



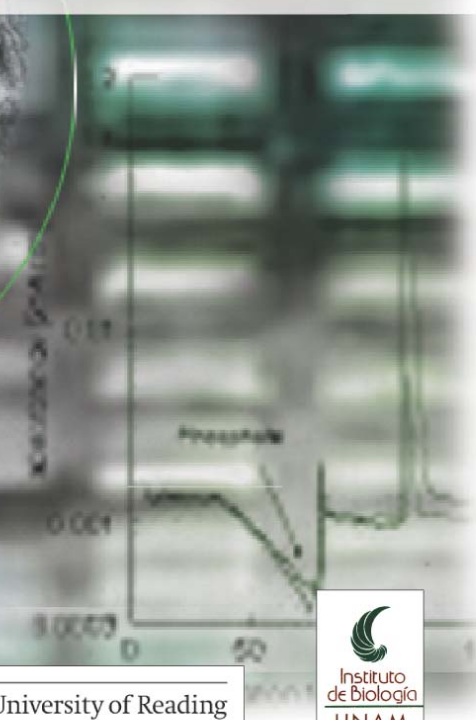
Darwin Initiative

CCMA

Certification to support conservation
of endangered Mexican desert cacti

Annual Report

Dr Julie A. Hawkins
Dr Rolando T. Barcenas Luna



Darwin Initiative Annual Report

Darwin Project Information

Project Ref Number	Ref 14-059
Project Title	Certification to support conservation of endangered Mexican desert cacti
Country(ies)	Mexico
UK Contract Holder Institution	University of Reading
UK Partner Institution(s)	-
Host country Partner Institution(s)	University of Querétaro
Darwin Grant Value	£240 106
Start/End dates of Project	September 2005 to September 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 April 2007 to 31 March 2008 Annual Report number 3
Project Leader Name	Dr Julie A. Hawkins; Dr Rolando T. Barcenas Luna
Project website	www.uaq.mx/ccma
Author(s), date	Dr Julie A. Hawkins; Dr Rolando T. Barcenas Luna 30 April 2008

1. 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.

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.

2. Project Partnerships

Our biggest challenge has been to respond to a lack of staff continuity in Reading. After the first PDRA Denise Hardesty left the project to take up a permanent job in Australia in June 2006, our second PDRA, Sara Hughes, joined the project. However, due to conflicting family and work obligations, Sara Hughes left the project in November 2007. After she left, the UK PI Julie Hawkins interviewed a number of candidates to fill in the position. In January 2008, the third PDRA, Chris Yesson joined the project. We hope that in appointing Chris we have been able to turn the staff turn-over "problem" into an opportunity. At the time Sara left the SSR work was almost completed, but the sequencing side of the project was ongoing. Chris has expertise in phylogenetic studies and outstanding ability in sequencing in the laboratory. Therefore he has been able to organise the outstanding tasks needed to continue and finalise the remaining sequencing and analysis of species. His Spanish speaking abilities have been useful in communicating with the Mexican counterparts. His IT skills have also contributed to enhanced communication between teams. For example, presently we are completing the sequencing, and it is essential that we are completely clear which team members are acting in what capacity, who is sequencing which species and using which primers. Chris has set up the password access website and form so we can upload information about our activities in real time.

The Reading team has developed its capacity to be an effective project partner by bringing on board the University's enterprise team as consultants. This has meant that business insights not otherwise available could be brought to bear for the planning for commercialisation of certified plants (see section 3.5).

In terms of development of the capacity in Querétaro, we have seen a change in staffing there which has significantly enhanced the range of skills available in the Mexican lab. Victor Rodriguez, the first Darwin exchange student and the first technician employed in Querétaro, was successful in an application to the Mexican research council CONACYT for a PhD studentship. Drs Hawkins and Barcenas are co-supervising his project, which will investigate further some of the biological questions relating to conservation biology and molecular ecology arising from the project. Victor is spending time in Querétaro and in Reading during his studentship. Victor's departure for the UK has meant that the number of "cactus people" has effectively been increased in the UK, and that the technician post in Mexico could be filled by our other Darwin exchange scholars. Maria de la Luz Ruiz Maqueda replaced Victor until she traveled to the UK for training in January. During her training period in Reading, Alberto Prado, the second trainee, has taken her place in the Mexican laboratory. We consider it an advantage for Querétaro that all of the Mexican exchange students have had the opportunity to be employed in Querétaro, and to use the skills they gained in Reading in the Mexican lab. All three have had the opportunity to work in the rather different conditions in Mexico and the UK, each enhancing the delivery of protocols in Mexico and bringing slightly different skills depending on the different technological challenges they faced in Reading. Further, there is no doubt that Victor's success in obtaining the PhD studentship funding can be attributed in large part to the training he received under the Darwin project, and particularly the publication arising which he co-authored.

In terms of collaboration with other projects, we continue to keep in touch with the CONACYT project (see Annual Report 2) through our collaboration with Hector Hernandez, a member of both teams.

The main contact for the CBD authority in Mexico has recently changed. We will be inviting the new representative to our second stakeholders' meeting.

3.1 Project progress

We continue to report on the three main aspects of the project in three sections 3.1.1 Microsatellites, 3.1.2 DNA sequencing, and 3.1.3 Fieldwork.

3.1.1 Microsatellites

We have completed screening of the two selected species of cacti, Ariocarpus bravoanus and Echinocactus grusonii, to test the utility of microsatellite fingerprints for certification purposes. As previously mentioned (Annual Report number 2), the article submitted to Molecular Ecology Resources on the development of the microsatellites of Echinocactus grusonii has been published (Hardesty et al. 2008). A second publication in Molecular Ecology Resources describing the development of the microsatellites for Ariocarpus bravoanus is currently in press.

To certify a genotype we need to know the distribution of SSR variation in natural populations, plants already in trade and in private collections. Micropropagated Echinocactus grusonii plants from the newly discovered Zacatecas population have been fingerprinted and shown to have fingerprints which are sufficiently distinctive (from other plants from the Zacatecas population, plants from the other known population and from plants in trade and in ex-situ collections) for authentication purposes.

We have also progressed towards designating a certified genotype for Ariocarpus bravoanus. All the known natural populations of Ariocarpus bravoanus in Mexico have been collected and microsatellite development and screening for this species has been finished. We will be exploring methods for propagating A. bravoanus so that certified genotypes can be made available.

Microsatellites can also find forensic use, and may guide conservation. Plant materials from several nurseries in Europe, Asia and the United States were screened in order to determine the ex-situ conservation value of these plants. Also, we have been able to sample five Ariocarpus bravoanus plants from a seizure by the Mexican authorities in the state of San Luis Potosí to determine where these plants were stolen from.

Summary:

key milestones relating to ssrs up to end of tenth quarter

ssr markers developed for two endangered species ✓

ssr screening completed for 100% of primer pairs across all accessions ✓

3.1.2 DNA sequencing

Presently we have three team members actively engaged in sequencing, Alberto Prado in Querétaro, and Chris Yesson and María de la Luz Ruiz Maqueda in Reading. María de la Luz Ruiz Maqueda is the third of three Mexican trainees. She arrived in the UK on January 15th to begin her training period. Luz is concentrated on sequencing missing regions, and has already attended Reading's Intensive Course in Molecular Systematics.

Access to voucher specimens (approved by DI – see annex 3) has increased our DNA bank for sequencing purposes. We have been able to collect samples from the National Herbarium in Mexico City (MEXU), the Herbarium of the Autonomous University of Baja California (BCMEX), the living plant collection of the Charco del Ingenio botanic gardens, in San Miguel de Allende, Guanajuato, Mexico, the Rancho Santa Ana Botanic Gardens (RSA) in California and the Sukkulenten-Sammlung Zürich Herbarium in Zurich. These samples were split between the UK and Mexican teams to increase the number of sequences per unit time. These collections have in general been a good source of DNA for sequencing purposes but some collections have been difficult to amplify for certain regions and we have collected other individuals from the same species to overcome this difficulty. We have also had some problems with some synonyms used in our preliminary list of species. It has been impossible to collect materials for some of the species since new and updated lists of species treat these names as synonyms for other species names. We have decided to exclude these names from our list of target species.

We have sequenced as two amplicons. The first amplicon has been sequenced for 592 species, the second amplicon for 538 species. We are currently sequencing the missing species and filling gaps for partially sequenced species. The third Mexican student will be at Reading until May. Sequencing in Reading will finish at that time and the rest of the species completed in Mexico by the end of May.

Summary:

Milestone relating to activities up to end of tenth quarter - 75% of species (488 species, 600 individuals, including multiple accessions) collected, determined, extracted and sequenced.

Delivered to date – 92% of species (645 species collected and determined, 592 species and 675 individuals sequenced, including multiple accessions).

Collection ✓ sequencing ✓

.1.3 Fieldwork

Fieldwork for Ariocarpus bravoanus certification scheme has been completed and all the known populations have been collected. Access to voucher specimens (approved by DI – see annex 3) has allowed us to reprioritise fieldwork objectives. The two-week trip to Tehuacán Valley has been postponed since all the endemic species of the Valley have already been collected and sequenced. The financial resources for this trip have been allocated to the purchase of laboratory consumables and fieldwork in the central region of Mexico, mainly fieldwork already done in Jalisco, Aguascalientes, San Luis Potosí and Guanajuato. This field trip to Central Mexico was important since various species are endemic to this region. The trip to North Baja has been carried out and all the missing species collected and sequenced. The continuation of the trip to NE Sonora, originally planned to be connected with the trip to North Baja, had to be cancelled since Mexican PI had to be present in UAQ to finalise paper work for his permanent tenure.

Summary:

Overall we have sufficient access to material – from field-collected sources and existing collections – to meet our objectives.

3.2 Progress towards project outputs

The project output will be the DNA-based CBD and CITES compliant certification scheme for nursery-propagated, traded cacti and the establishment in Mexico of DNA fingerprinting for certification and identification. We are progressing towards these outcomes on two fronts 1. Technically, through data collection and training. 2. In terms of negotiating an appropriate system for implementing the certification through stakeholder dialogue and associated activities.

Technically we have made great progress. The skills and the data are available to go ahead. There has also been progress on the development of the certification scheme. Significantly, the Mexican PI has been appointed Director of the Botanic Garden at UAQ and will direct the move of the actual garden to a new location. The relocation of the garden will be finished this year and the production of certified plants is already considered as part of the new plans for the garden. This will facilitate the production and distribution of nursery certified plants since the botanic garden is a legally registered organization under Mexican law. Additionally a review of the markets and the business opportunity has been carried out by University of Reading. The contents of their report will be fed back to the second stakeholders' meeting. The second stakeholders' meeting was to be held by now, but has been delayed to the end of the Mexican term for two reasons. One, University authorities in UAQ would like that interested students from Biology and other courses attend the workshop; a delay until after all classes have officially ended (May-June, 2008) would increase the participation of students and research staff in the workshop. Second, maternity leave from UK's PI has been planned for May and it is necessary that the second workshop would proceed without the participation of UK's PI. We considered it desirable that the Mexican PI visits the UK in advance of the meeting (and the maternity period if possible, though meetings can be scheduled for this period if necessary), combining the visit to prepare for the stakeholders' meeting with the training arranged for the Mexican PI in Reading (see annex 3). The organisation of the second stakeholders meeting is underway.

*We anticipate that the impact on biodiversity, sustainable use and equitable sharing will be felt in the following ways. When certified plants are marketed this will reduce the market share of unsustainably harvested wild plants. The successful negotiation and implementation of Prior Informed Consent (PIC) in accordance with the CBD will ensure that the profits arising from the marketing of certified plants will be distributed equitably. Thus the impact of marketing certified plants will be felt once the plants are marketed. We anticipate marketing of certified plants will be possible following completion of our project. We are continuing to propagate the first fingerprinted seedlings of *E. grusonii* as the first DNA-certified*

plant species to be propagated and traded in accordance following the CBD rules. This point is further amplified in section 6.

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
3	Intensive Course	1		1		3	2
5	Employ technician	1				1	1
6A/6B	Exchange students*	1		1		3	2
6A	Molecular training workshop in Mexico by UoR staff (changed to UoR, see annex 3)			1		0	1
7	Training manual				1	0	1
8	UK Staff time in Mexico	1				1	1
9	Stakeholders' report	1				1	1
10/12B	Identification tool				1	0	1
11B	Minimum of two submissions to peer-reviewed journals				2	2	2
12A	SSR database				1	1	1
13A	DNA collection				1	1	1
13B	Herbarium voucher collection			1		1	1
14A	Stakeholders' workshops	1		1		1	2
15A/C	National Press Releases	1			1	0	2
16A/B/C	Information leaflet and website for consumers				1	0	1
19C	Interview			1		1	1
20	Lab equipment	1				1	1
21	Lab established in UAQ	1				1	1

* The codes, descriptions e as detailed in section 21 of our application. Here we refer to two exchange students, although the project milestones and budget refer to three. Three exchange students have visited Reading for training; all three attended the Molecular Systematics Intensive Course.

4. Monitoring, evaluation and lessons

As previously mentioned in Annual Report 2, it was an important lesson for the future that collaborations include an explicit timetable for partner institutions to allow PI's to negotiate time for fieldwork as part of their responsibilities, so administrative and teaching duties could be distributed accordingly.

Access to herbarium materials for sequencing has greatly improved our situation and partially solved the problem of delayed fieldwork. However, since one of the goals was to produce a complete scientific collection of plant materials, fieldwork will extend until resources are fully exhausted in order to increase the collection of herbarium material, living plants and seed collection.

We have implemented, thanks to the new PDRA, Chris Yesson, an electronic system to control and supervise progress of both teams for updating collections of silica dried tissues, DNA extractions and sequencing. This scheme is based on a free web based system developed by Google, "google docs", that allows instant updating and retrieval of information by the different team members regardless of where they are. This new system has worked very well and we have greatly increased our communication. We are also continuing to communicate by email and Skype in order to reduce costs.

We are committed to raising the profile of the Darwin Initiative in the UK and in Mexico, but we have found it difficult to influence the reporting of the project in Mexico. As Table 2 shows, the project has attracted a great deal of press interest. Unfortunately we have not been able to influence the newspapers publishing articles describing our work to mention the Darwin Initiative. Despite the best efforts of the Mexican PI when being interviewed to highlight DI, DI is not always mentioned in the articles. Some articles have been published when an original newspaper article has been picked up by a second newspaper. In this case we have had no opportunity to influence the content of the second article. We don't have ideas about how to address this issue.

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

The reviewer asked for clarifications to be made in the half year report following submission of the second annual report. These were submitted as requested.

The reviewer made very valuable suggestions regarding the development of stakeholder dialogue. We have explored the questions raised by the reviewer in our own discussions, and are fully committed to integrating these suggestions in this summer's stakeholders' meeting. The Mexican PI is seeking to make links with the bodies flagged by the reviewer as having relevant expertise.

6. Other comments on progress not covered elsewhere

Accommodating maternity leave, and the impact of pregnancy of availability for travel, has been a challenge. We are confident we have a strategy in place so that we will continue to deliver on the project. The maternity period comes at a time when the Mexican partner has built significant capacity and, for example, is well placed to absorb to absorb a significantly increased role in the organisation of the second stakeholders' meeting. See annex 3.

The micro propagation of E. grusonii seedlings is underway and several tissue-cultured plants are growing at UAQ laboratories. Tissue culture with this species has been a challenge since no protocol has been published for vegetative propagation with E. grusonii. All the plants in the market are grown from seeds harvested at different botanic gardens or may have been harvested from the remnants of the original population, mainly illegally. We have been able to perfect the protocol to produce vegetative seedlings of E. grusonii and the plants are fully developing, but growth rate is lower than we expected if compared with other species under the same conditions. Dra. Guadalupe Malda, from the micro propagation unit at UAQ, has kindly provided some valuable remarks in order to increase growth rate for the seedlings. We are currently implementing those recommendations and it is expected that by the end of the project the seedlings will have a marketable size or at least be able to be distributed to nurseries interested in the propagation of such plants.

7. Sustainability

The Mexican PI's new role as Director of the University of Queretero's Botanic Garden provides an excellent opportunity to develop integrated laboratory, tissue culture and nursery facilities which will serve as a centre for certified cacti. We are envisaging that this facility can be developed to be at the heart of the provision of plants for the national and international market, either by providing plants to grow on in participating national or international nurseries (including local nurseries managed by local communities and ngos), or by directly supplying the market. The opportunity to bring together all stakeholders in the University of Queretero to develop more a more concrete vision given this opportunity is an exciting one.

8. Dissemination

Type	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Newspaper article	México, el gran concentrador de la biodiversidad. I. Rolando T. Bárcenas. 2008.	Periódico Tribuna. 438: 17. Querétaro, Querétaro, México	Address to request access. http://www.uaq.mx/fcps/tribuna/ . Email: tribunadequeretaro@gmail.com .	n/a
Newspaper article	México, el gran concentrador de la biodiversidad. II. Rolando T. Bárcenas. 2008.	Periódico Tribuna. 439: 16. Querétaro, Querétaro, México	Address to request access. http://www.uaq.mx/fcps/tribuna/ . Email: tribunadequeretaro@gmail.com .	n/a
Radio interview	Comercio legal de cactáceas y conservación. Rolando T. Bárcenas, enero 30, 2008.	Radio UAQ, Universidad Autónoma de Querétaro, Mexico.	Address to request access: http://www.uaq.mx/radio.html	n/a
Newspaper article Nb. Mexican PI was not interviewed for this article.	Combaten con genética el tráfico de cactáceas. Juan José Arreola. July 14 th , 2007.	El Universal, Mexico.	http://www.eluniversal.com.mx/cultura/53348.html	n/a
Newspaper article Nb. Mexican PI mentioned several times the funding body was DI	Sistema molecular permitirá saber el ADN de plantas en extinción	El Hispano News, U.S.A.	http://www.elhispanonews.com/news.php?nid=2134&pag=0	n/a
Undergraduate thesis. Nb. Acknowledges the support of the Darwin Initiative	Alberto Prado Farías, has developed his undergraduate thesis "Phylogenetic diversity analysis of the Cactaceae in the Peninsula of Baja California"	UAQ, 2008, Mexico.	Interlibrary loan, UAQ (once included in the records of the library). A peer-reviewed paper for submission to an international journal is being developed and Darwin Initiative acknowledged.	n/a. Salary, laboratory work and fieldwork included in the project's activities.
International	Mexican PI was invited	Poster	http://www.dnabarcodes2	Cost to

<i>meeting at the Second International Barcode of Life Conference</i>	<i>to assist to this meeting with a poster presentation "Barcoding cacti: a tool in the battle against illegal trade"</i>	<i>presentation</i>	<i>007.org/</i>	<i>project \$180.00 USD. (ca. £60.00 GBP). Remainder of cost met by conference organisers.</i>
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9 Project Expenditure

From University of Reading Project Summary Report to end of March 2008:

MEXICAN EXPENDITURE:

actual this year:

actual for project life:

budget:

balance in hand:

monies allocated for transfer to Mexico in next financial year: none

percentage in hand: 7.5%

The last transfer of funds to Mexico was due before March 2008, but we are awaiting the invoice from UAQ. Thus we have 7.5% of funds remaining in hand.

UNIVERSITY OF READING EXPENDITURE:

actual this year:

actual for project life:

budget:

balance in hand:

monies allocated for spending in 2008-2009:

budget less next years' spending:

percentage in hand: 3.9%

NB Monies to Mexico and monies to Reading are managed separately. This report is prepared from the March 2008 project summary reports for Mexican and UK funds. Project summary reports are sent to project PIs on a monthly basis. The Darwin project annual reconciliations will be available from the Research Accounting office next week. These will show the full budget headings.

Annex 1 *Report of progress and achievements against Logical Framework for Financial Year: 2007/08*

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 <i>(insert original project purpose statement)</i></p> <ul style="list-style-type: none"> • 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 	<p><i>(insert original purpose level indicators)</i></p> <ul style="list-style-type: none"> • 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 	<p><i>(report impacts and achievements resulting from the project against purpose indicators – if any)</i></p> <ul style="list-style-type: none"> • ongoing dialogue continues following publication of first stakeholder report, and is complemented by ongoing market research with a view to supporting CBD-compliant commercialisation • databases of SSR and sequence data which will underpin species identification, and identification of geographical origin and parentage are complete and almost complete respectively 	<p><i>(report any lessons learned resulting from the project & highlight key actions planning for next period)</i></p> <ul style="list-style-type: none"> • completion of fieldwork was particularly challenging because of time constraints on the Mexican PI – it was necessary for the UK PI to participate in more trips and to source some species from existing collections • now we are very close to completing the technical aspects of the project, full attention is turned to stakeholders' dialogue and implementation

*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.

Annex 1 continued. Report of progress and achievements against Logical Framework for Financial Year: 2006/2007.

Outputs			
<i>(insert original outputs – one per line)</i>	<i>(insert original output level indicators)*1</i>	<i>(report completed activities and outcomes that contribute toward outputs and indicators)</i>	<i>(lessons learned resulting from the project & highlight key actions planning for next period)</i>
report on methodology/policy for certification	stakeholders' report prepared	completed in last reporting period	the stakeholders' report was the output from the first meeting. We will need a further document which summarises progress since the first meeting – at least for internal use as a working document (this is over and above the agreed outputs)
collection of tissue and DNA for development and testing	field and lab work make DNA available	fieldwork completed; sourcing of outstanding species from existing collections underway	we learnt that negotiating PI availability for fieldwork is paramount for any future project
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	methods are now fully established in both Mexico and Reading; training manual being developed and tested.	ssr development was in Reading; limitations on availability of equipment in Mexico means the final stage of the screening step will have to be outsourced; this may incur "chain of custody" issues which will need to be discussed with stakeholders
university-level training	courses and training exchanges equip 3 Mexican scientists to take project forward	third exchange student now in Reading for training; all three trainees have worked on the project in the UAQ lab	unfortunately further resources for the employment of one or all of the trainees at the end of the project is not available; therefore in the next reporting period it is essential that we ensure that the Mexican PI is also fully able to carry out laboratory techniques (see annex 3)
peer-reviewed scientific publications information leaflet	publications prepared	second peer-reviewed publication in press (Molecular Ecology Resources, describing the <i>Ariocarpus bravoanus</i> primers)	papers describing the use of the DNA sequences for species identification and describing the application of ssrs for certification are in prep. We will discuss the content of the information meeting with stakeholders in the next reporting period.

Annex 2 Project's full current logframe

LOGICAL FRAMEWORK

<i>Project summary</i>	<i>Measurable Indicators</i>	<i>Means of verification</i>	<i>Important Assumptions</i>
<p><i>Goal:</i></p> <p><i>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</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 benefits arising out of the utilisation of genetic resources</i></p>			
<p><i>Purpose</i></p> <p><i>to support the conservation, sustainable harvest and use of Mexican desert cacti and to ensure stakeholders get a fair share of benefits arising out of exploitation by the horticultural trade through development and implementation of a DNA-based CBD and CITES compliant identification and certification scheme</i></p>	<p><i>dialogue between stakeholders, particularly policymakers, initiated and ongoing inc. forward planning for national implementation</i></p> <p><i>dialogue informed by technological developments and research findings for targeted cacti, and global market</i></p> <p><i>low-cost and robust (reliable and reproducible) fingerprinting methods for identification of species and genotypes developed</i></p>	<p><i>stakeholder meeting held, and stakeholders attend; follow-up identifies way forward in light of technological and scientific developments</i></p> <p><i>field and molecular research carried out</i></p> <p><i>low-cost and robust fingerprinting methods for identification of species and genotypes available and implemented in Mexico</i></p>	<p><i>all stakeholders are able to attend meeting</i></p> <p><i>safety of fieldwork in Sonoran border regions is such that fieldwork possible there</i></p> <p><i>UK and Mexican staff available. University of Querétaro continues to maintain laboratories, and access to herbaria in MEXU and Querétaro possible</i></p>
<p><i>Outputs</i></p> <p><i>report on methodology/policy for certification, outlining problems and possible solutions</i></p> <p><i>collection of tissue and DNAs for development and testing</i></p> <p><i>low cost, robust DNA technologies developed and transferred</i></p> <p><i>university-level</i></p>	<p><i>stakeholders' report, handbook and scientific publications prepared</i></p> <p><i>field and lab work makes DNA available</i></p> <p><i>new knowledge on sequence variation and SSRs in Mexican desert cacti</i></p> <p><i>appropriate fingerprinting tools methodologies developed</i></p> <p><i>technical handbook for DNA fingerprinting</i></p>	<p><i>stakeholders' report available in hardcopy and electronically</i></p> <p><i>database of material collected and extracted</i></p> <p><i>sequence data exploited as SSR and SNP markers implemented in Mexico</i></p> <p><i>certificates of attendance at short courses, and training exchanges</i></p>	<p><i>suitable post-doc and technician, and exchange scholars, can be identified and employed</i></p> <p><i>fieldwork successful</i></p> <p><i>permissions already granted to sample from herbarium specimens extended</i></p> <p><i>DNA extraction methods already developed in Reading for</i></p>

<i>training peer-reviewed scientific publications</i>	<i>short courses in Mexico and UK and training exchanges equip 3 scientists to take project forward in Mexico</i>	<i>happen at least two scientific publications, plus manual</i>	<i>Opuntioid cacti are applicable across other groups</i>
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Annex – supplementary material

Agreed changes to project schedule:

From: Eilidh Young [darwin-projects@ectf-ed.org.uk]

Sent: 15 January 2008 16:37

To: Julie A. Hawkins

Cc: Spencer, Lisa (WHB); Giles, Vicki (WHB)

Subject: RE: Project Ref 14-059

On the points you raise:

Maternity leave – congratulations... the project award was made to the University so it is their responsibility to ensure that the award conditions are met. Having said that, it is clear that it would be difficult for someone to pick up this project at the end of 3 years, just to complete the final reporting, so I am happy to be flexible here. With the current timetable (project end 31 August) I would expect a final report by the end of November. If this is likely to be difficult, and it depends on your own situation, I would be happy to agree a reasonable extension to the report deadline – preferably keeping it within the financial year (ie to allow us to review it before the end of March, the latest deadline would be February 2009). Perhaps you could let me know what you think is realistic timing so we can agree a date in principle.

Herbarium material – if the reviewer recommended this, and you have been able to organise it, then I am happy to agree to this change.

Relocation of Training – again, you have clearly explained the details and this seems to make sense. As long as it fits within the other project requirements, and has no budgetary implications, then I am happy to approve this change too.

I hope this is clear, but do let me know if there is anything you are unsure about.

Regards

Eilidh Young

Darwin Projects

Pentlands Science Park, Bush Loan, Penicuik, EH26 0PL

Tel: 0131 440 5181 Fax: 0131 440 5501 Website: www.darwin.gov.uk

From: Julie A. Hawkins

Sent: 19 December 2007 18:12

To: Spencer, Lisa (WHB)

Cc: Barrett, Maria (WHB); Rolando Bárcenas; "Rolando T. Bárcenas"

Subject: project Ref 14-059

Dear Lisa, Maria,

I'm writing with queries related to project reference 14-059, "Certification to support conservation of endangered Mexican desert cacti"

The first question relates to arrangements for maternity leave. I am PI on the project, due to finish in August of next year. However, I am expecting to take some maternity leave from May onwards. I am envisaging that the majority of the project work will be complete or almost complete by May, but I am concerned as to how the maternity leave will impact on the project's final reporting. I am salaried by my employer, and not through the Darwin grant. Are my employers obliged to find the means to deliver the final report if I am not able to fully contribute? My concern is that it would be extremely difficult to have someone pick up the project at this late stage and complete the final project report. I hoped you might have some advice for me. Might it be possible to seek an extension to the deadline for the final report?

On another matter, there are a couple of minor changes to the project which I hope you will approve. One is the use of herbarium specimen material to complement field-collected material as a source of DNA for the species-level barcoding research. I have already raised this matter in an annual report. The reviewer noted "It is recommended that the Darwin Secretariat is indeed approached to ask for permission to use the MEXU collection, if this will help the project complement the material, as soon as convenient. Material from collections has been used before in other projects when fieldwork activities have encountered specimen collection shortcomings (due to a variety of circumstances ie bad climate, unsuccessful trapping, etc)." Since that report was submitted we have been working hard to ensure field collections are used as far as possible, but are seeking permission to complement field collections with material from the MEXU herbarium. We have full permissions to use material from the appropriate MEXU authority.

The second minor change relates to the relocation of the training, currently scheduled to take place in Mexico. We propose to relocate the venue for the technical aspects of the training to Reading. This is for a number of reasons. 1. The Mexican PI has requested the change in venue, because it is difficult for him to concentrate on training and to create focused free time because of his numerous responsibilities to his employers, UAQ. 2. The Mexican PI has noted that the three students most likely to be involved in the delivery of the technical aspects of the project have already been trained in Reading, so there isn't a cohort of Mexicans to be trained - he considers himself to be the only untrained potential participant. 3. We can teach a range of software here in Reading which will inform the Co-PIs decision-making on which software he prefers to run for fragment analysis in Mexico. 4. One additional output of the training in Mexico was to ensure the smooth-running of the Mexican lab. However, the UK-PI made an unscheduled trip to Mexico in July (following the recommendation of our external reviewer), and in addition to joining the Mexican PI in the field the UK-PI reviewed practices in the Mexican lab, so this aspect of the training has already been delivered.

Thank you for your time and patience, and apologies for sending this mail so near to the holiday.

With seasonal best wishes,

Julie

Dr Julie Hawkins, University of Reading.

CC Rolando Barcenas, Mexican PI.