

# DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES : APPLICATION FOR GRANT FOR ROUND 9 COMPETITION

Please read the accompanying Guidance Note before completing this form. Give a full answer to each section; applications will be considered on the basis of information submitted on this form. Applicants are asked not to use the form supplied to cross refer to information in separate documents except where this is invited on the form. The space provided indicates the level of detail required but you may provide additional information on a separate sheet if necessary. Copies of this form are available on disk or by e-mail on request. You are asked also to complete the summary sheet attached at the end of this form. Although you may reproduce this sheet in a reasonable font, you should not expand it beyond an A4 sheet (leaving the allocated space for DETR comments to be made) as additional information will not be taken into account.

## 1. Name and address of organisation

DEPARTMENT OF ZOOLOGY, UNIVERSITY OF ABERDEEN, ABERDEEN AB24 2TZ

## 2. Principals in project

Details	Project leader	Other UK personnel (if working more than 50% on project)	Main project partner or co-ordinator in host country
Surname	RACEY	RUSS	RAKOTODRAVONY
Forename(s)	PAUL	JON	DANIEL
Post held	REGIUS PROFESSOR OF NATURAL HISTORY	POSTDOCTORAL RESEARCHER	PROFESSOR & HEAD OF DEPARTMENT
Institution (if different to the above)		QUEEN'S UNIVERSITY, BELFAST	UNIVERSITY OF ANTANANARIVO
Department	ZOOLOGY	BIOLOGY & BIOCHEMISTRY	BIOLOGICAL SCIENCES
Telephone			
Fax			
Email			

Please provide a one page CV for each of these named individuals.

## 3. Project title (not exceeding 10 words)

CONSERVATION AND MANAGEMENT OF MALAGASY MICROCHIROPTERA AND THEIR HABITATS

## 4. Abstract of study (in no more than 750 characters)

This project will

- 1) Survey insectivorous bats in protected areas of the eastern rainforests and in limestone regions using advanced bat detectors, mist nets and harp traps.
- 2) Train Malagasy graduates in these techniques which will then be extended to other protected areas and used to establish longer term monitoring programmes.
- 3) Incorporate the conservation requirements of bats into management plans for individual protected areas.
- 4) Establish a national database of bat biodiversity and produce a national action plan for the conservation of insectivorous bats.
- 5) Carry out a programme of environmental education in limestone cave areas to encourage bat friendly practices and sustainable ecotourism.
- 6) Evaluate the ecological services provided by bats in controlling insect pests as leverage for their incorporation into national conservation agendas.

## 5. Timing. Give the proposed starting date and duration of the project.

April 2001    3 years

6. Describe briefly the aims, activities and achievements of your organisation. (Please note that this should describe your unit, institute or department within a university.)

Aims of my research group:	
To carry out high quality research and teaching on ecology and conservation biology of mammals, particularly bats. To apply the techniques of molecular genetics to ecological problems, in collaboration with NERC's Centre for Ecology and Hydrology: current projects on grouse, otters, parasite nematodes of reindeer and brown trout.	
Activities	
Current research projects on bats:	<ol style="list-style-type: none"> <li>1. The role of fruit bats in pollination and seed dispersal in tropical forests (Madagascar and Thailand)</li> <li>2. The structure of insectivorous bat communities in different logging regimens (Trinidad)</li> <li>3. The importance of vegetation corridors to foraging insectivorous bats in European cultural landscapes (Scotland and Germany)</li> <li>4. The conservation ecology of noctule bats (England)</li> </ol>
Current teaching:	Contributions to courses in Ecology, Conservation Biology and Mammalogy
Current research group:	7 postdocs, 2 technicians, 7 PhD students
Achievements In the last decade:	
<ul style="list-style-type: none"> <li>◆ 73 research papers and 17 reviews – on ecology and conservation biology of bats, which include the molecular verification of a new species in the UK and the IUCN Global Action Plan on Microchiroptera (in press).</li> <li>◆ Twenty primary papers and one review published from my research group on Malagasy mammals.</li> <li>◆ 17 U.K. PhD students trained (including 2 working on Malagasy mammals and another writing up)</li> <li>◆ Research projects of 14 Malagasy graduates devised, funded and supervised for their Diplomes d'études Approfondies (equivalent to UK1 year MSc).</li> </ul>	

7. Has your organisation received funding under the Initiative before? If so, please give details.

5 <sup>th</sup> round: The role of fruit bats in maintaining biodiversity £90K; 1 <sup>st</sup> round: University of Aberdeen/RBG, Kew: Study of rheophyte flora £50K, supplemented in 5 <sup>th</sup> round £6K.
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8. Which overseas institutions, if any, will be involved in the project? Please explain the responsibilities of these institutions.

<u>Institution</u>	<u>Relevant Responsibilities</u>	<u>Contacts</u>
University of Antananarivo:	Nominates Darwin Trainees	Prof Daniel Rakotondravony (HOD Animal Biology) Dr Emiliene Razafimahatrata (Dept Anim. Biol.)
University of Tulear:	Nominates Darwin Trainees	Prof Flicitée Rejo-fienena (HOD Botany/Regional Coordinator - Ministry of Environment)
National Association for the Management of Protected Areas (ANGAP)	Overall responsibility for protected areas – provides permits to enter these areas to	M. Noel Randrianandia (Director) Mme Harisoa Faramalala (Head of Research) Mme Chantal Andrianarivo (Head, Biodiversity Evaluation) M. Vonjisoa Rasoloarison (Director Bemeraha National
Park)	carry out research, survey and monitoring	M. Julien Befourouack (Director of Ankarana Reserve) and other reserve directors
Ministry of Water & Forests	Responsible for all forest and fauna protection outside protected areas	Mme Fleurette Andriantsalava (Director General) Mlle Voahirina Andriatsalama (Head of Fauna & Flora Div.)
World Wide Fund for Nature: Antananarivo	Responsible for ex-Darwin vehicle (from Jan '01). Supports former Darwin trainees	Dr Jean-Paul Paddack (Head of Programmes) Dr Steve Goodman (Inventory Specialist) M. Achille Raselimanana (Biodiversity Officer)
Wildlife Conservation Society	Manages Masoala National Park	Mr Matthew Hatchwell (Director)

PROJECT DETAILS

9. Define the purpose (main objective) of the project in line with the logical framework.

The purpose of the project is to get bats onto the conservation agenda in Madagascar. There are at least 27 species of Microchiropteran bats in Madagascar, 15 of which are endemic, and they contribute 25% to Madagascar's mammalian biodiversity, are little studied and contribute ecological services by eating insect pests. Bats throughout the world are strongly associated with forests, and the well documented loss of forest in Madagascar has threatened bats. In addition to trees, caves are important bat roosts and pilot studies have revealed that the increased use of caves for tourism is clearly threatening bat populations.

10. Is this a new project or the continuation of an existing one?

A new project on ca. 27 species of insectivorous echolocating microchiropteran bats but building on pilot projects undertaken during student expeditions in 1999 and 2000. There have been no previous long-term projects on Malagasy Microchiroptera. The only projects have been undertaken during a total of 4 brief UK student expeditions over the last 10 years, as part of three Rapid Assessment surveys and as a minor part of a Darwin project to Lake Sakaha.

11. What is the evidence for a demand or need for the work? How is the project related to conservation priorities in the host country(ies)? How would the project assist the host country with its obligations under the Biodiversity Convention?

How was the work identified?

1. The IUCN Global Action Plan for Microchiroptera identified the need for such surveys of bats in Madagascar.
2. Despite a high level of endemism (15 of ca. 27 species)) there have been no systematic surveys of bats, and we have received requests from organisations managing protected areas to carry out surveys of bat biodiversity e.g. Wildlife Conservation Society for Masoala National Park.
3. The provision of ecological services such as the control of insect pests by bats is becoming increasingly recognised (and costed). Prof. Daniel Rakotondravony at the University of Antananarivo has approached us for technical and financial assistance to initiate research on this subject in Madagascar.
4. The Director General of the Ministry of Eaux et Forêts has requested evidence of such ecological services provided by insectivorous bats in Madagascar as leverage for their incorporation in national conservation agendas.

How is the project related to conservation priorities in the host country?

- Establishing the status of endemic species and the production of management plans for species groups is a priority of the Environmental Action Plan for Madagascar.
- Management of Protected areas is a key concern of ANGAP. The conservation requirements of bats will be incorporated into the management plans for individual protected areas. This project will also provide technical support for effective management of cave habitats in Ankarana and Bemaraha reserves, both of which are becoming popular visitor destinations which puts increasing pressure on the fragile cave ecosystems.

How will the project assist the host country meet its obligations under the Biodiversity Convention?

This project will produce a national plan for the conservation of microchiropteran bats (Article 6), will identify bat species and establish monitoring programmes that can be carried out by local staff (Article 7), will provide inputs into management plans for individual protected areas (Article 8), will provide advice and guidelines for the sustainable development of cave ecotourism which safeguards bat populations roosting within the caves (Articles 10, 13 & 14) and will train Malagasy graduates and reserve staff in bat identification using ultrasonic receivers (Article 12).

12 In what ways can this project be considered a Darwin project? How does the project relate to the Darwin principles? How would the project be advertised as a Darwin project and in what ways would the Darwin name and logo be used?

This is a Darwin project because:

1. It uses the highest level of British expertise to train local graduates *in situ* to survey and monitor their own insectivorous bat biodiversity using, *inter alia*, the most up-to-date but easily exportable electronic techniques, and to establish a database of bat distribution.  
  
[These techniques are currently used to measure biodiversity change in the UK in a major DETR-funded project using trained volunteers – The National Bat Monitoring Programme, the management committee of which is chaired by Racey. Russ carried out his doctoral work surveying the bats of Northern Ireland in a parallel DENI-funded project.]
2. It will prepare a national action plan for a neglected part of Madagascar's biodiversity, and provide inputs into the management plans of the protected areas surveyed. In terms of numbers of species, insectivorous bats (27+ species) are on a par with lemurs (32 species) as contributors to Madagascar's mammalian biodiversity (approximately 25% of species richness) but are poorly known since there has been no long-term project on insectivorous bats.
3. It will carry out environmental awareness programmes among the tour guides of the limestone (Tsingy) regions which are growing in importance as tourist attractions, and where the caves visited are important bat roosts, but where bats are threatened by excessive disturbance.
4. It will assist Madagascar to implement Articles 7, 8, 10, 12, 13 and 14 of CBD.
5. All 12 students involved in the project will be referred to as Darwin Trainees. The Darwin Initiative will be acknowledged in all outputs and presentations, which will also bear the Darwin logo.

13. Set out the proposed timetable for the work, including the programme's measurable outputs using the attached list of output measures.

	<u>Codes</u>
April 2001 – March 2002	
Issue inaugural newsletter and arrange interview for national TV & radio programmes	<b>16A, 18A, 19A</b>
Surveys: Mananara-Nord (National Park)	}
Anjanaharibe-Sud (Special reserve)	}
Marotandrano (Special reserve)	} <b>8</b> 56 weeks
Ambatovaky (Special reserve)	}
caves of Ankarana (Special reserve)	}
Train 4 DéA students in all aspects of project	<b>2</b>
Train 2 Malagasy assistants (all 3 years of project)	<b>5</b>
Establish bat database	<b>12A</b>
Prepare Bat Management Plans for surveyed areas (n = 5)	<b>9</b>
Prepare and distribute Project Poster and bat information leaflets	<b>7</b>
Prepare handout brochures for tour guides and tourists relevant to caves surveyed	<b>7</b>
Attend International Bat Conference (Kuala Lumpur) – Russ & Ranivo	<b>14B</b>
April 2002 – March 2003	
Issue progress newsletter and arrange interview for national TV & radio programme	<b>16A, 18A, 19A</b>
Surveys: Lac Aloatra (Proposed protected area)	}
Zahamena (National Park)	}
Mangerivola (Special reserve)	} <b>8</b> 56 weeks
Mantadia (National Park)	}
Ranomafana (National Park)	}
caves of Bemaraha (Strict Nature Reserve)	}
Train 4 DéA students in all aspects of project	<b>2</b>
Attend European Bat Research Symposium (Le Havre) – Russ & Kafoky	<b>14B</b>
Extend database	<b>12A</b>
Prepare Bat Management Plans for surveyed areas (n = 6)	<b>9</b>
Prepare handout brochures for tour guides and tourists relevant to caves surveyed	<b>7</b>

April 2003 – March 2004		
Issue progress newsletter and arrange interview for national TV & radio programme		<b>16A, 18A, 19A</b>
Surveys:		
Angringitra (National Park)	}	
Pic d'Ivohibe (Special reserve)	}	<b>8</b> 56 weeks
Andohahela (National Park)	}	
Cap Sainte Marie (Special reserve)	}	
caves of Namaroka (Strict nature reserves)	}	
and Anjohibe (site of biological and ecotourism interest)	}	
Train 4 DéA students in all aspects of project		<b>2</b>
Prepare Bat Management Plans for surveyed areas (n = 6)		<b>9</b>
Prepare handout brochures for tour guides and tourists relevant to caves surveyed		<b>7</b>
Prepare National Action Plan		<b>9</b>
Organise workshops in Antananarivo and Tulear		<b>14A</b>
Hand over database		<b>12A</b>
Hand over scientific equipment (bat detectors) to those who will continue longer term monitoring		<b>20</b>
4 papers submitted to peer-reviewed journals		<b>11B</b>

14. Do you know of any other individual/organisation carrying out similar work? Give the details of the work, explaining the similarities and differences.

In Madagascar, Dr S. Goodman of The Chicago Field Museum of Natural History and WWF Madagascar has for some years been co-ordinating an ongoing series of rapid biological inventory surveys of reserves. Because of the lack of personnel trained in field techniques on bats, only three of these surveys have included bats although capture rates were very low due to the difficulty of catching bats in mist-nets. The project proposed here will also use harp traps which are much more effective in catching bats (and safer for bats) as well as bat detectors.

The only previous surveys to use bat detectors were the pilot projects carried out by Aberdeen University graduates in 1999 and 2000, where bats were caught, their calls recorded, and those of some species (eg. the endemic sucker footed bat *Myzopoda aurita*) were so distinctive that bat detectors alone can now be used with confidence as a survey tool.

15. Will the project include training and development? Please indicate how many trainees will be involved, from which countries and what will be the criteria for selection. How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length of any training course.

- Training, professional development and technology transfer are primary objectives of this project and have characterised Aberdeen University's previous involvement in Madagascar where Malagasy biologists have been fully integrated into all projects. Such integration is written into the *Protocoles de Collaboration* which permit Professor Racey and his research associates to work in Madagascar.
- The previous Darwin project trained 10 students, all of whom obtained their DéA (Diplôme d'études Approfondies - equivalent to MSc), and most of whom are still involved in environmental work in Madagascar.
- A total of 12 Malagasy graduates (who may also be registered for the DéA of the Universities of Antananarivo and Tulear) will be selected by their Departments as trainees, 4 in each year of the project. They will each receive 1:1 year-long training in ecological theory and the principles of conservation biology as well as in field survey techniques in general and the use of bat detectors in particular. All Malagasy students will provide written reports which will be formally assessed by Dr Russ, Professor Rakotodravony and other colleagues listed in section 8, and feedback provided.
- Follow-up work will be co-ordinated by Professors Rakotodravony and Racey to ensure that the skills of Darwin trainees are fully utilised by government department (Eaux et Forêts), ANGAP and by national (FANAMBY; BioDev) and international NGOs (WWF, WCS, CI), and that bat monitoring programmes are sustained.

16. How will trainee outcomes/destinations be monitored after the end of the training?

- Outcomes by submission of DéA theses, publication of reports and journal papers.
- Destinations by maintaining contact with trainees, as we have done in the past.

17. How is the work of the project expected to continue after the end of grant period? A clear exit strategy must be included.

- In order to maintain the impetus for the conservation of Microchiroptera, the 12 Malagasy trainees will be available to work with government departments (Eaux et Forêts); independent agencies (ANGAP) National (FANAMBY, BIO-DEV) and International (WWF, WCS, CI) NGOs to continue surveys and public education programmes, update the database and keep bats on the conservation agenda in Madagascar. Conservation NGOs are almost entirely staffed by Malagasy and are eager to acquire and make use of biodiversity databases.
- Professor Racey's role as Council Member and Chairman of the Conservation Committee will ensure that Madagascar features prominently in Fauna and Flora's Conservation Initiative in the Western Indian Ocean, and that FFI's 100% fund is deployed to maintain the momentum in insectivorous bat conservation in Madagascar.
- The National Action Plan for Microchiropteran bats of Madagascar will provide useful practical and policy leverage in this respect.
- Professor Racey will maintain his involvement in Malagasy mammalogy.

### MONITORING AND EVALUATION

18. Describe how progress on the project would be monitored and evaluated in terms of achieving its aims and objectives, both during the lifetime of the project and at its conclusion. How would you ensure that it achieves value for money? What arrangements will be made for disseminating results? If applicable, how would you seek the views of clients/customers?

The project will be subject to regular review during annual month-long visits by Professor Racey who will assess progress against milestones set out in section 13. Regular contact will be maintained between Racey and staff in Madagascar by e-mail (transmitted via their personal telephones) and staff will provide Racey with monthly reports of progress.

Value for money is assured through partnership funding, tight financial control from Aberdeen, reduction in equipment cost due to the accumulation of equipment from previous research projects and the low unit costs for the *in situ* training of Darwin trainees. Downstream leverage in the present Darwin grant has made up the shortfall between the budget requested and grant awarded, and grants have been obtained from National Geographic, Bat Conservation International, The People's Trust for Endangered Species and The British Ecological Society. It is expected that this will be repeated, and applications will include commercial companies such as Rio Tinto Zinc.

The National Bat Action Plan will be disseminated to all relevant government departments and agencies and to national and international NGOs.

UK and Malagasy project staff will present the results of the project at the next international bat research project (Kuala Lumpur) and the next European bat research symposium (Le Havre).

Three-day workshops will be organised at the Universities of Antananarivo and Tulear to present our results at the end of the project. These workshops will include discussions with the National Scientific Conservation Committee to assess the status of Malagasy microchiropteran species and to review conservation options.

Results will also be disseminated by publications in international conservation journals, such as *Oryx*.

Continuing contacts between Professor Racey and his Malagasy colleagues and through contacts in ANGAP and the relevant ministry (*Eaux et Forêts*) will ensure that surveys continue, using trained staff and the project vehicle, that the database is updated and that the momentum for bat conservation is maintained.

The views of Clients/Customers have already been sought through the easy access which Professor Racey enjoys to Malagasy universities, agencies, government ministries and NGOs, and their needs have been incorporated into this proposal (surveys of protected areas, provision of ecological services by bats, training graduates). The Department of Biology, University of Antananarivo, The Ministry of Eaux et Forêts and ANGAP have confirmed support for this project as signatories of the *Protocoles de Collaboration* (enclosed). There will be regular ongoing dialogue with all stake holders.

19. Logical framework. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

Project summary	Measurable indicators	Means of verification	Important assumptions
<p>Goal</p> <p>To assist Madagascar with the conservation of Microchiropteran bats and implementation of the Biodiversity Convention with respect to bats</p>	<p>Bat populations are maintained at present levels</p>	<p>Long term monitoring of bat populations</p>	<p>Some external involvement may be required to sustain long-term monitoring</p>
<p>Purpose</p> <p>◆ To get Microchiropteran bats onto the Conservation agenda in Madagascar and to keep them there</p>	<p>◆ Bats receiving similar priority to lemurs in National Conservation Plans</p> <p>◆ Darwin Trainees working in government departments and NGOs</p>	<p>◆ Publications of Ministry of Eaux et Forêts (MEF) and ANGAP</p>	<p>Continued commitment of senior staff of MEF and ANGAP to bat conservation</p>
<p>Outputs</p> <p>◆ National Action Plan for the conservation of Microchiropteran bats</p> <p>◆ National Database for Microchiropteran bats</p> <p>◆ Bat management plans for individual protected areas</p> <p>◆ Brochures for tour guides and tourists in cave areas</p> <p>◆ Malagasy graduates trained to continue surveys and maintain databases</p>	<p>◆ Publication and dissemination of National Action Plan</p> <p>◆ Publication of revised management plans for protected areas</p> <p>◆ Graduation of Trainees with DéA</p>	<p>◆ Publications of MEF &amp; ANGAP</p> <p>◆ Publication of Park Management plans</p>	<p>◆ MEF and ANGAP will accept recommendations of the Action Plan.</p> <p>◆ Park directors will accept bat management plans</p>
<p>Activities</p> <p>◆ Survey insectivorous bats in protected areas (mainly eastern rainforests) using advanced methodology.</p> <p>◆ Train Malagasy graduates in construction and use of harp traps, in use of mist nets and in use of time expansion bat detectors.</p> <p>◆ Carry out a programme of environmental education in limestone cave areas to encourage bat-friendly and sustainable ecotourism.</p> <p>◆ Evaluate the ecological services performed by insectivorous bats in the control of insect pests and train Malagasy in the relevant research techniques</p>	<p>Key inputs:</p> <p>◆ Finance Year 1 53,625 Year 2 46,000 Year 3 45,500</p> <p>◆ Time by UK and Malagasy personnel</p>	<p>◆ Expenditure will be verified by detailed financial accounts.</p> <p>◆ Time will be verified by monthly reports from Madagascar detailing activities of project personnel.</p> <p>◆ Annual reports will detail results of surveys.</p> <p>◆ Brochures will be prepared for tour guides and tourists</p> <p>◆ Publications in international conservation journals</p>	<p>◆ Bats are trappable, nettable and detectable (already verified)</p> <p>◆ Trainees will be forthcoming (as they have been in the past)</p> <p>◆ Tourist guides and tourists will heed management advice (they have eagerly sought it in the past)</p> <p>◆ Bats eat insect pests</p>