

Darwin Initiative

Annual Report

1. *Darwin Project Information*

Project Ref. Number	162/14/004
Project Title	A biodiversity monitoring system for Trinidad and Tobago
Country(ies)	Republic of Trinidad and Tobago
UK Contractor	University of Oxford
Partner Organisation(s)	National Herbarium of Trinidad and Tobago
Darwin Grant Value	£264,500
Start/End dates	July 2005 to June 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 April 2005 to 31 March 2006 Annual Report Number 1
Project website	http://herbaria.plants.ox.ac.uk/bol/?Caribbean
Author(s), date	Nick Brown, April 27 th 2006

2. *Project Background*

Trinidad and Tobago have the richest biodiversity in the southern Caribbean but some of the most rapid rates of habitat loss. Conservation and sustainable management of natural vegetation in Trinidad and Tobago are compromised by a poor information base: basic habitat assessments and baseline population data are largely non-existent. This is aggravated by the scarcity of basic plant identification skills and an under-resourced and overburdened National Herbarium. This project seeks to address these problems by carrying out a detailed vegetation survey of the islands, building capacity at the National Herbarium and providing training in plant survey and identification techniques for local students, forestry staff and guides.

3. *Project Purpose and Outputs*

Project purpose: To build and maintain capacity in Trinidad and Tobago to monitor habitats, detect changes in plant populations and measure the effects of management.

Project outputs:

1. A network of permanent sample plots enumerated
2. An updated vegetation map of Trinidad and Tobago.
3. An assessment of changes in habitat structure, composition and distribution since 1984.
4. Taxonomy training courses provided for tertiary level students.

5. Taxonomy training courses provided for junior Forestry Division staff and Asa Wright guides.
6. Expansion of National Herbarium and collections catalogued on herbarium database (BRAHMS).
7. Field guide to the trees of T&T and Asa Wright Nature Centre published.

We have made no changes to these planned outputs or the proposed operational plan over the course of this year.

4. Progress

Project initiation

A pre-project planning visit was made from 12th – 17th June 2004. This enabled us to develop a realistic proposal that closely matched the needs of our partner organisations. We were able to develop a safe and practical work plan in close collaboration with our Trinidad partners.

A Memorandum of Understanding was drawn up between Oxford University and the University of the West Indies (UWI). This was signed in Oxford by the Head of the Life Sciences Division on behalf of OU and by the Director of Development on behalf of UWI on 5th May 2005. The project started on the 1st July 2005.

All field equipment and the field vehicle were purchased in August 2005. UWI made a substantial additional financial contribution to the project to enable a new, rather than a second-hand vehicle to be purchased.

The Oxford post-doctoral research position was advertised and attracted 17 applicants. Four candidates were short listed and interviewed, one by video link from Australia. Dr William Hawthorne was appointed. Dr Hawthorne has extensive experience of biodiversity surveys and development of field guides. The UWI post-doctoral research and herbarium assistant positions were advertised. No applications were received for the post-doctoral position and only one application for the herbarium assistant post. As it was felt unlikely that an appropriately qualified applicant would come forward, the post-doctoral position was re-graded as a post graduate research assistantship. Ms Shoba Maharaj was appointed to this post from October 2005 and will co-ordinate field surveys. Depending on her progress over the forthcoming year, Ms Maharaj may register for a Ph.D. at UWI under our joint supervision. UWI have not appointed a herbarium assistant yet, pending completion of the refurbishment of the Herbarium.

Herbarium upgrade

New purpose-built steel herbarium cabinets were ordered in September. A pre-installation structural survey revealed that the National Herbarium building was not strong enough to support the weight of the new cabinets. The necessary structural reinforcements work required the entire Herbarium to be crated and moved to another location. This Herculean task was carried out efficiently by the herbarium staff but as a consequence the collections have been unavailable for five months. Structural work is now complete and the herbarium refurbishment is well underway with an expected completion date of May 2006. The collections will then be returned to the Herbarium.

BRAHMS software was installed on two computers in the Herbarium. In September 2005 Dr Stephen Harris (SAH) gave a two day training course to

the Herbarium Curator, Mrs Yasmin Baksh Comeau (YBC) and research assistant in the use of the software and developed a plan for the databasing of the Trinidad collection on BRAHMS. Approximately 6,000 specimens held in the T&T Herbarium had already been recorded on an MS Access database by the Herbarium Curator. These were converted to BRAHMS format and this database is now up and running. A method has been developed for converting over 30 Microsoft Word file containing full details of the herbarium records for Trinidad and Tobago material held in Kew and the Natural History Museum (collated by YBC and Dr Denis Adams) to BRAHMS format.

A team of 3 students were employed in Oxford during the summer to database Caribbean specimens from the Oxford herbaria. Approximately 4500 specimens (about half of the Caribbean material held at Oxford) have been databased. All specimens (not just type material) were photographed at high resolution. The material is available at <http://herbaria.plants.ox.ac.uk/bol/?Caribbean>.

Field surveys

A field survey methodology was agreed in September 2005 and tested in the field by Oxford and UWI staff. The method is briefly described in Appendix 1, Thirty six field sites had been inventoried by the end of March 2006, well ahead of our proposed schedule. Progress has been far faster than anticipated due to the excellent collaboration with field staff from the Inventory Section of the Forestry Division. A team of eight Forestry personnel have worked with the Darwin Project since November 2005. The team has become very familiar with the methodology and work is therefore extremely efficient.

Field data from all surveys has been entered in the Herbarium database. We have collected in excess of 4,000 voucher specimens. The majority of these have not yet been sorted into named taxa due to the lack of access to the herbarium during refurbishment work. WH will travel to Trinidad in June for an extended period of herbarium work during which we anticipate that this backlog of specimens will be cleared.

Timetable 2006-7

June- July 2006	UK postdoc in Trinidad sorting specimens and supervising completion of field work in Tobago.
August 2006	T&T Herbarium curator to Oxford and Kew to work on specimen identification.
August – September 2006	Oxford University Canopy Biodiversity Expedition
August 2006	SAH and NDB to visit UWI to teach field survey and plant identification course.
July – September 2006	Oxford student team to continue digitisation of Caribbean collection and entry on BRAHMS database.
September 2006	Project website on-line with direct access to BRAHMS databases
December 2006	New tree inventory database and analysis software completed for Forestry Division.
March 2007	At least 60 sample plots enumerated in total.
March 2007	90% of existing accession to National Herbarium archived on BRAHMS.

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

Not applicable

6. Partnerships

Our relationship with UWI has been excellent. Staff at the National Herbarium have been totally committed to the project and have achieved all of the aims set out so far. Their work-load has been substantially increased by this project but they have accepted this without complaint and have been more than enthusiastic about the research.

Despite a clearly defined timetable in the project MoU, the Finance Office at UWI have to be repeatedly reminded to provide accounts and invoices. These have often arrived very late causing administrative problems in Oxford.

The Herbarium Curator, Mrs Yasmin Baksh Comeau, is an expert in epiphytic ferns. It became clear, soon after the start of our field work, that many of these were not being adequately collected in our ground-based surveys. We therefore decided to initiate a project designed specifically to collect epiphytes in the canopy of trees in the Northern Range. Five Oxford undergraduates will take part in the "Oxford University Canopy Biodiversity Expedition to Trinidad 2006" (<http://www.trinidad2006.co.uk/>). They have raised over £20,000 in sponsorship to fund their field work and the costs of Basic Canopy Access Training, taught by the Global Canopy Project, another Darwin Initiative funded project. They paid for Shoba Maharaj, our graduate research assistant to fly to Oxford in March 2006 to take part in the course. Shoba successfully achieved her BCAT qualification.

7. Impact and Sustainability

UWI has used the Darwin Biodiversity Project as the flagship for promoting plans, both internally and with the T&T Government, for a regional biodiversity centre. I understand that UWI intend to invite the Chairman of the Darwin Committee to visit Trinidad in the near future to discuss their plans and possible future applications for support.

The principal focus of the work in this early stage, has been on field surveys. It is important that we make timely progress with this aspect of the work in order to ensure that we are able to deliver future outputs. This component of the project is comparatively low profile. We have been delighted at the willingness of the Forestry Division to collaborate with this work. In the past senior Forestry Division staff have expressed doubts about the value of biodiversity studies. Their commitment to this project suggests that they may have recognized its value.

8. Outputs, Outcomes and Dissemination

Only two of the outputs of this project were scheduled to occur during this year. Press releases announcing the award of project funding and the signing of the project Memorandum of Understanding were made on schedule.

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

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
15A	Press release T&T	1				1
15C	Press release UK	1				1

9. Project Expenditure

- Please expand and complete Table 3.

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

10. Monitoring, Evaluation and Lessons

The UK post-doctoral research assistant reports directly to NDB. Weekly meetings are held to discuss progress and future plans. The T&T post-graduate research assistant reports to YBC and NDB (via email). YBC has written an end-of-year report (as agreed in the MoU) in which she praises Ms Maharaj for the quality of work, her assiduousness and having kept progress ahead of schedule despite very difficult field conditions. A copy of this report will be sent to the Environmental Monitoring Authority in Trinidad to keep them informed of progress.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2005/2006

Project summary	Measurable Indicators	Progress and Achievements April 2005-Mar 2006	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 • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources 			
<p>Purpose To build and maintain capacity in Trinidad and Tobago to monitor habitats, detect changes in plant populations and measure the effects of management.</p>	<p>Baseline information on the flora, its distribution and recent patterns of change made publicly available.</p> <p>Expanded National Herbarium and enhanced taxonomic skills base.</p> <p>New information used by policy makers, educators, managers and ENGOs</p>	<p>Oxford herbarium Caribbean specimens available via website.</p> <p>National Herbarium refurbished.</p> <p>Eight Forestry Division personnel have acquired skills and experience in field survey.</p>	
<p>Outputs</p>			
<p>Network of permanent sample plots enumerated</p>	<p>Ten 0.25 ha sample plots enumerated per habitat type.</p>	<p>36 sample plots enumerated.</p>	<p>More than 30 sample plots will be enumerated in 2006-7.</p>
<p>Updated vegetation map of T&T.</p> <p>Assessment of changes in habitat structure, composition and distribution since 1984.</p>	<p>Map and habitat descriptions published. Analysis of changes published in peer reviewed journal.</p>		<p>Preliminary ordination complete by Dec 2006.</p>
<p>Taxonomy training courses provided for tertiary level students.</p>	<p>At least 30 students from UWI and ECIAF take new course in taxonomy and participate in field surveys by Yr3</p>		<p>Training courses to commence in 2006.</p>

Taxonomy training courses provided for junior Forestry Division staff and Asa Wright guides.	At least 6 Forestry Division staff members and 4 Asa Wright guides take new course and participate in field surveys by Yr3		Training courses to commence in 2006
Expansion of National Herbarium and collections catalogued on herbarium database (BRAHMS).	10,000 new accessions to National Herbarium and 90% of old and new accessions recorded on herbarium database by Yr3	BRAHMS software installed and training provided. More than 4,000 new voucher specimens collected.	

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.

Appendix 1: Field survey method

The method used is an adaptation of that described by Hawthorne & Abu-Juam (1995).

The method uses plotless sampling of a defined landscape unit. The area of forest to be sampled is defined, usually by position in the landscape (e.g. ridge top, steep slope, gully side etc). The field team agree the area within which they will collect. A detailed field description of the site is taken, including its soil type, topography, aspect altitude and exact location.

One member of the team is nominated for booking specimens. A second member is responsible for numbering, labelling and pressing. All other members of the team collect specimens. Each collector specialises on a specific life-form (trees, herbs, climbers etc). Collectors take voucher specimens of as many species of vascular plant as possible. No plants are excluded that could be named or collected with reasonable effort. Mosses, lichens, fungi and dead trees are excluded. No special effort is made to collect epiphytes. A specific epiphyte collection will be made in August 2006 by a team of Oxford and UWI tree climbers. Leaf collections are made from canopy trees using a catapult and line. When this proves impossible, dead leaves are collected from beneath the tree, taking care to ensure that they match the leaves that can be seen in the canopy, through binoculars. A full description of the bark and slash is made.

Most specimens are sterile. From time to time a species is found in flower or fruit. High quality, duplicated voucher specimens are collected from these individuals.

All voucher specimens are recorded, numbered and pressed in the field. A 'field name' is given to those that the field team think they recognize. Notes are made on the physiognomy of the whole plant and where it was growing. Every specimen is given a unique number that is attached to it on a card tag. The number is also written on a leaf and on the newspaper in which the specimen is pressed. The number is prefixed by a unique four character code that identifies the field location.

A record is kept of the number of stems of each species (or morphotype) of canopy tree in the collection area. This information provides an index of relative abundance and a simple link with tree inventory data collected by the Forestry Division in their permanent sample plots. It also provides a discipline by which the identity of all trees is checked, rather than dismissed from afar as the same as one already seen.

All specimens are dried and securely stored in the Herbarium within 24 hours of being collected. Field data is recorded in the Herbarium database immediately.

Our field work has generated thousands of sterile specimens of plants. Many of these were not recognized by the field team during collection. Identification of these samples is a major component of the survey work. Once a substantial collection of specimens has accumulated they are sorted first into families and then into progressively smaller taxonomic units. This job is supervised by an experienced botanist but assistants with limited taxonomic knowledge very quickly acquire the skills needed to sort specimens into unique taxa. This is a very useful method for teaching field botany and many members of the project team are now able to recognize a very substantial number of species from sterile specimens. The final checking and naming of specimens is carried out by WH and YBC.