

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. 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	Cecilia Blundo
Project title	Tree regeneration, population structure and demographic patterns of timber tree species in Premontane Forest in Northwestern Argentina
RSG reference	8800-1
Reporting period	December 2010 - December 2011
Amount of grant	£6000
Your email address	ccblundo@yahoo.com.ar
Date of this report	19th December 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
1) To analyse population structure and demographic patterns of timber tree species in 20 1 ha permanent plots.			X	<p>We have established a network of 20 1 ha permanent plots between 2003-2007. In these plots, we marked and measured 9397 trees belonging to 99 species and 43 families. With RSG we re-measured 16 of the 20 1 ha plots; 6837 trees have two consecutive measurement.</p> <p>We have estimated population structure (tree density per hectare, basal area, biomass and age structure) and demographic patterns (recruitment, growth and mortality) in 14 timber tree species (including principal and secondary timber tree species). Details of these populations parameters are included in Table 1.</p>
2) To evaluate seedling tree recruitment.			X	<p>We censused seedling tree recruitment in 25 5 x 5 sub-plots inside all 1 ha plots (a total of 500 sub-plots).</p> <p>For the 14 timber tree species, we are analysing the data to determine the regeneration conditions of each of them. Particularly, we are taking into account the light requirements and the edaphic conditions to establishment.</p> <p>When data analyses are completed, we will prepare a manuscript with these results to transfer the information to institutions and people involved in policy development and implementation (e.g. NGO, environmental government office, timber producers). Fundación ProYungas (a NGO working in the study area since 1999) is developing a protocol of recommendations for secondary forests management (http://www.proyungas.org.ar/nuestrotrabajo/buenmanejoforestal.htm).</p> <p>The information generated with this project about both demographic and regeneration patterns of timber tree species allow us to identify the processes of natural restoration in secondary forest after logging activities.</p>
3) To identified environmental			X	<p>In this project, we have proposed to measure environmental conditions in all permanent</p>

<p>factors that influence seedling tree regeneration, populations structure and dynamic.</p>				<p>plots, particularly light availability and edaphic conditions.</p> <p>We have proposed to take 3 soil samples in all plots (60 samples); these samples would be analysed by Edaphology lab of University of Tucumán. During 2011, we find a lower budget that allowed us to increase the number of soil samples per plot. Finally, we measured soil conditions at 10 sites in 16 1 ha plots (160 samples) and the samples were analysed by INTA-Salta (National Institute of Agricultural Technology, in the Salta Province). The fine scale at which sampling was carried out is unprecedented in the study area. This allow to characterise the soil requirements of both timber and non-commercial tree species.</p> <p>In addition, we have measured light availability in 25 sub-plots inside all 1 ha plots with a digital camera to quantify canopy coverage. A total of 500 photos of the canopy were taken.</p> <p>Due to a delay in the field activities, we are still analysing data to identified the environmental factors that influence tree regeneration, population structure and dynamic. After that, we will prepare a scientific article to publish the information generated by this project in a journal related to forest ecology and management. We estimate that we could submit a paper in April 2012.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

We have delayed the activities in the field by logistical difficulties. However, we were able to complete all planned activities to develop in the field during the year, i.e. re-measurement of 16 1 ha plots, measurement of seedling tree recruitment, soil characterisation and estimation of light availability. For this delay, we have finished field work in November 2011 so we are still at the stage of data analyses. We estimate that we would be able to prepare the publications before April 2012.

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

a) With this project we have re-measured 16 1 ha permanent plots that include 6837 trees with two consecutive measurement. This information allows to characterise demographic patterns in almost tree species in Premontane forest of north-western Argentina, with particularly interest in all timber tree species (including principal and secondary timber tree species).

b) The fine scale at which soil sampling was carried out is unprecedented in the study area. This information allows to characterise the soil requirements of both timber and non-timber tree species.

c) Relationships that emerge from seedling recruitment and environmental conditions (light availability and edaphic conditions) allows identifying tree species strategy (e.g. pioneers and colonisers, species that promote establishment of other species, shade-tolerant tree species, etc.). This key information is necessary to generate sustainable forest management guidelines and promote conservation of native forest.

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

Results provided in this project will be transferred in a manuscript to Fundación ProYungas. This NGO, in coordination with environmental government office and organisations of timber producers, is developing a sustainable forest management guidelines with recommendations to promote natural restoration in secondary forest. Additional information is available in: <http://www.proyungas.org.ar/nuestrotrabajo/buenmanejoforestal.htm>

5. Are there any plans to continue this work?

The work development in this project is part of my doctoral dissertation. I have focused in tree regeneration, population structure and demographic patterns of timber tree species. However, as mentioned above, we can obtained forest structure and demographic patterns at the community level, because in the network of permanent plots all trees ≥ 10 cm DBH (diameter at breast height) are identified, measured and marked. Analyses at the community levels will contribute to understand forest dynamics in secondary forest. In Premontane forest of north-western Argentina, agriculture has replaced a vast area of native forest. Remnant forest is used for logging of selective tree species because about a dozen of tree species have commercial value.

Our goal is to maintain the network of permanent plots over time in order to continue adding re-measurements to assess the long-term forest dynamics in Premontane forest in north-western Argentina.

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

On one hand, we want to prepare a manuscript in Spanish with all results of populations structure and demographic patterns of timber tree species and tree regeneration; specifically about the environmental requirements of timber tree species (i.e. light and soil conditions). This information will be transferred to contribute in the development of a sustainable forest management guidelines. On the other hand, results will be published in a journal related to forest ecology and management. Specifically, the paper will refer about the regeneration strategies of tree species in forest with selective logging than differ in the time without use (i.e. old forest, medium-age forest and forest recently logging).

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

The project was developed during 2011. At the beginning of the year we had a delay in the onset of field activities. For this reason, we ended with field activities in November 2011. This caused a delay in the successive stages of the project (analyses and reporting). We believe that final products (i.e. a manuscript in Spanish and a scientific article) will be completed on April 2012.

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
Rent and maintenance of field vehicle	520	450	70	
1 Digital camera	1200	1200	0	
Field equipment (measuring tapes, batteries, etc.)	150	150	0	
Salary for field assistant	980	900	80	
Lodging during fieldwork	1330	1200	130	
Soil sample analyses	1680	1990	-310	The credit balance in items 1, 4, 5 and 7 were used in the soil samples analyses.
Supplies (sample bags, bibliography, etc.)	140	110	30	
Total	6000	6000	0	

Additional funding was provided by Fundacion ProYungas to cover vehicle maintenance, field equipment and dissemination of results at a cost of £1500.

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

In the short term I want to finish my doctoral dissertation. After that, I plan to continue working on forest ecology and conservation of tropical and subtropical forest.

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?

We will report about the funds origin when the publication stage is completed. Still we not use the RSGF logo.

11. Any other comments?

Special thank for RSGF for trusting in my proposal and allow significant progress in my PhD studies.

Table 1: Population structure parameters (average in 20 1-ha plots) and demographic rates in 14 timber tree species in Premontane forest of North-western Argentina. (*) Principals timber tree species.

Family	Species	Population structure				Demographic Rates		
		Density (tree ha ⁻¹)	Basal area (m ² ha ⁻¹)	Biomass (Ton C ha ⁻¹)	Total Biomass (Ton C in 20 1-ha)	Recruitment (% annual)	Growth (mm year ⁻¹)	Mortality (% annual)
Anacardiaceae	<i>Astronium urundeuva</i> *	13,9	1,33	34,0	680,5	0,4	1,04	1,1
Bignoniaceae	<i>Handroanthus impetiginosus</i>	8,6	0,51	9,2	184,3	0,5	0,54	2,1
Borraginaceae	<i>Cordia americana</i>	15,9	1,11	17,2	343,2	0,4	0,71	1,1
	<i>Cordia saccelia</i>	8,3	0,28	3,5	70,3	0,6	0,80	1,6
	<i>Cordia trichotoma</i>	11,5	0,44	4,2	84,4	0,9	1,53	2,4
Combretaceae	<i>Terminalia triflora</i>	4,9	0,18	1,9	37,6	1,9	0,75	0,5
Fabaceae	<i>Amburana cearensis</i> *	0,4	0,02	0,3	5,1	0,0	1,04	0,0
	<i>Anadenanthera colubrina</i> *	47,0	2,82	55,6	1111,2	1,3	1,91	1,9
	<i>Myroxylon peruiferum</i> *	5,3	0,32	5,9	118,0	1,2	1,20	0,6
	<i>Parapiptadenia excelsa</i>	16,2	0,81	9,2	183,8	1,3	1,36	3,5
Meliaceae	<i>Cedrela balansae</i> *	8,8	0,76	7,1	142,1	2,0	1,95	1,9
Polygonaceae	<i>Ruprechtia laxiflora</i>	2,7	0,14	2,1	41,2	1,9	1,15	2,1
Rubiaceae	<i>Calycophyllum multiflorum</i>	18,2	1,32	23,2	463,2	1,0	0,77	1,3
Ulmaceae	<i>Phyllostylon rhamnoides</i> *	33,0	1,73	28,5	570,8	1,2	0,52	0,7