COMPARATIVE ANALYSIS OF THE POPULATION INDICATORS OF THE SPECIES *SINANODONTA GIBBA* AND *SINANODONTA RUERORUM* OF THE UNIONIDAE FAMILY IN THE WATER ECOSYSTEMS OF THE SYRDARYO AND SANGZOR RIVERS

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Abstract. In the aquatic ecosystems of the studied area, as the population of Synanodonta genera species increased in age, it was observed that the population indicators such as the occurrence and density of the species decreased, and the population indicators such as the mass of mollusks and the size of the shells increased. The population indicators of Sinanodonta gibba, Sinanodonta gibba and Sinanodonta ruerorum species of the Unionidae family, Sinanodonta genus, distributed in the Syrdarya region of the Syrdarya river, were found to differ from the population indicators in the Gallaorol area of the Sangzor river. the hydrochemical composition of rivers and the water regime have an effect on this was determined. Synanodonta gibba in Syrdarya region of Syrdarya region and Sangzor river Gallaorol regions are distinguished by the fact that individuals of 2-5 years of age are mainly fast-growing, and individuals of 6-9 years of age are a decreasing population. The shell sizes of Sinanodonta gibba and Sinanodonta ruerorum species tend to increase with age was studied.

Keywords: aquatic ecosystems, Sinanodonta, species occurrence, density, population indicators, decline, Unionidae, Sinanodonta gibba, Sinanodonta ruerorum

INTRODUCTION

The current status of populations of *Sinanodonta gibba* and *Sinanodonta ruerorum* of the Unionidae family of bivalve molluscs distributed in the water ecosystems of the Syrdaryo and Sangzor rivers was analyzed.Observations of mollusk populations distributed in aquatic ecosystems from an ecological point of view. Age characteristics, density, biomass, and shell sizes of species aggregates belonging to one species distributed in a certain aquatic ecosystem biotope for a long period of time were determined. The species belonging to one population of Syrdarya freely and easily mix with species distributed in another population of the same species was observed (Bolotov, I. 2017, Bolotov, I. N. *et al*. 2018, Bouchet P. 2007, Huber Markus, 2010, Bogan A.E, 2010). One of the main characteristics of populations of the genus *Synanodonta* is their genetic unity. A mollusk population is considered a group association. Population parameters such as age, occurrence, distribution, density, mass and shell size of *Sinanodonta gibba* and

Sinanodonta ruerorum were analyzed in the study (Bogatov V.V., Starobogatov Ya.I. 2004, Bogatov V.V, 2014, Tozagul Zhabborova, Khusniddin Baymuradov *et al*. 2021, Kh. Boymurodov *et al*. 2021).

MATERIALS AND METHODS

Syrdaryo and Sangzor rivers during 2016-2023, the species *Sinanodonta gibba* and *Sinanodonta ruerorum* of the family Unionidae, genus Sinanodonta, were collected from water ecosystems. A total of 489 samples were collected in the research. Rijinashvili (2005); Izzatullaev, Boymurodov, (2019, 2023) methods were used in a comparative analysis of mollusk population indicators (Boymurodov H *et al*. 2022, Kh. Boymurodov *et al*. 2023, Rijinashvili A.L. 2009,Izzatullaev Z.I. 2019).

RESULTS AND DISCUSSION

In the course of research in 2016-2023, the population indicators of *Sinanodonta gibba* and *Sinanodonta ruerorum* species from the Sinanodonta of the Unionidae family were comparatively analyzed in the area of the Syrdarya River in the region of Syrdarya Region and in the middle reaches of the Sangzor River in Gallaorol (Boymurodov H *et al*. 2022, Izzatullaev Z.I. 2019). *Synanodonta gibba* - distribution in the middle reaches of the Sangzor River, Syrdarya River, Syrdarya Region was analyzed, and the current state of its populations was assessed. In the studies, their indicators of individuals (organisms) in the population and indicators of the population were compared to each other (Table 1).

R$_1$. The population of *Synanodonta gibba* in the Syrdarya River in the territory of the Syrdarya region is located around the quarry area where sand is mined on the banks of the river (N 40 ^{0} 54' 05", E 68 ^{0} 41' 54" height 253 m. N 40 ^{0} 54' 11" E 68 ^{0} 41' 58" height 256 m. N 40 ^{0} 54' 09" E 68 ^{0} 42' 03 " height 255 m.). The population indicators of *Sinanodonta gibba* are as follows: 2-3-year-old individuals make up 30% of the population, the density is 1.9 m^2/piece, and the mass is 62 gr. In the population of *Sinanodonta gibba* shell dimensions are as follows: *L*-42; *H*-34 and *W*-19 (Kh. Boymurodov *et al*. 2023, Izzatullaev Z.I. 2019).

T he share of 4-5-year-old individuals in the population (28%) and the density of the species is slightly lower than that of the rest - 1.2; type mass 229 gr. shell dimensions – *L* -110; *H* - 82 and *W* - 36; the share of 6-7-year-old individuals of the species in the population is 24%, the density is 0.9 m^2/piece and the mass is 346 gr. equal, shell dimensions *L* -164; *H is* -109 and *W* - 58; Although the share of 8-9-year-old individuals is the smallest (18%), there are certain differences from those of other age groups; density of this age is 0.7 m^2/piece, mass is 338 gr. the dimensions of the shell were as follows – *L* -166, *H* -111 and *W* -59 (Table 1, Figures 1, 2).

Unionidae family of *Sinanodonta* genus of *Sinanodonta gibba* in the territory of the Syrdarya River, Syrdarya Region, is characterized by the absence of significant differences between biologically different young individuals.

The largest share of the studied population is made up of 4-5-year-old mollusks with an active reproduction process. The highest biomass of the population is in 6-7 year old individuals and is 346 g, but with this indicator it is ahead of the populations of other water ecosystems.

R$_2$. The population of *Sinanodonta gibba* in the middle reaches of the Sangzor River in the Gallaorol area is located in the area of the Gallaorol village (N 40^0 02' 18" E 67^0 38' 17" altitude 531m. N 40^0 02' 20" E 67^0 38' 16" altitude 533 m. N 40^0 02' 15" E 67^0 37' 52" height 538 m). The population indicators of *Sinanodonta gibba* are as follows: 2-3-year-old individuals make up 36% of the total population, the density of *Sinanodonta gibba in the population* is 1.8 m^2/piece, mass

51 gr., shell dimensions: *L* -36; *H* -29 and *W* -16. It was observed that the share of 4-5-year-old individuals in the population (29%) and the density of the species is -1.0 m^2/piece, and the density decreases with age. The mass is 160 gr. shell dimensions – *L* -99; *H* -73 and *W* -30; the share of 6-7-year-old individuals in the population is 23%, the density is 0.7 m^2/piece, the mass is 283 gr. equal, shell dimensions *L* -153; *H* -101 and *W-51* was determined. The age structure of a population represents important processes such as the rate of regeneration, the rate of extinction, and the rate of reproduction. It depends on the genetic characteristics of the species for each population depending on the specific conditions. Age structure is expressed in different ways. It was found that as the age of *Sinanodonta gibba* increases, the shell size also tends to increase. The percentage of 8-9-year-old individuals in the studied population was at least 12%. The density of mollusks of this age is 0.5 m^2/piece, the mass is 281 gr. The dimensions of the shell are equal to *L* -153, *H* -102 and *W* -51. *Synanodonta* gibba was studied. In the population of the middle reaches of the Sangzor River, individuals of 2-5 years of age are distinguished by the fact that they are mainly fast-growing, while individuals of 6-9 years of age are found to be decreasing. In the case where populations in aquatic ecosystems have a clearly defined limit, it is biologically important to evaluate it with this indicator. It was found that the number and density of mollusk populations in the middle reaches of the Sangzor River are closely related.

Table 1

Comparative analysis of the population indicators of the Unionidae family Sinanodonta gibba in the water ecosystems of the Syrdarya River in the territory of the Syrdarya region and the middle reaches of the Sangzor River in Gallaorol

Water ecosystem	Species name	Age	Occurrence %	Density m^2/pc	Mass gr.	Shell dimensions mm.			Age	Occurrence %	Density m^2/pc	Mass gr.	Shell dimensions mm.		
						L	H	W					L	H	W
The Syrdarya river is the territory of the Syrdarya region	*Synanodonta gibba*	2-3	30	1,9 ±0.3	62 ±3,2	42	34	19	4-5	28	1,2±0,2	229 ±3,.2	110	82	36
	Synanodonta gibba	6-7	24	0,9 ±0,1	346±3,2	164	109	58	8-9	18	0,7 ± 0,1	338 ±3,2	166	111	59
The middle course of the Sangzor River is the region of Gallaorol	*Synanodonta gibba*	2-3	36	1,8 ±0,3	51 ±3,2	36	29	16	4-5	29	1,0 ±0,2	160 ±3,2	99	73	30
	Synanodonta gibba	6-7	23	0,7 ±0,1	283 ±3,2	153	101	51	8-9	12	0,5 ±0,1	281 ±3,2	153	102	51

Table 2

Comparative analysis of the population indicators of the Unionidae family Sinanodonta ruerorum in the water ecosystems of the Syrdarya River in the territory of the Syrdarya region and the middle reaches of the Sangzor River in Gallaorol.

Water ecosystem	Species name	Age	Occurrence %	Density m^2/pc	Mass gr.	Shell dimensions mm.			Age	Occurrence %	Density m^2/pc	Mass gr.	Shell dimensions mm.		
						L	H	W					L	H	W
The Syrdarya river is the territory of the Syrdarya region	*Synanodonta ruerorum*	2-3	32	1,8 ± 0,2	58 ±3,2	39	30	48	4-5	29	1,6±0,1	186 ±3,2	112	78	74
	Synanodonta ruerorum	6-7	26	1,4 ±0,2	293 ±3,2	159	99	102	8-9	13	0,8±0,1	290 ±3,2	160	99	103
The middle course of the Sangzor River is the region of Gallaorol	*Synanodonta ruerorum*	2-3	35	1,6 ±0,3	52 ±3,2	35	27	42	4-5	34	1,1±0,3	152 ±3,2	92	68	41
	Synanodonta ruerorum	6-7	20	0,8 ±0,2	276 ±3,2	146	88	64	8-9	11	0,3±0,1	272 ±3,2	146	88	64

L-shell length, H-shell height, W- shell convexity

It is possible to see certain changes in the biomass of mollusks with age. *Sinanodonta gibba* of the Syrdarya river in the Syrdarya region and the Sangzor River and Gallaorol regions are distinguished by the fact that individuals of 2-5 years of age are mainly fast-growing, while individuals of 6-9 years of age are a decreasing population.

Sinanodonta ruerorum - R$_1$. *Synanodonta ruerorum* the population of the Syrdarya river in the territory of the Syrdarya region is located in the area on the left bank of the river (N 40^0 54' 02" E 68^0 42' 06" height 253 m. N 40^0 54' 11" E 68^0 41' 58" height 256 m. N 40^0 54' 09" E 68^0 42' 03" height 255 m.) (Izzatullaev Z.I. 2019, Boymurodov H *et al*. 2022,2023,).

The population indicators of *Sinanodonta ruerorum* are as follows: 2-3-year-old individuals make up 32% of the population, the density differs from that of *Sinanodonta gibba* by the fact that it is 1.8 m^2/piece, mass 58 gr., shell dimensions: *L* -39; *H* -30 and *W* -48. The share of 4-5-year-old individuals in the population (29%) and the density of the species is slightly higher than that of the rest - 1.6 m^2/piece; type mass 186 gr. shell dimensions – *L* -112; *H* -78 and *W* -74; the share of 6-7-year-old individuals of the species in the population is 26%, the density is 1.4 m^2/piece, and the mass is 293 gr. equal, shell dimensions *L* -159; *H* -99 and *W* -102 are distinguished by the fact that they are the highest growth stage. Although the percentage of 8-9-year-old individuals was the lowest, 13%, it was observed that it was the least compared to other age groups. the density of mollusks of this age is 0.8 m^2/piece, the mass is 290 g. the dimensions of the shell were determined to be *L* -160, *H* -99 and *W* -103 (Table 2, Figures 1, 2). The population of *Sinanodonta ruerorum* in the Syrdarya region of the Syrdarya region mainly consists of 2-5-year-old individuals, and the number of 6-9-year-old individuals is observed to decrease. The high biomass of the population is similar to that of 4-5 and 6-7-year-old mollusks, this figure is 186-293 g, and the biomass of 8-9-year-old mollusks is 290 g. it is possible to see certain changes in biomass with age.

R $_2$. *Sinanodonta ruerorum* population of the middle reaches of the Sangzor River at this coordinate (N 40^0 02' 08" E 67^0 37' 35" height 542 m. N 40^0 02' 03" E 67^0 37' 17" height 547 m. N 40^0 01' 56" E 67^0 37' 10" height 550 m.) is located. 2-3-year-old individuals make up 35% of the total population in the researched area.

The density of *Sinanodonta ruerorum* in the population is 1.6 m^2/piece. Based on Olli's rule, there is a correlation between the density and viability of bivalve mollusks. The lower, average, and upper limits of the density were studied**.** In the population of this age, the mass is 52 gr., shell dimensions: *L* -35; *H* -27 and *W* -42. The share of 4-5-year-old individuals in the population (34%) and the density of the species is 1.1 m^2/piece, mass 152 gr. shell dimensions – *L* -92; *H* -68 and *W* -41; the share of 6-7-year-old mollusks in the population is 20%, density 0.8 m^2/piece, mass 276 gr., shell size *L* -146; *H* -88 and *W* -64. was determined. The percentage of 8-9-year-old individuals in the research population is at least 11%. The density of mollusks is at least 0.3 m^2/piece, the mass is 272 gr. shell dimensions are average – *L* -146, *H* -88 and *W* -64 mm. was determined (Table 2, Figures 1, 2).

Sinanodonta ruerorum have a high density, and 6-7 and 8-9-year olds differ by a sharp decrease. The low number of adults may have been influenced by water flow and hydrochemical composition of the water.

The main biomass of the species was observed at the ages of 4-5, 6-7 and 8-9. One of the reasons that mollusk population density fluctuates is the size of the mollusks. the larger *the*

Sinanodonta ruerorum mollusks in the Sangzor River Gallaorol area and Syrdarya region of the Syrdarya river the larger the population areas and the lower the density was studied.
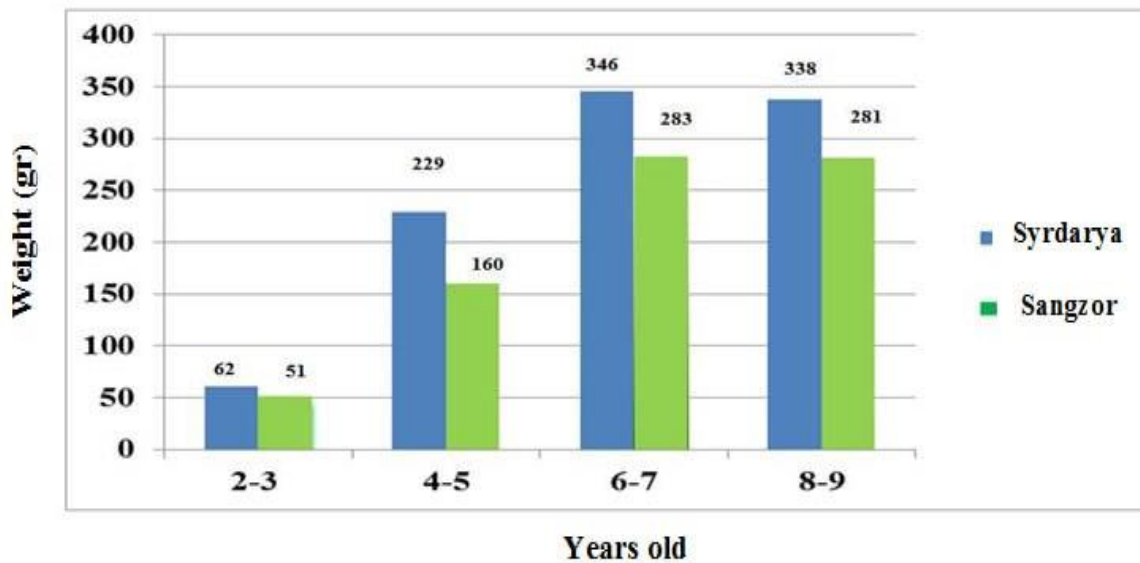
Figure 1. Comparative analysis of weight of Sinanodonta gibba distributed in Syrdarya and Sangzor rivers .
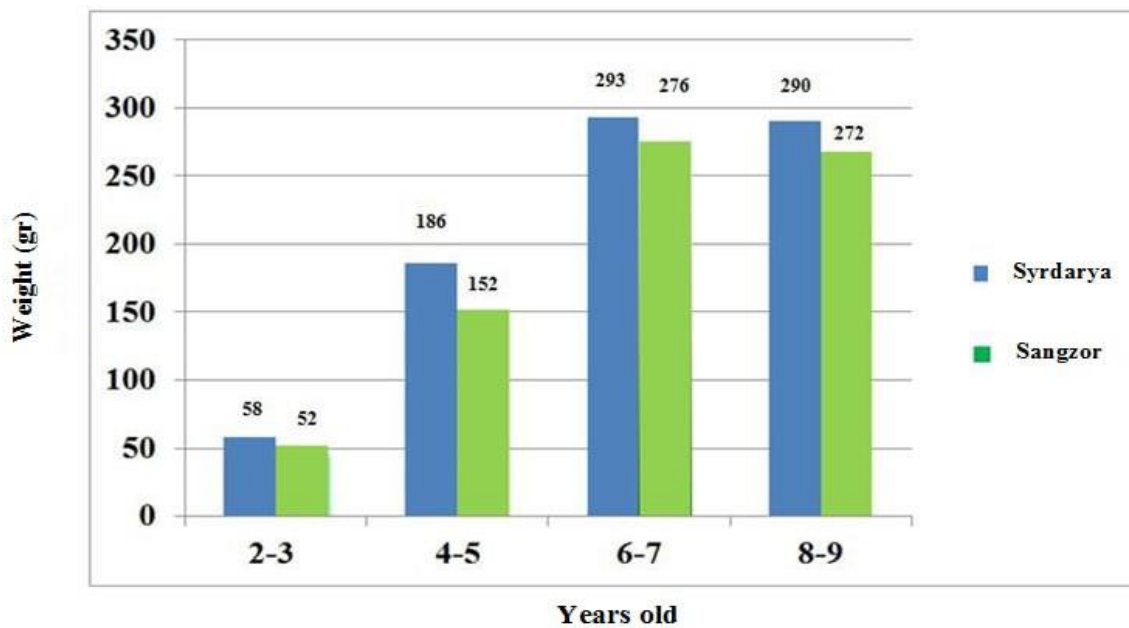
Figure 2. Comparative analysis of weight of Sinanodonta ruerorum distributed in Syrdaryo and Sangzor rivers .

Conclusions It was found that population parameters such as species occurrence and density tend to decrease with age in the species of genus *Synanodonta , while population parameters* such as mollusk mass and shell size tend to increase was studied. It was determined that the population indicators of *Sinanodonta gibba* and *Sinanodonta ruerorum* species of Unionidae family Sinanodonta, distributed in the territory of Syrdarya region of the Syrdarya river, are different from the population indicators in the middle reaches of the Sangzor river in the Gallaorol region, due to this, the hydrochemical composition of the river and the water regime have been studied.

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