Darwin Initiative Third Annual Report
Project reference 14-008

The Darwin Initiative Centre for Bat Conservation in China

Project leader: Professor Gareth Jones, School of Biological Sciences, University of Bristol, Woodland Road, Bristol BS8 1UG

Project partner: Professor Shuyi Zhang, Institute of Zoology, Chinese Academy of Sciences, 25 Beisihuan Xilu, Beijing 100080, China and School of Life Science, East China Normal University, Shanghai 200062, China.

Darwin Initiative Annual Report

Darwin Project Information

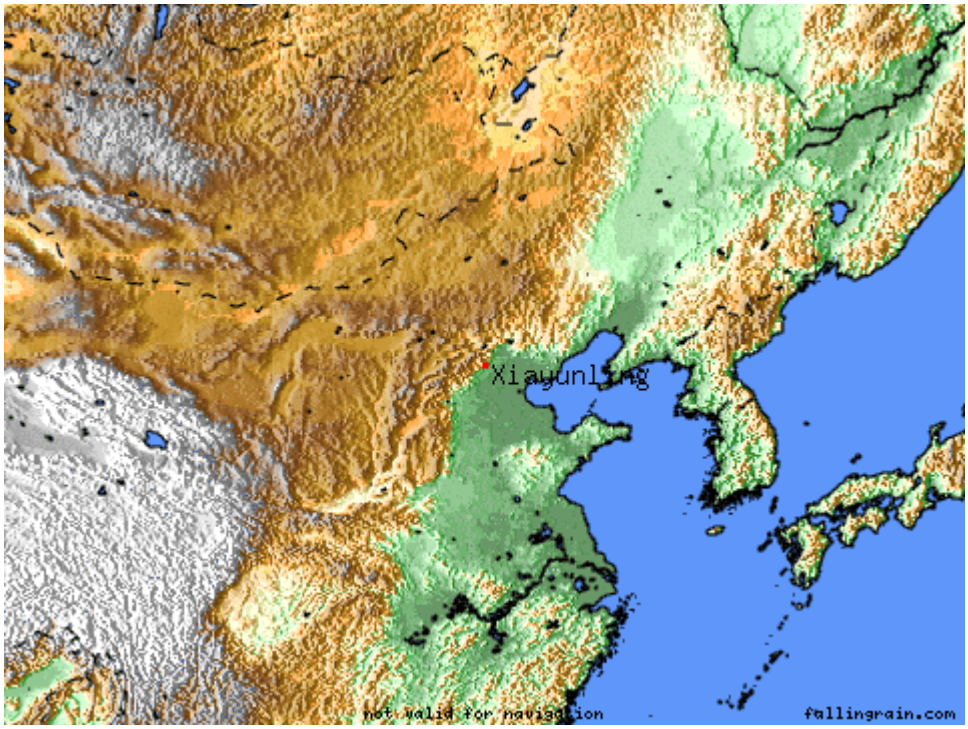
Project Ref Number	14-008
Project Title	The Darwin Initiative Centre for Bat Conservation in China
Country(ies)	China
UK Contract Holder Institution	University of Bristol
UK Partner Institution(s)	
Host country Partner Institution(s)	Institute of Zoology, Chinese Academy of Sciences, Beijing
Darwin Grant Value	£112,000 (plus £30,000 from Chinese collaborator)
Start/End dates of Project	1 July 2005-30 June 2008
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 April 2007-31 March 2008 (now 33 months into 36 month project)
Project Leader Name	Professor Gareth Jones
Project website	http://www.bio.bris.ac.uk/research/bats/China bats/index.htm
Author(s), date	Gareth Jones, Shuyi Zhang, Gareth Jones 2006-8

1. Project Background

The Darwin Initiative Centre for Bat Research and Conservation is situated in Xiayunling (latitude 38° 43'29 N; longitude 115° 44'7 E), about 100km SW of Beijing, China (map below, reproduced from http://www.fallingrain.com/world/CH/22/Xiayunling.html).

The diversity of bats in China is poorly understood. With 120 species listed to date, China has one of the most speciose bat faunas worldwide. However the validity and taxonomy of many of the described species is open to question, and a more in depth study of their taxonomy is needed. Many species reports seem to be erroneous. Basic studies on the ecology of Chinese bats are lacking. Despite their rich faunal diversity, bats in China are threatened due to habitat loss, cave disturbance and human consumption. There is an urgent need for education programmes to disseminate information about the ecological importance of bats, and to increase their protection. A Red Data book of the Endemic Mammals of China listed 6 microchiropteran bats as Rare, Vulnerable or Indeterminate (Wang, 1988 – China Red data Book of Endangered Animals: Mammalia Science Press, Beijing), and in reality accurate information on population levels of any species is lacking. Our project will assist in the conservation of Chinese bats by clarifying taxonomic status, describing ecological requirements, and quantifying distribution and abundance.

The project is centered around Beijing, and is in collaboration with Professor Shuyi Zhang of the Institute of Zoology, Chinese Academy of Sciences. In addition, Professor Zhang runs a research group in the School of Life Sciences, East China Normal University, Shanghai, and close collaborations have been forged with his students there. The main aims are to build capacity for bat research in China (including financial support of 2 PhD students, and intellectual support for 8 others); to improve understanding of the taxonomy of Chinese bats; to develop a website about the identification and biology of Chinese bats; to provide education programmes from an education centre about the importance of bat conservation.



2. Project Partnerships

Project partnerships: Professor Jones spent 2 weeks in China assisting with student projects at the Chinese Academy of Sciences in Beijing and East China Normal University in 2007. He also delivered a lecture to >100 students there. Three Chinese PhD students – Li Gang, Zhang Jinshuo and Wang Zhe – spent over a month at the University of Bristol. The students also visited the Natural History Museum (London) and a colleague at the University of London (Dr Stephen Rossiter) to undertake research.
Other Collaborations: We continue collaboration with Kadoorie Farm Conservation Centre, Hong Kong, and host their booklet about the conservation of bats in Hong Kong on our website. We have established new research collaborations with scientists from Germany and the Czech Republic in writing up our scientific papers, and continued collaborations with the Universities of London, Auckland and Guangdong Entomological Institute. We have collaborated with scientists from the USA, Hong Kong and Taipei Zoo (Taiwan) in obtaining images of rare bats for our website.

3. Project progress

Progress continues rapidly in all major areas of the project. The Darwin Initiative Centre for Bat Research and Conservation in Xiayunling hosts a number of research projects by Chinese researchers. The nearby primary school includes our education centre which has hosted lectures on bat conservation for schoolchildren. We have completed descriptions of 55 species for our website on Chinese bats (http://www.bio.bris.ac.uk/research/bats/China bats/index.htm) including photographs, range maps, echolocation call recordings and a bibliography. We have published 5 papers in refereed journals in the last year (8 now published in total), another 2 are written and being revised. Our paper on a new bat species has been published, and we are negotiating for its known habitat to be protected. We have published 9 articles about the Darwin Initiative work in popular science magazines in Chinese, another one in English. Our work has featured on Chinese Television. Professor Jones spoke about the project at the First South East Asian Conference on Bat Research (Phuket, Thailand, May 2007) where he also led a workshop on acoustic monitoring of bats. We are preparing our first paper on the distribution of bats in China.

3.1 Progress towards Project Outputs

Outputs listed in the initial logical framework are listed below, with a summary of progress made:
Foundation and running of Darwin Initiative Centre for Bat Conservation. The research centre continues to host researchers – see pictures at http://www.bio.bris.ac.uk/research/bats/China bats/Research Centre.htm. Two PhD students based their studies at the centre in 2007-8. We have purchased a floor at a nearby primary school for use as an education centre. We have developed a PowerPoint presentation in Chinese about the importance of bat conservation ('Bats and us'). The first presentation at the centre to a large class of schoolchildren took place on 18 April 2007, with further talks to students from the University of Ethnic Minorities, Beijing students from the Institute of Zoology, Chinese Academy of Sciences, and schoolchildren in Shanghai. Talks have also been arranged to with Chinese National Geographic, the China Zoological Society and the Beijing Youth Club for Science and Technology.

Identification key for Chinese bats. We make progress with our online version of this. Profiles of a further 25 species were completed, bringing the total now to 55. Photographs of 16 more species have been obtained for further pages. We believe this is one of the most thorough online guides to bats available at present. The site can be accessed at
http://www.bio.bris.ac.uk/research/bats/China bats/index.htm
with species accounts accessed by clicking on the family names in the left hand column of the page.

Baseline data on population sizes of Chinese bats. We continue to collect data on numbers of bats at roost sites visited, but the emphasis of research has focussed more on accurately documenting the species of bat present in China, rather than on recording numbers. Nevertheless, we have a manuscript of the distribution of horseshoe bats in China in an advanced state of preparation, and this will be an important foundation for assessing any future changes in distribution and abundance of bats in China.

Education packages for teachers and children. We have extended and developed our Chinese PowerPoint presentation 'Bats and us' for schoolchildren.

Lessons learned and best practises disseminated. We have completed 9 more articles on the Darwin Initiative work in Chinese popular science press. Two articles were published in China Nature about our work under the Darwin Initiative. Copies of these are attached. One of the articles describes our discovery of a new species of bat, *Barbastella beijingensis*. This work was covered extensively by the Chinese media, including an interview with S. and J. Zhang on 'Baike Tanmi' (Encyclopedia of Exploration) on CCTV-10. An article was written for the University of Bristol research magazine. Filming of fish catching bats at the Darwin Initiative Centre for Bat Conservation will appear on the BBC's 'Wild China' in May-June 2008, and will also be broadcast on CCTV China.

Our major outputs have been 5 further scientific papers published in refereed journals (appended). These are listed in Table 1 with Darwin Initiative participants highlighted in bold. The key findings of this research were:

- The discovery that a large bat species feeds extensively on birds, and appears to capture them in flight.
- Resolution of the phylogenetic position of an unusual bat in the family Hipposideridae, with the first description of its echolocation calls.
- Quantification of the genetic variation in greater horseshoe bats across their range, showing extensive genetic divergence of Chinese bats and the occurrence of two lineages with different echolocation calls in China, one of which is closely related to Japanese bats.
- Demonstration that the 'language gene' *foxp2* has undergone accelerated evolution in echolocating bats.

- Description of a new bat species, *Barbastella beijingensis*, which was first captured near the Darwin Initiative Centre.

Overall, the project has seen more emphasise on the development of capacity for scientific research than on education than was originally intended. The project has already exceeded its anticipated output of scientific papers threefold, and has helped build a research team of >25 PhD students in China. We have trained students to work in a wide range of methods in conservation biology, from describing new species to molecular ecology.

3.2 Standard Measures

Table 1. Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
Established codes							
1 A,B	PhD students (note that outputs relate to the 2 PhD students specified in the original application: additional assistance has been given to 8 others)	2	2 (continued)	2 (continued)		1 completed, 1 still ongoing, additional help for 8 others	2
7	PowerPoint presentation on bat conservation		1				1
8	Time spent in China	2 weeks	2 weeks	2 weeks	2 weeks planned		8 weeks
10	Online guide to Chinese bats			Ongoing – 55 species now online			1
11 A,B	Papers published in scientific journals	1	2	5	3 +predicted		3
14A	Seminars		1	2			50
14B	Conference attended, findings disseminated	1		1			3
18A	National TV, host country				2		'Wild China' Interview CCTV10
18B	National TV, UK				1		'Wild China'
21	Darwin Centre for Bat Research and	1					1

	Conservation						
23	Darwin Centre for Bat Research and Conservation	1					Matched funding provided by CAS (£30K)

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, eg title, name of publisher, contact details, cost. Mark (*) all publications and other material that you have included with this report.

Table 1 Table 2. Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Scientific paper*	THABAH, A., **LI, G.**, WANG, Y., LIANG, B., HU, K., **ZHANG, S.** & **JONES, G.** Diet, echolocation calls and phylogenetic affinities of the great evening bat *Ia io* (Vespertilionidae): another carnivorous bat.	*Journal of Mammalogy* **88,** 728-735.		
Scientific paper*	**LI, G.**, WANG, Y., ZHAO, H., HELGEN, K.M., LIN, L., **JONES, G.** & **ZHANG, S.** Echolocation calls, diet, and phylogenetic relationships of Stoliczka's trident bat *Aselliscus stoliczkanus* (Hipposideridae).	*Journal of Mammalogy* **88**: 736-744.		
Scientific paper*	**LI, G.**, WANG, J., ROSSITER, S.J., **JONES, G.** & **ZHANG, S.** 2007. Accelerated *FoxP2* evolution in echolocating bats.	*PLoS ONE* **2**(9): e900. doi:10.1371/journal.pone.0000900.	Open access, available online at PLoS ONE website	free
Scientific paper*	ROSSITER, S.J., BENDA, P., DIETZ, C., **ZHANG, S.** & **JONES, G.** 2007. Rangewide phylogeography in the greater horseshoe bat inferred from microsatellites: implications for population history, taxonomy and conservation.	*Molecular Ecology* **16**: 4699-4714 doi: 10.1111/j.1365-294X.2007.03546.x .		
Scientific paper*	**ZHANG, J.**, HAN, N., **JONES, G.**, LIN, L., ZHANG, J., ZHU, G, HUANG, D. & **ZHANG, S.** 2007. A new species of *Barbastella* (Chiroptera: Vespertilionidae) from north China. Journal of mammalogy 88: 1393-1403.	*Journal of mammalogy* **88**: 1393-1403.		
Popular Press*	**ZHANG, J. 2007.** Article about Darwin Initiative funded work	*China Nature* 2007 (**5**) 76-78.		
Popular Press*	**ZHANG, J. 2008.** The harmony between human and nature-my view in UK	*Science Times* 27/03/08	http://www.sciencenet.cn/dz/dznews_photo.aspx?id=3064	

Popular Press*	**JONES, G. 2007.** Batting for China	*Re:search* 16: 2-3	http://www.bris.ac.uk/university/publications/research/research-issue-16.pdf	free
Popular Press*	**ZHANG, J. 2008** Beijing barbastelle-a new mammalian species in China	*Forest and Humankind*, (2):92-99		
Popular Press	QIAN, J (pen name of **ZHANG, J**) A new member in bat world	*National Geographic Chinese version,* (1):9. (news)		
Popular Press	**ZHANG, J. 2007.** We discover a new species	*Beijing Sci-Tech Report*, 24 December, 7(14):56		
Popular Press	**CAI, W. 2007 (written by ZHANG, J)**. A new mammalian species discovered in Beijing	*Beijing Evening News*, 18 December.		
Popular Press	KE, W . 2008 (pen name of **ZHANG, J**). Chinese zoologists discovered a mammal species-Beijing barbastelle	*Science Times*, 17 December		
Popular Press	**ZHANG, J. 2007.** Chinese scientists name a new species-Beijing barbastelle	*DEEP-Chinese Scientific Exploration*, 12:38-39.		
Popular Press	**ZHANG, J. 2007.** Visiting bats in Fangshan	*China Nature*, (5):76-78		

3.3 Progress towards the project purpose and outcomes

We feel that we are making good progress towards achieving the project purpose and outcomes. In general however the better-than-expected output from more scientific aspects of the project has been at some cost to the educational aspects: we are currently developing a schedule for disseminating educational talks to schoolchildren during the final 6 months of the project.

3.4 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The project has contributed to better describing biodiversity in China, educating schoolchildren about the need to conserve bats, and has raised the profile of science in China. Professor Jones has been appointed as an evaluator for the IUCN's Global Mammals Assessment for input into the assessment of endemic Chinese bats as a consequence of this project.

4. Monitoring, evaluation and lessons

Quality of publications is evident from their acceptance in peer-reviewed journals. We have now published 8 papers. These appeared in respected publications, including *PLoS ONE* and Molecular Ecology (impact factor 4.8). The *PLoS ONE* paper was featured by *Science* (see http://sciencenow.sciencemag.org/cgi/content/full/2007/919/1) and was picked up by media throughout the world. We will monitor the numbers of schoolchildren who pass through the education centre in the coming year.

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

Comments made at the last annual review were 'The project has coped seamlessly with the transfer of its location and has been able to deliver excellent science. The challenge now is to ensure that the educational centre is used as effectively as possible to further bat conservation in China. The following additional comments are made:
1. It would be useful to try and monitor the impact of schools visits on the children as well as the numbers of visits made;
2. A brief report on feedback from users of the website would be useful as well as confirming the quality of the work that has been done to the benefit of the project;
3. Seek confirmation of approval for variation in expenditure, if not already done'.

In response to these comments we have:

- Written a questionnaire in Chinese that will be given to children before and after presentations to monitor their current knowledge of bats, and how attitudes may have changed as a result of the presentation. This questionnaire has so far been distributed to students at Beijing No. 8 High School.
- We have not implemented formal feedback from the website because of the dangers of email overload, but all feedback received has been positive. For example Dr John Fellowes, University of Hong Kong stated 'Gary passed on your website link - looks good'. (19/03/08).
- Approval for variation in expenditure has been obtained. The most important change has been to extend the finishing date (with no changes to costings) for the project until 31 October 2008 so that I can host the final batch of Chinese students in Bristol at a convenient time.

6. Other comments on progress not covered elsewhere

None

7. Sustainability

Professor Zhang has now established a major research group studying bat biodiversity in China. The group contains more than 25 young PhD students, and the influence of the Darwin Initiative funding was great for the development of the group. On 1 May 2008, Professor Zhang wrote the following to Eilidh Young

'I must say that this Darwin project, together with Gareth, has trained about 10 PhD and master students (even only two are included in the documents). And these students are the key persons for research and conservation of bats in China. We can perspect that: in 5-10 years, most of them will be professors of Universities, and then can teach their students about bats. So, this project is really the most important seed for bat research and conservation in China'.

A sustainable future for bat research and conservation in China has therefore been built, together with the establishment of a research and an education centre near Beijing which will continue to be maintained by Professor Zhang.

8. Dissemination

Input from the Darwin Initiative has been acknowledged in all 8 scientific publications, in 9 popular science articles, on Chinese TV and on the website. The research and education centres bear the Darwin Initiative logo.

9. Project Expenditure

Table 2 Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery) Also includes display materials			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Others			
Salaries (specify 2 PhD students, 1 education officer))			
TOTAL			

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

It has been agreed to deduct the £634.25 overspend from the budget in the last financial year (2008-9). The spend on capital was for a computer and software for website development, and travel expenses were higher than anticipated because GJ attended the SE Asia bat conference to give a presentation on the Darwin Initiative project as well as travelling to China.

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

A bat species new to science has been discovered in China as a result of work under a Darwin Initiative grant. The bat is a species of Barbastelle, called the Beijing barbastelle *Barbastella beijingensis*, and was first discovered close to the Darwin Initiative Centre for Bat Research and Conservation about 100 km SW of Beijing. The bat is more closely related to European barbastelle (*B. barbastellus*) bats than to the other barbastelle species previously known to exist in China (*B. leucomelas*), but is genetically distinct from both these species. At present it is only known from the area where it was found, and lobbying is underway to protect its habitat and roosting sites.

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

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve* *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*			*(do not fill not applicable)*
Purpose Promotion of bat conservation in China by establishment of a bat conservation centre in Beijing. From the centre we will increase public awareness about bat conservation, improve identification of Chinese bats, and establish baseline data to assess population changes in Chinese bat populations.	(insert original purpose level indicators) Completion of Darwin Initiative Centre for Bat Conservation by yr 1. Education dissemination strategy implemented by year 1. Education material disseminated by yr 3. Bat identification key completed by yr 3. Baseline data on bat populations in cave sites.	The Centre for Bat Conservation continues to host research students, and the nearby education centre has opened and hosted talks. Online information for about 55 bat species has now been uploaded to website. Five papers in refereed journals published, also 3 popular science articles. Description of a bat species new to science published. Manuscript of first paper on distribution of horseshoe bats in China in preparation. Li Gang completes and successfully defends PhD thesis at Chinese Academy of Sciences. Three Chinese PhD students hosted at Bristol. Presentation at First South East Asian Symposium of Bat Research.	
Output 1. Foundation and running of Darwin Initiative Centre for Bat Conservation.			
Activity 1.1 Building and operation of Darwin Initiative Centre for Bat Conservation		Two PhD students continued to work in projects at the Darwin Centre. Talk to	Continue to host research students and to give presentations. At least 3 major

		schoolchildren at the education centre.	presentations targeted to reach school children from a wide range of schools. Ensure centre continues to be used after Darwin grant ends.
Output 2. Identification key for Chinese bats (Chinese and English versions): online version to include echolocation calls and DNA sequences.			
Activity 2.1. Production of identification guide		Accounts of another 25 species added, bringing total to 55 species. All widespread species now have accounts.	Complete identification guide to include at least some information on rare species (many of which appear to be dubious records and should be flagged as such).
Output 3. Baseline data on population sizes of cave-dwelling bats.			
Activity3.1. Baseline population estimates		Some shift in interests of student Jinshuo Zhang from population studies to biodiversity assessment.	Publish a paper on the distribution of horseshoe bats in China as first step in describing current knowledge of distribution of Chinese bats.
Output4. Lessons learned and best practices disseminated			
Activity 4.1 Publicity		3 popular science articles published.	

Annex 2 Project's full current logframe

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 Promotion of bat conservation in southern China by establishment of a bat conservation centre in Beijing. From the centre we will increase public awareness about bat conservation, improve identification of Chinese bats, and establish baseline data to assess population changes in Chinese bat populations.	Completion of Darwin Initiative Centre for Bat Conservation by yr 1. Education dissemination strategy implemented by year 1. Education material disseminated by yr 3. Bat identification key completed by yr 3. Baseline data on bat populations in cave sites.	Opening ceremony involving Chinese co-funders. Biannual meetings of project partners and all participants, including Chinese co-funders.	Chinese funding partners remain committed.
Outputs Foundation and running of Darwin Initiative Centre for Bat Conservation. Identification key for Chinese bats (Chinese and English	Building completed staffed, displays and education material developed. Key published in a peer-reviewed	Biannual meetings of project partners and all participants.	

versions): online version to include echolocation calls and DNA sequences. Baseline data on population sizes of cave-dwelling bats. Education packages for teachers and children. Lessons learned and best practices disseminated	journal. Online version accessible. One PhD student trained. Population estimates published in scientific journal. One PhD student trained. Visits to Centre by teachers and classes. Estimated 50 school visits by yr 3, and 'pyramid' teaching by educating teachers and allowing PhD students to train undergraduates, who will then visit schools. CCTV documentary broadcast by yr 3. Radio broadcasts, articles (3+) in popular science magazines (e.g. National Geographic China).	Publication after peer review, PhD student examined. Access statistics to website. Publications lodged with Darwin Initiative. Publication after peer review, PhD student examined. Publications lodged with Darwin Initiative. Questionnaires about attitudes of children to bats before and after education programmes. Viewing, circulation statistics.	Students of sufficient calibre located. Publications subject to peer review.

Annex 3 onwards – supplementary material (optional)

Five scientific papers and three popular press articles have been provided as attachments to the report.

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	✓
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you completed the Project Expenditure table?	✓
Do not include claim forms or communications for Defra with this report.	