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AGRICULTURAL SCIENCES

PRACTICAL ASPECTS OF AQUACULTURE UNDER THE CONDITIONS OF EURO INTEGRATION

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Introductions. The technological conditions of modern production of aquaculture products identify the "quality" of biological products, as a product of the accumulation of all successive steps of the process. At the same time, the modern buyer shows a desire to control the entire production process: from the beginning of the choice of the cultivation object to the quality characteristics of the finished product, which is on the shelves of supermarkets.

Of course, the conditions of the "closed" cultivation of aquatic organisms provide maximum control of hydro-chemical parameters, which makes it possible to optimally select each of the options. Recirculation systems are a trendy solution to this aspect. At the same time, aquatic organisms that are grown under such conditions can easily be adapted to specific conditions: temperature regime, oxygen concentration, acidity, water salinity, type of cultivation (polyculture, monoculture, stocking density, aquaponics, etc.) [1]. European standards require high requirements for the production of products with the quality label "Organic", "Biological". In Ukraine, this direction is developing at a very slow pace. First of all, an obstacle is the regulatory framework of documentation and standards. And, of course, further difficulties arise in the technological aspects of feeding aquatic organisms. In addition, the issue of hydrology of water areas and the development of technological recommendations for improving their condition and stocking with persistent juveniles is relevant, if we are talking about fish for open water areas. The use of recirculation systems for rearing juvenile fish to vital stages with their subsequent introduction can solve this issue [2]. The organization of the practical side of organic aquaculture provides for a sequential cycle of special components of the entire cultivation cycle of an aquaculture object: these are special feeds that should exclude growth stimulants, chemical additives from the composition, total control over the parameters of hydrochemistry in reservoirs where hydrobionts are located, etc. In aquaculture, there are enough practical results that reflect the positive results of the use of non-traditional natural (alternative) natural food for feeding fish [3, 1]. But the experience of introducing the technological aspects of this

section into the technological chart of fish farming for the entire cycle is not enough. Therefore, the topic is relevant, and the issue of practical value is open and debatable.

Aim. The main objective of this study was to study the practical efficiency of growing aquatic organisms in the most adapted conditions for the production of environmentally safe aquaculture products. To study the rate of development in ontogeny of aquatic organisms in a modeled recirculation-type system using the example of tilapia and the formation of a nest (family) in a ratio of 1: 5♂♀. Analysis of this issue in world aquaculture and study of the practical value of using tilapia as the main object in recirculating aquaculture.

Materials and methods. The set task is being achieved by the fact that the fish, in order to increase their viability and growth intensity, is being placed in the recirculation system of the basin. In the module installation, the sectional units of reservoir for the cultivation of microalgae. All experimental work was realized in the laboratory of the aquatic bioresourses and aquaculture of KSAU (Kherson State Agrarian University). With each week of development, during the feeding, the amount of feed was increased in proportion to the body weight against the background of monitoring of the general functional status of the tilapia organism. Hydrochemical monitoring in the module system was performed systematically by express methods and in the laboratory according to the leading commonly accepted indicators in fish breeding [4, 5].

Results and discussion. Based on the data provided by FAO (Food and Agriculture Organization of the United Nations) [6], in the middle of the production of aquaculture products of the main species, it will become 44453 tons in 2017 and 54,091 tons in 2019. It should be noted that this amount includes not only freshwater and marine species of hydrobionts of the industrial industry, but also such species of hydrobionts, which are considered by the rate of the rate and industrial virobnastics, and such more than 21 species. According to the statistical data, having analyzed the representatives of the larger ones for the climatic minds of Ukraine, it seems that the number of cow species (Cyprinus carpio, Cyprinidae) becomes 9.84% in 2017, the majority of the total amount is 9.66%, - 15.95% in 2017 and 16.32% in 2019, grass carp (Ctenopharyngodon idellus, Mylopharyngodon piceus) - 12.4% in 2017 and 12.38% in 2019, catfish (Pangasius spp.) - 1 , 24% in 2017 and 1.80% in 2019. At that hour, the indicators are ranked in the following order, like: in 2017 it is 9.3%, and in 2019 - 9.94%. This means that, based on the above indicators, we have chosen tilapia as a model object of research. Research results have shown positive results in the rate of development of tilapia in ontogenesis. When fish were reared in tanks of a recirculation system using natural feed with additional feeding, a high percentage of safety (survival) of aquatic organisms was obtained. Development indicators: average daily body weight gain, average body weight during the period of active growth and after the formation of a family (nest) of the spawning period, the coefficient of nutritional status of fish were significantly higher than those in the group where tilapia was fed only with a general diet. A fragment of a modular recirculation system for growing tilapia is shown in the following Figure 1.

Figure 1. Fragment of a recirculation-type system for growing tilapia during the experiment

The features of the exterior profile of tilapia, which was used as a model object in cultivation, are shown in Figure 2.

Figure 2. Exterior features of the model object - *Florida red tilapia*

It should be noted that tilapia of this species showed good growth rates, productive parameters when grown in recirculation-type systems. The additional introduction of natural food into the diet of fish helped to stimulate metabolic processes in the body of aquatic organisms. Feeding food without chemical and hormonal growth stimulants and cultivation in the presented model system provides an opportunity to obtain better and more environmentally friendly aquaculture products. The results of studying the average body weight of tilapia are presented in the diagram in Figure 3.

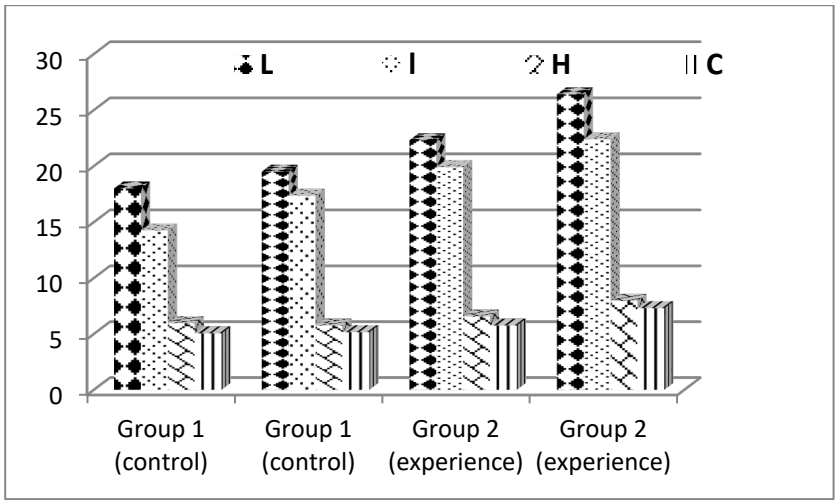

Figure 3. Analysis of the average body weight of tilapia when grown in recirculation-type systems

In addition, the analysis of the hydrochemical state of systems with fish showed their compliance with the standards in aquaculture for a thermophilic fish species. This demonstrates the absence of a conflict between the fodder mass fed to tilapia and hydrochemistry indices.

Conclusions. The results of the experiment, which were obtained, presented an opportunity to conclude a positive result of growing tilapia in a recirculation system. Supplementary feeding of fish with natural food helps to improve development, increase body weight and productivity. Maximum control and regulation of the hydrochemical regime is an advantage for this technology. In addition, the possibility of forming a nest (family) in an optimal ratio makes it possible to make the period of cultivation of tilapia in the recirculation system full-cycle. The production of eggs and their subsequent incubation will make aquaculture production attractive and profitable.

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