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USE OF INNOVATIVE TECHNOLOGIES IN THE CULTIVATION OF FISH PRODUCTS

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ABSTRACT:
The article examines the issues of development of intensive methods of organization and formation processes of production of fish products, taking into account geographic location, environmental conditions, availability of each region of Water Resources of Uzbekistan, developed implementation mechanism and carried out analysis of system products.

Key words: intensive technology, model, ecosystem, fish ponds, concentration, fiberglass pond, Carp, White carp, White Amur, Chipor carp

Introduction

The Resolution of the President of the Republic of Uzbekistan No. PP-4816 dated August 29, 2020 provides for the support of the fishing industry in the Republic, increasing the efficiency of fisheries and fishing farms, rational and efficient use of land and land resources and the widespread introduction of intensive technologies.

Uzbekistan has no access to the seas, so the flow of the main rivers of the Republic is controlled for irrigation and energy needs, and the existing inland water bodies are relatively small. Under these conditions, fishing and fish farming cannot be the sole or main source, which makes it necessary to develop aquaculture as the main source of fish grown in the republic.

Problem statement. Intensive fish farming in Uzbekistan has been proven to be cost-effective in the first phase in low-cost and easily constructed streams, which are currently being developed in the country through the Localization Program [2] (Figure 1).

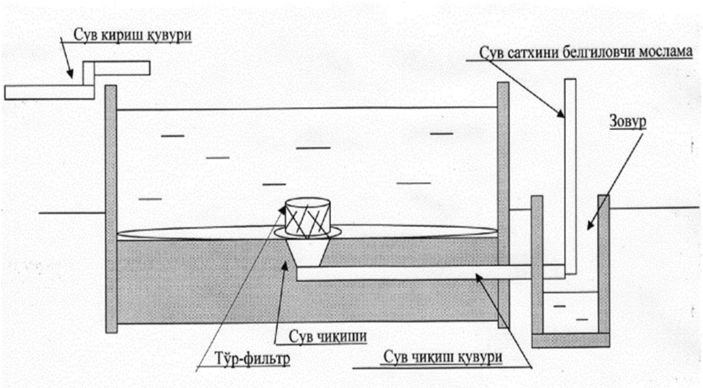

Figure 1. Glass-plastic pool.

Figure 1 shows the condition of the mesh filter, water outlet pipe, water inlet pipe, water level marker in fiberglass basins. Construction of artesian wells, near rivers, canals, collectors and drainage systems in areas where there is a possibility of reclaiming flat and used water provides good economic efficiency.

Fiberglass pools have been shown to be constructed in flat areas with a hard and gravel base, while concrete-type pools have been shown to be constructed in areas with good soil and ease of excavation [4,6].

The dimensions of the pools can be square, elongated or round, and depending on the requirements of the fishery, its sides are 2x2, 2.5x2.5 and

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5-10 meters, and the depth is 0.5-1.0-1.5 meters.

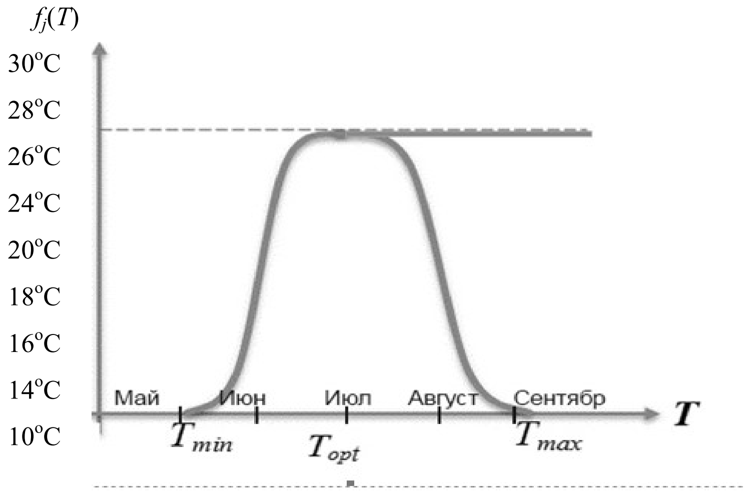

Figure 2. Dynamic scheme of forage supply in intensive fish farming

The figure shows that in the conditions of Uzbekistan from May to September, the increase in water temperature is closely related to the nutrition of fish. This condition can be expressed in the Lehmann function.

The temperature function of growth. The temperature dependence of the growth of organisms is described using

$$f_j(T)=\begin{cases} exp\left[-4,6\cdot\left(\dfrac{T^j_{opt}-T}{T^j_{opt}-T^j_{min}}\right)^4\right], T<T^j_{opt} \\ exp\left[-4,6\cdot\left(\dfrac{T-T^j_{opt}}{T^j_{max}-T^j_{opt}}\right)^4\right], T\geq T^j_{opt}, \end{cases}$$

a modified Leman function:

here T^j_{opt} – *j*- the optimum temperature for the development of the organism, Tjmin, Tjmax - j-accuracy of the corresponding minimum and maximum limits of temperature tolerance of the organism is included [1,5].

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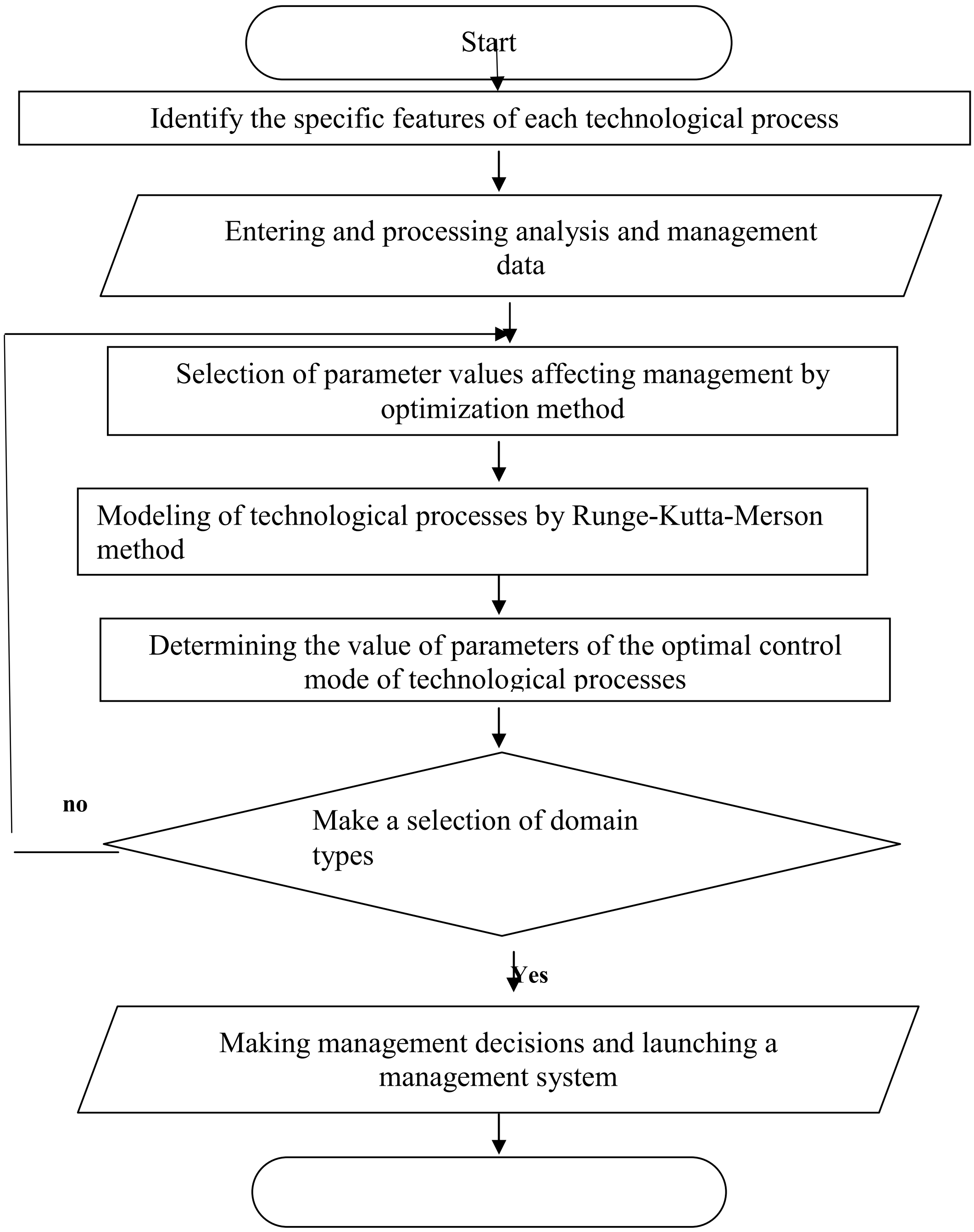

Figure 3. Algorithm for controlling the technological process of fish farming.

The algorithm identifies the specific characteristics of each technological process, selects the method of optimizing the values of parameters affecting management, modeling of technological processes in the Runge-Kutta-Merson method, provided that the choice of domain types depends on climatic conditions. The algorithm completes the management decisions and launches the management system.

Results obtained and their analysis. The practical significance of the results is that the placement of technological processes of fish farming in multi-chain facilities in regional natural or artificial reservoirs in accordance with geographical information resources ensures water conservation and cleanliness, meets the needs of the population for fish products, and software management of fish farming. performs.

If white-tailed deer is chosen as the dominant species in the farm, then phytoplankton will be the main food for fish. The main source for this is organic and mineral fertilizers. If white amur is chosen, then the main food is a green plant

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(grass, ryaska, azolo, wolfia). If carp is chosen, it is based on natural nutrients and mixed feeds and fertilizers. If cypress is selected, it is applied on the basis of organic fertilizers (Table 1) [3].

Table 1

The following is a selection of fish transfer rates (per thousand) in pliculture options.

Options	Bulletproof	White amur	Carp	Chipor dungpeshana	Total thousand pieces / ha
1	50	15	2,5	2,5	70
2	10	20	10	-	40
3	20	80	10	-	110
4	10	10	50	30	100
5	-	15	5	40	60

If the fisherman plans to grow whitefish as the dominant species, then option 1 is chosen. In options 2 and 5, the fish are raised to a larger size. All small fish (1-2 g) are fed with zooplankton for 8-10 days. After 8–10 days, each species begins to switch to a food that is specific or characteristic of the adult fish species (when it is 3-5 g) (Table 1).

Infrastructure and integrated management system for intensive cultivation of multi-chain fish products in regional natural and artificial reservoirs has been developed. The system of control of the technological process of fish farming, taking into account the composition and temperature of the regional water, provides intensive and high-quality, low-loss fish products [7,8].

Conclusion. Multi-chain fish farming process management system models and algorithms are used to manage fish farming processes in regional watersheds by developing technology to extract fish feed from agricultural waste, ie by destroying fish fry through the introduction of rational feed regimes. reducing the division status by 20%, saving 32% of the daily feed intake and achieving a 2-fold increase in fish productivity.

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