

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	Chaim José Lasmar
Project title	Environmental Factors and Community Structuring Mechanisms upon Ant Community in Distinct Brazilian Biomes
RSG reference	21757-1
Reporting period	29/03/2017 – 12/03/2018
Amount of grant	£5,000
Your email address	[removed]
Date of this report	26/11/2025

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
Fieldwork campaign in the six Brazilian biomes.			Yes	<p>Our fieldwork campaign started in April/2017 in Pantanal biome and finished in March/2018 in Atlantic rainforest biome.</p> <p>We established 10 transects in each biome, totalling 60 transects across the entire experiment. In each transect, we set five sampling points, and at each point we sampled ants across three habitat strata (subterranean, epigaeic, and arboreal) using pitfall traps, resulting in a total of 900 pitfall trap samples. In addition, we sampled ants using five liquid resources across the same three habitat strata at 75 sampling points per transect, totalling 4,500 samples across the whole study.</p>
Presentations in schools		Yes		<p>We carried out our presentations in schools in four of the six biomes. Unfortunately, in the Amazon and Caatinga biomes it was not possible to give the talks in schools due to the holiday period. Our fieldwork had to be conducted during the rainy season, which overlaps with school holidays in Brazil.</p>
Results of our research		Yes		<p>All samples were done successfully in all six Brazilian biomes, including the full sampling design originally proposed with no reduction in</p>

			<p>transects or sampling points. Midway through my PhD, I carried out a research internship at the University of Liverpool under the supervision of Professor Catherine Lucy Parr, which refined the project's focus and analytical approaches. Nevertheless, we were able to verify that ant biodiversity, foraging activity and nutrient-use patterns across the Amazon, Atlantic Forest, Caatinga, Cerrado, Pampa and Pantanal are strongly structured by large-scale ecological drivers, with precipitation and climatic stability emerging as the strongest predictors of species richness and niche differentiation. We found that foraging activity increases in wetter, more productive and less thermally seasonal regions, and that climate shapes nutrient preferences, with higher temperatures promoting amino acid and sodium use, while drier and less productive areas increase sugar use. We also detected strong consistent nutrient limitations across habitat strata, including sugar limitation in the canopy and lipid limitation on the ground, together with clear trophic-level differences that reveal robust local-scale niche partitioning across biomes. Complementing these scientific results, we also carried out an extensive outreach initiative across our sampling regions, engaging approximately 750 students and teachers in public schools surrounding protected areas, where we presented ant biology, ecosystem functions and the importance of biodiversity conservation in accessible language, as reported in our experiential account. These</p>
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			<p>activities helped demystify negative perceptions about ants, fostered environmental awareness and strengthened the connection between scientific research and local communities. Altogether, our findings show that ant ecological niches are strongly climate-dependent and evolutionarily conserved, while our outreach efforts promoted public understanding of biodiversity, and together these outcomes provide important contributions to conservation planning in Brazil by highlighting the ecological sensitivity of ant assemblages to environmental change and the need to involve local communities in protecting their biomes.</p>
<p>Publications derived from the project</p>		<p>Yes</p>	<p>Three publications were produced from the project, all acknowledging the support of the Rufford Foundation, and another manuscript is still being prepared, as the large amount of collected data has not yet been fully analysed. The completed publications are: (1) Geographical variation in ant foraging activity and resource use is driven by climate and net primary productivity (DOI: 10.1111/jbi.14089); (2) Testing the context dependence of ant nutrient preference across habitat strata and trophic levels in Neotropical biomes (DOI: 10.1002/ecy.3975); and (3) A Quick Break from Fieldwork to Talk About Brazilian Ants – An Experiential Account (https://doi.org/10.37885/250920266).</p>

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

One of the main unforeseen difficulties during the project was conducting field sampling in very remote areas, where access was limited and logistical planning was complex. To overcome this, I established partnerships with local researchers who were familiar with the region and could assist with navigation, access and safety. Similarly, identifying and reaching schools in remote communities for the outreach component proved challenging, but I was able to locate and contact them through the support of local residents. These challenges were intensified by the fact that my time in each field site was tightly constrained, as travel had to be scheduled around pre-purchased flights with fixed arrival and departure dates to ensure affordability. Despite these limitations, local collaboration and careful on-site coordination allowed us to successfully complete both the scientific sampling and the educational activities.

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

The first major outcome of the project was the successful completion of one of the most extensive ant sampling campaigns across six Brazilian biomes, which revealed that ant biodiversity, foraging activity and nutrient-use patterns are strongly shaped by climate, precipitation, productivity and habitat structure. These findings provide robust evidence that ant ecological niches are both climate-dependent and evolutionarily conserved, offering important insights into how future environmental change may affect ecosystem functioning. The second key outcome was the identification of consistent, biome-wide patterns of nutrient limitation and niche partitioning across habitat strata and trophic levels, demonstrating that sugar limitation increases in the canopy while lipid limitation dominates on the ground, and that trophic identity strongly predicts nutrient foraging behaviour. This advances our understanding of mechanisms of coexistence and resource use in diverse tropical communities. The third important outcome was the successful implementation of a large science outreach initiative, engaging students and teachers in schools surrounding protected areas. These activities helped demystify negative perceptions about ants, improve public understanding of biodiversity and strengthen connections between scientific research and local communities, thereby enhancing conservation awareness in regions where such engagement is often limited.

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

Local communities were actively involved throughout the project, especially during the outreach activities conducted in the regions surrounding the protected areas where fieldwork took place. We visited public schools in the Cerrado, Pantanal, Atlantic Forest and Pampa, engaging approximately 750 students and teachers in discussions about ant biology, ecosystem functions and the importance of conserving Brazilian biomes. These sessions were delivered in clear and accessible language, using locally collected specimens to make the content relatable to the students' daily experiences. Community members also supported the project by helping us locate schools in remote areas and by facilitating access to field sites. As a result, the project not only strengthened dialogue between researchers and local

residents but also helped demystify negative perceptions about ants, increased environmental awareness and inspired interest in biodiversity and conservation among young people living near protected areas. Full details are provided in the experiential report of this outreach activity (DOI: 10.37885/250920266).

5. Are there any plans to continue this work?

Yes. There are concrete plans to continue this work, but now at a smaller spatial scale focused on the protected areas and local communities near my current research base. The next phase will involve expanding biodiversity surveys, strengthening long-term monitoring and increasing the frequency of outreach activities with schools and residents surrounding these conservation units.

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

The results of the project have already been widely shared through multiple channels. In addition to the three peer-reviewed scientific publications produced, I presented the findings at several scientific conferences both in Brazil and abroad, ensuring that the academic community had direct access to the outcomes of the research. I also actively sought engagement with Brazilian media outlets to communicate the results to a broader audience. This led to extensive coverage by institutional and national media platforms, including reports published by the Instituto Nacional da Mata Atlântica (INMA), the Federal University of Lavras (UFLA), Agência Brasil, and other major science communication portals. Examples include: <https://www.gov.br/inma/pt-br/assuntos/noticias/pesquisador-do-inma-participa-de-publicacao-internacional-que-explora-a-relacao-das-formigas-com-o-meio-ambiente>; <https://ciencia.ufla.br/reportagens/meio-ambiente/908-pesquisa-da-ufla-analisa-as-dietas-das-formigas-nos-biomas-do-brasil>; <https://ciencia.ufla.br/reportagens/meio-ambiente/712-pesquisa-analisa-a-busca-de-alimentos-pelas-formigas-diferentes-biomas-do-brasil-clima-e-um-dos-fatores-que-influenciam>; and <https://agenciabrasil.ebc.com.br/geral/noticia/2021-04/pesquisa-usa-google-para-entender-impacto-climatico-sobre-formigas>. Through these scientific and public communication efforts, the main outcomes of the project have already reached researchers, students, policymakers and the general public, helping to strengthen awareness of biodiversity and the importance of ant-mediated ecosystem processes.

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 Foundation grant was used during the fieldwork period of 2017 and 2018, exactly as originally planned. However, the overall project extended well beyond this timeframe. Because the sampling effort was extremely intensive and generated a very large dataset, the processing, identification and analysis of the material continued for at least three additional years. In fact, given the volume and complexity of the data collected, I can state honestly that I am still working on outputs derived from this project and expect to continue doing so for at least another two years.

8. Budget: [Intentionally removed]

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

Looking ahead, the most important next steps involve consolidating this research at a more local scale in the region where I am currently based. This includes establishing long-term biodiversity monitoring, deepening our understanding of how climate and habitat conditions shape ecological processes, and expanding the integration of ecosystem-function measurements. It will also be essential to strengthen engagement with nearby communities and schools, ensuring that environmental education and public outreach become continuous components of future work. By combining focused ecological research with sustained community involvement, the next phases of the project will generate more precise conservation strategies and increase local capacity to respond to ongoing environmental change.

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?

Yes. I used the Rufford Foundation logo in all my oral presentations and posters presented at scientific conferences, and the Foundation was acknowledged as the funding agency in every publication, abstract and scientific output derived from the project. The Rufford Foundation was also mentioned in media coverage related to the research, ensuring that its support received visibility both within the academic community and in broader public communication channels.

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

PhD. Carla Rodrigues Ribas – Full Professor at Universidade Federal de Lavras; scientific advisor responsible for supervising the project design, ecological framework and analytical approaches.

PhD. Fernando Augusto Schmidt – Full Professor at Universidade Federal do Acre; scientific co-advisor who supported the coordination of fieldwork in the Amazon biome and contributed to ecological interpretation.

PhD. Catherine Lucy Parr – Full Professor at the University of Liverpool; hosted my research internship, provided guidance on foraging ecology.

PhD. Tom Rhys Bishop – Lecturer at Cardiff University; contributed to statistical analyses, ecological theory and co-authorship of resulting publications.

PhD. Antônio A. M. C. de Queiroz – Collaborator who assisted with field logistics, specimen processing and ecological data collection.

Mayara Mieko Imata – Field assistant who supported sampling in multiple biomes and helped with specimen organisation and curation.

Ícaro Wilker – Field assistant who assisted with pitfall sampling, bait experiments and data recording.

Jonas Aguiar – Contributed to sample collection, equipment setup and on-site logistics.

Cyntia Valéria – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

PhD. Clarissa Alves da Rosa – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

Agnis Cristiane – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

Sabrina Farsura – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

Elisa Mousinho – Collaborator involved in specimen identification, data organisation and preparation of outreach materials.

Rafael Couto – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

Rafael Gonçalves Cuissi – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content. Supported the coordination of fieldwork in the Pantanal biome.

Mariana Rabelo – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content. Supported the coordination of fieldwork in the Atlantic Forest biome.

Marina Angotti – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

Marcos Mendes – Collaborator who contributed to fieldwork outreach activities, school engagement and the development of educational content.

12. Any other comments?

Receiving this funding was essential for completing my PhD, as it enabled me to carry out all the unprecedented sampling across Brazil's six biomes and greatly strengthened my scientific and professional training. The project also provided me with experience in coordinating large field campaigns, managing collaborators and leading a multidisciplinary research initiative. This leadership experience played a significant role in securing my postdoctoral position and, ultimately, my current permanent position as a researcher. I am extremely grateful for the support from The Rufford Foundation, which had a direct and lasting impact on my academic development and long-term career.