

REVIEW OF ECOLOGICAL STUDIES ON GASTROPODS OF FERGHANA VALLEY SPRINGS, UZBEKISTAN

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Abstract

This article presents an overview of gastropod molluscs research conducted in Central Asia, Uzbekistan, and the Fergana Valley from the 18th century to the present day. German and Russian scientists conducted research with molluscs in Central Asia. The works of many collectors served as material. But there are almost no studies on molluscs distributed in springs

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We can find the first information about the ecology of molluscs of Central Asia in the work of E.Martens (1874). Similar information is available in the works of O.Rosen (1901) on freshwater molluscs of Turkmenistan and the Amudarya basin.

G.G.Abrikosov and B.N. Tsvetkov (1945) provided information on the ecology of molluscs distributed in areas near Ashgabat and Kopetdog.

B.N.Tsvetkov (1941) studied individual, ecological, geographic, plain and mountain variations in distribution of the Central Asian land mollusk *Fruticicola lantzi*. He gave information about individuals of this species distributed in the Fergana Valley.

V.I.Jadin's important work on Amudarya molluscs (1950, 1952) and the identifier of freshwater and saltwater molluscs of the USSR provide information on the ecology and biology of more than 30 molluscs in Central Asian water bodies.

Although Ya.I.Starobogatov (1970, 1972) was engaged in faunistic studies of aquatic molluscs, some of his researches focused on studying the ecological characteristics of molluscs.

Z.Izzatullaev (1970) conducted research on land molluscs of the Hisar mountain range and adjacent areas, and provided information on the distribution and ecology of 60 species of land molluscs belonging to 15 families and 29 genera. According to the author (1970) in the studied area, land molluscs are unevenly distributed by altitude, and the main species are found in broad-leaved forests (41 out of 60 species found in that area).

In a number of works of A.Pazilov (1994, 1998, 2001, 2004), land molluscs distributed in Uzbekistan and neighboring regions, endemic and on the verge of extinction were studied in detail, and information about their current status was provided. At present, about 10 species are recognized as rare and declining species in Uzbekistan and its neighboring regions, their habitats have been changed and their area is sharply reduced under the influence of various anthropogenic forces, and ways to preserve these species have been shown.

The terrestrial molluscs distributed in the neighboring mountainous areas of Uzbekistan, in particular, in the Kyrgyz Republic, were studied by S.E.Moiseeva (2000), and 150 species belonging to 19 families and 42 genera were ecologically and taxonomically described. Based on the obtained materials, changes were made to the systematic composition of representatives of the subfamily Paedhoplitinae, which is part of the Hygromiidae family, and information on the ecology and distribution of 17 species from the family representatives was given. In addition, distribution of 150 species distributed in the studied area in 12 biotopes was determined, and dominant species were indicated.

A.T.Karimkulov (2011) conducted research on the fauna, ecology and zoogeography of gastropod molluscs of the northwestern Turkestan mountain range under the leadership of Professor Z.Izzatullaev. The ecological groups of terrestrial and aquatic molluscs were revised, and the fresh water gastropod molluscs of the Turkestan mountain range were divided into 5 ecological groups (telmatophiles, pelophiles, phytophiles, phytophiles, crenophiles). The aquatic mollusk fauna of the region has proven to be mainly formed by endemic species belonging to the genera Martensamnicola, Bucharamnicola, Sogdamnicola and

Lymnaea. He analyzed the ecology of land molluscs in detail. According to the research results of A.T.Karimkulov, all types of terrestrial molluscs of the Turkestan mountain range are included in hygrophiles and divided into 3 ecological groups according to the nature of distribution in relation to water bodies: hygrobionts, xerohygrobionts and xerobionts.

Gulistan State University researcher, malacologist F.P.Gaibnazarova (2017) studied the fauna, ecology and lifestyle of land molluscs of the Buliminidae family in Uzbekistan and compiled a list of 35 species belonging to 6 genera and 2 subfamilies of the Buliminidae family in this region. For the first time, the researcher identified mesophilic, xerophilic, mesoxerophilic, and cryomesoxerophilic ecological groups of terrestrial molluscs belonging to the Buliminidae family. According to him, the ratio of ecological groups of land molluscs of the Buliminidae family according to the humidity factor is: creomesoxerophiles – 14.28%, mesophiles – 22.85%, mesoxerophiles – 42.85% and xerophiles – 20%. Species of the Buliminidae family in Uzbekistan at high risk of extinction in nature and susceptible to extinction (VU) - *P. errans*, *P. entoptyx*, *T. inversa*, species at very high risk of extinction in nature (CE) - *P. urgutensis*, *P. sinistrorsa*, *M. albocostatus* is a critically endangered species (NT) – *P. zaureshae* populations have been identified as being in a critical state and conservation measures have been developed.

Samarkand State University researcher, malacologist J.A. Kudratov (2018) evaluated the bioecological characteristics of gastropods in the Nurota Mountains, and found that aquatic gastropods belong to 4 ecological groups (1- crenophilic, 2- phytophilic, 3- telmatophilic, 4- phytophilic). determined.

Researcher of Termiz State University, malacologist Sh.K.Abdulazizova (2019) as a result of assessing the modern condition of land molluscs in the Surkhan-Sherabad valley and its surrounding mountains and studying their importance in the economy, determined the species in need of protection and made a map of their distribution. On this basis *Ps. kasnakowi*, *Ps. otostomus*, *F. perlucens*, *F. fedtschenkoi* and *K. hatagica* species recommended to be included in the "Red Book" of the Republic of Uzbekistan.

Z.M. Makhmudjonov (2021) studied species belonging to the Hygromiidae family distributed in the territory of Uzbekistan according to their ecological characteristics and distribution of altitude regions. Based on the characteristics

of the habitat of the members of the Hygromiidae family, taking into account the location of the core of populations, dependence of mollusks on a certain station and high density, they divided the areas where they live into 3 ecological complexes: plains plant association; association of semishrubs and shrubs; association of rock piles and woody plants. It was noted that a specific microclimate was formed in the biotopes of these ecological complexes. Depending on the level of humidity, representatives of the Hygromiidae family are divided into hygrobiont, mesobiont, xerobiont and mesoxerobiont ecological groups. Also, the population status of representatives of this family was analyzed, new information was prepared about species in need of protection, 4 species (*Nanaja cumulata*, *N. chatkalica*, *L. corona*, *Archaica eleorika*) 2(VU:R) and 2 species (*O. diplodon*, *L. ferghanica*) is recommended to be included in the Red Book of the Republic of Uzbekistan with the status of 2(VU:D).

Currently, research on the ecology of freshwater gastropods is being conducted in the CIS and other foreign countries.

Researcher of Samara State University of Russia Yu.V.Sachkova (2006) studied the fauna and ecology of terrestrial molluscs of Povalje steppe forests (in Samara region as an example) and recorded 46 species of terrestrial molluscs belonging to 20 families, 30 genera. For the first time, data on the density of molluscs of the studied area by biotopes, dominant, rare and protected species were obtained as a result of the research.

A.A Golubev (2009) studied the ecology of freshwater molluscs of the Republic of Kabarda-Balkaria. It was found that 10 species of gastropods live in the research area, and their distribution in 14 biotopes was analyzed.

The researcher of Kaliningrad State University of Russia D.P.Filippenko (2011) determined the species composition of gastropods distributed in Kaliningrad reservoirs and studied their distribution in different biotopes. He studied 42 types of molluscs according to water biotopes and divided them into pelophilic, psammophilic and phytophilic ecological groups.

A.G.Gajiramazanova, Sh.A.Rasulov, Kh.M.Ramazanovlar (2015) revealed the bioindication properties of land molluscs in relation to heavy metals in the environment. He developed methods for determining the level of environmental pollution based on the concentration of heavy metals (Co, Zn, Fe, Cd, Pb, Ni, Cu) accumulated in mollusk shells.

E.V. Komarova (2016), a researcher at the Penza State University of Russia, conducted research on the population, distribution and ecology of the land mollusk *Chondrula tridens* in Privolzhsk forests. He determined the variation in the shells of *Chondrula tridens* and the differences in the population indicators under the influence of abiotic factors.

Malacologist Robert Dillon, a professor at the College of Charleston, USA, is engaged in research on the genetics, evolution and ecology of molluscs. In 2004, his monograph on the ecology of aquatic molluscs was published. The work covers the results of research on autecology, nutrition, habitats, reproductive development, lifestyle, genetics, demography, population and biogeography of molluscs.

At the same time, malacological societies have been established in different countries of the world, and mature malacologists of the world are conducting research on molluscs together in these societies. In particular, in Germany - "Deutsche Malakozoologische Gesellschaft", in Belgium - "Belgische Vereniging voor Conchyliologie (B.V.C.)", in Great Britain and Northern Ireland - "Conchological Society of Great Britain and Ireland", in Latvia - "Malacology in Latvia", in the Netherlands - "Nederlandse Malacologische Vereniging", in the USA - "Conchologists of America", "American Malacological Society", in France - "Association Française de Conchyliologie", in Russia - "Dalnevostochnoe malakologicheskoe obshchestvo (DVMO, 1994)" and other similar malacological societies are examples of this.

In recent years, as a result of environmental pollution and the crisis of natural ecosystems, molluscs are the second most biodiverse species on Earth after insects. For this reason, A.D.Cameron (2013), L.Kiss, F.Magnin (2003), K.Szybiak (2000), I.A.Balashov (2013), N.Yorkina (2018), G.Falkner, T.Ripken, M. Falkner (2002), J.Hausser (2005), E.Johannessen, T.Solhoy (2001), J.Virbickas (2002), S. M. Porter (2007) and many other scientists are conducting research.

The following conclusion can be drawn based on the analysis of the historical and modern research carried out until now, although the Fergana Valley was also studied during the research conducted in Central Asia, but most of the research was carried out based on historical works and historical collections of molluscs, therefore the information can be said to be scientifically not new. In particular,

there is almost no accurate information in the literature about how many types of gastropod molluscs are distributed in the Fergana Valley. It is possible to learn about the malacofauna of the region only on the basis of mollusk shells collected by collectors 80-120 years ago. It should be noted that in 1989-1991, A.Pazilov determined the existence of 14 species of land molluscs in the Fergana Valley (1992). Studies of molluscs are mainly faunistic, and little attention is given by scientists to their ecological aspects.

In our opinion, the modern taxonomic composition of aquatic gastropods and terrestrial molluscs of the Fergana Valley, adventitious, rare, endemic species, lack of information on the processes of variation in mollusks under the influence of abiotic factors and population structures, the role of mollusks in ecosystems, indicators of species diversity, rare and protected species in the studied area. The lack of information about needed species and their conservation measures determines the relevance of this research work.

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