

## Final Project Evaluation Report

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Your Details	
Full Name	Frander Brian Riverón Giró
Project Title	Ecology and conservation of <i>Tetramicra malpighiarum</i> , the most endangered orchid of Cuba II
Application ID	26181-2
Grant Amount	£ 5000
Email Address	Franderb29@gmail.com
Date of this Report	August 23, 2019

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
<p>Develop field expeditions on the southern and northern coasts of Cuba, from Guantánamo to Sancti Spiritus provinces, with emphasis on the south-eastern coast (Granma-Santiago de Cuba-Guantánamo), and in the northern coast of Ciego de Ávila province, to try to locate new populations of <i>T. malpighiarum</i>.</p>				<p>During the year of the project, we carried out 11 field expeditions; four on the north-central coast of Cuba, one on the northeast coast, and six on the southeast coast. Three expeditions were carried out on the northern coast of Ciego de Ávila province; one on the northern coast of Sancti Spiritus province (central Cuba province, neighboring to Ciego de Ávila province); one on the northern coast of Camagüey province (central Cuba province, neighboring to Ciego de Ávila province), one in Pilon, Granma province, on the southeast coast, two in the area of the natural geomorphological trail Cueva de Samuel and one in Boca del Río Toro, both regions within the Desembarco del Granma National Park, and two in coastal zones of Santiago de Cuba province (southeast Cuba province, neighboring to Granma province).</p> <p>In each of these expeditions, we stayed several days in the field and walked through 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>Take ecological and demographical data of <i>T. malpighiarum</i> populations; and to collect leaf samples of all located populations to develop Genetic analyses.</p>			<p>As it was not possible to locate new populations of <i>T. malpighiarum</i> we consider that this objective was partially fulfilled. Notwithstanding, we continued the ecological studies of the population of El Guafe (three expeditions were carried out to El Guafe to collect ecological data from the population of <i>T. malpighiarum</i>). The absence of this species in other areas of the country increases the importance of the population of El Guafe and targets it as a priority for conservation efforts. All ecological data that we can obtain from this population will be necessary for understanding the natural history of the species, and to preserve it in its habitat. The leaf samples will be used to carry out genetic analyses in the future. To achieve this goal, we need to look for other funding sources.</p>
<p>Develop science divulgation and environmental education activities in the communities close to <i>T. malpighiarum</i> populations.</p>			<p>Throughout the year of the project we systematised the awareness, environmental education and dissemination activities of the project initiated during the Rufford Small Grant. Also, new activities were carried out. The key human communities with which we worked were Cabo Cruz, Las Coloradas and Belic, although some actions were also carried out in Alegría de Pio and Boca del Toro communities, allocated within or on the periphery of Desembarco del Granma National Park.</p>

<p>Write scientific and science divulgation articles</p>			<p>With the information gathered during the 2<sup>nd</sup> Rufford Small Grant and part of the Rufford Small Grant information, we are preparing a scientific paper (we want to send it to Plant Ecology and Evolution magazine). In addition, another science dissemination paper is being prepared and we think to send it to Flora and Fauna magazine, an important scientific popular circulation magazine in Cuba. As soon as both papers are published, we will send copies to The Rufford Foundation.</p>
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**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

As happened during the Rufford Small Grant, in the 2<sup>nd</sup>. Rufford Small Grant the main difficulties faced by the teamwork were related to logistical issues. Fundamentally, we had problems to guarantee the food supplies during the field work and with the mobility during the field expeditions (we use public buses, cargo trucks, tractors, horse carts, and rented cars as means of transportation, also we made long walks through difficult landscapes). These difficulties occur mainly because of the difficult economic conditions that exist in Cuba. However, 14 field expeditions were carried out; 11 expeditions to try to locate new populations of *T. malpighiarum* and three expeditions to continue the ecological and demographic studies of *T. malpighiarum* population in El Guafe, Desembarco del Granma National Park.

All the field expeditions were carried out in coastal areas of the north-central, northeastern and southeastern part of Cuba, in areas of thorn scrub and semi-deciduous forest, generally in areas of difficult access. During each one of these expeditions, we stayed several days in the field and made long walks.

The realisation of all the activities of our project would have been impossible to fulfill without the financial support of The Rufford Foundation. We do not have enough words to thank to The Rufford Foundation for supporting our conservation efforts.

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

a) *Tetramicra malpighiarum* is a highly threatened orchid species, with only one known population, few individuals, and only one locality of occurrence so far. Currently, this taxon is only located in El Guafe, Desembarco del Granma National Park (DGNP). During the Rufford Small Grant and the 2<sup>nd</sup>. Rufford Small Grant we carried out several trips to different regions of Cuba. This areas with ecological

characteristics that were similar to those of the El Guafe population. However, was no possible to find new populations

b) The data gathered during the Rufford Small Grant and the 2nd. Rufford Small Grant allowed having actual and trustworthy information about the ecological and demographic behaviour of *T. malpighiarum* in El Guafe, DGNP. Now we know more realistic evidence about the population size classes' structure, individual's growth, mortality, flowering, fructification, germination, circular distribution and vertical zonation of individuals on the phorophytes; and the species identity and dimensions of the phorophytes where *T. malpighiarum* grows.

To systematise the ecological studies that were started during the Rufford Small Grant and continued during the 2nd. Rufford Small Grant will be fundamental to validate and increase the knowledge about the demographic behaviour of *T. malpighiarum*. Additionally, this knowledge will be a key factor to design and strengthen the management and conservation actions of the only known population and its habitat.

Another relevant information obtained during these projects is that *T. malpighiarum* in its habitat [transition forest between semideciduous forest and coastal xeromorphic scrubland] was found growing on nine phorophytes (*Malpighia incana* [Malpighiaceae], *Randia aculeata* [Rubiaceae], *Guettarda elliptica* [Rubiaceae], *Eugenia anthacanthoides* [Myrtaceae], *Erythroxylum havanense* [Erythroxylaceae], *Croton* sp. [Euphorbiaceae], *Plumeria obtusa* [Apocynaceae], *Stigmaphyllon agreanum* [Malpighiaceae] y *Maytenus buxifolia* [Celastraceae]). Of these plants, six are shrubs, two are trees and one is a woody vine.

It is important to note that during the expeditions on the northern coast of Ciego de Ávila and Camagüey provinces, we observed some areas of semideciduous forest, and transition forest between semideciduous forest and coastal xeromorphic scrubland, highly anthropized as consequence of forest fires, livestock production and/or wood extraction.

c) We think that one of the most outstanding achievements of this project were the scientific dissemination, environmental education and awareness activities developed with the human communities close to *T. malpighiarum* population.

We honestly can say that the work carried out with children, young men and women and with adult people was fructiferous. Now they are conscious of the delicate conservation status of the species and they want to be involved in its conservation. Children are so proud of living in a place where a unique plant species inhabits that they have become the most important promoters of the preservation of *T. malpighiarum* for the future generations.

#### **4. Briefly describe the involvement of local communities and how they have benefitted from the project.**

One of the most important goals of this project was the development of environmental education activities that increase the awareness of the human

communities that live close to *T. malpighiarum* populations. Children, young women and men, and adult people were actively engaged in activities focused on the knowledge and preservation of *T. malpighiarum* population, the phorophytes species on which it grows and the whole habitat of the species in the DGNP.

In several of the fieldwork and expeditions developed through the archipelago to locate new populations of the species, we hired local guides who also helped with fieldwork. This activity besides to increase the awareness about the importance of the conservation of endangered and endemic species also contributed with the economy of this excellent people.

We have to mention an important person that is making and amazing work with the children of Cabo Cruz. Her name is Dalgi Martínez Espinosa and she works as cultural promoter of this locality. She focuses her work on the importance of nature conservation and introduces this topic in each one of the activities that she develops with the young people and children. She helped us a lot with the activities that took place in this community and especially in the primary school.

Finally, it is our opinion that the most outstanding achievement of this project is the significant increase of children's knowledge and awareness about nature conservation and fundamentally the preservation of *T. malpighiarum*. It can be easily seen how proud they are about having this peculiar species in their locality and how big their commitment with its conservation is.

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

We would love to continue the monitoring of the *T. malpighiarum* population of El Guafe. If it is possible, also continue developing field expeditions to different regions through Cuban coasts searching for new populations. It is necessary to keep track of every demographic event in the population of El Guafe. To take demographic data for several years would allow knowing the demographic behaviour of the species and contributing with the development of efficient conservation and long-term management plans in the DGNP. We think that several of the field workers of the DGNP, especially Leicy, are well trained to collect ecological and demographic data and they agree to visit the population periodically. We will keep working closely with them and whenever we have the chance, we will return to the population of El Guafe and the locality of Cabo Cruz to keep track of the work they have carried out there.

Finally, taking in to account the Cuban flora richness and the high number of endemic and endangered species we would love to continue the ecological study of endemic species with restricted distribution. Additionally, we would love to involve more local communities with the conservation activities and make decision makers more participant. In order to accomplish these goals in the near future, we will apply to a 1st Booster Grant.

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

During all the awareness and environmental education activities developed in local

human communities, we disseminated the results of the project. We worked together with workers and officials of the DGNP and with the regional authorities of the CITMA (Ministry of Science, Technology and Environment). They helped the teamwork with the development of awareness activities in the communities, field trips and environmental training activities and in accordance; we shared our findings with them. The two articles (one scientific paper and one science dissemination paper) that are in preparation phase will be an excellent means of disseminating the results of the project. The scientific paper will help to show to the international scientific community the current situation of *T. malpighiarum* population, and possibly will serve to boost joint strategies for the study of the species and get funds for its conservation. On the other hand, the science divulgation paper will be very important for the work with human communities, decision-makers and visitors in general. Additionally, once the papers 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.

**7. Timescale: Over what period was the 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 August 2018 to August 2019.

**8. Budget: 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. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
2 USB memory stick	20	35	+15	The price increased by the time we got the fund.
2 External hard drive	147	147		
1 Laptop	420	450	+30	The price increased by the time we got the fund.
3 Backpacks	145	105	-40	We found a better offer and decided to save funds for other activities
1 Hiking shoes and boots	68	58	-10	We found a better offer
Food for fieldwork	800	800		
Wages for field guides	440	440		
Gas	1670	1695	+25	We needed to buy more gas
Travel and transportation	570	570		

Officesupplies, printer and toners	120	100	-20	We found a better offer and save this money to buy gas
Printing of posters, brochures and different objects with advertising (cups, T-shirts, pocketbook, decals)	370	370		
Contingences	230	230		
<b>TOTAL</b>	<b>5000</b>	<b>5000</b>		<b>Local exchange rate: 22 MXN = £1</b>

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

Considering that we did not find any new population of the species, would be important to organise new field expeditions in areas with similar environmental characteristics to those of the El Guafe Population. Also, keep 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. It is highly necessary to keep and develop new activities of education and long-term environmental awareness in communities within and on the periphery of the DGNP. Keep the monitoring of El Guafe to address the status and viability of *T. malpighiarum* population over time. And finally, if new populations are found would be excellent to develop a genetic study to understand the genetic variability, degree of consanguinity among individuals or if there is not gene flow, how many generations they have been isolated from each other.

**10. 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?**

Every time we had the opportunity to talk about the goals and achievements of the project we referred and thanked to The Rufford Foundation by the support given. Consequently, in the Acknowledgments section of the two articles derived from the project, we will refer and thanks the RF. We used The Rufford Foundation logo during education and environmental awareness activities. In didactic materials (folding, poster, shirts, stickers, and keychains) elaborated to support the activities and give diffusion to the project. In addition, The Rufford Foundation logo was used in each one of the PowerPoint presentations showed during meetings and environmental education activities developed with the communities. It also will appear in all PowerPoint and poster presentations that could be presented in future scientific events.

**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**

Head of the teamwork. Planning and participating in fieldworks 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 development of environmental education activities and for the collection of ecological data.

**Ernesto Palacio**

Support during fieldwork and environmental education activities. Coordination in the communities.

**Carlos Acevedo**

Coordination and support during fieldworks, mainly in the north coast of Ciego de Ávila province and Camagüey province.

**Leicy Milanés Andrés**

Support during fieldwork and environmental education activities. Data collection. Coordination in the communities.

**Yamileth Hernández Montero**

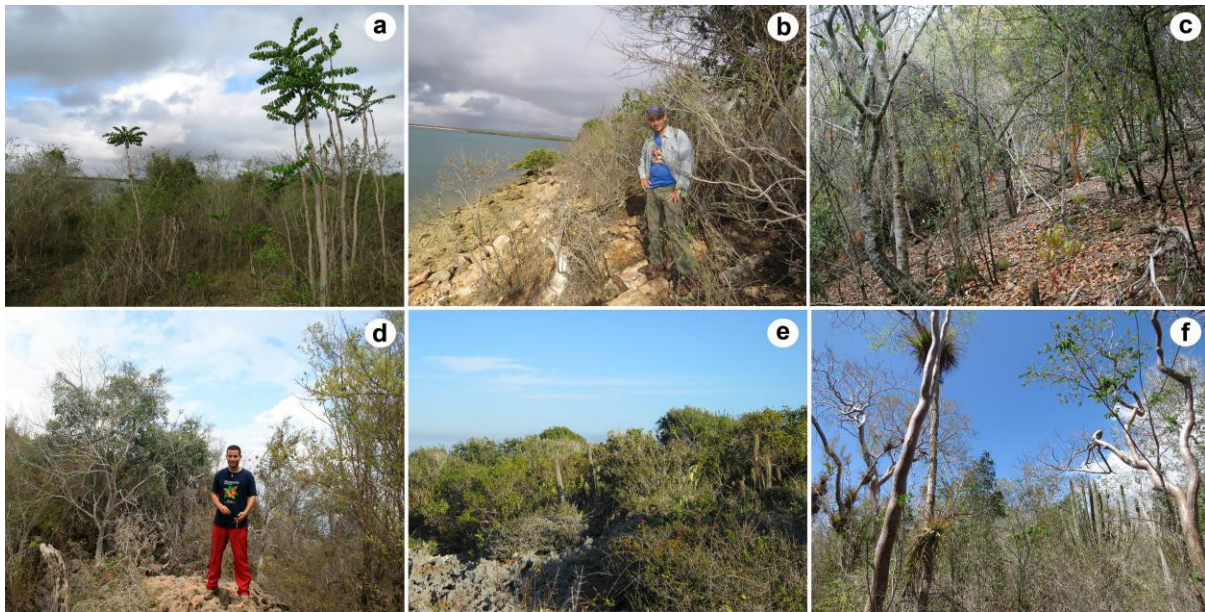
Support during fieldwork and environmental education activities. Data management.

**Field guides in the different visited regions of Cuba and community promoters of Cabo Cruz, Las Coloradas and Belic**

Support during fieldwork and environmental education activities. Coordination in the communities.

**12. Any other comments?**

*Tetramicra malpighiarum* is a small, endangered and endemic Cuban orchid that needs to be preserved for the future generations. We have not enough words to thank to The Rufford Foundation for the support given to this project. Thanks to your Foundation and the work carried out by our team the conservation of this species it is not more the concern of a few Cuban botanist but the whole population and specially the children who live nearby El Guafe. Thanks a million, The Rufford Foundation and please keep going with your honourable cause.



**Figure 1.** Field expeditions through the central-north and south-east coastal regions of Cuba, searching for new populations of *Tetramicra malpighiarum* [Orchidaceae]. a-b) Localities on the north coast of Ciego de Ávila province, c-d) localities in Santiago de Cuba province [south-east coast], e-f) localities in Desembarco del Granma National Park [remote areas far from “El Guafe”], Granma province, south-east coast of Cuba.



**Figure 2.** Monitoring of *Tetramicra malpighiarum* [Orchidaceae] population in “El Guafe”, Desembarco del Granma National Park, Granma province. a) Part of the teamwork at the entrance of the path “El Guafe”, b) Ecological data collection at *T. malpighiarum* population, c) *T. malpighiarum* plant in its habitat, d) *T. malpighiarum* flower.



**Figure 3.** Awareness, environmental education and dissemination activities of the project developed in different human communities located within and on the periphery of the Desembarco del Granma National Park, Granma province. a) Belic Community, b) Cabo Cruz Community, c) Expedition to Cabo Cruz community during one of the visits, d-e-f) Different educational activities developed with primary school children in the communities where our work was carried out, g-h) Interpretive tours developed with children and young people of the communities where our work took place.