

Final Evaluation Report

Your Details	
Full Name	Hai Ngoc Ngo
Project Title	Population assessment and conservation needs of the lull tiger gecko (<i>Goniurosaurus lullii</i>) in Vietnam
Application ID	30597-1
Date of this Report	11/2022

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
Evaluate population status of <i>Goniurosaurus lujii</i>				In this project, we estimated population size and density of <i>G. lujii</i> in the study site. However, the result was only partially achieved due to COVID-19 outbreak in Vietnam during the project period. Therefore, all survey plans had to be delayed and we could not survey in some restricted areas.
Assess the ecological characteristics of <i>Goniurosaurus lujii</i>				Together with previous surveys, we obtained adequate characteristics of microhabitat of <i>G. lujii</i> .
Evaluate human threats and provide conservation recommendations				Many human threats impact wild populations of <i>G. lujii</i> and its habitat such as forest conversion, logging, quarrying for cement product and infrastructure and online pet trade. Therefore, conservation actions are highly necessary and no longer delayed in safeguarding the species. Conservation recommendations were suggested that included monitoring, training, and developing propaganda and community education.

2. Describe the three most important outcomes of your project.

a). Population status and ecology of *Goniurosaurus lujii*

Three field trips were carried out in northern Vietnam, including the first trip in September 2020 in Lang Son Province, the second trip in April 2021 in all districts in Cao Bang Province and the final trip in March 2022 in Lang Son Province, northern Vietnam.

In terms of population status, a total of 27 individuals of *G. lujii* were observed during the two field surveys in Trang Dinh District, Lang Son Province, northern Vietnam, whereof 23 individuals were recorded in September 2020 and only four individuals were recorded in March 2022. In the second and third surveys, we interviewed local communities from all ten districts of Cao Bang Province and two districts of Lang Son Province and, consequently, recorded nine new sub-populations of the target species from six different districts. Using the "invisibility rate" method, we estimated the population size of 62 individuals along two surveyed routes from Trang Dinh District,

Lang Son Province (average of 31 ind. per route) in September 2020. Meanwhile, we only recorded four individuals of *G. lujii* along these two routes and estimated the population size of 11 individuals in March. The average population density of *G. lujii* was 9.6 ind./km (1.7–24.2 ind./km) along the surveyed transects. The density per day was further calculated with an overall mean value of 4.9 ind./km/day (max. 8.3 ind./km/day).

For microhabitat requirements, we combined previous data in 2014 and 2019 to evaluate. As a result, individuals of *G. lujii* were only recorded in the forest on limestone formations, covered with evergreen broadleaved woody trees, intermixed with ferns, shrubs and vines. The mean ambient air temperature in micro-habitats of *G. lujii* was 25.6 ± 0.2 °C (21.9 – 28.6 °C) and relative humidity ranged between 59 – 85% (74 ± 0.9). The ambient temperature dropped to the temperature of lower 17 °C in March which might cause the low number of *G. lujii* observed. The species preferred to rest at substrates with a mean temperature of 23 ± 0.2 °C (17.7 – 28.2). Regarding micro-habitat use, the mean canopy coverage above individuals was 83.7 ± 2.9 % (0 – 100 %). The average height from the occupied spots of *G. lujii* to the ground was approximately 0.9 ± 0.1 m (0 – 3 m, n = 27). A majority of *G. lujii* specimens were found on the substrate of rock (nearly 95%) and some were observed on the wood or soil ground.

b). Threat evaluation and conservation

By direct observation during night and day excursions, limestone mountains as the habitat of the target tiger gecko species have been destroyed and quarried to extract materials for cement production, and to expand road constructions and infrastructure associated with urbanisation. Furthermore, a large area of forest was found strongly fragmented due to timber logging activities, and gradually replaced by industrial crops or became grassy hills. Regarding the illegal local exploitation for the pet trade, some individuals of *G. lujii* were caught, taken photos and posted on the local Pet Facebook pages by local people to get the attention of dealers for the private trade, despite listing in CITES Appendix II and the Vietnam Government's Decree No. 06/2019/ND-CP (Group IIB) in 2019. All interviewed local hunters did not know about the legal regulations protecting this tiger gecko. However, dealers have not yet contacted local hunters to collect wild animals of *G. lujii* since the regulations came into effect.

To completely stop illegal trafficking in relation to the target species, we highly recommend implementing community education to enhance awareness of the biodiversity value and disseminate the legal regulations widely in the local communities. Furthermore, the study sites need to be increasingly patrolled to improve the effectiveness of forest protection and to stop the illegal activities of exploitation. However, all recorded populations of *G. lujii* are outside of protected areas. Therefore, we highly propose establishing a protected area for the conservation of the target species and its natural habitats. Furthermore, the basic understanding of microhabitat use contributes to improve husbandry conditions and thereby also enhances the potential success for future reintroductions.

c). Publications

Based on previous data from our research team for population status in 2016 and international trade in 2019, Prof. Dr. Truong Nguyen, a member and referee of this project, together with Chinese collaborators successfully listed *G. luyi* in the IUCN Red List as vulnerable (VU).

The data on ecology and conservation status of *G. luyi* was published in the Journal of Natural History: "Ngo, Ngoc Hai, Nguyen, Q.H., Phan, Q.T., Nguyen, Q.T., van Schinge-Khan, M & Ziegler T. (2022). Ecological niche overlap of two allopatric karst-adapted tiger geckos (*Goniurosaurus*) from northern Vietnam: Microhabitat use and implications for conservation. Journal of Natural History, 56: 37–40."

Furthermore, the data from this project partially supported to complete my doctoral research at Cologne University, Germany.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

The most unforeseen difficulty that arose during the project is the outbreak of COVID-19 in the world, especially in Vietnam. This was the main reason explaining why our project had to be extended until now. Unfortunately, I studied in Germany during this period, hence I could not take part in the second field trip and the third survey had to be delayed several times. To tackle the relevant problems, young scientists of our team who have been trained with skills and experiences in the field survey, monitoring and interview, conducted the second fieldwork during the time I could not come back to Vietnam. We changed the research schedule depending on the pandemic situation to ensure the health of the team and local guides. We also held some zoom meetings to discuss and establish appropriate methods.

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

All populations of *G. luyi* are currently recorded outside of protected areas. Therefore, the management and supervision of hunting and trade activities are all not strictly regulated and wild populations are not properly protected despite the high biodiversity value. Therefore, we initially identified propaganda activities and community education that will be principal conservation actions in the future. In this project, we started and gave information of national and international laws and relevant punishment to local hunters in the study site. By this way, they will avoid unintentionally breaking the laws and stop hunting the species despite the great commercial revenue.

5. Are there any plans to continue this work?

- Potential threats of climate change have been assessed on other tiger geckos in Vietnam (such as, *G. catbaensis*, *G. huuliensis* and *G. lichtenfelderi*). We assume that climate change also has negative impacts on the wild populations of *G. luyi*. By using future scenarios of climate and geographical coordinates recorded in this project, we expect to estimate the impact level of

climate change and propose potential refugia for conservation priorities, especially in border areas between China and Vietnam.

- We plan to obtain further data on the population status and ecological characteristics of *G. luyi* from the unsurveyed populations.
- Proposed conservation measures in this project will be implemented such as increasing capacity building measures for stakeholders as well as community education to improve the effectiveness of forest protection and enhance the awareness of the biodiversity value in the local communities. Signboards and video clips concerning the results of the project will be designed for propaganda activities with local authorities and communities.

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

With the results of listing the target species in the IUCN Red List as Vulnerable and publishing an article of ecology and conservation in the Journal of Natural History, the species are indeed at a high risk of extinction under human impacts and should be protected by conservation actions with the participation of relevant authorities, conservation organisations and local communities. Furthermore, the basic understanding of microhabitat use to improve husbandry conditions at Me Linh Station for Biodiversity in Vietnam where our team is carrying out an *ex-situ* conservation breeding programme for all Vietnamese tiger gecko species and that thereby enhances the potential success for future reintroductions if its wild populations are required to recover in disturbed areas.

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

In fact, all species distributions are not in any nationally protected areas. Thus, its wild populations have not received any indirect benefit or priority of general conservation programmes of protected areas and stringent supervision of local rangers. Establishing a protected area for the conservation of the target species and its natural habitats can be a proposed solution, but this conservation plan requires adequate information of species biology, a huge conservation budget and the participation of all stakeholders, scientists and local communities. Therefore, we consider activities of community education and propaganda as one of the most important next steps in the conservation project to protect the species of *G. luyi*. Signboards and video clips introducing biodiversity at the study site and information of the biology and conservation status of *G. luyi* will be designed for propaganda activities with local authorities and communities. Together with conservation organisations and local authorities, seminars or meetings should be carried out afterward for local communities.

8. 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?

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Furthermore, the data from this project partially supported to complete my doctoral research in October 2022 at Cologne University, Germany.

9. Provide a full list of all the members of your team and their role in the project.

Members of the team	Role in the project
Dr. Ngo Ngoc Hai	A chairman of this project, who conducted field surveys to obtain data on population, ecology and threats, analyzed data and wrote the final report. Furthermore, the articles were published by Hai Ngo as the first and corresponding author.
Prof. Dr. Nguyen Quang Truong	Prof. Truong Nguyen is head of the Wildlife Forensics Working Group/Vice Director of the Institute of Ecology and Biological Resources. He is the principal referee of this research project. He wrote and completed the proposal to include the target species <i>G. luyi</i> in the IUCN Red List as Vulnerable.
Mr. Nguyen Quoc Huy	Huy Nguyen is a researcher at Vietnam National Museum of Nature. He participated in this project as a researcher who conducted field surveys and interviews with local communities.
Mr. Phan Quang Tien	Tien Phan is a researcher at the Institute of Ecology and Biological Resources. He participated in this project as a researcher who conducted field surveys and interviews with local communities.
Mr. Tran Minh Hieu	Hieu Tran is a researcher at the Institute of Ecology and Biological Resources. He participated in this project as a researcher who conducted field surveys and analyzed population data.

Annex 1. Photos of *Goniurosaurus luyi*







Annex 2. Micro-habitats of *Goniurosaurus luyi*





Annex 3. Human threats







Annex 4. Night excursions in the forest.





