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Features of the structural organization of phytoplankton of coastal shallow water of Volga and Volga-Kama reaches of the Kuibyshev reservoir

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Abstract

Kuibyshev reservoir (Russia) is the sixth step of Volga cascade and ranks first in area in Europe and second in the world among all the reservoirs created in the river valleys. A characteristic feature of Kuibyshev reservoir is the presence of extended shallow water areas, which total area with the depth of up to 2 m is up to 15% of the total area of the reservoir, while a considerable part of shallow water overgrows with macrophytes. The most extended areas of overgrown shallow waters are located in Volga and Volga-Kama reaches of the reservoir. Biological communities of shallow waters function in the increased fluctuation of the environment modes and are characterized by specific structural and functional organization, which main feature is the adaptation mechanisms of biocenosis components and maintenance of its stability in dynamic environment. To determine the formation features of structure of phytoplankton in different biotopes of shallow waters of Kuibyshev reservoir, we studied the latter in *Typha angustifolia* L., *Phragmites australis* (Cav.) Trin. Ex Steud. thickets and in open water areas (thickets-free). We were conducting studies in 2002-2005 in two shallow bays of Volga and Volga-Kama reaches differing in the severity of human impact, protection from wind and wave action and other conditions. As a result of studies we have revealed that the most aligned phytoplankton communities with a high species diversity are common to areas with macrophyte beds where anthropogenic impact is minimized. Environmental conditions in shallow open water are less stable than in macrophyte thickets, which is due to the dynamics of water masses in the water. We also revealed a tendency to the quantitative increase in heterotrophic algae in polluted thicket communities compared to areas with superior water quality. Maximum qualitative and quantitative characteristics of phytoplankton are common to protected shallow waters of the contaminated and poorly flowing bays also characterized by significant differences in species composition between the shallow open water and macrophyte thickets, while there is a slight difference in the overall quantitative indicators between the thickets and the shallow open waters. Impact of macrophytes on plankton algae vegetation in water hypertrophicity is slightly expressed, and the nutrients abounding in this area do not serve as a limiting factor for algae.

Keywords

Algae, Kuibyshev reservoir, Macrophytes, Phytoplankton