

Darwin Initiative – Final Report

Darwin project information

Project Reference	15-007
Project Title	Focus for Fiji: Insect Inventories for Biodiversity Assessment
Host country(ies)	Fiji
UK Contract Holder Institution	University of Sussex
UK Partner Institution(s)	National Museums & Galleries of Wales
Host Country Partner Institution(s)	University of the South Pacific
Darwin Grant Value	£203,780
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Project Leader Name	Dr Alan J A Stewart
Project Website	http://www.usp.ac.fj/index.php?id=7040
Report Author(s) and date	Alan Stewart, Hilda Waqa; 28 December 2010

* Extended from 30 September 2009.

Readers of this report should refer to previous Annual Reports and Half-Annual Reports for details on particular topics, including tables in appendices, copies of published papers and photographs.

1 Project Background

Due to their remoteness, the Fiji Islands contain a high proportion of endemic species, especially amongst invertebrates, although knowledge is very incomplete. In collaboration with the University of the South Pacific's (USP) Institute of Applied Sciences (IAS), this project aimed to build capacity for insect survey work by establishing and training a team of curators, technicians and parataxonomists. The team completed insect diversity surveys at 32 sites across the Fiji Islands, established a national insect collection, raised general awareness of environmental and biodiversity issues and established a new natural history gallery at the national museum. Team members received training from visiting UK experts running intensive courses in Fiji and through visits to key institutions in the UK.

2 Project support to the Convention on Biological Diversity (CBD)

a) Support to host country capacity to meet CBD commitments:

Knowledge of Fiji's insect fauna is extremely patchy, mainly due to a relative shortage of within-country expertise in entomology, resulting in poor integration of insects into national conservation strategies. This project has trained a team of scientists in entomological survey, curation and identification techniques that has started to collect the kind of data on insects that is needed to inform wider conservation agendas. Fiji will not be able to meet its CBD commitments without well trained competent national conservation biologists who are familiar with a range of taxonomic groups, including insects: this project has gone a long way towards building this expertise.

b) Contact with the local (Fiji) CBD focal point:

There has been considerable informal contact with the local CBD contact throughout this project. The operational CBD focal point is Eleni Tokaduadua, principal biodiversity officer in

the Department of Environment (the formal focal point is her director, Jope Davetanivalu). Eleni is a USP graduate and close relative of two IAS staff so there is regular social contact. Eleni meets regularly with USP staff to discuss CBD work and she has attended presentations on the progress of the various Darwin projects. Additionally, Marika Tuiwawa (IAS) is an active member of CBD's Program of Work on Protected Areas (POWPA). In short, there has been regular contact with the CBD focal point.

IUCN is leading the Pacific Islands Roundtable for Nature Conservation (of which USP is a member, amongst ten other NGOs), one of whose key activities has been to help Fiji operationalise its *National Biodiversity Strategy and Action Plan* (NBSAP) with a four year strategic plan and annual work plan. The DI team have been able to inform this work with respect to insect diversity and rare insect species. For example, the well trained and equipped DI team has been vital in carrying out entomological surveys and reports on sites identified to be key biodiversity areas (KBA) for Fiji. Marika Tuiwawa sits on the Fiji NBSAP committee and provides the government with advice and information from the results of these biodiversity surveys to assist the designation of protected areas in Fiji. As a consequence, the Sovi basin, Viti Levu is now a protected area. Efforts are also underway by the DI team to provide scientific data on insects for two other identified sites on Viti Levu: Nakauvadra and Nakorotubu ranges in Ra Province, also thought to be KBAs.

Prof Bill Aalbersberg chairs a number of Department of Environment technical committees and occasionally the National Environment Council. One output from this has been that IAS (on behalf of the Dept. of Environment) completed a Natural Resource Inventory in 2010 which includes all known species across all taxa, including insects. The current DI project team have been collating and synthesizing insect checklists for this inventory.

3 Project Partnerships

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

Overall management of the project at USP started with Dr Linton Winder, but then passed to Professor Bill Aalbersberg at the Institute of Applied Sciences (IAS) when the former left Fiji at the end of 2007. Hilda Waqa (Senior Curator) was encouraged to take increasing responsibility for day-to-day management of the project and the project team as the project progressed. Dr Simon Hodge (appointed Lecturer in Ecology at USP in 2010) assisted Hilda Waqa with various aspects of her PhD studies and the DI project.

The project was housed within the South Pacific Regional Herbarium at IAS and benefitted considerably from close collaboration with Mr Marika Tuiwawa, Curator of the Herbarium, especially in relation to knowledge of potential survey sites, background information on vegetation and contacts for gaining permission for fieldwork.

As the UK partner, Alan Stewart (US) concentrated on project management, developing links with taxonomic experts who assisted with specimen identification and maintaining links with previous Darwin project partners in Papua New Guinea. Although these Darwin projects (EIDP 09/10-030 and 14/054) finished early in the life of this project, Alan Stewart retained good working relations with the partners in PNG (e.g. through co-supervision of new projects and continued publishing of material arising from the DI work). The Fiji project used similar insect survey techniques and protocols to those in PNG, enabling considerable synergy between the two projects. The timber-bait experiment (see below) was designed to be directly comparable with parallel experiments in Papua New Guinea, Panama and Europe.

Partnership with other UK partners:

The project benefitted from collaboration with the National Museums & Galleries of Wales (NMGW), Cardiff, primarily through Dr Mike Wilson. Following a training visit to Fiji in 2007, Dr Wilson provided taxonomic and curatorial advice and an identification service for the Hemiptera-Auchenorrhyncha from the project surveys. He published a complete review and checklist of the Auchenorrhyncha of the Fiji Islands resulting largely from his visit. Dr Chris Hodgson (also NMGW) ran a very successful training course in the identification of scale insects at USP in June 2009, that also led to a revision of the Fiji checklist for this group.

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. Our Darwin project was fortunate in being able to tap into this extensive network of contacts, through our partners at USP, especially Professor Bill Aalbersberg. Our annual reports have described these links in some detail. Good working relationships were fostered with the Fiji programme of the Wildlife Conservation Society (WCS), BioNet, BirdLife International, the World Wildlife Fund (WWF), Conservation International (CI), The Ministry of Agriculture's Koronivia 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.

4 Project Achievements

4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

This project was not designed to have a *direct* impact on biodiversity. Instead, our intention was to train individuals to a standard at which they could carry out insect surveys competently, interpret the results and use the conclusions to inform strategic conservation planning (including the Fiji *National Biodiversity Strategy and Action Plan*). Baseline surveys were conducted to establish the diversity of insects at selected sites for comparison with future data. The combination of improved knowledge of the Fiji insect fauna and individual scientists trained to a high standard should promote positive direct impacts on biodiversity in future.

4.2 Outcomes: achievement of the project purpose and outcomes

We successfully achieved the project's purpose of developing within-country expertise in entomology, in order to enhance biodiversity conservation activity and enable Fiji to meet its CBD commitments (under the Fiji *National Biodiversity Strategy and Action Plan*). Knowledge of Fiji's insect fauna has been enhanced, in terms of data on species distributions, patterns of endemism and understanding of the ecological requirements of rare species. Attitudes towards conservation and understanding of biodiversity, and insects in particular, will have been enhanced through a variety of outreach activities directed at local communities and national audiences.

4.3 Outputs (and activities)

Output 1: 11 trained staff (3 senior curators, 3 support technicians; 5 parataxonomists)

(i) Darwin project team

Table A in Annex 7 lists all the staff who have been employed at different stages on the project. In contrast to previous experiences with other DI projects in PNG, the parataxonomist team in Fiji has been more fluid, with individuals participating for shorter periods or percentages of time. The end result has been that more people have had the benefit of some training in entomology and related techniques and so the legacy of knowledge and skills is more dispersed. Trainees have been recruited from USP as well as government agriculture and forestry departments. Subsequently, some have returned to their respective departments, whilst others have moved on to become project co-ordinators in other organisations, helping to ensure that knowledge and skills penetrate the wider conservation community within Fiji.

Most of the in-service training of Fiji staff in the essentials of entomology, insect identification and techniques for the curation of the collection has been done by the Senior Curator (Hilda Waqa). She has also been responsible for organising and leading the field surveys, organising the processing of specimens and liaising with overseas taxonomic experts.

(ii) Training workshops run at USP, Fiji:

Six training courses/workshops were run at USP by experts from the UK (table below). These generally combined lectures with practical work in the laboratory and field excursions. A range of taxonomic groups were covered. The final workshop on GIS and multivariate statistics was arranged in response to a request for advanced training in statistical techniques. Participants included staff employed on the Darwin project and/or involved in entomological research at USP, as well as others from the Wildlife Conservation Society (WCS-Fiji), Massey University, New Zealand, the Fiji Government Forestry Department, the Agriculture Department and the Quarantine Department. Participants were awarded certificates for satisfactory completion of each course (Annex 8). In most cases, the identification courses also enabled the workshop leaders to review the Fiji fauna for their group, producing revised species checklists for publication (Wilson, 2009; Hodgson & Łagowska, in press) or as documents for reference.

Date	Topic/taxonomic group	Workshop leader	No. of participants
22 Mar – 5 April 2007	Hemiptera-Auchenorrhyncha (leafhoppers, planthoppers etc.)	Dr Mike Wilson (Cardiff Museum)	6
24 July – 3 Aug 2007	Coleoptera (beetles)	Mr Darren Mann (Hope Museum, Oxford)	5
13-15 July 2009	Coccidae (scale insects)	Dr Chris Hodgson (Cardiff Museum)	18
13-15 Sept 2010	Orthopteroidea (grasshoppers, crickets, stick insects, cockroaches)	Dr George Beccaloni (NHM, London)	15
16-17 Sept 2010	Araneae (spiders)	Mrs Jan Beccaloni (NHM, London)	15
23-30 Sept 2010	Geographical Information Systems (GIS) and multivariate statistics	Dr Mika Peck (University of Sussex)	12

(iii) Training visits to UK:

Hilda Haqa received six weeks of intensive training in entomology in the UK in August – September 2007. This included three weeks training at the Hope Museum, Oxford, one-week visits to Cardiff Museum, the University of South Bohemia, Czech Republic (to learn techniques for the timber-bait experiments) and the University of Sussex, and day visits to the Natural History Museum in London. During this time, she was given training in taxonomy, specimen preparation, dissection and labelling, advanced imaging techniques such as auto-montage macro-photography, museum curatorial techniques, collections management, literature searches, computer databases and advanced statistical techniques.

Originally, we planned for Sunil Prasad (Senior Curator) to accompany Hilda Waqa on the above visit. However, this was cancelled when it became apparent that he would be leaving the project shortly after the planned visit. Regrettably, no other visits by Fiji staff to the UK took place. At the time, after discussions between the Project Leader and USP collaborators, it was thought that there were no other people who would benefit sufficiently from such visits to justify the expense. With the benefit of hindsight, this was a mistake; when the Project Leader visited Fiji at the end of the project, it was possible through discussion to identify a number of people who would be appropriate for such visits. The budget saved by not bringing more people to the UK was instead diverted to constructing the Natural History Gallery at the Fiji Museum, conducting extra field surveys and associated processing of specimens, and the timber-bait experiments.

(iv) Other training:

- Ms Hilda Waqa completed research for a PhD on the taxonomy, biogeography and host-specificity of Fijian long-horned beetles, jointly supervised by Dr Linton Winder (Exeter University), Dr Simon Hodge (USP), Dr Steve Lingafelter (Smithsonian, Washington), Dr Peter Lockhart (Massey University, New Zealand) and Dr Alan Stewart (University of Sussex). By the end of the DI project, she had completed all of her field work and most analyses and was starting to write up her thesis. One scientific paper has been published (Waqa-Sakiti & Lingafelter, 2009) and several more are planned.
- Ms Visheshni Chandra (USP) conducted research for her MSc thesis on the endemic Fijian swallowtail butterfly, *Papilio schmeltzii*. This has unravelled many details of the ecology of this rare species which will help inform strategies for its conservation. Her thesis entitled "A study on habitat, biology and behavior of *Papilio schmeltzii* Herrich-Schaffer" was submitted in July 2010; three papers from her thesis are in preparation.

Output 2: Insect survey information for 14 locations in Fiji

Field survey sites for the project were chosen to cover a range of island sizes and degrees of remoteness within the Fiji Islands archipelago. By the end of the project, insect field surveys had been completed at 32 sites across 17 islands (23 sites from 8 major islands plus a further 9 sites on smaller islands within the Lau group) (See table of sites in Annex 7 Table B and associated map). The total therefore considerably exceeded the number of surveys originally planned (10, later revised to 14) and was completed ahead of schedule (finished in late 2008). The strategy was to complete the field surveys as early as possible within the project, to allow the remainder of the time to process, curate and properly identify the material, as well as to run a number of follow-up surveys to augment those already completed.

Collection techniques and the selection of focal insect taxa have been discussed in previous annual reports. The surveys produced 19,023 specimens, 15,773 of which were sorted at least to Order or Family level, mounted, labelled and databased (see Annex 7 Table B for breakdown into insect orders). Further identification has been achieved by sending material to international experts in selected taxonomic groups, including Maxwell Barclay and Paul Brock (NHM, London), Steve Lingafelter (Smithsonian, Washington), Chris Hodgson and Mike Wilson (Cardiff Museum). This process is continuing after the project has finished. In all cases, the agreement has been for overseas taxonomic specialists to retain representative voucher specimens for their institution's collection. This has the advantage that specimens of all species, including types, are repatriated to Fiji, but that duplicates of many of them are retained in other collections around the world as insurance against damage or loss of material from the collection housed in Fiji.

The following significant discoveries were made in the course of routine surveys or as a result of specific searches:

- Extension of the known range of the Fijian swallowtail butterfly, *Papilio schmeltzii*, Fiji's largest butterfly.
- New records for the very rare and endemic butterfly, *Hypolimnas inopinata*.
- New records for *Xixuthrus heros*, the endemic and endangered Fijian giant long-horned beetle (2nd largest beetle in the world, length 14-15cm).
- Collections of the endemic cicada, *Raiateana knowlesi*, from Navosa highlands, Sigatoka.
- Collections of the rare Fijian stick insects, *Cotylosoma dipneusticum* and the closely-related *Nisyryus spinulosus* (syn. *Cotylosoma*), both extremely rare.

Output 3: In-country insect collection

The project initiated and developed the Fiji National Insect Collection (FNIC) which has permanent housing at the South Pacific Regional Herbarium (SPRH), in the Institute of Applied Sciences, USP. By the close of the project, it comprised 75 cabinet drawers, although the total continues to rise. Specimens are arranged by order then family with a museum-standard

labelling system in operation. A total of 10,381 specimens have been fully catalogued and added to the FNIC. Many specimens have been shipped to overseas experts for identification or verification.

Other important collections of Fiji insects are held in other institutions within Fiji (e.g. the Agriculture Department at Koronivia). Rather than combining these into a single central collection, our strategy has been to train the curators of these collections to a high standard using the facilities at USP, by encouraging them to attend training workshops led within this project by visiting taxonomic experts from the UK.

Output 4: Database of insects within collection

A bespoke database in Microsoft Access was adapted from the system in use in the South Pacific Regional Herbarium to hold all the data from the surveys and all data relating to the FNIC. This is a fully relational collections database for maximal flexibility in information retrieval, including the ability to store data associated with the specimens and supplementary material such as images and relevant literature. Field survey data include information on sampling site, habitat, date, weather, method, recorder, determiner, specimen location within the collection and provisional taxonomic determination. UK collaborators were able to bring to bear their considerable experience of constructing and using such databases for storing information on collections and field surveys. Although it has not been possible to make the database fully accessible to outside users, summary data will soon be made available on the project website.

Output 5: Outreach activities to schools, communities etc.

The Darwin team actively promoted the project to a wide variety of audiences, including school children, university undergraduates, local NGOs, the general public (through activities such as the USP Open Day and BioBlitz) and scientific conferences (such as the Fiji Islands Conservation Science Forum Conference). Table C in Annex 7 lists the specific outreach activities undertaken to raise awareness of biodiversity issues amongst local village communities. These proved to be highly successful as landowners were empowered and better educated about the significance of insects for ecosystem function and the importance of certain rare insects known to occur in their local forested areas.

Other outreach work included:

- Hilda Waqa appeared on two TV programmes, talking about exciting discoveries of rare endemic insects made by the Darwin project team.
- The team assembled a library of images for use in publicity and outreach activities. Entomological experts around the world kindly sent good quality images of different insects in their group together with information on endemism and their distribution within Fiji. Some of the images were used for poster displays in the new Natural History Gallery (see examples in Annex 9).
- In collaboration with a local NGO (Nature Fiji - Mareqeti Viti), the DI team provided information and photos for the compilation of a booklet for high school students on the significance of Fiji's biodiversity, to be published soon.
- The South Pacific Regional Herbarium and the national insect collection is regularly visited by tertiary, high and primary school students, averaging five school visits per year. Likewise, visiting scientists and staff from the government sectors, including the Plant Protection unit (Agriculture Research), Quarantine section and Forestry research, also visit the collections.
- The project website (<http://www.usp.ac.fj/index.php?id=7040>) was created to be an attractive advertisement for the project. The site highlights the aims and objectives of the project, describes the methodology and provides some initial results from the surveys.
- Results from the Lau, Wabu, Nakauvadra, Nakoroubu, Kadavu and Waisoi surveys have been written as technical reports by the Darwin team. The Nakauvadra Rapid Assessment Program (RAP) report has been published as *RAP Bulletin of Biological Assessments 57* by Conservation International; the DI team contributed a chapter on insects (see Annex 5). The Nakorotubu Rapid Assessment Program (RAP) report is currently in press.

Additional outputs not planned in original application:

a) New Darwin Initiative Natural History Gallery, Fiji Museum, Suva:

This new permanent gallery was opened on 28th September 2010 at an official launch hosted by USP and the Fiji Museum. The 89 invited guests who attended included the British High Commissioner for Fiji and representatives from all the main conservation-focused organisations in Fiji (see guest list, Annex 9). Speeches were given by the British High Commissioner Mac McLachlan, DI Project Leader Alan Stewart and Fiji Museum Chairman Ikbal Jannif (see Annex 9 for transcripts), followed by a tour of the gallery. A press release was issued to cover the event and the USP website gave extensive coverage (see Annex 9). The event was covered in a special 2-minute report on *Fiji One News* (the main TV channel for Fiji) the same evening (wmv file submitted with electronic copy of report), including interviews with Alan Stewart and Prof Bill Aalbersberg, and in the *Fiji Times* the next day (see Annex 9). The gallery is to be entered for the USP Vice-Chancellor's best research prize. This prestigious award is made to individuals who have made a substantial contribution to the research output of the university.

The gallery houses exhibits of the fauna and flora that are of significance to Fiji's unique biodiversity including marine and freshwater aquatic life, rare and endemic plants, insects, birds, bats and reptiles. The focus is on species and groups that are unique to Fiji, especially those that are endangered, and including some that have gone extinct. The exhibits also emphasise the threats that Fiji's current biodiversity faces such as forest clearance for agriculture, logging, mining and housing and predation by invasive non-indigenous species such as mongoose and rats. Located within one of the main tourist cultural attractions, the gallery will raise awareness of Fiji's unique contribution to global biodiversity and the importance of ensuring its conservation. Material for the gallery was brought together through a collaboration between three Fiji-based DI projects: this project, 15-019 and 15-037.

b) Field experiment on host-specificity in wood-boring beetles:

Details of this major experiment were given in the 2009 and 2010 Annual Reports. Briefly, the experiment was designed to test which wood-boring beetle species colonise each of twelve tree species that are typical of lowland forest in Fiji. The experimental protocol followed that used by our collaborators working in Papua New Guinea (previously funded by Darwin projects 10/030 and 15/054, both lead by Alan Stewart) and other sites around the world (one of which Hilda Waqa was able to visit in the Czech Republic during her visit to Europe in 2007). Timber baits (constructed from logs of standard number, width and length, tied together) were hoisted into the canopy using ropes and left for six months to be colonised by dead-wood boring insects (principally beetles in the families Scolytidae, Platypodidae and Cerambycidae). Once removed, the logs were held for at least six months in individual net cages to allow emergence of insects. The experiments were conducted at Savura Forest Reserve near Suva and were replicated four times (at 3-month intervals).

6100 specimens from 22 beetle families were identified, the most diverse families being Scolytidae (bark and ambrosia beetles) and Curculionidae (weevils). The data are currently being analysed and written up for publication.

c) Studies of the Fiji swallowtail butterfly *Papilio schmeltzii*:

Research student Visheshni Chandra submitted her MSc thesis on the ecology and distribution of the rare endemic Fijian swallowtail butterfly *P. schmeltzii*. She was able to clarify the butterfly's main habitat associations, the specific larval host plants and the main sources of nectar for adults. The project consolidated existing information on the distribution of the species within Fiji and added four new islands to the list on which the species is found (for details, see 2009 Annual Report). Her work has provided much information that will inform conservation strategies for this important and iconic species.

4.4 Project standard measures and publications

See Annexes 4 and 5.

4.5 Technical and Scientific achievements and co-operation

The main research methods and findings are outlined in the sections above on outputs and activities. A number of peer-reviewed papers have been published in the scientific literature (see Annex 5). The project has directly supported one successfully completed MSc project (Visheshni Chandra) and one PhD project (Hilda Waqa) for which the thesis will be submitted in early 2011. All student theses are subject to peer review by the USP faculty, external committee members and internationally-recruited examiners.

4.6 Capacity building

The main purpose of this project was the development of in-country capacity in entomological techniques (field survey, specimen preparation and identification) to enhance biodiversity conservation activity and to enable Fiji to meet its responsibilities under the NBSAP. This was achieved through a combination of (a) training a team of entomologists at three levels (curator, technician and parataxonomist) and (b) initiating and developing a national insect collection and associated database. The latter will continue to be enhanced as future survey work is completed.

4.7 Sustainability and Legacy

Enduring achievements:

- The **Fiji National Insect Collection** will continue to be housed at USP and added to as future surveys generate further material. All the material has been fully documented in a specially-written database. Knowledge that there is a secure repository for valuable Fiji material will encourage the repatriation of important collections that are currently held overseas; hitherto, lack of such facilities has been a major impediment to this important process. The project's policy of depositing duplicate material in overseas museums also provides some insurance against damage or loss of valuable type and voucher material.
- The **Natural History Gallery** will be a permanent exhibit on biodiversity, located within a high-profile tourist attraction. Visitors who come to see the museum's exhibits on anthropology and archaeology will also have access to the natural history gallery, thus helping to expose biodiversity and conservation issues to a wider audience.
- Although the primary purpose of this project has been to develop within-country capacity and expertise in insect diversity, a longer-term goal is to **integrate insect data into strategic conservation planning**. The project has made significant steps in initiating this process. Senior IAS staff, especially Prof Bill Aalbersberg and Marika Tuiwawa are uniquely placed to forge links with the main conservation players in Fiji, to enable the integration of insect data into wider conservation agendas (see under 6.1d below).

Future for staff and resources:

The Senior Curator (Hilda Waqa) has been given a full-time permanent post at USP to secure her position after the DI project finishes. All the other technical USP staff involved in the project will also be maintained. Continued work on the insect collection will be supported partly by funding from the MacArthur Foundation. In addition, successful proposals for insect ecology and diversity research have been approved by both the USP Research Committee and the Conservation International Critical Environment Partnership Fund (CEPF). In Fiji, the future for people who are suitably qualified and experienced in conservation is good, with promising staff who have had postgraduate training in taxonomy and conservation having taken jobs in Nature Fiji-Mareqeti Viti, Conservation International (CI) and the Secretariat of the Pacific Regional Environment Programme (SPREP). USP/IAS continues to fund 2-3 new MSc projects in conservation each year.

Future collaboration between partners:

Our closing workshop at USP (27 September 2010) established that both the UK and Fiji partners are keen to continue working together. We developed an outline plan for a new project that would integrate existing biological and environmental data and develop robust indicators of biodiversity to inform future strategic conservation planning. A significant development was to add Dr Mika Peck (University of Sussex) to the collaboration, bringing his skills and experience in the application of GIS to conservation planning through his previous DI project in Ecuador: *Developing a sustainable conservation network for primates in Ecuador – PRIMENET (14-040)*.

In summary, the sustainability of the insect collections and data arising from this project have been assured as far as possible. Securing the legacy of in-country expertise developed during the project is more challenging, but the senior curator's position has been made permanent and considerable effort continues to be made to integrate the results of this project into mainstream conservation endeavours.

5 Lessons learned, dissemination and communication

Key lessons learned from the project:

One important lesson has been the relative difficulty of persuading UK experts to run identification workshops in Fiji. This was initially a surprise, given the opportunity that an expenses-paid training visit to Fiji would provide for entomologists to add on extra time for their own field work in an exciting under-recorded country. However, current financial constraints have meant that parent institutions have often wanted to charge for their employee's time and salary overheads, pushing the overall cost beyond what the project could support.

In comparison with experiences of working with parataxonomists in Papua New Guinea through previous DI projects, the Fiji training model has been rather different. The Fiji DI team has been more fluid, with more parataxonomists but each one joining and being trained for shorter periods of time. This has the advantage of spreading the training over a wider community, but at the expense of longer-term continuity. Fortunately, the latter is assured by the permanent position of the senior curator and associated technician staff at USP.

Field surveys showed that the relative density of many insect groups in Fiji is comparatively low. Reasons for this phenomenon are not immediately clear, but it appears to be true whatever collection method is adopted. For example, the timber-bait experiments, the design of which followed exactly the globally adopted protocol (see section 3.3 above) generated far fewer specimens than in other tropical countries (e.g. PNG, Panama). Future surveys would need to take this into account when planning total amounts of sampling effort.

Fiji has been the nexus for several recent DI projects. The early stages of this project were mostly concerned with completing the field surveys, processing the material and training the team. In retrospect, we could have forged stronger links with the other projects sooner, as pointed out in one of the annual reviews. Working with the other DI projects later became especially fruitful when organising joint field surveys (with BirdLife International) and developing the natural history gallery (with BirdLife International and WWF).

Dissemination:

Information about the project's achievements has been disseminated through various media to a variety of audiences: we have produced press releases which have appeared on the USP and dedicated DI project websites; various news reports have appeared in national and local Fijian newspapers; brief articles have appeared in popular magazines; the project has resulted in a number of peer-reviewed publications in the scientific journal literature; interviews have been given for Fiji local and national TV and radio stations; a short booklet, *Butterflies of Fiji*, is sold through the Fiji Museum; we have created a wide range of information displays for the new Natural History Gallery at the Fiji Museum. These outputs will have been seen by a range of audiences from members of the public to school and university students to the scientific research community and biodiversity conservation professionals.

5.1 Darwin identity

Support from the Darwin Initiative has been acknowledged in all publications and other printed outputs arising from this project (Annex 5). The DI logo is used on the project website and on appropriate publications (e.g. *Butterflies of Fiji* booklet). DI support has also been acknowledged in USP press releases, newspaper articles and, wherever possible, in TV and radio interviews. All PowerPoint presentations given at conferences and other fora included the DI logo and acknowledgment of support. All posters developed for the Natural History Gallery displayed the DI logo (see Annex 9) and the DI logo and prominent written acknowledgment appears on the display board at the entrance to the Gallery (see photographs, Annex 9). Both the British High Commissioner and Alan Stewart acknowledged the crucial support of the DI and outlined its overall philosophy in their speeches at the launch of the Natural History Gallery (see transcripts in Annex 9).

The project was sufficiently distinct from other DI projects in its objectives to be recognised as a stand-alone project. No other projects have specifically targeted terrestrial insects. This separate identity was assisted by its focus on developing a national insect collection. Nevertheless, the decision to construct the Natural History Gallery (not in the original proposal) provided immediate linkages with many other interest groups when developing displays on a wide range of taxonomic groups and environmental/conservation issues.

The Darwin Initiative is well known amongst the government departments and the national and international environmental NGOs operating in Fiji, having supported a total of seven projects covering marine and terrestrial environments and a diverse range of taxonomic groups including birds, marine life and insects. There appears to be a good understanding amongst these organisations of what the DI is trying to achieve. The large number of senior people from across the environmental field attending the launch of the Natural History Gallery was testament to the high regard in which the DI is held.

6 Monitoring and evaluation

There were no major changes to the project design. The only change to the logframe involved increasing the number of insect surveys from ten to fourteen locations (in any case, this target was greatly exceeded – see outputs above).

The most significant change to the budget was a redirection of funds to support the development of the Natural History Gallery. This was achieved by transferring funds from the T&S budget for Fiji staff to visit the UK for training. This was done after it was decided that no further such visits were appropriate (see section 4 above for further discussion)

In general, the indicators used for measuring progress on the insect surveys, insect collection, database and outreach activities worked well. Evaluating training outputs was more challenging. Short-term (3-5 day) workshops/courses do not lend themselves particularly well to examination of pre- and post-course skills and knowledge, especially where participants come from rather diverse backgrounds and start at different levels. Similarly, we have found that formal questionnaires rarely provide useful feedback that can be used to guide future events. Instead, we chose a less formal approach whereby course participants were encouraged to provide oral feedback during the course and the expert trainers were asked to provide a report on their experience of the class. The latter were especially useful when preparing the schedule and content of subsequent training workshops. For example, early experiences showed that laboratory-based training needed to be mixed with plenty of field experience, including demonstration of collecting techniques, 'field craft' and critical identification features of live insects.

Reviews of our annual reports were especially useful in providing feedback, encouragement and advice, and in helping to keep the project on track. We found the explicit encouragement to find synergies with other Fiji-based DI projects especially helpful.

The Project Leader (Alan Stewart) made two visits to the project in Fiji: one five months after the start of the project (February 2007, delayed due to a military coup in Fiji) and one to partake in the closing workshop at the end of the project (27 September 2010). The latter was especially useful in bringing together all members of the DI project team and associated USP staff with Alan Stewart and Mika Peck (also Sussex University and leading the GIS and multivariate statistics workshop). This enabled a thorough review of the project's achievements but also, more significantly, a stimulating exchange of ideas for future projects and collaboration between the UK and host-country partners.

6.1 Actions taken in response to annual report reviews

The following issues were raised in reviews of previous annual reports. Some of them were responded to in previous reports or correspondence but are elaborated upon further here.

a) Information on workshops to educate local farmers, villagers and school children:

In retrospect, we realise that we failed to report in sufficient detail on this issue in previous reports. This has unfortunately led reviewers to the incorrect conclusion that little activity had taken place. In fact, all field surveys were accompanied by extensive consultation with, and education of, local stakeholders. These included meetings with local farmers and villagers to explain what survey work was intended and its purpose (thereby enabling the project team to educate local decision-makers about the importance of biodiversity on their land) and subsequently to inform them about what the results were and their significance. Wherever possible, educational workshops and demonstrations were held for local school children, to inform them about the natural environment and wildlife in their local area and the importance of ensuring its conservation.

Annex 7 Table C provides more detailed information on the various outreach activities throughout the project.

b) Information on security of jobs in entomology:

This has largely been dealt with in Section 4.7 above with respect to the particular people who have been involved with the project. There is also the wider question of the future of entomology in general in Fiji and the extent to which this project has raised the profile of insects and the importance of bringing them into wider conservation agendas. Amongst several other initiatives, we suggest that the publication of *Butterflies of Fiji* and the development of the Natural History Gallery (both in collaboration with the Fiji Museum) have drawn public attention to the importance of biodiversity in general and insects in particular. It is also our general impression that the demand for suitably qualified conservation-literate professionals currently exceeds the supply of such people in Fiji. This means that really good quality candidates are normally able to find appropriate employment in the conservation field. How long this situation will persist is of course uncertain, but it appears to pertain at the moment.

c) Interactions with other Fiji-based Darwin projects:

A total of seven DI projects to date have been based in the Fiji and neighbouring Islands. Two other DI projects were contemporaneous with our one. One of these (15-037: *Distance Learning for Biodiversity Conservation in Small Island Developing States*, 2006-2009, jointly between USP, SPREP and the International Centre for Protected Landscapes at Aberystwyth University) set up the Pacific Island Community-based Conservation Course (PICCC). To a considerable degree, this course is the glue that binds together several of the DI projects in Fiji and helps ensure their sustainability. This training is widely recognized as being of great value for conservation workers who do community-based work. For example, two staff from the

National Trust of Fiji, which has the mandate to protect the natural and built heritage of Fiji, have been trained on the course and, on the strength of this, the Trust has recently proposed that all their field rangers (about ten) should take this course. Regionally, the Coral Triangle Initiative (CTI) has chosen USP to lead on its capacity building activities in each participating country using PICCC training.

The second contemporaneous project was run by Birdlife International who have had three DI projects in Fiji (11-022, 15-019, and 17-026). The most recent of these enabled important synergies with our project through running a joint environmental awareness campaign and insect survey at the Birdlife International project site at Nabukelevu, Kadavu. The various conservation organizations have also jointly planned a number of rapid biodiversity assessments (RBAs): two were done in Ra Province in 2009 and 2010 (Waqā-Sakiti, 2009; in press) and another is planned for Southern Lau in 2011. Thus, some survey and monitoring activities in Fiji have already benefitted from synergies among the various field-based projects.

Finally, the development of the Natural History Gallery was made possible only by linking with personnel from two other DI projects: *Community-based conservation groups at Fiji's key conservation sites* (15/019 with Birdlife International) and a project that had been recently completed, *Network of locally-managed marine protected areas in Solomon Islands* (14/020 with WWF). Both of these projects and their associated organisations were major contributors of ideas and material to the gallery.

d) **Mainstreaming of insect biodiversity knowledge:**

The baseline survey work done by this project will be essential for identifying key geographical areas and vegetation types that are important for insect conservation in Fiji. A better understanding of insect habitat associations, distributions and patterns of endemism will be vital for developing reliable indicators of habitat quality for insects. This approach fits into the wider agenda of identifying and protecting key habitats that are likely to be important for a range of taxonomic groups and has been used successfully by BirdLife International for identifying important bird areas (IBAs).

Another positive development has been that IUCN is supporting the National Trust of Fiji to lead the Program of Work for Protected Areas (PoWPA). A working group meets regularly to define key biodiversity areas for protection. Marika Tuiwawa, who sits on this group, has been directly involved with all stages of our DI project, including organizing logistics and providing background vegetation information for the field surveys, development of the insect collection (FNIC), and bringing the Natural History Gallery to fruition. This places him in a unique position of being able to use the results of the DI project to inform the selection of important sites for biodiversity.

The Institute of Applied Sciences has also had a partnership with Landcare New Zealand which has included insect research work. One of the projects for 2011 will be to explore the possibility of using Odonata (dragonflies and damselflies) as indicators of freshwater stream health. This will utilize entomological expertise developed during the course of the DI project.

7 Finance and administration

7.1 Project expenditure

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, overheads etc			
Office costs			
Travel and subsistence			
Printing			
Conferences, etc			
Capital items/equipment			
Others –Training Materials			
Others – Specimen Shipments			
Other – Entomological Equipment			
Other – Lab + Field Consumables			
Other – Bench Fees Cardiff			
Other- Museum Gallery			
Other – Audit			
Salaries:			
Dr Alan Stewart (UK)			
Dave Pritcher (UK)			
S Prasad (Fiji)			
K Alton (Fiji)			
V Chandra (Fiji)			
M Naula (Fiji)			
R Segran (Fiji)			
Hilda Waqa (Fiji)			
C Tokasaya (Fiji)			
A Liga (Fiji)			
TOTAL			

7.2 Additional funds or in-kind contributions secured

The Institute of Applied Sciences (IAS) contributed an additional FJ\$10,000 towards the construction of the Natural History Gallery and committed a member of their staff (Ms Nunia Thomas) to manage the project. IAS also provided considerable logistical and supervisory support for the postgraduate studies completed by Hilda Waqa (PhD) and Visheshni Chandra (MSc).

7.3 Value of DI funding

The funding has enabled us to export UK expertise to Fiji in order to enhance in-country capacity in insect taxonomic, field sampling and curation techniques. It is unlikely that resources would otherwise have been available to complete such a geographically wide ranging set of field surveys. The Fiji partners had discussed for some time the possibility of developing a natural history gallery, but the DI funding brought it to fruition.

Over 82% of the project funds were spent on Fijians and activities within Fiji, with minimal overheads and salary costs for UK institutions. Thus, the output:cost ratio was kept high. UK trainers ran their workshops in Fiji on an expenses-only basis, not charging for their time (a considerable contribution given both the time spent training and the time needed to travel to and from Fiji) and no charges were made for study visits to UK institutions.

Annex 1 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Achievements during lifetime of project
<p>Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</p> <ul style="list-style-type: none"> • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources 		
<p>Purpose 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. Extent & quality of data; incorporation of data into local conservation plans. Establishment of in-country insect collection; number of specimens fully processed. Awareness of insect conservation in schools and wider community; level of media coverage (radio, newspapers).</p>	<p>a) 15 staff trained in advanced entomological techniques - to different levels (senior curator, technician, parataxonomist) and for varying amounts of time b) Insect field surveys completed at 32 sites across the Fiji Islands c) Fiji National Insect Collection established and built up to >10,000 specimens with full supporting documentation databased d) Permanent natural history exhibit established at Fiji national museum e) Many environmental awareness-raising activities completed, to inform farmers, village communities and local schools about the significance of biodiversity in their area.</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>Activity 1.1 UK training of 6 Fijian nationals (senior curators and technicians).</p>		<p>One senior curator trained in UK for 6 weeks, visiting 3 major UK museums, one university and one continental university (in Czech Republic).</p>
<p>Activity 1.2 In-country training by 6 UK experts for 11 Fijians.</p>		<p>6 in-country workshops run by UK-based experts; number of participants ranged from 5 (first year) to 18 (final year).</p>
<p>Output 2. Insect survey information for 14 locations in Fiji.</p>	<p>Surveys completed; specimens deposited in collections; database</p>	

	on insect distributions	
Activity 2.1. Insect surveys of 14 Fiji Islands sites, conducted by Fijian staff.		Field surveys completed for 32 sites: 23 sites surveyed on 8 major islands (or island groups) and 9 sites on smaller islands in the Lau group. 19,023 insect specimens collected.
Activity 2.2. Sorting, curation and cataloguing of specimens. Assistance given by UK experts on in-country basis.		83% of all collected material sorted to order or family level, mounted, labelled and catalogued. UK experts provided direct assistance with checking identifications and access to personal worldwide networks of taxonomist contacts, both remotely and when in Fiji.
Output 3. In-country insect collection.	Extent and quality of collection.	10,381 specimens deposited in newly established Fiji National Insect Collection (FNIC). Voucher material of all species sent for verification to appropriate taxonomic experts with knowledge of Fijian fauna; experts' institutions allowed to retain any duplicate specimens.
Output 4. Database of insects within collection.	Proportion of insect collection identified to specified taxonomic levels.	Specimen information held in Access-based relational database specially-adapted from SPR Herbarium database. Full metadata recorded for all surveys.
Output 5. Outreach activities to schools, communities etc.	Number of schools, communities etc visited; demand for extra information.	Environmental awareness raising activities held in all villages hosting insect field surveys. Developed and launched Darwin Initiative Natural History Gallery at Fiji Museum, Suva (major public exhibit, including specimens, posters, displays, interpretation). Considerable interest raised in training in entomology, ecology and conservation through: <i>Butterflies of the Fiji Islands</i> guide; USP annual Open Day; Arbor Day; BioBlitz; TV appearances explaining discoveries of rare insects; presentations at conferences; lectures to USP students.

Annex 2 Project's final logframe, including criteria and indicators

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve 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</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>N.B. Change to single purpose as requested in response letter to Stage 1 application.</p>	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.
<p>Outputs</p> <p>1. 11 trained staff (3 senior curators, 3 support technicians; 5 parataxonomists).</p>	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.
<p>2. Insect survey information for 14 locations in Fiji.</p>	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.
<p>Activities</p> <p>1. Training</p>	<p>Activity milestones</p> <p>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.</p>		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.	

Annex 3 Project contribution to Articles under the CBD

Project Contribution to Articles under the Convention on Biological Diversity

Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use		Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	35	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation		Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation		Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity		Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	35	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	30	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair

Article No./Title	Project %	Article Description
		and equitable way of results and benefits.
16. Access to and Transfer of Technology		Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information		Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Other Contribution		Smaller contributions (eg of 5%) or less should be summed and included here.
Total %	100%	Check % = total 100

Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
Training Measures		
1a	Number of people to submit PhD thesis	1 (Hilda Waqa)
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	1 thesis submitted (Visheshni Chandra: A study on habitat, biology and behavior of <i>Papilio schmeltzii</i> Herrich-Schaeffer)
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	1 (Apaitia Liga)
4b	Number of training weeks provided to undergraduate students	1 year
4c	Number of postgraduate students receiving training (not 1-3 above)	2 (Presly Dovo & John Fasi)
4d	Number of training weeks for postgraduate students	1 year and 3 months respectively
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(ie not categories 1-4 above)	1 (Tokasaya Cakacaka)
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	2 years
6b	Number of training weeks not leading to formal qualification	6 weeks in UK; 7 weeks (workshops) in Fiji
7	Number of types of training materials produced for use by host country(s)	4: keys; checklists; field collection methods; curation methods
Research Measures		
8	Number of weeks spent by UK project staff on project work in host country(s)	5 Darren Mann, Chris Hodgson, Mike Wilson
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	1 produced (Sovi Basin); 4 being prepared (Waisoi, Nakauvadra Ranges, Nakorotubu ranges and Lau group).
10	Number of formal documents produced to assist work related to species identification, classification and recording.	7: <i>Butterflies of Fiji</i> ; 6 sets of training documentation from identification workshops
11a	Number of papers published or accepted for publication in peer reviewed journals	3 (Waqa & Lingafelter, 2009; Wilson 2009; Hodgson & Łagowska, in press)
11b	Number of papers published or accepted for publication elsewhere	5 (Waqa-Sakiti, 2007; Prasad <i>et al.</i> , 2007; Waqa-Sakiti, 2009a; Waqa-Sakiti, 2009b; Waqa-Sakiti,

Code	Description	Totals (plus additional detail as required)
		in press)
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	1
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	0
13a	Number of species reference collections established and handed over to host country(s)	1 (Fiji National Insect Collection)
13b	Number of species reference collections enhanced and handed over to host country(s)	0
Dissemination Measures		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	3: Lau Provincial council meeting; DI Fiji projects seminar (with Birdlife International) & DI closing workshop
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	4: Fiji Islands Conservation Science Forum Conference; DI-Fiji project leaders seminar; Lau Provincial council meeting; Ra Provincial council meeting
15a	Number of national press releases or publicity articles in host country(s)	6 (The significance of Insects to ecosystem functions in Kaila papers; The significance of the giant long-horned beetle, <i>Xixuthrus heros</i> on TV; The discovery of the periodic emergence of Fiji's endemic cicada <i>Raiateana knowlesi</i> on TV (local programme, National news) and in the Fiji Times; Launch of the Natural History Gallery (TV Fiji) One-National news)
15b	Number of local press releases or publicity articles in host country(s)	4 (University of the South Pacific press releases on: launch of DI project, launch of butterfly guide, workshop on scale insects and launch of the Natural History Gallery)
15c	Number of national press releases or publicity articles in UK	1: 'Feature species' on IUCN website (on <i>Xixuthrus heros</i> , for future use in 2011)
15d	Number of local press releases or publicity articles in UK	0
16a	Number of issues of newsletters produced in the host country(s)	0
16b	Estimated circulation of each newsletter in the host country(s)	

Code	Description	Totals (plus additional detail as required)
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	4: Significance of <i>Xixuthrus heros</i> (2); Records of the rare endemic cicada <i>Raiateana knowlesi</i> ; Natural history gallery launch
18b	Number of national TV programme/features in the UK	0
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	0
19a	Number of national radio interviews/features in host country(s)	2: Arbor day celebrations; Natural History gallery launch
19b	Number of national radio interviews/features in the UK	0
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	0
Physical Measures		
20	Estimated value (£s) of physical assets handed over to host country(s)	£22,000 (lab equipment: £7K; entomological equipment: £4K; natural history gallery: £11K)
21	Number of permanent educational/training/research facilities or organisation established	1 (Natural History Gallery at Fiji Museum, Suva)
22	Number of permanent field plots established	0
23	Value of additional resources raised for project	
Other Measures used by the project and not currently including in DI standard measures		

Annex 5 Publications

Type *	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Booklet	Prasad, S.R. & Waqa, H. (2007) <i>Butterflies of the Fiji Islands.</i>	Fiji Museum	Fiji Museum, Suva	FJ\$ 5
Popular magazine	Waqa-Sakiti, H. (2007) Entomology work in Fiji: how much do we really know? <i>MelanesianGeo</i> , 5: 24-25.	Melanesian Geo Publications	http://www.melanesiangeo.org/	Free
Popular magazine	Prasad, S.R., Lal, S., Caginitoba, A & Olson, D. (2007) First steps: long horned beetles of Fiji. <i>MelanesianGeo</i> , 5: 26-28.	Melanesian Geo Publications	http://www.melanesiangeo.org/	Free
Popular magazine	Waqa-Sakiti, H. (2009a) Two endemic and rare stick insects from the Nakauvadra Ranges, Fiji. <i>MelanesianGeo</i> , 7: 38.	Melanesian Geo Publications	http://www.melanesiangeo.org/	Free
Journal	* Wilson, M.R. (2009) A checklist of Fiji Auchenorrhyncha (Hemiptera). In: Evenhuis, N.L. & Bickel, D.J. <i>Fiji Arthropods XII</i> . Bishop Museum Occasional Papers 102: 33 -48.	Bishop Museum, Honolulu, Hawai'i	http://hbs.bishopmuseum.org/fiji/index.html	Free
Journal	Waqa-Sakiti, H. & Lingafelter, S. (2009) New Fijian Callidiopini (Coleoptera: Cerambycidae). <i>Fiji Arthropods</i> . Bishop Museum Occasional Papers 106: 3-15.	Bishop Museum, Honolulu, Hawai'i	http://hbs.bishopmuseum.org/fiji/index.html	Free
Journal	Waqa- Sakiti, H. 2009b. Insects of Nakauvadra Range, Ra Province, Fiji. In Morrison, C. and Nawadra, S. (eds). <i>A Rapid Biodiversity Assessment of the Nakauvadra Range</i> ,	RAP Bulletin of Biological Assessment 57. p. 81-86. Conservation International, Arlington.		Free

	<i>Ra Province, Fiji.</i>			
MSc thesis	Chandra, V. (2010) A study on habitat, biology and behavior of <i>Papilio schmeltzii</i> Herrich-Schaeffer	Unpublished thesis	Biology Department, USP	N/A
Journal	* Hodgson, C. & Łagowska, B. (2010) New scale insect (Hemiptera: sternorrhyncha: Coccoidea) records from Fiji: three new species, records of several new invasive species and an updated checklist of Coccoidea. <i>Zootaxa</i> .	Zootaxa	http://www.mapress.com/zootaxa/index.html	Free
Journal	Waq- Sakiti, H. (2009) Insects of <i>Nakauvadra Range</i> , Ra Province, Fiji. In Morrison, C. and Nawadra, S. (eds). <i>A Rapid Biodiversity Assessment of the Nakauvadra Range, Ra Province, Fiji.</i>	RAP Bulletin of Biological Assessment.	Conservation International, Arlington.	Free

Annex 6 Darwin Contacts

Ref No	15-007
Project Title	Focus for Fiji: Insect Inventories for Biodiversity Assessment
UK Leader Details	
Name	Dr Alan J A Stewart
Role within Darwin Project	Project Leader
Address	School of Life Sciences, University of Sussex, Falmer, Brighton, BN1 9QG
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	Dr Mike Wilson
Role within Darwin Project	Collaborator
Address	Entomology Department, National Museum Cardiff, CF10 3NP
Phone	
Fax	
Email	
Partner 1	
Name	Prof. W. Aalbersberg
Organisation	University of the South Pacific
Role within Darwin Project	Principal host-country project partner
Address	Institute of Applied Sciences, USP, Suva, Fiji Islands
Fax	
Email	
Partner 2 (if relevant)	
Name	
Organisation	
Role within Darwin Project	
Address	
Fax	
Email	