

## Description study of *Compsobuthus* (Vachon, 1949) species in South and Southwestern Iran (Scorpiones: Buthidae)

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### ABSTRACT

In the present study three species of *Compsobuthus* are described from Khoozestan province in Southwestern Iran: *Compsobuthus matthiesseni* & *Compsobuthus jakesi* From Bushehr and Fars provinces in Southern Iran: *Compsobuthus matthiesseni*, *Compsobuthus persicus* & *Compsobuthus jakesi*. The samples collected by UV light during field studies of RRLS collecting team in these parts of Iran. Morphologic and morphometrical characters are discussed.

**Keywords:** Scorpiones, Buthidae, *Compsobuthus spp.*, Morphology, Morphometry, Redescription.

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### INTRODUCTION

Before Vachon (1949) described *Compsobuthus*, its species had been placed in *Buthus* Leach, 1818. The genus *Compsobuthus* initially included *C. acutecarinatus* and *C. werneri*, in which authors placed as subspecies most taxa today regarded as separate species (Kovarik 2003). More recently several specialists studied this genus in some detail (Levy & Amitai, 1980, Sissom & Fet 1998, Lorenzo & Monod 1998, Lorenzo 1999, Vignoli, 2005), and in addition to introducing new species also elaborated on new characters and new understanding of species-group taxa. Farzanpay (1988) and Akbari (2007) reported only *C. matthiesseni* from South and South-West parts of Iran. Navidpour *et al* (2008) reported *C. jakesi* for first time from Iran and a new species of *Compsobuthus* from Bushehr province. They showed that scorpionism by this

scorpions is important in some part of Khoozestan specially north parts (Izeh, Masjedesoleyman, and Baghmalek). Dehghani *et al* (2009) identification of *C. matthiesseni* with the prevalence of 20.6% as one of the major species responsible for scorpion sting in Iran.

### MATERIALS AND METHODS

In order to study the scorpions of south and southwest parts of Iran, some samplings were carried out by night catch (UV light) method during March 2005 to November 2008. The specimens stored in 70% ethanol at the Department of scorpology, Razi Reference Laboratory of Scorpion Research, Ahvaz, Iran. Pectinal tooth count and morphological investigation were performed under stereomicroscope using diagnosis keys for species typing. Morphometric measurements of the scorpion were carried out as follow: 1) Length and width of carapace 2) Length and width of mesosoma, 3) Length and width of metasomal segments (I, II, III, IV, and V), 4) Telson length, 5) Patella length and

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width, 6) Tibia length and width, 7) Moveable finger length and 8) Total length of the male and female scorpion (Stahnke 1970) (Table).

**Table.** Morphometric measurement of *Compsobuthus* species

Parameter	<i>C. persicus</i>	<i>C. jakesi</i>	<i>C. mathiesseni</i>
	Measurement (mm)	Measurement (mm)	Measurement (mm)
Total Length	37	24.93	37
Carapace			
Length	4	3.1	4.19
Width	4	2.85	4
Mesosoma			
Length	7.5	7.82	7.2
Width	3.1	3.62	3.1
Metasomal seg.			
Length I	2.7	1.84	2.8
Width I	2.2	1.52	2.2
Length II	3.2	2.28	3.3
Width II	1.9	1.3	1.8
Length III	3.4	2.24	3.7
Width III	1.9	1.28	1.8
Length IV	3.9	2.53	3.9
Width IV	1.8	1.26	1.7
Length V	4.3	2.93	4.66
Width V	1.7	1.20	1.64
Femur			
Length	3.8	2.53	3.8
Width	1	0.72	1.02
Patella			
Length	4.7	3.34	6.7
Width	1.5	0.99	1.2
Tibia			
Length	7.3	5.08	7.3
Width	1.2	0.93	1.2
Finger Length	5.3	3.77	4.96
Telson length	3.5	2.02	2.9

## ABBREVIATIONS

**RRLS.** Razi Reference Laboratory of Scorpion Research, Ahvaz, Khoozestan province, Iran;

**FKCP:** Frantisek Kovarik Collection, Praha, Czech Republic;

Juv: Juvenile; Im: Immature; ♀: Female; ♂: Male.

## SYSTEMATIC

### Family Butidae C.L.Koch 1837

#### *Compsobuthus* Vachon, 1949

*Buthus* (*Buthus*): Pocock, 1889: 126 (in part).

*Buthus*: Kraepelin, 1891: 177 (in part).

*Buthus* (*Hottentotta*): Simon, 1910: 71 (in part).

*Compsobuthus* Vachon, 1949: 93 (1952:213); Simon, 1990: 101; Fet & Lowe, 2000: 124.

**DIAGNOSIS.** Carapace, in lateral view, with entire dorsal surface horizontal or nearly so. Central median and posterior median carinae of carapace fused into single linear carina. Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration. Tibial spurs present on third and fourth legs. Cheliceral fixed finger with two ventral denticles. Movable finger of pedipalp with four proximal to terminal granules. Trichobothrium *db* on chela of pedipalp basal to *est*. Tergites I-VI tricarinate. Carinae of tergites projecting beyond posterior margin as distinct spiniform processes (Kovarik 2003, Kovarik & Ahmed 2007).

#### *Compsobuthus jakesi* Kovařík, 2003

(Figure 1)

*Compsobuthus acutecarinatus*: Kovařík, 1998: 109 (in part); Kovařík, 2001: 79 (in part).

*Compsobuthus jakesi* Kovařík, 2003: 91; Kovařík & Ahmed, 2007: 5; Navidpour *et al* 2008: 9.

*Compsobuthus* sp.: Fet & Kovařík, 2003: 180.

**MATERIAL EXAMINED.** Iran, Bushehr Province. Bushehr to Dayer road, Dero Ahmad village, 27°53'47"N 51°35'51"E, 4 m a.s.l. (Locality No.

Bu-27), XI.2007, 1juv. RRLS, 1♀im. FKCP, leg. Mashipour, Hayader & Habibzadeh.

**Khoozestan Province.** Baghmalek, 31°55'28"N 49°22'25"E, 185 m. (Loc. No. Ba-104), II.2007, 1♀, RRLS, leg. Mashipour & Bahrani; Ahvaz-Omidiyeh road (40 km. to Omidiyeh), 30°37'81"N 49°31'79"E, (Locality No. 812/803/), V. 2007, 2♀, FKCP, leg. Mashipour & Bahrani; 30°13'42"N 50°12'01"E, 128 m. (Locality. No. B-Bi 805), VI.2007, 2 specimens, RRLS, 1♀, FKCP, leg. Navidpour and Mashipour; near Masdjed-e-Soleyman, 31 °38'31"N 48 °56'68"E, 53 m. (Locality. No. A-Ma 806), VIII.2007, 7 specimens, RRLS, 2ims., RRLS, leg. Navidpour and Mashipour; 45 km NW of Masdjed-e-Soleyman, Lali, 32°18'56"N 49 °03'64"E, 329 m. (Loc. No. La-815-3), X.2007, 2ims. (♂♀) FKCP, leg. Mashipour & Hayader, Shush (Apadana place), 32 10 92N 48 15 64 E, 75 m, x.2007, 2 f, Leg. Navidpour, Mashipour & Bahrani; Ahvaz-Naft sefid road, 31 44 46 N, 49 11 62 E, 148m, 2007, 2m, 1juv. Leg. Mashipour & Tofigh.

**DISTRIBUTION.** Iran, Khoozestan Province (Navidpour *et al* 2008: 9), Bushehr Province (Navidpour *et al* 2008: 7); Iraq (Kovařík, 2003: 91).

**DIAGNOSIS.** Total length 26 to 30 mm. Male with much wider and shorter chela of pedipalps. Movable finger of pedipalp bears 11 rows of granules, all without external and with internal granules (*acute carinatus* group). Intermediate carinae of second segment of metasoma may reach three-quarters of segment length or be confined to only its posterior half; third segment bears only three to ten posteriorly situated granules in place of intermediate carinae (however, carina may span one-half of segment); fourth segment with lateral surface entirely devoid of granules. Pectinal teeth number 16-17 in females and 16-19 in males.

**DESCRIPTION.** The adults are 26 to 30 mm long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given

in Table 1. In contrast to female, the male has a much wider and shorter chela of pedipalps.

**COLORATION.** The base colour is uniformly yellow to yellowish brown.

**MESOSOMA.** Tergites I-VI bear very strong, denticulate lateral carinae. Each carina terminates in a spiniform process that extends well past the posterior margin of the tergite. Tergite VII is pentacarinata, with lateral pairs strong, serratocrenulate and the median carina moderate, crenulate and present only in the proximal half. The pectinal tooth count is 16-17 in the females and 16-19 in the males. The seventh segment bears four ventral crenulate carinae. The other sternites are smooth and bear two carinae, which are densely crenulate on the sixth segment and sparsely crenulate on the remaining segments.

**METASOMA AND TELSON.** The first segment has a total of 10 carinae, the second through fourth segments have eight carinae, and the fifth segment has five carinae. Intermediate carinae of the second segment may reach three-quarters of the segment length or be confined to only its posterior half; the third segment bears only three to ten posteriorly situated granules in place of intermediate carinae, however a carina may span one-half of the segment; and the fourth segment has the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are rare between ventral carinae. The telson is bulbous, with a smooth ventral surface and a very small, smooth subaculear tubercle and a median row of few minute granules.

**PEDIPALPS.** The femur of pedipalp has four granulose to crenulate carinae and the patella has seven partly crenulate carinae. The chela has two dorsal carinae, which may be smooth or partly crenulate. For the position and distribution of trichobothria on the chela see Figs. 14 and 15. The movable fingers of pedipalps bear 11 rows of granules, all of them without external granules and with one internal granule. Only the first rows are

partly diagonal, the following are straight, linked with each other and harder to distinguish; consequently, only nine rows may be discernible in some specimens, the last row with more internal granules.



Figure 1. *C. jakesi*

**AFFINITIES.** The only species of the *acutecarinatus* group known from Khoozestan is *C. matthiesseni*, in which the male has markedly longer metasomal segments and narrower manus. *C. jakesi* sp. n., which sexual dimorphism is expressed in the shape of the chela, is most similar to *C. acutecarinatus* from Yemen and Oman, which, however, has different proportions (namely shorter fingers and broader manus of pedipalp) and distribution.

*Compsobuthus persicus* Navidpour *et al* 2008  
(Figure 2)

**TYPE LOCALITY AND TYPE REPOSITORY.** Iran, Bushehr Province. Borazjan, Dalaki, 29°23'27"N 51°16'00"E, 100 m a.s.l.; RRLS and FKCP.

**MATERIAL EXAMINED.** Iran, Bushehr Prov., Borazjan, Dalaki, 29°23'27"N 51°16'00"E, 100 m a.s.l. (Locality No. Bu-19), XI.2007,

1♂2♀(holotype and paratypes) RRLS, 1♂(paratype) FKCP, leg. Mashipour & Bahrani; Borazjan, 29 °16'56"N 51 °15'26"E, 200 m a.s.l. (Locality No. Bu-18), II.2007, 2♀(paratypes) FKCP, leg. Mashipour, Bahrani & Habibzadeh; Dayer, 27°49'35"N 52°04'44"E, 4 m a.s.l. (Locality No. Bu-25), XI.2007, 1♀(paratype) RRLS, leg. Mashipour, Bahrani & Habibzadeh; Tangestan, Ahram, 28°51'45"N 51°20'50"E, 123 m a.s.l. (Locality No. Bu-36), XI.2007, 1♂2♀(paratypes) RRLS, 1im. (paratype) FKCP, leg. Mashipour, Bahrani & Habibzadeh; Tangestan to Farashband, 29°52'49"N 51°22'31"E, 227 m a.s.l. (Locality No. Bu-37), XI. 2007, 2♂4♀(paratypes) RRLS 2♀(paratypes) FKCP, leg. Mashipour, Bahrani & Habibzadeh; Dailam road, Khite Amareh village, 30°42'52"N 49°44'59"E, 41 m a.s.l. (Locality No. OM-801), VII.2007, 1♂(paratype) RRLS, leg. Navidpour, Mashipour & Habibzadeh.

**Fars Province.** Lar, Juim, 28°14'43"N54°03'15"E, 733m a.s.l. (Locality No. Fa-877), XI.2008, 1♂, RRLS, leg. Mashipour, Bahrani & Habibzadeh ;Ghir-Hengam, 29°31'07" N52°52'02"E, 987.6m a.s.l. (Locality No. Fa-875), XI.2008, 2♂3♀, RRLS, leg. Mashipour, Bahrani & Behmam ;Ghir-Khonj, 28°15'16"N53°05'04"E, 675m a.s.l. (Locality No. Fa-868), XI.2008, 4♂2♀, RRLS, leg. Mashipour, Bahrani & Behmam.

**DISTRIBUTION.** Iran, Bushehr Province (Navidpour *et al* 2008), Fars Province (Navidpour *et al* unpublished).

**DIAGNOSIS.** Total length 28–37 mm. Movable finger of pedipalp bears 10 or 11 rows of granules, without external and with internal granules (the *acutecarinatus* group). Intermediate carinae of second metasomal segment may reach three-quarters of segment length or be confined to only its posterior half; third segment bears only 3–10 posteriorly situated granules in place of intermediate carinae. All segments of pedipalps long and narrow in both sexes. Telson elongate. Pectinal teeth number 21–24.

**DESCRIPTION.** The adults are 28 mm (male) to 37 mm (female) long. Measurements of the carapace, telson, segments of the metasoma and segments of the pedipalps, and numbers of pectinal teeth are given in Table 1. Sexual dimorphism is minor, adult males do not have fingers of pedipalps proximally flexed; there is no difference in length and width of pedipalps and metasomal segments.

**COLORATION.** The base color is uniformly yellow to yellowish brown.

**MESOSOMA.** Tergites I–VI bear very strong, denticulate lateral carinae. Each carina terminates in a spiniform process that extends well past the posterior margin of the tergite. Tergite VII is pentacarinata, with lateral pairs strong, serratocrenulate and the median carina moderate, crenulate and present only in the proximal half. The pectinal tooth count is 21–24 in the females and 23–24 in the males. The seventh segment bears four ventral crenulate carinae. The other sternites are smooth or shagreened and bear two or four smooth carinae.

**METASOMA AND TELSON.** The first segment has a total of 10 carinae, the second through fourth segments have eight carinae, and the fifth segment has five carinae. Intermediate carinae of the second segment may reach three-quarters of the segment length or be confined to only its posterior half; the third segment bears only 3–10 posteriorly situated granules in place of intermediate carinae. All segments are sparsely setose and granulated; larger granules are usually on lateral and ventral surfaces and may form another pair of ventromedian carinae. The telson is elongate, with the aculeus approximately as long as the vesicle. The ventral surface of the telson is smooth and a very small, with a smooth subaculear tubercle and a median row composed of several minute granules.

**PEDIPALPS.** The femur has four granulose to crenulate carinae and the patella has seven only partly crenulate carinae. The chela is smooth,

without discernible carinae. All segments are long and narrow, especially the femur and fingers. The movable finger bears 10 or 11 rows of granules, without external and with internal granules. The eleventh row may have one external granule.



Figure 2. *C. persicus*

**AFFINITIES.** *C. persicus* sp. n. is closest to *C. sobotniki* Kovářik, 2003 from Hormozgan Province, from which it differs in proportions. *C. persicus* sp. n. has more elongate telson and longer and narrower segments of pedipalps. The femur length to width ratio is 3.1 in *C. sobotniki* and 3.8–4.0 in *C. persicus* sp. n. The chela length to width ratio is 5.6 in *C. sobotniki* and 6.0–6.6 in *C. persicus* sp. n. The chela to movable finger length ratio is 1.54 in *C. sobotniki* and 1.37–1.40 in *C. persicus* sp. n.. *C. sobotniki* has all metasomal segments smooth, whereas *C. persicus* sp. n. has them usually granulated.

***Compsobuthus matthiesseni* (Birula, 1905)**  
(Figures 5-6)

*Buthus acutecarinatus matthiesseni* Birula, 1905a: 142; Birula, 1937: 107.

*Buthus (Buthus) acutecarinatus matthiesseni*: Birula, 1917: 229, 240; Birula, 1918: 25.

*Buthus (Hottentotta) acutecarinatus matthiesseni*: Vachon, 1940b: 173.

*Compsobuthus matthiesseni*: Pringle, 1960: 77; Habibi, 1971: 43; Levy *et al* 1973: 114; Levy & Amitai, 1980: 60; Farzanpay, 1987: 149; Farzanpay, 1988: 37; Kovařík, 1992: 183; Kovařík, 1996: 53; Kovařík, 1997a: 40, 49; Kovařík, 1997b: 179; Kovařík, 1998: 109; Sissom & Fet, 1998: 1; Crucitti, 1999: 84; Fet & Lowe, 2000: 127; Lourenço & Vachon, 2001: 180; Kovařík, 2002: 7; Crucitti & Vignoli, 2002; Kovařík, 2003: 97; Vignoli *et al* 2003: 2; Vignoli, 2005: 85; Akbari, 2007: 76; Kovařík & Ahmed, 2007: 6; Navidpour *et al* 2008: 9.

*Compsobuthus acutecarinatus matthiesseni*: Vachon & Kinzelbach, 1987: 101; El-Hennawy, 1992: 123.

**MATERIAL EXAMINED.** Iran, Bushehr Prov., Genaveh, 29 °13'42"N 50 °14'22"E, 227 m a.s.l. (Locality No. Bu-G), VI.2005, 8♂11♀ RRLS, 1♂3♀ FKCP, leg. Hayader & Tofigh; Omidiyeh to Genaveh road, 30 °13'42"N 50 °12'01"E, 128 m a.s.l. (Locality No. B-Bi805), VI.2007, 3♂2♀ RRLS, leg. Navidpour & Mashipour.

**Khoozestan Province.** Baghmalek, karbali ghasem village, 31 °27'41"N 49 °57'62"E (Locality No. 501), 2006, 3♂7♀, FKCP, leg. Kazemi & Habibzadeh; Shoushtar Gtvand road (Locality. No. 016-3), VII.2007, 22♀32♂, RRLS, leg. Mashipour and Bahrani; Bidroobeh (Andimeshk), 32 °46'25"N 48 °15'44"E, 504 m. (Loc. No. Bi 813-2), X.2007, 1♀ RRLS, leg. Mashipour & Hayader; 45 km NW of Masdjed-e-Soleyman, Lali, 32 °18'56"N 49 °03'64"E, 329 m. (Loc. No. La-815-4), X.2007, 12♂11♀ RRLS, 1♂ FKCP, leg. Mashipour & Hayader.

**Fars Province.** Kazeroon to Borazjan road, 29°33'36"N 51°23'58"E, 724 m a.s.l. (Locality No. Fa-841), XI.2008, 2♂ RRLS, leg. Mashipour, Bahrani & Behmam; Firoozabad, 29°40'39"N 52°44'34"E, 1207.1 m a.s.l. (Locality

No. Fa-850), XI.2008, 2♀ RRLS, leg. Mashipour, Bahrani & Habibzadeh.

**DISTRIBUTION.** Iran, known from provinces Kermanshah (formerly Bachtaran), Bushehr, Fars, Hamadan, Khoozestan, Kerman, Kordestan, Lorestan, Markazi, and Qom (Sissom & Fet, 1998, Kovařík, 2003: 100, Akbari, 2007: 76; Navidpour *et al* 2008: 9); Iraq (Birula, 1917: 240; Pringle, 1960: 77), Syria (Kovařík, 2002: 7), Turkey (Kovařík, 1996: 53).

**DIAGNOSIS.** This species, with its slender body and elongated metasoma and pedipaps, is quite distinct compared to other species of *Compsobuthus*, and it cannot be readily confused with any that are currently described (Sissom & Fet 1998). Body size is 40-50 mm.

**COLORATION.** Base color light yellow, immaculate except for black pigment surrounding median and lateral eyes and also half of IV and V metasomal segments.

**MESOSOMA.** Carapace slender, almost parallelsided. Ocular tubercles situated at anterior 1/3 of carapace. Posterior median carinae terminating distally in small spinoid process that extends slightly beyond the posterior margin of the carapace. Central median and posterior median carinae separated by a small space, but linearly arranged as in other *Compsobuthus*. Tergite I with lateral carinae moderate, denticulate and on II-VI strong, denticulate; each carina terminates in a spinoid process that extends well past the posterior margin of the tergite.

**METASOMA AND TELSON.** All segments elongated and in segments I-IV dorsolateral and lateral suprmedian carinae strong, finely, irregularly serrate. Ventrolateral carinae on I-IV strong, finely crenulate. Segment V with dorsolateral carinae moderate, serrate; lateromedian carinae indicated by an irregularly-spaced row of coarse granules; ventrolateral and ventromedian carinae strong, crenulate with the granules gradually increasing in size toward distal end. Telson has

ventral aspect with median and paired lateral rows of rounded granules; subacular tubercle indicated by an elevated, rounded area when viewed from lateral aspect; aculeus gently curved and relatively short.

**PEDIPALPS.** Trichobothrial pattern Type A, orthobothriotaxic (Vachon, 1940a); dorsal trichobothria of femur arranged in beta-configuration (Vachon, 1940b). Femur slender, pentacarinata, with all carinae moderate. Patella octocarinata, with dorsointernal carina moderate, granular; and without accessory macrosetae. Chela palm very slender with fingers long and tenuous. Fixed and movable chela fingers with 10 oblique rows of denticles, these lacking outer accessory denticles;



**Figure 3. C. matthiesseni**

movable finger with 4 distal granules preceding first granular row. Fixed finger trichobothria *et* opposite extreme distal end of fourth granular row, *est* opposite enlarged granule at base of fifth row.

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