

ORIGINAL ARTICLE

# Twenty new spider species (Arachnida: Araneae) from Late Cretaceous Kachin amber (Myanmar)

Yafei Xin<sup>1,3</sup>, Tongyao Jiang<sup>2</sup>, Zhiyuan Yao<sup>1\*</sup>, Shuqiang Li<sup>2\*</sup>

<sup>1</sup>College of Life Science, Shenyang Normal University, Shenyang 110034, Liaoning, China

<sup>2</sup>Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, China

<sup>3</sup>Southeast Asia Biodiversity Research Institute, Chinese Academy of Sciences, Yezin, Nay Pyi Taw 05282, Myanmar

\*Corresponding authors, E-mails: yaozy@synu.edu.cn; lisq@ioz.ac.cn

**Abstract** Twenty new species of extinct spiders belonging to 10 genera in five families from Late Cretaceous Kachin amber are reported. One new genus, *Triangulum* Jiang & Li, **gen. nov.**, of the family Theridiidae Sundevall, 1833 was established with *T. thutai* Jiang & Li, **sp. nov.** as the type species. The remaining 19 new species are: *Retroecobius lwini* Jiang & Li, **sp. nov.**, *Zamilia arkari* Jiang & Li, **sp. nov.**, *Z. sheini* Jiang & Li, **sp. nov.**, *Z. shwayi* Jiang & Li, **sp. nov.** from Oecobiidae Blackwall, 1862; *Furcembolus inzaliae* Jiang & Li, **sp. nov.** from Pacullidae Simon, 1894; *Priscacleclercera chimei* Jiang & Li, **sp. nov.**, *P. foshou* Jiang & Li, **sp. nov.**, *P. hlaingi* Jiang & Li, **sp. nov.**, *P. kani* Jiang & Li, **sp. nov.**, *P. kyawae* Jiang & Li, **sp. nov.**, *P. thanae* Jiang & Li, **sp. nov.**, *P. thaungi* Jiang & Li, **sp. nov.** from Psilodercidae Machado, 1951; *Bicornoculus aungi* Jiang & Li, **sp. nov.**, *B. wunnai* Jiang & Li, **sp. nov.**, *B. yarzari* Jiang & Li, **sp. nov.**, *Cymbioblemma ohnmari* Jiang & Li, **sp. nov.**, *Palpalpaculla phyui* Jiang & Li, **sp. nov.** from Tetrablemmidae O. Pickard-Cambridge, 1873; *Burmatheridon cetani* Jiang & Li, **sp. nov.**, *Cretotheridion champoi* Jiang & Li, **sp. nov.**, from Theridiidae. All species are described based on males. All types are deposited in the Institute of Zoology, Chinese Academy of Sciences (IZCAS) in Beijing, China.

**Key words** Diagnosis, distribution, etymology, taxonomy, type species.

## 1 Introduction

Kachin ambers are from Kachin State, Myanmar. U–Pb dating indicates a maximum age of  $98.79 \pm 0.62$  Ma for these ambers (Shi *et al.*, 2012). However, the actual age might be slightly older (Mao *et al.*, 2018). Kachin amber contains the most diversity of spiders preserved in Cretaceous amber. According to incomplete statistics, as of May 2021, 333 spider species from Kachin amber have been published, from 27 extant families and 35 extinct families (Dunlop *et al.*, 2020; Ross, 2020, 2021).

Here, we report 20 new spider species from Kachin amber.

## 2 Materials and methods

All types are deposited in the Institute of Zoology, Chinese Academy of Sciences in Beijing (IZCAS). All specimens

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were examined and measured with a Leica M205C stereomicroscope. Photos of amber pieces and spider inclusions were either taken with a Canon EOS 60D digital camera with Canon EF 100mm f/2.8L IS USM Macro lens or with an Olympus C7070 digital camera mounted on an Olympus SZX12 dissecting microscope. Details of specimens were taken with an Olympus C7070 camera mounted on an Olympus BX51 compound light microscope. Photos were stacked using Helicon Focus 7.6.1® and processed using Adobe Photoshop CC 2020®.

All measurements are in millimeters (mm) and were obtained with an Olympus SZX16 stereomicroscope with Zongyuan CCD industrial camera. Measurements of appendages of both sides are given as follows: for legs: total length (femur + patella + tibia + metatarsus + tarsus); for palps: total length (femur + patella + tibia). Leg podomeres were measured on their dorsal side. Terminology and taxonomic descriptions follow Wunderlich (2020), Magalhaes *et al.* (2021), and Xin *et al.* (2021). If the left palp is strongly deformed or not observable in particular views, images of the right palp were taken.

In non-fossil specimens, the palp can be adjusted to a certain position and easily compared to similar species in a standard view. However, amber specimens cannot be rotated and may be deformed. Hence, after studying a large number of specimens, we compared the palp with the other palp of the same specimen or other specimens of the same species to ensure the stability of the critical characters. Thus, deformation and misidentification owing to different angles of view can be ruled out.

The following abbreviations are used in text and figures:

ALE—anterior lateral eye;  
 ALS—anterior lateral spinneret;  
 AM—apical macroseta;  
 AME—anterior median eye;  
 B—bulb;  
 C—colulus;  
 CL—cheliceral lamina;  
 Co—conductor;  
 Cy—cymbium;  
 E—embolus;  
 EA—embolic apophysis;  
 En—endite;  
 Fe—femur;  
 Lb—labium;  
 MA—median apophysis;  
 Pa—patella;  
 PLE—posterior lateral eye;  
 PLS—posterior lateral spinneret;  
 PME—posterior median eye;  
 PMS—posterior median spinneret;  
 PT—promarginal teeth;  
 RM—retrolateral macroseta;  
 S1—sclerite 1;  
 S2—sclerite 2;  
 S3—sclerite 3;  
 ST—subtegulum;  
 T—tegulum;  
 Ti—tibia;  
 TTA—theridiid tegular apophysis.

### 3 Taxonomy

#### 3.1 Family Oecobiidae Blackwall, 1862

Genus †*Retrooecobius* Wunderlich, 2015

Type species: *Retroecobius chomskyi* Wunderlich, 2015.

***Retroecobius lwini* Jiang & Li, sp. nov.** (Figs 1–3)

Holotype. Male (IZCAS-Ar42683Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one neuropteran.

Etymology. The species name is a popular Burmese boy's name and means "outstanding"; noun in apposition.

Diagnosis. *Retroecobius lwini* Jiang & Li, **sp. nov.** can be distinguished from *R. chomskyi* Wunderlich, 2015 (figs 313–321, photos 149–153), the only species of the genus described based on male specimen before, by the clypeus. *R. chomskyi* has a clypeal apophysis, while the new species does not have. In addition, the palp of *R. chomskyi* was obscured.

Description. Male. Total length 3.09; carapace 1.33 long, 1.25 wide; opisthosoma 1.76 long, 0.88 wide. Left palp: - (0.29 + - + -), left leg I: - (1.07 + - + - + 1.19 + 0.64), leg II: - (- + - + - + 1.17 + 0.71), leg III: 4.30 (0.99 + 0.40 + 0.78 + 1.18 + 0.95), leg IV: 4.87 (1.15 + 0.46 + 1.01 + 1.37 + 0.88); right palp: - (0.67 + - + -), right leg I: 4.44 (1.25 + 0.45 + 0.90 + 1.12 + 0.72), leg II: 4.39 (1.34 + 0.41 + 0.91 + 1.20 + 0.53), leg III: - (1.56 + - + - + 1.31 + 0.75), leg IV: 5.28 (1.68 + 0.41 + 0.97 + 1.24 + 0.98). Eye sizes and interdistances: ALE 0.09, AME 0.07, PLE 0.07, PME 0.08; AME–AME 0.08, AME–ALE 0.04, PME–PLE 0.03, PME–PME 0.08. Habitus as in Figs 2A–B. Carapace has an obvious fovea, longer than wide, brown, covered with dark brown setae. Sternum brown, with dense brown setae. Labium not visible. Legs with long setae, approximate to width of leg segment. Opisthosoma elongate, black-brown. Anterior and posterior spinnerets (Fig. 2D) are approximately the same length.

Palp (Figs 1A–D, 3). Ratio of femur length to cymbial length 2.71; median apophysis triangular, sclerotized.

**Genus †*Zamilia* Wunderlich, 2008**

Type species: *Zamilia antecessor* Wunderlich, 2008.

***Zamilia arkari* Jiang & Li, sp. nov.** (Figs 4–6)

Holotype. Male (IZCAS-Ar42684Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means "sky"; noun in apposition.

Diagnosis. *Zamilia arkari* Jiang & Li, **sp. nov.** resembles *Z. quattuormammillae* Wunderlich, 2015 (see Wunderlich, 2015: 296, figs 300–309, photo 147) by the trapeziform median apophysis. *Z. quattuormammillae* has a tegular apophysis in addition to the median apophysis, while the new species does not have.

Description. Male. Total length 3.80; carapace 1.55 long, 1.44 wide; opisthosoma 2.25 long, 1.25 wide. Left palp: - (0.66 + 0.32 + -), left leg I: 7.08 (2.09 + 0.62 + 1.73 + 1.87 + 0.77), leg II: 7.84 (2.82 + 0.71 + 1.52 + 1.90 + 0.89), leg III: - (2.02 + 0.69 + - + - + -), leg IV: 6.75 (1.86 + 0.52 + 1.34 + 2.09 + 0.94); right palp: - (0.78 + - + -), right leg I: 6.80 (1.88 + 0.59 + 1.62 + 1.81 + 0.90), leg II: 7.08 (1.93 + 0.72 + 1.71 + 1.89 + 0.83), leg III: 5.71 (1.75 + 0.66 + 1.52 + 1.03 + 0.75), leg IV: - (1.93 + 0.48 + 1.47 + 1.79 + -). Eye sizes and interdistances: ALE 0.08, AME 0.08, PLE 0.09, PME 0.04; AME–AME 0.04, AME–ALE 0.02, PME–PLE 0.06, PME–PME 0.19. Habitus as in Figs 5A–B. Carapace almost round, longer than wide, yellow. Sternum oval, yellow, with dense brown setae. Metatarsi with 2 distal spines. Opisthosoma elongate. Anterior lateral spinnerets (Fig. 5D) short, posterior spinnerets with terminal segment long, *ca.* 0.63, basal segment short, *ca.* 0.20; anal tubercle fringed with long setae.

Palp (Figs 4A–D, 6). Ratio of femur length to cymbial length 1.27, femur width 0.22, cymbium oval, longer than wide; median apophysis elongate, bent distally.

***Zamilia sheini* Jiang & Li, sp. nov.** (Figs 7–9)

Holotype. Male (IZCAS-Ar42685Fo). Late Cretaceous amber from Hukawng Valley. Syninclusions include one mite and two dipterans.

Etymology. The species name is a popular Burmese boy's name and means "reflection"; noun in apposition.

Diagnosis. *Zamilia sheini* Jiang & Li, **sp. nov.** can be distinguished from its congeners by a flake-shaped median apophysis and a membranous conductor. It can be distinguished from *Z. quattuormammillae* Wunderlich, 2015 (see Wunderlich, 2015: 296, figs 300–309, photo 147) by the triangular median apophysis and the smooth clypeal margin, while *Z. quattuormammillae* has a nose-shaped apophysis on the clypeus and a curved median apophysis.



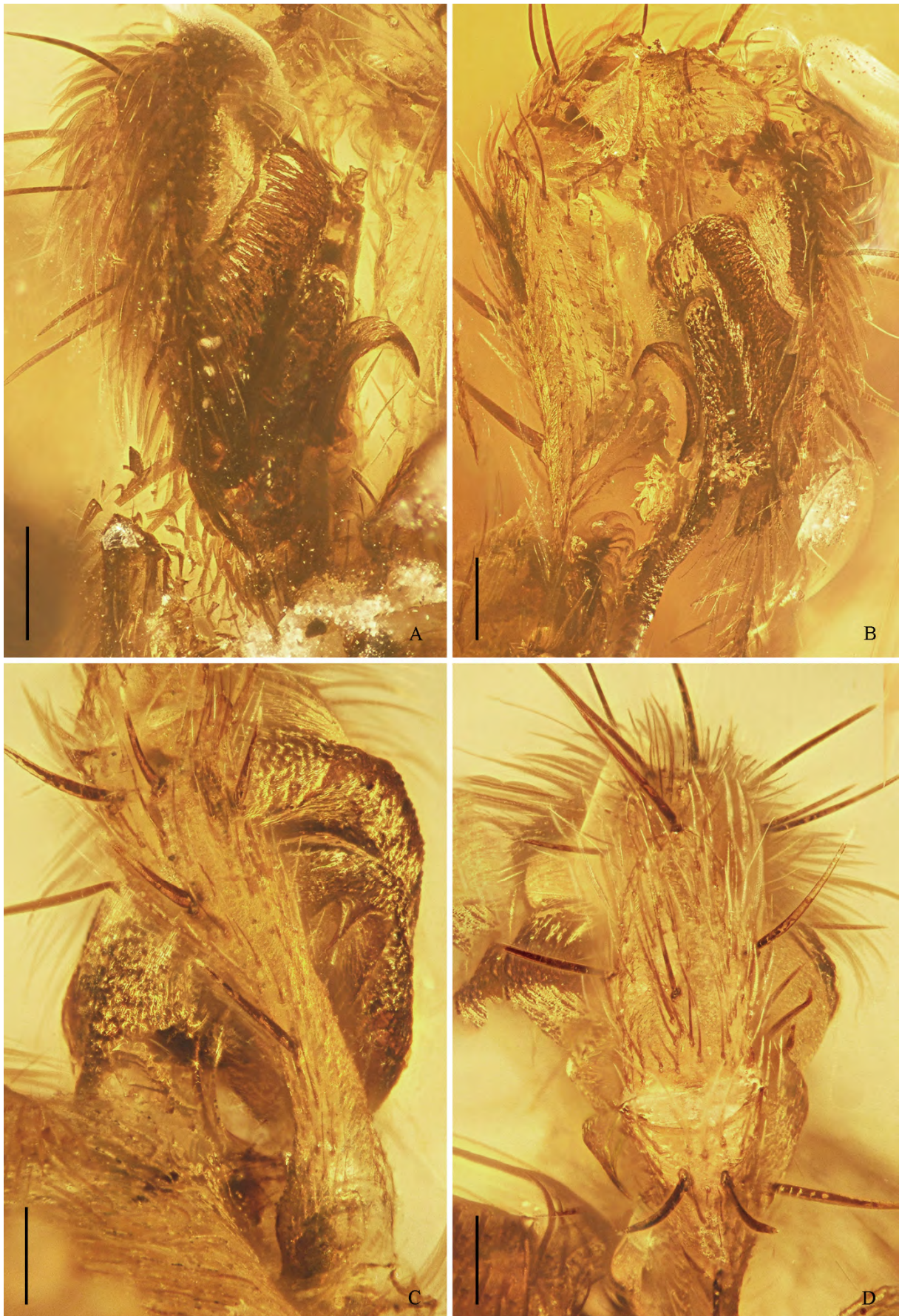


Figure 1. *Retrooecobius lwini* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42683Fo). A. Left palp, retrolateral view; B–C. Right palp (B. Retrolateral view; C. Ventral view); D. Left palp, ventral view. Scale bars=0.10mm.



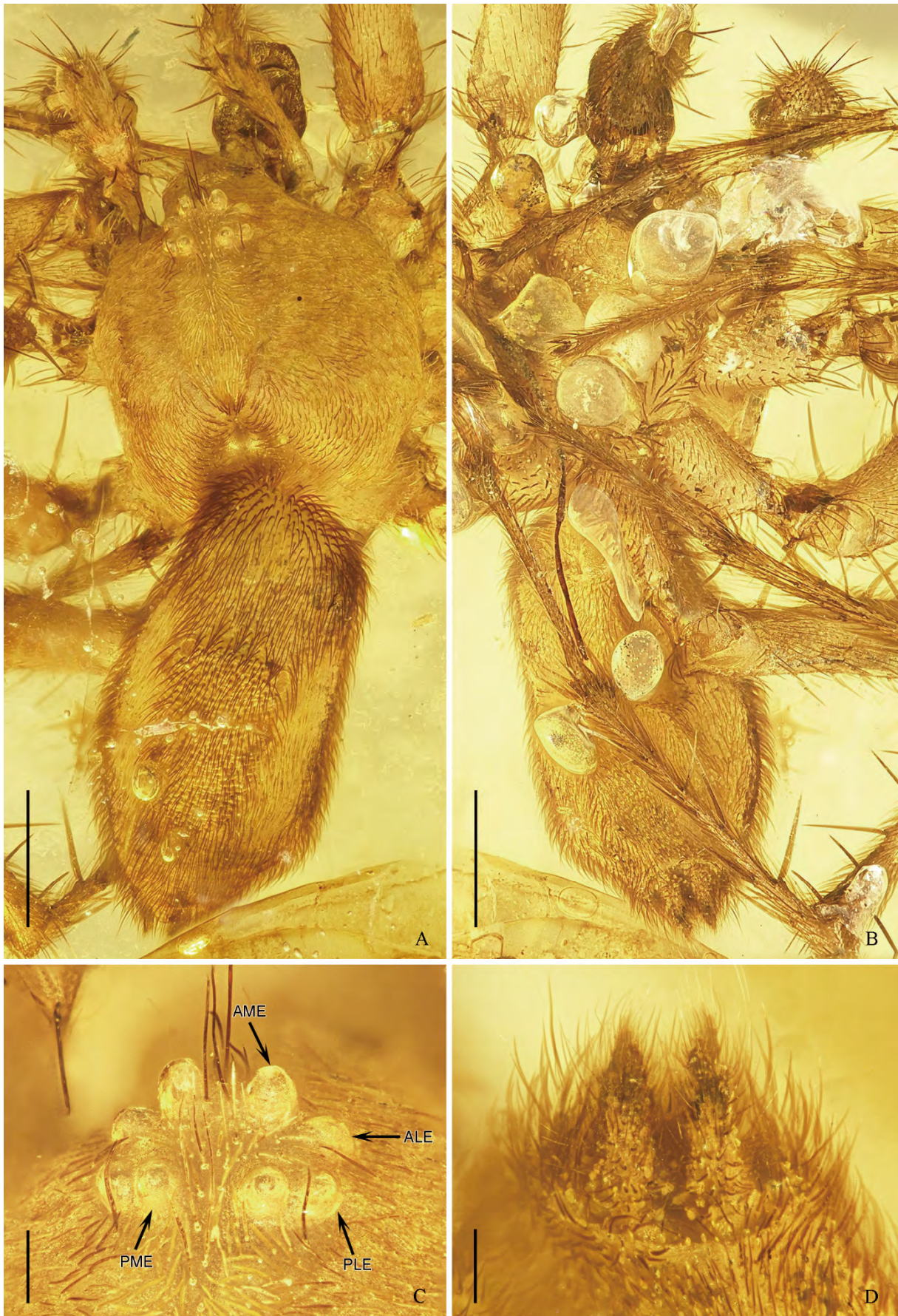


Figure 2. *Retroocobius lwini* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42683Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C. Ocular area, dorsal view; D. Spinnerets, ventral view. Scale bars: A–B=0.50 mm; C–D=0.10 mm.



Description. Male. Total length 1.97; carapace 0.74 long, 0.91 wide; opisthosoma 1.23 long, 1.01 wide. Left palp: - (- + 0.21 + -), left leg I: - (- + - + - + 0.89 + 0.45), leg II: - (- + - + - + 0.84 + 0.40), leg III: - (- + - + - + 0.76 + 0.40), leg IV: - (- + - + - + 0.83 + 0.47); right palp: - (0.67 + - + -), right leg I: - (- + - + - + 0.83 + 0.36), leg II: - (0.79 + - + - + 0.81 + 0.40), leg III: - (0.81 + - + - + 0.77 + 0.38), leg IV: - (- + - + - + 0.75 + 0.44). Eye sizes and interdistances: ALE 0.05, AME 0.07,



Figure 3. *Retrooecobius lwini* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42683Fo), left palp, retrolateral view. Scale bar = 0.10mm.



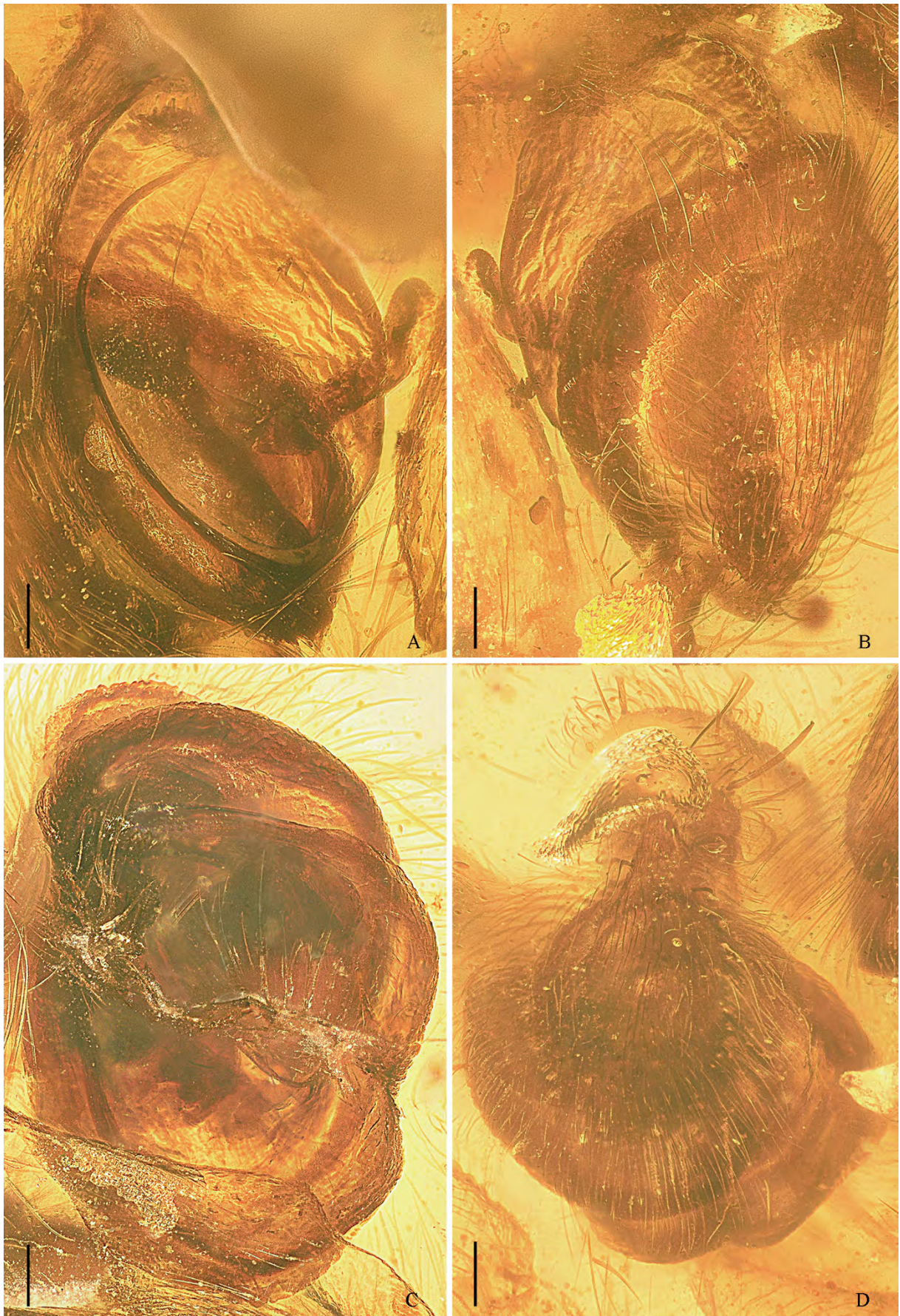


Figure 4. *Zamilia arkari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42684Fo). A–B. Left palp (A. Ventral view; B. Dorsal view); C–D. Right palp (C. Ventral view; D. Dorsal view). Scale bars=0.10 mm.



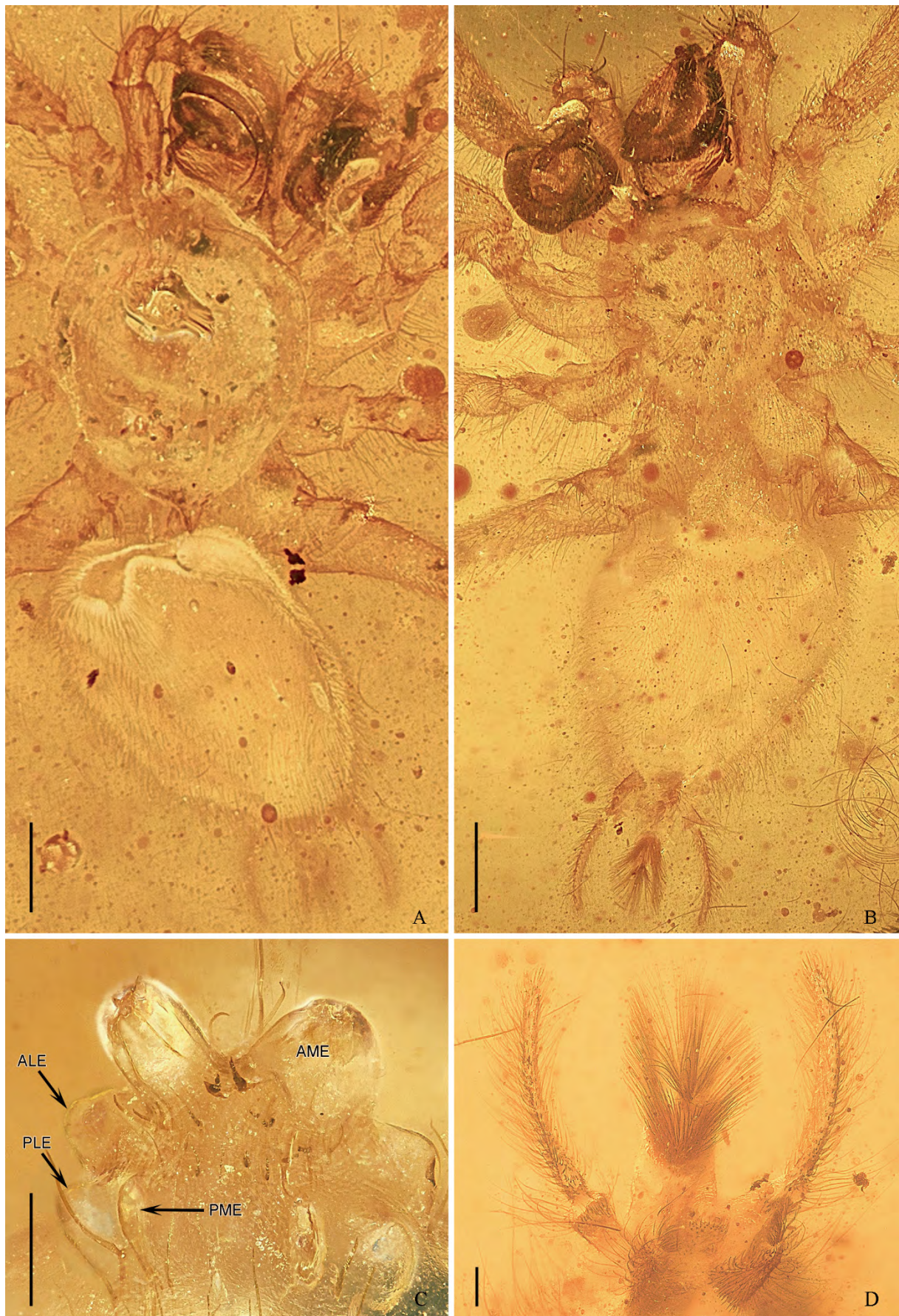


Figure 5. *Zamilia arkari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42684Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C. Ocular area, dorsal view; D. Spinnerets, ventral view. Scale bars: A–B=0.50 mm; C–D=0.10 mm.

PLE 0.07, PME 0.06; AME–AME 0.04, AME–ALE 0.02, ALE–PLE 0.05, PME–PLE 0.01, PME–PME 0.05. Habitus as in Figs 8A–B. Carapace almost round, yellowish. Sternum round, yellowish with dense brown setae. Legs have two spines distally on metatarsus and tarsus, 3 claws. Opisthosoma round. Anterior lateral spinnerets (Fig. 8D) short, posterior spinnerets with terminal segment long, *ca.* 0.26, basal segment short, *ca.* 0.06; anal tubercle fringed with long setae.

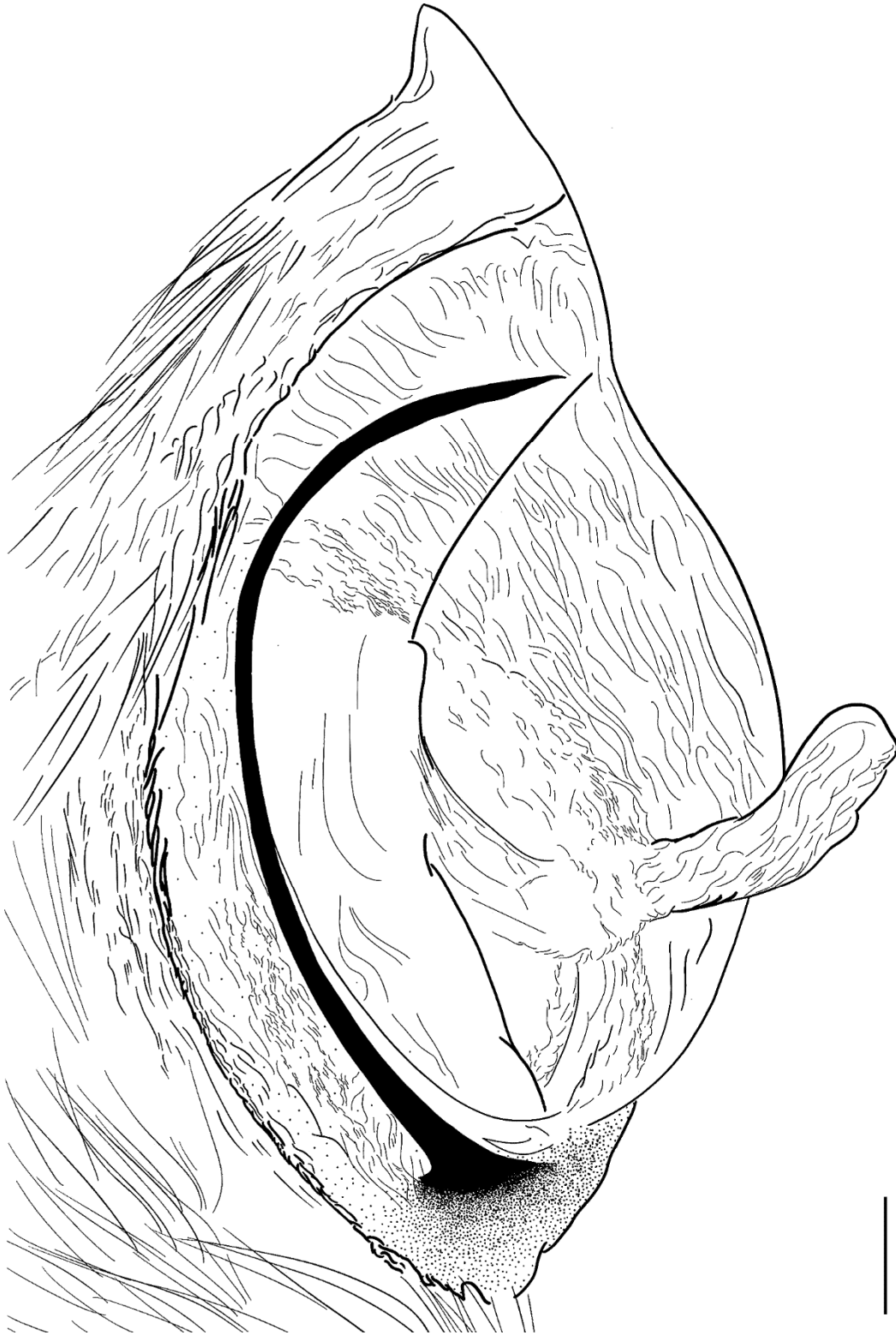


Figure 6. *Zamilia arkari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42684Fo), left palp, ventral view. Scale bar=0.10 mm.



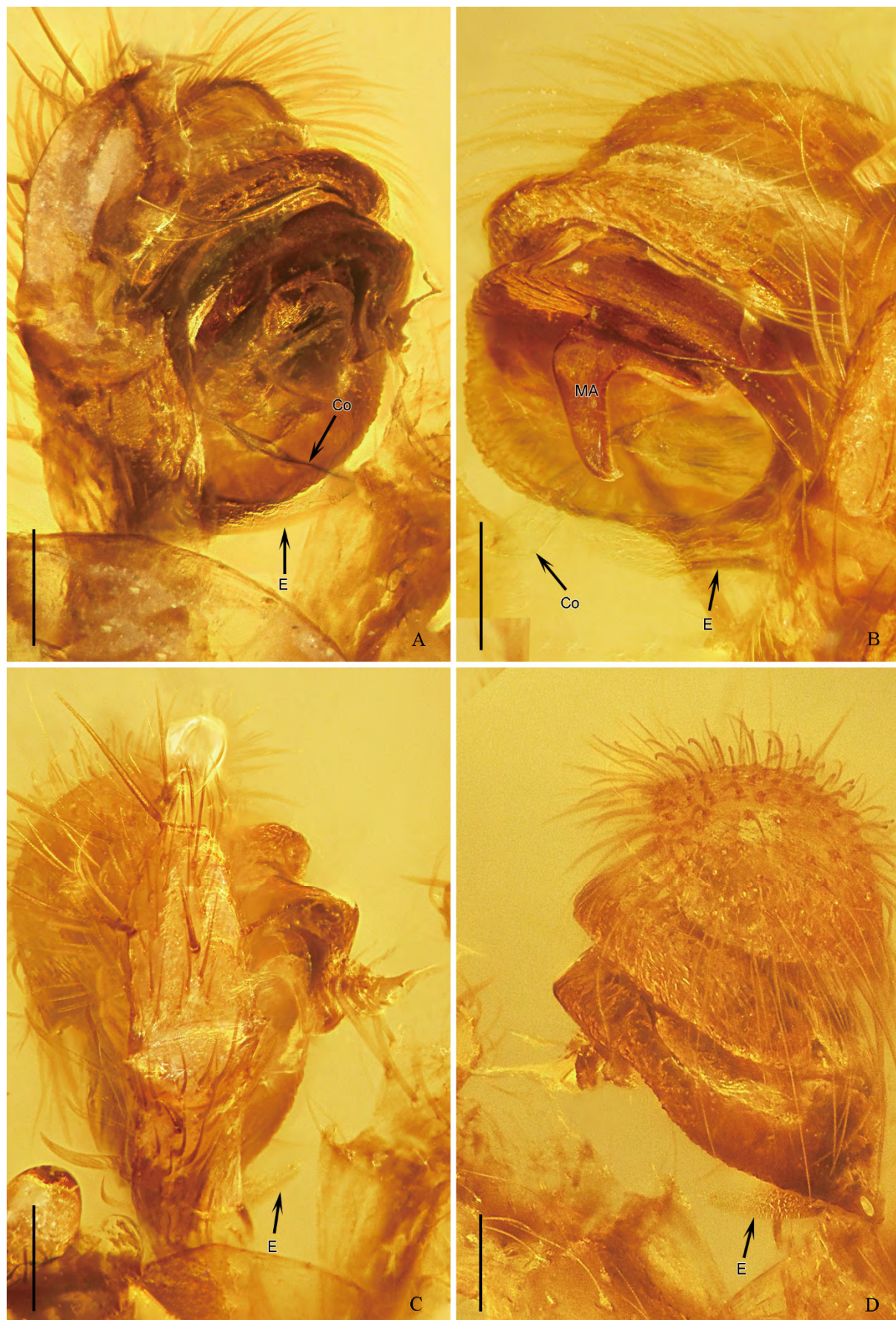


Figure 7. *Zamilia sheini* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42685Fo). A. Right palp, ventral view; B. Left palp, ventral view; C–D. Right palp (C. Retrolateral view; D. Apical view). Scale bars: A, C=0.10mm; B, D=0.05 mm.



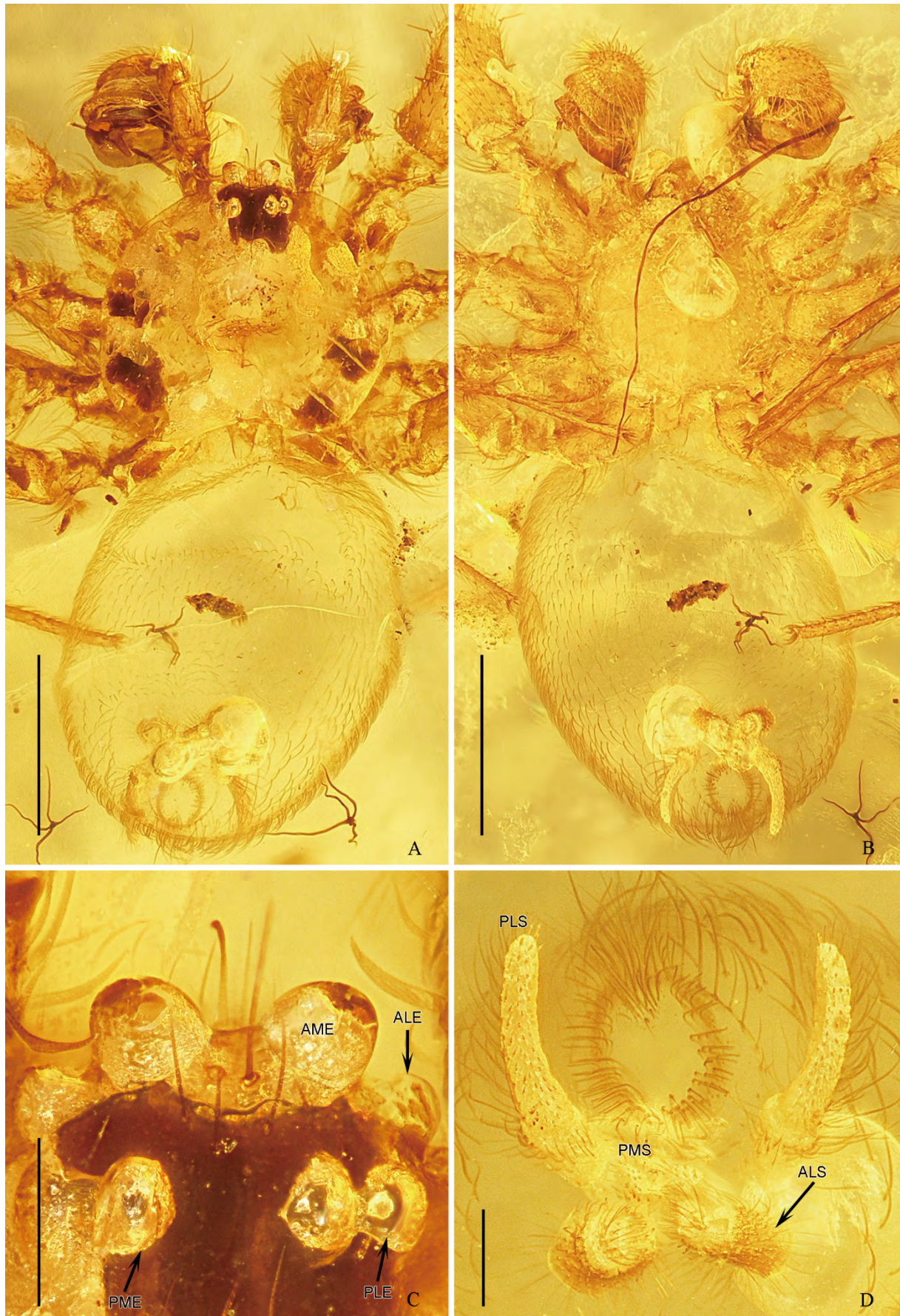


Figure 8. *Zamilia sheini* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42685Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C. Ocular area, dorsal view; D. Spinnerets, ventral view. Scale bars: A–B=0.50 mm; C–D=0.10 mm.



Palp (Figs 7A–D, 9). Ratio of femur length to cymbial length 2.57, femur width 0.09, cymbium round, length equal to width; embolus slightly flattened, flake-shaped; median apophysis triangular.

***Zamia shwayi* Jiang & Li, sp. nov.** (Figs 10–12)

Holotype. Male (IZCAS-Ar42686Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means "gold"; noun in apposition.

Diagnosis. *Zamia shwayi* Jiang & Li, sp. nov. resembles *Z. quattuormammillae* Wunderlich, 2015 (see Wunderlich, 2015: 296, figs 300–309, photo 147) by the general shape of the median apophysis but can be distinguished from the latter by the lack of another tegular apophysis in addition to the embolus and conductor.

Description. Male. Total length 2.21; carapace 0.87 long, 0.79 wide; opisthosoma 1.34 long, 0.67 wide. Left palp: - (0.37 + - + 0.22), left leg I: - (0.88 + - + - + 0.70 + 0.36), leg II: - (0.93 + - + - + 0.68 + 0.38), leg III: - (0.92 + - + - + 0.67 + 0.34), leg IV: 2.89 (0.99 + 0.20 + 0.53 + 0.80 + 0.37); right palp: - (0.33 + - + 0.24), right leg I: - (- + - + - + 0.75 + 0.36), leg II: 2.68 (0.78 + 0.22 + 0.60 + 0.73 + 0.35), leg III: 2.53 (0.72 + 0.19 + 0.50 + 0.77 + 0.35), leg IV: 2.89 (0.91 + 0.23 + 0.54 + 0.81 + 0.40). Eye sizes and interdistances: ALE 0.04, AME 0.06, PLE 0.04, PME 0.06; AME–AME 0.05, AME–ALE 0.03, PME–PLE 0.01, PME–PME 0.07. Habitus as in Figs 11A–B. Carapace almost round, brown, short, with black-brown setae. Sternum yellowish and round, with dense brown setae. Labium not visible. Legs have two spines distally on metatarsus and tarsus, three claws. Opisthosoma elongate, black-brown. Spinnerets not visible; anal tubercle fringed with long setae.

Palp (Figs 10A–D, 12). Ratio of femur length to cymbial length 1.23, femur width 0.10, cymbium oval, longer than wide; embolus sclerotized. Conductor membranous, with a tip that looks like a rhomboid ribbon distally. Median apophysis near base of conductor, slightly flattened, with crimping distally.

### 3.2 Family Pacullidae Simon, 1894



Figure 9. *Zamia sheini* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42685Fo), left palp, ventral view. Scale bar=0.05 mm.



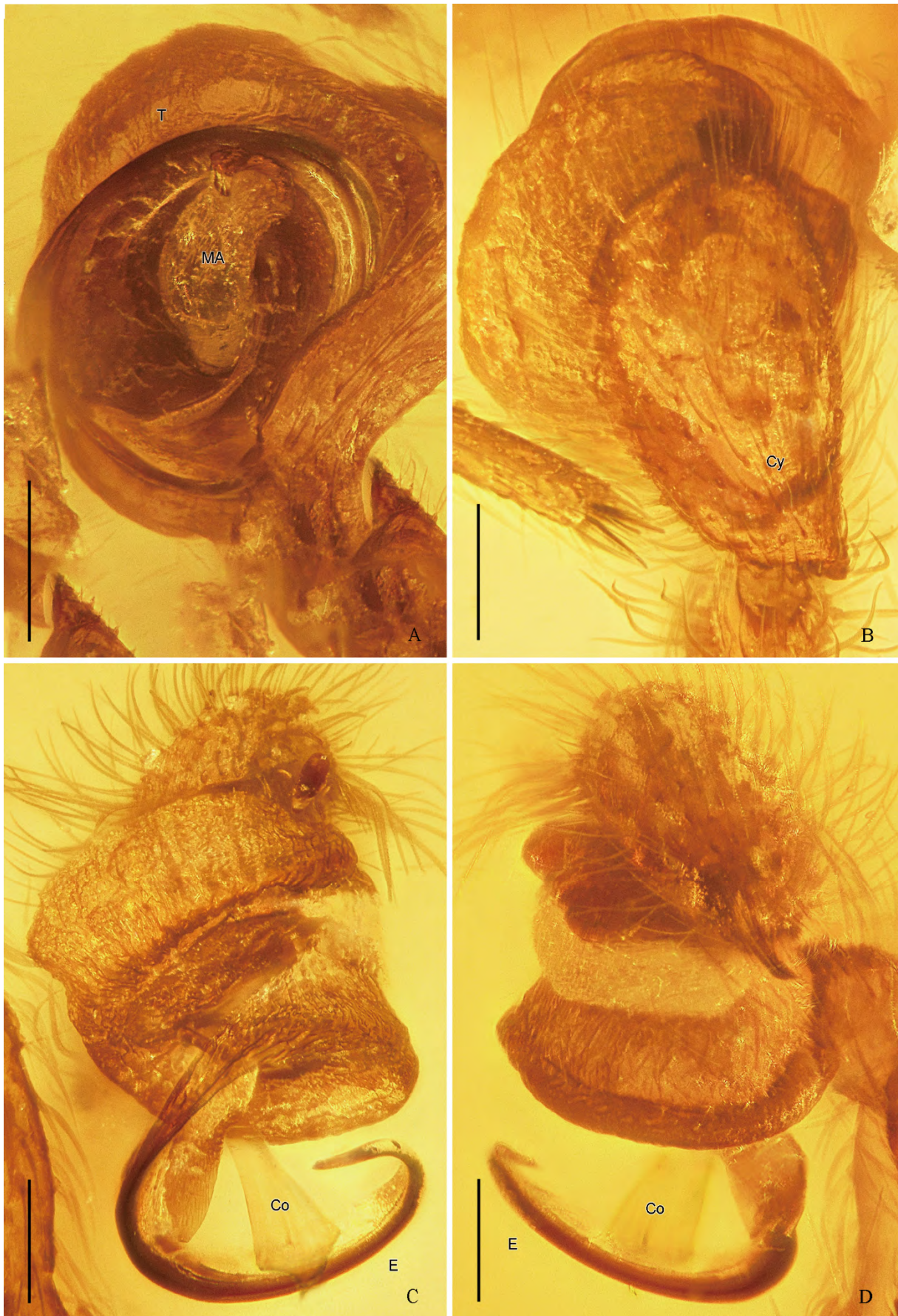


Figure 10. *Zamilia shwayi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42686Fo). A–B. Left palp (A. Ventral view; B. Dorsal view); C–D. Right palp (C. Retrolateral view; D. Prolateral view). Scale bars = 0.10 mm.





Figure 11. *Zamilia shwayi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42686Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C. Ocular area, dorsal view; D. Tarsus and claw, lateral view. Scale bars: A–B=0.50 mm; C–D=0.05 mm.



Figure 12. *Zamilia shwayi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42686Fo), right palp, retrolateral view. Scale bar=0.10mm.

**Genus †*Furcembolus* Wunderlich, 2008**

Type species: *Furcembolus andersoni* Wunderlich, 2008.

***Furcembolus inzaliae* Jiang & Li, **sp. nov.** (Figs 13–15)**

Holotype. Male (IZCAS-Ar42687Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one beetle.  
Etymology. The species name is a popular Burmese girl's name and means "prayer, offerings"; noun in apposition.



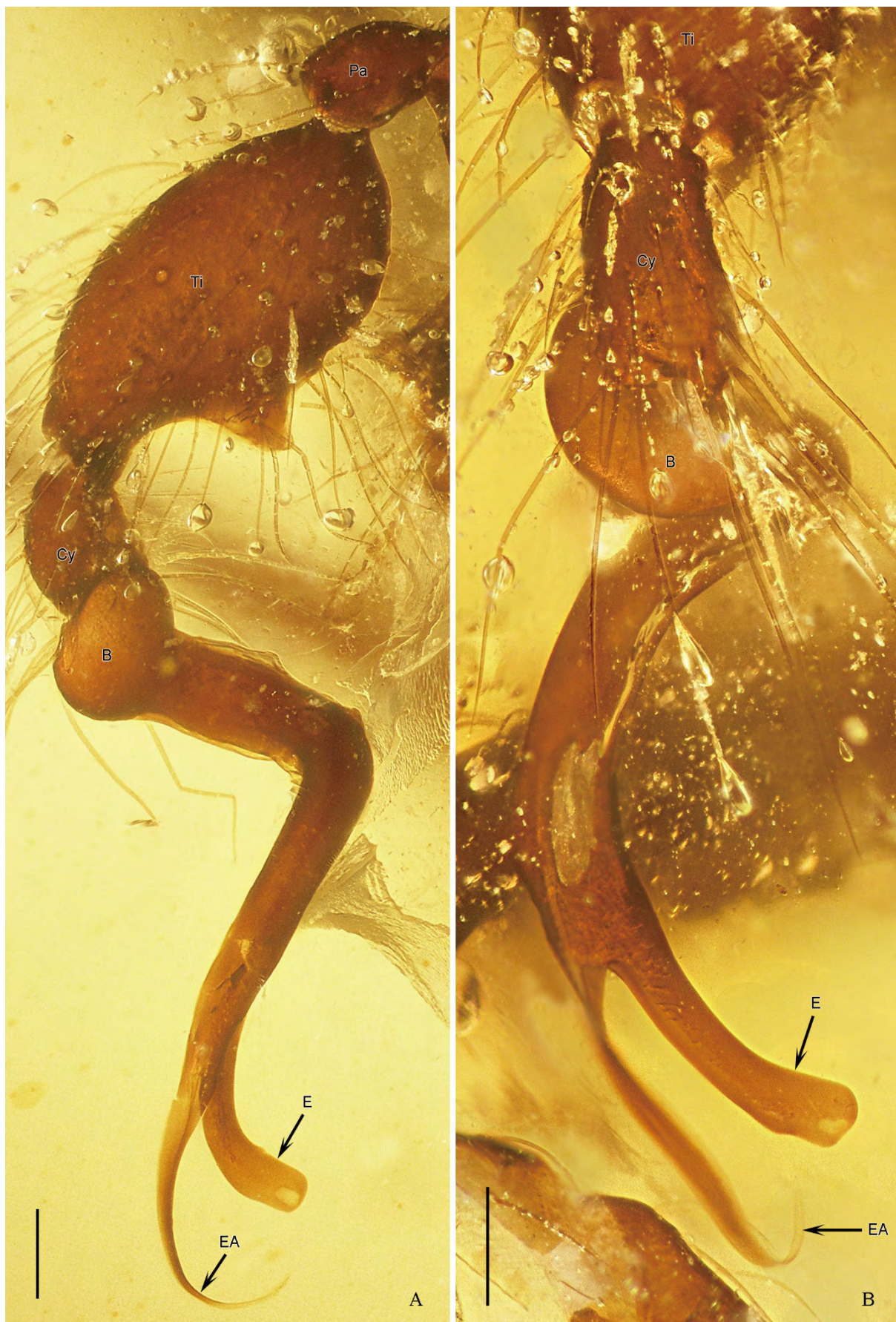


Figure 13. *Furcembolus inzaliae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42687). A. Left palp, retrolateral view; B. Right palp, dorsal view. Scale bars=0.10 mm.



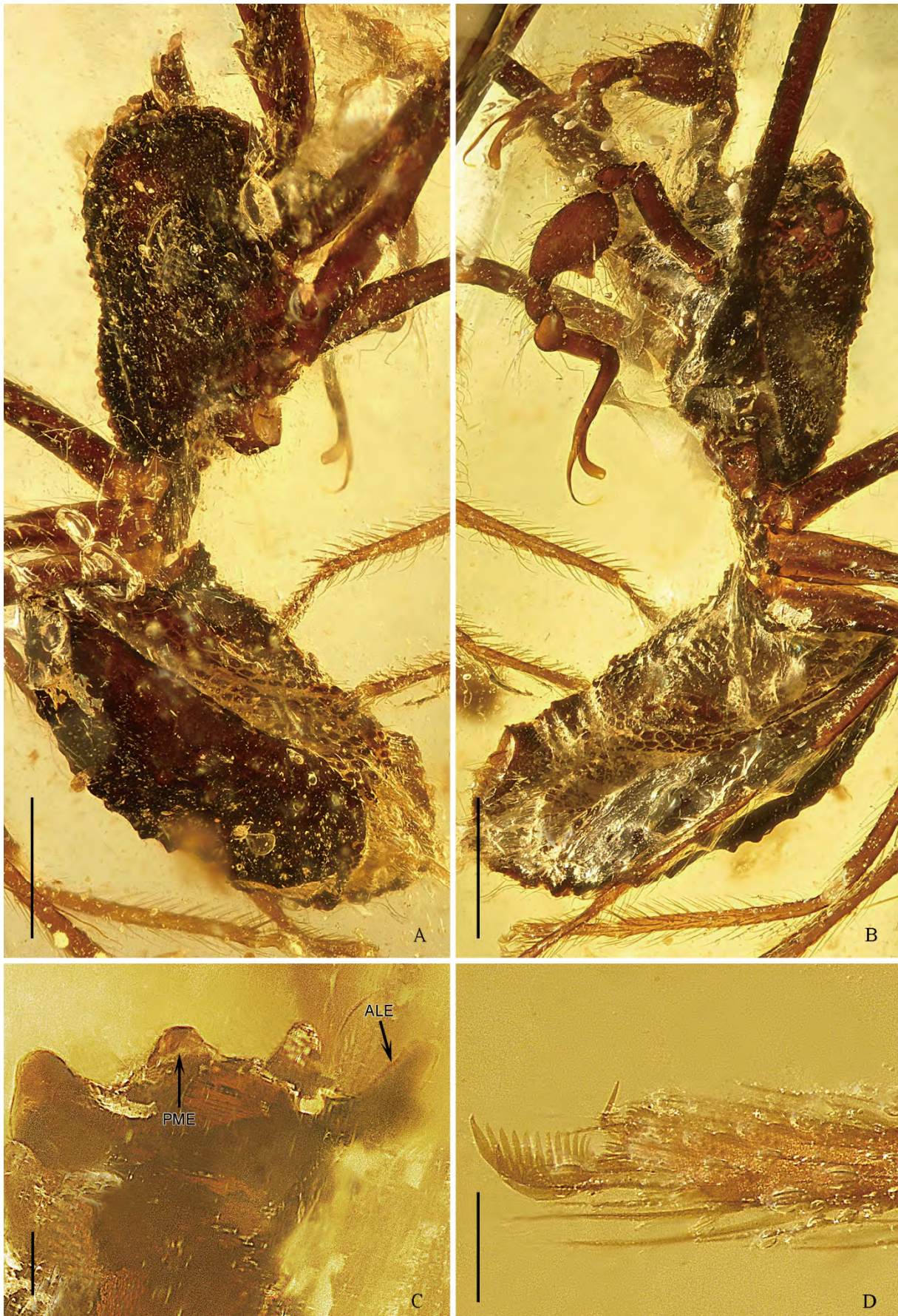


Figure 14. *Furcembolus inzaliae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42687). A–B. Habitus, lateral view; C. Ocular area, dorsal view; D. Tarsus and claw, lateral view. Scale bars: A–B=0.50 mm; C=0.10 mm; D=0.05 mm.



**Diagnosis.** This new species resembles *F. crassitibia* Wunderlich 2017: (see Wunderlich, 2017: 129, fig. 78) by the absence of an embolic apophysis but can be distinguished by the presence of a tibial apophysis and the shape of the bulb. The bulb of the new species bent three times at a right angle, while that of *F. crassitibia* folds two times at a right angle.

**Description.** Male. Total length 2.59; carapace 0.88 long, 0.54 wide; opisthosoma 1.71 long, 0.91 wide. Left palp: 1.22 ( $0.56 + 0.18 + 0.48$ ), left leg I: - ( $2.48 + 0.39 + - + - + V$ ), leg II: - ( $1.36 + 0.37 + - + - + -$ ), leg III: 3.59 ( $1.01 + 0.21 + 1.09 + 0.87 + 0.41$ ), leg IV: - ( $1.39 + 0.28 + - + 1.34 + 0.52$ ); right palp: - ( $- + 0.23 + -$ ), right leg I–IV absent. Eye sizes and interdistances: ALE 0.07, PME 0.08, PLE 0.09, PME–PME 0.06. Habitus as in Figs 14A–B. Carapace (Fig. 14A) finely granulate, margin distinctly serrate, cephalic part of carapace noticeably highest posteriorly; eyes (Fig. 14C) ovoid,  $PLE > PME > ALE$ ; labium triangular, distally obtuse; sternum granulate. Opisthosoma (Figs 14A–B): Abdomen oval with sclerotized lateral plates, smooth, modified by tiny pits, covered with thin setae; ventral scutum rugose; three tarsal claws (Fig. 14D), with a single pectinate row of teeth. Spinnerets not visible.

Palp (Figs 13A–B, 15). Femur more than 3 times longer than patella; patella short, *ca.* 0.1; tibia swollen, about two times wider than femur, with triangular apophysis in ventral view; cymbium small and compressed; bulb long, oval, proximally slightly swollen, bent, forming three right angles; embolic apophysis originates from middle of embolus, hook-shaped.

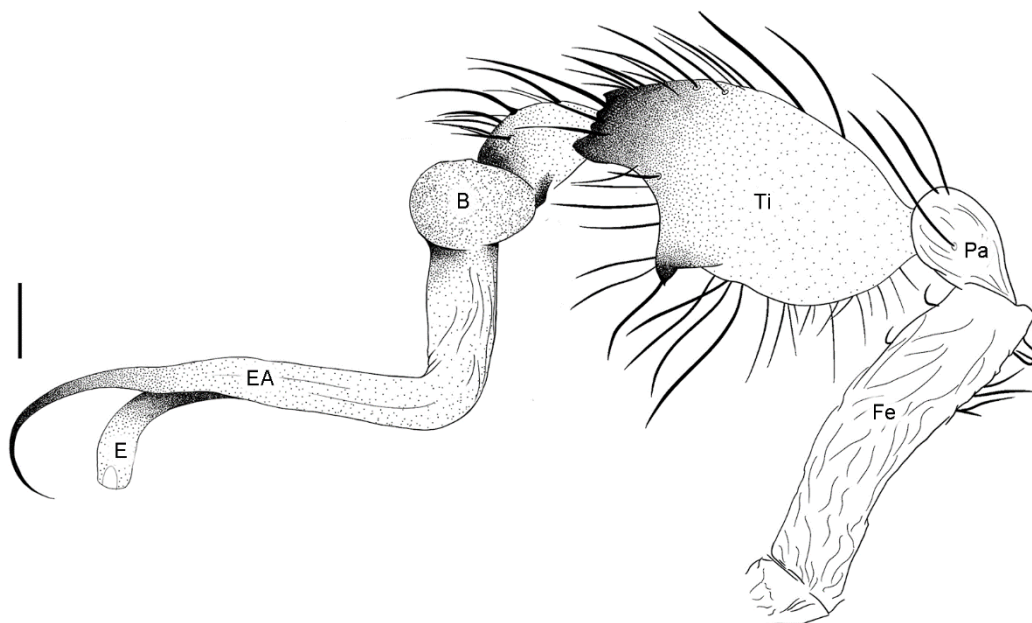


Figure 15. *Furcembolus inzaliae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42687), left palp, retrolateral view. Scale bar = 0.10mm.

### 3.3 Family Psilodercidae Machado, 1951

#### Genus †*Priscaleclercera* Wunderlich, 2017

Type species: *Priscaleclercera ellenbergeri* Wunderlich, 2015.

#### *Priscaleclercera chimei* Jiang & Li, **sp. nov.** (Figs 16–18)

**Holotype.** Male (IZCAS-Ar42688Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one mite. **Paratype** male (IZCAS-Ar42689Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

**Etymology.** The species name is a popular Burmese boy's name and means "everlasting or immortal"; noun in apposition.

**Diagnosis.** The new species can be distinguished from all other *Priscaleclercera* species by the shape of the palpal sclerites: sclerite 1 with 3 apices; sclerite 2 with two needle-shaped, strongly sclerotized structures distally; sclerite 3 with sclerotized structure with membranous margin.





Figure 16. *Priscacleclercera chimei* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42688Fo), left palp. A. Retrolateral view; B. Retrolateral, slightly ventral view. Scale bars=0.10 mm.



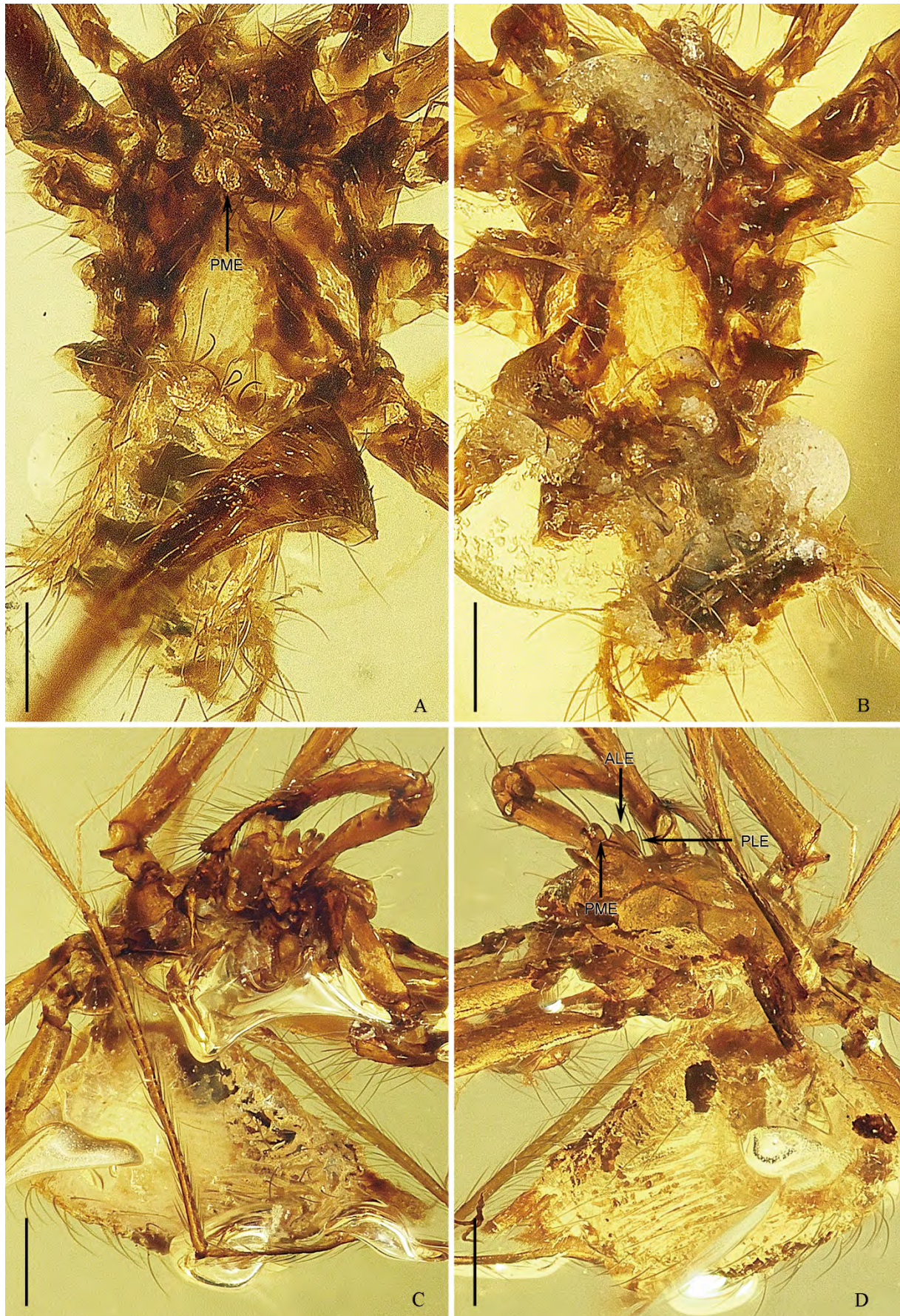


Figure 17. *Priscacleclercera chimei* Jiang & Li, **sp. nov.** A–B. Habitus (A. Dorsal view; B. Ventral view), holotype male (IZCAS-Ar42688Fo); C–D. Habitus (C. Ventral view; D. Dorsal view), paratype male (IZCAS-Ar42689Fo). Scale bars=0.20 mm.



Description. Male (holotype): carapace 0.75 long, 0.52 wide; opisthosoma absent. Left palp: 1.26 ( $0.62 + 0.13 + 0.51$ ), legs absent. Eye sizes and interdistances: ALE 0.03, PLE 0.03, PME 0.04, PLE–PME 0.04. Habitus as in Figs 17A–B. Carapace oval (Fig. 17A), brown; six eyes (Fig. 17A) almost ovoid,  $PME > ALE = PLE$ ; labium not visible.

Palp (Figs 16A–B, 18). At least five short macrosetae ventrally on femur; cymbium 0.45 long, 0.12 wide, with dense brown setae; cymbium with three macrosetae: a long, curved retrolateral one with a hook, and two preapical, short, subconical ones. The bulb bears three sclerites apically. Sclerite 1 and 2 slender, sclerotized. Sclerite 3 forked, with triangular apophysis.

Male (paratype, Figs 17C–D). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions. Total length 1.42; Carapace 0.59 long, 0.45 wide; Opisthosoma 0.83 long. Left palp: 0.87 ( $0.42 + 0.12 + 0.33$ ), left leg I: - ( $2.25 + 0.22 + - + -$ ), leg II: - ( $1.84 + 0.18 + - + -$ ), leg III: 3.86 ( $1.16 + 0.12 + 1.21 + 0.94 + 0.43$ ), leg IV: 5.89 ( $1.78 + 0.23 + 1.86 + 1.51 + 0.51$ ); right palp: 0.72 ( $0.38 + 0.12 + 0.22$ ), right leg I absent, leg II: 6.44 ( $1.92 + 0.22 + 2.15 + 1.6 + 0.55$ ), leg III: 4.00 ( $1.24 + 0.21 + 1.08 + 1.06 + 0.41$ ), leg IV: 5.98 ( $1.71 + 0.22 + 2.01 + 1.64 + 0.40$ ). Eye sizes and interdistances: ALE 0.04,



Figure 18. *Priscacleclercera chimei* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42688Fo), left palp, retrolateral view. Scale bar = 0.10 mm.



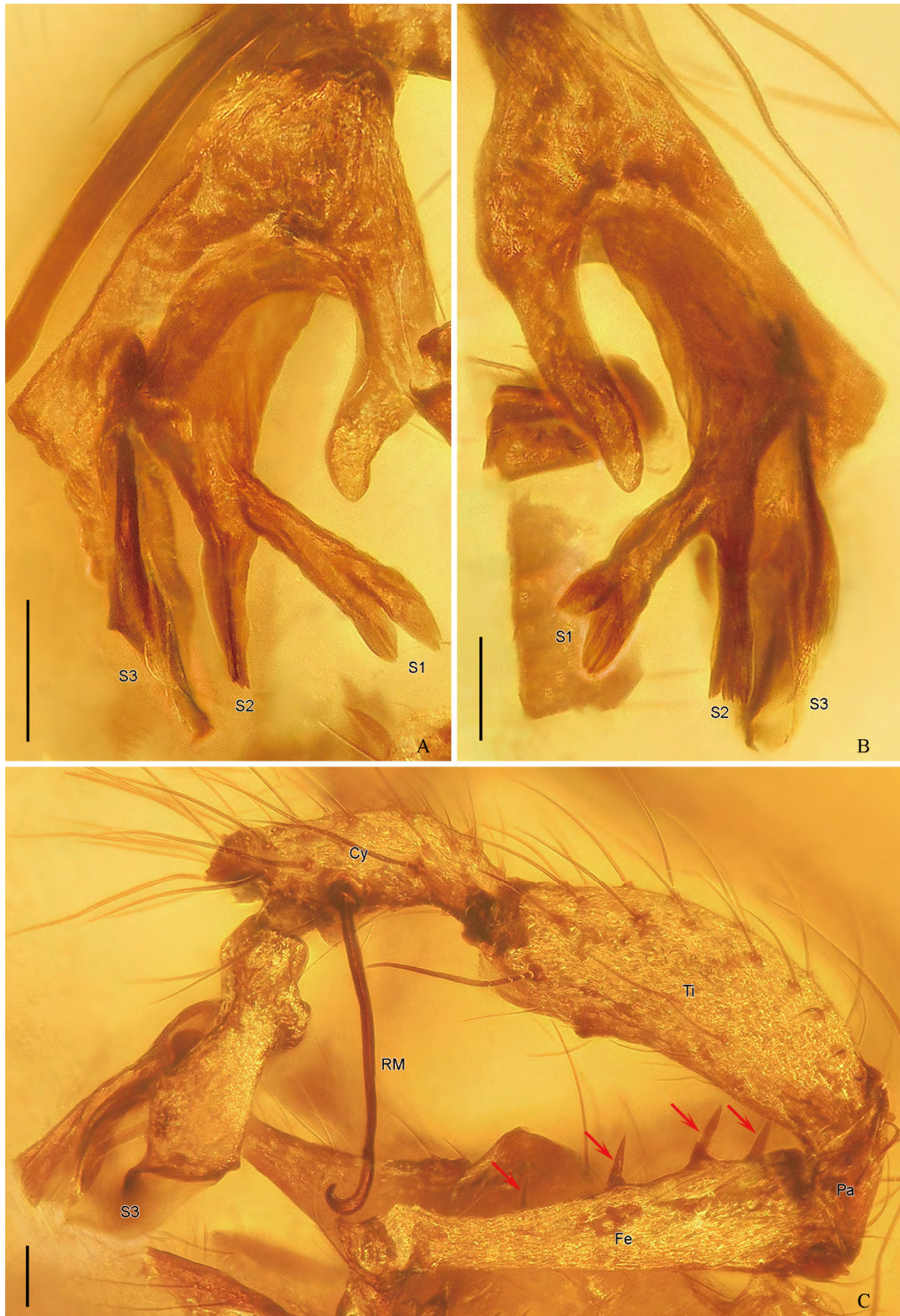


Figure 19. *Priscacleclercera foshou* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42690Fo). A. Right palp, dorsal view; B–C. Left palp (B. Prolateral view; C. Retrolateral view, arrows point at macrosetae on femur). Scale bars=0.05 mm.



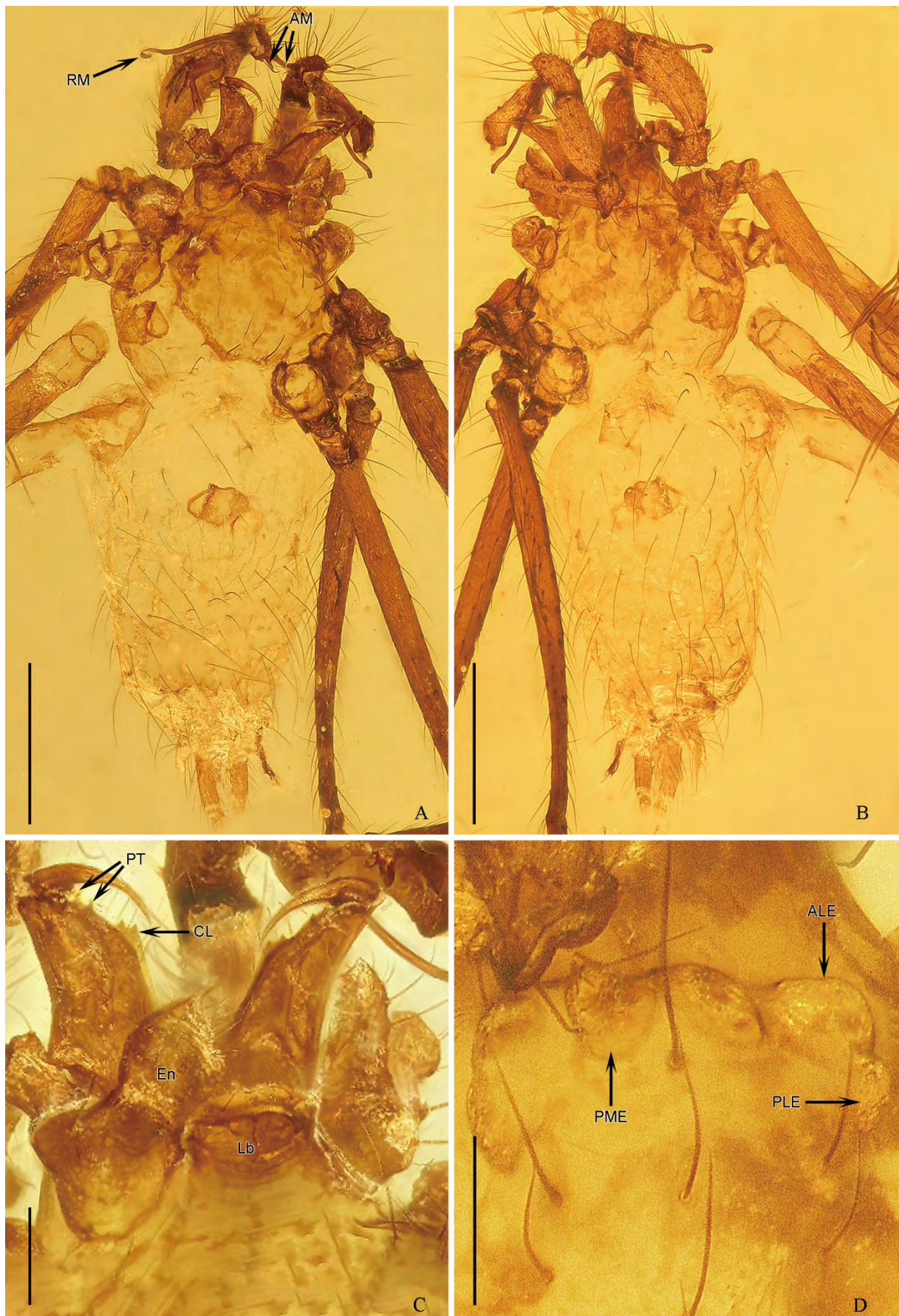


Figure 20. *Priscacleclercera foshou* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42690Fo). A–B. Habitus (A. Ventral view; B. Dorsal view); C. Mouthparts, ventral view; D. Ocular area, dorsal view. Scale bars: A–B=0.50 mm; C–D=0.10 mm.



PLE 0.05, PME 0.04, PLE–PME 0.04. Habitus as in Figs 17C–D. Carapace ovoid, brown; clypeus brown, slanted; chelicerae 0.26 long. Abdomen light yellow, elongate. Anterior lateral spinnerets cylindrical.

*Priscaleclercera foshou* Jiang & Li, *sp. nov.* (Figs 19–21)

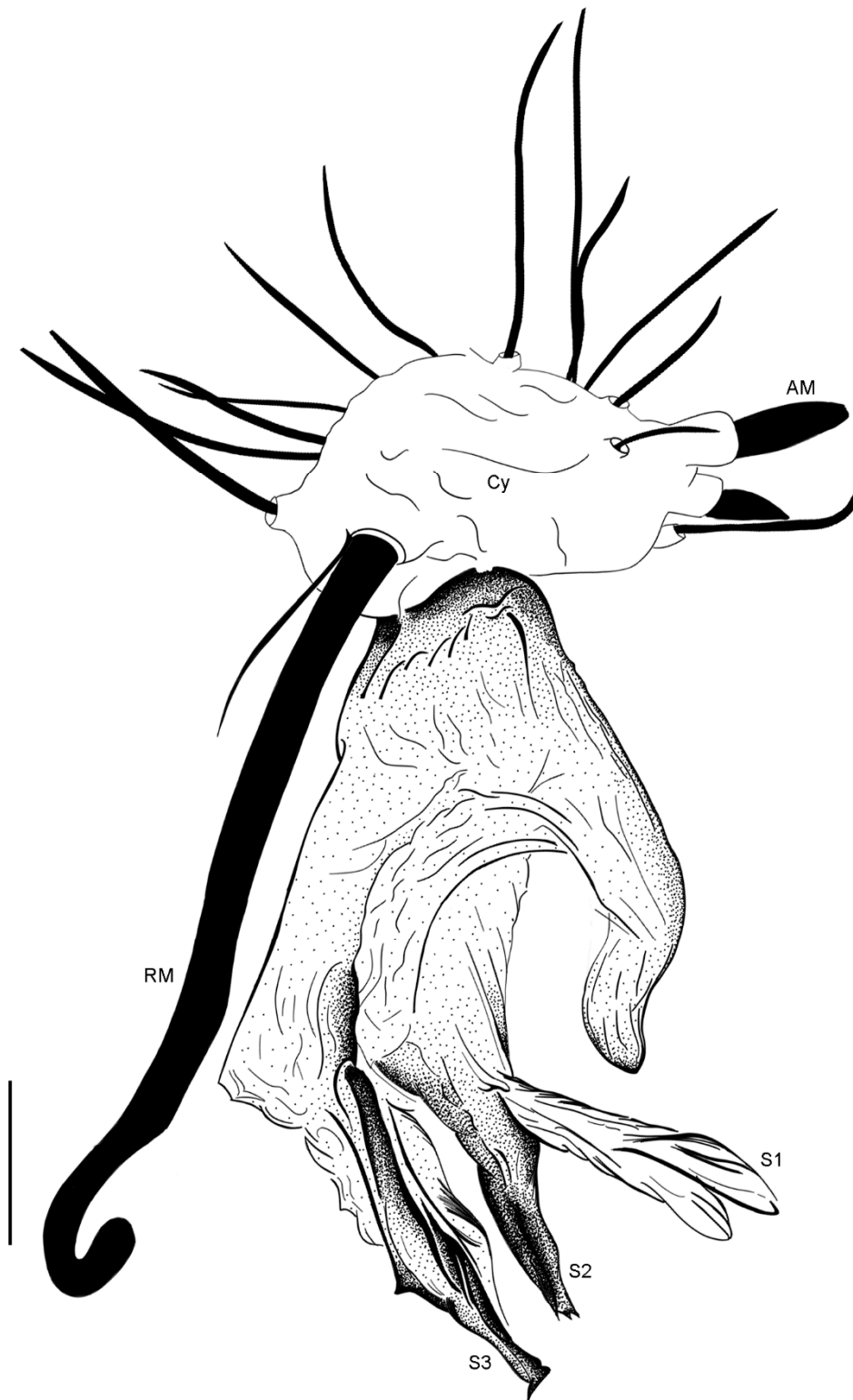


Figure 21. *Priscaleclercera foshou* Jiang & Li, *sp. nov.*, holotype male (IZCAS-Ar42690Fo), right palp, dorsal view. Scale bar = 0.05 mm.



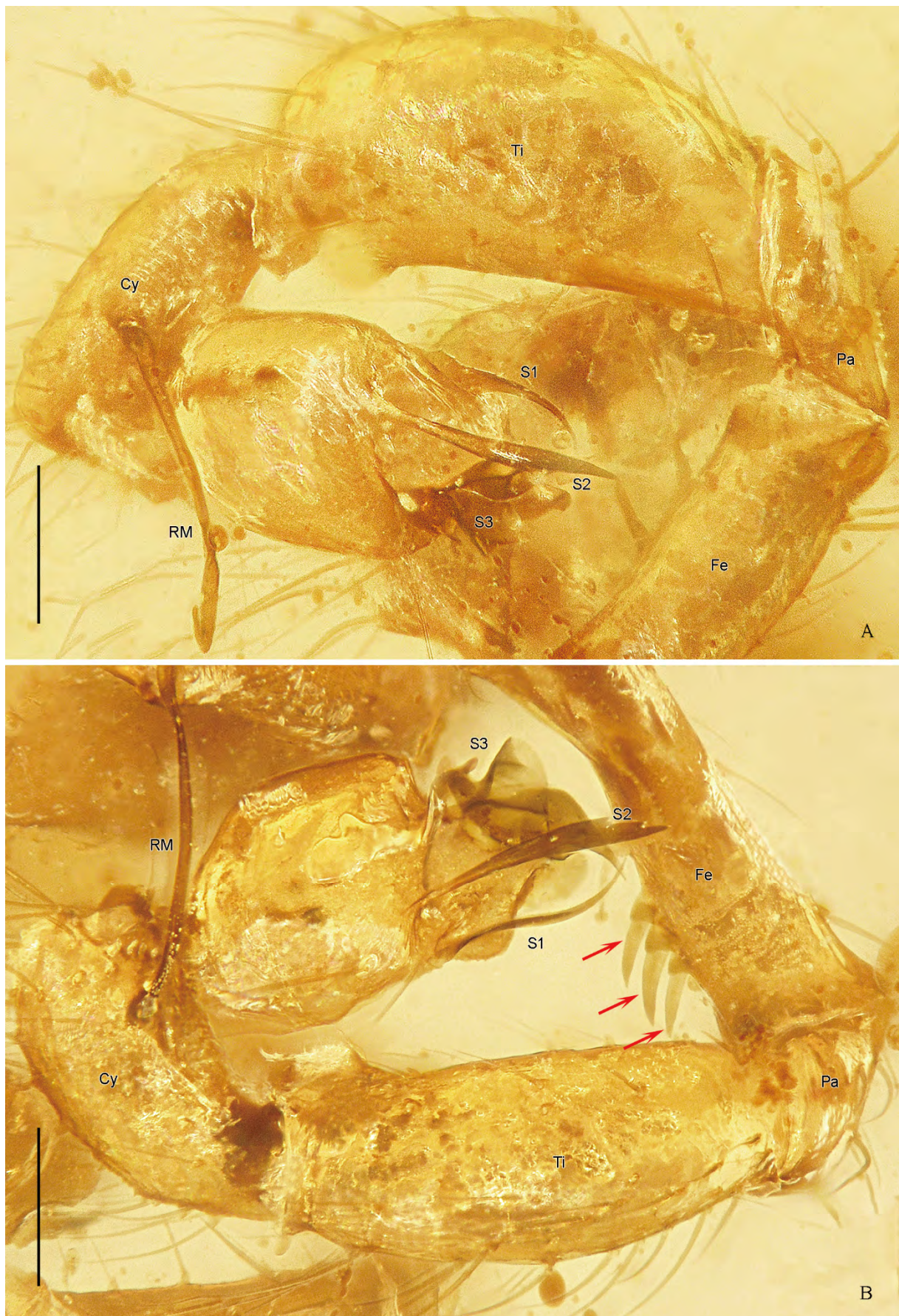


Figure 22. *Priscacleclercera hlaingi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42691Fo). A. Left palp, retrolateral view. B. Right palp, retrolateral view, arrows point at macrosetae on femur. Scale bars=0.10 mm.



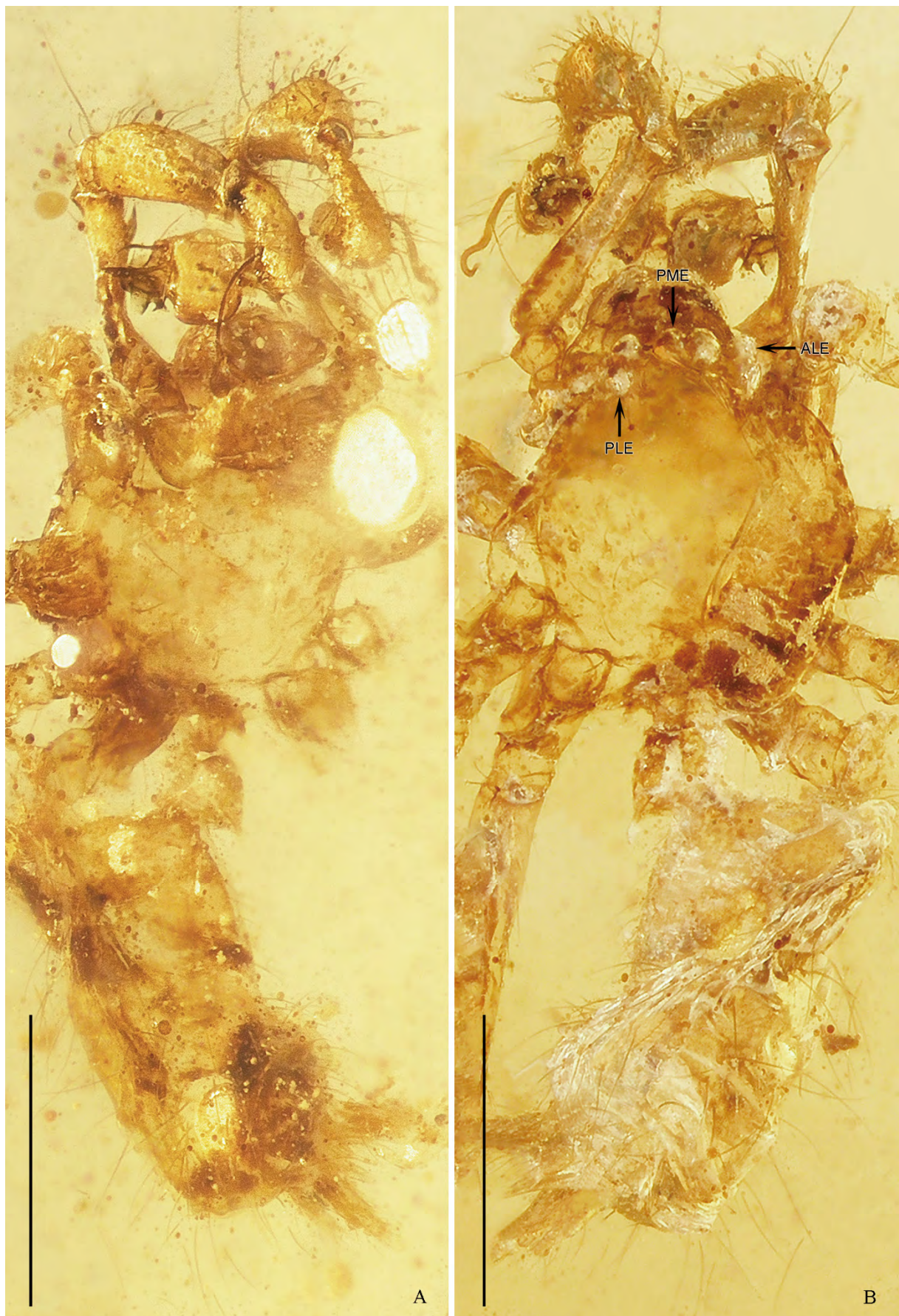


Figure 23. *Priscacleclercera hlaingi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42691Fo), habitus. A. Ventral view; B. Dorsal view. Scale bars=0.50 mm.



Holotype. Male (IZCAS-Ar42690Fo). Late Cretaceous amber from Hukawng Valley. Syninclusions include two dipterans, one mite, and one diplopod.

Etymology. The specific name is derived from the Chinese pinyin word for “Buddha’s hand” (foshou), referring to the shape of the palpal bulb; noun in apposition.

Diagnosis. The new species can be distinguished from all other *Priscaleclercera* species by the shape of the palp: the proximal parts of sclerites 1 and 2 are fused; sclerite 1 has a forked tip; sclerite 2 has a serrated margin; sclerite 3 has a membranous apex.

Description. Male. Total length 1.80; carapace 0.56 long, 0.67 wide; opisthosoma 1.24 long, 0.67 wide. Left palp: 0.97 (0.39 + 0.24 + 0.34), left leg I absent, leg II: - (2.38 + 0.22 + 2.41 + - + -), leg III: 4.61 (1.42 + 0.20 + 1.27 + 1.23 + 0.49), leg IV: - (2.15 + 0.19 + - + - + -); right palp: 0.86 (0.36 + 0.15 + 0.35), right leg I: - (- + - + - + 2.37 + 0.80), leg II: - (2.34 + - + - + 2.15 + 0.74), legs III–IV absent. Eye sizes and interdistances: ALE 0.07, PLE 0.05, PME 0.07, PLE–PME 0.04. Habitus as in Figs 20A–B. Carapace (Fig. 20B) oval, wider than long, yellowish; clypeus brown, slanted; chelicerae with lamina, promargin with two teeth; six eyes (Fig. 20D) almost ovoid, ALE = PME > PLE; labium 0.23 long, slanting; sternum yellow, 0.54 long, 0.51 wide. Abdomen (Figs 20A–B) elongate. Anterior lateral spinnerets (Figs 20A–B) cylindrical, with three segments.

Palp (Figs 19A–C, 21). Femur (Fig. 19C) has at least four short macrosetae ventrally; cymbium longer than wide, with dense brown setae; cymbium with three macrosetae: a long, curved retrolateral one with a hook, and two preapical, short, subconical ones. The bulb has a finger-shaped apophysis and three sclerites apically. Sclerite 1 forked, appressed to sclerite 2. Sclerite 2 elongate, serrated apically. Sclerite 3 with a membranous apex.

*Priscaleclercera hlaingi* Jiang & Li, sp. nov. (Figs 22–24)



Figure 24. *Priscaleclercera hlaingi* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42691Fo), right palp, retrolateral view. Scale bar = 0.10 mm.



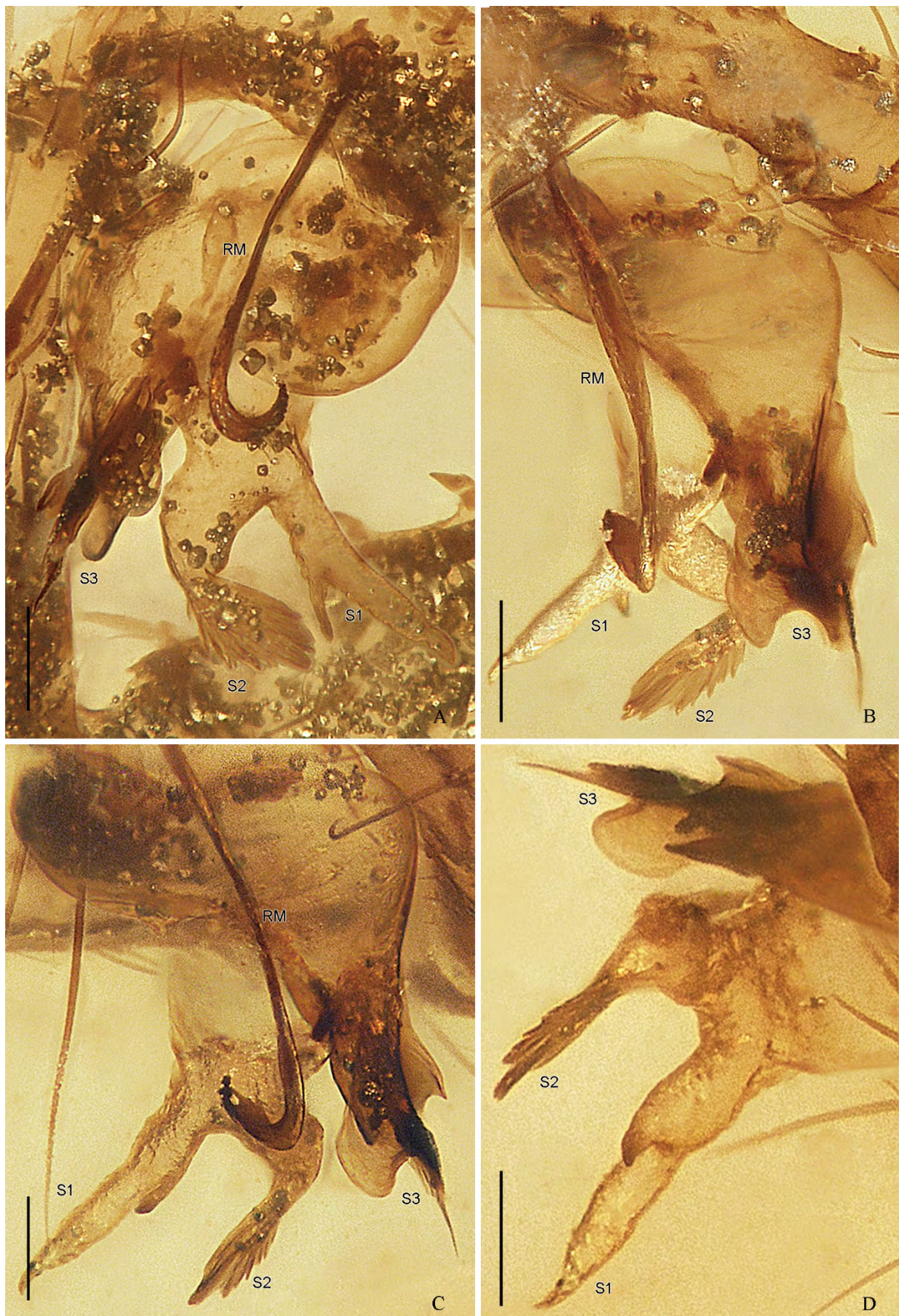


Figure 25. *Priscacleclercera kani* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42692Fo). A. Right palp, retrolateral view; B–D. Left palp (B–C. Retrolateral view; D. Prolateral view). Scale bars=0.05 mm.



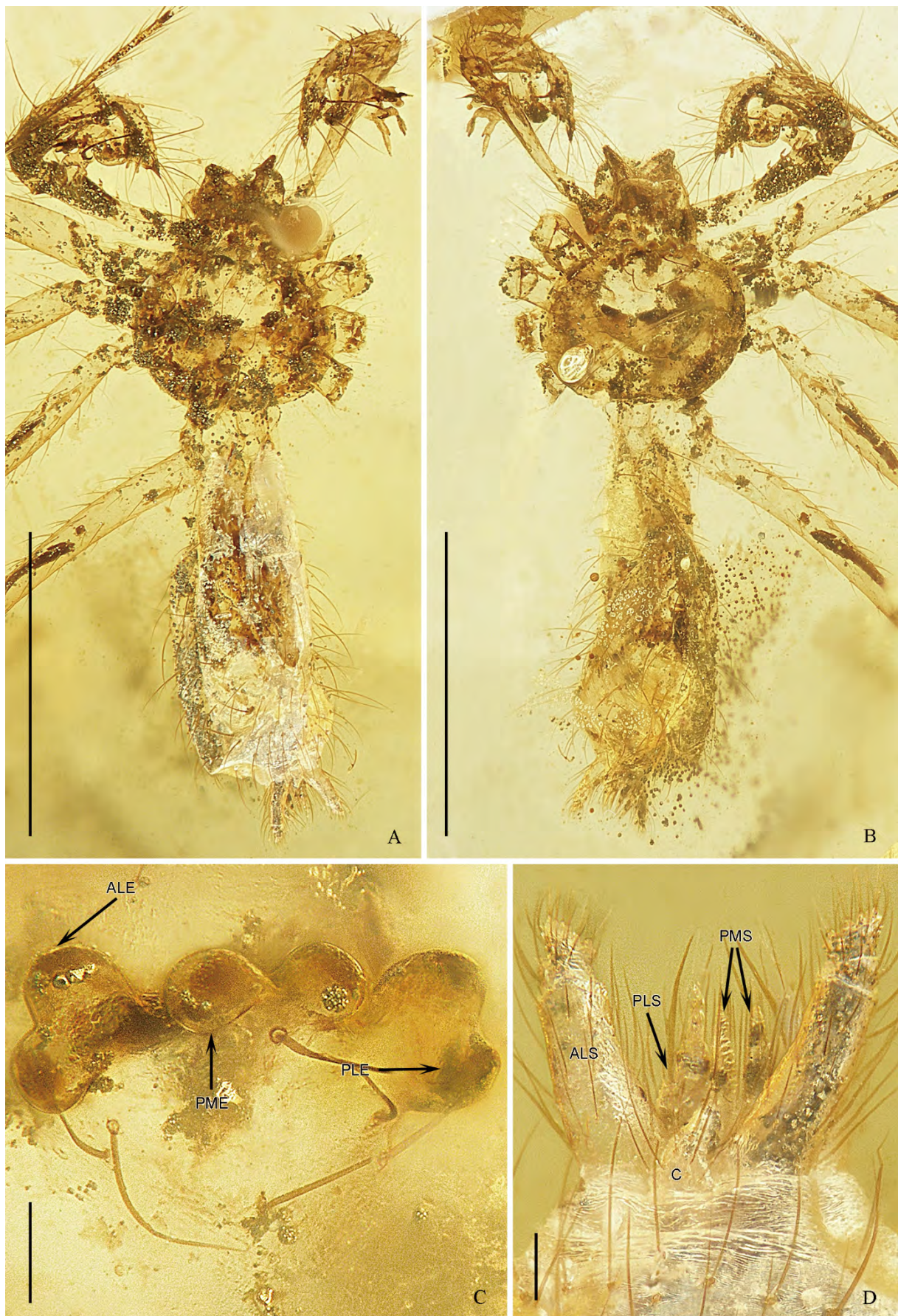


Figure 26. *Priscacleclercera kani* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42692Fo). A–B. Habitus (A. Ventral view; B. Dorsal view); C. Ocular area, dorsal view; D. Spinnerets, ventral view. Scale bars: A–B=0.50 mm; C–D=0.05 mm.



Holotype. Male (IZCAS-Ar42691Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one mite.

Etymology. The species name is a popular Burmese boy's name and means "plenty, plentiful"; noun in apposition.

Diagnosis. The new species can be distinguished from all other *Priscaleclercera* species by the palp's shape. In the new species, sclerites 1 and 2 are both sclerotized and attached to the base of the oval bulb; sclerite 1 is separated from sclerite 2; sclerite 3 is different from those on all other *Priscaleclercera* species, composed of a sclerotized structure and a complex membranous structure.

Description. Male. Total length 1.55; carapace 0.61 long, 0.54 wide; opisthosoma 0.94 long, 0.34 wide. Left palp: 0.83 (0.42 + 0.16 + 0.25), left leg I: 7.78 (2.28 + 0.27 + 2.31 + 2.25 + 0.67), leg II: 6.80 (2.00 + 0.17 + 2.33 + 1.76 + 0.54), leg III: 2.96 (1.17 + 0.16 + 0.11 + 1.08 + 0.44), leg IV: 6.14 (1.66 + 0.19 + 1.88 + 1.80 + 0.61); right palp: 0.89 (0.38 + 0.21 + 0.30), right leg I: - (2.34 + 0.25 + 1.98 + - + -), leg II: 6.27 (1.84 + 0.16 + 2.01 + 1.71 + 0.55), leg III: 3.75 (1.11 + 0.13 + 1.16 + 0.94 + 0.41), leg IV: 5.53 (1.33 + 0.24 + 1.76 + 1.64 + 0.56). Eye sizes and interdistances: ALE 0.06, PLE 0.05, PME 0.06, PLE–PME 0.05. Habitus as in Figs 23A–B. Carapace round (Fig. 23B), yellowish; clypeus yellow, slanted; six eyes (Fig. 23B) almost ovoid, ALE = PME > PLE; labium 0.20 long, slanted; sternum yellow, 0.43 long, 0.45 wide. Abdomen (Figs 23A–B) elongate. Anterior lateral spinnerets cylindrical, with three segments.

Palp (Figs 22A–B, 24). Femur with at least three short macrosetae ventrally; cymbium longer than wide, with brown setae; cymbium with three macrosetae: a retrolateral, curved one with a hook, and two preapical, short, subconical ones. Bulb longer than wide, with oval basal portion and three sclerites apically. Sclerite 1 sclerotized, slender, S-shaped in retrolateral view. Sclerite 2 elongate, lance-shaped, serrated apically. Sclerite 3 with a complex membranous structure.

***Priscaleclercera kani* Jiang & Li, sp. nov.** (Figs 25–27)

Holotype. Male (IZCAS-Ar42692Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.



Figure 27. *Priscaleclercera kani* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42692Fo), left palp, retrolateral view. Scale bar = 0.10 mm.



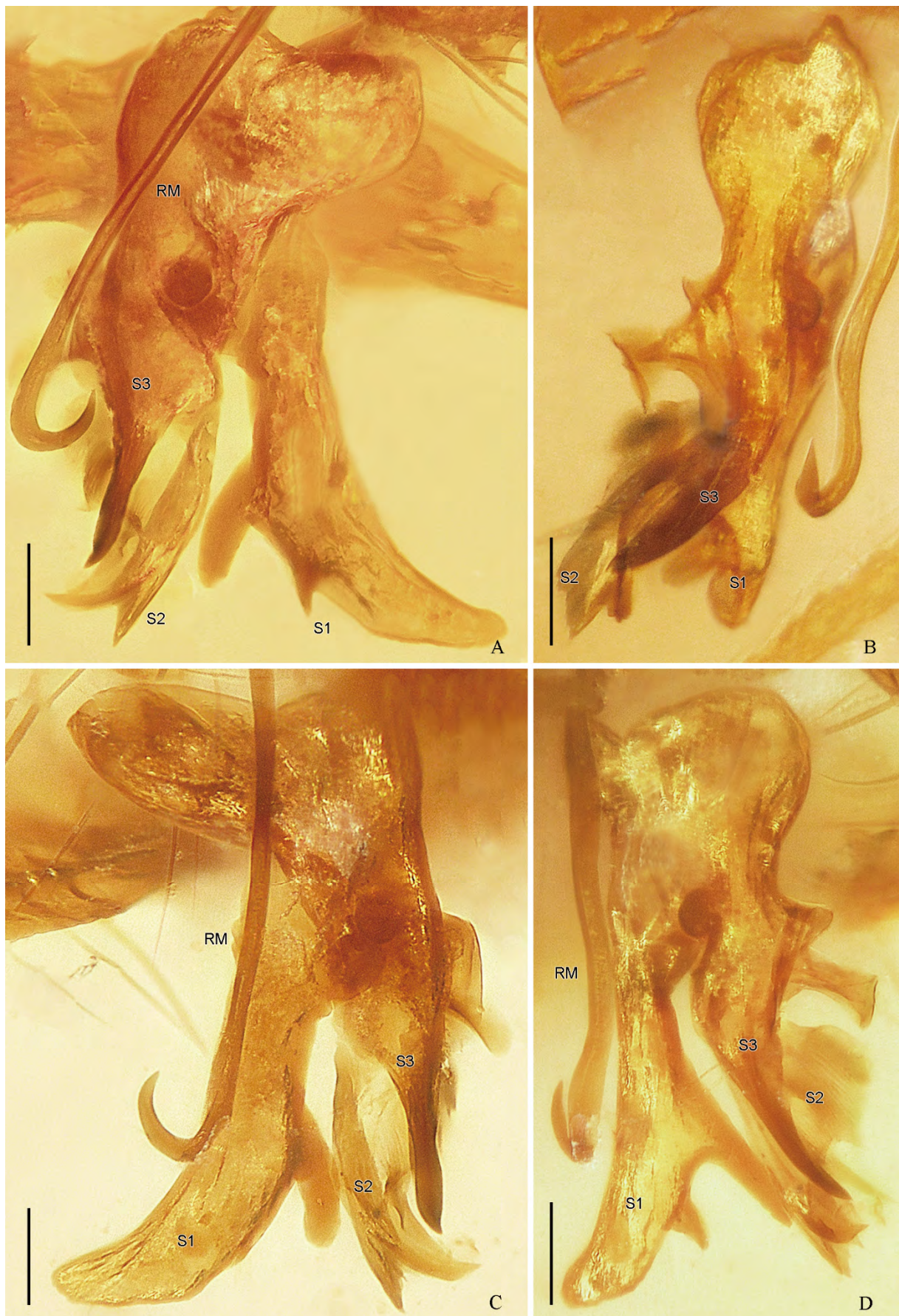


Figure 28. *Priscacleclercera kyawae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42693Fo). A–B. Right palp (A. Retrolateral view; B. Ventral view); C–D. Left palp (C. Retrolateral view; D. Prolateral view). Scale bars=0.05 mm.



**Etymology.** The species name is a popular Burmese boy's name and means "fortune"; noun in apposition.

**Diagnosis.** This species resembles *P. furcata* (see Wunderlich, 2020: 101, figs 106–107, photos 18–19) by the shape of sclerite 3 (Figs 25A–D) on the bulb but can be distinguished by the pointed apophysis of sclerite 1 (Figs 25A–D) and the broom-shaped apex of sclerite 2 (Figs 25A–D).

**Description.** Male. Total length 0.98; carapace 0.36 long, 0.31 wide; opisthosoma 0.62 long, 0.23 wide. Left palp: 0.38 (0.20 + 0.07 + 0.11), left leg I–IV absent; right palp: 0.50 (0.24 + 0.08 + 0.18), right leg I: - (2.69 + 0.20 + 1.80 + - + -), leg II: - (2.41 + 0.20 + 2.56 + 2.25 + -), leg III: 4.58 (1.55 + 0.22 + 1.39 + 1.01 + 0.41), leg IV: - (2.01 + 0.12 + - + - + -). Eye sizes and interdistances: ALE 0.05, PLE 0.04, PME 0.04, PLE–PME 0.04. Habitus as in Figs 26A–B. Carapace round (Figs 26A–B); six eyes (Fig. 26C) almost ovoid, ALE > PLE = PME; labium not visible. Abdomen elongate, 0.25 long, 0.23 wide. Anterior lateral spinnerets (Fig. 26D) cylindrical, with three segments, 0.09 long, 0.02 wide.

**Palp** (Figs 25A–D, 27). Femur with at least three short macrosetae ventrally; cymbium longer than wide, with dense brown setae; cymbium with three macrosetae: one retrolateral long and curved with a hook, and two preapical, short, subconical. Bulb longer than wide, with an oval basal portion and three sclerites apically. Sclerite 1 appressed to sclerite 2, with a pointed apophysis medially. Sclerite 2 rough, with a broom-shaped tip. Sclerite 3 strongly sclerotized with an acicular

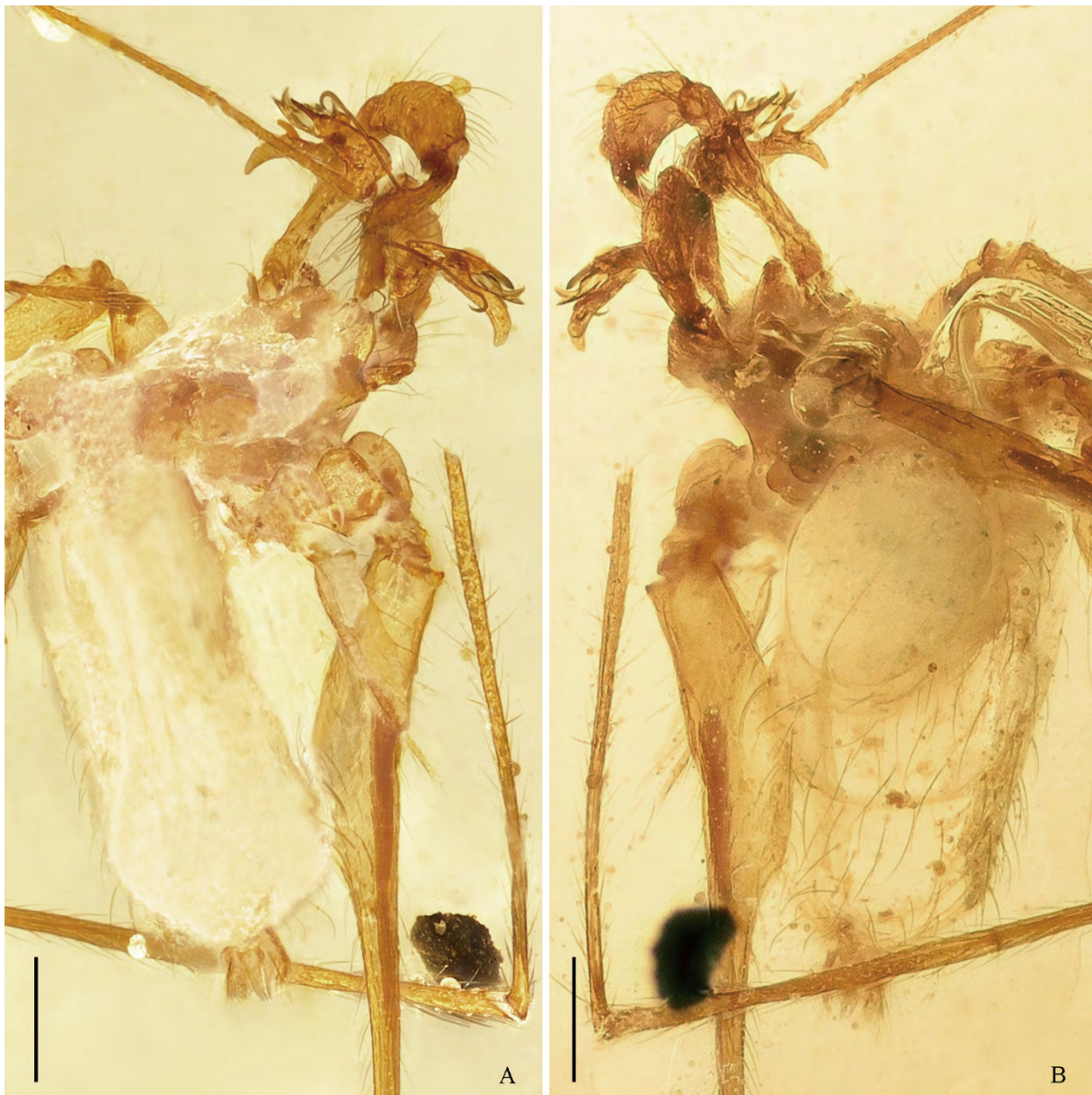


Figure 29. *Priscacleclercera kyawae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42693Fo), habitus. A. Ventral view; B. Dorsal view. Scale bars=0.50 mm.



apophysis.

***Priscaleclercera kyawae* Jiang & Li, sp. nov.** (Figs 28–30)

Holotype. Male (IZCAS-Ar42693Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.



Figure 30. *Priscaleclercera kyawae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42693Fo), right palp, retrolateral view. Scale bar = 0.05 mm.



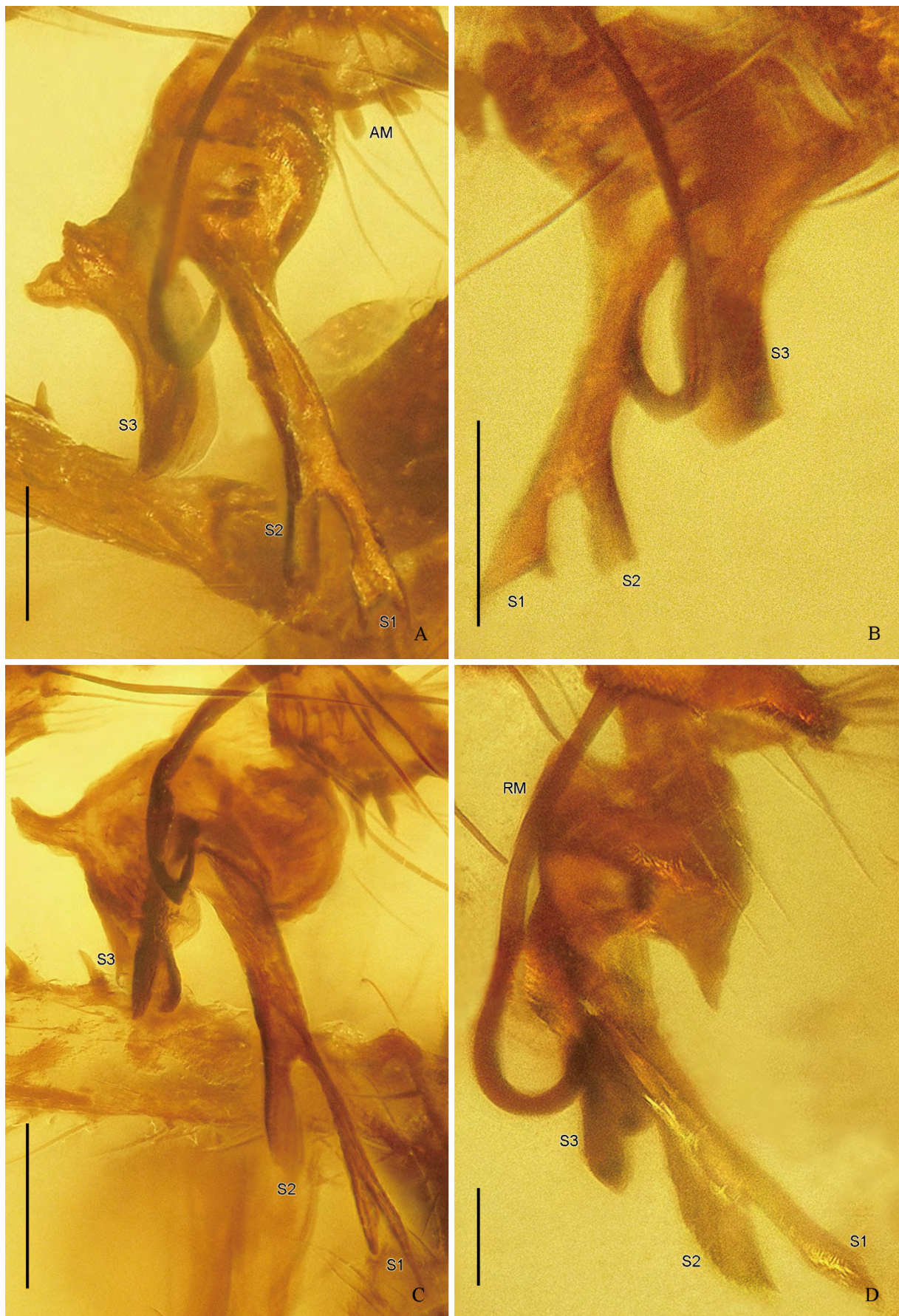


Figure 31. *Priscacleclercera thanae* Jiang & Li, **sp. nov.** A–B, D. Holotype male (IZCAS-Ar42694Fo) (A. Right palp, retrolateral view; B. Left palp, retrolateral view; D. Right palp, dorsal view); C. Paratype male (IZCAS-Ar42695Fo), right palp, retrolateral view. Scale bars=0.05 mm.



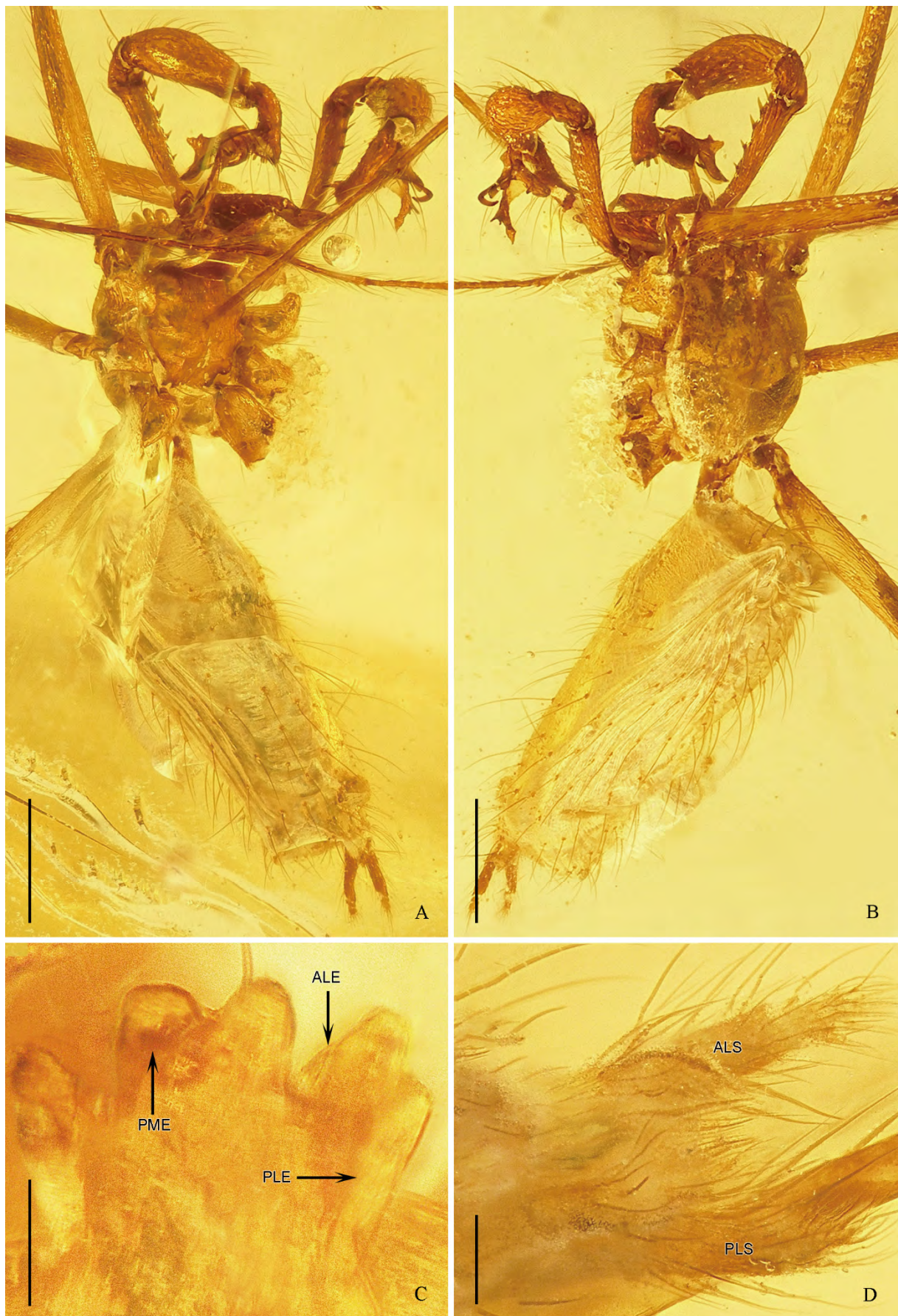


Figure 32. *Priscacleclercera thanae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42694Fo). A–B. Habitus (A. Ventral view; B. Dorsal view); C. Ocular area, dorsal view; D. Spinnerets, ventral view. Scale bars: A–B=0.50 mm, C–D=0.05 mm.



**Etymology.** The species name is a girl's name from Myanmar and means “famous, fame”; noun in apposition.

**Diagnosis.** This species resembles *P. furcata* (see Wunderlich, 2020: 101, figs 106–107, photos 18–19) by the shape of sclerite 3 on the bulb but can be distinguished by the pointed apophysis of sclerite 1 (Figs 28A–D) and the forked, membranous apex of sclerite 2 (Figs 28A–D).

**Description.** Male. Total length -; carapace not visible; opisthosoma 1.01 long, 0.52 wide. Left palp: - (- + - + 0.28), left leg I: - ( $1.78 + 0.23 + 2.02 + 1.08 + -$ ), leg II, III absent, leg IV: - ( $1.90 + 0.21 + 2.10 + - + -$ ); right palp: 0.80 ( $0.37 + 0.14 + 0.29$ ), right leg I absent, leg II: 4.85 ( $1.52 + 0.10 + 1.66 + 1.36 + 0.21$ ), leg III: - ( $1.03 + 0.22 + 0.91 + 0.94 + -$ ), leg IV: - ( $1.47 + 0.17 + 1.64 + - + -$ ). Eyes not visible. Habitus as in Figs 29A–B. Opisthosoma (Figs 29A–B): Abdomen elongate, yellow.



Figure 33. *Priscacleclercera thanae* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42694Fo), right palp, retrolateral view. Scale bar = 0.10 mm.



Palp (Figs 28A–D, 30). Femur with at least five short macrosetae ventrally; cymbium longer than wide with a retrolateral macroseta which long and curved with a hook. Bulb longer than wide and with three sclerites apically. Sclerite 1 elongate, boot-shaped in retrolateral view, with an apophysis medially. Sclerite 2 with a forked, membranous apex. Sclerite 3 strongly sclerotized with a pointed apophysis medially.

***Priscaleclercera thanae* Jiang & Li, sp. nov.** (Figs 31–33)

Holotype. Male (IZCAS-Ar42694Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one dipteran. Paratype male (IZCAS-Ar42695Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese girl's name and means “a million”; noun in apposition.

Diagnosis. This species resembles *P. paucispinae* (see Wunderlich, 2017: 151, figs 119–121, photo 75) by the presence of forks on the sclerites. The new species can be distinguished from the latter by the sclerite 2 without a forked tip in retrolateral view (Fig. 31A).

Description. Male. Total length 2.38; Carapace 0.72 long; Opisthosoma 1.66 long. Left palp: - (0.49 + 0.18 + -), left leg I: - (3.28 + 0.27 + 3.48 + - + -), leg II–IV absent, right leg I absent, leg II: 9.67 (2.97 + 0.13 + 3.03 + 2.84 + 0.70), leg III: 4.81 (1.56 + 0.16 + 1.22 + 1.31 + 0.56), leg IV: 9.64 (3.21 + 0.31 + 2.56 + 2.78 + 0.78). Eye sizes and interdistances: ALE 0.04, PLE 0.03, PME 0.05, PLE–PME 0.04. Habitus as in Figs 32A–D. Carapace round (Fig. 32B), brown, six eyes (Fig. 32C) almost ovoid, PME > ALE > PLE; labium not visible. Abdomen (Figs 32A–B) light yellow, elongate. Anterior lateral spinnerets (Fig. 32D) cylindrical, with three segments.

Palp (Figs 31A–B, D, 33). Femur with at least five short macrosetae ventrally; cymbium longer than wide, with dense

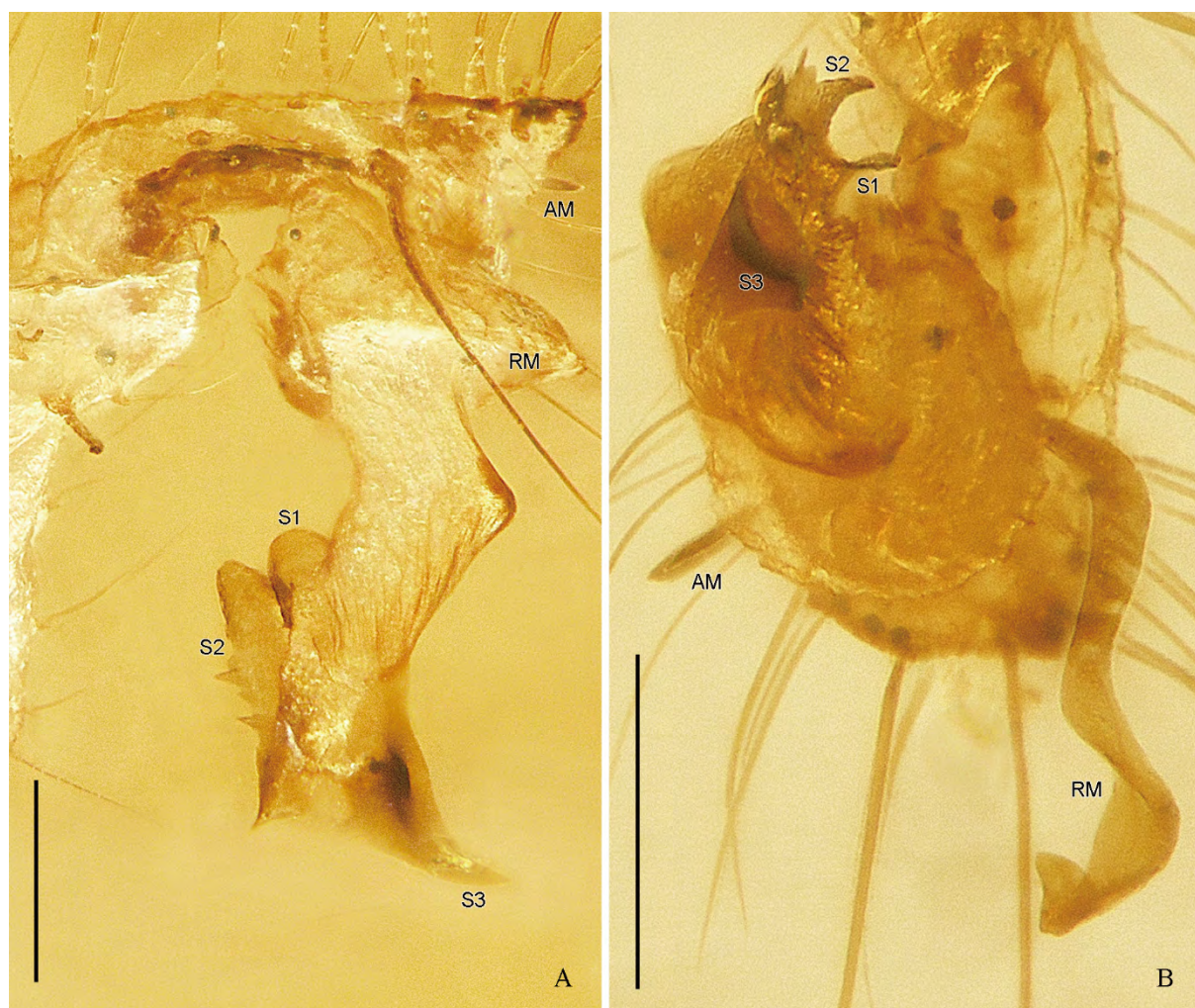


Figure 34. *Priscaleclercera thaungi* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42696Fo), right palp. A. Retrolateral view; B. Apical view. Scale bars = 0.05 mm.



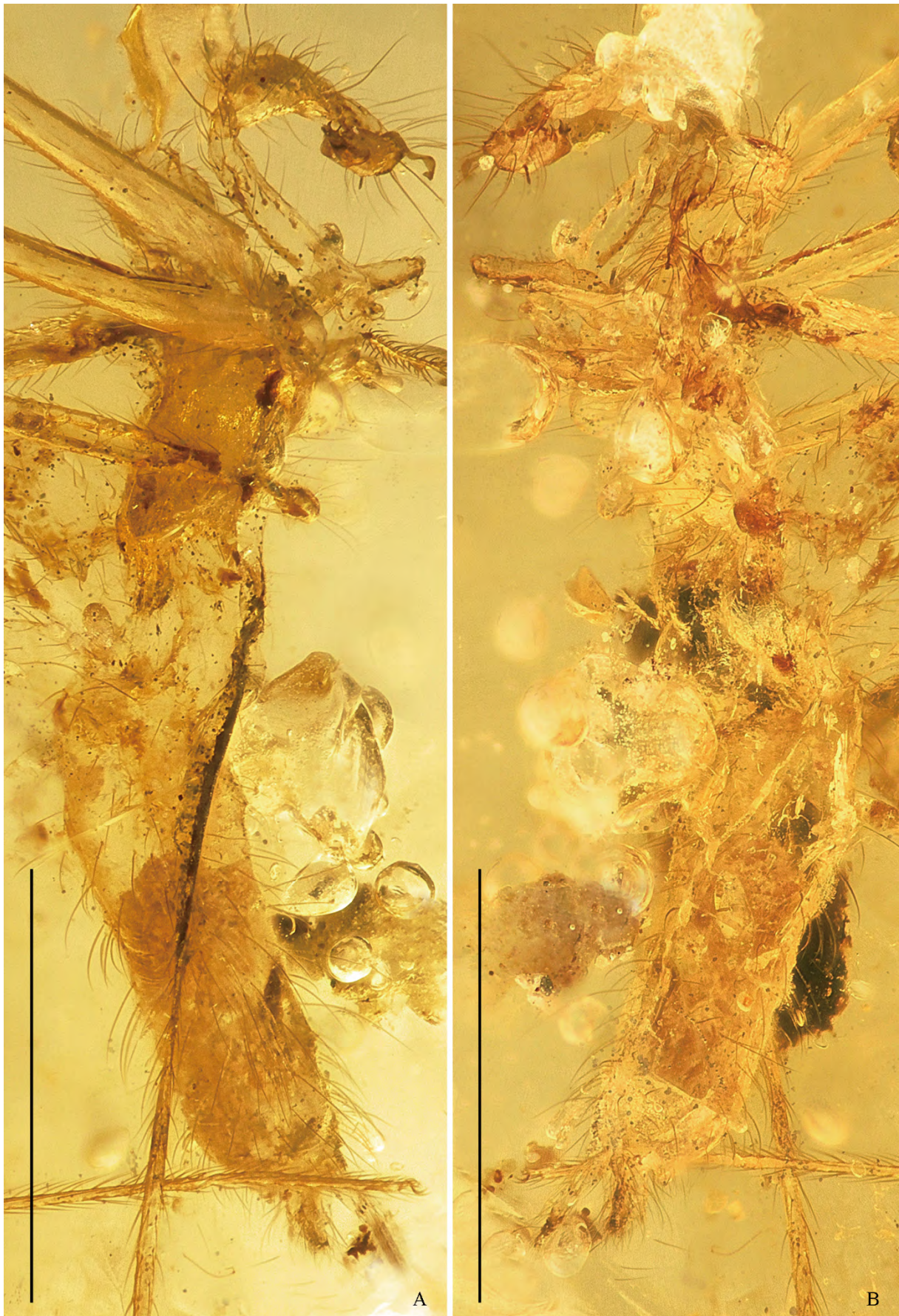


Figure 35. *Priscacleclercera thaungi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42696Fo), habitus, lateral view. Scale bars = 0.50 mm.



brown setae; cymbium with three macrosetae: one retrolateral long and curved with a hook, and two preapical, short, subconical. Bulb longer than wide, with oval basal portion, and three sclerites apically. Sclerite 1 forked, appressed to sclerite 2. Sclerite 2 elongate, serrated apically. Sclerite 3 disc-shaped with two horn-shaped apophyses.

Male (paratype, IZCAS-Ar42695Fo, Fig. 31C). Same as holotype.

***Priscaleclercera thaungi* Jiang & Li, sp. nov.** (Figs 34–36)

Holotype. Male (IZCAS-Ar42696Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means "ten thousand"; noun in apposition.

Diagnosis. The new species can be distinguished from all other *Priscaleclercera* species by the shape of the sclerites. Sclerite 1 of the palp is a rounded apophysis. Sclerite 2 has a serrated margin.

Description. Male. Total length 1.16; carapace 0.52 long, 0.33 wide; opisthosoma 0.64 long, 0.18 wide. Left palp absent, left leg I, II absent, leg III: - (1.28 + - + - + 1.36 + 0.32), leg IV absent; right palp: 0.40 (0.19 + 0.08 + 0.13), right leg I: - (2.88 + 0.26 + - + - + -), leg II: - (2.49 + 0.18 + - + - + -), leg III: - (1.49 + - + - + - + -), leg IV: - (2.22 + 0.13 + - + - + -). Eyes not visible. Habitus as in Figs 35A–B. Carapace round, yellowish; clypeus yellow, slanted; chelicerae 0.16 long.

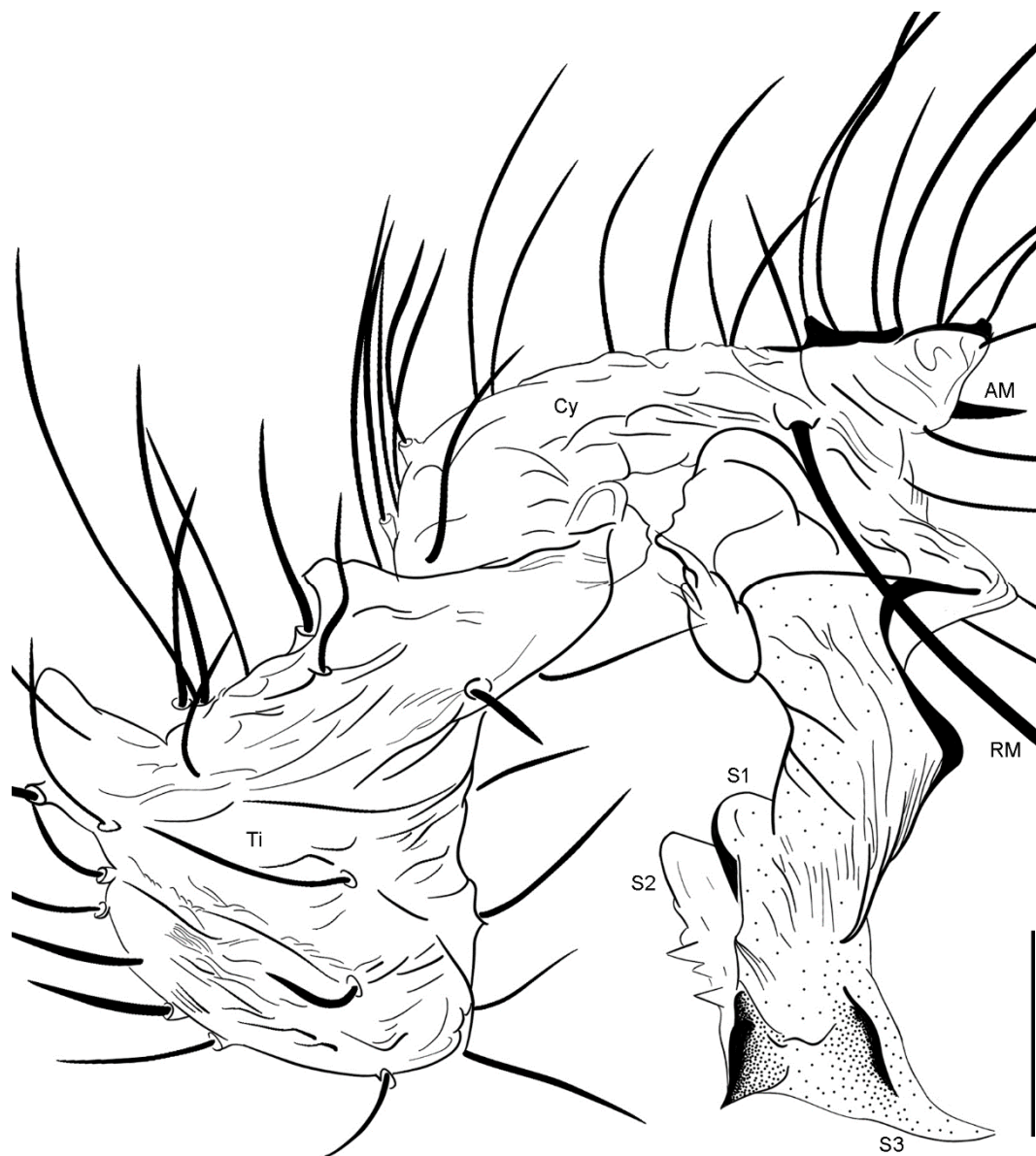


Figure 36. *Priscaleclercera thaungi* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42696Fo), right palp, retrolateral view. Scale bar = 0.05 mm.



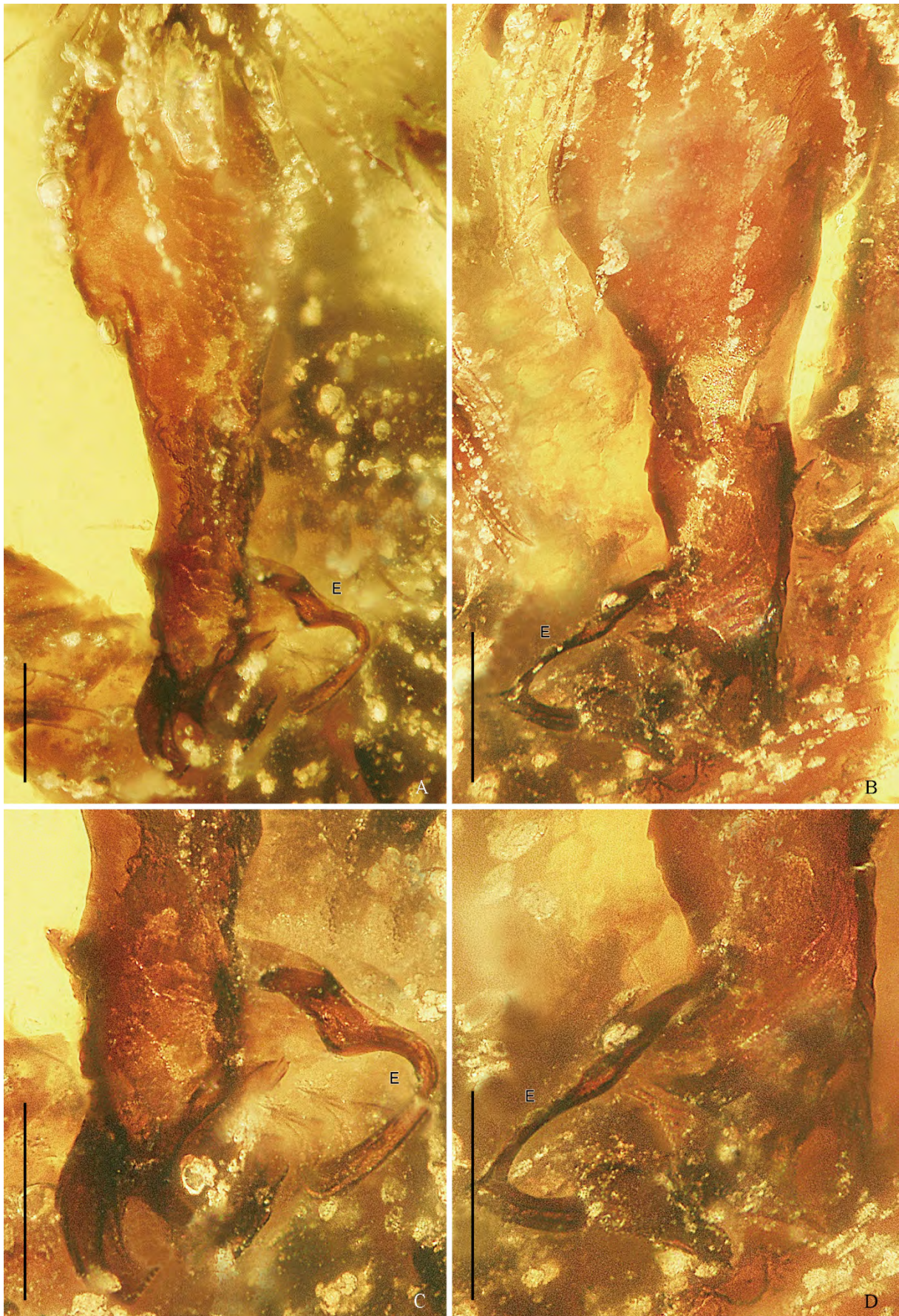


Figure 37. *Bicornoculus aungi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42697Fo). A, C. Right palp, dorsal view; B, D. Left palp, dorsal view. Scale bars=0.05 mm.



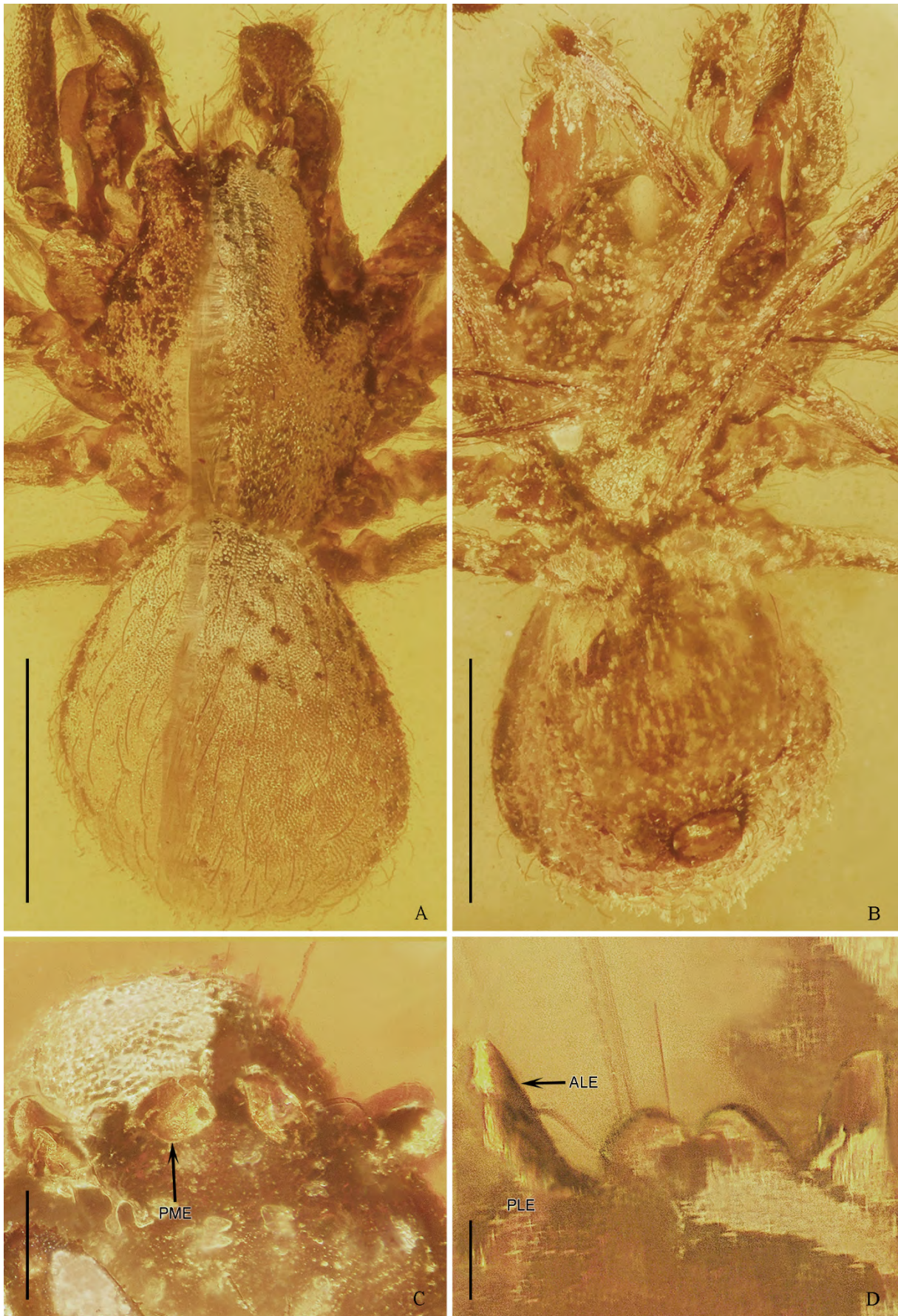


Figure 38. *Bicornoculus aungi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42697Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C–D. Ocular area (C. Apical view; D. Dorsal view). Scale bars: A–B=0.50 mm; C–D=0.05 mm.



Abdomen (Figs 35A–B) elongate. Anterior lateral spinnerets cylindrical, with three segments.

Palp (Figs 34A–B, 36). Femur with at least four short macrosetae ventrally; cymbium longer than wide, with dense brown setae; cymbium with three macrosetae: one retrolateral long, and two preapical, short, subconical. Bulb with three sclerites apically. Sclerite 1 a rounded apophysis; sclerite 2 serrated; sclerite 3 strongly sclerotized, tip sharpened distally.



Figure 39. *Bicornoculus aungi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42697Fo), right palp, dorsal view. Scale bar=0.10mm.



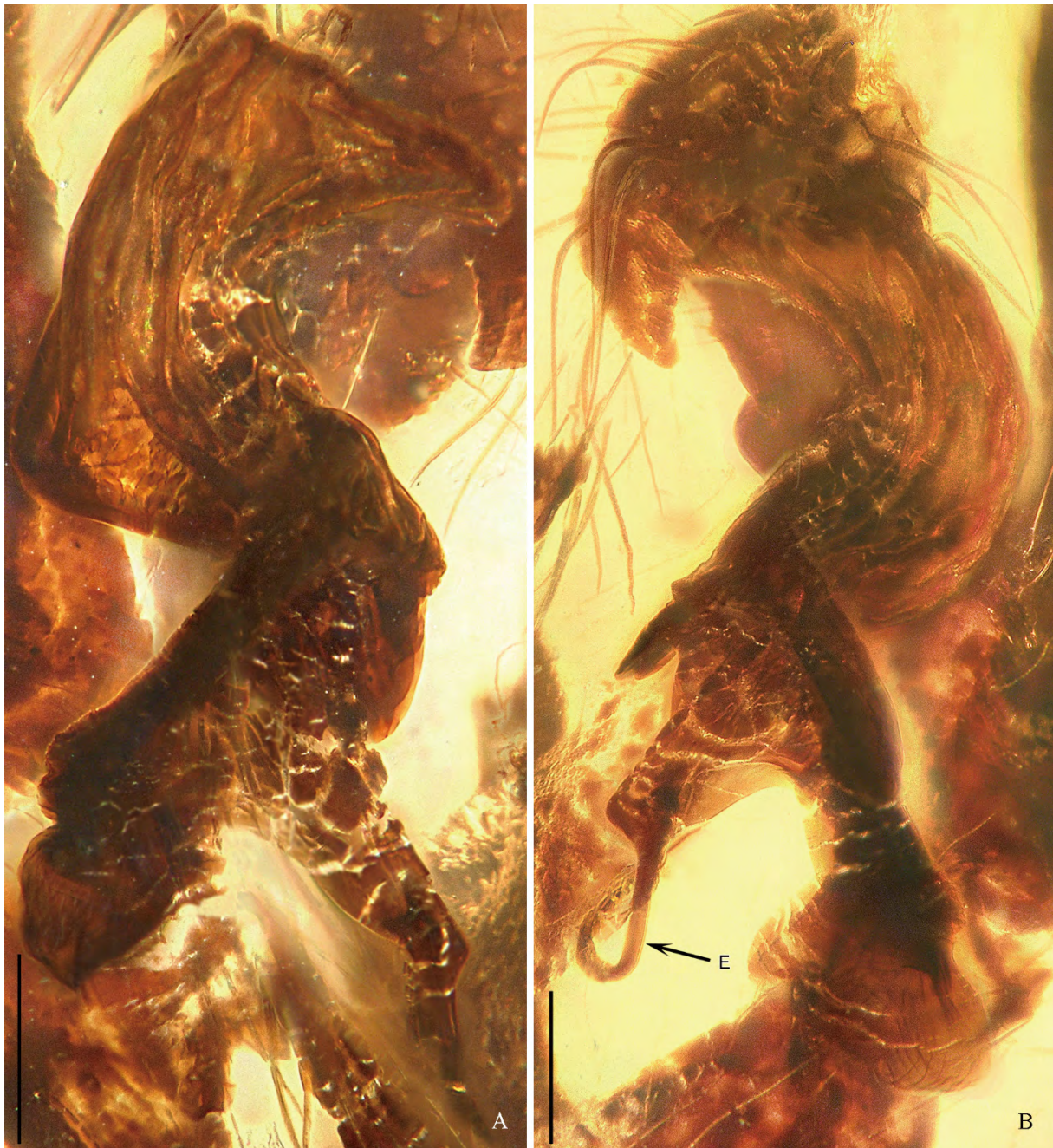


Figure 40. *Bicornoculus wunnai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42698Fo). A. Right palp, dorsal view; B. Left palp, dorsal view. Scale bars=0.05 mm.

### 3.4 Family Tetrablemmidae O. Pickard-Cambridge, 1873

#### Genus †*Bicornoculus* Wunderlich, 2015

Type species: *Bicornoculus levis* Wunderlich, 2015.

#### *Bicornoculus aungi* Jiang & Li, **sp. nov.** (Figs 37–39)

Holotype. Male (IZCAS-Ar42697Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one hemipteran.





Figure 41. *Bicornoculus wunnai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42698Fo). A–B. Habitus (A. Dorsal view; B. Ventral view); C. Ocular area, dorsal view; D. Claw, ventral view. Scale bars: A–B=0.50 mm; C–D=0.10 mm.



**Etymology.** The species name is a popular Burmese boy's name and means “success”; noun in apposition.

**Diagnosis.** This species resembles *B. levis* (see Wunderlich, 2015: 165, figs 117–121, photo 43–44) by the spindle-shaped bulb but can be distinguished by the wave-shaped embolus (Figs 37A–D, 39). The embolus of the new species is longer than *B. levis*.

**Description.** Male. Total length 2.13; carapace 0.90 long, 0.55 wide; opisthosoma 1.23 long, 0.74 wide. Left palp: 0.43 (0.23 + 0.08 + 0.12), left leg I: - (0.79 + 0.22 + - + - + 0.30), leg II: 2.10 (0.71 + 0.23 + 0.51 + 0.36 + 0.29), leg III: - (0.58



Figure 42. *Bicornoculus wunnai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42698Fo), left palp, dorsal view. Scale bar=0.10 mm.



+ - - - + 0.32 + 0.24), leg IV: - (0.70 + - - - + 0.39 + 0.20); right palp: 0.40 (0.20 + 0.09 + 0.11), right leg I: - (0.81 + 0.22 + - - - + 0.24), leg II: - (0.61 + 0.18 + - - - + 0.20), leg III: - (0.54 + - - - - + 0.20), leg IV: - (0.64 + - - - + 0.43 + 0.23). Eye sizes: ALE 0.05, PLE 0.06, PME 0.04, eyes interdistances not visible. Habitus as in Figs 38A–B. Carapace (Figs 38A–B) reticulated, brown; clypeus brown; six eyes (Figs 38C–D) almost ovoid,  $PME < ALE < PLE$ ; sternum reticulated, rugose. Opisthosoma (Figs 38A–B): Scutum long, oval, covered with long setae, reticulated, center granulated; ventral scutum reticulated, margin rugose.

Palp (Figs 37A–D, 39). Bulb long with two apophyses distally, apophyses curved, with serrated margin; embolus sclerotized, slender, bent twice.

***Bicornoculus wunnai* Jiang & Li, sp. nov.** (Figs 40–42)

Holotype. Male (IZCAS-Ar42698Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means "gold"; noun in apposition.

Diagnosis. This species resembles *B. granulans* (see Wunderlich, 2020: 88, figs 78–79) by the apophysis of the bulb but can be distinguished by the shape of the embolus (Fig. 40B). In *B. wunnai* Jiang & Li, **sp. nov.**, the distal part of the embolus is strongly hooked, but the embolus of *B. granulans* is straight.

Description. Male. Total length 1.92; carapace 0.91 long, 0.62 wide; opisthosoma 1.01 long, 0.56 wide. Left palp: - (0.24 + - - -), left leg I: - (0.85 + - - - + - - -), leg II: - (0.58 + - - - + - - -), leg III: - (0.55 + - - - + - - -), leg IV: - (0.69 + - - - + - - -); right palp: - (0.23 + - - -), right leg I: - (0.75 + - - - + - - -), leg II: - (0.62 + - - - + - - -), leg III: - (0.57 + - - -

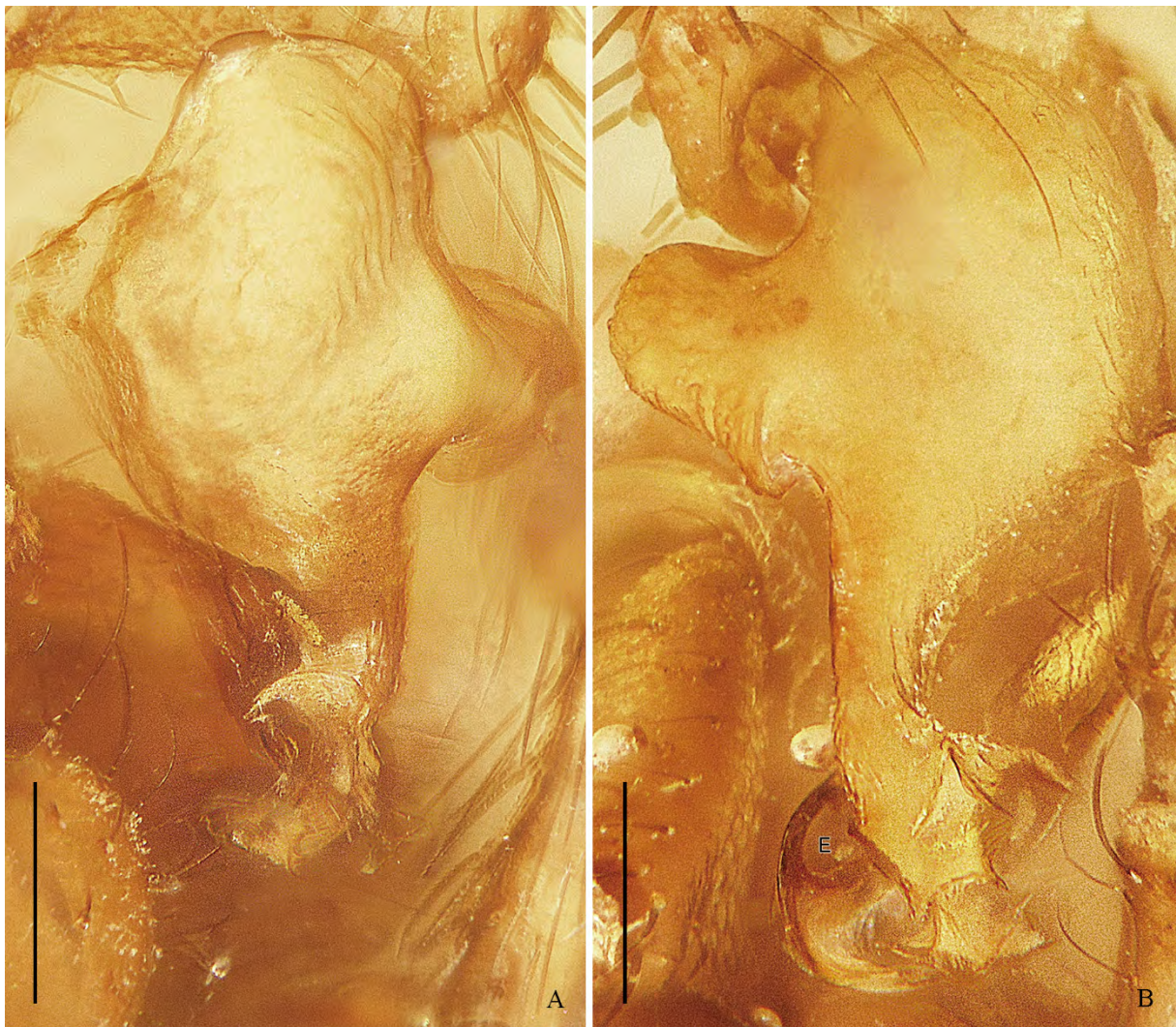


Figure 43. *Bicornoculus yarzari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42699Fo). A. Right palp, dorsal view; B. Left palp, dorsal view. Scale bars = 0.05 mm.



- + - + -), leg IV: - (0.61 + - + - + -). Eye sizes: ALE 0.05, PLE 0.06, PME 0.06, eyes interdistances not visible. Habitus as in Figs 41A–B. Carapace (Figs 41A–B) reticulated, brown; clypeus brown; six eyes (Fig. 41C) almost ovoid, ALE < PLE = PME; sternum reticulated, rugose. Opisthosoma (Figs 41A–D): Scutum long, oval, covered with long setae, reticulated, center granulated; ventral scutum reticulated, margin rugose.



Figure 44. *Bicornoculus yarzari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42699Fo), habitus. A. Dorsal view; B. Ventral view. Scale bars = 0.50 mm.



Palp (Figs 40A–B, 42). Bulb long, deformed, S-shaped in dorsal view, bent twice; embolus sclerotized, slender; distal part of embolus fishhook shaped, tip slightly hooked.

***Bicornoculus yarzari* Jiang & Li, sp. nov.** (Figs 43–45)

Holotype. Male (IZCAS-Ar42699Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means “king”; noun in apposition.

Diagnosis. This new species resembles *B. granulans* (see Wunderlich, 2020: 88, figs 78–79) by the apophysis of the



Figure 45. *Bicornoculus yarzari* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42699Fo), left palp, dorsal view. Scale bar=0.05 mm.



bulb but can be distinguished by the shape of the embolus (Fig. 43B). The embolus of *B. yarzari* Jiang & Li, **sp. nov.** is a falciform structure, but the embolus of *B. granulans* is straight.

Description. Male. Total length 1.68; carapace 0.76 long, 0.46 wide; opisthosoma 0.92 long, 0.50 wide. Left palp not visible, left leg I: - (- + - + - + 0.40 + 0.33), leg II: - (0.63 + - + - + 0.37 + 0.32), leg III: - (0.59 + - + - + 0.33 + 0.27), leg IV: - (0.67 + - + - + - + 0.38); right palp not visible, right leg I: - (- + - + - + 0.42 + 0.36), leg II: - (- + - + - + 0.36 + 0.34), leg III: - (- + - + - + 0.27 + 0.22), leg IV: - (- + - + - + 0.40 + 0.31). Eyes not visible. Habitus as in Figs 44A–B. Carapace (Figs 44A–B): carapace (Fig. 44A) sclerotized, reticulated, yellow; cephalic part not visible; clypeus brown; clypeus vertical anteriorly; labium triangular, distally obtuse; sternum marginally rugose. Opisthosoma (Figs 44A–B): Abdomen oval, covered with long setae; ventral scutum rugose.

Palp (Figs 43A–B, 45). Bulb with an apophysis, 0.19 long, 0.07 (0.13 with apophysis) wide; embolus with a sclerotized apophysis, falciform.

### Genus †*Cymbioblemma* Wunderlich, 2017

Type species: *Cymbioblemma corniger* Wunderlich, 2017.

### *Cymbioblemma ohnmari* Jiang & Li, **sp. nov.** (Figs 46–48)

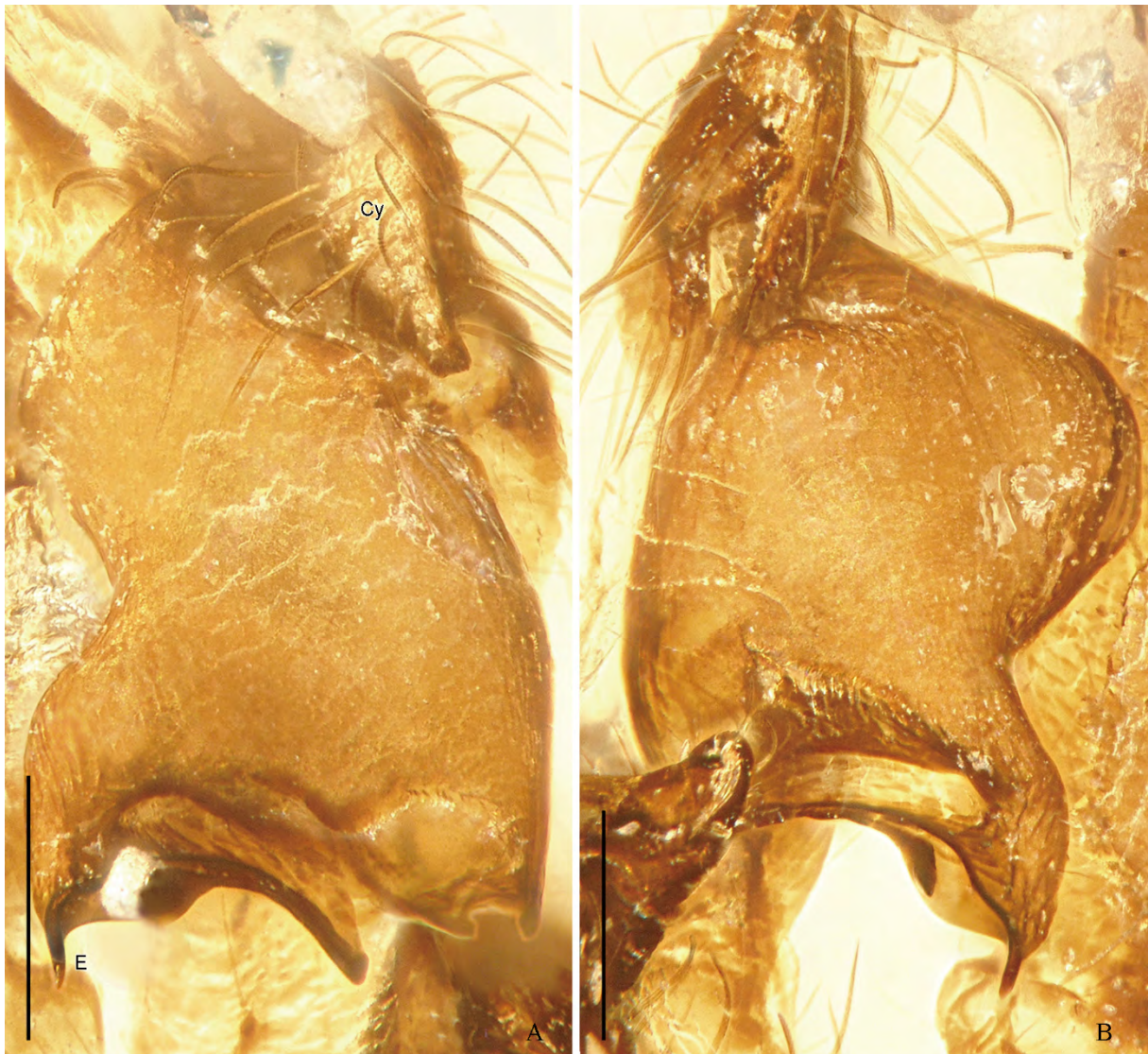


Figure 46. *Cymbioblemma ohnmari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42700Fo). A. Right palp, dorsal view; B. Left palp, dorsal view. Scale bars=0.10 mm.



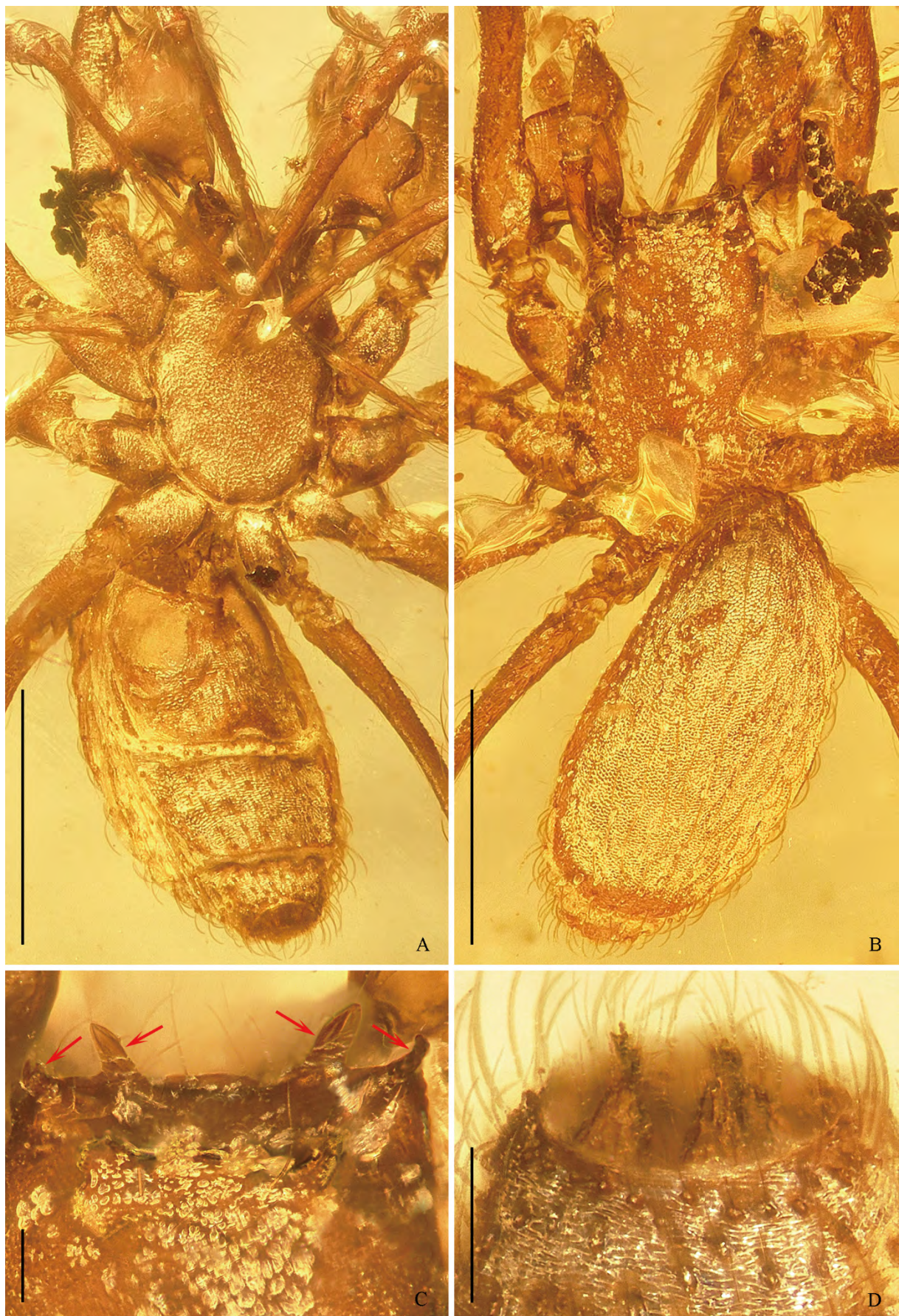


Figure 47. *Cymbioblemma ohnmari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42700Fo). A–B. Habitus (A. Ventral view; B. Dorsal view); C. Ocular area, dorsal view, arrows point at apophyses on carapace; D. Spinnerets, ventral view. Scale bars: A–B= 0.50 mm; C–D=0.05 mm.



Holotype. Male (IZCAS-Ar42700Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means "insane"; noun in apposition.

Diagnosis. The new species can be distinguished from all other *Cymbioblemma* species by the shape of the bulb and embolus. The bulb of the new species is irregularly shaped but the bulb of the other *Cymbioblemma* species is oval. The



Figure 48. *Cymbioblemma ohnmari* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42700Fo), right palp, dorsal view. Scale bar = 0.10 mm.



embolus of the new species is close to the lateral margin of the bulb.

Description. Male. Total length 1.59; carapace 0.64 long, 0.38 wide; opisthosoma 0.95 long, 0.44 wide. Left palp: 0.30 (0.13 + 0.05 + 0.12), left leg I: 1.81 (0.66 + 0.14 + 0.45 + 0.36 + 0.20), leg II: 1.50 (0.55 + 0.12 + 0.33 + 0.29 + 0.21), leg III: - (0.47 + - + - + 0.30 + 0.28), leg IV: - (0.67 + 0.13 + 0.40 + - + -); right palp: - (0.13 + 0.05 + -), right leg I: - (0.61 + - + - + 0.35 + 0.17), leg II: - (0.57 + - + - + 0.34 + 0.28), leg III: - (- + - + - + 0.26 + 0.24), leg IV: - (0.62 + - + 0.43 + 0.49 + -). Eye sizes: ALE 0.02, AME 0.02, PLE 0.02, eyes interdistances not visible. Habitus as in Figs 47A–D. Carapace (Fig. 47B) reticulated, brown; clypeus brown; six eyes (Fig. 47C) almost ovoid, AME = ALE = PLE; sternum reticulated, rugose. Opisthosoma (Figs 47A–B): scutum long, oval, covered with long setae, reticulated, center granulated; ventral scutum reticulated, margin rugose; anterior lateral spinnerets 0.04.

Palp (Figs 46A–B, 48). Femur more than two times longer than patella; patella short; cymbium conspicuously divided; bulb 0.33 long, 0.26 wide, with abruptly narrowed, needle-shaped basal part, surface smooth; embolus short, strongly sclerotized, appressed to bulb.

### Genus †*Palpalpaculla* Wunderlich, 2017

Type species: *Palpalpaculla pulcher* Wunderlich 2017.

#### *Palpalpaculla phyui* Jiang & Li, *sp. nov.* (Figs 49–51)

Holotype. Male (IZCAS-Ar42701Fo). Late Cretaceous amber from Hukawng Valley. Syninclusions include two dipterans.

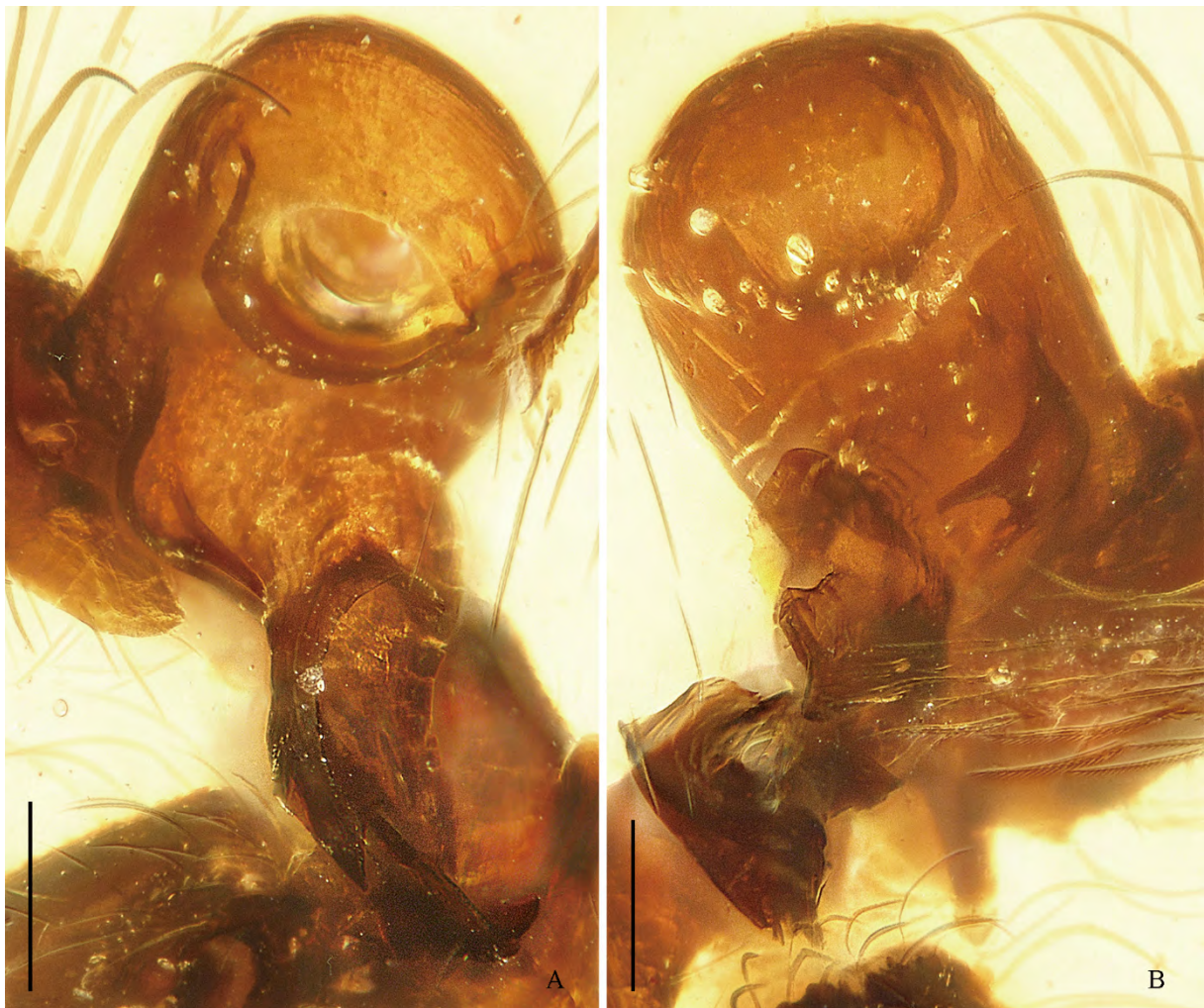


Figure 49. *Palpalpaculla phyui* Jiang & Li, *sp. nov.*, holotype male (IZCAS-Ar42701Fo). A. Left palp, dorsal view; B. Right palp, dorsal view. Scale bars=0.05 mm.



Etymology. The species name is a popular Burmese boy's name and means “white”; noun in apposition.

Diagnosis. The new species resembles *P. pulcher* (see Wunderlich, 2017: 135, figs 89–91, photos 66–67) by the bulb shape but can be distinguished by the embolus shape (Figs 49A–B, 51). The embolus is tuber-shaped and straight in *P. pulcher* and the new species, but the embolus of the new species is more complex distally.

Description. Male. Total length 1.96; carapace 0.81 long, 0.52 wide; opisthosoma 1.15 long, 0.65 wide. Left palp: 0.46



Figure 50. *Palpalpaculla phyui* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42701Fo), habitus. A. Dorsal view; B. Ventral view. Scale bars = 0.50 mm.



(0.16 + 0.09 + 0.21), left leg I: - (- + - + - + 0.42 + 0.32), leg II: - (- + - + - + 0.33 + 0.28), leg III: - (- + - + - + 0.32 + 0.21), leg IV: - (- + - + - + 0.43 + 0.31); right palp: 0.43 (0.15 + 0.09 + 0.19), right leg I: - (0.72 + - + - + 0.41 + 0.33), leg II: - (0.46 + - + - + 0.35 + 0.33), leg III: - (0.41 + - + - + 0.33 + 0.30), leg IV: - (0.54 + - + - + 0.45 + 0.34). Eye sizes: ALE 0.06, AME 0.06, PLE 0.06, eyes interdistances not visible. Habitus as in Figs 50A–B. Carapace (Fig. 50A) sclerotized, reticulated, brown; cephalic part moderately raised; six eyes (Fig. 50A) almost ovoid, AME = ALE = PLE, ALE and PLE adjacent; clypeus brown; clypeus vertical anteriorly; labium triangular, distally obtuse; sternum marginally rugose, posterior corner protruded. Opisthosoma (Figs 50A–B): oval with sclerotized lateral plates, smooth, modified by tiny pits, covered with thin setae; ventral scutum rugose.

Palp (Figs 49A–B, 51). Femur and patella with apophysis; cymbium small; bulb long, strongly swollen distally, bent once; embolus originates from apex of oval palpal bulb; embolus sclerotized, thickened.



Figure 51. *Palpalpaculla phyui* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42701Fo), left palp, dorsal view. Scale bar=0.05 mm.



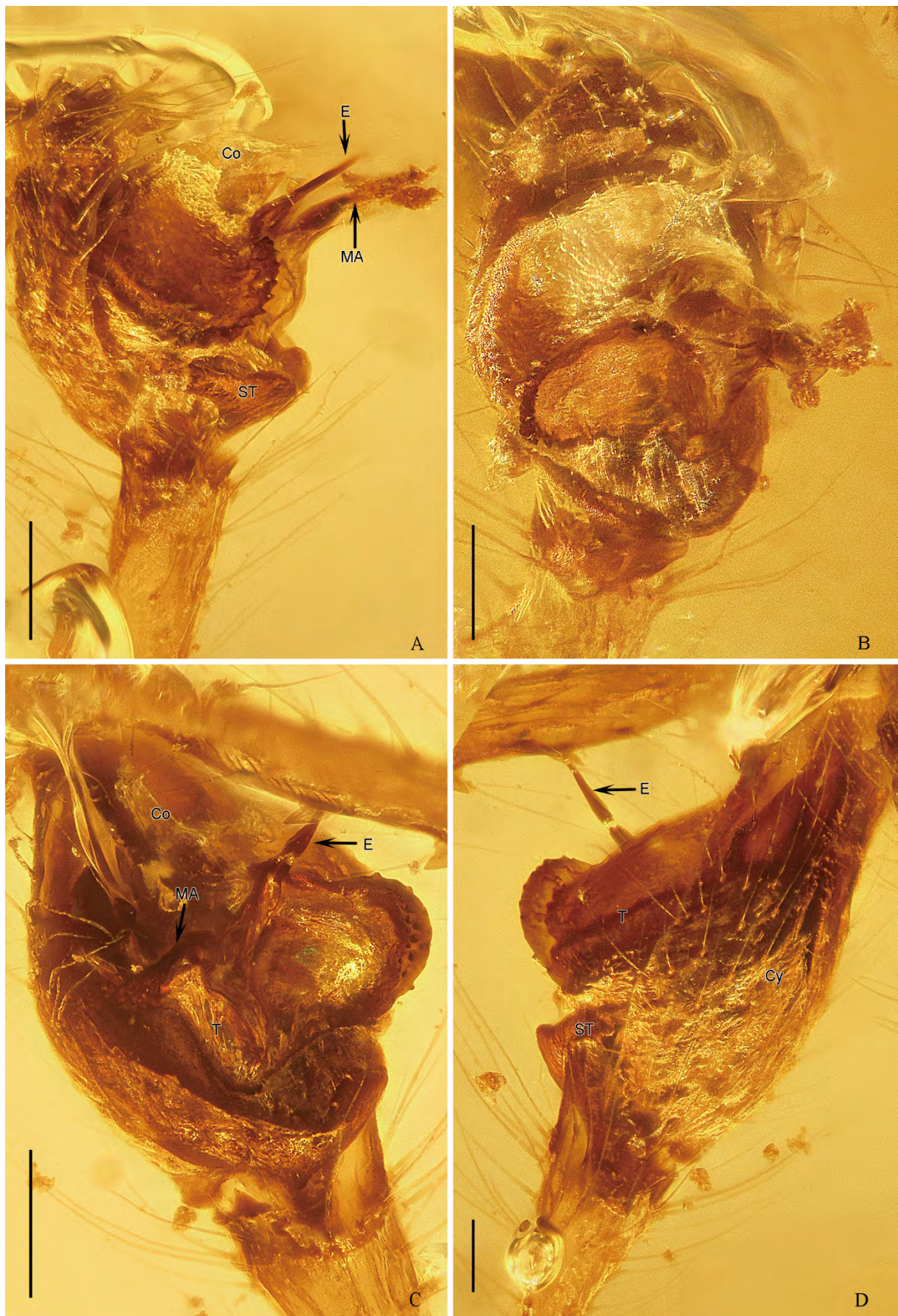


Figure 52. *Burmatheridon cetani* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42702Fo). A–B. Right palp (A. Retrolateral view; B. Ventral view); C–D. Left palp (C. Ventral view; D. Retrolateral view). Scale bars=0.05 mm.



3.5 Family Theridiidae Sundevall, 1833

Genus †*Burmatheridon* Wunderlich, 2018

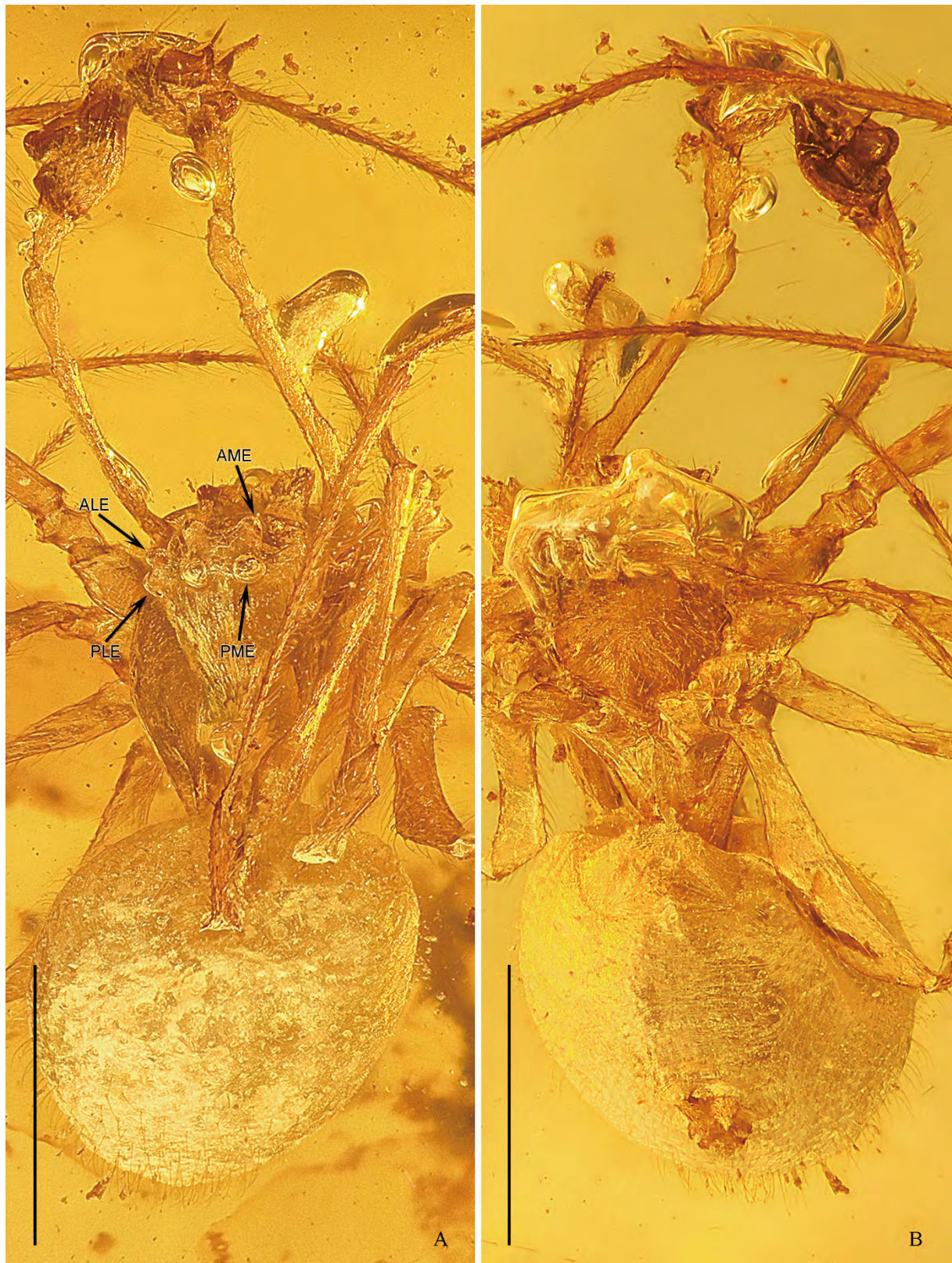


Figure 53. *Burmatheridon cetani* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42702Fo), habitus. A. Dorsal view; B. Ventral view. Scale bars = 0.50 mm.



Type species: *Burmatheridon sinespinae* Wunderlich, 2018.

*Burmatheridon cetani* Jiang & Li, sp. nov. (Figs 52–54)



Figure 54. *Burmatheridon cetani* Jiang & Li, sp. nov., holotype male (IZCAS-Ar42702Fo), left palp, ventral view. Scale bar = 0.05 mm.



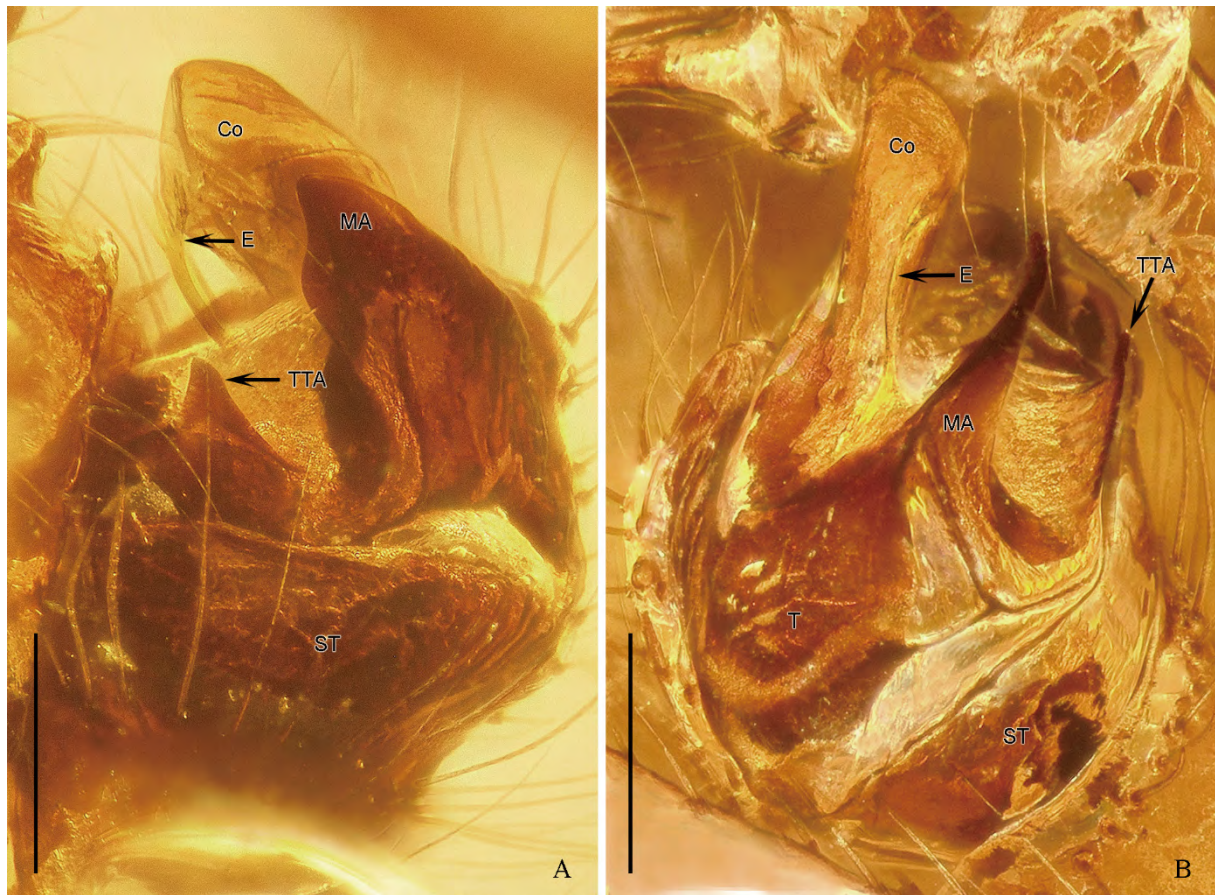


Figure 55. *Cretotheridion champoi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42703Fo). A. Left palp, retrolateral view; B. Right palp, retrolateral view. Scale bars = 0.05 mm.

Holotype. Male (IZCAS-Ar42702Fo). Late Cretaceous amber from Hukawng Valley. Syninclusion includes one spiderling.

Etymology. The species name is a popular Burmese boy's name and means "hawk"; noun in apposition.

Diagnosis. The new species can be distinguished from *B. sinespinae* (see Wunderlich & Müller, 2018: 117, figs 219–222, photos 54–55) by the shape of the apophysis on the palp. *B. sinespinae* has four apophyses (a serrated tegular apophysis, two thin tegular apophyses, and a long apophysis) that are different from those of *B. cetani* Jiang & Li, **sp. nov.**, which has three apophyses (embolus, median apophysis, and conductor).

Description. Male. Total length 1.32; carapace 0.59 long, 0.44 wide; opisthosoma 0.73 long, 0.68 wide. Left palp: - (0.51 + 0.23 + -), left leg I: 4.04 (1.24 + 0.23 + 1.10 + 1.18 + 0.29), leg II: 2.50 (0.75 + 0.18 + 0.59 + 0.64 + 0.34), leg III: - (0.51 + 0.12 + - + - + -), leg IV: 2.18 (0.69 + 0.11 + 0.52 + 0.55 + 0.31); right palp: - (0.49 + 0.20 + -), right leg I: 3.57 (1.07 + 0.19 + 1.12 + 0.82 + 0.37), leg II: 2.31 (0.78 + 0.22 + 0.60 + 0.73 + 0.35), leg III: - (- + 0.16 + 0.37 + 0.26 + 0.30), leg IV: - (0.63 + 0.28 + 0.56 + - + -). Eye sizes and interdistances: ALE 0.05, AME 0.04, PLE 0.05, PME 0.05; AME–AME 0.09, AME–ALE 0.06, PME–PLE 0.07, PME–PME 0.06. Habitus as in Figs 53A–B. Carapace almost oval, yellow, short, with brown setae. Sternum yellowish, round, with dense setae. Labium not visible. Legs have two rows of strong setae on metatarsus and tarsus, 3 claws. Opisthosoma oval, yellowish.

Palp (Figs 52A–D, 54). Femur longer than patella, patella and tibia without apophyses. Embolus slender, sclerotized. Base of embolus irregular polygon shaped, serrated at edge, median apophysis originates from tegulum, sclerotized, slender, conductor deformed, subtegulum small.

### Genus †*Cretotheridion* Wunderlich, 2015

Type species: *Cretotheridion inopinatum* Wunderlich, 2015.



***Cretotheridion champoi* Jiang & Li, sp. nov.** (Figs 55–57)

Holotype. Male (IZCAS-Ar42703Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

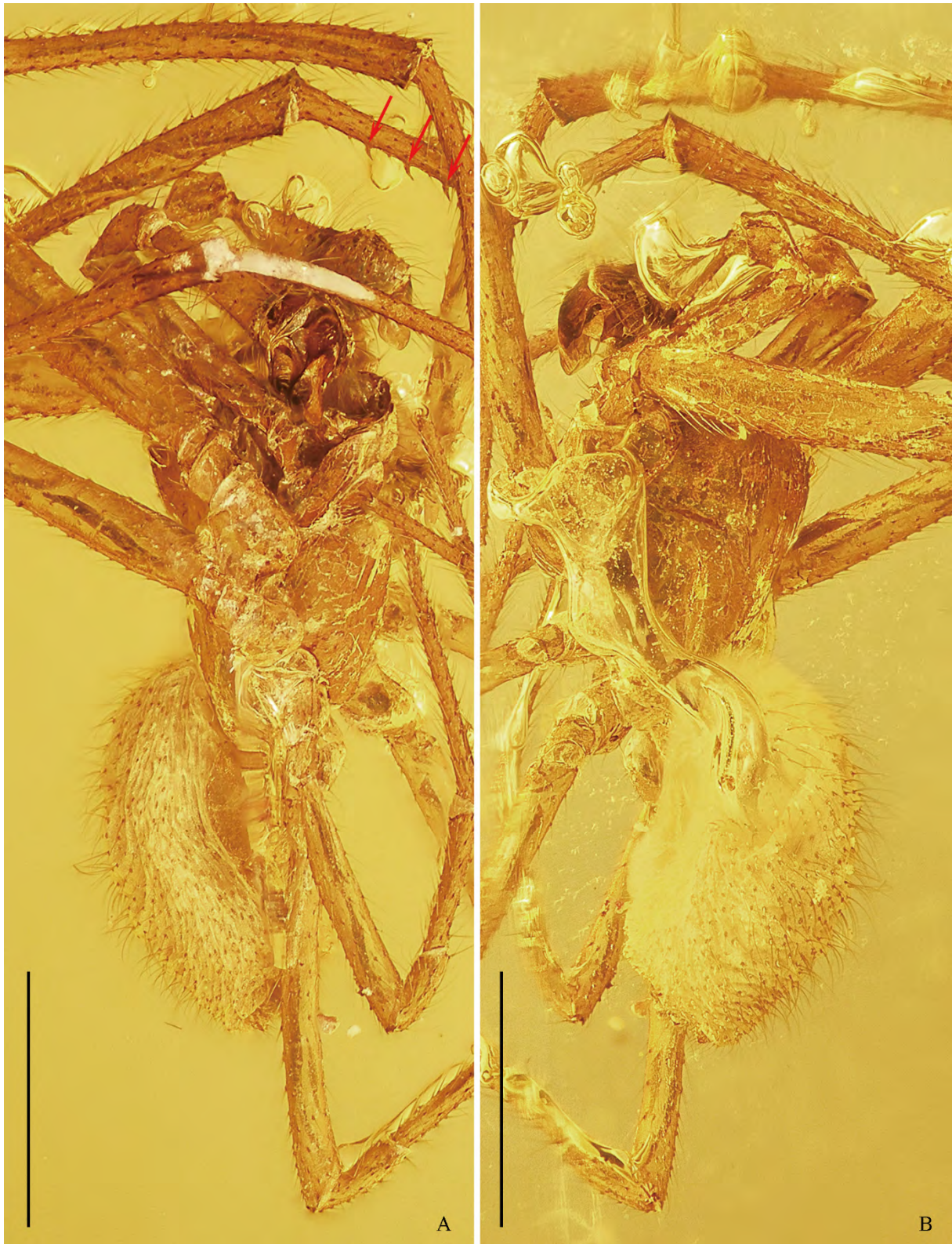


Figure 56. *Cretotheridion champoi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42703Fo), habitus, lateral view, arrows point at macrosetae on femur. Scale bars=0.50 mm.



**Etymology.** The species name is a popular Burmese boy's name and means "He is friendly"; noun in apposition.

**Diagnosis.** The new species can be distinguished from *C. inopinatum* (see Wunderlich, 2015: 343, figs 398–406, photo 175) by the shape of the median apophysis. The median apophysis of the new species is an irregular polygon-shaped apophysis, but the median apophysis of *C. inopinatum* is circular. The conductor of the new species is rectangular and



Figure 57. *Cretotheridion champoi* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42703Fo), right palp, retrolateral view. Scale bar = 0.05 mm.



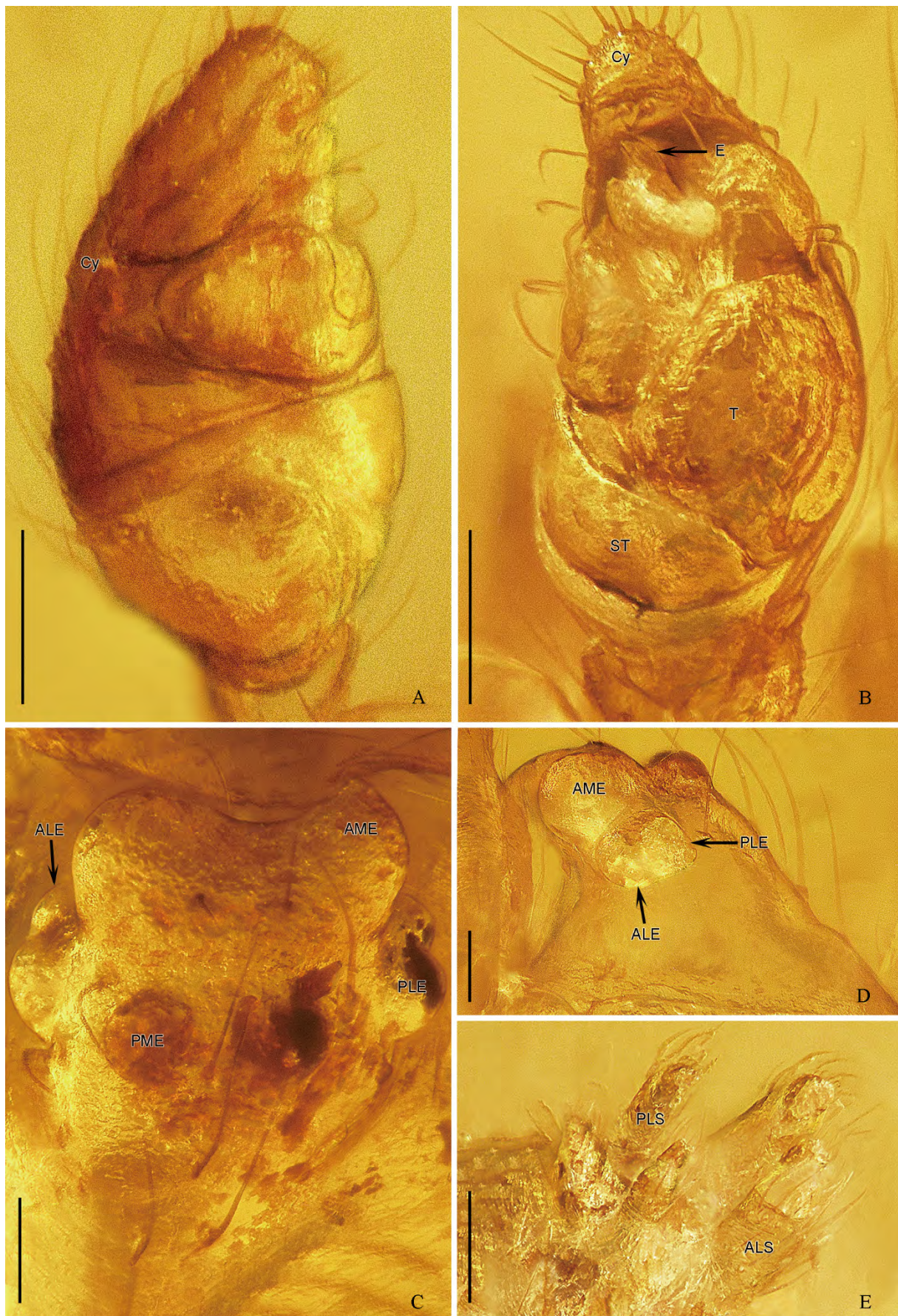


Figure 58. *Triangulum thutai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42704Fo). A–B. Left palp (A. Prolateral view, B. Retrolateral view); C–D. Ocular area (C. Dorsal view, D. Lateral view); E. Spinnerets, ventral view. Scale bars=0.05 mm.



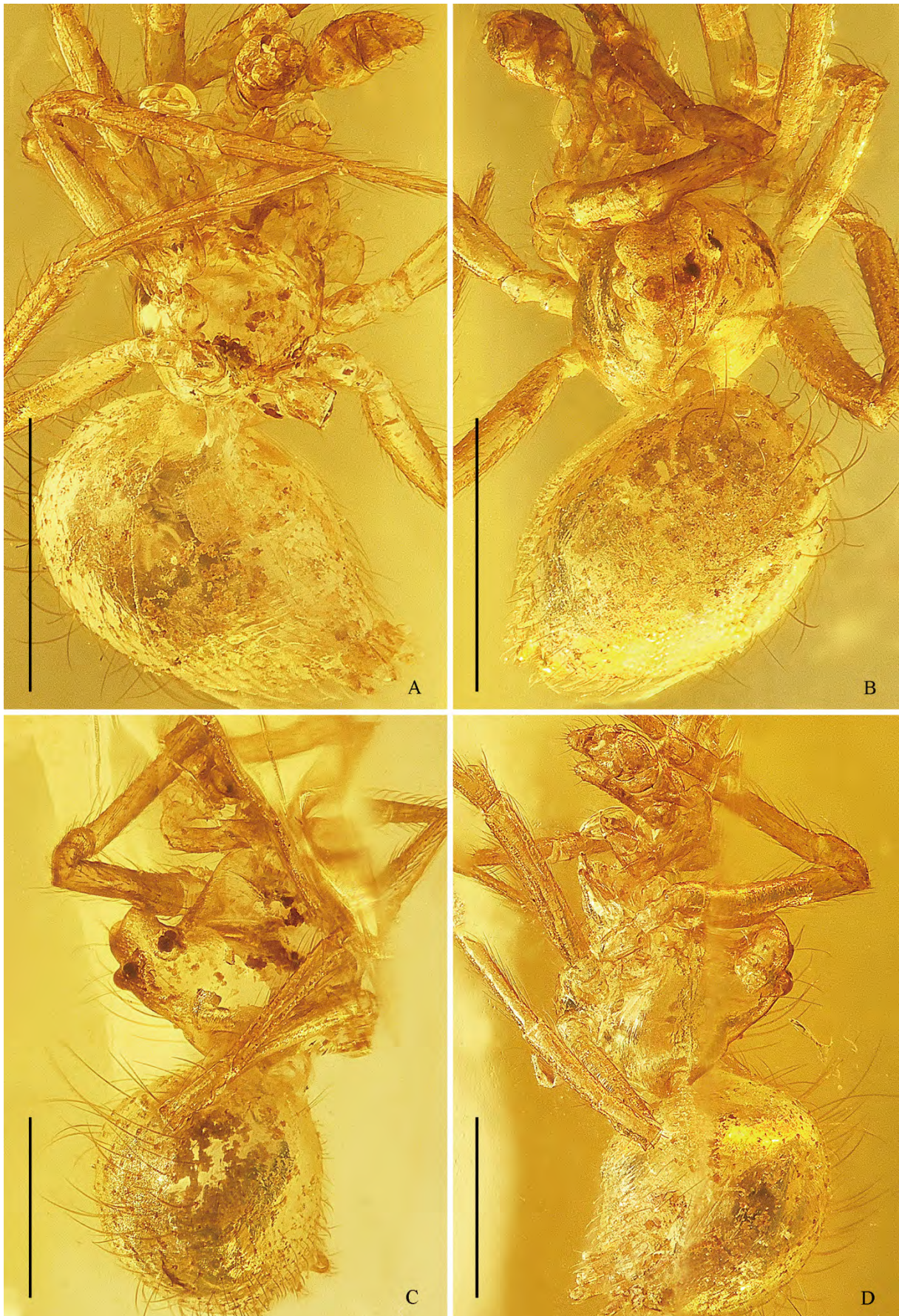


Figure 59. *Triangulum thutai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42704Fo). A–B. Habitus (A. Ventral view; B. Dorsal view); C–D. Habitus, lateral view. Scale bars=0.50 mm.



undivided, but the conductor of *C. inopinatum* is divided into two parts.

Description. Male. Total length 1.46; carapace 0.72 long; opisthosoma 0.74 long. Left palp: - (0.47 + 0.13 + -), left leg I: 4.04 (1.24 + 0.23 + 1.10 + 1.18 + 0.29), leg II: 2.50 (0.75 + 0.18 + 0.59 + 0.64 + 0.34), leg III: - (0.51 + 0.12 + - + - + -), leg IV: 2.18 (0.69 + 0.11 + 0.52 + 0.55 + 0.31); right palp: - (0.50 + 0.12 + -), right leg I: 2.86 (1.03 + 0.27 + 0.78 + 0.59 +

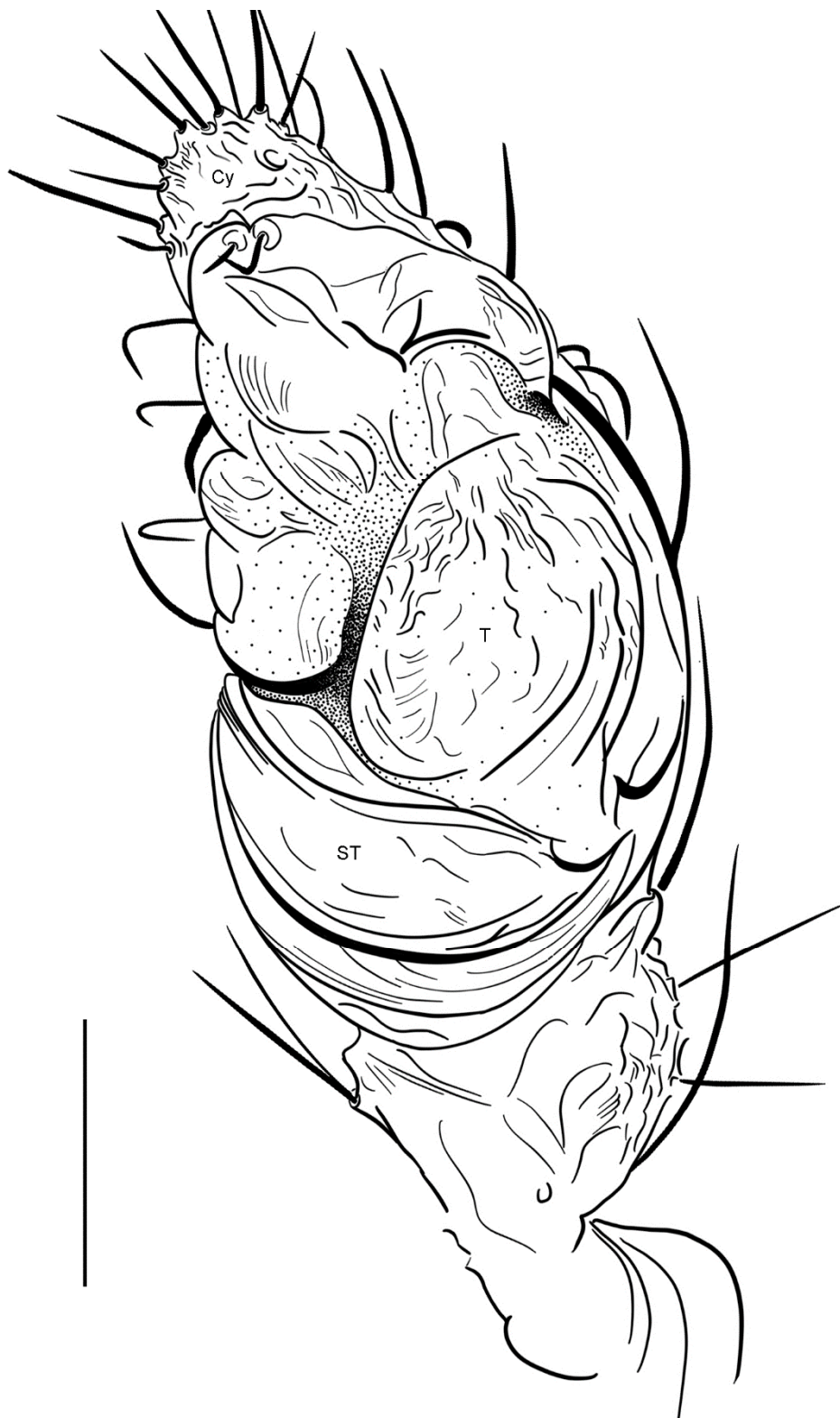


Figure 60. *Triangulum thutai* Jiang & Li, **sp. nov.**, holotype male (IZCAS-Ar42704Fo), left palp, retrolateral view. Scale bar = 0.05 mm.



0.19), leg II: 2.23 (0.72 + 0.22 + 0.57 + 0.54 + 0.18), leg III: 1.30 (0.45 + 0.11 + 0.26 + 0.28 + 0.20), leg IV: 1.96 (0.79 + 0.18 + 0.36 + 0.43 + 0.20). Eye sizes and interdistances: ALE 0.07, AME 0.03, PLE 0.08, PME 0.06; AME–AME 0.05, AME–ALE 0.07, PME–PLE 0.08, PME–PME 0.06. Habitus as in Figs 56A–B. Carapace almost oval, yellow, with brown setae. Sternum yellowish, round, with dense hairs. Labium 0.16 long, 0.10 wide. Legs have strong setae on metatarsus and tarsus, 3 claws. Opisthosoma oval, yellowish.

Palp (Figs 55A–B, 57). Femur longer than patella, patella, and tibia without any apophyses. Embolus slender, median apophysis originates from tegulum, sclerotized, irregular polygon-shaped, conductor rectangular, theridiid tegular apophysis triangular.

### Genus †*Triangulum* Jiang & Li, gen. nov.

Type species. *Triangulum thutai* Jiang & Li, **sp. nov.**

Etymology. The generic name is derived from the Latin word “*triangulum*” meaning “triangle” referring to the shape of the carapace. The generic name is neutral.

Diagnosis. *Triangulum* Jiang & Li, **gen. nov.** can be distinguished from all other theridiid genera in Kachin amber by the characters of the carapace and the male palp. The carapace is triangular in lateral view. The palp has a large tegulum and subtegulum.

### *Triangulum thutai* Jiang & Li, **sp. nov.** (Figs 58–60)

Holotype. Male (IZCAS-Ar42704Fo). Late Cretaceous amber from Hukawng Valley. No biotic syninclusions.

Etymology. The species name is a popular Burmese boy's name and means “knowledge”; noun in apposition.

Diagnosis. The new species can be distinguished by the characters of the genus.

Description. Male. Total length 1.29; carapace 0.58 long, 0.34 wide, 0.54 high; opisthosoma 0.71 long, 0.46 wide. Left palp: - (0.22 + - + -), left leg I: - (0.52 + 0.12 + 0.42 + 0.46 + 0.28), leg II: (0.48 + 0.20 + 0.26 + 0.28 + 0.22), leg III: 1.06 (0.20 + 0.16 + 0.24 + 0.26 + 0.20), leg IV absent; right palp: absent, right leg I: 1.65 (0.56 + 0.11 + 0.42 + 0.36 + 0.20), leg II: 1.41 (0.40 + 0.15 + 0.32 + 0.30 + 0.24), leg III: 1.00 (0.32 + 0.08 + 0.20 + 0.22 + 0.18), leg IV: 1.34 (0.34 + 0.10 + 0.32 + 0.32 + 0.26). Eye sizes and interdistances: ALE 0.04, AME 0.80, PLE 0.04, PME 0.04; AME–AME 0.10, PME–PME 0.04. Habitus as in Figs 58C–E, 59A–D. Carapace (Figs 58C–E): carapace rather high but not cylindrical; sternum yellowish, round, with dense setae; eye region raised, clypeus projecting. AME largest, posterior row slightly recurved as seen from above, PME smallest. Opisthosoma (Figs 59A–D): Abdomen oval, covered with long setae. Legs unmodified, slender, fairly long with long bristles.

Palp (Figs 58A–B, 60). Femur longer than patella, patella and tibia without apophyses; cymbium voluminous and round; embolus small and slender; tegulum large; median apophysis not visible; tegulum sclerotized.

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