagascar. It is an isolated fragmented forest, which has had no connection to neighbouring forest fragments Petriky and Andohahela for more than 40 years. The forest is in the transitional zone between the humid coastal climate and the arid interior. Data provided by Qit Madagascar Minerals and FTM (1979) shows that the loss of forest was 8,6 hectares per year between 1957 and 1989 (Ramananjato and al., 2002). Three fragments of forest persist on the mountain of Ambatotsirongorongo: the fragment of Ambatotsirongorongo (25 ° 4.703' S 46 ° 47.246' E), the fragment of Vohisampa (25 ° 5.042' S 46 ° 46.060' E) and the fragment of Lavasoa (25 ° 5.037' S 46 ° 44.960' E).

Methods

We will conduct systematic surveys for 20 days in each fragment of forest. We will map the Geographic Positioning System coordinates of Ambatotsirongorongo trails in different vegetation and elevation zones and census all lemur troops. We will create maps for Ambatotsirongorongo which will help us navigate in the forest in the future. We will walk the trails at different times of the day to account for possible differences in the species' activity. We will walk at roughly 1 km/h, checking both sides of the trail. We will identify animals using binoculars, record the number of individuals, the time, the weather conditions, the location using a Global Positioning System (GPS) and record any information on the animal's position, behaviour. We will identify dominant plant species and estimate levels of disturbance by setting up plots sampling in different zone. We will select two ringtailed lemur troops at Bealoka that appear comparable to the Berenty forest troops. We will select two troops of browns and two troops of ringtails from two fragments for longer-term study.

Analysis

From this pilot survey, we came up choosing the best site for a research of the ecology and behaviour of the two sympatric lemurs, which is the fragment called Vohisampa where a population of collared and ring-tailed lemurs occur together. We have used sightings and number individuals/troops to estimate relative abundance in number of individuals (Randriatahina and Rabarivola 2004). We grouped the sightings according to habitat type, elevation and habitat disturbance and compared them to assess whether any of these could be a factor in the distribution of the species and need further investigation. Combining these three methods will provide a contingency in the event one or more should fail.

**3) Budget**

Amounts in GBP	Cost uno	Amount	Cost	Requested from PSGB
<b>Travel expenses</b>				
Flight London-Antananarivo	932,00	1	932,00	
Flight Antananarivo-FortDauphin with student	80,86	2	161,72	<b>80.86 (Student flight)</b>
<b>Total</b>			<b>1053,72</b>	
<b>Protected areas entrance fees and salaries</b>				
Entrance and permit COGE	15,23	1	15,23	<b>15,23</b>
Student per diem	3,50	80	280	<b>280</b>
Guides per day	2,50	70	175,00	<b>175,00</b>
<b>Total</b>			<b>470,23</b>	
<b>Equipment</b>				
Flags– tape measure			40	
Binoculars Minolta Activa 12x50 WP FP	145,00	1	145,00	<b>145,00</b>
GPS (borrowed from NPRG)				
Camera Sony Handycam	256,49	1	256,49	
Data books,pen,pencils			40	<b>40</b>
Duracell Procell AA Batteries (pack of 10)	2,23	50	111,50	
<b>Total</b>			<b>592,99</b>	
				<b>TOTAL AMOUNT REQUESTED:</b>
<b>TOTAL</b>			<b>2156,94</b>	<b>736,09</b>

**4) Total amount received: £500**

**Research report:**

**1) Changes to intended methods**

The Ambototsirongorongo forest is constituted by three forest fragments. The smallest one as called Ambatotsirongorongo has about 20 to 25ha of surface. The biggest one – Lavasoa – has about 75 ha of surface. Because of the size of the forests and also to avoid further destruction, we didn't manage to create new trails for the population survey. We walked on existed trails and through the forests in order to undertake a complete and direct census. The details of this method are written below. We conducted a complete and direct census lemurs during the late dry season (End Sept – November), when troops are most conservative in their range use (O'Connor, 1987). Migration among troops is infrequent, and juveniles are small enough to be clearly distinguished from 2 year olds and adults. Observers walked along trails, and through the forests. To locate lemur troops we used binoculars to scan tree branches and we listened for lemur vocalizations. We searched at a fixed time during the morning from 6 to 10 am and afternoon peaks of lemur activity from 3 to 6pm. We identified each troop, recorded its location on GPS, and note the age and sex composition of all visible troop members if possible. When a troop was sighted, we tried to describe at least one third of troop members using a standard system of terms and facial sketches, and noting distinctive characteristics such as missing limbs or tails, unusual pelage characteristics or eye colour, notched ears or facial scars. Sex is identified by pelage colouration for the collared lemurs and age class is distinguished by the size of the animal's genitalia, and corroborated by its body size. Ring-tailed lemurs maintain nearly identical home range boundaries over decades, and females are individually recognizable and do not migrate, so troops are easy to find and identify (Jolly *et. al.* 2002).

**2) Population density estimate**

We conducted 49 hours of observations in each fragment, 147 hours in total. We identified 4 groups of ring-tailed lemurs: 1 is living in Ambatotsirongorongo fragment; the other groups range in Vohisampa and Lavasoa fragments by using a small corridor connecting both forests. We estimate a total of 46 individuals spread into 4 groups. The average troop size is 11.5 individuals per group. The density is 0.35ind/ha which is relatively small, compared to other places where brown and ring-tailed lemurs occur in natural sympatry.

We counted three groups of collared lemurs within Vohisampa and Lavasoa fragments. The smallest fragment does not contain any collared lemurs. This last lives inside the forest and use the corridor to exploit larger home ranges. In contrast, ring-tailed lemurs occupy mostly the periphery of the forests and feed with some crops and fruits trees of the surrounding villages.

**3) Extra-project observations**

Apart from the presence of collared and ring-tailed lemurs, we discovered some traces of Aye-aye – *Daubentonia madagascariensis* - (nest and faeces) and some feeding trace of bamboo lemurs – *Hapalemur* sp. -on *Flagellaria indica*. Recent studies by Tim Empley (MSc thesis in Primate Conservation, 2008) on the bamboo lemurs at Mandena forest demonstrated that this plant species is one of their main food. These traces are found only in Vohisampa and Lavasoa fragments.

Human-wildlife conflict was found on the place, as ring-tailed lemurs fed on fruit trees such as mango trees and other crops. This is one of the threats of this population as many studies shown the impacts of Human wildlife conflict on species survival.

#### 4) Vegetation surveys

We undertook a vegetation survey within 5 belt transects for the whole area, 10 x 100m each. The smallest fragment is the most degraded forest: 90% of the big trees (such as *Canarium* sp.) are gone; the canopy cover of the forest is less than 40%. As a result, this forest became drier and only ring-tailed population is found within that fragment. Ring-tailed lemurs are more adaptable to different situation; they are more likely to live in open and dry areas (Sussman 1974, 2006). Vohisampa fragment is classified as slightly degraded. Between 50 and 60% of big trees are still present and the canopy cover is 55%. Few trees were cut down. The biggest fragment is the most protected one, it may due to the topography of the place: high and steep mountain. The canopy cover is higher than 85% and very few trees were cut down. This is the most humid fragment where some lemur’s species occur together. On table 1, is shown the list of the dominant and abundant plant species (counted more than 10 in each transect) within the three fragments.

**Table 1. Dominant plant species in Ambatotsirongorongo Forests**

Family Name	Genera (if known) or common malagasy name
Lauraceae	<i>Ocotea laevis</i>
Burseraceae	<i>Canarium</i> sp.
Salicaceae	<i>Bembicia</i> sp.
Myristicaceae	<i>Brochoneura madagascariensis</i>
Monimiaceae	<i>Decarydendron</i> sp.
Moraceae	<i>Ficus</i> sp.
Rutaceae	<i>Cedrelopsis</i> sp.
Fabaceae	<i>Dalbergia eminnense</i>
Fabaceae	<i>Dialium</i> sp.
Moraceae	<i>Trilepisium</i> sp.
	Lapovahatsy
	Lamotinala
	Ampoly

#### 9. Planned further activities and publication

The results shown above are from preliminary analysis. A more in-depth analysis will be done for the next few months. Then we will publish an article collating all known information about Ambatotsirongorongo forests, including habitat disturbance description, lemur population density and comparison to previously published data from other sites which we plan to submit for review to the *American Journal of Primatology* in the first instance or *International Journal of Primatology* in the second instance. We are currently preparing a long-term research project involving behavioural observations of collared and ring-tailed lemurs in those forests, to further improve our understanding of the ecology and behavioural interactions between both species. The study will include day-follows and records of diet, social interactions, home range and activity patterns. We will continue helping to form trainee guides and educational project introducing school children and villagers to the variety

of life in the forests. Our research will also involve Malagasy students preparing a DEA. We will provide equipment and supervision for their short research projects benefiting the aims of our research.

**Education conservation action:** we provided some copies of the “Ako project” booklets about lemurs and their forests, to the schools and children. This small part of the project is intended to have a long-term impact by providing simple and fun reading materials that can be handed around between local people.

## 10) Bibliography

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**11)Financial report**

The following table shows what the £500 grant was used for:

<b>Item</b>	<b>Cost in GBP</b>
Guides' salaries for 55 days @ 6,000 MGA/day	110.73
Student's flight from Tana to Fort-Dauphin	98.9
Student per diem for 60 days @ 10,000 MGA/day	201.34
Binoculars for student assistant	69.25
Entrance and Permit COGE for 65 days @ 1,000 MGA/day	21.81
<b>TOTAL</b>	<b>502.03</b>

Exchange rate used: 1GBP ~ 2, 980 MGA -- September 2008

Additional costs including equipment were funded by other sources (including Primate Conservation Inc., Quit Madagascar Minerals QMM Fort-Dauphin Madagascar) which sponsored the main research project focussing on the ecology and behaviour of ring-tailed and brown lemurs in forest fragments of Madagascar.