

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	Andrés Cristian Valenzuela Sánchez
Project title	Chytridiomycosis in the endangered Darwin's frogs: developing models for their conservation
RSR reference	19017-2
Reporting period	January 2016 to January 2017
Amount of grant	£5000
Your email address	a.valenzuela.s@uandresbello.edu
Date of this report	10th February, 2017

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

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

Fortunately, this project was carried out without any unforeseen difficulty. This was due, in a great extent, to the strong collaboration that we have developed with local people and organisations, which allow us to have an excellent logistic before and during fieldwork activities. However, we miscalculated the real budget and time needed for the survey development and application, and therefore, we were not able to follow our original planning (i.e. to apply the survey in all the four study areas).

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

A. Population and epidemiological model: The model we have developed is crucial to understand the population dynamics of our focal species as well as to evaluate the impact of chytridiomycosis. In this aspect, this project has produced for the first time demographic and movement data of wild-living *R. darwinii* populations. As such, the population model developed here is critical to inform management and conservation actions in Darwin's frogs. Unfortunately, the model tell us that chytridiomycosis is a serious threat to Darwin's frogs: the disease has the capability to drive populations to extinction. Therefore, the next step is to understand how the chytrid infections are acquired and spread within a population (e.g. other semi-aquatic amphibians living together with Darwin's frogs can be an important source of chytrid infections), as well as to develop an experiment to mitigate the negative effects of chytridiomycosis at the population level in our study species.

B. Collaboration with local organisations and outreach: We have strengthened the collaboration with local NGOs (Fundación Huilo, Fundación MERI and Parque Tantauco) in order to achieve a long lasting protection of Darwin's frog populations.



Figure 1. Field excursion in October 2016 to the Austral temperate forest with children from the local school of Choshuenco, located close to Neltume, one of our study sites in Southern Chile. Children are fascinated after knowing for the very first time the amazing Darwin's frog, a small animal that inhabits the native forest surrounding their small town.

These organisations own large private lands in Southern Chile (100,000 ha, 16,000 ha, and 118,000 ha, respectively) where several Darwin's frog populations exist. Fortunately, our close work with these organisations has positioned the protection of Darwin's frog within their conservation objectives (e.g.

<http://huilohuilo.com/investigando-sobre-la-ranita-de-darwin/>). The information generated from this project will inform future management and conservation decisions made by these organisations in order to improve the conservation of Darwin's frog populations. Additionally, we have kept our constant work with local people in outreach activities, mainly with talks at local schools and with field excursions to show local people Darwin's frogs (figure 1). These field activities have resulted in an ideal occasion to share with local people and tourists our knowledge about amphibians and the importance of protecting this amazing taxonomic group. Finally, we have produced two videos about this RSG project and Darwin's frog conservation, with more than 7,000 video views on Facebook until date!

C. Assessment of beliefs, attitudes and knowledge of local people towards amphibians: We developed a survey in direct collaboration with social workers from the Ranita de Darwin NGO. This survey was applied to local people from Neltume and Inio (figure 2), providing for the first time crucial information about the beliefs, attitudes and knowledge of local people towards amphibians in Chile. This is a critical step for the planning of outreach activities aimed to improve the conservation of this taxonomic group in our country. Additionally, we were able to detect some additional threats to Darwin's frogs, such as unsustainable logging activity that could lead to habitat degradation for Darwin's frogs and threaten their populations.



Figure 2. Interviewing a local adult man from Neltume about their beliefs, attitudes and knowledge towards amphibians. A section of our survey includes the use of photographs in order to do it more understandable. Social workers from the Ranita de Darwin NGO assisted us in the development and application of this survey.

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

The involvement of local communities with this project has been amazing. We keep direct contact with local tourist guides, artisans, NGO staff, park rangers, and local community in general. All of them collaborate with us from their own specialisation (e.g. tourist guides teach people about Darwin's frog and amphibian conservation, artisans from Neltume made handcrafts inspired by Darwin's frogs, and so on) and also benefit from what they have learned from us and from our project (e.g. tourist guides have learned from us about Darwin's frog natural history, artisans use our Darwin's frogs photographs, illustrations and advice to create more realistic handcrafts, and so on; figure 3). It is wonderful to realise how a conservation project aimed to protect a specific animal species can also improve the wellbeing of local people. Since Darwin's frog is a very charismatic species, tourists are very interested to learn more about this species. Therefore, local communities perceive a direct (economic) benefit when they incorporate Darwin's frogs to their routine activities and products.



Figure 3. Mosaic workshop directed to local people developed by the artist Jadra Daurich in collaboration with Huilo Foundation in Neltume used illustrations from our team to develop their handicrafts. This specific illustration was released in a sticker produced by our team during the course of a previous Rufford Small Grant (available at: [http://www.rufford.org/files/Sticker Protect the Native Forest.pdf](http://www.rufford.org/files/Sticker%20Protect%20the%20Native%20Forest.pdf)). Photo by: Jadra Daurich.

5. Are there any plans to continue this work?

Yes. There is still a big unanswered question: How this fully terrestrial species acquire chytrid infection (which is a pathogen with an aquatic infective stage)? One hypothesis is that other syntopic semi-aquatic amphibians (i.e. species living

together with Darwin's frogs) could be an important source of chytrid infections in *R. darwinii* populations. The role of syntopic species for the transmission of this pathogen to *R. darwinii* requires further investigation, as management interventions, such as enclosures, to limit inter-specific contact might be a feasible (short- to medium-term) mitigation measure for the conservation of *R. darwinii*, especially as discrete populations of this species exist within small, manageable areas.

Additionally, we are concluding a 3-year monitoring of nine Darwin's frog populations, but we are planning to extend this monitoring for at least 10-15 years more to provide the relevant information at the relevant temporal scale in order to gain a profound understanding of the population dynamics of our focal species. Finally, in the short-term we are planning to use the information generated during this project to collaborate in the development of a conservation strategy for Darwin's frogs.

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

A. Outreach material: We have shared our results with local communities in different outreach activities. Furthermore, we have produced two videos:

I. Video about this RSG project (1,600 video views on Facebook of Ranita de Darwin NGO until the 7th February 2017), available at: https://www.youtube.com/watch?v=X0Kktuk2G_A (with English subtitles if you select the option)

II. Video about the native forest, home of Darwin's frogs (5,949 reproductions on Facebook of Ranita de Darwin NGO until the 7th February 2017). Available at: <https://www.youtube.com/watch?v=4NHbFT4xArU>

Additionally, we have collaborated with Huilo Huilo Foundation in the production of an additional video about the conservation of the Austral temperate forests. Available at: <https://www.youtube.com/watch?v=S6lJzCujV6w&app=desktop>. We also participated in the filming of a national TV show talking about Darwin's frogs (Mucho Gusto TV show, Mega channel).

B. Scientific meetings: The results of this project were also presented at the 8th World Congress of Herpetology (WCH8) in August 2016 in China (attendance partially supported by the WCH8 Organizing Committee), the 7th Chilean Congress of Herpetology in November 2016 in Santiago of Chile, and the 4th Symposium of Conservation Medicine in November 2016 in Santiago of Chile.

C. Scientific and non-scientific publications: With the results of this project we are producing three scientific articles to be submitted to peer-reviewed, high-quality

journals. Additionally, we are producing a non-scientific, outreach article and one outreach book about Darwin's frog (funded by the Chilean Cultural Agency under the title: "Descubriendo a la Ranita de Darwin. Un viaje apasionante").

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 current RSG covered the period between January 2016 and January 2017. As the project started in 2014 funded by a previous RSG, the current grant covered almost the half of the whole project.

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
Consumables (fieldwork materials, laboratory material and reagents, etc.)	1260	1120	-140	Used to purchase fieldwork materials (swabs, gloves, etc.) and laboratory reagents for fungus detection.
Transport (for fieldwork)	3300	3150	-150	Included land and sea transport
Food and accommodation (in fieldwork)	1800	2180	+380	The additional cost was covered by a grant from the Universidad Andrés Bello
Audio-visual material	400	755	+355	Included the production of two videos, the additional cost was covered by Ranita de Darwin NGO
TOTAL	6760	7205	+445	

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

First, to continue with the monitoring of Darwin's frog populations. Second, to use the information generated with this project in the elaboration of a conservation strategy for Darwin's frogs (currently in planning in collaboration with international and national organizations). Finally, our project need to move forward from an observational study to chytridiomycosis mitigation actions in order to halt the population decline and extinction of Darwin's frogs. Currently, we are working hard to produce a strong project proposal that allow us to lead such an important work.

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, the RSGF logo was used in all the outreach and scientific talks. Additionally, the logo was included in the two videos produced, which have more than 7,000 reproductions only in Facebook!

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

12. Any other comments?

My team and I would like to say thanks to Rufford Foundation for their important support in the development of this project. We deeply enjoyed working in this project. We were astonished by the always growing interest of the local people and tourists in Darwin's frogs, and we really enjoyed the outreach activities. We think Darwin's frogs can help us to raise public awareness about the amphibians decline crisis and to help conserve another less charismatic species. We are very excited to continue our work with amphibian conservation and help to save the amazing Darwin's frog!