



Faunistic study of Caelifera (Insecta: Orthoptera) in Dasht-e Azadegan County, Khuzestan Province, Iran

Seyed Yousef Mousavi-Rashedi¹, Mohsen Mofidi-Neyestanak^{2,*} and Fatemeh Shahbazi³

¹ Department of Biology, Payam-e Noor University, Tehran-shargh Unit, Tehran, Iran.

² Insect Taxonomy Research Department and Hayk Mirzayans Insect Museum, Iranian Research Institute of Plant Protection, Agricultural Research, Education and Extension Organization, Iran.

³ Department of Biology, Payam-e Noor University, Iran.

ABSTRACT. This study is aimed to explore the fauna of grasshoppers and locusts (Orthoptera) within the county of Dasht-e Azadegan (Khuzestan Province), where is placed a vast plain with geographical coordinates of 47°42' to 48°28' E and 31°24' to 32°57' N. Sampling carried out since March 2015 until end of August 2016 using insect sweeping net and also light torch at eleven selected sites and continued for the duration of all seasons of each year every one month. The collecting sites were selected to cover the whole area in terms of climate, sea level, and vegetation. Referring to morphological identification keys and comparing the result with the type of material deposited at Hayk Mirzayans Insect Museum, out of 1770 specimens, four Families, 11 Subfamilies, 21 genera and 25 species enlisted. Out of which, one genus, and two species were discovered to be new to the fauna of Iran. Based on the yielded statistics, *Aiolopus thalassinus* is candidates as the most frequent species in the area.

Key words: Dasht-e Azadegan, fauna, Iran, grasshopper, new record

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Introduction

The Dasht-e Azadegan County (Fig. 1) with specific climate conditions and geographical coordinates 47° 42' to 48° 28' E and 31° 24' to 32° 57' N in Khuzestan Province, south-west of Iran. The total area of the region is 1972 km², from North to the East to the city of Shush, from East and the South-East to the city Hamidiyeh and to the city Ahwaz, southwest to Hoveyzeh. The county is bordered by the West with Iraq with particular climate characteristics: from

altitudes, up to 270 meters on the East side to the hills of Allah-o-Akbar mounds with a height of 55 meters and the protected forests of the Om-Al-Debes to agricultural fields, and wetland Hawr Al-Azim with a height of about 5 meters above sea level; maximum temperature of +51.4 °C during July and minimum temperature of 1.2 °C in February; the highest monthly rainfall in December with 70.02 mm and average annual rainfall of 18.48 mm (Statistical

Corresponding author: Mohsen Mofidi-Neyestanak, E-mail: m.mofidi@areeo.ac.ir

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Yearbook, 2015). The average temperature for a 25-year period is 31 °C. The annual evaporation rate in plain and post areas is more than 2500 mm, that is, in addition to ten times the annual rainfall (Maghsoudi et al., 2013). This area is one of the main agricultural pillars of the province Khuzestan. Thousands of cereals, such as wheat and barley, are to export to other cities and provinces too. It also has dry and waterless lands, partly fixed by resistant trees such as *Prosopis* and oil Mulch (Statistical Yearbook, 2015).

Over the last few years, climate change, drought, irregular inadequate precipitation and overgrazing have led many pastures and agricultural fields of Dasht-e Azadegan to be disappeared. As a result, several herbivorous insect species, particularly grasshoppers, are likely to find their food sources from their home to go beyond and invading their surrounding area, more and more. Thus, it is necessary to explore the orthopteran fauna of the region and also evaluate the frequency and distribution of these insects in the area more precisely to take appropriate decisions while locust outbreaks.

Principally, most insects' population fluctuations indicate climate change in that area. For this reason, insects that are most opportunistic have the most benefit from environmental changes. Orthopteran insects, grasshoppers in particular, might be considered as bio-indicator (Hosseyani, 2013).

So far, no comprehensive research has been carried out over Caelifera of this geographical area; however, an investigation was conducted by Khajehzadeh et al. (1999) to investigate these orthopterans in the eastern counties of Khuzestan Province in 1995–1998. As a result, they recorded 27 species including *Aiolopus thalassinus*, *Esfandiarina obesa* and

Locusta migratoria as the most damaging species to the agro-ecosystems.

Material and methods

After initial field surveys and collecting data, eleven sites were nominated based on information over environment, vegetation, topology (Figs 1 & 2), geographic location, altitude and availability (Table 1).

Monthly samplings carried out since early March until the end of August using insect sweeping net and also light torch; while scattered sampling was done all the year. The samples were collected on plants, from the surface of the earth, rock, sandy hills and river banks, even from rural and urban houses.

Insect mounting was carried out immediately after killing with ethanol 75% v/v. Afterwards, the specimens studied according to their morphological characteristics such as color, shape and size of the various organs of the body, the length of the various parts of the legs, the femoral stridulatory and wing tympanal organs, the upper and lower parts of the body, the shape and punctuations of the male and female sexual organs (Hosseyani, 2013; Allipour et al., 2014) and the body length of the species are in millimeters.

The identification done via valid morphological keys mainly Uvarov (1938), Bey-Bienko & Mishchenko (1951), Bey-Bienko (1964), Harz (1975), Naskrecki & Unal (1995), Star & Ozbay (2003), Srinivasan & Prabakar (2013), Kumar & Usmani (2014), Gapparov et al. (2016) and Louveaux et al. (2016) and confirmed through comparing the samples with the material already deposited in the Hayek Mirzayans Insect Museum. Distribution map, taxonomic checklist, images and scientific illustrations and the latest taxonomy of all species was presented.

Table 1. Geographic coordinates, geological specifications and vegetation of the sites.

Site	Local name	Altitude (m)	location	Specifications
A	Kot Seyed-Naeem	21	32° 31' 38" N 48° 23' 35" E	Alluvium lands of the Karkheh river, forests, suitable vegetation, crops, gardens, vegetable and Fodder.
B	Susangerd	13	31° 33' 38" N 48° 12' 17" E	Green space, suburban water streams, Fodder.
C	Abo-Jalal	14.5	31° 34' 08" N 48° 11' 40" E	Karkheh river bank, reedy, forage fields, gardens.
D	Bardiyeh	12	31° 36' 02" N 48° 06' 57" E	With almost poor vegetation, wild and saline fields, Wheat and barley fields
E	Seyed Naser	12	31° 36' 39" N 48° 08' 23" E	Karkheh river bank, sandy fields, grain fields such as wheat, barley, sesame, rice fields.
F	Daghaghleh	11	31° 31' 47" N 48° 03' 27" E	Alluvium lands of the Karkheh river, suitable vegetation cover, agricultural land, forage, okra, rice field.
G	Neheyrat	11.5	31° 33' 40" N 48° 59' 58" E	Karkheh River coastline, Alluvium lands, reedy, Livestock forage, Crops, Beans, Sesame.
H	Sableh	11.2	31° 39' 34" N 48° 01' 12" E	Alluvium lands of the Karkheh river, forests, suitable vegetation cover, agricultural land, forage, gardens.
I	Bostan	11.5	31° 43' 07" N 48° 00' 24" E	Alluvium lands of the Karkheh river, suitable vegetation cover, agricultural land, forage, rice field, gardens.
J	Om Al-Debes	58.5	31° 46' 02" N 48° 05' 46" E	Rocky cliffs, sand dunes, forest, farmland
K	Hawr AL-Azim	6.5	31° 41' 46" N 47° 53' 47" E	The end of the river, the fortresses, the shores, the fields around the lagoon.

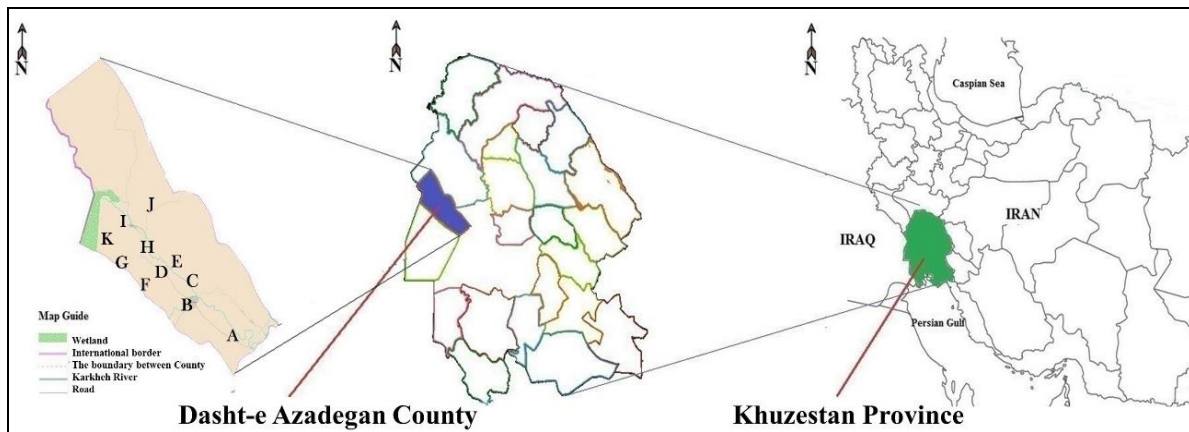


Figure 1. Sampling localities in Dasht-e Azadegan County.

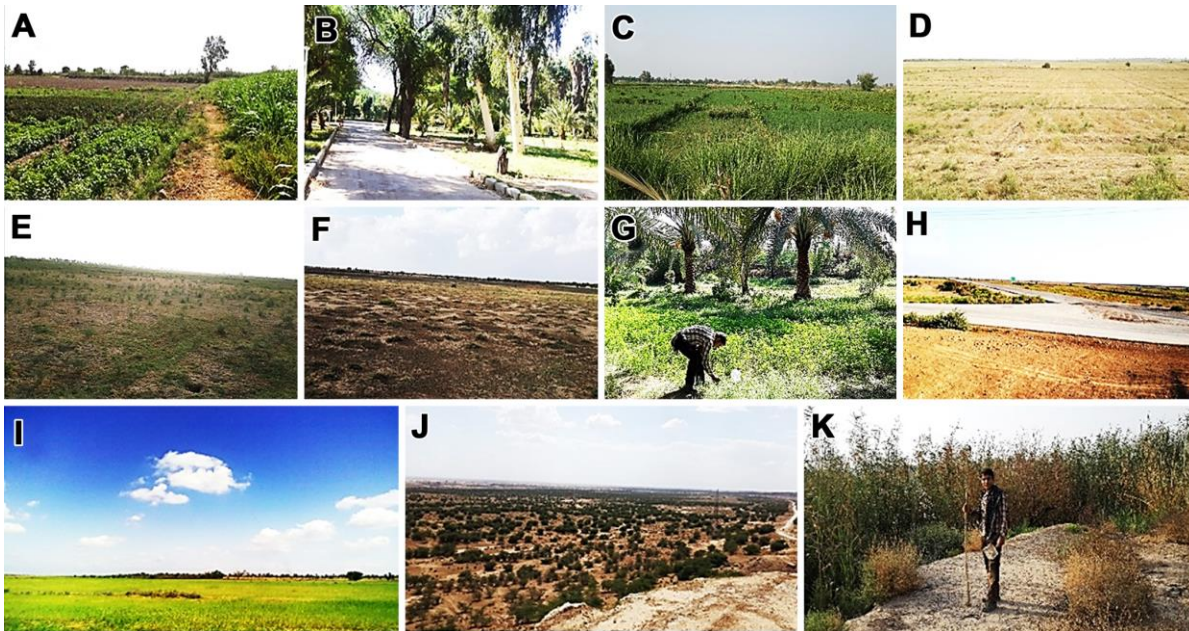


Figure 2. The geological appearance of sampling sites: A. Kot Seyed-Naem, B. Susangerd, C. Abo-Jalal, D. Bardiyeh, E. Seyed-Naser, F. Daghaghleh, G. Naheytrat, H. Sableh, I. Bostan, J. Om Al-Debes, K. Hawr Al-Azim.

Results

In this study, 25 species of the suborder Caelifera out of 1770 specimens were identified for the Dasht-e Azadegan County (Table 2, Fig. 6). In total, 3 superfamilies, 4 families, 11 subfamilies, 16 tribes, 2 subtribes, 21 genera, 2 Subgenera and 25 species were identified. Of these, one genus and two species are new records for Iran Orthoptera fauna shown with an asterisk (*).

Suborder Caelifera

Family Acrididae

Acrida oxycephala (Pallas, 1771)

Material examined: 25 specimens (Fig. 3A), 1♀ and 1♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 3♀ and 2♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 10♀ and 2♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♀ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 1♂

swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 2♀ and 1♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 1♂ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Duroniella kostylevi* (Bey-Bienko, 1948)**

Material examined: 50 specimens (Fig. 3B), 6♀ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 11♀ and 1♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 11♀ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 2♀ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 10♀ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 4♀ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 3♀ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E), 2♀ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Truxalis nasuta* (Linnaeus, 1758)**

Material examined: 3 specimens (Fig. 3C), 1♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♀ and 1♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E).

Activity time: Diurnal.

***Truxalis robusta* (Uvarov, 1916)**

Material examined: 11 specimens (Fig. 3D), 1♀ and 2♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 2♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 2♀ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 1♀ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 2♀ swept from Bostan (31° 43' 07" N, 48° 00' 24" E).

Activity time: Diurnal.

***Calliptamus barbarus* (Costa, 1836)**

Material examined: 1 specimen (Fig. 3E), 1♀ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

Activity time: Diurnal.

Stenocatantops splendens* (Thunberg, 1815)

Material examined: 18 specimens (Fig. 3F), 2♀ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♀ and 1♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 4♀ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 4♀ and 2♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E).

Activity time: Diurnal.

Morphological characteristics

Pronotum flattened; Prosternal tubercle laterally compressed. Size medium; body more or less slender, elongated; brownish testaceous in colour; antennae thin, weakly compressed dorso-ventrally, longer than the head and pronotum together; Middle joints of the antennae about twice or thrice as long as broad. Pronotum moderately compressed laterally; tegmina projecting beyond the hind knees by the length of head and pronotum together or less. Prosternal tubercle strongly curved and bent backwards; hind femur moderately slender; sub genital plate weakly acute-conical; circus slightly broadened at base, narrowing and incurved towards apex (Srinivasan & Prabakar, 2013).

***Anacridium aegyptium* (Linnaeus, 1764)**

Material examined: 6 specimens (Fig. 3G), 1♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♂ swept from Susangerd (31° 33' 38" N, 48° 12' 17" E), 1♀ and 1♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♂ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 1♀ and 1♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E).

Activity time: Diurnal.

***Heteracris adspersa* (Redtenbacher, 1889)**

Material examined: 206 specimens (Fig. 3H), 5♀ and 10♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 65♀ and 38♂ swept from Susangerd (31° 33' 38" N, 48° 12' 17" E), 1♀ and 9♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 9♀

and 9♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 6♀ and 9♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 4♀ and 4♂ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 5♀ and 2♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 14♀ and 16♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 3♀ and 2♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 1♂ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Chorthippus bornhalmi* (Harz, 1971)**

Material examined: 18 specimens (Fig. 3I), 3♀ and 1♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 2♀ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 4♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♀ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 7♀ and 1♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

Activity time: Diurnal.

***Ochrilidia geniculata* (Bolivar, 1913)**

Material examined: 97 specimens (Fig. 3J), 8♀ and 10♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 5♀ and 13♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 7♀ and 11♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 3♀ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 10♀ and 12♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 13♀ and 5♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E).

Activity time: Diurnal.

***Tropidopola longicornis* (Fieber, 1853)**

Material examined: 27 specimens (Fig. 3K), 5♀ and 4♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 1♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♀ and 3♂ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 1♀ and 3♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 1♀ and 3♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 3♀ and 1♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 1♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

58" E), 1♀ and 3♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 3♀ and 1♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 1♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

Activity time: Diurnal.

***Acrotylus insubricus* (Scopoli, 1786)**

Material examined: 8 specimens (Fig. 4A), 2♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 2♀ and 4♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E).

Activity time: Diurnal.

***Mioscirtus wagneri* (Eversmann, 1859)**

Material examined: 90 specimens (Fig. 4B), 3♀ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 7♀ and 5♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 9♀ and 19♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♀ and 1♂ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 5♀ and 1♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 26♀ and 6♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E), 5♀ and 1♂ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Aiolopus thalassinus* (Fabricius, 1781)**

Material examined: 692 specimens (Fig. 4C), 54♀ and 49♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 2♀ and 1♂ swept from Susangerd (31° 33' 38" N, 48° 12' 17" E), 56♀ and 47♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 51♀ and 46♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 39♀ and 33♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 46♀ and 37♂ swept from Daghaghleh (31° 31' 47" N, 48° 03' 27" E), 20♀ and 33♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 74♀ and 43♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 13♀ and 24♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 5♀ and 1♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

48° 05' 46" E), 12♀ and 6♂ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Aiolopus strepens* (Latreille, 1804)**

Material examined: 107 specimens (Fig. 4D), 5♀ and 2♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 8♀ and 10♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 1♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 8♀ and 7♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 12♀ and 9♂ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 3♀ and 2♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 2♀ and 5♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 19♀ and 14♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E).

Activity time: Diurnal.

***Hilethera hierichonica* (Uvarov, 1923)**

Material examined: 6 specimens (Fig. 4E), 6♀ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Hilethera maculata* (Karny, 1907)**

Material examined: 74 specimens (Fig. 4F), 8♀ and 2♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 4♀ and 1♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 14♀ and 18♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♂ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 1♀ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 5♀ and 5♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 6♀ and 2♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 4♀ and 2♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E), 1♂ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Locusta migratoria* (Linnaeus, 1758)**

Material examined: 23 specimens (Fig. 4G), 1♀ and 3♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♂ swept from

Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 1♀ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♀ and 1♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♂ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 1♀ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 1♀ and 3♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 1♀ and 1♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E).

Activity time: Diurnal.

***Helioscirtus moseri* (Saussure, 1884)**

Material examined: 79 specimens (Fig. 4H), 4♀ and 2♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 4♀ and 3♂ swept from Susangerd (31° 33' 38" N, 48° 12' 17" E), 11♀ and 1♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 12♀ and 15♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 3♀ and 4♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 3♀ and 2♂ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 3♀ and 1♂ swept from Neheytrat (31° 33' 40" N, 48° 59' 58" E), 7♀ and 6♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 3♀ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

***Sphingonotus (Sphingonotus) savignyi* (Saussure, 1884)**

Material examined: 36 specimens (Fig. 4I), 1♀ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 3♀ and 2♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 1♀ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), , 8♀ and 20♂ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E).

Activity time: Diurnal.

Family Dericorythidae

***Dericorys albidula* (Serville, 1838)**

Material examined: 1 specimen (Fig. 5A), 1♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E).

Activity time: Diurnal.

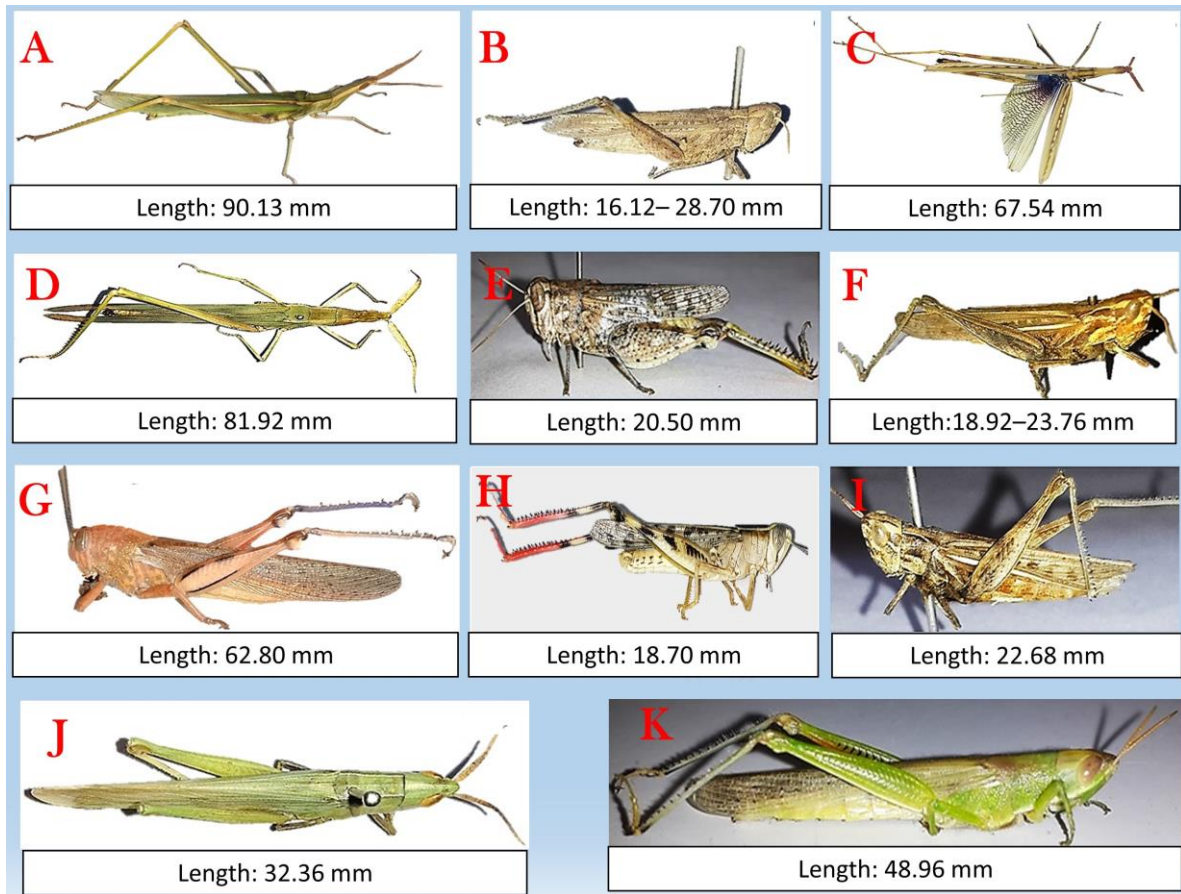


Figure 3. The species of Family Acridoidea: **A.** *A. oxycephala* (♀), **B.** *D. kostylevi* (♀), **C.** *T. nasuta* (♀), **D.** *T. robusta* (♀), **E.** *C. barbarus* (♀), **F.** **S. splendens* (♀), **G.** *A. aegyptium* (♂), **H.** *H. adspersa* (♂), **I.** *C. bornhalmi* (♀), **J.** *O. geniculata* (♀), **K.** *T. longicornis* (♀).

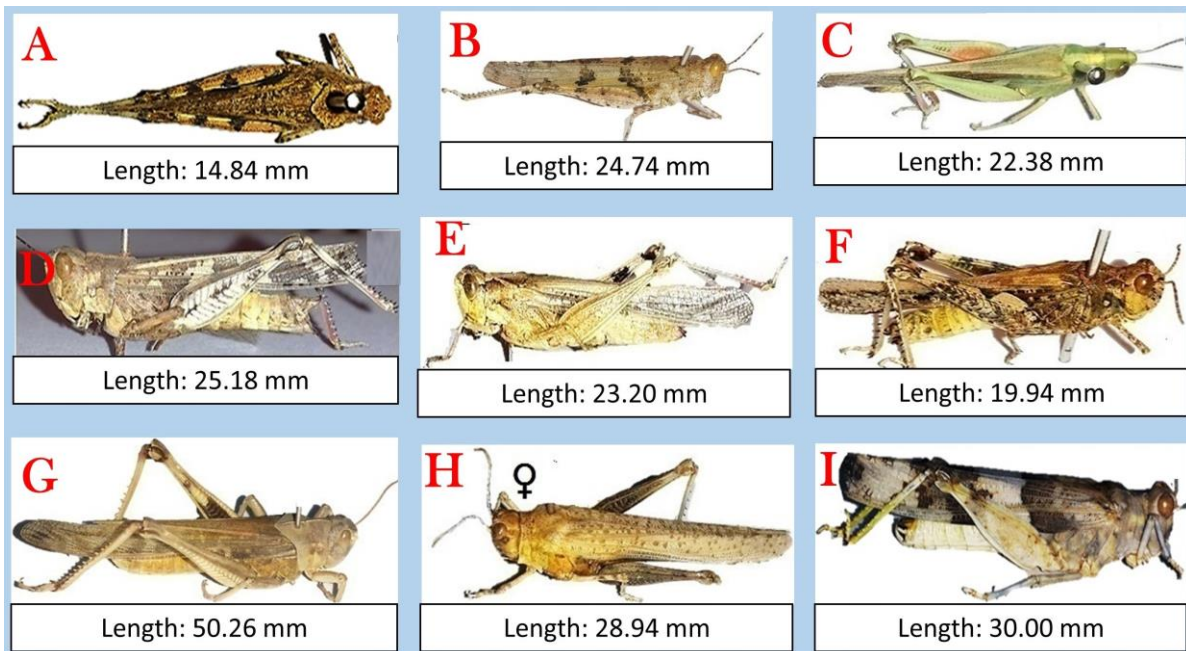


Figure 4. The species of Subfamily of (Acridoidea: Oedipodinae): **A.** *A. insubricus* (♀), **B.** *M. wagneri* (♀), **C.** *A. thalassinus* (♀), **D.** *A. strepens* (♀), **E.** *H. hierichonica* (♀), **F.** *H. maculata* (♀), **G.** *L. migratoria* (♂), **H.** *H. moseri* (♀), **I.** *S. (S.) savignyi* (♀).

Family Pyrgomorphidae***Pyrgomorpha (Pyrgomorpha) conica* (Olivier, 1791)**

Material examined: 132 specimens (Figs. 5B, 5C), 7♀ and 1♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 2♀ and 1♂ swept from Susangerd (31° 33' 38" N, 48° 12' 17" E), 13♀ and 6♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 7♀ and 12♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 13♀ and 6♂ swept from Seyed-Naser (31° 36' 39" N, 48° 08' 23" E), 1♀ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 3♀ swept from Neheyra (31° 33' 40" N, 48° 59' 58" E), 10♀ and 6♂ swept from Sableh (31° 39' 34" N, 48° 01' 12" E), 16♀ and 15♂ swept from Bostan (31° 43' 07" N, 48° 00' 24" E), 54♀ swept from Om Al-Debes (31° 46' 02" N, 48° 05' 46" E), 6♀ swept from Hawr AL-Azim (31° 41' 46" N, 47° 53' 47" E).

Activity time: Diurnal.

Family Tetrigidae***Tetrix depressa* (Brisout de Barneville, 1848)**

Material examined: 18 specimens (Figs. 5D, E, F, G), 11♀ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 6♀ and 2♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E).

Activity time: Cathemeral.

Tetrix bolivari* (Saulcy, 1901)

Material examined: 21 specimens (Figs. 5H, 5I), 11♀ and 6♂ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♀ and 1♂ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 7♀ and 15♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E).

Activity time: Cathemeral.

Morphological characteristics

The ventral edge of the middle femora slightly wavy; median keel of pronotum low, not raised like a knife blade, not higher than the side keels in the apical part

only; ratio of the width of interocular distance to the width of one eye seen from above (Harz, 1975).

***Paratettix obliteratedus* (Bey-Bienko, 1951)**

Material examined: 20 specimens (Figs. 5J, 5K), 3♀ swept from Kot Seyed-Naeem (32° 31' 38" N, 48° 23' 35" E), 1♀ swept from Abo-Jalal (31° 34' 08" N, 48° 11' 40" E), 11♀ and 2♂ swept from Bardiyeh (31° 36' 02" N, 48° 06' 57" E), 2♀ swept from Daghighleh (31° 31' 47" N, 48° 03' 27" E), 1♀ swept from Sableh (31° 39' 34" N, 48° 01' 12" E).

Activity time: Cathemeral.

Discussion

During the years of 1952 to 1958, a locust called *Schistocerca gregaria* (Forskål, 1775) caused huge damage to the agricultural crops of the Dasht-e Azadegan County which resulted in a tragic famine. In the native language, it's called the "Moken" locust. This pest is very famous among the inhabitants of the area and is always referred to as a great disaster.

This research is the first faunistic study in the Dasht-e Azadegan County. Thus, the entire records are new to the fauna of Orthoptera in this region. The results show that the site "Bardiyeh" with 22 identified species has the richest fauna in the county. The species *Aiolopus thalassinus* (Fabricius, 1781) is nominated as the most dominant species with up to 16 polymorphic materials. Among the identified families, the Acrididae with 8 subfamilies, 16 genera and 20 species, has the most species. Also, most species belonging to the subfamily Oedipodinae with 9 species were found in Bardiyeh, Abo-Jalal, and the lowest species in Susangerd and Om Al-Debes regions, but in other regions, the species composition of this family is somewhat the same. The smallest number of species belonging to the families, Dericorythidae (Caelifera) and Pyrgomorphidae (Caelifera), for which only one species is found.

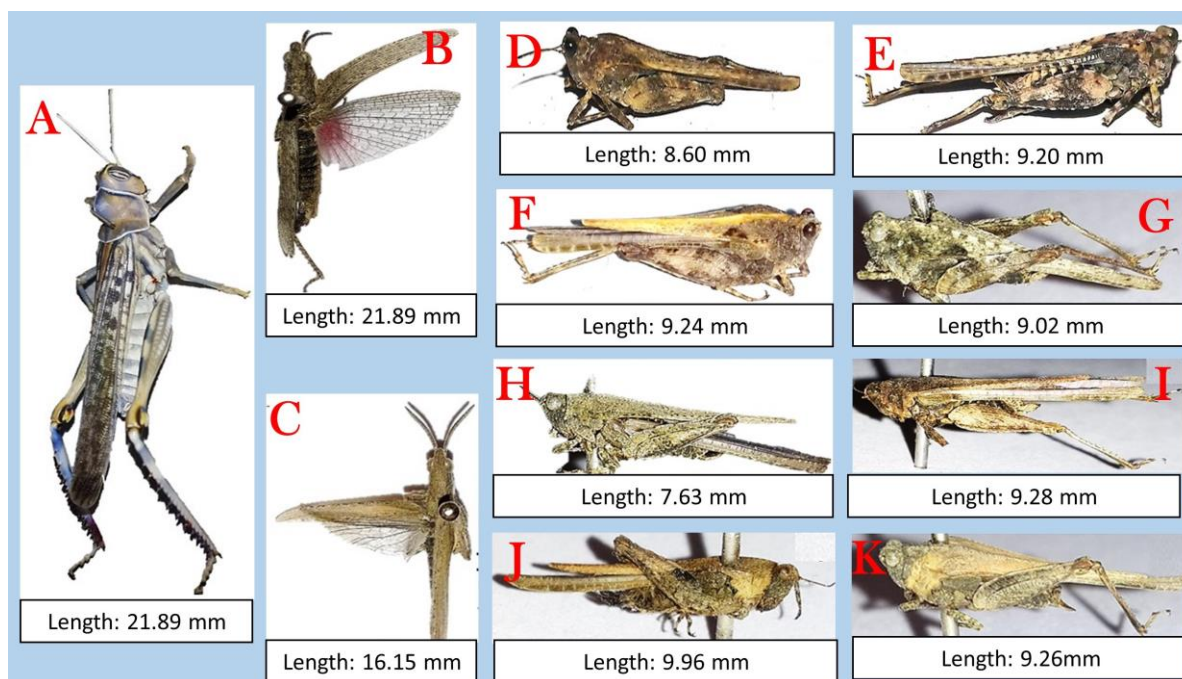


Figure 5. The species of families Dericorythidae: **A.** *D. albidula* (♂), Family Pyrgomorphidae: **B.** *P. (P.) conica* (♂), **C.** *P. (P.) conica* (♂) and Family Tetrigidae: **D, E, F,** and **G.** *T. depressa* (♂), *T. depressa* (♀), **E, H** and **I.** *T. bolivari** (♀), **J** and **K.** *P. obliteratus* (♀).

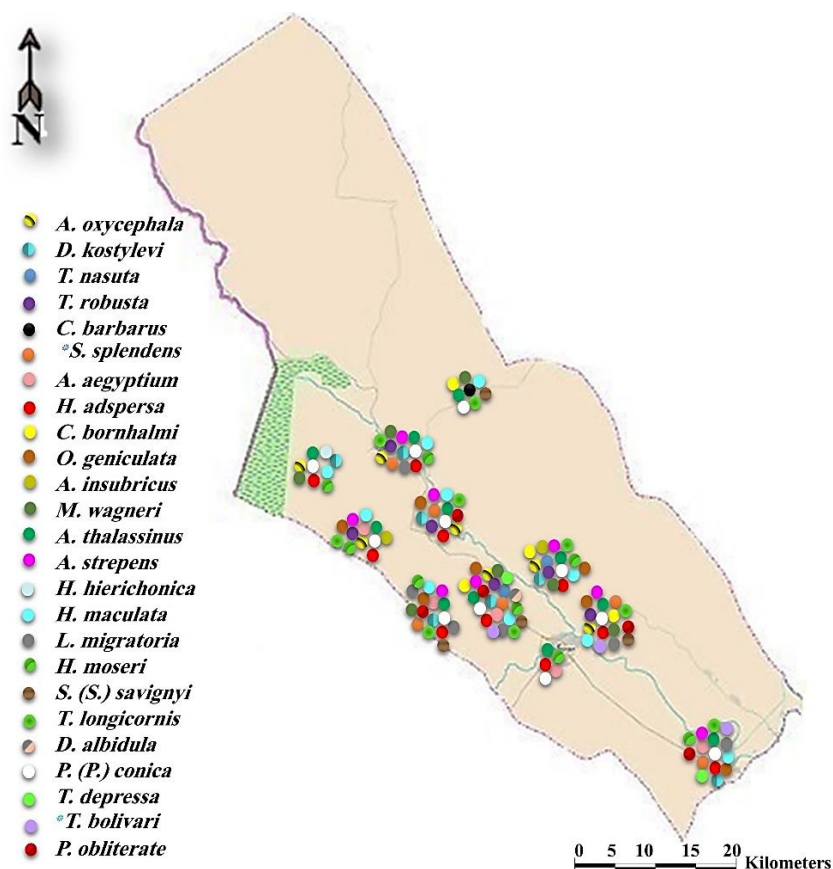


Figure 6. Collecting localities of Suborder Caelifera species in the Dasht-e Azadegan County.

Table 2. List of Suborder Caelifera species recorded from Dasht-e Azadegan County, Iran.

Suborder	Family	Species
Caelifera	Acrididae	<i>Acrida oxycephala</i> (Pallas, 1771)
		<i>Duroniella kostylevi</i> (Bey-Bienko, 1948)
		<i>Truxalis nasuta</i> (Linnaeus, 1758)
		<i>Truxalis robusta</i> (Uvarov, 1916)
		<i>Calliptamus barbarus</i> (Costa, 1836)
		<i>Stenocatantops splendens</i> (Thunberg, 1815)*
		<i>Anacridium aegyptium</i> (Linnaeus, 1764)
		<i>Heteracris adpersa</i> (Redtenbacher, 1889)
		<i>Chorthippus bornhalmi</i> (Harz, 1971)
		<i>Ochrilidia geniculata</i> (Bolívar, 1913)
		<i>Acrotylus insubricus</i> (Scopoli, 1786)
		<i>Mioscirtus wagneri</i> (Eversmann, 1859)
		<i>Aiolopus thalassinus</i> (Fabricius, 1781)
		<i>Aiolopus strepens</i> (Latreille, 1804)
	<i>Hilethera hierichonica</i> (Uvarov, 1923)	
	<i>Hilethera maculata</i> (Karny, 1907)	
	<i>Locusta migratoria</i> (Linnaeus, 1758)	
<i>Helioscirtus moseri</i> (Saussure, 1884)		
<i>Sphingonotus (Sphingonotus) savignyi</i> (Saussure, 1884)		
<i>Tropidopola longicornis</i> (Fieber, 1853)		
Dericorythidae	<i>Dericorys albidula</i> (Serville, 1838)	
Pyrgomorphae	<i>Pyrgomorpha (Pyrgomorpha) conica</i> (Olivier, 1791)	
Tetrigidae	<i>Tetrix depressa</i> (Brisout de Barneville, 1848)	
	* <i>Tetrix bolivari</i> (Saulcy, 1901)	
	<i>Paratettix obliterated</i> (Bey-Bienko, 1951)	

Locusta migratoria (Linnaeus, 1758) with low population and *Aiolopus thalassinus*, *Heteracris adpersa* and *Pyrgomorpha (Pyrgomorpha) conica* were observed in large numbers. In the event of the infestation, they can cause a great deal of damage to the products and industry of the region. The *Tropidopola longicornis* species has three polymorphisms, however, one of these is found during the harvesting season on the October-November period. The members of the Family Tetrigidae are less well known for less economic significance. In this study, more than 77 specimens were found in herbs, such as gardens (especially at night), trees, rotten leaves, around farmland, fodder, other wet places in rural

houses, and along the water basins. These insects are interested in white light so much that they accumulate in the darkness of the night around the lights. Of these samples, 2 genera were identified as *Paratettix* and *Tetrix* with 3 species in total. Two species and one subspecies belonging to the genus *Paratettix* are already reported from Iran. One species, which lives on the slopes of the southern side of Alborz Mountains and in the hills of northern Tehran, was described by Uvarov & Dirsh (1952), the name of the species *Paratettix iranica*. The same year, Mr. Dirsh examined a series of material at the NHMB Basel in Germany and described a new species called *Paratettix iranicus*. More recently, in 2016,

Mr. Tumbrinck wrote a memo to the OSF (<http://orthoptera.speciesfile.org/Comment/basic/Taxa.aspx?TaxonNameID=1102349>) and (probably with access to both samples) saying that these two species are probably synonymous by comparing the collected samples belonging to this genus with samples collected from north of Tehran. It was found that there was not much difference.

For subspecies of *Paratettix obliteratus obliteratus* in the Caucasus region and the subspecies *Paratettix obliteratus iranicus* in the southern side of the middle Alborz, it is quite possible that the number of specimens of this species from the southwest region of Iran and future comparisons could lead to a description of the new species Khuzestan Province. Also, with regard to the distance dimension, it seems that the specimens of that area should also be located in distinct subdivisions before it should examine the continuity of the species distribution and the probability of Clin's formation.

In the past few years, this kind of research has grown dramatically in the interior, and in the coming years, we will see an increase in the Orthoptera fauna in the country. By comparing the number of species identified in the Dasht-e Azadegan with the species in the eastern part of the Khuzestan province, the former is smaller relative to the entire province. Finding this samples of the suborder Caelifera is amazing. In this study, *Aiolopus thalassinus* was recognized as the dominant species, which is consistent with the dominant species in the eastern part of the province. But other dominant species in the eastern part of the province such as *Esfandiaria obesa* was not found in the Dasht-e Azadegan County. According to this study and considering the species found in this area compared to the eastern part of the province, there are 52 species of suborder Caelifera in Khuzestan Province, while the

number of species of this suborder of the Dasht-e Azadegan County is comprised fifty percent of these species.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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بررسی فونستیک راست‌بالان زیرراسته *Caelifera* (Insecta: Orthoptera) در دشت آزادگان، استان خوزستان، ایران

سید یوسف موسوی راشدی^۱، محسن مفیدی نیستانک^۲ و فاطمه شهبازی^۳

۱ گروه زیست‌شناسی، دانشگاه پیام نور واحد تهران شرق، تهران، ایران.

۲ بخش تحقیقات رده‌بندی حشرات، مؤسسه تحقیقات گیاه پزشکی، سازمان تحقیقات، آموزش و ترویج کشاورزی، تهران، ایران.

۳ گروه زیست‌شناسی، دانشگاه پیام نور، ایران.

* پست الکترونیکی نویسنده مسئول مکاتبه: m.mofidi@areeo.ac.ir

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چکیده: این تحقیق با هدف بررسی فون ملخ‌ها و آفت ملخ‌ها (راست‌بالان) در محدوده دشت آزادگان، جایی که یک منطقه وسیع با مختصات جغرافیایی $47^{\circ}42'$ تا $48^{\circ}28'$ شرقی و $31^{\circ}24'$ تا $32^{\circ}57'$ شمالی است، انجام گرفت. نمونه‌برداری از فروردین‌ماه ۱۳۹۴ تا پایان مردادماه ۱۳۹۵ به‌وسیله تور حشره‌گیری و چراغ‌قوه در یازده ایستگاه و به فاصله یک ماه در طول تمام فصل‌های هر سال ادامه یافت. سایت‌های نمونه‌برداری برای پوشش کل منطقه از نظر آب‌وهوا، ارتفاع از سطح دریا و پوشش گیاهی انتخاب شدند. با استفاده از کلیدهای شناسایی ریخت‌شناسی و مقایسه با تایپ‌های ذخیره‌شده در موزه حشرات هایک میرزایانس، از ۱۷۷۰ نمونه، ۴ خانواده، ۱۱ زیرخانواده، ۱۶ قبیله، ۲۱ جنس و ۲۵ گونه شناسایی شد. از بین نمونه‌ها، ۱ جنس و ۲ گونه برای فون جانوری ایران، کشف جدید بود. بر اساس آمار ارایه شده، *Aiolopus thalassinus* فراوان‌ترین گونه در این منطقه بود.

واژگان کلیدی: دشت آزادگان، فون، ایران، ملخ، گزارش جدید