ISSN NO: 2771-8840
February 2025

Cultivation Of Tilapia (*Oreochromis Mossambicus*) In Various Water Reservoirs In Karakalpakstan

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Abstract. This article provides information on the cultivation of Tilapia (*Oreochromis mossambicus*) in various types of water in the conditions of Karakalpakstan. Research work was carried out in 3 different water bodies, namely geothermal springs, closed water circulation systems, and artificial reservoirs, and their chemical composition was determined. During the research work, the average body weight of fish and the ratio of their caviars to body weight were determined in different types of water bodies.
Keywords: Tilapia, caviar, geothermal waters, chemical composition of waters, Takhtakupyr district, Nukus city, Khojeyli district, Karakalpakstan.

Introduction. Today, there are more than 650 water bodies in the Republic, of which 146 (83,244 ha) are natural and more than 500 (2,516 ha) are artificial. At the initiative of our president, work is underway to establish at least one intensive water reservoir in each district, starting in 2022. To date, several fish species (Hungarian carp, silver tilapia, etc.) have been acclimatized to natural and artificial water reservoirs in the Republic. Tilapia belong to the order Perciformes, suborder Percoidei, family Cichlidae, and family Tilapiinae. The family includes more than 1500 tropical and subtropical fish species, which are widespread in the tropical waters of South and Central America, Africa, Southeast Asia, and India. In the basins of the Amazon and Orinoco rivers, Africa, and the large lakes of East Africa, Malawi, Tanganika, Niasa, Victoria, and cyclids are the main representatives of the local ichthyofauna and an important object of the fishing industry[2]. Tilapia is grown in more than 120 countries worldwide. The largest producers are China–51% (897.3 thousand tons), Southeast Asian countries (Philippines, Indonesia, Thailand), Mexico, and Egypt. In Europe, tilapia are grown in Germany, France, Belgium, the Czech Republic, Bulgaria, and other countries. China is gradually placing its leading position in aquaculture in Nigeria and other African countries. In recent years, the volume of aquaculture production in the sub-Saharan zone has increased 20 times. Chile and Indonesia are in 2nd place in terms of aquaculture growth rates, whereas Norway and Vietnam are ranked 3rd place [5].

Materials and research methods. Research work was carried out in 2023-2024 in hot water and geothermal springs (Takhtakupyr district), a closed water circulation system (in the city of Nukus), and an artificial reservoir (in the Khojeyli district) located in the territory of Karakalpakstan.

For ichthyological studies, generally accepted methods of fish farming were used. Ichthyological analysis includes the determination of linear dimensions, weight, and fat content[3]. The growth rate of the studied fish was determined according to the adopted methods [1,4].

In the course of the research, exogenous feeding and feeding in different conditions with a single feed were carried out, and the influence of external factors and changes in the morphobiological characteristics of local fish species in different reservoir conditions were studied.

Research results and conclusions. Given the great potential of geothermal resources for use in fisheries, there is a need to develop new methods and technologies for the rational use of water resources for fish breeding and cultivation, including new heat-loving aquaculture facilities for Karakalpakstan.

Geothermal water supply in ponds varies depending on the season, which also affects the hydrochemical regime of the ponds. In experiments on studying the adaptive ability of Tilapia, their relationship to environmental factors was studied: temperature regime; chemical composition; water salinity depends on nitrite ion, ammonium ion, and pH value. In this regard, the salinity of the water in the studied areas was checked by the level of ionic nitrite, ammonium, and pH (Table 1).

Various types of aquaculture reservoirs exist in the Republic. Our research was conducted in the following reservoirs.

Table 1

The average pH, ion nitrite, and ion nitrate content in the water sources were checked at the minimum and maximum levels in the reservoirs.

№		Territories	Indicators	Normal	Result during the research
1	**Year 2023**	In the city of Nukus (closed water circulation system)	Ph	6.5-8.5	7.8
			Ion nitrite	0,08	0.1
			Ammonium ion	0,5	1.65
2		In Khojaly district (artificial reservoir)	Ph	6.5-8.5	6,7
			Ion nitrite	0,08	0,067
			Ammonium ion	0,5	0,63
3		In Takhtakupyr district (geothermal spring)	Ph	6.5-8.5	8
			Ion nitrite	0,08	0,12
			Ammonium ion	0,5	1,33
1	**Year 2024**	In the city of Nukus (closed water circulation system)	Ph	6.5-8.5	6,5
			Ion nitrite	0,08	0,12
			Ammonium ion	0,5	2,12
2		In Khojaly district (artificial reservoir)	Ph	6.5-8.5	6,6
			Ion nitrite	0,08	0,14
			Ammonium ion	0,5	1,8
3		In Takhtakupyr district (geothermal spring)	Ph	6.5-8.5	6,9
			Ion nitrite	0,08	0,08
			Ammonium ion	0,5	1,54

Closed water circulation system: Keeping in devices with a closed water use cycle allows for year-round cultivation of tilapia fish species. The research was conducted in the closed water circulation system of “Qarakalpoqbaliqsanoat” LLC. Fishing enterprises use groundwater. During the fish farming process, after the fish are released from the ponds, an increase in organic pollution and a decrease in the oxygen content in the water are observed. Sequential mechanical and biological treatment was used to prepare the water. The use of oxygenators in the system allows maintaining the optimal oxygen regime in the ponds.
The water temperature in the ponds is automatically maintained at a certain level. In general, we can conclude that the water quality in the closed ponds is acceptable for tilapia farming.
In artificial reservoirs: When growing tilapia in artificial reservoirs, the composition of fish of the same species in the reservoir is effective, which increases the possibility of reproduction. Because males of many species of artificial reservoirs grow faster than females, breeding only one male allows for a significant increase in production volumes. However, the selection and sorting of unisexual fish is labor-intensive, although males are much larger than females. They have large jaws and large heads, and their wings are larger, pointed, and elongated. Men are brighter in color. They also differ in the nature of their behavior, which is more aggressive.

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Thermal waters: Fish farming in geothermal waters is becoming widespread in our country. In addition, the chemical composition of geothermal water is characterized by the amount of dissolved salts and gases. In this regard, the formation of geothermal waters in different regions of the country and at different levels can differ significantly (Table 2).

Table 2

№	Districts	Hot water source	Suv temperaturasi
1	Muynak	Hot cranes	70 °C
2	Takhtakupir	Hot cranes	37 °C
3	Karauzak	Hot cranes	35 °C

In this study, tilapia (*O. Mossambicus*) were cultured in four groups of three ponds. According to the results of the research, the number of eggs in relation to the average weight of the tilapia fish and the average weight of the fish over a period of 1 year was determined.

Throughout the entire experiment, the temperature regime was maintained quite stably and was set within the range of 25-31°C, which is optimal for the growth of tylapia. The obtained data and materials were analyzed. During the study, 187 tilapia were selected and placed in four fish trays in different bodies of water. In particular, 71 tilapia were sent to the closed water circulation system, 67 to the artificial reservoir, and 49 to the geothermal water (Table 3).

Table 3

Proportion of tilapia with caviar to body weight in different water bodies

Fish trays	Various research water bodies	Body length (cm)	Number of fish (pcs)	Average body weight (g)	Ratio of caviar to body weight (gr)
1	In the city of Nukus (closed water circulation system)	11-20	17	107.2	0
2		21-30	19	167.1	25.1
3		31-40	20	239.9	26.3
4		41-50	15	392.1	29.1
Total:			**n=71**	**906.3**	**80.5**
1	In Khojaly district (artificial reservoir)	11-20	15	109.7	0
2		21-30	23	169.1	22.3
3		31-40	16	240.6	25.1
4		41-50	13	393.6	29.3
Total:			**n=67**	**913**	**76.7**
1	In Takhtakupyr district (geothermal spring)	11-20	11	166.5	0
2		21-30	15	172.3	25.5
3		31-40	13	242.1	27.3
4		41-50	10	395.1	30.2
Total:			**n=49**	**976**	**83**

3-month-old fish fry and two-year-old females with a tilapia length of 11–50 cm were selected for the experiment. In the conducted experiments, when analyzing 3-month-old shoots, it was found that tilyapias grown in thermal waters developed much better. In the 1st research pool, that is, with a closed water circulation system, a total of 71 fish were selected, with an average body weight of 906.3 grams, and the eggs weighed 80.5 grams relative to body weight. In the second study pool, the average weight was 91.3 g, and the ratio of caviar was 76.7. In the 3rd study basin, that is, in the hot water source of the Takhtakupyr district, we found that the average weight of fish was 976 g and the ratio of caviar was 83 g.

Conclusion. During the studies, we can see that 11-20 and 21-30-gram fry developed better in geothermal reservoirs than in other reservoirs. It was established that the ratio of caviar to body weight was practically the same in all water bodies.

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Based on the conducted research, it can be concluded that under the conditions of the Republic, there is an increase in the number of farms raising tilapia in pools and closed water circulation systems. Based on the results of our experiments, we observed that this species showed better results in geothermal water bodies.

List of references

1. Chugunova N.I. Guide to the Study of the Age and Growth of Fish. - M., 1959.-165 p.
2. Oziransky Yu., Kolesnyk N., Shcherbak S., Кononenko R., Fedorenko, M., Mosnitskyy, V., Nekrasov S. Modern status of fishery sectors of Israel (review). Rybohospodarska nauka Ukrayiny, 2017. 1, 6-28.
3. Pravdin I.F. Guide to the Study of Fish. - M.: Food Industry, 1966. - 376 p.
4. Privezentsev Yu.A. Intensive Pond Fish Farming. - M.: Agropromizdat 1991. P. 386.
5. http://aquacultura.org/news/mirovoy-spros-na-tilyapiyu-stabilen-na foneotnositelno-nizkikh-tsen