

JAMES RENNIE BEQUEST

REPORT ON EXPEDITION/PROJECT/CONFERENCE

Expedition/Project/Conference Title: Expedition Mahazo Loko 2007.....

Travel Dates: June 1st 2007 till August 10th 2007

Location: Madagascar, Toalagnaro, Sainte Luce (24°45'S 47°11'E)

Group Member(s): James Greenwood, Emily Woollen, Christopher Beirne, Samuel Leigh, Ariane Laporte-Bisquit

Aims: The aims of this project were to (i) collect ecological information on the chameleon community of the Ste Luce littoral forests fragments, focusing primarily on determining population densities; (ii) determining forest health and degradation status of forest fragments by ground based surveys of stem density, canopy cover and stump counts; and (iii) through analysis of chameleon density against forest health information assess whether forest degradation has an influence on chameleon density.....

OUTCOME (not less than 300 words):-

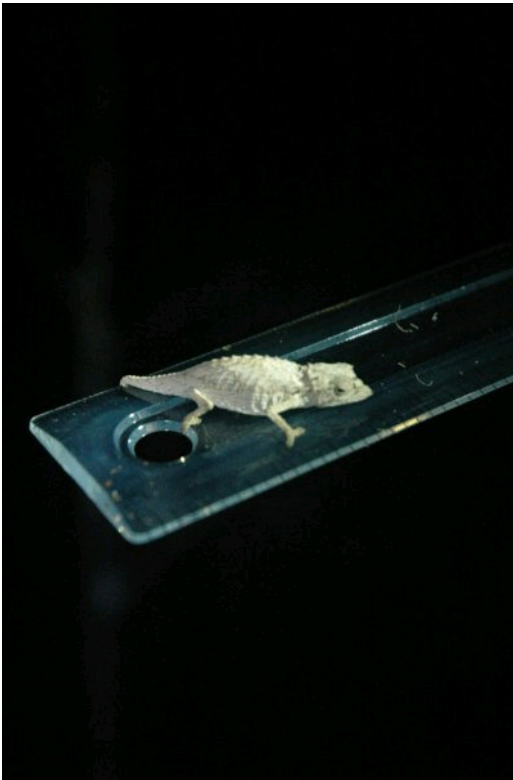
Expedition Mahazo Loko set out to determine the health of the forest and the chameleon populations in the Sainte Luce region of Madagascar. Widely regarded as an area of mega diversity, Madagascar is now a global priority for conservation owing to the islands exceptional diversity and the ongoing loss of natural habitat. Madagascar is home to two-thirds of the worlds chameleons, and a robust pet-trade has resulted in nearly all of these being added to either Appendix II or I of CITES (*Convention on International Trade in Endangered Species of Wild Flora and Fauna*). Despite their importance relatively little is known about chameleon population dynamics within Madagascar, making the effects of the pet trade on their populations impossible to quantify. Expedition Mahazo Loko aimed to address this issue, by performing our own chameleon population density study and presenting our results to the appropriate Madagascan scientists and authorities.

Consequently, the second focus of our expedition was to assess the health of the littoral forests in the Ste Luce area. The littoral forests of Madagascar are a top conservation priority due to their high endemicy of flora. We assessed forest health through basal area measurement, canopy cover and stump counts, which have all been shown to correlate strongly with forest health. The research we conducted, if repeated and compared in several years time, could provide valuable information in the management of the littoral forest and their inhabitancies both locally and nationally.



The team: Ariane, Sam, James, Jasmin, Chris, Emily and Maka

Chameleon population density values were obtained using the Distance sampling technique, where a line transect is set out randomly within the forest fragment to be sampled. As chameleons are more easily detected at night, our study took place after dark. Population density estimates were calculated by use of the software package DISTANCE for each fragment. These four littoral forests fragments were also surveyed for basal area, stem density, stump counts and canopy cover to determine forest condition. Simple correlations were conducted between *Brookesia nasus* density estimates and stem density, basal area, canopy cover, stump count and total fragment size to determine if any correlation exists between these parameters.



Furcifer oustaleti in the day time (top) and a *Brookesia nasus* adult at night (left).

A total of 490 chameleons representing two species (*B. nasus*, 98% and *F. oustaleti*, 2%) were found in four forest fragments. There were too few *Furcifer oustaleti* to conduct density estimates and all were found to be juveniles. The results for density estimates for *B. nasus* showed that the fragments determined as in good condition had higher densities than the smaller and more degraded fragments. The population structure of *B. nasus* showed that there was no sex bias and there was no bias of juveniles to adults, showing a balanced population.

Our study suggests that the *B. nasus* populations in the fragments are healthy and well maintained. The highest *B. nasus* population densities were found in the fragments considered to be in good condition of forest health. Therefore it may be worth considering conserving healthy fragments from further fragmentation and degeneration as they may support important metapopulations for *B. nasus* in the region of Ste Luce. If our findings are indicative of other regions this could suggest that *B. nasus* are plentiful in other regions but that *F. oustaleti* populations may be at risk. *B. nasus* are some of the least-studied chameleon species in Madagascar and we therefore recommend more chameleon population studies to be carried out in other regions of Madagascar to determine the distribution and abundance of this species. Baseline information on specific species population abundances, fluctuations, and distributions are necessary to understand the effects that forest degradation and deforestation may have on chameleons in the future.

The structural categories basal area, canopy cover and stump counts all showed significance difference at the 1% level between the four fragments, but there was no significant difference in stem densities between the fragments. This was compared with a previous classification of the forest fragments in 2001, which was based solely on canopy cover. Our results showed that the forest fragments have degraded since 2001, predominantly due to human disturbance due to the high stump counts. These results confirm that the fragments are tropical secondary forest fragments,

typified by selective logging, fewer large stems and reduced canopy cover. They also confirmed that some forest fragments were in better condition than others.



Measuring tree diameter (left) and pulling in a transect (right)

Correlations between *B. nasus* population density estimates and forest health parameters showed that there was no evident correlation between density estimates and any of these parameters. Due to there only being four data points in the correlations, it would not be possible to assess to any significant level whether or not a correlation between the population density estimates and forest health parameters exist or not. There is a trend of increasing population density with increasing total fragment area, but our data cannot quantifiably support this suggestion.

In conclusion this study found that there was a high abundance of one species of chameleon, *B. nasus*, in four littoral forest fragments of the Sainte Luce area, and a low abundance of *F. oustaleti*. The *B. nasus* population is in good health and exhibits even male to female and adult to juvenile ratios. Furthermore, the distance sampling method used to estimate population density estimates was proven to work well for the study of chameleon populations. The study also showed that forest conditions of the unprotected forest fragments have worsened since 2001. However further studies need to be done before the exact effects of forest degradation upon the chameleon population can be fully understood.

Acknowledgements

The Expedition Mahazo Loko 2007 team would like to thank the University of Edinburgh and the expedition's committee for supporting this research. Special thanks must go to all our funding organisations and the James Rennie Bequest. Personal thanks go to Dr. Graham Russell, Dr. Jill Lancaster, Dr. Colin Legg, and Dr. Terry Dawson for all their support in the design and development of our expedition. Within Madagascar we would like to thank Brett Massoud, Matt Heath and all the team at NGO Azafady for their complete support and personal aid, as well as their friendship. Finally many thanks to Maka Andrianasolo and Jasmin Randrianirina for their expertise and invaluable assistance out in the forest. Many thanks from the team Mahazo Loko, 2007.