

Notes on the genus *Mesobuthus* (Scorpiones: Buthidae) in China, with description of a new species

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Abstract. *Mesobuthus karshius* new species from the southern region of Xinjiang, China, is described. Nine species and subspecies of the genus *Mesobuthus* Vachon 1950 from China are recorded, and diagnoses of *M. eupeus mongolicus* (Birula 1911), *M. eupeus thersites* (C.L. Koch 1839) and *M. martensii martensii* (Karsch 1879) are provided. In addition, *M. caucasicus przewalskii* (Birula 1897), *M. caucasicus intermedius* (Birula 1897), *M. eupeus mongolicus* (Birula 1911), *M. karshius* sp. nov. and *M. martensii martensii* (Karsch 1879) are illustrated, and a key to the Chinese *Mesobuthus* is also provided.

Keywords: New species, taxonomy, morphology, *Mesobuthus karshius*

The genus *Mesobuthus* Vachon 1950 currently includes 13 species (Fet & Lowe 2000; Gantenbein *et al.* 2000; Lourenço *et al.* 2005; Kovařík 2007; Sun & Zhu 2010; Sun *et al.* 2010), including one new species reported here. It is one of the most widely distributed genera of the family Buthidae, with species from the Balkans, Anatolian Peninsula, Iran, throughout Asia to China, Korea, and Japan. The composition of this large, predominantly Asian, genus has not been very clear until now, mainly because of its plentiful subspecies (Fet & Lowe 2000), especially in Iran and Afghanistan. The most useful publications involving *Mesobuthus* are old keys and reviews by Birula (1897, 1900, 1904, 1905, 1911, 1917), and the only recent revisions and keys for the genus focus on India (Tikader & Bastawade 1983) and Afghanistan (Vachon 1958).

The first species of *Mesobuthus* described from China was *M. martensii* by Karsch (1879), originally described as *Buthus martensii*. After the description of *M. martensii*, two other taxa, *M. caucasicus przewalskii* (Birula 1897) and *M. eupeus mongolicus* (Birula 1911) were described by Birula (1897, 1911) in the genus *Buthus* as *B. caucasicus przewalskii* and *B. eupeus mongolicus*. Moreover, Birula (1904) also described a new subspecies, *M. martensii hainanensis*, based on a single specimen of unknown sex from Hainan Island, as *B. confucius hainanensis*. More recently, *M. eupeus thersites* (C.L. Koch 1839) and *M. caucasicus intermedius* (Birula 1897) have also been recorded from China (Fet 1994; Fet & Lowe 2000). Lourenço *et al.* (2005) described the fourth species of this genus from China, *M. songi*, based on old preserved specimens from the northern piedmont of the Himalayas, Xizang (Tibet). This species has been found to belong to *Hottentotta* Birula 1908 (Sun *et al.* 2010). Here we provide the results of the first comprehensive investigation of all six *Mesobuthus* species from China (as well as six subspecies), as well as detailed illustrations of four previously established subspecies (*M. caucasicus przewalskii*, *M. caucasicus intermedius*, *M. eupeus mongolicus* and *M. martensii martensii*) and the description of a new species discovered from the Karshi (Kashgar) District, Xinjiang Uygur Autonomous Region, China.

METHODS

We examined and measured specimens under a Leica M165c stereomicroscope with an ocular micrometer. To

produce illustrations, we used a Leica M165c stereomicroscope with a drawing tube. All measurements follow Stahnke (1970) and are given in millimeters (mm), except for the chela, in which we follow Vachon (1952). Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Hjelle (1990). Specimens used in this taxonomic work come from the Museum of Hebei University, Baoding (MHBU) and the American Museum of Natural History, New York (AMNH).

TAXONOMY

Family Buthidae C.L. Koch 1837

Genus *Mesobuthus* Vachon 1950

Mesobuthus Vachon 1950:152; Vachon 1952:324; Vachon 1958:141; Stahnke 1972:133; Tikader & Bastawade 1983:186; Kovařík 1998:114; Fet & Braunwalder 2000:15–16, fig. 1; Fet *et al.* 2000:287–288; Fet & Lowe 2000:169; Karataş & Karataş 2001:297; Teruel 2002:75; Ganbentein *et al.* 2003:412, 417; Karataş & Karataş 2003:1; Soleglad & Fet 2003a:9, 12, 20, 26, table 2; Soleglad & Fet 2003b:12, 13, 19, 21, 53, 66, 68, 78, 88, 91, figs. 4, 15, 78, tables 3, 4, 9; Qi *et al.* 2004:137; Teruel *et al.* 2004:2, 5; Zhu *et al.* 2004:112; Fet *et al.* 2005:3, 7, 10, 12–13, 22, 29, table 1, fig. 23; Karataş 2005:1; Lourenço *et al.* 2005:2–3; Prendini & Wheeler 2005:451, 454, 481, table 3; Shi & Zhang 2005:474; Dupré 2007:7, 13, 17; Karataş 2007:1; Kovařík 2007:1–3, 8, 94; Shi *et al.* 2007:216; Kovařík 2009:24; Lourenço & Duhem 2009:38–39, 44, 48, 50; Sun & Zhu 2010:1; Sun *et al.* 2010:35.

Olivierus Farzanpay 1987:387 (synonymy by Ganbentein *et al.* 2003:417).

Type species.—*Androctonus eupeus* C.L. Koch 1839, by original designation.

Diagnosis.—See Vachon (1950); Sissom (1990) and Sun *et al.* (2010).

Distribution.—Species of *Mesobuthus* occur in Asia, the Balkan Peninsula and Caucasia.

Mesobuthus bolensis Sun, Zhu & Lourenço 2010

(Fig. 10)

Mesobuthus bolensis Sun *et al.* 2010:36–40, figs. 2, 3, 5–11, 14–18, 21, 22, table 1.

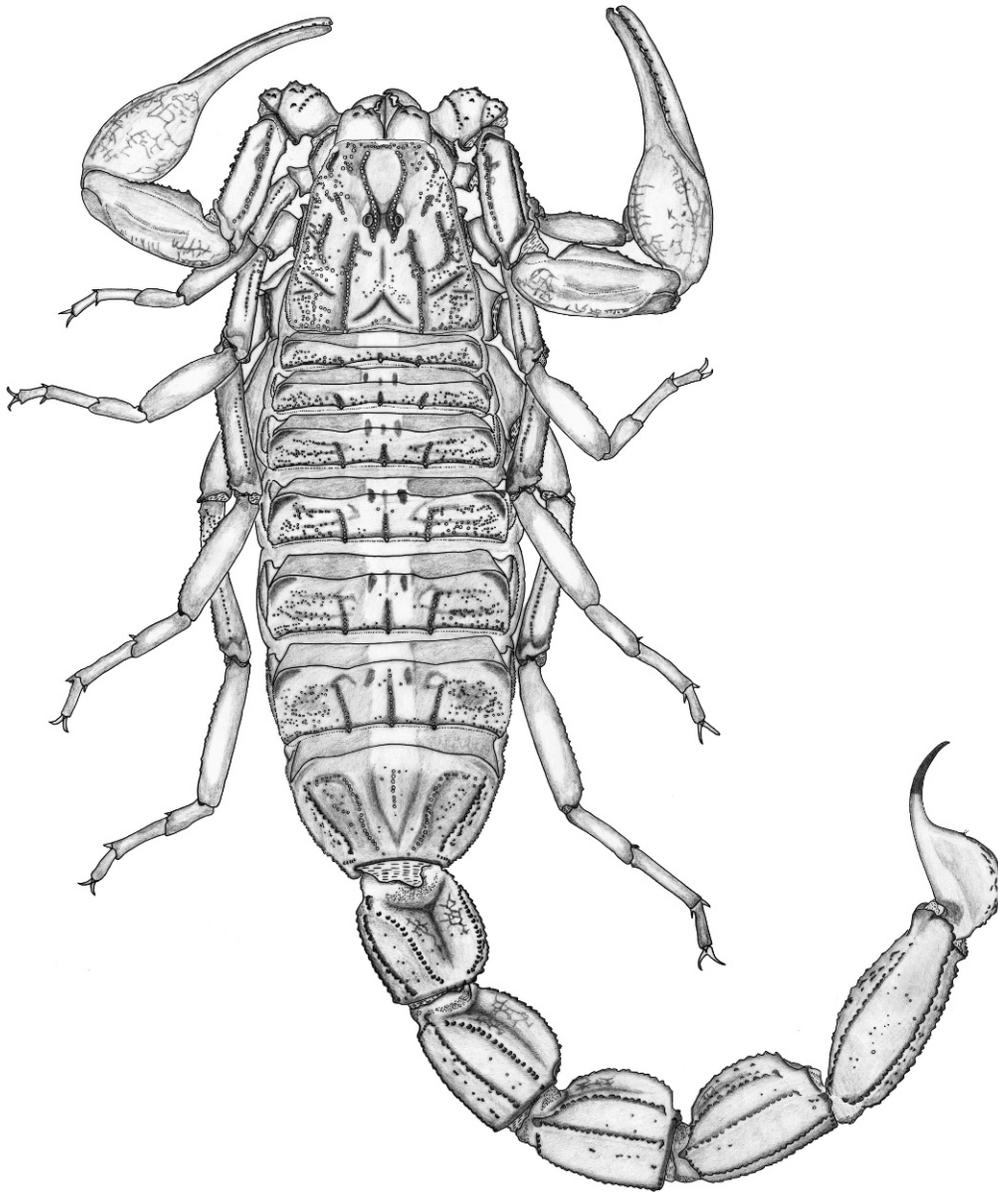


Figure 1.—*Mesobuthus caucasicus przewalskii* (Birula 1897), female from Tuokexun County, Xia Village (42°47'N, 88°40'E), dorsal view.

Material examined.—See Sun et al. (2010).

Diagnosis.—See Sun et al. (2010).

Distribution.—This species occurs in China (Xinjiang Uygur Autonomous Region).

Ecology.—See Sun et al. (2010).

Mesobuthus caucasicus przewalskii (Birula 1897)
(Figs. 1, 2, 10, Table 1)

Buthus caucasicus przewalskii Birula 1897:387.

Mesobuthus caucasicus przewalskii (Birula): Vachon 1958:148, fig. 31; Gantenbein et al. 2003:412; Qi et al. 2004:142; Shi & Zhang 2005:475; Sun & Zhu 2010:4–5, 7–8, figs. 3, 14–16.

Olivierus caucasicus przewalskii (Birula): Farzanpay 1987:156; Fet & Lowe 2000:192; Zhu et al. 2004:113.

Type specimens.—Type material not examined.

Material examined.—CHINA: Xinjiang Uygur Autonomous Region: Aksu City, 7 km SW of downtown area, near to West Bridge, 41°07'N, 80°11'E, 2 June 2009, D. Sun and Y.W. Zhao, 2 ♀, 2 ♂, 1 juvenile (MHB); Artush City, area near to Arhu Town, 39°42'N, 76°09'E, 7 June 2009, D. Sun and Y.W. Zhao, 6 ♀, 3 ♂ (MHB); Wuqia County, 39°44'N, 75°14'E, date and collector unknown, 2 ♀ (MHB). Other material examined, see Sun et al. (2010).

Diagnosis.—See Sun et al. (2010).

Distribution.—*Mesobuthus caucasicus przewalskii* occurs in China (Xinjiang Uygur Autonomous Region), Tajikistan, Uzbekistan and Mongolia.

Ecology.—This subspecies is distributed from Mongolia, throughout Xinjiang, to Central Asia. In Xinjiang, most of specimens were collected in croplands (cotton or other) and vineyards, or around villages. In pure, natural environments

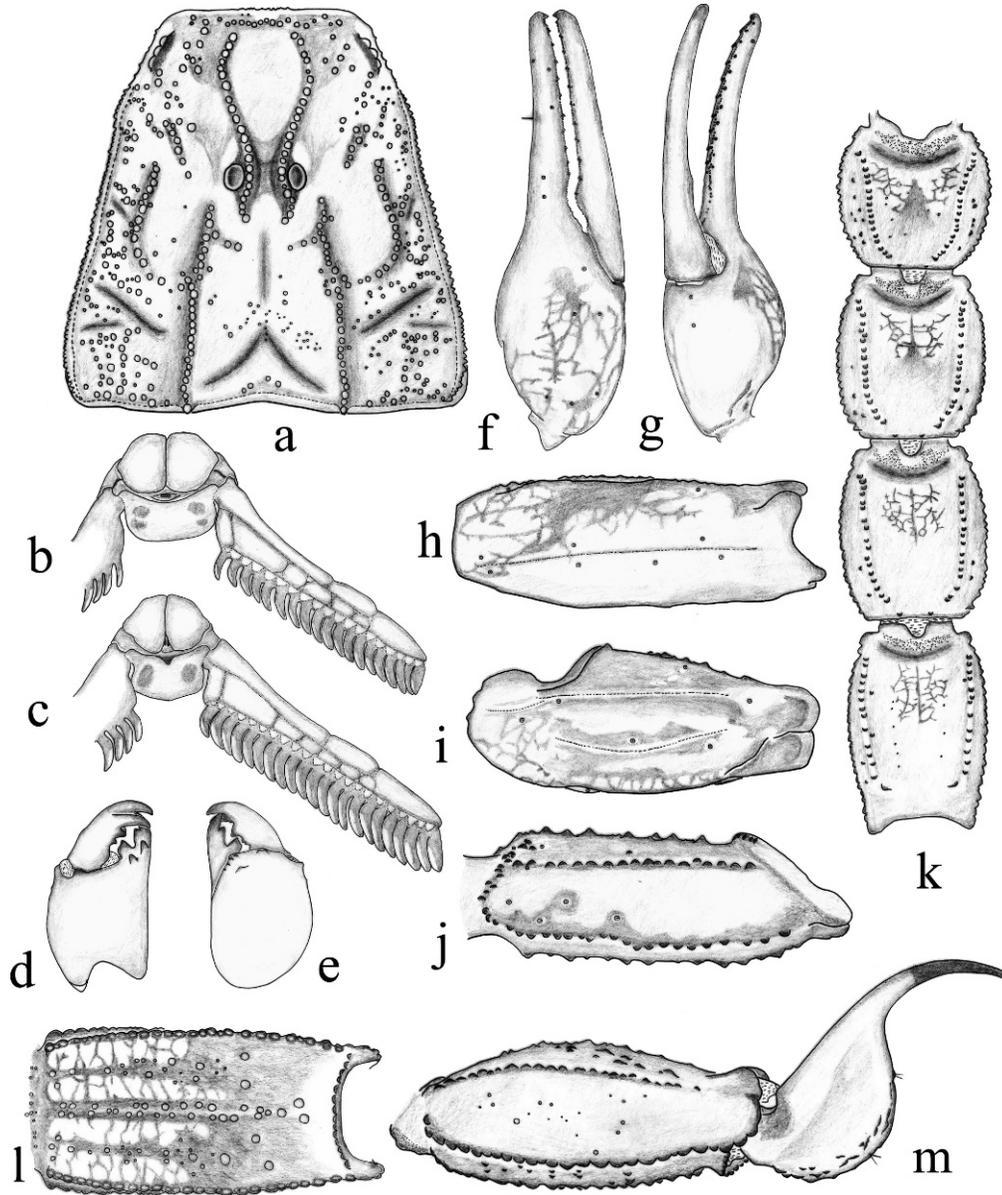


Figure 2.—*Mesobuthus caucasicus przewalskii* (Birula 1897), from Tuokexun County, Xia Village (42°47'N, 88°40'E): a, b, d–m: female; c: male. a. Carapace, dorsal aspect; b, c. Genital operculum and pectines, ventral aspect; d, e. Chelicera (d, ventral; e, dorsal); f, g. Chela (f, dorso-external; g, ventral); h, i. Patella (h, external; i, dorsal); j. Femur, dorsal aspect; k. Metasomal segment I–IV, dorsal aspect, showing the pigments; l. Metasomal segment V, ventral aspect; m. Metasomal segment V and telson, lateral aspect.

(the deserts or Gobi) the population density is quite low, probably mainly because of the lack of food and potential excessive water loss in high temperatures.

Mesobuthus caucasicus intermedius (Birula 1897)
(Figs. 3, 4, 10, Table 1)

Buthus caucasicus forma γ *intermedius* Birula 1897:387.

Buthus caucasicus intermedius (Birula): Birula 1900:368; Birula 1911:168; Pohl 1967:214.

Mesobuthus caucasicus intermedius (Birula): Vachon 1958:150, fig. 31; Kovařík 1997:49; Kovařík 1998:114; Qi et al. 2004:142; Shi & Zhang 2005:475; Sun & Zhu 2010:3–4, 7–8, figs. 2, 11–13.

Olivierus caucasicus intermedius (Birula): Farzanpay 1987:156; Fet & Lowe 2000:191; Zhu et al. 2004:113.

Type specimens.—Type material not examined.

Material examined.—CHINA: *Xinjiang Uygur Autonomous Region*: Yining City, 5 km E of downtown area, 43°55'N, 81°23'E, 14 August 2006, F. Zhang, H.Q. Ma and S.N. Liu, 1 ♀, 1 ♂; Bole City, 2 km SW of downtown area, south bank of canal, 44°52'N, 82°02'E, 31 July 2007, D. Sun and L. Zhang, 1 ♂. KAZAKHSTAN: see Sun et al. (2010).

Diagnosis.—See Sun et al. (2010). This subspecies is undoubtedly a close relative of *M. caucasicus przewalskii*, but it can be distinguished by the following features: 1)

Table 1.—Morphometric values (in mm) for *Mesobuthus caucasicus przewalskii* (Tuokexun County, Xia Village, 42°47'N, 88°40'E), *M. caucasicus intermedius* (Almaty Area, Kurty District, 44°53'N, 75°17'E), *M. karshius* new species (Karshi District, Shache County, 38°24'N, 77°05'E), *M. eupeus mongolicus* (Alxa Youqi, 39°12'N, 101°42'E), *M. eupeus thersites* (Yining County, 44°00'N, 81°31'E), and *M. martensii martensii* (Alxa Zuoqi, 38°39'N, 105°48'E).

Sex	<i>M. caucasicus przewalskii</i>		<i>M. caucasicus intermedius</i>		<i>M. karshius</i> new species		<i>M. eupeus mongolicus</i>		<i>M. eupeus thersites</i>		<i>M. martensii martensii</i>	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
	Type "topotype"	Type "topotype"	♂	♀	paratype	holotype	Type "topotype"	Type "topotype"	♂	♀	♂	♀
Total length	55.03	65.57	59.7	75.69	61.11	67.67	40.33	40.51	37.91	41.91	54.31	56.48
Carapace:												
Length	5.77	7.31	6.69	8.15	6.56	7.89	4.24	4.08	4.23	4.46	5.54	5.69
Anterior width	3.15	4.08	3.69	5.08	3.78	4.67	2.62	2.46	2.46	2.84	3.46	3.23
Posterior width	5.78	7.62	6.7	9.39	6.78	8.44	4.95	4.85	4.77	5.08	5.77	6.85
Metasomal segment I:												
Length	4.08	4.77	5.08	6	4.38	5.56	3.09	3.1	2.81	3.09	4.46	4.08
Width	3.92	4.46	4.46	5.23	4.54	5.22	3.05	2.76	3.14	3.05	3.77	3.85
Metasomal segment II:												
Length	5.01	5.78	5.77	6.77	5.15	6.11	3.43	3.19	3.1	3.33	4.77	4.92
Width	3.77	4.31	4.15	5.01	4.31	5.02	3.01	2.71	3.14	3.04	3.62	3.54
Metasomal segment III:												
Length	5.08	6.01	6.15	6.79	5.46	6.44	3.38	3.33	3.52	3.43	5.15	5.08
Width	3.76	4.31	4.15	4.92	4.23	4.89	3	2.71	3.13	3.05	3.54	3.46
Metasomal segment IV:												
Length	5.39	6.15	6.76	7.46	6.08	7.22	4.19	3.81	4.09	3.81	5.54	5.62
Width	3.69	4.15	4.07	4.77	4.08	4.67	2.99	2.71	3.19	3.04	3.46	3.31
Metasomal segment V:												
Length	6.54	7.32	7.63	8.92	7.15	9.11	4.86	4.52	4.86	4.19	5.92	5.85
Width	3.15	3.54	3.77	4.08	3.54	4.33	2.86	2.71	3.05	2.86	3.23	3.15
Depth	2.77	3.08	3.08	3.46	3.08	3.67	2.24	1.95	2.14	2.14	3.01	2.69
Telson:												
Length	5.85	7.31	7.01	9.08	6.46	7.69	4.52	4.33	4.38	4.52	5.85	6.01
Width	2.31	2.92	2.69	3.23	2.54	3.15	1.91	1.86	2.15	2.14	2.54	2.54
Depth	2.02	2.69	2.46	2.92	2.31	2.85	1.81	1.71	1.8	1.81	2.36	2.31
Aculeus length	3.01	3.69	3.61	4.92	3.23	3.92	2.14	2.01	2.19	2.2	2.62	2.85
Pedipalps:												
Femur length	5.01	5.92	5.85	6.54	5.69	6.38	3.86	3.71	3.33	3.52	5.39	5.23
Femur width	1.46	1.77	1.69	2.08	1.69	2.01	1.19	1.14	1.14	1.2	1.46	1.63
Patella length	5.77	6.85	6.69	7.92	6.38	7.54	4.52	4.33	3.71	4.09	6.02	6.02
Patella width	2.15	2.77	2.62	3.08	2.54	2.54	1.67	1.71	1.67	1.86	2.15	2.39
Chela length	9.85	12.08	11.62	14.23	11.54	12.69	7.85	7.54	6.99	7.46	10.46	10.62
Chela width	2.54	2.92	3	3.23	2.92	3.31	2.15	1.92	2.38	2.19	2.62	2.92
Chela depth	3.08	2.69	3.54	4.02	3.46	3.92	2.46	2.15	2.62	2.39	2.99	2.62
Movable finger length	6.46	8.09	7.31	8.92	7.46	8.23	4.62	4.76	4.27	4.69	6.63	6.92
Pectines:												
Tooth count (L-R)	20-21	17-17	26-26	20-22	25-25	22-21	26-25	20-21	27-27	20-22	25-24	19-20

pectinal teeth number 20–25 in females and 26–30 in males, with 15–19 in females and 19–23 in males in *M. c. przewalskii* (Fig. 15); 2) dentate margins of movable and fixed fingers with 12 and 11 oblique rows of granules respectively, whereas movable and fixed fingers with 11 and 10 oblique rows of granules respectively in *M. c. przewalskii*; 3) aculeus longer than a half of telson length, while aculeus about equal to a half of telson length in *M. c. przewalskii*.

Distribution.—*Mesobuthus caucasicus intermedius* occurs in China (Xinjiang Uygur Autonomous Region), Iran (north-west), Kazakhstan, Kirghizstan, Tajikistan, Turkmenistan, and Uzbekistan.

Discussion.—Although we have conducted fieldwork in Xinjiang and other areas of northwest China over the past four years and have collected a large number of scorpion specimens, we could not find evidence to support a wide

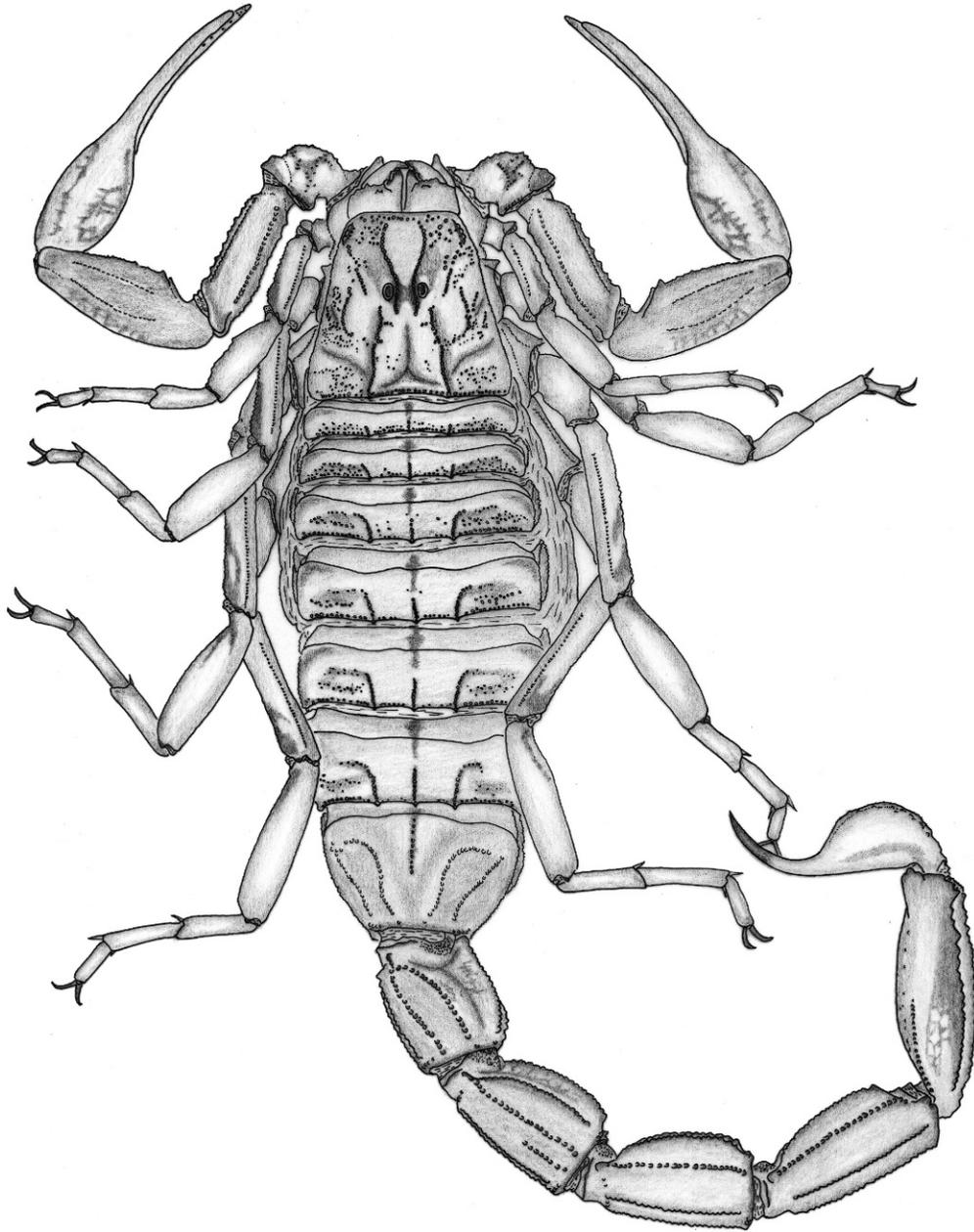


Figure 3.—*Mesobuthus caucasicus intermedius* (Birula 1897), female from Almaty Area, Kurty District (44°53'N, 75°17'E), dorsal view.

distribution of *M. caucasicus intermedius* in China (as in *M. caucasicus przewalskii*).

Mesobuthus karshius new species
(Figs. 5, 6, 10, Table 1)

Material examined.—Holotype ♀ (MHB), CHINA: *Xinjiang Uygur Autonomous Region*: Karshi District, Shache County, 38°24'N, 77°05'E, 6 August 2006, F. Zhang, H.Q. Ma and S.N. Liu. Paratypes: 27 ♀, 17 ♂ (MHB), all the same as for holotype; 1 ♀, Karshi District, area near to Karshi City, 39°28'N, 75°58'E, 7 August 2006, F. Zhang, H.Q. Ma and S.N. Liu (MHB); 8 ♀, 2 ♂, Artush City, area near to Arhu

Town, 39°42'N, 76°09'E, 7 June 2009, D. Sun and Y.W. Zhao (MHB); 3 ♀, 1 ♂, 2 km S of Artush City, near to Songtake Village, 39°41'N, 76°11'E, 8 June 2009, D. Sun and Y.W. Zhao (MHB).

Etymology.—The specific name refers to Karshi (Kashgar) District, Xinjiang Autonomous Region, China, type locality of the new species.

Diagnosis.—Total length 56–72 mm in females and 46–62 mm in males. General coloration yellow to brownish-yellow; anterior median carinae of carapace with dark brown pigment and other carinae with light brown pigment; metasoma yellow to brownish-yellow, only ventral-median carinae with brown pigment. Prosoma: anterior, central, and

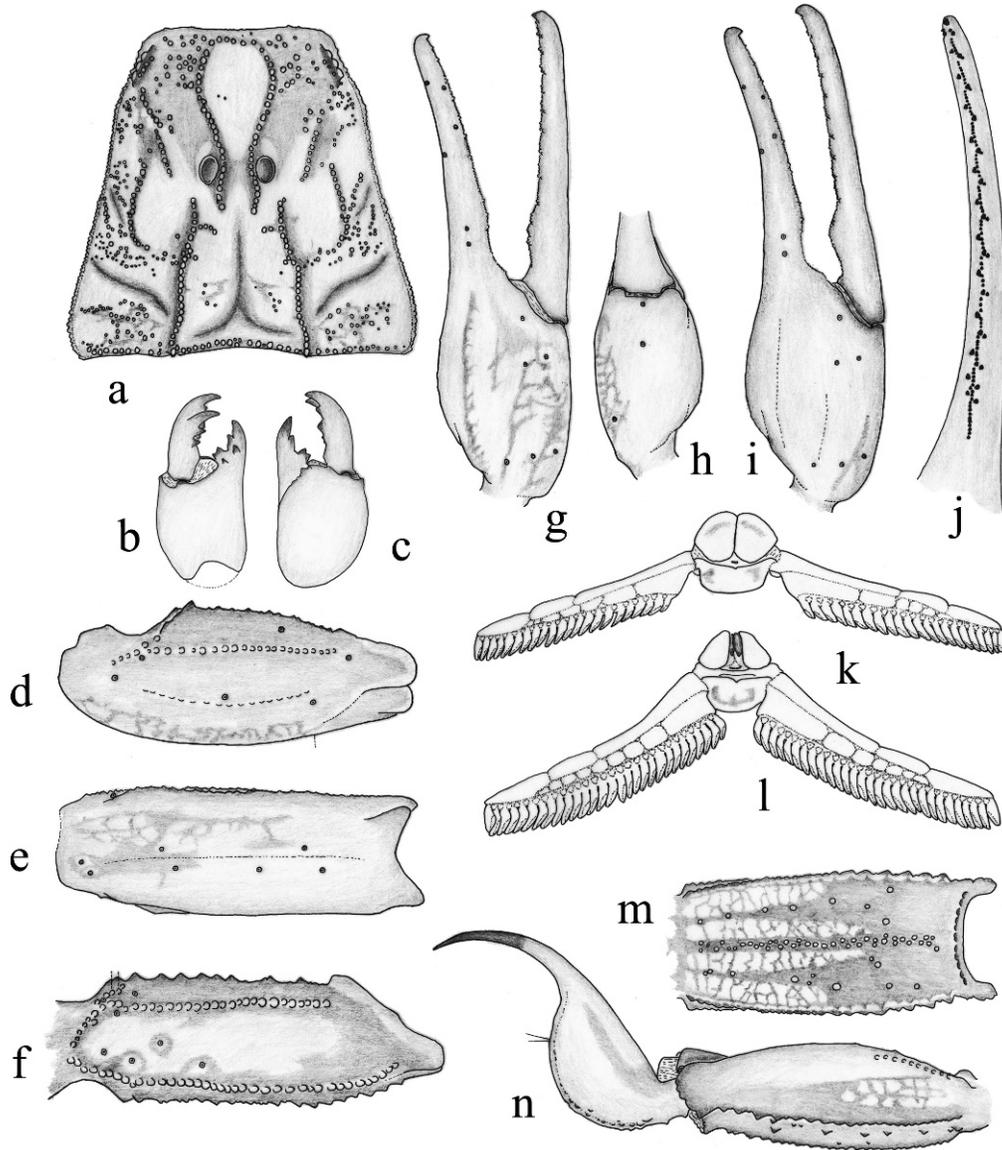


Figure 4.—*Mesobuthus caucasicus intermedius* (Birula 1897), from Almaty Area, Kurty District (44°53'N, 75°17'E): a–h, j, k, m, n: female; i, l: male. a. Carapace, dorsal aspect; b, c. Chelicera (b, ventral; c, dorsal); d, e. Patella (d, dorsal; e, external); f. Femur, dorsal aspect; g–i. Chela (g, i, dorso-external; h, ventral); j. Disposition of granulations on the dentate margins of the pedipalp chela movable finger; k, l: Genital operculum and pectines, ventral aspect; m. Metasomal segment V, ventral aspect; n. Metasomal segment V and telson, lateral aspect.

posterior median carinae granular and granules relatively minor; central median carinae directly connected with posterior median carinae and lateral median carinae by a row of sparse granules. Mesosoma: Tergite: segments I–VI tricarinate; the intercarinal surfaces relatively smooth, except for the posterior margins with fine granules; exterior surfaces with dense granules. Pectines: moderately long; pectinal teeth 19–23 in females and 23–28 in males. Metasoma: Segments I–V with 10-8-8-8-5 complete carinae, median lateral carinae complete on segment I, only with sparse granules and covered 1/2–2/3 length of segment on II, almost obsolete and remaining several granules at distal end on III and absolutely obsolete on IV; ventrolateral carinae on segment V markedly serrate, stronger posteriorly, and posterior lobed granules not uniform; aculeus slightly more than a half of telson length.

Dentate margins of movable and fixed fingers with 12 and 11 oblique rows of granules respectively; outer accessory denticles uniform from base to tip (not becoming smaller), and nearly same as inner accessory denticles on the tip in size. Legs: Tarsus with two short longitudinal rows of setae positioned ventrally.

This subspecies is undoubtedly allied with *M. caucasicus*, especially in these characters: the shape of carinae on carapace, the shape of chela and metasoma, and the characters about carinae on metasoma. It can, however, be distinguished by three features:

- 1) Characters distinguished from *M. c. przewalskii*: a) the carinae and granules on carapace moderately strong, while the carinae and granules on carapace markedly strong in

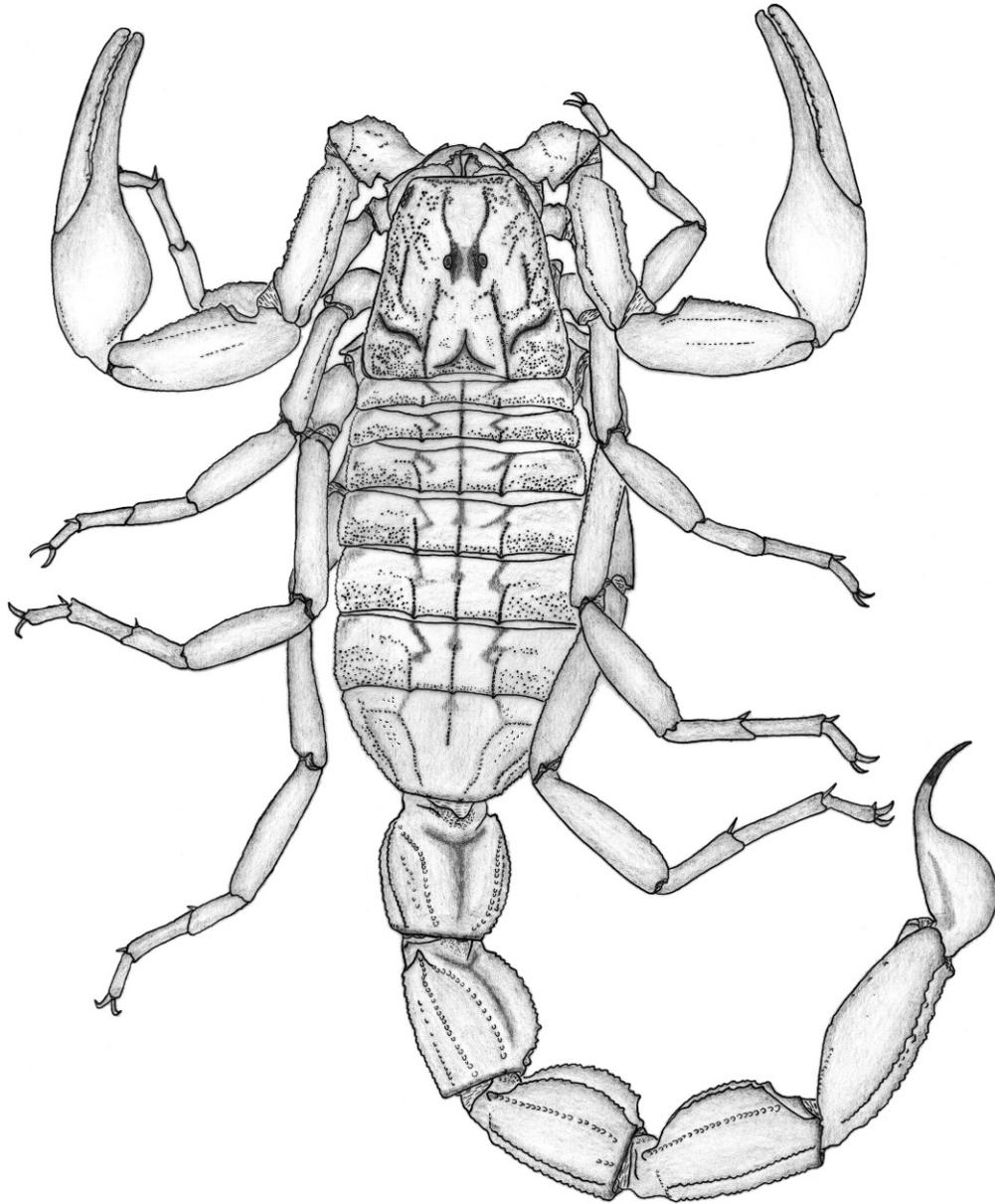


Figure 5.—*Mesobuthus karshius* new species, female holotype from Karshi District, Shache County (38°24'N, 77°05'E), dorsal view.

M. c. przewalskii; b) dentate margin of movable finger of chela with 12 oblique rows of granules, but with 11 oblique rows in *M. c. przewalskii*; c) pectinal teeth 19–23 in females and 23–28 in males, but 15–19 in females and 19–23 in males in *M. c. przewalskii* (Fig. 15); d) the new species without irregular net-like dark pigmentation on chela, dorsal surfaces of segments I–V on metasoma and ventral surface of segment V, while *M. c. przewalskii* with these pigmentation; e) tarsus of legs with two short longitudinal rows of setae, *M. c. przewalskii* with two long longitudinal rows of setae.

2) Characters distinguished from *M. c. intermedius*: a) pectinal teeth 19–23 in females and 23–28 in males, but 20–25 in female and 26–30 in male *M. c. intermedius* (Fig. 15); b) new species without irregular net-like dark pigmentation on chela, dorsal surfaces of segments I–V

on metasoma and ventral surface of segment V, while *M. c. intermedius* with this pigmentation; c) chela of new species with outer accessory denticles uniform from base to tip (not becoming smaller) and nearly same as inner accessory denticles on the tip in size, while *M. c. intermedius* with outer accessory denticles becoming markedly smaller from base to tip, and obviously smaller than inner accessory denticles on the tip; d) tarsus of legs with two short longitudinal rows of setae, *M. c. intermedius* with two long longitudinal rows of setae.

3) Characters distinguished from *M. c. parthorum*: a) pectinal teeth 19–23 in females and 23–28 in males, 22–24 in females and 29–34 in males in *M. c. parthorum*; b) general coloration of metasoma is yellow to brownish-yellow, whereas it is markedly dark brown in *M. c. parthorum* (Vachon 1958).

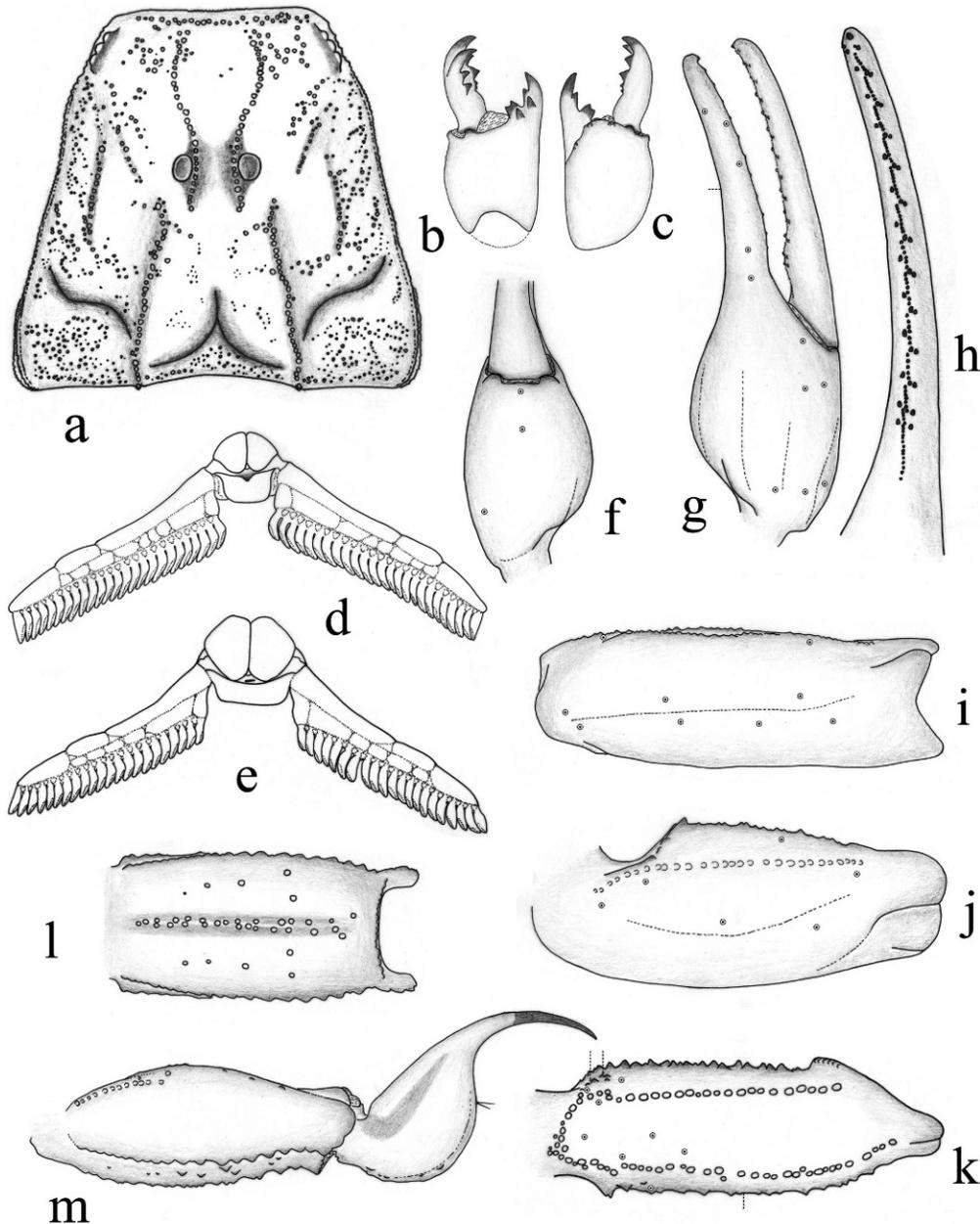


Figure 6.—*Mesobuthus karshius* new species, from Karshi District, Shache County (38°24'N, 77°05'E): a–c, e–m: female holotype; d: male paratype. a. Carapace, dorsal aspect; b, c. Chelicera (b, ventral; c, dorsal); d, e. Genital operculum and pectines, ventral aspect; f, g. Chela (f, ventral; g, dorso-external); h. Disposition of granulations on the dentate margins of the pedipalp chela movable finger; i, j. Patella (i, external; j, dorsal); k. Femur, dorsal aspect; l. Metasomal segment V, ventral aspect; m. Metasomal segment V and telson, lateral aspect.

Description.—Based on female holotype. Species of moderate to large size, with respect to the genus. Total length 56–72 mm in females and 46–62 mm in males.

Coloration: basically yellow to brownish-yellow. Prosoma: carapace brownish-yellow, middle and lateral eyes surrounded by black pigment; anterior median carinae with dark brown pigment and other carinae with light brown pigment. Mesosoma: brownish-yellow; middle and lateral carinae with brown pigment on segments I–VI and without pigment on segment VII. Metasoma: yellow to brownish-yellow, only ventral-median carinae with brown pigment; vesicle light brownish-yellow and aculeus dark reddish on its extremity.

Venter brownish-yellow, except for the pectines, which are pale yellow. Chelicerae: light brownish-yellow without pigmentation; teeth dark reddish to brownish. Pedipalps: brownish-yellow without pigmentation; granules on dentate margins of the fingers blackish-brown. Legs: brownish-yellow without pigmentation.

Morphology: Prosoma: anterior margin with a very weak median concavity; carinae moderately strong, only anterior lateral carinae weak; anterior, central and posterior median carinae granular, and granules relatively minor; central median carinae directly connected with posterior median carinae and lateral median carinae by a row of sparse granules;

posterior median carinae terminating distally in a small spinoid process that extends slightly beyond the posterior margin of the carapace; surfaces between median carinae almost smooth, but the external surfaces with comparatively dense small granules; the surfaces between anterior median carinae and lateral eyes coarsely granular; furrows moderate. Median ocular tubercle slightly anterior to the center of carapace; median eyes separated by almost 2.0 ocular diameters; three pairs of lateral eyes. Mesosoma: Tergite: segments I–VI tricarinate; median and lateral carinae on I–VI moderate, granular; each carina on I–VI terminating distally in a small spinoid process, which extends beyond the posterior margin of tergite, except the median carina on I and II; intercarinal surfaces relatively smooth, except for posterior margins with fine granules; exterior surfaces with dense granules; VII pentacarinate; two pairs of lateral carinae moderate to strong; median carinae present on proximal half, moderate; intercarinal surfaces with sparse granules. Sternites: segments III–VII smooth; lateral margins moderately serrate; VII with four moderately marked carinae, granular, and the intercarinal surfaces smooth. Pectines: moderately long; pectinal teeth 19–23 in females and 23–28 in males. Metasoma: Segments I with 10 complete carinae, segments II–IV with 8 complete carinae; all carinae moderately strong, granular, except the dorsal carinae, serrate and stronger posteriorly; median lateral carinae complete on segment I, only with sparse granules and covered 1/2–2/3 length of segment on II, almost obsolete with several remaining granules at distal end on III and absolutely obsolete on IV; intercarinae surfaces on segments I to IV smooth, except the surfaces between dorsal and dorsolateral carinae on segment I, which are weakly to moderately granular. Segment V pentacarinate; ventral carina moderate, granular; ventrolateral carinae markedly serrate, stronger posteriorly, and posterior lobed granules not uniform; dorsolateral carinae weakly developed, little shorter than the length of this segment, obsolete posteriorly; dorsal and lateral surfaces smooth, ventral surface with sparse large granules. Telson smooth dorsally and weakly granular ventrolaterally; aculeus long, slightly more than a half of telson length. Chelicerae: Dentition as defined by Vachon (1963) for the family Buthidae. Pedipalps: Trichobothrial pattern: Orthobothriotaxic A- β (Vachon 1974, 1975). Femur pentacarinate, moderately to strongly granular; ventrointernal carina with spinoid granules. Patella with seven carinae, weakly to moderately granular. Intercarinal surfaces on both segments smooth. Chela smooth without carinae; dentate margins of movable and fixed fingers with 12 and 11 oblique rows of granules respectively; outer accessory denticles uniform from base to tip (not becoming smaller), and nearly same as inner accessory denticles on the tip in size. Legs: Tarsus with two short longitudinal rows of setae positioned ventrally; tibial spurs present on legs III and IV, moderately marked; pedal spurs present and moderately developed on all legs.

Distribution.—*Mesobuthus karshius* occurs in China (Xinjiang Uygur Autonomous Region).

Variation.—The posterior lobed granules on ventrolateral carinae of metasoma segment V in some elderly individuals are relatively smooth, which may result from abrasion after their last ecdyses. This character is not found in juveniles or most

adult individuals. Also, there is nothing markedly sexually dimorphic in this variation. Several individuals with light brown to brownish-yellow pigmentation on the ventral surfaces of metasoma segment V, and most individuals without. Sternite segment VII with four moderately granular lateral carinae in adult female individuals, males with four very slightly granular or absolutely no-granular lateral carinae.

Ecology.—The new species is abundant in habitats such as houses built with blocks of soil or stone, in which cement is not used. They were commonly collected in clefts of walls, but also under blocks of soil or stones. In natural environments, most specimens were collected under large blocks of soil or stones; however, a few specimens were found under small blocks of soil or stones.

Mesobuthus eupeus mongolicus (Birula 1911)
(Figs. 7, 8, 10, Table 1)

Buthus eupeus mongolicus Birula 1911:195; Birula 1917:42; Birula 1925:96; Birula 1927:202; Takashima 1945:77.

Buthus (Buthus) eupeus mongolicus Birula: Birula 1917:239.

Mesobuthus eupeus mongolicus (Birula): Vachon 1958:155, fig. 37; Stahnke 1967:61–68, figs. 1–5; Pérez 1974:27; Farzanpay 1986:334; Fet 1994:527; Kovařík 1997:180; Kovařík 1998:114; Fet & Lowe 2000:174; Gantenbein et al. 2003:413, table 1; Qi et al. 2004:138, 142; Zhu et al. 2004:112; Shi & Zhang 2005:474; Parmakelis et al. 2006:2886, 2889, fig. 2, table 1; Shi et al. 2007:216, 218; Sun & Zhu 2010:2.

Type specimens.—Type material not examined.

Material examined.—CHINA: *Inner Mongolia Autonomous Region*: Wuhai City, 10 km E of downtown area, Zhuozhi hill, 39°40'N, 106°56'E, 19 July 2007, Z.Y. Di, Y.N. Fu and M.C. Xie, 12 ♀, 9 ♂, 2 juveniles (MHB); Urad Zhongqi, Wujiahe Town, north hill (part of Yin Mountain), 41°16'N, 108°13'E, 16 July 2008, D. Sun and C.L. Zhang, 16 ♀, 17 ♂ and 6 juveniles (MHB); Wuhai City, south park of locomotive depot (in sandy tracts), 39°38'N, 106°48'E, 22–23 July 2008, D. Sun and C.L. Zhang, 20 ♀, 22 ♂, 10 juveniles (MHB); Alxa Zuoqi, Wenduermaodao District, 40°54'N, 104°20'E, 26 July 2008, M.S. Zhu and D. Sun, 2 ♀ (MHB); Urad Houqi, 15 km S of Chaogewenduer Town, south hill (part of Lang Mountain), 41°19'N, 107°04'E, 21 July 2008, D. Sun and C.L. Zhang, 3 ♀, 2 juveniles (MHB); Bayan nur League, Dengkou County, Bayan ula (township level village), 40°22'N, 106°57'E, 25 July 2008, M.S. Zhu and D. Sun, 1 ♀, 1 ♂, 1 juvenile (MHB). *Gansu Province*: Zhangye City, 38°56'N, 100°23'E, August 2005, collector unknown, 2 ♀ (MHB); Jiuyan City, Suzhou District, 5 km S of Qingshui Town, Qilin Township, 39°18'N, 99°01'E, 13 August 2008, M.S. Zhu and D. Sun, 10 ♀, 9 ♂, 4 juveniles (MHB); Jiuyan City, Jinta County, Yuanyangchi Scenic Spot, 39°50'N, 98°52'E, 28 July 2008, M.S. Zhu and D. Sun, 1 ♀, 3 ♂ and 1 juvenile (MHB). *Ningxia Hui Autonomous Region*: Helan Mountain National Nature Reserve, Liutiao Clough, exact location unknown, 29 July 2008, X.P. Wang, 3 ♀, 4 ♂ (MHB). *Xinjiang Uygur Autonomous Region*: Tuoli County, area 10 km SE of Tiechanggou Town, 46°06'N, 84°33'E, 9 August 2008, M.S. Zhu and D. Sun, 4 ♀, 2 ♂ (MHB); Manas County, South Hill Ranch, 43°55'N, 85°51'E, 10 August 2008, M.S. Zhu and D.

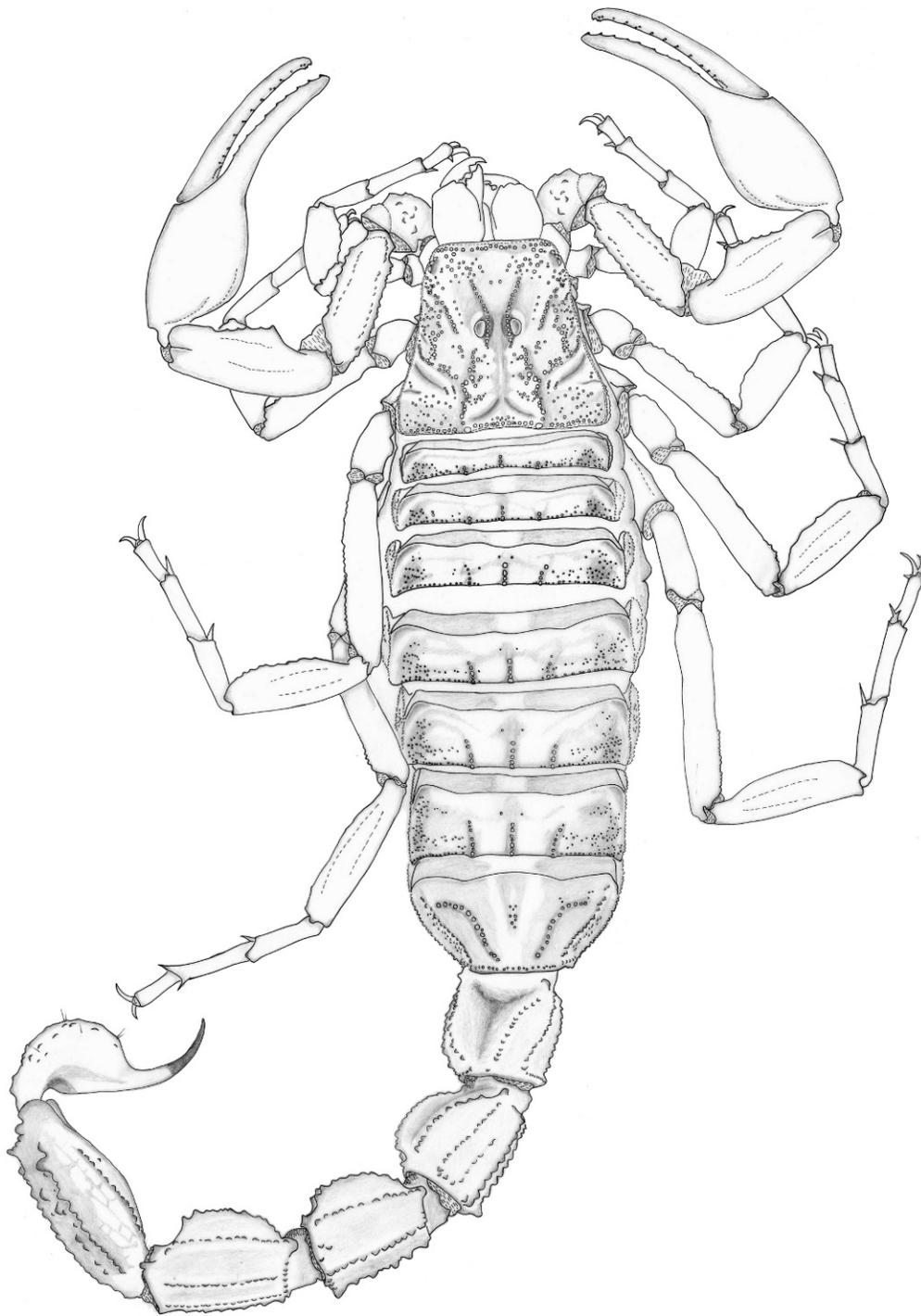


Figure 7.—*Mesobuthus eupeus mongolicus* (Birula 1911), female “topotype” from Alxa Youqi (39°12’N, 101°42’E), dorsal view.

Sun, 4 ♀, 4 ♂, and 6 juveniles (MHBV); Bole City, 10km S of Bole downtown area, desolated sands, 44°47’N, 82°02’E, 4 August 2007, D. Sun and L. Zhang, 3 ♀, 1 ♂, and 7 juveniles (MHBV); Karamay City, 2–3 km N of downtown area, 45°38’N, 84°51’E, 30 July 2007, D. Sun and L. Zhang, 1 ♀, 1 juvenile (MHBV); Tuoli County, “Dongwozi” Ranch, exact location unknown, 30 July 2007, D. Sun and L. Zhang, 3 ♀, 2 ♂ (MHBV); Fuhai County, Wucaiwan, desolated sands, 47°50’N, 86°40’E, 20 July 2007, D. Sun and L. Zhang, 2 ♂

(MHBV); Tuoli County, exact location unknown, 20 August 2006, F. Zhang, H.Q. Ma and S.N. Liu, 1 ♂ (MHBV); Urumqi County, Liuhuag Clough, 43°44’N, 87°13’E, 1 September 2006, F. Zhang, H.Q. Ma and S.N. Liu, 13 ♀, 9 ♂ (MHBV); Alataw Pass, near the frontier inspection station of China, 45°02’N, 82°34’E, 5 August 2007, D. Sun and L. Zhang, 4 ♀, 1 ♂, 16 juveniles (MHBV); Wenquan County, exact location unknown, 16 August 2006, F. Zhang, H.Q. Ma and S.N. Liu, 1 ♀, 1 ♂ (MHBV); Qinghe County, 46°40’N, 90°20’E, 11 June

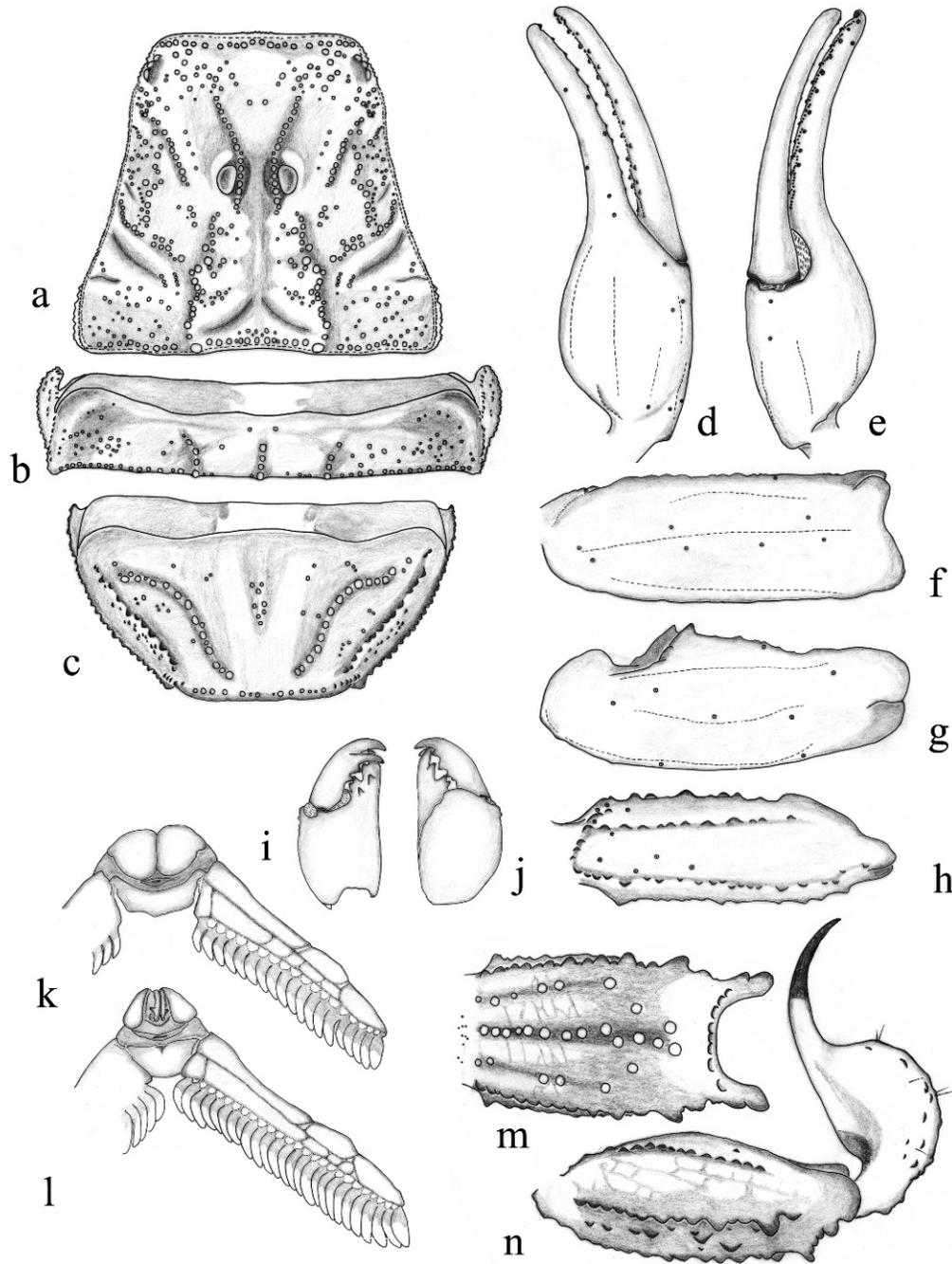


Figure 8.—*Mesobuthus eupeus mongolicus* (Birula 1911), from Alxa Youqi (39°12'N, 101°42'E): a–k, m, n: female “topotype”; l: male “topotype”. a. Carapace, dorsal aspect; b. Segment III of tergite, dorsal aspect; c. Segment VII of tergite, dorsal aspect; d, e. Chela (d, dorso-external; e, ventral); f, g. Patella (f, external; g, dorsal); h. Femur, dorsal aspect; i, j. Chelicera (i, ventral; j, dorsal); k, l. Genital operculum and pectines, ventral aspect; m. Metasomal segment V, ventral aspect; n. Metasomal segment V and telson, lateral aspect.

2006, Y.B. Ba, 1 ♂ (MHBV); Fuyun County, 46°58'N, 89°31'E, 6 June 2006, Y.B. Ba, 1 ♀, 1 ♂ (MHBV); Alataw Pass, 45°09'N, 82°36'E, 15 August 2006, F. Zhang, H.Q. Ma and S.N. Liu, 1 ♂ (MHBV). Other material examined, see Zhang & Zhu (2009).

Diagnosis.—Total length 40–55 mm in females and 35–45 mm in males. General coloration light yellow to pale brownish-yellow; anterior median, central median and posterior median carinae of carapace with dark brown pigment;

tergite I–VI segments with 3 or 5 longitudinal dark brown strips (one of the most conspicuous characters). Prosoma: anterior margin with a very weak median projection or approximately straight, all carinae weak to moderately strong, posterior median carinae terminating distally in a small spinoid process not extending beyond the posterior margin of the carapace. Mesosoma: Tergite segments I–VI tricarinate; intercarinal surfaces with sparse small granules; carinae terminating distally in small spinoid process that does not

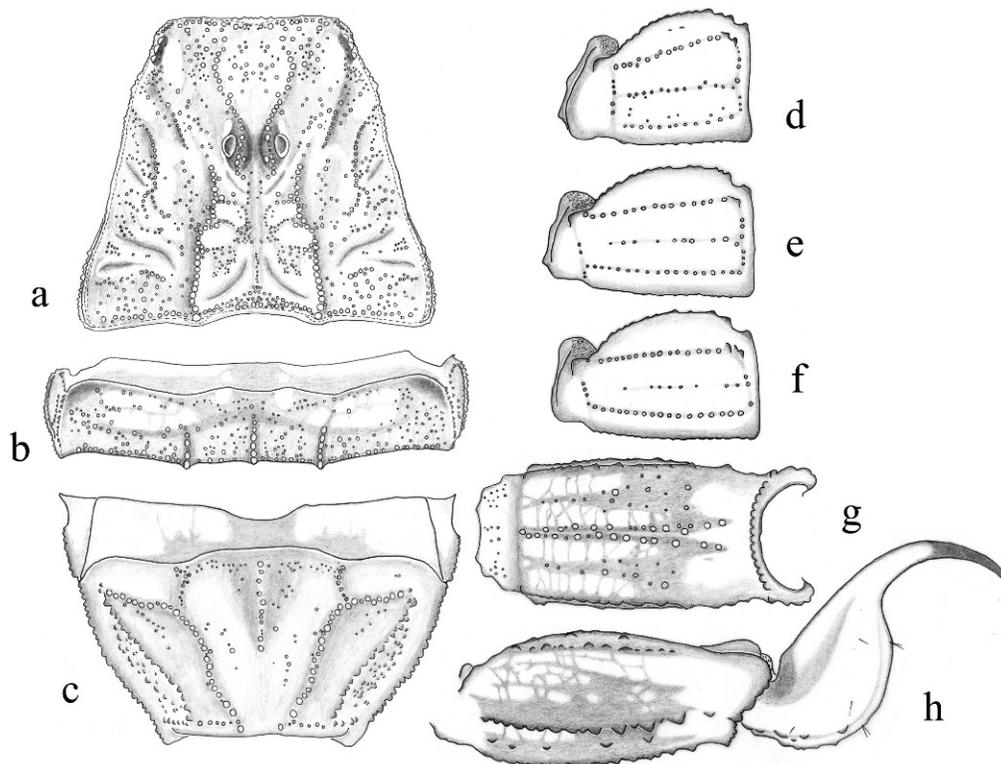


Figure 9.—*Mesobuthus martensii martensii* (Karsch 1879), female from Alxa Zuoqi (38°39'N, 105°48'E). a. Carapace, dorsal aspect; b. Segment III of tergite, dorsal aspect; c. Segment VII of tergite, dorsal aspect; d–f. Metasomal segments, lateral aspect (d, segment I; e, segment II; f, segment III); g. Metasomal segment V, ventral aspect; h. Metasomal segment V and telson, lateral aspect.

extend beyond posterior margin of carapace. Pectines: moderately long; pectinal teeth 19–22 in females and 24–28 in males. Metasoma: Segments I–V with 10–8–8–8–5 complete carinae, median lateral carinae complete on segment I, only with sparse granules and covered half length of segment or little more on II, almost obsolete with several remaining granules at distal end on III and absolutely obsolete on IV; ventral carinae on segment II and III with markedly serrate granules, becoming larger posteriorly; ventrolateral carinae on segment V strong, serrate, becoming strongly marked posteriorly with 1–3 (mostly 2) markedly large and extroversive lobed granules; aculeus equal to half of telson length. Dentate margins of movable fingers with 10–11 (mostly 10) oblique rows of granules. Legs: Tarsus with two short, strong longitudinal rows of setae positioned ventrally.

Distribution.—*Mesobuthus eupeus mongolicus* occurs in China (Inner Mongolia Autonomous Region, Gansu Province, Ningxia Hui Autonomous Region, Xinjiang Uygur Autonomous Region), Mongolia.

Variation.—The marked variant character among different geographical populations is the dark or light brown pigmentation on the ventral surfaces of metasoma segments I–IV. Individuals from the type locality (“Alashan Province” in about 1907, and “Alxa Zuoqi” today) and nearby areas (Inner Mongolia Autonomous Region, Gansu Province, Ningxia Hui Autonomous Region) are without the brown pigmentation, whereas some of the specimens collected from Xinjiang Uygur Autonomous Region have dark or light brown pigmentation, or lack pigmentation.

Ecology.—The distribution of this subspecies is from southern Mongolia, Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, northern and western of Gansu Province to eastern and northern Xinjiang Uygur Autonomous Region. This area is an arid or semi-arid continental climatic region: hot and arid in summer, cold and dry in winter, and quite windy and dusty in spring. According to this rhythm, the main active period of individuals is from early April to early October. Typically, this subspecies inhabits a terrene hillside with crushed rocks and low herbaceous plants, and it often hides in a flat hole under rocks during the day.

Mesobuthus eupeus thersites (C.L. Koch 1839)
(Fig. 10, Table 1)

Androctonus thersites C.L. Koch 1839:51, plate CXIII, fig. 466 (synonymized by Birula 1896:238); Kraepelin 1891:204.

Buthus eupeus thersites (C.L. Koch): Kraepelin 1899:24; Birula 1900:359; Birula 1904:20; Birula 1905:122, fig. 3; Birula 1906:45, plate V, fig. 1; Roewer 1943:206.

Buthus eupeus volgensis Birula 1925:96 (synonymized by Birula 1928:338).

Mesobuthus eupeus thersites (C.L. Koch): Vachon 1958:155, fig. 37; Pérez 1974:26; Fet 1980:224; Farzanpay 1986:334; Farzanpay 1988:38; Fet 1989:91; Fet 1994:527; Kovařík 1997:49; Kovařík 1998:114; Fet & Lowe 2000:175; Gantenbein et al. 2003:413, 417, table 1; Qi et al. 2004:138, 142; Zhu et al. 2004:112–113; Shi & Zhang 2005:474–475; Parmakelis et al. 2006:2886, 2889, fig. 2, table 1; Shi et al.

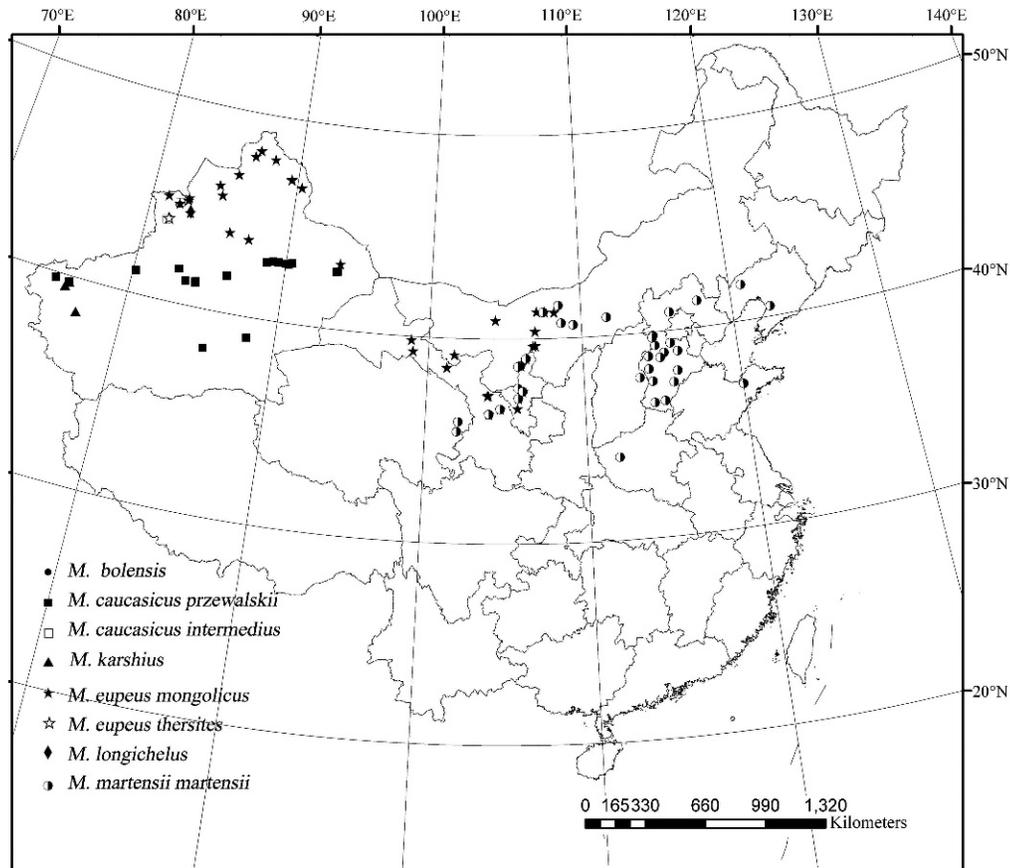


Figure 10.—Map of China illustrating the recorded distributional ranges of the genus *Mesobuthus* in China.

2007:216, 219; Kamenz & Prendini 2008:8, 41, plate 32; Sun & Zhu 2010:2.

Mesobuthus eupeus volgensis (Birula): Orlov & Vasiliyev 1983:62.

Type specimens.—Type material not examined.

Material examined.—CHINA: *Xinjiang Uygur Autonomous Region*: Yining County, north of county cement works, hillsides, 44°00'N, 81°31'E, 18 May 2009, D. Sun and Y.W. Zhao, 10 ♀, 12 ♂ (MHB). UZBEKISTAN: *Bukhara Area*: Gizhduvan District, SW foothills of Karatau Mountain Range, 14.5 km N of Kanimekh, 5 June 2003, L. Prendini and A.V. Gromov, 3 ♀, 4 ♂ (AMNH). KAZAKHSTAN: *Almaty area*: Kurty District, Taukum Desert, 25.5 km SE of Topar, 9 May 2003, L. Prendini and A.V. Gromov, 2 ♀, 3 ♂ (AMNH); South Kazakhstan area: Suzak District, SW slope of Toyzkentau Mountain Range, 30 km SSW of Sholakespe village, 24 June 2003, L. Prendini and A.V. Gromov, 3 ♀, 1 male (AMNH); Otrar District, 4.5 km SSE of Utrabat (32 km SSE of Turkestan), Sargatazhol boundary, 21 June 2003, L. Prendini and A.V. Gromov, 2 ♀, 3 ♂ (AMNH).

Diagnosis.—This subspecies is associated with *M. eupeus mongolicus*, especially in the following characters: a) the shape and development of carinae on carapace and tergites; b) the numbers of pectinal teeth in males and females; c) the shape and development of carinae on metasoma segments I–V, especially the ventral carinae on segments II–III and ventrolateral carinae on segment V.

The subspecies can be distinguished by the following three features:

- 1) Anterior margin of carapace in *M. e. thersites* with very weak median concavity; while that of *M. e. mongolicus* either has a very weak median projection or is approximately straight.
- 2) Chela of *M. e. thersites* more robust; *M. e. mongolicus* with relatively less robust chela (Table 1).
- 3) Dorsal carinae on metasoma segments I–IV of *M. e. thersites* relatively weak, approximately obsolete anteriorly, moderately granular posteriorly; in contrast, dorsal carinae on metasoma segments I–IV of *M. e. mongolicus* much developed, moderately granular anteriorly, and with marked granules posteriorly.

Distribution.—*Mesobuthus eupeus thersites* occurs in China (Xinjiang Uygur Autonomous Region), Kazakhstan, Uzbekistan, Tajikistan and Kyrgyzstan.

Discussion.—According to the analysis of some species and subspecies of *Mesobuthus* based on molecular data by Gantenbein et al. (2003), the relationship between *M. e. thersites* and *M. e. mongolicus* is not very clear. After inspecting a significant number of specimens of these two subspecies from extensiveness regions, we discovered diagnostic characteristics (above) that were consistent among different geographical populations.

Mesobuthus longichelus Sun & Zhu 2010
(Fig. 10)

Mesobuthus longichelus Sun & Zhu 2010:5–10, figs. 1, 4–10, 17–21; Sun et al. 2010:36, 38–40, figs. 4, 12, 13, 19, 20, 23, 24, table 1.

Material examined.—See Sun & Zhu (2010).

Diagnosis.—See Sun & Zhu (2010).

Distribution.—*Mesobuthus longichelus* occurs in China (Xinjiang Uygur Autonomous Region).

Ecology.—See Sun & Zhu (2010).

Mesobuthus martensii martensii (Karsch 1879)
(Figs. 9, 10, Table 1)

Buthus martensii Karsch 1879:112; Kishida 1939:51–67, plate I–IV.

Buthus confucius Simon 1880:124–125 (synonymized by Karsch 1881:219).

Buthus confucius [sic] Simon: Pocock 1889a:336–337, plate X–V, fig. 2a; Pocock 1889b:116; Birula 1898:133–134; Birula 1927:205–209; Kästner 1941:231.

Buthus martensii Karsch: Kraepelin 1899:25–26; Wu 1936:115–117, fig. 1; Takashima 1944:51–53; Takashima 1945:75; Vachon 1948:61, fig. 4; Isshiki & Yonezawa 1960:117–123; Song et al. 1982:22–25, figs. 1–7; Song 1998:508, fig. 30:1.

Buthus nigrocinctus (nec *Androctonus nigrocinctus* (Ehrenberg 1828); Thorell 1893:360–361.

Mesobuthus martensii (Karsch): Vachon 1950:153; Vachon 1952:325; Pérez 1974:26; Kovařík 1992:183.

Mesobuthus martensii (Karsch): Kovařík 1998:115; Shi & Zhang 2005:474; Shi et al. 2007:216–223, figs. 1–3, table 1; Zhang & Zhu 2009:1–17, figs. 1–18, tables 1–8; Sun & Zhu 2010:10.

Mesobuthus martensii martensii (Karsch): Fet & Lowe 2000:178; Qi et al. 2004:137–143, figs. 1–19, table 1; Zhu et al. 2004:113.

Type specimens.—Type material not examined.

Material examined.—CHINA: *Gansu Province*: Jingyuan County, Mitan Township, 36°35'N, 104°40'E, 5 August 2007, Z.Y. Di, Y.N. Fu and M.C. Xie, 1 ♀, 2 ♂ (MHB); Gaolan County, Dongwan Village, 36°20'N, 103°57'E, 4 August 2007, Z.Y. Di, Y.N. Fu and M.C. Xie, 1 ♀, 1 ♂ (MHB). *Ningxia Hui Autonomous Region*: Yinchuan City, Helan Mountain National Nature Reserve, Suyukou forest park, 38°42'N, 105°57'E, 14–17 August 2008, X.P. Wang and G.J. Yang, 10 ♀, 9 ♂, 1 juvenile (MHB); Helan Mountain National Nature Reserve, Liutiao Clough, exact location unknown, 29 July 2008, X.P. Wang, 9 ♀, 10 ♂ (MHB). *Inner Mongolia Autonomous Region*: Alxa Zuoqi, Nansi, 38°39'N, 105°48'E, 21 July 2007, Z.Y. Di, Y.N. Fu and M.C. Xie, 25 ♀, 21 ♂, 8 juveniles (MHB); Urad Zhongqi, Hailiutu Town, north hill (part of Yin Mountain), 41°36'N, 108°30'E, 15 July 2008, D. Sun and C.L. Zhang, 1 male (MHB); Baotou City, Jiuyuan District, Agerutai Sumu, Meiligeng Gacha, 40°38'N, 109°27'E, Tongla and J.J. Wang, 15 August 2006, 3 ♀, 4 ♂, 3 juveniles (MHB); Urad Zhongqi, Shilanji Township, north hill (part of Yin Mountain), 41°17'N, 107°29'E, 18 July 2008, D. Sun and C.L. Zhang, 1 ♀, 3 juveniles (MHB). *Shandong Province*: Pingdu County, Daze Mountain, 36°59'N,

120°01'E, 5 May 2007, F.Y. Wang, 1 ♂ and 4 juveniles (MHB). *Hebei Province*: Quzhou County, Anzhai Town, Guzhuang Village, 36°38'N, 115°01'E, August 2004, X.Y. Gu, 19 ♀, 13 ♂ (MHB); Chicheng County, 40°54'N, 115°50'E, 2 October 2002, Z.S. Zhang, 2 ♀, 3 juveniles (MHB); Longhua County, 41°18'N, 117°45'E, 14 June 2004, W.G. Lian, 5 ♀, 2 ♂ (MHB); Handan City, date and collector unknown, 4 ♀, 1 ♂ (MHB); Laishui County, 39°24'N, 115°42'E, 28 June 2004, J. Song, 20 ♀, 7 ♂ (MHB); Xiong County, 38°59'N, 116°07'E, 20 July 2004, C.Y. Fan, 3 ♀, 2 ♂ (MHB); Zhou County, Xiaowutai Mountain National Nature Reserve, 39°50'N, 114°37'E, 10 July 2004, F. Zhang, 21 ♀, 5 ♂ (MHB); Laiyuan County, 39°21'N, 114°41'E, date and collector unknown, 2 ♀ (MHB). *Liaoning Province*: Yingkou City, Dashiqiao County, Laodong Village, 40°30'N, 122°30'E, 14 July 2009, D. Sun, 8 ♀, 12 ♂ (MHB). *Shanxi Province*: Yangquan City, 37°51'N, 113°33'E, 3 May 2004, S.J. Zhao, 1 ♀, 2 juveniles (MHB). *Henan Province*: Song County, Dazhang Township, Baligou, 34°04'N, 111°56'E, 12 July 2004, M.S. Zhu, 3 ♀, 2 ♂ (MHB). Other material examined, see Zhang & Zhu (2009).

Diagnosis.—See Qi et al. (2004).

Distribution.—*Mesobuthus martensii martensii* occurs in China (north, northeast, northwest), Mongolia, the Korean Peninsula and Japan. In China, *M. martensii martensii* appears to be restricted to south of latitude 43°N and the north side of the Yangtze River, bordered by Helan Mountain, the Tengger and Mo Us Desert in the west and limited by the sea in the east (Shi et al. 2007).

Ecology.—This species was found mainly in habitats composed of temperate and subtropical areas, often under rocks on sunny hillsides with many herbs and shrubs, but without leafy trees in natural environments. Few individuals were found on shaded hillsides of collecting locations, probably because of the diseases and mycotic infections caused by excessive humidity there (Song 1982). The burrow of *M. martensii martensii* often has an underground passage-way, generally 30–50 cm below ground level, where they can move to the deepest points when preparing for hibernation in late autumn.

Mesobuthus martensii hainanensis (Birula 1904)

Buthus confucius hainanensis Birula 1904:27.

Mesobuthus martensii hainanensis (Birula): Fet & Lowe 2000:178; Qi et al. 2004:138, 142; Zhu et al. 2004:113; Zhang & Zhu 2009:1; Sun & Zhu 2010:2.

Material examined.—No material examined; type material preserved in Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (lost).

Discussion.—The type material was collected on Hainan Island (Hainan Province) by O. Herz in 1895. In the original diagnosis by Birula (1904), only general coloration was used and only a single specimen of unknown sex was investigated. This subspecies remains, however, of dubious validity, mainly because it was never found again on Hainan Island or from adjacent areas, but also because no species of *Mesobuthus* has ever been found inhabiting evergreen rain forests (Hainan Island is covered in rainforests and rubber plantations).

KEY TO CHINESE SPECIES AND SUBSPECIES OF *MESOBUTHUS*

1. Ventrolateral carinae of segment V on metasoma strong, serrate, becoming marked posteriorly and with several markedly large and extroversive lobed granules (Figs. 8m, 8n) 2
 Ventrolateral carinae of segment V on metasoma strong, serrate, becoming gradually stronger posteriorly, and without any markedly large and extroversive lobed granules (Figs. 2l, 2m) 4
2. Ventral carinae of segment II and III on metasoma gradually stronger posteriorly (Fig. 7) 3
 Ventral carinae of segment II and II on metasoma not stronger posteriorly (Sun & Zhu 2010, fig. 1) *Mesobuthus longichelus*
3. Anterior margin of carapace with a very weak median concavity; chelae more robust (Table 1) *Mesobuthus eupeus thersites*
 Anterior margin of carapace with a very weak median projection or approximately straight (Fig. 8a); chelae relatively less robust (Table 1) *Mesobuthus eupeus mongolicus*
4. Ventral surface of segment V on metasoma without brown pigment (Fig. 6l) 5
 Ventral surface of segment V on metasoma with markedly brown pigment (Figs. 2l, 4m, 9g) 6
5. Surfaces of carapace with relatively dense small granules (Sun et al. 2010, figs. 2, 3); tarsus of legs with two long longitudinal rows of setae positioned ventrally *Mesobuthus bolensis*
 Surfaces of carapace between median carinae almost smooth, but the external surfaces with comparatively dense small granules (Fig. 6a); tarsus of legs with two short longitudinal rows of setae positioned ventrally *Mesobuthus karshius* new species
6. Dorsal surfaces of metasomal segments I–IV and each surface of segment V with irregular net-like dark pigmentation (Fig. 2k) 7
 Only surfaces of segment V on metasoma with irregular net-like dark pigmentation, dorsal surfaces of segments I–IV without net-like pigmentation *Mesobuthus martensii*
7. Pectinal teeth number 20–25 in females and 26–30 in males; dentate margins of movable and fixed fingers with 12 and 11 oblique rows of granules respectively *Mesobuthus caucasicus intermedius*
 Pectinal teeth number 15–19 in females and 19–23 in males; dentate margins of movable and fixed fingers with 11 and 10 oblique rows of granules respectively *Mesobuthus caucasicus przewalskii*

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