

Project Update: December 2022

1. Choosing a training location

- During June and July 2022, surveys were carried out in the limestone areas of Ha Giang, Cao Bang and Hoa Binh provinces. The endangered (EN) *Cyrtomium hemionitis* is found in Bac Me (Ha Giang), Trung Khanh (Cao Bang) and Mai Chau (Hoa Binh). *C. hemionitis* is rare in Ha Giang and Cao Bang but the frequency of encountering this species is very high in Hoa Binh province and only in Pa Co Commune.
- In addition to *Cyrtomium hemionitis*, we also discovered a new species and a new national record of the genus *Polystichum* (Dryopteridaceae) in Ha Giang Province. These two species are also very rare, only a few individuals are found in caves and under deep limestone crevices (in the publication process).
- Among the habitats of *C. hemionitis*, we found that there are Hmong, Dao ethnic groups in Co Cay, Du Gia communes, Ha Giang Province which living as villages at the foot of the limestone mountain where *C. hemionitis* was discovered. Therefore, Du Gia commune, Ha Giang Province is a suitable place to organize the conservation of rare and endangered species.

2. The training process

2.1. The research team held a meeting to discuss about the training program, include:

- Agenda (time, place, participants of the training course).
- Prepare posters, questionnaire form on biodiversity, ferns and conservation for the meeting attendees.
- Contact the Forest Management Board and the village head to connect the local people.

2.2. The training courses

Time: 6-8, December 2022

Place: Du Gia Commune, Bac Me District, Ha Giang Province

- The local representatives: Forest management board + village head.
- Rufford project representative: project manager and project members.

Training content:

- The Forest Management Board (Mr. Vuong Dinh Luong) briefly introduced the Rufford project as well as the project manager and project members.
- The project manager reported on the 2nd Rufford Small Grant, objectives and results achieved during the field visits in 2022.
- Project members gave presentations by slideshow, shared pictures of endangered species and taught local people how to recognise these endangered species in the forest.
- Conservation output with the participation of the Forest Management Board and local people: After assessing the number of populations, habitats and factors that could influence the development of *Cyrtomium hemionitis*, we proposed conservation methods:

+ In-situ conservation:

Due to the small number of individuals remaining, living in the limestone mountains, the project team instructed the local people on how to zone conservation areas, entering the forest without trampling, without affecting the survival of *Cyrtomium hemionitis*, committing not to harvest or trade in endangered species. The project team also guided people to recognise *Cyrtomium hemionitis* in the field for better conservation.

+ Ex-situ conservation:

Knowing that *Cyrtomium hemionitis* had few individuals, we could not take the whole plant to grow in other places, but can try to grow from the spores in different soil composition volumes.

- The project collected spores of *Cyrtomium hemionitis* from fieldwork in 2022, prepared different soil trays, the project manager and project members taught local people how to grow ferns from spores.
- At the end of the training course: project members gave questionnaire form on biodiversity and conservation for participants to answer and to help participants better understand and gain insight into biodiversity and conservation knowledge.
- Discussion part: Q&A between the local people, the Forest Management Board and the project team.
- Conclusion on the status of endangered species *Cyrtomium hemionitis*:

+ After investigating the current situation, it was found that *Cyrtomium hemionitis* has a small population and occurs only on limestone mountains, which have many negative impacts on *Cyrtomium hemionitis*.

+ The project organised a training course on conservation for local people and rangers, zoning protected areas and proposed the conservation methods with the participation of local people and Du Gia Special Use forest management board.

3. Plant growing results:

We tried growing spores through five different soil trays, using different soil types and different planting methods but the results were not as expected, the spores did not germinate. The reason may be that this plant lives in the limestone mountains, so it has a special adaptation mechanism, such as, pinnae often very thick and brittle, so spores may have structural adaptations to limestone conditions as thick spore wall, made it difficult for spores to germinate.

4. Limitations and suggestions for further studies:

Cyrtomium hemionitis has a small population and suffers from many negative impacts, while the method of propagation from spores does not give good results, propagation should be carried out from leaves.

Related species, such as *Cyrtomium fortunei*, distributed in karst habitats, have properties that can be used as alternative medicine to treat various diseases in humans. But because of the small amount of *Cyrtomium hemionitis*, so far there has

been no published work on the biological activities of *Cyrtomium hemionitis* components.

We hope that Rufford will continue to fund the project along with further states so that the project can grow endangered *Cyrtomium hemionitis* species by Propagation methods.

Here are some pictures of the training course held in Du Gia commune, Ha Giang province



Left: Showing how to grow ferns from spores. Right: Participants learn how to separate spores from leaves.



Group photos.