

Final Project Evaluation Report

Your Details	
Full Name	Ricardo Koroiva
Project Title	Expanding the assessment of threatened dragonflies in a high biodiversity area of Cerrado: conservation subsidies
Application ID	25133-2
Grant Amount	4,911
Email Address	ricardo.koroiva@gmail.com
Date of this Report	17/Aug/2019

1. 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
Collection of specimens from 20 sites located in the Serra da Canastra and update of the Odonata checklist				We made two sampling campaigns in 20 sites located in the Serra da Canastra (Figure 1). This month (August 2019), we submitted an updated species list of dragonflies from Serra da Canastra National Park (PNSC).
Organization and online publication of the Odonata species list for Serra da Canastra				We built the website (https://www.environmentalsentinel.net/inicio-canastra) and Instagram post (https://www.instagram.com/libelulas_da_serra_da_canastra/). We are waiting the final decision of Biota Neotropica to publish the updated species list on the website.
Identification of sites with endangered dragonfly species (IUCN) in the Serra da Canastra National Park				We identified two sites with new occurrence to <i>F. franciscoi</i> and one site with new occurrence of <i>A. franciscoi</i> (since its description, we performed several searches in the site of holotype sampling, but we did not find any specimens. This is the first record of this species since its description in 2015).
Descriptive taxonomy of odonatan species:				We submitted to Zootaxa a new species of <i>Heteragrion</i> and we are describing another new species, both collected in our sampling campaigns. We also submitted a manuscript with synonymisation of an endemic species from PNSC.
Field guide of endangered dragonfly species of the Serra da Canastra National Park:				In April 2019, we published "Photographic guide to rare and endangered dragonflies – Dragonflies of Serra da Canastra" (the Guide). This material is already available to park employees, the local community and tourists.

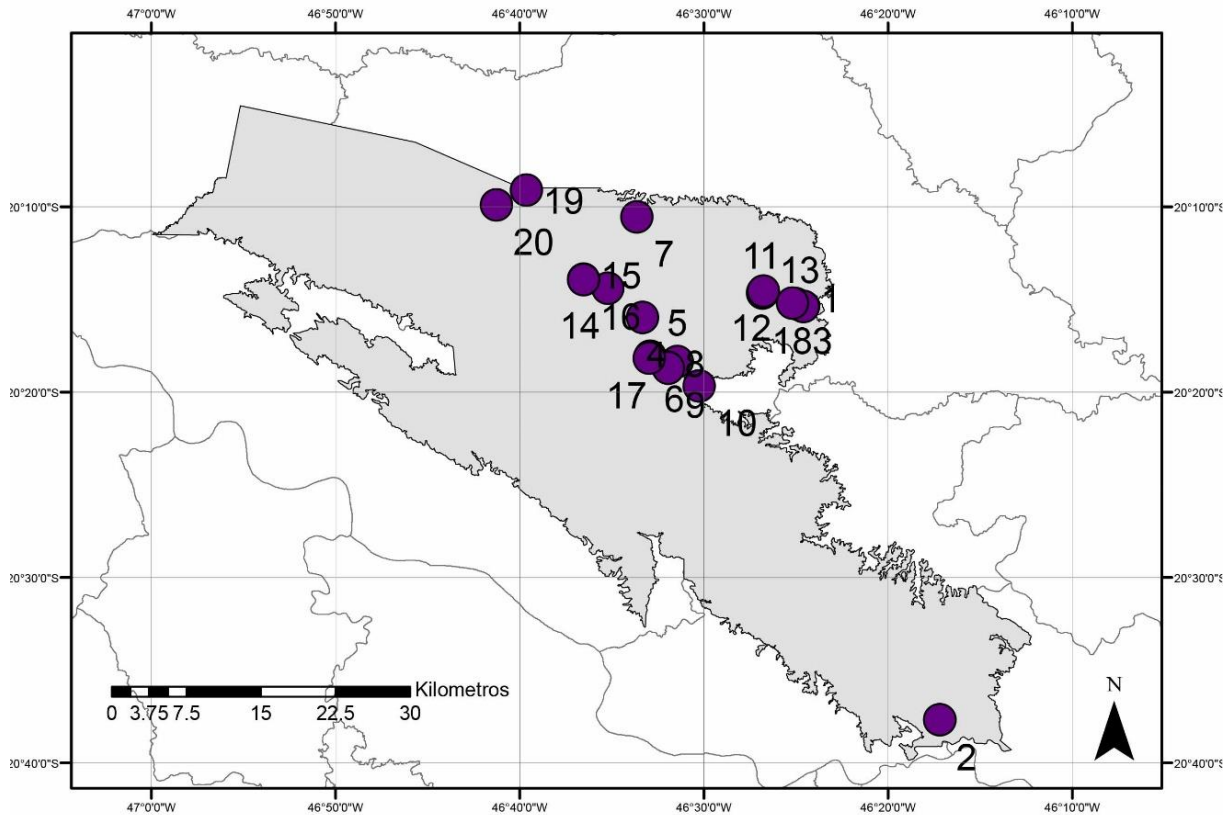


Figure 1. Map of National Park of Serra da Canastra (PNSC) showing our sampling sites (purple circles). This figure is mine. I allow its publication on Rufford's website.

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

The main difficulty during the project was the poor quality of the roads in the national park. As can be seen in the photo below (Figure 2), in many places, the streams cover the road. Another water-related difficulty was mud on the road, which increased the driving risks such as slipping and losing control and added to the car maintenance costs. Even using 4 x 4 cars in both campaigns, we took extra care in driving and therefore we spent more time traveling among sampling sites.



Figure 2. PNSC road conditions (sampling site "Bridge 2"- n°17). This figure is mine. I allow its publication on Rufford's website.

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

I believe that the three most important outcomes of the project were:

- (1) Publication and dissemination of the "Photographic guide to rare and endangered dragonflies - Dragonflies of Serra da Canastra". The publication of this guide had a great repercussion among tourists and the local community. Because of this publication, we were invited to give an interview to the newsletter of the Serra da Canastra National Park. In addition, the subject of threatened dragonfly species is now known to park management who can inform of its importance to all visitors and park staff;
- (2) Publication of new species, synonym and checklist: In this project we recorded at least two new species of dragonflies (one manuscript has already been submitted to *Zootaxa* (Figure 3) and the other species will be in the manuscript to be submitted as soon as possible), and proposed the synonymisation of an endemic species inferred through morphological, physiological and molecular evidences (*PLoS One*). We also updated the species list for Odonata from PNSC, and added this information to the checklist of Odonata from the western region of Minas Gerais state (*Biota Neotropica*);



Figure 3. New species of *Heteragrion* (Odonata: Megapodagrionidae) collected in this project. Its manuscript is under review in *Zootaxa*. This figure is mine. I allow its publication on Rufford's website.

(3) Locating new populations of endangered species within PNSC: We found new populations of *Mnesarete rhopalon* and *Minagrion franciscoi* both will be considered endangered species by IUCN. Fortunately, all of these populations are within the park, but they are also quite close to the state road that runs through the middle of PNSC. We also discovered a new population of *Acanthagrion franciscoi*. We performed several searches at the place where the holotype was collected but we did not have success in finding it. This new population is the first record for this species since its description in 2015.

4. Briefly describe the involvement of local communities and how they have benefited from the project.

Throughout the project, we aimed to highlight to the local community, tourists and park staff about the importance of streams present in the Serra da Canastra for maintaining the regional biodiversity, especially to dragonflies (Figure 4). The distribution of the guide to locals and the disclosure of rare species has made many landowners aware about this issue. In addition, the elaboration of the guide allows greater dissemination of the national park and adds scientific knowledge to the Neotropical region, whose fauna is considered less well known throughout the world. (Von Ellenrieder, 2012).



Figure 4. The presentation of the scientific information the employees of the PNSC (above, our group and Mr. Gaspar and for the local community; below, Mr Joao Batista da Souza and Ricardo Koroiva). These figures are mine. I allow its publication on Rufford's website.

5. Are there any plans to continue this work?

We are still studying some specimens that can be new species. We have also mapped new areas for future sampling campaigns. However, we decided that, considering the road conditions in the region, the new collections will be carried out after the rainy season (after March). Finally, I intend to create a DNA barcode reference library for Odonata species of the Serra da Canastra, similar to what we did in the first Rufford grant (DNA Barcoding of Serra da Bodoquena).

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

Since the beginning of the project, we have planned and made the dissemination of our findings through our website and social media (e.g. Instagram). We have also submitted several manuscripts for publication in scientific journals. Finally, the Odonata guide will be a permanent and widely distributed material for the local

community and tourists of Serra da Canastra. The head of PNSC, Dr. Fernando Tizianel (Figure 5), will help with its distribution.



Figure 5. Fernando Tizianel (head of PNSC), Ricardo Koroiva, Diogo Vilella and Rhainer Guillermo are showing the folder "Photographic guide to rare and endangered dragonflies – Dragonflies of Serra da Canastra". This figure is mine. I allow its publication on Rufford's website.

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

The grant has been used since the first month for the planning and preparation of sampling equipment and, until this last month, for the payment of molecular genetic materials. Prior to this, I had just made a site reconnaissance survey. After the grant, the project was truly established allowing for all collections, disclosures and publications.

8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Field guide (300)	500	154	-346	We found a cheaper place to print.
DNA Sanger molecular sequencing	2000	2000		
DNeasy Blood & Tissue Kit	700	408	-292	
Molecular consumables	200	816	+616	We underestimated consumable costs.
Taq polymerase	210	377	+167	
Entomological nets	120		-120	We decided to use the same Entomological nets of the first project.
Lodging + food	900	306	-599	The head of PNSC kindly provided accommodation within the park during the study.

Fuel	281	821	+540	Fuel consumption was higher than initially expected.
Website		77	+77	I renewed the website domain for 2 years.
TOTAL	4911	4959	+48	

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

Next steps will be: (1) describe and publish the new species; (2) present findings to the media (especially TV) about endangered species and the importance of conservation of streams, especially to dragonflies; (3) continue the environmental research and education project within PNSC; (4) create a DNA barcode reference library for Odonata species of the Serra da Canastra, as performed in the first Rufford grant to Serra da Bodoquena.

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

Yes, I did. The Rufford logo is in our guide (Figure 6) and on our websites, and the Rufford reference is in the text of our interviews (e.g. Newsletter of the Serra da Canastra National Park) and in the acknowledgments of all manuscripts published or submitted.



Figure 6. Front page of the "Photographic guide of rare and endangered dragonflies" from the PNSC. This figure is mine. I allow its publication on Rufford's website.

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

Diogo Silva Vilela: He participated in the field trips and he is the main person responsible for specimen identification. He is a classic taxonomist who assisted in describing the new species and assisted me in publications with molecular genetics.

Rhainer Guillermo-Ferreira: Leader of the research group. Professor Rhainer Guillermo-Ferreira also participated in the collections, and has an important role in reviewing the manuscripts and all scientific material created by our group. He also helped in the identification of certain species.

12. Any other comments?

I would like to thank the Rufford Foundation for research funding, because without this financial aid the whole project would not be viable. I am very happy with the current importance being displayed for the project, especially to the local media. The dissemination and interest of the local community also increases the hope of maintaining the Serra da Canastra biodiversity and its importance of biodiversity conservation. The result of the project, although still in its initial submission, shows that less than 300 km from Belo Horizonte (one of the largest state capitals in Brazil), there are still many species of dragonflies to be described. Information about the natural history of the recorded species is an important scientific contribution, especially for their use in IUCN Red List. On behalf of all the collaborators and dragonflies from Serra da Canastra, I would like to say again thank you very much!