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	Sheema Abdul Aziz
Project title	Interactions between flying foxes, plants and people on Tioman island – implications for conservation
RSG reference	17325-1
Reporting period	May 2015 – May 2016
Amount of grant	£4978
Your email address	sheema@rimbaresearch.org
Date of this report	7 October 2016

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
O1: To elucidate the role of *P. hypomelanus* as a pollinator of commercially important durian trees on Tioman			✓	Camera trapping and statistical analyses revealed that *P. hypomelanus* has a positive effect on durian fruit set, suggesting that it potentially plays an important economic role as the most efficient pollinator for this fruit tree. The results of this study are being prepared for publication in the journal *Oecologia*.
O2: To elucidate the importance of figs in the diet of *P. hypomelanus* and the role of *P. hypomelanus* as their dispersal agent		✓		NGS analysis suggests that the diet of *P. hypomelanus* is likely dominated by wild figs throughout the year. However, we could not ascertain the bat's specific role in seed dispersal, as we did not have enough time or manpower to investigate this aspect. The results of the analysis are being prepared for publication in the journal Peer J.
O3: To identify factors affecting human attitudes towards *P. hypomelanus* and potential areas of conflict on Tioman			✓	A questionnaire survey and statistical analysis revealed that locals in Juara village hold largely negative attitudes towards *P. hypomelanus* due to concerns over fruit raiding, hygiene and noise. Older males are more likely to hold negative attitudes, as are fruit tree owners who derive income from fruit and have experienced flying fox raids. Due to this, some locals believe that flying foxes should be killed. The results of this study have just been submitted for publication to the journal *Human Ecology*.
O4: Lobby for a moratorium on *Pteropus* hunting licences throughout			✓	I have communicated with the Department of Wildlife & National Parks (DWNP), and shared the preliminary outcomes of this research with them.

Peninsular Malaysia				They are supportive of flying fox conservation and are moving to amend the relevant legislation to extend full protection to Malaysia's two flying fox species, which would include a total ban on hunting. These amendments are expected to come into effect in 2017.

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

i) We could not investigate seed dispersal due to constraints on time, manpower and logistics. To some extent the geographical setting of the study site also presented a constraint, as we could not find a suitable location nearby for conducting seed germination studies. As such, this aspect of the study was postponed for future exploration. The extra funds were rerouted to pay for Next-Generation Sequencing (NGS) analysis of *P. hypomelanus* diet (see below).

ii) The collaboration with the University of Malaya (UM) on DNA analysis of flying fox diet was not satisfactory as it did not produce the results needed within the project timeline. Therefore we had to terminate the collaboration and enter into a new collaboration with Monash University Malaysia for this aspect of the project. This resulted in UM terminating their financial contribution to the project. Since the new collaboration with Monash involved NGS analysis, which is costly, the leftover funds that were not used for investigating seed dispersal/germination were used instead for this purpose.

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

i) Proved that flying foxes play an important role as efficient pollinators of durian, a culturally and economically important cultivated fruit tree throughout Southeast Asia.

ii) Successfully trialled and pioneered NGS analysis of faeces as an effective method for studying flying fox diet.

iii) Provided data and scientific evidence to lobby DWNP to push for protection and conservation of all flying foxes in Peninsular Malaysia.

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

i) We stayed in accommodation owned by a local family, who allowed us to rent a room on a monthly basis at a discounted rate.

ii) We made a point to have our meals at an assortment of local cafes and restaurants owned by local villagers, thereby contributing financially to local livelihoods.

iii) We hired a local villager as our regular driver during the entire data collection period. This person also occasionally assisted us with data collection.

iv) The owner of a durian orchard allowed us to use her orchard for the pollination study, at no cost although we offered payment. We will be sharing the results of our study with this owner and others who have durian trees, in order to explain to them how flying foxes are actually providing benefits to them.

5. Are there any plans to continue this work?

Yes, I plan to continue this research and hope to develop it into a long-term project with applied conservation impact, as long as I can secure the funds to do so.

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

i) Talking directly to local villagers at the study site, with the aid of videos and photos. Organising a presentation or public talk on the island, if appropriate.

ii) Collaborating with Reef Check Malaysia, who are based on the island, to help disseminate the results, and spread awareness of flying fox conservation, to the wider community on Tioman. We will also discuss and explore the possibility of introducing these aspects into school programs or activities with schoolchildren, if possible.

iii) Communicating and working closely with DWNP via written reports and face-to-face meetings.

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

It was used from May 2015 to May 2016. This corresponded closely with the project's period of intensive data collection and data analyses, which the grant was used for.

The data collection period started in March 2015 and ended in October 2015, after which analyses began.

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. Local exchange rate used: 1 GBP = 5.5 MYR

Item	Budgeted Amount	Actual Amount	Difference	Comments
Field assistant wages	729	727	+2	
Field sampling equipment & supplies	2792	2513	+279	Actuals include costs of NGS analyses (~1618). Difference was rerouted to pay for transport & accommodation
Transport & accommodation	1457	1738	-281	
Total	4978	4978	0	

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

i) Outreach and awareness efforts to educate people on the important ecosystem services provided by flying foxes, and the potential consequences of flying fox extinctions.

ii) Engagement with the durian industry to conduct more extensive research into the role of flying foxes and other fruit bats in commercial durian plantations.

iii) More extensive research into human-flying fox conflict beyond Tioman, and trials of potential mitigation options particularly for fruit raiding.

iv) More extensive research into the diet and foraging behaviour of *P. hypomelanus*, including other island sites.

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?

i) I thanked The Rufford Foundation and used the logo in a short online video produced to promote the project and raise awareness of flying fox conservation.

The video can be viewed here: https://rimbaresearch.org/2015/08/21/video-update-5-project-pteropus-takes-flight/

ii) I thanked the Rufford Foundation and included the logo in my scientific presentations at the Association for Tropical Biology and Conservation (ATBC) Asia-Pacific Chapter Meeting in 2015, the 3rd Southeast Asian Bat Conference (SEABCO) in 2015, and the ATBC General Meeting in 2016. I also did the same at a public talk I gave at an event organised by the Malaysian Heritage and History Club in 2016.

11. Any other comments?

This project struggled to raise sufficient funds in its first, exploratory phase (2014), and this grant proved to be a lifeline as it allowed data collection and analyses to be carried out during the second phase. Without this grant, the project would not have been able to conduct any further work, and would have been at risk of termination. As such, the grant has permitted us to advance our knowledge of flying foxes, their ecological roles and ecosystem services, and the issues they face coexisting with humans in the Anthropocene. We are now better-equipped with skills, tools and information that will allow us to take effective steps to arrest flying fox declines. The Rufford Foundation has thus played an instrumental role in advancing the cause of flying fox conservation – not just in Malaysia or Southeast Asia but throughout the entire geographical range of flying foxes.