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## **Eight new species of *Compsobuthus* Vachon, 1949 from Africa and Asia (Scorpiones: Buthidae)**

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### **Abstract**

Eight new species of genus *Compsobuthus* are described. *C. becvari* sp. n. from Pakistan, *C. jakesi* sp. n. from Iraq and *C. sobotniki* sp. n. from Iran belong to the *acuteccarinatus* group; and *C. kafkai* sp. n. and *C. kaftani* sp. n. from Iran, *C. kabateki* sp. n. from Egypt, *C. plutenkoi* sp. n. from Iran and *C. seichertii* sp. n. from Sudan belong to the *wernerii* group. These two groups are discussed and lists of all species of *Compsobuthus* and of all specimens in the author's collection are presented.

**Keywords:** Taxonomy, description, new species, Scorpiones, Buthidae, *Compsobuthus*, Egypt, Iran, Iraq, Pakistan, Sudan.

### **Introduction**

Before Vachon (1949) described *Compsobuthus*, its species had been placed in *Buthus* Leach, 1815. The genus *Compsobuthus* initially included *C. acuteccarinatus* and *C. wernerii*, in which authors placed as subspecies most taxa today regarded as separate species. For this reason the distribution of *C. acuteccarinatus* encompassed inter-alia India (Birula, 1917: 213; Minnocci, 1974: 23) Iraq (Khalaf, 1962: 2), Iran (Farzanpay & Pretzmann, 1974: 216), Libya (Borelli, 1934: 170; Stathi & Mylonas, 2001: 288), Niger (Vachon, 1940b: 173), Pakistan (Minnocci, 1974: 23) and Sudan (Pocock, 1895: 300). More recently several specialists studied this genus in some detail (Levy & Amitai, 1980; Sissom, 1994; Sissom & Fet, 1998; Lourenço & Monod, 1998; Lourenço, 1999; Lowe, 2001), and in addition to introducing new species also elaborated on new characters and new understanding of species-group taxa. Sissom (1994) was first to restrict the occurrence of *C. acuteccarinatus* to only Yemen, to which Lowe (2001) added Oman. Fet & Lowe (2000: 125) summarized the findings and concluded that many previously published records of *C. acuteccarinatus* had been based on misidentifications. I therefore decided to thoroughly examine all specimens

of *Compsobuthus* in my collection and to compare them with published descriptions and type material. The result is eight new species of *Compsobuthus* described below.

ABBREVIATIONS. The institutional abbreviations listed below and used throughout are mostly after Arnett, Samuelson & Nishida (1993); only FKCP is my own.

BMNH	The Natural History Museum, London, United Kingdom;
FKCP	František Kovařík Collection, Praha, Czech Republic;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
MZUF	Museo Zoologico de "La Specola", Firenze, Italy;
NMPC	National Museum (Natural History), Praha, Czech Republic;
SMFD	Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany.

Other abbreviations are: ♂: male; ♀: female; A: specimens preserved in alcohol; E: specimens mounted dry; im.: immature; juv.: juvenile.

***Compsobuthus* Vachon, 1949**  
(Figs. 1-19, Table 1)

*Buthus (Buthus)*: Pocock, 1890: 126 (in part).

*Buthus*: Kraepelin, 1891: 177 (in part); Kraepelin, 1899: 9 (in part); Pocock, 1900b: 56 (in part).

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

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

DIAGNOSIS: Patella of pedipalp without ventral trichobothria. Dorsal trichobothria of femur arranged in beta-configuration (Fig. 19 and fig. 3.3 in Sissom, 1990: 70). Tibial spurs present on third and fourth legs. Cheliceral fixed finger with two ventral denticles. Carapace with distinct carinae (Fig. 1). 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. Movable finger of pedipalp with four proximal to terminal granules (Figs. 4-12). Trichobothrium db on chela of pedipalp basal to est (Figs. 13-18). Tergites I-VI tricarinate. Carinae of tergites projecting beyond posterior margin as distinct spiniform processes (Fig. 1).

***Compsobuthus abyssinicus* Birula, 1903**

*Buthus acutecarinatus abyssinicus* Birula, 1903: 108.

*Buthus (Buthus) acutecarinatus abyssinicus*: Birula, 1908: 131; Birula, 1917: 223.

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

*Compsobuthus acutecarinatus abyssinicus*: Kraepelin, 1913: 127; Lamoral & Reynders, 1975: 506; El-Hennawy, 1992: 122; Kovařík, 1998: 109.

*Compsobuthus abyssinicus*: Vachon, 1949: 99 (1952: 219); ? Levy & Amitai, 1980: 60; Fet & Lowe, 2000: 124.

MATERIAL EXAMINED. **Ethiopia**, Assab, 1♂2♀, MZUF; Parco naz Awasc, 9.IV.1971, 1im., 12.IV.1971, 2♀, leg. Lanza & Alii, MZUF; Parco naz Awasc, Kudu Track,

10.IV.1971, 1♀1juv., leg. Azzaroli, Granchi & Lanza, MZUF; 30 km W Metahara (near Addis Abeba), VIII.1982, 2♀A, FKCP.

*Compsobuthus arabicus* Levy, Amitai & Shulov, 1973

*Compsobuthus arabicus* Levy, Amitai & Shulov, 1973: 122; Vachon, 1979: 39; Levy & Amitai, 1980: 60; Kettel, 1982: 6; Sissom, 1994: 20; Fet & Lowe, 2000: 125; Lowe, 2001: 172.

*Compsobuthus acutecarinatus arabicus*: Vachon & Kinzelbach, 1987: 101; El-Hennawy, 1992: 122; Kovařík, 1998: 109; Kovařík, 2001: 80.

*Compsobuthus acutecarinatus*: Kovařík, 2002: 7.

MATERIAL EXAMINED. **Saudi Arabia**, 150 km ssö El Riyadhth, 13.VI.1959, 1♂(im.), leg. Diehl, SMFD No. 29218.

*Compsobuthus becvari* sp. n.

(Figs. 6, 13 and 19, Table 1)

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

TYPE LOCALITY AND TYPE DEPOSITORY. **Pakistan**, S Baluchistan, Awaran Khuzdar; FKCP.

TYPE MATERIAL. **Pakistan**, S Baluchistan, Awaran Khuzdar, 1♂E (holotype), 4-7.IV.1993, leg. S. Bečvář.

ETYMOLOGY: Named after Stanislav Bečvář, who collected the unique holotype.

DIAGNOSIS: Total length 32.6 mm. Male with much wider manus of pedipalp and fingers of pedipalps slightly flexed proximally. Movable fingers of pedipalps bear 11 rows of granules, of which first eight rows lack external granules (*acutecarinatus* group). Internal granules present. Second through fourth segments of metasoma with eight carinae. Intermediate carinae of second segment replaced by less than 10 granules which may form carinae only in posterior half; third segment bears only four posteriorly situated granules; fourth segment bears only one posteriorly situated granule. Pectinal teeth number 18-19.

DESCRIPTION: The holotype is an adult male 32.6 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. Most likely the male has a much wider manus of pedipalp (Fig. 13) and fingers of pedipalps slightly flexed proximally. The female is not known, nevertheless the obvious male characters and knowledge of sexual dimorphism within *Compsobuthus* justify this assumption.

COLOURATION: The base colour is yellow to yellowish brown with scattered dark pigmentation on carinae. The fifth metasomal segment bears a dark spot.

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 18-19. The seventh segment bears four ventral crenulate carinae. The other sternites are smooth, with two 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 are replaced by less than 10 granules which may form carinae only in its posterior half; the third segment bears only four posteriorly situated granules, and the fourth segment bears only one posteriorly situated granule in place of intermediate carinae. The segments are sparsely setose, however bristles are absent between ventral carinae. The telson is bulbous, without a subaculear tooth or tubercle and with a smooth ventral surface.

**PEDIPALPS:** The femur of pedipalps has four granulose to crenulate carinae and the patella has seven crenulate carinae. The chela has smooth carinae which may be difficult to discern. For the position and distribution of trichobothria on the chela see Fig. 19. The movable fingers of pedipalps bear 11 rows of granules, of which the first eight rows lack external granules. The ninth and tenth rows possess external granules, and one external granule is present also at the eleventh row (Fig. 6).

**AFFINITIES.** The described features distinguish *C. becvari* sp. n. from all other species of the genus. *C. becvari* sp. n. is close to *C. rugosulus*, the only species known from Pakistan and the easternmost species of the genus. *C. rugosulus* differs from *C. becvari* sp. n. by the presence of external granules at all rows of granules on movable fingers of pedipalps and heavy, coarse granulation of the cuticle.

### *Compsobuthus brevimanus* (Werner, 1936)

*Buthus (Hottentotta) acutecarinatus brevimanus* Werner, 1936a: 175; Vachon, 1940b: 173; Whittick, 1941: 44.

*Compsobuthus acutecarinatus acutecarinatus*: Birula, 1937: 105 (in part) (see Sissom, 1994: 12).

*Buthus (Buthus) acutecarinatus*: Roewer, 1943: 205.

*Compsobuthus acutecarinatus brevimanus*: Vachon, 1949: 146; Lamoral & Reynders, 1975: 506; El-Hennawy, 1992: 123.

*Compsobuthus brevimanus*: Vachon, 1966: 211; Minnocci, 1974: 23; Sissom, 1994: 12; Kovařík, 1998: 109; Lourenço & Monod, 1998: 789; Lourenço, 1999: 85; Fet & Lowe, 2000: 126; Kovařík, 2002: 7.

*Compsobuthus manzoni*: Levy, Amitai & Shulov, 1973: 114 (in part); Vachon, 1979: 42 (in part); Levy & Amitai, 1980: 60 (in part) (see Sissom, 1994: 12).

*Compsobuthus maindroni*: Levy, Amitai & Shulov, 1973: 114 (see Fet & Lowe, 2000: 126).

**MATERIAL EXAMINED.** **Yemen Arab Republic**, 2♀A, SMFD No. 6663/72; Sanáa, IX.1980, 1♂1♀A, leg. H. Poggesi & M. Borri, MZUF; strada fra Sanáa e Shibén, 15°31'N 43°54'E, IX.1980, 1juv.A, leg. H. Poggesi & M. Borri, MZUF; villaggio ai piedi del Jabal Karún, 15°05'N 44°22'E, 30.I.1984, 4♀4juvsA, leg. H. Poggesi & M. Borri, MZUF; villaggio Kawkaban, 15°29'N 43°53'E, 31.I.1984, 2♂2♀1juv.A, leg. H. Poggesi & M. Borri, MZUF; Bab el Filak, 2420 m, 14°32'N 44°27'E, 2.II.1984, 1♀A, leg. H. Poggesi & M. Borri, MZUF; Hadola, 6 km SW Sanáa, 2500 m, 15°18'N 44°10'E, 4.II.1984, 1♀A, leg. H. Poggesi & M. Borri, MZUF; Sanáa Azor, 2♂1♀A 2♂2♀E, 1989, leg. P. Nečas, FKCP; 1980, 1♀E, FKCP; Vadí Daher near Sanáa, 22.III.2001, 2♂3♀A 1♂1♀E, leg. K. Šťastný, FKCP.

***Compsobuthus jakesi* sp. n.**  
(Figs. 7, 14 and 15, Table 1)

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

TYPE LOCALITY AND TYPE DEPOSITORY. **Iraq**, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), Geophysics Brno base camp, 150 km SW of An-Najaf (Najaf), 262 m asl, 31°06'N 43°95'E; FKCP.

TYPE MATERIAL. **Iraq**, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), Geophysics Brno base camp, 150 km SW of An-Najaf (Najaf), 262 m asl, 31°06'N 43°95'E, X-XII.1978, 1♂E (holotype) 1♀E (allotype) 1♂A (paratype No. 1) 2♀im.A (paratypes Nos. 2 and 3) 2juvsA (paratypes Nos. 4 and 5), leg. O. Jakeš.

ETYMOLOGY: Named after Oldřich Jakeš, who collected the types.

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 (*acutecarinatus* 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 (Figs. 14 and 15, Tab. 1).

COLOURATION: 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 (in paratypes Nos. 2 and 3 run nearly throughout the 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 (paratypes Nos. 2 and 3); 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 (Fig. 7), 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.

**AFFINITIES.** The described features distinguish *C. jakesi* sp. n. from all other species of the genus. The only species of the *acutecarinatus* group known from Iraq 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 (Figs. 14 and 15), 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.

**COMMENTS.** The collecting site in Iraq was a base camp for oil and gas exploration by Geophysics Brno, at the edge of a limestone region called Al-Hajara. The terrane was described to me (O. Jakeš, pers. comm.) as rocky, partially weathered, with numerous limestone outcrops, locally with harder and more weathering-resistant cementstone layers up to 1 m thick. The camp itself was located in a broad depression which in the rain season received water from several otherwise dry riverbeds. In the rain season it formed extensive ephemeral lakes which took 2-3 weeks to dry out. After the rain season (December through March) the locality had only sparse vegetation that by April was scorched by the sun. Climate of the area is that of a hot and dry subtropical desert with daily fluctuation of temperatures up to 20°C. From spring to fall: sunny with frequent desert storms. In November: a sudden temperature drop, in December-January: frequent rains and thunderstorms. Water lasted for several days and depressions were filled by the above noted ephemeral ponds or lakes for 2-3 weeks. Daily temperatures reached 52°C in July and only 12°C in November and December. The highest night temperature reached 40°C in July and only 3°C in November, when at 6 a.m. they were around freezing and frequently accompanied by fog. Other species of scorpions collected at this site belonged to the typical arid-desert fauna of the Middle East: *Androctonus crassicauda* (Olivier, 1807), *Buthacus tadmorensis* (Simon, 1892), *Orthochirus* sp. (all Buthidae), *Scorpio maurus* Linnaeus, 1758 (Scorpionidae), and also *Euscorpius italicus* (Herbst, 1800) (Euscorpiidae) (see Fet & Kovařík, in press).

***Compsobuthus jordanensis* Levy, Amitai & Shulov, 1973**

*Compsobuthus jordanensis* Levy, Amitai & Shulov, 1973: 120; Vachon, 1979: 40; Levy & Amitai, 1980: 60; Vachon & Kinzelbach, 1987: 100; Amr, Hyland, Kinzelbach, Amr & Defosse, 1988: 372; Fet & Lowe, 2000: 126; Stathi & Mylonas, 2001: 288.

*Compsobuthus acutecarinatus jordanensis*: Vachon & Kinzelbach, 1987: 101; El-Hennawy, 1988a: 14; El-Hennawy, 1992: 123; Amr & El-Oran, 1994: 188; Kovařík, 1998: 109; Kabakibi, Khalil & Amr, 1999: 86; Kovařík, 2001: 80.

MATERIAL EXAMINED. **Syria**, Palmyra, 1♀E, IV.1994, leg. D. Modrý, 1♀A, 30.IV.1995, leg. V. Šejna, 1♀A, 1.V.1995, leg. M. Kaftan, 1♀A, 10-15.V.1995, leg. P. Kabátek, FKCP.

***Compsobuthus kabateki* sp. n.**

(Fig. 8, Table 1)

TYPE LOCALITY AND TYPE DEPOSITORY. **Egypt**, Luxor env.; FKCP.

TYPE MATERIAL. **Egypt**, Luxor env., 1♀A (holotype) 1im.A (paratype), IX.1984, collector unknown.

ETYMOLOGY: Named after Petr Kabátek, who collected many specimens for my collection.

DIAGNOSIS: Total length 29.3 mm. Movable finger of pedipalp bears 9 or 10 rows of granules which always include external and internal granules (*weneri* group) but are not slanted. On second segment of metasoma intermediate carinae replaced by about 10 granules, namely in posterior half; third segment bears only several posteriorly situated granules; fourth segment with lateral surface entirely devoid of granules. Pectinal teeth number is 15-16.

DESCRIPTION: The holotype is an adult female 29.3 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.

COLOURATION: The mesosoma and carapace are grayish black in the holotype and largely yellowish in the immature paratype. The pedipalps and legs are yellow to yellowish brown, with scattered dark pigmentation. The metasoma is dark, only posterior margins of the segments are light. The telson is light-coloured.

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 15-16. The seventh segment bears four moderate and crenulate ventral carinae. The other sternites are smooth, with several bristles.

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 are replaced by about 10 granules, namely in its posterior half; the third segment bears only several posteriorly situated granules; and the fourth segment has the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are absent 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 pedipalps has four granulose to crenulate carinae and the patella has seven partly crenulate carinae. The chela is smooth, without carinae. The movable fingers of pedipalps bear 9 or 10 rows of granules which always include external and internal granules but are not slanted (Fig. 8).

AFFINITIES. The described features distinguish *C. kabateki* sp. n. from all other species of the genus. *C. kabateki* sp. n. is closest to *C. weneri*, from which it differs namely by darker colouration and presence of rows of granules on movable fingers of

pedipalps, which are not slanted and tend to form a single, continual row (Fig. 5 and 8). Another difference is in the number of carinae on the second metasomal segment, 10 in *C. weneri* and only eight in *C. kabateki* sp. n.

***Compsobuthus kafkai* sp. n.**  
(Figs. 9, 16 and 17, Table 1)

TYPE LOCALITY AND TYPE DEPOSITORY. **Iran**, Baluchistan, Bampur; FKCP.

TYPE MATERIAL. **Iran**, Baluchistan, Bampur, XII.1995, 1♀A (holotype), 1♂A (paratype No. 1), 1♀im.A (paratype No. 2), leg. M. Kafka.

ETYMOLOGY: Named after Marek Kafka, who collected the types.

DIAGNOSIS: Total length 30 – 33.2 mm. Male has much wider manus of pedipalps and fingers of pedipalps slightly flexed proximally. Movable finger of pedipalp bears 11 rows of granules. First four rows lack external lateral granules, following rows have one external granule of variable size each (*weneri* group). Intermediate carinae of second segment of metasoma replaced by five or less granules near posterior margin; third segment bears only one to three posteriorly situated granules in place of intermediate carinae; fourth segment with lateral surface entirely devoid of granules. Pectinal teeth in females number 17-18.

DESCRIPTION: The adults are 30.0 (female) and 33.2 (male) 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 manus of pedipalps (Figs. 16 and 17, Tab. 1) and fingers of pedipalps slightly flexed proximally.

COLOURATION: The base colour is uniformly yellow or yellowish brown with scattered dark pigmentation on carinae. The fifth metasomal segment bears a dark spot which covers much of the segment. The telson is light yellow, often lighter than the body.

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 17-18 in the females; the male is heavily damaged and lacks both pectines and all legs. The seventh segment bears four ventral crenulate carinae. The other sternites are smooth and bear two carinae which are crenulate on the sixth segment and smooth, without granules 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 are replaced by five or less granules near the posterior margin; the third segment bears only one (paratype No. 1) to at most three (holotype) posteriorly situated granules in place of intermediate carinae; and the fourth segment has the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are absent between ventral carinae. The telson is slightly elongate, with a smooth ventral surface and a median row of few minute granules.

PEDIPALPS: The femur of pedipalps has four granulose to crenulate carinae and the patella has seven partly crenulate carinae. The chela has smooth carinae which may be difficult to see. For the position and distribution of trichobothria on the chela see Figs.



16 and 17. The movable finger of pedipalp bears 11 rows of granules. The first four rows lack external lateral granules, whereas the following rows have one external granule of variable size present (Fig. 9).

AFFINITIES. The described features distinguish *C. kaffkai* sp. n. from all other species of the genus. The following key may serve to distinguish all Iranian species of the *weneri* group:

1. Second segment of metasoma with 10 carinae ..... *C. rugosulus*  
- Second segment of metasoma with 8 carinae and sometimes with several accessory granules which do not form a complete carina ..... 2
2. External lateral granules present at all rows of granules on movable finger of pedipalp (Fig. 10) ..... 3  
- External lateral granules absent at first four rows of granules (Fig. 9).. *C. kaffkai* sp. n.
3. Movable finger of pedipalp with 10 rows of granules (Fig. 10). Segments of pedipalps and metasomal segments markedly longer and narrower (Fig. 3, Table 1) ..... *C. plutenkoi* sp. n.  
- Movable finger of pedipalp with 11-13 rows of granules. Segments of pedipalps and metasomal segments markedly shorter and wider (Fig. 1, Table 1) ..... *C. kaftani* sp. n.

***Compsobuthus kaftani* sp. n.**

(Fig. 1, Table 1)

TYPE LOCALITY AND TYPE DEPOSITORY. **Iran**, Esfahan prov., Jafar abad SEE of Kashan, 33°55'N 51°53'E; FKCP.

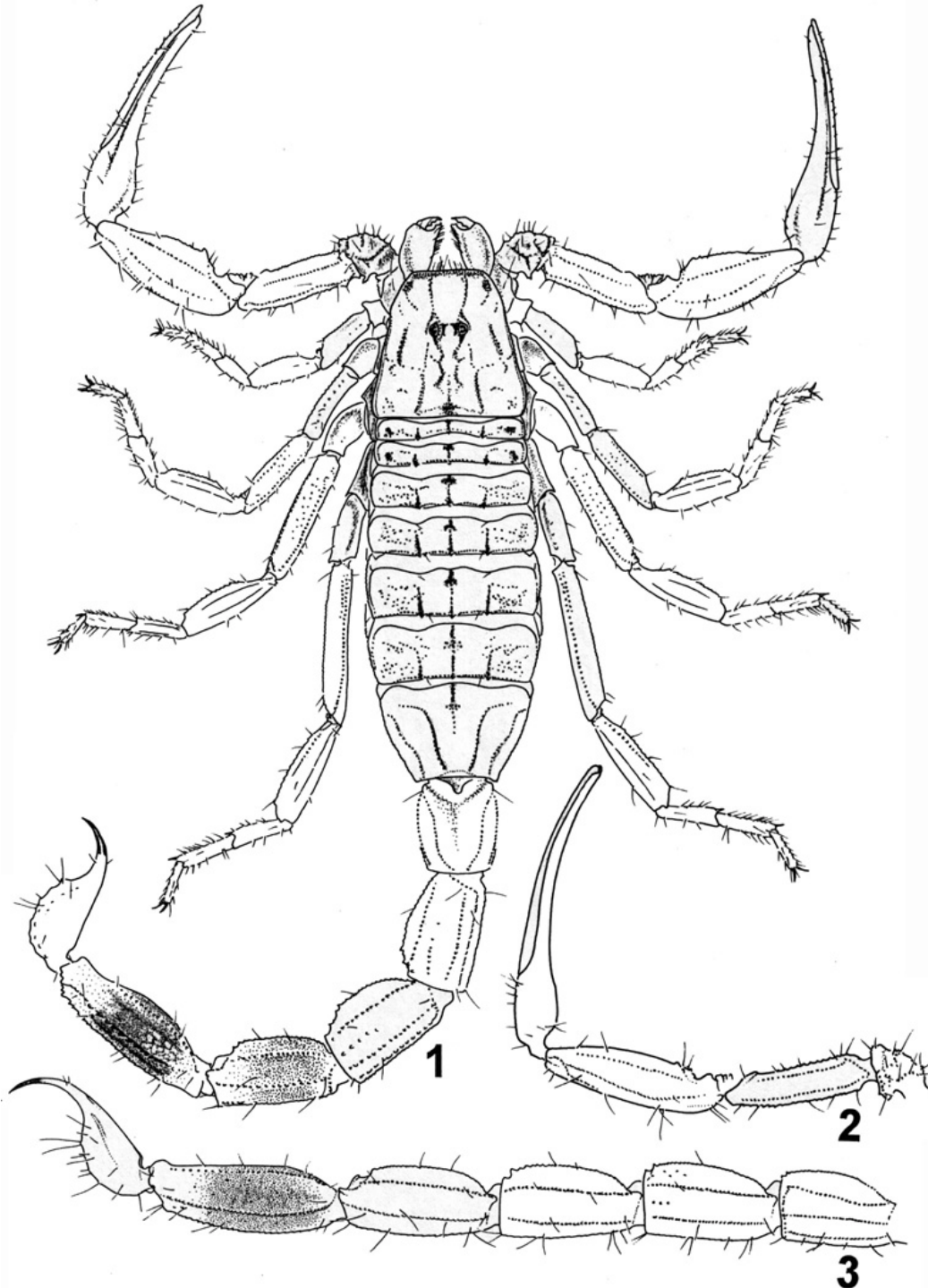
TYPE MATERIAL. **Iran**, Esfahan prov., Jafar abad SEE of Kashan, 33°55'N 51°53'E, ca 800 m, 26-27.IV.1996, (locality No. 2 see *Frynta et al.*, 1997), 1♂A (holotype) 1♀im.A (paratype No. 1), leg. V. Šejna; 5 km N of Natanz, 6. IV.2000, 33°32'473"N, 51°52'607"E, alt. 1903 m, 1♀A (allotype), leg. M. Kaftan; TEPPE-SIALK (Esfahán), 33°58'N 51°24'E, 1000 (-) m, 2.V.1997, 1♂1♀A (paratypes Nos. 2 and 3), leg. M. Kaftan; Emam Sadeh, 5.IV.2000, 2♀im.E (paratypes Nos. 4 and 5), leg. Jan Šobotník; Dodehak, 24.IV.2000, 34°07'090"N, 50°37'317"E, alt. 1420 m, 1♀im.E (paratype No. 6) 1♀im.A (paratype No. 7), leg. M. Kaftan.

ETYMOLOGY: Named after Milan Kaftan, who collected most of the types.

DIAGNOSIS: Total length 35 – 42 mm. Male has longer pectines with more teeth. Sexual dimorphism minor, adult males with fingers of pedipalps very slightly flexed proximally; there is no difference in length and width of metasomal segments. Movable finger of pedipalp bears 11 to 13 rows of granules which always include external and internal granules (*weneri* group). Intermediate carinae of second segment of metasoma replaced by less than 10 granules which may form carinae posterior half; third segment bears only one to five posteriorly situated granules in place of intermediate carinae; fourth segment with lateral surface entirely devoid of granules. Pectinal teeth number 18-21 in females and 24-29 in males.

DESCRIPTION: The adults are 35 – 42 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. Habitus is shown in Fig. 1. A colour photo of a still-alive

paratype is in Kovařík (2003: 57). In contrast to female, the male has longer pectines with more teeth. Sexual dimorphism is minor, adult males have fingers of pedipalps very slightly flexed proximally; there is no difference in length and width of metasomal segments.



Figs. 1–3. Fig. 1. *C. kaftani* sp. n., male paratype No. 1, dorsal view. Fig. 2. *C. plutenkoi* sp. n., female holotype, pedipalp. Fig. 3. *C. plutenkoi* sp. n., female holotype, metasoma.

COLOURATION: The base colour is uniformly yellow or yellowish brown with scattered dark pigmentation on carinae. Dark spots tend to be more numerous in juvenile and smaller specimens. The fifth metasomal segment bears a dark spot which encompasses one-half of the segment (Fig. 1). Some specimens (paratype No. 1) may have dark pigment also on the hind part of the fourth metasomal segment, and immature specimens may bear dark spots on all metasomal segments. The telson is light yellow, often lighter than the body.

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 18-21 in the females and 24-29 in the males. The seventh segment bears four moderate and crenulate ventral carinae. The other sternites are smooth, usually without carinae, but occasionally there may be two smooth carinae without granules on the fifth and sixth sternites (holotype).

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 are replaced by less than 10 granules, which may form carinae only in its posterior half; the third segment bears only one (holotype) to at most five (paratype No. 1) posteriorly situated granules in place of intermediate carinae; and the fourth segment has the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are absent between ventral carinae. The telson is bulbous, with a smooth ventral surface and a median row of few minute granules.

PEDIPALPS: The femur of pedipalps has four granulose to crenulate carinae, and the patella has seven carinae of which only the dorsal are crenulate and the others are nearly smooth. The chela has six smooth carinae which may be difficult to see but due to black pigmentation are usually easy to discern in juvenile specimens. The movable finger of pedipalp bears 11 (paratype No. 1) to 13 (holotype) rows of granules which always include external and internal granules.

AFFINITIES. The described features distinguish *C. kaftani* sp. n. from all other species of the genus. *C. kaftani* sp. n. is closest to *C. carmelitis* from Israel, from which it differs in proportions and longer, narrower metasomal segments. See the key under *C. kafkai* sp. n. to differentiate among all Iranian species of the *wernerii* group.

### *Compsobuthus klaptoczi* (Birula, 1909)

*Buthus klaptoczi* Birula, 1909: 511.

*Buthus (Buthus) acutecarinatus klaptoczi*: Birula, 1917: 223; Birula, 1918: 26.

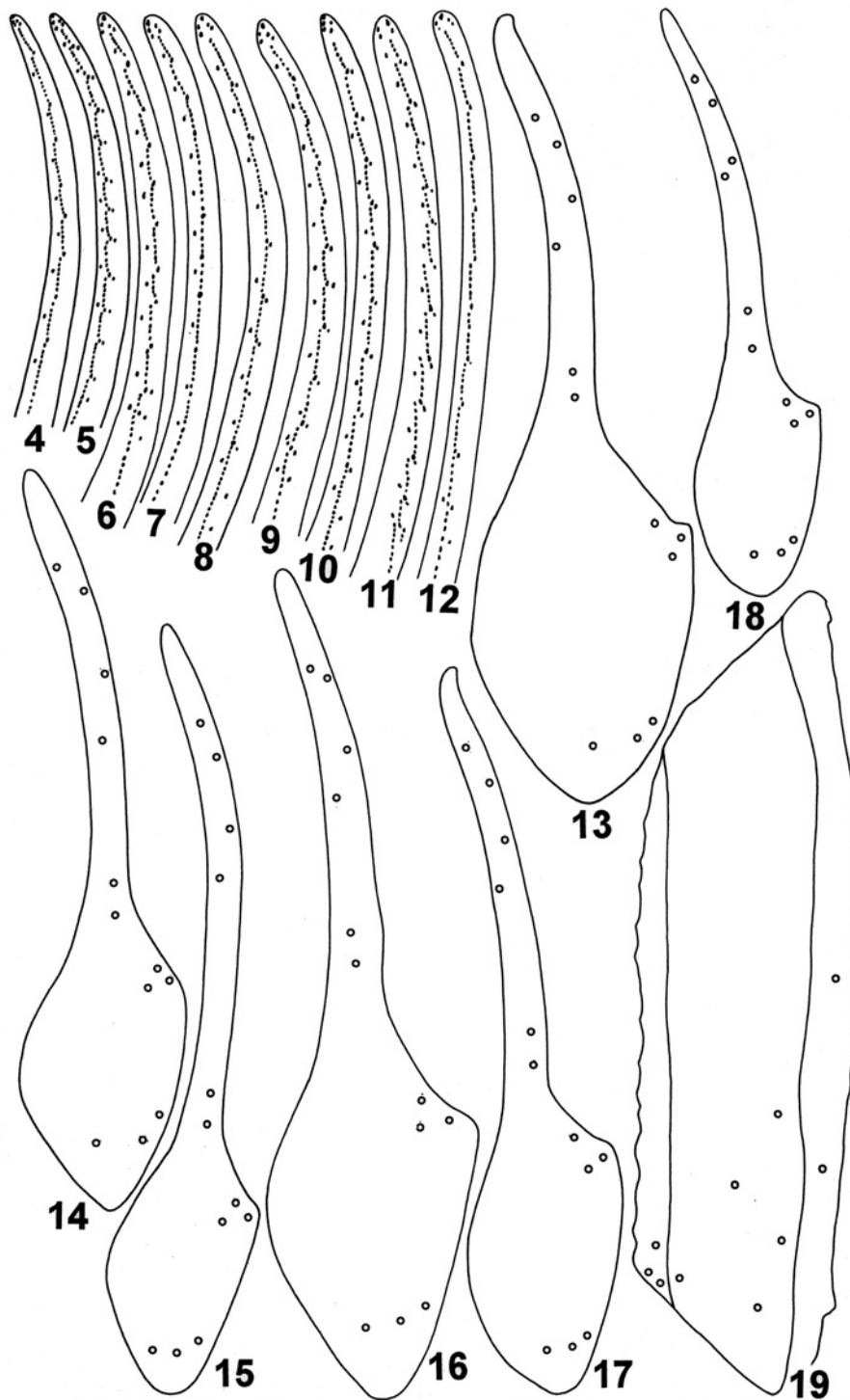
*Buthus acutecarinatus klaptoczi*: Borelli, 1924: 7; Borelli, 1928: 351; Borelli, 1934: 170.

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

*Compsobuthus klaptoczi*: Minnocci, 1974: 24; Levy & Amitai, 1980: 60; Vachon & Kinzelbach, 1987: 101; Fet & Lowe, 2000: 126.

*Compsobuthus wernerii klaptoczi*: El-Hennawy, 1992: 124; Kovařík, 1998: 109; Kovařík, 2001: 80.

MATERIAL EXAMINED. **Libya**, 1♀E, FKCP.



Figs. 4–19. Figs. 4–12 Movable finger of pedipalp. Fig. 4. *C. maindroni* (Kraepelin), female from Oman, FKCP. Fig. 5. *C. wernerii* (Birula), female from Somalia, MZUF. Fig. 6. *C. becvari* sp. n., male holotype. Fig. 7. *C. jakesi* sp. n., male holotype. Fig. 8. *C. kabateki* sp. n., immature paratype. Fig. 9. *C. kafkai* sp. n., male paratype No. 1. Fig. 10. *C. plutenkoi* sp. n., female holotype. Fig. 11. *C. seichertii* sp. n., female holotype. Fig. 12. *C. sobotniki* sp. n., female holotype. Figs. 13–18 Tibia of pedipalp. Fig. 13. *C. becvari* sp. n., male holotype. Fig. 14. *C. jakesi* sp. n., male holotype. Fig. 15. *C. jakesi* sp. n., female allotype. Fig. 16. *C. kafkai* sp. n., male paratype No. 1. Fig. 17. *C. kafkai* sp. n., female holotype. Fig. 18. *C. sobotniki* sp. n., female holotype. Fig. 19. Femur of pedipalp, *C. becvari* sp. n., male holotype.

***Compsobuthus maindroni*** (Kraepelin, 1901)  
(Fig. 4)

*Buthus maindroni* Kraepelin, 1901: 11; Borelli, 1904: 2.  
*Buthus (Buthus) acutecarinatus maindroni*: Birula, 1917: 229.  
*Buthus acutecarinatus maindroni*: Borelli, 1931: 218; Moriggi, 1941: 85.  
*Buthus (Hottentotta) acutecarinatus maindroni*: Vachon, 1940a: 256; Vachon, 1940b: 173; Caporiacco, 1947: 231.  
*Compsobuthus maindroni*: Vachon, 1949: 99 (1952: 219); Vachon, 1966: 211; Levy, Amitai & Shulov, 1973: 114 (in part); Minnocci, 1974: 23; Vachon, 1979: 40; Levy & Amitai, 1980: 60 (in part); Sissom, 1994: 15, 36; Lourenço, 1999: 86; Fet & Lowe, 2000: 127; Lowe, 2001: 172.  
*Compsobuthus acutecarinatus maindroni*: Lamoral & Reynders, 1975: 507; El-Hennawy, 1992: 123; Kovařík, 1998: 109.

MATERIAL EXAMINED. **Oman**, Wadi Bani Kharus, 23°11.94'N 57°33.43'E, 800 m, 11.X.1993, 21:39, 2♂A, UV detection, wadi, leg. G.Lowe, A. S. Gardner, & S. M. Farook, det. G. Lowe, FKCP; road up Jabal Shams, 23°13.97'N 57°10.2'E, 1710 m, 2.X.1994, 1♂1♀E, UV detection, on rocks, leg. G.Lowe & M. D. Gallagher, det. G. Lowe, FKCP.

***Compsobuthus cf. manzonii*** (Borelli, 1915)

*Buthus acutecarinatus manzonii* Borelli, 1915: 458.  
*Buthus (Hottentotta) acutecarinatus manzonii*: Vachon, 1940b: 173.  
*Compsobuthus manzonii*: Vachon, 1949: 99 (1952: 219); Vachon, 1966: 211; Minnocci, 1974: 24; El-Hennawy, 1992: 123; Kovařík, 1998: 109; Fet & Lowe, 2000: 127.  
*Compsobuthus manzoni*: Levy, Amitai & Shulov, 1973: 114 (in part); Levy & Amitai, 1980: 60 (in part).

MATERIAL EXAMINED. **Yemen Arab Republic**, Hadjara, 2400 asl, XI.1999, 1♂1♀A (det. ?), leg. K. Štápný, FKCP; near Sanáa, III.2001, 1♂2juvs(♂ and ♀)A (det. ?), leg. K. Štápný, FKCP.

COMMENTS. The original description does not contain enough data to reliably distinguish this species, and other published information is of only catalogue character. The above specimens thus cannot be unequivocally assigned to *C. manzonii* without examination of the type.

***Compsobuthus matthiesseni*** (Birula, 1905)

*Buthus acutecarinatus matthiesseni* Birula, 1905: 142; Birula, 1917a: 140; Birula, 1937: 107.  
*Buthus (Buthus) acutecarinatus matthiesseni*: Birula, 1917: 229, 240; Birula, 1918: 25; Werner, 1936b: 204.  
*Buthus (Hottentotta) acutecarinatus matthiesseni*: Vachon, 1940b: 173.  
*Compsobuthus acutecarinatus matthiesseni*: Vachon & Kinzelbach, 1987: 101; El-Hennawy, 1992: 123.

*Compsobuthus matthiesseni*: Pringle, 1960: 77; Habibi, 1971: 43; Levy, Amitai & Shulov, 1973: 114; Levy & Amitai, 1980: 60; Farzanpay, 1988: 37; Kovařík, 1992: 183; Kovařík, 1996: 53; Kovařík, 1997a: 40, 49; Kovařík, 1997b: 179; Kovařík, 1998: 109; Kovařík, 1999: 39, 42; Sissom & Fet, 1998: 1; Crucitti, 1999: 84; Lourenço, 1999: 85; Fet & Braunwalder, 2000: 18; Crucitti & Cicuzza, 2000: 280; Fet & Lowe, 2000: 127; Crucitti & Cicuzza, 2001: 231; Lourenço & Vachon, 2001: 180; Kovařík, 2002: 7.

MATERIAL EXAMINED. **Iran**, Fars prov., alt. ca 1700 m, 10 km E of Sivand vill., 29-30.IV.1996, 1♀A, leg. M. Kaftan, 1♀A, leg. D. Král, 3♀A, leg. J. Pitulová, FKCP; Fars prov., alt. ca 1000 m, Zagros Mts., Abshar vill. env., 2-3.V.1996, 1♀E, leg. M. Kaftan, FKCP; Hamadan prov., ca 2000 m, 35 km SE of Hamadan, Gonbad vill. env., 7-8.V.1996, 1♂3♀A, leg. M. Kaftan, 2♂7♀A1♂E, leg. V. Šejna, FKCP; Lorestán prov., Jeiugir env., 500 m, 32°19'37"N 48°30'40"E, 1♂A, 10-11.X.1998, leg. P. Kabátek, FKCP; Lorestán prov., 10 km SE Bavineh, 1100 m, 33°36'08"N 47°11'59"E, 1♂6♀A, 16-17.X.1998, leg. P. Kabátek & M. Kaftan, FKCP; Bahtarán prov., Hasrouabad, 1300 m, 34°10'09"N 46°21'56"E, 1♀(im.)1juv.A, 17-18.X.1998, leg. P. Kabátek, FKCP; Deh Bahri, 7.IV.2000, 29°05'370"N, 57°55'539"E, alt. 6422 ft., 1♀A (det. ?), leg. M. Kaftan, FKCP; 5 km SE of Posht Chenár, 19-20.IV.2000, 29°12'941"N, 53°20'014"E, alt. 1692 m, 2♀1juv.A, leg. Jan Šobotník, FKCP; 2 km W of Khollar, 22-23.IV.2000, 29°59'373"N, 52°12'098"E, alt. 2130 m, 1♀A (det. ?), leg. J. Šobotník, FKCP; 10 km S of Firuz Abad, 20-21.IV.2000, 28°55'892"N, 52°31'770"E, alt. 1412 m, 1♀E1juv.A, leg. J. Šobotník, FKCP. **Iraq**, Baghdad, leg. V. Kálalová, 1929, 3♀4♂E, FKCP, 79♀24♂63juvsA 7♀7♂2juvsE, NMPC; Eskikalak (Com. Arbil), from the vicinity of River Great Zab, 1♂1♀1juv.A, 4.XII.1977, leg. Topál & Zibahy (locality No. 298-299), HNHM. **Turkey**, prov. Diyarbakir, Ergani env., 1300 m, 1juv(♂)A, 2.V.1993, leg. P. Rojek, FKCP. **Syria**, Nahr al-Habur Area, 35°37'N 40°45'E, Tall Shaih Hamad, 2♂5♀6juvsA, 21-24.IX.1988, TSH 1/88, SMFD; Qalcat Sakkara, 1♀A, 2.X.1988, TSH 13/88, SMFD; Gabal Abd al-Aziz, 1♀1juv.A, 2.X.1988, TSH 15/88, SMFD; Tall Gunaidiya, 1juv.A (det. ?), 5.X.1988, TSH 20/88, SMFD; 5 km SE Margáda, 1♀A, 12.X.1988, TSH 42/88, SMFD.

### *Compsobuthus plutenkoi* sp. n.

(Figs. 2, 3 and 10, Table 1)

TYPE LOCALITY AND TYPE DEPOSITORY. **Iran**, Hormozgan prov., Beshagerd Mts., Davari vil., 26°27'N – 57°38'E; FKCP.

TYPE MATERIAL. **Iran**, Hormozgan prov., Beshagerd Mts., Davari vil., 26°27'N – 57°38'E, 6-11.IV.2000, 1♀E (holotype), leg. V. Siniaev & A. Plutenko.

ETYMOLOGY: Named after Andrei Plutenko, who collected the unique holotype.

DIAGNOSIS: Total length 32.4 mm. Movable finger of pedipalp bears 10 rows of granules which always include external granules (*weneri* group). Internal granules present at third to tenth rows. Intermediate carinae of second segment of metasoma replaced by three granules; third and fourth segments with lateral surface entirely devoid of granules. Pectinal teeth number 22.

DESCRIPTION: The holotype (adult female) is 32.4 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.

COLOURATION: The base colour is yellow to yellowish brown with scattered dark pigmentation on carinae. The fifth metasomal segment bears a dark spot which encompasses more than one half of the segment (Fig. 3). The telson is 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 22. The seventh segment bears four moderate and crenulate ventral 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. On the second segment intermediate carinae are replaced by three granules; the third and fourth segments have the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are absent between ventral carinae. The telson is elongate, with a smooth ventral surface and a small, smooth subaculear tubercle and few rounded granules.

PEDIPALPS: The femur of pedipalps has four granulose to crenulate carinae and the patella has seven only partly crenulate carinae. The chela is smooth, without discernible carinae. All segments of pedipalps are long and narrow, especially the fingers (Fig. 2, Table 1). The movable finger of pedipalp bears 10 rows of granules which always include external granules. Internal granules are present at the third to tenth rows. The tenth row has two external granules (Fig. 10).

AFFINITIES. The described features distinguish *C. plutenkoi* sp. n. from all other species of the genus. See the key under *C. kafkai* sp. n. to distinguish all Iranian species of the *weneri* group. *C. plutenkoi* sp. n. is closest to *C. longipalpis* from Egypt (Sinai), Israel and Jordan, from which it differs in proportions, longer fingers of pedipalps and narrower manus of pedipalps (Fig. 2, Table 1).

### ***Compsobuthus rugosulus* (Pocock, 1900)**

*Buthus acute-carinatus rugosulus* Pocock, 1900a: 20; Takashima, 1945: 76.

*Buthus acute-carinatus rugulosus*: Birula, 1905: 141; Kraepelin, 1913: 127.

*Buthus (Buthus) acute-carinatus rugulosus*: Birula, 1917: 229, 240.

*Buthus (Hottentotta) acute-carinatus rugosulus*: Vachon, 1940b: 173.

*Compsobuthus rugulosus*: Vachon, 1966: 211; Habibi, 1971: 43; Farzanpay, 1988: 37.

*Compsobuthus rugosulus*: Levy, Amitai & Shulov, 1973: 114; Minnocci, 1974: 23;

Levy & Amitai, 1980: 60; Kovařík, 1997a: 49; Kovařík, 1998: 109; Lourenço &

Monod, 1998: 790; Lourenço, 1999: 85; Fet & Lowe, 2000: 128; Lourenço, 2001: 318.

*Compsobuthus acute-carinatus rugosulus*: Tikader & Bastawade, 1983: 169.

TYPE MATERIAL EXAMINED. India central, Gwalior, 1♀A (paralectotype); BMNH No. 1896.12.15.14.17.

### ***Compsobuthus schmiedeknechti* Vachon, 1949**

*Buthus acute-carinatus judaicus* Birula, 1905: 139 (preocc. by *Buthus judaicus* Simon, 1872: Scorpionida) = *Compsobuthus weneri schmiedeknechti* Vachon, 1949, nom. nov. (syn. by Fet, 1997: 246).

*Buthus (Hottentotta) acutecarinatus judaicus*: Werner, 1935: 212; Vachon, 1940a: 256; Vachon, 1940b: 173.

*Compsobuthus judaicus*: Vachon, 1949: 99 (1952: 219); Vachon, 1966: 211; Minnocci, 1974: 23.

*Compsobuthus schmiedeknechti* Vachon, 1949: 99 (1952: 219).

*Compsobuthus weneri judaicus*: Levy, Amitai & Shulov, 1973: 114; Levy & Amitai, 1980: 67; Polis, 1990: 286; El-Hennawy, 1992: 124; Kabakibi, Khalil & Amr, 1999: 82.

*Compsobuthus weneri schmiedeknechti*: Fet, 1997: 246; Kovařík, 1998: 109; Fet & Lowe, 2000: 129.

MATERIAL EXAMINED. **Syria**, Bloudan, 1♀2♂E, 28.VI.1994, leg. D. Vlasta, B. Blecha & L. Adámek, 1♂2♀A, 17.V.1995, leg. V. Šejna, FKCP; Qanawat, 3♀A, 2.V.1995, leg. V. Šejna & M. Kaftan, FKCP; Malula, 1♀A, 17.V.1995, leg. M. Kaftan; 35°36'19" - 36°12'54", 1355 m, 1♂E, leg. E. Hajdaj, FKCP.

### *Compsobuthus seichertii* sp. n.

(Fig. 11, Table 1)

TYPE LOCALITY AND TYPE DEPOSITORY. **Sudan**, Khartoum env.; FKCP.

TYPE MATERIAL. **Sudan**, Khartoum env., 1♀E (holotype), 3.IX.1974, leg. V. Seichert.

ETYMOLOGY: Named after Václav Seichert, who collect the unique holotype.

DIAGNOSIS: Total length 44.3 mm. Movable finger of pedipalp bears 13 rows of granules, which always include external and internal granules (*weneri* group). Intermediate carinae of second segment of metasoma replaced by less than 10 granules in posterior half; third segment bears only one posteriorly situated granule in place of intermediate carinae; fourth segment with lateral surface entirely devoid of granules. Pectinal teeth number 21.

DESCRIPTION: The holotype (adult female) is 44.3 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.

COLOURATION: The base colour is uniformly yellow with scattered dark pigmentation on the mesosoma and carapace. Pedipalps, legs, metasoma, and telson are lighter than the body.

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. The seventh segment bears four moderate and crenulate ventral carinae. The other sternites are smooth, with several bristles.

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 are replaced by less than 10 granules in its posterior half; the third segment bears only one posteriorly situated granule in place of intermediate carinae; and the fourth segment has the lateral surface entirely devoid of granules. The segments are sparsely setose, however bristles are absent between



ventral carinae. The telson is bulbous, with a nearly smooth ventral surface bearing only few rounded granules.

**PEDIPALPS:** The femur of pedipalps has four granulose to crenulate carinae and the patella has seven partly crenulate carinae. The chela is smooth, without carinae. The movable and fixed fingers of pedipalp bear 13 and 12 rows of granules, respectively, which always include external and internal granules (Fig. 11).

**AFFINITIES.** The described features distinguish *C. seichertii* sp. n. from all other species of the genus. *C. seichertii* sp. n. is closest to *C. wernerii*, from which it differs by larger size, longer and narrower segments of the metasoma (Table 1), and the presence of 13 rows of granules on the movable fingers of pedipalps. *C. wernerii* has 9-12 rows of granules on the movable fingers of pedipalps. Another difference is in the number of carinae on the second metasomal segment, 10 in *C. wernerii* and eight in *C. seichertii* sp. n.

***Compsobuthus sobotniki* sp. n.**  
(Figs. 12 and 18, Table 1)

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

**TYPE LOCALITY AND TYPE DEPOSITORY.** **Iran**, Kargushki, 26°04.353'N 57°18.293'E; FKCP.

**TYPE MATERIAL.** **Iran**, Kargushki, 26°04.353'N 57°18.293'E, 10 asl, 18.IV.2000, 1♀A (holotype), leg. J. Šobotník.

**ETYMOLOGY:** Named after Jan Šobotník, who collected the unique holotype.

**DIAGNOSIS:** Total length 26 mm. Movable finger of pedipalp bears 11 rows of granules, of which first eight rows lack external granules (*acutecarinatus* group). Internal granules present. Intermediate carinae of second segment of metasoma replaced by less than 10 minute, isolated granules situated mainly in posterior half; third segment bears only two posteriorly situated granules; fourth segment with lateral surface smooth, entirely devoid of granules. Pectinal teeth number 22.

**DESCRIPTION:** The holotype (adult female) is 25.8 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.

**COLOURATION:** The base colour is yellow to yellowish brown, only the anterior portion of the carapace and area around the median eyes are dark.

**MESOSOMA:** Tergites I-VI bear denticulate lateral carinae. Tergite VII is tetracarinate, with the median carina indicated by only three granules in the proximal half. The pectinal tooth count is 22. The seventh segment bears four ventral crenulate carinae. The other sternites are smooth, and the sixth segment bears two smooth carinae without granules.

**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 are replaced by less than 10 minute and isolated granules situated mainly in the posterior half; the third segment bears only two posteriorly situated granules; and the fourth segment has the lateral surface smooth, entirely devoid of granules. The segments bear only a few bristles each, which

are absent between ventral carinae. The telson is elongate, with the vesicle longer than the aculeus. Its ventral surface is smooth and bears a median row of few minute granules.

**PEDIPALPS:** The femur of pedipalps has four granulose to crenulate carinae and the patella has seven partly crenulate carinae. The chela has smooth carinae which may be difficult to see. For the position and distribution of trichobothria on the chela see Fig. 18. The movable fingers of pedipalps bear 11 rows of granules (Fig. 12).

**AFFINITIES.** The described features distinguish *C. sobotniki* sp. n. from all other species of the genus. It appears to be most closely related to the Oman species clustered around *C. acutecarinatus*, from which it is separated by the Gulf of Oman. It differs from that cluster of species in the presence of external granules on the ninth and tenth rows of granules (Fig. 12). Other differences are as follows: *C. arabicus* has only 9-15 pectinal teeth (*C. sobotniki* sp. n. has 22); *C. acutecarinatus* has a broader manus of pedipalp than *C. sobotniki* sp. n. (Fig. 18) and 10 rows of granules on movable fingers (*C. sobotniki* sp. n. has 11); *C. polisi* has a row of several granules in place of intermediate carinae on the third metasomal segment (*C. sobotniki* sp. n. lacks such granules); *C. maindroni* which is darker-coloured than *C. sobotniki* sp. n., has only nine rows of granules on the movable fingers, and its telson is more elongate. The aculeus of *C. maindroni* is longer than the vesicle, whereas in *C. sobotniki* sp. n. the proportions are reversed (vesicle longer than aculeus).

#### *Compsobuthus vachoni* Sissom, 1994

*Compsobuthus vachoni* Sissom, 1994: 18; Sissom & Fet, 1998: 7; Kovařík, 1998: 109; Lourenço & Monod, 1998: 789; Lourenço, 1999: 85; Fet & Lowe, 2000: 128; Lowe, 2001: 172.

**TYPE MATERIAL EXAMINED.** **Yemen Arab Republic**, dintorni di Moka / fino ai piedi delle prime colline, ca 30 km dal Mare, 11-12.II.1984, 1♀A (holotype), leg. Sammickeli *et al.*, MZUF.

#### *Compsobuthus weneri* (Birula, 1908) (Fig. 5)

*Buthus acutecarinatus weneri* Birula, 1908: 131; Birula, 1909: 512; Borelli, 1915: 459.

*Buthus (Buthus) acutecarinatus weneri*: Birula, 1917: 223; Birula, 1928: 80.

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

*Compsobuthus weneri*: Vachon, 1949: 97 (1952: 217); Vachon, 1950a: 96; Vachon, 1950b: 460; Minnocci, 1974: 23; Lamoral & Reynders, 1975: 507; Vachon, 1979: 40; Levy & Amitai, 1980: 61; Kinzelbach, 1984: 100; El-Hennawy, 1987: 16; Amr, Hyland, Kinzelbach, Amr & Defosse, 1988: 372; El-Hennawy, 1988a: 14; El-Hennawy, 1988b: 21; Polis & Sissom, 1990: 184; Sissom, 1990: 92; El-Hennawy, 1992: 124; Sissom, 1994: 18; Kovařík, 1998: 109; Fet & Lowe, 2000: 128; Ali *et al.*, 2001: 97; Stathi & Mylonas, 2001: 289; Kovařík, 2002: 7.

*Compsobuthus weneri weneri*: Levy, Amitai & Shulov, 1973: 114; Levy & Amitai, 1980: 63; Sissom, 1994: 16; Amr & El-Oran, 1994: 188; Lourenço & Monod, 1998: 789; Kabakibi, Khalil & Amr, 1999: 82; Lourenço, 1999: 85; Fet & Lowe, 2000: 129.

MATERIAL EXAMINED. **Israel**, Ya'ar Odem Reserve, 23.V.1998, 1♂1♀A, leg. A. Sforzi & L. Bartolozzi, No. 2104, MZUF. **Jordan**, Bqueuiyah, 1♂4♀1juv.A1♀E, 9.IV.1996, leg. D. Modrý, FKCP; Quasr Burga, 1♀A, 12.IV.1996, leg. D. Modrý, FKCP. **Libya**, 1♀(im.) (det. ?), leg. Brandt, SMFD No. 29220. **Somalia**, Bender Cassim, IX.1931, 1♀A, MZUF. **Sudan**, Dafur Prov., El Fashes, XI.1961, 1♀A, leg. H. Schwitulla, SMFD; Khartoum, I-III.1966, 1♂1♀A, leg. P. Štys, FKCP; Sabaloro, 16.VIII.1966, 1juv.A, leg. P. Štys, FKCP; Erbowit, 17.IX.1966, 1juv.A, leg. P. Štys, FKCP; Hasa Heisa, 1♂E, XI.1973, leg. V. Seichert, FKCP. **Yemen Arab Republic**, Colline Khazain, 17°01'N - 43°37'E, 2000 m, XI.1979, 1♀A, leg. B. Lanza, M. Borri et H. Poggesi, MZUF; Ju Amlah (17°07'N - 43°34'E) ca 26 km NW Sa'dah, 1950 m, XI.1979, 4♀3juvs.A, leg. B. Lanza, M. Borri et H. Poggesi, MZUF; Wadi Magsala, 17°05'N - 43°32'E, IX.1980, ca 26 km WNW Sa'dah, 1♂1♀1juv.A, leg. M. Borri, B. Lanza et H. Poggesi, MZUF; Manakhah, 15°04'N - 43°45'E, 2300 m, 1.II.1984, 1♀1juv.A, leg. M. Borri et H. Poggesi, MZUF; Wadi Magsala, 17°05'N - 43°32'E, 2000 m, IX.1980, 2♂2juvsA, leg. M. Borri et H. Poggesi, MZUF; Pozze ai piedi Jabal Nefah, 17°07'N - 43°34'E, IX.1980, 1juv., MZUF, leg. M. Borri et H. Poggesi, MZUF; valle del Wadi Azzou, 17°01'N - 43°33'E, IX.1980, 1♂1♀1juv.A, leg. M. Borri et H. Poggesi, MZUF; villaggio Madag, 17°11'N - 43°25'E, IX.1980, 1♀(im.)A, leg. M. Borri et H. Poggesi, MZUF; Jabal Alab, 17°32'N - 43°28'E, IX.1980, 1juv.A, leg. M. Borri et H. Poggesi, MZUF; Altopiano Ashaf (tra 17°30'N - 43°20'E e 17°35'N - 43°30'E, IX.1980, 1juv.A, leg. M. Borri et H. Poggesi, MZUF; tra Umm Laylah (17°17'N - 43°24'E) e Begin (17°24'N - 43°27'E), IX.1980, 1♀A, leg. M. Borri et H. Poggesi, MZUF; strada tra Magsala e L'Anam (17°01'N - 43°29'E), IX.1980, 1♂1♀A, leg. M. Borri et H. Poggesi, MZUF; Wadi Ar-Akua, 17°12'N - 43°31'E, ca 36 km NW Sa'dah, 1950 m., VI-VII.1981, 1♂A, leg. M. Borri, B. Lanza et H. Poggesi, MZUF; Madag, 17°01'N - 43°25'E, VI-VII.1981, 1♂A, leg. M. Borri et H. Poggesi, MZUF; Ju Amlah, 17°01'N - 43°34'E, ca 26 km NW Sa'dah, 1950 m, VI-VII.1981, 1im.A, leg. M. Borri et H. Poggesi, MZUF.

COMMENTS. *C. weneri* was often treated in a broad sense, as encompassing all populations with external granules on the movable finger (similarly to *C. acutecarinatus*, which encompassed all populations without these granules). This concept has gradually changed through descriptions of certain populations as subspecies and later on as full species. However, I believe that as currently understood, *C. weneri* still includes more than one species. Specimens from Jordan, Israel and probably also Saudi Arabia and Egypt (Sinai) possess numerous bristles on metasomal segments and a narrow manus with long fingers of pedipalps, whereas populations from Yemen have a broader manus and shorter fingers of pedipalps, similarly to populations inhabiting northern Africa. Future studies of these populations and more thorough examinations of type material may lead to further division of this species.

### List of species divided into basic groups, and their geographic distribution

#### *A. acutecarinatus* group

Rows of granules on movable finger without external granules (Fig. 7). Occasionally, there may be an external granule present at the last two or three rows, but at most of the rows it is absent (Fig. 12).

A1. Rows of granules on movable finger without internal granules

<i>Compsobuthus garyi</i> Lourenço & Vachon, 2001	Iran
<i>Compsobuthus tofti</i> Lourenço, 2001	Afghanistan
<i>Compsobuthus williamsi</i> Lourenço, 1999	Morocco

A2. Rows of granules on movable finger with internal granules.

<i>Compsobuthus abyssinicus</i> (Birula, 1903)	Djibouti, Eritrea, Ethiopia, Somalia
<i>Compsobuthus acutecarinatus</i> (Simon, 1882)	Oman, Yemen
<i>Compsobuthus arabicus</i> Levy, Amitai & Shulov, 1973	Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates
<i>Compsobuthus becvari</i> sp. n.	Pakistan
<i>Compsobuthus berlandi</i> Vachon, 1950	Algeria, Mauritania
<i>Compsobuthus brevimanus</i> (Werner, 1936)	Yemen
<i>Compsobuthus jakesi</i> sp. n.	Iraq
<i>Compsobuthus jordanensis</i> Levy, Amitai & Shulov, 1973	Jordan, Syria
<i>Compsobuthus maindroni</i> (Kraepelin, 1901)	Ethiopia, Oman, Somalia, United Arab Emirates
<i>Compsobuthus matthiesseni</i> (Birula, 1905)	Iran, Iraq, Syria, Turkey
<i>Compsobuthus polisi</i> Lowe, 2001	Oman
<i>Compsobuthus simoni</i> Lourenço, 1999	Niger
<i>Compsobuthus sobotniki</i> sp. n.	Iran
<i>Compsobuthus vachoni</i> Sissom, 1994	Yemen

B. *weneri* group

Rows of granules on movable finger with external, often very small granules, which are usually present at all rows (Fig. 10) and always at more than one-half of rows (Fig. 9).

<i>Compsobuthus carmelitis</i> Levy, Amitai & Shulov, 1973	Israel
<i>Compsobuthus kabateki</i> sp. n.	Egypt
<i>Compsobuthus kafkai</i> sp. n.	Iran
<i>Compsobuthus kaftani</i> sp. n.	Iran
<i>Compsobuthus klaptoczi</i> (Birula, 1909)	Libya
<i>Compsobuthus longipalpis</i> Levy, Amitai & Shulov, 1973	Egypt (Sinai), Israel, Jordan
<i>Compsobuthus manzonii</i> (Borelli, 1915)	Yemen
<i>Compsobuthus plutenkoi</i> sp. n.	Iran
<i>Compsobuthus rugosulus</i> (Pocock, 1900)	? Afghanistan, India, Iran, Pakistan
<i>Compsobuthus schmiedeknechti</i> Vachon, 1949	Israel, Jordan, Lebanon
<i>Compsobuthus seichertii</i> sp. n.	Sudan
<i>Compsobuthus weneri</i> (Birula, 1908)	Burkina Faso, Egypt, Ethiopia, Israel, Jordan, Libya, Mali, Niger, Saudi Arabia, Somalia, Sudan, Syria, Yemen

## Discussion

The stability of some of the characters used to differentiate *Compsobuthus* remains unclear. One such character is the presence, partial presence or absence of intermediate carinae on the second and third metasomal segments, whose stability appears to be inversely related to the number of specimens studied. In sufficiently large samples of species in which the intermediate carinae are partially present (e.g. *C. kaftani* sp. n.), their extent is variable and the character becomes difficult to apply.

In this paper, I divided species into the *acutecarinatus* and *weneri* groups depending on a character which is accepted by all authors, i.e. the presence vs. absence of external granules at rows of granules on the movable finger. However, even this character is not perfect and allows for a third group of species in which external granules are present at some rows and absent at others. The species in the above list are further subdivided on the presence vs. absence of internal granules at the rows of granules on the movable finger. These divisions should not be viewed as necessarily natural, they are a working tool and it needs to be pointed out that at least one of the groups (*weneri*) has been determined to be paraphyletic (see Fet & Lowe, 2000: 124).

A good character undoubtedly is sexual dimorphism which is expressed differently in different species, e.g. in the length of the metasoma (*C. matthiesseni*) or the shape of the pedipalp chela *C. kafkai* sp. n.), or is hardly discernible (*C. kaftani* sp. n.).

My original intention was to present a unified key to all species of *Compsobuthus*, however difficulties in finding stable characters that would span the entire spectrum of species inhabiting different regions prevented me from doing so. At the current state of knowledge, separate keys for Africa, Arabia and Asia would be a workable alternative. Nevertheless, I believe the combination of characters used in this paper allows for more reliable definitions of species and hopefully establishes a basic order in this taxonomically complex genus.

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Table 1. Measurements (in millimetres) of type specimens of eight new *Compsobuthus* species.

	<i>becvari</i> ♂		<i>jakesi</i> ♂		<i>jakesi</i> ♀		<i>kafkai</i> ♀		<i>kafkai</i> ♂		<i>kaftani</i> ♂		<i>kabateki</i> ♀		<i>plutenkoi</i> ♀		<i>seicherti</i> ♀		<i>sobotniki</i> ♀	
	HT	HT	HT	AT	HT	HT	PT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Total length	32.6	28.2	30	30	30	30	33.2	37.7	29.3	32.4	44.3	25.8								
Carapace length	3.8	3.4	3.6	3.6	3.5	3.5	3.9	4.0	3.4	3.5	5.1	3.0								
Width	3.9	3.4	3.5	3.5	3.7	3.7	4.1	4.1	3.6	3.6	5.9	3.1								
Metasoma length	20.4	17.4	17.4	17.4	18.5	18.5	21.6	21.3	17.5	18.6	26.6	15.5								
segment I length	2.5	2.2	2.2	2.2	2.2	2.2	2.6	2.8	2.4	2.4	3.4	2.0								
width	2.2	2.1	2.1	2.1	2.0	2.0	2.5	2.5	2.1	1.9	3.0	1.6								
segment II length	3.1	2.6	2.6	2.6	2.7	2.7	3.2	3.2	2.6	2.7	3.7	2.2								
width	2.0	1.8	1.8	1.8	1.9	1.9	2.1	2.4	1.9	1.6	2.9	1.4								
segment III length	3.2	2.8	2.8	2.8	2.9	2.9	3.3	3.3	2.7	2.8	4.0	2.3								
width	2.0	1.8	1.8	1.8	1.8	1.8	2.1	2.4	1.8	1.6	2.9	1.4								
segment IV length	3.6	3.0	3.0	3.0	3.3	3.3	3.9	3.4	3.0	3.4	4.7	2.7								
width	2.0	1.7	1.7	1.7	1.7	1.7	2.0	2.3	1.7	1.5	2.8	1.4								
segment V length	4.3	3.6	3.6	3.6	3.8	3.8	4.4	4.3	3.5	3.8	5.8	3.1								
width	1.8	1.6	1.5	1.5	1.6	1.6	1.9	2.0	1.7	1.4	2.5	1.3								
telson length	3.5	2.9	3.0	3.0	3.5	3.5	4.0	4.2	3.2	3.5	5.0	2.8								
Pedipalp femur length	3.0	3.1	3.3	3.3	3.0	3.0	3.2	3.5	3.0	3.7	4.8	2.5								
width	0.9	0.8	0.8	0.8	0.9	0.9	1.0	1.1	0.8	0.7	1.4	0.8								
patella length	4.2	3.6	3.9	3.9	4.0	4.0	4.2	4.5	3.7	4.5	5.7	3.3								
width	1.6	1.3	1.3	1.3	1.4	1.4	1.6	1.7	1.3	1.2	2.0	1.2								
tibia length	6.7	6.1	6.4	6.4	6.1	6.1	6.8	7.5	6.0	6.9	9.4	5.1								
width	1.7	1.3	1.1	1.1	1.2	1.2	1.6	1.5	1.3	1.1	2.0	0.9								
finger mov. length	4.4	4.4	4.9	4.9	4.2	4.2	4.6	5.2	4.1	5.4	6.5	3.3								
Pectinal teeth	18:19	17:16	17:16	17:16	17:18	17:18	-	29:27	16:16	22:-	21:-	22:22								

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