

Notes on the scorpions (Arachnida, Scorpiones) from Xizang with the redescription of *Scorpiops jendeki* Kovařík, 2000 (Scorpiones, Euscorpiidae) from Yunnan (China)

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Academic editor: W. Lourenço | Received 29 December 2012 | Accepted 22 April 2013 | Published 17 May 2013

Citation: Di Z, Xu X, Cao Z, Wu Y, Li W (2013) Notes on the scorpions (Arachnida, Scorpiones) from Xizang with the redescription of *Scorpiops jendeki* Kovařík, 2000 (Scorpiones, Euscorpiidae) from Yunnan (China). ZooKeys 301: 51–99. doi: 10.3897/zookeys.301.4608

Abstract

Until now, there are 26 scorpion species of 7 genera of 5 families recorded in Xizang (China). Xizang Autonomous Region (Tibet) is the scorpion biodiversity richest area in China (53 scorpion species of 12 genera of 5 families), also the highest altitude habitat of scorpions in the world. We present information of type specimens, an identification key of the scorpion species from Xizang, the distribution, updated feature pictures, and discussion on the disputed species. The redescriptions of *Scorpiops jendeki* Kovařík, 2000 (Yunnan) and *S. tibetanus* Hirst, 1911 (Xizang), comments and feature figures of species of genus *Scorpiops* are provided for identification.

Keywords

Scorpions, *Scorpiops*, taxonomy, checklist, key, Tibet, Xizang

Introduction

Xizang (Tibet) Autonomous Region is located in southwest China ($26^{\circ}52'–36^{\circ}32'N$, $78^{\circ}24'–99^{\circ}06'E$), about $1,228,400 \text{ km}^2$ ($\approx 12.5\%$ of China), famous as the “Roof of the world”. Xizang facing Xinjiang and Qinghai to the north, Sichuan and Yunnan to the east, while India, Myanmar, Bhutan, Sikkim, Nepal and Kashmir to the south

and west (Bai, 2004). It is the main part of the Qinghai-Tibet Plateau, with an average elevation of more than 4,000 m, its central part above 4,500 m.

Scorpiops tibetanus Hirst, 1911 (Euscorpiidae) was the first scorpion species established by Xizang (China) specimens. Hirst (1911) described this new species by comparing it with some relatives briefly. Almost ninety years later, Kovařík (2000a and b) reported 2 new species: *Chaerilus tryznai* Kovařík, 2000 (Chaerilidae); *Scorpiops margerisonae* Kovařík, 2000 and 1 new record: *Scorpiops hardwickii* (Gervais, 1843). Zhu, Qi and Song (2004) summarized the historical scorpion records in China: totally 19 species and subspecies of scorpion s belonging to 9 genera and 5 families according to the relevant literatures, and presented the distribution information on species from Xizang: *Heterometrus petersii* (Thorell, 1876) (Scorpionidae) and *Scorpiops petersii* Pocock, 1893. From 2005, much more work on Xizang was finished. Kovařík (2005) described *Euscorpiops novaki* Kovařík, 2005 (Euscorpiidae). After scientific expedition, Qi, Zhu and Lourenço (2005) published the first comprehensive report of scorpions from Xizang, discovered 6 new species belonging to Chaerilidae (*Chaerilus*) and Euscorpiidae (*Euscorpiops* and *Scorpiops*): *Scorpiops atomatus* Qi, Zhu & Lourenço, 2005; *Scorpiops langxian* Qi, Zhu & Lourenço, 2005; *Scorpiops luridus* Qi, Zhu & Lourenço, 2005; *Scorpiops pococki* Qi, Zhu & Lourenço, 2005; *Euscorpiops karschi* Qi, Zhu & Lourenço, 2005; and *Chaerilus tessellatus* Qi, Zhu & Lourenço, 2005. Lourenço, Qi and Zhu (2005) identified *Mesobuthus songi* Lourenço, Qi & Zhu, 2005 (Buthidae), and *Heterometrus tibetanus* Lourenço, Qi & Zhu, 2005. Lourenço and Qi (2006) established of a new genera by specimens from Xizang: *Tibetiomachus* Lourenço & Qi, 2006 (Hemiscorpiidae) and new species: *Tibetiomachus himalayensis* Lourenço & Qi, 2006. Bastawade (2006) reported 2 new species and 4 new records: *Chaerilus dibang-valleycus* Bastawade, 2006; *Chaerilus pictus* (Pocock, 1890); *Chaerilus tricostatus* Pocock, 1899; *Euscorpiops asthenurus* (Pocock, 1900); *Euscorpiops kamengensis* Bastawade, 2006; *Scorpiops leptochirus* Pocock, 1893 by the specimens from South Xizang (China). Lourenço and Zhu (2008) discovered a new species belonging to *Isometrus* (Buthidae): *I. (Reddyanus) tibetanus* Lourenço & Zhu, 2008, at the same time, *Isometrus* was a new recorded genus to Xizang. Zhu, Han and Lourenço (2008) summarized the chaerilid scorpions of China, and provided the redescriptions for *Chaerilus tessellatus* Qi, Zhu & Lourenço, 2005 and *Chaerilus tryznai* Kovařík, 2000; pointed out that *Chaerilus pictus* (Pocock, 1890) which was described by Qi et al. (2005) was misidentified, and described one new species: *Chaerilus conchiformis* Zhu, Han and Lourenço, 2008, all of them from Xizang. Di and Zhu (2009a and b) established 2 new species: *Scorpiops lhasa* Di & Zhu, 2009 and *Chaerilus mainlingensis* Di & Zhu, 2009 successively. Di and Zhu (2009c) described the male of *Euscorpiops karschi* firstly. Di et al. (2009) analysed the genus *Chaerilus* Simon, 1877 (Scorpiones: Chaerilidae) from China, described the female *Chaerilus tricostatus* Pocock, 1899 firstly (*Chaerilus assamensis* Kraepelin, 1913 was a wrong record in this paper). Di and Zhu (2010) provided the redescription of *Scorpiops margerisonae* Kovařík, 2000, and reported the female for the first time. Sun, Zhu and Lourenço (2010) accommodated *Mesobuthus songi* Lourenço, Qi & Zhu,

2005 in the genus *Hottentotta*, as a new combination *Hottentotta songi* (Lourenço, Qi & Zhu 2005). In the meantime, Teruel and Rein (2010) transferred *Mesobuthus songi* Lourenço, Qi & Zhu, 2005 to the genus *Hottentotta* (Buthidae) too. Recently, Kovařík (2012) reported five new species of genus *Chaerilus*, including a Xizang species *Chaerilus wrzecionkoi* Kovařík, 2012.

Until now, twenty-six scorpion species of seven genera and five families were recorded in Xizang, all of them distribute in south and the north shores of Yarlung Zangbo Jiang. All of the eight species of *Chaerilus* from China found in Xizang, 10 of 11 species of *Scorpiops* from China living in Xizang (others: *Scorpiops jendeki* Kovařík, 1994 found in Yunnan, one unnamed species of *Scorpiops* in Hubei see Di et al. 2011a), 4 of 12 species of *Euscorpiops* from China found in Xizang (other 8 species in Yunnan; see Di et al. 2011b). The scientific expedition investigation of some areas of China has been finished basically which reflected in the papers (Qi et al, 2005; Shi et al, 2007; Zhang and Zhu, 2009; Di et al, 2009, 2010, 2011a and b, 2012; Sun and Sun, 2011). Followed these reports, Xizang is the richest area in China in scorpion diversity.

Material and methods

Illustrations and measurements were produced using a Motic K-700L stereomicroscope with an Abbe drawing device and an ocular micrometer. Measurements follow Sissom (1990), and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Hjelle (1990). Terminology of metasomal carination follows Vachon (1952), Prendini (2000) and Soleglad and pedipalp chela carinae follow Sissom (2001) for. FKCP: private collection of F. Kovařík, Prague, Czech Republic; MHBU: Museum of the College of Life Sciences, Hebei University, Baoding, China; MNHN: Muséum national d'Histoire naturelle, Paris, France; NCZS: National Collections, Zoological Survey of India, Kolkata, India. NMPC: National Museum (Natural History), Prague, Czech Republic.

Taxonomy

Family Buthidae C. L. Koch, 1837

Buthidae: Fet & Lowe, 2000: 54–57; Soleglad & Fet, 2003: 89–91.

Genus *Hottentotta* Birula, 1908

Hottentotta: Fet and Lowe, 2000: 134–135; Kovařík, 2007: 2–3, 8–10. Sun et al., 2010: 40.

***Hottentotta songi* (Lourenço, Qi & Zhu, 2005)**
http://species-id.net/wiki/Hottentotta_songi

Mesobuthus songi Lourenço, Qi & Zhu, 2005: 3–8, figs 1–17, tab. 1.
Hottentotta songi: Teruel & Rein, 2010: 7; Sun et al., 2010: 40–12, figs 25–29.

Type specimens. Holotype, male; Paratypes, 9 males and 9 females, China, Xizang, south region of Pulan, low valley of the river Kongque He, near to the border with Nepal, 7/1931. Male holotype, 7 male and 8 female paratypes deposited in MNHN. 2 male and 1 female paratypes deposited in MHBU.

Distribution. Burang County (Pulan Xian) (China).

Genus *Isometrus* Ehrenberg, 1828

Isometrus: Fet & Lowe, 2000: 146; Kovařík, 2003: 1–2, figs 1–8, tab. 1.

Subgenus *Reddyanus* Vachon, 1972

Isometrus (Reddyanus): Fet & Lowe, 2000: 151; Kovařík, 2003: 5.

***Isometrus (Reddyanus) tibetanus* Lourenço & Zhu, 2008**

http://species-id.net/wiki/Isometrus_tibetanus

Isometrus (Reddyanus) tibetanus Lourenço & Zhu, 2008: 268–270, figs 14–26, 32, tab. 1.

Type specimens. Holotype, male, China, Xizang Region of Chesi (?) 10/1970, Lindberg leg., deposited in MHBU.

Distribution. Chesi (?), China.

Family Chaerilidae Pocock, 1893

Chaerilidae: Fet, 2000a: 323. Kovařík, 2000a: 40–41; Soleglad & Fet, 2003: 92.

Genus *Chaerilus* Simon, 1877

Chaerilus: Fet, 2000a: 323; Kovařík, 2000a: 38; Kovařík, 2005: 1; Qi, Zhu & Lourenço, 2005: 29; Lourenço & Zhu, 2008: 462.

***Chaerilus conchiformus* Zhu, Han & Lourenço, 2008**

http://species-id.net/wiki/Chaerilus_conchiformus

Chaerilus pictus: Qi, Zhu & Lourenço, 2005:34–38, figs 126–144.

Chaerilus conchiformus Zhu, Han & Lourenço, 2008: 38–44, figs 1–21, tab. 1.

Type specimens. Holotype, female, China, Xizang, Nyingchi County, Bayi Town, 29°41'N, 94°21'E, 17/8/2002, Ming-Sheng Zhu leg. (Ar.-MHU-XZ0201); Paratype, 1 female juvenile, China, Xizang, Nyingchi County, Bayi town, 6/8/2003, Feng Zhang leg. (Ar.-MHU-XZ0202); Paratypes, 6 females, China, Xizang, Nyingchi County, Baishuwang Town, 29°34'N, 94°30'E, 7/2006, Ming-Sheng Zhu, Xiao-Feng Yang and Long Liu leg. (Ar.-MHU-XZ0601-0606); Paratype, 1 male, China, Xizang, Mainling County, Pai Town, 29°12'N, 94°06' E, 30/7/2006, Zhu Ming-Sheng, Yang Xiao-Feng and Liu Long leg. (Ar.-MHU-XZ0102) (deposited in MHBU).

Habitat. Under the stones in the farmland (highland barley) and forest (cypress).

Distribution. Mainling County and Nyingchi County (China).

***Chaerilus dibangvalleycus* Bastawade, 2006**

http://species-id.net/wiki/Chaerilus_dibangvalleycus

Chaerilus dibangvalleycus Bastawade, 2006: figs 1–16.

Type specimens. Holotype, male; Paratypes, 5 females, 5 males and 2 young ones, China, Xizang, Dibangvalley District, Mayodia, 1800 Mts (deposited in NCZS).

Other materials reported. 3 males and 4 females, 15/9/1991, D. B. Bastawade leg.; 1 male, 16/9/1991, K. Alia leg.; 2 males and 1 female and 2 young ones, 17/9/1991, D. B. Bastawade leg.

Distribution. Mêdog County (China).

***Chaerilus mainlingensis* Di & Zhu, 2009**

http://species-id.net/wiki/Chaerilus_mainlingensis

Chaerilus mainlingensis Di & Zhu, 2009a: 97–102, figs 1–16.

Type specimens. Holotype, female, China, Xizang, Mainling County, the Estate of Gongbuwang, 12/7/2008, Zhi-Yong Di and Guo-Dong Ren leg. (Ar.-MHU-XZML0801); 1 female paratype, same data as holotype (Ar.-MHU-XZML0802) (deposited in MHBU).

Habitat. Under the stones of mixed forest.

Distribution. Mainling County (China).

***Chaerilus pictus* (Pocock, 1890)**

http://species-id.net/wiki/Chaerilus_pictus

Chaerilus pictus: Fet, 2000a: 327; Kovařík, 2000a: 53–54; figs 21–22, 39, 42–43, tabs 1–2; Lourenço & Bernard, 2010: figs 30–31.

Materials reported. Specific locality see Bastawade, 2006.

Distribution. South Xizang (China); (Assam) India; (Silhet) Bangladesh.

***Chaerilus tessellatus* Qi, Zhu & Lourenço, 2005**

http://species-id.net/wiki/Chaerilus_tessellatus

Chaerilus tessellatus Qi, Zhu & Lourenço, 2005: 30, 34, figs 109–125; Zhu, Han & Lourenço, 2008: 44–47, figs 30–44, tab. 1.

Type specimens. Holotype, female, China, Xizang, Mêdog County, Beibeng Town, 29°02'N, 95°03'E, 22/8/2003, Feng Zhang leg.(MHBU, Ar.–MHU–XZ0301); 2 female paratypes, China, Xizang, Bomi County, 29°08'N, 95°07'E, 14/8/2002, Ming-Sheng Zhu leg.(MHBU, Ar.–MHU–XZ0203; another deposited in MNHN); 1 female paratype, China, Xizang, Mêdog County, 108K-8K, 17/8/2003, Feng Zhang leg. (MHBU, Ar.–MHU–XZ0302).

Other materials reported. 1 female, China, Xizang, Bomi County, Mt. Sela, 3/8/2002, Ming-Sheng Zhu leg.(MHBU, Ar.–MHU–XZ0204); 2 female juveniles. China, Xizang, Nyingchi County, Dongjiu villige, 21/9/2007, Fu-Ming Shi leg. (MHBU, Ar.–MHU–XZ0401-02).

Distribution. Bomê County (Bomi), Mêdog County and Nyingchi County (China).

***Chaerilus tricostatus* Pocock, 1899**

http://species-id.net/wiki/Chaerilus_tricostatus

Chaerilus tricostatus: Fet, 2000a: 327, Kovařík, 2000a: 61–62, figs 27–28, tabs 1–2; Di et al., 2009: 131–138; figs 1–18; tab. 1.

Materials reported. 3 females, 1 female immature and 3 juveniles, China, Xizang, Mêdog County, elevation 1146m, 29°20'N, 95°20'E, 14/8/2009, Liqing Fan leg. (Ar.–MWHU-XAMT0901–07; deposited in MWHU).

Distribution. Mêdog County, South Xizang (China); (Assam) India.

***Chaerilus tryznai* Kovařík, 2000**

http://species-id.net/wiki/Chaerilus_tryznai

Chaerilus tryznai Kovařík, 2000a: 65–66, figs 32–33, tabs 1–2.

Chaerilus tryznai: Zhu, Han & Lourenço, 2008: 47–51, figs 45–60, tab. 1.

Type specimens. Holotype, male; Allotype and Paratype (No. 1), 2 females; Paratypes Nos. 2–12, 10 females and 1 immature, China, Xizang, Bomi County, 29°52' N, 95°45'E, 3000m, M. Tryzna & O. Safranek, FKCP.

Other materials reported. China, Xizang, Mêdog County, 29°02' N, 95°03' E, Hanmi Village, 11/8/2006, 1 female, Zhi-Shun Song leg. (Ar.–MHU–XZ0607) (in MHBU); China, Xizang, Mêdog County, Hanmi Village, 10/8/2006, 1 female, Zhi-Shun Song leg. Zhi-Shun Song leg. (Ar.–MHU–XZ0608) (deposited in MHBU).

Habitat. Under the stones in the mixed forest.

Distribution. Bomê County, Mêdog County (China).

Comments. Five related species with close geographical distribution, *C. assamensis*: Kraepelin, 1913, *C. conchiformus*, *C. dibangvalleycus*, *C. mainlingensis*, and *C. tryznai*, all with 7–8 granulated cutting edges on the movable fingers of pedipalp (Bastawade, 2006; Di & Zhu, 2009; Kovařík, 2000a; Zhu, Han & Lourenço, 2008). *C. assamensis* was described by type specimen from Assam (India), its original description is poor (see Kraepelin, 1913). Kovařík (2000a: 69), who analysed the old reference, recorded three characters of *C. assamensis*: middle and lateral eyes present; 7–8 granulated cutting edges on the movable fingers of pedipalp; the anterior margin of carapace arched in males. Lourenço and Duhem (2010) thought *C. tryznai*, with few differences from *C. assamensis*, may prove to be conspecific. Both sexes of *C. conchiformus*, *C. dibangvalleycus* and *C. tryznai* have anterior margin truncated, but only females of *C. mainlingensis* have same anterior margin of carapace as *C. dibangvalleycus*. Except *C. assamensis* with poor information, other 4 species can be identified by the key provided in this paper.

***Chaerilus wrzecionkoi* Kovařík, 2012**

http://species-id.net/wiki/Chaerilus_wrzecionkoi

Chaerilus wrzecionkoi Kovařík, 2012b: 11–13, figs 62–77.

Type specimens. Holotype, allotype and paratypes, 2 males and 2 females, China, Xizang, Tomi (Tangmai), 30 km W of Donjung, 2075 m a.s.l., 23/6/2007, leg. A. Wrzecionko; FKCP.

Distribution. Tangmai (Tongmai?), Tomi (Bomê County?) (China).

Comments. *C. wrzecionkoi* are closest with *C. mainlingensis* Di & Zhu, 2009 and *C. tryznai* Kovařík, 2000. Both have manus and patella of pedipalp narrower and longer than other congeneric species. *C. mainlingensis* has four distinct carinae on the seventh sternite; *C. wrzecionkoi* has the seventh sternite granulated but without

carinae; manus of pedipalp in male narrow and long, chela length/width ratio in male higher than 3 in *C. tryznai* Kovařík, 2000, while manus of pedipalp in male robust and chela length/width ratio in adults lower than 2.6 in *C. wrzecionkoi* (see Kovařík, 2012).

Family Euscorpiidae Laurie, 1896

Euscorpiidae: Fet & Sissom, 2000: 355; Soleglad & Fet, 2003: 105.
Scorpiopidae: Fet, 2000d: 487; Kovařík, 2000b: 154.

Genus *Euscorpiops* Vachon, 1980

Euscorpiops: Fet & Sissom, 2000: 488. Kovařík, 2000b: 154; Kovařík, 2005: 1, 4; Kovařík, 2012a: 1, 3.

Euscorpiops asthenurus (Pocock, 1900)

http://species-id.net/wiki/Euscorpiops_asthenurus

Euscorpiops asthenurus: Fet, 2000d: 488.

Scorpiops asthenurus: Kovařík, 2000b: 167, figs 15, 28, 31, tabs 1–3.

Other materials reported. Specific locality see Bastawade, 2006.

Distribution. South Xizang (China); Bhutan; (Assam, West Bengal, Sikkim) India.

Euscorpiops kamengensis Bastawade, 2006

http://species-id.net/wiki/Euscorpiops_kamengensis

Euscorpiops kamengensis Bastawade, 2006: 454, 456, 457, figs 17–26.

Type specimens. Holotype, male; Paratype, 1 female immature, China, South Xizang, West Kameng, 7 Kms of Bomdilla, Sara village, 2500 mts. D. B. Bastawade leg. 18/9/1991 (deposited in NCZS).

Distribution. South Xizang (China).

Euscorpiops karschi Qi, Zhu & Lourenço, 2005

http://species-id.net/wiki/Euscorpiops_karschi

Euscorpiops karschi Lourenço, Zhu & Qi, 2005: 25, figs 94–108. Di & Zhu, 2009b: 11–15, figs 1–27, tab. 1.

Type specimens. Holotype, female, China, Xizang, Zayü district, Xia Zayü town (28°30'N, 97°00'E), 8/8/2002, Ming-Sheng Zhu leg. (MHBU, Ar.-MHBU-XZ-ZY0201). Paratypes: 2 females and 2 immature males, same data as holotype (one female in MHBU, Ar.-MHBU-XZZY0202); one female in MNHN, Ar.-MNBNU-XZZY0203).

Other materials reported. 1 male, China, Xizang, Zayü district, Xia Zayü town (28°30' N, 97°00' E), 2/10/2007, Fu-Ming Shi leg. (MHBU, Ar.-MHBU-XZZY0701); 1 female, China, Xizang, Zayü district, Shang Zayü town, 23/8/2005, Zhi-Shun Song leg. (MHBU, Ar.-MHBU-XZZY0501).

Distribution. Zayü County (Zayü district, Chayu district) (China).

Euscorpiops novaki Kovařík, 2005

http://species-id.net/wiki/Euscorpiops_novaki

Euscorpiops novaki Kovařík, 2005: 4, 6, figs 8, 11, 15–16, tab. 1.

Type specimens. Holotype, male, China, Xizang, Bomi County (29°52' N, 95°45'E), ca 3000 m, 1988, P. Rojek leg., FKCP.

Distribution. Bomê County (China).

Genus *Scorpiops* Peters 1861

Scorpiops: Fet, 2000d: 491; Kovařík, 2000b: 162, 164, 166; Qi, Zhu & Lourenço, 2005: 2; Di & Zhu, 2009: 40; Di et al., 2011b, 1–2. Kovařík, 2009: 1.

Scorpiops atomatus Qi, Zhu & Lourenço, 2005

http://species-id.net/wiki/Scorpiops_atomatus

Figures 1–21, Table 1

Scorpiops atomatus Qi, Zhu & Lourenço, 2005: 6–10, figs 16–31.

Type specimens. Holotype, male, China, Xizang, Lang district (29.02°N, 93.08°E), 7-8/2004, Ai-Min Shi and Yi-Bin Ba leg. (MHBU). Paratypes: 3 females, 1 male, same data as holotype (2 females in MHBU, 1 female and 1 male in MNHN); 1 male, China, Xizang, Chayu district, Xia Zayü town (28.4°N, 97.0°E), 7/8/2002, Ming-Sheng Zhu leg. (MHBU?); 2 females, China, Xizang, Lang district (29.02°N, 93.08°E), 20 August 2002, Ming-Sheng Zhu leg. (MHBU?); 1 male, China, Xizang, Gyaca district (29.1°N, 92.7°E), 21/8/2002, Ming-Sheng Zhu leg. (MHBU?); 1 male, 1 female, 22 August 2002, other data same as above (MHBU?).

Table 1. Measurements (in mm) of *Scorpiops atomatus*, *Scorpiops langxian* and *Scorpiops luridus*.

Species Contents \ Sex	<i>Scorpiops atomatus</i>		<i>Scorpiops langxian</i>		<i>Scorpiops luridus</i>	
	Male HT(MHBU)	Female PT(MHBU)	Male HT(MHBU)	Female PT(MHBU)	Male HT(MHBU)	Female PT(MHBU)
Total length	42.1	40.4	63.0	58.5	86.7	75.1
Carapace:						
-Length	6.2	6.4	7.7	7.3	11.7	10.2
- Anterior width	3.7	4.0	4.3	4.0	5.0	4.1
- Posterior width	6.5	6.2	8.4	7.9	10.6	9.2
Metasomal segment I:						
- Length	2.4	2.3	4.1	3.9	4.3	4.1
- Width	2.4	2.4	3.8	3.5	4.5	4.1
- Depth	2.0	1.9	3.1	2.8	3.7	3.2
Metasomal segment II:						
- Length	2.9	2.6	4.7	4.3	4.9	4.2
- Width	2.1	2.1	3.6	3.2	4.0	3.7
- Depth	1.8	1.9	2.9	2.8	3.7	3.1
Metasomal segment III:						
- Length	3.1	2.9	5.2	4.9	5.7	5.1
- Width	2.0	2.0	3.3	3.1	3.8	3.2
- Depth	1.8	2.0	3.0	2.6	3.6	3.1
Metasomal segment IV						
- Length	3.6	3.1	5.7	5.5	7.8	6.4
- Width	1.8	1.9	3.2	2.9	3.6	3.1
- Depth	2.0	2.0	3.0	2.6	3.7	3.1
Metasomal segment V						
- Length	5.4	5.2	9.0	8.3	12.8	9.6
- Width	1.8	2.0	2.9	2.6	3.2	2.7
- Depth	1.8	1.9	2.9	2.4	3.3	2.8
Telson:						
- Length	5.9	5.5	8.8	7.4	12.8	10.2
- Width	2.0	1.9	3.7	3.0	4.6	4.0
- Depth	2.0	1.8	3.4	2.7	4.6	3.8
Pedipalp femur:						
- Length	5.6	5.6	6.1	6.1	10.2	8.9
- Width	2.6	2.4	2.6	2.7	3.8	3.7
- Depth	1.9	1.9	2.4	2.4	2.6	2.6
Pedipalp patella:						
- Length	5.1	5.3	6.0	5.3	9.6	8.3
- Width	2.8	2.7	3.1	3.1	4.5	4.1
- Depth	2.3	2.3	3.1	3.2	3.8	3.8

Species Contents \ Sex	<i>Scorpiops atomatus</i>		<i>Scorpiops langxian</i>		<i>Scorpiops luridus</i>	
	Male HT(MHBU)	Female PT(MHBU)	Male HT(MHBU)	Female PT(MHBU)	Male HT(MHBU)	Female PT(MHBU)
Chela						
- Length (chela)	10.0	9.9	11.2	11.5	23.5	20.0
- Length (manus)	6.1	6.2	6.6	6.7	12.0	10.2
- Width	4.4	4.2	6.2	5.8	7.3	6.4
- Depth	3.0	2.8	4.6	4.2	5.7	4.6
Movable finger- Length	5.9	5.9	7.4	7.3	11.5	9.8
Pectinal teeth (left/right)	10/11	9/9	8/8	6/6	10/10	8/8

Distribution. Gyaca County, Nang County (Lang district, Langxian district), Zayü County (China).

Comments. Kovářík & Ahmed (2009: 10) provided a list of *S. hardwickii* (Gervais, 1843) “complex”, which included 12 species, containing *S. atomatus*. Di et al. (2011a) summarized the characters of *S. hardwickii* “complex” and excluded *S. atomatus* with the reasons as followed: (1) pectinal teeth count is 9–11 in *S. atomatus*, and 4–8 in *S. hardwickii* (Kovářík, 2000: 178); (2) ventral trichobothria on patella number is 9 in *S. atomatus*, and 6–8 in *S. hardwickii* (Kovářík, 2000: 176); (3) fulcra are present in *S. atomatus* but absent in *S. hardwickii*. In addition, *S. atomatus* has clearly thinner chela than *S. pococki* and *S. langxian*.

Scorpiops hardwickii (Gervais, 1843)

http://species-id.net/wiki/Scorpiops_hardwickii

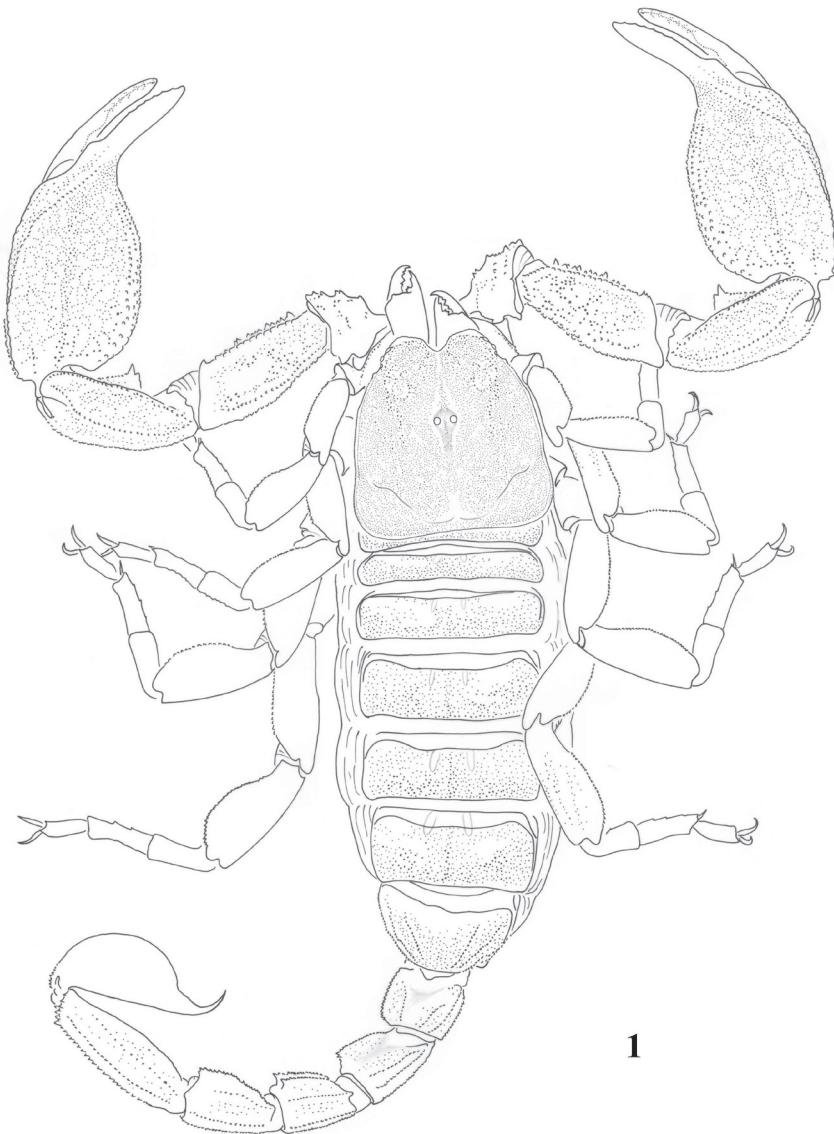
Scorpiops hardwickii: Kovářík, 2000b: 175–179, figs 14, 46, 56, 57.

Scorpiops hardwickii hardwickii: Fet, 2000d: 492.

Materials reported. 1 male, 3 females and 3 juveniles, China, Xizang, Nyainqntangha Mts, Lhasa, 3800m, V. Major leg. FKCP.

Distribution. Lhasa, Xizang (China); (Himachal, Uttar, Jammu, Kashmir, Punjab) India; Nepal; Pakistan.

Comments. The list of *S. hardwickii* (Gervais, 1843) “complex”, provided by Kovářík & Ahmed (2009: 10), containing 12 species widely distributed in Asia. Di et al. (2011a) summarized the characters of *S. hardwickii* “complex”: (1) color red brown to dark brown; (2) total length about 45–80 mm in adults; (3) fingers of pedipalps very strongly flexed (curved) in males, slightly flexed (undulated) in females; (4) ventral trichobothria on patella number 6–8; (5) pectinal teeth number 4–9; (6) length/width ratio of chela about 1.8–2.1; (7) fulcra absent; (8) patella with two small spinoid granules on the internal aspect.



1

Figure 1. Habitus of *Scorpions atomatus*, male, holotype, dorsal view.

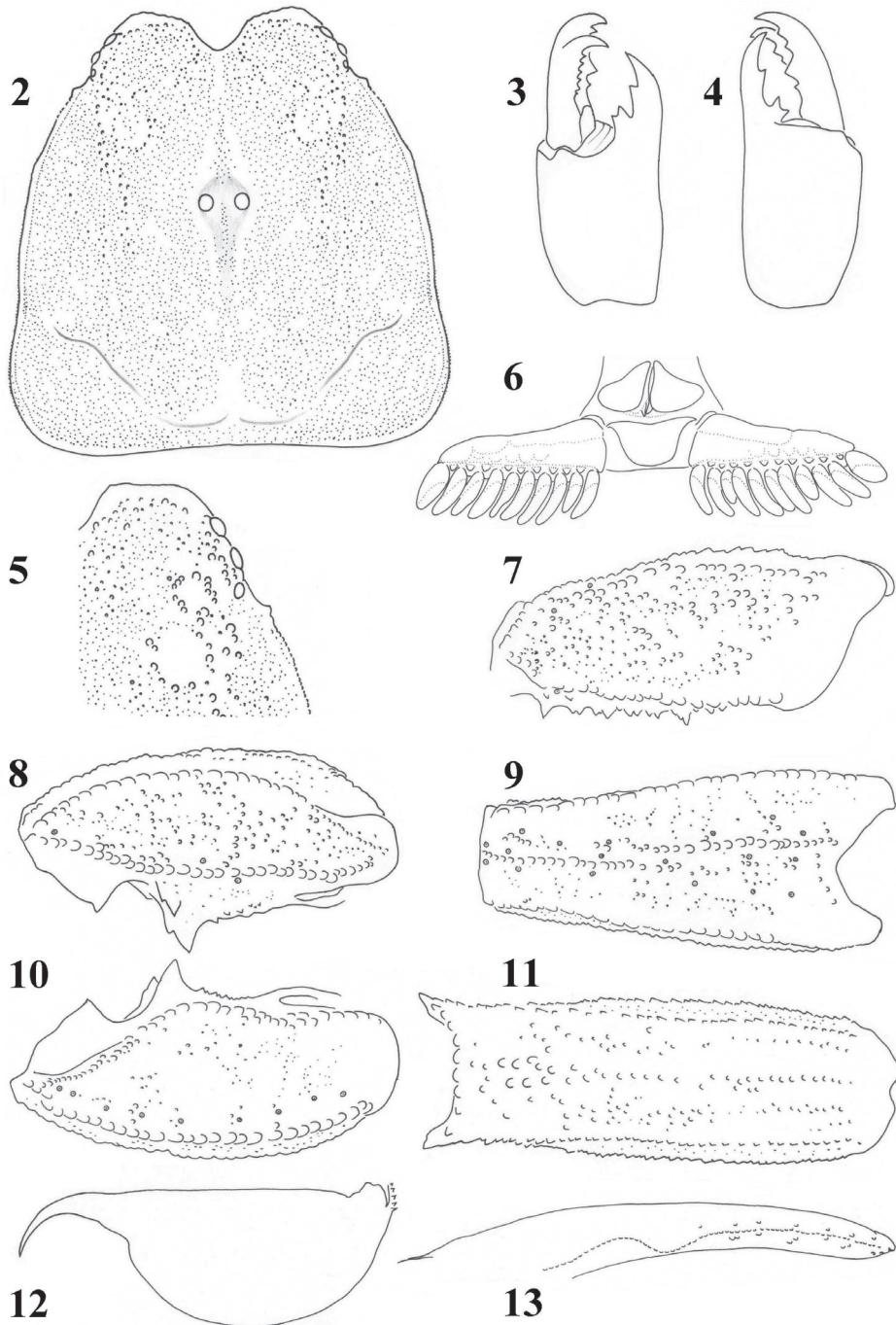
***Scorpions langxian* Qi, Zhu & Lourenço, 2005**

http://species-id.net/wiki/Scorpions_langxian

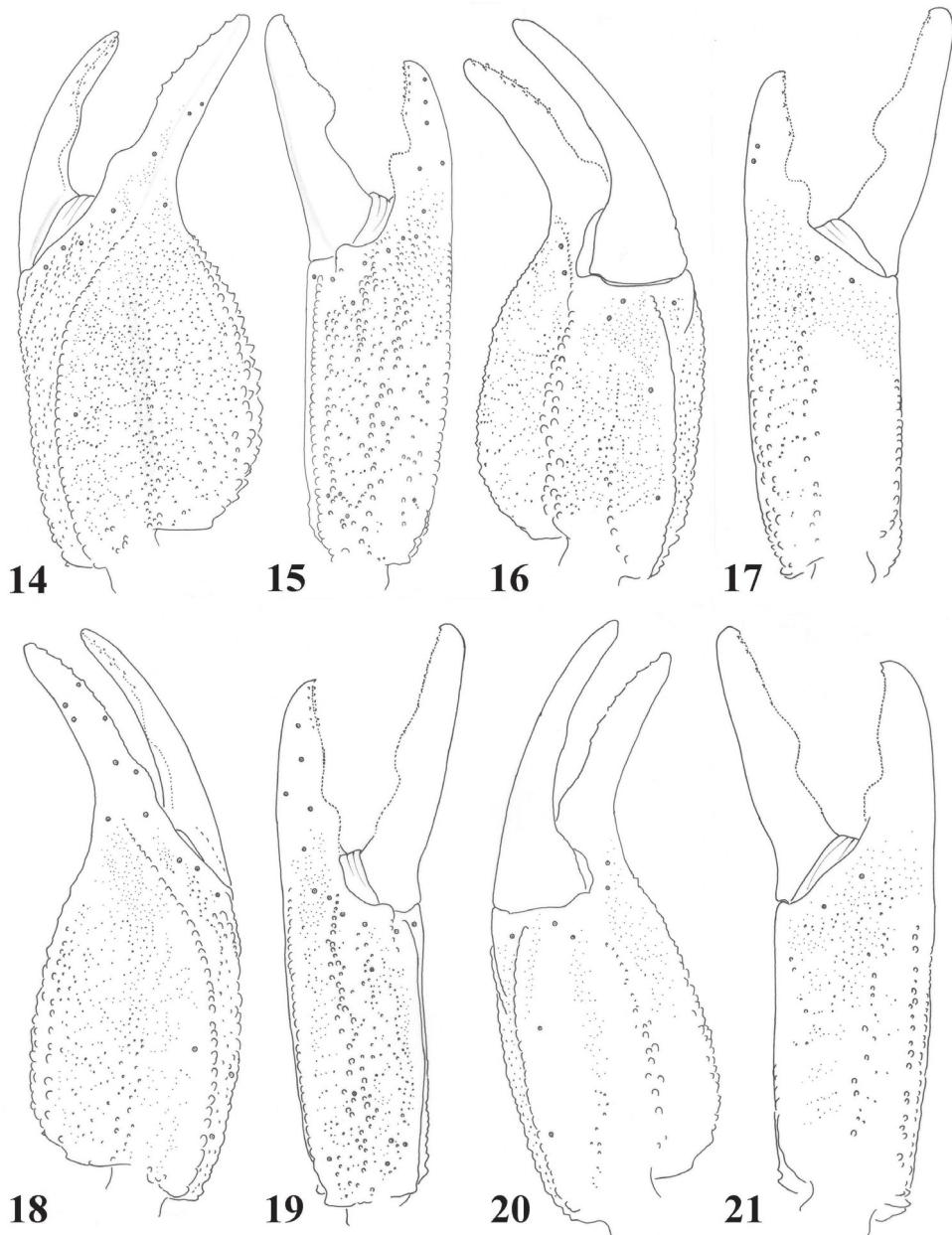
Figures 22–42, Table 1

Scorpions langxian Qi, Zhu & Lourenço, 2005: 10–18, figs 32–46.

Type specimens. Holotype, male, China, Xizang, Lang district ($29^{\circ}02'N$, $93^{\circ}08'E$), 7–8/2004, Ai-Min Shi and Yi- Bin Ba leg. (MHBU); Paratypes 1 female, 1 male same



Figures 2–13. *Scorpops atomatus*, male, holotype. **2** Carapace **3–4** Chelicera, dorsal and ventral aspects **5** Lateral eyes **6** Genital operculum and pectines **7** Femur dorsal aspect **8–10** Patella dorsal, external and ventral aspects **11** Metasomal segment V, ventral aspect **12** Telson, lateral aspect **13** Dentate margin of movable finger, showing rows of granules.



Figures 14–17. *Scorpions atomatus*, male, holotype. Chela (left) dorsal, external, ventral and internal aspects **18–21** *Scorpions atomatus*, female, paratype. Chela dorsal, external, ventral and internal aspects.

data as holotype (MHBU); 1 female, China, Xizang, Nyingchi district ($29^{\circ}34'N$, $94.30'E$), Baishuwang town, 21/8/ 2003, Feng Zhang leg. (MNHN).

Distribution. Nang County, Nyingchi County (China).

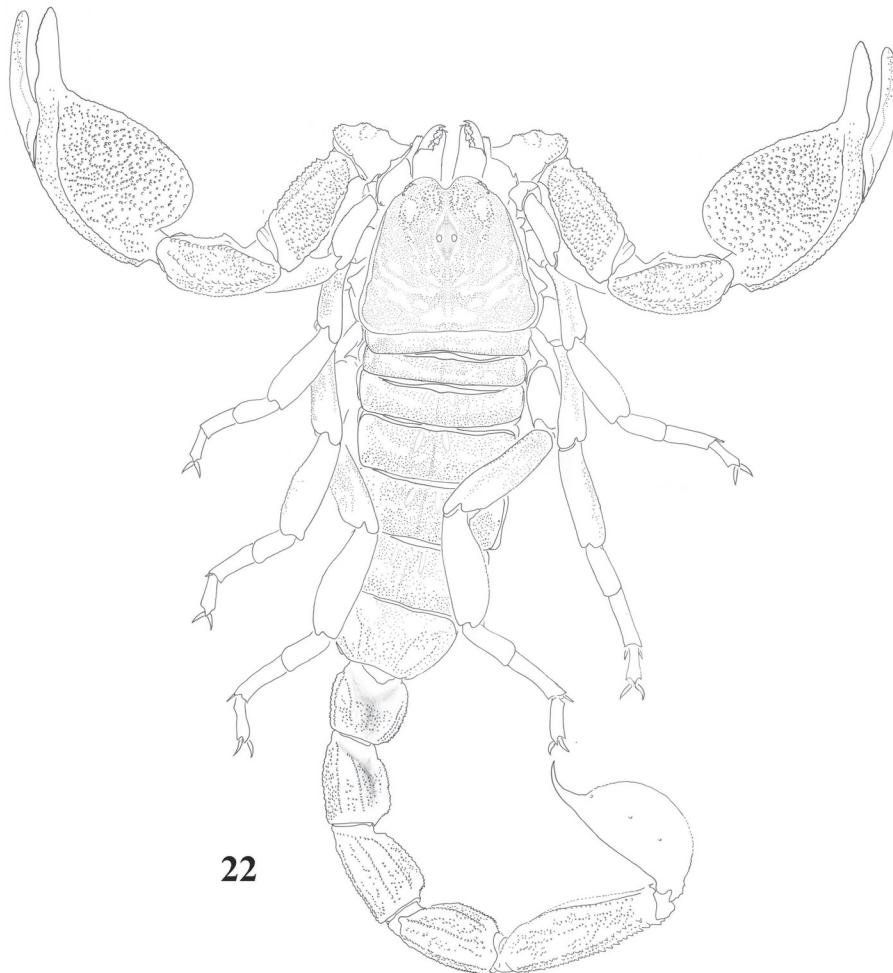


Figure 22. Habitus of *Scorpiops langxian*, male, holotype, dorsal view.

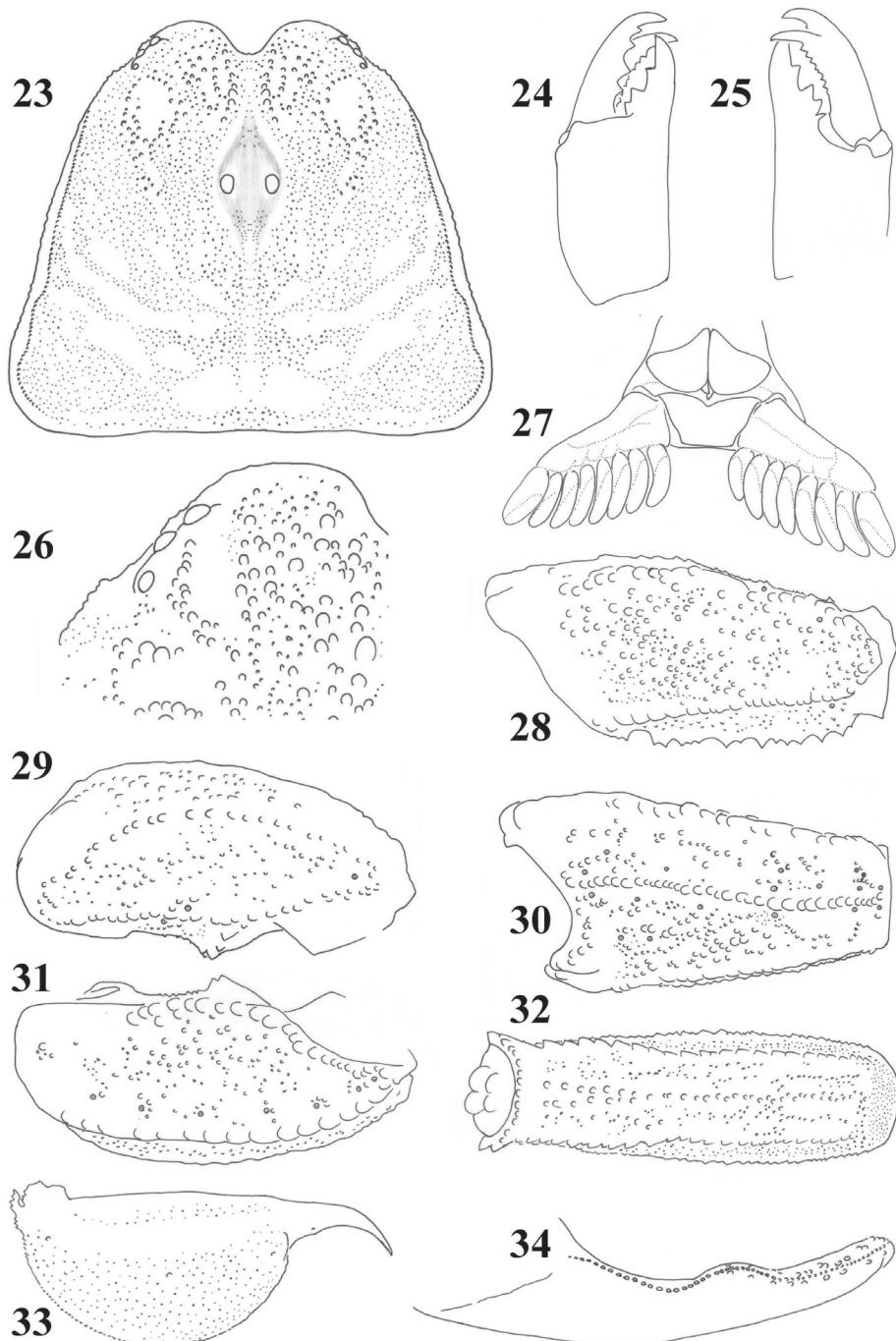
Comments. Kovářík & Ahmed (2009: 10) provided a list of *S. hardwickii* (Gervais, 1843) "complex", which contained 12 species, including *S. langxian*, and its features accord with the summary of Di et al (2011a).

***Scorpiops leptochirus* Pocock, 1893**
http://species-id.net/wiki/Scorpiops_leptochirus

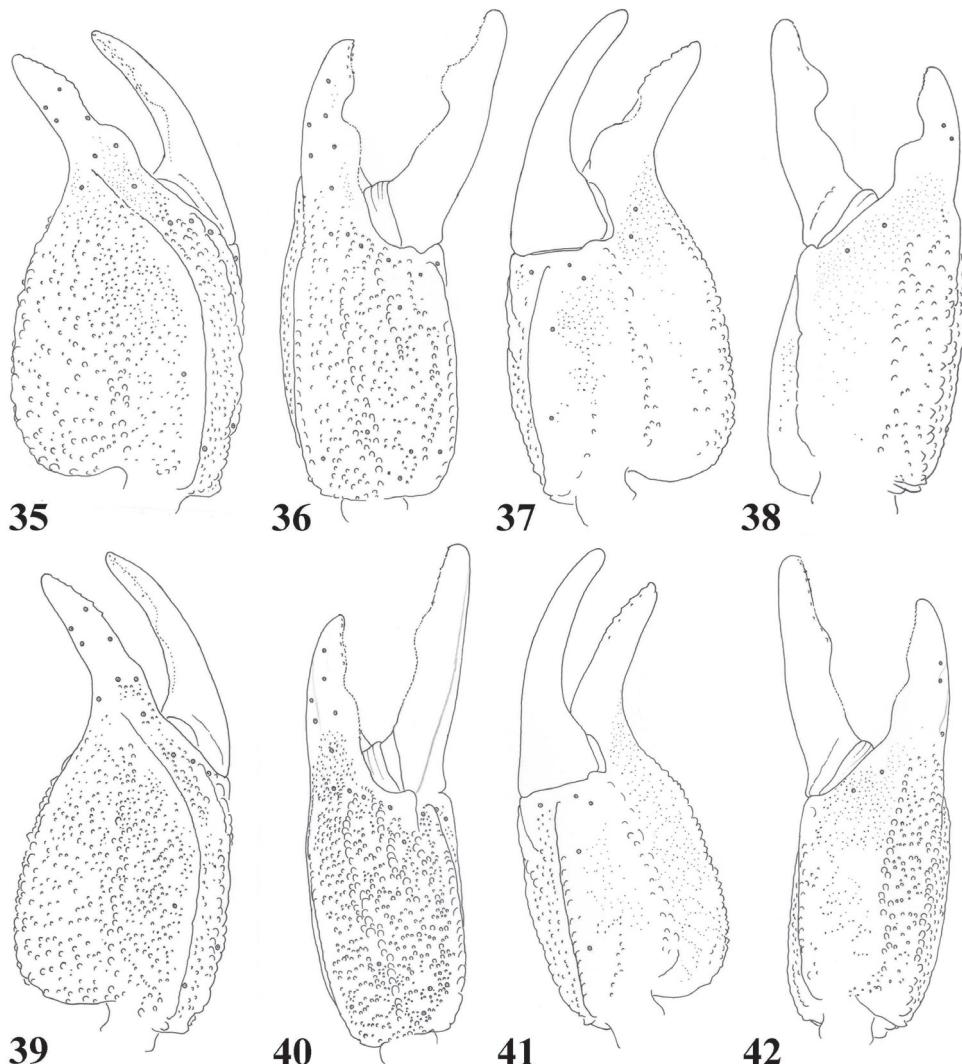
Scorpiops leptochirus Pocock, 1893: Fet & Sissom, 2000b: 493.

Materials reported. Specific locality see Bastawade, 2006.

Distribution. South Xizang (China); Bangladesh; (Meghalaya, Assam) India.



Figures 23–34. *Scorpions langxian*, male, holotype. **23** Carapace **24–25** Chelicera, dorsal and ventral aspects **26** Lateral eyes **27** Genital operculum and pectines **28** Femur dorsal aspect **29–31** Patella dorsal, external and ventral aspects **32** Metasomal segment V, ventral aspect **33** Telson, lateral aspect **34** Dentate margin of movable finger, showing rows of granules.



Figures 35–38. *Scorpions langxian*, male, holotype. Chela dorsal, external, ventral and internal aspects
39–42 *Scorpions langxian*, female, paratype. Chela dorsal, external, ventral and internal aspects.

Scorpions lhasa Di & Zhu, 2009

http://species-id.net/wiki/Scorpions_lhasa

Scorpions lhasa Di & Zhu, 2009c: 40–47, figs 1–33, tab. 1.

Type specimens. Holotype, female, China, Xizang, Lhasa banlieue, elevation about 3700m, 10/7/2008, Zhi-Yong Di leg (Ar.-MHU-XZLS0801); paratypes: 1 female and

1 female juvenile, 2 males and 1 male juvenile, same data as holotype (Ar.-MHU-XZLS0802–0806) (deposited in MHBU).

Habitat. Under the stones of barren mountain.

Distribution. Lhasa (China).

***Scorpiops luridus* Qi, Zhu & Lourenço, 2005**

http://species-id.net/wiki/Scorpiops_luridus

Figures 43–63, Table 1

Scorpiops luridus Qi, Zhu & Lourenço, 2005: 2–6, figs 1–15.

Type specimens. Holotype, male, China, Xizang, Lang district (29°02' N, E.93°08' E), 2/8/2002, Ming-Sheng Zhu leg. (deposited in MHBU). Paratypes: 2 females, same data as holotype (One is deposited in MHBU, the other in MNHN).

Habitat. Under the stones of barren mountain.

Distribution. Nang County (China).

Comments. *S. luridus* is the absolute offbeat member of *Scorpiops*: large body, pale yellow color, strong chelas and swollen telson. We checked other specimens (1 male and 1 female, from Shannan Prefecture, Xizang) and the type specimens, confirmed the distinctive color of this species not because of the immature age after molting.

***Scorpiops margerisonae* Kovařík, 2000**

http://species-id.net/wiki/Scorpiops_margerisonae

Scorpiops margerisonae Kovařík, 2000b: 189, figs 66, 70, tabs 1–3; Di & Zhu, 2010: 1–8, figs 1–23, tabs 1–2.

Type specimens. Holotype, male, China, Xizang, FKCP.

Other materials reported. 1 male, 1 female (Ar.-MHBU-XZLX060137, Ar.-MHBU-XZLX060138) and 7 juveniles., Langxian District, China, Xizang, 4/8/2006, leg. Ming-Sheng Zhu; 5 males (Ar.-MHBU-XZND060188, Ar.-MHBU-XZND060218, Ar.-MHBU-XZLX060238, Ar.-MHBU-XZLX060245, Ar.-MHBU-XZLX060246), 4 females (Ar.-MHBU-XZND060189, Ar.-MHBU-XZND0 60219, Ar.-MHBU-XZLX060220, Ar.-MHBU-XZLX06 0247), 1 female (imm.) (Ar.-MHBU-XZLX060248) and 5 juveniles, Naidong District, China, Xizang, 9/8/2006, leg. Ming-Sheng Zhu.

Habitat. Found under stones.

Distribution. Nang County, Nêdong County (Naidong district) (China).

Comments. *S. margerisonae* was established by Kovařík (2000b) just using 1 male specimens. Its most important character provided by Kovařík (2000b) is the highest

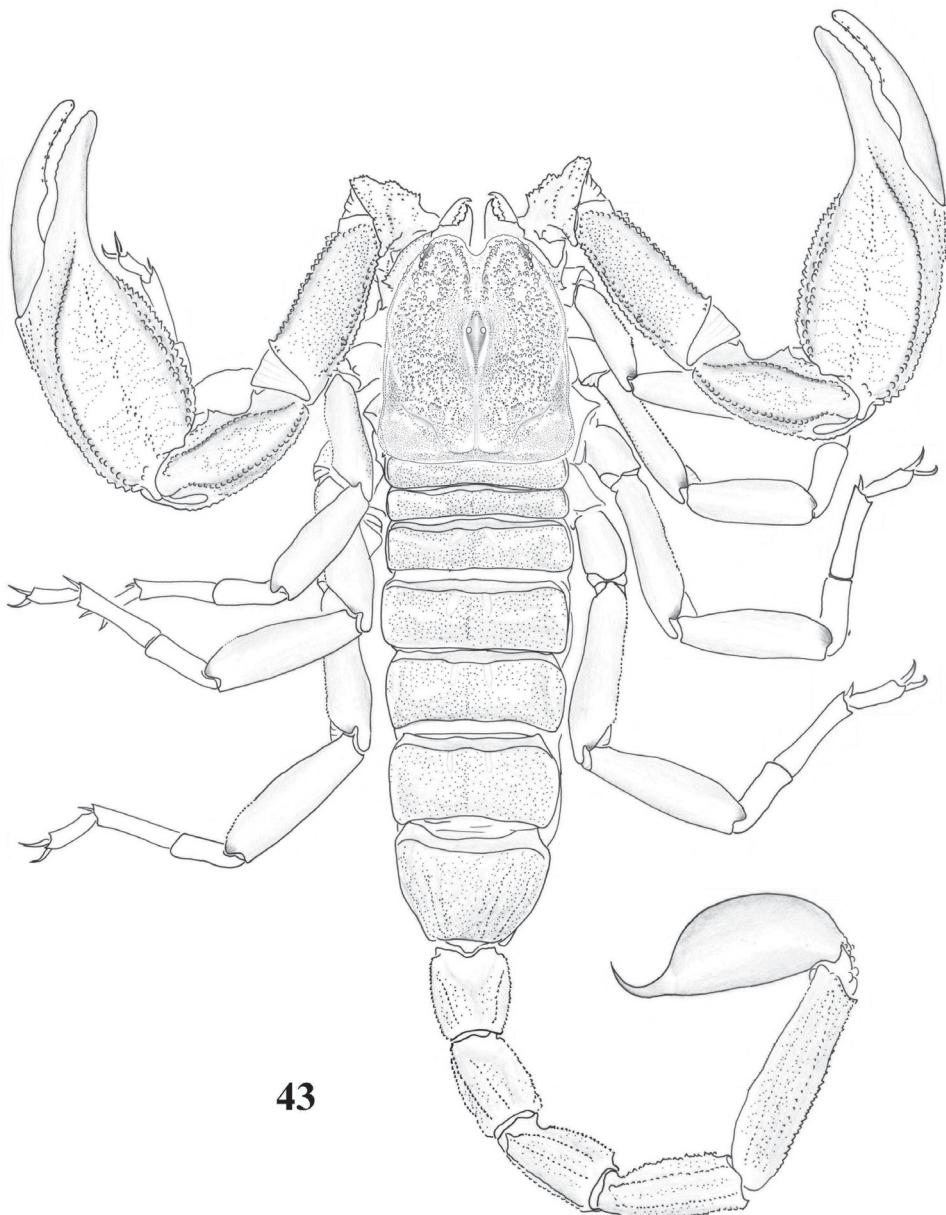
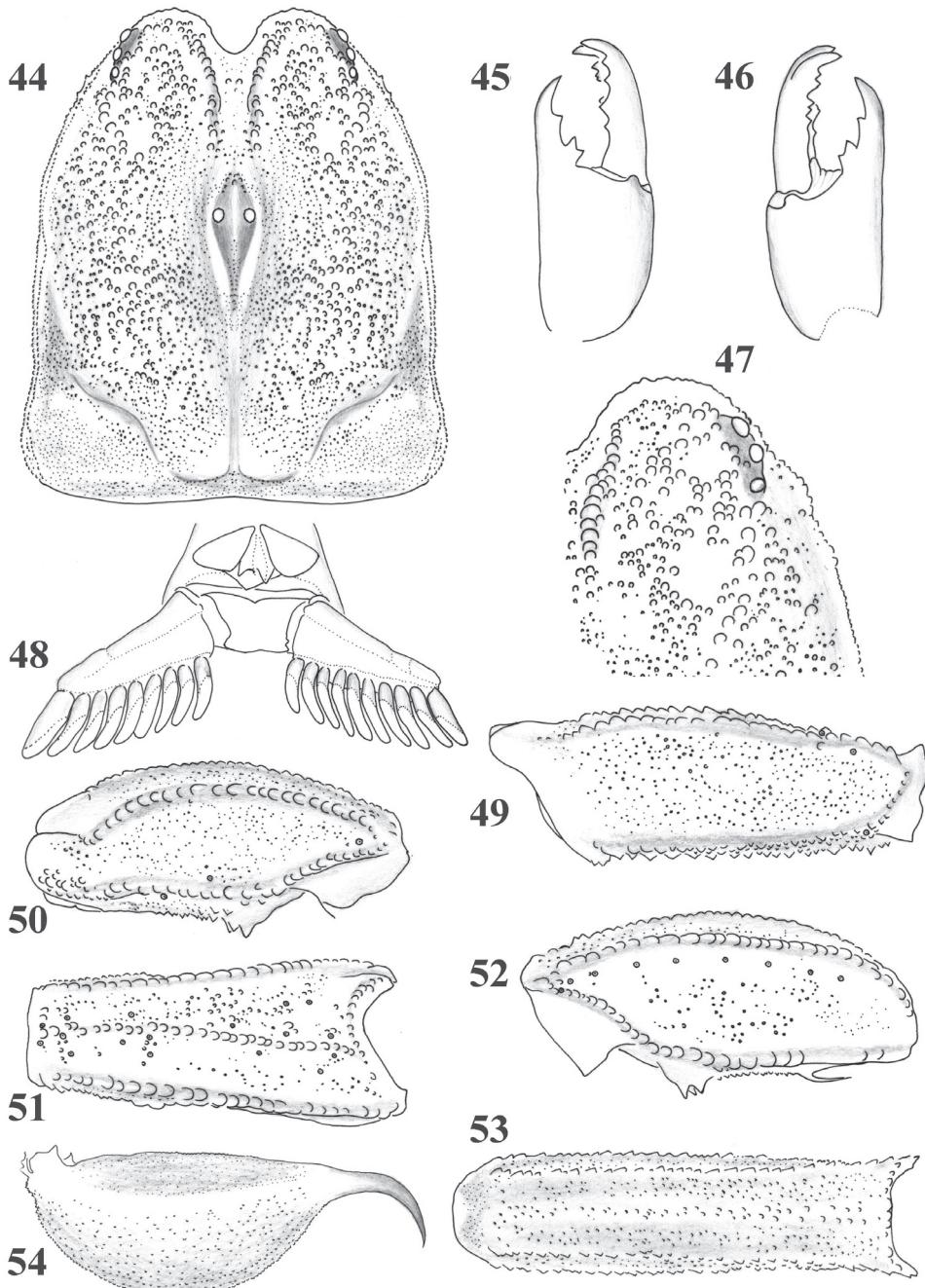
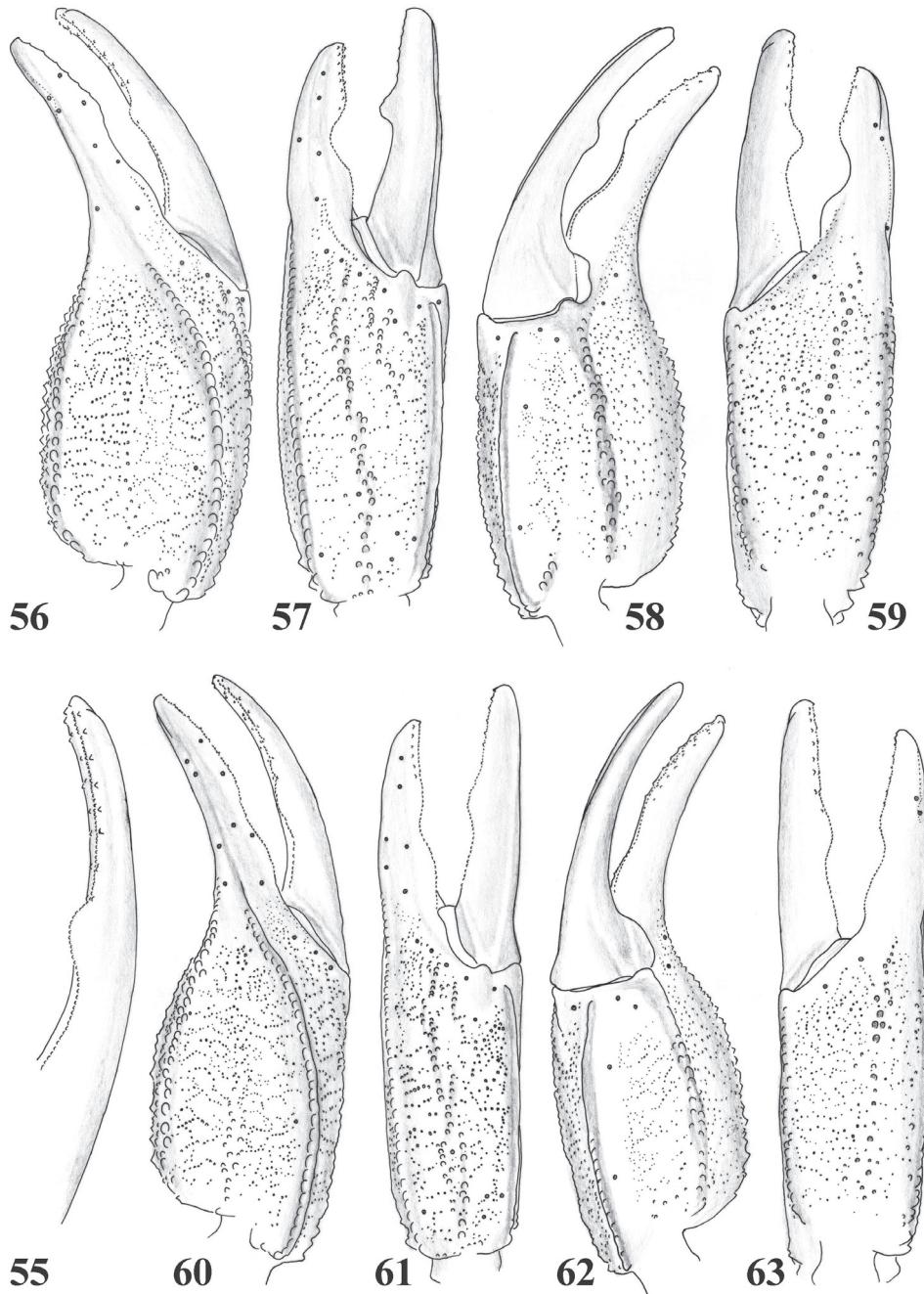


Figure 43. Habitus of *Scorpiops luridus*, male, holotype, dorsal view.

numer of pectinal teeth (12–13). Although the original description is poor, we can find another valuable information: *S. margerisonae* has a pair strong chelas with rectangular manus (with big granules in surface). Di & Zhu (2010) redescribed *S. margerisonae* and reported its female for the first time, and changed its pectinal teeth numer characters as a range 8–10 in females, 9–13 in males.



Figures 44–54. *Scorpions luridus*, male, holotype. **44** Carapace **45–46** Chelicera, dorsal and ventral aspects **47** Lateral eyes **48** Genital operculum and pectines **49** Femur dorsal aspect **50–52** Patella dorsal, external and ventral aspects **53** Metasomal segment V, ventral aspect **54** Telson, lateral aspect.



Figures 55–59. *Scorpiops luridus*, male, holotype. **55** Dentate margin of movable finger, showing rows of granules **56–59** Chela dorsal, external, ventral and internal aspects **60–63** *Scorpiops luridus*, female, paratype. Chela dorsal, external, ventral and internal aspects.

***Scorpiops petersii* Pocock, 1893**

http://species-id.net/wiki/Scorpiops_petersii

Table 2

Scorpiops petersii: Kovařík, 2000b: 192–194, figs 35, 42, tabs 1–3; Fet, 2000d: 494.

Distribution. Xizang (China); Bhutan; (Assam, Himachal, Uttar, Kashmir, Meghalaya, Sikkim) India; Pakistan.

Comments. *S. petersii* Pocock, 1893 has a simple original description. Kishida (1939: 45) recorded this species distributed in Xizang and Xikang (western Sichuan and eastern Tibet of China). Kovařík (2000b) examined the lectotype and many specimens but thought it is necessary to re-evaluate the characters used in distinguishing this species from others in the genus scorpiops (Kovařík, 2000b: 193). We cannot distinguish *S. petersii* with *S. hardwickii* (Gervais, 1843) “complex” by the diagnostic characters provided by Kovařík (2000b: 193): total length is up to 75mm; male has finger of pedipalps strongly flexed; 17 external (5 eb, 2 esb, 2 em, 4 est, 4 et) and 7, or rarely 6 or 8 ventral trichobothria on the patella; pectinal teeth number 4–9. We checked *Scorpiops* sp (1 adult and 1 immature females and 1 immature male and 1 juvenile, Lhasa, 4/7/2008, Zhiyong DI leg, kept in MHBG), its adult female: body length 80.1mm (Figs 85–101; table 2), very strong; ventral trichobothria on patella number 7 (with other: rarely 6 or 8); pectinal teeth number 4–9; a swollen telson. Except the unusual body length can let us conjecture the specimens from Lhasa maybe *S. petersii*, all of other features shared by *S. hardwickii* and *S. petersii*. We noticed body length is an important character but it like the pectinal teeth number and patella ventral trichobothria number, all of them are some ranges and few exceptions are normal. We can't confirm any of these characters in one species if checked just few specimens. Here, we add it to *S. hardwickii* (Gervais, 1843) “complex” group. We checked an immature female (locality is Uttarakhand, India; identified as *S. petersii* by Kovařík). And confirm the diagnosis of *S. petersii* as follows: (1) male chela length to width ratio about 2.6, and about 2.5 in female (see Kovařík, 2000b: tab. 1); (2) male has finger of pedipalps strongly flexed; (3) 17 external (5 eb, 2 esb, 2 em, 4 est, 4 et) and 7, or rarely 6 or 8 ventral trichobothria on the patella; (4) pectinal teeth number 4–9; (5) total length above 65mm. The first character is the key difference between *S. petersii* and *S. hardwickii* (Gervais, 1843) “complex” group.

***Scorpiops pococki* Qi, Zhu & Lourenço, 2005**

http://species-id.net/wiki/Scorpiops_pococki

Figures 64–84, Table 3

Scorpiops pococki Qi, Zhu & Lourenço, 2005: 14–18, figs 47–61.

Type specimens. Holotype, male, China, Xizang, Gyaca district (29°08'N, 92°43'E), 22/8/2002, Ming-Sheng Zhu leg. (MHBG); paratypes: 7 females and 4 males, same data as holotype (1 female and 1 male in MNHN, the others in MHBG); 1 female, Chi-



Figure 64. Habitus of *Scorpiops pococki*, male, holotype, dorsal view.

Table 2. Measurements (in mm) of *Scorpiops petersii*, *Scorpiops* sp (Lhasa) and *Scorpiops tibetanus*. * Data from Kovářík, 2000b.

Species Contents \ Species	<i>Scorpiops petersii</i> *		<i>Scorpiops</i> sp (Lhasa)	<i>Scorpiops</i> <i>tibetanus</i>	<i>Scorpiops tibetanus</i> *	
Sex	Male LT(BMNH)	Female AT(NHMB)	Female (XZLS0801)	Female (XZSH0601)	Male HT (BMNH)	Female (FKCP)
Total length	69.3	67.0	80.1	45.2	60.4	53.2
Carapace:						
-Length	8.8	8.3	10.2	5.7	7.5	7.5
- Anterior width			5.5	3.5		
- Posterior width	8.0	8.7	10.8	6.1	7.5	7.7
Metasomal segment I:						
- Length	3.5	3.2	4.3	2.7	3.6	2.7
- Width	3.5	3.6	4.4	2.7	3.9	3.1
- Depth			3.6	2.3		
Metasomal segment II:						
- Length	4.1	3.6	5.6	3.2	4.3	3.2
- Width	3.0	3.4	4.0	2.4	3.5	2.7
- Depth			3.6	2.1		
Metasomal segment III:						
- Length	4.4	4.1	6.1	3.4	4.7	3.6
- Width	2.8	3.3	3.7	2.3	3.4	2.7
- Depth			3.6	2.1		
Metasomal segment IV						
- Length	5.0	4.4	6.5	3.8	5.2	4.2
- Width	2.6	3.0	3.5	2.1	3.2	2.5
- Depth			3.5	2.0		
Metasomal segment V						
- Length	8.2	7.1	10.3	6.0	8.1	6.7
- Width	2.3	2.8	3.2	2.0	2.9	2.4
- Depth			3.4	1.8		
Telson:						
- Length	8.7	7.5	10.2	5.6	7.6	6.7
- Width			4.1	2.2		
- Depth			4.0	2.1		
Pedipalp femur:						
- Length	7.2	6.6	7.9	4.7	5.3	5.4
- Width	3.3	3.0	3.6	2.1	2.4	2.4
- Depth			3.3	1.9		
Pedipalp patella:						
- Length	7.2	7.0	8.2	4.5	5.8	5.8
- Width	3.4	3.1	3.5	2.7	2.5	2.5
- Depth			4.0	2.6		
Chela						
- Length (chela)	15.1	13.8	16.5	9.3	11.9	12.5
- Length (manus)			9.1	5.6		

Species Contents	<i>Scorpiops petersii</i> *		<i>Scorpiops</i> sp (Lhasa)	<i>Scorpiops</i> <i>tibetanus</i>	<i>Scorpiops tibetanus</i> *		
	Sex	Male LT(BMNH)	Female AT(NHMB)	Female (XZLS0801)	Female (XZSH0601)	Male HT (BMNH)	Female (FKCP)
- Width		5.8	5.5	7.5	4.3	5.9	5.1
- Depth				5.9	3.5		
Movable finger-Length		7.5	8.1	9.9	5.5	6.8	7.0
Pectinal teeth (left/right)		5/5	7/7	5/5	7/7	8/7	8/7

na, Xizang, Zayü district, Xia Zayü town ($28^{\circ}30'N$, $97^{\circ}00'E$), 7/8/2002, Ming-Sheng Zhu leg.; 1 male, China, Xizang, Ny-ingchi district ($29^{\circ}34'N$, $94^{\circ}30'E$), 2/8/2002, Ming-Sheng Zhu leg., 2 females, 3 males, 17/8/2002, other data same as above; 3 females, China, Xizang, Nêdong district ($29^{\circ}11'N$, $91^{\circ}48'E$), 15/8/2002, Ming-Sheng Zhu leg.; 1 male, China, Xizang, Xigazê ($29^{\circ}16'N$, $88^{\circ}51'E$), 7/9/2002, Ming-Sheng Zhu leg.; 3 females, China, Xizang, Lhasa ($29^{\circ}39'N$, $91^{\circ}08'E$), 23/8/2003, Feng Zhang leg.(deposited in MHBU).

Distribution. Gyaca County, Nêdong County, Nyingchi County, Zayü County, Lhasa (China).

Comments. Kovařík & Ahmed (2009: 10) provided a list of *S. hardwickii* (Gervais, 1843) “complex”, including *S. pococki*. *S. pococki*’s features accord with the summary of Di et al (2011a). We provided the figures of the type specimen of *S. pococki* and other members from Xizang.

Scorpiops tibetanus Hirst, 1911

http://species-id.net/wiki/Scorpiops_tibetanus

Figures 102–118, Table 2

Scorpiops tibetanus Hirst, 1911: 472–473; Kovařík, 2000b: 197, figs 47, 68, 69, tab. 1–3; Fet, 2000d: 495.

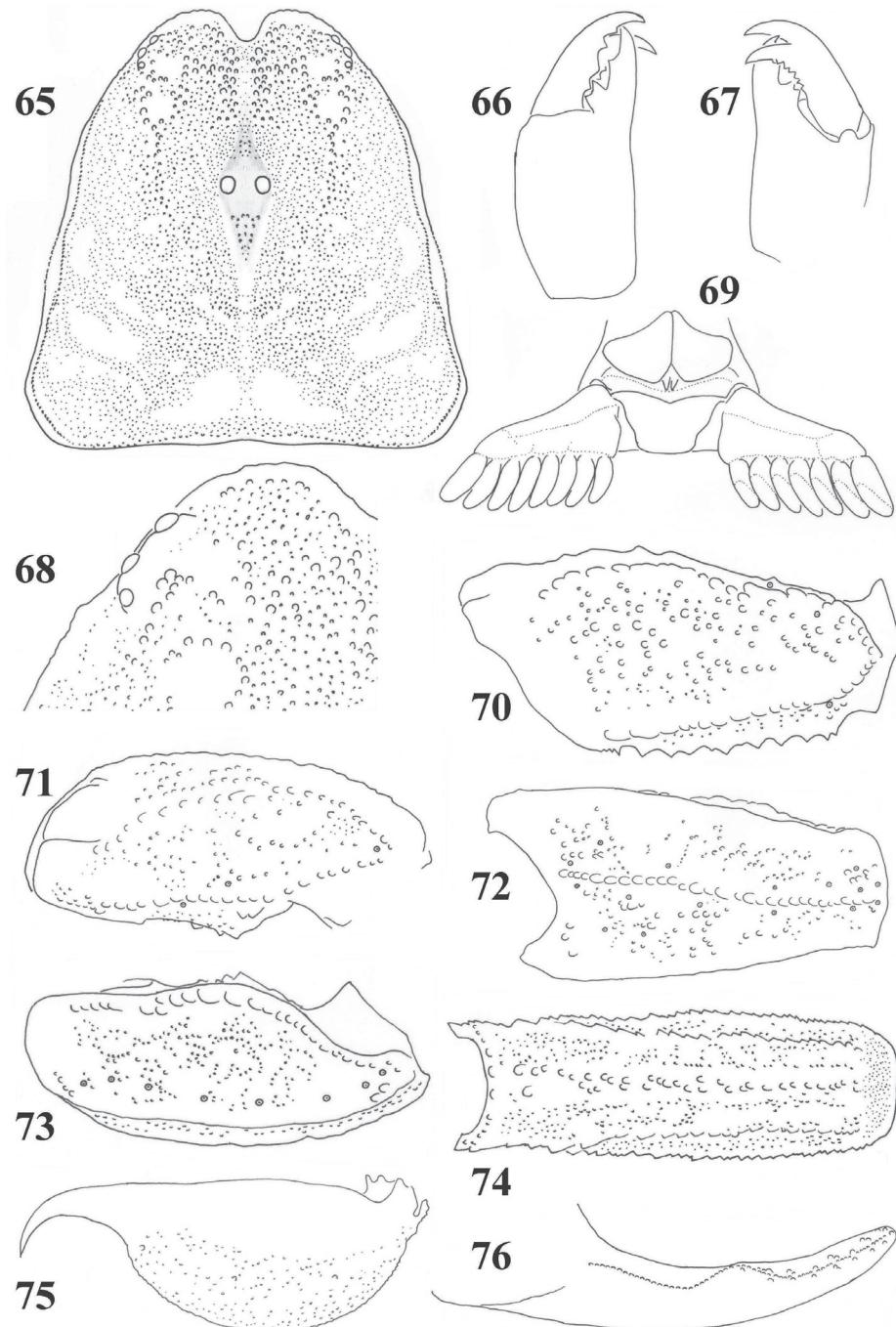
Type locality. China, Xizang, Tsango Valley, Chaksam Ferry..

Type material. Holotype, male. L. A. Wadell leg. BMNH, No. 1911. 8. 10. 1.

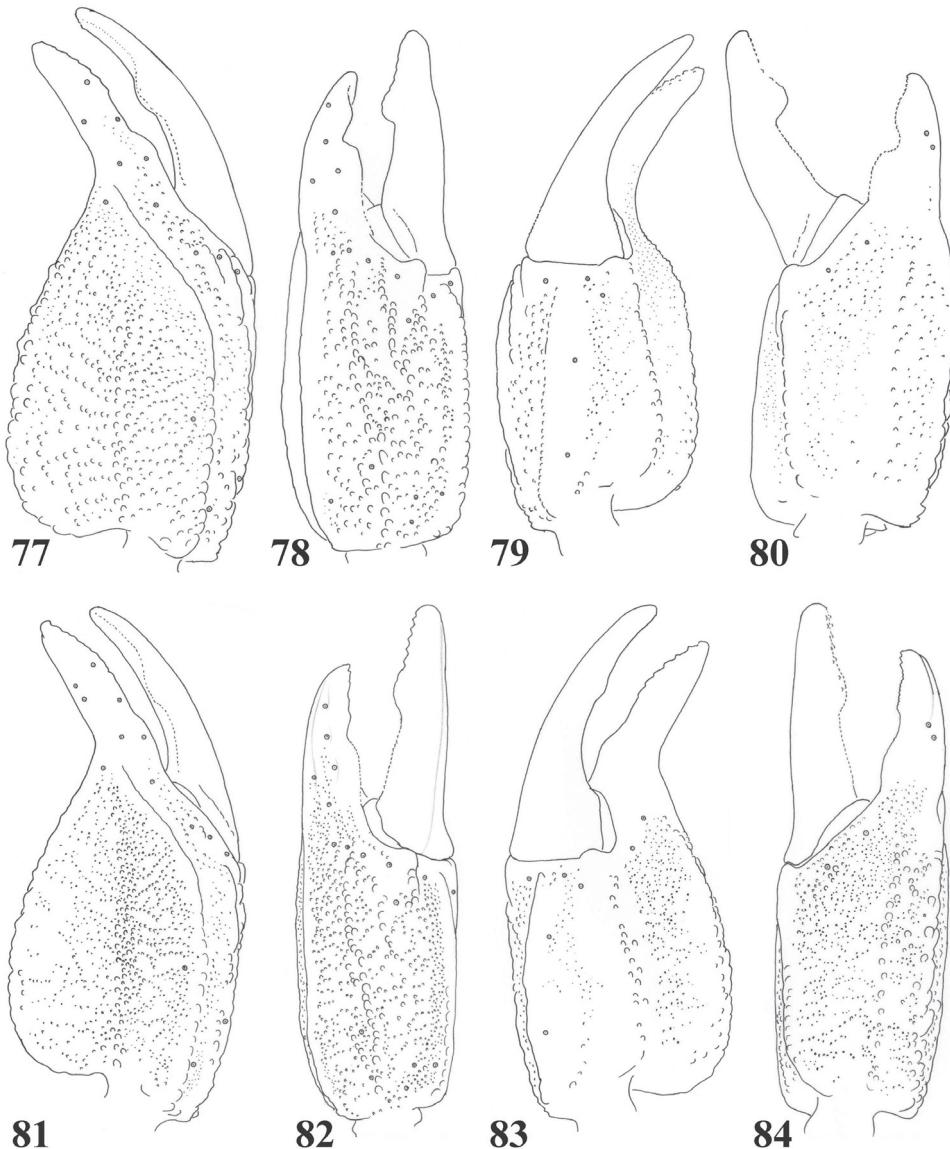
Material examined. 1 female and 5 juveniles, China, Xizang, Shigatse City, around the Zhabulun Temple, 13/8/2006, Xiao-Feng Yang leg, (MHBU, Ar.- MHBU - XZSH0601–6).

Diagnosis. Adult body length about 45–65 mm. Mainly color uniformly reddish-black. Male has finger of pedipalps more flexed and manus shorter and broader than the female. 17 external trichobothria (5 eb, 2 esb, 2 em, 4 est, 4 et) and 7–10 ventral trichobothria (usually 9) on the patella. Pectinal teeth number 5–11.

Comments. In Kovařík & Ahmed’s list of *S. hardwickii* (Gervais, 1843) “complex”(2009: 10) : containing *S. tibetanus* Hirst, 1911. Hirst (1911) did not provide a detailed description except the brief comparison with *S. austerus* Hirst, 1911 (syn-



Figures 65–76. *Scorpions pococki*, male, holotype. **65** Carapace **66–67** Chelicera, dorsal and ventral aspects **68** Lateral eyes **69** Genital operculum and pectines **70** Femur dorsal aspect **71–73** Patella dorsal, external and ventral aspects **74** Metasomal segment V, ventral aspect **75** Telson, lateral aspect **76** Dentate margin of movable finger, showing rows of granules.



Figures 77–84. *Scorpions pococki*. **77–80** male, holotype. Chela dorsal, external, ventral and internal aspects **81–84** female, paratype. Chela dorsal, external, ventral and internal aspects.

onymized with *S. hardwickii* by Tikader & Bastawade, 1983: 418) and *S. crassimanus* Pocock, 1899 (synonymized with *S. hardwickii* by Kovařík, 2000b: 175). Kovařík (2000b) examined the holotype (male) of *S. tibetanus* and recorded some important information: (1) total length is 50–65 mm; (2) male has finger of pedipalps more flexed and manus shorter and broader than the female; (3) 17 external trichobothria (5 eb, 2 esb, 2 em, 4 est, 4 et) and 7–10 ventral trichobothria (usually 9) on the patella; (4)

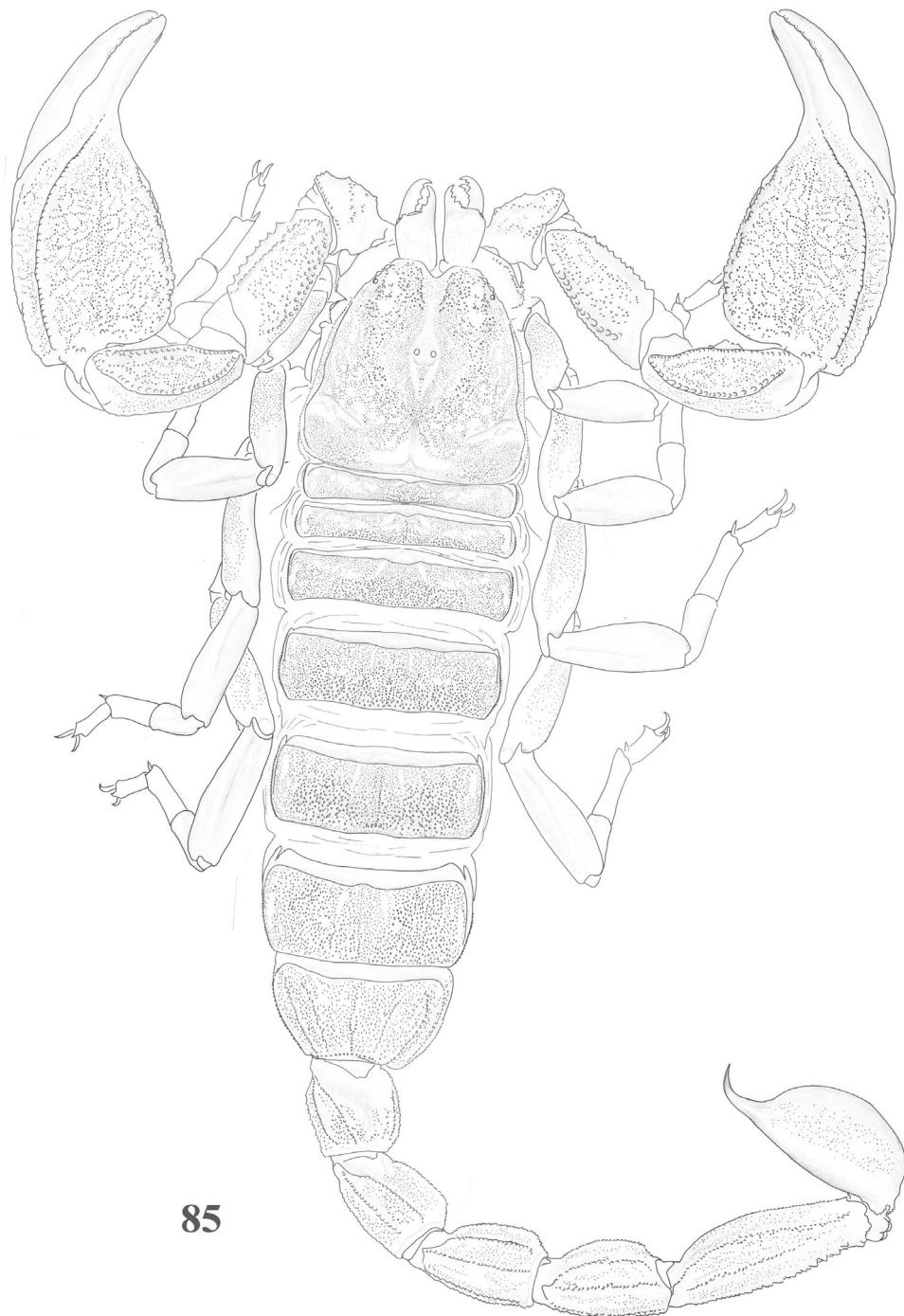
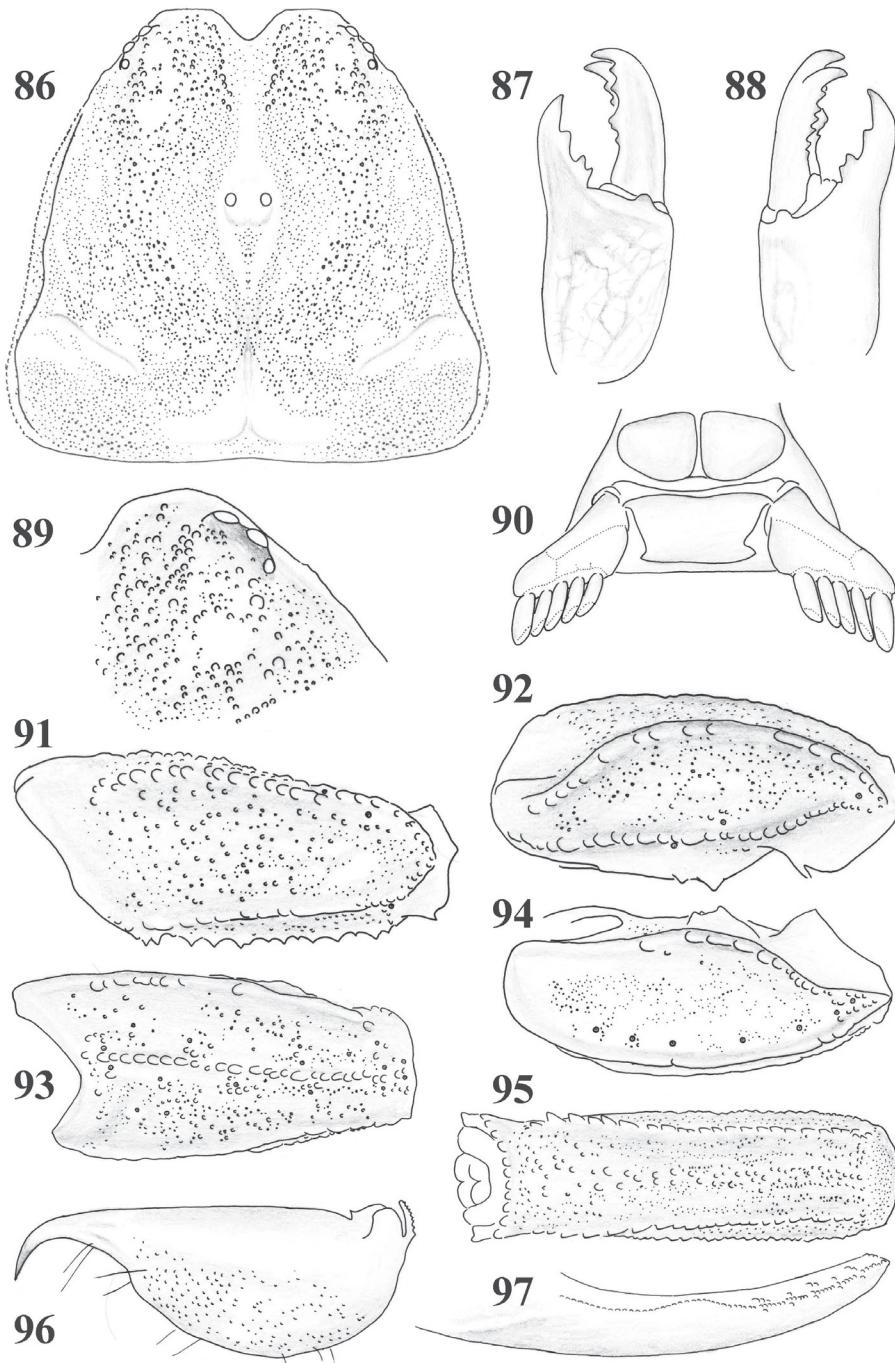
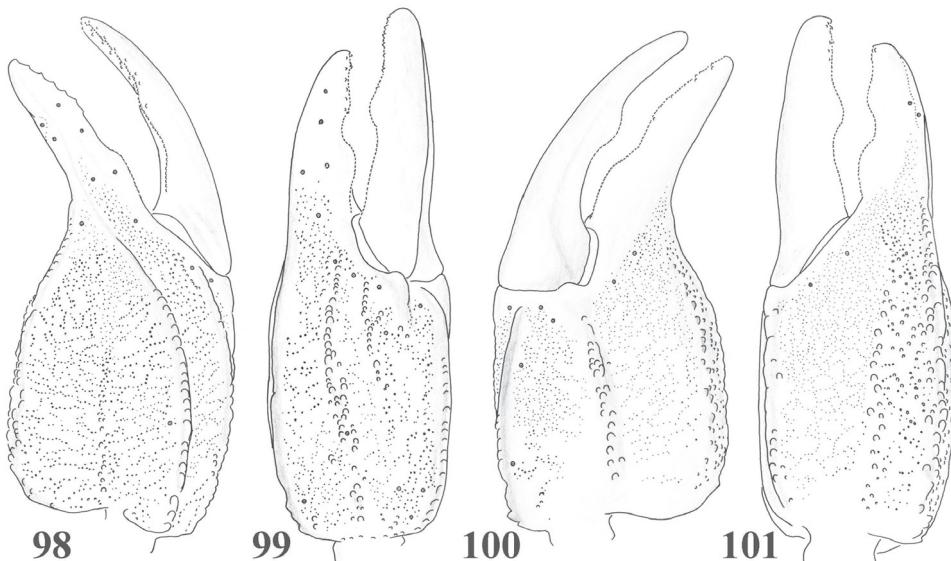


Figure 85. Habitus of *Scorpiops* sp. (*hardwickii* “complex”) from Lhasa, female, dorsal view.



Figures 86–97. *Scorpops* sp. (*hardwickii* “complex”) from Lhasa, female. 86 Carapace 87–88 Chelicera, dorsal and ventral aspects 89 Lateral eyes 90 Genital operculum and pectines 91 Femur dorsal aspect 92–94 Patella dorsal, external and ventral aspects 95 Metasomal segment V, ventral aspect 96 Telson, lateral aspect 97 Dentate margin of movable finger, showing rows of granules.



Figures 98–101. *Scorpions* sp. (*hardwickii* “complex”) from Lhasa, female. Chela dorsal, external, ventral and internal aspects.

pectinal teeth number 5–11. Di et al. (2011a) excluded *S. tibetanus* from Kovařík’s *S. hardwickii* “complex” as followed reasons: (1) ventral trichobothria on patella in *S. tibetanus* number 7–10 (usually 9, in one young out of 37 specimens, 7 on one side; Kovařík, 2000b: 196), 6–8 in *S. hardwickii* “complex”; (2) pectinal teeth number is 5–11 (usually 7–11) in *S. tibetanus*, 4–9 in *S. hardwickii* (usually 5–7).

Description. (based on female specimens: Ar.- MHBU - XZSH0601).

Coloration: red brown mainly.

Carapace dark red brown. Median and lateral ocular tubercles black. Tergites mostly red brown to dark brown. Metasoma segments dark red brown to dark brown. Vesicle red brown with a reddish aculeus. Chelicerae yellow brown with fingers dark red brown gradually lighter toward the tip. Pedipalp femur and patella dark red brown, chela manus and fingers red brown. Legs red brown with yellow brown tarsi. Tarsal unguis yellowish brown. Sternum, genital operculum and sternites pale brown. Pectines yellowish.

Morphology. Prosoma: Carapace with sparse, coarse granules (Fig. 103); lateral furrow broad; anterior median furrow broad and moderately deep; posterior median furrow deep; margin behind lateral eyes with granules, other margins smooth. Median eyes situated anteriorly compared to center of carapace; three pairs of lateral ocelli, posterior smallest (Figs 103, 106). Median ocular tubercle with granules and a pair of big median eyes and a median furrow. Lateral ocular tubercle with some granules.

Mesosoma: Tergites sparsely covered with coarse and big granules, posterior part of tergites with bigger granules; tergites III–VI with a median carina; tergite VII with two pairs of lateral carinae (shaped by bigger granules); tergites margin smooth. Pectinal

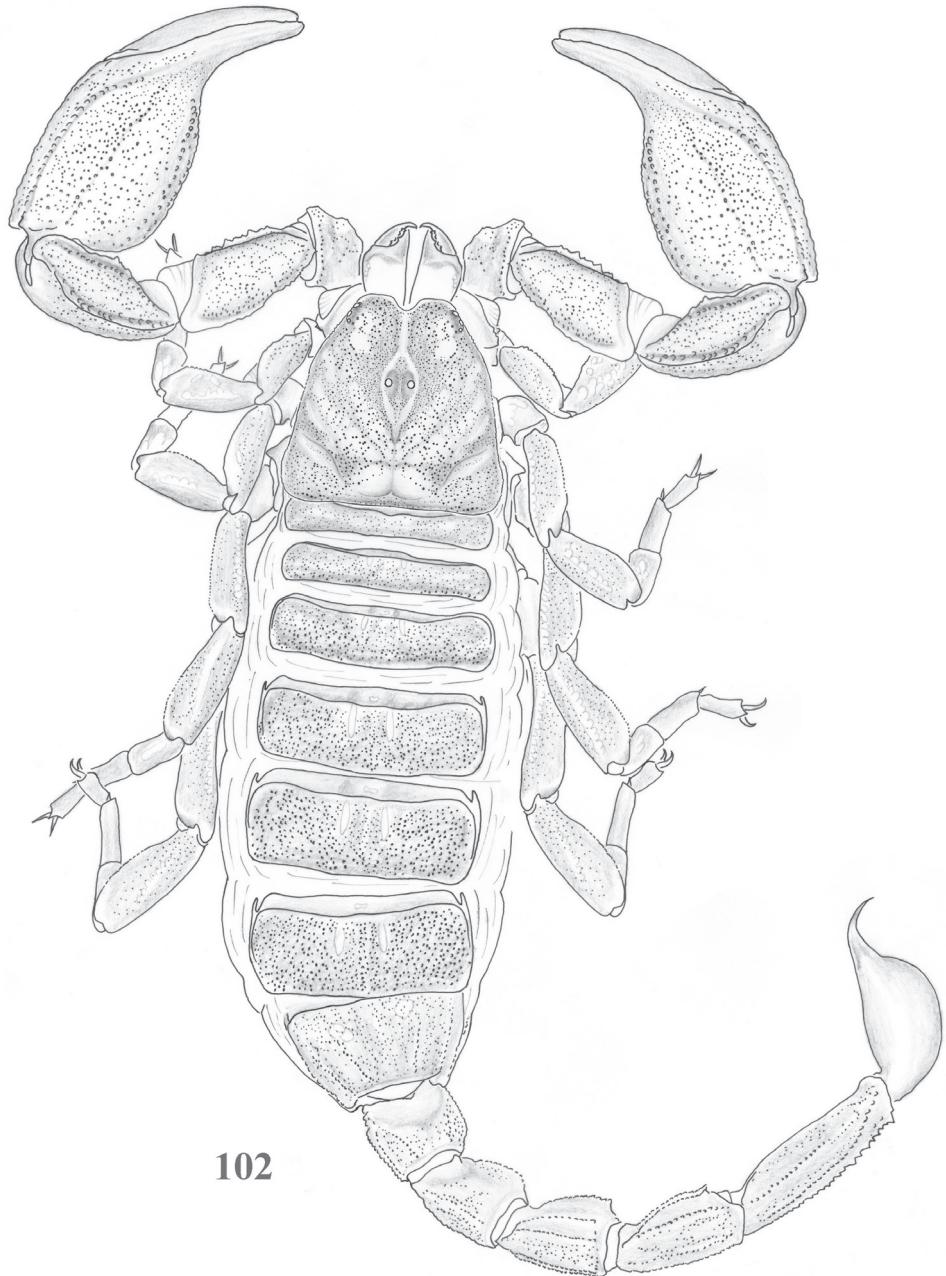
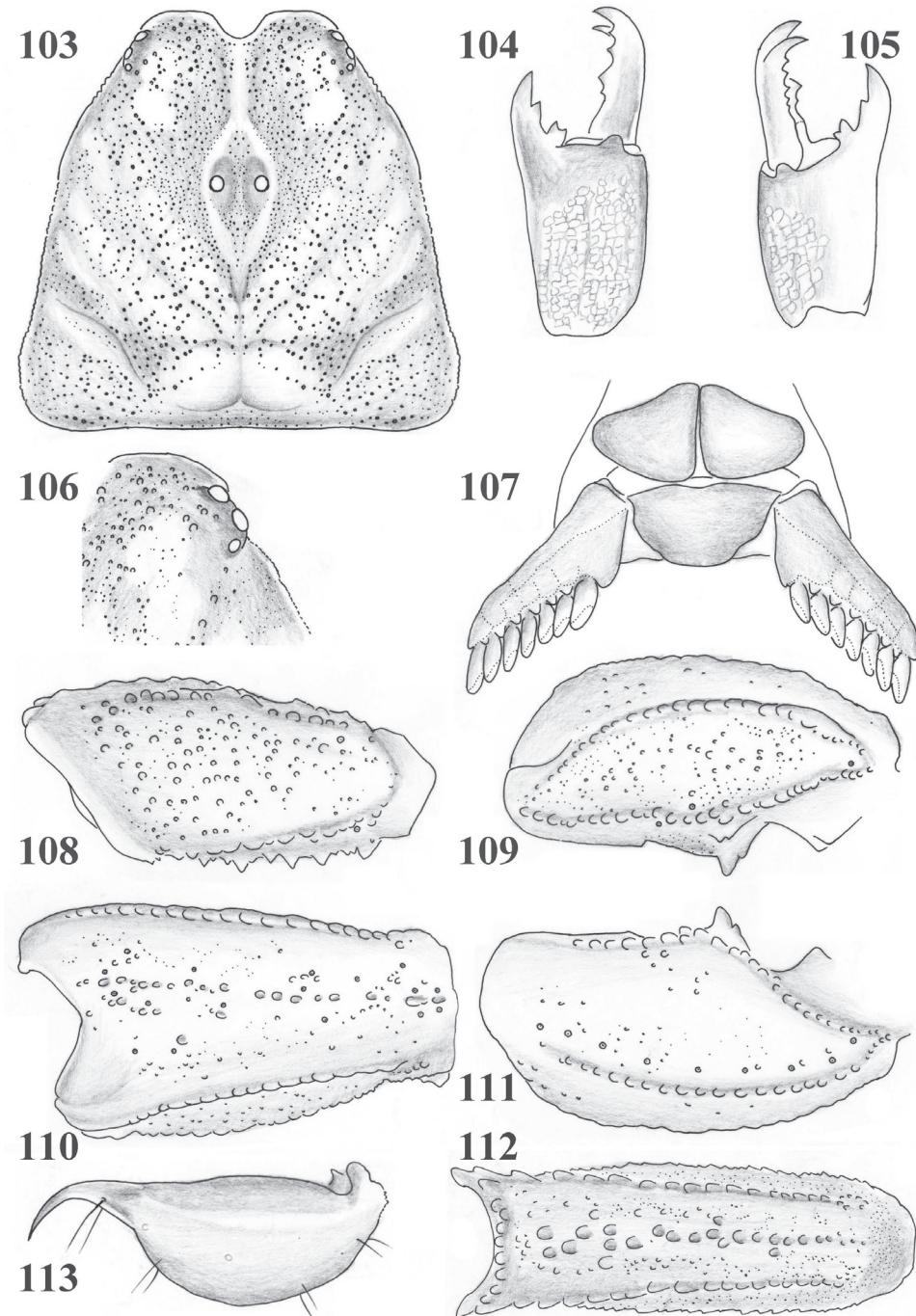
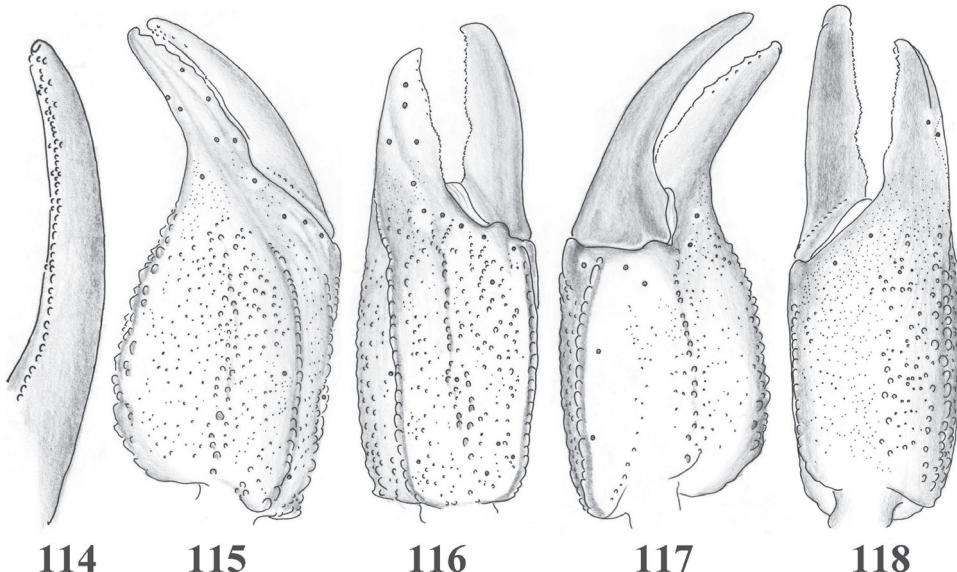


Figure 102. Habitus of *Scorpiops tibetanus* from Shigatse, female, dorsal view.

teeth count 7/7, fulcra present (Fig. 107). Sternum quinquangular. Genital operculum subtriangular. Sternites smooth and shiny; segment VII with 4 smooth ventral carinae and few granules.



Figures 103–113. *Scorpions tibetanus* from Shigatse, female. **103** Carapace **104–105** Chelicera, dorsal and ventral aspects **106** Lateral eyes **107** Genital operculum and pectines **108** Femur dorsal aspect **109–111** Patella dorsal, external and ventral aspects **112** Metasomal segment V, ventral aspect **113** Telson, lateral aspect.



Figures 114–118. *Scorpioops tibetanus* from Shigatse, female. 114 Dentate margin of movable finger, showing rows of granules 115–118 Chela dorsal, external, ventral and internal aspects.

Metasoma: Tegument coarse. Segments II to V longer than wide; segments I to V with respectively 10-8-8-8-7 carinae, segments II–IV with a pair of vestigial lateral carinae; all dorsal carinae crenulate, slightly stronger distally; segment V carinae with smaller granules dorsally and larger serration ventrally. Vesicle with few setae and granules. **Pedipalps:** Tegument coarse. Femur with external, dorsointernal, dorsoexternal, ventrointernal, ventroexternal and internal carinae granulated; tegument with scattered granules dorsally (Fig. 108) and smooth ventrally. Patella with dorsointernal, dorsoexternal, ventrointernal, ventroexternal and external carinae with big granules; two large spinoid granules present on the internal aspect; tegument with some granules. Trichobothrial pattern C, neobothriotaxic (Vachon 1974); patella with 17 external trichobothria (5 eb, 2 esb, 2 em, 4 est, 4 et), 9 ventral trichobothria (Figs 109–111). Chela with length/width ratio: 2.2–2.5 in adult females and 2.0 in male (holotype, Kovářík, 2000b: 161, tab. 1). Chela with dorsal marginal, external secondary, and ventrointernal carinae granulated (Figs 115–118); ventrointernal carina with some big granules; tegument with granules; female fingers scalloped with a pronounced lobe in the movable finger and a corresponding notch in fixed finger, lobe and corresponding notch reduced to absent in females. The male has fingers of pedipalps more flexed and manus shorter and broader than the female (Kovářík, 2000b: 196).

Chelicerae: Tegument smooth. Tibia smooth. Movable finger with 4 teeth on dorsal edge, 5 teeth on ventral edge. Fixed finger with 3 teeth on dorsal edge (Figs 104, 105).

Table 3. Measurements (in mm) of *Scorpiops pococki*, and *Scorpiops jendeki*. * Data from Kovařík, 2000b.

Species Contents \ Sex	<i>Scorpiops pococki</i>		* <i>Scorpiops jendeki</i>		<i>Scorpiops jendeki</i>	
	Male HT(MHBU)	Female PT(MHBU)	Male (FKCP)	Female HT(FKCP)	Female (YNLL0801)	Female (YNLL0802)
Total length	40.0	45.7	32.2	42.1	22.8	20.8
Carapace:						
- Length	6.2	7.1	4.5	5.1	3.1	2.9
- Anterior width	3.6	4.1			1.6	16.
- Posterior width	6.3	7.2	4.8	5.9	3.3	3.2
Metasomal segment I:						
- Length	2.2	2.5	1.9	2.1	1.3	1.1
- Width	2.4	2.2			1.6	1.5
- Depth	2.0	2.2	2.4	2.6	1.3	1.3
Metasomal segment II:						
- Length	2.8	2.8	2.1	2.5	1.5	1.4
- Width	2.1	2.3	2.1	2.3	1.4	1.3
- Depth	1.9	2.0			1.2	1.1
Metasomal segment III:						
- Length	3.0	3.1	2.3	2.6	1.5	1.6
- Width	2.0	2.2	2.0	2.1	1.3	1.2
- Depth	2.0	2.1			1.1	1.1
Metasomal segment IV						
- Length	3.5	3.4	2.8	3.1	1.8	2.8
- Width	1.9	2.0	1.9	2.1	1.2	1.1
- Depth	2.0	2.2			1.1	1.0
Metasomal segment V						
- Length	5.4	5.8	4.5	5.4	2.8	2.7
- Width	1.9	2.0	1.9	2.0	1.2	1.1
- Depth	1.8	1.8			1.0	0.8
Telson:						
- Length	5.8	6.2	4.9	4.8	3.0	3.0
- Width	2.3	2.4			1.1	1.1
- Depth	2.1	2.2			1.0	0.9
Pedipalp femur:						
- Length	5.5	4.3	3.5	4.2	2.2	2.1
- Width	2.4	2.8	1.5	1.6	1.1	1.0
- Depth	1.9	2.0			1.0	0.9
Pedipalp patella:						
- Length	5.1	5.6	3.7	4.4	2.3	2.4

Species Contents	<i>Scorpiops pococki</i>		* <i>Scorpiops jendeki</i>		<i>Scorpiops jendeki</i>	
	Male HT(MHBU)	Female PT(MHBU)	Male (FKCP)	Female HT(FKCP)	Female (YNLL0801)	Female (YNLL0802)
- Width	2.8	3.1	1.7	1.8	1.1	1.1
- Depth	2.6	2.8			1.1	1.0
Chela						
- Length (chela)	10.0	10.8	7.5	8.3	4.4	4.1
- Length (manus)	6.2	6.6			2.6	2.6
- Width	4.7	4.9	3.4	3..8	1.8	1.8
- Depth	3.3	3.5			1.4	1.2
Movable finger- Length	6.1	6.6	4.0	4.6	2.7	2.8
Pectinal teeth (left/right)	11/10	9/10	5/5	4/4	4/4	4/4

Legs: Tegument coarsely granular dorsally, except basitarsi and telotarsi, smooth ventrally. Trochanters with few setae. Femur dorsal surface with few small granules, external surface with a granular carina, internal surface with two granular carinae. Patella internally with a dentate carina. Tibia with few setae and small granules, without spurs. Basitarsi with some spinules, few setae and 2 lateral pedal spurs. Tarsi ventrally with one row of short spinules and few setae. Tarsal unguis curved and hook-like.

Variation. Both sexes with coloration and morphology very similar to holotype. Sexual dimorphism: adult males, with more pronounced lobes on the movable fingers of the chela, and a more pronounced notch in the fixed finger and bigger pectinal teeth than females. Measurements in Table 2.

Ecology. This species was collected from barren mountain. They were found under stones.

Distribution. Tsangpo Valley and Xigazê (standard notation of Shigatse) (China).

Family Hemiscorpiidae Pocock, 1893

Ischnuridae: Fet, 2000b: 383.

Liochelidae: Fet & Bechly, 2001: 1–2.

Liochelidae: Soleglad & Fet, 2003: 112–113.

Hemiscorpiidae: Soleglad, Fet & Kovařík, 2005: 1.

Genu *Tibetiomachus* Lourenço & Qi, 2006

Tibetiomachus Lourenço & Qi, 2006: 291.

***Tibetiomachus himalayensis* Lourenço & Qi, 2006**

http://species-id.net/wiki/Tibetiomachus_himalayensis

Tibetiomachus himalayensis Lourenço & Qi, 2006: 291–294, figs 1, 2, 5–26.

Type specimens. Holotype, female, China, Xizang, Guerla Mandhata, ≈4600 m, 7/1939 (Italian expedition leg) (deposited in MNHN).

Habitat. In soil under rocks.

Distribution. Guerla Mandhata (China).

Family Scorpionidae Latreille, 1802

Scorpionidae: Fet, 2000c: 427–428. Soleglad & Fet, 2003: 113–114.

Genus *Heterometrus* Hemprich & Ehrenberg, 1828

Heterometrus: Fet, 2000c: 431; Lourenço, Qi & Zhu, 2005: 9.

***Heterometrus tibetanus* Lourenço, Qi & Zhu, 2005**

http://species-id.net/wiki/Heterometrus_tibetanus

Heterometrus tibetanus Lourenço, Qi & Zhu, 2005: 10–14, figs 18–34, tab. 1.

Type specimens. Holotype, male; Paratypes, 2 males, China, Xizang, south region of Pulan, low valley of the river Kongque He, near to the border with Nepal, 7/1931. Holotype and 1 paratype deposited in the MNHN. One paratype deposited in MHBU.

Distribution. Burang County (China).

Key to genera of Scorpiones from Xizang

- | | | |
|---|--|--|
| 1 | Orthobothrioxic pattern type A; ventral aspect of leg tarsus with multiple irregular rows of setae, no trace of spinules; dorsal edge of cheliceral movable finger with <i>two</i> basal denticles; hemispermatophore is <i>flagelliform</i> (Buthidae)..... | 2 |
| – | Orthobothrioxic pattern type B or C; ventral aspect of leg tarsus with or without irregular setal rows, spinules present medially; dorsal edge of cheliceral movable finger with a <i>single</i> basal denticle; hemispermatophore is either <i>fusiform</i> or <i>lamelliform</i> | 3 |
| 2 | Telson without subaculear tooth..... | <i>Hottentotta</i> Birula, 1908 |

- Telson with subaculear tooth pointed or rounded (*Isometrus* Ehrenberg, 1828), Trichobothrium *db* on chela of pedipalp situated between trichobothria *et* and *est*. Males of most species have longer segments of metasoma and often also wider manus than females; segments of pedipals are of equal length in both sexes **Subgenus Reddyanus Vachon, 1972**
- 3 Orthobothriotaxic pattern type B; sternum is *type 1*; hemispermatophore is *fusiform* ***Chaerilus* Simon, 1877**
- Orthobothriotaxic pattern type C; sternum is *type 2*; hemispermatophore is *lamelliform* 4
- 4 Legs with two pedal spurs (though one or more pedal spurs are lost in many troglobitic species); ventral aspect of leg tarsus equipped with moderately developed setal pairs and/or median row of spinules (configuration 5, see Soleglad & Fet, 2003); paraxial organ without reflection of internobasal sperm duct (Chactoidea, see Soleglad & Fet, 2003, p. 92–93: Key to the superfamilies of parvorder Iurida); chelal fingers equipped with inner accessory denticles (IAD), outer denticles (OD) situated outside of median denticle (MD) row; major variable neobothriotaxy present, types Eu1 and Eu2; chelal palm is flat in appearance, carinae D3 and V2 essentially obsolete, angle formed by carinae D3: D4: D5 greater than 90° (Euscorpiidae, see Soleglad & Fet, 2003, p. 94: Key to the families of superfamily Chactoidea) 5
- Legs with one pedal spur (retrolateral spur absent, though this character is reversed in some bothriurid genera); ventral aspect of leg tarsus equipped with pairs of large limbated socketed setae, median spinule row optional (configuration 4, see Soleglad & Fet, 2003); paraxial organ with reflection of internobasal sperm duct (Scorpionoidea, see Soleglad & Fet, 2003, p. 92–93: Key to the superfamilies of parvorder Iurida) 6
- 5 Tricho-bothrium *Eb*₃ on external surface of chela is located between trichobothria *Dt* and *Est*. Telson vesicle/aculeus juncture with annular ring ***Euscorpiops* Vachon, 1980**
- Trichobothrium *Eb*₃ on the external aspect of pedipalp chela located basally from trichobothrium *Dt*. Annular ring at vesicle/aculeus juncture absent ***Scorpiops* Peters, 1861**
- 6 Median ocular tubercle of carapace shallow, not raised above carapace surface; 2 pairs of lateral eyes; telotarsus with lateral lobes truncated; *Est* located in middle of hand (Hemiscorpiidae, see Stockmann & Ythier, 2010: 201). 7
- Median ocular tubercle raised up; 3 pairs of lateral eyes; telotarsus with lateral margins ending in rounded lobes; *Est* located in distal of hand (Scorpionidae, see Stockmann & Ythier, 2010, p. 201); pedipalp femur with three trichobothria; patella of pedipalp with 19 trichobothria, three on ventral and 13 on external surface; chela of pedipalp with 26 trichobothria; retrolateral pedal spurs absent; lateroapical margins of tarsi produced into rounded lobes; metasomal segments I to IV with paired ventral submedian carinae; stridula-

- tory organ located on opposing surfaces of pedipalp coxa and first leg; total length 60 to 180 mm..... ***Heterometrus*** Ehrenberg, 1828
 7 Chela trichobothrium *dt* present..... ***Liocheles*** Sundevall, 1833
 – Chela trichobothrium *dt* absent ***Tibetiomachus*** Lourenço & Qi, 2006

Key to species of Family Chaerilidae from Xizang (China)

- 1 Movable finger of pedipalp with 7–8 rows of granules 2
 – Movable finger of pedipalp with 10–14 rows of granules 6
 2 Chela length to width ratio in adults 1.6–1.8.....
 ***C. conchiformus*** Zhu, Han & Lourenço, 2008
 2 Chela length to width ratio in adults higher than 2.0..... 3
 – Ventral side of seventh mesosomal segment with 2 pair of granular carina, anterior margin straight with a median notch 4
 – Ventral side of seventh mesosomal segment with many granules but without carina, anterior margin straight without median notch 5
 4 Pedipalp femur shorter than carapace; 8–9 minute teeth on inner ventral margins of movable and immovable fingers respectively.....
 ***C. dibangvalleyicus*** Bastawade, 2006
 – Pedipalp femur longer than carapace, 7–8 minute teeth on inner ventral margins of movable and immovable fingers respectively.....
 ***C. mainlingensis*** Di & Zhu, 2009
 5 Manus of pedipalp in male narrow and long. Chela length/width ratio in male higher than 3 ***C. tryznai*** Kovářík, 2000
 – Manus of pedipalp in male robust. Chela length/width ratio in adults lower than 2.6 ***C. wrzecionkoi*** Kovářík 2012
 6 Movable finger of pedipalp with 13–14 rows of granules; telson of male rather long and about 4.7 times longer than wide, with a obvious sexual dimorphism ***C. pictus*** (Pocock, 1890)
 – Movable finger of pedipalp with 11–12 rows of granules, telson of male and female without sexual dimorphism, manus lacks 1 dorsal carina 7
 7 Carapace, tergites nearly smooth in adults, chelicerae dorsal aspect without granules (Zhu, Han & Lourenço, 2008).....
 ***C. tessellatus*** Qi, Zhu & Lourenço, 2005
 – Carapace, tergites with many big granules in adults, chelicerae dorsal aspect with granules ***C. tricostatus*** Pocock, 1899

Key to species of family Euscorpiidae from Xizang (China)

- 1 Trichobothrium *Eb*₃ on external surface of chela is located between trichobothria *Dt* and *Est*. Telson vesicle/aculeus juncture with annular ring (*Euscorpiops*) 2

- Trichobothrium *Eb*₃ on the external aspect of pedipalp chela located basally from trichobothrium *Dt*. Annular ring at vesicle/aculeus juncture absent (*Scorpiops*) 5
- 2 Number of trichobothria on external surface of pedipalp patella: 19 (5 *eb*, 2 *esb*, 2 *em*, 5 *est*, 5 *et*) 3
- Number of trichobothria on external surface of pedipalp patella: 17–18 (5 *eb*, 1–2 *esb*, 2 *em*, 4*est*, 5*et*) 4
- 3 Number of trichobothria on ventral surface of patella: 7; number of pectinal teeth: 4–5; movable finger longer than carapace and as long as pedipalp femur *E. kamengensis* Bastawade, 2006
- Number of trichobothria on ventral surface of patella: 9; pectinal teeth number 8; movable finger as long as carapace and shorter than pedipalp femur *E. novaki* Kovářík, 2005
- 4 Female pedipalp fingers nearly straight *E. asthenurus* (Pocock, 1900)
- Female pedipalp fingers obviously scalloped *E. karschi* Qi, Zhu & Lourenço, 2005
- 5 Fingers of pedipalps are straight or only slightly flexed in both sexes 6
- Fingers of pedipalps are flexed (curved) in both sexes 7
- 6 Ventral trichobothria on patella number 6 (7 rarely), total length 30–42.1 mm, pectinal teeth number 4–5, chela length to width ratio about 2.2 *S. jendekei* Kovářík, 2000 (Yunnan)
- Ventral trichobothria on patella number 7, total length 40–58 mm, pectinal teeth number 7–9, chela length to width ratio about 3.3–3.5 *S. leptochirus* Pocock, 1893
- 7 Male chela length to width ratio about 1.8–2.2; the manus with same or very similar length and width, fingers of pedipalps are very strongly flexed in the male; ventral trichobothria on patella number 6–8 *S. hardwickii* (Gervais, 1843) “complex”
- Male chela length to width ratio above 2.2; or the manus with length longer than width, or ventral trichobothria on patella number more than 8 8
- 8 Total length more than 65 mm 9
- Total length less than 65 mm 10
- 9 Mostly yellowish to yellow in adults, ventral patella of pedipalps with 9 trichobothria *S. luridus* Qi, Zhu & Lourenço, 2005
- Mostly red brown in adults, ventral patella of pedipalps with 7 (rarely 6 or 8) trichobothria *S. petersii* Pocock, 1893
- 10 Dorsally flat manus of pedipalps and chela of both sexes with length/width ratio: 2.1–2.2 (mean about 2.1 in males and 2.2 in females), total length 40.0–50.0 mm in adults *S. margerisonae* Kovářík, 2000
- Dorsally round manus of pedipalps or at least the chela of one sex with length to width ratio higher than 2.2 or total length higher than 50 mm 11
- 11 Total length more than 50 mm, chela strong, with length/width ratio: 2.0 in male and 2.5 in female *S. tibetanus* Hirst, 1911

- Total length less than 40 mm 12
- 12 Chela of pedipalp length to width ratio about 2.6–3.0, dorsal surface of chela of pedipalp coarse *S. Ihasa* Di & Zhu, 2009
- Chela of pedipalp length to width ratio lower than 2.5, dorsal surface of chela of pedipalp smooth with luster *S. atomatus* Qi, Zhu & Lourenço, 2005

***Scorpiops jendeki* Kovařík, 2000**

http://species-id.net/wiki/Scorpiops_jendeki

Figures 119–135, Table 3

Scorpiops jendeki Kovařík, 2000: 180, 182, figs 59–60, tabs 1–3.

Scorpiops hardwickii jendeki: Kovařík, 1994: 62, figs 7–13, tab. 1; Fet, 2000b: 492.

Scorpiops jendeki: Di et al., 2011b: 29–30, figs 118–122.

Type locality. China, Yunnan, Gaoligongshan Nature Reserve 100 km west of Baoshan.

Type material. Holotype, female, China, Yunnan, Gaoligongshan Nature Reserve 100 km west of Baoshan; 1 female paratype (NMPC), 4 females paratypes (FKCP), 14–21/6/1993, E. Jendek and O. Sausa leg.

Material examined. 3 females and 1 immature male (MHBG, Ar.- MHBG-YNLL0801–4, 0804 is male), China, Yunnan Province, Baoshan City, Longling County, 7/2008, Ji-Shan Xu and Zhen-Hua Gao leg.

Diagnosis. Total length is 30–42.1 mm. Patella with 17 external trichobothria (5eb, 2 esb, 2 em, 4 est, 4 et) (Fig. 127) and 6–7 ventral trichobothria (6 specimens, Fig. 128). Pectinal teeth count 4–5. Both males and females have fingers of pedipalps straight, without any flexure. The carapace bears very sparse large granules.

S. jendeki appears to be closely related to *S. hardwickei* (Gervais, 1843), both species have the same number of external and ventral trichobothria on the patella, and a similar length/width ratio of chela; however, in the latter the fingers of pedipalps are strongly flexed.

Description. (based on female specimen: Ar.- MHBG -YNMH0801).

Coloration: mainly yellow. Carapace red brown with yellow stripe. Median and lateral ocular tubercles black. Tergites mostly dark red brown to dark brown with yellow stripe. Metasoma segments dark red brown to dark brown. Vesicle red yellow brown with brown stripe and a red brown aculeus. Chelicerae yellow brown with fingers dark red brown gradually lighter toward the tip. Pedipalp femur and patella dark red brown, chela manus and fingers red brown. Legs red brown with yellow stripe, tarsi yellow brown. Tarsal unguis yellowish brown. Sternum, genital operculum and sternites pale brown. Pectines yellowish.

Morphology. **Prosoma:** Carapace with sparse, big granules (Fig. 120); anterior edge with big granules, lateral and posterior edges smooth; lateral furrow broad, anterior median furrow broad and moderately deep, posterior median furrow deep; margin behind lateral eyes with granules, other margins smooth. Median eyes situated ante-

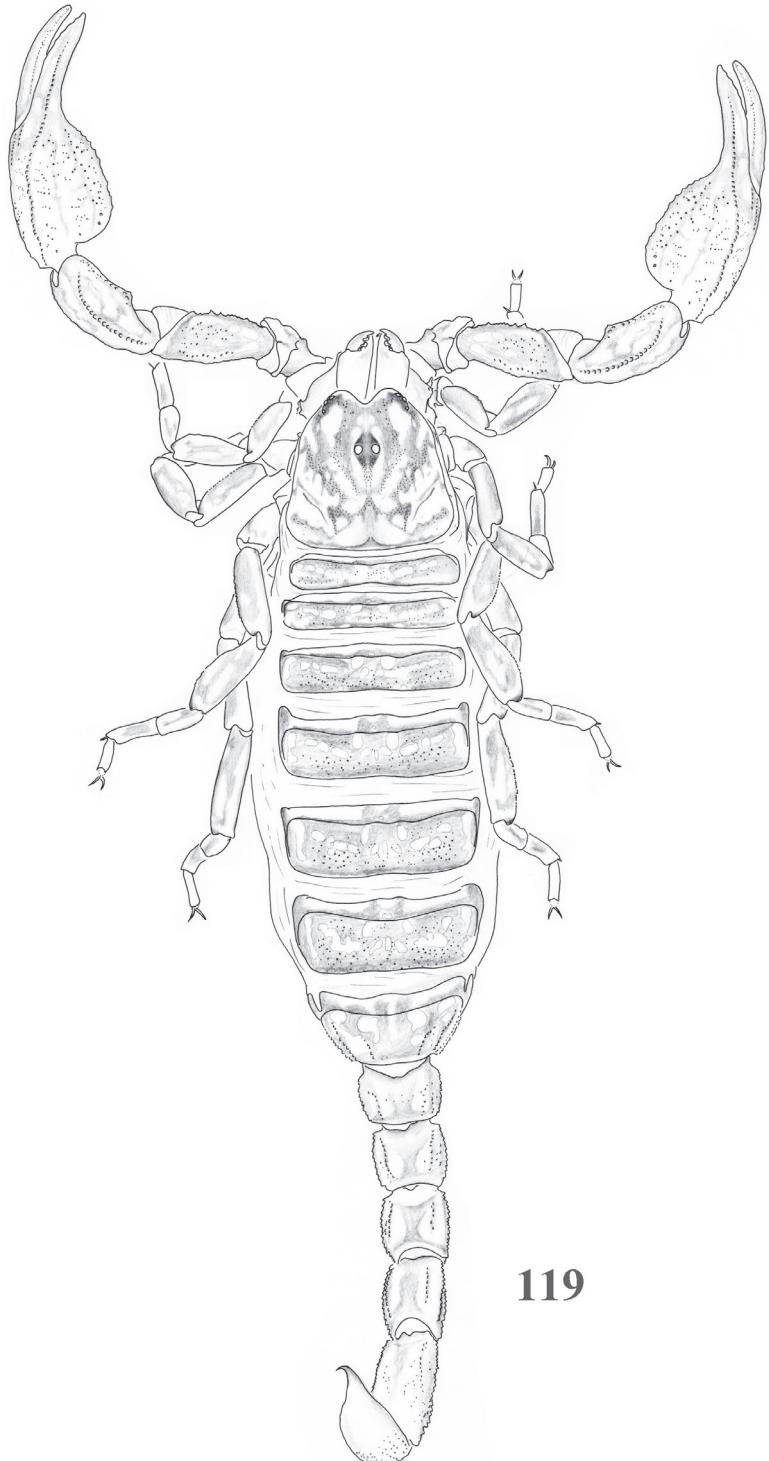
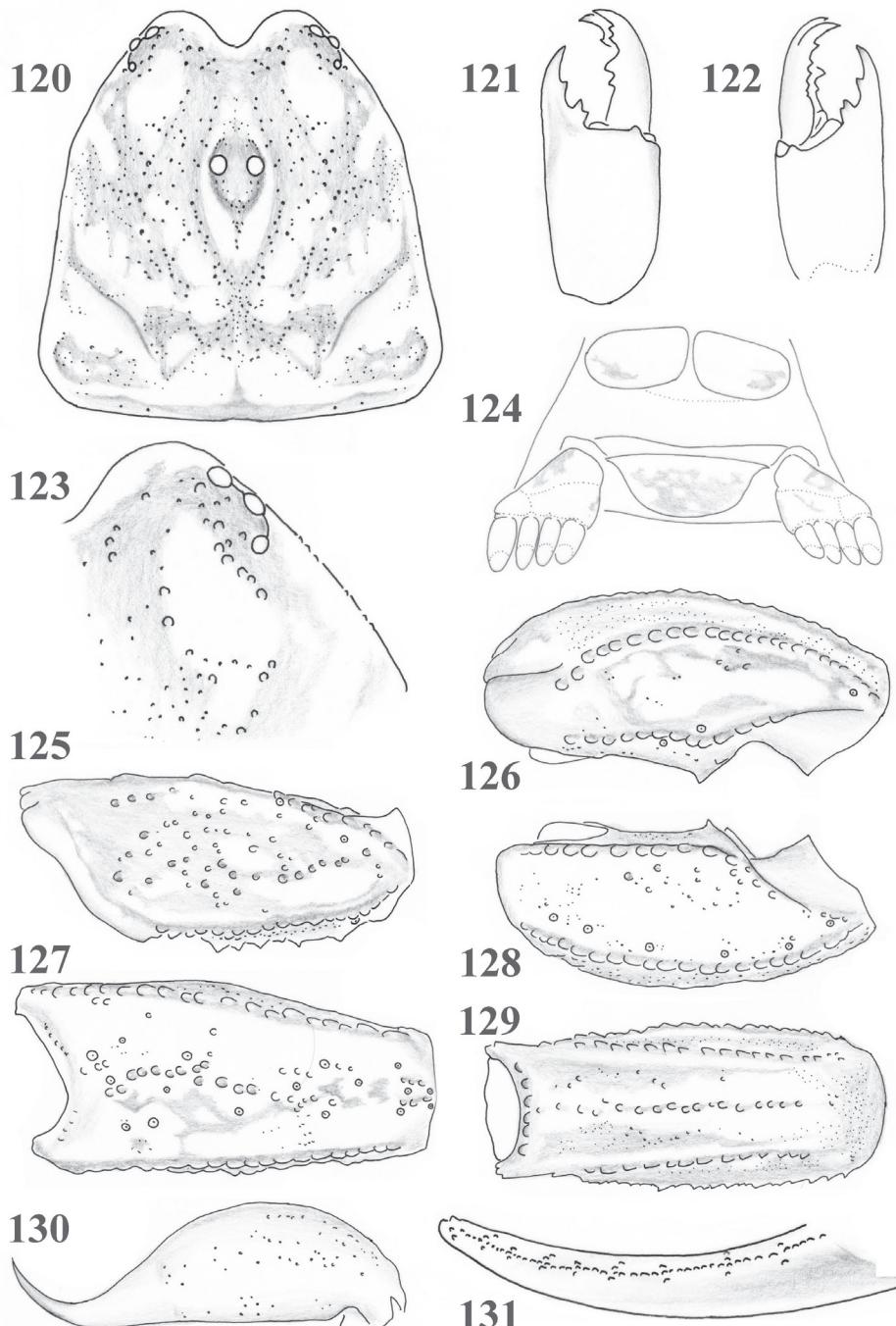
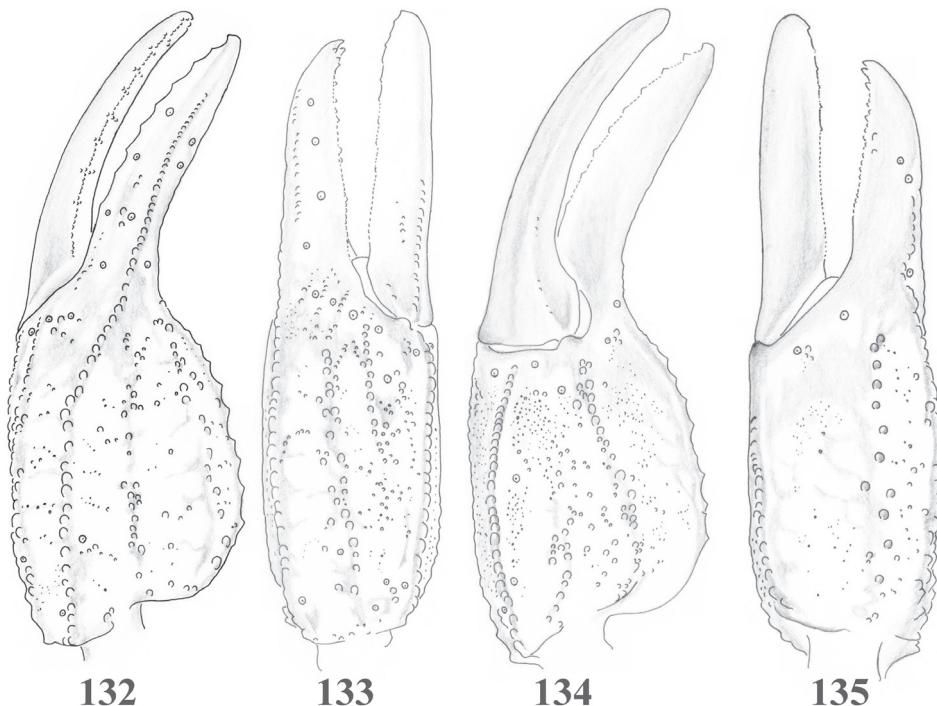


Figure 119. Habitus of *Scorpiops jendeki* from Longling County, female, dorsal view.



Figures 120–131. *Scorpions jendeiki* from Longling County, female. **120** Carapace **121–122** Chelicera, dorsal and ventral aspects **123** Lateral eyes **124** Genital operculum and pectines **125** Femur dorsal aspect **126–128** Patella dorsal, external and ventral aspects **129** Metasomal segment V, ventral aspect **130** Telson, lateral aspect **131** Dentate margin of movable finger, showing rows of granules.



Figures 132–135. *Scorpions jendeki* from Longling County, female. Chela dorsal, external, ventral and internal aspects.

riorly compared to center of carapace; three pairs of lateral ocelli, posterior smallest (Fig. 123). Median ocular tubercle smooth with a pair of median eyes which are much larger than lateral eyes, and a median furrow. Lateral ocular tubercle with some granules around eyes.

Mesosoma: Tergites sparsely covered with coarse granules, posterior part of tergites with bigger granules; tergites III–VI with a median swell and two pairs of lateral carinae (shaped by bigger granules). Pectinal teeth count 4/4, fulcra absent (Fig. 124). Genital operculum subtriangular. Sternites smooth and shiny; segment VII with 4 smooth ventral carinae.

Metasoma: Tegument coarse. Segments II to V longer than wide; segments I to V with respectively 10–8–8–8–7 carinae; ventromedian, ventrolateral carinae stronger distally, dorsal carinae with small granules, lateral carinae weaker distally; segment V carinae with smaller granules dorsally and larger serration ventrally (Fig. 129). Vesicle with few setae and granules. Aculeus short and slightly curved (Fig. 130). The boundary between vesicle and aculeus not sharp.

Pedipalps: Tegument coarse. Femur with external, dorsointernal, dorsoexternal, ventrointernal, ventroexternal and internal carinae with round granules; tegument with few small granules dorsally (Fig. 125) and smooth ventrally. Patella (Figs 126–128) with dorsointernal, dorsoexternal, ventrointernal, ventroexternal and external

carinae with round granules; two large spinoid granules present on the internal aspect; tegument with few granules dorsally and ventrally nearly smooth. Trichobothrial pattern C, neobothriotaxic (Vachon 1974); patella with 17 external trichobothria (5 eb, 2 esb, 2 em, 4 est, 4 et), 6 ventral trichobothria. Chela with length/width ratio: 2.2 in adult males and 2.2–2.4 in adult females (2.2 on female holotype and a male specimen in Kovařík 2000b: 160, tab. 1) (Figs 131–135). Chela with dorsal marginal, external secondary, and ventrointernal carinae granulated. For position and distribution of trichobothria on the tibia of pedipalp see (Figs 132–135).

Chelicerae: Tegument smooth. Movable finger with 4 teeth on dorsal edge, 4 teeth on ventral edge. Fixed finger with 3 teeth on dorsal edge (Figs 121, 122).

Legs: Tegument coarsely granular dorsally, except basitarsi and telotarsi, smooth ventrally. Femur dorsal surface with few small granules, external surface with a granular carina, internal surface with two granular carinae. Patella internally with a dentate carina. Tibia with few setae and small granules, without spurs. Basitarsi with some spinules, few setae and 2 lateral pedal spurs. Tarsi ventrally with one row of short spinules and few setae. Tarsal unguis curved and hook-like.

Variation. Female and male materials: coloration and morphology are very similar to holotype. Sexual dimorphism is not distinct. Total length is 30–42.1 mm. 6–7 ventral trichobothria on the patella of pedipalps. Pectinal teeth count 4–5. Measurements in Table 3.

Ecology. This species is uncommon, collected from moist mixed forest and in the bark or leaves and moss.

Distribution. Yunnan (China).

Discussion

Twenty-six scorpion species of 7 genera and 5 families (Buthidae: *Hottentotta* (1 species), *Isometrus*(1); Chaerilidae: *Chaerilus* (8); Euscorpiidae: *Euscorpiops* (4), *Scorpiops* (10); Hemiscorpiidae: *Tibetiomachus* (1); Scorpionidae: *Heterometrus* (1)) were recorded in Xizang, all of them distribute in south and the north shores of Yarlung Zangbo Jiang: south of 31°N, bound on the north by the Burang - Lhasa- Maizhokunggar - Gongbo'gyamda - Bomê line (Figs 136–139). In them, 20 of 26 recorded species are endemic (76.9%).

In China, the closest area of scorpion fauna with Xizang is Yunnan. Except one *Scorpiops* sp. was found in Hubei, all of euscorpiids were found in Xizang and Yunnan. Species of the genera *Scorpiops* and *Euscorpiops* are dominant, with confined distribution and not overlapped in Xizang and Yunnan. All of the species of family Chaerilidae found in China are living in Xizang. Qinghai, Sichuan and Xinjiang, are also with border on of Xizang. In Qinghai, just *Mesobuthus martensii martensii* (Karsch, 1879) reported in its northeast (Zhu et al., 2004; Zhang & Zhu, 2009). There is no scorpion species reported in Sichuan (Zhu et al., 2004). In Xinjiang, species genera of the family Buthidae recorded (*Mesobuthus* (7 species and subspecies), *Razianus* (1)) (Zhu et al., 2004; Lourenço et al., 2010; Sun and Sun, 2011). *Mesobuthus martensii martensii* (Karsch, 1879) and *M. eupeus mongolicus* (Birula 1911) found in South of Gansu

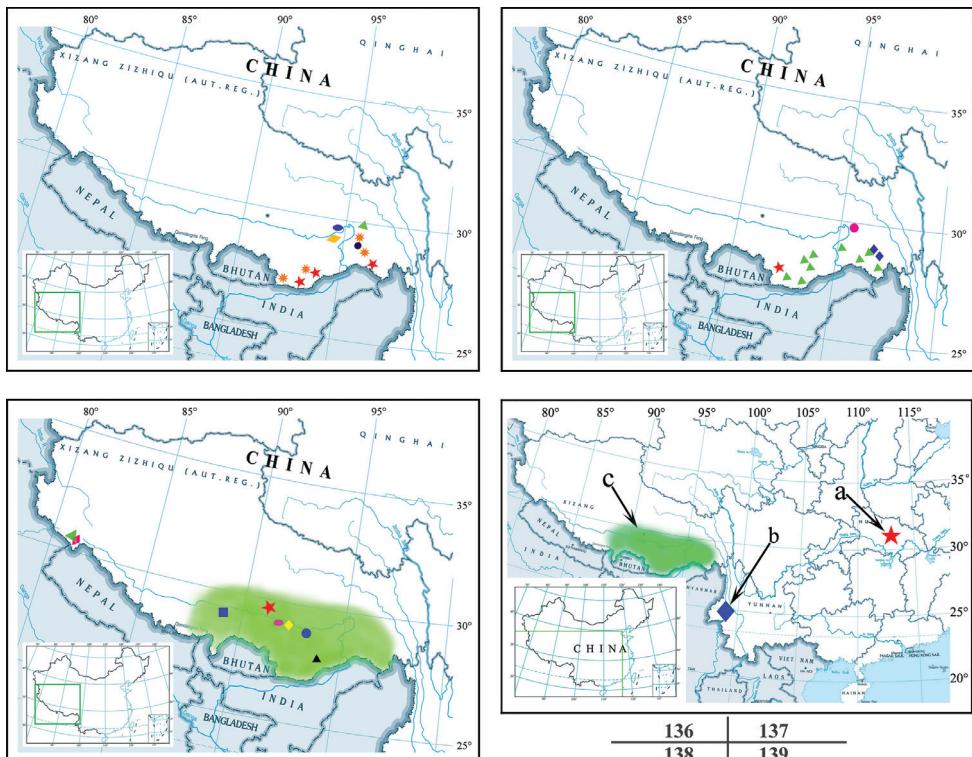


Figure 136–139. **136** Map of Xizang (China), showing the localities of the *Chaerilus* species. Map abbreviations: **a** (ellipse and rhombus) *C. conchiformus* **b** (round) *C. dibangvalleycus* **c** (rhombus) *C. mainlin-gensis* **d** (triangle and round) *C. tryznai* (macula) **e** (star) *C. tricostatus* **f** (pentagram) *C. pictus* **g** (triangle) *C. urzecionkoi* **h** (ellipse, triangle and macula) *C. tessellatus*. The red line showing the scorpions appears to be restricted to latitude north of 31°N, bordered by Burang - Lhasa - Maizhokunggar - Gongbo'gvamda - Bomê line **137** Map of Xizang (China), showing the localities of *Euscorpiops* species. Map abbreviations: **a** (triangle) *E. asthenurus* **b** (pentagram) *E. kamengensis* **c** (rhombus) *E. karschi* **d** (round) *E. novaki* **138** Map of Xizang (China), showing the localities of *Scorpiops* species, *Heterometrus tibetanus* and *Hottentotta songi*. Map abbreviations: **a** (round) *S. atomatus*, *S. langxian* and *S. luroris* **b** (black triangle) *S. leptochirus* **c** (pentagram) *S. lhasa* **d** (ellipse) *S. margerisonae* **e** (square) *S. tibetanus* **f** (yellow rhombus) *Scorpiops pococki* **g** (purple rhombus) *Heterometrus tibetanus* **h** (green triangle), *Hottentotta songi* **139** Map of China, showing the localities of *Scorpiops* species. Map abbreviations: **a** (pentagon), *Scorpiops* sp. from Hubei (Huzhaoshan Mountains) **b** (rhombus), *S. jendeiki* from Yunnan (Gaoligongshan Mountains) **c** (green part), the area rich in *Scorpiops* (Xizang).

which also belong to Qinghai-Tibetan Plateau (Sun and Sun, 2011). We conjecture the vast area of gap of scorpion distribution in the north of Xizang and the south of Qinghai is caused by the cold and clammy climate. So the scorpion fauna of Xizang isn't related to Qinghai and Xinjiang.

In the world, the 7 genera found in Xizang were recorded distributing to the south of Xizang. Modern species of genera *Chaerilus*, *Euscorpiops* and *Scorpiops* are limited to tropical areas of South Asia and Southeast Asia, although they reached considerable altitudes

in Kashmir, Nepal, and Tibet (Kovařík, 2000a, 2000b). The distribution of the species of genera *Hottentotta*, *Isometrus*, *Heterometrus* and the close related genera of *Tibetiomachus* also suggest the scorpion fauna of Xizang is close to South Asia and Southeast Asia.

Acknowledgements

We are grateful to Professors Victor Fet and Wilson R. Lourenço who provided references and valuable advices, in particular, for linguistic improvement. Sincere appreciation goes to Mr. Jan Ove Rein for providing references. Thanks are due to Miss Liqing Fan for collecting the specimens. This work was supported by grants from the National Natural Sciences Foundation of China (No. 31071942), the Basic Project of Ministry of Science and Technology of China (No. 2007FY210800), and the 973 program (No. 2010CB529800 and No. 2010CB530100).

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