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Faunistic Study of Scorpions in Lendeh County in 2020

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Abstract

Background: Given the importance of scorpion stings and poisonous creatures that cause casualties and fatality to humans and located in the city of Lendeh (in Kohgiluyeh and Boyer-Ahmad province) in the tropical zone, this study has been conducted.
Objectives: The results can be used in the prevention, control, and treatment programs and for research purposes in the country.
Methods: In this cross-sectional study, 59 samples were collected from five rural areas of Lendeh county in the summer of 2020. The samples were transferred to the entomology and parasitology laboratory of the Behbahan Faculty of Medical Sciences. They were identified using stereomicroscope-based diagnostic key scorpions in Iran.
Results: In this study, 59 samples from five villages in the summer 2020 collection, including 5 species of 2 families, were identified *Buthidae* and *Liochelidae*. *Mesobuthus eupeus* with 30 samples (50.8%), the dominant species and species *Hemiscorpios lepturus* with 16 samples (27.1%), *Compsobuthus matthiesseni* with 10 samples (16.9%), *Simonoides farzanpay* with 2 cases (3.3%) and any Hottentata schach 1 sample (1.6%) had the lowest reported among the species identified.
Conclusions: Considering the importance of scorpion stings in Iran, identifying the fauna of Scorpions seemed necessary. Observation of *Hemiscorpius lepturus* species in this area as the main cause of death due to scorpion stings in Iran; it can be dangerous for the residents of these areas. Therefore, the present research can be an introduction to continue the work and complete the research on the scorpions of this region.

Keywords: Scorpions, Fauna, Arachnida, Iran

1. Background

Scorpions are nocturnal arachnids with worldwide distribution from tropical to temperate, including deserts, savannas, tropical forests, and mountains over 5500 m in altitude, and the intertidal areas, and because they attack humans and are considered a threat to their lives (1, 2). Scorpions are of various lengths and sizes, ranging from 13 to 220 mm, and their morphologic structures are easily identifiable (3). Scorpion accumulation is high in the subtropical areas with a 23 - 38 geographical width bearing. They would get less variety as we go towards the poles and smaller (in size) as we go towards the tropical areas (1). Although the annual number in the world is estimated at 1 million, actual scorpion-stinging statistics are unknown (4). Only in Mexico, 150,000 cases of scorpion stings are reported yearly, of which nearly 800 - 1,000 people die, and more than 70% of them belong to 4-6-year-old children (5). According to the type of climate and weather, especially the arthropod fauna of scorpions, Iran is very rich (6). In Iran, 32 scorpion species belong to three families (7). In Iran, more than 100 thousand people annually, more than 75% of children suffer from a scorpion sting. But, only about 36 thousand cases per year are reported to be at least 7 - 60 leading to death (8). In America, about 13 - 10 thousand cases per year of scorpion stinging are reported, but only four deaths due to scorpion stinging occur every year (9). In Khuzestan province, the fourth cause of death is a scorpion sting. In this region, 25,000 cases of scorpion stings happen annually, and 95% of deaths occur due to scorpion bites from *Hemiscorpios lepturus* (10-12). The last comprehensive report and documentary on the Iranian scorpion, done by Dehghani and Fathi, presents a review of

previous reports of scorpions in 18 genera, 29 species and subspecies, and three families 5 *Buthidae*, *Scorpionidae*, and *Liochelidae* reported (12). Studies and reports of scorpion species diversity and stings in Kohgiluyeh and Boyer Ahmad provinces indicate the high importance of this problem in this province (13, 14). Considering the different environmental and climatic conditions of Lendeh county, the reported cases of scorpion stings from it, and the lack of studies on identifying scorpions found in this county, the present study was conducted. The research results can be used in the prevention, control, and treatment programs and for research purposes in Iran (Figure 1).

2. Methods

This is a descriptive cross-sectional study involving scorpions from different areas of Lendeh county. Scorpion capture was done according to the region's climatic conditions in the summer of 2020. Then, to increase the sampling geographical coverage and thus increase the maximum identification of species in the region, the whole city by considering factors such as climatic conditions, temperature, humidity, and geographical factors such as altitude, vegetation status, soil type, rainfall and geographical location (north, south, east, west, and center) were divided into five regions. Then, 5 villages (Barmeh Sabz, Sar-Asiab, Qiam, Idenak, Mugarmoun) were selected as sampling stations based on region division. Due to scorpions' nocturnal activity and their daily rest in permanent and temporary shelters, we captured scorpions using ultra-violet (UV) light, pitfall traps, and hand-catching methods under stones in different areas such as agricultural lands, hills, mountains, etc. It was performed for two hours at night and two hours at sunset. The collected scorpions were transferred to plastic containers with 70% ethanol and glycerin (to keep the scorpion soft), and after coding, the required information, including area name, place of hunting, type of scorpion (digger/non-digger), geographical location, village name, temperature, etc. First, all data were recorded in researcher-made questionnaires and then analyzed using descriptive statistics. All specimens were transferred to the entomology and parasitology laboratory of Behbahan Faculty of Medical Sciences to determine the species and were identified and determined using a stereomicroscope and valid diagnostic keys based on comparing morphological characteristics.

3. Results

The findings showed that five species belonging to two families (*Buthidae* and *Liochelidae*) were identified. *Mesobuthus eupeus* (n = 30; 50.8%) was the dominant species in Lendeh county. Other identified species included *Hemiscorpios lepturus* (n = 16; 27.1%), *Compsobuthus matthiesseni* (n = 10; 16.9%), *Simonoides farzanpay* (n = 2; 3.3%), and *Hottentata schach* (n = 1; 1.6%). Other findings of the study are given in Tables 1 , 2 and 3 in more detail below.

4. Discussion

Determination and faunistic study of scorpions native to each region of our country because the preparation of the relevant antidote of particular importance and the necessity arises. Like most previous studies in Iran, the *Mesobuthus eupeus* species dominate the region. This species is widely distributed in Iran, and even in most studies of scorpion fauna, it has been reported and has more location and ecological diversity than other species. *M. eupeus*, due to the non-digger, is adapted to living with humans and has not been reported deaths or stings from this species, and probably a safe species (1, 13, 15). Studies were performed on the distribution of Iran's scorpion species, *M. eupeus* of Gonabad (29%), Hormozgan (23.7%), Shiraz (84.9%), and the Persian Gulf islands (13.5%) have been reported (15-17). *Hemiscorpios lepturus* species was observed in three villages (Barmeh Sabz, Qiam, Mugarmoun); this species is a very important scorpion in Iran and the main cause of deaths from stings in the country (18). Due to the delicate and short bites of this species, it initially does not pain substantially; for this reason, the patient does not refer to the medical centers. After many days, leads to acute complications such as tissue necrosis and hemolysis that eventually cause death (16). The prevalence of *Compsobuthus matthiesseni* species in the present study was similar to that of other studies in Iran (2, 3, 12, 13, 16, 17, 19). Two cases of *Simonoides farzanpay* species were found in the Barmeh Sabz village. This rare scorpion species has very limited distribution in Iran; until before this study, only it was reported in Bandar Abbas (20). One case of *Hottentata schach* species was found in Qiam village. *H. schach* is a very important scorpion in the Middle - East and African countries such as Iran (21).

4.1. Conclusions

Considering the importance of scorpion stings in Iran, identifying the fauna of scorpions seemed necessary. Observation of *Hemiscorpius lepturus* species in this area as the main cause of death due to scorpion stings in Iran; it can be dangerous for residents of these areas. It is inevitable to identify the region's fauna and use species for different purposes. There is very little specialized research on scorpions in Lendeh county. Hence, the present

Figure 1. Location of Kohgiluyeh and Boyer-Ahmad province and Lendeh county

Table 1. Frequency of Scorpions Caught in the Lendeh According to the Place of Collection [a]

Location	Species					
	Mesobuthus eupeus	*Hemiscorpios lepturus*	*Compsobuthus matthiesseni*	*Simonoides farzanpay*	*Hottentata schach*	Total
Mugarmoun	7 (11.86)	7 (11.86)	6 (10.16)	0 (0)	0 (0)	20 (33.89)
Barmeh Sabz	7 (41.17)	8 (47.05)	0 (0)	2 (11.76)	0 (0)	17 (28.81)
Idenak	9 (75)	0 (0)	3 (25)	0 (0)	0 (0)	12 (20.33)
Qiam	3 (50)	1 (16.33)	1 (16.33)	0 (0)	1 (16.33)	6 (10.16)
Sar-Asiab	4 (100)	0 (0)	0 (0)	0 (0)	0 (0)	4 (6.77)
Total	30 (50.84)	16 (27.11)	10 (16.94)	2 (3.38)	1 (1.69)	59 (100)

Abbreviations: No., number of samples; %, percentage of samples.
[a] Values are expressed as No. (%).

Table 2. Frequency of Scorpions Caught in Lendeh County According to the Gender [a]

Species	Gender	
	Male	Female
Mesobuthuseupeus	11 (36.66)	19 (63.34)
Hemiscorpioslepturus	1 (6.25)	15 (93.75)
Compsobuthusmatthiesseni	4 (40)	6 (60)
Simonoidesfarzanpay	0 (0)	2 (100)
Hottentataschach	0 (0)	1 (100)
Total	16 (27.11)	43 (72.89)

[a] Values are expressed as No. (%).

Table 3. Frequency of Scorpions Caught in Lendeh County According to the Time and Location of the Catch [a]

Species	Capture Time		Capture Location				
	Day	Night	Agriculture Lands	Gardens	Hills	Mountains	Other Places
Mesobuthuseupeus	21 (70)	9 (30)	14 (46.6)	6 (20)	4 (13.3)	4 (13.3)	2 (6.6)
Hemiscorpioslepturus	11 (68.8)	5 (32.2)	8 (50)	4 (25)	1 (6.2)	1 (6.2)	2 (12.5)
Compsobuthusmatthiesseni	8 (80)	2 (20)	5 (50)	2 (20)	0 (0)	2 (20)	1 (10)
Simonoidesfarzanpay	0 (0)	2 (100)	1 (50)	1 (50)	0 (0)	0 (0)	0 (0)
Hottentataschach	1 (100)	0 (0)	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)
Total	41 (69.5)	18 (30.5)	28 (47.5)	13 (22)	5 (8.5)	8 (13.5)	5 (8.5)

[a] Values are expressed as No. (%).

research can serve as an introduction to further research on the scorpions of this region and other neighboring counties and provinces, such as Khuzestan.

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Footnotes

Authors' Contribution: The design and operation of the research and writing the article were done by Ali Jamshidi, Ahad Mohammadi, and Hossein Solymanpour. The scientific advisor of the project was Kourosh Azizi. The samples were collected by Mehdi Jamshidi, Somayeh Parvin, and Kazem Alizadeh-Barzian.

Conflict of Interests: There is no conflict of interest.

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