

PLANKTONIC ROTIFERS (ROTATORIA)
OF POLESIE NATIONAL PARK PONDS

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A b s t r a c t. Planktonic rotifers were examined in June and September 1997 in five ponds: Stujłos, Perkoz, Graniczny, Głęboki and Mała Zośka located in Poleski National Park. Qualitative and quantitative analysis of rotifer species (*Rotatoria*) was carried out. In general 26 species of rotifers were found, including 13 in Perkoz Pond, 12 in Stujłos, 11 in Mała Zośka, 9 in Graniczny and, finally, 8 in Głęboki Pond. Species diversity index was the highest in Graniczny Pond, whereas its lower values were observed in Mała Zośka, Stujłos and Perkoz, and the lowest in Graniczny Pond. Rotifers were the most abundant in Głęboki Pond, a less abundant in Perkoz, Stujłoz, Mała Zośka and Graniczny Pond. In almost all Ponds species preferring fertile waters – *Keratella cochlearis*, *Keratella cochlearis tecta*, *Polyarthra vulgaris* and *Trichocerca similis* predominated. In Stujłos Pond *Conochilus unicornis* was the most numerous species.

K e y w o r d s: Ponds, planktonic rotifers, Polesie National Park

INTRODUCTION

Rotifers inhabiting pond waters are the basic element of heleoplankton. They feed on the following microorganisms: bacteria, algae and protozoa. Detritivorous forms are also encountered. Rotifers play, therefore, an important role in food web of ponds [8]. Some species may also be considered to be good indicators of water fertility [7,8,10].

The objective of the research was to examine quantitative and qualitative structure of planktonic rotifers (*Rotatoria*) inhabiting ponds in Polesie National Park, Poland. Until now these ponds had been the object of only very fragmentary research concerning biology and ecology of various groups of water invertebrates [9,11,12].

STUDIED AREA; MATERIAL AND METHODS

There are two pond complexes 7.5 kilometres apart in Polesie National Park, Bruski Pond Complex comprising Stujłos, Perkoz i Graniczny Ponds, and Pieszowolski Pond Complex with Głęboki and Mała Zośka (Table 1). The former complex is situated in the north-eastern part of Polesie National Park whereas the latter in its north-western part. The pond complexes came into existence in the early 1930s in the transitional peat bog meadows. Until the early 1960s Bruski ponds were fed by the Mietiulka river whereas Pieszowolski ponds by the Pieszowolski watercourse. Since the turn of the 1960s and 70s all ponds have been fed by the Mietiulka river. Bruski Ponds were excluded from fishing production for many years. During that time they grew with reeds, shrubs and forests (birch, alder), and some of them transformed into agricultural land. In 1990 they were incorporated into Polesie National Park and they have been undergoing gradual renaturalisation since 1994.

Table 1. Ecological characteristics of the studied ponds in Poleski National Park

	Ponds	Stujłos	Perkoz	Głęboki	Mała Zośka and Graniczny
Area (ha)					
Total area		49.02	81.91	43.45	77.32
Forests		1.62	0.75	3	11.74
Woodlots		10.27	36.38		10.45
Arable land				10.53	4.90
Water		36.85	44.01	18.18	47.59
Dikes				0.12	1.49
Rushes		0.29	0.76	11.63	1.13

The research was carried out in the spring-autumn of 1997 in five Ponds: Stujłos, Perkoz, Graniczny, Głęboki and Mała Zośka. Plankton was sampled in the pelagic zone of the ponds. During each occasion 10 litres of water was taken using "Toń" sampler. Subsequently, the sample of water was strained through a plankton net No. 25 mesh size and condensed to a constant volume of 100 cm³. Samples were preserved with Lugols solution and after several hours preserved with 4% formalin solution with the addition of glycerine [1]. Species distribution and quantitative composition analysis of rotifers were determined in the preserved samples using an inverted microscope. The number of individuals per 1 litre of water was calculated for each sample.

RESULTS

Qualitative structure

In the ponds of Polesie National Park 26 planktonic rotifer species were found (Table 2). The number of species was the highest in the Bruski Pond Complex, ranging from 13 species in Perkoz Pond to 9 in Graniczny. In the Pieszowski Pond Complex the number of rotifer species was a little lower, ranging from 8 in the Głęboki Pond to 11 in Mała Zośka 1. The number of rotifer species in the ponds of Polesie National Park was close to species abundance in Lasy Janowskie Landscape Park [7] and considerably lower than in the ponds of Żeromin near Łódź in central Poland [5]. In many carp ponds, however, the number of rotifer species was lower than that in the ponds of Polesie National Park.

Shannons species diversity index points out to the fact that the highest rotifer species diversity can be observed in Graniczny Pond, $H=3.095$ and the lowest in Głęboki Pond, $H=0.982$ (Fig. 1).

Abundance and dominance

The abundance of rotifers in particular ponds was clearly diversified and ranged from 7 indiv./l in Graniczny Pond to as many as 500 indiv./l Głęboki.

Mean rotifer abundance was the highest in Głęboki Pond, being 275 indiv./l. It was considerably lower in the remaining ponds, where it ranged from 11 indiv./l in Graniczny to 146 in Perkoz Pond (Fig. 1). Rotifer abundance in Polesie National Park ponds was lower than in carp ponds in other regions of Poland [2-4,6] and close to that of Lasy Janowskie Landscape Park [7].

The species dominance structure of planktonic rotifers in the ponds in Polesie National Park was diverse (Fig. 2). *Keratella cochlearis* was predominated in Głęboki Pond, where it constituted 84% of the total rotifer population. The percentage of other species was much lower (*Brachionus angularis* – 7%, *Keratella quadrata* – 4% and *Asplanchna priodonta* – 2%. In Perkoz Pond *Keratella cochlearis* accounted for 74% of the total rotifer numbers, *Polyarthra vulgaris* – 10% and *Keratella quadrata* – 6%. In Stujłos Pond 68% of the rotifer numbers, was represented by *Conochilus unicornis* which is a typical case of mesotrophy. The percentage of the remaining species was low: *Keratella cochlearis* – 11%, *Polyarthra vulgaris* – 6%, *Keratella quadrata* – 5% and *Brachionus forficula* – 2%. In Mała Zośka Pond two rotifer species *Polyarthra vulgaris* i *Keratella cochlearis tecta* were predominated and accounted for 37 and 29% of the total

Table 2. Rotifer population abundance in Polesie National Park ponds – spring and autumn 1997 (indiv./l)

No.	Species	Pond		Stujlos		Perkoz		Graniczny		Głęboki		Mała Zośka	
		Month		VI	IX	VI	IX	VI	IX	VI	IX	VI	IX
1	<i>Asplanchna priodonta</i>					4				1	10	7	
2	<i>Brachionus angularis</i>						2			4	31	1	
3	<i>Brachionus angularis</i>				3								
4	<i>Brachionus rubens</i>							1					
5	<i>Brachionus quadridentatus</i>						4						
6	<i>Conochilus unicornis</i>		126			2							
7	<i>Cohurella adriatica</i>		1	1								2	1
8	<i>Elosa spinifera</i>					2				6		2	
9	<i>Euchlanis dilatata</i>		1										
10	<i>Filinia longiseta</i>				1		2						
11	<i>Keratella cochlearis</i>		17	2		148	67			13	450	2	1
12	<i>Keratella cochlearis tecta</i>					1	2			1	4	7	18
13	<i>Keratella quadrata</i>		10			17		1	1	18	2	2	
14	<i>Lecane closterocerca</i>									1			
15	<i>Lecane creanta</i>							2					
16	<i>Lecane lunaris</i>								2			2	1
17	<i>Lecane quadridentata</i>		2			1							
18	<i>lepadella rhomboides</i>							2					
19	<i>Platylas leloupi</i>					1							
20	<i>Platylas patulus</i>		1										
21	<i>Polyarthra vulgaris</i>		4	8		3	27	1	2		3	10	21
22	<i>Synchaeta pectinata</i>		1										
23	<i>Testudinella patina</i>		1					1					
24	<i>Trichocerca rattus</i>					2	1						
25	<i>Trichocerca similis</i>							2	1			3	
26	<i>Trichotria tetractis</i>							1	1				1
	Number of species		10	5		10	7	8	5	7	6	10	6
	Abundance		164	15		181	105	11	7	44	500	308	43

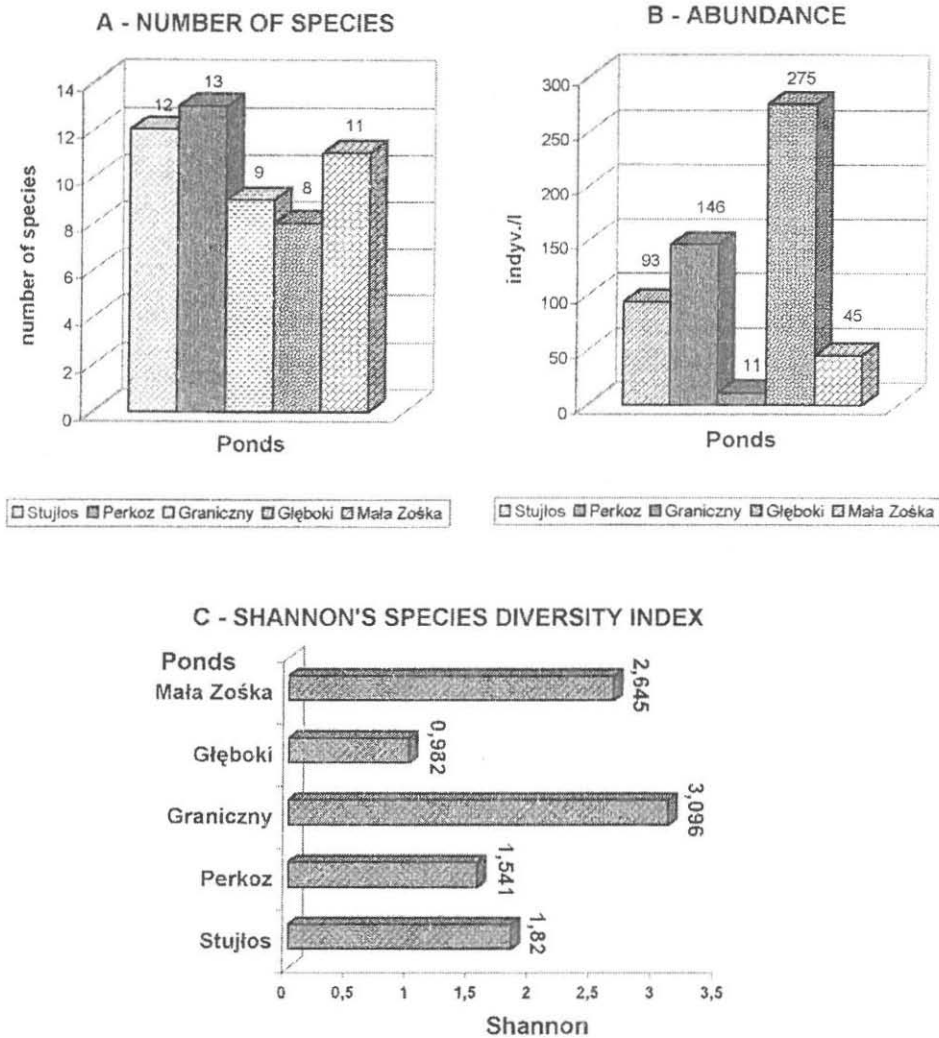


Fig. 1. Qualitative and quantitative composition of rotifers in Polesie National Park ponds – 1997

population, respectively. The remaining species, *Asplanchna priodonta*, *Keratella cochlearis*, *Trichocerca similis*, *Lecane lunaris* and *Colurella adriatica* accounted for as little as 4 to 9% of rotifer population 2). The character of rotifer species dominance in Graniczny Pond was considerably different from that of other ponds. Two species, *Polyarthra vulgaris* and *Trichocerca similis*, predominated the community, being 19 and 18% of the total numbers, respectively. Several other species, *Brachionus rubens*, *Lecane crenata*, *Lepadella rhomboides*, *Testudinella*

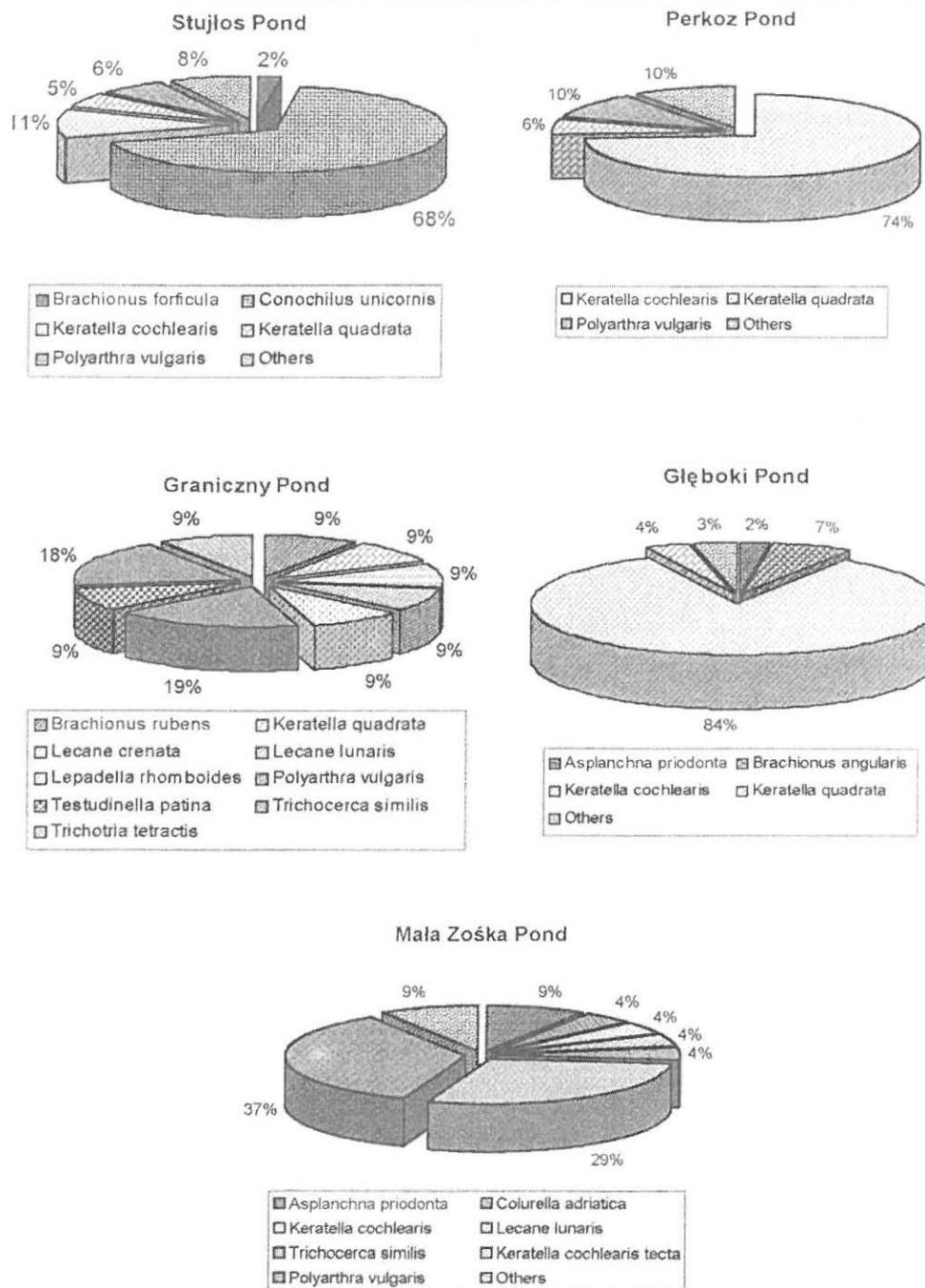


Fig. 2. Rotifer species dominance structure in Polesie National Park ponds – 1997

patina, *Trichocerca similis*, *Lecane lunaris* i *Keratella quadrata*, each of which accounted for 9% of the total population did not play a significant role in its quantitative structure.

CONCLUSIONS

The study of planktonic rotifers in Poleski National Park point out to the fact that:

1. Species diversity index was the highest in Graniczny Pond, whereas its lower values were observed in Mała Zośka, Stujłos i Perkoz and the lowest in Głęboki Pond.

2. Rotifer number were the highest in Głęboki Pond, a little lower in Perkoz, Stujłoz, Mała Zośka and, finally, Graniczny Pond had the least numerous rotifer population.

3. *Keratella cochlearis* was the dominant species in all Ponds, which is a typical case of eutrophy. The only exceptions were the rotifer populations of Stujłos Pond, predominated by *Conochilus unicornis* rotifers, which is believed to be a bioindicator of mesotrophy and Graniczny Pond, whose rotifer population was dominated by two species, *Polyarthra vulgaris* and *Trichocerca similis*, which we typical of eutrophy.

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WROTKI (*ROTATORIA*) PLANKTONOWE STAWÓW POLESKIEGO PARKU NARODOWEGO

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S t r e s z c z e n i e. Badania wrotków planktonowych prowadzono w czerwcu i wrześniu 1997 roku w sześciu stawach: Stujłoz, Perkoz, Graniczny, Głęboki i Mała Zośka położonych na terenie Poleskiego Parku Narodowego. Określano w nich strukturę jakościową i ilościową wrotków (*Rotatoria*). Stwierdzono 26 gatunków wrotków, w tym w stawie Perkoz 13 gatunków, w stawie Stujłoz 12 gatunków, w stawie Mała Zośka 11 gatunków, w stawie Granicznym 9 gatunków i w stawie Głęboki 8 gatunków. Wskaźnik różnorodności gatunkowej najwyższy był w stawie Granicznym, niższe jego wartości obserwowano w stawach: Mała Zośka, Stujłoz i Perkoz, a najniższe w stawie Głębokim. Najwyższe liczebności wrotków notowano w Stawie Głębokim, nieco mniejsze w stawach: Perkoz, Stujłoz, Mała Zośka i najmniejsze w stawie Granicznym. We wszystkich stawach dominowały gatunki preferujące wody żyzne: *Keratella cochlearis*, *Keratella cochlearis tecta*, *Polyarthra vulgaris*, *Trichocerca similis*, a w stawie Stujłoz zdecydowanie dominowała *Conochilus unicornis*.

S ł o w a k l u c z o w e: stawy, wrotki planktonowe, Poleski Park Narodowy