



# Microscopic animals of the Neva River and their role in the ecosystem

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The main water intake in St. Petersburg is carried out in the Neva River. The health of the inhabitants of our city depends on the level of safety of the water in the Neva. In nature, there is a natural process – self-cleaning. This process involves microorganisms that decompose organic matter into inorganic and microscopic animals that perform the function of bacteriophages, sedimentations, biofilters. Their role in water purification is difficult to overestimate.

Approximately 80% of all diseases in the world are associated with unsatisfied water quality and violations of sanitary and hygienic standards of water supply.

The importance of water in the spread of infection is explained by the fact that it is not only a habitat for microorganisms, but also spreads them over long distances. This applies to both surface and groundwater.

The formation of the reservoir biocenosis depends largely on the species composition of microscopic animals.

The study of microscopic animals in the water of the Neva River, which is the main source of water supply in St. Petersburg and the Leningrad Region, is relevant and significant.

## THE OBJECTIVE OF THE WORK

is to describe the qualitative composition of microscopic animals and their role in the ecosystem of the Neva River.

## ROLE OF MICROSCOPIC ANIMALS IN ECOSYSTEM

In addition to zooplankton, zoo benthos organisms can be found in samples - inhabitants of the bottom, which enter the water column with intense flows.

Plankton crustaceans are peculiar filters, as for their nutrition they filter bacteria, phytoplankton and various particles of dead organic matter – detritus from water. Lower crustaceans are active filter feeders. They filter a large amount of water through their bodies, retaining suspended substances, partially mineralize them, and throw the residues out in a compact (glued) state. Food for them are bacteria, small algae, organic suspension. Many of these organisms feed on detritus, which sink to the bottom. And also some species are sedimentators.



Another ecological aspect of the role of microscopic animals is that in the process of their vital activity, they release various soluble organic and inorganic substances. For example, phosphorus and nitrogen compounds that can be directly used by phytoplankton for their development.

#### TOOLS NECESSARY

To study microscopic animals, water was sampled along the Neva River in the city center (under the Troitsky Bridge). For this was used the so-called plankton network. It is a bag of mill gas (sieve), sewn in the shape of a cone. A special glass, usually metal, is sewn to the top of the cone-shaped plankton net, into which a small amount of water is collected with filtered plankton. At the bottom of the glass there is a tap that allows you to drain into the sample container.

We used the microbiological research method – the analysis was carried out on an MSP-1 V.22 microscope under a magnification of 40 times, equipped with a TOUPCAM video camera.

To determine the qualitative composition of microscopic animals, a brief determinant of freshwater invertebrates from the center of European Russia was used (M. V. Chertoprud, E. S. Chertoprud).

#### FINDINGS

The most numerous animals in the sample were rotifers – 75%, which is important and significant, as they purify water, destroying masses of bacteria, algae and detritus that they serve as food. At the same time, rotifers themselves serve as food for other organisms. Copepods and branchy ones have the same functions, but they are found to be much smaller (20% and 3%, respectively). Only 2% of benthic organisms are found, since these organisms live on the bottom and rarely fall into the water column. Benthos serves as food for fish and other aquatic animals.

The content of microscopic animals we have determined by biomass, where the main part is benthos (43%) and copepods (46%), since they are large in comparison with rotifers (8%) and branchy creepers (3%).

Representatives of branchy species such as *Daphnia*, *Bosmina*, *Leptodora*, *Polyphemus* were found in the sample. In addition to zooplankton, such representatives of zoo benthos were found in the sample: *Oligochaeta*, *Nematoda* and *Tardigrada*.

Thus, the species composition of microscopic animals is diverse. In the water of the Neva, rotifers, branchy, copepods, oligochaeta, nematodes, slow moving fish, and Diptera larvae are identified.

- The species diversity of the microscopic animals of the Neva provides the species diversity of the microscopic animals of the Neva Bay, since the Neva flows into the Neva Bay.
- The presence of the species diversity of the Neva River favorably affects the ecology, since microscopic animals filter out water, secrete useful organic and inorganic substances, and serve as food for many aquatic inhabitants. ♦



Authors of the study, Anna and Anastasia in biology classroom.



Mayflies are aquatic insects who belong to the order *Ephemeroptera*. Their immature stages are aquatic fresh water forms, whose presence indicates a clean, unpolluted environment.



The caddisflies, or order *Trichoptera*, are a group of insects with aquatic larvae and terrestrial adults.