Final Evaluation Report

Your Details	
Full Name	Jonas Rafael Rodrigues Rosoni
Project Title	Neotropical grasslands connection: ecology, migration, and conservation of the threatened Chestnut Seedeater *Sporophila cinnamomea*
Application ID	27044-1
Grant Amount	£5000
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Date of this Report	March 28, 2022

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

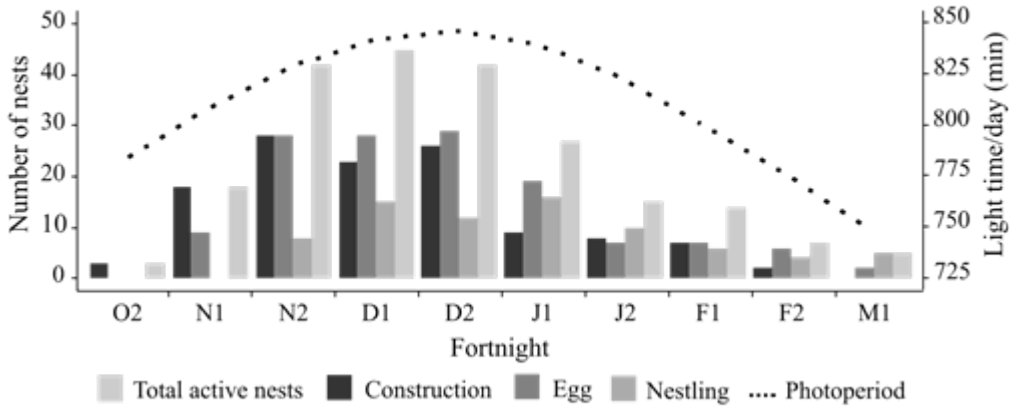
Objective	Not achieved	Partially achieved	Fully achieved	Comments
1. Estimate the following reproductive parameters: clutch size, fecundity, egg success rates, nestling survival, and annual production of nestlings per nest.				We monitored 98 nests during two breeding seasons. Mean clutch size was 2.22 ± 0.45 eggs (n = 82 nests). The fecundity rate was 1.12 nestlings/female (n = 90 nests). The egg success rate was 28% (n = 193 eggs). The nestling survival was 50% (n = 49 nests), and the average nestling annual production was 0.96 ± 0.17 nestlings/nest.
2. Describe nesting behaviour, egg-laying, incubation, and parental care.				The chestnut seedeater females laid their eggs in the morning on consecutive days (n = 13 females). The average incubation period was 12 ± 0.34 days (n = 52 nests). On average, the chicks fledged when 10.14 ± 0.65 days old (n = 28 nests). Parental care was biparental (n = 9 nests), but females exhibited higher nest attentiveness (81.7%) than males (18.3%). Overall, the frequency of feeding visits increased with nestling age. However, feeding visits by females were more frequent than by males in nests with chicks in earlier and later stages of development (see figure below).
3. Estimate the sex ratio of nestlings.				The nesting sex ratio did not significantly differ from 1:1 (n = 33 males; n = 26 females).
4. Calculate daily survival rates of the nests (DSR) and breeding success.				The nest daily survival rate was 0.95 ± 0.01 and the breeding success was 29% (n = 86 nests).
5. Estimate relationship of breeding period with environmental variables.				The photoperiod was strongly correlated with the number of active nests and no correlation was found between the number of active nests and average temperature, minimum temperature, maximum temperature, or precipitation. The number of active

				nests increased with daylight (photoperiod) with an average increase of 20 min of light/day (see figure below).
6. Describe the species' foraging behaviour and diet.				Even though we were not able to complete this objective as planned, we recorded some plant species consumed by birds during the breeding seasons. We noticed that birds took seeds directly from the plant, not from the ground, showing an apparent preference for new and fresh seeds. Some of the most consumed plants were grasses of the family Poaceae: *Paspalum urvillei*, *P. plicatulum*, *P. dilatatum*, *P. quadrifarium*, *Setaria parviflora*, *Dichanthelium sabulorum*, *Eriochrysis cayennensis*, and *Digitaria violascens*.
7. Identify the structure and floristic composition of breeding territories.				Breeding territories were characterised by having tall (~90 cm) and dense vegetation (see figure below). Most breeding territories (51.1%, N = 23) were located in wetland environments, 37.8% (N = 17) used wet soil environments and 11.1% (N = 5) in dry soil environments. The wetland environments were characterised by the presence of *Ludwigia sericea* (Onagraceae), *Floscopa glabrata* (Commelinaceae), and *Thelypteris interrupta* (Thelypteridaceae). The wet soil environments were characterised by *Chromolaena laevigata* (Asteraceae), *Tibouchina gracilis* (Melastomataceae), and *Pycreus lanceolatus* (Cyperaceae); and the dry soil environments were characterised by *Richardia humistrata* (Rubiaceae), *Schizachyrium microstachyum* (Poaceae), and *Ambrosia tenuifolia* (Asteraceae).
8. Estimate the size of breeding territories.				We estimate a total of 39 breeding territories, with an average size of 1.91 ± 0.59 ha (range 0.97 – 3.70 ha).
9. Generate species distribution models (SDMs) for the present and future scenarios.				We generate species distribution models for the present time in two major occurrence areas, according to seasonal migratory periods. Our

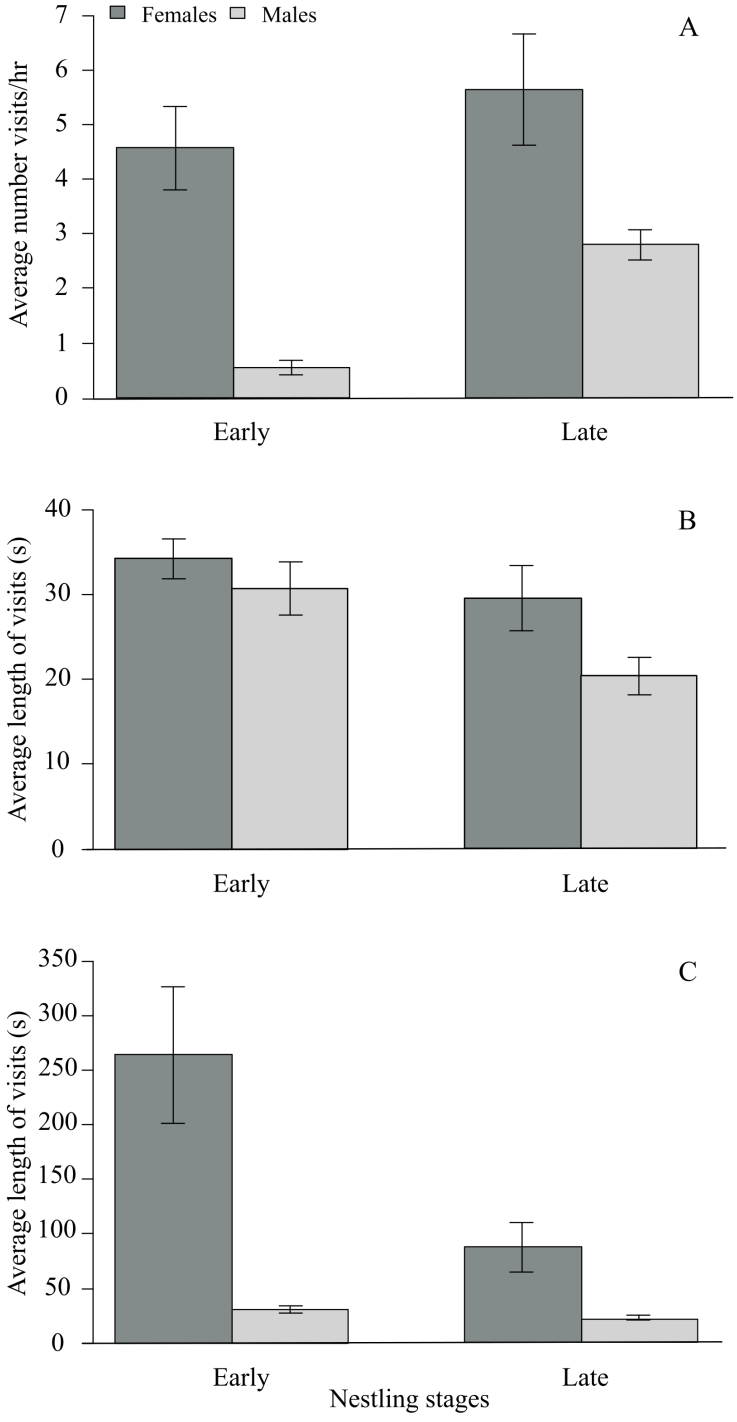
				calibration areas were the Brazilian cerrado biome (non-breeding season) and the southern grasslands, including the pampa biome (breeding season). In the cerrado, we identified a large and potential area with habitat suitability where chestnut seedeater possibly remains during the non-breeding season. To the south, in the pampa biome, we identified new areas with habitat suitability, suggesting that other environments (e.g., central region of Rio Grande do Sul) are suitable for chestnut seedeater during the breeding season (see figure below).
10. Identify the species' contranuptial areas in Cerrado.				We identified, through the analysis of geolocators, eight contranuptial (wintering) sites. On average, tracked birds spent 145.24 ± 39.19 days there (see figure below).
11. Estimate the species' migratory routes.				We estimated the migratory for nine tracked birds. The autumn (north) migration occurs along the central Paraná-Paraguay flyway. A similar pattern was noted for the spring (south) migration; however, we noted that birds move north from their contranuptial sites before heading south to the breeding region (see figure below).
12. Validate the SDMs obtained through geolocators technologies.				We decided to use geolocator data to generate distributions models in the cerrado biome because only a few (~13) reliable winter records were available from the databases we accessed. Nevertheless, our models are congruent with citizen science records months other than those within the window time we considered in our models: June and July.
13. Propose subsidies to create new conversation units (contranuptial areas) and corridors ecological (migratory routes).				Work on this objective is still underway. Currently, we are working on a research paper that addresses the species' geographical distribution in South America and its migration routes. We expect to submit the paper sooner and circulate our results to coordinators of the Brazilian National

				Action Plan for the Conservation of Grassland Birds. This National Action Plan has the general objective of integrating research, management, and protection initiatives and efforts to reduce threat factors and improve the conservation status of endangered birds in Campos Sulinos and their habitats.
14. Update the species' occurrence status in Brazil.				As already mentioned in the previous item, this objective will be part of our research paper under preparation. We believe that potential areas found in our study can be considered and used by, e.g., BirdLife International and the Brazilian National Action Plan for the Conservation of Grassland Birds, highlighting and increasing the priority for research in these areas, including their conservation, making them hotspots for migratory species.

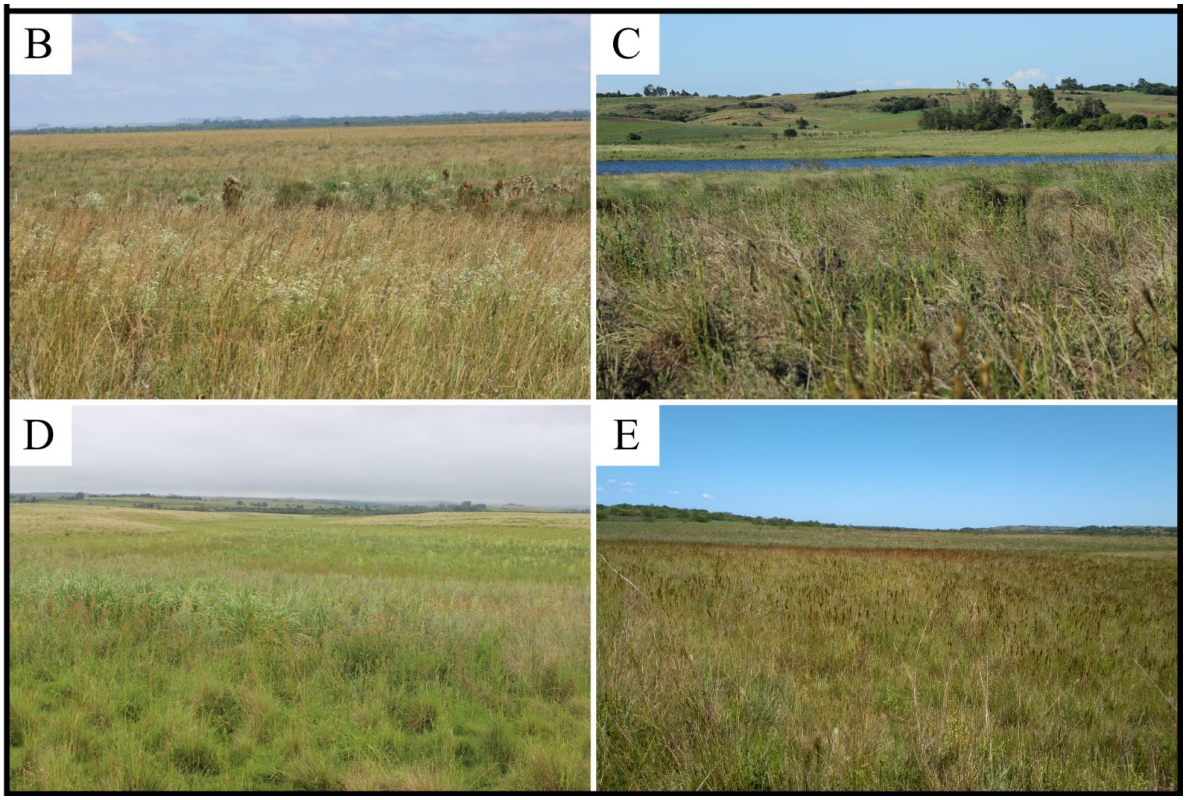
Objective 5. The total number of active nests of the Chestnut Seedeater (Sporophila cinnamomea) is grouped by development phase: construction, egg, and nestling. Secondary axis with average photoperiod value in minutes for two breeding seasons (October to March 2018–2020) in the Brazilian Pampa grasslands. Values are grouped by a fortnight, beginning in the last fortnight of October (O2) until the first fortnight of March (M1), summing the values for both breeding seasons.



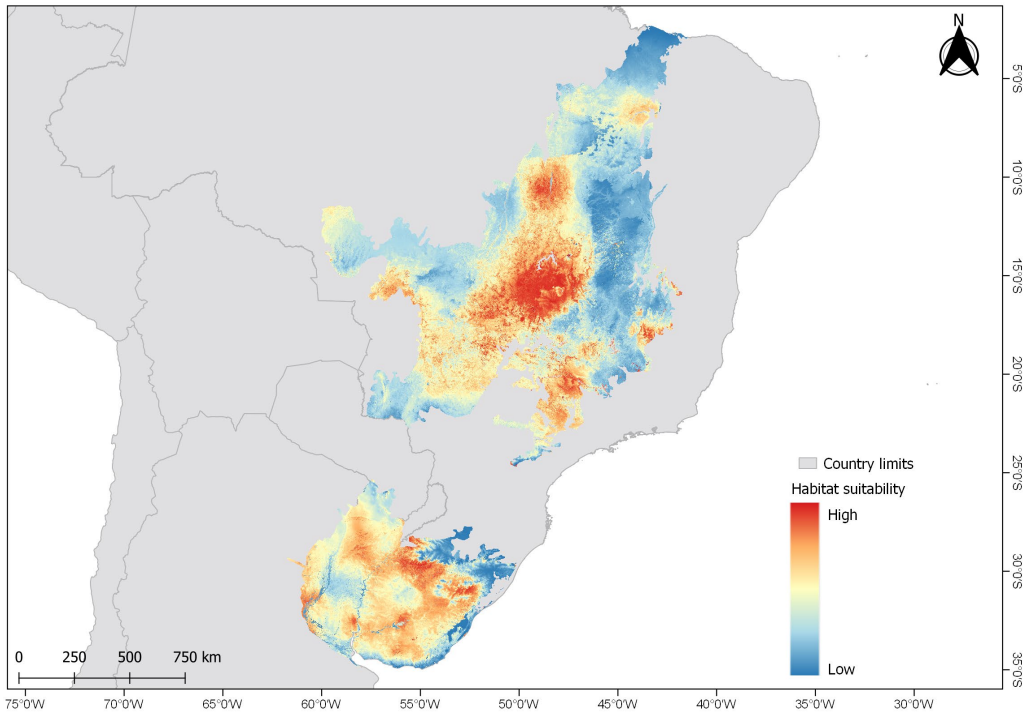
Objective 2. (A) Mean ± SE for the number of visits per hour and (B and C) Mean ± SE for the length of visits per hour in monitored nests of the Chestnut Seedeater (*Sporophila cinnamomea*) in southern Brazil. (B) the length of visits without brooding the nestlings after feeding them and (C) the length of the visits with brooding nestlings after feeding them. The nestling development stage: early (1-4 days of age) and late (5-10 days of age).



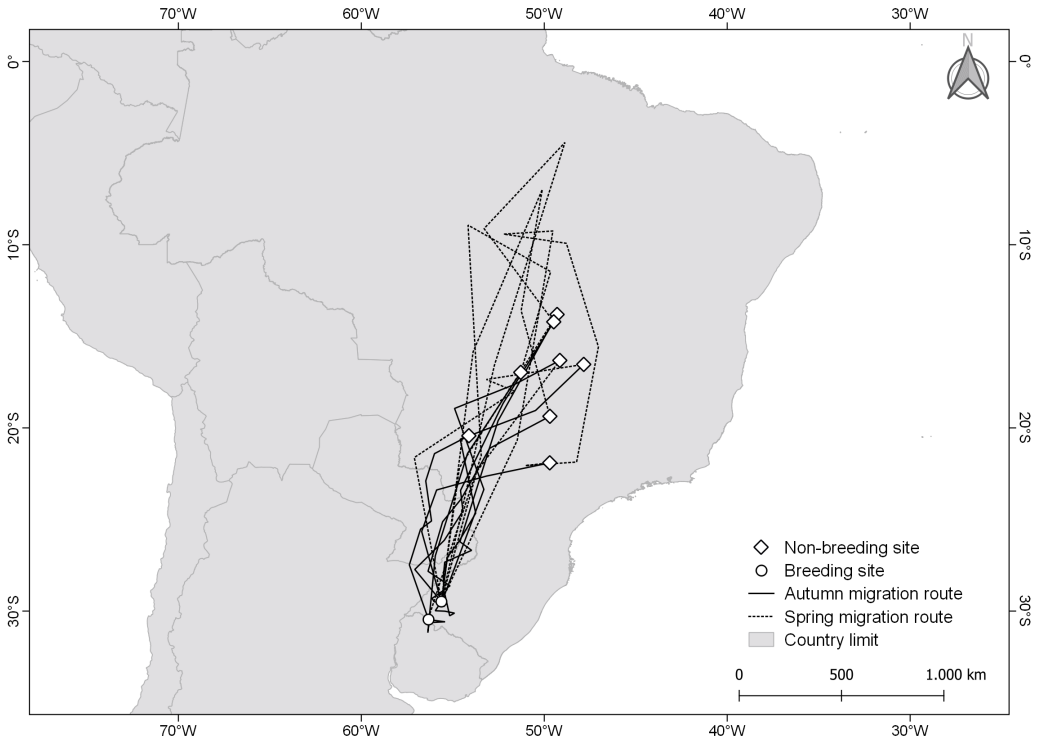
Objective 7. Grassland landscapes in the Manoel Viana (B and C) and Quaraí (D and E) study areas. (B) dry soil environmental, (C) wetland environmental, and (D and E) wet soil environmental.



Objective 9. Habitat suitability for Chestnut Seedeater (*Sporophila cinnamomea*). Model to the north refers to the calibration area in the Cerrado biome and the south to the grasslands of the Pampa biome.



Objectives 10 and 11. Breeding and non-breeding sites, and migration routes (autumn and spring) of Chestnut Seedeater (*Sporophila cinnamomea*) in South America.



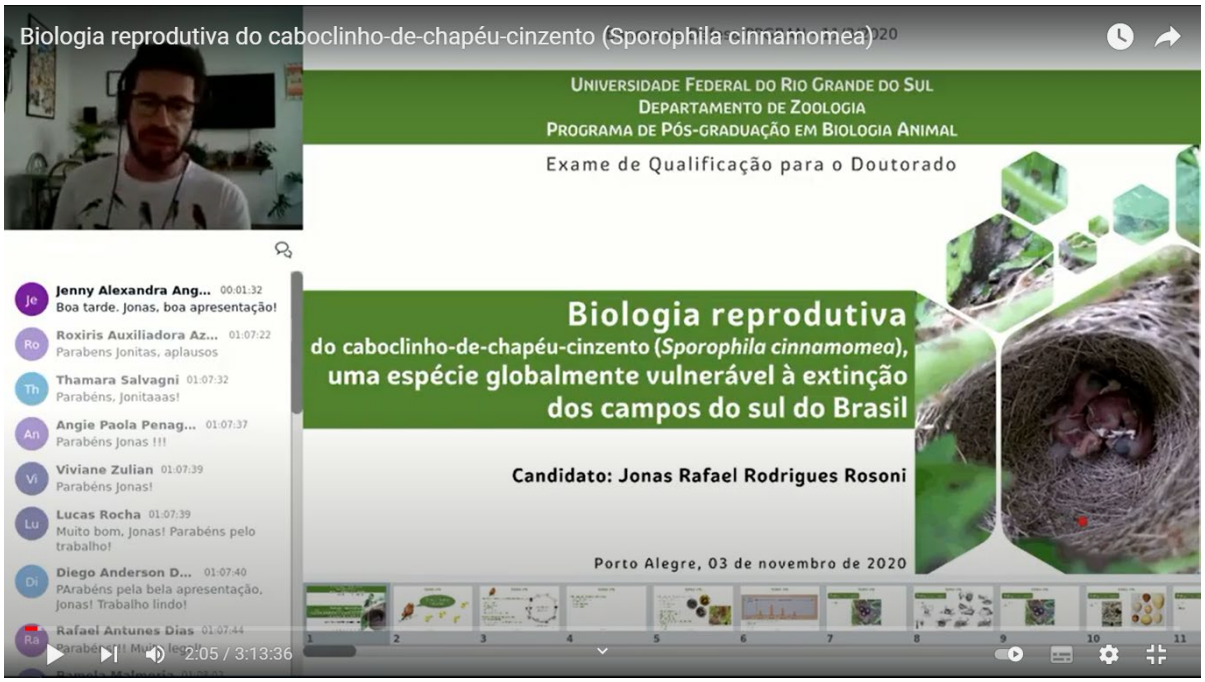
2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

We believe that the unforeseen difficulties were those related to the emergence of the COVID-19 pandemic, which made it difficult to hold workshops, courses, and lectures in schools and other entities in the cities where the species occurs. Therefore, we sought to compensate for this deficit of tasks by participating in virtual events with the presentation of our results and thus publicising our project. In addition, considering the issue of the pandemic, we were not able to carry out monitoring in the population located in the state of Mato Grosso do Sul, as indicated in the goals of the initial project submitted. We believe that in the future this population will be able to be monitored by university students close to the area of occurrence of the species in Terenos and Campo Grande.

Figure 1. Lecture presented at the third event Aves de Santa Maria held between November 16 and 19, 2020, via the Zoom platform. Top image slide showing acknowledgments and funders; bottom image event participants.

Figure 2. Lecture presented at the II Virtual Meeting of COA POA – Clube de Observadores de Aves de Porto Alegre, held on September 12, 2020. Top image cover of the presentation and the author of this project; lower image of the event publicity card.

Figure 3. Lecture presented to the Graduate Program in Animal Biology, where the author of this project presents the first results obtained on the breeding biology of the species. The event was held on November 03, 2020.



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

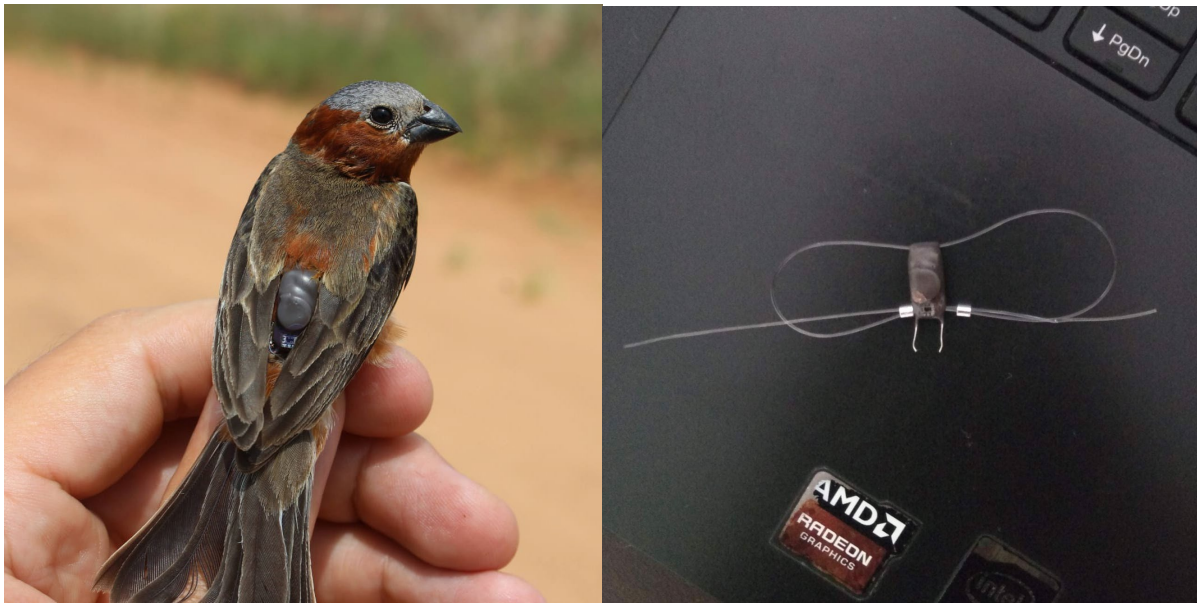
We obtained many novel data in our project, considering the species' vulnerability to extinction. We highlight the following:

(1) The description of the characteristics of nests, eggs, nestlings, and clutch size, which were published in The Wilson Journal of Ornithology (doi: https://doi.org/10.1676/1559-4491-132.4.998).

(2) Identification of migratory routes.

(3) Non-reproductive sites in the Cerrado biome, information that will be published in a research article that is in the final stage of elaboration. The last two findings are the most important, considering the size of the species and the use of tracking technologies (Figure 4). it is a relevant finding for Neotropical ornithology. Our project becomes the pioneer in tracking the non-breeding sites and migratory routes for the group of southern capuchino seedeaters. With this information, new ways can be approached for the conservation of the species and its migratory congeners.

Figure 4. Left figure geolocator fixed to a male individual of Chestnut Seedeater (*Sporophila cinnamomea*); right figure, detail of the leg loop harness in the geolocator in detail.



4. What do you consider to be the most significant achievement of this work?

We believe that the most significant achievement is related to how our project broke geographical barriers and reached other countries by taking our information. It is surprising how new partnerships can be made when the goals are related to biodiversity conservation. It is very gratifying to see people recognising the real value of our project and supporting us in the four countries where the studied species occurs (Uruguay, Argentina, Paraguay, and Brazil), with the involvement of environmental entities and agencies (e.g., CEMAVE, Aves Uruguay, Guyra Paraguay, and SAVE Brazil).

5. Briefly describe the involvement of local communities and how they have benefitted from the project.

Locally, during the fieldwork, the community was very receptive and collaborative. Some residents of these communities helped with fieldwork during nest monitoring and specimen captures (Figure 5). During field sampling, conversations with landowners (Figure 6) were held showing why it is important to study and protect this species, as well as the environments where it lives. The community apparently recognised the importance of maintaining wetland environments for biodiversity and ecosystem services. Another relevant aspect of our project was related to data collection via citizen science. All data with this origin were requested from the authors and the same in the publications will be duly recognised for collaborating with our results.

Figure 5. Fieldwork assistant, 14-year-old teenager resident of the local community in the Santa Maria do Ibicuí Settlement in Manoel Viana.

Figure 6. People from Santa Maria do Ibicuí settlement in Manoel Viana, who kindly opened the doors to their homes and helped our team during fieldwork.

6. Are there any plans to continue this work?

In principle, yes. We would like to better integrate the local community into fieldwork during data collection in long-term monitoring. We are evaluating the possibility of organising and creating a Bird Observatory in the Pampa biome, where chestnut seedeater will be one of the target species for conservation that will be monitored via research and environmental education activities.

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

1) This project is part of the doctoral thesis of the author of this project, which at the end of this period, an academic document will be available to the community in the library of the university.

To complement and access the results by the scientific community, four articles will be prepared and submitted for publication in journals.

1.1) Article describing nests, eggs, nestlings, and clutch size was published in The Wilson Journal of Ornithology (doi: https://doi.org/10.1676/1559-4491-132.4.998).

1.2) Article with information on breeding biology and nest success is under review in the Journal Austral Ecology.

1.3) Article with results on habitat selection, territory size, philopatry, and floristic composition of breeding territories, is being prepared and submitted to the journal Studies on Neotropical Fauna and Environment.

1.4) Article with the results of migration (migration routes and non-breeding sites) and distribution of Chestnut Seedeater, will be prepared and submitted to the journal (IBIS International journal of avian science or Journal of Avian Biology).

2) We were present at the XXVII Brazilian Congress of Ornithology in 2019, where we presented two works addressing breeding biology data and another presenting our general project.

3) We held three virtual lectures, where we presented the main results obtained from our project to audiences from different areas and backgrounds (see item 2).

4) We believe that it will still be possible to produce a booklet with the main results obtained for distribution to local communities, aiming to show the community the importance of doing science and conserving biodiversity.

5) We created a visual identity for our project, as already mentioned in the update (https://ruffordorg.s3.amazonaws.com/media/project_reports/27044-1%20October%202019.pdf), and from this identity, we produce adhesive, buttons, and a few mousepads (Figure 7) for dissemination in society.

6) We created a promotional video available on YouTube with a quick presentation of the project with a brief introduction about the grasslands of the pampa biome and their biodiversity with some results obtained and illustrated. See the video available in Portuguese (https://www.youtube.com/watch?v=aFVXHqfUpdQ&t=97s).

7) We were present in a podcast episode on "Uru Podcast" with an interview talking about our project and the species studied. The episode is available in Portuguese on Spotify (https://open.spotify.com/episode/4jeHEWJ5GpOIv6hq3zpqGa?si=e8bb2a0efaa549b5).

8) We continually extend our project on social media (@projetocinnamomea) with the dissemination of information, results obtained, fieldwork activity, curiosities about the species studied, surveys on the conservation of fields, and data collection of occurrences with citizen science, where followers inform their records with all the information and a photo to share. Visit and follow us on our social media: Instagram – 1,659 followers – (https://www.instagram.com/projetocinnamomea/) and Facebook – 1,147 followers – (https://www.facebook.com/projetocinnamomea/?ref=page_internal).

Figure 7. Items produced to help publicize the Cinnamomea Project (short title). The top left shows a representation of the adhesive, and the right side shows the adhesive fixed in a water heater. In the bottom figure, on the left side, is a button with the engraved logo and a black mousepad.

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

Our project had a period of 4 years (2018-2022) for its execution; however, the grant received was of total importance to carry out the work exclusively for the fieldwork period. The grant was used between March 2019 and October 2020, according to the schedule pre-established in the submitted proposal.

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

1) Improve integration with the local community, showing that biodiversity is much broader than they believe it to be, and emphasising the value of ecosystem services for all.

2) Increase our networks of partnerships, both in Brazil and in other countries where the species occurs.

3) Create a collaborative network to monitor endangered species, such as the black-and-white monjita (*Heteroxolmis dominicanus*), saffron-cowled blackbird (*Xanthopsar flavus*), sharp-tailed tyrant (*Culicivora caudacuta*), bearded tachuri (*Polystictus pectoralis*), and other species of the genus *Sporophila* seedeaters and to identify the main impacts that these species have suffered in their grassland environments.

4) Carry out extension work in local schools with bird watching activities and integrate young people in fieldwork activities, data collection, and preparation of booklets and technical reports.

5) Finally, to start what we were unable to do due to the pandemic, which was to train students, park managers, and small farmers by integrating different disciplines related to the environment and biodiversity conservation, with a focus on the management of fields and wetlands.

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, we used the logo in our work posters that were presented at the XXVII Brazilian Congress of Ornithology in 2019, as already mentioned in the update (https://ruffordorg.s3.amazonaws.com/media/project_reports/27044-1%20October%202019.pdf), we mentioned the foundation in our lectures, in the video created that is available on YouTube (link in item 7) and in the posts on our social media (Instagram and Facebook) mentioning that the project was financed with the help of the grant received from The Rufford Foundation.

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

Jonas Rafael Rodrigues Rosoni – coordinator of this project, the functions performed were creating budgets, writing, and submitting the project, the final report, and articles. During the fieldwork, he programmed and executed the data collection. In activities after fieldwork: processed and analysed data and results. He collected the citizen science data and generated the species, distribution models. In social media, he is responsible for creating and disseminating all extension material content.

Caio José Carlos – supervisor of this project, among the functions performed were review and edit the project, the final report, and articles. In activities after fieldwork: assisted in the processing and analysis of data and the results obtained.

Carla Suertegaray Fontana – supervisor of this project, among the functions performed were review and edit the project, the final report, and articles. In activities after fieldwork: assisted in the processing and analysis of data and the results obtained.

Mariana de S. Vieira – a specialist in botany who assisted in the collection of data regarding the floristic composition of the breeding territories of the Chestnut Seedeater.

João Rosoni Lopes – fieldwork assistant who assisted during the collection of reproductive data from Chestnut Seedeater during a breeding season.

Cassiana Alves de Aguiar – fieldwork assistant who assisted during the collection of botanical material in the breeding territories and the captures and banding of the Chestnut Seedeater individuals.

Arthur Venancio de Santana – fieldwork assistant who assisted during the collection of botanical material in the breeding territories and the captures and banding of the Chestnut Seedeater individuals.

João Gava Just – fieldwork assistant who assisted during the collection of reproductive data and in the captures and banding of the Chestnut Seedeater individuals.

Oscar Mauricio Ardila – fieldwork assistant who assisted during the collection of reproductive data and in the captures and banding of the Chestnut Seedeater individuals.

Vítor Henrique Lopes da Silva - fieldwork assistant who assisted during the collection of reproductive data and in the captures and banding of the Chestnut Seedeater individuals.

Thuani Luísa Saldanha Wagener - fieldwork assistant who assisted during the collection of reproductive data and in the captures and banding of the Chestnut Seedeater individuals.

12. Any other comments?

We are very grateful for the grant from the Rufford Small Grants Programme. Because in the current Brazilian financial scenario for carrying out scientific research, without this financial support, we would not be able to carry out our project and increase the scientific knowledge of this endangered species that occurs in equally threatened environments. Finally, we highlight the importance of allying the academy and the community in favour of conservation, as we are taking the first

steps and our idea is to continue and create the bird observatory in the pampa biome.