

1ST RUFFORD SMALL GRANT

Progress Report - Participatory monitoring of the Brazilian three-banded armadillo in northeast Brazil

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1 PROJECT OVERVIEW

The project “Participatory monitoring of the Brazilian three-banded armadillo in northeast Brazil” is carried out by Instituto Tamanduá with financial support from the Rufford Foundation through the 1st Rufford Small Grant. This project aims to monitor a recently discovered population of the Brazilian three-banded armadillo *Tolypeutes tricinctus* (hereafter TBA) in the Sumidouro community in northeastern Brazil. With the participation of residents, the project aims to assess population trends and the effects of environmental and anthropogenic factors on its population, meeting the objectives of the national action plan for the conservation of three-banded armadillos. The project also aims to raise awareness of biodiversity conservation among residents and train them in techniques relevant to environmental jobs.

2 ACTIVITIES AND ACHIEVEMENTS

The project effectively started in late May 2023, with the first fieldwork conducted in the Sumidouro community. During fieldwork, camera traps were deployed to monitor the TBA during the dry season. The deployments were made by two field assistants who had been previously trained by the project coordinator (Fig. 1).



Fig. 1 – Field assistants deploying a camera trap to monitor the Brazilian three-banded armadillo.

At the beginning of 2023, the project was expanded to address other objectives with financial support from the Percy Sladen Memorial Fund (PSMF) and the Conservation Connect (CC) grant. Together with Rufford, these funders are now allowing us to extend the duration of the monitoring until 2025 and include other armadillos in the occupancy analysis. Thus, a comparative analysis of the spatial ecology of armadillos will be conducted. It would include, for example, the nine-banded armadillo *Dasypus novemcinctus*, a species with high ecological importance, large distribution range,

and invasive potential in North America, as well as ecological characteristics that differ from the TBA. In addition, as part of the CC grant, we are supporting the development of handcraft inspired by the TBA, planning community-based conservation/scientific tourism associated with the TBA, building capacity for environmental jobs, and collecting biological samples from captured TBA individuals.

During fieldwork started in May 2023, a workshop was also conducted at the beginning of June to present results from the EDGE of Existence Project and the activities and objectives of the projects being funded by Rufford, PSMF, and CC (Fig. 2). In total, 33 residents attended the workshop. In the end, a questionnaire was applied to assess the perceptions of participants about the objectives being proposed for those projects. The questions concerned:

1. Continuity of the TBA monitoring using camera traps.
2. Continuity of monitoring with photos of armadillos taken by residents (citizen-science).
3. Start capturing TBA individuals to collect biological samples.
4. Educational activities to raise awareness of TBA and environmental conservation.
5. Discussions with the wind farm to install more effective traffic signs to mitigate roadkill.
6. Incentives for ecotourism in the region.



Fig. 2 – Workshop conducted in June 2023 to present previous results and the objectives for the new projects and assess public perception about them.

The perceptions for all objectives were mostly positive, indicating that our actions would still be supported by the community (Fig. 3). The questionnaires may reflect only the perceptions of those

who attended the workshop, who may be those more interested in the project and thus support it. Nevertheless, some residents came to talk with the project coordinator, apologizing for not participating in the workshop but stating that they hope the project continues. Key informants have also been consulted and indicated that the project is still well supported in the community.

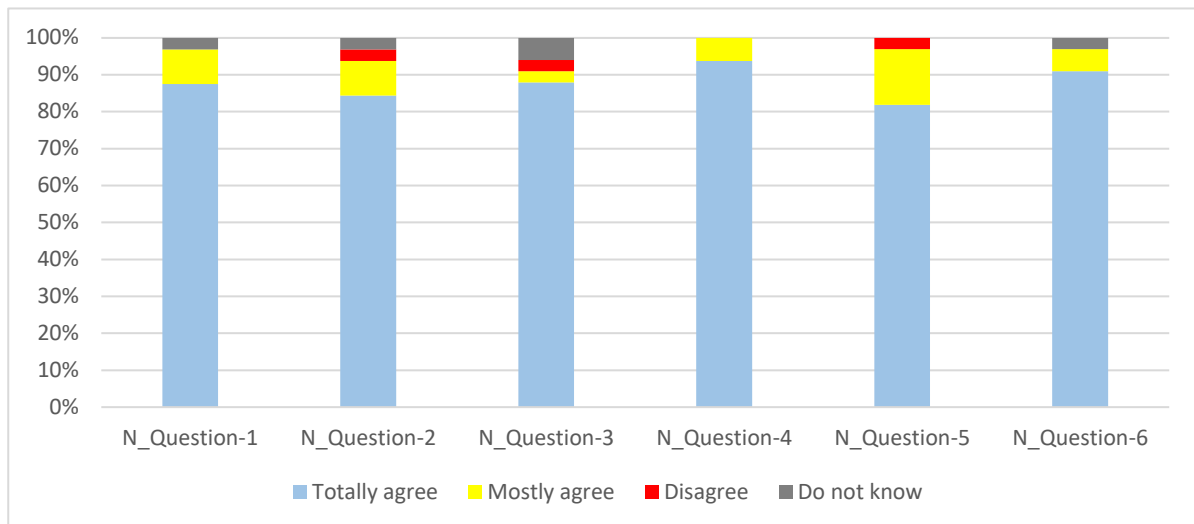


Fig. 3 – Results from the questionnaires applied during the workshop conducted in June 2023 assessing participants' perceptions about the objectives for the projects starting in 2023.

Finally, during fieldwork, we received the team of the TV show *Terra da Gente*, who recorded a short documentary about our projects with the TBA in Sumidouro (Fig. 4). The documentary is expected to be exhibited at the beginning of 2024.



Fig. 4 – Recording of a documentary about the projects with the Brazilian three-banded armadillo conducted in the Sumidouro community.

The second fieldwork campaign was conducted in August 2023. During this campaign, camera traps were removed from the previous stations then cleaned, tested, and set up. Data were also retrieved from memory cards. Cameras were then installed in the second array. The camera trap survey was conducted until October 2023, still in the dry season.

The data retrieved from memory cards are being processed. From the beginning of the EDGE of Existence project until the most recently processed images from the May-August 2023 survey, more than 350 videos of the TBA have been obtained (Fig. 5). Other threatened species were also recorded during the survey, such as the northern tiger cat *Leopardus tigrinus* and the cougar *Puma concolor*. One species, the lesser grison *Galictis cuja*, was detected for the first time during that survey.



Fig. 5 – Video frame containing an individual of the Brazilian three-banded armadillo obtained during the camera trap survey conducted as part of the Rufford project between May and August 2023.

As planned, we delivered a course about working with camera traps (Fig. 6). The course was divided into two parts. The first one was about theoretical knowledge, consisting of the following subjects: (1) what camera traps are, (2) how camera traps work, and (3) what camera traps can be used for. The second part was about practical knowledge regarding (4) how to set up camera traps, (5) how to deploy camera traps in the field, and (6) camera trap housekeeping (e.g., cleaning, storing). In total, 20 people attended the course.

We applied questionnaires before and after the course to measure participants' confidence in the subjects being discussed. For each questionnaire, participants should rate their confidence in each subject from 0 (extremely low confidence) to 5 (extremely high confidence). We hypothesized (and aimed) that:

1. For each subject separately, confidence would be higher right after the course.
2. For the subjects altogether, confidence would be higher right after the course.
3. We expected higher theoretical than practical knowledge before the course, which would be equalized right after it. Theoretical knowledge could have been higher before the course because of the lectures and workshops we had already given in the community, which involved information about camera traps.



Fig. 6 – Participants of the course about camera traps delivered in August 2023 in the Sumidouro community.

All the hypotheses were confirmed, meaning that knowledge increased for each subject and in general, as well as theoretical and practical knowledge were equalized right after the course (Fig. 7). Two residents that participated in the course and had been previously engaged in project activities were invited to be responsible for setting up camera traps from now on. They were trained by the project coordinator in the specific protocols used in the project.

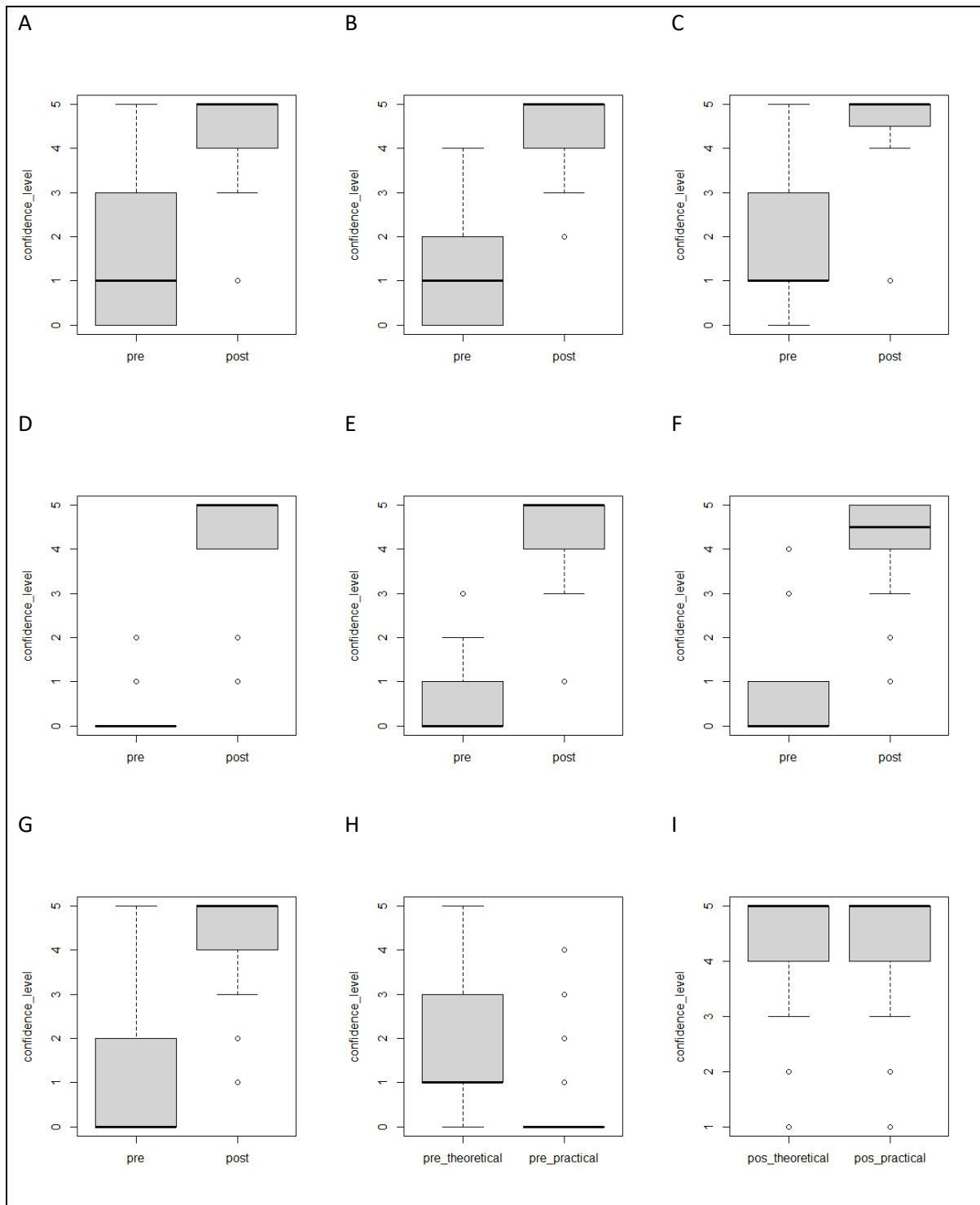


Fig. 7 – Course confidence levels (from 0 – extremely low confidence – to 5 – extremely high confidence) of participants of the course about camera traps. A-F: pre- and post-course confidence levels for each subject. G: Pre- and post-course confidence levels for all subjects combined. H-I: confidence levels in theoretical and practical subjects pre (H) and post (I) course. All pairwise comparisons were made using the Mann-Whitney test, and all presented $p < 0.05$, except for the comparison between confidence levels on theoretical and practical knowledge right after the course (I; $p = 0.21$).

Finally, following the workshop conducted in June 2023, we scheduled a meeting with a working group composed of representatives of local institutions, such as the group of craftswomen and the association of rural producers of Sumidouro. Among the subjects discussed were the environmental education activities planned for the Rufford project. We scheduled them for May 2024, right before the end of the project, because they should be supervised by the project coordinator and could not be conducted during the summer school break between December and February.

The last fieldwork started in October 2023. Camera traps were removed by field assistants and delivered to the camera set-up team (i.e., the two residents trained in August). Next, cameras were set up, cleaned, and returned to field assistants for a new deployment in the same array used in May 2023 but now referring to the rainy season. The most recent deployment started in November 2023.

1 NEXT ACTIVITIES

Cameras will be removed again in January 2024, set up and cleaned, and then deployed in the same array sampled between August and October 2023 but now during the rainy season. Then, they will be removed in April 2024. Model covariates are being processed in the meantime. As previously mentioned, awareness-raising activities in schools will be conducted in May 2024 during the last fieldwork of the project. The final workshop will also be conducted in May 2024, and data will be analysed right after that. Thus, we expect to have all data analysed and the project's final report written by July 2024.