

DISTRIBUTION AND ECOLOGICAL GROUPS OF BIVALVE MOLLUSKS OF THE FAMILIES UNIONIDAE AND SORBICULIDAE IN THE AQUATIC ECOSYSTEMS OF THE KYZYLKUM NATURE RESERVE

Husniddin Boymurodov

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Samarkand Veterinary and Medical Institute, Uzbekistan
boymurodov1971@mail.ru

Abstract

In the part of the Amudarya river flowing through the territory of the Kyzylkum Nature Reserve, 9 species and 2 subspecies of bivalve mollusks of the families Unionidae and Corbiculidae were found. The acclimatization of White Amur (Ctenopharyngodon idella) and White Hummus (Hypophthalmichthys molitrix) has led to the spread of Sinanodonta gibba, S. orbicularis and S. puerorum into aquatic ecosystems. In the Amudarya, Sinanodonta seed species have led to an expansion of their distribution areas. For the first time in the reserve, 5 species included in "Red Book" of Uzbekistan Corbicula cor, S. purpurea, S. fluminalis, Colletopterum syreum sogdianum, C. bacterianum.

Keywords: reserve, aquatic ecosystems, Unionidae and Corbiculidae families, Colletopterum syreum sogdianum, C. bacterianum

I. Introduction

Malachological research in the world focuses on the identification of biological diversity of natural and artificial water bodies, the study of mollusk fauna in aquatic ecosystems of reserves, the assessment and use of the degree of transformation of mollusks in areas with strong anthropogenic impact. The study of regional fauna creates important conditions for the complex solution of theoretical and practical problems. The study of the fauna distribution and ecological groups of dicotyledonous mollusks of the families Unionidae and Sorbiculidae in the aquatic ecosystems of the Kyzylkum nature reserve is one of the current issues. Here, along with the complex distribution of individual species, a whole faunistic complex, the existing differences in the ecology of different populations of the same species are also manifested. Careful study of the fauna, species diversity and distribution patterns of bivalve mollusks of the Kyzylkum terrestrial aquatic ecosystems is both theoretically and practically important. Bivalve mollusks play an important role in the purification of contaminated water among invertebrates.

They completely pass water through the body and filter it, i.e. these mollusks are natural water purifiers.

III. Materials and methods

The study of mollusks and collection of materials from the aquatic ecosystems of the Kyzylkum Nature reserve began in 2004. Aquatic ecosystems of the Kyzylkum Nature reserve the

species composition, ecological characteristics, interspecific distribution and importance of bivalve mollusks still have not been sufficiently studied. Materials for research were collected in spring, summer and autumn materials of 2004-2021. (Figure 1).

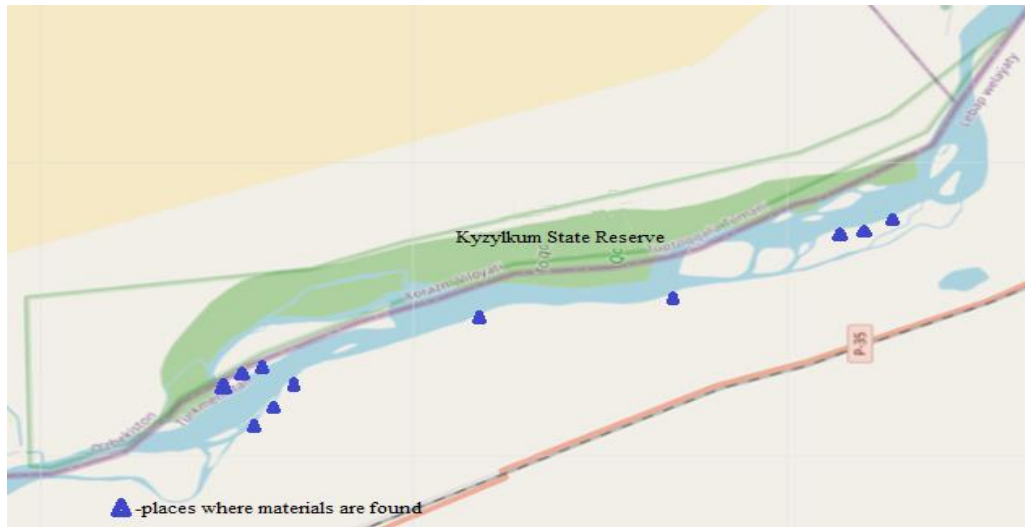


Figure 1: Places where species of families Unionidae and Sorbiculidae are found in the territory of Kyzylkum reserve.

In aquatic ecosystems, there are several ways to manually collect mollusks. Mollusks were collected from the mud near the shore with a steel net, and underwater with a metal net with a sieve [1, 3-5]. The volumes of the large shells were measured using a caliper and the small ones using an MBS-1 ocular micrometer.

IV. Analysis and results

Kyzylkum nature reserve is located in the Bukhara region of Uzbekistan and in the middle reaches of the Amu Darya, on both banks of the river. The area of the reserve is more than 10,311 hectares, the forested area is 5,338 hectares, the sandy desert is 800 hectares, and the tugai forest area is 1,883 hectares. The reserve stretches 30 km from northwest to southeast and 3 km from east to west along the banks of the Amudarya. The Amudarya river flows through the Kyzylkum nature reserve. We studied the distribution of species of the families Unionidae and Sorbiculidae in the river. The Amudarya is the wettest river in Uzbekistan and the largest in terms of catchment area. The river begins at an altitude of 4950 m on the northern slopes of the Hindu Kush Mountains. The length of the Amudarya is 2540 km. Based on the study of Central Asian aquatic mollusks, ZI Izzatullaev provided the first information about bivalve mollusks in the lower reaches of the Amudarya river and introduced several new species [2, 6].

In the aquatic ecosystems of the Kyzylkum Nature Reserve, river water temperature, groundwater content and river saturation play an important role in the distribution of mollusks belonging to the Unionidae and Corbiculidae families in the Amudarya. As the Amudarya is mainly saturated with ice and snow, it has affected the distribution of some bivalve mollusks. In particular, according to Izzatullaev ZI in the mountainous part of the territory of Tajikistan, its rapid flow and the almost absence of planktonic organisms led to the absence of bivalve mollusks of the family Unionidae [6].

Large bivalve mollusks are widespread only in the plains of rivers - throughout Uzbekistan,

due to environmental factors such as slow water flow in this part of the river, favorable water temperature and the abundance of planktonic organisms for feeding mollusks. In addition, it should be noted that in the Amudarya basin, changes in the composition, number and habitat of species of bivalve mollusks occur naturally and under the influence of human activities.

As a result of the research, 9 species and 2 subspecies of bivalve mollusks of the families Unionidae and Corbiculidae were found in the part of the Amudarya flowing through the territory of the Kyzylkum Nature Reserve (Table 1). They are distributed in rocky soils (11,7%), sandy soils (47,0%) and muds (41,3%), depending on the specific characteristics of the river (Figure 2).

Table 1: Unionidae and Corbiculidae families in the part of the Amudarya flowing through the territory of the Kyzylkum Nature Reserve

№	Types	Density in river flow, m ² (n = 10)		Biotop			Ecological groups
		The middle part Latitude: 40.62255237092874 Distance: 62.11395263671876	Lower width: 40.54433048799512 Distance: 62.17300415039063	rocky soils	sandy soils	muds	
1.	<i>Sinanodonta orbicularis</i>	1,0±0,3	-	-	-	+	Peloreofil
2.	<i>Sinanodonta gibba</i>	1,9±0,4	1,2±0,2	-	+	+	Peloreofil
3.	<i>Sinanodonta puerorum</i>	1,8±0,4	1,1±0,1	-	+	+	Peloreofil
4.	<i>Colletopterum bactrianum</i>	0,8±0,1	-	-	-	+	Reofil
5.	<i>Colletopterum cyreum sogdianum</i>	1,1±0,3	-	-	-	+	Reofil
6.	<i>Colletopterum ponderosum volgensis</i>	1,2±0,3	0,7±0,1	-	+	+	Pelolimnofil
7.	<i>Corbicula cor</i>	-	1,1±0,2	-	+	-	Peloreofil
8.	<i>Corbicula purpurea</i>	-	0,8±0,1	+	+	-	Peloreofil
9.	<i>Corbicula fluminalis</i>	0,3±0,1	0,9±0,1	-	+	-	Peloreofil
10.	<i>Corbiculina tibetensis</i>	1,6±0,3	2,6±0,4	-	+	+	Peloreofil
11.	<i>Corbiculina ferghanensis</i>	1,9±0,4	2,8±0,5	+	+	-	Peloreofil
Total types:		9	8	2	8	7	

We conducted our research in the area of the Kyzylkum nature reserve which coordinate of the middle part of the Amudarya is latitude: 40.62255237092874, the distance is 62.11395263671876, and the coordinate of the Amudarya sheep is latitude: 40.54433048799512, the distance is 62.17300415039063 analyzed the distribution, density biotopes, and ecological groups of species of the Unionidae and Corbiculidae families.

We found that 9 species are distributed in the muddy and sandy soils of the middle part of the Amudarya with latitude: 40.62255237092874 and latitude: 62.11395263671876. Their density per 1 m² is based on the average Unionidae family *Sinanodonta gibba* 1,0, *S. orbicularis* 1,9, *S. puerorum* 1,8, *Colletopterum bactrianum* 0,8, *C. cyreum sogdianum* 1,1, *C. ponderosum volgensis* 1,2 from the seeds of *Colletopterum*. Sorbiculidae family *Corbicula fluminalis* 0,3 from *Corbicula* seed, *Corbiculina tibetensis* 1,6 and *C. ferghanensis* 1,9 from *Corbiculina* seed studied.

Z.I.Izzatullaev's researches in 1980-1992 did not show the species *Sinanodonta gibba*, *S.orbicularis* and *S.ruerorum* from Amudarya. However, research has shown that these species are distributed in the middle part of the Amu Darya - Surkhandarya and lower - Khorezm region [6]. It should be noted that gloxidia of *Sinanodonta* seed species are exoparasitic for some time in fish for reproduction and spread. These species are specific to the territory of China and are associated with the development of non-traditional Chinese complex fish species infested with *Sinanodonta* gloxidia for the development of fisheries in our country - white amur (*Ctenopharyngodon idella*) and whitefish (*Hypophthalmichthys molitrix*). It should be noted that as a result of acclimatization and reproduction of these fish species in fisheries near the Amudarya basin, the influx of white amur and khumbosh into the river under human influence has led to the spread of *Sinanodonta* species in the Amudarya (Figure 3).

Corbicula cor and *S.purpurea* are not found in the aquatic ecosystems of this region because these species cannot live in muddy biotopes, which are mainly adapted to live in sandy and rocky biotopes. 8 species of *Sinanodonta orbicularis* 1,2, *S. puerorum* 1,1, *Colletopterum ponderosum volgense* 0,7, *Corbicula cor* 1,0, *C.purpurea* 0,8, *C. fluminalis* 0,9, *Corbiculina tibetensis* 2,6 and *C. ferghanensis* 2,8. (Figure 4).

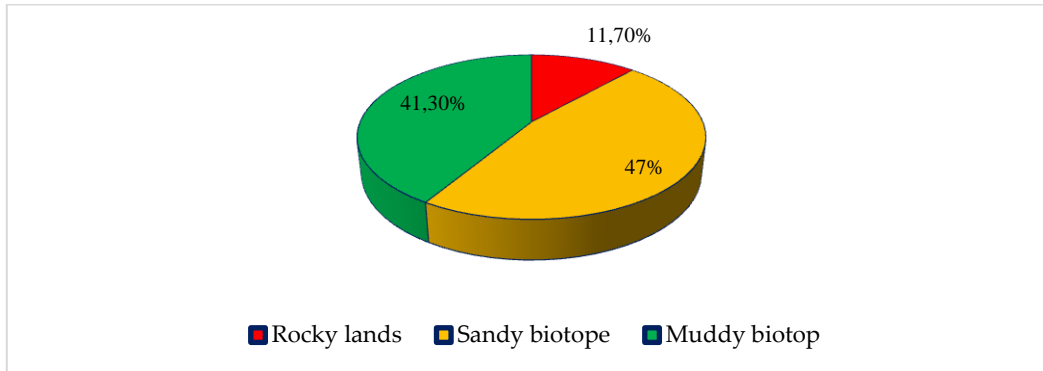


Figure 2: Distribution of Unionidae and Corbiculidae families in biotopes

We found that *Sinanodonta orbicularis*, *Colletopterum bactrianum*, *C. cyreum sogdianum* were not distributed in the waters of this region. The variability of the water level in the lower reaches of the river and the scarcity of muddy biotopes may have contributed to the absence of the species. 5 species included in the Red Data Book of Uzbekistan in the reserve *Corbicula cor*, *S. purpurea*, *S.fluminalis*, *Colletopterum syreum sogdianum*, *C. bacterianum*. We learned that these species differ from other species in the reserve by a lower distribution density.

The species of the Unionidae and Corbiculidae families distributed in the Kyzylkum Nature Reserve were divided into ecological groups depending on their habitat. All species were found to belong to 3 different ecological groups. Eight species of peloreophiles (*Corbicula cor*, *S. purpurea*, *S.fluminalis*, *Corbiculina tibetensis*, *C.ferghanensis*, *Sinanodonta gibba*, *S.orbicularis*, *S. puerorum*) are common in the Amudarya, accounting for 73% of the total mollusks. Rheophiles 2 species (*Colletopterum syreum sogdianum*, *C. bacterianum*) were found to be 18% and 1 species (*Colletopterum ponderosum volgense*), pelolemnofil 9%.

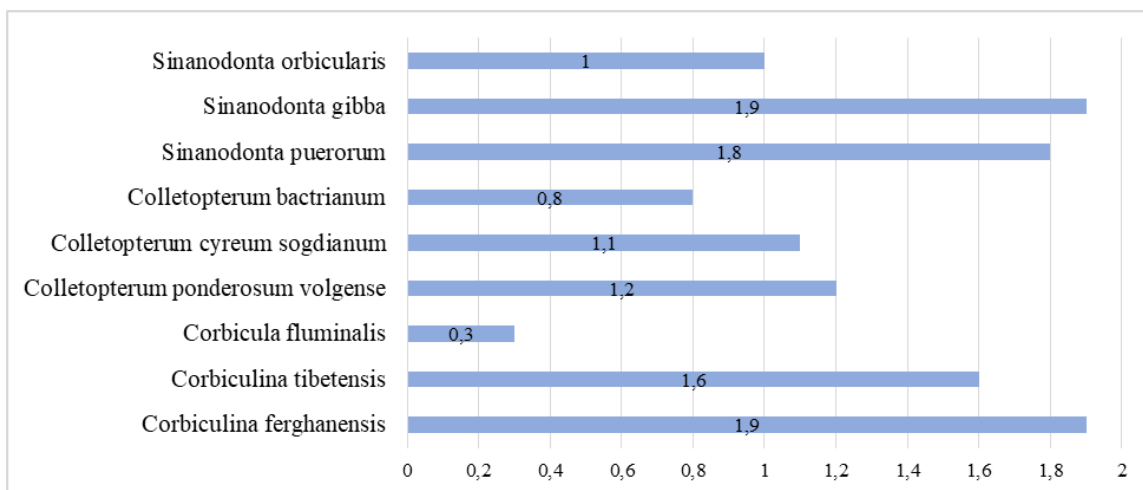


Figure 3: Distribution density indicators of bivalve mollusks in the middle part of the Amudarya

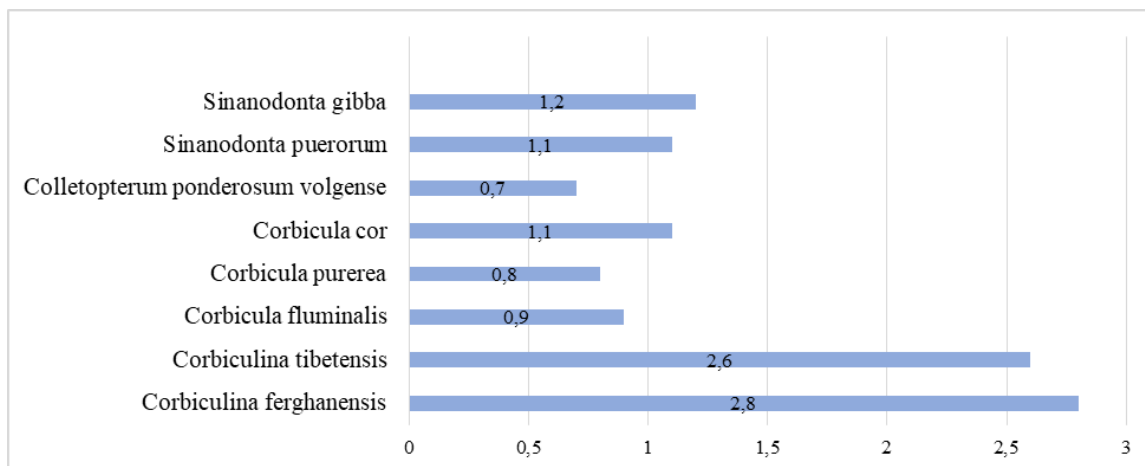


Figure 4: Distribution density of bivalve mollusks in the lower reaches of the Amudarya.

V. Conclusions

In the part of the Amudarya flowing through the territory of the Kyzylkum Nature Reserve, 9 species and 2 subspecies of bivalve mollusks of the families Unionidae and Corbiculidae were found. 2 species in rocky biatops, 8 species in sandy biatops and 7 species in muddy biatopes survival were studied. With the acclimatization of the Amudarya aquatic ecosystems in 1985-2000 to breed Chinese complex fish species-white amur (*Ctenopharyngodon idella*) and whitefish (*Hypophthalmichthys molitrix*), the distribution of *Sinanodonta gibba*, *S.orbicularis* and *S. puerorum* seeds in the aquatic ecosystems of this region led to the expansion of their range. The extension of 5 species *Corbicula cor*, *S. purpurea*, *S.fluminalis*, *Colletopterum cyreum sogdianum*, *C. bacterianum* which included in the Red Book of Uzbekistan were found in the reserve.

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