

Zooplankton Community of Lake Lebyazh'e (Kazan, Russia) under Changing Conditions

O.Y. Derevenskaya

Kazan Federal University, Kazan, Russia

Annotation

The article presents the results of long-term observations of the zooplankton community of Lake Lebyazhye (Kazan). Earlier lake Lebyazhye is a system of four reservoirs: Large, Small, bright and dry Lebyazhye interconnected channels. Under the influence of anthropogenic and natural factors, there was a decrease of the water level and the shrinking of Lebyazhye Lake. To save valuable recreational facility, it carried out a range of hydraulic events.

By 2015, the surface of the lake Lebyazhye area has decreased about 13 times the level pegged supply of groundwater, which caused an increase in water salinity, prevalence of sulfate ions. This has led to changes in the structure of the zooplankton community. Significantly reduced the species composition (more than 20%). There are new species, previously in the lake are not met. There was a change of the dominant species of zooplankton, their number has decreased. Decreased quantitative zooplankton. If prior to the exposure values of the numbers and biomass of zooplankton corresponded mesotrophic-eutrophic water bodies, it is now the quantitative characteristics of zooplankton correspond oligotrophic. However, the value of Shannon index, which characterizes the species diversity of zooplankton, not decreased. This suggests that exposures are all organisms that form the community. Largest body of water is saprobic index β -mesosaprobic, moderately polluted, III water quality class.

Thus, the properties of zooplankton-indicator can be used to describe the changes that have occurred with the ecosystem as a result of changes in hydrological conditions, salinity and main ions.

Keywords: Zooplankton, Lake, bioindication, mineralization.

References

1. Essays on Geography of Tatarstan. Kazan, Tatknigoizdat, 1957. 357 p. (In Russian)
2. Taixing A.S. Prikazanskogo Lakes region of modern natural and human-induced changes. Kazan, Publishing house TSHPU, 2006. 167 p. (In Russian)
3. Lake of the Middle Volga Region. Leningrad, Publishing House "Nauka", 1976. 236 p. (In Russian)
4. Kutikova L.A. Rotifer fauna of the USSR (Rotatoria). Subclass Eurotatoria (units Ploimida, Monimotrochida, Paedotrochida). Leningrad, Nauka, 1970. 744 p. (In Russian)
5. Alekseev V.R., Vasilenko S.V., Glagolev S.M., Dobrynina T.I., Korovchinskii N.M., Kotov A.A., Kuraschov E.A., Orlova-Benkovskaya M.Y., River I.K., Smirnov N.N., Starobogatov Y.I., Stepanova L.A., Filchakov V.A. Key to freshwater invertebrates of Russia and adjacent territories. Crustaceans. Saint-Petersburg, Zoological Institute of Russian Academy of Sciences, 1995. Vol. 2. 628 p. (In Russian)
6. Ivanova L.V., Stepanyants S.D., Rogozin A.G., Kutikova L.A., Tsalolikhin S.J., Spiridonov C.E., Finogenova N.P., Polyakova E.A., Gontar V.I., Tumanov D.V. Key to freshwater invertebrates of Russia and adjacent territories. Lower invertebrates. Saint-Petersburg, Zoological Institute of Russian Academy of Sciences, 1994, Vol. 1. 396 p. (In Russian)
7. Alekseev V.R., Glagolev S.M., Dobrynina T.I., Kotov A.A., Kutikova L.A., Mazey Y.A., Malyavin, S.A., Naumova E.Y., Sinev A.Y., Smirnov N.N., Stepanova L.A., Stoiko T.G., Suhii N.M., Telesch I.V., Fefilova E.B., Filchakov V.A.. Key to zooplankton and zoobenthos of fresh waters of European Russia. T. 1. Zooplankton. Moscow, Association of scientific publications of KMK, 2010. 495 p. (In Russian)
8. Guidelines for the collection and processing of materials in hydrobiological studies in freshwater. Zooplankton and its products. Leningrad, Zoological institute of AS USSR, 1982. 33 p. (In Russian)
9. Shannon C.E., Weaver W. The mathematical theory of communication. Urbana, Univ. Illinois Press, 1949, 117 p.
10. Whittaker R.H. Dominance and diversity in land plant communities. *Science*, 1965, vol. 147, 3655, pp. 250-260.
11. Sladeček V. System of water quality from biological point of view. *Egetnisse der Limnologie*, 1973, No. 7, 218 p.

12. Derevenskaya O.Y. Monitoring of ecological status of lakes Lebyazhe system in terms of zooplankton. *Bulletin of the Tatarstan branch of the Russian Ecological Academy*, 2003, no. 2, pp. 18 - 21. (In Russian)
13. Derevenskaya O.Y. Characteristics of zooplankton water bodies Kazan. *Bulletin of the Tatarstan branch of the Russian Ecological Academy*, 2003, no. 4, pp. 16-19. (In Russian)
14. Derevenskaya O.Y., Nikitin O.V. Indicators of the state of zooplankton in lakes bioindication Medium and Small Boar Lebyazhe. *Bulletin of the Tatarstan branch of the Russian Ecological Academy*, 2004, no. 2, pp. 10-14. (In Russian)
15. Kryuchkova N.M. Community structure of zooplankton in the waters of different types. *Productionno-gidrobiologicheskie issledovaniya vodnyh ekosistem* [Production-hydrobiological studies of aquatic ecosystems]. Leningrad, 1987, pp. 184-198. (In Russian)
16. Reimers N.F. Ecology (theories, laws, rules, principles and hypotheses). Moscow, Journal "Young Russia", 1994. 367 p. (In Russian)
17. Andronikova I.N. Structural and functional organization of zooplankton trophic lake ecosystems of different types. Saint Petersburg, Nauka, 1996. 189 p. (In Russian).
18. Galkovskaya G.A. Interdisciplinary relationships and problems of stability of plankton communities. *Hydrobiological journal*, 1995, vol. 31, no. 4, pp. 3-10. (In Russian)
19. Ivanova M.B. The impact of pollution on planktonic crustaceans and they can be used to determine the degree of contamination of rivers. *Metody biologicheskogo analiza presnyh vod* [Methods of the biological analysis of fresh waters]. Leningrad, 1976, pp. 68-80. (In Russian)
20. Kutikova L.A. Rotifers river plankton as the water quality. *Metody biologicheskogo analiza presnyh vod* [Methods of the biological analysis of fresh waters]. Leningrad, 1976, pp. 80-90. (In Russian)
21. Derevenskaya O. Yu., Mingazova N.M. Communities of zooplankton in lakes in the course of their contamination and restoration. *Hydrobiological journal*, 2000, v. 36, № 1, pp. 1-7.
22. Mingazova N.M., Derevenskaya O. Yu. The concept and methodology of the restoration of small lakes. *Hydrobiological journal*, 2000, v. 36, № 2, pp. 40-51.
23. Alimov A.F. Patterns of changes in the structural and functional characteristics of communities of aquatic organisms. *Hydrobiological journal*, 1995, v. 31, 5, pp. 3-11. (In Russian)
24. Stroganov N.S. Theoretical aspects of the action of pesticides on aquatic organisms. *Eksperimentalnaya vodnaya toksikologiya* [Experimental aquatic toxicology]. Riga, 1973, vol. 5, pp. 11-36. (In Russian)
25. Braginsky L.P. The theoretical aspects of the problem "of norm and pathology" in the aquatic ecotoxicology. *Teoreticheskie voprosy vodnii toksikologii. Materialy 3 Sovetsko-Amerikanskogo simpoziuma* [Theoretical questions aquatic toxicology. Materials of 3 Soviet-Amer. Symposium]. Leningrad, Nauka, 1981, pp. 29-40. (In Russian)
26. Alimov A.F. The study of biodiversity in communities of plankton, benthos, fish and freshwater ecosystems of different productivity. *News of the Academy of Sciences. Ser. Biological.*, 2001, №1, - pp. 87-95. (In Russian)
27. Mathis B.J. Species diversity of benthic macroinvertebrates in three mountain streams. *Trans. Okla. State Acad. Sci.*, 1968, no. 61, pp. 171-176.
28. Hendricks A.D., Henley J.T., Wyatt K.L., Dickson, Silvey J.K. Utilization of diversity indices in evaluation the effect a papermill effluent on bottom fauna. *Hydrobiologia*, 1974, no. 44, pp. 463-474.
29. Hoehn R.C., Stauffer J.R., Masnik M., Hocutt C.H. Relationships between sediment oil concentration and the macroinvertebrates present in a small stream following an oil spill. *Environ.Letter*, 1974, v. 7, no. 4, pp. 345-352.