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	Katharina Johanne Peters
Project title	Ensuring the survival of Darwin's Finches through the control of an introduced parasitic fly and by galvanising local community action.
RSG reference	12595-1
Reporting period	15.01.13 – 30.09.13
Amount of grant	£5790
Your email address	Katharina.peters@flinders.edu.au
Date of this report	29 October 2013

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
Identify Parasite Intensity and beak deformation in Darwin's Medium Tree Finch			Yes	Medium tree finch had the highest parasite intensity compared with other tree finch species on the same island; birds had different levels of beak deformation due to parasites.
Identify nesting success in Darwin's Medium Tree Finch			Yes	Medium tree Finch had 0% nesting success in 2013 (25 nests monitored)
Quantify parasite intensity and nesting success in all three sympatric species in declining forest			Yes	The hybrid finches had the lowest parasite intensity and highest nesting success, suggesting hybrid fitness in this system. A manuscript describing this pattern was accepted by *American Naturalist* in 2013.
Quantify vegetation characteristics of nest sites in relation to parasite intensity			Yes	Data collected and pending analysis

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

The breeding season of the Darwin's tree finches is triggered by the onset of the raining season, which usually falls into late January. In 2013, the rainy season started a few weeks later, which also delayed the nesting of the tree finches. Because we had planned fieldwork from late January to late March, we were still able to collect sufficient data.

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

Main findings for 2013 fieldwork:

1. The medium tree finches had the highest parasite intensity of any Darwin finch population on Floreana Island (Figure 1), and the lowest nesting success (0% from 25 nests).
2. Medium tree finch nestlings with many parasites were likely to have deformed beaks if they survived as adults (Figure 2).
3. Female medium tree finches preferred male small tree finches as partners, which led to hybrid pairings (Figure 3), and hybrid nests had lower parasite intensity (Figure 1).

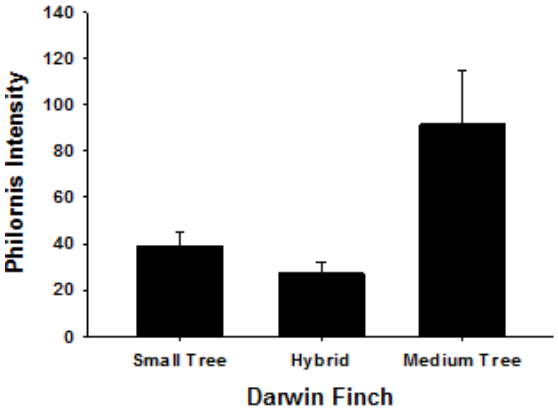

Figure 1. Parasite intensity (mean ±se) from *Philornis downsi* larvae on Floreana Island. Note that medium tree finch nests had the most parasites compared with small tree finches or hybrid pairs.

Figure 2. Deformed beak as the result of parasites feeding on the soft beak tissue when the finch was a nestling. Male finches with deformed beaks had lower song quality. We could show that females preferred males that sang high quality song and avoided large males with large beak deformation.

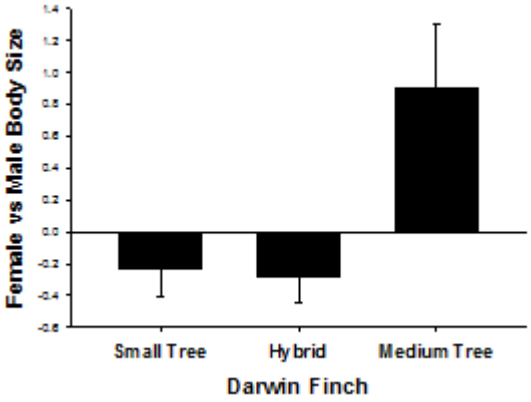

Figure 3. The difference (mean ±se) in body size in male and female pairs for each genetic population. Because Medium Tree Finch females often paired with Small Tree Finch males, they had larger body size than the pair male.

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

In 2013, we trialled an explicit model of community engagement with teachers, on-ground tour operators, international volunteers, and Galapagos National Park staff to increase awareness about the plight of the Galapagos land birds affected by the introduced parasite. We developed brochures, audio files, and PowerPoint presentations that have been disseminated to primary and secondary school across the Galapagos Archipelago and the mainland, including to the USA. We then invited a total of ~60 people into the field with us on different days and provided each person with a 6 hour intensive field day mist-netting birds and finding nests, putting up traps and removing larvae. The

idea was to combine intense personal experience with “easy to use” field identification manuals and audio recordings that anyone could use to identify Darwin’s finches, and to disseminate the personal experience and information via these brochures and audio files with other students and volunteers. Thus, community professionals become the patrons of the local wildlife and in this manner are role models for the next generation of children. It is not effective for visiting scientists to possess all of the information and provide “expert advice” on what needs to be done if the local and international community remains unconvinced or unaware of the problem. By sharing the capacity to identify wildlife and threats to wildlife, the teachers, tour operators, international volunteers, and parks workers become stewards of the messages themselves adding personal anecdote to their tales of observing larvae eating nestling birds alive. This approach increases community capacity in several ways. We provide the most accurate information on Darwin finch identification and song available, because our group is a world leader on the subject. The volunteers and community members then engage and apply the information and generate their own insights, observations, and experiences; local and international students benefit from an increasing number of mentors with first-hand experience observing birds and controlling introduced disease, which creates awareness, interest, and provides a skill base to be an effective conservation manager or citizen more likely to vote for conservation action.

5. Are there any plans to continue this work?

This project is part of an ongoing study supervised by Kleindorfer since 2000 with support from the BirdLab since 2004. Our group has conducted annual fieldtrips to collect data on various aspects of the ecology of Darwin’s tree finches since 2000 with focus on the critically endangered medium tree finch since 2004; the years we were unable to collect data were the years that we were unable to secure funding (2007, 2009, and 2011). In recent years, the Philornis problem has become the prime subject of research, and we have been working in close collaboration with Galapagos National Parks in order to manage the impacts of this invasive parasite. We plan to further investigate the host-parasite relationship, its mechanisms and the consequences for the tree finches in the future with the aim of eradicating the fly and conserving the medium tree finch.

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

At present we are writing several manuscripts that include data collected in the field season 2013. These manuscripts will be submitted to international scientific journals in the near future. One was accepted in *American Naturalist* in October 2013. Furthermore, we will present the results at national and international conferences in 2014. Additionally, the Ecuadorian Journalist Christian Johnson interviewed us for his programme 593 Ecuador. He reported on the problems of human migration to the Galapagos and covered the story of the Philornis fly.

In all years of study, we have actively shared the project outcomes with all relevant stakeholders, and well beyond that with local schools, conservation managers and tour operators. We will continue this approach and actively communicate the results of our findings with the local community as well as international scientists and conservation organisations to implement effective control options. This will be done in close collaboration with the Charles Darwin Foundation and Galapagos National Parks, via on-the-ground training, invited talks, dissemination of written and audio materials. The strategies we use have broad general significance in other localities where introduced parasites and disease are impacting fauna. Our research has featured in Ecuadorian TV

programmes, online websites, online education programmes (e.g. NEXUS), and other non-traditional outlets. In addition, we will disseminate the findings of our study in traditional venues such as journal publications, conferences, and workshops. Because of its isolation, the Galapagos Archipelago is vulnerable to the introduction of foreign organisms through tourism and mass cargo delivery of many goods to sustain the island communities. Under these circumstances, community outreach is even more important to engage the local and international public about conservation and working together towards sustainability to the benefit of all.

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

The Rufford Small Grant was used to cover fieldwork expenses during January-March 2013. Due to the remote location and the intensity of the work, fieldwork is naturally the most costly part of this project. We therefore planned to use the RSG for this period of time, although of course the project including data analysis, manuscript and report writing continues over several months afterwards.

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
Accommodation on Galapagos for a team of 4 people	720	900	-180	Short-term accommodation on Santa Cruz Island was needed for two people to organise more food and drinking water
Food on Galapagos for a team of 4 people	4500	4800	-300	Drinking water needed to be purchased and transported to the island due to water shortage
Boat travel to and from Floreana	720	720	-	-
Car travel to study sites	1350	1100	+250	On several days the weather conditions did not allow fieldwork, therefore no travel costs
Air travel Quito- Galapagos for an Ecuadorian volunteer	300	300	-	-
Air travel Adelaide – Galapagos (Ph.D.-candidate Katharina Peters)	2000	2000	-	-
Total	9590	**9820**	-230	

Exchange rate used: February 2013, 1 £ sterling = 1.55 USD (currency of Ecuador)

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

This project is of high ecological importance and annually fieldwork is necessary to keep up the research progress in this exiting system. Since the tree finches are severely threatened by Philornis, we must take measures to actively reduce the impact of this parasite.

In 2014, we plan to install flytraps in order to investigate the impact of trapping Philornis flies on the nesting success of the critically endangered medium tree finch. Once we ascertain the impact of local flytraps on removal of adult female parasites (and check native fly impacts), this method can be used across the Galapagos archipelago to reduce parasite stress. We know from previous experimental study that finch nests without parasites had ~100% fledging success. The proposed control measure will encourage nesting success in severely declining finch populations. This will create a time window to test bio control measures that are being developed in parallel with our on-the-ground approaches.

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?

We will use the logo at presentations on national and international conferences in 2014. Furthermore we will use the logo on the BirdLab website which will be online in the near future.

11. Any other comments?

The ideas that we generated in 2013, along with the pilot study to trap flies, will inform the next phase of our research project that aligns with the International Philornis Action Plan. We are most grateful to the Rufford Small Grant Foundation for its support, without which this work could not have been done.