

The Rufford Foundation Final Report

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.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details

Your name	Frander Brian Riverón Giró
Project title	Ecology and conservation of <i>Tetramicra malpighiarum</i> , the most endangered orchid of
RSG reference	21753-1
Reporting period	2017-2018
Amount of grant	£4997
Your email address	franderb29@gmail.com
Date of this report	April 7, 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
<p>Relocate the population of <i>Tetramicra malpighiarum</i> of the northern coast of Ciego de Ávila province, and find possible new populations in the north-east and south-east coast of Cuba.</p>				<p>During the year of the project we conducted 15 field expeditions, three in the northern coast of Ciego de Ávila province, one in the northern coast of Camagüey province (province of central Cuba, neighboring to Ciego de Ávila province), eight on the southeast coast and three on the northeast coast of Cuba. In each of these expeditions we stayed several days in the field and explored different locations. However, it was not possible to locate any new population of <i>T. malpighiarum</i>, apart from the population already known in El Guafe, Granma province.</p>
<p>To study ecological aspects of <i>T. malpighiarum</i> populations of El Guafe and of the other populations that are located.</p>				<p>We consider that this objective was partially fulfilled because it was not possible to locate new populations of <i>T. malpighiarum</i>, so we could only make the ecological study of the population of El Guafe. However, in this population we obtained very relevant ecological information. The absence of the species in other areas of the country is an essential fact to take it into account for planning conservation efforts. With the information obtained during the investigation we are preparing a scientific paper (thought to be sent to Lankesteriana magazine) and it is about to be published one science dissemination paper in Flora y Fauna, an important scientific popular magazine in Cuba. As soon as the scientific paper is published, we will send copies to The Rufford Foundation.</p>

To develop a map of current and potential distribution of <i>T. malpighiarum</i> .			As new populations of <i>T. malpighiarum</i> were not found, it was not possible to construct the map of current and potential distribution of the species.
To develop scientific dissemination and environmental education activities with human communities close to <i>T. malpighiarum</i> population, so that they know the biological importance of this orchid species and to involve them in their conservation.			

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

The project was very complicated from the logistical point of view. In Cuba the mobility and the assurance of food in the field is very difficult. However, we managed to carry out 15 field expeditions, where we walked through large, wild and difficult to access areas. These field expeditions were mainly carried out in areas with xeromorphic coastal scrub, semi-deciduous forest and transition areas between these two plant formations, which are very dense vegetation complexes with many hard and particular characteristics, such as spiny shrubs and a lot of sun. Generally, during each of these expeditions we stayed many days in the field, and to reach the areas where we made the field expeditions, we had to use several means of transportation, such as public buses, horse carts, rented cars, tractors and cargo trucks.

In addition, the budget could not be executed exactly as it was originally planned, and the expenses were higher than we expected. Mainly for the field work we used more funds than we reported (we spend more in food, gas, lodging, transportation, payment to field guides etc.), as well as the awareness raising activities and buying materials. So to achieve our goals would not be possible without the support in the first place of The Rufford Foundation and also to the help provided by Mohamed Bin Zayed Species Conservation Fund. We are very grateful to both of these foundations for supporting our conservation work, especially to The Rufford Foundation.

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

a) We confirmed that *T. malpighiarum* is probably more threatened than initially thought. During the field trips it was not possible to locate other new populations, apart from the population located in El Guafe, Desembarco del Granma National Park (DGNP). Although several expeditions were made in the regions of the country where were most likely to find *T. malpighiarum* populations.

b) Current information about the ecological characteristics of *T. malpighiarum* in El Guafe, DGNP was obtained. Current data concerning flowering, population structure, circular distribution and vertical zonation of the individuals on the phorophytes, and species and dimensions of the phorophytes where *T. malpighiarum* grows.

The data obtained during the project are very relevant for the conservation of *T. malpighiarum*, an orchid species of very restricted distribution, which is currently only known from the El Guafe area, in the DGNP, Granma province, southeast Cuba. Fortunately, at this moment the ecosystem where *T. malpighiarum* is found, is healthy and apparently this orchid species can develop its life cycle without difficulties. However, this area is very vulnerable and any affectation that it suffers, both of natural and anthropic origin, can compromise even more the already delicate conservation situation of *T. malpighiarum*. It is difficult to predict and manage the possible impacts of natural phenomena such as hurricanes, which can potentially impact this region, although possibly *T. malpighiarum* has evolved to be resilient to this type of affectations. However, it is feasible to take actions to mitigate possible anthropic effects, which would probably cause more serious damage to the population of this orchid species.

El Guafe is an interpretative path in the area of public use of the DGNP, so its level of protection is not very strict. In addition, this trail is very accessible and with little protection, its entrance is very visible and is on the edge of the road that reaches the community of Cabo Cruz, very close to this community (approximately 2.5 km before reaching the community). In general, the existence of *T. malpighiarum* is known in Cabo Cruz community, some people of this community work linked to the DGNP, and on several occasions there have been events of illegal extraction of individuals from the natural population of *T. malpighiarum*. Not necessarily the robbery of *T. malpighiarum* individuals must have been carried out by people of Cabo Cruz, although probably they have been guided by people of this community, or eventually by settlers from other more remote communities, such as Las Coloradas (on the edge of the DGNP) or Belic (another community approximately 7 km from the edge of the DGNP).

It is essential to continue monitoring the population of *T. malpighiarum* of El Guafe, to know the population dynamics of the species in the long term, and to evaluate if it is growing, decreasing or remaining stable over time. One of the positive findings of our study was that *T. malpighiarum* is able to occupy two other plant species (*Croton* sp. [Euphorbiaceae] and *Maytenus buxifolia* (A. Rich.) Griseb. [Celastraceae]) as phorophytes, apart from the seven species previously reported (García-González et al., 2016). This is a positive fact, and it expands the chances of survival and adaptation of this orchid species, considering that historically it was claimed that *T. malpighiarum* was only able to grow on *Malpighia incana* Mill. (Malpighiaceae).

All the information obtained in the project will be published in a scientific paper that we are working on (we are planning to send it for publication in the specialised magazine *Lankesteriana*). In addition, one science dissemination paper

will be soon published in *Flora y Fauna*, a scientific popular periodic publication widely distributed among managers of protected areas of Cuba (e.g. DGNP). Being written in simple language and having numerous images, this article will be very attractive and will play an important role in working with the communities that live within the DGNP (e.g. Cabo Cruz), or in its periphery (e.g. Las Coloradas and Belic). It will also serve as a base for the biodiversity managers of the DGNP to focus their conservation efforts on *T. malpighiarum*, and will facilitate the work of field workers in the protected area.

c) Activities of scientific dissemination and environmental education were developed with the human communities close to *T. malpighiarum* population, mainly in Cabo Cruz, but also in Las Coloradas and Belic.

The results achieved in this objective were one of the most satisfactory achievements of the project. We worked mainly with children, but also with adults, performing dynamics and various activities so that they know the biological importance of this orchid species, its delicate state of conservation, make them feel proud of having a living being exclusive of their region, and encourage them to get involved in its conservation.

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

The communities of Cabo Cruz, Las Coloradas and Belic (communities within or on the periphery of the DGNP) were a key component during the development of this project. Both with the children and with the adults of these communities, various education and environmental awareness activities were carried out, focused on the knowledge, valorization and conservation of *T. malpighiarum*, but also on the conservation of the DGNP in general, of all plant species of its region and its local ecosystems. In addition, several locals from the different regions of Cuba that we visited during the search for new populations of *T. malpighiarum*, served as a guide and support during the field work.

One of the most exciting activities that we did during the project was a drawing contest which we developed with children from the elementary school of Cabo Cruz. The contest was called: "I take care of my little orchid", and during this activity the children drew and explained how they could contribute with *T. malpighiarum* conservation. By means of this activity we could see how much the children had increased their knowledge about the importance of preserving our natural resources, and specifically this peculiar species of orchid.

5. Are there any plans to continue this work?

It would be excellent to obtain other funding that would allow us to continue making field expeditions to different regions in the Cuban coasts, to carry out an exhaustive search of *T. malpighiarum*, and to corroborate if the *T. malpighiarum* population of El Guafe is really the only one in Cuba and in the world. Confirming this information would have great implications for the conservation of this orchid species.

In addition, we are very interested in continued monitoring of the only known population of *T. malpighiarum*, to take demographic data for several years, and thus to know the demographic behavior of this population. These data would also be very relevant for the conservation and long-term management of this orchid species and its habitat. Thinking precisely about this, during this project we worked closely with several field workers of the DGNP, and trained them in the collection of ecological data, so that they would continue to visit the population periodically and take the annual data of each individual of *T. malpighiarum*. Also, to the best of our ability we would try to return to visit the population and monitor the data collection, whenever possible.

Also, considering the great floristic richness of Cuba, with numerous endemic taxa, and probably many of them threatened; we are very interested in continue studying the ecological characteristics, the current distribution and the threats faced by several Cuban endemic plants species, which apparently have very restricted distribution. This would allow us to obtain an overview of the state of conservation of these taxa and work with communities and decision makers to mitigate these threats. With this in mind, I will soon apply for a 2nd. Rufford Small Grant.

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

Our two articles (one scientific paper and one science dissemination paper) will be an excellent means of disseminating the results and for the project. The scientific paper is currently in the preparation phase and will be sent to the specialised journal *Lankesteriana*. The science dissemination paper should be published soon, in the scientific popular magazine *Flora y Fauna*.

Also, during all the education and environmental awareness activities that took place in the communities, we disseminated the results of this project. During the development of the project we worked very close with the workers and officials of the DGNP and with the regional authorities of the CITMA (Ministry of Science, Technology and Environment). The workers and officials of the DGNP actively participated with the communities in many of the activities, and we had several training meetings and field trips with the field workers. Likewise, when the articles are published, we will provide copies to the DGNP, to the schools and social circles of the communities and to the regional office of CITMA. All this regardless of the distribution and normal distribution that magazines will have (*Lankesteriana* is an international distribution magazine, while *Flora y Fauna* is a national distribution magazine).

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 April 2017 to March 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		-450	This equipment was purchased with a small grant obtained from Mohamed Bin Sayed Species Conservation Fund
1 laptop	400		-400	
1 GPS	60		-60	
1 Diametric tape	10	20	+10	It was necessary to buy 2 diametric tape
2 Measuring tape	18	16	-2	We find a better offer
6 Flagging tape	22	22		
Wages for field guides of the communities	385	490	+105	We visited more places than initially planned, so we had to hire more guides and for more days
Raincoats and rain boots	65	95	+30	We found a better offer and it was necessary to buy more quantity
Food for the field	940	1060	+120	More places were visited than initially planned and we stayed more days in the field. Also, prices were higher
Fuel	1400	1560	+160	The distance traveled was greater than initially calculated
2 Sleeping bags	30	36	+6	It was necessary to buy 3 sleeping bags
2 Backpacks	117	150	+33	It was necessary to buy 3 backpacks
1 Camping tents	50	100	+50	It was necessary to buy 2 camping tents
Flashlights and batteries	50	90	+40	We visited more places than initially planned and in each expedition we stayed several days in the field
Travel	355	740	+385	We visited more places than initially planned and to reach many of the sites we had to use public transport or with rented means of transportation (horse carts, rented cars, tractors and cargo trucks)
Office supplies, printer and toners	160	185	+25	Prices were higher
Paper publishing	200		-200	The science dissemination paper is

				about to be published in Flora y Fauna magazine, and the scientific paper is still being prepared, but we plan to send it to Lankesteriana magazine. These two journals are prestigious and recognized publications, but they do not charge for the publication of articles. This allowed us to reorganize the budget to cover other expenses, where the price of materials increased or when we needed to spend more than we had originally planned.
Posters printing	55	210	+155	In addition to the posters, we sent to print collapsible, t- shirts, stickers and keychains, so we had to allocate more funds for this
Contingences	230	230		
TOTAL	4997	5004		Local exchange rate: 22 MXN = £1

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

It is essential to systematise the activities of education and long-term environmental awareness in the communities within and on the periphery of the DGNP. Also, to maintain the monitoring of the population of *T. malpighiarum* of El Guafe, to know the demographic behaviour of this species over time, to know its most vulnerable life stages, flowering rate, pollination, germination and mortality, and its natural cycles of growth or decline, data that will accurately address the current status of the population and its viability over time. In addition, continue working with DGNP officials and CITMA authorities to increase the level of protection in the El Guafe area, and to improve access control and management actions in the area.

Likewise, we would like to work with other species of Cuban endemic plants, of restricted distribution, using methodologies similar to those used during this project. This would allow us to obtain a general idea of the conservation status of these species, their ecological characteristics, current distribution and the main threats they face in their habitats. Then, the results obtained would encourage attention to these species and contribute to their conservation, for which the work we have done with *T. malpighiarum* and the general experience acquired during this project would be of great help.

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 during all the education and environmental awareness activities that we developed with the communities within and on the periphery of the DGNP. Also in all the didactic materials (folding, poster, shirts, stickers, keychains) that we elaborate to support the activities and give diffusion to

the project. In addition, The Rufford Foundation logo will appear in all PowerPoint and poster presentations that will be presented at scientific events, where reference will be made about the results of the project. Likewise, in the Acknowledgments section of the two articles derived from the project, we refer and thanks the RSGF.

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

Frander Brian Riverón Giró

Coordination of the work team. Planning and participating in field trips and environmental education activities. Field data collection, data management and preparation of the scientific and scientific dissemination articles.

Anne Damon

Support and advice for the collection of ecological data in the population of *T. malpighiarum* and for environmental education activities. Cooperation in data management.

Ernesto Palacio

Support during field work and environmental education activities. Coordination in the communities.

Carlos Acevedo

Coordination and support during the field works, mainly for the departures developed in the north coast of Ciego de Ávila province and Camagüey province.

Field workers of the DGNP (mainly Leicy Milanés Andrés)

Support during field work and environmental education activities. Coordination in the communities.

Raisa Escalona Domenech (Ph.D. student of ECOSUR)

Support during field work and environmental education activities. Data management.

Field guides in the different visited regions of Cuba and community promoters of Cabo Cruz, Las Coloradas and Belic. 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 knowledge and conservation of *T. malpighiarum*; currently one of the most endangered Cuban endemic plants.

Figures



Figure 1. a-b: *Tetramicra malpighiarum* in its habitat (transition areas between xeromorphic coastal scrub and semi-deciduous forest), El Guafe trail, Desembarco del Granma National Park, Granma province, Cuba. c: Field work, collecting ecological data from the population of *T. malpighiarum*. d: About to enter to the El Guafe trail, starting a day of ecological data collection in the population of *T. malpighiarum* (Leicy Milanés Andrés and Frander Brian Riverón Giró).



Figure 2. Winning drawings of the drawing contest "I take care of my little orchid", made with children from the elementary school of Cabo Cruz community, Desembarco del Granma National Park, Granma province, Cuba. a: Category 5 to 7 years old. b: Category 7 to 9 years old. c: Category 9 and 10 years old. d: Category 11 and 12 years old.