

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	Jayne Augusto Prevedello
Project title	Does harvesting of the Brazilian pine seeds affect mammals of the Atlantic Forest?
RSG reference	41.10.09
Reporting period	March 2010 – December 2011
Amount of grant	£5108
Your email address	ja_prevedello@yahoo.com.br
Date of this report	January 13, 2011

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
Experimental removal of seeds			x	A total of 534.0 kg of <i>Araucaria</i> seeds were collected at the four removal sites (mean of 133.5 ± 43.0 kg per site). We estimated that ca. $61 \pm 11\%$ of the seeds produced at each site were removed.
To evaluate the effects of seed removal on individual biomass			x	We recorded the body mass of almost all of the 2534 captured animals.
To evaluate the effects of seed harvest on individual movements			x	Using spool-and-line devices, we tracked the movements of 135 individuals from the two most abundant species, <i>Akodon montensis</i> and <i>Delomys dorsalis</i> .
To determine the impacts of seed removal on population density			x	With a sampling effort of 27,300 trap-nights, we captured 2534 individuals from 12 species of small mammals between January 2010 and December 2011. Ninety-two percent of these individuals belonged to only two species, <i>Akodon montensis</i> and <i>Delomys dorsalis</i> , which were the focus of the population analyses.
To determine resource availability and climate		x		It was not possible to record invertebrate biomass and fruit availability in the study areas, because these were extremely time-consuming activities. Temperature and precipitation were recorded for all sampling months.
To sample medium and large mammals	x			The sampling areas were too small to properly evaluate the effects of seed removal on medium and large mammals

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

It was not possible to record invertebrate biomass and fruit availability in the study areas, because these were extremely time-consuming activities. The high number of captures of small mammals and the movement tracking activities demanded more hours of work than initially predicted. We also realized in the beginning of the field work that the sampling areas were too small to study medium and large mammals, because these animals are capable of moving over large areas, thus our sampling sites would not be independent invalidating statistical comparisons. Therefore, we decided to concentrate our efforts on the small mammals only.

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

The project had three main conclusions important for the management and conservation of the *Araucaria* forests: a) seed harvest negatively affected the abundance of *Delomys dorsalis* and the reproduction of *Akodon montensis*, the dominant rodents in the studied system; b) seed harvest increased movement areas of individuals, because they had to move over larger areas in order to find enough food; c) seed addition increased abundance of *D. dorsalis* and *A. montensis*, and the biomass of *A. montensis* individuals. These results demonstrate that *Araucaria* seeds are indeed an essential resource for the two dominant rodents in the *Araucaria* Forest Ecosystem. The traditional activity of harvesting the seeds, commonly carried out in southern Brazil every year, has a negative impact on animals. Thus, we recommend that seed harvest be only moderate (not-exhaustive) and that non-harvested areas be left near harvest areas, in order to offer a minimum amount of seeds to the animals. This study also shows that *Araucaria* seeds are a limiting resource in areas where the *Araucaria* was removed for timber, a situation common in many parts of the distribution range of the *Araucaria* Forest Ecosystem. Our results indicate the need to re-establish the tree in those logged forests, in order to restore the natural provision of *Araucaria*'s seeds to the animals.

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

The harvesting of seeds on our experimental plots was carried out by two members of the communities located at the surroundings of the reserve. Both provided important information regarding the procedures, intensity and frequency of seed harvest traditionally carried out on the studied forests. Through informal talks, we explained to them the potential impacts of the activity on animals, and we provided information regarding the ecology of small mammals. The managers and employees of the reserve (Floresta Nacional de São Francisco de Paula) also supported us in all stages of the project. We gave to them an album with 20 pictures with informative legends, which was left in the administration of the reserve to be consulted by students, researchers and other visitors of the reserve. We also sent a final report of the study to the Brazilian Environmental Institute (IBAMA) and to the administration of Floresta Nacional de São Francisco de Paula, with the conclusions of the project and recommendations to the management of the harvesting activities.

5. Are there any plans to continue this work?

Currently there are no planned field work activities. The next stages of this project will be to finish data analysis, to finish and present three MSc thesis and one PhD thesis, and to publish the results in scientific and popular journals. However, we expect in the future to contact colleagues working with birds and other mammals and to encourage them to perform similar experiments, in order to have a broader picture of the impacts of seed removal on the studied ecosystem.

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

The results will be shared mainly through papers in scientific and popular journals, which will be submitted after the completion of my PhD thesis in February 2013. The results will also be presented in scientific meetings, including the 11th International Mammalogical Congress to be held in Ireland in 2013. We have already sent a final report of the project to the Brazilian Environmental Institute (IBAMA) and to the administration of Floresta Nacional de São Francisco de Paula, as explained

above. Also, three abstracts were already presented and published during the 10th Brazilian Congress of Ecology, carried out in September 2011 in Minas Gerais, Brazil.

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 just as initially planned, from March 2010 to December 2011.

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
Compass	4.90	0	+4.90	The compass was provided by University of Rio de Janeiro
Latex gloves – box with 50 pairs	11.77	0	+11.77	The gloves were provided by University of Rio de Janeiro
Bait for small mammals	196.20	238.03	-41.83	We used more bait than initially estimated because we increased the number of traps, in order to capture a higher number of animals
Subsistence during field work	1962.00	2142.28	-143.66	The amount of food initially predicted was underestimated
Reserve entrance fee	108.00	0	+108.00	From March 2010 on, there was no need to pay entrance fees in the reserve; however, the accommodation fees were increased accordingly (see in the sequence)
Accommodation during field work	1765.80	2094.67	-328.87	Accommodation fee in the reserve increased in March 2010, from R\$6 (£2.20, as initially budgeted) to R\$10 (£3.66)
Bus transportation	568.80	558.46	+10.34	
Taxi transportation	490.50	399.16	+91.34	
Total	5107.97	5432.60	-324.63	

Local exchange rate: 1 Brazilian Real = 0.366201383 £ sterling

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

After publishing the results of the current project, the next important steps would be to evaluate the impacts of seed harvest on other taxonomic groups, especially birds and other mammals. We expect in the future to contact colleagues working with such groups, in order to carry out more comprehensive, integrated experiments in the studied system.

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?

Yes. We made two presentations of the project, one in Federal University of Rio de Janeiro (2010) and another during an international course held in Brazil, the “São Paulo School on Ecological Networks”. In this last event we received important feedbacks to the project from students and professional researchers from different parts of the world. The logo of the RSGF was always included in the acknowledgements section of the presentations.

11. Any other comments?

We would like to thank the Rufford Small Grants Foundation team for supporting this project. It would be impossible to carry out this project without your support! Thanks for your great efforts to protect world’s biodiversity!