Project Update: August 2020

A mini biological camp and photo-camp was organised from 5th – 7th June 2020 at the Čardak locality, Modriča municipality, Bosnia and Herzegovina. The aim of the camp was gathering project members as mentors and students who were joining the team for detailed area research in the fields of botany, mycology, herpetology, entomology, ornithology and mammalogy. There were 15 participants in total, since we had to minimise the number of people due to Covid-19. All protection measures were conducted.

The research area was the Čardak locality at the Posavina area, located at the former course of the River Tolisa, which was diverted by a lateral canal into the Bosna River more than 40 years ago to reduce floods and enabled more active agriculture. Today in that area there are remnants of the riverbed in which they formed temporary ponds, and the remains of typical meadows, oak forests. With our research on reptiles and amphibians, European common spadefoot toad, *Pelobates fuscus*, since 2014, we have recognised the importance of this area with the key values:

- water and floodplain that is significant and endangered on a global level,
- the presence of more than a third of the herpetofauna in relation to the whole of Bosnia and Herzegovina,
- the most suitable habitats for the species *Pelobates fuscus*, where the largest population of the species in B&H was found,
- significant habitat for entomofauna and ornithofauna,
- historically and culturally interesting area.

Figure 1. Field researches at Čardak locality

The summer period was not the ideal for gathering data of most living groups researched, but because of this year's situation, the camp had to be organised when the situation allowed us. The good part was that the May 2020 was wet, and the

temperatures were not extremely high, and the land was soaked with water. The precipitation during the evening, night and morning was over 70 %.

Figure 2. Lectures and presentations during the mini biological camp Čardak 2020

Figure 3. Different types of habitats. Dry season.

RESULTS

Mycology report

The Čardak locality is not very rich in preferable habitats and exceptional moisture for fungi. The existing woods are young, and the most moisture is present during the night and mornings in the late spring, summer and early autumn. Despite the habitat types, low elevation and poor percentage of moisture, this kingdom is the biggest and dispersed organism in the world, and it can be found everywhere.

During the 3-day camp research some species from three phyla were found in the woodland area, near pond and near channels. Interested species found were G*anoderma lucidum,* a mushroom used for a potent immune system regulator, a promising anti-cancer agent, and stress reducer and *Helvella elastica,* one of the interesting Ascomycota fungi and species that can perform fibrinolysis.

Phylum Basidiomycota
Fam. Bolbitiaceae
Spec. *Conocybe* sp.

Fam. Polyporaceae
Spec. G*anoderma lucidum*

Incertae sedis
Spec. *Megacollybia platyphylla*

Fam. Hymenogastraceae
Spec. *Galerina marginata*

Fam. Inoycbaceae
Spec. *Inocybe erubescens*

Fam. Russulaceae
Spec. *Russula cyanoxantha*

Fam. Psathyrellaceae
Spec. *Psathyrella candolleana*

Fam. Schizophyllaceae
Spec. *Schizophyllum commune*

Phylum Ascomycota
Fam. Helvelaceae
Spec. *Helvella elastica*

Fam. Pyronemataceae
Spec. *Anthracobia melaloma*

Fam. Hypoxylaceae
Spec. *Hypoxylon howeianum*

Fam. Orbiliaceae
Spec. *Orbilia* sp.

Phylum Myxomycota
Spec. *Lycogala epidendrum*
Spec. *Ceratiomyxa fruticulosa*
Spec. *Tubifera ferruginosa*

Figure 4. *H. elastica, T. ferruginosa* and *G. lucidum*

Botany report

The lowland parts of northern Bosnia have been very little floristically explored. As the plains in our country are not rich in endemic species, and have suffered a great anthropogenic influence, they are usually not of interest to botanists. Until the middle of the 20th century, only scarce data on the Flora of Bosnia and Herzegovina (Beck 1903-1983) were known for northern Bosnia.

First detailed studies in northern Bosnia and Herzegovina, in Posavina region, were done in the middle of the 20th century (Bijelčić 1954, Riter-Studnička 1954). Some research was done in the next 20 years (Fukarek 1954, 1963, 1975, Kovačević 1959), and continued at the beginning of the 21st century (Kovačević & Šumatić 2005; Kovačević & Stojanović 2008 Kovačević 2010; Davidović et al. 2006, Petronić et al. 2010, Milanović et al. 2011, 2013; Milanović 2014, Milanović 2016).

There is no data from the Čardak site in any of the mentioned works and these are the first botany data collected.

The first phase of the research was the collection of literature data. However, as the flora of northern Bosnia was not interesting to botanists, very little information can be found in the literature. All data refer to similar areas, i.e. there are no literature data specifically for Čardak.

For the purposes of this project, flora research has been conducted on several occasions. The first field trip was done in April 2020. During this period, species identification in forest ecosystems was performed. Phytocenological surveying was performed in acacia and oak forests. In May 2020, ruderal flora was determined, around the restoration site, and partly the former wetland complex was explored.

During the research camp with the students, all ecosystems (forests, meadows, ruderal habitats and drained ponds) were explored. On this occasion, we collected species for the herbarium and their identification was done for the purpose of the final plant species list at the locality Čardak. Students had the opportunity to learn new species, about different lowland habitats and its importance.

During the project, so far, about 180 different plant species were recorded. Some of the most important species identified are *Alopecurus geniculatus, Ruscus aculatus* and *Iris pseudocorus*.

Figure 5. *Alopecurus geniculatus, Ruscus aculatus* and *Iris pseudocorus* flower and leaves

Entomology report

During biological camp we monitored about 7 km of the area that included groves, occasionally flooded meadows, oat fields, meadows. Most habitats are affected by anthropogenic modification.

For identification of butterfly species, the Collins Nature Guide – Butterflies and Moths (Hofmann & Marktanner 1995) was used. To identify all other species, various keys on the internet and the iNaturalist and BioLoger application was used. All data (pictures) collected was uploaded in BioLoger application for determination. During the field research some of the species were identify: *Polyommatus icarus, Vanessa atalanta, Minucia lunaris, Melitaea athalia, Maniola jurtina, Cetonia aurata, Argynnis paphia, Pseudovadonia livida, Nemophora degeerella, Ponorpa communis, Aglais io, Camponotus* sp.*, Vanessa cardui, Lucanus cervus.*

Figure 6. Ants carrying eggs (*Camponotus* sp.), *Melitaea athalia*


Figure 7. *Adscita* sp., *Cetonia aurata*, *Vanessa atalanta*, *Maniola jurtina*

Herpetofauna report

The goal of the camp was more intensive research of five groups of organisms that are important for a given marsh area, whose main goal is restoration and protection at the state level, as one of the increasingly rare and endangered aquatic habitats. In the area of Posavina in Bosnia and Herzegovina, under anthropological influence, a large number of temporary and permanent water bodies were destroyed and thus the habitat of numerous birds, amphibians, plants, which are permanently or periodically attached to them, were destroyed. In the lowland area of Posavina in Bosnia and Herzegovina, three areas are protected, the Una River as a Nature Park, the Tišina Pond as a Protected Habitat and the Gromiželj Wetland as a Protected Habitat.

Unfortunately, many other areas and habitat types, such as floodplain forests, floodplain meadows, old tributaries, ponds, have been drained and drainage of the area has been carried out so that excess water flows into rivers through canals, and without heavy rainfall, most such habitats do not have their own original purpose. As a result, many animal species have lost the habitats in which they feed, rest during migrations, and reproduce, all of which affect population decline and extinction.

Field research of herpetofauna was done in the evening and during the day. On that occasion, the manual method (hand grip) was used. Since the previous winter passed without significant snowfall, the pond located in this area, which is occasionally filled with water, dried up during the camp, as well as in the previous spring period, and therefore the expected number of species was not found.

The following species of amphibians were found and identified in the field research during the evening hours: *Pelobates fuscus*, *Bufo bufo*, *Bombina* - juvenile individuals, *Phelophylax* sp., *Triturus dobrogicus*. Reptile species found at the site: *Podarcis muralis* and *Natrix natrix.* All species except *Phelophylax* sp. were caught by hand. Also, the call of the species *Hyla arborea* was heard, but the frog was not observed during the field research.

Two dead individuals of the species *Emys orbicularis* were found during day field

research. One was juvenile on which no injuries were observed, and which is presumed to have died from lack of water, and the other, adult, died from traffic and the same was sampled for further genetic research.

Figure 8. *Natrix natrix, Bombina bombina, Podarcis muralis,* two individuals *Bufo bufo*

Ornithology report

Except the camp research, this year the ornithological fields were realised on 6th April 17th May 25th June and 23rd July 2020, at the area of Čardak and its surroundings (Kornica, Živkovo polje, Kladari). Each field was done in the morning period of the day. The method was a targeted search of terrain in open habitats (agricultural areas and mosaic habitats) and a census at a point applied near the pond Ada and in a fragment of pedunculate oak and hornbeam forest. Ornithological terrain within the camp was performed on 6th June 2020 during dusk and night in order to find species that are active at these times of the day. At that time, forest habitats and meadows in the vicinity of the Ada pond were visited. The birds were observed with 8 x 30 magnification binoculars, photographed, and the playback method was used for determination and confirmation of certain bird species.

Not counting the historical data of previous research, from the beginning of 2020, 76 bird species were recorded which is 22,1 % of all registered birds in Bosnia and Herzegovina, from orders: Podicipediformes, Ciconiiformes, Anseriformes, Falconiformes, Galliformes, Gruiformes, Charadriiformes, Columbiformes, Cuculiformes, Strigiformes, Piciformes and Passeriformes.

In relation to the previous period and to the previous data (the researcher's own observations, Sjeničić J.), it is evident that no species that directly depend on water have been recorded (grebes, some species of ducks, snipe, etc.). Species that are currently emerging testify the potentials and geological (and ecological) past of these terrains and habitat potentials. At this moment, the number of species cannot be commented on, because the bird fauna is not even close to exhaustion. Species diversity is suspected, but at the same time the fragmentation and degradation of habitats are indicated by the frequency and number of recorded species.


Figure 9. *Acrocephalus palustris* and *Circus aeruginosus*

Mammalogy report

The research was carried out in the remains of a riverbed in which temporary ponds were formed, and the remains of meadows, oak forests. The method of work was based on setting Longworth traps for small mammals. Traps are set by trapping food that will attract potential small mammals. The inside of the trap is then covered with grass that is nearby, so that the animal does not feel the foreign space when entering and experiences a shock when activating and closing the trap. On 5th June 2020 seven traps were set for small mammals, in the vicinity of the pond. The traps were inspected on the morning of 6th June and *Apodemus sylvaticus* was found in one trap. After being photographed, the rodent was released. The same morning, seven more traps were set. The traps were arranged along the meadow and a couple of traps in the forest, which was located nearby. So, there were a total of 14 traps, which were set in two locations, near the pond and along the meadow. All traps were checked on the night of 6th June 2020. The same species, *Apodemus sylvaticus*, was found in a trap near the meadow. On June 7th 2020, another *A. sylvaticus* was found. The trap in which the species was mentioned was located in the forest. An abandoned nest of *Micromys minutus* was found at the entrance to the forest. Three individuals of the European rabbit were recorded at three locations within survey area (between the riverbed and the local road - two individuals and between the local road and forest – one individual). Data on mammalian species were also collected based on trace and scats monitoring. In this way, the presence of wild boar and roe deer has confirmed in oak forest and along agricultural fields. Also, information on the presence of mammals were gathering through interviews conducted with the local people and hunters who are members of the hunting organisation "Majna" from Modriča. They confirmed the presence of European rabbit, wild boar and roe deer and told that they can see very often foxes and badgers.

Figure 10. *Micromys minutus* nest, *Apodemus sylvaticus* in “Longworth” trap, *Capreolus capreolus* tracks