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A new cave-dwelling species of the linyphiid spider genus *Theoa* Saaristo, 1995 (Araneae: Linyphiidae) from Guizhou, China

Chang-Hao HU[1] & Andrei V. TANASEVITCH[2]

[1]Arachnid Resource Centre of Hubei Province & Centre for Behavioural Ecology and Evolution, School of Life Sciences, Hubei University, Wuhan 430062, China;
https://orcid.org/0009-0007-5591-3121; changhaohu1998@gmail.com

[2]A.N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Leninsky prospect 33, Moscow 119071 Russia;
https://orcid.org/0000-0002-9116-606X; tanasevitch@gmail.com

Abstract: A new species, *Theoa davyjones* **sp. nov.**, is described from caves in Guizhou Province, China, based on both sexes. The species is clearly distinguished from its congeners by the specific shapes of the posterior cymbial outgrowth and the terminal apophysis in the male, as well as by the structure of the epigyne in the female. The genitalia of both sexes are illustrated in detail, a distribution map is provided.

Keywords: Asia, distribution, dwarf-spiders, morphology, taxonomy

中国贵州穴居地奥蛛属一新种（蜘蛛目：皿蛛科）

胡昌昊[1] & Andrei V. TANASEVITCH[2]

[1]湖北大学生命科学学院，湖北省蛛形动物资源中心，行为生态与进化中心，武汉 430062，中国
[2]俄罗斯科学院生态与进化研究所，莫斯科 119071，俄罗斯

摘要：本文描述了产自中国贵州洞穴中的皿蛛科一新种，戴维地奥蛛 *Theoa davyjones* **sp. nov.**。该新种可通过雄蛛独特的跗舟后突和顶突，以及雌蛛的外雌器结构与同属其他物种相区分。本文还提供了该新种的照片和分布图。

关键词：亚洲，分布，皿蛛，形态学，分类学

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Introduction

The genus *Theoa* Saaristo, 1995 was established by Saaristo (1995) for *Theonina tricaudata* Locket, 1982. The genus is characterized by the specific structure of the male palp, namely, a highly modified cymbium, a totally reduced lamella characteristica, a well-developed terminal apophysis, and the position of Fickert's gland inside the embolus. *Theoa tricaudata* (Locket, 1982) was originally described from West Malaysia and later recorded from the Seychelles (Locket 1982; Saaristo 1995). Subsequently, five additional species of *Theoa* have been described, three of which are known from China (Tanasevitch 2014ab, 2017; Zhao & Li 2014; Irfan *et al.* 2022). Thus, the genus currently contains six species known from China, Laos, Thailand, Malaysia, Indonesia, and the Seychelles (World Spider Catalog 2026). Spiders of *Theoa* mainly inhabit leaf litter and tree trunks, and no cave-dwelling species have been reported in this genus to date (Locket 1982; Saaristo 1995; Zhao & Li 2014; Tanasevitch 2014a, 2017).

Guizhou Province, located in southwest China, is characterized by extensive karst landform containing numerous caves and underground rivers (Lin & Li 2010). A survey of cave-dwelling spiders was conducted in Guizhou from July to August 2026. During the examination of the collected specimens, a new species of *Theoa* was identified and is described herein.

Materials and methods

This paper is based on the materials collected from two caves in Guizhou Province, China, and deposited at the Centre for Behavioral Ecology and Evolution (CBEE), School of Life Sciences, Hubei University in Wuhan, China. Specimens were preserved in ethanol absolute and studied using an OLYMPUS SZX7 stereo microscope. The male palp was examined and photographed after dissection. The epigyne was dissected from the body, immersed in 0.1 mg/ml Protease K solution and heated in a water bath at 56 ℃. All measurements and photographs were taken using an OLYMPUS BX51 microscope. Eye diameters were taken at the widest point. Leg measurements are given as the total length of leg (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimeters (mm). The terminology of genitalic structures mainly follows that of Saaristo & Tanasevitch (1996).

Abbreviations: ALE–anterior lateral eye; AME–anterior median eye; BTA–branch of TA; CD–copulatory duct; D–duct; DPS–distal part of scape; E–embolus; EP–embolus proper; Fe, femur; FG–Fickert's gland; I, II, III, IV–legs I to IV; LL–lateral lobe; MM–median membrane; MPS–meddle part of scape; Mt, metatarsus; Pa, patella; PC–paracymbium; PH–pit hook; PI–pit; PLE–posterior lateral eye; PME–posterior median eye; PS–proscape; R–radix; S–spermatheca; SA–suprategular apophysis; ST–subtegulum; T–tegulum; TA–terminal apophysis; TH–thumb; Ti, tibia; TmI–position of trichobothrium on metatarsus I.

Taxonomy

Family Linyphiidae Blackwall, 1859 皿蛛科
Genus *Theoa* Saaristo, 1995 地奥蛛属
Theoa davyjones sp. nov. 戴维地奥蛛，新种

Figs 1–6

https://zoobank.org/49082E44-A7A7-4396-A5D6-BE25F4597325

Type material: Holotype ♂ (HCH2026003): **CHINA: Guizhou Province:** Qiandongnan Miao and Dong Autonomous Prefecture, Shibing County, Niudachang Town, Tangkan Cave; 27.2083° N, 108.0314° E, elev. 1050 m, 6 August 2026, Chang-Hao Hu leg. **Paratypes:** 2♂3♀ (HCH2026004–2026008), with same data as holotype. 2♂1♀ (HCH2026009–2026011): **Guizhou Province:** Guiyang City, Kaiyang County, Shuangliu Town, nameless cave; 27.0314° N, 106.8577° E, elev. 1345 m, 30 July 2026, Chang-Hao Hu leg.

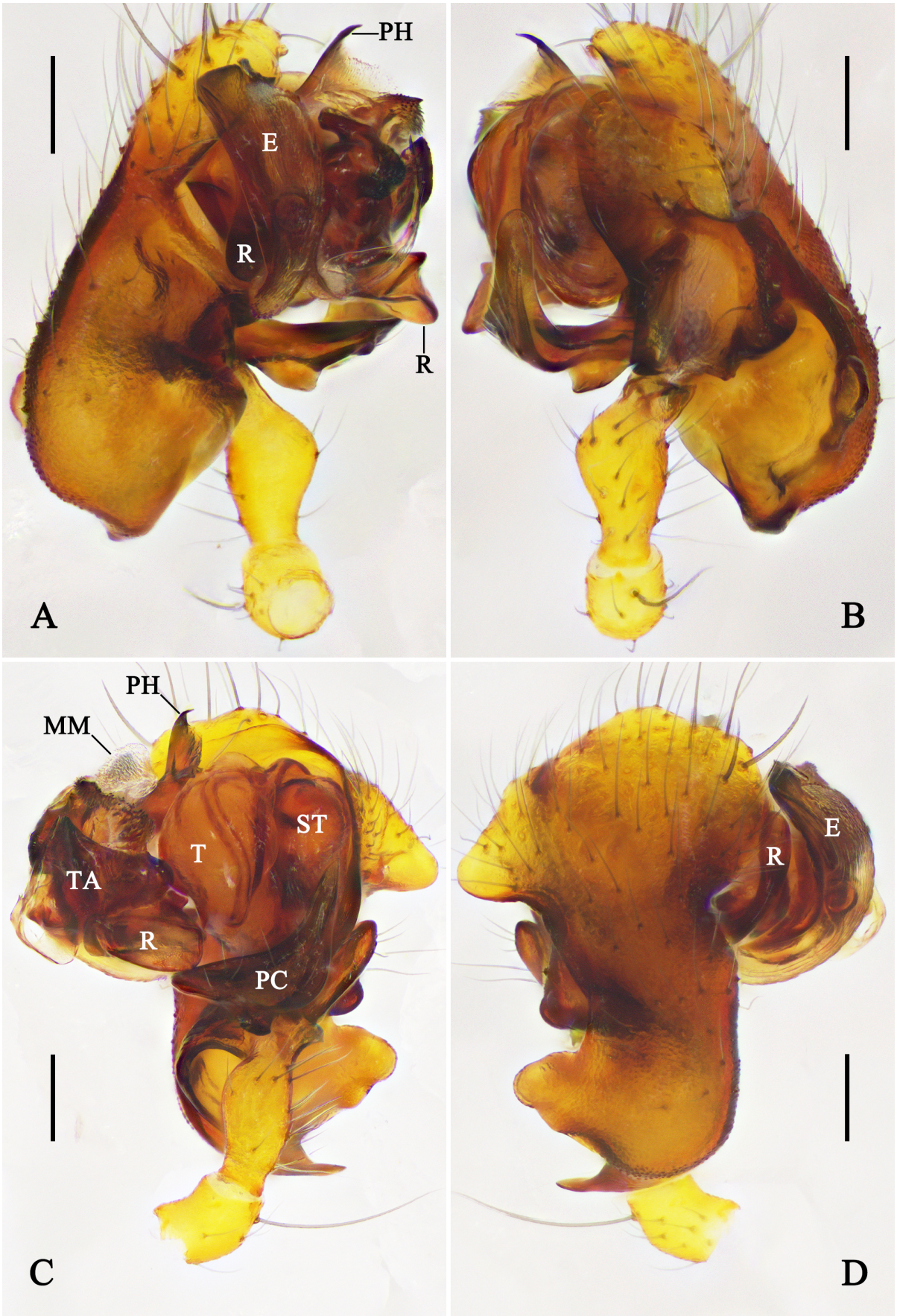

FIGURE 1. Left male palp of *Theoa davyjones* **sp. nov.**: **A** prolateral view **B** retrolateral view **C** ventral view **D** dorsal view. Abbreviations: E–embolus, MM–median membrane, PC–paracymbium, PH–pit hook, R–radix, ST–subtegulum, T–tegulum, TA–terminal apophysis. Scale bars = 0.1 mm.

Etymology. The specific name is derived from Davy Jones, a character in the Disney film series *Pirates of the Caribbean*, who fell in love with the sea goddess Calypso but betrayed her, carved his own heart out of his chest, and locked it in the Dead Man's Chest; noun in apposition.

Diagnosis. Based on the male palpal structure, the new species seems to be most similar to *T. elegans* Tanasevitch, 2014. The male of *T. davyjones* **sp. nov.** is distinguished well by the structure of the posterior outgrowth of cymbium (Figs 1, 2 cf. figs 72–79 in Tanasevitch 2014b; figs 96, 97A, B, 99A, B in Zhao & Li 2014);

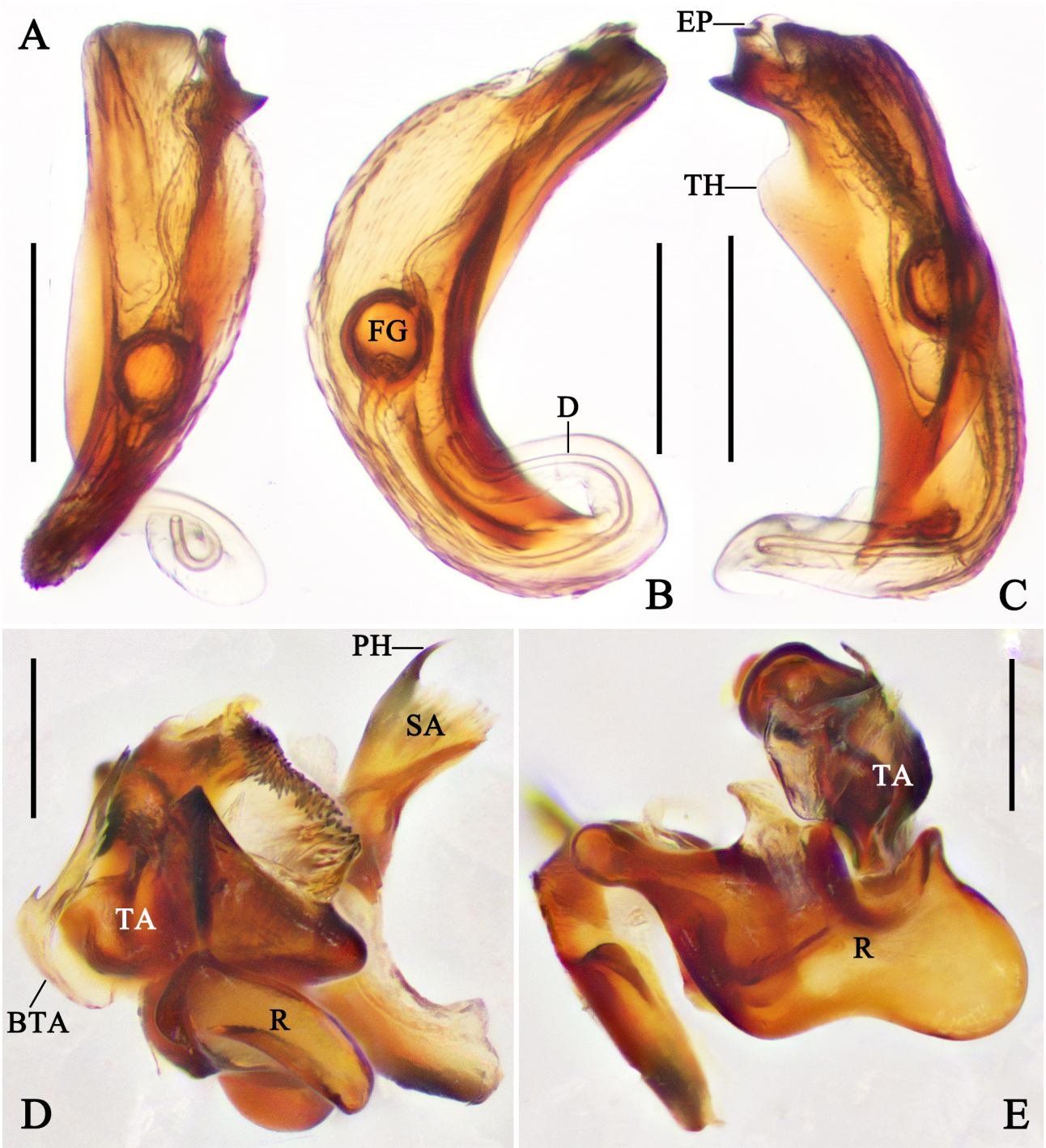

FIGURE 2. Embolic division of right palp of *Theoa davyjones* **sp. nov.**, horizontally flipped: **A–C** embolus (**A** prolateral view **B** ventral view **C** retrolateral view) **D, E** embolic division, embolus removed (**D** ventral view **E** posterior view). Abbreviations: BTA–branch of TA, D–duct, EP–embolus proper, FG–Fickert's gland, PH–pit hook, R–radix, SA–suprategular apophysis, TA–terminal apophysis, TH–thumb. Scale bars = 0.1 mm.

as well as by the shape of the terminal apophysis divided into a serrated anterior portion and a triangular posterior portion (rounded in *T. elegans*). The female is characterized by narrower (non-swollen) copulatory ducts prior to their entrance into the scape, which are not discernible through the integument (Figs 3, 4 cf. figs 98A–D, 99C, D in Zhao & Li 2014), as well as by the reniform shape of the spermathecae (spherical in *T. elegans*).

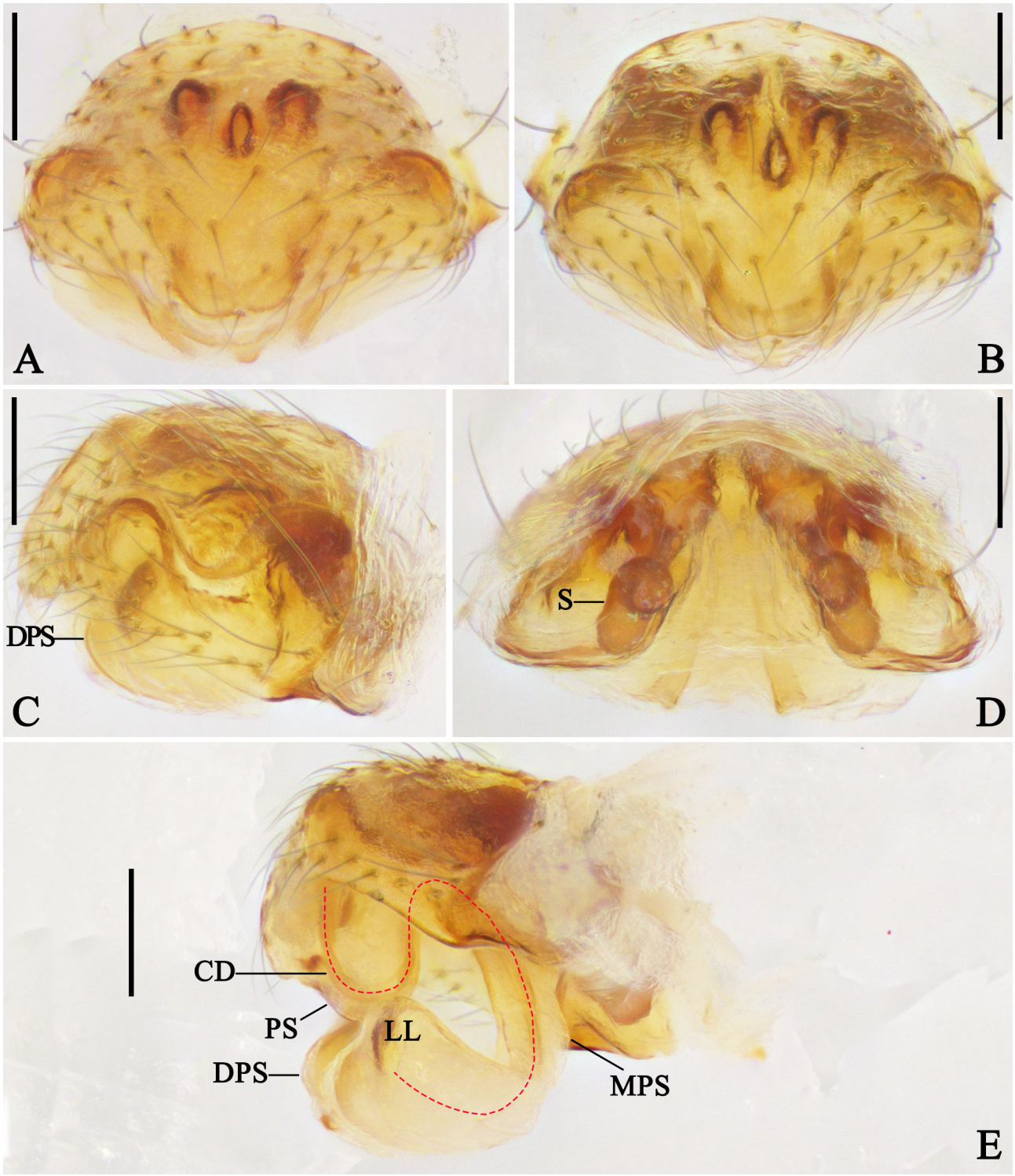

FIGURE 3. Epigyne of *Theoa davyjones* **sp. nov.**: **A, B** epigyne, ventral view (**A** uncleaned **B** cleaned) **C** epigyne, lateral view **D** vulva, dorsal view **E** epigyne, scape expanded, lateral view; dashed red line indicates the course of the scape. Abbreviations: CD–copulatory duct, DPS–distal part of scape, LL–lateral lobe, MPS–meddle part of scape, PS–proscape, S–spermatheca. Scale bars = 0.1 mm.

Description. Male: Total length 1.87; carapace length 0.84, width 0.72; sternum length 0.50, width 0.52. Opisthosoma length 1.15, width 0.73. Eye sizes and interdistances: AME 0.03; ALE 0.04; PME 0.03; PLE 0.05; AME–AME 0.01, AME–ALE 0.08; PME–PME 0.07, PME–PLE 0.09, AME–PME 0.03; ALE–PLE 0.01. Measurements of legs: I: 5.62 (1.51, 0.17, 1.68, 1.45, 0.81); II 4.72 (1.30, 0.17, 1.35, 1.20, 0.71); III 4.04 (1.01, 0.14, 1.19, 1.05, 0.65); IV 3.71 (1.25, 0.15, 0.88, 0.87, 0.56). Leg formula: I-II-III-IV. Chaetotaxy: Fe: I–IV 0-0-0-0; Pa: I–IV 1-0-0-0; Ti: I–IV 2-0-0-0; Mt: I–IV 0-0-0-0, length of spines about 0.5–1 diameter of segment. TmI 0.14.

Habitus (Fig. 5A–C): Carapace unmodified, light brown, with reticulate wrinkles; median part and cervical groove with three longitudinal rows of setae. Sternum and labium light brown. Chelicerae light brown, anterior surface with a large mastidion. Endites light brown, with a ventral projection. Palps and legs yellow. Opisthosoma brownish gray, dorsally with brown transverse lines, ventrally with two longitudinal brown lines, posteriorly with a yellow ring surrounding the spinnerets. Spinnerets yellow.

Palp (Figs 1, 2): Tibia almost as long as embolus, with a swelling ventral part. Cymbium with a large, broad, complex outgrowth posteriorly. Paracymbium L-shaped, almost as long as tibia. Suprategular apophysis fin-shaped,

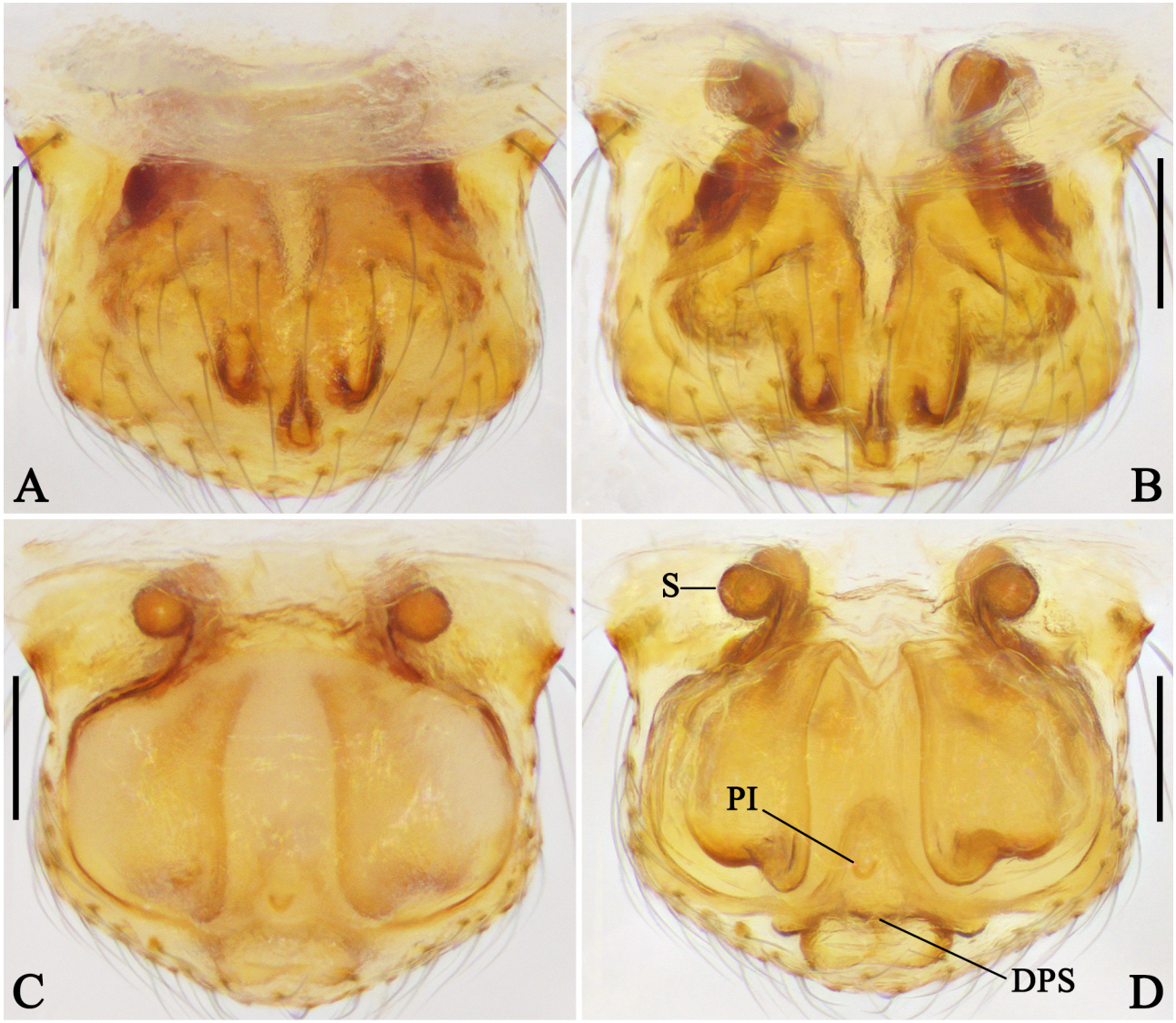

FIGURE 4. Epigyne of *Theoa davyjones* **sp. nov.**: **A, B** anterior view **C, D** posterior view (**A, C** uncleaned **B, D** cleaned). Abbreviations: DPS–distal part of scape, PI–pit, S–spermatheca. Scale bars = 0.1 mm.

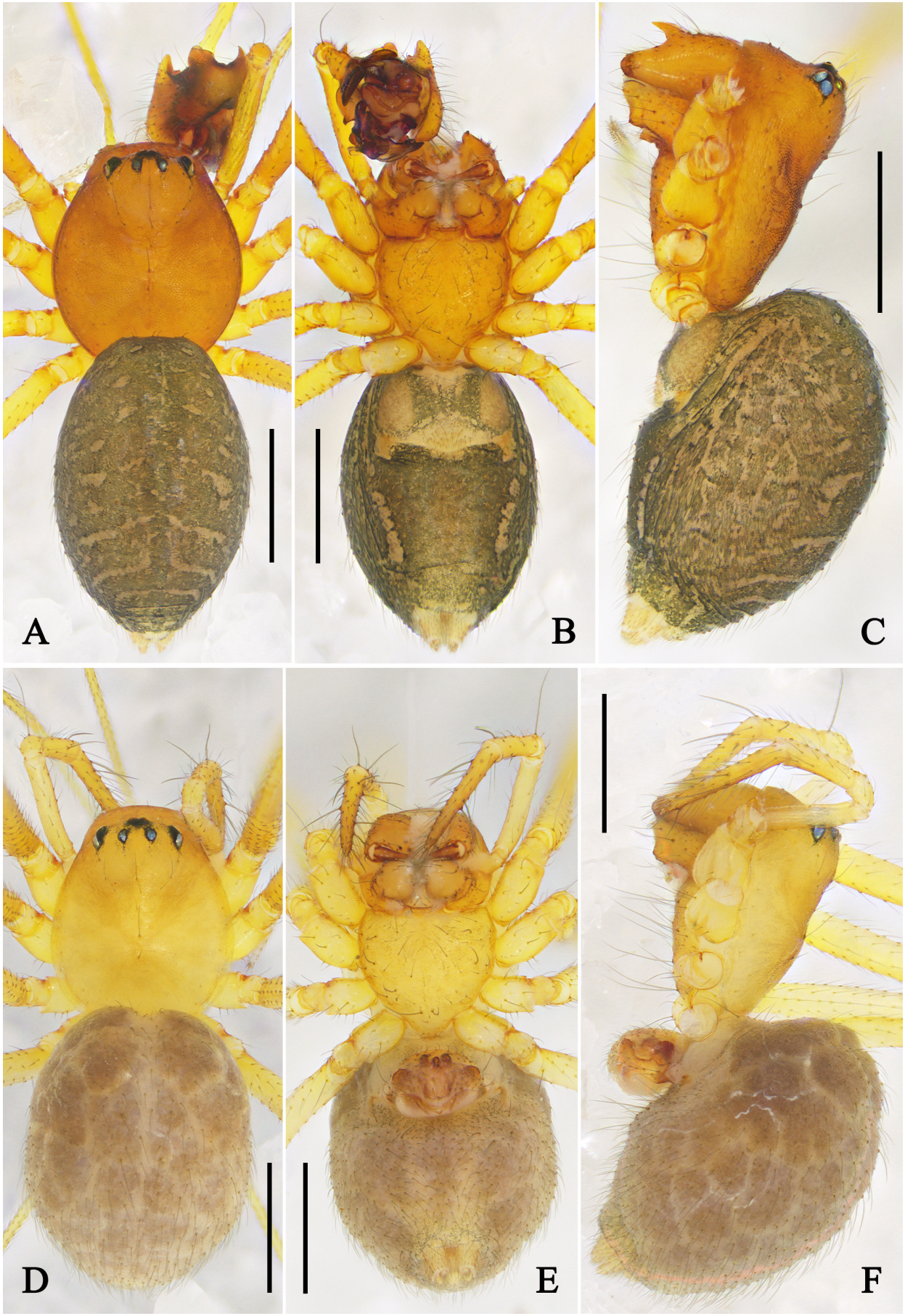

FIGURE 5. Habitus of *Theoa davyjones* **sp. nov.**: **A–C** male **D–F** female (**A, D** dorsal view **B, E** ventral view **C, F** lateral view). Scale bars = 0.5 mm.

with a pointed pit hook. Median membrane rounded triangular. Radix large, violin-shaped in posterior view. Terminal apophysis divided into two portions; anterior portion with serrated margins; posterior portion triangular, with a median longitudinal ridge and a spine-like branch arising from its dorso-prolateral part, branch with serrated retrolateral margin and a denticle on the prolateral margin. Embolus with Fickert's gland inside, banana-shaped, with three ridges, thumb present, rounded.

Female: Total length 1.87; carapace length 0.82, width 0.71; sternum length 0.50, sternum 0.53. opisthosoma length 1.07, width 0.87. Eye sizes and interdistances: AME 0.03; ALE 0.04; PME 0.04; PLE 0.05; AME–AME 0.01, AME–ALE 0.08; PME–PME 0.08, PME–PLE 0.07, AME–PME 0.03; ALE–PLE 0.00. Measurements of legs: I: 6.01 (1.63, 0.21, 1.77, 1.52, 0.88); II 5.15 (1.43, 0.17, 1.48, 1.31, 0.77); III 3.72 (1.12, 0.15, 0.99, 0.92, 0.54); IV 4.77 (1.41, 0.18, 1.32, 1.18, 0.68). Leg formula: I-II-IV-III. Chaetotaxy as in male, length of spines about 0.5–1.5 diameter of segment. TmI 0.15.

Habitus (Fig. 5D–F): Colouration lighter than in male. Chelicerae without a mastidion. Other characters as in male.

Epigyne (Figs 3, 4): Epigyne well protruded. Scape long, S-shaped in lateral view. Proscape (anterior part of scape, devoid of spines) reduced; middle parts of scape almost 1/4 the width of epigyne; distal part of scape and lateral lobes well-developed, almost as wide as epigyne. Stretcher reduced, a pit presence. Spermathecae reniform.

Distribution. Guizhou, China, in caves (Fig. 6).



FIGURE 6. Cave localities of *Theoa davyjones* **sp. nov.**

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