THE IMPACT OF CONVENTIONAL TREATED MINE WATER ON HONDOL RIVER – A PRELIMINARY STUDY OF BENTHIC INVERTEBRATES'

Catalina Stoica[1*], Laurentiu Dinu[1], Irina Lucaciu[1], Mihai Nita-Lazar[1], Voicu Oncu[2]

[1]National Research and Development Institute for Industrial Ecology – ECOIND, 71-73 Drumul Podu Dambovitei, district 6, Bucharest, 060652, catalina.stoica@incdecoind.ro, Romania
[2] SC CEPROMIN S.A, 22 Decembrie 37A, Blvd., 330166, Deva, Romania

Introduction
The use of biological models for freshwater quality assessment was one of the main objective of Water Framework Directive (2000/60/EC), due to their ability for long-term retaining both structurally and functionally, the direct and indirect effects of pressure factors. One of the most appropriate biological models are the benthic invertebrates. They are very heterogeneous taxonomic group that presents a broad spectrum of responses to each form of stress, including chemical pollution and morphological changes of aquatic habitat.
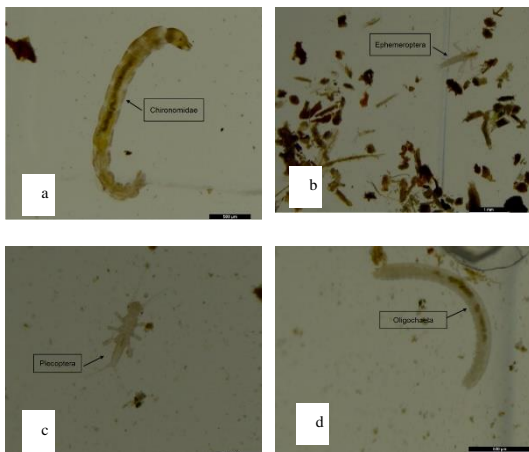To further investigate the impact of conventional treated mine water on freshwater system, a preliminary characterization of benthic invertebrates' composition was performed upstream of Hondol River.

Materials and methods
The sediment samples were taken with a Surber sampler considered to be suitable for low-water courses with moderate flow and stony substrate. The sample unit was of 929 cm^2 and the sampling depth ranged between 3 cm to 5 cm. For the estimation of structural parameters, the sample was made up of three sample units which were placed in 1 L plastic containers, were preserved with 4% formaldehyde solution and properly labeled. The samples were washed through 500 µm and 200 µm mesh sieves and were prepared for sorting. The counting and identification of organisms were performed with the fluorescence stereomicroscope Leica M205FA and specific determination keys of Thorp and Covich (2001), Godeanu (2002) and Bouchard (2004). The structure of benthic invertebrates was estimated by means of taxonomic composition – an index that qualifies the structure and the taxonomic wealth of the communities as a measure of diversity – and by the detection of numerical density and abundance. The abundance represented the numerical percentage proportion of each taxonomic group identified. The results presented the average value of the three sample units.

Results and conclusions
A preliminary characterization of benthic invertebrates' structure was performed at the level of Hondol aquatic system.
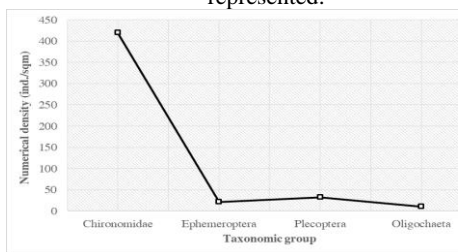
The composition of benthic invertebrate fauna showed the presence of various species belonging to following taxonomic groups: Chironomidae (Fig.1a), phemeroptera (Fig.1b), Plecoptera (Fig.1c) and Oligochaeta (Fig.1d).

The numerical abundance (%) revealed a good representation of Chironomidae larvae (87%), while Plecoptera (7%), Ephemeroptera (4%) and Oligochaeta (2%) were less represented.

Figure 1. The main taxonomic groups identified at Hondol river (stereomicroscope Leica M205FA)

From the total numerical density of benthic invertebrate fauna (484 ind./sqm), Chironomidae larvae prevailed over the entire benthic populations (420 ind./sqm) (Fig.2). The phytal substrate allowed a large numerical abundance of chironomidae larvae which through their feeding mode could induce a good water filtration.

Figure 2. Numerical density (ind./sqm) of benthic invertebrate fauna at Hondol river

In addition, the presence of Plecoptera and Ephemeroptera larvae and poor representation of worms indicated a good oxygenation of water, corroborated with low values of chemical variables (data not shown), which can induce a good water quality of the studied aquatic system. However, for a judicious quality assessment of Hondol freshwater system, an extensive and intensive study (both spatial and temporal, respectively) is required.

References

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