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**Wstępne badania małży zbiornika zaporowego
w Goczałkowicach**

**Preliminary investigations on bivalves *Bivalvia*
of the dam reservoir at Goczałkowice**

Wpłynęło 16 stycznia 1975 r.

Abstract — The paper contains preliminary observations on bivalves of the family *Unionidae* in the dam reservoir at Goczałkowice. Taking advantage of the lowered water level and emergence of about 800 ha of the bottom of the reservoir in 1972, investigations on bivalves (*Bivalvia*) were carried out there as well as in the inundated part of the reservoir. The qualitative composition, number, and biomass were determined and biometric measurements aiming at determination of the age structure of these organisms were performed. It was estimated that there were 106 million bivalves of 5038 tons biomass in the reservoir. At present the dominating species is *Unio pictorum*, found mainly in the northern part of the reservoir. The second as to number is *Anodonta cygnea*, occurring in the southern zone and in deeper parts of the central zone.

Molluscs are one of the most important constituents of the aquatic biocoenosis. The present elaboration is concerned with the group of bivalves in the dam reservoir at Goczałkowice.

The problem of the influence of fresh water bivalves on their environment has already been discussed many times (Berwald 1971, Stańczykowska 1968, Widuto, Kompowski 1968). In dam reservoirs they play a specially important part as, owing to the fact of being filtrating organisms, they cause purification of the water from mineral and organic suspension, hence their presence is advantageous. The shells of bivalves are, moreover, a convenient place for settlement by algae, especially diatoms, to which a separate elaboration (Strzelecki — manuscript) has been devoted. An increased development of

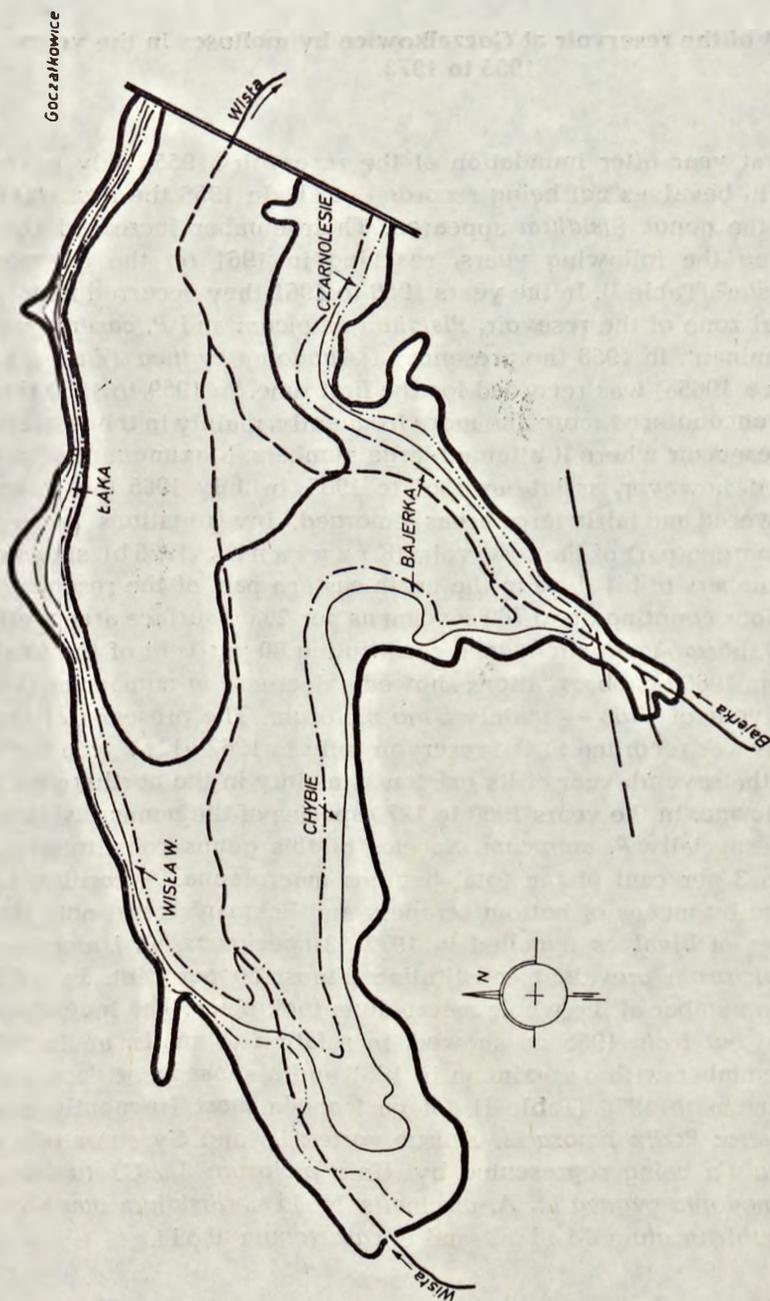
bivalves causes an accumulation of great amounts of organic matter in the reservoir. At the same time their nymphal stages, constantly increasing in number, cause a greater danger of fish glochidiosis and also a more intensive invasion of sporocysts and cercaria — dangerous parasites in the flesh of fish (C a s t a g n o l o 1972).

Aiming at a detailed investigation of the problem of the role of bivalves in the dam reservoir at Goczałkowice, the author found it necessary above all to determine accurately their qualitative and quantitative composition, their biomass, including shells, and by means of essential biometric measurements also their age structure.

Investigations on malacofauna are mostly carried out in dam reservoirs concomitantly with those of the whole macrobenthos. For these investigations bottom samplers and hand nets are used for sampling, which methods, however, fail when large bivalves are concerned. In 1972 detailed investigations on bivalves were performed in the dam reservoir at Goczałkowice in those parts which emerged after the water level had been lowered and also in the inundated parts using the diving method. The latter method had been used previously for investigations on bivalves in Lake Gopło (W i ś n i e w s k i 1973).

The dam reservoir at Goczałkowice (fig. 1) was built in the years 1950 to 1955, the first inundation having taken place in July 1955. The reservoir is situated on the course of the River Vistula, its surface area being 30 km², maximum length 12 km, and maximum width 3 to 4 km. It is a reservoir of lowland type, shallow, the maximum depth being 12 m and mean depth 5 m. In this reservoir all possible hydrobiological investigations have been carried out including also benthos macrofauna (K r z y ż a n e k 1965, 1966a, 1966b, 1970, 1973, Z a ć w i l i c h o w s k a 1965a, 1965b, 1965c).

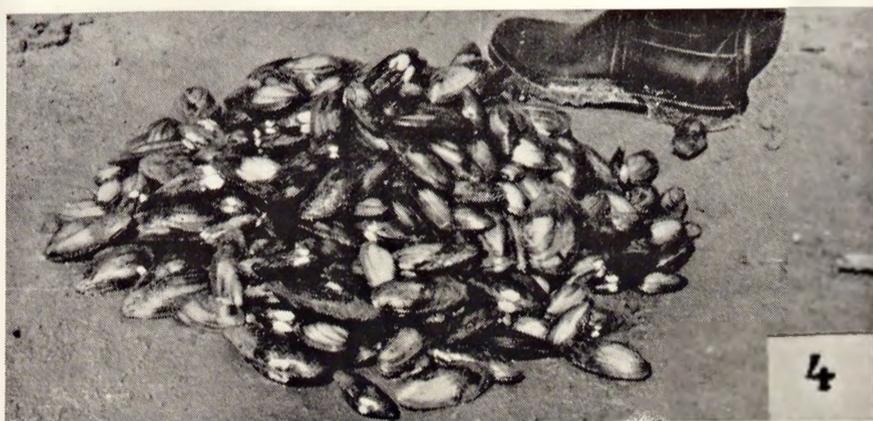
One of the main features distinguishing dam reservoirs from lakes are constant variations in water level. In such a type of reservoir as that at Goczałkowice, designed only for retention and pipe water supply, variations in water level are small. With regard to its character (shallow with large areas of shoal) even small variations in water level cause the emergence of fairly large bottom areas. In this reservoir the water level was twice lowered by almost 2 m in 1965 and 1972, on account of maintenance work on the technical equipment of the dam. In consequence, a bottom area of about 800 ha emerged. In this area great amounts of bivalves of the family *Unionidae* were found.



Ryc. 1. Plan zbiornika zaporowego w Goczałkowicach
 Fig. 1. Plan of the dam reservoir at Goczałkowice

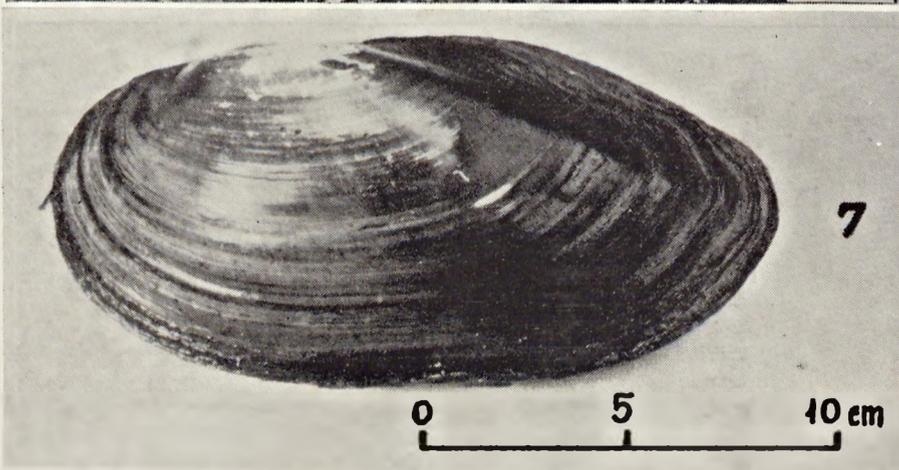
Settlement of the reservoir at Goczałkowice by molluscs in the years 1955 to 1973

In the first year after inundation of the reservoir (1955) only snails occurred in it, bevalves not being recorded at all. In 1956 the first small bivalves of the genus *Pisidium* appeared. Their number increased constantly during the following years, reaching in 1961 on the average 66 specimens/m² (Table I). In the years 1958 to 1961 they occurred mainly in the central zone of the reservoir, *Pisidium amnicum* and *P. casertanum* being predominant. In 1958 the presence of *Anodonta cygnea* (Z a ć w i - l i c h o w s k a 1965a) was recorded for the first time. In 1959 to 1960 this species was encountered more and more frequently, mainly in the western part of the reservoir where it attained large numbers. Maximum numbers were reached, however, as late as 1961 to 1965. In July 1965 the water level was lowered and fairly large areas emerged. Investigations carried out in the emerged part of the reservoir (K r z y ż a n e k 1966 b) showed maximum numbers of bivalves in the north-eastern part of the reservoir. Agglomerations counting up to 780 specimens per 20 m² surface area were encountered there, *Anodonta cygnea* constituting 80 per cent of the total number. From 1966 on, observations showed a decrease in number of this species in favour of *Unio* — mainly *Unio pictorum*. The presence of the latter species was recorded in the reservoir only in 1962 (K r z y ż a n e k 1970) i.e. in the seventh year of its existence, mainly in the northern part of its littoral zone. In the years 1960 to 1970 species of the genus *Pisidium* dominated, especially *P. amnicum*. Species of this genus constituted in places up to 3 per cent of the total benthos macrofauna. According to data obtained by means of bottom scrapers and Eckman's hand nets the mean number of bivalves equalled in 1972 53 specimens/m², *Unionidae* with *Unio pictorum* prevalent constituting almost 50 per cent. In 1975 a decrease in number of the whole macrofauna took place. The investigations carried out from 1955 on showed, in relation to snails, an initial increase in number with a maximum in 1961 and a subsequent decrease with a minimum in 1970 (Table I). Of gastropoda most frequently encountered were: *Radix limosa* L., *Anisus vortex* L., and *Gyraulus albus* Müll., *Bivalvia* being represented by *Unio pictorum* L., *U. tumidus* Philps., *Anodonta cygnea* L., *A. piscinalis* Nills., *Pisidium amnicum* Müll., *P. subtruncatum* Malm., and *P. casertanum* Poli.



Ryc. 2—4. 2 — Fragment wynurzonego dna południowo-wschodniej części zbiornika; 3 — fragment wynurzonego dna północno-wschodniej części zbiornika; 4 — małże zebrane z powierzchni 6 m² w południowo-zachodniej części wynurzonego dna zbiornika

Figs 2—4. 2 — Fragment of the emergent bottom of the south-eastern part of the reservoir; 3 — fragment of the emergent bottom of the north-eastern part of the reservoir; 4 — bivalves collected from the area of 6 m² in the south-western part of the emergent bottom of the reservoir



Ryc. 5—7. 5—6: Fragmenty wynurzonego dna południowo-zachodniej części zbiornika z licznymi szczątkami małży; 7 — *Anodonta cygnea* największy okaz znaleziony w zbiorniku

Figs 5—7. 5—6: Fragments of the emergent bottom of the south-western part of the reservoir with remains of bivalves; 7 — *Anodonta cygnea* the largest specimen found in the reservoir at Goczałkowice

Tabela I. Zmiany liczebności mięczaków sibiordnika Goczałkowice w latach 1961-1973 oraz biomasy w latach 1971-1973
 Table I. Changes in the number of molluscs of the Goczałkowice reservoir in 1961-1973 and biomass in 1971-1973

rok Year	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Kategoria Kategorie total	Liczba okazów/m ² Number of specimens/m ²	233	157	191	84	56	45	28	42	35	26	44	30
	Biomasa Biomass dag/m ²	-	-	-	-	-	-	-	-	-	-	43.23	71.66
Kategoria Kategorie	Liczba okazów/m ² Number of specimens/m ²	157	103	131	52	36	29	22	20	15	6	8	17
	Biomasa Biomass dag/m ²	-	-	-	-	-	-	-	-	-	-	0.03	0.59
Kategoria Kategorie	Liczba okazów/m ² Number of specimens/m ²	66	54	60	32	20	16	16	22	19	20	36	53
	Biomasa Biomass dag/m ²	-	-	-	-	-	-	-	-	-	-	45.20	70.97

Bivalves of the emergent zone of the reservoir in 1972

Since the water level of the reservoir was lowered for the second time in July 1972, the opportunity again arose to undertake investigations both in the emerged area and, by means of the diving method, also in the part under water. Letting out of the water began on 1st July to a level of 258.29 m above sea level, attaining the minimum level 252.00 m above sea level on 11th August. In the later days of August a high flood wave caused a sudden rise in the water level to the ordinate 255.81 m above sea level. This high water level lasted for almost 2 weeks, by the end of August the water level again being lowered to permit the maintenance work to be completed. In consequence of the lowered water level a bottom area of almost 800 ha emerged. Taking advantage of this situation, detailed investigations on bivalves were carried out. The whole area was divided into 30 stations which seemed most representative with regard to the investigated organisms. At each station several sites, each 3 m² in area, were appointed on which analysis of quantitative relations, number and biomass was carried out. At the same time, biometric measurements, with regard to the length, width, and thickness of the shell were performed. These measurements permitted the age of the examined specimens to be determined. The age was determined comparatively, several series of measurements of length and animal increase being made in laboratory conditions. In analysing particular parts of the reservoir the largest number and biomass of bivalves were found in its northern part with a surface area of 200 ha (Table II). The mean number equalled there 2 to 10 species/m². The bottom area was, however, not uniformly settled. Next to places where the mean number reached up to 100 specimens/m² there were places with a number not exceeding a few specimens or even completely free of these animals.

The whole northern part was divided into 3 areas. The first one, with a surface area of 30 ha, covered the emergent bottom in the north eastern part where the mean number was 2 specimens/m². The main constituent here was *Unio pictorum* (58 per cent) the others being: *Anodonta cygnea* (10 per cent), *Unio tumidus* (35 per cent), and *Anodonta piscinalis* (2 per cent). The maximum number was recorded in the central part of the northern part of the reservoir where *Unio pictorum* constituted 60 per cent. The maximum number was recorded in the central part of the average number was here 2 to 10 specimens/m² with 33.25 dag/m² of biomass. On the whole 60 ha area 6300 thousand specimens with biomass of 119.5 tons were determined. The third part, covering the north western part of the reservoir, had a mean number of 9 specimens/m² with a fairly large biomass, reaching even up to 84 dag/m², caused by larger specimens

Tablica II. Rozkład osobniczy sialki na wyznaczonej drodze dna zbiornika Beckathovice w 1972 r.
 Table II. Distribution of bivalves on the marked part of the bottom of the Beckathovice reservoir in 1972

Strefa Zone	Stacja Station	Powierzchnia Area w ha in ha	Średnia gęstość Mean number of specimens/m ²	Średnia biomasa biomasy biomass kg/m ²	Całkowita ilość Total number of specimens	Całkowita biomasa Total biomass in tons	Prezentacja sialki Species content in percentage
Północna - North	I. PORT	30	2	15,00	600 000	45	Ulat pictorana 50 - tursicus 30 Anodonta cygnea 10 - planorbis 2
	II. IAKA	60	11	35,25	2 100 000	199,5	Ulat pictorana 60 - tursicus 25 Anodonta cygnea 5
	III. WIEŻA WIELKA	90	9	84,00	7 560 000	770	Ulat pictorana 70 - tursicus 24 Anodonta cygnea 6
	IV. CHYBIE	200	0,2	1,00	400 000	20	Ulat pictorana 6 - tursicus 4 Anodonta cygnea 80 - planorbis 10
	V. BAZENKA	150	0,3	1,70	450 000	15	Ulat pictorana 20 - tursicus 20 Anodonta cygnea 50 - planorbis 10
	VI. CZARNOLESIE	70	3	9,40	2 100 000	65	Ulat pictorana 10 - tursicus 5 Anodonta cygnea 80 - planorbis 5

of *Unio pictorum*. Calculating for the whole 90 ha surface area, 8060 thousand specimens and 770 tons of biomass were obtained.

The bottom of the whole southern emergent zone, of muddy character with large areas overgrown with aquatic vegetation was settled in a different way. This part of the emergent zone of the reservoir can be divided into three separate parts. The south-eastern part was characterized by a fairly great density of bivalves. There were, however, areas completely deprived of them. The mean number was 3 specimens/m² of 9.4 dag biomass which, calculated for the area of 70 ha, gives 2100 thousand specimens with 65 tons of biomass. Species of the genus *Unio*, *Unio pictorum* together with *Unio tumidus*, prevailed in the valley of the

Tabela III. Analiza populacji małży strefy wynurzonej zbiornika Goczalkowice w 1972 r.

Table III. Analysis of the bivalve population of the emergent zone in the Goczalkowice reservoir in 1972

Gatunek Species	Klasa długości Length class w cm	Średnie wymiary małża Mean dimensions of bivalve			Średni ciężar z muszlą Mean weight with shell w mg	Ilość analizowanych okazów Number of analysed specimens
		długość length	szerość width	grubość thickness		
<i>Unio pictorum</i>	1 - 3	2.3	1.1	0.8	2 240	30
	3 - 6	5.1	2.2	1.6	10 830	156
	6 - 9	7.7	3.2	2.3	33 700	652
	9	9.8	4.0	2.9	65 970	52
<i>Unio tumidus</i>	1 - 3	2.6	1.4	0.9	2 630	56
	3 - 6	4.8	2.4	1.6	11 470	254
	6 - 9	7.7	2.5	2.5	39 440	142
	9	brak lack				
<i>Anodonta cygnea</i>	1 - 4	3.5	2.3	1.0	3 780	14
	4 - 8	6.8	4.1	2.2	28 700	396
	8 - 12	11.5	5.6	3.6	117 900	432
	12	12.3	6.7	3.6	131 850	4

Bajerka stream which falls into the reservoir from its southern part. These species, however were not numerous. The whole area of 150 ha was settled by 450 thousand specimens with 15 tons of biomass, the mean number being 0.3 specimens/m² and mean biomass 1.0 dag/m². There were still fewer bivalves on the remaining 200 ha of the area in which 400 thousand bivalves with 20 tons of biomass were counted.

The whole emergent area of the reservoir was settled by 18 million bivalves with 1114 tons of biomass, with a mean number of 4 specimens/m² and mean biomass of 24 dag (figs 2—7).

In order to determine the age structure of bivalves of the emergent part of the reservoir, biometric measurements of 2380 specimens were performed. *Unio pictorum* constituted 37 per cent, *Anodonta cygnea* 36 per cent, *Unio tumidus* 25 per cent and *Anodonta piscinalis* 2 per cent. The results of a detailed analysis are given in Table III in which *A. pisci-*

nalis are not taken into consideration because of their small number in the investigated environment. *Unio pictorum* showed the maximum number in the length class 6 to 9 cm, supposedly at the age of 6 to 8 years. *Unio tumidus* appeared in length classes 3 to 6 and 6 to 9 cm in almost identical numbers in age classes 4 to 5 and 6 to 8 years respectively. In this species no specimens over 9 cm were found. The maximum number of *Anodonta cygnea* was in class 8 to 12 cm and 4 to 8 cm the supposed age being 8 to 10 years and 4 to 8 years respectively. Only two specimens over 12 cm were found there.

Bivalves of the inundated zone of the reservoir in 1972

The investigations on bivalves of the inundated zone of the reservoir were carried out by the diving method. Samples were taken from the bottom of a 1 m² surface area in four sections of the reservoir at the depths: 2, 4, 6, and over 6 metres, at the last one no bivalves of the family *Unionidae* being caught. The results obtained at particular depths were calculated for a corresponding area of the reservoir. Calculations of the surface area of the reservoir at various depths were made on the basis

Tabela IV. Rozmieszczenie małży w zalanej strefie zbiornika w 1972 r.

Table IV. Distribution of bivalves in the inundated zone of the reservoir in 1972

Strefa - Zone	Głębokość poboru prób Depth of sampling	Liczebność okazów/ m ² Number of specimens/ /m ²	Biomasa Biomass dag/m ²	Liczebność na całkowitej pow. dna w milionach okazów Number on the total area of the bottom in millions of specimens	Biomasa na całkowitej pow. dna w tonach Biomass on the total area of the bottom in tons	Procentowy skład gatunkowy Species content in percentage
Północna-North	2	16	39.4	22.5	551	<i>Unio pictorum</i> 60 - <i>tumidus</i> 25 <i>Anodonta cygnea</i> 10 - <i>pisicualis</i> 5
	4	6	29.5	18	886	<i>Unio pictorum</i> 55 - <i>tumidus</i> 15 <i>Anodonta cygnea</i> 30
	6	2	13.4	3	201	<i>Unio pictorum</i> 45 <i>Anodonta cygnea</i> 55
Południowa-South	2	6	30	15	780	<i>Unio pictorum</i> 30 - <i>tumidus</i> 20 <i>Anodonta cygnea</i> 50
	4	1.5	8.5	7.5	425	<i>Unio pictorum</i> 20 <i>Anodonta cygnea</i> 80
	6	5	36	15	1080	<i>Unio pictorum</i> 10 <i>Anodonta cygnea</i> 90

of tables of parameters of changes of area in dependence on damming level (Politechnika Śląska, 1956). Knowing the actual level of the reservoir and the area corresponding to it, the area could be calculated also for various depths. Calculations of distribution of bivalves were made for the emergent area and for the area under water at intervals to 2 m, to 4 m, to 6 m depth, and over 6 m depth of the reservoir.

The maximum number was obtained for the reservoir area to the depth of 2 m (22.5 million specimens — Table IV) in the northern part of the reservoir, despite the fact that the area for this depth was only 140 ha. The biomass was rather small, equalling 55 tons, since a large percentage was constituted by *Unio*. With the increase in depth the number of *Anodonta cygnea* also increased, hence in spite of a smaller number the biomass was higher. In the northern part of the reservoir of this zone the biomass was 886 tons at a depth of 4 m.

Summing all the obtained results, both of the emergent and inundated zones, 106 million bivalves were found in the reservoir, this giving 38 thousand per 1 ha and 4 specimens for the area of 1 m². The biomass of the whole reservoir was 5038 tons, from 1 ha 1.8 tons, from 1 m² 20 dag.

In order to identify the age structure of bivalves of the family *Unionidae* occurring at particular depths of the reservoir, biometric measurements were performed each time. From the depths of 2 m, 4 m, and 6 m 424, 210, and 126 bivalves respectively were measured. At the depth of 2 m the most numerous species was *Unio pictorum*, mainly in the second length class (Table V), specimens of less than 3 cm not being encountered at all. Also *Unio tumidus* had the largest number of specimens in the second length class. *Anodonta cygnea* had, on the other hand, more specimens in the third class. Specimens of the first length class were completely absent, whereas the second class was represented only by two specimens. In the case of *Unio pictorum* from the depth of 4 m an increase in the number of specimens of smaller body sizes (Table V) was found. *Unio tumidus* occurred in small numbers and the majority of specimens belonged to the second class of length. *Anodonta cygnea*, similarly as at the depth of 2 m, occurred in the majority in the third length class, but in smaller numbers. At the depth of 6 m (Table V) *Unio tumidus* was completely absent. The prevailing species here was *Anodonta cygnea*, mainly in the third length class, whereas *Unio pictorum* occurred in considerably decreased numbers in the second and third length classes. Observations made in 1972 confirm the results of previously carried out investigations on benthos macrofauna as far as the succession of occurrence of dominating species of bivalves is concerned—from small specimens of the genus *Pisidium* through *Anodonta cygnea* to *Unio pictorum*. Maximum numbers of *Anodonta cygnea*, *Unio pictorum*, and *Unio tumidus* occurred as specimens in the age classes 8 to 10, 6 to 8, and 4 to 6 years respectively.

Tabela V. Analiza populacji małży w zalanej strefie zbiornika w 1972 r. Pobory prób na różnych głębokościach

Table V. Analysis of population of bivalves in the inundated zone of the reservoir in 1972. Sampling at different depths

Gatunek Species	Klasa długości Length class w cm in cm	Głębokość - Depth 2 m				Głębokość - Depth 4 m				Głębokość - Depth 6 m						
		Średnie wymiary małża Mean dimensions of bivalve			Średni ciężar z muszlą Mean weight with shell w mg in mg	Ileść analizowanych okazów Number of analysed specimens	Średnie wymiary małża Mean dimensions of bivalve			Średni ciężar z muszlą Mean weight with shell w mg in mg	Ileść analizowanych okazów Number of analysed specimens	Średnie wymiary małża Mean dimensions of bivalve			Średni ciężar z muszlą Mean weight with shell w mg in mg	Ileść analizowanych okazów Number of analysed specimens
		długość length	szerokość width	grubość thickness			długość length	szerokość width	grubość thickness			długość length	szerokość width	grubość thickness		
Unio pictorum	1 - 3	brak - brak					2.1	1.0	0.7	1 950	4	2.6	1.2	0.8	1 400	2
	3 - 6	5.2	2.2	1.5	11 350	54	5.2	2.2	1.5	10 700	64	4.7	2.0	1.3	8 490	22
	6 - 9	7.0	3.0	1.9	25 670	212	7.1	3.1	1.9	26 900	54	6.7	2.8	1.8	22 600	20
	9	10.1	4.7	2.8	68 300	19	9.7	3.8	2.3	56 300	16	brak - brak				
Unio tumidus	1 - 3	2.3	1.2	0.8	2 300	2	2.5	1.4	1.0	2 700	2					
	3 - 6	4.0	2.0	1.3	7 160	34	4.0	1.9	1.2	7 170	14					
	6 - 9	7.3	3.4	2.1	34 300	12	6.5	3.1	1.8	23 000	4					
	9	9.5	3.2	2.0	49 000	2	brak - brak									
Anodonta cygna	1 - 4	brak - brak					brak - brak					brak - brak				
	4 - 8	6.0	3.7	1.8	16 300	2	5.4	3.35	1.0	7 450	4	7.3	4.1	2.2	29 320	12
	8 - 12	10.5	5.7	3.0	84 925	56	10.0	5.6	2.9	81 640	44	9.3	5.3	2.8	68 660	66
	12	12.4	6.5	3.7	131 970	12	12.9	7.2	3.8	134 390	10	12.1	6.8	4.0	128 000	2

Results

The dam reservoir at Goczałkowice has a numerous and interesting macrofauna. A succession of occurrence of its particular components in the years 1955 to 1973 was shown, from small species of the genus *Pisidium*, through the genus *Anodonta*, to the genus *Unio*, especially *Unio pictorum*. According to recent investigation this species is dominant. It mainly settles the sandy bottom in the whole northern zone of the reservoir. The southern zone, with a more muddy bottom, is settled above all by *Anodonta cygnea*. In spatial distribution the attention was drawn to the zonification of occurrence of particular species which were obtained for investigation by the diving method. *Unio pictorum*, and *Anodonta cygnea* occurred most numerously at depths of 2 m and 6 m respectively. Gradually, with the increase in depth, participation of *Anodonta cygnea* also increased.

The investigations carried out in the reservoir in 1972 both in the emergent and in the inundated zone permitted the estimation that the reservoir is settled by 106 million specimens of bivalves with biomass of 5038 tons, giving in calculation for 1 m² 4 specimens of 20 dag biomass. Analysis of the age structure also permitted the succession in time, given in the investigations of the whole microbenthos (K r z y ż a n e k 1970) of settlement of the reservoir by particular species of bivalves to be confirmed. It was found that *Anodonta cygnea* had the largest number of specimens in the age class 8 to 10 years, but *Unio pictorum* and *Unio tumidus* in the age classes 6 to 8 and 4 to 6 years respectively. Attention was also drawn to the fact of an increase in number of younger specimens of bivalves at greater depths (Table V) in *Anodonta cygnea* and *Unio pictorum* at the depths of 6 and 4 m respectively.

STRESZCZENIE

W roku 1972 przeprowadzono na zbiorniku zaporowym w Goczałkowicach szczegółowe badania małży z rodziny *Unionidae*, korzystając z obniżenia poziomu jego wody o ponad 2 m. Wylonił się wtedy obszar obejmujący powierzchnię 800 ha (ryc. 1), na którym stwierdzono masowo rozrzucone małże. Na obszarze tym przeprowadzono badania na wybranych 30 stanowiskach, określając dokładnie skład gatunkowy, liczebność i biomasę (tabela II) oraz wykonując pomiary biometryczne 2380 małży, przez pomiary ich długości, szerokości i grubości. Na całym odstłoniętym obszarze zbiornika oszacowano 18 mil. małży o biomasie 1114 ton, co w przeliczeniu na 1 m² dało 4 okazy o biomasie 24 dag. Podobne badania z zastosowaniem nurkowania, wykonano na zalanej części zbiornika w czterech przekrojach pobierając próby z 2, 4 i 6 m. Poniżej 6 m nie złowiono przedstawicieli *Unionidae*. W maksymalnej liczebności występowały małże na głębokości 2 m — 22,5 mil. okazów (tabela IV), maksymalną biomasę miały na głębokości 4 m — 886 ton. Dla całego zbiornika otrzymano 106 mil. małży o biomasie 5038 ton.

Na 1 m² daje to 4 okazy o biomase 20 dag. Przewodnim gatunkiem w zbiorniku jest obecnie *Unio pictorum*, która zasiedla głównie północną strefę zbiornika, o dnie piaszczystym. Drugim co do liczebności gatunkiem jest *Anodonta cygnea*, zasiedlająca głównie mulistą strefę południową oraz głębsze centralne partie zbiornika. Analizy struktury wiekowej przewodnich gatunków (tabele III, V) potwierdziły podaną w badaniach makrobentosu (Krzyżanek 1970) kolejność w czasie występowania poszczególnych składników tej populacji od *Pisidium*, poprzez *Anodonta* do *Unio*, na co wskazuje wiek osobników poszczególnych gatunków z rodziny *Unionidae* w różnych klasach długości. Ze względu na duże znaczenie małży, zwłaszcza w zbiornikach zaporowych o przeznaczeniu jako rezerwuaru wody pitnej, badania tych organizmów będą kontynuowane.

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