



Ecological screening on health condition of fish populations in Lake Ohrid (R. North Macedonia) through histopathological biomarkers

Lydia Velkova-Jordanoska



We support the Sustainable Development Goals

WLC18- 0146

Introduction

Lake Ohrid is one of Europe's deepest and oldest lakes and preserving a unique aquatic ecosystem that is of worldwide importance. The lake itself has very transparent water with maximum transparency of 22 m in winter.

This is a result to its oligotrophic state and low production of organic matter. There was been conducted a histological analysis of the samples of liver, kidney and gills from the natural population of fishes, which inhabits the Lake Ohrid. The caught specimens of fishes were with satisfactory external look, active and without any external changes.

Methodology

During the summer period of 2018, in Lake Ohrid have been caught total of 178 pieces of fish, which were classified in 11 different species: *Barbus peloponnesius* (Syn. *Barbus rebeli*), *Chondrostoma ochridanum* (Syn. *Chondrostoma nasus*), *Rutilus ohridanus*, *Leuciscus cephalus*, *Alburnus alborella* (Syn. *Alburnus scoranza*), *Pachychilon pictum*, *Gobio ohridanus*, *Alburnoides ohridanus*, *Rhodeus sericeus* (Syn. *Rhodeus amarus*), *Scardinius knezevici*, *Carassius carassius* (Syn. *Carassius gibelio*). Out of each specimen there have been dissected a piece of the liver and gill for histological analysis, which, thereafter has been processed on the standard procedure for development of histological preparation. They have been analyzed under a microscope and the registered tissue lesion has been photographed.

Results

LIVER

The analysis of the histological preparations of liver from the investigated specimens indicated presence of many types of tissue lesion, as an inflammatory processes, necrosis, steatosis and fibrosis at the level on hepatocellular parenchym. On a level of hepatic bile tract were evidenced bile duct proliferation, bile duct epithelium necrosis etc.

GILL

The gills, which participate in many important functions in fishes, such as respirations, osmoregulation and excretion, remain in close contact with the external environment, and particularly sensitive to changes in the quality of the water, are considered the primary target of the contaminants.

Microscopic analysis of histological preparations of fishes gills tissue displayed a presence of progressive changes like a hypertrophy of the lamellae epithelium, regressive changes, necrosis, lamellar disorganization and inflammatory changes.

Conclusions

A wide range of toxic effects of xenobiotics in the water have been demonstrated in aquatic animals in nature. In conclusion the present study showed that histopathological biomarkers of toxicity in fish organs are a useful indicator of environmental pollution. The organ and tissue damage in the investigated fishes due to the direct toxicity of the xenobiotics on the fishes populations

Acknowledgments

The research was supported by Ministry of environment and physical planning of Republic of North Macedonia (Contract No. 08-26581)

References (Font Arial)

Brusle, J., Gonz`alez, I., and Anadon, G. (1996). The structure and function of fish liver. In: Fish Morphology (J. S. D. Munshi and H. M. Dutta, eds.), Science Publishers Inc., New York.

Hille, S., Deufel, J., Kausch, H., Platz, F. (1980). Entstehung eines Fettlebersyndroms bei Regenbogenforellen (*Salmo gairdneri*) in Abhängigkeit von Kohlenhydrat- und Proteingehalt des Putters sowie bei Überfütterung. Arch. Hydrobiol. Suppl. 59. 1-16

Hinton D.E., Baumann P.c., Gardner G.R., Hawkins W.E., Hendricks J.D., Murchelano R.A., Okihiro M.S., (1992): Histopathological biomarkers. In: