WATER QUALITY AND ZOOPLANKTON COMMUNITY STRUCTURES IN THE POND KYIV REGION AND IMPACT ON DEVELOPMENT CARP ROE

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Shows the results of water quality monitoring ponds Kiev region. It was found that water ponds studied not responsible fisheries TVL, which in turn affects the structure of zooplankton groups. Confirmed toxic effects of wastewater components on the development of eggs carp.

Keywords: *organic pollution, waste water, zooplankton, eggs carp, water quality.*

The increase of anthropogenic impact on ecosystems, including water, leading to contamination of xenobiotics different origin [8], depletion of faunal diversity and disturbance of self-regulation. In this regard, it is necessary to monitor the state of ponds in terms of pollution and improving methods for assessing impacts and ways to eliminate them.

One of the indicators of aquatic ecosystems can be zooplankton - grouping lower aquatic invertebrates, which determine the life of the synthesis and degradation of organic matter in water, forming water quality. Directional and non-directional ponds genesis subject to strong influence of anthropogenic factors; water is potentially toxic [5]. Thus, the study of structural and functional organization of zooplankton in the changing environment is not only practical, but also general biological importance, including how to respond to the action of organic matter.

The method of environmental indicators is that the evaluation of the ecological state of hydro in terms of human impact is made on the basis of a deep and comprehensive environmental analysis of different groups of aquatic organisms that form the biological component of the ecosystem. This analysis is

based on the study of a variety of qualitative and quantitative structural and functional parameters of a particular group and their dynamics in a particular space or over time. It has long developed a scheme of environmental analysis that hitherto widely used to solve many issues general biological, now begins to serve new interpretation solving complex environmental problems [5].

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It is known that zooplankton researchers successfully used as an indicator for the assessment of ecosystems [3, 4, 16, 17].

According to the established basic criteria for water quality freshwater fish, we conducted research on the effects of ammonia on the development of carp eggs as one of the components of pollutants, which is almost all the studied reservoirs.

The purpose of the study is to examine the hydrochemical parameters and levels of zooplankton communities reservoirs Kiev region.

Materials and methods. Water and zooplankton, were taken from the waste channel Bortnichy WWTP, pond fisheries based Nemishayevo Agrotechnical College and the area along the Dnieper River near the residential area Korchevate by conventional methods of Hydrobiology in [9,12], during the summer and early fall of 2013.

Hydrochemical study conducted by conventional standard methods of chemical analysis of surface water [1, 2].

In the analysis of zooplankton communities took into account the following parameters: species composition, biomass and species diversity index of Shannon

[10, 11,12, 13]. To clarify the status water biocenosis, within which there are experimental stations were made coenotic analysis saprobic indices.

The impact of toxicants major water pollutants on freshwater fish embryos studied the newly fertilized eggs carp. The experiment was carried out by conventional method using visual and quantitative assessment of the results [7,11]. Studies have been conducted effect of different concentrations of ammonia in water: 0.05 mg/l and 0.5 mg/l and 5 mg/l.

Statistical analysis of data was performed using the program Exel.

Results and discussion. It was found hydrochemical composition of the studied reservoirs (Table. 1), which showed that water in waste channel Bortnichy Wastewater Treatment Plant (WWTP) for ammonia nitrogen content exceeding the maximum permissible limits for industrial fishing reservoirs [15] - 18 times, nitrite nitrogen 12 times for phosphates 12 times.

In water pool, drive fisheries based Nemishayevo Agrotechnical College exceeded the TVL was found by nitrite nitrogen, manganese and iron. Hydrochemical parameters on the section of the Dnieper residential area Korchuvate generally conform with the standards, in addition to indicators of ammonium and phosphate.

1. Chemical parameters in the areas of water sampling zooplankton (Summer, 2013)

Indecator	**TVL**	**Bortnichy WWTP**	**Pond of Nemishayevo Agrotechnical College**	**Dnieper**
pH		6,96	7,29	7,30
Mineralization, mg/l		685,5	486,5	312,7
Bicarbonates, mg/l		298,9	201,3	195,2
Sulfates, mg/l	100	98,0	90,0	16,0
Chloride, mg/l		90,5	60,4	21,3
Magnesium, mg/l	40	13,2	18,0	8,4

Calcium mg/l	180	60,0	70,0	48,0
Hard water, mmol/l		4,1	5,0	3,1
Potassium+sodium, mg/l		124,8	46,9	23,8
Potassium, mg/l	50	41,6	15,6	7,9
Sodium, mg/l	120	83,2	31,3	15,8
Iron, mg/l	0,1	***0,14***	***0,12***	0,02
Ammonia mg/l	0,39	***7,25***	0,363	***0,405***
Nitrite mg N/l	0,02	***0,255***	***0,0214***	0,0121
Nitrates mg N/l		2,564	0,167	0,195
Mineral nitrogen, mg/l		10,069	0,5514	0,6121
Phosphates mg/l	0,05	***0,628***	0,026	***0,127***
Manganese, mg/l	0,01	***0,06***	***0,02***	0,01

Zooplankton WWTP (water discharge) p. Bortnychi characterized by low rates of species diversity and quantitative development. It is composed of seven registered species (three - rotifers, two - copepods, two - cladocera).

The number of zooplankton was 12,81 thousand. Ind/m3, biomass - 0.02 g/m3. As the number of rotifers dominated bdelloid rotifers - a significant indicator of organic pollution. They accounted for 86% of the total. Significant development reached as β-mesosaprobic kind *Bosmina longirostris* - a representative number of Cladocera. Relative proportion of copepods equal to only 2%.

The index Shannon (0.79 bits/ind and 1.27 bits/g) indicate the nature monodominant group. Saprobity index (2.26) corresponds to β-α-mesosaprobic zone and indicates the significant organic pollution.

As part of the pond zooplankton c. Nemeshaevo registered 31 species, including 18 species of rotifers, seven - shellfish copepods and six - Cladocera. Among the most numerous were rotifers representatives of *Brachionus.*

The level of zooplankton groups was high and the season. Its total number was 136,98tys. ind/m3, biomass - 0,91 g/m3.

As the number and biomass of rotifers dominated *Brachionus calyciflorus, B.diversicornis, Asplanchna priodonta,* the relative share equal to 53%. The

structure of the complex were also dominant nauplius and copepods in various stages of development – 45% of the total zooplankton groups.

The index Shannon (3.09 bits / ind and 2.47 bits / d) indicate the nature oligodominant zooplankton communities. Saprobic index (2.03) corresponded to β-mesosaprobic zone, indicating moderate organic pollution.

During the period of research at the site of the Dnieper River as part of zooplankton recorded 81 species of which 46 species of rotifers is (Rotatoria), 19 species - shellfish copepods (Copepoda) and 16 species of Cladocera (Cladocera).

The relative share of the total rotifers equal to 55.6% for biomass 37%. Among rotifers dominated during the summer different species of *Asplanchna* and *Trichocerca*. From Cladocera are two dominant types *Daphnia longispina* and *Diaphanosoma brachyurum*, among copepods obvious nominees were observed.

For saprobic index studied area belongs to the β-mesosaprobic zone, indicating moderate organic pollution.

As noted ammonia present in the water most of the studied water bodies are product of protein and amino acids of plants and animals, microorganisms and freshwater fish. Its source is in the water as manure and organic fertilizers - animal waste facilities.

Studies have shown that resistance against ammonia fish species specific, but these differences are small and occur under short-term effects. Therefore, the literature permitted levels of ammonia in water for different fish species are significant differences [9].

Monitoring the number of dead embryos carp spent in critical periods of development of eggs showed that during the crushing germinal disc and morula formation at concentrations of NH_4+ 0,05 mg/l of dead calves was 23.2%, 0.5 mg/l - 84 % 5 mg/l – 89.1%, while in the control of this figure was 33.9%. After the death of embryos Gastrulation for the actions defined in three ammonia concentration was almost the same – 61.7, respectively; 68.7 and 54.4% respectively. The total number of live eggs in the control was 28.6%, while in water with a concentration of NH_4+ 0,5 mg/l - more than 80% of the embryos died

at the stage of segmentation and separation until the tail section. Before leaving calf mortality in this group reached 86.3%. When the concentration of NH_4+ in water 0.5 mg/l number of live calves was – 20.3%, and the third experiment, the concentration of NH_4+ 5 mg/l embryos died during eye formation of bubbles. Early leaving individual embryos observed for concentrations of NH_4+ in water 0.5 mg/l. However, after 3.5 days after fertilization of eggs, number of embryos that came out of the shell by concentration NH_4+ 0,05 and 0,5 mg/l was the same. The greatest care caviar observed in all investigated variants for the first two days. Live eggs remaining acquired resistance to ammonium ions and the following days virtually not died. During leaving leaving eggs in all experimental groups increased and averaged 7.8%. Individuals that were alive, continued to exist until the end of the suction bile sac.

Over time, the initial stages of crushing eggs that developed to the concentration of ammonia in water 5 mg/l ahead on this indicator embryos of other options experiment. When specified calf survival aquatic environment with the concentration of ammonia in water 0.05 and 0.5 mg/l was as stimulating and protective to a certain point of embryos.

The obtained results confirm the opinion of other authors about the toxic effects of ammonia and accelerated leaving whitebait with subsequent death [6,18].

In some cases, the development of embryos under ammonia is broken, resulting in morphological abnormalities, eye pigmentation late, dehydration and embryos leads to their death.

Conclusions

1. Water Waste Channel Bortnichy WWTP is not responsible for MPC fishery ponds, confirming low rates of species diversity and dominance of Bdelloidea rotifers zooplankton communities.

2. The structure of zooplankton in the village pond. Nemeshaevo had oligodominant character of dominance representatives rotifer, copepoda, which also shows a significant contamination by organic waste.

3. 3 Plot of the Dnieper array Korchuvate most favorable hydrochemical regime and has the highest species diversity and quantitative development of zooplankton.

4. Confirmed toxic effects of wastewater components including ammonia development carp eggs, resulting in abnormalities of eggs and larvae leaving and in her death.

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ЯКІСТЬ ВОДИ ТА СТРУКТУРА УГРУПОВАНЬ ЗООПЛАНКТОНУ У ВОДОЙМАХ КИЇВСЬКОЇ ОБЛАСТІ ТА ЇЇ ВПЛИВ НА РОЗВИТОК ІКРИ CYPRINUSCARPIOL

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Наведено підсумки моніторингу якості води водойм Київської області. З'ясовано, що вода досліджуваних водойм не відповідає рибогосподарській ГДК, що в свою чергу впливає на структуру угруповань зоопланктону. Підтверджено токсичний вплив компонентів стічних вод на розвиток ікри корона.

Ключові слова: *органічне забруднення, стічні води, зоопланктон, ікра корона, якість води*

КАЧЕСТВО ВОДЫ И СТРУКТУРА ЗООПЛАНКТОННЫХ СООБЩЕСТВ В ВОДОЕМАХ КИЕВСКОЙ ОБЛАСТИ И ВЛИЯНИЕ НА РОЗВИТИЕ ИКРЫ КАРПА

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Представлены результаты, мониторинга качества воды водоемов Киевской области. Установлено, что вода исследованных водоемов не отвечает параметрам рибохозяйственной ГДК, что в свою очередь влияет на структуру зоопланктонных сообществ. Подтверждено токсическое влияние компонентов сточных вод на развитие икры карпа.

Ключевые слова: *органическое загрязнение, сточные воды, зоопланктон, икра карпа, качество воды*