

Final Evaluation Report

Your Details	
Full Name	Sergio Lopes De Oliveira
Project Title	Biological control of bats on arthropods in cocoa agroforestry: effects of local management and landscape
Application ID	25017-1
Grant Amount	£4,970
Email Address	sergiobiolopes@gmail.com
Date of this Report	September, 2019

1. 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 how and on which scale the bat's community is influenced by the landscape.				I have identified that agroforests are ecosystems friendly for bats, but scale pattern analysis is still going on.
Identify the threshold where native forest cover affects bats within an agroforest.				I have identified that forest remnants are important for the equability of the community bats, but scale pattern analysis is still going on.
Measure the predation of arthropods by bats, with emphasis on groups of arthropods that can cause damage to cocoa production				I identified the most affected orders, but to conclude the results, I need on specific identification of arthropods that depend on a skilled professional. Step already in progress.

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

Materials damaged in the field by problems of natural damage or by outsiders who occasionally access work, areas caused the greatest difficulties. As well as, climate issues such as excessive rainfall, that damage roads or cause some developmental delay from work

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

1. To date, into the cocoa agroforests, I captured 1835 bats distributed in 34 species. Species such as *Lonchorryna aurita*, *Macrophyllum*, *Micronycteris microtis* and *M. minuta*, which apparently are highly forest-dependent species, were recorded within agroforests, highlighting the great importance of these systems for maintaining biodiversity and autonomous ecosystem functioning.
2. Landscapes with the largest number of cocoa agroforests had higher bat abundance and richness, which may indicate that these environments can be considered as non-native bat-friendly ecosystems. However, I observed landscapes that have a higher percentage of the native forest had greater equability among the captured species, especially among more generalist species, which have more adaptation to more homogeneous environments.
3. In the cocoa trees, I recorded 2908 arthropods distributed was distributed in 25 orders. By excluding bats, I observed a significant increase in the orders Araneae, Orthoptera and Hemiptera. More refined analyses are underway for better interpretation of results

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

In addition to the 22 farm owners, I had the involvement of 15 other local workers who were hired to provide services in the execution of the project, totalling 37 directly involved in the work. Residents were able to follow the development of the research as well as learn more about the bats and the ecosystem services performed by them.

The children were curious and attentive and were able to know the stages of conservation research.

5. Are there any plans to continue this work?

The work will continue with long-term predator exclusion experiments, as well as environmental education actions in local communities scheduled for the coming months. Field data collection work needs new funding, to carry out other activities to increase knowledge about ecosystem services in agroforestry systems.

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

I scheduled the disclosure of results in local schools in the three cities where the work was developed: Belmonte, Uruçuca and Una. The outreach work will take place in conjunction with other researchers of similar topics in the same region and should primarily target children aged 10 to 16 years. This step awaits completion of the analysis of the results.

In addition to dissemination to the local community, the work will be submitted for consideration by the Student Conference on Conservation Science committee for presentation at the forthcoming Cambridge conference in March 2020.

New partnerships were made in order to disseminate the result of the work in the format of scientific dissemination videos that are still in the production phase. Scientific articles produced are also will be as a means of dissemination. Each action will have my thanks to the Rufford Foundation, in addition to the exposure of the Foundation Logo. Every material created will later be sent to Rufford.

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

The grant did use during the validity period of the project, however till has a small balance to make the scientific dissemination activities provided for in the project, which will happen in the coming months.

8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Environmental education activities	220	220		Will happen in the coming months.
Satellite imagens interpretation	600	600		
Cotton bags (for to wrap up the bats)	100	100		
Fieldwork food supplies	400	400		
Fuel	900	900		
Daily car rental	700	700		
Field assistant to conduct bat surveys	1100	1100		
Field assistant to conduct exclusion experiment	350	350		
Field assistant to conduct vegetation surveys	600	600		
Totals	4970	4970		The amount applied for is £ 4970, where R\$1 = £ 0.21

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

To complete the identification of arthropods, at the specific level, in the laboratory, for data analysis and disclosure of results. Disseminate the results to the scientific community as well as to the local community, including schoolchildren in the study region. After dissemination of the results to start project continuity strategies with other graduate students.

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

Due to delays in the implementation of the project due to climatic issues (such as excessive rainfall and delayed flowering and fruiting of cocoa in the region), the disclosure of the results has not yet been made. The Rufford Foundation has been cited in all project presentations, as well as banners and informative distributed and presented during the execution of the project as well as in the establishment of new partnerships.

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

Name	Position
Dra. Camila Righetto Cassano	Project supervisor
MSc. Sérgio Lopes de Oliveira	PhD student – Project proponent and executor
Dr. Eduardo Gross	Farm contact facilitator
M. Sc. Ana Cláudia Fandi	Environmental educator and school contact facilitator
Rubens Vieira Lopes	Local field assistant for exclusion experiment and vegetation surveys
Alexandre Góes	Volunteer worker – Graduate student
Lucas Rossini	Volunteer worker – Graduate student

12. Any other comments?

Rufford's funding was extremely important for the execution of my work. I consider the project execution time relatively short, as several unforeseen occur during the execution of the work, although I have carried out all field activities within the established period, the data have not been analysed yet and the disclosure of the results is still pending to start in the coming months.



