

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Abhijit Das
Project title	An assessment of herpetofaunal diversity, distribution and conservation status in Barail Hill range.
RSG reference	04.03.08
Reporting period	19 June 2008 to November 2009
Amount of grant	£4995
Your email address	protobothrops@gmail.com abhijitdas80@rediffmail.com
Date of this report	31 December 2009

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Herpetofaunal inventory from mid to higher elevations of Barail Hill Range			√	A total of 45 species of herpetofauna recorded from upper reaches of Barail Hill Range, comprising of 23 species of snakes, 5 species of lizards and 17 species of amphibians. The recorded diversity is lower than the diversity encountered at the lower elevation of Barail Hill range (68 species). This presumably reflects the fact that tropical areas of the Barail Range (20-1000 m) are rather species compared with sub-tropical and temperate regions (1000-2500 m). However, these mid-to high elevation dwelling species are rather distinctive and thus of conservation concern.
Natural history notes on the recorded species			√	Detailed notes were maintained about the each species encountered in the field. Information like habitat, microhabitat, reproductive information, and ecological interactions were gathered.
Biogeographic analysis for the herpetofauna species of Barail Hill range.		√		The herpetofauna at the upper elevation are found to be quite "distinct" from the lower elevation assemblage. The coefficient of biogeographic resemblance ($CBR = 2c/N_1 + N_2$) between the two regions is only 0.10. The two regions share only 6 species in common. Also a comparison of snake fauna of Barail Hill range with the other hill ranges of north-east India showed its close resemblance with Lushai hills (CBR 0.50) followed by Khasi Hills (CBR 0.47). The high snake faunal similarity between Barail Hill and Lushai Hill presumably reflects the geographic proximity and habitat similarity between the two areas.
Identifying unique species and "ecologically		√		The survey revealed few unique species that are restricted to the upper elevation of Barail Hill range.

sensitive species”.				<i>Rhabdophis nuchalis</i> is so far only known from upper elevation of Barail range. Besides, a typical assemblage of high elevation dwelling snake guild: <i>Amphiesma vinningi</i> , <i>Bungarus bungaroides</i> , <i>Euprepiophis mandarinus</i> , <i>Oligodon dorsalis</i> , <i>Orthriophis cantoris</i> are also recorded. Among amphibians, <i>Pterorana khare</i> , <i>Hyla annectans</i> , <i>Rhacophorus taronensis</i> are restricted to upper elevation of Barail range.
Conservation awareness			√	Conservation awareness at scientific and management level was achieved through scientific publications, seminars and discussion with the policy makers. The awareness at grassroots level was achieved through village meetings, informal discussions and publication of awareness materials.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

During our field survey we met an accident as our vehicle rolled down from a moderate slope. As I was sitting in the front seat, I could manage to jump out of the vehicle but our team member (Vivosile Meyese) and one local guide (Kevi Meyese) sustained lacerated wounds on their head, ear and leg. We took the help of local villagers and got first aid in a primary health care centre. Later two of my friends were shifted to a town hospital where they were treated for 10 days. For this incident, we also lost binoculars and field supplies like datasheet, food materials, batteries and fuel (~80 Litres of diesel). Our field work suffered for at least 17 days. However, as soon as my friends recovered we could immediately resume our survey.

Also, my PhD related work kept me off from the field for at least 2 months at the peak season (June-July 2009). I presume that survey during that period might have yielded few more herpetofaunal species. But I had to abide by my University regulations. However, as soon as I finished my PhD viva and other university matter, I took “better late than never approach” and came back to my field site. Although, I had to go for a bigger team involving three more local guide.

3. Briefly describe the three most important outcomes of your project.

The study helped to document the first herpetofaunal checklist of the upper reaches of Barail Hill Range. Although identity of few species up to species level could not be ascertained so far, however, it is almost certain that few of those records will be of much taxonomic interest. Detailed natural history information on rare snake species like *Amphiesma vinningi*, *Bungarus bungaroides*, *Euprepiophis mandarinus*, *Oligodon dorsalis*, *Orthriophis cantoris*, *Rhabdophis nuchalis*, *Viridovipers yunnanensis* was gathered.

The survey also revealed one interesting Natricine snake that possibly represents a species new to science. Also systematic study involving comparative materials is underway for *Cyrtodactylus* sp., *Bufo* sp., *Xenophrys* sp., *Amolops* sp., *Philautus* sp. obtained during present field work. The population currently referred under *Amphiesma parallelum* showed close resemblance with *Natrix clerki* which is currently regarded as a synonym of *Amphiesma parallelum*. Thus, further study might show the validity of the *Natrix clerki*.

Present study helps us to document the species distributed in upper reaches of Barail range. This enables in initiating the faunal distribution pattern along an altitudinal gradient. The coefficient of biogeographic resemblance between the lower tropical formation and upper subtropical to temperate formation is found to be low (0.10) which indicates a rather distinct biota between the two zones. Also, a comparison involving the snake fauna of Barail range with the snake fauna known or recorded from other hill ranges of north-east India showed close overlap with Lushai hills followed by Khasi hills. However, a robust biogeographic analysis involving multiple groups of herpetofauna is our next priority.

The project also generates opportunity to reach out among various section of society through scientific writings, publication of awareness materials, scientific presentations and through village meetings.

The findings of the project were presented in Wildlife Institute of India, Dehradun, at Field Studies Council, Shrewsbury, United Kingdom beside in regional universities and colleges. The Department of Life Science in Assam University agreed in developing a special "Barail Biodiversity Research Initiative" which I feel is an important step for long term research and conservation of Barail landscape.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

The project area covers a community reserve forest called Khonoma Nature Conservation and Tragopan Sanctuary (KNCTS). The result of the survey was very encouraging to the local community there. A possible new species to science, new range record, record of rare species from their community conserved forest actually showed them the value of their conservation effort. They realized that habitat protection can actually help in conservation of covert species like herpetofauna. Thus, the project got full support from Naga Village Council and authorities of KNCTS. They participated in the fieldwork or helped run project activities smoothly. Their help and support is always acknowledged in all publications and presentation and even scientific authorship is given to one of the wildlife warden of the sanctuary. I also distributed herpetological, ornithological and mammalian pictorial field guides to interested students and wildlife wardens of KNCTS. The wildlife warden and few other local guys learn to handle venomous snakes and currently involved in snake removal operations from human habitation. Village and school meetings in Nagaland gave me an opportunity to tell about the ecological values of herpetofauna and also help me to narrate about venomous snake species of the area and first aid methods in case of snake bite.

5. Are there any plans to continue this work?

Yes! I feel the low to mid elevation areas yet to reveal hitherto unknown species. I presume that field expedition in the interior mountainous areas particularly at the junction point of Assam and Meghalaya (Norphu Reserved Forest) and the between Halflong and Nagaland (N.C Hill Reserved

Forest) will significantly contribute to the herpetofaunal diversity of the Barail landscape. Thus, further survey will refine our knowledge about the species assemblage, biogeographic distributional pattern and conservation status of the herpetofauna of Barail Hill range. These interior mountainous areas will definitely add species unknown to science and also provide new range records and unknown natural history information of herpetofaunal species.

The robust dataset thus obtained can go a long way in biological prioritization of the Barail landscape and while proposing for an elevation of the conservation status of Barail wildlife Sanctuary into Barail Biosphere reserve.

Also, further work will provide opportunity to initiate further taxonomic and natural history study based on fresh field materials. Collaborative study is planned so as to solve the taxonomic problems surrounding herpetofaunal species.

6. How do you plan to share the results of your work with others?

The results of the project are already presented in Wildlife Institute, regional universities, forest departments and in Naga village councils and local schools. The Biodiversity Research Department of Assam University, Silchar also agreed to develop a special programme for long term research on biodiversity of Barail Hill range.

The following scientific papers are already published and few are in press. More taxonomic and inventory paper work is under preparation and by 2010 we presume to publish fresh set of publications based on project finding in respected peer reviewed journals.

Following publication can be made available on request to Protobothrops@gmail.com

Das, A., U. Saikia, B.H.C.K. Murthy, S. Dey, S.K. Dutta. 2009. A herpetofaunal inventory of Barail wildlife sanctuary and adjacent regions, Assam, Northeastern India. *Hamadryad*. 34 (1). 117-134.

Sengupta, S., **A. Das**, S. Das, B. Hussain, N. K. Choudhury and S. K. Dutta. 2009. Taxonomy and biogeography of *Kaloula* Species of Eastern India. *Natural History Journal of Chulalongkorn University*. 9(2): 209-222.

Das, A., M. V. Nair, M. F. Ahmed., P. K. Sharma. 2008. Distribution of King Cobra (*Ophiophagus hannah*) in Northeastern India with new altitudinal record and notes on its habitat. *Tigerpaper* 35 (4): 1-6.

Das, A., 2008. *Tropidophorus assamensis*: Geographical Distribution. *Herp. Review*. 39(1): p. 110.

Mohapatra, P. P., **A. Das**, F. Tillack, and S. K. Dutta. 2009. Taxonomy, Natural history and distribution of *Boiga forsteni* (Dumeril, Bibron et Dumeril, 1854) (Serpentes: Colubridae) from Orissa, India. *Russian Journal of Herpetology*. 1-10. in press.

Das, A., P. P. Mohapatra, J. Purkayastha, S. Sengupta, S. K. Dutta, M. F. Ahmed and F. Tillack. A contribution to *Boiga gokool* (Gray, 1835). (Reptilia: Squamata: Colubridae). *Russian Journal of Herpetology*. (in press).

Further, we are working on systematic description of species new to science and I hope by 2010 we can finish the description of at least two new species from Barail Hill range and also publish the upper elevation herpetofaunal inventory paper. All the results will be published in peer reviewed scientific journals as well as shared with national and regional mass media. A detail technical report with photographs of each recorded species with their distribution maps and natural history notes will be submitted to RSGF for uploading it in the Barail project webpage. The softcopy of the report

will be made available to herpetologists and other scientific bodies and a hard copy of the report will be submitted to respective forest departments, village council and libraries of educational institutions.

7. Timescale: Over what period was the RSG used? How does this compare to the anticipated or actual length of the project?

I received the 2nd RSG letter on 19th June 2008. I received the project money sometime during first week of July 2008. However, the month of July 2009 went in “groundwork” for smooth implementation of the project. I could only start the field inventory from August 2008 and I supposed that I could finish my project activity and get ready with final technical report by end of August 2009. However, I failed to do that as for my thesis related work which kept me off from field for two peak monsoon months (June-July 2009), and had to go for additional survey beyond the project time frame that is through August-November 2009.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Transportation(Vehicle hiring @ £ 14×50days = £ 700 and fuel @ £ 6×40days=£ 240)	940	1055	115	Also costs slightly increased from 3 times to and fro Train journey (@ Rs. 1500 per visit) to Zoological Survey of India, Kolkata.
Lodging (For 4 persons @ 2 £ per day × 4 × 70 days (4×70×2= £ 560)	560	500		Money was saved from the budgeted amount from home stay and also in community hall during survey.
Per-diem (4 persons @ £ 3 per day for 100 days (Food at field))	1200	1000	200	Expense was reduced from eating local food and also no cost while eating during home stay with local community.
Honorarium (For 2 Field assistants @ £ 3 × 2 person × 60 days = £ 360 and 1 Local guide @ £ 2 for 60 days = £ 120)	480	600	120	
Equipment 1 GPS £ 100 2 binoculars £ 100 3 Speedometer £ 25 Chemicals and other field equipment's £ 190	415	415	0	
Field supplies (note book, data sheets, paper, herbarium sheet, blotting	450	570	120	Increased from budgeted amount from processing photographs, purchasing batteries and few

paper, field guides and reference materials, leech guards, snake bags = £ 300 Photo films and processing, batteries = £ 150				animal photo guides that were distributed among local guides. Also few items (rolls, batteries, herbarium sheets) got destroyed during accident.
Publication of educational materials	200	230	30	
Communication	100	150	50	
Contingency	100	220	120	Due to unfortunate accident met during field work, additional 120 was spent for treatment of the field staffs.
Overhead expenses	250	250	0	
Total	4995			

9. Looking ahead, what do you feel are the important next steps?

Further survey will definitely yield hitherto unknown rare species. This is supported by the sharp slope in species accumulation curve obtained from lower elevation (tropical zone). A recent field trip (10 days) to lower elevation of Barail range added 5 species that were not recorded during earlier survey. I feel inventory of hitherto unsurveyed North Cachar Hill reserve forest, Norphu reserve forest and Mupa-Langteng reserve forest is a priority. This will allow us to have a holistic idea about the herpetofaunal assemblage along an elevational gradient. Documentation of additional diversity and distributional information will help us in developing a proposal for uplifting the current status of Barail Wildlife Sanctuary to Barail Biosphere Reserve. And in this case awareness activities at the fringe areas of Barail will help in long term conservation of Barail biodiversity.

Also, recognizing the taxonomically cryptic species is an important ongoing step. Systematic description will demand comparison with related taxa distributed in Southeast Asia and may also need molecular approach to solve the taxonomic puzzle surrounding the cryptic species. Thus the series of publications from the project will help focus the biological value of the area among scientific and conservation bodies which will help in setting future conservation priority.

Setting up a special "Barail Biodiversity Research initiative" in local Assam University, Silchar seems to be an important step for long term research and monitoring effort, where this project results can provide a baseline data for all future research effort in this important landscape.

I also look forward for an opportunity to publish a colour booklet on herpetofauna of Barail Hill range. The Booklet will contain species description with photographs and natural history notes, distribution patterns and one chapter on conservation status of the recorded diversity.

10. Did you use the RSGF logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?

The RSGF logo was used in all my presentation based on Barail Herpetofauna Project. Currently, my sticker and herpetofaunal poster is in press where I used the RSGF logo. I also used RSGF logo on the

cover page of Final Technical report which is under preparation. RSGF got publicity through published educational materials, book, print media and through peer reviewed publications.

11. Any other comments?

As a spin-off benefit of this project, one of my botanist friends (Santanu Dey) discovered a new species of *Zingiber* from Barail wildlife Sanctuary while accompanying me on a herpetological trip. Also, the mammal and butterfly species photographed during the survey are incorporated in the management plan of the sanctuary. This presumably indicates that, inventory in a data deficient area like Barail Hill Range will generate valuable information on multiple taxa and thus can contribute in conservation priority. So, I feel inventory work in more interior areas should continue. It is also important to continue the ongoing effort to develop a community buffer through awareness activity in the fringe village areas of Barail Hill range.

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