

## The Rufford Foundation

### Final Report

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Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to [jane@rufford.org](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

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#### Grant Recipient Details

<b>Your name</b>	Alfredo García González
<b>Project title</b>	Evaluation of the influence of the coffee species on vascular epiphytes assemble, in shade coffee plantations of Soconusco, Chiapas,
<b>RSG reference</b>	21114-1
<b>Reporting period</b>	2017-2018
<b>Amount of grant</b>	£4998
<b>Your email address</b>	alfredmx22@gmail.com
<b>Date of this report</b>	January 26, 2018

**1. Please 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 study vascular epiphytes assemblies that characterize to the <i>Coffea arabica</i> and <i>Coffea canephora</i> coffee plantations, in the Soconusco region, Chiapas.				One scientific paper (thought to be sent to <i>Biología Tropical</i> magazine) and one science dissemination paper (which it is thought to be sent to <i>Biodiversitas</i> magazine), are currently in preparation. As soon as the papers are published, we will send copies to The Rufford Foundation.
To identify how many species share these agroecosystems and to know how many exclusive, endemic, rare and endangered species occupied them, and what areas are of greater importance for conservation.				<u>Title of papers</u> <i>Biología Tropical</i> : Evaluating the influence of coffee species on vascular epiphyte assembles, in shade coffee plantations of Soconusco, Chiapas, Mexico <i>Biodiversitas</i> : Shade coffee plantations, a refuge for vascular epiphytes in southern Chiapas, Mexico
To work with farmers, for them to know the biological richness of its plantations, and to involve them in its conservation.				

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).**

It was impossible to work in the coffee plantations of three peasant communities visited during the second semester of the project, mostly due to problems between the peasants, regarding the boundaries of the plots. In addition, the budget could not be executed exactly as it was initially planned, because in some tacks we had to spend more than the amount initially expected, also, the prices of some materials went up, then the planning had to be readjusted. However, these setbacks will be taken into account when requesting a 2nd. Rufford Small Grant, and despite the setbacks, the planned objectives of the study were satisfactorily achieved. Work was carried out in 12 sites, where periodic visits were made to carry out several environmental

education activities with the communities, and to carry out the monitoring of vascular epiphytes in coffee plantations.

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

- a)** We collected current data on the concurrence of vascular epiphytes (richness and abundance) that characterize the coffee plantations (*Coffea arabica* L. and *Coffea canephora* Pierre ex A. Froehner), in the Soconusco region, Chiapas.
- b)** Was obtained current information about the exclusive, endemic, rare and endangered species that occur in this agroecosystems.
- c)** We identified "hotspots" of diversity among the coffee plantations studied, in terms of richness of vascular epiphytic species. In addition, it was possible to know the specific characteristics that differentiate the coffee plantations of *C. arabica* and *C. canephora*, in terms of their role as reservoirs of diversity, and also the substrate preferences of the epiphytes in each type of agroecosystem and the typical species of each kind of plantation.

The data obtained during the project are very relevant for the conservation of vascular epiphytes in the studied area, an area where for decades most of the original forests were removed to replace them with shade coffee plantations. Fortunately, to a certain extent, these agroecosystems develop environmental conditions similar to the habitats they replaced, and they are capable of harbouring part of the original diversity if they are properly managed. Notwithstanding, despite the ecological importance of these agroecosystems, works like this has never been done before. All the information obtained in the project will be published very soon in two papers we are preparing (a scientific paper in *Biología Tropical* magazine and a science dissemination paper in *Biodiversitas* magazine). However, we are offering a summary of the most important results. About 122 taxa belonging to 12 groups of vascular epiphytes were identified, where the most outstanding groups considering the number of species were ferns and lycophytes (26 species), and among the angiosperms the families Orchidaceae (49 species) and Bromeliaceae (15 species). *Coffea arabica* and *C. canephora* plantations generally present different vascular epiphytic communities, being the *C. arabica* plantations the richest. However, both agroecosystems are very important, considering that each one harbours numerous taxa, which they do not share. Also, in both agroecosystems the vascular epiphytes behave differently. In the case of the coffee plantations of *C. canephora*, the vascular epiphytes grow mainly on shade trees, while in the coffee plantations of *C. arabica*, shade trees and coffee bushes play a similar and fundamental role. In two *C. arabica* plantations (Fracción Montecristo and Benito Juárez El Plan communities), were found several rare and threatened orchid species such as *Telipogon helleri* (L.O. Williams) N.H. Williams & Dressler, *Oncidium guatemalensis* M.W. Chase & N.H. Williams, *Oncidium poikilostalix* (Kraenzl.) M.W. Chase & N.H. Williams and *Lepanthes samacensis* Ames, which were growing mainly on coffee bushes. The coffee plantations of *C. arabica* with greater richness and abundance of vascular epiphytes were those of Fracción Montecristo and Benito Juárez El Plan, while in the case of *C. canephora*, were the

coffee plantations of San Vicente and La Fortuna 1. In both types of coffee plantations, the dominant shade tree, on which the greatest number of taxa and individuals of vascular epiphytes grew, was the "chalum" [*Inga micheliana* Harms; Fabaceae]. However, in the case of coffee plantations of *C. canephora*, "spring" was also important [*Tabebuia donnell-smithii* Rose; Bignoniaceae], the "cedar" [*Cedrela odorata* L.; Meliaceae] and the "nanche" [*Byrsonima crassifolia* (L.) Kunth; Malpighiaceae]. Unfortunately, it was possible to corroborate the proliferation of destructive management practices for vascular epiphytes, such as "desmusgue", excessive pruning and the extensive substitution of *C. arabica* for *C. canephora*.

**d)** The information about the vascular epiphytes that live in the shade coffee plantations of Soconusco, their ecological and potential economic importance, state of conservation and threats in the region, were disseminated through environmental education programmes that were implemented in the peasant communities with which we work. In general, these communities welcomed the programme with great enthusiasm and always expressed that they felt very happy and identified with the activities of the project. In addition, from the beginning of the project, we identified communities with the greatest fondness for ornamental plants, and more enthusiastic and interested in activities. Then with these communities we performed special activities to train them in the correct identification and importance of vascular epiphytes for their coffee plantations, and prepare them as local guides and community managers.

**4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).**

The peasant communities that cultivate the shade coffee plantations were a key component during the development of this project. These people explained to us the different forms of management that they apply in the coffee plantations of the Soconusco region. They gave us permission to enter their plots, they served as a guide and support during field works, and actively participated in the different environmental education activities that we carry out in the communities during the development of the project.

All the activities we developed during the project activities were aimed at achieving the greatest possible integration of the communities, and to make them feel motivated and identified with the work we were developing. The importance of conserving the diversity of vascular epiphytes was continually emphasised, in order to have richer and healthier ecosystems, of which they could be proud of and in the future could obtain sustainable economic benefits. Some of these benefits could be green seals, in order to obtain more competitive prices of their coffee productions in select markets of North America and Europe. They could also insert their coffee plantations in payment programs for environmental services, and coffee plantations rich in vascular epiphytes could be a potential source for the development of ecotourism, where local guides would have a leading role.

The main short-term benefits for local communities was the acquisition of knowledge

and training regarding the species of vascular epiphytes that they have in their plots, and the importance of maintaining traditional managements in their shade coffee plantations, avoiding intensive managements that destroy the diversity of vascular epiphytes and reduce the biological richness of these agroecosystems.

#### **5. Are there any plans to continue this work?**

Chiapas is the most diverse state of Mexico, in terms of vascular epiphytic species, mainly orchids. Therefore, we would like to study the richness, abundance and conservation problems these plants have in other sites of the state. This would allow us to obtain an overview of the state of conservation and main threats that these plants have in Chiapas, and to work with communities and decision makers to mitigate these threats. With this in mind, I will soon apply to a 2nd. Rufford Small Grant to study the concurrence of orchids that live in the Valley of San Cristóbal, their main threats, species in greater danger and impact of human communities. San Cristóbal Valley is located in the region of Altos de Chiapas, one of the areas with the greatest diversity of orchids in the state and one of the areas with the highest population growth in recent years.

Later, we would like to request a Booster Grant to resume the study of vascular epiphytes associated with shade coffee, but this time expanding the study to other coffee regions of Mexico, which would allow us to establish comparisons, know the richness and abundance of vascular epiphytes that it is associated with these agroecosystems throughout the country, and establish communication to the peasant communities that support them.

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

We will share our results through two publications, one scientific paper and one science dissemination paper. These articles are currently in the preparation phase, and are intended to be sent to *Biología Tropical* magazine in the case of the scientific paper, and to *Biodiversitas* magazine in the case of the science dissemination paper. Also, during the meetings in the communities and through the environmental education activities we carry out, we disseminate the results of this project. In addition, we are planning to meet soon with presidents of the ejidal areas studied, and with local and regional decision makers (belonging to the Secretariat of Environment and Natural Resources [SEMARNAT] and the National Commission of Protected Natural Areas [CONANP]), linked with the protection and management of natural resources, to explain them the results obtained and discuss possible management proposals. Likewise, when the articles are published, copies will be provided to the decision makers and the communities, in which we think mainly when elaborating the science dissemination paper.

#### **7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?**

The Rufford Foundation grant was used for a period of 12 months, from February 2017 to January 2018.

**8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Digital camera, lens and accessories	450	440	- 10	We find a better offer
1 Laptop	400	410	+10	Prices have risen
1 GPS	60	50	- 10	We find a better offer
1 Diametric tape	10	8	- 2	We find a better offer
2 Measuring tape	18	16	- 2	We find a better offer
6 Flagging tape	22	22		
Wages for field guides of the communities	380	400	+ 20	Prices have risen
Raincoats and rain boots	70	60	- 10	We find a better offer
Food for the field	940	990	+ 50	Prices have risen
Gas	1400	1550	+	Prices have risen
2 Sleeping bags	30	24	- 6	We find a better offer
2 Backpacks	118	110	- 8	We find a better offer
1 Camping tents	50	50		
Flashlights and batteries	50	50		
Travel	350	350		
Office supplies, printer and	160	160		
Paper publishing	200	0	- 200	The papers have not been
Posters printing	60	110	+ 50	In addition to the posters, we
Contingences	230	230		
<b>TOTAL</b>	<b>4998</b>	<b>5030</b>		Local exchange rate: 22

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

It is essential to maintain the exchange of experiences and systematise long-term environmental education activities in the peasant communities with which we work. In addition, to expand the study to other coffee regions of Mexico, which would allow us to obtain essential information to have an overview of the diversity of vascular epiphytes housed by the different types of coffee plantations and the important role they play in their conservation. Also, it would allow us to establish actions of conservation and environmental awareness on a large scale and with greater effectiveness. It would be great to organise meetings and exchanges on conservation and management experiences among the



different peasant communities that grow and manage the coffee plantations in the country, and as it would be a larger project, it could have greater visibility, which would facilitate access to other sources of funding which guarantee continuity.

**10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the RSGF receive any publicity during the course of your work?**

The Rufford Foundation logo was used in environmental education materials, such as PowerPoint presentations, posters, brochures, jars and decals. This material contains images and basic information regarding the project, and was used in different events and activities in the communities. Also, The Rufford Foundation will be referred to and grateful in the Acknowledgments section of the articles that will be published. In addition, the RF logo will appear in all the presentations and scientific posters that are made with the results of the project.

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

<b>Miembros del equipo de trabajo</b>	<b>Rol en el proyecto</b>
Alfredo García González	Coordination of the team and activities. Participation and planning of field work and environmental education activities. Taxonomic identification of many taxa. Data management and development of scientific and science dissemination papers.
Frander Brian Riverón Giró	Support during field work and environmental education activities. Collaboration in the taxonomic identification of taxa. Cooperation in data management and preparation of scientific and science dissemination papers.
Nelson Pérez Miguel	Support during field work and coordination in the communities.
Mariana Teresa Vázquez Alonso	Preparation and conservation of herbarium specimens collected during field work. Collaboration in the taxonomic identification of taxa. Support in environmental education activities.
Field guides and community of the different peasant communities in which we work	Support during field work and environmental education activities. Coordination in the communities.

**12. Any other comments?**

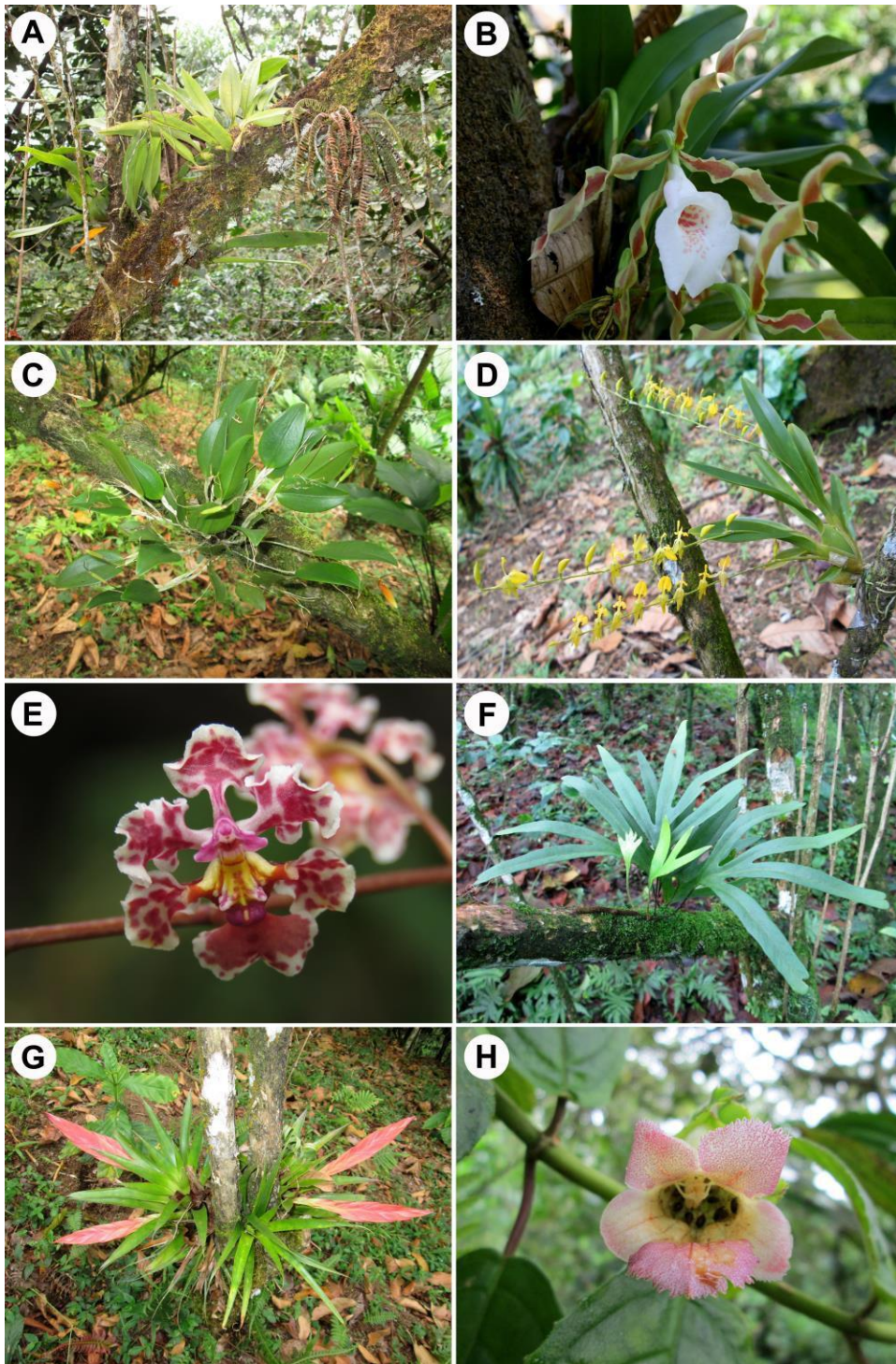
I would like to express a great thanks to The Rufford Foundation for the support given to this project, of great relevance for the conservation of vascular epiphytes in southern Chiapas, Mexico.

**FIGURES**



**Figure 1.** A: Shade coffee plantation of *Coffea arabica* (community Benito Juárez El Plan). B: Shade coffee plantation *Coffea canephora* (community La Fortuna 1). C: Field work in a coffee plantation of *C. arabica* (community Benito Juárez El Plan). D: Collecting herbarium materials in a coffee plantation of *C. canephora* (community San Vicente).





**Figure 2.** Some of the vascular epiphyte species that grow in shade coffee plantations of *Coffea arabica* and/or *Coffea canephora*, in the Soconusco, Chiapas, Mexico. A: *Trichopilia tortilis* Lindl. [Orchidaceae] and *Melpomene xiphopteroides* (Liebm.) A.R. Sm. & R.C. Moran [Polypodiaceae]. B: *Trichopilia tortilis*. C: *Restrepia trichoglossa* F. Lehm. ex Sander [Orchidaceae]. D: *Oncidium guatemalensis* M.W. Chase & N.H. Williams [Orchidaceae]. E: *Trichocentrum oerstedii* (Rchb. f.) R. Jiménez & Carnevali [Orchidaceae]. F: *Pleopeltis angusta* Humb. & Bonpl. ex Willd. [Polypodiaceae]. G: *Tillandsia multicaulis* Steud. [Bromeliaceae]. H: *Drymonia serrulata* (Jacq.) Mart. [Gesneriaceae].