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## Insect fauna of the Republic of Uzbekistan: Rare true bugs (Hemiptera, Heteroptera)

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Research during 2020–2024 identified three species of Heteroptera rare in the fauna of Uzbekistan, members of the Reduviidae family: *Stenolemus bogdanovii* Oshanin, 1871, *Holotrichius mesoleucus* (Kiritshenko, 1914) and *Reduvius fedtschenkianus* (Oshanin, 1871). Other rare species found are as follows: two species from the family Coreidae (*Cercinthus lehmanni* Kolenati, 1891, and *Centrocoris voxemi* (Puton, 1878)), five species from the family Scutelleridae (*Irochrotus turanicus* Kerzhner, 1976; *Promecocoris testaceus* (Reuter, 1900); *Psacasta exanthematica conspersa* Germar, 1839; *Leprosoma tuberculatum* Jakovlev, 1874; *Phyllomorpha lacerata* Herrich-Schäffer, 1835, *Dictyla platyoma* (Fieber, 1861)), one species from the Tingidae family (*Prostenma sanguineum* (Rossi, 1790)) and Nabidae family (*Nabis (Aspilaspis) pallidus*). Information on the current state of distribution of a total of 13 true bugs is presented. Currently, only three species of these rare true bugs were found in natural and anthropogenic areas; eight species are in the collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan; and five species are not present in nature or in the collection today; they are known only from the literature. There are also proposals to change the status of *Reduvius fedtschenkianus* Oshanin, 1871, *Stenolemus bogdanovi* Oshanin, 1896, *Cercinthus lehmanni* Kolenati, 1891, which are included in the Red Book of Uzbekistan, based on their current level of occurrence.

**Keywords:** fauna; rare species; red book; Reduviidae; true bugs; Uzbekistan.

### Introduction

The Heteroptera, commonly called true bugs, are one of four suborders in the order Hemiptera. They are one of the most diverse groups of hemimetabolous insects, comprising more than 45,000 species in 91 families worldwide (<http://heteroptera.org>). In the countries of Central Asia, including Kazakhstan, more than 1250 species belonging to 32 families (Korganbek, 2024) have been registered, including 774 species belonging to 35 families registered in Uzbekistan (Aukema et al., 1995, 1996, 1999, 2001, 2006).

In recent years, under the influence of environmental and anthropogenic factors, the diversity of the world's and Uzbekistan's nature have been damaged. A 2003 analysis of the world's fauna based on the International Red Lists shows that over the next four hundred years, 683 species, including 72 species of insects, will have completely disappeared from the earth. Such a sad process has been going on since the end of the 19th century. Today, approximately 557 species of insects are threatened with extinction. The latest edition of the Red Book of Uzbekistan in 2019 includes 59 species of insects (28.6% of total animals). Three species of them (*Cercinthus lehmanni*, *Reduvius fedtschenkoana* and *Stenilemus bogdanovi*) are true bugs (Red book of Uzbekistan, 2019). In addition, under the current conditions of global climate change, scientific research is being conducted on the monitoring of insect populations in Uzbekistan, focusing on specific groups. In particular, detailed studies on Orthoptera are provided by Nurjanov et al. (2023, 2024), and on Hymenoptera by Medetov et al. (2024). Among the true bugs, *Gerris sphagnetorum* is included in Belarus; *Coranus griseus* and *Oncocephalus paternus* are included in the Red book of Ukraine (Akimov, 2009). Scientific research is

being conducted in various countries to study rare and endangered species of true bugs. In particular, Vinokurov (2020) studied the true bugs distributed in the Far Eastern regions of Russia (Siberia) and found that 43 species of them belonging to 11 families are rare. *Ranatra linearis*, *Nepa cinerea*, *Himacerus apterus*, *Orius minutus*, *Picromerus bidens*, and *Zicrona caerulea* are rare in the Republic of Mordovia. They were proposed to be included in the Red Book (Ruchin & Nikolaeva, 2015); in 2007, 46 species of true bugs were identified in Western Kazakhstan, and 11 species belonging to 7 families were considered uncommon (Korganbek, 2024). In Uzbekistan, scientific research aimed at the study of the fauna of true bugs mainly dates back to the times of the Soviet Union. During the period of independence, the study of pests in our republic was mainly focused on the types of agricultural pests and the system of combating them. In the years 2020–2024, scientific research work is being carried out by the scientific staff of the Entomology Laboratory of the Institute of Zoology of the Academy of Sciences of Uzbekistan. During this period, species such as *Halymomorpha halys*, *Zelus renardii*, *Creontiades pallidus*, and *Eurystylus bellevoeyi* were identified for the first time in the fauna of Uzbekistan (Musaev et al., 2020, 2022, 2023).

### Materials and methods

The research was carried out during 2020–2024 in natural and anthropogenic areas, nature reserves, and national parks in Uzbekistan using generally accepted eco-faunistic methods. Entomological sweep nets with a diameter of 38–40 cm, light traps, soil traps, and other methods were used to catch true bugs (Golub et al., 2012). Species of true bugs were identified using special identification guides (Kirichenko, 1951; Kerjner,

1981; Puchkov, 1987). The worldwide distribution and systematic status of true bugs were determined based on the scientific sources of scientists in the field (Aukema et al., 1996; Linnavuori et al., 2000; Ghahari et al., 2014). Also, the article was prepared on the basis of comparison with samples from the collections of the Institute of Zoology of the Academy of Sciences of Uzbekistan, the National Nature Museum of Uzbekistan, Samarkand State University and using the information of the Red Book of Uzbekistan.

## Results

An analysis of the results of studies conducted in 2020–2024, and samples of the collection, available literature, found that 13 species of true bugs that have been recorded in Uzbekistan belong to 6 families and are rare and need protection. During the research, 5 species of them were found in different regions of Uzbekistan (Fig. 1).

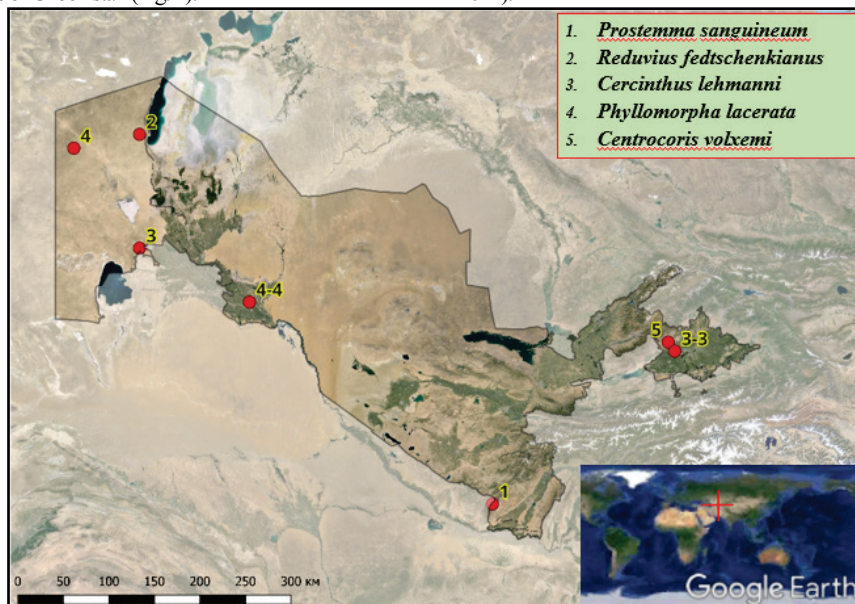


Fig. 1. Determined coordinates of true bugs

*Distribution in Uzbekistan.* Kara-Allna, 1♂, 1700 m; valley of the Karasu river, 1♂, 1600 m. Pskem ridge: Pskem, 1♀, 1600 m. In the steppe and mountain steppe formations, along rivers (Papov, 1966). Collection of Zoological Institute of Uzbekistan (CZIUZ), Tashkent region Chirchik district (no author), 30. Jun. 1818, 2♀. Box No. 18,

***Dictyla platyoma* Fieber, 1861**  
= *Monanthia platyoma* Fieber (1861)  
Genus *Dictyla* Stal, 1874

*Distribution in Uzbekistan.* Western Tien-Shan (Papov, 1966).  
*General distribution.* From Central Europe and the Balkan Peninsula to Central Asia and the Russian Far East, also known from Cyprus, the record from Egypt seems doubtful (Péricart & Golub 1996).  
*Zoogeography.* Holarctic.

***Prostemma sanguineum* (Rossi, 1790)**  
= *Reduvius sanguineus* Rossi, 1790; = *Prostemma afghanicum* (Poppius, 1909) in (Reuter & Poppius, 1909)  
Genus *Prostemma* Laporte, 1832  
*Material.* Surkhan National Reserve (Surkhandarya region), 1♀, 18. Jun. 2022, 2815 m, 37°51'32.25" N, 66°38'05.08" E, light trap (Musaev, 2022).

ID: HIM000496 (Fig. 2), (Aukema & Rieger, 1996), Karakalpakstan (Kulumbetova, 1999).

*General distribution.* From Central Europe and the Balkan Peninsula to Central Asia and the Russian Far East, also known from Cyprus, the record from Egypt seems doubtful (Péricart & Golub, 1996).

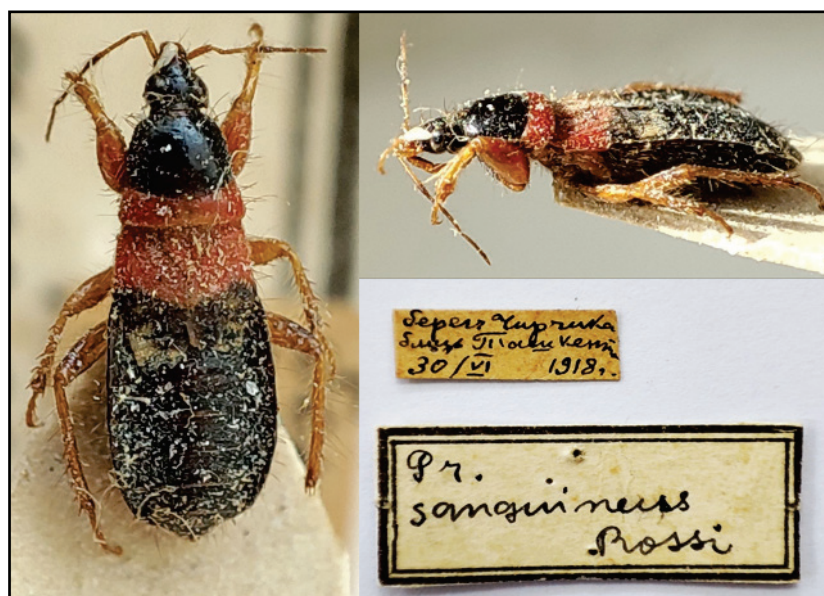


Fig. 2. View of the dorsal and lateral parts of *Prostemma sanguineum* (Rossi, 1790)

***Nabis pallidus* Fieber, 1861**

Genus *Nabis* Latreille, 1802

*Distribution in Uzbekistan.* Tashkent region (Chatkal ridge), Surkhandarya region (Termez district), Kashkadarya region (Gissar ridge), Jizzakh region (Kerzhner, 1981).

*General distribution.* Irano-Turanian, distributed from the Caucasus to Mongolia and north China (Kerzhner, 1996).

*Host plants.* *Tamarix* (Linnavuori & Hosseini 2000).

*Zoogeography.* Holarctic.

***Stenolemus bogdanovii* Oshanin, 1871**

Genus *Stenolemus* Signoret, 1858

*Distribution in Uzbekistan.* Tashkent and Surkhandarya regions (Gerzhner), Kattakurgan district, Samarkand region (no author, June 3, 1939), Eastern Fergana (Kiritshenko, 1964), Samarkand region (Aukema & Rieger, 1996). The only specimen of this species found by A. N. Kirichenko on July 12, 1918, in the Kanibadam region of the Republic of Tajikistan is kept in the Natural Museum of Uzbekistan.

*Description.* The length is 12–14 mm. The body is whitish or yellowish in color. Eyes are black, and legs are yellowish in color. There are black-tipped, spiky growths on the forelegs. The whole body and legs are covered with fine, long, and thick bristles (Fig. 3).

*General distribution.* Irano-Turanian, distributed from the Caucasus to Mongolia and north China (Kerzhner, 1996).

*Host plants.* *Tamarix* (Linnavuori & Hosseini 2000).

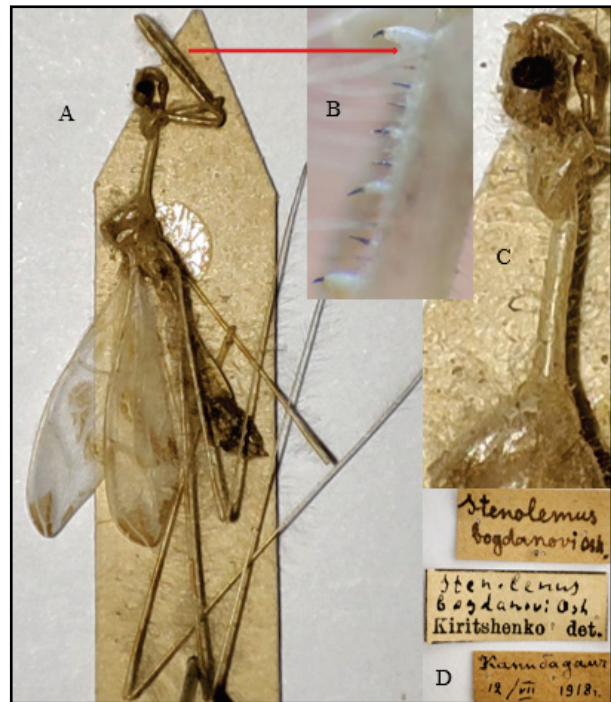
***Holotrichius mesoleucus* (Kiritshenko, 1914)**

Genus *Holotrichius* Burmeister, 1835

*Distribution in Uzbekistan.* Zarafshan Valley (Kiritshenko, 1964; Aukema & Rieger, 1996), Kyzylkum Desert (Kiritshenko, 1951). There is one female specimen stored in the entomological collection of the Institute of Zoology of Uzbekistan. However, no information regarding the location, date, and collector of this species is provided (Fig. 4).

*General distribution.* Iran-Razavi Khorasan (Rahimi et al., 2010), Kazakhstan (Putshkov & Putshkov, 1996).

*Host plants.* *Avena fatua* (Poaceae) (Rahimi et al., 2010).



**Fig. 3.** General view of *Stenolemus bogdanovii* Oshanin, 1871 (A), spiky setae on forelegs (B), part of pronotum (C), location and time of detection



**Fig. 4.** *Holotrichius mesoleucus* (Kiritshenko, 1914): dorsal and lateral views of the female

***Reduvius fedtschenkianus* (Oshanin, 1871)**

Genus *Reduvius* Fabricius, 1775

The species is included in the Red Book of the Republic of Uzbekistan.

*Material.* Part of the Ustyurt plateau of Karakalpakstan, 1♂, 14 Jun. 2021, 42°44'35.48.66" N, 58°02'33.62" E, Eastern Fergana, 2♂, 07 May 2022, 40°14'13.03" N, 64°17'37.85" E.

*Description.* Height: up to 15–18 mm. The color is mostly jet black, but the eyes, antennae (except the first joint), and tarsus of the legs are yellowish. The first joint of the antennae is hairless; the other joints are hairy. Legs also have sparse, small hairs (Fig. 5).

*Distribution in Uzbekistan.* There are three specimens in the collection of the Institute of Zoology of Uzbekistan (CZIUz), Box No. 24, ID: HIM000368, Karshi District, Kashkadarya Region (no author), 5 Jul. 1963, 1♀, Surkhandarya region, 1♂, 6 Aug. 1921 (no author), Tashkent region, 1♂, 5 Jul. 1960 (no author). These specimens are very old and in poor condition because they are not well preserved. There is also information in the literature that it was found in the Kyzylkum desert (Davleshina, 1960), Western Tien-Shan (Papov, 1957), Khorezm region (Khamraev, 2003) and Karakalpakstan (Rulumbetova, 1999).

*General distribution.* Afghanistan, Kazakhstan, China, Iran, Iraq, Turkmenistan, Tajikistan and Uzbekistan (Aukema & Rieger, 1996).

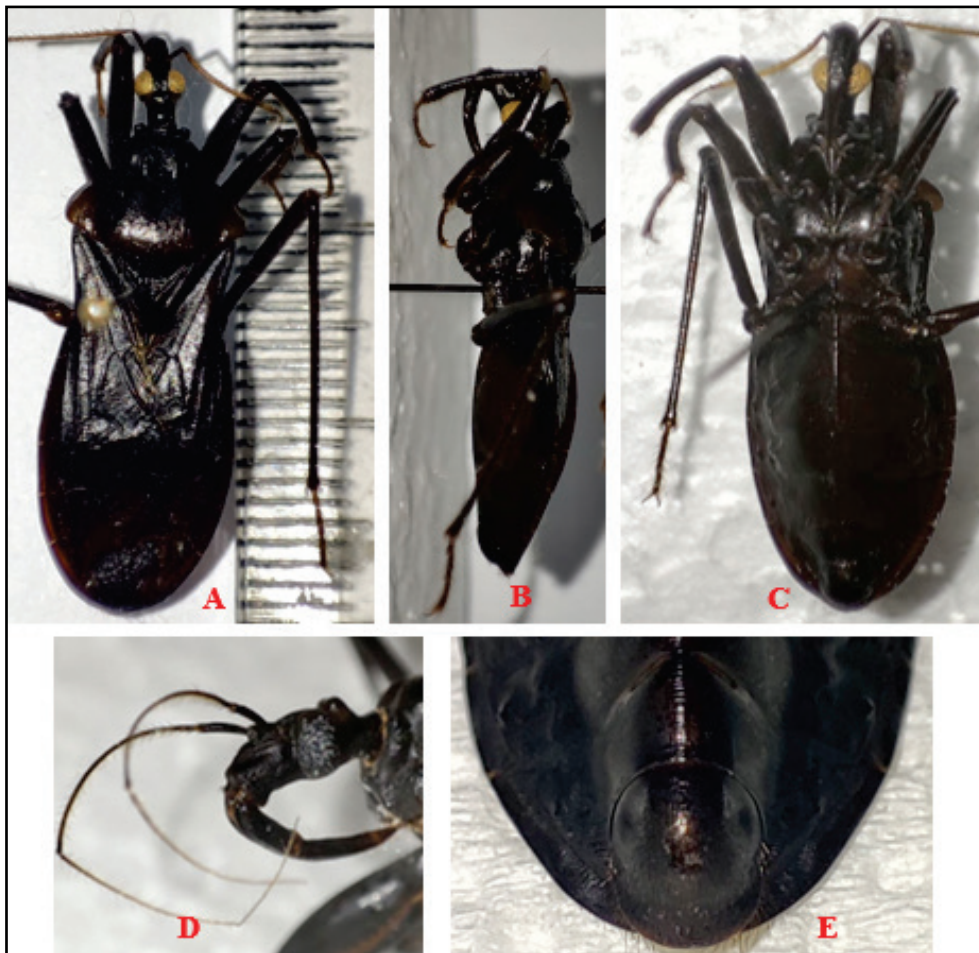


Fig. 5. View of the dorsal (A), lateral (B), ventral (C), labrum (D), and male genitalia (E) parts of *Reduvius fedtschenkoana* Oshanin, 1871

***Cercinthus lehmanni* Kolenati, 1891**

≡ *Centrocoris lehmannii* Kolenati, 1857; = *Cercinthus chobauti* Puton, 1896

Genus *Cercinthus* Stal

The species is included in the Red Book of the Republic of Uzbekistan.

**Material.** Kyzylkum Desert, 1♀, 23 Jun. 2021; Karakalpak part of the Ustyurt Plateau, Kasarma, 15 May 2021, 2♂, 42°44'35"48.66" N, 58°02'33.62" E (Fig. 6).

**Distribution in Uzbekistan.** Nishan district, Kashkadarya region (no author), 10 Sep. 1967, 1♀, Bukhara part of the Kyzylkum desert, 1♂, 12 May 1974 (no author), Collection of the Zoological Institute of Uzbekistan (CZIUz).

**General distribution.** North Africa, the Middle East, and Central Asia. Kazakhstan and Mongolia (Aukema & Rieger, 1996).

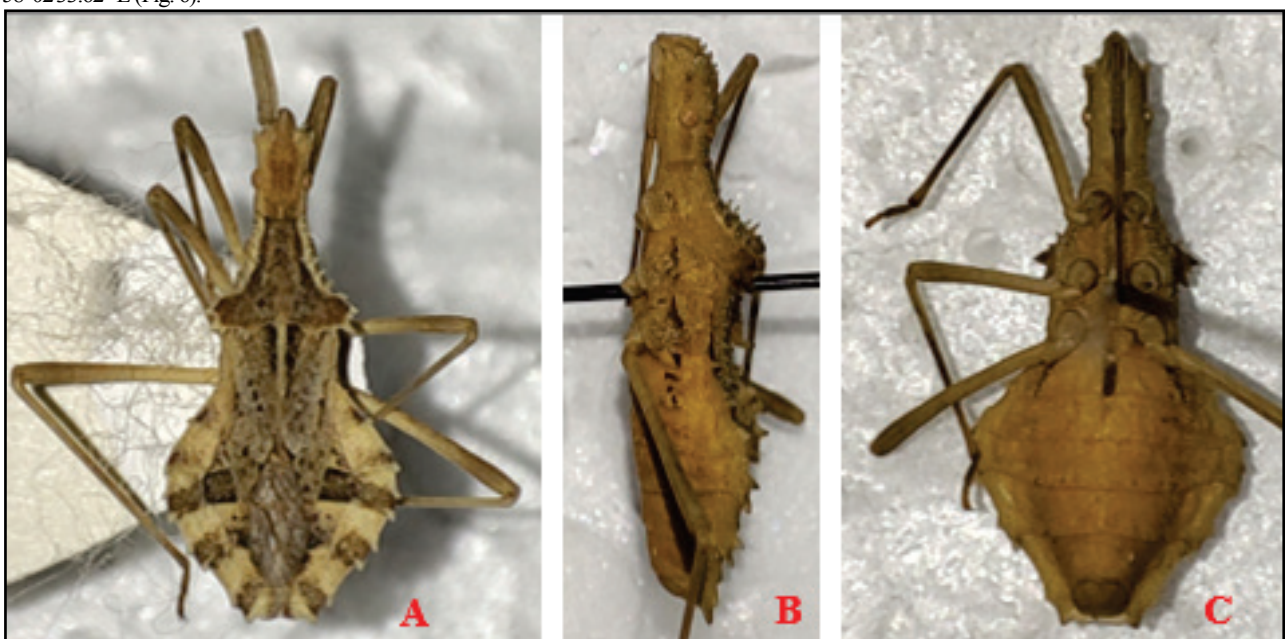


Fig. 6. View of the dorsal (A), lateral (B), and ventral (C) parts of *Cercinthus lehmanni* Kolenati, 1891

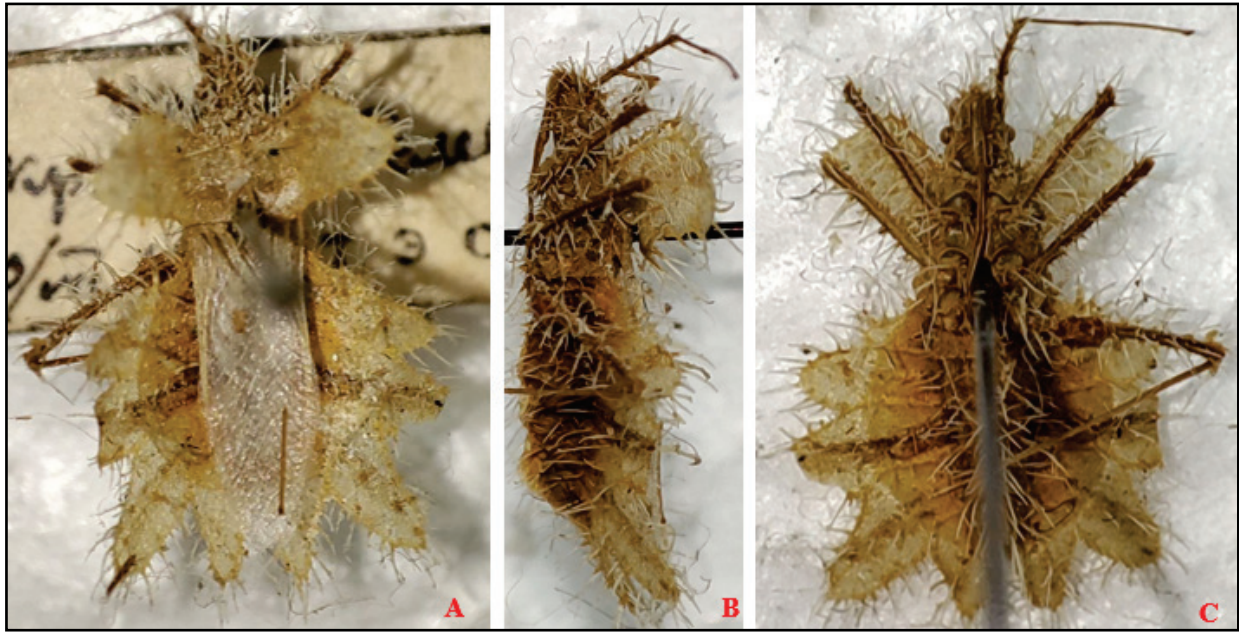


Fig. 7. View of the dorsal (A), lateral (B), and ventral (C) parts of *Phyllomorpha lacerata* Herrich-Schäffer, 1835

***Phyllomorpha lacerata* Herrich-Schäffer, 1835**

= *Paranotocoris echinus* Ahmad & Shadab, 1973; = *Phyllomorpha laceratus* Herrich-Schäffer, 1835; = *Phyllomorpha persica* Westwood, 1841  
Genus *Phyllomorpha* Laporte, 1833

**Material.** Khorezm region (Kyzylkum desert), 19 Aug. 2021, 1♀, 41.62621° N 60.71946° E, Karakalpak part of the Ustyurt Plateau, 1♂, 11 Jul. 2022, 44°21'29.69" N, 56°26'39.20" E.

**Distribution in Uzbekistan.** Nishan district, Kashkadarya region, 10 Nov. 1962, 1♀ (no author), Eastern Fergana, 2♀, 20 Jun. 1919 (no author), Box No. 16, ID: HIM000215, Collection of Zoological Institute of Uzbekistan (Fig. 7).

**General distribution.** North Africa, the Middle East, and Central Asia (Aukema & Rieger, 1996).

***Centrocoris volxemi* (Puton, 1878)**

= *Centrocarenus balassogloi* Jakovlev, 1883; = *Centrocarenus coroniceps* Jakovlev, 1879; = *Centrocarenus ruficeps* Jakovlev, 1908; ≡ *Centrocarenus volxemi* Puton, 1878; = *Centrocoris scutellaris* Linnavuori, 1968.  
Genus *Centrocoris* Kolenati, 1845

**Material.** Namangan region, Pop Hills (Eastern Fergana), 6 May 2023, 1♀, 2♂, 40°53'44.47" N, 70°54'55.91" E (Fig. 8).

**Distribution in Uzbekistan.** Syrdarya region (desert) 30 Oct. 1958, 1♂ (B. Zolotov), Box No. 29, ID: HIM000213 Collection of Zoological Institute of Uzbekistan.

**General distribution.** Southern Russia, Afghanistan, Iran, Iraq, Turkey, Saudi Arabia, Kazakhstan, China, Mongolia, and Central Asia (Aukema, & Rieger, 1996).



Fig. 8. View of the dorsal (A), ventral (B), and lateral (C) parts of *Centrocoris volxemi* (Puton, 1878)

***Leprosoma tuberculatum* Jakovlev, 1874**

Genus *Leprosoma* Baerensprung, 1859

**Distribution in Uzbekistan.** Bukhara region (Gazli desert), 29 May 1927, 1♀ (no author), Box No. 24, ID: HIM000390 Collection of Zoological Institute of Uzbekistan (Fig. 9).

**General distribution.** Southern Russia, Turkey, Azerbaijan, Afghanistan, Iran and Central Asia (Aukema & Rieger, 1996).

***Irochrotus turanicus* Kerzhner, 1976**

Genus *Irochrotus* Amyot & Serville, 1843

**Distribution in Uzbekistan.** Surkhandarya region, Derband, Navoi region, Zarafshan desert (Aukema, & Rieger, 1996).

*General distribution.* Caucasus and Central Asia: Iran, Russia (southern regions), Kazakhstan (Asian part), Kyrgyzia, Tajikistan, Turkmenistan, Turkey (Anatolia) and Uzbekistan (Ghahari et al., 2014).

*Host plant.* Under *Acantholimon* (Plumbaginaceae) (Hoberlandt, 1997).



**Fig. 9.** View of dorsal parts of *Leprosoma tuberculatum* Jakovlev, 1874

***Promecocoris (Emphylocoris) testaceus* (Reuter, 1900)**

= *Emphylocoris testaceus* Reuter, 1900; = *Promecocoris ceratocranoides* Popov, 1964.

Genus *Promecocoris* Puton, 1886

*Distribution in Uzbekistan.* No locality was cited (Aukema & Rieger, 1996).

*General distribution.* Turkey, Armenia and Central Asia (Gapon, 2007).

***Psacasta exanthematica conspersa* Germar, 1839**

= *Psacasta conspersa* Germar, 1839; = *Scutellera albopunctata* Krynicki, 1871; = *Psacasta exanthematica* var. *minor* Puton, 1881; = *Psacasta cercinthe* var. *argillacea* Horváth, 1889; = *Psacasta affine* Reuter, 1900; = *Psacasta exanthematica* var. *antennata* Halászfy, 1954.

Genus *Psacasta* Germar, 1839

*Distribution in Uzbekistan.* No locality was cited (Aukema & Rieger, 1996).

*General distribution.* Balkan Region, Russia, Ukraine, the Caucasus, Central Asia, and Kazakhstan (both European and Asian parts), extending to Siberia (Ghahari et al., 2014).

Thus, the list of rare species among true bugs of Uzbekistan includes *Stenolemus bogdanovii* from the family Reduviidae (Oshanin, 1871), *Holotrichius mesoleucus* (Kiritchenko, 1914), *Reduvius fedtschenkianus* (Oshanin, 1871); *Cercinthus lehmanni* from the family Coreidae (Kolenati, 1891), *Centrocoris volkhemi* (Puton, 1878); from the family Scutelleridae *Irochrotus turanicus* (Kerzhner, 1976), *Promecocoris testaceus* (Reuter, 1900), *Psacasta exanthematica conspersa* (Germar, 1839), *Leprosoma tuberculatum* (Jakovlev, 1874), *Phyllomorpha lacerata* (Herrich-Schäffer, 1835); *Dictyla platyoma* (Fieber, 1861) from the family Tingidae *Prostemma sanguineum* (Rossi, 1790) and *Nabis (Aspilaspis) pallidus* from the Nabidae family was found to consist of a total of 13 species.

## Discussion

The fauna of the suborder Heteroptera was thoroughly studied in the literature and during the years 2020–2024. Based on the number and density of the population, it was found that only three species of 13 true bugs, such as *Reduvius fedtschenkianus*, *Holotrichius mesoleucus*, and *Cercinthus lehmanni*, are distributed in natural and anthropogenic areas. Also, the specimens of the following rare species: *Prostemma sanguineum*, *Stenolemus bogdanovii*, *Reduvius fedtschenkianus*, *Holotrichius mesoleucus*, *Cercinthus lehmanni*, *Centrocoris volkhemi*, *Phyllomorpha lacerata* and *Leprosoma tuberculatum* are kept in the collection of the Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan. Examples of such species as *Dictyla platyoma*, *Nabis pallidus*, *Irochrotus turanicus*, *Promecocoris testaceus* and *Psacasta exanthematica conspersa* are not available in the collections of Uzbekistan but are cited in foreign literature.

The Red Book of the Republic of Uzbekistan includes three species of true bugs, such as *Reduvius fedtschenkianus* Oshanin, 1871; *Stenolemus bogdanovi* Oshanin, 1896; *Cercinthus lehmanni* Kolenati, 1891. During the monitoring period, the occurrence levels of *Reduvius fedtschenkianus* and *Cercinthus lehmanni* from these species were evaluated. It was found that the population of *Reduvius fedtschenkianus* has increased compared to previous periods. Therefore, it was recommended to change its status in the Red Book of Uzbekistan from 2 (VU: R) to 3 (NT). Despite our 5-year search for the species *Stenolemus bogdanovi* Oshanin, 1896, no larvae or imagoes were found. In general, information on the bioecological characteristics of this species is hardly found in the literature. There is also a possibility that *Stenolemus bogdanovi* may have completely disappeared in Uzbekistan. In the future, it will be necessary to carry out large-scale scientific research on this species. Based on the results of our research, we recommend changing the status of *Stenolemus bogdanovi* from VU: R (vulnerable: declining) to EN (endangered) in the next edition of the Red Book. Also, during the monitoring of true bugs, it was observed that the frequency of observation of *Reduvius carinatus*, *Reduvius ciliatus*, *Vachiria deserta*, *Coranus subapterus*, and *Holotrichius apterus* species was very low. Further research is also required for the study of these species. If there is no increase in the population of these species in the near future, they should be included in the list of species in need of protection.

## Conclusion

To date, the decrease and extinction of insects on our planet are mainly due to environmental factors related to the change or destruction of their habitats, i.e., biotopes. This is especially true for species that are highly adapted to life in certain conditions or that are associated with the development of any type of plant. Also, the results of the conducted research may serve as a basis for the development and practical use of the cadastral system for the preservation and sustainable development of the biological diversity of true bugs.

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