

# Existence of Different Species of Scorpions (Arachnida: Buthidae) in and Around of Amedical Center, Southern Iran

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## Abstract

**Background:** Scorpions, as a group of venomous invertebrates, are distributed worldwide including the Middle East. These arthropods are distributed throughout Iran, are dangerous to humans and animals, and can cause severe damages and even death.

**Methods:** In this cross-sectional study, scorpions were collected from different parts in southern Iran such as Kohgiluyeh and Fars provinces using hand catch method with U.V torch. Morphological identification of scorpion specimens was done using specific keys.

**Results:** Besides different species of scorpions, *Hottentotta jayakari* Pocock, was identified in Amir Oncology Hospital, Shiraz city, Fars province, South of Iran, 1895.

**Conclusion:** *Hottentotta jayakari* is endemic in tropical regions and its existence in Shiraz with a mild climate seems unexpected. In addition, Amir Hospital is an oncology treatment center and this scorpion was caught on the hospital grounds. It is possible that more species can be identified in this province by conducting more studies.

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## Introduction

Scorpions have a wide geographical distribution ranging from tropical to temperate regions. There are more than 1,500 species of scorpions worldwide; out of these, around 5% are dangerous to humans.<sup>1</sup> Scorpionism are common in rural places compared to urban areas. The species richness of scorpion is high in Iran due to its long geological history, vast plains, and high mountain ranges.<sup>2</sup>

Totally, 68 species of scorpions have already been reported. They belonged to 3 families of Buthidae, Scorpionidae, and Liochelidae (=Hemiscorpiidae). Due to geographic area, 52 species were recorded as endemic in Iran. Besides, the genera of *Iranobuthus* Kovařík (1997) and *Polisius* Fet, Capes & Sissom (2001) were reported from endemic areas in Iran (Karataş, Garkheloo, & Uçak, 2012).<sup>3, 4</sup> In this

country, scorpions and scorpionism are have caused health problems which have threatened many people's lives over the years, imposing fear, worries, and medical costs.<sup>5</sup>

In total, 117 species of scorpions within six families (Buthidae, Diplocentridae, Euscorpiidae, Hemiscorpiidae, Luridae and Scorpionidae) and 27 genera have been reported from the Arab countries of the Middle East. In Bahrain, only four species are known to be found in this country. These species are: *Androctonus crassicauda*, *Buthacus nigroaculeatus*, *Leiurus arabisicus*, and *Orthochirus innesi*. The scorpions of Iraq were extensively studied with a total of 25 species in five families. Four species were described from Iraq, which could be considered endemic: *Compsobuthus jakesi*, *Hottentotta mesopotamicus*, *Compsobuthus iraqensis*, and *Odontobuthus bidentatus*.<sup>6</sup> In Afghanistan, a case of a

scorpion sting with *Androctonus australis* (Buthidae) has been reported.<sup>7</sup>

*Hottentotta zagrosensis*, *Hottentotta saulcyi*, *Hottentotta jayakari*, *Hemiscorpius acanthocercus*, *Hemiscorpius lepturus*, *Mesobuthus eupeus*, *Mesobuthus caucasicus*, *Mesobuthus phillipsii*, *Orthochirus sp.*, *Apistobuthus susanae*, *Odontobuthus doriae*, *Odontobuthus bidentatus*, *Androctonus crassicauda*, and *Compsobuthus matthiesseni* are the main species of scorpion in Iran; among them, *A. crassicauda*, *H. achantocercus*, *H. lepturus*, and *Orthochirus sp.* are considered the most lethal scorpions.<sup>8</sup>

So far, the following species of *Hottentotta* have been reported in Iran: *Hottentotta schach*, *Hottentotta saulcyi*, *Hottentotta zagrosensis*, *Hottentotta khoozestanus*, *Hottentotta jayakari*, *Hottentotta navidpouri*, *Hottentotta sistansensis*, and *Hottentotta lorestanus*. Among them, *H. zagrosensis* and *H. saulcyi* seem to be medically important.<sup>4,9</sup>

Most cases of scorpion stings are related to the southern part of the country; about 80% of scorpion stings were reported from Khuzestan province. Among the different species of scorpions, 12 species are involved in scorpion stings in Fars province, southern Iran. The sting with *H. jayakari* has been first reported from Iran.<sup>10</sup> Different species of *Hottentotta* genus (Family: Buthidae) are found in different parts of The Middle East including the Arabian Peninsula, Iraq, Afghanistan, southeastern Turkey, Pakistan, India, and Iran.

The ten species distributed in Iran include *Hottentotta jayakari*, *H. juliae*, *H. khoozestanus*, *H. lorestanus*, *H. navidpouri*, *H. saulcyi*, *H. schach*, *H. sistansensis*, and *H. zagrosensis*. All species are endemic in Iran except *H. jayakari* and *H. saulcyi*. The species of *Hottentotta jayakari* can be found in Qom, Hormozgan, and Fars.<sup>11</sup> *Hottentotta jayakari*

is one of the medically important scorpions in Iran.<sup>12</sup>

## Methods

Fars Province, with an area of about 122000 km<sup>2</sup> is located in south of Iran. Shiraz city with about 1,869,001 population is one of the most populous towns in Iran and the center of Fars Province (29° 36' 36" N, 52° 32' 33" E). This region has a moderate climate and is classified as a cold semi-arid climate, and the mean annual precipitation is about 300 mm (Figure 1).

In this study, the specimens were collected from different parts of Shiraz city such as gardens and suburban areas, using hand catch method with U.V torch. The collected specimen was delivered to the Entomology Laboratory; their morphological characteristics were examined and recorded using a diagnostic key.

## Results

The scorpions caught in this study were similar to the samples of the previous research.<sup>13</sup> These scorpions included *Androctonus crassicauda* (7, 50%) (Figure 2), *Hemiscorpius leptorus* (4, 28.6%) (Figures 3 and 4), and *Mesobuthus eupeus* (2, 14.3%) (Figure 5). One specimen of *Hottentotta jayakari* (Scorpionida: Buthidae) was captured in Shiraz city on the 1<sup>st</sup> September 2021 (1, 7.1%) (Figure 6) (Table 1). The exact location of this sample was Amir Onchology Hospital. We measured the crucial characteristics of this scorpion which were essential for recognition according to the diagnostic key, using the Vernier caliper. These characteristics include whole body length, triangular sternum, pedipalp length, abdomen, tail segments, pectines, cheliceral movable finger, pectinal teeth count, and telson that were gaged using a Collis Vernier caliper.

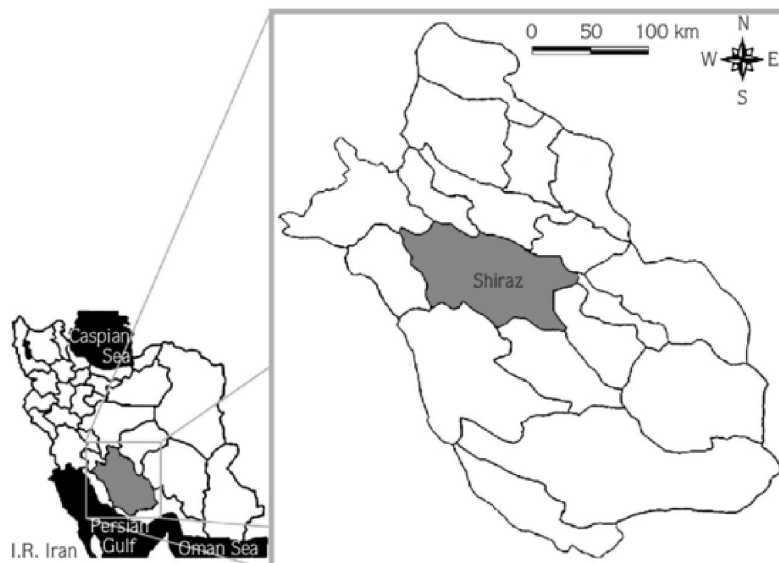


Figure 1: Location of sampling site in Fars Province, Southern Iran, 2021.



Figure 2: *Androctonus crassicauda* (Original Picture)



Figure 3: *Hemiscorpius lepturus* ♂ (Original Picture)



Figure 4: *Hemiscorpius lepturus* ♀ (Original Picture)



Figure 5: *Mesobuthus eupeus* (Original Picture)



Figure 6: *Hottentotta jayakari*: (Original Picture)

Table 1: Fauna, Fars Province, Southern Iran, 2021

Species	<i>A. crassicauda</i>			<i>H. lepturus</i>			<i>M. eupeus</i>		<i>H. jayakari</i>			Total			
	♂	♀	T	♂	♀	T	♂	♀	♂	♀	T	♂	♀	T	
Shiraz	1	0	1(20%)	1	1	2(40%)	0	1	1(20%)	0	1	1(20%)	2	3	5

### Discussion

In the present study, 5 scorpions which belonged to 4 different species were captured in Amir Oncology Hospital area, Shiraz city, Fars Province, Southern Iran. These species include one *Hottentotta jayakari*, one *Androctonus crassicauda*, two *Hemiscorpius lepturus*, and one *Mesobuthus eupeus*. In this report, the scorpions were caught in the green space of Amir Hospitals. Of course, this case report complements previous research conducted in Shiraz city.<sup>13,14</sup>

These species are dangerous and their presence

in hospital environment is too important. Different species of scorpions have been reported from Iran. The highest statistics of stings and fatalities belong to Khuzestan and Hormozgan.<sup>12</sup>

The bites of the Buthidae family are painful. When these scorpions bite, swelling and numbness at the bite site, and pain, mostly at night occur. Some members of the Iranian scorpion have poisonous and deadly stings, and some others have painful stings. This is the reason why they are medically important.<sup>15</sup>

*Hottentata* is one of the most important medically genus in Iran. Decreased blood pressure, increased

heart rate, seizures, anesthesia, distraction, restlessness and anxiety, hemolysis, skin ulcers and necrosis, and renal failure have been reported as complications of scorpion stings.

*Hottentotta jayakari* has been reported in Fars, Qom, Hormozgan, and Sistan and Baluchestan provinces. In these areas, this scorpion is found in warm plains. This finding is similar to those of other studies reported in this province. Also, this scorpion has been reported as a medically important case.<sup>16-18</sup>

The *Mesobuthus eupeus* species belong to Buthidae family and is commonly distributed from Turkey to China, including Iran. Among these species, *Mesobuthus eupeus* is regarded as the most medically important species which is responsible for most cases of envenomation in this area. In Iran, this species has been reported in Ardabil, Azarbaijan, Kerman, Isfahan, Markazi, Mazandaran, Sistan and Baluchestan, Yazd, Kohgiluyeh and Boyer-Ahmad, Semnan, Fars, Khuzestan, Hormozgan, Kermanshah, Golestan, Tehran, Kurdistan, Ilam, Khorasan, and Qom provinces.<sup>19-21</sup>

The black scorpion *Androctonus crassicauda* is the second most frequent species of scorpion in Fars province of South Iran. It is very dangerous since its venom affects the nervous system. In Iran, this species has been reported in Bushehr, Semnan, Khuzestan, Ilam, Kurdistan, Khorasan, Kermanshah, Kerman, Sistan and Baluchestan, Qom, Azerbaijan, and Ardabil provinces.<sup>13, 21</sup>

*Hemiscorpius lepturus* is a species of scorpion in the Hemiscorpiidae family. It is found in deserts of the Middle East, especially in southern Iraq and Iran. *H. lepturus* is the only scorpion not in the family Buthidae that is potentially lethal. In Iran, this species has been reported in Semnan, Fars, Khuzestan, Kurdistan, Hormozgan, Bushehr, Ilam, Lorestan, Kermanshah, Isfahan, Hamedan, Kohgiluyeh and Boyer-Ahmad, and Kerman provinces.<sup>11</sup>

## Conclusion

*Hottentotta jayakari*, *Androctonus crassicauda*, *Hemiscorpius lepturus*, and *Mesobuthus eupeus* are endemic in tropical regions of Fars province, and its existence in Shiraz with a mild climate seems unexpected. In addition, Amir Hospital is an oncology treatment center, and these scorpions were caught on the hospital ground. It is possible that more species can be identified in this province by conducting more studies.

## Ethics Statement

The research plan was approved by the Shiraz University of Medical Sciences research ethics committee with the ethics code of IR.SUMS.SCHEANUT.REC.1401.134.

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## Authors' Contribution

MK and KA contributed to the study design. MA identified the scorpion species and KA and MK confirmed the morphological identifications of scorpions. MA wrote, and edited the figures of the first draft. All authors read, edited, and approved the final manuscript.

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**Conflict of Interest:** None declared.

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