Mikhaevitch T.V. Elements of the ecology of *Plumatella fungosa* bryozoan from the cooling reservoir at Bereza Electric Power Plant, Belarus. All'Union Colloquium on Fossil and Recent bryozoans, Academy of Science of URSS, Paleontological Institute, Scientific Council for the problem "Ways and patterns of historical development of plant and animal organisms", Moscow, 1986, pp.53-56.

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Studies of freshwater bryozoans are not numerous and do not fully reflect their role in ecosystems reservoirs. The fauna of Bryozoa of Belarus is totally unknown. In the recent years, the data appears about the development of bryozoans in the warm waters. In the cooling reservoir of the Bereza power plant the mass appearance of Bryozoa is observed from 1981-82. The determination of the role of bryozoans in the ecosystem of the cooling reservoir has the theoretical and practical interest. Our studies have been conducted on bryozoan from the heated channel during the spring-summer season of 1983-84 years. Based on some population characteristics, the series of experiments on nutrition, growth, survival rate and respiration, the purpose of the work was to give a preliminary assessment of the functional role of bryozoans in the cooling reservoir of the Bereza Electric Power Plant.

The correlation between the number of zooids ($\mathbf{N_z}$) and the colony area ($\mathbf{S}_{mm2}$) of bryozoans in the spring-summer season have been described by the equation 1:

$$\mathbf{Nz = 3.25 \cdot S - 9.7} \qquad r=0.84 \ \mathbf{(1)}$$

The correlation between humid (**W,** mg), dry (**W,** mg) matter and volume of bryozoa fouling (**V,** mm^3) have been described by the following equations:

$$\mathbf{W = 0.75 \cdot V - 5.55} \qquad r=0.91 \ \mathbf{(2)}$$

$$\mathbf{W = 0.041 \cdot V - 0.15} \qquad r=0.72 \ \mathbf{(3)}$$

According to the equations 2 and 3, have been estimated that the biomassa of bryozoa fouling on the fish cages set in the heating channel of Bereza Power Plant can reach 1.2 kg/m^2 of dry matter and 22.5 kg/m^3 of humid matter (the thickness of bryozoa fouling is about 3 cm).

The zooids biomass per m^2 is 188.5 g or 15.8% of the dry bryozoa fouling (the dry weight of bryozoa zooid is 0.057 mg).

The eutrophication of the cooling reservoir of Bereza Power Plant is hight. The concentration of the seston in the summer in the heated channel is 35-40 mg of the dry matter/liter. Blue-green algae is dominated component in the phytoplankton. In the spring sample from the heated channel the number of *Aphanizomenin flos-aquae* is 30%, the biomass is 24.3% (9.28 mg/l), the number of *Anabaenopsis raciborskii* is 60.1 %, the biomass is 48.5 % (18.54 mg/l). The number of blue-green algae of the same species packed in the pellets of bryozoans is 94.3 %, the biomass is 52.4 % (0.048 mg/l). Taking into consideration that in the cooling reservoir bryozoans are major consumers of blue-green algae, we have attempted to estimate the sedimentation capacity of bryozoans by their defecation in relation to the temperature 20-23°C and to the natural diet from the heated canal. The correlation between the number of pellets ($\mathbf{N_f}$, pcs/h) and numbers of zooids ($\mathbf{N_z}$, pcs) have been described by the following equation:

$$\mathbf{N_f = 1.35 + 0.38\ N_z} \qquad r=0.96 \ \mathbf{(4)}$$

According to the equation (4) have been calculated that 1 m^2 of bryozoa fouling contains $3.25 \cdot 10^6$ zooids, which according to (4) produce $1.24 \cdot 10^6$ pellets/h

consuming 11.4 g/h of algae/h, 0.27 kg/day, 194.4 kg/month (algae biomass contained in 1 pellet is 0.092 mg).

The growth of bryozoans in the laboratory during 40 days at the temperature 20-23˚C in the natural diet have been studied. Daily linear growth of 1 zooid was 0.18 mm. Zooid reaches a definitive size (2.4 mm) on the sixth day and starts budding. To calculate the growth equation have been taken that the condition of growth was optimal with permanent increase of the quantity of zooids in the colony. The growth of the colony *P.fungosa* have been described by the exponential equation:

$$N_t = 2.31 \cdot e^{0.11} \quad (5)$$

The time of the duplication of the population quantity is 6.3 days. The biotic potential of the species *P.fungosa*, or the ability to increase the quantity under the optimal conditions, according to (5), was equal to 0.11days $^{-1}$. The maximum biotic potential calculated for the individual parts of the growth curve, was 0.2 days $^{-1}$.

In the heated channel of the cooling reservoir in the summer the temperature reaches 33-36˚C. In order to determine the upper lethal temperatures and oxygen demand at high temperatures, the experiments on survival and oxygen consumption rate by bryozoans zooids have been made. The survival have been determined by the LD-50 in the spring, autumn and winter at the temperature gradient 31-39˚C. For bryozoans of the spring and autumn season the limiting temperature was 38˚C, for the winter colonies - 36˚C. The winter colonies oxygen consumption rate have been determined at 25 and 30˚C on two samplings of the animals according to the developed method and expressed by the relatively low quantities.
The expenses/day for metabolism of the bryozoans population have had the significant parameters - on 25˚C and 30˚C, respectively, 77.7 and 60.8 kcal/m^2. The relative expenses of the population, calculated on dry biomass of zooids per m^2 /day, at the same temperatures, have had, respectively, 409 and 320 kcal/kg · day.

Table. Oxygen consumption rate **(R, µl/zooid $^{-1}$. h^{-1})** by bryozoa *P.fungosa* from the cooling reservoir of Bereza Power Plant.

T˚C	number of animals, average, zooid	n, number of tests	R ± S_x	δ	cv
25˚ C	20	6	0.21 ± 0.020	0.049	22.9
	10	4	0.20 ± 0.20	0.410	86.7
30 ˚C	25	5	0.20 ± 0.0095	0.021	10.8
	12	5	0.11 ± 0.013	0.030	27.9

We have been shown that in the cooling reservoir the zooids of bryozoa, adapted to the life in high temperatures, has a high growth rate. The expenses for the metabolism of the *Plumatella* population were quite high. Certainly, among the zooperiphyton organisms bryozoans have an important role in the formation of

the ecosystems of heated water. Great biomass and quantity of *Plumatella* in the cooling reservoir creates a powerful biological filter, precipitating the dominant in the phytoplankton blue-green algae. Currently, bryozoan should not be viewed only as fouling organisms, but also as a powerful utilizer of the organic matter, substrate for settlement and supplementary food for many species of animals.