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**Fauna denna zbiornika zaporowego w Tresnej
na rzece Sole w 1966 roku**

Bottom fauna in the Tresna dam reservoir in 1966

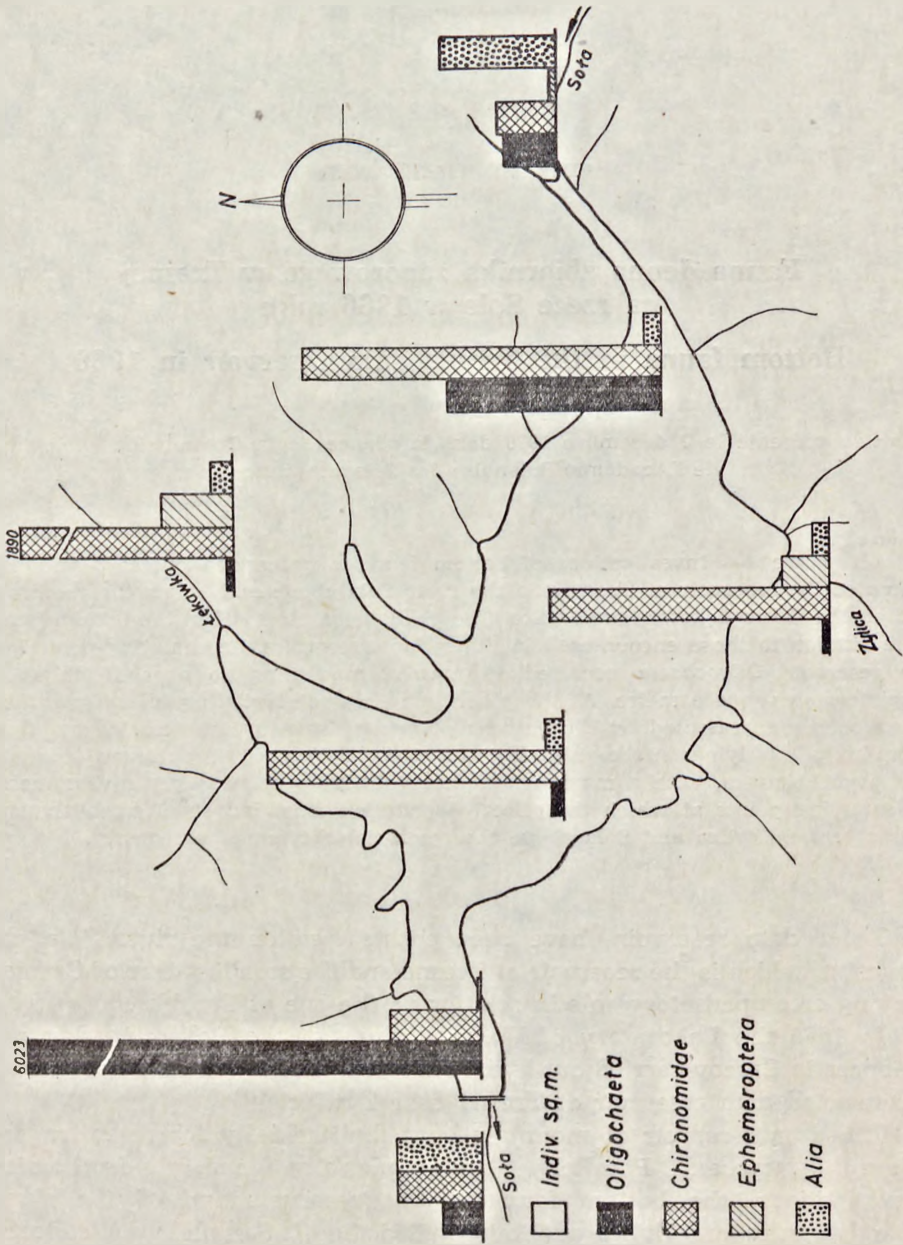
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Abstract — Investigations of bottom fauna were carried out at 3 sampling points of the reservoir at Tresna, on the river Sola above and below the reservoir, and on the rivers Łękawka and Żylica. The phenomena observed in the bottom fauna were similar to those encountered in other dam reservoirs. At sampling point I of the reservoir *Oligochaeta* occurred in masses, amounting to over 15 thousand specimens per square metre. At the other sampling points *Chiromonidae* prevailed, being chiefly represented by *Chironomus plumosus*. Investigations carried out from sampling points lying on the rivers showed that the richest bottom fauna occurs in the river Łękawka, with a maximum number of 3225 specimens per square metre. At sampling points at which the effect of pollution from industrial establishments was observed (Żylica and Sola above the reservoir) the fauna was poorer.

Three dam reservoirs have been constructed on the river Sola, the largest of which is the reservoir at Tresna and the smallest that of Czaniec, playing a compensatory role in relation to the one at Porąbka.

In 1966 the Laboratory of Water Biology of the Polish Academy of Sciences in Cracov carried out hydrobiological investigations on the newly constructed dam reservoir at Tresna near Żywiec.

This is a reservoir of mountain type, built chiefly for retention and energy purposes. Parallely with plankton and hydrochemical investigations, the bottom fauna of the reservoir and of the rivers Sola, Łękawka, and Żylica was investigated (fig. 1). Samples were collected on five dates: on 30th June, 17th August, 14th September, 10th October, and 19th December (on this last date only in the rivers). Three sampling points were set up in the reservoir: point I near the dam, point II in the



Ryc. 1. Rozmieszczenie fauny dennej w zbiorniku zaporowym w Tresnej w 1966 roku
 Fig. 1. Distribution of bottom fauna in the Tresna reservoir in 1966

middle zone of the reservoir, and point III in its upper part. Samples from the bank were taken only once (sampling point IIa). In the reservoir they were collected (twice) with an Eckman Birge dredge with an aperture of 225 sq.cm, and in the rivers with a dredge of 400 sq.cm. After being washed in a net with 0.5 mm mesh, the material was kept in 4 per cent formalin. The numbers of animals found were calculated in relation to a superficies of 1 sq.m.

Characteristics of the bottom fauna of the reservoir

Sampling point I was situated before the dam, where the depth amounted to 12.5—13 m, and the bottom was covered with a thin layer of mud. The samples were collected four times. The greatest number of animals were noted in October and June. Their chief component were *Oligochaeta* (fig. 1), whose number amounted to more than 15 thousand specimens per square metre. *Chironomidae* occurred more numerously in August and September. This group was 94 per cent represented by *Chironomus*, whereas the other species, *Cryptochironomus defectus* and *Polypedilum nubeculosum*, occurred only sporadically.

Sampling point II was situated in the middle part of the reservoir, where the depth amounted to up to 6 m and the bottom was covered with the remains of decaying plants. From August to October similar quantities of animals were found on the bottom, amounting to 1200 specimens/sq.m. The bottom fauna in June was very scarce (264 specimens/sq.m.) and consisted of a few leeches (*Helobdella stagnalis*), (Table I), and *Oligochaeta*. In the other periods almost the only component of bottom fauna were *Chironomidae*, among which *Chironomus plumosus* represented 91 per cent.

Sampling point III was situated in the upper part of the reservoir, where the depth amounted to 2 m, and the bottom was covered with mud and decaying plants. The richest fauna occurred at this point in June. It chiefly consisted of *Chironomidae* (2552 specimens/sq.m), (Table II), whose most often encountered representative was *Chironomus plumosus*. *Microtendipes chloris* was fairly common, occurring, however, in small numbers. Of the other species worthy of note were *Polypedilum nubeculosum*, *Cryptochironomus defectus*, and *Chironomus thummi*. *Oligochaeta* occurred most numerously in September, at that time reaching 1584 specimens per square metre. In the remaining periods they were found in only small numbers. The other species occurring at this sampling point were *Nematodes* and *Asellus aquaticus*, which was encountered once.

In June samples were also collected from the bank of the reservoir at the sampling point marked IIa which had a very scarce bottom fauna (572 specimens/sq.m), among which *Oligochaeta* prevailed (484 specimens/sq.m).

Tabela I. Skład procentowy poszczególnych gatunków fauny dennej zbiornika zaporowego w Treśniej
 Table I. Percentage of individual species in the bottom fauna of the Treśnia reservoir

Stanowiska Sampling points	Soła 1	I	II	III	IIa	Soła 2	Ląkawska	Żylica
Fauna denna - ogółem (osob./m ²) Bottom fauna - total (indiv./sq.m)	650	6711	990	1778	572	735	2200	1050
Ephemeroptera (osob./m ²) (indiv./sq.m)						20	220	145
<i>Ecdyonurus lateralis</i> Curt.							12	40
- <i>venosus</i> F.							52	51
<i>Ephemera</i> <i>ignita</i> Poda.							5	
<i>Baetis</i> <i>rhodani</i> Pict.							6	12
<i>Caenis</i> <i>moesta</i> Bgtes.						100	21	3
<i>Rhitrogena</i> <i>semicolorata</i> Curt.							20	5
<i>Habroleptoidea</i> <i>modesta</i> Hag.								9
<i>Paraleptophlebia</i> <i>cincta</i> Etn.							4	
Trichoptera (osob./m ²) (indiv./sq.m)						20	30	30
<i>Chaetopteryx</i> <i>villosa</i> Fabr.							76	
<i>Rhyacophila</i> sp.							14	
- <i>nubila</i> Zett.								10
<i>Polycentropus</i> <i>flavomaculatus</i> Pict.						100		12
<i>Hydropsyche</i> sp.							10	60
<i>Psychomyia</i> <i>pusilla</i> Fabr.								18
Hirudinea (osob./m ²) (indiv./sq.m)	10		22			10		
<i>Haemopis</i> <i>sanguisuga</i> (L.)						20		
<i>Helobdella</i> <i>stagnalis</i> (L.)			100			60		
<i>Erpobdella</i> <i>octoculata</i> (L.)	40							
<i>Glossiphonia</i> <i>heteroclita</i> (L.)	60					20		
Plecoptera (osob./m ²) (indiv./sq.m)							20	5
<i>Leuctra</i> <i>lerna</i> Kmp.							20	
<i>Chloroperla</i> <i>neglecta</i> Rost.								100
<i>Perlodes</i> <i>microcephala</i> Pict.							80	
Mollusca (osob./m ²) (indiv./sq.m)			22			260	5	5
<i>Ancylus</i> <i>fluviatilis</i> MULL.						62	100	100
<i>Radix</i> <i>limosa</i> L.						24		
- <i>auricularia</i> L.						6		
<i>Lymnaea</i> <i>stagnalis</i> L.						4		
<i>Pisidium</i> <i>canertanum</i> Poli.			100			4		
Isopoda (osob./m ²) (indiv./sq.m)				15				
<i>Asellus</i> <i>aquaticus</i> L.				100				
Hydrozoa (osob./m ²) (indiv./sq.m)	5							
<i>Hydra</i> <i>oligactis</i> (Pall.)	100							

The investigations showed that the bottom fauna of the reservoir was actually composed only of *Oligochaeta* and *Chironomidae*, the latter group being represented almost exclusively by *Chironomus plumosus*. Other species were found at sampling point III, but they always occurred only in small numbers. The large number of *Chironomidae* in August and

September and the small one in June and October at sampling point I may be evidence of the occurrence in the last mentioned months of flights of imagines. The first organisms to settle on the bottom were *Chironomidae* and *Oligochaeta*. On account of the character of the environment (mud), *Oligochaeta* prevailed at sampling point I and *Chironomidae* at point II. At sampling point III *Chironomus thummi* occurred in some periods. This

Tabela II. Skład procentowy poszczególnych gatunków *Chironomidae* w zbiorniku zaporowym Treśna
Table II. Percentage of individual species in the *Chironomidae* of the Treśna reservoir

Stanowiska Sampling points	Soła 1	I	II	III	IIa	Soła 2	Łękawka	Zylica
<i>Chironomidae</i> (osob./m ²) (Indiv./sq.m)	252	277	902	1084	88	190	1890	840
<i>Ablabezia</i> ex grege <i>conilia</i> L.						2		2
<i>Pelopia punctipennis</i> (Meig.)								1
<i>Procladius</i> Skuse			2			18	2	14
<i>Procladius olivacea</i> (Meig.)						10		
<i>Diaanea prolongata</i> (Kieff.)						2		
<i>Eucricotopus</i> ex grege <i>sylvestris</i> (Fabr.)	3						12	
<i>Trichocladius algarum</i> Kieff.				1		16	28	32
- <i>biformis</i> Edw.							2	
<i>Psectrocladius</i> ex grege <i>psilopterus</i> (Kieff.)	20			1		20	35	42
<i>Rheotocladius saxicola</i> (Kieff.)							6	1
<i>Eukiefferiella atrofasciata</i> G.							3	2
- <i>similis</i> Goetgh.	10						1	
- <i>longicalcar</i> Kieff.	23						5	1
- <i>clypeata</i> (Kieff.)							4	5
<i>Endochironomus</i> ex grege <i>tendens</i> F.						1		
<i>Chironomus</i> f.l. <i>plumosus</i> (L.)	22	94	91	63	100	31		
- f.l. <i>thummi</i> (Kieff.)				4				
<i>Cryptochironomus</i> ex grege <i>defectus</i> E.		2	3	4				
- ex grege <i>conjugens</i> (Kieff.)				1				
<i>Microtendipes</i> ex grege <i>obloria</i> (Mg.)				14				
<i>Polypedilum</i> ex grege <i>nubeculosum</i> (Mg.)	12	4	4	7				
- ex grege <i>convictum</i> (Walk.)	10							
- ex grege <i>pedestre</i> (Meig.)				4				
<i>Tanytarsus</i> ex grege <i>gregarius</i> E.							1	
<i>Chironomidae</i> non. det.				1			1	

species is characteristic of polluted waters, withstanding in this environment even strong rotting processes. It also occurred in the Goczałkowice reservoir in the first years after its construction (Kyselá 1956), but later ceased to be encountered there (Krzyszczak 1961). This species was also reported by Kownacki from the dam reservoir at Porąbka (Kownacki 1963).

The bottom fauna of the rivers Soła, Łękawka and Zylica

Parallely with investigations on the reservoir, investigations of bottom fauna were carried out on the river Soła above the reservoir (Soła 2), on the right-bank affluent Łękawka, the left-bank Zylica, and twice on the river Soła below the reservoir (Soła 1).

The bottom fauna of the river Soła below the reservoir was poor, being represented chiefly by *Chironomidae*, and especially by *Psectrocladius psilopterus*, *Eukiefferiella longicalcar*, and *Chironomus plumosus*. Apart from *Chironomidae*, *Hirudinea* also occurred, chiefly *Glossiphonia heteroclita*, *Oligochaeta*, and in one case *Hydra oligactis*.

A richer bottom fauna was found in the river Soła above the reservoir. *Oligochaeta* prevailed here. *Mollusca* and *Chironomidae* occurred in smaller numbers. Among the former, most often encountered were *Ancylus fluviatilis* and *Radix limosa*, and among *Chironomidae* *Chironomus plumosus*, *Psectrocladius psilopterus*, *Procladius*, and *Trichocladus algarum*. The other groups of bottom fauna, especially *Hirudinea*, *Trichoptera*, and *Ephemeroptera* occurred in small numbers.

The river Łękawka had the richest bottom fauna, amounting to more than 3000 specimens per square metre. *Chironomidae* occurred in the greatest numbers with a maximum of 2800 specimens/sq.m in September and a minimum of 1275 specimens/sq.m in December. Most numerous in this group were *Psectrocladius psilopterus*, *Trichocladus algarum*, and *Eucricotopus sylvestris*. *Ephemeroptera*, especially *Ecdyonurus venosus*, *Rhitrogena semicolorata*, and *Caenis moesta* occurred in great numbers. *Trichoptera*, *Plecoptera*, and *Oligochaeta* were less numerous. Among *Trichoptera* *Chaetopteryx villosa* was chiefly encountered, and among *Plecoptera* *Leuctra inermis*.

In the river Żylica the fauna was poorer. Similarly as at the preceding sampling point, *Chironomidae* prevailed here, being chiefly represented by *Psectrocladius psilopterus* and *Trichocladus algarum*. Apart from these, *Ephemeroptera*, especially *Ecdyonurus lateralis* and *Trichoptera* (*Hydropsyche* sp.) played a certain part. Of the family *Chironomidae* species of the subfamily *Orthocladinae* prevailed at all sampling points, in particular *Psectrocladius psilopterus*, *Trichocladus algarum*, and *Eucricotopus sylvestris*. They were collected chiefly among algae overgrowing stones in the water. In the river Soła above the reservoir, as well as in Łękawka and Żylica, there also occurred species of the genus *Eukiefferiella*, particularly *E. longicalcar*. Snails, mainly *Ancylus fluviatilis* and *Radix limosa*, were also found in great numbers in the Soła and fairly often *Hirudinea*, especially *Helobdella stagnalis* and *Haemopsis sanguisuga*. The first mentioned species often occurs in polluted waters and the second in various water bodies. *Ephemeroptera* and *Trichoptera* occurred in fairly large numbers at all investigated sampling points on the rivers, *Plecoptera* being encountered only in Żylica and Łękawka. The specific composition was typical of small submontane rivers. Łękawka had the richest bottom fauna with typical representatives of potamofauna, whereas both in the Soła and Żylica the detrimental effect of pollution from numerous industrial establishments (tannery, brewery) situated in this region appeared distinctly.

Conclusions

Investigations carried out in the dam reservoir at Tresna in the first year of its existence showed an occurrence of the phenomena commonly observed in every newly constructed dam reservoir. The first organisms to appear in the bottom fauna were *Chironomidae* larvae and *Oligochaeta*. In the deepest place, on a muddy bottom, *Oligochaeta* prevailed. At sampling point II, where the bottom was covered with decaying plants, *Chironomidae* were the most numerous. A more diversified specific composition, especially of *Chironomidae* larvae, was observed at sampling point III lying on the old river-bed of the Soła within the upper part of the reservoir, where the development of new conditions in the freshly constructed reservoir had not such a marked influence on the formation of a new community of bottom fauna. The effect of sewage flowing into the Soła could also be observed at this point, being mainly demonstrated by the occurrence of the species *Chironomus thummi*, typical of strongly polluted waters. The phenomena observed, such as the predominance of *Chironomidae* and *Oligochaeta* in almost the whole reservoir, the violent increase in the numbers of *Oligochaeta* in some places, and the predominance of *Chironomus plumosus* in the *Chironomidae* groups, show that as concerns the development of bottom fauna the picture of this reservoir is similar to that of other investigated dam reservoirs, such as, e.g., the Goczałkowice reservoir, the Moravian reservoir in Czechoslovakia (Zelinka 1962), and some dam reservoirs in the USSR (Morduchaj-Boltovskij 1961).

STRESZCZENIE

W 1966 roku przeprowadzono badania hydrobiologiczne zbiornika zaporowego w Tresnej na rzece Sole, w pierwszym roku jego istnienia. Równolegle z innymi badaniami prowadzono badania fauny dennej na trzech stanowiskach zbiornika oraz na rzece Sole, poniżej i powyżej zbiornika, na rzece Łękawce i Żylicy. Na stanowisku I położonym przy tamie, z głębokością do 13 m, obserwowano zdecydowaną przewagę *Oligochaeta*, podczas gdy *Chironomidae* liczniej występowały jedynie w sierpniu i wrześniu. W tej ostatniej grupie dominantem był *Chironomus plumosus*. Na stanowisku II, uboższym w faunę denną, przeważały *Chironomidae* z maksymalną ilością 1408 okazów/m². Bardziej urozmaiconą faunę denną posiadało stanowisko III, położone w obrębie cofki zbiornika, gdzie obok *Chironomus plumosus* występowały też *Microtendipes ohloris*, *Polypedilum nubeculosum*, *Cryptochironomus defectus* i *Chironomus thummi*. Skład ilościowy i jakościowy fauny dennej obserwowany w tym roku podobny był do innych badanych zbiorników zaporowych. Na rzece Sole poniżej zbiornika fauna denna była uboga i reprezentowana głównie przez *Chironomidae*. Nieco bogatsza była fauna na Sole powyżej zbiornika, z maksymalną ilością (1450 okazów/m²) w październiku i minimalną (325 okazów/m²) w czerwcu. Najbogatsza fauna denna występowała w rzece Łękawce z maksymalną ilością (3225 okazów/m²) we wrześniu i minimalną (1450 okazów/m²) w czerwcu. W rzece Żylicy średnia ilość fauny dennej wynosiła 1050 okazów/m². Rzeka ta podobnie jak

i Soła narażona jest na częste zanieczyszczenie przez liczne zakłady przemysłowe (garbarnia, browar). Skład gatunkowy był typowy dla tego rodzaju zbiorników. Wśród *Chironamidae* przeważały gatunki podrodziny *Orthoclaadiinae*, zwłaszcza *Psectrocladius psilopterus* i *Trichocladius algarum*. Wśród *Ephemeroptera* przeważały *Ecdyonurus venosus* i *E. lateralis*, natomiast wśród *Trichoptera*, *Chaetopteryx villosa* i *Hydropsyche* sp.

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