



Short Communication

Extended List of Orthoptera Fauna of Cholistan Desert (Punjab, Pakistan)

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ABSTRACT

Cholistan has a diverse fauna and flora, but until now its orthopteran fauna is relatively unstudied. The survey was conducted during November 2018 to August 2019. We found 25 species of grasshoppers, crickets and tree crickets. Caelifera were more diverse than Ensifera with 16 and 9 species, respectively. This work is provided an extended list of Orthopterans registered from Cholistan desert for the first time.

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Authors' Contribution

SK collected the samples. RS designed the study and MH identified the species.

Key words

Faunistics, Orthoptera, Cholistan

The Cholistan desert is a part of the world's seventh largest desert, the Great Desert, which stretches along the south border of Punjab province, Pakistan (Rao *et al.*, 1989). The total area of Cholistan desert is about 26,000 km²; it lies between 27° 42' and 29° 45' North and 69° 52' and 75° 24' East at an altitude of about 112 m above sea level (Arshad *et al.*, 2007). Topography, soil type and texture, and vegetation structure divide this desert into two distinct regions: the northern region (Lesser Cholistan) covers about 7,770 km² and the southern region (Greater Cholistan) about 18,130 km². Greater Cholistan extends from the most recent course of the extinct Hakra River to the border with India (Akhter and Arshad, 2006).

The high diversity of habitats also allows for high biodiversity, especially in insects. As insects, and especially grasshoppers, are known to be a major component of grassland biodiversity they play vital role in food webs, e.g. as primary herbivores and abundant food resource for other animals, such as birds and reptiles (Quinn *et al.*, 1993; Lockwood, 1996). Many species of grasshoppers are further known as pests, which may cause severe damage

to crop and farmland. However, while some species are detrimental, many Orthoptera species have been strongly declining, even in remote regions (Hodjat *et al.*, 2019). In order to recognize such decline, it is important to have lists of the local fauna. However, despite their importance for the food web, as well as their economic relevance as pests, Orthoptera diversity still is understudied in many regions, also in Cholistan. Therefore, we here provide a first list of Orthoptera species from the Cholistan desert based on field and literature surveys.

Material and methods

The study was conducted in Cholistan desert (27° 42' and 29° 45' N, 69° 52' and 75° 4' 27" E). Cholistan, is a barren desert, bound on the north and west by the Hakra depression with ruins of old settlements along its high banks; it is still inhabited by nomads. It is located about 30 km from Bahawalpur. It covers an area of about 16,000 km² and extends into the Thar Desert of India. The region was once watered by the Hakra River, known as the Saravati in Vedic times. At one time there were 400 forts in the area and archaeological finds around the Darawar Fort, the only place with a perennial waterhole. The average annual rainfall is only 12 cm, and the only cultivation possible is supported by underground wells, drawn up by the camels.

Collected insects were brought to the laboratory and killed by means of potassium cyanide in standard entomological killing bottles. The specimens were not left too long (30 minutes) in cyanide because the color changed particularly that of green specimens. Specimens were pinned within few hours after sacrificing. Mounting

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was done according to the standard procedure described by [McE-Kevan \(1989\)](#). Dust and other extraneous matter were removed with the help of a dry camel hairbrush. The fully dried specimens were removed from stretching boards and were stored in standard entomological boxes with labels showing locality, date of collection and collector name. Samples of *Schiozcomicus* were transferred into polythene bags and brought to the laboratory where they were put in small glass jars containing 90% ethanol with a few drops of glycerin. After a couple of weeks, fresh 90% ethanol was added in the glass jars.

Identification of samples was carried out by following [Khattar \(1972\)](#). Collected material was deposited in the Sindh Entomological Museum at the Department of Zoology, University of Sindh, Jamshoro.

Results and discussion

We were able to collect a total of 507 specimens and sorted out into 25 species of Orthoptera; these included 19 Caelifera (true grasshoppers) in the two families Acrididae and Pyrgomorphidae and 8 subfamilies (Acridinae, Cyrtacanthacridinae, Calliptaminae, Eypreocnemidinae, Oxyinae, Spathosterinae, Oedipodinae and Pyrgomorphinae). Ensifera were less diverse with 9 species in 4 families (Gryllidae, Gryllotalpidae, Schizodactylidae and Tettigoniidae). During this study the more prominent group was Caelifera, which is mainly diurnal and particularly active in warm weather and sunshine. During field survey it was noted that grasshoppers we mainly caught on the ground or in low vegetation when the temperature was high. Generally, more individual-rich and more diverse catches were made in summer and spring, whereas numbers decline with a rise in temperature from February to October in Cholistan.

Number of species in all recognized families of different orders collected from Cholistan Desert were as follows:

Sub-order: Caelifera

Family: Acrididae

Sub-family: Acridinae

Species: *Acrida exaltata* (Walker, 1859)

Truxalis eximia eximia (Eichwald, 1830)

Sub-family: Cyrtacanthacridinae

Species: *Schistocerca gregaria* (Forsk., 1775)

Sub-family: Calliptaminae

Species: *Acorypha glaucopsis* (Walker, 1870)

Sphodromerus undulatus undulatus (Kirby, 1914)

Sub-family: Eypreocnemidinae

Species: *Eypreocnemis alacris alacris* (Audinet-Serville, 1838)

E. alacris impicta (Uvarov, 1933)

Sub-family: Oxyinae

Species: *Oxya hyla hyla* Audinet-Serville

O. velox (Fabricius, 1831)

Sub-family: Spathosterinae

Species: *Spathosternum prasiniferum* (Walker, 1871)

Sub-family: Oedipodinae

Species: *Acrotylus humbertians*, Saussure, 1884

A. longipes longipes, Charpentier, 1845

Aiolopus thalassinus thalassinus, (Fabricius, 1781)

A. thalassinus tamulus, (Fabricius, 1798)

Locusta migratoria (Linnaeus, 1758)

Sphingonotus savignyi Saussure 1884

Family: Pyrgomorphidae

Sub-family: Pyrgomorphinae

Species: *Chrotogonus tracypterus tracypterus* (Blanchard, 1836)

C. tracypterus robertsi Kirby, 1914

Pyrgomorpha bispinosa bispinosa (Walker, 1870)

Poeciloceris pictus (Fabricius, 1775) (F.)

Sub-order: Ensifera

Family: Gryllidae

Sub-family: Gryllinae

Species: *Acheta domesticus* (Linnaeus, 1758)

Gryllus (Gryllus) bimaculatus Degeer, 1773

G. (Gryllus) campestris Linnaeus, 1758

Gryllodes sigillatus Walker, 1869

Family: Gryllotalpidae

Sub-family: Gryllotalpinae

Species: *Gryllotalpa africana* Palisot de Beauvois 1805

Gryllotalpa kimbasi Baccetti, 1992

Family: Schizodactylidae

Sub-family: Schizodactylinae

Species: *Schizocomicus* nov.gen Riffat 2019

Family: Tettigoniidae

Sub-family: Tettigoniinae

Species: *Phaneroptera spinosa*, Bei-Bienko, 1965

P. roseata, Walker, 1869

The current paper adds to the findings of [Riffat *et al.* \(2013\)](#), who reported 29 species of Orthoptera from the Thar Desert (N 24.8777°, E 70.2408°), of these 24 belonged to Acrididae, 4 to Pyrgomorphidae and a single species to the Tetrigidae. However, the authors were not able to report any single species of Ensifera from Thar. During this study we have reported 9 species of Ensifera of these 4 belong to family Gryllidae, 2 from Gryllotalpidae and Tettigoniinae and only single species from Schizodactylidae.

The most important species in terms of conservation is the genus *Schizocomicus* [Riffat \(2019\)](#), which is endemic to Cholistan and Thar Desert of Pakistan. It is

very interesting to note that during the present study 3 specimens of *Schizocomicus* were reported. Mostly they are burrow makers (both adults and nymphs). They hide themselves in burrows at day time while at night they came out from their burrows. The adults and nymphs usually dig their burrows near or close to water channel. Although, all species of Schizodactylidae were believed to inhabit self-constructed burrows during the day. In our survey we just saw tracing of different burrows on different spots that were descending at an angle of 45-60 degree varying with the slope of the surface and the sands angle of repose. We determined the moisture content and particle size of the sand, but as we were not able to open any burrow we also could not observe the specimen inside. The specimens which are in our hands were incidentally captured at 3:30 AM at different dates.

During this study we have reported that a number of orthopterans live underground, but are not burrowers, and comprise a number of cavernicolous or hypogean species like *Schizocomicus* and *Gryllotalpa*. It was observed that the orthopterans had higher densities and diversities compared to other groups of insects (i.e. Mantidae, Phasmidae).

A most unusual habitat in which orthopterans particular small crickets (ant-loving or ant-inquiline crickets) are expected to be found is within ant nests. However, during this survey we couldn't register any member of ant-inquiline crickets. Present study strongly recommend that more extensive and regular surveys are needed in this region in order to explore the hidden wealth of this desert at globally.

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Statement of conflict of interest

The authors have declared no conflict of interest.

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