



## MICROPLASTICS MONITORING PROTOCOL TRIAL (MMPT)

# NEWSLETTER N. 2



## NEWS FROM THE SCHOOLS

We are happy to dedicate the n. 2 of the MMPT Newsletter to the **Reports of two Croatian schools**, which are doing excellent work. The first is the **High School Srednja škola Čakovec** in Čakovec, the second one is the **Elementary school (Osnovna škola) Valentin Klarin, in Preko**.

The Reports are signed by the teachers: **Kristina Trstenjak Šifković** and **Denis Horvat** for the first one and **Jasminka Dubravica**, for the second one.

The editorial staff thanks the authors and congratulates them and their classes for the quality of the activities implemented in an objectively very complicated situation due to COVID.

The Reports show on the one hand the ability to seek and obtain important collaborations within the community in which they live, as well as the ability to obtain funds to purchase the equipment consistent with the indications of the Protocol.

But above all the pleasure of the scientific didactic adventure emerges which, while contributing to the improvement of a new environmental investigation protocol, allows students to develop new skills and new knowledge on a serious emerging environmental problem, that of microplastics in the hydrosphere, and to share them with the local community to raise awareness of individuals and citizens in order to activate actions by both aimed at combating the dispersion of plastic in the environment.



## GLOBE CROATIA

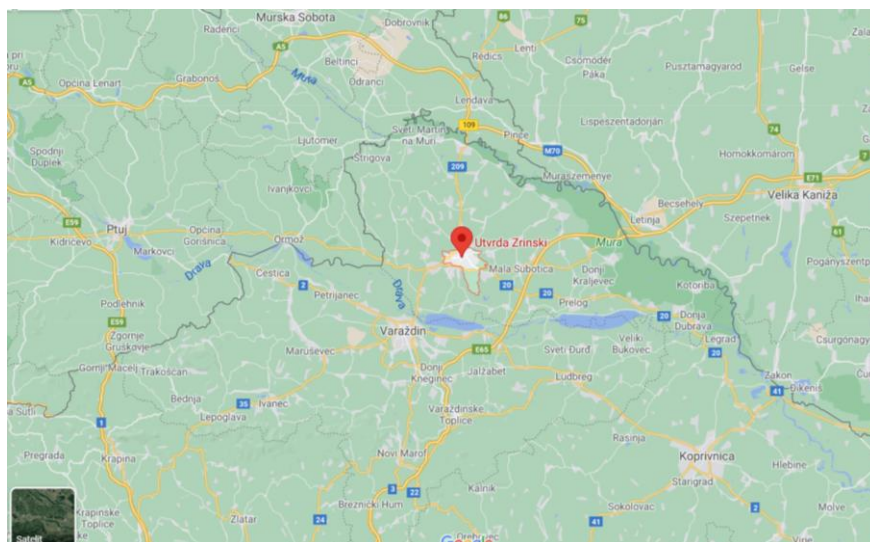
### Srednja škola Čakovec

*Srednja škola Čakovec, Čakovec*

*The article, in English, is edited by the teacher Kristina Trstenjak Šifković, biology and chemistry teacher ([kristina.trstenjak@gmail.com](mailto:kristina.trstenjak@gmail.com)) and Denis Horvat, biology and chemistry teacher ([denis.horvat96@gmail.com](mailto:denis.horvat96@gmail.com))*

## WHO AND WHERE

We are Srednja škola Čakovec and our school is located in Čakovec, which is about 100 kilometers northwest from the capital city of Croatia, Zagreb.



## WHEN WE JOINED THE GLOBE Program



We have been actively participating in the GLOBE program since 2017, and we have been involved in a number of projects and activities.

In our GLOBE group, there are 15 students. We implement atmosphere protocols on a daily basis, and once a week we measure the physical and chemical properties of water.

We also publish news related to the GLOBE project regularly on our school Facebook and web page (<https://www.facebook.com/sscakovec>, <http://www.sscakovec.hr/>), as well as send it to local media.

## THE MICROPLASTICS MONITORING PROTOCOL AND US

Our students, like us, are satisfied with the microplastics protocols. Protocols are clearly defined and easy to use. We had minor problems with purchasing school filtering equipment, but we managed to do it all. We think that talking about microplastics is very important and our plan is to include even more students in the project from next year on.



Credit: Deakin University. Microplastics monitoring protocol. This work is licensed under a Creative Commons Attribution-NonCommercial4.0 International License.

## PROBLEMS AND SOLUTIONS

Our school does not own a filtration device, which is necessary for the microplastics monitoring protocol, so we contacted Međimurske vode, a utility company for water supply, sewage and wastewater treatment. They offered to help us filter our samples on May 27. We collected 9 samples (each of 500 ml), three separate samples in three different locations, and took them to the laboratory where we performed filtration.

## ACTIVITIES PHOTO REPORT

### Sampling Activities

Sampling at location Križopotje and location Lateralac

Location Križopotje







Location Lateralac





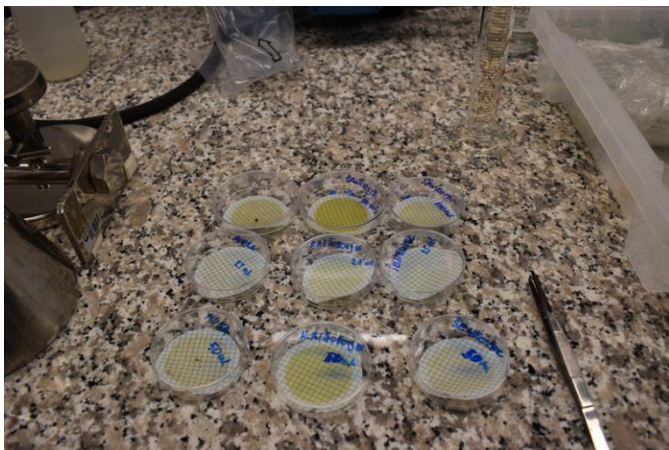


## Filtration Activities in the Lab or in the Field

### Filtration unit



Used membrane- Sartorius cellulose nitrate filter ( pore (size) - 0,45  $\mu\text{m}$ )



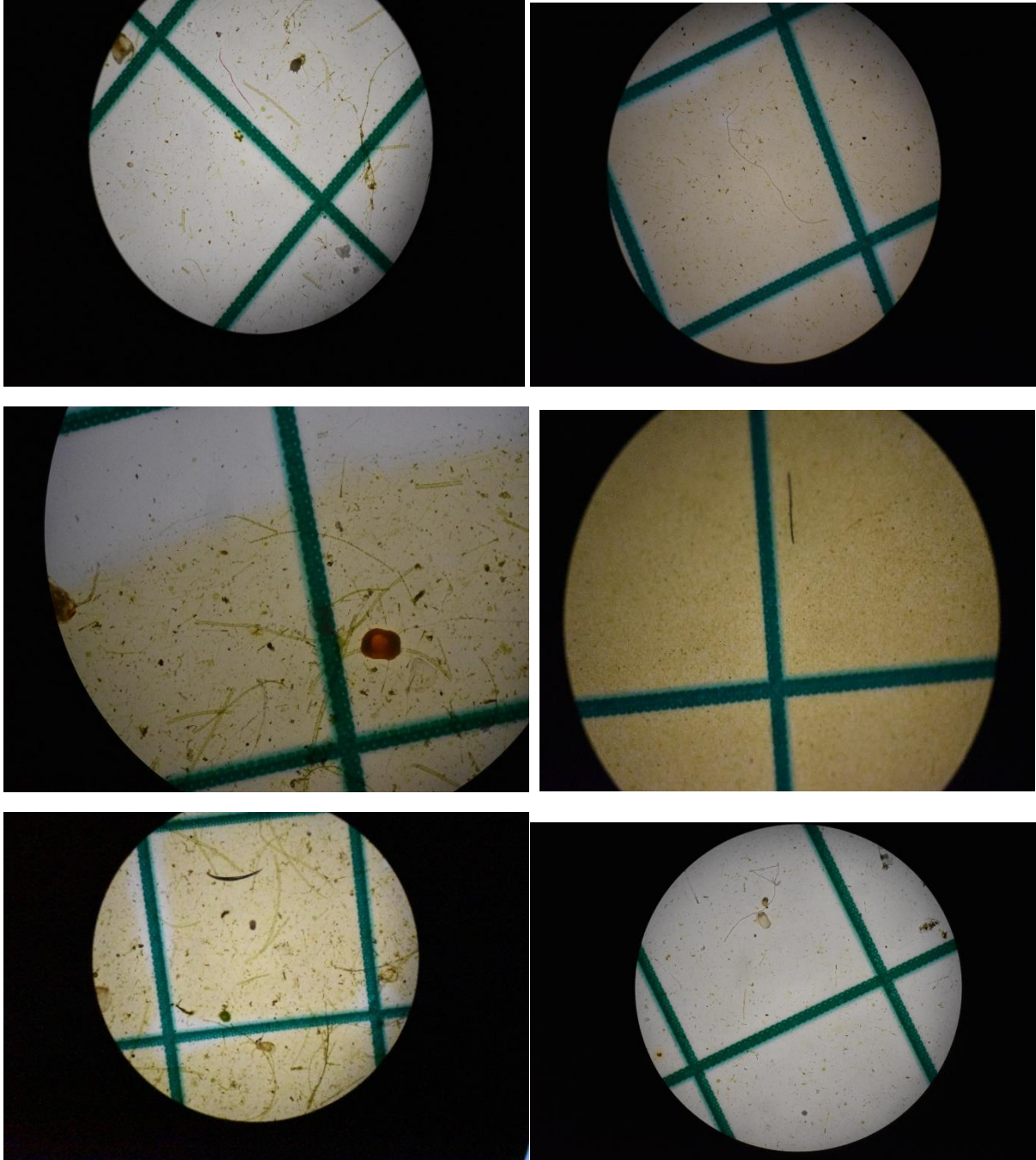
After we had collected our samples, we took them to the lab at Međimurske vode. In the laboratory, we were given a short introduction to laboratory work and filtration devices.

After filtration, we placed the samples in Petri dishes and took them to our school so that they could be analyzed under a microscope.

### Observation of the Samples under Microscope at School

In the school, we analyzed the samples under the microscope, model OLYMPUS CX23 LED RFS1.

We took photos with a Nikon 3500 camera.



We found microplastic in all samples.

In the samples from the Mura river, there were 15 microplastic particles, mostly fibers.

In the samples from Križipotje retention, we found 12 microplastic particles, mostly fibers.

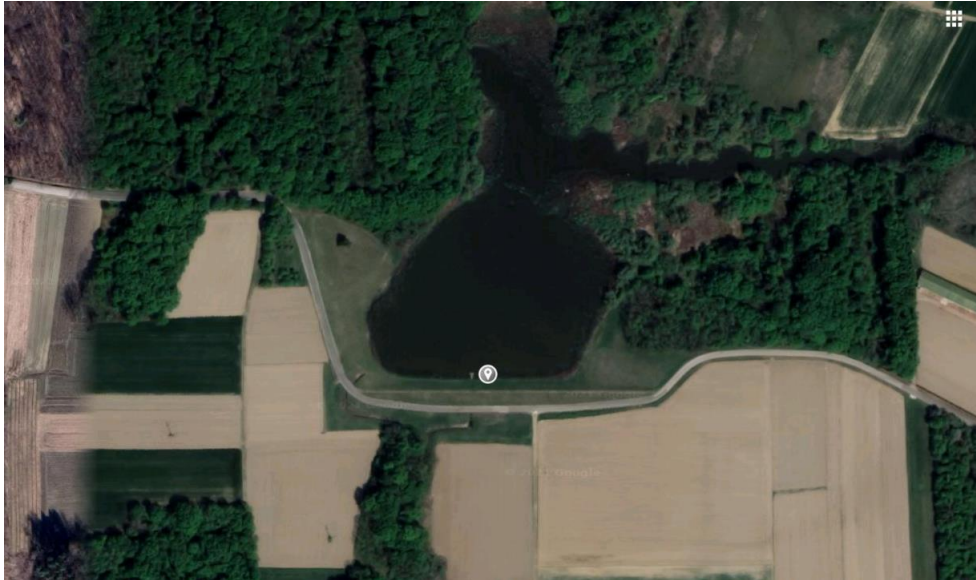
In the samples from Lateralac, we found only six particles, also mostly fibers.



### The water body that we monitored

The locations we have observed are following:

Križopotje - artificial lake retention (46.416843, 16.342283),



Lateralac - stream (46.401145, 16.420146)



Mura - river (46.532016, 16.377237).



Križopotje Lake is stagnant, while the Mura River and Lateralac Stream are streams whose water movement speed depends on their water levels and other abiotic factors, so it is difficult to estimate the speed of movement as it varies from day to day.

The total length of the Mura River is around 464 kilometres. About 326 km are within the interior of Austria; 95 km flow in and around Slovenia (67 km along the borders with Austria and Croatia, 28 km inside Slovenia), and the rest forms the border between Croatia and Hungary. The largest city on the river is Graz, Austria. Its basin covers an area of 13,800 km<sup>2</sup>. The Mura River passes through many more settlements and cities, and in the area of the town of Mursko Središće there are several industrial zones both on the Croatian and Slovenian side, which can potentially contribute to the presence of microplastics.

Retentions are located in an area of moderately warm rainy climate with no dry periods (according to Köppen's classification). The retention area of Križopotje is 32,000 m<sup>2</sup>. The floristic research of Križopotje retentions determined 55 species that belong to 26 families. The most common families of Križopotje are: Poaceae (16%) and Fabaceae (11%). The analysis of endangered taxa identified two sensitive species: *Carex riparia* Curtis and *Alopecurus aequalis* Sabol. No taxa are legally protected. Areas of retention are rich not only in plant but also in animal species due to the fact that several different habitat types (swamp, wet meadow and forest) overlap in a very small area. The artificial lake Križopotje is located outside the Križopotje settlement area, but nearby there are numerous agricultural areas that are used for growing various cereals.

In terms of location, the Latealac Stream passes through several settlements, but there is not a single industrial plant nearby.

#### **THE WATER BODY CHALLENGE (GLOBE Europe-Eurasia Region Coordination Office, May, 19 2021)**

Due to the epidemiological situation, we were unable to participate in the Water Body Challenge.



## MICROPLASTICS MONITORING PROTOCOL TRIAL (MMPT)



## NEWS FROM THE SCHOOLS



### GLOBE CROATIA

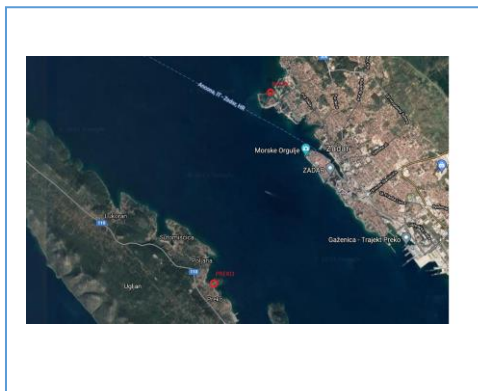
**Elementary school (Osnovna škola) Valentin Klarin , Preko**

*The article, in English, is edited by the teacher Jasminka Dubravica, professor of biology  
([jdubravi@gmail.com](mailto:jdubravi@gmail.com))*



## WHO AND WHERE

We are the Elementary school Valentin Klarin and we are located in Preko ( island Ugljan) , which is about 5 kilometers west of Zadar.



## WHEN WE JOINED THE GLOBE Program



We have been actively participating in the GLOBE program since 2005. In the immediate vicinity of our school is the Adriatic sea, which we monitor once a week, by implementing GLOBE water protocols. We publish news related to the GLOBE project on our school website.

[http://os-vklarin-preko.skole.hr/skola/globe\\_projekt](http://os-vklarin-preko.skole.hr/skola/globe_projekt)

## THE MICROPLASTICS MONITORING PROTOCOL AND US

We are very happy to participate in this project. We took samples from the beach near the sea and the beach in the city of Zadar. We want to share our results with our community. We also decided to do this regularly every year.



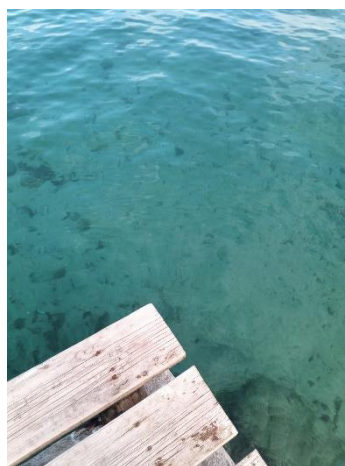
Credit: Deakin University. Microplastics monitoring protocol. This work is licensed under a Creative Commons Attribution-NonCommercial4.0 International License.

## PROBLEMS AND SOLUTIONS

Our problem was how to get the necessary material for this project. Luckily we managed to get everything.

## ACTIVITIES PHOTO REPORT

### Sampling Activities



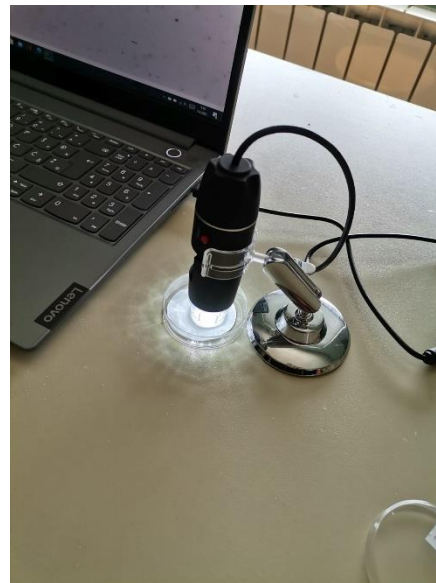
Sampling at our Measuring station in Preko. We took 3 samples of 500 ml each.

## Filtration Activities in the Lab or in the Field

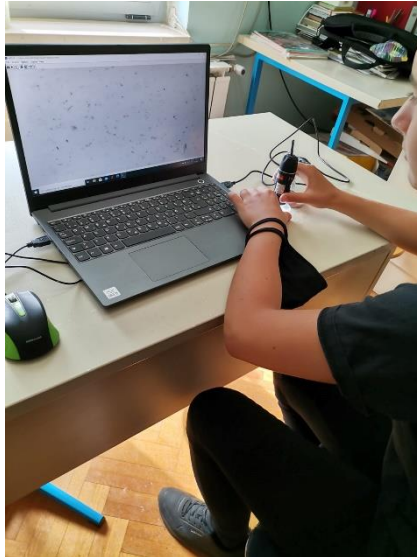
We brought the samples to school where we filtered them.



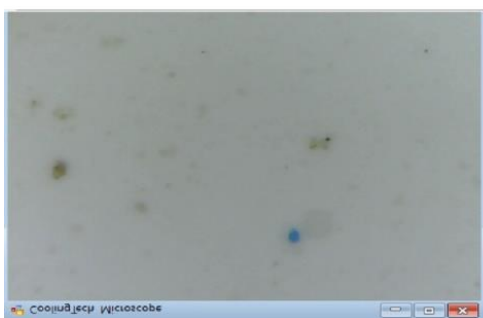
## Observation of the samples under the Microscope at School



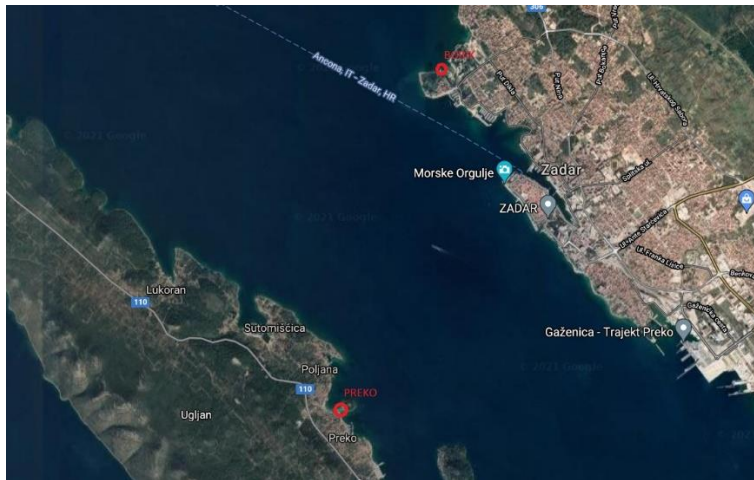




Samples were placed in petri dishes and analyzed using a digital microscope (U500X). The total number of samples we found was 41( 10 Plastic, 20 Natural fibre, 11 Syntetic fibre). We photographed the samples using the Preent Screen. For now, we have analyzed only the samples taken in Preko.



## The Adriatic Sea : the water body that we monitored



The Adriatic Sea is a branch of the Mediterranean Sea.

Its area is 138,595 km<sup>2</sup>, length 870 km, average width 159.3 km, average depth 173 m. The Adriatic Sea is mostly shallow. North of Zadar, its depth does not exceed 100 m. The Adriatic is a relatively warm sea - its temperature does not fall below 11 ° C. Its transparency is also great. The eastern coast of the Adriatic Sea, especially its Croatian part, is extremely indented. Sea currents in the Adriatic Sea are warm. The Croatian coast of the Adriatic Sea is considered the cleanest sea in Europe.

**THE WATER BODY CHALLENGE (GLOBE Europe-Eurasia Region Coordination Office, May, 19 2021)**