

Final Project Evaluation Report

We ask all grant recipients to complete a project evaluation that helps us to gauge the success of your project. This must be sent in **MS Word and not PDF 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 – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Complete the form in English and be as concise as you can. Note that the information may be edited before posting on our website.

Please email this report to jane@rufford.org.

Your Details	
Full Name	Zhengyang Wang
Project Title	Butterflies and Sacred Mountains: Building Local Conservation Capacity
Application ID	18858-1
Grant Amount	£4880
Email Address	zhengyangw@hotmail.com
Date of this Report	Oct. 20th 2017

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
<i>Bhutanitis</i> habitat assessment				Team documented all <i>Bhutanitis</i> hostplants on an established 2000 – 3000 m transect. We also documented all hostplants and flowering plants on 14 transects of 200 m length.
<i>Bhutanitis</i> population estimate				Team marked 210 <i>Bhutanitis</i> butterflies at different localities and obtained a 5% recapture. Further statistical analysis in progress.
Lepidopteran sampling across altitudinal gradients				Team set up 4 lepidoptera sampling sites from 2000 to 3800 m. We obtained 379 individuals, sorted to 151 morpho-species and 109 of them successfully barcoded. Reference collection stored in Xingxing village.
Conservation monitoring with insect telemetry				Insect telemetry system proved too heavy for individual <i>Bhutanitis</i> to bear; we instead tested the effectiveness of telemetry monitoring with <i>Troides aeacus</i> , a larger birdwing species that shares hostplants with <i>Bhutanitis</i> . We documented different flight patterns of high and low altitude species. Data analysis in progress.
Information distribution				Team interacted with every active <i>Bhutanitis</i> collector and informed all collectors of the pros, cons and legality issues involving making a living as a collector. Team also interacted widely with many households of the village and orally (non-intrusively) distributed information about <i>Bhutanitis</i> butterfly, general lifecycle and the importance of hostplant protection.

Increasing local conservation capacity				Local villagers received training of using GPS, identifying hostplants, basic telemetry, operating light traps. Now equipped with more comprehensive knowledge about <i>Bhutanitis</i> and its habitat, what conservation decisions local villagers of Xingxing will make remains to be seen. Team will follow up with this work in the summer of 2018.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

2.1 We have anticipated that locals would be hesitant (even resistant) to freely interacting with “outsiders” and to disclosing information about their butterfly collecting. We also anticipated that any form of “top-down” approach of giving out “conservation instructions” would not be effective. Regardless of these anticipations, the time and work required to let the community understand our intention (and for us to truly grasp the political dynamics of the village) was still longer than we thought. In response to these difficulties, firstly, we redesigned parts of the project that involves ostensible publicity, such as brochure distribution, website building, workshop and seminar (reflected in final budget) — instead, we distributed conservation knowledge by one-to-one interaction with individuals and chatting leisurely with them (Zhengyang spent a total of six months living in the village since 2016); secondly, the only setting in which we need to formally ask villagers about their conservation knowledge (i.e. the interview) were postponed until the second year of the project, when villagers were sure that we did so with good intentions. This meant that to really assess whether there is change in conservation attitude, Zhengyang will return in 2018 (and very likely many consecutive years afterwards) for a follow-up survey. We are extremely happy about these changes in our approach, which assured the villagers that we are not propagandists who come for the sole purpose of giving instructions, which most people dislike.

2.2 Our second difficulty, or rather, a concern, had to do with the conservation motivation of many villagers. Many villagers worked diligently with us to monitor the butterflies and their habitat in the past two years and provided transportation and accommodation for us. In the process they were happily being compensated for their work economically. Even for the villagers who worked as field assistants and acquired conservation training, they were compensated for their work (**reflected in final budget**). Our concern was, if no such financial motivation were provided in long term, how much of the acquired conservation knowledge would still shape local conservation decisions? It is out of the team’s capacity to decide what kind of land use choice local stakeholders make in the future. The pressure of developing butterfly habitat into other forms of ecologically unfriendly land use will be even more obvious when next year the Yaan-Kangding highway finish construction, allowing speedy high quality road access from Chengdu (population 14million) to the Xinxing village . As we have stated in our original proposal, our main goal is to empower locals with the conservation knowledge to face modern change (and providing them help and

consultant if needed) — this has been delivered, but what choice local stakeholders will make is something we could not, and did not intend to instruct.

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

a). We now have a more in-depth understanding of the *Bhutanitis* butterfly and its habitat. In the past two summers, in terms of population study, we marked 210 *Bhutanitis* butterflies with information about locality, date, sex, behavior, wing condition and obtained a 5% recapture — these information are important in estimating the population size of the butterfly, which is endemic to the region. In collaboration with Dr Krushnamegh Kunte we are also sequencing these two local *Bhutanitis* species to construct a phylogeny of all *Bhutanitis* species. In terms of monitoring individual butterflies, we documented, every thirty minutes during the day time, different flight trajectories of eleven high and low altitude species of Golden birdwing (*Troides aeacus*), which shares hostplant with *Bhutanitis*. In terms of environmental data, we obtained GPS data of each *Bhutanitis* hostplant on a 2000 – 3000 m transect. We also documented localities of all hostplants and identified all flowering plants on 14 transect of 200m length, covering both disturbed and undisturbed habitats. Many of these data are under analysis and preparing for publication.

b). We established a reference lepidopteran collection as well as DNA barcode library for Xingxing village. Four sampling sites were established from montane agricultural fields (2000 m), through to cloud forest (2600 m and 3200 m), and to grassland above timber line (3800 m). We obtained 379 individuals, which were sorted into 151 morpho-species and deposited as a local reference collection in Xingxing village. Among the 151 morpho-species, 109 were successfully barcoded with CO1. Clustering suggests that the 109 morpho-species contain 80 genetically distinct species. When the 109 sequences are blasted on NCBI, only 36 have a higher than 95 percent identity (commonly denoted as “genus level” identity) with any existing identified NCBI sequences; only 20 of them have a higher than 98 percent identity (commonly used as “species level” identity) with existing NCBI sequences. These results indicate the immense Lepidopteran diversity of the region.

c). Local stakeholders are empowered with conservation knowledge to make their own conservation decisions. Local stakeholders have acquired basic knowledge about the butterfly and its habitat, learnt to operate moth light traps, GPS, telemetry system and log data scientifically. We are also in touch with villagers of Xingxing and surrounding villages through Chinese communication platform, so that when needed, we could give villagers advice. As stated in the original project description, our goal was not to give conservation instructions, but to empower locals with knowledge and technical capability to understand their own environment.

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

Local community members are actively engaged in every part of the project: (1) Many villagers worked as research assistants and transportation/accommodation providers — such participation provided numerous opportunities for interaction

between team members and local communities. (2) Especially for villagers who worked as research assistants, they acquired a range of skills from identifying butterfly caterpillar and hostplants, operating moth light traps, logging data, using GPS, and telemetry system. (3) Two local university students are further trained in data analysis. (4) A local lepidopteran collection is deposited in Xingxing village and open to lend upon request. (5) More importantly, fully embedded in the community, we have opened up a channel of conversation between the team and the villagers.

5. Are there any plans to continue this work?

Definitely! An immediate plan is to return in summer 2018 to conduct a survey to see whether there is change in conservation attitude since our last survey in 2017. We also plan to conduct more mark-recapture of *Bhutanitis* to enhance our population estimation model. In the long term, the village will be the “base-camp” for Zhengyang’s PhD thesis in understanding the biodiversity of Hengduan region — there will be many more years of in-depth study and opportunities for interaction.

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

All data, as well as the local Lepidoptera collection, is open to any researcher upon request. We are preparing at least two peer-reviewed publications, one on the population, habitat and conservation of *Bhutanitis* butterfly, another on the insect telemetry of *Troides aeacus* butterfly of the region.

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

The proposed project date was March 2016 to December 2017. Project was conducted as anticipated, with one exception, as mentioned in (2.1): the conservation survey was pushed back for 1 year, which means the second survey data would not be completed till summer 2018.

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.

For those that we have labeled “receipt not available”, upon request we’d be happy to ask the villagers to provided a hand written proof of receiving the payment.

Item	Budgeted Amount	Actual Amount	Difference	Comments
International travel (for Anuj roundtrip Singapore to Chengdu)	400	485	85	This also included \$90 Visa fee to enter China (exchange rate 0.76)
Ground transportation: 2016 (one car rental, five days (60 x 5))	300	319	19	Car rental was used for 10 days to finish lepidopteran transect at (280 yuan) per day. Price negotiated with villagers; no receipt available. (exchange rate 0.11)
Ground transportation: 2017 (one car rental, five days (60 x 5))	300	284	-16	Motorcycle was used and charged (50 yuan) round trip to <i>Bhutanitis</i> habitat, both 2016 and 2017. 50 person-round-trip was made. Price negotiated with villagers; no receipt.(exchange rate 0.11)
2016: Accommodation and Food. (eight people for fifteen days (6 x 8 x 15))	720	341	-379	Food and accommodation were negotiated at 100 yuan per person per day; no receipt available. The expense included fifteen days for Zhengyang and a training student from Sichuan agriculture university. Long term stay for Zhengyang was covered with own stipend. Local field assistants, whose food and accommodation were planned to be covered, were instead paid for "field assistance" (see row below). (exchange rate 0.11)
2016 Field assistance	0	455	455	100 yuan per day x 40 person-day. (exchange rate 0.11)

2017: Accommodation and Food (eight people for fifteen days (6 x 8 x 15))	720	455	-265	Food and accommodation were negotiated at 100 yuan per person per day; no receipt available. The expense included fifteen days for Zhengyang and a training student from Sichuan agriculture university. Ten days for Anuj. Long term stay for Zhengyang was covered with own stipend. Local field assistants, whose food and accommodation were planned to be covered, were instead paid for "field assistance" (see row below). (exchange rate 0.11)
	0	455	455	100 yuan per day x 40 person-day. (exchange rate 0.11)
Telemetry equipment: GPS	70	0	-70	Provided by Ganzi Plant Quarantine Station.
Telemetry equipment: transmitters (100 x 5)	500	720	220	One shipping from ATS (\$147) and 4 shipping from (\$628) from Holohil. (exchange rate 0.76)
Telemetry equipment: receiver	700	622	-78	Provided by Ganzi Plant Quarantine Station.
Telemetry equipment: headphones	50	132	82	This included headphone, cable case, antenna, shipping fee for the entire telemetry system.
Monitoring equipment: camera	100	0	-100	Provided by agriculture department
Monitoring equipment: moth traps (50 x 10)	500	611	111	16 traps were actually deployed in the field (4 x 4 altitudinal gradient); the cost is subtracted from a total order of 50 traps, assembled at Harvard SEAS.
Supportive training: two conservation awareness surveys (50 x 2)	100	0	-100	Fully digitized
Supportive training: publishing brochures	200	0	-200	Explained in (2.1)
Supportive training: conservation workshops	150	0	-150	Explained in (2.1)
Totals	4880	4879	-1	

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

As we have pointed out in (2.2), although trained villagers now have a wide range of conservation skills and information about butterfly habitat was widely distributed among all villagers, without further economic incentive, it still remains to be seen what conservation decisions villagers of Xingxing will make. Could an understanding of the significance of the biological diversity really influence people's decision, even without economic incentives and under a backdrop of future heavy development? Some immediate next steps which we are taking include: (1) keeping up with our conservation survey to document change in conservation attitude; (2) finish data analysis to gain more accurate scientific information. In the long run, the most important step involves devising a scheme of conservation which will naturally incorporate the economic interest of the local stake holders.

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?

As explained in (2.1), project was conducted to draw as little public attention and be as "non-intrusive" as possible. Never has any logo of any kind been used during the project. The Rufford Foundation was mentioned in only two context: in a report we submitted to local forestry officials and another to the local agricultural officials. Part of the work funded by this grant was documented in a documentary on Kham Tibet by China Central Television (name and broadcast date to be determined).

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

Zhengyang Wang (Harvard OEB) bases his Ph.D thesis in Xingxing village. He is most closely in touch with the community. He coordinates the project and trains local conservationists.

Anuj Jain (BirdLife International) brought an academic perspective into the project from his many years of working involvement in conservation. He designs much of the mark-recapture study, ecological transacts and conservation surveys. He is also in close contact with people working on Bhutanitis in north eastern India — lending a nice comparative aspect into the project.

Jiankang Qiang (Ganzi Plant Quarantine Station) is our go-to person for ground logistics, permits, interacting with local officials and arranging transportations. He advises the team on local community dynamics.

12. Any other comments?

A huge THANK YOU to the Rufford Foundation! Mt. Gongga, where Xingxing village is located, is one of the most exciting regions for a modern conservation biologist to work on. Both the unknown cultural and biological diversity and the excitement of development will continue to attract conservation attention globally. Our work has just started and we will certainly keep up with it.



We made effort to interact with the local community as “non-intrusively” as possible. Even when we had to conduct a formal interview, we tried to do it through casual chatting (in this case, in the middle of a Chinese chess game). © Rui Tang.



A rare photo of a *Bhutanitis mansfieldi* mating pair. Forest abundant of *Aristolochia* at 2400m. It was May 29th, around 5pm, temperature has already dropped below 20C. The interesting mating position suggests that the female was spreading herself over a relatively warm rock surface to gain warmth, while male stood straight, concentrated on delivering the spermatophore. © Anuj Jain.