The Composition and Status of Fish Species in the Current Conditions of Tuzkan Lake

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Abstract: In the article, the geographic location, physical-chemical condition, and ichthyofaunistic characteristics of Lake Tuzkan, identification of existing fish species using the detector. Biological characteristics of representatives of Tuzkan lake ichthyofauna. The current composition of fish species in Lake Tuzkan, their condition, the most common types of hunting importance, especially the plastic and meristic characteristics of the pikeperch fish (Sander lucioperca L), analysis by classical and modern methods, the pikeperch fish information on age size indicators is provided. The types and systematic status of the fish caught in the conducted research hunts, as well as industrially caught by the fishing brigades, were taken and their characteristics were determined using the available identifiers and the available identifier literature. Meristic indicators of fish were determined by counting and measuring plastic indicators. Collection, processing, and analysis of materials were carried out following generally accepted ichthyological methods. In the general biological analysis of the fish, their total length (TL) was measured with an accuracy of 0.1 cm, and standard length (SL) (to the point where the scales ended) was measured with an accuracy of 0.1 mm. The total body weight (W, g) was measured to the nearest 1 gram, and the species of fish present in Lake Tuzkan were determined.

1 INTRODUCTION

Supplying the population with food, preservation of biodiversity and effective use of natural resources are considered as the main problems in the world. In order to effectively use water resources, special attention is paid to the research work on increasing the fish productivity of water bodies, including the study of the species composition of hunting ichthyofauna for fishing. Also, in a number of developed European, North American, and Far Eastern countries, existing fish species in water bodies for recreational fishing are regularly monitored.

Fishing and pasture aquaculture in inland water bodies differ from the experience of developed countries in other regions, including Uzbekistan, due to differences in climate, location of water bodies, physical and chemical characteristics, and also the composition of ichthyofauna is unique. Therefore, it is necessary to carry out comprehensive research in each area. To increase the volume of fishing in the Tuzkan water basin, it is important to study the existing species in the area and their current ichthyofaunistic features in order to preserve biodiversity..

The successful organization of fishing in natural water bodies is closely related to the state of its ichthyofauna and its population. Therefore, it is important to determine the status of fish stocks in natural water bodies and to conduct scientific research on non-game fish and game fish, which depend on biodiversity, ecological balance and the survival of predatory fish. Obtaining information about the current state of the number of species, sexual maturity, and its reproduction is considered one of the urgent tasks of research in the field of ichthyology and fisheries (Dekhkonova, 2023).

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Until 1969, Tuzkon Lake was brackish water with a very high salinity (90 g/l) and dried up at the end of summer due to the melting of snow and spring rainwater. In 1969, Lake Tuzkon was connected to Aydarkol through a narrow channel and was constantly flooded. Today, the area of theLake Tuzkon is 413 km^2, its length is 34 km, and its water volume is 1.07 km^3 (Dekhkonova, 2023). (Figure 1).

2 MATERIALS AND METHODS

Research work was carried out in Tuzakan Lake during 2020-2022. The fish caught in the conducted research hunts, as well as industrially caught by fishing crews, were taken and their types were identified using the existing identification and identification literature and the monograph "Fishes of Uzbekistan" (Yuldashov et al., 2018) by T.Salikhov, M.Yuldashov, B.Kamilov using their characteristic features. and clarifications were made to the systematic situation (Salikhov et al., 2001). Meristic characters of fish were determined by counting and by measuring plastic characters (Pravdin6 1966).

Collection, processing and analysis of materials were carried out in accordance with generally accepted ichthyological methods. In the general biological analysis of the fish, their total length (TL) was measured with an accuracy of 0.1 cm, and standard length (SL) (to the point where the scales ended) was measured with an accuracy of 0.1 mm. The total body weight (W, g) was measured to the nearest 1 gram, and the species of fish present in Tuzkan Lake were determined. (Table 1).

Figure 1: The geographical location of Tuzkan Lake[9].

Figure 2: Location of sampling sites in the Tuzkan Lake.

Research conducted in Tuzkan Lake revealed that the only obligate predatory fish is pikeperch in this water body. It was important to know the biological, morpho-ecological characteristics of the pikeperch fish in order to determine the reason why it can survive in this water body. But since this study is very large, we will mention some of them. A total of 190 pikeperch fish of different sizes were analyzed in Tuzkon Lake. (table 2)

Table 1: The current state of fish species composition in Tuzkan Lake.

№	Fish species	Tuzkan Lake
1.	Roach fish - *Rutilus aralensis* Berg.	+
2.	Common rudd - *Scardinius erythrophthalmus* (L)	+
3.	Grass carp – *Ctenopharyngodon idella* (Val)	+
4.	Aral asp fish – *Aspius aspius iblioides* Kessler	+
5.	Turkestan gudgeon – *Gobio gobio lepidolaemus K.*	+

6.	Samarkand Capoeta capoeta - *Varicorhinus capoeto heratensis st.*	+
7.	Aral shemaia – *Chalcalburnus chalcoides aralensis*	+
8.	Sabrefish – *Pelecus cultratus* L.	+
9.	Prussian carp –*Carassius auratus gibelio*	+
10.	Common carp – *Cyprinus carpio* L	+
11.	Silver carp - *Hypophthalmichthys molitrix*	+
12.	Mosquito fish - *Gambusia affinis holbrookii* (Jir)	+
13.	Pikeperch - *Sander lucioperca* L	+
14.	Goby fish - *Neogobius* Jljin	+
	Total	14

Table 2: The number of samples collected for the study of pikeperch fish in Lake Tuzkon

№	Study of biological characterist	Number (pieces)
1	Morphologic characterist	40
2	Age of grow	100
3	sexual maturity	25
4	ndicators of fertility, the size offish eggsi	25
	Total	190

The studied lake basin is quite large, and this lake may have one or more populations of pikeperch fish. This needs to be determined because it is a very important aspect in managing the commercial fishing of a fish species of important fishery value. For the methodical solution of this problem, it is important to give the classification of the pikeperch fish in each water basin, to compare them with each other and later with the data from other areas of the area where the pikeperch fish is distributed (Dekhkonova, 2023).

The meristic characteristics of pikeperch fish were determined by counting (Dekhkonova, 2022).

Table 3 shows the indicators of the meristic characteristics of the group of pikeperch fish in this lake.

Table 3.

Age group	Back-calculated standard length according age group, cm						N, pieces
	SL_1	SL_2	SL_3	SL_4	SL_5	SL_6	
1	23,9						17
2	26	42,8					38
3	24,8	43,3	53				18
4	28,4	51	64,3	70,3			12
5	22,9	38,5	55	62	69,5		7
6	26,4	42,2	53,9	63.8	75,3	78,4	8
Mean SLi (cm)	**24**	**44,2**	**55,8**	**66,4**	**73,3**	**78,4**	
Annual increment (cm/year)	**24**	**20,2**	**11,6**	**10,6**	**6,9**	**5,1**	

When analyzing the obtained meristic characters, it was found that the most variable character is the number of scales on the lateral lines. (Figure 4)

Table 4: Indexes of plastic morphological characteristics of the pike perch in Tuzkon Lake (n - 40 speciments)

Morphological characteristics	Min	Max.	Mean $\pm S_x$
Absolute length of the fish, mm	239	784	515,2±6,5
Standard length of fish body, mm	235	780	450±5,9
Total weight of fish body, g	300	6030	1125,4±42
Lateral line	87	103	96,7±0,6
I D rays. s.	13	15	13,8±0,1
II D rays s.	2	3	2,2±0,1
II D rays b.	19	23	21,2±0,1
A rays. s.	2	3	2,5±0,1
A rays. b.	11	13	11,7±0,1
Gill rakers	64	198	121,0±0,1
Pyloric cecum	11	13	11,6±0,1

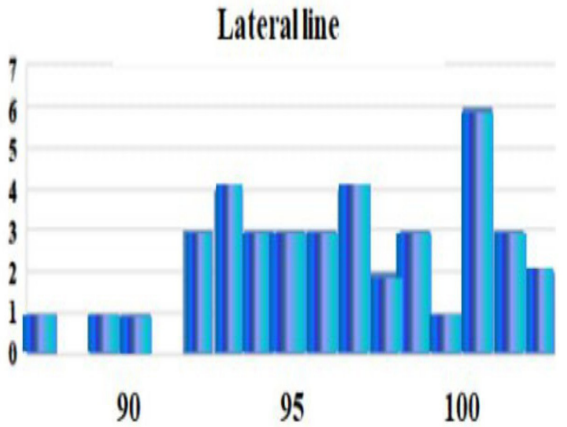

Figure 4: Variants formed by the number of scales on the lateral line of the fish

Pikeperch fish is one of the important catchting species, so they do not live to the state of natural aging, that is, they are caught as a result of commercial fishing. in the Tuzkon lake. The scales of pikeperch fish uses as the main recording structure in determining their age (Chugunova, 1959). (Table 4)

Table 4. The mean stanard length determined by back-calculation method according to age groups of the pike perch (males and females combined) (2020-2022 y. 100 pieces)

The result of the obtained data can be analyzed using the showing graph. (Fig. 5)

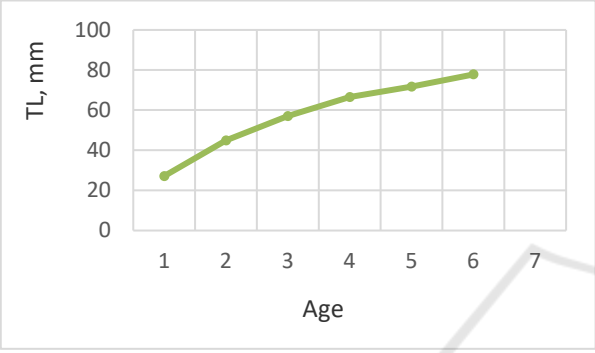

Figure 5: Growth rate of pikeperch fish in the Tuzkan Lake, 2020-2022 y

3 RESULTS AND DISCUSSION

We made an ichthyological analysis of the current state of Tuzkan Lake. According to the results, 14 types of fish species were found in Lake Tuzkan, and the composition of the species was clarified. In recent years, the increase in the salinity level of Tuzkan Lake and the receding of the water level and the appearance of many islets did not fail to affect the ichthyofauna in its composition, and therefore the number of fish species in recent years decrease was observed.

Research conducted in Lake Tuzkan revealed that the only obligate predatory fish is the pikeperch fish in this water basin. The length of the pikeperch fish samples taken from Tuzkon Lake was 23.9-78.4 cm, the total weight of the body was 300-6030 g. Fish up to 6+ years old were found in the samples collected from Tuzkon Lake. The samples collected from this reservoir were composed of fish up to 6+. According to the data presented in Table 4, the growth rate was very high in the first year of life, and it was also high in the second year. In the following years, it gradually decreased

4 CONCLUSIONS

This can be concluded from the research results. Continuous monitoring of the ichthyofauna is very important for effective organization of fishing. Analyzing the available fish species in Tuzkan Lake, the common and only obligate predator species that is important for hunting in this water body is the white sla fish. According to the analysis of the results of the conducted research, the pikeperch fish in Tuzkon lake grows faster than in other water bodies where it reproduces naturally (Makhmurov et al., 2024). It is necessary not only to protect the species studied in Tuzkan Lake, but also to develop ways of their effective use.

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