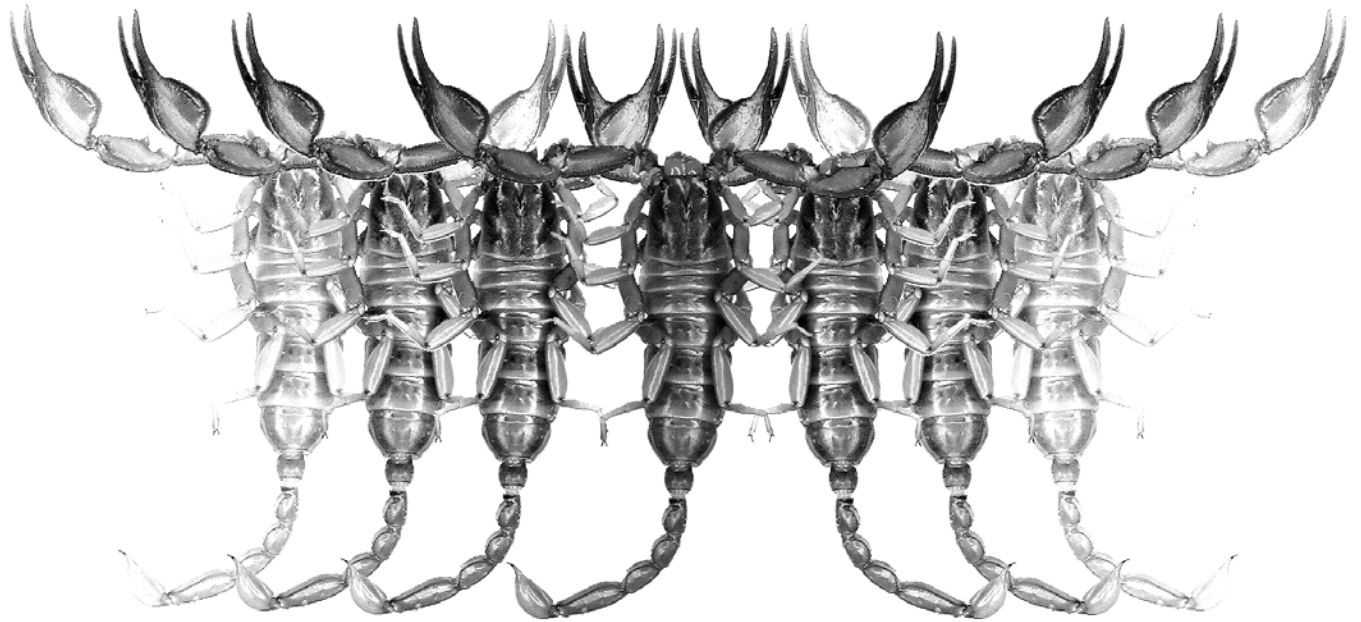


Euscorpilus

Occasional Publications in Scorpiology



**Taxonomic Position of Species of the Genus *Buthacus* Birula,
1908 Described by Ehrenberg and Lourenço, and Description
of a New Species (Scorpiones: Buthidae)**

František Kovařík

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Occasional Publications in Scorpiology

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- **WAM**, Western Australian Museum, Perth, Australia
- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway

Taxonomic position of species of the genus *Buthacus* Birula, 1908 described by Ehrenberg and Lourenço, and description of a new species (Scorpiones: Buthidae)

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Summary

Lectotypes are designated for *Androctonus (Leiurus) leptochelys* Ehrenberg, 1829, *Androctonus (Leiurus) thebanus* Ehrenberg, 1828 and *Androctonus (Leiurus) macrocentrus* Ehrenberg, 1828. In recent papers the latter two species have been regarded as synonyms of *Buthacus leptochelys*, however its type series is composed of seven specimens that in reality belong to three species. The type series of *Androctonus leptochelys* includes specimens belonging to *Buthacus leptochelys* and *Buthacus spatzi* (Birula, 1911), and the type series of *Androctonus macrocentrus* includes specimens belonging to *Buthacus leptochelys* and *Buthacus tadmorensis* (Simon, 1892). In order to preserve stability, I designate as the lectotype of *A. leptochelys* a specimen that does not cause changes in the taxonomic position of *Buthacus leptochelys* and its complex. Upon designation of the lectotype of *A. macrocentrus* (Fig. 8), it becomes a valid species *Buthacus macrocentrus* (Ehrenberg, 1828) **stat. n.** with the synonyms *Buthus tadmorensis* Simon, 1892, *Buthus pietschmanni* Penther, 1912 and *Buthacus yotvatensis* Levy, Amitai & Shulov, 1973. *Buthacus mahraouii* Lourenço, 2004 from Morocco is considered a *nomen dubium* because its description is confused and characters unclear, which precludes determination of whether it belongs to the *Buthacus leptochelys* complex or the *Buthacus arenicola* complex. *Buthacus ehrenbergi* **sp. n.** from Mauritania is described. This new species belongs in the *Buthacus leptochelys* complex and has tibial spurs moderate on legs IV and extremely reduced on legs III, which distinguishes it from the other two species of *Buthacus* known to occur in Mauritania. *B. huberi* Lourenço, 2001 has tibial spurs on legs III and IV reduced, and *B. occidentalis* Vachon, 1953 has them moderately well developed. A key to the species of the genus *Buthacus* is also presented.

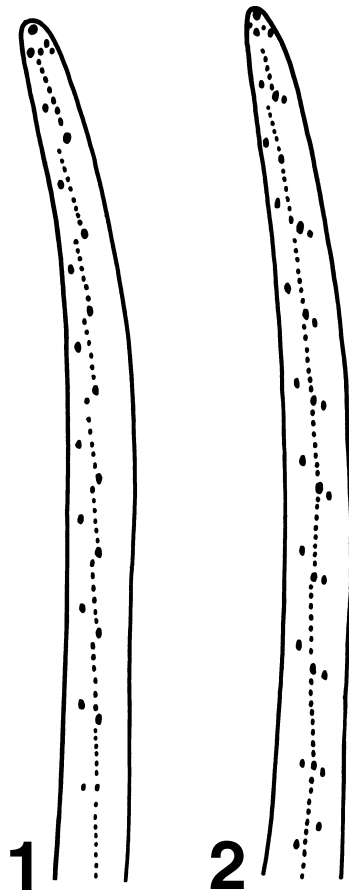
Introduction

The first species of the genus *Buthacus* were described by Ehrenberg in Hemprich & Ehrenberg (1828, 1829) as *Androctonus (Leiurus) leptochelys* Ehrenberg, 1829, *Androctonus (Leiurus) thebanus* Ehrenberg, 1828 and *Androctonus (Leiurus) macrocentrus* Ehrenberg, 1828. Kraepelin (1891: 60) regarded all of them as a single species, which he called *Buthus leptochelys*. Birula (1908: 139) originally described *Buthacus* as a subgenus of *Buthus*, with the type species *Buthus (Buthacus) leptochelys*. Later authors looked for characters that would allow species recognition, but no one describing new species and concerned about their respective positions within the genus either selected lectotypes from Ehrenberg's syntypes or verified the presence of features only mentioned by Ehrenberg and/or Kraepelin but important in modern taxonomy. This has not been done in spite of the fact that Kraepelin synonymized with *Buthus leptochelys* also species which are today considered valid, i.e. *Buthus arenicola* Simon,

1885 and *Buthus tadmorensis* Simon, 1892 (see Kraepelin, 1899: 17).

Examination of the types of all Ehrenberg's species has shown that among the seven syntypes there are three species today called *Buthacus leptochelys* (Ehrenberg, 1829), *Buthacus spatzi* (Birula, 1911) and *Buthacus tadmorensis* (Simon, 1892). In the interest of nomenclatural stability I therefore designate as the lectotype of *Buthacus leptochelys* (Fig. 5) a damaged female, although another, better preserved female (Fig. 6) is part of the type series. It is because the better preserved female belongs to the species that appears in recent papers as *Buthacus spatzi*.

In recent years, Lourenço (2000, 2001, 2004a, 2004b) described several species of *Buthacus* without paying adequate attention to the type species, *Buthacus leptochelys*. Instead, he compared the new species with an arbitrarily chosen specimen identified by him as *Buthacus leptochelys* and then used its characters in the keys (see Lourenço, 2004b: 229). This approach resulted in incorrect numbers of rows of granules on the movable fingers (9 instead of 9–10) and of teeth in the pectines



Figures 1–2: Movable finger of pedipalp. **1.** *Buthacus arenicola* (Simon, 1885), female from Algeria, FKCP. **2.** *Buthacus leptochelys* (Ehrenberg, 1829), male from Morocco, FKCP.

(25–30 instead of 23–35), and in other errors (see comments below on *Buthacus mahraouii*) which cannot be presently corrected because I have not been allowed to examine the types of Lourenço's species.

Abbreviations

List of depositories: FKCP, Personal collection of František Kovařík, Prague, Czech Republic; MNHN, Muséum National d'Histoire Naturelle, Paris, France; ZMBH, Museum für Naturkunde der Humboldt-Universität Berlin, Berlin, Germany; ZMUH, Zoologisches Institut und Zoologisches Museum Hamburg, Universität Hamburg, Hamburg, Germany.

Systematics

Buthacus leptochelys (Ehrenberg, 1829)

(Figs. 2, 5 and 7)

= *Androctonus (Leiurus) thebanus* Ehrenberg in Hemprich & Ehrenberg, 1828: pl. 1, fig. 4; Ehrenberg in Hemprich & Ehrenberg, 1829: 355; Hemprich &

Ehrenberg, 1831: 6; Moritz & Fischer, 1980: 324; Braunwalder & Fet, 1998: 32.

Androctonus (Leiurus) macrocentrus Ehrenberg in Hemprich & Ehrenberg, 1828: pl. 1, fig. 6; Ehrenberg in Hemprich & Ehrenberg, 1829: 355 (in part); Hemprich & Ehrenberg, 1831: 5 (in part); Moritz & Fischer, 1980: 317 (in part); Braunwalder & Fet, 1998: 32 (in part).

Buthus macrocentrus: Karsch, 1879: 9.

Androctonus (Leiurus) leptochelys Ehrenberg in Hemprich & Ehrenberg, 1829: 355 (in part); Ehrenberg in Hemprich & Ehrenberg, 1831: 5 (in part); Moritz & Fischer, 1980: 317 (in part); Braunwalder & Fet, 1998: 33 (in part).

Buthus leptochelys: Kraepelin, 1891: 202 (in part); Pocock, 1895: 299 (in part); Kraepelin, 1901: 266 (in part).

Buthus (Buthacus) leptochelys: Birula, 1908: 139 (in part); Birula, 1910: 155 (in part).

Buthacus leptochelys: Levy et al., 1973: 125 (in part); Levy & Amitai, 1980: 77 (in part); Kovařík, 1998: 105 (in part); Fet & Lowe, 2000: 82 (in part); ICZN, 2000: 7 (in part); Kovařík, 2001: 80; Stathi & Mylonas, 2001: 288; Kovařík, 2002: 5; Lourenço, 2001: 255; Kovařík, 2003: 135; Lourenço, 2003: 877; Lourenço, 2004a: 205; Lourenço, 2004b: 229.

Buthacus leptochelys leptochelys: Levy et al., 1973: 125; Levy & Amitai, 1980: 79; Kinzelbach, 1984: 99; Kovařík, 1997: 49; Kabakibi et al., 1999: 82; Fet & Lowe, 2000: 84.

= *Buthacus leptochelys nitzani* Levy et al., 1973: 126; Vachon, 1979: 38; Levy & Amitai, 1980: 83; Kinzelbach, 1984: 101; Fet & Lowe, 2000: 84.

= *Buthacus granosus* Borelli, 1929: 297; Probst, 1973: 329; Lamoral & Reynders, 1975: 499.

Buthus granosus: Vachon, 1949: 162 (1952: 248).

Buthacus leptochelys granosus: Levy et al., 1973: 125; Vachon, 1979: 38; Levy & Amitai, 1980: 76; El-Hennawy, 1992: 113; Kovařík, 1998: 105; Fet & Lowe, 2000: 84.

Androctonus leptochelys: ICZN, 2000: 7 (in part).

TYPE MATERIAL EXAMINED. **Egypt**, Sinai Peninsula (labeled as *Androctonus leptochelys*, Syrien, Ehrenberg, No. 152), 2♀, lectotype and paralectotype No. 1, ZMHB; Thebae, now Luxor, 2♂, lectotype and paralectotype of *Androctonus (Leiurus) thebanus* Ehrenberg in Hemprich & Ehrenberg, 1828, ZMHB No. 154; Sinai (labeled as *Androctonus macrocentrus*, Sinai, No. 153), 1♀, paralectotype of *Androctonus (Leiurus) macrocentrus* Ehrenberg in Hemprich & Ehrenberg, 1828, ZMHB.

OTHER MATERIAL EXAMINED. **Algeria**, Hassi, oasis Touiel, 1♀, 10.IV.1991, leg. R. Nerger, FKCP. **Egypt**, oasis Bahariye, VI.2000, 1♀, FKCP. **Kuwait**, 1♀, 1988, FKCP. **Libya**, Akakus Mts, Sabha province, 25° 20'N, 10° 31'E, ca. 831 m a.s.l., 10.IV.2003, 1♀(im.), leg. M. Kaftan, FKCP. **Morocco**, M.Hamid, 1♀, 7.V.1991, leg. K. Karpf, FKCP; Merzouga, 25.VI.1993, 1♀, leg. Rejsek, FKCP; south of Erfourd, V.2003, 1♀, leg. A. Funk, FKCP; Ar Rachidia prov., Merzouga – Erg Chebbi, 31°08.53'N, 04°01.18'W, 30–31.I. 2005, (WGS84), 1♂3juvs., leg. R. & H. Fouqu e & S. Be v ar, FKCP.

DIAGNOSIS: Total adult length 45–75 mm, color uniformly yellow to yellowish green. Movable fingers of pedipalps bear 9 or 10 rows of granules with one internal and one external granule and 4 distal granules (Fig. 2). Tarsomeres of first to third legs with bristlecombs. Tibial spurs moderate to strong on legs III and strong on legs IV. Pedipalp smooth, several granules present only on dorsal surface of femur. Femur with granulate carinae, patella with obsolete carinae and chela without carinae (obsolete carinae may be indicated in male). Female chela as wide as patella, male chela wider than patella. Base of male fingers slightly twisted. Seventh mesosomal segment ventrally with four obsolete carinae lacking granules. Pectines long, with 23–29 teeth in females and 26–35 in males. First metasomal segment with 10 carinae, second to fourth segments with eight

carinae (on lateral surface of second segment rows of granules cover only anterior half and do not form discrete carinae; dorsal carinae of fourth segment may be smooth or altogether absent). Fifth metasomal segment usually devoid of dorsal carinae, with ventro-median carina and two conspicuous ventrolateral carinae composed of unevenly sized granules. Surface between carinae smooth, only venter of fifth segment granulate. Metasoma and telson sparsely hirsute.

COMMENTS. Lectotypes of *Androctonus (Leiurus) leptochelys* and *A. (L.) thebanus* are hereby designated in order to stabilize the nomenclature.

The type series of *A. (L.) leptochelys* consists of three females that belong to two species. The lectotype and paralectotype No. 1 are torsa, one lacking the entire metasoma and the other lacking part of the metasoma and most legs. Despite that one of them has to be designated the lectotype of *Buthacus leptochelys* (Fig. 5), because the third and only complete syntype (paralectotype No. 2) is a synonym of *Buthacus spatzi* (Fig. 6).

The type series of *A. (L.) thebanus* consists of two *B. leptochelys* males, of which the one illustrated here (Fig. 7) is designated the lectotype.

Ehrenberg described *A. (L.) thebanus* in 1828 and *A. (L.) leptochelys* in 1829, which would make *Buthacus thebanus* (Ehrenberg, 1828) the valid name. However, Kraepelin (1891: 202) considered *A. (L.) thebanus* a junior synonym of *Buthus leptochelys*, and since then *Buthacus leptochelys* has been accepted as valid in more than 25 papers published by more than 10 authors during the past 50 years and over more than 10 years (see Fet & Lowe, 2000: 83 and more recent references above). In accord with ICZN (1999) Article 23.9.1, *B. leptochelys* thus attains the status of a *nomen protectum* and has precedence over the older *A. (L.) thebanus*, which becomes a *nomen oblitum*.

Buthacus ehrenbergi sp. n.

(Figs. 3 and 4, Table 1)

TYPE LOCALITY AND TYPE REPOSITORY. **Mauritania**, Chinguetti env., (20°26'N, 12°26'W); the author's collection (FKCP).

TYPE MATERIAL. **Mauritania**, Chinguetti env., (20°26'N, 12°26'W), X.1999, 1♂ (holotype), leg. R. Demis, FKCP. No other material.

ETYMOLOGY: Named after C. G. Ehrenberg (1795–1876), who described the first species of the genus *Buthacus*.

DIAGNOSIS: Total length of male holotype 49.3 mm, color uniform yellow to yellowish green. Movable



Figure 3: *Buthacus ehrenbergi* sp. n., male holotype, dorsal aspect.



Figure 4: *Buthacus ehrenbergi* sp. n., male holotype, ventral aspect.

| | | <i>Buthacus ehrenbergi</i> sp. n. male holotype |
|------------------------|-----------|--|
| Total | length | 49.3 |
| Carapace | length | 5.6 |
| | width | 5.4 |
| Metasoma and telson | length | 31.8 |
| | segment I | length |
| segment II | width | 3.2 |
| | length | 5.0 |
| segment III | width | 3.0 |
| | length | 5.1 |
| segment IV | width | 2.9 |
| | length | 5.6 |
| segment V | width | 2.4 |
| | length | 6.4 |
| telson | width | 2.4 |
| | length | 5.4 |
| Pedipalp femur | length | 4.6 |
| | width | 1.3 |
| patella | length | 5.7 |
| | width | 2.0 |
| chela | length | 8.2 |
| | width | 2.4 |
| finger mov. | length | 4.7 |
| Pectinal teeth | | 24:25 |

Table 1: Measurements (in millimeters) of male holotype of *Buthacus ehrenbergi* sp. nov.

fingers of pedipalps bear nine rows of granules that have one internal and one external granule (*Buthacus leptochelys* complex) and four distal granules. Male chela wide, base of male fingers very slightly twisted (nearly straight). Tarsomeres of first to third legs with bristlecombs. Tibial spurs moderate on legs IV, extremely reduced on legs III. Seventh mesosomal segment ventrally with four obsolete carinae lacking granules. Pectines long, with 24 and 25 teeth. First metasomal segment with 10 carinae, second to fourth segments with eight carinae (on lateral surface of second segment rows of granules cover less than anterior half and do not form discrete carinae). Much of metasoma between carinae smooth, granules present only on ventral and lateral surfaces of fifth segment. Metasoma and telson sparsely hirsute.

DESCRIPTION: The holotype and only known specimen is an adult male 49.3 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. For habitus see Figs. 3 and 4. Most likely the male has a much wider manus of pedipalp (Fig. 3). The female is not known, nevertheless the obvious male characters and knowledge of sexual

dimorphism within the genus justify this assumption. The base color is yellow to yellowish green.

CARAPACE AND MESOSOMA: The carapace bears dense granules of variable size and shape, which do not form carinae. Tergites I–VI are granulated and bear three carinae, each with two to four denticles in the posterior part. Tergite VII is pentacarinata, with lateral pairs strong, serratocrenulate and the median carina moderate, crenulate and present only in the anterior half. The pectines are long, with 24 and 25 teeth. The seventh mesosomal segment bears four obsolete ventral carinae without granules. The other sternites are smooth, with two to four poorly discernible obsolete carinae.

METASOMA AND TELSON: The first metasomal segment bears 10 carinae and the second to fourth segments bear eight carinae (on the lateral surface of the second segment rows of granules cover less than the anterior half and do not form discrete carinae). Dorsal carinae on the fourth segment are smooth and inconspicuous. The fifth segment lacks dorsal carinae but bears a ventromedian carina and two conspicuous ventrolateral carinae composed of unevenly sized granules. Much of the metasoma between carinae is smooth, granules are present only on the ventral and lateral surfaces of the fifth segment. The metasoma and telson are sparsely hirsute.

LEGS: Tarsomeres of the first to third legs have very dense bristlecombs. The fourth legs are only sparsely hirsute. Tibial spurs are moderate on legs IV and extremely reduced on legs III.

PEDIPALPS: The movable fingers bear nine rows of granules that have one internal and one external granule (*Buthacus leptochelys* complex) and four distal granules. The pedipalp is smooth, with a few granules present only on the dorsal surface of the femur. Carinae are granulose on the femur, obsolete on the patella and absent on the chela. The chela is wide and the base of the fingers is very slightly twisted (nearly straight).

AFFINITIES: *Buthacus ehrenbergi* sp. n. is distinguished from all other species of the genus in the key below. Two other species, *B. huberi* and *B. occidentalis*, have been recorded from Mauritania. According to the original description, in *B. huberi* Lourenço, 2001 tibial spurs are reduced on legs III as well as on legs IV (*B. ehrenbergi* has them extremely reduced on legs III and moderate on legs IV) and the pectines bear 27 and 28 teeth (*B. ehrenbergi* has 23 and 24 pectinal teeth). *B. occidentalis* Vachon, 1953 has the same number of pectinal teeth as *B. ehrenbergi*, but its tibial spurs of legs III and IV are moderate to strong (*B. ehrenbergi* has the tibial spurs of legs III extremely reduced).



Figure 5: *Buthacus leptochelys*, female lectotype, dorsal aspect.

Buthacus mahraouii* Lourenço, 2004, *nomen dubium

Buthacus mahraouii Lourenço, 2004b: 226.

COMMENTS. Lourenço based this species on a single male from Morocco, near to the border with Algeria northwest of Béni-Abbés and Igli. He concluded that it belongs in the *Buthacus leptochelys* complex (see Lourenço, 2004b: 226) and prepared a key to the northwestern African species belonging to this complex, in which he incorrectly defined *Buthacus leptochelys* (see the above introduction and diagnosis of *Buthacus leptochelys*, and Lourenço, 2004b: 229). Even a more serious problem, however, is fig. 3 in Lourenço (2004b: 227), which shows the position and number of external and internal granules on the dentate margins of the pedipalp chela movable finger in the holotype of *Buthacus mahraouii*. It is apparent from this figure that the specimen lacks external granules, whose presence determines assignment to the *Buthacus leptochelys* complex (see Fig. 2). Conversely, the absence of these granules determines assignment to the *Buthacus arenicola* complex (Fig. 1 and Lourenço, 2004b: 227, fig. 3). Because of unavailability of the MNHN type, I can only speculate about the taxonomic position of

Buthacus mahraouii. There appear to be only two possibilities:

1) Fig. 3 of Lourenço (2004b: 227) faithfully depicts the absence of external granules in the holotype of *Buthacus mahraouii*, in which case Lourenço's assignment of the species to the *Buthacus leptochelys* complex is erroneous and *B. mahraouii* may be a synonym of e.g. *Buthacus spatzi* (Birula, 1911) in the *Buthacus arenicola* complex, with which it was not compared.

2) Fig. 3 of Lourenço (2004b: 227) is not a faithful rendition of the situation in the holotype, in which case *B. mahraouii* belongs in the *Buthacus leptochelys* complex but possesses characters other than those given in the original description.

Only a careful redescription of the holotype of *Buthacus mahraouii* can resolve the situation, and until then the name must be regarded as a *nomen dubium*.

***Buthacus spatzi* (Birula, 1911)**
(Fig. 6)

Androctonus (Leiurus) leptochelys Ehrenberg in Hemprich & Ehrenberg, 1829: 355 (in part);



Figure 6: *Buthacus spatzi*, female paralectotype No. 2 of *Androctonus (Leiurus) leptochelys*, dorsal aspect.

Ehrenberg in Hemprich & Ehrenberg, 1831: 5 (in part), Moritz & Fischer, 1980: 317 (in part); Braunwalder & Fet, 1998: 33 (in part).
Buthus leptochelys: Kraepelin, 1891: 202 (in part); Pocock, 1895: 299 (in part); Kraepelin, 1901: 266 (in part).
Buthus (Buthacus) spatzi Birula, 1911: 137; Birula, 1917b: 214.
Buthacus spatzi: Caporiacco, 1937: 349; Pallary, 1937: 100; Levy et al., 1973: 138; Levy & Amitai, 1980: 76; Fet & Lowe, 2000: 85; Crucitti & Vignoli, 2002: 440.
Buthacus arenicola spatzi: Vachon, 1951: 3; El-Hennawy, 1992: 112; Kovařík, 1998: 105.

TYPE MATERIAL EXAMINED. **Locality unclear**, labeled as *Androctonus leptochelys*, Syrien, Ehrenberg, No. 152, 1♀, paralectotype No. 2 of *Androctonus (Leiurus) leptochelys* Ehrenberg in Hemprich & Ehrenberg, 1829, ZMHB.

OTHER MATERIAL EXAMINED. **Tunisia**, Nefta, 1juv., 28–29.V.1993, leg. R. Nerger, FKCP; Klebia (Nousil), 1♀, 24.V.1995, leg. R. Nerger, FKCP; Douz, 1♂2juvs., 12.IX.1996, leg. J. Batelka & H. Podroužková, FKCP; Blidette, 1♀, 14–15.IX.1996, leg. J. Batelka & H. Podroužková, FKCP; Kebili prov., 8 km W Douz, Zaafrane, 2♀, 28.V.2005, leg. F. Kovařík, FKCP.

DIAGNOSIS: Total adult length 45–70 mm, color uniformly yellow to yellowish green. Movable fingers of

pedipalps bear 9 or 10 rows of granules that have one internal and no external granule (one minute external granule may be present at last two or three rows) and three distal granules. Tarsomeres of first to third legs with bristlecombs.

Tibial spurs on legs III and IV moderately developed but larger on IV. Pedipalp smooth, without granules. Femur with carinae that may be sparsely granulate, patella with only inconspicuous and smooth carinae, chela without carinae. Female chela narrower than patella. Male chela approximately as wide as patella, base of male fingers slightly twisted. Seventh mesosomal segment ventrally with four obsolete carinae that lack granules. Pectines long, with 26–30 teeth in females and 31–35 teeth in males. First metasomal segment with 10 carinae, second to fourth segments with eight carinae (on lateral surface of second segment rows of granules cover only anterior half and do not form discrete carinae). Dorsal carinae of fourth segment may be smooth or absent. Fifth segment usually without dorsal carinae but with a ventromedian carina and two conspicuous ventrolateral carinae composed of unevenly sized granules. Metasoma and telson sparsely hirsute.

***Buthacus macrocentrus* (Ehrenberg, 1828)**
(Fig. 8)

Androctonus (Leiurus) macrocentrus Ehrenberg in Hemprich & Ehrenberg, 1828: pl. 1, fig. 6; Ehrenberg in Hemprich & Ehrenberg, 1829: 355 (in part);



Figure 7: *Buthacus leptochelys*, male lectotype of *Androctonus (Leiurus) thebanus*, dorsal aspect.

Hemprich & Ehrenberg, 1831: 5 (in part); Moritz & Fischer, 1980: 317 (in part); Braunwalder & Fet, 1998: 32 (in part).
 = *Buthus tadmorensis* Simon, 1892: 84; Kraepelin, 1895: 83; Birula, 1905: 136; Habibi, 1971: 43. **Syn. n.**
Buthus (Buthacus) tadmorensis: Birula, 1910: 172; Birula, 1917a: 229.
Buthacus tadmorensis: Simon, 1910: 76; Vachon, 1966: 210; Farzanpay, 1988: 36; Kovařík, 1997: 49; Kovařík, 1998: 105; Kovařík, 2001: 80; Fet & Kovařík, 2003: 180.
Buthacus tadmorensis tadmorensis: Vachon & Kinzelbach, 1987: 101; Kovařík, 2002: 5;
 = *Buthus pietschmanni* Penther, 1912: 112 (syn. by Birula, 1917a: 229).
Mesobuthus pietschmanni: El-Hennawy, 1992: 128.
 = *Buthacus yotvatensis* Levy et al., 1973: 130; Levy & Amitai, 1980: 90; Kinzelbach, 1984: 99; Vachon & Kinzelbach, 1987: 100; Fet & Lowe, 2000: 85; Crucitti & Vignoli, 2002: 439; Soleglad & Fet, 2003a: 5; Soleglad & Fet, 2003b: 7 (syn. by Kovařík, 2001: 80).
Buthacus yotvatensis yotvatensis: Vachon, 1979: 36; Fet & Lowe, 2000: 85.
Buthacus tadmorensis yotvatensis: Vachon & Kinzelbach, 1987: 101; Amr et al., 1988: 374; El-Hennawy, 1992: 114; Kabakibi et al., 1999: 82.
Androctonus macrocentrus: ICZN, 2000: 7.

TYPE MATERIAL EXAMINED. Sinai (labeled as *Androctonus macrocentrus*, Sinai, No. 153), 1♀, lectotype of *Androctonus (Leiurus) macrocentrus* Ehrenberg in Hemprich & Ehrenberg, 1828, ZMHB.

OTHER MATERIAL EXAMINED. **Iran**, Chamak prov., ca. 17 km NW Bandar-e Gonárer, 10 m, 29°38'32''N, 50°26'56''E, 1♀, 13–14.X.1998, leg. P. Kabátek, FKCP; Bandar-e Gonárer, X. 2000, 2♂, leg. R. Perlík, FKCP. **Iraq**, Shibchah, Camp, 150 km SW of Hajaf, stone desert, 260 m, 3♀3juvs., X–XII.1978, leg. O. Jakeš, FKCP. **Syria**, Palmyra, 1♀, 1993, leg. D. Modrý, FKCP, 1♀, 3.VII.1994, leg. M. Kaftan, FKCP, 1♀, IV.1994, leg. D. Modrý, FKCP, 1♀, 30.IV.1995, leg. P. Rohlena, FKCP; As Safirah, Sabkhat Al Jabbul lake env., 9.IX.1998, 1♂, leg. A. Bezděk, FKCP; Halabiyyeh, 35°41'19''N, 39°49'31''W, 17.VI.1998, 1♀, leg. P. Kabátek, FKCP.

DIAGNOSIS: Total adult length 50–75 mm, adult color uniform yellow to yellowish green. Movable fingers of pedipalps bear 9 or 10 rows of granules that have one internal and one external granule and 4 distal granules. Tarsomeres of first to third legs with bristlecombs. Tibial spurs of legs III and IV strong, larger on IV. Pedipalp smooth, only dorsal surface of femur may bear several granules. Femur with granulate carinae, patella with obsolete carinae, chela without carinae. Female chela as wide as patella. Male chela as wide as or wider than patella, base of male fingers very slightly twisted or straight. Seventh mesosomal segment ventrally with four obsolete or minutely granulate carinae. Pectines long, with 24–29 teeth in females and 28–35 in males. First metasomal segment with 10 carinae, second to fourth segments with eight carinae (on lateral surface of second segment rows of granules cover less than anterior half and do not form discrete carinae). Lateral surface of third metasomal segment with several granules that



Figure 8: *Buthacus macrocentrus*, female lectotype, dorsal aspect.

reach at most one-third of segment length (usually more pronounced and longer in males). Fourth metasomal segment with dorsal carinae either smooth or granulate and ventral carinae strongly granulate. Fifth metasomal segment usually lacks carinae but bears a ventromedian carina and two ventrolateral carinae composed of unevenly sized granules. Much of metasoma between carinae smooth, granulate only on ventral surface of fifth segment. Metasoma and telson densely hirsute.

COMMENTS. Lectotype of *Androctonus (Leiurus) macrocentrus* (Fig. 8) is hereby designated in order to stabilize the nomenclature. The type series of *A. (L.) macrocentrus* consists of two females that belong to two species. The paralectotype is a synonym of *Buthacus leptochelys*.

Type locality “Sinai” (Ehrenberg in Hemprich & Ehrenberg, 1829: 355 and label) must be regarded as erroneous.

The ruling of ICZN (2000: 7) for the precedence of *Androctonus leptochelys* Ehrenberg, 1829 over a disused synonym *Androctonus macrocentrus* Ehrenberg, 1828 is hereby annulled since these two names are found to belong to two different species.

Key to the species of *Buthacus*

1. Rows of granules on movable finger without external granules (Fig. 1) *Buthacus arenicola* complex 2
 - Rows of granules on movable finger with external granules (Fig. 2) *Buthacus leptochelys* complex 3
2. Movable finger with three distal granules. Chela slightly wider in males than in females, approximately as wide as patella, base of male fingers slightly twisted *B. spatzi* (Birula, 1911)
 - Movable finger with four distal granules (Fig. 1). Chela wider in males than in females, wider than patella, base of male fingers twisted so that closure is incomplete *B. arenicola* (Simon, 1885)
3. Telson black *B. nigroaculeatus* Levy, Amitai & Shulov, 1973
 - Telson yellow to reddish yellow 4
4. Segments of metasoma and telson densely hirsute *B. macrocentrus* (Ehrenberg, 1828) and *B. striffleri* Lourenço, 2004
 - Metasomal segments (mainly dorsal surface) only sparsely hirsute 5

5. Ventral surface of first metasomal segment with two obsolete or granulate carinae 7
 - Ventral surface of first metasomal segment smooth or punctate, without carinae 6
6. Ventral surface of first metasomal segment sparsely punctate. *B. calviceps* (Pocock, 1900)
 - Ventral surface of first metasomal segment smooth *B. zieglerei* Lourenço, 2000
7. Total adult length less than 30 mm *B. villiersi* Vachon, 1949
 - Total adult length more than 40 mm 8
8. Movable finger with 6 or 7 rows of granules.....*B. clevai* Lourenço, 2001
 - Movable finger with 8 to 11 rows of granules 9
9. Second metasomal segment with 10 complete carinae *B. huberi* Lourenço, 2001
 - Second metasomal segment with eight carinae 10
10. Base of male fingers only slightly twisted 11
 - Base of male fingers twisted so that closure leaves circular gap *B. foleyi* Vachon, 1948
11. Pectines in both males and females with at most 25 teeth 12
 - Pectines with more than 26 teeth, at least in males 13
12. Tibial spurs moderately developed on leg IV, extremely reduced on legs III. ... *B. ehrenbergi* sp. n.
 - Tibial spurs of legs III and IV moderate to strong..... *B. occidentalis* Vachon, 1953
13. Tibial spurs of legs III and IV reduced
B. huberi Lourenço, 2001
 - Tibial spurs strong, especially on legs IV
B. leptochelys (Ehrenberg, 1829)

Discussion

I have not been able to examine the species described by Lourenço (*B. zieglerei* Lourenço, 2000; *B. clevai* Lourenço, 2001; *B. huberi* Lourenço, 2001; and *B. striffleri* Lourenço, 2004), they are included solely on characters as given in the original descriptions, whose accuracy needs to be verified. Uncertainty about some of the characters given by Lourenço has led to double listing of *B. huberi* Lourenço, 2001 in the key. Although in the text Lourenço (2001: 259) states that *B. huberi* has 10 carinae on the second metasomal segment, his fig. 1 (Lourenço, 2001: 256) shows instead of lateral carinae only a row of granules which does not reach even one-

half of the segment length and suggests that the second metasomal segment of *B. huberi* may in fact bear only eight complete carinae. *Buthacus striffleri* Lourenço, 2004 was based on two males from Afghanistan, but the diagnosis and description (see Lourenço, 2004a: 207) do not include any characters that would allow to distinguish this species from *Buthacus macrocentrus* (Ehrenberg, 1828). Lourenço (2004a: 209) compared this species only with *Buthacus nigroaculeatus* Levy, Amitai & Shulov, 1973 from Arabia, however the mutual relationship of these two species should be further verified. Examination of the holotype of *Buthacus striffleri* Lourenço, 2004 may prove it to be a synonym of *Buthacus macrocentrus* (Ehrenberg, 1828).

Other material used in composing the key. The specimens are in the author's collection (FKCP):

Buthacus arenicola (Simon, 1885)

Algeria, 1♂, det.1991; Biskra, 1♀, 10.VI.1983, leg. J. Strnad; Hassi, oasis Touiel, 3♀, 10.IV.1991, leg. R. Neger and V. Galčík. **Libya**, Marhuna, 1♀, 14.X.1988, leg. Bačovský; Terhuna, 1♀, 14.X.1988, leg. Bačovský; 10 km W of Ash Shwairif, Tarabulus province, 30°00'N, 14°11' E, ca 473 m a.s.l., 2.IV.2003, 1♀, leg. M. Kaftan.

Buthacus calviceps (Pocock, 1900)

Somalia, Galgalo env., 1980, 1♂, leg. Dorsak.

Buthacus foleyi Vachon, 1948

Morocco, north of Boudenib, X.1980, 1♂1♀.

COMMENTS. *Buthacus foleyi* has hitherto been known to occur only in Algeria and Libya, this is the first record for Morocco.

Buthacus nigroaculeatus Levy, Amitai & Shulov, 1973

Oman, N. of Al Nuqdah, 20°52.45' N, 58°39.09' E, 30.I.1998, 1♂1♀, UV detection, leg. I. D. Harrison. **Saudi Arabia**, 27°08'56" N, 49°20'06" E, V.1992, 1♂.

Buthacus occidentalis Vachon, 1953

Morocco, Western Sahara, 70 km S of Ad-Dakhla, 23°04.13' N, 16°05.08' W, 7.II. 2005, (WGS84), 1juv., leg. R. & H. Fouquè & S. Bečvář.

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