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Materials of the international scientific-practical conference devoted to prospects for development and cooperation in the field of aquaculture in different regions of Russia and some foreign countries. The basic problem, suggested solutions, as well as possible ways of international cooperation.

Editor V.M. Tatosov
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SESTON AND CHLOROPHYLL CONTENT IN FISHERY PONDS
AND CONNECTED WITH THEM RIVERS OF THE FISH-FARM
«VILEYKA» (BELARUS)

H.A. Zhukova ¹, B.V. Adamovich ²

¹Belarusian State University
²Belarusian Fish Industry Institute

Content of seston (suspended substances) and chlorophyll are the two integral parameters, that characterize trophic state and water quality in waterbodies. The determination of chlorophyll is widely used as the express-method to estimate phytoplankton biomass. Chlorophyll content per unit of phytoplankton biomass ranges widely – from 0,1 to 3,2 %, but in natural waters it is in average approximately 0,3 % in fresh or 1,5 % in dry weight of algae (Mikheyeva, 1970); this coefficient is used for the estimation of algae biomass in water communities based on chlorophyll.

The aim of this study was to estimate seston and chlorophyll content in the water of the fishery ponds and connected with them rivers of the fish-farm «Vileyka» (Belarus).

Fishery ponds are the artificial waterbodies with small depths (1-3 m). The productivity of such ponds is regulated by human activity by applying fertilizers and fish feed. Partially this substances are accumulated in fish biomass and then are withdrawn out of the ecosystem, part of them enters the bottom sediments of is transferred through the overflow water into natural waterbodies. In contrast to natural waterbodies, in ponds temporal changes in hydrobionts abundance and biomass are very sharply defined even during one vegetation season.

The ponds of the fish-farm «Vileyka» have the cascading disposition. In spring the ponds are flooded with water from River Smerdija, and in case of water shortage the additional amount of water is received from River Viliya. During the vegetation season the regular inflow takes place as well as the outflow through R. Smerdija to R. Viliya.

Seston content has been estimated by gravimetric method filtering water through nuclear filters (pore diameter was 1 micron) and subsequent drying them (at 70 °C) to the constant weight. Measurements were conducted in 3-6 replications for each testing site. The same filters were used to determine chlorophyll content in suspended matter by spectrophotometric method (SCOR UNESCO, 1966) taking into account the phaeopigments share in light-absorption (Lorenzen, 1967).

The study was carried out at 9 testing sites: at the three ponds (feeding ponds №8 and №9 0,1 km² each, nursery pond №6 – 0,3 km²), and at the rivers Smerdija and Viliya where inflow and outflow takes place and 500 m downstream from the outflow. Samples were taken monthly from June to September in 2010 from the subsurface water layer. Average temperature for the period of investigation was 15-18 °C in the rivers and 19-22 °C in the ponds.
The seston content in the water at the testing sites ranged from 2 to 29 mg·l⁻¹, the minimum was recorded in August for R. Smerdiya’s outflow. On average, seston content was lower in the rivers comparing with the ponds. Thus, for example at R. Smerdiya’s inflow seston concentration in the water oscillated nearby 5 mg·l⁻¹ during the period of study (figure 1), maximum was recorded in the fish ponds (10-29 mg·l⁻¹ with increasing by the end of summer), and intermediate values were found for R. Smerdiya’s outflow (7-11 mg·l⁻¹). In R. Viliya the content of seston ranged from 6 to 16 mg·l⁻¹ and was higher comparing to that in R. Smerdiya.

![Figure 1 - Seston content (lines) and chlorophyll share in it (columns) in the water of feeding pond No 8 and R. Smerdiya's inflow and outflow (500 m downstream) at the fish-farm](image)

Chlorophyll content in the water on the testing sites ranged more appreciably – from 1 (June, R. Smerdiya’s inflow) to 162 µg·l⁻¹ (September, feeding pond No 8), and at the same time the seasonal variations in seston corresponded with the chlorophyll content in the water. But seasonal distinctions within the testing sites were more clear-cut in chlorophyll: the differences between minimum and maximum was 3-6, while in seston it was only 1,5-4,5 (figure 2).

Chlorophyll content in the water of the fish ponds increased by September and on average (90 µg·l⁻¹) was essentially higher comparing to R. Smerdiya’s inflow and outflow (2 and 21 µg·l⁻¹). In R. Viliya chlorophyll concentration didn’t differ for the inflow and outflow in fish-farm and was close to 23 µg·l⁻¹.
Phaeopigments share ranged in wide limits – from 3 to 74 %. Maximal values were registered in R. Smerdiya in June-July (when chlorophyll content in the river’s water was minimal – 1 µg·l⁻¹). This was due to a bulk of dead plant remains in the water (tree waste, stirring-up bottom sediments). In August-September phytoplankton biomass reached its peak and phaeopigments share decreased to 10-30 %. In the ponds the share of phaeopigments was rather stable and averaged (±Sd) 24±13 %.

Chlorophyll content calculated per unit of seston was higher in the ponds (0,5 and 0,2 % respectively) as well as per unit of phytoplankton biomass (1,4 and 0,9 %). Estimated (based on chlorophyll) share of algae in seston averaged for the period of study approximately 1 % for R. Smerdiya’s inflow, nearly 10 % for the ponds, 5 % for R. Smerdiya’s outflow and 8 % for R. Viliya (both inflow and outflow). Total range for share of algae in seston was 0,4-49 %.

REFERENCES

