Phytoplankton Population Structure Dynamics in the Coastal Waters of the Zmiinyi Island in the Black Sea (2004-2012)

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Abstract

Long-term studies of phytoplankton community structure with the main natural and anthropogenic factors' simultaneous registration are the important stage of research into the reasons and consequences of eutrophication, which quite often occurs in the North-Western Black Sea [1-3].

Our study assesses the long-term changes and trends in the structure of phytoplankton population for the coastal waters of the Zmiinyi Island in the Black Sea.

Marine phytoplankton has been sampled in the Zmiinyi Island area by the staff of Marine Research Station (MRS) "Zmiinyi Island" of Odessa National I.I. Mechnikov University in 2004-2012. Phytoplankton samples were taken regularly every 5 days (2005 – 2008) and every 10 days (2009 – 2012) from two horizons (0 and 8 m) 100 m far from the island coastline. Taxonomic identification of phytoplankton was done using National and International guidelines.

We have analyzed the temporal distribution of biomass average monthly values (B), number (N) and quantity of species (n), as well as taxa number (S) for the entire phytoplankton community comprising 11 taxa (*Bacillariophyta, Dinophyta, Chlorophyta, Cyanophyceae (Cyanobacteria), Cryptophyta, Haptophyta, Dictyochophyceae, Chrysophyceae, Euglenophyceae, Ebriophyceae, Craspedophyceae (Choanoflagellatea)*. Mean values of B, N and n for the whole period of studies were 3940±2800 mg·m^{-3} and 2850±1900 mg·m^{-3}; 4440±2440 mg·m^{-3}and 3160 ±1180 cells·10^{6}·m^{-3}; 18 ±4 and 15 ±3 species for surface and

bottom horizons respectively. At that, maximal values of B=65760 mg·m^{-3} (in surface layer) and 11790 mg·m^{-3} (in bottom horizon) have been registered in May, 2009; N= 91335 cells·10^{6}·m^{-3} (May, 2009) and 46690 cells·10^{6}·m^{-3} (April, 2009); n=49 (June, 2005) and 32 species (November, 2012).

The results of temporal distribution of each taxon (Bacillariophyta, Dinophyta, Chlorophyta, Cyanophyceae, Cryptophyta, Haptophyta, Dictyochophyceae, Chrysophyceae, Euglenophyceae, Ebriophyceae, Craspedophyceae), total values of B and N and the trends of their changes during 9 past years are discussed in detail.

It has been proposed to use ratios of biomass and number of separate taxa to reveal long-term changes in the ecosystem of the Zmiinyi Island coastal waters.

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