



Research Journal of Pharmaceutical, Biological and Chemical Sciences

The Technology Of Raising Rainbow Trout On The Farms.

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ABSTRACT

The technology of raising rainbow trout on the farms is described in the article. The authors give the results of studying the influence of feed produced by different companies and natural zeolites on the growth of marketable fish, and the assessment of the ecological cleanliness of the fish grown has been given.

Keywords: fish farming, rainbow trout, feed, natural zeolites, gain, weight, indicators of safety, economic efficiency

<https://doi.org/10.33887/rjpbcs/2019.10.3.27>

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INTRODUCTION

Salmon farming is one of the main areas of people’s activity in fish farming. Rainbow trout (*Oncorhynchus mykiss*) is one of the most widely reared salmon species.

Rainbow trout is of great importance in people’s lives. The meat of this fish is rich in easily digestible proteins, it is also rich in trace elements, but the most valuable is its content of unsaturated fatty acids. In addition, it is favorite activity of sport and amateur fishing.

Trout is a fish that loves cold, clean, oxygen-rich water, which usually can be found in streams, mountain rivers and lowland water reservoirs with a sandy or pebbled bed. This fish does not live in the dirty water. Therefore, the trout meat is considered to be not only wholesome, but it is also the most ecologically clean. In addition, it is a favorite occupation of sport and amateur fishing.

There are all the required conditions in the Ulyanovsk region for the trout farming development. A large number of small rivers flow through the region, there are many ponds and springs [3,4].

The objective of the study

To develop a technology of raising rainbow trout on farms, to determine the effectiveness of its rearing based on the example of the farm holding “Kuzakhmetov N.Sh” in the Ulyanovsk region. To assess the influence of feeds produced by different companies and natural zeolites on the growth of the marketable fish, to determine the ecological cleanliness of the fish grown.

RESEARCH RESULTS

The technology of rearing rainbow trout was developed, which does not require a lot of expenses. Fish is kept in the pools(tanks) of a rectangular shape, made of concrete. The width of the pools varies from 4 to 6 m, length - from 6 to 24 m, depth - 1.2 m. An open canal is used for the water supply of the pools, which goes from the river Izbalyk. The supply and discharge of water for each pool are independent (Fig. 1).

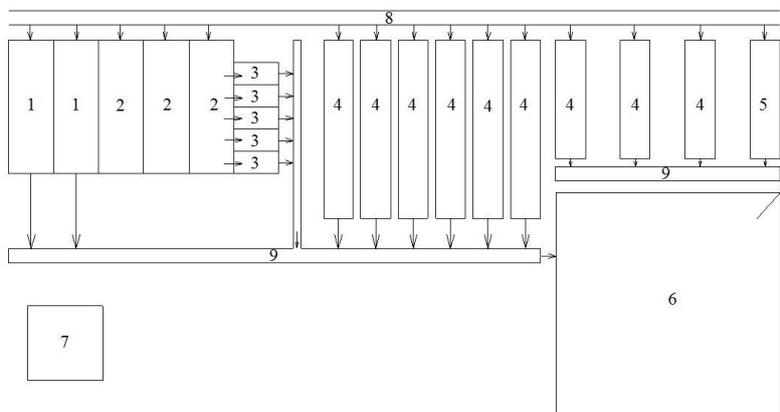


Figure 1: Diagram of the trout raising farm

1 – pools for brood stock size 18x6 m; 2 - pools for fingerlings of 18 x 6 m in size; 3 - pools for rearing young fry size 6 x 3 m; 4 - commercial fish pools of 24 x 4 m and 16 x 4 m; 5 – pool for keeping fish in quarantine 16 x 4 m in size; 6 - a settling pool, 30 x 30 m in size; 7 - incubation workshop; 8 - water supply conduit; 9 - drainage channel

The temperature of groundwater that feeds the river Izbalyk, in the winter is 7-8 ° C, and in the summer 12-13 ° C, and it is the most optimum temperature condition for raising cold-water fishes. The oxygen content in water is more than 10%.

The amount and correct choice of the feed for trout raising determine the profitability of production.

Currently, there is a huge amount of feed for salmon fishes on the market, produced both at domestic and foreign plants [5,6]. In the experiment, two types of feed with the same feed ratio were used: AQUAREX was used in the control group and COPPENS in the experimental group.

Differences were established in the weight gain and growth rates in fish of different groups. It was found that the use of COPPENS compound feeds contributed to the highest activity of growth processes in rainbow trout (Table 1).

Table 1: Growth parameters in rainbow trout while using different types of feed (n=50)

Date of control catch	AQUAREX (control group)		COPPENS (experimental group)	
	weight, g.	length, cm	weight, g.	length, cm
March 30	107,8±2,5	20,5±0,8	107,8±2,5	20,5±0,8
April 29	114,49 ±4,8	20,9±1,2	116,37±3,2	21,1±1,3
May 29	135,7±3,1	21,7±0,83	141,94±2,8	22,6±0,85
June 28	203,8±4,2	23,2±0,78	212,94±4,1	24,8±0,64
July 29	326,6±5,4	25,4±1,08	348,65±6,1	26,9±1,24
August 29	522,7±4,9	27,3±1,1	568,22±5,8	29,2±1,12
September 28	694,3±7,3	31,4±1,2	732,07±6,1	32,6±1,03

So the total weight gain in the fish of the experimental group where the feed of the company COPPENS was used for feeding, was 624.27 g, the length increased by 12.1 cm, which is more by 37.77 g or 6.4% and 1.2 cm or 11.0 %, respectively, compared with the control group of fish where AQUAREX feed was used for feeding.

In view of the freshwater aquaculture conditions there is a need for additional introduction of trace elements required for normal life of the fish.

Silica marl, extracted from zeolite-containing rocks of the Siuch-Yushansky site of the Mainsky district of the Ulyanovsk region, was used as a mineral additive.

Zeolite was added to the feed AQUAREX “Trout-Growth” at a rate of 2% of the total feed amount. For feeding the fish of the control group, the same feed was used, without adding zeolite.

The results of the evaluation of the effectiveness of diets in view of fish-biological indicators are presented in table 2.

Table 2: Fish rearing and biological indicators for rainbow trout fed with the addition of natural zeolite

Indicator	Control group	Experiment group
Weight initial, g	343,6± 0,96	353,1± 0,82
Weight final, g	412,97± 1,52	441,39±1,93
Total weight gain, g	69,37	88,29
Daily average weight gain, g	1,16	1,47
Survival rate, %	100	100
Feed consumption, kg	1,4	1,2
Experiment duration, days.	60	60

The total weight gain of trout for 60 days of raising in the pools with the addition of zeolite relative to the control was 127.3%. The indexes of average daily growth exceeded those of the control by 0.31 g. At the same time, feed consumption of the feed mixture with zeolite was lower than that of the control group by 0.2 kg. In both cases, the survival rate was 100%.

To determine the ecological cleanliness, the grown fish was examined according to safety standards. Strontium and cesium in the studied fish were not found. The cadmium content was 0.01 mg / kg, arsenic - less than 0.1 mg / kg, mercury - 0.001 mg / kg, lead - 0.02 mg / kg. All indexes are significantly lower than the standard requirements.

A combination of factors, such as optimal conditions for raising trout (water temperature, flow rate, oxygen content and the absence of harmful impurities in the water, flowage, etc.), as well as specialized fish food, manufactured in accordance with the European standards and adapted to local conditions, the use of the mineral supplement of silica marl allowed us to achieve high economic indexes (Table 3).

Table 3: Economic efficiency of rearing rainbow trout on the farm “Farm Holding Kuzakhmetov N.Sh.”

Indicator	Result
Number of fish, pieces	30000
Cost of 1 kg of the fry, roubles	480
Cost of the total amount of the fry, thousand roubles	1440,0
Weight of 1 fish at the beginning of the experiment, g	100
Weight of 1 fish at the end of the experiment, g	732
Weight gain for the period, g	632
Ichthyomass gain for the period, kg	18960
Price of 1 kg of mixed feed, roub.	126
Mixed feed fed for the group, kg	26164,8
Price of mixed feed total, thousand roubles	3296,76
Feed consumption for 1 kg of weight gain, kg	1,38
Sale price of 1 kg of fish, roubles.	450
Income from the sale of the produce, thousand roubles	9882,0
Production expenses, thousand roubles.	540
Expenditures total, thousand roubles.	5276,76
Cost of production of 1 kg of fish, roubles.	240,3
Profit from the sale of fish, roubles.	4605,24
Profit from the sale of 1 kg of fish, roubles.	209,7
Cost efficiency, %	87,2

The analysis of the table shows that the profitability of rearing rainbow trout is 87.2%, the cost of reared fish is relatively small - 240.3 per kg, the profit from the sale of 1 kg of fish is 209.7 rubles.

CONCLUSIONS

- Rearing rainbow trout on the farms of the Ulyanovsk region is economically profitable, it allows one to get ecologically clean meat of high quality, ooze odorless, characteristic of artificially reared fish.
- Safety standards of farmed fish meet the requirements of the state standard (GOST).
- The total weight gain and length of the fish, in the feeding of which the feed of the company COPPENS was used was more by 37.77 g or 6.4% and 1.2 cm or 11.0%, respectively, compared with the similar indicators of the fish fed with AQUAREX.
- The introduction of natural zeolite to the diet of rainbow trout contributes to a faster growth: the average daily gain of fish from the experimental group was 0.31 g more compared to the control, the total weight gain of trout after the control 60 days of growing increased by 27.3%, while costs decreased by 0.2 kg.

REFERENCES

- [1] Ponomaryov S.V. Salmon farming. Moscow, Morkniga, 2012, p.561
- [2] Mokhov B.P., Naumova V.V., Vasina S.B., Kiryanov D.A., Shabalina E.P. Aquaculture - innovative approaches to increasing fish productivity. In the collection of works: Catalog of scientific developments and innovative projects. Ulyanovsk, 2015, p. 41.
- [3] Khasanov L.Sh. Naumova V.V., Vasina S.B. Natural and climatic conditions and physico-chemical indicators of the ponds of the fish farm “IP Khasanov” in the Sengiley district of the Ulyanovsk region. Agrarian science and education at the present stage of development: experience, problems and ways to solve them. University, 2012; Vol. 1: 84-89.



- [4] Naumova V.V., Kiryanov D.A., Sveshnikova E.V., Smirnova A.N. The comparative assessment of the degree of the toxic element accumulation in the organism of different fish species reared in recirculating aquaculture systems. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2018; Vol. 9;№ 4: 139-142.
- [5] Khasanov L.Sh., Naumova V.V., Vasina S.B. The effectiveness of the mixed feeds use produced by different companies when feeding young fry of rainbow trout. *Agrarian science and education at the present stage of development: experience, problems and ways to solve them*. Ulyanovsk, 2012; Vol. 1: 89-94.
- [6] Naumova V.V., Vasina S.B., Kiryanov D.A. Efficiency of using the feeds Coppens International and Aller Agva when rearing rainbow trout (*Salmo Iridius*). *State and ways of developing aquaculture in the Russian Federation in the light of import substitution and ensuring the country's food security: materials of the national scientific conference*. Saratov, 2016, pp.84-88.