Project Update: August 2018

With the aim to collect all relevant information on plant life (both native and alien flora), vegetation and habitat types in the area of Dinaric arid karst fields in Montenegro, in the end of May 2018 we started with project "Semi natural dry grasslands in Montenegro as potential NATURA 2000 sites – Vegetation diversity, habitat typology, conservation".

Dinaric arid karst fields are extremely sensitive ecosystems, shaped throughout centuries by human activities. These ecosystems have unquestionable economic, biological, landscape and cultural value. Detailed research in this will provide better basis for conservation efforts, raising of awareness of possible biodiversity loss, monitoring of vegetation changes and creation of management plans for sustainable use.

All activities planned within the project in the period of May 2018-September 2018 are divided into two parts: fieldwork and promotion. Time scale of the activities is presented in **Table 1**.

Activities		Time scale
Field activities		
1. Flo	ora-vegetation-habitat mapping	May-September 2018
2. Pla	ant identification/data	
pr	rocessing/habitat mapping	June 2018- November 2018
(A	ArcView Gis)	
Promotion		
3. D€	esign of the internet page	May/June 2018
4. Le	ecture for students/volounteers	May 2018
5. Ex	cursions with	
stu	udents/volounteers to Piperi,	May/June 2018
G	irahovo- Dragaljsko polje	
6. W	/orkshop for farmers	June/July 2018

 Table 1. Project activities in the period May 2018 – September 2018

Flora-Vegetation-Habitat Mapping

The fieldwork started at the end of May 2018. The project covers five sites: Grahovsko Polje, Dragaljsko Polje, Radovče, Kopilje and Gostilje Martinićko. Grahovsko Polje and Dragaljsko Polje are located in the western part of Montenegro, on the main road which is leading from Nikšić towards Risan and Boka Kotorska. Radovče, Kopilje and Gostilje Martinićko are located in the central part of Montenegro and belong to the area of mountain Prekornica.

Research included three aspects: (i) floristic research, (ii) vegetation research and (iii) habitat mapping.

The floristic research includes all aspects of flora, early spring to late autumn. So far, floristic investigations of the karst fields were conducted in 1998-1999 in the area of Piperi: Radovče, Kopilje and Gostilje Martiničko (Stešević 2001) and in 2014-2016 in Grahovsko Polje above Risan (Stanišić et al. 2017). Ca. 550 species and subspecies

are reported for both areas. Due to the fact that research in Piperi area was conducted 20 years ago we needed new investigation and revision of literature references and herbarium material. Taking into account that there are no existing data on the flora of Dragalj Polje, we focussed on floristic investigation in this area.

During the spring and summer we collected plant material for identification. Still we need plant material from autumn aspect of flora. All herbarium specimens will be deposited in herbarium collection in University of Montenegro (TGU!).

During the fieldwork we noticed the differences between investigated areas in terms of land use. Intensification of agricultural activities and urbanisation is visible in the areas of Gostilje, Kopilje and especially in Grahovsko Polje (**Picture 1**, **Picture 2**). On the other hand, in the areas of Radovče and Dragalj Polje land abandonment is represented (**Picture 3**). In both cases, these changes leads to habitat changes and loss of natural habitats. The urbanisation causes the spreading of invasive species, especially *Ambrosia artemisifolia*. Expansion of the *A. artemisifolia* is best visible along the roads, unregulated landfills and near to newly constructed houses.



Picture 1. Intensification of agricultural activities in Grahovsko Polje. ©Milica Stanišić.

Picture 2. Urbanisation in Grahovsko Polje. ©Milica Stanišić.



Picture 3. Land abandonment in Dragaljsko Polje. ©Milica Stanišić.

Grahovsko Polje and Gostilje Martinićko are one of several localities in Montenegro, where *Ruta patavina* is reported according the literature references. This species is categorised as endangered - criteria B2ab (iii, v). During the fieldwork, we did not find this species in the area of Gostilje Martinićko. In the area of Grahovsko Polje we found reduced population of *Ruta patavina* in comparison with investigations from 2014-2016. The main reason is habitat lost due to the land cultivation (**Picture 4**).



Picture 4. Reduced population of *Ruta patavina* due to the land cultivation. ©Milica Stanišić.

The vegetation survey is undertaken during the vegetation optimum (June 2018). In terms of methodology the Braun-Blanquet method is applied. For survey we used plots with size of 25m². During the fieldwork we made ca. 80 the vegetation releves (**Picture 5**).

Likewise, the habitat mapping is done during the vegetation optimum (June 2018) according to EUNIS methodology. The results will be presented in maps made by ArcGis.

Activities included in the fieldwork is carried out by national and international experts in the field of floristics, vegetation and habitat mapping. On the fieldwork participation is taken by: Milica Stanišić, Danijela Stešević, Urban Šilc, Filip Kuzmič and Duško Vujačić.



Picture 5. Vegetation survey. Milica Stanišić, Urban Šilic Filip and Kuzmič making а vegetation releve. ©Danijela Stešević.

Plant Identification/Data Processing/Habitat Mapping (Arcview GIS)

At the moment we working on identification of plant material that we collected during the fieldwork. Identification will be finished after we collect plant material in autumn aspect of flora (September 2018). For identification of species in floristic analysis we use standard botanical determination keys (Tutin et al. (eds.) 1964-1980, Pignati, 1982, Josifović, M. (Ed.) (1970-1976). Also we compared collected plant material with existing specimens from herbarium collections in Podgorica and Ljubljana. Nomenclature is accorded to Euro+Med Plantbase (2006-) and The Plant List. In this activity participation is taken by Milica Stanišić, Danijela Stešević, Urban Šilc, Filip Kuzmič and Danka Caković.

After identification of plant material, the vegetation releves will be stored in Turboveg database and further processed with several specialised software programmes (Juice, R).

The results of habitat mapping will be presented in maps made by ArcGis, according to EUNIS methodology (base maps scale 1: 10.000).

Design of the Internet Page

One of the activities regarding the promotion of the project is designing of the internet page. For that purpose we choose promotion through social media, more precisely through Facebook (<u>https://www.facebook.com/Biljni-svijet-kra%C5%A1kih-polja-Crne-Gore-2116989315180449/?modal=admin todo tour</u>).

- 1. Lecture for students/volunteers.
- 2. Excursions with students/volunteers to Piperi, Grahovo and Dragaljsko Polje.

At the end of May 2018 we organised excursions and lectures for students and volunteers from NGOs (**Picture 6**). These lectures used to raise the knowledge about dry meadows and grasslands ecosystems of arid karst fields, its biological value and to promote its conservation. Also, students of biology and agronomy had to collect plant material for Herbarium collections of University of Montenegro (TGU!) (**Picture 7**).



Picture6.Lecturesforstudentsgivengivenbyprof.byDanijelaStešević.© MilicaStanišić.

Picture 7: Students of biology and agronomy on fieldwork. ©Milica Stanišić.

Workshop for Farmers

At the end of July 2018 we organised workshop for farmers in cooperation with Ministry of Agriculture. The aim of workshop is to emphasise importance of traditional and extensive farming systems, which have significantly more positive effects on the sustainability of dry grasslands ecosystems. During the fieldwork we noticed that there is a significant number of farmers have different species of domestic animals, usually sheep and cows, which positively affects the floristic composition of plant communities of grasslands (**Picture 8, Picture 9**). On the private properties of farmers every year is present mowing, which also in positive way affects biodiversity of grasslands.



Picture 8: Grazing in the Grahovsko Polje. ©Milica Stanišić.

Picture 9: Sheep in the Grahovsko Polje. ©Milica Stanišić.