

Darwin Initiative

Annual Report

1. Darwin Project Information

Project Ref. Number	14-015
Project Title	<i>Conservation of Jiaozhou Bay: biodiversity assessment and biomonitoring using ciliates</i>
Country(ies)	<i>China</i>
UK Contractor	<i>The Natural History Museum</i>
Partner Organisation(s)	<i>Ocean University of China</i>
Darwin Grant Value	<i>£137,897</i>
Start/End dates	<i>1/11/05 – 31/10/08</i>
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	<i>1 November 2005 to 31 March 2006 Report No. 1</i>
Project website	
Author(s), date	<i>Alan Warren & Weibo Song</i>

2. Project Background

- Briefly describe the location and circumstances of the project and the problem that the project aims to address.

Jiaozhou Bay is located near Qingdao on the NE coast of China and is a major centre for fisheries and mariculture industries, including fish, molluscs and crustaceans. It is also identified in China's Biodiversity Action Plan (BCAP) as a potential nature reserve due to its high species richness. The environmental quality of the water in Jiaozhou Bay is therefore of immense significance for: (i) the maintenance of fisheries stock; (ii) successful mariculture, and (iii) biodiversity conservation. Increased industrial activity and inadequate wastewater treatment in the area surrounding the Bay, however, is compromising the marine water quality. Consequently Jiaozhou Bay is one of only 7 estuarine wetland ecosystems listed in the BCAP as requiring priority conservation attention. This project aims to help address the problems of biodiversity conservation and fisheries protection.

3. Project Purpose and Outputs

- State the purpose and outputs of the project. Please include your project logical framework as an appendix and report achievements and progress against it (or, if applicable, against the latest version of the logframe).

Ciliated protozoa (ciliates) are potentially key indicators of environmental stress in estuarine ecosystems and can be major pathogens of fisheries stocks. The main purposes of the project are; to provide baseline data for monitoring future biodiversity change in Jiaozhou Bay; to establish a protocol for using ciliates as bioindicators of

marine water quality; to train postgraduate students 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 whereby the environment amenity, as well as the fisheries industry, in the Jiaozhou Bay can be improved and developed in a sustainable fashion. See Annex 1 for the logical framework. Outputs include:

- *At least 20 papers on the taxonomy, systematics and ecology of marine ciliates published in peer-reviewed journals (5 papers submitted);*
 - *6 PhD and 7 Masters theses submitted (16 OUC students currently registered);*
 - *A ciliate-based method for monitoring marine water quality developed (sampling sites identified and sampling protocol established);*
 - *At least 30 staff and students at OUC and stakeholder institutes trained (5 OUC staff and students have received UK training in advanced methods; 16 students receiving ongoing training at OUC);*
 - *A field guide to the identification of marine ciliates produced (one chapter drafted).*
- Have the outputs or proposed operational plan been modified over the last year, for what reason, and have these changes been approved by the Darwin Secretariat? (Please note that any intended modifications should be discussed with the Secretariat directly rather than making suggestions in this report).

The start date was postponed for 6 months pending the completion of the new laboratory facilities at OUC. This, and the attendant changes to the activity-, milestone- and output delivery dates, were approved by the Secretariat. The consumables budget was brought forward and spent on an additional item of capital equipment (agreed by the Secretariat). The items of equipment specified for purchase by OUC were changed (agreed by Secretariat). Dates of future visits have been changed in order to meet with operational requirements at the partner institutes. These various changes do not impact negatively on the project in any way.

4. Progress

- Please provide a brief history of the project to the beginning of this reporting period. (1 para)

This project is in its early stages. Essential items of equipment have been procured by OUC. Ciliates have been collected from a variety of sites and examined using modern methods. A number of new and poorly known taxa have been isolated. These are being described or redescribed and in some cases their morphogenetic patterns and/or molecular sequences are analyzed. Four sites have been identified for the development of the ciliate-based method for monitoring water quality and regular sampling has begun. One chapter of the marine ciliate identification guide has been drafted. Training for 5 OUC staff and students in advanced methods of studying ciliates has taken place in the UK.

- Summarise progress over the last year against the agreed baseline timetable for the period and the logical framework (complete Annex 1). Explain differences including any slippage or additional outputs and activities.

Any differences from baseline timetable are due to the 6-month delay of the start

- Provide an account of the project's achievements during the last year. This should include concise discussion on methodologies and approaches by the project (e.g. research, training, planning, assessment, monitoring) and their consequences and impacts as well as results. Please **summarise** content on methodologies and approaches, and, if necessary, provide more detailed

information in appendices (this may include cross-references to attached publications).

All equipment needed by OUC for the successful completion of the project has been sourced within the agreed budget and has either been delivered or is on order. Five papers have been submitted for publication (see Annex 2) and another 5 are at an advanced stage of preparation. Training in advanced methods for studying ciliates (denaturing gradient gel electrophoresis, electron microscopy) has been given to 5 OUC staff and students. A method for collecting ciliates for biomonitoring marine water quality has been adopted (modified polyurethane foam unit) and is being trialled. It is too early in the project for any of these achievements to have a significant impact.

- Discuss any significant difficulties encountered during the year and steps taken to overcome them.
- Has the design of the project been enhanced over the last year, e.g. refining methods, indicators for measuring achievements, exit strategy?
- Present a timetable (workplan) for the next reporting period.
 - *Examination of ciliates, including their morphology, morphogenesis and molecular gene sequences, from a range of sites to continue throughout the year.*
 - *Regular monitoring of ciliate communities and water quality to continue at 4 chosen sites until February 2007. On completion of this 12-month study, laboratory work will commence on prospective indicator species.*
 - *Work on the remaining 11 chapters of the ciliate identification guide to begin with at least five to be completed by March 2007*
 - *Ongoing training of OUC postgraduate students to continue.*
 - *Seven OUC staff and students to present papers at the VII Asian Conference on Ciliate Biology.*
 - *At least 7 papers to be submitted for publication.*

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

- Have you responded to issues raised in the review of your last year's annual report? Have you discussed the review with your collaborators? Briefly describe what actions have been taken as a result of recommendations from last year's review.

6. Partnerships

- Describe collaboration between UK and host country partner(s) over the last year. Are there difficulties or unforeseen problems or advantages of these relationships?

The collaboration has been highly effective and productive. Regular communication has been maintained. Visits have been successfully completed. Financial aspects (money transfer, expenditure within budget, production of relevant paperwork, etc.) have been faultless. The only problem encountered so far has been the demand by the UK Home Office/FCO that academic visitors to the UK now require work permits. This was entirely unexpected and therefore unbudgeted. Consequently the visits to the UK by 5 OUC staff and students had to be shortened.

- Has the project been able to collaborate with similar projects (Darwin or other) in the host country or other regions, or establish new links with / between local or international organisations involved in biodiversity conservation? *Not yet.*

7. Impact and Sustainability

- Discuss the profile of the project within the country and what efforts have been made during the year to promote the work. What evidence is there for increasing interest and capacity for biodiversity resulting from the project? Is there a satisfactory exit strategy for the project in place?
 - *Promotion of project. A presentation was made at the Conference on Water Conservation and Management in Coastal Areas, 13-15 November 2005, Qingdao, China.*
 - *Exit strategy. 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 apprised 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.*

8. Outputs, Outcomes and Dissemination

- Explain differences in actual outputs against those agreed in the initial 'Project Implementation Timetable' and the 'Project Outputs Schedule', i.e. what outputs were not or only partly achieved? Were additional outputs achieved?

All project outputs and activities have been completed or nearly completed. The reason for any failure to meet the timetable (e.g. only 5 papers submitted for publication rather than 6-8; only 1 paper presented at a conference in China rather than 5) was the six-month delay in the project start date. This also accounts for the changes of the visit dates to the UK (January 2006 rather than November 2005).

- Provide details of dissemination activities in the host country during the year, including information on target audiences. Will dissemination activities be continued by the host country when the project finishes, and how will this be funded and implemented?

One paper was presented the Conference on Water Conservation and Management in Coastal Areas, 13-15 November 2005, Qingdao, China. Dissemination activities will continue by the host partner when the project finishes, funded by grants to be applied for from national funding bodies within China (e.g. NNSFC) and from international funding bodies (jointly with UK partner).

- Please expand and complete Table 1. **Quantify** project outputs over the last year using the coding and format from the Darwin Initiative Standard Output Measures (see website for details) and give a brief description. Please list and report on appropriate Code Nos. only. The level of detail required is specified in the Guidance notes on Output Definitions, which accompanies the List of Standard Output Measures. Only the summarised totals after the end of your project will be recorded on the Darwin project database from your final report (the totals below will help you to keep track on a yearly basis).

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
4C	OUC personnel receiving training in advanced methods in UK	5				
5	OUC postgrad. students receiving ongoing training in ciliate identification	16				
8	UK staff made 2 visits to OUC (2 weeks each)	2				
11B	Papers submitted to peer-reviewed journals	5				
14B	Papers presented at conferences in China	1				
20	No. items of equipment acquired by OUC	10				

- In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, e.g. title, name of publisher, contact details, cost. Details will be recorded on the Darwin Monitoring Website Publications Database. Mark (*) all publications and other material that you have included with this report.

Table 2: Publications

Type *	Detail	Publishers	Available from	Cost £
(e.g. journals, manual, CDs)	(title, author, year)	(name, city)	(e.g. contact address, website)	

9. Project Expenditure

- Please expand and complete Table 3.

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

		Year 1	Year 2	Year 3	Year 4	TOTAL

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- Highlight any recently agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

10. Monitoring, Evaluation and Lessons

- Discuss methods employed to monitor and evaluate the project this year. How can you demonstrate that the outputs and outcomes of the project actually contribute to the project purpose? i.e. what are the indicators of achievements (both qualitative and quantitative) and how are you measuring these?

We are working to clearly defined, focused objectives and milestones that the project partners are determined to meet or exceed. It is too early in the life of the project for any of the outputs and outcomes to have made a contribution to the purpose of the project purpose. For example, the submitted papers have yet to be accepted for publication, the ciliate identification guide is still in its infancy and work has only just begun on developing the water quality biomonitoring protocol.

- What lessons have you learned from this year's work, and can you build this learning into future plans?

11. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

■ I agree for ECTF and the Darwin Secretariat to publish the content of this section

In this section you have the chance to let us know about outstanding achievements of your project over the year that you consider worth highlighting to ECTF and the Darwin Secretariat. This could relate to achievements already mentioned in this report, on which you would like to expand further, or achievements that were in addition to the ones planned and deserve particular attention e.g. in terms of best practice. The idea is to use this section for various promotion and dissemination purposes, including e.g. publication in the Defra Annual Report, Darwin promotion material, or on the Darwin website. As we will not be able to ask projects on an individual basis for their consent to publish the content of this section, please note the above agreement clause.

Annex 1 Report of progress and achievements against Logical Framework for Financial
Year: 2005/2006

Project summary	Measurable Indicators	Progress and Achievements April 2005-Mar 2006	Actions required/planned for next period
<p>Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources 			
<p>Purpose <i>(insert original project purpose statement)</i></p> <p>Enhance biodiversity conservation and sustainable use of Jiaozhou Bay</p>	<p><i>(insert original purpose level indicators)</i></p> <ol style="list-style-type: none"> 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 	<p><i>(report impacts and achievements resulting from the project against purpose indicators – if any)</i></p> <ol style="list-style-type: none"> 1. Five papers submitted, five in preparation (see Annex 2). 2. Monitoring sites identified and sampling protocol developed. 3. Training in advanced methods given to 5 OUC staff and students 4. Sampling sites identified and sampling method established 	<p><i>(report any lessons learned resulting from the project & highlight key actions planning for next period)</i></p>
<p>Outputs</p>			
<p><i>(insert original outputs – one per line)</i></p> <ol style="list-style-type: none"> 1. Inventory of ciliate biodiversity; biodiversity assessment programme established and functioning 	<p><i>(insert original output level indicators)</i></p> <ol style="list-style-type: none"> 1. 6 PhD and 7 Masters theses submitted and at least 20 papers published by Yr 3 	<p><i>(report completed activities and outcomes that contribute toward outputs and indicators)</i></p>	<p><i>(report any lessons learned resulting from the project & highlight key actions planning for next period)</i></p>
<ol style="list-style-type: none"> 2. Ciliate-based tool for water quality assessment and monitoring developed 	<ol style="list-style-type: none"> 2. Method published and system adopted for monitoring and training purposes 		
<ol style="list-style-type: none"> 3. Training for OUC personnel and for stakeholders delivered 	<ol style="list-style-type: none"> 3. Minimum of 30 staff and students at OUC and stakeholder institutes trained 		
<ol style="list-style-type: none"> 4. User-friendly guide to the identification of ciliates in Jiaozhou Bay produced 	<ol style="list-style-type: none"> 4. Field guide tested by non-specialists; manuscript submitted and electronic version mounted on web 		8

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels.

Annex 2. List of papers submitted for publication.

Lifang Li, Weibo Song, Alan Warren, Yangang Wang, Honggang Ma, Xiaozhong Hu and Zigui Chen. Phylogenetic position of *Cardiostomatella vermiforme* (Kahl, 1928) Corliss, 1960 inferred from the SS rRNA gene sequences (Protozoa, Ciliophora, Oligohymenophorea). *European Journal of Protistology* (accepted).

Chen Shao, Weibo Song, Alan Warren, Khaled A.S. Al-Rasheid and Jun Gong. Morphogenesis of the marine ciliate, *Pseudoamphisiella alveolata* (Kahl, 1932) Song & Warren, 2000 (Protozoa, Ciliophora, Hypotrichida) during binary fission. *Journal of Eukaryotic Microbiology* (submitted)

Daode Ji, Weibo Song & Alan Warren. Two new marine sessile peritrichous ciliates (Protozoa, Ciliophora). *Acta Zootaxonomica Sinica* (accepted).

Dapeng Xu, Weibo Song & Alan Warren. Morphology and infraciliature of two marine oligotrich ciliates, *Parallelostrombidium armatum* (Bürger, 1908) nov. comb. and *Strombidium montagnesi* nov. spec. (Ciliophora: Oligotrichida) from China. *Journal of the Marine Biological Association of the UK* (submitted).

Weibo Song, Alan Warren, Dave Roberts, Norbert Wilbert, Lifang Li, Ping Sun, Xiaozhong Hu and Honggang Ma. Comparison and redefinition of four marine, coloured *Pseudokeronopsis* spp. (Ciliophora, Hypotrichida), with emphasis on their living morphology. *Acta Protozoologica* (submitted).