



Conference Abstract

# Assessment of aquatic genotoxicity of the Lake Sevan basin, Armenia using natural bioindicators

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## Abstract

Water pollution can cause genomic instability, thereby threatening aquatic wildlife and human health. For a correct assessment of the impact of the mixture of pollutants, chemical analysis of environmental contaminants should be simultaneously applied with genotoxicity assays. The comet assay is a sensitive, versatile and extensively used method for genotoxicity assessment in a water environment and was successfully applied in aquatic wild species, including fish and crayfish. Earlier we investigated the genotoxicity of waters of the Lake Sevan basin (Simonyan et al. 2016, Simonyan et al. 2019). Lake Sevan is the largest lake of the Caucasus Region, situated in the Republic of Armenia, in the Gegharkunik Province. Water pollution in the lake is a result of both anthropogenic and natural pressures. A combination of comet assay (Tice et al. 2000) and chemical analysis was applied for evaluation of water genotoxicity using gibel carp *Carassius auratus gibelio* and crayfish *Astacus leptodactylus* as sentinel organisms. Fish and water samples were collected from the south–southwest of the village Shorzha (40°28'33"N and 45°14'22"E), Peninsula of Lake Sevan (40°33'46"N and 45°01'37"E), the estuaries of the Rivers Gavaraget (40°25'12"N and 45°09'53"E) and Dzknaget (40°36'55"N and 44°58'13"E). Crayfish and water samples were collected from the estuary of the River Masrik (40°13'25"N and 45°38'21"E) and near the villages of Artanish (40°27'19"N and 45°25'12"E) and Tsapatakh (40°24'34"N and 45°28'22"E). According to the chemical analysis of waters,

the south–southwest of the village Shorzha and the estuary of the River Masrik were chosen as reference sites. The content of contaminants in water was analyzed according to the standard methods in the Environmental Impact Monitoring Center, Ministry of Environment of the Republic of Armenia. The obtained results showed that the levels of DNA damage were significantly higher in both species in polluted areas than in reference sites. A significant positive correlation between DNA damage in *C. auratus gibelio* and contents of Al, Fe, Cu and Mn in water was shown. DNA damage in *A. leptodactylus* correlated with Al, Fe, Cu and Mo. *C. auratus gibelio* and *A. leptodactylus* were found to be sensitive mostly to the same pollutants, which indicate that these metals may be of primary concern as contaminants of the studied aquatic environment. Thus, the current study indicates that *C. auratus gibelio* and *A. leptodactylus* are sensitive bioindicators for monitoring of water pollution in the Lake Sevan basin.

## Keywords

Water pollution, ecogenotoxicity, bioindicators, fish, crayfish, Comet assay

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