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IMPACT OF BIOGENICS ON EUTROPHICATION PROCESSES IN THE TETERIV RIVER RESERVOIRS IN ZHYTOMYR REGION

The problem of water resources protection in Zhytomir region is extremely urgent nowadays. The phytoplankton is one of the important indicators of the ecological state of an aquatic environment. This paper deals with the dynamics of phytoplankton growth and eutrophication processes and their impact on water quality in the reservoirs of the river Teteriv. Phytoplankters are of many species, mostly oxygen-evolving prokaryotic blue-green algae (Cyanophycota) and Prochlorophycota and eukaryotic algae. The eukaryote groups of greatest importance are the Cryptophyceae (cryptophytes). Dinophyceae (dinoflagellates), Chlorophycota (green algae), Euglenophycota (euglenoids), Bacillariophyceae (diatoms) and Chrysophyceae and Haptophyceae (yellow-green or golden-yellow algae).

The research was carried out in the Vidsichne Intake and the Denyshi Reservoir. The length of the river Teteriv is 365 km, the basin area is 15,300 km². The study was conducted between January and December 2015. We determined the peculiarities of phytoplankton formation and development as well as methods for finding quantitative and qualitative indicators of eutrophication. A study of dissolved oxygen content was made. The results of the investigation and recommendations for preventing eutrophication in the reservoirs were presented. Our research showed that a significant increase in algae biomass led to biological contamination of the reservoirs under our consideration and resulted in deterioration of water quality: its transparency, color, acidity and amount of toxic compounds.

The study showed that the phytoplankton in the reservoirs was presented by diatoms, euglenophyta, dinoflagellata, blue-green, green and golden algae. We observed the most abundant types of algae: blue-green algae (93,6%), diatoms (3,4%) and green algae (2,8%). Euglenophyta, dinoflagellata and golden algae were found in negligible quantity and did not influence the indicators significantly.

We determined seasonable periodicity of the phytoplankton growth for each type. The seasonable changes in the phytoplankton growth are presented in Fig.1.

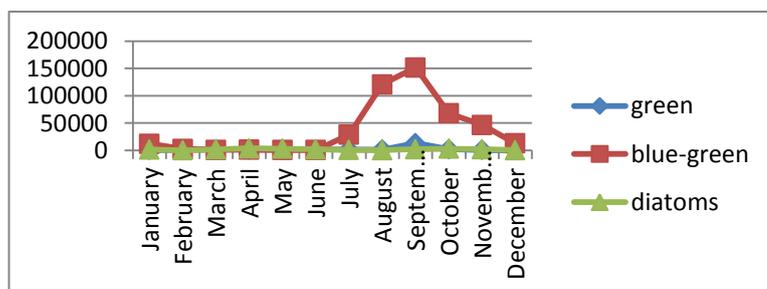


Fig.1. Dynamics of algae growth

The figure shows that algae have an intensive reproduction only during certain periods of the year. For example the maximum of blue-green algae was observed in

August in the Denyshi Reservoir and in September in the Vidsichne Intake. The green algae first occurred in late May and reached their mass reproduction in June. Diatoms were observed in the reservoirs all over the year and had two periods of mass reproduction. The first period was between April and June and the second one lasted from September to November.

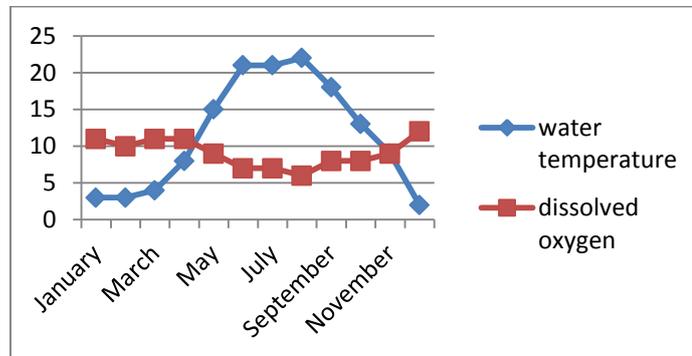


Fig.2. Average water temperature and dissolved oxygen concentration

Fig. 2. shows a high rise of temperature in the period of the intensive growth of blue green algae in summer months. We can also observe a slight decrease in dissolved oxygen concentration during the period of blue green algae growth (April-October). This reduction in the dissolved oxygen concentration is a sign of eutrophication processes. There is also an insignificant reduction in diatoms population and an increase in green algae population.

We can conclude that it is the algal toxins released in the periods of intensive algae reproduction and growth that cause water contamination and eutrophication in the reservoirs of the Teteriv River. The activities to reduce algae blooms in the Teteriv River reservoirs are the following:

- to form water conservation zones for the reservoirs;
- to aerate the reservoirs to avoid oxygen depletion;
- to use algicide in order to reduce algae growth;
- to remove organic excess substances from the reservoirs.