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A survey of clubionid spiders (Araneae: Clubionidae) from Shiwandashan National Nature Reserve, Guangxi, China

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Abstract. A survey of clubionid spiders from Shiwandashan National Nature Reserve, Guangxi, China, is presented. A total of four genera and eight species are reported and illustrated, including three new species and one new combination: *Femorbiona pinglong* Wu & Xu sp. nov. (♂♀), *F. triangula* Wu & Xu sp. nov. (♂♀), *Porrhoclubiona songbai* Wu & Xu sp. nov. (♀), and *F. kayashimai* (Ono, 1994) comb. nov. (♀), which is transferred from *Clubiona* Latreille, 1804. In addition, four previously known species are recorded, including the first description of the male of *C. yanzhii* Zhang & Yu, 2020. Detailed descriptions and diagnoses are provided for the new species and the new combination. Photographs and DNA barcodes of all examined species are included to aid species delimitation, sex matching, and future research.

Key words. Sac spider, taxonomy, morphology, *COI*, new species, southern China.

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Introduction

Spiders of the family Clubionidae Simon, 1878 are small- to medium-sized, with slender bodies. They inhabit diverse microhabitats and are commonly found on soft leaves or blade-shaped foliage, where they spin silk to construct tube-shaped retreats, but are also found under tree bark, within leaf litter, or on the ground (Song *et al.* 1999; Yin *et al.* 2012).

The Clubionidae represents a relatively species-rich spider family, currently comprising 678 valid species across 18 genera, with a global distribution excluding the Polar Regions, and 540 (79.6%) of these are placed in the genus *Clubiona* Latreille, 1804 (WSC 2025). While traditional taxonomic efforts prioritized new taxon discovery and species revisions, recent molecular analyses challenge its monophyly (Kulkarni *et al.* 2023).

In China, clubionids have been well studied, with a total of 206 species across 11 genera recorded to date, of which 186 belong to *Clubiona*. Over the past twenty years, nearly all known Chinese species of the family were provided with detailed color illustrations, when described or redescribed (Zhang *et al.* 2007a, 2007b, 2007c; Zhang & Zhu 2009; Chen & Huang 2012; Zhu *et al.* 2012; Liu *et al.* 2016; Yu & Chen 2017; Yu *et al.* 2017; Wang *et al.* 2018; Yu & Li 2019a, 2019b; Zhang & Yu 2020; Zhang *et al.* 2020, 2021a, 2021b, 2021c, 2021d, 2025; Lin *et al.* 2023; Zhang *et al.* 2024; Guo *et al.* 2025; WSC 2025).

Over the past decade, the Arachnid Research Team from Hunan Normal University has conducted extensive faunal surveys of spiders in Guangxi Zhuang Autonomous Region, southern China. These efforts have resulted in the discovery of numerous taxa. To date, only part of the collected material has been published, including representatives of the families Agelenidae C.L. Koch, 1837, Caponiidae Simon, 1890, Liocranidae Simon, 1897, Pholcidae C.L. Koch, 1850, Phrurolithidae Banks, 1892, Tetragnathidae Menge, 1866, Theridiidae Sundevall, 1833, Thomisidae Sundevall, 1833, and Uloboridae Thorell, 1869 (Huang *et al.* 2023, 2024; Liang *et al.* 2021, 2024; Liu *et al.* 2017, 2019a, 2019b, 2020; Liu *et al.* 2024; Wei & Xu 2014). A significant amount of additionally collected material, including specimens of the Clubionidae, remains to be studied.

The goal of this paper is to present all species of clubionid spiders currently known from Shiwandashan National Nature Reserve, including: 1) illustrations, diagnoses and descriptions of *Femorbiona kayashimai* (Ono, 1994) comb. nov., *F. pinglong* Wu & Xu, sp. nov., *F. triangula* Wu & Xu, sp. nov. and *Porrhoclubiona songbai* Wu & Xu, sp. nov.; 2) illustrations, diagnosis and description of the male of *C. yanzhi* Zhang & Yu, 2020 for the first time; 3) re-illustrations of *C. lala* Jäger & Dankittipakul, 2010, *C. milingae* Barrion-Dupo, Barrion & Heong, 2012 and *Matidia spatulata* Chen & Huang, 2006 based on newly collected material, supplemented with micrographs; and 4) DNA barcodes for all eight species were obtained for species identification, matching of sexes and future use, most of which are published for the first time.

Material and methods

Taxonomy

All specimens were collected by beating vegetation and preserved in absolute ethanol. The examined specimens are deposited in the College of Life Sciences, Hunan Normal University (HNNU), China. The right leg I was removed for DNA extraction, while the remaining body was stored in 75% ethanol for morphological examination. Specimens were examined under an Olympus SZX16 stereo microscope and an Olympus BX53 compound microscope. Epigynes were dissected, cleared in lactic acid or a warm 10% potassium hydroxide (KOH) solution, and photographed using a Canon 80D camera mounted on an Olympus BX53 compound microscope. Final multifocal images were generated using Helicon Focus ver. 6.0 (https://www.heliconsoft.com).

All morphological measurements were taken using a LEICA M205C stereo microscope and are given in millimeters. Eye diameters were measured at their widest points. Leg segment lengths were recorded from the dorsal side. The total body length excludes the chelicerae and spinnerets. Leg lengths are presented as total length, followed by segment measurements in the order: femur, patella, tibia, metatarsus, and tarsus.

Abbreviations used for morphological terms

Most of the terminology in this paper follows Zhang *et al.* (2021a, 2021b, 2021c). To facilitate the description of the species of *Femorbiona* Yu & Li, 2021, the following abbreviations are proposed and used in the text and figures:

DPS = dorsal part of spermatheca
VPS = ventral part of spermatheca

Other abbreviations used for morphological terms

A = epigynal atrium
AER = anterior eye row
ALE = anterior lateral eyes
AME = anterior median eyes
AME–AME = distance between AMEs
AME–ALE = distance between AME and ALE
BS = bursa
C = conductor
CD = copulatory duct
CO = copulatory opening
DCA = dorsal cymbial apophysis
DPS = dorsal part of spermatheca
DTA = dorsal tibial apophysis
E = embolus
EB = embolic base
FA = femoral apophysis
FD = fertilisation duct
H = hood
MOQ = median ocular quadrangle
MOQA = anterior width of MOQ
MOQL = length of MOQ
MOQP = posterior width of MOQ
PER = posterior eye row
PLE = posterior lateral eyes
PME = posterior median eyes
PME–PME = distance between PMEs
PME–PLE = distance between PME and PLE
PPA = prolateral patellar apophysis
PTA = prolateral tibial apophysis
RTA = retrolateral tibial apophysis
SB = spermathecal base
SD = sperm duct
SH = spermathecal head
SP = spermatheca
TA = tegular apophysis
VPS = ventral part of spermatheca
VTA = ventral tibial apophysis

Molecular analysis

DNA barcodes were obtained to confirm species identification and ensure accurate sex matching. Genomic DNA was extracted from the leg tissue of adult spiders using the TIANamp Genomic DNA Kit (TianGen Biotech, Beijing, China), following the manufacturer's protocol (https://en.tiangen.com/content/details_43_4224.html; accessed 1 Mar. 2025). A fragment of the mitochondrial cytochrome c oxidase subunit I (*COI*) gene was amplified for 12 samples using

the primer pairs LCO1490 (5′-GGTCAACAAATCATAAAGATATTGG-3′) and HCO2198 (5′-TAAACTTCAGGGTGACCAAAAAATCA-3′) (Folmer *et al.* 1994).

The resulting PCR products were purified and sequenced by Sangon Biotech (Shanghai, China). The PCR reaction protocol and sequence data inspection followed Wheeler *et al.* (2017). Sequences were verified using BLAST (https://www.ncbi.nlm.nih.gov; accessed 20 Mar. 2025) and are deposited in GenBank. GenBank accession numbers for voucher specimens are listed in Table 1.

Sequence alignments were carried out using Geneious Prime 2025.0.2 (https://www.geneious.com) with the MAFFT ver. 7.490 (Katoh & Standley 2013) strategy. Ambiguously aligned positions were culled using Geneious Prime 2025.0.2 (https://www.geneious.com). The genetic distance of the *COI* gene was calculated using MEGA ver. 11 (Tamura *et al.* 2021) with the following parameters: 1000 bootstrap replications based on *p*-distance substitution models, and other parameters were set the default.

Results

Genetic distance

The genetic distances between the species examined in this study are provided in Table 2, supporting our identifications and helping to prevent potential mismatches.

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Clubionidae Simon, 1878

Genus ***Clubiona*** Latreille, 1804

Type species

Araneus pallidulus Clerck, 1757.

Remarks

The genus *Clubiona* has often functioned as a repository for species that could not be confidently assigned to other, better-defined genera. And due to the high species diversity in *Clubiona*, several subgenera and species groups have been proposed, resulting in a rather complex taxonomic situation. *Clubiona* is also one of the spider genera with the largest number of generic-level synonyms; currently, 14 genera or subgenera are considered junior synonyms (Zhang *et al.* 2021a, 2021c, 2021d, 2025; WSC 2025). This reflects the considerable taxonomic complexity within the genus.

Table 1. Samples information: taxon name, specimen label, and GenBank accession numbers.

Species	Specimen code	GenBank accession number
Clubiona lala Jäger & Dankittipakul, 2010	HNU1396	PX640161
Clubiona milingae Barrion-Dupo, Barrion & Heong, 2012	HNU1402	PX640166
Clubiona yanzhii Zhang & Yu, 2020	HNU1372	PX640157
Clubiona yanzhii	HNU1391	PX640160
Femorbiona kayashimai (Ono, 1994) comb. nov.	HNU1399	PX640163
Femorbiona pinglong Wu & Xu sp. nov.	HNU1368	PX640156
Femorbiona pinglong sp. nov.	HNU1398	PX640162
Femorbiona triangula Wu & Xu sp. nov.	HNU1373	PX640158
Femorbiona triangula sp. nov.	HNU1376	PX640159
Matidia spatulata Chen & Huang, 2006	HNU1400	PX640164
Matidia spatulata	HNU1403	PX640167
Porrhoclubiona songbai Wu & Xu sp. nov.	HNU1401	PX640165

Clubiona lala Jäger & Dankittipakul, 2010
多样管巢蛛
Fig. 1

Clubiona lala Jäger & Dankittipakul, 2010: 29, figs 22–25, 28–30 (♀).

Clubiona lala – Zhang, Yu & Li 2021a: 48, figs 42a–e, 43a–h, 60b, 70b, 79d, 87d, 95d (♂♀).

Diagnosis and description

See Jäger & Dankittipakul (2010) for the female; Zhang *et al.* (2021a) for the male. Female habitus as in Fig. 1A–B; epigyne as in Fig. 1C–D.

Material examined

CHINA • 1 ♀; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Pinglong Station; 21°50′ N, 107°53′ E; 527 m a.s.l.; 29 Apr. 2021; J. Liu leg; HNU1396.

Distribution

China (Guangxi Zhuang Autonomous Region, Yunnan), Laos.

Clubiona milingae Barrion-Dupo, Barrion & Heong, 2012
米琳管巢蛛
Fig. 2

Clubiona milingae Barrion-Dupo, Barrion & Heong in Barrion *et al.*, 2012: 8, fig. 7a–e (♂).

Clubiona milingae – Zhang, Yu & Chen 2020: 3, figs 1a–f, 2a–e, 3a–d (♂♀). — Lin *et al.* 2023: 504, figs 1a–c, 2a–b (♂).

Table 2. Estimates of evolutionary divergence between sequences derived from this study (based on *p*-distance).

	1	2	3	4	5	6	7	8	9	10	11	12
1. *Femorbiona. pinglong* Wu & Xu sp. nov. HNU1368												
2. *F. pinglong* sp. nov. HNU1398	0.0015											
3. *F. triangula* Wu & Xu sp. nov. HNU1373	0.0759	0.0744										
4. *F. triangula* sp. nov. HNU1376	0.0774	0.0759	0.0045									
5. *F. kayashimai* comb. nov. HNU1399	0.0881	0.0865	0.0657	0.0657								
6. *Clubiona yanzhii* HNU1372	0.0908	0.0893	0.1086	0.1101	0.1090							
7. *C. yanzhii* HNU1391	0.0908	0.0893	0.1086	0.1101	0.1090	0.0000						
8. *Matidia spatulata* HNU1400	0.0923	0.0908	0.1071	0.1086	0.1170	0.1146	0.1146					
9. *M. spatulata* HNU1403	0.0923	0.0908	0.1071	0.1086	0.1170	0.1146	0.1146	0.0000				
10. *Porrhoclubiona songbai* Wu & Xu sp. nov. HNU1401	0.1161	0.1146	0.1116	0.1131	0.1170	0.1354	0.1354	0.1161	0.1161			
11. *Clubiona milingae* HNU1402	0.1265	0.1250	0.1205	0.1190	0.1234	0.1369	0.1369	0.1131	0.1131	0.1116		
12. *C. lala* HNU1396	0.1265	0.1250	0.1176	0.1190	0.1218	0.1399	0.1399	0.1280	0.1280	0.1161	0.1220	

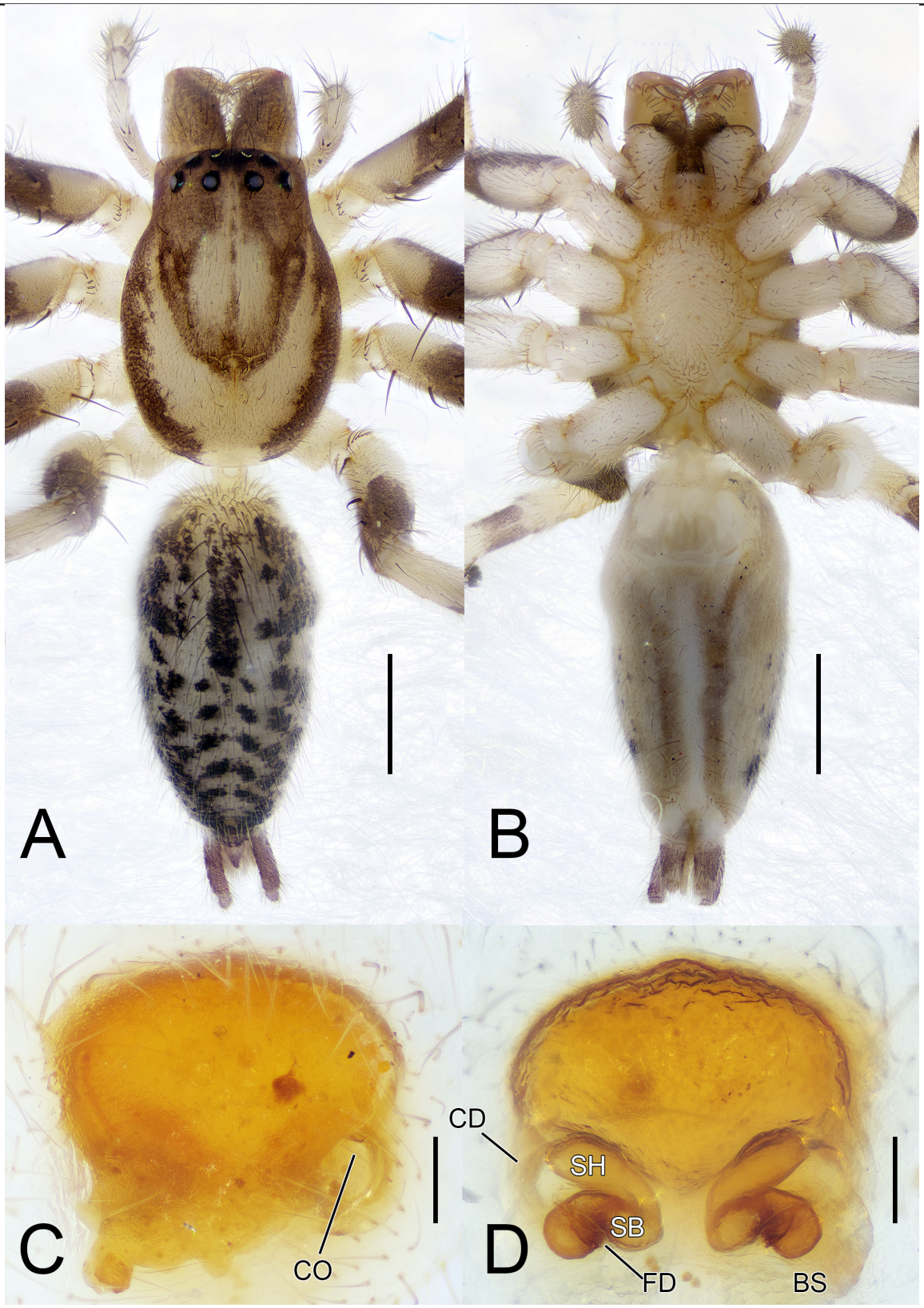

Fig. 1. General somatic morphology and genital anatomy of *Clubiona lala* Jäger & Dankittipakul, 2010, ♀ (HNU1396). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–D**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in lactic acid, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–D = 0.1 mm.

Diagnosis and description

See Barrion *et al.* (2012) for the original description of the male, and Zhang *et al.* (2020) for a redescription of the male and first description of the female. Male habitus as in Fig. 2A–B; palp as in Fig. 2C–F.

Material examined

CHINA • 1 ♂; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Songbai Station; 21°58′ N, 108°01′ E; 303 m a.s.l.; 1 May 2021; J. Liu leg; HNU1402.

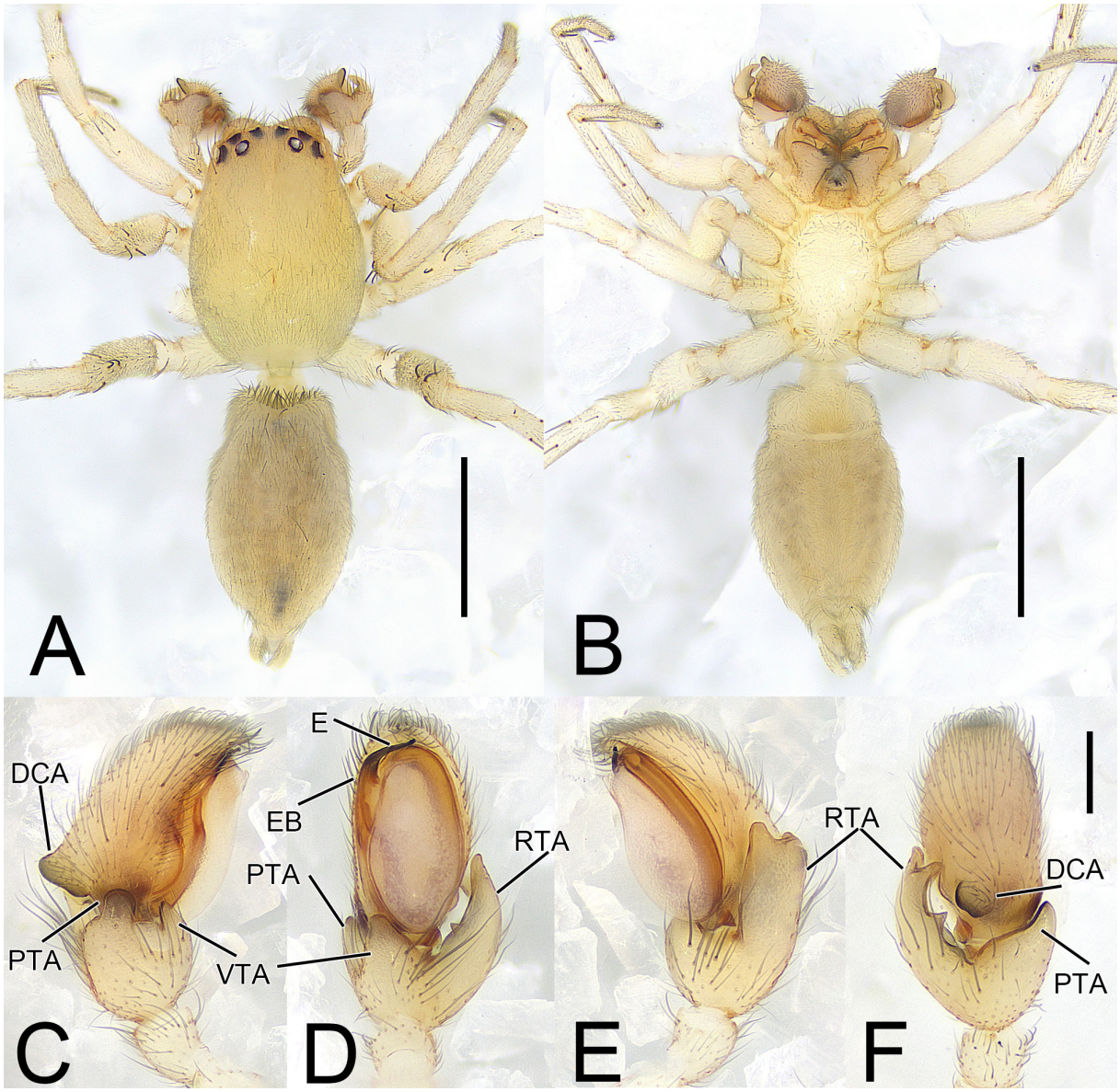

Fig. 2. General somatic morphology and genital anatomy of *Clubiona milingae* Barrion-Dupo, Barrion & Heong, 2012, ♂ (HNU1402). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C**. Left palp, prolateral view. **D**. Left palp, ventral view. **E**. Left palp, retrolateral view. **F**. Left palp, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 0.5 mm; C–F = 0.1 mm.

Distribution

China (Guangxi Zhuang Autonomous Region, Hainan).

Clubiona yanzhii Zhang & Yu, 2020
彦之管巢蛛
Figs 3–4

Clubiona yanzhii Zhang & Yu, 2020: 353, fig. 5a–g (♀).

Diagnosis

The male *C. yanzhii* resembles that of *C. subapplanata* Wang, Chen & Zhang, 2018 in the shape of the palp (compare Fig. 3C–E with Wang *et al.* 2018: figs 14a–b, 15c–d) but can be distinguished by the absence of the LTA, the membranous VTA, the transparent, membranous conductor, the small EB, and the TA with a straight and pointed distal end (Fig. 3C–E) (vs presence of the LTA, a distinctly sclerotized VTA, absence of the conductor, a distinctly swollen EB, and a twisted distal end of the TA in *C. subapplanata*, as in Wang *et al.* 2018: figs 14a–b, 15c–d).

For the diagnosis of the female, see Zhang & Yu (2020).

Material examined

CHINA • 1 ♂; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Pinglong Station; 21°50′ N, 107°53′ E; 749 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1372 • 2 ♀♀; same data as for preceding; 21°50′ N, 107°53′ E; 619 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1391 to HNU1392 • 1 ♀; same data as for preceding, Banba Village, Dongkou Station; 21°43′ N, 107°32′ E; 820 m a.s.l.; 27 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg.; HNU1393.

Description

Male (HNU1372)

Total length 5.08; carapace 2.28 long, 1.60 wide; abdomen 2.66 long, 1.51 wide. Carapace elongate-oval, brown, fovea red; cephalic region distinctly narrowed; cervical groove indistinct, radial grooves distinct; anterior part densely covered with fine white hairs (Fig. 3A). Eyes: AER distinctly recurved, PER wider than AER and nearly straight in dorsal view. Eye sizes and interdistances: AME 0.10, ALE 0.12, PME 0.12, PLE 0.12, AME–AME 0.09, AME–ALE 0.05, PME–PME 0.21, PME–PLE 0.13, MOQL 0.36, MOQA 0.30, MOQP 0.44. Chelicerae brown, darker than carapace, with five promarginal and four retromarginal teeth. Sternum yellow, oval, with long black hairs along the margins, 1.28 long, 0.77 wide. Labium and endites light brown, longer than wide. Legs colored as sternum, without markings (Fig. 3B). Leg measurements: I 5.58 (1.56, 0.77, 1.47, 1.15, 0.63), II 6.23 (1.82, 0.75, 1.65, 1.36, 0.65), III 5.30 (1.54, 0.75, 1.13, 1.44, 0.44), IV 7.14 (2.03, 0.83, 1.79, 2.14, 0.62). Leg formula 4213. Abdomen elongate-oval, dark brown, with blackish-brown markings; anterior part flat, with thick tuft of setae (Fig. 3A). Ventral side colored as dorsal side, with blackish-brown markings; book lung area pale yellow. Spinnerets short, pale yellow (Fig. 3B).

Palp (Fig. 3C–E). Femur and patella unmodified. Tibia short, ca $^{2}/_{5}$ as long as cymbium, with two apophyses: RTA bluntly triangular, about 120°, moderately sclerotized; VTA bluntly rounded, partly membranous, longer than wide. Bulb distinctly bulging and prolapsed, sperm duct indistinct in ventral view. EB represented by enlarged tubercle, ca $^{2}/_{7}$ as long as embolus at 12 o'clock position on tegulum; free part of embolus filiform, ca $^{5}/_{7}$ of its length, with tip curved ventrally. Conductor nearly as long

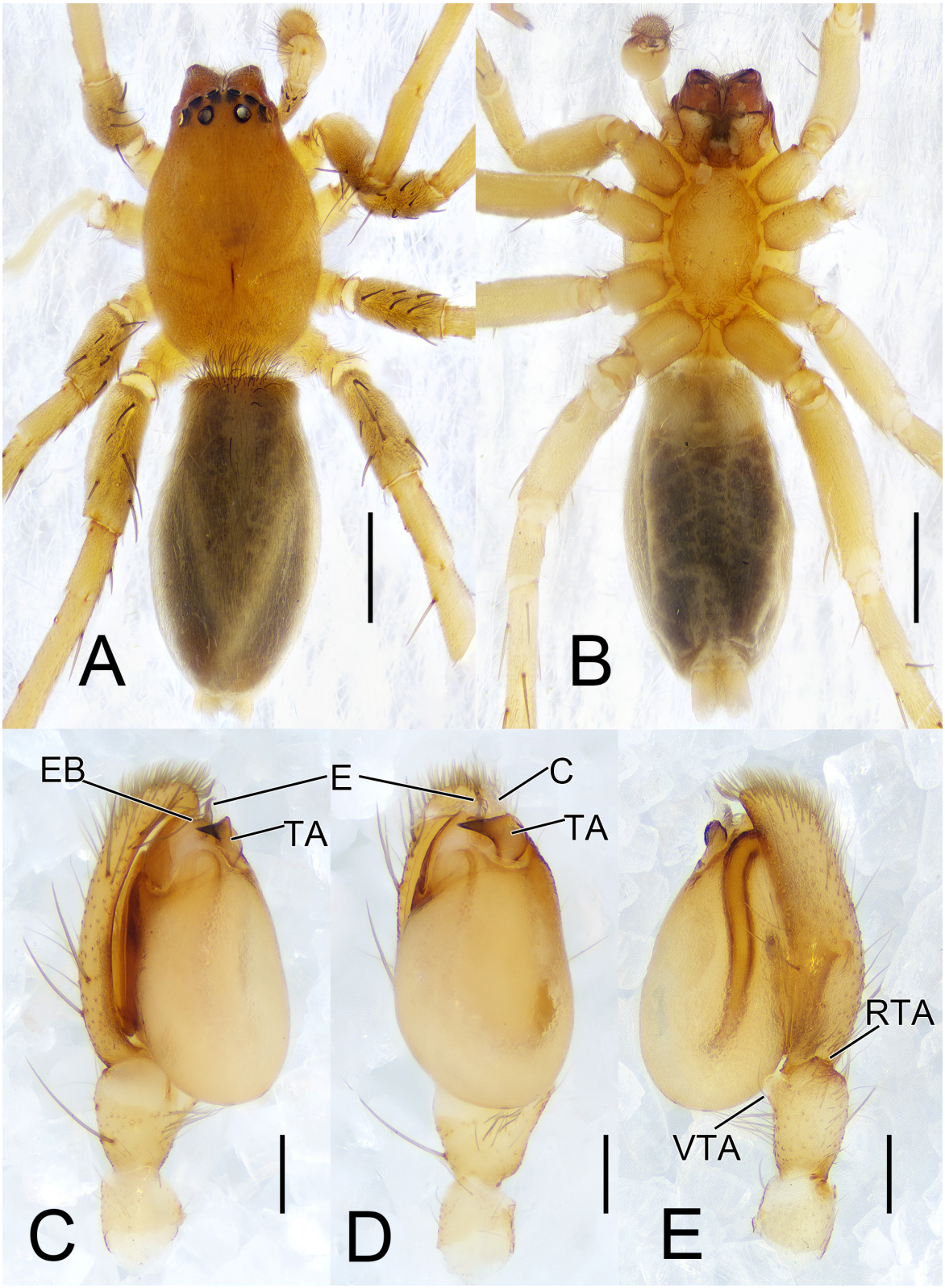

Fig. 3. General somatic morphology and genital anatomy of *Clubiona yanzhii* Zhang & Yu, 2020, ♂ (HNU1372). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C**. Left palp, prolateral view. **D**. Left palp, ventral view. **E**. Left palp, retrolateral view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–E = 0.2 mm.

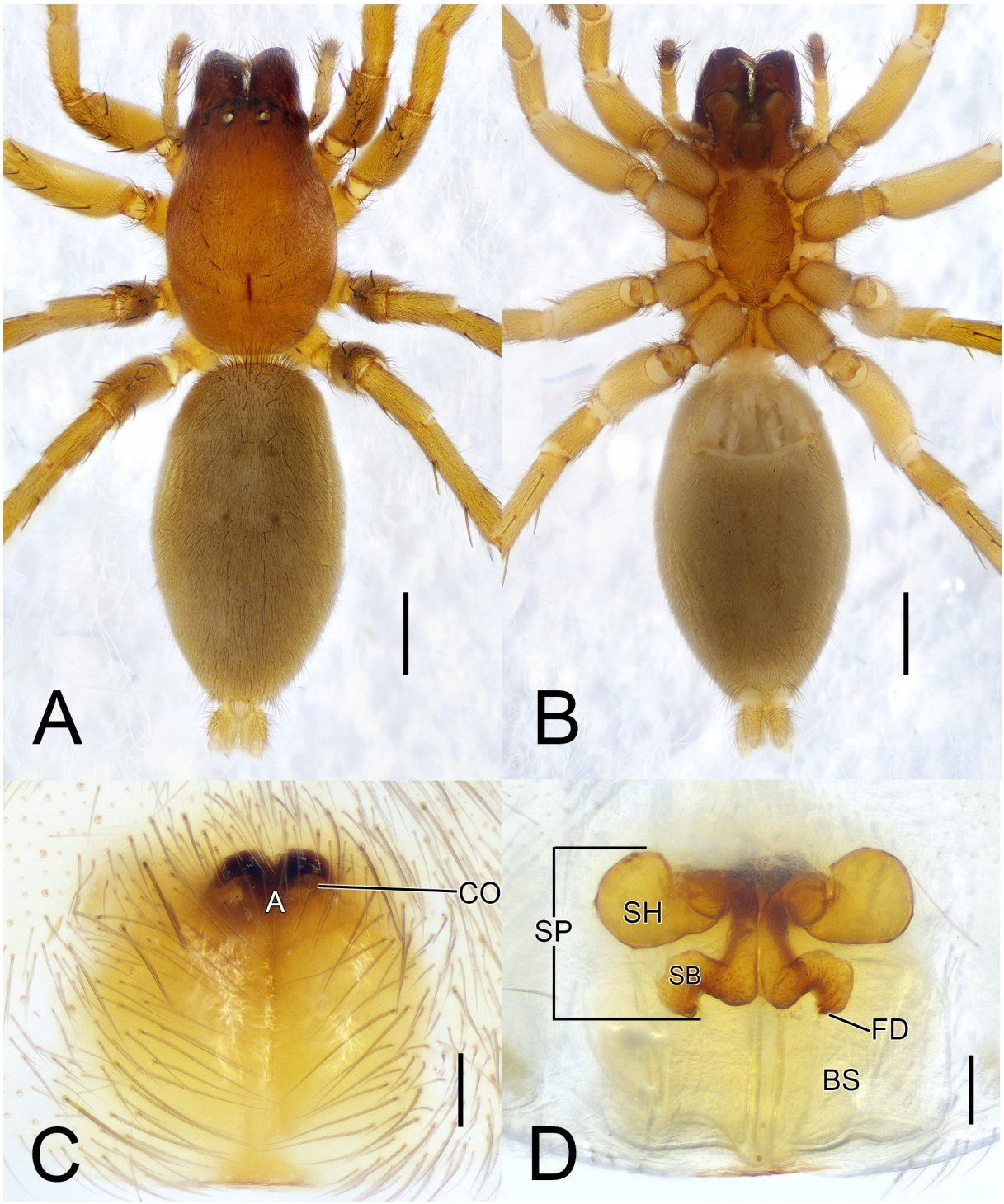

Fig. 4. General somatic morphology and genital anatomy of *Clubiona yanzhii* Zhang & Yu, 2020, ♀ (HNU1391). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–D**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in lactic acid, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–D = 0.1 mm.

as embolus, extending alongside embolus, membranous, lamellar. TA beak-shaped, originating from retrolateral side of tegulum, with broad base and sharp apex pointing prolaterally.

Female

For diagnosis and description, see Zhang & Yu (2020). Habitus as in Fig. 4A–B, epigyne as in Fig. 4C–D.

Distribution

China (Guangxi Zhuang Autonomous Region, Hunan).

Remarks

The structure labeled as TA in Fig. 3D has been identified as the conductor in the similar species *C. subapplanata* (Wang *et al.* 2018). However, we consider this structure to be the tegular apophysis (TA) instead, since it is a sclerotized projection arising from the distal margin of the tegulum. In our specimen, a membranous conductor accompanying the embolus is clearly visible, further supporting our interpretation.

Genus ***Femorbiona*** Yu & Li, 2021
跨袋蛛属

Type species

Clubiona brachyptera Zhu & Chen, 2012; gender feminine.

Femorbiona kayashimai (Ono, 1994) comb. nov.
萱氏跨袋蛛
Fig. 5

Clubiona kayashimai Ono, 1994: 73, figs 3–5 (♀).

Clubiona kayashimai – Song, Zhu & Chen 1999: 425, fig. 246q–r (♀).

Diagnosis

The female of this species can be distinguished from that of all other congeners by its relatively short DPS that is ca ½ as long as bursa, and the visibility of the CD in dorsal view (Fig. 5E–F) (vs DPS relatively long, more than ⅔ as long, CD covered by large SP in dorsal view in all other species of *Femorbiona*, such as *F. brachyptera*, *F. pinglong* sp. nov. and *F. triangula* sp. nov.; as in Zhang *et al.* 2021b: fig. 2c–d; Figs 7E–F, 9E–F). It can also be distinguished from *F. brachyptera*, *F. phami*, *F. shenzhen* and *F. triangula* sp. nov. by the CO being centrally located on the epigynal plate (Fig. 5C–D) (vs CO located posteriorly in the latter four species, as in Zhang *et al.* 2021b: figs 2a–b, 4a–b, 6a–b; Fig. 9C–D).

Material examined

CHINA • 1 ♀; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Banba Village, Dongkou Station; 21°43′ N, 107°32′ E; 820 m a.s.l.; 27 Apr. 2021; J. Liu leg; HNU1399.

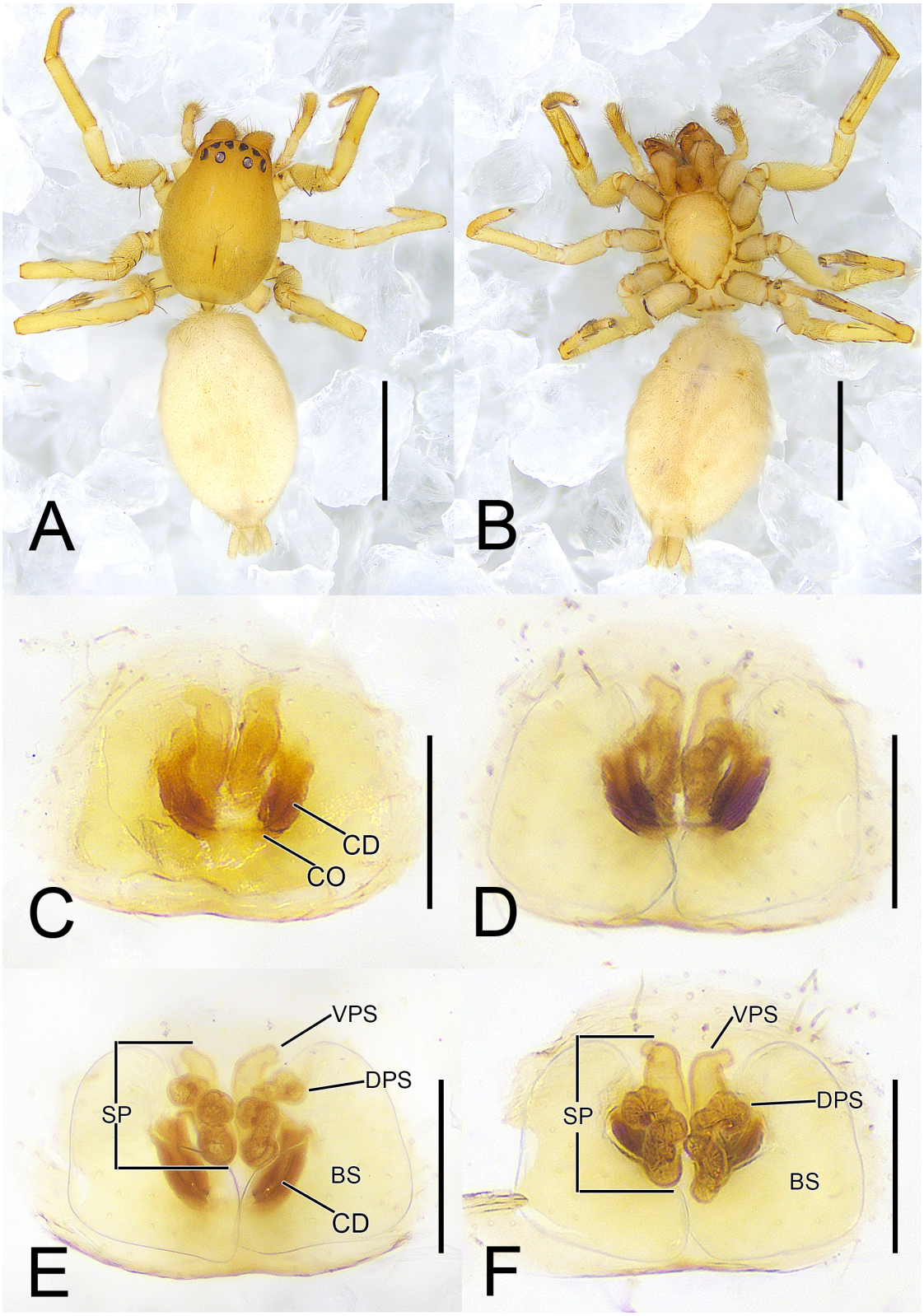

Fig. 5. General somatic morphology and genital anatomy of *Femorbiona kayashimai* (Ono, 1994) comb. nov., ♀ (HNU1399). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–F**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in KOH, ventral view. **E**. Cleared in lactic acid, dorsal view. **F**. Cleared in KOH, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 0.5 mm; C–F = 0.1 mm.

Description

Female (HNU1399)

Total length 3.24; carapace 1.34 long, 0.95 wide; abdomen 1.79 long, 1.10 wide. Carapace oval, light orange, fovea red; cephalic region slightly narrowed; cervical and radial grooves indistinct (Fig. 5A). Eyes: AER distinctly recurved, PER wider than AER, almost straight in dorsal view. Eye sizes and interdistances: AME 0.06, ALE 0.09, PME 0.08, PLE 0.07, AME–AME 0.07, AME–ALE 0.06, PME–PME 0.14, PME–PLE 0.10, MOQL 0.22, MOQA 0.18, MOQP 0.31. Chelicerae light orange, with five promarginal and four retromarginal teeth. Sternum yellow, 0.77 long, 0.55 wide. Labium and endites colored as chelicerae, longer than wide. Legs colored as sternum, without markings. Leg measurements: I 2.27 (0.59, 0.30, 0.57, 0.52, 0.29), II 2.31 (0.55, 0.42, 0.68, 0.40, 0.26), III 2.19 (0.68, 0.35, 0.33, 0.46, 0.37), IV 3.14 (0.67, 0.43, 0.73, 0.69, 0.62). Leg formula 4213. Abdomen yellowish-white, uniformly colored, densely clothed with setae, without patterns, with two pairs of muscle depressions situated centrally on dorsal side (Fig. 5A). Ventral side colored as dorsal side, without patterns. Spinnerets short, yellow (Fig. 5B).

Epigyne (Fig. 5C–F). Epigynal plate wider than long, with SP and BS distinctly visible through integument in ventral view (Fig. 5C). CO small and indistinct, situated medially on epigynal plate. CD sclerotized, separated by about twice their own diameter, visible in dorsal view, extending anteriorly to connect with BS. SP tubular and sinuous; DPS slightly convoluted, extending anteriorly; VPS about 2 × as long as wide, nearly parallel and closely positioned, each bearing digitiform glands. FD indistinct. BS reniform, translucent, occupying nearly ⅔ of the epigynal plate, slightly longer than wide, with smooth surface.

Male

Unknown.

Distribution

China (Guangxi Zhuang Autonomous Region, Taiwan).

Remarks

Femorbiona kayashimai comb. nov. was originally described as *Clubiona kayashimai* by Ono (1994), based solely on a female specimen with simple hand-drawn illustrations of the genitalia. Since then, the species has not been reported again for nearly 30 years. Although we were unable to examine the type material of *C. kayashimai*, we contacted Hirotsugu Ono, who confirmed that our identification of the present specimen is correct.

Femorbiona pinglong Wu & Xu sp. nov.

平隆踦袋蛛

urn:lsid:zoobank.org:act:FE3DFBBE-6D52-4AAD-8452-9E6C213D18F9

Figs 6–7

Diagnosis

The male of the new species can be easily distinguished from that of all other congeners by its membranous and transparent conductor (Fig. 6D–E) (vs weakly sclerotized in *F. triangula* sp. nov. and *F. brachyptera* (Zhu & Chen, 2012), as in Fig. 8D and Zhang *et al.* 2021b: fig. 7a, respectively; absent in *F. phami* Yu & Li, 2021 and *F. shenzhen* Yu & Li, 2021, as in Zhang *et al.* 2021b: fig. 7b–c). It can also be distinguished from other species of *Femorbiona* by the absence of PPA (Fig. 6C–D) (vs present, such as in *F. brachyptera*, *F. phami*, *F. Shenzhen*, *F. triangula* sp. nov.; as in Zhang *et al.* 2021b: fig. 7a–c; Fig. 8C–D).

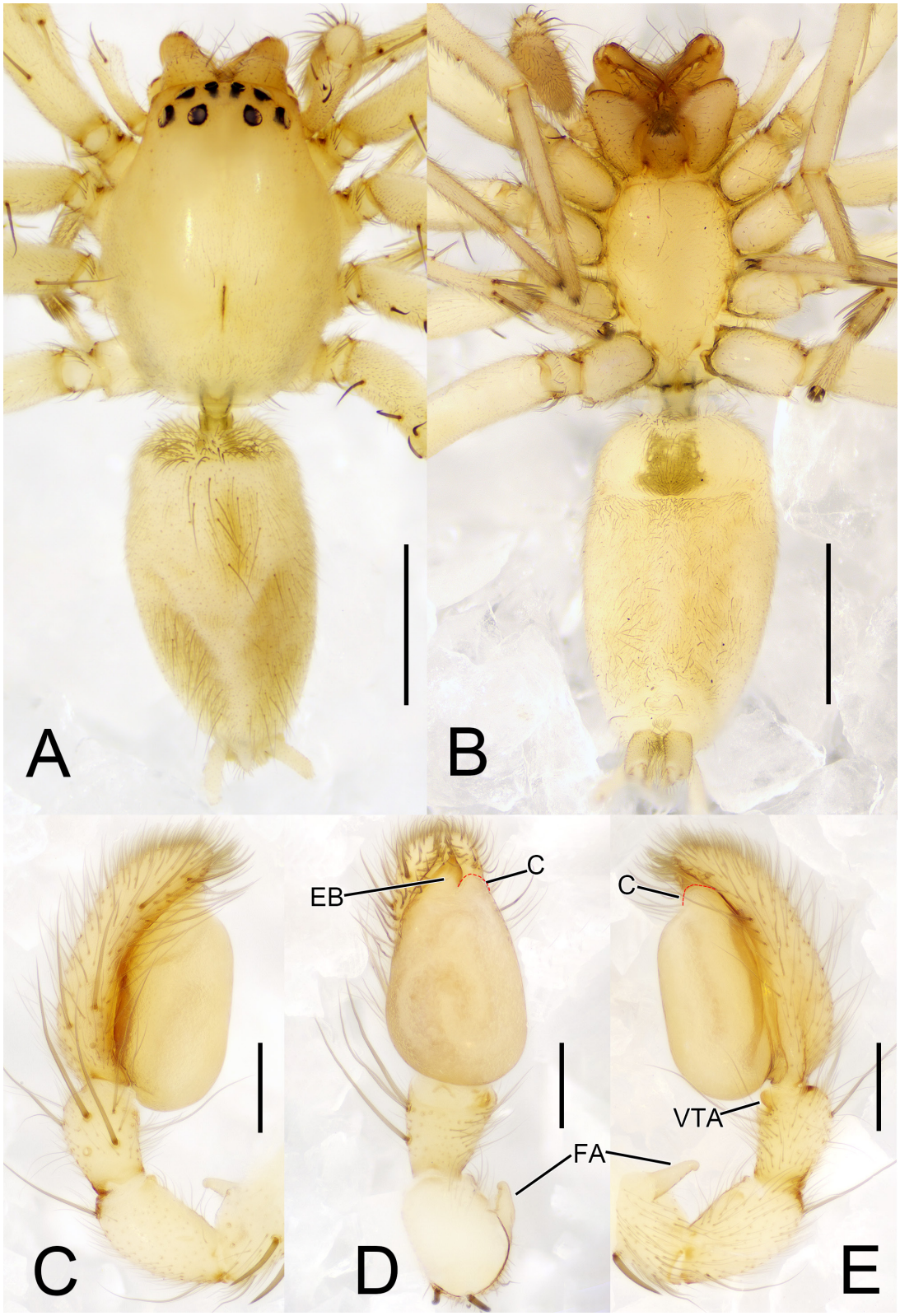

Fig. 6. General somatic morphology and genital anatomy of *Femorbiona pinglong* Wu & Xu sp. nov., holotype, ♂ (HNU1368). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C**. Left palp, prolateral view. **D**. Left palp, ventral view. **E**. Left palp, retrolateral view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–E = 0.2 mm.

The female of this species can be distinguished from that of other species of *Femorbiona* by its DPS, which extends anteriorly and then twists into an S-shaped terminal portion in dorsal view (Fig. 7E–F) (vs a DPS that extends anteriorly with only a slight downward bend, such as *F. phami* in Zhang *et al.* 2021b: fig. 4c–d and *F. triangula* sp. nov. in Fig. 9E–F).

Etymology

The specific epithet refers to the type locality; noun in apposition.

Type material

Holotype

CHINA • ♂; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Pinglong Station; 21°50′ N, 107°53′ E; 619 m a.s.l.; 28 Apr. 2021; J. Liu leg; HNU1368.

Paratypes

CHINA • 1 ♂; same data as for holotype; HNU1371 • 1 ♀; same data as for holotype; HNU1398 • 1 ♂; same data as for holotype; 21°50′ N, 107°53′ E; 339 m a.s.l.; 29 Apr. 2021, J. Liu leg; HNU1370.

Description

Male (holotype HNU1368)

Total length 3.93; carapace 1.82 long, 1.30 wide; abdomen 2.10 long, 1.18 wide. Carapace oval, yellow, with anterior part light orange and smooth, while remaining area densely covered with short, fine setae, fovea red; cephalic region slightly narrowed; cervical and radial grooves indistinct (Fig. 6A). Eyes: AER distinctly recurved; PER wider than AER and nearly straight in dorsal view. Eye sizes and interdistances: AME 0.09, ALE 0.11, PME 0.08, PLE 0.11; AME–AME 0.05, AME–ALE 0.05, PME–PME 0.22, PME–PLE 0.11; MOQL 0.32, MOQA 0.23, MOQP 0.43. Chelicerae light orange, with six promarginal and five retromarginal teeth. Sternum yellow with long black hairs along margins, 1.06 long, 0.73 wide. Labium and endites light orange, longer than wide. Legs same color as sternum, without markings (Fig. 6A–B). Leg measurements: I 3.88 (1.00, 0.55, 1.10, 0.80, 0.43), II 4.46 (1.34, 0.62, 1.34, 0.85, 0.31), III 3.60 (1.04, 0.46, 0.88, 0.90, 0.32), IV 4.57 (1.57, 0.37, 1.29, 0.93, 0.41). Leg formula: 4213. Abdomen yellow, anterior part flat with a thick tuft of setae (Fig. 6A). Ventral side slightly paler than dorsal; book lung area pale yellow, with brownish patch located centrally between book lungs. Spinnerets short, yellow (Fig. 6B).

Palp (Fig. 6C–E). Femur with finger-shaped retrolateral apophysis (FA), ca ½–⅓ as long as femur. Patella unmodified. Tibia short, ca 3/5 as long as patella, with VTA bearing blunt apex. Bulb distinctly swollen and protruding; tegulum ca 1.5 × as long as wide, SD indistinct in ventral view. Embolus ca 1/7 as long as tegulum, arising at 11 o'clock position; EB swollen, abruptly tapering toward short embolic apex. Conductor short, translucent, membranous, and indistinct, ca ⅓ as long as embolus.

Female (HNU1398)

Total length 4.75; carapace 1.55 long, 1.04 wide; abdomen 2.69 long, 1.50 wide. Carapace oval, light orange, fovea red; cephalic region slightly narrowed, orange; cervical and radial grooves indistinct (Fig. 7A). Eyes: AER distinctly recurved, PER wider than AER, almost straight in dorsal view. Eye sizes and interdistances: AME 0.07, ALE 0.08, PME 0.08, PLE 0.09, AME–AME 0.06, AME–ALE 0.06, PME–PME 0.16, PME–PLE 0.11, MOQL 0.23, MOQA 0.19, MOQP 0.33. Chelicerae orange, with four promarginal and five retromarginal teeth. Sternum yellow, 0.91 long, 0.61 wide. Labium and endites light orange, longer than wide. Legs colored as sternum, without markings. Leg measurements: I 3.22 (0.90, 0.54, 0.77, 0.57, 0.44), II 3.76 (1.14, 0.52, 1.03, 0.65, 0.42), III 3.31 (1.00, 0.41, 0.69, 0.75, 0.46), IV 4.08 (1.36, 0.47, 1.14, 0.62, 0.49). Leg formula 4231. Abdomen grey, uniformly colored, densely

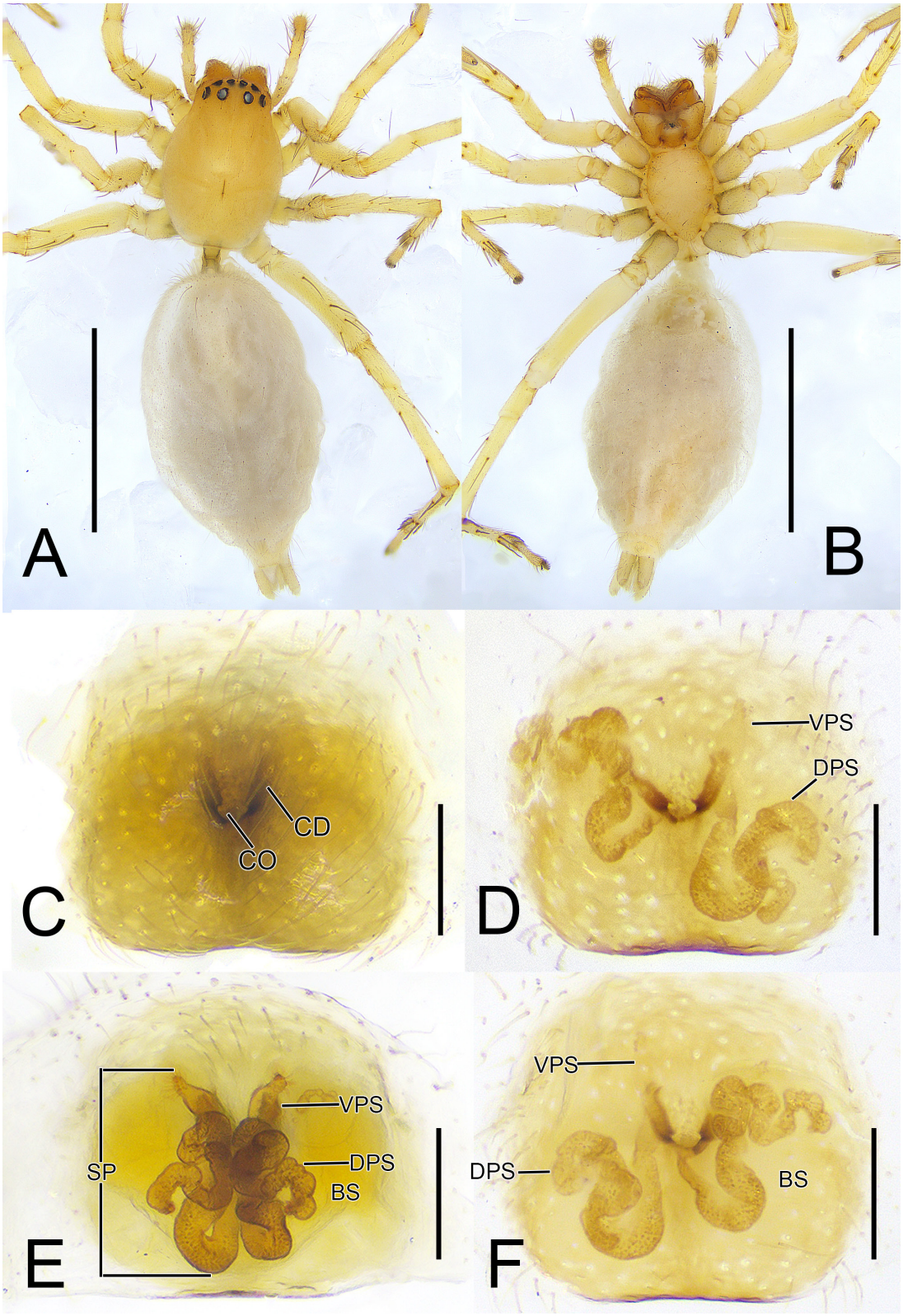

Fig. 7. General somatic morphology and genital anatomy of *Femorbiona pinglong* Wu & Xu sp. nov., ♀ (HNU1398). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–F**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in KOH, ventral view. **E**. Cleared in lactic acid, dorsal view. **F**. Cleared in KOH, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–F = 0.1 mm.

clothed with setae, lacking distinct patterns; two pairs of muscle depressions present medially on dorsal side (Fig. 7A). Ventral side colored as dorsal side, without patterns. Spinnerets short, yellow (Fig. 7B).

Epigyne (Fig. 7C–F). Epigynal plate wider than long. CO semicircular, situated medially on epigynal plate. CD sclerotized, closely spaced, concealed by large spermathecae in dorsal view (Fig. 7E). SP tubular and sinuous; DPS exceptionally long, extending anteriorly and then twisting into S-shaped terminal portion in dorsal view (Fig. 7E–F); VPS tapering distally (Fig. 7E–F). FD indistinct. BS reniform, translucent, occupying nearly ⅔ of epigynal plate, longer than wide, with smooth surface.

Distribution

Known only from the type locality in Guangxi Zhuang Autonomous Region, China.

Remarks

We identify this species as a new member of *Femorbiona* based on the female specimen, which is consistent with the diagnostic characteristics of the genus *Femorbiona* Yu & Li, 2021 as defined by Zhang *et al.* (2021b). However, the male specimen lacks a PPA, which does not fully conform to the current diagnosis of the genus. This indicates that the presence of a PPA may not be a consistent or defining character across all *Femorbiona* species.

Femorbiona triangula Wu & Xu sp. nov.
三角踦袋蛛
urn:lsid:zoobank.org:act:DBF91FCB-BA1C-4A73-878F-967EAAACF70B
Figs 8–9

Diagnosis

The male of the new species can be readily distinguished from that of its congeners by the conductor, which is slightly sclerotized, lamellar, and triangular in ventral view (Fig. 8D) (vs elliptical and slightly curved around the embolus in *F. brachyptera*; absent in *F. phami* and *F. shenzhen*; translucent and membranous in *F. pinglong*, as in Zhang *et al.* 2021b: figs 1d, 3d, 5d; Fig. 6D, respectively).

The female of the new species resembles that of *F. brachyptera* in having the DPS following a double S-shaped course (compare Fig. 9C–F with Zhang *et al.* 2021b: fig. 2a–d), but differs by the CD being clearly visible through the epigynal plate in ventral view (Fig. 9C), and by the longer, semicircular connection between DPS and VPS (as indicated by the white dashed line in Fig. 9F) (vs CD indistinct and the DPS directly connected to the VPS in *F. brachyptera*, as in Zhang *et al.* 2021b: fig. 2a–d). The female of the new species also resembles that of *F. shenzhen* in the shape of the CO and the hood, and the CD easily visible through the epigynal plate in ventral view (compare Fig. 9C with Zhang *et al.* 2021b: fig. 6a), but differs by the DPS strongly convoluted, following a double S-shaped course (Fig. 9E–F) (vs the DPS not strongly convoluted, following a C-shaped course, as in Zhang *et al.* 2021b: fig. 6c–d).

Etymology

The specific epithet '*triangula*' (Latin adjective, meaning 'triangular') refers to the triangular shape of the conductor.

Type material

Holotype

CHINA • ♂; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Pinglong Station; 21°50′ N, 107°53′ E; 527 m a.s.l.; 29 Apr. 2021; J. Liu leg; HNU1373.

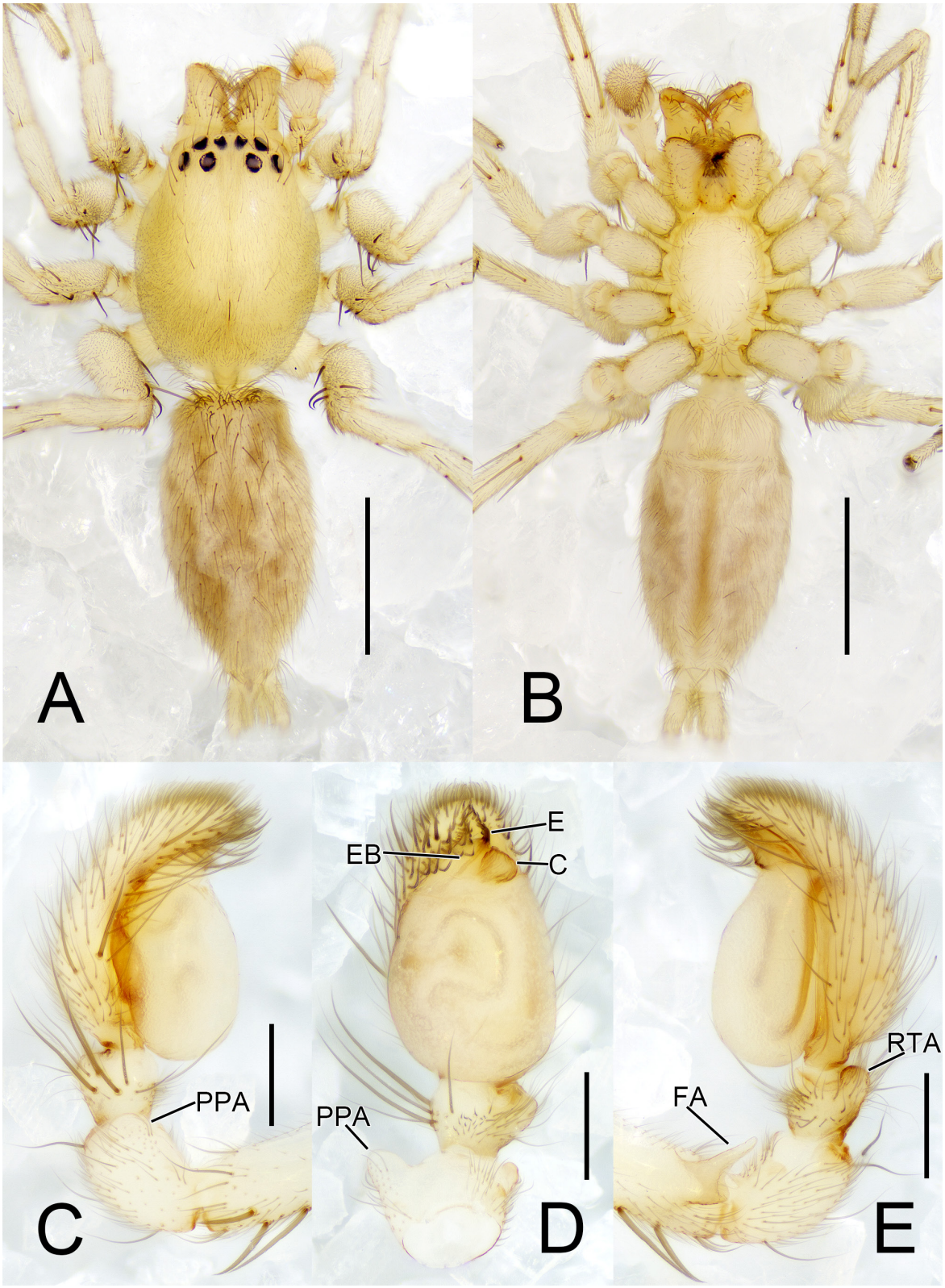

Fig. 8. General somatic morphology and genital anatomy of *Femorbiona triangula* Wu & Xu sp. nov., holotype, ♂ (HNU1373). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C**. Left palp, prolateral view. **D**. Left palp, ventral view. **E**. Left palp, retrolateral view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–E = 0.2 mm.

Paratypes

CHINA • 1 ♀; same data as for holotype; 21°51′ N, 107°54′ E; 339 m a.s.l.; 29 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1376 • 2 ♀♀; same data as for holotype, Dalongshan Station; 22°01′ N, 108°08′ E; 233 m a.s.l.; 2 May 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1374 to HNU1375 • 3 ♂♂; same data as for holotype; 21°50′ N, 107°53′ E; 619 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1377 to HNU1379 • 4 ♀♀; same data as for holotype; 21°50′ N, 107°53′ E; 619 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1380 to HNU1383 • 1 ♂; same data as for holotype; 21°50′ N, 107°53′ E; 749 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1384 • 3 ♀♀; same data as for holotype; 21°50′ N, 107°53′ E; 749 m a.s.l.; 28 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1385 to HNU1387 • 1 ♂; same data as for holotype; 21°51′ N, 107°54′ E; 339 m a.s.l.; 29 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1388 • 1 ♀; same data as for holotype; 21°51′ N, 107°54′ E; 339 m a.s.l.; 29 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1389 • 1 ♀; same data as for holotype, Wangle Station; 21°54′ N, 107°54′ E; 309 m a.s.l.; 30 Apr. 2021; A. He, J. Liu, Y. Liang, R. Liao, Q. Li, H. Zhang, S. Zhu, Z. Zhao and Y. Liu leg; HNU1390.

Description

Male (holotype HNU1373)

Total length 3.42; carapace 1.54 long, 1.09 wide; abdomen 1.76 long, 1.07 wide. Carapace oval, yellow, densely covered with short, fine setae, fovea black; cephalic region slightly narrowed; cervical and radial grooves indistinct (Fig. 8A). Eyes: AER slightly recurved; PER wider than AER and almost straight in dorsal view. Eye sizes and interdistances: AME 0.07, ALE 0.10, PME 0.08, PLE 0.08; AME–AME 0.06, AME–ALE 0.04, PME–PME 0.19, PME–PLE 0.10; MOQL 0.23, MOQA 0.20, MOQP 0.36. Chelicerae yellow, with five promarginal and five retromarginal teeth. Sternum yellowish white, 0.86 long, 0.73 wide. Labium and endites yellow, same in color as chelicerae, longer than wide. Legs colored as sternum, without markings. Leg measurements: I 2.62 (0.75, 0.37, 0.64, 0.54, 0.32), II 2.89 (0.90, 0.45, 0.73, 0.52, 0.29), III 2.57 (0.81, 0.41, 0.55, 0.60, 0.20), IV 3.67 (1.05, 0.54, 0.89, 0.92, 0.27). Leg formula 4213. Abdomen elongate-oval, pale brown, densely clothed with setae, dorsally marked with numerous brown spots (Fig. 8A). Ventral side similar in color to dorsal side, laterally marked with numerous brown spots. Spinnerets short, yellowish white (Fig. 8B).

Palp (Fig. 8C–F). Femur with retrolateral apophysis near distal margin, and apophysis with broad base and slender finger-shaped distal end. Patella ca 2 × as long as and 1.3 × as wide as tibia, bearing round PPA. Tibia short, ca $^{2}/_{7}$ as long as cymbium, with small, distally blunt, and slightly sclerotized RTA. Bulb inflated and prolapsed; SD faintly visible in ventral view. Embolus needle-like, black, short, situated at 12:30 o'clock position; apex sharp, directed anterolaterally. EB forming enlarged tubercle. Conductor slightly shorter than EB, weakly sclerotized, lamellar, and triangular in ventral view.

Female (paratype HNU1376)

Total length 3.40; carapace 1.53 long, 1.05 wide; abdomen 1.76 long, 1.03 wide. Carapace oval, light orange, densely covered with short, fine setae; fovea red; cephalic region slightly narrowed; cervical and radial grooves indistinct (Fig. 9A). Eyes: AER distinctly recurved, PER slightly recurved and wider than AER in dorsal view. Eye sizes and interdistances: AME 0.09, ALE 0.08, PME 0.10, PLE 0.07, AME–AME 0.07, AME–ALE 0.05, PME–PME 0.19, PME–PLE 0.10, MOQL 0.23, MOQA 0.21, MOQP 0.34. Chelicerae light orange, with five promarginal and five retromarginal teeth. Sternum yellow, 0.82 long, 0.55 wide. Labium and endites same in color as chelicerae, longer than wide. Legs yellow, same as sternum, without markings. Leg measurements: I 2.56 (0.77, 0.37, 0.59, 0.49, 0.34), II 2.83 (0.73,

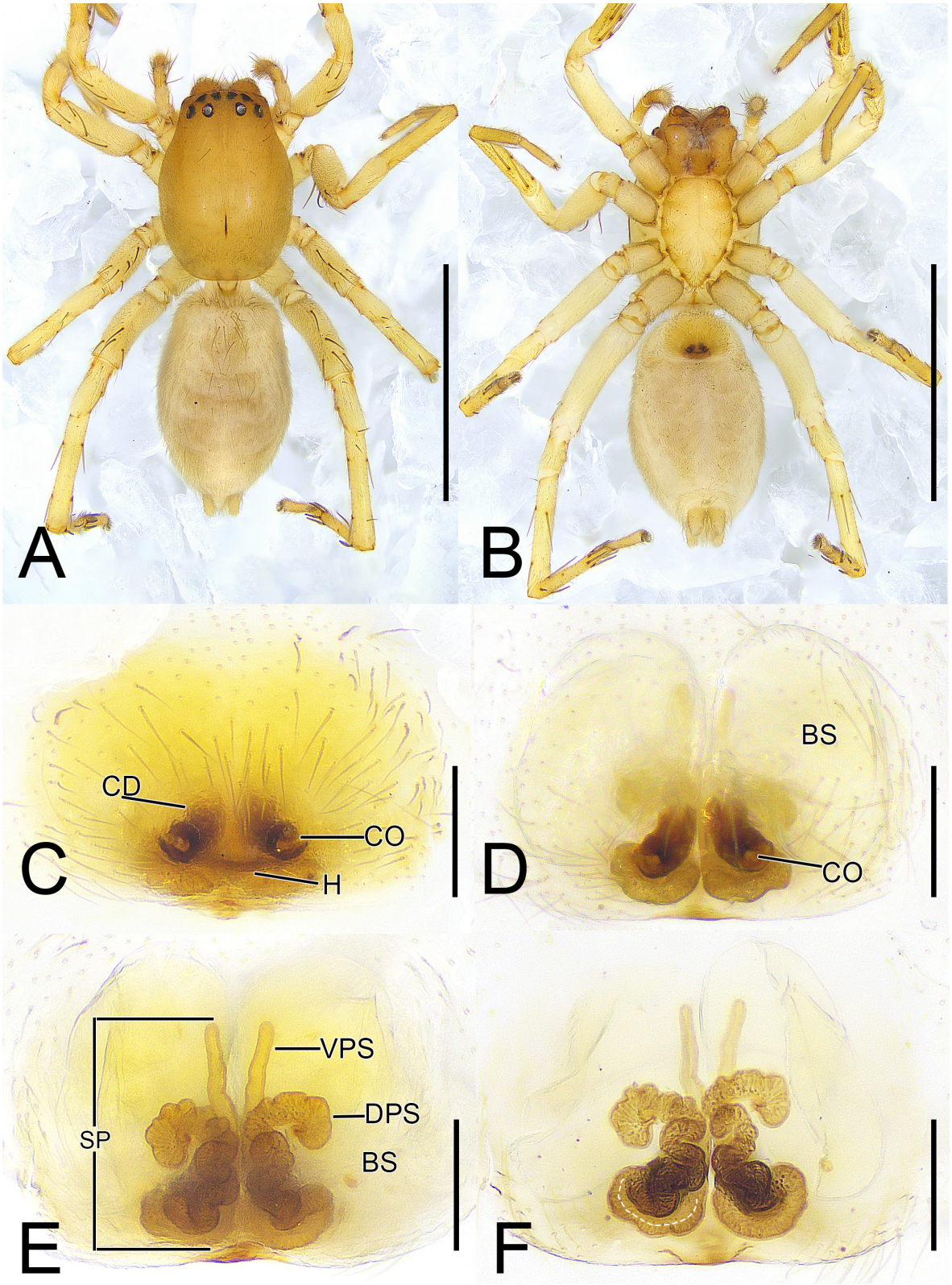

Fig. 9. General somatic morphology and genital anatomy of *Femorbiona triangula* Wu & Xu sp. nov., ♀ (HNU1376). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–F**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in KOH, ventral view. **E**. Cleared in lactic acid, dorsal view. **F**. Cleared in KOH, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–F = 0.1 mm.

0.52, 0.70, 0.54, 0.34), III 2.46 (0.64, 0.31, 0.54, 0.68, 0.29), IV 3.32 (0.72, 0.46, 0.93, 0.85, 0.36). Leg formula 4213. Abdomen brown, uniformly colored, densely covered with setae, lacking distinct dorsal markings (Fig. 9A). Ventral side slightly lighter in color than dorsal side, without markings. Spinnerets short, pale yellow (Fig. 9B).

Epigyne (Fig. 9C–F). Epigynal plate wider than long, with SP and BS visible through the integument in ventral view (Fig. 9C). Hood located posteriorly on epigynal plate, ca 2/5 as wide as epigyne, slightly procurved, arcuate. CO circular, located laterally at margin of hood, separated by ca 2 × their own diameter. CD thick, strongly sclerotized, obscured by large spermathecae in dorsal view. SP tubular and sinuous; DPS strongly convoluted like intestines, forming double S-shaped course directed anteriorly; VPS nearly parallel and closely positioned, extending forward for ca ⅔ of epigynal plate length. Connection between DPS and VPS long, semicircular (as indicated by the white dashed line in Fig. 9F). BS oval, translucent, and large, nearly occupying entire epigynal plate, longer than wide, with smooth surface.

Distribution

Known only from the type locality in Guangxi Zhuang Autonomous Region, China.

Genus ***Matidia*** Thorell, 1878
马蒂蛛属

Type species

Matidia virens Thorell, 1878; gender feminine.

Matidia spatulata Chen & Huang, 2006
铲形马蒂蛛
Fig. 10

Matidia spatulata Chen & Huang, 2006: 68, fig. 1a–c (♂).

Matidia spatulata – Huang & Chen 2012: 1, figs 1–4 (♀). — Chen & Huang 2012: 29, fig. 29a–c, pl. 8c–d (♂). — Zhang, Yu & Li 2021c: 82, figs 3a–f, 4a–h (♂♀).

Diagnosis and description

See Chen & Huang (2006) for the male, Huang & Chen (2012) for the female. Habitus as in Fig. 10A–D; palp as in Fig. 10E–G; epigyne as in Fig. 10H–I.

Material examined

CHINA • 1 ♀; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Songbai Station; 21°58′ N, 108°01′ E; 303 m a.s.l.; 1 May 2021; J. Liu leg; HNU1400 • 1 ♂; same data as for preceding; HNU1403.

Distribution

China (Guangxi Zhuang Autonomous Region, Taiwan, Yunnan).

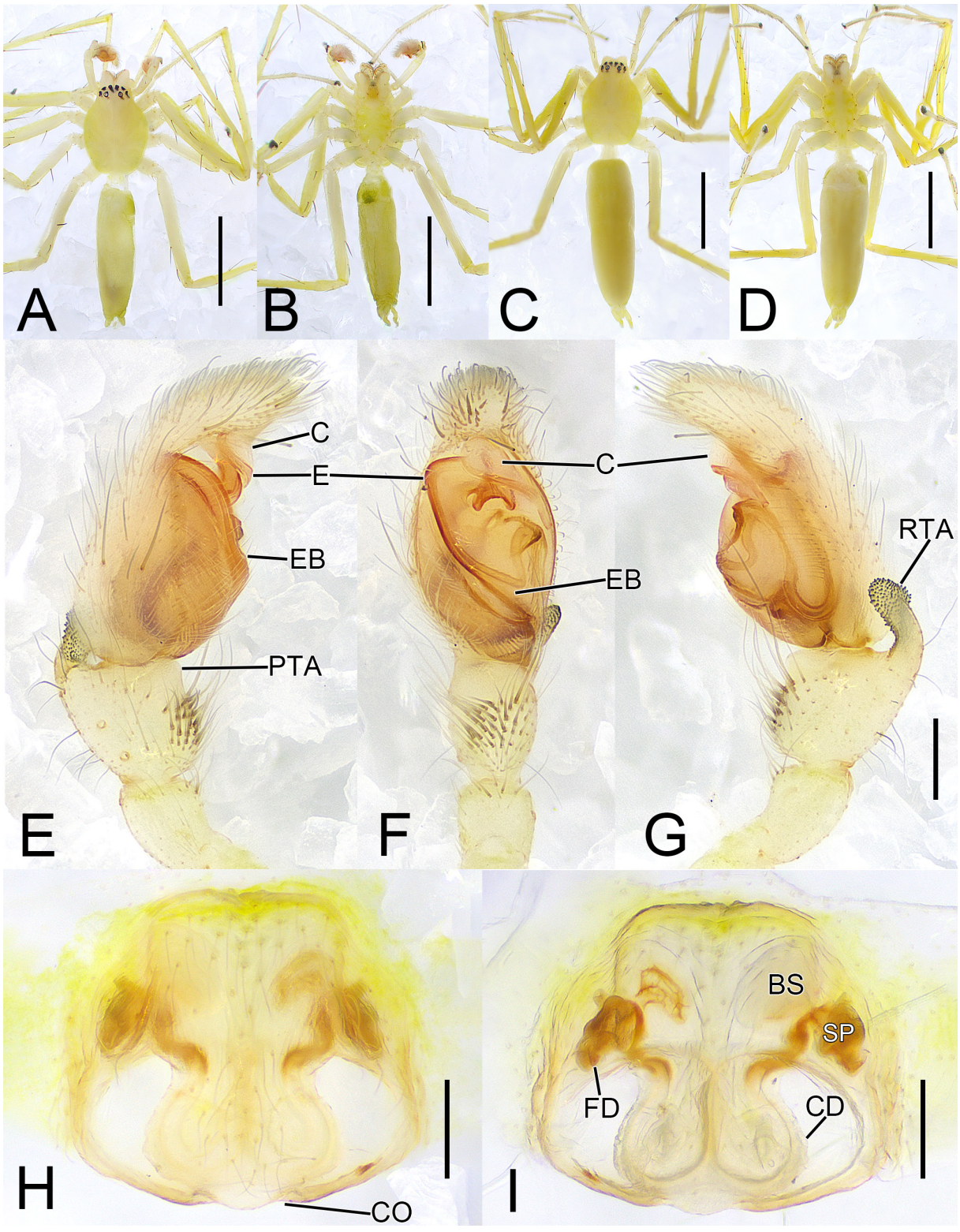

Fig. 10. General somatic morphology and genital anatomy of *Matidia spatulata* Chen & Huang, 2006. **A–B**, **E–G**. ♂ (HNU1403). **C–D**, **H–I**. ♀ (HNU1400). **A**, **C**. Habitus, dorsal view. **B**, **D**. Habitus, ventral view. **E**. Left palp, prolateral view. **F**. Left palp, ventral view. **G**. Left palp, retrolateral view. **H–I**. Epigyne. **H**. Intact, ventral view. **I**. Cleared in lactic acid, dorsal view. Abbreviations: see Material and methods. Scale bars: A–D = 1 mm; E–I = 0.1 mm.

Genus ***Porrhoclubiona*** Lohmander, 1944
栅管巢蛛属

Type species

Clubiona clandestina Menge, 1873; gender feminine; synonym of *Porrhoclubiona genevensis* (L. Koch, 1866).

Porrhoclubiona songbai Wu & Xu sp. nov.
松柏栅管巢蛛
urn:lsid:zoobank.org:act:DE36B5D9-0D2F-45B9-BEE1-C2C98DD85DDC
Fig. 11

Diagnosis

The female of the new species resembles *P. pteronetoides* (Deeleman-Reinhold, 2001) in having similarly large CO situated near the epigastric furrow, and translucent, wrinkled CD, and reniform SP (compare Fig. 11C–F with Zhang *et al.* 2021c: fig. 16a–d). However, it can be easily distinguished from *P. pteronetoides* by the CD being distinctly longer and extending anteriorly beyond the SP, with their distal ends looping around the base of the spermathecae (Fig. 11C–F) (vs CD not extending beyond the SP anteriorly and their twisted ends connecting directly to the SP in *P. pteronetoides*, as in Zhang *et al.* 2021c: fig. 16a–d).

Etymology

The specific epithet refers to the type locality; noun in apposition.

Type material

Holotype

CHINA • ♀; Guangxi Zhuang Autonomous Region, Fangchenggang City, Shiwandashan National Nature Reserve, Songbai Station; 21°58′ N, 108°01′ E; 303 m a.s.l.; 1 May 2021; J. Liu leg; HNU1401.

Description

Female (holotype HNU1401)

Total length 4.40; carapace 1.75 long, 1.25 wide; abdomen 2.53 long, 1.28 wide. Carapace oval, yellowish brown with anterior part light orange, densely covered with short, fine setae; fovea black, inconspicuous; cephalic region slightly narrowed; cervical groove distinct, radial groove indistinct (Fig. 11A). Eyes: AER distinctly recurved; PER slightly procurved and wider than AER in dorsal view. Eye sizes and interdistances: AME 0.08, ALE 0.07, PME 0.10, PLE 0.09; AME–AME 0.06, AME–ALE 0.05, PME–PME 0.20, PME–PLE 0.09; MOQL 0.24, MOQA 0.23, MOQP 0.36. Chelicerae yellow, with three promarginal and two retromarginal teeth. Sternum bright yellow, 0.95 long, 0.55 wide. Labium and endites yellowish white, longer than wide. Legs yellowish white, unmarked. Leg measurements: I 3.21 (0.90, 0.54, 0.80, 0.58, 0.39), II 3.52 (1.02, 0.60, 0.91, 0.62, 0.37), III 2.98 (0.91, 0.37, 0.67, 0.66, 0.37), IV 4.48 (1.17, 0.55, 1.26, 1.06, 0.44). Leg formula: 4213. Abdomen grayish brown, uniformly colored, densely covered with setae, lacking distinct dorsal markings, with two pairs of muscle depressions centrally located on dorsal side (Fig. 11A). Ventral side slightly paler than dorsal one, unmarked. Spinnerets short, yellow (Fig. 11B).

Epigyne (Fig. 11C–F). Epigynal plate longer than wide, with SP and CD visible through integument in ventral view. CO large, oval, located posteriorly on epigynal plate near epigastric furrow. CD tubular, translucent, with wrinkled and ribbed appearance; ascend anteriorly in front of spermathecae, then

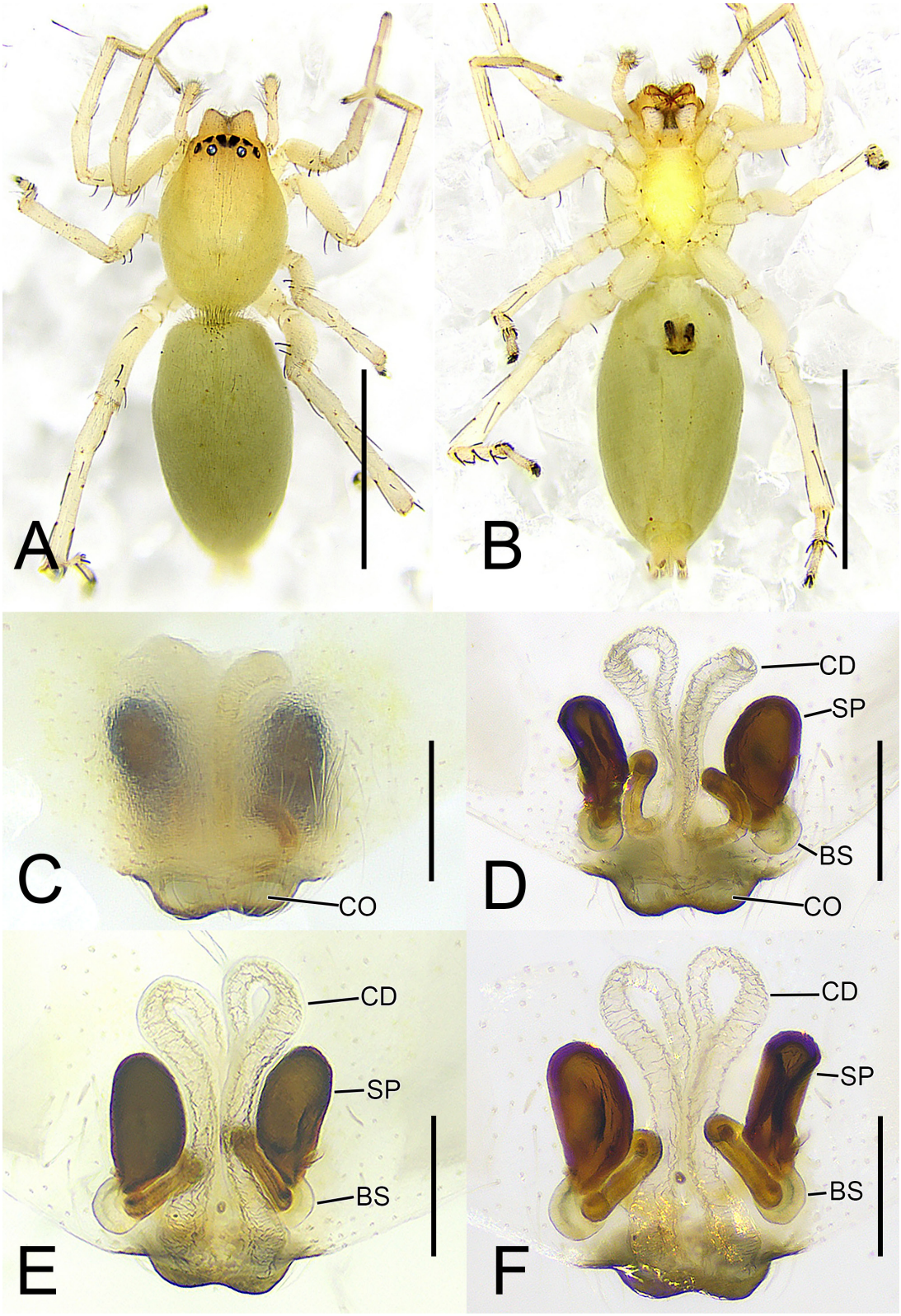

Fig. 11. General somatic morphology and genital anatomy of *Porrhoclubiona songbai* Wu & Xu sp. nov., holotype, ♀ (HNU1401). **A**. Habitus, dorsal view. **B**. Habitus, ventral view. **C–F**. Epigyne. **C**. Intact, ventral view. **D**. Cleared in KOH, ventral view. **E**. Cleared in lactic acid, dorsal view. **F**. Cleared in KOH, dorsal view. Abbreviations: see Material and methods. Scale bars: A–B = 1 mm; C–F = 0.1 mm.

curve inward, descend posteriorly in ventral view, and finally loop around base of spermathecae before connecting to both SP and BS. SP reniform. BS situated posteriorly, translucent, and globular.

Male

Unknown.

Distribution

Known only from the type locality in Guangxi Zhuang Autonomous Region, China.

Remarks

The new species also resembles *Clubiona wulingensis* Yu & Chen, 2017, which should likewise be transferred to the genus *Porrhoclubiona* (given the lack of available material and that this issue is beyond the scope of the present study, we retain its current taxonomic status). It can be distinguished from *C. wulingensis* by the dorsal part of the CD being ca ⅓ the diameter of the SP and positioned in the front of them in dorsal view (Fig. 11C–F) (vs dorsal part ca half the diameter of the SP and positioned behind them in *C. wulingensis*, as in Yu & Chen 2017: figs 7–9).

Discussion

As mentioned in the introduction, nearly half of the known clubionid species are described from only one sex or from juveniles. A similar situation is evident in our study: among the eight species recorded, four are represented by only one sex. Moreover, many juveniles collected from Shiwandashan National Nature Reserve remain unidentified at the species level. In contrast, the number of adult specimens suitable for species identification is considerably smaller than that of juveniles.

The prevalence of species described from single-sex individuals has inevitably led to conspecific males and females sometimes being erroneously described as separate species. Consequently, a considerable number of synonyms may exist within Clubionidae, especially in its largest genus, *Clubiona*. To address this long-standing problem, it is necessary to incorporate molecular methods alongside traditional morphological approaches. In this study, we provide DNA barcodes for all eight species to minimize potential identification errors and to facilitate future taxonomic revisions of those species currently known only from a single sex.

Considering that ambiguities are widespread within the family Clubionidae, the boundaries between genera, subgenera, and species groups are often unclear. A comprehensive systematic study focusing on Clubionidae is urgently needed to resolve these issues. The challenges are substantial, given the high species richness, wide distribution, and historical focus on the description or revision of individual taxa rather than on large-scale systematic analyses. Moreover, molecular data, crucial for resolving phylogenetic relationships, remain scarce for this family. Conducting such a study will require broad sampling across multiple genera and representative species groups within *Clubiona*, as well as collaboration among researchers worldwide. Although an in-depth systematic study is beyond the scope of the present work, it represents the direction of our future efforts.

Acknowledgments

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