Submit by 21 January 2005 14-015

DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 13 COMPETITION:STAGE 2

Please read the Guidance Notes before completing this form. Applications will be considered on the basis of information submitted on this form and you should give a full answer to each question. Please do not cross-refer to information in separate documents except where invited on this form. The space provided indicates the level of detail required. Please do not reduce the font size below 11pt or alter the paragraph spacing. Keep within word limits.

1. Name and address of organisation

Name:	**Address:**
Natural History Museum	Cromwell Road, London SW7 5BD

2. Project title (not exceeding 10 words)

Conservation of Jiaozhou Bay: biodiversity assessment and biomonitoring using ciliates

3. Project dates, duration and total Darwin Initiative Grant requested

Proposed start date: May 2005			**Duration of project:** 3 years		
Darwin funding requested	**Total** **£137,897**	**2005/06** **£**53,299	**2006/07** **£**44,799	**2007/08** **£**39,799	**2008/09** **£ -**

4. Define the purpose of the project in line with the logical framework

To provide baseline data for monitoring future ciliate biodiversity change in Jiaozhou Bay, China; to produce a user-friendly guide to the identification of ciliated protozoa in Jiaozhou Bay; to establish a protocol for using ciliates as bioindicators of marine water quality; to train staff and postgraduate students at partner and stakeholder institutions in order to ensure adequate levels of local expertise are available for future assessment of ciliate biodiversity and for monitoring water quality using ciliate bioindicators. In the longer term the results of the project will help in the formulation of a management strategy for Jiaozhou Bay whereby its biodiversity can be protected, its environmental amenity value can be improved, and its fisheries industry can be developed in a sustainable fashion.

5. Principals in project. Please provide a one page CV for each of these named individuals

Details	**Project Leader**	**Other UK personnel (working more than 50% of their time on project)**	**Main project partner or co-ordinator in host country**
Surname	Warren		Song
Forename (s)	Alan		Weibo
Post held	Researcher, Protists		Head of Protozoology
Institution	Natural History Museum		Ocean University of China
Department	Zoology		Laboratory of Protozoology
Telephone			
Fax			
Email			

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

During the past 12 years, the NHM has led 22 Darwin Initiative projects in 16 countries.

7. IF YOU ANSWERED NO TO QUESTION 6 describe briefly the aims, activities and achievements of your organisation. (Large institutions please note that this should describe your unit or department)

Aims (50 words) n/a

Activities (50 words) n/a

Achievements (50 words) n/a

8. Please list the overseas partners that will be involved in their project and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. What steps have been taken to ensure the benefits of the project will continue despite any staff changes in these organisations? Please provide written evidence of partnerships.

The project has been completely collaborative in its inception and preparation with both partners being equally involved in planning, both intellectual and practical. A primary aim of the Ocean University of China (OUC) is the exploration, discovery, understanding, sustainable exploitation and conservation of marine resources and environments. Studies of marine ciliates in Jiaozhou Bay by OUC has revealed a rich biodiversity including 30 new species, 7 new genera, and the presence of some harmful species that have caused up to 80% losses of fisheries stocks in recent years in north China. The OUC has also established links with a number of local stakeholder organisations (see attached letters). The OUC will be responsible for: (1) regular sampling, ciliate analysis and for assessing water quality at specific sites within the Bay; (2) correlating water quality with ciliate populations as part of the development of a tool for water quality assessment (jointly with the NHM); (3) co-ordinating with Chinese stakeholders; (4) training of staff and students at OUC and at stakeholder organisations; (5) dissemination of information *via* Chinese language publications and presentations. The OUC protozoology group has a sufficient staff complement to ensure that any reasonable staff changes can be absorbed without detriment to the project. The NHM and OUC have collaborated successfully for the past 10 years and are currently working in partnership funded by the Royal Society Joint Projects programme (project no. Q822). Written confirmation of OUC's commitment to the present project is here attached.

9. What other consultation or co-operation will take place or has taken place already with other stakeholders such as local communities? Please include details of any contact with the government not already provided.

Two local organisations for which the conservation of Jiaozhou Bay is of high priority include: (1) the Jiaozhou Bay Marine Ecosystem Research Station, Chinese Academy of Sciences, Qingdao; (2) the Mariculture Disease Control & Molecular Pathology Laboratory of the Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences, Qingdao. Both organisations have expressed strong support for the project (see letters attached).

National Focal Points for CBD implementation have been contacted and support for the project has been expressed on their behalf by Dr Da-Wei Huang, Director of the Institute of Zoology of the Chinese Academy of Sciences and CBD National Focal Point for the Global Taxonomy Initiative Co-ordination Mechanism (see letter attached). Details of the project plan have also been disseminated to representatives of the UK government in China and to the Director for China of CAB International who has expressed strong support for the project (see letter attached).

Participants in one completed DI project (project no. 6023) that focussed on marine coastal biodiversity in the Qingdao region have been consulted and have expressed enthusiasm for the current project.

PROJECT DETAILS

10. Is this a new initiative or a development of existing work (funded through any source?) Are you aware of any other individuals/organisations carrying out similar work, or of any completed or existing Darwin Initiative projects relevant to your work? If so, please give details explaining similarities and differences and showing how results of your work will be additional to any similar work and what attempts have/will be made to co-operate with and learn lessons from such work for mutual benefits.

This is a new initiative building on an existing partnership between the NHM and the OUC (see part 8). Although numerous studies have been carried out on freshwater ciliates and their use as bioindicators, similar investigations of marine ciliates are rare. We will seek to: significantly expand our knowledge of local ciliate biodiversity; confirm correlations between ciliates and marine water quality parameters; develop a ciliate-based tool for monitoring marine water quality. This project will complement those carried out by the Univ. Masachusetts (http://codfish.smast.umassd.edu/research_projects/JZB/), the Ministry of Sciences and Technology of China (http://www.acca21.org.cn/ppc21n5-10.html) and the State Oceanic Administration (China)/PML (Plymouth) (http://tejo.dcea.fct.unl.pt/inco/china). The experiences of participants in DI project 6023, involving OUC and PML (Plymouth), have been used in project planning.

11. How will the project assist the host country in its implementation of the Convention on Biological Diversity? Please make reference to the relevant article(s) of the CBD thematic programmes and/or cross-cutting themes (see Annex C for list and worked example) and rank the relevance of the project to these by indicating percentages. Is any liaison proposed with the CBD national focal point in the host country? Further information about the CBD can be found on the Darwin website or CBD website.

This project addresses the obligation for countries that become parties to the CBD to identify and monitor components of biodiversity that are important for its conservation and sustainable use, as well as identifying and monitoring processes and activities that may adversely affect biological diversity (Articles 7 & 8 – 15%). The survey of ciliates in Jiaozhou Bay will improve local knowledge (Article 18 – 10%) and the development of a tool for biomonitoring water quality will assist in minimizing adverse impacts of inputs into the Bay (Article 14 – 10%). Training of students and staff at OUC and at stakeholder organisations (Article 12 – 20%) will strengthen the capacity to achieve conservation once the project is completed. The project has particular relevance to the following CBD themes: marine and coastal biodiversity (25%); indicators (15%); global taxonomy initiative (5%). Liaison with the relevant CBD National Focal Point will be maintained throughout the project and a copy of the final report will be sent to him.

12. How does the work meet a clearly identifiable biodiversity need or priority defined by the host country? Please indicate how this work will fit in with National Biodiversity Strategies or Environmental Action Plans, if applicable.

Jiaozhou Bay is one of only 7 estuarine wetland ecosystems listed in China`s Biodiversity Action Plan (BCAP) requiring priority conservation attention. It is also identified in the BCAP as a potential nature reserve due to its high species richness. The project will help with the implementation of the BCAP by contributing to the following objectives and activities (C –Chapter; O-Objective; A-Action):

C3, O2, A1: Helping to provide a clear description of the health of a protected area (i.e. Jiaozhou Bay).

C3, O3: Demonstrating that indicator species (i.e. ciliates) can be used to monitor ecosystem change.

C3, O6: Providing biological information pertaining to micro-organisms (i.e. ciliates).

C4 (A- to Ensure Implementation) Conducting biodiversity surveys (i.e. of ciliate protozoa in Jiaozhou Bay).

C4 (A- to Ensure Implementation) Increasing international, and improving bilateral, co-operation.

13. If relevant, please explain how the work will contribute to sustainable livelihoods in the host country.

Jiaozhou Bay is a major centre for fisheries and mariculture industries, including fish, molluscs and crustaceans. The environmental quality of the water is therefore of immense significance for maintenance of fisheries stocks and for successful mariculture. The development and adoption of an effective ciliate-based tool for water quality assessment and monitoring will thus be of great benefit to local people whose livelihoods depend on these industries. Furthermore, some ciliates are harmful to fisheries: in north China up to 80% of shrimp (*Penaeus chinensis*) stocks, and 50% of cultured flatfish (*Paralichthys olivaceus*), were lost in 1995-97 due to opportunistic infection by the free-living ciliates *Paranophrys carcini* and *Miamiensis avidus* respectively. OUC has isolated both species from Jiaozhou Bay. The ciliate identification guide will enable stakeholders to identify the causative agents of such infections and so help protect fisheries stocks.

14. What will be the impact of the work, and how will this be achieved? Please include details of how the results of the project will be disseminated and put into effect to achieve this impact.

Project outputs and outcomes are clearly linked to at least 5 articles and 3 themes of the CBD (see part 11). Overall they will contribute to helping China meet the aims of its BCAP by assisting biodiversity conservation and sustainable development in Jiaozhou Bay. This will be achieved by training local personnel in ciliate biodiversity assessment and in the development and use of a ciliate-based tool for water quality biomonitoring. The guide to ciliate identification will be: (i) user-friendly; (ii) published in the Chinese language; (iii) freely available on-line. Results on the use of ciliates for biomonitoring water quality will be presented at national and international conservation conferences. Scientific results will be presented at national/international scientific meetings and published in international peer-reviewed journals. Gene sequences of harmful or otherwise important taxa will be deposited in open-access gene banks (e.g. EMBL).

15. How will the work leave a lasting legacy in the host country or region?

The immediate legacies of the planned work will be the user-friendly guide to the identification of ciliates (the electronic version of which can be updated and revised in future) and the ciliate-based tool for water quality assessment and biomonitoring. The microscope slide collection at the OUC containing examples of the local ciliate fauna will be expanded with the deposition of specimens isolated during the project and will become a freely available reference collection. Staff and students at the OUC and at stakeholder organisations will be trained in the identification of ciliates (including potentially harmful species) and in the use of ciliates for biomonitoring thereby enhancing their capacity to carry out effective biodiversity and environmental assessments and thus to contribute to the future conservation of Jiaozhou Bay.

16. Please give details of a clear exit strategy and state what steps have been taken to identify and address potential problems in achieving impact and legacy.

Our aim is not only to leave a fully functional user-friendly ciliate identification guide, a ciliate-based tool for water quality assessment, and series of research projects, but to establish close links with stakeholders who will continue to use the project outputs as part of their long-term commitment to the sustainable development of Jiaozhou Bay. The National Focal Point for CBD action will be kept appraised of the results and outcomes of the project in order that the concepts can be integrated into the national strategy for the conservation of marine and coastal biodiversity and its sustainable use.

17. How will the project be advertised as a Darwin project and in what ways would the Darwin name and logo be used?

The DI logo will used during all presentations made at scientific and conservation conferences. The DI will be identified as the sponsor for the project in all publications. All literature produced in connection with the project (e.g., the user-friendly ciliate guide, training literature, etc.) will bear the DI logo and name. Relevant articles in publications such as the NHM members` magazine will likewise carry the DI logo and name. The DI will be acknowledged in annual reports etc. of both partner institutions.

18. Will the project include training and development? Please indicate who the trainees will be and criteria for selection and that the level and content of training will be. How many will be involved, and from which countries? How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length and dates (if known) of any training course. How will trainee outcomes be monitored after the end of the training?

Training in ciliate identification will be given by staff of the NHM and OUC to up to 13 postgraduate students at OUC. This training will be ongoing throughout the project and will include all the basic techniques needed to describe and identify ciliates, including literature searching and manuscript preparation. Advanced training in modern methods of ciliate investigation (e.g. electron microscopy and molecular analysis) will be given by NHM staff to 6 OUC personnel (each year of the project 2 OUC personnel will visit London for 2 months). The effectiveness of this training will be measured by the successful publication in peer-reviewed journals of results produced by the personnel in question. It is expected that all those who receive advanced training will be able to train others. In addition, at least 20 students and staff from two stakeholder organisations (see part 9) will be trained by OUC staff in basic ciliate identification and in the use of ciliates for biomonitoring water quality. In this case, training will be delivered as a series of one-day sessions during the final year of the project. At the end of the training course the trainees will analyse samples from Jiaozhou Bay in terms of their ciliate content and water quality.

LOGICAL FRAMEWORK

19. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note. This should not have substantially changed from the Logical Framework submitted with your Stage 1 application. Please highlight any changes.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: **To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve** • **the conservation of biological diversity,** • **the sustainable use of its components, and** • **the fair and equitable sharing of benefits arising out of the utilisation of genetic resources**			
Purpose Enhance biodiversity conservation and sustainable use of Jiaozhou Bay	**1**. Ciliate biodiversity of Jiaozhou Bay described **2**. Ciliate-based tool for assessing water quality developed **3**. Enhanced capacity for ciliate biodiversity- and water quality assessment **4**. Tools for ciliate identification provided	**1**. Results published **2.** Water quality monitoring system adopted by stakeholders **3.** Input from OUC personnel and from stakeholders using the system **4**. User-friendly ciliate identification guide published and used	Participants will work collaboratively and students will remain in their institution. Marine ciliates will prove useful as bioindicators in Jiaozhou Bay. A publisher will agree to publish the ciliate guide.
Outputs Inventory of ciliate biodiversity; biodiversity assessment programme established and functioning	6 PhD and 7 Masters theses submitted. At least 20 papers published by Yr 3.	PhD and Masters theses successfully defended; Reprints of papers sent to DI	Students complete their degree programmes and use the skills acquired; manuscripts processed by journals in a timely fashion.
Ciliate-based tool for water quality assessment and monitoring developed	Method published. System adopted for monitoring and training purposes	Reprints of papers sent to DI. System adopted by OUC for teaching and by stakeholders for monitoring	Ciliates prove to be reliable bioindicators of water quality within Jiaozhou Bay
Training for OUC personnel and for stakeholders delivered	Minimum of 30 staff and students at OUC and stakeholder institutes trained	Training reports and attendance lists sent to DI	Active participation of stakeholders in training; OUC staff and students free to attend UK-based training
User-friendly guide to the identification of ciliates in Jiaozhou Bay produced	Field guide tested by non-specialists; manuscript submitted and electronic version mounted on web (Yr 3)	Feedback from non-specialist field-testers. Reports from referees. Copy sent to DI	Agreement can be reached with publisher over publication details (cost, quality, timescales etc.).
Activities Ciliate biodiversity characterization	**Activity Milestones (Summary of Project Implementation Timetable)** Yr 1-3: 6-8 papers submitted for publication each year (total ca. 20 by 03/08); 5 papers presented at conferences each year (total ca. 15 by 03/08): Yrs 2,3: gene sequences of 3 taxa submitted each year to gene bank (total 6); Yr 3: reference collection established at OUC.		
User-friendly ciliate identification guide	Yr1: data for guide assembled; Yr2: guide compiled and tested by stakeholders; Yr3: guide submitted for publication and mounted on OUC website		
Ciliate-based tool for water quality assessment and monitoring	Yr1: ciliate community data and water quality data gathered; Yr2: data gathering continues, assessment tool developed; Yr3: functionality of assessment tool verified, tool tested and adopted by stakeholders.		
Training	Training of OUC students ongoing throughout project; Yrs 1,2,3: Training in UK (for approx. 2 months) for 2 OUC personnel each year; Yrs 2, 3: training courses (3 days each) for 20 stakeholder personnel		

20. Provide a project implementation timetable that shows the key milestones in project activities.

Project implementation timetable		
Date	**Financial year**	**Key milestones**
	Apr-Mar 2005/6 Apr-Mar 2006/7 Apr-Mar 2007/8	Ciliate biodiversity characterization (CBC); ciliate identification guide (CIG); water quality assessment tool (WQAT); training (T)
	2005/2006	
May 05		OUC personnel selected for advanced training in UK (T)
July 05		Protocols for collection and analysis of field samples established (CBC; WQAT)
November 05		Advanced training in UK given to OUC personnel (T)
January 06		Papers presented at scientific and conservation meetings in China (CBC)
March 06		Manuscripts of peer-reviewed papers submitted (CBC)
March 06		Data collection throughout year (CBC; WQAT)
March 06		Training of OUC postgraduate students throughout year (T)
	2006/2007	
September 06		Data for ciliate identification guide assembled and gaps identified (CIG)
November 06		Advanced training in UK given to OUC personnel (T)
January 07		Papers presented at scientific and conservation meetings in China (CBC)
March 07		Data collection throughout year (CBC; WQAT)
March 07		Training of OUC postgraduate students throughout year (T)
March 07		Manuscripts of peer-reviewed papers submitted (CBC)
March 07		Gene sequences deposited in gene bank (CBC)
	2007/2008	
May 07		Draft ciliate identification guide completed and sent to non-specialists for testing (CIG)
July 07		Modifications to identification guide implemented (CIG)
August 07		Prototype ciliate-based tool for water quality assessment developed (WQAT)
August 07		Paper presented at European Protistology meeting (CBC)
September 07		Training course for stakeholders on ciliate identification and use of ciliates for water quality assessment (T)
November 07		Advanced training in UK given to OUC personnel (T)
January 08		Ciliate identification guide completed; submitted to publisher and mounted on OUC website (CIG)
January 08		Papers presented at scientific and conservation meetings in China (CBC)
March 08		Slide collection at OUC to become locally accessible reference collection
March 08		Gene sequences deposited in gene bank (CBC)
March 08		Manuscripts of peer-reviewed papers submitted (CBC)
March 08		Reliability of ciliate-based tool for water quality assessment verified; submitted for publication and made available to stakeholders (WQAT)
March 08		Final report drafted and sent to CBD National Focal Point and to DI

21. Set out the project's measurable outputs using the separate list of output measures.

PROJECT OUTPUTS		
Year/Month	**Standard output number (see standard output list)**	**Description (include numbers of people involved, publications produced, days/weeks etc.)**
2005/2006		
May/05	-	1st project planning meeting in UK (4 UK plus 2 OUC personnel for up to 3 days)
May/05	5	5 OUC postgraduate students receive ongoing training in ciliate identification and water quality assessment
July/05	8	2nd project planning in China (OUC personnel plus UK co-ordinator for up to 3 days)
September/05	20	OUC acquire scientific equipment (water analysis kit, spectrophotometer, centrifuge): total £18.5k
November/05	4C	UK-based training in advanced ciliate investigation techniques (2 OUC personnel x 2 months)
January/08	14B	5 papers presented at scientific meeting in China
March/06	8	UK staff to visit OUC (1 person x 2 weeks)
March/06	11B	6-8 papers submitted to peer-reviewed journals
March/06	23	£84,085 funding raised (salaries, consumables, travel)
2006/2007		
April/06	5	4 OUC postgraduate students receive ongoing training in ciliate identification and water quality assessment
November/06	4C	UK-based training in advanced ciliate investigation techniques (2 OUC personnel x 2 months)
January/07	14B	5 papers presented at scientific and/or conservation meetings in China
January/07	11A	6-8 papers published in peer-reviewed journals
February/07	8	UK staff to visit OUC (1 person x 2 weeks)
March/07	11B	6-8 papers submitted to peer-reviewed journals
March/07	-	Gene sequences of 3 taxa deposited in gene bank
March/07	23	£82,085 funding raised (salaries, consumables, etc)
2007/2008		
April/07	5	4 OUC postgraduate students receive ongoing training in ciliate identification and water quality assessment
August/07	14B	1 paper presented at European Protistology meeting
September/07	6A	Training course on identification and use of ciliates for water quality assessment (20 people x 3 days)
November/07	4C	UK-based training in advanced ciliate investigation techniques (2 OUC personnel x 2 months)
January/08	10	User-friendly ciliate guide finalized, submitted for publication and mounted on OUC website
January/08	14B	5 papers presented at scientific and conservation meetings in China
February/08	11A	6-8 papers published in peer-reviewed journals
March/08	8	UK staff to visit OUC (1 person x 2 weeks)
March/08	11B 11A	6-8 papers submitted to peer-reviewed journals (expected publication 2008/09)
March/08	13B	One slide collection enhanced and made available as an accessible reference collection in OUC.
March/08	-	Gene sequences of 3 taxa deposited in gene bank
March/08	-	Ciliate-based tool for assessing water quality developed and made available to stakeholders
March/08	23	£82,085 funding raised (salaries, consumables, etc)
March/08	9	Final report delivered to National Focal Point for CBD action and to DI

MONITORING AND EVALUATION

22. Describe, referring to the Indicators in the Logical Framework, how the progress of the project will be monitored and evaluated, including towards delivery of its outputs and in terms of achieving its overall purpose. This should be during the lifetime of the project and at its conclusion. Please include information on how host country partners will be included in the monitoring and evaluation.

Progress of the project and delivery of outputs to achieve logical framework indicators will be monitored and evaluated by project partners in collaboration through:
(1) The NHM's own project assessment and annual performance review process, which is firmly objective based. A similar objective-based review will be put in place for staff based at the OUC.
(2) Annual meetings between partners will be used to review progress and evaluate objectives.
(3) Quarterly reports from NHM to OUC and vice versa will negate any potential problems.
(4) Regular communication between partner organisations (mainly by e-mail) and between OUC and local stakeholders (by meetings, telephone and e-mail).
(5) Each objective of the project will be broken down into a number of smaller targets around the project outputs, and these will be monitored on a 3-montly basis by the partner organisations.
(6) Communication mechanism set up for post-project co-operation will be established before the project ends.
(7) Scientific publications resulting from work carried out during the project will be published in international peer-reviewed journals.