Ecological risk assessment of heavy metal pollution of river ecosystems in the Debed River catchment area, Armenia

Gor Gevorgyan*[1], Tatevik Boshyan[1], and Tigran Vardanyan[1]

[1]Scientific Center of Zoology and Hydroecology of National Academy of Sciences of Republic of Armenia – Armenia

Abstract

Investigating the mechanisms behind the impact of heavy metal pollution on aquatic ecosystems is urgently required. Due to increasing growth in the mining sector, pollution in the Debed River catchment area located in the north of the Republic of Armenia has become a serious threat to water resources and aquatic biodiversity. The aim of the present study was to investigate and assess the environmental risks of heavy metal pollution of river ecosystems in the Debed river catchment basin. Water and hydrobiological (macrozoobenthos and fish) samples were taken from the risky and non-risky river sites of the Debed river catchment area in April, July and September of 2017. Heavy metal and hydrobiological analyses were done by the standard methods. The results of the study showed that heavy metal concentrations in the waters of the investigated rivers were conditioned by both lithogenic and anthropogenic sources, as the concentrations of different heavy metals in all the investigated observation sites of the rivers exceeded the background level (BL). In the river sites being at the risk of mining impact, all the investigated heavy metals exceeded the BL, and heavy metal content was mainly formed by anthropogenic influence. In the mining impact zone, a noticeable increase in heavy metal content was also registered in the tissues and organs of aquatic organisms (macrozoobenthos and fish). Hydrobiological investigations showed that the degree of heavy metal pollution of the river waters in mining areas negatively affected the growth of aquatic communities. In the mining impact zone, a decrease in the quantitative parameters and diversity of benthic macroinvertebrates and fish was observed. **Acknowledgements:** This work was supported by the State Committee of Science of MES RA, in the frame of the research project No. 16YR–1F014.

*Speaker