

# Distribution of hydrobionts in aquatic ecosystems in different parts of the akdaryo river

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**Abstract.** The work covers a comparative analysis of the distribution of hydrobionts in water ecosystems in different parts of the Okdarya River. The distribution of 22 species in the area near Chelak city of Akhdarya and 20 species in the area after the Akhdarya reservoir was researched and studied. Ecological groups of hydrabionts distributed in biotopes of the Akdarya River were analyzed depending on their habitat. In the river, there are 8 types of peloreophiles in 28.5%, 3 types of rheophiles in 11%, 1 type of pelolimnophiles in 3.5%, 8 types of phytophiles in 28.5%, 1 type of telmotophiles in 3.5% and 1 type of phytophiles in 3.5%, phytolithoreophiles 7% of type 2, 11% of 3 types of phytopelophiles and 3.5% of 1 type of lithoreophiles were studied.

## 1 Introduction

Increasing drought in the regions leads to the reduction of biological diversity of natural water bodies and the crisis of water ecosystems. The purpose of the research is Unionidae, Corbiculidae, Lymnaeidae, Physidae, Planorbidae, Astacidae, Glossiphoniidae, Hirudinidae, Praobdellidae, Haemopidae and Erpobdellidae consists in studying the distribution, density and ecological groups of hydrobionts belonging to families in biotopes [1, 8].

E.Froufe, C.Alanp 1991, S.Utevsky 2009, D.V.Goncalves, 2010, L.Vasiliev 2018 on systematics, ecology and utilization of bivalves, gastropod mollusks, crustaceans and leeches were analyzed, Researches biodiversity of gyrobionts, taxonomic composition, density, assessment of population status, study of indicator properties of hydrobionts were conducted by V.V.Bogatov, Y.I.Storobogatov 2005, N.I.Andreev 2010, V.V.Bogatov 2014, D.V.Kuzmenkin 2015, Kh.B.Yunusov 2020, 2023, Z.I.Izzatullaev 2022, Kh.T. Boymurodov 2019, 2023 [2-3, 8].

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## 2 Materials and methods

Rijinashvili (2005) in material selection; The methods of Izzatullaev, Boymurodov, (2019, 2023), Yunusov (2022, 2023) were used. Research on hydrobionts in aquatic ecosystems began in 2015. 893 pieces of hydrobionts were collected and analyzed from the studied area. Variation of conchological signs in hydrobionts G.F. It was studied by the method of Lakin (1980). 30 adult mollusks were collected and studied using MBS-9. We used Z.I.Izzatullayev, Kh.T.Boimurodov (2009) "System of bivalve mollusks of the Zarafshan River basin" and Z.I.Izzatullayev (2019) "Mollusk fauna of aquatic ecosystems of Central Asia and adjacent areas" to create the following taxonomic system [4-7].

## 3 Results and Discussion

Akdaryo River - receives water from the Zarafshan River. The length of Akdaryo is 131 km, water consumption is 230 m<sup>3</sup>/sec. 23 streams receive water from Akdarya. 12 of them are on the right bank - Qurbanabad - 9, 6 km, Yangikent - 34 km and others, and 10 are on the left bank - Shahob - 17 km, Fazara - 26,8 km, Chelak - 9 km and others. Analysis of the literature shows that until now the fauna of river hydrabionts has not been specially studied. In order to study hydrabionts, we conducted continuous observations at two points of the Okdarya river near Chelak city and in the part after the Okdarya reservoir. We studied out that 22 types of hydrabionts are distributed in Okdarya near Chelak city, coordinates N 39.69477167145121, E 67.05410957336427, 8 types of bivalve mollusks and 1 subspecies, 7 types of gastropod molluscs, 1 type of shrimp and 5 types of leeches are distributed (Table 1).

Unionidae, Corbiculidae, Lymnaeidae, Physidae, Planorbidae, Astacidae, Glossiphoniidae, Hirudinidae, Praobdellidae, Haemopidae and Erpobdellidae hydrabionts belonging to the family Unionidae of the bivalve mollusks are distributed from *Sinanodonta* genus *Sinanodonta gibba* 1.7, *S. orbicularis* 1.5, *S. puerorum* 1.4, from Colleopterum genus *Colleopterum bactrianum* 0.7, *C. cyreum sogdianum* 0.6. mainly found in muddy biotopes at depths of 0.4-2.3 meters. In aquatic ecosystems, the genus *Sinanodonta* dominates with a large density of species.

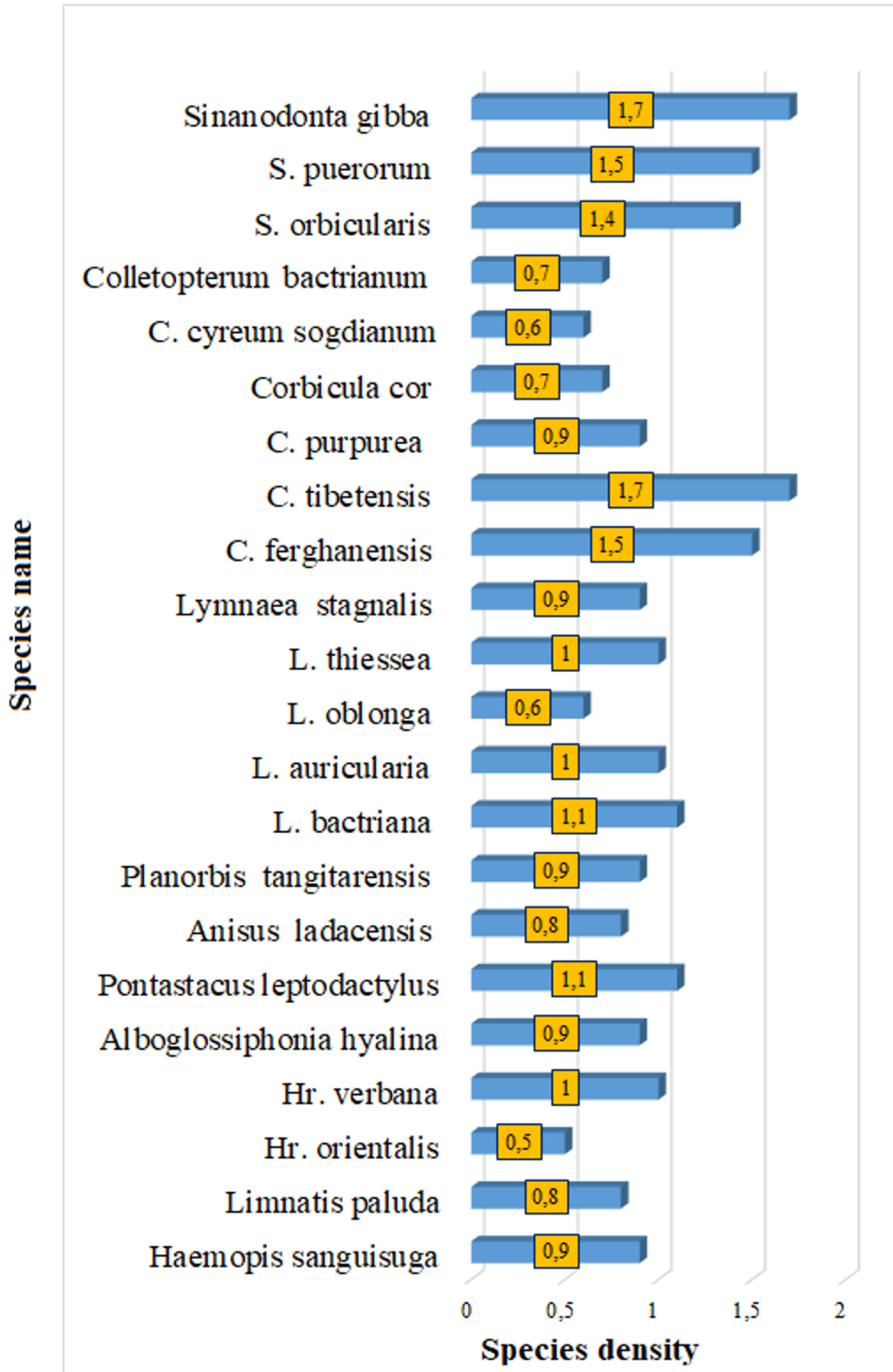
*Corbiculia cor* 0.7, *C. purpuria* 0.9, *Corbiculina tibetiensis* 1.7, *C. ferghanensis* 1.5 are found in the sandy biotopes of the slow-flowing part of the river. These species are relatively abundant in ponds of fish farms around the river, where there is a constant presence of water, where there is a lot of silt and many microphytes are found (Figure 1).

Aquatic mollusks in the waters of the canals and ditches of the territory Lymnaeidae from the family *Lymnaea stagnalis* 0.9, *L. thiessea* 1.0, *L. oblonga* 0.6, *L. auricularia* 1.0, *L. bactriana* 1.1, Planorbidae from the family *Planorbis tangitarenensis* 0.9 and *Anisus ladacensis* 0.8. Astacidae from crabs family *Pontastacus leptodactylus* 1,1 and leeches Glossiphoniidae family *Alboglossiphonia hyalina* 0.9, family Hirudinidae *Hr. verbana* 1.0, *Hr. orientalis* 0.5, family Praobdellidae *Limnatis paluda* 0.8, family Haemopidae *Haemopsis sanguisu* was studied to have a prevalence of 0.9. It was observed that the hydrabiont fauna of this area differs from the fauna of other parts of the river in terms of its density.

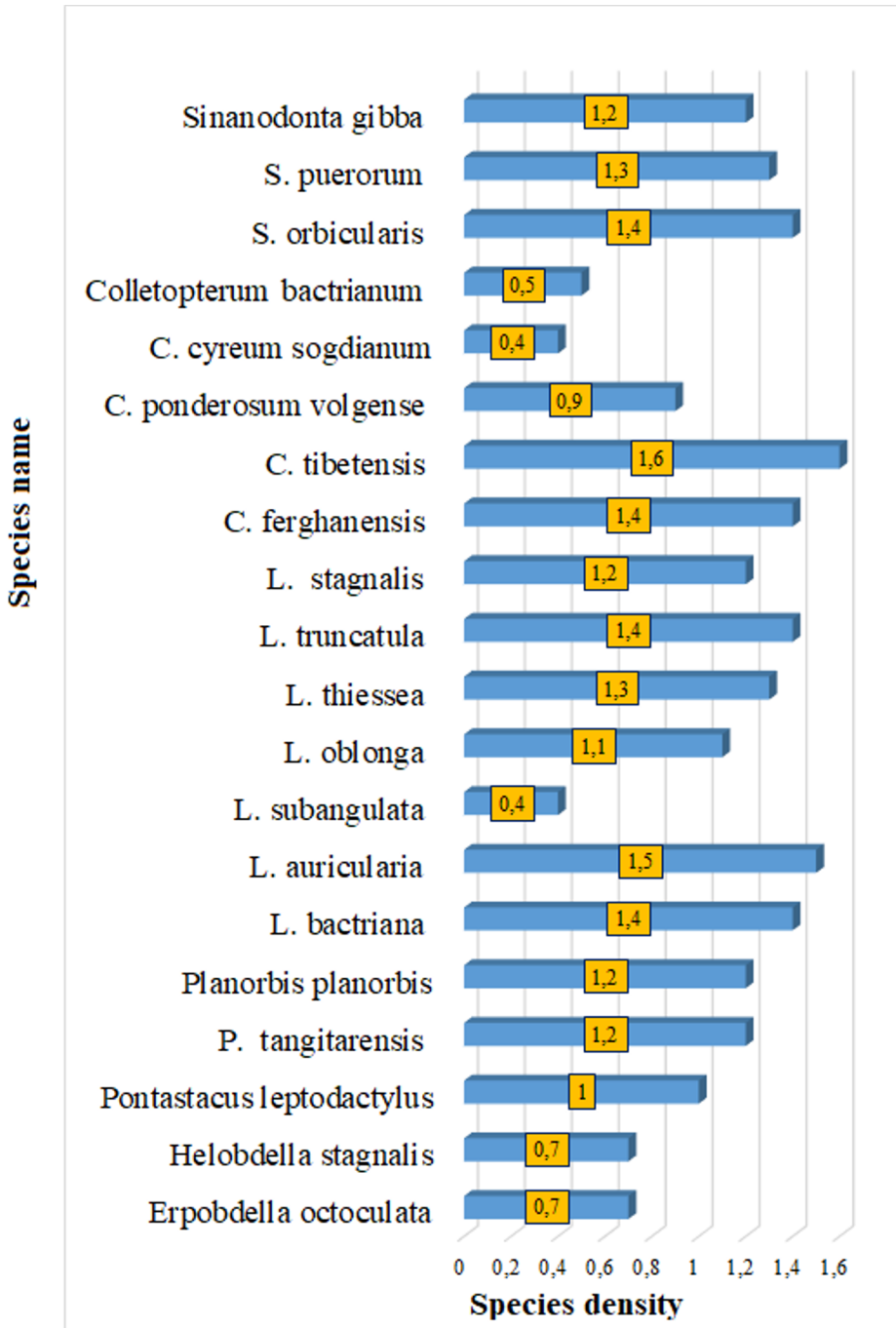
We defined a total of 20 types of hydrabionts are distributed in the part after the Akdaryo reservoir with coordinates N 40.01696639570046, E 65.9517002105713. The main reason for the impact of the Akdaryo reservoir on the diversity of species in this area is that the constant presence of water in the reservoir affects the distribution of species in water and other water ecosystems. We defined that *Sinanadonta gibba* 1.2, *S. orbicularis* 1.4, *S. puerorum* 1.3, *Colleapterum bactrianum* 0.5, *C. cyreum sagdianum* 0.4, and *C. ponderosum volgense* 0.9 from the Unionidae family are found in muddy biotopes. *Solleopterum* in aquatic ecosystems *cocandicum* type was not found [8, 10].

**Table 1.** Comparative analysis of the distribution density of hydrobionts, their occurrence in biotopes in the Okdarya River near the city of Chelak and the Okdarya Reservoir (n= 10, m<sup>2</sup>/piece).

No.	Types	Akdaryo river		Biotopes			Ecological groups
		Khududi near the city of Chelak	The area next to the Akdaryo reservoir	rocky terrain	sandy lands	clays	
Bivalves class Unionidae family							
1	<i>Sinanodonta gibba</i>	1.7±0.3	1.2±0.2	-	-	+	Peloreophil
2	<i>Sinanodonta puerorum</i>	1.5±0.3	1.3±0.2	-	+	-	Peloreophil
3	<i>Sinanodonta orbicularis</i>	1.4±0.2	1.4±0.2	-	-	+	Peloreophil
4	<i>Colletapterum bactrianum</i>	0.7±0.3	0.5±0.1	-	-	+	Rheophile
5	<i>Colletapterum cyreum sogdianum</i>	0.6±0.1	0.4±0.1	-	-	+	Rheophile
6	<i>Colletapterum ponderosum volgensis</i>	-	0.9±0.1	-	+	-	Pelolimnophile
Corbiculidae family							
7	<i>Corbicula cor</i>	0.7±0.1	-	-	+	-	Peloreophil
8	<i>Corbicula fluminalis</i>	-	-	-	+	-	Peloreophil
9	<i>Corbicula purpurea</i>	0.9±0.1	-	-	+	-	Peloreophil
10	<i>Corbiculina tibetensis</i>	1.7±0.3	1.6±0.3	+	-	-	Peloreophil
11	<i>Corbiculina ferghanensis</i>	1.5±0.2	1.4±0.2	-	+	-	Peloreophil
Gastropods (Gastropoda) Class Lymnaeidae family							
12	<i>Lymnaea stagnalis</i>	0.9±0.1	1.2±0.1	+	-	-	Phytophil
13	<i>Lymnaea truncatula</i>	-	1.4±0.2	-	-	+	Telmatophile
14	<i>Lymnaea thiessea</i>	1.0±0.3	1.3±0.1	-	-	+	Rheophile
15	<i>Lymnaea oblonga</i>	0.6±0.1	1.1±0.1	-	+	-	Phytophil
16	<i>Lymnaea subangulata</i>	-	0.4±0.1	-	-	+	Phytophil
17	<i>Lymnaea auricularia</i>	1.0±0.1	1.5±0.2	-	-	+	Phytorheophilic
18	<i>Lymnaea bactriana</i>	1.1±0.1	1.4±0.1	-	+	-	Phytophil
Physidae family							
19	<i>Costatella acuta</i>	-	-	-	+	-	Phytophil
Planorbidae family							
20	<i>Planorbis planorbis</i>	-	1.2±0.2	-	-	+	Phytophil
21	<i>Planorbis tangitarenis</i>	0.9±0.1	1.2±0.1	-	-	+	Phytophil
22	<i>Anisus ladacensis</i>	0.8±0.1	-	-	-	+	Phytophil
Crayfish ( S rustacea ) class Astacidae family							
23	<i>Pontastacus leptodactylus</i>	1.1±0.1	1.0±0.1	-	+	-	Phytophil
Leeches Clitellata Michaelsen, class 1919 Glossiphoniidae family							
24	<i>Hemiclepsis marginata</i>	-	-	+	-	-	Crenophyllum
25	<i>Alboglossiphonia hyalina</i>	0.9±0.1	-	+	-	-	Phyto-lithoreophile
26	<i>Helobdella stagnalis</i>	-	0.7±0.1	+	-	-	Phyto-lithoreophile
Hirudinidae family							
27	<i>Hr. verbana</i>	1.0±0.1	-	+	-	-	Phyto-pelophile
28	<i>Hr. orientalis</i>	0.5±0.1	-	-	+	-	Phyto-pelophile
Praobdellidae family							
29	<i>Limnatis paluda</i>	0.8±0.1	-	-	+	-	Phyto-pelophile
Haemopidae family							
30	<i>Haemopsis sanguisuga</i>	0.9±0.1	-	-	+	-	Peloreophil
Erpobdellidae family							
31	<i>Erpobdella octoculata</i>	-	0.7±0.1	-	-	+	Lithoreophile
Total number of rounds		22	20	6	13	12	



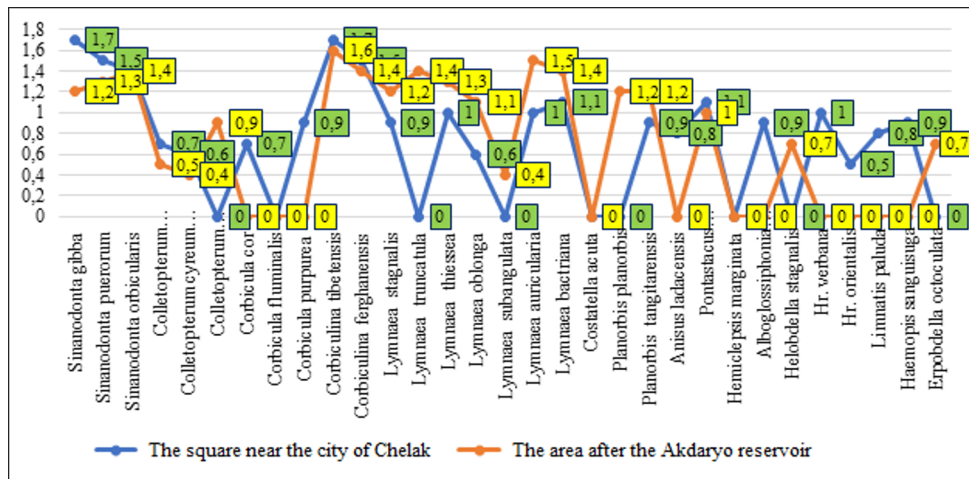
**Fig. 1.** Distribution of hydrabionts in the Chelak area of the Akdarya River.



**Fig. 2.** Distribution of hydrabionts in the area of the Okdarya river after the Okdarya reservoir.

*Corbicula cor*, *C. fluminalis* and *C. purpurea* from the Sorbiculidae family included in the Red Book of Uzbekistan are not distributed in aquatic ecosystems. We defined that *Corbiculina tibetensis* 1.6 and *C. ferghanensis* 1.4 were distributed in sandy biotopes. For *Corbiculina tibetensis* and *C. ferghanensis*, which live in water, the salinity, clarity, turbidity, content of mineral salts, etc. have their effect as a limiting factor. The water

ecosystems of the part of the river after the Akdarya reservoir are the type of water that is favorable for the spread of mollusks. They are Lymnaeidae in 1m<sup>2</sup> *Lymnaea stagnalis* 1.2, *L. truncatula* 1.4, *L. thiessea* 1.3, *L. oblonga* 1.1, *L. subangulata* 0.4, *L. auricularia* 1.5, *L. bactriana* 1.4 from the family *Lymnaea*. We found out that it is spread from Planorbidae in biotopes of channels starting from the reservoir from the family *Planorbis planorbis* 1,2, *P. tangitarenis* 1,2 and crabs we found that Astacidae *leptodactylus* was distributed from 1.0. *Pontastacus leptodactylus* is also used in food. The family Glossiphoniidae is *Helobdella*, except among the giants *stagnalis* spread from 0.7. *Hr. verbana*, *Hr. orientalis*, *Limnatis paluda*, *Haemopsis sanguisuga*, *Erpobdella* It was found that *octoculata* species did not spread (Figures 2 and 3).



**Fig. 3.** The difference in the distribution density of hydrabionts in the Chelak area of the Okdarya River and the Okdarya reservoir area.

## 4 Conclusion

We defined that 22 species are distributed in the area of Akhdarya near the city of Chelak and 20 in the area after the Akhdarya reservoir. When we analyzed the ecological groups of hydrabionts distributed in the biotopes of the Akdarya River according to their habitat, 8 types of peloreophiles were found in 28.5%, 3 types of rheophiles in 11%, 1 type of pelolimnophiles in 3.5%, 8 types of phytophiles in 28.5%, 1 type of telmotophiles in 3.5% and we studied that 1 type of phytophiles is 3.5%, 2 types of phyto-lithoreophiles are 7%, 3 types of phyto-pelophiles are 11% and 1 type of lithoreophiles is 3.5%. It was found that the species belonging to the ecological group peloreophile living in the mud of running water and phytophile living on plants are dominant over other species in riverside aquatic ecosystems. We can include *Sinanodonta* and *Lymnaea genera species* among the evrybiont species of regional water types.

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