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DANUBE - A LIFELINE GOVERNED BY MULTIPLE USES, PRESSURES AND A MULTITUDE OF ECOSYSTEM SERVICES

Book of Abstracts

Editors: Milan Lehotský, Anna Kidová, Miloš Rusnák, Jozef Dudžák

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DNA damage and histopathological alterations in liver and gills of common bream *Abramis brama* (L.) as biomarkers of the Danube River pollution

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Biomarkers are used in ecosystem health assessment because they provide information about the biological effects of pollution. Aquatic ecosystems are often the ultimate recipients of different pollutants, which may have potentially genotoxic and carcinogenic effects on aquatic organisms.
The aim of this study was to assess the impact of untreated urban wastewater during different seasons on the DNA damage level and histopathological alterations in gills and liver of common bream (*Abramis brama*). This study was carried out at the site Višnjica, situated downstream from Belgrade, which is identified as one of the major hotspots of fecal pollution along the Danube River. Sampling was performed in February, April, August and November 2014. DNA damage in fish tissues was assessed by alkaline comet assay. Histopathological alterations were quantified by combining pathological significance and the extent for each lesion. Subsequently, lesion scores within organs are summed in order to calculate histopathological index.
The highest level of DNA damage in both tissues was observed in August. Liver had the lowest level of DNA damage in February, and gills in April. Gills had a significantly higher level of DNA damage in comparison to liver during all months, except in April.
Histopathological index of the liver had the highest values in April and of the gills in November. Both tissues had the lowest value of histopathological index in August. In general, histopathological alterations in liver were more severe in comparison to gills during all months, except in November.
The presence of DNA damage acted as an early-marker signal in fish, while histopathological alterations reflected state of fish organs when exposed to contaminants during long term pollution. This study confirmed the potential of untreated urban wastewaters to trigger responses on different levels of biological organization in fish.

Keywords: fish, biomarkers, comet assay, histopathology, urban pollution.