

A survey of the genus *Orchestina* Simon, 1882 (Araneae, Oonopidae) from Xishuangbanna, China, with descriptions of five new species

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Abstract

Five new species and three known species of the genus *Orchestina* Simon, 1882 are recorded from Xishuangbanna, Yunnan Province: *O. clavulata* Tong & Li, 2011 (♂), *O. colubrina* Liu, Henrard & Xu, 2019 (♂♀), *O. concava* Tong & Li, **sp. nov.** (♂), *O. menglun* Tong & Li, **sp. nov.** (♂), *O. subclavulata* Tong & Li, **sp. nov.** (♂), *O. truncatula* Tong & Li, 2011 (♂♀), *O. wengnan* Tong & Li, **sp. nov.** (♂) and *O. xui* Tong & Li, **sp. nov.** (♂♀). The males of *O. colubrina* Liu, Henrard & Xu, 2019 is described for the first time. An identification key to species of the genus *Orchestina* from Xishuangbanna is provided.

Key Words

Asia, goblin spiders, identification key, Orchestininae, taxonomy

Introduction

Xishuangbanna (Fig. 19), located in the south of Yunnan Province, has the best preserved tropical rainforest of China and belongs to the Indo-Burma biodiversity hotspot (Myers 1988). Implementing an “All Species Inventory” of spiders in Xishuangbanna Tropical Botanical Garden (XTBG, 1125-hectare area in total) has increased the spider species from fewer than 50 before 2006 to about 782 by the end of 2021 (Li 2021). Goblin spiders (Oonopidae Simon, 1890) are composed of tiny spiders between 1.0 and 3.0 mm. They have a nearly worldwide distribution, and mainly occur in leaf litter, under bark, and in the tree canopy (Jocqué and Dippenaar-Schoeman 2006; Henrard and Jocqué 2012; Ubick and Dupérré 2017). Currently, 1940 extant described species in 115 genera of oonopid spiders have been recorded in the world (WSC 2024).

The genus *Orchestina* Simon, 1882 is characterized by having an enlarged femur IV with which these species are capable of jumping. The genus is also characterized by having a well-sclerotized sperm duct, six well developed eyes with near H-shaped arrangement, a 4-4-3-3 pattern of raised receptors on the tarsal organs of the legs I–IV, respectively, and by lacking spines on all the legs (Henrard and Jocqué 2012; Platnick et al. 2012; Izquierdo and Ramírez 2017). Currently, 164 extant species have been described, in which 14 species have been recorded from China (Tong and Li 2011; Liu et al. 2016, 2019; Wang et al. 2021; Lin et al. 2024).

The survey of oonopid spiders from Xishuangbanna has started relatively recently. To date, 20 species in 4 genera (*Bannana* Tong & Li, 2015, *Camptoscapbiella* Caporiacco, 1934, *Ischnothyreus* Simon, 1893 and *Opopaea* Simon, 1892) have been recorded from Xishuangbanna (Tong and Li 2015a, b; Sun et al. 2019; Huang et al. 2021; Tong et al.

2021). While studying spiders collected from Xishuangbanna, Yunnan Province, China, we found many *Orchestina* specimens, and belonging to several different species. The present paper aims to provide the descriptions of five new species and three known species from this region.

Materials and methods

The specimens were examined using a Leica M205C stereomicroscope. Details of body parts and measurements were studied under an Olympus BX51 compound microscope. Photos were made with a Canon EOS 750D zoom digital camera (18 megapixels) mounted on an Olympus BX51 compound microscope. Vulvae were cleared in lactic acid. Photos were stacked using Helicon Focus 7.6.1 and processed using Adobe Photoshop 21.1.2. All measurements in the text are given in millimeters. Terminology and taxonomic descriptions follow Henrard and Jocqué (2012) and Tong and Li (2011).

All material studied is deposited in Shenyang Normal University (SYNU) in Shenyang, China.

The following abbreviations are used in the text and figures: **ALE** = anterior lateral eyes; **ARe** = anterior receptaculum; **AUS** = anterior uterine sclerite; **Ex** = dorsolateral extension; **Exc** = excavations; **PLE** = posterior lateral eyes; **PME** = posterior median eyes; **Po** = pocket; **PP** = posterior plate; **Pr** = protrusion; **Se** = serrula; **TO** = triangular outgrowth; **XNNR** = Xishuangbanna National Natural Reserve; **XTBG** = Xishuangbanna Tropical Botanical Garden.

Taxonomy

Family Oonopidae Simon, 1890

Genus *Orchestina* Simon, 1882

Type species. *Schoenobates pavesii* Simon, 1873; gender feminine.

N.B.: considered a senior synonym of *Ferchestina* Saaristo & Marusik, 2004: 52 (type *F. storozhenkoi* Saaristo & Marusik, 2004) by Platnick et al. 2012: 37.

Key to *Orchestina* from Xishuangbanna

O. concava, *O. menglun*, *O. subclavulata* and *O. wengnan* females unknown.

- | | | |
|----|---|---|
| 1 | Male | 2 |
| – | Female | 9 |
| 2 | Bulb oval or roughly triangle shaped, embolus base thinner (Figs 7E, F, 12A, B)..... | 3 |
| – | Bulb pear-shaped in lateral view, with ventral side strongly protruding proximally, embolus base thicker (e.g., Fig. 1A–C)..... | 4 |
| 3 | Bulb oval shaped (Fig. 12A, B); chelicerae with distal group of long converging setae (Fig. 10F); tibia I with a group of ventrobasal spines (Fig. 10D) | <i>O. truncatula</i> Tong & Li, 2011 |
| – | Bulb triangle shaped (Fig. 7E, F); chelicerae with distal single long setae (Fig. 2D, F); tibia I without the aforementioned character | <i>O. colubrina</i> Liu, Henrard & Xu, 2019 |
| 4 | Palpal tibia distinctly narrower than bulb (Fig. 7A, B)..... | <i>O. menglun</i> sp. nov. |
| – | Palpal tibia strongly enlarged, at least as wide as bulb (e.g., Fig. 1A–C)..... | 5 |
| 5 | Sperm duct with 2 loops in prolateral view (Figs 5A, 14A)..... | 6 |
| – | Sperm duct with 3 loops in prolateral view (Figs 1A, 9A, 16A)..... | 7 |
| 6 | Endites with deep excavations (Figs 4G, 5D) | <i>O. concava</i> sp. nov. |
| – | Endites without deep excavations (Figs 13G, 14D) | <i>O. wengnan</i> sp. nov. |
| 7 | Embolus with conspicuous dorsal flattened extension and acute tip (Fig. 16A–C) | <i>O. xui</i> sp. nov. |
| – | Embolus gradually tapered (Figs 1A–D, 9A–C)..... | 8 |
| 8 | Endites with large triangular outgrowth (Fig. 9D) | <i>O. subclavulata</i> sp. nov. |
| – | Endites lacking triangular outgrowth (Fig. 1E)..... | <i>O. clavulata</i> Tong & Li, 2011 |
| 9 | Genitalia with posterior plate (PP); anterior uterine sclerite (AUS) with lateral protrusion (Pr) well developed (Fig. 18D)..... | 10 |
| – | Genitalia with two dorsolateral extensions (Ex) surrounding anterior uterine sclerite (AUS); AUS with lateral protrusion (Pr) reduced (Figs 3I, 12F)..... | 11 |
| 10 | Epigaster with two small, dark sclerotized pockets (Fig. 18C) | <i>O. xui</i> sp. nov. |
| – | Epigaster without two small, dark sclerotized pockets (Tong and Li 2011: fig. 4B)..... | <i>O. clavulata</i> Tong & Li, 2011 |
| 11 | Epigaster with distinctly medial marks in ventral view (Fig. 11G); anterior uterine sclerite (AUS) short, length/width ratio about 1.25 (Fig. 12F) | <i>O. truncatula</i> Tong & Li, 2011 |
| – | Epigaster without distinctly medial marks in ventral view (Fig. 3G); anterior uterine sclerite (AUS) long, length/width ratio about 2.0 (Fig. 3H, I)..... | <i>O. colubrina</i> Liu, Henrard & Xu, 2019 |

***Orchestina clavulata* Tong & Li, 2011**

Fig. 1

Orchestina clavulata Tong & Li, 2011: 38, figs 1C–D, 2B, 3B, 4B, 5D, 7A–F; Tong 2013: 47, figs 26C–D, 27B, 28B, 29B, 30D, 65A–F.

Material examined. 1♂ (SYNU-777), CHINA, Yunnan, Mengla Co., Menglun Town, XNNR, fogging, seasonal rainforest, 48 km (21°58.764'N, 101°09.748'E), elev. 1038 m, 10 August 2011, Zheng, Zhao & Gao leg.; 2♂ (SYNU-778), fogging, Lvshilin, limestone monsoon rainforest (21°54.769'N, 101°16.959'E), elev. 599 m, 9 August 2011, Zheng, Zhao & Gao leg.; 2♂ (SYNU-890), fogging, mountaintop secondary rainforest, 55 Km (21°57.987'N, 101°12.167'E), elev. 1038 m, 10 August 2011, Zheng, Zhao & Gao leg.

Type material (examined). *Paratypes*: 6♂3♀ (IZCAS Ar 19334), China: Hainan, Lingshui, Diaoluoshan, Plank roadside, 963 m a.s.l., 18°43.631'N, 109°51.939'E, 7 August 2010, leg. G. Zheng.

Diagnosis. This species is most similar to *O. thoracica* Xu, 1987 in having the net-shaped pattern on carapace and the pear-shaped bulb, but can be distinguished by the sperm duct with three loops in prolateral view (Fig. 1A, B; Tong and Li 2011: fig. 7A) vs. two loops in *O. thoracica* (Xu 1987: fig. 11), and by female genitalia without marks (Tong and Li 2011: fig. 4B), vs. with elongate heart-shaped mark in *O. thoracica* (Xu 1987: fig. 9).

Description. See Tong and Li (2011).

Distribution. China (Hainan, Yunnan).

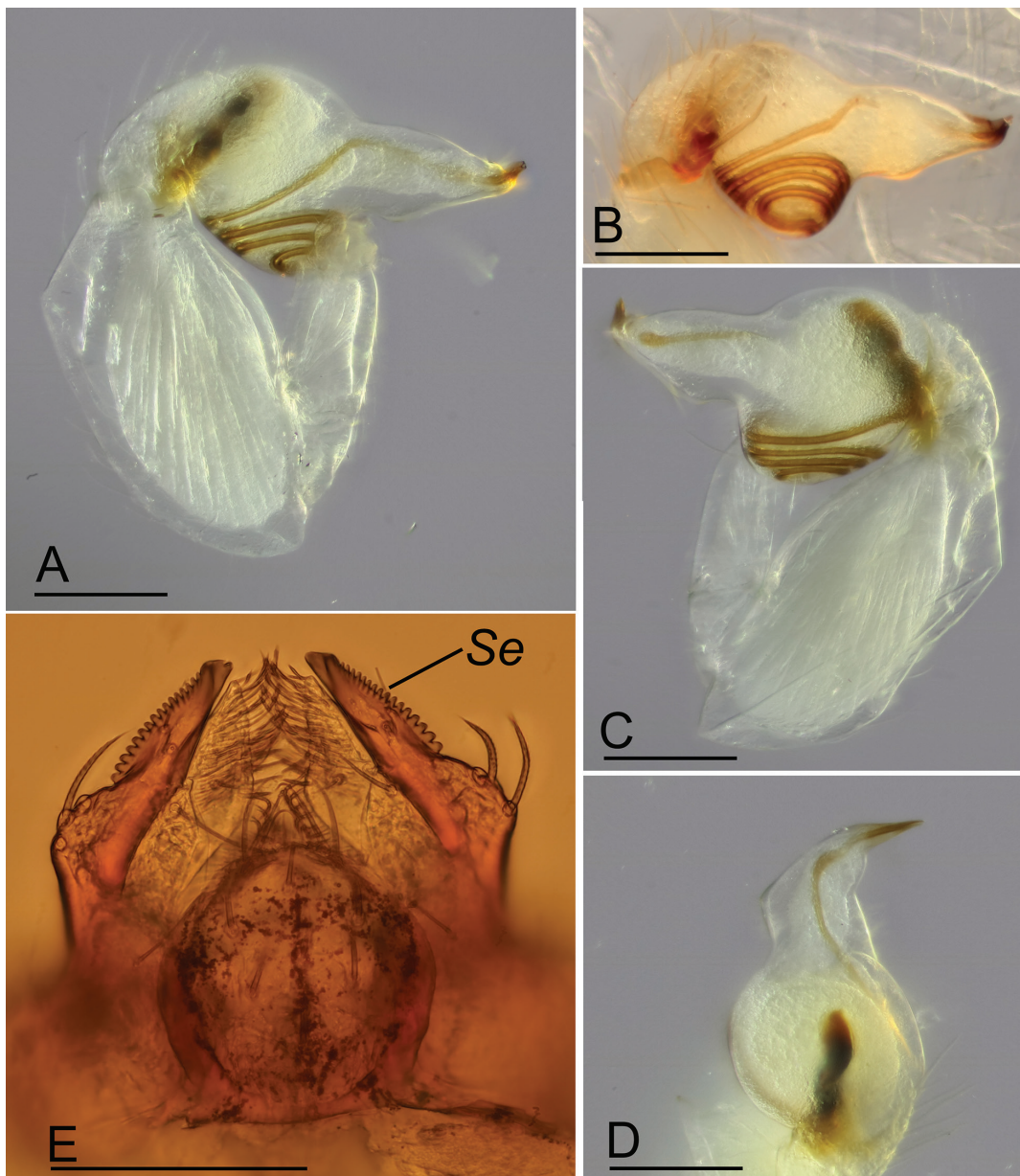


Figure 1. *Orchestina clavulata* Tong & Li, 2011, male (SYNU-777). A, C, D. Left palp, prolateral, retrolateral and dorsal views; B. Left bulb, prolateral view; E. Endites and labium, ventral view. Abbreviation: Se = serrula. Scale bars: 0.1 mm.

***Orchestina colubrina* Liu, Henrard & Xu, 2019**

Figs 2, 3, 7E, 7F

Orchestina colubrina Liu, Henrard & Xu, in Liu et al. 2019: 246, figs 10A–H, 11A–F.

Material examined. 1♂ (SYNU-841), CHINA, Yunnan, Mengla Co., Menglun Town, XTBG, trunk traps, *Paramichella baillonii* plantation (21°54.772'N, 101°16.043'E), elev. 556 m, 16–31 May 2007, Zheng leg.; 1♂1♀ (SYNU-845-846), same data as above; 3♀ (SYNU-847-849), same data as above; 1♂ (SYNU-843), XTBG, Fogging, same locality as above, 18 July 2007, Zheng leg.; 1♂ (SYNU-842), XTBG, fogging, rubber plantation (21°54.463'N, 101°15.978'E), elev. 569 m, 21 July 2007, Zheng leg.; 1♂ (SYNU-844), XTBG, trunk traps, rubber plantation (21°55.551'N, 101°16.923'E), elev. 561 m, 1–15 June 2007, Zheng leg.

Type material (unexamined). *Holotype* ♀, China, Jiangxi Province: Ji'an City, Jinggangshan County Level City, Ciping Town, Xingzhou Vill., forest, 26.519°N, 114.193°E, 514m, 3.X.2015, Keke Liu, Zeyuan Meng, Lei Zhang, Jianyun Wen and Tianming Wang leg. (OON 75). **Paratype:** 1♀, collected together with the holotype (OON 76).

Diagnosis. Males of *Orchestina colubrina* is similar to *O. multipunctata* Liu, Xiao & Xu, 2016 (female unknown) in having a strongly swollen palpal tibia, the tube-shaped embolus and the same kind of modified setae in the labium, but can be distinguished by the triangle shaped bulb (Fig. 7E, F) vs. drop-shaped (Liu et al. 2016, fig. 8H, I). Females of *O. colubrina* resemble to those of *O. yinggezui* Tong & Li, 2011 in having the long lateral extensions (Ex) surrounding anterior uterine sclerite (AUS), but can be distinguished by the narrow cylindrical sclerite (AUS) having Y-shaped lateral protrusions (Fig. 3H, I), vs. AUS with circular protrusions in *O. yinggezui* (Tong and Li 2011: fig. 5H, 10B).

Description. Male (SYNU-841). Total length 1.33, carapace length 0.72, carapace width 0.48, abdomen length 0.63. Habitus as in Fig. 2A, B. Color in alcohol: pale yellow. Carapace oval, with net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 2D, F) margin unmodified, curved downwards in front view, sloping forward in lateral view. Sternum (Fig. 2E) longer than wide, with marginal band of tiny dark spots, surface smooth. Mouthparts (Fig. 2D, F): chelicerae straight, with a single distal long setae; labium rounded, not fused to sternum, anterior margin not indented at middle, with five modified, leaf-shaped setae; endites not strongly sclerotized, without serrula. Abdomen ovoid, with gray ^-shaped pattern. Genitalia (Fig. 7E, F): tibia of palp strongly enlarged, length/width ratio = 1.41, cymbium small; bulb triangle-shaped, about 0.76 times as wide as tibia; tapering apically; sperm duct not strongly sclerotized, barely

visible through cuticle; embolus slender, tube-shaped, flattened at tip.

Female (SYNU-846). Same as male except as noted. Body: habitus as in Fig. 3A, B; body length 1.36. Carapace: 0.66 long, 0.51 wide. Clypeus (Fig. 3F): anterior margin straight. Mouthparts: chelicerae shorter; endites simple, with serrula. Abdomen: 0.67 long. Epigaster (Fig. 3G, H): without special external features; internal parts visible through integument. Endogyne (Fig. 3I): with medial cylindrical sclerite (AUS), anterior part of cylindrical sclerite (AUS) with pair of Y-shaped protrusions (Pr); AUS surrounded by narrow hoop (Ex).

Distribution. China (Jiangxi, Yunnan).

***Orchestina concava* Tong & Li, sp. nov.**<https://zoobank.org/528FB8F7-E56D-4CDF-9260-EE5CD2C30470>

Figs 4, 5

Type material. Holotype: ♂ (SYNU-771), CHINA, Yunnan, Jinghong City, Menghai Co., Meng'a Town, Wengnan Vill., sifting leaf litter, secondary forest (22°05.020'N, 100°22.086'E), elev. 1118 m, 24 July 2012, Zhao & Chen leg. **Paratypes:** 1♂ (SYNU-772), same data as for holotype.

Etymology. The specific name comes from Latin, *concavus*, meaning hollowed, referring to the excavations of male endites.

Diagnosis. The new species is similar to *O. clavulata* in having the strongly swollen palpal tibia and the pear-shaped bulb, but can be distinguished by the endites with deep excavations (Fig. 5D) vs. straight in *O. clavulata* (Fig. 1E) and the sperm duct with two loops in prolateral view (Fig. 5A) vs. three loops in *O. clavulata* (Fig. 1A, B). This new species is also similar to *O. wengnan* sp. nov. in having the pear-shaped bulb and the sperm duct with two loops in prolateral view, but can be distinguished by the endites with deep excavations (Fig. 5D) vs. straight in *O. wengnan* sp. nov. (Fig. 14D).

Description. Male (holotype). Total length 1.29, carapace length 0.63, carapace width 0.46, abdomen length 0.64. Habitus as in Fig. 4A–C. Color in alcohol: carapace yellow, abdomen and legs pale yellow. Carapace oval, with net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 4F): margin unmodified, curved downwards in front view, sloping forward in lateral view. Sternum (Fig. 4G) longer than wide, with marginal band and median area of radiating lines, surface smooth; setae sparse, needle-like, evenly scattered, without hair tufts. Mouthparts (Fig. 4F): chelicerae straight, anterior face unmodified; labium rounded, not fused to sternum, anterior margin not indented at middle; endites (Figs 4G, 5D) strongly sclerotized, with triangular outgrowth, outer margin with serrula and excavations. Abdomen ovoid,

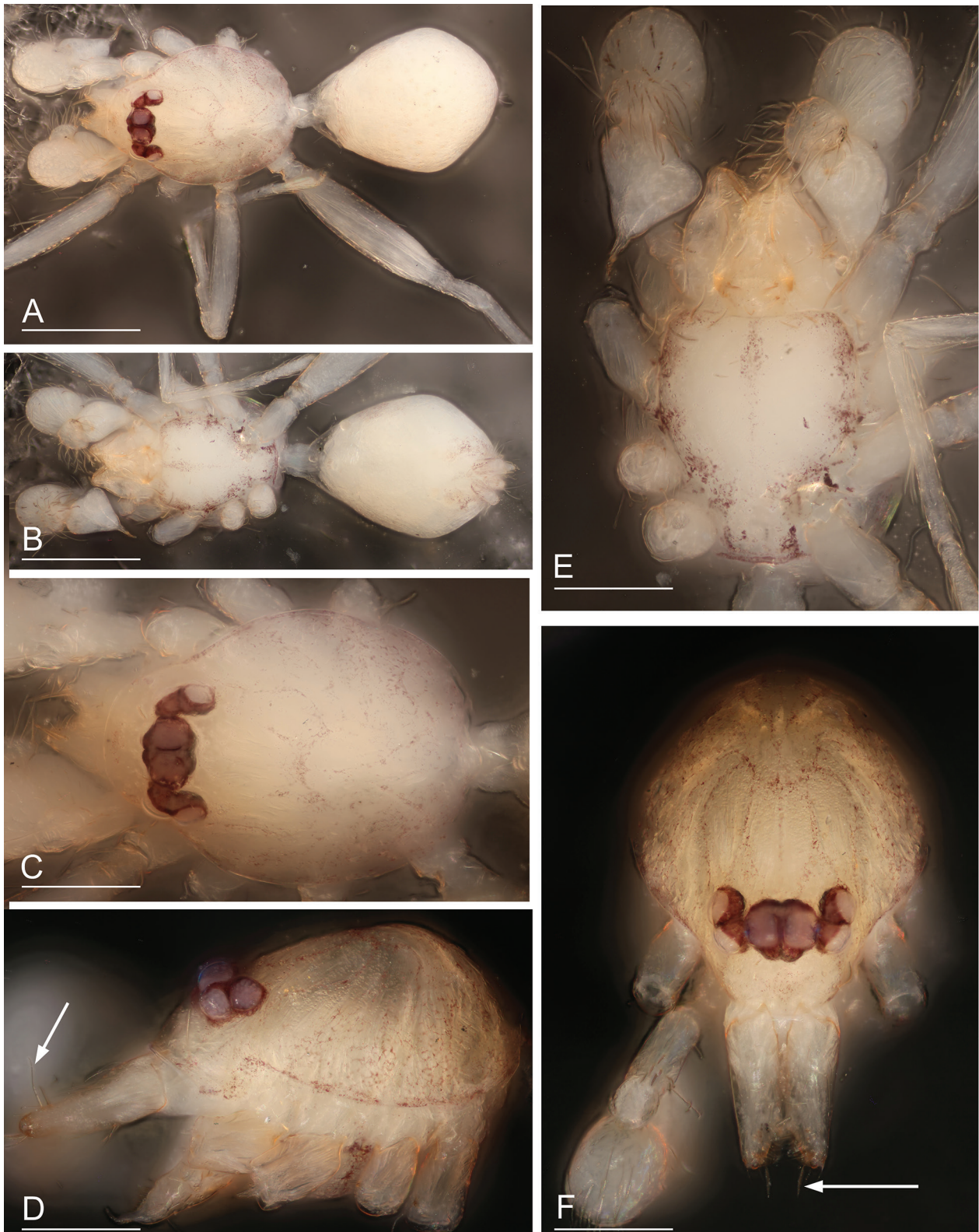


Figure 2. *Orchestina colubrina* Liu, Henrard & Xu, 2019, male (SYNU-841). **A, B.** Habitus, dorsal and ventral views; **C–F.** Prosoma, dorsal, lateral, ventral and anterior views (arrows show the single distal seta). Scale bars: 0.4 mm (**A, B**); 0.2 mm (**C–F**).

with gray ^-shaped pattern. Genitalia (Fig. 5A–C): tibia of palp strongly enlarged, length/width ratio = 1.63, cymbium small; bulb pear-shaped in lateral view, with ventral side strongly protruding proximally, about 0.92 times as

wide as tibia; the sperm duct strongly curved with two loops; embolus slender.

Female. Unknown.

Distribution. Known only from the type locality.

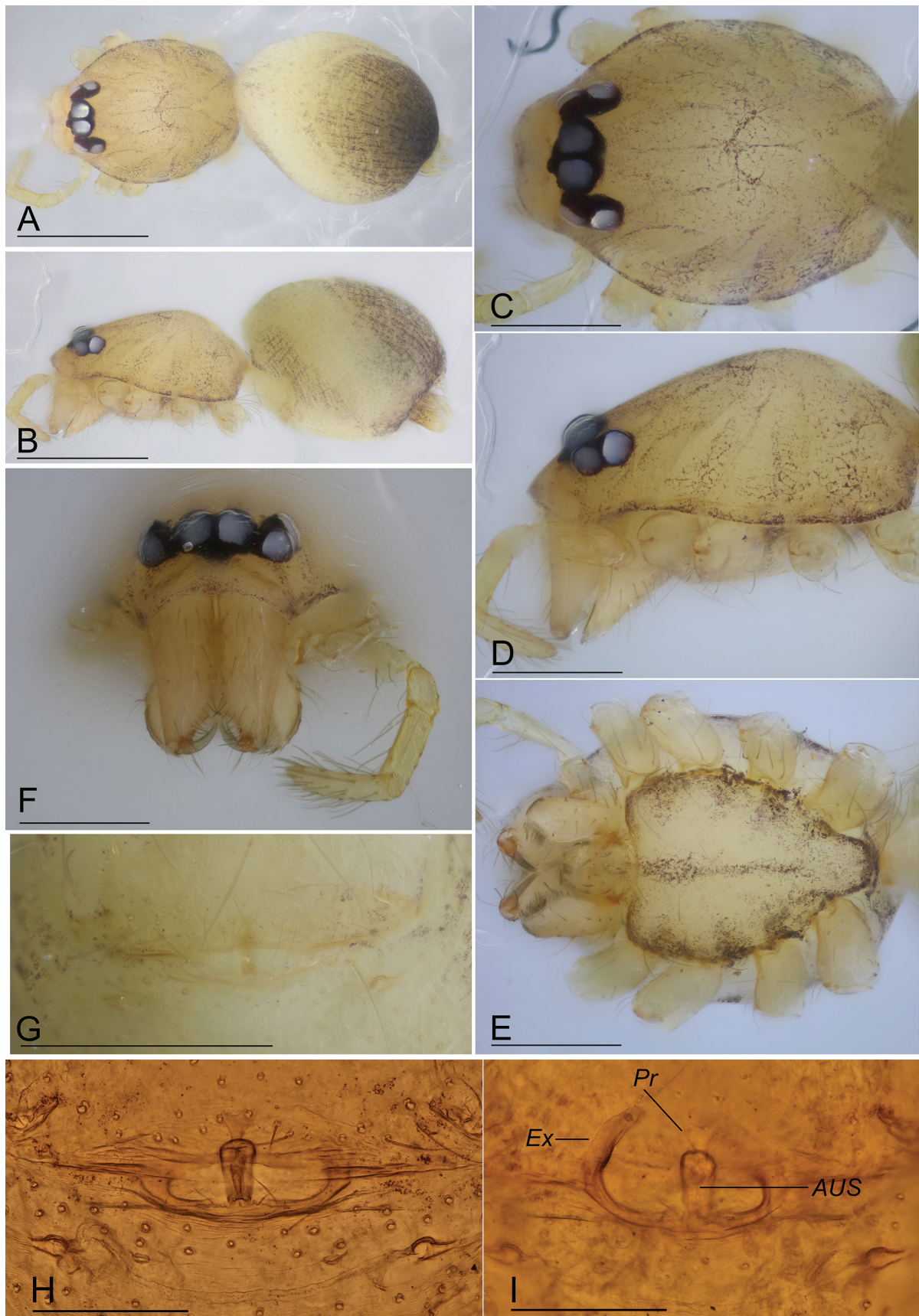


Figure 3. *Orchestina colubrina* Liu, Henrard & Xu, 2019, female (SYNU-846). **A, B.** Habitus, dorsal and lateral views; **C–F.** Prosoma, dorsal, lateral, ventral and anterior views; **G.** Epigaster, ventral view; **H–I.** Endogyne, ventral and dorsal views. Abbreviations: AUS = anterior uterine sclerite; Ex = dorsolateral extension; Pr = protrusion. Scale bars: 0.4 mm (**A, B**); 0.2 mm (**C–G**); 0.1 mm (**H, I**).

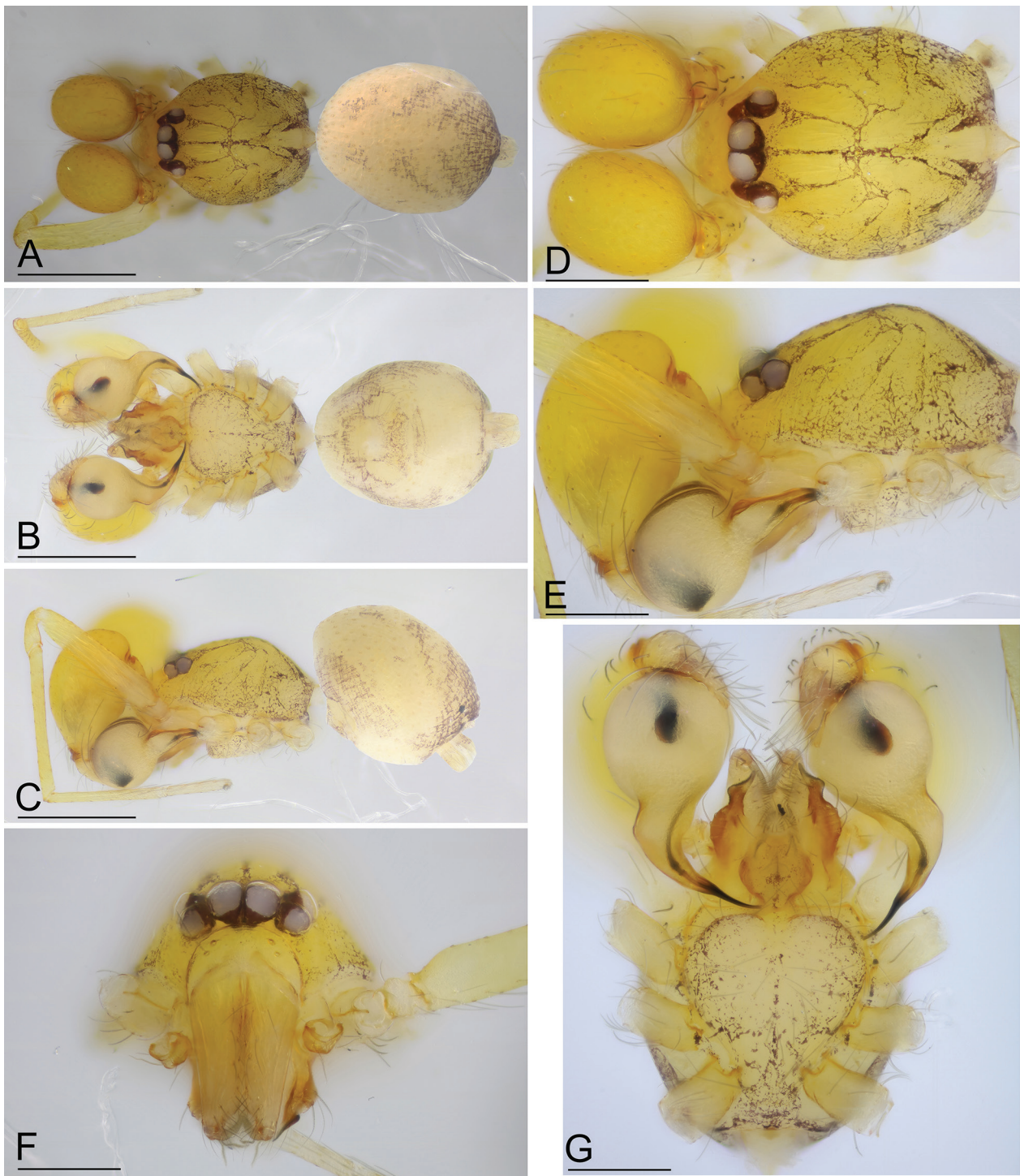


Figure 4. *Orchestina concava* sp. nov., holotype male. **A–C.** Habitus, dorsal, ventral and lateral views; **D–G.** Prosoma, dorsal, lateral, anterior and ventral views. Scale bars: 0.4 mm (**A–C**); 0.2 mm (**D–G**).

***Orchestina menglun* Tong & Li, sp. nov.**

<https://zoobank.org/EAD9BEBA-2A52-44BC-A6E8-0BA96462F79A>
Figs 6, 7A–D

Type material. *Holotype*: ♂ (SYNU-775), **CHINA**, Yunnan, Mengla Co., Menglun Town, XTBG, fogging, Lvshilin, limestone monsoon rainforest (21°54.617'N, 101°16.843'E), elev. 738 m, 8 August 2011, Zheng, Zhao & Gao leg. *Paratypes*: 7♂ (SYNU-900-906),

XTBG, fogging, secondary tropical seasonal moist forest (21°54.607'N, 101°17.005'E), elev. 633 m, 28 July 2007, Zheng leg.

Etymology. The specific name is a noun in apposition taken from the type locality.

Diagnosis. The new species is similar to *O. clavulata* in having the pear-shaped bulb and the net-shaped pattern on carapace, but can be distinguished by the palpal tibia distinctly narrower than bulb

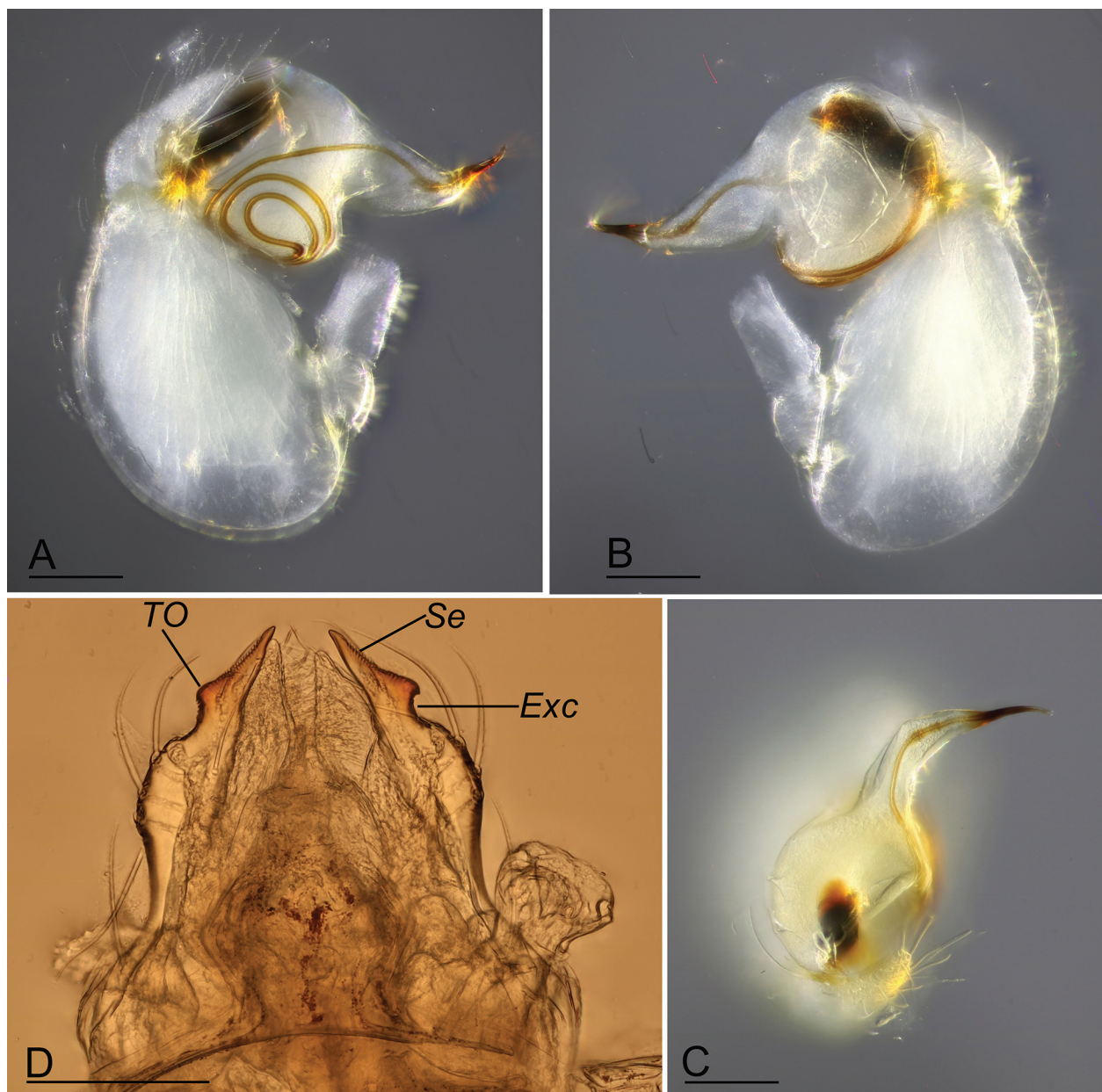


Figure 5. *Orchestina concava* sp. nov., holotype male. **A–C.** Left palp, prolateral, retrolateral and dorsal views; **D.** Endites and labium, ventral view. Abbreviations: Exc = excavations; Se = serrula; TO = triangular outgrowth. Scale bars: 0.1 mm.

(Fig. 7A, B) vs. as wide as bulb in *O. clavulata* (Fig. 1A) and endites not strongly sclerotized, with smoothly curved outer margin (Figs 6G, 7D) vs. strongly sclerotized, with straight outer margin in *O. clavulata* (Fig. 1E).

Description. Male (holotype). Total length 1.18, carapace length 0.61, carapace width 0.42, abdomen length 0.56. Habitus as in Fig. 6A–C. Color in alcohol: pale yellow. Carapace oval, with sepia net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 6F) margin unmodified, curved downwards in front view, sloping forward in lateral view. Sternum (Fig. 6G) longer than wide, with marginal band and median area of

radiating lines, surface smooth. Mouthparts: chelicerae straight, anterior face unmodified; labium rounded, not fused to sternum, anterior margin not indented at middle; endites (Fig. 7D) not strongly sclerotized, outer margin smoothly curved, with serrula. Abdomen ovoid, with gray ^-shaped pattern. Genitalia (Fig. 7A–C): tibia of palp enlarged, length/width ratio = 1.72, cymbium small; bulb pear-shaped in lateral view, with ventral side strongly protruding proximally, about 1.52 times as wide as tibia; the sperm duct strongly curved with three loops; embolus short.

Female. Unknown.

Distribution. China (Yunnan: Xishuangbanna Tropical Botanical Garden).

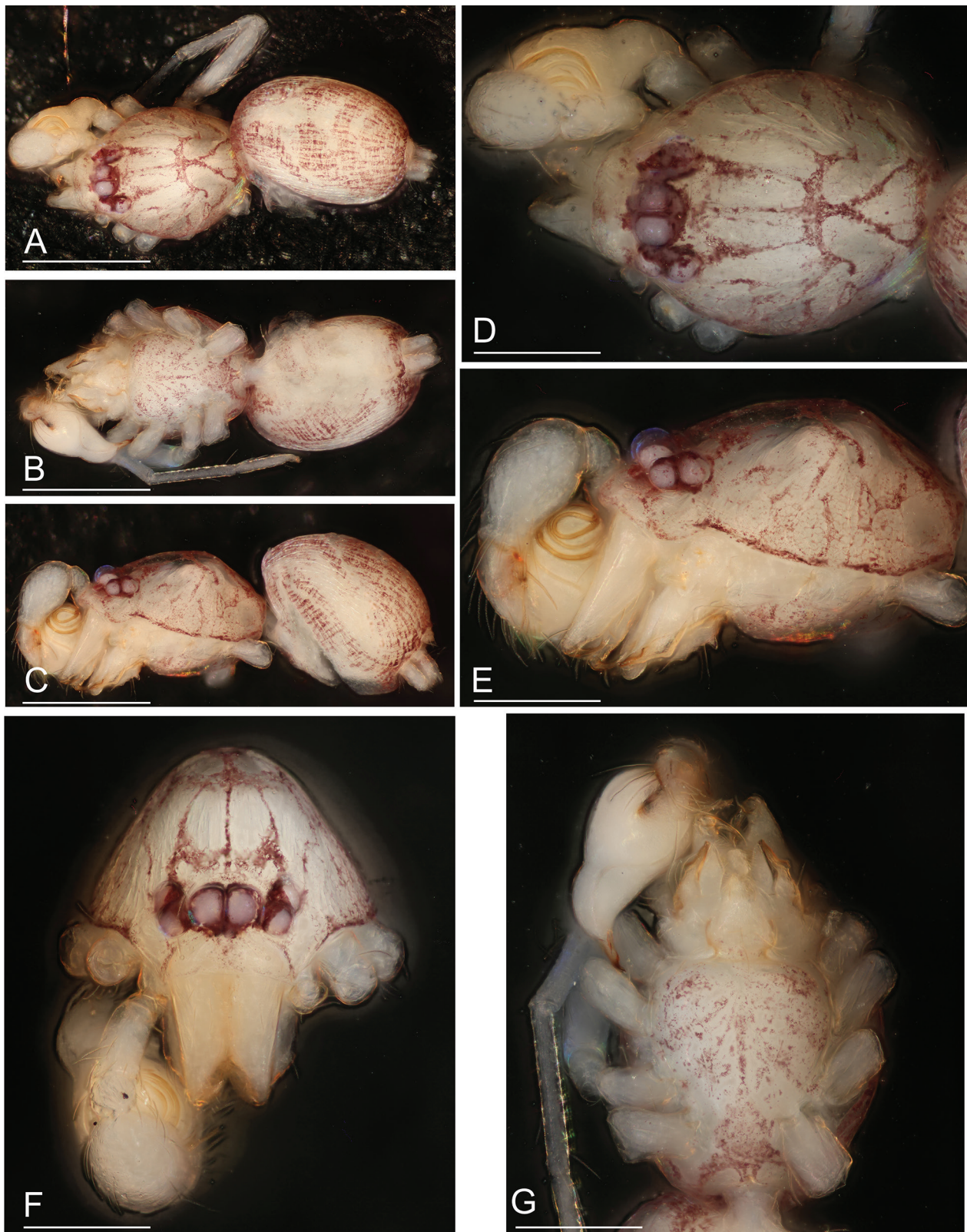


Figure 6. *Orchestina menglun* sp. nov., holotype male. A–C. Habitus, dorsal, ventral and lateral views; D–G. Prosoma, dorsal, lateral, anterior and ventral views. Scale bars: 0.4 mm (A–C); 0.2 mm (D–G).

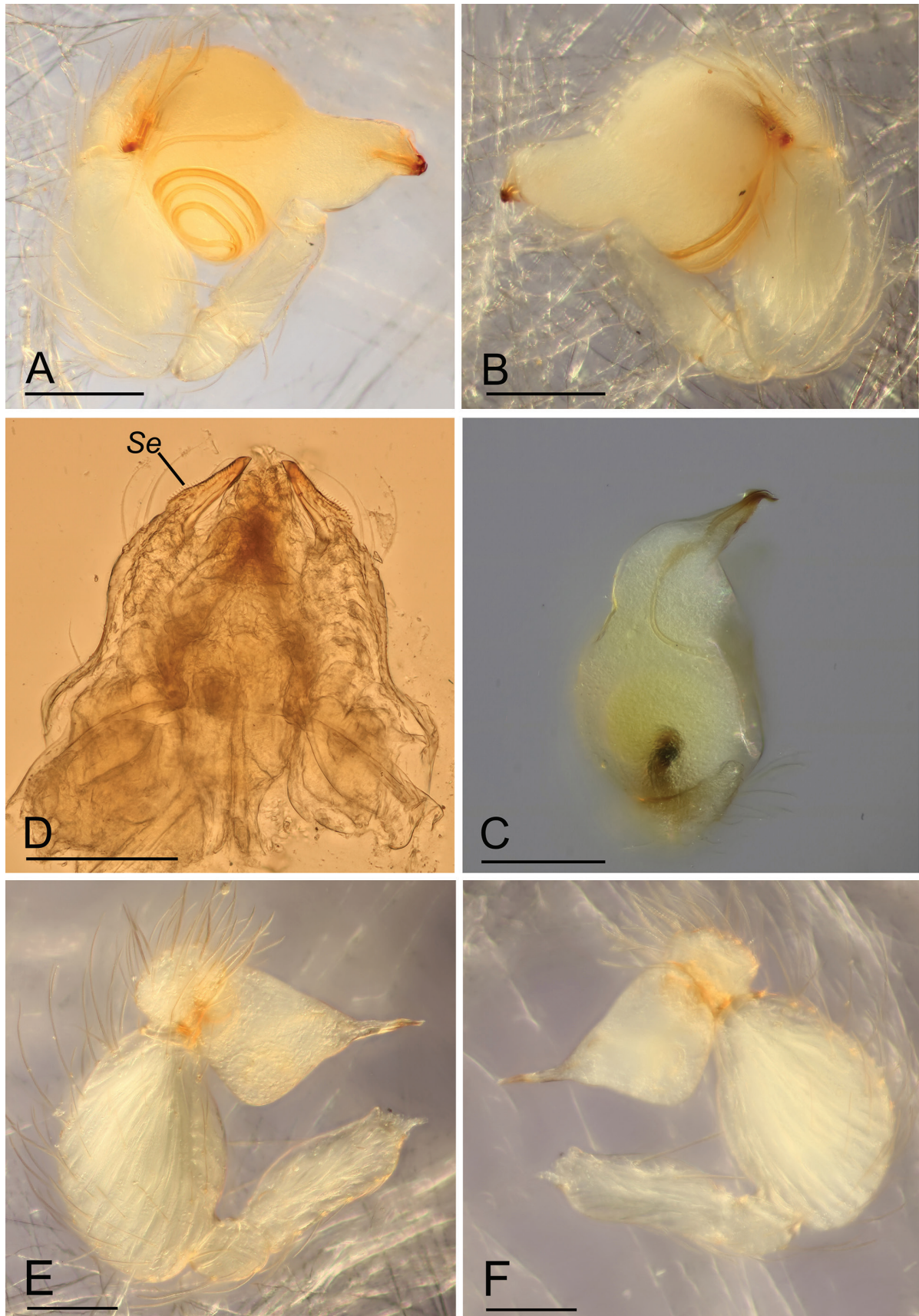


Figure 7. *Orchestina menglun* sp. nov., **A–D**, holotype male; *Orchestina colubrina* Liu, Henrard & Xu, 2019, **E, F**, male (SYNU-841). **A, E**. Left palp, prolatateral view; **B, F**. Left palp, retrolateral view; **C**. Left palp, dorsal view; **D**. Endites and labium, ventral view. Abbreviation: Se = serrula. Scale bars: 0.1 mm.

***Orchestina subclavulata* Tong & Li, sp. nov.**

<https://zoobank.org/FE9EC909-7177-4E77-A09F-15634499B087>

Figs 8, 9

Type material. Holotype: ♂ (SYNU-776), CHINA, Yunnan, Mengla Co., Menglun Town, XNNR, fogging, seasonal rainforest, 55 Km (21°57.953'N, 101°12.305'E), elev. 781 m, 13 August 2011, Zheng, Zhao & Gao leg. **Paratypes:** 5♂ (SYNU-819-823), same data as for holotype.

Etymology. The specific name refers to the similarities to *O. clavulata*.

Diagnosis. The new species is similar to *O. clavulata* and *O. menglun* sp. nov. in having the pear-shaped bulb and the net-shaped pattern on carapace, but can be distinguished by the endites with triangular outgrowth (Figs 8G, 9D), vs. without triangular outgrowth in *O. clavulata* (Fig. 1E) and *O. menglun* (Fig. 7D), and the sperm duct overlapped at the margin of bulb (white arrow in Fig. 9A) vs. not overlapped in *O. clavulata* (Fig. 1B) and *O. menglun* (Fig. 7A).

Description. Male (holotype). Total length 0.96, carapace length 0.41, carapace width 0.39, abdomen length 0.48. Habitus as in Fig. 8A–C. Color in alcohol: carapace yellow, abdomen, legs and palp pale yellow. Carapace oval, with net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 8F) margin unmodified, curved downwards in front view, rounded forward in lateral view. Sternum (Fig. 8G) longer than wide, pale yellow, with marginal band and median area of radiating lines, surface smooth. Mouthparts: chelicerae elongate, anterior face unmodified; labium elongate, spade-shaped, not fused to sternum, anterior margin not indented at middle; endites (Figs 8G, 9D) strongly sclerotized, with triangular outgrowth, outer margin with serrula. Abdomen ovoid, with ^-shaped pattern. Genitalia (Fig. 9A–C): tibia of palp strongly enlarged, length/width ratio = 1.67, cymbium small; bulb pear-shaped in lateral view, with ventral side strongly protruding proximally, about 0.91 times as wide as tibia; the sperm duct strongly curved with three loops; embolus short, with sub-apical, opaque crest.

Female. Unknown.

Distribution. Known only from the type locality.

***Orchestina truncatula* Tong & Li, 2011**

Figs 10–12

Orchestina truncatula Tong & Li, 2011: 39, figs 1E–F, 2C, 3C–D, 4D, 5E, 8A–F; Tong, 2013: 48, figs 26E–F, 27C, 28C–D, 29D, 30E, 66A–F; Rajoria & Jadhao, 2016: 61, figs 1–5.

Material examined. 2♂ (SYNU-773-774), CHINA, Yunnan, Mengla Co., Menglun Town, XTBG, fogging, Lvshilin, limestone monsoon rainforest (21°54.617'N,

101°16.843'E), elev. 738 m, 8 August 2011, Zheng, Zhao & Gao leg.; 1♀ (SYNU-783), sifting leaf litter, Bubang Vill. (21°36.640'N, 101°34.905'E), elev. 823 m, 10 July 2012, Zhao & Chen leg.; 7♂5♀ (SYNU-874), sifting leaf litter, seasonal rainforest (22°09.765'N, 100°52.553'E), elev. 862 m, 22 July 2012, Zhao & Chen leg.

Type material (examined). Holotype ♂ (IZCAS Ar 19320), China: Hainan, Baisha, Yinggeling, Yinggezui Protection Station, 693 m a.s.l., 19°03.049'N, 109°33.751'E, 25 August 2010, leg. G. Zheng. **Paratypes:** 1♂, 1♀ (IZCAS Ar 19319), same data as holotype; 2♀ (IZCAS Ar 19318), China: Hainan, Ledong, Jianfengling, 997m a.s.l., 18°44.658'N, 108°50.435'E, 18 August 2010, leg. G. Zheng.

Diagnosis. This species is similar to *O. communis* Henrard & Jocqué, 2012 in the large leaf-shaped setae on the diamond-shaped labium and the group of strong, converging setae on distal part of the male chelicerae, but can be distinguished by the small process at base of male chelicerae (Fig. 10F, G; Tong and Li 2011: fig. 3C, D), vs. without the small process (Henrard and Jocqué 2012: figs 90, 93), and the shape of anterior uterine sclerite (AUS), the length/width ratio about 1.25 (Fig. 12F; Tong and Li 2011: fig. 5E), vs. about 0.6 (Henrard and Jocqué 2012: fig. 104).

Description. See Tong and Li (2011).

Comment. Tong and Li (2011) described this species based on two male and three female specimens from forest canopy of Hainan Island. The present study materials were collected by fogging and sifting leaf litter from Xishuangbanna, Yunnan. Rajoria and Jadhao (2016) reported this species from Melghat region of Maharashtra, India based on a single male specimen. This suggests that *O. truncatula* may be widely distributed in Asia. In addition, tibia I of male with a group of ventrobasal spines (Fig. 10D). This character was overlooked in the original publication.

Distribution. China (Hainan, Yunnan); India.

***Orchestina wengnan* Tong & Li, sp. nov.**

<https://zoobank.org/58A0D0E9-CBC1-4742-B1C8-E9436A18A7C3>

Figs 13, 14

Type material. Holotype: ♂ (SYNU-767), CHINA, Yunnan, Jinghong City, Menghai Co., Meng'a Town, Wengnan Vill., sifting leaf litter, secondary forest (22°05.020'N, 100°22.086'E), elev. 1118 m, 24 July 2012, Zhao & Chen leg. **Paratypes:** 1♂ (SYNU-768), sifting leaf litter, Mandazhai Vill., secondary forest (22°01.702'N, 100°23.697'E), elev. 1188 m, 28 July 2012, Zhao & Chen leg.; 1♂ (SYNU-789), sifting leaf litter, Wengnan Vill., secondary forest (22°04.996'N, 100°22.223'E), elev. 1137 m, 25 July 2012, Zhao & Chen leg.

Etymology. The specific name is a noun in apposition taken from the type locality.

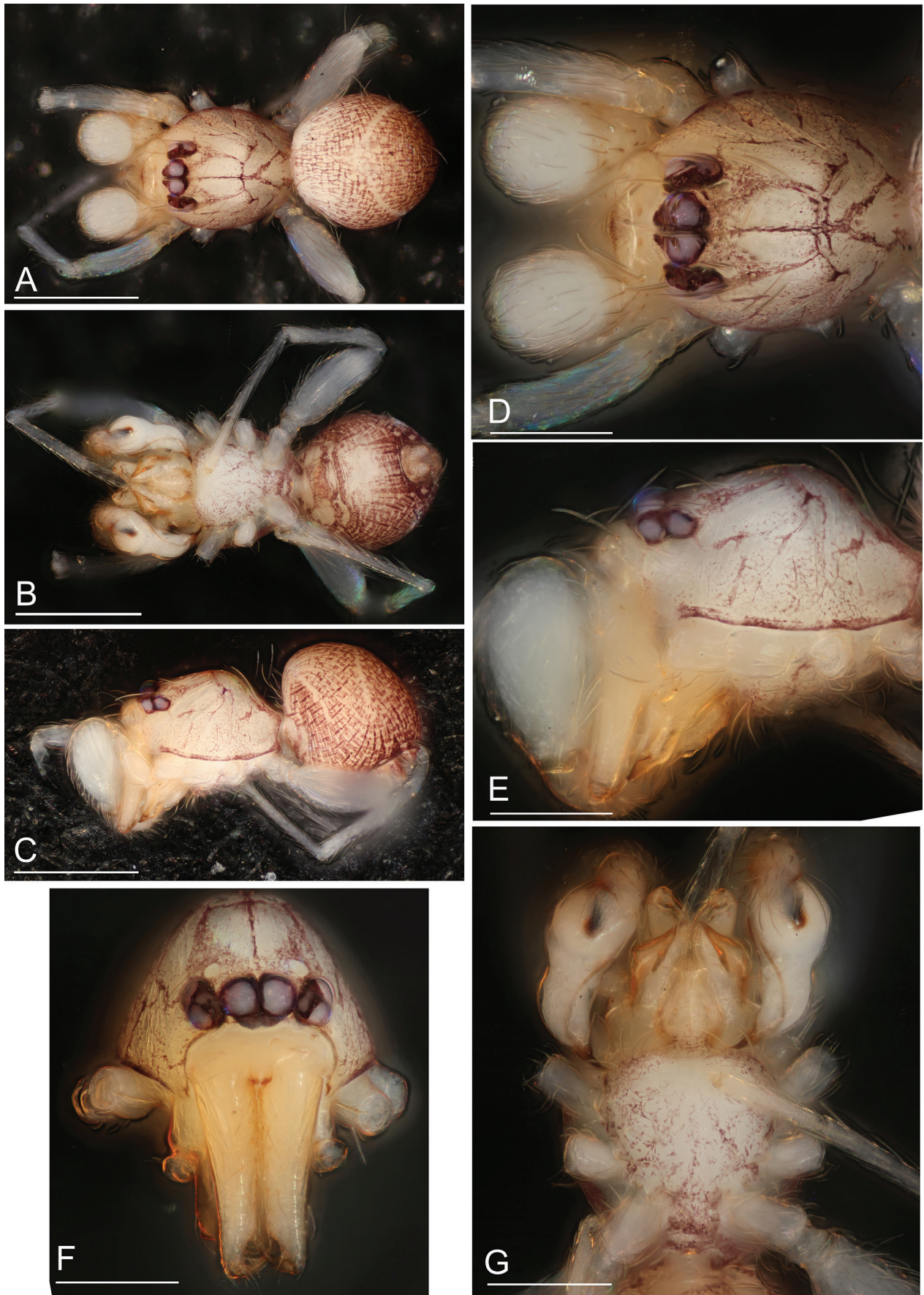


Figure 8. *Orchestina subclavulata* sp. nov., holotype male. A–C. Habitus, dorsal, ventral and lateral views; D–G. Prosoma, dorsal, lateral, anterior and ventral views. Scale bars: 0.4 mm (A–C); 0.2 mm (D–G).



Figure 9. *Orchestina subclavulata* sp. nov., holotype male. **A–C.** Left palp, prolateral, retrolateral and dorsal views, white arrow shows the overlapped sperm duct, red arrow pointing on subapical crest of embolus; **D.** Endites and labium, ventral view. Abbreviations: Se = serrula; TO = triangular outgrowth. Scale bars: 0.1 mm.

Diagnosis. The new species is similar to *O. zhiwui* Liu, Xu & Henrard, 2019 in having median projection of clypeus and the net-shaped pattern on carapace, but can be distinguished by the endites with smoothly outer margin (Fig. 14D) vs. with triangular outgrowth in *O. zhiwui* (Liu et al. 2019: figs 12H, 13A; Wang et al. 2021: figs 1H, 2G) and the sperm duct with

two loops in prolateral view (Fig. 14A) vs. only half loops (Liu et al. 2019: fig. 13B; Wang et al. 2021: fig. 1I).

Description. Male (holotype). Total length 0.94, carapace length 0.48, carapace width 0.38, abdomen length 0.49. Habitus as in Fig. 13A–C. Color in alcohol: carapace yellow, abdomen and legs pale

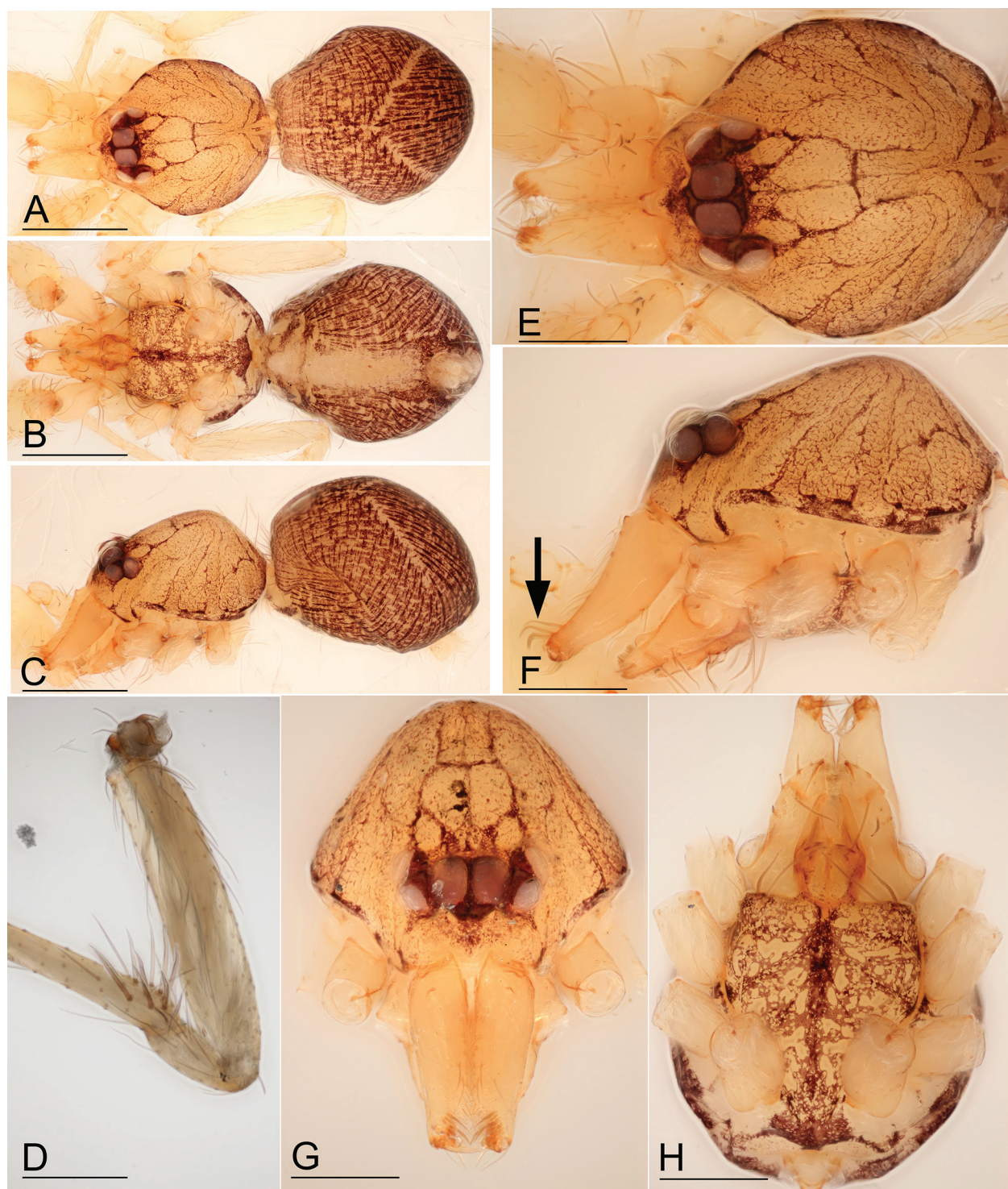


Figure 10. *Orchestina truncatula* Tong & Li, 2011, male (SYNU-773). **A–C.** Habitus, dorsal, ventral and lateral views; **D.** Left leg I, prolateral view; **E–H.** Prosoma, dorsal, lateral, anterior and ventral views, arrow shows the characteristic distal setae. Scale bars: 0.4 mm (**A–C**); 0.1 mm (**D**); 0.2 mm (**E–H**).

yellow. Carapace oval, with net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 13F) with a median projection in frontal view, rounded forward in lateral view. Sternum (Fig. 13G) longer than wide, with marginal band and median area of radiating lines, surface smooth. Mouthparts: chelicerae

straight, anterior face unmodified; labium rounded, not fused to sternum, anterior margin not indented at middle; endites (Figs 13G, 14D) strongly sclerotized, outer margin with serrula. Abdomen ovoid, with gray ^-shaped pattern. Genitalia (Fig. 14A–C): tibia of palp strongly enlarged, length/width ratio = 1.72, cymbium small; bulb pear-shaped, about 1.0 times as wide

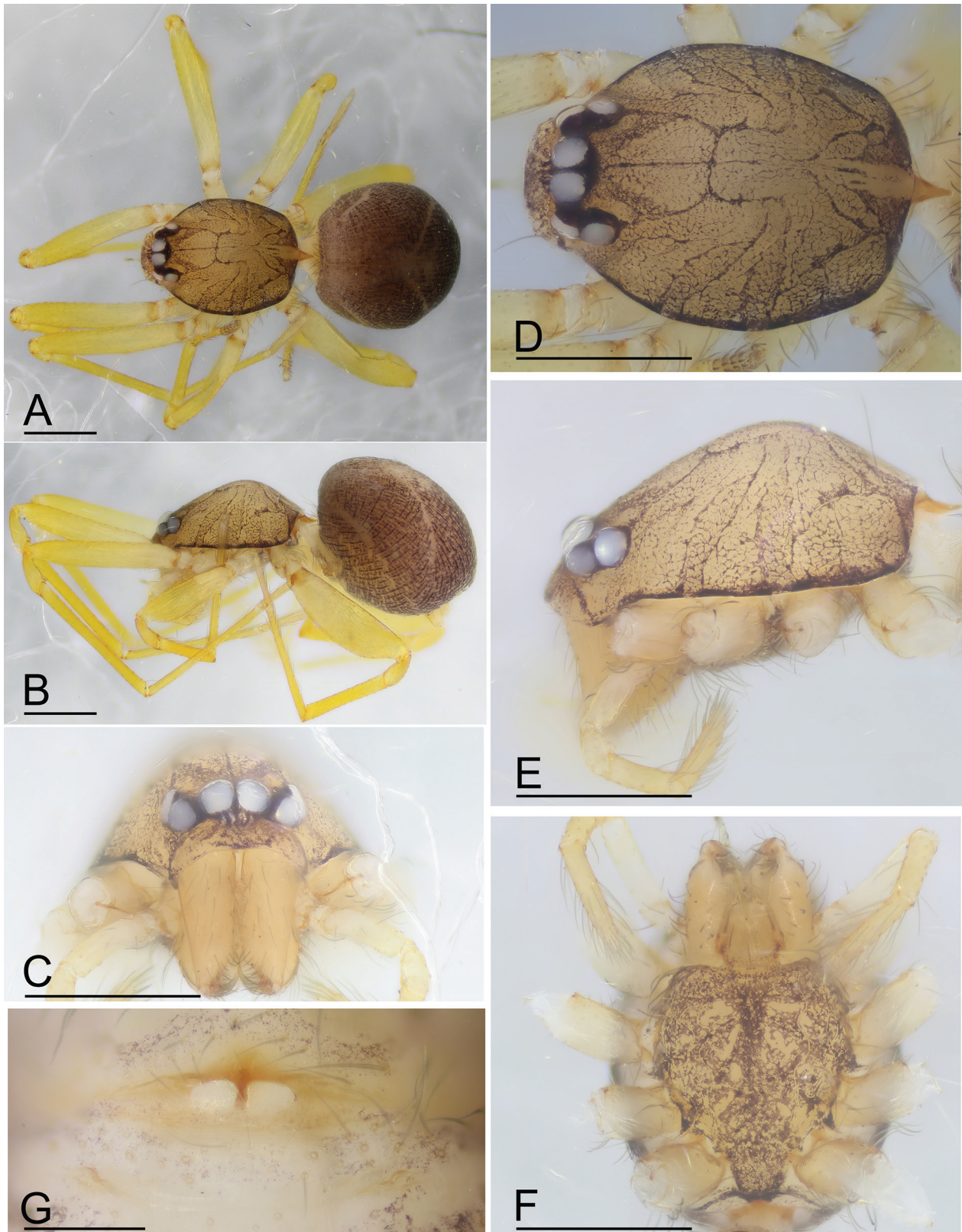


Figure 11. *Orchestina truncatula* Tong & Li, 2011, female (SYNU-783). **A, B.** Habitus, dorsal and lateral views; **C–F.** Prosoma, anterior, dorsal, lateral and ventral views; **G.** Epigaster, ventral view. Scale bars: 0.4 mm (A–F); 0.1 mm (G).

as tibia, with distal part gradually tapered towards embolus; the sperm duct strongly curved with two loops; embolus short.

Female. Unknown.

Distribution. China (Yunnan: Menghai County, Meng'a Town).

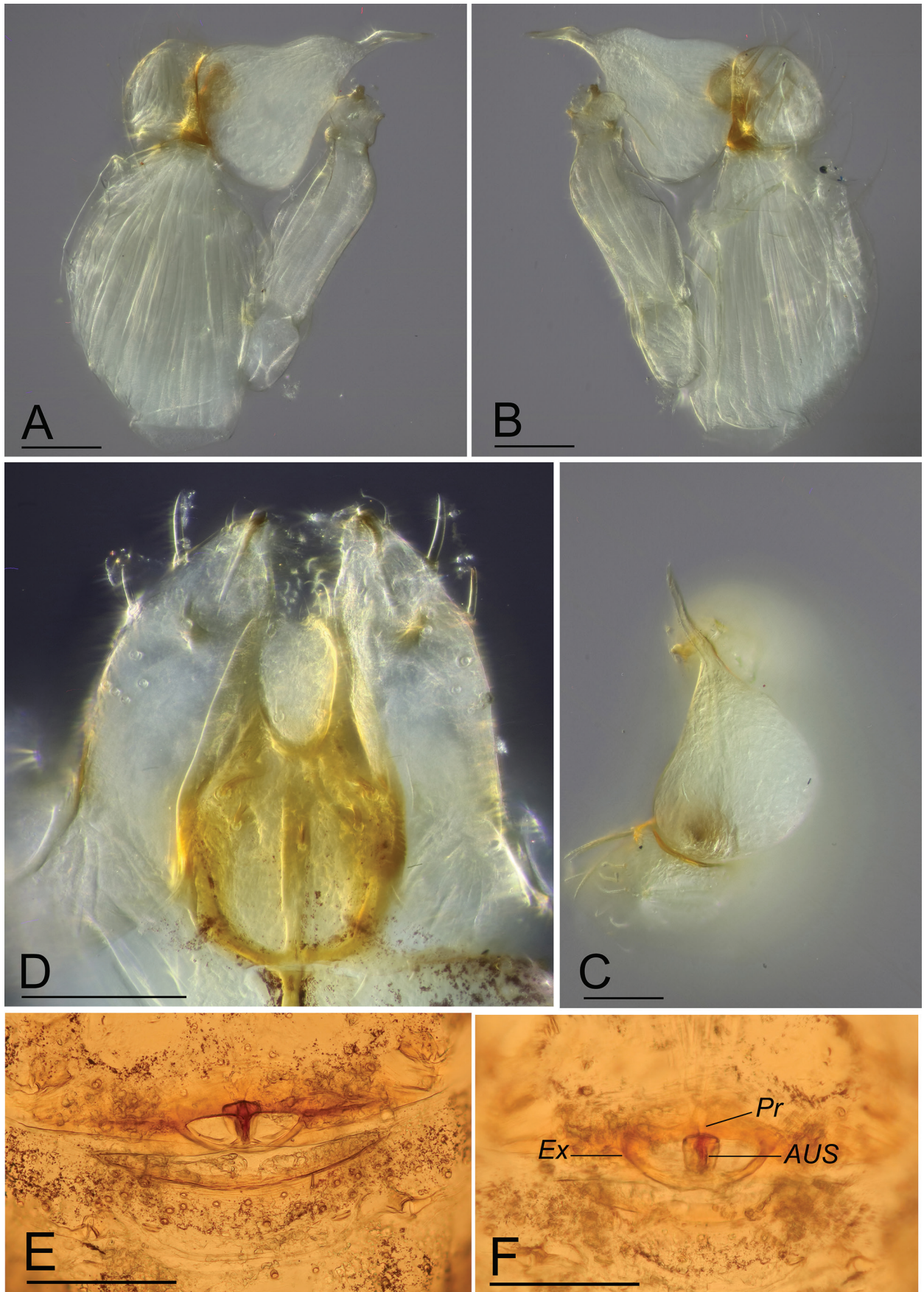


Figure 12. *Orchestina truncatula* Tong & Li, 2011, male (SYNU-773), female (SYNU-783). A–C. Left palp, prolateral, retrolateral and dorsal views; D. Endites and labium, ventral view; E, F. Endogyne, ventral and dorsal views. Abbreviations: AUS = anterior uterine sclerite; Ex = dorsolateral extension; Pr = protrusion. Scale bars: 0.1 mm.

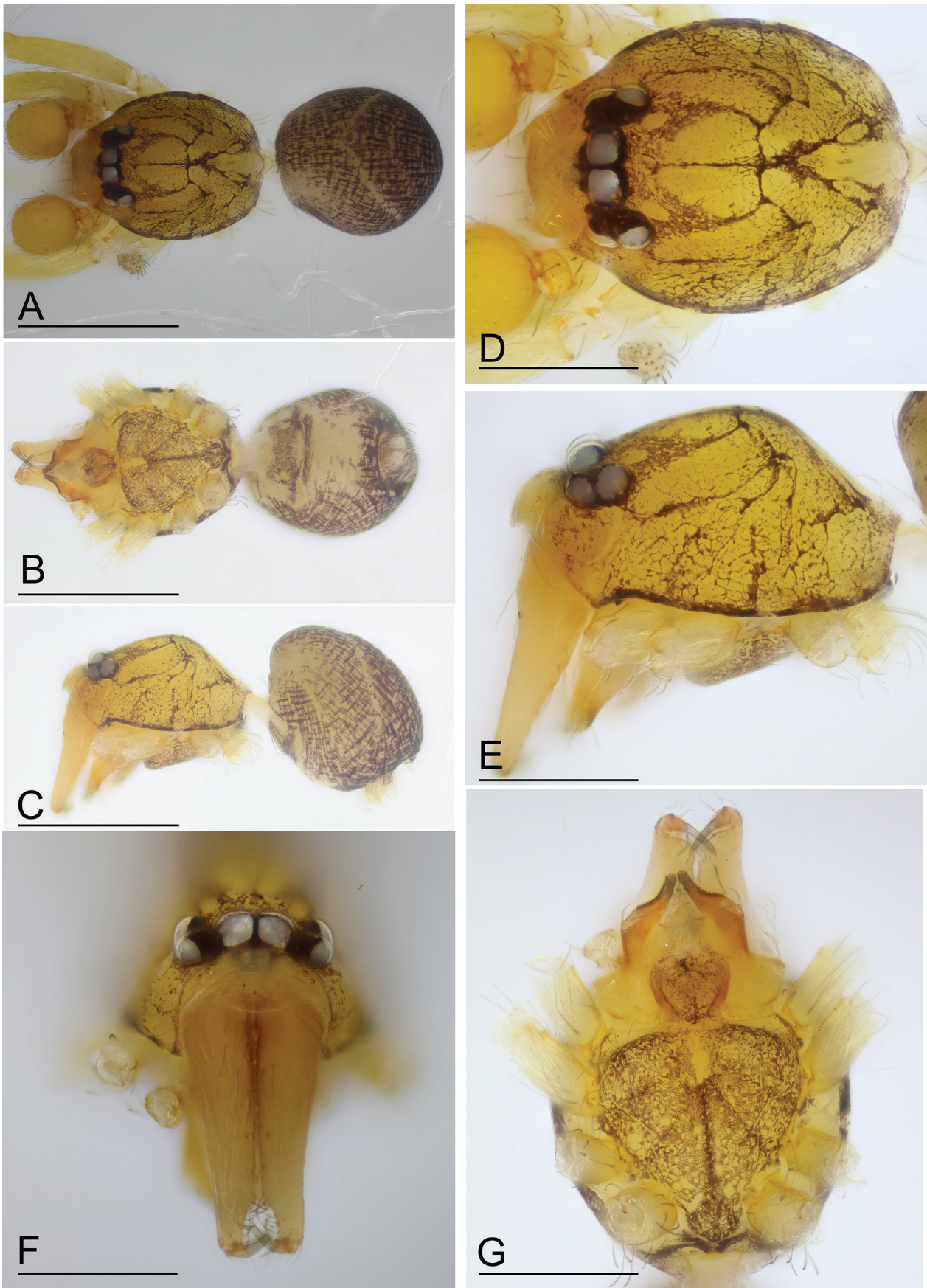


Figure 13. *Orchestina wengnan* sp. nov., holotype male. A–C. Habitus, dorsal, ventral and lateral views; D–G. Prosoma, dorsal, lateral, anterior and ventral views. Scale bars: 0.4 mm (A–C); 0.2 mm (D–G).

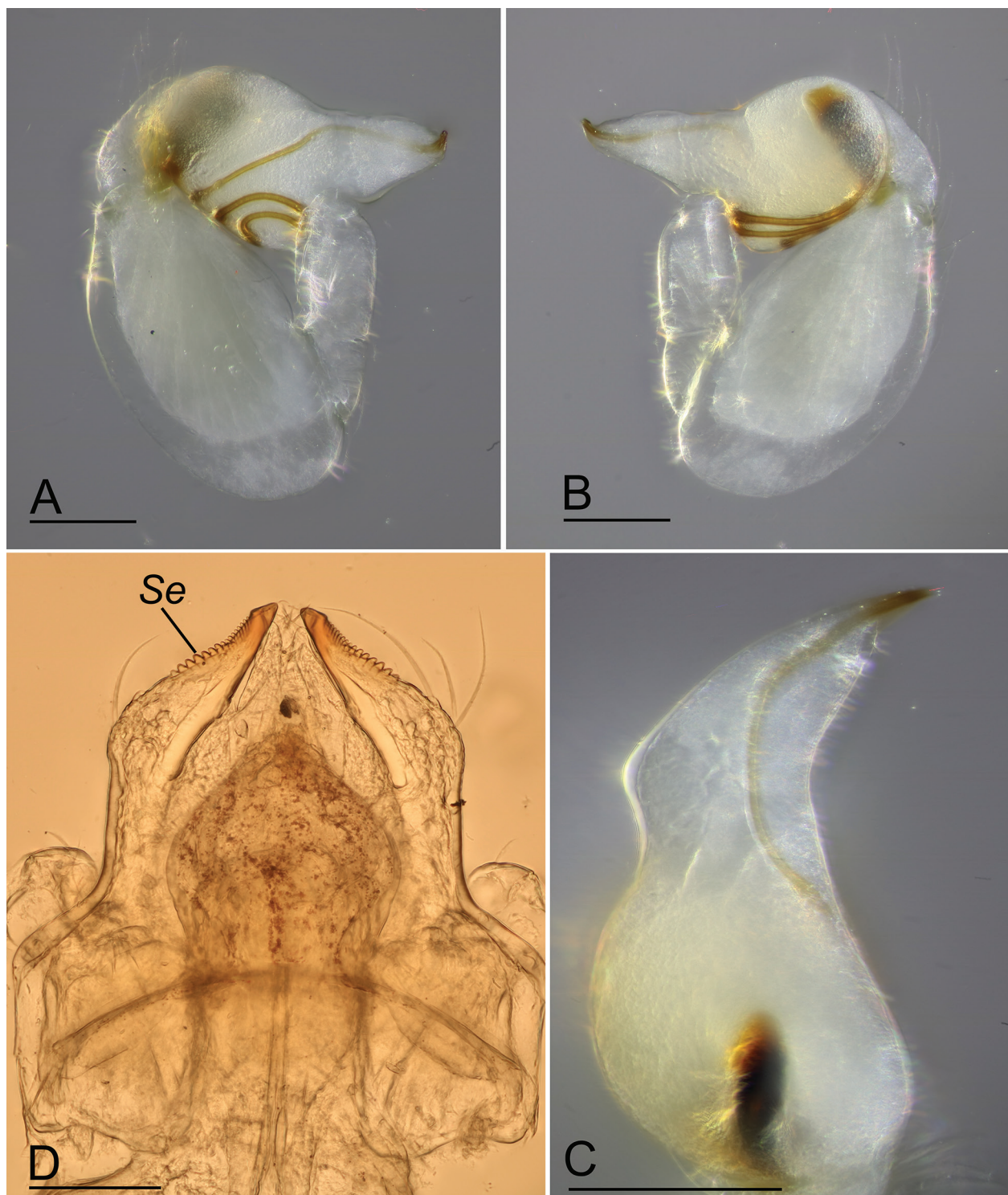


Figure 14. *Orchestina wengnan* sp. nov., holotype male. **A–C.** Left palp, prolateral, retrolateral and dorsal views; **D.** Endites and labium, ventral view. Abbreviation: Se = serrula. Scale bars: 0.1 mm.

***Orchestina xui* Tong & Li, sp. nov.**

<https://zoobank.org/B9604684-7F31-4D24-B20E-A90BEB9A2127>

Figs 15–18

Type material. Holotype: ♂ (SYNU-769), **CHINA, Yunnan**, Mengla Co., Menglun Town, XNNR, fogging, mountaintop secondary rainforest, 55 Km (21°57.987'N, 101°12.167'E), elev. 842 m, 18 August 2011, Zheng, Zhao & Gao leg. **Paratypes:** 1♂ (SYNU-770), same data as for

holotype; 1♂ (SYNU-811), sifting leaf litter, Xiaolongha Vill., seasonal forest (21°24.330'N, 101°37.022'E), elev. 801 m, 30 June 2012, Zhao & Chen leg.; 1♂2♀ (SYNU-790-792), sifting leaf litter, Xiaolongha Vill., secondary forest (21°24.213'N, 101°37.995'E), elev. 834 m, 3 June 2012, Zhao & Chen leg.; 3♂2♀ (SYNU-805-809), XNNR, fogging, valley rainforest, 55 Km (21°57.883'N, 101°12.147'E), elev. 839 m, 15 August 2011, Zheng, Zhao & Gao leg.

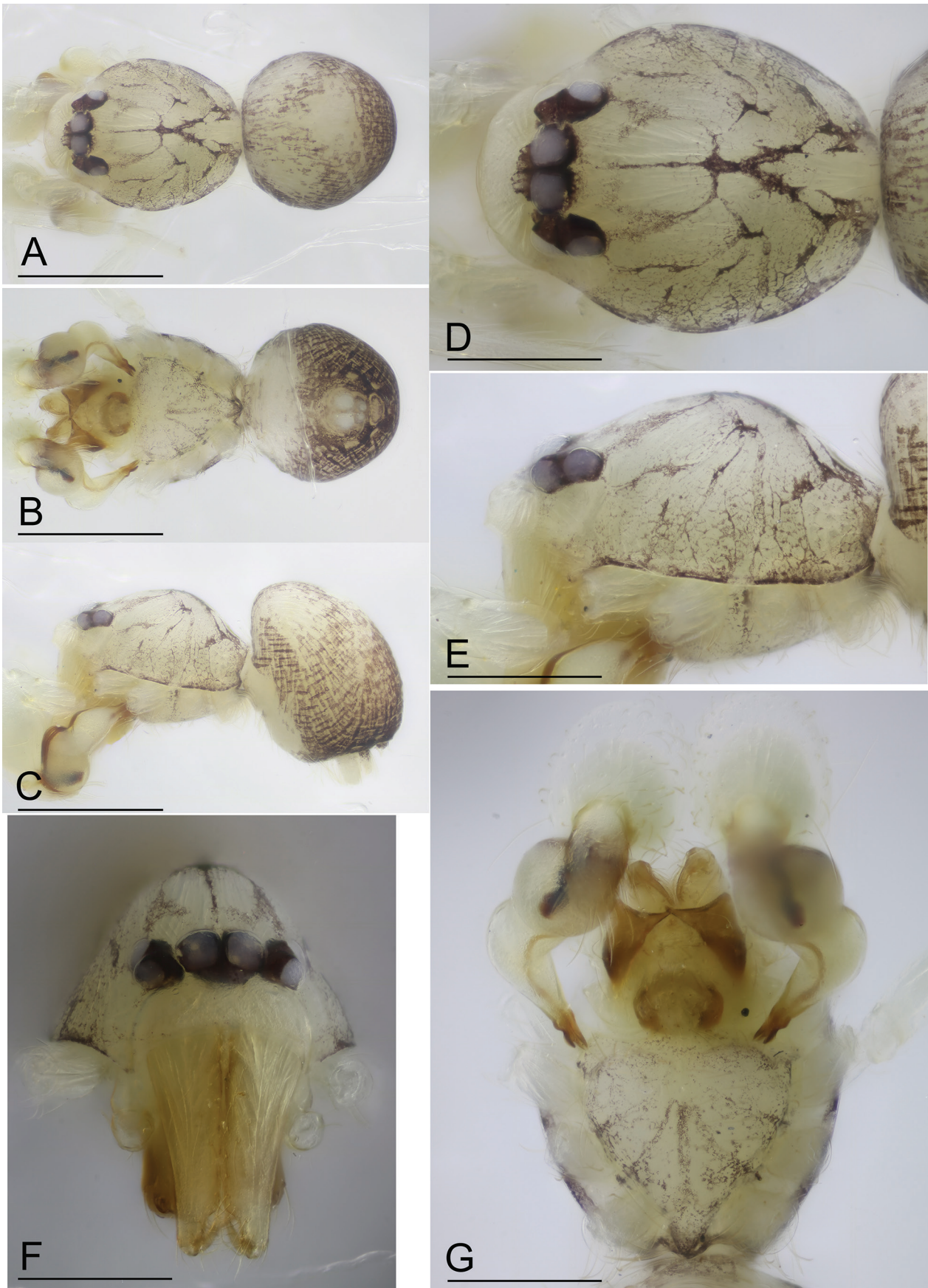


Figure 15. *Orchestina xui* sp. nov., holotype male. A–C. Habitus, dorsal, ventral and lateral views; D–G. Prosoma, dorsal, lateral, anterior and ventral views. Scale bars: 0.4 mm (A–C); 0.2 mm (D–G).

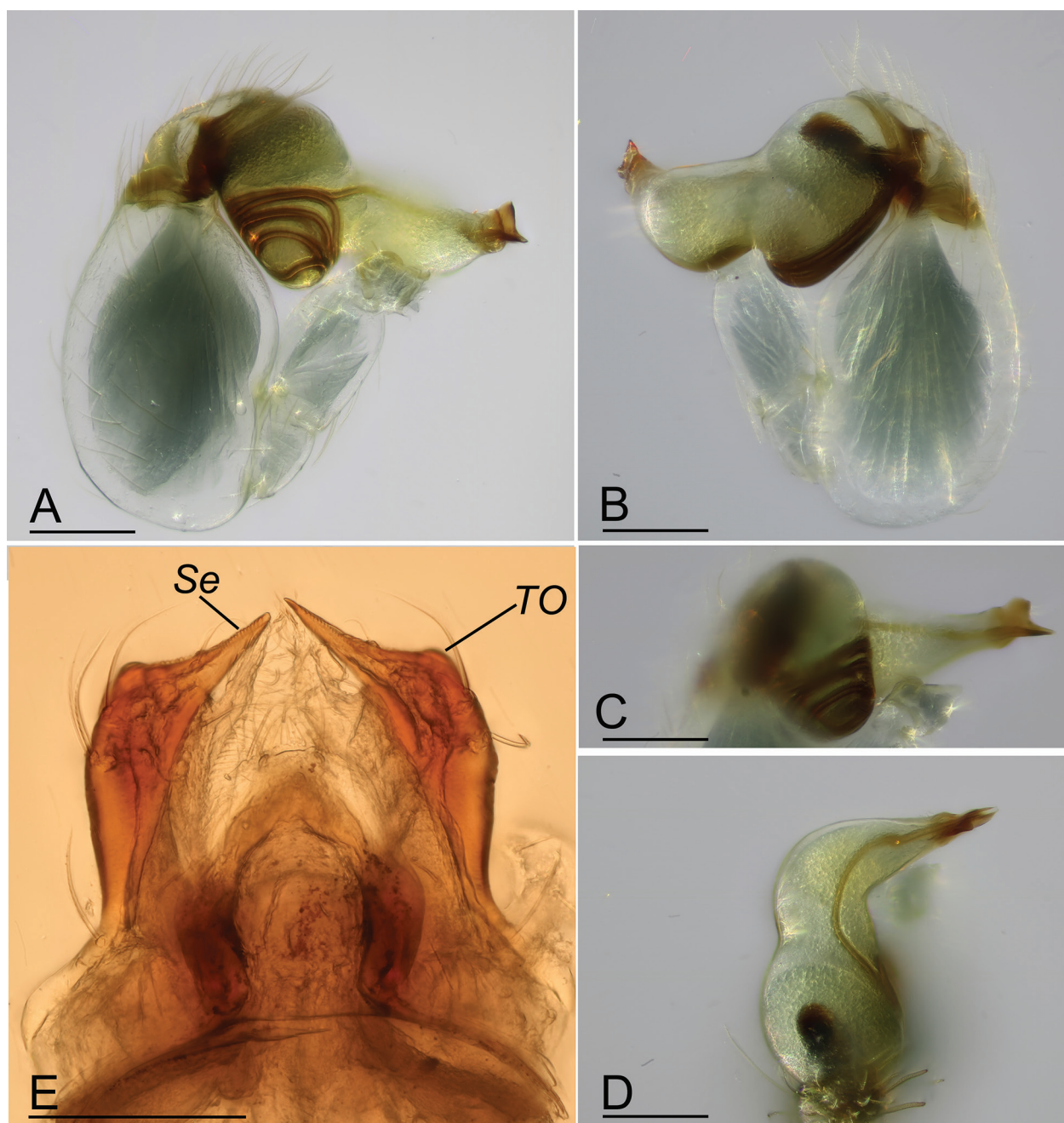


Figure 16. *Orchestina xui* sp. nov., holotype male. **A, B, D.** Left palp, prolateral, retrolateral and dorsal views; **C.** Distal part of bulb, prolateral view; **E.** Endites and labium, ventral view. Abbreviations: Se = serrula; TO = triangular outgrowth. Scale bars: 0.1 mm.

Etymology. The specific name comes from the family name of Mr Yajun Xu, who worked extensively on the Chinese goblin spiders; noun.

Diagnosis. The new species is similar to *O. clavulata* in having the pear-shaped bulb, the net-shaped pattern on carapace and the large posterior plate, but can be distinguished by the endites with large triangular outgrowth (Figs 15G, 16E), vs. straight outer margin in *O. clavulata* (Fig. 1E), the embolus with flattened extension (Fig. 16A–D) vs. gradually narrower in *O. clavulata* (Fig. 1A–D), and the genital area with two small, dark sclerotized pockets (Fig. 18B, C) vs. without sclerotized

pockets (Tong and Li 2011: fig. 4B). The new species is also similar to *O. subclavulata* sp. nov. in the shape of male endites, but can be distinguished by the embolus with conspicuous dorsal flattened extension and acute tip (Fig. 16A, B), vs. embolus gradually tapered, with sub-apical, opaque crest (Fig. 9A, B).

Description. Male (holotype). Total length 1.13, carapace length 0.55, carapace width 0.43, abdomen length 0.58. Habitus as in Fig. 15A–C. Color in alcohol: pale yellow. Carapace oval, with net-shaped pattern, pars cephalica strongly elevated in lateral view, with rounded posterolateral corners. Clypeus (Fig. 15F) margin

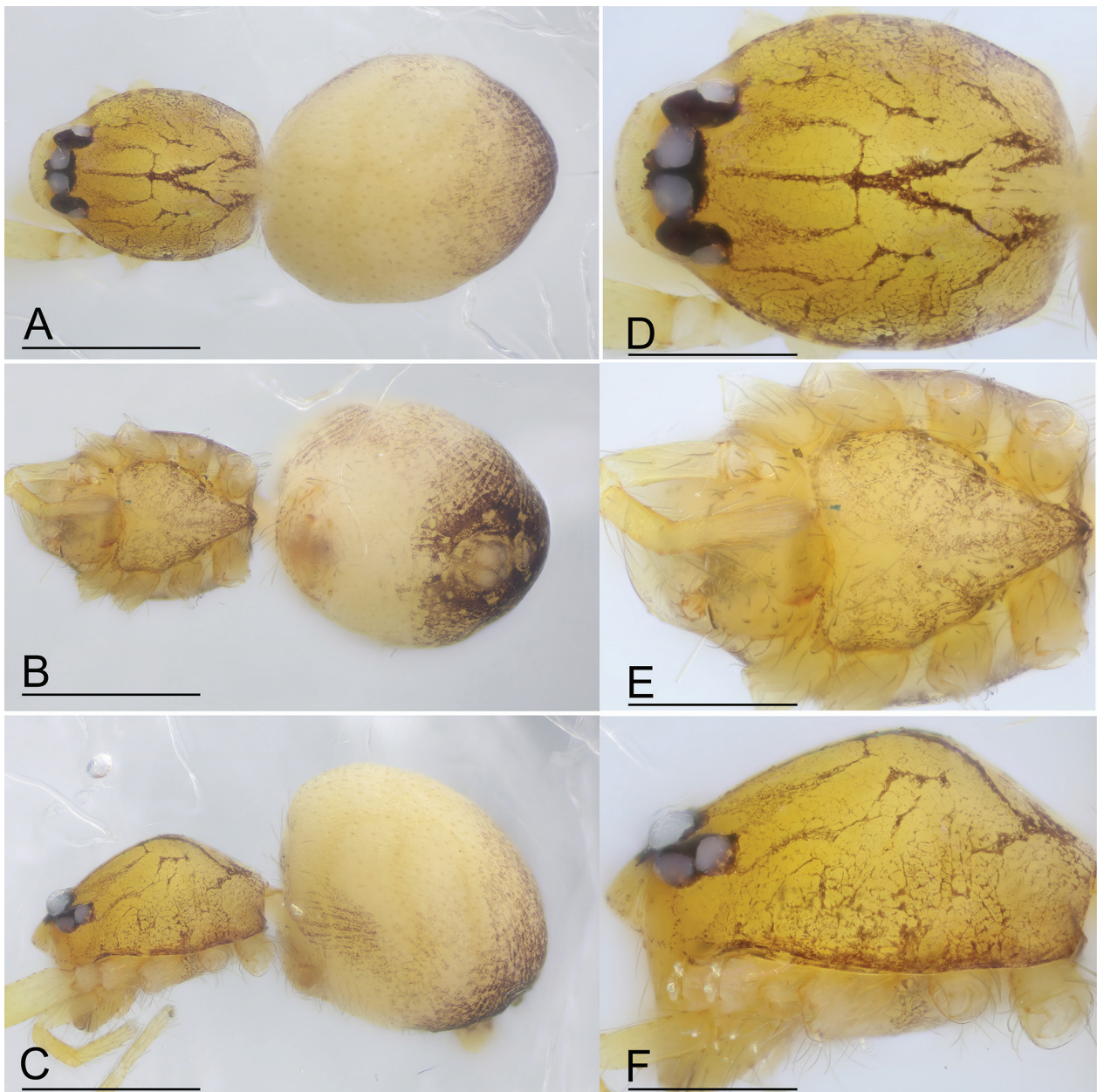


Figure 17. *Orchestina xui* sp. nov., paratype female. **A–C.** Habitus, dorsal, ventral and lateral views; **D–F.** Prosoma, dorsal, ventral and lateral views. Scale bars: 0.4 mm (**A–C**); 0.2 mm (**D–F**).

unmodified, curved downwards in front view, rounded forward in lateral view. Sternum (Fig. 15G) longer than wide, with marginal band and median area of radiating lines, surface smooth. Mouthparts: chelicerae elongate, anterior face unmodified; labium rounded, not fused to sternum, anterior margin not indented at middle; endites (Figs 15G, 16E) strongly sclerotized, with large triangular outgrowth, outer margin with serrula. Abdomen ovoid, with gray ^-shaped pattern. Genitalia (Fig. 16A–D): tibia of palp strongly enlarged, length/width ratio = 1.53, cymbium small; bulb pear-shaped, about 0.88 times as wide as tibia, with distal part gradually tapered towards embolus; the sperm duct strongly curved with three loops; embolus flattened, with acute tip.

Female (SYNU-792). Same as male except as noted. Body: habitus as in Fig. 17A–C; body length 1.18. Carapace: 0.52 long, 0.41 wide. Mouthparts: chelicerae shorter; endites simple, with serrula. Abdomen: 0.67 long. Epigaster (Fig. 18B, C): with two small, dark sclerotized pockets; internal parts visible through integument. Endogyne (Fig. 18D): with stout medial clavate sclerite (AUS), anterior part of cylindrical sclerite (AUS) with pair of lateral protrusions (Pr); anterior receptaculum (ARE) rounded, transparent, slightly longer than AUS; with large posterior plate (PP).

Distribution. China (Yunnan: Mengla County, Menglun Town).

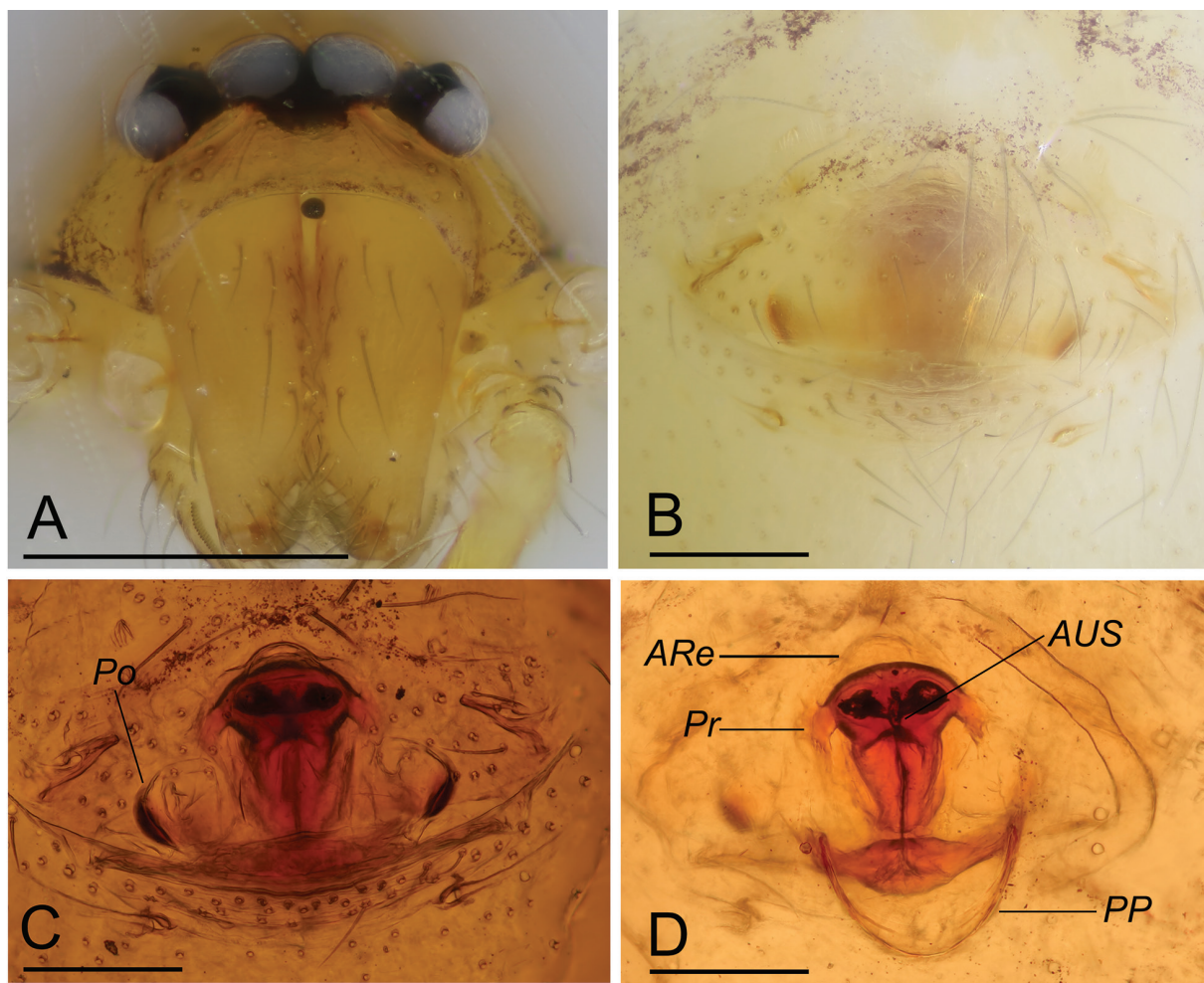


Figure 18. *Orchestina xui* sp. nov., paratype female. **A.** Prosoma, anterior view; **B.** Epigaster, ventral view; **C, D.** Endogyne, ventral and dorsal views. Abbreviations: ARe = anterior receptaculum; AUS = anterior uterine sclerite; Po = pocket; PP = posterior plate; Pr = protrusion. Scale bars: 0.2 mm (**A**); 0.1 mm (**B–D**).



Figure 19. Locality of Xishuangbanna, Yunnan Province, China

Discussion

The genus *Orchestina* is perhaps the dominant group in canopies (Henrard and Jocqué 2012). Occasionally, some of these spiders are also found under bark, in litter, grasses, and suspended litter, and even inside buildings (Izquierdo and Ramírez 2017).

The diversity of *Orchestina* from China is still poorly known. Xu (1987) firstly reported two species from Anhui Province. Both species were collected from leaf litter by hand. Tong and Li (2011) reported six species collected from forest canopy from Hainan Province. Liu et al. (2016, 2019) discovered five species from Hunan and Jiangxi Provinces. All species were collected by sifting leaf litter. Wang et al. (2021) recorded one species from Fenghuang Mountain, Liaoning Province by sifting leaf litter. So far, it is the northernmost locality of *Orchestina* in China. Recently, Lin et al. (2024) reported one species from Chongqing municipality. This species was collected from leaf litter by hand. In the 14 known *Orchestina* species of China, eight species were collected from leaf litter.

As to the eight species of *Orchestina* from Xishuangbanna, *O. concava* and *O. wengnan* were collected by sifting leaf litter, *O. clavulata*, *O. menglun* and *O. subclavulata* were collected from forest canopy, *O. truncatula* and *O. xui* were collected from leaf litter and forest canopy, and *O. colubrina* was collected by fogging and trunk trap. At least three Chinese species, i.e., *O. colubrina*, *O. truncatula* and *O. xui* were collected from both leaf litter and forest canopy, suggesting that some species of the genus *Orchestina* can occupy a wide variety of habitats.

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