

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	Andres Link
Project title	Effects of deforestation on the behavioural ecology of the critically endangered brown spider monkeys (<i>Ateles hybridus</i>) and the primate community at Serranía de Las Quinchas, Colombia.
RSG reference	
Reporting period	August 2009
Amount of grant	£ 4994
Your email address	al898@nyu.edu
Date of this report	August 01/2009

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
Generate the first in-situ data on the behavioural ecology and social behaviour of brown spider monkeys (<i>Ateles hybridus</i>).			Fully Achieved	We have begun a long term project on the brown spider monkeys in Las Quinchas and San Juan that has provided the baseline data on several ecological and social aspects of these primates. We have collected data on the diet, ranging and activity patterns as well as on their social behaviour. We are beginning to understand how fragmentation and habitat loss is affecting brown spider monkeys in the short term and we expect to continue this work to see how these effects influence their reproductive output and overall survival in the long term.
Evaluate the adaptive responses of a whole primate community to deforestation at Las Quinchas and San Juan, Colombia		Partially achieved		We have been able to collect a large amount of data on most primate species both at Quinchas and at San Juan. Nevertheless the broken terrain at Quinchas has made it quite difficult to collect more data on capuchins (<i>Cebus albifrons</i>) and the extensive flooding at San Juan in 2008 also increased the difficulty of conducting field work. Nevertheless there are substantial data to begin comparing the ecology and behaviour of these species under different habitat fragmentation and alteration.
Describe the forest structure and composition of the forests at Las Quinchas and San Juan			Fully achieved	Vegetation plots were set only in San Juan as our colleagues (Aldana <i>et al.</i>) had already done several vegetation plots in Quinchas. Thus we doubled our effort at San Juan in this topic to have comparable data at both sites.
Phenological patterns		Partially achieved		This has been thoroughly developed at Las Quinchas but intermittently in San Juan due to the flooding that has interrupted data collection. Nevertheless long term data on the forest productivity are still being collected and will most probably show the differences between these two forests in the future.
Raising local awareness and building capacity in Colombia			Fully Achieved	We conducted several local workshops and educational activities with the local children at both sites. Also, we have been able to train ca. 20 students (over 3 years) from more than 10 different universities in Colombia. 95% of them still work in conservation or wildlife research both in Colombia and abroad.

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

2.1 We decided to change one of the projects sites (La Guinea was replaced by San Juan).

Just before starting the project in La Guinea local people had agreed to stop hunting of most wildlife but at least in particular brown spider monkeys (*Ateles hybridus*) and blue-billed curassows (*Crax alberti*) were banned from hunting. Nevertheless, several local hunters did not stop hunting and we decided not to begin habituating the groups of spider monkeys in this area, as it would make things easier for hunters and our work would not have any purpose in terms of conserving these primates in the wild.

Thus we decided to change this site to that of San Juan de Carare, a large private cattle ranch that is comprised by a mixture of pastures and forest fragments of different sizes (range 30 to 1200 hectares). The owners have been very helpful and eager to promote conservation in the forests they own (over 2000 hectares) and we have been working since then at this site on the conservation of brown spider monkeys and the ecosystems they currently live in.

2.2 An extremely intense rainy season and flooding at San Juan during 2008.

The site at San Juan is made of a seasonally flooded forest that usually floods every year for a couple of weeks during the rainy season. Nevertheless, 2008 rainfall was very intense and the forest was flooded for several months when we were obliged to stop our research as it was impossible to carry on with it. Thus, our scheduled timeline got delayed from our initial expectations, but fortunately we were able to conclude it successfully.

2.3. Methodological difficulties to collect systematic data from primates at both areas.

Both sites are challenging to allow researchers to conduct long term behavioural observations on our study groups. Ideally we had planned to follow our study animals from dusk to dawn as we do in several Amazonian sites where we work with spider monkeys. Nevertheless, La Quinchas has an extremely broken terrain which makes it very difficult to move from one place to the other. We have set a trail system that allows us to move to almost all areas used by our study groups, but some areas still remain very difficult to access while following the monkeys (without losing them out of sight).

At San Juan, the terrain is challenging not due to its inclination, but given the fact that the forest seasonally floods and many areas (and sometimes all the forest) is under water. Furthermore, a large portion of the area is comprised by thickets of a spiny palm (*Bactris sp.*) which increases the difficulty of following the monkeys. At San Juan we have also set a trail system that greatly improves our behavioural data collection and nowadays we can survey our study groups almost continuously except during the flooded season. Finally, the forest at San Juan had over 60 buffaloes that were being raised by the ranch owners and that went daily into the forest fragments. We have been able to convince the owners to put their electric fences in the borders of the forest and now buffaloes seldom if ever are found within the forest fragments.

2.4. Sudden decrease of Colombian currency (pesos) per dollar decreased our net income for the RSG grant.

This coupled with the substantial increase in prices for food and lodging at El Paujil Reserve from Fundacion Proaves in Las Quinchas made our budget more tight.

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

The most significant outcomes of our project refer to the establishment of two long term study and conservation sites (Las Quinchas and San Juan) where we have habituated and identified all individuals from our study groups. We plan to continue with this research in the long run and not

only study the short term effects of habitat fragmentation (changes in grouping patterns or diet) but long term effects on the population dynamics and demographic patterns in brown spider monkeys.

The first important outcome is the dataset on how subgroup size is being influenced by fragmentation and more strictly by fruit availability. We found that both at San Juan and at Quinchas, average subgroup size is much smaller than that of other studied populations of spider monkeys in North-western Amazonia. We compared our data from Tinigua National park and Tiputini Biodiversity Station (two pristine tropical lowland rainforests) to that of the brown spider monkeys studied at Quinchas and San Juan (fragmented and with a recent exposure to selective logging). Our results show that the average sub-group size is significantly smaller (controlling for group size) in fragmented areas and this is correlated to fruit productivity in each of the forests.

This result provides a very interesting piece of data as it supports the hypothesis that spider monkeys tend to minimize competition for resources through changing their grouping patterns and travelling and foraging in smaller subgroups (see Shimooka 2004). Thus it is interesting to further evaluate this hypothesis as it might begin to reveal how spider monkeys are dealing with a decrease in fruit resources (via habitat loss) that is permanent throughout the year (not just seasonal scarcity periods).

The second important outcome refers to the study of diet and feeding ecology of spider monkeys in fragmented areas at Las Quinchas and San Juan. We wanted to evaluate if the diet of brown spider monkeys (specialized frugivores) would change in areas with long periods of fruits scarcity, in this particular case small forest fragments with high primate densities (as a proxy of competition) and recently reduced to small isolated areas.

We have been observing that the diet of brown spider monkeys at San Juan (small fragment) has the lowest percentage of fruit intake by any studied population of spider monkeys. In general, spider monkeys rely on fruit for 73% to 95% of their annual diet and almost no month has a higher intake of leaves than fruits. Nonetheless, at San Juan our data show that brown spider monkeys have “been obliged” to switch their diets to a higher young leaf consumption and fruits only represented 55% of the diet, having several months in which leaves were consumed more often than fruits. Thus it seems that these groups living under severe habitat loss are facing with challenging scenarios where food availability (i.e. fruits) might be not enough to cover the needs of the current primate populations.

In terms of diet, another additional interesting fact is that both populations (Quinchas and San Juan) are consistently using salt licks or decayed wood in trees to complement their diet. This is in fact interesting as the only populations that are regularly observed undertaking this behaviour are those of White-bellied spider monkeys in north and western Amazonia. Most researchers agree that this behaviour is used by primates (and other animals) to complement the mineral poor diets of frugivores and folivores.

The third important outcome from this project is the general dataset we have been gathering from all the primate community at Las Quinchas and at San Juan, which is beginning to provide evidence that in areas with higher fragmentation and those exposed to a lower fruit availability, the general overlap in resource use between species is higher. This is particularly true for feeding resources and we have observed that under ecological pressures such as reduced habitat and fruit or food scarcity, primates become more general in their diets in order to cope with overall scarcity. Although it is an adaptive strategy for each primate species, it increases the inter-specific competition amongst the primate community living sympatrically and might also have negative influences on those species that are more specialized or fragile to behavioural (i.e., dietary) changes, such as spider monkeys.

All of the outcomes mentioned above are essential factors that will allow us to better understand some of the underlying principles driving the populations of spider monkeys to local extinction through out their range. Spider monkeys are some of the first large mammals to disappear after human intervention, in some cases due to hunting, but also in areas where hunting is not widespread. Thus, we are confident that through the long term comparative study of wild spider monkeys living in habitats with different levels of disturbance we will begin elucidating the proximate factors and processes that drive the decline of *Ateles* spp. populations in fragmented and intervened areas.

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

The involvement of local communities has been mostly focused to the development of “ecological groups” with the local children and schools of the nearest towns to our study areas. At Las Quinchas we have conducted several educational workshops and activities with the local children who are very motivated to participate. This has been done in collaboration with Fundacion ProAves who also work with the same local community and who also develop conservation oriented activities for children and the local communities. These activities are not only targeted to the local children but indirectly to the whole community living in the neighbouring areas of our conservation sites.

For example, at one of our workshops at Las Quinchas we programmed to develop and elaborate a conservation documentary in video that would be designed, elaborated and promoted by the local ecological group. Thus, we did a 3-day workshop in which the kids forming the “ecological group” would think on the type of video they would like to do referring to the conservation of brown spider monkeys and the forests in their areas, and with our guidance and facilitation they put together a documentary that has been shown several times in Puerto Pinzon, the main town around our study site. This video has had a great reception from local persons as they have seen their sons, friends, etc. participating actively in it. Thus, we think these participative activities are reaching a broad audience at a local level and are being successful at raising local awareness. The video is now in www.youtube.com and available through the following links:

- Chapter 1. <http://www.youtube.com/watch?v=aM7wLRGSivs>
 - Chapter 2. <http://www.youtube.com/watch?v=Dvt9HKtEc0A&feature=related>
- Video name: Un viaje al interior del Magdalena Medio (www.youtube.com)

5. Are there any plans to continue this work?

Yes. We began our long term study and conservation programme on wild brown spider monkeys in December 2005, and only now are we starting to get a comprehensive analysis on the behavioral ecology of these endangered primates. Our main objective is to work towards the conservation of brown spider monkeys in the wild and implement a successful conservation action plan for this species that will protect the biodiverse ecosystems in lowland tropical rainforests in northern Colombia.

Thus, we currently have an on-going research and conservation plan that is focused on obtaining key data that will be helpful in the design and implementation of conservation initiatives for *Ateles hybridus*. We hope to be able to continue this work for many decades and to have the ability to build capacity in Colombia in a way that conservation of wildlife and especially of brown spider monkeys will be led by a broad team of conservation leaders.

In the short term, we are continuing to study our groups of brown spider monkeys at Las Quinchas, at San Juan and we have started to monitor two additional populations (Remedios and Curumani) in order to increase our sample size in our study of the effects of fragmentation and habitat loss on the populations of *Ateles hybridus*. We have also done several (ca. 25) short field surveys all over Colombia and Venezuela to identify potential areas for conservation and we have done census work on several areas to estimate population densities of brown spider monkeys.

We aim to begin providing the information required to major stakeholders in order to influence and promote the formation of national protected areas or even the designation of private protected areas in a region where less than 1% of its land cover is protected for conservation.

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

We plan to share this information with different stakeholders that may certainly have a positive or negative influence on the conservation of brown spider monkeys and the diverse ecosystems it lives in.

a) Local communities. We have an on-going conservation programme with the local communities at Las Quinchas and San Juan and we plan to incorporate the results from our study into some educational booklets that can show the local kids the main factors affecting brown spider monkey survival and some of the alternatives that can be implemented to ameliorate these impacts. We have involved the local children in activities such as the elaboration of a conservation-oriented video (see above) and this is being showed publicly in all nearby towns and communities and we think this kind of material receives a lot of attention amongst local people.

Also, in those sites where we work with local ranchers, we will be able to show them in a simplified form the results from our studies and begin promoting the ideas of building a network of cattle ranchers that support the conservation of wild habitat within their lands and the management (i.e., natural corridor design and implementation to connect isolated forests) of this landscapes to continue providing the economic benefits they are interested on, while preserving the forests and ecosystems in their areas.

We will contact national media and will try to use them as tools to raise awareness amongst a more widespread public in Colombia about the threats of these primates (as umbrella species for the conservation of a larger biodiversity) and the need to work towards their conservation.

b) Governmental institutions and NGO's. The results from our research will be made available to the local governmental institutions, as well as to the national Natural Park System so they can take them into account in their decision making on environmental and conservation-related agenda. Also, this information will be shared with all NGO's or interested parties that are working towards the conservation of wildlife and biodiversity in Colombia.

c) Scientific community. Finally, we have begun to participate in national and international congresses (IPS 2008 in Edinburgh, SCB 2009 in Beijing) where we have raised awareness on the needs to orient efforts for the conservation of brown spider monkeys and Inter-Andean forests in Northern Colombia and Venezuela. Also, we will publish our scientific research in well known international journals (i.e., Conservation Biology, International Journal of Primatology) in order to share our results with other researches developing similar work throughout the world.

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 during a longer length to that planned initially. The RSG was planned to be used over the course of one year which in neotropical rainforests, approximately covers a phenological period for most plant species. Due to unexpected events (such as the extended floods at San Juan), we were obliged to extend our research plan to ca. 15 months (November 2007 – February 2009).

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
Salaries for Local Assistants	£ 360	£ 270	£ + 90	Daily salaries for local assistants were higher than budgeted (from £ 5 to £ 5.6). We hired assistants for 48 days (planned 72), on average 2 per month per site.
Food and Lodging	£ 3402	£ 3421	£ - 19	Prices were higher at El Paujil, thus we were only able to cover 313 person-days there, and San Juan's prices were lower, thus we stayed over 400 person-days.
Expendable supplies and materials	£ 920	£ 704	£ + 216	We were able to spend less than previously budgeted in Supplies and Material.
Travel Expenses	£ 312	£ 601	£ - 289	Travel expenses were much higher than expected due to the fact that students had to come back from the field when the floods began and then go again when the conditions were better to resume field work.
Total	£ 4994	£ 4996	£ -2	

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

I consider that one of the most important steps is to give continuity to the long term studies that are ongoing in Quinchas and San Juan. Thus we plan to follow up this projects work through:

- Continued work on our focal brown spider monkey study groups in order to continue to collect data on their behavioural ecology and population biology that will allow us in the future to have the science-based data to develop population viability analyses and on the end to support conservation initiatives with our knowledge on the natural history and behaviour of these primates so that these conservation initiatives become successful in preserving the wild population of *Ateles hybridus*.
- Expanding our work to several other localities and continue to search for relevant areas for the conservation of brown spider monkeys. Also, we plan to evaluate how brown spider monkeys are competing with other sympatric primate species for feeding resources in order to evaluate more variables that may influence the decline of brown spider monkeys in fragmented and altered habitats.
- Intensifying our work with local communities and raising awareness with local stakeholders on the importance of conserving wild spider monkeys and their habitats, which bring environmental services to most communities in the area.

- Influencing governmental institutions and providing them with science based data on the status of threat of wild populations of spider monkeys in order to help promote the creation of national reserves in this region or even to provide governmental support to land-owners and communities that promote conservation of tropical inter-Andean rainforests and other threatened ecosystems in Northern Colombia.

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?

To date, we have only used the RSGF logo in the presentation given at international meetings. We have publicized RSGF in the documentaries made with local children in Quinchas.

As we begin writing up our results and structuring them into scientific articles and media releases we will use the logo to give publicity to the RSGF.

11. Any other comments?

We greatly appreciate any comments on the Final Report, and if RSGF requires any topic to be discussed more in detail, or results to be presented more specifically for any purpose, please inform us. Also, if you need a more detailed description of the budget or any section of it, as well as copies of receipts, we can also organize them and send them to you.

We are very grateful to RSGF for the support given to us to work towards the conservation of one of the 25 most endangered primates in the world. You have allowed us to begin to make a difference in the conservation of lowland rainforests and their most threatened taxa in the Inter-Andean valleys in Colombia. Thanks.