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DISTRIBUTION OF UNIONIDAE, EUGLESIDAE, PISIDIIDAE AND CORBICULIDAE FAMILY SPECIES IN THE SANGZOR RIVER AQUATIC ECOSYSTEMS IN BIOTOPES

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РАСПРЕДЕЛЕНИЕ ВИДОВ СЕМЕЙСТВ UNIONIDAE, EUGLESIDAE, PISIDIIDAE И CORBICULIDAE В БИОТОПАХ ВОДНЫХ ЭКОСИСТЕМ РЕКИ САНЗАР

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Abstract. Our research revealed 20 species of Bivalvia, 1 subspecies and 1 variety of the Sangzor River and its surrounding aquatic species belonging to 4 families and 5 genera. Of the species listed in the table: *Euglesa hissarica*, *E. (Casertiana) obliquata*, *Odhneripisidium polytimeticum* are more numerous. They are found in the amount of 1-4 m per 1 m^2. The rest of the species are relatively rare. *Euglesa (Cyclocalyx) gurvichi*, *Odhneripisidium terekense*, *O. (Kuiperipisidium) issykkulense* were first discovered in the basin of the Sangzor river. These Bivalves are crenophils and pelolimnophils living in springs depending on their habitat. The length of the Sangzor River and the presence of all biotopes in which mollusks live, made the river a favorable habitat for mollusks. However, it should be noted that while all species occur in the river, they vary in density.

Аннотация. Выявлено 20 видов двухстворчатых моллюсков 1 подвид и 1 разновидность, относящихся к 4 семействам и 5 родам реки Санзар и ее притоков. Наиболее многочисленны *Euglesa hissarica*, *Odhneripisidium polytimeticum*. Встречаются в количестве 1–4 на 1 $м^2$. Остальные виды относительно редки. *Euglesa (Cyclocalyx) gurvichi*, *Odhneripisidium terekense*, *O. (Kuiperipisidium) issykkulense* впервые обнаружены в бассейне р. Санзар. Эти двустворчатые моллюски — кренофилы и пелолимнофилы, обитающие в родниках в зависимости от места их обитания. Протяженность реки Санзар и наличие всех биотопов, в которых обитают моллюски, сделали реку благоприятным местообитанием для моллюсков. Однако следует отметить, что хотя все виды встречаются в реке, они различаются по плотности.

Keywords: Bivalvia, rivers, aquatic ecosystems.

Ключевые слова: двустворчатые моллюски, реки, водные экосистемы.

It is important to record the biological diversity of the world. Especially, using from an arid zone’s water biological resources and to contribute their using rationally perspectives and

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protecting, water resources also important. Bivalve mollusks in water resources play significantly role to create secondary products. Ben those consist of mollusks with 70-80%.

The Sangzor River begins at the 3400 m high spring near the Guralash mountain pass in the Turkestan Range and flows into the Tuzkon Lake 70 km north-west of the Jizzakh city on the south-eastern edge of the Kyzylkum desert. The area of the 198 km basin is 3220 km^2 (mountainous part). The main part is called Guralashsoy. After joining Jontekasai near the small village of Karashakshak, it is called Sangzor. Below the city of Jizzakh is known as the Sangzor Kili. The Sangzor mountain range is a branch of the Turkestan Range up to the village of Yorgok, which runs north-west through the wide valley on the Island of Malguzar Mountains. Sangzor is a low-lying river. Its average annual water consumption is 4 m^3/sec [5, 6, 8, 10].

After passing through the Jizzakh oasis, Sangzor is often drying out or oozing with groundwater, which is much less than irrigation. It is saturated with snow and rainwater. Most of the annual water flow in March-June seems to flow in May. Regulation of the Sangzor water and from it the Kukjarsay, Okkurgonsay, Tangatopdisoy, Sutariq, Bagmazorsoy, Novqasay and others). Some of these streams end up in the Sangzor River. Since independence, much attention has been paid to the conservation and conservation of biodiversity in our country. The use of aquatic ecosystems of the Republic has resulted in the protection of natural and artificial water storage [1-4, 11, 14].

Currently, the species composition of Unionidae and Corbiculidae families on the Sangzor River, the study of their distribution patterns in natural and artificial reservoirs, and the validity of endemic and endangered species and the factors influencing them, are of vital scientific and practical importance.

The investigation of the fauna of the Central Asian mollusks was based on the materials of A. P. Fedchenko collected from this region in 1868-1871. The study of Bivalvia of the CIS countries by V. I. Zhadin (1948, 1952), A. F. Alimov (1981), Ya. Starobogatov, Z. I. Izzatullaev (1984), Z. I., Izzatullaev (1980, 1992, 2001, 2014), S. I. Andreeva (2006), S. I. Andreeva, N. I. Andreev, A. N. Krasogorova (2008, 2009), F. E. Rubinova, and Y. N. Ivanov (2005) conducted research [7, 9, 12, 13].

Foreign scientists J. H. Thorp, A. Covich (1991), Aldridge (1999), Bouchet (2007), Huber Markus (2010), Bogan (2010), Annabelle Cuttelod et al. al. (2011) and studies on pearl cultivation in the economic sectors, particularly artificial ponds Maria Haws (2002), Mamangkey et al (2009), Rahayu et al. (2009); Sata Yoshida by Srie Rahayu (2013). population status assessment and global invasion species distribution Alyokhina et al (2007); Panov et al (2009), Son (2009), Yanovich (2013) studies on the role of two-stage clams in determining water pollution levels by Rijinashvili (2009), Sintyurina, Bigaliev (2009), and Kuzmenkin [9, 12].

Materials and teaching methods

Given the systematic composition of two-tailed mollusks, their bio-ecological properties and other important aspects of the various species of the Sangzor River, we have begun collecting mollusks in 2017. Research materials for our studies were collected from spring, summer and autumn 2016-2019 sea-grass species of the Sangzor River. The published materials are known in science and studied by the methods of V. I. Zhadin (1938-1952), Y. I. Starobogatov, Z. I. Izzatullaev (1984), Z. I. Izzatullaev, H. T. Boymurodov (2009). In addition to manual typing of clams, we used several other methods of typing. We collected mollusks from clay near the edges with a steel arc net, and under a sieve with a metal sieve beneath the surface [2].

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Research results

The literature review has shown that we have not studied the Bivalvia of the Sangzor River before. Our study revealed that 20 species of Bivalvia, 1 subspecies and 1 variety live in the river and surrounding water species, belonging to 4 families and 5 genera.

For the first time, it was discovered that the Unionidae family of Chinese toothless species of *Sinanodonta* species: *S. gibba*, *S. puerorum* and *S. orbicularis* were accidentally acclimated to the watersheds of Uzbekistan. These mollusks are representative of the *Sinanodonta sensu stricto.* As a result of acclimatization of Chinese complex fish (silver carp, grass carp) into our region, they are distributed among all river basins (canals, water storage, fisheries), along with the larvae of mollusks.

Table

DENSITY, DISTRIBUTION AND ENVIRONMENTAL GROUP IN BIOTYPES OF THE TWO-TAILED MOLLUSKS OF THE SANGZOR RIVER

№	Species	Density of river flow, sp./m^2			Biotypes			Environmental groups
		Upper	Middle	Bottom	Rocky terrain	Sandy places	Clay	
Unionidae family								
Sinanodonta Modell, 1945 genus								
1.	*Sinanodonta orbicularis* (Heude, 1880) (= *Sinanodonta woodiana* (I. Lea, 1834))	–	1.2±0.2	–	–	–	+	pelorheophil
2.	*Sinanodonta gibba* (Benson, 1842) (= *Sinanodonta woodiana* (I. Lea, 1834))	–	1.1±0.1	1.2±0.2	–	–	+	pelorheophil
3.	*Sinanodonta puerorum* (Heude, 1880) (= *Sinanodonta woodiana* (I. Lea, 1834))	–	1.3±0.3	–	–	–	+	pelorheophil
	Colletopterum Bourguignat, 1880 (= *Anodonta* Lamarck, 1799) *genus*							
4.	*Anodonta bactriana* Rolle, 1897 (= *Anodonta anatina* (Linnaeus, 1758))	–	1.0±0.1	–	–	–	+	rheophil
5.	*Anodonta (Colletopterum) cyrea* subsp. *sogdiana* Kobelt, 1896 (= *Anodonta anatina* (Linnaeus, 1758))	–	1.2±0.1	1.1±0.2	–	–	+	rheophil
6.	*Colletopterum ponderosum volgens*e (Shadin, 1938) (= *Anodonta piscinalis* var. *volgensis* Zhadin, 1938 = *Anodonta anatina* (Linnaeus, 1758))	–	1.2±0.3	–	–	–	+	pelolimnophil
7.	*Colletopterum (Ponderosiana) kokandicum* Starobogatov & Izzatullaev, 1984 (= *Anodonta anatina* (Linnaeus, 1758)		–	–	–	–	–	pelolimnophil
Euglesidae (= Sphaeriidae) family								pelolimnophil
	Euglesa Jenyns, 1832 genus	4.2±0.4	–					

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№	Species	Density of river flow, sp./m²			Biotypes			Environmental groups
		Upper	Middle	Bottom	Rocky terrain	Sandy places	Clay	
8	*Euglesa hissarica* Izzatullaev, 1985 (= *Euglesa casertana* (Poli, 1791))	4.1±0.3	–	–	–	+	–	pelolimnophil
9	*Euglesa (Cyclocalyx) gurvichi* Izzatullaev & Starobogatov, 1985	4.3±0.3	–	–	–	+	–	pelolimnophil
10	*Euglesa (Euglesa) turkestanica* Izzatullaev, 1974	3.0±0.1	–	–	–	+	–	pelolimnophil
11	*Euglesa (Casertiana) obliquata* (Clessin, 1874) (= *Euglesa casertana* (Poli, 1791))	3.0±0.1	–	–	–	+	–	pelolimnophil
12	*Euglesa (Pseudeupera) turanica* (Clessin in Martens, 1874) (= *Euglesa subtruncata* (Malm, 1855))	4.2±0.1	–	–	–	+	–	pelolimnophil
Pisidiidae (= Sphaeriidae) family								
Odhneripisidium Kuiper, 1962 genus								
13	*Odhneripisidium terekense* Izzatullaev & Starobogatov, 1986 (= *Odhneripisidium annandalei* (Prashad, 1925))	4.0±0.3	–	–	–	–	–	crenophil
14	*Odhneripisidium (Kuiperipisidium) issykkulense* Izzatullaev & Starobogatov, 1986	3.0±0.4	–	–	+	+	–	crenophil
15	*Odhneripisidium (Kuiperipisidium) sogdianum* Izzatullaev & Starobogatov, 1986 (= *Odhneripisidium annandalei* (Prashad, 1925))	4.0±0.2	–	–	–	+	–	crenophil
16	*Odhneripisidium polytimeticum* Izzatullaev & Starobogatov, 1986 (= *Odhneripisidium annandalei* (Prashad, 1925))	5.0±0.3	–	–	+	+	–	crenophil
17	*Odhneripisidium behningi* Izzatullaev & Starobogatov, 1986	4.0±0.3	–	–	–	+	–	crenophil
Corbiculidae (= Cyrenidae) family								
Corbicula Megerle von Mühlfeld, 1811 genus								
18	*Cyrena (Corbicula) cor* Lamarck, 1818 (= *Corbicula fluminalis* (O. F. Müller, 1774))	–	2.1±0.9	–	–	+	–	crenophil
19	*Corbicula purpurea* Prime, 1867 (= *Corbicula fluminalis* (O. F. Müller, 1774))	–	2.2±0.3	–	+	+	–	crenophil
20	*Corbicula fluminalis* (O. F. Müller, 1774)	–	2.0±0.6	–	–	+	–	crenophil
21	*Corbicula tibetensis* Prashad, 1929	–	3.9±0.3	2.5± 0.4	–	+	+	crenophil

№	Species	Density of river flow, sp./m^2			Biotypes			Environmental groups
		Upper	Middle	Bottom	Rocky terrain	Sandy places	Clay	
22.	*Corbicula (Corbicula) ferghanensis* Kursalova & Starobogatov, 1971	–	4.2±0.6	2.1± 0.2	+	+	–	crenophil
Total species:		*11*	*11*	*4*	*4*	*14*	*7*	

Large Bivalvia do not live there because of the rapid flow of the Sangzor River in the narrow valley and the low water temperatures and low organic matter content. In the slopes of the middle stream of the Sangzor River, it is estimated that *Sinanodonta orbicularis*, *S. puerorum* and *S. gibba* species are 1-1.5 m^2 in Gallaorol, Jizzakh and Pakhtakor districts. The first of these is the most numerous, with the total clams occurring in many parts of the river, where clay and macrophytes and reeds grow. Here they live at depths of 1–2 m and can sometimes be found in sandy areas (Table 1).

From these clusters all species of Chinese toothless were collected from the lower Sangzor River and the Jizzakh canal. They were first identified in 2019 for the Sangzor River qualification. Chinese complex fish play an important role in the occurrence and distribution of these tar on the Sangzor River. In the lower reaches of the river, the density of distribution decreases sharply compared to the middle part of the *S. gibba* species and occurs at 1.1–1 per 1 m^2. This is due to river pollution. *Anodonta (Colletopterum) cyrea subsp. sogdiana* and *A. piscinalis var. volgensis* occur in the middle of the Sangzor River in the post - Jizzakh region at 1.2–1 per 1 m^2, while *A. piscinalis var. volgensis* is 0.4 in the lower Pakhtakor district. The number and density of species is relatively low. The amount of water in the Sangar River and, accordingly, seasonal hydrological regime may be considered as one of the direct factors influencing the number of species of two-stage clams. Species of the Corbiculidae family *Cyrena (Corbicula) cor*, *C. purpurea*, *C. fluminalis*, *C. (Corbicula) ferghanensis*, and *C. tibetensis* are buried in sandy soils on 2-3 sq. m in waters in the Gallaorol and Pakhtakor districts.

The upper and middle streams of the Sangzor River are hot springs, which run from the ground under the influence of hydrostatic pressure. In the mountains there are more springs and springs than in the plain. Small bipedal clams were collected from the springs of the mountain part of the river. Seven species of mollusks of the *Euglesa* and *Odhneripisidium* genera were found in the Sangzor riverbanks and in the ditches from the springs (Table 1).

Summary. Our study identified 20 species of Bivalvia, 1 subspecies and 1 variety of the Sangzor River and its surrounding water species, belonging to 4 families and 5 genera. Of the species listed in the table: *Euglesa hissarica*, *E. (Casertiana) obliquata*, *Odhneripisidium polytimeticum* are more numerous. They occur at 1-4 m per 1 m^2. The other species are relatively rare. *Euglesa (Cyclocalyx) gurvichi*, *Odhneripisidium terekense*, *O. (Kuiperipisidium) issykkulense* are the first to show from the Sangzor river basin. These bivalve mollusks are crenophils and pelolimnophils that live in springs and springs according to their habitat. The length of the Sangar River and the presence of all the biotopes in which the clams are inhabited have made the reservoir a favorable reservoir for the clams. However, it should be noted that although all species occur in the river, they differ in density. For example, although Sinanodonta is found in rivers, its density is lower than that of other ponds. The Sangar River is the most suitable reservoir for the reproduction and distribution of *Corbicula* species. Among the Bivalvia, the species is not very common in the lower Sangzor River, except for the *Corbicula tibetensis* species, which is found in both

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the middle and lower reaches of the river, and this species is widely adapted to the habitat and the variability of the hydrological regime of the river. Species endemic and rare species, and the subspecies, *Anodonta (Colletopterum) cyrea subsp. sogdiana*, *Corbicula fluminalis*, *C. purpurea*, *Cyrena (Corbicula) cor*, are adapted to live in the middle and lower reaches of the Sangzor River. Although they are distributed in the middle part of the river, the poor hydrological regime of the lower reaches and the high level of pollution affect their distribution.

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