

Darwin Initiative Annual Report
Project 162/14/004 2006-7

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 Contract Holder Institution	University of Oxford
UK Partner Institution(s)	
Host country Partner Institution(s)	National Herbarium of Trinidad and Tobago, Forestry Division of Trinidad and Tobago
Darwin Grant Value	£264,500
Start/End dates of Project	July 2005 to June 2008
Reporting period	1 April 2006 to 31 March 2007 Annual Report Number 2
Project Leader Name	Nick Brown
Project website	http://herbaria.plants.ox.ac.uk/bol/?Caribbean
Author(s), date	Nick Brown

1. 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.

2. Project Partnerships

National Herbarium: We continue to have a very positive and productive relationship with both the curator of the Herbarium, Mrs Yasmin Baksh Comeau and the Darwin Research Assistant, Miss Shobha Maharaj. Mrs Comeau has visited Oxford University twice since the start of the project (funded by UWI) for planning and research meetings. Miss Maharaj has travelled to Oxford three times, to be trained in canopy access techniques and to discuss opportunities for post-graduate study. Miss Maharaj has applied for and been accepted as a post-graduate student studying for a D.Phil. in the Department of Plant Sciences.

Forestry Division: A very significant practical contribution to the project has been the secondment of a team of eight Forestry Division field staff to the project team for the last seven months. This was not part of the original plan for this project but it is a consequence of senior managers within Forestry Division recognizing the importance of biodiversity assessment to their work and realizing that the Darwin Project provides an ideal opportunity for staff to receive training. We hope to bring the Deputy Director of Forestry Division, Mr Seepersad Ramnarine to Oxford in July/August 2007 for training in forest modelling. We believe that this will enhance Forestry Division's commitment and involvement in the project and make valuable use of existing permanent sample plot data.

Other Collaborations: During the last year Nick Brown and Shobha Maharaj received completed Basic Canopy Access Training with the Global Canopy Programme.

3. Project progress

3.1 Progress in carrying out project activities

A network of permanent sample plots enumerated

The major achievement this year is the completion of the first phase of vegetation sampling. Fifty-eight Rapid Biological Surveys (RBS) have been completed in Trinidad and twenty in Tobago. We have therefore managed to keep to the schedule of survey work originally planned for the project. (The survey method was described in detail in Annexe 1 of the 2006 Project Annual Report). More than 7,000 voucher specimens have been collected in total indicating that in excess of 100 vascular plant species have been recorded on average at each site. All voucher specimens have been logged on a project database, dried and securely stored in the National Herbarium.

In addition five Oxford University students worked with the project team for a six-and-a-half week period (11th August – 25th September 2006) surveying epiphytes in the forest canopy. Dr Brown took part in this field work. Nine lowland sites were sampled, three each in the Northern, Central and Southern Ranges. Over six hundred and fifty epiphytes were collected by climbing 45 adult trees. It is clear from the analysis of this data that there are likely to be many more epiphyte species to discover in lowland sites and we anticipate that epiphyte diversity will increase with altitude.

Dr Hawthorne worked with the Herbarium team in October 2006. He carried out a preliminary sort of voucher specimens and identified approximately 60% to species level. Dr Harris visited Trinidad for two weeks in February 2007 and continued this work. He worked with the Curator identifying voucher specimens from field surveys, focussing particularly on difficult groups such as Melastomes. Eighty five percent of voucher specimens have now been formally identified. The families Bignoniaceae and Myrtaceae remain to be identified. We have arranged for Profa. Carolyn Proença (University of Brasilia) to visit in September 2007 to identify problematic Myrtaceae. Mrs Comeau will bring other problematic voucher specimens to the UK in July. We will attempt to identify these using the herbaria at the British Museum and Royal Botanic Gardens Kew.

The second phase of sampling has already begun. The aim is to complete a further 65 Rapid Botanical Surveys by September 2007. We have selected sites for second phase sampling based on the results of the first phase. Most of these second phase surveys will be carried out in the Northern Range and in the South West corner of Trinidad, regions that our first phase of sampling has revealed to be particularly diverse.

We intend to bring Mr Seepersad Ramnerine, Deputy Director of Forestry Division, to Oxford in July/August in order to work with him entering data from paper records of a network of Forestry permanent sample plots and carry out basic forest modelling with the data. Dr Hawthorne is preparing a specific add-on to the BRAHMS software that will facilitate forestry plot data entry and will allow basic forestry statistics to be calculated. The forestry Permanent Sample Plot data can then be incorporated into the wide project database.

An updated vegetation map of Trinidad and Tobago.

All specimens that have been formally identified have been entered into the BRAHMS database (by Dr Paul Comeau, working on a voluntary basis). These records are precisely georeferenced allowing us to accumulate datasets on a very large number of species for species distribution modelling. Drs Brown and Hawthorne are assembling environmental data layers for incorporating into a Geographical Information System for this purpose. We will be working with colleagues in the Oxford University Centre for the Environment over the next year of the project to develop these distribution models.

An assessment of changes in habitat structure, composition and distribution since 1984.

This work will commence next year.

Taxonomy training courses provided for tertiary level students.

The unexpected opportunity to work closely with the Forestry Division team has meant that our capacity to provide training has been fully occupied. We have decided to postpone training for UWI students until Year 3 when the pressure to complete survey work will be less. We have, however been able to provide intensive training for the post-graduate research assistant, Miss Shobha Maharaj and have given basic training in using BRAHMS to the herbarium technician.

Taxonomy training courses provided for junior Forestry Division staff and Asa Wright guides.

Dr Hawthorne spent one month in Tobago working with the field team in October 2006 and then provided training and directed a major specimen sort and identification in the National Herbarium. Miss Maharaj has been training the team in RBS methodology and field botany. The team are now capable of carrying out survey work without supervision and can sort voucher specimens into major taxonomic groups. We are negotiating with Forestry Division over awarding Certificates of Competence to the team. Forestry Division have some concerns that official recognition of the skills that the team have acquired may encourage them to ask for promotion or higher salaries.

Expansion of National Herbarium and collections catalogued on herbarium database (BRAHMS).

Two undergraduates were employed over the Summer Vacation 2006 to complete the data basing of all Caribbean specimens in the Oxford University Herbaria and to check the quality of the incorporated data. All the Oxford material (circa 9,000 specimens) has now been incorporated into the database. All specimens have high resolution images associated with them and these are currently being incorporated into a BRAHMS online Website for Caribbean material.

The University of the West Indies has shown strong commitment to the project by fulfilling its commitment to make a major investment in refurbishing the Herbarium. The Herbarium building required (unanticipated) structural reinforcement prior to the installation of steel herbarium cabinets. This meant that the entire Herbarium had to be packed into crates and put in temporary storage whilst building work was carried out. Although this work was carried out speedily (primarily as a consequence of the drive and determination of the Curator, Mrs Comeau) it inevitably delayed research since the collection could not be accessed for several months.

The new Herbarium is now complete and operational. The opportunity was taken to re-order the collection in line with modern curatorial standards using an order based on Mabberley (2007), to install new plant drying facilities and to create a separate library for field guides, monographs etc. A herbarium technician was appointed in September 2006 and he has been acquiring data basing, photographic and herbarium maintenance skills.

Dr Stephen Harris visited the National Herbarium for two weeks in February 2007 to provide further training to the Herbarium staff in using the BRAHMS database and in photographing specimens.

Progress with entering National Herbarium collection data into the BRAHMS database has progressed more slowly than anticipated. This is primarily a result of delays caused by the refurbishment of the Herbarium and delays in appointing a Herbarium technician. In order to bring the project back on schedule we have decided to make very high resolution photographs of the entire collection. Photographs are then sent to Oxford where a team of students has been employed to database the information from the herbarium labels. This method has the considerable advantage that high resolution images of the collection will be incorporated into the BRAHMS database and will shortly be available on-line.

Field guide to the trees of T&T and Asa Wright Nature Centre published.

All project team members have agreed to refine this project output from a guide to the trees of T&T to a comprehensive conservation checklist of the entire flora. Further details are given below (§ Changes to Project Design). This is a more ambitious project but it was widely felt that this would be of greater value in helping T&T meet targets and obligations for biodiversity conservation.

We are now making rapid progress with this publication. A conservation checklist database has been created from existing (Microsoft Word) flat files originally compiled by Dr Denis Adams (British Museum) and Mrs Yasmin Comeau. The file was converted into BRAHMS format and is now being edited. All plants have been allocated to a biogeographic category and have been given IUCN conservation category ratings. We are busy resolving significant problems of synonymy. Our plan is that every species will be accompanied by a photograph to aid identification and a distribution map compiled from our survey work. We are on-schedule for the production of this publication by the end of the project.

3.2 Progress towards Project Outputs

Overall progress has been extremely good towards achieving most of the project outputs. We are ahead of schedule with the plant survey work – that area of the project which it was anticipated might be most vulnerable to logistic problems and delays. We have been able to provide more extensive and detailed training for Forestry Division staff than anticipated in our project proposal. We have fallen behind schedule with databasing of the T&T collection and with the provision of training to tertiary level students. We have already implemented measures to address these problems. We have responded to suggestions from our host country counterparts to increase the value of the project by modifying one of our outputs and remain on schedule to produce these by the end of the project.

3.3 Standard Output Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 2 Total	Details
Established codes			
4C	Number of postgraduate students to receive training	1	S Maharaj has received training in Basic Canopy Access (in the UK), field survey methods, plant taxonomy, database management, herbarium specimen preparation and management.
4D	Number of training weeks provided	10	S
6A	Number of people to receive other forms of education/training	8	8 Forestry Division staff have received training in field survey methods and taxonomy
6B	Number of training weeks provided	14	8 Forestry staff have received training from W Hawthorne in RBS methods and from S Maharaj in field taxonomy and survey methods.
8	Number of weeks to be spent by UK project staff on project work in the host country	16	Dr N. Brown – 3 weeks Dr S Harris – 2 weeks Dr W Hawthorne – 11 weeks
13B	Number of species reference collections to be enhanced and handed over to the host country(ies)	1	The National Herbarium has been significantly upgraded (air conditioned, new storage cabinets, new library, database access), expanded and internationally networked.
20	Estimated value (£'s) of physical assets handed over to host country	£23,888	All equipment as detailed in project application has been purchased and handed over. Salaries and field cost have been paid as planned.
22	Number of permanent field plots established during the year	65	65 RBS surveys carried out (20 in Tobago and 45 in Trinidad) in Phase 1.
23	Value of resources raised from other sources (ie. in addition to Darwin funding) for project work	£15,716	Oxford University Canopy Biodiversity Expedition to Trinidad.
New - Project specific measures			

Publications - No publications this year.

3.4 Progress towards the project purpose and outcomes

We are confident that the project has already made a substantial contribution towards building and enhancing capacity in Trinidad and Tobago to monitor habitats, detect changes in plant populations and measure the effects of management. The country now has a state-of-the-art herbarium. We have trained a large team of Forestry Division staff in field survey methods and field botany. We have recruited a talented post-graduate research assistant who will continue to doctoral level studies in Oxford and will then be in a position to contribute substantially to biodiversity conservation management.

Our partner organisations remain wholly committed to the project.

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

It is too early to claim any significant impact in these areas although we have growing confidence that the project will make a positive contribution in the near future.

4. Monitoring, evaluation and lessons

Monitoring

So far, monitoring has consisted of ensuring that the project meets financial and work targets. Most of the project outcomes that are amenable to evaluation by other means fall at the end of the project term. Final and half year reports are distributed in draft form to all project partners and to the T&T Biodiversity Advisory Council.

Lessons learned

This year we have encountered, for the first time, resentment both of the comparatively large financial resources available to the project and to the rapid rate of progress. Host country biodiversity professionals who have not been centrally involved in the project may feel that it is "treading on toes". We have sought to involve as many people as possible in the design and implementation of the project but local professional rivalries have not always allowed this to work. A need to be aware of such sensitivities has played an important part in our decision to modify one of our project outputs. We believe that it would be difficult to realize our project purpose if, in the process of achieving our outputs we created widespread resentment.

5. Actions taken in response to previous reviews

The review of last year's annual report acknowledged that good progress was being made and suggested that more information could be given on the doctoral research project which Shobha Maharaj proposes to undertake at Oxford.

Miss Maharaj applied to Oxford University in November 2006 and was offered a place to study for a D.Phil. starting in October 2007. She proposes to focus her research on "Assessing the vulnerability of high conservation-value plants in Trinidad and Tobago to climate change." She will be supervised by Darwin Project staff. A copy of her research proposal is included in Annexe 3.

We are delighted that Miss Maharaj will have this opportunity to develop high-level expertise in this area, since it will significantly reinforce capacity in conservation biology in T&T. Miss Maharaj has shown an extraordinary level of commitment to the project that has gone well beyond that necessary for her job. Much of the success of the project in maintaining a very challenging schedule of vegetation sampling has been attributable to her dedication and determination. There is a real need to provide continuity in the management of the National Herbarium once the current curator, Mrs Comeau, retires. At present there is no-one with appropriate knowledge or interests available in-country.

The total cost of Shobha Maharaj's doctoral study will be in excess of £120,000. Oxford University will be providing a large proportion of this as a bursary. Dr David Rampersad, Director of the Business Development Unit at the University of the West Indies is investigating the opportunity for funding the remainder from sources within T&T.

6. Other comments on progress not covered elsewhere

Changes to the design of the project

We have refined our plans for a major output from the project, on the advice of Yasmin Comeau, our principal host country partner. We had proposed to produce a guide to the trees of T&T. We have now decided to produce a more ambitious but much more useful publication; a conservation check-list of the entire flora. We have made this change for the following reasons:

- a) The curator of the National Herbarium, Mrs Comeau, pointed out that one of the major barriers to plant monitoring and conservation, was the lack of a definitive plant checklist. Mrs Comeau felt that a far more valuable publication would be to produce an illustrated checklist to the entire flora, with details on distribution and conservation status. She and a former collaborator Dr Denis Adams, had made some progress on developing a manuscript over the last 15 years, however, progress was slow due to other professional commitments. Now that she is familiar with the potential of the BRAHMS database she feels that this change to the focus of this output is both achievable and is likely to make a much more direct contribution to biodiversity conservation. This output has her very enthusiastic support and we felt that we should capitalise on her enthusiasm rather as this meant that she would be fully committed to the work.
- b) The tree flora is comparatively well-known and there are several (partial) field guides available. Dr Mike Oatham at UWI is already in the process of producing an electronic guide to the trees. Some tension had been created, internally within UWI, by the potential overlap between the Darwin project and his ongoing research. We felt that the revised output would complement rather than duplicate his work.

Significant difficulties encountered during the year

The demands of field sampling in often remote locations have meant that our team of eight foresters, seconded from Forestry Division, have had to work many very long days. Their normal working hours are from 07:30 until 15:00. However, they frequently do not get back from field sampling work until 18:00 at night. Although they have done this willingly, they have recently asked for a large amount of overtime to be paid in their salaries. Forestry Division management have not been in a position to afford to pay this money from very their limited budget.

As a direct consequence field work was brought to a halt for seven weeks. I have repeatedly offered to find funding to cover the cost of overtime but so far this offer has not been taken up. Field work (on the second phase of sampling) has recently recommenced but the overtime issue is still to be resolved. It is likely to continue to be an issue since the field sites chosen for the second phase are more remote and difficult to access than those in the first phase and may require very long days or overnight stays. I am in close touch with our local research assistant on this issue.

7. Sustainability

A major achievement of the project has been the refurbishment and capacity building within the National Herbarium. This has been totally transformed over the last 18 months from cramped and primitive facilities into a state-of-the-art resource. The collection is well on the way to being available on-line, across the world and is already a regional showcase facility. It forms the heart of a new Biodiversity Research Centre which UWI is in the process of developing.

An enormous amount of hard work has been expended in field surveys and training. These are only likely to bare fruit in the final phase of the project but have built a very strong foundation for the future sustainability of biodiversity monitoring in T&T. We are particularly heartened by the significant change of heart within senior management of the Forestry Division. At the start of the project there was little interest an enthusiasm for biodiversity research and monitoring. It is clear that Forestry Division see this as an important future role and they value the opportunity to be involved with the Darwin Project in order to develop appropriate skills.

8. Dissemination

We have not yet begun dissemination activities in this project.

9. Project Expenditure

Table 2 Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

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

[I agree for ECTF and the Darwin Secretariat to publish the content of this section](#)

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2006/07

Project summary	Measurable Indicators	Progress and Achievements April 2006 - March 2007	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p><i>To early to evaluate.</i></p>	<p><i>(do not fill not applicable)</i></p>
<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>Baseline information collected</p> <p>Large database on plant species distribution close to completion.</p> <p>Major renovation and expansion of National Herbarium complete. Training underway.</p> <p>Key conservation information in production</p>	<p>On-line databases completed. Production of Conservation Checklist.</p> <p>Copies of Conservation Checklist published and distributed to key biodiversity professionals.</p>
<p>Output 1 Network of permanent sample plots enumerated</p>	<p>Ten 0.25 ha sample plots enumerated per habitat type.</p>	<p>Progress ahead of schedule.</p>	
<p>Activity 1.1 Field surveys</p>		<p>78 Rapid Botanical Survey plots completed. 65 further surveys planned for forthcoming year.</p>	

<p>Output 2. Updated vegetation map of T&T.</p> <p>Assessment of changes in habitat structure, composition and distribution since 1984. (insert original output)</p>	<p>Map and habitat descriptions published. Analysis of changes published in peer reviewed journal.</p>	<p>On schedule</p>
<p>Activity 2.1.Vegetation mapping</p>		
<p>Activity 2.2. Oxford Caribbean specimens digitised and available on-line</p>		<p>All 9,000 specimens now available in on-line database with high-resolution images.</p>
<p>Output 3. 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>Not yet started</p>
<p>Activity 3.1: Training in field survey and field taxonomy for UWI students</p>		<p>Delayed due to other training demands</p>
<p>Output 4 Taxonomy training courses provided for junior Forestry Division staff and Asa Wright guides.</p>	<p>At least 6 Forestry Division staff members and 4 Asa Wright guides take new course and participate in field surveys by Yr3</p>	<p>On schedule</p>
<p>Activity 4.1: Training in field survey and field taxonomy for Forestry Division staff</p>		<p>8 Forestry Division staff trained and now competent to undertake independent biodiversity assessments.</p>
<p>Output 5. Expansion of National Herbarium and collections catalogued on herbarium database</p>	<p>10,000 new accessions to National Herbarium and 90% of old and new accessions recorded on herbarium</p>	

(BRAHMS).	database by Yr3	
Activity 5.1. Refurbishment of herbarium		Completed
Activity 5.2. Existing accessions recorded on herbarium database		Behind schedule. Major effort using Oxford University student team to catch up.
Activity 5.3. New accessions to National Herbarium		7,000 new specimens collected. 85% now identified.
Output 6. Field guide to the trees of T&T and Asa Wright Nature Centre published	Field guides peer reviewed and publication dates established.	On schedule. Output changed to Conservation Checklist.
Activity 6.1. Analysis and publications		Production underway and on schedule.

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>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</p>			
<p>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>Project data and reports available via National Herbarium website.</p> <p>Increase in the number of personnel within the Forestry Division, and ENGOs with taxonomic skills</p> <p>EMA, Forestry Division and ENGO reports and publications</p>	<p>Partner organisations remain committed to project.</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>Project data and reports available via National Herbarium website.</p>	<p>No unforeseen disruption to field surveys. Trained staff able to participate in survey work.</p>
<p>Updated vegetation map of T&T. 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>Map and descriptions available via National Herbarium website.</p> <p>Copies of published papers sent to Darwin Secretariat.</p>	<p>Effective research collaboration with Forestry Division and Centre for Caribbean Land and Environmental Appraisal Research.</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>Course materials published on-line. Student attendance and assessment records and certification.</p>	<p>>30 students opt to take new course.</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	Course materials published on-line. Student attendance and assessment records.	Staff available to take new course.
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	Database accessible via National Herbarium website	New herbarium storage facilities in place.
Field guide to the trees of T&T and Asa Wright Nature Centre published.	Field guides peer reviewed and publication dates established.	Copies of reviewer comments sent to Darwin Secretariat. Two copies of both guides sent when published.	N/A
Activities	Activity Milestones (Summary of Project Implementation Timetable)		
Field surveys	Sampling methodology agreed and tested (Aug 05). At least thirty 0.25ha sample plots enumerated per year. All voucher specimens pressed, dried, mounted and catalogued (March 08).		
Vegetation mapping	Recent remotely sensed images of T&T obtained (Sept 05). Cloud-free mosaic produced (Nov 05). Unsupervised classification and stratified random sampling design produced (Dec 05). Ordination of field survey data completed (Dec 07). Supervised classification and updated vegetation map produced (March 08).		
Taxonomy training	New course materials and timetable prepared (Jan 06). First cohort of ECIAF and UWI students enrolled (March 06). Course taught and students participate in National Vegetation Survey (May 06,07 and 08).		
Herbarium upgrade	BRAHMS database installed and working (Sept 05). Existing accessions added to database (June 07). Pre-1900 Oxford accession added to database (June 07). National Vegetation Survey voucher specimens added to database (March 08).		
Analysis and publications	Project website on-line (March 07). Draft user-friendly guide to Asa Wright Nature Centre produced (June 07). Draft field guide to trees of T&T produced (March 08). Analysis of habitat change completed and manuscript prepared for publication (June 08).		

Annexe 3 – D.Phil Proposal, Shobha Maharaj

Assessing the vulnerability of high conservation-value plants in Trinidad and Tobago to climate change

Global warming is modifying the distribution of most species with significant implications for their conservation and management. Predicting the direction and magnitude of future species range changes presents a significant scientific challenge, particularly in tropical regions where there is very high biodiversity and where knowledge of species autecology is limited. The high species richness of such areas generally limits the availability of detailed information at the species level (Diaz et al. 1998, Kursar et al. 1998).

An important approach to understanding future patterns of change is species distribution modeling. Once a distribution has been successfully modeled using current species-environment data, the implications of climate change scenarios for a species can be forecast. A major limitation of most modeling approaches is their dependence on the observed correlation between a species distribution and a range of environmental parameters. Theory suggests that the borders of most species distributions are likely to be determined by species interactions and not environmental parameters alone. Secondly, there is a growing awareness that the present-day distributions of species may not be in equilibrium with the environment. In order to overcome these problems we need detailed plant inventory data from a range of adjacent habitats along an environmental gradient and an opportunity to carry out careful experimental manipulations. Where these requirements are met it will be possible to examine the degree to which current plant assemblages are likely to dissolve in the face of predicted environmental change and to carry out a series of transplant experiments to test the correspondence between current distribution and fundamental niche requirements.

An on-going research collaboration between the University of Oxford and the University of the West Indies offers an ideal opportunity to contribute to the development of understanding about the consequences of climate change for biodiverse tropical plant assemblages. This project is in the process of accumulating detailed inventory data from across the islands of Trinidad and Tobago. The high degree of taxonomic resolution (species) that will be obtained from the DARWIN funded vegetation inventory of Trinidad and Tobago provides an ideal opportunity for mechanistic modeling whereby the response of biodiversity to possible climate and land use change scenarios can be studied in the tropics.

In addition, T&T occurs in a region of extreme environmental gradients from dry to mesic, over a very small geographic range, making it practically possible to explore the relationship between plants and their environment.

A further dimension of environmental change that has rarely been incorporated into species distribution modeling is the effect of habitat loss. In Trinidad and Tobago there has been a noticeable acceleration of habitat conversion over the past decade, by which natural vegetation such as forests, savannas and even coastal mangroves are being cleared at an increasing rate to make way not only for homes and agriculture, but also to facilitate a policy of increasingly intensive industrial development.

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