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	Karolina Riano Ospina
Project title	Soil quality and biotic factors related to the invasion of *Pteridium* sp. in the Lacandon tropical rain forest ecosystem in México
RSG reference	20219-1
Reporting period	August 2016-August 2017
Amount of grant	£5000
Your email address	krospina@gmail.com
Date of this report	5th September 2017

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 identify soil features associated to the tropical bracken fern				Although I was unable to analyse plant nutrient concentration because the laboratory where I could analyse the samples was out of action during this year, I could make analysis of the soil features associated to the tropical bracken fern and I showed the results of this part in the ATBC meeting in Merida, Yucatan, Mexico 2017, and in the SCME in Leon Guanajuato Mexico 2017. Besides this, I am preparing the first article to submit to a journal
Nursery experiment "Pteridium soil feedback"				Also, I showed the results of this experiment in de ATBC meeting in Merida, Yucatan, Mexico 2017, and SCME in Leon Guanajuato Mexico 2017. Product of these data I am preparing the second article to submit to a journal
Control practices to eliminate Pteridium from invaded fields				I execute the whole project (field work, lab work, data analysis, and papers), and this part exceeded my personal capacity

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

Unfortunately, the students related to the team description of my project couldn't work with me. The PhD student from the University of Wageningen did not continuing his PhD. The Mexican students were not admitted to the UNAM.

One part that they were going to do was to interview landowners, and support me to establish the experiment "control practices to eliminate *Pteridium* from invaded fields", so this part is not achieved. However, I could identify management strategies that landowners use to control the tropical bracken fern, and I would like to request a second grant to test the effectiveness and economic and ecological trade-offs of these methods.

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

There is a general idea that invaded land by the tropical bracken fern (*Pteridium arachnoideum*) becomes unsuitable for agriculture, and also natural regeneration is delayed and for this reason farmers cut down more forest.

With the results of my project, I found that: 1) contrary to the expected, the tropical bracken fern is not related to soil poor in nutrients, 2) I found a novel relationship between saprothophic fungi and tropical bracken fern rhizome, 3) Surprisingly, I found that the tropical bracken fern has a negative feedback over itself and neutral feedback over three pioneer tropical tree.

Then, I proposed that invaded soil is not necessarily useless for agriculture, or that forest restoration is impossible in invaded areas. It is necessary to identify an appropriate management strategy for the region.

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

When the sampling took place, the farmers were very friendly and cooperative, because the invasion of the tropical bracken fern has directly affected their agricultural fields. It seems important that my results can't support academic paradigms that have been permeated to the local community and probably promoted deforestation in the Lacandona region. I present evidences that probably help to start looking for solutions to the problem of invasion by *P. arachnoideum*.

5. Are there any plans to continue this work?

Yes, I would like to have the opportunity to analyse the economic and ecological costs and benefits of the different management controls used by peasants when the fern invades their fields. In addition, inspired by the work of David Douterlunge who studies the use of *Ochroma pyramidale* for the tropical bracken fern control (a traditional Mayan management strategy in Chiapas), I want to evaluate Mucuna's efficiency in controlling areas invaded by the fern. Also, I would like to do a palaeoecological study on fern-dominated patches, because it is suggested that the ancestral anthropic activities of the Mayas in the region promoted the presence of the invasion.

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

I am finishing two papers that I will send to international journals, where I document the results derived from this project.

I am planning a visit the study area to conduct socialization workshops of the results.

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 since September 2016 and Jun 2017. I think it fits well with the project times.

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.

The local exchange: 1£ = 23.11 pesos Mexicanos

Item	Budgeted Amount	Actual Amount	Difference	Comments
Karolina and field assistant airplane tickets Mexicocity-Tuxtla (200 per trip x 4 x2)	1600	1100	500	
Car rental (37 per day x 20 days, two field trips)	740	600	140	The real cost per day was 30
Fuel (0.6 per litre x 500 l)	300	300		
Accommodation and food (10 per day x75x2)	1500	2100	-600	The real cost per day was 14
Local field guide (10 per day x 30 days)	300	900	-600	It was necessary to pay +30 days, the real cost per day was 15
Lab plant analysis (C, N, P)	560	0	560	This analysis was not measured because the Lab that offer the service at IIES was disabled for a long period
Total	5000	5000	0	

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

First, I think it is important to socialize the results in the region. Second, I feel is necessary to continue talking/working/living with the local community, they expect a lot from biologists, more than we can give!

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, I presented preliminaries results in two conferences, one international (ATBC-Merida 2017) and other national (SCME-Leon 2017). Also, in the two papers that are preparation I am going to agreement to the Rufford Foundation small grant.

11. Any other comments?

Thanks for your support in this project, without the grant I would not have been able to get this research done.