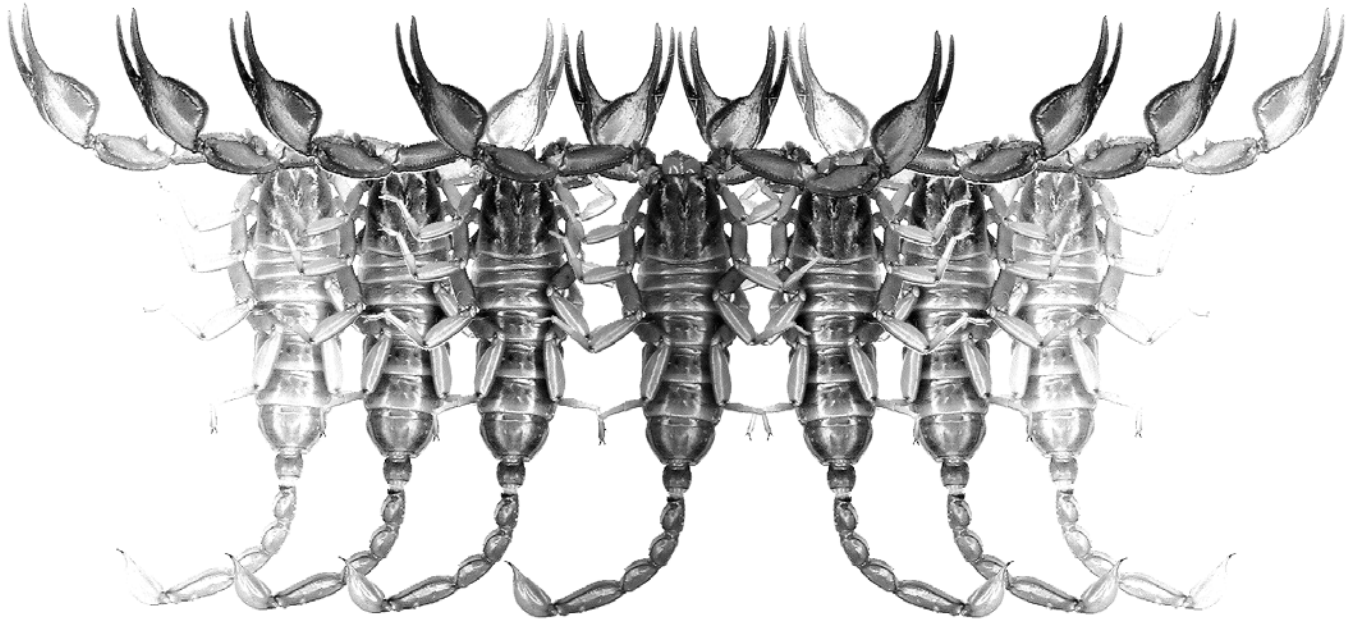


Euscorpilus

Occasional Publications in Scorpiology



**Scorpions of Iran (Arachnida, Scorpiones).
Part V. Chahar Mahal & Bakhtiari Province**

**Khodadad Pirali-Kheirabadi, Shahrokh Navidpour, Victor Fet,
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Euscorpilus

Occasional Publications in Scorpiology

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- **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 V. Chahar Mahal & Bakhtiyari Province

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Summary

Ten species of scorpions belonging to three families are reported from the montane Chahar Mahal & Bakhtiyari Province of Iran. Of these, only *Razianus zarudnyi* (Birula, 1903) was formerly reported for this province, while nine species are reported for the first time: *Androctonus crassicauda* (Olivier, 1807), *Compsobuthus matthiesseni* (Birula, 1905), *Hottentotta saulcyi* (Simon, 1880), *Hottentotta zagrosensis* Kovařík, 1997, *Mesobuthus eupeus phillipsii* (Pocock, 1889), *Odontobuthus doriae* (Thorell, 1876), *Orthochirus zagrosensis* Kovařík, 2004, *Hemiscorpius lepturus* Peters, 1861, and *Scorpio maurus townsendi* (Pocock, 1900). Also presented is a key to all species of scorpions found in the Chahar Mahal & Bakhtiyari 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 Chahar Mahal & Bakhtiyari Province is the fifth region surveyed (see previous publications of our group: Navidpour et al., 2008a, 2008b, 2008c, 2008d), and this publication represents the first comprehensive treatment of its scorpions. A study made by a team under Shahrokh Navidpour (Razi Reference Laboratory of Scorpion Research, Razi Vaccine and Serum Research Institute, Ahvaz, Khoozestan, Iran) reveal ten species of three families; nine of these species are recorded from this Province for the first time. In order to study the scorpion fauna of Chahar Mahal & Bakhtiyari Province, sampling using various methods including UV lamps was carried out. The fieldwork was conducted by Khodadad Pirali.

The Chahar Mahal & Bakhtiyari Province lies in the southwestern part of Iran and is bordered by the Esfahan Province in the north and east, the Kohgiluyeh & Boyer Ahmad Province in the south, and the Khoozestan Province in the west (see Fig. 1). This province covers an area of 16,500 km². Much of the province (about 70%) is montane, with altitudes from 1100 to 4200 m a.s.l. The

humidity varies from 30.2 to 50.3%, and temperatures range up to 36°C in the summer and down to -25°C at higher altitudes in the winter. Our study showed that *Odontobuthus doriae*, *Scorpio maurus townsendi*, and *Hottentotta saulcyi* are rare, while *Hottentotta zagrosensis*, *Mesobuthus eupeus phillipsii*, and *Orthochirus zagrosensis* are abundant in Chahar Mahal & Bakhtiyari Province.

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;

MCSN – Museo Civico de Storia Naturale “Giacomo Doria”, Genova, Italy;

MNHN – Muséum National d’Histoire Naturelle, Paris, France;

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;

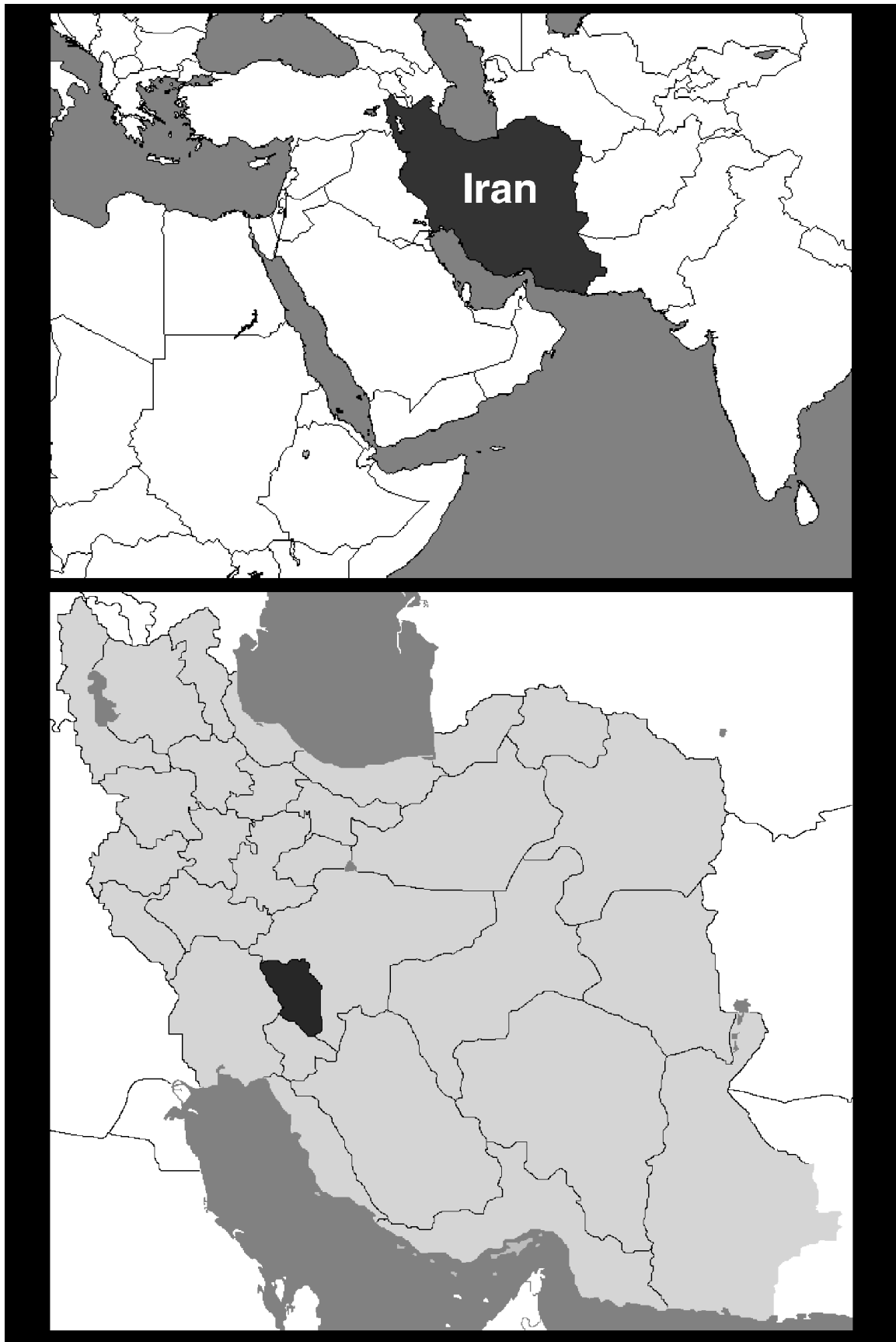


Figure 1: Map of southwestern Asia highlighting Iran (top) and closeup of Iran showing provinces, the Chahar Mahal & Bakhtiari Province depicted in black (bottom).

ZMHB – Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany;

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

List of Scorpions of Chahar Mahal & Bakhtiyari Province (all species except *R. zarudnyi* are reported for the first time for this Province)

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

Androctonus crassicauda (Olivier, 1807)

Compsobuthus matthiesseni (Birula, 1905)

Hottentotta saulcyi (Simon, 1880)

Hottentotta zagrosensis Kovařík, 1997

Mesobuthus eupeus phillipsii (Pocock, 1889)

Odontobuthus doriae (Thorell, 1876)

Orthochirus zagrosensis Kovařík, 2004

Razianus zarudnyi (Birula, 1903)

Family **Scorpionidae** Latreille, 1802

Scorpio maurus townsendi (Pocock, 1900)

Family **Hemiscorpiidae** Pocock, 1893

Hemiscorpius lepturus Peters, 1861

Systematics

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

Androctonus crassicauda (Olivier, 1807)

Figures 3, 4, 12–15

Scorpio crassicauda Olivier, 1807: 97.

Buthus crassicauda: Simon, 1872: 247 (in part); Simon, 1879: 99; Simon, 1892: 83; 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, g: 180; Kovařík & Whitman, 2005: 105; Lourenco, 2005: 149; Hendrixson, 2006: 38; Akbari, 2007: 76; Navidpour et al., 2008a: 5; Navidpour et al., 2008b: 3; Navidpour et al., 2008c: 3; Navidpour et al., 2008d: 3.

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, 1900a: 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.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. **Iran**, Chahar Mahal & Bakhtiyari Province, Lordegan, Aloni Village, 31°32'18"N 51°04'03"E, 1883 m a.s.l. (Locality No. SH-3), XII.2007, 2♂1♀, RRLS, 1♀, FKCP, leg. Pirali; Lordegan, Giloreh and Sini Villages, 31°32'02"N 51°02'38"E, 1856 m a.s.l. (Locality No. SH-12-13), XII.2007, 2♀, RRLS, 1im., FKCP, leg. Pirali.

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, 1872: 247), 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 (Birula, 1900b: 9), Tunis (Kraepelin, 1901: 266), Turkey (Pocock, 1902: 373), United Arab Emirates (Hendrixson, 2006: 40), Yemen (Birula, 1937: 101).

Compsobuthus matthiesseni (Birula, 1905)

Figures 4, 6, 28–31

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;



Figures 2–3: Iran, Chahar Mahal & Bakhtiyari Province. **2.** Lordegan, Shahidane Baraftab Village, 30°56'05"N 51°21'32"E (Locality No. SH-2). Recorded occurrence of *Hottentotta zagrosensis* Kovařík, 1997, *Orthochirus zagrosensis* Kovařík, 2004, and *Razianus zarudnyi* (Birula, 1903). **3.** Lordegan, Aloni Village, 31°32'18"N 51°04'03"E, 1883 m a.s.l. (Locality No. SH-3). Recorded occurrence of *Androctonus crassicauda* (Olivier, 1807), *Orthochirus zagrosensis* Kovařík, 2004, and *Hemiscorpius lepturus* Peters, 1861.

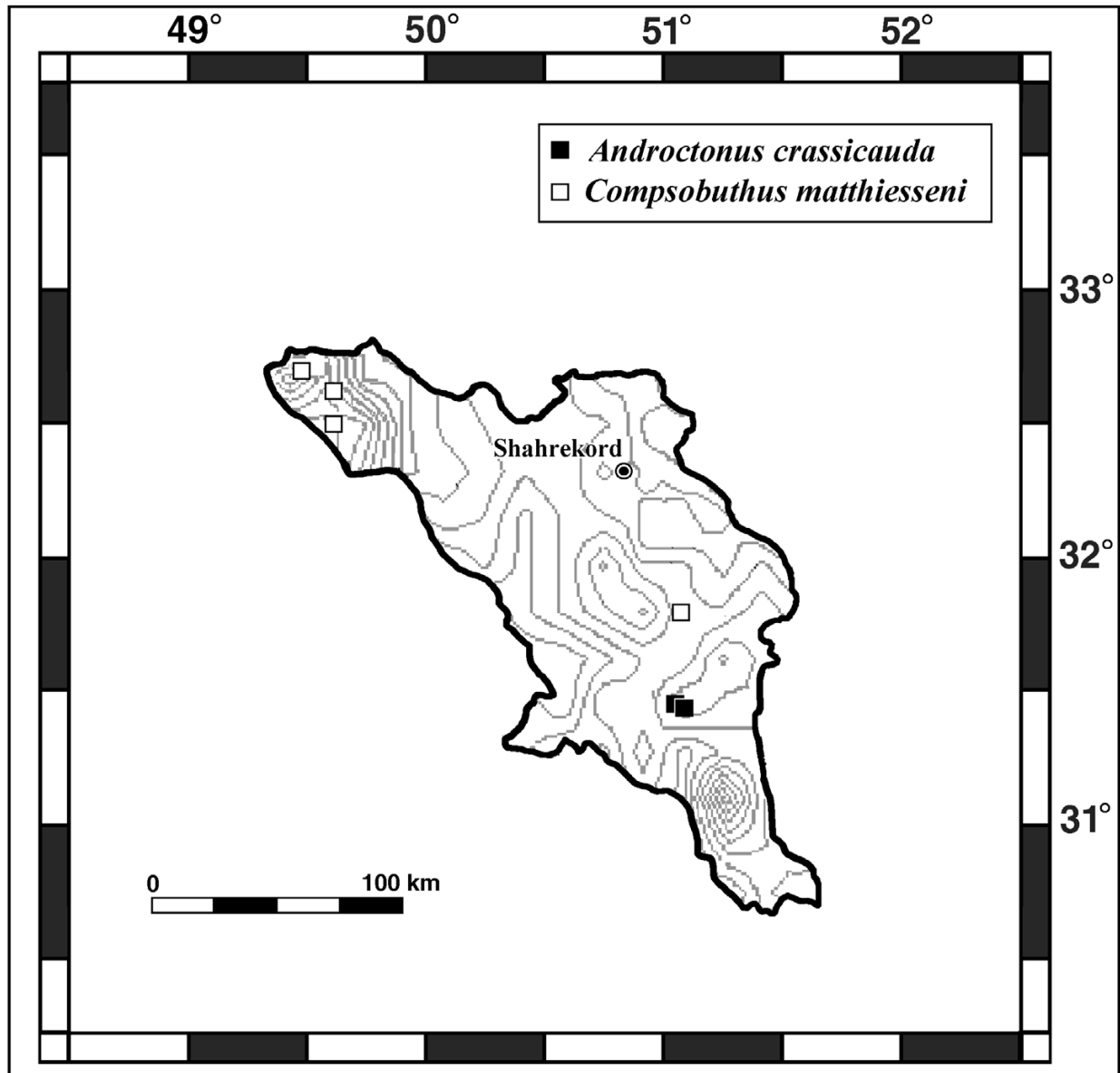


Figure 4: Map of Chahar Mahal & Bakhtiyari Province showing distribution of *Androctonus crassicauda* and *Compsobuthus matthiesseni* collected in this study.

Crucitti, 1999: 84; Fet & Lowe, 2000: 127; Lourenço & Vachon, 2001: 180; Kovařík, 2002: 7; Crucitti & Vignoli, 2002; Kovařík, 2003: 97; Vignoli et al., 2003: 2; Vignoli, 2005: 85; Akbari, 2007: 76; Kovařík & Ahmed, 2007: 6; Navidpour et al., 2008a: 9; Navidpour et al., 2008b: 9; Navidpour et al., 2008c: 8; Navidpour et al., 2008d: 3.

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.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Iran, Chahar Mahal & Bakhtiyari Province,

Bazoft, Abikarolya Village, 32°29'28"N 49°36'02"E (Locality No. SH-1), 2007, 1♂1♀, RRLS, leg. Pirali; Farsan, 32°35'43"N 49°39'27"E, 1981 m a.s.l. (Locality No. SH-6), V.2008, 1♀1im., RRLS, 1♀ FKCP, leg. Pirali & Khosravi; Bazoft to Kohrang road, 32°42'05"N 49°33'12"E, 1262 m a.s.l., V.2008, 1♀ RRLS, leg. Pirali & Rashidi; Lordegan, Kohiyan Village, 31°50'02"N 51°03'48"E, 1856 m a.s.l. (Locality No. SH-8), VII.2007, 1♀, FKCP.

DISTRIBUTION: Iran, known from provinces Kermanshah (formerly Bahtaran), Bushehr, Fars, Hamadan, Ilam, Khozestan, Kerman, Kordestan, Lorestan, Markazi, Qom (Sissom & Fet, 1998, Kovařík, 2003: 100, Akbari, 2007: 76), Kohgilouyeh & Boyer Ahmad (Navidpour et

al., 2008d: 3), and Chahar Machal & Bakhtiyari Province (first report); Iraq (Birula, 1917: 240; Pringle, 1960: 77), Syria (Kovařík, 2002: 7), Turkey (Kovařík, 1996: 53).

Hottentotta saulcyi (Simon, 1880)
Figures 9, 16–19

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, 2007: 76; Akbari et al., 1997: 112; Dupré, Lambert & Gérard, 1998: 70.

Hottentotta saulcyi: Kovařík, 1997a: 40; Crucitti & Vignoli, 2002: 446; Vignoli et al., 2003: 4; Karatas, 2003: 315; Kovařík, 2007: 61; Navidpour et al., 2008a: 10; Navidpour et al., 2008b: 13; Navidpour et al., 2008c: 8; Navidpour et al., 2008d: 5.

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.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Iran, Chahar Mahal & Bakhtiyari Province, Bazoft to Kohrang road, 32°42'05"N 49°33'12"E, 1262 m a.s.l., V.2008, 1im., RRLS, leg. Pirali.

DISTRIBUTION: Iran, known from Kermanshah (formerly Bachtaran), Fars, Hamadan, Hormozgan, Ilam, Lorestan Provinces (Kovařík, 2007: 65), Bushehr and Khoozestan Provinces (Akbari, 2007: 76, Akbari et al., 1997: 112), Kohgilouyeh & Boyer Ahmad (Navidpour et al., 2008d: 5), and Chahar Machal & Bakhtiyari Province (first report); Afghanistan (Kovařík, 1997a: 40), Iraq (Simon, 1880a: 379), Turkey (Crucitti & Vignoli, 2002: 446).

Hottentotta zagrosensis Kovařík, 1997
Figures 2, 6, 7, 9, 20–23

Hottentotta zagrosensis Kovařík, 1997a: 41; Kovařík, 1998: 111; Fet & Lowe, 2000: 144; Kovařík, 2007: 86; Navidpour et al., 2008a: 10; Navidpour et al., 2008d: 5.

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

TYPE MATERIAL EXAMINED. Iran, Fars Province, cca. 1000 m a.s.l., 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.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Bazoft, Abikarolya Village, 32°29'28"N 49°36'02"E (Locality No. SH-1), 2007, 4♂3♀2 juvs., RRLS, 1♀im., FKCP, leg. Pirali & Khosravi; Lordegan, Shahidane Baraftab Village, 30°56'05"N 51°21'32"E (Locality No. SH-2), V.2008, 3♀ RRLS 1juv. FKCP, leg. Pirali & Khosravi; Farsan, 32°35'43"N 49°39'27"E, 1981 m (Locality. No. SH-6), V.2008, 2♀1♀im., RRLS, 1juv., FKCP, leg. Pirali & Khosravi; Ardal, Dareh Bid and Dareh Yas Villages, 31°46'47"N 50°46'18"E, 1401 m a.s.l. (Locality. No. SH-11), V.2008, 2♀1♀im., RRLS, 1im., FKCP, leg. Pirali & Khosravi; Bazoft to Kohrang road, 32°42'05"N 49°33'12"E, 1262 m a.s.l., V.2008, 2♀1juv., RRLS, leg. Pirali & Rashidi; Lordegan, Marvan Village, 31°33'14"N 51°06'08"E, 1892 m a.s.l., X.2007, 4♂, RRLS, leg. Pirali & Khosravi; Ardal, Dorak Village, 31°47'30"N 50°43'47"E, 1359 m a.s.l., V.2008, 2♀, RRLS, leg. Pirali & Rezaie; Ardal, Dopolan Village, 31°53'46"N 50°37'04"E, 1652 m a.s.l., V.2008, 2♂ RRLS, leg. Pirali & Rezaie; Ardal, Madan Village, 31°55'56"N 50°48'38"E, 1398 m a.s.l., V.2008, 2♂im., RRLS, leg. Pirali & Rezaie.

DISTRIBUTION: Iran, known from provinces Fars, West Azerbaijan, Khoozestan (see Kovařík, 2007: 86), Khoozestan (Navidpour et al., 2008a: 10), Kohgilouyeh & Boyer Ahmad (Navidpour et al., 2008d: 5), and Chahar Machal & Bakhtiyari (first report).

Mesobuthus eupeus phillipsii (Pocock, 1889)
Figures 5, 10, 32–35

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.

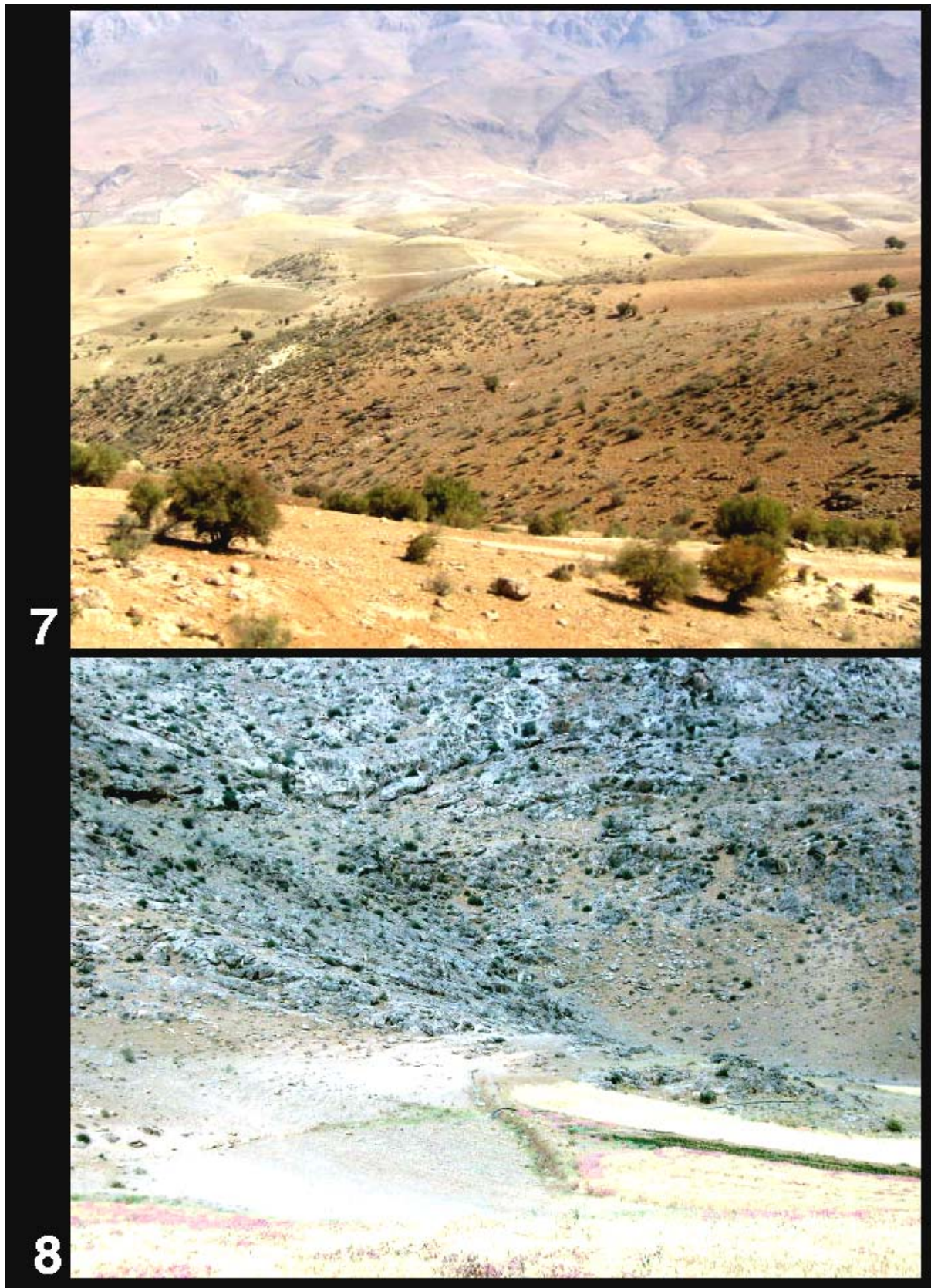
Mesobuthus eupeus phillipsi: Vachon, 1959: 148; Vachon, 1966: 213; Habibi, 1971: 44; Farzanpay, 1986: 334; Fet, 1994: 527; Kovařík, 1997a: 49; Kovařík, 1998: 114; Fet & Lowe, 2000: 175.

Mesobuthus eupeus phillipsii: Farzanpay, 1987: 150; Farzanpay, 1988: 38; Navidpour et al., 2008a: 11; Navidpour et al., 2008b: 13; Navidpour et al., 2008c: 11; Navidpour et al., 2008d: 5.

Mesobuthus eupeus: Akbari, 2007: 76.



Figures 5–6: Iran, Chahar Mahal & Bakhtiyari Province. **5.** Shahrekord (hills of Shahrekord University), 32°21'18"N 50°50'10"E, 2148 m a.s.l. (Locality No. SH-4). Recorded occurrence of *Mesobuthus eupeus phillipsii* (Pocock, 1889) and *Orthochirus zagrosensis* Kovařík, 2004. **6.** Farsan, 32°35'43"N 49°39'27"E, 1981 m a.s.l. (Locality. No. SH-6). Recorded occurrence of *Compsobuthus matthiesseni* (Birula, 1905) and *Hottentotta zagrosensis* Kovařík, 1997.



Figures 7–8: Iran, Chahar Mahal & Bakhtiyari Province. **7.** Ardal, Dareh Bid, and Dareh Yas Villages, $31^{\circ}46'47''\text{N}$ $50^{\circ}45'18''\text{E}$, 1401 m a.s.l. (Locality No. SH-11). Recorded occurrence of *Hottentotta zagrosensis* Kovařík, 1997. **8.** Lordegan, Giloreh and Sini Villages, $31^{\circ}32'02''\text{N}$ $51^{\circ}02'38''\text{E}$, 1856 m a.s.l. (Locality No. SH-12-13). Recorded occurrence of *Androctonus crassicauda* (Olivier, 1807), *Orthochirus zagrosensis* Kovařík, 2004, and *Razianus zarudnyi* (Birula, 1903).

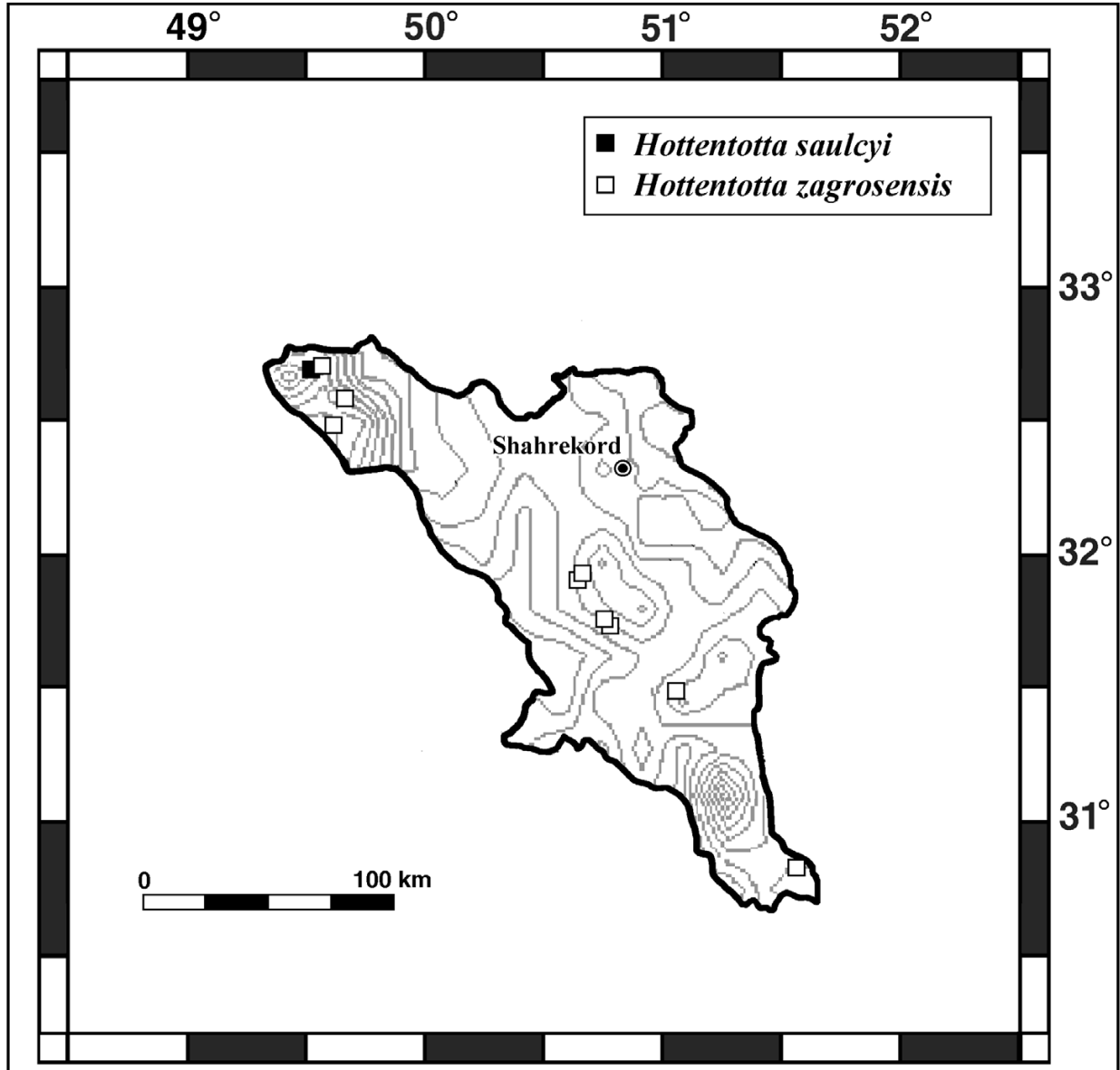


Figure 9: Map of Chahar Mahal & Bakhtiyari Province showing distribution of *Hottentotta saulcyi* and *H. zagrosensis* collected in this study.

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

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Bushir (now Bushehr) Province; BMNH.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Shahrekord (hills of Shahrekord University), 32°21'18"N 50°50'10"E, 2148 m a.s.l. (Locality No. SH-4), V.2007, 7♂5♀11♀im.3juvs., RRLS, 6♂1juv., FKCP, leg. Pirali & Navidpour; Shahrekord, Sarteshniz Village, 32°08'51"N 50°54'11"E, 2116 m a.s.l. (Locality No. SH-7), V.2008, 3♂2♀1♀im.5juvs., RRLS, 2♀1juv., FKCP, leg. Pirali; Saman, 32°27'17"N 50°52'36"E, 2134 m a.s.l. (Locality No. SH-9), V.2008, 2♂4♀, RRLS, leg. Pirali; Lordegan, Milas Village, 31°30'02"N 51°02'38"E, 1840

m, X.2007, 4♂2♀, RRLS, leg. Pirali; Lordegan, Marvan Village, 31°33'14"N 51°06'08"E, 1892 m a.s.l., X.2007, 4♂2♀, RRLS, leg. Pirali & Khosravi.

DISTRIBUTION: Iran, Bushehr Province (Pocock, 1889: 341), Ilam Province (Akbari, 2007: 76), Khozestan Province (Navidpour et al., 2008a: 9), Kohgilouyeh & Boyer Ahmad (Kovařík, 1997), and Chahar Machal & Bakhtiyari Province (first report); Iraq (Vachon, 1966: 213; Fet & Lowe, 2000: 175).

Odontobuthus doriae (Thorell, 1876)

Figures 10, 24–27

Buthus doriae Thorell, 1876: 107; Kraepelin, 1899: 27.

Odontobuthus doriae: Pringle, 1960: 83; Khalaf, 1963: 66; Vachon, 1966: 213; Habibi, 1971: 44; Pérez Minocci, 1974: 28; Farzanpay, 1988: 39; Kovařík, 1997: 47; Kovařík, 1998: 115; Fet & Lowe, 2000: 187; Kovařík, 2002: 9; Lourenço & Pézier, 2002: 116; Vignoli, Kovařík & Crucitti, 2003: 4.

TYPE LOCALITY AND TYPE REPOSITORY. Iran, Teheran; MCSN.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Saman, 32°27'17"N 50°52'36"E, 2134 m a.s.l. (Locality No. SH-9), V.2008, 1♀, RRLS, 1♂, FKCP, leg. Pirali.

DISTRIBUTION: Iran, Esfahan, Fars, Hamadan, Kerman, Kermanshah, Mazandaran, Markazi, Teheran, West Azarbaijan, Yazd Provinces (Kovařík, 1997: 47, Lourenço & Pézier, 2002: 116, 117, 124), Chahar Machal & Bakhtiyari Province (first report), and Sistan & Baluchistan Province (first report, see Figs. 24–25).

***Orthochirus zagrosensis* Kovařík, 2004**

Figures 2–3, 5, 8, 10, 36–39

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

Orthochirus zagrosensis Kovařík, 2004: 22; Kovařík & Fet, 2006: 8; Navidpour et al., 2008a: 20; Navidpour et al., 2008d: 7.

TYPE MATERIAL EXAMINED. Iran, Fars Province, Dasht-e-Arzan, 21–22.IV.2000, 29°34.644'N 51°56.889'E, 2000 m a.s.l., 1♂ (holotype), FKCP, leg. J. Šobotník; Kohgiluyeh & Boyer Ahmad Province, Zagros Mts., Kuh-e-Dinar ridge, 10 km N Yasuj by road, 30°39'N, 51°36'E, 1800–2500 m a.s.l., 1–2.V.1996 (Locality No. 13 in Frynta et al., 1997: 4), 1♀ (allotype), FKCP, leg. J. Pitulová; Esfahan Province, Zagros Mts., Qamishlu, 32°02'N 51°29'E, ca. 2000–2200 m a.s.l., 27–28.IV.1996, (Locality No. 5 in Frynta et al., 1997: 4), 1♀ (paratype), FKCP, leg. M. Kaftan; Yazd Province, E of Taft, 31°44'N 54°13'E, 1542 m a.s.l., 7.IV.2004, 1im. (paratype), FKCP, leg. V. Vignoli & P. Crucitti; W of Baghdadabad, Taft, 31°35'N 54°24'E, 1502 m a.s.l., 9.IV.2004, 1♀ (paratype), FKCP, leg. V. Vignoli & P. Crucitti.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Lordegan, Shahidane Baraftab Village, 30°56'05"N 51°21'32"E (Locality No. SH-2), V.2008, 2♂3♀, RRLS, 1♀, FKCP, leg. Pirali & Khosravi; Lordegan, Aloni Village, 31°32'18"N 51°04'03"E, 1883 m a.s.l. (Locality No. SH-3), XII.2007, 2♂1♀, RRLS, 1♂, FKCP, leg. Pirali; Shahrekord (hills of Shahrekord University), 32°21'18"N 50°50'10"E, 2148 m a.s.l. (Locality No. SH-4), V.2007, 4♂7♀3♀im.2juvs., RRLS, 2♂, FKCP, leg. Pirali & Navidpour; Shahrekord-Farokh

Shahr, Yahya Abad Village, 32°15'06"N 50°59'58"E, 2178 m a.s.l. (Locality No. SH-5), V.2008, 3♀, RRLS, 1juv. FKCP, leg. Pirali; Lordegan, Kohiyan Village, 31°50'02"N 51°03'48"E, 1856 m a.s.l. (Locality No. SH-8), VII.2007, 2♂3♀1juv., RRLS, 1♂ FKCP; Lordegan, Giloreh and Sini Villages, 31°32'02"N 51°02'38"E, 1856 m a.s.l. (Locality No. SH-12-13), XII.2007, 6♀1juv., RRLS, 1♂1♀, FKCP, leg. Pirali.

DISTRIBUTION: Iran, Esfahan, Fars, Kerman, Kohgiluyeh & Boyer Ahmad, Yazd Provinces (Kovařík, 1997; Kovařík, 2004: 22), and Chahar Machal & Bakhtiyari Province (first report).

***Razianus zarudnyi* (Birula, 1903)**

Figures 2, 11, 40–43

Hemibuthus zarudnyi Birula, 1903: 75; Vachon, 1966: 211.

Razianus zarudnyi: Farzanpay, 1987: 159; Farzanpay, 1988: 41; Fet & Lowe, 2000: 216; Akbari, 2007: 76; Navidpour et al., 2008a: 20; Navidpour et al., 2008b: 17; Navidpour et al., 2008c: 14; Navidpour et al., 2008d: 11.

= *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, 1977); ZISP.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Lordegan, Shahidane Baraftab Village, 30°56'05"N 51°21'32"E (Locality No. SH-2), V.2008, 2♂, RRLS, leg. Pirali & Khosravi; Lordegan, Giloreh and Sini Villages, 31°32'02"N 51°02'38"E, 1856 m a.s.l. (Locality No. SH-12-13), XII.2007, 2♀1juv., RRLS, leg. Pirali.

DISTRIBUTION: Iran, Bushehr Province (Akbari, 2007: 76), Chahar Machal & Bakhtiyari Province (Fet, 1997: 67), Fars Province (Fet, 1997: 68), Ilam Province (Akbari, 2007: 76), Khozestan Province (Lourenço, 1996: 94; Fet, 1997: 67-68), Kohgiluyeh & Boyer Ahmad (Navidpour et al., 2008d: 11), and Sistan & Baluchistan Province (Fet, 1997: 66).

Family **Scorpionidae** Latreille, 1802

***Scorpio maurus townsendi* (Pocock, 1900)**

Figures 11, 44–48

Heterometrus townsendi Pocock, 1900: 364.

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

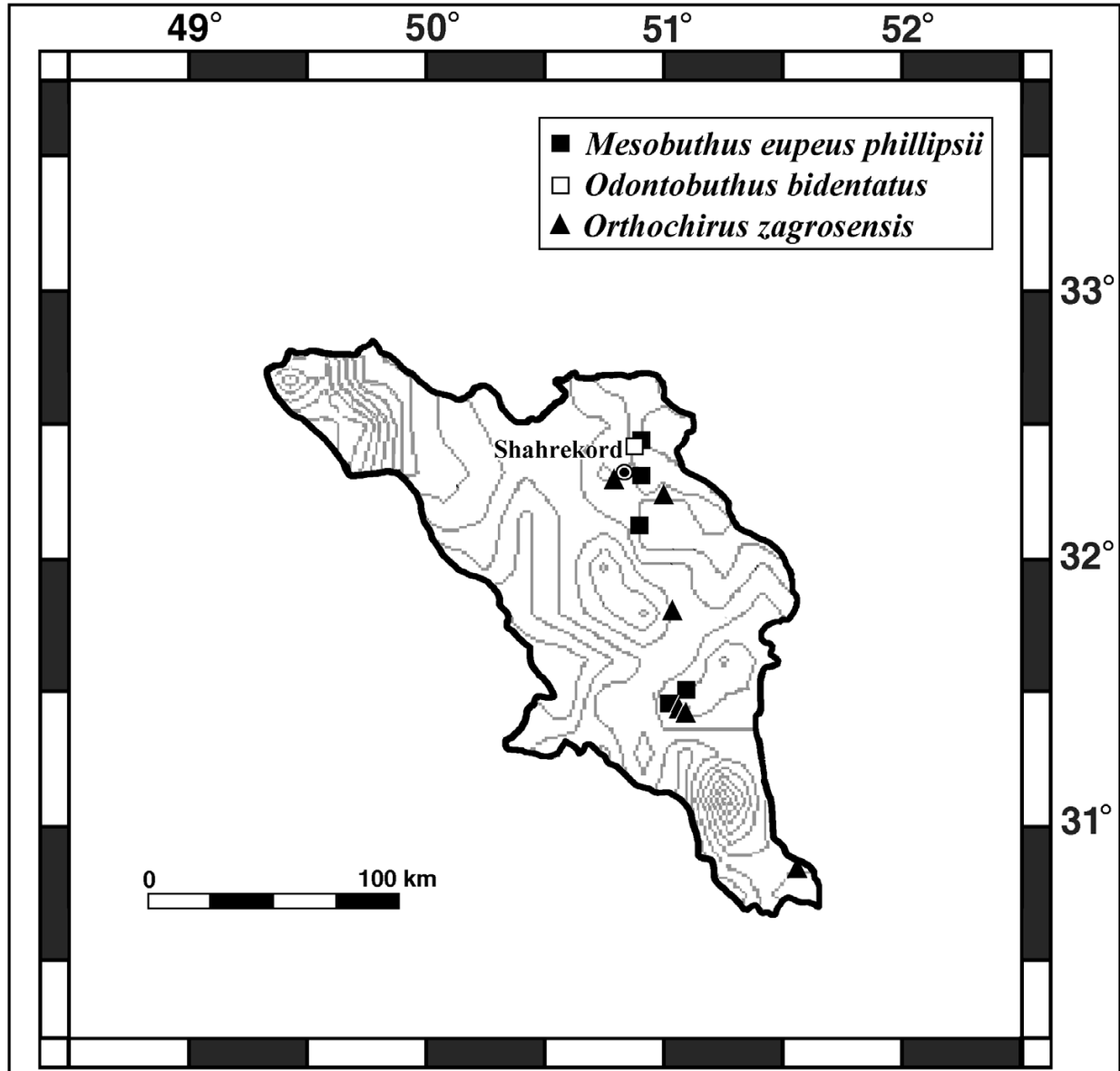


Figure 10: Map of Chahar Mahal & Bakhtiyari Province showing distribution of *Mesobuthus eupeus phillipsii*, *Odontobuthus bidentatus*, and *Orthochirus zagrosensis* collected in this study.

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; Navidpour et al., 2008a: 26; Navidpour et al., 2008b: 20; Navidpour et al., 2008c: 14; Navidpour et al., 2008d: 12.

Scorpio maurus: Farzanpay, 1987: 165; Farzanpay, 1988: 42; Akbari, 2007: 76.

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

TYPE MATERIAL EXAMINED. **Iran**, Bushehr Province, Fort Reshire near Bushire, Persia, 1♀ (holotype) leg. F. W. Townsend, BMNH No. 1900.5.9.1.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Ardal, Dareh Yas Village, 31°46'47"N 50°46'18"E (Locality No. SH-10-1), V.2008, 1♂3juvs., RRLS, 1♀, FKCP, leg. Pirali.

DISTRIBUTION: Iran, Bushehr Province (Pocock, 1900: 364), Ilam Province (Akbari, 2007: 76), Khoozestan Province (Navidpour et al., 2008a: 26), Kohgilouyeh & Boyer Ahmad Province (Navidpour et al., 2008d: 12), and Chahar Machal & Bakhtiyari Province (first report).

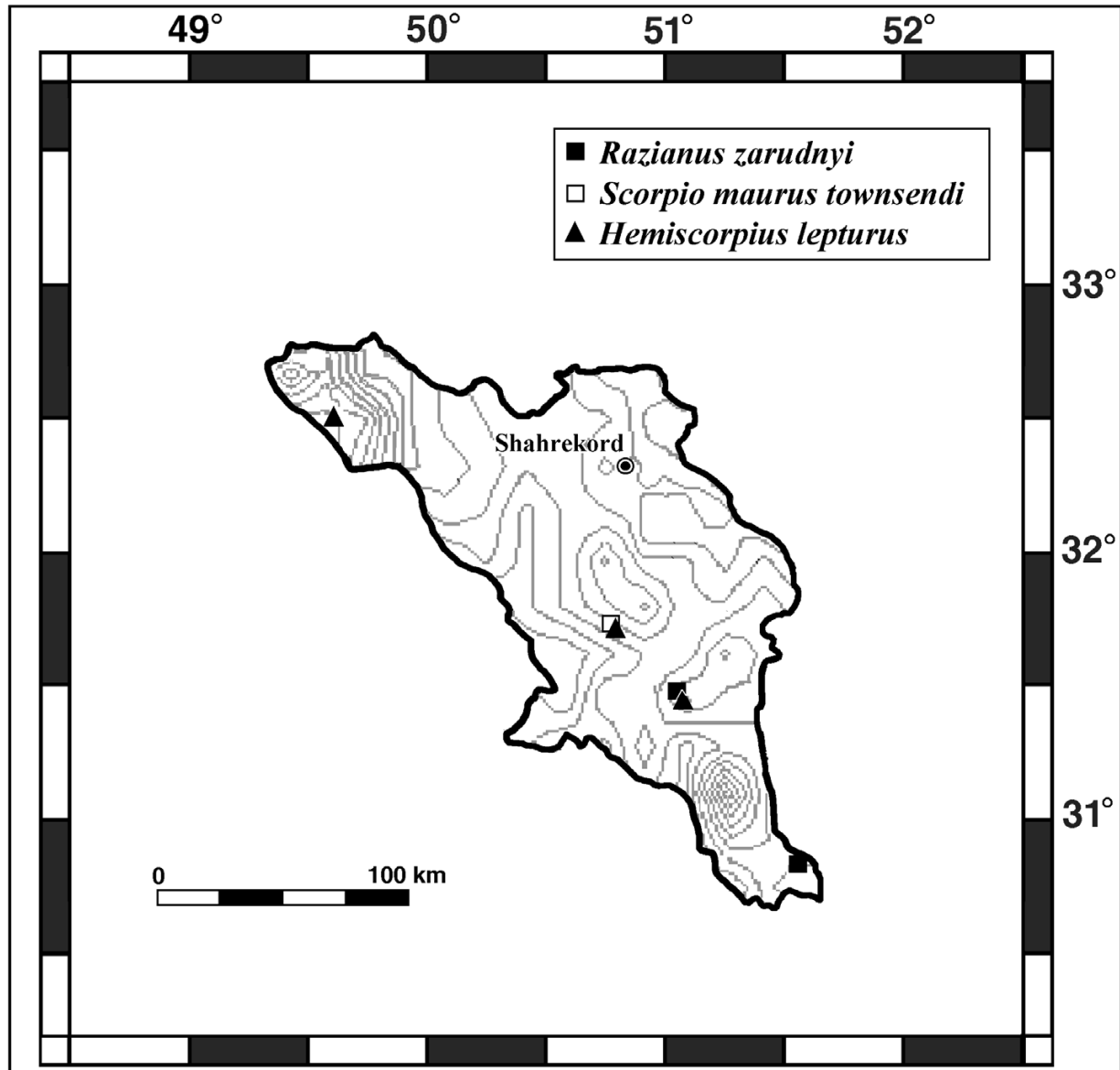


Figure 11: Map of Chahar Mahal & Bakhtiyari Province showing distribution of *Razianus zarudnyi*, *Scorpio maurus townsendi*, and *Hemiscorpius lepturus* collected in this study.

Family **Hemiscorpiidae** Pocock, 1893

Hemiscorpius lepturus Peters, 1861
Figures 3, 11, 49–52

Hemiscorpius lepturus Peters, 1861a: 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; Navidpour et al., 2008a: 26; Navidpour et al., 2008b: 20; Navidpour et al., 2008c: 15; Navidpour et al., 2008d: 14.

Hemiscorpion lepturus: Peters, 1861b: 511; Ausserer, 1880: 466; Kraepelin, 1899: 142; Werner, 1934: 276; Moritz & Fischer, 1980: 317; Kovařík, 2002: 14.

Hemiscorpius 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.

CHAHAR MAHAL & BAKHTIYARI PROVINCE MATERIAL EXAMINED. Bazoft, Abikarolya Village, 32°29'28"N 49°36'02"E (Locality No. SH-1), 2007, 1♂3♀1juv., RRLS, 1♀, FKCP, leg. Pirali & Khosravi; Lordegan, Aloni Village, 31°32'18"N 51°04'03"E, 1883 m a.s.l. (Locality No. SH-3), XII.2007, 1♀, RRLS, 1♂, FKCP, leg. Pirali; Ardal, Dareh Yas Village, 31°46'47"N 50°46'18"E, 1401 m a.s.l. (Locality No. SH-10-1), V.2009, 1♂2♀, RRLS, 1♂, FKCP, leg. Pirali.

DISTRIBUTION: Iran, Fars, Hormozgan, Kohgilouyeh & Boyer Ahmad, Lorestan Provinces (Kovářik, 1997a: 48), Bushehr, Ilam, Khoozestan Province (Farzanpay, 1987: 141; Monod & Lourenço, 2005: 902; Akbari, 2007: 76), and Chahar Machal & Bakhtiyari Province (first report); Iraq (Peters, 1861a: 426).

Key of scorpions of Chahar Mahal & Bakhtiyari 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, 1861
3. Carapace in lateral view distinctly inclined downward from median eyes to anterior margin
..... **Orthochirus zagrosensis** Kovářik, 2004
- Carapace in lateral view with entire dorsal surface horizontal or nearly so (possibly with a slight anterior decline) 4
4. Cheliceral fixed finger with a single ventral denticle
..... **Razianus zarudnyi** (Birula, 1903)
- Cheliceral fixed finger with two ventral denticles 5
5. Ventral carinae of second and third metasomal segments and ventral transverse carina of fourth segment armed with very strong denticles. **Odontobuthus doriae** (Thorell, 1876)
- Ventral carinae of metasomal segments without very strong denticles..... 6
6. 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)..... 7

7. Central median and posterior median carinae of carapace joined to form a continuous linear series of granules to posterior margin
..... **Compsobuthus matthiesseni** (Birula, 1905)

- Central median and posterior median carinae of carapace not joined to form a continuous linear series of granules to posterior margin 8

8. Trichobothrium *db* on tibia 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** 9

- Trichobothrium *db* on tibia 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 granules.....
..... **Mesobuthus eupeus phillipsii** (Pocock, 1889)

9. Color black except reddish brown chela of pedipalp. Legs may also be reddish-brown.
..... **Hottentotta zagrosensis** Kovářik, 1997
- Color not entirely black, usually yellowish green
..... **Hottentotta saulcyi** (Simon, 1880)

Acknowledgments

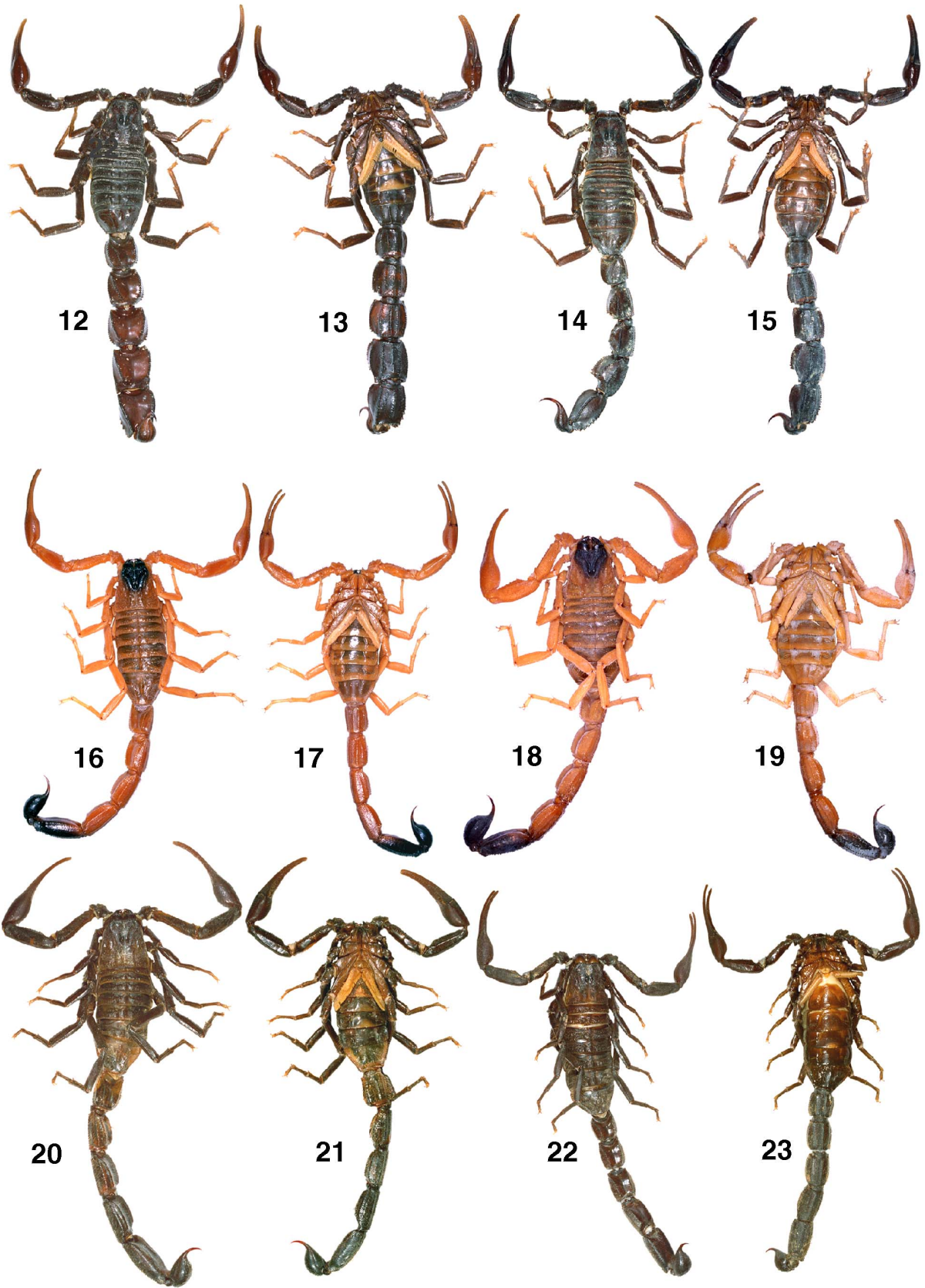
We are grateful to Mohammad Khosravi, Mohsen Fashidi, and Farid Rezaei of Shahrekord University, and to Mr. Salehi and Mr. Hendijani of the Central Post Office of Khoozestan Province, Iran, for their help.

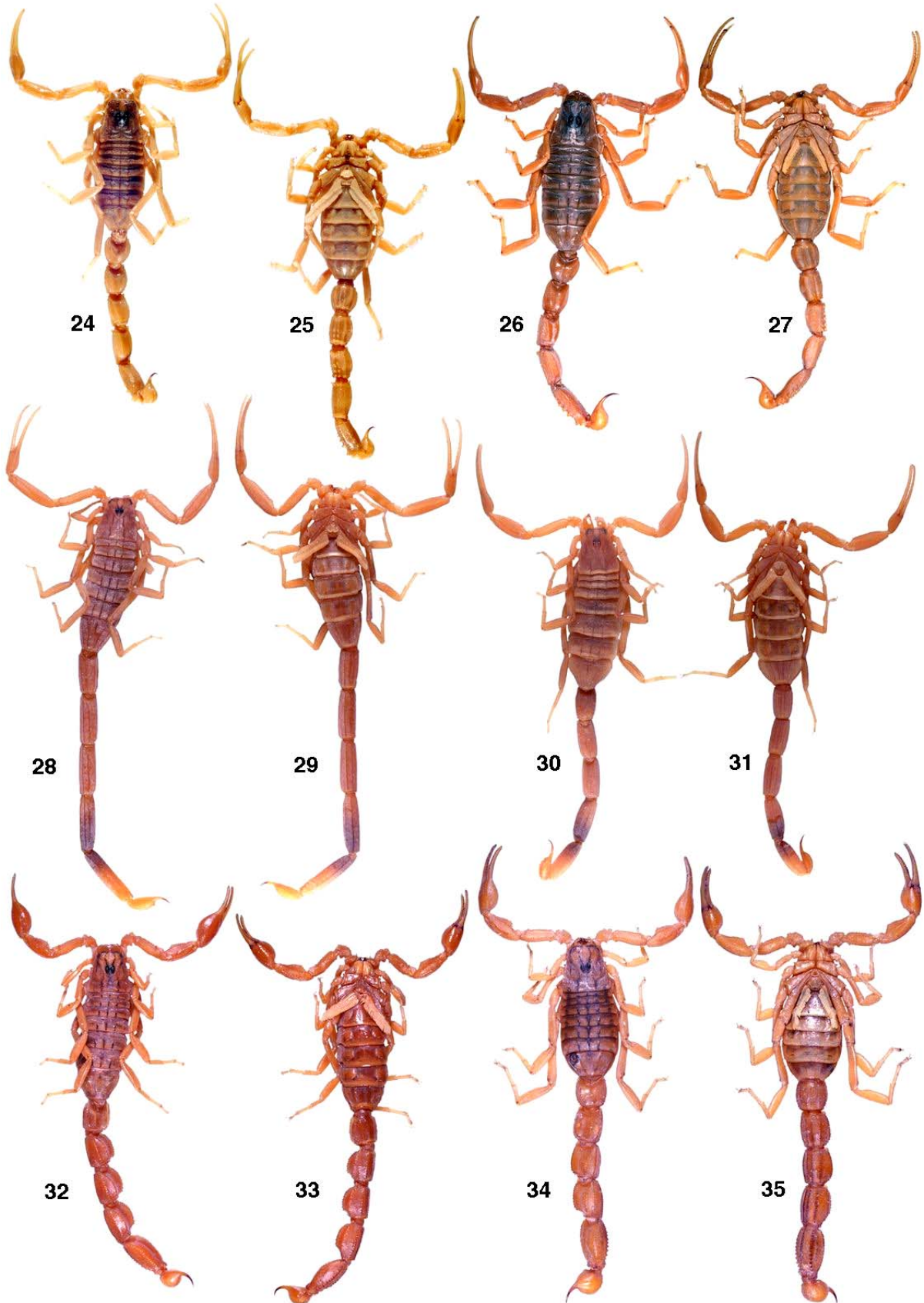
Figures 12–23 ➔: 12–13. *Androctonus crassicauda* (Olivier, 1807), dorsal and ventral views, ♂ (73 mm), Iran, Bushehr Province, Chahak District, 29°38'32"N 50°26'56"E, FKCP. **14–15.** *Androctonus crassicauda* (Olivier, 1807), dorsal and ventral views, ♀ (85 mm), Egypt, FKCP. **16–17.** *Hottentotta 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. **18–19.** *Hottentotta saulcyi* (Simon, 1880), dorsal and ventral views, ♀ (94 mm), Iran, Ilam Province, 30 km NW Ilam, 33°43'N 46°41'E, FKCP. **20–21.** *Hottentotta zagrosensis* Kovařík, 1997, dorsal and ventral views, ♂ (102 mm) holotype, Iran, Fars Province, Zagros Mts., Abshar Village, FKCP. **22–23.** *Hottentotta zagrosensis* Kovařík, 1997, dorsal and ventral views, ♀ (103 mm) allotype, Iran, Fars Province, Zagros Mts., Abshar vill. env., FKCP.

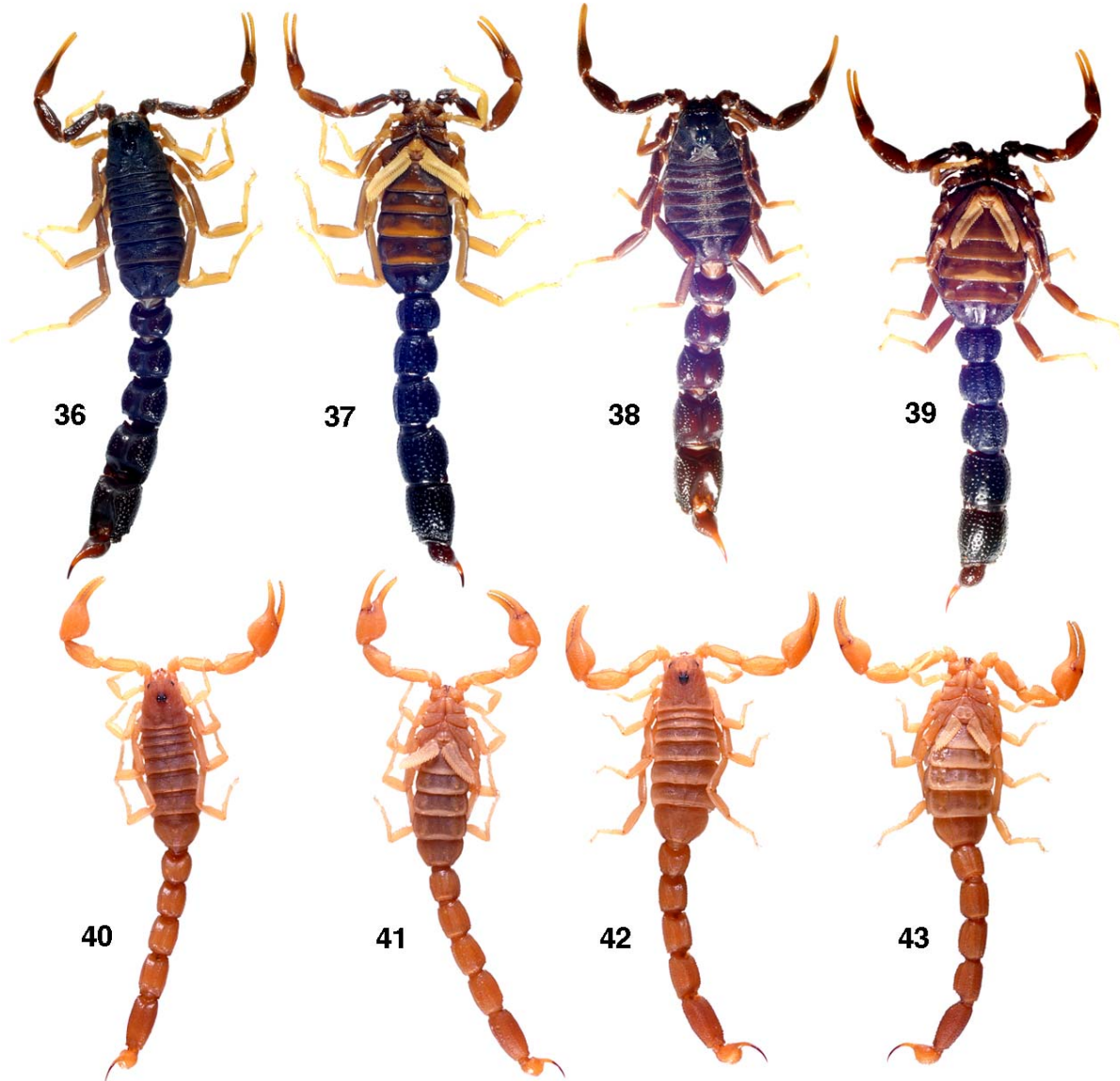
Figures 24–35 ➔: 24–25. *Odontobuthus doriae* (Thorell, 1876), dorsal and ventral views, ♂ (60 mm), Iran, Chahar Mahal & Bakhtiyari Province, Saman, 32°27'17"N 50°52'36"E, 2134 m (Locality No. SH-9), FKCP. **26–27.** *Odontobuthus doriae* (Thorell, 1876), dorsal and ventral views, ♀ (70 mm), Iran, Sistan & Baluchistan Province, 30 km N of Espake by road, 27°05'07"N 60°01'02"E, alt. 540 m, FKCP. **28–29.** *Compsobuthus matthiesseni* (Birula, 1905), dorsal and ventral views, ♂ (38 mm), Iran, Lorestan Province, 10 km SE Bavineh, 1100 m a.s.l., 33°36'08"N 47°11'59"E, FKCP. **30–31.** *Compsobuthus matthiesseni* (Birula, 1905), dorsal and ventral views, ♀ (38 mm), Iran, Lorestan Province, same locality as in Figs. 28–29, FKCP. **32–33.** *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. **34–35.** *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.

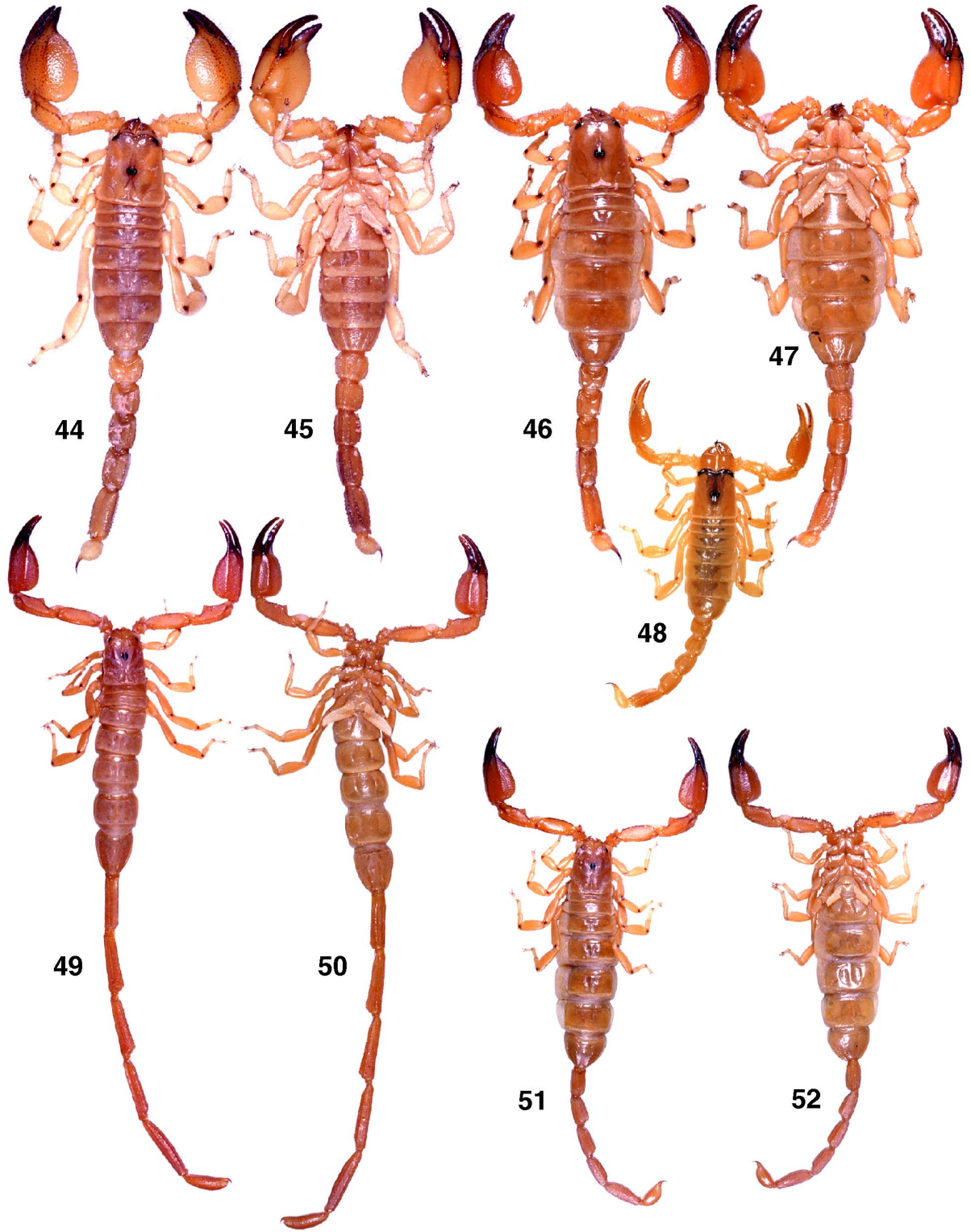
Figures 36–43 ➔: 36–37. *Orthochirus zagrosensis* Kovařík, 2004, dorsal and ventral views, ♂ (40 mm), Iran, Chahar Mahal & Bakhtiyari Province, Lordegan, Giloreh and Sini Villages, 31°32'02"N 51°02'38"E, 1856 m (Locality No. SH-12-13), FKCP. **38–39.** *Orthochirus zagrosensis* Kovařík, 2004, dorsal and ventral views, ♀ (46 mm) allotype, Kohgiluyeh & Boyer Ahmad Province, Zagros Mts., Kuh-e-Dinar ridge, 10 km N of Yasuj by road, 30°39'N, 51°36'E, 1800–2500 m a.s.l., FKCP. **40–41.** *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. **42–43.** *Razianus zarudnyi* (Birula, 1903), dorsal and ventral views, ♀ (24 mm), Iran, Khoozestan Province, same locality as in Figs. 40–41, FKCP.

Figures 44–52 ➔: 44–45. *Scorpio maurus townsendi* (Pocock, 1900), dorsal and ventral views, ♂ (55 mm), Iran, Khoozestan Province, Ahvaz–Omidyeh road, Chombeh Village, 31°11'54"N 49°11'41"E, 44 m a.s.l., FKCP. **46–47.** *Scorpio maurus townsendi* (Pocock, 1900), dorsal and ventral views, ♀ (54 mm), Iran, Khoozestan Province, Ramhormoz, 31°11'54"N 49°11'41"E, 44 m a.s.l. (Locality No. A-Ra 807), FKCP. **48.** *Scorpio maurus townsendi* (Pocock, 1900), dorsal view, juv. (25 mm), Iran, Bushehr Province, Tangestan, Farshanbeh, 28°52'53"N 51°18'43"E, 95 m a.s.l. (Locality No. Bu-35), FKCP. **49–50.** *Hemiscorpius lepturus* Peters, 1861, 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. **51–52.** *Hemiscorpius lepturus* Peters, 1861, dorsal and ventral views, ♀ (58 mm), Iran, Khoozestan Province, same locality as in Figs. 49–50, FKCP.









References

- AKBARI, A. 2007(1836). [Study of scorpion fauna of Iran]. *Project Report Publication of Razi Vaccine & Serum Research Institute*, 2007: 96 (in Farsi).
- AKBARI, A., M. TABATABAI, A. HEDAYAT, H. MODIRROOSTA, M. H. ALIZADEH & M. KAMAL ZARE. 1997(1826). [Study of the geographical distribution of the scorpions in south of Iran]. *Pajooresh and Sazandegi*, 34: 112–115 (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.
- 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. 1900a. Beiträge zur Kenntniss der Scorpionenfauna Ost-Persiens. *Bulletin de l'Académie Impériale des Sciences de St.-Petersbourg*, 12(1): 355–375.
- BIRULA, A. A. 1900b. Scorpiones mediterranei Musei Zoologici mosquensis. *Izvestiya Imperatorskogo Obshchestva Lyubitelei Prirody, Istorii, Antropologii i Etnografii*, 98, 3(1): 8–20 (in Russian).
- BIRULA, A. A. 1903. Beiträge zur Kenntniss der Scorpionenfauna Persiens (Zweiter Beitrag). *Bulletin de l'Académie Impériale des Sciences de St.-Petersbourg*, 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.-Petersbourg*, 9: 28–38.
- BIRULA, A. A. 1905a. Beiträge zur Kenntniss der Scorpionenfauna Persiens (Dritter Beiträge). *Bulletin de l'Académie Impériale des Sciences de St.-Petersbourg*, 23: 119–148.
- BIRULA, A. A. 1905b. 4. Skorpiologische Beiträge, 1.-3. *Microbuthus littoralis* (Pavesi), *Anomalobuthus rickmersi* Kraepelin und *Buthus zarudnianus* n. nom. *Zoologischer 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. I. Scorpions*. Jerusalem: Israel Program for Scientific Translations, 170 pp. (in Russian).
- BIRULA, A. A. 1918. Miscellanea scorpiologica. XI. Materialy k skorpiofaune nizhnei Mesopotamii, Kurdistana i Severnoi Persii (Matériaux pour servir à 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.-Petersbourg*, 22(1917): 1–44 (in Russian).
- BIRULA, A. A. 1937. Zametki o kollektzii 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 Società Italiana di Scienze Naturali*, 53: 456–464.
- 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 (España) 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 occurring 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 Museums 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: Scorpiones) 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.
- HABIBI, T. 1971. Liste de Scorpions de l'Iran. *Bulletin of the Faculty of Science, Teheran University*, 2(4): 42–47.
- 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.
- 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.
- KOVAŘÍK, F. 1992. A check list of scorpions (Arachnida: Scorpiones) in the collections of the Zoological Department, 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. 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, *Balorthochirus* 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. 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. 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 Residenzstadt 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 Linnean 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. 2005. Nouvelles considérations taxonomiques sur les espèces du genre *Androctonus* Ehrenberg, 1828 et description de deux nouvelles espèces (Scorpiones, Buthidae). *Revue suisse de Zoologie*, 112 (1) : 145–171.
- LOURENÇO, W. R. & A. PÉZIER. 2002. Taxonomic consideration of the genus *Odontobuthus* Vachon (Scorpiones, Buthidae), with description of a new species. *Revue suisse de Zoologie*, 109(1): 115–125.
- 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: Burgham Beeches, Bucks.
- MASI, L. 1912. Note sugli Scorpioni appartenenti al R. Museo Zoologico di Roma. *Memorie della Società 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. Skorpiones. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 56: 309–326.
- NAVIDPOUR, S., F. KOVAŘÍK, M. E. SOLEGLAD & V. FET. 2008a. Scorpions of Iran (Arachnida, Scorpiones). Part I. Khoozestan Province. *Euscorpium*, 65: 1–41.
- NAVIDPOUR, S., M. E. SOLEGLAD, V. FET & F. KOVAŘÍK, 2008b. Scorpions of Iran (Arachnida, Scorpiones). Part II. Bushehr Province. *Euscorpium*, 67: 1–33.
- NAVIDPOUR, S., V. FET, F. KOVAŘÍK & M. E. SOLEGLAD, 2008c. Scorpions of Iran (Arachnida, Scorpiones). Part III. Ilam Province. *Euscorpium*, 69: 1–29.
- NAVIDPOUR, S., F. KOVAŘÍK, M. E. SOLEGLAD & V. FET. 2008d. Scorpions of Iran (Arachnida, Scorpiones). Part IV. Kohgiluyeh & Boyer Ahmad Province. *Euscorpium*, 74: 1–24.
- 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. 1861a. Eine neue Untergattung von Scorpionen, Hemiscorpion lepturus. *Monatsberichte der Königlichen Preussischen Akademie der Wissenschaften zu Berlin*, 1861: 426–427.
- PETERS, W. 1861b. 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.
- 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 Société 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 Espèces de l'ordre des Scorpiones. *Annales de la Société Entomologique de France*, 5(10)1880: 377–398.
- SIMON, E. 1880b. Quelques Scorpions qui lui ont été donnés par notre confrère M. Reiche, de la part de M. F. de Sauley, qui les a recus de Mossoul (ancienne Ninive), sur le Tigre, en Mésopotamie. *Annales de la Société 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.
- 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. *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.
- THORELL, T. 1876. Études scorpiologiques. *Atti della Società Italiana di Scienze Naturali*, 19: 75–272.
- 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 tarafından Türkiyede toplanan akrepler hakkında. À 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 Kobenhavn*, 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.
- 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 Verlagsgesellschaft, Leipzig. 5(IV) 8 (Scorpiones pp. 1–316): 1–490.