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Incidence of *Gryllidae* on Different Host Plants from Mirpurkhas, Sindh

Shamshad Ali Talpur, Riffat Sultana, Barkat Ali Bughio, Jeram Das, Abdul Aziz Babar 10.18805/ag.DF-465

ABSTRACT

Background: True cricket is the popular name for representatives of the Gryllidae family. *Gryllidae* insects can damage agricultural crops such as wheat, maize, cotton and grasses. The purpose of this study was to identify the most effective plants as well as economic losses in the district of Mirpurkhas.

Methods: A total of 626 specimens were captured as a consequence of this investigation from 07 various places in the District of Mirpurkhas. *Gryllidae* are phytophagous insects that eat a vast number of crops, in addition, crickets damage paper, clothing, carpets and furniture. The Standard Entomological technique and instruments were used to correctly identify cricket species. The taxonomic work was mounted, labeled and sorted properly.

Result: As a consequence of this work during 2019-2020. 05 genera and 11 species with 01 subspecies belonging to 02 subfamilies of family *Gryllidae* were distinguished during the current examination. Out of these species, 01 species and 01 subspecies; *Gryllus multipulsator* and *Gryllus* (*gryllus*) assimilis assimilis subspecies were recorded for the first time from the area.

Key words: Agricultural crops, Cricket, *Gryllidae*, New records, Phytophagous.

INTRODUCTION

Mirpurkhas is the fourth largest city in Sindh province and Pakistan's 33rd largest city. Mirpurkhas is noted for its mango cultivation, exporting hundreds of varieties of mangoes each year. It is also regarded as the "Mango Capital of the World." The order Orthoptera and suborder Ensifera contain the Gryllidae family, which are generally called as long-horned grasshoppers due to their long antennae. In their natural environment, they are nocturnal and are known for chirping, however, only the male creates sound. The Gryllidae family of insects can indeed be found in a wide range of environments, including trees, shrubs, herbs, vegetation, soil wetness and grasses. Crickets, like cockroaches, have chewing mouthparts and can eat almost anything. At night, they are attracted to the lights around a building. Crickets have a global distribution and can be found in all regions of the world. They are phytophagous, indicating that graze a wide range of crops. Crickets have a negative impact on the economy by damaging seedlings and a high number of crickets can be actually detrimental. Black field crickets wreak havoc on crops and gardens and their chirping may be quite loud and obnoxious.

Ghouri and Ahmed (1959); Chopard (1969); Yunus *et al*., (1980); Ramzan (1984); Qayoom *et al*., (1987); Abdullah (1995); Saeed *et al*., (2000); Malik *et al*. (2015) and Riffat *et al*., (2016) all identified cricket fauna in Pakistan. The majority of researchers gathered material in Punjab, with only a few allusions to specific locations in Sindh in the literature, such as Karachi, Sukkur, Badin Hyderabad and the Thar Desert. As a result, the point of the study was to survey and identify cricket species in the district of Mirpurkhas-Sindh.

Department of Zoology, University of Sindh, Jamshoro-76080, Sindh, Pakistan.

Corresponding Author: Shamshad Ali Talpur, Department of Zoology, University of Sindh, Jamshoro-76080, Sindh, Pakistan. Email: shamshadtalpur@gmail.com

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MATERIALS AND METHODS

During the year 2019-2020, a study on the finding of crickets was done in the district of Mirpurkhas-Sindh. During the investigation, seven localities in the district of Mirpurkhas were visited: Digri, Mirpurkhas Sindhri, Shujabad (Mirwah), Jhuddo, Hussain Bux Mari and Kot Ghulam Muhammad. Specimens were taken from trees, shrubs, herbs, grasses, bakeries, holes in the walls, on lights at night, leaf litter, soil fissures, crops, vegetable fields and areas near human habitats.

The procedure proposed by Vickery and Kevan (1983) was used for specimen killing and preservation. All samples are obtained with an insect net and by hand. Captured samples were taken to the lab for additional examination. After killing all specimens in a glass jar with chloroform, samples were pinned using a standard entomological approach. The morphology and hidden genitalia of the obtained material were used to identify them. The Standard Entomological technique and instruments were used to correctly identify cricket species. The taxonomic work was mounted, labeled and sorted properly.

RESULTS AND DISCUSSION

During the current study on cricket species in the district of Mirpurkhas-Sindh, 05 genera and 11 species were found, with 01 subspecies belonging to 02 subfamilies of the main family Gryllidae.

Key to subfamilies of gryllidae occurring in district mirpurkhas

1	Posterior tibia with short spines, Head without dorsal bristles, Cerci long with minute hairs and pointed at apex, Ovipositor with smooth margins…	Gryllinae
-	Posterior tibia with long spines, Head with dorsal bristles, Cerci long and slender, Ovipositor with denticulate margin……..	Nemobiinae

As a consequence of this work, 626 samples were collected from Digri, Jhuddo, Mirpurkhas, Mirwah (Shujaabad), Sindhri, Kot Ghulam Muhammad and Hussain Bux Mari in District Mirpurkhas (Table 1). The specimens were mostly captured from agricultural land, trees, herbs, natural vegetation and holes in homes, among other places. Gryllinae and Nemobiinae were the two sub-families that were identified from the collected material. These 02 subfamilies belong to 03 tribes (Gryllini, Medicogryllini and Pteronemobiini) and 05 genera (*Acheta domesticus*, Linnaeus, 1758, *Acheta chudeaui*, Chopard 1927, *Acheta meridionalis*, Uvarov, 1921, *Acheta thoracica saeed et al.* 2000, *Gryllus bimaculatas*, De Geer, 1773, *Gryllus (gryllus) quadrimaculatus apicalis* Bolivar, 1900, *Teleogryllus*

Table 1: Distribution of species in various localities of District Mirpurkhas.

Species	Localities								
	Digri (n = 203)	Mirpurkhas (n = 66)	Mirwah (n = 93)	Kot ghulam Muhammad (n = 70)	Sindhri (n = 63)	Hussain bux mari (n = 63)	Jhuddo (n = 68)	Total (n = 626)	Percentage %
Acheta domesticus	63	16	21	20	21	28	22	191	30.51%
Acheta chudeaui	15	2	6	5	7	4	2	41	6.54%
Acheta meridionalis	13	3	7	4	5	3	4	39	6.23%
Acheta thoracica (Saeed et al. 2000)	5	-	-	-	-	-	-	05	0.79%
Gryllodes sigillatus	41	18	29	21	9	11	17	146	23.32%
Gryllodes supplicans	26	21	16	13	17	13	18	123	19.64%
Gryllus bimaculatus	20	4	6	7	3	4	4	48	7.66%
Gryllus (Gryllus) assimilis assimilis subspecies	1	-	-	-	-	-	-	01	0.15%
Gryllus quadrimaculatus apicalis	5	-	-	-	-	-	-	05	0.79%
Gryllus multipulsator	8	-	-	-	-	-	-	08	1.27%
Telogryllus mitratus	-	-	5	-	-	-	-	05	0.79%
Pteronemobius concolor	6	2	3	1	1	-	1	14	2.23%

Note: Total number of specimens were collected 626.

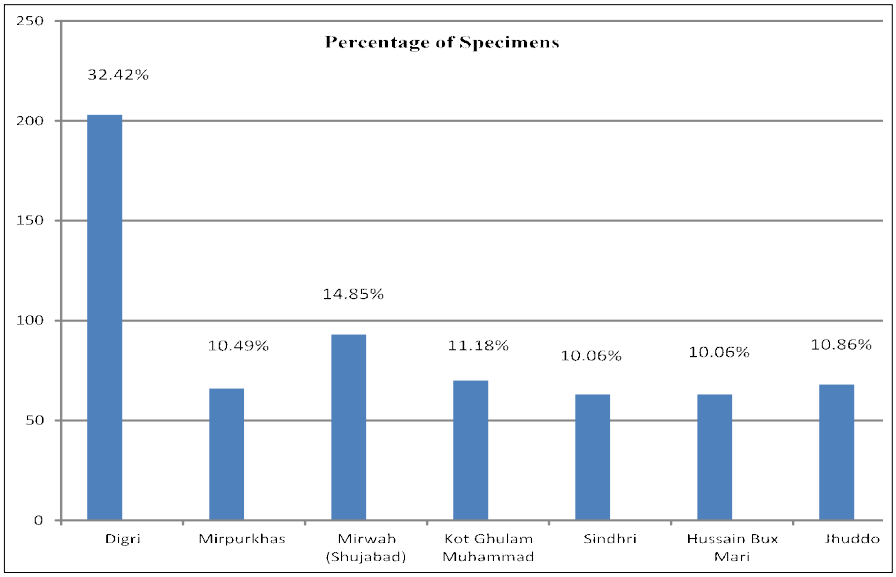

Fig 1: Showing percentage of specimens collected from various localities of District Mirpurkhas.

Table 2: List of host plants affected by various species of gryllidae in District Mirpurkhas.

Host plants	
Comman name	Scientific name
Common lawn grass	*Cynadon dactylon*
Prosopis (Devi)	*Prosopis glandulosa*
Common lawn grass	*Cynadon dactylon*
Common lawn grass	*Cynadon dactylon*
Jaar / Miswak tree	*Salvadora oleiodes*
Aak	*Calotropis procera*
Barley	*Hordenum vulgare*
Common lawn grass	*Cynadon dactylon*
Ber (chinese date)	*Ziziphus mauritiana*
Common lawn grass	*Cynadon dactylon*
Snow bush	*Breynia nivosa*
Cluster bean	*Cyamopsis tetragonoloba*

Note: Crickets are cosmopolitan insects occurring in wide variety of habitats *i.e.* trees, shrubs, herbs, vegetations, soil moisture and grasses. The family Gryllidae (crickets) is an important group of Orthoptera and it has significant number of plant pests that cause damage to cotton, sugar cane, wheat, rice, vegetable fields and also to household things.

(macroteleogryllus) mitratus Burmiester, 1838, *Gryllus (Gryllus) assimilis assimilis* Fabricius, 1775, subspecies, *Gryllus multipulsator*, Weissman, 2009, Grylline subfamily representatives *Gryllodes sigillatus* Walker, 1869 and *Gryllodes supplicans* Walker, 1859. Walker, 1871 identified *Pteronemobius concolor* as a member of the Nemobiinae family. *Acheta domesticus* ranked first with 30.51 per cent of the total species collected, followed by *Gryllodes sigillatus* with 23.32 per cent. Furthermore, a large number of specimens were taken in Digri (32.42%), followed by Mirwah (14.85%) and the smallest population of Gryllidae was found in Hussain Bux Mari (10.06%) and Sindhri (10.06%) (Fig 1).

The purpose of this study was to discover the cricket fauna and their host plants (Table 2) in the Mirpurkhas district. Several researchers have carried out taxonomic studies on the spread of the Gryllidae fauna. Chopard (1969) described species from Pakistan and neighboring countries that belong to 12 Grylliodea groups. Saeed *et al*. (2000) conducted a detailed survey of Gryllidae fauna in Pakistan, visiting various locations and identifying fauna at the family, subfamily and generic levels. However, the number of workers collected material from Punjab and only references to specific areas in Sindh, such as Karachi, Sukkur, Badin, Hyderabad and the Thar Desert, can be found in the literature.

CONCLUSION

As a result of this work, a total of 626 specimens were captured from 07 localities of District Mirpurkhas. At present study it was also noted that many species of crickets are dimorphic in the length of the metathoracic wings. Long winged are macropterous individual may fly, short winged or micropterous individual cannot. Present study suggests that it might be due to genetic and environmental factors that cause an individual to develop long or short wings. It was noted that, the distribution of all previously recorded species has been greatly extended to the new localities. The taxonomic keys for various taxa have also been constructed for their future identification. These findings supplied important basis and data for integrated Pest Management (IPM) of Gryllidae, biodiversity conservation and grassland restoration in Sindh.

Conflict of interest: None.

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