DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES

ANNUAL MONITORING FORM

Project Details

DoE Project Ref No

Project Title: **The Darwin Project in Coastal Vegetation Survey and Conservation for Lebanon**

Institution: **Royal Botanic Gardens, Kew and American University of Beirut**

Round 1	☐	(please tick)
2	☐	
3	☐	
4	☐	
5	☐	
6	☐	
7	☑	

PROJECT IMPLEMENTATION TIMETABLE

a) Outline progress over the last year against the agreed baseline timetable for the project. If some milestones have not been achieved or have slipped, explain reasons for this.

- Three MSc theses submitted, degrees awarded (Mirella Dardas, Roland El Hachem, Marcelle Dagher - abstracts attached) (2A–3)
- Two MSc theses in preparation (Hala Zahreddine, Joanna Chatilla). Two MSc continuing (Heba Rteil, Maya Abboud). All on various aspects of the ecology and conservation of the coastal zone of Lebanon.
- Coastal plant species reference collection established at AUB. 1800 specimens collected, dried and mounted on herbarium sheets; approx. 85% identified. Further identification in progress (13A-1). Duplicate collection held in University of Reading Herbarium. 613 specimens collected during spring flowering season and awaiting processing.
- Revised checklist of coastal plants completed (Nigel Hepper, Hala Zahreddine) (10)
- Coastal insect species reference collection established at AUB - approx. 2000 specimens collected which have been identified to order, family, genus or species level. Further identification in progress (13A-1)
- One week training in survey and ecological techniques for postgraduate students completed in May (Dr Colin Clubbe) (4C-5; 4D-1)
- Project planning meetings held at AUB - May (Dr Salma Talhouk, Dr Colin Clubbe)
- Two weeks training in plant identification, field collection for herbarium specimens for postgraduate students completed in June (Dr Stephen Jury, Ronald Rutherford, University of Reading) (4C-5; 4D-2)
- Two AUB postgraduate students attended a 2-week training course in Egypt in 'Conservation of Biological Diversity: the challenges facing the arid areas of the Mediterranean' (4C-2; 4D-2)
- 1-day workshop held at AUB in June for postgraduate students and faculty on 'Digital photography and its applications to biodiversity documentation' (Dr Walid Raad). A digital camcorder has been purchased by the project for documenting the coastal zone habitats and plants.
- Digital image collection established. Currently comprises 200 digital images and approx. 1800 other photographs - habitats and species portraits. Currently being documented and classified (13A-1)
- GIS/ landscape ecology training/study visit to University Reading for one faculty member (Dr Rami Zurayk – 1 week) and one postgraduate student (Joanna Chatilla – 2 weeks) in July (4C-1; 4D-2; 6A-1; 6B-1)
- 2 week visit by Dr Colin Clubbe in October – 1 week training in field survey/ecology/data analysis (4C-9; 4D-1). 1 week research/ MSc examining (8-1)
- Project planning meetings held at AUB - October. (Dr Salma Talhouk, Dr Colin Clubbe)
- Discussions initiated with the Ministry of Environment to select appropriate Municipalities and NGOs and plan their further involvement in conservation activities. This will come under the broader Ministry project on Coastal Rehabilitation
- Brochure on coastal conservation and the Darwin project in preparation to distribute to Municipalities prior to hosting series of workshops/ meetings on wider involvement in conservation - planned for May/June

- Discussions/ meetings held with the Ministry of Environment to plan greater involvement with conservation and the outputs of the Darwin project. Planning started for major workshop including Government representatives in March 2002.
- 1 week visit by Dr Colin Clubbe in April for research/ MSc examining (8-1)
- 3 scientific papers in preparation to publish results of project
- Electronic version of revised plant checklist for coastal species completed and handed over to AUB (1530 species). Maintained in Post Herbarium at AUB (12A-1)
- 18 permanent field plots established as part of Maya Abboud's project (22-18)
- Workshop organised by the NGO *Greenline* on the cultivation of fruit trees and other plants during which Hala Zahreddine ran a session on the importance of native species in landscaping, incorporating the Darwin project and some of her results on *Pancratium maritimum*. Attended by 55 school teachers (14C-1)
- Dr Talhouk gave a public lecture on coastal conservation and the Darwin project at a meeting in Tripoli attended by approx 300 members of NGOs and Heads of Municipalities from Northern Lebanon (14C-1)
- Approximately £150 worth of books and reference materials donated to Darwin library at AUB (20-£150)
- Project has started work on the compilation of a project CD to contain all the project documentation and outputs (data, images, scanned herbarium specimens etc).

b) What progress has the project made in achieving its objectives over the last year? Is the project still expected to achieve all the original objectives which were specified? Explain any problems/difficulties which have been encountered to date in achieving the objectives of the project (or any which you envisage may be encountered in the future).

The project is making good progress.

The MSc based activity is exceeding that planned for in the original proposal. Students are being attracted to the project because of the keen and enthusiastic team that has developed around faculty members and project collaborators Drs Talhouk and Zurayk. Although only 4 MSc studentships were written into the original proposal and receive full Darwin scholarships, an additional 3 are working in the coastal zone, including one on insect diversity, and 1 in the mountains. All students work collaboratively under the Darwin umbrella, giving the project a higher profile in AUB. 'Extra' master's project funded from sources outside the Darwin project.

Three coastal field study sites have been lost during the course of the first 18 months of this project, affecting the work of four students. One was ploughed up and fenced for agriculture, one burned and cleared, and one cleared for a car park and related beach development. This not only highlights the urgent need for conservation planning, based on sound data, an objective of the project, but also the urgency of the situation. We hope that further sites will not be lost, but if they are it could affect the final outputs of the project.

We are still unable to undertake any fieldwork in the south of the country and this remains a hole in our dataset. We had hoped to be able to survey the southern areas after the Israeli withdrawal in May, but this area remains inaccessible due to presence of land mines.

Identification of insects has proved to be a problem. One of the 'extra' master's projects added to the project is a complementary survey of insect diversity in sites where the plant inventory work is being undertaken. Approximately 30 insects have been identified only to the order level, 287 to the family level, 33 to genus level, and 100 to the species level. Dr Knio at AUB has expertise in some groups, but for many insect groups identification keys do not exist and the expertise for identifying many of these species resides in Institutions such as the Natural History Museum that has a commercial charge of £100 per specimen. Since this project was additional to the original proposal, no funds were budgeted for this area. Dr Knio has approached the NHM and similar institutions to see whether any help may be available.

The project finances are being re-profiled, as a result of carry-forwards requested and agreed by the Darwin Initiative, subject to this re-profiling (see project expenditure). The request was made rather late in the year.

c) What lessons can be learnt from your experiences (both good and bad) over the last year?

The Darwin project at AUB is acting as a positive catalyst for conservation-related activities within AUB itself and more broadly in Lebanon. Dr Talhouk (project co-ordinator, AUB) has forged strong links with the Ministry of Environment and there is a regular flow of information. Related activities have been undertaken, including a recent capability assessment for a World Bank project completed by Dr Talhouk. Interest has been generated about establishing a botanic garden in the coastal zone in Lebanon (the project study area), and a possible site has been identified. The project originally called for 4 MSc students to be trained within the project. Three have graduated and a further 4 are registered and undertaking related projects under the overall Darwin umbrella. The Post Herbarium in AUB is being re-activated after years of limited activity. This helped to secure funds recently to purchase additional herbarium cabinets, supplies and computer equipment. A Post Herbarium Interfaculty Committee has been established with Dr Stephen Jury as an advisor to the committee. The curator, Mrs Nada Saoud, is attending the Herbarium Techniques course at Kew (30 May - 20 July 2001). Mrs Saoud is also discussing the possibilities and practicalities of registering for a PhD at the University of Reading with Dr Jury as her main supervisor. If this all goes through it will be an enormously valuable development in improving AUB's taxonomic capacity.

Political conditions in the region remain volatile and can change rapidly. These external influences are having some negative effects on the project because of the needs for extra security, and the related costs, as well as preventing a full assessment of the coast as it is still not possible to establish sampling sites in the extreme south of the country.

Building capacity based largely on training master's students has limitations. Once they graduate, they need to find jobs and those can take them out of the conservation field, resulting in potential loss of trained capacity. However, we hope that they will have a 'conservation influence' wherever they work. Some investment in Research Assistants within the project for a graduated master's student has several advantages. This would retain expertise within the lifetime of the project. They help cascade the training and maintain continuity. We have done this in the latter part of this year with Mirella Dardas who has helped plan internal workshops as well as going out into the field with new student Maya Abboud to help with field identification. We are making a formal request to Darwin to keep on a graduated master's student as a research assistant during the last year of the project, using money originally allocated for a field assistant. This is part of the re-profiling exercise.

Internal staffing problems at Kew have had some delaying effects on the project. Brought about by changes in personnel, maternity leave and non-replacement of posts, there has been a knock-on effect in the timing of some activities. The main effect has been that the reintroduction/ recovery workshop scheduled for the end of this project year has been postponed to autumn 2001, although some essential tutorials in this area have been held.

d) If the project timetable has slipped or changed, provide an updated project implementation timetable for the remainder of the project. *(Please note that projects are expected to adhere to their original timetable and that the timely completion of projects is an important factor taken into account by the Department when assessing project performance. However, from time to time projects may be delayed unavoidably. Where a project is falling behind schedule, details on the revised programme of work should be provided below.*

The project remains on schedule. The number of Lebanese postgraduate students who attend the various training activities lead by the UK collaborators varies, averaging 5-9 and below the 10 planned for in the original project proposal, although the numbers are made up by AUB faculty who participate in many aspects of the programme. Part of the problem in reaching a wider group at AUB has been timetabling. Some teaching has been done within the formal taught master's programme (eg Dr Clubbe taught on the 'Survey and Collection of Plant Genetic Resources course'). However, visits by UK project staff can not often be timed to coincide with the timetable of relevant courses. In addition, our ideas of the effectiveness of training have evolved in response to the needs of the project. A much higher investment has been made in those whose research work is part of the project, with more small-group work and tutorials. We hope that this investment will pay dividends during the final year of the project as they cascade the training to schools, NGO groups and the Municipalities. In this way real project results and materials of direct relevance to Lebanon will be disseminated rather than a more 'academic/ theoretical' level of teaching.

e) What is the estimated completion date for the project?

We would like to request that the project end date be moved to June 2002. If agreed we would envisage making a request for a small carry-forward of funds to cover final activities during April-June 2002. There are two main reasons for this request. The main 'end of project workshop' is planned for March 2002. The final two master's students will not graduate until May 2002. We would like to complete both of these elements, including the 'proceedings' from the workshop, and it will be difficult to finish all this, plus clear all the associated costs by end of March 2002. In addition, we would like to include both these final outputs in the project CD that will document the whole of the project and all of the outputs. This will form part of the final report.

f) Is this different to the completion date set out in the original application form?

Yes ☑ (please tick)

No ☐

Project completion date was end **March 2002**

PROJECT OUTPUTS

a) What outputs have been achieved by the project over the last year? We would like you to work through the list of standard output measures which have been agreed for the Darwin Initiative and to report on those which are relevant to your project. All information provided should be referenced clearly to the appropriate project output reference number, and should provide the level of detail required (requirements are specified in the Guidance Note on Output Definitions which accompanies the List of Standard Output Measures).

Please note you are not expected to report against all the output measures which are listed. We only expect you to report on the outputs which were agreed for your project. However, if further outputs have been generated which relate to one or more of the standard output measures, these should also be reported below. Further outputs which do not fit easily into any of the standard output categories should be reported later in this section (see sub-section b).

Output Ref. No.	**Description/Commentary**
2A(3)	Three MSc degrees awarded (Lebanese)
13A(2)	Two reference collection established at AUB (Coastal plant species -1800 specimens); Coastal insect species (2000 specimens)
10(1)	Checklist of coastal plants completed
4C(5), 4D(1)	1-week training in survey and ecological techniques (Lebanese)
4C(5), 4D(2)	2-week training in plant identification, collection of herbarium specimens (Lebanese)
4C(2), 4D(2)	2-week training course in Egypt (Lebanese)
4C(2), 4D(2)	2-week training in UK (Lebanese)
6A(1), 6B(1)	1-week study visit to UK (Lebanese)
4C(9), 4D(1)	1-week training in field survey/ecology/data analysis (Lebanese)
8(2)	2-week research/ MSc examining
12A(1)	Electronic version of coastal plant checklist handed over to AUB
22(18)	18 permanent field plots established
20(£150)	Approximately £150 worth of books and reference materials
13A(1)	Digital image collection established
14C(2)	2 workshops attended in Lebanon where results from Darwin project presented

b) Please provide details on any further outputs generated by the project over the last year which do not fit easily into the standard output categories for the Darwin Initiative.

Article about the project in April 2000 issue of *OnCourse*, Newsletter of Kew's International Training Programme (circulation 500).

Dr Clubbe regularly uses the project as a case study by in teaching (lectures and seminars).

c) Explain any problems encountered to date in achieving the output targets specified for this project or any problems you envisage in achieving these outputs in the future.

The original project suggested that five species would be targeted for the development of horticultural protocols, re-introduction trials and for use in landscaping. The scope and difficulties of this have proved to be greater that originally anticipated. Good progress has been made with two key species, *Pancratium maritimum* and *Vagaria parviflora*. Little progress has been made with *Matthiola crassifolia*. Time has prevented expanding this work beyond these three species, and the work with *Matthiola crassifolia* is unlikely to get much further. In contrast, coastal field inventory work has been completed at 11 sites whereas 5 were specified in the original project proposal.

The production of a Red List for Coastal Species was planned for the middle of the project (February 2001). We are still working on this and realistically this will be an end of project product, presented during the final workshop (March 2002). Elements of this work form part of Heba Rteil's research work that has only just started.

d) If the project timetable has slipped or changed, provide an updated timetable for the achievement of outputs over the remainder of the project period. *(Please note that projects are expected to adhere to the original output timetable which was agreed with the Department and this is taken into account when assessing project performance. However, some projects may be delayed unavoidably. Where a project is falling behind schedule a revised output timetable should be provided below*).

5 day course on recovery planning will be held in November 2001.

PROJECT EXPENDITURE

a) Grant expenditure last year £50,878
b) Grant expenditure to date approx £92,882

c) Please provide a breakdown of grant expenditure using the main expenditure headings in the original application form.

Expenditure Last Year	Expenditure to Date

f) Explain any variations in expenditure (+/-10%) from the original application form.

Due to large requested carry-forward, the project is being re-profiled. Kew Finance Department will forward this directly to the Darwin Initiative for approval.

STAFF RESOURCES

a) Please provide details on the staff who have worked on the project over the last year.

Name	Institution	Grade/Position	% of time allocated to the project last year
Dr Salma Talhouk	American University of Beirut	Project Leader – AUB Project planning, teaching, management	approx. 30% of time
Dr Colin Clubbe	RBG, Kew	Project Leader - RBG Kew Project planning, administration, teaching, field work	approx 15% of time
Ms Madeleine Groves	RBG, Kew	Administration, documentation	approx 20 days
Mr Nigel Hepper	RBG, Kew - taxonomic consultant	Production of coastal plant check-list	<5%
Dr Stephen Jury	University of Reading	Taxonomic support and identification of collections	approx 20 days
Dr Rami Zurayk	American University of Beirut	Project member – GIS specialist	20%
Dr Khouzama Knio	American University of Beirut	Project member – Entomologist	10%
Ms Mirella Dardas	American University of Beirut	After graduating - project continuity - training new students /administration	50%
4 AUB graduate students	American University of Beirut	Project research/ master's training	100%

b) Please explain any variations in the composition of the project team or in the inputs of key staff from the details provided in the original application form.

Dr Clare Hankamer is currently on maternity leave and was replaced by Ms Madeleine Groves who is covering her maternity leave.

AN ABSTRACT OF THE THESIS OF

Mirella Maurice Dardas for Master of Science
Major: Ecosystem Management

Title: Floristic assessment of selected communities along the Lebanese Littoral zone.

Biodiversity is being lost at an alarming rate both nationally and globally, caused mainly by habitat loss. Current status of the vegetation in Lebanon is based on old herbarium data and their associated flora produced by early botanical explorers (Post and Dinsmore, 1933; Mouterde, 1970). Current patterns of species richness along the Lebanese coastal zone are unknown. The objective of this study was to assess the floristic richness currently sustained in the Lebanese littoral zone and to establish a possible basis for conservation priorities. For this purpose, permanent collecting lines were established in 9 selected communities of the littoral zone of Lebanon, at four different locations in semi-natural habitats found on different soil types. A monthly-based collection of plant species was undertaken between October 1999 and July 2000. A total of 271 species from 181 genera and 45 families were recorded in the study locations. Species richness varied considerably between communities ranging from as low as 6 species in the pavement of Al Dalieh to 70 species in the first rocky beach of Amshit. Much of the species richness in the different littoral communities resulted from a large number of species occurring at low frequency. The cluster analysis performed using Sorenson similarity index indicated a trend towards clustering of communities within locations rather than community types. However, the cluster analysis based on littoral-specific species grouped communities more closely together than locations, which may reveal a constancy of core littoral species in each community type. The littoral zone plant communities are perhaps the most threatened in Lebanon requiring urgent conservation. The identification of littoral-specific species points to their potential use as indicator species for the selection and establishment of protected areas within the coastal zone. The low community similarity and patchy species distribution revealed in the study points towards the need for complementary ex-situ conservation, for example within a botanic garden.

AN ABSTRACT OF THE THESIS OF

Marcelle Robert Dagher for Master of Science
Major : Crop Production

Tilte: Floristic assessment of selected communities along the Lebanese coastal zone

Global awarness has risen in the past few years concerning biodiversity, since it is being lost at an alarming rate, both nationally and globally, mainly due to habitat loss. Existing information regarding the patterns of species richness along the Lebanese coastal zone are unknown. The status of vegetation in Lebanon is based on old herbarium data and their associated flora produced by early botanical explorers (Post and Dinsmore, 1933; Mouterde, 1970). The coastal zone plant communities are among the most threatened in Lebanon, necessitating urgent conservation. In this regard, the following study aimed at assessing the floristic richness presently harbored in the Lebanese coastal zone and to establish possible basis for conservation priorities. For this purpose, permanent collecting lines were established in 17 selected communities of the coastal zone of Lebanon, at seven different locations in relatively, semi-natural habitats found on different soil types. A monthly-based collection of plant species was undertaken between October 1999 and July 2000. A total of 508 species from 278 genera and 68 families were recorded in the study locations. Species richness differed considerably between semi-natural and relatively disturbed communities, ranging from as low as 20 species in the oak woodland of Hamat to 119 species in the abandoned terraces of Al Dalhamieh. Much of the species richness in the different coastal communities resulted from a large number of species occruing at low frequency. The cluster analysis done using the Sorenson similarity index resulted in a low similarity between the selected coastal communities. Even with respect to the riparian specific species, the three riparian vegetation types were not quite similar. The low community similarity and irregular species distribution uncovered in the study, point towards the need for complementary ex-situ conservation, such as within a botanic garden. The identification of riparian species points to their potential use as indicator species for the selection and establishment of protected areas within the coastal zone.

AN ABSTRACT OF THE THESIS OF

Roland Charbel El Hachem for Master of Science
Major: Ecosystem Management

Title: Insect diversity along the Lebanese coast in selected plant communities.

Insects far surpass any other animal species in number and diversity and represent a key component in the right functioning of ecosystems. In almost all Mediterranean coastlines insect diversity is poorly documented, while rapid tourist and urban developments are destroying habitats of many specialized species. The objective of this study was to produce an inventory of selected insect groups and determine species richness and diversity in different plant communities along the Lebanese coast. More than 2000 insects were compiled from monthly collections that were initiated in October 1999 and ended on August 2000. In each site, 100 sweeps were performed following four selected lines to ensure consistency between collections and minimize possible bias. Species richness, Shannon-Weaver diversity index, and Sorensen similarity index were calculated for each order in each site. The present study provides a new baseline inventory for insect species on the Lebanese coast. Eighty four percent of the collected insects belonged to the Hymenoptera (19.1%), Lepidoptera (20.5%), Diptera (14.1%) and Coleoptera (30.3%) orders. Similarity indices between sites were low. However, cluster analysis grouped insect communities from littoral habitat together, separated the least disturbed site of Naameh on its own, and grouped insect communities in Nahr El Kalb and Deyr El Nourieh which are experiencing ongoing agricultural activities. Total site species richness varied from 89 in Raouche to 128 in Naameh, while H' varied between 3.4 in Raouche and 4.3 in Naameh. The study revealed a change in status for 25 Lebanese butterflies for which previous literature related to their abundance was available. Ten species have become rare whilst seven were abundant including five species known to be agricultural pests. The potential effects of these pests on the wider biodiversity need to be closely monitored. Further investigations on status of butterflies could lead to their use as indicators of environmental disturbances. No definite associations between plant and insect diversity could be established in this study. For this purpose, specific collection techniques, assessment of plant-associated insects, and additional data on plant communities are needed.