

Final Project Evaluation Report

Your Details					
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Project Title	Distribution and conservation of the endangered Giant land snail Bertia cambojiensis in Southern Vietnam				
Application ID	24823-1				
Grant Amount	£4996				
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Date of this Report	May 08, 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	
Determining the distribution areas of <i>Bertia cambojiensis</i> in Southern Vietnam				See "comment 1" below	
Providing information about the habitat of Bertia cambojiensis in the wild				See "comment 2" below	
Determining the population density of Bertia cambojiensis in Southern Vietnam				See "comment 3" below	

Comment 1:

Our study recorded *Bertia cambojiensis* in Lam Dong and Binh Thuan province. Especially, in Dong Nai province, *B. cambojiensis* appeared in the protected area -Dong Nai Biosphere Reserve, Vinh Cuu district.

Comment 2:

Our study recorded Bertia cambojiensis distributed in three habitats: bamboo forest, evergreen forest, and mixed forest. Three habitats were present in Lam Dong province. In Binh Thuan province, we recorded B. cambojiensis in the bamboo forest. In Dong Nai province, B. cambojiensis appeared in the evergreen forest.

In the rainy season, *Bertia cambojiensis* lives in habitat with high air temperature, soil temperature recorded up to 25.5°C, pH is acidic. Soil moisture is always high in Lam Dong and Binh Thuan province, in Dong Nai province, soil moisture was 30%.

In the dry season, almost *Bertia cambojiensis* live individuals have not been found. Our study only recorded three live individuals. They appeared in microhabitat similar to the rainy season. However, the air temperature is higher than in the rainy season. The average soil temperature is not significantly different.

The study recorded Bertia cambojiensis frequently occur in five microhabitats: on the ground, under the leaf litter, on the rocks on rotten fallen tree and fallen tree branch. In the dry season, most live individuals have been found on leaf litter, they tended to hide in hidden corners such as under rock niches or under leaf litter floor. In the rainy season, some individuals consume fruits on the forest floor, mushrooms, and land crabs.

The other land snail species have been recorded in Bertia cambojiensis habitat include 20 species in genera: Amphidromus sp., Leptopoma sp., Parmarion sp., Cyclophorus sp., Hemiplecta sp., Macrochlamys sp., Camaena sp., Chloritis sp.,



Euplecta sp., Haplotychius sp., Opisthoporus sp., Quantula sp., Sarika sp., Succinei sp., Tortaxis sp., Pupina sp., Elaphroconcha sp., Sitala sp., Schistoloma sp., Cyclotus sp.

Comment 3:

In two seasons, a total of 39 live individuals and nine shells of Bertia cambojiensis have been recorded in all sampling sites.

In the rainy season, *B. cambojiensis* mostly occurred in the evergreen forest, and secondly in the mixed forest, Lam Dong province. The lowest population density recorded in Dong Nai province. In bamboo forest, *B. cambojiensis*'s population density in Lam Dong province was the same to Binh Thuan province on July 2018 with 10×10^{-4} individual/m². On June 2018, population density in Binh Thuan province was lower than July and in August was higher than July.

In the dry season, *B. cambojiensis* commonly aestivates during periods of heat but in some cases this can occur after rain or dewfall, others requiring mechanical disturbance as other land snail species. The study recorded three live individuals of *B. cambojiensis* on rainy days in the evergreen forest and bamboo forest belong to Lam Dong and Binh Thuan province. In Dong Nai province, no individual occurred during the dry season.

Among 39 individuals, the largest was 103.07 g in weight and the smallest 4.94 g in the rainy season. The height and width of these shell s ranged from 21.06 - 59.10 mm and 32.20 _ 79.76 mm respectively. The body size of B. cambojiensis in our study was larger than previous records of Reeve (1860) and Schileyko (2011). In addition, aperture height (AH) and aperture width (AW) also measured. The aperture height ranged from 16.50 – 42.40 mm. The aperture width ranged from 18.04 – 46.68 mm. There is no significant correlation between body size and weight of B. cambojiensis individuals. The weightiest B. cambojiensis individual was not largest body size individual (W = 103.07 g, H = 57.24 mm, D = 74.92 mm, AH = 37.58 mm, AW = 43.44 mm).

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

The field survey was particularly difficult during the rainy season. In Lam Dong and Binh Thuan province; the study areas had rugged and slippery terrain. We could not move by motorbike if it had heavy rain, and we had to walk and carry all equipment and food.

We also had to cross large streams. In the rainy season, stream flowed very strong that prevented our movement. We had to rely on the support of local people to be able to cross streams and carry our backpack. In addition, heavy rain obstructed vision when we set up sample plots, found the land snails and recorded environmental parameters.



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

- A. Our research initially defined the distribution areas and habitat of *Bertia cambojiensis* in southern Vietnam. We provide information about temperature, humidity, and pH suitable for *B. cambojiensis*' life. In addition, the substrates where *B. cambojiensis* frequently occur and other land snail had the same habitat was determined. These data provide a basis for further understanding of *B. cambojiensis* ecology, which also serves as a basis for further predicting possible distribution areas of *B. cambojiensis*. We share this data with local managers. They can use our results as a reference to establish actions for conserving *B. cambojiensis*.
- B. Our study recorded and measured the population density of Bertia cambojiensis. This data supplied information to predict the sustainability of *B. cambojiensis* population in various habitats and in different areas. The results support the scientific basis for local managers to develop appropriate and effective usage management strategies.
- C. Authority management and local people directly involved in the sampling process were shared information about the importance and status to conserve Bertia cambojiensis. We recognise that conservation awareness of the local community has been enhanced. Some local people told us that "They only caught large size B. cambojiensis and released small size individuals to allow them to grow for using in the future". In addition, the managers also encouraged us to continue studying this species to provide specific information for conservation plans in the near future.

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

During working with the communities of Lam Dong, Binh Thuan, and Dong Nai province, we realise that people have no knowledge of *Bertia cambojiensis* species, nobody knew that it is Critically Endangered species and distribute only in Vietnam. In these areas, we share information about the value and importance of *B. cambojiensis* as well as the other land snails for the local manager. This information could help to improve their understanding of the biodiversity value of the area. After the study ended, the result would donate for Lam Dong Forest Management Board, Museums and Department of Science and Technology of Lam Dong Province, Binh Thuan Forest Management Board, Dong Nai Biosphere Reserve Management Board. This result is scientific information for raising conservation management of land snail *B. cambojiensis* when it facing to over-exploitation status.

Local people who directly participated with us in snail sampling are trained with many skills such as how to design sample plots, specimen sampling, and record data, measured and identify specimens. They also have the opportunity to understand this resources value which they have also contributed to improve their sense of use and resource protection.



In the future, based on the results of this study, we would organise conservation education programmes in the study areas. Of course, *B. cambojiensis* would be a key species in this programme.

5. Are there any plans to continue this work?

The information related to giant land snail *Bertia cambojiensis* was limited. In order to conduct more in-depth studies, promote management and conservation of this species, it was necessary to first identify their distribution areas, habitats, and population density in the wild. In this study, we provide data on ecological of *B. cambojiensis* in Southern Vietnam.

In the next step, it is important to understand threats to *B. cambojiensis* in the wild. When threats are identified, stakeholders include researchers, conservationist, local managers and people can cooperate to develop appropriate conservation management plans.

In the future, we plan to continue research relate to conservation activities. Summary of our implementation process is as follows:

- 1. Understanding basic ecological information of *B. cambojiensis* consisting of distribution, habitat and population density in the wild.
- 2. Identifying threats can affect to *B*. *cambojiensis* in the wild related to demand use and trade of *B*. *cambojiensis* in the community. Understanding *B*. *cambojiensis*'s role and value in human livelihood.
- 3. Establishing B. cambojiensis management plan, use, and sustainable development focus on raising conservation awareness for the local community.
- 4. Evaluating the effect of conservation activities.

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

In fact, we have already shared the study result for local management in the survey areas. They can use our result as a reference to establish conservation activities.

Firstly, the study's result is included in my ecology master theses. This study will be presented at University of Science, and the thesis will be stored at the University of Science Library, Library of Department of Ecology and Evolutionary Biology, Library of Zoology Laboratory. The students and researchers who are interested in the land snails can learn for reference.

Secondly, we design the poster with the title "Distribution, habitat and population density of the Endangered Giant land snail *B. cambojiensis* in the Southern Highland". The poster is presented in 10th Scientific Conference organized by the University of Science – Vietnam National University - Ho Chi Minh City (shown in attached files with this report). It drew attentions and inspiration from many researchers and students who are interested in this land snail species.



Thirdly, Ms. Trinh Hoai Phong (team leader) presented about "Distribution and Conservation of the Endangered Giant Land Snail (*Bertia cambojiensis*) in Southern Vietnam" at the Rufford Small Grants Conference – Ha Noi, Vietnam 2018. With this presentation, Ms. Trinh shared interesting information about the conservation status of *B. cambojiensis* to participants.

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

We proposed to conduct this project from June 1, 2018 to April 31, 2019. The Rufford Foundation supported our project in April 2018. So, our study was conducted as the expected schedule.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in \pounds 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
Field expenses (map, sample bag, stationery)	60	60		
Stipends for local people (guide way and collect sample)(7£/person/day x 3 person x 20 days)	420	420		
Travel from Ho Chi Minh to Dong Nai province (7£/person/time x 2 persons x 4 times)		56		
Travel from Ho Chi Minh to Binh Thuan province (10£/person/time x 2 persons x 4 times)		80		
Travel from Ho Chi Minh to Lam Dong province (9£/person/time x 2 persons x 4 times)		72		
Stipends for forest ranger (10£/person/day x 3 persons x 20 days)		600		
Stipends for interviewee $(3\pounds/person/time \times 10 persons \times 3 sites \times 2 trips)$		180		
Rest house for team (7£/person/day x4 persons x 9 days x 3 sites x 2 trips)		1512		
Food for team in field trip $(5.4\pounds/person/day \times 4)$ persons x 10 days x 3 sites x 2 trips)		1296		
Fuel cost during the field work (10£/motorbike x 2 motorbikes x 3 sites x 2 trips)		120		
Vehicle rental cost $(5\pounds/motorbike/day \times 2)$ motorbike x 60 days)	600	600		
Totals	4996	4996		



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

Currently, in some locations where we research, giant land snail Bertia cambojiensis is being used as a valuable medicine and food source. Therefore, the level of exploitation of the community is increasing. Not only that, but some people also buy and store B. cambojiensis to trade with high prices in the rainy season. In the current situation, the necessity is to identify all possible threats affecting to B. cambojiensis population in the wild. In addition, understanding the role and value of B. cambojiensis in community life is also important. Combined with the basic ecological data of B. cambojiensis in this study, conservation strategies will be developed and implemented in these hotspot areas.

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?

The Rufford Foundation logo was used in the poster "Distribution, habitat and population density of the Endangered Giant land snail *Bertia cambojiensis* in Lam Dong province, Vietnam" and presented in 10th Scientific Conference in the University of Science – Ho Chi Minh City that was mentioned above. I also used the Rufford Foundation logo to introduce our study to students in the laboratory.

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

Trinh Hoai Phong (team leader): Master student in Ecology and Evolutionary Biology, University of Science, VNU-HCM City. Duties: Land snail sampling, field works design, morphological analysis, data analysis and report writing.

K' Giang (livelihoods of communities): he is a member of the Forest Management Board in the study area (Lam Dong province). Duties: contact with the manager in Lam Dong, Binh Thuan and Dong Nai province to get permission and visit some sampling sites, he also took care of the logistic for all the field trip.

Thanh Kim Huynh (conservation researcher): Master student in Ecology and Evolutionary Biology, University of Science, VNU-HCM City. Duties: Sample plots design, land snail sampling and record environmental parameters.

We also got the supervision from **Assoc. Prof. Huy Duc Hoang** (University of Science, VNU-HCM) about sampling design, strategic planning for conservation and quality assurance for this project. Undergraduate students at University of Science - VNUHCM assisted in morphological measurement and identification. Some students joined the field work and learned about fieldwork skills.

In addition, we had the support of **Mr. Cang Le Phung**. Currently, he is the lecturer at University of Science - VNUHCM. His expertise research is the biodiversity of land snails. He assists us in identifying snail species.



12. Any other comments?

First of all, we are deeply grateful to The Rufford Foundation to support us to conduct this interesting and meaningful project.

This study is an opportunity for me to contribute to the conservation of my hometown's natural resources. In addition, through this study, I will improve more knowledge and skills to apply to my studies in the future.

When we surveyed in the field, there was the participation of the students in my lab. Students could directly apply the knowledge and skills which they learned to practice. This was very useful for them in conducting their studies later. In addition, our study is also pervasive when most students increase their interest and conservation awareness of natural resources. They want to participate in more projects with our team. After this project, we have a student is conducting a bachelor's thesis about diversity of land snails.

In the present, the community in the study areas not really understand the importance of snail *Bertia cambojiensis*. So, overexploitation is still happening leading to an increased risk of extinction. In order to use this snail sustainably, it is necessary to implement quickly management and use plans. In particular, the community plays a key role. In the next time, I am preparing our proposal for identifying threats can affect to *B. cambojiensis* in the wild and understanding *B. cambojiensis*'s role and value in human livelihood. I hope that the Rufford Foundation will keep supporting us to conserve this land snail species.





SỰ PHÂN BỐ, SINH CẢNH VÀ MẬT ĐỘ QUẦN THỂ CỦA LOÀI ỐC CẠN QUÝ HIẾM BERTIA CAMBOJIENSIS TẠI TỈNH LÂM ĐỒNG, VIỆT NAM

HỘI NGHỊ KHOA HỌC LẦN XI - NĂM 2018

Phòng Hoài Trinh, Huỳnh Kim Thành, Trần Duy Thịnh, Lê Tấn Thiện, Nguyễn Thị Tuyết Ngân PTN Động vật, Bộ môn Sinh thái và Sinh học tiến hóa, Khoa Sinh học - Công Nghệ Sinh học

BERTIA CAMBOJIENSIS

Bertia camboiiensis là loài ốc can lớn phân bố rất han chế tại một số khu vực thuộc miền Nam Việt Nam và đang trong tình trạng cực kì nguy cấp (IUCN Red List).

Việc khai thác và sử dụng B. cambojiensis làm thực phẩm, dược phẩm cũng như các hoạt động thương mại vỏ của loài ốc này cũng đang góp phần làm tăng nhanh nguy cơ tuyệt chủng của chúng trong tự nhiên.

Sau nhiều năm gần như đã tuyệt chủng, năm 2014, loài ốc này được tái ghi nhận nhưng chưa có thông tin cụ thể về phân bố, sinh cảnh sống và mật độ quần thể.

PHƯƠNG PHÁP NGHIÊN CỨU

Tại mỗi khu vực khảo sát tương ứng với các sinh cảnh rừng thường xanh, rừng tre nứa và rừng hỗn giao thiết lập 10 ô mẫu (20x20m), mỗi ô mẫu được chia thành các tuyến nhỏ với kích thước 20x20m. Tiến hành thu mẫu theo các tuyến với tổng thời gian khảo sát tối đa 2 giờ/ô. Đối với các cá thể sống được tìm thấy, ghi nhận tọa độ, các chỉ số về vi môi trường (nhiệt độ không khí, nhiệt độ đất, độ ẩm đất, pH đất) và mô tả các nhân tố hữu sinh xung quanh.

Ngoài ra, các mẫu vỏ cũng như các cá thể ngoài ô mẫu cũng được ghi nhận tọa độ để bổ sung thông tin về vị trí phân bố của B. cambojiensis.

VI MÔI TRƯỜNG THƯỜNG XUYÊN HIỆN DIỆN



NGUỒN THỨC ĂN

Bertia cambojiensis có nguồn thức ăn đa dạng từ các loại nấm rừng, mầm cây đến cả các loài động vật như cua đất



Sự nguy cấp của loài ốc cạn khổng lồ Việt Nam

Phân bố

ta sao

lât

& dâu?

ĐỊA ĐIỂM VÀ THỜI GIAN NGHIÊN CỨU

Sinh cảnh

nào?

- Địa điểm: Một số khu vực đồi núi thuộc tỉnh Lâm Đồng
- Thời gian thu mẫu: Mùa mưa, năm 2018



BIỂU ĐỒ SỐ LƯƠNG CÁ THỂ SỐNG VÀ MẪU VỎ B. CAMBOJIENSIS TẠI CÁC SINH CẢNH RỪNG TRONG MÙA MƯA, 2018

Rừng hỗn giao





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TÀI LIÊU THAM KHẢO:

1. Naggs F., 2014. Bertia cambojiensis. The IUCN Red List of Threatened Species 2014. Available at http://dx.doi.org/10.2305/IUCN.UK.2014 1.RLTS.T21247820A21247822.en. 2. Heryanto, 2001. Snails Composition in the Southern Part of Gvjsung Halimun National Park 3. O. C. Oke, 2006. The land snail diversity in a square kilometre of tropical rainforest in Okomu

Poster "Distribution, habitat and population density of the Endangered Giant land snail Bertia cambojiensis in Lam Dong province, Vietnam"