



## **RARE AND ENDANGERED SPECIES OF TERRESTRIAL MOLLUSK IN WESTERN TIEN SHAN**

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### **ANNOTATION**

*This article is about rare and endangered species of terrestrial mollusk in Western Tien Shan and for two of them nature conservation status is evaluated as – CR (that is on the verge of complete disappearance), for five species-VU:R (vulnerable really rare) and for a species-NT(close to threat, narrowly areal endemic species).*

*Destruction and transformation of habitats, deforestation of shrubby vegetation, cattle overgrazing, active construction, afforestation in primarily treeless steppe and rocky places, rock mining, including export of separate stones and excessive recreation are the main causes of becoming rare and disappearance of the species.*

**KEY WORDS:** *terrestrial mollusk, malacofauna, population, shell shapes, threatening factors, rare and endemic species.*

### **INTRODUCTION**

Originality of Western Tien Shan landscape is for its geographical position at the junction of large bio-geographical provinces, from the history of the formation of flora and fauna from various sources. Therefore here is concentrated extraordinary large number of species of fauna and flora for these latitudes. A global value of it is in presence of speciation and ancient tertiary refugiums causing the existence of significant number of endemic and relict species.

Unfortunately, for the last decade natural diversity in Western Tien Shan has undergone considerable depletion. Especially strong impact on nature of Western Tien Shan began in the 50-60<sup>th</sup> of the last century. In the result of it area and the number of many species declined sharply.

It must be noted that if “currently in the world fauna there are about 35 thousand species of terrestrial mollusk (The Biology..., 2001)”, 422 or less than 1,5% of them nowadays died out

(Régnieretal., 2009, 2015). Therefore, today globally main attention is paid to the matters of saving and rationally using the world of fauna which appears the main structural part of biological diversity.

### **MATERIALS AND METHODS**

field collections of observations held 2000-2020 on the Kuramin, Chatkal, Ugam, Karjanto, Pskem, Fergana and Talas ranges, collections of terrestrial mollusk from the Zoology museums at Samarkand and Gulistan Universities, and also from the Zoology museum at Moscow University served as material. It was analyzed all the literature concerning the terrestrial mollusk of Uzbekistan and adjacent territories.

### **THE RESULTS AND THEIR ANALYSIS**

As you know, 210 relative species of terrestrial mollusk live in Central Asia (Uvalieva,1990; Pazilov, Azimov, 2003) from which

121 can be found in Western Tien Shan. The discovered species having fairly diverse range types (Palearctic and holarctic, European, West Asian, Highland Asian, Central Asian and Front Asian), live in different biotopes.

Strong impact on the nature in Western Tien Shan late 50-60 years:- reduction of mountain valley and desert forests, and deforestation of shrubby vegetation and cattle overgrazing led to the destruction of habitats, in the result of it the area and the number of many species dramatically reduced. Many of earlier usual species became rare, and a number of species disappeared or caught on the brink of extinction. And mollusks could not avoid of this fate either.

Having studied the population state of malacofauna in Western Tien Shan, we bring new data about rare and endangered species of terrestrial mollusk.

While evaluating the population state, as the basis was taken thoroughly developed criteria created for the Red list of International Union for Conservation of Nature (IUCN, 2012 a, 2012 b).

The review, the assessment of the population state of the rare or endangered species is constructed according to the following scheme: after the name of the species it is shown a link to the original description; brief description of shells; status; habitat; propagation; state; threatening factors; measures of protection.

### ***Pseudonapaeus (Pseudonapaeus) errans*** (Westerlund, 1891). Pic.A.

Conically cylindrical shell, thick-walled, the number of turnovers is 7.5 – 8.5, three top turns are smooth and the others are ribbed. The turnovers are convex, evenly growing and the last turn to the mouth is slightly raised. On the column in the deep mouth there is a tooth shaped ledge.

Height of the shell 14-15 mm, large diameter 4-4,2 mm, mouth height 4 mm, height of the turn before the last 4,5-5mm.

Status: 2 (VU:R): Vulnerable, naturally rare, endemic species.

Habitats: It can be discovered in the foothills and middle zones of the mountains. It lives under stones and plants in the areas of shrubs, and also on open slopes among talus.

Propagation: the Chatkal ridge.

State: Naturally rare species occupying limited area in little disturbed natural habitats. On the Chatkal ridge it occupies extremely small areas in separate locations.

Environmental preferences of the species are narrowing. The number is too low, 1-2 individuals per 50 sq. m.

Threatening factors: Destruction and transformation of habitats; deforestation of shrubby vegetation; carrying out forestry activities; economic development in foothill zones, including plowing; cattle overgrazing and excessive recreation

Protection measures: It is necessary to implement security regime in the habitat of the species, where any kind of construction and forestry activity including “Sanitary and Wellness”, excessive recreation will be forbidden.

### ***Pseudonapaeus (Ps.) zaureshae*** Schileykoet Rymzhanov, 2013. Pic.B

Left-hand-curved shell, slender, bullet-elongated shape, the number of turnovers is 6.5–9. Coloring is more mottled, middle turns are decorated with a number of uneven transverse vivid, dark-horny strokes. On the surface of two-three last turns distinct spiraling is expressed, and in front of the mouth, especially around the navel there are a lot of spiral dents and scars. The mouth noticeably smaller size is more rounded and the places of its attachment are closer together.

Height of the shell 15-16 mm, large diameter 5-46 mm, mouth height 5 mm, height of the turn before the last 6-6,5mm.

Status 3(NT): Close to menace, narrowly areal endemic species.

Habitats: It can be discovered in mountain areas. It lives among small stones, grassy vegetation and shrubs.

Propagation: the Chatkal ridge.

State: Close to menace, occupies small areas in limited number in little disturbed natural habitats, mainly among shrubs and large talus. The quantity is known from a small number of finds.

Threatening factors: Destruction and transformation of habitats; deforestation and degradation of shrubs, including the export of separate stones (reduces habitable space in the cavities among stones), fragmentation and reduction of biotope areas for earth roads, excessive recreation

Protection measures: It is necessary to implement security regime in the habitat of the species, where it will be forbidden to cut down shrubs, transport travels outside functionally necessary roads, limited recreation.

### ***Pseudonapaeus (Siraphorus) entoptyx*** (Lindholm, 1925). Pic.B

Left spun shell, almost cylindrical with conical top, faintly shiny. The number of turnovers is 7-8, weakly convex, separated by depressed seam, the last turnover is slightly raised to the mouth.

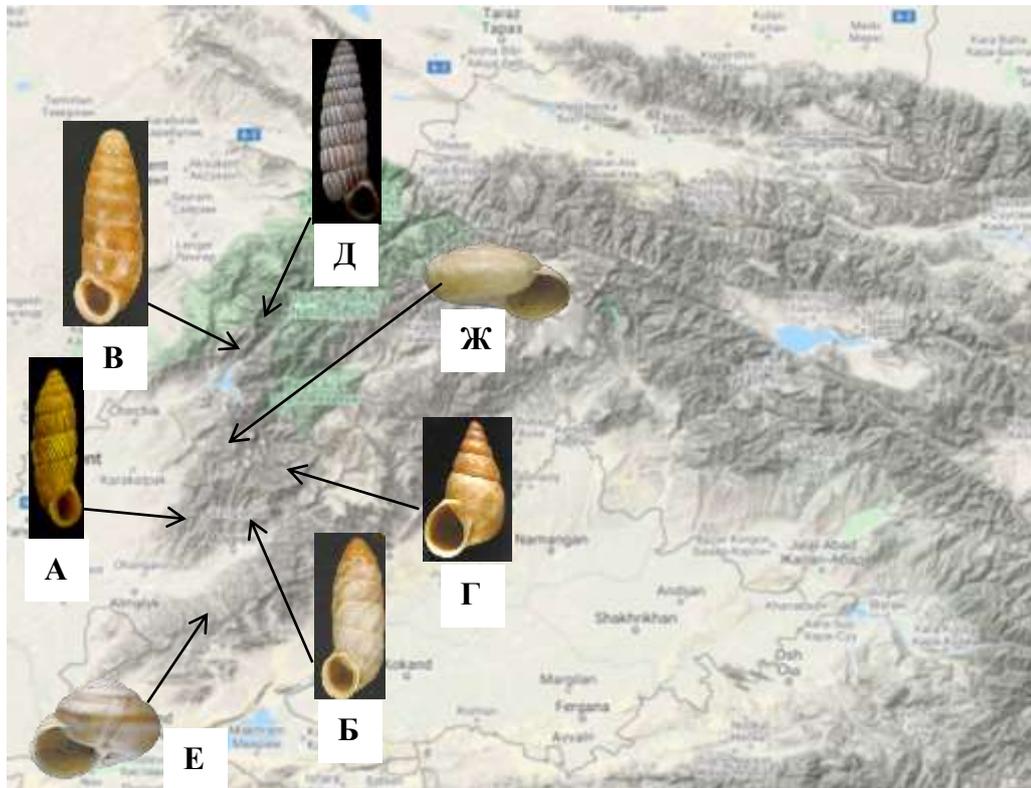
The color is red-horny. The sculpture, at first sight seems almost smooth, but with an increase of at least 20 times it is noticeable very thin and unevenly located striation. The mouth is half oval, oblique, mouth edges are thin, without teeth, with a yellowish lip, the places of attachment of the mouth are slightly close and connected by yellow corns

Height of the shell is 8,5-9,5 mm, large diameter 3,0-3,5 mm, mouth height 3 mm, height of the turn before the last 4-5mm.

Status: 2 (VU:R): vulnerable, naturally rare

State: Extremely rare mountain species, occupying small areas in two locations of the Ugam ridge among shrubs. The quantity is 3-4 individuals in 10-15 sq.M.

Habitat: It can be discovered in mountain areas. It lives among shrubs and thickets of grass.  
Propagation: the Ugam ridge.



**Pic. The map of propagation of rare and endangered species of terrestrial mollusk in Western Tien Shan.**

- А**-*Pseudonapaeuserrans* (The Chatkal ridge);
- Б**-*Ps. (Ps.) zaureshae* (The Chatkal ridge);
- В** -*Ps. (Siraphorus) entoptyx* (The Ugam ridge);
- Г**-*Turanena inversa* (The Chatkal ridge);
- Д**-*Mastoidesalbocostatus* (The Ugam ridge);
- Е**-*Fruticicolasinistrorosa* (the Kuramin ridge);
- Ж**-*Leucozonellaferghanica* (The Chatkal ridge).

Threatening factors: Destruction and transformation of habitats; deforestation of trees and shrubs, cattle overgrazing, fragmentation and reduction of biotope areas for earth roads, excessive recreation.

Protection measures: It is necessary to implement security regime in the habitat of the species, where it will be forbidden any kind of construction and forestry activity including «Sanitary-Wellness», limited recreation.

***Turanena inversa*** Schileyko et Moisseeva, 1995. Pic. Г

Left spun shell, high conical, with conical curl, enough hard-walled. Turnovers are 6, moderately convex and the last turnover to the mouth is not raised. The height of the last turnover increases half of the whole height of the shell. The color of fetal turnovers is dark-brown, definitive one are much

lighter. The sculpture presents uneven radial wrinkles. The mouth is round and the place of its attachment is not close. The mouth edges are widely turned away, it has no lips.

The height of the shell is 14,5-17,5 mm, large diameter is 9,0-9,5 mm, the height of the mouth is 6,5-7 mm, the height of the turnover before the last is 8-9mm.

Status: 2 (VU:R): Vulnerable, naturally rare, endemic species.

State: Rare mountain endemic species occupying the smallest areas in 3 remote and rocky habitats of the Chatkal ridge. The quantity is 1-2 individuals in 20-25 sq.M.

Habitat: It lives on rocky stones where shrubs grow.

Propagation: It is found only in two places of the Chatkal ridge.

Threatening factors: Destruction and transformation of habitats, active construction, afforestation in primarily treeless steppe and rocky places, rock mining, including exportation of separate stones and excessive recreation.

Protection measures: It is necessary to implement security regime in the habitat of the species, limitation of afforestation, construction mining and exportation of stones, limitation of recreation and cattle overgrazing.

***Mastoides albocostatus***(Westerlund, 1896).Pic.Д

Tower-alike shell, high, slim, moderately hard-walled. The number of turnovers is 10 - 11, moderately convex, separated by a deep seam. The last turnover to the mouth is energetically raised. The color is from light-horny to chestnut. The sculpture is in the shape of very sharp massive radial ribs. The mouth is short oval and the places of its attachment are over-arranged and connected with well-developed light corn. The mouth edges are moderately turned away with white large lip. The navel is wide-chest-look.

The height of the shell is 14-15 mm, large diameter is 3,5-4 mm, the height of the mouth is 3,3,5 mm, the height of the turnover before the last is 4-4,5 mm.

Status: 1(CR): It is on the verge of complete disappearance, endemic species.

State: Rare forest species occupying small areas in a limited number in little disturbed natural habitats, especially in the walnut forests with plenty of dead wood. The quantity has been found little for the last 50 years and in 1990 a living species was found by A. Pazilov.

Habitat: It can be found in mountain areas. It lives among shrubs and in gravelly with tall grass in walnut forests.

Propagation: The Ugam ridge.

Threatening factors: Destruction and transformation of habitats, cutting down natural forests, going in for forestry activity in existing forests, cattle overgrazing, fragmentation and reduction of biotope areas for earth roads, excessive recreation.

Protection measures: It is necessary to implement security regime in the habitat of the species, where it will be forbidden any kind of construction and forestry activity including «Sanitary-Wellness», excessive recreation.

***Laevozebrinus ujfalvyanus***(Ancey, 1886)

Slim shell, tower-alike, hard-walled, glistening with a narrow blunt top. The number of turnovers is 11, slightly convex. The last turnover to the mouth is slightly raised and its height is always significantly less than half the height of the shell. The color is white, with numerous dark radial motleys. The sculpture is in the look of flaccid smoothed wrinkles, but at first sight the shell looks almost smooth. The mouth is oval, almost not beveled. Columellar edge is sheer, basal and palatal smoothly evenly curved. The mouth edges are moderately turned away with very blurry white lips. The navel is wide-chest-look.

The height of the shell is 17-24 mm, large diameter is 6-8 mm, the height of the mouth is 3-3,5 mm, the height of the turnover before the last is 4-4,5 mm.

Status: 1(CR): It is on the verge of complete disappearance, endemic species.

State: Rare mountain species occupying small areas in limited number in little disturbed natural habitats, mainly in shrubby places. For the last 50 years a living individual has not been found.

Habitat: It can be discovered in mountain areas at the height 2300-2500 m above the sea level. It lives among shrubs and in gravelly with tall grass.

Propagation: The Chatkal ridge.

Threatening factors: Cutting down natural forests, going in for forestry activity in existing forests, cattle overgrazing.

Protection measures: It is necessary thorough study of its lifestyle.

***Fruticolasinistrorosa***(Tzwetkov, 1940).Pic.E

Left spun shell, the number of turnovers is 6.5. The turnover but the last is angular, the angle is smoothed to the mouth and slightly hung. The color is yellowish. Top tape is clearly visible, there is no a lower one. The sculpture consists of irregular rough radial wrinkles. The mouth is rough, oblique, the edges are not turned. The lips are well developed.

The height of the shell is 14 - 16, large diameter is 21 - 23, the small diameter is 17 - 19 mm.

Status: 2 (VU:R): Vulnerable, naturally rare, endemic species.

State: Rare mountain endemics occupying the smallest areas in 3 remote and rocky habitats of the Chatkal ridge. The number is 1-2 individuals in 20-25 sq.m.

Habitat: It can be discovered at the height of 2500 m above the sea level, it lives among shrubs.

Propagation: The Kuramin ridge.

Threatening factors: Cutting down shrubs, conducting forestry activity in existing forests, cattle overgrazing and recreation.

Protection measures: It is necessary to implement security regime in the habitats of the species, limited recreation and cattle overgrazing.

***Leucozonella ferghanica***(Lindholm, 1927).Pic.Ж

Tightly pressed shell, the number of turnovers is 5.5 - 6, slowly rising. The last turnover 1.5 - 2 times wider than penultimate, slightly hung to the mouth.

The color is light-horny and there is not a light tape around the periphery. The mouth is oval, heavily beveled. The place of attachment of the mouth is moderately close and connected by a thin callus.

The height of the shell is 9.5-10.5, large diameter is 18-20, the small diameter is 17-18 mm.

Status: 2 (VU:R): Vulnerable, naturally rare, endemic species.

State: Naturally rare species occupying limited areas in little disturbed natural habitats. Ecological preferences of the species are getting narrower. The number is too low and 1-2 individuals in 50 sq.m.

Habitat: It can be discovered in mountain areas. It lives among shrubs in grass overgrown near reservoir.

Propagation: The Chatkal ridge.

Threatening factors: Destruction and transformation of habitats, cutting down shrubs, overgrazing and excessive recreation.

Protection measures: It is necessary to implement security regime in the habitat of the species, where it will be forbidden any kind of construction and forestry activity including «Sanitary-Wellness», excessive recreation.

Thus, having studied the population state of terrestrial mollusk of Western Tien Shan we can draw the following conclusions:

For the two species nature conservation status is rate as – CR (Fully endangered, endemic species): *Laevozebrinusujfalvyanus*, *M. albocostatus*; for five species-VU:R (vulnerable, naturally rare, endemic species): *Ps. errans*, *Ps. entoptyx*, *T. inversa*, *F. sinistorosa*, *L. ferghanica*; and for one-NT(close to endangered, narrow areal endemic species): *Ps. zaureshae*.

It is noted that the main reasons of becoming rare and endangered species are destruction and transformation of habitat, deforestation of shrubby vegetation, cattle overgrazing, active construction, afforestation in primarily treeless steppe and rocky places, rock mining, including export of separate stones and excessive recreation.

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