

Fauna and Formation of Orthopteroid Insects (Insecta: Orthopteroidea) Ustyurt Plateau

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Abstract The article presents the results of the first studies on the distribution of orthopteroid insects of the main order Orthopteroidea of 6 orders of 14 families, 81 species belong to 57 genera in the Ustyurt plateau. Among those listed above, one species for the fauna of Uzbekistan and one genus and species for the Ustyurt plateau were noted for the first time. One genus of grasshoppers (*Bicolorana*) and one species - *Bicolorana bicolor* (Philippi, 1830) were identified in the eastern part of the Ustyurt eastern chink, one species of locust *Chorthippus angulatus* Serg. Tarbinsky was identified in the southern part of Ustyurt, which is found mainly in natural landscapes on reed beds. Locust species differ in body structure, adapted to inhabit the station of cereal plants where they feed on herbaceous plants. The peculiarities of the distribution, biology and ecology of orthopteroid insects in Uzbekistan, especially in the Ustyurt Plateau, have not been sufficiently studied, which dictates the need for comprehensive research.

Keywords Insects, Orthopteroids, Ustyurt plateau, Grasshoppers, Dragonflies, Mantises, Biology and ecology of insects

1. Introduction

There are more than 30 thousand known in the world species of orthopteroid insects, of which 520 are found in Central Asia (Pravdin, 1978). Representatives of this order play an important role in nature; they are essential in maintaining ecological balance, transforming plant biomass and are an important link in the formation of populations of insectivorous animals. In addition, they are one of the important bio-diagnostic elements reflecting changes occurring in natural and soil-climatic conditions.

Some representatives of the order (Orthoptera), Real locusts (Acridoidea) for example: migratory locusts, is an important laboratory object of study in biochemistry and physiology. Some species of erect-winged are considered serious pests of agricultural crops, pastures and they can cause enormous harm if control over them is weakened [1,2]. From this point of view, the study of fauna, bio ecology of the orthopteroid species of Ustyurt plateau and improvement of pest monitoring methods are of great importance. Despite the numerous studies conducted on the study of the Republic's erect wings, the main works aim at generalizing data considering the background of the Central Asian region. As a result, the species composition of the orthopteroid insects of Ustyurt plateau has not yet been established.

2. Materials and Methods

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The collection of orthopteroid material, the definition of species, ecological and geographical analysis were carried out according to M.F. Pravdin (1978), A.V. Lachininsky et al. (2001). Field experiments were conducted according to B.A. Dospekhov (1985). Statistical processing of the obtained data was carried out using the computer program "Microsoft Office Excel 2007".

Work on the study of orthopteroid insects was carried out during 2017-2019 on stationary areas and along planned routes. Biomaterials were collected from samples of orthopteroid insects of natural landscapes on the Kungrad-Beineu highways, research biostations of Ustyurt territories, in chink parts and near Lake Sarykamys. All collected samples were processed in the Entomology laboratories of the Academy of Sciences of the Republic of Uzbekistan. When determining the taxonomic status of insects for locusts, the determinant "Locusts of Kazakhstan, Central Asia and adjacent territories" was used [3,4], and for determining grasshoppers and crickets - "Peculiarities of distribution of straight-winged insects of Northern Asia" [5,6,7]. Insects were collected mainly during the day (mainly at dawn) with special nets. They were fixed with ammonia in special envelopes [8].

3. Results

For the present time, information about the insect fauna of the Ustyurt plateau has not been studied enough. Studies have shown that the analysis of insect samples collected from the Ustyurt plateau revealed the distribution of 6 orders of 14 families, 16 subfamilies and 81 species and subspecies

belonging to 57 genera of orthopteroid insects of the Ustyurt plateau. The number of species, their taxonomic status and distribution in the Ustyurt plateau were identified. They include 1 genus, 1 species, from the family of cockroaches, termites (Blattidae), (Ectobiidae), (Hodotermitidae), 5 genera and 5 species from the order of mantis family (Mantidae), 1 genus and 1 species from the family (Empusidae), 1 genus and 1 species of leatherbats family (Labidurida), 1 generation and 2 species of the stick insect family (Diapheromeridae), 7 species belonging to 5 genera of straight-winged grasshoppers (Tettigoniidae), 5 species belonging to 5 genera of crickets (Grylloidea), 1 species belonging to 1 genus of bear plant (Gryllotalpidae), 1 species belonging to 1 genus of hoppers (Tetrigidae), 2 species belonging to 2 genus of pyrgomorphids (Pyrgomorphidae), 6 species belonging to 3 genus of pamphigids (Pamphigidae) and 47 species belonging to 29 genus of true locusts (Acrididae) and subspecies of the fauna of the studied territory. One genus (*Bicolorana*) and one species of grasshoppers - *Bicolorana bicolor* (Philippi, 1830), one species of locust *Chorthippus angulatus* Serg. Tarbinsky, were found in the Ustyurt plateau which is for the first time for the fauna of Uzbekistan.

Place and time of collection: Northern Ustyurt, Eastern Chink on lucerne. Coordinates N 44°08'03.4., E 058°23'00.7., (2♀.1L. 22.07.2019 r).

The species is distributed in Europe, Russia, Kazakhstan, Turkey, Uzbekistan.

The habitat is the Palearctic. The type is north steppe trans-Palearctic. In life, they are specialized phytophiles living on plants. A very rare species. They are predators, rarely feed on flowers and fruits, food specialization is weak.



Figure 1. *Bicolorana bicolor* (Philippi, 1830), North Ustyurt, Eastern chink, 2♀.1L. 22.07.2019 (original photo)

Its habitat is the Southern Ustyurt, reed thickets, the coordinates of detection are N 42°36'8.64", E 56°16'51.78"., 2♀.1♂. 15.08.19.

The species is widespread in Kazakhstan, Kyrgyzstan and Uzbekistan. It is distributed in deserts. It is a Central Asian type. In terms of nutrition, they are hortobionts. Rare species.

A comparative analysis of the fauna of orthopteroids of Ustyurt with other regional species and with other territories – the Kyzylkum desert, the lower reaches of the Amu Darya delta and the territory of Southern Uzbekistan was done. The

degree of similarity of orthopteroids in the fauna selected for comparison is determined using the similarity coefficient P. Jaccard, cluster analysis was also carried out [9].



Figure 2. *Chorthippus* (s. str.) *angulatus* Serg. Tarbinsky 1927, Southern Ustyurt 2♀.1♂. 15.08.19

The fauna of this territory is considered to have a high level of biodiversity. Fauna of the orthopteroids of Ustyurt and indicators of similarity of biological diversity are compared with other different territories such as the Kyzylkum desert, the Lower Delta of the Amu Darya and Southern Uzbekistan.

Cluster analysis of the similarity of the fauna of orthopteroid insects in the region showed similarity with the fauna of the Kyzylkum Desert, the Lower Delta of the Amu Darya and Southern Uzbekistan.

This is due to the fact that they are geographically close to each other and have a common basic genesis. A high degree of similarity due to the desert species of Central Asia correspond to the families Acrididae, Tettigoniidae, Mantidae. In the fauna of the Ustyurt plateau and the Kyzylkum desert, the main share is made up of species belonging to the generations of Sphingonotus, Calliptamus, Dericorys, Thrinchus, Melanogryllus, Platycleis, which are characteristic of the desert and semi-desert areas of Central Asia and Kazakhstan. Among the species common to all four regions compared, a certain place is occupied by species belonging to the class of areas of the Ancient Mediterranean, Palearctic and Holarctic.

Of the species belonging to the fauna of Ustyurt, only 9 species (*Severinia turcomaniae*, *Melanogryllus desertus*, *Eremogryllodes semonovi*, *Dericorys annulata roseipennis*, *Sphingonotus nebulosus discolor*, *Sphingonotus eurasius eurasius*, *Eremippus comatus*, *Mesaspippus kozhevnikovi kozhevnikovi*, *Chorthippus* (s. str.) *angulatus*), which make up 11.1%, are characteristic of Southern Ustyurt. Of the total number of species of the Central Ustyurt, only four species (*Chrotogonus turanicus*, *Sphingonotus salinus*, *Dociostaurus tartarus*, *Kazakia tarbinskyi*) make up 4.9%.

4. Conclusions

81 species and subspecies of orthopteroid insects from 6 families and 57 genera have been identified in the Ustyurt

plateau. Of these, 1 genus and 2 species and subspecies are noted for the first time in the fauna of the studied region. As a result of the conducted research, the number of species for the fauna of Ustyurt increased from 34 to 81, and genera from 21 to 57, thus, the faunal data of the region are enriched. For the first time for the fauna of the Ustyurt plateau, a species of grasshopper (*Bicolorana bicolor* (Philippi, 1830), a species of locust (*Chorthippus* (s. str.) *angulatus* Serg. Tarbinsky 1927) are indicated for the first time for the fauna of Uzbekistan.

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