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RESEARCH ARTICLE

A CHECKLIST OF CAELIFERANS (ORTHOPTERA) SPECIES FROM THAR DESERT, SINDH, PAKISTAN

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ABSTRACT

An extensive survey of Thar has been made during the year 2015 to 2016, in the result of this a total of 943 specimens were captured and sorted out into 25 species. Majority of specimens belong to Acrididae followed by Pyrgomorphidae while only single species i-e *Dericorys tibialis* (Pallas, 1773) of Dericorythidae was come in collection. Specimens were captured from different habitats that include sandy, rocky, grassy and cultivated crops. This study will be fruitful for up gradation of checklist of caeliferans fauna of Thar Desert.

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INTRODUCTION

Suborder Caelifera commonly called as Short- horned grasshoppers recognized by three segmented tarsi and a short ovipositor and placed in Order Orthoptera. This include Superfamilies Acridoidea, Tridactyloidea, Tetrigoidea and Eumastacoidea in which Acridoidea is the dominant one. Thar Desert has resulted from geo- tectonic and climatic changes in the past, more than 100 years ago (Wadia 1960, Ahmed 1969). It has also been claimed and argued by many historians that the Thar Desert is even older since towards, west, it almost continues into Sahara Desert through Middle Eastern desert. Thar is a desert region in the southern part of Sindh province in Pakistan. In the northeast the desert extends towards Punjab Province eastward across the Indo-Pakistan border, spreading over an area of about 200,000 km^2. About 85% area of Thar included in Indian states of Gujarat, Rajasthan and Punjab while, remaining 15% area in Pakistan. In the Pakistani part of Thar Desert, the habitations are concentrated in the form of small villages scattered all over the desert. This desert is one of the most densely populated in the world.

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The population of Thar ranges between 850,000 to 950,000 (Qadri, 1983, Sazda, 1988, Baanhn, 1990). It mainly thrives on rains and it is saying that. Rains are blessing for Thar Desert else it is a fatal and daunting desert. Rains are the only source in the sand desert tract and it is rare, at intervals of 3-4 years and maximum rain fall is recorded up to 3 inches only, with the result that the local Tharies are always in the state of nomad tribes. Besides, uncertain fate, famine is inherited by Tharies i-e poverty and malnutrition. Less area which is under cultivation affected by numbers of vertebrate and invertebrate includes varieties of insects. Nevertheless, no detail survey of grasshoppers has been done yet (with exception of Riffat *et al.,* 2013, Mohan *et al.,* 2015). However, survey of grasshoppers has been done by Bei-Bienko and Mishchenko, (1952); Moeed, (1966, 1976); Jago, (1977); Ahmed, (1980); Ahmed *et al.,* (1980), Perwin *et al.,* (1983); Wagan and Solangi, (1989); Riffat and Wagan, (2008, 2009, 2010a, b, 2012, 2015) from different climatic zones of world. At the present complete checklist of caeliferans is compiled here for the first time. This study will be helpful in developing forcasting methods indicating time, place and population density for their preventive / curative measures.

MATERIALS AND METHODS

The present study is mainly based on the material collected from different habitats of Thar Desert which include herbs, shrubs, grasses, fruits, vegetables, sandy, rocky, hills and along the roadsides. Specimens were collected by using insect net, hands picking, or by using large forceps. After collection collected material was brought to laboratory then killed, pinned and examined by the Standardized Entomological Method purposed by Riffat and Wagan (2012, 2015).

Identification of specimens was carried out under the Stereoscopic Dissecting Binocular Microscope. All the collected material deposited in Sindh Entomological Museum (SEM), with complete description that include ID No. host plant, date and locality name where the specimens was collected.

RESULTS AND DISCUSSION

At the present 943 specimens were collected which were sorted out into 3-families i-e Acrididae, Pyrgomorphidae and

Table 1. Occurrence of various species from different localities of Thar Desert during year 2015-2016

Species	Localities				
	Umerkot	Mithi	Islamkot	Nagarparkar	Diplo
Family Acrididae					
Subfamily Oedipodinae					
Hilethera aelopoides	+	+	+	+	+
Aiolopus T. Thalassinus	+	_	_	+	+
A. T. tamulus	+	_	+	_	+
Sphingonotus (Sphingonotus) rubescens rubescens	+	_	+	+	+
S.(Sphingonotus) savignyi	+	+	_	+	+
Trilophidia annulata	+	_	+	+	_
Locusta migratoria	+	_	+	+	_
Subfamily Gomphocerinae					
Ochrilidia geniculata	+	_	+	+	+
O. gracilis gracilis	+	_	+	+	_
Subfamily Eyprepocnemidinae					
Heteracris littoralis					
Eyprepocnemis alacris alacris	+	+	+	+	+
	+	_	_	+	+
Subfamily Acridinae					
Acrida exaltata					
Truxalis eximia eximia	+	+	+	+	+
T. fitzgeraldi	+	_	+	+	+
	+	_	_	+	_
Subfamily Cyrtacanthacridinae					
Anacridium aegyptium					
	+	_	_	+	_
Subfamily Tropidopolinae					
Tropidopola longicornis					
	+	_	+	_	+
Subfamily Spathosterninae					
Spathosternum prasiniferum					
	+	+	+	+	_
Family Pyrgomorphidae					
Subfamily Pyrgomorphinae	+	+	+	+	+
Chrotogonus (Chrotogonus) homalodemus homalodemus					
C. (Chrotogonus) trachypterus trachypterus	+	+	_	+	+
Poekilocerus pictus	+	+	+	+	+
Atractomorpha acutipenis blanchardi	+	_	+	+	+
Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa	+	+	+	+	+
Pyrgomorpha (Pyrgomorpha) bispinosa . deserti	+	+	+	+	+
Tenuitarsus orientalis	+	+	+	+	+
Family Dericorythidae					
Subfamily Dericorythinae					
Dericorys tibialis	+	_	+	+	_

Note: + available, _ Not available

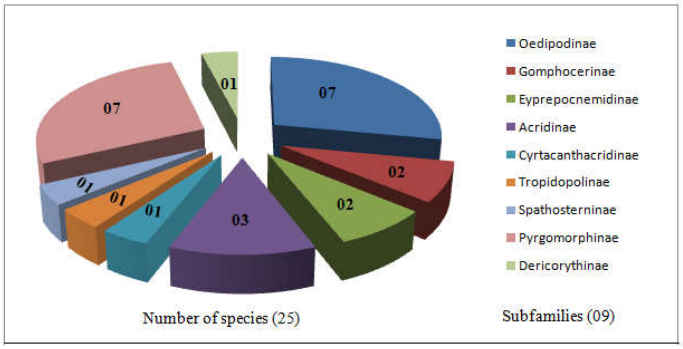

Figure 1. Distribution of various species in different subfamilies reported from Thar Desert

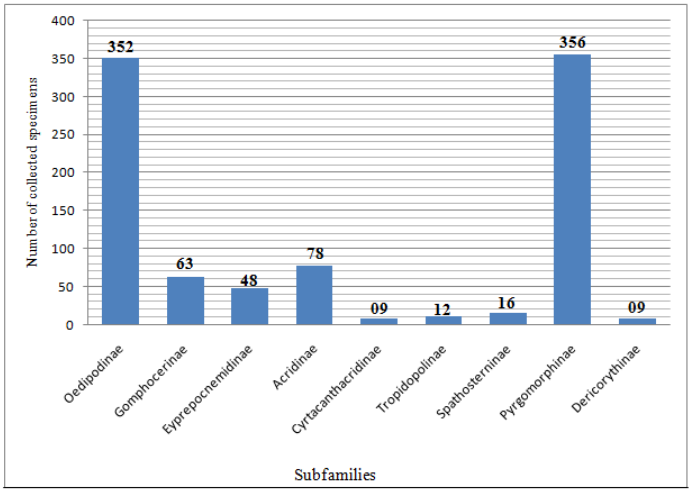

Figure 2. Occurrence of various subfamilies in Thar Desert

(a)

(b)

(c)

(d)

Countinue……..

(e)

(f)

(g)

(h)

(i)

(j)

(k)

(l)

Countinue……..

(m)

(n)

(o)

(p)

(q)

(r)

(s)

(t)

Countinue……..

(u)

(v)

(w)

(x)

(y)

Figure 3. (a) ***Hilethera aeolopoides,*** **(b)** ***Aiolopus thalassinus thalassinus*****, (c)** ***A. thalassinus tamulus*****, (d)** ***Sphingonotus (Sphingonotus) rubescens rubescens*****, (e)** ***S. (Sphingonotus) savignyi*****, (f)** ***Trilophidia annulata*****, (g)** ***Locusta migratoria*****, (h)** ***Ochrilidia geniculata*****, (i)** ***O. gracilis gracilis*****, (j)** ***Heteracris littoralis,*** **(k)** ***Eyprepocnemis alacris alacris*****, (l)** ***Acrida exaltata*****, (m)** ***Truxalis eximia eximia*****, (n)** ***T. fitzgeraldi*****, (o)** ***Anacridium aegyptium*****, (p)** ***Tropidopola longicornis*****, (q)** ***Spathosternum prasiniferum*****, (r)** ***Chrotogonus (Chrotogonus) homalodemus homalodemus*****, (s)** ***C. (Chrotogonus) trachypterus trachypterus*****, (t)** ***Poekilocerus pictus*****, (u)** ***Atractomorpha acutipenis blanchardi*****, (v)** ***Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa*****, (w)** ***P. (Pyrgomorpha) bispinosa. deserti*****, (x)** ***Tenuitarsus orientalis*****, (y)** ***Dericorys tibialis***

Dericorythidae, further break into 9-subfamilies i-e Oedipodinae, Acridinae, Eyprepocnemidinae, Tropidopolinae, Cyrtacanthacridinae, Gomphocerinae, Spathosterninae, Pyrgomorphinae and Dericorythinae and 25- species i-e *Hilethera aeolopoides* (Uvarov, 1922), *Aiolopus thalassinus thalassinus* (Fabricius, 1781), *A. thalassinus tamulus* (Fabricius, 1798), *Heteracris littoralis* (Rambur, 1838), *Acrida exaltata* (Walker, 1859), *Tropidopola longicornis* (Fieber, 1853),

Anacridium aegyptium (Linnaeus, 1764), *Sphingonotus (Sphingonotus) rubescens rubescens* (Walker, 1870), *S. (Sphingonotus) savignyi* Saussure, 1884, *Trilophidia annulata* (Thunberg, 1815), *Eyprepocnemis alacris alacris* (Serville, 1838), *Ochrilidia geniculata* (Bolivar, 1913), *O. gracilis gracilis* (Krauss, 1902), *Truxalis eximia eximia* Eichwald, 1830, *T. fitzgeraldi* Dirsh, 1950, *Spathosternum prasiniferum* (Walker, 1871), *Locusta migratoria* (Linnaeus, 1758), *Chrotogonus (Chrotogonus) homalodemus homalodemus* (Blanchard, 1836), *C. (Chrotogonus) trachypterus trachypterus* (Blanchard, 1836), *Poekilocerus pictus* (Fabricius, 1775), *Atractomorpha acutipenis blanchardi* Bolívar, 1905, *Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa* Walker, 1870, *P. (Pyrgomorpha) bispinosa deserti* Bey-Bienko & Mishchenko, 1951, *Tenuitarsus orientalis* Kevan, 1959, *Dericorys tibialis* (Pallas, 1773). Majority of species belong to the family Acrididae with 61.29% followed by family Pyrgomorphidae with 37.75% and family Dericorythidae with 0.95%. 07-subfamilies i-e Oedipodinae, Gomphocerinae, Eyprepocnemidinae, Acridinae, Cyrtacanthacridinae, Tropidopolinae, Spathosterninae of Acrididae, while, Pyrgomorphinae and Dericorythinae related with Pyrgomorphidae and Dericorythidae respectively. During present survey it was noticed that Thar Desert has wealth of grasshopper's fauna but due to harsh climatic conditions and wide area occupied by Thar Desert large number of specimens were not come into collection. Earlier, Riffat *et al.,* (2013) reported 29 species from desert areas of Tharparkar, Umerkot, Sanghar and Badin districts of Sindh and has reported *Criotettix* from low sea level for the first time. Hirdesh and Usmani (2014) described 37 species of locusts and grasshoppers representing 25 genera and 11 subfamilies belonging to the family Acrididae were reported from different localities of Rajasthan (India).

Rashid and Kamil (2012) reported 41 species belonging to 28 genera of 10 subfamilies, 3 families and 4 tribes from Jharkhand India. Similarly, Suhail *et al.,* (2000) reported 6 grasshopper's species belonging to the subfamilies Tropidopolinae and Truxalinae from various localities of Pakistan. Riffat *et al.,* (2013) while determining the grasshopper population in Thar reported that there are some practical difficulties were often encountered to collector in observed areas. Similarly, during the present survey thick or coarse vegetation surrounded by tall grasses and harsh climatic condition prevent us for frequent collection. More recent, Prabakar *et al.,* (2015) carried the work on the Orthoptera diversity from Tamil Nadu India. They reported 12 species/subspecies along with them known distribution, morphological description and pest status but they could not report *Hilethera aeolopoides, Heteracris littoralis, Anacridium aegyptium, Ochrilidia geniculata, O. gracilis gracilis, Truxalis eximia eximia* species from Tamil Nadu. At the present we have reported fair numbers of grasshopper from this area. Thus the result of present study revealed that grasshoppers were present throughout the year but their population level varied species to species at different time of the year. On the basis of peak seasonal activities of abundant and prevalent species, it can be suggested that control measures would be effective during May to early July when their hatching start. Since monsoon rain is uncertain in Thar, a careful watch over population build up of grasshoppers is also necessary at selected area. It was observed that the population of some occasional species was higher during monsoon month i-e (June to August) as compare to prevalent species. The population build up of these species appeared to have direct influence in relation to the amount and extent of rainfall in the area.

Conclusion

It could be concluded that majority of specimens belong to Acrididae followed by Pyrgomorphidae and only one single species i-e *Dericorys tibialis* of Dericorythidae was captured from Thar. Present study fills some gaps in the existing knowledge of fauna of Caeliferans of Pakistan. Moreover, the finding of the present study will be useful in making predictions about the relationship between the species and for accurate identification.

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