

The Rufford Foundation Final Report

Congratulations on the completion of your project that was supported by The Rufford 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	Sanjay Sondhi
Project title	Assessment of Lepidopteran Diversity in the Kameng Protected Area Complex, Arunachal Pradesh, India to Augment Ongoing Community Ecotourism Initiatives.
RSG reference	12638-2
Reporting period	February 2013 - February 2015
Amount of grant	£ 6000
Your email address	sanjay.sondhi1@gmail.com
Date of this report	1 July 2015

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
Generate species and population data about butterflies.			✓	In the first RSG, 72 days of survey yielded 380 species of butterflies. During this grant, 38 days of survey yielded an additional 50 species of butterflies. A manuscript titled "Butterflies (Lepidoptera) of the Kameng Protected Area Complex, western Arunachal Pradesh" has been submitted to the Journal of Threatened Taxa for publication in March 2015. Population, altitudinal and seasonal data were generated during the course of the surveys to assist in establishing baseline data.
Generate species data about moths		✓		During the first RSG, 400 species of moths were identified. During the course of the second RSG, the total number of moth species identified has gone up to 840 species. At least another 500 species still remain unidentified. Seasonal, altitudinal and locational information were generated to assist in establishing baseline data.
Augment on-going ecotourism at Eaglenest by expanding it to butterflies and moths		✓		
Augment on-going ecotourism at Pakke by expanding it to butterflies and moths		✓		The first butterfly and moth tour to Eaglenest was successfully organised and conducted in October 2012. Two catalogues titled "Butterflies of Eaglenest Wildlife Sanctuary" and Moths of Eaglenest Wildlife Sanctuary" were published in May 2013 that helped market the area's lepidopteran diversity. Additional visits by tourists and tourist groups to watch the area's butterflies were facilitated but were conducted by the local community independently. Tourists and

			<p>researchers accompanied me during RSG funded surveys in May 2013, September 2013 and May 2015 adding to the revenues of the community venture at Pakke. I facilitated the visits of two tourist groups from US and India in April 2014 and October 2014. In addition, tour operators independently conducted butterfly and moth tours to Pakke, adding to revenues for the local community. Exposure tours for youth from other parts of northeast India who were trained in butterflies and moths were conducted at Pakke in October 2013 and May 2015, which too, assisted the local community ecotourism venture. The publication of the book "Butterflies and Moths of Pakke Tiger Reserve" in February 2014 assisted in marketing Pakke as a destination for butterflies and moths. Titli Trust and ESI also participated in the Pakke Paga festival January 2015, organised by the local community to boost tourism at Pakke.</p>
Local capability building for butterflies and moths		✓	<p>Training and local capability building for butterfly and moths was conducted in the landscape in May 2013, April 2014 and July 2014. More than 100 people (forest guards, nature guides, local community members) were trained during the course of the project. The publications on butterflies and moths in the landscape assisted capability building. The Arunachal Pradesh Forest Department re-printed at its own cost, 1,000 copies of the butterfly and moth catalogues of Eaglenest for training and marketing purposes.</p>
Increased awareness about lepidopteran fauna amongst stakeholders of the importance of lepidopteran fauna and the need to conserve it.		✓	<p>Education workshops for school children in the landscape were conducted in September 2012 (Eaglenest), May 2013, April 2014 and July 2014 (Pakke). The butterfly and moth publications made for Eaglenest and Pakke were freely distributed during these workshops.</p> <p>In addition, a photographic booklet titled "Moths of NE India" with more than 700</p>

				moth species was prepared and copies provided to the tourism ventures at Eaglenest and Pakke, and the respective Protected Area managers at each location. Assistance was provided to prepare posters on butterflies and moths in two interpretation centres at Tippi and Seijosa at Pakke Tiger Reserve highlighting the importance of lepidopteran fauna.
Financial contribution to local communities involved in eco-tourism and conservation		✓		A contribution of £ 100 was made to the Bugun Welfare Society for conservation and social work through sales of the butterfly and moth catalogues. Sales from the Pakke butterfly and moth book resulted in a contribution of £ 600 to the Pakke Tiger Conservation Foundation, which in turn uses these funds for conservation.

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

Marketing: Two butterfly and moth tours, which were announced in September 2013 to Eaglenest and November 2014 to Pakke, did not result in a good response from eco-tourists and had to be cancelled. Lack of marketing and outreach were assessed as the main reasons for the failure of the tours. The key learning from this was that it was necessary to tie up with nature tour operators who have wherewithal to market these tours effectively. Also, while the local community ventures are fully capable of conducting Lepidoptera tourism on their own, their ability to market these tours on their own remains an issue that needs to be addressed.

Moth tourism: An absence of popular moth publications severely hampers moth tourism. In order to address this, a folder titled "Moths of NE India" was distributed in all the tours and training programmes that were conducted. The moth catalogue for Eaglenest and the moth section of the Pakke book published during this project assisted but are still not comprehensive enough. Over a longer term, there is the need of a book to support moth identification for eco-tourists, which is being planned. In addition, more than 500 species of moths identified in the landscape are already uploaded on the Titli Trust <http://www.titlitrust.com/Moths.html>. Finally, an independent, peer-reviewed moth website has been initiated as part of a citizen science project to increase interest in moths and permit identification of moth species. This website will be launched in 2015.

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

1. The addition to the knowledge of butterfly fauna for India was an important outcome of the project. A total of 430 butterfly species were recorded during the surveys, including two species new to India (*Gonepteryx amintha thibetana* and *Bhutanitis ludlowi*) and several species rediscoveries, most notably *Arhopala belphoebe* and *Calinaga aborica*, both of which were recorded in India after many decades and several range extensions in the Eastern Himalaya such as *Sovia separata magna*, *Aulocera saraswati vishnu*, *Callerebia annada annada*, and *Callerebia scanda opima*, to name a few species, were documented. Many species were recorded of which there are no recent published records from India such as *Celaenorrhinus badia*, *Celaenorrhinus patula/morena*, *Celaenorrhinus plagifera*, *Celaenorrhinus pyrrha*, *Celaenorrhinus sumitra*, *Tagiades coharens cynthia*, *Arhopala khamti*, *Chrysozephyrus assamicus* amongst many others. These records are in the process of being published.
2. The addition to the knowledge of moth fauna was a key outcome of the project. A total of 840 moth species have now been identified, with several new records for India and range extensions. Seasonal and altitudinal records also have added to the information about flight periods and seasonality of moths in the landscape.
3. The increase of butterfly and moth tourism in the study area, and elsewhere in India was a key outcome of this project. It is our estimate that 10% of the total revenues at Pakke and Eaglenest over the study period were generated from lepidoptera tourism, supplementing bird tourism. While the total market for lepidoptera tourism is still small, it is growing in number and popularity and will contribute significantly to local economies in the years to come.
4. The importance of lepidopteran fauna, and the need to conserve it, is now firmly established amongst the stakeholders (forest department, local community) in the landscape.

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

The local communities at Pakke and Eaglenest benefitted economically from the research and ecotourism that was conducted as an outcome of this project. In addition, the Nyishi tribe at Pakke and Pakke Kesang and the Bugun and Sherdukpens at Eaglenest are now aware of the importance of butterflies and moths for ecotourism and their role in nature.

5. Are there any plans to continue this work?

Yes. I intend to continue this work. The unfinished agenda is outlined as under:

- a. Butterfly data: The species accumulation curve for butterflies shows that there are still species to be found in the study area. In addition, a review of older literature showed that 41 species that were recorded by other researchers that have still not been

recorded during my surveys, necessitating the need for more surveys. The study area is vast, and many areas still remain unexplored in the different seasons.

- b. Moth data and publication: Many moth species (>500) remain unidentified. The work to identify these species needs to continue with more fieldwork and visits to moth collections in various institutes across the country.
- c. Lepidoptera tourism: The two hurdles (local community marketing and absence of popular moth literature) need to be addressed to sustain and grow lepidoptera tourism.
- d. There is the need to evolve a model for the involvement of the local community in research and monitoring activities for lepidopteran fauna.

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

Numerous technical and popular publications helped share the work being done in the landscape.

Technical papers

Naro, T & S. Sondhi (2013). Sightings of Bath White *Pontia daplidice moorei* Röber, 1907 (Lepidoptera: Pieridae: Pierinae: Pierini) from Arunachal Pradesh and Nagaland, India. *Journal of Threatened Taxa* 5 (7), 4122-4124; <http://dx.doi.org/10.11609/JoTT.o3308.4122-4>

Sondhi, S. & P.K. Roy (2013). Sightings of *Gonepteryx amintha thibetana* Nekrutenko, 1968 (Lepidoptera: Pieridae: Coliadinae) from Arunachal Pradesh, India: an addition to Indian butterfly fauna erroneously placed in southeastern Tibet earlier. *Journal of Threatened Taxa* 5(12): 4687-4692.

The manuscript "Butterflies (Lepidoptera) of the Kameng Protected Area Complex, western Arunachal Pradesh, India." has been submitted to the *Journal of Threatened Taxa* for review and publication. This paper lists the 420 species recorded in the study area along with a literature review, seasonal and population data.

Books and catalogues

Sondhi, S. & K. Kunte (2014). *Butterflies and Moths of Pakke Tiger Reserve*. Titli Trust (Dehradun) and Indian Foundation for Butterflies (Bengaluru). vi+ 202 pp.

Sondhi, S (2013). *Moths of Eaglenest Wildlife Sanctuary*. Titli Trust (Dehradun).

Sondhi (2013). *Butterflies of Eaglenest Wildlife Sanctuary*. Titli Trust (Dehradun).

Numerous articles were published in Indian Newspapers to support conservation and tourism in the study area. Articles were published in *New Indian Express*, *Telegraph*, *Hindustan Times*, *Hindu* and *TerraGreen* amongst others.

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

The grant was originally to be used over a 24-month period from February 2013 to February 2015. However, the need to do a pre-monsoon survey at Pakke-Kesang, in the northeastern part of Pakke Tiger Reserve meant that the last field trip was conducted in May 2015, extending the project by 3 months.

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. (£=82 INR)

Item	Budgeted Amount	Actual Amount	Difference	Comments
<u>Lepidoptera survey and assessment</u>				
Four field visits of two weeks each				
Travel and per diem of naturalists	2500	2572	72	Increased airfares.
Field transport and fuel	1350	1475	125	Increased cost of vehicle hire and fuel
Boarding, lodging and field camping expenses	450	418	-32	Contributions from volunteers for conservation program helped reduce project costs
Visits to institutes for examining moth collection and identification	240	180	-60	Only two institutional visits were made
<u>Initiating tourism and local capability building</u>				
Equipment: Books, butterfly nets, moths screens	235	349	+114	Purchase of additional books for moth identification.
Equipment: Generator set	235	246	+11	£ 2,700 were raised from other funding sources to support publications during this project.
Marketing collateral and toolkits for local capability building	240	252	+12	£ 990 were raised from other sources for educational and exposure workshops.
Exposure tours for	180	0	-180	

capability building				
<u>Awareness building and outreach</u>				
Workshop with key stakeholders	60	0	-60	£ 990 were raised from other sources for educational and exposure workshops.
<u>Institutional and administrative overheads</u>				
Entry permits, research institute memberships, research permits	210	194	-16	
Institutional overheads and other administrative costs	300	314	+14	
Total	6000	6000		

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

Continuing to generate species data on butterflies and moths.

Continuing to identify moths recorded in the landscape and publishing a technical paper with seasonal and altitudinal data.

Publishing a field guide to moths of northeast India. No recent field guides have been published in India, and this acts as a significant deterrent to moth tourism and conservation. Community involvement in moth and butterfly conservation.

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

Yes. The Rufford logo was used in numerous publicity and education material during the course of the project. The publications, Butterflies of Eaglenest Wildlife Sanctuary, Moths of Eaglenest Wildlife Sanctuary and Butterflies and Moths of Pakke Tiger Reserve all used the Rufford logo. In addition, the Rufford logo was used on banners in all the educational workshops that were conducted during the course of the project. The logo was used in presentations that were made in numerous forums such as the Forest Research Institute, Dehradun, IIT-Alumni Association, New Delhi, Centre for Cellular and Molecular Biology, Hyderabad, and Uttarakhand Forest Department consultations.

11. Any other comments?

The lessons learnt in developing lepidoptera tourism in northeast India through funding by Rufford are being replicated in many other landscapes. Currently, the faunal survey-led model, involving local communities to adopt eco-tourism as an incentive to conserve; developed and refined during RSG projects are being adopted in four landscapes in Uttarakhand, India, some by Titli Trust, and a few by other NGOs with support from the Uttarakhand Forest Department. In the future, it is hoped that the model developed during the first two phases of this project will be scaled up to include other parts of northeast India.