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Czesław KOWALCZYK, Stanisław RADWAN,
Jerzy FALL

Modification of the Net Method of Syrthon Sampling

Modyfikacja sieciowej metody połowu syrtonu

Модификация сетевого метода лова сиртона

All kinds of sampling equipment are used for catching syrthon. Icanberry, Richardson (2) used filter pomps, Waters (9, 10), Besch (3) used frame — net traps, Berner (1) used mud grabs and Tarwid et al. (8), Müller (4), Pawłowski (5, 6), Tabacki (7) used typical plankton nets with the inlet hole of different diameter and the collecting container at its end.

Net sampling covered only part of syrthon and it was impossible to determine precisely its total mass. Most often they covered only certain groups of organisms which were of great importance in the water environment.

To determine exactly the organic and inorganic matter drifting in the water a new selecton method of syrthon catching in the drainage area of Lake Jorzec was used. In the years 1977—1979 in two tributaries and in one outlet 4 kinds of nets of different aperture were used. The nets had the following mesh size: I — 170 mm (fishermans), II — 2 mm (nylon), III — 0,283 mm (stylon GG 60), IV — 0,055 mm (planktonic net no. 25). The nets were put in the bed of the drainage area in a row according to the increasing thickness (Fig. 1).

Because of its permeability the fisherman's net was spread all over the river bed with the help of metal bars. Thus, uniform sampling area for macrosyrthon was formed. Nets II, III and IV were cone-shaped and had the trapezial inlet hole measuring $1.70 \times 1.40 \times 0.80$ m. It was

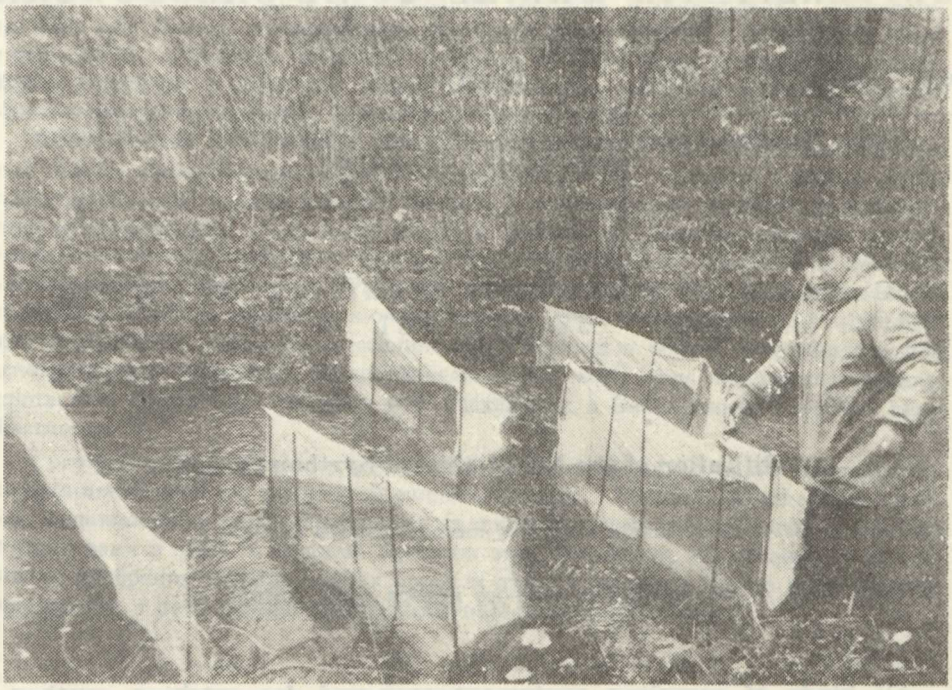

Fig. 1. Net placing in the drainage-area of Lake Jorzec

strengthened with the linen collar and equipped with metal rings in which iron bars were fixed joining the nets with the bed of the drainage area. These nets were ended with collecting funnels having the capacity of 0.5 l made of a plastic container and were closed with the help of a screw cap. The side length of the net trap II together with the plastic container was 1 m and that of III and IV was 1.20 m. In the case of wide bed of the drainage area the number of nets II, III and IV was increased and they were arranged in a step-like way.

In all the examinations the time of net exposure depended on the water level and speed of the water current, as well as the amount of matter carried in the water. It was from 10 min. to 30 min. at the time of the experiments. At high water levels (after spring thaw and intensive rains) and when the amount of substance suspended in the water increased only the nets of the first three categories were used. To obtain a full picture of drifting fauna a plankton sample was taken outside the nets. For this purpose, 100 litres of water from each inshore sector and 200 litres from the middle sector of each drainage area were drained off through the plankton net no. 25 to make 1 sample which was condensed to the volume of 100 ml.

In two thinnest nets the largest organisms and big particles of organic

and inorganic matter were caught. They were: most of the land and water insects, smails, leeches, leaves and stems of plants, small stones and gravel. This fraction of matter was called macrosyrthon. In nets III smaller organisms were caught, such as: *Chironomidae*, *Trichoptera*, *Oligochaeta*, *Hydracarina*, *Hydrophilidae* and inorganic matter (mainly grains of sand). They were named mezosyrthon. In samples taken in nets IV or in plankton net no. 25 there were organisms belonging to phyto- and zooplankton *Rotatoria*, *Cladocera* and *Copepoda* predominated in zooplankton. There was also a little of inorganic substance in the form of mud. It was called microsyrthon.

Taking into consideration the flow of water (Fig. 2) (because of the rectangular overflow expenditure of water was calculated according to

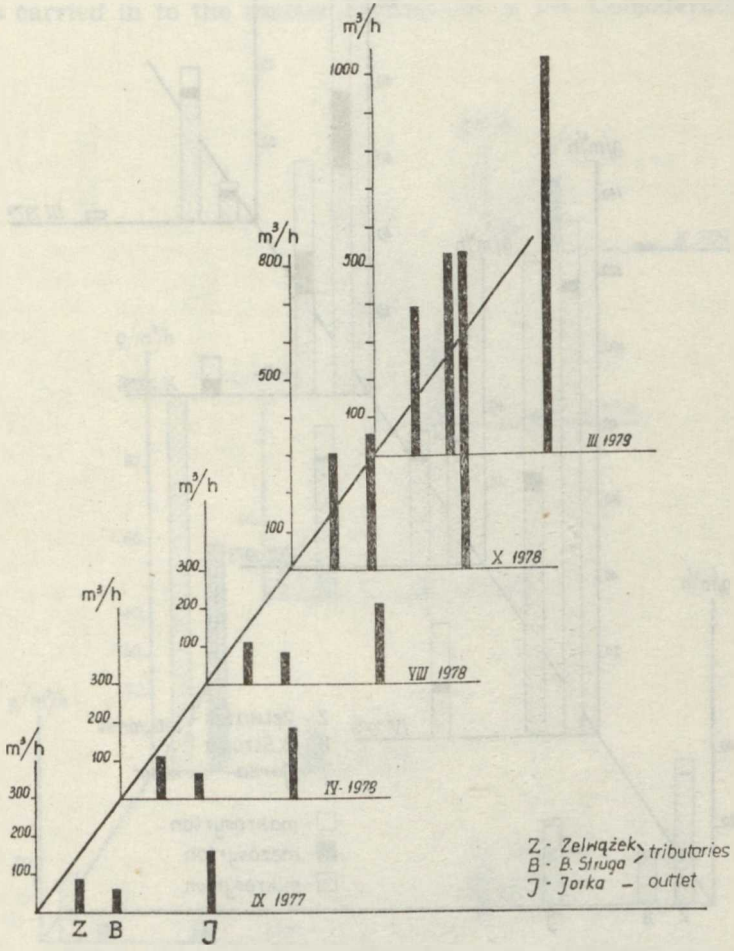

Fig. 2. Water flow in the drainage-area of Lake Jorzec

the formula of Poncelet $Q=\frac{2}{3}\,\mu bh\sqrt{2gh}$) and the time of nets exposure the mass of syrthon and the number of organisms were calculated in water and time units.

Complete separation of the drainage area bed by increasing the number of nets of each category depending on its width makes it possible to determine the amount of matter carried in the water.

In the case of the drainage areas of Lake Jorzec the amount of wet syrthon matter was from 3.9 to 135 g/m³/h (Fig. 3) and that of dry matter from 0.03 to 63 g/m³/h (Fig. 4). This method made the quantitative ana-

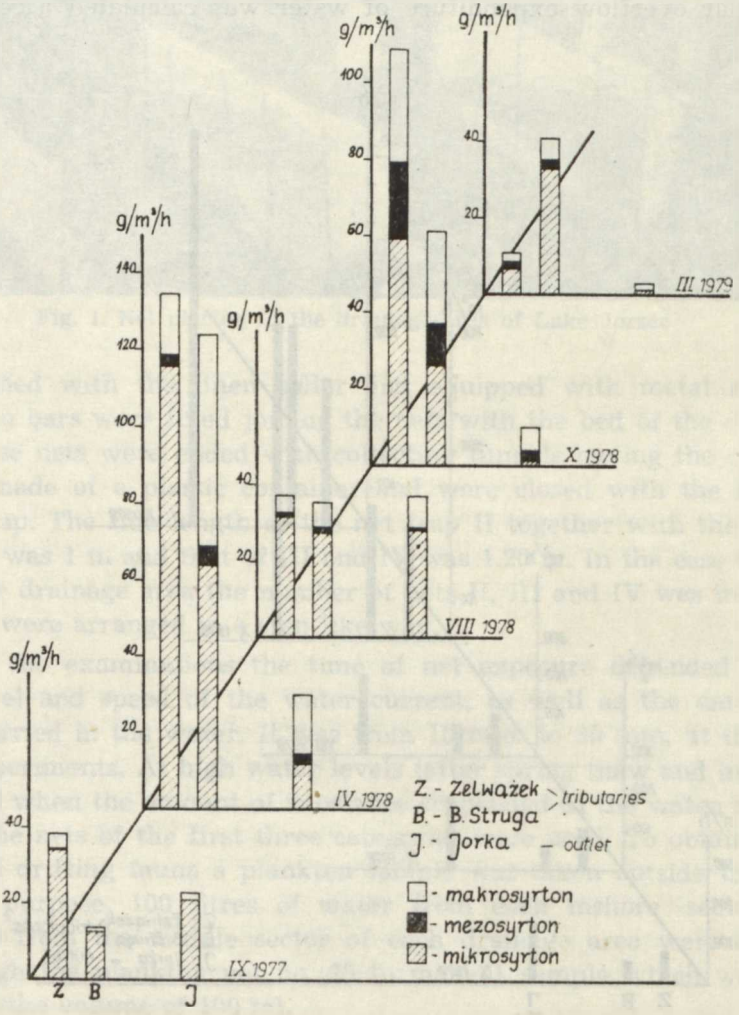

Fig. 3. Wet matter in the drainage-area of Lake Jorzec

lysis of each syrthon fraction possible. It appeared that microsyrthon achieves the highest values in the wet and dry matter (Fig. 3).

The extreme values of the wet matter for this fraction were from 1.2 to 116 g/m³/h and for dry matter from 0.03 to 41 g/m³/h.

The applied method makes it possible to observe seasonal changes of the syrthon matter. The highest values of the wet and dry syrthon matter were noted in the outlet in summer and in the tributaries in spring and autumn. The lowest values were noted in the outlet in winter and they were changeable in the tributaries in winter or autumn (Figs. 3, 4). As a result of the experiments a high concentration of syrthon was found in the lake because the matter which was carried in was higher than the matter carried out of the lake.

On the basis of mean values one can see that the ratio of the matter which is carried in to the matter carried out is 1:6. Considerably higher

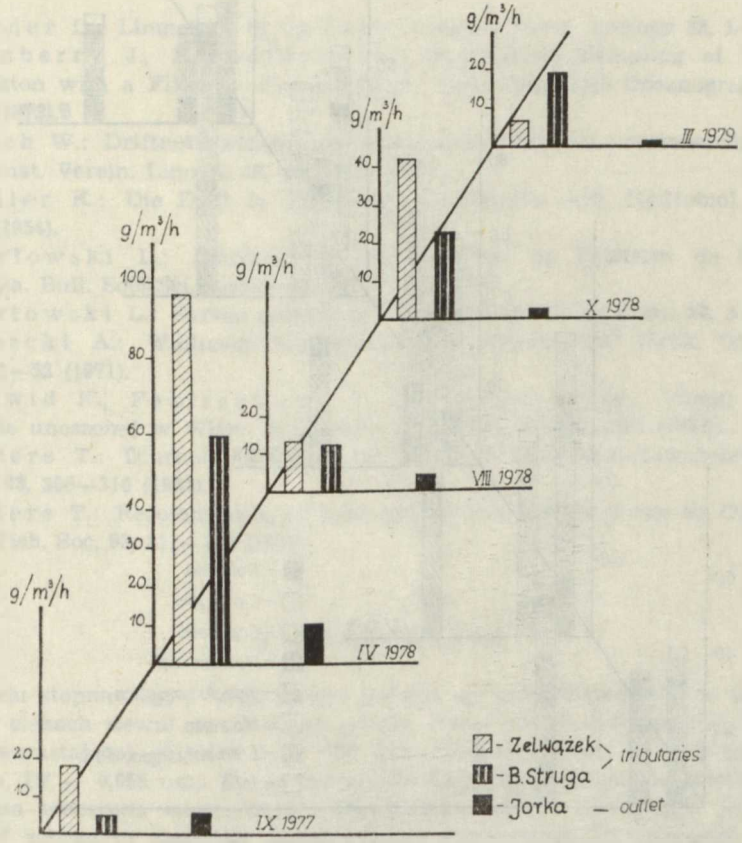

Fig. 4. Dry matter of syrthon in the drainage-area of Lake Jorzec

differences were noted in relation to the dry syrthon matter because the ratio was 1:12.

Absolute values of these factors were the following in the outflow: wet matter — 20.3 g/m³/h; dry matter — 4.8 g/m³/h and in both tributaries — wet matter — 122 g/m³/h; dry matter — 59.5 g/m³/h.

The modified method of net sampling of syrthon makes it possible to determine the species composition and the number of different invertebrate groups carried in the water in a better way. In the material from the drainage area of Lake Jorzec 28.5 systematic units belonging to different taxons of invertebrates were found. The majority of them (89%), are water living organisms, the remaining 11% belong to the land fauna.

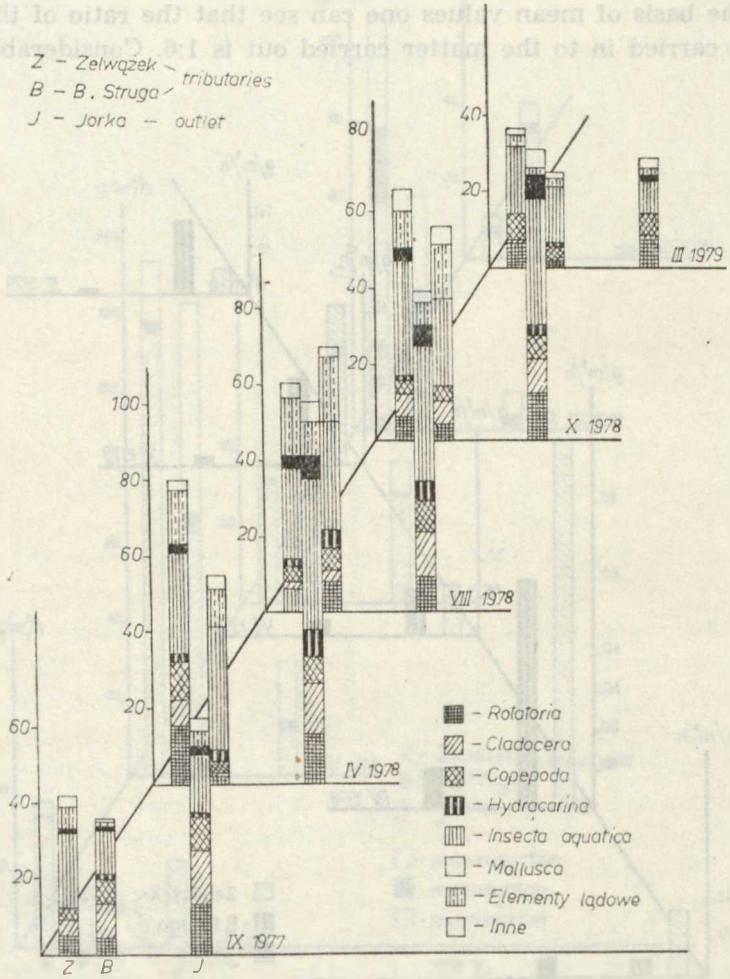

Fig. 5. Number of taxons in the drainage-area of Lake Jorzec

Water fauna of each fraction showed considerable fluctuations in the number of taxons and was clearly differentiated from the systematic point of view. Most of the forms were found in mezosyrthon (13:9) where *Chironomidae* predominated (46 forms). Only 82 forms were found in microsyrthon with *Rotatoria* as the predominating species (37 forms). The smallest number of taxons was noted in macrosyrthon — 66. The element of land fauna constituted its greatest part (23 taxons).

In each drainage area a considerable fluctuation of the number of taxons was noticed in each season of research (Fig. 5).

On the basis of the results one can suppose that application of the modified method of syrthon sampling may have some effect on a better and thorough understanding of its weight relations and its quantitative and qualitative composition.

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STRESZCZENIE

W celu stopniowego i selekcyjnego połowu syrtonu zastosowano w latach 1977 i 1978 w ciekach zlewni mazurskiego jeziora Jorzec cztery rodzaje sieci, ustawione według wzrastającej gęstości: I — 170 mm średnica oczek, II — 2 mm, III — 0,238 mm, IV — 0,055 mm. Stwierdzono dużą kumulację syrtonu w jeziorze Jorzec, gdyż masa wnoszona wielokrotnie przewyższała masę wynoszoną z jeziora (ryc. 3 i 4). W zebranym materiale faunistycznym stwierdzono 271 jednostek systematycznych bezkręgowców (212 w dopływach, 172 w odpływach).

РЕЗЮМЕ

В 1977 и 1978 гг. с целью постепенного и селекционного лова сиртона в водотоках бассейна мазурского озера Иожец были применены 4 вида сетей, установленных по возрастающей густоте диаметра ячеи: I — 170 мм, II — 2 мм, III — 0,238 мм, IV — 0,055 мм. Установлена большая кумуляция сиртона в озере, так как вносимая масса многократно превышала массу, выносимую из озера (фиг. 3, 4). В собранном фаунистическом материале обнаружена 271 систематическая единица беспозвоночных (212 в притоках, 172 в стоках).