Rediscovering The Neglected Insects Of Mauritius:

Building In-Country Capacity

Linton Winder, 26th April 2004

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	*162/12/005*
Project Title	*Rediscovering the neglected insects of Mauritius*
Country(ies)	*Mauritius*
UK Contractor	*University of Plymouth*
Partner Organisation(s)	*Mauritius: Mauritian Wildlife Foundation, MSIRI, Mauritius Institute, University of Mauritius* *UK: The Natural History Museum (UK)*
Darwin Grant Value	*£51,491*
Start/End dates	*1 October 2003 to 30 September 2006*
Reporting period	*1 April 2003 to 31 March 2004.*
Project website	*In development (please see report)*
Author(s), date	*n/a*

2. Project Background

Much of the biodiversity in Mauritius is endemic but the population status of some taxa is virtually unknown. Knowledge relating to native insects is extremely limited, as few studies have been conducted since the 1960s. Management of key ecosystems and strategies to preserve native endemic insects is hindered by the absence of entomological expertise within Mauritian conservation organisations.

This project will build essential in-country capacity in entomology and includes the following components: (i) Training to build institutional capacity; (ii) Research to improve the information base on a neglected group of species; (iii) Development of awareness of insect conservation into decision-making for habitat management.

3. Project Purpose and Outputs

This project will:

(i) **Provide training to develop institutional capacity**. This will be achieved initially by a member of MWF attending the Advanced Methods in Taxonomy and Biodiversity MSc based at the Natural History Museum, UK. This will incorporate a nine month taught programme and a three month research project. The research project will be based at the NHM using specimens collected in Mauritius, incorporating field ecology and taxonomy (using conventional and molecular techniques).

(ii) **Include a baseline study to create an inventory of extant insects**. Firstly, a review of historic literature (including the use of unpublished field notebooks

from the 1960s) will be undertaken to determine the current knowledge-base. Secondly, a sampling programme will be devised and undertaken in three island areas (Isle Aux Aigrettes, Round Island, and Isle de Cocos) free from introduced predators (rats, shrews, tenrecs, toads, etc) and two 'mainland' locations on Mauritius and Rodrigues. Specimens collected will be catalogued and identified to an appropriate taxonomic level with additional support from UK scientists.

(iii) **Include a workshop on insect sampling and ecosystem function**. To expand awareness and expertise within MWF partner organisations a workshop will be held incorporating sampling methods, basic identification and the importance of insects in ecosystems.

(iv) **Prepare an exit-strategy document**. A review of specimens collected during the study and the assessment of ecosystem services provided will enable the preparation of a strategy document to develop insect conservation expertise and integrate knowledge into the wider conservation remit of MWF. The project will leave a legacy by embedding expertise within the NGO and thus facilitate the development of long-term biodiversity conservation.

We have not modified the proposed operational plan.

4. Progress

This project was developed in collaboration with the University of Plymouth and the Mauritian Wildlife Foundation (MWF) following a Royal Society funded Travel Fellowship awarded to the Project Leader Dr Linton Winder. The Fellowship was based with MWF (the country's leading conservation NGO) in order to evaluate current insect conservation management within Mauritius and Rodrigues. It was evident that the development of insect conservation strategies was prevented by: (i) a lack of in-country capacity; (ii) restricted knowledge of the current population status of native and introduced species; (iii) the lack of systematic sampling programmes. This hinders MWF from fulfilling its mission to conserve the native flora and fauna within the Republic of Mauritius.

During this year (the first year of the project), Saoud Motala of the Mauritian Wildlife Foundation is studying for an MSc in Advanced Methods in Taxonomy and Biodiversity at the Natural History Museum, UK. Our first output will be Saoud's completion of his MSc in September 2004. As such we are making good progress against the baseline timetable and logical framework and will meet the first identified milestone on time.

In addition to Saoud's excellent progress on the MSc we have made a major advance in developing a web-based resource for the project. Dr Frank Krell (Saoud's dissertation supervisor at the NHM) has discovered that there are 1480 beetle specimens of Jean Vinson's Mauritian collection deposited with the museum in 1972. Jean Vinson published a comprehensive catalogue primarily in the Mauritius Institute Bulletin (1956-1962).

We intend to considerably enhance the project by providing a web-based catalogue of the complete Mauritian beetle fauna, illustrated by colour photographs of each available species, and accompanied by references on economic importance and ecology of the species. We will then use additional material collected during the next phases of the study to identify extant species and build a database of 'rediscovered' species. Dr Krell is facilitating the photographing of beetle specimens, which is likely to be completed by

NHM in-house capacity. This will be the first web catalogue of a complete beetle fauna on an up-to-date taxonomic basis and might serve as a model case for similar, larger-scale projects. We have also submitted a poster presentation for the 2004 International Congress of Entomology (Brisbane, Australia) titled 'A complete beetle fauna on the web: Mauritius as a model case' authored by S. Motala, F.-T. Krell, S. Ganeshan, A. Raman, V. Florens, Y. Mungroo and L. Winder. Please note that all our Mauritian project partners are included as authors.

In addition, we have carefully selected a dissertation project for Saoud to augment his knowledge and develop our understanding of the Mauritian fauna:

Not as dead as a dodo - did the dodo's dung beetle survive?

Mauritius is a small isolated island of 1865 km^2 in the Indian Ocean. No native large mammals live or lived in Mauritius. Since dung beetles depend on the dung of large animals, we should expect no native dung beetles on an island without native dung. All large mammals (including man) were introduced, and so were their dung beetles. However, there are two genera of dung beetles, called *Neovinsoniella* (1 species) and *Nesosisyphus* (4 species) which live only in Mauritius. How could they have evolved there without any suitable food? Preliminary experiments revealed that *Nesosisyphus* is attracted to chicken pellets. Chickens are introduced as well, hence they could not have delivered the original food for the beetles. Tiny droppings of native Mauritian birds are not likely to have triggered the evolution of several dung beetle species. However, there were other birds on Mauritius several hundred years ago: large birds, such as the dodo, which produced, without doubt, large droppings. Are these dung beetles the only living remains the dodo left behind when it was wiped out by sailors and settlers? We do not know where these beetles come from; we do not know what they regularly feed on (because chickens and their droppings do not occur in the dung beetles' present range); we do not know how the species are related to each other. What we know, however, is that these beetles are unique, only present in Mauritius (endemics) and therefore a priority group for conservation.

Like the sacred *Scarabaeus* of the Egyptians, *Nesosisyphus* beetles are rollers, but much smaller and superficially similar to a genus called *Sisyphus* with very long legs to handle dung balls. However, under the microscope, they look quite different from all other *Sisyphus*. With voucher specimens Saoud will collect during his field trip, we will find out whether *Nesosisyphus* has developed its long legs independently or whether it is related to other roller beetles. By means of molecular and morphological examination in the NHM molecular lab (in cooperation with Dr Alfried Vogler), we will find out where on earth its nearest relatives live, and hence, from where its ancestor probably invaded Mauritius. The DNA study will also allow reconstruction of the evolutionary history of the Mauritian dung beetle species and correlation with geological events and landscape history.

We have not had any significant difficulties this year. The project has been enhanced by the NHM's collection of Mauritian beetles, and this fits in well with the existing structure of the project. We intend to concentrate on this insect group as it provides an ideal platform for the project.

Timetable for next reporting period

Sep 04	***HISTORIC LITERATURE REVIEW.*** Historic literature reviewed and collated. Information gathered considered with respect to sampling protocol. Report published and distributed to partners.
Oct 04	***DEVELOPMENT OF SAMPLING PROTOCOL.*** Development of sampling programme and testing of protocol. Includes publication of sampling programme and training of participatory MWF staff.
Nov 04	***PROJECT PLAN REVIEWED AND APPROVED BY STEERING COMMITTEE.*** Sampling protocol and survey programme reviewed and approved by meeting of steering committee.
Aug 05	***SAMPLING AND SORTING.*** Field sampling completed at three island locations (Ile Aux Aigrettes, Round Island, Ile de Cocos) and two 'mainland' locations on Mauritius and Rodrigues. Specimens sorted and preserved.

5. Actions taken in response to previous reviews (if applicable)

Not applicable

6. Partnerships

Our partnership with the Natural History Museum has proved particularly fruitful. There enthusiasm and willingness to work on the project has been extremely beneficial. We have been in contact with partners in relation to the web-based beetle database and have kept them fully informed.

We will establish full links with local and international organisations when S. Motala returns to Mauritius to conduct the in-country component of the work.

7. Impact and Sustainability

Not applicable as Mauritian-based phase of the work does not start until October 2004. We have an exit plan which is part of the logical framework for this project.

8. Post-Project Follow up Activities (max 300 words)

Not applicable

9. Outputs, Outcomes and Dissemination

This is not applicable at the moment. Our first output relates to the completion of S. Motala's MSc (August 2004). The start of the project was publicised within the host country via a Mauritian Wildlife Foundation Press Briefing. We have been in regular contact with all project partners during the year to keep them fully informed of project development.

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
NOT APPLICABLE TO THIS PROJECT UNTIL AUGUST 2004 WHEN THE FIRST PROJECT OUTPUT IS TIMETABLED.		

Table 2: Publications

Poster submission for International Congress of Entomology 2004 – decision pending

A complete beetle fauna on the web: Mauritius as a model case

S. Motala, F.-T. Krell, S. Ganeshan, A. Raman, V. Florens, Y. Mungroo, L. Winder

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Mauritius is a tropical, mountainous island in the Indian Ocean of 1865 km^2. Its beetle fauna comprises around 1020 species and has been covered by a comprehensive catalogue of Vinson (1956-1962) and recently by a synoptic list by Yves Gomy (2000). Keys and illustrations are available for only a few small groups.

Jean Vinson deposited 1480 specimens of his beetle collection in The Natural History Museum, London, in 1972. On the basis of these specimens and additional material to be collected within the Darwin Initiative Programme 'Rediscovering neglected insects of Mauritius: building in-country capacity', we compile a web-based catalogue of the complete Mauritian beetle fauna, illustrated by colour photographs of each available species, and accompanied by references on economic importance and ecology of the species. This will be the first web catalogue of a complete beetle fauna on an up-to-date taxonomic basis and might serve as a model case for similar, larger-scale projects.

either Section 14 (Biodiversity & Biogeography) or Section 15/session 'The Emerging Global Biodiversity Information Infrastructure'

10. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance

11. Monitoring, Evaluation and Lessons

I have monitored the progress of S. Motala by regular contact with his tutors at the NHM. We have also had three progress meetings reviewing the project. I believe that the project has made excellent progress and consider that the identification of appropriate project partners during the initial phases of project development is the key to maximising the likelihood of success.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

LOGICAL FRAMEWORK

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose (insert original project purpose statement) To initiate an insect conservation programme within the Republic of Mauritius, led by in-country capacity based within the Mauritian Wildlife Foundation (MWF).	*(insert original purpose level indicators)* Entomological expertise provision within MWF. The rediscovery of endemic and native species unreported since historic studies. Discovery of new species. The development of awareness of insect conservation within MWF and other conservation stakeholders.	*(report impacts and achievements resulting from the project against purpose indicators – if any)* S. Motala currently studying for MSc. Regular briefings to stakeholders of progress of study	*(report any lessons learned resulting from the project & highlight key actions planning for next period)*
Outputs			
1. MWF with capacity to manage and develop insect conservation strategies.	MWF staff member trained using UK-based MSc. Training provided to other stakeholders.	Ongoing studies at MSc level.	The opportunity for overseas students to study in the UK is invaluable. We hope to incorporate additional time at the NHM for S.Motala during the project.

2. Report on review of historic entomological information.	Collation of material. Draft report edited by Project Leader.	Appraisal of UK's NHM collection revealed 1000+ coleopteran specimens.	Identification of and collaboration with appropriate partners leads to invaluable additional benefit.
3. Baseline sampling programme designed and conducted.	Protocol developed by partners. Sampling programme conducted.	Dissertation project based on field work and collection of Mauritian endemic dung beetle specimens.	Strategy to link MSc dissertation with Darwin project helpful in building project.
4. Inventory of specimens sampled.	Database construction including records of extant species with ecological function, endemism and native/alien status.	Discussion of construction of web-based database to match NHM collection allowing updating of rediscovered species.	
5. Insect conservation strategy document including future-funders.	Meeting of collaborators to formulate strategy. Preparation and review of document.	Not applicable at this stage.	

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.