

Biodiversity and Ecology of Some Macro zoobenthos (Hirudinea, Gastropod) of Shiraganbulak Spring, Fergana Valley, Uzbekistan

Farrukh Umarov*, Khayrulla Solijonov, Surayyo Makhsudova

Andijan state university, Andijan, Uzbekistan

*Corresponding author e-mail: eco_umarov@mail.ru

Abstract. The number of springs in the Ferghana Valley is very large and diverse. For this reason, the biological diversity of macrozoobenthos organisms is high among them. This article describes the species composition of leeches and fresh-water gastropods living in the Shiraganbulak spring located in the southeastern part of the Fergana Valley, as well as their ecological description. Researches were carried out in generally accepted zoological and ecological methods. According to the research results, it was found that 2 species of leeches and 5 species of fresh-water gastropods live in Shiraganbulak spring.

Keywords: Shiraganbulak spring, leeches, fresh-water gastropods, ecological description.

Introduction

Shiraganbulak spring is located in the southeastern part of the Fergana valley. This spring is considered a mountain spring because it is located on the mountainside. Local residents use this spring as drinking water. It is also used for irrigation of agricultural crops.

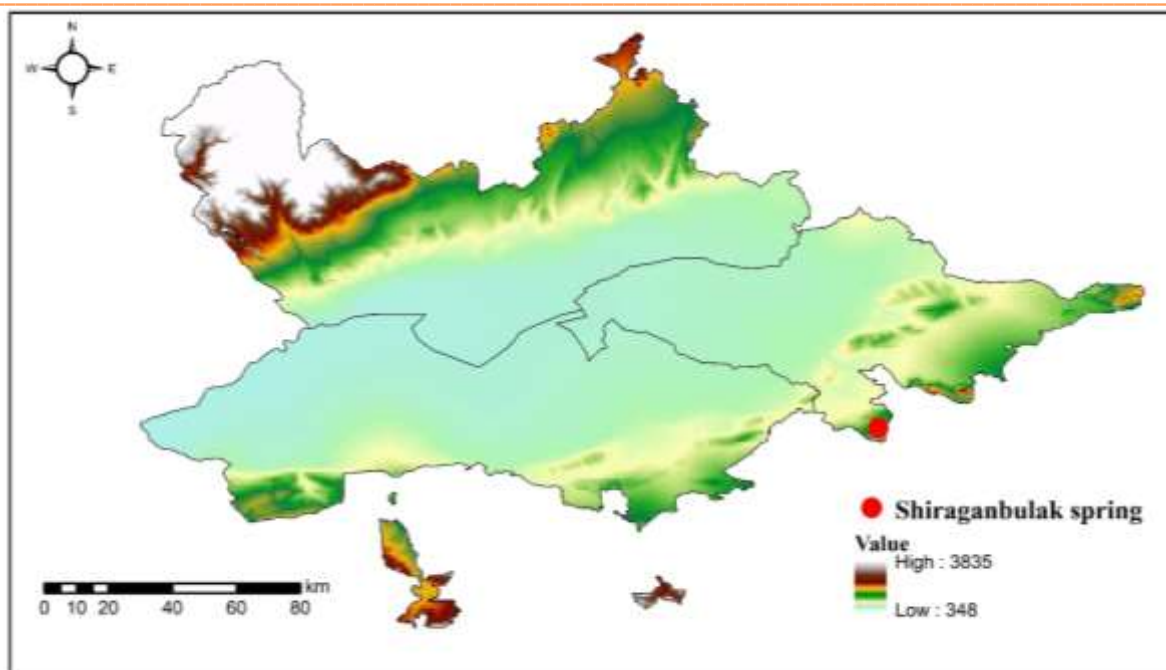
Many hydrobiological researches have been conducted in the Fergana Valley. The study of water molluscs was carried out for the first time by Zhadin (1950, 1952). He described the aquatic molluscs found in this area and included the species *Pseudomnicola archangelskii*. Starobogatov (1970) studied the species of the Fergana Valley during the study of aquatic gastropod molluscs in mountainous Asia. Mukhamediev (1969, 1989) studied the hydrobionts of the Fergana Valley and mentioned that the species of gastropod molluscs: *Anisus ladacensis*, *Planorbis tangitarenis*, *Costatella acuta* are found in springs, but there is no information about leeches.

For the first time, Izzatullaev (2018, 2019) studied the distribution of Central Asian water molluscs according to the main features of their living conditions - biotopes and water types, the life forms of molluscs were classified and described from an ecological and zoogeographic point of view. Izzatullaev and Solijonov (2016) studied the influence of anthropogenic factors on the distribution of 4 types of aquatic gastropod molluscs: *Lymnaea thiesseae*, *L. auricularia*, *Anisus centralis* and *Costatella acuta*, found around the city of Andijan.

The analysis of the literature shows that until now, in the studies carried out in the water bodies of the Ferghana Valley, information about the macrozoobenthos of the Shiraganbulak spring is hardly found (Pazilov and Umarov, 2020, 2021; Umarov, 2020).

Material and methods

Shiraganbulak spring is located in Markhamat district of Andijan region (40°26'29.7"N 72°24'06.6"E; Map). More than 100 leeches and fresh-water gastropods served as research materials in 10 samples collected from the Shiraganbulak spring during 2021-2022.



Map: The area where the Shiraganbulak spring is located (●) in the Fergana Valley.

The methods of Lukin (1976), Zhadin (1952), Izzatullaev (2018, 2019) were used in the collection and fixation of materials.

Lukin (1976); Neseemann et al. (1999); Govedich et al. (2019); Starobogatov et al. (2004); Kruglov (2005); Izzatullaev (2018, 2019) determinants were the basis for determining the species composition of the collected materials.

The names and taxonomy of the identified species were compared with the leading international systematic databases (World Register of Marine Species - WoRMS (www.marinespecies.org) and the Danish Global Information Database on Biological Diversity - GBIF (www.gbif.org). MBS-9 stereomicroscope and XPS-500E biological research microscope (with photo camera) were used to study the morphological features of leeches and molluscs.

Used abbreviations: SH – shell height, SW – shell width.

Results and discussion

According to the results of the research, 2 species of leeches were identified from the Shiraganbulak spring, they belong to 2 genera and 2 families; 5 species of fresh-water gastropods were identified, they belong to 4 genera, 2 families and 2 subclasses. Below is their faunal composition and ecological description.

Phylum	Annelida
Class	Clitellata Michaelsen, 1919
Subclass	Hirudinea Savigny, 1822
Family	Glossiphoniidae Vaillant, 1890
Genus	<i>Helobdella</i> Blanchard, 1896
Species	<i>Helobdella stagnalis</i> (Linnaeus, 1758)
Family	Praobdellidae Sawyer, 1986
Genus	<i>Limnatis</i> Moquin-Tandon, 1826
Species	<i>Limnatis paluda</i> (Tennent, 1859)

Phylum	Mollusca
Class	Gastropoda Cuvier, 1795
Subclass	Pectinibranchia Blainville, 1814
Family	Hydrobiidae Stimpson, 1865
Genus	<i>Sogdamnicola</i> Izzatullayev, Sitnikova & Starobogatov, 1984

Species	<i>Sogdanicola pallida</i> (von Martens, 1874)
Subclass	Pulmonata Cuvier, 1814
Family	Lymnaeidae Rafinesque, 1815
Genus	<i>Ampullaceana</i> Servain, 1882
Species	<i>Ampullaceana lagotis</i> (Schränk, 1803)
Genus	<i>Lymnaea</i> Lamarck, 1799
Species	<i>Lymnaea bowelli</i> Preston, 1909
	<i>Lymnaea tengriana</i> (Izzatullayev, Kruglov & Starobogatov, 1983)
Genus	<i>Radix</i> Montfort, 1810
Species	<i>Radix auricularia</i> (Linnaeus, 1758)

Leeches

Helobdella stagnalis

Dimensions: Full body length: 18-24 mm; The length of the body in the middle position: 12-16 mm; Body width: 2-3 mm.

Ecology. A cosmopolitan specie. It is a benthic organism in natural and artificial water bodies. They mainly live in waters of 10-450 cm depth, 8-26°C. In waters of moderate turbidity. According to the results of research, it is also widely distributed in organically polluted, eutrophicated water bodies, so it was included in the euribiont group. This species does not like light and lives mainly under stones, bricks, solid waste, especially waste products containing polyethylene. Algae, fish, lake frogs, aquatic molluscs, crustaceans, insect larvae were also present in the biotopes where this species was found. *HL. stagnalis* is predatory and mainly attacks species such as aquatic molluscs and then feeds on them.

Distribution. It is common in freshwaters all over the world

Limnatis paluda

Dimensions: Full body length: 90-120 mm; Body width: 12-18 mm.

Ecology. Leech populations are distributed in small water biotopes and ponds where livestock come to drink. For them, shallow, stagnant or slow-flowing, muddy (swampy) water bodies are the optimal environment. This leech lives in waters of 18-24°C. Algae, lake frogs, water molluscs were also found in the biotope where this species was found. Studies have shown that these parasitic leeches wait for their hosts, sheep, cattle, and horses, in water and quickly enter their oral cavity when they drink water. They stick to their master's lips and under the tongue, even inside the nose, and live for several days, sucking blood from the mucous membrane.

Distribution. Common in Central Asia and the Middle East.

Gastropods

Sogdanicola pallida

Dimensions: SH 2.3 mm, SW 1.6 mm.

Ecology. Crenophilous species. It lives in a cold room at a temperature (11-13°C) and in water with a spring water, rare species. However, this gastropod was also found in the Shiraganbulak spring. The water temperature of the spring is 18-25°C.

Distribution. Middle Amudarya endemic species. It is found in Turkmenistan, Tajikistan and Uzbekistan and is distributed in the springs of the foothills (up to 1200-1400 m above sea level).

Ampullaceana lagotis

Dimensions: SH 12.4 mm, SW 7.5 mm.

Ecology. A phytophilous species. It lives among vegetation in both permanent (springs, reservoirs, lakes) and irregularly drying reservoirs, at depths of up to 2-3 m. In the valley it breeds from May to August, in the mountains from July to August. Life expectancy is apparently no more than 1.5 years.

Distribution. European-Siberian species. In the reservoirs of Central Asia, it is distributed from plains to highlands (most often in the latter) and is found in the territories of Tajikistan, Kyrgyzstan and Uzbekistan.

Lymnaea bowelli

Dimensions: SH 9.7 mm, SW 5.7 mm.

Ecology. Crenophilous species. Lives in spring reservoirs. It is also found in irrigation ditches near the water's edge. It breeds in April-May-June, the total lifespan is about 1 year.

Distribution. Central Asian species. In Central Asia, it is distributed from plains to highlands (Tajikistan, Kyrgyzstan and Kazakhstan).

Lymnaea tengriana

Dimensions: SH 5.5 mm, SW 3 mm.

Ecology. Crenophilous species. It lives in springs, less often in drying up puddles, ditches and lakes. It is also found in the coastal zone of reservoirs. A very rare species.

Distribution. Central Asian species. In Central Asia, it is known from Tajikistan (Kairakkum reservoir and the vicinity of Muminabad - Khozrati - Sho ridge) and southern Kazakhstan (Quaternary deposits of Lake Balkhash). It was also found in the Fergana Valley.

Radix auricularia

Dimensions: SH 20-22 mm, SW 17-18 mm.

Ecology. A phytophilous species, it lives among the algae in lakes, reservoirs, and slow-flowing parts of rivers. It is usually rare in the fast-flowing part of the river. Increases in March-June. Lives 1.5-2 years.

Distribution. A common species of the Palearctic. Europe, the entire northern part of Asia and Central Asia.

Conclusions

In short, 2 species of leeches and 5 species of gastropods live in the Shiraganbulak spring in the Fergana valley. There were no negative anthropogenic effects on the spring because the local population used the spring water as drinking water. Its biotope is not polluted. Biodiversity of the spring is high compared to other springs.

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