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LIVE FOOD IN STARTER FEEDING STURGEON JUVENILES

ЖИВІ КОРМА У СТАРТОВІЙ ГОДІВЛІ МОЛОДІ ОСЕТРОВИХ РИБ

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One of the most important tasks in modern fish farming is to obtain viable grown-up fish juveniles for pond and lake farms, as well as for reservoirs. The transition to the industrial methods of fish reproducing and growing theoretically makes it possible to obtain any required number of larvae, but in practice it is limited by the lack of complete starter food. Using compound food due to the absence of live food leads to high larvae mortality in their first rearing days and their low vitality.

Aquaculture is the fastest developing food production sector. The priority areas of freshwater aquaculture are trout and sturgeon farming [1, p. 105].

Currently, commercial sturgeon farming is an actively developing branch of industrial fish farming. When switching to exogenous nutrition growing juveniles is one of the most "problematic" stages of the technological cycle of industrial sturgeon farming. To obtain full-fledged juveniles, in order to accelerate the cultivation of marketable fish in the industrial enterprises, live food is needed for the larvae.

When switching to exogenous nutrition growing juveniles is one of the most "problematic" stages in the technological cycle. There is usually a significant loss of juveniles at this stage. Under natural conditions in the first days of exogenous feeding, a variety of benthic organisms becomes food for sturgeons, and therefore, a characteristic feature of juvenile sturgeons is euryphagy in relation to food objects.

Live and artificial starter food is used to raise fish larvae. However, dry microbial food is inferior to animal food, juveniles grow worse and their survival rate is lower. The digestive organs of the larvae are underdeveloped, the pancreas is not formed, and the activity of alkaline proteases (enzymes that break down protein) in the intestines is very weak. The enzymatic activity of extracts from artemia nauplii and zooplankton (rotifers, bosminae, cyclops) is 2–3 times higher than the intestines of larvae. Consequently, fish juveniles use enzymes from invertebrates supplied as live food [1, p. 65].

Sturgeon, unlike other fish species, require higher protein food. First of all, it concerns sturgeon juveniles.

Free embryos (or prelarvae) hatched from eggs are kept at rest for one-two weeks, depending on external environmental factors and the type of fish. At this time, the vital activity of the body is supported by the supply of the yolk sac. The period of endogenous nutrition (due to the yolk) ends with the release of the "melanin plug". From this moment, the larvae are ready to eat external food, and they must begin to be fed.

Since this act takes time and does not occur simultaneously in all fish, to begin regular feeding the larvae when the "plugs" are released in 15–20% of individuals is considered advisable [6, 8]. It is very important not to be late with the start of feeding because not only the subsequent growth of the fish but above all their survival and resistance to external influences largely depends on it [2, p. 77].

It is recommended to use live food at least until the juveniles reach a weight of 200–250 mg, although, if possible, it is recommended to use it and during the later period – up to a fish weight of 1–2 g.

For normal growing and forming the larvae digestive system in the first days of feeding the following live food is recommended to use: artemia nauplii (*Artemia*), daphnia (*Daphnia magna*), moina (*Moina macrocopa*), copepods (*Copepoda*), small branchiopods (*Streptocephalus torvicornis*), rotifer (*Rotatoria*), chironomid larvae (*Chironomus plumosus*), gammaridae

(*Gammaridae*), oligochaeta Oligochaeta (white worms *Enchitreus albus*), tubifex (*Tubifex tubifex*) and Californian worm (*Eisenia foetida*) [2, p. 12].

Then, as the fish grow, they are given larger forms of food organisms, and their daily rates of additives to the starter food are gradually reduced.

When reproducing juveniles, appropriate feed raw materials closed in composition to natural food (fish hydrolysates, hydrolysates from hydrobionts), should be used [3, p. 75].

Proteins from living food organisms are the most complete in terms of their amino acids composition, which contributes to the optimal growth and development of sturgeon juveniles. In addition, small zooplankton is rich in soluble proteins and dispersed nitrogenous products – small peptides and free amino acids.

Natural feeds are characterized by high nutritional value, significant protein content, fat content, essential amino acids, vitamins, enzymes and other vital components for fish juveniles. Live food increases the survival rate of juvenile stages of aquatic organisms and increases the production profitability in general [1, p. 62].

Modern technologies of industrial cultivation make high demands to the food quality and rationing; the emergence of new starter food with increased digestibility determines the need to develop scientifically based feeding standards and to compile the most effective diets.

Bibliography:

1. Миськовець Н. П. Аналіз сучасного стану та перспективи розвитку рибного господарства України. Бізнес Інформ. 2020. № 3. С. 104–111. DOI:10.32983/2222-4459-2020-3-104-111

2. Стратегії сталого розвитку європейської аквакультури. URL: https://darg.gov.ua/files/6/strtroz16.doc

3. Стан світових рибних запасів (по доповіді ФАО 2022 р.) URL: https://fishindustry.com.ua/stan-svitovix-ribnix-zapasiv-po-dopovidi-fao-2020-r/

4. Rosamond, L. Naylor, et al. (2021). A 20-year retrospective review of global aquaculture. Nature, 591, 551-563.