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SOME HYDROCHEMICAL ASPECTS OF FARMING EUROPEAN CATFISH SILURIS GLANIS

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Abstract. Aquaculture in Uzbekistan is in need of new cultivation objects, as the technology of carp polyculture in earthen ponds has reached its limit, beyond which it is impossible to further increase fish production. This is due to the limited number of pond areas in the country and the volume of available water..
Keywords: European catfish Siluris glanis, flow-through tanks, hydrochemistry, incubation.

The common or European catfish is a very interesting and promising fish for farming, but the country has yet to develop a dedicated technology for incubating and subsequently raising this species. Only one such project was conducted at the Institute of Fisheries, where staff spent three years (2009-2011) studying the reproductive biology of the common catfish and developing a technology for breeding and raising this species in conditions new to Uzbekistan—namely, in a system of flow-through tanks.

It should be noted in advance that, alongside the existing fish farms with established operating methods, many new farms have emerged in the republic, which are not fully capable of appreciating the need for water quality control at all stages of fish farming.

This article examines only one, but the most important aspect of a hydrochemist's work: conducting hydrochemical control during incubation.

All work on this topic was carried out at the state fish hatchery, Tashkent region, Yangiyul district.

The spring of 2011 was characterized by unusually high air temperatures (up to 37°C) recorded in the second and third ten days of April. Then, in mid-May, temperatures dropped to 25-27°C during the day and 14-16°C at night. These temperature fluctuations impacted the incubation process itself, the preparation period, and related phenomena. For example, the so-called "algal bloom" in ponds shifted in time, which immediately affected the dissolved oxygen content of the water, which is a crucial factor in the normal course of the incubation process.

Daily hydrochemical monitoring was conducted from the very beginning of incubation. Two sets of samples were collected: the first at 4:30 a.m. (before sunrise), the second at 6:30 p.m. Key parameters were determined: temperature, pH, oxygen content, and organic matter content (ammonium nitrogen, BOD1, and aggressive oxidizability).

Oxygen levels were monitored most meticulously. Oxygen samples were taken in a specific sequence: settling pond, central channel (at two points), injection pond, aerator, and incubation room.

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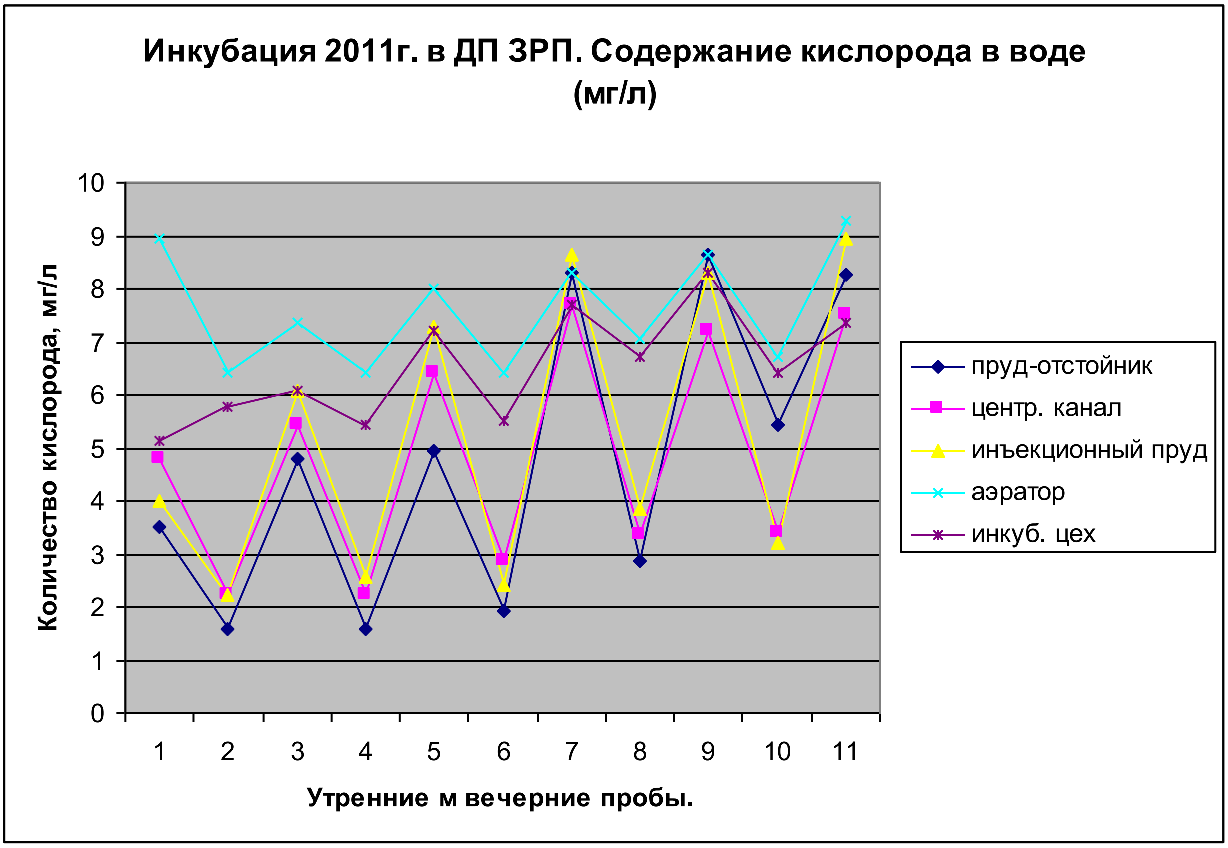
Diagram 1.



The diagram clearly demonstrates the importance of an aerator supplying water to the incubation unit. In natural reservoirs, in our case a settling pond, a central channel, and an injection pond, peak values are common. This is because oxygen levels in the water drop to a minimum in the pre-dawn hours due to aquatic respiration. In the evening, however, oxygen levels peak due to active photosynthesis. These are natural phenomena. However, for the incubation process to proceed normally, a constant high oxygen content in the water is essential. At the hatchery, this is achieved with an aerator, which smooths out peaks and stabilizes the oxygen content in the water entering the unit.

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Diagram 2.

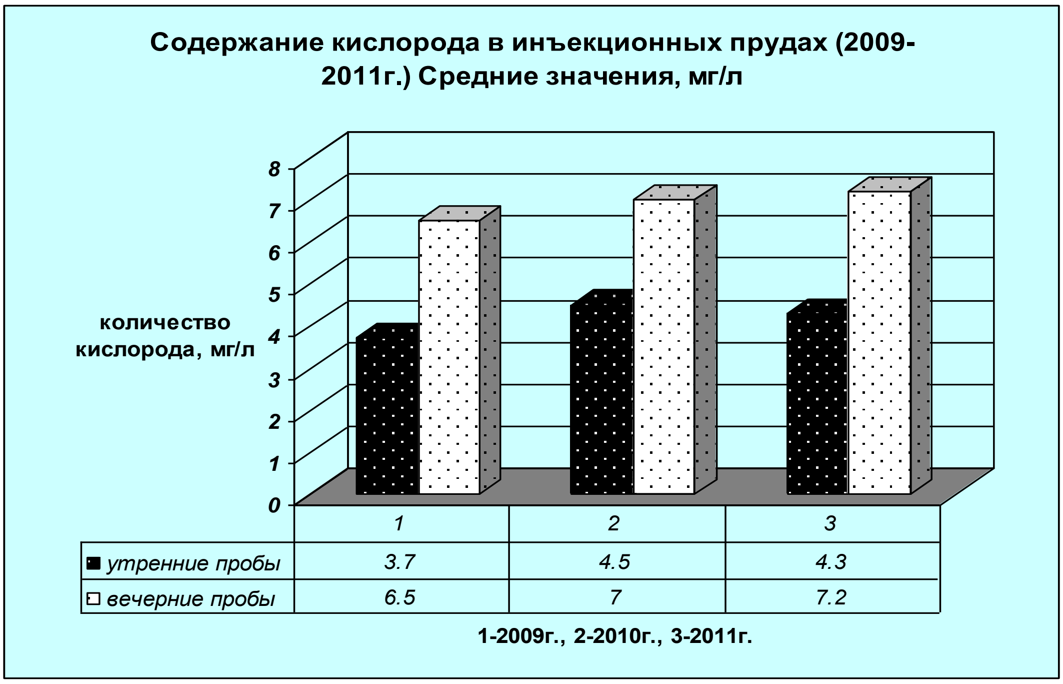

Diagram 3.

Diagram 2 shows the results of additional testing of the water in the settling tank, as it was suspected that it contained elevated levels of organic matter.

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Sector 1 – oxygen content, 5.44 mg/l
Sector 2 – pH 8.0
Sector 3 – ammonium nitrogen content, 2.0 mg/l
Sector 4 – BOD1 (biochemical oxygen consumption per day) 2.56 mg/l
Sector 5 – aggressive oxidation, 32%.

The figures provided indicate that although indicators such as BOD1 and aggressive oxidizability were normal at the time of analysis, the increased ammonium nitrogen NH_4^+ content of 2.0 mg/L (with a norm of 1.0) combined with a high pH of 8.0 posed a danger. All this points to difficulties that arise during incubation, but with regular water analysis, many of these can be avoided with timely detection and the implementation of necessary fish farming measures.

Conclusions.

1. When raising fish in tanks, if the incoming water is low in oxygen, an additional aeration device must be installed. Even a simple homemade device can increase the oxygen content in the incoming water by 0.5 mg/L.
2. Since high stocking densities are used when growing fish in flow-through tanks, such parameters as stocking density and the time of complete water replacement in the tanks should be carefully calculated in order to ensure optimal hydrochemical parameters of water quality at each stage of cultivation.
3. Incubation, as the most important stage in the fish breeding process, requires particularly careful hydrochemical control.

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