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	Ana Carolina Antunes
Project title	Seed patches in Amazon flooded forests - a key seasonal resource for rainforest mammals?
RSG reference	16299-1:
Reporting period	29/1/2015 to 29/2/2016
Amount of grant	£5,000.
Your email address	a.carol.antunes.88@gmail.com
Date of this report	22/02/2016

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
To understand the ecological importance of seed-patches in unflooded igapó			Yes	
To understand the influence that seed patches have on the occurrence of rodents (large and small), other fruit/seed eaters (peccaries, deer, tapir) and their predators (e.g. jaguar, ocelot).			Yes	

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

Some difficulties were related to in-field logistics. The regions isolation aggravates the impact of unforeseen events that inevitably occur during fieldwork (e.g. damage and subsequent repairs to the boat's engine). However, it was possible to find solutions to these unexpected difficulties and solve them without major impacts on the pre-established activities.

One practical problem related to the identification and measurement of the seed patches themselves. When we first arrived at the study site seeds had not yet germinate, so that the visual identification of seed patch locations was extremely challenging. The problem was resolved by scanning the area thoroughly, removing all litter and focussing our searches on areas where seeds were likely to accumulate (either side of large formerly-floating logs and palm fronds, for example). For this it was necessary to reduce the quadrats size from 500 X 500 to 50 X 20 m. To measure the size of each seed patch we estimated a polygon that represented the patch and then calculated the area of this polygon.

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

Although seed patches had been noted before, no one had every fully investigated them and their importance. We expected them to be visited by all sorts of herbivores (for the sprouting seeds) and seed-eaters (for those yet to germinate). Instead, we found there was no difference in the studied vertebrate assemblage occurrence between the seed patches and control areas. However, it is unquestionable that large numbers of both species and individuals are present in igapó when it is unflooded. Our results, however, showed that these animals are not more commonly found where there are seeds and seedlings accumulations. Instead, they seem to occupy the area more homogeneously. Furthermore, there were no differences in the number of seeds and seedlings consumed within and outside the seed patches.

There may, however, be others factors in play: in this study the camera-traps recorded a large number of carnivores (n = 26; 16% of records). The large numbers of paw prints also attested to the frequent occurrence of these animals in the study habitat. The species included those known to prey on small granivores, such as rats and mice (e.g. margay and ocelot), and those who prey on larger species such as a paca, peccary and deer (e.g. jaguar). The presence of such predators in an open landscape such as unflooded igapó, coupled with random distribution of most seeds and seedlings (and hence requiring extensive travel by granivores to find them) may have an influence on the way

potential prey species are consuming the resources available at seed patches. The widespread occurrence of these animals by igapó, not only where there are accumulated resources (seed banks and seedlings), seems to be the way these animals select the most favorable food items while avoiding the risk of being preyed remaining concentrated in the same patches.

Also, there was a positive relation between predator occurrence and this vertebrate assemblage, so that predators may be tracking prey movements or positioning themselves in locations where encounter rate likelihoods are high. This result corroborates the assumption of Haugaasen and Peres (2007) that primary consumers presence in igapó forest has a positive domino effect on the predator's influx from terra firma. The positive prey-predator relation has already been addressed in previous work, and is further evidence that the predation risk in this environment seems to be high for most vertebrates. Thus, not only is the igapó important, but is the basis for some unexpectedly subtle ecological interactions.

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

The area where the study was done is very sparsely inhabited, with only two houses in the immediate region and the nearest community (Patauá) some 5 hours upriver by boat. Consequently, we had little direct involvement with the local community, with regard to the development of the project. However, on an individual level, we formed strong bonds with a local man who that guided and helped us during the fieldwork. A kind of relationship very common in the works developed in the Amazon forest, Roberto, the "mateiro", was the one who made possible this work. As a means of exchange, we paid him a daily rate (set and agreed with the park authorities), proportional to the time he helped us in the field, and will thoroughly recommend his work for future researchers who will work in the area.

5. Are there any plans to continue this work?

At the moment, the priority is to finish writing-up scientific articles. Although the steps to follow that have yet to be defined, the desire to continue the work is huge. The results showed how much still exist to study in the igapó environment. Especially with regard to vertebrates, there are very few existing studies that provide information, and this gap in knowledge stimulates great interest in developing projects related to the vertebrate use of this little studied and little understood forest ecosystem.

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

Regarding dissemination within the scientific community, a paper has already been submitted to *Mammalian Biology* and another will shortly be submitted to the *Journal of Ecology*. A third article, on terrestrial primate activity in Amazonian flooded forests, in being planned. Additionally, work will be published online at the Amazon Mammal Research Group website and the INPA website. There are plans to publish in national (*Ciência Hoje*) and in international (*BBC Wildlife, Discovery*) popular science and natural history magazines.

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

The funding was used before and during the field activities. Due to the area's isolation, spending on gasoline and food was higher than anticipated. For the same reason, any unforeseen field turns out to be costly as well. However, it was done an extensive planning so that the funding was sufficient for the execution of the field work and purchase materials.

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
Plastic loop-rings (animal identification)	26	0	-	Not used in the study
Buckets	784	0	-	Not used In the study
Mammal processing eqpt.	570	0	-	Not used in the study
Daily payments to guide/field assistant	1319	1857	538	It was necessary one more field assistant
Food	1098	1547	449	Food for 3 instead of 2 people
Petrol	535	818	283	The per-litre price was 3.58 and not 2.55
Batteries for camera traps	0	144	144	
TOTAL	1132	1141	-9	

Costs were calculated at a rate of R$1.00 = £0.2615.

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

I believe it is essential to continue the studies carried on the floodplains of the Amazon, especially in igapó forests. Existing works are, to date, mainly about floristic composition and are few. When it comes to the animals or the existing ecological interactions in these areas, virtually no information is available. Still, the few existing studies highlight the importance of conserving this environment. For me the next steps are: to complete the preparation of the central article to be published, as well as other possible publications, and then look at how to continue fieldwork in this remarkable environment.

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 logo was shown at a presentation of planned fieldwork methods at the Instituto Nacional de Pesquisas da Amazonia (INPA) in Manaus, Brazil. It was shown again in May 2015 at a full presentation of results at the same institution. It will also be used in the displays of the projects results at the websites of the Amazon Mammal Research Group and the INPA website. It is planned

to present talks and posters at national and international congresses over the next 12 months and there, as the prime project sponsor, the RSGF logo will be prominently displayed.

11. Any other comments?

We would like to thank you once again for the kindness of you and the committee in providing the sponsorship without which this innovative and novel research could not have taken place.