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NET ZOOPLANKTON DIVERSIFICATION ABOVE AND BELOW THE „KASZTANOWO" HYDRO-ELECTRIC POWER STATION ON THE PASŁĘKA RIVER°

Urszula Szymańska*, Alina Bonar**

Katedra Prawa Środowiskowego
Uniwersytet Warmińsko-Mazurski, ul. Żołnierska 14c, 10-561 Olsztyn
e-mail: *urszula.szymanska@uwm.edu.pl, **alina.bonar@uwm.edu.pl

Summary. A study concerning zooplankton composition in the Pasłęka River within the influence range of the „Kasztanowo" hydro-electric power station was carried out in the years 2001-2003. It was found that *Rotifera* dominated the zooplankton aggregates. Distribution of zooplankton organisms and biodiversity indicators were diversified due the river engineering sites (above the power station – slower flowing water, below the power station – faster flowing water), as well as due to different average monthly precipitation levels in successive years of the study.

Key words: zooplankton, river, dam, biodiversity

INTRODUCTION

The Pasłęka River is one of the longest rivers in the Warmia-Mazury Lakeland. Its forestry and farming basin is diversified with respect to the landscape and is characterized by richness of flora and fauna. Following this, the river was granted protection as a reserve. Because of surface drop fluctuation, which amounts from 5 to 0.4% [Czachorowski 1988], the Pasłęka is a river of differentiated water flow speed and the bed width in the studied area was about 20 m. In the upper part of the course, it is a typical lowland river, meandering among fields and flowing through several lakes. In the lower part, however, it takes on mountain river features. The small Kasztanowo hydroelectric power station (built in 1902 and restored in 1989 after fifty years out of service) is located on this part of the river. The development of a dam weir on the river and the turbine of the power station have caused the hydrological conditions to undergo a change. Above the power station there is a 2.5 m deep „stagnation pool" with a very slow water flow. Below the power station, however, the river is shallow (up to a few dozen centimetres), and the speed of the flowing water is much higher.

The aim of the study was to determine the influence of the Pasłęka River development on the distribution of the zooplankton above and below the power station by means of determination of its quantitative and qualitative composition and biodiversity indicators.

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STUDY AREA, MATERIAL AND METHODS

A study of the zooplankton was carried out in the years 2001-2003 at sits situated within distances up to 1 km above (sites: 0, 0A, 1, 2, 4) and up to 1.1 km below the power station „Kasztanowo" on the Pasłęka River (sites: 5, 6, 7). The zooplankton samples were taken once a month, mainly near the shore zone, according to metodology in this type of research [Wiśniewski *et al.* 1985]. Altogether, 282 samples were taken and analysed. In order to determine the systematic representation and quantity of organisms composing the zooplankton from the sample, which was again condensed to the volume of 20 ml, 1 ml was taken and placed in the plankton chamber in order to determine the organisms under a Nikon microscope (with the magnitude of 5×, 10×, 20× and 40×) and the specimens belonging to particular taxons were counted. This was repeated three times and the average values were then calculated. Based on this, the quantity of the specimens in 1 dm^3 of water was calculated according to the methodology proposed by Starmach [1955]. Biodiversity of the plankton was determined using three indicators: Margalef's, Menhinick's and Shannon-Wiener's [Kawecka and Eloranda 1994, Krebs 1996].

RESULTS AND DISCUSSION

Quantity and structure of the zooplankton from the Pasłęka River in the years 2001-2003

In the zooplankton group, the following were determined: *Rotifera*, *Protozoa* (mainly armoured forms *Testacea*), *Cladocera* and *Copepoda*. The largest quantities of the zooplankton were determined in 2003 – from 114 ind. · dm^{-3} below the power station (site no. 5) to 182 ind. · dm^{-3} just before the power station (site no. 4), and the smallest in 2002 (from 48 ind. · dm^{-3} just after the power station (site no. 5) to 91 ind. · dm^{-3} above the power station (sites no. 0, 0A, 1). *Rotifera* dominated in all sites in the years 2001-2003 – from 41 ind. · dm^{-3} above the power station (sites no. 0, 0A, 1) in 2002, to 166 ind. · dm^{-3} – before the power station (site no. 4) in 2003 (Tab. 1).

The share of the *Rotifera* was the smallest above the power station (sites no. 0, 0A, 1) in the all years of the study and ranged from 44.76 to 79.17% (Tab. 1). However, it was more increased before the power station (site no. 4), and it was higher than after the power station (site no. 5, Tab. 1). In the river Pasłęka the second group with respect to quantity was the *Protozoa*, which were present in the largest quantity in 2002 – from 23.15% after the power station (site no. 5) to 41.30% above the power station (sites no. 0, 0A, 1, Tab. 1).

Domination of the *Rotifera* was also ascertained by Burger *et al.* [2002] in the Waikato River, where it amounted to 85% of the population; Szlauer and Szlauer [1994] in the Odra River, where it amounted to 90%.

The quantities of the zooplankton changed over the years depending on the annual precipitation and, in consequence, on the quantity of water flowing through the Pasłęka River. It was found that with an increased volume of water in the river, the quantity of the zooplankton organisms per 1 dm^3 decreased; particularly the *Rotifera*. The quantities of the *Protozoa, Cladocera* and *Copepoda* maintained the same level regardless of the precipitation level in a given year. The average monthly precipitation levels (from March

to November) in the basin of the Pasłęka River were respectively: in 2002 – 69 mm, 2001 – 55 mm, 2003 – 12 mm.

Table 1. Composition of the net zooplankton in the Pasłęka River in the years 2001-2003
Tabela 1. Skład zooplanktonu sieciowego w rzece Pasłęce w latach 2001-2003

Taxons Taksony	Above the power station sites no. 0, 0A, 1 Powyżej elektrowni stanowiska nr		Before the power station site no. 4 Przed elektrownią stanowisko nr		After the power station site no. 5 Za elektrownią stanowisko nr		Below the power station sites no. 6, 7 Poniżej elektrowni stanowiska nr	
	ind. · dm^{-3}	%	ind. · dm^{-3}	%	ind. · dm^{-3}	%	ind. · dm^{-3}	%
2002 – high water								
Protozoa	37	41.30	16	27.69	11	23.15	16	28.41
Rotifera	41	44.76	34	59.50	28	58.55	30	53.06
Cladocera	8	8.54	6	9.81	6	11.97	8	13.81
Copepoda	5	5.40	2	3.00	3	6.33	3	4.71
Total	91	100.00	57	100.00	48	100.00	56	100.00
2001 – mean water								
Protozoa	18	21.08	8	9.11	8	7.70	9	9.65
Rotifera	54	64.27	75	81.60	88	84.60	79	83.80
Cladocera	9	10.04	6	6.35	4	4.14	4	3.96
Copepoda	4	4.61	3	2.94	4	3.56	2	2.59
Total	85	100.00	91	100.00	104	100.00	94	100.00
2003 – low water								
Protozoa	29	18.10	12	6.61	8	6.86	9	5.28
Rotifera	126	79.17	166	91.56	103	90.22	164	93.12
Cladocera	2	1.16	1	0.38	1	1.04	0	0.25
Copepoda	3	1.57	3	1.45	2	1.88	2	1.35
Total	160	100.00	182	100.00	114	100.00	177	100.00

Before the power station there is a „stagnation pool" where water is collected from the upper part of the river and stays for a long time and there are differentiated habitats. Due to this, conditions favourable for gathering and developing zooplankton organisms are created. After the power station, the fast water current helps the *Rotifera* and other zooplankton organisms to be carried for longer distances and this is the reason for their regular contribution. An exception was the year 2003, which could have been connected with the smaller volume of water in the river. Such conditions were favourable for the higher fluctuations of the zooplankton quantities.

Diversification of the zooplankton species in the Pasłęka River in the years 2001-2003

The largest number of the zooplankton species was registered in the „stagnation pool" above the power station in sites 0, 0A, and 1 in case of all taxons. The largest quantity of species were represented by *Rotifera* (68), *Protozoa* (29), *Cladocera* (18) and *Copepoda* (8) – Tab. 2.

Table 2. Number of the zooplankton taxons in particular taxons in the Pasłęka River in the years 2001-2003

Tabela 2. Liczba taksonów zooplanktonu sicciowego w poszczególnych grupach taksonomicznych w rzece Pasłęce w latach 2001-2003

Taxons Taksony	Above the power station sites no. 0, 0A, 1 Powyżej elektrowni stanowiska nr	Before the power station site no. 4 Przed elektrownią stanowisko nr	After the power station site no. 5 Za elektrownią stanowisko nr	Below the power station sites no. 6, 7 Poniżej elektrowni stanowiska nr
Protozoa	29	17	14	19
Rotifera	68	44	37	55
Cladocera	18	9	6	9
Copepoda	8	5	6	8
Total	123	75	63	91

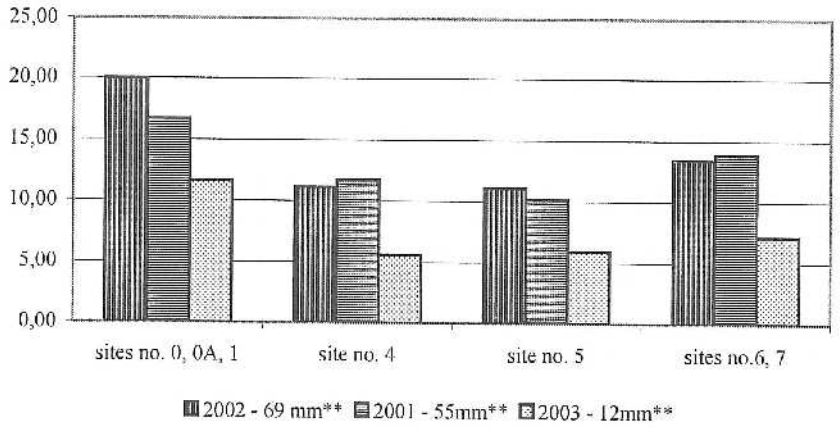

Fig. 1. Biodiversity coefficients for the zooplankton in the Pasłęka River in the years 2001-2003 (acc. to Margalef) – down along the river; the indicator calculated for all the species totally, **the average monthly precipitation levels

Rys. 1. Współczynniki różnorodności ekologicznej dla zooplanktonu sicciowego w rzece Pasłęce w latach 2001-2003 (wg Margalefa) – wzdłuż biegu rzeki; wskaźnik obliczono dla wszystkich gatunków łącznie, **średnie opady miesięczne

A similar structure of zooplankton species was observed in the upper Vistula River and its tributaries near the city of Cracow, where 95 species of *Rotifera*, 15 – *Cladocera* and 4 – *Copepoda* [Żurek 2000] were discovered, but in comparison to the Pasłęka River, there were many more species of rotifers. In the typically lowland part of the Odra River, however, near the city of Szczecin, the number of species was lower, respectively 30, 16 and 10 [Szlauer and Szlauer 1994], while in the lowland Wieprz River, only 15 species of *Rotifera* [Radwan *et al.* 2000] were registered. Comparing the above results, in the upper parts of the rivers, where the speed of water flow is higher a significant number of species can be expected (especially the *Rotifera*). Pawłowski [1956] identified as many as 228 species of rotifers in the Grabia River (a tributary of the upper Warta River). The author, however, underlines that it required very detailed studies and precise

equipment. The slower water flow in the lowland parts of rivers favours sedimentation of organic matter and increasing trophy. At the same time, the influx of the waste water (sometimes toxic) could have had a degrading influence on the zooplankton organisms. However, an increase in the concentration of biogenes, with the constant mixing and oxygenation of waters may have been a stimulating factor for the development of many zooplankton organisms [Szlauer and Szlauer 1994].

Species differences were discovered between the groups of sites below and above the power station within all taxons. Both common species and those which occurred only in one of the compared sites were registered. The most significant differences were shown for the sites above the power station (0, 0A, 1) and below it (6, 7), while above the power station the number of species was much higher. This may be due to the slower flow speed in the river, the gathering of a larger mass of water and the greater diversity of habitats following more intensive processes of organic and inorganic matter accumulation in this part of the river as well as the development of vascular plants in the stagnation pools near the shore where the water flow is slower.

Zooplankton biodiversity in the Pasłęka River in the years 2001-2003

The biodiversity indicators calculated according to the formulas given by Margalef, Menhinick and Shannona-Wiener were higher above the power plant in case of the *Ro-*

Table 3. Biodiversity coefficients for the zooplankton in the Pasłęka River in the years 2001-2003 (acc. to Margalef, Menhinnick and Shannon-Wiener)
Tabela 3. Współczynniki bioróżnorodności dla zooplanktonu sieciowego w rzece Pasłęce w latach 2001-2003 (wg Margalef'a, Menhinnicka i Shannona)

Taxons Taksony	Above the power station sites no. 0, 0A, 1, 4 Powyżej elektrowni stanowiska nr	Below the power station sites no. 5, 6, 7 Poniżej elektrowni stanowiska nr
acc. to Margalef		
Protozoa	6.722	5.726
Rotifera	18.486	14.844
Cladocera	4.411	3.393
Copepoda	1.470	1.484
Total* – Razem	31.090	25.447
acc. to Menhinick		
Protozoa	3.054	2.649
Rotifera	8.235	6.718
Cladocera	2.036	1.609
Copepoda	0.740	0.757
Total* – Razem	14.065	11.733
acc. to Shannon-Wiener		
Protozoa	0.876	0.553
Rotifera	1.320	1.144
Cladocera	0.202	0.149
Copepoda	0.133	0.115
Total* – Razem	2.531	1.962

*The indicator calculated for all the species totally
Wskaźnik obliczono dla wszystkich gatunków łącznie

tifera, *Protozoa* and *Cladocera*. The highest biodiversity was discovered for the *Rotifera*, and the lowest for the *Copepoda* (Tab. 3).

The biodiversity coefficient according to Margalef, calculated for all the organisms in each particular year, reached the lowest values – from 5.57 to 11.63 – in 2003 (low water), and the highest values – from 11.09 to 19.97 in 2002 (high water) (Fig. 1, Tab. 4). This suggests that together with the increasing mass of water flowing through the river, both the number of species and the density of the zooplankton organisms increase. This suggests that a greater mass of water favours the development of zooplankton organisms, which are carried in from the river basin, for example, more detritus, resting spores, eggs, etc. Thus, it cannot be excluded that during intensive rains and increased water influx from the river basin, allochtonic zooplankton also flows down with them into the river.

Table 4. Biodiversity coefficients for the zooplankton in the Pasłęka River in the years 2001, 2002 and 2003 (acc. to Margalef)

Tabela 4. Współczynniki różnorodności ekologicznej dla zooplanktonu sieciowego w rzece Pasłęce w latach 2001, 2002 i 2003 (wg Margalefa)

Taxons Taksony	Above the power station sites no. 0, 0A, 1 Powyżej elektrowni stanowiska nr	Before the power station site no. 4 Przed elektrownią stanowisko nr	After the power station site no. 5 Za elektrownią stanowisko nr	Below the power station sites no. 6, 7 Poniżej elektrowni stanowiska nr
2002 – high water				
Protozoa	6.07	4.71	4.97	4.69
Rotifera	13.77	6.52	6.88	8.84
Cladocera	4.40	2.90	1.14	1.95
Copepoda	3.15	1.86	2.68	4.10
Total* – Razem	19.97	11.12	11.09	13.40
2001 – mean water				
Protozoa	3.81	3.30	2.89	3.62
Rotifera	10.26	7.89	6.71	9.61
Cladocera	6.07	2.84	2.75	4.55
Copepoda	4.40	4.05	3.07	4.47
Total* – Razem	16.67	11.74	10.13	13.85
2003 – low water				
Protozoa	5.95	3.62	3.40	4.93
Rotifera	5.58	2.74	3.24	3.33
Cladocera	9.77	1.53	11.45	1.62
Copepoda	3.26	1.03	1.31	4.59
Total* – Razem	11.63	5.57	5.91	7.15

*The indicator calculated for all the species totally
Wskaźnik obliczono dla wszystkich gatunków łącznie

The highest biodiversity indicator values were observed above the power station (sites no. 0, 0A, 1, Tab. 4). Along the river, the overall biodiversity indicator for all the organisms decreased, but later in the sites below the power station (6, 7) again reached higher values (Fig. 1, Tab. 4). The structure of the diversity of the *Rotifera* (Tab. 4) also

had a similar pattern. In 2003 (low water), however, the highest biodiversity indicators values were observed for the *Cladocera* – from 1.53 to 11.45. Exceptions were the sites 4 (above the power station) and 6, 7 (below the power station), where the highest biodiversity indicators were registered for the *Protozoa* – from 3.62 to 4.93 (Tab. 4).

Summarizing, the conclusion can be drawn that the development of the Pasłęka River has contributed to the creation of different conditions above and below the power station, as reflected in the diversified quantity, structure and biodiversity of the zooplankton organisms.

CONCLUSIONS

Based on the obtained results, the following was found:

1. In the group of zooplankton, the presence of the *Rotifera, Protozoa*, *Cladocera* and *Copepoda* was observed. With respect to the population size, *Rotifera* dominated in all the sites in the years 2001-2003, both above and below the power station.

2. The quantities of zooplankton have changed over the years depending on the annual precipitation total and, in consequence, on the volume of the water flowing through the Pasłęka River. It was also discovered that the quantity of the zooplankton organisms per 1 dm^3 decreased with an increase in the water volume in the river.

3. The largest number of species was discovered within the *Rotifera*.

4. The biodiversity coefficient according to Margalef calculated for all the species reached the lowest values – from 5.57 to 11.63 – in 2003 (low water), and the highest values – from 11.09 to 19.97 in 2002 (high water).

5. The highest biodiversity indicator values and the highest number of zooplankton species were observed above the power station.

Appendix

List of net zooplankton taxons in the Pasłęka River in the years 2001-2003
Lista gatunków zooplanktonu sieciowego stwierdzonych w Rzece Pasłęce w latach 2001-2003

1*	2*	Taxons – Taksony	Above the power station sites no 0, 0A, 1 Powyżej elektrowni stanowiska nr	Below the power station sites no 6, 7 Poniżej elektrowni stanowiska nr	2*
		Protozoa			
1	1	*Arcella vulgaris Ehrenberg 1830*	+++	++	1
2	2	*Codonella cratera (Leidy)*	++	++	2
3	3	*Cyphoderia ampulla Ehrenberg*	++	++	3
4	4	*Centropyxis constricta (Ehrenberg 1843) „spinosa"*	++	++	4
5	5	*Centropyxis aculeata Ehrenberg 1832 „aculeata"*	++	+	5
6	6	*Difflugia oblonga Ehrenberg 1832 „tenuis"*	+	+	6
7	7	*Difflugia oblonga Ehrenberg 1832 „lanceolata"*	+	+	7
8	8	*Difflugia limnethica*	+	+	8
9	9	*Vorticella sp.*	+	+	9
10	10	*Euglypha brachiata Leidy*	+	+	10
11	11	*Cucurbitella tricuspis (Carter 1856)*	+	+	11
12	12	*Actinosphaerium eichhorni Ehrb*	+	+	12
13	13	*Difflugia protaeiformis Lamarck 1816 „claviformis"*	+	+	13
14	14	*Difflugia urceolata Carter 1864 „elongata"*	+	+	14
15	15	*Difflugia protaeiformis Lamarck 1816 „acuminata"*	+	+	15
16	16	*Difflugia lobostoma Leidy*	+	+	16
17	17	*Difflugia corona Wallich 1864*	+	+	17
18	18	*Chilodonella spp.*	+	-	
19	19	*Difflugia oblonga Erenberg 1832 „glans"*	+	-	
20	20	*Ciliophora*	+	-	
21	21	*Difflugia protaeiformis Lamarck 1816 „amphoralis"*	+	-	
22	22	*Centropyxis constricta (Ehrenberg 1843) „constricta"*	+	-	
23	23	*Difflugia urceolata Carter 1864 „urceolata"*	+	-	
24	24	*Centropyxis aërophila Deflandre*	+	-	
25	25	*Wailesiella eboracensis Wailes*	+	-	
26	26	*Pontigulasia vas Leidy*	+	-	
27	27	*Phacodinium metchnikoffi (Certes)*	+	-	
28	28	*Nebella collaris Ehrenberg 1848*	+	-	
29	29	*Lagenodifflugia vas (Leidy 1874)*	+	-	
30	30	*Tokophrya lemnarum (Stein)*	-	+	18
31	31	*Paraeuglypha recticulata Penard*	-	+	19
		Rotifera			
32	1	*Keratella cochlearis cochlearis Gosse f. tecta*	+++	+++	1
33	2	*Polyarthra vulgaris Carlin*	++	++	2
34	3	*Keratella quadrata quadrata* (O.F.M.)	++	++	3
35	4	*Asplanchna priodonta (Gosse)*	++	++	4
36	5	*Brachionus angularis Gosse*	++	++	5
37	6	*Colurella uncinata uncinata* (O.F.M.)	++	+	6
38	7	*Euchlanis dilatata dilatata Ehrb.*	++	+	7
39	8	*Trichocerca similis* (Wierzn.)	++	+	8
40	9	*Kellicottia longispina longispina* (Kellicott)	+	+	9

41	10	*Keratella cochlearis var. hispida* (Lauterborn)	+	+	10
42	11	*Cephalodella gibba* (Ehrb.)	+	+	11
43	12	*Keratella cochlearis cochlearis Gosse f. typica*	+	+	12
44	13	*Notholca foliacea* (Ehrb.)	+	+	13
45	14	*Ascomorpha ecaudalis Perty*	+	+	14
46	15	*Filinia longiseta var. limnetica* (Zach.)	+	+	15
47	16	*Notholca squamula* (Müller)	+	+	16
48	17	*Brachionus calyciflorus* Pallas	+	+	17
49	18	*Lecane closterocerca* (Schmarda)	+	+	18
50	19	*Lepadella patella f. similis* (Lucks.)	+	+	19
51	20	*Filinia longiseta longiseta* (Ehrb.)	+	+	20
52	21	*Lecane luna* (O.F.M.)	+	+	21
53	22	*Anureopsis fissa* Gosse	+	+	22
54	23	*Testudinella patina patina* (Herman)	+	+	23
55	24	*Lecane hamata* (Donner)	+	+	24
56	25	*Encentrum putorius* Wulf.	+	+	25
57	26	*Notholca acuminata* (Ehrb.)	+	+	26
58	27	*Filinia terminalis* (Plate)	+	+	27
59	28	*Brachionus urceolaris urceolaris* O.F.M.	+	+	28
60	29	*Lepadella patella patella* (O.F.M.)	+	+	29
61	30	*Asplanchna priodonta var. henrietta* (Langhans)	+	+	30
62	31	*Lecane lunaris lunaris* (Ehrb.)	+	+	31
63	32	*Trichotria pocillum* (O.F.M.)	+	+	32
64	33	*Euchlanis incisa incisa* (Carlin)	+	+	33
65	34	*Keratella cochlearis var. hispida f. pustulata* (Lauterborn)	+	+	34
66	35	*Trichocerca capucina* (Wierzn.&Zach.)	+	+	35
67	36	*Cephalodella incila* Wulf.	+	+	36
68	37	*Lecane lunaris f. perplexa* (Ahlstr.)	+	+	37
69	38	*Lepadella patella f. oblonga* (Ehrb.)	+	+	38
70	39	*Lecane bulla bulla* (Gosse)	+	+	39
71	40	*Euchlanis dilatata f. lucksiana* (Hauer)	+	-	
72	41	*Trichocerca rutlhneri* Donn.	+	-	
73	42	*Lecane flexilis* (Gosse)	+	-	
74	43	*Lecane furcata var. rugosa* (Harr.)	+	-	
75	44	*Notommata codonella* H.&M.	+	-	
76	45	*Keratella hiemalis* Carlin	+	-	
77	46	*Lecane lamellata thalera* (H.&M.)	+	-	
78	47	*Mytilina ventralis var. mucronata* (Ehrb.)	+	-	
79	48	*Brachionus urceolaris nilsoni* (Ahlstron)	+	-	
80	49	*Lecane lunaris var. constricta* (Murr.)	+	-	
81	50	*Notholca labis labis* (Gosse)	+	-	
82	51	*Microcodides chlaena* (Gosse)	+	-	
83	52	*Proalidea tentaculatus tentaculatus de* Beauchamp	+	-	
84	53	*Scaridium longicaudum* (O.F.M.)	+	-	
85	54	*Monomata arndti* Rem.	+	-	
86	55	*Brachionus calyciflorus Pallas var. dorcas* (Gosse)	+	-	
87	56	*Wierzejskiella marina* Rem.	+	-	
88	57	*Lindia tecusa* (H.&M.)	+	-	
89	58	*Colurella anodonta* Carlin	+	-	
90	59	*Lecane nodosa* Hauer	+	-	
91	60	*Testudinella truncata truncata* (Gosse)	+	-	
92	61	*Cephalodella arcuata*	+	-	
93	62	*Trichocerca similis grandis* (Hauer)	+	-	
94	63	*Euchlanis alata* Vor.	+	-	

95	64	*Colurella obtusa f. clansa* (Hauer)	+	-	
96	65	*Lecane nana* (Murray)	+	-	
97	66	*Epiphanes macrourus* (Barrois&Daday)	+	-	
98	67	*Keratella serrulata f. curvicornis* (Rylov)	+	-	
99	68	*Lecane physalis* Wulf	+	-	
100	69	*Proales reinhardti* (Ehrb.)	-	+	40
101	70	*Asplanchnella sieboldi f. cruciformis*	-	+	41
102	71	*Lecane submagna de* Ridder	-	+	42
103	72	*Trichocerca bicristata* (Gosse)	-	+	43
104	73	*Euchlanis proxima* Myers	-	+	44
105	74	*Trichocerca stylata* (Gosse)	-	+	45
106	75	*Proales parasita* (Ehrb.)	-	+	46
107	76	*Anureopsis navicula navicula* (Rousselet)	-	+	47
108	77	*Trichocerca heterodactyla* (Tschug.)	-	+	48
109	78	*Keratella testudo* (Ehrb.)	-	+	49
110	79	*Asplanchnopus multiceps* (Schr.)	-	+	50
111	80	*Brachionus diversicornis diversicornis* (Daday)	-	+	51
112	81	*Lecane pygmea* (Dad.)	-	+	52
113	82	*Trichocerca gracilis* (Tessin)	-	+	53
114	83	*Colurella uncinata f. biscupidata* (Ehrb.)	-	+	54
115	84	*Hexarthra intermedia intermedia* Wiszniewski	-	+	55
		Cladocera			
116	1	*Bosmina longirostris* (O. F. Müller)	++	++	1
117	2	*Alonella nana* (Baird)	+	+	2
118	3	*Camptocercus rectirostris* Schoedler	+	+	3
119	4	*Alona affinis* Leydig	+	+	4
120	5	*Alona quadrangularis* (O. F. Müller)	+	+	5
121	6	*Daphnia cucullata* Sars	+	+	6
122	7	*Chydorus ovalis* Kurz	+	+	7
123	8	*Acroperus harpae* (Baird)	+	-	
124	9	*Oxynurella tenuicaudis* (Sars)	+	-	
125	10	*Bosmina longispina* Leydig	+	-	
126	11	*Chydorus sphaericus* (O. F. Müller)	+	-	
127	12	*Simocephalus vetulus* (O. F. Müller)	+	-	
128	13	*Chydorus latus Sars*	+	-	
129	14	*Peracantha truncata* (O. F. Müller)	+	-	
130	15	*Bosmina obtunostris* Sars	+	-	
131	16	*Graptoleberis testudinaria* (Fischer)	+	-	
132	17	*Iliocryptus agilis* Kurz	+	-	
133	18	*Eurycercus lamellatus* (O. F. Müller)	+	-	
134	19	*Alona weltneri* Keilhack	-	+	8
135	20	*Pleuroxus uncinatus* Baird	-	+	9
		Copepoda			
136	1	*Nauplius Cyclopoida*	++	++	1
137	2	*Harpacticoida*	+	+	2
138	3	*Mesocyclops leuckarti*	+	+	3
139	4	*Copepodit Cyclopoida*	+	+	4
140	5	*Nauplius Calanoida*	+	+	5
141	6	*Cyclopoida n. det.*	+	+	6
142	7	*Copepodit Mesocyclops leuckati*	+	+	7
143	8	*Copepodit Harpacticoida*	+	-	
144	9	*Cyclops abyssorum*	-	+	8

*Number of taxons totaly – Liczba taksonów ogółem

**Number of taxons in particular group – Liczba taksonów w poszczególnych jednostkach

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ZRÓŻNICOWANIE ZOOPLANKTONU SIECIOWEGO POWYŻEJ I PONIŻEJ ELEKTROWNI WODNEJ „KASZTANOWO" NA RZECE PASŁĘCE

Streszczenie: Badania dotyczące składu zooplanktonu sieciowego rzeki Pasłęki w obrębie oddziaływania elektrowni wodnej „Kasztanowo" prowadzono w latach 2001-2003. Stwierdzono, iż w zespołach zooplanktonu dominowały *Rotifera*. Rozmieszczenie organizmów zooplanktonowych i wskaźniki różnorodności ekologicznej były zróżnicowane w wyniku zabudowy rzeki (powyżej elektrowni – wody o mniejszej prędkości przepływu, poniżej elektrowni – wody o zwiększonej prędkości przepływu) oraz w wyniku różnych średnich opadów miesięcznych w kolejnych latach objętych badaniami.

Key words: zooplankton, rzeka, zapora, różnorodność ekologiczna