



Darwin Initiative First Year Annual Report (April 2005)
“Taxonomic Capacity Building in Support of Biodiversity Conservation in Thailand”.

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Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	13-003
Project Title	Taxonomic Capacity Building in Support of Biodiversity Conservation in Thailand.
Country(ies)	Thailand.
UK Contractor	The Natural History Museum.
Partner Organisation(s)	Queen Sirikit Botanic Garden, Chiang Mai.
Darwin Grant Value	£205,417
Start/End dates	Ist June 2004/ 31st May 2007
Reporting period (1 Apr 200x to 31 Mar 200y) and report number (1,2,3..)	1 April 2004 to 31 March 2005
Project website	-
Author(s), date	Ralph Harbach & Tony Shelley, 29 April 2005

2. Project Background

Thailand's biodiversity is at risk because of human population pressures, and there is an urgent need to assess and monitor endangered insects. A major constraint to developing Thai expertise on insects is the total absence of national reference collections essential for their identification. The project fills this gap by building the capacity of key institutions needed to conserve insect biodiversity. It meets GTI and CBD aims by strengthening relevant Thai institutions, provides a linkage between these institutions and the NHM, and seeks means to enable effective use of taxonomic information, as laid out in the Thai National Report on the Implementation of Convention on Biological Diversity (2002). A Protected Area System has been set up in which the principles of the CBD are being implemented in three distinct habitats: (1) watersheds, (2) unique natural ecosystems that are sensitive and vulnerable to destruction from human impact, and (3) areas with aesthetic value. The project is based at the Queen Sirikit Botanical Garden (QSBG) at Chiang Mai in northern Thailand with field work centred in Doi Inthanon National Park, which has these three habitats. Collecting will later be carried out within the extensive grounds (1000 hectares) of the QSBG. The project will be the cornerstone for Thai biodiversity and conservation research on insects by providing a state-of-the-art entomological depository in the QSBG.

3. Project Purpose and Outputs

The project will provide a national depository and identification facility for insects, a prerequisite for generating the biological information needed for effective biodiversity conservation in Thailand. UK expertise will be used to establish a focus to help build and maintain the human resources, systems and infrastructure needed to obtain, collate and curate the biological specimens that are the basis for taxonomic knowledge. A principal aim is to link collection-based research to current and future entomological expertise in Thai universities, other Thai institutions and the NHM. Insects will primarily be collected in Doi Inthanon National Park and be processed and curated in the QSBG. Databases, websites, training of local staff and implementation of research programmes in collaboration with other institutions will result from the project. No alterations to the proposed outputs or operational plan have been made.

4. Progress

- During a short visit by Ralph Harbach and Tony Shelley to Thailand in February 2003, with the objective of setting up collaborative research programmes on insects, two senior Thai scientists made two important observations. Thailand was making great efforts to protect endangered insect species under their obligations to the CBD and that this was considerably complicated by the lack of a national reference collection of insects. Consequently, Thai scientists had to rely on foreign assistance for much of their taxonomic work. The recent construction of the Queen Sirikit Botanic Garden in Chiang Mai and the National Science Museum currently being built in Bangkok, emphasise the Thai government's interest in biodiversity and conservation. A depository for insects in one or both of these institutions was regarded as a national priority. Initially, they wished to set up collections of well-known families in which research is being carried out and which are already well known taxonomically either in Thailand or the region, rather than make a general insect collection. The Culicidae (mosquitoes) and Simuliidae (blackflies) were selected because of the comparatively small size of both families and the comprehensive taxonomic studies (morphological, enzymatic, cytological and molecular) that have already been done. Groups of researchers and curators would concentrate on these families with Thai funding but NHM participation was initially needed as a pump primer for setting up the collections and training Thai staff in curation and research techniques. Once established, the collections would be expanded to include other insect orders. The Darwin Initiative was regarded by all concerned to be the perfect vehicle for developing this essential entomological infrastructure in Thailand.
- The project officially started on 1 June 2004. Installation of the entomological infrastructure has now begun. This is a monumental task because the institution previously had no entomological facilities and only one member of staff with an entomological background. The project is on schedule and its main elements during the first year have been the equipping of an entomological laboratory, including scientific reference papers, collections of insects in the field and training Thai staff in all appropriate techniques. No alterations to proposed outputs or operational plan have been made.

The project started rather shakily since it was introducing an infrastructure completely new to Thailand, and so a firm programme could not be established at the outset. Earlier logistical teething problems have been resolved and there are now regular insect collections from Doi Inthanon National Park. The Director of the

QSBG has now given additional support for the project in terms of infrastructure and staff and we are well on course for achieving our final objectives. The project has been particularly strengthened by the appointment by the Director of a senior scientist (with a doctorate in Entomology) from the Department of Forestry as scientific adviser to the project. This has now provided the project with a direct link to CBD activities at ministerial level and academic institutions in Thailand carrying out research in entomology and conservation.

- A suite of three rooms in a new laboratory block has been provided for the Darwin project. These consist of an office for the QSBG entomologists, technical assistants and the two local scientists paid by the project, a laboratory and a rearing room. All rooms are now fully equipped with the necessary furniture and communication facilities. The image analysis system was recently installed in the office since access needs to be restricted to this delicate equipment. Work is underway on the construction of insect storage cabinets. Additionally, part of a large air-conditioned and humidity controlled room has been set aside for insect storage cabinets, which are being specially built by the QSBG carpenters and will house the national collection in future years.

The project now comprises two locally recruited staff, one specialising in culicid taxonomy and overseeing the scientific coordination of the project, and the other specialising in field collections, rearing and curation of culicids and simuliids. The QSBG entomologist is in charge of the imaging facility and is planning work on fireflies, which will be one of the major features of the project in the third year. Three part-time assistants also have been provided by the QSBG; a postgraduate student working on simuliids and later fireflies, a technician working on mosquitoes and an IT technician on data basing. Additionally, an MSc student from Chiang Mai University has been attached to the project for his research on simuliids. From March, the scientific adviser became associated with the project. In June, a freshwater biologist (PhD) will begin, initially on a two-year contract, to oversee the scientific development of the project and work during her first year (second year of project) on simuliids.

Collections of mosquitoes have been made at 225 localities and blackflies at 133 localities in Doi Inthanon National Park. By the end of the first year (May 2005), most of the habitats in relation to underlying geology and vegetation will have been sampled and in most cases seasonal variation data will have been collected. Certain localities will be targeted during the second year to complete areas where insufficient data are available. All adult specimens have been labelled and 60% of the associated immature stages have been mounted and labelled. Preliminary identifications have been made of all mosquitoes (80 species), and 16 species of blackflies have been found but no firm identifications have been made. However, a preliminary identification key has been constructed to facilitate the separation of blackfly species (Annex 2). Training of staff in dissection, curation, imaging and identification of the model insect groups has been completed. The progress of daily work at the QSBG is monitored through monthly field and laboratory reports, and necessary guidelines for future modification of the work are provided as required.

- Due to differences in the British and Thai financial years, the QSBG provision of funds for their contribution to the imaging system (capital equipment) will not be available until October 2005 when their new financial year begins. The Natural History Museum has covered this cost so that the project remains on schedule, and will be reimbursed later in the year.

- The status of the project in relation to the functioning of the QSBG has now been clarified. Instead of being a separate entity working within the institution, the Director has now made it an integral part of the QSBG and linked it to the proposed Entomological Museum, which has considerably streamlined its administration. The appointment of a senior scientific adviser has significantly strengthened the project through evolving links with national and international scientific institutions.
- June 2005 Collection, curation and databasing of collection to continue.
- July 2005 Co-ordination meeting in Chiang Mai. Second season of field work will start and GIS training will be given.
- February 2006 Mid-year review and planning meeting and visit to field sites.
- March 2006 Training for funding. Selection of these projects will be based on promising project work, reviews to date, and your suggestions within this section. Further information on this scheme introduced in 2003, field work, curation & data recording continue. Database and website populated.

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

Not applicable.

6. Partnerships

- Collaboration over the first year of the project has been excellent and the perspective for the future is very positive.
- One of the objectives in the second year is to identify satellite projects that will utilise the developing entomological infrastructure. We have already succeeded in incorporating an MSc project on freshwater biology at Chiang Mai University with the DI project, and Luis Hernandez of the NHM is currently carrying out supervision of data analysis on simuliids. We have also successfully negotiated a visit to our QSBG Darwin laboratory and Doi Inthanon NP by coleopterists and lepidopterists in a one-month project funded by the Natural History Museum, UK. Their remit is to collect insects for taxonomic research on beetles and moths of the region. They will be integrating this work within project with a view for future collaboration in the area of endangered insect conservation in Thailand.

7. Impact and Sustainability

- The appointment of a senior scientific adviser by the Director of *the QSBG* demonstrates the Thai commitment to the project. The Adviser is a member of Thai committees dealing with biodiversity and the CBD, and this will highlight the national and international profile of the DI project.

8. Post-Project Follow up Activities

- Not applicable.

9. Outputs, Outcomes and Dissemination

- All planned outputs have been achieved. In addition, a satellite project on simuliid biology is already functioning a year ahead of schedule. Negotiations for a link with research on Coleoptera and Lepidoptera based at the NHM have been successful and will link with the DI project in the third year.

- At this stage in the first year of the project no concerted effort has been made to divulge activities of the project.

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

Code No.	Quantity	Description
4C, 4D	4 Thais	Entomological and data acquisition training in Thailand (8 person wks)
4C; 4D	3 Thais	Entomologist and IT specialist training in NHM (24 person wks)
4C; 4D	1 Thai 8	Entomologist trained in use of image analysis system (2 wks)
	8	NHM staff in Thailand on project (2 [REH, AJS], 4 person wks)
14A	3 UK based	NHM staff in Thailand on project (3 [REH, AJS, LMH], total 6 person wks)
14A	2 UK based	Planning workshop in Thailand
	2 UK based	Mid-year review and planning meeting and site visits

Table 2: Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
0	-	-	-	-

10. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance

- DEFRA had agreed a £12,000 advance to Thailand to cover the costs of equipment because QSBG have no funds until their new financial year in October 2005, provided that a letter was sent to DEFRA by the Director of the QSBG agreeing to reimburse this amount. Since no letter was sent, the NHM provided this amount and will receive reimbursement later this year from the QSBG.

11. Monitoring, Evaluation and Lessons

- Apart from our biannual visits to Thailand, we receive monthly reports on scientific and financial matters. We are in constant email contact and occasional telephone contact with the Scientific Adviser. Scientific progress is assessed through the number of specimens and quality of material collected and the efficiency of curation.
 - Involvement with senior decision making officials at both institutional and ministerial level is paramount to the development of the project on schedule and this will continue in the future.

12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

The appointment of a Senior Scientific Adviser to the project by the Director of the QSBG has not only emphasised his commitment but has also provided a considerable impetus in terms of links to national and international institutions and relevant researchers. This will have a dual effect. It will facilitate divulgence of the project to a wide audience and will channel entomological research in Thailand towards the infrastructure being developed in the QSBG.

I agree for ECTF and the Darwin Secretariat to publish the content of this section

Since the project is in a preliminary phase, we will not have any statement to make until the second and third years.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2004/2005

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
<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</p> <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and <p><i>the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>			
<p>Purpose</p> <p>To establish capacity in Thailand for developing and maintaining national reference collections and identification facilities for insects in support of biodiversity conservation and research in Thailand.</p>	<p>Infrastructure and collections of model insect groups established at QSBG, and training for NSM staff.</p> <p>Thai capacity established for continued development and curation of insect reference collections to support biodiversity and conservation research.</p>	<p>Office and laboratory space acquired, equipped and set in use for analysis and storage of collections.</p> <p>A collaborative research project initiated with MSc student at Chiang Mai University on freshwater biology.</p> <p>Training given in collection, dissection, curation, imaging and identification of specimens.</p>	<p>Complete construction of insect storage facility.</p> <p>Complete collection and curation of model insect groups.</p> <p>Complete supervision of MSc project.</p> <p>Identify and integrate additional satellite projects for further development and expansion of the national collection.</p>
<p>Outputs</p> <p>Keystone insect reference collections.</p> <p>Expandable taxonomic database</p> <p>Expandable interactive website facility.</p> <p>Application of remote sensing and GIS techniques.</p> <p>Training of Thai museum staff and partners.</p>	<p>Culicid, simuliid and endangered species collections completed.</p> <p>Data collection and entry completed; database functional.</p> <p>Functional website of integrated data, images and identification keys.</p> <p>GIS data and maps linking collections, species and land cover ecology.</p> <p>At least 6 individuals trained in field methods, information and collection management practices, and/or GIS.</p>	<p>Collections, curation and identification of Culicidae and Simuliidae underway.</p> <p>Database developed and being populated with collection data.</p> <p>Website not yet developed.</p> <p>GIS system not yet installed.</p> <p>Trained 4 QSBG and 2 DI project participants in field and laboratory methods.</p> <p>One QSBG staff member trained in image analysis.</p> <p>One DI and 2 QSBG employees in curatorial methods in NHM.</p>	<p>Complete collection, curation and identification of simuliids and culicids.</p> <p>Populate the database.</p> <p>Design and develop a taxonomic website.</p> <p>Install GIS system and incorporate the collection data.</p> <p>Train local IT staff in the use of GIS.</p> <p>Begin selection and analysis of data for publications on the model insect groups.</p>

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.

Pupae

1. Gill with 3 filaments **species 4 (*nodosum*)**
- Gill with more than 3 filaments.....2
2. Gill with 6 filaments.....3
- Gill with more than 6 filaments.....9
3. Filaments thick basally, antler like. Cocoon shoe-shaped.....4
- Filaments fine not in form of antlers. Cocoon slipper-shaped.....5
4. Filaments very broad basally, roughly arranged vertically. [Egrey, first 3 or 4 anterior abdominal segments yellow] **species 5 (*nigrogilvum*)**
- Filaments slightly wider basally, arranged in bunch. [Egrey, first abdominal segment yellow] **species 11 (near *chamlongi*)**
5. Filaments in vertical plane or bunched together basally, forwardly directed.....6
- Filaments spread-eagled in forward or various directions.....8
6. Filaments bunched together basally. [E unknown. Γ scutum brown with 3 black longitudinal fine lines] **species 13 (*feuerborni*)**
- Filaments in vertical plane, in 2:2:2 configuration. [Γ scutum black anchor on silver pruinose background]7
7. Filaments fine at base. [E scutum grey with fine golden setae].....
- **species 12 (near *rufibasis*)**
- Filaments wide at base. [EGrey with silver pruinose pattern and fine black setae].
- **species 3 (near *tani*)**
8. Filaments all forwardly and laterally directed and relatively broad. [E grey with golden setae]..... **species 9 (nr. *aureohirtum*)**
- Filaments forward and backward directed, and relatively fine. [E pewter grey with fine grey setae]..... **species 15 (near *brevipar*)**
9. Gill with 8 filaments.....10
- Gill with 10 filaments. Filaments radiating like spokes from a wheel.....11
10. Gill in vertical plane with dorsally arched filaments, basally branched, wider at base than distally. Cocoon slipper-shaped with large fenestration laterally near rim. [E scutum black with 1+1 median, 1+1 sub-median and 1+1 lateral wide silver vittae; anterior 1 or 2 segments of abdomen yellowish]..... **species 7 (near *chainarongi, fenestratum, malayense*)**

- Gill with fine splayed filaments in 3+3+2 configuration from stems near base.
Cocoon slipper-shaped. [Escutum grey pruinose with median and 1+1 sub-median posteriorly diverging black lines]..... **Species 1 (near *inthanonense*,
siamense, *sheilae*)**.
- 11. Gill with base of filaments considerably wider. [E black with 1+1 median, 1+1 sub-median and 1+1 lateral, wide, grey pruinose vittae] **species 2 (near
nakhonense)**.
- Gill with base of filaments not widened.....**species 16 (near *quinquestriatum*)**