DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES : APPLICATION FOR GRANT FOR ROUND 9 COMPETITION

Please read the accompanying Guidance Note before completing this form. Give a full answer to each section; applications will be considered on the basis of information submitted on this form. Applicants are asked not to use the form supplied to cross refer to information in separate documents except where this is invited on the form. The space provided indicates the level of detail required but you may provide additional information on a separate sheet if necessary. Copies of this form are available on disk or by e-mail on request. You are asked also to complete the summary sheet attached at the end of this form. Although you may reproduce this sheet in a reasonable font, you should not expand it beyond an A4 sheet (leaving the allocated space for DETR comments to be made) as additional information will not be taken into account.

1. Name and address of organisation

THE UNIVERSITY OF READING, WHITEKNIGHTS, READING, BERKSHIRE RG6 6AH

2. Principals in project

Details	Project leader	Other UK personnel (if working more than 50% on project)	Main project partner or co-ordinator in host country
Surname	Jury		Rejdali
Forename(s)	Stephen Leonard		Mohamed
Post held	Senior Research Fellow and Herbarium Curator		Director for Scientific Research and Development
Institution (if different to the above)			Institut Agronomique et Vétérinaire Hassan II
Department	Department of Botany		
Telephone			
Fax			
Email			

Please provide a one page CV for each of these named individuals.

3. Project title (not exceeding 10 words)

INVENTARY OF MOROCCAN PLANTS AND THE CONSERVATION OF PRIORITY SPECIES

4. Abstract of study (in no more than 750 characters)

THE PROJECT WILL HELP WITH PRODUCING AN INVENTARY OF MOROCCAN PLANTS AND SELECT THOSE MOST IN NEED OF CONSERVATION USING LITERATURE, *THE RED DATA BOOK* AND HERBARIUM RECORDS, THE DARWIN PLANT INFORMATION SYSTEM FOR MOROCCO AND THE PERSONAL KNOWLEDGE OF MOROCCAN BOTANISTS. TARGET SPECIES WILL BE BROUGHT INTO CULTIVATION IN THE NEW BOTANIC GARDEN AT THE INSTITUT AGRONOMIQUE ET VETERINAIRE SO THAT COLLECTION MANAGEMENT FOR CONSERVATION, CULTIVATION AND PROPAGATION REQUIREMENTS CAN BE ESTABLISHED. IT IS PROPOSED THAT DATA BE GATHERED TO ENABLE *EX SITU* CONSERVATION TO BE ASSURED AND WHEN POSSIBLE ASSISTANCE GIVEN TO THE MINISTRY OF THE ENVIRONMENT FOR MAINTENANCE OF THE POPULATIONS IN SITU. PRIORITY WILL BE GIVEN TO THE WILD RELATIVES OF CROP PLANTS. THE WORK WILL BE SUPPORTED BY APPROPRIATE TRAINING PROGRAMMES.

5. Timing. Give the proposed starting date and duration of the project.

July 2001 for two years.

6. Describe briefly the aims, activities and achievements of your organisation. (Please note that this should describe your unit, institute or department within a university.)

Aims

The research aims of the School of Plant Sciences are to advance fundamental plant science, enhance our understanding of plant biodiversity and the natural environment, and provide innovative research that supports the agricultural and horticultural industries.

Activities

The School completely integrates the research of three departments: Agricultural Botany, Botany and Horticulture & Landscape to form the largest grouping of plant scientists in the UK university system. The School offers a wide range of undergraduate and postgraduate degrees, and currently has about 100 PhD research students.

Almost all research involves international collaboration with links to about 25 different countries. Research collaboration occurs with leading national institutions, including: The Royal Botanic Gardens, Kew; The Natural History Museum, London, and The Royal Horticultural Society. The unique blend research carried out is given coherence and coordination through five research groups. One of these, the Centre for Plant Diversity and Systematics has a long tradition of floristic research and after *Flora Europaea, Flora of Tierra Del Fuego* is actively engaged on *Flora iberica* as well as the publication of a checklist of the plants of northern Morocco, resulting from a recent EU contract to Dr S.L. Jury. Under the leadership of Professor F.A. Bisby, the Centre has become a centre of excellence for bioinformatics with secretariats for both ILDIS and Species 2000 projects. An EUgrant (€1.434 million) to Dr S.L. Jury for Euro+Med PlantBase continues the *Flora Europaea* research for an enlarged area but now using 21st century technology.

Centre staff run two MSc and two Diploma courses with a third in bioinformatics planned, as well as running numerous other training courses and short-course programmes.

Achievements

At the last RAE, the School was awarded the highest possible rating of 5* for the quality of research. Currently, the School attracts about £5 m of external research funding from research councils, industry, governments and charitable foundations. The Centre for Plant Diversity and Systematics was only one of three national centres to benefit from large-scale funding (£750,000) from the NERC Taxonomy Initiative (1995—2000). The Centre is now the foremost university-based group of taxonomists in the UK. Flagship international projects, such as ILDIS, Species 2000 and Euro+Med PlantBase, are coordinated from the Centre which is at the cutting edge in the fields of botanical inventory and floristics, plant molecular systematics and diversity evolution, and species diversity information systems.

7. Has your organisation received funding under the Initiative before? If so, please give details.

Yes. We received funding of £26,030 for two years in Round 7 for The Darwin Plant Information System for Morocco, also led by Dr Stephen L. Jury.

8. Which overseas institutions, if any, will be involved in the project? Please explain the responsibilities of these institutions.

1.The Institut Agronomique et Vétérinaire Hassan II (IAV), Rabat & Agadir, Morocco; 2. The Institut Scientifique (IS), Rabat, Morocco, and 3. The University Cadi Ayyad (UCA), Marrakech, Morocco.

1. (IAV) is developing a new botanic garden (supported by a grant from Prime Minister Tony Blair's Environmental Challenge Fund through Our Man in Rabat) and an EU initiative. They have a rapidly developing herbarium, shortly to be re-housed within the botanic garden and plans for a modest seed bank. The IAV is in a good position to provide transport, staff and facilities for field collection, storage and cultivation of plants. They will also provide and edit appropriate data for the developing Darwin database of Moroccan plant information. The IAV is trying to organise itself to become the Moroccan centre for *Ex situ* plant conservation. They can take on responsibilities for all these matters.
2 (IS) has a large (120,000 specimen) herbarium built up during the earlier periods of the French occupation which contains most Moroccan plant species and thus, large numbers of important plant distribution records. This is supported by a good, if rather old, library. The IS has become the centre for the production of the red list of Moroccan plants and a proposed three-volume work, the *Flore practique du Maroc.* The IS will be responsible for providing historical baseline information on location information and the taxonomy of the flora. This will be assisted through the development of databases. They are in a good position to help select target species and to liaise on taxonomic work and will be responsible for these aspects.
3 (UCA) have been studying the flora of the High Atlas, in particular the large Jbel Toubkal National Park. This is a celebrated centre for very many rare endemic plant species. The University will provide local contacts, expertise and support for work to be developed and continued in this most important region.

PROJECT DETAILS

9. Define the purpose (main objective) of the project in line with the logical framework.

The project sets out to find what species of Moroccan plants are the most rare and which are most threatened with extinction and to produce a list of priority taxa and to get a proportion of these successfully into cultivation for *ex situ* conservation. Special attention will be paid to the wild relatives of crop plants. It is also a principle objective that Moroccan staff are trained to become fully competent to undertake the work and to continue it and to develop the work after the completion of this initiative. It is also proposed to provide data for completing the inventory of Moroccan plant species and to assist indirectly with the production of the *Flore practique du Maroc.*
In order to carry out this work, several training courses are planned, both in Reading and in Rabat. These include special instruction on databases for botanical garden collection management.

10. Is this a new project or the continuation of an existing one?

This is a new project, but will use data from earlier EU-funded ones and the Darwin Plant Information System for Morocco set up by an earlier Round 7 Darwin Award in 1999.

11. What is the evidence for a demand or need for the work? How is the project related to conservation priorities in the host country(ies)? How would the project assist the host country with its obligations under the Biodiversity Convention?

How was the work identified?

Work on the *Flore practique du Maroc* in Morocco has shown that there is a great need for a complete, modern inventory of plant species. It is still necessary to compile information from *Flora Europaea* (itself now out-of-date), *MedChecklist* (incomplete) and the scattered literature to update the taxonomy and records of the French publications by Maire and others of the 1930s. An especially valuable first red data book has been compiled, but recent experience shows this is far from complete and in need of assessment and verification. This projects aims to help this and is supported by Professor Mohamed Fennane of the IS.

The British-sponsored development by the building of a visitors' centre (with herbarium and library) in a new botanic garden at the IAV has given the possibility of *ex situ* conservation and the Director has indicated he is anxious to get 60 priority species into cultivation. The IAV is most anxious that the impetus and publicity gained by this botanical garden project continues and that the new facility rapidly becomes a resource for Moroccan plant conservation. Most species have previously only been collected on a more or less random basis and the IAV wishes to concentrate on the threatened taxa, especially those that may be of, or potentially of, economic importance, such as the wild relatives of crop plants. This necessitates training personnel in collection management and data handling with the transfer of expertise on this from Reading to Morocco.

How is the project related to conservation priorities in the host country?

Although Morocco has the richest flora in North Africa, it is the least well-known with no up-to-date inventory. The most recent estimate by Medail & Quezel reports that there are about 4200 species and subspecies of which 900 are endemic. The Moroccan Government has recently awarded a grant to the IS to produce a second volume (of three) of the *Flore practique du Maroc.* It gives a high priority to the completion of the plant inventory and Flora. Despite this lack of knowledge, an attempt has been made by Messrs Fennane and Tattou (1998) to produce a list of endemic, rare and threatened plants. This contains no less than 2185 species and 634 subspecies. Reading taxonomists have now been invited to participate formally in this project, replacing a deceased French collaborator. This extension of collaboration with the UK will enable careful taxonomic evaluation of rare taxa to be carried out to produce the much-needed details on rare and threatened taxa, including propagation and cultivation techniques. There are very few *in situ* conservation measures for plants in Morocco at present.

How will the project assist the host country meet its obligations under the Biodiversity Convention?

Previous collaborative ventures have been successful and worked well, and thus systems and training in use in The University of Reading can be easily transferred to Rabat. This project will enable the Moroccan botanists and their students to continue to undertake conservation and serious scientific work on their flora to fulfil their obligations under the CBD. This is especially by completing the inventory of plants, producing a Flora and obtaining conservation data that can be used for habitat designation for conservation purposes as well as species protection legislation.

12 In what ways can this project be considered a Darwin project? How does the project relate to the Darwin principles? How would the project be advertised as a Darwin project and in what ways would the Darwin name and logo be used?

I believe Moroccan requests for help with efforts to assist and help speed this work are very urgent: great use is made of plants and plant products for food and medicinal uses; woody plants are used for fuel, construction and souvenir manufacture, and all with little or no regard for sustainability.

Moroccan botanists are now well aware of the principles of plant conservation, sustainability, etc. They lack the resources to carry them out and are anxious to collaborate in research and training exercises. This project will enable results from abroad in the UK to be coordinated with those in Morocco, further fieldwork and *ex situ* conservation work to be carried out, staff trained and results published. These results include taxonomic papers, inventories and cultivation methods for important target species. A new and revised checklist of taxa can be drafted as well as accounts for the *Flore Practique du Maroc*.

It is anticipated that the project will be novel in making extensive use of the now cheap but accurate GPS in the field, coupled with digital images and all made available over the internet

It is proposed that the project will help a country rich biodiversity, but poor in resources by collaboration with British scientists and institutions. It is planned that it should be of high calibre to enable a further EU grant to be obtained. The results can be guaranteed to be substantial and to make a real contribution to Moroccan plant conservation and hence utilisation of plants and products by the native population.

The project will be advertised as a Darwin project by the name used in the title and the Darwin logo used on web pages, reports, teaching materials (both in Reading and in Morocco) and on collection labels. Full acknowledgement would be given to the Darwin Initiative in all writings. The project would be promoted at the large forthcoming OPTIMA conference in Palermo in September 2001 for c. 350 Mediterranean botanists.

13. Set out the proposed timetable for the work, including the programme's measurable outputs using the attached list of output measures.

Year 1.

July 2001
Visit of three botanists from Reading to Rabat for planning, herbarium and library work. This will enable selection of participants for future work to be decided. Discussion of training programmes and confirmation of dates. (2 weeks)
Output: 8 (2 weeks x 2 staff), Agreed memorandum of understanding.

September 2001
Completion of selection of species for investigation and possible collection. Visit to Reading by four Moroccan botanists for training in horticultural techniques and collection management; recording of some collection data from Kew and the Natural History Museum holdings, and commencement of taxonomic evaluation of species lists. (3 weeks)
Output: 4C (2 weeks) 3 Moroccans

October/November 2001
Completion of list of main locations to be visited. Visit to Morocco by two Reading botanists for two to take part in fieldwork with Moroccan botanists and provide training for collection management. (2 weeks)
Output: 4C (1 weeks) 4 Moroccans; 8 (2 weeks x 2 staff) 13B 3 collections

Winter 2002
Visit to Reading by four Moroccan botanists for training in database use and management by Reading staff. Continued evaluation of taxonomic treatments. (3 weeks)
Output: 4C: (1 week) 4 Moroccans

February 2002
Visit to Morocco by Reading botanist to evaluate work and plan further collections
Output: 8 (2 weeks x 1 member staff)

Three other field trips will be undertaken by Moroccan botanists alone in Year 1.
Output: 13B 3 collections

Year 2.

July 2002
Visit to Morocco by three Reading and one RHS Wisley botanist for plant collection, verification of identifications and collection management training. (3 weeks)
Output: 4C (1 week) 4 Moroccans, 8 (3 weeks x 4 staff)

September 2002
Visit to Reading by four Moroccan botanists to complete identifications and production of web pages for result display (2 weeks)
Output: 4C (1 week) 4 Moroccans

March 2002
Visit to Morocco by three Reading Botanists to complete datasets and make information available over the www. Organisation and preparation of research papers. (2 weeks)
Output: 12B 2 databases, website, 8 (2 weeks x 3 staff)

June 2002
Completion of a provisional checklist of Moroccan plants, publication of species brought successfully into cultivation, guide information leaflet for botanic garden concerning project species, production of Flora accounts, updated website available.
Output: 11B 4 papers, garden guide leaflet, upgraded database and information system, Flora accounts.

14. Do you know of any other individual/organisation carrying out similar work? Give the details of the work, explaining the similarities and differences.

No, not in Morocco.

15. Will the project include training and development? Please indicate how many trainees will be involved, from which countries and what will be the criteria for selection. How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length of any training course.

Yes, four Moroccan staff will be trained selected by the Moroccans and approved by Reading botanists.

The effectiveness of the training will be measured by the work undertaken by then and after courses on their own. It is planned that they will be able to train others.

Five short training courses will be given for a total of six weeks.

16. How will trainee outcomes/destinations be monitored after the end of the training?

Trainees will be monitored by their work performance at their Moroccan institutions by Senior Moroccan staff.

17. How is the work of the project expected to continue after the end of grant period? A clear exit strategy must be included.

The work will continue with the trained staff as local resources and further collaborations allow. It is anticipated that good model systems will have been put in place and that further expeditions to bring further rare plants into cultivation with appropriate cultivation techniques used and results published.

MONITORING AND EVALUATION

18. Describe how progress on the project would be monitored and evaluated in terms of achieving its aims and objectives, both during the lifetime of the project and at its conclusion. How would you ensure that it achieves value for money? What arrangements will be made for disseminating results? If applicable, how would you seek the views of clients/customers?

The project will be monitored by an annual review meeting, with the production of lists of species for evaluation at agreed times, a list of locations to be visited, specimens collected and the quality of their associated data.

It will also be evaluated by the number of taxa brought into successful cultivation and the number of resulting publications and webpages produced concerning them.

Training will be monitored by the subsequent work of the trainees.

Value for money and customer views will be sought by usage made of the collections made and the visitors to the collections. Customer views would be obtained verbally and by a visitor questionnaire.

19. Logical framework. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

Project summary	Measurable indicators	Means of verification	Important assumptions
Goal To assist Moroccan botanists provide an inventory of their flora and help the conservation of Moroccan plant diversity in accordance with the Darwin Initiative main objective.	Project completed with goals met.	Reports approved of work.	Moroccan government remains stable and continues to develop its present policies towards the environment.
Purpose The project aims to set up the IAV botanical garden as a major *ex situ* conservation resource with trained staff to serve Moroccan conservation needs and to assist in inventory and Flora production at the IS	Garden is recognised as an important facility with a substantial number of species in cultivation with trained staff; a provisional list of Moroccan plants published; Flora accounts written.	Users visiting to consult collections for research and education; staff running garden and herbarium competently after training; inventory and plant lists published; Flora accounts written.	The IS continues to maintain a herbarium, library and botanical staff; the IAV maintains a botanical garden and keeps to its plans to look for means to develop seed bank facilities, staffing is maintained.
Outputs Trained staff competent in *ex situ* plant conservation and collection management; provisional inventory of Moroccan plants; floristic accounts, research papers and enhanced database with search facilities over the www.	Inventory produced; lists of target species selected; plants collected and successfully cultivated; collection with well-managed data; research papers written and submitted; database enhanced and searchable over the www.	Published inventory, species lists selected and approved, plants collected and cultivated with good data, research papers in press, database enlarged and enhanced, searchable over the www.	Staff available; records are reliable; field work can be undertaken satisfactorily.
Activities Production of lists of target species; verification of names; collection expeditions; staff training; collection management; cultivation research; website development; database upgrading and research paper planning and writing.	Budget correct and activities all taking place according to plan.	Published inventory, species lists selected and approved, plants collected and cultivated with good data, research papers in press, database enlarged and enhanced, searchable over the www achieved within the budget guidelines.	Availability of appropriate staff, students, collection resources (vehicle remains roadworthy), library continues to be accessible, access to web continues to develop.