

## Ecological Consequences of Black Sea Pollution

Rudneva, Irina.<sup>1</sup>, Oven, Lidya.<sup>1</sup>, Shevchenko, Nadejda.<sup>1</sup>, Shaida, Valentin.<sup>1</sup>, Zalevskaya, Irina.<sup>2</sup>

1. Institute of the Biology of the Southern Seas, Sevastopol, Ukraine, 2. Tavrichesky National University

For thousands of years different human civilizations have been developing on the coasts around the Black Sea. People have depended on the rich diversity of marine seafood, on the fertile soils on its coast and fresh waters in the rivers. The human population increased progressively during that time, but it is only in the last 40 years that the Black Sea has become unable to cope with our demands on it. The news media have reported on many instances of environmental changes in Black Sea, affecting ecosystem transformation often a result of pollutants from human activities. Since 70s, and at present time the Black Sea ecosystem exposes the environmental stress factors, which continue to worsen the situation in entire aquatoria and, especially, in coastal waters, containing many of the most significant marine resources. It is a result of changing hydrological and climate regime, and the peculiarities of social, administrative, political, industrial and agricultural problems. All these factors influence on physical and chemical properties of water and biological composition of marine communities. The combine effect of this mass loading had a devastating effect on ecosystem in Black Sea. There are some dramatic ecological and socioeconomic consequences which we observed at present time. Increase of nitrogen and phosphate contents stimulates eutrophication processes. They provoke decrease of euphotic zone depth; modify phyto- and zooplankton composition, which was influenced on marine food chains and biodiversity; leads hypoxia and death of fish and invertebrates; stimulates growth of microbial populations, including pathogenic and dangerous for human health. Biological events, which reflect the biological system status under environmental stress impact, could inform about stability or instability of ecosystem. Ecosystem characterization must include a lot of biological indicators (biomarkers) and reflect the interactions between living organisms, chemical compounds and stress environmental factors. We demonstrated the worsening of Black Sea ecosystem on different levels on its biological organization (molecular, cell, organism, population, species and communities). Biological events, which reflect the biological system status under environmental stress impact, could inform about stability or instability of ecosystem. At this case the ecosystem characterization must include a lot of biological indicators (biomarkers) and reflect the interactions between living organisms, chemical compounds and stress environmental factors. We could note three main results in Black Sea ecosystem under the effects of environmental stress: 1. **Degradation** : biodiversity loss, elimination of some species, worsening of their health, decline of populations size. 2. **Transformation** : replacement of one species to another, replacement of dominated organisms in fish and planktonic communities, changes in food chains, food quality and quantity. 3. **Adaptation** of marine organisms to environmental stress factors, induction of defense systems, increase of population polymorphism, growth of resistance to unfavorable conditions and stressors.