

Darwin Initiative: Half Year Report

(due 31 October 2007)

Project Ref. No.	14-001
Project Title	Conservation and monitoring of Meso-American orchids
Country(ies)	Costa Rica
UK Organisation	Royal Botanic Gardens, Kew (RBG Kew)
Collaborator(s)	Lankester Botanical Garden (LBG), University of Costa Rica (UCR)
Project Leader	<i>Dr Vincent Savolainen</i>
Report date	31 October 2007
Report No. (HYR 1/2/3/4)	HYR 3
Project website	http://www.jardinbotanicolankester.org/esp/project_a.html

1. Outline progress over the last 6 months (April – September) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up).

All agreed objectives set in the baseline timetable detailed in the last annual report and project application have been met as follows:

The DNA barcoding library for Mesoamerican orchids has been enhanced, from a matrix of 432 sequences to one comprising 1607 sequences.

Project partners from RBG Kew (Guillaume Gigot and Martyn Powell, along with RBG Kew GIS specialist Steve Bachman) visited Costa Rica to discuss the project with in-country collaborators and work on several components of the project (April 2007).

The databases of LBG were assessed for their viability to provide sufficient data for red list assessments of orchid species; 194 species were identified as being suitable for red listing and of these 190 have had preliminary assessments carried out (including for 84 species from the three project monitoring sites).

A GIS and red listing training course ('GIS and Red List Conservation Assessment') was held in collaboration with Prof. Francisco Aguilar from Laboratorio de Geomaticá, at UCR during April 2007. The course was attended and well received (see Appendix 1) by 15 students from UCR (See: http://www.ucr.ac.cr/mostrar_noticia.php?ID=833).

Results of the project were presented at the Second International Barcoding Conference in Taipei (September 2007), which was attended by Costa Rican project leader Jorge Warner (LBG). The project was also publicised in talks by Diego Bogarín presented at LBG and RBG Kew, and in the publication of the article by project officers in the *Orchid Review* (published in the July 2007 issue).

Eight scientific papers submitted resulting from the work of the project have been either published or submitted (1: Dressler, R.L & D.Bogarín. Submitted. *Elleanthus ligularis*, a name for a relatively common "new" species of *Elleanthus* Sect. *Chloidelyna*. Lankesteriana; 2: Bogarín, D. Submitted. A new *Lycaste* (Orchidaceae: Maxillarieae) from Costa Rica. Lankesteriana; 3: Lahaye, R., M. van der Bank, D. Bogarín, J. Warner, F. Pupulin, G. Gigot, O. Maurin, S. Duthoit, T. Barraclough, V. Savolainen. Submitted. DNA Barcoding the Floras of Biodiversity Hotspots; 4: Pupulin, F. & D. Bogarín. 2007. A second species of *Restrepiella* (Orchidaceae:Pleurothallidinae). *Willdenowia* 37: 323-329; 5: Dressler, R.L. & D. Bogarín. 2007. Two attractive new species of *Sobralia* from Panama. *Orchids* 76 (9): 696-701; 6: Dressler, R.L. & D. Bogarín. 2007. A new and bizarre species in the genus *Condylago*

(Orchidaceae:Pleurothallidinae) from Panama. Harv. Pap. Bot. 12 (1): 1-5; 7: Bogarín, D. & F. Pupulin. 2007. Las orquídeas del Parque Nacional Barra Honda, Guanacaste, Costa Rica. Lankesteriana 7 (1-2): 446-449; 8: Gigot, G., J. Van Alphen-Stahl, D. Bogarín, J. Warner, M.W. Chase & V. Savolainen. 2007. Finding a suitable barcode for Mesoamerican orchids. Lankesteriana 7 (1-2): 200-2003).

The target for 600 samples available for DNA barcoding work in LBG's silica-dried collection has been surpassed (1012 samples in the collection) and 246 of these have been sent to RBG Kew for extraction.

Collection of orchid samples was aided by new collecting permits which were obtained from MINAE (for a period from 16 July 2007 to 15 July 2008). A total of 978 new specimens were collected from 18 field trips (with assistance from UK project partners on two trips during April 2007).

The Coco Island monitoring site was revisited (nine-day trip, April 2007) by the RBG Kew and Costa Rican project officers, in addition to one student from UCR (Jose-Daniel Zuniga). Sampling of the Island's flora was improved with the collection of 577 samples.

Diego Bogarin (LBG) visited RBG Kew for two months (August/September 2007) to work on various aspects of the project and receive further training in molecular biology techniques.

Collaboration with other Costa Rican institutions was enhanced, as Diego Bogarín collaborated with a project called Digital Flora of the La Selva Biological Station, part of the OET (Tropical Studies Organization). He helped with orchid identification and sharing knowledge with the research team of the Project (See: http://sura.ots.ac.cr/local/florula3/fr_colab.php). He was also invited to give a talk about Lankester Garden Projects and the Darwin Initiative Project to 40 students of the course Costa Rican Natural History. This course is for undergraduate students at School of Biology, UCR led by Professor Gerardo Avalos.

2. Give details of any notable problems or unexpected developments that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

None encountered.

Have any of these issues been discussed with the Darwin Secretariat and if so, have changes been made to the original agreement?

N/A, although the Secretariat agreed for some of last's year money to be carry forward this year

Discussed with the DI Secretariat: no/yes, in..... (month/yr)

Changes to the project schedule/workplan: no/yes, in.....(month/yr)

3. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?

N/A

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan or budget should not be discussed in this report but raised with the Darwin Secretariat directly.

Please send your **completed form email** to Eilidh Young, Darwin Initiative M&E Programme at Darwin-Projects@ectf-ed.org.uk . The report should be between 1-2 pages maximum. **Please state your project reference number in the header of your email message eg Subject: 14-075 Darwin Half Year Report**

Response to reviewer's comments

- *Comment: Clarification is requested on the role and collaboration of CIBCM and SINAC.*

Response

The laboratory of CIBCM, headed by Dr Federico Albertazzi, has been made available to us to help with lab work and teaching in molecular techniques in Costa Rica. It is envisaged that LBG will continue DNA barcoding and undertake molecular phylogenetic studies of orchids at CIBCM after the Darwin funding.

SINAC is helping us with all the permits and access to protected areas. In order to regulate the access to biodiversity, its academic activities and non-profit research, the Law of Biodiversity of Costa Rica number 7788 in Article 4, gave permission to UCR to develop an internal regulation commission that is in charge of all the projects that use biodiversity in UCR. The resulting 'Institutional Commission of Biodiversity' is responsible to evaluate and grant access and permissions to Biodiversity. The project "Conservation and Monitoring of Meso-American orchids" was the first project approved by this Commission. As a result of the experience acquired with the negotiation of the terms of the mentioned project, the Co-leader, Jorge Warner, was named from 1 September 2006 Coordinator of the Institutional Commission of Biodiversity. The project "Conservation and Monitoring of Meso-American Orchids" has served as model for the evaluation and approval of several similar projects in UCR.

- *Comment: The project leader is requested to provide some information on the monitoring methodology ... is it restricted to red list assessments?*

Response

So far, our monitoring approach is indeed restricted to red list assessments. We acknowledge the fact that a more comprehensive programme is ultimately desirable, but Darwin grants are small only allowing us to make a start towards a more ambitious goal.

Progress indicators for the project, primarily preliminary IUCN conservation assessment and data analysis for detailed IUCN conservation assessments, have been selected to comply with those agreed by the Convention of Biological Diversity as 'Provisional Indicators for Assessing Progress towards the 2010 Biodiversity Target'. More specifically, they are linked to the focal area 'Status and trends of the components of biological diversity', which can be assessed by 'trends in abundance and distribution of selected species' and 'change in status of threatened species'. In February 2008 it is planned to write the Costa Rican response to the GSPC, with analysis of the monitoring sites compliant with the CBD 2010 targets.

We have started to 'red list' taxa in inland monitoring sites, and we will emphasize particularly the members of Zygotetinae because their conservation status was previously assessed although without the rigorous methodology of the IUCN. We are also using the Coco Island orchid flora as an indicator of ecosystem health and genetic diversity through time, employing detailed but routine population genetics analyses based on AFLP markers. Finally we propose to make a contribution to the 'Sample Red List' as a monitoring tool. Indeed, during a workshop we organised in Costa Rica, a potential link to the Sampled Red List Index project (www.kew.org/gis/projects/srli/index.html) was identified. This is an IUCN initiative in response to CBD 2010 target "Reduction of rate of loss by 2010". This work aims to evaluate changes in status of threatened species. RBG Kew is involved in the coordination and development of methodologies for this project. About 28 Costa Rican orchid species, occurring in the project monitoring sites of Tapanti and Monteverde, are listed in the SRL Index and have to be

assessed. It could be a direct action to meet one of the most important CBD's targets and to valorise Lankester data for an international initiative.

- Comment: The project leader is requested to attempt to simplify purpose and quantify purpose indicators.

Response

We are happy to simplify our purpose as proposed by the referee.

Initially: "The project purpose is to create in Costa Rica a multi-site expert centre for biodiversity research and conservation of Meso-American orchids by: (a) establishing long term monitoring sites for CBD 2010 targets and GSPC, (b) capacity building in six overseas biodiversity institutes, (c) developing material transfer agreements and new conservation strategies for epiphytic orchid flora."

Simplified new purpose: "The project purpose is to develop the Lankester Botanical Garden at the University of Costa Rica as a modern platform for research, training and conservation of Meso-American orchids by: (a) hosting and training students and researchers in orchid taxonomy and conservation, (b) monitoring the threat status of orchids with IUCN red list assessments, (c) developing conservation strategies with government officials (MINAE, SINAC, etc). The new purpose is now less ambitious and its measurable indicators will necessarily overlap with our initial measures of outputs. But to be pragmatic, we would propose that overall success of our purpose is measured against three simple indicators: number of red list assessments produced by LBG; number of research publications submitted by LBG; number of days spent by LBG staff with governmental officials for developing research and conservation strategies.

- Comment: It is recommended that the project expand and update the project website and devote more attention to dissemination to a wider public.

Response:

Several international conferences have been identified as ideal opportunities to disseminate the project's activities. In addition to the recently attended DNA barcoding conference in Taipei, two further conferences in November will feature presentations on behalf of the project. Firstly, a joint conference hosted by RBG Kew and the Linnean Society ("Orchid evolutionary biology and conservation: From Linnaeus to the 21st century") will be attended by three project partners from RBG Kew, with an oral presentation of the project's barcoding results. The second conference will be held in Ecuador (Second Scientific Conference on Andean Orchids, Loja, Ecuador) and will be attended by Costa Rican project partners with one oral and one poster presentation of the project's results. A further conference to be featuring participation of project partners will be the World Orchid Conference in Miami in January 2008.

The publication of the article about the project in the Orchid Review (July 2007 issue) also helps to disseminate the aims and goals of the project to a wider audience.

In addition, next year represents the 300 year anniversary of Linnaeus, and there are various activities throughout the course of 2008 designed as a celebration of his work and of taxonomy in general. Plans are underway for LBG to get involved in this by running a 'DNA in the garden' exhibition. RBG Kew ran a similar event a few years ago, and it was very successful with the general public. It is easy to set up, and simply involves extracting DNA from common food plants using a washing detergent, and allows the public an insight into how and why DNA is extracted from plants.

It is accepted that the project website has not been updated as regularly as would be ideal, and the process of updating the website with the latest Annual Reports, publications and conference presentations is being carried out. All of the available data is now with the webmaster at UCR, and will be uploaded to the website in the near future.

- *Comment: It is recommended that the project consider how to provide policy and management recommendations.*

Response:

The present project represents only a small grant that has only been running for two years, and as such it is too early to expect to be able to dictate to conservation authorities. However a full report (detailing methodologies, preliminary results, future plans etc) is being prepared for sending to appropriate authorities (e.g. MINAE and SINAC) will increase the awareness of our project with them.

LBG has a strong link to orchid specialist groups, forming an integral part of the Mesoamerican orchid specialist group. Efforts will be made to gain the support of the IUCN orchid specialist group, which will undoubtedly strengthen the standing of LBG with conservation authorities and enhance subsequent recommendations regarding policy and management.

The databases and geo-referenced specimen data available at LBG will enable a variety of uses of this data to be employed in addition to IUCN conservation assessments. These include:

- Basic distribution maps to accompany scientific papers
- Identify collection effort – where to prioritise future collections
- Species richness analysis
- Range prediction models
- Biogeography analysis
- Identify representation of orchids in protected areas
- Analysis of Life zones and association with species

The application of these approaches can in turn provide useful and informative recommendations regarding policy and management.

Appendix 1

Darwin Initiative Project

GIS and Red List Conservation Assessment

From 09/04/07 to 13/04/07

Training Course – Evaluation

RESULTS

Please let us know how you thought the GIS and Red List training course went. (1=awful, 2=not good, 3=neither bad nor good, 4=good, 5=excellent)

Average (15 students, 10 evaluations received)

Introduction and IUCN Red List Categories and Criteria 4.5

1 2 3 (1) 4 (2) 5 (5)

Comments

Good. "Every biologist should know and understand these criteria"

Databasing standards and georeferencing 4.8

1 2 3 4 (2) 5 (8)

Useful and simple.

GIS introduction and application to Red List assessment 4.8

1 2 3 4 (2) 5 (8)

A bit complicated.

Relevance of case studies 4.9

1 2 3 4 (1) 5 (9)

Case studies were appropriate and relevant. Good illustration on Costa Rican biodiversity.

Any comments or advice?

General very good appreciation. Practice work in small groups was well appreciated. Expectation of more training courses that type in the future. Comments has been made on the length (5 days) of the training period, a longer course might be required in the future, in order to include more practice on GIS software extensions. This course includes a lot of information and 5 days might not be enough ("too short").