EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Report on the outcomes of a Short-Term Scientific Mission[1]

Action number: CA18201

Grantee name: Alice Dalla Vecchia

Details of the STSM

Title: Exploring the resource-use strategies of endangered Utricularia species and Aldrovanda for better conservation strategies

Start and end date: 05/07/2022 to 12/07/2022

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

(max. 500 words)

The mobility lasted 8 days, during which the activities were planned including travelling, field sampling and samples processing. The first day was dedicated to travelling to the Institute of Botany of the Czech Academy of Sciences in Třeboň, Czech Republic. On the second day the sampling of plant material was performed. Eight sites were visited around the Třeboň Basin area, and plants were collected from 10 locations. In the field, 7 species were collected: *Aldrovanda vesiculosa, Utricularia australis, U. bremii, U. intermedia, U. minor, U. ochroleuca* and *U. stygia*. Two different populations were collected for all species except for *U. intermedia* and *U. ochroleuca*, which are very rare and were present only in one site each. In the following days plants were processed at the Institute and 5 traits were measured: leaf area (LA), leaf fresh weight (LFW), leaf dry weight (LDW), and derived traits like leaf dry matter content (dry weight/fresh weight, LDMC) and specific leaf area (leaf area/leaf dry weight, SLA). All these traits were measured on 10 functional units for each population. We defined the functional unit as the first mature, fully expanded leaf whorl or node including the corresponding internode. The functional units were carefully selected for each species in order to measure traits on plant portions of similar age, so the traits can be as much comparable as possible. Functional units from different plants (2-5) were pooled when the species were too small, in order to reach a measurable biomass. Moreover, the investment in carnivory was determined for each sample, and was defined as number of traps per unit dry weight or traps dry weight per total unit dry weight. Dried material free of traps was pooled for each population and prepared for elemental composition analysis

Alice Dalla Vecchia

[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

(carbon, nitrogen and phosphorus content). *A. vesiculosa, U. australis, U. bremii, U. intermedia, U. ochroleuca* and *U. stygia*, together with *U. vulgaris*, were also collected from the Collection at the Institute, and analyzed following the same protocol as for field samples. A total of 8 species and 195 samples (including 400 individual plants) were processed. On the last day of the mobility, just before the departure, a new field sampling was carried out in the same sites. Fresh plant material was collected for pigments analysis, together with filtered water and sediment samples for environmental characterization (water and sediment chemistry).

Description of the STSM main achievements and planned follow-up activities

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

(max. 500 words)

The goals of the grant proposal were all fulfilled. Eight target species were analysed from at least two populations (for species present also in the field), along with corresponding water and sediment parameters. Part of the material was transported to Parma, where some of the planned analysis have already been carried out. Leaf chlorophyll-a, chlorophyll-b and carotenoids content were analysed on 5 samples per population for each species (110 samples). Sediment water content, porosity, density and organic matter content, together with water phosphorus content and dissolved inorganic carbon for each location were also already analysed. Next activities include sediment phosphorus determination, leaf area determination from scanned images, and water cations and anions analysis, which are planned over the next few weeks. Leaf phosphorus content will be analysed in the Czech Republic at the Institute of Botany of CAS at Třeboň. Once all data will be ready, the collaboration with the host will continue by discussing the best plan for data analysis and publication. Carnivorous aquatic plants include species listed in national Red Lists (e.g. *Aldrovanda vesiculosa* is extinct in Italy, and *U. intermedia* and *U. ochroleuca* are listed as endangered in the Czech Republic, according to the IUCN categories), so a comprehensive functional analysis could shed light into the resource use strategies of these species and how they might respond to environmental conditions. We plan to produce a manuscript exploring the functional space occupied by each investigated species, highlighting which species could be more plastic and how they are related to the trophic status of the sites they were collected. Another direction of utilization of the data shall be to compare the functional traits of aquatic carnivorous plants with those of submerged aquatic non-carnivorous species.

Parma, 22/07/2022