Final Evaluation Report

Your Details	
Full Name	Aída Otálora-Ardila
Project Title	Effects of organic and conventional agriculture on insectivorous bat assemblages using multiple dimensions of biodiversity
Application ID	35308-1
Date of this Report	December 31, 2023

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
To evaluate the taxonomic, functional and phylogenetic diversity, activity and foraging patterns of insectivorous bats in four habitats				We did passive acoustic monitoring in each habitat sampled. We obtained 235,952 acoustic recordings with 157,281 recordings containing bat calls. We analysed these recordings and got data related to the taxonomic diversity and the presence/absence of the insectivorous bat species for all the sampled habitats. Although we could develop models based on pattern-matching species identification using the Arbimon platform, we could get activity data for only 10 species. We could not get information for all species identified because it is a highly time-consuming process. Therefore, we are currently running analyses to obtain information about activity for the remaining species. For phyllostomid bats, our findings based on a robust Bayesian statistical approach (MCMCGLMM) indicated that the habitat type and conservation stage of each landscape fundamentally influenced bat assemblages. Habitats more structured in terms of vegetation, such as riparian forests at private reserves, displayed a significant increase in bat taxonomic, functional, and mainly phylogenetic diversity compared to rice monocultures. Further, forest cover, savannah patch density, and edge density were the most important landscape variables to predict the bat responses to habitat conversion.
Main reason: We could not evaluate the functional and phylogenetic diversity of insectivorous bats. However, all these analyses could be carried out with data from Phyllostomidae bats captured in mist nets.				
To determine the trait-environment				Although we could develop models based on pattern-matching species

relationships between insectivorous bat species and the four habitats sampled				identification using the Arbimon platform, we could get activity data for only 10 species. We could not get information for all species identified because it is a highly time-consuming process. However, we used insectivorous bat species presence/absence data to analyse trait-environment links using a recently developed framework that integrates RLQ and fourth-corner methods. Using the same bat dataset as the previous objective, we employed spatial and phylogenetic information on a robust statistical approach following a conservative way to analyse trait-environment relationships. Our findings showed that functional traits and environmental variables jointly predict variation in bat occupancy patterns in countryside landscapes at a local scale. We also demonstrated that environmental filtering represented mainly by conventional rice crops consistently shape bat assemblages, selectively benefiting the most abundant and disturbance-tolerant phytophagous species.
Main reason: We could evaluate how insectivorous bats traits were related to habitat alteration and landscape characteristics, based on presence/absence data of insectivorous bat species in each habitat. Additionally, we evaluated how phyllostomid bat traits were related to habitat alteration and landscape characteristics.				
To disseminate the results of the project				We disseminate the results in two different areas: 1. Academic community: As a product of this project, we sent two manuscripts to the journals: Biodiversity and Conservation and Animal Conservation. Currently they are being reviewed and we expected that they will be published in the next months. Additionally, we presented results in two national (Colombian congress of Mammalogy, Colombian congress of Zoology) and one international congress (XV International Congress of Wildlife management in the Amazonian and Latin America). Additionally, two students participated in the project and used the

				data to develop a thesis in biology (undergraduate level). 2. Local community: We presented the project results to local people and stakeholders at the ending of each fieldwork.
We disseminated the project result in the academic community and in the local community				

Below are some striking results and figures associated with our objectives:

1. **Trait-environment relationships between insectivorous bat species and habitat disturbance in the Orinoco Llanos**

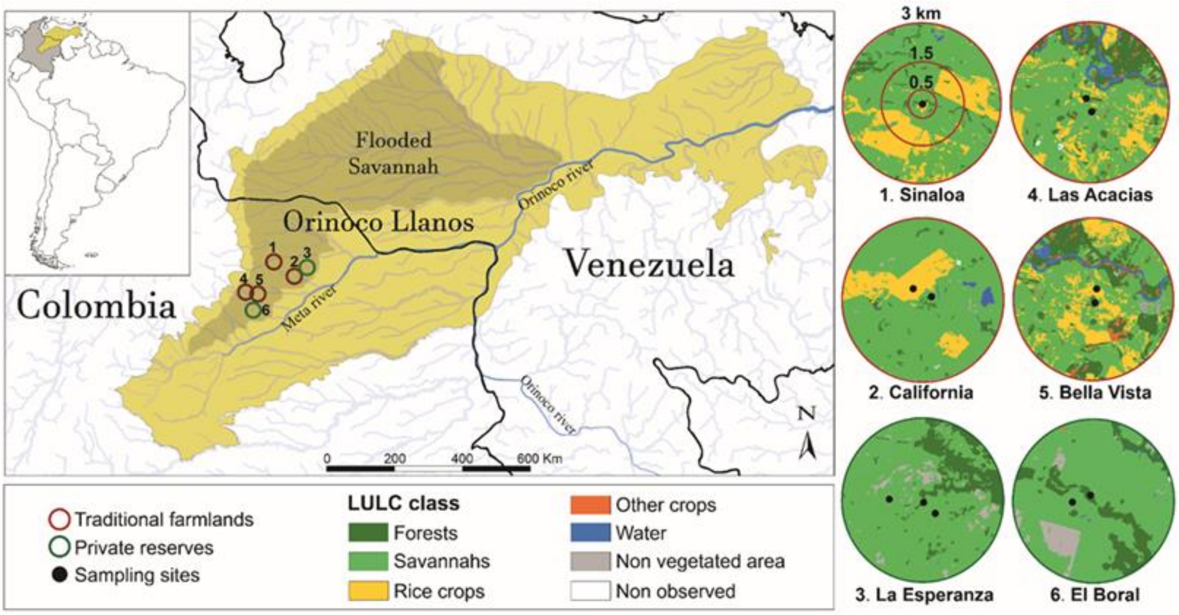

Fig. 1. Spatial distribution of the six Colombian landscapes in traditional farmlands and private reserves in the Orinoco Llanos ecoregion. The darkest area highlights the flooded (hyper seasonal) savannah. Each landscape is characterized by "Land Use Land Cover" (LULC) class and focal scales of 0.5, 1.5, and 3 km radii (as represented in Hato Sinaloa) centred on each mist net sampling site.

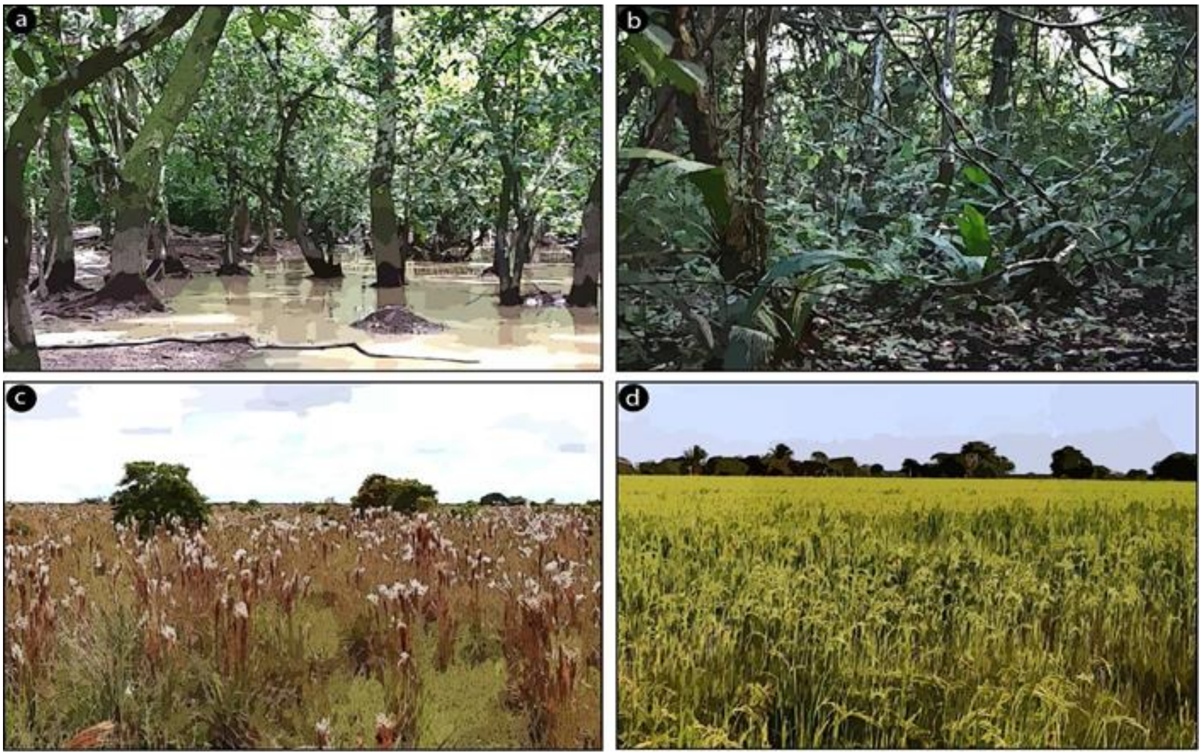

Fig. 2. Differences in vegetation structure among the habitats where mist nets and acoustic detectors were used to sample bats, Orinoco region, Colombian Llanos. a = riparian forest, b = unflooded forest, c = flooded savannah, d = conventional rice crop.

Insectivorous bat species richness was higher in the riparian forests (22 species) and preserved savannahs (22) than in unflooded forests (19), organic rice (18) and conventional rice (16). Organic rice exhibited a higher richness of insectivorous bat species than conventional rice (Table 1).

Table 1. Complete list of insectivorous bat species and presence recorded using passive acoustic monitoring in five habitats in the Colombian Llanos.

Family	**Species**	**Organic rice**	**Conventional Rice**	**Unflooded Forests**	**Riparian Forests**	**Preserved Savanahs**
Emballonuridae	*Saccopteryx leptura*	X	X	X	X	X
	Saccopteryx canescens	X	X	X	X	X
	Saccopteryx bilineata			X	X	X
	Peropteryx macrotis	X	X	X	X	X
	Peropteryx kappleri	X				X
	Centronycteris centralis		X	X		
	Rhynchonycteris naso				X	X

Noctilionidae	*Noctilio albiventris*	X	X	X	X	X
	Noctilio leporinus			X	X	X
Molossidae	*Cynomops planirostris*	X	X	X	X	X
	Eumops glaucinus	X	X	X	X	X
	Eumops nanus	X	X	X	X	X
	Molossops temminckii	X			X	X
	Sonotipo Molossus (Mmol-Mruf)	X	X	X	X	X
	Molossidae I (Edab)	X	X	X	X	X
	Molossidae III (Nyc-Tad)	X			X	
	Promops centralis	X	X	X	X	X
	Promops nasutus	X			X	
Vespertilionidae	*Eptesicus orinocensis*	X		X	X	X
	Eptesicus sp	X	X	X	X	X
	Lasiurus sp	X	X	X	X	X
	Myotis nigricans	X	X	X	X	X
	Myotis riparius		X	X	X	X
	Myotis albescens					X
	Rhogeessa sp		X	X	X	X
Species per habitat		18	16	19	22	22

Through the RLQ and fourth-corner analysis based on the presence/absence of the insectivorous bat species, we found a positive and significant relationship between the FME (frequency of maximum energy) and the riparian forest. In contrast, we found a negative and significant association between the FME and the rice cover and between species that emit pulses with an FM-qCF structure with the shortest distance to water (Fig 3).

RLQ analysis suggests some exciting associations between insectivorous bat traits and the environment. Data indicate that bat species emitting pulses with an FM-qCF structure were associated with riparian forests, savannah, and cover. Similarly, the only bat species with FM pulse structure was related to riparian forests. FM-qCF and FM pulses are typical of aerial insectivores in highly cluttered spaces and are emitted by background-cluttered space aerial insectivores. This relation means these bat species are more frequently found in forestry areas or edge forests characterised by cluttered spaces (Fig 4). In contrast, we found a relationship between insectivorous bats that emit qCF pulses with open areas such as conventional and organic rice. However, the molossid bat seems more associated with conventional rice, while some emballonurid bat species seem more related to organic rice (Fig 4).

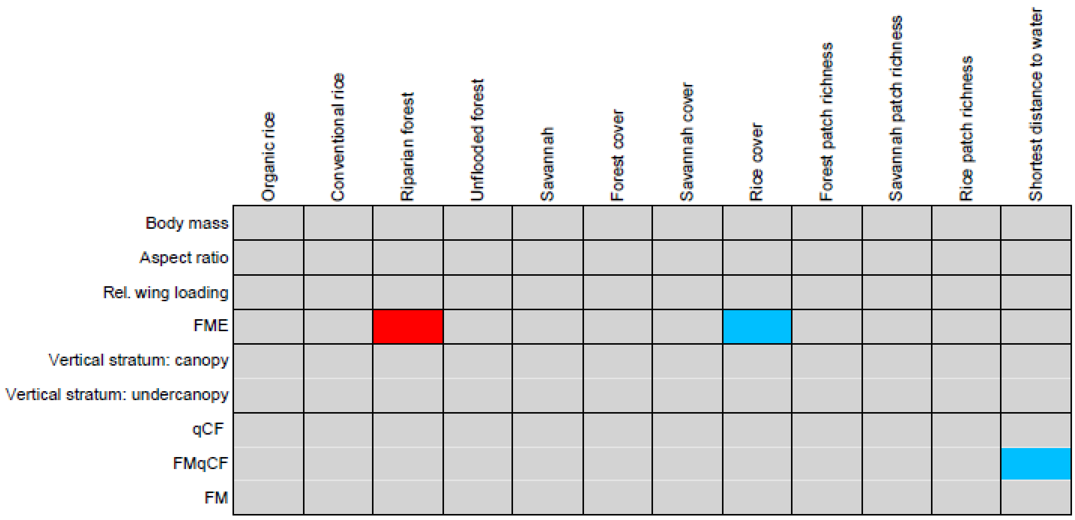

Fig. 3. Results from the fourth-corner test for bivariate associations between insectivorous bat species traits and environmental variables in the Orinoco Llanos ecoregion. Blue square: significant and negative association, red square: significant and positive association, gray square: non-significant association.

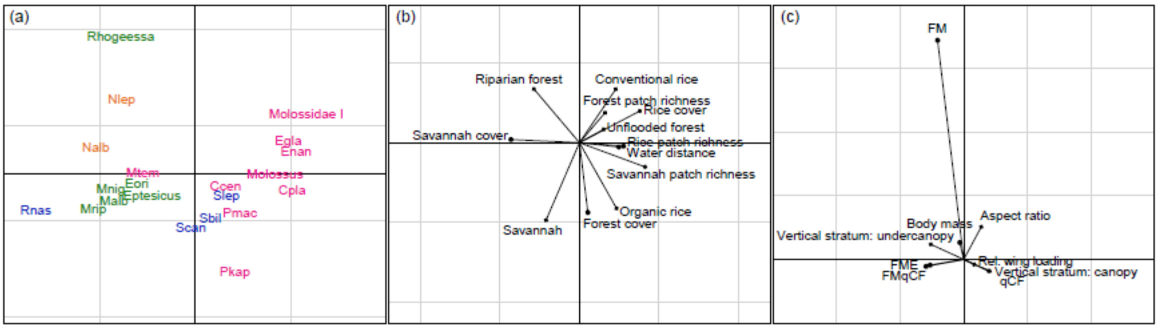

Fig. 4. Results from the RLQ analysis between insectivorous bat functional traits and environmental variables in the Orinoco Llanos ecoregion. Relatedness between the insectivorous species identified and some sonotypes (a), association between the type of habitat and landscapes variables (b), and association between the insectivorous bats' traits (c).

Table 2. Preliminary list of activity values obtained for aerial insectivore bat species using acoustic sampling (Fig. 5) in four habitats in the Colombian Llanos. The data will be modelled, analysed and discussed in future manuscripts.

Species	**Habitat type**	**Mean passes**	**Mean passes per habitat**
Eptesicus orinocensis	Conventional rice	6.0	12.3
Eptesicus orinocensis	Unflooded forest	4.0	67.9

Eptesicus orinocensis	Riparian forest	5.5	47.6
Eptesicus orinocensis	Savannah	5.5	16.7
Sonotipo Molossus (Mmol-Mruf)	Conventional rice	5.5	13.7
Sonotipo Molossus (Mmol-Mruf)	Unflooded forest	4.0	38.2
Sonotipo Molossus (Mmol-Mruf)	Riparian forest	5.5	21.3
Sonotipo Molossus (Mmol-Mruf)	Savannah	5.5	9.2
Myotis nigricans	Conventional rice	5.5	12.2
Myotis nigricans	Unflooded forest	4.0	20.9
Myotis nigricans	Riparian forest	5.5	7.4
Myotis nigricans	Savannah	5.0	8.6
Molossops temminckii	Conventional rice	2.0	0.7
Molossops temminckii	Unflooded forest	4.0	12.6
Molossops temminckii	Riparian forest	5.5	13.1
Molossops temminckii	Savannah	5.0	2.3
Noctilio albiventris	Conventional rice	5.5	6.5
Noctilio albiventris	Unflooded forest	5.0	13.4
Noctilio albiventris	Riparian forest	5.5	27.9
Noctilio albiventris	Savannah	5.5	7.3
Noctilio leporinus	Conventional rice	6.0	70.1
Noctilio leporinus	Unflooded forest	5.5	117.2
Noctilio leporinus	Riparian forest	6.0	87.2
Noctilio leporinus	Savannah	6.0	66.1
Promops centralis	Conventional rice	6.0	50.9
Promops centralis	Unflooded forest	3.5	161.2
Promops centralis	Riparian forest	6.0	59.0
Promops centralis	Savannah	6.0	47.0
Rhogeesa minutilla	Conventional rice	3.0	9.0
Rhogeesa minutilla	Unflooded forest	4.0	24.9
Rhogeesa minutilla	Riparian forest	5.5	8.2
Rhogeesa minutilla	Savannah	5.0	6.9
Rhynchonycteris naso	Conventional rice	6.0	7.4
Rhynchonycteris naso	Unflooded forest	5.5	34.3
Rhynchonycteris naso	Riparian forest	5.5	9.9
Rhynchonycteris naso	Savannah	5.5	9.8
Saccopteryx canascens	Conventional rice	6.0	85.1
Saccopteryx canascens	Unflooded forest	5.5	146.3
Saccopteryx canascens	Riparian forest	6.0	147.2
Saccopteryx canascens	Savannah	6.0	94.7

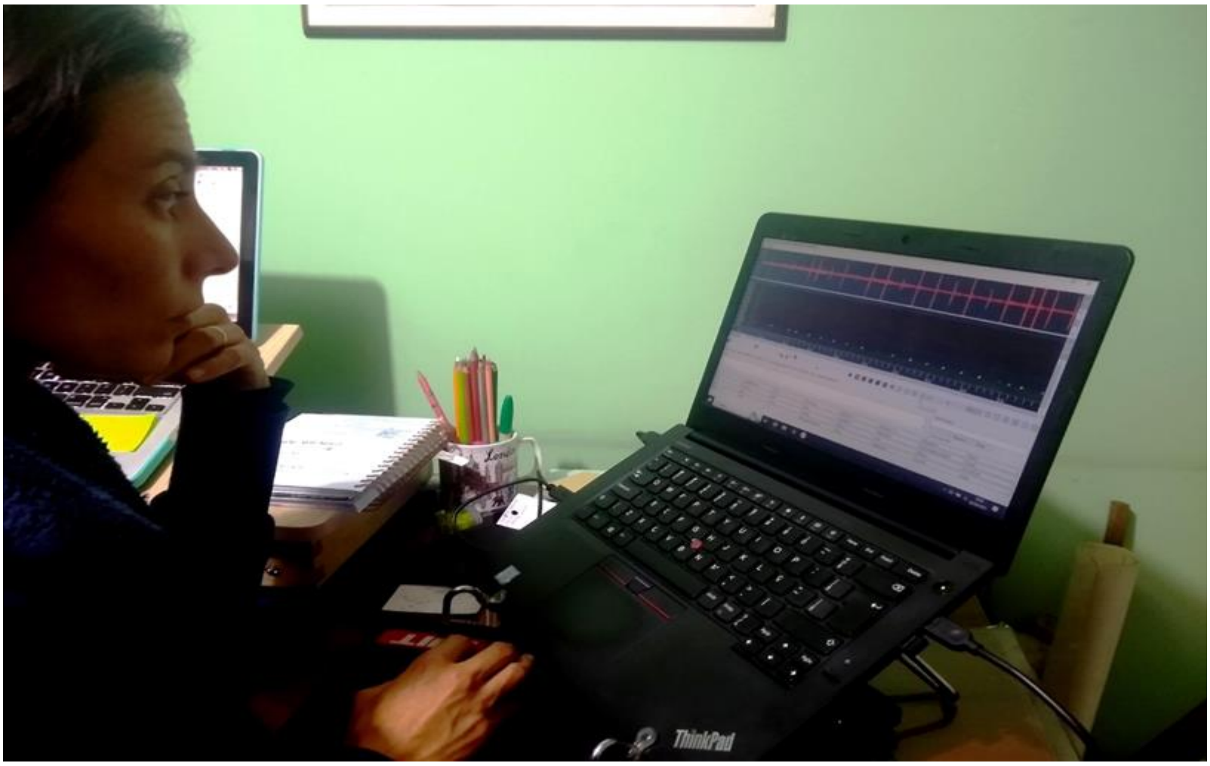

Fig. 5. Dr. Aída Otálora-Ardila analysing acoustic data of insectivorous bats recorded in the Orinoco Llanos.

2. **Multiple dimensions of phyllostomid bat biodiversity and trait-environment relationships between phyllostomid bat species and habitat disturbance in the Orinoco Llanos**

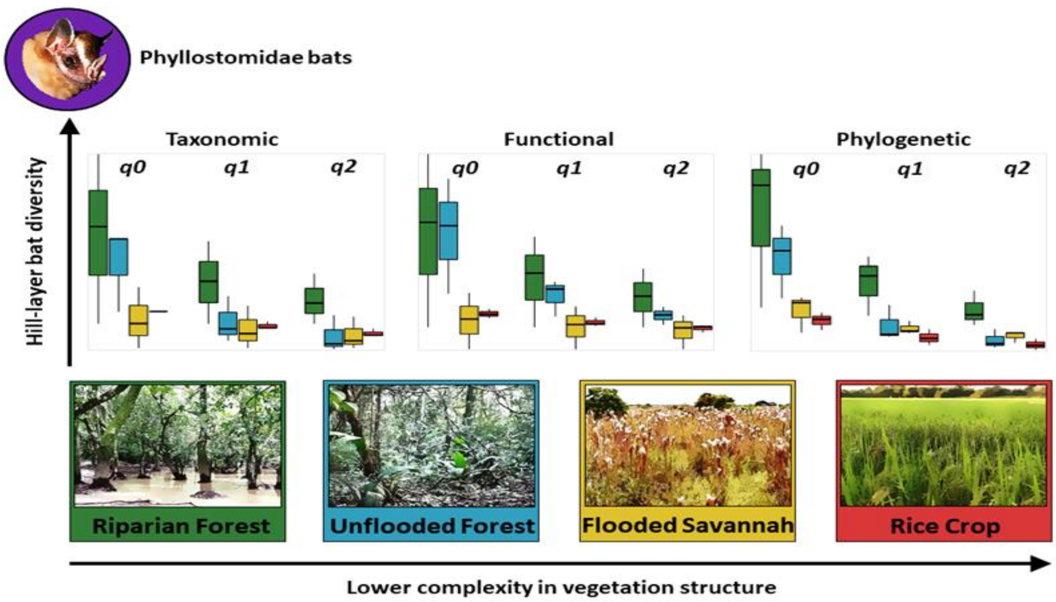

Fig. 6. GRAPHICAL ABSTRACT concerning the first objective focused on phyllostomid data.

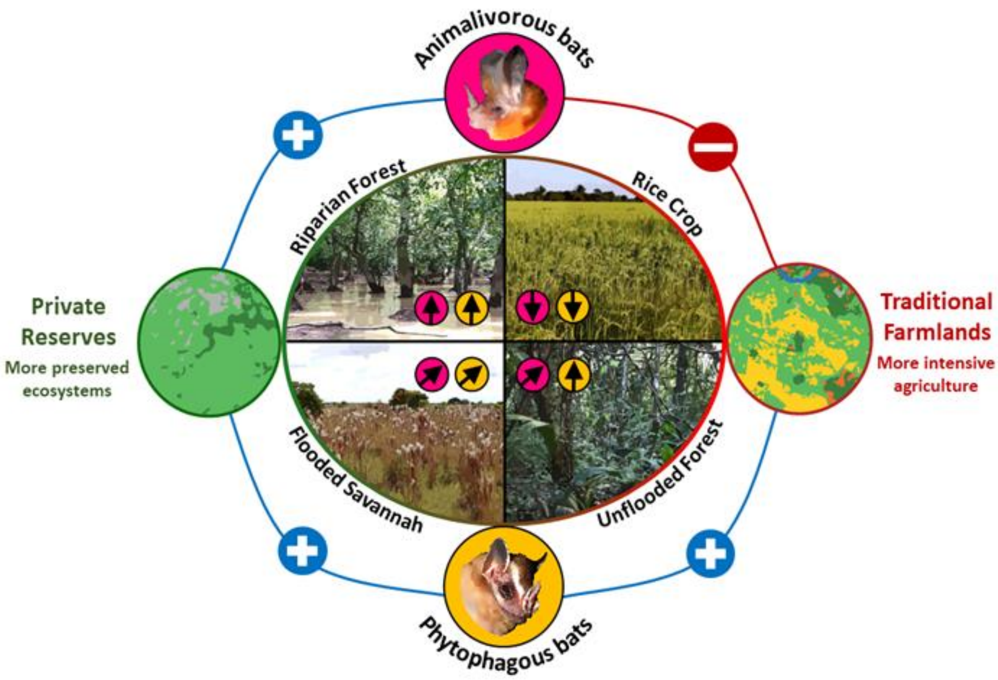

Fig. 7. GRAPHICAL ABSTRACT concerning the second objective focused on phyllostomid data.

Table 3. Complete list of species and numbers of captures using mist nets in four habitats in the Colombian Llanos. Same-site recaptures (= 29) were excluded.

Species	**Riparian forests**	**Unflooded forests**	**Preserved Savannahs**	**Rice fields**	**Total**
Artibeus lituratus	23	40	8	21	92
Artibeus planirostris	31	212	3	4	250
Carollia brevicauda	3	0	0	0	3
Carollia perspicillata	34	38	5	3	80
Chiroderma villosum	2	0	1	0	3
Choeroniscus minor	0	1	0	0	1
Cynomops planirostris	6	15	0	0	21
Dermanura gnoma	2	0	0	1	3
Desmodus rotundus	10	3	1	0	14
Eptesicus orinocensis	19	11	1	0	31
Eumops glaucinus	2	6	0	0	8
Eumops nanus	22	34	3	6	65
Glossophaga soricina	9	2	0	0	11
Lampronycteris brachyotis	3	0	0	0	3
Lophostoma brasiliense	11	5	0	0	16
Mesophylla macconnelli	1	0	0	1	2
Molossops temminckii	20	13	0	2	35

Molossus molossus	0	0	2	2	4
Molossus rufus	34	1	0	0	35
Micronycteris microtis	1	0	0	0	1
Micronycteris minuta	12	0	0	0	12
Myotis albescens	0	0	1	0	1
Myotis nigricans	2	6	4	0	12
Myotis riparius	5	10	0	0	15
Noctilio albiventris	14	22	32	9	77
Phyllostomus discolor	0	6	0	0	6
Phyllostomus elongatus	2	2	1	0	5
Phyllostomus hastatus	4	6	0	0	10
Platyrrhinus angustirostris	2	10	1	2	15
Platyrrhinus brachycephalus	0	2	0	0	2
Platyrrhinus helleri	1	4	0	1	6
Platyrrhinus cf. *matapalensis*	1	0	0	0	1
Rhogeessa sp.	0	1	0	0	1
Saccopteryx bilineata	1	1	0	0	2
Saccopteryx canescens	6	3	8	4	21
Sturnira lilium	1	25	0	0	26
Trachops cirrhosus	3	0	0	0	3
Uroderma bilobatum	8	65	4	8	85
Uroderma magnirostrum	5	6	2	5	18
Total of individuals	**300**	**550**	**77**	**69**	**996**
Total of species	**33**	**28**	**16**	**14**	**39**

2. Describe the three most important outcomes of your project.

1. We found striking data on the trait-environment relationships between insectivorous bat species and habitat disturbance in the Orinoco Llanos. Our data suggests that functional traits and environmental variables jointly predict variation in bat presence/absence patterns in altered landscapes. We also found that environmental filtering represented mainly by riparian forests consistently shapes bat assemblages, selectively benefiting insectivorous bats emitting FM-qCF pulses and strongly associated with water bodies. Although we are still analysing the activity data for insectivorous bat species, it would be interesting to identify if these patterns are consistent, considering the bat activity.

2. We obtained novel data in our project associated with multiple biodiversity dimensions of Phyllostomidae bat species and their vulnerability to habitat disturbances. Our findings show that functional traits and environmental variables jointly predict variation in bat occupancy patterns in countryside landscapes at a local scale. We also demonstrate that environmental filtering represented mainly by conventional rice crops consistently shape bat assemblages, selectively benefiting the most abundant and disturbance-tolerant phytophagous species. We wrote two manuscripts showing these findings. One of them was submitted at

"Animal Conservation" associated with the first objective of this project but using Phyllostomidae bats from mist-netting data (Fig 8a). The second one manuscript was submitted at "Biodiversity and Conservation" associated with the second objective and using Phyllostomidae bats from mist-netting data (Fig 8b).

3. Inclusion of two undergraduate students (Yuri Chantre and Jessica Blanco) for developing their theses. Yury Chantre has finished her undergraduate thesis, and Jessica Blanco is still analysing data. Yury Chantre analysed the insect diversity, comparing the taxonomic diversity at the level family. She found a higher number of insect families in the savannah than in the conventional rice (Fig 9). In contrast, there were more insects in the conventional rice (36063) than in the savannas (21190).

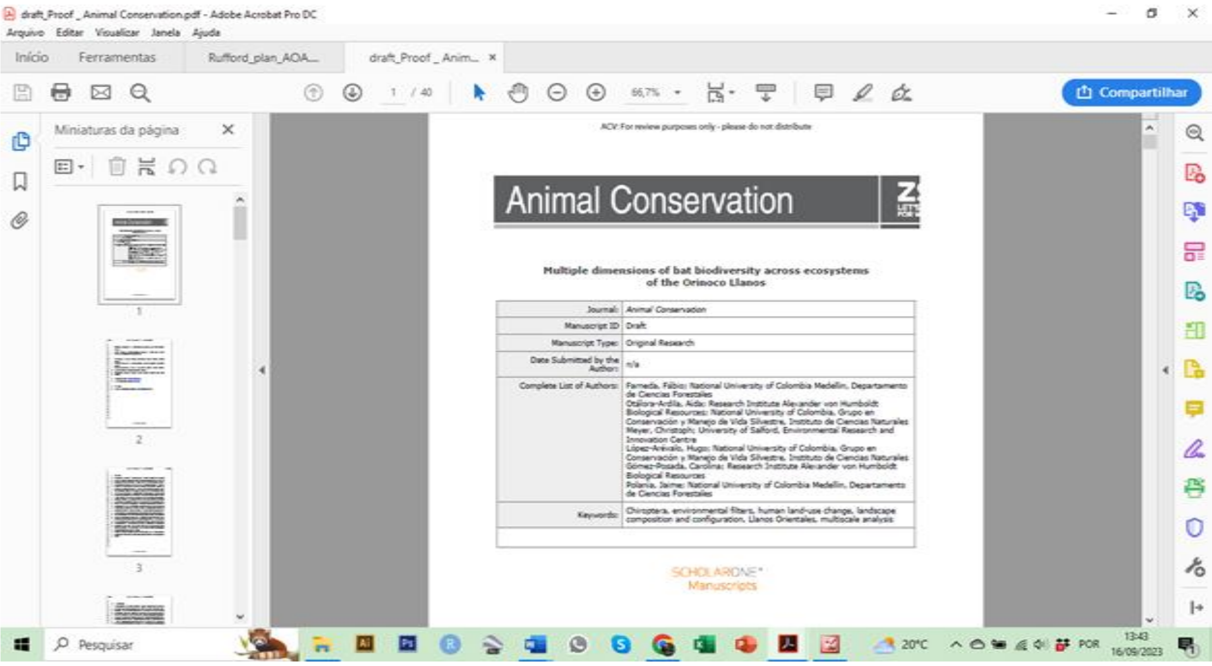

Fig8. a). Article submitted to the traditional conservation journal, *Animal Conservation*.

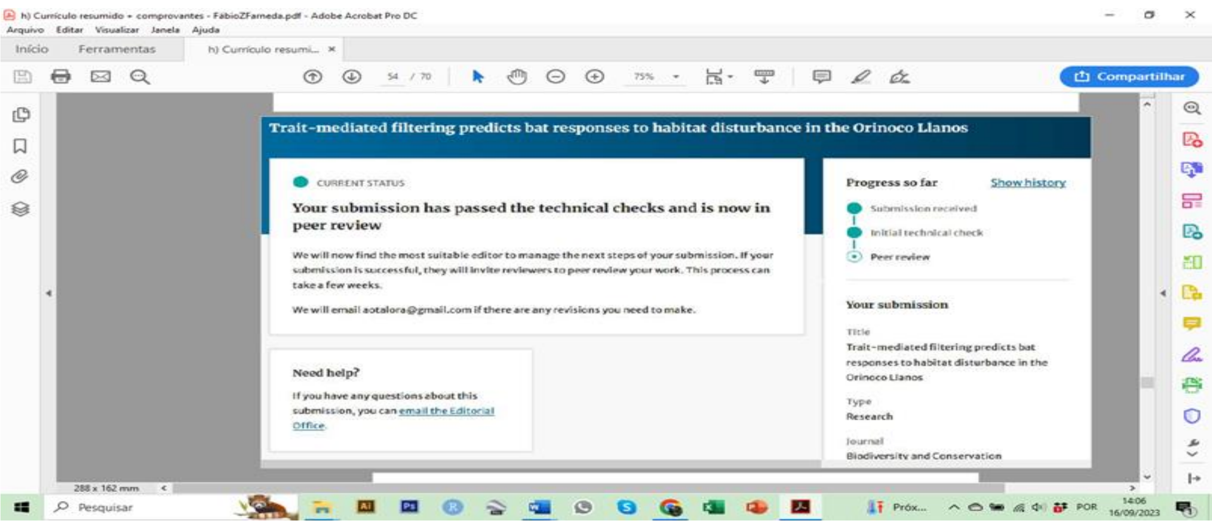

Fig8. b). Article under review in *Biodiversity and Conservation*.

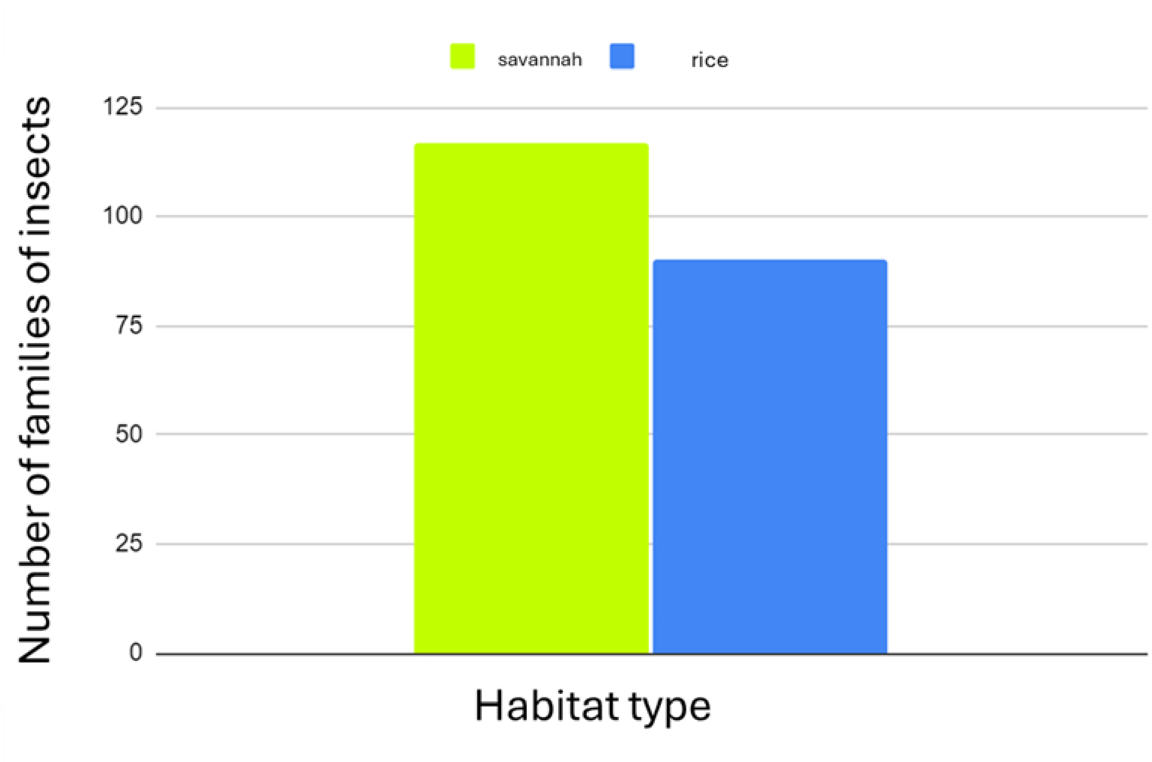

Fig 9. Number of families of insects registered in preserved savannahs and conventional rice fields in in the Orinoco Llanos ecoregion.

Fig 11. Undergraduate students Yuri Chantre and Jessica Blanco (Pedagogical and Technological University of Colombia, also known as "UPTC") working with insect samples in an unflooded forest area at Finca Bella Vista.

3. **Explain any unforeseen difficulties that arose during the project and how these were tackled.**

Fieldwork in the Orinoco Llanos is challenging due to poor or absent road infrastructure or public safety situations. In addition, considering just one owner (of three) decided to farm rice again this year, we found a low number of bats captures in organic rice crops. Therefore, organic rice fields were not included in the analyses for phyllostomid bats. Furthermore, the Orinoco Llanos is characterised by a high seasonal fluctuation, with dry and extreme rainfall periods, and this made it difficult to access the sampling points mainly during the rainy season due to the high-water level in savannas, rice paddies, and riparian forests. To overcome the water problem, the farm owners helped us with transport until the sampling sites through of tractors (Fig. 6) or by horses (Fig. 7).

Fig. 12. "Sinaloa" farm employee helping us get to the rice sampling sites during the rainy season with the tractor.

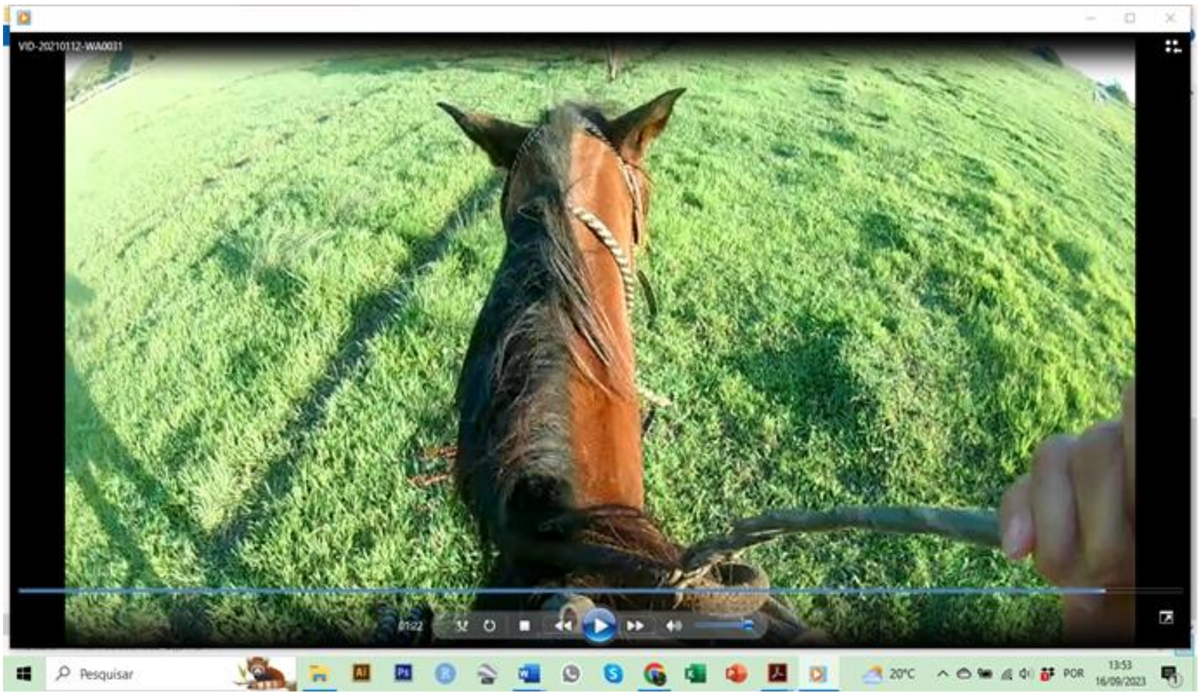

Fig. 13. We use horses in the "California" farm to get to bat sampling sites during the rainy season.

4. **Describe the involvement of local communities and how they have benefitted from the project.**

During the fieldwork the landowners of the private reserves and farmlands were very receptive and collaborative. Some residents of these communities helped with fieldwork during sampling monitoring and specimen captures. During field sampling, conversations with landowners were important (Fig. 8), showing why studying and protecting this species and its environment is essential. Moreover, in the articles we include guidelines for future research and applied recommendations highlighting the importance of private reserves in minimising the detrimental effects of habitat conversion and preventing local extinctions of particularly disturbance-sensitive bat species and of the ecosystem services that they are providing. The private reserves protect part or the whole of a natural ecosystem, and their owners have voluntarily committed to biodiversity conservation without receiving financial government assistance. Initiatives of the Colombian and Venezuelan Governments' environmental departments and agencies to support the creation of private reserves via payments for ecosystem services are scarce. Safeguarding the private reserves through payments for environmental services and implementing and encouraging more wildlife-friendly farming in the Colombian Orinoquia is of prime relevance if current governance fully realises its promise of environmental protection. Our results support calls for promoting sustainable advancement in the Orinoco macro-basin to reduce trade-offs between food security and nature conservation, to improve the preservation of natural ecosystems outside protected and indigenous areas, and to stimulate scientific research to fill part of the several ecological knowledge gaps, such as the green economy. Encouraging the creation of more wildlife-friendly farming practices, as we did in the articles, and supporting private reserves in the long-term is key to ensuring the functional connectivity between forest and savannah patches in the Llanos. This, in turn, would enable the conservation of a more complete set of bat species across these human-disturbed landscapes and the maintenance of their crucial ecosystem functions and services such as insect suppression and pollination.

Fig. 14. Bat field team and owners of "La Esperanza" Reserve.

5. Are there any plans to continue this work?

Yes, of course! We aim to quantify the role of insectivorous bats as insect pest controllers in conventional rice crops through controlled exclusion experiments. To achieve this, we will quantify the role of bats as insect pest controllers in rice crops through exclusion. Three new field expeditions will be carried out in Casanare to sample bats in areas of conventional rice fields of Hato California, Sinaloa, and Finca Bella Vista. To carry out the exclusion experiments, we will build a control (open) enclosure and another exclusion enclosure in each farm, separated at least 100 m from each other and the nearest tree line. The enclosures will be constructed using a

9 x 9 x 4 m high bamboo frame. A mesh will cover the enclosure walls and ceiling, allowing insects to pass through but exclude all bats. The control bullring will have identical bamboo frames without networks. These experiments will be developed during vegetative growth and maturation of the grain of rice. This way, the fieldwork will be conducted between May and August, where rice cultivation presents already developed plants. Parallel to the exclusion experiment, passive acoustic monitoring will be carried out to determine the activity patterns of insectivorous bats using two Song Meter 4 recorders. This acoustic monitoring involves capture or direct manipulation of individuals since records of the presence and activity of the species will be estimated from the analysis of recordings obtained remotely. Acoustic data processing and post-identification of species will be carried out following what was previously described in objectives 1 and 2. The effect of the exclusion of bats on rice plants will be determined by identifying foliar damage (e.g., yellowing, defoliation of leaves, and herbivory) and counting the number of spikes produced in both the control and exclusion enclosures. To test the effect of the treatment (exclusion or control) on plant damage caused by insects, a linear mixed model will be carried out generalised (GLMM). The response variables will be foliar damage (presence/absence) and the number of spikes, the explanatory variable will be the type of treatment (exclusion/control), and the site will be considered a random effect. Further, the objective in academic terms is also now to hire a master or doctoral student to analyse the acoustic data and write at least three more articles.

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

This project is part of the postdoctoral of Aída Otálora-Ardila and Fábio Zanella Farneda, and at the moment, two articles were submitted for publication.

The first original manuscript entitled "Multiple dimensions of bat biodiversity across ecosystems of the Orinoco Llanos" was accepted in "Animal Conservation". This is the first study highlighting the importance of private reserves to protect multiple diversity metrics (taxonomic, functional, phylogenetic) of bat communities to habitat conversion in a Neotropical savannah. The Orinoco Llanos ecosystems in Colombia and Venezuela are highly biodiverse, threatened by varied intensity levels of human activities, rarely protected throughout conservation parks, necessary for the livelihoods of local communities, and ecologically little studied. Here, we quantified landscape variables (habitat cover, patch density, and edge density) across three spatial scales (0.5, 1.5, 3 km) and surveyed bats using mist nets in riparian and unflooded forests, flooded savannahs, and conventional rice fields, to investigate how changes in habitat quality through human activity affect taxonomic, functional, and phylogenetic dimensions from two Colombian farming systems in the Orinoco Llanos: traditional farmlands with high-intensity agriculture (mainly rice production) and Civil Society Nature Reserves with greater ecosystem protection. We used a unified framework for measuring biodiversity based on Hill numbers, and modelled the taxonomic, functional, and phylogenetic diversity and landscape variables using Bayesian generalised linear mixed-effects models.

The second original manuscript entitled "Trait-mediated filtering predicts bat responses to habitat disturbance in the Orinoco Llanos" was accepted in "Biodiversity and Conservation". This is the first study aiming to understand which functional traits of bat species correlate with their vulnerability to habitat disturbance across the Orinoco Llanos ecosystems, and it is the first to highlight the role of private reserves in protecting biodiversity in this ecoregion. Here, we used body mass, wing morphology, trophic level, and diet to identify which traits make phyllostomid bat species more vulnerable to human impacts in the Orinoco Llanos ecosystems of Colombia from traditional farmlands with high intensity agriculture and Civil Society Nature Reserves with greater ecosystem protection. Bats were surveyed using mist nets in riparian forests, unflooded forests, flooded savannahs, and conventional rice crops. We tested the associations between species traits and environmental characteristics of the landscape (habitat cover and type, patch richness, shortest distance to water) using a combination of RLQ and fourth-corner analyses, accounting for both spatial and phylogenetic autocorrelation.

We presented the results, and we will continue offering them at national and international scientific events, such as the "*Annual Meeting of the Association for Tropical Biology and Conservation (ATBC*)" or the "*Colombian Mastozoology Congress*". Further, we presented a virtual lecture series about the project, showing the objectives and results to students from different knowledge of environmental areas.

We will make scientific divulgation through press releases or short educational videos about the results obtained to encourage the publication of articles on environmental and conservation journalism platforms. Furthermore, we continually extend our social media project by disseminating results obtained, the fieldwork activities, and curiosities about the conservation of the bat species studied.

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

The next step is to conduct the first Neotropical bat exclusion experiment in rice fields to understand the importance of bats as biological pest controllers. This study will determine the level of damage from insect pests in rice fields with the experimental exclusion of bats and how this will contribute to more greater and sustainable rice production. With the information obtained in this study, it will be possible to quantify the ecosystem services that bats provide and how this may represent new ways to protect this taxonomic group and reduce the use of pesticides.

8. 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?

We used the The Rufford Foundation logo trough the posters and oral presentations in scientific events about biodiversity conservation, such as *IV Colombian Mastozoology Congress*, *I Colombian Bio-acoustic and Eco-acoustic Congress*, (Fig. 9) and... We also mentioned the The Rufford Foundation in our articles, lectures, and in the posts on social media (Instagram, Facebook) about the project (Fig. 10).

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Patrón de actividad de murciélagos insectívoros en sabanas inundables y arrozales en los Llanos colombianos

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Vulnerabilidad de las especies de murciélagos a la conversión del hábitat en los Llanos colombianos

Aída Otálora-Ardila*[1,2], Fábio Z. Farneda[3], Sara Gabriela Acosta-Morales[3,4], Hugo Fernando López-Arévalo [5], Carolina Gómez-Posada[1]

Fig. 15. Examples of scientific material that were published in events.

Fig. 16. Publicity of the project on Facebook.

9. Provide a full list of all the members of your team and their role in the project.

Aída Otálora-Ardila	Project coordinator and principal researcher. She performed budgets, writing, and submitting the project, the final report, and articles. During the fieldwork, she programmed and executed the data collection. In activities after fieldwork: processed and analysed data and results. She is responsible for creating and disseminating all extension material content on social media
Fábio Zanella Farneda	Project sub-coordinator and associate researcher. He reviewed and edited the project, the final report, and the articles. In activities after fieldwork: assisted in the processing and analysis of data and led the writing of the manuscripts
Christoph F. J. Meyer	Bat specialist who helped us write the articles and analysed the data
Hugo F. López-Arévalo	He has collaborated through initial relationships with local stakeholders and with ideas for the preparation of the study area map
Jaime Polanía	Supervisor of postdoctoral research of Dr. Farneda, and he has helped with the manuscript review
Carolina Gómez-Posada	My supervisor of postdoctoral research, and she has contributed to manuscript review
Thomas Lilley	The inclusion of Professor Thomas Lilley (Helsinki University) will take place now in a second project phase through the involvement of a master's student to analyse molecular data on diet samples collected from insectivorous bats.
Jessica Blanco	Helped with fieldwork and is developing a study on beta diversity with data obtained in this project
Yuri Chantre	Helped with fieldwork and is developing a study on insect diversity with data obtained from this project
Jonatan Caro Montoya	Fieldwork
Hernán Serrano	Cartographic analysis
Landowners of the private reserves and farmlands	Logistic support and permissions to sampling in their lands

10. Any other comments?

We are very grateful for the grant from The Rufford Foundation. In the current Colombian financial scenario for scientific research, this financial support is pivotal to carrying out our project and increasing the scientific knowledge of the importance of private reserves to bat conservation in the Orinoco Llanos. Furthermore, this grant from Rufford made it possible to include two undergraduate students. Finally, we highlight the importance of aligning the academy and the community concerning the conservation of multiple bat biodiversity dimensions, and our objective is to continue the bat monitoring project in the Llanos.