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Biodiversity assessment of limestone karst dependent bats in Myanmar (Burma)

Darwin Initiative Annual Report

April, 2002 - March, 2003

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	Biodiversity assessment of limestone karst dependent bats in Myanmar (Burma)
Country(ies)	Myanmar (Burma)
Contractor	Dr Paul Bates, Harrison Institute
Project Reference No.	162/11/09
Grant Value	2002/3 **£42,677**; 2003/4 £39,958; 2004/5 £37,750; Total £120,385
Start/Finishing dates	April 2002 - March 2005
Reporting period	April 2002 - March 2003

2. Project Background

- The project is run in collaboration with the Zoology Department of the University of Yangon (Rangoon). The laboratory-based training and research component is based at the University of Yangon in Myanmar and at the Harrison Institute in Kent and Aberdeen in the UK. The field component is in seven geographical locations in the limestone karst areas of Myanmar, which are situated in the eastern part of the country.

- In 1999, the Harrison Institute was invited by Professor Daw Tin Nwe of the University of Yangon to undertake joint research and training programmes in biodiversity studies. The current Darwin project has evolved from these initial collaborative studies of the two institutions, which focused particularly on bats.

- Joint studies of the Harrison Institute and the University of Yangon from 1999 - 2001, prior to the Darwin Initiative, had resulted in the discovery of five bat species (and one family) new to the fauna of Myanmar, including globally endangered and near threatened taxa. These records all came from limestone karst areas and were published in two papers by the Harrison Institute and the University of Yangon in international peer-reviewed journals.

- From these pre-Darwin studies, it became apparent that Myanmar had an important role in the conservation of globally threatened bat taxa. The Darwin Initiative project seeks to build on these studies by broadening the scope of the research and training programme and by including a conservation component.

- Pre-Darwin studies also suggested that in some areas, for example parts of Mon and Kayin States, the detrimental impact of man on the environment was still relatively modest and that there was an opportunity to try and influence future

development decisions to the benefit of man and nature.

- The Darwin project therefore seeks to address two potential problem areas:
    - A lack of data concerning the diversity, distribution, ecology and behaviour of bats in the limestone karst areas of Myanmar, with particular reference to those species roosting in caves. Prior to the studies of the Harrison Institute/Yangon University, there had been no publications in international journals based on contemporaneous field studies since pre-WWII.
    - A need to increase the in-country capacity in bat studies within the University of Yangon, with the aim of creating a core group of scientists within Myanmar capable of studying and disseminating data nationally and internationally on a wide range of bat-related research and conservation topics.

3. Project Objectives

The purpose of the project is to ensure that Myanmar fulfils its potential in conserving limestone karst dependent bat species, including globally threatened taxa.

The objectives are to:

- Survey bats in the limestone karst areas of Myanmar, with the results to be published in a series of peer-reviewed international publications and as a field key and an identification guide to the bats of Myanmar.
- Train 12 Myanmar students at the University of Yangon in bat research and survey techniques.
- Present and discuss results at a series of workshops in Myanmar and internationally.
- Establish a national database of cave bats and identify 'key' sites for conservation, with the data to be disseminated to various governmental and non-governmental organisations in Myanmar and internationally.
- Strengthen links between the research and conservation community of Myanmar and the international bat and limestone karst community.
- Draw up a national action plan for cave bats and a management plan for 'key' limestone karst sites.
- Try to ensure that bats and limestone karst habitats are given equal status within the Protection of Wildlife and Natural Areas law as other 'priority' species and habitats (such as large mammals and forest habitats) and that the conservation of karst ecosystems is included both as an objective of the National Commission for Environmental Affairs and in the agenda of the Nature and Wildlife Conservation Division of the Forest Department.
- Carry out an education programme at 'key' sites, encouraging the sustainable utilisation of bats and bat products (e.g. guano).

No significant changes have been made to the objectives or proposed operation plan over the last year.

4. *Progress*

As outlined in the Project Background above, the Darwin Initiative project was developed from an on-going biodiversity programme of Harrison Institute/University of Yangon, which had been initiated in 1999 and formalised with the signing of a Memorandum of Understanding in June 2000. This programme had been supported by a range of sponsors including the 100% Fund of Fauna and Flora International (FFI) and included field studies, research, and training. It had concentrated primarily on bats, with some additional work on birds, and had resulted in some significant scientific findings, which had been published jointly by the two organisations in international journals.

All agreed project outputs for the year 2002-3 have been achieved, with the exception of the design of the management plans for key cave sites, which require further consultation with the end-users (scheduled for September, 2003).

Research work:

- Three field surveys took place - Shan and Kachin States and Mandalay Division ([March]-April, 2002); Mon and Kayin States (October-December, 2002); Mandalay Division and Shan State (March-[April], 2003).
- Design of cave-bat database formalised (in conjunction with Chair of Asia and Pacific Region IUCN Cave and Karst Working Group). However, translation of the design into a computer programme has still to be completed.
- Data gathered for cave-bat database from three of the seven study areas - including data on cave characteristics; cave biodiversity, with particular reference to bats; and assessment of threats to caves and their biodiversity.
- Data gathered for the bat echolocation call database from three of the seven study areas.
- First records of four bat species new to the fauna of Myanmar. Eight cave sites identified as roosts of a globally endangered bat species/family. Many significant range extensions of bat species.
- Data gathered on a variety of bat-related topics, including behaviour, diet, wing structure, interaction between man and bat, and bat acoustics.
- Joint papers for publication in international journals are currently being prepared, including (1) significant new records of horseshoe bats and (2) pipistrelle bats and (3) intra and interspecific variation in bat acoustics in Myanmar bats.

Training

- Core group of eight Myanmar postgraduate students selected jointly by Professor Daw Tin Nwe of the University of Yangon and Dr Paul Bates and Dr Iain Mackie of the Harrison Institute for training in aspects of bat studies including echolocation, diet analysis, interaction between man and bat, behaviour and systematics. Students selection is based on:
    - Existing interest in bat studies (including participation in pre-Darwin Harrison Institute/University of Yangon research) and a wish to further their postgraduate research.

- Ability to cope in the field.
- Ability to speak and write English.

- Two Darwin trainees (Mr Khin Maung Swe and Ms Khin Mie Mie) received:
  - intensive training in systematics and bat acoustics from Dr Paul Bates and Dr Iain Mackie during 3 month study visits to the UK (June-September, 2002).
  - exposure to international research methods and the opportunity to make contacts with international scientists by attending two international conferences in the UK: Society for Conservation Biology meeting at Kent University, July, 2002 and Bat Conservation Trust meeting at Reading University, September, 2002.

- Nine students (Ms Aye Aye Khine, Mr Khin Maung Swe, Ms Khin Mie Mie, Ms Khin Thein Soe, Ms Naing Naing Aung, Ms Nu Nu Aye, Ms Nyo Nyo, Ms Yin Yin Toke, and Mr Win Kyi) received day-to-day training from Dr Iain Mackie, Dr Paul Bates and from 6 additional international scientists [for a variety of time periods] (Dr Tigga Kingston and Dr Stephen Rossiter, UK: Prof Elery Hamilton-Smith, Australia; Dr Kranti Yardi, India; Maria Joao Ramos Pereira and Hugo Rebelo, Portugal) during nine weeks of field surveys.

- One four-day international workshop took place at the University of Yangon (23-27 October, 2002). All local arrangements were made by the University of Yangon. The Harrison Institute was responsible for all international arrangements. Highlights included:
  - 29 presentations by 19 delegates from 6 countries (UK x4, Myanmar x10, Australia x1, India x1, Malaysia x1, and Portugal x2).
  - Topics included: community education, bat ecology, bat echolocation, field techniques and systematics.
  - Participation by over 200 postgraduate students and staff from Yangon and a range of regional universities.
  - An opportunity for Darwin trainees and other students to present their work to an international audience.
  - Participation of all students in two interactive sessions: the first on the design of a community education project and the second on designing a research project.

- In addition to the Workshop hosted at the University of Yangon, two field workshops took place:
  - Mon and Kayin State (November, 2002) including field and theoretical training from Dr Paul Bates, Dr Iain Mackie, Peter Scrimshaw, and Colleen Mainstone, UK; Prof Elery Hamilton-Smith, Australia; Dr Kranti Yardi, India; Maria Joao Ramos Pereira and Hugo Rebelo, Portugal).
  - Mandalay Division (March, 2003) training in field techniques for the study of bats and caves from Dr Paul Bates, Dr Iain Mackie, Dr Tigga Kingston, Dr Stephen Rossiter, and Andrew Eavis, UK.

There were no significant difficulties encountered during the year and the working relationship with the University of Yangon remains excellent. Two possible problems for the future were identified:

- A potential problem to the training programme exists in the system of staff transfers that takes place between universities in Myanmar. One of our most able Darwin trainees believes that she may be transferred to another university before a training programme at Yangon is completed. This would be a significant loss to the programme and a great personal loss to her. However, we are on good terms with the Professor Daw Tin Nwe and the Rector and Director General of Yangon University and believe that a personal appeal to these higher authorities could postpone any possible transfer until after the completion of the programme.

- In March, 2002, permission for access to the limestone areas of Mogok in Mandalay Division was denied to the UK scientists on security grounds. Mogok is a sensitive area as it is the centre of gem production in Myanmar and foreigners are not permitted to enter the region. However, the Darwin team is not due to visit the area until 2004-5 and it is understood that the University of Yangon scientists (without the UK scientists) will receive permissions to conduct bat research in the area. A similar situation is thought to apply to Loikaw in Kayah State. Again, this area is not scheduled for study until 2004-5.

The design of the project has not been modified significantly. However, two changes have been made:

- The number of Darwin trainees that have been included in various aspects of the field studies/training programmes from year one has been increased from 4 to 9. It is anticipated that most of the trainees will work with us throughout the three year programme. Others will be recruited in the next two years to fulfil specialist roles, such as GIS mapping. The total number of Darwin trainees will exceed the stated aim of 12.

- This expansion of the team from the first year will make for a better trained core group of in-country bat scientists. It is anticipated that this team will be better able to withstand any natural wastage (should this occur) as well as the possible vagaries of the university staff transfer system.

- To date the extra expenditure required has been met from existing Darwin funds and some external funding.

- The number of UK staff has been reduced from 3 to 2 (Dr Paul Bates and Dr Iain Mackie). This change was notified to DEFRA on 26/4/2002.

Timetable for 2003-4

All activities are conducted jointly by students and staff of the University of Yangon and staff of the Harrison Institute unless otherwise stated:

(March) - April, 2003: field survey to Shan State

April, 2003 - March, 2004: input data into cave-bat database.

April, 2003 - March, 2004: input data into cave-bat echolocation database.

April, 2003 - March, 2004: prepare publications based on 2002-3 research data

(papers, books, presentations).

May, 2003: Dr Paul Bates to visit Yangon University; continue training and research programme and to liaise with possible sponsors.

August, 2003: Ms Mar Mar Thi to make a presentation at the Systematics Association Biennial Conference, Dublin; Dr Paul Bates also to attend.

August-September, 2003: Dr Paul Bates to visit Yangon University to continue training and research programme. Workshop with end-users of the Management plans for key cave sites.

September, 2003: Dr Iain Mackie to visit Myanmar to conduct further joint field surveys in Shan State.

October-December, 2003: Field survey to Tanintharyi Division. Practical workshop on limestone karst and biodiversity conservation (international scope dependent on securing additional funding).

March, 2004: Workshop on the role of international NGOs in biodiversity conservation. Field survey to Shan and Kachin States.

5. Partnerships

The collaboration between the Harrison Institute and University of Yangon has been very positive. The University of Yangon has co-operated enthusiastically in all aspects of the work including:

- Making staff and students available for the Darwin programme.
- Making all facilities in the University available for the Darwin programme.
- Hosting the first international bat workshop to be held at the University (October, 2002).
- Using Darwin Initiative funding to upgrade facilities essential to the Darwin programme, eg. computers for the analysis of bat echolocation calls.
- Making all in-country arrangements for field surveys (all matters including permissions to transport, accommodation, food, and guiding).

The only problem that has been identified is the possible transfer of staff (which includes our Darwin trainees) between Myanmar universities prior to the completion of their training (see Section 4 above).

There are no similar projects in the host country. However, in March, 2003, a practical workshop was organised by the Harrison Institute/Yangon and Mandalay Universities at Mandalay University to reinforce links between the two universities and international bat scientists.

In 2002-3, 9 international scientists from 5 countries, including UK, Australia, India, Malaysia, and Portugal took part in workshops and field surveys organised by the Harrison Institute/University of Yangon for the Darwin project.

Local links were reinforced with the Forest Department, Wildlife Conservation Society and regional universities.

International links were made with scientists working for the Asia and Pacific Region IUCN Cave and Karst Working Group; Bat Conservation Trust, UK; Boston University bat research team in Malaysia; Forest Research Institute, Malaysia; Indian wildlife consultancy; Portuguese bat research group; and Smithsonian Institution.

6. *Impact and Sustainability*

Considerable effort was made to ensure that the project was recognised within Myanmar. This included:

- Inviting members of the government, academic, diplomatic and business community to the Welcome Reception of the International Workshop - the official launch of the Darwin project. Guests invited included:
    - the Deputy Minister of Education (U Myo Nyunt), who agreed to address the Welcome Reception (unfortunately he was unable to attend the actual event).
    - the Rector, Director General and other senior members of the University of Yangon (attended).
    - the Second and Third Secretaries of the British Embassy and the Director of the British Council, Rangoon (attended).
    - members of the UK and international business community (attended).
    - scientists from other international research institutes working in Myanmar (eg Smithsonian Institution and Wildlife Conservation Society) (attended).
- Two articles were published in 2002-3 in Myanmar national newspapers concerning the project:
    - The New Light of Myanmar, 5 November, 2002, page 5: *Bat workshop: research and conservation.*
    - Myanmar Times, February 24- March 2, 2003, page 3: *No vampire, but expectancy high for discovery of new bat species.*

It is envisaged that there will be satisfactory exit strategies in place for the project by 2004-5. The Harrison Institute and the University of Yangon have actively promoted the involvement of other international scientists in the Darwin project, some with an interest in bats and caves, others with a diverse range of biodiversity specialisms. Many of these have expressed a wish to develop their own projects with the University of Yangon.

The Harrison Institute is also interested in maintaining and expanding its links with the University up to and beyond this period by becoming involved in a further range of biodiversity research and conservation projects.

7. Outputs, Outcomes and Dissemination

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

Code No.	*Quantity*	*Description*
14B	5	Society of Conservation Biologists, Kent Univ, July, 2002 (2UK staff and 2 Myanmar Darwin trainees) Bat Conservation Trust, Reading Univ, September, 2002 (1UK staff and 2 Myanmar Darwin trainees) Royal Geographical Society - invited audience - Oct, 2002 (1 UK staff) University of Yangon, December, 2002 (9 Myanmar Darwin trainees) Scientific Exploration Society meeting, January, 2003 (1 UK staff)
16A	1	Illustrated newsletter distributed at meetings and conferences and to academics, conservationists, diplomats, members of the business community.
14A	1	International bat workshop at Univ of Yangon, attended by 200+ postgraduate students and staff from a range of Myanmar universities. 19 delegates from 6 countries (UK, Myanmar, Australia, India, Malaysia and Portugal) made 29 presentations. (All UK and Myanmar Darwin staff and trainees attended).
14A	2	Smaller workshops primarily concerned with field survey techniques took place (1) in Mon and Kayin (November, 2002), which included 8 international scientists and 9 Myanmar students; and (2) Mandalay Division (March, 2003) with 5 international scientists and 51 postgraduate students.
8	18	Harrison Institute staff conducted project work in the host country in all or parts of the following months: (March), April, September, October, November, December, 2002 and March, 2003.
13B	1	Voucher specimens taken of new and interesting bat taxa - collections divided between Univ of Yangon and Harrison Institute; includes four species new to Myanmar.
4C	9	Nine postgraduate students have received training in a variety of aspects of bat studies.
4D	41	41 weeks of training were provided to Darwin trainees by Drs Paul Bates and Iain Mackie in UK and Myanmar; in addition guidance was given throughout the year by e-mail.
4D	13	Further training was given by other UK and international scientists during field surveys and practical workshops in Myanmar.
12A	2	Format of cave-bat database and bat acoustic database designed and data gathered for both from 3 out of 7 study areas.

15A	2	The New Light of Myanmar, 5/11/02; and Myanmar Times, 24/2-2/3/03
15D	1	Kent Bat Group newsletter - January/03
15?	1	Spotlight Organisation: the Harrison Institute. In: *The Babbler; Birdlife International in Indochina*, 2003: 2(1): 11-12

Difference in Outputs

- There was an increase in the number of conferences attended and in the number of presentations given.
- The scope of the international workshop in Yangon (Oct., 2002) was larger than originally envisaged, with more international delegates. This was made possible through additional external funding.
- The scope of the 2 other workshops was more field-based than previously envisaged, since many of the theoretical topics had already been discussed in detail at the International workshop.
- The number of Darwin trainees was increased from four to nine. This helped maximise the benefit of each field survey and ensure that the Myanmar bat group is robust and able to withstand any natural wastage (should this occur) and also the system of staff transfers.
- The number of training weeks given by UK staff and international scientists was more than originally envisaged. This was in part a result of the willingness of international scientists to donate their time to the project.
- The publication of 2 articles in national newspapers in Myanmar was not included in the original list of outputs. Information was additionally published in an article in *The Babbler; Birdlife International in Indochina*, 2003: 2(1): 11-12.
- Management plans for key cave sites have not been formally designed since it was felt that there was a need for further liaising with key end users (Forest Department and Wildlife Conservation Society) to determine the structure of these plans in order to maximise their impact.

Table 2: Publications

*Type **	*Detail*	*Publishers*	*Available from*	Cost £
(e.g. journals, manual, CDs)	*(title, author, year)*	*(name, city)*	*(e.g. contact address, website)*	

Guide	*Myanmar: an illustrate guide to the country and its wildlife* *Si Si Hla Bu and Paul Bates*	*University of Yangon*	*Book retailers in Myanmar; University of Yangon; Harrison Institute www.harrison-institute.org*	*£3.50* *$5.00* *5000 kyats*
Report (Illustrated in colour)	*Bat workshop and field survey to Kayin and Mon States (Oct-Dec, 2002)* *Paul Bates*	*Harrison Institute*	*Harrison Institute www.harrison-institute.org*	*£5.00* *(free to Myanmar institutions)*
CD-Rom	*Abstracts of Bat Workshop: research and conservation* *Thein Win and Si Si Hla Bu (eds)*	*University of Yangon*	*University of Yangon; Harrison Institute www.harrison-institute.org*	*£3.50* *(free to Myanmar institutions)*
Abstract	*Bat conservation in South-East Myanmar* *Paul Bates and Khin Maung Swe*	*Society for Conservation Biology*	*Harrison Institute www.harrison-institute.org*	*free*
Abstract	*Bat diversity and conservation in Myanmar (Burma)* *Paul Bates*	*Bat Conservation Trust*	*Harrison Institute www.harrison-institute.org*	*free*
Presentation paper	*Echolocation behaviour of bats from limestone karst areas of Mon and Kayin States, Myanmar* *Khin Mie Mie*	*University of Yangon*	*University of Yangon; Harrison Institute www.harrison-institute.org*	*free*
Presentation paper	*Foraging emergence time of some bat species studied in the limestone karsts around Mon and Kayin States* *Nyo Nyo*	*University of Yangon*	*University of Yangon; Harrison Institute www.harrison-institute.org*	*free*

Information about the work of the Harrison Institute/University of Yangon was disseminated by:

- Newspaper articles (x2 in national newspapers).
- Distribution of newsletters.

- International Workshop in the University of Yangon.
- Distribution of the Report and CD-Rom on the Workshop and field survey.
- Distribution of the guide to *Myanmar: an illustrate guide to the country and its wildlife* to the President and Cabinet ministers of the Myanmar Government (on request of the government); a range of civil servants; diplomats; university staff and students; foreign visitors to Myanmar and those in the UK and abroad with an interest in Myanmar's wildlife.

The University of Yangon is responsible for promoting much of the publicity activity (eg disseminating the guide and arranging the newspaper articles). So, it is anticipated that this work will continue after the completion of the Darwin.

8. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	*Budget*	*Expenditure*
Salaries (specify)	[redacted]	
Paul Bates		
Iain Mackie		
Si Si Hla Bu		
Myanmar trainees		
Total		
Rent ,rates heating lighting et		
Office administration costs		
Travel, subsistence		
Printing		
Conference and seminars		
Capital items/equipment		
Others		

External funding: used for

international workshop

equipment

travel

training

[redacted]

Total

Differences between budget and actual expenditure

Capital items/equipment: A macro imaging system was purchased for [redacted] in 2002-3, although it was in the budget for [redacted] was moved to this year's budget and sanctioned by DEFRA by e-mail on 23/10/2002.

External funding: £[redacted] was received in monies from a range of external sources to cover additional aspects of the project. [redacted] was received in kind, including free and discounted air tickets and international scientists donating their time to train students. In some cases, these international scientists were supported by other sponsors for example Hugo Rebelo and Maria Pereira by the BP Conservation Programme and Dr Tigga Kingston and Dr Stephen Rossiter by the Royal Geographical Society.

9. *Monitoring, Evaluation and Lessons*

The purpose of the project is to ensure that Myanmar fulfils its potential in conserving limestone karst dependent bat species, including globally threatened taxa.

1: This requires raising the profile of bat conservation. The outputs of 2002-3 that contributed towards this purpose are listed below. (No attempt has been made to date to evaluate in quantifiable terms the impact of these activities on decision makers).

- International bat workshop - the first ever in Myanmar - with information disseminated to ministers, diplomats, local and international NGOs, academics, and conservationists.

- Presentations at national and international conferences and meetings.
- Dissemination of leaflets outlining the objectives of the Darwin project.
- Involving international scientists in the practical study of Myanmar's bats.
- 2 articles in national newspapers

2: Research is required to achieve the project's purpose. In 2002-3, field surveys and laboratory-based analysis identified a number of 'key' sites for bat diversity, including globally endangered species. Currently, it is not possible to state with certainty that the range of reports, publications and data bases, which are in various stages of production, will contribute to the practical conservation of limestone dependent bats. However, it is certain that without such data, it will be impossible to devise a meaningful conservation programme.

3: Training is required to achieve the project's purpose. In 2002-3, there were many activities associated with this aspect, including: training in the field; presentations at national and international workshops; and writing publications. All have contributed to the building of an in-country core group of bat specialists. Although such a group in itself will not ensure the conservation of cave bats, its existence certainly increases the chances that the role of bats in the ecosystem is understood and that the diversity of bats is known and is seen as a priority in nature conservation.

During the year, we acquired a greater understanding of the professional competitiveness between the various Myanmar universities. This has both positive and some negative aspects. However, it has ensured that our future dealings with Myanmar academic institutions outside Yangon are very open and that the correspondence is widely circulated to prevent misunderstandings.

10. Author(s) / Date Dr Paul Bates, 14 April, 2003