Project Update: November 2018

Objectives:

Locate populations of A. *belzebul* and describe its biogeographical limits – Partially achieved - We interviewed 72 locals and gathered information about presenceabsence in 52 forest patches. According to those interviews, 21 patches possibly have the presence of A. belzebul. Currently, we are sampling some patches using playbacks. We confirmed the species presence in ten out of 17 forest patches. The information about presence-absence of the species obtained in the interviews has been consistent with the results of playbacks in 15 out of 17 forest patches. We are still visiting forest patches and we expect to finish the additional fragments by January 2019.

Evaluate landscape and ecological characteristics that influence the occurrence of these primates in forest patches – Partially achieved - This objective is still ongoing. We are sampling vegetation within forest patches with and without A. belzebul and accessing landscape variables to carry out the analyses. We have already sampled the vegetation structure of 16 forest patches, out of a total of 43 that were selected. The conclusion of this stage is scheduled for May 2019. Regarding the analyses of the landscape, we performed a supervised classification in one region of the study area using Geographic Information System; however, we still need to perform a better classification, as the accuracy was only 50%. We expect to finish this stage by February 2019.

Establish a strategy of communication with locals, disseminating knowledge and using participative tools to create a conservation strategy for the species in the state of Amapá – Achieved - We visited 108 households, spread across six municipalities in the study region to interview locals about mammal occurrence within forest patches and hunting activities. We distributed 48 hunting calendars to volunteer hunters that wanted to contribute to an ongoing program dedicated to monitor hunting levels over all native game species, including the red-handed-howler monkeys. We also carried environmental education activities in three rural schools in the study area, where we carried 3-days-long activities with children from 8 to 15 years-old. A total of 139 children participated in those activities.

Difficulties:

Our first problem was actually receiving the funds since we had a problem with the bank that manages the project's account. We only received the funds in another account more than three months later, what delayed the project start. Indeed, we were able to start fieldwork only in October 2nd of 2017.

We finished our activities related to environmental education, which were carried out in three schools located in African descendant communities or *Quilombos*. During these

activities, we presented topics like "Amazonian biodiversity", "Threatened species", and "Sustainability" through videos, storytelling, and games (see more details below). However, although we observed some improvement in the answers of the quiz game after the activities (right answers raised from 55,3% to 62,1%), this increase was not significant. We felt the three-day-long activities were not enough for increasing children's knowledge and we should have continued these activities for a few more days. Unfortunately, our time schedule and budget did not allow for the extension of these activities.

Outcomes:

Species distribution and occurrence: We draw a map of the species distribution using information from the interviews with locals, and identified the Araguari River as the northern limit and the Vila Nova River is the Western limit for *Alouatta belzebul* (see map). Additionally, we have confirmed the presence of howlers in ten forest patches and registered evidence of the presence of *A. belzebul* in other 12 forest patches through interviews. The area of occupied patches ranges between 9 and 230 ha (mean 61.1 ha), totalizing 1283 ha.



Hunting: We found out that A. *belzebul* is the most hunted primate in the region. Out of 50 records of last primate consumed, which included seven species, 68% (n = 34) were records of the consumption of A. *belzebul*. However, primates are not preferential targets for local hunters in general. Only 5% of our records of hunted animals were records of primates.

Communication: another important component regarding our strategy of communication is related to the use of social media to communicate to the general public about the project activities:

Website (<u>https://labecoap.wixsite.com/projetoguariba-ap</u>), Facebook (410 followers) (<u>https://www.facebook.com/projetoguariba.ap/</u>), Instagram (343 followers) (<u>https://www.instagram.com/projetoguariba.ap/</u>), YouTube (<u>https://www.youtube.com/channel/UCOA6sRWLq6vvGxi1MxoMh-g/videos</u>).

With this divulgation, the "brand" *Projeto Guariba AP* have been recognized locally. Besides to social media, we participated in a local symposium about Amazonian Education and Culture, where we presented our activities of environmental education. We also participated in interviews in a local radio station three times.

Community Involvement:

When we submitted this project to The Rufford Foundation, we were asked about how we would access the effects of our environmental education activities. This made us include a method to access the level of hunting in the study area. We interviewed locals and distributed hunting calendars to local hunters that volunteered to mark the days in which they hunted and some basic information on the species that they killed (i.e.: species identity, sex, quantity, and distance from their household to the catchment area). This created a proximity relationship between the project and the communities, which is reinforced by each new visit required by the project. Many people became aware of the fact that red-handed-howler monkey is a threatened species. Generally, locals appreciated receiving hunting calendars acknowledging that they should know how much they are hunting. On the first two months of this monitoring program, we already gathered information on 247 hunted animals. The monitoring will complete 12 months in February 2019, and we hope to access the level of hunting in the region and if there is some change in the hunting level throughout the study. We have also assessed the drivers of hunting in the region on a manuscript that is currently under review, submitted to the scientific journal Oryx. These findings should guide our future actions towards reducing hunting levels on threatened species in this region.

We also carried environmental activities in rural schools of three communities, in which we introduced threatened species that occur in the region, explained the importance of the environment and biodiversity, and that hunting needs to be sustainable in order to conserve the local biodiversity and guarantee the food security of local communities in the future. We interacted with a total of 139 children from 8 to 15 years-old. Our environmental activities were carried playfully and were very appreciated by the kids. We distributed quiz games (cards with questions) to the schools, so the teachers may use them with the children to reinforce the subjects that we approached. We also gave a booklet to each child. The booklet tells the story of an infant red-handed howler monkey that had his mother killed by a hunter. At the end of the story, the hunter learns that he cannot hunt indiscriminately, that he should avoid hunting threatened species or pregnant/lactating females.

Since most of the hunters in the region are young men, we expect that our intervention may have some effect in a few years. We also expect that children must influence their families to some extent. Therefore, with all these actions, we hope that hunting becomes more sustainable and do not aim threatened species anymore, benefitting the communities that rely on bushmeat for subsistence.

Timescales:

The interviews were concluded in October/17, one month later than expected. The visits to and sampling of forest patches started in July/18, and so far we have already sampled 16 out of 43 selected forest patches. We are doing this sampling on intensive trips, every month. We expect to complete this step in May/19, instead of October/19, as we predicted at first.

Next Steps/Future:

To promote the conservation of red-handed howler monkeys, three approaches are important. The first one is to guarantee the conservation of the species habitat. Since Amapá's Savannas are threatened by agriculture expansion, we are making biodiversity inventories throughout the region to support the creation of a protected area that protects Amapá's Savannas and red-handed howler monkeys. Therefore, one next step is to conduct a survey of large and medium-sized mammals in the region, which also hosts other six species of threatened mammals. By pointing out some areas in which we can find red-handed howler monkeys together with other threatened species we could get enough support for the creation of this protected area.

The second approach is to reduce hunting levels on red-handed howler monkeys. To achieve this, we plan to develop a monitoring scheme involving the community to access whether populations of hunted species are in decline. The involvement of the community in the monitoring scheme should make it easier for us to promote any necessary behavioral/attitude change if we detect population declines. Concomitantly we will keep in contact with the communities, telling hunters about the threatened animals and the importance of conserving them.

The third approach is to improve our knowledge about the conservation status of redhanded howler monkey populations. Therefore, we also intend to collect fecal samples to access the genetic variability of the populations, and also parasitism levels, indicating whether these populations are healthy or not.

Regarding mammal conservation and the conservation of Amapá's savannas itself, we plan to increase our knowledge about hunting in the study area by installing sound recorders at the forest patches and record shot sounds. Furthermore, we intend to continue the hunting calendar approach and environmental education activities. We also plan to start a fauna monitoring project in collaboration with local communities, in which community members will be responsible for changing batteries and downloading data from storage cards of camera traps. This monitoring scheme should last at least five years to detect trends in populations of hunted species. This should make the community more willing to agree with behavioral/attitude changes if we detect negative trends in some populations. Regarding red-handed-howler monkeys, we plan to start a study of population genetics and parasitism to access the health of the populations. Moreover, we intend to establish a dialogue with environmental organs of the local government to implement a conservation plan for red-handed howler monkeys based on the results of the present project.

Sharing/Promotion:

We are going to publish our results in international scientific journals. Indeed, the first paper is about the factors that influence hunting prevalence and intensity within the study area and is already submitted to Oryx. We plan to submit at least two other papers as soon as we finish fieldwork and the analyses. We also plan to share our results by attending national and international scientific conferences and congresses. Finally, we will also share the results with local communities explaining what we found and the conservation consequences, and through our social media (see above).

We developed educational materials to promote the conservation of red-handedhowler monkeys (a booklet and a quiz game) in which we included The Rufford Foundation logo (see photos below). We also included the logo in a poster that we made to spread information about red-handed howler monkeys and the need to preserve the species throughout its occurrence area. Furthermore, we always include The Rufford Foundation logo in any presentation we make about this project and in the project's website (see prints below). Lastly, we also included The Rufford Foundation in the acknowledgment section of the one published paper (Hilário et al. 2017, The Fate of an Amazonian Savanna: Government Land-Use Planning Endangers Sustainable Development in Amapá, the Most Protected Brazilian State. Tropical Conservation Science, 10:1-8. DOI: 10.1177/1940082917735416) and in one scientific paper that we have submitted to Oryx about the drivers of hunting in the region.



Booklet telling the story of an infant red-handed howler monkey that had his mother killed by a hunter. Note The Rufford Foundation logo in the back cover of the booklet.



Quiz game developed to test the children knowledge about the surrounding environment, threatened animals (including red-handed howler monkeys), and conservation attitudes. Note The Rufford Foundation logo in one of the cards.



Poster developed to spread information about red-handed howler monkeys and the need to preserve the species. The Rufford Foundation logo is in the bottom part of the poster.



Poster attached to a wall at one of the schools where we developed environmental education activities



Our web page used to share information about the project, the species, and its environment. Note the Rufford Foundation logo, as a supporter of the project.

Team:

Adriane Formigosa. Contributed in the elaboration of games and questions carried out in the local schools.

Angélica Martínez Alfonso. Designed the educational material (posters, booklet and quiz game). Additionally, designed the project logo and created the web site and all social media profiles, such as Facebook, Instagram and YouTube. She is the filmmaker (video and photography) in both field and education activities. She did the screenplay of the short documentary and currently is editing it. She participated in all educational activities in local schools as assistant and contributed in the elaboration of games and questions carried out in the local schools.

Bayron R. Calle-Rendón. Did interviews with locals to gather information about presence-absence of howler and information about hunting in the study site. He is carrying out playback within forest fragments to confirm the presence of howlers and verify the accuracy of the interviews. He participated in all educational activities in local schools and contributed in the elaboration of educational material.

Saulo Meneses Silvestre. Did interviews with locals to gather information about presence-absence of howler and information about hunting in the study site. He is carrying out vegetation structure surveys to identify the drivers of howler's presence in forest patches. He participated in all educational activities in local schools and contributed in the elaboration of educational material.

Renato R. Hilário. Coordinated the project, supervising the fieldwork and elaboration of educational material.

José Julio de Toledo. Is the academic advisor of Bayron and Saulo.