



UDC 595.7:591.5(575.172)

FAUNISTIC COMPOSITION AND ECOLOGICAL FEATURES OF INSECTS WITH INCOMPLETE METAMORPHOSIS (INSECTA: HEMIMETABOLA) OF THE NORTH-WESTERN KYZYLKUM

Yusupova Asya Zhubatkhanovna

Assistant Lecturer, Berdakh Karakalpak State University, Republic of Uzbekistan

ABSTRACT

The article presents the results of studies on the fauna of insects with incomplete metamorphosis (Hemimetabola) in the Northwestern Kyzylkum. The species composition, taxonomic structure, distribution patterns, and ecological characteristics of representatives of various orders were investigated. During the research, 58 insect species belonging to 27 families and 7 orders were identified. The greatest species diversity was recorded among true bugs (Hemiptera) and grasshoppers and crickets (Orthoptera). It was established that the formation of the insect fauna is determined by arid climatic conditions, vegetation cover, and the degree of anthropogenic impact. The obtained data are of significant importance for biodiversity monitoring of desert ecosystems and for the development of conservation measures aimed at protecting rare insect species.

KEY WORDS: Hemimetabola, insect fauna, Northwestern Kyzylkum, biodiversity, insect ecology, desert ecosystems.

INTRODUCTION

The desert ecosystems of Central Asia are characterized by a high level of adaptation of living organisms to extreme environmental conditions. Among the components of terrestrial ecosystems, insects play an important role as pollinators, phytophages, detritivores, and food resources for vertebrate animals. The Northwestern Kyzylkum is a unique natural region located between the lower reaches of the Amu Darya River and the southern margins of the Ustyurt Plateau. This territory is characterized by a sharply continental climate, high aridity, considerable seasonal temperature fluctuations, and limited water resources. Despite the ecological importance of the region, the fauna of insects with incomplete metamorphosis remains insufficiently studied. Representatives of the Hemimetabola group play a vital role in the functioning of desert ecosystems. Many species are indicators of environmental conditions, participate in food chains, and have a significant impact on plant communities. The aim of this study was to investigate the faunal composition and ecological characteristics of incompletely metamorphosed insects in Northwestern Kyzyl Kum.

MATERIALS AND METHODS

The studies were conducted from 2023 to 2025 in the Northwestern Kyzylkum region within the territory of Karakalpakstan. Survey routes covered sandy, clayey, and saline habitats, as well as saxaul (*Haloxylon*) and wormwood

(*Artemisia*) plant communities. Insects were collected using standard entomological methods, including sweep-net sampling, hand collecting, pitfall traps, and light traps operated during evening and nighttime hours. Species identification was carried out using insect identification guides for Central Asia and modern taxonomic references. For each recorded species, the ecological group, feeding habits, and habitat preferences were determined. The collected material was analyzed using comparative faunistic methods, including the calculation of the relative abundance of individual taxa and an assessment of their role in the structure of the entomofauna of the study area.

RESULTS AND DISCUSSION

During the conducted studies in the Northwestern Kyzylkum, 46 species of insects with incomplete metamorphosis (Hemimetabola) were recorded, belonging to 22 families, 38 genera, and 4 orders. Analysis of the taxonomic structure revealed an uneven distribution of species diversity among the different orders (Table 1).

The order Hemiptera was the richest in species composition, comprising 21 species, which accounted for 45.7% of the total number of recorded species. The second highest species diversity was observed in the order Orthoptera, represented by 14 species (30.4%). Representatives of the order Odonata included 7 species (15.2%), whereas the order Mantodea was represented by 4 species (8.7%).

Table 1

Taxonomic Structure of Insects with Incomplete Metamorphosis in the Northwestern Kyzylkum

Squad	Family	Genus	Species	Proportion of species, %
Hemiptera	10	18	21	45,7
Orthoptera	6	11	14	30,4
Odonata	4	6	7	15,2
Mantodea	2	3	4	8,7
Total	22	38	46	100,0



Among Hemiptera, the most widespread representatives of the families Pentatomidae, Lygaeidae, Miridae, and Reduviidae are found in various types of desert habitats. Among Orthoptera, representatives of the families Acrididae and Tettigoniidae predominate, many of which are characteristic components of the desert ecosystems of Central Asia. Research has shown that insect distribution is closely linked to vegetation patterns. In sandy areas dominated by black saxaul (*Haloxylon aphyllum*), significant numbers of grasshoppers, cicadas, and other xerophilous species were observed. In wormwood-saltwort communities, herbivorous bugs and grasshoppers were more common, using these plants as food and habitat.

Ecological analysis revealed a predominance of species adapted to arid conditions. The fauna consists primarily of xerophilous insects, highly tolerant of moisture deficits and significant temperature fluctuations. Among the recorded species, phytophages, feeding on desert vegetation, predominate. A significantly smaller proportion are predatory forms, represented primarily by assassin bugs (Reduviidae) and praying mantises (Mantidae), as well as species with mixed and saprophagous feeding patterns.

The results obtained indicate that the development of the incompletely metamorphosed insect fauna of Northwestern Kyzylkum is determined by a combination of natural factors, including climatic aridity, vegetation type, and habitat structure. The dominance of representatives of the orders Hemiptera and Orthoptera corresponds to the general patterns of development of the entomofauna of desert areas in Central Asia.

A comparison of the obtained data with research results from other regions of Kyzylkum reveals similarities in the main taxonomic groups and the ecological structure of the communities. However, northwestern Kyzylkum is characterized by a significant presence of xerophilous and psammophilous species adapted to sandy and semi-desert landscapes. These characteristics indicate a high degree of adaptation of the local entomofauna to extreme environmental conditions and highlight the importance of preserving the region's natural ecosystems as habitats for specialized desert species.

CONCLUSION

The conducted research allowed us to characterize the fauna and ecological characteristics of insects with incomplete metamorphosis in Northwestern Kyzylkum. Forty-six species belonging to 22 families, 38 genera, and 4 orders were identified. Representatives of the orders Hemiptera and Orthoptera exhibit the greatest species diversity. It was established that insect distribution is linked to vegetation characteristics and habitat conditions, with saxaul and wormwood-saltwort communities proving the most favorable. The fauna is dominated by xerophilous species adapted to arid conditions. The obtained results demonstrate the important role of Hemimetabola representatives in the functioning of desert ecosystems and maintaining the region's biological diversity. The collected data can be used for further faunistic research, environmental monitoring, and the development of measures to conserve the biodiversity of Northwestern Kyzylkum.

LITERATURE

1. Davletshina A.G., Avanesova G.A., Mansurov A.K. Entomofauna of Southwestern Kyzylkum. – Tashkent: FAN, 1979. – 129 p.
2. Insects of Uzbekistan / Ed. D.A. Azimov. – Tashkent: Fan, 1993. – 340 p.
3. Beneficial and harmful insects of Uzbekistan / Institute of Zoology and Parasitology of the Academy of Sciences of the Uzbek SSR. – Tashkent: Fan, 1973. – 148 p.
4. Yusupova A. Biological characteristics of insects with incomplete metamorphosis (Insecta: Hemimetabola) of the northwestern part of the Kyzylkum desert // EPRA International Journal of Research and Development (IJRD). – 2024. – Vol. 9, Issue 10. – P. 26–27.