

A new species of *Euscorpiops* Vachon, 1980, from China (Scorpiones, Scorpioridae)

Éric YTHIER

SynTech Research, 613 route du Bois-de-Loyse, F – 71570 La Chapelle-de-Guinchay
<eythier@syntechresearch.com>

<http://zoobank.org/ACB5D901-4F6B-4137-915E-D9733AF5D448>

(Accepté le 17.V.2019 ; publié le 19.VI.2019)

Abstract. – A new species of scorpion belonging to the genus *Euscorpiops* Vachon, 1980 (family Scorpioridae Kraepelin, 1905) is described on the basis of two adult females collected in a montane rainforest formation located in Tong Bi Guan Xiang, Yingjiang County, Yunnan Province, China, close to the border with Myanmar. This new scorpion taxon represents the 27th known species of the genus *Euscorpiops*, the tenth reported from China and the eighth reported from Yunnan Province.

Résumé. – Une nouvelle espèce d'*Euscorpiops* Vachon, 1980, de Chine (Scorpiones, Scorpioridae). Une nouvelle espèce de scorpion appartenant au genre *Euscorpiops* Vachon, 1980 (famille Scorpioridae Kraepelin, 1905) est décrite sur la base de deux femelles adultes collectées dans une forêt tropicale d'altitude à Tong Bi Guan Xiang, district de Yingjiang, province du Yunnan, Chine, proche de la frontière Birmane. Ce nouveau taxon représente la 27^e espèce décrite pour le genre *Euscorpiops*, la dixième décrite pour la Chine et la huitième décrite pour la province du Yunnan.

Keywords. – Scorpion, taxonomy, morphology, Yunnan.

The current generic composition of the family Scorpioridae is mainly due to VACHON (1980) who revised the genus *Scorpions* Peters, 1861, and described three new subgenera (*Alloscorpions*, *Euscorpions* and *Neoscorpions*) in addition to the nominotypical subgenus. Later, LOURENÇO (1998) elevated these four subgenera to generic rank and added two genera (*Parascorpions* Banks, 1928, and *Dasysscorpions* Vachon, 1974, previously in the family Vaejovidae) to the family. More recently, two genera (*Vietscorpions* Lourenço & Pham, 2015 and *Plethoscorpions* Lourenço, 2017) were also added to the family Scorpioridae (LOURENÇO & PHAM, 2015; LOURENÇO, 2017).

In the present paper, a new species of the genus *Euscorpions* is described from a montane rainforest formation (1500 m altitude) in Tong Bi Guan Xiang, Yingjiang County, Yunnan Province, China. Yingjiang County is located in the westernmost part of China's tropical region. Given its altitude ranging from 200 to 3400 m, Yingjiang County is a biodiversity hotspot where the Himalayan, Central Chinese, and Indo-Malayan species meet, making this ecoregion a convergence zone for species diversity. With over 70 percent of forest cover, this area near the Myanmar border holds some of the intact rainforests in the region, with a great diversity and complexity of endemism.

The description of the new species raises to ten the number of species belonging to the genus *Euscorpions* in China (two in Tibet and eight in Yunnan Province). An identification key of the species reported from Yunnan Province and distribution records for species occurring in Yunnan Province and Kachin State (Myanmar) are provided.

MATERIAL AND METHODS

Measurements and illustrations were made using a Motic DM143 digital stereo-microscope together with a Canon EOS 7D camera and a Wacom Intuos drawing tablet. Map was made using

Google Maps and Adobe Photoshop software. Measurements follow STAHLKE (1970) and are given in mm. Trichobothrial notations follow VACHON (1973) and morphological terminology mostly follows HJELLE (1990). Specimens studied herein are deposited in the Muséum national d'Histoire naturelle, Paris, France (MNHN) and author's personal collection (EYPC).

TAXONOMIC TREATMENT

Family **Scorpiopidae** Kraepelin, 1905

Genus ***Euscorpiops*** Vachon, 1980

Diagnosis for the genus. – Scorpions of small to medium size with a total length ranging from 24 to 70 mm. Ventral edge of cheliceral movable finger with 5 to 7 denticles. Pedipalp patella with 6 to 18 ventral trichobothria and 16 to 21 external trichobothria. Chela manus with four ventral trichobothria with trichobothrium V_4 always situated on ventral surface; on external surface trichobothrium Eb_3 situated between Dt and Est . Pedipalp chelal movable fingers with two longitudinal series of granules. Telson vesicle/aculeus juncture with annular ring at least on males. Type species: *Euscorpiops asthenurus* (Pocock, 1900).

Composition of the genus *Euscorpiops* (in order of description)

- Euscorpiops montanus* (Karsch, 1879) (India, Pakistan)
- Euscorpiops binghamii* (Pocock, 1893) (Myanmar, Thailand)
- Euscorpiops longimanus* (Pocock, 1893) (India, Bangladesh, Myanmar)
- Euscorpiops asthenurus* (Pocock, 1900) (India, Bhutan)
- Euscorpiops bhutanensis* (Tikader & Bastawade, 1983) (Bhutan)
- Euscorpiops kaftani* (Kovařík, 1993) (Vietnam)
- Euscorpiops problematicus* Kovařík, 2000 (Thailand)
- Euscorpiops sejnai* Kovařík, 2000 (Vietnam)
- Euscorpiops kubani* Kovařík, 2004 (Laos, China: Yunnan)
- Euscorpiops beccaloniae* Kovařík, 2005 (Myanmar)
- Euscorpiops karschi* Qi, Zhu & Lourenço, 2005 (China: Tibet)
- Euscorpiops novaki* Kovařík, 2005 (China: Tibet)
- Euscorpiops shidian* Qi, Zhu & Lourenço, 2005 (China: Yunnan)
- Euscorpiops vachoni* Qi, Zhu & Lourenço, 2005 (China: Yunnan)
- Euscorpiops kamengensis* Bastawade, 2006 (India)
- Euscorpiops yangi* Zhu, Zhang & Lourenço, 2007 (China: Yunnan)
- Euscorpiops puerensis* Di, Wu, Cao, Xiao & Li, 2010 (China: Yunnan)
- Euscorpiops validus* Di, Cao, Wu & Li, 2010 (China: Yunnan)
- Euscorpiops xui* Sun & Zhu, 2010 (China: Yunnan)
- Euscorpiops thaomischorum* Kovařík, 2012 (Vietnam)
- Euscorpiops alexandréanneorum* Lourenço, 2013 (Laos)
- Euscorpiops cavernicola* Lourenço & Pham, 2013 (Vietnam)
- Euscorpiops neradi* Kovařík, Pliskova & Stahlavsky, 2013 (Thailand)
- Euscorpiops dakrong* Lourenço & Pham, 2014 (Vietnam)
- Euscorpiops artemisae* Kovařík, Košulič, Stahlavsky, Dongkhamfu & Wongprom, 2015 (Myanmar)
- Euscorpiops orioni* Kovařík, Košulič, Stahlavsky, Dongkhamfu & Wongprom, 2015 (Thailand)

***Euscorpiops zhangshuyuani* n. sp. (fig. 1-10)**

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HOLOTYPE: ♀, China, Yunnan Province, Dehong Prefecture, Yingjiang County, Tong Bi Guan Xiang, border with Myanmar (Kachin State), 1500 m altitude, rainforest, 6.XI.2018, *Zhang Shuyuan* leg. (MNHN).

PARATYPE: 1 ♀, same data as holotype, EY0128 (EYPC).



Fig. 1-2. – *Euscorpiops zhangshuyuani* n. sp., ♀ holotype, habitus. – 1, Dorsal. – 2, ventral. Scale bar = 1 cm.

Diagnosis. – The new species exhibits the general characteristics of the genus *Euscorpiops* (VACHON, 1980; SOLEGLAD & SISSOM, 2001); total length 49.1 mm for female holotype (see morphometric values in description) and 53.1 mm for female paratype; general coloration yellowish brown to reddish brown; carapace yellowish brown with median ocular tubercle not darkened; narrow pedipalp chela with a length/width ratio of 4.2-4.3; chelal fingers slightly scalloped, with lobe and corresponding notch reduced on fixed finger; pectines with 8-7 teeth, fulcra present; metasomal segments I-II wider than long; pedipalp patella with 18 external and 11 ventral trichobothria; trichobothrial pattern on external side of patella with *esb1* situated proximal to *esb2*, *em1* situated distal to *esb2*, and *et3* situated distal to *et1* and *et5*.

Description based on female holotype (fig. 1-2, 9)

Coloration. General coloration yellowish brown to reddish brown (fig. 1-2). Carapace yellowish brown, marked with darker pigmentation on the anterior part of the carapace and around lateral ocelli; median ocular tubercle of same colour as carapace, not darkened. Tergites brownish, darker on the posterior edge of the tergites. Venter and sternites yellowish brown, with darker pigmentation on posterior edge of sternites except sternite VII which is entirely yellowish; sternum yellowish brown; genital operculum yellowish; pectines greyish yellow with teeth pale yellow. Metasomal segments dark yellowish brown to dark reddish brown; ventral side of segments I and II yellowish. Telson with vesicle dark reddish brown, basis of aculeus yellowish red and tip reddish black. Chelicerae yellowish with variegated dark brownish spots; fingers dark brownish, gradually lighter toward the tip; teeth reddish. Pedipalps reddish brown with dark brown pigmentation on carinae; fingers dark brown with tip yellowish red. Legs yellowish brown marked with brownish variegated spots.

Morphology. Carapace finely granulated with smooth areas in lateral, anterior median and posterior median furrows; furrows weekly to moderately deep; median eyes anterior to the middle of carapace with ocelli one diameter apart; three pairs of lateral ocelli, the posterior ocelli about half the size of the others; median ocular tubercle mostly smooth with only few granules anteriorly and posteriorly.

Tergites with a moderately marked median carinae, tergite VII two additional pairs of lateral carinae; all tergites covered with fine granulation and bigger granules on their posterior part.

Sternum pentagonal, longer than wide. Pectinal tooth count 8-7 in female holotype (8-7 in female paratype), fulcra present. Sternites smooth and shiny, sternite VII with four weakly marked carinae.

Metasomal segments weakly granulated; segments I-II wider than long and III to V longer than wide; segments I to V with 10-8-8-8-7 carinae, respectively; dorsal carinae crenulated, with a single posterior spinoid granule on segments III and IV.

Telson (fig. 8) with vesicle elongated, smooth, without granulations.

Pedipalp femur and patella with tegument weakly granular; femur (fig. 7) with dorsal internal, dorsal external, ventral internal, ventral external and internal carinae complete and granular; patella (fig. 5-6) with dorsal internal, dorsal external, ventral internal, ventral external and external carinae complete and granular, two large spinoid granules present on internal aspect; chela (fig. 3-4) with dorsal marginal, external secondary, ventral internal and ventral carinae granular, chela narrow with a length/width ratio of 4.3 in female holotype (4.2 in female paratype); chelal fingers slightly scalloped, with lobe and corresponding notch reduced on fixed finger, fixed and movable fingers with two longitudinal series of granules almost fused in a single one and with a few inner and outer accessory granules.

Chelicerae with dentition typical of the family Chactidae (Vachon, 1963); movable finger with 4 teeth on dorsal face and 6 on ventro-internal face.

Trichobothriotaxy of type C, neobothriotaxic (Vachon, 1973); pedipalp patella with 18 external trichobothria (5 *eb*, 2 *esb*, 2 *em*, 4 *est*, 5 *et*) with *esb1* situated proximal to *esb2*, *em1* situated distal to *esb2*, and *et3* situated distal to *et1* and *et5*; ventral side of patella with 11 trichobothria.

Morphometric values of the female holotype. – Total length (including telson), 49.1. Carapace: length, 7.9; anterior width, 4.3; posterior width, 7.5. Mesosoma length, 17.3. Metasomal segments. I: length, 2.5; width, 2.8; II: length, 2.4; width, 2.6; III: length, 2.8; width, 2.5; IV: length, 3.5; width, 2.3; V: length, 5.7; width, 2.2; depth, 2.2. Telson: total length, 7.0; vesicle length, 4.7, width, 2.0, depth, 1.9; aculeus length, 2.3. Pedipalp: femur length, 8.8, width, 2.9; patella length, 7.7, width, 3.6; chela length, 16.8, width, 3.9, depth, 3.2, length/width ratio, 4.3; movable finger length, 8.7.

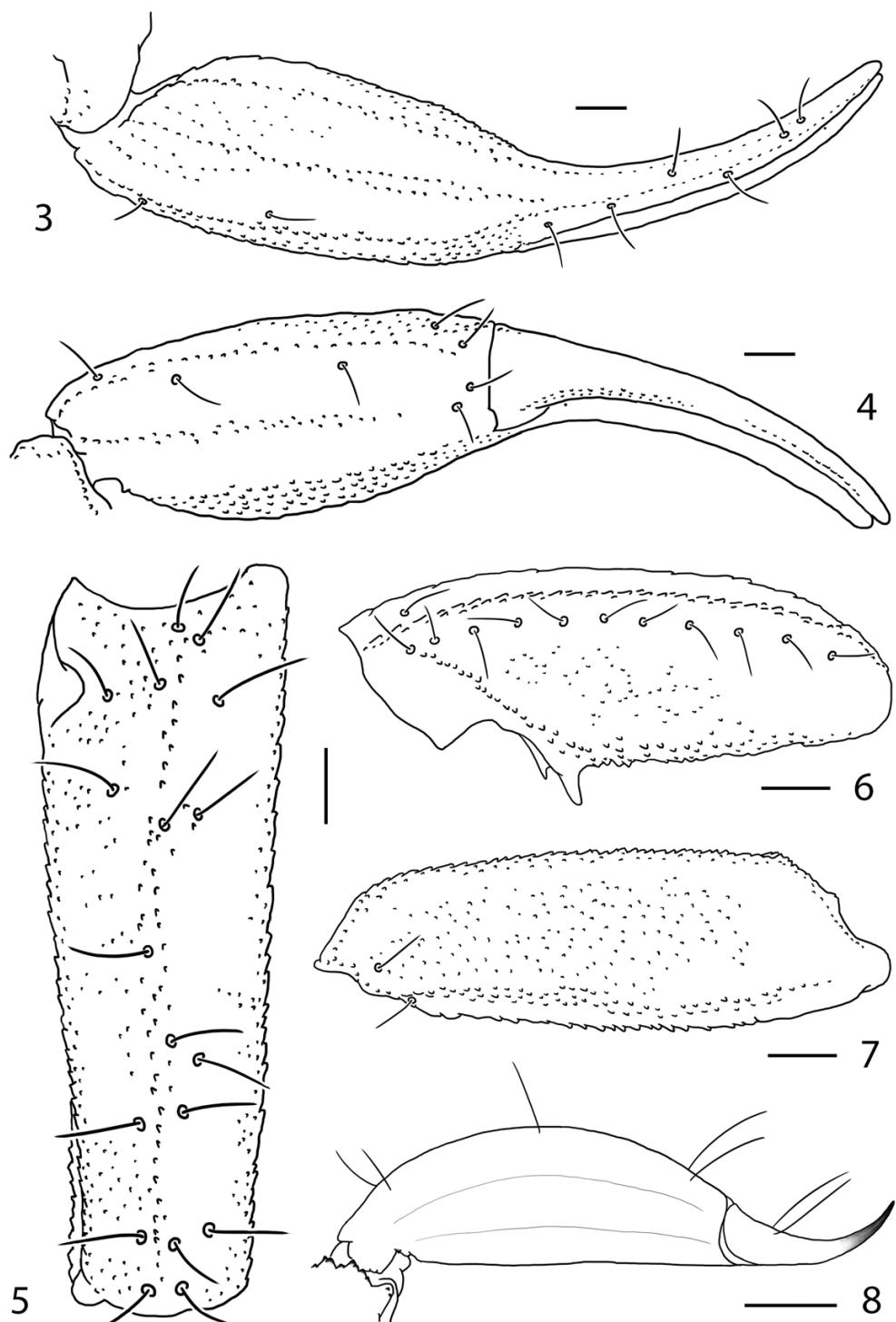


Fig. 3-8. – *Euscorpiops zhangshuyuani* n. sp., ♀ holotype. – 3-4, Right chela: 3, dorsal; 4, ventral. – 5-6, Right patella: 5, external; 6, ventral. – 7, Right femur, dorsal. – 8, Telson, lateral. Scale bars = 1 mm.



Fig. 9-10. – *Euscorpiops zhangshuyuani* n. sp., alive. – **9**, ♀ holotype. – **10**, Group of adult specimens with two females (top) and two males (bottom). (Photo Z. Shuyuan).

Etymology. – The specific name honours Mr Zhang Shuyuan (Hangzhou, China), who collected the type material.

Relationships. – The new species appears to be related to *E. shidian* Qi, Zhu & Lourenço, 2005, which is also the geographically closest species of the genus (occurring in Shidian County, Baoshan Prefecture, Yunnan Province, China; see fig. 11), but the two species can be readily distinguished on the basis of the following combination of characters: (i) female chela narrow with a length/width ratio of 4.2-4.3 (3.2-3.5 in *E. shidian*), (ii) metasomal segments I-II wider than long (only segment I wider than long in *E. shidian*), (iii) median ocular tubercle yellowish brown, of same colour as carapace (black in *E. shidian*), (iv) different trichobothrial pattern on external side of pedipalp patella with *esb1* situated proximal to *esb2* (distal in *E. shidian*), *em1* situated distal to *em2* (proximal in *E. shidian*), and *et3* situated distal to *et1* and *et5* (proximal in *E. shidian*).

E. zhangshuyuani sp. n. can also be distinguished from the other species of the genus *Euscorpiops* occurring in the Yunnan Province of China or Kachin State of Myanmar, by the following main features: (i) pedipalp patella with 11 ventral trichobothria (9-10 in *E. yangi*, 9-10 (rarely 8/11) in *E. validus*, 10 (rarely 9) in *E. kubani*, 10 in *E. vachoni* and *E. xui*, 12 in *E. beccaloniae*), (ii) female chela narrow with a length/width ratio of 4.2-4.3 (2.7-2.8 in *E. puerensis*, 3.0 in *E. vachoni*, 3.1 in *E. validus*, 2.7-3.2 in *E. kubani*, 3.3 in *E. yangi*, 3.4-3.6 in *E. xui*). Male of the new species could not be examined but based on photos of alive specimens (see fig. 10), males seem to have very narrow chela with an estimated length/width ratio between 4.7 and 5.4 (the maximum chela length/width ratio recorded in male of *Euscorpiops* species occurring in Yunnan Province is 4.1 in *E. xui*).



Fig. 11. – Map of the known distribution of *Euscorpiops* species from southwestern China (Yunnan Province) and northern Myanmar (Kachin State): *E. beccaloniae* (five-pointed star), *E. kubani* (circle), *E. puerensis* (square), *E. shidian* (triangle), *E. vachoni* (cross), *E. validus* (six-pointed star), *E. xui* (heart), *E. yangi* (inverted triangle) and *E. zhangshuyuan* n. sp. (diamond).

Key to the species of *Euscorpiops* from Yunnan Province, China (modified from Di et al., 2011)

1. Chela length/width ratio 2.6-3.2; male chela fingers strongly scalloped, with a pronounced lobe on the movable finger and a corresponding notch on fixed finger 2
– Chela length/width ratio 3.2-4.3; male chela fingers slightly scalloped or straight, with lobe and corresponding notch reduced or absent 5
2. Chela manus stout and rounded *Euscorpiops vachoni* Qi, Zhu & Lourenço
– Chela manus flattened dorsoventrally 3
3. Female chela fingers nearly straight *E. kubani* Kovařík
– Female chela fingers scalloped 4
4. Chela length/width ratio 2.6-2.8; pedipalp patella with 11 (rarely 10) ventral trichobothria; pectinal tooth count 7-8 *E. puerensis* Di, Wu, Cao, Xiao & Li
– Chela length/width ratio 2.9-3.2; pedipalp patella with 9-10 (rarely 8/11) ventral trichobothria; pectinal tooth count 6-7 (rarely 8) *E. validus* Di, Cao, Wu & Li
5. Female chela length/width ratio 4.2-4.3; pedipalp patella with 11 ventral trichobothria and 18 external trichobothria *E. zhangshuyuan* sp. n.
– Female chela length/width ratio 3.2-3.6; pedipalp patella with 9-11 ventral trichobothria and 18-19 external trichobothria 6
6. Chela length/width ratio 3.4-3.6 in females and 4.0-4.1 in males; pedipalp patella with 19 (rarely 18) external trichobothria *E. xui* Sun & Zhu
– Chela length/width ratio 3.2-3.5 in both sexes; pedipalp patella always with 18 external trichobothria 7
7. Pedipalp patella with 11 (rarely 10 or 12) ventral trichobothria; pedipalp chela fingers nearly straight *E. shidian* Qi, Zhu & Lourenço
– Pedipalp patella with 9 or 10 ventral trichobothria; pedipalp chela fingers slightly undulated *E. yangi* Zhu, Zhang & Lourenço

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