

Final Evaluation Report

Your Details	
Full Name	Oscar Gustavo Martínez López
Project Title	Conservation monitoring in Mesoamerica: linking local indigenous knowledge with natural history of bumble bees
Application ID	36145-1
Date of this Report	August 8th 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
Understanding the relationship between people and bumblebees				This objective was fulfilled, there is strong evidence of the different relationship that people have with bumblebees across their crops and fields.
Natural history information for bumblebee species				We have information from nesting sites, materials for nest construction, nest architecture, temperature and humidity recordings.
Nest search and finding				It is partially achieved, since we were expecting finding nests for different bumblebee species, and we found only for one species.
Bumblebee floral visitation				We have information on which crops they visit, and we also have pollen and honey studies for a bumblebee species that will enhance the information from the field.

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

a). The first outcome is information on the relationship of people from the Mam culture with bumblebees in an area which has high biodiversity, the Tacana volcano. This information will be valuable for conservation, as Mam people have different ways in which they manage their landscape, cohabit their territory with bumblebees which enhances or diminish bumblebee health and survival. This information has been transmitted between people from each community and will be used for Red List assessments for the region.

b). The second outcome will be the information gathered around the natural history of a neotropical bumblebee species. All the information is new to the scientific community and will be valuable to other regions.

c). The third outcome will be information on bumblebee floral visitation, and the relationship between crops from the Mam people and bumblebees.

Understanding the relationship between Mam people and bumblebees in the field. All of the ethnoentomological knowledge that they have is invaluable, and the way they relate with bumblebees (the positive, the negative) is something that probably

happens across the region. This will be information valuable for conservation purposes.

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

Finding nests was harder than expected and record them in the field was difficult. We thought using endoscope cameras to find the nests would be a good way to find the nest, but as we tried to use them several times, we saw that it is difficult to follow one tunnel, as there are multiple twists and turns that the camera is not able to do.

We relied on the expertise of the people from the community and dig and got as closer as we could to get the endoscope camera to film the nest in situ.

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

Local people were actively engaged in the project, as they found the nests and ask me about bumblebee species and their importance in the region. After our workshop, the information that they provided plus my experience, gave them an idea of why bumblebees are important, why they find them in flowers, how can they protect them and themselves from being stung. Finally, part of the involvement of kids from the community in the workshop led them to understand the importance of pollination, and they explained that to their parents and families. People were happy that kids were involved, since they hope that the curiosity they had for bees and bumblebees can eventually led them to study them.

5. Are there any plans to continue this work?

There is so much more to be done! There is still information on more bumblebee's species to be recorded in the area, local people want to understand more the pollination process and how can they benefit from pollinators.

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

We had workshops in which we share back with the community all the information they have plus the information I have. This is important for the local community. I am working on a manuscript to be published on a journal, in which we highlight the traditional knowledge of the Mam people towards bumblebees, and their relationship with this type of bees. This would be the third manuscript that I know that involves local knowledge with bumblebees worldwide.

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

We believe that we just scratched the surface of all the things that can be done in the region. People are interested in pollination and its importance in their crops, they are interested in kids' education and the positive impacts that research can have. Regarding bumblebee natural history, there is still much to be done, since finding

nests is still a priority and we need more information on this. Now that we understand properly how people find nests in their crops, and the seasonality of finding these nests, we could focus more the time on the field (staying in the community 2 months when people in the community will pick up the crops, and 2 months when people will start the crop season. This will help maximise the efforts in finding nests, and at the same time learn more about the natural history of bumblebees.

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?

Yes, during the workshop, and all the materials given and all the arduinos have logos.

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

Oscar Martínez: Project leader, initiated the research, went to the field, and found nests, collected bumblebees, and recorded flower interactions. Organized the workshop with the communities. Designed the semi-structured interviews and interviewed more than 30 people in the community. Writing the scientific article to be published and will assist to the XIII Mesoamerican Native Bee Congress to share this experience.

Perez family (Jesús and Esteban): They were the first people to be contacted, they share their experience and went to the field to find nest and support our efforts in the community.

Miriam Aldasoro: Assessor, reviewed the questions for the interviews, gave guidance towards information on traditional knowledge and tuned the workshop. Co-author to the scientific article and congress talk.

Rémy Vandame: Assessor, reviewed the questions for the interviews. Co-author to the scientific article and congress talk.

Ruth Hernández: Undergraduate student supervised by Oscar Martínez. Went to the field, collected honey and pollen from the nests that we found. Collected bumblebees, recorded flower interactions. Using the information and the support from this project to write her Bachelor Thesis and will assist to the XIII Mesoamerican Native Bee Congress to share this information and will also write a scientific article as well.

10. Any other comments?

We believe that there is so much more to do, and we will apply for a second booster, as there is so much more to do towards conservation of pollinators and bumblebees in the region. We want to thank The Rufford Foundation for its support on this project, and we will continue to give credits to the foundation in the years to come as there will be more information and useful information generated thanks to the support of this project.



Figure 1. Documenting bumblebee interactions (*Bombus wilmattae*) in native plant (*Cirsium* sp.).



Figure 2. Jesús Pérez showing how to find nests in the field.



Figure 3. Pictures of a bumblebee nest (*Bombus wilmattae*) found in the field.





Figure 4. Digging and using the dataloggers to record humidity and temperature.



Figure 5. Extraction of nest, honey, and pollen.



Figure 6. Workshop held in Ejido Benito Juárez El Plan. **Figure 7.** Interviewing people near Sibinal, San Marcos (Bottom right).



Figure 8. Bumblebee on bean flower.