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Toxic Metals in Fish and Mollusks of the Zmiinyi Island Coastal Waters (North-Western part of the Black Sea) in 2012-2014

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Abstract

The results of Toxic Metals (TM) determination in fish and mollusc species for 2012-2014 in the north-western Black Sea (NWBS) have been presented. It has been shown that the soft tissue samples of molluscs and fish mass species collected in the coastal waters of the Zmiinyi Island periodically revealed high levels of certain TMs concentration (As, Cu, Zn, Ni, Fe, Mn) which was connected with the Danube discharge and the diet of concrete species.

Keywords: Black Sea, PERSEUS, Toxic Metals, biota

1. Introduction

Last years investigations of pollution in biota in NWBS were finalized (Jitar et al., 2014, Medinets et al., 2014a,b). The objective of our research in the framework of PERSEUS Project was to determine the levels of TMs in fish and molluscs to fill the gaps in evaluation of levels of contaminants and pollution effects.

2. Materials and methods

The results of studies of TMs accumulation in the mass species of fish and molluscs in the Zmiinyi Island coastal waters for the period 2012-2014 were presented. Mass species of molluscs as mussels *Mytilus galloprovincialis* Lamarck, 1819 and rapa whelk *Rapana venosa* (Valenciennes, 1846) and fish species as round goby *Neogobius melanostomus* (Pallas, 1814), common blenny *Parablennius sanguinolentus* (Pallas, 1814), grey wrasse *Symphodus cinereus* (Bonnaterre, 1788), sole *Pegusa lascaris* (Risso, 1810) and anchovy *Engraulis encrasicolus* (Linnaeus, 1758) were analysed for Cd, Cu, Hg, Pb, Zn, Co, Ni, Cr, Fe and Mn using methods (Medinets et al, 2014b, RSRM 8, 1985 and RSRM 11, 1984).

3. Results

The results presented reflect the TMs concentrations in the dominant demersal and bottom-dwelling species: round goby, common blenny and grey wrasse. It was shown that round goby as a typical mollusc-eating species accumulated TM contained in large quantities in tissues of mussels dwelling in the coastal waters of the island. For common blenny, which mostly feeds on macrophytes, maximal concentrations of copper, zinc and iron were registered in 2012. The concentration of TMs in grey wrasse and sole, which are feeding mainly on small benthic crustaceans, was significantly lower than in the mollusc-eating round goby. Concentrations of TMs in anchovy (pelagic migratory species) soft tissues were minimal. Analysis of average annual TMs concentration values in mussels during the period of studies revealed the highest level of pollution with TMs in 2012 when the impact of the Danube River discharge was major.

4. Conclusions/Discussion

Analysis of soft tissue samples of mass species of molluscs (mussel and rapa whelk) and fish (round goby, common blenny, grey wrasse, sole and anchovy) collected has revealed the periodically high TMs concentrations (As, Cu, Zn, Ni, Fe, and Mn) in the samples, The TMs average annual concentrations analysis in 2012-2014 has shown that maximal pollution levels for practically all the studied hydrobionts were observed in 2012 (the year of heavy precipitation and the highest discharge of the Danube River). During the low-water periods of 2013-2014 the levels of hydrobionts pollution with TMs decreased significantly. It was shown that the levels of TMs in fish species were depended from the diet of the concrete species.

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