

FISH BIOMARKERS IN BLACK SEA ECOSYSTEM HEALTH ASSESSMENT

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Various approaches have been used for assess and predict the effects of environmental stress on marine ecosystems. The most common is ecological monitoring which includes detection levels of the different pollutants in water sediments and organisms, their distribution, accumulation and transformation. But at present time study of polluted effects on marine organisms - biological monitoring – is very important. Biological monitoring studies need in selected indicator species (biomonitors) which parameters in different levels of their biological organization could be used as biomarkers. Biomarkers have been defined as “biological responses that can be related to an exposure to, or toxic effect of, an environmental chemical or chemicals”. These include a number of molecular, cellular, physiological, population and community characteristics, which can be measured simply and are very informative.

For evaluation of Black Sea coastal zone ecosystems scorpion fish *Scorpaena porcus* populations from polluted and non-polluted bays in Sevastopol region were studied. The biomarkers were following: 1. molecular parameters – antioxidant enzyme activities, lipid peroxidation, serum alanine and aspartat aminotransferase activities, serum protein composition; 2. Cell parameters – hystological analysis of gonads and gamets; 3. Physiological parameters – liver index, gonadosomatic index; 4. Population parameters – mass, length, age, sex characteristics. Significant differences between all studied parameters in fish from polluted and non-polluted bays were observed. In fish blood from highly contaminated areas induction of antioxidant enzyme activities and lipid peroxidation, modification of serum protein composition, changes in AlAT and AsAT activity were observed. Additionally, the damage of gonads, gametogenesis and increase of liver index were determined in fish from polluted bays. The population structure was also differed: growth rate was lower and more younger fish were dominated in polluted regions.

Thus pollution of coastal zones resulted negative effects on fish populations in different levels of their biological organization. Studied biomarkers could be used for evaluation and prediction the impacts of effluents on fish. Some of investigated parameters could be adopted in national and international monitoring programs of Black Sea.