Project Update: May 2011

In February 2011, we attached radio-collars to guarantee a rigorous observation schedule. The initial plan was to attach collars to one collared lemur per group per site (two in Mandena and two in Sainte Luce). However, a cyclone and the inundation of the swamp in Mandena prevented us capturing the lemurs in this area until now. Thus, we only captured one adult female for the group "A" and an adult male for the group "B" (both in Sainte Luce), by the use of cages and bananas. Each animal was anaesthetised with 0.1 ml tiletamine hydrochloride (Zooletil 100) and morphometric data as well as samples for genetic analyses have been taken. All animals recovered from anesthesia within 1.5 hours and there were no injuries as a consequence of the captures. The impossibility to attach radio-collars on the relocated groups in Mandena has not prevented us from collecting data on one group (AB), while we were not able to collect data on a second group until now.

Since the end of February 2011 we have been collecting data on a total of three groups containing 24 individuals. A total of 173 hours and 20 minutes of observations on group "A", 211 hours on group "B" (both in Ste Luce), and 235 hours on group "AB" (in Mandena) have been collected via Instantaneous Focal Sampling. Each focal animal has been observed for cycles of 12 hours, recording its activity, posture, height, position in the crown, proximity of other members of the group, number of animals on the same tree.

Affiliative and aggressive interactions between all members of the group have been recorded by the use of All Occurrences Sampling, in order to get information on social and hierarchical structure. The same sampling method has been used to record each event of anti-predatory behaviours, such as scans and alarms.

In terms of ecological data, we have recognised to species level 167 feeding trees and 54 resting trees for the group "A", 174 feeding trees and 35 resting trees for the group "B", and 91 feeding trees and 44 resting trees for the group "AB", after having estimated height and measured diameter at breast height. For nutritional analyses, 32 food items have been collected in Ste Luce and 17 food items in Mandena. Wet and dry weight of each sample has been measured by the use of an electronic balance.

Thanks to the use of radio-collars sensitive to skin temperature in Ste Luce it was possible also to collect data on lemur thermoregulation. Recordings of skin temperature have been performed at three fixed intervals of the day, 07.00, 12.00, 17.00, while during resting each 15 minutes. These data will be important to study the interface among diet, metabolism, and thermoregulatory postures in relation to habitat degradation. Additionally, each half an hour, the group location was recorded by marking the point on a GPS to determine the home-range areas.

As for hormonal analyses, until today 37 faecal samples have been collected for the group "A", 33 for the group "B", and 36 faecal samples for the group "AB". Each sample has been collected immediately after defecation and stored in 95% ethanol at room temperature.

Finally, three data-loggers for climatic variables have been installed in three different zones of the Ste Luce forest: two within the home range of the two study groups and one in the degraded area in order to make comparisons. Similarly, two additional data-loggers have been installed in two areas within the home range of the two study groups in Mandena.

We have scheduled the realisation of a presentation about the importance of collared lemurs for the littoral forests to explain our work to children and adults of the villages nearby Ste Luce and Mandena.

A preliminary analysis of the activity budget of the collared lemurs during this first period of our research (February-April 2011) at the two sites indicates that resting was the prevalent activity. However, the groups in the intact area (Ste Luce) spent more time to feed and less time to rest as compared to the lemurs in the degraded area (Mandena). The first 3 months of data collection also indicate that the two lemur populations were mainly frugivorous. However, in the degraded area the animals spent more time consuming flowers and leaves, while in the intact area the large majority of time was devoted to fruits. Diet diversity also shows an interesting pattern between the two study areas. In the degraded area the lemurs tended to spread their feeding time over a wide variety of plant species, while in Ste Luce the diet was mainly based on barriers of Rotrymena (*Syzigium* sp.). Finally, in contrast to the hypothesis of higher predatory pressure in the degraded area (and thus possible higher levels of stress), the collared lemurs in Mandena showed a lower frequency of alarms against predators as compared to Sainte Luce animals.

The preliminary nature of this report does not allow us to analyse some of the most crucial data of this project, i.e. stress-hormone and metabolic patterns as well as social dynamics, since both these analyses require a considerable amount of time to be performed and a larger data set. These findings will be provided once the research will be completed. However, preliminary indications from the behavioural ecology of the two collared lemur populations show an interesting seasonal pattern, which may lead to differences in stress levels and social patterns. It appears from these initial findings that a strategy of "time minimizers" is adopted by the lemurs living in the degraded area during this time of the year. In fact, the group observed in Mandena has spent considerably less time feeding on a diet which includes low-quality resources, such as leaves and flowers. This pattern may have lead to a lower energetic gain from food and, thus, a consequent effort of the lemurs to save energy. This is also indicated by the higher amount of resting in Mandena. These results differ from previous studies on these two populations of collared lemurs which indicated an "energy maximizers" strategy with lemurs in Mandena feeding and moving more than in Ste Luce. Hormonal analysis will indicate whether the groups in Mandena suffer a nutritional stress during this time-window due to the low-quality of food and/or scarcity of fruits or if they cope well with this situation. It is probable that the very diverse but low quality diet in the degraded area might be a direct consequence of a bottle-neck in resource availability, which may be present in the degraded area in February-April.

In contrast to the expectation, the frequency of alarms against predators was higher in Ste Luce than in Mandena. Thus, the lemurs in the degraded area seem to be less stressed than expected in terms of predator encounters. But this result might be the consequence of the low sample size. Alternatively, the lemurs in Mandena may be actually under high predatory pressure but they use a cryptic strategy by remaining silent instead of reacting by alarming.