

### 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	Priscilla Alpízar Alpízar				
Project title	Diet, gut microbiome, and immune system of a nectar- feeding bat in intensive banana plantations in the Caribbean Costa Rican lowlands				
RSG reference	16703-1				
Reporting period	January 2015- January 2016				
Amount of grant	£5000				
Your email address	prialp55@gmail.com				
Date of this report	January 15 <sup>th</sup> , 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
Explore the relations between land use changes on diet, gut microbiome and immune system		X		I have obtained samples from 70 individuals in banana plantations and from 20 in forests. Next April, I'll travel to Germany to start the analyses and determine their behaviour. I am also adding 5 more months to my sampling sessions to obtain samples from more individuals.
Test for correlations between pesticide levels and physiological effects		X		I have taken samples from my sampling sites. However, the analyses will be done after my additional sampling session. We are also taking samples from banana nectar to determine the presence of pesticides in the flowers.

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

The most important difficulty came from finding the banana plantations to work at. We had negotiated with Chiquita Banana (with whom I worked with for my Masters), but the company got sold just before I started sampling. We had to begin negotiations with a new company, so we had some setbacks in our timetable. However, the company we are working with now is extremely open to suggestions in order to improve their ecological footprint.

Another unforeseen difficulty was to capture the focal species in forest patches. We had anticipated this would be easy, since *Glossophaga soricina* is the most common nectar-feeding bat in the area. However, the lack of flowers and the change in local weather patterns made it harder than we had initially thought. To solve this, we found more forest patches, increased the number of sampling nights in forests, and used more mist nets in forests. *G. soricina* individuals started appearing in September 2015, when bat flowers bloomed. We have focused our sampling sessions in forests sites during these past months. Also, we added an extra sampling session from September 2016 to February 2017 in order to complete the amount of individuals needed for our study.



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

One of our most important outcomes is the knowledge we have generated about the use given by nectar-feeding bats to banana plantations. The flowers from this crop are widely liked by our focal species, as well as by other nectar-feeding bat species. This aspect only reinforces the importance that our study has, and creates more anticipation to what we will find in our laboratory analyses.

We have also managed to develop a small environmental education programme with the community that lives and works in the banana plantations. We are working with both adults and children. For adults, I gave general talks about bats. I focused the talk on what are bats, where they live, what they eat, bats of Costa Rica, ecosystem services provided by bats, and myths about them. These talks have been very interesting because the community members have many questions about bats. We believe that the talks have helped to improve the perception that local people have regarding these animals. We also have several workshops scheduled with local children for February 2016 (when school lessons begin). For them we are developing hands-on activities in which they will learn about bats while they play. We have a memory game that matches pictures of bats with their diet items. We also have roost models that they can make themselves, as well as colouring pages with information about bats. We expect kids to receive the information we will give them with as much enthusiasm as adults did.

Finally, we are having constant contact with the high-ranked managers from the plantations. During our meetings we discuss how they could improve their ecological footprint. We have spoken about the construction of bat houses, about planting native species that bats use, and about proper extraction of bats from people's houses. We have a list of plants they can plant, and they have agreed to start using some of them in edges and gaps. We are also discussing the importance that forest patches have for wildlife, and they are considering implementing reforestation programs. We believe that with their example, other companies might begin to change their mentality little by little.

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

As described in point number 3, local communities have been included through talks and workshops. This environmental education programmes will benefit them with new knowledge, for both kids and adults. Also, hopefully, their perception about bats will change strongly and they will appreciate the importance these animals have for ecosystem services.

Additionally, I have trained two local men to work as my assistants. They can now identify bat species from the area, know about their diets and roosts, and they can mist-nets for bats. Both of them work during the day in a private reserve and are now in charge of the reserve's mist-netting for bat tours.



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

We are continuing this work. We are sampling until April 2016, with an extra sampling session from September 2016 until February 2017. All of the analyses will be done during the following years. We expect to finish in 2019. We have also thought about additional small projects that will complement mine, for example, to determine the home range of *Glossophaga soricina* in banana plantations, and expect new students to start with them soon.

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

Once we are finished with our sampling sessions and analyses we will publish our results in scientific magazines and conferences. We also have talks scheduled both in Ulm University in Germany and in the Universidad de Costa Rica in my native country. We will create non-scientific documents for all the forest patches and for the banana plantations where we sampled, as well as talks about what we found. These documents will include suggestions that could mitigate the impact that banana plantations have on bats. We also want to broadcast our project more widely, so we have plans to speak with local Costa Rican newspapers (like Semanario Universidad) for them to write a small note on our project.

## 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 Rufford Foundation grant was used during our sampling sessions. Our project is expected to last almost 5 years. We used this grant during our first year, which was basically field work. Thanks to the Rufford Foundation grant, we managed to obtain most of the samples I need for this study. I have obtained a scholarship from the Costa Rican Science and Technology Ministry (micitt) to perform my studies and analyses in Germany.

# 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.

ltem	Budgeted	Actual	Difference	Comments
	Amount	Amount		
Housing	2300	3000	700	Additional sampling nights covered
				by Ulm University
Meals	1200	1600	400	Additional meals covered by Ulm
				University
Transport	1500	2000	500	Additional transport expenses
				covered by Ulm University
Total	5000	6600	1600	



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

For this project, the next steps are to begin the laboratory analyses and to obtain all the samples needed. Both of them are scheduled for this year. Publishing our results, both for the scientific community and for everyone else, is an important step. We also believe that complementary studies, like the one mentioned above, will be useful for my project.

In terms of the application of the project, the most important step is to continue in contact with the banana plantation managers and to contact new companies and CORBANA (entity in charge of coordinating all of them). The most important next step in relation to this, even if it is a long-term one, is to develop management strategies for banana plantations in order to decrease the amount of pesticides used and to improve the status of wildlife in them.

## 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 Foundation logo was part of all the talks and workshops I gave during this period of time. I have also mentioned it when asking for further scholarships or grants.