

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	Are forest-collected bromeliads used by frogs? Integrating field research, citizen science and outreach towards the conservation of bromeliad frogs
RSG reference	25033-B
Reporting period	01 Sep 2018 - 30 Aug 2019
Amount of grant	£9530
Your email address	rodrigoecologia@yahoo.com.br
Date of this report	01 Oct 2019

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
<p>Continuing field survey in the reserves (upland natural habitats) and in the surrounding private properties (agricultured valleys) to determine the diversity of frogs and bromeliads across the landscape</p>				<p>We have successfully surveyed 38 sites for bromeliads and associated frogs in outcrops, forest remnants, and farmer's houses around the reserves. This large scale sampling contributed to: i) elaborating a preliminary list of bromeliads and associated frogs occurring across this mosaic landscape, ii) establishing a long term-monitoring programme of bromeliad frogs, iii) finding another population of the new bromeligenous frog we are describing, iv) finding a likely new species of bromeliad, and v) recording a new population of some frog species threatened to extinction.</p> <p>The fieldwork research contributed to strengthen the value of the local research centre through nine scientific publications, enriching the botanical and zoological collection with specimens, and engaging mentoring and training seven undergraduates of biology and photography, three master students, a master in ecology and a PhD in zoology from different educational institutions. We helped to organise and coordinate the Red List of Amphibians from the Espirito Santo State. Our fieldwork provided natural history and ecological data for species risk assessments. The next phase, we will train a team for canopy sampling to potentially find new species and populations of frogs and bromeliads. Also, continue the long-term monitoring programme.</p>

<p>Developing a citizen science program by training local farmers to monitor bromeliad frog in their gardens across the agricultured valleys</p>			<p>The first phase of this objective was achieved. We have interviewed, trained and distributed the educational kit to 52 local farmers. Since then, they have sent us photos of the bromeliad frogs in their gardens. We plan on expanding this citizen science programme to include more local farmers and communities surrounding the reserves.</p> <p>We had been trained by Dr Emily Kalnicky, a social environment researcher from Minnesota Zoo and University of Minnesota. Dr Kalnicky spent 2 weeks training and participating with us on establishing the citizen science programme in Santa Teresa.</p> <p>These data will be part of the master thesis of Fernanda C. Lirio Ferreira.</p>
<p>Studying selection of bromeliads (empty vs used) by frogs for reproductive purposes</p>			<p>We compiled a global-scale database on bromeliad frogs and used bromeliads. We have conducted sampling to study the selection of bromeliads across the landscape by all species of bromeligenous frogs, including the new species of <i>Crossodactylodes</i> and a recently described one (<i>Fritziaria tonimi</i>).</p> <p>These data will be part of the master thesis of Suzana C. Correia.</p>
<p>Investigating bromeliad collection activity: frequency, number, and targeted bromeliad species</p>			<p>We have interviewed 52 local farmers around the Augusto Ruschi Biological Reserve. We have worked on analysing these data and identifying the bromeliads from farmer's gardens. Next phase, we plan on identifying the bromeliad species at local bromeliad nurseries and understand the bromeliad trade.</p>
<p>Engaging locals by interviewing and discussing about the association of bromeliad and frogs</p>			<p>We have interviewed 52 local farmers around the Augusto Ruschi Biological Reserve. During these interventions, we distributed educational materials and discussed</p>

and the importance of their land for amphibian conservation				the importance of their land for amphibian conservation.
Continuing outreach activities (i.e. Bromeligenous itinerant) through science exposition with water-terrariums of live amphibians, poster presentations, educational games, and presentations at the local communities and primary schools				We have organised seven outreach events to over 1200 kids and adults at the municipalities of Santa Teresa, Vila Velha and Vitória.
Organizing the local edition of the international event "Save the Frogs Day" at the local research center				Over 1000 kids and adults participated in the "Save the Frogs Day" at the National Institute of the Atlantic Forest in the municipality of Santa Teresa. We have displayed water-terrariums of live amphibians, poster presentations, educational games, and presentations. This event is in the 2020 calendar of the local research center.
Organizing an itinerant photographic exposition to be held at farmer's markets, primary schools and the local research center				In January 2019, we opened the itinerant photographic exposition "Living in microcosmos" exhibiting 12 amazing photos of a frog's life inside a bromeliad. Over 15,000 students, tourists and locals visited "Living in Microcosmos" during 3 months at the local research center, 2 months in the Augusto Ruschi Marine Reserve and a week in the Colégio América. Some of the printed photos were taken by the winners of the photo contest we organised through social media. It is important to mention that the photographic exposition is moveable, thus we have several places that want to expose it.
Producing a series of short educational documentaries focused on bromeliads and bromeliad frogs to be				We have made the short video documentary "Cultivator of Hope", showing the life of a retired mechanic that found himself in depression after his wife passed

<p>exhibited in our outreach activities and social media</p>			<p>away and then decided to plant native trees. Seu Hélio has already distributed 18,000 native trees seedlings. We have distributed 2,000 of these seedlings to local farmers in the mountainous region of Atlantic Forest. We have organised the seminar presentation of the social environment researcher Dr Emily Kalnicky from the Minnesota Zoo and University of Minnesota and provided the video on the project's social media (YouTube and Facebook). We have been working on another two short videos regarding the Bromeligenous Project and the reproduction of bromeligenous frogs. We have published 65 posts on Instagram and Facebook focused on bromeliads and associated frogs.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Brazil's federal and states governments have dramatically cut the budget for education, research and environmental conservation. We have been granted U\$7,000 from CNPq but we have not received the grant. Several government grants had not opened for application in 2019. We have worked on another proposal because we currently rely solely on grants from foreigner institutions to continue our research and education programs.

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

- Discovery of: i) another population of the new bromeligenous frog species (Leptodactylidae: *Crossodactylodes* sp. nov.) and sampling of adults, tadpole and eggs for species description; ii) two new species of leaf-litter frogs (*Crossodactylus* sp. nov. and *Ischnocnema* sp. nov.); and iii) a new bromeliad species (*Aechmea* sp. nov.
- Establishment of the citizen science programme by training local farmers to monitor bromeliad frogs in their gardens across the agriculture valleys surrounding the Augusto Ruschi Biological Reserve.
- Organisation of seven outreach activities (i.e. Bromeligenous itinerant and photographic exposition) through display of water-terrariums of live amphibians, poster presentations, educational games, and distribution of educational materials at the local communities, primary schools and the local research centre.

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

The local communities are fully engaged in our educational activities. The farmers and students have participated in the outreach events. The local farmers have happily engaged in our citizen science by photographing bromeliad frogs at their gardens, and even recording the calls. The kids got really happy when they received educational colouring booklets and a kit with many playing items. We donated two computers to a local rural school (Escola Multiseriada Alto Santo Antonio). The local farmers often thank us for visiting them, for giving educational materials and for engaging them on outreach activities.

5. Are there any plans to continue this work?

We thoroughly believe the research and educational components of this successful work should continue to assure long-time behavioural changes in the local community toward environmental protection, discoveries of new populations and species of bromeliads and frogs, gather natural history data for conservation risk assessments, organise educational materials and outreach events, and training of undergraduate and graduate students.

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

The results have been shared through several approaches. For the scientific public, we have presented 10 posters in the Brazilian Congress of Herpetology, helped with ecological data for the conservation assessments of many frog species during the State RedList workshop, and presented nine publications in scientific journals. For the general public, we have published 65 posts on social media (Facebook and Instagram) to share news, research updates and fieldwork findings. For the local communities, we have presented our results through home visits, distribution of educational materials, outreach events, and the local newspaper.

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 Rufford grant was fully used throughout the funded period to accomplish our scientific and educational goals.

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
Gas (vehicle)	1560	1950	+390	We conducted more fieldwork

				than expected
Car maintenance	830	360	-470	The car broke less than expected. It is an old vehicle (Fiat 1.0 Uno Mille 2010) but reliable for fieldwork.
Field assistants (3 people)	1950	1250	-700	I got some students to help on fieldwork. So, we did not need to use everything.
Photos printing	530	340	-190	
Panel for photos	300	260	-40	
Compact photographic camera (10)	500		-500	We implemented the first phase of the citizen science that is capacitating the farmers to take picture with their own cell phone.
Educational banners (3)	80	140	+60	We donated educational banners to the reserves.
Terrarium (5)	320	320		
Portable canopy tent	280	280		
Office supplies	160	160		
Mug (promotional item)	80	560	+480	We decided to include more items in the promotional kit.
Plastic jumping frog (promotional item)	192	192		
Project's t-shirt (30)	450	450		
Stickers (500)	500	500		
Informative booklets (1500 booklets)	840	1500	+660	We made 2000 booklets to distribute to local farmers and students.
Field guide of bromeliad frogs (300 items)	450	425	-25	
Educational short-video documentaries (8 videos)	750	1100	+350	We have made two documentaries and have worked on another three. It is more time and funding consuming than we previously predicted.
TOTALS:	£9772	£13612	£-15	

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

- a) Engage local community leaders on organisation of outreach activities and spreading the word about conservation of bromeliad frogs.
- b) Continue sampling remote locations and start canopy surveys expecting to find new populations and species of bromeliads and frogs.
- c) Organise outreach activities in another two isolated communities.

- d) Expand the citizen science programme by engaging more local farmers and students.
- e) Continue mentoring young students and biologists.
- f) Produce two short video documentaries about natural history of bromeliad frogs.
- g) Organise the 2020 Save the Frogs Day.
- h) Add a taxonomist of Bromeliaceae in our collaborator team.
- i) Promote workshops to capacitate farmers on nurturing bromeliads for yard decoration and replant in the wild.
- j) Conduct a first assessment on the prevalence of the parasitic fungus *Batrachochytrium dendrobatidis* on bromeliad frogs.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did The Rufford Foundation receive any publicity during the course of your work?

Rufford Foundation was exposed to our audience through banners, bumper stickers, booklets for kids, oral and poster presentations, instructive pamphlets, social media posts, and scientific publications. Below, we provide some details of media and publicity:

- a) The project's vehicle (Fiat Uno Mille 1.0 2010) has a large bumper sticker of Rufford logo.
- b) ~350 educational materials (booklets, pamphlets, and folders) distributed to the local students and villagers have Rufford logo.
- c) 65 posts on social media (Facebook and Instagram) mention Rufford hashtag.
- d) 10 posters and 2 talks presented at the Brazilian Congress of Herpetology have Rufford logo.
- e) The project's website (www.bromeligenous.weebly.com) has Rufford logo.
- f) Approximately 15,000 people were exposed to Rufford logo at the itinerant photographic exposition "Living in microcosms" held in three institutions.
- g) Approximately 3,200 people were exposed to a banner with Rufford logo at the eight outreach events.
- h) Nine scientific publications acknowledged Rufford Foundation. Certainly, Rufford Foundation will be acknowledged in forthcoming publications.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Nathalia dos Santos Oliveira, Thiago Ferreira, Isabela Carvalho, Mauricio Milanezzi, Juliana Teixeira Moraes, João Pedro Kloss Degen, Leonardo Navares and Julia Almeida Vargas from Universidade Vila Velha. I have mentored these undergraduates in Biology. They have been working on a global database regarding natural history aspects of bromeliad frogs. They have participated in the fieldworks and outreach activities. They have presented their research findings on the Brazilian Congress of Herpetology. Some of these undergrads plan on conducting master studies under the Bromeligenous Project.

Tarsis Viana, Lucas Silveira, and Guilherme Santos Neto from Universidade Vila Velha. I have mentored these undergraduates in Photography. Tarsis helped to organize the photographic exposition "Living in microcosms", produced the short-video documentary "Cultivator of hopes", and presented the final photographic portfolio about the bromeliad frogs. Lucas produced the short-video documentary "I Pinto Expedition". Recently, Guilherme had been added to the team, and has been trained during our fieldworks.

Dr. Amanda Santiago Lantyer-Silva and Dr. Euvaldo Marciano Junior have studied behavior, taxonomy and ecology of bromeliad frogs across the state of Bahia, northeastern Brazil. They have also organized outreach activities and a photo contest through social media regarding the association between bromeliad and frog.

Rafael Cipriano and Dr. João Victor Lacerda from Instituto Nacional da Mata Atlântica. Rafael is a local biologist interested in identification of bromeliad species. He has been responsible for collecting, identifying and depositing bromeliads in the local research center. João has a PhD in Zoology and is focused on taxonomy. Recently, I selected João to work in the project and receive a two years scholarship from the local research center (Instituto Nacional da Mata Atlântica). Thus, João is the key person to conduct the project's scientific and educational goals. João has lead the description of the new species of frogs and the description of calls and tadpoles of several species. João has been monitoring the bromeliad frogs across the landscape. João is a valuable addition to the project's team.

Cassio Zocca Zandomenico from Universidade Vila Velha. Cassio has worked with me since 2011, when I got the first Rufford support. Cassio finished the master in Ecology and I was his advisor. Cassio is interested on inventoring the assemblages of bromeliad frogs across the landscape. Recently, I selected Cassio to receive a two years scholarship from Instituto Nacional da Mata Atlântica, so he can lives in Santa Teresa and become the key person to conduct the project's scientific and educational goals. Cassio has worked on several scientific publications.

Fernanda C. Lirio, Suzana Carvalho Correia, and Juliana Alves from Universidade Vila Velha. I have mentored these three master students in Ecology. Fernanda has worked with me since 2011, when I got the first Rufford support. She is originally from Santa Teresa and has broad knowledge of the local communities. Fernanda has implemented and monitored the citizen science program. Suzana Carvalho has conducted fieldwork at bromeliad islands, and has worked on the thesis regarding the bromeliad selection by a bromeligenous frog. Juliana has helped on outreach activities and has started her project on bromeliad frogs.

Dr. Emily Kalnicky from Minnesota Zoo and University of Minnesota has trained the master student Fernanda Lirio and has implemented our citizen science program. Dr. Emily is interested in working on these data and getting funds to be the PhD advisor of Fernanda Lirio.

Dr. Cecilia Waichert from Universidade Vila Velha has contributed on identifying the invertebrates found inside bromeliads which may be predator, prey and/or competitor of bromeliad frogs.

Dr. Karen Beard from Utah State University was my PhD advisor working with me on conservation of bromeliad frogs. She is well known on the field of conservation biology and helps on publications.

Dr. João Filipe R. Tonini from Harvard University has been developing research on bromeliad microbiome and leading publications on evolutionary aspects of the association between bromeliads and frogs.

12. Any other comments? This project represents a key step in integrating scientific knowledge and local communities to implement sustainable management practices in private properties surrounding biological reserves at Santa Teresa, a biodiversity hotspot in Brazil's Atlantic forest. This project's outcomes certainly would not have been possible without the generous support of the Rufford Foundation, for which we are extremely grateful. We plan on name a new species of bromeliad frog as "Rufford...".

