Final Evaluation Report

Grant Recipient Details	
Your name	Mireile Reis dos Santos
Project title	Population structure of Pithecopus ayeaye (Lutz, 1966 - Anura -Phyllomedusidae) in the Morro do Ferro region - Poços de Caldas Plateau / MG
RSG reference	32714-2
Date of this report	October, 24th 2024

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
Search for *Pithecopus ayeaye* population in remaining Campos Naturais de Altitude (Highland fields) on the Poços de Caldas Plateau			x	All the Plateau Poços de Caldas have 59,574.66 hectares. The potential lands to the occurrence of specie were mapped in the laboratory through high definition satellite images in geoprocessing software and, after that with Unmanned Aerial Vehicle - UAV in fieldwork. These lands that effectively were highland fields were checked in loco and covered by researchers. On the whole, there were 98 highland fields identified, but only 86 were sampled by researchers. These 98 highlands add up to 2,824.04 hectares which make 5% of the plateau region, including urbanization regions. The owners of the eleven (11) sampled areas didn't allow our research. Of the 86 areas sampled, *P.ayeaye* was present in 25 ones, including urbanized regions that are inserted in territorial conflict zones. Of these 25 areas where the species occurred in the Plateau, 2 (27.07 ha) are located in Andradas county,

				06 (30.71 ha) in Caldas county and 17 (384.75 ha) in Poços de Caldas county. ****see map of occurrence areas in supplementary material**
Analyze the population structure of *P.ayeaye* in the lands of occurrence, found in 2019-2020		x		The biggest recorded population of *P. ayeaye* is in the "type locality" (local where the specie was found for the first time) of the species (Morro do Ferro). However, during the project execution, the home caretaker person and owner made it impossible for us to enter the farm and access the species' reproduction area. Some vandals stole the lighting system on the farm and the owner (who does not live on the farm) decided to prevent us from entering the study area. As a result, we ran less fieldwork than planned at this location. However in the 2022-2023 wet season we got entry and measured some specimens, besides the exploited new areas of Campos de Altitude. ****See table and graphical about occurrences in supplementary material**

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

Contact with landowners often constitutes a difficulty/barrier for research. Some people do not want us to access your land and feel "threatened" by our presence and scientific research. Maybe they think that we can somehow take away their title law of the land or harm them.

Another difficulty was to realize the presence of the specie in areas considered by the local government itself as an "urban expansion zone" according to the Municipal Master Plan (Plano Diretor Municipal), that is, an area destined for the growth of urban infrastructure.

In general, this document ("Municipal Master Plan") constitutes a Brazilian legal instrument that guides the planning and growth of cities. According to current legislation, it should be built on a multi-criteria data basis, considering social, economic, and environmental/scientific aspects.

Unfortunately, this is not the way in Brazil and, most of the time political interests overlap the socio-environmental interests. In order to solve this problem and try to protect the remnants of Campo de Altitude (Highland field) from real estate speculation, we protocoled in the municipal government a document informing the occurrence of the species and the legal aspects related to their elimination, in the case of removal of the highland field (APPENDIX 1). If this happens it's possible that the government be accused of disaccord of federal law (lei 9605/1968 about environmental crimes).

After that, we were invited to a meeting with the municipal environment department to present the species occurrence data (Photo 01).

Photo 01 – Meeting with the county government about *Pithecopus ayeaye* **occurrence in urbanization zone**

We also made contact a county councilman in order to change the municipal legislation, inserting these occurrence areas of *Pithecopus ayeaye* in the municipally law as wildlife protection areas. There was a public hearing (Photo 02), but unfortunately we did not obtain very positive results, because the species' areas continued as a potential area for "urban expansion" according to municipally document.

Photo 02 – Public hearing held to deal with changes in the municipal master plan

We also contacted the Minas Gerais State Secretariat for the Environment (a higher level than the municipal one) to inform them about the species' areas that occur. We asked that the polygon shapes (geographical limits) of the species' areas occurrence be included in the state database and considered as wildlife protection zones, in the environmental licensing processes of infrastructural projects (APPENDIX 02). We had positive signaling from this governmental agency, but so far, we have not obtained any significant and practical change resulting from this action.

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

We believe that the most important result of this project step was the record of the expansion of the species' area of occurrence to 25 new locations in the Poços de Caldas Plateau, expanding its regional geographic distribution. This result could support the creation of mosaic-protected areas.

With the new records expansion of the areas of occurrence *Pithecopus ayeaye*, in the next breeding season we will be able to analyze the ecological structure of these populations as well, to verify which plateau'

populations Poços de Caldas is better established and which one is possibly more vulnerable.

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

The species' breeding season is relatively short, starting in September, reaching a peak in December, and ending in March/April every year. In this way, we focused our efforts in this period (September 2021 to date) on locating potential areas, contacting the owners, and validating the presence or absence of the species in the highland fields' remaining. At the same time, whenever possible, we talked to the owners about the species' importance for the ecosystem and aspects of its biology. We also available the graphic material produced about *P.ayeaye* in stage 01 of this project (2019 to 2020) and distributed it as a way of informing and raising awareness of the owner. From now on, we will contact those landowners who do not have an environmental record of their areas in the Rural Registry System (Sistema de Cadastro Rural - SICAR) and offer them this service free of charge. This is an attempt to legalize their "Legal Reserves" according to Brazilian legislation recommends and thus protect the areas where the species occurs.

5. Are there any plans to continue this work?

For the next step of this project, we intend to analyze the ecological structure of the populations recorded in some of the 25 areas of occurrence. At the same time, we intend to offer the (free) service of regularization and protection of these remaining highlands for the owners of the farms where *Pithecopus ayeaye* occurs.

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

The dataset from this project has already been shared on the institution's social media and the Biodiversity Laboratory, whenever possible. We also promoted a virtual meeting during the week of "Sustainable Turnover" (Giro Sustentável) talks to the population about the importance of Campos de Altitude and their conservation for the maintenance of the *P.ayeaye* species (Photo 3). Giro sustentável is a great regional event with a wide social reach.

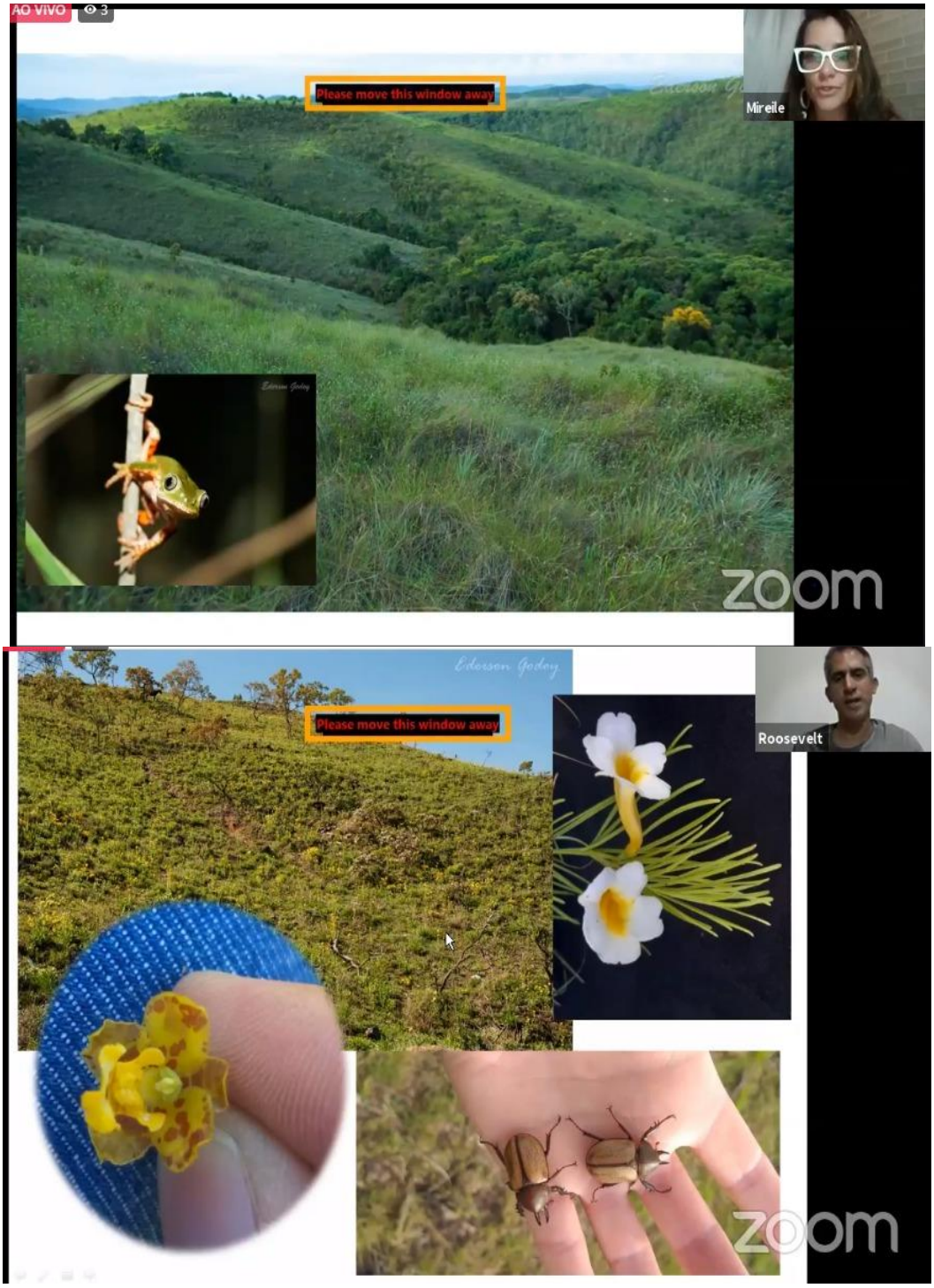
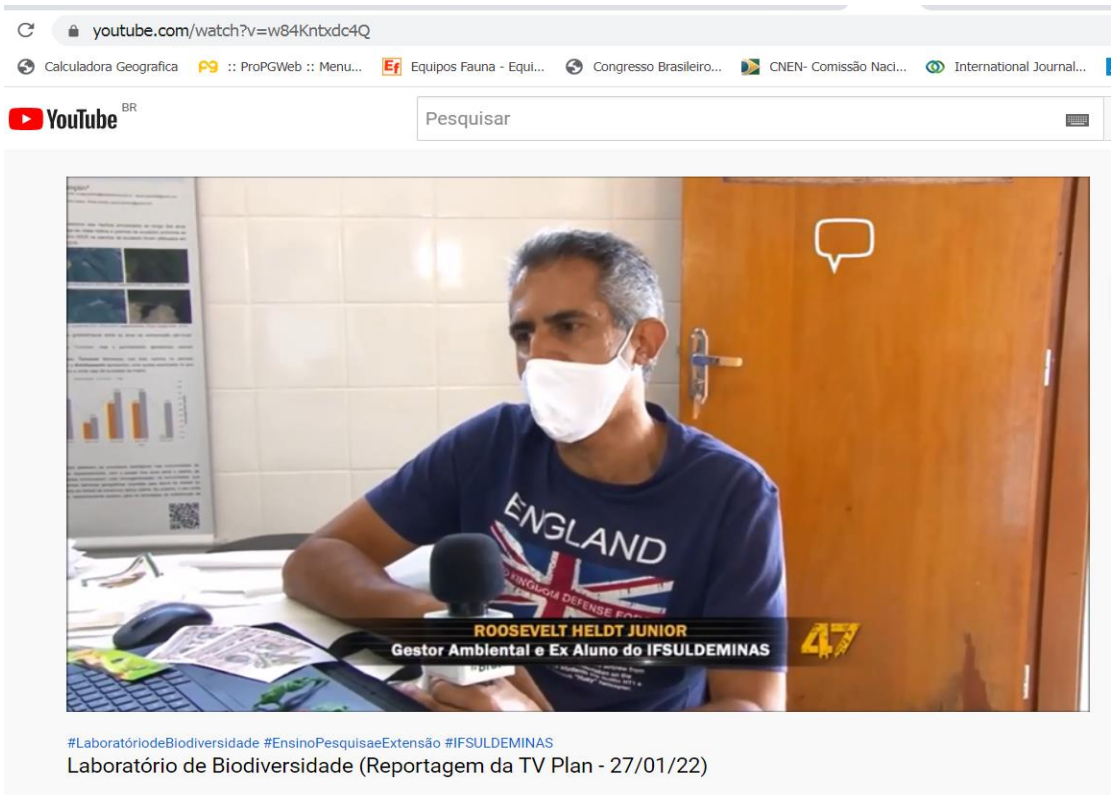
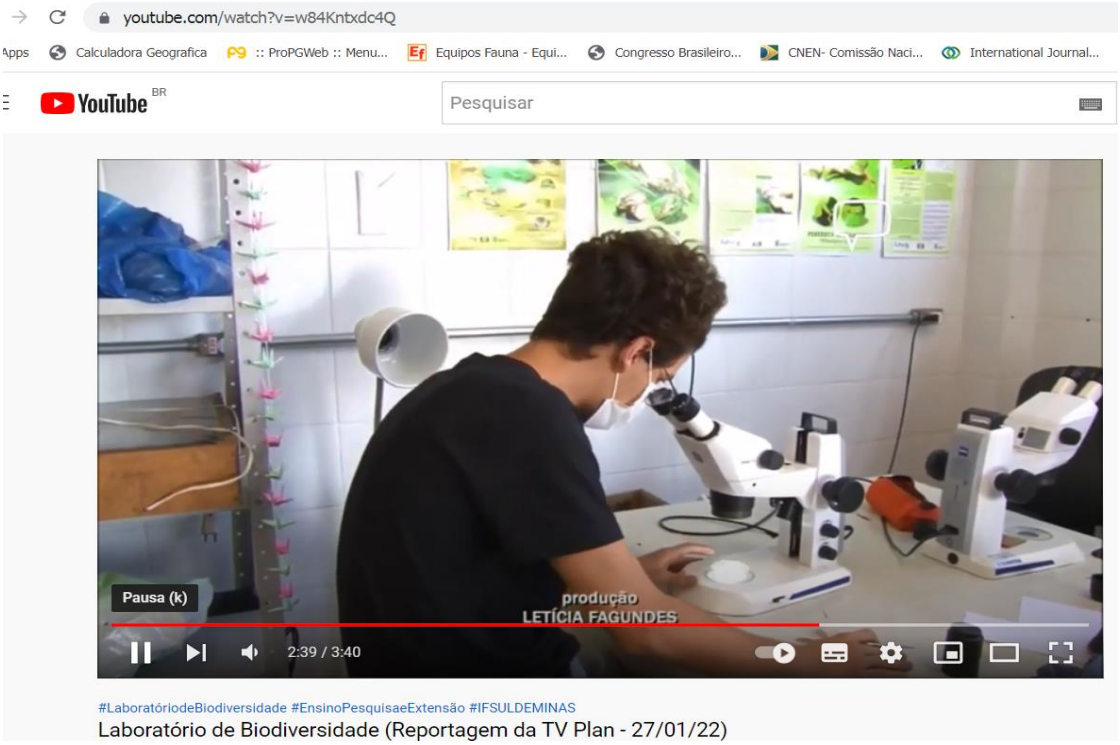


Photo 03 – Virtual meeting during the week of "Sustainable Turnover" (Giro Sustentável to inform the population about the importance of Campos de Altitude and *P.ayeaye* species (Photo 3).

To publicize our research results, we gave an interview on local television, in which we showed the project and talked about the importance of conserving the species. (https://www.youtube.com/watch?v=w84Kntxdc4Q) (Photo 04)

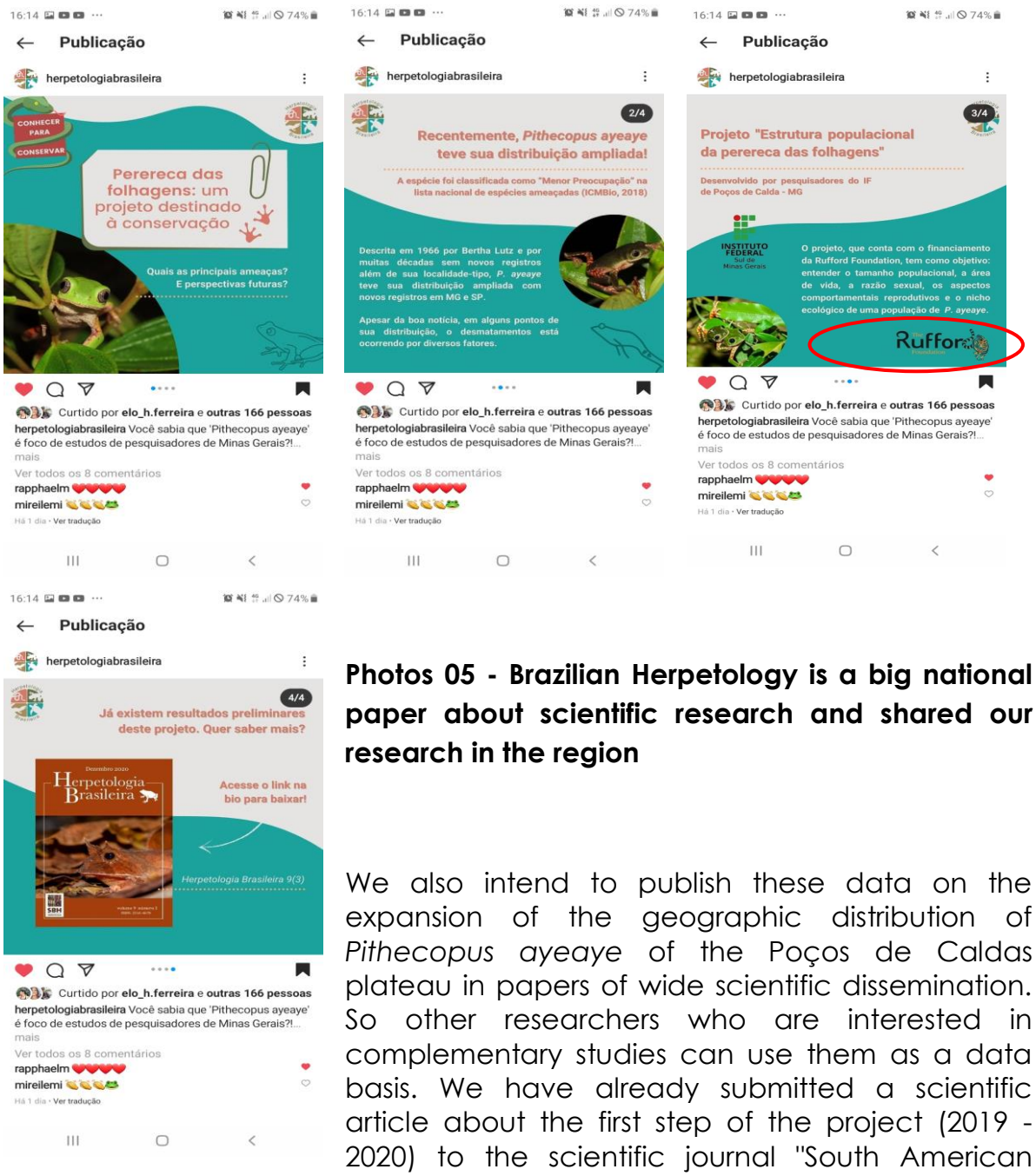




Photos 04 - Interview on local television to inform the population about the importance of species and their conservancy.

Currently, the COVID-19 pandemic is more controlled in our County. In this way, we are planning a face-to-face seminar/forum for May/Jun 2022 in which we will invite landowners for a conversation and presentation of the project results so far. Our goal for this action is to present the results of the research and propose the regulation of farms in SICAR with the suggestion of implementation of Conservation Units in these areas. Afterward, we will invite the local community, through some of their representatives.

Our network and social media partners are also always helping us to spread the research and its results, besides the partners that support our research, including the **Rufford Foundation** (Photos 05).



Photos 05 - Brazilian Herpetology is a big national paper about scientific research and shared our research in the region

We also intend to publish these data on the expansion of the geographic distribution of *Pithecopus ayeaye* of the Poços de Caldas plateau in papers of wide scientific dissemination. So other researchers who are interested in complementary studies can use them as a data basis. We have already submitted a scientific article about the first step of the project (2019 - 2020) to the scientific journal "South American Journal of Herpetology" and we are still awaiting approbation (Appendix 03). We publicized to a paper scientific about the risk of the allotment expansion on the Campos de altitude remains.

https://sites.google.com/view/revista-regnellea-scientia/edi%C3%A7%C3%A3o-atual

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 financial resource for purchasing the requested products and equipment was used immediately upon receipt. The daily rates and expenses of food and fieldwork were used as far as fieldwork was occurring.

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.

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

In 2023 I transferred institutions and therefore ended the project. At the moment, we are data analysis phase and writing a scientific paper to publish the results. We believe that after the published results, other researchers will be able to continue their research with the species. Furthermore, IFSULDEMINAS (my past worked institution) it is a university with a Biology graduate and the botany´s research assumed other mapping and conservation projects about Campos de Altitude, already increasing scientific results in these areas.

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?

In the entire project's publicity media as well as the scientific papers, we insert The Rufford's logo or make acknowledgments, giving the due credits. Besides that, in the entire research concomitant in which we use some equipment acquired from Rufford's grant, we highlight this support (Photos 06).


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Publicação
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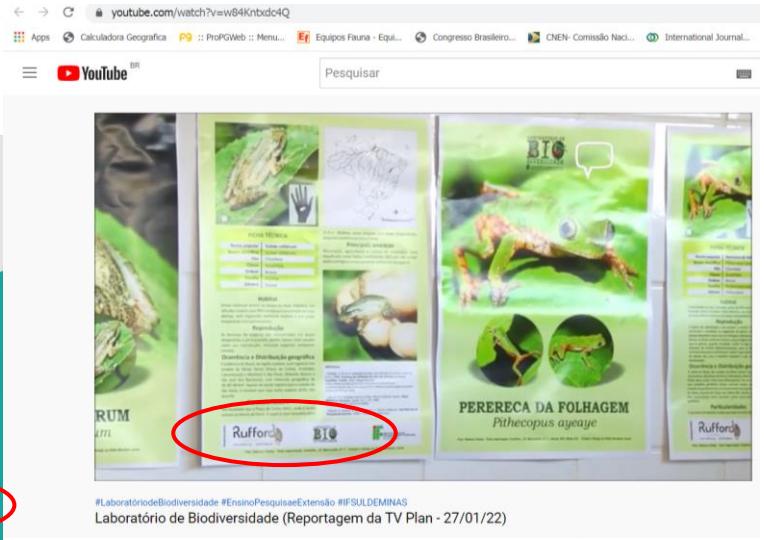
Projeto "Estrutura populacional da perereca das folhagens"
Desenvolvido por pesquisadores do IF de Poços de Calda - MG
INSTITUTO FEDERAL
Sul de Minas Gerais
O projeto, que conta com o financiamento da Rufford Foundation, tem como objetivo: entender o tamanho populacional, a área de vida, a razão sexual, os aspectos comportamentais reprodutivos e o nicho ecológico de uma população de P. ayeaye.
Curtido por elo_h.ferreira e outras 166 pessoas
herpetologiabrasileira Você sabia que 'Pithecopus ayeaye' é foco de estudos de pesquisadores de Minas Gerais?!... mais
Ver todos os 8 comentários
rapphaelm
mireilemi
Há 1 dia · Ver tradução


youtube.com/watch?v=w84Knbxdc4Q
YouTube
Pesquisar
PERERECA DA FOLHAGEM
Pithecopus ayeaye
#LaboratóriodeBiodiversidade #EnsinoPesquisaeExtensão #IFSULDEMINAS
Laboratório de Biodiversidade (Reportagem da TV Plan - 27/01/22)

- **Scientific paper submitted to Herpetologia Brasileira**

Herpetologia Brasileira vol. 9 nº. 3 - Notícias de Conservação

PITHECOPUS AYEAYE LUTZ, 1966 EM SUA LOCALIDADE TIPO – UM PROJETO PARA ENTENDER AS PRINCIPAIS AMEAÇAS E PERSPECTIVAS FUTURAS PARA CONSERVAÇÃO

Bárbara Caroline Marcondes[1], Daniel Silvares1, Iberê Farina Machado[2], Ederson Godoy1, Roosevelt Heldt Junior[1], José Eduardo Coutinho[1], Paulo Augusto Pamplin[1], Mireile Reis dos Santos[1*].

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A principal causa de declínio dos anfíbios no mundo é a fragmentação de ambientes e consequente perda de habitat naturais (Ferrante *et al*., 2017). estudo sobre a espécie *Pithecopus ayeaye* Lutz, 1966, até pouco tempo considerada endêmica do Planalto de Poços de Caldas, Estado de Minas Gerais (localidade-tipo)

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(Candido, 2013; Oliveira, 2017). Esta característica possibilita o uso de metodologias menos invasivas, como identificação individual por fotografia dos animais em campo. Dessa forma, todos os animais encontrados em cada dia de campo, terão os flancos direitos fotografados de modo que os seus padrões de manchas e coloração sejam registrados. Após isto, as imagens serão processadas no software Wild-ID, o qual comparará as imagens para identificação de novos indivíduos adicionados a cada amostragem. Assim, teremos uma estimativa acurada do tamanho populacional através da metodologia de Pertesen que inclui captura-marcação-recaptura (Krebs, 1989; Ricklef, 2016).

Adicionalmente, uma iniciativa de Ciência Cidadã será realizada, na qual uma ampla divulgação da espécie será feita junto aos moradores de Poços de Caldas. A proposta é conseguir identificar novas populações

endemismo para a fauna de anuros quando comparada a outras regiões de altitude na Mata Atlântica (Giovanelli et al., 2008), contando com outras espécies endêmicas do Planalto, como *Scinax caldarum* (Lutz 1968) e *Bokermannohyla vulcaniae* (Vasconcelos & Giaretta, 2005), também encontradas no Morro do Ferro, e que serão alvo da segunda etapa desse projeto.

Agradecimentos

A pesquisa foi financiada por Rufford Foundation, pelo Instituto Federal do Sul de Minas Gerais - IFSULDEMINAS - Campus Poços de Caldas e obteve apoio técnico (equipamento) da Universidade Federal de Alfenas.

Referências

Araújo C.O., Condez T.H., Haddad C.F.B. 2007. Amphibia, Anura, *Phyllomedusa*

- **Scientific paper submitted to South American Journal of Herpetology**

FRAGMENTATION AND REPLACEMENT OF NATURAL MATRICES AND THEIR IMPACT ON ANURAN DIVERSITY IN A HIGH ALTITUDE OF THE ATLANTIC FOREST

Bárbara Caroline Marcondes[1,2*], Mireile Reis dos Santos[1], Roosevelt Heldt Junior[1], Daniel Silvares de Mattos[1], José Eduardo Coutinho[1], Ederson José Godoy[1], Iberê Farina Machado[3].

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Abstract

The loss of amphibian diversity around the world it's mainly caused due to the fragmentation of natural environments. These changes affect the structure of communities, isolate populations and play

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The current anthropic activities directly influence the richness of the community and, even when the richness is stable, there is a loss in phylogenetic diversity, directly impacting the ecological functionality and evolutionary history of biological groups. Therefore, we indicate an emergency better land-use planning in the region, as well as urgent protective measures for the native remnants. In addition, we recommend the ecological and natural history studies of the two endemic species (*Bokermannohyla vulcaniae* and *Proceratophrys palustris*), in order to be able to get conservation measures, if necessary.

ACKNOWLEDGMENTS

The author's thanks the Rufford Foundation, IFSULDEMINAS - campus Poços de Caldas and also thank IBAMA/ICMBio/SISBIO for license nº 74238.

REFERENCES

- **Scientific paper submitted to Studies on Neotropical Fauna and Environment in which we used Unmanned Aerial Vehicle - UAV**

1 **Loss of Dragonfly (Odonata) diversity in Campos de Altitude regions and**
2 **associated ecosystems in the Poços de Caldas Plateau, southeastern Brazil.**
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4 Mireile Reis dos Santos[1], Roger Tallison Monteiro[2], Roosevelt Heldt Junior[3], Diogo Silva
5 Vilela[4], Marcos Magalhães de Souza[5]
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9 37713-100, Brazil. mireile.santos@ifsuldeminas.edu.br
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414
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419 identification; Laboratory of Aquatic Biology, Department of Biological Sciences, Faculty of
420 Sciences and Letters of Assis, Universidade Estadual and. DSV thanks Fundação de Amparo à
421 Pesquisa do Estado de São Paulo (FAPESP) for a postdoctoral fellowship grant (Proc.
422 2019/26438-9).

Photos 06 - Disclosure of Rufford's logo on the social media and scientific paper.

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

Dr. Iberê Farina Machado and Rodrigo Augusto Matavelli: support in taxonomic identification

Daniel Rubens Silvares de Matos, José Eduardo Coutinho, Bárbara Marcondes, Raphael Moraes de Oliveira, Felipe Kaik Scatola Vianello da Silva: participation in fieldwork up to December/2021. Analysis of data from the previous campaign (2019 – 2020).

Ederson José de Godoy and Eloiza Helena Ferreia – participation in fieldwork and photography of species. Analysis of data from the previous campaign (2019 – 2020).

Roosevelt Heldt Junior - Technologist in Environmental Management. Coordinator of technologies (maps, files for 3D printer, augmented reality, etc.) and participation in fieldwork. Analysis of data from all the campaigns of the project (2019, 2020, 2021 and 2022).

Elidio Monteiro Junior - Technologist in Environmental Management and graduating in Biological Sciences. Responsible for digital media (website, data sheets and news) and graphic designer of the project.

Paulo Augusto Zaitune Pamplin – equipment loan technical support.

12. Any other comments?
None

APPENDIX 01 - REPORT TO THE COUNTY HALL OF THE OCCURRENCE OF THE SPECIES IN ZONES OF URBAN EXPANSION

APPENDIX 02 – E-MAIL TO MINAS GERAIS STATE (Superintendência Regional de Meio Ambiente - SUPRAM) ABOUT THE NEW AREAS OF OCCURRENCE OF THE *Pithecopus ayeaye*

APPENDIX 03 - SUBMISSION OF SCIENTIFIC PAPER TO SOUTH AMERICAN JOURNAL OF HERPETOLOGY

APPENDIX 04 – PHOTOGRAPHY MEMORIAL

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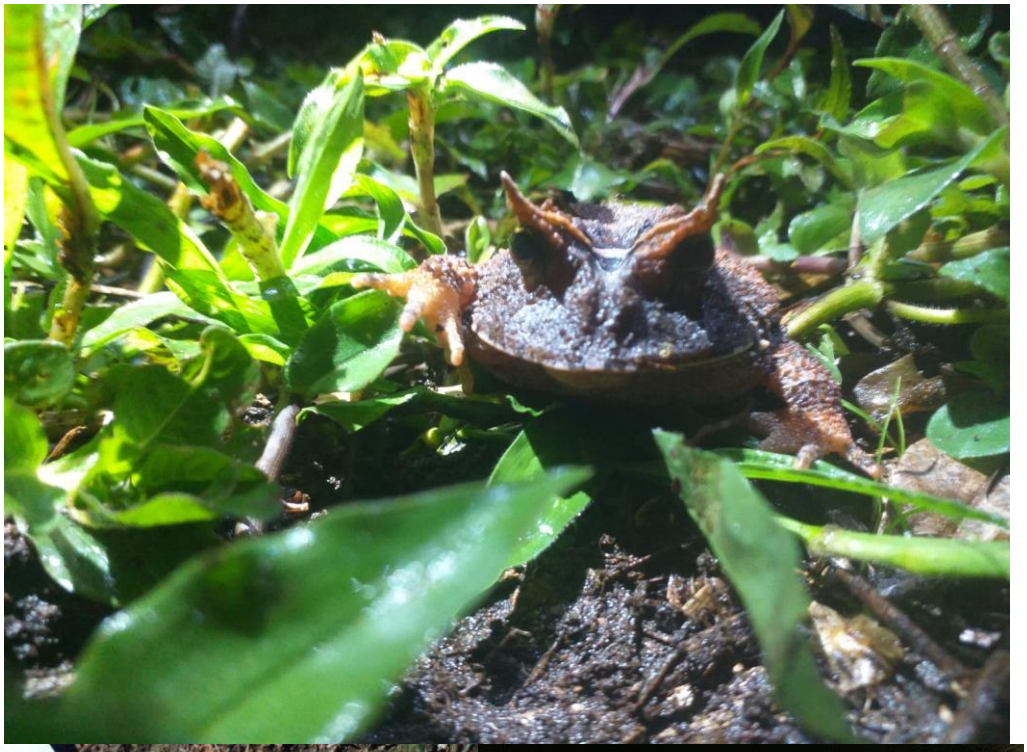


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DATASET TABLES AND GRAPHICAL

Table 01 - All event of sampling of 2020 to 2022 per area

Year	County	Area Code	Month	Map quadrant	*P. ayeaye* Absence	Tadpole	Tadpole with legs	Froglet	Adult Frog
		A10	Dec	8	Ø	-	-	-	-
		A11	Dec	14	Ø	-	-	-	-
		A12	Dec	14	Ø	-	-	-	-
		A13	Dec	14	Ø	-	-	-	-
		A14	Dec	14	Ø	-	-	-	-
		A15	Dec	14	Ø	-	-	-	-
		A16	Dec	14	Ø	-	-	-	-
		A17	Dec	15	Ø	-	-	-	-
		A2	Sep	16	Ø	-	-	-	-
2020	Poços de Caldas	A3	Sep	16	Ø	-	-	-	-
		A5	Nov	8	Ø	-	-	-	-
		A6	Nov	8	Ø	-	-	-	-
		A7	Dec	7	Ø	-	-	-	-
		A1	Nov	16		-	-	1	4
		A1	Oct	16		-	-	1	52
		A1	Sep	16		-	-	-	21
		A2	Oct	16		1	-	-	-
		A4	Nov	16		-	-	-	1

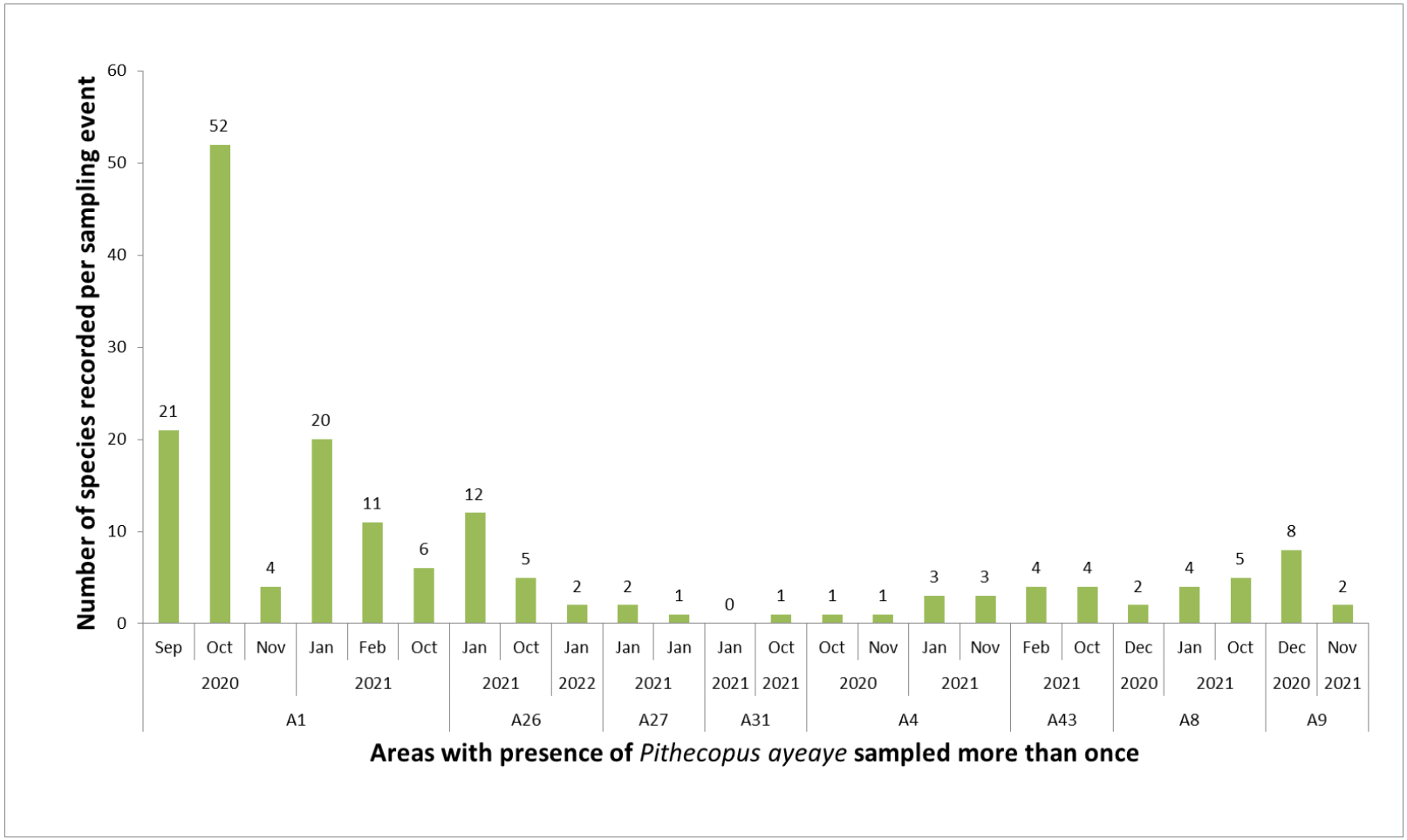
		A4	Oct	16		-	-	-	1
		A8	Dec	8		-	-	-	2
		A9	Dec	8		-	-	-	8
		A17	Feb	15	Ø	-	-	-	-
		A18	Jan	7	Ø	-	-	-	-
		A19	Jan	7	Ø	-	-	-	-
		A20	Jan	7	Ø	-	-	-	-
		A21	Jan	8	Ø	-	-	-	-
		A22	Jan	8	Ø	-	-	-	-
		A24	Jan	13	Ø	-	-	-	-
		A25	Jan	13	Ø	-	-	-	-
		A28	Jan	14	Ø	-	-	-	-
2021	Poços de Caldas	A28	Oct	14	Ø	-	-	-	-
		A29	Jan	14	Ø	-	-	-	-
		A32	Jan	16	Ø	-	-	-	-
		A33	Feb	16	Ø	-	-	-	-
		A33	Jan	16	Ø	-	-	-	-
		A34	Feb	7	Ø	-	-	-	-
		A35	Feb	8	Ø	-	-	-	-
		A36	Feb	9	Ø	-	-	-	-
		A37	Feb	9	Ø	-	-	-	-
		A38	Feb	10	Ø	-	-	-	-

	A39	Feb	10	Ø	-	-	-	-
	A40	Feb	13	Ø	-	-	-	-
	A41	Feb	15	Ø	-	-	-	-
	A42	Feb	15	Ø	-	-	-	-
	A44	Feb	20	Ø	-	-	-	-
	A45	Feb	20	Ø	-	-	-	-
	A46	Feb	21	Ø	-	-	-	-
	A47	Feb	22	Ø	-	-	-	-
Caldas	A48	Feb	22	Ø	-	-	-	-
	A49	Feb	22	Ø	-	-	-	-
	A52	Oct	11	Ø	-	-	-	-
	A53	Oct	11	Ø	-	-	-	-
	A54	Oct	13	Ø	-	-	-	-
	A55	Oct	13	Ø	-	-	-	-
Poços de Caldas								
	A56	Oct	13	Ø	-	-	-	-
	A57	Oct	18	Ø	-	-	-	-
	A58	Oct	24	Ø	-	-	-	-
	A59	Oct	24	Ø	-	-	-	-
Caldas	A62	Oct	28	Ø	-	-	-	-
Poços de Caldas	A65	Oct	28	Ø	-	-	-	-
	A69	Nov	21	Ø	-	-	-	-
	A70	Nov	21	Ø	-	-	-	-
Caldas	A71	Nov	21	Ø	-	-	-	-
	A72	Nov	28	Ø	-	-	-	-
	A73	Nov	29	Ø	-	-	-	-
Poços de Caldas	A1	Feb	16		-	-	-	11

	A1	Jan	16	-	-	-	20
	A1	Oct	16	-	-	-	6
	A14	Oct	14	-	-	-	4
	A23	Jan	8	1	-	-	-
	A26	Jan	13	-	-	-	12
	A26	Oct	13	-	-	-	5
	A27	Jan	13	-	-	-	2
	A27	Jan	13	-	-	-	1
	A30	Jan	16	-	1	-	-
	A31	Jan	16	1	-	-	-
	A31	Oct	16	-	-	-	1
	A4	Jan	16	-	1	-	3
	A4	Nov	16	-	-	-	3
	A43	Feb	16	-	-	-	4
	A43	Oct	16	-	-	-	4
Caldas	A50	Feb	28	-	-	-	1
Andradas	A51	Oct	11	-	-	-	1
Caldas	A60	Oct	28	-	-	-	2
	A61	Oct	28	-	-	-	1
	A63	Oct	28	-	-	-	1
	A64	Oct	28	-	-	-	1
Poços de Caldas	A66	Nov	8	-	-	-	1
	A67	Nov	11	-	-	-	2
	A68	Nov	11	1	-	-	-

		A8	Jan	8		-	1	-	4
		A8	Oct	8		-	-	-	5
		A9	Nov	8		-	-	-	2
2022	Poços de Caldas	A74	Jan	8	Ø	-	-	-	-
		A75	Jan	10	Ø	-	-	-	-
		A76	Jan	10	Ø	-	-	-	-
		A78	Jan	11	Ø	-	-	-	-
		A79	Jan	14	Ø	-	-	-	-
		A80	Jan	17	Ø	-	-	-	-
	Andradas	A81	Jan	18	Ø	-	-	-	-
		A82	Jan	18	Ø	-	-	-	-
		A83	Jan	21	Ø	-	-	-	-
		A84	Jan	27	Ø	-	-	-	-
		A85	Jan	27	Ø	-	-	-	-
		A86	Jan	27	Ø	-	-	-	-
		A87	Jan	27	Ø	-	-	-	-
	Caldas	A88	Jan	27	Ø	-	-	-	-
		A89	Jan	30	Ø	-	-	-	-
		A91	Feb	23	Ø	-	-	-	-
		A93	Feb	28	Ø	-	-	-	-
		A94	Feb	28	Ø	-	-	-	-
		A96	Feb	28	Ø	-	-	-	-
		A97	Mar	29	Ø	-	-	-	-
	Poços de Caldas	A26	Jan	8		-	-	-	2
	Andradas	A77	Jan	11		-	-	-	1
	Poços de Caldas	A90	Feb	10		1	-	-	-
		A92	Feb	28		-	-	1	-
	Caldas	A95	Feb	28		-	1	-	-
		A98	Mar	29		1	-	-	-

Graphical 01 – Number of specimens per sample event in the same area

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