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	K. Supriya
Project title	Impact of ants on elevational pattern of bird species diversity in the eastern Himalayas.
RSG reference	18701-1
Reporting period	January 2016- July 2017
Amount of grant	£4955
Your email address	ksupriya@uchicago.edu
Date of this report	12th October, 2017

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
Ant-exclusion experiment				
Nest-box experiment				
Diet-overlap between ants and birds				Sample collection from the field has been completed, but the lab work is not complete yet.

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

The main difficulty was with the lab work component of the project. Next generation sequencing is much more expensive in India than in the US and I have had trouble figuring out the best and most economical way to go about it. I also struggled with optimizing the PCR and primers for the method.

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

My field research shows that ants and birds compete for both arthropod prey and nesting cavities.

Removal and exclusion of insectivorous weaver ants from trees resulted in higher abundance of large arthropods (>4 mm) on trees over a 1-month period. The effect was not observed over a 1-year period, which can be attributed to the disappearance of weaver ants from some trees from which we had not removed them. Because arthropods >4 mm in size are likely to constitute the majority of bird prey base, this result shows potential competition between ants and birds for arthropod prey.

The second important result comes from the nest box experiment. Birds used an unusually large proportion of nest boxes at low elevation (200 m), but none at 1200 m. This is despite a higher number of bird species that excavate cavities at the low elevation. A large number of nest boxes at the low elevation were also occupied by ants, some of them almost completely obstructing the entrance of the nest box. Together, these results suggest that ants may be causing a shortage of nesting cavities for birds at low elevations. All the nest boxes at low elevation were used by a single species of bird, the white-rumped shama (Copsychus malabaricus).

Finally, I recorded a number of nest predation events at the low elevation on the shama nests. The nest predators we recorded included some unidentified snake

species, grey-bellied squirrel, monitor lizard, Asian palm civet and even an Oriental pied hornbill.

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

Fieldwork for the project involved participation from three people from the local community who learned different useful skills during the project. We also had a lot of interaction with the children in the village and conducted a science workshop for them.

5. Are there any plans to continue this work?

This work is part of my PhD dissertation and I am currently writing and analysing the data. I would like to continue this work, however, it depends on where I get a post-doctoral fellowship. A number of undergraduate and masters students were involved with the project as interns and I am hoping to continue the work through collaborations with them.

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

I am planning to publish the results as articles in peer-reviewed scientific journals. I have also presented my results at a couple of scientific conferences already and plan to continue doing that. I participate in various outreach initiatives in Chicago including the "meet a scientist" hour at the Field Museum of Natural History and plan to share my results with people through that. I also have a website where I will write blog articles to explain my results to non-scientific audiences and share them widely through social media. I am also planning to set up a meeting with the forest department of West Bengal and share my results with the staff there, once I have completed analysing my data.

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

I used the Rufford Foundation grant over a period of one and half years, from February 2016- July 2017. This is about 1/3rd the length of the project, but it funded crucial field seasons of my project.

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

Round-trip from Chicago to New Delhi (2 times)	1200	996	-204	My advisor covered costs for my flight for 2016 field season because I went to the Ant Course in Mozambique on my way back.
Round trip from New Delhi to Bagdogra in India (2 times)	800	282.8	-517.2	Dip in Indian currency value and low cost flights from a new airline brought the costs down drastically.
Travel between field sites (2 field seasons)	300	261	-39	We couldn't visit the 1200m or 2000m site after the beginning of June 2017 because of political situation and strikes in the region, so we had two less trips than anticipated.
Nest boxes (60)	300	1266.31	+ 966.31	We ending up getting 240 nest boxes made, instead of 50, because we were getting interesting results and decided to do additional experiments.
Tanglefoot (10 15oz tubs)	90	93.8	+3.8	
Field assistance (1 assistant for 3 months/year)	900	904.7	+4.7	
Additional assistance for the camping site at mid-elevation	200	199.9	-0.1	
Qiagen DNeasy Blood and Tissue kit for ants (6)	630	678.4	+48.4	Qiagen kit prices increased over time.
QIAamp DNA stool mini kit for bird feces (2)	285	353	+68	Qiagen kit prices increased over time.
PCR primers & reagents	250	249.43	-0.57	

Exchange rate used for budget calculations:
USD to £: 1 USD= 0.75 £
INR to £: 1 INR= 0.012 £

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

We experimented with different nest box designs in this project. The other aspect to experiment with would be nest box height. It would be great if we could get birds to use some of the nest boxes at 1200 m elevation, so we could identify the nest predators there. It will also be good to find natural nests and compare the rates of

predation between low and mid-elevation. Finally, examining the use of some natural cavities at the low and mid-elevations by ants and birds would be a challenging but very useful extension to the project.

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

Yes, I included the Rufford Foundation logo in the talks and posters I presented at the American Ornithological Society meeting in East Lansing and the Indian Biogeography Society meeting in Bangalore in 2017. I will acknowledge funding support from the Rufford Foundation in all the publications resulting from this project.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

- Amir Chhetri: Local field assistant from Panijhora village, helped out in all aspects of fieldwork
- Jobin Varughese: Intern in 2016 and 2017 field season, helped with field work, data entry and some data analyses.
- Ritobroto Chanda: Volunteer in 2016 and 2017, helped with fieldwork, data entry and some data analyses.
- Vinod Shankar: Volunteer in 2016, helped with data collection in field.
- Priyanka Das: Volunteer in 2016 and 2017, helped with data collection in the field.
- Ramesh Tamang: Local field assistant from Panijhora village, helped occasionally with fieldwork
- Sakuntala Tamang: Local person from Panijhora village, helped in data entry.

12. Any other comments?

Thank you so much for funding my project, even though the primary focus of this project is not conservation. However, our results are highly relevant to conservation. Nest boxes have been used for conservation programmes for many endangered bird species the world over. The pattern of nest box use by birds here helps us understand what nest box designs would work and where. It also highlights the importance of excluding ants from at least part of the tree trunk around the nest box to ensure that birds are not precluded from using the nest boxes by ants occupying it.