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Biodiversity of Bivalve Mollusks of the Unionidae and Corbiculidae Families in the Aquatic Ecosystems of Uzbekistan

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Abstract. Anthropogenic degradation of terrestrial zoogeographic barriers in Uzbekistan has led to the entry of invasive species into the fauna of many regions, especially hydrofauna, which have not changed for a long time. Representatives of the Sinanodonta genus have been accidentally introduced into the Chinese complex herbivorous fish since the 1980s as a result of the acclimatization of Ctenopharyngodon idella, Hypophthalmichthys molitrix. Successful reproduction in the climatic conditions of the country. At the same time it was found that the distribution areas of Sinanodonta seeds have expanded.
Keywords*: bivalve mollusk, aquatic ecosystems, Corbiculidae. Corbicula cor. C. fluminalis. andCorbiculinatibeteenssis.*

Relevance of the topic. The world's demand for biological resources of aquatic ecosystems, in particular, bivalve mollusks, is growing from year to year. Today, 1,3588.2 million of the bivalve mollusks tons of food raw materials and 5.9 millionUSDoll worth of pearls[1] are grown and used[2] in developed countries to clean water bodies. It is important to find out the species composition of the members of the *Unionidae* and *Corbisulidae* families and the possibilities of using them in practice. One of the most pressing issues in the aquatic ecosystems of Uzbekistan is the study of biodiversity of bivalve mollusks of the families *Unionidae* and *Corbiculidae*.

The degree of the problem has been studied. Scientific work on the species composition of the families *Unionidae* and *Corbiculidae* and their biological diversity, distribution, systematics was carried out by foreign scientists such as J.H.Thorp., A. Covich (1991), D.C. Aldridge (1999), P. Bouchet (2017), H. Markus (2010), A.F. Bogan (2010), A.Cuttelod (2011), M.Haws (2002), N.F. Conducted by Mamangkey (2009), S.Rahayu (2009), S.Rahayu (2013) [1,2,4].

[1]South Sea Pearl Necklace Price Wholesale Pearls Lombok Indonesia (http://missjoaquim.com/southseapearls/blog/indonesian-pearls-in-figures)
[2]GE's Water & Process Technologies(www.gewater.com)

This can be seen in the work by V.V.Bogatov, Ya.I. Starobogatov (2004), V.V. Bogatov (2014), N.I. Andreev (2009), G.P. Alyoxina (2007), V.F.Panov (2009), M.O. Son (2009), L.N. Yanovich (2013), A.L. Rijinashvili (2009), A.V.Sintyurina, A.B.Bigaliev (2009), D.V. Kuzmenkin (2015) from the CIS countries [3,5,6].
Z.I.Izzatullaev (2019, 2021), A.S.Daminov (2015,2017), H.T.Boymurodov (2018,2021), B.N.Otakulov (2019) and A.N.Egamkulov (2021) carried out researches in Uzbekistan.

The Materials and learning methods. The materials were collected from the following water basins of the rivers of Uzbekistan; rivers: Amudarya, Syrdarya, Kashkadarya, Surkhandarya, Zarafshan, Aqdarya, and Qoradarya; reservoirs: Tuyamoyin, Uchqizil, Kattakurgan, Aqdarya, Tosinsay, Talimarjan, Chimkurgan, Pachkamar, South Surkhan, Shurkul; lakes: Aydarkol and Ashikol fisheries collected materials from canals and ditches that flow in and out of them. A total of 8,223samples were studied, including 12,162 molluscs. Sample of this mollusk are studied by Ploxinsky, 1970; Rijinashvili, 2005; Starobogatov, Izzatullaev, 1984, Izzatullaev, Boymurodov, 2010 with the following methods.

Research results. From the distribution of mollusk seeds belonging to the *Unionidae* and *Corbiculidae* families in Uzbekistan, it can be said that they are uniquely distributed throughout the water basins, regardless of the density of mollusks. It can be said that the rivers are a basin of water in which all the seeds are almost evenly distributed - in which all the seeds are found in close proportions (23-27%). The length of the rivers and the presence of all the biotopes inhabited by mollusks have made the watershed a suitable reservoir for mollusks. However, it should be noted that although all species are found in rivers, they differ in their mutual density. For example, *Sinanodonta* representatives are found in rivers, so their density in rivers is lower than in other water bodies. The *Corbiculina* seed species is the most suitable aquifer for reproduction and distribution in rivers. In rivers, it reaches the maximum density of seed representatives (for example, *Corbiculinatibetensis* - Middle Zarafshan, 4.4/m^2; *Corbiculinaferghanensis* - Middle Amudarya 4.2/m^2). Although the natural lakes of Uzbekistan (Aydarkol, Ashikol) are closed water basins, *Sinanodonta* is rare in muddy biotopes. The absence of these species in Ashikol, especially in the Lower Amudarya, has led to a low percentage of them. The speed of water flow in the canals, their constant use as an active irrigation system, their insulation (e.g. cementing the bottom) to prevent water loss in the canals leads to a sharp change in the hydrological regime of the canals. Given that the life of bivalve mollusks, which are benthos organisms, is associated with more calm water bodies, it should be noted that the above factors primarily affect them negatively. The positive impact on the number of species of bivalve mollusks in the canals can be attributed to their antiquity, wetland (Dargom) and length (Eskianhor) and their connection with fisheries (Dargom, Mirzachul).

Representatives of *Colletopterum* seed - *Colletopterum bactrianum, Colletopterum cyreum sogdianum, Colletopterum ponderosum volgense, Colletopterum kokandicum* studied water do not show superiority over other seed representatives in natural and artificial water bodies. 3 species (*C.bactrianum, C. cyreum sogdianum, C. kokandicum*) are included in the Red Book of Uzbekistan. *C.bactrianum*is found only in the Middle Zarafshan and Amudarya rivers, in the Syrdarya (Syrdarya region only), in the reservoir and fishery only in Chelak, and from the canals only in the Tuyatortar and Mirzachul canals. Although *C. cyreum sogdianum* is listed in the Red Book (2009), it can be

included in the list of more common mollusks today. In general, there are favorable biotopes in fisheries for *Colletopterum* seed representatives - where the maximum seed density is observed.

Representatives of the *Corbicula* seed, like the representatives of the *Colletopterum* seed, do not show superiority over other species in the water studied in natural and artificial watersheds. All of them (*Corbicula cor, Corbicula purpurea, Corbicula fluminalis)* are rare species. Their maximum density is observed in river basins (*C. cor* - Middle Kashkadarya, 2.7/m^2, *C. purpurea, C. fluminalis* - Middle Zarafshan, 2.3-2.5/m^2).

In the water basins of Uzbekistan, the distribution of bivalve mollusks by ecological groups is common (Figure 1). The peloreophilic ecological group predominates in all watersheds, but the species included in the ecological group have different diversity in different basins. *Sinanodontagibba, S. orbicularis, Corbiculinatibetensis* and *C. ferghanensis*frompeloreophiles predominate within the group in rivers, fisheries and reservoirs. Corbiculinatibetensis and *C. ferghanensis* predominate in the canals. The next most common ecological group in water bodies is rheophiles.

This group includes *Colletopterumbactrianum* and *S. cyreum* includes *sogdianums*, but *S. cyreumsogdianum*is observed to predominate in many water bodies. Pelolimnophils are very rare in water bodies and their parts.

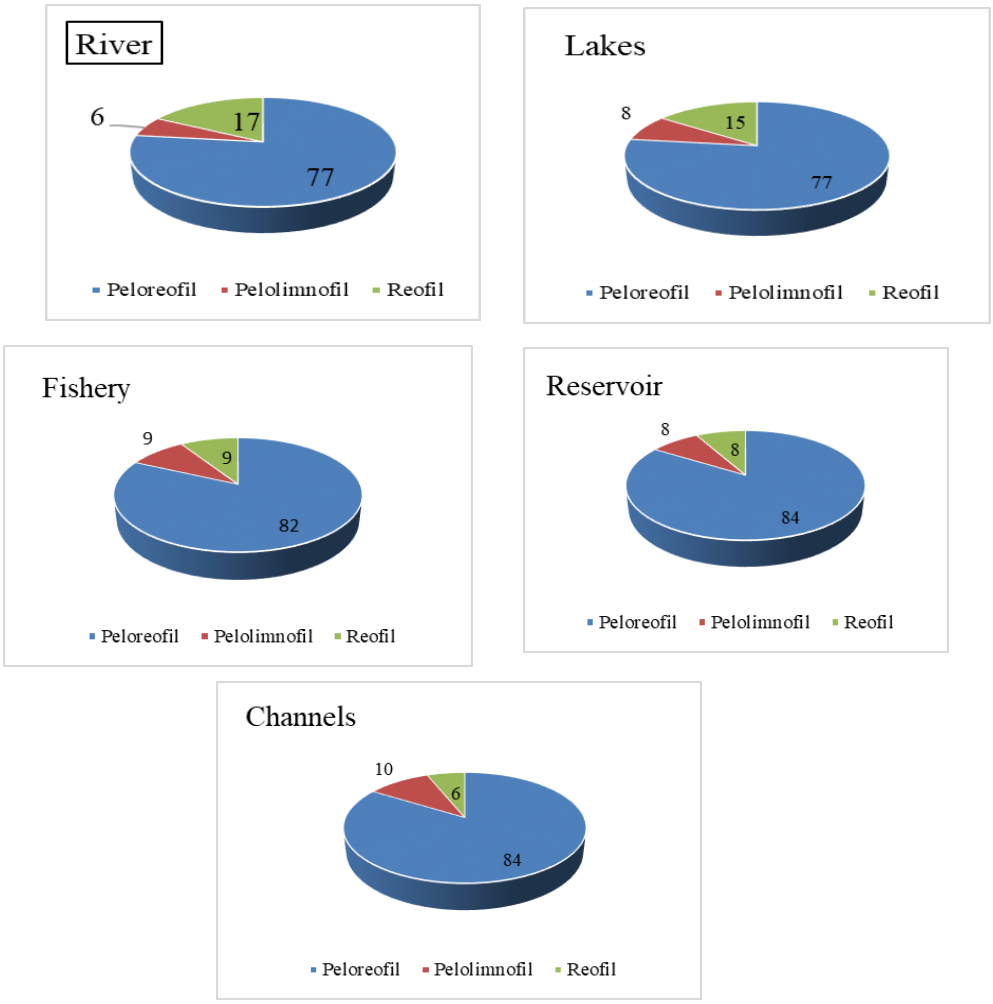

Figure 1. Distribution of bivalve mollusks of Uzbekistan in ecological groups in water basins, in%

Anthropogenic degradation of terrestrial zoogeographic barriers in Uzbekistan has led to the entry of invasive species into the fauna of many regions, especially hydrofauna, which have not changed for a long time. Changes in natural hydrological systems as a result of hydrotechnical structures and anthropogenic impacts are major factors influencing the diversity of bivalve mollusk fauna and their invasion.

Conclusion. Other representatives of the genus *Sinanodonta* - an invasive species found in the territory of Uzbekistan - Chinese toothless *S.orbicularis, S.gibba, S. puerorum* can also be seen as a limiting factor for bivalve mollusks. The natural range of these species is south of the *Sinanodontawoodiana* area - the Yangtze and Huanghe river areas of China. Representatives of the *Sinanodonta* genus have accidentally entered the Chinese complex herbivorous fish (*Ctenopharyngodonidella*, *Hypophthalmichthys molitrix)* since the 1980s and have been a successful introduction to the country's climate. Successful distribution of this species in the watersheds of Uzbekistan is important not only for climatic factors (temperature), but also for fisheries from artificial water bodies. The influence of rivers and fisheries on the formation of the fauna of bivalve mollusks in the canals is significant. The formation of the fauna of the Mirzachul and South Mirzachul canals by the fisheries of the Syrdarya and its environs; The Zarafshan River is responsible for the distribution of bivalve mollusks in the Dargam and Eskianhor canals; The influence of the fisheries of the Amudarya and its environs on the formation of the fauna of the Amu-Bukhara, Qizketgan and Karshi main canals can be noted.

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