

SMALL COMPLEXES OF DIFFERENT BIOTOPES OF THE SOUTHERN SLOPE OF THE AKHANARAN BASIN

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ABSTRACT

This article examines density of terrestrial mollusks by biotopes and by river basins, malacomplexes of various biotopes of the southern slopes of the Akhanaran basin, 15 biotopes were studied and 35 species of terrestrial mollusks were recorded.

Today, the growing influence of anthropogenic factors, such as deforestation on a global scale, land reclamation, the creation of artificial reservoirs, and open-pit mining, leads to a reduction in the biodiversity of mollusks and the complete disappearance of some of their species. Especially in recent years, the expansion of urban areas and improper water use give rise to irreversible processes leading to the degradation of ecosystems, affecting their diversity. Therefore, assessing the current state of terrestrial mollusk populations in areas with strong anthropogenic factors, substantiating their ecological and biological characteristics and developing measures to protect endemic, rare and endangered species is important.

COLLECTION, FIXING AND STORING MATERIAL

When carrying out the field part of the study, the route-expedition method was used in combination with the standard method of survey areas. In total, more than 20 expeditions were carried out, both excursions along new routes and repeated trips to places where mollusks were discovered in previous years were carried out in order to clarify the dynamics of phenological development occurring in populations of mass species.

Field work included the following general stages: 1. Preliminary inspection of the study area; 2. Carrying out geobotanical descriptions on trial plots; 3. Large-scale mapping of the study area; 4. Accounting work, collection fees, experiments in natural (natural) conditions.

Since the natural and climatic conditions are extremely heterogeneous, it was necessary to conduct collections along vertical belts in order to have a clear picture of the distribution of individual faunal groups in them

The collection and identification of shell mollusks was carried out according to the method described by A.A. Shileiko, according to which mollusks with a shell diameter (or height) of more than 8-10 mm are collected by hand one by one. When collecting small



species (Pupillina), one must be extremely careful in the field. When collecting small mollusks in the forest (foothill and mountain zones), first of all you need to pay attention to the loose bark of stumps, fallen trees and the layer of leaf litter. Shelters are inspected on site, and some of the leaf litter is taken to the laboratory, where the surface of the leaves is examined using a magnifying glass. In foothill and mountainous areas, among rocky placers on slopes, representatives of Enidae, Valloniidae, and Pupillidae are sometimes found in masses. Here you need to examine not only the top layer of pebbles and gravel, but also reach deeper horizons.

Rich conchological material is provided by emissions left by rivers and streams after a spill.

In hot weather, most snails accumulate in various shelters - near lying branches and stones and in the lower horizons of screes. It must be borne in mind that a number of species are buried in the soil during the dry period. Therefore, if shells of some kind are present, but living mollusks are not visible, you need to unscrew the stones and examine the soil underneath them to a depth of several centimeters, carefully loosening it.

The collected material is placed in boxes or, for species that are larger in size, placed in a bag. Leaves, grass stems, or paper cut into strips should be placed in the boxes to prevent the shells from rolling around and breaking.

In the laboratory, the material is sorted: dry shells are placed in boxes, and live mollusks are placed in a jar for fixation.

Fixation of mollusks was carried out according to the method of R.Ya.Brother. The shellfish were placed in a jar of water (Fig. 1.3.A) at room temperature and tightly closed with a lid. Then the jar was placed in a water bath, where the temperature was maintained for 30-50 minutes. brought to 70°C, after which the shellfish are transferred to alcohol with a strength of 70%.

It is convenient to store dry shells as follows. Small shells are placed in small test tubes (Fig.1.3.B,C), each of which is placed in a matchbox, and a field label is also placed there (Fig. 1.3.D). A copy of the label, neatly designed and written in ink, is glued to the front of the box, and only the species name is written on the end of it. The material placed in this way is placed in one of the boxes so that the end on which the species name is written is facing upward.

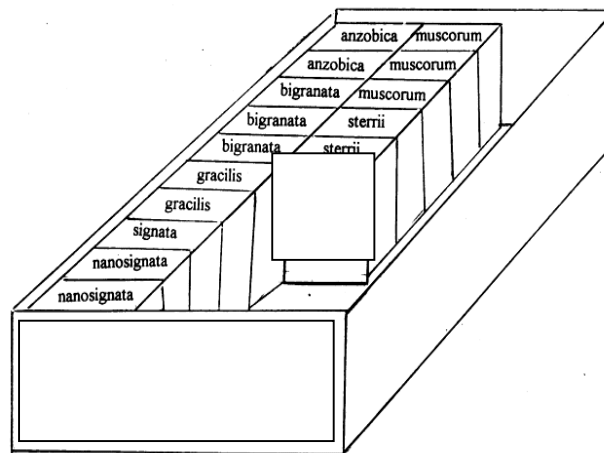
The complex structure of the altitudinal landscape zonation of the Akhangaran basin and the anthropogenic impact on the lowland parts greatly influence the distribution and population size of terrestrial mollusks, since all their main aspects are closely related to environmental conditions.

Nowadays, when the structure of natural communities and their changes under the influence of expanding human economic activity are being studied, an inventory of malacofauna alone is clearly not enough. Therefore, we tried to analyze the materials of the Akhangaran basin from the point of view of landscape-biotopic distribution.

A separate box is allocated for a family or genus, where the species inside it are arranged alphabetically (Fig. 1.3.). This method makes it possible to quickly find all the material in the collection by the desired type.



Rice. 1.1. Fixation and storage of mollusks: A-in a jar; B, B-c test tube; G- in a matchbox.



Rice. 2. Method for preserving a collection of dry shells (according to Pazilov and Azimov, 2023)

The landscape-biotope distribution of terrestrial mollusks on the northern slopes was studied in the basin of the Shavvazsay, Irtishsay and Ertash rivers, and on the southern slopes - in the basin of the Abajsay and Naugarzansai rivers.

We have given the distribution of terrestrial mollusks by landscape zones, since vegetation serves as their habitat and source of nutrition.

Malacocomplexes of various biotopes of the southern slopes of the Akhanara basin

Malacocomplexes on the southern slopes have been studied in the basin of the Abajsai and Naugarzansai rivers.



The vertical profile in the Abajsay River basin runs from the left bank part in the vicinity of the village of Airtom, then along the river valleys to the villages. Ovzhazsay, along the left tributary of Abajsay and ends at the pass Karamazar.

In the Gushsay River basin, we studied malacocomplexes starting near the village of Ilgor along the river valleys to the villages. Kuchbulak.

In the Naugarzansai river basin, we examined the territory from the Akhangaran reservoir to the river valleys, ending in the watershed of the Kurama ridge.

The relief of the southern slopes of the basin creates favorable combinations of temperature and humidity conditions: shelter from the scorching sun and drying winds in summer and from freezing ice in winter. In general, the sharply continental climate here acquires peculiar features. The mountains are characterized by a rapid change from winter frosts to summer heat, and large daily and annual temperature fluctuations. This, of course, leaves its mark on many factors influencing the fauna of terrestrial mollusks.

As noted above, according to research by V.N. Pavlov [52;P.245] identified 4 altitudinal zones on the southern slopes of the Akhangaran basin.

A belt of low-mountain ephemeral vegetation (on loess fine-earth plumes), wormwood and grass-wormwood deserts.

Most of the territory is used for irrigated agriculture: gardens, vegetable gardens, alfalfa plantations. On undeveloped lands, in gravelly areas, wormwood and semi-shrub species from the genus *Seriphidium* mainly grow: *Artemisia ferganensis*, *A. tenuisecta*, *A. sogdiana*, *A. cina* (Pavlov, 1980).

In this belt, malacofauna was studied in the following biotopes: along ditches among grasses; in tugai forests in wet meadows; in gardens, vegetable gardens and alfalfa plantations, among wormwood and semi-shrub plants.

Along the ditches, among the grasses, the following were found: *Cochlicopa nitens*(10)A-(12)H, *Vallonia costata*(3)A-(9)H, *Vallonia pulchella*(2)A-, *Pupilla muscorum*(4)A-(7)H.

Tight and wet meadows are inhabited by: *Xeropicta candacharica* (12) A-(5) H, *Vallonia costata* (11) A, *V. pulchella* (14) A. Found in gardens, vegetable gardens and alfalfa plantations - *Deroceras laeve* (3)A-(4)H *D. reticulatum* (12)A(5)H *Xeropicta candacharica*(18)A. The only species living in wormwood and semi-shrub biotopes is *Xeropicta candacharica* (55)A.

In general, only 6 species of terrestrial mollusks were found in the belt.

Belt of Turanian cereal-forb mountain steppes. It occupies slopes of various exposures with light brown carbonate soils of various mechanical compositions, from fine soil to heavily washed away stony ones.

In this belt, malacofauna was studied in the following biotopes: along river banks among grasses, among subshrubs under stones, along the banks of sairs in open areas.

In the biotope along the river banks among grasses live: *Deroceras laeve* (1)A-(3)H, *Pupilla muscorum* (5)A-(8)H. In the biotope among subshrubs under stones *Sphyradium doliolum*(12)H, *Gibbulinopsis signata*(5)A-(7)H, *Pupilla triplicata*(5)A, *Gibbulinopsis signata*(5)A-(7)H, *Pupilla triplicata*(5)A, *Chondrulopsina intumescens*-(3)H, *Pseudonapaeus chodschendicus*(2)A.

Xeropicta candacharica(12)A was found on the banks of the sairs in open areas.

Thus, 9 species of terrestrial mollusks were discovered in the belt.



Belt of subalpine meadows and juniper steelhead.

It is characterized by significant mid-mountain relief with steep slopes and narrow gorges. High hypsometric levels cause a decrease in temperatures and, as a consequence, a decrease in evaporation.

Significant amounts of precipitation fall on the windward slopes of the ridge. There is less moisture on leeward slopes.

These differences and the significant amplitude of heights within the belt contribute to the complication of the intra-belt structure of the soil and vegetation cover. These conditions naturally affect the distribution of terrestrial mollusks.

Biotopes have been studied in the belt: under stones among xerophilous-ephemeral vegetation, on slopes among tree and shrub vegetation, in various scree and saklyas, thickets of grasses along the banks of streams in plant remains from juniper.

In the biotope, under stones among xerophilic - ephemeral vegetation on the slopes, the following were found: *Pupilla triplicata* (10) A-(9) H, *Gibbulinopsis signata* (15) A-(17) H, *Truncatellina costulata* (9) H.

In the biotope tree and shrub vegetation inhabited by: *Pseudonapaeus albiplicata*-(9)H, *Ps. sogdiana*-(5)H, *Chondrulopsina intumescens*-(7)A, *Ch. fedtschenkoi*-(6)H, *Bradybaena almaatini*-(3)H, *B. dichrozona*-(3)H, *B. cavimargo cavimargo*-(2)A, *B. sinistorosa*- single specimen foundH, *B. plectotropis*-(2)A, *Leucozonella mesoleuca*-(7)A, *L. crassicosta*-(6)H, *Angiomphalia regeliana*-(6)H, *Macrochlamys turanica*-(2)H, *M. sogdiana*-(1)H, *M. schmidti*-(1) N. The biotope of various screes and saklas is inhabited by: *Pupilla sterrii*(10)A, *B. perlucens* - (2)A, *M. schmidti*-(1)H. In the biotope along the banks of streams among the grasses the following were found: *Zonitoides nitidus* (5) A - (8) H, *Novisuccinea evoluta* - (3) A, *Oxyloma elegans* - (2) H.

In the biotope plant remains from juniper were found: *Sphyradium doliolum*(5)A -(9)H, *Gibbulinopsis signata*(25)A-(17)H, *Truncatellina callicratis*, *T. costulata* (11)H.

Belt of alpine vegetation. It is represented by *cobresia* low-grass meadows (heathlands), lawns of small herbs (viviparous knotweed, Altai violet, fireweed), steppes and upland xerophytes.

The soil and vegetation cover of the belt is mosaic and fragmentary. Large areas are occupied by scree and rocks. The malacofauna of this belt is poor and unique.

In the belt, malacofauna has been studied in the following biotopes: along the banks of small streams among thickets of grass, on rocks and scree, in subalpine meadows.

In biotopes along the banks of small streams among thickets of grasses the following were found: *Cochlicopa nitens*(5)A-(9)H, *C. lubrica*(5)A-(7)H, *Vallonia pulchella*(2)A-(4)H, *Deroceras laeve* (5)A-(8)H, *Novisuccinea evoluta* -(1)A, *Oxyloma elegans*-(1)H.

The biotope on rocks and screes is inhabited by *Pupilla sterrii*(3)A, *Pyramidula rupestris*(2)H, *Bradybaena perlucens* -(1)A, *M. schmidti*-(2)H.

In the biotope of subalpine meadows (formed on typical mountain meadow and chernozem-like soils) the following were found: *Cochlicopa nitens*(3)A-(3)H, *Cochlicopa lubricella*-(4)H, *Vallonia pulchella*(4)A-(3)H, *Zonitoides nitidus*(3)A-(5)N.

Thus, in total, on the southern slopes of the Akhangaran basin, we studied 15 biotopes and recorded 35 species of terrestrial mollusks.



The study shows that the density of terrestrial mollusks varies among biotopes and river basins. For example, in the Abdzhasai River basin, the biotopes of wormwood and subshrubs have the highest density (55 ind./m²) of terrestrial mollusks.

In the Naugarzansai river basin, the highest density of terrestrial mollusks (45 ind./m²) was noted in the biotope of semi-shrub and tree-shrub vegetation, and the lowest (2-9 ind./m²) was noted along the banks of the sais, various screes and sakla.

As for the species diversity of terrestrial mollusks, this indicator reaches its maximum value in biotopes: along ditches among grasses, tree and shrub vegetation and along the banks of small streams, among thickets of grasses, in which 4-9 species live. The richness of the species diversity of terrestrial mollusks is apparently explained by a wide variety of natural conditions, associated primarily with highly dissected topography and the optimal combination of temperature conditions and precipitation.

The minimum value of species diversity was noted in biotopes among wormwood and semi-shrub plants, thickets of grass along the banks of streams, on rocks and scree (1 species each).

Apparently, the reason for the poverty of the malacofauna of these biotopes depends, firstly, on the sparseness of the vegetation cover, and secondly, on the extremely dry climate with a large deficit of precipitation.

Analysis of the landscape-biotopic distribution of terrestrial mollusks on the southern slopes of the Akhangaran basin showed that:

1. As on the northern slopes, terrestrial mollusks are distributed unevenly along the main vertical belts and biotopes: in the belt of low-mountain ephemeral vegetation (on loess fine-earth plumes), wormwood and grass-wormwood deserts (on gravelly-rocky slopes) there are 6 species, in the belt of Turanian cereal-forb mountain steppes – 9, in the belt of subalpine meadows and juniper steelhead – 26, in the belt of alpine vegetation – 10 species.
2. On the southern slope of the Akhangaran basin, the greatest species diversity of terrestrial mollusks (26 species) was noted in the belt of subalpine meadows and juniper steelhead.
3. The highest density of 45 ind./m² of terrestrial mollusks was noted in biotopes of semi-shrub and tree-shrub vegetation, and the lowest density of 2-9 ind./m² along the banks of sais, various screes and sakle.

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