

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	Rodrigo Barbosa Ferreira
Project title	How do matrix-habitat types influence edge effects? Ecological perspectives of local farmers and applied field study on frogs at Brazilian Atlantic Rainforest
RSG reference	13469-2
Reporting period	10-17-2013 to 10-17-2015
Amount of grant	£5782
Your email address	rodrigoecologia@yahoo.com.br
Date of this report	10-27-2014

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
Educational element: Interview local villagers				We interviewed another six families, totalling 18 families if you sum with interviews from the previous year. We expected to interview more families but it was difficult to find both men and women at home at the same time.
Educational element: Booklet				We distributed educational material to the local villagers and students about both the research project and the ecological role of bromeliads.
Educational element: Contest				We organised a contest to let the local community decide the common name of a new frog species that we were formally describing. We exposed the new species in several events. The event got in the local, regional, and national TV (see details below).
Educational element: Stickers and t-shirts				We distributed project stickers and t-shirts with the RSGF logo to local villagers. In total 350 stickers were distributed.
Educational element: Talks with the local policy makers and community				We presented two talks; one to the staff of Augusto Ruschi Biological Reserve and another to the local community on an environmental activity promoted by the NGO SOS Mata Atlantica.
Field work: Mentor local biologists				We continued mentoring two local biologists (Mr Cassio Zocca Zandomenico and Ms Fernanda Lirio Ferreira). This partnership has been extended and now I am their adviser on their specialisation degree.
Field work: Gather life-history data for several frogs currently listed as threatened or data deficient by IUCN Red List				We collected ecological information for several species listed in the threatened categories by IUCN. These findings will contribute toward the new round of threatening assessment organised by IUCN Red List.

<p>Field work: Investigate the use of the three most widespread matrix-habitat types by frogs</p>			<p>We surveyed another 42 plots of 5 x 5 m across 21 matrix sites representing seven replicates of each matrix type. Most species (70%) were not recorded in matrix plots. Richness and abundance of frogs were not different across the three matrix types.</p>
<p>Field work: Understand how the three most widespread matrix-habitat types influence frog response to edge effects</p>			<p>We surveyed another 126 plots of 5 x 5 m across three different distances (at the edge, 50 m from the edge, and 200 m from the edge). Frogs strongly avoided forest edge (edge effect). Matrix type surrounding the forest influenced neither richness nor abundance of frogs inside the forest.</p>
<p>Sharing results: Participation in national and international conferences</p>			<p>In addition to share our results with the local community, we presented the results of our educational and scientific outcomes at several conferences. I did an oral presentation and a poster presentation at the VI Brazilian Congress of Herpetology, a poster presentation at the II North America Congress for Conservation Biology, and at the 99th Ecology Society of America Annual Meeting.</p>
<p>Sharing results: Scientific publication</p>			<ol style="list-style-type: none"> 1. Lourenço-de-Moraes, R., Ferreira, R.B., Fouquet, A. and Bastos, R. 2014. A new diminutive frog of the genus <i>Adelophryne</i> Hoogmoed and Lescure 1984 (Amphibia, Anura, Eleutherodactylidae) from the Atlantic forest of Espírito Santo, Brazil. <i>Zootaxa</i>, 3846(3): 348-360. 2. Zocca, C.Z.; Lirio, F.C.F. and Ferreira, R.B. 2014. Observações sobre história natural de <i>Zachaenus carvalhoi</i> Izecksohn, 1983 "1982" (Amphibia: Anura: Cycloramphidae). <i>Boletim do Museu de Biologia Mello Leitão</i>, 34: 63-74. 3. Ferreira, R. B. and Beard, K. H. 2014. Frog assemblies' homogenization across Brazil's Atlantic Forest. <i>Annals of the 99th Congress of the Ecology Society of America</i>. 4. Ferreira, R. B. and Beard, K. H. 2014. Contest to local villagers decide the

			<p>common name of a new frog species. II North American Congress of Conservation Biology.</p> <p>5. Zocca, C. Z.; Lirio, F. C. F. and Ferreira, R. B. Observações sobre história natural de <i>Zachaenus carvalhoi</i>. VI Brazilian Herpetology Congress.</p> <p>6. In press. Lacerda, J.V.A., Ferreira, R.B., Souza, G.A., Silva, H.R., and Feio, R.N. On the diagnosis and conservation of the poorly known bromeligenous <i>Scinax arduus</i> Peixoto, 2002 (Amphibia, Anura, Hylidae). Zootaxa.</p> <p>7. Submitted. Ferreira, R.B.; Lourenço-de-Moraes, R.; Teixeira, R.L. and Beard, K. Frogs associated to bromeliads in a cacao agroecosystem. Salamandra.</p> <p>8. Submitted. Lourenço-de-Moraes, R.; Mendes, C.C.V.M.; Ferreira, R.B.; Zocca, C.Z.; Medeiros, T.; Ruas, D.S.; Rebouças, R.; Toledo, L.F. and Solé, M. Marsupial treefrogs (Hemiphractidae: Gastrotheca) exhibiting escalated defensive behaviors.</p> <p>9. Submitted. Mageski, M.M.; Ferreira, R.B.; Beard, K. H.; Costa, L.C.; Jesus, P.R.; Medeiros, C.C.; and Ferreira, P.D. Bromeliad selection by <i>Phyllodytes luteolus</i> (Anura:Hylidae): the influence of structural complexity and water physic-chemical factors. Journal of Herpetology.</p> <p>10. In preparation. Ferreira, R.B.; Pombal Jr., J.P. and Faivovich, J. Description of the first bromeligenous species of <i>Dendropsophus microcephalus</i> group, mountainous region of southeastern Brazil (Amphibia, Anura, Hylidae). Herpetologica.</p> <p>11. In preparation. Ferreira, R.B. and Beard, K.H. Preference for breeding habitats determine how frogs respond to forest edge in Brazil's Atlantic Forest.</p> <p>12. In preparation. Ferreira, R.B.; Lourenço-de-Moraes, R.; Beard, K.H. and Brodie, E. Defensive behaviors of Atlantic Forest frogs.</p> <p>13. In preparation. Targino, M.; Ferreira,</p>
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				<p>R.B. and Cruz, C.A. A new species of <i>Ischnocnema</i> (Amphibia: Anura: Brachycephalidae) from the mountainous region of Atlantic Forest, Brazil.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

a) I had a lot of difficulties to find sites surrounded by matrix of secondary forest because most of this matrix type has been replaced by *Eucalyptus* plantation. Coffee plantation is also getting rare in the landscape by being replaced by *Eucalyptus* plantation.

b) The administration of Augusto Ruschi Biological Reserve created issues that almost prevented us from sampling inside the reserve. Unfortunately, its staff and director are not educated for their professional role and do not recognise the importance of scientific research. However we communicated intensely with them showing the importance of our project for both improving management practices surrounding the reserve and also for transferring scientific information to the local community. And thus they decided to support our research.

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

1. We organised a month-long contest for the local citizens voting on the common name of a new frog species discovered during the project's sampling. Expositions in a local school, farmers' market, and in the local biological museum showed individuals of the new species to the local people and provided education information about the local amphibian community. In total, 1,357 people voted to choose the common names of this species. This is the first time that this type of environmental educational activity has been conducted in Brazil. It received county (Journal Rio Doce, Santa Noticia), state (TV Gazeta, Gazeta online), and national (Globo Rural, G1 online) media coverage, which contributed to the engagement of local citizens. The species formal description (Lourenço-de-Moraes et al. 2014) includes the chosen common name, "rãzinha-pulga-teresense", which means Teresensis-flea-frog. We believe this was a very successful outreach programme, and that it might work in other places and for other species.
2. We recorded 1022 frog individuals representing 35 species and nine families across the 336 plots (two plots x four distances x 21 sites x two seasons) and another six bromeliad islands surveyed. We found five new species: *Adelophryne glandulata* (Lourenço-de-Moraes et al. 2014), *Ischnocnema* cf. *parva* 1, *Ischnocnema* cf. *parva* 2, *Dendropsophus* sp. new, and *Brachycephalus* sp. new. Most species are forest specialist (86%) and 'Least Concern' (46%) (Table S1). We have been working on the risk assessment of eight species that have not been previously evaluated by IUCN.

3. Frog distribution inside the forest is best explained by their breeding habitat preferences. Dry season intensifies edge effect. The matrix type surrounding the forest does not affect edge effect. Conversion of native forest into any non-natural matrix is extremely detrimental to richness and abundance of frogs. Most species (70%) were not recorded in matrix plots. Richness and abundance were not different across the three matrix types. The richness and abundance of frogs are positively related to the number of bromeliads which means these plants are biological indicator of environmental health. The results of this research will be soon submitted to the Journal of Biological Conservation.

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

First, it is worth mentioning the positive reception we received from local villagers once we presented ourselves as researchers of frogs. Often our introductions resulted in long conversations because local villagers loved to discuss their knowledge on frogs. In this region, it is common to hear several myths involving frogs; for example: a) hand capturing frogs can transmit skin parasites, b) one can get blind if a frog urinates in the person's eyes, c) frogs attract snakes to homeowners' properties, etc. As these opinions are detrimental to the taxon and they are not accurate, I had the opportunity to answer questions regarding these topics.

The local community participated in a contest to decide the common name of a new species we were describing. We organised expositions in a local school, farmers' market, and in the local biological museum showing individuals of the new species to the local people and provided educational information about the local amphibian community. In total, 1,357 people voted to decide the new species common name. The scientific publication (Lourenço-de-Moraes et al. 2014) mentions the common name chosen by the local community.

We gave two talks in Santa Teresa regarding the ecological relationship between bromeliads and frogs. One talk was for the staff of Augusto Ruschi Biological Reserve and another one to the local community. This second talk was organized by a well-known NGO, SOS Mata Atlantica.

We also mentored two local biologists (Mr Cassio Zocca Zandomenico and Ms Fernanda Lirio Ferreira) in methods for conducting field surveys of bromeliad frogs in three forest sites. We believe that this experience will improve local environmental policies because both biologists work for the environment sector of municipal government.

5. Are there any plans to continue this work?

Yes. The new phase of this project will be focused on understanding the effect of landscape features on bromeligenous frogs across the northern portion of Serra do Mar ecoregion in Brazil. We also intend to continue engaging local people in

educational activities as a way to promote biodiversity conservation. This plan will be the Post doctorate research project of Rodrigo B. Ferreira.

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

For the local community, we gave two talks in Santa Teresa regarding the ecological relationship between bromeliads and frogs. One talk was for the staff of Augusto Ruschi Biological Reserve and another one to the local community. This second talk was organized by a well-known NGO, SOS Mata Atlantica. I have been monthly contributing as columnist in a regional newspaper (www.santanoticia.com.br), in which I translate scientific facts into popular language. A compilation of interviews with the local villagers will be published in the regional online scientific journal "Natureza online" as it is the only one accessible to the local community. A complete report containing suggestions on management practices was sent to the local biological reserve. Additionally, I will send this report to the State Agency for Nature Protection hopefully to influence policy makers regarding management practice of reserve surroundings.

Regarding how we share the results with the scientific communities, we have proudly published/submitted/worked on 10 manuscripts (see list above). We gave one talk in a national conference (VI Brazilian Herpetology Congress) and another one in an international conference (26th International Congress for Conservation Biology). Additionally we presented posters in three conferences (VI Brazilian Herpetology Congress, North America Congress of Conservation Biology) (see details above). Additionally, life history information was gathered for numerous data deficient and threatened frog species listed on the IUCN Red List. These findings will be carefully examined in a partnership with Dr Ariadne Angulo, who is responsible for the maintenance and curation of the amphibian database on the IUCN Red List of Threatened Species.

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

This grant was mainly used for the field work conducted during the May-July 2014 and for the contest during December 2013.

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
Clinometer	145	0	0	We used an app in an iPhone 4s instead of buying this equipment.
Hobo devices	810	810	0	

Gas (car)	800	800	0	
Car maintenance	450	450	0	
Field assistants	2851	3296	300	We had to hire another field assistant.
Office supplies	50	50	0	
Booklets	450	150	300	We got a good deal with a local printing company.
Car bumper sticker	96	96	0	
Photographic exposition	130	130	0	
Total	5782	5782		

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

Regarding educational environment approach, we intend to expand these activities throughout the central and southern portion of Espirito Santo state because this region has one of the most remarkable rates of endemic species in Atlantic Forest. Considering the incredible success of these educational activities, we plan to maintain the same strategy. Regarding scientific approach, we plan to continue our research and focus on understanding how frogs respond to different landscape features across the entire northern portion of Serra do Mar ecoregion.

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?

a) The vehicle purchased to be used during the sampling period had stickers fixed on both sides. Two large stickers of RF logo were fixed on the car.

b) 50 t-shirts showing RF logo on the back were distributed to both the field assistants and to members of the local community.

c) 350 folders and stickers containing RF logo were distributed to the local students and villagers to inform them about the project's objectives and possible outcomes as well as the effects of habitat fragmentation on bromeliad frogs.

d) The contest to decide the common name of a new frog species exposed RSGF logo on a banner and through the media to most people of Santa Teresa municipality.

e) RF was acknowledged in the 10 scientific publications.

f) The posters and the oral presentations also showed RF logo.

g) Two regional newspapers (Santa Noticia and Rio Doce) published our educational and scientific outcomes.

h) The Ecology Centre website (<http://www.usu.edu/ecology/>) of Utah State University featured our contest that involved the local people in deciding the

common name of a new frog species. We mentioned the essential support from RSGF.

11. Any other comments?

This project represents a key step in producing scientific knowledge that will change management practices of private properties surrounding biological reserves along Brazilian Atlantic rainforest. This project's outcomes certainly would not be possible without the support of the RF, for which we are extremely grateful.