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MODERN SPECIES COMPOSITION OF ICHTHYOFAUNA IN THE AKHANGARAN RIVER BASIN

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ABSTRACT

The article presents the results of studies to determine the species composition of the ichthyofauna of water bodies in the Akhangaran river basin of the Tashkent region of Uzbekistan. The modern composition of the ichthyofauna was determined, consisting of 33 species of fish, while 4 species (Gobio cynocephalus, Triplophysa dorsalis, Ictalurus punctatus, Esox lucius) were recorded by us for the first time. The species composition of the ichthyofauna of the Akhangaran reservoir has been clarified; it consists of 5 aboriginal fish species and 22 fish species of the Tuyabuguz reservoir.

KEYWORDS: ***Akhangaran river, reservoirs, species, ichthyofauna, fish, reservoir.***

INTRODUCTION

Among the main environmental problems of our time, the reduction in the diversity of species and ecological systems occupies a special place. Over the past decades, the natural evolution of river and lake ecosystems of the republic has been significantly disturbed under the influence of anthropogenic pressure. The result is the eutrophication of water bodies and watercourses. All this cannot but affect the state of the ichthyofauna and the conditions of natural reproduction of fish, changes in the productivity of fishing grounds and a decrease in fish catch in them, and the efficiency of fishing.

The Akhangaran river is the right tributary of the Syrdarya river, which originates at an altitude of 3500 m above sea level on the northwestern slope of the Chatkal ridge from the confluence of the Aktashsay and Urtalyksay rivers. In the upper reaches of the river, there is the Angren plateau, which is 2100-3400 m above sea level. The water filling regime is snow and rain, and there are many different springs in the river basin filling it with fresh water. The river is 236 km long, the basin area is 5220 km^2. The average long-term annual runoff is 0.72 km^3.

The tributaries - Boksuksay, Tuganbashsay, Shavazisay, Dukentsay, Karabausay, Akchasay, Dzhigiristansay, Kairagachsay, Beshsay, Nishbashsay, Gushsay and others flow into the river. The largest settlements located along the river valley are the cities of Angren and Akhangaran. In the foothill and flat parts of the river, two large reservoirs have been built - the Akhangaran and Tuyabuguz reservoirs.

The Akhangaran reservoir is a hydraulic structure on the Akhangaran river, which was built for the seasonal regulation of the Akhangaran waters and was filled in 1989. The reservoir is located at the eastern outskirts of the city of Angren, above the coalmine. The reservoir has an approximately triangular, narrow, elongated shape with an extension towards the dam. The height of the water's edge when filling is about 1080 m. In the southeastern part of the reservoir there is a reinforced concrete dam 1350 m long, 12 m wide (at the top) and a maximum height of 100 m. The total volume of the reservoir is 260 million m^3.

Behind the reservoir, the Akhangaran River is canalized and flows underground to Jigiristan. The underground section of Akhangaran departs laterally from the southwestern shore of the reservoir. The water accumulated in the reservoir is used for irrigation in the Akhangaran, Urtachirchik, Pskent and Buka regions.

In the summer period 2018-2019, there was a good filling of the reservoir, there is a lot of water, rifts and littoral are flooded. In summer, the water temperature in the upper reaches (at the confluence of the river) was 10-14°C and on average 15-19°C. The color of the water was from green to grayish-green, slightly turbid, the transparency was 1.0-2.0 m (according to the Secchi disk); the nature of bottom sediments along the coast are stones,

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pebbles, coarse sand, at a depth - clay with sand deposits.

The Tuyabuguz reservoir is a channel reservoir built for the purpose of seasonal regulation of the Akhangaran river flow. The total volume of the water mass is 250 million m^3. The area of the water surface is 20 km^2, the length is 9 km, the maximum width is 3 km, and the average width is 1.88 km. Depth: maximum - 31.5 m, average - 16 m. The reservoir is purely for irrigation purposes; two irrigation canals extend from the right and left-bank parts of the dam. Water discharge along the right bank canal is 55 m^3/s; on the left bank - 20 m^3/s.

The Tuyabuguz reservoir belongs to the moderately warm water bodies of the lake type. The nature of bottom sediments along the coast are stones, pebbles, at a depth - gray silt. Soils are represented by alluvial deposits - sand, clay, loam. The color of the water is mainly green, the transparency is 2.5-3.5 m (according to the Secchi disk).

MATERIALS AND RESEARCH METHODS

The objects of study were aquatic biocenoses (phytoplankton, zooplankton, periphyton, zoobenthos and fish) of water bodies of the Akhangaran River basin (Akhangaran and Tuyabuguz reservoirs).

The material on the ichthyofauna of the Akhangaran River basin was collected from 2018-2020. The study of the Akhangaran river channel for more than 200 km, starting from the upper section to the confluence of the river into the Syrdarya, was of a route character with camps in separate sections of the river for 2-3 days. The collection of material in the reservoirs was carried out stationary. Fishing was carried out with a set of fixed nets with a mesh of 15-70 mm. In addition, the catches of fishermen were analyzed. The collected material was processed and analyzed according to generally accepted ichthyological methods [Pravdin, 1966]. The species of fish was determined according to L.S. Berg [1948, 1949].

RESULTS

The earliest information about the fish fauna of the Akhangaran River can be found in the works of L.S. Berg (1948, 1949) and F.A. Turdakov (1963). F.A. Turdakov (1963) describes seven fish species (*Leuciscus lehmani, Gobio gobio lepidolemus, Schizothorax intermedius, Alburnoides oblongus, Nemachilus kuschakewitschi badamensis, Nemachilus conipterus, Cobitis aurata aralensis*), belonging to two families (Cyprinidae and Cobitidae). Further studies by Z.Y. Kasimova (1967) showed that in the Akhangaran river basin there are 21 fish species belonging to six families.

During the period of our research, in the ichthyofauna of the Akhangaran river basin, we noted the habitation of 33 fish species belonging to 4 orders, 12 families, and 30 genera. The native fish fauna consists of 18 species, the rest are invasive, the majority of which are representatives of the Chinese lowland complex. Of the 33 fish species identified, 4 were noted by us for the basin for the first time - *Gobio cynocephalus, Triplophysa dorsalis, Ictalurus punctatus, Esox lucius* (Table 1).

Table 1.
Species composition of the ichthyofauna of reservoirs of the Akhangaran river basin

№	Family, species, subspecies	Akhangaran river	Reservoir	
			Akhangaran	Tuyabuguz
	Family Cyprinidae			
1.	*Rhodeus ocellatus*	B	-	-
2.	*Luciobarbus conocephalus*	+	-	-
3.	*Ctenopharyngodon idella*	A	-	-
4.	*Hemiculter leucisculus*	B	-	B
5.	*Carassius gibelio*	A	-	A
6.	*Cyprinus carpio*	+		+
7.	*Abbottina rivularis*	B		B
8.	*Gobio lepidolaemus*	+	+	+
9.	*Gobio cynocephalus*	B	-	-
10.	*Pseudorasbora parva*	B	-	B
11.	*Abramis brama orientalis*	+	-	+
12.	*Alburnoides taeniatus*	+	-	+
13.	*Alburnnus oblongus*	+	-	-
14.	*Hypophthalmichthys molitrix*	A	-	A
15.	*Aspius aspius iblioides*	+	-	-

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16.	*Squalius squaliusculus*	+	-	+
17.	*Rutilus aralensis*	+	-	+
18.	*Opsariichthys bidens*	B	-	B
19.	*Schizothorax eurystomus*	+	+	+
	Family Cobitididae			
20.	*Sabanejewia aralensis*	+	-	+
	Family Balitoridae			
21.	*Iskandaria kuschakewitschi*	+	+	-
22.	*Triplophysa dorsalis*	+	-	-
23.	*Triplophysa elegans*	+	+	-
24.	*Triplophysa strauchi*	+	-	-
	Family Ictaluridae			
25.	*Ictalurus punctatus*	A	-	A
	Family Siluridae			
26.	*Silurus glanis*	+	-	+
	Family Sisoridae			
27.	*Glyptosternon oschanini*	+	+	-
	Family Esocidae			
28.	*Esox lucius*	+	-	+
	Family Poeciliidae			
29.	*Gambusia holbrooki*	A	-	A
	Family Percidae			
30.	*Sander lucioperca*	A	-	A
	Family Odontobutidae			
31.	*Micropercops cinctus*	B	-	B
	Family Gobiidae			
32.	*Rhinogobius brunneus*	B	-	B
	Family Channidae			
33.	*Channa argus*	B	-	B
	Total number of species (subspecies)	33	5	22
	Number of native species	18	5	10
	Number of introduced species	15	0	12

Note: A - acclimatized species; B - randomly introduced species; + - native species.

The nature of the quantitative distribution of ichthyofauna within the Akhangaran river basin is very uneven, which is determined by the hydrological conditions of its individual areas and the ecological characteristics of fish.

The mountainous zone of flow (the upper reaches of the Akhangaran River and its tributaries) is inhabited by three species (*Schizothorax eurystomus, Triplophysa elegans, Glyptosternon oschanini*) of fish. From the headwaters to the foothills, ichthyocenoses change markedly. The fish fauna of the foothill zone of the current (the area that occupies the course of the Akhangaran River up to the city of Akhangaran) consists of five species (*Alburnoides taeniatus, Schizothorax eurystomus, Gobio lepidolaemus, Iskandaria kuschakewitschi, Triplophysa dorsalis*).

The largest number of species was recorded in the flat part of the river. Such species as *Abramis brama orientalis, Alburnoides taeniatus, Aspius aspius iblioides, Carassius gibelio, Cyprinus carpio, Gobio lepidolaemus, Squalius squaliusculus, Luciobarbus conocephalus, Rutilus aralensis, Schizothorax eurystomus, Silurus glanis* and fish species of the Chinese lowland complex *(Abbottina rivularis, Pseudorasbora parva, etc*) were recorded. Note that Schizothorax eurystomus is the only representative of the ichthyofauna of the Akhangaran River basin, which inhabits the river from the mountainous to the flat area, and is also found in the Tuyabuguz reservoir, located in the upper part of the flat area of the river.

Turning to the issue of the formation of the ichthyofauna of reservoirs, it should be noted that any constructed reservoir is a reservoir of a new type, which differs from the river in its hydrobiological and hydrochemical regimes, usually with sharp fluctuations in the level, a kind of fauna and flora. In these reservoirs, organisms appear that are adapted to life in stagnant or slowly flowing waters. The complex of fish species in channel reservoirs differs from the ichthyofauna of the river section occupied by the reservoir. In non-channel reservoirs, the living conditions of fish differ from those in the river even

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more than in channel reservoirs, therefore, changes in the species composition of fish occur.

The fish fauna of the Akhangaran reservoir consists of 5 native fish species. As for the ichthyofauna of the Tuyabuguz reservoir, earlier - in the 1960s - early 70s, it was represented by 16 species of fish. *Cyprinus carpio* (66.5% in catches), *Silurus glanis, Schizothorax eurystomus* occupied the leading position in the fishery [Kasymova, 1967; Kamilov, 1973]. In subsequent years, there was a significant enrichment of the ichthyofauna of the reservoir (up to 23 species) with species of fish of the Far Eastern complex due to their penetration from the ponds of the fish farm, as was the case in other reservoirs of the basin. However, in 1989, the Tuyabuguz reservoir was almost completely drained as a result of the release of water, so in 1990 there was a significant depletion of the ichthyofauna. In the control catches, only low-value and trash fish from the Akhangaran River were recorded: *Opsariichthys bidens, Hemiculter leucisculus, Rhinogobius brunneus, Abbottina rivularis, Alburnoides taeniatus, Carassius gibelio, Gambusia holbrooki, Gobio lepidola*

CONCLUSIONS

Thus, at present, the modern composition of the ichthyofauna of the Akhangaran River basin consists of 33 fish species, while 4 species (*Gobio cynocephalus, Triplophysa dorsalis, Ictalurus punctatus, Esox lucius*) were recorded by us for the first time. The species composition of the ichthyofauna of the Akhangaran reservoir has been clarified; it consists of 5 aboriginal fish species and 22 fish species of the Tuyabuguz reservoir.

The ichthyofauna of the Tuyabuguz reservoir was initially formed from the funds of the original water system - the Akhangaran River, then due to acclimatizers. To date, a peculiar ichthyofauna has formed in the reservoir, consisting mainly of representatives of the indigenous fauna and acclimatizers. The departure from the Tuyabuguz reservoir of the previously numerous river fish in it - rheophiles: *Schizothorax eurystomus and Luciobarbus conocephalus*, in addition to an increase in the degree of eutrophication with organic substances, is largely due to their displacement by fish by limnophils, due to food competition.

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