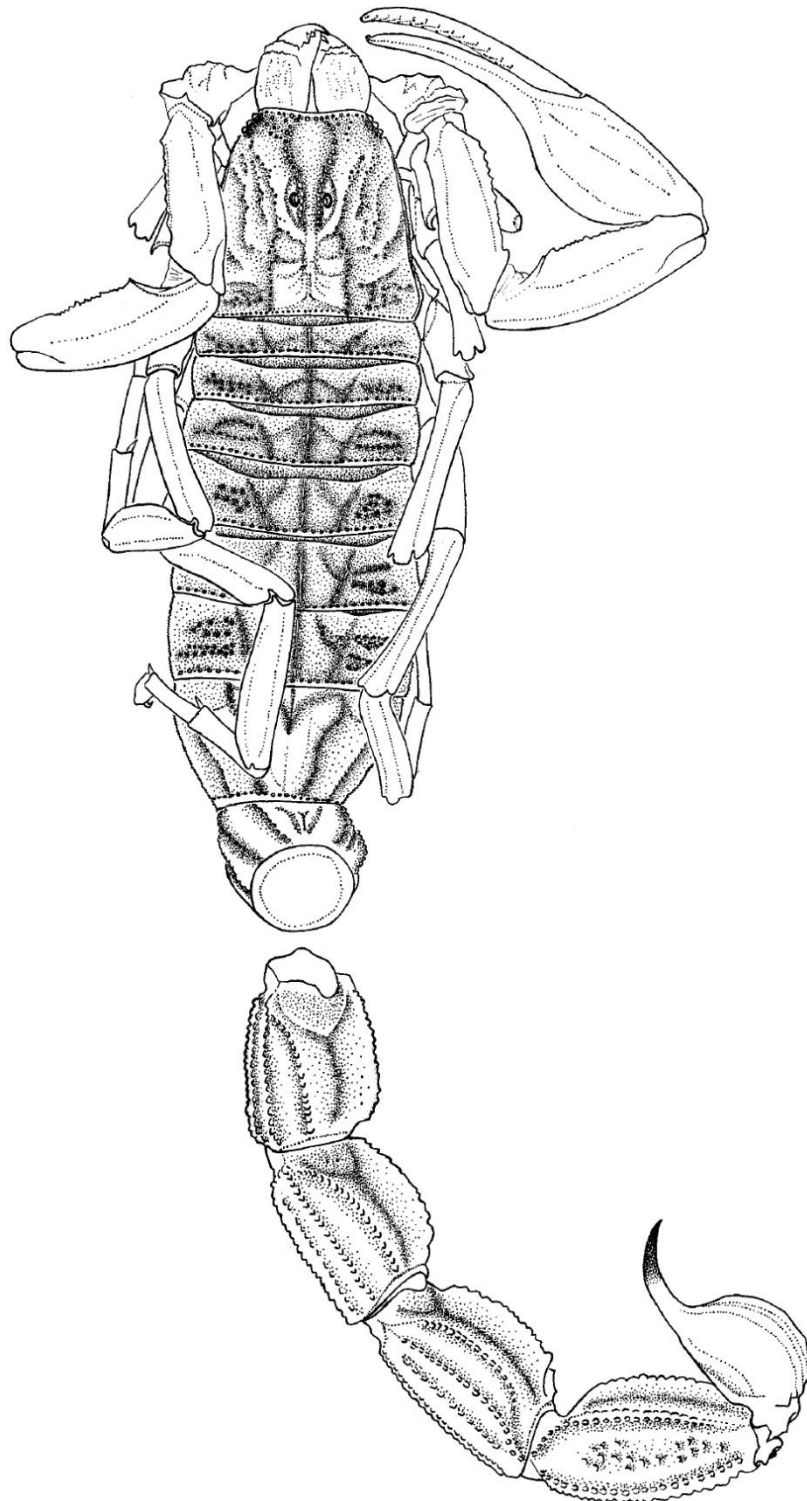


ARACHNIDES

BULLETIN DE BIBLIOGRAPHIE ET DE RECHERCHES



**A NEW HIGH-ELEVATION SCORPION SPECIES OF THE GENUS
HOTTENTOTTA BIRULA, 1908 (SCORPIONES: BUTHIDAE) FROM TIBET, CHINA**

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Abstract

A new species belonging to the genus *Hottentotta* Birula, 1908 (family Buthidae C. L. Koch, 1837) is described on the basis of one adult female specimen collected in Wāgya La, Kangmar County, Tibet (Xizang), China. *Hottentotta leetzi* sp. n. was collected at an elevation of 4920 m, representing to our knowledge the highest elevation record for a scorpion species in Asia, and maybe in the World. This new scorpion taxon represents the 61st described species among the currently recognized species for the genus *Hottentotta* and the second reported from China. It is the 30th scorpion species reported from Tibet.

Keywords. Scorpion, taxonomy, morphology, elevation, record, Asia, Himalayas.

Résumé

Une nouvelle espèce appartenant au genre *Hottentotta* Birula, 1908 (famille Buthidae C. L. Koch, 1837) est décrite sur la base d'une femelle adulte collectée à Wagya La, Xian de Kangmar, Tibet (Xizang), Chine. *Hottentotta leetzi* sp. n. a été collecté à une altitude de 4920 m, représentant à notre connaissance le record d'altitude pour un scorpion en Asie, et éventuellement dans le monde. Ce nouveau taxon représente la 61^{ème} espèce décrite parmi les espèces actuellement reconnues pour le genre *Hottentotta* et la seconde décrite pour la Chine. C'est la 30^{ème} espèce de scorpion décrite du Tibet.

Mots clés. Scorpion, taxonomie, morphologie, altitude, record, Asie, Himalaya.

Introduction

The knowledge of the scorpion fauna of China has seen a remarkable development during the last twenty years, thanks to the work of several authors like e.g. W. R. Lourenço, J.-X. Qi, M.-S. Zhu, Z.-Y. Di, D. Sun, Z.-N. Sun, or more recently V. Tang. Some regions of China have been extensively prospected, while others remain largely unexplored, and the diversity of Chinese scorpions will certainly increase as these regions become more studied.

The Xizang Autonomous Region (Tibet) has been well prospected over the years (Gervais, 1843; Pocock, 1890, 1893, 1899, 1900; Hirst, 1911; Kraepelin, 1913; Bastawade, 2006; Kovařík, 2000, 2005, 2012, 2020; Lourenço et al., 2005; Qi et al., 2005; Lourenço & Qi,

2006; Di & Zhu, 2009, 2010; Zu et al., 2008; Di et al., 2013; Yin et al., 2015; Di & Qiao, 2020) and it currently comprises 29 species belonging to six genera and six families (Di et al., 2013; Tang, 2022). This region shows the highest level of scorpion diversity in China (about two thirds of the total scorpion fauna of the country) and some of its species are among the highest-elevation scorpion species in the World.

The new scorpion species described here, *Hottentotta leetzi* sp. n., was collected in Wāgya La, Kangmar County, Tibet, near to the border with Bhutan, at an elevation of 4920 m a.s.l. (ref. Google Maps), representing to our knowledge the highest elevation record for a scorpion species in Asia, followed by *Tibetiomachus himalayensis* Lourenço & Qi, 2006 (4600 m), *Chaerilus variegatus* Simon, 1877 (4600 m), *Scorpiops taxkorgan* Lourenço, 2018 (4500 to 4600 m), *Scorpiops rohtangensis* Mani, 1959 (4300 m), *Scorpiops spitiensis* Zambre, Sanap & Mirza, 2014 (4200 m), *Chaerilus insignis* Pocock, 1894 (4000 m) and *Scorpiops tibetanus* Hirst, 1911 (4000 m), for the species occurring above 4000 m (Dupré, 2016). The World's highest elevation record for a scorpion has long been discussed (e.g. Polis, 1990; Lourenço, 1997; Lourenço & Qi, 2006; Prendini, 2006; Ochoa et al., 2011, Dupré, 2016). According to Lourenço (1997), this record belongs to *Pachakutej crassimanus* (Maury, 1976), collected at an elevation of 5560 m in the Peruvian Andes (Llanganuco, Nevado Huascarán). This record remained well accepted by most scorpion experts until Ochoa et al. (2011) suggested that both the identification and the locality of this record were erroneous, and the elevation record belongs to *Orobothriurus huascaran* Ochoa et al., 2011 (4910 m). It is not the purpose of this work to give our opinion on this matter, especially since we have not examined any of the mentioned material, so based on this information, should we consider Lourenço (1997), the World's highest elevation record for a scorpion belongs to *P. crassimanus* (5560 m), and should we consider Ochoa et al. (2011), the World's highest elevation record now belongs to *H. leetzi* sp. n. (4920 m).

The new species appears to be related to *Hottentotta songi* Lourenço, Qi & Zhu, 2005, also described from Tibet, south region of Pulan, near to the border with Nepal, and *Hottentotta tamulus* (Fabricius, 1798), widely distributed in India and Pakistan, but it can be distinguished from these two species by a combination of several morphological characters, including a small size. Indeed, according to Polis (1990), high-elevation species are small, and this character is possibly the consequence of the short periods during which they are able to forage.

Another character distinguishing *H. leetzi* sp. n. from the above mentioned congenics is the position of trichobothrium *db* in relation to trichobothrium *est* on the fixed finger of pedipalp chela. This character is, among others, commonly used to differentiate the genera *Hottentotta* Birula, 1908 (*db* between *et* and *est* or on level with *est*) and *Mesobuthus* Vachon, 1950 (*db* between *est* and *esb*). The species studied here has pedipalp chela fixed finger with trichobothrium *db* between trichobothria *est* and *esb*, which would normally place it in the genus *Mesobuthus*. However, considering the variation of this character (e.g. Vachon & Stockmann, 1968; Kovařík, 2007), and other characters placing the species in the genus *Hottentotta* (e.g. carination of the carapace not forming a lyre-shaped configuration, ventrolateral carinae on metasomal segment V with all granules more or less equal in size, not lobate), we decided to describe the new species in the genus *Hottentotta*.

Material and Methods

Illustrations and measurements were produced using a Motic DM143 digital stereomicroscope with an ocular micrometer. Habitus photographs were made with a Canon EOS RP and Adobe Photoshop software. Map was made using Google Maps Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow

Vachon (1974), morphological terminology mostly follows Vachon (1952) and Hjelle (1990), and chelicerae dentition follows Vachon (1963). Specimens studied herein are deposited in the following collections: MNHN (Muséum national d'Histoire naturelle, Paris, France) and EYPC (Eric Ythier Private Collection, Romanèche-Thorins, France).

Taxonomic treatment

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

Genus ***Hottentotta*** Birula, 1908

Hottentotta leetzi sp. n. (Fig. 1-7, Tab. 1)

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China, Tibet (Xizang), Kangmar County, Wagya (Wāgya La), near to the border with Buthan, est. 4920 m a.s.l. (ref. Google Maps), 2004 (M.-S. Zhu leg.). 1 adult ♀ holotype deposited in the Muséum national d'Histoire naturelle, Paris, France.

Etymology. The specific name honours our friend and eminent arachnologist Mr. André Leetz (Walheim, France, 1951-2022).

Diagnosis. Species of small to moderate size when compared with the average size of the other species of the genus, with a total length of 55.3 mm for the female holotype. General coloration yellowish, without any darker pigmentation on body or appendages. Carinae and granulations moderately marked on carapace, tergites and metasomal segments. Carapace with central, lateral and posterior median carinae not forming a lyre-shaped configuration; median eyes separated by 1.3 ocular diameters. Pectines with 23-24 teeth in female. Metasomal segments with 10-10-10-8-5 carinae; ventrolateral carinae on metasomal segment V with all granules more or less equal in size, not lobate. Pedipalps with setation almost absent; only few sparse setae on chela fingers and ventral and internal surfaces of femur and patella. Pedipalp chela fixed and movable fingers with 11-11 longitudinal series of granules; movable finger with 4 accessory granules next to the terminal denticle. Trichobothrial pattern of type A, orthobothriotaxic; dorsal trichobothria of femur arranged in β (beta) configuration (Vachon, 1974, 1975); pedipalp chela fixed finger with trichobothrium *db* proximal to *est*, between trichobothria *est* and *esb*.

Description (based on female holotype; measurements in Tab. 1).

Coloration. General coloration yellowish, without any darker pigmentation on body or appendages. Prosoma: carapace yellowish. Mesosoma yellowish. Metasomal segments I to V yellowish to yellowish orange. Vesicle yellowish orange with the base of the aculeus yellowish orange and the tip reddish. Venter pale yellow to yellowish. Chelicerae uniformly yellowish without reticulation; fingers yellowish with teeth reddish. Pedipalps yellowish; fingers of chela with the oblique rows of granules dark reddish. Legs yellowish with tarsal segments paler.



Fig. 1-2. *Hottentotta leetzi* n. sp. female holotype. Habitus, dorsal (1) and ventral (2) aspects. Scale bar = 1 cm.

Morphology. Carapace unevenly covered by granules of moderate size; carinae moderate, anterior median, central median and posterior median carinae moderately granular; central, lateral and posterior median carinae not forming a lyre-shaped configuration; furrows moderate; median anterior margin slightly emarginated. Median ocular tubercle anterior to the centre of the carapace; median eyes separated by 1.3 ocular diameters. Three pairs of lateral eyes. Mesosoma: tergites moderately granular. Tergites I-VI with three moderately granular carinae; tergite VII pentacarinata. Sternum triangular. Pectines with 23-24 teeth; three margin lamellae and eight middle lamellae; fulcra present. Sternites III-VI smooth; spiracles elongate; sternite VII with four carinae and minute granulations. Metasomal segments I-III with 10 carinae, moderately crenulate, IV with 8 carinae and V with 5 carinae, moderately to strongly crenulate; ventrolateral carinae on metasomal segment V with all granules more or less equal in size, not lobate. Intercarinal spaces moderately granular. Telson bulky, smooth dorsally and moderately to strongly granular latero-ventrally. Cheliceral dentition characteristic of the family Buthidae (Vachon, 1963). Pedipalps: femur pentacarinata; patella with weakly marked carinae; chela smooth without carinae. Pedipalp femur and patella smooth except some minute granulation internally; chela smooth; setation almost absent from all three segments, only few sparse setae on chela fingers and ventral and internal surfaces of femur and patella. Chela fixed and movable fingers with 11-11 longitudinal series of granules; internal and external accessory granules present; distal extremity of movable finger with 4 accessory granules next to the terminal denticle. Trichobothriotaxy: trichobothrial pattern of type A, orthobothriotaxic; dorsal trichobothria of femur arranged in β (beta) configuration (Vachon, 1974, 1975). Chela fixed finger with trichobothrium *db* proximal to *est*, between trichobothria *est* and *esb*. Legs:

tarsomeres with two rows of macrosetae on the ventral surface and numerous macrosetae on the other surfaces; tibial spurs present on legs III and IV, strong; prolateral and retrolateral spurs present in all legs.

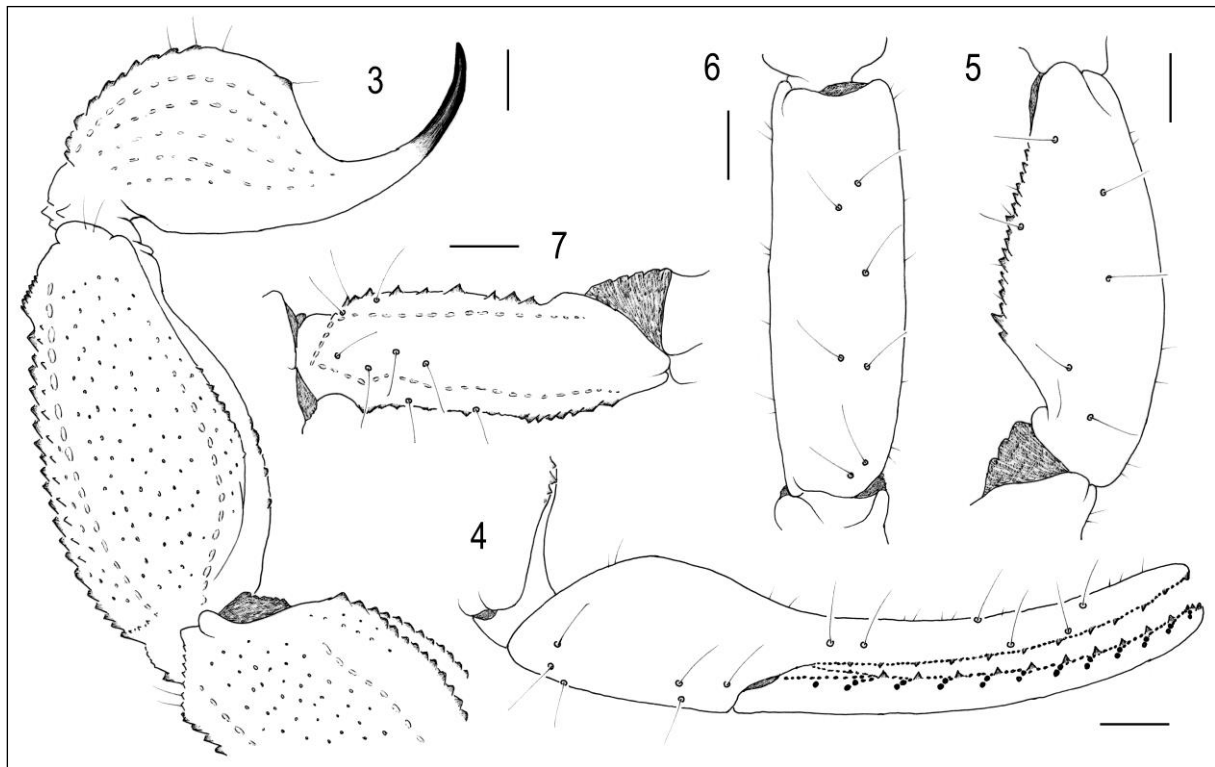


Fig. 3-7. *Hottentotta leetzi* sp. n. female holotype. 3. Metasomal segment V and telson, lateral aspect. 4-7. Trichobothrial pattern. 4. Chela dorso-external aspect, showing the dentate margin of movable finger with rows of granules. 5-6. Patella, dorsal (5) and external (6) aspects. 7. Femur, dorsal aspect. Scale bars = 1 mm.

Relationships. *Hottentotta leetzi* sp. n. appears to be related to *Hottentotta songi* Lourenço, Qi & Zhu, 2005, also described from Tibet, south region of Pulan, near to the border with Nepal (fig. 9), and *Hottentotta tamulus* (Fabricius, 1798), widely distributed in India and Pakistan. The new species can however be distinguished from both species notably by the following main features: (i) generally smaller size with 55.3 mm in female holotype (68-80 mm in *H. songi*, 50-90 mm in *H. tamulus*), (ii) general coloration yellowish without any darker pigmentation on body or appendages (reddish-yellow to reddish-brown in *H. songi* and yellowish to reddish yellow in *H. tamulus*, with blackish zones on carinae in both species), (iii) carapace, tergites and metasoma with granulation less marked than in *H. songi* and *H. tamulus*, (iv) median eyes separated by 1.3 ocular diameters (about 2 ocular diameters in *H. tamulus*, almost 3 ocular diameters in *H. songi*), (v) female pectines with 23-24 teeth (27 to 29 in *H. songi*, 27 to 34 in *H. tamulus*), (vi) metasomal segment IV with 8 carinae (10 in *H. songi*, usually 10 (rarely 8) in *H. tamulus*), (vii) setation almost absent on pedipalps (covered with intense setation in *H. tamulus*, very intense in *H. songi*), (viii) pedipalp chela fixed and movable fingers with 11-11 longitudinal series of granules (13-13 in *H. songi*, 13 to 15 in *H. tamulus*), (ix) chela fixed finger with trichobothrium *db* between trichobothria *est* and *esb* (between *et* and *est* in *H. songi*, between *et* and *est* or on level with *est* in *H. tamulus*), (x) several distinct morphometric ratios (see Tab. 1).

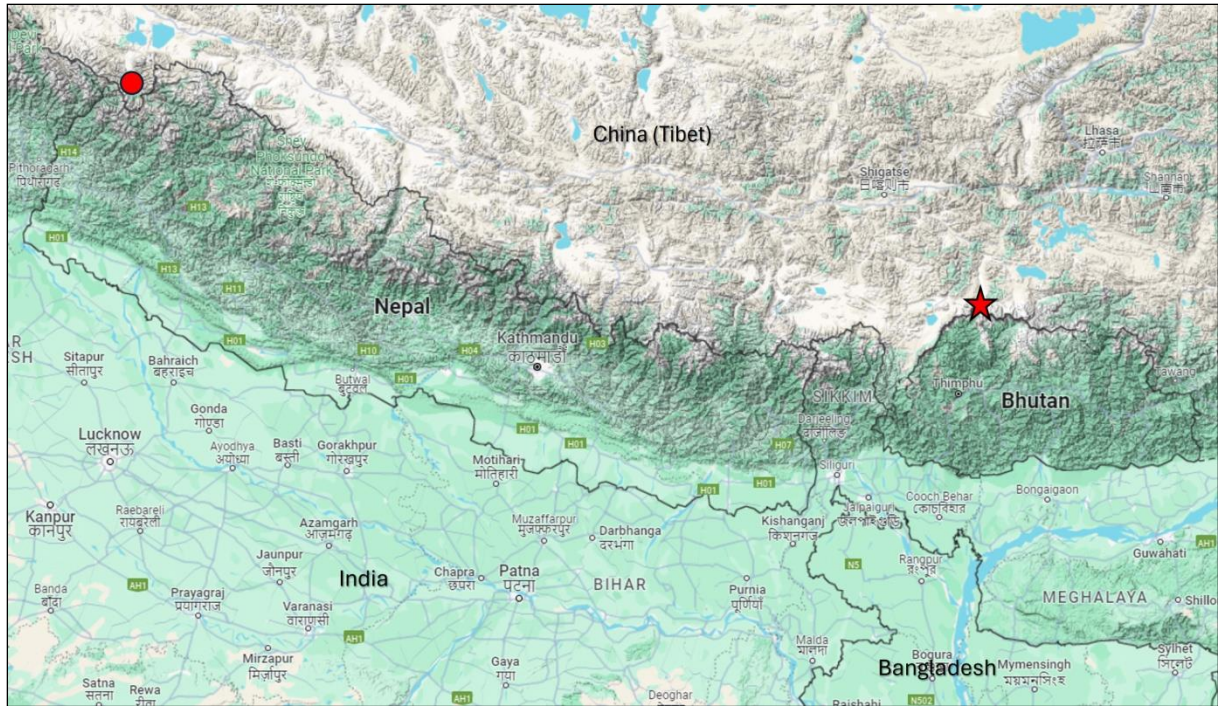


Fig. 8. Topographic map showing the type localities of *Hottentotta songi* (circle) and *Hottentotta leetzi* sp. n. (star) in Southern Tibet.

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Table I. Morphometric values (in mm) and selected morphometric ratios of the female holotype of *Hottentotta leetzi* sp. n., the female paratype of *Hottentotta songi* (MNHN) and one female of *Hottentotta tamulus* from India (EYCP). L: length, W: width, D: depth, NA: not available.

	<i>H. leetzi</i> sp. n.	<i>H. songi</i>	<i>H. tamulus</i>
Total length	55.3	67.8	80.6
Carapace:			
- length	6.3	9.3	8.1
- anterior width	3.8	6.4	4.9
- posterior width	7.0	10.7	10.0
Mesosoma length	18.1	NA	27.9
Metasomal segment I:			
- length	3.6	5.5	5.1
- width	4.4	6.6	5.3
Metasomal segment II:			
- length	4.4	NA	6.3
- width	4.3	NA	5.1
Metasomal segment III:			
- length	4.5	NA	6.4
- width	4.3	NA	4.8
Metasomal segment IV:			
- length	5.1	NA	7.9
- width	4.1	NA	4.8
Metasomal segment V:			
- length	6.8	10.5	9.5
- width	4.0	5.6	4.3
- depth	3.4	5.3	4.1
Telson length	6.5	NA	9.4
Vesicle:			
- width	3.1	4.4	4.1
- depth	2.9	4.0	4.1
Pedipalp:			
- femur length	5.4	8.3	7.5
- femur width	1.8	2.8	2.5
- patella length	6.3	9.6	8.5
- patella width	2.3	3.6	3.1
- chela length	10.3	15.7	14.6
- chela width	2.1	2.8	2.5
- chela depth	2.3	2.8	2.6
- movable finger length	7.3	10.7	9.8
Morphometric ratios:			
- metasomal segment I L/W	0.82	0.83	0.96
- metasomal segment V L/W	1.70	1.88	2.21
- metasomal segment V L/D	2.00	1.98	2.32
- telson vesicle W/D	1.07	1.10	1.00
- pedipalp chela L/W	4.90	5.61	5.84
- pedipalp chela L/D	4.48	5.61	5.62
- pedipalp chela L / movable finger L	1.14	1.47	1.49

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ARACHNIDES N°114.

2024

SOMMAIRE

1-9. A new high-elevation scorpion species of the genus *Hottentotta* Birula, 1908 (Scorpiones: Buthidae) from Tibet, China. Eric YTHIER.

Image de couverture : mâle holotype d'*Hottentotta songi* (Lourenço, Qi & Zhu, 2005) in *Zootaxa*, n° 985, p. 1–16.

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