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MONAKOV A.V. (1958). On the problem of the distribution of Acanthocyclops viridis Jurine in the Rybinsk reservoir. Byull.Inst.Biol.Vodokhran. No. 1, 36-39.

Translated by J.E.M.Horne.

Acanthocyclops viridis Jurine is one of the most widely distributed and largest of the cyclops in the Rybinsk reservoir. Its distribution in water-bodies is of general interest, since this species, often found in the guts of both young and adult fish, is practically absent from plankton samples collected by plankton nets and plankton-traps. Most authors refer to its benthopelagic form, confining it to the littoral (Graeter, 1930; Ponyi, 1957; Pesta, 1928); yet there are isolated indications of a pelagic form of life of A.viridis(Lint, 1922). In Rybinsk reservoir it positively is not present in the composition of the pelagic plankton, as its absence is demonstrated in net and plankton-trap samples. Only individual immature examples of this species are sometimes taken in samples of the torpedo-shaped plankton trap (constructed by F.I.Vovka).

This obliged us to investigate for the clarification of its distribution in the bentho-pelagic layer with the help of the somewhat modified "sledge" trawl of Markovskii (1953), produced in the mechanical workshop of the Institute of Reservoir Biology. A description of this sampler will be given in a special paper. By the sampler one can produce calculations of the benthopelagic fauna at any given interval with the limits of 5 to 55 m. Moving along the bottom of the water-body, the trawl encloses a benthopelagic layer of water of a height of 20 cm, capturing the topmost semi-liquid layer of the bottom (known as the pelogen). This sampler permits the making of quantitative calculations of the benthopelagic microfauna and in particular these forms which do not form large masses, but are encountered more rarely and therefore cannot be calculated by instruments catching with a small area of catch, like the tube samplers for calculating microbenthos.

As a disadvantage of the sledge trawl, it appears on the one hand that it works badly on liquid bottoms of the peaty mud type (in this case

the trawl buries itself in the mud), on the other hand samples collected by it often contain much detritus which strongly hampers the analysis of the material. As a rule, in the analysis the sample was completely miscalculated. In this case, if there was little detritus and the concentration of organisms was significant, a determined volume is taken by a ~~stamped~~ Stempel pipette, counted under a binocular (microscope), and subsequently there is produced a calculation on the total number of examples in the sample. So as to be able to compare these samples with data of the plankton scoops, a calculation of the biomass in a cubic metre in the layer of water of a height of 20 cm over the bottom is produced.

Collections were made at the end of August 1957 at 21 stations, situated both in the open part of the reservoir and in its river reaches. (Fig. 1).

In the results of the analysis of the material it was ascertained that Acanthocyclops viridis is widely distributed in the whole Rybinsk reservoir, and is localised in the benthopelagic layer of water. It was found in all biotopes with the exception of solid peat and peaty mud.(1) Of the remaining biotopes the poorest in cyclops were shown to be compact sands, where the numbers of A.viridis dis not exceed 10-20 per m^3. On grey muds of the sapropel type numbers of cyclops constituted about 100 per m^3 (in the estuarine parts of the river and on their former beds). Richest in numbers appeared the comparatively compact muddy-sandy bottoms and the weakly silt[? mud]-covered soils in the estuarine parts and partly in the southern part of the central reach at a depth of 6-8m. Here numbers of crustaceans varied from 100 to 1000 examples/m^3, in isolated cases (in the estuary region of the Volga) exceeding 1500 examples/m^3 with a biomass of 150mg/m^3 (fig. 1).

On the confinement of A.viridis to sandy-muddy bottoms see also Rylov (1948). It is probable that the inequality of its distribution on the bottom is connected with the distribution of food.

Besides the fact that the sledge trawl permits us to consider the forms confined next to the bottom (besides benthopelagic cyclops, many chydorids, Ostracods, Harpacticoids), it at the same time

(1) On the poverty of cyclops on peaty mud in L.Glubokoye see also Shcherbakov (1955).

encloses also the most benthopelagic layer of the water, about the composition of which we cannot judge by plankton-trap and net samples. As our collections showed, in the benthopelagic layer is observed a concentration of typically planktonic forms - Daphnia longispina, Bosmina coregoni, Diaptomus gracilis and D. graciloides, the numbers of which on individual stations are significantly greater than on the surface and middle layers. Benthopelagic samples differ from surface ones also in specific composition. Thus, for example, in the district of Vsekhvyatsk (station 19), samples taken by plankton-trap by their composition are characteristic of typical August plankton with mass blue-green algae, great numbers of copepodites and adult forms of Mesocyclops and with individual diaptomus. The total biomass of these forms was equal to 0.195 g/m^3. In benthopelagic samples at this same station daphnia and diaptomus predominated with a biomass of 0.389 g/m^3. In the district of Gorelov (station 4) the biomass of daphnia and bosmina in the benthopelagic layer reached unprecedentedly high (for August) figures - up to 1.700 g/m^3. In the surface layers it was equal to only 0.032 g/m^3.

It is wholly probable that the summer depression of the zooplankton, which we usually observe in July-August, coinciding with the intensive blooming of blue-green algae, is partially connected with this, that the filtrators which are daphnia, bosmina and diaptomus, move in the benthopelagic layer and we do not take them into account by plankton trap samples.

Everything written shows that for a complete count of the microfauna of Rybinsk reservoir (and evidently, of other reservoirs) one must introduce in practice, besides plankton-traps, and tube bottom-samplers, a quantitative sledge trawl, not only giving a representation of the specific benthopelagic fauna, but also adding to knowledge on the vertical distribution of plankton.

REFERENCES

MARKOVSKII, Yu.M. (1953). Fauna of invertebrates of lower rivers of the Ukraine, conditions of their occurrence and ways of utilization; Ch. 1 Izd-vo AN UkrSSR, Kiev.

RYLOV, V.M. (1948) Fauna of the USSR, Cyclopoida of fresh waters, Vol III, part 3

SHCHERBAKOV, A.P.(1955). Dynamics of numbers and biomass of some representative microbenthos of L.Glubokoye. Trudy vses.gidrobiol.Obshch. 6.

GRAETER, A. (1903). Die Copepoden der Umgebung von Basel. Revue Suisse de Zoologie, vol.11.

PESTA, O. 1928. Krebstiere oder Crustacea. Ruderfüsser oder Copepoda. Die Tierwelt Deutschlands, Bd. 9.

PONYI 1957 Untersuchungen uber die Crustaceen der Wasserpflanzenbestände im Plattensee. Arch. f. Hydrob. Bd. 53. H.4.

LINT, G.M. 1922. Untersuchungen uber Planktoncopepoden in niederländischen Gewassern. Int. Rev. d. ges. Hydrob. u. Hydrograph. 10, 80-81.

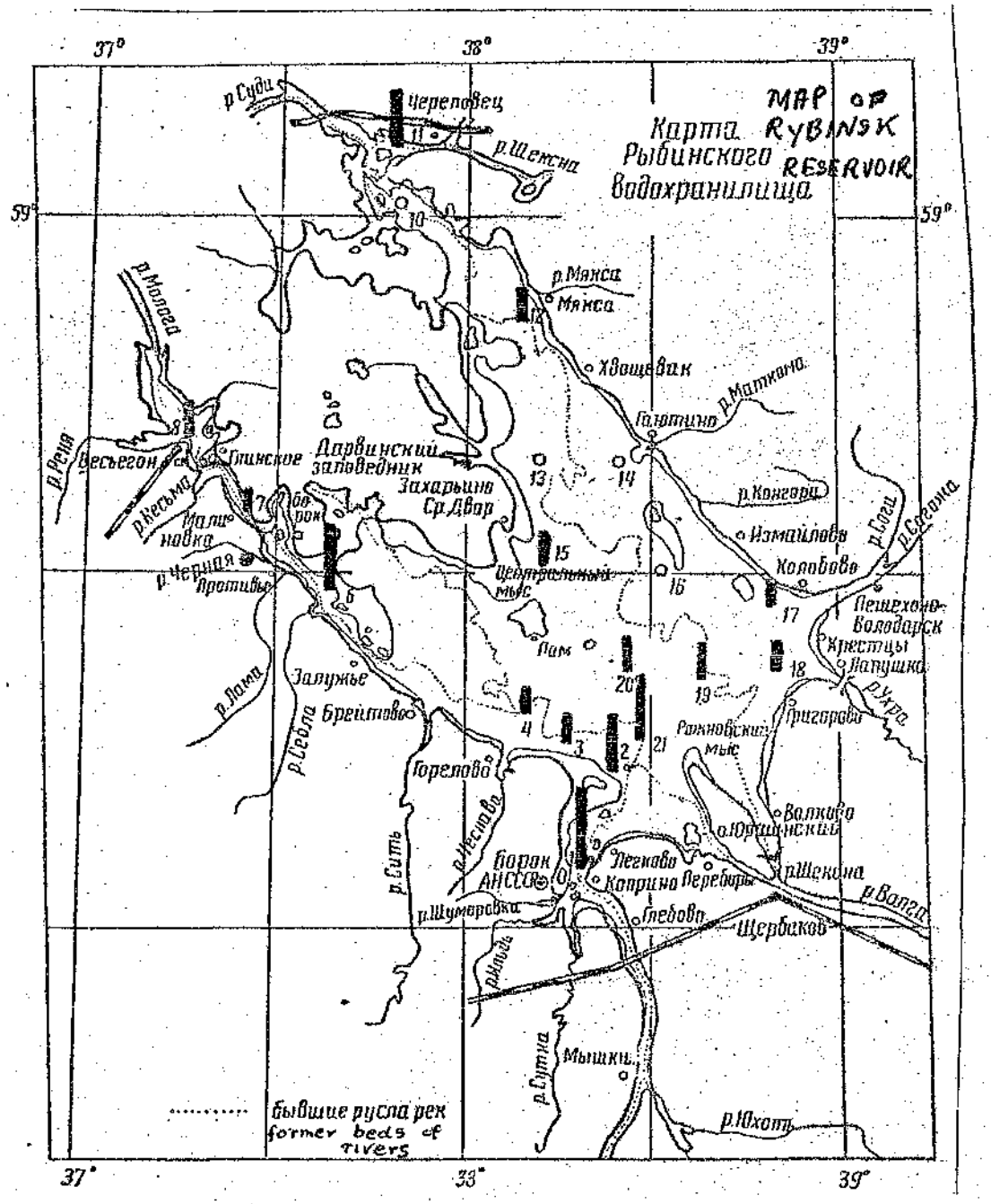

Figure 1. Distribution of Acanthocyclops viridis in Rybinsk reservoir in August 1957.
Numbers of cyclops in 1 m^3 in the layer of 20 cm thickness above the bottom.

Conventional signs:

o — no cyclops

— less than 100/m^3

— 100 to 1000/m^3

— more than 1000/m^3

Notice

Please note that these translations were produced to assist the scientific staff of the FBA (Freshwater Biological Association) in their research. These translations were done by scientific staff with relevant language skills and not by professional translators.