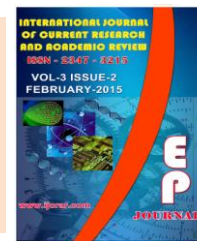




International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 3 Number 2 (February-2015) pp. 167-172

www.ijcrar.com



Morphological Parameters of Scorpions inhabiting Ardabil province in the northwest of Iran

Asslan faal, S.¹, Shayestehfar, A.^{2*}, Latifi, A.³, and Ghassemi Khademi, T.⁴

¹University of applied science and technology Agriculture training center Ardabil Province, Iran

²Biology Department, Faculty of Science, Arak University, Markazi Province, Iran

³Department of Environment Protection of Ardabil Province, Iran

⁴Iranian Academic Center for Education, Culture and Research (acecr) Ardabil Province, Iran

*Corresponding author

KEYWORDS

Iran, Biometric parameter, *Buthotus saulcyi*, *Androctonus crassicauda*, *Scorpio maurus*, *Mesobuthus eupeus*

A B S T R A C T

The evolutionary history of Scorpions goes back to the Silurian era 350 million years ago. They have adapted to a wide range of environmental conditions and can now be found on all continents except Antarctica. In this survey we aimed to study some morphological parameters of Scorpions inhabiting Ardabil province, northwest of Iran, to fulfill this task, 50 specimens of Scorpions belong to different regions. The specimens were transferred to the laboratory and then identified by the help of a standard identification key. According to this study, it was found that two families of scorpions live in Iran Buthidae and Scorpionidae and the different genera and species are distributed in Ardabil province.

Introduction

Taxonomically, Scorpions are members of class Arachnida of the phylum Arthropoda. Scorpions are characterized by their elongated and segmented body that consists of the cephalothorax or prosoma (abdomen or mesosoma and tail or the metasoma). Scorpions are viviparous (AL Hajjaj, 2005) and usually active or mobile at night. These animals are cold blooded and their body temperature is subject to their environmental changes (Pocock, 1889).

Owing to medical importance, the scorpions received considerable amount attention from several workers (Vachon, 1966; Levy *et al*, 1973; Wahbeh, 1976; Amr *et al*, 1988, 1994; El-Hennawy, 1988; Amr and El-Oran 1994). As a result of these works diversity, distribution and zoogeographic affinities of the scorpions have been identified. Scorpions are classified in seven families: i) Scorpionidae, ii) Bothriuridae, iii) Buthidae, iv) Diplocentridae, v)

Chaerlidae, vi) Chactidae vii) Vejovidae. The first research for Iranian scorpions was done by Oliver (1807) and described Kashan scorpions. Later Thorell (1876) identified new species of Iranian Scorpions and called it *buthus doriae*. Pocock (1889) in Booshehr port (in the south of the country) found new species and called *Buthus phillipsi*. Birulya *et al* (1896) first reported *Orthochirusmelanurus* in Iranian region (Birulya, 1896). Habib *et al* (1971) listed Iranian scorpions and identified *Mesobuthus eupeus*. According to previous researches of the seven above-mentioned families the two families of Scorpionidae and Buthidae have been found in Iran.

Globally, Buthidae displays a wider distribution compared to Scorpionidae (Farzanpey, 1987). Members of Buthidae have been found in Africa, Asia and Europe but Scorpionidae scorpions have only been reported from Asia and Africa (Birulya, 1896). Similarly, Buthidae in Iran has a wider distribution as it could be seen in all regions but Scorpionidae has just been reported from the southwest (Ahwaz) and (Lorestan) and the northwest (Ardabil) of the country (Fig. 1). In this study we identified scorpions of Ardabil province in a biosystematic manner for first time. Ardabil Province is located on the northwest of Iranian plateau between geographical coordinates of 37.45 to 39.42 as northern latitude and 48.55 to 47.3 as eastern longitude. This province is regarded as one of cold and mountainous areas of Iran.

Materials and Methods

Nine areas of Ardabil province including Pars Abad, Namin, Germe, Givi, Neer, Meshkin Shahr, Ardabil, Khal khal and Bilehsavar were selected (Fig.1). The Samples of scorpions were collected from under stones and clods and underground

holes with the help of a pair of forceps. The specimens were placed in 75% alcohol and labeled in terms of sampling conditions including date, temperature, time and place of sampling. The collected specimens were transferred to a laboratory for feature studies. In the laboratory biometrical parameters and the gender of scorpions were characterized by the aid of a stereomicroscope (Olympus SZX9) and their taxonomy position was identified by the keys suggested by Farzanpey (1987) as shown in table1.

Results and Discussion

In general, four species of scorpions including *Buthotus saulcy*, *scorpio maurus*, *Mesobuthus eupeus* and *Androctonus crassicauda* were collected from the study area. Here the average length body of *Buthotus saulcy* was 8 to 9 cm. The color of the body in different specimens collected was light or relatively dark yellowish. The last metasomal segment is relatively longer and dark yellow in color. The number of dens in female and male were (24 and 31) respectively. Many trichobothrie observed on the feet, pedipalps and metasoma (Fig.5).

Sternum is three-angled in shape with an operculum (reproductive cap) made of separated segments (Fig.3). They are 15 row of dens on the moveable fingers. The average body length of *scorpio maurus* was 4.5 to 6 cm. The color of the body was dark yellow or brown. Sternum was Five-angled and operculum consists of two segments. In females two segments fuse together. The number of dens in females and males was (10 and 11) respectively (Fig.4). Carapace lacks carene.

Digits are protracted and have two tothy rows. They are 6 rows of dens on the moveable fingers. There is no space between

dens. The number of lateral eyes was three. The body's color in *Mesobuthus eupeus* varied from transparent to dark yellow, which is reported from the Neer (Fig. 1) showan over all lighter coloration and more slender pedipalp chelae; these difference sappeer to reflect merely variation between populations. Sternum was three-angled and with an operculum of separated segments (Fig.3).

The number of dens varied between 20 and 25. In all legs the basitarsus with one pair of goad, while only a single goad in the third and fourth tibia legs. They are 10-11 rows of dens on the moveable fingers. Each row has two granules, an internal accessory and an external accessory. Color of *Androctonus crassicauda* is black. Tail's segments are thick and wide. Lateral keels of the second and third segments of the postabdomen are reduced to only a few granules. Total length of the body was 8.5 cm. The number of dens in males and females is 28 and 32, respectively (Fig. 2). Many parameters measured in this study were shown in table 2, 3, 4 and 5. Body of *A. crassicauda* is large, soft, sleek and extensive. Lateral eyes are three and different granules were observed in body.

Observations made in the current study show that scorpions inhabit Ardabil province belong to two families of Buthidae and Scorpionidae. The distribution of Buthidae is greater than Scorpionidae and the frequency of *Mesobuthus eupeus* is higher than other species from this family. It seems thatthese families originated from Africa because another families: *Anderoconus*, *Buthotus*, *Compsobutuths* and *scorpio* found in Africa.

Body length in *Mesobuthus* was 5-6 cm and body color in dorsal view dark. Eyes carene was in the shape of U. Three dentes were

seenin anus. These parameters were reported by Sampour (2003). The number of comb form (pectine) in Buthidae is greater than Scorpionidae. In taxonomical study we were able to separate *Buthotus saulcyi*fromother collected species; the first fundamental characters may be the metasomal segment which is relatively longer and darker in yellow color. The number of dens in female and male is 24 and 31 respectively. This specious is nocturnal and geographical distributed in Ardabil province. In *scorpio maurus* pectine was short and the number of dens varied between 10 and 11. In this species telson is usually equipped with accessory spines. Scorpions of *A. crassicauda* display different colors including black, olive and blackish. Total length of mature *A.crassicauda* varies from 90 to 100 mm (Ozkano and Karayez, 2004). Wahben (1976) showed that only 6% of collected scorpions belong to this species. It has been collected by Levy and Amitai (1980) and Amr *et al* (1988). This is a desert adapted species. As the localities suggest *A. crassicaude* is one of the venomous species in the Middle East. It lives in horizontal burrows in dry soil in deserted regions or in rodent burrows. This species was recovered from pellets of the eagle owl in eastern desert of Jordan (Rifai *et al*, 2000). The space between median eyes is greater than their diameters. Tail is squatty, approximately long and towards above is wide. Width of the first, second and third digit is greater than their length. The fifth digit is wider, lateral and dorsal digitsare dentate likely saw. In the posterior three and fourth these dentates is larger. Telson in ventral is convex and gradually limber. Telson diameter is half of width of fifth digit. Anus is long and bent. Femur length is shorter than carapace. Movable and fixed finger are thin and extensive. Body length in female and male is 12 and 10 cm respectively.

Table.1 Biometric parameters (Abbreviation)

Abbreviation	Parameters
LP	Length prosoma
LM1	Length mesosoma
LM2	Length metasoma
LBT	Length body total
LT+LA	Length telson+aculeus
LC	Length chelicera
LMF	Length moveable finger
WC	Wide carapace
LFT	Length foot tibia
WM5SE	Wide mesosoma 5 segment
LFF	Length foot femur
WM4SE	Wide mesosoma 4 segment

Table.2 Biometric parameters of *Scorpio maurus*

Triat	LP	LM1	LM2	LT+ST	LBT	LMF	LC	WC	WM5SE	WM4SE	LFT	Lff
Min	6.1	16.5	27.6	7.2	49.7	7	3.2	5.5	9.7	3.8	3.2	5.7
max	4.4	10.3	17.6	4.3	33.8	4.5	1.7	3.5	4.9	2.3	1.8	3.4
Mean	5.07	12.45	22.27	5.55	40.02	5.62	2.25	4.33	6.50	2.84	2.49	4.59
SD	0.59	1.96	3.21	1.01	4.91	0.71	0.39	0.61	1.22	0.52	0.49	0.79

Table.3 Biometric parameters of *Mesobuthu seupeus*

Triat	LP	LM1	LM2	LT+ST	LBT	LMF	LC	WC	WM5SE	WM4SE	LFT	Lff
Min	9.4	21.7	45.5	12.1	76.6	12.9	4.2	8.2	12.1	3.7	5.4	8.8
Max	3.9	2.1	18.6	4.5	33.8	4.6	1.5	2.9	5	2	1.9	3.6
Mean	5.4	15	24	5.96	43.7	5.8	2.4	4.6	7.3	2.59	2.7	4.8
SD	1.3	4.45	5.8	1.6	9.6	1.9	0.7	1.1	1.7	0.5	0.8	1.1

Table.4 Biometric parameters of *Buthotus saulcyi*

Triat	LP	LM1	LM2	LT+ST	LBT	LMF	LC	WC	WM5SE	WM4SE	LFT	Lff
Min	6.9	16.5	23.9	6.7	50.6	1.1	3.1	5.3	7	2.6	3	5.6
Max	9.3	22.7	35.4	8.9	65.1	11.3	4.4	7.4	13.2	3.7	7	8.9
Mean	8.18	18.91	31.14	7.91	58.69	9.19	3.64	6.26	9.41	3.13	4.07	7.32
SD	0.79	2.02	3.56	0.78	5.09	3.14	0.45	0.61	1.97	0.48	1.19	0.88

Table.5 Biometric parameters of *Androctonus crassicauda*

Triat	LP	LM1	LM2	LT+ST	LBT	LMF	LC	WC	WM5SE	WM4SE	LFT	Lff
Min	10.5	29.4	44.6	10.1	83.8	11.8	6.6	8.6	15.1	7	5.7	9.5
Max	6.5	19.5	27.5	7	53	7.5	2.5	5.7	10.2	3.5	2.9	5.5
Mean	9.23	24.03	38.11	78.73	71.53	10.4	4.36	7.41	12.15	5.98	4.56	7.35
SD	1.45	4.39	5.98	1.05	10.95	1.51	1.48	1.09	1.79	1.28	1.16	1.52

Fig.1 The topography of Sampling Site

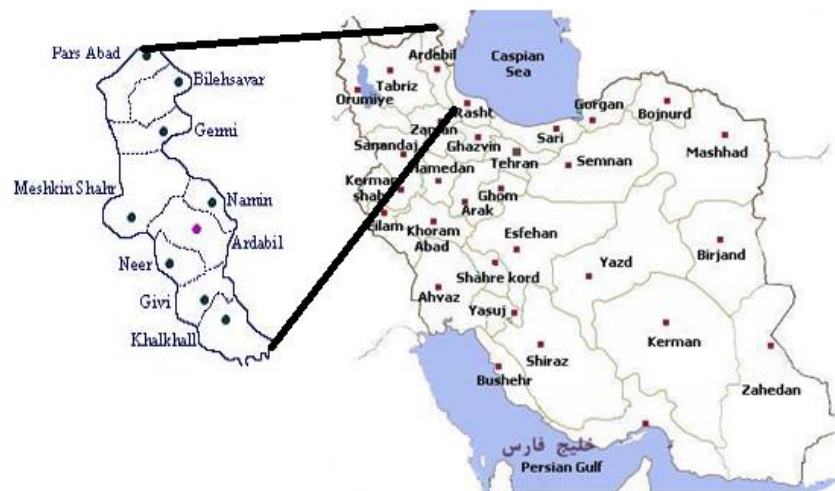


Fig.2 1- Showing the 28 row of dens on the moveable fingers., 2- Showing the sternum three-angle in shape, and separated operculum segments., 3- Showing the comb form in *Scorpiomaurus*., Showing many Trichobothrion legs, pedipalps and metasoma



References

- AL Hajjaj A (2005) Scorpions in the Arab World and rest of the Globe:Amman: Daraldia, 12p.
- Amr Z S, and Al-Oran R (1994) Systematics and distribution of scorpions (Arachnida, Scorpionida) in Jordan. *Bollettino di Zoologia* 61, 185-190.
- Amr Z S, and Al-Oran R and Amr S (1994) Scorpion sting in Jordan. *Annals of Tropical Medicine and Parasitol.* 88, 99-101.
- Amr Z, Hyland K, Kinzelbach R, Amr S and Defosse D (1988) Scorpion et piqûres de scorpions en Jordanie. *Bull. Soc. Path. Ex.* 81, 369-379.
- Aslanfaal S, Sampour M and Shayestehfar AR (2008) Biosystematic study of scorpions on Markazi province of Iran. *Desertation Lorestan University.*
- Birulya A (1896) *Miscellanea scorpologica-1. Zur Synonymie der russischen scorpione.* *Ezheg. Zool. Muz.*, 229.
- El-Hennawy H (1988) Scorpions of Jordan. *Serket* 1, 13-20.
- Farzanpey R (1987) scorpions recognition, Markaznashr Daneshghahi, Iran. P.30-75.
- Levy G, Amitai P and Shulov A (1973) New scorpions from Israel, Jordan and Arabia. *Zoological J. Linnanean Society* 52, 113-140.
- Olivier G A (1807) *Voyage dans 3/4 empire Othoman, 3/4 Egypte Perse.*
- Ozkano and Karayerz (2004) Body structure of scorpions. *Acta Parasitol. Turcica* 28, 54-58.
- Pocock R I (1889) Notes on the some Buthidae, new and old. *A. Mag. Nat. Hist. Ser.* 6, 3, 334.
- Rifai L B, Al-Melhim W N, Gharaibeh B M and Amr Z (2000) The diet of the Desert Eagle Owl, *Bubo bubo ascalaphus*, in the Eastern Desert of Jordan. *J. Arid Environ.* 44, 369-372.
- Sam pour, M. (2003) Project in biosystematical study if Scorpion in Lorestan province, Lorestan University press, Iran.
- Thorell, T. (1876) *Etudes Scorpologiques.* *Act. Soc. Ital. Sei. Nat.*, 19.
- Vachon M (1966) liste des scorpions connusen Egypte, Arabie, Israel, Liban, Syrie, Jordanie, Turquie, Irak, Iran. *Toxicon* 4, 209-218
- Wahbeh Y (1976) A study of Jordanian scorpions. *Jordan Medical Journal* 11, 84-92.