
Darwin Initiative
CCMA
Certification to support conservation
of endangered Mexican desert cacti
Annual Report
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1. Darwin Project Information.

Project Ref. Number	Ref 14-059
Project Title	Certification to support conservation of endangered Mexican desert cacti
Country(ies)	Mexico
UK Contractor	University of Reading
Partner Organisation(s)	University of Querétaro
Darwin Grant Value	£240 106
Start/End dates	September 2005 to September 2008
Reporting period and annual report number (1,2,3..)	September 2005 to 31 March 2006 Annual Report number 1.
Project website	*www.uaq.mx/ccma*
Author(s), date	Dr Julie A Hawkins; Dr Rolando T Bárcenas Luna 28th April 2006

2. Project Background.

Cactus collection by amateur enthusiasts and commercial organisations, and illegal trade in cactus plants and seeds present a significant challenge to Mexico in terms of meeting its obligations as a signatory of the Convention on Biological Diversity (CBD). Wild collected cacti from any locality cannot be traded or exported for commercial purposes, but current Mexican legislation allows collection, under permit, of “mother plants”. These plants can be propagated and the resulting plants marketed or exchanged. Limiting the negative impact of collection on wild populations has been difficult in the past because it is not possible to ascertain whether a plant has been wild-collected or propagated. This project aims to support the conservation, sustainable harvest and use of Mexican desert cacti by providing molecular tools which can be used to identify plants to the species level, to determine their parentage and to locate the populations that they were collected from originally. DNA fingerprinting and barcoding tools are applied here for the first time to cacti in trade.

3. Project Purpose and Outputs.

The central purpose of the project is to support the conservation, sustainable harvest and use of Mexican desert cacti and to ensure stake-holders get a fair share of benefits arising out of exploitation by the horticultural trade.

The project outputs, as outlined in the Logical Framework are as follows:

- A report on methodology/policy for certification (the stakeholders report)
- A collection of tissue and DNAs for development and testing
- Low cost, robust DNA technologies developed and transferred through establishment of laboratories in Mexico
- University-level training of Mexican scientists in the UK provisions skills to support the technology transfer
- Dissemination of research findings through peer-reviewed scientific publications
- Promotion of awareness of the Certification Scheme amongst growers and consumers through an information leaflet

The outputs and proposed operational plan have not been modified since September 2005 when the project commenced. However, there have been some delays in implementing activities to timetable because of the delays in signing the MoUs between Reading and Querétaro (reported to the Darwin Secretariat in the first Half Year Report, October 2005). This has impacted on the purchase of equipment in Mexico. Also, there have been minor changes to the fieldwork schedule. This is following the selection of target species, and because of the Mexican technician is training in Reading and not available for fieldwork.

4. Progress.

The project started in September 2005. Therefore we are not reporting on project activities prior to the beginning of this reporting period, April 2005 to March 2006.

The progress of the project (over the seven months of the reporting period that the project was active) is summarised in Annex 1. The following key milestones were in place for the first two quarters of the project.

Mexican technician appointed.

This milestone has been met. Mr Victor Rodriguez Garcia has been appointed to post at the University of Querétaro.

Equipment purchased.

Equipment was to be purchased for University of Reading and University of Querétaro. Equipment for University of Querétaro is on order. Equipment for University of Reading has not been purchased yet, to be ordered this month. The delay is because the laboratories at the University of Reading have been refurbished, and a new combination of research groups will be sharing labs. Best use of funds will be in response to the new arrangement.

Initial stakeholders' workshop.

This milestone has been met. The meeting was held at Universidad Nacional Autónoma de México (UNAM) in November 2005.

Plant collecting programme finalised.

This milestone has been met. We have devised a collecting programme.

Ongoing programme of plant collecting and molecular work initiated.

First two two-week collecting trips to Chihuahuan desert carried out.

Collecting has been carried out as a series of short visits. This is because of availability of field collectors. We need two people to work safely in the field. The technician, Mr Rodriguez, has been in the UK for some of the reporting period and Dr Bárcenas has been reliant on other project partners for field companions. We are improving our fieldwork planning by collaboration with other projects (see below) and anticipate field planning will be easier when Mr Rodriguez has returned to Mexico. Seek fieldwork summary box for outcome of fieldwork to date.

Target species for SSR maternity/paternity testing demonstrator identified.

We have chosen two species, *Echinocactus grusoni* and *Ariocarpus bravoanus*. The species selection was made based on anticipated pressure on populations due to illegal trade and availability of species distribution information.

First draft of stakeholders' report circulated.

This milestone has been met. The first draft of the stakeholders report has been circulated, and will be finalised and uploaded onto the website in the next reporting period.

Web site established.

This milestone has been met. The web site is hosted at the University of Querétaro at the following address: www.uaq.mx/ccma. However, since the main internet search engines are not retrieving the web page easily, we are considering mounting a mirror independent site with an independent service provider.

First exchange student selected.

This milestone has been met. The project PIs agreed to train Victor Rodriguez, the technician, in the first instance. This was for two reasons. Dr Bárcenas Luna is a new lecturer at the University of Querétaro and didn't have a relationship with current graduate students who might be appropriate exchange students. Mr Rodriguez can bring skills back to the lab in Querétaro where they can be utilised early in the project through his work as technician,

mainly in relation to the development of the protocols for the microsatellites. See fieldwork summary box for outcome of fieldwork to date.

Six-week collecting trip to S. Baja carried out.

Following refinement of the plant collecting programme (milestone two) and in view of the desirability of training Mr Rodriguez in molecular methods at an early stage we are planning to carry out this collection trip on his return to Mexico. Seek fieldwork summary box for outcome of fieldwork to date.

First exchange student visits UoR for molecular systematics intensive short course (10 days) and six-month supervised training in the molecular laboratories.

This milestone has been met. Mr. Rodriguez was able to attend the short course in full and to obtain a certificate of participation. Also, Mr. Rodriguez continues his training in the molecular laboratories in close contact and participation with the UK post-doc developing the microsatellites.

Third two-week collecting trip to Chihuahuan Desert carried out.

Because one of the species chosen for certification was in Zacatecas we relocated the trip from the main body of the Chihuahuan Desert to the western regions of desert in the state of Zacatecas. The UK post-doc travelled to Mexico for a second time to join this trip to provision material for microsatellite screening.

Fieldwork summary:

We now have available

E. grusoni: 145 samples; A. bravoanus: 12 samples; samples for DNA sequencing from other species: 125 samples.

5. Actions taken in response to previous reviews.

Not applicable.

6. Partnerships.

One unforeseen difficulty was gaining signatures for the Memorandum of Understanding between the University of Reading and the University of Querétaro. As a consequence funds were not available in the University of Querétaro in a timely fashion. This has slowed down the purchase of laboratory equipment and laboratory consumables in Mexico. Paperwork is now in place and financial transfers have been made. In terms of personal communication between project partners, we are very happy with the quality and quantity of communication. Dr Bárcenas Luna and Dr Hawkins have been

making good use of free internet chat facilities (skype). Emails are copied three ways between University of Reading, University of Querétaro and Universidad Nacional Autónoma de México.

We discovered that a grant application had been made to CONACYT, the Mexican science funding body, at the same time as the Darwin Initiative project. The CONACYT project addresses evolutionary questions about the evolution of the Mexican flora and has a broad taxonomic coverage. One of the study groups is the Cactaceae. Although the goals of the two projects are very different both rely of the collection of material in the field and the extraction of DNA. The project leaders of the CONACYT project met with Dr Hawkins, Dr Barcenas Luna and Dr Hernández in Mexico in September 2005. We agreed that there were opportunities to collaborate, especially in planning and carrying out fieldwork. The funding for the CONACYT project has only just been cleared and so we anticipate closer links in the future.

7. Impact and sustainability.

The stakeholders' meeting attracted the attention of many Mexican stakeholders, and word of mouth continued to spread after the meeting. We have raised the profile of the project by submitting information sheets to an EU CITES Scientific Review Group meeting and to the Partnership for Action Against Wildlife Crime (PAW) forensics working group in the UK. The Plant Talk article promoted heated discussion amongst UK cactus growers, collectors and specialist associations. Some responses are found on our project website.

Exit strategy was discussed at the stakeholders' meeting, and there was a feeling that Mexico could sustain the certification process after the project withdrew. It was agreed that this matter would be raised again at the next stakeholders' meeting.

8. Outputs, Outcomes and Dissemination.

The project outputs schedule includes the following for the first two quarters of the project. Where there are differences they are indicated in bold.

- 2006/03 One Mexican exchange students takes the Intensive Course in Molecular Systematics at the University of Reading. Achieved.
- 2005/09 A Mexican technician is employed. **Late start (2006/01 due to delay in signing MoAs)**
- 2006/01 Exchange student, 26 weeks training. Achieved.
- 2006/03 onwards. Four UoR staff spend 26-30 weeks in total in Mexico. Achieved (3 weeks spent in 2006/03).
- 2005/09 First stakeholder meeting. **Held in November not September because of delay in MoAs**
- 2005/11 National Press releases in Mexico and UK. **Article published in UK-based popular journal (Plant Talk).**

- In prep. **The Biodiversitas newsletter of CONABIO, the national Mexican body in charge of studying and developing plans for the protection and use of Mexican biodiversity will include a description of the project. The publication is expected in June or July, 2006 and will be included in the project's webpage.**

The following dissemination took place:

1. Website launched - target audience Mexican cactus growers, Mexican authorities, international cactologists and collectors.

2. Article published in Plant Talk - target audience UK collectors and conservationists.

3. Project profiled in the IUCN Species Survival Commission e-bulletin, link from http://www.iucn.org/themes/ssc/ - target audience international policy makers and conservationists.

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
3	Intensive Course	1				1
5	Employ technician	1				1
6A/6B	Exchange student	1				1
8	UK staff in Mexico	1				1
14A	Stakeholders' workshop	1				1
15A/C	Press coverage	1				1

Table 2: Publications NB with the exception of the website these are not publications written by the grant holder or collaborators, but they are describing the project.

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
website	Hawkins	n/a	http://www.uaq.mx/ccma	n/a
Plant Talk article	Pilot project uses DNA to control trade in Mexican Cacti. Claire Coleman (2005)	Plant Talk, see http://www.plant-talk.org/	http://www.uaq.mx/naturales/biologia/ccma/ENGLISH/03-Publications-In-News/Publications.html	n/a

9. .

Table 3: .

10. Monitoring, Evaluation and Lessons.

We had originally planned to use a log-in password protected website to upload checklists and data. To date our monitoring has been through informal channels, sharing spreadsheets electronically as attachments and through skype and messenger. Dr Hawkins has visited Mexico twice and Dr Hardesty the Reading post-doc has also visited Mexico twice. These opportunities for face-to-face discussions have been invaluable. We plan that the Dr Bárcenas and the Mexican web designer will visit the UK this summer to discuss formal implementation of the web-site monitoring.

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
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 • 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			
Purpose *(insert original project purpose statement)* • to support the conservation, sustainable harvest and use of Mexican desert cacti and to ensure stake-holders get a fair share of benefits arising out of exploitation by the horticultural trade	*(insert original purpose level indicators)* • dialogue between stakeholders initiated and ongoing • dialogue informed by technological developments and research findings for targeted cacti • development and implementation of a DNA-based CBD and CITES compliant certification scheme supported by DNA-based identification tools	*(report impacts and achievements resulting from the project against purpose indicators – if any)* • stakeholders' dialogue has been initiated (meeting held Mexico City, November 2005) and is ongoing (through submissions posted on website) • dialogue was informed by technological possibilities (presentation of DNA marker technologies made at stakeholder's meeting); these are in the process of being realised as the DNA identification tools are being developed	*(report any lessons learned resulting from the project & highlight key actions planning for next period)* • it was difficult to get full participation at the first stakeholders meeting; we anticipate the this will be easier for the second meeting as the profile of the project is raised and we consolidate and make new contacts. This is therefore a priority for the next reporting period

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

Outputs			
(insert original outputs – one per line)	*(insert original output level indicators)*1*	*(report completed activities and outcomes that contribute toward outputs and indicators)*	*(lessons learned resulting from the project & highlight key actions planning for next period)*
report on methodology/policy for certification	stakeholders' report prepared	the first draft of the stakeholders' report has been circulated	
collection of tissue and DNAs for development and testing	field and lab work make DNA available	we have collected 125 samples in the field; extraction is underway.	fieldwork been slow because collectors cannot safely travel alone; we need to plan collaborative fieldwork more effectively
low cost, robust DNA technologies developed and transferred	new knowledge on sequence variation and SSRs in Mexican desert cacti appropriate fingerprinting tools methodologies developed training manual prepared	we have started development of microsatellite (ssr) primers for two target species. We are currently screening colonies. we have DNA of exemplars of Mexican genera ready for sequencing.	ssr primer development is proceeding as planned we have learnt of another project using DNA sequence data for Mexican cacti, so an action is to dovetail the two projects
university-level training	courses and training exchanges equip 3 Mexican scientists to take project	the first Mexican exchange student arrived in Reading in January 2006, attended an intensive theory course and received laboratory training.	we learnt the best way to manage exchanges (through academic visitor status) it will be easier to implement for the next exchange
peer-reviewed scientific publications information leaflet	scientific publications prepared	we have planned the scientific publications, and data collection is underway for three publications	we have been monitoring recent publications relevant to our project and will continue to do so

*1 in the original Logical Framework there was not one to one correspondence between outputs and indicators; several indicators are indicators for multiple outputs. I have edited the presentation of the indicators to provide one to one correspondence although this has required some rewording.