Water Quality Testing of the Brooks in the Vrbovec Area and the Surrounding Areas

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1. The purpose of the investigation

In this research we wanted to test the water quality of the brooks in the Vrbovec area. We have chosen five brooks; one of which runs through the town of Vrbovec (Zlenjin), three of them are in the immediate surroundings of the town (Velika, Črnec, Dulepska) and the last one is in the rural area near Vrbovec. We have decided to use the analysis of the macrozoobenthos community and the analysis of the physical and chemical parameters (measuring the concentration of PO_4^{3-}, NO_3^-, NO_2^-, NH_4^+, the amount of dissolved oxygen (O_2) and pH of water). We also wanted to compare the differences of the water quality depending on the brook location. Macrozoobenthos is a diverse group of macroscopic invertebrates which populate the bottom of the flowing and stagnant waters. The organisms react to the characteristics of the water running in their biotype and therefore the water quality can be assessed by the analysis of the macrozoobenthos community. The organisms are big enough to enable their easy sampling using the benthos net, their sorting and identification.

2. Material and working methods

In the course of one year we have performed collecting macrozoobenthos and water sampling in the previously mentioned brooks nine times. In the school lab we have analysed water using the field kit for chemical water analysis. Using the key for identifying invertebrates [1], we have determined the systematic categories of the collected macrozoobenthos. Based on the found species, we have calculated the biotic index. Biotic index gives a certain number of points, ranging from 1 to 10, to each animal group depending on the sensitivity of the animal to pollution. Organisms living in polluted waters have a lower biotic index as opposed to the ones living in clean waters. Then we have classified brooks according to the value of the biotic index and chemical water analysis. There are five classes of water bonitet or water quality: class I for clean waters, class II for slightly polluted waters, class III for polluted waters, class IV for much polluted waters and class V for extremely polluted waters.

3. Results

During the research of the water quality of small flowing waters in the Vrbovec area and its surroundings, we have found the total of 13 different groups of macrozoobenthos (52 different species) (Fig 1). According to the values of the biotic index, which for the mentioned brooks ranges from 3 to 5, we can put two of these brooks into water bonitet category III (Dulepska and Vuna) and the remaining two into water bonitet category IV (Velika, Črnec, Zlenjin). According to the physical and chemical parameters two of the brooks belong to the boninet category II (Dulepska and Vuna) and other three belong to bonitet category III (Velika, Črnec, Zlenjin) (Table 1).
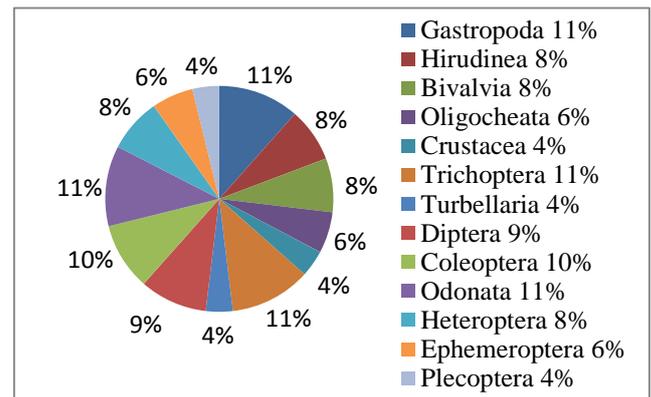

Fig.1 Presence of different groups of macrozoobenthos in all the brooks expressed in percentages

Table 1 Classification of water in the brooks

Brooks:	Water category based on biotic index	Water category based on chemical analysis
Velika	IV.	III.
Črnec	IV.	III.
Zlenjin	IV.	III.
Dulepska	III.	II.
Vuna	III.	II.

4. Conclusion

Resulting data show us that two of the brooks in the Vrbovec area, Dulepska and Vuna, are quite polluted and the other three, Velika, Črnec and Zlenjin, are much polluted. Human factor has a big influence on the overall pollution of the flowing waters. So, it is necessary to educate people regarding that as soon as possible and to take some ecological actions to reduce pollution.

REFERENCE

[1] Government of the Republic of Croatia (GRC). 1998 Directive on Water Classification. Official Gazette No. 77 (NN 77/98)