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. 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. 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	Fernanda Teixeira Saturni
Project title	Effects of landscape composition on biodiversity and pollination in coffee plantations in the Brazilian Atlantic Forest: Implications for conservation
RSG reference	13891-1
Reporting period	December 2013 – November 2014
Amount of grant	5690
Your email address	fernandasaturni@gmail.com
Date of this report	November 23rd 2014

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
Describe the relationship between landscape forest cover and pollination in the coffee plantations			x	We sampled 9 landscapes in a gradient of forest cover going from approximately 10% to 50% (Figure 1). 22 bee species were captured visiting coffee flowers. Most of them were from Meliponini tribe (Figure 2). For the pollination measures, we counted 12.493 flowers and 9.362 fruits in all 855 analysed branches. The presence of bees increased coffee fruit set in 25% (Figure 3) and the native bee abundance was higher in landscapes with more than 30% of forest cover (Figure 4).
Evaluate the relationship between the distance of a forest fragment and pollination in coffee plantations			x	We sampled 135 coffee trees in 9 different landscapes. As trees were randomly selected, we had trees from 0 to 324 metres distant from the forest edge. There are evidences that native bees visit more coffee trees that are closer to the forest edge (Figures 5a and b).
Identify possible thresholds for pollination related to loss of natural habitat		x		Our results show that there is a possible threshold for pollination around 30% of forest cover. However, more statistical analysis are need to confirm that.

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

The original sample design included 10 landscapes. However, during the project, one farm was sealed and the new landowner cut all the coffee trees sampled. Being so, that landscape was eliminated from the project.

Our pollination experiment originally included a cross-pollination by hand treatment. However, during the field work, it was noticed that it would not be enough time to do it. This treatment requires delicate work to transfer pollen from one flower to another. Because of the distance between sample sites, the bad roads conditions and the short period of coffee blooming that experiment was cancelled.

The related difficulties did not compromise the project execution and objectives.

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

The three most important project outcomes are: a) coffee production is influenced by the presence of bees, being that fruit set in open pollination condition was 25% higher than in bagged flowers condition (Figure 3); b) native bee abundance is affected by landscape composition, once landscapes with more than 30% of forest cover had approximately 3 times more bees visits than the others landscapes (Figure 4); c) landscape configuration also seems to affect the presence of native bees in coffee flowers, being that more native bees visited coffee trees closer to the forest edge (Figures 5a and b).

Overall, our results reinforce that proximity of native forest fragments has a positive influence on coffee pollination, and thus suggest that the protection of these fragments could benefit both farmers and biodiversity conservation.

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

The farmers and farm employees were involved directly during field work, and they also participated actively providing useful tips which helped improved our initial experimental design.. After that period, the farmers and farm employees followed the experiments in most of the sites, showing great excitement about the work. They could follow the preliminary results by periodic informal talks and an informational email that was send.

The informations generated by the project are useful for improving farms productivity and also increase their knowledge about the importance of natural habitats conservation in their farms and around it.

5. Are there any plans to continue this work?

In order to report the final results of the project for the farmers and employees, formal meetings with will be held in December.

A natural question that arises from this project is: *Who are the bees that are really pollinating coffee and how their pollination capacity changes with the landscape?* Another researcher is working in this question at this time in the same sites. We hope this additional information can enrich our findings and give more information to farmers about the importance of native bees.

Furthermore, other 6 projects related to landscape effects on ecosystem services are being conducted in the same sites. The projects are about biological pest control. Wasps, ants, birds and bats are also being sampled in coffee plantations and the ecosystem services they can provide are being estimated. These projects are part of Project Interface, our research group project (more information on http://projetointerfaceenglish.weebly.com/)

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

The project was already presented in scientific meetings – Brazilian National Meeting of Social Insects (February, 2014) and International Conference of Ecosystem Service Partnership, (September, 2014). The project was also shared in our research group website (http://projetointerfaceenglish.weebly.com/). Currently we are preparing a first manuscript, which will be submitted to the *Journal of Applied Ecology*.

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 project costs between August 2013 and July 2014, despite the money just arrived in December 2013. As the coffee flowering was in September 2013 and that was the time with more intense field work, most of the costs were generated before the RSG arrival. Considering that we could not wait to pay all the costs, we used a student departmental fund to complement this costs. This is the main reason why £1343 was left from RSG.

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
2 Entomological net	35	53	+19	Value correction.
GPS	280	548	+268	We decided to use only the RSG to buy the GPS, increasing the budgeted amount.
Pan Traps	23	11	-12	Value correction.
Packaging (glass and plastic) to store the captured insects	23	30	+7	Value correction.
Alcohol 70% and Ethyl Acetate	35	0	-35	We used this materials from the university BeeLab.
Exclusion nets	210	223	+13	Value correction.
Car rent and driver	2518	1614	-904	We used student departmental fund to complement this cost.
Car fuel	700	601	-99	We used student departmental fund to complement this cost.
Team accommodation	933	633	-300	We used student departmental fund to complement this cost.
Team Food	933	633	-300	We used student departmental fund to complement this cost.
TOTAL	5690	3293		-1343

Local exchange rate: 1 Brazilian Real = 0.33 £ sterling

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

After refining the statistic analysis of the current project, the next important steps would be to publish our results and to integrate our results with others researches being conducted in the area. It would be very interesting to known if there are synergies or thresholds between ecosystem services.

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 was used in the posters presented in the scientific events described above. The logo is also present in the research group website.

11. Any other comments?

We would like to thank the Rufford Small Grants Foundation for supporting this project. It would be impossible without your help.

12. I agree to this report being published on the Rufford Small Grants website

Signed (or print name) Fernanda T. Saturni

FIGURES

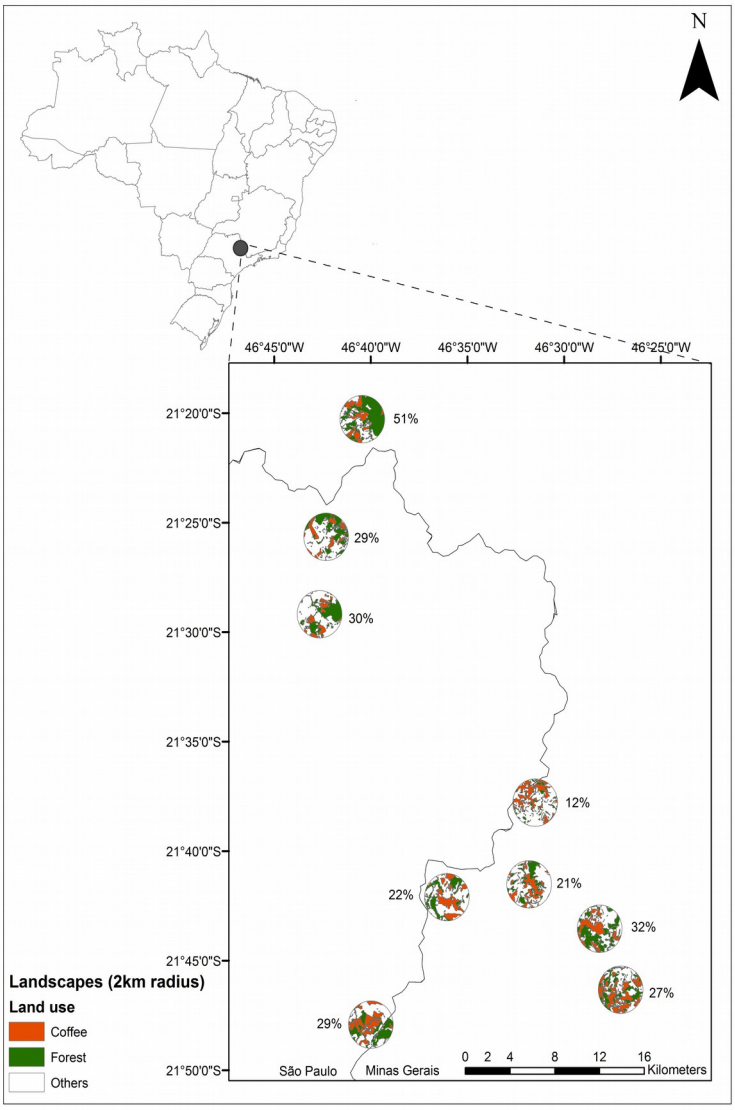

Figure 1. Satellite image showing the location of studied landscapes in between São Paulo and Minas Gerais states, Brazil. Landscapes encompass a large range of remnant forest cover (12-51%).

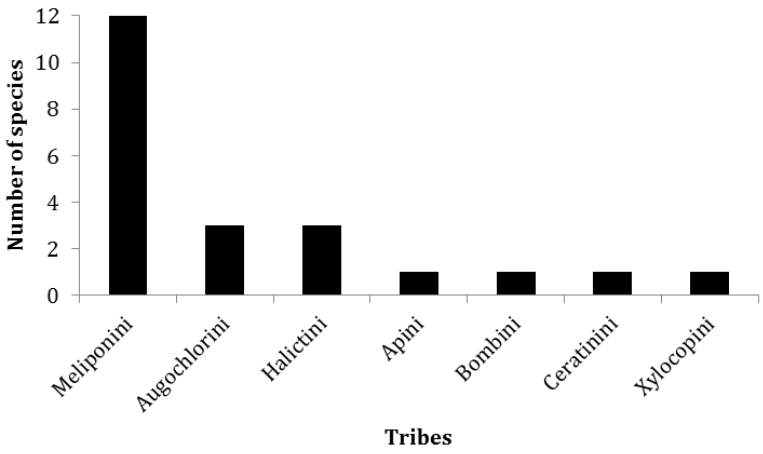

Figure 2. Number of bee species collected on coffee flowers divided by tribes.

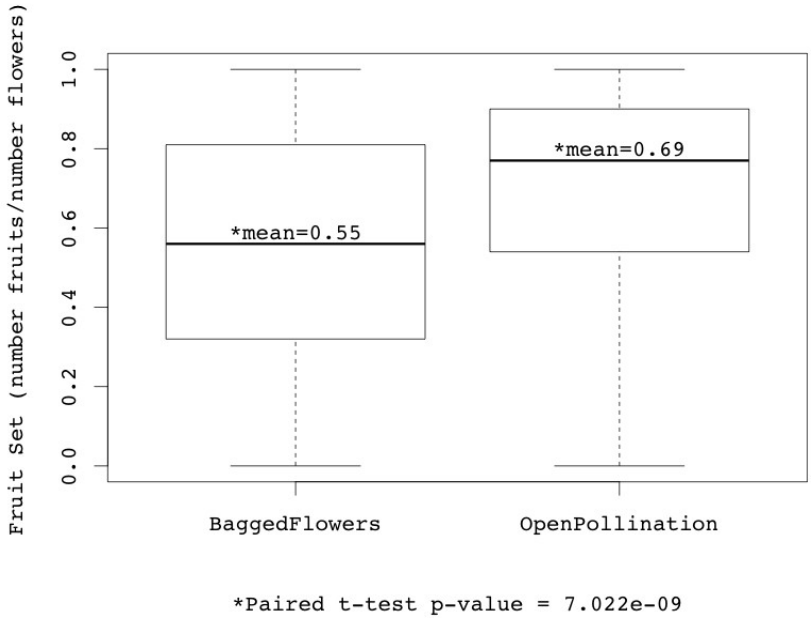

Figure 3. Fruit set (number of fruits per number of flowers) per branch at control (open pollination) and manipulated (bagged flowers) in all landscapes.

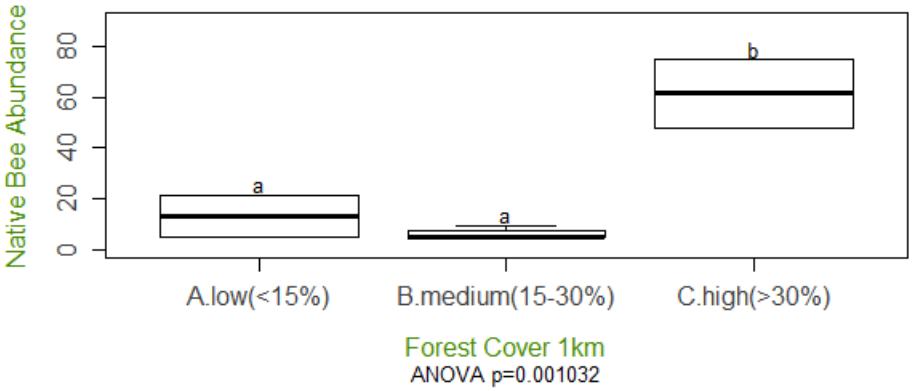

Figure 4. Native bee abundance per forest cover considering three classes of cover: A. low - less than 15% of forest cover in 1km radius; B. medium – between 15% and 30% of forest cover in 1km radius; and C. high – more than 30% of forest cover in 1km radius.

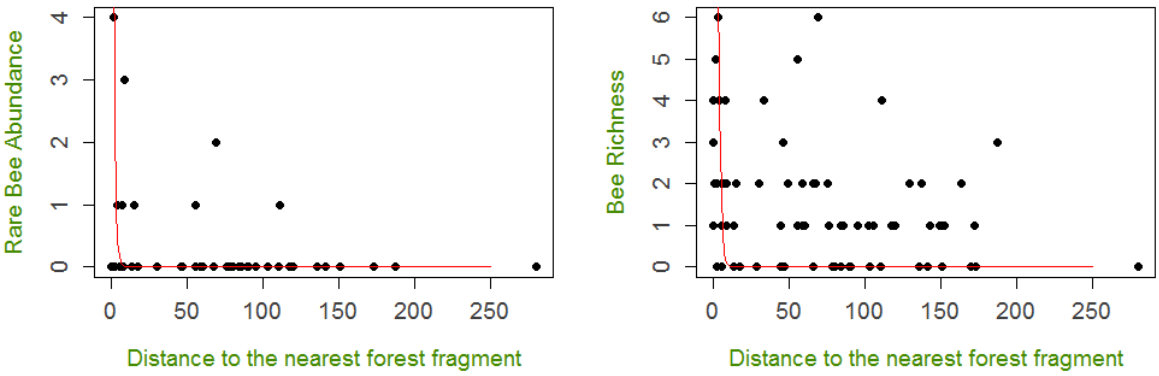

Figure 5. Rare Bee Abundance (A) and Richness (B) per distance from the nearest forest fragment.