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An Orthoptera of the district Umerkot Sindh

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Abstract
An inventory of Orthoptera species found in the various ecological habitats in Umerkot is presented here. In the result of an extensive survey 734 specimens were captured from the 4 important talukas of district Umerkot i.e. Umerkot, Kunri, Pithoro and Samaro during the year 2015-2016. The collected material was sorted out into 3 families i.e. Acrididae, Pyrgomorphidae and Dericorythidae and further break into 7 subfamilies pertaining to 12 tribes, 15 genera and 18 species. Additions to this, useful plants attack by Orthoptera species were also enlisted. This is first ever effort has been carried out from Umerkot.

Keywords: Orthoptera, ecological, habitat, Umerkot, host plant

1. Introduction
District Umerkot is a historically important administrative unit that plays an important role in the economy and trade of eastern Sindh. Formerly known as Amarkot, it was the capital of Greater Sindh Province, including some parts of present day's Rajasthan state of India. District Umerkot lies in 690 10' 08" to 700 19' 44" east longitudes and 240 52' 54" to 250 47' 59" north latitudes. The district is divided into two distinct regions i-e the eastern part and the western part. The eastern half of the district, which comprises of the taluka Umerkot, basically comprises of Thar Desert. This region is distinguished by its low and erratic rainfall, high atmospheric aridity, abundant sunshine and heat, strong dust-raising winds and sparse vegetation cover. High sand dunes and sandy plains cover 70% of its surface. However, the region is gifted with a large variety of natural vegetation, there being over 700 species of grasses, shrubs and trees. *Zea mays* and *Triticum aestivum* are also grown here and attacked by numbers of pest species [2, 18]. Considerable taxonomic work has been done on the Orthoptera of plain, cultivated and semi-mountainous area [22, 23, 24, 25, 26, 27, 3, 19, 20, 21, 7, 8, 10, 12, 13, 14, 15, 17, 9, 11]. Nevertheless, surveys and collections of Orthoptera is limited [16] from this region. Thus, information pertaining to seasonal occurrence of grasshoppers in a given habitat with different ecological conditions i-e cropped/ non-cropped areas will be useful in understanding population density in this area.

2. Material and Methods
2.1 Sampling
Many extensive visits were carried out in 4 talukas i-e Umerkot, Kunri, Pithoro and Samaro during year 2015-2016. Mostly the specimens were captured at night time in order to avoid the extreme weather of this region. Samples were collected from agriculture fields of maize, sugarcane, millets, fodder crops and their surrounding vegetation of grasses with the help of traditional insect hand net as well as by hand picking. Collections were brought into laboratory for further analysis.

2.2 Killing and placement of samples
The method given by Vickery and Kevan [28] has been adapted. Specimens were euthanized by placing them in chloroform for 15 minutes. Insect pins were inserted on the pronotum posterior to transverse sulcus slightly to the right of median dorsal carina. The left wings were set with the long axis of the body nearly at right angle to the pin and head was directed slightly downwards. The posterior legs were bent beneath the body. After that they examined under Stereoscopic Dissecting Binocular Microscope.
Morphometric features were analyzed with external traits. Close up photographs of specimens were taken by using (Canon IXY430F) digital camera.

2.3 Arrangement and identification of samples
All the specimens were arranged alphabetically for easy to reference and deposited in Sindh Entomological Museum (SEM) Department of Zoology, University of Sindh Jamshoro with complete ID, indicating name of collector, place of collection and date along with host plant. Tahir Rajput kindly identified host plant.

3. Results and Discussion
In result of extensive survey a total of 734 specimens were captured and sorted out into 3 families i-e Acrididae, Pyrgomorphidae and Dericorythidae, these families further break up into 7 subfamilies i-e Oedipodinae, Pyrgomorphinae, Eyprepocnemidinae, Acridinae, Tropidopolinae, Dericorythinae and Cyrtacanthacridinae, possess 12 tribes, 15 genera and 18 species i-e *Hilethera aeolopoides* (Uvarov, 1922), *Chrotogonus (Chrotogonus) homalodemus homalodemus* (Blanchard, 1836), *Aiolopus thalassinus thalassinus* (Fabricius, 1781), *Heteracris littoralis* (Rambur, 1838), *Poekilocerus pictus* (Fabricius, 1775), *Acrida exaltata* (Walker, 1859), *Atractomorpha acutipenis blanchardi* Bolívar, 1905, *Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa* Walker, 1870, *Pyrgomorpha (Pyrgomorpha) bispinosa deserti* Bey-Bienko and Mishchenko, 1951, *Tenuitarsus orientalis* Kevan, 1959, *Chrotogonus (Chrotogonus) trachypterus trachypterus* (Blanchard, 1836), *Tropidopola longicornis* (Fieber, 1853), *Dericorys tibialis* (Pallas, 1773), *Anacridium aegyptium* (Linnaeus, 1764), *Sphingonotus (Sphingonotus) rubescens rubescens* (Walker, 1870), *Sphingonotus (Sphingonotus)*

savignyi Saussure, 1884, *Trilophidia annulata* (Thunberg, 1815) and *Eyprepocnemis alacris alacris* (Serville, 1838). Most, dominant subfamily was reported Pyrgomorphinae with 48.50%, followed by Oedipodinae 22.34% and Eyprepocnemidinae 11.71%, while least one was Tropidopolinae with 3.13%. During the present survey it was noticed that species richness was highest in Umerkot followed by Kunri and Samaro while, least from Pithoro. It seems that many useful plants attacked by this group (Table 2). Overall, it was noticed that broom brush commonly known as khip is attacked by *Hilethera aeolopoides*, *Tenuitarsus orientalis*, *Dericorys tibialis*, *Sphingonotus* species while, cluster bean is effective by *Acrida exaltata*, *Atractomorpha* and *Pyrgomorpha* species. Bajar the most eatable crop of Thar is also significantly attacked by *Eyprepocnemis* species. Grasshoppers are polyphagus insect, consumed wide varieties of agriculture crops, vegetables fruits come in their permissive. Their many aspects were studied by earlier worker [16, 17] but no work has been done from this region [7, 12, 14].

During this study 18 species of Orthoptera were enlisted. Earlier, 29 species of grasshoppers were reported from Tharparkar, Umerkot, Sanghar and Badin districts of Sindh [16]. At the present 3 important families of grasshoppers have been captured, they have great economic importance. The order to prevalence of grasshopper species was varying in studied areas. It can be seen that *Pyrgomorpha, Chrotogonus*, *Tenuitarsus* and *Poekilocerus* species were prevalent (Table 1). It is thus evident that majority of prevalent species were found in cropped area. While, *Heteracris littoralis, Chrotogonus (Chrotogonus) trachypterus trachypterus* and *Sphingonotus (Sphingonotus) rubescens rubescens* were found in non-cropped area. The population patterns of these species during the year 2015-2016 have been presented in (Fig. 1). It can be seen that population of *Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa* was reported least in numbers. During field survey it was also noted that lower and higher range of temperature also affected the activities of this species. The grasshopper species were more active during March to July and population level was somewhat higher in cropped areas. Many species of Pyrgomorphidae cause damage to tea and tobacco in Nilgiri Hilli [1, 29] and some of them cause severe damage to rice in China and Taiwan [6]. In Taiwan it is abundant on Miscanthus species which grows around gardens and causes damage to cultivated plants. Beside this, there are reports of serious devastation to rice in India and Pakistan by [5, 17]. Present study recommends that if more extensive survey would be taken other species of major, minor and sporadic importance will come in collection, because the economic importance of a species often varies greatly in different parts of its range and season [4].

4. Conclusion

During the present study significant numbers of grasshoppers have been collected from 04 selected areas. It was observed that greater numbers of *Chrotogonus (Chrotogonus) homalodemus homalodemus* was reported followed by *Tenuitarsus orientalis* and *Poekilocerus pictus*. However, *Sphingonotus (Sphingonotus) rubescens rubescens*, *Aiolopus thalassinus thalassinus* and *Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa* were reported in least number i-e, 21, 19, 14 respectively. It was also noted that ratio of Pyrgomorphinae was higher as compare to other described species. Beside this, Khip, Guar and Booh plants severly attack by Orthopteras species. Additionally, through finding of this designed study people associated with agriculture especially plant protection and pest management will be benefited towards an initiating the exact date of occurrence of Pest species in field.

Table 1: List of subfamilies and tribes of collected species from district Umerkot

S. No.	Species	Total (734)	Subfamily	Tribe
1.	*Hilethera aeolopoides*	42	Oedipodinae	Epacromiini
2.	*Chrotogonus (Chrotogonus) homalodemus homalodemus*	67	Pyrgomorphinae	Chrotogonini
3.	*Aiolopus thalassinus thalassinus*	19	Oedipodinae	Epacromiini
4.	*Heteracris littoralis*	54	Eyprepocnemidinae	Eyprepocnemidini
5.	*Poekilocerus pictus*	64	Pyrgomorphinae	Poekilocerini
6.	*Acrida exaltata*	52	Acridinae	Acridini
7.	*Atractomorpha acutipenis blanchardi*	33	Pyrgomorphinae	Aractomorphini
8.	*Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa*	14	Pyrgomorphinae	Pyrgomorphini
9.	*Pyrgomorpha (Pyrgomorpha) bispinosa deserti*	74	Pyrgomorphinae	Pyrgomorphini
10.	*Tenuitarsus orientalis*	66	Pyrgomorphinae	Chrotogonini
11.	*Chrotogonus (Chrotogonus) trachypterus trachypterus*	38	Pyrgomorphinae	Chrotogonini
12.	*Tropidopola longicornis*	23	Tropidopolinae	Tropidopolini
13.	*Dericorys tibialis*	26	Dericorythinae	Dericorythini
14.	*Anacridium aegyptium*	27	Cyrtacanthacridinae	Cyrtacanthacridini
15.	*Sphingonotus (Sphingonotus) rubescens rubescens*	21	Oedipodinae	Sphingonotini
16.	*Sphingonotus (Sphingonotus) savignyi*	34	Oedipodinae	Sphingonotini
17.	*Trilophidia annulata*	48	Oedipodinae	Trilophiidini
18.	*Eyprepocnemis alacris alacris*	32	Eyprepocnemidinae	Eyprepocnemis

Table 2: Useful plants attack by Orthoptera species occurring in district Umerkot

S. No.	Species	Host plant
1.	*Hilethera aeolopoides*	Khip (Broom Brush).
2.	*Chrotogonus (Chrotogonus) homalodemus homalodemus*	Khejri (Prosopis cineraria)
3.	*Aiolopus thalassinus thalassinus*	Trooh (Bitter-apple)
4.	*Heteracris littoralis*	Booh (Snow bush)
5.	*Poekilocerus pictus*	Aak (Apple of Sodom)
6.	*Acrida exaltata*	Guar (Cluster bean)
7.	*Atractomorpha acutipenis blanchardi*	Guar (Cluster bean)

8.	*Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa*	Guar (Cluster bean)
9.	*Pyrgomorpha (Pyrgomorpha) bispinosa deserti*	Trooh (Bitter-apple)
10.	*Tenuitarsus orientalis*	Khip (Broom Brush)
11.	*Chrotogonus (Chrotogonus) trachypterus trachypterus*	Booh (Snow bush)
12.	*Tropidopola longicornis*	Phog (Calligonum)
13.	*Dericorys tibialis*	Khip (Broom Brush)
14.	*Anacridium aegyptium*	Booh (Snow bush)
15.	*Sphingonotus (Sphingonotus) rubescens rubescens*	Khip (Broom Brush)
16.	*Sphingonotus (Sphingonotus) savignyi*	Khip (Broom Brush)
17.	*Trilophidia annulata*	Booh (Snow bush)
18.	*Eyprepocnemis alacris alacris*	Bajar (Barley)

Table 3: The Occurrence of different species of Orthoptera from district Umerkot

S. No.	Species	Surveyed areas			
		Umerkot	Kunri	Pithoro	Samaro
1.	*Hilethera aeolopoides*	+	+	+	+
2.	*Chrotogonus (Chrotogonus) homalodemus homalodemus*	+	+	+	+
3.	*Aiolopus thalassinus thalassinus*	+	+	_	+
4.	*Heteracris littoralis*	+	+	+	+
5.	*Poekilocerus pictus*	+	+	+	+
6.	*Acrida exaltata*	+	_	_	+
7.	*Atractomorpha acutipenis blanchardi*	+	_	+	+
8.	*Pyrgomorpha (Pyrgomorpha) bispinosa bispinosa*	+	+	+	+
9.	*Pyrgomorpha (Pyrgomorpha) bispinosa deserti*	+	+	+	+
10.	*Tenuitarsus orientalis*	+	+	_	_
11.	*Chrotogonus (Chrotogonus) trachypterus trachypterus*	+	_	+	+
12.	*Tropidopola longicornis*	+	_	_	_
13.	*Dericorys tibialis*	+	_	_	_
14.	*Anacridium aegyptium*	+	+	_	+
15.	*Sphingonotus (Sphingonotus) rubescens rubescens*	+	+	_	_
16.	*Sphingonotus (Sphingonotus) savignyi*	+	+	_	_
17.	*Trilophidia annulata*	+	+	+	+
18.	*Eyprepocnemis alacris alacris*	+	_	_	_

Note: + Available, - Not available

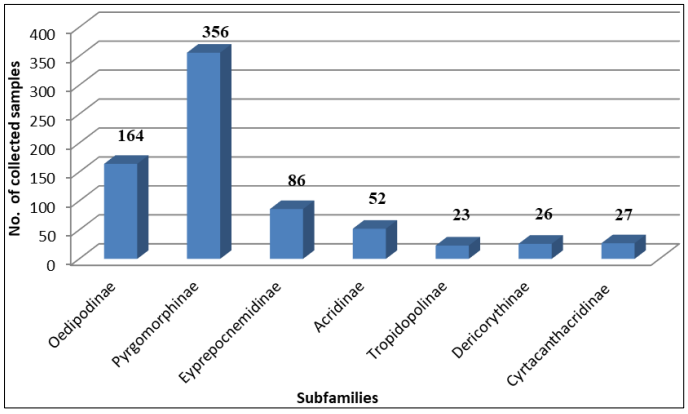

Fig 1: The total number of collected specimens from district Umerkot

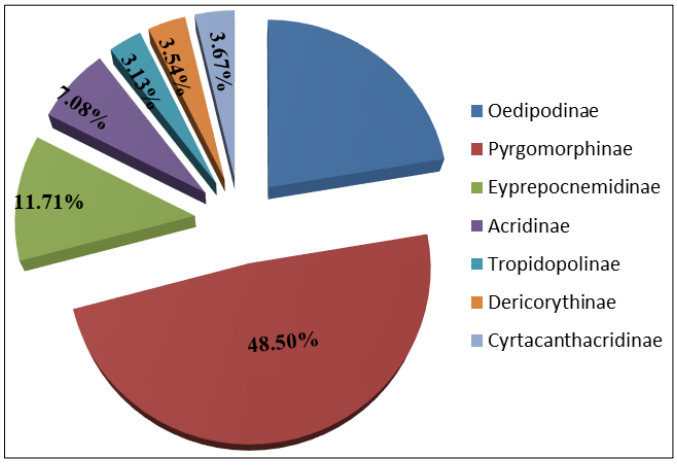

Fig 2: The Percentage of different subfamilies from district Umerkot

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