

# THE ORTHOPTERA FAUNA (INSECTA: ORTHOPTERA) OF KASHKADARYA PROVINCE

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**ABSTRACT:** 71 Orthoptera species belonging to 50 genera and four families were identified in various landscapes in Kashkadarya region. 31 species were recorded in natural landscapes and 40 species in agrocoenoses.

**Keywords:** Orthoptera, fauna, Insecta, Kashkadarya province, natural landscapes, agrocoenoses.

## INTRODUCTION

Orthoptera insects rank among the most important dwellers of the grass layer. They can consume a considerable portion of phytomass and are included in the diets of a number of vertebrate and invertebrate animals. All this makes Orthoptera an essential component in a wide range of ecosystems, and their presence is absolutely necessary for the maintenance of biological equilibrium. Therefore, to specify the current status and role of Orthoptera insects in natural ecosystems and agrocoenoses in various regions throughout Uzbekistan is highly important from the scientific and practical aspect. Ergashev (1985) and Gapparov (2002) studied the species composition of Orthoptera in the Karshi steppe and the role of destructive Acrididae species. However, no comprehensive research has been made into the fauna of the insects in question in Kashkadarya province so far.

### **Materials and methods:**

Orthoptera insects were studied between April and August in 2016-2017. The following sites were inspected for Orthoptera insects: alfalfa fields, orchards, vineyards, mulberry plantations, legume fields, melon and watermelon fields, saxaul populations, steppes, mountains, and elevated areas of various kinds. Collecting the insects we used GPS to determine the coordinates of our routes.

The collection of Orthoptera was based on the standard method developed by Pravdin (1978). We agreed on the following abbreviations to specify the abundance of a species: sg – single individuals (1-3 inds. collected per 1 hour); rr – rare species (4-10 inds./h); cn – common species (11-20 inds./h); ab – abundant species (21-100 inds./h), which, however, does not swarm.

### **Results and discussion:**

Information on the sites and short characteristics of the quantitative values of collected individuals of Orthoptera species are provided in Table 1. In Guzar District the insects were collected in 8 different sites, in Mubarak and Kitab Districts – in 3 sites in each, and in Karshi and Dehkanabad Districts – in 2 sites in each district. Each site was located at some distance from the others. We determined the quantity of collected insects (males, females and larvae). We also specified their species composition.

Based on the analysis of the obtained data we determined that in the course of the research we collected a total of 1,260 insects (Table 1). They comprised 657 females (52.1%), 383 males (30.4%) and 220 larvae (17.5%). The ratio of females to males was (1.7:1.0). Larvae predominate in spring collections.

Table 1. Collection sites, time and conditions and quantitative values for Orthoptera

No.	Administrative unit (district)	No. <sup>1</sup>	Collection date	Quantity of collected insects per hour				Number of species
				♀	♂	L	Total	
1	Mubarak	1	21 April	7	5	14	26	9
2	Mubarak	1	18 June	29	14	6	49	14
3	Mubarak	1	28 August	58	42	3	103	16
4	Guzar	2	21 April	12	7	22	41	9
5	Guzar	2	18 June	40	20	5	65	14
6	Guzar	2	28 August	72	44	3	119	16
7	Guzar	2	18 June	43	38	33	114	16
8	Guzar	2	28 August	65	49	15	129	20
9	Guzar	3	18 June	32	27	2	61	12
10	Dehkanabad	3	18 June	25	15		40	8
11	Dehkanabad	4	18 June	16	7	1	24	11
12	Kitab	5	23 June	37	29	5	71	16
13	Kitab	6	23 June	26	13	10	49	19
14	Kitab	4	24 June	35	14	3	52	16
15	Kamashi	7	23 June	26	15	8	49	18
16	Guzar	8	29 April	15	8	19	42	15
17	Guzar	8	24 June	30	24	3	57	21
18	Karshi	9	28 April	5	1	22	28	7
19	Karshi	9	24 June	30	11		41	9
20	39°27'04.6	10	20 April	8	4	33	45	9
21	39°27'04.6	10	17 June	25	8	2	35	12
22	39°27'04.6	10	27 August	21	8	5	34	11

**Note:** 1 – alfalfa fields, 2 – orchards, 3 – elevated areas, 4 – mountains, 5 – vineyards, 6 – mulberry plantations, 7 – mung bean fields, 8 – melon and watermelon fields, 9 - desert, 10 – saxaul populations.

The collections made in 24-26 April showed that in spring larvae comprise over half of all insects. Their development into adult forms results in the decrease of the number of larvae in summer. Larvae of species that breed several times a year were encountered in the summer period as well. The abundance of Orthoptera was not the same in all the sites we studied. The largest number of individuals collected per hour (129 inds.) was recorded in an orchard in Guzar District on 28 August. About the same quantity was registered in an alfalfa field in Mubarak District. The smallest number of insects (34-35 inds/h) was collected in a saxaul population, the coordinates of which are specified in Table 1.

We established that the insects we collected in Kashkadarya province comprised a total of 68 Orthoptera species (Tables 2 and 3). The analysis of the species composition in Tettigonioidae and Grylloidea from the order Orthoptera inhabiting agrocoenoses and adjacent natural landscapes in Kashkadarya province showed that the agrocoenoses were populated by 15 species and natural landscapes by 4 species. The largest number of species was recorded in orchards (Table 2).

Table 2. The species composition in Tettigonioidae and Grylloidea in agrocoenoses and adjacent natural landscapes in Kashkadarya province.

No	Family, genus and species	Kashkadarya province.								
		*	**	I	2	3	II	2	3	
Family: Tettigonioidae										
1	<i>Tettigonia viridissima</i> L.	+	+		+	+				
2	<i>Tettigonia caudata</i> Charp.	+	+	+	+	+				
3	<i>Conocephalus discolor</i>	+	-							
4	<i>Decticus albifrons</i> P.	+	+		+					
5	<i>Decticus verrucivorus</i>	-	+	+	+	+				
6	<i>Platycleis intermedia</i> Serv	+	+	+	+	+	+			
7	<i>Semenoviana plotnikovi</i>	+	-							
8	<i>Glyphonothus alactaga</i> Miram	-	+			+	+			
Family: Grylloidea										
9	<i>Oecanthus turanicus</i> Uv.	+	+		+	+				
10	<i>Gryllus bimaculatus</i> D	+	+	+		+				
11	<i>Melanogryllus desertus</i>	+	+	+	+	+				
12	<i>Modicogryllus bordigalensis</i>	+	+			+			+	+
13	<i>Modicogryllus pallipalpis</i>	+	+			+				
14	<i>Modicogryllus chivensis</i>	+	-							
15	<i>Gryllodinus kerkennensis</i>	+	+	+	+	+				
16	<i>Velarifictorus bolivari</i> (Uv)	-	+				+		+	
17	<i>Pteronemobius haydeniconcolor</i>	+	-							

18	<i>Pteronemobius gracilius</i>	+	-			
19	<i>Bothriophylax semonovi</i> Mir	+	-			
Family: Gryllotalpidae.						
20	<i>Grullatalpa unispina</i> Sauss.	+	+	+	+	+
21	<i>Grullatalpa grullatalpa</i> L.	-	+	+		+

**Note:** According to N. E. Ergashev (1985)\* and M. Zh. Medetov\*\*. I – Agricultural landscapes (1 – alfalfa fields, mung bean fields; 2 – melon and watermelon fields; 3 – orchards, vineyards and mulberry plantations); II – Natural landscapes (1 – mountains, elevated areas, 2 – steppe, 3 – saxaul population).

Table 3. The species composition and abundance of Acridoidea in agrocoenoses and adjacent natural landscapes in Kashkadarya province.

Family, genus and species		*	**	I			II		
				1	2	3	1	2	3
Family: Tetrigidae.									
1.	<i>Tetrix sudulata</i> Saulcy.	+	+	+	+	+			
2.	<i>Tetrix tartaratarata</i> Saulcy.	+	+	+	+	+			
3.	<i>Tetrix tartara subacuta</i> B.-Bienko.	+	-						
Family: Pyrgomorphidae Brunner									
4.	<i>Pyrgomorpha bispinosa deserti</i> .	+	+	+	+	+	+	+	+
Family: Pamphagidae Burm									
5.	<i>Melanotmethis fuscipennis</i> (Rebt	-	+						+
6.	<i>Asiotmethis heptapotamicus</i> (Zub.)	-	+				+		
7.	<i>Pezotmethis nigrescens</i> (Pyln.)	-	+				+		
8.	<i>Pezotmethistartarus</i> (Sauss.)		+			+	+		
Family: Acrididae MacLeay									
9.	<i>Dericorys albidula</i> Aud.-Serv.	-	+					+	+
10.	<i>Dericorys tibialis</i> (Pall.)	-	+					+	+
11.	<i>Conophyma semenovi semenovi</i> Zub.	-	+				+		
12.	<i>Conophyma sokolovi modestum</i>	+	+				+		
13.	<i>Conophyma sokolovi decorum</i> Mit.	-	+				+		
14.	<i>Diexisvarentzovi</i>	-	+						
15.	<i>Anacridium aegyptium</i> (L.)	+	+				+	+	+
16.	<i>Calliptamus turanicus</i> Serg. Tarb	+	+	+	+	+	+	+	+
17.	<i>Calliptamus italicus italicus</i> (L.)	+	+	+		+			
18.	<i>C. barbarus cephalotes</i> (Costa)	+	+			+			+
19.	<i>Heteracris adspersa</i> (Redt.)	+	+			+			
20.	<i>Heteracris littoralis littoralis</i>	+	+		+	+			
21.	<i>Heteracris pterosticha</i> (F.d.W.)	-	+			+			
22.	<i>Egnatioides desertus desertus</i> Uv.	-	+						
23.	<i>Egnatius apicalis</i> Stal.	-	+						
24.	<i>Atrichotmethis semenovi</i>	+	-						
25.	<i>Acrida oxycephala</i> (Pall.)	+	+	+	+	+			
26.	<i>Truxalis eximia eximia</i> Eichw	+	+	+	+	+			
27.	<i>Duroniella gracilis</i> Uv.	+	+	+	+	+			
28.	<i>Duroniella kalmyka</i> (Ad.)	+	+	+	+				
29.	<i>Aiolopusthalassinus</i> (F.)	-	+		+	+			
30.	<i>Helioscirtus moseri</i> Sauss.	-	+						
31.	<i>Ramburiella foveolata</i> (Tarb.)	+	-	+	+		+		
32.	<i>Ramburiella turcomana</i>	+	+						+
33.	<i>Dociostaurus maroccanus</i>	+	+	+		+	+	+	+
34.	<i>Dociostaurus tartarus</i>	+	+	+		+			
35.	<i>Dociostaurus plotnikova</i> Uv.	+	+					+	+
36.	<i>D. kraussi nigrogeniculatus</i>	+	+				+		+
37.	<i>D. kraussi kraussi</i>	-	+					+	+
38.	<i>Notostaurus albicornis albicornis</i>	+	+						
39.	<i>N. albicornis turcmenus</i> (Uv.)	+	+						
40.	<i>Eremippus prsicus</i>	+	-						
41.	<i>Eremippus simplex simplex</i> (Ev.)	+	+						
42.	<i>Chorthippus biguttulus meridionalis</i>	+	-			+			
43.	<i>Chorthippus biguttulus pamiricus</i>	+	-						
44.	<i>Aiolopusthalassinus</i> (F.)	+	+						
45.	<i>Helithera turanica</i> Uv.	+	+			+			
46.	<i>Locusta migratoria migratoria</i> L.	+	+	+	+	+			
47.	<i>Oedaleus decorus</i> (Germ.)	-	+				+		
48.	<i>Oedaleus senegalensis</i> (Kr.)	-	+				+		
49.	<i>Pyrgodera armata</i> F.d.W.	-	+						
50.	<i>Mioscirtus wagneri wagneri</i>	+	+	+	+				

51.	<i>Oedipoda fedtschenkoi fedtschenkoi</i>	+	-						
52.	<i>Oedipodamiata</i> (Pall.)	+	+			+	+		
53.	<i>Oedipoda caerulescens</i> L.	-	+				+		
54.	<i>Acrotylus subricus inficitus</i>	+	+	+	+	+		+	+
55.	<i>Acrotylus subricus</i> (Scop.)	-	+			+	+	+	
56.	<i>Sph. maculatus maculatus</i> Uv.	+	-						
57.	<i>Sphingonotus halocnemi</i> Uv.	+	+						
58.	<i>Sphingonotus miramae</i>	-	+						+
59.	<i>Sphingonotus nebulosus</i> (F.d.W).	-	+						
60.	<i>Sph. maculatus maculatus</i> Uv.	-	+						
61.	<i>Sphingonotus satrapes</i> Sauss	-	+						
62.	<i>Sph. rubescens rubescens</i>	+	+						
63.	<i>Pseudosphingonotus savignyi</i>	+	+				+		
64.	<i>Sph. nebulosus viclascens</i>	+	-						
65.	<i>Sphingoderus carinatus</i>	+	+	+	+				+

**Note:** According to N. E. Ergashev (1985)\* and M. Zh. Medetov\*\*. I – Agricultural landscapes (1 – alfalfa fields, mung bean fields; 2 – melon and watermelon fields; 3 – orchards, vineyards and mulberry plantations); II – Natural landscapes (1 – mountains, elevated areas, 2 – deserts, 3 – saxaul populations).

The analysis of the species composition of Orthoptera in the orchards of Guzar District showed they are inhabited by 20 species (Table 4). We collected a total of 129 individuals in the site, 65 of which were females, 49 males and 15 larvae.

Table 4. The species composition and number of Orthoptera in orchards (Guzar District, 28 August 2016, inds/h. Coordinates: N 38°39'34.7., E 066°13'28.3).

No.	Species	Imagines, inds.		Larvae, inds.	Total	%
		♀	♂			
1	<i>Tettigonia viridissima</i> L.	3	2		5	3.8
2	<i>Platycleis intermedia</i> Serv.	2	1		3	2.3
3	<i>Melanogryllus desertus</i>	1	2		3	2.3
4	<i>Modicogryllus bordigalensis</i>	1		3	4	3.1
5	<i>Modicogryllus pallipalpis</i>			1	1	0.7
6	<i>Oecanthus turanicus</i> Uv.	5	3		8	6.2
7	<i>Calliptamus italicus italicus</i> (L.)	12	9		21	16.2
8	<i>C. barbarus cephalotes</i> (Costa)	2			2	1.5
9	<i>Pyrgomorpha bispinosa deserti</i> .	5	3	3	11	8.5
10	<i>Acrotylus subricus</i> (Scop.)	4	2	3	9	6.9
11	<i>Locusta migratoria migratoria</i> L.	3	2		5	3.8
12	<i>Acrida oxycephala</i> (Pall.)	4	5		9	6.9
13	<i>Truxalis eximia</i> Eichw	3	4		7	5.4
14	<i>Duroniella gracilis</i> Uv.	6	4		10	7.7
15	<i>Heteracris littoralis littoralis</i>	3	2		5	3.8
16	<i>Heteracris adspersa</i> (Redt.)	1			1	0.7
17	<i>Aiolopusthalassinus</i> (F.).	8	6	3	17	13.1
18	<i>Helithera turanica</i> Uv.	2			2	1.5
19	<i>Dociostaurus maroccanus</i> Thu.	2	3		5	3.8
20	<i>Chorthippus meridionalis</i>		1		1	0.7
Total:		65	49	15	129	100

The data in Table 4 show that the species predominating in orchards are *Calliptamus italicus italicus* (16.2%), *Aiolopusthalassinus* (13.1%), *Pyrgomorpha bispinosa deserti* (8.5%), *Duroniella gracilis* (7.7%). The portion of *Modicogryllus pallipalpis*, *Heteracris adspersa*, *Chorthippus meridionalis* was less than 1%. We also came across species *Locusta migratoria migratoria* and *Dociostaurus maroccanus* from the superfamily Acridoidea, which are regarded harmful and considered to cause great damage to agricultural crops. We recorded 16 Orthoptera species in an alfalfa field in Mubarak District (Table 5).

Table 5. The species composition and number of Orthoptera in an alfalfa field (Mubarak District, 28 August 2016, inds/h. Coordinates: N 39°09'19.9., E 065°23'01.3).

No	Species	Imagines, inds.		Larvae, inds.	Total	%
		♀	♂			
1	<i>Tettigonia caudate</i> Charp.	4	3		7	6.7
2	<i>Platycleis intermedia</i> Serv.	5	1		6	5.8
3	<i>Decticus verrucivorus</i> (Linnaeus)	1			1	0.9
4	<i>Gryllus bimaculatus</i> D	2	3		5	4.8
5	<i>Melanogryllus desertus</i>	7	6		13	10
6	<i>Grullatalpa unispina</i> Sauss.	2			2	1.9
7	<i>Gryllus bimaculatus</i> D	1	1		2	1.9
8	<i>Sphingoderus carinatus</i> (Sauss.)	4			4	3.8
9	<i>Dociostaurus maroccanus</i> (Thn)	8	6		14	13.5
10	<i>Acrida oxycephala</i> (Pall.)	5	4		9	8.7
11	<i>Duroniella gracilis</i> Uv.	6	5		11	10.6
12	<i>Duroniella kalmyka</i> (Ad.)	2	2		4	3.8
13	<i>Calliptamusturanicus</i> Serg.Tarb	1			1	0.9
14	<i>Pyrgomorpha bispinosa deserti</i> .	7	5	3	15	14.5
15	<i>Tetrix tartarata</i> Saulcy.	3	2		5	4.8
16	<i>Tetrix tartarata</i> Saulcy.		4		4	3.8
Total:		58	42	3	103	100

A total of 103 individuals were collected in the alfalfa field, 58 of which were females, 42 males and 3 larvae. The predominant species were *Pyrgomorpha bispinosa deserti* (14.5%), *Dociostaurus maroccanus* (13.5%), *Melanogryllus desertus* (10.0%), *Duroniella gracilis* (10.6%). The population density of species *Decticus verrucivorus* and *Calliptamus turanicus* was very low.

The results of the research into the species composition of Orthoptera in the saxaul population are provided in Table 6. We came across 12 Acridoidea species, but did not find any grasshoppers or crickets. The following species clearly predominated the saxaul site: *Pyrgomorpha bispinosa deserti* (22.8%), *Dociostaurus maroccanus* (14.2%) *Dericorys albidula* (14.3%), *Dericorys tibialis* (11.4%). These four species comprised 62.7% of all the Orthoptera insects recorded in the site. Saxaul-specific pests *Dericorys albidula* and *Dericorys tibialis* were quite common in these sites.

Table 6. The species composition and number of Orthoptera in a saxaul site (17 June 2016, inds/h; Coordinates: N 39°27'04.6., E 064°55'13.3., altitude above sea level – 256 m).

No.	Species	Imagines, inds.		Larvae, inds.	Total	%
		♀	♂			
1	<i>Pyrgomorpha bispinosa deserti</i> .	5	2	1	8	22.8
2	<i>Melanotmethis fuscipennis</i> (Rebt)	1			1	2.8
3	<i>Dericorys albidula</i> Aud.-Serv.	3	2		5	14.2
4	<i>Dericorys tibialis</i> (Pall.)	2	2		4	11.4
5	<i>Calliptamusturanicus</i> Serg.Tarb	2			2	5.7
6	<i>C.barbarus cephalotes</i> (Costa)	2		1	3	8.5
7	<i>Acrotylus insubricus inficitus</i>	1			1	2.8
8	<i>Ramburiella turcomana</i> (F.d.W.)	1			1	2.8
9	<i>Dociostaurus maroccanus</i> (Thnd)	4	1		5	14.2
10	<i>Dociostaurus plotnikova</i> Uv.		1		1	2.8
11	<i>Dociostaurus kraussi kraussi</i> Ing.	3			3	8.5
12	<i>D. kraussi nigrogeniculatus</i> Tarb	1			1	2.8
Total:		25	8	2	35	100

The species composition of Orthoptera recorded in mountains, namely, in the Kitab Pass area, is distinguished by the presence of species and subspecies from the genus *Conophyma*. There we came across such subspecies as *C. semenovi semenovi*, *C. sokolovi modestum* and *C. sokolovi decorum* (Table 7). The species dominating in the mountain area are locust *Calliptamusturanicus* and grasshopper *Platycleis intermedia*. In these sites we discovered a total of 16 species.

Table 7. The species composition and number of Orthoptera in mountains (Kitab Pass). Kitab District, 24 June 2016, inds./h. Coordinates: N 39°07'27.8., E 066°56'16.4.

No.	Species	Imagines, inds.		Larvae, inds.	Total	%
		♀	♂			
1	<i>Asiotmethis heptapotamicus</i> (Zub.)	2	2		4	7.6
2	<i>Pezotmethis tartarus</i> (Sauss.)	1			1	1.9
3	<i>Pezotmethis nigrescens</i> (Pyln.)	3			3	5.7
4	<i>Conophyma semenovi semenovi</i> Zub.	3	2		5	9.6
5	<i>Conophyma sokolovi modestum</i> Mist.	2			2	3.8
6	<i>Conophyma sokolovi decorum</i> Mistsh.	1	2		3	5.7
7	<i>Calliptamusturanicus</i> Serg. Tarb	5	3		8	15.3
8	<i>Oedipoda caerulescens</i> L.	3			3	5.7
9	<i>Acrotylus insubricus</i> (Scop.)	1		1	2	3.8
10	<i>Ramburiella foveolata</i> (Tarb.)	3	2		5	9.6
11	<i>Dociostaurus maroccanus</i> (Thnd)	3	1		4	7.6
12	<i>Pyrgomorpha bispinosa deserti</i> .	2		2	4	7.6
13	<i>Platypleis intermedia</i> Serv.	4	2		6	11.5
14	<i>Glyphonothus alactaga</i> Miram	2			2	3.8
Total:		35	14	3	52	100

We identified 9 Orthoptera species in the steppe area of Kashkadarya province. The predominant species in this zone is Moroccan locust, which is abundant in the area and poses danger for agricultural crops in steppes and foothills. There we also recorded the Turanian prus (*Calliptamus turanicus* Tarb), which comprised 21.9%. As is seen in Table 8, species from the genera *Dociostaurus* and *Dericorys* predominate in steppes. These genera are represented by three and two species, respectively. The density of abovementioned Orthoptera in the site in question was 0.4 individuals per 1 m<sup>2</sup>.

Table 8. The species composition and number of Orthoptera in the Karshi steppe. Karshi District, 24 June 2016, inds/h. Coordinates: N 39°00'29.7., E 065°59'30.6.; altitude above sea level – 439 m; density – 0.4 inds/m<sup>2</sup>, 37 inds./h.

No.	Species	Imagines, inds.		Larvae, inds.	Total	%
		♀	♂			
1	<i>Velarifictorus bolivari</i>	2		0	2	4.8
2	<i>Pyrgomorpha bispinosa deserti</i> .	5		0	5	12.1
3	<i>Dericorys albidula</i> Aud.-Serv.	1		0	1	2.4
4	<i>Dericorys tibialis</i> (Pall.)	3	2		5	12.1
5	<i>Calliptamusturanicus</i> Serg. Tarb	6	3	0	9	21.9
6	<i>Acrotylus insubricus</i>		1		1	2.4
7	<i>Dociostaurus maroccanus</i> (Thnd)	8	4	0	12	29.2
8	<i>Dociostaurus plotnikova</i> Uv.	2			2	4.8
9	<i>Dociostaurus kraussi kraussi</i> Ingen.	3	1	0	4	9.7
Total:		30	11		41	100

**Conclusion:**

We identified 71 Orthoptera species from 50 genera and 4 families in various agrocoenoses and natural landscapes adjacent to them in Kashkadarya province. We recorded 31 species in natural landscapes and 40 species in agrocoenoses. Taking into account the species provided in literary sources, the total number of species inhabiting the province amounts to 83. The species diversity and abundance of Orthoptera in agrocoenoses are the largest in June and August.

**REFERENCES**

Alimzhanov R. A. The development of the destructive entomofauna of the Karshi Steppe. Tashkent: Fan. 1974. 73 pages.  
 Gapparov F. A. The bioecology of the evolution of destructive Acridoidea and the development of efficient methods and remedies to control them. // An abstract from a Doctor of Agriculture thesis. Tashkent, 2002.41 pages.  
 Pravdin F. N. The ecological geography of insects in Central Asia. Moscow: Nauka, 1978. 273 pages.  
 Ergashev N. E. The Orthoptera of the Karshi steppe. Tashkent. 1985. 73 pages.