ISSN NO: 2771-8840
September 2024

Fauna And Ecology Of Aquatic Organisms Common In Aquatic Ecosystems Of Southern Uzbekistan.

Z.Izzatullaev[1], A.Kuzmetov[2], H.Boymurodov[3], B.Aliev [1].
[1] Samarkand State University baxtiyoraliyev1981@mail.ru
[2] Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan kuzmetov@bk.ru
[3] Samarkand State University of Veterinary Medicine, Animal Husbandry and Biotechnology, boymurodov1971@mail.ru.

Annotation. The study of the fauna and ecology of hydrobionts common in the aquatic ecosystems of Southern Uzbekistan is considered one of the urgent tasks. As a result of our research, it was established that 40 species are common in the Surkhandarya region, 25 species in coastal waters, 39 species in Kashkadarya and 26 species in coastal waters. Among the bivalve mollusks common in the rivers of Southern Uzbekistan, *Corbiculla cor, Corbiculla fluminalis, Corbiculla purpurea*, and among the fish, *Pseudoscaphirhynchus kaufmanni, Pseudoscaphirhynchus hermanni, Capoetobrama kuschakewitschi, Luciobarbus capito, Sabanejewia aurata, Glyptosternum oschanini* are listed in the "Red Book" of the Republic of Uzbekistan as rare species. When studying species depending on their habitat, it was found that 31 species are adapted to life in different environments, and 14 species are common in a constant (homogeneous) environment. It is evident that hydrobionts common in the aquatic ecosystems of Southern Uzbekistan are widely distributed in a variable habitat.
Key words: Leeches, Corbiculla cor, C. fluminalis, C. purpurea, Pseudoscaphirhynchus kaufmanni, P. hermanni, habitat.

Introduction. The development of production on land causes an increase in demand for water resources. Hydrobionts, common in aquatic ecosystems, are important, and as a result of improper use of water and aquatic ecosystems, their biodiversity is reduced. Determining the species composition of aquatic organisms common in these ecosystems, determining abiotic, biotic and anthropogenic factors influencing their common populations, as well as developing measures to preserve rare species are of great scientific and practical importance.

Therefore, at present, much attention is paid to the inventory of hydrobionts common in aquatic ecosystems, identifying promising species and introducing them into production. One of the pressing issues is the determination of the state of hydrobionts of aquatic ecosystems of Southern Uzbekistan, the assessment of their natural and geographical distribution and distribution depending on the characteristics of water bodies, the development of measures to preserve rare and endangered species.

Materials and research methods. We have collected materials for studying the fauna and ecology of aquatic organisms common in rivers and reservoirs of aquatic ecosystems of Southern Uzbekistan for the period 2017-2023. In total, the samples contain 2650 copies of organisms. When selecting and identifying materials, we used the works of Izzatullaev [2019], Izzatullaev, Boymurodov [2009], Boymurodov [2017], Kuzmetov [2019], Yuldashev [2019], Mirabdullaev [2011] and others, when studying their importance in water purification, Izzatullaev [2011] and when using the taxonomy of leeches by Izzatullaev, Solizhonov [2022]. [1,2,3,4,5,6,7,8].

Research results and their discussion. Among the surface waters of Southern Uzbekistan, the most important are the waters of rivers and reservoirs. Kashkadarya and Surkhandarya are the main rivers of Southern Uzbekistan. The length of the Kashkadarya River is 332 km, the catchment area is 8750 km^2. Kashkadarya starts as a small stream from the western part of Mount Hisar (3000 m) and plunges into the sands before reaching Mubarak. Surkhandarya is formed by the confluence of the Tupalan and Karatag rivers and flows into the Amu Darya, its length is 196 km. The average width of the Surkhandarya River valley is 5-6 km, the average long-term water flow is 76.2 m^3/sec. These rivers are narrow in the upper part and fast in the lower part. As a result of our research, it was established that 40 species are distributed in the Surkhandarya region, 25 species in coastal waters, 39 species in the Kashkadarya region, and 26 species in coastal waters (Table 1). By distribution of hydrobionts in habitats: Eurybionts are widespread species that

ISSN NO: 2771-8840
September 2024

live in various environments. Stenobiont - analyzed by dividing it into species that are less common in small areas adapted to constant conditions.

Table 1

Species composition of hydrobionts common in aquatic ecosystems of Southern Uzbekistan

№	A type of aquatic organism	Surkhan river	Reservoirs on the coast of Surkhandarya	Kashka river	Reservoirs on the coast of Kashkadarya	Habitat
	Leeches					
	Class *Clitellata* Family *Piscicolidae*					
1	*Piscicola geometra* (Linnaeus, 1758)	+	-	+	+	Eurybiont
2	*Helobdella stagnalis* (Linnaeus, 1758)	+	-	+	-	Stenobiont
3	*Hr. Verbana* (Carena, 1820)	+	+	+	+	Eurybiont
4	*Hr. Orientalis* (Utevsky & Trontelj, 2005)	+	+	+	+	Eurybiont
5	*Limnatis paluda* (Tennent, 1859)	+	+	+	+	Eurybiont
6	*Haemopis sanguisuga* (Linnaeus, 1758)	+	+	+	+	Eurybiont
7	*Erpobdella octoculata* (Linnaeus, 1758)	+	-	+	-	Stenobiont
8	*Erpobdella nigricollis* (Brandes, 1900)	+	+	+	+	Eurybiont
	Crayfish					
	Family *Astacidae*					
9	*Pontastacus leptodactylus* (Eschscholtz, 1823)	+	+	+	-	Eurybiont
	Gastropods					
	Family *Lymnaeidae*					
10	*Lymnaea stagnalis* (Linnaeus, 1758)	+	+	+	-	Eurybiont
11	*Galba truncatula* (Müller, 1774)	+	-	+	-	Eurybiont
12	*G. thiessea* (Clessin, 1979)	+	+	-	+	Eurybiont
	Bivalves					
	Class *Bivalvia*					
	Family *Unionidoe*					
13	*Sinanodanta woodiana (I. Lea, 1834)*	+	+	+	+	Eurybiont
14	*S.puerorum* (Heude, 1880)[2]	+	+	+	+	Eurybiont
15	*S.orbicularis* (Heude, 1880)[2]	-	+	+	+	Eurybiont
	Corbiculidae оиласи					
16	*Corbiculla cor*[*]	+	-	+	-	Stenobiont

ISSN NO: 2771-8840
September 2024

	(Lamarck, 1818)					
17	*Corbiculla fluminalis*[*] (O.F. Miiller, 1774)	+	-	+	-	Stenobiont
18	*Corbiculla purpurea*[*] (Prime, 1864)	+	-	+	-	Stenobiont
19	*Corbiculina tibetensis* (Prashad, 1929)	+	+	+	+	Eurybiont
20	*Corbiculina ferghanensis* (Kursalova et Starobogatov, 1971)	+	+	+	+	Eurybiont
	Family *Pisididae*					
21	*Kuiperipisidium terekense* (Kazannikov in Izzatullaev et Starobogatov, 1986)	+	-	+	-	Eurybiont
22	*K. issykkulense* (Izzatullaev et Starobogatov, 1986)	+	-	+	-	Eurybiont
	Euglesidae оиласи					
23	*Euglesa hissarica* (Izzatullaev et Starobogatov, 1985)	+	-	+	-	Stenobiont
24	*E. turkestanica* (Izzatullaev, 1974)	+	-	+	-	Stenobiont
			Fish			
	Class *Piscis* Family *Acipenseridae*					
25	*Pseudoscaphirhynchus kaufmanni (Bogdanow, 1874)*[*]	+	-	-	-	Stenobiont
26	*Pseudoscaphirhynchus hermann* (Kessler, 1877)[*]	+	-	-	-	Stenobiont
	Family *Cyprinidae*					
27	*Carassius gibelio* (Bloch, 1782)	-	-	+	+	Eurybiont
28	*Cyprinus carpio* Linnaeus, 1858	+	+	+	+	Eurybiont
29	*Schizothorax eurystomus*. Kessler, 1972	+	+	+	+	Eurybiont
30	*Capoetobrama kuschakewitschi* (Kessler, 1872)[*]	+	+	+	+	Eurybiont
31	*Abramis brama* Linnaeus, 1958	+	+	-	-	Stenobiont
32	*Alburnoides holciki* Coad et Bogutskaya, 2012	+	+	+	+	Eurybiont
33	*Alburnus taeniatus*	+	+	+	+	Eurybiont

ISSN NO: 2771-8840
September 2024

	(Kessler, 1874)					
34	*Aspiolucius esocinus (Kessler, 1874)*	-	-	+	+	Eurybiont
35	*Rutilus rutilus* (Linnaeus , 1758)	+	+	+	+	Eurybiont
36	*Ctenopharyngodon idella (*Valenciennes, 1844)	+	+	+	+	Eurybiont
37	*Capoeta steindachneri* Kessler, 1872	+	+	+	+	Eurybiont
38	*Luciobarbus capito* (Güldenstädt, 1773)*	+	-	+	-	Stenobiont
	Family *Cobitidae*					
39	*Sabanejewia aurata* (De Filippi, 1863)*	+	-	-	-	Stenobiont
	Nemacheilidae оиласи					
40	*Paracobitis longicauda* (Kessler, 1974)	+	+	+	+	Eurybiont
41	*Dzihunia amudarjensis* (Rass, 1929)	-	-	+	+	Eurybiont
42	*Oxynoemacheilus oxianus* (Kessler 1877)	+	+	-	-	Stenobiont
43	*Triplophysa stoliczkai* (Steindachner, 1866)	-	-	+	+	Eurybiont
	Family *Siluridae*					
44	*Silurus glanis* Linnaeus, 1758	+	-	+	-	Eurybiont
	Family *Sisoridae*					
45	*Glyptosternum oschanini* Herzenstein, 1889*	+	+	+	+	Stenobiont
	Total types	**40**	**25**	**39**	**26**	

Note: Eurybionts are widespread species that live in a wide variety of environments. Stenobionts are rare species in small areas that have adapted to constant conditions. *Rare species listed in the Red Book.

It has been established that species belonging to the families *Pisididae* and *Euglesidae* are common in springs and sources along the river banks. Since the bivalve mollusks *Corbiculla cor, Corbiculla fluminalis, Corbiculla purpurea* and fish *Pseudoscaphirhynchus kaufmanni, Pseudoscaphirhynchus hermanni, Capoetobrama kuschakewitschi, Luciobarbus capito, Sabanejewia aurata, Glyptosternum oschanini*, common in the rivers of Southern Uzbekistan are rare species, they are listed in the Red Book of the Republic of Uzbekistan [9]. We have studied the distribution and ecology of these species. Therefore, they are classified below.

Classification and ecology of the shell of *Corbicula cor*. The shell of Corbicula cor is heart-shaped, brown in color, the front and back parts are rounded, the inner wall is white. The shell sizes are Height of shell 21-24; length of shell 25-29; convexity of shell 16-19.3 mm. A rare species is the stenobiont. It has been established that in the habitats the water flow rate is 0.44-0.88 m/s, the water temperature is 10-19 °C, the transparency is 8-25 s/m, the depth is 0.54-1.6 m. Peloreophile. Often coexists with Corbiculla purpurea and Colletoperum cyreum sogdianum. This species is an oviparous species. With the arrival of spring and an increase in water temperature by 11-19 °C, it begins to reproduce and develop, and it was observed that this continued from the second half of March to June.

ISSN NO: 2771-8840
September 2024

Spreading. Widely distributed in aquatic ecosystems of Western Asia. Found in aquatic ecosystems of Uzbekistan, Turkmenistan and Azerbaijan. Lives in the Surkhandarya and Kashkadarya rivers in the south of Uzbekistan, in the Shurtan, Tallimarjon, Toshloksoy, Tupalang and Oktepe reservoirs.

Classification and ecology of the shell of *Corbicula fluminalis*. The shell of the species *Corbicula fluminalis* differs from the species common in Central Asia in its distinct orange coloration and strongly protruding ridges, as well as the thickness of the wall. The cardinal teeth (1, 2a, 2b, 3c) of both segments are sharp and bicuspid, but teeth 3a and 4c are very fine lines, and the lateral teeth are long and finely serrated. Size: Height of shell 22-23; length of shell 20-21.8; convexity of shell 19 mm. Stenobiont species. Common in the swampy part of water bodies, can also be found in water bodies with salt water. Pelorrheophilic and rheophilic species are rare. The breeding season of oviparous species lasts from March to May.

Spreading. It is widespread in the water types of Central and Western Asia. It has been established that it lives in the Tupalang, Oktepa, Uchkizil, Kalkama, Toshloksoy reservoirs in the rivers of Southern Uzbekistan.

Classification and ecology of the shell of *Corbicula purpurea*. The shell is dark red to yellowish-brown, larger than that of C.cor, with a thick, hard and evenly striated wall, but less swollen than that of C. fluminalis, light grey, with a rounded triangular heart-shaped apex, shiny. The central teeth (2a, 2b, 3a) are double-edged, teeth 3c and 4c are thin and sharp, and the lateral teeth (AII, AIII, PII, PIII) are very long. The inner wall of the shell is purple. Lives buried in silt to a depth of 5-10 cm. Peloreophile. It has been established that in residential areas aquatic ecosystems with a water flow rate of 0.39-0.88 m/s, water temperature of 12-25 °C, transparency of 16-33 s/m, depth of 0.42-1.7 m are widespread. Stenobiont species, rare, low density.

Spreading. This is a species of Western and Central Asia, and is also found in the aquatic ecosystems of Tajikistan and Uzbekistan. It is common in the rivers of Southern Uzbekistan.

Classification and ecology of the shell of *Pseudoscaphirhynchus kaufmanni*. It has been studied that the brachial fin of this species has an average of 28-31, anal fin - 17-18, brachial ridges - 11-13, lateral - 31-37. Length up to 76 cm (excluding tail thread), weight on average 2.2 kg. The Amu Darya carp enters the breeding stage at the age of 6-7 years, and breeding occurs in March-April when the water temperature rises. During breeding, it spawns in rocky and gravelly biotopes with fast-flowing water. It feeds on hydrobionts common in aquatic ecosystems, as well as small fish. The Amu Darya large-tailed fish is an endemic species common in aquatic ecosystems of the Aral Sea basin, the fishing of which is prohibited. It is included in the "Red Book" published in Uzbekistan, Turkmenistan and the IUCN Red List [9, 12].

Spreading. It has been established that this species is distributed mainly in the aquatic ecosystems of the Amu Darya and its tributaries, the Surkhandarya.

Classification and ecology of the shell of *Pseudoscaphirhynchus hermanni*. The species has 28-31 brachial fins, 18-20 anal fins, 10-13 brachial convexities, 31-37 lateral fins. It has been studied that the length of the species is up to 26-28 cm. Changes in the level and hydrochemical composition of aquatic ecosystems have affected the reduction of species. The Aral Sea basin is an endemic type of aquatic ecosystems, which differs from other types in its uniqueness. It is listed in the "Red Book" of Uzbekistan and Turkmenistan, and fishing for it is prohibited [12].

The range of this fish population has decreased. The main reason for this is the violation of the hydrological regime of the Amu Darya and the consequences of the construction of reservoirs. There is no information about whether the fish was caught in water bodies. Because these fish live in fast, rocky, sandy waters. Does not spread in calm, stagnant waters. Does not occur in water bodies [10].

Spreading. In the aquatic ecosystems of the Amu Darya, it has been established that it is distributed mainly in the types of water around the city of Termez and in areas before the river flows into it, in the waters of the middle and lower parts of Surkhandarya.

Classification and ecology of the shell of *Capoetobrama kuschakewitschi*. Endemic species of the Amu Darya basin. Fishing is prohibited. It is included in the Red Books of Uzbekistan and Tajikistan and the IUCN Red List. It lives in muddy and flowing waters, and reaches sexual maturity at 3 years. Mating lasts from April to July, dropping its eggs on algae [10, 12].

ISSN NO: 2771-8840
September 2024

Spreading. It is widespread in the upper and lower reaches of the Amu Darya, in the middle and lower reaches of the Kashkadarya, Surkhandarya and Zarafshan. There are 8-9 setae on the dorsal fin, 15-20 setae on the anal fin, and 44-66 setae on the lateral line. Its length is up to 25-26 cm, and its weight is up to 150 g.

Classification and ecology of the shell of *Luciobarbus capito*. Reaches sexual maturity at the age of 3-4 years. Spawning occurs at the same time. Mating occurs in May-June on sandy-rocky soils. Fertility up to 40-100 thousand eggs. Feeds on underwater animals, plants and fish. Hybrids with the island whiskered fish and the Chuya black fish are known (http://www.fishbiosystem.ru). Endemic to the Aral Sea basin. In subsequent years, their numbers have significantly decreased. Fishing is prohibited. Included in the Red Book of Uzbekistan and Kazakhstan [10, 12].

Spreading. Found in the Syr Darya and Amu Darya basins, in the Caspian Sea basin. The snout is extended forward. The anterodorsal distance is greater than the postdorsal. The shoulder, strongly compressed from the sides, rises vertically behind the back of the head, the shoulder straightens behind the fin. In the posterior fin III-IV there are 7-9 setae, in the anal fin III there are 4-6 setae. The number of scales on the lateral line is 60-66. There are 16-18 lunar pillars. The body length is up to 70 cm, the weight is up to 12 kg.

Classification and ecology of the shell of *Sabanejewia aurata*. They live in silty and sandy soils near the banks of water bodies, sometimes they bury themselves. In the second year of life they reach sexual maturity. Mating is partial and begins in mid-April. Fertility is up to 500-5000 eggs. Feeds on aquatic invertebrates and algae. Endemic to the Aral Sea basin. Included in the "Red Book" of Uzbekistan.

Spreading. It is found in the basins of the Amu Darya, Syr Darya, Zarafshan, Kashkadarya, Chu, Sarysu rivers, from the upper reaches of the rivers to the foothills. It prefers the upper reaches of the rivers. Sabanejewia aurata (De Filippi, 1863) lives in the water bodies of the Caucasus, Iran, and Eastern Europe. The spine under the eye is underdeveloped. There is a leathery crown behind the shoulder and anal fins. The scales penetrate to the crown. The color is yellow, golden or gray-brown. Along the shoulder there are 8-16 large spots, on the sides there are 13-20 smaller spots. On the dorsal fin II-III there are 6-7 setae, on the anal fin II-III there are 5-6 setae. The body length is up to 7 cm. Adult males have a characteristic swelling on the side of the body in front of the brachial fin [10, 12].

Classification and ecology of the shell of *Glyptosternum oschanini*. It is mainly found on river slopes, under rocks. It reaches sexual maturity in 2-3 years. Reproduction lasts from May to June. It throws its eggs in portions. Fertility is characterized by 200-1000 eggs, the diameter of the eggs is 3 mm. Males are larger than females and guard the laid eggs. Feeds on underwater animals. Central Asian endemic. Included in the "Red Book" of Uzbekistan.

Spreading. Found in the Amu Darya and Syr Darya basins, as well as in the mountain rivers of Kazakhstan, Tajikistan, Kyrgyzstan and Uzbekistan. The eyes are small. There are 4 pairs of whiskers on the nose. The head is flat. The body is naked. The belly is flat. The back of the shoulder fin has a leathery crown on the tail axis. The color is from dark gray to yellowish-brown, the belly is pale. In the shoulder fin there are I 6 setae, in the anal fin II-III 5 setae. The body length is up to 25 cm [10, 12].

Conclusion. As a result of our research, it was established that 40 species are distributed in the Surkhandarya region, 25 species in coastal waters, 39 species in Kashkadarya and 26 species in coastal waters. The bivalve mollusks *Corbiculla cor, Corbiculla fluminalis, Corbiculla purpurea* and fish *Pseudoscaphirhynchus kaufmanni, Pseudoscaphirhynchus hermanni, Capoetobrama kuschakewitschi, Luciobarbus capito, Sabanejewia aurata, Glyptosternum oschanini*, which are common in the rivers of Southern Uzbekistan, are listed in the Red Book of the Republic of Uzbekistan, as they are rare species. When studying species depending on their habitat, it was found that 31 species are adapted to life in different environments, and 14 species are common in a constant (homogeneous) environment. It is evident that hydrobionts common in the aquatic ecosystems of Southern Uzbekistan are widely distributed in a variable habitat.

References.

1. Boymurodov Kh. T. i dr. Istochniki zagryazneniya vodnyx resursov srednego techeniya reki zeravshan i technologii vodopodgotovki //Chemistry, physics, biology, mathematics: teoreticheskie i prikladnye issledovaniya. - 2022. - S. 16-19.

ISSN NO: 2771-8840
September 2024

2. Боймуродов Х.Т. 2017. Двустворчатые моллюски (Bivalvia:Unionidae, Corbiculidae) водных бассейнов Узбекистана // Автореф. докторской (DSc) диссертации по биол. наукам. Ташкент. С.29-60.
3. Husniddin Boymurodov, Khojamurod Jabborov, Tozagul Jabbarova, Bakhtiyor Aliyev, Omon Mirzamurodov, Azamat Egamqulov. CHanges in the habitats of the unionidae, euglesidae, pisididae and sorbiculidae species with the construction of reservoirs in the kashkadarya basin due to climate change. Reliability: Theory and Applications Electronic journal of international group on reliability journal is registered in the library of the u.s. congress Special Issue 4 (70), November 2022. P. 343-347.
4. Иззатулаев З.И. Водные моллюски Средней Азии – индикатори загрязнения водоемов и водотоков // Гидробиологический журнал,1992.Т.28,–№1.С.85-90;
5. Izzatullaev.Z.I. Results of a study of Bivalve moluscs of Certral Asia // Вестник Житомирского педагогического университета, 2002. – №5. – С.21 23.
6. Иззатуллаев З.И., Боймуродов Х.Т. Зарафшон дарёси ҳавзаси иккипаллали моллюскалари. Монография. – Самарқанд, 2009. – 95 б.
7. Иззатуллаев З.И. Фауна моллюсков водных экосистем Средней Азии и сопредельных территорий. Монография. Тошкент: «LESSON PRESS», 2019. – 420 с.
8. Иззатулаев З., Солижонов Х. Фарғона водийси зулукларининг биохилма-хиллиги ва ноёб турларни муҳофаза қилишга оид Тавсиянома. Андижон : “Andijon nashriyot-matbaa”, 2022. -23 б.
9. Kuzmetov A. O‘zbekiston suv omborlari zooplankton organizmlari faunasi, ekologiyasi va amaliy ahamiyati. Biologiya fanlari doktori (DSs) ilmiy darajasini olish uchun yozilgan diss. avtoreferati. – Toshkent, 2019. –B. 3-24.
10. Мирабдуллаев И.М., Мирзаев У.Т., Кузметов А.Р., Кимсанов З.О. Ўзбекистон ва қушни ҳудудлар балиқлари аниқлагичи. Тошкент : “Сано стандарт” нашриёти. 2011. -107 б.
11. Yuldashov M.A. O‘zbekiston turli tipdagi suv havzalari baliq mahsuldorligini oshirishning biologik asoslari. Biologiya fanlari doktori (Dostor of Science) ilmiy darajasini olish uchun tayorlangan dissertatsiya. –Toshkent, 2019. – B.18, 176, 177, 191.
12. Ўзбекистон Республикасининг Қизил китоби, II жилд: Ҳайвонлар; Ж.А. Азимовнинг умумий таҳрири остида. Т.: "Tasvir" нашриёт уйи, 2019. - 392 б.