

1. DARWIN PROJECT INFORMATION

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|---|---|
| <i>Project Ref. Number</i> | 162/10/024 |
| <i>Project Title</i> | Conservation and management of Malagasy Microchiroptera and their habitats |
| <i>Country</i> | Madagascar |
| <i>UK Contractor</i> | Prof. Paul Racey |
| <i>Partner Organisations</i> | (1) Department of Animal Biology, University of Antananarivo (2) School of Biological Sciences, University of Tulear (3) Department of Water and Forests, School of Agronomy Sciences, University of Antananarivo (4) National Association for the Management of Protected Areas (ANGAP) |
| <i>Darwin Grant Value</i> | £145,125 |
| <i>Start/End dates</i> | 1/12/02 to 30/11/04 |
| <i>Reporting period (1 Apr 200x to 31 Mar 200y) and report number (1,2,3..)</i> | December 01/12/01 to 30/11/04 Annual Report #3 |
| <i>Project website</i> | n/a |
| <i>Author(s), date</i> | Richard Jenkins and Paul Racey (11/4/04) |

2. PROJECT BACKGROUND

The project aims to address the dual weakness in Madagascar of a lack of biologists trained in methods of studying bats and a lack of data on which to make species/habitat management recommendations. By raising the awareness of conservation organisations to bat-related issues we aim encourage the demand for more bat research and we will meet this demand by leaving in place an equipped and able team of Malagasy bat specialists. The training element of the project involves supporting Malagasy Diplômes d'études Approfondies (DEA) students in conducting research projects as part-fulfilment of their degrees.

3. PROJECT OBJECTIVES

(i) Original purpose and outputs

- a) Survey insectivorous bats in protected areas of the eastern rainforests and in limestone regions using bat detectors, mist nets and harp traps
- b) Train Malagasy graduates in these techniques that will then be extended to other protected areas and used to establish longer term monitoring
- c) Incorporate the conservation requirements of bats into management plans for individual protected areas
- d) Establish a national database of bat biodiversity and produce a national action plan for the conservation of insectivorous bats
- e) Carry out a programme of environmental education in limestone cave areas to encourage bat friendly practices and sustainable ecotourism

- f) Evaluate the ecological services provided by bats in controlling insect pests as leverage for their incorporation into national conservation agendas

(ii) Alteration to the proposed operational plan

None

4. PROGRESS

(i) Brief project history

The project started on December 1st 2001 with the appointment of the Darwin Fellow who has been resident in Madagascar since June 2002. Following a delayed start, caused by a disputed general election result and civil strife, the project has made significant progress since the last reporting period and has achieved all of the major targets in the 2002/3 logical framework.

(ii) Summary of progress against logical framework

- a) Forest and cave surveys undertaken of all eight protected areas named in logical framework for 2003/04: Bemaraha National Park (July and October), Isalo National Park (April), Sarodrano (June, November and February) and Ambohitantely Special Reserve (September-February), Fort Dauphin littoral forests (February and March), Namoraka Intergated Reserve (September), Kirindy CPFF (October), Andasibe-Mantadia National Park (bi-monthly visits)
- b) Field research completed for six DEA students (4 from School of Agronomy, 1 from University of Tulear and 1 from University of Antananarivo)
- c) Field research started for a further four DEA students from the University of Antananarivo
- d) Completed the laboratory phase of a study on the diet of free-tailed bats
- e) Distribution of colour poster on bat conservation and project desk calendar)
- f) National newspaper coverage of the survey in Bemaraha National Park
- g) Broadcast on Radio National Madagascar with by a Darwin Assistant and Professor Olga Ramilijaona (Head of the Department of Animal Biology, University of Antananarivo) about bat conservation and the potential for bats to reduce insect pests)
- h) 'Microchiroptera Survey of Makira Plateau', final report submitted to Wildlife Conservation Society/Ministry of the Environment (June)
- i) Brochure on bat identification and best-practice cave visits submitted to our partners for review
- j) Capacity building and training of a Malagasy bat/education NGO

There was no slippage during the current reporting period and we achieved a number of outputs and activities that were not in the logical framework for 2003/4 (see below):

(iii) Additional outputs and progress

- a) Article on the Bemaraha National Park survey in the inaugural Darwin e-Newsletter
- b) Completed 12 months monitoring of bat activity by a national park guide using a bat detector
- c) Bat surveys and a study on *Hipposideros commersoni* in Ankarafantsika National Park (ongoing March/April 2004)
- d) A survey of Torotorofotsy wetland using time-expansion bat detectors
- e) Two new protocols of collaboration signed (School of Biological Sciences, University of Tulear and Department of Water and Forests, School of Agronomy) to raise Darwin Trainee participation
- f) National Park guides trained in bat identification in Bemaraha (3) and Isalo (1)

- g) Draft guide to the identification of insect fragments in bat faeces given to taxonomists for comments
- h) Distribution of colour project desk calendar to our partners and colleagues
- i) Car logo to promote the Darwin Initiative funded collaboration between UK and Madagascar
- j) Additional grants from seven sources totaling £19k to help sustain the project during 2004, taking the total extra funds received since the beginning to £48.5k
- k) Mr. Brian Donaldson (Her Majesty's Ambassador to Madagascar), Mr. Jean-Paul Paddock (Programme Director, WWF Madagascar/West Indian Ocean) and Mr. Bruno Rasoanaivo (ANGAP, Programme Bemaraha) visited the project office in December and listened to each Darwin Trainee describe their own research projects
- l) Three Malagasy supervisors from our partners accompanied us into the field for short visits to evaluate the project and student's progress
- m) A conservation education initiative in 18 primary schools started in March with 2-day teacher training days (attended by 65 people). Pupils are currently engaged in a colour poster competition

(iii) Project's activities

a) *Bemaraha National Park*: this is a large karst outcrop that is experiencing rising tourism levels. It is a centre of local species endemism but has received relatively little interest from researchers. We conducted a number of small research projects in Bemaraha to compare bat ecology in different seasons. Amyot Kofoky studied microchiropteran species composition and habitat use using bat detectors and his work was part-funded by grants from Bat Conservation International's Scholarship Programme (US) and the Rufford Foundation (UK). Andrianajoro Rakotoarivelo studied diet preference and insect availability in four Microchiroptera species for his DEA. Fanja Ratriromanarivo surveyed 16 caves for bats, recording microclimate and assessed potential conflicts with tourism. Hanta Julie Razafimanahaka studied the extent to which bats are forest-dependent by comparing catches inside forest, on the forest edge and in the adjacent farmland.

At the end of the first visit, Amyot Kofoky gave a powerpoint presentation to park staff (including the Conservation Programme Manager [Hery Lala Ravelomanantsoa] and the Ecological Monitoring Officer [Anrianasolo Mamy]) to disseminate our preliminary results. We have been invited to return in 2004/5 to repeat our surveys in the north of the park. The data are currently being analysed but we know that one of the bat specimens is a new species and that the preliminary results indicate that *Triaenops furculus* is the most forest-dependent species in the area.

b) *Ambohitantely Special Reserve*: this is a high plateau, fragmented rainforest where DEA students, Rantoanina Andrianasolo, Myriam Rakotondramanana and Andriantsialonina Andriamanandratra studied the effect of fragmentation on bats, the use of forest edges by bats and habitat selection of *Miniopterus manavi*.

c) *Sarodrano*: this is an area of coastal scrub that contains a remarkably rich Microchiroptera community of up to 12 species. Tsibaraha Mbohoahy conducted his DEA field research in the caves, buildings and forest to study the relationship between bat morphology and habitat selection, behaviour and diet.

d) *Ankarafantsika National Park*: this large area of western deciduous forest was selected following the success of the work in Bemaraha. We now have two DEA students (Rampilamanana Roseline and Ralisita Mahefatiana) working there on

projects to compare bat use of major habitat types (e.g. farm, wetland and forest) and the ecology of *Hipposideros commersoni*, Madagascar's largest microchiropteran.

e) *Torotorofotsy Marsh*: is a unique wetland site that is surrounded by mining concessions. We conducted the first bat survey of the wetland, by comparing bat species in four major habitat types using time-expansion bat detectors. This work allowed Felicien Randrianandrianina to participate as a national bat expert in a multi-disciplinary survey team and to use the techniques acquired in his DEA research.

f) *Fort Dauphin*: the littoral forests of Fort Dauphin are currently threatened by a proposed ilmenite mine development. Using bat detectors, we studied the species composition across a gradient of wet to dry forest and from intact to heavily degraded. We have been invited to contribute to a forthcoming monograph on the area.

g) *Otomops madagascariensis*: we have described for the first time the diet, behaviour and population structure of this endemic, vulnerable, cave-dependent species.

h) *Seasonality and diet*: faecal samples from trapped bats (*Mormopterus jugularis*, *Chaerephon pumilus*, *C. leucogaster*, *Mops leucostigma*, *Miniopterus manavi* and *Myotis goudoti*) and insects from a light trap were collected approximately every 6-8 weeks in three sites to investigate the feeding ecology of Madagascar's bats. Additional funding allows the project to employ a full time entomologist, Nicolas Ranaivson, to identify insects in faeces and in traps and we are currently preparing a publication on 'Dietary Overlap in Three Co-roosting Species of Free-tailed Bats (Family: Molossidae)'.

i) *Species database and Echolocation*

Our database continues to grow and we have biometrics, echolocation and wing tracings from 24 Microchiroptera (90% of Madagascar's bat fauna)

j) *Capacity building of a local Malagasy NGO*

We have provided training in bat survey methods and levered funds for bat education and monitoring projects for the Malagasy NGO called ACCE.

(iv) Project training

The main training component of the project is for Malagasy DEA (Darwin trainees) students to learn the techniques required to study bats. The DEA degree in Madagascar is usually the first experience the students have of field research and can be a stepping-stone to a PhD or employment.

Following discussion with our Malagasy university partners we have adopted the following structure for DEA student projects: the Darwin Fellow provides the project ideas because the students generally have no prior knowledge of bats. After preliminary discussions the students prepare a research proposal using the computers and literature available in the project office. The trainee must obtain the endorsement of his/her proposal from a university supervisor before starting the research. The first period in the field is always with the Darwin Fellow and is devoted to introducing the trainees to the relevant methods (e.g. bat detectors, insect traps, radio telemetry, mist nets). Malagasy Darwin Assistants and other, more experienced team members, maintain high support levels for trainees throughout the field project. The trainee is expected to be more independent during the second half of the fieldwork and is given the opportunity to develop original ideas. A Darwin-funded visit from the university supervisor of the trainee occurs during the fieldwork. Students

receive one-to-one training in data entry, statistical analysis and thesis preparation from the Darwin Fellow and they have 24-hour access, 7 days a week to the computers in the project office and three guest rooms are also at their disposal. We have provided our student from the University of Tulear with a laptop computer (otherwise he will be sharing the department's PC with 22 of his colleagues) and he will make short, residential study visits to Antananarivo.

The additional funding secured by the project has enabled the team of Darwin Assistants to be increased by three to a total of five. The assistants are all experienced in their fields (three from the previous Darwin Initiative grant to the University of Aberdeen's fruit bat project, one from BP funded Microchiroptera expeditions and an entomologist) and are not currently engaged in any formal study. They receive more advanced training than the DEA students (e.g. advanced statistics, desktop publishing, preparation of scientific publications) and are given an opportunity to devise and manage budgets, write project proposals and to lead field trips.

Radosoa Andrianaivoarivelo, Darwin Assistant, has received a full scholarship to attend the Tropical Biological Association's field course in Uganda during 2004. He will also attend a three-week project management and biodiversity-monitoring workshop in the UK, for which he has received full funding from BP.

National Park guides who work with us received training in bat identification and learn about bat ecology. This is especially useful in parks such as Bemaraha where many tourists are taken into caves to see the roosting bats.

The Darwin Fellow has been assisted in training Malagasy students by separately funded short visits by Professor Paul Racey, Dr Jon Russ of the University of Aberdeen and Dr Lorraine Marshall-Ball of the University of St Andrews.

(v) Significant difficulties

There have been no significant difficulties encountered during the reporting period.

(vi) Alteration to the exit strategy

The success of the project has led to a significant momentum to maintain a permanent team of Malagasy bat biologists. This is a fitting conclusion to two short-term (fruit bats [2 years] and microchiropterans [3 years]) bat conservation projects funded by Darwin in Madagascar. With the support and backing of all of our partners and major international NGOs we have a plan for 2005 and 2006 to develop further the bat training and survey programme to species/habitats of conservation priorities that were unable to be fully addressed during the first two projects.

5. ACTIONS TAKEN IN RESPONSE TO REVIEWS

Our last review was favorable and raised no major issues.

6. PARTNERSHIPS

a) We continue to enjoy a close working relationship with faculty members at the University of Antananarivo. Dr Daniel Rakotondravony accompanied Prof. Paul Racey and the Darwin Fellow (Dr. Richard Jenkins) into the field to see the Darwin Trainees in action. Other field visits from the Department of Animal Biology were made by Dr Emiliene Razafimahatratra who accompanied a team of Darwin Assistants and Trainees to Ambohitantely Special Reserve and Dr Marlene Razanahoera who visited two of our projects in Ankarafantsika National Park. Dr Joelsoa Ratsirarson of the School of Agronomy visited Ambohitantely to see three of our trainees during their field research.

All of our major partners continue to fully endorse our desire to extend the project into the next phase. Prof. Olga Ramilijaona has been particularly helpful in writing letters of support and recommendation to funding agencies. Her support, along with that of the Wildlife Conservation Society and ANGAP greatly assisted us in receiving a BP Consolidation Award for 2005/6.

Prof. Paul Racey gave a lecture on bat conservation to the Department of Animal Biology, and they remain our primary partner, with all research permits obtained via our protocol with them.

We also work closely with Dr Steve Goodman of WWF in Antananarivo. In September 2003 we jointly surveyed Namoraka Integrated Reserve and are currently describing a new species of *Scotophilus* from Bemaraha together.

b) We renewed our protocol of collaboration with the School of Biological Sciences, University of Tulear through the cooperation and support of Dr Felicité Rejo-Fienena (DEA course organizer and Ministry of Water and Forests Regional Director, Tulear).

ACCE is a local Malagasy bat NGO that approached us for technical support in March 2003. We now work closely with them and have trained their staff members in bat handling and identification, provided reference literature for inclusion in education programmes and helped to find funds. We have levered \$3,625 from the Lubee Bat Conservancy for ACCE to monitor bat roosts for two years. We have also received funding from Fauna and Flora International's Flagship species fund (£2,000) and Cleveland Metroparks Zoo (\$2,700) for ACCE to conduct a bat education project in primary schools, which began in March.

A number of international biodiversity researchers have contacted us during 2003/4. As a result of these inquiries we hope to collaborate with Prof. David Jacobs (University of Cape Town) on a project about Molossidae bats and with Prof. Michael Bird (University of St. Andrews, UK) on a study to use deposits of bat droppings to describe climate change.

(vii) Work plan for next twelve months (the next 6 month reporting period shaded)

| Activity | Description | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb |
|--|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Activities | Ankarafantsika National Park bat survey | X | | | X | | | | | | | |
| | Namoraka Integrated Reserve bat survey | | | | | | | X | | | | |
| | Ankarana National Park bat survey | | X | X | | | | | | | | |
| | Bay of Nirinda bat survey | | | | | | | | X | | | |
| | Education project in primary schools | X | X | X | | | | | | | | |
| | School visits (10) to show video film on bat conservation | | | | | | | | X | X | | |
| Outputs | Cave bat brochures (given to ANGAP) – final version | | | X | | | | | | | | |
| | Key to insect fragments in bat faeces – final version | | | | | X | | | | | | |
| | Description of new <i>Scotophilus</i> species submitted | | | | | | | X | | | | |
| | Paper on bat diet submitted | | | | | | X | | | | | |
| | DEA vivas | | | X | | | | | | | | |
| | Bemaraha National Park bat management plan - draft for review | | | | | | X | | | | | |
| | Draft paper on the conservation status of Bemaraha bats | | | | | | X | | | | | |
| | DEA submissions (3) | | | | | | | | | X | | |
| Short (20 min) film on the role of bats in the environment | | | | | | | X | | | | | |
| Funding | Apply for continuity funding | X | X | X | X | X | X | X | X | X | X | X |
| Dissemination of results | Bat conservation seminar held in Department of Animal Biology, University of Antananarivo | | | | | | | | | | X | |

7. IMPACT AND SUSTAINABILITY

The project's impact continues to grow as more people become aware of the existence of the team and bat conservation issues.

We have been invited to contribute to three monographs on the bats of Bemaraha National Park, Mandena forest and Tampolo Special Reserve. The Tropical Biological Association invited two of our Darwin Trainees to hold a bat-survey demonstration in Kirindy (November 2004). We have been invited to co-produce a special issue on bat conservation and ecology in Madagascar for the 'Department of Water and Forest's' journal 'Akon'ny Ala'. We also receive regular requests to survey key sites for bats using bat detectors (e.g. Tampolo, Torotorofotsy, Narinda Bay).

Key evidence for the increased capacity as a result of the project is the size of the team and scope of the work. We frequently have three or four teams located simultaneously in different parts of Madagascar. This is a reflection of the ability of the Darwin Trainees and Assistants to run field projects and to conduct bat surveys. Put simply, from a position of one Malagasy bat biologist trained in methods of studying microchiropteran bats (Amyot Kofoky) at the start of the project we now have 12-14 people capable of undertaking bat detector or trapping surveys.

8. POST-PROJECT FOLLOW UP ACTIVITIES (max 300 words)

The current project has developed a team of well-trained, properly equipped and enthusiastic Malagasy biologists who want to continue working for bat conservation. It is the largest bat research group in Africa and has secured an impressive array of expertise and resources:

Justification of our request for Darwin Post Project Funding:

- a) We already have a plan for 2005 and 2006 that will develop the current team of Darwin Assistants and Trainees into a new national bat association with the aim of making it independent and able to function without the need for a full time expatriate advisor
- b) We have already been awarded £50k for 2005 and 2006 and hope that the Darwin Initiative will consider funding the shortfall (c. £75k over two years)
- c) The University of Aberdeen's two Darwin projects in Madagascar raised the conservation profile of bats and identified four new major research areas that need to be addressed in the future
 1. Fruit bats and fragmentation;
 2. Ecology of the endemic sucker footed bat *Myzopoda aurita*;
 3. Mitigating bat-human conflicts;
 4. Surveys of caves outside protected areas.

There is currently no other team in Madagascar with the capacity to undertake such a project.

d) The project is suitable for Darwin Post Project Funding because (i) British expertise is still required (ii) the number of Malagasy bat-trained DEA students is still small compared to those available to work on other major taxa such as lemurs or birds (iii) the profile and capacity of the current project has been created by Darwin investments (iv) although we have been successful in obtaining a number of top-up grants (£0.5k-£18) additional funding from Darwin is required to realise the new phase.

e) Our major partners have already displayed a strong commitment to the continuation of the project through the provision of letters of support for continuity/consolidation funding.

9. OUTPUTS, OUTCOMES AND DISSEMINATION

(i) Dissemination activities

On the national scale, dissemination activities were confined to the national media and we ran bat conservation-related features on national radio and in newspapers. MBS (Malagasy Broadcasting System) have agreed to feature our project on TV during 2004. A public display on the role of bats in the environment, threats and conservation measures, was held on World Environment Day in Moramanga (eastern Madagascar). Power-point presentations of preliminary results were made to biodiversity and research officers at three sites (Bemaraha, Fort Dauphin and Ankarafantsika) before the field teams departed the site. Dissemination beyond the current project will be achieved by funding from the BP Conservation Programme for 'Bat Conservation and Education Officer'.

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

| Code No. | Quantity | Description |
|----------|----------|---|
| 2 | 10 | 8 Malagasy DEA students (below) from three different academic departments are engaged on the project and in various stages of their study |
| | 1 | 1 Malagasy Agronomy Engineer (Water and Forest Option) student (Hanta Julie Razafimanahaka) |
| 4C | 1 | <p>A> Drafts received</p> <p>1. Felicien Randrianandrianina (DEA) <i>The Use of Echolocation to Determine Habitat Use of Microchiroptera in Primary and Disturbed Habitats</i></p> <p>2. Hanta Julie Razafimanahaka (Agronomy Engineer, pre-DEA) Habitat use and seasonality in the bats of Bemaraha National Park</p> <p>B> Data analysis/processing</p> <p>3. Andrianajoro Rakotoarivelo (DEA) Dietary Preference of Microchiroptera in Bemaraha National Park</p> <p>4. Rantoanina Andrianasolo (DEA) Use of rainforest edges by Microchiroptera</p> <p>C> Field research</p> <p>5. Tsibaraha Mbohoahy (DEA) Morphology, emergence time and habitat use of a coastal bat community</p> <p>6. Myriam Rakotondramanana (DEA) Use of rainforest fragments by Microchiroptera</p> <p>7. Andriantsialonina Andriamanandratra (DEA) Ecology of <i>Miniopterus manavi</i> (Vespertilionidae)</p> <p>8. Rampilamanana Roseline (DEA) Habitat use and seasonality in the bats of Ankarafantsika National Park</p> <p>9. Ralisita Mahefatiana (DEA) Echolocation, diet and habitat use of <i>Hipposideros commersoni</i></p> |
| 5 | 1 | <p>^bAmyot Kofoky: Darwin Assistant <i>Echolocation surveys of bats in different habitats</i> Status: Hoping to register as a PhD student in the University of Antananarivo September 2005 to write up the data he's collected</p> |

| | | |
|-----|----------|--|
| 5 | 1 | ^b Fanja Ratrimomanarivo: Darwin Assistant <i>Cave Roost Selection of Microchiropteran Bats</i> Status: data analysis. Fanja has been invited to join WWF in September 2005 to begin a PhD on bats |
| 5 | 1 | ^b Julie Ranivo: Darwin Assistant Status: Julie returned to Madagascar in May after having a baby. After briefly rejoining the project she left to begin a bat PhD with WWF |
| 5 | 1 | ^b Rado Andrianaivoarivelo: Project Assistant <i>Diet and seasonality in Malagasy Microchiroptera</i> Status: first draft received. Rado is currently seeking funding to conduct his PhD on <i>Rousettus madagascariensis</i> |
| 5 | 1 | ^b Daudet Andriafidison: Project Assistant <i>Ecology of Otomops madagascariensis</i> Status: data analysis |
| 5 | 1 | ^b Nicolas Ranaivson: Project Assistant Entomologist |
| 4D | | Each DEA student receives 3-5 months field training and at least 1 year of close supervision during thesis preparation. Project assistants receive training and then conduct closely supervised individual research projects for a year or more. |
| 6A | 1 | Andriamanana Rabearivelo and Zo Tsimandresy (NGO staff) trained in bat identification and handling (three weeks) |
| 8 | 2 weeks | Based in University of Aberdeen |
| 8 | 50 weeks | Based in Madagascar |
| 9 | 1 | Report on Makira forest bats submitted |
| | 9 | Summary field reports submitted to host institutions |
| 10 | 1 | Key to identification of insect fragments in bat faeces (with partners for review) |
| | 1 | Cave bat information leaflet (with partners for review) |
| 13A | 1 | Comprehensive species reference collections established for University of Antananarivo and University of Tulear – these will be added to during 2004/5 |
| 15A | 2 | Publicity articles in national newspapers (one in French, one in Malagasy) |
| 15B | 1 | Article submitted to 'Tsingy' newsletter |
| 15D | 1 | Darwin Initiative newsletter |
| 19A | 1 | Ten minute feature, in Malagasy, on Radio National Madagascar (August 2003) |
| 21 | | We are seeking continuity funding to consolidate the project, leading within two more years to the creation of a new, national bat conservation NGO |
| 23A | £6,000 | From Rio Tinto via Fauna and Flora International |
| | £5,000 | Rufford Foundation |
| | £2,000 | Fauna and Flora International, Flagship Species Fund |
| | £2,000 | The Carnegie Trust for the Universities of Scotland (P Racey) |
| | £1,000 | The Carnegie Trust for the Universities of Scotland (L M Ball) |
| | £1,500 | British Ecological Society |
| | \$3,640 | Lubee Bat Conservancy |
| | \$2,700 | Cleveland Metroparks Zoo |
| | \$1,000 | Bat Conservation International |

10. PROJECT EXPENDITURE

| Item | Budget (please indicate which document you refer to if other than your project schedule) | Expenditure | Balance |
|---|--|-------------|---------|
| <i>From the rescheduled budget</i> | | | |
| Rent, rates, heating, overheads etc | - | | |

11. MONITORING, EVALUATION AND LESSONS

(i) Monitoring and evaluation

Visits to the field by university staff from our partners have two objectives. The first is to see the Darwin Trainees in action and to learn about their individual projects. The second objective is an evaluation of the training, the Darwin Fellow and the quality of the proposed research. We have received no direct feedback as yet but judge it to be favorable from informal remarks and their encouragement for the project to be extended beyond the current Darwin funding.

(ii) Lessons

Provision of training to Malagasy graduates is the first step in getting bats onto the conservation agenda. However, without a recognizable bat team in the future, the equipment and resources will slowly (or maybe quickly) be lost. From our experience of other Darwin projects in Madagascar (on chameleons and fruit bats), the fine work during the lifetime of Darwin funding is in stark contrast to the post-funding period when the equipment has been given away to resource-poor partners and there are few opportunities to apply the training they have received. This current project has developed a highly capable team and we are receiving many requests to conduct surveys and research and also increasingly to give advice on bat conservation issues. This is all made possible by the provision of a project office (part-funded by the Darwin Fellow's salary), which acts as a centre for bat research and is the first port of call for someone seeking advice/assistance on bats. The original exit strategy was to leave behind a number of trained Malagasy biologists, to hand over all equipment to partners and to hold two workshops. This plan had been refined over the past year in recognition of (i) the problems encountered by Darwin Trainees following the end of previous Darwin projects in Madagascar (ii) strong support from our partners to continue our project (iii) there are many research and training objectives that are currently beyond the scope of the current project (iv) a true bat conservation project will include both Megachiroptera and Microchiroptera (v) the need for a permanent voice on bat conservation in Madagascar. We are therefore planning to continue the project into 2005 and 2006 with the aim of leaving behind a new bat conservation association, capable of raising funds, organizing itself, undertaking high quality research/surveys and giving advice on bat conservation.

It is interesting to note the vast difference between the DEA courses in different university departments. For example, students from the Department of Animal Biology generally take about four years from the time fieldwork begins to their final presentation and thesis defence whilst those from the School of Agronomy follow a much stricter regime, having to complete fieldwork and present the thesis in 18 months. It is not unusual for supervisors in the Department of Animal Biology students to correct the thesis on more than ten different occasions. Neither is it unusual for highly promising students, including PhD candidates, to become very disillusioned with the system. The impact on the current project is such that even if a DEA student from the Department of Animal Biology started fieldwork on the first day of Darwin funding, it is very unlikely that they would complete their DEA within three years.

12. OUTSTANDING ACHIEVEMENTS OF YOUR PROJECT DURING THE REPORTING PERIOD

A significant feature of this year has been the contribution made to the field supervision of Darwin Trainees by the project's five full-time Darwin Assistants. The significant additional funding levered by the Darwin Fellow has enabled the team to expand its capacity, size and remit. Other funds levered for a local Malagasy NGO support a new education initiative in primary schools aimed at raising the awareness of bat conservation issues through the incorporation of local environmental matters (e.g. roost site protection) in the curriculum. Our survey teams that participated in multi-taxa surveys of Makira and Torotorofotsy were the first bat specialist group to be included in such work, and as such represent a major step-towards getting bats onto the conservation agenda in Madagascar. In Bemaraha National Park we discovered a new species of *Scotophilus* and conducted the first ever study on the biology of the vulnerable, cave-dependent endemic *Otomops madagascariensis*. Our work in Bemaraha resulted in bats being incorporated into the bi-monthly ecological monitoring programme conducted by the park's biodiversity team and we have been invited to survey the northern section of the park during 2005. The only previous attempt to investigate the diet of Microchiroptera in Madagascar, by a team from WWF, killed hundreds of bats for their stomach contents and the samples were sent abroad for identification. In 2003 we developed our own team capable of identifying the fragment remains of insects from the faeces of live bats. This is the internationally preferred way of studying diet and our team also produced a guidebook to insect fragments from the faeces of free-tailed bats that will promote further study.

■ **I agree for ECTF and the Darwin Secretariat to publish the content of this section**

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

| Project summary | Measurable Indicators | Progress and Achievements April 2003-Mar 2004 | Actions required/planned for next period |
|---|---|---|---|
| <p>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</p> <ul style="list-style-type: none"> • 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 | | | |
| <p>Purpose (insert original project purpose statement)</p> <p>To get microchiropteran bats onto the conservation agenda and to keep them there</p> | <p>(insert original purpose level indicators)</p> <ul style="list-style-type: none"> - Bats receive similar priority to lemurs - Darwin Trainees employed in conservation after the project | <p>(report impacts and achievements resulting from the project against purpose indicators – if any)</p> <ul style="list-style-type: none"> - Our bat team is frequently invited to survey protected areas - Two Darwin Assistants have obtained PhD studentships with WWF | <p>(report any lessons learned resulting from the project & highlight key actions planning for next period)</p> <ul style="list-style-type: none"> - Keeping bats on the conservation agenda requires a permanent team in Madagascar to respond to survey, research and advisory requests. - It is not enough to just train individuals and expect them to maintain a strong bat conservation presence. Expertise and resources will be best used together - In the next period we will seek continuation funding to develop the project during 2005 and 2006 (£50k already guaranteed. £75 shortfall) - The team will undergo an institutional assessment by |

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| | | | Conservation International and a new organizational structure will be designed to take the project beyond the current Darwin Funding which expired in November 2004 |
| Outputs | | | |
| (insert original outputs – one per line) | (insert original output level indicators) | (report completed activities and outcomes that contribute toward outputs and indicators) | (report any lessons learned resulting from the project & highlight key actions planning for next period) |
| National Action Plan for the Conservation of Microchiroptera | Publication and dissemination of action plan | <ul style="list-style-type: none"> - Surveyed 4 national parks - Surveyed 6 other protected areas - One new species discovered - New information on forest-dependency - Targeted research on IUCN 'vulnerable' species | <ul style="list-style-type: none"> - Reconnaissance northern Bemaraha - Cave survey of Namoraka - Survey Narinda Bay - Survey Ankarafantsika National Park - Focus on <i>Otomops madagascariensis</i>, <i>Hipposideros commersoni</i>, <i>Triaenops furculus</i> and <i>Scotophilus</i> |
| National database for Microchiroptera | | <ul style="list-style-type: none"> - Excel file with all capture records - Library of echolocation calls - Specimen collections made for two partners | Maintain current levels of data collection |
| Brochures for tour guides and cave visitors | | <ul style="list-style-type: none"> - Colour poster on the role of bats as insect pest controllers - National radio broadcast | Publish brochure for Bemaraha and Ankarafantsika National Parks |

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| | | - Draft cave brochure given to our partners for review | |
| Bat management plans for individual protected areas | Publication of revised management plans | - Bat monitoring in 4 caves incorporated into Bemaraha National Park's ecological monitoring programme - Preliminary reports from over 16 field trips given to our partners | Hand over final report on the bats of Bemaraha National Park to ANGAP |
| Malagasy graduates trained to continue surveys | Graduation of trainees | - 4 trainees completed field research - 8 trainees with ongoing field projects - Bat survey teams can operate without the presence of the Darwin Fellow - 1 draft thesis received - 2 trainees and 2 assistants trained to determine the insect composition of bat faeces | - Close supervision of thesis preparation - 1 more trainee recruited - Acquire continuation funding for 2005/6 |

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.