

## 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

#### Grant Recipient Details

<b>Your name</b>	Stephanie Hing
<b>Project title</b>	Deforestation and Disease - A Survey of Endoparasites in Endangered Bornean Elephants <i>Elephas maximus borneensis</i> in Continuous and Fragmented Habitat
<b>RSG reference</b>	11840-1
<b>Reporting period</b>	21 April to 17 July 2012
<b>Amount of grant</b>	£4000
<b>Your email address</b>	<a href="mailto:stephanie.hing11@imperial.ac.uk">stephanie.hing11@imperial.ac.uk</a>
<b>Date of this report</b>	4 September 2012

**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
To develop and trial a practical method to screen endoparasites in free ranging wild Bornean elephants			✓	Over 100 faecal samples were collected from wild Bornean elephants and successfully analysed using a special modification of the McMaster method. Methods and results were verified by experts.
To profile the endoparasites of Bornean elephants			✓	Endoparasites of Bornean elephants include trematodes, cestodes and nematodes.
To assess patterns of endoparasite infection in Bornean elephants in fragmented and continuous habitat			✓	Results showed significant differences in parasite prevalence, diversity and load between fragmented and continuous habitat.

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

More field support was required than anticipated. Hence, the project budget includes additional wages for field assistants.

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

- The first catalogue of endoparasites in Bornean elephants – baseline data is lacking on parasites, pathogens and disease of most, if not all, wild animals so this study fills a significant knowledge gap and can be used in the future research.
- Developed, honed and executed a protocol for parasite surveys in wild elephants – This protocol can be repeated in the future using step by step illustrated guides I have compiled.
- Results – This study indicates links between ecosystem and animal health, specifically that habitat loss and fragmentation can influence infection dynamics. Most notably the prevalence of strongyle nematodes was significantly higher in fragmented compared to continuous habitat suggesting that habitat fragmentation is associated with increased risk of disease spread by faecal-oral transmission.

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

Field assistants were all local Sabahan with excellent knowledge of the local area and the elephants. They shared their knowledge with me particularly how to work around wild elephants. I provided training in faecal sample collection methods and they proved very adept. On expeditions, we stayed in various locations including with local families.

## 5. Are there any plans to continue this work?

At yet, there are no concrete plans to continue this work but methods used were shared with colleagues at the Danau Girang Field Centre who are working on various endangered species in Borneo. Results are also informing other studies on Bornean elephants. They plan to conduct similar parasite surveys in their focus species including endangered proboscis monkeys.

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

- MSc thesis – shared with Imperial College, Durrell Wildlife Conservation Trust, Kew Gardens, ZSL and Chester Zoo. The full thesis will eventually be available to the public online via the Imperial College Conservation Science website [www.iccs.org.uk](http://www.iccs.org.uk)
- Journal article – Currently drafting a paper for a scientific journal with the aim to publish by the year end
- Seminar presentations – Presentations were made to several field courses of undergraduate and postgraduate students from Malaysia, the US, UK and Europe as well as local staff, providing updates on the project
- Conference presentations – Presentation and posters e.g. Student Conference on Conservation Science, Cambridge, ZSL

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

The RSG was used to cover the following costs incurred during the field expedition 20 April to 17 July 2012.

## 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.

The budget is different to that included in the application as since that time, additional funding was obtained. The £4000 RSG was allocated as follows:

Item	Budgeted Amount	Actual Amount	Difference	Comments
International flights	1000	1109	+109	
Accommodation, food, water	2037	1552	+485	Danau Girang Field Centre revised the initial quote for accommodation, food and water
Wages for field assistants	255	472	+217	More field support was required than anticipated. Hence, the project budget includes additional wages for field assistants.
Insurance	185	185	0	
Digital binocular compound microscope and duty costs	230	300	+70	
Anti-malarials	200	460	+260	Had to take malarone as could not take doxycycline due to photosensitivity
<b>Total</b>	<b>3907</b>	<b>4078</b>	<b>+171</b>	

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

This study has developed an effective and practical method to screen free ranging Bornean elephants for endoparasites. This opens many avenues for further research. The spatial and temporal scale of the project could be expanded, the methods refined, novel population surveys conducted, scope of the study widened, and findings can be incorporated into conservation management. Considering that endoparasites occur in virtually all ecosystems, the protocols and techniques used in this study can also be applied to assess the health and status of other endangered species under threat from anthropogenic habitat loss and fragmentation.

**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 has been used in all material produced in relation to this project thus far including presentations to audiences from different countries including the US and UK. RSGF is also acknowledged, and the logo appears on my thesis which will eventually be available for public access online.

**11. Any other comments?**

Thank you very much to RSGF for essential support for this project. You have helped to establish important links between habitat loss, fragmentation and infection dynamics in free ranging endangered wildlife, links which have so far been neglected in conservation science despite constituting key threats to species survival.