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***Asiacantha* gen. nov., a new genus of the orb-weaver spiders from China**

(Araneae, Araneidae, Gasteracanthinae)

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***Asiacantha* gen. nov., a new genus of the orb-weaver spiders from China (Araneae, Araneidae, Gasteracanthinae)**

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Abstract

Asiacantha **gen. nov.**, a new genus of the subfamily Gasteracanthinae is established with the type species *A. pengi* **sp. nov.** (♀♂) from Guangxi and two other new species: *A. jianfeng* **sp. nov.** (♂) from Hainan and *A. yinae* **sp. nov.** (♀♂) from Yunnan and Guizhou. Diagnostic drawn and detailed description, as well as a distributional map, are provided.

Keywords

Morphology, taxonomy, new taxa, South-China

Introduction

Araneidae, with 3084 species in 178 genera, is the third-largest family in Araneae worldwide (WSC 2021). Of those, 422 species in 50 genera are recorded in China (Li 2020; Mi & Li 2021a, b).

Gasteracanthinae O. P. -Cambridge, 1871 comprises a group of species that have evolved rigid and generally broad abdomens armed with up to three pairs of prominent spines (Tan et al. 2019). The subfamily is represented by 117 species under 8 genera broadly distributed in the Old World and shows high diversity in Madagascar and Africa (Scharff and Coddington 1997; Tan et al. 2019; WSC 2021). To date, only eight species of three genera have been recorded from China, and only one is endemic (WSC 2021; Mi and Peng 2013).

In our recent study of Araneidae specimens from South China, three species of the subfamily Gasteracanthinae were identified as new to science. Moreover, they are sharing similar habitus and copulatory organs, which are different from all other congeners in this subfamily. Based on that, *Asiacantha* **gen. nov.**, is established and described in the present work.

Materials and methods

Specimens were collected by beating shrubs and handing collecting. All specimens were preserved in 75% ethanol and are deposited in the museum of Tongren University (TRU). The specimens were examined with an Olympus SZ51 stereomicroscope. After dissecting from the body, epigynes were cleared in trypsin enzyme solution before examination and photography. Left male palps were used for description and illustration. Photos of copulatory organs were taken with a Kuy Nice CCD mounted on an Olympus BX51 compound microscope. Compound focus images were generated using Helicon Focus 6.7.1 software®.

All measurements are given in millimeters. Leg measurements are given as total

length (femur, patella + tibia, metatarsus, tarsus). The abbreviations used in the text and figures as follow:

ALE anterior lateral eye; **AME** anterior median eye; **C** conductor; **CD** copulatory duct; **CO** copulatory opening; **E** embolus; **FD** fertilization duct; **MA** median apophysis; **MOA** median ocular area; **PC** paracymbium; **PLE** posterior lateral eye; **PME** posterior median eye; **S** spermatheca; **SC** scape; **SA** subterminal apophysis; **TA** terminal apophysis.

Taxonomy

Family Araneidae Clerck, 1757

Subfamily Gasteracanthinae O. P. -Cambridge, 1871

Genus *Asiakantha* gen. nov.

Type species: *Asiakantha pengi* sp. nov. from China

Etymology. The epithet is a combination of “Asia”, the origination of the type species, and the Latin word “acantha”; Gender feminine.

Diagnosis. *Asiakantha* gen. nov. resembles *Thelacantha* Hasselt, 1882 in habitus, but can be distinguished from the latter by the absence of sexual dimorphism in size, the presence of terminal and subterminal apophyses of male pale, and by the long epigynal scape originated from the anterior portion of epigyne, whereas presence of sexual dimorphism in size, lacking terminal and subterminal apophyses, and having short epigynal scape originated from the posterior margin of epigyne in *Thelacantha* (Yin et al. 2012: fig. 281a–h). It also resembles *Togacantha* Strand, 1913 in habitus, but can be distinguished from the latter by the presence of terminal and subterminal apophyses, and the ventro-mesally originated embolus, whereas absent and prolaterally originated in *Togacantha* (Benoit, 1962: figs 12–13; Emerit, 1983: fig. 2A–D). It is similar to *Enacrosoma* Mello-Leitão, 1932 in habitus and copulatory organs, and in having the femur IV as long or longer than femur I in females and shorter than femur I in males, but differs in the following characters: 1) the paramedian apophysis of male palp is absent, whereas present in *Enacrosoma* (Levi, 1996: 148, figs 344, 345); 2) the terminal apophysis is almost equal length to tegular width, whereas about 1/2 the tegular width in *Enacrosoma* (Levi, 1996: 148, figs 344, 345); 3) the tooth of endite and hook of coxa I is absent, whereas present in *Enacrosoma* (Levi, 1996: 148, fig. 331); 4) the scape is originated from the anterior portion of epigyne, whereas with a median lobe at the distal end of epigyne in *Enacrosoma* (Levi, 1996: 148, figs 327, 328, 339, 340).

Description. Small to median-sized spiders. Carapace red-brown to dark brown, pear-shaped in male and almost trapeziform in female, slightly elevated in cephalic region, with an irregular yellow patch postero-medially, covered with small tubercles bearing short, dark spines or white hairs. Chelicerae with three promarginal and one retromarginal teeth. Endites broadened distally and paler distally. Labium wider than long, paler distally. Sternum heart shaped, with lateral and terminal extensions, covered with small tubercles. Legs with small ventral tubercles on coxae, trochanter and femora, of those, the femoral tubercles bearing long spines. Abdomen with two pairs of caudal tubercles, and two or three pairs of lateral tubercles, as well as a pair

of anterior tubercles (just presented in the female of the type species); dorsum with small tubercles bearing short spines or white hairs, brown depressions, longitudinal, middle band anteromedially, and irregular white patches or stripes posteromedially. Spinnerets located posteromedially.

Palp: patella with a dorsal bristle; tibia broadened; cymbium hairy, with baso-retrolateral paracymbium; median apophysis well-developed, terminus bifurcated or not; conductor membranous; subterminal apophysis originated ventro-mesally, different in form; embolus short, partly or completely hidden by the terminal and subterminal apophyses in prolateral view; terminal apophysis well-developed, almost equal width with tegulum.

Epigyne: scape long, originated from the anterior portion of epigyne; copulatory openings oval or slit-shaped, posteromedially located; copulatory ducts thick, straight or curved; spermathecae elongated oval, strongly curved at middle; fertilization ducts originated from the postero-lateral sides of spermathecae, lamellar.

Composition. Only including the described three species.

Distribution. China (Yunnan, Hainan, Guizhou, Guangxi).

Asiakantha pengi sp. nov.

Figs 1–3, 9A

Type material. **Holotype.** ♂ (TRU-Araneidae-139), **CHINA: Guangxi Zhuang Autonomous Region:** Chongzuo City, Jiangzhou District, Zuozhou Township, Guanghe Village (22°34.72'N, 107°24.94'E, 159.82 m), 4.VII.2019, C. Wang, S.Y. Yan & C.G. Qin leg. **Paratype:** 1♀ (TRU-Araneidae-140), same locality and collectors, 3.VII.2019.

Etymology. The epithet is a patronym in honor of Prof. Xianjin Peng (Changsha, China), who has made significant contributions to the taxonomy of Chinese spiders; noun (name) in genitive case..

Diagnosis. The new species resembles that of *A. yinae* sp. nov. in having the bifurcated median apophysis, elongated-oval spermathecae, but can be easily distinguished by following characters: 1) the distal end of terminal apophysis is grooved (Fig. 2A), whereas not grooved in *A. yinae* (Fig. 7A); 2) the embolus is partly visible in prolateral view (Fig. 2A), whereas completely invisible in *A. yinae* (Fig. 7A); 3) the epigynal scape is almost tapered towards the tip (Fig. 3A), whereas broadened posteriorly in *A. yinae* (Fig. 8A); 4) the copulatory ducts are strongly curved anteromedially (Fig. 3C, D), whereas straight in *A. yinae* (Fig. 8C, D).

Description. **Male** (holotype). Total length 2.39. Carapace 1.26 long, 1.18 wide; abdomen 1.27 long, 1.49 wide. Eye sizes and interdistances: AME 0.13, ALE 0.07, PME 0.08, PLE 0.09, AME–AME 0.06, AME–ALE 0.12, PME–PME 0.08, PME–PLE 0.23, MOA length 0.30 with anterior width 0.28 and posterior width 0.23. Leg measurements: I 3.42 (1.08, 1.33, 0.68, 0.33), II 3.09 (0.98, 1.18, 0.60, 0.33), III 2.19 (0.75, 0.73, 0.38, 0.33), IV 2.79 (1.05, 0.93, 0.48, 0.33). Carapace (Fig. 1A) red-brown, pear-shaped, slightly elevated on cephalic region, with an irregular yellow patch posteromedially, covered with small tubercles bearing short, dark brown spines or white hairs. Endites (Fig. 1C) yellow, pale distally. Labium (Fig. 1C) yellow, pale

the distal end. Sternum (Fig. 1C) yellow except dark brown marginally. Legs yellow to red-brown, femora with five or six ventral tubercles bearing spines. Abdomen (Fig. 1A, C) wider than long, with two pairs of lateral and three pairs of caudal tubercles, dorsum with a longitudinal, middle dark brown band anteromedially, an irregular, large, white patch medially, covered with brown depressions of varying sizes and small tubercles bearing dark spines or white hairs; venter with three yellow patches medially.

Palp (Figs 2A, B, 9A): median apophysis wider than long, with bifurcated end; embolus sclerotized, hidden by subterminal apophysis terminally; conductor membranous, partly visible; subterminal apophysis sclerotized, paliform; terminal apophysis well-developed, grooved distally.

Female (TRU-Araneidae-140). Total length 2.65. Carapace 1.16 long, 1.07 wide; abdomen 1.80 long, 2.17 wide. Eye sizes and interdistances: AME 0.12, ALE 0.09, PME 0.09, PLE 0.10, AME–AME 0.11, AME–ALE 0.13, PME–PME 0.10, PME–PLE 0.25, MOA length 0.31 with anterior width 0.28 and posterior width 0.25. Leg measurements: I 3.63 (1.18, 1.45, 0.65, 0.35), II 3.33 (1.05, 1.33, 0.60, 0.35), III 2.23 (0.75, 0.75, 0.38, 0.35), IV 3.08 (1.13, 1.05, 0.55, 0.35). Habitus (Fig. 1B, D) similar to that of male except paler in color and with a pair of anteromarginal tubercles on the dorsum of abdomen.

Epigyne (Fig. 3A–D): with a tapered, elongated scape blunt at distal end; copulatory openings median-laterally located, slit-shaped; copulatory ducts thick, curved 180° before ascending anteriorly; spermathecae elongated, anterior-laterally extending, close to each other basally; fertilization ducts twisted.

Distribution. China (Guangxi). (Fig. 10)

Asiacantha jianfeng sp. nov.

Figs 4–5, 9B

Type material. Holotype. ♂ (TRU-Araneidae-136), **CHINA: Hainan Province:** Ledong County, Jianfeng Township, Jianfengling National Nature Reserve, Tianchi (18°44.45'N, 108°57.49'E, 856 m), 11.IV.2019, C. Wang & Y.F. Yang leg. **Paratypes:** 1♂ (TRU-Araneidae-137), Mingfenggu (18°44.61'N, 108°51.24'E, 812 m), 12.IV.2019, the same collectors; 1♂ (TRU-Araneidae-138), Yulingu (18°44.96'N, 108°55.32'E, 647 m), 13.IV.2019, the same collectors.

Diagnosis. The species can be distinguished from other two congeners by the terminal apophysis having a sclerotized, knife-shaped process and by the not bifurcated median apophysis (Fig. 5A, B), whereas absent and with terminally bifurcated median apophysis in *A. pengi* sp. nov. (Fig. 2A, B) and *A. yinae* sp. nov. (Fig. 7A, B)

Etymology. The epithet is derived from the name of the type locality, Jianfengling National Nature Reserve; noun in position.

Description. Male (holotype). Total length 2.17. Carapace 1.10 long, 1.04 wide. Abdomen 1.21 long, 1.51 wide. Eye sizes and interdistances: AME 0.13, ALE 0.07, PME 0.08, PLE 0.09, AME–AME 0.05, AME–ALE 0.12, PME–PME 0.09, PME–PLE 0.24, MOA length 0.33 with anterior width 0.30 and posterior width 0.29.

Leg measurements: I 3.14 (0.98, 1.25, 0.58, 0.33), II 2.76 (0.85, 1.05, 0.53, 0.33), III 1.91 (0.63, 0.65, 0.33, 0.30), IV 2.49 (0.93, 0.83, 0.43, 0.30). Carapace (Fig. 4A) red-brown to dark brown, with an irregular yellow patch posteromedially and three pairs of dark streaks laterally on thorax, covered with small tubercles bearing white hairs, and thin hairs. Endites (Fig. 4B) yellow, bearing dense hairs. Labium (Fig. 4B) colored as endites. Sternum (Fig. 4B) yellow with green-brown margins. Legs yellow to red-brown, with annulus, and five or six ventral tubercles bearing spines on femora. Abdomen (Fig. 4A–C) slightly wider than long, with two pairs of postero-lateral and caudal tubercles respectively, dorsum with small tubercles bearing white hairs, varying sizes brown depressions, longitudinal, middle, brown band anteromedially, and a pair of white stripes; venter dark yellow, with pale white area behind the epigastric furrow. Spinnerets posteriorly located.

Palp (Figs 5A, B, 9B): median apophysis large, almost 2.5 times wider than long in prolateral view; embolus sclerotized, slightly curved antero-medially; conductor membranous, elongated, extending above the bulb margin distally; subterminal apophysis anterior to embolus and conductor, almost shield-shaped; terminal apophysis well-developed, with a knife-shaped terminal process.

Female. Unknown.

Distribution. China (Hainan). (Fig. 10)

Asiakantha yinae sp. nov.

Figs 6–8, 9C

Type material. Holotype. ♂ (TRU-Araneidae-141), **CHINA: Guizhou Province:** Xingren County, Luchuying Township, Qingshuihe Nature Reserve, Mabaoshu Grand Canyon (25°17.79'N, 104°56.13'E, 1270 m), 3.VIII.2016, C. Wang et al. leg. **Paratypes:** 1♂ (TRU-Araneidae-142), Haifeng Township, Chuandong (25°17.58'N, 104°55.59'E, 1270–1410 m), 3.VIII.2016, same collectors of holotype; 1♂ (TRU-Araneidae-143), Libo County, Weng'ang Township, Jilong Village, Maolan National Nature Reserve (25°13.53'N, 107°56.18'E, 840 m), 10–11.VIII.2013, X.Q. Mi et al. leg.; 2♀1♂ (TRU-Araneidae-144–146), **Yunnan Province:** Nanjian County, Baohua Township, A'paxin Village (24°50.54'N, 100°26.08'E, 2320 m), 11.VIII.2015, C. Wang et al. leg.

Etymology. The epithet is a patronymic in honor of Prof. Changmin Yin for her contribution to the taxonomy of Chinese spiders; noun (name) in genitive case.

Diagnosis. See diagnosis in *Asiakantha pengi* sp. nov.

Description. Male (holotype). Total length 2.15. Carapace 1.08 long, 0.98 wide; abdomen 1.21 long, 1.40 wide. Eye sizes and interdistances: AME 0.10, ALE 0.06, PME 0.06, PLE 0.09, AME–AME 0.07, AME–ALE 0.11, PME–PME 0.08, PME–PLE 0.21, MOA length 0.29 with anterior width 0.27 and posterior width 0.25. Leg measurements: I 2.83 (0.90, 1.13, 0.50, 0.30), II 2.51 (0.78, 0.95, 0.48, 0.30), III 1.81 (0.60, 0.60, 0.33, 0.28), IV 2.23 (0.80, 0.75, 0.40, 0.28). Carapace (Fig. 6A) red-brown, pear-shaped, elevated on cephalic region, with an irregular yellow patch posteromedially, covered with small tubercles bearing white hairs and thin hairs. Endites (Fig. 6C) yellow. Labium (Fig. 6C) brown. Sternum (Fig. 6C) yellow, dark

brown marginally, covered with sparse white hairs anteriorly. Abdomen (Fig. 6A, C) wider than long, with three pairs of lateral tubercles and two pairs of caudal tubercles, dorsum dark brown, with a longitudinal, dark brown band antero-medially, and white spots and stripes medially, covered with small tubercles bearing white hairs; venter paler than the dorsum, with a pale area behind the epigastric furrow. Spinnerets posteromedially located.

Palp (Figs 7A–C, 9C): median apophysis large, concave medially, and bifurcated at terminus; embolus short, completely covered by subterminal apophysis in prolateral view; conductor membranous, partly hidden by subterminal apophysis; terminal apophysis almost equal width to tegulum; subterminal apophysis elongated elliptic.

Femlae (TRU-Araneidae-144). Total length 3.52. Carapace 1.21 long, 1.10 wide; abdomen 2.49 long, 2.95 wide. Eye sizes and interdistances: AME 0.12, ALE 0.09, PME 0.10, PLE 0.10, AME–AME 0.08, AME–ALE 0.02, PME–PME 0.12, PME–PLE 0.23, MOA length 0.34 with anterior width 0.32 and posterior width 0.30. Leg measurements: I 3.68 (1.20, 1.43, 0.65, 0.40), II 3.30 (1.05, 1.25, 0.60, 0.40), III 2.46 (0.83, 0.83, 0.40, 0.40), IV 3.23 (1.20, 1.08, 0.55, 0.40). Habitus similar to that of male except paler in color and with more well-developed postero-lateral and caudal tubercles.

Epigyne (Fig. 8A–D): scape longer than wide, broadened posteriorly; copulatory openings almost oval; copulatory ducts thick, short, almost parallel extending; spermathecae elongated oval, anterior-laterally extending; fertilization ducts strongly curved medially.

Distribution. China (Guizhou, Yunnan). (Fig. 10)

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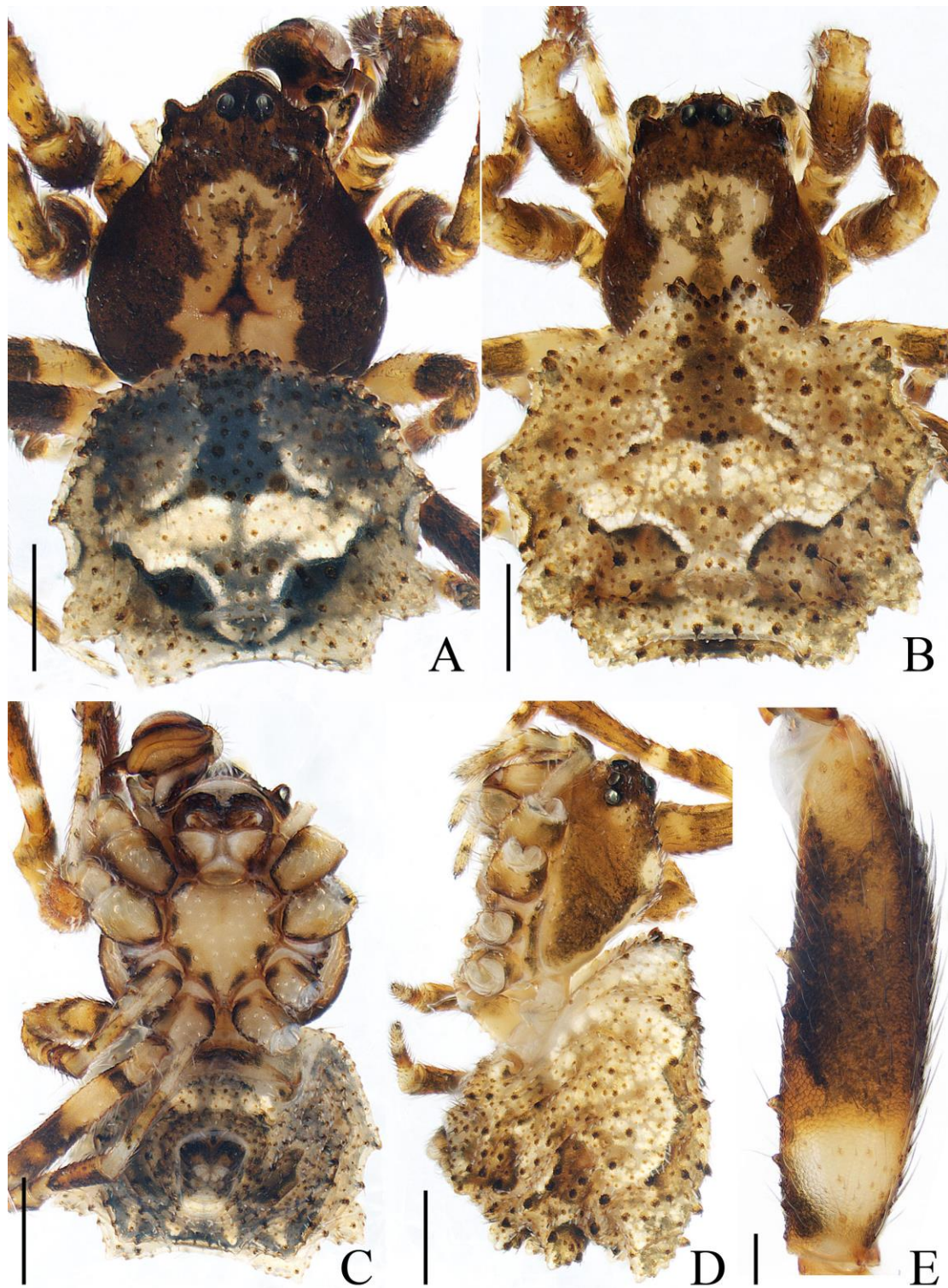


Figure 1. *Asiakantha pengi* sp. nov., male holotype and female paratype. **A** holotype habitus, dorsal; **B** female paratype habitus, dorsal; **C** holotype habitus, ventral; **D** female paratype habitus, lateral; **E** holotype leg I, retrolateral. Scale bar: 0.5 (**A–D**); 0.1 (**E**).

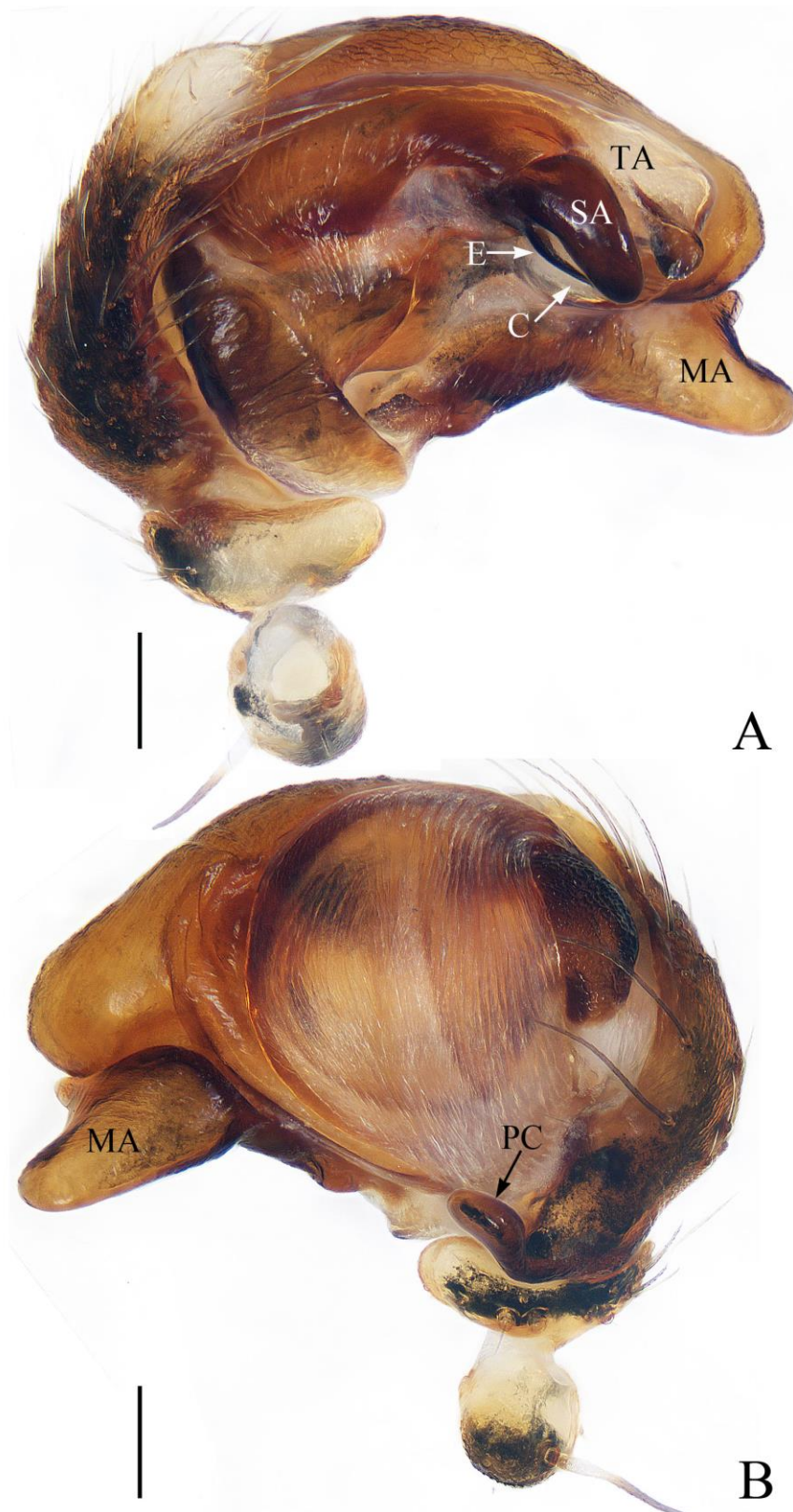


Figure 2. Male palp of *Asiakantha pengi* sp. nov., holotype. **A** prolateral; **B** retrolateral. Scale bar: 0.1.

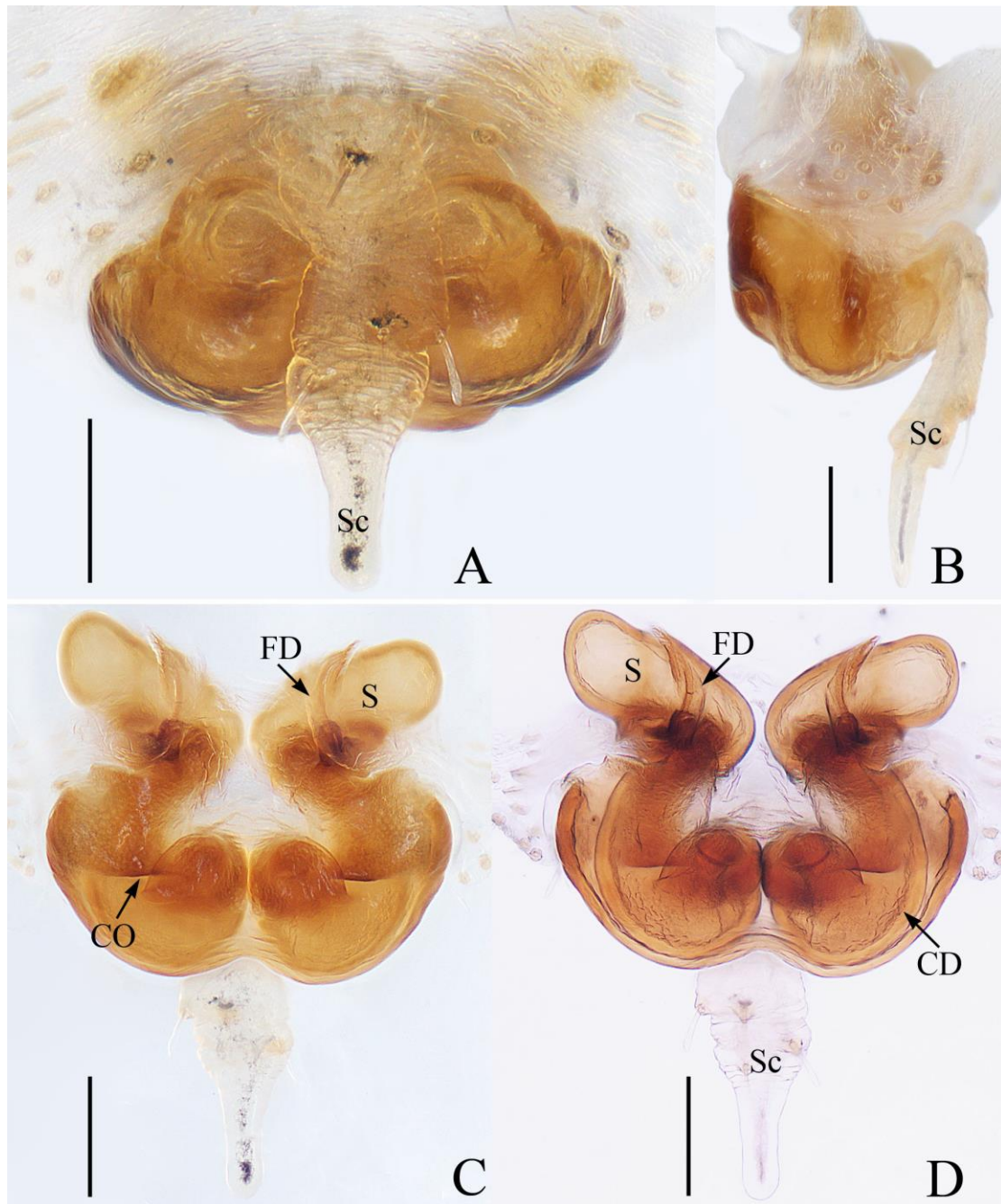


Figure 3. Epigyne of *Asiakantha pengi* **sp. nov.**, paratype. **A** ventral; **B** lateral; **C, D** dorsal. Scale bar: 0.1.

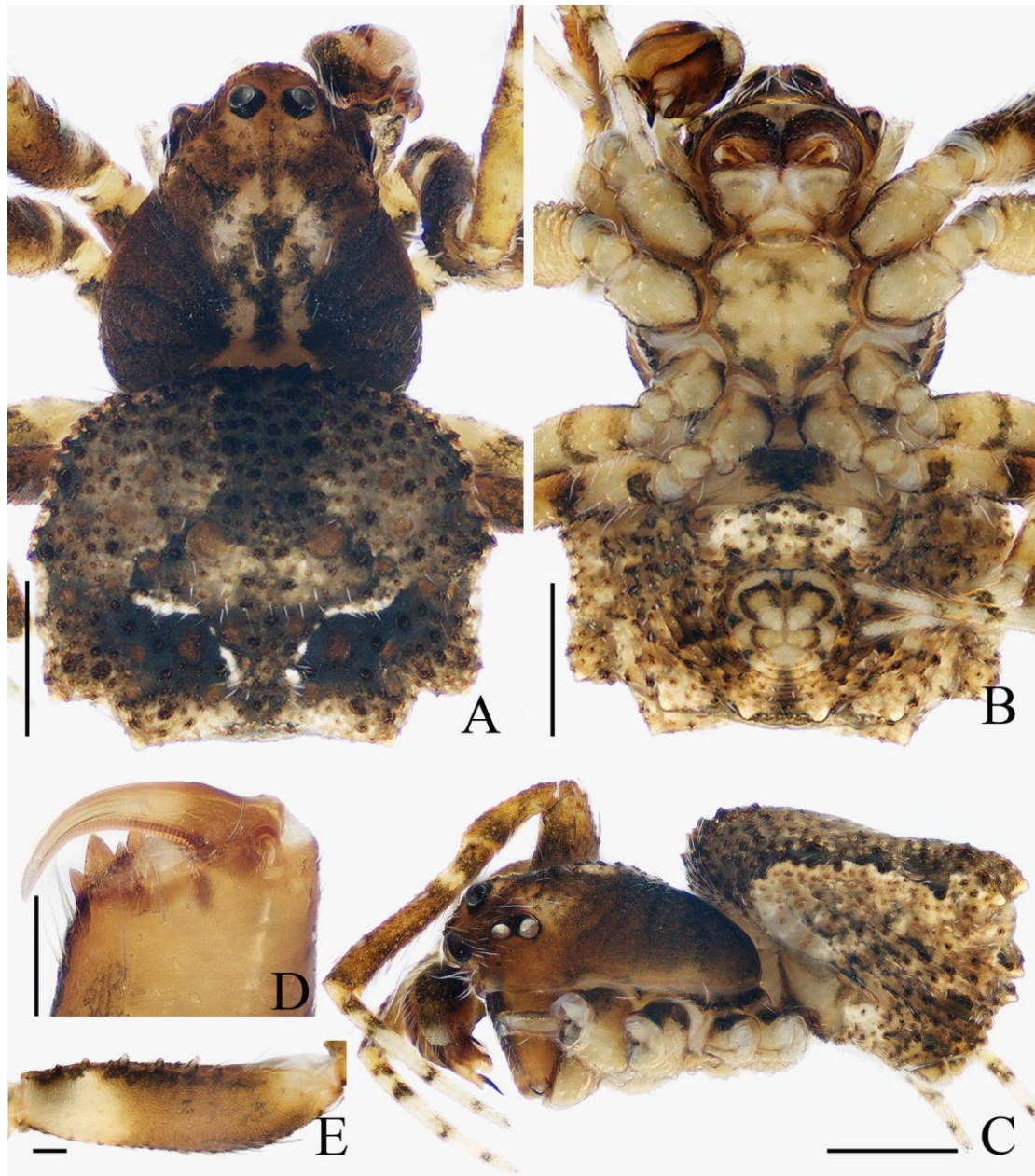


Figure 4. *Asiacantha jianfeng* **sp. nov.**, holotype. **A** habitus, dorsal; **B** ditto, ventral; **C** ditto, lateral; **D** chelicerae, posterior; **E** femora of leg I, retrolateral. Scale bar: 0.5 (A–C), 0.1 (D, E).

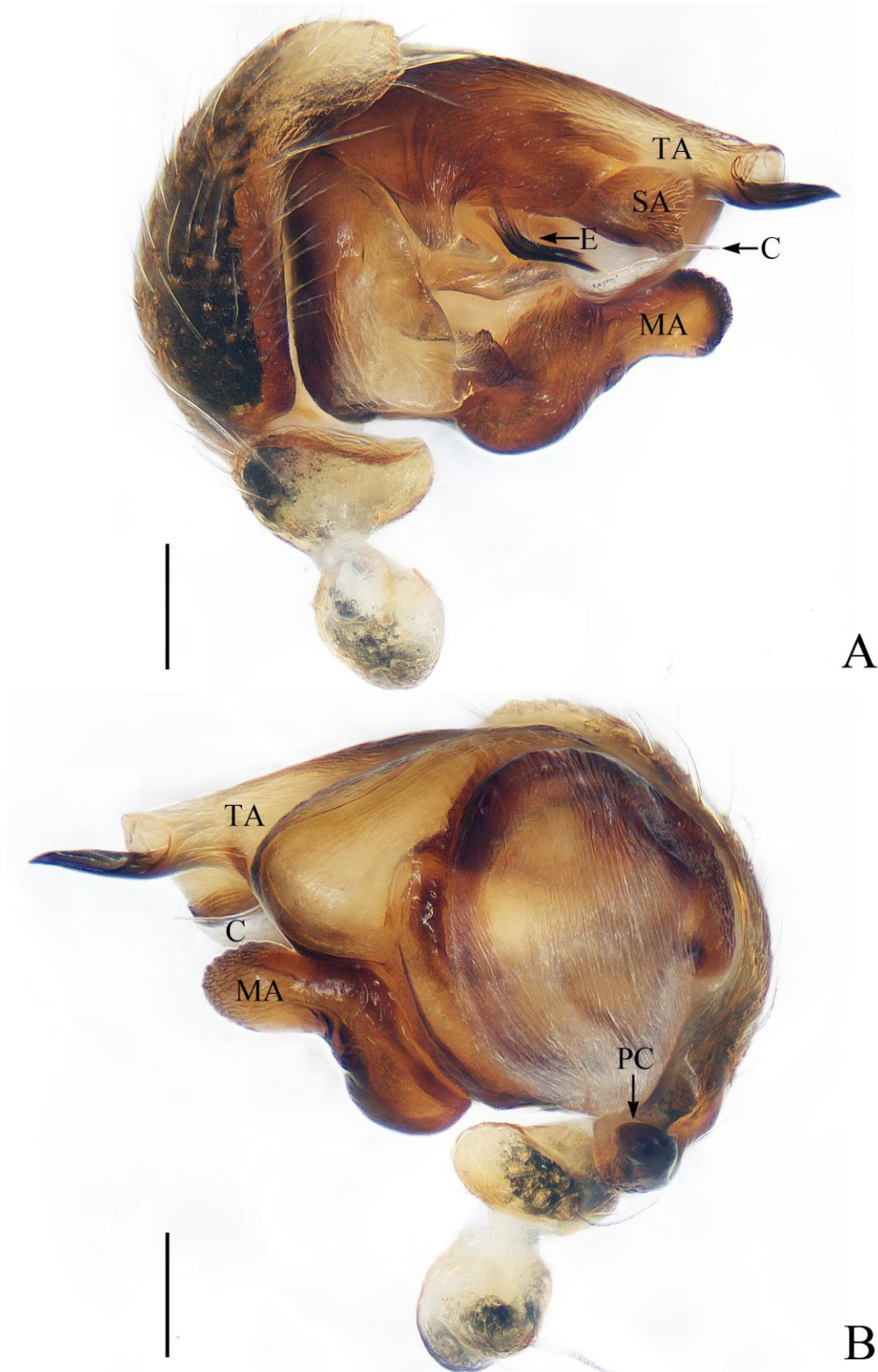


Figure 5. Male palp of *Asiakantha jianfeng* sp. nov., holotype. **A** prolateral; **B** retrolateral. Scale bar: 0.1.

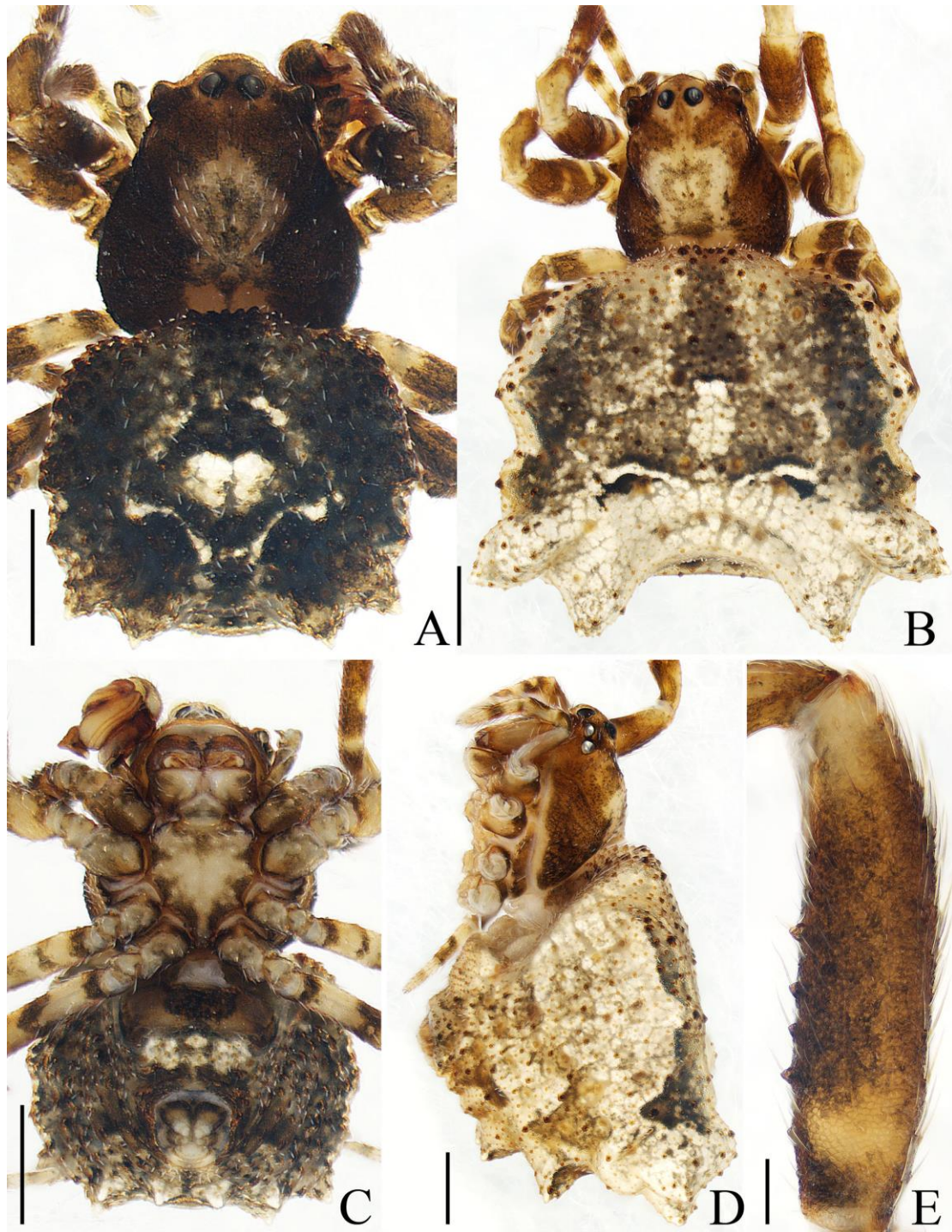


Figure 6. *Asiacantha yinae* sp. nov., male holotype and female paratype. **A** holotype habitus, dorsal; **B** female paratype habitus, dorsal; **C** holotype habitus, ventral; **D** female paratype habitus, lateral; **E** holotype femora of leg I, retrolateral. Scale bar: 0.5 (A–D); 0.1 (E).

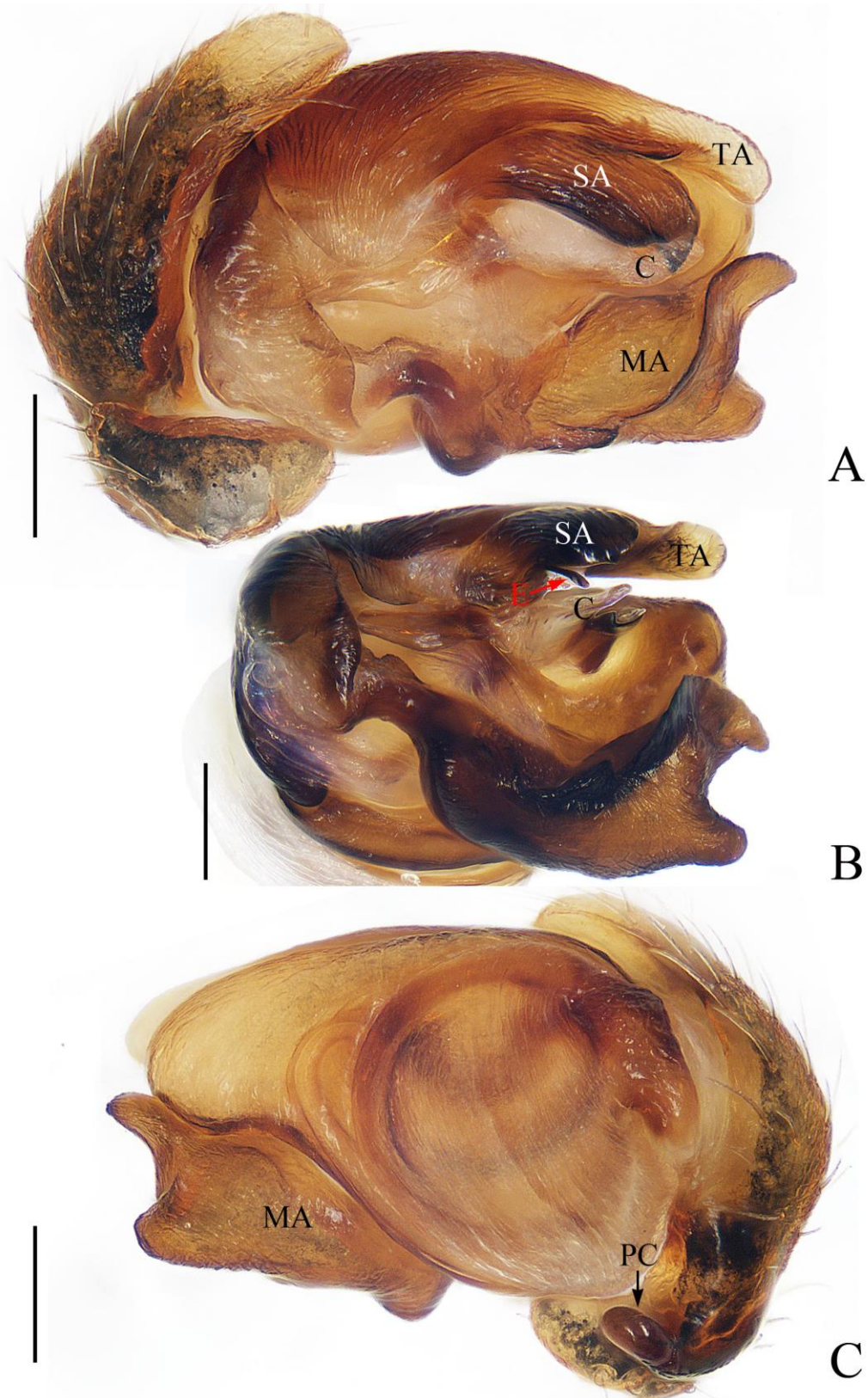


Figure 7. Male palp of *Asiacantha yinae* sp. nov., **A**, **C** holotype, **B** paratype. **A** prolateral; **B** bulb, expanded in KOH solution; **C** retrolateral. Scale bar: 0.1.

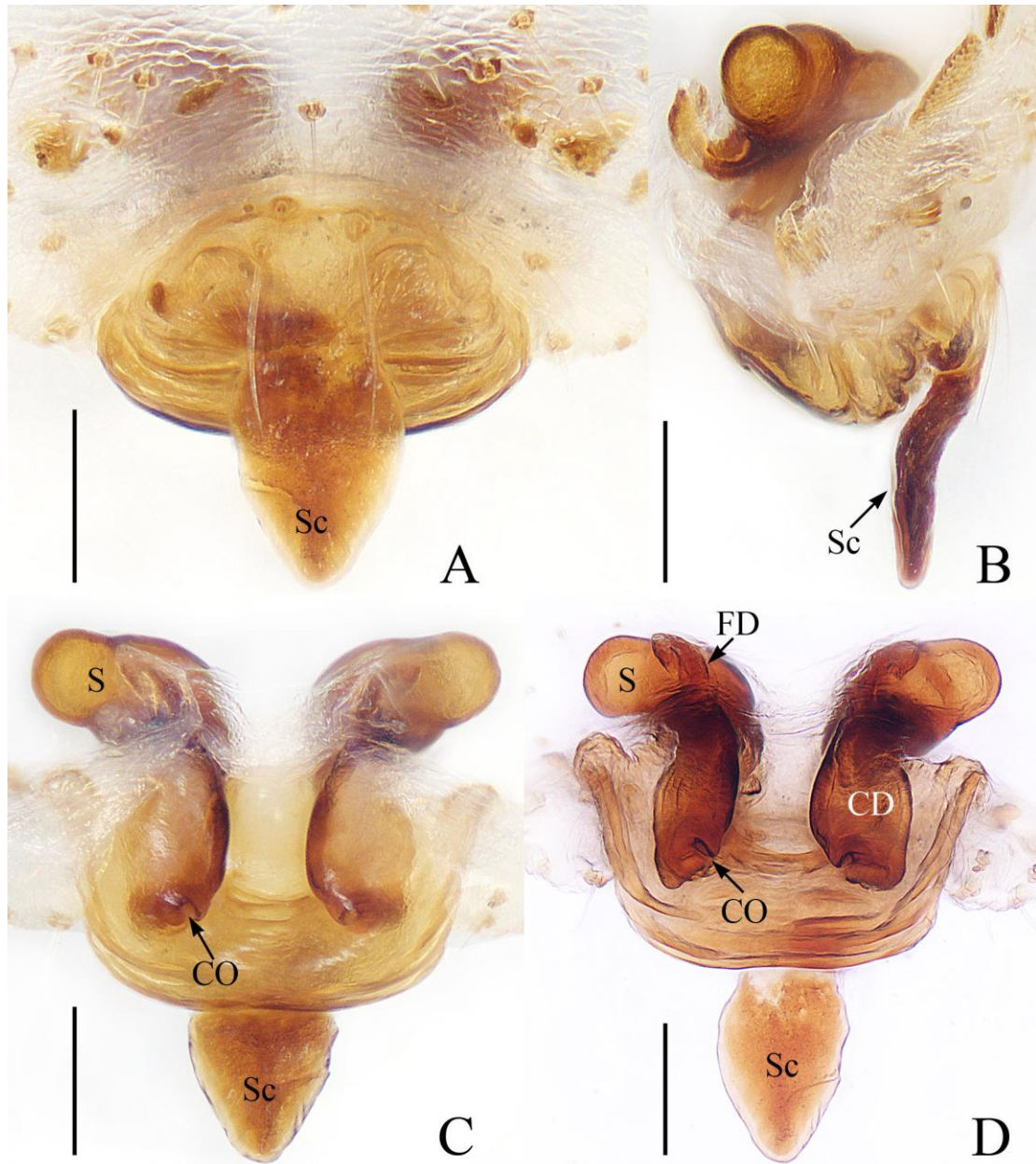


Figure 8. Epigyne of *Asiakantha yinae* **sp. nov.**, paratype. **A** ventral; **B** lateral; **C**, **D** dorsal. Scale bar: 0.1.



Figure 9. Holotype palp of *Asiakantha* gen. nov. spp., apical view. **A** *A. pengi*; **B** *A. jianfeng*; **C** *A. yinae*. Scale bar: 0.1.

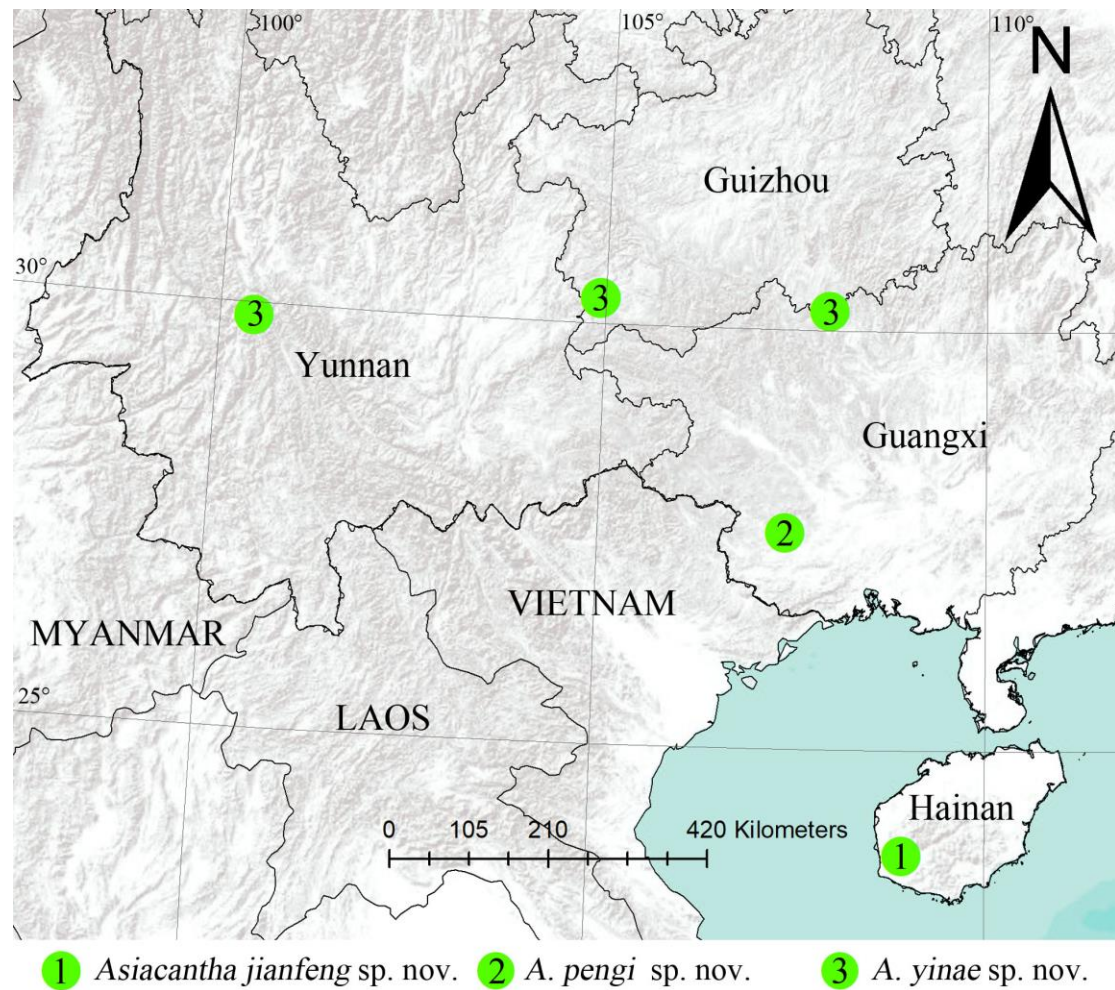


Figure 10. The distributional records of *Asiacantha* **gen. nov.** spp.