



Scorpions of pishin, *Orthochirus carinatus pishinis* (Buthidae, arachnida) a new record in scorpion fauna of (Baluchistan) Pakistan

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Abstract

A new sub species of scorpion, *Orthochirus carinatus pishinis* sp. (Buthidae), is described. The aim of this research was to identify the exact taxonomy of black scorpion (*O.carinatus pishinis*). These specimens were collected in various localities of district pishin Baluchistan (Pakistan). Total 121 *Orthochirus* species were collected in three field trips purposively at night and day time from March to September 2019. Result showed that *Orthochirus carinatus pishinis* is reported for the first time from pishin, Baluchistan.

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Introduction

Scorpions are generally found in hot and arid environments, they are medically important arachnids (arthropods) (Bawaskar, 2012; Rafizadeh *et al.*, 2013). Typically they are nocturnal and appear after sunset, conceal beneath bark, stones, wood and other objects lying on land where they remain or seems for their prey. The scorpions feed on tiny insects, spiders, centipedes, earthworms, and other scorpions. As capture the prey, they utilize the great claws to draw and crush it near the oral cavity.

The fluids from the body of the prey are sucked by scorpion. They come at night and these activities activate the scorpions to control water balance and temperature, significant feature for living in arid habitats. Several belonging species dig tunnels and burrows inside the soil. They differentiate and catch prey by the sense of touching. They possess highly audible range. Some of their burrows, i.e. desiccated deserts, are of severe ecological conditions, and scorpions possess a wide range of adaptations for existence in such unsympathetic environments and the common is extensive and varied (Jeram, 1990).

These are nocturnal in habits and smallest surface activity and like better to go away from their burrows during the early sunset (Warburg and Polis, 1990). Totally, there are more than 1500 species of scorpion throughout the world.

That has been recorded although without a doubt others postpone for innovation. Although they have a wide range dispersal around the globe but the typically distribute at elevation ranges from 23° to 38° (Kjellesvig, 1986; Farzanpay, 1988 and Kovarik, 2009). As for there was lack of a standard research work on distribution of scorpions species in district Pishin Baluchistan. Therefore, this study is carried out in area concerning to recognize the species as well as their distribution. So, based on the consequences of this research, a manageable approach was designed to minimize stings of scorpion as much as possible. The family Buthidae with 85 genera and 895 species is the largest of the scorpion families, well-known

around the world; its members are found in tropical, subtropical, and partly in temperate habitats (Fet and Lowe, 2000; REIN, 2010). Orthochirus species are small to medium sized scorpions with black color recently reported from Iraq, turkey and Iran (Navidpour *et al.*, 2019).

In north Baluchistan (Pakistan), a variation of scorpion habitats sandy, muddy, forested and hilly areas are present but scorpion fauna of this region has not been explored in detail (Pocock, 1900). In addition he was the first to initiate scorpion study in area now under Pakistan. Later, some other archeologists added some new species to Pocock list (Birula, 1913, Henderson, 1919, Khatoon, 1999; Kovarik, 2003; and Kovarik, *et al.* 2013). Accessible record on scorpions recommended that Pakistan has 5 families, 17 genera and 50 species of scorpions (Kovarik *et al.*, 2007; Tahir *et al.*, 2014).

Material and methods

Sampling location

Pishin, a district in the northwest of Baluchistan province of Pakistan. Located on distance of 51km away from provincial capital Quetta with total area around 7,819 km², with total population 736,481 reported census of 2017. Geographically this district lies at 1370-1680 meter above sea level with extreme seasonal fluctuations. But in last three decades the level of ground water has fallen down.

Many of the natural herbs and shrubs plains are converted into barren lands and artificial crops have cut down due to less fruit fabrications and unavailability of water. In consequence a minor climatic change has occurred and currently the atmosphere is quite suitable that enhances scorpion's populations to live and offer a sustainable habitat.

Scorpion collection and identification

Three field trips first from (March, April & May), second from (June, July & August), and third was carried out in (September & October) in various vicinities including urban, rural, and mountainous regions of the Pishin district.

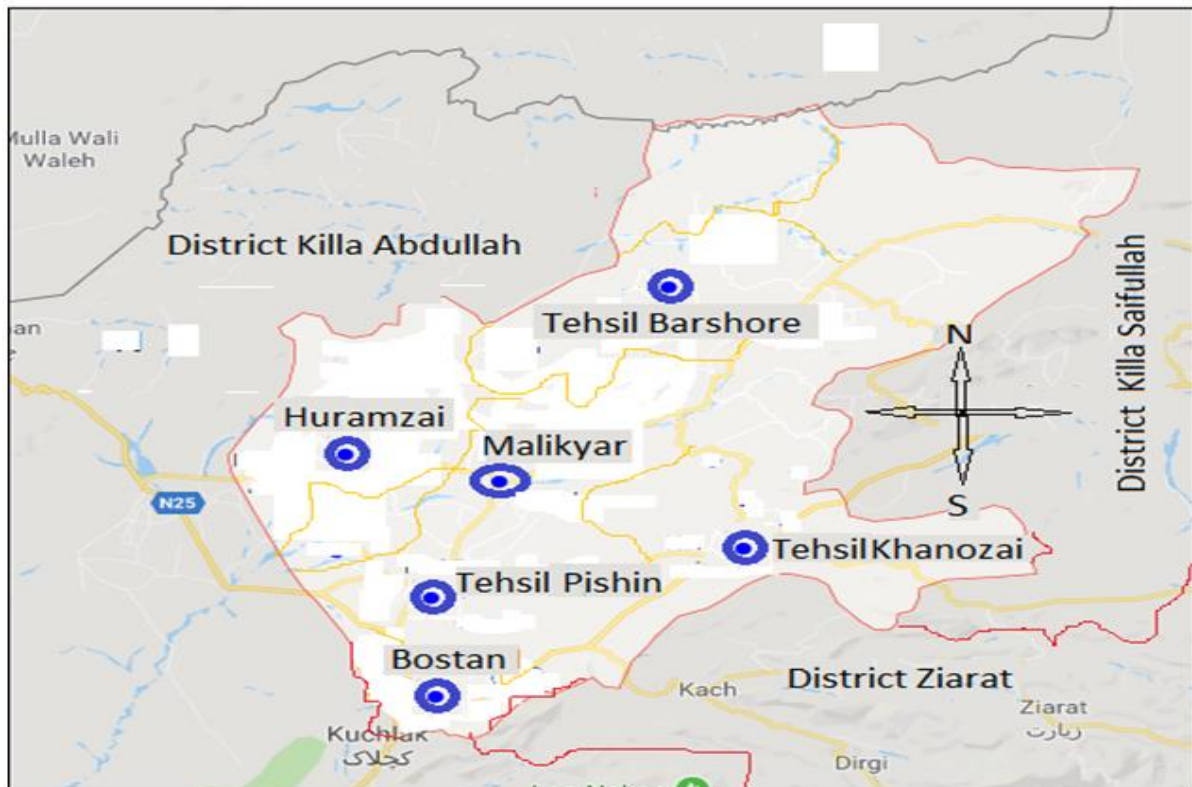


Fig. 1. Map showing collection sites.

Total 133 Scorpions were collected purposively alive at night time by using the UV light and few of them were captured at early morning in caves of rodents, under stones, in crevices and under plant leaves. Then processed to porous aerated plastic tanks (18cm x14cm) in size by adding dust wood for observing more characteristics. During rearing they were nourished with tiny invertebrates especially cockroaches, ants, grasshoppers and earthworms. After that specimens were stored in 70% alcohol and processed for identification in the research laboratory by using ordinary microscope, measuring scale, entomological forceps, led magnifier of 3x power and images were taken by Nikon (E-8800) camera. The morphological and diagnostic keys of Farzanpay's (1987) were utilized for genera's species identification. This cross-sectional research work was

achieved from period of March to November 2019, when scorpion population was dynamic. The data of collection were transformed to MS-excel 2016 for designing of tables and graphs. Taxonomic classification was based on Iranian keys of scorpion identification of Farzanpay's (1987). Finally, these species were named under the rule of zoological trinomial nomenclature with suffix "pishinis" because of locality.

Results

Total 133 scorpions were collected in this research work Out of which 121 were "*Orthochiruscarinatus*" species and 12 species were identified as Andructonous species that were removed later. Analysis showed that 50 species were male, 25 juvenile and 40 were female (Fig 2).

Table 1. Lengthened width of width of various body parts.

Body parts	Paratypemale, ♂	Holotype female
Total length	37.6 mm	39.2 mm
Carapace length	5.5 mm	6 mm
anterior width	2 mm	2 mm
posterior width	5.1 mm	4.3 mm

Metasomal segment I length width	2.5 mm 2 mm	2.4 mm 2 mm
Metasomal segment II length width	3 mm 2.1 mm	3.5 mm 2.1 mm
Metasomal segment III length width	3.1 mm 2.3 mm	3.5 mm 2.3 mm
Metasomal segment IV length width	4 mm 2.4 mm	4 mm 2.4 mm
Metasomal segment V length width	4.1 mm 2.2 mm	4.2 mm 2.2 mm
Pedipalp femur length width	4 mm 1 mm	4.2 mm 1 mm
Pedipalp patella length width	4.4 mm 1.1 mm	4.6 mm 1.2 mm
Pedipalp chela length width	4.5 mm 1.2 mm	4.4 mm 1.3 mm
Movable finger length	2.5 mm	2.4 mm
Pectinal teeth count (L/R)	15 / 17	15 / 17

Figure reveals that these scorpions are fully active in hot session particularly in the months of June, July and august. Data analysis also demonstrated that female is slightly longer and wider than males (Table 1).

Distribution

Orthochirus carinatus and its other sub species are widely distributed in India, Pakistan, Iran, Iraq, and Turkey (Navidpour *et al*, 2019).

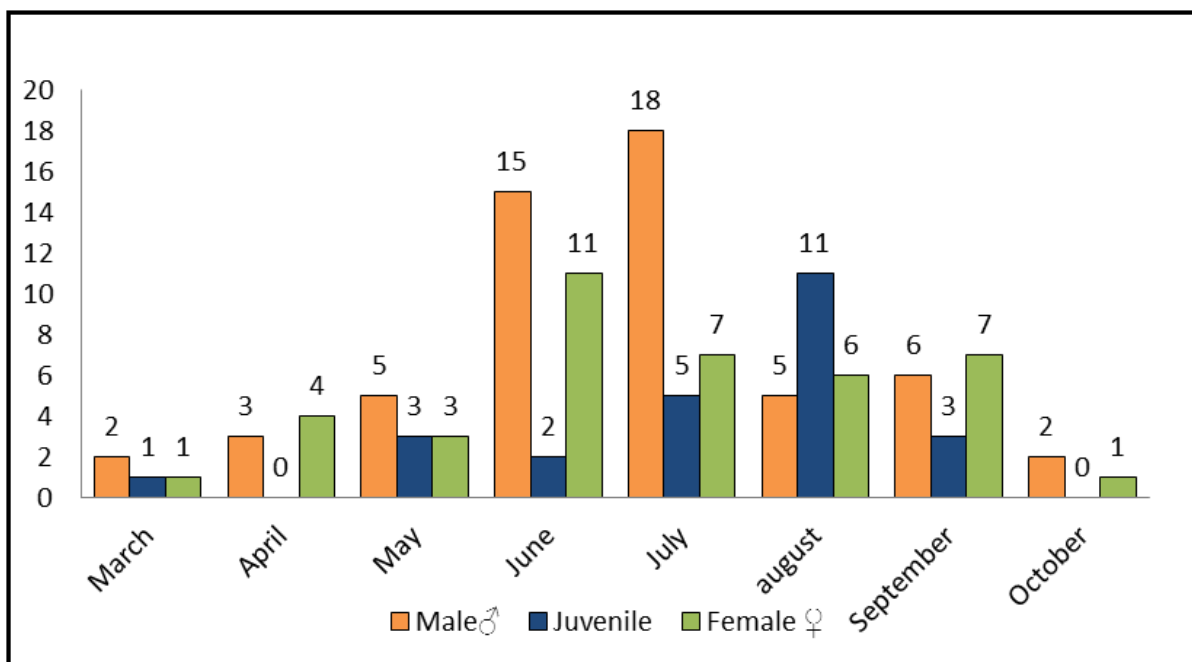


Fig. 2. Monthly occurrence of *O. carinatus pishinis*.

Comments

This scorpion species are remarkably distributed in district pishin (Pakistan). These are medium sized black scorpion and generally range from 20 to 40 mm (2-4 cm) with thick, spotted metasoma, yellow

appendages and pointed telson (Fig 3). They move very quickly as compared to other scorpions. A unique lateral trembling movement of tail (metasoma) is also observed during analysis in living species.

Discussion

In this research work 121 species were determined as *Orthochirus carinatus pishinis* (Fig 3). It is reported for the first time in the world. During three field trips number of collected species was varied depending upon temperature and locality as reported in other neighboring countries due to having almost similar geographical and climatic features that support the scorpion fauna. The population was at its peak during hotter months such as June, July and august. 12

species were mistakenly collected that were excluded later. 18 males with highest number were collected in July, while highest numbers of females 11 were captured in June and 11 juveniles were gathered in august. Because in these months temperature is exclusively suitable for scorpion to raise up their population and the pregnant females to hatch babies in order to grow enough to resist against forth coming extreme temperature fluctuations.

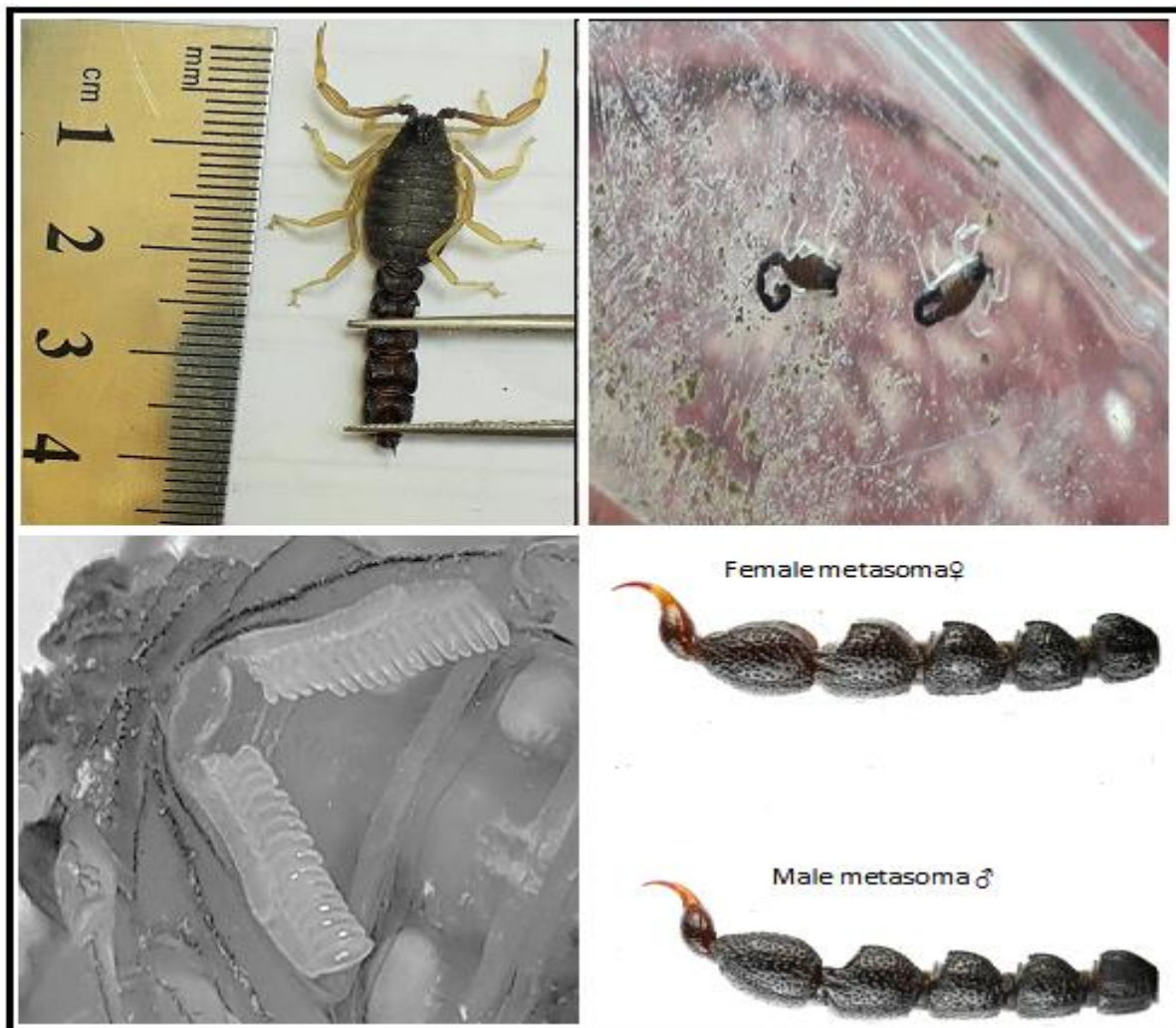


Fig. 3. (a) Showing the average length of *O. carinatus pishinis* (b) original photos of juveniles in plastic container (d) pectinal teeth count and (e) male and female metasoma.

Conclusion

This research work shown that this area was rich scorpion fauna. Diverse varieties of scorpions inhabits in this region which can help in various fields of biomedical science in order to treat number of incurable diseases in near future. Parallel to this, the

inhabitants of this district are highly affected due to scorpionism annually. So, to get rid of such hazardous scorpion bites, it requires better health facilities.

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