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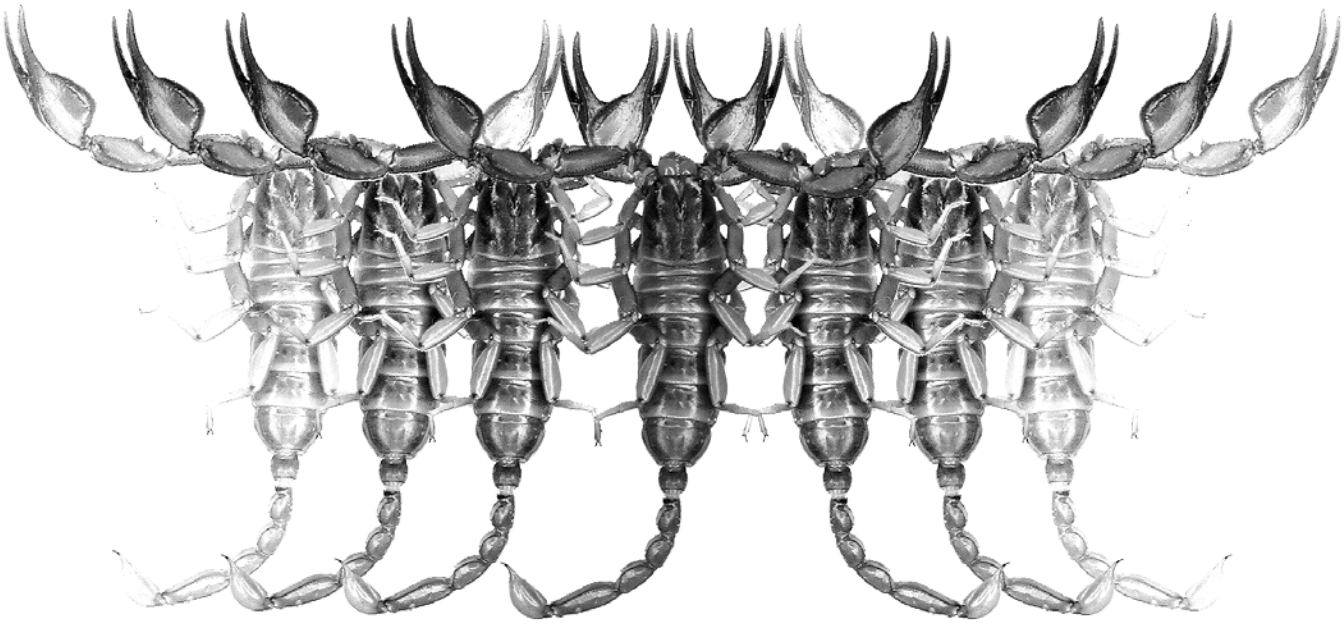
Occasional Publications in Scorpiology



Scorpions of Iran (Arachnida, Scorpiones). Part I. Khoozestan Province

Shahrokh Navidpour, František Kovařík, Michael E. Soleglad & Victor Fet

February 2008 – No. 65

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- **AMNH**, American Museum of Natural History, New York, USA
- **CAS**, California Academy of Sciences, San Francisco, USA
- **FMNH**, Field Museum of Natural History, Chicago, USA
- **MCZ**, Museum of Comparative Zoology, Cambridge, Massachusetts, USA
- **MNHN**, Museum National d'Histoire Naturelle, Paris, France
- **NMW**, Naturhistorisches Museum Wien, Vienna, Austria
- **BMNH**, British Museum of Natural History, London, England, UK
- **MZUC**, Museo Zoologico "La Specola" dell'Universita de Firenze, Florence, Italy
- **ZISP**, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
- **WAM**, Western Australian Museum, Perth, Australia
- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway

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Scorpions of Iran (Arachnida, Scorpiones). Part I. Khoozestan Province

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Summary

Collections made by a team of Shahrokh Navidpour (Razi Reference Laboratory of Scorpion Research, Razi Vaccine and Serum Research Institute, Ahvaz, Khoozestan, Iran) include 17 of the 19 species known to inhabit Khoozestan Province, and form the basis of this paper. Among them are two new species (*Hottentotta khoozestanus* **sp. n.** and *Vachoniolus iranus* **sp. n.**), *Compsobuthus jakesi* Kovařík, 2003 previously known only from Iraq, and five species representing first records for the province: *Buthacus macrocentrus* (Ehrenberg, 1828); *Odontobuthus bidentatus* Lourenço & Pézier, 2002; *Orthochirus farzanpayi* (Vachon et Farzanpay, 1987); *Orthochirus stockwelli* (Lourenço et Vachon, 1995) **comb. n.**; and *Scorpio maurus townsendi* (Pocock, 1900). In contrast, *Orthochirus zagrosensis* Kovařík, 2004, as described from Khoozestan, stands corrected to Kohkiloye & Boyer Ahmad, Esfahan, Fars, Kerman, and Yazd Provinces. Occurrences of *Hottentotta schach* (Birula, 1905) and *Compsobuthus garyi* Lourenço et Vachon, 2001 could not be verified for Khoozestan, but are nevertheless included, and the uncertain taxonomic position of the latter is discussed. A large collection of *Orthochirus iranus* Kovařík, 2004 allowed the study of intraspecific variation and resulted in the observation that trichobothrium d_2 on the dorsal surface of pedipalp femur may be fully developed, reduced, or absent. Since the presence or absence of trichobothrium d_2 is the only character separating *Orthochirus* Karsch, 1892 from *Paraorthochirus* Lourenço et Vachon, 1995, it follows that *Paraorthochirus* is a synonym of *Orthochirus*, **syn. n**. Also presented is a key to all species of scorpions found in the province.

Introduction

Many papers deal with the scorpions of Iran to some extent, but a comprehensive study of the scorpion fauna has been lacking. We have therefore decided to survey the scorpions of Iran thoroughly, province by province. The fieldwork is conducted by the RRLS team under Shahrokh Navidpour and includes documentation of habitat diversity, revisitation of previously known sites, some of them type localities, and sampling of all the encountered scorpion species. All specimens are collected by UV light at night. The pilot survey in Khoozestan Province shows how much can be learned from such systematically conducted surveys, as it reveals the presence of 17 from 19 species of which 5 have not been previously known to occur in this province, one is a new country record, and two are new taxa described below. The extensive new material allows to assess intraspecific variation that has not been available to previous authors, resulting in refined taxonomy and, predictably, in synonymization of some taxa. Moreover, the taxonomic and faunistic work contributes also to toxicology, as some of the recorded species are of medical importance. Scorpions, scorpionism, and human envenomation cases are common in Khoozestan due to its geographical location and climate. This province is located in the Southwest of Iran and borders five other provinces: Lorestan in the north, Ilam in the northwest, Chahar Mahal & Bakhtiyari and Kohkiloye & Boyer Ahmad in the east, and Bushehr in the southeast; it is limited by the Persian Gulf in the south (see map in Fig. 1). Khoozestan is one of the large provinces of Iran, with 63,236 km^2 of land area. Humidity varies from 10 to 90% and temperature from 60˚C in deserts during summers to 0˚C in eastern montane areas during winters.

The habitats and ecological niches in this part of Iran are diverse (Figs. 2–4). Lowland deserts (3–70 meters altitude) with sandy substrate prevail in the western and some central parts of Khoozestan (e.g. Albaji, Bostan, Shadegan and Omidiyeh), whereas the eastern parts of the province (150–650 m a.s.l., e.g. Lali, Masjedsoleyman, Izeh, and Ramhormoz) are hilly and montane with dominant rocky substrates. The team

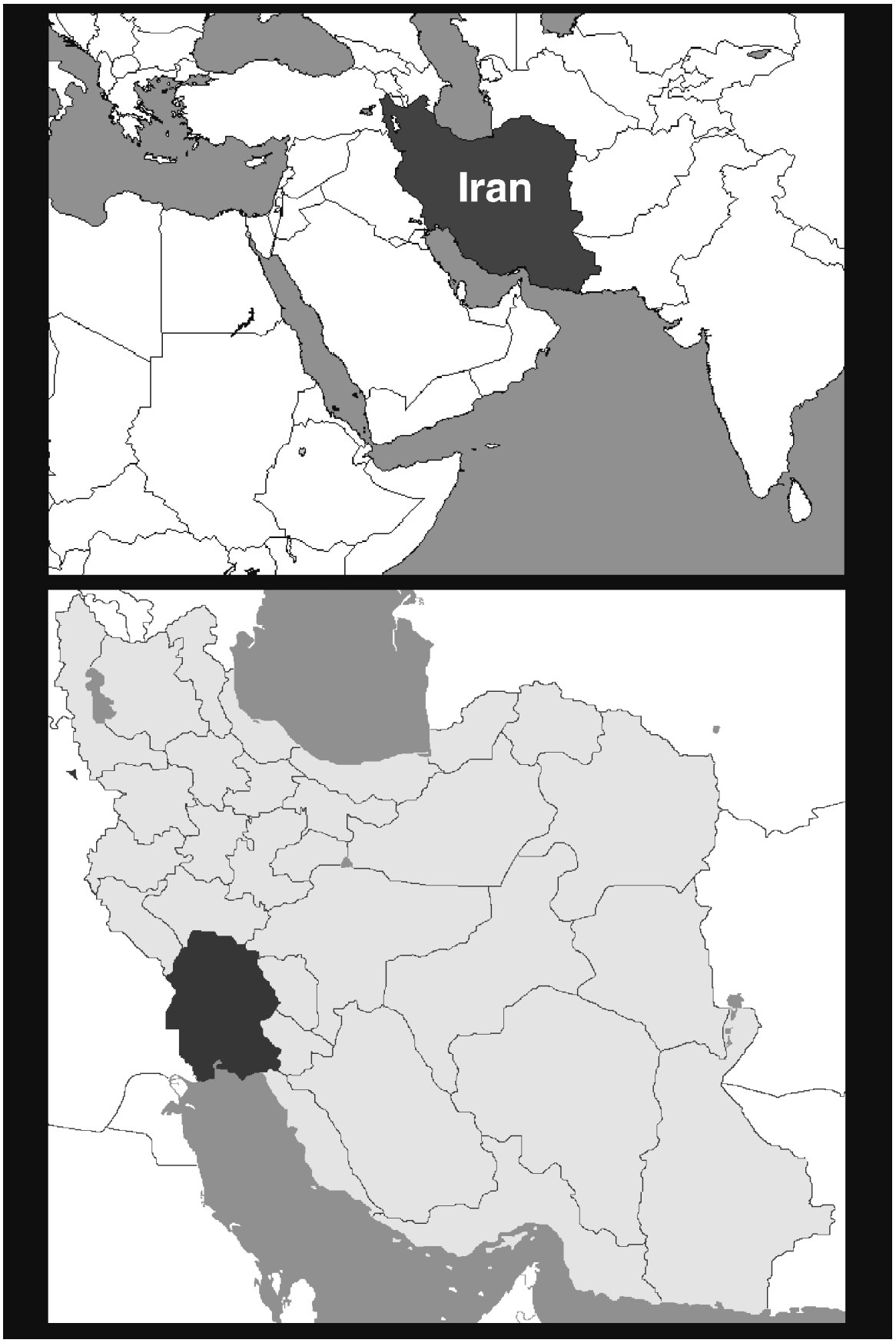


Figure 1: Map of southwestern Asia highlighting Iran (top) and closeup of Iran showing provinces, the Khoozestan province depicted in black (bottom).

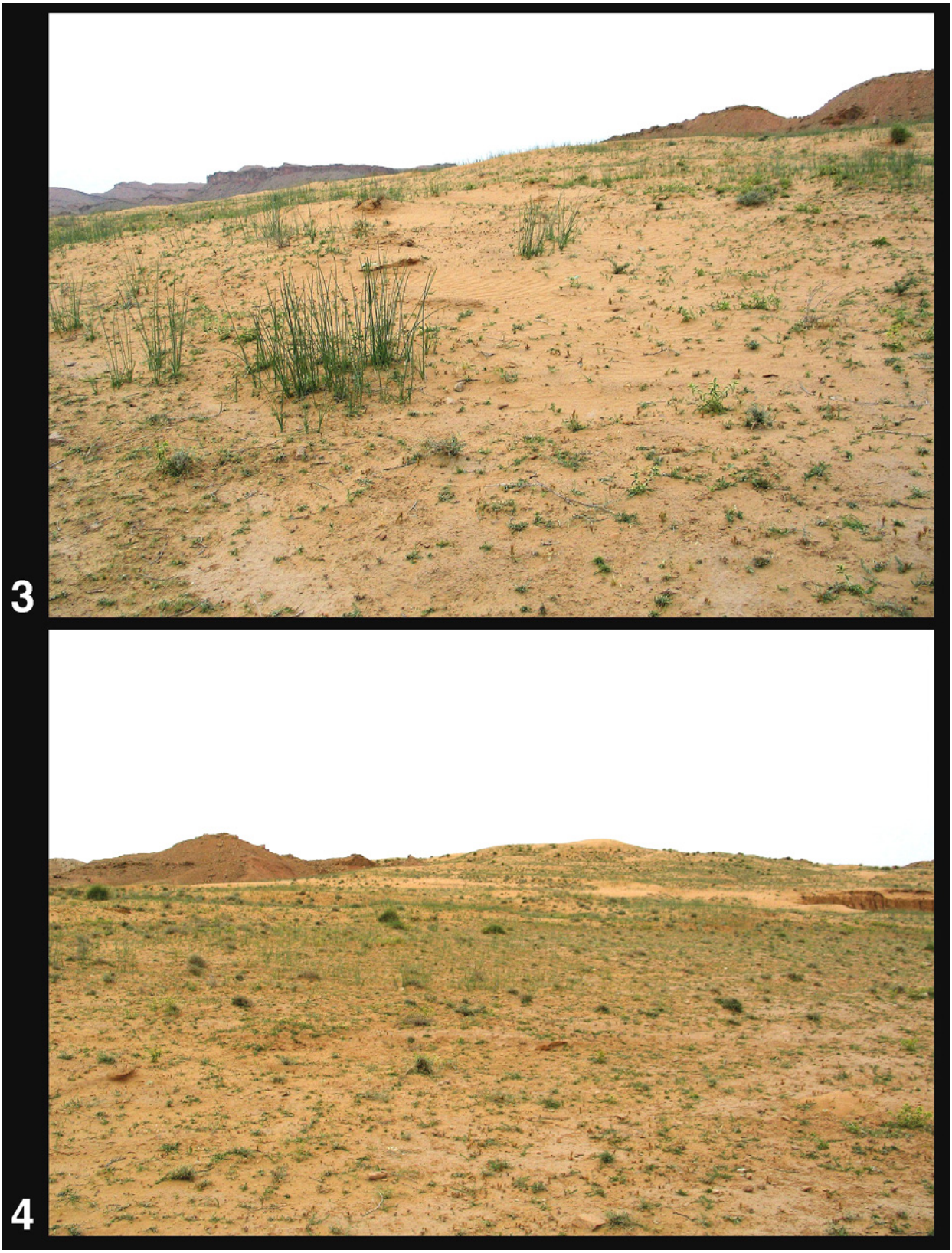
Figure 2: Iran, Khoozestan Province, Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 527 m a.s.l. (Locality No. D-103). Recorded occurrence of *Orthochirus stockwelli* (Lourenço et Vachon, 1995), **comb. n.,** *Hottentotta saulcyi* (Simon, 1880), and *Scorpio maurus townsendi* (Pocock, 1900).

surveyed and collected scorpion species belonging to three families, Buthidae, Scorpionidae, and Hemiscorpiidae.

Apistobuthus susanae occurs in lowland sandy areas at 10–35 m a.s.l., e.g. at Omidiyeh, Shadegan, Bostan, and Albaji. In surrounding areas we collected *Orthochirus iranus, Vachoniolus iranus*, and *Buthacus macrocentrus. Hemiscorpius lepturus*, *Compsobuthus matthiesseni*, and *Hottentotta saulcyi* occur in montane areas such as around Masjedsoleyman, Izeh, Baghmalek, and Ramhormoz. In lowland areas (1–5 m) with soft clays were found *Odontobuthus bientatus* and *Scorpio murus townsendi*, both burrowing species. In the mountains of eastern Khoozestan (Baghmalek) at 650–730 m a.s.l. we captured *Hottentotta zagrosensis. Mesobuthus eupeus* and *Androctonus crassicauda* are present everywhere except in desert areas with sandy substrata. *Mesobuthus eupeus, Hemiscorpius lepturus, Scorpio maurus,* and *Compsobuthus matthiesseni* are common and have high densities in Khoozestan, whereas *Orthochirus stockwelli, Hottentotta khoozestanus*, and *Compsobuthus jakesi* are rare.

Abbreviations. The institutional abbreviations listed below and used throughout are mostly after Arnett et al. (1993).

BMNH – The Natural History Museum, London, United Kingdom;
FKCP – František Kovařík Collection, Praha, Czech Republic;
MHNG – Museum d'Histoire naturelle, Geneva, Switzerland;
MNHN – Muséum National d´Histoire Naturelle, Paris, France;
NHMW – Naturhistorisches Museum Wien, Vienna, Austria;
RRLS – Razi Reference Laboratory of Scorpion Research, Razi Vaccine and Serum Research Institute, Sepah St., Hejrat Sq., Ahvaz, Khoozestan, Iran;
ZISP – Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;
ZMHB – Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany;



Figures 3–4: Iran, Khoozestan Province. **3.** Near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 53 m a.s.l. (Locality No. A-Ma 806-1). Type locality of *Vachoniolus iranus* **sp. n.** Also found *Buthacus macrocentrus* (Ehrenberg, 1828), *Compsobuthus jakesi* Kovařík, 2003, and *Orthochirus iranus* Kovařík, 2004. **4.** Ahvaz-Omidiyeh road (40 km to Omidiyeh), 30°37'49"N 49°31'47"E (Locality No. 812). Recorded occurrence of *Apistobuthus susanae* Lourenço, 1998, *Buthacus macrocentrus* (Ehrenberg, 1828), *Compsobuthus jakesi* Kovařík, 2003, and *Orthochirus iranus* Kovařík, 2004.

ZMUH – Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Germany.

List of Scorpions of Khoozestan Province

Family **Buthidae** C. L. Koch, 1837
Androctonus crassicauda (Olivier, 1807)
Apistobuthus susanae Lourenço, 1998
Buthacus macrocentrus (Ehrenberg, 1828) (first report for Khoozestan Province)
Compsobuthus garyi Lourenço et Vachon, 2001
Compsobuthus jakesi Kovařík, 2003 (first report for Iran)
Compsobuthus matthiesseni (Birula, 1905)
Hottentotta saulcyi (Simon, 1880)
Hottentotta schach (Birula, 1905)
Hottentotta zagrosensis Kovařík, 1997
***Hottentotta khoozestanus* sp. n.**
Mesobuthus eupeus phillipsii (Pocock, 1889)
Odontobuthus bidentatus Lourenço et Pézier, 2002 (first report for Khoozestan Province)
Orthochirus farzanpayi (Vachon et Farzanpay, 1987) (first report for Khoozestan Province)
Orthochirus iranus Kovařík, 2004
Orthochirus stockwelli (Lourenço et Vachon, 1995) **comb. n.** (first report for Khoozestan Province)
Razianus zarudnyi (Birula, 1903)
***Vachoniolus iranus* sp. n.**

Family **Scorpionidae** Latreille, 1802
Scorpio maurus townsendi (Pocock, 1900) (first report for Khoozestan Province)

Family **Hemiscorpiidae** Pocock, 1893
Hemiscorpius lepturus Peters, 1862

Systematics

Family **Buthidae** C. L. Koch, 1837

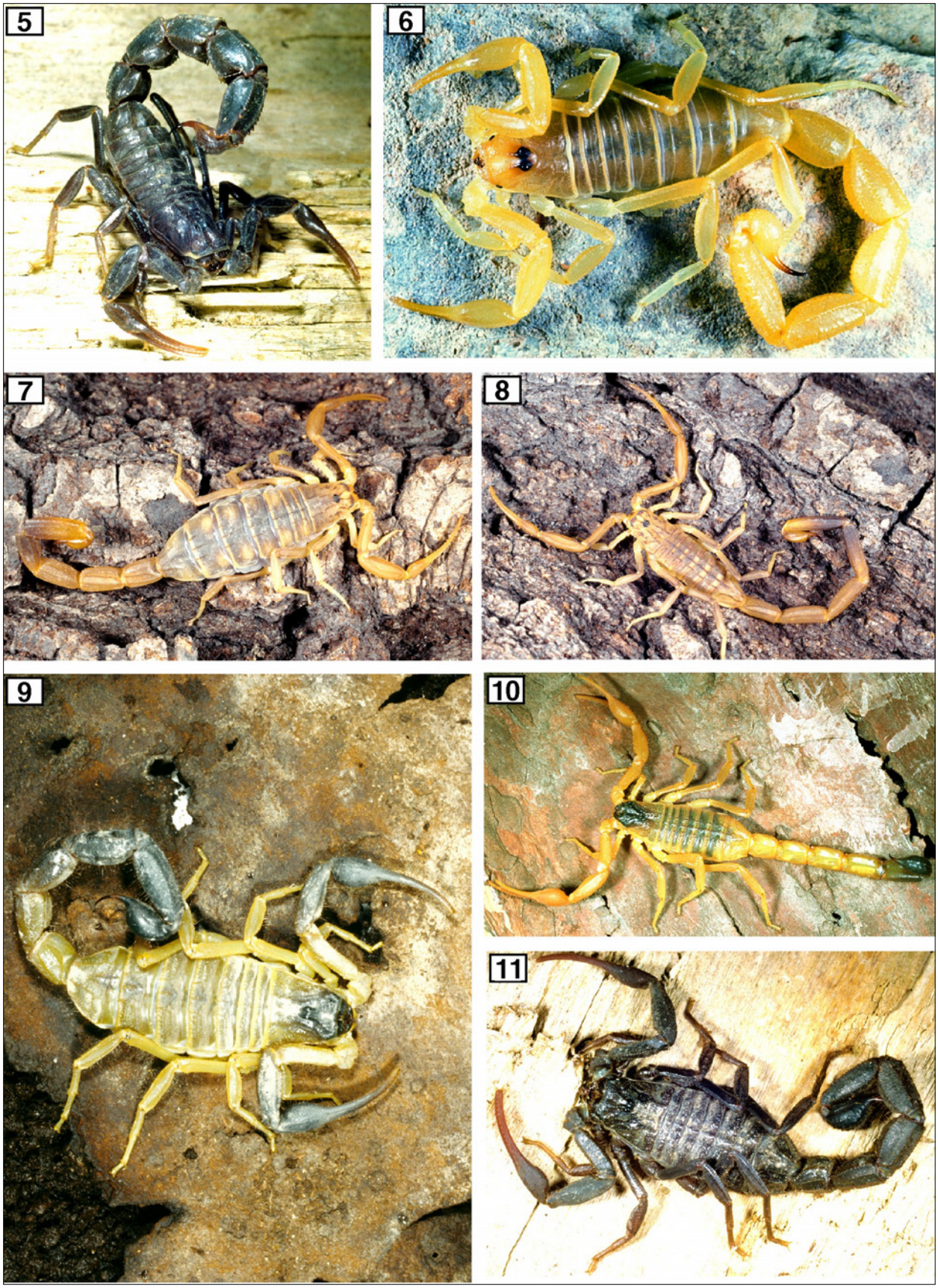
Androctonus crassicauda (Olivier, 1807)
Figures 5, 12, 44–45

Scorpio crassicauda Olivier, 1807: 97.
Buthus crassicauda: Simon, 1872: 247 (in part); Simon, 1879: 99; Kraepelin, 1899: 16; Pocock, 1902: 373; Kraepelin, 1913: 124; Lampe, 1918: 190.
Androctonus crassicauda: Kraepelin, 1891: 175 (in part); Vachon, 1951: 343; Khalaf, 1962: 1; Khalaf, 1963: 60; Habibi, 1971: 42; Farzanpay & Pretzmann, 1974: 215; Pérez Minocci, 1974: 17; Vachon, 1974: 909; Vachon, 1979: 31; Farzanpay, 1987: 141; Farzanpay, 1988: 36; Fet, 1989: 78; Sissom, 1994: 36; Al-Safadi, 1992: 96; Amr & El-Oran, 1994: 187; Dupré et al., 1998: 59; Kovařík, 1998: 104; Crucitti, 1999: 83; Kabakibi et al., 1999: 80; Fet & Lowe, 2000: 72; Stathi & Mylonas, 2001: 288; Kovařík, 2002: 5; Crucitti & Vignoli, 2002: 439; Vignoli et al., 2003: 2; Fet & Kovařík, 2003: 180; Kovařík & Whitman, 2005: 105; Hendrixson, 2006: 38 Akbari, 2007: 76.
Prionurus crassicauda: Pocock, 1895: 292; Tullgren, 1909: 2; Birula, 1904: 29; Birula, 1905a: 120; Masi, 1912: 91; Penther, 1912: 110.
Androctonus crassicauda crassicauda: Vachon, 1959: 124; Vachon, 1966: 210; Habibi, 1971: 42; Vachon, 1979: 34; Levy & Amitai, 1980: 24; Kovařík, 1997a: 49.
= *Prionurus crassicauda orientalis* Birula, 1900: 355; Birula, 1903: 67 (syn. by Fet, 1989: 79)
Buthus (*Prionurus*) *crassicauda orientalis*: Birula, 1917: 93, 240.
Buthus crassicauda orientalis: Kraepelin, 1913: 124.
Androctonus crassicauda orientalis: Vachon, 1959: 124; Vachon, 1966: 210; Habibi, 1971: 42; Pérez Minocci, 1974: 18.
Androctonus amoreuxi baluchicus: Kovařík, 1997a: 39 (see Vignoli et al., 2003: 4).

TYPE LOCALITY AND TYPE REPOSITORY. Kashan, Persia, now Iran, Esfahan Province; MNHN.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek, 31°55'17"N 49°22'15"E, 185 m a.s.l. (Locality No. Ba-102), I.2007, 10♂13♀2juvs. RRLS, leg. Kazemi; Ahvaz–Haftgel road (40 km to Haftgel), 44 m a.s.l. (Locality No. Ha-1), XII.2006, 2♀ RRLS, 4juvs. FKCP, leg. Hayader & Masihipour; Andimeshk district, Bidrooyeh, Jahangiri village, 32°46'15"N 48°15'26"E (Locality No. Bi 813-1), X.2007, 2♂1♀ RRLS, 2juvs. FKCP, leg. Masihipour & Hayader; Ramhormoz road (20 km to Ramhormoz), 31°13'55"N 49°14'26"E, 50 m a.s.l., V.2007, 10♀ RRLS, leg. Masihipour & Tofigh; Dagh Mishan–Abdelkhan road, Razihassan village, 31°51'16"N 48°19'07"E, 42 m, 2007, 10♂18♀ RRLS.

DISTRIBUTION: Widespread in Iran, found in most provinces. Recorded also from Armenia (Kraepelin, 1899: 17), Azerbaijan (Fet, 1989: 79), Bahrain (Crucitti & Vignoli, 2002: 439), Egypt (Fet & Lowe, 2000: 72), Iraq (Kennedy, 1937: 745), Israel (Simon, 1892: 83), Jordan (Amr & El-Oran, 1994: 187), Kuwait (Kettel, 1982: 6), Lebanon (El-Hennawy, 1992: 100), Oman (Birula, 1917: 229; Hendrixson, 2006: 39), Qatar (El-Hennawy, 1992: 100), Saudi Arabia (Pocock, 1895: 292; Hendrixson, 2006: 39), Syria (Simon, 1872: 247), Tunis (Kraepelin, 1901: 266), Turkey (Pocock, 1902: 373), United Arab Emirates (Hendrixson, 2006: 40), Yemen (Birula, 1937: 101).



Figures 5–11: 5. *Androctonus crassicauda* (Olivier, 1807), female. **6.** *Buthacus macrocentrus* (Ehrenberg, 1828), male. **7.** *Compsobuthus matthiesseni* (Birula, 1905), female. **8.** *Compsobuthus matthiesseni* (Birula, 1905), male. **9.** *Hottentotta schach* (Birula, 1905), female. **10.** *Hottentotta saulcyi* (Simon, 1880), male. **11.** *Hottentotta zagrosensis* Kovařík, 1997, female paratype.

Apistobuthus susanae Lourenço, 1998
Figures 4, 12, 48–51

Apistobuthus pterygocercus: Farzanpay, 1987: 141.
Apistobuthus susanae Lourenço, 1998: 238; Kovařík, 1998: 104; Fet & Lowe, 2000: 76.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Khoozestan Province, Ahvaz; ZMUH.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Hamidiyeh, 31°27'57"N 48°29'18"E, 13 m a.s.l. (Locality No. A-Ham-812-1), IX.2007, 18♂11♀11juvs RRLS, 1♀1juv. FKCP, leg. Masihipour & Navidpour; Ahvaz–Masjedsoleyman road, 31°35'44"N 48°57'19"E, 35 m a.s.l. (Locality No. A-Ma-810), IX.2007, 23♂18♀ RRLS, 2ims.(♂♀) FKCP leg. Navidpour & Masihipour; Ramhormoz road (20 km to Ramhormoz), 31°13'55"N 49°14'26"E, 50 m a.s.l., V.2007, 8♂10♀ RRLS, leg, Masihpour & Tofigh; Dagh Mishan–Abdelkhan road, Razihassan village, 31°51'16"N 48°19'07"E, 42 m a.s.l., 2007, 10♂18♀ RRLS, leg. Habibzadeh, Hayader & Bahrani; Albaji, Ahvaz–Andimeshk road, 20 km to Ahvaz, 31°20'44"N 48°38'36"E, 16 m a.s.l., 2007, 6♂3♀ RRLS, leg. Masihipour, Behani & Hayader; Ahvaz–Haftgel road (40 km to Haftgel), 31°16'17"N 49°14'07"E, 44 m a.s.l., 2007, 9♂2♀ RRLS, leg. Habibzadeh, Hayader & Bahrani; Ahvaz–Masjedsoleyman road Zoveyer village, 31°35'20"N 48°57'01"E, 34.5 m a.s.l., 2007, 15♂3♀11 juvs. RRLS, leg. Masihipour, Hayader & Bahrani.

DISTRIBUTION: Iran, Khoozestan Province (Lourenço, 1998: 238).

Buthacus macrocentrus (Ehrenberg, 1828)
Figures 3, 6, 12, 56–59

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).
Buthacus macrocentrus: Kovařík, 2005: 7.
= *Buthus tadmorensis* Simon, 1892: 84; Kraepelin, 1895: 83; Birula, 1905a: 136; Habibi, 1971: 43 (syn. by Kovařík, 2005: 8).
Buthus (*Buthacus*) *tadmorensis*: Birula, 1910: 172; Birula, 1917: 229.
Buthacus tadmorensis: Simon, 1910: 76; Vachon, 1966: 210; Farzanpay, 1987: 144; Farzanpay, 1988: 36; Kovařík, 1997a: 49; Kovařík, 1998: 105; Kovařík, 2001: 80; Fet & Kovařík, 2003: 180.
= *Buthus pietschmanni* Penther, 1912: 112 (syn. by Birula, 1917: 229).
= *Buthacus yotvatensis* Levy, Amitai & Shulov, 1973: 130; Levy & Amitai, 1980: 90; Kinzelbach, 1984: 99; Vachon & Kinzelbach, 1987: 100; Fet & Lowe, 2000: 85; Crucitti & Vignoli, 2002: 439 (syn. by Kovařík, 2001: 80).
Buthacus yotvatensis yotvatensis: Vachon, 1979: 36; Fet & Lowe, 2000: 85.
Buthacus tadmorensis tadmorensis: Vachon & Kinzelbach, 1987: 101; Kovařík, 2002: 5;
Buthacus tadmorensis yotvatensis: Vachon & Kinzelbach, 1987: 101; Amr et al., 1988: 374; El-Hennawy, 1992: 114; Kabakibi et al., 1999: 82.
Mesobuthus pietschmanni: El-Hennawy, 1992: 128.

TYPE LOCALITY AND TYPE REPOSITORY. Sinai; ZMHB. Type locality "Sinai" (Ehrenberg in Hemprich & Ehrenberg, 1829: 355 and label) must be regarded as erroneous.

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

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Ahvaz–Omidiyeh road (40 km to Omidiyeh), 30°37'49"N 49°31'47"E (Locality No. 812), V.2007, 1juv. FKCP, leg. Masihipour & Bahrani; Hamidiyeh, 31°27'57"N 48°29'18"E, 13 m a.s.l. (Locality No. A-Ham-812-2), IX.2007, 3♀ RRLS, 1♂1♀ FKCP, leg. Masihipour & Navidpour; Ahvaz–Masjedsoleyman road, 31°49'34"N 49°05'00"E, 53 m a.s.l. (Locality No. A-Ma-816), X.2007, 4ims. 3juvs. RRLS, leg. Masihipour & Hayader; Ahvaz–Omidiyeh road (20 km to Omidiyeh), 30°56'12"N 49°34'00"E, 53 m a.s.l., 2007, 3♂5♀1juv. RRLS, leg. Bahrani, Masihipour & Jahanifard; Chogha Zanbil (zikkurat), 32°00'55"N 48°31'04"E, 68.5 m a.s.l., 2007, 4♂1♀ RRLS, leg. Masihipour, Navidpour & Hayader; Ahvaz–Haftgel road (40 km to Haftgel), 31°16'17"N 49°14'07"E, 44 m a.s.l., 2007, 3♂ RRLS, leg. Habibzadeh, Hayader & Bahrani; Ahvaz–Omidiyeh road, Chombeh village, 31°11'54"N 49°11'41"E, 44 m a.s.l., 2007, 3♂3♀ RRLS, leg. Masihipour, Navidpour & Tofigh; Shush (Apadana Palace), 32°10'55"N 48°15'39"E, 75 m a.s.l., X.2007, 1♂5♀3 juvs. RRLS, leg. Navidpour, Masihipour & Bahrani.

DISTRIBUTION: Iran, known from Bushehr Province (Chahak district) (Kovařík, 2005: 8, as "Chamak Province") and Khoozestan Province (first report); Iraq (Penther, 1912: 112), Israel (Vachon, 1966: 210), Jordan (Pérez Minocci, 1974: 19), Syria (Simon, 1892: 84), Turkey (Crucitti & Vignoli, 2002: 439).

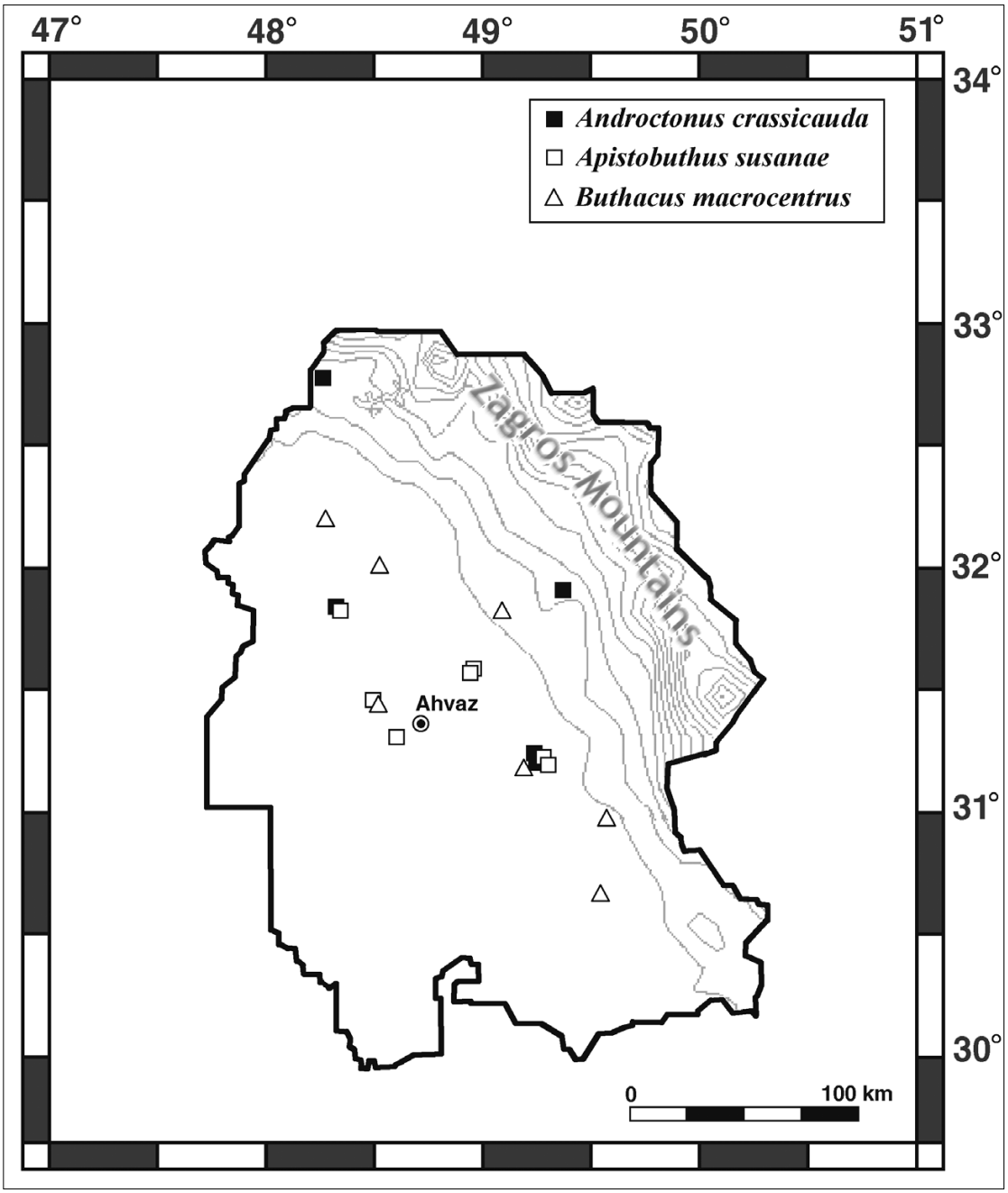


Figure 12: Map of Khoozestan province showing distribution of *Androctonus crassicauda, Apistobuthus susanae* and *Buthacus macrocentrus* collected in this study.

COMMENTS: This is most likely the only species of *Buthacus* present in Iran, but its distribution needs to be better documented. All records of *Buthacus leptochelys* (Ehrenberg, 1829) in Iran probably pertain to *B. macrocentrus*.

Compsobuthus garyi Lourenço et Vachon, 2001

Compsobuthus garyi Lourenço & Vachon, 2001: 180; Kovařík, 2003: 106; Vignoli, 2005: 85; Kovařík & Ahmed, 2007: 5.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Khoozestan Province, 45 km NW of Masdjed-e-Soleyman; MNHN.

DISTRIBUTION: Iran, Khoozestan Province (Lourenço & Vachon, 2001: 180).

COMMENTS: The collecting team led by the first author searched some parts of Masdjedsoleyman, especially 45 km NW of the city of Lali, and could not find *Compsobuthus garyi*, the only species found were *C.*

jakesi and *C. matthiesseni*. *C. garyi* is characterized by the absence of both internal and external granules in the rows of granules on the movable finger (see fig. 2 in Lourenço & Vachon, 2001: 181). Whereas the absence of external granules is frequent in *Compsobuthus* and signals the *acutecarinatus* group, the absence of internal granules would be unique and has never been seen by any of us. Surprisingly, Lourenço (in Lourenço & Vachon, 2001: 180) did not mention this character in the text and instead distinguished *C. garyi* and *C. Matthiesseni* on other characters of doubtful taxonomic value, which invites the possibility that fig. 2 of Lourenço & Vachon (2001: 181) is not accurate. A similar situation arose in the description of *Buthacus mahraouii* Lourenço, 2004, when Lourenço subsequently (2006: 63) admitted that this species has very small external granules which had been left out from his original figure (see fig. 3 in Lourenço, 2004: 227 versus fig. 14 in Lourenço, 2006: 63). If this happened in the description of *C. garyi* as well, it would explain the absence of this species at its type locality. Since MNHN does not lend type specimens, it is not clear at this moment whether *C. garyi* really lacks internal granules in rows of granules on the movable finger or in fact has them, in which case it would be a synonym of *C. matthiesseni* that we found at the site.

Compsobuthus jakesi Kovařík, 2003
Figures 3, 4, 17, 60–63

Compsobuthus acutecarinatus: Kovařík, 1998: 109 (in part); Kovařík, 2001: 79 (in part).
Compsobuthus jakesi Kovařík, 2003: 91; Kovařík & Ahmed, 2007: 5.
Compsobuthus sp.: Fet & Kovařík, 2003: 180.

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

TYPE MATERIAL EXAMINED. **Iraq**, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), Geophysics Brno base camp, 150 km SW of An-Najaf (Najaf), 262 m a.s.l., 31°06'N 43°95'E, X.-XII.1978, 2♂3♀2juvs. (holotype, allotype, and paratypes), leg. O. Jakeš, FKCP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek, 31°55'17"N 49°22'15"E, 185 m a.s.l. (Locality No. Ba-104), II.2007, 1♀ RRLS, leg. Masihipour & Bahrani; Ahvaz–Omidiyeh road (40 km to Omidiyeh), 30°37'49"N 49°31'47"E, (Locality No. 812/803/), V. 2007, 2♀ FKCP, leg. Masihipour & Bahrani; near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 53 m a.s.l. (Locality No. A-Ma 806), VIII.2007, 5♀4ims. RRLS, leg. Navidpour & Masihipour; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-3), X.2007, 2ims.(♂♀) FKCP, leg. Masihipour & Hayader; Shush (Apadana Palace), 32°10'55"N 48°15'39"E, 75 m a.s.l., X.2007, 2♀ RRLS, leg. Navidpour, Masihipour & Bahrani; Ahvaz–Naft Sefid road, 31°27'24"N 49°57'37"E, 148 m a.s.l., 2007, 2♂1juv, leg. Masihipour & Tofigh.

DISTRIBUTION: Iran, Khoozestan Province (first report for the province as well as the country); Iraq (Kovařík, 2003: 91).

Compsobuthus matthiesseni (Birula, 1905)
Figures 17, 64–67

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

TYPE LOCALITY AND TYPE REPOSITORY. Iran, "Kum, Province Irak-Adschemi" now Qum (Qom); ZISP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek district, Karbalai Ghasem village, 31°27'24"N 49°57'37"E (Locality No. 501), 2006, 3♂7♀ FKCP, leg. Kazemi & Habibzadeh; Shushtar–Gotvand road (Locality No. 016-3), VII.2007, 34♂15♀ RRLS, leg. Masihipour & Bahrani; Behbahan–Bibihkimeh road, 30°13'48"N 50°12'16"E, 128 m a.s.l. (Locality No. B-Bi 805), VI.2007, 2ims. RRLS, 1♀ FKCP, leg. Navidpour & Masihipour; Andimeshk district, Bidrooyeh, Jahangiri village, 32°46'15"N 48°15'26"E, 504 m a.s.l. (Locality No. Bi 813-2), X.2007, 1♀ RRLS, leg. Masihipour & Hayader; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-4), X.2007, 25♂45♀11ims. RRLS, 1♂ FKCP, leg. Masihipour & Hayader.

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); Iraq (Birula, 1917: 240; Pringle, 1960: 77), Syria (Kovařík, 2002: 7), Turkey (Kovařík, 1996: 53).

Hottentotta saulcyi (Simon, 1880)
Figures 2, 10, 17, 68–71

Buthus saulcyi Simon, 1880a: 378; Simon, 1880b: 29; Kraepelin, 1899: 18; Kraepelin, 1901: 267; Weidner, 1959: 99.
Buthus (*Hottentotta*) *saulcyi*: Birula, 1905a: 136; Birula, 1917: 214; Birula, 1918: 30; Vachon, 1940b: 255.
Buthotus saulcyi: Vachon, 1949: 147 (1952: 233); Vachon, 1959: 134; Pringle, 1960: 79; Khalaf, 1962: 2; Khalaf, 1963: 64; Vachon, 1966: 210; Vachon & Stockmann, 1968: 91; Habibi, 1971: 43; Pérez Minocci, 1974: 21; Farzanpay, 1987: 148; Farzanpay, 1988: 37; El-Hennawy, 1992: 118; Kovařík, 1992: 90; Kovařík, 1992: 183; Akbari et al., 1997: 112; Dupré, Lambert & Gérard, 1998: 70; Akbari, 2007: 76.
Hottentotta saulcyi: Kovařík, 1997a: 40; Crucitti & Vignoli, 2002: 446; Vignoli et al., 2003: 4; Karatas, 2003: 315; Kovařík, 2007: 61.
Hottentotta (*Hottentotta*) *saulcyi*: Kovařík, 1998: 110; Fet & Lowe, 2000: 143.
Buthus hottentotta: Kraepelin, 1891: 185 (in part).

TYPE LOCALITY AND TYPE REPOSITORY. Iraq, Mosul; MNHN, ZMUH.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Andimeshk district, Bidrooyeh, Jahangiri village, 32°46'15"N 48°15'26"E, 504 m a.s.l. (Locality No. Bi 813-1 and 2), X.2007, 3ims.5juvs. RRLS, 1♀im. 1juv. FKCP, leg. Masihipour & Hayader; Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 527 m a.s.l. (Locality No. D-SH), VI.2007, 1♀1im. RRLS, leg. Navidpour & Masihipour; Ahvaz–Naft Sefid road, 31°44'28"N 49°11'37"E, 148 m a.s.l., 2007, 5♂71♀3ims. RRLS, leg.Masihipour & Tofigh.

DISTRIBUTION: Iran, known from Kermanshah (formerly Bachtaran), Fars, Hamadan, Hormozgan, Ilam, and Lorestan Provinces (see Kovařík, 2007: 65), Bushehr and Khoozestan Provinces (Akbari et al., 1997: 112, Akbari, 2007: 76); Afghanistan (Kovařík, 1997a: 40), Iraq (Simon, 1880a: 379), Turkey (Crucitti & Vignoli, 2002: 446). Record for Syria (Kinzelbach, 1985; El-Hennawy, 1992: 118) must be considered dubious.

Hottentotta schach (Birula, 1905)
Figures 9, 72–73

Buthus schach Birula, 1905a: 134.
Buthus (*Hottentotta*) *schach*: Birula, 1914: 652; Birula, 1917: 214; Birula, 1918: 31.
Buthotus schach: Vachon, 1949: 147 (1952: 233); Vachon, 1959: 134; Vachon, 1966: 211; Vachon & Stockmann, 1968: 91; Habibi, 1971: 43; Pérez Minocci, 1974: 20; Farzanpay, 1987: 149; Farzanpay, 1988: 37; El-Hennawy, 1992: 118.
Hottentotta schach: Farzanpay & Pretzmann, 1974: 215; Kovařík, 1997a: 40, Kovařík, 2007: 69).
Hottentotta (*Hottentotta*) *schach*: Kovařík, 1998: 110; Fet & Lowe, 2000: 143.

TYPE LOCALITY AND TYPE REPOSITORY. Dech-i-Dis (now Dehdez), Arabistan (now Khoozestan Province, Iran); ZISP.

DISTRIBUTION: Iran, Khoozestan Province (Birula, 1905a: 134), Fars Province (Kovařík, 2007: 69); Iraq (Vachon, 1966: 211).

COMMENTS: Reaching sizes up to 130 mm it is the largest but the most infrequently encountered Iranian scorpion species. It seems to be more common in Fars Province to the south, although its type locality is in Khoozestan.

Hottentotta zagrosensis Kovařík, 1997
Figures 11, 17, 77–80

Hottentotta zagrosensis Kovařík, 1997a: 41; Kovařík, 1998: 111; Fet & Lowe, 2000: 144, Kovařík, 2007: 86.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Fars Province, ca. 1000 m a.s.l., Zagros Mts., Abshar village env., 30°23'N 51°30'E; FKCP.

TYPE MATERIAL EXAMINED. **Iran**, Fars Province, alt. ca. 1000 m, Zagros Mts., Abshar vill. env., 2.-3.V.1996 1♂ (holotype) 1♂ (im.) and its ecdysis (paratype No. 1), leg. J. Pitulová, 1♀ (allotype, Fig. 129) 2juvs. (paratypes No. 2 and No. 3), leg. V. Šejna, 1juv. (paratype No. 4), leg. D. Král, FKCP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, 10 km W. Ize, 31°45'19"N 49°48'18"E, 900 m a.s.l., 1♂1♀1juv., 12–13.X.1998, leg. P. Kabátek, FKCP; Baghmalek district, Karbalai Ghasem village, 31°27'24"N 49°57'37"E (Locality No. B4), VII.2005, 182♂113♀6ims. RRLS (Locality No. B5), VII.2007, 1im. FKCP, leg. Salari.

DISTRIBUTION: Iran, known from Fars, West Azerbaijan, and Khoozestan Provinces (see Kovařík, 2007: 86).

Hottentotta khoozestanus Navidpour, Kovařík, Soleglad et Fet, **sp. n.**
Figures 13–16, 17, 74–76; Table 1

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, Khoozestan Province, Behbahan–Dailam road, 31°55'N 49°44'E, RRLS.

TYPE MATERIAL EXAMINED. **Iran**, South-east part of Khoozestan Province, Behbahan–Dailam road, 31°55'N 49°44'E, VI.2006, 1♀ (holotype) RRLS, leg. Navidpour. The holotype was captured under stone.

ETYMOLOGY. Named after the type locality

DIAGNOSIS. Total length of female holotype 119.5 mm. For habitus see Figs. 74–75. Trichobothrium *db* on fixed finger of pedipalp situated between trichobothria *et* and *est* or *dt* and *et* (Fig. 13). Chelicerae reticulate. Pectinal teeth number 28–30. Pedipalps and metasoma bear only a few hairs. Color yellowish green except black spot on anterior part of carapace. Femur of pedipalp with 3 carinae, patella with 8 carinae (some of them weakly indicated), chela lacks carinae. Movable fingers of pedipalps with 16 rows of granules and 4 or 5 terminal granules. Seventh mesosomal sternite smooth, with 4 smooth carinae. First and second metasomal segments with 10 carinae; third and fourth segments with 8 carinae and fifth segment with 5 carinae, 3 ventral (1 median, 2 lateral) and 2 dorsal. Dorsal carinae of metasomal segments bear terminal granules of size approximately equal to preceding granules. Dorsal surface smooth, fifth metasomal segment with 2 short, inconspicuous carinae. Ventral carinae on first to fourth metasomal segments smooth, without granules. All metasomal segments longer than wide.

DESCRIPTION: The total length of female holotype is 119.5 mm. The habitus is shown in Figs. 74–75. Measurements of the carapace, telson, segments of the metasoma and of the pedipalps, and numbers of pectinal teeth in the holotype and allotype are given in Table 1. Trichobothrium *db* on the the fixed finger of pedipalp is situated between trichobothria *et* and *est* or *dt* and *et* (Fig. 13). Pectinal teeth in the female number 28 and 30. Chelicerae are yellow, reticulate, fingers of chelicerae are black.

COLORATION: The color is yellowish green except for a black spot on the anterior part of the carapace.

MESOSOMA: The mesosoma has three dorsal and two ventral carinae, except for the seventh segment which bears four obsolete ventral carinae. The dorsal surface is granulated, whereas the ventral surface is smooth.

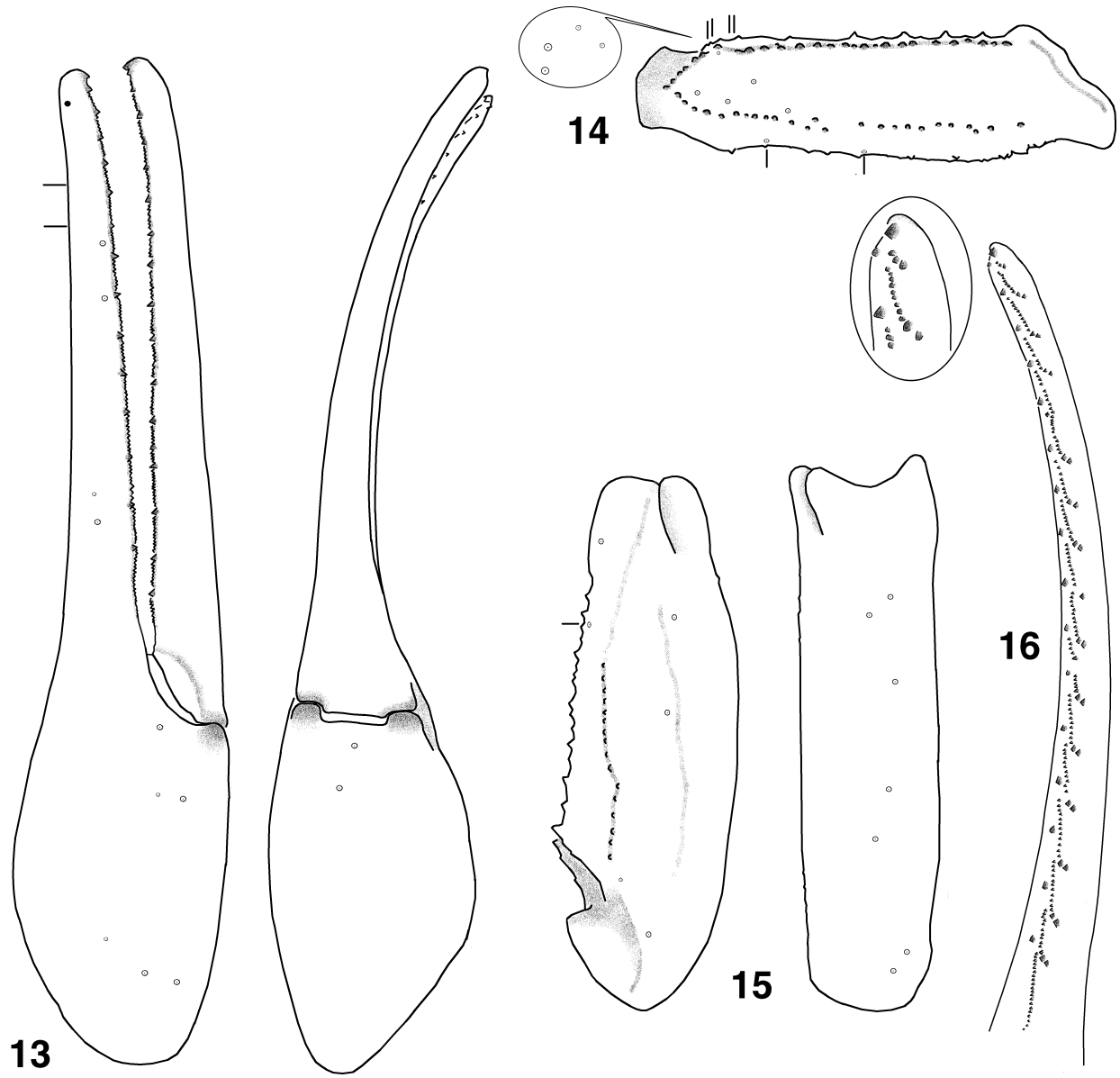
PEDIPALPS: The pedipalps are smooth to glossy, without hairs. The femur of pedipalp bears three discrete carinae, two other carinae are indicated only by a few scattered granules. The patella has eight carinae, some of which are weakly indicated. The chela lacks carinae. The movable fingers of pedipalps bear 16 rows of granules and 4 or 5 terminal granules (Fig. 16).

METASOMA AND TELSON: All metasomal segments are longer than wide.The first and second segments bear 10 carinae, the third and fourth segments bears eight carinae, and the fifth segment bears five carinae, three ventral (one median, two lateral) and two dorsal. The dorsal surface is smooth and glossy, and the fifth metasomal segment bears two short, inconspicuous carinae. The ventral carinae on the first to fourth metasomal segments are smooth, without granules. The lateral carinae are smooth and weakly defined, whereas dorsal carinae of all segments bear obsolete granules of even size. The intervals between carinae are smooth, without granules, only the ventral surface of the fifth segment bears additional rows of granules. A subaculear tooth is absent; the telson is bulbous, essentially smooth, with only a few scattered granules.

AFFINITIES. The described features distinguish *H. khoozestanus* **sp. n.** from all other species of the genus. They are recounted in the key below. Together with *H. saulcyi* (Simon, 1880) and *H. schach* (Birula, 1905), the new species is among the largest in the genus. The last species hitherto described from Iran is *H. zagrosensis* Kovařík, 1997. *H. khoozestanus* **sp. n.** can be easily distinguished from the above named three species on two characters: (1) Hairless pedipalps and metasoma, which in the other three species are densely hirsute. And (2) coloration; whereas *H. khoozestanus* **sp. n.** has the fifth metasomal segment and telson yellow, in the other three species those parts are black (*H. zagrosensis* is entirely black).

Mesobuthus eupeus phillipsii (Pocock, 1889)
Figures 22, 81–84

Buthus phillipsii Pocock, 1889: 341; Weidner, 1959: 99.
Buthus phillipsi: Kraepelin, 1899: 24; Birula, 1905a: 131; Borelli, 1915: 460; Werner, 1916: 80; Lampe, 1918: 191.
Mesobuthus phillipsi: Vachon, 1950: 153 (1952: 325); Pérez Minocci, 1974: 25.
Buthus (*Buthus*) *eupeus phillipsi*: Birula, 1917: 228.
Mesobuthus eupeus phillipsi: Vachon, 1959: 148; Vachon, 1966: 213; Habibi, 1971: 44; Farzanpay,



Figures 13–16: *Hottentotta khoozestanus*, **sp. n.**, female holotype. **13–15.** Trichobothrial pattern. **13.** Chela, external, and ventral views. Closed circle on chelal fixed finger external view indicates trichobothrium *i*. **14.** Femur, dorsal view. Circled area shows internal trichobothria from an internal perspective. **15.** Patella, dorsal and external views. **16.** Chelal movable finger dentition; enlarged circled area shows distal tip.

1986: 334; Fet, 1994: 527; Kovařík, 1997a: 49; Kovařík, 1998: 114; Fet & Lowe, 2000: 175.

Mesobuthus eupeus phillipsii: Farzanpay, 1987: 150; Farzanpay, 1988: 38.

Mesobuthus eupeus: Akbari, 2007: 76.

Buthus hottentotta: Kraepelin, 1891: 185 (part?).

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Bushir Province; BMNH.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, ca 100 m a.s.l., Chogha Zanbil (zikkurat) env., 5–6.V.1996, 1♀ FKCP, leg. M. Kaftan, 3♂1♀1juv. FKCP, leg. D. Král; Baghmalek district, Hore village, 31°55'30"N 49°31'47"E, 185 m a.s.l. (Locality No. B1 and B2), I. 2007, 250 specimens RRLS, 1♀ FKCP, (Locality No. B3), II.2007, 128 specimens RRLS, 2♀ FKCP, leg. Kazemi; Shush (Apadana Palace), 32°10'55"N 48°15'39"E, 75 m a.s.l. (Locality No. SHO-814), X.2007, 1♀ RRLS, leg. Hayader & Habibzadeh; Ahvaz–Masjedsoleyman road, 31°48'08"N 48°58'07"E, 38 m a.s.l. (Locality No. A-Ma-808), IX.2007, 125 specimens RRLS, leg. Bahrani & Masihipour; Chogha Zanbil (zikkurat), 32°00'55"N

		Hottentotta khoozestanus sp. n. female HT	*Vachoniolus iranus* sp. n. male HT	female PT
Total	length	119.5	42.5	40.5
Carapace	length	12.5	4.5	4.0
	width	14.3	4.6	4.5
Metasoma and telson	length	67.5	26.7	23.0
segment I	length	8.0	3.4	3.0
	width	7.5	2.5	2.1
segment II	length	9.6	4.1	3.4
	width	7.2	2.3	2.0
segment III	length	10.2	4.4	3.6
	width	7.0	2.3	2.0
segment IV	length	11.6	4.9	4.1
	width	6.6	2.2	1.8
segment V	length	13.8	5.2	4.6
	width	6.8	2.1	1.8
telson	length	14.3	4.7	4.1
Pedipalp femur	length	12.0	2.8	2.7
	width	3.4	1.3	1.1
patella	length	14.0	3.8	3.6
	width	4.8	1.8	1.4
tibia	length	24.4	5.9	4.7
	width	5.1	3.1	1.3
finger mov.	length	16.9	2.6	2.8
Pectinal teeth		30:28	20:22	14:14

Table 1: Measurements (in millimeters) of type specimens of new *Hottentotta* and *Vachoniolus* species.

48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-100), VI.2007, 29 specimens RRLS, 4♂ FKCP, leg. Navidpour & Masihipour; Chogha Zanbil (zikkurat), 32°00'55"N 48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-103), VI.2007, 2♂1♀ FKCP, leg. Navidpour & Masihipour; Ahvaz–Masjedsoleyman road, 31°46'31"N 49°06'01"E, 48 m a.s.l. (Locality No. A-Ma-811), IX.2007, 61 specimens RRLS, leg. Navidpour & Masihipour; Ahvaz–Masjedsoleyman road, 31°49'34"N 49°05'00"E, 53 m a.s.l. (Locality No. A-Ma-816-1), X.2007, 1♂1♀6juvs RRLS, leg. Masihipour & Hayader; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-4 and 5), X.2007, 197♂201♀2juvs. RRLS, 2♀1im. FKCP, leg. Masihipour & Hayader.

DISTRIBUTION: Iran (Bushehr and Khoozestan Provinces), Iraq (Vachon, 1966: 213; Habibi, 1971: 44; Fet & Lowe, 2000: 175).

Odontobuthus bidentatus Lourenço et Pézier, 2002
Figures 18, 22

Odontobuthus odonturus: Habibi, 1971: 44 (in part); Farzanpay, 1987: 155; Farzanpay, 1988: 39; Kovařík, 1997a: 47; Kovařík, 1998: 115 (in part); Fet & Lowe, 2000: 188 (in part); Akbari, 2007: 76.
Odontobuthus bidentatus Lourenço & Pézier, 2002: 118.

TYPE LOCALITY AND TYPE REPOSITORY. Iraq, 180 km north of Bagdad, Khanagin-Dyala; MHNG.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Omidiyeh, 30°57'49"N 49°31'47"E, 56 m a.s.l. (Locality No. A-OM), V.2007, 10♂9♀6ims. RRLS, 1♀ FKCP, leg. Hayader & Bahrani; Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 75 m a.s.l. (Locality No. SHO-814), X.2007, 1juv. RRLS, leg. Hayader & Habibzadeh; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-2 and 4), X.2007, 11♂8♀5ims.15juvs RRLS, 1♂2juvs FKCP, leg. Masihipour & Hayader; Andimeshk district, Bidrooyeh, Jahangiri village, 32°46'15"N 48°15'26"E, 504 m a.s.l., X.2007, 1♂2juvs. RRLS, leg. Masihipour & Hayader; Ahvaz–Omidiyeh road, Chombeh village, 31°11'54"N 49°11'41"E, 44 m a.s.l., 2007, 3♂5♀ RRLS, leg. Masihipour, Bahrani & Hayader; Ahvaz–Omidyieh road (20 km to Omidiyeh), 30°56'12"N 49°34'00"E, 53 m

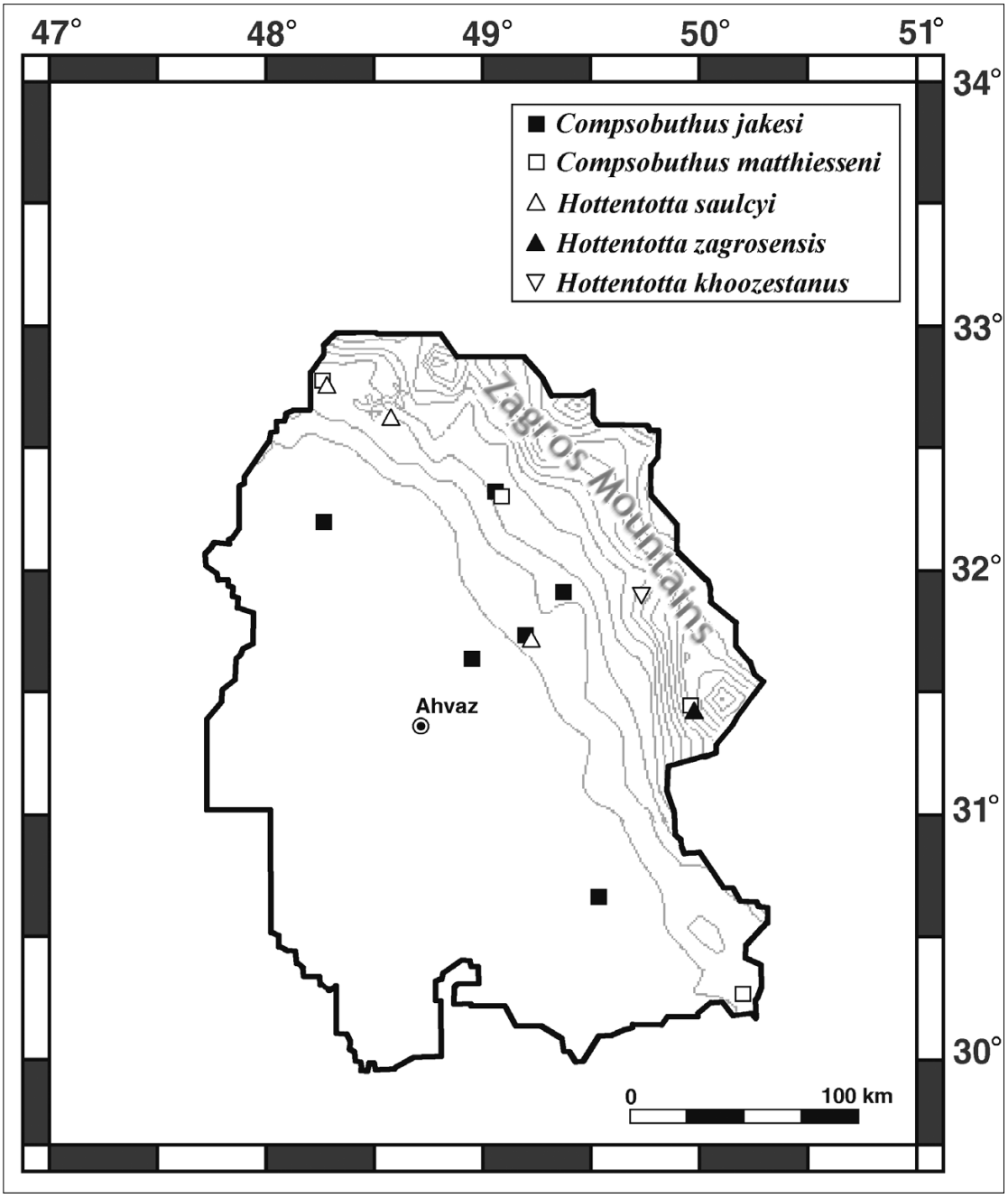


Figure 17: Map of Khoozestan province showing distribution of *Compsobuthus jakesi*, *C. matthiesseni*, *Hottentotta saulcyi*, *H. zagrosensis* and *H. khoozestanus* **sp. n.** collected in this study.

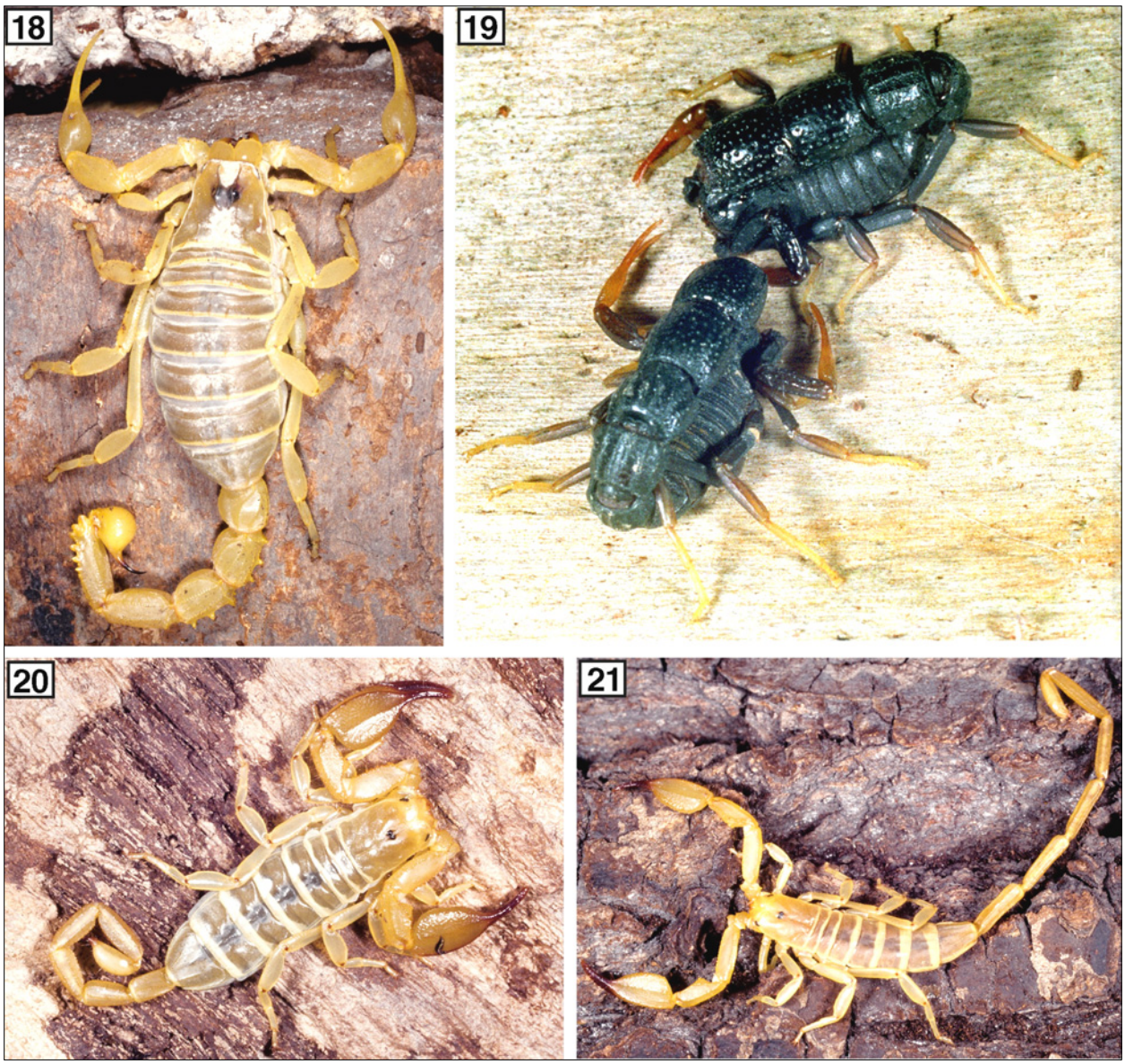
a.s.l., 2♂1♀ RRLS, leg. Bahrani, Masihipour & Jahanifard.

COMMENTS: Habibi (1971), Farzanpay (1988), Kovařík (1997a), Akbari et al. (1997) and Akbari (2007) reported *Odontobuthus odonturus* (Pocock, 1897) from south-western Iran, but our studies show that all specimens of this genus collected in Khoozestan are *O. bidentatus*.

DISTRIBUTION: Iran, Bushehr Province (Lourenço & Pézier, 2002: 118), Khoozestan Province (first report); Iraq (Lourenço & Pézier, 2002: 118).

Orthochirus farzanpayi (Vachon et Farzanpay, 1987)
Figures 31, 93–96

Simonoides farzanpayi Vachon & Farzanpay in Farzanpay, 1987: 162; Farzanpay, 1988: 41; Fet & Lowe, 2000: 223.



Figures 18–21: 18. *Odontobuthus bidentatus* Lourenço et Pézier, 2002, female. **19.** *Orthochirus iranus* Kovařík, 2004, females. **20.** *Hemiscorpius lepturus* Peters, 1862, female. **21.** *Hemiscorpius lepturus* Peters, 1862, male.

Orthochirus farzanpayi Kovařík & Fet, 2006: 1.
= *Orthochirus sobotniki* Kovařík, 2004: 20 (syn. by Kovařík & Fet, 2006: 1).

TYPE LOCALITY AND TYPE REPOSITORY. Iran, 215 km N of Bandar-e-Abbas; NHMW.

TYPE MATERIAL EXAMINED. **Iran**, 215 km N of Bandar-e-Abbas, 22.III.1972, 1♀ (lectotype) 1♂1♀ (para - lectotypes), NHMW Nos. 68–70, rev. Max Vachon in 1977, No. VA 1910; 5 km SE of Posht Chenar, 19–20 April 2000, 29°12'941"N, 53°20'014"E, 1692 m a.s.l., 1♂1♀1im. ♂ (holotype, allotype, and paratype of *Orthochirus sobotniki*), leg. J. Šobotník, FKCP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Shushtar district, Arab Hasan village (Locality No. SH-100), VII.2007, 2♂ RRLS, 1♂ FKCP, leg. Masihipour & Hayader.

DISTRIBUTION: Iran: Hormozgan and Fars Provinces (Kovařík & Fet, 2006: 1–3), Khoozestan Province (first report).

Orthochirus iranus Kovařík, 2004
Figures 4, 19, 24–26, 27-30, 31, 97–100; Table 2

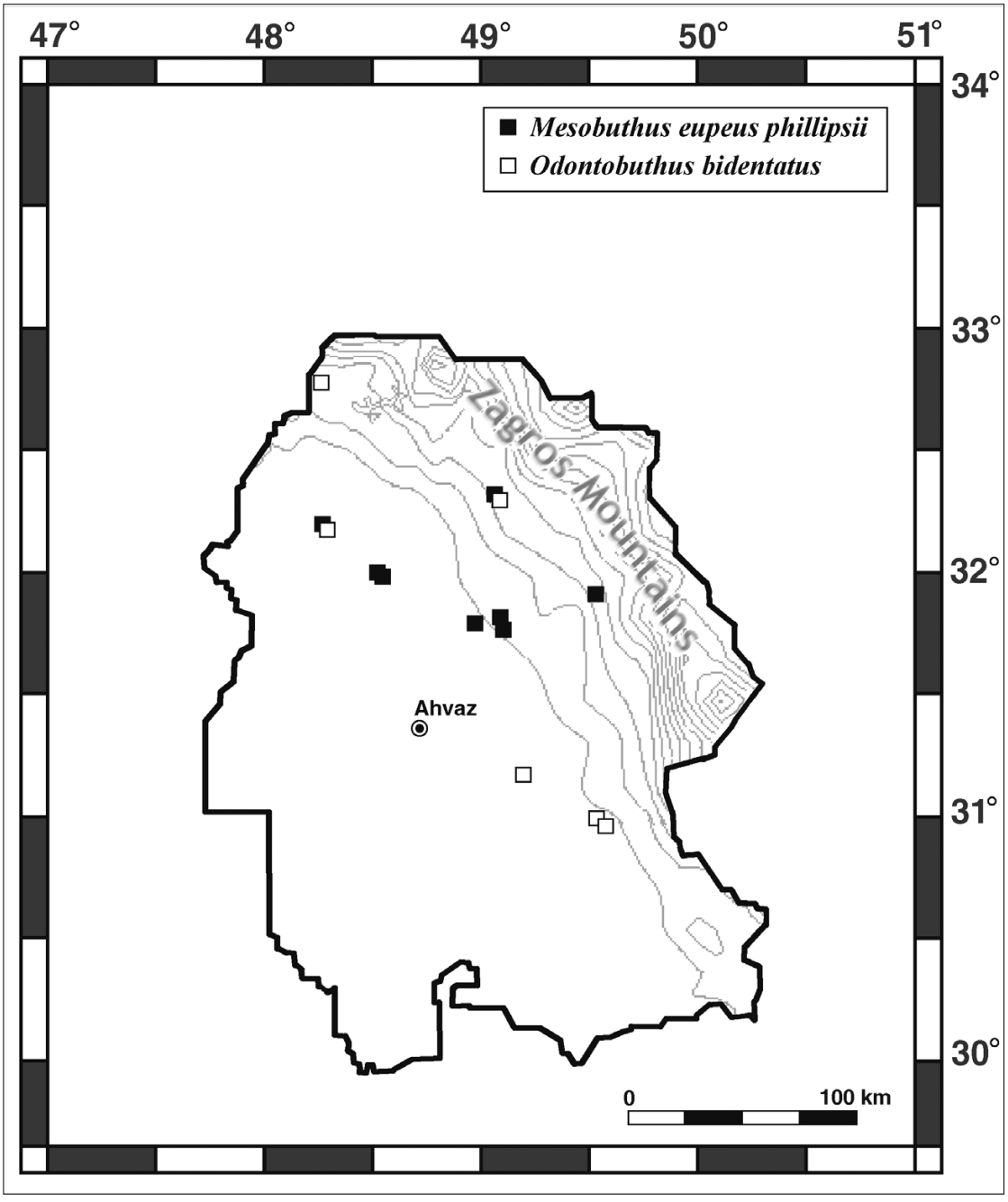


Figure 22: Map of Khoozestan province showing distribution of *Mesobuthus eupeus phillipsii* and *Odontobuthus bidentatus* collected in this study.

Orthochirus sp. n.?: Kovařík, 1997a: 47 (in part).

Orthochirus iranus Kovařík, 2004: 13; Kovařík & Fet, 2006: 8.

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, Bushehr Province, cca 17km NW. Bandar-e Gonárer, 10 m, 29°38'32"N 50°26'56"E; FKCP.

TYPE MATERIAL EXAMINED. **Iran**, Bushehr Province, cca 17km NW Bandar-e Gonarer (correct: Bandar-e-Gonaveh), 10 m, 29°38'32"N 50°26'56"E, 3♂2♀ (holotype and paratypes), 13–14.X.1998, leg. P. Kabátek; Chahak 15 km NW Bandar-e-Gonaveh by road, 29°40'N, 50°25'E, 20 m a.s.l., 3–5.V.1996 (loc No. 19 in Frynta et al., 1997: 4), 1♀ (allotype), leg. D. Král,

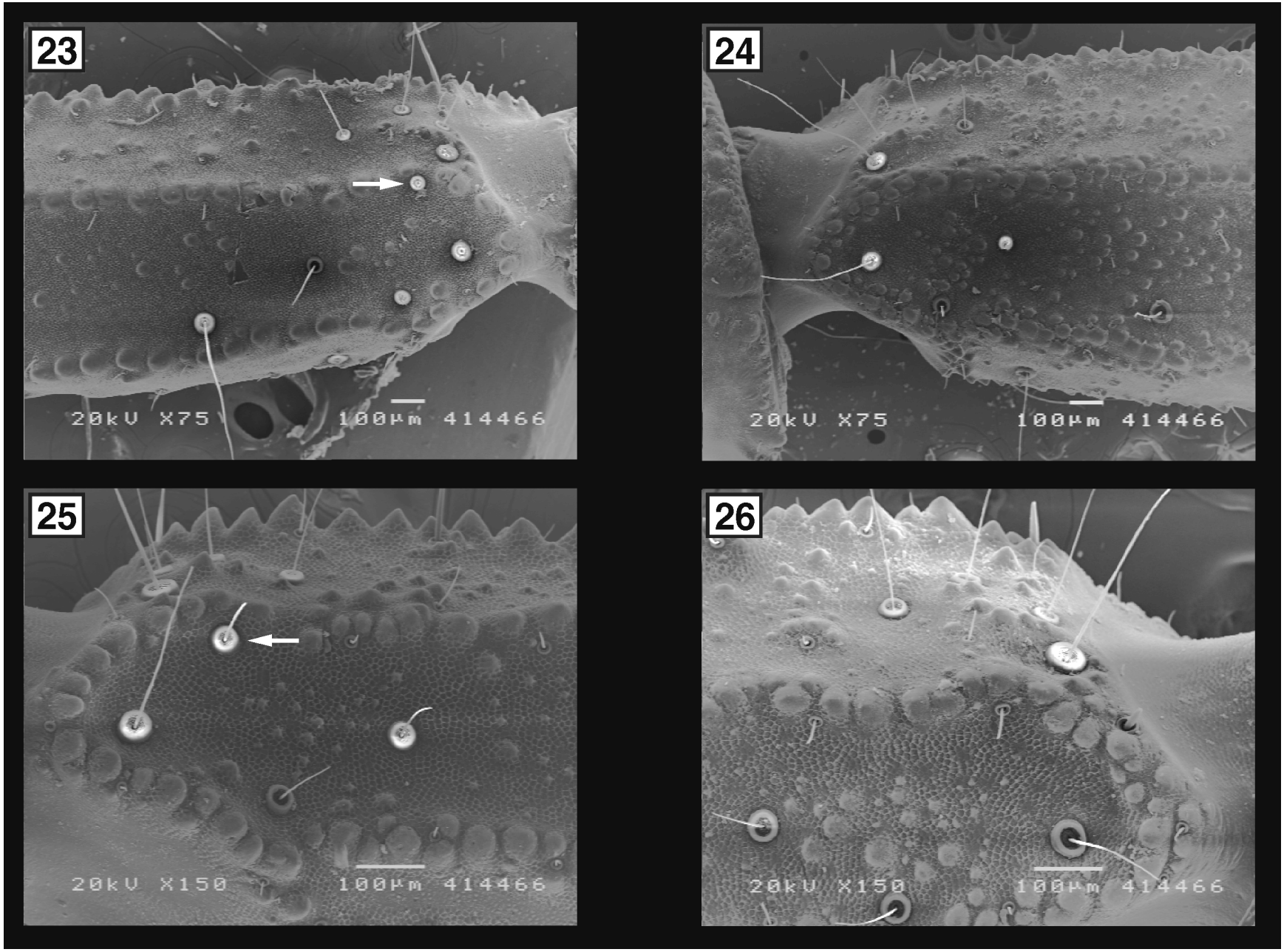
1♂1♀ (paratypes), leg. M. Kaftan; Khoozestan Province, Chogha Zanbil (zikkurat), 32°00'N, 48°31'E, 100 m a.s.l., 5–6.V.1996 (loc No. 20 in Frynta et al., 1997: 4), 1im.♂ (paratype), leg. M. Kaftan. All types are in FKCP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek district, Karbalai Ghasem village, 31°27'24"N 49°57'37"E (Locality No. H-201), XII.2006, 1♂ FKCP, leg. Kazemi & Habibzadeh; Ahvaz-Omidiyeh road (40 km to Omidiyeh), 30°37'49"N 49°31'47"E (Locality No. OM-80), V. 2007, 1♂ RRLS, leg. Masihipour & Bahrani; Chogha Zanbil (Locality No. CH-95), 1♂ FKCP, 2007, leg. Masihipour, Hayader & Bahrani; Shadegan district, Toopjieh village, 30°39'33"N 48°36'44"E (Locality No. SH-75), 2006, 1♀ FKCP, leg. Hayader & Jahanifard; Shadegan district, Toopjieh village, 30°39'33"N 48°36'44"E, 33 m a.s.l. (Locality No. 700), 2006, 2♀ FKCP, leg. Hayader & Jahanifard, (Locality No. SH-1 to 4), IV.2007, 11♂9♀7ims. RRLS, 15♂7♀6ims.1juv. FKCP, leg. Navidpour & Jahanifard; Baghmalek district, Karbalai Ghasem village, 31°27'24"N 49°57'37"E (Locality No. B7), IV.2007, 1♀1im. RRLS, leg. Salari; Omidiyeh, 30°57'49"N 49°31'47"E, 21 m a.s.l. (Locality No. A-OM-1), V.2007, 1♂ FKCP, leg. Navidpour & Jahanifard; near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 53 m a.s.l. (Locality No. A-Ma 806-2), VIII.2007, 10♂4♀ RRLS, leg. Navidpour & Masihipour; near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 54 m a.s.l. (Locality No. A-ma 809), VIII.2007, 6♂3juvs. RRLS, 4♂2♀ FKCP, leg. Navidpour & Masihipour; Shushtar (Locality No. SHO-014), VIII.2007, 2♂1im. FKCP, leg. Hayder; Hamidiyeh, 31°27'57"N 48° 29'18"E, 13 m a.s.l. (Locality No. A-Ham-812), IX.2007, 5♂1♀13juvs RRLS, 4♂1♀ FKCP, leg. Masihipour & Navidpour; Ahvaz–Masjedsoleyman road, 31°49'34"N 49°05'00"E, 53 m a.s.l. (Locality No. A-Ma-816-2), X.2007, 1♂1♀ RRLS, leg. Masihipour & Hayader.

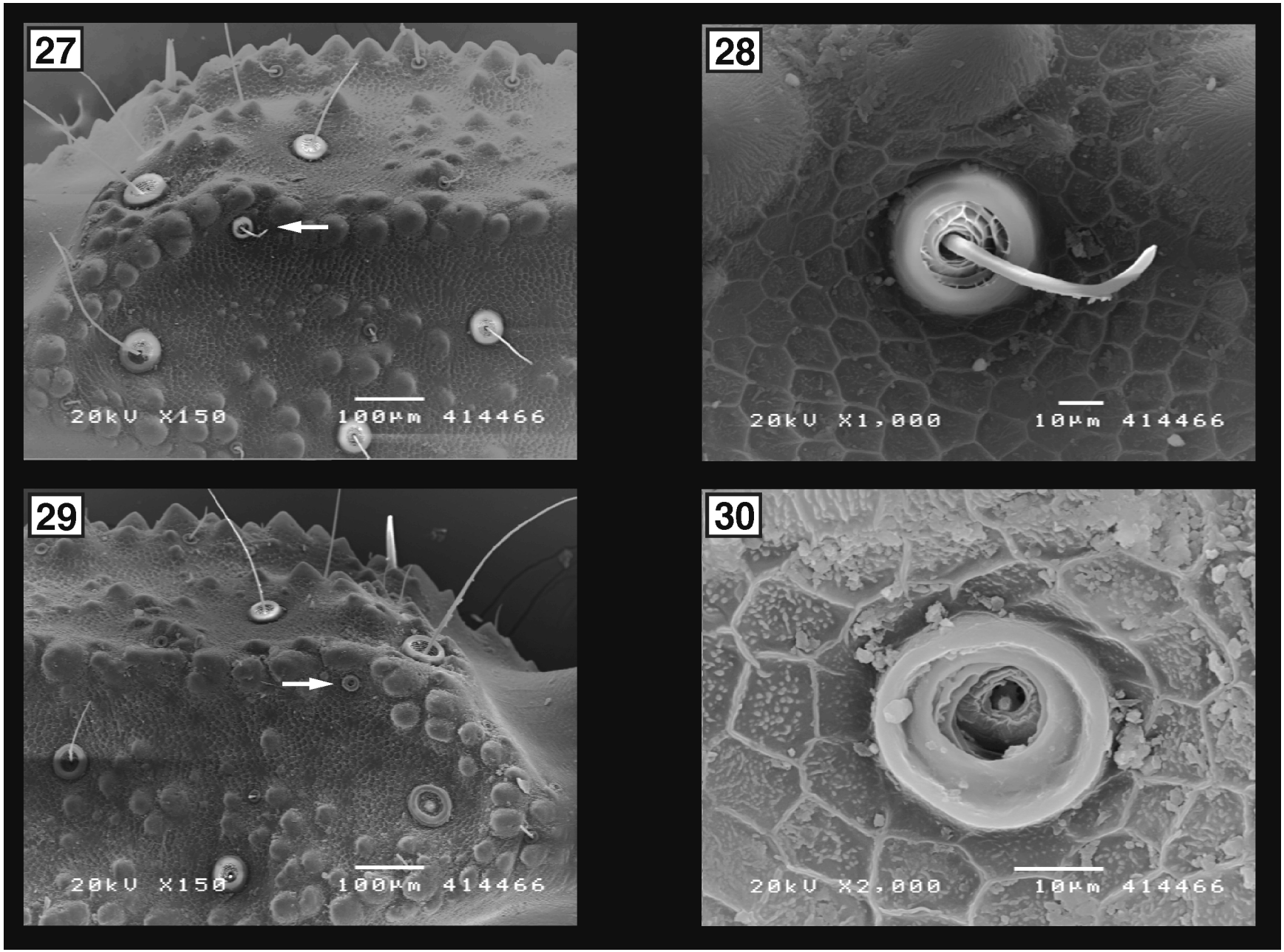
COMMENTS: All examined specimens of *Orthochirus iranus* from Bushehr Province (types) lack trichobothrium d_2 on the dorsal surface of pedipalp femur. Some specimens from Khoozestan Province have this trichobothrium fully developed, some have it reduced and some lack it, although they are morphologically and colorwise identical and have been collected during the same day in the same place. One male examined even has the trichobothium on the right femur of pedipalp fully developed and on the left side reduced. All examined specimens found northward in Lorestan and Hamadan Provinces possess trichobothrium d_2. It is a situation that appears to warrant further study. It is clear now, however, that the presence or absence of trichobothrium d_2 on the femur of the pedipalp is not a generic and perhaps not even a specific character. This is because at one locality we have several specimens of *Orthochirus iranus* that differ only in having or lacking the d_2 trichobothrium. Since the presence or absence of trichobothrium d_2 on the femur of pedipalp is the only character separating *Orthochirus* Karsch from *Paraorthochirus* Lourenço et Vachon (Lourenço & Vachon, 1995, 1997; Kovařík, 2004), it follows that these two genera are synonyms, i.e. *Paraorthochirus* Lourenço et Vachon, 1997, **syn. n.** = *Orthochirus* Karsch, 1892.

DISCUSSION: The Type A (Buthidae) trichobothrium d_2 on the pedipalp femur is characterized as "petite" (Vachon 1974; Soleglad & Fet 2001, 2003), i.e. of a reduced size (of both areola and shaft). Soleglad & Fet (2001) introduced "petite" as a cladistic character for scorpion trichobothria, whereby in addition to a fully developed trichobothrium or its absence the "petite" condition as an intermediate state, when a trichobothrium is being lost or gained in the evolutionary process. As they wrote (Soleglad & Fet, 2001: 37), "Petite trichobothria are identified by their relatively smaller size than the other full-sized trichobothria found on the scorpion. This size differential can be quantified as a difference in the diameter of the trichobothrium follicle, typically exhibiting a reduction in diameter anywhere from 10 to 45% of a normal trichobothrium." Soleglad & Fet (2001: Table A-1) noted that Buthidae "have the most reduced petite trichobothria", but they did not quantify the reduction of d_2 on the femur. They considered a petite d_2 on the femur an ancestral (plesiomorphic) character state for the Buthidae. However, from the available literature it is not clear to what extent d_2 is reduced in various taxa. Some authors note it and clearly depict it in drawings: areola is usually depicted as a circle about two times smaller than in other trichobothria, and if the shaft is drawn (which is not always done), it is also depicted as very short. Probably the earliest clear drawing of this petite d_2 on the femur can be found in Vachon (1940: fig. 10) for *Buthus* (now *Compsobuthus*) *acutecarinatus*; see also Vachon (1952, 1979). Other authors comment on this reduction only in describing some taxa: e.g. Lourenço (1998: 243) specifically noted it as "very small" for *Apistobuthus*.

Complete absence (loss) of d_2 on the femur is a derived (synapomorphic) character rarely encountered in the Buthidae. It could have been lost several times independently, and is considered diagnostic for a number of buthid genera: *Alayotityus, Baloorthochirus*, *Lissothus*, *Microbuthus*, *Microtityus, Orthochiroides*, *Orthochirus*, *Razianus* (= *Neohemibuthus*), and *Zabius* (Vachon, 1973, 1974, 1977; Sissom, 1990; Lourenço 1996, 2002; Kovařík, 2004). Also, in *Orthochirus*, presence of d_2 was reported in some populations (Levy & Amitai 1980: 95, 99, for *O. "scrobiculosus" negebensis*). There are also reports of d_2 size variation (degree of reduction). Lourenço (Lourenço & Vachon, 1995: 301–305) considered "normal vs. reduced size" of



Figures 23–26: *Orthochirus* pedipalp femur, dorsointernal view, showing development of trichobothrium d_2 (indicated by white arrow). **23.** *Orthochirus glabrifrons* (Kraepelin, 1903), **comb. n.** (Oman), d_2 present on left femur. **24.** *O. iranus* Kovařík, 2004, d_2 is missing on right femur. **25.** *O. iranus* Kovařík, 2004, petite d_2 present on right femur. **26.** *O. iranus* Kovařík, 2004, d_2 is missing on left femur, replaced by small seta.



Figures 27–30: *Orthochirus iranus* Kovařík, 2004, pedipalp femur, dorsointernal view, showing development of trichobothrium d_2 (indicated by white arrow). **27-28.** Right femur showing *reduced* sized *d2*. **29-30.** Left femur showing showing *aberrant d2*.

this trichobothrium as a character separating *Paraorthochirus glabrifrons* from *P. goyffoni*. It is thus not clear whether d_2 is always present as petite or may be sometimes reduced further and become vestigial. No detailed study of its size variability has been done.

We analyzed under SEM four specimens of *O. iranus* [all from Iran, Khoozestan province, Shadegan-Toopjieh village, 30°39'33"N 48°36'44"E (Locality No. SH-1 to 4)]. For comparison, we also imaged *Paraorthochirus glabrifrons* from Oman that has d_2 (left femur; Fig. 23). Of four observed specimens of *O. iranus* one (SH.1.4) lacks d_2 on both femora (Figs. 24–26); in the other three specimens the presence of d_2 varies. The second specimen (SH.1.1) has a petite d_2 on both femora (imaged on right femur, Figs. 27–28); the third specimen (SH.1.2) is asymmetric, with a petite d_2 only on the right side (not imaged), whereas the left femur (Fig. 26) has *no* d_2 (however, there is a seta in place of d_2, and under low magnification it could be mistaken for a reduced trichobothrium). The fourth specimen (SH.1.3) has a petite d_2 on both femora; the right femur (Fig. 28) has a normally developed petite d_2, whereas on the left femur the d_2 is aberrant (Figs. 29–30); it has an aberrant areola with the lattice structure incompletely developed, and the shaft is absent (underdeveloped or broken). This teratology could be an additional indication of developmental instability of d_2 in this population.

Specimen	Diameter d_2 (µm)	Diameter d_1 (µm)	Ratio d_2/d_1
SH.1.1	36	46	0.78
SH.1.3	30	57	0.52

Table 2: Petite trichobothrium d_2 in *Orthochirus iranus* (pedipalp femur).

We measured areola diameter of petite d_2 and regular-size d_1 in two specimens using SEM images at 1000x (Table 2). Even this small sample shows that there is variability in absolute size both among petites and other trichobothria, as well as in their relative size. Observed reduction of 22 to 48% falls roughly within limits defined by Soleglad & Fet (2001). It is advisable to conduct a detailed statistical study of trichobothrial size variability to define gaps between "petite" and regular-size trichobothria.

ADDITIONAL MATERIAL FROM IRAN (all possess trichobothrium d_2). **Iran**, Hamadan Province, ca 2000 m a.s.l., 35 km SE of Hamadan, Gonbad vill. env., 7–8.V.1996, 1♂1♀1juv., leg. V. Šejna; Lorestan Province, Dorúd, 1700 m, 33°26'57"N 49°01'14"E, 2♂2♀, 8–10.X.1998, leg. P. Kabátek; Lorestan Province, Jeiugir env., 500 m a.s.l., 32°19'37"N 48°30'40"E, 1♂1♀, 10–11.X.1998, leg. P. Kabátek; Deh Bahri, 7–8.IV.2000, 29°05'370"N 57°55'539"E, 1957 m a.sl., 1♀, leg. M. Kaftan. All specimens are in FKCP.

DISTRIBUTION: Iran, Bushehr and Khoozestan Provinces (Kovařík, 2004: 13), Lorestan and Hamadan provinces (first report).

Orthochirus stockwelli (Lourenço et Vachon, 1995), **comb. n.**
Figures 2, 31, 101–102

Paraorthochirus stockwelli Lourenço & Vachon, 1995: 299; Lourenço & Vachon, 1997: 329; Kovařík, 1997a: 50; Kovařík, 1998: 117; Fet & Lowe, 2000: 212; ? Kovařík & Fet, 2006: 9.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Hormozgan Province, Bandar-Abbas; MNHN.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 527 m a.s.l. (Locality No. D-103), VI.2007, 1♂ FKCP, leg. Navidpour, Masihipour & Hayader.

DISTRIBUTION: Iran, Hormozgan Province (Lourenço & Vachon, 1995: 299), Khoozestan Province (first report).

Orthochirus zagrosensis Kovařík, 2004
Figures 31, 93–96

Orthochirus sp. n. ?: Kovařík, 1997a: 47 (in part).
Orthochirus zagrosensis Kovařík, 2004: 22; Kovařík & Fet, 2006: 8.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Dasht-e-Arzhan, 29°34.644'N 51°56.889'E, 2000 m a.s.l.; FKCP.

COMMENTS: The original description (Kovařík, 2004: 22) gave the type locality as Iran, Khoozestan Province, Dasht-e-Arzhan, 29°34.644'N 51°56.889'E, 2000 m a.s.l. In actuality Dasht-e-Arzhan is in the Fars Province. So far, this species has not been found in Khoozestan; it is known from Kohkiloyeh & Boyer Ahmad, Esfahan, Fars, Kerman, and Yazd Provinces (Kovařík, 2004: 22; Kovařík & Fet, 2006: 8).

Razianus zarudnyi (Birula, 1903)
Figures 42, 89–92

Hemibuthus zarudnyi Birula, 1903: 75; Roewer, 1943: 216; Vachon, 1966: 211.
Razianus zarudnyi: Farzanpay, 1987: 159; Farzanpay, 1988: 41; Fet & Lowe, 2000: 216; Akbari, 2007: 76.

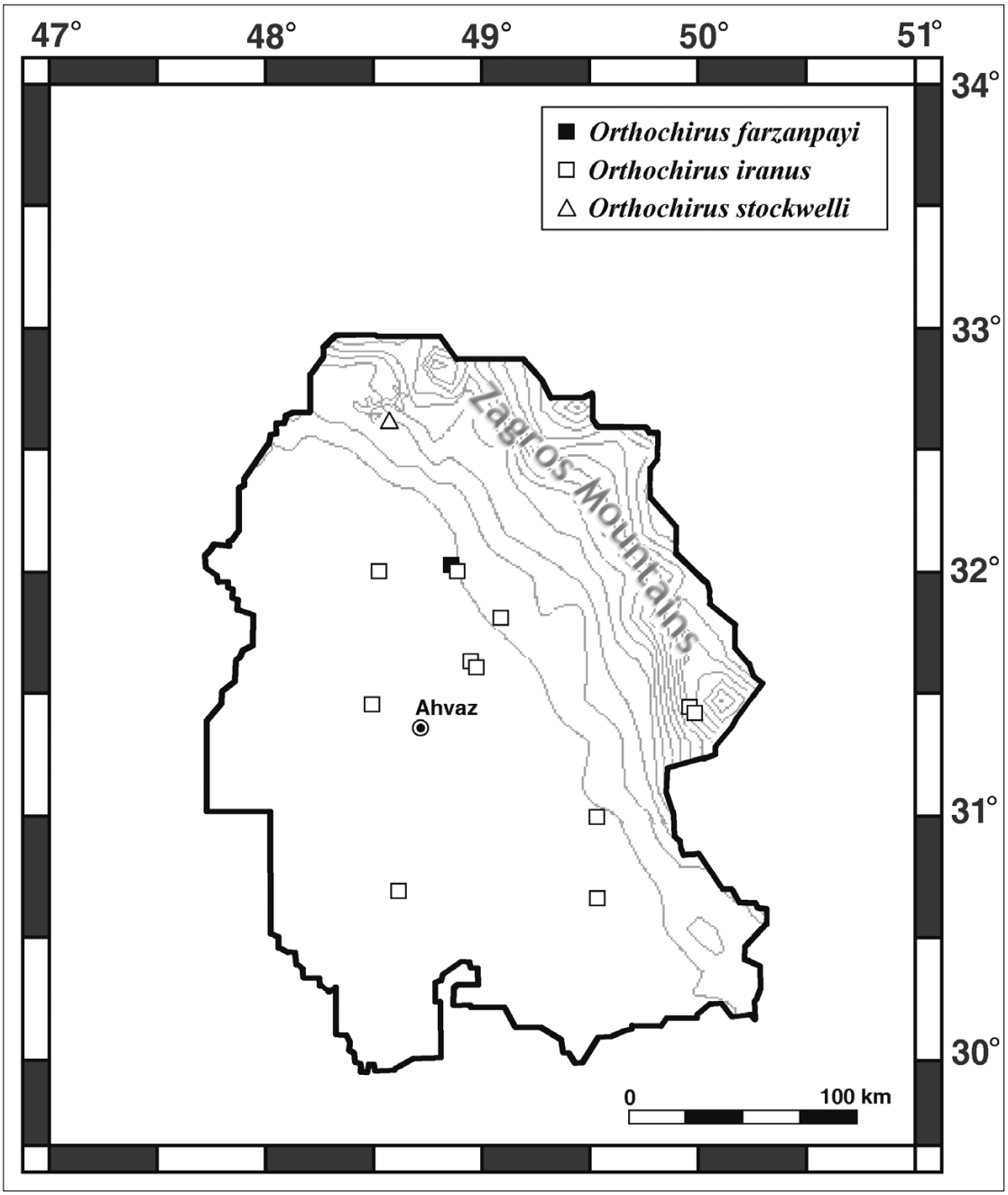


Figure 31: Map of Khoozestan province showing distribution of *Orthochirus farzanpayi, O. iranus* and *O. stockwelli* collected in this study.

= *Buthus zarudnianus* Birula, 1905a: 144; Birula, 1905b: 450; Kraepelin, 1913: 127; Vachon, 1966: 211; Habibi, 1971: 43 (syn. by Fet, 1997: 66).

= *Neohemibuthus kinzelbachi* Lourenço, 1996: 94; Kovařík, 1997a: 49 (syn. by Fet, 1997: 66).

Neohemibuthus zarudnyi: Fet, 1997: 65; Kovařík, 1998: 115.

TYPE LOCALITY AND TYPE REPOSITORY. "Persia, Kalagan Prov., Beludjistan, and Geh Prov., Makran", now Sistan & Baluchistan Prov., Iran (Fet, 1997); ZISP.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek, 31°55'17"N 49°22'15"E, 185 m a.s.l. (Locality No. Ba-103), I.2007, 110♂25♀ RRLS, 14♀ FKCP, leg. Kazemi; Chogha Zanbil (zikkurat), 32°00'55"N 48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-101), VI.2007, 11♂4juvs RRLS, 3♂1♀ FKCP, leg. Navidpour & Masihipour; Andimeshk district, Bidrooyeh, Jahangiri village, 32°46'15"N 48°15'26"E, 504 m a.s.l. (Locality No. Bi 813-2), X.2007, 20 specimens RRLS, leg. Masihipour &

Hayader; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-3), X.2007, 2♂2♀ FKCP, leg. Masihipour & Hayader; Shushtar, 2007, 1♀ RRLS, leg. Hayader, Bahrani & Habibzadeh; Gotvand–Shushtar road, 2007, 6♂3♀ RRLS, leg. Masihipour, Hayader & Bahrani; Behbahan–Bibihakimeh road, 30°13'48"N 50°12'16"E, 128 m a.s.l., 2007, 3♂10♀ RRLS, leg. Masihipour, Bahrani & Habibzadeh; Ahvaz–Masjedsoleyman road, Hadam village, 2007, 1♂ RRLS, leg. Masihipour, Bahrani & Habibzadeh; Ahvaz–Masjedsoleyman road, Zoveyer village, 31°35'20"N 48°57'01"E, 345 m a.s.l., 2007, 4♂1♀ RRLS, leg. Navidpour, Masihipour, Habibzadeh & Bahrani; Ahvaz–Masjedsoleyman road, Mayah village, 31°46'31"N 49°06'01"E, 48 m a.s.l., 2007, 1♂3♀ RRLS, leg. Masihipour, Hayader; Fakeh, 32°19'33"N 49°07'52E", 99 m a.s.l., 2007, 1♀ RRLS, leg. Masihipour, Habibzadeh & Bahrani.

DISTRIBUTION: Iran: Bushehr Province (Akbari, 2007: 76), Chahar Machal & Bakhtiyari Province (Fet, 1997: 67); Fars Province (Fet, 1997: 68); Khoozestan Province (Lourenço, 1996: 94; Fet, 1997: 67-68); Sistan & Baluchistan Province (Fet, 1997: 66).

Vachoniolus iranus Navidpour, Kovařík, Soleglad et Fet, **sp. n.**

Figures 3, 32–38, 39–41, 42, 85–88; Table 1

TYPE LOCALITY AND TYPE REPOSITORY. **Iran**, Khoozestan Province, near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 53 m; RRLS.

TYPE MATERIAL. **Iran**, Khoozestan Province, near Masdjedsoleyman, 31°38'40"N 48°56'41"E, 53 m a.s.l. (Locality No. A-Ma 806-1), VIII.2007, 8♂25♀13juvs (holotype and paratypes), leg. Navidpour & Masihipour; Ahvaz–Masjedsoleyman road, 31°35'44"N 48°57'19"E, 35 m a.s.l. (Locality No. A-Ma-810), IX.2007, 12♂27♀7juvs (paratypes), leg. Navidpour & Masihipour. Holotype and most of paratypes are in RRLS, 2♂2♀ paratypes are in FKCP and one male paratype is in the collection of Graeme Lowe.

ETYMOLOGY. Named after the country of occurrence.

DIAGNOSIS: Dorsal trichobothria of femur arranged in beta-configuration with d_2 situated on dorsal surface. External surface of pedipalp patella with 8 (rarely 7 or 9) trichobothria, pedipalp femoral trichobothrium d_5 distal to e_2. Dentate margin of the movable finger of the pedipalp with distinct granules divided into 8 or 9 rows and 4 to 6 terminal granules. Cheliceral fixed finger with two ventral accessory denticles. Tergites I–VI of mesosoma each with one carina. Carapace granulated, without distinct carinae. Legs with distinct bristlecombs, third and fourth legs with tibial spurs in all examined specimens. Male pedipalp chela robust and inflated, densely granulated, completely devoid of carinae. Aculeus long. Pectines with fulcra. Stigmata large, slitlike. Total length 34 to 42.5 mm.

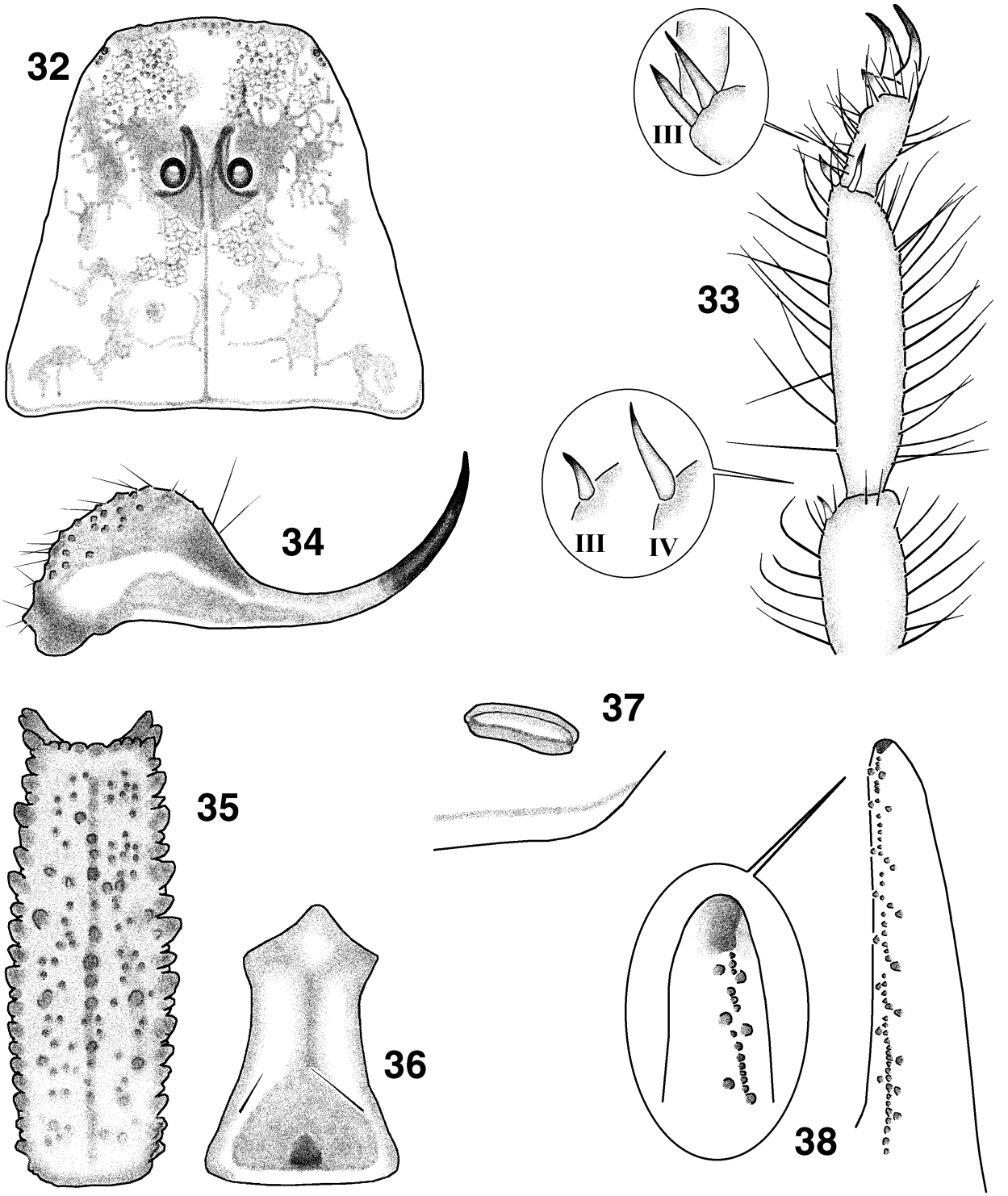
DESCRIPTION: The total length is 34 to 42.5 mm. The habitus is shown in Figs. 85–88. Measurements of the carapace, telson, segments of the metasoma and of the pedipalps, and numbers of pectinal teeth in the holotype are given in Table 1. For trichobothrial pattern see Figs. 39–41. External surface of pedipalp patella usually with 8 trichobothria (Fig. 41). One female has 7 trichobothria on the right patella (*et* is absent) but 8 trichobothria on the left, and one male has 9 trichobothria on both patellae (an additional smaller esb_a trichobothrium between *eb* and *esb*). Pedipalp femoral trichobothrium d_5 distal to e_2. Pectinal teeth number 20–22 in males and 14–15 in females. The male has pedipalp chela distinctly swollen. Female chela is narrower than in the male (Figs. 85–88).

COLORATION: The color is uniformly pale yellow to yellowish green. The median ocular tubercle black, the anterior part of carapace (Fig. 32) is gray to black, the distal fourth to fifth of the fourth metasomal segment, the fifth metasomal segment (Fig. 35) and the telson (Fig. 34) are yellowish green to black. Carinae carinae on femur and patella of pedipalps are gray (Figs. 40–41). The chelicerae are yellow, without reticulation.

MESOSOMA AND CARAPACE: The anterior margin of carapace (Fig. 32) is straight or very slightly convex. The entire carapace is densely granulated but devoid of carinae. Granules in front of the median ocular tubercle are bigger and rounded, elsewhere they are smaller and pointed.

The mesosoma is smooth to shagreened and has one carina on the dorsal surface. The sternum (Fig. 36), Type 1, is elongate with a deep concave area and anterior depression. The sternites are smooth, sternite VII bears four smooth or granulate carinae. Stigmata large, slitlike (Fig. 37).

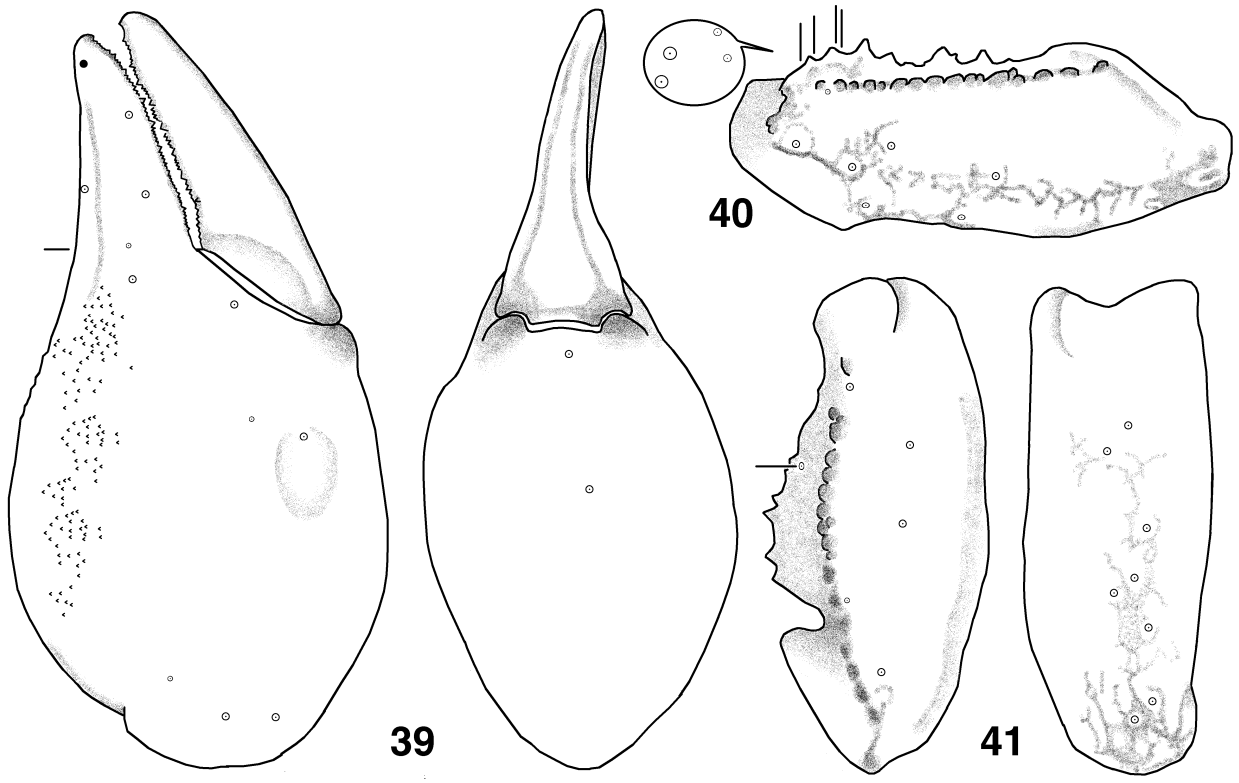
METASOMA AND TELSON: All metasomal segments are longer than wide. The first segment has a total of 10 carinae, the second through fourth segments have eight carinae, and the fifth segment has five carinae. Intermediate carinae of the second to fourth segments are replaced by less than 10 granules situated mainly in the posterior half. Ventral carinae are moderate to strong, coarsely serrate. The surface between the carinae is sparsely to densely granulated. The segments bear



Figures 32–38: *Vachoniolus iranus* **sp. n.**, male paratype. **32.** Carapace. **33.** Left leg III showing setal brush on basitarsus and tibia; enlarged circled areas show uneven lengthed pedal spurs of leg III and tibial spurs of leg III and IV. **34.** Telson, lateral view. **35.** Metasomal segment V, ventral view. **36.** Sternum. **37.** Fourth right stigma. **38.** Chelal movable finger dentition; enlarged circled area shows distal tip.

only a few bristles. The telson is elongate, with the vesicle shorter than the aculeus and the surface nearly smooth, with only a few large granules and setae. There is no subaculear tubercle.

PEDIPALPS: The femur has dorsal carinae strong and granulose, no ventroexternal carina, and the internal surface bears a few coarse granules; the surfaces are shagreened and sometimes bear a few randomly situated



Figures 39–41: *Vachoniolus iranus*, **sp. n.**, male paratype, showing trichobothrial pattern. **39.** Chela, external and ventral views. Closed circle on chelal fixed finger external view indicates trichobohtrium *i*. **40.** Femur, dorsal view. Circled area shows internal trichobothria from an internal perspective. **41.** Patella, dorsal and external views. In external view note neobothriotaxy, an accessory trichobothrium present in the *esb* series. Note, these figures are of the left pedipalp, the images have been *reversed* for easy comparison to other right pedipalp illustrations.

coarse granules. The patella has dorsal carinae moderate, granular, and ventrointernal carina strong, granulose. Other carinae are inconspicuous or absent. The male chela is robust, inflated and completely devoid of carinae. The fingers are quite short. The entire surface is finely granulated, especially the dorsum of chela (Fig. 39). The female chela is smooth and narrower than in the male (Figs. 85–88). The dentate margin of the pedipalp-chela movable finger bears distinct granules divided into 8 or 9 rows and 4 to 6 terminal granules (Fig. 38).

LEGS: Leg III basitarsus and tarsus with conspicuous setal brush (Fig. 33); pedal spurs unequal in length. Tibial spurs present, elongate on leg IV and reduced on leg III.

COMMENTS: All examined specimens have tibial spurs on the third and fourth legs, the spur of leg III more reduced than that of leg IV. Presumbly this may be as variable as in *Vachoniolus globimanus*, in which some specimens possess the spurs and others lack them.

AFFINITIES. The described features distinguish *Vachoniolus iranus* **sp. n.** from all other species known to occur in Khoozestan Province. The genus *Vachoniolus* Levy, Amitai et Shulov, 1973 has so far included only one species, *V. globimanus* Levy, Amitai et Shulov, 1973, which occurs in the United Arab Emirates, Saudi Arabia, and Oman. The new species thus represents the first record of this genus in Iran. The two species can be distinguished from one another by the males of *V. globimanus* having the chela of pedipalp smooth and carapace smooth to shagreened, whereas in the males of *V. iranus* **sp. n.** these parts are densely granulated. Other differences between *V. iranus* **sp. n.** and *V. globimanus* include the following (variation is to be expected in some). *V. iranus* **sp. n.** has strong fuscous patterns on carapace, internal and external surfaces of pedipalp femur and internal surface of pedipalp patella, whereas in the *V. globimanus* pigmentation is much weaker on carapace and absent on pedipalps. *V. iranus* **sp. n.** is smaller, total length is 34 to 42.5 mm (adult *V. globimanus* may reach 65 mm). *V. iranus* **sp. n.** has metasoma II and III dorsal carinae serrate, with larger denticles arrayed uniformly, closely spaced and mostly separated by one denticle width or less (in *V. globimanus* these carinae are denticulate, with smaller denticles, most separated by two denticle widths or

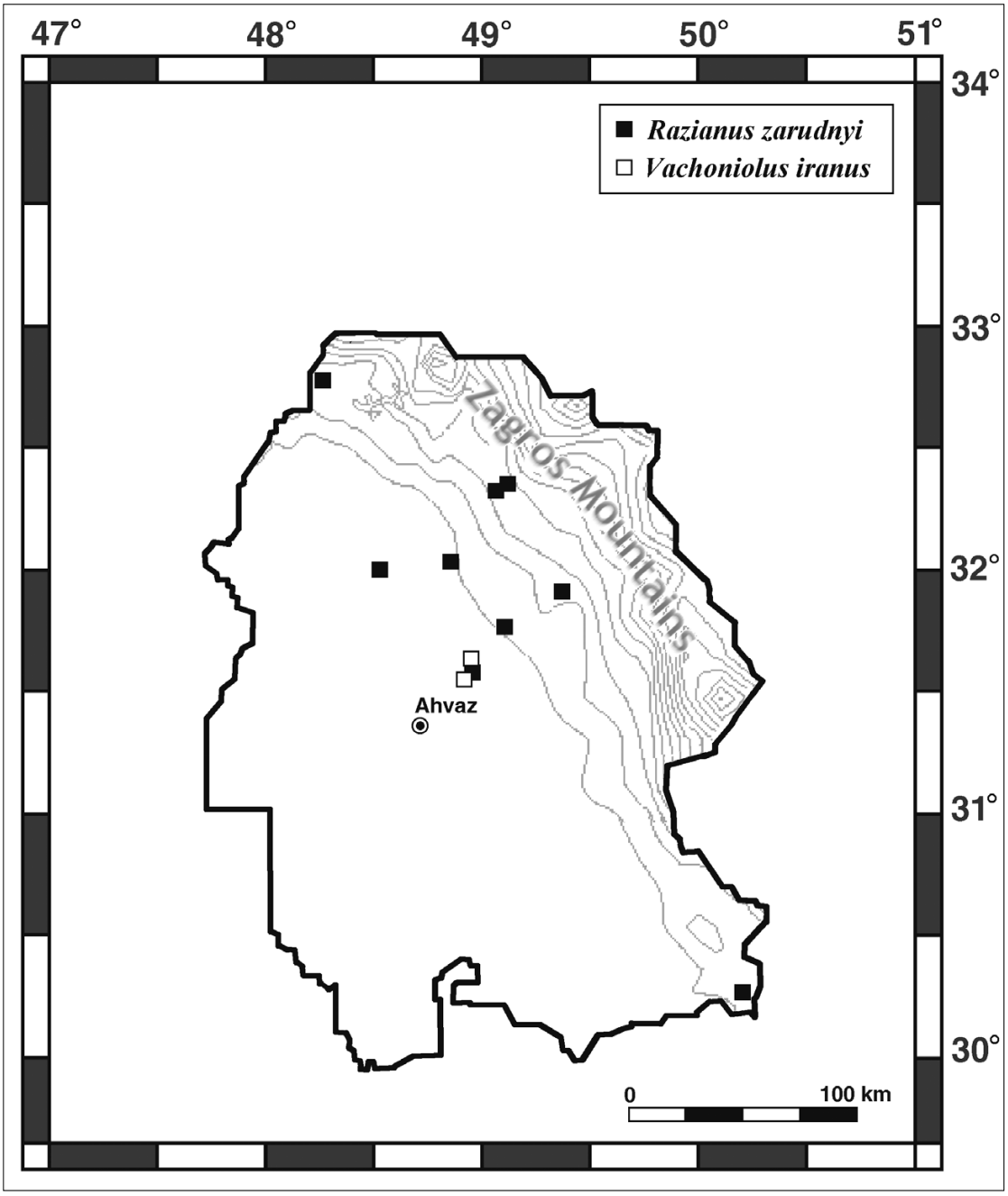


Figure 42: Map of Khoozestan province showing distribution of *Razianus zarudnyi* and *Vachoniolus iranus* collected in this study.

more). *V. iranus* **sp. n.** has fewer denticles on metasomal carinae, e.g. metasoma II and III ventral carinae with 6 denticles on posterior half of segment (*V. globimanus* with 7–13). *V. iranus* **sp. n.** has pedipalp patella with dorsointernal carina prominently developed, with robust granules or denticles (weaker with smaller granules or denticles in *V. globimanus*). *V. iranus* **sp. n.** has tergites III–VI lateral carina positions marked by paired posterolateral longitudinal rows of 2–3 distinct granules (only one weak granule, if any, in *V. globimanus*), and median carina bearing 1–3 granules (none in *V. globimanus*). *V. iranus* **sp. n.** has heavier granulation on anterior interocular area of carapace (*V. globimanus* with finer granulation). *V. iranus* **sp. n.** has posterior portions of tergites finely granular (smooth in *V. globimanus*). *V. iranus* **sp. n.** Has metasoma I and II with dorsolateral

surfaces granulated (smooth to finely shagreened in *V. globimanus*).

Family **Scorpionidae** Latreille, 1802

Scorpio maurus townsendi (Pocock, 1900)
Figures 2, 43, 103–106

Heterometrus townsendi Pocock, 1900: 364.

? *Scorpio townsendi*: Birula, 1905a: 147 (Birula, 1910: 184).

Scorpio maurus townsendi: Birula, 1910: 184; Birula, 1917: 231; Vachon, 1950: 164 (1952: 336); Vachon, 1966: 215; Habibi, 1971: 44; Pérez Minocci, 1974: 40; Kovařík, 1997a: 50; Kovařík, 1998: 141; Fet, 2000: 479; Akbari, 2007: 76.

Scorpio maurus: Farzanpay, 1987: 165; Farzanpay, 1988: 42.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Bushehr Province, Fort Reshire near Bushire, Persian Gulf, Iran; BMNH.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Ahvaz– Ramhormoz road, 31°11'54"N 49°11'41"E, 44 m a.s.l. (Locality No. 016-1), VIII.2007, 10♀1im. RRLS, 1♂1im. FKCP, leg. Navidpour & Masihipour; Ahvaz– Ramhormoz road, 31°11'54"N 49°11'41"E, 44 m a.s.l. (Locality No. A-Ra 807), VIII.2007, 4♀ RRLS, 1♂1♀ FKCP, leg. Masihipour & Hayader; Shushtar–Gotvand road (Locality No. 016-2), VII.2007, 12♂32♀3ims. RRLS, leg. Masihipour, Hayader & Bahrani; Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 527 m a.s.l. (Locality No. D-SH), VI.2007, 2♂12♀1im. RRLS, leg. Navidpour & Masihipour; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-4), X.2007, 8♀1im.1juv. RRLS, leg. Masihipour & Hayader; Shush (Apadana Palace), 32°10'55"N 48°15'39"E, 75 m a.s.l., X.2007, 3♂2♀6 juvs. RRLS, leg. Masihipour, Habibzadeh & Hayader; Sardasht (Dezful), 2006, 2♀3juvs. RRLS, leg. Navidpour.

DISTRIBUTION: Iran, Bushehr Province (Pocock, 1900: 364), Khoozestan Province (first report).

Family **Hemiscorpiidae** Pocock, 1893

Hemiscorpius lepturus Peters, 1862
Figures 20-21, 43, 107–110

Hemiscorpius lepturus Peters, 1862a: 426; Karsch, 1879: 15, 21; Birula, 1905a: 146; Birula, 1917: 215; Birula, 1918: 42; Weidner, 1959: 100; Pringle, 1960: 84; Khalaf, 1962: 2; Khalaf, 1963: 68; Vachon, 1966: 214; Habibi, 1971: 44; Farzanpay & Pretzmann, 1974: 217; Pérez Minocci, 1974: 36; Vachon, 1977: 213; Vachon, 1979: 59; Farzanpay, 1987: 141, 168; Farzanpay, 1988: 42; Simard & Watt, 1990: 441; Sissom, 1990: 75; El-Hennawy, 1992: 135; Kovařík, 1997a: 48; Kovařík, 1998: 136; Fet, 2000: 429; Prendini, 2000: 44; Capes & Fet, 2001: 303; Monod & Lourenço, 2005: 902; Akbari, 2007: 76.

Hemiscorpion lepturus: Peters, 1862b: 511; Ausserer, 1880: 466; Kraepelin, 1899: 142; Werner, 1934: 276; Moritz & Fischer, 1980: 317; Kovařík, 2002: 14.

Hemiscorpio lepturus: Simon, 1880b: 29.

TYPE LOCALITY AND TYPE REPOSITORY. Iraq, "Mendeli bei Baghdad" (Mendeli near Baghdad); ZMHB.

TYPE MATERIAL EXAMINED. Iraq, Mendeli bei Baghdad, 2♂2♀ (syntypes), leg. Petermann, ZMHB 43a–d.

KHOOZESTAN PROVINCE MATERIAL EXAMINED. **Iran**, Khoozestan Province, Baghmalek, 31°55'17"N 49°22'15"E, 185 m a.s.l. (Locality No. Ba-100), I.2007, 51♂39♀10♀ims. RRLS, leg. Kazemi; Baghmalek, 31°55'17"N 49°22'15"E, 185 m a.s.l. (Locality No. Ba-101), I.2007, 26ims. RRLS, 4♂ FKCP, leg. Kazemi; Chogha Zanbil (zikkurat), 32°00'55"N 48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-102), VI.2007, 1♂1♀ FKCP, leg. Navidpour & Masihipour; Behbahan–Bibihkimeh road, 30°13'48"N 50°12'16"E, 128 m a.s.l. (Locality No. B-Bi 805), VI.2007, 3 specimens, 3♂ RRLS, leg. Masihipour & Hayader; 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-1 and 5), X.2007, 263♂183♀111ims RRLS, 1♂3♀1juv. FKCP, leg. Masihipour & Hayader; Ahvaz-Masjedsoleyman road, Hadam village, X.2007, 8♂1♀ RRLS, leg. Navidpour, Masihipour, Bahrani & Habibzadeh; Ahvaz–Masjedsoleyman road, Mayah village, 31°46'31"N 49°00'36"E, 48.4 m a.s.l., 2007, 3♂5♀ RRLS, leg. Hayader, Habibzadeh & Masihipour.

DISTRIBUTION: Iran, Kohkiloyeh & Boyerahmad, Fars, Hormozgan, and Lorestan Provinces (Kovařík, 1997a: 48), Bushehr and Khoozestan Provinces (Farzanpay, 1987: 141, Monod & Lourenço, 2005: 902; Akbari, 2007: 76); Iraq (Peters, 1862a: 426).

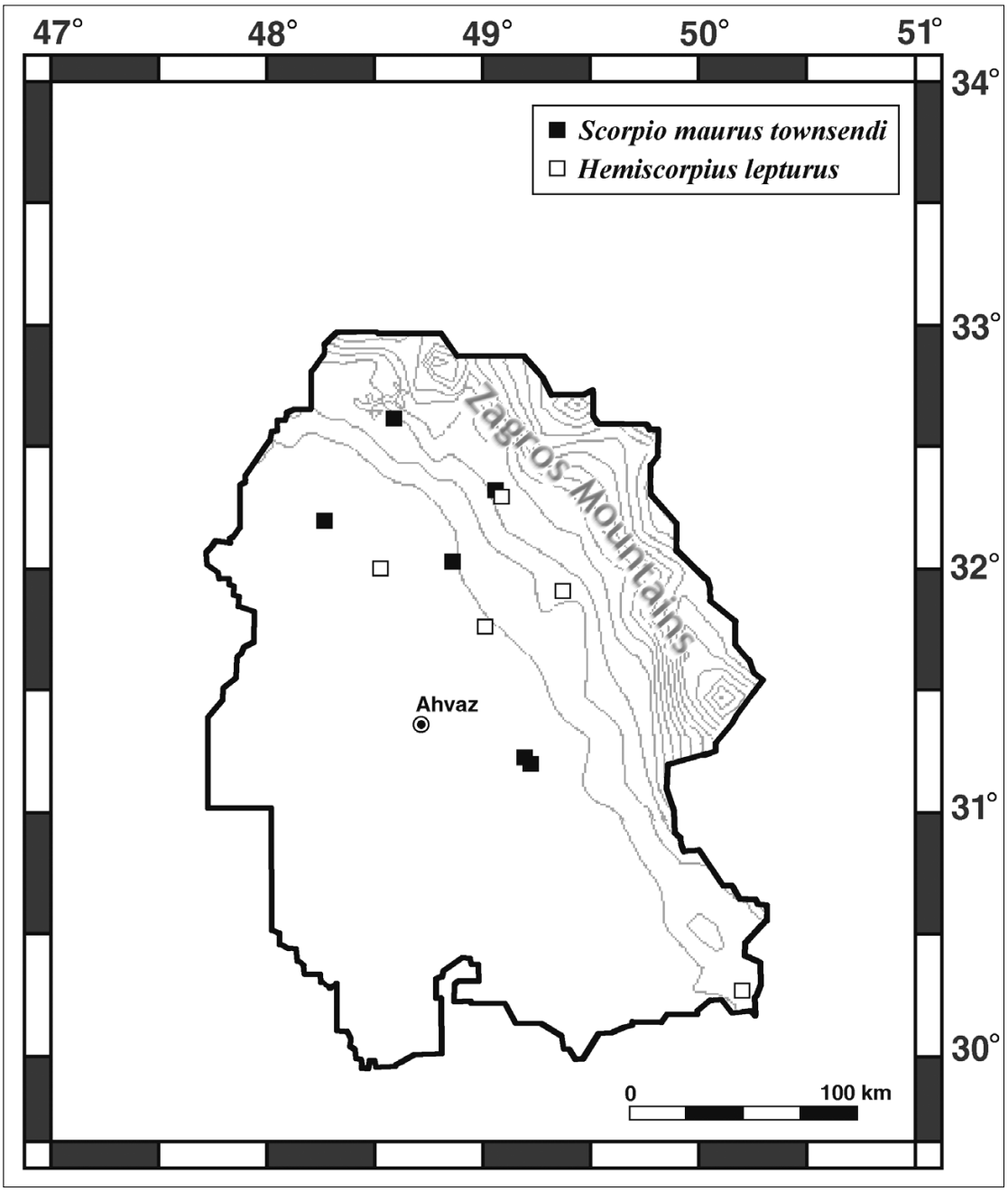


Figure 43: Map of Khoozestan province showing distribution of *Scorpio maurus townsendi* and *Hemiscorpius lepturus* collected in this study.

Key to scorpions of Khoozestan Province

1. Pedipalp patella without ventral trichobothria ....**Buthidae** 3
- Pedipalp patella with ventral trichobothria 2

2. Lateroapical margins of leg tarsi shaped into rounded lobes. ..... ***Scorpio maurus townsendi*** (Pocock, 1900)
- Lateroapical margins of leg tarsi straight. .... ***Hemiscorpius lepturus*** Peters, 1862

3. Carapace in lateral view distinctly inclined downward from median eyes to anterior margin. Total length less than 50 mm. ..... ***Orthochirus***..... 4
- Carapace in lateral view with entire dorsal surface horizontal or nearly so (possibly with a slight anterior deeline) 6

4. Metasoma densely hirsute. ..... ***Orthochirus stockwelli*** (Lourenço et Vachon, 1995)
- Entire metasoma glabrous (short, thin setae may issue from some punctae)..... 5

5. Dorsal surface of fifth metasomal segment mesially densely granulated..... ***Orthochirus iranus*** Kovařík, 2004
- Dorsal surface of fifth metasomal segment mesially smooth. ..... ***Orthochirus farzanpayi*** (Vachon & Farzanpay, 1987)

6. Cheliceral fixed finger with a single ventral denticle .....***Razianus zarudnyi*** (Birula, 1903)
- Cheliceral fixed finger with two ventral denticles 7

7. Second metasomal segment of adults widely flattened, much wider than other metasomal segments ....***Apistobuthus susanae*** Lourenço, 1998
- Second metasomal segment similar in width to other metasomal segments 8

8. Carapace granulated but without carinae 9
- Carapace with carinae 10

9. Patella of pedipalp with 8 (rarely 7 or 9) external trichobothria. ..... ***Vachoniolus iranus*** **sp. n.**
- Patella of pedipalp with 7 external trichobothria. ... . ***Buthacus macrocentrus*** (Ehrenberg, 1828)

10. Ventral carinae of second and third metasomal segments and ventral transverse carina of fourth segment armed with very strong denticles. ..... ***Odontobuthus bidentatus*** Lourenço et Pézier, 2002
- Ventral carinae of metasomal segments without very strong denticles..... 11

11. Dentate margin of pedipalp chela movable finger with 4 terminal granules (3 terminal and one basal terminal)..... ***Androctonus crassicauda*** (Olivier, 1807)
- Dentate margin of pedipalp chela movable finger with 5–7 terminal granules (4–6 terminal and one basal terminal)..... 12

12. Central lateral and posterior lateral carinae of carapace joined to form a continuous linear series of granules to posterior margin ..... ***Compsobuthus*** 13
- Central lateral and posterior lateral carinae of carapace not joined to form a continuous linear series of granules to posterior margin 15

13. Rows of granules on movable finger without internal granules (see fig. 2 in Lourenço & Vachon, 2001: 181) ..... ***C. garyi*** Lourenço & Vachon, 2001
- Rows of granules on movable finger with internal granules 14

14. Male has longer metasoma than female. Width of pedipalp manus the same in both sexes ..... ***C. matthiesseni*** (Birula, 1905)
- Length of metasoma the same in both sexes. Male has much wider and shorter pedipalp chela .... ***C. jakesi*** Kovařík, 2003

15. Trichobothrium *db* on patella of pedipalp located usually between *est* and *dt*. Trichobothrium *db* may be on level with trichobothrium *est* or rarely between *est* and *esb.* Carinae of carapace not forming a lyre-shaped configuration. Ventrolateral carinae on the fifth metasomal segment with all granules more or less equal in size. ..... ***Hottentotta*** 16
- Trichobothrium *db* on patella of pedipalp always located between *est* and *esb*. Carinae of carapace forming a lyre-shaped configuration. Ventrolateral carinae on the fifth metasomal segment with irregular sized granules. .....***Mesobuthus eupeus phillipsii*** (Pocock, 1889)

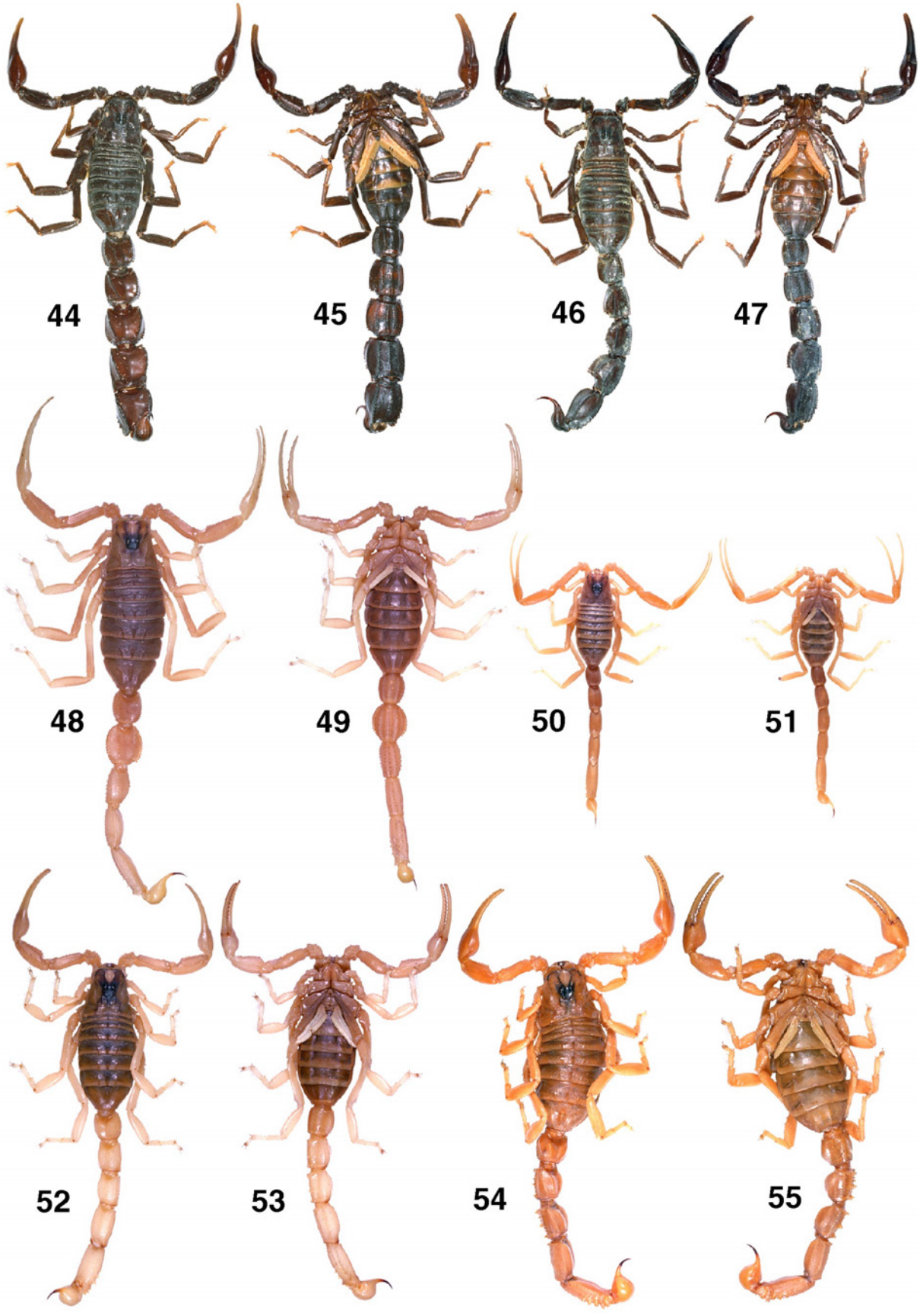
16. Color black except reddish brown chela of pedipalp. Legs may also be reddish-brown. - Color not entirely black, usually yellowish green ……..... 17

17. Chela of pedipalp always darker than femur of pedipalp …..... ***Hottentotta schach*** (Birula, 1905)
- Chela of pedipalp of same color as femur of pedipalp, not darker 18

18. Ventral surfaces of metasomal segments and vesicle densely hirsute …..... ***Hottentotta saulcyi*** (Simon, 1880)
- Metasoma glabrous or only very sparsely hirsute ….....…***Hottentotta khoozestanus*** **sp. n.**

Acknowledgments

We thank Graeme Lowe (USA) for his expertise help in assessing the taxonomic position of *Vachoniolus iranus* **sp. n.** and a gift of valuable specimens of *Orthochirus glabrifrons* from Oman. We are grateful to Dr. Taheri, Mrs. Jahanifard, Mr. Masihipour, Mr. Hadiyan, Mr. Hayader, Mr. Habibzadeh, and Mr. Bahrani (Iran) for their kind support. We thank David P. A. Neff (Marshall University, Huntington, West Virginia, USA) for his skilled SEM assistance that allowed us to clarify important issues with *Orthochirus* trichobothrial variation. We also thank two anonymous reviewers for their comments.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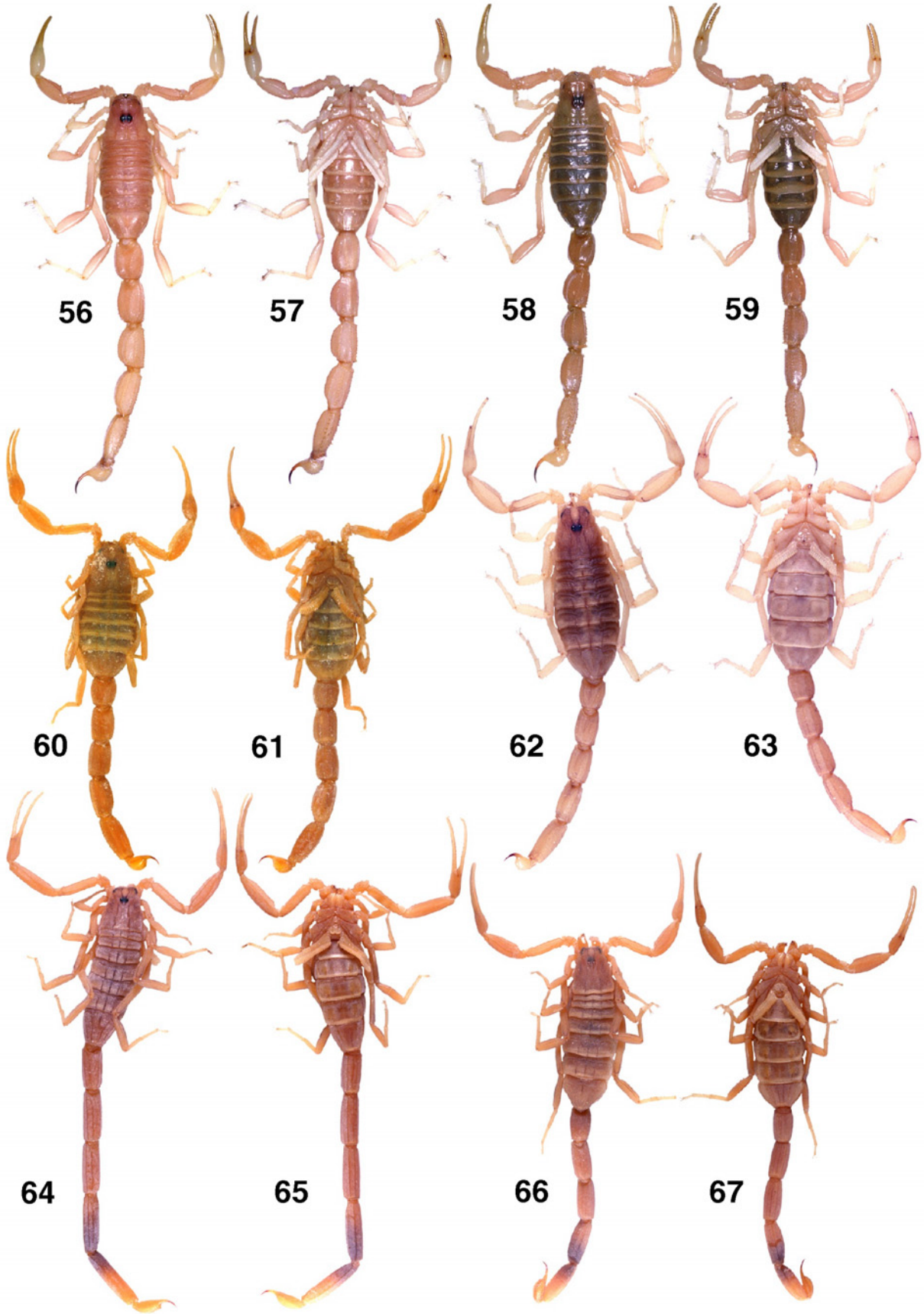
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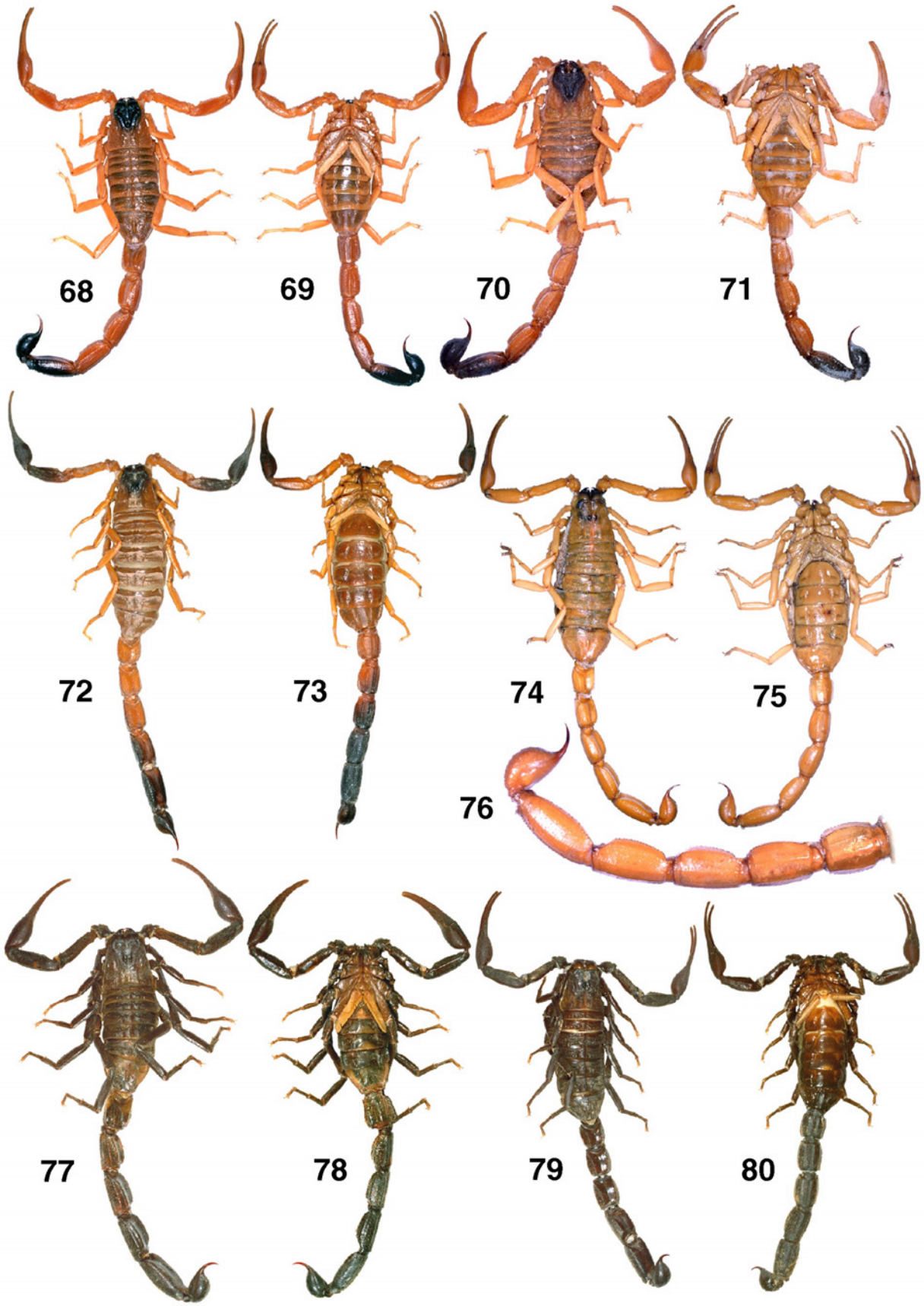
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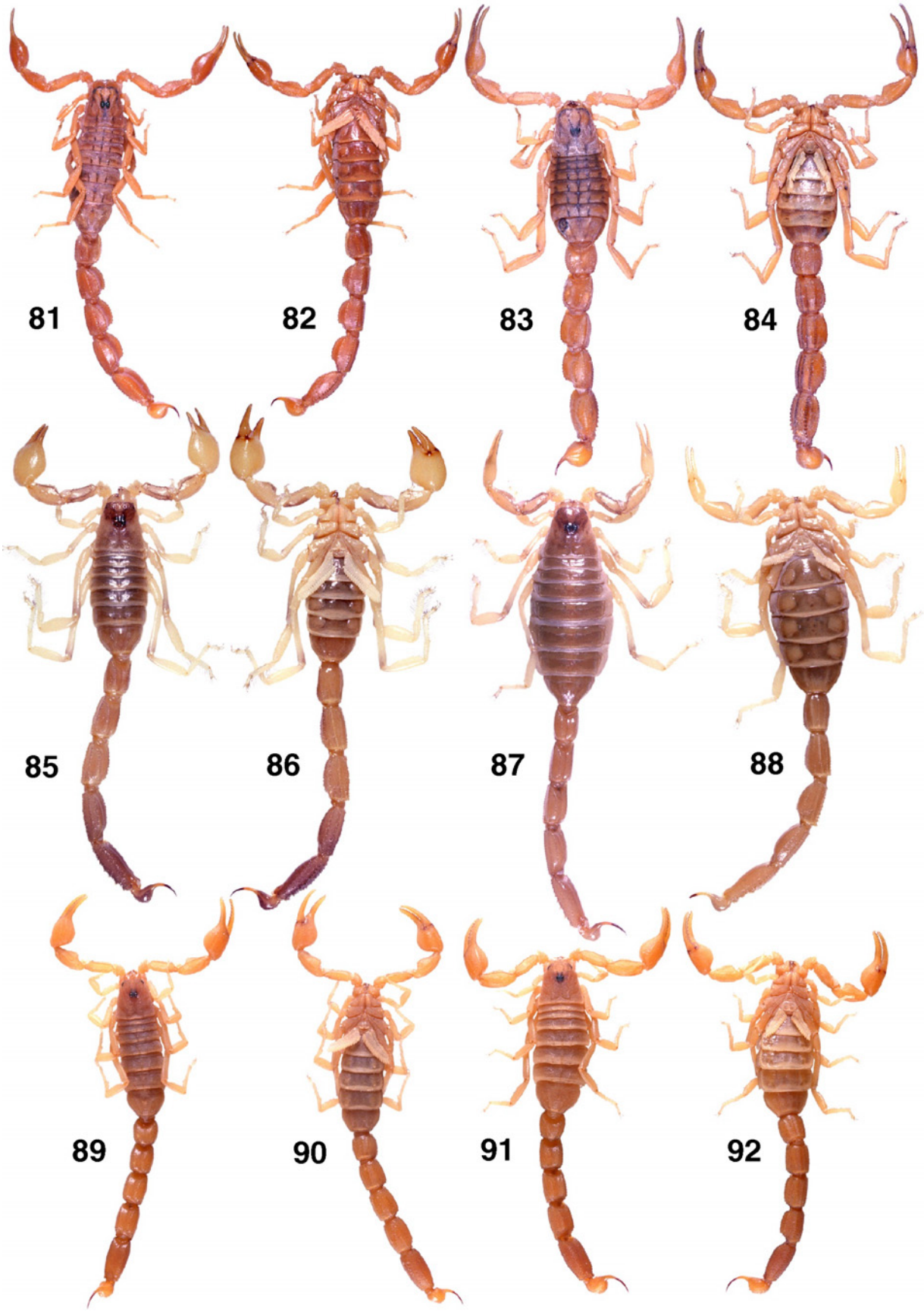
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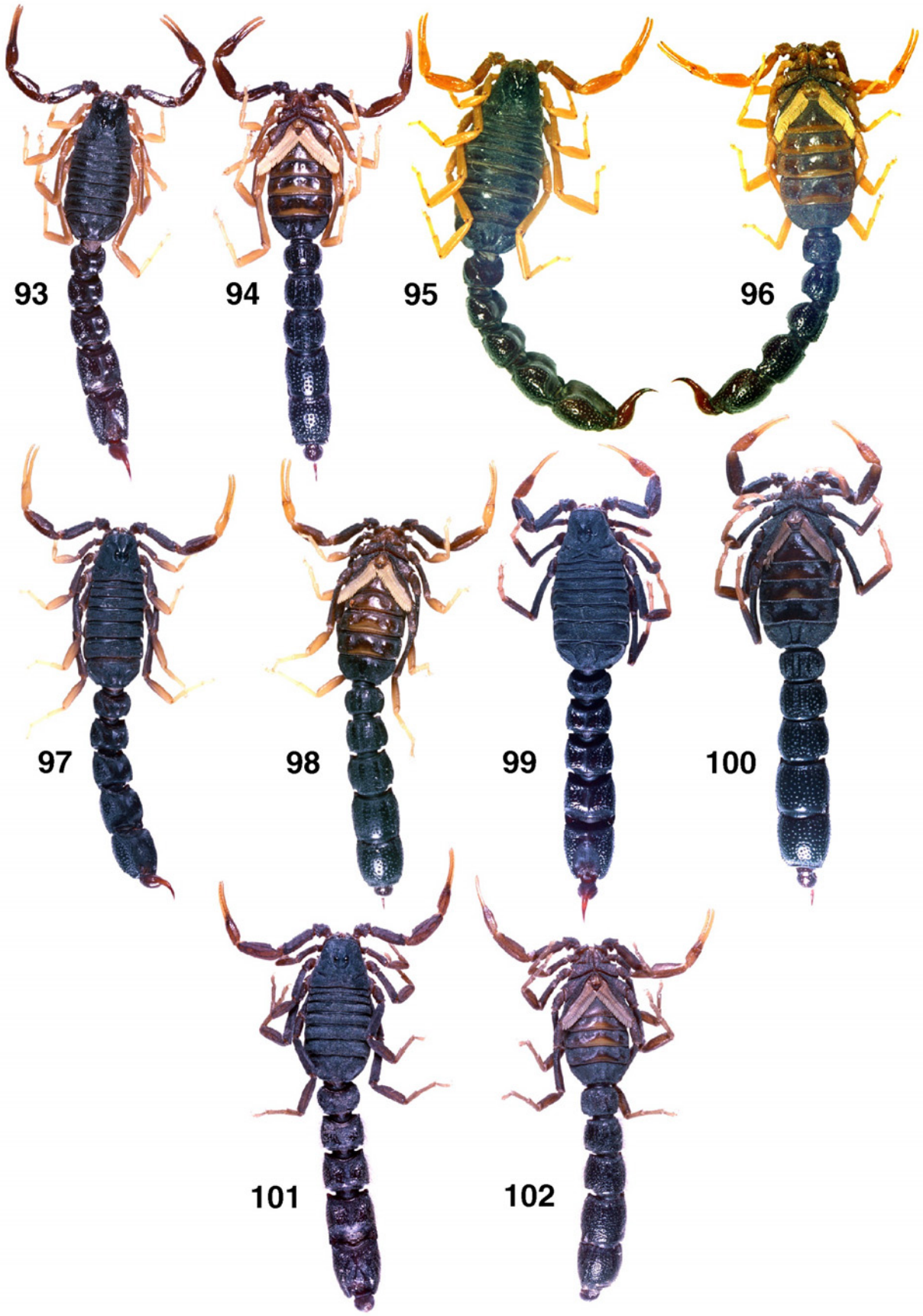
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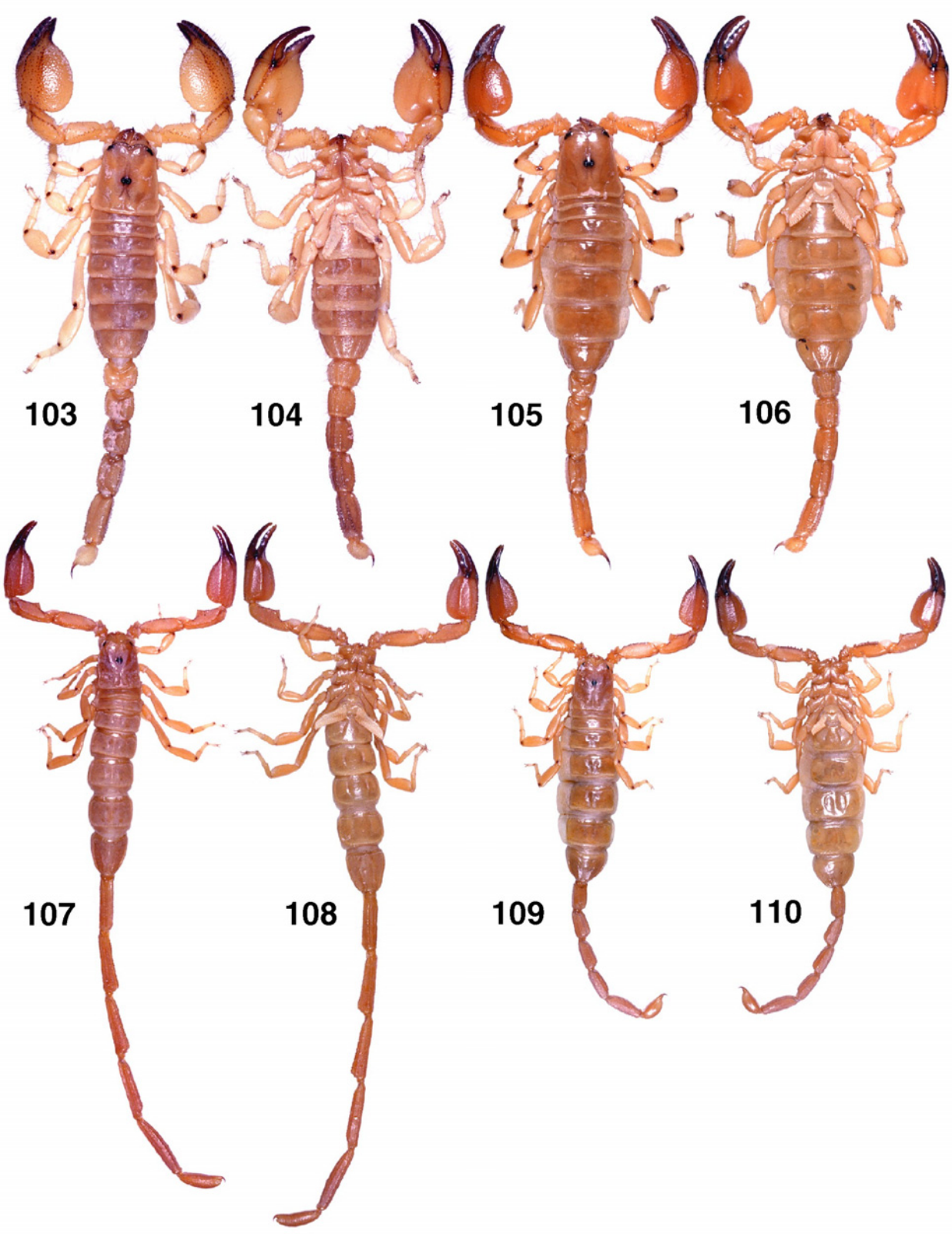
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← (p. 29) Figures 44–55: 44–45. *Androctonus crassicauda* (Olivier, 1807), dorsal and ventral views, ♂ (73 mm), Iran, Bushehr Province, Chahak district, 29°38'32"N 50°26'56"E, FKCP. **46–47.** *Androctonus crassicauda* (Olivier, 1807), dorsal and ventral views, ♀ (85 mm), Egypt, FKCP. **48–49.** *Apistobuthus susanae* Lourenço, 1998, dorsal and ventral views, ♀ (69 mm), Iran, Khoozestan Province, Hamidiyeh, 31°27'57"N 48°29'18"E, 13 m a.s.l. (Locality No. A-Ham-812-1), FKCP. **50–51.** *Apistobuthus susanae* Lourenço, 1998, dorsal and ventral views, juv. (27 mm), Iran, Khoozestan Province, Hamidiyeh, same locality as in Fig. 48–49, FKCP. **52–53.** *Odontobuthus bidentatus* Lourenço et Pézier, 2002, dorsal and ventral views, ♂ (63 mm), Iran, Khoozestan Province, 45 km NW of Masdjedsoleyman, Lali, 31°18'33"N 49°03'39"E, 329 m a.s.l. (Locality No. La-815-2), FKCP. **54–55.** *Odontobuthus bidentatus* Lourenço et Pézier, 2002, dorsal and ventral views, ♀ (70 mm), Iran, Bushehr Province, Chahak district, cca 17 km NW of Bandar-e Gonavev, 29°38'32"N 50°26'56"E, 10 m a.s.l., FKCP.

← (p. 30) Figures 56–67: 56–57. *Buthacus macrocentrus* (Ehrenberg, 1828), dorsal and ventral views, ♂ (69 mm), Iran, Khoozestan Province, Hamidiyeh, 31°27'57"N 48°29'18"E, 13 m a.s.l. (Locality No. A-Ham-812-2), FKCP. **58–59.** *Buthacus macrocentrus* (Ehrenberg, 1828), dorsal and ventral views, ♀ (58 mm), Iran, Khoozestan Province, Hamidiyeh, same locality as in Fig. 56–57, FKCP. **60–61.** *Compsobuthus jakesi* Kovařík, 2003, dorsal and ventral views, ♂ (28 mm) paratype, Iraq, Najaf Province, Ash-Shabakah (Shabachah, Shabicha), 262 m, 31°06'N 43°95'E, FKCP. **62–63.** *Compsobuthus jakesi* Kovařík, 2003, dorsal and ventral views, ♀ (27 mm), Iran, Khoozestan Province, FKCP. **64–65.** *Compsobuthus matthiesseni* (Birula, 1905), dorsal and ventral views, ♂ (38 mm), Iran, Lorestan Province, 10km SE Bavineh, 1100 m, 33°36'08"N 47°11'59"E, FKCP. **66–67.** *Compsobuthus matthiesseni* (Birula, 1905), dorsal and ventral views, ♀ (38 mm), Iran, Lorestan Province, same locality as in Fig. 64–65, FKCP.

← (p. 31) Figures 68–80: 68–69. *Hottentotta saulcyi* (Simon, 1880), dorsal and ventral views, ♂ (82 mm), Iran, Kermanshah Province (formerly Bachtaran), Hasrouabad, 34°10'09"N 46°21'56"E, 1300 m a.s.l., FKCP. **70–71.** *Hottentotta saulcyi* (Simon, 1880), dorsal and ventral views, ♀ (94 mm), Iran, Ilam Province, 30 km NW Ilam, 33°43'N 46°41'E, FKCP. **72-73.** *Hottentotta schach* (Birula, 1905), dorsal and ventral views, ♀ (112 mm), Iran, Fars Province, 10 km E of Sivand village, ca 1700 m a.s.l., FKCP. **74–75.** *Hottentotta khoozestanus* sp. n., dorsal and ventral views, ♀ (119 mm) holotype, Iran, Southeast part of Khoozestan Province, Behbahan–Dailam road, 31°55'N 49°44'E, RRLS. **76.** *Hottentotta khoozestanus* sp. n., ♀ (119 mm) holotype metasoma. **77–78.** *Hottentotta zagrosensis* Kovařík, 1997, dorsal and ventral views, ♂ (102 mm) holotype, Iran, Iran, Fars Province, Zagros Mts., near Abshar village, FKCP. **79–80.** *Hottentotta zagrosensis* Kovařík, 1997, dorsal and ventral views, ♀(103 mm) allotype, same locality as in Fig. 77–78, FKCP.

← (p. 32) Figures 81–92: 81–82. *Mesobuthus eupeus phillipsii* (Pocock, 1889), dorsal and ventral views, ♂(52 mm), Iran, Khoozestan Province, near Choga Zanbil (zikkurat) ca. 100 m a.s.l., FKCP. **83–84.** *Mesobuthus eupeus phillipsii* (Pocock, 1889), dorsal and ventral views, ♀(53 mm), Iran, Khoozestan Province, Baghmalek district, Hore village, 31°55'30"N 49°31'47"E, 185 m a.s.l.,, FKCP. **85–86.** *Vachoniolus iranus* sp. n., dorsal and ventral views, ♂ (42 mm) holotype, Iran, Khoozestan Province, near Masdjedsoleyman, 31°38.40´N 48°56.41´E, RRLS. **87–88.** *Vachoniolus iranus* sp. n., dorsal and ventral views, ♀(40 mm) allotype, Iran, Khoozestan Province, Ahvaz–Masjedsoleyman road, 31°35'44"N 48°57'19"E, 35 m a.s.l. (Locality No. A-Ma-810), FKCP. **89–90.** *Razianus zarudnyi* (Birula, 1903), dorsal and ventral views, ♂ (22 mm), Iran, Khoozestan Province, near Chogha Zanbil (zikkurat), 32° 00'55"N 48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-101), FKCP. **91–92.** *Razianus zarudnyi* (Birula, 1903), dorsal and ventral views, ♀(24 mm), Iran, Khoozestan Province, same locality as in Figs. 89–90, FKCP.

← (p. 33) Figures 93–102: 93–94. *Orthochirus farzanpayi* (Vachon et Farzanpay, 1987), dorsal and ventral views, ♂(39 mm), Iran, Khoozestan Province, Shushtar district, Arab Hasan village, FKCP. **95–96.** *Orthochirus farzanpayi* (Vachon et Farzanpay, 1987), dorsal and ventral views, ♀ (37 mm) lectotype, Iran, 215 km N of Bandar-Abbas, NHMW Nos. 68–70. **97–98.** *Orthochirus iranus* Kovařík, 2004, dorsal and ventral views, ♂(30 mm), Iran, Khoozestan Province, Shadegan district, Toopjieh village, 30°39'33"N 48°36'44"E, 33 m a.s.l., FKCP. **99–100.** *Orthochirus iranus* Kovařík, 2004, dorsal and ventral views, ♀ (38 mm), Iran, Khoozestan Province, same locality as in Fig. 97–98, FKCP. **101–102.** *Orthochirus stockwelli* (Lourenço et Vachon, 1995) **comb. n.**, dorsal and ventral views, ♂ (28 mm), Iran, Khoozestan Province, Dezful district, Shahyoon village, 32°36'41"N 48°33'36"E, 527 m a.s.l.,, FKCP.

← (p. 34) Figures 103–110: 103–104. *Scorpio maurus townsendi* (Pocock, 1900), dorsal and ventral views, ♂ (55 mm), Iran, Khoozestan Province, Ahvaz–Omidiyeh road, Chombeh village, 31°11'54"N 49°11'41"E, 44 m a.s.l., FKCP. **105–106.** *Scorpio maurus townsendi* (Pocock, 1900), dorsal and ventral views, ♀(54 mm), Iran, Khoozestan Province, Hayader and Bahrani; Ramhormoz, 31°11'54"N 49°11'41"E, 44 m (Locality No. A-Ra 807), FKCP. **107–108.** *Hemiscorpius lepturus* Peters, 1862, dorsal and ventral views, ♂ (72 mm), Iran, Khoozestan Province, Chogha Zanbil (zikkurat), 32°00'55"N 48°31'04"E, 68.5 m a.s.l. (Locality No. Ch-102), FKCP. **109–110.** *Hemiscorpius lepturus* Peters, 1862, dorsal and ventral views, ♀ (58 mm), Iran, Khoozestan Province, same locality as in Fig. 109–110, FKCP.

References

AKBARI, A., M. TABATABAI, A. HEDAYAT, H. MODIRROOSTA, M. H. ALIZADEH & M. KAMAL ZARE. 1997 (1826). [Study of the geographical distribution of scorpions in the south of Iran]. *Pajoohesh & Sazandegi*, 34: 112-115 (in Farsi).

AKBARI, A. 2007(1836). [Study of scorpion fauna of Iran]. *Project report publication of Razi Vaccine & Serum Research Institute,* 2007*,* 96 (in Farsi).

AL-SAFADI, M. M. 1992. Additions to the scorpion fauna of Yemen. *Zoology in the Middle East*, 6: 95–99.

AMR, Z. S. & R. EL-ORAN. 1994. Systematics and distribution of scorpions (Arachnida, Scorpionida) in Jordan. *Bolletino di Zoologia*, 61(2): 185–190.

AMR, Z.S, K. E. HYLAND, R. KINZELBACH, S. S. AMR & D. DEFOSSE. 1988. Scorpions et piqûres de scorpions en Jordanie. *Bulletin de la Société de Pathologie Exotique*, 81(3): 369–379.

ARNETT, H.R. JR., G.A. SAMUELSON & G.M. NISHIDA. 1993. *The Insect and Spider Collections of the World. Flora & Fauna Handbook No. 11, Second edition*. Gainesville: Sandhill Crane Press, 308 pp.

AUSSERER A. 1880. Arachnida. *Zoologischer Jahresbericht*, 1879: 430–470.

BIRULA, A. A. 1900. Beiträge zur Kenntniss der Scorpionenfauna Ost-Persiens. *Bulletin de l´Académie Impériale des Sciences de St.-Pétersbourg*, 12(1): 355–375.

BIRULA, A. A. 1903. Beiträge zur Kenntniss der Scorpionenfauna Persiens (Zweiter Beiträg). *Bulletin de l´Académie Impériale des Sciences de St.-Pétersbourg*, 19: 67–80.

BIRULA, A. A. 1904. Miscellanea scorpiologica. VII. Synopsis der russischen Skorpione. *Annuaire du Musée Zoologique de l´Académie Impériale des Sciences de St.-Pétersbourg*, 9: 28–38.

BIRULA, A. A. 1905a. Beiträge zur Kenntniss der Scorpionenfauna Persiens (Dritter Beiträge). *Bulletin de l´Académie Impériale des Sciences de St.-Pétersbourg*, 23: 119–148.

BIRULA, A. A. 1905b. 4. Skorpiologische Beiträge, 1.-3. *Microbuthus littoralis* (Pavesi), *Anomalobuthus rickmersi* Kraepelin und *Buthus zarudnianus* n. nom. *Zoologisher Anzeiger*, 29(14): 445–450.

BIRULA, A. A. 1910. Ueber *Scorpio maurus* Linné und seine Unterarten. *Horae Societatis Entomologicae Rossicae*, 39: 115–192.

BIRULA, A. A. 1914. Ergebnisse einer von Prof. Franz Werner im Sommer 1910 mit Unterstützung aus dem Legate Wedl ausgeführten zoologischen Forschungsreise nach Algerien. VI. Skorpione und Solifugen. *Sitzungsberichte der Kaiserlich-Königlichen Akademie der Wissenschaften*, Wien, 123(1): 633–668.

(BIRULA, A. A.) BYALYNITSKII-BIRULYA, A. A. 1917. Arachnoidea Arthrogastra Caucasica. Pars I. Scorpiones. *Zapiski Kavkazskogo Muzeya (Mémoires du Musée du Caucase)*, Tiflis: Imprimerie de la Chancellerie du Comité pour la Transcaucasie, A(5), 253 pp. (in Russian; published August 1917). English translation: Byalynitskii-Birulya, A. A. 1964. *Arthrogastric Arachnids of Caucasia. 1. Scorpions*. Jerusalem: Israel Program for Scientific Translations, 170 pp. (in Russian).

BIRULA, A. A. 1918. Miscellanea scorpiologica. XI. Materialy k scorpiofaune nizhnei Mesopotamii, Kurdistana i Severnoi Persii (Matériaux pour servir á la scorpiofaune de la Mésopotamie inférieure, du Kurdistan et de la Perse septentrionale). *Annuaire du Musée Zoologique de l´Académie Impériale des Sciences de St.-Pétersbourg*, 22(1917): 1–44 (in Russian).

BIRULA, A. A. 1937. Zametki o kollektsii skorpionov iz Yemena (Yu. V. Arabia). (Notes sur les collections des scorpions recueillis dans le Jémen (Arabie S. E.)). *Archives du Musée Zoologique de l´Université de Moscou*, 4: 101–110 (in Russian).

BORELLI, A. 1915. Gli Scorpioni del Museo Civico di Storia naturale di Milano. *Atti della Societá Italiana di Scienze Naturali*, 53: 456–464.

BRAUNWALDER, M. E. & V. FET. 1998. On publications about scorpions (Arachnida, Scorpiones) by Hemprich and Ehrenberg (1828–1831). *Bulletin of the British Arachnological Society*, 11(1): 29–35.

CAPES, E. M. & V. FET. 2001. A redescription of the scorpion genus *Plesiobuthus* Pocock, 1900 (Scorpiones: Buthidae) from Pakistan. *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg*, 13(164): 295–304.

CRUCITTI, P. 1999. The scorpions of Anatolia: biogeographical patterns. *Biogeographia*, 20: 81–94.

CRUCITTI, P. & V. VIGNOLI. 2002. Gli Scorpioni (Scorpiones) dell'Anatolia sud-orientale (Turchia). *Bolletino della Museo Scienze Naturali in Torino*, 19(2): 433–474.

DUPRÉ, G., N. LAMBERT & P. GÉRARD. 1998. *Les Scorpions. Biologie. Élevage.* Paris, 82 pp.

EL-HENNAWY, H. K. 1992. A catalogue of the scorpions described from the Arab countries (1758–1990) (Arachnida: Scorpionida). *Serket*, 2(4): 95–153.

FARZANPAY, R. 1986. *Mesobuthus eupeus*, an indigenous scorpion from Iran. Origin and its geographical distribution. *In* Barrientos, J.A. (ed.), *Actas X. Congreso Internacional de Aracnologia. Jaca (Espaňa) Septiembre 1986*, 1: 333–335.

FARZANPAY, R. 1987 (1366). *[Knowing Scorpions]*. Teheran: Central University Publications, No. 312, Biology 4, 231 pp. (in Farsi, with Latin index).

FARZANPAY, R. 1988. A catalogue of the scorpions occuring in Iran, up to january 1986. *Revue Arachnologique*, 8(2): 33–44.

FARZANPAY, R. & G. PRETZMANN. 1974. Ergebnisse einiger Sammelreisen nach Vorderasien 4. Teil: Skorpione aus Iran. *Annalen des Naturhistorischen Museuns in Wien*, 78: 215–217.

FET, V. 1989. A catalogue of scorpions (Chelicerata: Scorpiones) of the USSR. *Rivista del Museo Civico di Scienze Naturali "Enrico Caffi"* (Bergamo), 13(1998): 73–171.

FET, V. 1994. Fauna and zoogeography of scorpions (Arachnida: Scorpions) in Turkmenistan. Pp. 525–534 In: Fet V. & K. I. Atamuradov K. I. (eds.), *Biogeography and Ecology of Turkmenistan*. Kluwer Academic Publishers: Boston–Dordrecht.

FET, V. 1997. *Neohemibuthus zarudnyi* (Birula, 1903) from Iran, a senior synonym of *N. kinzelbachi* Lourenço, 1996 (Scorpiones, Buthidae). *Revue Arachnologique*, 12(6): 65–68.

FET, V. 2000. Family Scorpionidae Latreille, 1802. Pp. 427–486 *in* Fet, V., Sissom, W. D., G. Lowe & M. E. Braunwalder. 2000. *Catalog of the Scorpions of the World (1758–1998).* The New York Entomological Society, New York, 689 pp.

FET, V. & F. KOVAŘÍK. 2003. First record of *Euscorpius* (*Polytrichobothrius*) *italicus* (Scorpiones: Euscorpiidae) from Iraq. *Acta Societatis Zoologicae Bohemicae*, 67: 179–181.

FET, V. & G. LOWE. 2000. Family Buthidae C. L. Koch, 1837. Pp. 54–286 *in* Fet, V., Sissom, W. D., G. Lowe & M. E. Braunwalder. 2000. *Catalog of the Scorpions of the World (1758–1998).* The New York Entomological Society, New York, 689 pp.

FRYNTA, D., J. MORAVEC, J. ČIHÁKOVÁ, J. SÁDLO, Z. HODKOVÁ, M. KAFTAN, P. KODYM, D. KRÁL, V. PITULE & V. ŠEJNA. 1997. Results of the Czech Biological Expedition to Iran. Part 1. Notes on the distribution of amphibians and reptiles. *Acta Societatis Zoologicae Bohemicae*, 61: 3–17.

HABIBI, T. 1971. Liste de Scorpions de l'Iran. *Bulletin of the Faculty of Science, Teheran University*, 2(4): 42–47.

HEMPRICH, F. G. & C. G. EHRENBERG. 1828: Animalia articulata. Arachnoidea, Scorpiones africani et asiatici. In: *Symbolae physicae seu icones et descriptiones Animalium evertebratorum sepositis insectis quae ex itinere per Africam Borealem et Asiam Occidentalem*. Berolini: Officina Academica, Decas Prima, Plates IX et X.

HEMPRICH, F. G. & C. G. EHRENBERG. 1829. Vorläufige Uebersicht der in Nord-Afrika und West-Asien einheimischen Scorpione und deren geographischen Verbreitung, nach den eigenen Beobachtungen. *Verhandlungen der Gesellschaft Naturforschende Freunde in Berlin*, 1: 348–362.

HEMPRICH, F. G. & C. G. EHRENBERG. 1831. Animalia Articulata, Arachnoidea, Scorpiones. In *Symbolae physicae animalia evertebrata, exclusis insectis, series prima, tabularum decade prima.* Berolini: Officina Academica 12 pp.

HENDRIXSON, B. E. 2006. Buthid scorpions of Saudi Arabia, with notes on other families (Scorpiones: Buthidae, Liochelidae, Scorpionidae). *Fauna of Arabia*, 21: 33–120.

KABAKIBI, M. M., N. KHALIL & Z. AMR. 1999. Scorpions of southern Syria. *Zoology in the Middle East*, 17: 79–89.

KARATAŞ, A. 2003. New records on the occurrence of *Hottentotta saulcyi* (Simon, 1880) (Scorpiones: Buthidae) in Turkey. *Israel Journal of Zoology*, 49(4): 315–316.

KARSCH, F. 1879. Skorpionologische Beiträge I. and II. *Mitteilungen des Münchener Entomologischen Vereins*, 3: 6–22, 97–136.

KHALAF, K. I. 1963. Scorpions reported from Iraq. *Bulletin of Endemic Diseases* (Baghdad), 5(1–2): 59–70.

KHALAF, L. 1962. A small collection of scorpions from Iraq. *Bulletin of the Iraq Natural History Institute*, 2(4): 1–3.

KINZELBACH, R. 1984. Die Skorpionssammlung des Naturhistorischen Museums der Stadt Mainz – Teil II: Vorderasien. *Mainzer Naturwisserschaftiches Archiv*, 22: 97–106.

KOVAŘÍK, F. 1992. A check list of scorpions (Arachnida: Scorpiones) in the collections of the Zoological Depertment, National Museum in Prague. *Acta Societatis Zoologicae Bohemoslovaca*, 56: 181–186.

KOVAŘÍK, F. 1996. First report of *Compsobuthus matthiesseni* (Scorpiones: Buthidae) from Turkey. První zpráva o štíru *Compsobuthus matthiesseni* z Turecka. *Klapalekiana*, 32: 53–55.

KOVAŘÍK, F. 1997a. Results of the Czech Biological Expedition to Iran. Part 2. Arachnida: Scorpiones with descriptions of *Iranobuthus krali* gen. n. et sp. n. and *Hottentotta zagrosensis* sp. n. (Buthidae). *Acta Societatis Zoologicae Bohemicae*, 61: 39–52.

KOVAŘÍK, F. 1997b. A check-list of scorpions (Arachnida) in the collections of the Hungarian Natural History Museum, Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 89: 177–185.

KOVAŘÍK, F. 1998. *Štíři* [*Scorpiones*]. Jihlava (Czech Republic): Publishing House "Madagaskar", 176 pp (in Czech).

KOVAŘÍK, F. 2001. *Catalog of the Scorpions of the World* (1758–1998) by V. Fet, W. D. Sissom, G. Lowe, and M. Braunwalder (New York Entomological Society, 2000: pp. 690). Discussion and supplement for 1999 and part of 2000. *Serket*, 7(3): 78–93.

KOVAŘÍK, F. 2002. A checklist of scorpions (Arachnida) in the collection of the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt am Main, Germany. *Serket*, 8(1): 1–23.

KOVAŘÍK, F. 2003. Eight new species of *Compsobuthus* Vachon, 1949 from Africa and Asia (Scorpiones: Buthidae). *Serket*, 8(3): 87–112.

KOVAŘÍK, F. 2004. Revision and taxonomic position of genera *Afghanorthochirus* Lourenço & Vachon, *Baloorthochirus* Kovařík, *Butheolus* Simon, *Nanobuthus* Pocock, *Orthochiroides* Kovařík, *Pakistanorthochirus* Lourenço, and Asian *Orthochirus* Karsch, with descriptions of twelve new species (Scorpiones, Buthidae). *Euscorpius*, 16: 1–33.

KOVAŘÍK, F. 2005. Taxonomic position of species of the genus *Buthacus* Birula, 1908 described by Ehrenberg and Lourenço, and description of a new species (Scorpiones: Buthidae). *Euscorpius*, 28: 1–13.

KOVAŘÍK, F. 2007. A revision of the genus *Hottentotta* Birula, 1908, with descriptions of four new species (Scorpiones, Buthidae). *Euscorpius*, 58: 1–107.

KOVAŘÍK F. & Z. AHMED. 2007. Two new species of the genus *Compsobuthus* Vachon, 1949 from Afghanistan and Pakistan (Scorpiones: Buthidae). *Euscorpius*, 53: 1–6.

KOVAŘÍK, F. & V. FET. 2006. Taxonomic position of the genus *Simonoides* Vachon et Farzanpay, 1987, and description of a new species of *Orthochirus* Karsch from Iran (Scorpiones, Buthidae). *Euscorpius*, 38: 1–10.

KOVAŘÍK, F. & S. WHITMAN. 2005. Cataloghi del Museo di Storia Naturale dell´Università di Firenze – sezione di zoologia «La Specola» XXII. Arachnida Scorpiones. Tipi. Addenda (1998–2004) e checklist della collezione (Euscorpiinae esclusi). *Atti della Società Toscana di Scienze Naturali, Memorie*, serie B, 111 (2004): 103–119.

KRAEPELIN, K. 1891. Revision der Skorpione. I. Die Familie des Androctonidae. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten*, 8(1890): 144–286 (1–144).

KRAEPELIN, K. 1895. Nachtrag zu Theil I der Revision der Skorpione. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten*, 12(1894): 73–96.

KRAEPELIN, K. 1899. Scorpiones und Pedipalpi. *In* F. DAHL (ed.), *Das Tierreich. Herausgegeben von der Deutschen Zoologischen Gesellschaft.* Berlin: R. Friedländer und Sohn Verlag, *8. Lieferung*. 265 pp.

KRAEPELIN, K. 1901. Catalogue des Scorpions des collections du Muséum d`Histoire Naturelle de Paris. *Bulletin du Muséum National d´Histoire Naturelle Paris*, 7: 265–274.

KRAEPELIN, K. 1913. Neue Beiträge zur Systematik der Gliederspinnen. III. A. Bemerkungen zur Skorpionenfauna Indiens. B. Die Skorpione, Pedipalpen und Solifugen Deutsch-Ostafrikas. *Jahrbuch der Hamburgischen Wissenschaftlichen Anstalten*, 30: 123–196.

LAMPE, E. 1918. Katalog der Skorpione, Pedipalpen und Solifugen des Naturhistorischen Museums der Residentzstadt Wiesbaden. *Jahrbücher des Nassauischen Verein für Naturkunde*, 70(1): 185–203.

LEVY, G. & P. AMITAI. 1980. *Fauna Palaestina, Arachnida I.– Scorpiones*. The Israel Academy of Sciences and Humanities, 132 pp.

LEVY, G., P. AMITAI & A. SHULOV. 1973. New scorpions from Israel, Jordan and Arabia. *Zoological Journal of the Linnaean Society*, 52: 113–140.

LOURENÇO, W. R. 1996. A new genus and a new species of scorpion (Buthidae) from Iran. *Zoology in the Middle East*, 12: 93–98.

LOURENÇO, W. R. 1998. A new species of *Apistobuthus* Finnegan, 1932 (Chelicerata, Scorpiones, Buthidae) from Iran. *Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg*, 12(157): 237–244.

LOURENÇO, W. R. 2004. New considerations on the Northwestern African species of *Buthacus* Birula (Scorpiones, Buthidae), and description of a new species. *Revista Ibérica de Aracnología*, 10: 225–231.

LOURENÇO, W. R. 2006. Further considerations on the genus *Buthacus* Birula, 1908 (Scorpiones: Buthidae), with a description of one new species and two new subspecies. *Boletín de la Sociedad Entomológica Aragonesa*, 38: 59–70.

LOURENÇO, W. R. & A. PÉZIER. 2002. Taxonomic consideration of the genus *Odontobuthus* Vachon (Scorpiones, Buthidae), with descripion of a new species. *Revue suisse de Zoologie*, 109(1): 115–125.

LOURENÇO, W. R. & M. VACHON. 1995. Un nouveau genre et deux nouvelles espéces de scorpions Buthidae d´Iran. *Bulletin du Muséum National d´Histoire Naturelle Paris*, 17: 297–305.

LOURENÇO, W. R. & M. VACHON. 1997. Un nouveau genre et quatre nouvelles espéces de scorpions (Buthidae) du Moyen-Orient. *Zoosystema*, 19(2–3): 327–336.

LOURENÇO, W. R. & M. VACHON. 2001. A new species of *Compsobuthus* Vachon, 1949 from Iran (Scorpiones: Buthidae). Pp. 179–182 *in*: Fet, V. & P. A. Selden (eds.), *Scorpions 2001. In Memoriam Gary A. Polis*. British Arachnological Society: Burhnam Beeches, Bucks.

MASI, L. 1912. Note sugli Scorpioni appartenenti al R. Museo Zoologico di Roma. *Memorie della Societá Entomologica Italiana*, 1(3): 88–108, 120–144.

MONOD L. & W. R. LOURENÇO. 2005. Hemiscorpiidae (Scorpiones) from Iran, with descriptions of two new species and notes on biogeography and phylogenetic relationships. *Revue suisse de Zoologie***,** 112(4): 869–941.

MORITZ, M. & S.-CH. FISCHER. 1980. Die Typen der Arachniden-Sammlung des zoologischen Museums Berlin. III. Scorpiones. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 56: 309–326.

OLIVIER, G. A. 1807. *Voyage dans l`Empire Othoman, l`Égypte et la Perse*. Henri Agasse, Paris, Vol. 3: 96–97, fig. 2.

PENTHER, A. 1912. Wissenschaftliche Ergebnisse der Expedition nach Mesopotamien, 1910. Scorpiones. *Annalen des Kaiserlich-Königlichen Naturhistorischen Hofmuseums in Wien*, 26(1/2): 109–115.

PÉREZ MINNOCCI, S. 1974. Un inventario preliminar de los escorpiones de la región Paleártica y claves para la identificación de los géneros de la región Paleártica Occidental. *Madrid: Universidad Complutense de Madrid, Facultad de Ciencias, Departamento de Zoología, Cátedra de Artrópodos*, 7: 1–45.

PETERS, W. 1862a. Eine neue Untergattung von Scorpionen, Hemiscorpion lepturus. *Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*, 1861: 426–427.

PETERS, W. 1862b. Über eine neue Eintheilung der Skorpione und über die von ihm in Mossambique gesammelten Arten von Skorpionen. *Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*, 1861: 507–520.

POCOCK, R. I. 1889. Notes on some Buthidae, new and old. *Annals and Magazine of Natural History*, 6(3): 334–351.

POCOCK, R. I. 1895. On the Arachnida and Myriapoda obtained by Dr. Anderson`s collector during Mr. T. Bent's expedition to the Hadramaut, South Arabia; with a supplement upon the scorpions obtained by Dr. Anderson in Egypt and the Eastern Soudan. *Journal of the Linnaean Society*, 25: 292–316.

POCOCK, R. I. 1900. The scorpions of the genus *Heterometrus*. *Annals and Magazine of Natural History*, 7(6): 362–365.

POCOCK R. I. 1902. A contribution to the systematics of scorpions. *Annals and Magazine of Natural History*, 7(10): 364–380.

PRENDINI, L. 2000. Phylogeny and classification of the superfamily Scorpionoidea Latreille 1802 (Chelicerata, Scorpiones): an exemplar approach. *Cladistics,* 16: 1–78.

PRINGLE, G. 1960. Notes on the scorpions of Iraq. *Bulletin of Endemic Diseases*, 3(3–4): 73–87.

ROEWER, C. F. 1943. Über eine neuerworbene Sammlung von Skorpionen des Natur-Museums Senckenberg. *Senckenbergiana*, 26(4): 205–244.

SIMARD, J. M. & D. D. WATT. 1990. Venoms and toxins. Pp. 414–444 *in* Polis, G. A. (ed.), *The Biology of Scorpions.* Stanford: Stanford University Press, 587 pp.

SIMON, E. 1872. Arachnides de Syrie, rapportés par M. Charles Piochard de la Brulerie (Scorpions et Galéodes). *Annales de la Sociéte Entomologique de France*, (5)2: 245–266.

SIMON, E. 1879. 3e Ordre. Scorpiones. Pp. 79–115 *in : Les Arachnides de France. VII. Contenant les Ordres des Chernetes, Scorpiones et Opiliones.* Paris: Roret.

SIMON, E. 1880a. Études Arachnologiques 12e Mémoire. Part XVIII. Descriptions de Genres et Espéces de l`orde des Scorpiones. *Annales de la Sociéte Entomologique de France*, 5(10)1880: 377–398.

SIMON, E. 1880b. Quelques Scorpions qui lui ont été donnés par notre confrére M. Reiche, de la part de M. F. de Saulcy, qui les a recus de Mossoul (ancienne Ninive), sur le Tigre, en Mésopotamie. *Annales de la Sociéte Entomologique de France*, 5(10): 29.

SIMON, E. 1892. Liste des Arachnides Recueillis en Syrie par M. le Dr Théod. Barrois. *Revue Biologique du Nord de la France*, 5: 80–84.

SIMON, E. 1910. Révision des Scorpions d'Egypte. *Bulletin de la Société Entomologique d´Egypte*, 1910: 57–87.

SISSOM, W. D. 1990. Systematics, biogeography and paleontology. Pp. 64–160 *in* Polis, G. A. (ed.), *The Biology of Scorpions.* Stanford: Stanford University Press, 587 pp.

SISSOM, W.D. 1994. Descriptions of new and poorly known scorpions of Yemen (Scorpiones: Buthidae, Diplocentridae, Scorpionidae). *Fauna of Saudi Arabia*, 14: 3–39.

SISSOM W. D. & V. FET. 1998. Redescription of *Compsobuthus matthiesseni* (Scorpiones, Buthidae) from southwestern Asia. *The Journal of Arachnology*, 26: 1-8.

STATHI, I. & M. MYLONAS. 2001. New records of scorpions from the central-eastern Mediterranean area: biogeographical comments, with a special reference to the Greek species. Pp. 287–295 *in:* Fet, V. & P. A. Selden (eds.), *Scorpions 2001. In Memoriam Gary A. Polis.* British Arachnological Society. Burnham Beeches, Bucks.

TULLGREN, A. 1909. Solifugae, Scorpiones und Chelonethi aus Ägypten und dem Sudan. Pp. 1–12 *in*: Jägerskiöld, L. A. (ed.), *Results of the Swedish Zoological Expedition to Egypt*, 1901, Uppsala, 3(21).

VACHON, M. 1940a. Voyage en A. O. F. de L. Berland et J. Millot. Scorpions. V. *Bulletin de la Société Zoologique de France*, 65: 170–184.

VACHON, M. 1940b. Sur la systématique des scorpions. *Mémoires du Muséum National d´Histoire Naturelle, Paris*, 13(2): 241–259.

VACHON, M. 1951. Prof. Kosswig tarafindan Türkiyede toplanan akrepler hakkinda. Á propos de quelques Scorpions de Turquie collectés par M. le Professeur Dr. Curt Kosswig. *Revue de la Faculté des Sciences de l´Université d´Istanbul, ser. B*, 16(4): 341–344.

VACHON, M. 1952. *Études sur les Scorpions*. Institut Pasteur d´Algérie, Alger, 482 pp. (published 1948–1951 in *Archives de l´Institut Pasteur d´Algérie*, 1948, 26: 25–90, 162–208, 288–316, 441–481. 1949, 27: 66–100, 134–169, 281–288, 334–396. 1950, 28: 152–216, 383–413. 1951, 29: 46–104).

VACHON M. 1959. Scorpionidea (Chelicerata) de l`Afganistan. The 3rd Danish Expedition to central Asia (Zoological Results 23). *Videnskabelige Meddelelser fra Dansk Naturhistorisk Forening i Kobehavn*, 120: 121-187.

VACHON, M. 1966. Liste des scorpions connus en Égypte, Arabie, Israël, Liban, Syrie, Jordanie, Turquie, Irak, Iran. *Toxicon*, 4: 209–218.

VACHON, M. 1974. Étude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en Arachnologie, Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. *Bulletin du Muséum National d´Histoire Naturelle Paris*, 140: 857–958.

VACHON, M. 1977. Scorpions. *In* The scientific results of the Oman flora and fauna survey 1975. *Journal of the Oman Studies*, 1: 209–218.

VACHON, M. 1979. Arachnids of Saudi Arabia, Scorpiones. *Fauna Saudi Arabia* 1: 30–66.

VACHON, M. & R. KINZELBACH. 1987. On the taxonomy and distribution of the scorpions of the Middle East. *In* Krupp, F., W. Schneider & R. Kinzelbach (eds.), *Proceedings of the Symposium on the Fauna and Zoogeography of the Middle East, Mainz (TAVO)*, 28(1985): 91–103.

VACHON, M. & R. STOCKMANN. 1968. Contribution á l`étude des Scorpions africains appartenant au genre *Buthotus* Vachon 1949 et étude de la variabilité. *Monitore Zoologico Italiano*, (N. S.) (2. supplemento): 81–149.

VIGNOLI, V. 2005. Description of a new species of *Compsobuthus* Vachon, 1949 (Scorpiones: Buthidae) from southern Iran. *Zoology in the Middle East*, 34: 79–86.

VIGNOLI, V., F. KOVAŘÍK & P. CRUCITTI. 2003. Scorpiofauna of Kashan (Esfahan Province, Iran) (Arachnida: Scorpiones). *Euscorpius*, 9: 1–7.

WEIDNER, H. 1959. Die Entomologischen Sammlungen des Zoologischen Staatsinstituts und Zoologischen Museums Hamburg, I. Teil, Pararthropoda und Chelicerata I. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, 57: 89–142.

WERNER, F. 1916. Über einige Skorpione und Gliederspinnen des Naturhistorischen Museum in Wiesbaden. *Jahrbücher des Nassauischen Verein für Naturkunde*, 69: 79–97.

WERNER, F. 1934. Scorpiones, Pedipalpi. *In* H. G. Bronns *Klassen und Ordnungen des Tierreichs.* Akademische Verlaggesellschaft, Leipzig. 5(IV) 8 (Scorpiones pp. 1–316): 1–490.