

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	María Jimena Gómez Fernández
Project title	Population status and connectivity of the endangered taruca (<i>Hippocamelus antisensis</i>) in the Northwest of Argentina: diagnosis for a management proposal.
RSG reference	9345-1
Reporting period	2014-2016
Amount of grant	6000£
Your email address	mjgfernandez@macn.gov.ar
Date of this report	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 test a panel of microsatellites that were isolated in two other neotropical deer				Please refer to Comment 1 below
To estimate the size of the different Argentine populations of <i>Hippocamelus antisensis</i> , using non-invasive samples.				Please refer to Comment 3 below
To determine if there is population isolation throughout its distribution area using two different markers mitochondrial and nuclear (microsatellites).				Please refer to Comment 2 below

Comment 1

We tested 19 different microsatellite loci that were developed in close deer species. None of them was previously used in *H. antisensis*. Twelve pairs of primers were designed for the species *Ozotoceros bezoarticus* (pampas deer) and seven for the species *Blastocerus dichotomus* (marsh deer). We performed a pilot test with 20 samples, to evaluate the informative level of each microsatellite. Through this assay, we found that four of them did not amplify in *H. antisensis*. Of the remaining 15, another seven were removed because they had the same allele for all samples (monomorphic loci) and other two because we did not obtain consisting results in the different rounds of genotyping. Finally, we selected a set of eight microsatellite loci to further work on.

Comment 2

The use of non-invasive samples presented more difficulties than we expected (see point 2 unforeseen difficulties). Therefore, the results only allowed us to distinguish a minimum of 28 individuals, 16 individuals for Cerro Santa Ana, eight for National Park Campo de los Alisos and four for Provincial Park Potrero de Yala. The final sample size was too low to assess properly the effective population sample size.

Comment 3

While working on the project, we found the need to add an historical perspective. Since there is no background information for this issue in this particular species, we amplified a fragment of 202 base pairs of the mitochondrial control region. Comparing both mitochondrial and nuclear markers we found that, there is a recent genetic structure and a restriction to the gene flow following a north-south direction, indicated by the microsatellite markers. We obtained two genetic groups, one in the province of Jujuy (including Cerro Santa Ana and Provincial Park Potrero de Yala) and

the other in Tucumán (National Park Campo de los Alisos). This structure is not reflected in the mitochondrial DNA sequences, which seem to indicate a more continuous distribution in the past.

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

The efficiency of the DNA extraction and amplification was low. The low-quality DNA of faeces is, among other reasons, due to the exposure of the samples to the environment where the presence of microorganisms, the exposure to precipitation, temperature and UV light, favours the degradation processes. This was evident in the differential success between localities. While the sampling at Cerro Santa Ana was performed in September, far from the rainy season (from December to March), at Provincial Park Potrero de Yala and National Park Campo de los Alisos were conducted closer to the rainy season in April. Therefore, from this point forward we recommend to plan the campaigns in a way to avoid the sampling of faeces during the rainy season. In spite of these disadvantages, non-invasive sampling remains the chosen option for endangered species with a wide range of distribution, such as the taruca, since it allows ecological, demographic and population-genetic monitoring without the need to capture or disturb animals.

The cross-amplification of these loci proved to be more difficult than expected. Because we only had non-invasive samples to test the microsatellite loci, it took as more time and resources to select the final markers.

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

1. The cross-amplification of molecular markers of microsatellites from two close species belonging to the family Cervidae (*Ozotoceros bezoarticus* and *Blastocerus dichotomus*).

2. There is a recent genetic structure and restriction to gene flow following a north-south direction, indicated by the microsatellite markers. Two genetic groups were obtained, one including the two localities in the Province of Jujuy (North) and the other the one in Tucumán (South). This structure is not reflected in the mitochondrial DNA sequences, which indicates a more continuous distribution in the past.

3. The results obtained up to now, became part of an undergraduate thesis, for a student belonging to the University of Buenos Aires. We also trained two other students from the University of Salta, in different molecular techniques as part of extracurricular activities.

4. We carry out a progress report for the Ombudsman of the Nation. We took part in two workshops, led by the Department of Wildlife and Biodiversity Conservation (DFSyCB), which brought together the various national and provincial institutions involved in the "National Management Plan of Taruca *Hippocamelus antisensis*". In these meetings, the progress made so far in the different fields of study was discussed.

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

As part of the involvement of provincial institutions, in one of the above mentioned workshops, a seminar on collection of samples was given to the local park rangers. The goal was to train them in proper collection (sample manipulation and additional information as GPS data) and preservation of samples.

5. Are there any plans to continue this work?

So far, there was no genetic information to describe, characterise and evaluate the status of taruca populations. Therefore, this work is the first population genetic study carried out on the species. These are preliminary results are the starting point for the planning of management and conservation strategies. We will continue to be involved in the conservation efforts for this species.

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

The information obtained in the course of this study will be presented at a National Congress of Mammals, in November 2017. In addition, will become part of the publications of all those persons involved in the field surveys and laboratory studies, as more results are added to the preliminary ones.

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 grant was used between late 2014 and early 2017. Laboratory work was thought to be finished by the end of 2015, but for unforeseen reasons (explained above) it was not done until early 2017. We have been involved in this project since 2013, and it is ongoing, the work conducted so far, help to us further to plan future strategies.

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
Kit ZR Fecal DNA MiniPrep Kit 50 preps. (2)	£548.24	£334.3	£213.94	(*)
50 ml centrifuge tubes (bag x 25 units)(2)	£7.53	£6.24	£1.29	(*)
GPS Garmin ETREX 20	£295.17	£254.07	£41.1	(*)
Food and accommodations	£2750	£2835	£85.44	(*)
Field assistant	£1500	£1628.165	£85.44	(*)

Gasoline	£900	£1028.165	£85.44	(*)
Total	£6000.94	£6000.94		

(*)Because of continuous changes in the local exchange, some if the items were less expensive than we anticipate, so we distributed between the ones that turn to be more expensive than anticipated.

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

Taking into account that these are the first results of the variability and genetic structure of the Taruca populations in Argentina, we consider that the next step will be to include more protected and unprotected areas in our studies.

Since the last IUCN categorisation, the taruca was listed as vulnerable with declining population trend. Coincidentally, we observed a recent restriction on gene flow that was not discovered in the past, which is why we recommended to ensure the connectivity of populations (for example, with the establishment of green corridors between protected and unprotected areas), with the aim of avoiding more isolation between localities.

On the other hand, we recognised the need to promote projects of scientific and environmental disclosure involving the local communities, increasing the commitment of locals with the conservation of the species.

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?

Our findings are going to be presented in the National Congress of Mammals, in November of this year. We will use the RSGF logo in our and in further publications.

11. Any other comments?

I am extremely grateful to RF for the provision of financial support. It has given us the opportunity to study an elusive species, which could go from vulnerable to endangered without our knowledge. We have also expanded our network of collaborators, creating bonds for future works and collaborations related with the conservation of the taruca. Conservational efforts needs to be made, although the existence of social and economic difficulties makes it arduous to obtain funding in Argentina. It is through institutions like The Rufford Foundation that our efforts can be embodied in concrete projects and consequently we will be able to contribute to generate management decisions.