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	Constanza Schapheer Carrasco
Project title	Molukia Project: The Ecosystem Role of Native Cockroaches in the Chilean Matorral: Research, Education and Outreach as an Integrated Conservation Strategy
RSG reference	21286-6
Reporting period	2018
Amount of grant	£5000
Your email address	Cp.schapheer@gmail.com
Date of this report	16-01-2018

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
Determination of cockroach's ecosystem role				We carry out all Moluchia specimens' collection considered in the project: from different ontogenetic stages on three sites in three different dates. Currently we are analysing those samples (for isotopes and mouthparts analysis). During the development of this objective we found that it is a very hard task. That involved more working hours and funds than we expected. To supplement this, we are also working with the support of the project N ° WW-061R-17 (National Geographic Society granted by Professor Cristian Villagra).
Paper about native cockroaches-plants interaction				We published a scientific article based on work funded by this grant. In this we demonstrated the close relationship between *Moluchia brevipennis* (VU) and Chilean Mediterranean Matorral's plants. We also show that these endemic insects cannot survive in anthropised habitats, stressing the relevance to preserve coastal species community. Paper available. here: https://doi.org/10.1016/j.rbe.2017.02.001
Categorization in Ministry of the Environment of Chile (MMA) of two endemic cockroach species (according IUCN criteria)				We sent the necessary background to categorise two species of cockroaches in Chilean Environmental Ministry (MMA): *Moluchia castanea* (http://www.mma.gob.cl/clasificacionespecies/fichas14proceso/Moluchia_castanea_14RCE_INICIO.pdf) and *Moluchia strigata* (http://www.mma.gob.cl/clasificacionesp

				ecies/fichas14proceso/Moluchia_strigata_14RCE_INICIO.pdf). Now we just need to wait for MMA administrative process (Due to mid 2018), that will assign a conservation categories according IUCN criteria based on the data and background information we provided in each file.
Environmental education				We conducted five workshops focused on school students in different regions of the country. Depending on the age, we used different teaching tools such as talks and live observation of samples and mounted insects. The goal in these educational activities was to let kids know the existence of endemic wild roach species and to promote the conservation of native insects in Chile: Educational Institutions benefited were: 1) Nobel School, Parral. Maule Region (May 2017) 2) University of Santiago Scientific Fair. Santiago. Región Metropolitana (November 2017). 3) Colegio Huelen, Vitacura. Metropolitan Region (October 2017) 4) Paine Scientific Fair, Paine. Metropolitan Region. 5) Colegio Particular N°1, Ñuñoa. Metropolitan Region (November 2017).
Outreach				We were very successful on this goal, summarised in three main achievements: 1-Logo Update: We wanted to update the image of the project through a new logo; it conserved the original design but incorporated host plant flower Chagual (*Puya berteroniana*). This to illustrate the importance of cockroach-plant interaction. Moreover, we have observed a positive change in people's attitude

				towards wild cockroaches when they see them on flowers. Thus, we wanted to highlight this part of *Moluchia*'s life cycle. 2-Organization of The Second Meeting of Chile's Insect Conservation Initiatives ("Segundo Encuentro de Iniciativas de Conservación de Insectos en Chile") We consider this event an important milestone of our project's outreach. This corresponded to the second version this symposium, open for free to all public, where insect conservation projects running in Chile gather to exhibit their work. This time we had 11 lecturers and also the support Faculty of Forestry Sciences and Nature Conservation of the University of Chile. (http://www.forestal.uchile.cl/noticias/137429/facultad-y-umce-realizan-encuentro-sobre-conservacion-de-insectos). 3-Press and Social Networks: We also had two press appearances ("Viernes" Magazine and "La Hora" Newspaper). In these releases our conservation work carried out with the support of the Rufford Foundation was highlighted. Furthermore, we have kept a dynamic and fluent outreach on social networks. For this we have privileged Facebook page because of its extensive coverage in Chile (www.facebook.com/proyectomolukia.cl). We also made a video showing our recent discovery of Moluchia cockroaches ontogenetic changes in the use of foraging resources (https://www.youtube.com/watch?v=OfJXDBptDZ4).

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

In general, the work was carried out without major problems. The only difficulty was that, regarding the work of cockroaches' role in the ecosystem, we require more hours of work in the field and laboratory (which meant more resource for field work). We solve this problem with the complementary support of another fund (National Geographic Society N° WW-061R-17 granted by Professor Cristian Villagra, co-investigator in this project).

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

I-Publication of *Moluchia brevipennis'* biology paper. In Chile it is very important to lay theoretical foundations for species conservation. Especially in the case of species such as cockroaches that have not been studied in many years. Because this is the only way to have solid arguments for its conservation.

II-Information gathering and presentation of species' files for categorization process of Chilean Ministry of the Environment (MMA). Currently, this is one of the most important tools that exist for species conservation in Chile. In our previous version of this grant we already presented the information for *M. brevipennis* to the MMA and this species was classified in "vulnerable" status. Now, in this project we sent data collected and background information of two other wild roaches: *M. strigata* and *M. castanea*. Now only the MMA administrative procedure is missing to be formally assigned a conservation category.

III-Second meeting of insect conservation initiatives. Thanks to Rufford we were able to repeat this conference (first held in 2016 with our first Rufford grant). This is an activity open to the public. On one hand this allow us to present our work to citizens and the community and demonstrate to them that wild roaches are important, and on the other hand it helps us to create links between scientists and organisations that are working on insect conservation in Chile. We think that this is very important to generate strategies that allow a greater impact on conservation of Chilean insects.

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

In order to access to a wide public, we designed two different activities: 1-Environmental education activities (Focused primarily on school children) and 2-outreach (focused in young adults).
The goal of these activities is to generate a chance in the use of native plants in gardens. As a consequence, this may positively impact our wild insects, by

preserving and generating microhabitats even in highly anthropized environments or areas with a big treat of destruction of native plant community such as coastal central Chile. Also impacts the communities because it educates them and empowers them with respect to their natural heritage.

5. Are there any plans to continue this work?

Of course! During the development of our projects, we have discovered many new things about Chilean wild roaches that have yet to be communicated to the scientific community and may became educational and outreach material. Also there are still many other venues of research and data gathering in order to prevent Molukia's ecosystem to be destroyed. Among our future plans are to assess how human-derived fragmentation is affecting cockroaches population in the Chilean Matorral and to design strategies to ameliorate or prevent these impacts.

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

To scientific community with a publication in a peer-reviewed journal and for local communities and non-scientific public with activities and products such as workshops, talks, social networks, brochures and videos.

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

For the scientific work, we still need approximately six months left to complete analyses. For the remaining objectives time scheduled was adequate.

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
Field Trips	2250	8250	6000	This Extra Expense Was Covered By The Project N° Ww-061r-17,, And Basically It Consisted In The Payment Of More Days In The Field (Accommodation And Food For Whole Team)
Lab Reagents	300	300	0	

Lab Materials	300	300	0	
Field Materials	300	300	0	
Sending Samples	150	380	230	This Extra Expense Was Covered By The Project N° Ww-061r-17.
Sem Photography	500	500	0	
Poster Layout	50	50	0	
Print Poster	100	100	0	
Mounting Exhibition	300	300	0	This Money Was Used To Make The Second Meeting Of Insect Conservation Initiatives In Chile
Student Workshops	150	150	0	
Documentary Video	500	500	0	
Website Update	100	100	0	This Money Was Used To Update The Facebook Fanpage And Project Logo.
Total	**5000**	**11230**	**6230**	

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

The most important thing is to continue working integrating different aspects of Entomology and Ecology, all this considering research and education at service of conservation. It is necessary to know in depth the functions of cockroaches in Mediterranean ecosystem and how anthropisation may affects cockroaches.

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?

All outreach material used during the project had Rufford Foundation logo. We do not receive any publicity during project development.

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

Constanza Schapheer, Entomologist and coordinator of the team, responsible for organizing and executing the work in the laboratory.

Cristian Villagra, ecologist and insect plant interaction specialist. In charge of work related to cockroaches and native plants.

Alejandro Vera, specialist in taxonomy and insect morphology. in charge of the work of mouthparts comparison.

Chris Harrod, ecologist, specialist in trophic networks in charge of stable isotopes analysis.

For laboratory work we also have an undergraduate thesis student (Pedagogy in Biology), currently he is working on the mouthparts assembly study.

12. Any other comments?

Again we would like to thank the Rufford Foundation for supporting this initiative. Since the possibilities of financing for this type of work are scarce. During the course of this work we were also thrilled to see the positive response from students and young people when we show them these endemic insects, far from popular culture fear and disgust against cockroaches. There are still many things to learn and to invest our efforts in order to protect these kind of organisms, often less charismatic than other focus of care and conservation but also vulnerable to changes in the environment driven by our own species none less. We are eager to continue working with the native cockroaches of Chile and their conservation.


Left: Quebrada de Cordova. Right: Pichidangui.


School talks.

Insect conservation meeting.