EKOLOGIA POLSKA SERIA B

TOM VII 1961 ZESZYT 2

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The trap method of capturing water mites (*Hydracarina*)

For purposes of ecological research in land habitats the method in most common use for collecting invertebrate fauna takes the form of various kinds of traps (e.g. soil traps, litter traps etc.). Compared with other methods of capture, the trap method is the one which best permits of assessing the activity of the animals examined, and the results thus obtained are characterised by a greater „objectivity". The fact that this relatively unlaborious method is productive of more and better results is also of importance.

The application of traps in water habitats has not as yet acquired its own traditions. Welch (1948) does not refer to them in his work on limnological methods. The trap method in a water habitat has hitherto had a somewhat specific and narrow sphere of application, that is, using the trap principle, apparatus is constructed for the capture of hatching imagines of water insects — chiefly *Tendipedidae* (Żadin 1956, Kajak 1957). Attempts have been made to apply such apparatus to the capture of other invertebrate fauna also. Woronina (1958) used a slightly modified Borucki apparatus when analysing the diurnal migration of plankton. Szlauer (1960) used Halme's selfacting plankton sampler to his research of vertical plankton migrations.

Štěpánek and Chalupa (1958) who also used a Borucki apparatus, investigated the littoral fauna of a reservoir. The apparatus was suspended in the littoral with the collecting surface facing the bottom, thus capturing organisms which migrated in the direction of the surface. *Hydracarina* decidedly predominated in the material obtained in this way. The second place in numerical order was accupied by *Tendipedidae;* the sporadic presence of representatives of such groups as *Ephemeroptera, Coleoptera, Trichoptera* and *Branchiura* was observed. For research on water in caves a baited trap has been used, (Chappuis 1930, 1950) constructed on the principle of a miniature seine bow net. A piece of meat is placed in these traps as bait, and they are then left in the water for from 24—48 hours. Despite the considerable poverty of the fauna typical of cave water, numerous representatives of such groups as *Turbellaria, Isopoda* and *Amphipoda* are caught.

During the vegetation season in 1960, while carrying out field work on the Mikołajskie Lake, traps were constructed and tried out for the capture of water mites. The trap, based on the principle governing fly-

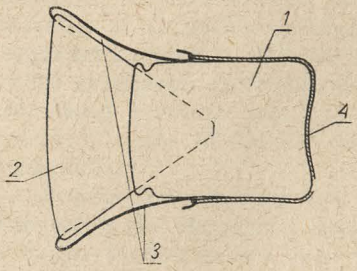

Fig. 1. Diagram of structure of trap for capturing water mites
1 — glass jar (1 l); *2* — glass funnel; *3* — metal clamps; *4* — rubber band holding funnel in the jar

Schemat budowy pułapki do połowu wodopójek
1 — słoik szklany (1 l); *2* — lejek szklany; *3* — uchwyty metalowe; *4* — gumka utrzymująca lejek w słoiku

-traps, is of very simple construction (Fig. 1), and consists of two parts: a glass funnel and a jar, which are held together by two metal clamps and a rubber band. As a rule 1-litre jars were used, and funnels, the mouth of which was 15 cm. in diameter, and the outlet pipe 1.3 cm. in diameter. Before the trap was placed in the water, it was filled with water filtered through fine gauze, which prevented animals getting into the inside of the trap as it was submerged. The traps were either placed

Table I

Numbers of different groups of water invertebrates in bottom trap
Liczebność różnych grup bezkręgowców wodnych w pułapce dennej

Groups of invertebrates Grupy bezkręgowców	Average numbers in 1 trap after a period of 24 hours Średnia liczebność w 1 pułapce w ciągu 24 godzin
Hydracarina	47.5
Ostracoda	5.6
Oligochaeta (*Stylaria lacustris* L.)	2.5
Trichoptera	0.6
Hemiptera	0.5
Ephemeroptera	0.4
Coleoptera	0.3
Gastropoda	0.3
Hirudinea	0.1
Tendipedidae	0.1

on the actual bottom (with collecting surface vertical to the bottom), or hung on wooden rods at different heights from the bottom, the collecting surfaces facing in various directions. The traps were generally left in the littoral for a period of 24 hours.

The effectiveness of the traps is illustrated in the enclosed table (Tab. I), which shows the average number of animals captured, of the

various groups of water invertebrates, in one bottom trap over a period of 24 hours (averages of 30 traps). The numbers of water mites is several times greater than the number of other invertebrate animals. In compa-

Table II

Numbers of water mites obtained by using various capture apparatuses
Liczebność wodopójek uzyskana przy użyciu różnych aparatów łownych

	Types of apparatuses Typy aparatów			
	Bernatowicz type plankton sampler (5 l.) Czerpak typu Bernatowicza (5 l)	Łastoczkin-Ułomski type bottom dredge (10 sq. cm.) Chwytacz denny typu Łastoczkina-Ułomskiego (10 cm²)	Plankton traps (period of 24 hours) Pułapki planktonowe (okres 24 godz.)	Bottom traps (period of 24 hours) Pułapki denne (okres 24 godz.)
Size of series Wielkość serii	50	50	10	10
Average numbers Średnia liczebność	2.12	2.08	7.30	53.50

rison with other capture apparatus the numbers of water mites caught by the traps was far greater (Tab. II). This is undoubtedly connected with the great mobility of these animals.

Table III

Horizontal and vertical migrations of water mites in the littoral of Mikołajskie Lake
(average numbers in 1 trap after 24 hours; series of 5 — 10 traps)
Poziome i pionowe migracje wodopójek w litoralu Jeziora Mikołajskiego
(średnia liczebność w 1 pułapce w ciągu 24 godz.; serie 5 — 10 pułapek)

Horizontal migrations Migracje poziome			Vertical migrations Migracje pionowe	
0 — 15 cm. (near surface) (przy powierzchni)	15 — 30 cm.	30 — 45 cm. (near bottom) (przy dnie)	in the direction of the surface w kierunku powierzchni	in the direction of the bottom w kierunku dna
1.8	2.0	16.2	6.2	3.1

Using the trapping method, preliminary investigations were made of the character of migrations by water mites [1]. By suspending traps at

[1] By the term „migration" I mean the general mobility and change of place by the water mites, not taking into account the duration and cyclic character of these phenomena.

different heights from the bottom, either parallel or vertical to the bottom, data were obtained which gave some guidance as to the intensity of horizontal or vertical migrations (Tab. III). The zone of most intensive migration is the layer of water several centimetres above the bottom of the littoral.

Table IV

Comparison of activity during the day and at night of different groups water invertebrates in the littoral of Mikołajskie Lake (average numbers in 1 trap)

Porównanie aktywności w dzień i w nocy różnych grup bezkręgowców wodnych w litoralu Jeziora Mikołajskiego (średnia liczebność w 1 pułapce)

Groups of invertebrates Grupy bezkręgowców	Day Dzień	Night Noc	*P*
Hydracarina	11.05	7.13	0.0000
Ostracoda	1.65	0.87	0.0124
Ephemeroptera	0.07	0.43	0.0007
Coleoptera	0.00	0.27	0.0005
Gastropoda	0.10	0.18	0.2943
Oligochaeta	0.07	0.12	0.3427
Tendipedidae	0.07	0.12	0.3959

Preliminary investigations were also made of the activities of various groups of littoral invertebrates during the diurnal cycle. Activity during the day and nigth were compared for three consecutive days, using a series of 20 traps. A total of 60 traps giving a picture of day activity, and 60 traps showing night activity, was thus obtained. It was found that (Tab. IV) *Hydracarina* and *Ostracoda* are more active during the day, and *Ephemeroptera* and *Coleoptera* during the night (the differences are statistically significant). *Gastropoda, Oligochaeta* and *Tendipedidae* exhibit similar activity during both day and night (differences statistically non-significant).

Detailed results of research on water mites, using the trapping method, will form the subject of a separate work.

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METODA PUŁAPKOWA POŁOWÓW WODOPÓJEK (*HYDRACARINA*)

Streszczenie

W artykule opisano budowę pułapki do połowów wodopójek. Składa się ona z dwóch części: szklanego lejka i słoika, połączonych razem przy pomocy dwóch metalowych uchwytów i gumki (fig. 1). Liczebność wodopójek, rejestrowana przez pułapkę jest znacznie wyższa od liczebności innych grup bezkręgowców wodnych (tab. I). Znacznie wyższe są też ilości wodopójek chwytanych w pułapki w porównaniu z innymi aparatami łownymi (tab. II). Przedstawiono również przydatność pułapek w badaniach nad poziomymi i pionowymi migracjami wodopójek (tab. III) i ich aktywnością oraz aktywnością innych bezkręgowców wodnych w cyklu dobowym (tab. IV).