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The Role of Bryozoa as a Filter in Water-Coolers

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The increase in number of Thermal Power Plants resulted in appearance of warm-water ecosystems with partial supplanting of cold-water species by warm water ones due to thermal press and eutrophication. Their biomass is growing fast in new conditions.

During the last years mass development of Bryozoa has been reported for such ecosystems. Bryozoann biomass could reach up to several kilograms per square meter in the Kanevsk, Chizhovka, Uchinsk, Ivankovsk water reservoirs and in the water-coolers of the Bereza, Zmievsk Power Plants and Chernobyl Atomic Plant.

The eutrophication of water reservoirs brings mass development of blue-green, often toxic, algae which change water quality for worse. Thus, the search of potential consumers of suspended organic seston matter has become quite important lately. Bryozoans can be used as natural biofilter-sedimentator in management of anthroponegic systems.

In the water-cooler of the Bereza PP (Belarus), the vegetative season of Bryozoa *Plumatella fungosa*, which has no "biological winter", makes up nearly 10 months from March till December.

Growth analysis of modular integral organism of Bryozoa under the typical for water-cooler temperature gradient of 15-35° C and trophic conditions of 8.8 – 70 mg of dry seston matter per liter showed that the colony has maximal specific growth rate at low food concentration (8.8 – 17.5 mg) in the 30-33° C temperature range. At high seston concentration (70 mg of dry matter per liter) the maximal growth rate is observed in the lower temperature range (23-27° C). The highest colonial growth rate (0.31 day^{-1}) is registered at 30° C and typical for summer season average seston content of 35 mg of dry matter per liter. At 15, 20 and 25° C,.the growth rate made up 0.098 , 0.17 and 0.27 day^{-1}, respectively.

Due to their high colonial growth rate, Bryozoa reach significant biomass on fish nursery and iron stews fixed in warm-water channel, creating powerful

biological filter in the water-cooler. As a sedimentator, Bryozoa consumes blue-green algae, dominating in phytoplankton of the water-cooler.

The fecal pallet product, produced during vegetative season, made up 92520 in spring, 140850 – in summer, 48276 – in autumn, 2016Kcal/m² - in winter (table).

Table. The parameters of sedimentical activity of Bryozoa P.fungosa in the cooling reservoir at different seasons.

Season	t°C	Zooid number, spm/m²	Zood biomass, kg/m²	Zooid biomass, kcal/m²	Feces production kg/m²·day	Feces production kcal/m²·day	Feces production kcal/m²·season
Spring	22	$2.7 \cdot 10^6$	0.11	404	0.23	1028	92520
Summer	30	$2.9 \cdot 10^6$	0.12	440	0.35	1565	140850
Autumn	22	$1.4 \cdot 10^6$	0.06	220	0.12	536	48276
Winter	13	$0.09 \cdot 10^6$	0.04	147	0.05	22	2016

The estimated assimilation value appeared to be low (near 6%). This allows us to suggest that at high temperatures suspension goes through digestive system of Bryozoa at a high rate and pallets are produced (in average, 1 pallet/zooid hour) without proper food utilization, thus, supplying bottom biocenoses with organic seston matter for its conversion into detrital chains.

Zooperiphytic organism of Bryozoa has often difficulties with finding substrate to grow upon, so it can serve as natural bryozoan biofilter on man-made reefs.

These reefs can act as a substrate for bryozoan dwelling, thus, enlarging the square of biological filter for removal of suspension from water and its purification. They will create a biotope for introduction of various commercially valuable benthic organisms, will rise benthic biomass and abundance and will create additional food source for fish.