

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	Elizabeth CHANG REISSIG
Project title	Disease risks for native deer species, associated to exotic ungulates <i>Cervus elaphus</i> and <i>Sus scrofa</i> in National Parks of Northern Patagonia, Argentina.
RSG reference	5738-1
Reporting period	July 2010-July 2011
Amount of grant	£6000
Your email address	eli.changreissig@gmail.com
Date of this report	15th August 2011

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
Identify diseases of exotic mammals in Patagonia			X	Pathological findings in exotic red deer and wild boar include: <i>Fasciola hepatica</i> , <i>Dyctiocaulus</i> sp., <i>Metastrongylus pudendotectus</i> , <i>Sarcocystis</i> sp., <i>Trichinella</i> sp. Microscopic lesions observed included: hepatitis, collangiohepatitis, collangitis and centrolobulillar necrosis in liver; pneumonia, bronchitis and emphysema in lung; sarcocystis in heart. Antibodies against Rotavirus, Parainfluenza type 3 virus, and Leptospirosis were also found in both species. Chronic wasting disease was negative for all brain stem samples analyzed in deer (including native deer found accidentally dead). Health surveys in red deer and wild boar are being carried out during annual hunting season in Lanin and Nahuel Huapi National Parks and also during hunting periods of management control programmes.
Evaluate the risk of disease transmission from introduced species to native fauna		X		<ul style="list-style-type: none"> - The parasites mentioned above caused severe hepatic disease, granulomatous bronchopneumonia, and myocarditis in red deer and wild boar. It is unknown the effects of these pathologies in Patagonian native deer such as huemul (<i>Hippocamelus bisulcus</i>) and pudu (<i>Pudu pudu</i>). - No statistic difference was found in pathological lesions between introduced species sampled within and outside of National Park's areas. It is suggested that exotic ungulates are spreading new infections into areas of National Parks due to their movements between grassland and forest (natural habitat of native deer). However, further studies are needed to evaluate epidemiologically the risk of disease transmission from introduced species to native fauna, which involve animal movements and environment variables (type of habitat, presence of red deer, wild boar, livestock and intermediate hosts). - It is planned to continue monitoring the health status and movements of the population of red deer and wild boar, as well as livestock movement into Northern Patagonian National

				<p>Parks.</p> <p>- During the study, one huemul and four pudus were found accidentally dead. Pathological findings of two out of four pudus included <i>Cysticercus</i> sp. This parasite is associated with carnivores (definitive host native carnivores or feral dogs). The cause of the death of the huemul could have been by drowning but it was not confirmed by histopathology due to the samples were unsuitable collected for laboratory analysis (carcass condition, and not enough amount of formalin to fix the tissues).</p>
Generate basic information to prevent zoonosis			X	<p>Workshops, seminars, brochures, teaching materials, and reports related to disease prevention and the importance of studying wildlife diseases in Patagonia were performed, written and given to park-rangers, national park's staff, hunters, guide-hunters and rural local community.</p>

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

The difficulties that arose during the project consisted of the difficulty of accessing the carcass of hunted red deer and hunted wild boar in natural areas of National Parks (remote mountain areas in Nahuel Huapi and Lanin NP). In surrounding areas of Los Alerces NP, we got very few samples due to low density of red deer in this area. To deal with the difficulty of sampling collection in the field, several workshops, talks and seminars to park-rangers, hunters, hunter-guides, and farmers were performed and are going to be done all over again as part of the ongoing present project.

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

This study allowed us to (1) identify for the first time exposure to several pathogens in exotic mammals from Patagonia, specifically describing severe pathological lesions in vital organs of the studied animals and showing the evidence that introducing species with pathologies are present in protected areas of National Parks. It also sets the foundation for (2) a diseases database from which to build a health monitoring and surveillance system in natural areas, which is essential for the sustainable conservation management of threatened native fauna. Education and consciousness in (3) preventive measures to avoid zoonosis (Fasciolosis, Trichinosis, Leptospirosis and other endemic diseases) from wild animals were also achieved, however, it is needed to strengthen the recommendations and application of the measures. At the present, wildlife disease is becoming a matter of concern to Argentinean Governmental Institutions such as National Parks and National Service of Animal Health and Food Safety (SENASA).

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

Local veterinarians, biologist, hunters, guide-hunters, national park's staff, and park rangers were trained to become acquainted with the methods and disease prevention procedures necessary for wildlife management. The training in this field emphasised how important health studies are for conservation aspects of wildlife, such as negative impacts from exotic to native species and its threats in reducing natural populations. The development of the project took into account the concept of global health, where include the health of wildlife, livestock, environment, and people.

5. Are there any plans to continue this work?

Yes, there are plans to continue my work in wildlife diseases and diseases ecology aspects of free-living exotic mammals in Northern Patagonia. I believed that understanding the ecology and the dynamics of invaders through health surveys will facilitate conservation actions for the protection of endangered native species such as the huemul (*Hippocamelus bisulcus*) and pudu (*Pudu puda*) as well as preventing zoonosis. Therefore, I am planning first of all to continue with biological sampling collection for pathological studies as a priority to analyse the health status of free-range exotic ungulates. Describing tissue lesions and assessing the pathogenesis of the diseases through histological and histochemical techniques will be done as part of my project and career interest. Secondly, to evaluate the ungulates movements and use of habitat, I am planning to increase the number of camera traps that are at this moment registering the presence of introduced red deer and wild boar in different types of environment at the Lanin National Park. At present there is insufficient field data on the prevalence of diseases, distribution and density in free-living wild mammals in Argentina. As health data of native deer is difficult to obtain because of their low densities, few observations in the field and risk of capture, indirect studies using exotic ungulates sharing their habitat (which are regularly hunted) is a useful tool to assess disease in wild populations. Therefore, I am planning to continue this work through literature search, field work, and laboratory studies relating to diseases of introduced ungulates. I expect that results to be compiled into a mathematical model to assess free-range animal movement concerning diseases spread in natural protected areas and its contact with livestock.

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

Health screening protocol and preventive medicine recommendations was elaborated and given to local community, veterinarians, biologists, hunters, park-rangers, and National Park's technical staff. Reports with work results and wildlife management recommendations was present to Official Governmental Institutions: Patagonian Regional Technical Delegation (PRTD) of the Argentinean National Park Administration (APN); Province Fauna Departments; and Argentinean National Service of Animal Health and Food Safety (SENASA). A review of ungulate diseases was present to the PRTD. Annual reports will be written to the PRTD as part of my project permission to proceed biological sampling in natural protected areas. Communication of recently results will be conducted by presentations at scientific meetings and workshops, and scientific publications will be send to peer-reviewed journals. In addition, collaborators and co-workers (local biologist, and students who did intership in this project) will participate as co-autors in future publications.

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

The RSG was used from July 2010 to July 2011. The major work of biological sampling collection in exotic hunted red deer and wild boar is during the annual hunting season (from March to April) at the Nahuel Huapi and Lanin National Parks. Therefore, we had only one hunting season (2011) during the period of my Second RSG. Beside this, few red deer hunted in three local farms surrounding Los Alerces National Park were sampled during 2010, and laboratory analysis and workshops were performed during all the length of the grant. Additionally, thanks for RSG we started to work with camera traps with the aim to monitor red deer and wild boar movements in different types of environment at the Lanin National Park (work carry out in association with Nicolas Ferreyra/RSG 2010). This work was started during the period of my Second RSG and it will continue during 2011-2012 as part of my ongoing research project. All equipment and material acquired from my First and Second RSG will be use for the next hunting seasons and will be share with colleagues (veterinarians and biologists) who perform research projects with introduced species in Northern Patagonia.

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
Disposable material	800	766.44	33.56	Expenses included disposable material for collecting samples at the field and for processing the samples in the laboratory at San Carlos de Bariloche city.
Non-disposable equipment	1,000	981.01	18.99	To fulfil needs of fieldwork and laboratory analysis, the following equipment were purchased with the Second RSG Budget: one pH meter, one agitator, one freezer, one refrigerator, two cameras traps, one camera trap viewer's photo, three SD cards for cameras traps and viewer, two scales (one 100 kg field-portable scale, one 200 g lab-scale).
Laboratory analysis	1,000	983.04	16.96	Diagnostics were performed by selected professionals at recognised facilities (Faculty of Veterinary Sciences/Univ. La Plata and Univ. Litoral; National Institute of Technology and Agriculture/INTA Castelar; and Malbrán Institute). Costs included: disposable materials used in diagnostic tests by these labs, microscopic electronic cost, as

				well shipment of samples from Bariloche to the laboratories.
Travel and lodging for principal investigator and collaborators	2,600	2561.51	38.49	<ul style="list-style-type: none"> - Two campaigns fieldwork were performed at Los Alerces National Park; and two campaigns at Lanin NP. Both campaigns included food and logistic expenses for three to four people during the field work. - S.C. Bariloche (my town city) is located inside of the Nahuel Huapi NP, therefore field work expenses during the project included fuel and vehicle maintenance. - Two trips at University of La Plata for attending the Argentinean Veterinarian Pathology Meeting and for processing pathological samples at the Institute of Pathology/Univ. of La Plata. - One trip to Neuquén city for the Trichinosis Workshop with local veterinarians.
Travel and lodging for principal investigator and collaborators				
General office expenses and communications	400	361.66	38.34	Expenses included: paper, printer cartridges, envelopes, publications, photocopies, internet, telephone and fax expenses.
Developing educational material and training of locals	200	210.39	- 10.39	- Two workshops were performed at San Carlos de Bariloche city with NP's staff and park-rangers; one training workshop for park-rangers was performed at Junin de Los Andes city. Talks, brochures and material with the project information were given to park-rangers, national park's staff, local community (hunters and guide-hunters, local people).
Total	£ 6000	£ 5864	£ 135.95	

* Charges in transferring the RSG payment to the National Argentinean Bank were £\$ 207.47 and it was deducted from the budgeted amount.

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

I believe that important next steps are: (1) continuing the assessment of diseases in exotic ungulates through pathological studies, and (2) following a line of investigation on diseases ecology in Patagonia by assessing animal movements (red deer, wild boar, and livestock) in relation to disease spread (eco-epidemiology). Oftentimes, the presence of disease in wildlife threatens conservation

goals either through misguided management actions to control the disease, or by preventing land-use choices that are compatible with wildlife. Understanding the ecology of these diseases must therefore be used to facilitate conservation oriented management actions, and to use health as a tool for policy change and increased public support. It is likely that our lack of knowledge about the possible impacts of disease and interactions with domestic animals are currently hindering our efforts to protect neotropical deer dwindling populations, particularly more so for highly endangered species.

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?

Yes, the RSG logo was used in the presentations of workshops, seminars, scientific meetings, reports and brochures given to local community and colleagues.

11. Any other comments?

I appreciated very much the Rufford Small Grants Foundation for the grant received and the opportunity to follow and support our project. We believed that wildlife disease is an area of increasing interest among Argentinean veterinarians, biologist, students and technicians of National Parks and Governmental Institutions. I plan to continue my research in this area and hope to answer questions related to the pathologies that exotic mammals carry and its consequences to the endangered native fauna.