

Darwin Initiative Annual Report

Darwin Project Information

Project Ref Number	15/007
Project Title	Focus for Fiji: Insect Inventories for Biodiversity Assessment
Country(ies)	Fiji
UK Contract Holder Institution	University of Sussex
UK Partner Institution	National Museums & Galleries of Wales
Host country Partner Institution	University of the South Pacific
Darwin Grant Value	£203,780
Start/End dates of Project	1 October 2006 – 30 September 2009
Reporting period	1 October 2007 – 31 March 2008. Annual Report Number 2
Project Leader Name	Dr Alan J A Stewart
Project website	N/A
Author(s), date	Alan Stewart, 28 April 2008

1. Project Background

Due to their remote location and unique geological history, the Fiji Islands contain a high proportion of endemic species, especially amongst invertebrates. Knowledge of the insect fauna is extremely patchy, mainly due to an almost complete lack of within-country expertise in entomology, resulting in poor integration of insects into national conservation strategies. In conjunction with the University of the South Pacific, this project aims to build capacity for insect diversity survey work by establishing and training an 11-strong team of senior curators, technicians and parataxonomists. This team will conduct at least fifteen insect diversity surveys across the Fiji Islands, establish a national insect collection and engage in raising general awareness of environmental and biodiversity issues. Team members will receive training from visiting UK experts running intensive courses in Fiji and through visits to key institutions in the UK. The team is housed within the Institute of Applied Sciences (IAS) based at the University of the South Pacific (USP) in Suva.

2. Project Partnerships

Partnership between UK lead institution (University of Sussex) and host country partner (University of the South Pacific):

The collaboration has generally worked well over the last year. Alan Stewart as the UK partner has concentrated on project management and developing links with his other Darwin projects in Papua New Guinea (EIDP 09/10-030 and 14/054) that have used similar insect survey techniques and protocols. Local management of the project on a daily basis at USP passed from Prof Linton Winder, who left USP in December 2007, to Prof Bill Aalbersberg (IAS). Collaboration between the Fiji institutions and the UK was greatly facilitated by the Project Leader's visit to Fiji in March 2007, as it enabled him to meet all the participants in the project, meet members of collaborating institutions, assess the facilities already available to the project and help plan project activities accordingly. The project has also benefited from close collaboration with Mr Marika Tuiwawa, Curator of the South Pacific Regional Herbarium, at the Institute of Applied Sciences on the USP campus.

Collaborations with other similar projects:

Fiji (and Suva in particular) is the focus of considerable activity in biodiversity conservation. USP in particular provides a nexus for a great many projects and international collaborations focused on the

south Pacific region. This Darwin project is fortunate in being able to tap into this extensive network of contacts, through our partners at USP. Good working relationships have been developed with the Fiji programme of WCS, BioNet, The Ministry of Agriculture's Korinivia Research Station, the Forestry Department at Colo-i-Suva and the Fiji Museum in Suva, all of which are based either on the USP campus or in/near Suva.

Professor Bill Aalbersberg has taken over from Professor Linton Winder as overall Fiji coordinator for the project. Through him, considerable progress has been made on integrating the three current Darwin projects in Fiji. The Darwin project with the most immediate relevance is 15-019 "Community-based Conservation Groups at Fiji's Key Conservation Sites". This is a project managed by Birdlife International that builds on a previous Darwin project (11-022) that used surveys of bird diversity to identify priority areas for biodiversity conservation (Important Bird Areas, IBAs).

Professor Aalbersberg helped originate the partnership with the International Centre for Protected Landscapes (ICPL) in 2000 and is the main local developer of the course materials with ICPL for the Darwin project on protected area management training. He is teaching the new postgraduate extension course in 2008 funded by the Darwin Initiative (as part of the new Diploma in Protected Area Management at USP) and has incorporated materials about important bird areas work and the insect inventories from this project into the course materials under the island biodiversity unit of the new course.

Professor Aalbersberg has also had discussions with the South Pacific Regional Environment Programme (SPREP) about combining their Island Species-led Action (ISLA) training initiative on rare and endemic species management into the next Pacific Islands Community-based Conservation Course (PICCC) to be run in 2009 for which local scientists being trained under the other two Darwin grants will be included as resource people speaking on the insect and bird work. It is also expected that Presly Dovo, who has joined the project from Vanuatu (see below), will undertake the Diploma in Protected Area Management being developed under the Darwin Initiative with USP. Other Darwin staff who are working on insects and birds are also interested in undertaking the PICCC and the Diploma.

Professor Aalbersberg also sits on the Advisory Board of Bird Life International in Fiji and has encouraged the idea that the key bird management areas that have been chosen for pilot management plan development in Fiji on Kadavu and Vanua Levu islands would also be areas where insect surveys should take place. The watershed management planning for these area is being done in partnership with the work of the Institute of Applied Science (IAS) at USP. Through the PICCC training, decentralized indigenous teams have been trained in Kadavu and Vanua Levu that are carrying out community training and management plan development for sustainable use of natural resources. An IUCN project on integrated water management will also be a partner in the Kadavu Birdlife initiative (IAS is one of only three IUCN members in the island Pacific and has encouraged this partnership with the Birdlife work; IAS is also organizing a watershed management workshop for Fiji to discuss best practice in this work and how NGOs and government agencies can best work together -Birdlife will be a presenter at this workshop).

3. Project progress

3.1 Progress in carrying out project activities

i) Development of the survey team

Two senior curators were identified at the start of the project: Ms Hilda Waqa (Fiji) and Mr Sunil Prasad (Fiji). Ms. Waqa is concurrently pursuing a PhD in entomology at USP. Regrettably, Mr. Prasad's contract was not renewed after the first 12 months (September 2007) To date, no suitable candidate has been identified to replace him.

The intended programme of recruiting technicians and parataxonomists to work on the project has been slow, due to difficulties in finding appropriate people. Five technicians, a graduate assistant and three parataxonomists now contribute varying amounts of time to the project (see table below).

Name	Position and roles	Starting date	% time on project
Hilda Waqa-Sakiti	Project Co-ordinator	September, 2006	100%
Presly Dovo	Technician: Field work and curation	January, 2008	100%
Francis Wise	Technician: curation of specimens	February, 2008	20%
Anare Caucau	Technician: curation of specimens	February, 2008	20%

Lusiana Tuvou	Technician: curation of specimens	February, 2008	20%
Akanisi Cagi	Technician: curation of specimens	April, 2007	10%
Tokasaya Cakacaka	Parataxonomist: field work and curation	March, 2008	100%
Visheshni Chandra	Graduate Assistant	December, 2007	80%
Lola Naulu	Parataxonomist: curation of specimens	April, 2007	70%
Sakeasi Tukei	Parataxonomist: field work	December, 2007	20%

ii) Development of facilities at USP

The DI team is established in the South Pacific Regional Herbarium at the Institute of Applied Sciences on the USP campus. The project is now fully set up with appropriate computing equipment, microscope facilities, entomological equipment and insect cabinets to conduct its work, both in terms of fieldwork and development of the national insect collection.

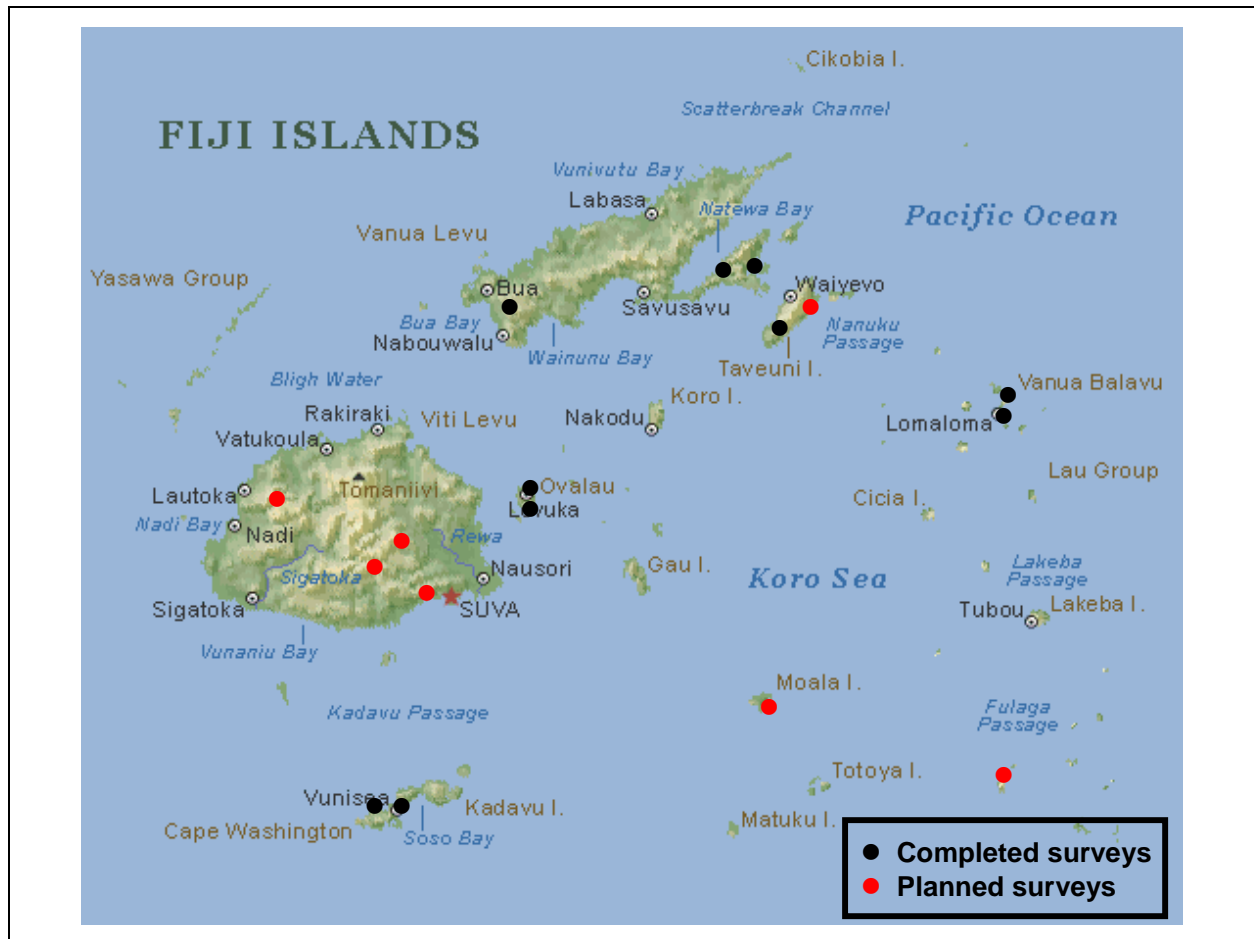
iii) Field surveys

Insect collection techniques include light traps, flight interception traps, window interception traps, malaise traps and use of beating trays. The following taxa are extracted from trap catches and are targeted for particular attention: Coleoptera (beetles), Hemiptera (bugs), Formicidae (ants), Lepidoptera (butterflies & moths), Odonata (dragonflies & damselflies) & Phasmida (stick insects). In addition, butterflies are identified wherever possible in the field and small representative collections are made either for subsequent identification confirmation or as voucher specimens.

Hitherto, identification has been to order or family level. Wherever possible (i.e. where appropriate taxonomic literature exists) specimens will be identified to species level. In most cases however, material will be sorted into 'morphospecies', with representative specimens of each one sent to taxonomic experts for verification as unique taxa and possible identification.

A pilot field sampling survey, involving a team of four people, was done during July 2007 in Savura/Nakobalevu and Colo-i-suva. The techniques listed above were tested to establish the typical numbers of targeted taxa collected and to test the sampling design. Each site (an approximately 1 ha plot) is chosen from an area of relatively intact forest. At each sampling site, the following traps are set: (i) one malaise trap, set for a period of two months; (ii) two light traps run for at least two nights with good weather; (iii) flight intercept traps (FIT) for six days; and (iv) window intercept traps (WIT) for six days. A good diversity of insects is usually collected using methods (i) and (ii), but methods (iii) and (iv) tend not to yield such good collections and also need more attention. We are therefore reviewing whether or not to continue with the latter two techniques. A vegetation study is also conducted at each site: four 10m x 10m sub-plots within the sampling 1ha plot are marked and plants >5cm DBH are identified. Butterfly collections are also made at each site, tending to be mainly on roadsides, grassland areas and along forest edges.

Field surveys have now been carried out at 11 sites on 5 islands (see map and table overleaf). The rest of the programme of field surveys has been planned for the next six months of the project (see table overleaf). Sites have been chosen to cover a range of island sizes and degrees of remoteness within the Fiji Islands archipelago. One of these surveys (Taveuni) coincided with very poor weather conditions with the result that few specimens were collected; this survey will be repeated later in 2008. The team has therefore already completed a significant proportion of the surveys planned. Whilst it is somewhat behind in the planned schedule presented in the last Annual Report, it is nevertheless ahead with respect to the initial schedule presented in the project proposal. The plan is now to complete the rest of the surveys in the next six months, to allow the last full year of the project to process and properly identify the material and allow the possibility of running any further follow-up surveys pending the results from those completed.



Surveys completed:

Abbreviations: Butt.: butterfly collection; LT: light trap; FIT: flight interception trap; WIT window interception trap; MT: Malaise trap. Processing refers to sorting to Order level, mounting and labelling. MT samples stored in 70% ETOH.

Island	Locations/sites	Dates surveyed	Samples processed *					Notes
			Butt.	LT	FIT	WIT	MT	
Taveuni	Ravilevu Forest Reserve	4-14 Dec 2007	✓	✓	✓	✓	✓	Survey coincided with severe adverse weather; a resurvey is planned for June 2008
Vanua Balavu	Daliconi Namalata Boitaci	18-28 Dec 2007	✓	✓			✓	Butterfly collections also include those from the northern Lau islands survey that was conducted in September, 2007.
Kadavu	Solodamu Delainabukelevu	8-17 Jan 2008	✓	✓	✓		✓	
Ovalau	Viro Lovoni	19-26 Feb 2008	✓	✓				Malaise traps still in the field
Vanua Levu	Driti, Bua Natewa Loa, Buca Bay	1-8 April 2008		✓				Malaise traps still in the field Butterfly material being worked on

Surveys planned for reporting year 2008/2009:

See previous table for abbreviations.

Island	Locations/sites	Dates to be surveyed	Sampling planned *					Notes
			Butt.	LT	FIT	WIT	MT	
Viti Levu	Savura Waisoi Sovi Abaca	1-10 May 2008	✓	✓	?	?	✓	
Taveuni	Bouma Reserve	June 2008	✓	✓	?	?	✓	Follow-up to unsuccessful survey in Dec 2007
Southern Lau	Moala Kabara	Sept 2008	✓	✓	?	?	✓	

Numbers of insect specimens sampled:

Island	Locations:	Collecting techniques used:					Insect Orders:							Total
		MT	LT	FIT	WIT	Butt	Col.	Lep	Hem.	Hym.	Dip.	Orth.	Other	
Taveuni	Ravilevu Forest Reserve	✓	✓	✓	✓	✓	261	31	230	170	919	63	21	1695
Vanua Balavu (& N.Lau)	Namalata; Daliconi; Boitaci; N. Lau Is.	✓	✓			✓	130	85	30	76	83	20	20	444
Kadavu	Delainabukelevu; Solodamu	✓	✓	✓		✓	1393	39	462	140	177	159	11	2381
Ovalau	Viro; Lovoni	✓	✓			✓	48	9	4	10		84	2	157
Vanua Levu	Driti, Bua; Natewa; Loa, Buca Bay	✓	✓			✓	152	6	34	16		37	2	247
TOTAL S							1984	170	760	412	1179	363	56	4924

iv Development of the Fiji National Insect Collection at USP

The number of specimens mounted and deposited in the National Collection for the various target orders is as follows: Lepidoptera: 324; Coleoptera: 1586; Hemiptera: 104; Hymenoptera: 119; Diptera: 77; Orthoptera: 182; Odonata: 19; Isoptera: 3; Blattodea: 6; Total: 2420 specimens. Although this is still a modest total, some time has been spent ensuring that the right equipment is procured and that staff are trained appropriately before further material is added to the collection. Discussions have taken place about the digital storage of information relating to the collection (data, images etc.). Digital capture of collection data also formed part of the UK training received by Hilda Waqa (see below).

Some discussion was presented in the last Annual Report about collections held in other Fiji institutions (e.g. Koronivia Research Station, Department of Forestry). Discussions have now been held with a number of these institutions. We take the view that the best way to ensure the long-term survival of these important collections is not, as previously contemplated, to bring them all under one roof, but instead to train their curators to a high level of expertise using the facilities at USP and the visiting taxonomic experts from the UK.

v) Taxonomy training workshop

Coleoptera (beetles) taxonomy training workshop by Darren Mann (Hope Entomology Department, Oxford University Museum, UK). The training was conducted at USP from the 24th July – 3rd August and was attended by Hilda Waqa, Sunil Prasad, two people from the Wildlife Conservation Society and one person from the government Forestry Department. It included field training that was carried out at Monasavu (cloud forest in the interior of Viti Levu) focusing on sampling techniques for specific insect taxa. Laboratory work included using keys and identifying down to family level specimens collected during the field work. This proved to be a successful training exercise as it allowed participants to gain an appreciation of how difficult it is to go through a key when identifying specimens and most importantly to develop their skills in doing so.

vi) UK visit by Senior Curator (Hilda Waqa)

Hilda Waqa received six weeks of intensive training in entomology in the UK:

Week 1 (20th-24th August) - Cardiff Museum, Wales under the supervision of Dr. Mike Wilson (Head of Entomology Dept.). Entomological skills such as transilluminator imaging, auto-montage photography, data-basing and genitalia dissection were learnt. Also, Fijian Hemiptera specimens (previously collected by the NSF- Fiji project using Malaise traps) were sorted to particular target taxa and also by island. Early results suggest some important patterns in island occupancy by different taxa.

Weeks 2-4 (27th August- 14th September) - Hope Entomology Department at Oxford University Museum, UK under the supervision of Darren Mann (Curator). This included building a database of the taxonomy and distribution of the Fijian Cerambycidae (from reviewing published literature and the recent checklist published by the Bishop Museum, Hawaii) and visiting the Natural History Museum in London on several occasions to borrow Fijian specimens for photographing for reference identification. Altogether 50 species were successfully imaged (edited using Adobe Photoshop). Type specimens of the Fijian fauna have been borrowed from the Bishop Museum, Hawaii; these will also be imaged and added to the database. Curatorial techniques for Coleoptera including genitalia dissection and preparation, drying, mounting and labeling techniques were also taught. Collections, storage facilities and maintenance of collections were also shown. Hilda also conducted a general literature search on the diversity, distribution patterns, phylogenetics and island biogeography of tropical Coleoptera.

Week 5 (17th- 21st September) - University of South Bohemia, Czech Republic. The purpose of this visit was to meet with Prof. Vojtech Novotny and his team of researchers (linking with Alan Stewart's other Darwin project, 15/054, based in Papua New Guinea). The purpose was for Hilda to see and discuss the work that Novotny's group have been doing on host-specificity in cerambycids and other bark beetles, which use standardised freshly cut timber baits left in the forest for colonisation by wood-boring insects. The intention is to carry out similar experiments at one of the Fiji study sites (in lowland rainforest at Savura) for comparison with work by Novotny's team currently underway in PNG, Panama, Czech Republic and Bolivia.

Week 6 (24th- 28th September) - University of Sussex, UK. This involved training in multivariate statistics such as CANOCO and PcOrd under the guidance of ecologist/statistician Naomi Ewald. Hilda and the Project Leader (Alan Stewart) were able to conduct a review and discuss plans for future work on the project, including equipments needs, survey sites and dates and completion of the Darwin team. A discussion with Dr. Mika Peck (Sussex University), who has been leading a Darwin funded project in Ecuador on Primate Conservation (PRIMENET) was useful for comparing experiences, problems, solutions and general approaches. Hilda also had the opportunity to meet Prof. Alfried Vogler (Imperial College/ Natural History Museum, London) to discuss the molecular side of her PhD project; he has expressed interest in being involved in the project.

vii) Additional training

Hilda Waqa has registered for a PhD at USP on the taxonomy, ecology and biogeography of long-horned beetles (Cerambycidae). She was trained in insect molecular techniques at Massey University, New Zealand from the 5th- 16th July. The training included DNA extractions, gel electrophoresis and PCR protocols specifically for the family Cerambycidae (long-horned beetles). This was provided by Massey University, New Zealand and represents 'added value' to the initial project. Molecular techniques are likely to be vital in the identification of beetle larvae during her PhD study as a 'barcoding' exercise.

viii) In-service training

The Darwin team facilitated one week of basic training in entomology at USP in April, 2007 for Mr. Presly Dovo (Darwin parataxonomist based in the Forestry Service in Vanuatu). He received training in basic entomology sampling techniques, sorting and identification. The intention is that, after training, Mr Dovo will be able to carry out entomology inventory work in Vanuatu. He will also be taking the USP postgraduate course in research methods.

Discussions are taking place about appropriate staff taking courses in the new Protected Area Management Diploma that is being developed under a separate Darwin grant. There are also plans for them to take part in a workshop on the LUCID approach to making taxonomic keys.

Since January 2008, the Darwin team has started in-service training of one representative from the Forestry Department and two from the Agriculture Department (Fiji). The training is conducted once a

week, involving curatorial techniques (i.e. sorting, mounting and labelling) and proper storage of the collections.

ix) Publication of *Butterflies of the Fiji Islands* by Sunil Prasad and Hilda Waqa

This guide is in full colour with illustrations and photographs of all 42 species and morphs, names and synonyms, localities within Fiji (including maps) and worldwide distributions, and descriptive accounts for each species. The guidebook is the first Fiji-insect guide ever produced and represents a collaboration between the Fiji Museum (the national museum) and USP, facilitated by the Darwin project, which is fully acknowledged as a major sponsor. It has been designed and written for sale to the general public and is part of an awareness-raising program for environmental issues and biodiversity in general and for Fijian invertebrates in particular. Full production costs were met by the Darwin project and proceeds will go to the Fiji Museum who will market it.

x) Education & Outreach activities

(i) Formal launch of guidebook '*Butterflies of the Fiji Islands*' by Sunil Prasad and Hilda Waqa, former and current Senior Curators respectively in the Darwin project team. The guidebook was launched at the Fiji Museum on Friday 5th October by Dr 'Ana Taufe'ulungaki (Acting Vice Chancellor), University of the South Pacific (USP). As a result of this collaborative project, some discussions took place on developing a 'Darwin Initiative Biodiversity Gallery' within the national museum. Progress on this has stalled due to funding cutbacks at the museum, but we hope to reinvigorate the idea at some later date. A temporary Darwin Initiative exhibit in the main gallery of the museum was produced as part of the book launch.

(ii) A TV interview featuring Hilda Waqa on the cultural significance of the giant Fijian long-horned beetle, *Xixuthrus heros*, was aired on the national Fiji One TV programme – 'Noda Gauna'.

(iii) Two articles, one on studies of the giant Fijian long-horned beetle (*Xixuthrus* spp.) and another on the general status of insect studies in Fiji were published on Melanesian Geo, Issue # 5. This can be accessed online: www.melanesiangeo.org.

(iv) A display at USP's annual Open Day attracted thousands of school children. The Darwin team prepared and manned a display at this important event, highlighting the biodiversity of insects and providing information on conservation organisations working within the Fiji Islands.

(v) Awareness posters and displays for the general public on the ecological significance of insects to forest ecosystems were prepared for Arbor Day. This was a programme organized by the Fiji Forestry Department as part of an awareness raising exercise for students on the importance of watershed systems during the Arbor Week celebrations. A brief overview of this day's programme highlighting the section on entomology was published in the local paper, "Kaila".

(vi) A poster was presented by Hilda Waqa in the EVOLUTION 2007 conference held in New Zealand from the 17th-20th June that highlighted the Darwin project and survey work to be conducted. Conference attendance was supported by USP and Massey University, New Zealand and represented 'added value' to the project.

(vii) Three of the giant Fijian long-horned beetles (*Xixuthrus heros*, *X. ganglbaueri*, *X. terribilis*) have recently been included into Fiji's National Protection list based on their rarity and potential vulnerability to extinction after a submission made by the Darwin team.

viii) Hilda Waqa gave a lecture (31st March 2008) to undergraduate students at USP on insect biodiversity in general, the significance of insects to ecosystem function and the work of the Darwin Initiative project.

3.2 Progress towards Project Outputs

After a somewhat slow start in the first 6 months (reported in first Annual report), rapid progress is now being made towards achieving the project outputs, especially in terms of completing the field surveys. We are slightly behind with the visits by UK experts to run training courses in Fiji, but we expect to remedy this in the next six months. Progress towards each output is summarised below. We have no concern that these will not be achieved by the end of the project. The output indicators are still appropriate and there have been no changes in the assumptions behind these.

3.3 Standard Measures

Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
Established codes							
5	Fijian nationals receive in-service training in entomology	2	6				11
6B	Fijian nationals receive 2 months training each in UK	0	1				6
8	UK experts provide 2-week intensive workshops in Fiji	2	1				6
9	Species Action Plans / recommendation for special protection (<i>Xixuthrus</i> beetles)		1				1
9	Fiji insect conservation strategy plan				1		1
10	Guide book: Butterflies of the Fiji Islands		1				1
11A, 11B	Scientific papers published						3
12A	Specimen and field survey databases established	1	1				2
13A	Fiji National Insect Collection established at USP	1					1
14A	Closing project seminar				1		1
14B	Conferences attended with DI project presented		1	1	1		4
15A	Fiji national & local press release announcing start of Darwin project	1,1					4
15C, 15D	UK national & local press release announcing start of Darwin project	1,1					2
18A	National TV programmes in Fiji		1				2
19A, 19C	Fiji national & local radio interviews	0	1				2
20	Equipment value: laptops, printers, microscopes, digital camera, insect storage facility	£7,300					
New measures							

Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Book	<i>Butterflies of the Fiji Islands</i> . S.R. Prasad & H. Waqa (2007)	Fiji Museum	Fiji Museum, Suva	F\$12

3.4 Progress towards the project purpose and outcomes

Progress towards achieving the project outputs got off to a somewhat slow start in the first 6 months of the project, mainly due to interruption by the military coup in Suva which took place in December 2006. Aspects of this continued to have an effect in the current reporting period. However, progress has now improved.

Output 1: Training staff

Two training visits have taken place by UK experts and the project leader has visited to assess training needs and potential. All visits have allowed useful exchange of ideas and views on the conduct of the project and the primary training requirements. One Senior Curator (Waqqa) has visited the UK for 6 weeks training.

Output 2: Insect surveys

Surveys covering 11 separate sites on five islands have now taken place, producing 2420 specimens. Most of this material has been sorted at least to Order or Family level, mounted and stored in the new insect collection. Further identification will be achieved by sending 'morphospecies' to international experts in particular taxonomic groups.

Output 3: Insect collection

The new fully equipped insect collection is housed in the USP herbarium. Hilda Waqa has received intensive training in museum curatorial techniques and protocols during her visit to the UK whilst working with Dr Wilson at Cardiff and Mr Mann at Oxford.

Output 4: Database of survey information

Hilda Waqa has received training in digital information storage for museum collections whilst working with Dr Wilson and Mr Mann. Some research has been done on how best to organize the information derived from the field surveys; this includes an exploration of how best to catalogue and retrieve information on the preserved specimens. No final decision has yet been taken on a long-term solution, but current possibilities include: adoption and modification of the Access database developed by the USP herbarium; developing a bespoke application for the project; adopting one of several currently available software packages used for biological recording (such as Recorder 6, MapMate) or cataloging of museum collections (e.g. Platypus). In the meantime, all data are being entered into Excel spreadsheets for eventual transfer into whatever database system is adopted.

Output 5: Outreach activities

The guidebook *Butterflies of the Fiji Islands* has been formally launched in conjunction with the National Museum in Fiji. This guide targets the 'general member of the public' market, in the hope of stimulating interest and concern for the future of Fiji butterflies.

The Darwin team is currently working on putting together a pamphlet on the diversity of insects in Fiji and their significance for dissemination to school children.

More extensive outreach activities will be associated with future surveys, where environmental education and conservation awareness activities will be carried out in local village communities as part of the process of gaining permission to work and collect specimens on what is often private land. The process of getting permission ("Sevusevu" ceremonies) from the village elders is normally done on the first day of the survey, followed up with reporting back on the final day. Considerable time needs to be set aside for such ceremonies, so that villagers can ask questions about the work being done and its significance. There is usually a lot of discussion because most local people are not aware of the diversity and the high endemism of insects in Fiji and the significance of insects to ecosystem functioning and as indicators of ecosystem health.

3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

A measurable impact on biodiversity was been achieved early in the project through the addition of the longhorn beetle genus *Xixuthrus* to Schedule 2 of the Fiji Endangered and Protected Species (EPS) list, affording it some degree of protection. This was the first step in getting the genus accepted for IUCN Red Data Book status.

Monitoring, evaluation and lessons

Successful completion of activities listed above can be used to monitor progress on the project. Ultimately, success will be judged against meeting the specified outcomes, but the wider objective (project purpose) will be judged against our success in building local capacity in insect identification, survey and monitoring.

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

The main recommendation in the review of last year's Annual Report was for us to build links with other conservation projects in Fiji, funded by both the Darwin Initiative and other sources. Considerable effort has been made on this, especially on forging links with the Birdlife International project funded by Darwin on priority protected areas. Many of the insect surveys are being sited to coincide with these high priority areas for birds.

5. Other comments on progress not covered elsewhere

None

6. Sustainability

The profile of the project was actively promoted in the initial stages by USP through its web pages (see previous report) and a further boost has been received through publication of the *Butterflies of the Fiji Islands* book.

The project has generated considerable local interest in training in insect taxonomy of specific groups and scientific research in insect ecology (host plants, distribution patterns etc.). Local opinion amongst USP partners is that there is also scope for, and interest in, extending the project to other South Pacific islands that form part of the University's ambit. The plan to initiate a national insect collection has generated interest and concern regarding how best to safeguard the current collection, together with issues relating to the repatriation of other collections of Fijian insects that are stored in overseas museums that should be sent back to Fiji to enhance its reference collections.

7. Dissemination

Dissemination activities are listed in section 3.1 (x) above. We envisage that these will increase as the project develops.

8. Project Expenditure

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 application)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Others –Audit			
Others – Specimen Shipments			
Other – Entomological Equipment			
Other – Bench Fees Cardiff			
Other – Lab + Field Consumables			
Salaries Alan Stewart			
Salaries Dave Pritcher			
Salaries Hilda Waqa			
Salaries Maria Naula			
TOTAL			

9. **OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes**

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>			
<p>Purpose Within-country expertise in entomology to be developed, to enhance biodiversity conservation activity and allow stakeholders to meet their responsibilities under the Fiji Biodiversity Strategy and Action Plan.</p>	<p>Skills tests at start and end of project, plus at intervals during project to assess training needs.</p> <p>Extent & quality of data; incorporation of data into local conservation plans.</p> <p>Establishment of in-country insect collection; number of specimens fully processed.</p> <p>Awareness of insect conservation in schools and wider community; level of media coverage (radio, newspapers).</p>	<p>Skills of one Senior Curator assessed during visit to UK, Aug-Sept 2007</p> <p>Approx. 5000 specimens collected with associated data</p> <p>Insect collection expanded at USP; 2420 specimens added.</p> <p>Popular guide to butterflies of Fiji published through Fiji Museum, Suva; awareness raising in villages hosting surveys.</p>	<p>Regular assessments of skills development in team</p> <p>7 insect surveys on 3 island groups planned for next year</p> <p>Further expansion of insect collection, based on specimens from surveys</p> <p>Outreach and environmental education activities in villages; dissemination of project outputs through local & national media</p>
<p>Output 1. 11 trained staff (3 senior curators, 3 support technicians; 5 parataxonomists).</p>	<p>Assessment reports on trained personnel from project partners.</p>	<p>1 Senior Curator (Hilda Waqa) engaged to lead the Darwin project team; a second Senior Curator being sought. The 10-strong team is now in place, each contributing varying percentages of time to the project.</p>	
<p>Activity 1.1 UK training of 3 Fijian nationals as senior curators.</p>		<p>Senior Curator Hilda Waqa visited UK from 15 August to 1 October 2007, receiving training at: National Museum & Galleries of Wales, Cardiff with Dr Mike Wilson (1 week); Hope Entomology Collections, University of Oxford, with Mr Darren Mann (3 weeks); University of South Bohemia, Czech Republic (1 week); Biology & Environmental Science Department, University of Sussex, with Dr Alan Stewart (1 week).</p>	
<p>Activity 1.2 In-country training by 2 UK experts for 11 Fijians.</p>		<p>2-week training course on taxonomy and identification of Coleoptera (beetles) at USP by Mr Darren Mann, July 2007, timed to coincide with first major field survey (Monasavu) to enable demonstration of field collection techniques. Further such training courses planned for next year.</p>	

Output 2. Insect survey information for 14 locations in Fiji.	Surveys completed; specimens deposited in collections; database on insect distributions	11 sites surveyed on 5 major islands (or island groups); a further 7 sites across 3 island groups targeted for survey in next half-year. Once all planned surveys are completed, results will be reviewed and decisions made about the best strategy for the final year of the project; e.g. whether to increase the number of sites within islands already surveyed, the geographical coverage (number of islands), the time period covered or the sampling intensity at existing survey sites.
Activity 2.1. Insect surveys of 14 Fiji Islands sites, conducted by Fijian staff.		Programme of 18 short intensive surveys across Fiji Islands (see above).
Activity 2.2. Sorting, curation and cataloguing of specimens. Assistance given by UK experts on in-country basis.		2420 specimens already deposited in newly established national collection; voucher material to be sent for verification of identifications to appropriate taxonomic experts with knowledge of Fijian fauna; UK experts to provide direct assistance when in Fiji with checking identifications and access to personal worldwide networks of taxonomist contacts.
Output 3. In-country insect collection.	Extent and quality of collection.	Discussions continuing on whether national insect collection can be housed within a purpose-built national museum of Fijian natural history on the USP campus.
Output 4. Database of insects within collection.	Proportion of insect collection identified to specified taxonomic levels.	Information on specimens and field surveys currently held in Excel spreadsheets, ultimately to be incorporated into digital database. Database software options are currently being evaluated. Training in whichever system is adopted will be required.
Output 5. Outreach activities to schools, communities etc.	Number of schools, communities etc visited; demand for extra information.	Awareness raising activities in villages hosting surveys. Pamphlet planned on insect diversity and endemism in Fiji for distribution to schools, villages etc. Considerable interest raised in training in entomology, ecology and conservation through Diploma in Protected Area Management, the Pacific Islands Community-based Conservation Course and other courses at USP.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
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 <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of benefits arising out of the utilisation of genetic resources 			
Purpose Within-country expertise in entomology to be developed, to enhance biodiversity conservation activity and allow stakeholders to meet their responsibilities under the Fiji Biodiversity Strategy and Action Plan. N.B. Change to single purpose as requested in response letter to Stage 1 application.	Skills tests at start and end of project, plus at intervals during project to assess training needs.	Fijian nationals trained as senior curators (3), support technicians (3) and parataxonomists (5).	Suitably motivated people available; UK experts available to run intensive training courses.
	Extent & quality of data; incorporation of data into local conservation plans.	Survey reports; site assessments; statements on species of conservation concern.	Access permitted to sites; adequate spatial and temporal coverage of surveys.
	Establishment of in-country insect collection; number of specimens fully processed.	Database of specimens held at USP; metadata made available through web page.	UK support for identification is available.
	Awareness of insect conservation in schools and wider community; level of media coverage (radio, newspapers).	Environmental lectures and workshops for schools, communities; educational leaflets; media coverage.	Knowledgeable staff can be trained for outreach work; schools, communities etc are receptive to environmental issues.
Outputs 1. 11 trained staff (3 senior curators, 3 support technicians; 5 parataxonomists).	Assessment reports on trained personnel from project partners.	11 Fiji nationals trained as entomologists.	Dedicated people exist in Fiji to fill such posts; UK experts available to do training.
2. Insect survey information for 10 locations in Fiji.	Surveys completed; specimens deposited in collections; database on insect distributions	Survey reports; publications in appropriate journals	Intensity of sampling program sufficient; access to islands gained
3. In-country insect collection.	Extent and quality of collection.	Substantial insect collection held in a safe location.	Time available to collect, sort and curate collection.
4. Database of insects within collection.	Proportion of insect collection identified to specified taxonomic levels.	Database of collection; identifications confirmed by experts.	Time available to conduct identification to appropriate taxonomic level.
5. Outreach activities to schools, communities etc.	Number of schools, communities etc visited; demand for extra information.	Reports provided by schools and participants.	Schools, communities etc willing to participate.
Activities 1. Training	Activity milestones Yr1: UK training of 3 Fijian nationals as senior curators. In-country training by 2 UK experts for 11 Fijians. Yr2: UK training of 3 Fijians as technicians. In-country training by 2 UK experts for 11 Fijians. Yr 3: In-country training by 2 UK experts for 11 Fijians.		Assumptions
2. Sampling/survey	Yrs 1, 2, 3: Insect surveys of 10 Fiji Islands, conducted by Fijian staff.		
3. Sorting and Identification	Yrs 1, 2, 3: Sorting, curation and cataloguing of specimens. Assistance given by UK experts on in-country basis.		

4. Outreach	Yrs 2 & 3: School, community visits to engender interest in entomology.	
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Annex 3 Photo gallery



Presly Dovo sorting specimens



Anare Caucau and Francis Wise working on labels



Tokasaya Cakacaka arranging collections in storage cabinets



Mounted butterfly specimens and National Insect Collection cabinets



Malaise trap set in Driti, Bua



Fijian swallowtail (*Papilio schmeltzi*) in captive breeding



Light trapping in Natewa , Vanua Levu



Flight Intercept traps in Ravilevu, Taveuni



Sunil Prasad, Hilda Waqa and 'Ana Taufe'ulungaki (centre) at book launch



***Butterflies of the Fiji Islands*, by Sunil Prasad and Hilda Waqa (2007)**