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).

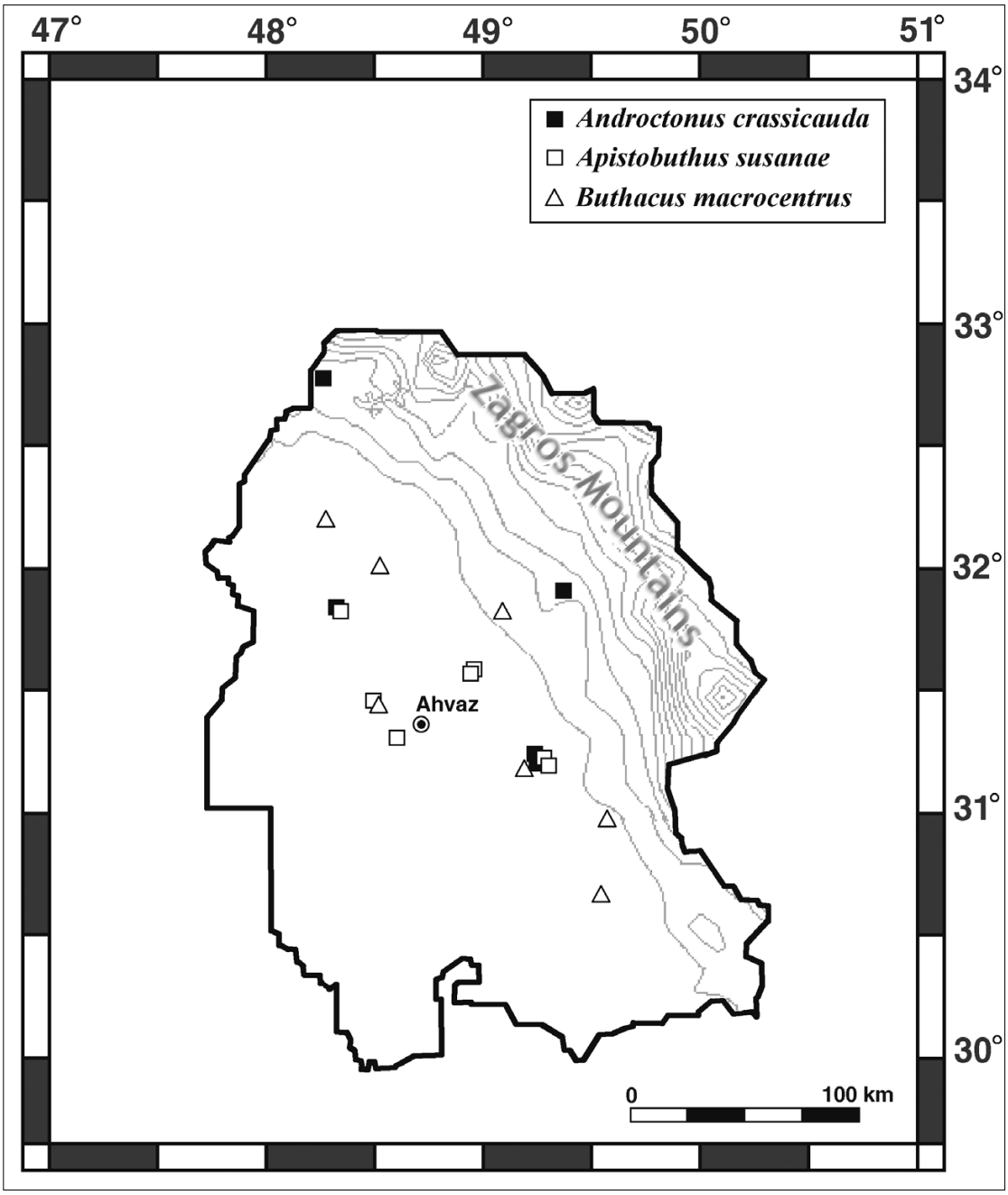


Figure 12: Map of Khoozestan province showing distribution of *Androctonus crassicauda, Apistobuthus susanae* and *Buthacus macrocentrus* collected in this study.

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.

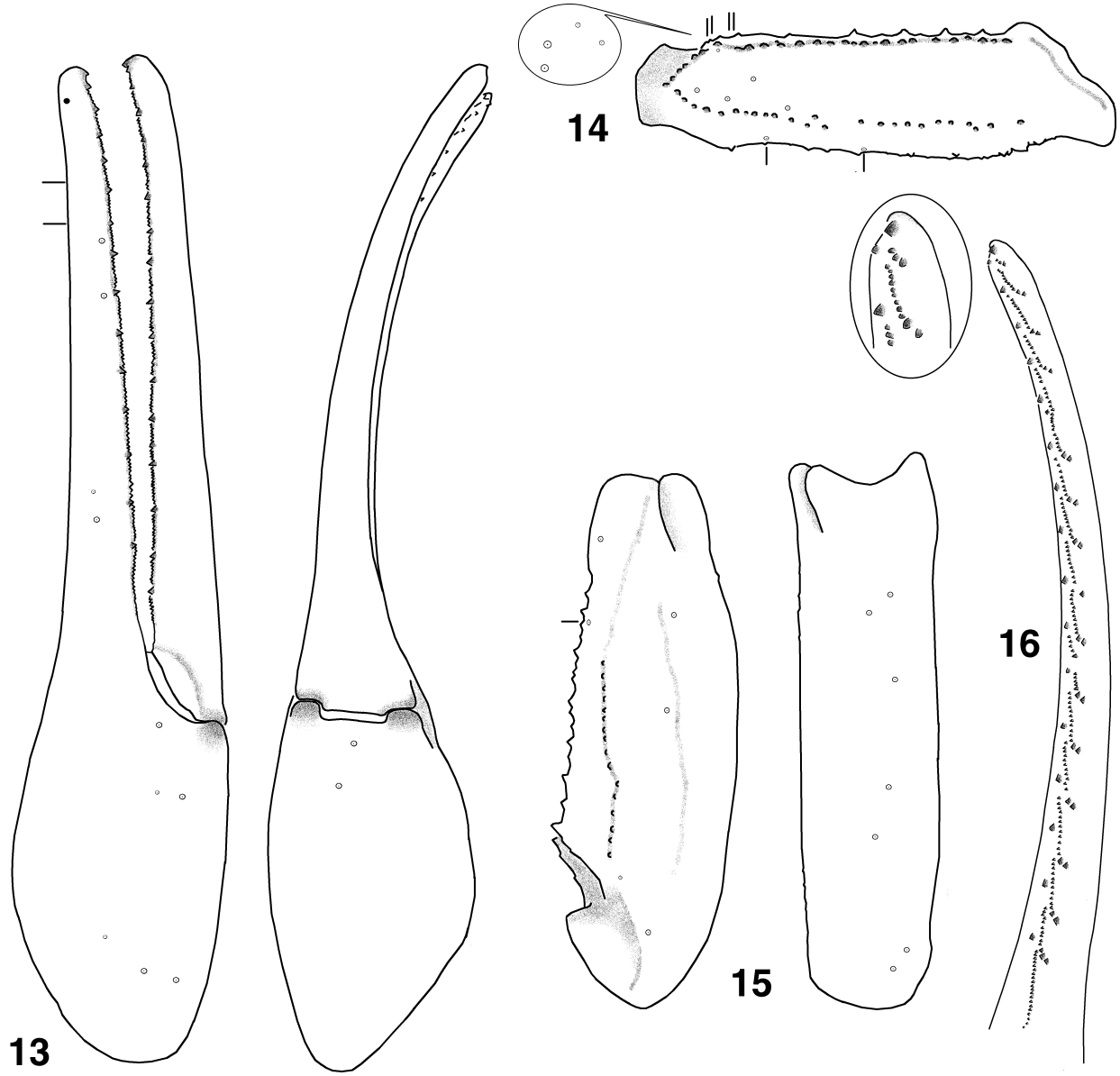
PEDIPALPS: The pedipalps are smooth to glossy, without hairs. The femur of pedipalp bears three discrete carinae, two other carinae are indicated only by a few scattered granules. The patella has eight carinae, some of which are weakly indicated. The chela lacks carinae. The movable fingers of pedipalps 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

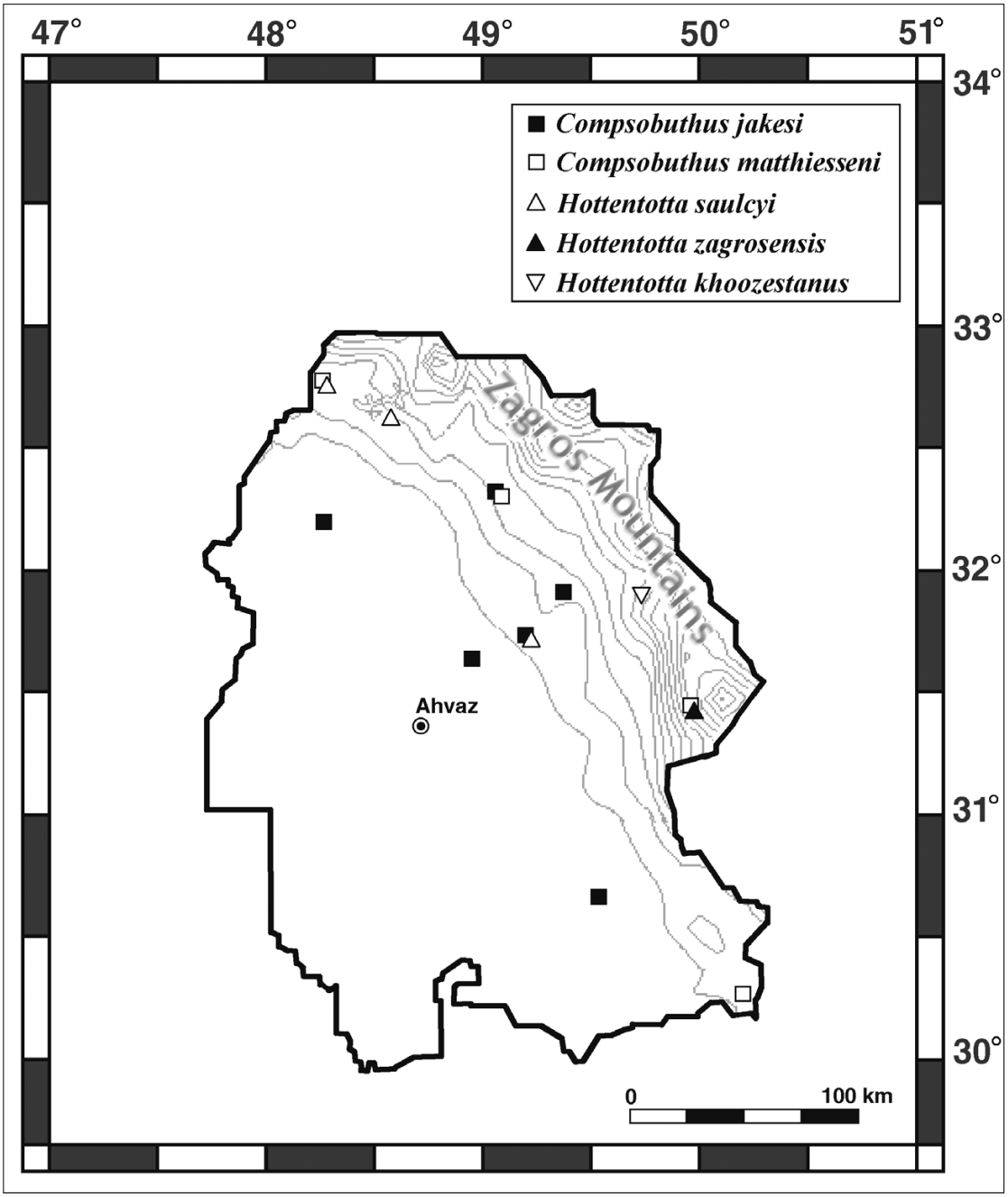


Figure 17: Map of Khoozestan province showing distribution of *Compsobuthus jakesi*, *C. matthiesseni*, *Hottentotta saulcyi*, *H. zagrosensis* and *H. khoozestanus* **sp. n.** collected in this study.

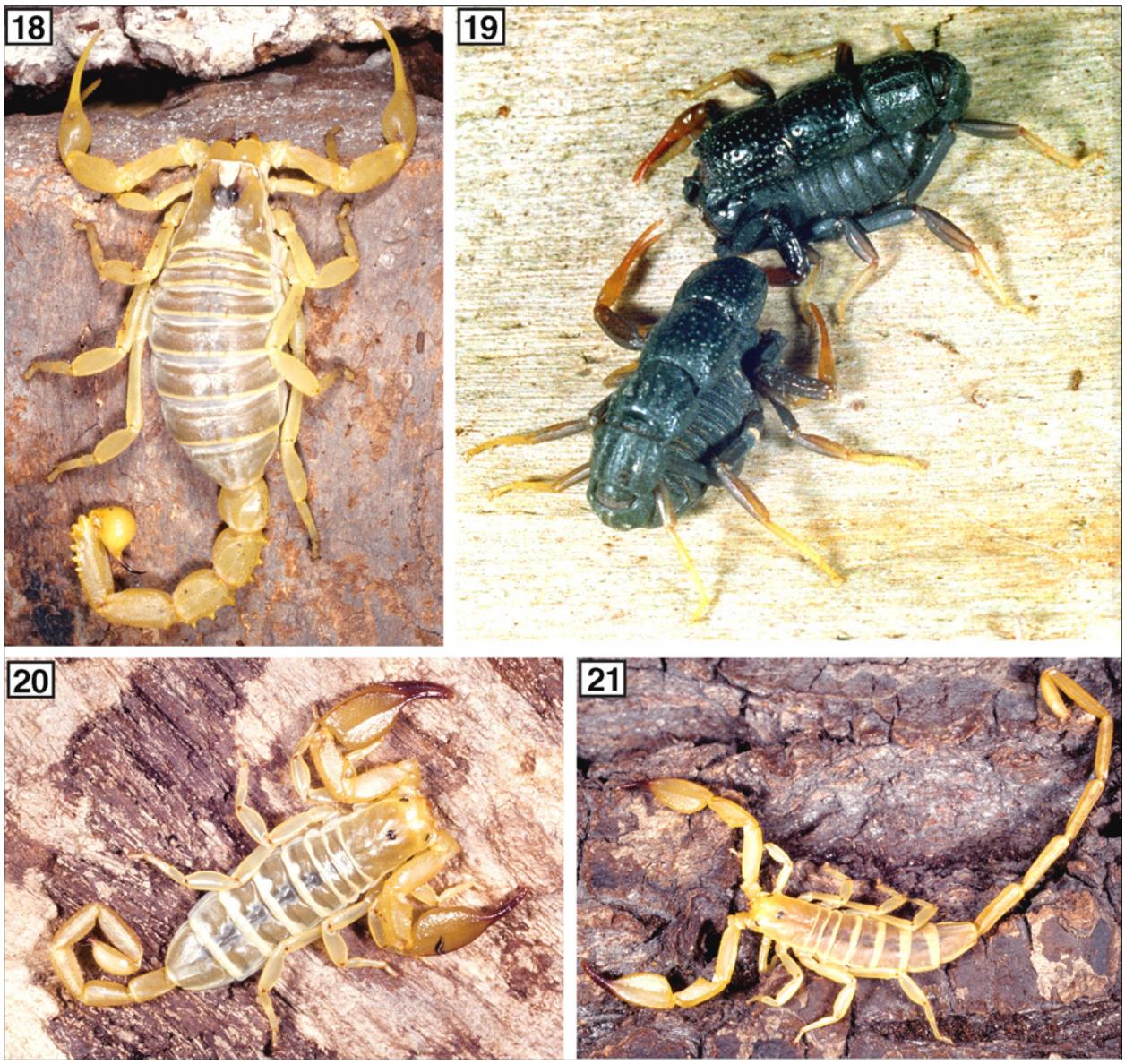
a.s.l., 2007, 2♂1♀ RRLS, leg. Bahrani, Masihipour & Jahanifard.

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

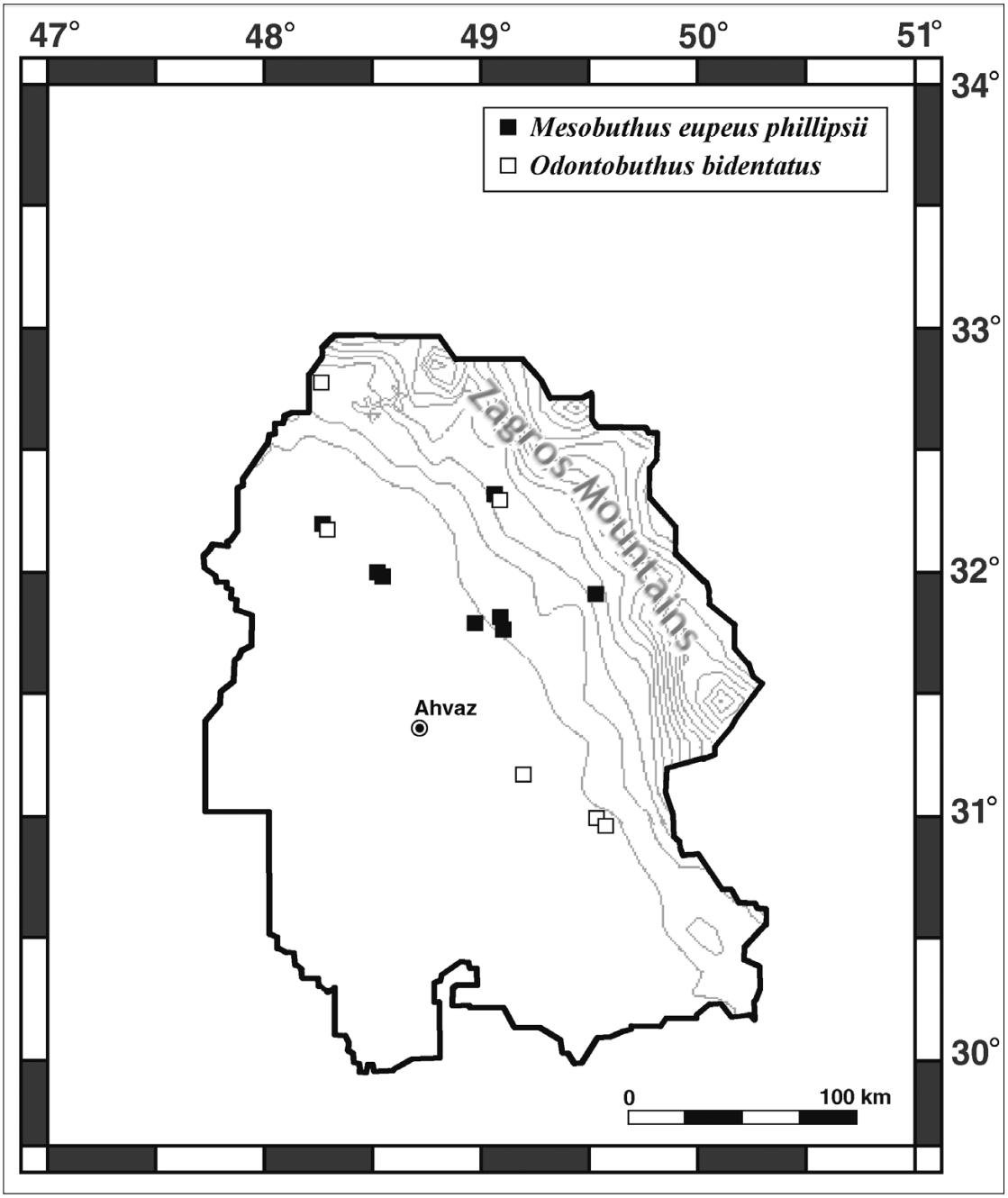


Figure 22: Map of Khoozestan province showing distribution of *Mesobuthus eupeus phillipsii* and *Odontobuthus bidentatus* collected in this study.

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,

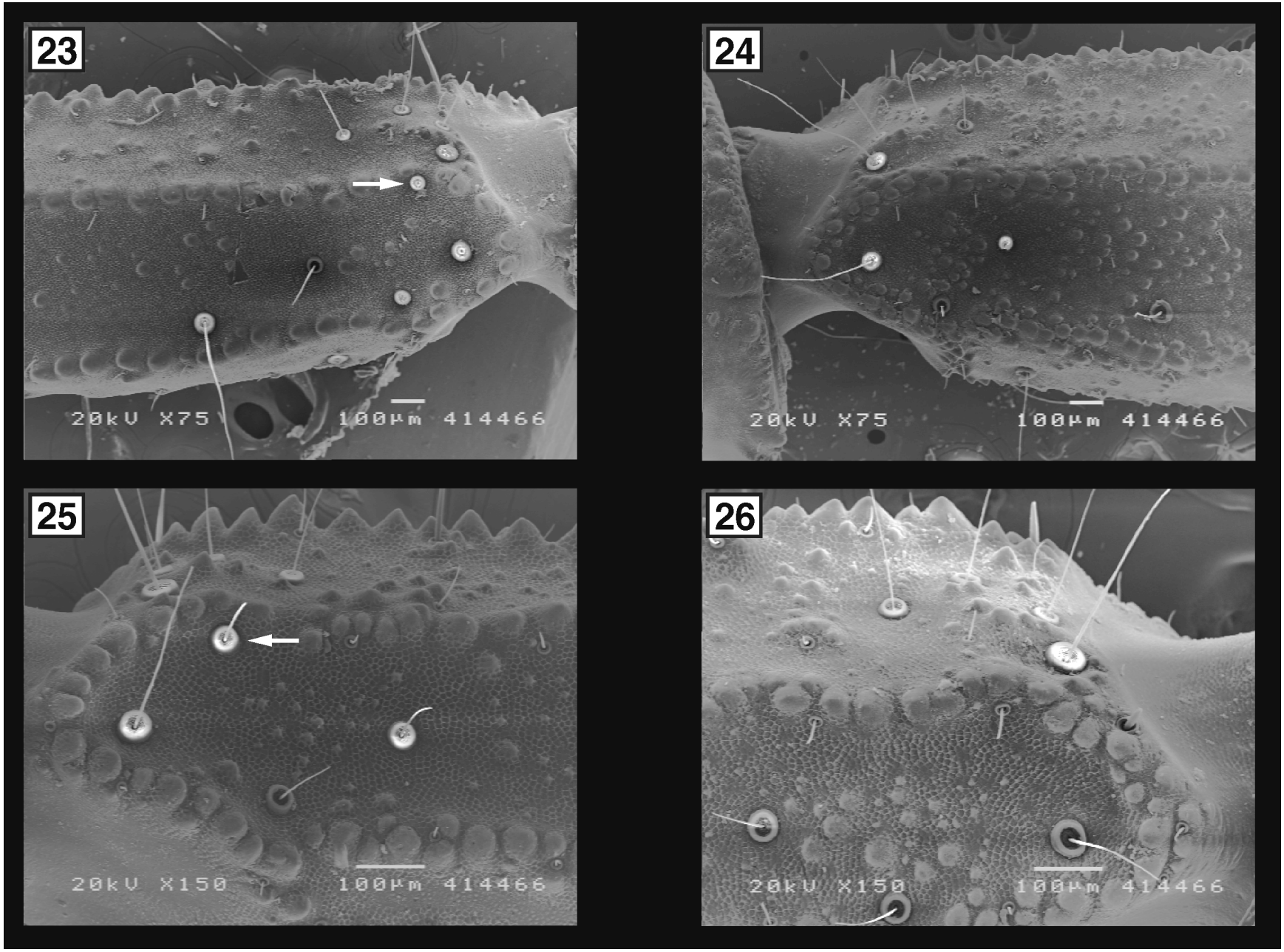
1♂1♀ (paratypes), leg. M. Kaftan; Khoozestan Province, Chogha Zanbil (zikkurat), 32°00'N, 48°31'E, 100 m a.s.l., 5–6.V.1996 (loc No. 20 in Frynta et al., 1997: 4), 1im.♂ (paratype), leg. M. Kaftan. All types are in FKCP.

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.