

DISTRIBUTION OF ASSASSIN BUGS (HETEROPTERA: REDUVIIDAE) STUDIED UNDER THE CONDITIONS OF UZBEKISTAN ACROSS DIFFERENT LANDSCAPES

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Abstract

This article presents the results of a comparative analysis of the biodiversity, ecological characteristics, and distribution of assassin bugs belonging to the family Reduviidae studied in Uzbekistan, based on literature sources. An analysis of scientific literature from various regions of the republic for the period 1916–2024, as well as field studies conducted in 2024–2025 in Kashkadarya and Surkhandarya provinces, revealed that representatives of Reduviidae possess a wide ecological range in the southern regions. During the study, 4 subfamilies, 11 genera, and 17 species of this family were recorded in mountain, foothill, desert, and agrobiosenosis landscapes. Literature analysis also showed that comprehensive studies on the fauna and ecology of Reduviidae in Southern Uzbekistan remain insufficient. As a result of this study, an updated checklist of assassin bug species recorded in the territory of Uzbekistan was compiled.

Keywords: Heteroptera, assassin bugs, family, genus, species, mountains, desert, agrobiosenosis, landscape.

Introduction

Among insects (Insecta), one of the most widely distributed, morphologically and ecologically diverse orders is the true bugs-Hemiptera: Heteroptera. According to Henry (2017), the infraorder Heteroptera Latreille, 1810 currently includes about 100 families, 6 000 genera, and 45 000 species worldwide. Although species belonging to this group share similarities in their developmental stages and general life history, they differ significantly in their morphophysiological characteristics, ecological interactions, and trophic relationships (Hemala, 2022).

Within this group, members of the family Reduviidae (assassin bugs) are highly adapted to predatory strategies, and many of them are cosmopolitan species (Aukema, 1996). However, their species richness is greatest in tropical and subtropical biogeographical regions. Assassin bugs possess a unique diversity, broad distribution, and distinct ecological groupings. In ecosystems, they play an important role in maintaining natural balance by regulating populations of other arthropods, which makes them valuable both scientifically and practically (Putshkov, 2009).

Species of the family Reduviidae are highly adapted to predation, and many are considered



cosmopolitan. Nevertheless, they are most abundant in tropical and subtropical zones. As entomophagous organisms, they act as natural bio-aggressors within agroecosystems (Aukema, 1996). Adults and late-instar nymphs exhibit high daily hunting activity, consuming up to 50–60 pest arthropods per day, including spider mites (Tetranychidae), aphids (Aphididae), and thrips (Thysanoptera), which are among the major agricultural pests. In some cases, they may also attack small vertebrates, demonstrating their broad trophic spectrum and high adaptive potential (Putshkov, 2009).

The potential of assassin bugs as biological control agents and their use in integrated pest management systems within agroecosystems has not yet been fully explored, making research in this area highly relevant.

Although assassin bugs remain relatively understudied, significant progress has been made in understanding their systematics, biology, ecology, and zoogeographical patterns in the Palaearctic region. In his monograph *Fauna of Ukraine* (Putshkov, 1987), P.V. Putshkov reported over 1,000 genera and 7,500 species belonging to 29 subfamilies of Reduviidae.

In Uzbekistan, studies on assassin bugs have been conducted by Y.A. Popov (1966), A.G. Davletshina (1979), L.B. Kulumbetova (1999), A.Sh. Khamraev (2003), L.A. Ganjayeveva (2021), J.K. Abdullayeva (2024), as well as G.S. Mirzayeva, M.J. Medetov, D.M. Musayev, and A.G. Akhmedov (2021–2024). According to a comparative review of the literature, a total of 51 species of Reduviidae have been recorded from various regions of Uzbekistan between 1916 and 2024 (Valiyeva, 2025).

Despite these findings, comprehensive ecological and entomological studies on the fauna and ecology of assassin bugs (Heteroptera: Reduviidae) in Southern Uzbekistan have not yet been conducted. Their bioecological characteristics, trophic relationships, distribution patterns across regions and biotopes, as well as the species composition specific to Southern Uzbekistan, remain insufficiently studied. Therefore, scientific investigations were carried out to examine the fauna, distribution, and ecological features of the family Reduviidae in various regions of Southern Uzbekistan.

Materials and Methods

The research was conducted during 2024–2025 in various regions of Southern Uzbekistan. The methodological approaches were based primarily on the techniques developed by A.N. Kirichenko (1951), I.M. Kerzhner (1964), R.B. Asanova and B.V. Isakov (1977), and V.B. Golub et al. (2012). During fieldwork, an entomological sweep net and light traps were used for collecting specimens of assassin bugs. For species identification based on morphological characteristics, the taxonomic keys of P.V. Putshkov (1987) and P.A. Esenbekova (2013) were utilized.

Species-level identification of the collected assassin bugs was carried out in the Entomology Laboratory of the Institute of Zoology, Academy of Sciences of Uzbekistan. Collected biomaterial samples were sorted for subsequent preservation and study. Processing of the specimens was performed under laboratory conditions using binocular microscopes, forceps, preparation needles, and Petri dishes. The samples were examined under MBS-9 or SMZ-161-TL binocular microscopes placed in Petri dishes. The external morphology and body structure of the insects were photographed using a Canon EOS 1200D digital camera.

Results and Discussion

In our research, comparative analyses were conducted on the distribution of assassin bugs across various regions of Uzbekistan during 1916–2024, as well as on specimens collected from different biotopes of the southern parts of Kashkadarya and Surkhandarya provinces in 2024–2025. Additionally, the species identified in our study areas were compared with the results of previous research conducted by other scientists across Uzbekistan. These include the works of Y.A. Popov (1966) in the Western Tien Shan, A.G. Davletshina (1979) in the Kyzylkum Desert, L.B. Kulumbetova (1999) and J.K. Abdullayeva (2024) in the Republic of Karakalpakstan, A.Sh. Khamraev (2003) in the Khorezm Province, L.A. Ganjayeva (2021) in the Lower Amudarya region, as well as the studies carried out by G.S. Mirzayeva, M.J. Medetov, D.M. Musayev, and A.G. Akhmedov (2021–2024) in different regions of Uzbekistan. The aim was to determine the similarity rate between our identified species and those preserved in collections, as well as to compare their distribution across biotopes.

According to comparative analyses of assassin bugs (Heteroptera: Reduviidae) across various biotopes of Uzbekistan, 51 species of this family have been recorded in the country's entomofauna. In particular, during the 1957–1966 faunistic and zoogeographical studies of Central Asian insects, Y.A. Popov documented 24 species belonging to 6 subfamilies of Reduviidae in the insect fauna of the Western Tien Shan mountain ranges—Karatau, Karjantau, Ugam-Chatkal, Pskam, and the Fergana Range. A.G. Davletshina (1979), in her research on the entomofauna of the Southwestern Kyzylkum Desert, reported 11 species representing 4 subfamilies of Reduviidae.

During 1998–1999, L.B. Kulumbetova, in her study of the insect fauna of the Southern Aral Sea region within the Republic of Karakalpakstan, recorded 4 species of assassin bugs. According to A.Sh. Khamraev (2003), 13 species of Reduviidae were identified during comprehensive studies of the entomofauna of Khorezm Province and the Republic of Karakalpakstan. In 2010–2021, L.A. Ganjayeva's research on the fauna, morphology, and ecological characteristics of Heteroptera in the Lower Amudarya region documented 15 species of assassin bugs. Assessment of the biodiversity and taxonomic structure of assassin bugs in the Southern Aral Sea region by J.K. Abdullayeva (2021–2024) revealed 24 species belonging to the family Reduviidae. Furthermore, within the framework of the research program “Heteroptera of Uzbekistan” conducted in 2021–2024, 25 species representing 11 genera of Reduviidae were identified.

Based on the results of our study on the distribution of assassin bugs across biotopes of Southern Uzbekistan—including mountain, foothill, agrobiosenosis, and desert landscapes—17 species belonging to 4 subfamilies and 11 genera were recorded from various regions of Southern Uzbekistan during 2024–2025 (Table 1).

Table 1 Taxonomic composition of Reduviidae recorded in Southern Uzbekistan

Subfamilies	Genera	Species
Reduviinae	Reduvius	Reduvius elegans
		Reduvius pallipes
		Reduvius testaceus
	Holotrichius	Holotrichius apterus
	Pasira	Pasira basiptera
Harpactorinae	Rhynocoris	Rhynocoris iracundus
		Rhynocoris monticola
		Rhynocoris abramovii
	Coranus	Coranus aegyptius
		Coranus griseus
	Nagusta	Nagusta goedelii
Peiratinae	Ectomocoris	Ectomocoris ululans
	Peirates	Pirates hybridus
Stenopodainae	Oncocephalus	Oncocephalus plumicornis
		Oncocephalus termezanus
	Stirogaster	Stirogaster fausti
	Pygolampis	Pygolampis bidentata
4	11	17

Within the framework of our scientific research, the distribution of predatory true bugs recorded in various regions of Uzbekistan during 1916–2024, as well as their occurrence in different landscapes of the southern part of the country — the Kashkadarya and Surkhandarya regions — during 2024–2025 (mountain and foothill areas, desert and semi-desert zones, and agrobiocenoses) was investigated.

According to the overall analysis of the collected data, the distribution of 51 species of predatory bugs belonging to the family Reduviidae identified from different regions of Uzbekistan is as follows: in mountain and foothill landscapes — 26 species (51%), in agrobiocenoses — 21 species (41.2%), in desert and semi-desert areas — 22 species (43.1%).

These results demonstrate that the distribution of predatory bugs varies significantly across landscapes depending on their ecological groups (Table 2, Figure).


Table 2. Distribution of Reduviidae Species in Uzbekistan by Landscape Type

№	Species	Mountain and foothill areas	Desert and semi-desert zones	Agrobiocenosis
1.	<i>Ectomocoris quadrimaculatus</i>	+	-	-
2.	<i>Ectomocoris ululans</i>	+	+	+
3.	<i>Peirates hybridus</i>	+	-	+
4.	<i>Empicoris culiciformis</i>	+	+	+
5.	<i>Oncocephalus brachymerus</i>	-	+	+
6.	<i>Oncocephalus plumicornis</i>	-	+	-
7.	<i>Oncocephalus pilicornis</i>	-	+	-
8.	<i>Oncocephalus termezanus</i>	-	+	-
9.	<i>Oncocephalus impictipes</i>	-	-	+
10.	<i>Stenolemus bogdanovii</i>	-	+	+
11.	<i>Pygolampis bidentata</i>	+	+	-
12.	<i>Vachiria deserta</i>	+	+	-
13.	<i>Vachiria semerwvi</i>	+	+	-
14.	<i>Vachiria insignis</i>	-	+	-
15.	<i>Coranus angulatus</i>	-	-	+
16.	<i>Coranus aegyptius</i>	+	-	-
17.	<i>Coranus subapterus</i>	+	+	+
18.	<i>Coranus griseus</i>	+	-	-
19.	<i>Rhynocoris annulatus</i>	-	+	-
20.	<i>Rhynocoris niger</i>	+	+	-
21.	<i>Rhynocoris abramovii</i>	-	+	-
22.	<i>Rhinocoris kiritshenkoi</i>	+	-	-
23.	<i>Rhinocoris (s.str.) sordidulus</i>	+	-	-
24.	<i>Rhynocoris monticola mollticola</i>	+	-	-
25.	<i>Rhinocoris (s.str.) monticola</i>	+	-	-
26.	<i>Rhinocoris (s.str.) monticola f. jucunda</i>	+	-	-
27.	<i>Rhinocoris (s.str.) monticola trochanthericus</i>	+	-	-
28.	<i>Rhynocoris iracundus</i>	+	-	+
29.	<i>Rhinocoris nigronitens</i>	-	-	+
30.	<i>Holotrichius apterus</i>	-	-	+
31.	<i>Holotrichius sp.</i>	-	-	+



32	<i>Holotrichius moestus</i>	-	+	+
33	<i>Holotrichius mesoleucus</i>	-	+	+
34	<i>Reduvius testaceus</i>	+	-	+
35	<i>Reduvius semenovi</i>	-	-	+
36	<i>Reduvius fedtschenkianus</i>	+	+	-
37	<i>Reduvius christophi</i>	-	-	+
38	<i>Reduvius elegans</i>	-	-	+
39	<i>Reduvius disciger</i>	-	-	+
40	<i>Reduvius pallipes</i>	+	-	-
41	<i>Reduvius ciliatus</i>	+	+	-
42	<i>Reduvius carinatus</i>	-	+	-
43	<i>Reduvius personatus</i>	-	-	+
44	<i>Ploiariola culiciformis</i>	+	-	-
45	<i>Metapterus linearis</i>	+	-	-
46	<i>Mecistocoris lineatus</i>	+	-	-
47	<i>Pasira basiptera</i>	+	-	+
48	<i>Prostemma sanguineum</i>	-	+	-
49	<i>Stirogaster fausti</i>	-	+	-
50	<i>Zelus renardii</i>	-	-	+
51	<i>Nagusta goedelii</i>	-	-	+
Total		26	22	23

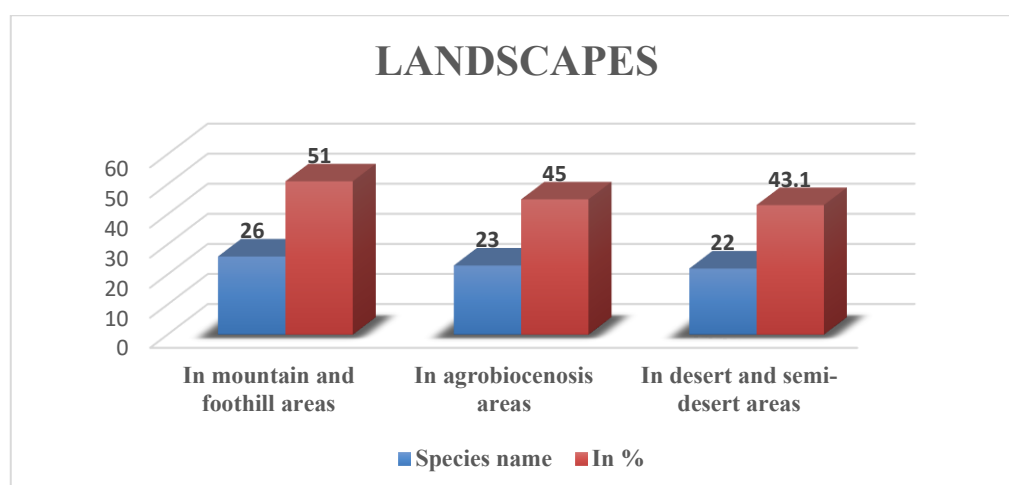


Figure. Figure. Distribution (%) of Reduviidae Species by Landscape in Uzbekistan

Conclusion

The analysis of literature and field data indicates that the biodiversity, ecological characteristics, and biotope distribution of Reduviidae in Southern Uzbekistan have been insufficiently studied. Records from 1916–2024, combined with field investigations in 2024–2025, confirm that Reduviidae occupy a broad ecological range in the southern regions.

During the study, 17 species belonging to 11 genera and 4 subfamilies of predatory bugs were identified across mountain, foothill, desert, and agro-biosenosis biotopes of Southern Uzbekistan, highlighting the significant role of these insects in the regional entomofauna. The predatory activity of these bugs, their natural regulation of pest populations, broad trophic spectrum, and high adaptive potential make them promising biological control agents in agroecosystems.

However, the literature review revealed that, until now, comprehensive ecological and entomological studies on the fauna and ecology of Reduviidae in Southern Uzbekistan have not been conducted. Based on the comparative analysis, an updated checklist of Reduviidae predatory bugs studied in the conditions of Uzbekistan has been compiled.

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