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**ESTIMATION OF SEDIMENTARY ACTIVITY OF BRYOZOA PLUMATELLA
FUNGOSA IN THE GRADIENT OF TEMPERATURES**

Though continental bryozoans play a significant part in water ecosystems, their biology and ecology have been studied quite poorly. But lately the interest to this species has increased and several reports, related to their functional role in the water reservoirs, have been published [1,3-9]. Quite scarce are data on Bryozoa feeding. It is known that their food depends on seston content, and small planktonic algae of 5-17µm size constitute the basic food component of *Plumatella* [10]. However, quantitative study of food sedimentation process in bryozoans and its relation to environmental factors have not been made yet.

The aim of our research is to reveal temperature dependence of sedimentary activity of Bryozoa in the gradient of temperatures and to estimate its function in the conversion of organic matter into detritus food chain in the water-cooler of the Bereza Power Plant.

The analysis of phytoplankton and feces of bryozoans from the warm channel have been made in summer season with the aim to determine their food content and functional role in the water reservoir under study. It showed that blue-green algae make up 98% of phytoplankton: *Aphanisomenon flos-aquae* – 30% (9.3 mg/l), *Anabaenopsis raciborskii* – 60% (18.5 mg/l), *Oscillatoria limnetica* – 7.7% (1.6 mg/l). Bryozoa feces are mostly "packed" by *A. raciborskii*, *O. limnetica* and *Gloeocapsa minuta* equaling 89.3%, 2 and 3%, respectively. Blue-green algae make up 95% of feces, other algae species – 5%. Thus, feeding is not selective. In the system of water-cooler bryozoans consume blue-green algae which dominate in phytoplankton.

Continental bryozoan is an attached colonial animal with sedimentary type of feeding. Its zooid has a captive funnel on the front surface surrounded by tentacles. Movement of ciliae on lophophore tentacles induces water rotation which sucks suspension into it out of water, where it is settled down to funnel bottom and passes to mouth inlet. Bryozoa have well-shaped feces, so its sedimentary activity was evaluated using values of excreted feces for the given time period in the temperature gradient 15-20-25-30-33-35° C. For 30-35° C analysis Bryozoa were taken from warm channel of the Bereza Power Plant water-cooler (t= 30-33° C), for that at 15-25° C – from the Lake Beloie (t=25°C). The latter have been acclimated to the temperatures of 15° and 20° for twelve hours. Seston from warm channel was used as a food during research in the amount of 30 mg of dry matter per 1 l. In order to maintain the constant food concentration, water in the experimental glass was

changed every two hours for water from warm channel with natural algae concentration.

Basing on 400 measurements, the equation $y=a+bx$ was calculated which related defecation rate to quantity in the range of 10 - 90 zooids in the bryozoan colony at the temperature gradient typical for natural environment of these animals (see table).

Table. Parameters and statistic indices of the equations N 1-6 for the relation defecation rate with the number of zooids in the bryozoan colony at the temperature gradient.

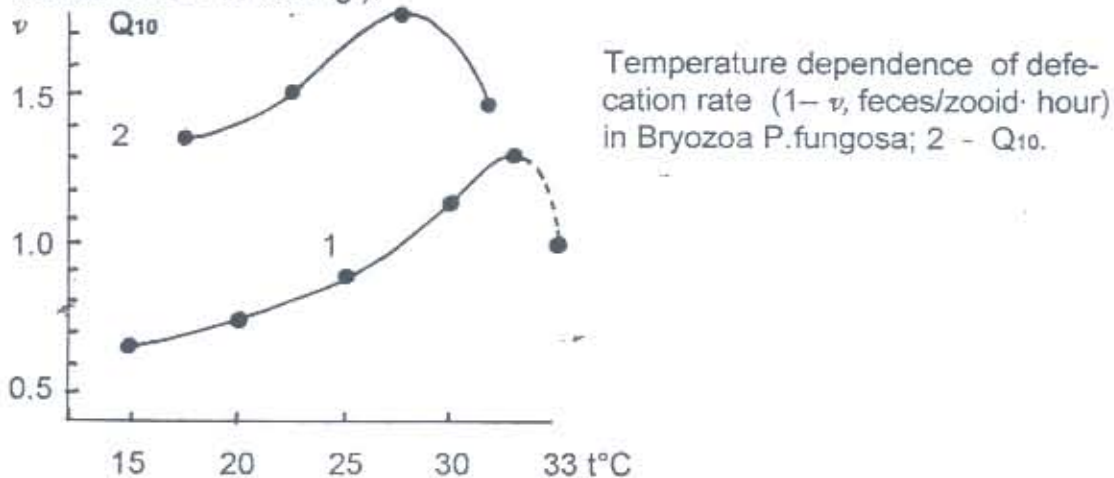
t°C	N of equation	a	b	r	number of measurements
15	1	1,86	0,40	0,69	66
20	2	0,75	0,65	0,84	60
25	3	0,56	0,84	0,48	80
30	4	2,60	1,04	0,94	65
33	5	-3,17	1,43	0,82	74
35	6	-4,50	1,27	0,90	52

The relation of fecal production rate (v , feces/zooid·hour) at the temperature range of 15-33° C (see Fig.) and the equation

$$v = 0.29 \cdot e^{0.044 t^{\circ}}$$

have been found out.

As you see from the Figure, the rise of temperature above 15° C speeds up greatly the process of defecation in bryozoans: at 20° C it increases 1.2 times, at 25° - 1.4, 30° - 1.9, 33°-2.2, 35° C - 1.7 times (see the curve Q_{10} in the Fig.).



The maximal fecal production rate is at 33° C, optimal - at 25-30° C. High temperature decreases sedimentary activity of Bryozoa. With rising temperature the time for food digestion gets 2.2 times shorter: at 15° it is 100 min, at 33° - 45 min. The distance between produced fecal pallets is 0.035 - 1.2, diameter is 0.025-0.4 mm. Wet fecal mass is 0.0092, dry one - 0.0045 mg.

Bryozoan feces are colored bright-green. Using extracting spectrophotometrical technique for determining chlorophyll content and photosynthetic activity of algae included in the bryozoan feces, it was shown that their content is high and they undergo photosynthesis for some time. The were used for calculating fecal production in the warm-water channel of the water-cooler in summer when temperature and food conditions were similar to experimental ones and bryozoan biomass reached several kg/m². In summer season the average dry mass of pellets produced by one zooid per day was 0.12 mg. The colony, covering 1 m², produced 390 g of fecal dry matter; that is two times higher than zooid mass of the same square. Dry pellet production per month equaled 28 kg/m², in summer season – 84 kg/m².

Quantitative estimation of sedimentary activity of Bryozoa showed that colonies of eutrophic water-cooler settle about 0.5 kg/m² of dry pellets per day. Detrital "rain" which gets into the water-cooler system, has high nutritional value for detritophages.

Summary

Estimation of the sedimentary activity of Bryozoa in the water-cooler of the Berezovskaya Power Plant has shown that the colonies consume blue-green algae, dominating in the phytoplankton, and in summer they settle about 0.5 kg/m² dry pellet per day.

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