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FAUNISTIC COMPOSITION OF THE ZOOPLANKTON OF LAKE BUBANJ

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ABSTRACT. In analysis of material in the collection of the Institute of Biology and ecology Faculty of Science (University of Kragujevac), 41 taxa were recorded in composition of the zooplankton of Lake Bubanj, which is located at the very entrance to the city of Kragujevac. Rotatoria were prevalent in regard to the number of species. Inasmuch as the lake is shallow and more in the nature of swamp, it is not surprising that benthic and phytophilic forms are most common in it, whereas true euplanktonic forms (for example Calanoida) are mainly absent. A highly accelerated process of eutrophication is threatening the diversity of organisms in Lake Bubanj, and certain protective measures need to be implemented.

INTRODUCTION

There are four artificial lakes on the territory of Kragujevac. Two of these lakes (the Grosnica and Gruza Reservoirs) are used to supply the city with water, one (lake in the Sumarice Park) serves for rest and recreation of the city's residents, and the smallest (the so-called Lake Bubanj) is on the outskirts of town.

The Grosnica and Gruza Reservoirs have been the subject of many hydrobiological investigations. Among other things, the zooplankton of these reservoirs has been studied in detail [1, 2, 3, and 4]. Apart from this, the zooplankton of the other waters in the vicinity of Kragujevac has also been investigated from time to time, but considerably less thoroughly [5].

Hydrobiological investigations of Lake Bubanj were carried out during the period of 1992-1994 [6]. Samples of zooplankton taken at that time are preserved in the collection of the Faculty of Science in Kragujevac. Recently conducted qualitative analysis of this material represents a contribution to knowledge about the distribution of zooplankton on the territory of Serbia.

Description of investigated location

Lake Bubanj has been formed in the alluvial plane of the river Lepenica, in a desolated hollow from which the soil for a former brick kiln had been exploited [7]. The process of the lake formation started in 1955. The lake is supplied with water from a subterranean spring, from the drinking-fountain "Bubanj" and from rainfalls. The water surface equals to approx. 2.7ha. The land belt around the lake is a flat ground of approx. 10ha, without buildings and with scarce woody vegetation [6]. Moreover, the lake is situated in the urban zone of the city, not far from the city centre. It is from three sides surrounded with busy roads, and from the fourth side with a service shop of the company "Crvena zastava". The lake once had an efflux trench, which is now, however, cut with a municipal sewer and is out of use.

The average depth of the lake is approx. 1.20m (max. 1.60m, min. 0.50m) [6]. In comparasion with analyses conducted 30 years ago [7], the depth decreased for about 0.50-0.60m. The greatest part of the lake bottom is muddy. The average thickness of the mud is 0.50-0.70m, with most of deposit directed towards the central parts of the lake [6]. The water is transparent to the very bottom, and therefore not stratified. During the summer water temperature reaches up to 30^0C, the average value for the observed period being 22.4^0C [6]. During the winter the whole lake surface is frozen, except for a small area where water from the drinking-fountain "Bubanj" is emptied. The level of oxygen in the water is relatively good, with the lower values during the winter period (4-6 mg/l). During the summer period the water becomes enriched with oxygen through photosynthesis of the macrophyte vegetation which occupies the whole water mass of the lake (11 ml/mg on the average) [6].

MATERIAL AND METHODS

Samples of zooplankton were taken once a month during the period from November of 1992 to June of 1993. In 1994, samples were taken once a month throughout the summer.

Qualitative samples of plankton were taken with a No. 100 plankton net (during 1992/93) and No. 25 plankton net (during 1994); while quantitative samples were collected with 2-liter Ruttner hydrobiological bottles and then filtered across a plankton net. Samples were preserved with 4% Formalin at the collection site.

RESULTS AND DISCUSSION

Qualitative analysis revealed the presence of 41 taxa in the composition of zooplankton (Table 1). More taxa were recorded in 1994 than during the period 1992/93, which is presumably the result of using a plankton net with smaller mesh size. This is confirmed by the greater number of taxa recorded in the group of Rotatoria.

Table 1. Qualitative composition of zooplankton in Lake Bubanj

Taxa	XI 1992. – VI 1993.	summer 1994
ROTATORIA		
Asplanchna sp.	+	+
Brachionus angularis Gosse 1851		+
Brachionus quadridentatus Hermanns 1783		+
Colurella colurus (Ehrenberg 1830)	+	+
C. obtusa (Gosse 1886)	+	+
Euchlanis dilatata (Ehrenberg 1832)	+	+
Filinia longiseta (Ehrenberg 1834)		+
Gastropus stylifer Imhof 1891		
Hexarthra mira (Hudson 1871)	+	+
Keratella cochlearis Gosse 1851		+
Keratella cochlearis f. *macracantha* (Lauterborn 1898)		+

Table 1. continue

Keratella quadrata (O.F. Müller 1786)	+	+
Lecane (Monostyla) bulla (Gosse 1851)	+	+
Lecane (M.) cornuta (O.F. Müller 1786)	+	+
Lecane (M.) furcata (Murray 1913)		+
Lecane (Lecane) luna (O.F. Müller 1786)	+	+
Lecane sp.		+
Lepadella patella f. *oblonga* (Ehrenberg 1834)	+	+
Lepadella (L.) ovalis (O.F. Müller 1786)	+	+
Mytilina sp.		+
Platyas quadricornis (Ehrenberg 1832)	+	
Polyarthra dolichoptera (Idelson 1925)	+	+
Polyarthra sp.	+	+
Synchaeta sp.	+	+
Testudinella patinna (Hermann 1783)	+	
Trichocerca (Trichocerca) cylindrica (Imhof 1891)	+	+
Trichocerca parvula Carlin 1939	+	+
Trichocerca pussila (Jennings 1903)		+
Trichocerca similis (Wierzejski 1893)		+
Trichocerca stylata Gosse 1851		+
Trichocerca sp.	+	+
Σ Rotatoria	19	28
CLADOCERA		
Alona affinis (Leydig 1860)	+	+
Alona guttata G.O. Sars 1862	+	+
Bosmina longirostris (O.F. Müller 1786)	+	+
Ceriodaphnia affinis (Lilljeborg 1900)	+	+
Chydorus sphaericus (O.F. Müller 1786)	+	
Simocephalus vetulus (O.F. Müller 1786)	+	
Σ Cladocera	6	4
COPEPODA		
Eucyclops serrulatus (Fisher 1851)	+	
Macrocyclops albidus (Jurine 1820)	+	+
Microcyclops sp.	+	
Thermocyclops dybowskii (Lande 1890)	+	+
Σ Copepoda	4	2
Total zooplankton	29	34

During both periods of investigation, the group Rotatoria was dominant with respect to diversity. Inasmuch as Lake Bubanj in fact represent a swamp, the absolute dominance of benthic and phytophilic form is logical. There are few true planktonic species (species of genera *Keratella* and *Polyarthra, Bosmina longirostris*). This assertion is further supported by the complete absence of euplanktonic form such as the group Calanoida, which is, by the way, a constant component of zooplankton in the Grosnica and Gruza Reservoirs [4].

All of the recorded taxa are common and also occur in the other aquatic ecosystems of Serbia. The majority of taxa recorded in Lake Bubanj were also registered in the Grosnica and Gruza Reservoirs [4]. Only the species *Lecane furcata, Lepadella ovalis, Mytilina* sp., *Trichocerca parvula, T. stylata* and *Macrocyclops albidus* were recorded just in Lake Bubanj.

The transparency of lake water to the bottom, large quantity of nutrients in it, and massive development of macrophytes [6, 8] point to an accelerated process of eutrophication, which exerts strong influence on the development of all organisms in Lake Bubanj. The great quantify of mud on the bottom is stable source of biogenic elements (N, P), which are necessary for an increased process of eutrophication. There is a risk of negative consequences of anaaerobic processes in the mud (oxygen deficiency, increased level of nitries, ammonia, etc.). High water temperatures during the summer period and complete transparency intensify eutrophic processes in the lake. There is a possibility for oxygen deficiensy during the winter, which jeopardize the survival of many oxyphile organisms, like fishes [6]. If no protective measures measures are undertaken, degradational processes will threaten the survival of most organisms and the lake will become a dystrophic system. The measures that have been proposed for the lake's revitalization and conservation [6] would make it possible to slow negative processes and perhaps even arrest them. The existing diverstity of organisms could then be preserved and protected.

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