

MORPHOLOGICAL STUDIES ON TWO GENUS OF SCORPIONS

M. Sampour, S. Aslanfaal, A. R. Shayestehfar*, A. Bolandian and S. Mohammadzadeh

Department of Biology, Lorestan University, Lorestan, Iran

* Arac University, Iran

e mail: saidmohammadzadeh@yahoo.co.in

(Accepted 30 August 2010)

ABSTRACT – Almost 350 scorpions species inhabit in the world. Sometimes they are better important than snakes. Identification of scorpions is very important for pharmacologists and biologists. Study of some species is very necessary for protection of rare scorpions also. For study of scorpions in Markazi province, 56 scorpions from different area were collected and identified by key identification. Biometric parameters consist LP, LM1, LM2, ope for *Androctonus crassicauda* and *Odontobuthus doriae*. Rate of this species is low so must be ProtLS+ST, LBT, LMF, LC, WC, WM5SE, WM4SE, LFT, LFF determined by digital ruler and stereomicroscope.

Key word : *Androctonus crassicauda*, biometric traits, scorpion, *Odontobuthus doriae*.

INTRODUCTION

Scorpions are one of the most ancient animals, and probably they appeared about 350 million years ago during the Silurian period, where they invaded terrestrial habitats from an amphibious ancestor (Vachon, 1953). They have hard bodies that are elongated in front, with a large pair of pincers and four pairs of legs, followed by a slender, segmented tail-like abdomen with a sting at the tip (fig. 1). Large pincers are used for capturing and holding food. venom gland (located at the tip of the tail) equipped with a stinger. On its underside, the scorpion has a pair of unique sense organs called pectines. In the male, these are usually larger and like more “teeth” and presumably sense textures of surfaces, they walk across and serve as chemoreceptors to detect pheromone own species of scorpions, found mainly in the warmer parts of the world. This type of habitat is characterized by low rain fall that does not exceed 10 mm annually. Soil varies from sandy to limestone and sandstone. When exposed to ultraviolet light, scorpions absorb the light and reflect it as greenish visible light (bio fluorescence).

They are 1 to 5 inches in size, depending on the species, with colours ranging from yellowish brown to black. Scorpions do not usually attack man unless directly or accidentally provoked. Scorpion is very important arachnidan envenomation that causes adult morbidity and child mortality. Scorpion stings is achy. The stings of two species may be fatal; particularly in small children and older persons, for example LD₅₀ of *Androctonus crassicauda*'s Venom is 0.4 mg/kg. (Simard and Watta, 1984). Although individual reactions to the stings may vary,

and need to seek medical assistance immediately. This is real health problem in many tropical and subtropical countries (Osnaya *et al*, 1988; Ozkano and Karayerz, 2004; Vatanpour, 2003). In addition to Turkey, *A. crassicauda* has high prevalence in Azerbaijan, Iran, Iraq, Syria, Jordan, and Saudi Arabia (Ismail *et al*, 1994; Ozkano and Filazi, 2004 and Vatanpour, 2003); and venom toxicity also changes according to regions and scorpion species (Amaral and Rezende, 2000). The world's most dangerous scorpions live in North Africa and the Middle East (species of *Androctonus*, *Buthus*, *Hottentotta*, *Leiurus*).

In binomenclature system *Androctonus crassicauda* and *Odontobuthus doriae* are as follow division: Phylum: Arthropoda, Class: Arachnida, Order: Scorpiones, Family: Buthidae, Genus: *Androctonus*, Species: *A. crassicauda* and Genus: *Odontobuthus* Species: *O.doriae* respectively. Species of *crassicauda*

Table 1: Biometric Parameters.

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

distribute in Turkey, Syria, Jordan, Iraq, Iran, Kuwait, Saudi Arabia, Israel, Egypt, Sudan and Morocco. The diversity, distribution and zoogeographic affinities of the scorpions are discussed in south-west of Iran by Puladgar (1999). In Markazi province of Iran (west-center) many families of scorpions are found. It seems distribution of Buthidae is greater than Scorpionidae. The aim of this study is to find biometrical parameters of *Androctonus crassicauda* and *Odontobuthus doriae* in this region.

MATERIALS AND METHODS

Samples of scorpions were searched and collected in desert of west-center of Iran. With the help of pincers, scorpions were captured from under stones and clods, ore and under ground holes. Samples were placed in 75% alcohol and labeled ecological properties e.g. date and capturing place. Species were determined by key identification. With the help of stereomicroscope Olympus SZX9 Japan and digital calliper, characteristic of parameters were measured. Parameters consist: Length prosoma, Length mesosoma, Length metasoma, Length body total, Length telson+aculeus, Length chelicera, Length moveable finger, Width carapace, Length foot tibia, Width mesosoma 5 segment, Length foot femur, Width metasoma 4 segment. Abbreviation of parameters list in table 1. Details of scorpion body shown in fig 2.

RESULT AND DISCUSSION

Colour of *Androctonus crassicauda* is black. Tail segments thick and wide. Lateral keels of the second and third segments of the postabdomin are reduced to

only a few granules. Total length of mature *A. crassicauda* varies from 90 to 100mm (Ozkan and Karayez, 2004). Total length 4-9cm (average 8.5 cm), prosoma 10.3-11.5mm, mesosoma 19.6-23.9mm, metasoma 42.1-49.9mm. Pectines 24-33. Wahbeh (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. crassicauda* is one of the venomous species in the Middle East. It lives in horizontal burrows in dry soil in desertic regions or in rodent burrows. This species was recovered from pellets of the Eagle Owl in Eastern Desert of Jordan (Rifai *et al*, 2000). In this study many parameters shown in table 2 and 3. Body of *Androctonus crassicauda* is large, soft, sleek and extensive. *A. crassicauda* has different colours: black, olive blackish. Distance between median eyes is greater than their diameters. Tail is squatty, approximately long and toward above is wide. Width of first, second and three digit is greater than length. Fifth digit is wider, lateral and dorsal digits are dentate likely saw. In the posterior three and forth these dentates is larger. Telson in ventral is convex and gradually limber. Telson diameter is half of width of fifth digit. Aculeus 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 fig 4.

In *Androctonus doriae*, body length is approximately 5-7 cm. Sternum is triangular and reproduction segment is separated. Basitarsus dentated with 21-22 numbers.

Table 2: Many characteristic of scorpions *Odontobuthus doriae*.

	IP	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 3: Many characteristic of scorpions *Androctonus crassicauda*.

	IP	LM1	LM2	LT+ST	LBT	LMF	LC	WC	WM5SE	WM4SE	LFT	LFF
Max	10.5	29.4	44.6	10.1	83.8	11.8	6.6	8.6	15.1	7	5.7	9.5
min	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
SE	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: *Androctonus crassicauda*, venom is complex mixtures of neurotoxins and therefore should be handled with care.



Fig. 2: The surfaces of the legs and body are covered with thicker hairs that are sensitive to direct touch.



Fig 3: (A) Schematic of *Androctonus doriae*, (B) Dorsal digit Dentated like saw(3).



Fig. 4 : (a) Schematic of *Androctonus crassicauda*, (b) Dorsal view like comb (3).

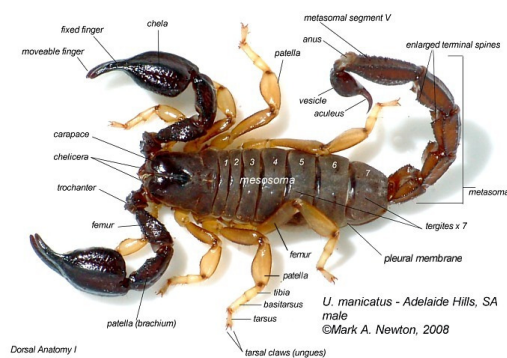


Fig. 4 : Different part on scorpions.

Lateral eyes are three and different granules were observed in body. Sensitive hairs on movable segment (Tail, carous, hand and digits) were lined. Fifth digit of tail is long and has irregular dentates. In anus two dentes was seen. This species was captured from Khomein and Seveh. Figure 3 shown *Androctonus dorioe*.

REFERENCES

- Amaral C F and Rezende N A (2000) Treatment of scorpion envenoming should include both a potent specific antivenom and support of vital functions. *Toxicon* **38**, 1005-1007.
- Amr Z, Hyland K, Kinzelbach R, Amr S and Defosse D (1988) Scorpion et piqures de scorpions en Jordanie. *Bull. Soc. Path. Ex.* **81**, 369-379.
- Aslanfaal S, Sampur M and Shayuestefar AR (2008) Biosystemic study of scorpions on Markazi province of Iran. Dissertation, Lorestan University.
- Ismail M, ABD-Elsalamma and AL-Ahibib M S (1994) *Androctonus crassicauda* (Olivier), a dangerous and unduly neglected scorpion – I. Pharmacological and clinical studies. *Toxicon* **32**, 1599-618.
- Levy G, Amitai P and Shulov A (1973) New scorpions from Israel, Jordan and Arabia. *Zool. J. Linn. Soc.* **52**, 113-140.
- Ozkano and Karayerz (2004) Body structures of scorpions. *Acta Parasitol. Turcica* **28**, 54-58.
- Ozkano and Filazi A (2004) The determination of acute LD₅₀ levels of venom in mice, obtained by different methods from scorpions *Androctonus crassicauda* (Oliver 1807). *Acta Parasitol. Turcica* **28**, 50-53.
- Puladgar A R, Rahmati A F and Hakim A (1998) Frequency study of different scorpions species on Khuzestan province in Iran. Final report of Jihad research 156G.N.
- 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.
- Simard M and Watta J (1984) Neurotoxic Proteins in Scorpion Venom *Toxin Reviews* **3**, 181 – 221.
- Vachon M (1953) The biology of scorpions. *Endeavour* **12**, 80-89.
- Vatanpour H (2003) Effects of black scorpion *Androctonus crassicauda* venom on striated muscle preparation *in vitro*. *Iranian J. Pharmaceutical Res.* **2**, 17-22.
- Wahbeh Y (1976) A study of Jordanian scorpions. *Jordan Medical J.* **11**, 84-92.