

INTRODUCTION

Vranica Mountain is located in the central part of Bosnia and Herzegovina around which the Kingdom of Bosnia and Herzegovina developed with numerous cultural centers, among which are Fojnica and Kreševo. Although it is located in the central part of the Dinaric mountains in Bosnia and Herzegovina, Vranica is completely different from them because it is not of a limestone-dolomite origin. Vranica Mountain belongs to the old mountains, unlike the Dinarides, it is formed by a numerous type of shales and metamorphic rocks. Therefore, it has been our most famous mining mountain ever since the Roman period. Throughout the history of Bosnia, gold and other mined metals and minerals were found there. Although the mountain does not belong to the limestone-dolomitic mountains, there are numerous caves and pits on it, and the inexperienced observers often take them for old mines. In addition to the mineral wealth, the foothills of this mountain are known for numerous mineral water springs, some of which are being successfully exhausted. The mountain is located between Uskoplje / Gornji Vakuf and the fertile Uskopljan Valley in the west and Fojnica in the east. The rivers that separate Vranica from other eastern Bosnian mountains meet there. As it is located in the central part of the country, it represents the water parting between the rivers Vrbas and Bosna on one side and the Neretva on the other. Vranica is one of the highest mountains in Bosnia and Herzegovina. The highest peak is Nadkrstac with 2112 m above sea level, followed by Krstac with 2069 m and Rosinj with 2059 m. There are also slightly lower peaks: Ločika, Matorac, Sikira and Motika. We cannot say that the climate of Vranica is very harsh.

Vegetation is at higher altitudes, where the influence of the Mediterranean is not felt, adapted to the short vegetation period of 120 days. Otherwise, temperatures on the mountain are moderate low, and extreme minima range from -20° C, and the summers are very warm only on the southern and western slopes due to the influence of the submediterranean. Due to the collision of two climates, continental and submediterranean from the Neretva valley, the mountain abounds with precipitation and the annual average is about 1100 mm. In the winter, the mountains form snow, which is often deep over 2 m, and two ski resorts are opened, Brusnica and Vran-Kamen. Such climatic conditions, combined with a complex geological structure, also caused the occurrence of specific vegetation. In hydrological aspects, the mountain is extremely rich in surface waters and there are many springs high in the mountain. The famous Prokoško Lake, which gives a special value to the mountain, has been devastated recently and is also threatened by a complete disappearance due to the unplanned development of tourism around it. When it comes to hydrology, one must not ignore the fact that there are several important rivers on Vranica, such as the Vrbas or Ragalska river and Željeznica, which create the Fojnica River at Fojnica, and on the other hand there are numerous tributaries of Neretvica. The great problem of these rivers is that they are threatened by the small hydropower plants, and the groundwater system has already been disturbed, so many springs have disappeared or their capacity has been reduced.

At present, there is an active campaign to use the remaining free streams to generate electricity. There are a lot of beautiful waterfalls on numerous streams such as the waterfall on the Kozica River or the Ždrimački Waterfall, while on the Uskopljanian side

there is the Strapala waterfall (Balian, 2017¹). Data about geology, hydrology and biology of Vranica Mountain are very scarce. But, at this moment it is very important to mention authors who have investigated this area and give a great scientific contribution to the promotion of natural values of this area, as well as Bosnia and Herzegovina.

In this regard, it is important to highlight the authors who have given their great scientific contribution: Katzer (1902)², Katzer (1903)³, Protić (1924)⁴, Katzer (1926)⁵, Protić (1927)⁶, Kušan (1934/35)⁷, Horvat & Pawlovski (1939)⁸, Lakušić et al. (1979)⁹, Vukorep (1979)¹⁰, Lakušić (1984)¹¹, Spahić (1991)¹², Spahić (2001)¹³, Redžić (2000)¹⁴, Redžić et al. (2003)¹⁵, Barudanović (2003)¹⁶, Đug (2003)¹⁷, Lelo et al. (2003)¹⁸, Đug & Redžić (2006)¹⁹, Kapetanović & Hafner (2007)²⁰, Redžić (2007)²¹, Redžić et al. (2008)²², Šoljan et al. (2009)²³, Aariä-Kundaliä et al. (2010)²⁴, Korjenić & Banda (2015)²⁵, Barudanović et al. (2017)²⁶ and Balian (2017)²⁷. Based on the available literature data, we can conclude that freshwater oligotrophic habitats are not subject to numerous papers. The main focus of the investigation was Prokoško lake and wet habitats in the subalpine belt around the lake.

One paper (Kapetanović & Hafner, 2007) deal with diatoms in subalpine belt. But there is no available checklist of diatom taxa. A More detailed study about algae in freshwater oligotrophic habitats type, especially in peatlands we can find in the publication by Barudanović et al. 2017. This publication was the main basis and motive for the current project. After the completion of the field and laboratory phase of our study, it can be freely said that it was justified. During our study, we have detected the presence of rare and endangered diatom and prepared a good basis for future investigation of this very fragile and extraordinary mountain and freshwater oligotrophic habitats.

¹ Balian, D. (2017). Zemlja planina – Bosna i Hercegovina. Grafotisk, Grude. Sarajevo, 2017. pp 1- 231.

² Katzer, F. (1902). Die ehemalige Vegeltshuerungen der Vranica planina in Bosnien. Globus B. 81, No 3, Braunschweig; 37-39.

³ Katzer, F. (1903). Geologischer Führer durch Bosna und die Herzegovina. Sarajevo, 156-192.

⁴ Protić, Dž. (1924). Hidrobiološke i plankton studije na jezerima Bosne i Hercegovine. I dio. Glasnik Zemaljskog muzeja BiH, sv. XXXVI. Sarajevo, 39-67.

⁵ Katzer, F. (1926). Geologija Bosne i Hercegovine. Knjiga 1. Sarajevo.

⁶ Protić, Dž. (1927). Mogućnost ekonomskog iskoristavanja planinskih jezera BiH kao ribnjaka. Glasnik Ministarstva poljoprivrede i voda. Godina V, 17 Sarajevo.

⁷ Kušan, F. (1934/35). Limnološka istraživanja Vranice planine u Bosni i Rugovsko-metohijskih planina u Crnoj Gori. Ljetopis Jugoslovenske akademije znanosti i umjetnosti, Sv. 48: 227-242.

⁸ Horvat I. & Pawlovski B. 1939. Istraživanje vegetacije planine Vranice. Ljetopis JAZU, Zagreb 51: 149-152.

⁹ Lakušić, R., Pavlović, D., Abadžić, S., Kutleša L., Mišić, L.J., Redžić, S., Maljević, D. & Bratović, S. 1979. Struktura i dinamika ekosistema planine Vranice u Bosni. Zbornik radova II kongresa ekologe Jugoslavije, knjiga 1: 605-714.

¹⁰ Vukorep I. 1979. Zemljišni pokrivač sjevernih padina planine Vranice. Zbornik radova II kongresa ekologe Jugoslavije, knjiga 2: 1167-1174.

¹¹ Lakušić, R. (1984). Planinske biljke. IP Svjetlost – Zavod za udžbenike i nastavna sredstva, Sarajevo. Zavod za udžbenike i nastavna sredstva Beograd.

¹² Spahić, M. (1991). Negativni recentni antropogeni procesi u neposrednom slivu Prokoškog jezera. Geografski pregled, sv. XXXV. Sarajevo, 125-132.

¹³ Spahić, M. 2001. Prirodna jezera Bosne i Hercegovine. Limnološka monografija. Harfo-Graf, Tuzla, 170 pp.

¹⁴ Redžić, S. 2000. The forms and patterns of vegetation diversity at the Vranica Mts. in Central Bosnia. The study of the centre of ecology and natural resources, Faculty of Science University of Sarajevo, 145 pp.

¹⁵ Redžić, S., Barudanović, S., Đug S. & Kapetanović, T. 2003. Obrasci ekološkog diverziteta na planini Vranici u Bosni. Prirodno-matematički fakultet Univerziteta u Sarajevu i Ministarstvo obrazovanja i nauke Federacije BiH, 145 pp.

¹⁶ Barudanović, S. 2003. Ekološko-vegetacijska diferencijacija lišćarsko-listopadnih šuma planine Vranice. Ph. Thesis, Prirodno-matematički fakultet Univerziteta u Sarajevu, 373 pp.

¹⁷ Đug S. 2003. Diverzitet i konzervacija vegetacije pretplaninskog pojasa planine Vranice. PhD thesis. Prirodno-matematički fakultet Univerziteta u Sarajevu.

¹⁸ Lelo, S., Memišević, E., Kašić-Lelo, M. (2003). Potvrda stabilne egzistencije bosanskohercegovačke endemične populacije alpskog tritona *Triturus alpestris* reiseri Werner, 1902 (Amphibia: Urodela, Salamandridae) u Prokoškom jezeru i njegovoj okolini. Radovi poljoprivrednog fakulteta Univerziteta u Sarajevu, 48(52), 47-56.

¹⁹ Đug S. & Redžić S. 2006. Syntaxonomic differentiation of vegetation of the class Montio-Cardaminetea Br. Bl. et R. Tx. ex Klika et Hadač 1944 em. Zechmeister 1993 in the Balkan peninsula. GZM (PN), SN 32: 151-156.

²⁰ Kapetanović, T., Hafner, D. (2007). Diatoms of wet habitats in the subalpine belt of Mt. Vranica (Bosnia and Herzegovina). Proceedings of the 1st Central European Diatom Meeting 2007 Kusber, W.-H. & Jahn, R. (ed.) Botanic Garden and Botanical Museum Berlin-Dahlem, Freie Universität Berlin, pp 73-78.

²¹ Redžić, S. (2007). Syntaxonomic diversity as an indicator of ecological diversity – case study Vranica Mts in the Central Bosnia. Biologia, Bratislava, 62/2: 173-184.

²² Redžić, S., Barudanović, S., Radević, M. /ed./ (2008). Bosna i Hercegovina – Zemlja raznolikosti. Pregled i stanje biološke i pejzažne raznolikosti Bosne i Hercegovine. Prvi izvještaj Bosne i Hercegovine za CBD. Bemust Sarajevo, 2008: 1-164.

²³ Šoljan, D., Muratović, E., Abadžić, S. (2009). Biljke planina Bosne i Hercegovine. Šahinpašić, Sarajevo/Zagreb. pp 1-453.

²⁴ Aariä-Kundaliä, B., Fritz, E., Dobeš, C., & Saukel, J. (2010). Traditional medicine in the pristine village of Prokoško Lake on Vranica Mountain, Bosnia and Herzegovina. *Scientia pharmaceutica*, 78(2), 275-290.

²⁵ Korjenić, A., Banda, A. (2015). Prirodni segment turističke atrakcijske osnove planine Vranice. *Acta geographica Bosniae et Herzegovinae*, 3: 75-82.

²⁶ Barudanović, S., Mašić, E., Macanović, A. (2017). Tresetišta na bosanskim planinama. Prirodno-matematički fakultet, Univerzitet u Sarajevu. Štamparija Fojnica dd Fojnica, pp 1-183.

²⁷ Balian, D. (2017). Zemlja planina – Bosna i Hercegovina. Svijetlo riječi. Sarajevo, 2017: 1-231.

Thanks to the grant, which was awarded by the Rufford Foundation, an extensive study was completed and realized entitled as: [“Conservation of Freshwater Oligotrophic Habitats on Vranica Mountain and Establishment of Long-Term Monitoring of Biodiversity”](#). The study primarily focused on different freshwater oligotrophic habitat types on this mountain and on rich algal biodiversity, especially diatoms. During the months of March, April, May and June, various project activities were realized, followed by the dynamic plan of our project. It is important to note that all project activities were realized according to the dynamic plan and until now we have not encountered any problems that would prevent the implementation of the proposed project. Further, in the **Fifth Project Update**, description of various project activities is presented.

Through our Fourth project update, 10 realized activities were presented as follows:

Activity 1. *Literature analysis*

Activity 2. *Detailed fieldwork*

Activity 3. *Establishment of diatom collections*

Activity 4. *Registration on different international conferences*

Activity 5. *Promotion of our project through social media*

Activity 6. *Establishment of a database of biotic parameters*

Activity 7. *Establishment of a complex matrix with abiotic and biotic data*

Activity 8. *Android App for entering data on the field*

Activity 9. *Preparation of original scientific papers*

Activity 10. *Preparation of promotional materials*

Activity 1. *Literature analysis*

In order to understand the structure and dynamics of selected habitat types, a large number of original scientific papers have been collected and analysed. These papers will serve as a basis for the establishment of a large database of reference, which will be expanded and analysed in the next period of realization of our project. The scientific papers were downloaded from the official Journal pages, through the Research Gate platform, and through Google search engine. Our base of thematic scientific papers has more than 500 references so far. The above-mentioned scientific papers will be used for the preparation of promotional materials, future congress and original scientific papers. It is very important to note that we have collected all available literature data and published references which have a focus on Vranica Mountain. The collected publications analysed different aspects of this area as follows: geology, hydrology, limnology, botany, zoology, phytocoenology and general ecology. All collected literature data will help in the future during the establishment long-term monitoring of biodiversity and state of freshwater oligotrophic habitats on Vranica Mountain. Some historical publications and data could help in modelling and prediction of future of these extraordinary habitat types. Mendeley reference software has been selected to manage the collected original scientific papers (<http://www.mendeley.com/download-desktop>).

Activity 2. *Detailed fieldwork*

The last days of our fieldwork were realized during the months of March, April, May and June. As with the previous fieldwork, special attention in this project is focused on the oligotrophic freshwater habitats on the wide area of Vranica Mountain. In order to obtain comparable results, for each studied habitat type, a robust field protocol was used,

which was previously prepared²⁸ and introduced in our **1st project update**. For each studied site, two phytobenthos samples were collected. One sample is for diatoms and the second sample is for other algal groups. The samples of phytobenthos were fixed with formalin 4% and stored until laboratory analysis. Each collected sample contains a unique QR code which is related to the same field protocol. By scanning the unique QR code with QR scanner (Android application) it is possible to access the database and reach general information about habitat characteristics from which the sample was collected. On each investigated site sampling of aquatic macrophytes (bryophyte and vascular plants) was carried out. During the fieldwork, plant materials were collected in plastic bags and they were dried in laboratory conditions. The collected samples of phytobenthos and aquatic macrophytes were stored in the Laboratory for Systematics of Algae and Fungi at the Faculty of Science, University of Sarajevo.

Activity 3. Establishment of diatom collections

Research on diatoms in the wider area of Vranica Mountain has not been carried out so far. First data about the biodiversity of cyanobacteria and algae in some specific habitat types were provided by Protić (1926), Kapetanović & Hafner (2007) and Barudanović et al. (2017). It is very important to highlight that this comprehensive study is first in regards to inventarization of cyanobacteria and algae in the wider area of Vranica Mountain. All collected samples are stored in the Laboratory for Systematics of Algae, and also aliquot with diatoms and permanent slides. It is very important to note that from each sample (aliquot), we prepared five permanent slides which are associated with unique field protocol. All protocols and permanent slides are organized in the collection which will be used as a reference and for generating future projects and publications.

Activity 4. Registration on different international conferences

In order to present the results of our project, but also to promote and share our knowledge, we will participate in the *European Phycological Congress* which will be held in Zagreb, 25.08. – 30.08.2019²⁹. The title of our presentation is: „Diversity of diatoms in freshwater oligotrophic habitat types on Vranica Mountain (Bosnia and Herzegovina)“ (App. 1).

Activity 5. Promotion of our project through social media

In order to raise ecological awareness about the importance of freshwater oligotrophic habitat types, during current phases, continuous promotion of our project was carried out. For the promotion of results and current activities, we relied on social media. All photo albums and other information about current project activities are available at the following links:

Link 1.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1351715164959329&type=3

Link 2.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1365567346907444&type=3

Link 3.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1372867046177474&type=3

Link 4.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1382180618579450&type=3

²⁸ <https://www.rufford.org/files/24578-1%20June%202018.pdf>

²⁹ <http://epcseven.biol.pmf.hr/>

Link 5.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1392457977551714&type=3

Link 6.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1392457977551714&type=3

Link 7.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1396730650457780&type=3

Link 8.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1419825644814947&type=3

Link 9.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1425308467599998&type=3

Link 10.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1536078419856335&type=3

Link 11.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1552949678169209&type=3

Link 12.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1573577542773089&type=3

Link 13.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1575350419262468&type=3

Link 14.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1580376058759904&type=3

Link 15.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1600372623426914&type=3

Link 16.

https://www.facebook.com/ermin.masic.505/media_set?set=a.1601149773349199&type=3

Activity 6. Establishment of a database of biotic parameters

In addition to the prepared database of abiotic parameters which contains the basic characteristics of habitats from which sampling was carried out, a long database for diatoms and other algae groups was established (**App. 2**). The database was prepared in the form of an excel table, but for the easier and simpler inventory and possible mapping of cyanobacteria and algae in the wider area of Vranica Mountain, **BIOTA 3**³⁰ Biodiversity Database Manager was used. Biota 3 is a very simple but effective software for establishing, managing and editing large databases, in our case data on the diversity of diatoms in the wider area of Vranica Mountain. The software consists of three main parts as follows: 1. Find Records, 2. Input Records and 3. Import or Export Records. Each of these sections contains a number of operations that facilitates database management. After determining the diatom taxa from the permanent slides and forming the .xls table, the data are entered into the program. For each identified species unique code is created and the main taxonomic data (genus, specific name, species author and year) are entered. Part of the prepared BIOTA 3 database is shown in this project update. Using a basic and also advanced function, a researcher can, in every moment, find all statistical data which are entered in the database. Currently, our database contains 174 diatom taxa from 60 genera, 34 families, 17 orders, 2 classes, 1 phylum and 1 regnum. In the future our plan is to enter more taxa in the database, and prepare unique sheets which will be dealing with distribution and some ecological properties for our taxa in BIOTA 3 Data Manager.

³⁰ <http://vicero.eeb.uconn.edu/biota/>

Activity 7. Establishment of a complex matrix with abiotic and biotic data

In order to carry out statistical analysis, a complex matrix with abiotic and biotic data which were collected during the investigation period are prepared. Based on the outcomes, certain original scientific and conference papers will be prepared (**App. 3**).

Activity 8. Android App for entering data on the field

Entering data into this long database of abiotic factors will be possible in the future through our newly prepared Android application. Access to the application and entering data are possible through a tablet or smartphone. Through the application, the data is entered directly into the .xls file. A newly formatted file can be downloaded to a laptop, edited and analysed on a regular basis. Android Application has been successfully created, tested and we will use it for the future establishment of long-term monitoring in the wider area of Vranica Mountain.

Activity 9. Preparation of original scientific papers

After synthesis of all obtained results, several papers will be prepared. In our papers, we are indicating the presence of rare and endangered species of diatoms, and we are also highlighting the state of freshwater oligotrophic habitat types on Vranica Mountain. As we mentioned in our project proposal the main goal of this project is protection and monitoring of these very unique and sensitive habitat types. Currently, several papers are in preparation. After peer-review process, they will be submitted to the scientific journals which deal with our topics (**App. 4**).

Activity 10. Preparation of promotional materials

As a result of our study, we have prepared rich promotional materials. The main aim of these promotional materials is the dissemination of our results and raising ecological awareness of the importance of freshwater habitats in the mountain area. During the last months, active promotion and education through short posts were done. For this task, we have used a social network. Our posts deal with interesting facts about diatoms and freshwater oligotrophic habitats on Vranica Mountain and elsewhere (**App. 5**).

Interesting facts about freshwater oligotrophic habitats on Vranica Mountain and about diatoms are available at the following links:

Link 1. <https://sway.office.com/Ce3NbXRigsK8Zyrk?ref=Link&loc=mysways>

Link 2. <https://sway.office.com/SwFxHo1XD9GvBtQ1?ref=Link&loc=mysways>

Link 3. <https://sway.office.com/wB5cUq1ARdWyeHMe?ref=Link&loc=mysways>

Link 4. <https://sway.office.com/y2vQOGKRgQV3QJ8t?ref=Link&loc=mysways>

Link 5. <https://sway.office.com/zwb9XTPoNF1NTzPx?ref=Link&loc=mysways>

Link 6. <https://sway.office.com/XRtBs5LBoBkcO711?ref=Link&loc=mysways>

Link 7. <https://sway.office.com/eVFDraWeRaW4yphG?ref=Link&loc=mysways>

Link 8. <https://sway.office.com/dyVjq1yLfiRRwD50?ref=Link&loc=mysways>

Link 9. <https://sway.office.com/Q0MUbULLnzYNcFJY?ref=Link&loc=mysways>

Link 10. <https://sway.office.com/APBkbwxUNnR6Z5Yo?ref=Link&loc=mysways>

Link 11. <https://sway.office.com/Sc5NXIQR4CxyZ3BH?ref=Link&loc=mysways>

Link 12. <https://sway.office.com/jRPX9Nw9G4slA6vG?ref=Link&loc=mysways>

Link 13. <https://sway.office.com/4J8KoMRJU7aBLoup?ref=Link&loc=mysways>

Link 14. <https://sway.office.com/dV9glGdU40lETvFb?ref=Link&loc=mysways>

Link 15. <https://sway.office.com/TowPxMPzIRDa7iml?ref=Link&loc=mysways>

Link 16. <https://sway.office.com/QO2TkSoXCTiVljnb?ref=Link&loc=mysways>

Plans for the future

It is planned to continue with our research. The focus of future research would be on freshwater oligotrophic habitat types, especially on mountain springs, mountain creeks, mountain streams, mountain lakes and mountain peatlands. In addition to the algae of phytobenthos that we have used as bioindicators to determine the ecological condition of freshwater oligotrophic habitats, in the future we will include algae of phytoplankton as an important component. In the continuation of our work, we would use the knowledge and resources that we acquired during the realization of the **First Rufford project**. Also, more attention would be focused on educating students and fieldwork. The results of future research could be also used to prepare high-quality diploma and master thesis within an institution where I am currently working.

Additional activities

During the regular fieldwork conducted at the Department of Biology, University of Sarajevo, I had the opportunity to visit protected areas in Sarajevo Canton with students of the fourth year. The fieldwork was realized in the area of the Natural Monument of Vrelo Bosne and the Protected Landscape of Bijamabare. In these protected areas students had the opportunity to get acquainted with the characteristics of oligotrophic habitat types, and with the living world that inhabits them. In addition to the theoretical part, students also practically worked on the field with the help of equipment purchased by the grants of Rufford Foundation. In the field, students have used the equipment, filled out the field protocol, tested the android application and sampled algae from selected oligotrophic habitat types located within the protected areas (e.g. creeks and peatlands).

We continued also with the promotion of our work to the broad range of public through very popular media as follows: **iNaturalist**³¹ and **YouTube**³².

Progress about our project is also available on [ResearchGate](#).

In the continuation of the report, the following contents are presented:


1. Android applications (sampling protocol) and BIOTA 3 database manager,
2. Photos of new localities in the area of Vranica Mountains and
3. Working with students within the Protected Areas of Canton Sarajevo.

³¹ <https://www.inaturalist.org/projects/conservation-of-freshwater-oligotrophic-habitats-on-vranica-mountain?tab=about>

³² https://www.youtube.com/channel/UCSZBVEUVQG04oETRFVyGieA?view_as=subscriber

Rufford - Dr. Mašić Ermin

The Rufford Foundation



ID	
Code	
Locality	
Date	Pick a date
Latitude (N):	
Longitude (E):	
Altitude:	
Sample and Photographic note:	

Next

Rufford - Dr. Mašić Ermin

RELATED SAMPLING ACTIVITIES

<input type="checkbox"/> Water chemistry	<input type="checkbox"/> Environmental DNA
<input type="checkbox"/> Invertebrate survey	<input type="checkbox"/> Fish survey
<input type="checkbox"/> Habitat survey	<input type="checkbox"/> Bed sediment

PHYSICAL SITE CONDITIONS

Air temp. °C	Air humidity %
Light intensity Lux	Clouds %

Wind (check)	N/a
Precipitation (check)	N/a
Precipitation intensity (check)	N/a
Shading (check)	N/a
Water color (check)	N/a

Next

Rufford - Dr. Mašić Ermin

WATER MEASUREMENTS

Beginning water measurement | Ending water measurement

Time	Pick a time	Time	Pick a time
------	-------------	------	-------------

Water temperature	°C	Water temperature	°C
pH		pH	
Dissolved oxygen	mg/l	Dissolved oxygen	mg/l
Specific Conductance	µS/cm	Specific Conductance	µS/cm
TDS	ppm	TDS	ppm
Turbidity	NTUs	Turbidity	NTUs

Next

Rufford - Dr. Mašić Ermin

Recognizable periphyton habitats (Note and sample)

Epilithic: %	Epidendric: %
Epiphytic: %	Epipsamic: %
Epipellic: %	Other: %

Periphyton abundance (check)

☐ Dense ☐ Moderate ☐ Sparse ☐ N/a

Recognizable algal taxa (Note and sample)

☐ Cyanophyceae ☐ Florideophyceae

Note

☐ Chrysophyceae

Note

☐ Xanthophyceae ☐ Chlorophyceae

Note

Next

Species Records 174 Records

Double click a Species to view or modify record

Species Code	Family	Genus	Specific Name, Subsp., Variety	Subgenus	Aux
ACHDKR	Achnanthidiaceae	Achnanthidium	Achnanthidium kranzii		0
ACHMIN	Achnanthidiaceae	Achnanthidium	Achnanthidium minutissimum		0
ADLBRY	Anomooneidaceae	Adafia	Adafia bryophila		0
AMPPEL	Amphipleuraceae	Amphipleura	Amphipleura pellucida		0
AMPCOP	Catenulaceae	Amphora	Amphora copulata		0
AMPINA	Catenulaceae	Amphora	Amphora inariensis		0
AMPMIN	Catenulaceae	Amphora	Amphora minutissima		0
AULALP	Aulacoseiraceae	Aulacoseira	Aulacoseira alpigena		0
AULUCR	Aulacoseiraceae	Aulacoseira	Aulacoseira crenatula		0
BRABRE	Brachysiraceae	Brachysira	Brachysira brebissonii		0
BRANT	Brachysiraceae	Brachysira	Brachysira intermedia		0
CALAER	Naviculaceae	Caloneis	Caloneis aerophila		0
CALAPS	Naviculaceae	Caloneis	Caloneis alpestris		0
CALSIL	Naviculaceae	Caloneis	Caloneis silicula		0
CALATE	Naviculaceae	Caloneis	Caloneis tenuis		0
CAVCOC	Cavinulaceae	Cavinula	Cavinula cocconeiformis		0
CHAHME	Naviculales incerta	Chamaepinnularia	Chamaepinnularia mediocris		0
COCLNT	Cocconeidaceae	Cocconeis	Cocconeis lineata		0
COCPED	Cocconeidaceae	Cocconeis	Cocconeis pediculus		0
COCPLA	Cocconeidaceae	Cocconeis	Cocconeis placentula		0
COCPK	Cocconeidaceae	Cocconeis	Cocconeis placentula var. kinorafis		0
COCOPL	Cocconeidaceae	Cocconeis	Cocconeis pseudolineata		0
CRACUS	Stauroneidaceae	Craticula	Craticula cuspidata		0
CYMSOL	Surirellaceae	Cymatopleura	Cymatopleura solea		0
CYMASP	Cymbellaceae	Cymbella	Cymbella aspera		0
CYMNFO	Cymbellaceae	Cymbella	Cymbella neocistula		0
CYMNLC	Cymbellaceae	Cymbella	Cymbella neolanceolata		0
CYMPRX	Cymbellaceae	Cymbella	Cymbella proxima		0
CYMBAM	Cymbellaceae	Cymboppleura	Cymboppleura amphicephala		0
CYMBAU	Cymbellaceae	Cymboppleura	Cymboppleura austriaca		0
CYMBUC	Cymbellaceae	Cymboppleura	Cymboppleura cuspidata		0
CYMBUC	Cymbellaceae	Cymboppleura	Cymboppleura inaequalis		0

Change Var Fields Add Species Sort Print Aux Fields

Delete Selection Sub-Selection Done

File Edit Input Series Find Display Labels Im/Export Loans Special Help

Classification Subsp/Names Synonymy Dist/Types Aux Fields Notes Refs

EUNTET
Eunotia Eunotia tetradron Ehrenberg (1838)

Species Code: Assign

Genus:

Specific Name (Specific Epithet):

Species Author (& Date): ☐

Subgenus: ☐

Section: ☐

Synonymy
Valid Species Code:
A valid Species name. Click the Synonymy tab to check for synonyms.

Record
Number 75 of 174
Created 16 Mar 2019
Last changed 16 Mar 2019
Changed By Administrator

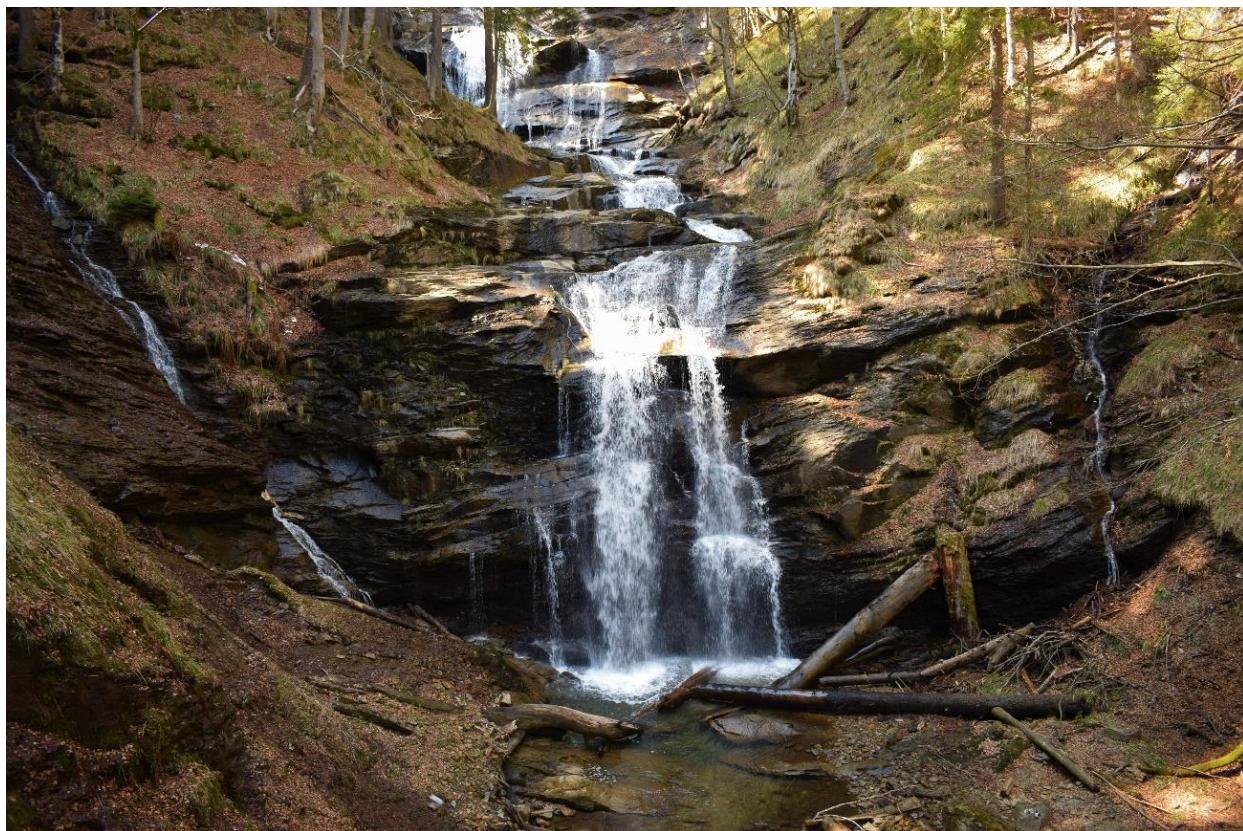
Classification
Family Eunotiaceae
Order Eunotiales

Show Genus Record

Show Specimens (None)

This Species record
Save
Print Carry
Delete Cancel

Navigate records
Previous Next First Last



Kozica river



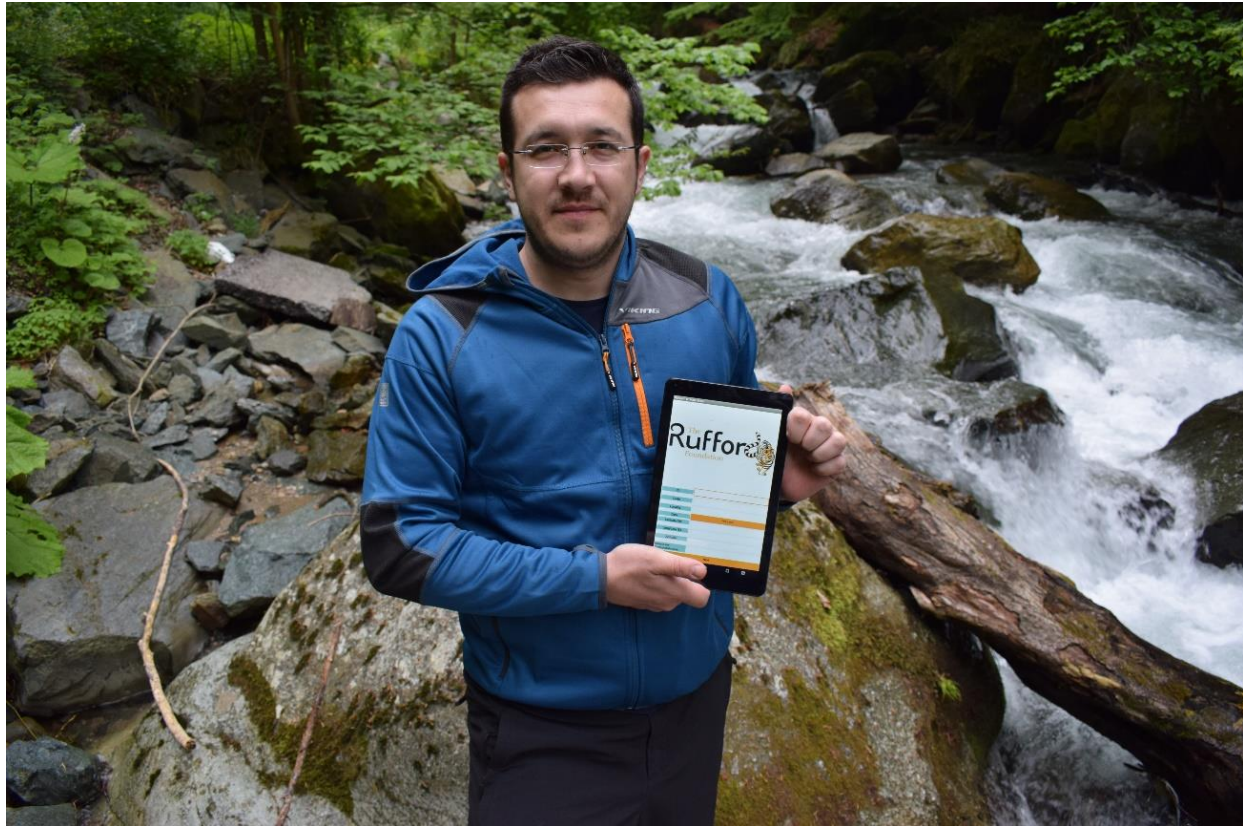
Tributaries of the of the river Kozica



River Jezernica



Tributaries of the of the river Jezernica





Fieldwork with students within the Protected Areas of Canton Sarajevo