



A New Genus *Schizocomicus* (Schizodactyloidea: Ensifera) from Sindh, Pakistan

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ABSTRACT

A new genus *Schizocomicus* of the superfamily Schizodactyloidea is described from Tharparkar district, Pakistan. Hind spure of this new genus look like table tennis racket, broad distantly and narrow from one side while from the other side these are elongated. Wings are completely absent. The body is light yellowish with black patches dorsally and brown ventrally.

Article Information
Received 03 May 2018
Revised 09 July 2018
Accepted 20 December 2018
Available online 18 June 2019

Key words
New genus, *Schizocomicus*, Sindh,
Pakistan.

INTRODUCTION

Tharparkar lies in the south-east of Sindh province with a population of about 1.2 million. It is one of the poorest of country's 120 districts, with the lowest human development index. Ground-water in Tharparkar is largely brackish. The area surrounding the city is a rocky belt called Parkar and the remaining part is a sandy area. The superfamily Schizodactyloidea represents most remarkable members of the Order Orthoptera and was known to comprise of two genera *Schizodactylus* and *Comicus*. The species of these genera have been described from the shores of the River Ganga, Bengalia and is mainly found in India, Bangladesh, Pakistan, Sri Lanka and Burma. These are formidable burrowing insect, This species makes burrows in the sand, usually near rivers and streams, the young are similar to the full grown insects but not winged, the appearance of the winged insect with its most formidable jaws is most sticking they are primarily nocturnal and are thought to be active predators (Maxwell, 1906; Fletcher, 1914; Khattar, 1972). The species of Schizodactyloidea play very important role in an ecosystem that prevents certain insect's populations from increasing and becoming dominant in sand dune habitat. Besides the mentioned factors these species constitute an important part of food of many arthropods and vertebrates night-prowlers and that they are themselves are voracious carnivorous with a turn for predatism.

A plentiful work has been done on morphology, burrow excavating behavior external genitalia, post genital segments and other important taxonomic features of

Orthopteran species including *Schizodactylus monstrosus* carried out by Walker (1919, 1922, 1949), Crampton (1929), Ramme (1931), Hubbell (1936), Snodgrass (1937, 1957), Ragge (1957), Imms (1957), Khattar (1958, 1959, 1972), Khattar and Srivastava (1962) and Randell (1964) its sub social behavior studied by Choudhuri and Bagh (1974) and Channa *et al.* (2011, 2013). Although, the morphology, anatomy, sub social behavior and population dynamics of *S. monstrosus* has been studied by Ragge (1957), Khattar (1965, 1972), Choudhari and Bagh (1974) and Hazra *et al.* (1983) and for *S. hesperus* Bienko and Povolony (1967) but for *comicus* species no such study has been undertaken. Surprising during field survey 3 specimens (on different dates) of Schizodactyloidea were captured which, offer some distinctive characteristic not occurring in its two existing genera.

MATERIALS AND METHODS

Three male specimens were collected from Tharparkar (24.87°N-70.24°E). The material was collected on moderate slopes or level in deep layers of loose and fine sand, with or without thin semi-desert vegetation or in places to which layers of this fine soil were deposited by wind. From the field, the collected material was transferred into polythene bags and brought to the laboratory where they were put in small glass jars containing 70% alcohol with a few drops of glycerin and then a label showing locality, date of collection and collector name was pasted on each jar. After a couple of weeks, fresh 70% alcohol was added in the glass jars and the old one was replaced in order to perverse the insects longer. The terminology regarding the different body regions adopted here was that of Khattar (1972).

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0030-9923/2019/0005-1693 \$ 9.00/0
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Table I.- Comparative table showing the morphometric characteristic of various genera of Schizodactyloidea.

Body parameters	Morphometry				
	<i>S. minor</i> (n=10)		<i>S. monstrosus</i> (n=10)		<i>Schizocomicus</i> genus nov. (n=03) ♂
	♂	♀	♂	♀	
Head length	3.93±0.37	3.9±0.1	6.36±0.55	7.76±0.66	7.16±0.28
Distance b/w two eyes	3.21±0.08	3.25±0.09	12.53±0.70	13.36±0.39	7.66±0.28
Length of pronotum	5.17±2.07	6.90±0.13	5.7±0.54	6.27±0.14	6.66±0.28
Hind femur	13.72±0.78	15.32±0.10	23.41±0.72	23.35±0.66	23.33±0.57
Hind tibia	10.35±0.06	11.50±0.16	18.71±0.54	18.15±0.59	20.33±0.57
Hind tarsus	2.65±0.63	3.40±0.06	14.87±0.95	13.45±0.99	9.16±0.28
Cerci	5.06±0.01	5.51±0.10	9.62±0.54	8.36±0.29	6.83±0.28
Total body length	25.12±0.36	29.31±0.68	41.61±2.01	43.54±3.23	40.66±3.54



Fig. 1. *Schizocomicus* genus nov. A, dorsal view; B, ventral view; C, dorsal view of cerci; D, ventral view of cerci; E, dorsal view of tibia; F, ventral view of tibia. Scale bars = 1 mm.

RESULTS

Key to the genera of Schizodactyloidea

1. Size small to large, slender and graceful very long hind-wing in fully alate forms are present and when at rest are coiled into tight spiral at right angles to substrate 2
- Size usually medium more gracile body, long, slender legs, male sub genital plate elongated and narrow and complete reduction of the wings *Comicus*
2. Body surface bright whitish or creamish yellow with dark brown or grayish patches dorsally and creamish green ventrally *Schizodactylus*
- Body surface light yellow with black patches dorsally and brown ventrally *Schizocomicus* genus nov.

Schizocomicus genus nov.

(Fig. 1)

Description of male holotype

Size large (40.66±3.54 mm large) robust with unusual

appearance of brown dots the antennae filiform, long (each about 8.3 cm). The scape is light yellow with a brown dots on its inner side; the rest of antennae are light brown. Head large, frons long ovoid, vertex steeply sloping between compound eyes; fastigial vertices small, deeply furrowed lying between dorsal margins of internal scroba elevated. The large diamond shaped labrum covers the mandibles in front. Mandibles long, its lateral margins sinuate convex near base concave in middle and convex again are apical half apex sub-acute black pronotum. Fore femur with 5-6 min spinules on ventro- internal margins mid femur from with 7-8 spinules is ventro external margins and hind femur with 15-16 min spinules on both ventral margins, knee lobes of all legs obtuse. Fore tibia with 4 long ventro external and 4 long ventro internal spines and with 2 apical spurs at each side, the internal spurs the longer than the external ones, the internal spur the longest one. Mid tibia with 4 long thin dorso internal spines and 1 shorter dorso external spine just above the apical spurs; 2 apical spurs at each side, the internal spur being the longest one. Hind

tibia with dorso external and 4 dorso long thick internal spines, with 3 apical spurs at each side, the internal spurs longer than the external ones distally widened. Venter apical margin of hind tibia with 4 short spines just below apical spurs and with 1 longer spine at internal angle. Tibia surround by numerous thin hairs. Tarsi of all legs with 4 segment and a pair of apical claws, 2nd and 3rd segment very short and provided each with a pair of large plantulae; first segment of hind tarsus with a pair of large, compressed, triangular lateral projection deeply furrowed lying between dorsal margins of internal scroba elevated. Last abdominal tergite with broad and short median projection divided by profound median longitudinal furrow the upper surface of this projection covered by rather dense small spinulae. Sub-genital plate simple, elongated with conical broad lateral margins parallel in basal half convergent in apical half. Cerci elongated broad in apical area, with slight conical base.

Coloration

The general body coloration is light yellowish with black patches dorsally, and brown ventrally. Head above with dark longitudinal stripes and with a long bow-shaped vertical stripe behind eyes. The head whitish with a green tinge front, light cream laterally and with brown patches dorsally. Antenna is pale brown except scape which is whitish with a black dot on its inner side. Labrum whitish in colour, pronotum pinkish in color with light and dark brown patches dorsally. Wings are completely absent. The fore and mid tibiae are light brown while hind tibiae are light creamy color there are 4 sharp spines at both sides thick at base and thin and blackish from tip, claws yellowish in color. The abdominal tergites are off-white in color with dark brown patches on their mid posterior margins. Ventrally, the abdomen is creamy brown, and bulges slightly downwards. Cerci are elongated white in color and inundated with numerous sensory hairs. Hind spure of this species look like table tennis racket, broad distantly and narrow from one side while from the other side these are elongated and distantly broad like in *Schizodactylus* beside this hind pattern and mandibles are very closely resemblance with *Schizodactylus*.

Material examined

Islamkot (Sindh) 1 male 25.iv.2009 (Majid Bilal), Nangar Parkar (Sindh) 2 males 14.v. 2016 (Riffat, Ameen)

Derivato nominis

The specific epithet refers to the intermediate placement of this genus between *Schizodactylus* and *Comicus*.

Depository

The type material (TN: 638 SEM) has been deposited in Sindh Entomological Museum, Department of Zoology, University of Sindh, Jamshoro.

Remarks

Hind spure of this new species look like table tennis racket, broad distantly and narrow from one side while from the other side these are elongated and distantly broad like in *Schizodactylus* beside this, hind pattern and mandibles are very closely resemblance with *Schizodactylus*. In this species wing are completely absent it is very peculiar character of *Comicus* species. It was also noted that this species is greater in size like *Schizodactylus* while the *Comicus* (usually less than 25 mm in length) (Kevan, 1982). During the present study comparative morphology and spurs of hind tibia were studied the species in our hand offer some unique feature which is indication of intermediate placement of *Schizodactylus* and *Comicus*. This study based on the analysis of 3 male specimens that were collected in different dates and localities. Although, material we having provide some unique character on the bases of this we can say that this is entirely new genus. The material in our hand is very rare and this species is not reported previously from anywhere.

DISCUSSION

These insects are nocturnally active on the surface of sandy arid environments, their peculiar tarsi permit them to run on sand with facility and live inside burrows during day time. They prefer to live in moist sandy places where tunneling is easy. Both the adults and nymphs construct isolated burrow. When constructing their burrows they use their mandibles and anterior legs to scrape and loosen sand from the burrow and then push the sand behind them out of burrow using the abdomen and hind tibia. They possess several morphological modifications for digging in sandy environment. Those *Schizodactylus* collected from South Africa were ones placed in a separate subfamily Comicinae, but no more than tribal status would seem justified. These insects live in sandy places, apparently usually along river banks and their peculiar tarsi permit them to run on sand with facility. They spend much of their time tunneling underground emerging mostly at night. They seem to be mainly predators, but apparently will also feed vegetable matter; 1 species is sometimes said to be minor crop pest.

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vegetable matter. *Comicus* one species is sometimes said to be a minor crop pest (Kevan, 1982). The anomalous and disjunctly distributed Schizodactylidae of the arid areas of Southern and Western Asia (*Schizodactylus*) and Southern Africa *Comicus* exhibit a peculiar morphological feature in the form of their extraordinarily modified tarsi. These are adopted for progression on the surface of loose sand on the snow-shoe-principle (Chinery, 1993). Irish (1986) reported that *Comicus* live amongst rocks. May be this peculiar insect spend much of their time tunneling beneath the surface digging by means of their mouth parts, emerging mainly at night (Khattar, 1972) and also our personal observation because all three species were collected at evening time. They appear to be mainly insectivores or scavengers (Khattar, 1972; Channa et al., 2011). Besides this, Maxwell (1906) reported that *S. monstrosus* (Drury) has been alleged to be a minor pest of crop roots in India. From personal observation in Nagar Parker it would see that *Comicus* species, by submerging themselves beneath the surface of the sand during the heat of the day. Protect them, as do various other desert animals, from excessive heat and desiccation. Kevan (1989) also suggested that to ensure survival, animals must avoid certain hazards, among which are: (i) rainy climatic and other physical condition, (ii) inadequate food supplies, (iii) unsustainable reproductive rate and (iv) predators and other natural enemies. Sometime the strategy adopted to avoid one of these hazards may help to avoid one or more of the other. Although, there are great morphological similarities among these three reported genera but the major difference are in the appearance of spurs which make quite different these species with *Schizodactylus* and *comicus*. So on the bases of this unique character author assure that this is addition of third genus in Schizodactyloidea.

ACKNOWLEDGMENT

Author is highly grateful to Prof. Dr. Michel Lecoq Entomologist, Past President, Orthopterists' Society: ORCID and Prof. Dr Muhammad Saeed Wagan Ex-Chairman Department of Zoology, University of Sindh, Jamshoro for their technical advice on this manuscript. Author is also thankful to HEC Islamabad for research grant under NRP-2015 (Project No. 6737).

Statement of conflict of interest

The authors declare no conflict of interest.

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