



**DARWIN INITIATIVE**

**APPLICATION FOR DARWIN SCHOLARSHIP PROGRAMME 2003**

Please read the Guidance Notes before completing this form. Give a full answer to each section; applications will be considered on the basis of information submitted on this form. Please note the additional information requirements (CVs and letters of support as detailed in the Guidance for Applicants)

**Submit by 22 April 2003**

**1. Contact Details**

<i>Ref. (Defra/ECTF only):</i>
<b>Name and address of UK applicant organisation</b> Dr Jane Memmott School of Biological Sciences University of Bristol Woodland Road Bristol BS8 1UG

**2. Darwin Scholar. A one page CV must be enclosed.**

<b>Name and official address of proposed Darwin Scholar</b> Ruth Boada Charles Darwin Foundation Pto. Ayora, Santa Cruz - Galapagos- Ecuador
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**3. Project summary (no more than 100 words)**

While much conservation research documents the distribution and abundance of rare species, very little documents the interactions between rare species and the rest of the community. Obviously such interactions are critical to the conservation of rare plants as they depend on interactions with pollinators in order to reproduce. Recently developed methods of food web construction and analysis can be applied to plant-pollinator communities and the aim of this scholarship is to (1) use these methods to quantify the pollination requirements of rare plants; (2) assess the efficacy of the habitat restoration programme on these rare plants.
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**4. Principals in Project. Please give the details of the individuals from the UK host organisations who would be directly involved in supervising/working with the Darwin Scholar. A 1 page CV on each must be enclosed.**

Details	Main UK expert	Other UK expert	Other UK expert	Other UK expert
<b>Surname</b>	Memmott	Wilson		
<b>Forename(s)</b>	Jane	Michael		

<b>Post held</b>	Senior Lectureship	Head of Entomology Section		
<b>Institution (if different to above)</b>	University of Bristol	National Museums & Galleries of Wales		
<b>Department</b>	School of Biological Sciences	Department of Biodiversity & Systematic Biology		
<b>Telephone</b>				
<b>Fax</b>				
<b>Email</b>				

**5. Describe briefly the aims, activities and achievements of the UK applicant organisation. (Large institutions please note that this should describe your unit or department)**

The School of Biological Sciences, at the University of Bristol, is a dynamic, research-based School with a commitment to fundamental biology and cutting edge advances in new technologies. We were rated at grade 5 in the 2001 HEFCE Research Assessment Exercise. Our teaching has been rated as 'excellent' by HEFCE. The combination of excellence in research and teaching places us in the top rank of UK biology departments. The Community Ecology Research Group (where the Darwin Scholar will be based) encompasses food web biology, invasion ecology, biological control, pollination biology, restoration ecology and habitat fragmentation. Both pure and applied problems are addressed. A mixture of observational and experimental methods are used in field sites ranging from Costa Rican tropical dry forest to Hawaiian swamps to New Forest Heathland in Great Britain. The aim of the group is to use the latest developments in ecology to answer key environmental problems.

**6. Describe briefly the aims, activities and achievements of the proposed Darwin Scholar's organisation. (Large institutions please note that this should describe your unit or department)**

The Charles Darwin Foundation (CDF) is an international, non-governmental, non-profit organization, which works to conserve the unique biodiversity of Galapagos Islands. CDF's research and conservation programs focus on long-term conservation of marine and terrestrial environments in Galapagos, keeping Galapagos biologically intact and providing environmental education on a variety of levels, nationally and internationally. CDF works in partnership with the Galapagos National Park Service (GNPS), which manages the conservation and resources of the Galapagos National Park and Galapagos Marine Reserve. The CDF provides the core scientific research and technical support to strengthen and guide the park's management and conservation strategies. The Botany and Terrestrial Invertebrate Sections have been strengthened by Darwin Initiative funding in recent years that has greatly enhanced their capacity to locally identify plants and insects.

**7. Describe briefly the proposed Darwin Scholar's current role within their organisation.**

Ruth Boada was employed as Research Associate during the Darwin Initiative funding on terrestrial invertebrates. She became involved in a project on a baseline survey of insects associated with endangered plants on several islands in Galapagos. Specimens collected on these surveys were prepared for identification and deposition in the collection.

8. Provide a concept note on the Darwin Scholarship. This should include:

- a clear outline of the aim and objectives of the Scholarship
- the programme of work, including key milestones through the duration of the Scholarship and their timing
- the role of the UK applicant organisation, and others where relevant (including contacts)
- where appropriate, how the Scholarships will contribute towards sustainable development or sustainable livelihoods

**Aim of Scholarship:** To provide practical training in the use and application of pollination ecology techniques. Specifically the Darwin Scholar will learn how to use food web techniques to understand how plant-pollinator communities function.

**Objectives of Scholarship:** (1) To construct visitation webs quantifying which insect species visit the flowers of endangered British plants and to put this data into community context. (2) To transfer this training and work experience to study pollination ecology in selected endangered plants in Galapagos.

**Programme of work:** Plots (c.20m x 20m) will be chosen in the Avon Gorge National Nature Reserve, Bristol. This will be done in collaboration with the Avon Gorge Botanist (Libby Houston), the Bristol Downes Biodiversity office (Mandy Leivers), the Avon Wildlife Trust (Helen Hall) and the National Trust (Bill Morris) all of whom work on the rare plants in the Avon Gorge. Plots will be chosen in habitats invaded by alien plants and in plots where alien plants were removed (in 2001-2002). Each plot will be sampled for flower-pollinator interactions along transect lines every 7-10 days. Floral units will be quantified after insect sampling. The data will be used to construct quantitative visitation webs, an example of which is shown below.



**Figure 1:** An example of a visitation web. The web shows the interactions between plants and their pollinators on a British heathland. The lower black boxes show flower species and their abundance, the upper boxes show insect species abundance and the frequency of the interaction is shown by the triangles linking the two rows of boxes. Hymenoptera are shown in red, Diptera in blue, Lepidoptera in blue, Coleoptera in brown and Thysanoptera in yellow

These webs will allow the Darwin Scholar to address the following questions: (1) What pollinating species are visiting the rare plant's flowers? (2) What other flower species do these pollinators visit; (3) Are flowers of native and alien plants visited by equal numbers of insect species, and is the number of visitors to an alien influenced by the taxonomic affinity of that plant to the native flora? (4) Are similar percentages of visitors to native and alien plants classified as "abundant" species, and are they actually likely to pollinate the flowers? (5) Are the visitors to flowers of native and alien plant species equally likely to have generalized floral diets? (6) Does the connectance of the flower visitation web differ for native and alien plant communities?

Comparing plant-pollinator webs from restored and pristine plots will allow the efficacy of the restoration programme to be assessed. The restoration programmes in the Avon Gorge have identical objective to those running in the Galapagos – the removal of alien plant species. Thus the Darwin Scholar's Bristol training will be of direct relevance to the conservation of the Galapagos Islands.

**Key milestones:** (1) Completion of the literature study of the ecology of insects from Galapagos; (2) Field work completed; (3) Insects webs constructed (4) Webs drawn and analysed and manuscript prepared for submission.

**Role of UK applicant organization:** This work will be carried out based at the University of Bristol, with the involvement of Dr Jane Memmott, a noted specialist in this area. The study of pollinating agents of native, endemic and also alien plants is of considerable importance in the conservation of both plants and their pollinators. It is a priority research area in Galapagos, and one that provides a link between plant and invertebrate scientists.

**Contribution to sustainable development:** This project will contribute to the research capability of the Darwin Scholar, and to the scientific basis of conservation in Galapagos, without which decisions on the long-term future of this World Heritage Site cannot be based.

**9. Legacy. Provide information on how the Darwin Scholar will utilise, promote and disseminate the benefits of the Scholarship on return to his/her home country. Will a strategy be developed during the Scholarship to ensure this is achieved?**

The Darwin Scholar will be able to utilise the techniques acquired during the work programme in research activities upon return to Ecuador. Pollination ecology studies of endangered plants are a high priority in Galapagos and the experience gained will enable dissemination to others and promotion of the techniques.

Discussions on how best this can be achieved will take place between Charles Darwin Foundation and Bristol during the scholarship.

**10. How will the Scholarship assist the Scholar's organisation and/or local communities and/or home country in working towards the objectives (or implementation) of the Convention on Biological Diversity? References to the Convention should be specific, for example, by referring to articles, cross-cutting or thematic issues<sup>1</sup>.**

The proposed programme makes several direct contributions to articles of the Convention of Biological Diversity.

Article 7 (identification and monitoring) - assists in identification of biodiversity and their monitoring.

Article 12 (research & training) - assists in the development of scientific and technical education in identification.

Article 13 (public awareness) - the programme will disseminate information through the media, both in Galapagos and in mainland Ecuador to develop awareness of biodiversity issues.

Article 17 (exchange of information) - this programme assists by exchanging taxonomic information as well as technical research training.

**11. What collaboration has there been with the Darwin Scholar to date in developing the proposal, and what collaboration is planned for the duration of the Scholarship? Where relevant, describe any consultation or collaboration by the proposed Scholar within his/her own country.**

The proposal was developed collaboratively and by direct discussion with Mike Wilson, who visited Galapagos in April 2003.

Discussions were also held between the proposed Scholar and staff members of Charles Darwin Foundation.

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<sup>1</sup> Refer to the Guidance Notes for Applicants for sources of further information

**12. Provide details of the Darwin Initiative project that the proposed Scholar was involved in, including his/her role in that project and any ongoing involvement.**

Terrestrial invertebrate biodiversity in Galapagos: Training & Collection rehabilitation. (162/9/010 ended March 2003)

Ruth Boada was employed as research associate on this DI project. As well as field based projects she attended taxonomic training sessions in Galapagos as well as participating in the International Hymenoptera Training Course, Silwood Park, London in April 2002.

**13. Duration of the Scholarship: what is the intended start and finish date.**

Start April 2004 and finish September 2004

**14. Where will the Darwin Scholar be based? Please be specific with organisational details and dates (where more than one location).**

The Darwin Scholar will be based in the Community Ecology Group in the School of Biological Sciences at the University of Bristol. Desk space, laboratory space and computing facilities are all available.

Identification of insects will be carried out at the Department of Biodiversity & Systematic Biology, National Museums & Galleries of Wales

In addition library research on the known biology of insects found on endangered plants in Galapagos will be carried out in both Cardiff and Bristol

**15. Financial Aspects.**

Scholar payment		
London: £1200/month	Number of months	Total £
UK (outside London): £1000/month	Number of months	
Overseas location £ /month*	Number of months	Total £
Host Organisations' costs		
UK: £200/month	Number of months	Total
Overseas location: £ /month*	Number of months	Total £
<b>A. Total Scholar &amp; Host Organisation Costs</b>		

\* Figures available from Darwin at [darwin@defra.gsi.gov.uk](mailto:darwin@defra.gsi.gov.uk)

Actual travel costs	
Return airfare. <i>Details</i> Galapagos to Quito to Cardiff/Bristol	£
Travel to/from airports. <i>Details</i>	£
Visas etc. <i>Details</i>	£
<b>B. Total Scholarship Travel Costs (Actual costs up to £2000 will be paid)</b>	<b>£</b>

<b>TOTAL SCHOLARSHIP COSTS (A + B)</b>	<b>£</b>
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**16. Other sources of funding: provide details and amounts**

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**FCO NOTIFICATION**

Please check the box if you think that there are sensitivities that the Foreign and Commonwealth Office will need to be aware of should they want to publicise details of the Darwin Scholarship and the resultant work in the UK or the Darwin Scholar's home country

Field Code Changed

**CERTIFICATION**

I certify that, to the best of our knowledge and belief, the statements made by us in this application are true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.

I enclose a copy of the organisation's most recent audited accounts and annual report, CVs for project principals and letters of support.

<b>Name (block capitals)</b>	Dr Jane Memmott
<b>Position in the organisation</b>	Senior Lecturer

Signed

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Date:

16/04/2003

Please return completed form to The Edinburgh Centre for Tropical Forests (ECTF) by **22 April 2003** by e-mail to [stefanie.halfmann@ed.ac.uk](mailto:stefanie.halfmann@ed.ac.uk)

Where it is not possible to send the full application in electronic form (for example if signed references are not available electronically), a hard copy of the full application should also be sent to ECTF, Darwin Monitoring & Evaluation Project, Stefanie Halfmann, John Muir Building, Kings Buildings, University of Edinburgh, Mayfield Rd, Edinburgh EH9 3JK.