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Darwin Initiative Annual Report

Dear Rose Clarkson

Please find herewith the annual report for project number 162/10/030. I apologise for the slight delay in getting this to you. Please contact me if there are any matters on which you need clarification.

Yours sincerely,

Dr Alan J A Stewart

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	Developing local capacity for biodiversity surveys in Papua New Guinea
Country(ies)	U. K. and Papua New Guinea
Contractor	University of Sussex
Project Reference No.	162/10/030
Grant Value	£ 162,489.00
Start/Finishing dates	September 2001 / August 2004
Reporting period	Annually

2. Project Background

The project is led by Alan Stewart (University of Sussex (UoS), UK) in collaboration with Vojtech Novotny (Institute of Entomology, Czech Republic) and Mike Wilson (National Museum of Wales, Cardiff, UK). The primary aim of the project is to train a team of parataxonomists (research technicians) based at the Parataxonomist Training Center (PTC) in Madang, Papua New Guinea, so that they will become a source of expertise for carrying out local biodiversity surveys, producing data for (inter)national nature conservation and sustainable forest use projects and material for national taxonomic collections.

3. Project Objectives

A team of parataxonomists in Papua New Guinea is being trained to (1) design and implement biodiversity surveys, (2) process and evaluate plant and insect samples, (3) produce high quality biological specimens, (4) document the specimens by digital photography, and (5) summarise the information in electronic databases, field guides, technical reports, education leaflets for grassroots landowners and www pages.

The project objectives have not been modified, although some minor changes to the timing of visits by the UK scientists have been an unavoidable consequence of delays in obtaining visas.

4. Progress

- **Brief history of project:** Please note that because the project did not start until September 2001, this report refers to only seven months of the last financial year. The main progress milestones of this first reporting period of the project included (i) consolidating collaborative links between UoS and PTC, including routines for communication, project management, transfer of funds, and financial reporting; (ii) purchasing and setting-up project equipment at PTC; (iii) selecting and hiring project personnel, i.e. parataxonomist trainees, (iv) visit by Alan Stewart to PTC,

(v) completing the first biodiversity survey, (vi) completing three environmental awareness presentations and one training course with a combined audience of 150 people, (vii) producing and distributing 32 educational leaflets on environmental issues, (viii) conference on 'Science and Technology in Developing Countries: Emerging Trends in the New Millennium' (Goroka, September 2001) attended by seven parataxonomists who presented two posters and two oral presentations.

- **Progress over last year:** The project started in September 2001, i.e. after three months delay, which was caused primarily by administrative and logistical difficulties involved in working in Papua New Guinea as well as negotiation of the contract details with the Darwin Initiative Secretariat. The visits by Alan Stewart and Mike Wilson also had to be postponed due to delays in obtaining visas, which were finally granted in January 2002. Apart from these problems, the project has followed the proposed time schedule, met most targets and achieved most outputs planned for its first year (with minor exceptions listed in (7) below).
- **Summary of results:** (see also the attached table of scheduled and achieved project outputs):

- **A) Establishment and training of parataxonomist team.**

Five new parataxonomist trainees were selected from numerous applicants. The main selection criteria were: interest in biology, understanding of the environment, skills demonstrated, enthusiasm and ability to learn, and an ability to work in a team; by contrast, little emphasis was placed on the extent of formal education since access to it is limited in PNG. The parataxonomist trainees were young grassroots villagers with education ranging from grade 6 to 10, except one, who had completed one semester at a university.

The new parataxonomists were trained in computer literacy, photography, and the basics of biology. In addition to this introductory course, further training is a part of everyday activities at PTC. Visiting scientists and PhD students share accommodation and other facilities with parataxonomists, which creates an ideal environment for both informal and formal training. Furthermore, experienced senior parataxonomists played an important part in training the new members of the team. For example, the conference presentations and environmental leaflets (see Outputs) were prepared through close collaboration between senior parataxonomists and new trainees.

Training of students: two M.Sc. students from the University of PNG, Merra Minne and Darren Bito, stayed for one month at PTC and took part in biodiversity surveys. These students were recommended by Prof. Lance Hill, the head of the Biology Department at the University, as exceptionally gifted biology students.

- **B) Research work**

We finished the 1st biodiversity survey and also the field part of the 2nd survey. The surveys are targeting moths (Lepidoptera), which are collected by light-trapping. The collected specimens are mounted (thereby producing valuable material for taxonomic investigations, and also specimens for the PNG National Insect Collection), digitally photographed (many species have never been photographed before), and databased. They are then sent overseas for taxonomic study, to be finally returned to PNG. The biodiversity of the samples is analysed and finally, when data from several surveys are available, these data will provide insights into the patterns of insect diversity in the tropics.

Our first survey provided extensive and species-rich material. We mounted and databased 6,933 specimens, which were then sorted to 1,264 species. So far, 629 of them have been photographed. It should be noted that this type of large-scale survey (2-4 weeks of field collection) generates quantities of material that take several months to process (curation and identification). Since it is premature to draw any conclusions from a single data set, we shall delay the first analyses until additional data sets become available.

- **C) Educational and environmental awareness activities**

The parataxonomists organised three environmental presentations for the public (combined audience of approximately 150 persons) and also a training course for one NGO (Sangamanga Conservation and Environmental Preservation Group). Furthermore, they produced 32 educational leaflets in English and Tok Pisin, targeting mostly village grassroots audiences and school children. The parataxonomists also presented two posters and two oral presentations at the ‘Science and Technology in Developing Countries: Emerging Trends in the New Millennium’ conference, organised by the University of Goroka (PNG). See the Project Outputs (Table 1) for further details.

- **Workplan for second financial year:** The project design has not been modified. Likewise, we do not propose any significant changes in the workplan for the second year, which is as follows:

July 2002	14B	2 parataxonomists attend and present poster at Rainforest Canopy conference in Cairns, Australia.
Aug 2002		Completion of 2 nd biodiversity survey and processing of the material (Morobe Prov., montane rain forest)
	5	Specialist training of 2 parataxonomists for 4 weeks in UK (2 weeks spent at Univ. Sussex, 2 weeks spent at Cardiff Museum)
	14B	PNG staff (3-5, depending on cost) present DI results at New Guinea Biological Society conference in Jayapura (brought forward from March 2003)
Oct 2002		UK collaborator (MRW) visits PNG for training parataxonomists in taxonomy and curation techniques
Nov 2002		Project Leader (AJAS) visits PNG for training, planning etc.
		Annual Planning meeting, PNG, involving VN, AJAS, & parataxonomists
Dec 2002	4A	2 PNG students complete 20 weeks training
		Completion of 3 rd biodiversity survey and processing of the material (Sepik Province, lowland rain forest)
Jan 2003	6A/B	30 landowners from 2 villages trained on environmental issues and forest conservation; either 1-week seminars or 1-day courses or a mixture of both formats.
Feb 2003		Project Leader (AJAS) visits PNG for training, planning etc.
March 2003	15A	National press release in host country
	15C	Local press release in UK
	15D	National press release in UK
		Completion of 4 th biodiversity survey and processing of the material (Simbu Prov., montane rain forest)

5. Partnerships

- **Collaboration between UK and host country:** Linkages between the UK institution and PTC, already established through collaboration between Dr Stewart and Dr Novotny, have developed well. Some initial delays were experienced while contracts between UoS and PTC were negotiated and finalised, but these matters have been resolved and communication between the institutions now runs smoothly.
- **Collaboration within host country:** The project has collaborated with the following institutions:
 - The National Agriculture Research Institute (Port Moresby): we signed a Memorandum of Understanding with the Institute and started collaboration, which will contribute specimens from our studies to their National Insect Collection.
 - University of Papua New Guinea (Port Moresby): we trained two students from the Biology Department.
 - University of Technology (Lae): we have started selection process for one M.Sc. student who should receive one-year training and assistance with his M.Sc. research as a part of the DI project.

We have started informal collaboration and contact with the following conservation NGOs based in PNG:

- Tree Kangaroo Conservation Project (administered in collaboration with Roger Williams Park Zoo, Rhode Island, USA)
- Sangamanga Conservation and Environment Preservation Group
- Bismarck-Ramu Group
- WWF

The project has established contact with John Dransfield (Kew) and his Darwin Initiative project in the Indonesian part of New Guinea; these contacts will develop further when the parataxonomists visit Kew as part of their stay in the UK.

6. Impact and Sustainability

The start of the project met with considerable interest from the PNG media: the project generated six news items in national newspapers and one item on national radio. The collaborations listed in (5) above also indicate that the project is becoming known in the NGO community as well as the academic research community in PNG.

It is too early to comment on exit strategies after the first part-year of the project. However, the safety of assuming that the parataxonomist team will be self-sustaining by the end of the Darwin funding period through conducting biodiversity surveys is supported by the number of contracts for survey work which PTC was able to attract during this first year, viz.

- The Indo-Pacific Conservation Alliance (Washington) invited PTC to conduct a biodiversity survey in the Bintuni Bay in the Indonesian part of New Guinea.
- The Tree Kangaroo Conservation Project (administered in collaboration with Roger Williams Park Zoo, Rhode Island, USA) invited PTC to survey their Protected Area in the Finisterre Mts.

- The Misima Mine requested a survey as a part of their mine re-vegetation programme.

These contracts also demonstrate the rising profile that PTC enjoys within PNG. Based on the progress since the start of the Darwin project and the achievements over the previous five years under different funding, we are optimistic that the PTC will become known widely as one of the principal sources of expertise on PNG biodiversity.

7. Outputs, Outcomes and Dissemination

Table 1. Project Outputs

Code No.	Quantity	Description
4A	2	M.Sc. students from University of PNG
4B	8	M.Sc. students from University of PNG
5	12	Parataxonomists receiving training at PTC
6A	145	School children and grassroots village people receiving training on conservation issues and forest conservation
6B	18	Mostly half-day or one-day training session per person
7	32	Educational leaflets, 1-3 pages per leaflet, in English or Tok Pisin; see Table 2
8	2	Alan Stewart's visit to PTC
11A	1	See Table 2
12A	1	The database of Lepidoptera species from light-trap surveys has been established, but will be further expanded and developed
14B	1	'Science and Technology in Developing Countries: Emerging Trends in the New Millennium' conference, organised by the University of Goroka (PNG). See also Table 2
15A	6	In Post-Courier, Independent, National and Wantok newspapers (PNG)
15C/D	3	UoS press release; item on UoS web-site; article in UoS Bulletin
19A	1	News item on PNG national radio station Nau FM

The following Project Outputs scheduled for the first year have not been achieved:

- 8: one visit by Alan Stewart and one by Mike Wilson to PNG (both due to delays in obtaining visas); these have been rescheduled for the 2nd year of the project)
- posting preliminary results and analyses from biodiversity surveys on www (this will be done in the 2nd year of the project, when the data become more extensive and suitable for analysis)

The following Project Outputs have been modified:

- 6A and 6B: the two-week courses originally planned for selected villagers were replaced by one-day seminars for 145 persons, due to the large amount of interest in the courses. We found that village schools and also village communities generally were interested in basic information on environmental issues, but at the same time teaching schedules at schools and the various activities of everyday life, particularly in agriculture, in the villages made it impractical to organise longer courses. We found that one-day public seminars and meetings in villages or village schools were the most efficient form of environmental education which had higher impact than more lengthy courses which would attract only a limited audience.
- Due to the deteriorating state of unrest in the Southern Highlands Province of PNG, we have decided (based on UK Foreign Office advice) that this area can no longer be included as one of our six locations for biodiversity surveys (originally planned for August 2003). We have therefore taken advantage of an opportunity that arose during the year of substituting this with a full survey in the Finisterre Mountains (Morobe Province). This was especially attractive since it provided an opportunity to develop collaborative links and a degree of cost-sharing with other organisations, whilst fully complying with the previously established fieldwork design and protocols.

The following Project Outputs are additional or ahead of schedule:

- 14B Extensive participation and project presentation at a conference, Goroka, PNG.
- An additional field data set was obtained and extra parataxonomist training was achieved due to an invitation by the Indo-Pacific Conservation Alliance to conduct a biodiversity survey in Indonesia.
- The fieldwork part of the 2nd biodiversity survey, originally planned for the 2nd year has been finished ahead of schedule. This survey was conducted in the Finisterre Mountains.

Table 2: Publications

A selection of the publications listed below (those marked with an asterisk) have been appended to this report. Copies of all others can be requested from the Project Leader.

Type	Detail	Available from
* Leaflet	Martin Mogia: Gutpela yus na wok blong cicada (Useful work of Cicadas)	PTC
Leaflet	Samuel Hiuk: Ol kainkain binatang bilong Papua New Guinea (Various insects of PNG)	PTC
* Leaflet	Samuel Hiuk: Kapul bilong diwai o bilong graun? (Do the wallabies belong to the tree or to the ground?)	PTC
* Leaflet	William Boen: Stori bilong bataplai (About the Butterflies)	PTC
Leaflet	Samuel Hiuk: Bikpela kapul bilong diwai i gat longpela tel (The Great Tree Cangaroo has a long tail)	PTC
Leaflet	Samuel Hiuk: Lukautim bus na grauna na wara! (Take care of the forest, of the ground, of the water!)	PTC
* Leaflet	Mark Andreas: We have remarkable insects that other countries do not have!	PTC
Leaflet	Samuel Hiuk: Mining	PTC
Leaflet	William Boen: Olsem wanem dispela ol samting I wok long lus? (How is all this disappearing?)	PTC
Leaflet	William Boen: We, Papua New Guineans, should be proud!	PTC
* Leaflet	Martin Mogia: The rich tropical rainforest of PNG	PTC
Leaflet	William Boen: Wildlife facing Extinction in PNG	PTC
* Leaflet	Markus Manumbor: Yu tingim mi long bihain tu? (Will you think about me in the future?)	PTC
Leaflet	Markus Manumbor: What's these children's future gonna be like?	PTC
Leaflet	Markus Manumbor: Yu save wanpela lip i kisim hamas dei antap long diwai? (Do you know how many days the leaf stays on the tree?)	PTC
Leaflet	William Boen: The Parataxonomist Training Center, Madang PNG	PTC
Leaflet	William Boen: Save Papua New Guinean rich diversity	PTC
Leaflet	Martin Mogia: Entomology	PTC
* Leaflet	William Boen: Save Papua New Guinean tropical rainforest – species too	PTC
Leaflet	William Boen: Maining i save kamapim bikpela distraksen tru long ol resorses bilong yumi (Mining is causing vast destruction of our resources)	PTC
Leaflet	William Boen: Coral reefs are very important	PTC
Leaflet	William Boen: Rip em wanpela bikpela samting tru (The reef really matters)	PTC
Leaflet	William Boen: Senisim pasin bilong kisim pis (Change the way you catch the fish!)	PTC

Leaflet	Markus Manumbor: Pacific leatherback turtles face extinction	PTC
Leaflet	Mark Andreas: Burned forest	PTC
Leaflet	Martin Mogia: The Forest	PTC
Leaflet	Max Manaono: Tree Cangaroo Conservation	PTC
Leaflet	Richard Kutil: Dispela em soim wonem kain environment (This shows what is this environment like)	PTC
Leaflet	Richard Kutil: Why na fruits bilong mipela binatang save bagarapim? (Why do insect damage our fruit?)	PTC
Leaflet	Richard Kutil: Yu tingim bihain bai yu kisim pis olsem or nogat sapos yu no lukautim bus wara bilong yu? (Do you thing you'll get this kind of fish when you wont care about your forest river?)	PTC
Leaflet	Richard Kutil: Bus bilong mipela i gat ol kinkain diwai na tu i gat ius bilong em (Our forest have various useful trees)	PTC
Leaflet	Richard Kutil: Yu save holim tumbuna pasin bilong yu yet or nogat? (Do you keep the traditions or not?)	PTC
Conference Proceedings	Molem, K., Mogia, M., Kutil, R. & Auga, J. (2001) Scientific and traditional taxonomies of rainforest plants. In Proc. of the 'Science and Technology in Developing Countries: Emerging Trends in the New Millenium' Conference, University of Goroka, Goroka, Sept 12-14, 2001, p. 19.	University of Goroka
Conference Proceedings	Tamtiai, E., Manumbor, M., Boen, W. & Isua, B. (2001) Parataxonomists: A new approach to training for science. In Proc. of the 'Science and Technology in Developing Countries: Emerging Trends in the New Millenium' Conference, University of Goroka, Goroka, Sept 12-14, 2001, p. 21.	University of Goroka
* Research paper	Mogia, M: Traditional uses of cicadas by Tabare Sine people in Simbu province of Papua. New Guinea. <i>Denisia</i> 04: 17-20.	

- Dissemination activities in the host country.

The main mechanisms for dissemination of this project are (i) the production of leaflets, as in Table 2, (ii) organisation of training courses in local villages, and (iii) the development of web-pages. These activities are considered to be core elements of the PTC's work and an important part of maintaining its profile and its ability to attract funding within PNG. Consequently, they will be continued after the Darwin project finishes, funded by locally- and internationally-derived contract work.

8. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Budget	Expenditure
Salaries:		
• Alan Stewart (project leader)		
• Michael Wilson (UK collaborator)		
• PTC staff: Vojtech Novotny (partner in host country); 8 current parataxonomists (John Auga, William Boen, Richard Kutil, Markus Manumbor, Martin Kasbal, Samuel Hiuk, Brus Isua, Kenneth Molem); 5 new trainee parataxonomists		
Office costs eg. postage, telephone and stationery		
Travel and subsistence		
Printing		
Conferences, seminars etc		
Capital items/equipment:		
1 laptop computer with monitor, printer & CR-RW		
Portable electric generator		
1 stereomicroscope with fibre optics light and digital camera		
Other equipment		
TOTAL		

£XXX carry-forward to next financial year agreed with Darwin Secretariat, to cover:

- £XXX: T&S underspend because single visits to PNG by Dr Stewart and Dr Wilson had to be postponed due to problems obtaining visas.
- £XXX: Salary underspend because involvement by Dr Wilson delayed (for reason above).

9. Monitoring, Evaluation and Lessons

• **Methods employed to monitor and evaluate the project**

The outputs from this project will be multifaceted and therefore need to be evaluated in diverse ways. The following list outlines some of the indicators of achievement that will be used to measure the extent to which the project objectives are being met:

- Training: the number of parataxonomists attending and making presentations at national and international conferences (such as in Goroka last year and in Cairns next year) indicate the extent to which training is instilling both the skills and the confidence that is required to contribute to such events.
- Environmental education and awareness: the number of participants in village-based courses and presentations indicates the level of interest, awareness of and concern about environmental issues.
- Awareness of PTC: the number and quality (both high) of applicants for the parataxonomist jobs indicates the level of awareness of PTC and its work and the fact that it is perceived as an appropriate training for an environmental career in PNG.
- Research: the completion of survey fieldwork and the processing of the material is the immediate measure of progress. However, publications in peer-reviewed journals are a better long-term measure of the quality and impact of the research done. In this context, senior scientists associated with PTC have just published (25 April 2002) a report in Nature (Vol 416, pp.841-844) on work that was, in part, supported by Darwin Initiative funds and for which the parataxonomists were pivotal in generating the raw data. We see the approach of training locally-recruited parataxonomists to generate high quality scientific data as a proven way to cultivate a new generation of environmentally-literate people at the same time as tackling major ecological questions that have wide applicability beyond PNG.
- Exit strategy: the ability of PTC to attract full-economic-cost contracts to do biodiversity survey work is the best measure of the extent to which this project will fulfil its overall aim, which is *"to transform biodiversity surveys from an overseas-driven to a local activity, relying on local experts with access to national biological collections who can establish rapport with both local grassroots landowners and international research communities"* (as defined in the original project application).

- **Lessons from this years work**

The initial problems that caused the project start-date to be delayed by three months have now been resolved satisfactorily. There have been no major issues arising from the day-to-day running of the project which require any substantial revision of the programme or the way in which it is to be carried out. However, we remain unclear on the precise requirements for financial auditing and are still awaiting instructions from the Darwin Initiative Secretariat on this.

10. Authors: Dr Alan Stewart, Dr Vojtech Novotny
Date: 14 May 2002

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<p><i>Goal</i></p> <p><i>Increase the intensity of biodiversity surveys in unexplored rain forests of Papua New Guinea which are threatened by logging and increase the relevance of these surveys for conservation decisions, particularly the decisions made by local village landowners, who own a majority of PNG forests.</i></p>	<p><i>The extent and detail of biodiversity information on species-rich plant and animal taxa available for main forest areas in PNG; conservation vs. logging decisions by local communities exposed to environmental education and similar decisions by government bodies for areas with known biodiversity information.</i></p>	<p><i>Biodiversity maps and research publications; case studies, field reports and published information on conservation decisions by local communities; national statistics on logging concessions and information on governmental policies and laws on logging in biodiversity hotspots; reports by environmental organisations</i></p>	<p><i>Biodiversity information and environmental education can influence conservation decisions by local communities and the government; sustainable forest use can, at least under certain circumstances and in certain social situations, compete with industrial logging in satisfying the development aspirations of the local communities</i></p>
<p><i>Purpose</i></p> <p><i>Transform biodiversity surveys from an overseas-driven to a local activity, relying on local teams with sufficient expertise, equipment and access to biological collections, which can establish rapport with both local grassroots landowner and international research communities</i></p>	<p><i>The intensity of biodiversity surveys in various parts of PNG and the role and share of local experts in the planning and implementation of these surveys; the flow of biological specimens to national vs. overseas collections; the role of local experts in data reporting, evaluation and interpretation.</i></p>	<p><i>Survey reports and research publications; statistics on research activities by the National Research Institute; statistics on holdings in the national biological collections; publications on biodiversity issues authored by local experts and their activity in environmental discussions (in the press, on the internet, etc.).</i></p>	<p><i>Local experts are more sensitive to country needs and have a better understanding of the local social, economic and environmental situation so that they can collect and use biodiversity information for conservation more efficiently than overseas experts. Local experts can attain a sufficient level of expertise in research.</i></p>
<p><i>Outputs</i></p> <p><i>Establish a fully equipped team of parataxonomists, trained for and experienced in biodiversity surveys including building of biological collections and data analysis, which can collaborate with researchers as well as with local villagers, thus capable of providing survey data both to the scientific community and resource owners.</i></p>	<p><i>Biodiversity surveys accomplished by the parataxonomist team; biological specimens and research information generated by these surveys; flow of specimens to national collections resulting from these surveys; village educational programmes successfully completed by the parataxonomists.</i></p>	<p><i>Products created by the parataxonomists: museum-quality biological specimens, electronic specimen databases, internet pages, biodiversity reports, papers, posters and oral presentations, educational leaflets, radio features, environmental lectures to the public and schools.</i></p>	<p><i>Parataxonomists are better biodiversity surveyors than university graduates who tend to pursue administrative careers in towns and are thus unavailable for fieldwork and also become too removed from concerns of village landowners. There is a sufficient demand for biodiversity surveys to sustain a parataxonomist team.</i></p>
<p><i>Activities</i></p> <p><i>Recruit and train parataxonomists in computer use, field survey methods and logistics, curation and databasing of biological specimens, data analysis and creation of educational materials; provide them with field experience; expose them to researchers; provide with baseline databases, collections, and equipment.</i></p>	<p><i>Every senior parataxonomist is able to: train others to his level of expertise; organise and lead a survey team; organise complex logistics and solve various emergencies in remote areas; interact with local landowners as well as with overseas researchers; communicate survey results to both these communities. All 6 planned surveys are successfully completed.</i></p>	<p><i>Reports on the progress of individual parataxonomists and the whole team during the training sessions in PNG and UK and during the biodiversity surveys no. 1-6.</i></p>	<p><i>There is a pool of highly dedicated and capable school leavers in PNG villages with extensive traditional knowledge of the natural world, who could be trained as fully qualified biodiversity surveyors (parataxonomists); the DI senior personnel are able to accomplish such training.</i></p>