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THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE DEVELOPMENT AND REPRODUCTION OF WHITE PERCH (SANDER LUCIOPERCA L).

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Abstract: The abstract provides information about the effects of environmental factors on the development and reproduction of pikeperch (Sander lucioperca L), including water temperature, pH level, salinity, water level, aquatic fauna distribution, and competition with other fish species. Optimal conditions for the fish's development have been identified.

Keywords: pikeperch (Sander lucioperca L), ecological factors, water temperature, oxygen, pollution, salinity level, pH level, optimal conditions, aquaculture, rheophilic, invasive, obligate, pesticides.

Introduction.

Providing the world's population with adequate food, including through the effective use of existing water resources, is one of the urgent problems of today. Fish is a very valuable food product, the main supplier of which is the global fishing industry, which annually produces 86.4 million tons in the world's oceans and 10.8 million tons from inland water bodies (FAO, 2020). In our republic, great attention is paid to the effective use of natural and artificial water bodies. In this regard, due to the fact that the local ichthyofauna, in which rheophilic fish species predominate, is determined by its characteristics, certain scientific results are being achieved in acclimatizing fish species and artificially forming hunting ichthyofauna. The Development Strategy of New Uzbekistan for 2022-2026 sets out tasks for "...radically reforming the water resources management system" as well as "...increasing the volume of livestock production by 1.5-2 times." In carrying out these tasks, it is of great scientific and practical importance to analyze the effectiveness of the adaptation of white sla fish to new conditions, study the influence of external environmental factors in the areas where the species is distributed, and analyze optimal conditions. In Uzbekistan, the white sla fish lived in the Aral Sea, in the lower reaches of the Amu Darya and Syrdarya (which disappeared due to the development of the ecological crisis). In order to increase the fish productivity of newly formed water bodies in the lowland, including the middle reaches of the Syrdarya, the Aydar-Arnasay lake system, the resettlement of white sla fish from the Ural River began in the 1960s. It has become an object of extremely important fishing value in our republic. White sla fish is a highly plastic species that lives in both fresh and slightly saline waters, a fast-growing predator, reaches a length of 1 m and a weight of up to 18 kg. The number of spines on the lateral line is 87-99, the number of spines on the first arc of the auricle is 11-13. White sla is a fish with an average cycle. In the south of the temperate climate zone, it reaches its standard body length of 29-40 cm, reaches sexual maturity for the first time at the age of 2-4 years, reproduces in late March - early April, lays its eggs in burrows at a depth of 0.25-1.5 meters, the male guards the eggs and young fry. It has a high fecundity, that is, the absolute fecundity of white perch at the age of 2-6 years in the republican conditions is 20-500 thousand pieces. An obligate (strict) predator, it begins to feed on fish from the first year of life. Its population directly depends on the ecological state of water bodies. White perch Sander lucioperca L. (more commonly known as "sudak" or "European pike

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perch") - lives mainly in freshwater bodies. Its development is greatly influenced by environmental factors. The main ones are listed below:

1. Water temperature. Water temperature directly affects the growth, reproduction and motor activity of white sla. Too low or high temperatures cause the fish to become stressed or slow down their growth. Optimum growth temperature: 18–24 °C Minimum temperature (at which vital activity is maintained): 4–6 °C

The temperature required for the start of reproduction: 12–14 °C When the water temperature exceeds 28 °C, growth slows down and a state of stress begins.

2. Oxygen saturation of water. If the oxygen content is insufficient, it becomes difficult for the species to survive and grow. The most favorable oxygen level: 6 mg/l and above. Optimal oxygen level: 6–8 mg/l Minimum tolerable level: 3 mg/l If the oxygen content is less than 3 mg/l, growth slows down, and even death is observed. In water with an oxygen content of 5 mg/l, the growth rate decreases by 20–25%.

3. Food resources. White sla is a predatory fish, feeding mainly on small fish (for example, plankton, crustaceans and other small fish, fish fry, small crucian carp, etc.). Lack of food base leads to a decrease in the fish population. White sla grows by an average of 20–30 cm per year, this indicator is observed with a full food supply. If food is scarce, the growth rate decreases by 2 times. Average annual weight gain: 200–400 g (with full food)

4. Water salinity. White sla is mainly found in freshwater bodies, but can also live in slightly brackish water. Very high salinity has a negative effect. It can live in the range of 0–5‰ (per mille). If it is higher than 6‰, growth and reproduction processes slow down sharply. Optimal pH: 7.0 – 8.0 Limit values: 6.5 – 8.5 Egg survival rate drops to 40% below pH 6.0

5. Habitat structure. Natural habitats (sandy or gravel bottom, areas among algae) are important for fish to feel safe and hunt. Creating habitats in artificial reservoirs (for example, artificial reefs) is beneficial for fish.

6. Water pollution. Chemical pollutants (pesticides, heavy metals, petroleum products) have a negative effect on fish health. Biological pollution of water (organic matter, sewage effluents) also leads to oxygen deficiency. Ammonia (NH_3): Above 0.02 mg/l, egg survival rate drops from 60% to 25%. Nitrite (NO_2^-): above 0.1 mg/l, causes damage to the circulatory system. Heavy metals (Pb, Cd, Hg): accumulate in the liver and kidneys of fish and negatively affect reproduction. Biological pollution of water (organic matter, sewage flows) also leads to oxygen deficiency.

7. Conditions during the breeding season During the breeding season, water temperature and the presence of quiet, safe places are very important. White sla lays its eggs on the bottom of the water or in grass. Therefore, sudden changes in water level during the breeding season can lead to the death of eggs. The female lays: 200,000 - 900,000 eggs in one season. If the water level is not stable or the water is dirty, up to 30-50% of the eggs may die.

Conclusion

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The development of Sander lucioperca L. fish is directly dependent on environmental factors, in particular water temperature, oxygen content, water salinity, pH level, nutrient base and ecological stability. Studies show that the optimal growth temperature of white perch is 18–25°C, under which conditions its feed consumption, metabolism and growth rate are at a high level. Under low oxygen or eutrophic conditions, the vital activity of white perch decreases, the immune system weakens and the survival rate decreases. If the pH level of the water is in the range of 7.0–8.0, this provides the most favorable environment for white perch. In excessively acidic or alkaline conditions, fish growth slows down and physiological stress increases. Insufficient food resources have a negative impact not only on growth rate, but also on the overall density and genetic stability of the population. Also, anthropogenic factors such as pollution, construction of reservoirs, illegal hunting and climate change limit the natural habitat of white sla fish. Global warming and oxygen depletion pose a threat to the wild population of white sla. Based on the above, environmental monitoring, water quality control and creation of optimal conditions in artificial breeding systems are of great importance for the sustainable development of white sla fish. This will allow protecting fish resources and achieving high productivity in aquaculture.

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