

Four new coelotine species (Araneae, Agelenidae, Coelotinae) from South China, with the first description of the male of *Coelotes septus* Wang, Yin, Peng & Xie, 1990

Ji-he Liu^{1,2}, Yong-hong Xiao², Meng-zhen Zhang², Xiang Xu¹, Ke-ke Liu²

1 College of Life Science, Hunan Normal University, Changsha 410081, Hunan, China **2** College of Life Science, Jinggangshan University, Ji'an 343009, Jiangxi, China

Corresponding authors: Xiang Xu (xux@hunnu.edu.cn), Ke-ke Liu (kekeliu@jgsu.edu.cn)

Academic editor: D. Dimitrov | Received 13 January 2021 | Accepted 14 March 2021 | Published 8 April 2021

<http://zoobank.org/F0461DBC-2C7E-4091-B4C8-EBB2C76CEAD9>

Citation: Liu J-h, Xiao Y-h, Zhang M-z, Xu X, Liu K-k (2021) Four new coelotine species (Araneae, Agelenidae, Coelotinae) from South China, with the first description of the male of *Coelotes septus* Wang, Yin, Peng & Xie, 1990. ZooKeys 1029: 93–112. <https://doi.org/10.3897/zookeys.1029.63060>

Abstract

Four new species are described from Jinggang Mountain National Nature Reserve, Jiangxi Province of southern China: *Draconarius lingdang* **sp. nov.** (♂♀), *D. substrophadatus* **sp. nov.** (♀), *Orumcekia cipinensis* **sp. nov.** (♀) and *Tonsilla shuikouensis* **sp. nov.** (♀). Additionally, *Coelotes septus* Wang, Yin, Peng & Xie, 1990 is redescribed and its male is described for the first time.

Keywords

Draconarius, *Orumcekia*, southern China, taxonomy, *Tonsilla*, unknown male

Introduction

The spiders of the family Agelenidae are usually found in a wide range of habitats such as deserts, grasslands, wetlands, and forests and they can live in caves, leaf litter, leaves, humus, bark, brush, streams, forest canopies, tree roots, house, and under rocks. It is a group of entelegyne spiders, currently known by 87 genera and 1342 species (WSC 2020). The species diversity of this family is the highest in Asia (ca. 900 species), from

where 67% of total number of agelenid species are reported (Zhu et al. 2017; Li 2020; WSC 2020). More than half (463 species from 35 genera) are described from China (Zhu et al. 2017; Li 2020; WSC 2020). The increased species numbers mainly benefited from active arachnologists' efforts, such as Shuqiang Li, Zhisheng Zhang, and Xiping Wang (WSC 2017–2020). Among Chinese agelenid species, most (ca. 400 species) are reported from the south provinces of the country (Chen et al. 2015a, b, 2016; Zhang et al. 2016, 2017; Zhao and Li 2016; Zhang and Zhao 2017; Zhu et al. 2017; Li et al. 2018a, b, c, 2019a, b, c, d; Yuan et al. 2019). According to the collecting information recorded on WSC (2020), southern China has both the richest species and generic diversities (Zhu et al. 2017); however, there are still many species (more than 200 species) known by one sex only.

Many details of many species in this family were not known until the work by Zhu et al. (2017). At present, many diverse groups of genera were described and reported from south China, such as *Ageleradix* Xu & Li, 2007, *Bifidocoelotes* Wang, 2002, *Flexicoelotes* Chen, Li & Zhao, 2015, *Guilotes* Zhao & Li, 2018, *Huangyuania* Song & Li, 1990, *Leptocoelotes* Wang, 2002, *Longicoelotes* Wang, 2002, *Nuconarius* Zhao & Li, 2018, *Papiliocoelotes* Zhao & Li, 2016, *Robusticoelotes* Wang, 2002, *Sinocoelotes* Zhao & Li, 2016, *Sinodraconarius* Zhao & Li, 2018, *Tonsilla* Wang & Yin, 1992, *Troglocoelotes* Zhao & Li, 2019, and *Vappolotes* Zhao & Li, 2019.

The Jinggang Mountain National Nature Reserve is located in the middle section of Luoxiao Mountains in southern China. While studying its funnel-web spider fauna, four new species and the previously unknown male of *Coelotes septus* Wang, Yin, Peng & Xie, 1990 were found and are described herein.

Materials and methods

More than 2600 specimens, belonging to 22 species from 12 genera, were collected using sieving and hand sampling. Specimens were examined using a Zeiss Stereo Discovery V12 stereomicroscope with a Zeiss AxioCam HRc. Both the male palps and female copulatory organs were dissected and examined in 75–80% ethanol. The vulvae were cleaned in pancreatin. All the specimens were photographed with a Zeiss Axio Scope A1 compound microscope with a KUY NICE CCD.

All measurements were made by using the software ImageView CM2000 and are given in millimeters. Leg measurements are given as total length (femur, patella, tibia, metatarsus, tarsus). All the specimens are deposited in the Animal Specimen Museum, College of Life Science, Jinggangshan University (**ASM-JGSU**).

Terminology of the male and female copulatory organs follows Wang (2002), Wang (2003), and Wang et al. (2010). The abbreviations used in the text and figures are:

Eyes

ALE anterior lateral eye;
AME anterior median eye;

PLE posterior lateral eye;
PME posterior median eye.

Male palp

CF cymbial furrow;	PA patellar apophysis;
Con conductor;	RTA retrolateral tibial apophysis;
DAC dorsal apophysis of conductor;	TS tooth-like sclerite;
Em embolus;	VTA ventrolateral tibial apophysis.
MA median apophysis;	

Epygine

At atrium;	FD fertilization duct;
CD copulatory duct;	GT glandular tubes;
CO copulatory opening;	SH spermathecal head;
EH epigynal hood;	Spe spermatheca.
ET epigynal teeth;	

Taxonomy

Family Agelenidae C.L. Koch, 1837

Genus *Coelotes* Blackwall, 1841

***Coelotes septus* Wang, Yin, Peng & Xie, 1990**

Figures 1, 2

Coelotes septus Wang et al. 1990: 224, figs 108–109 (♀); Song et al. 1999: fig. 224P–Q (♀); Wang and Jäger 2007: 34, figs 44–47 (♀); Yin et al. 2012: 996, fig. 510a, b (♀); Zhu et al. 2017: 188, fig. 96A, B (♀).

Material examined. • 1 ♀, China, Jiangxi Prov., Ji'an City, Jinggangshan County Level City, Ciping Town, Dajing Village, Shiliao Cave, 26°34'12.89"N, 114°07'41.87"E, 950 m, 2 Oct. 2018, Ke-ke Liu et al. leg.; • 4 ♀, 1 ♂, same locality, Dajing Village, Jingzhu Mountain, 26°30'10.8"N, 114°5'16.8"E, 1085 m, 20 Dec. 2015, Ke-ke Liu et al. leg.; • 1 ♀, same locality, Lingxiufeng Scenic Spot, 26°34'12"N, 114°7'19.2"E, 947 m, 25 Aug. 2015, Ke-ke Liu et al. leg.; • 1 ♀, same locality, Xiajing Village, 26°34'12"N, 114°7'19.2"E, 927 m, 26 Aug. 2015, Zhi-wu Chen et al. leg.

Diagnosis. The male resembles *Coelotes conversus* Xu & Li, 2006 in having a long, broad, curved conductor and the small triangular retrolateral apophysis, but can be easily separated by the absence of a patellar apophysis (vs. long patellar apophysis in *C. conversus*), the indistinct median apophysis (vs. spoon-like in *C. conversus*), and a tooth-like sclerite (vs. absent in *C. conversus*) (Fig. 1C–E) on the male palp. The female of this species is easily recognized by the transversal slit-shaped copulatory openings (vs. arc-shaped, longitudinal, or other), and the touching triangular copulatory ducts (vs. tube-shaped, sac-shaped, ellipsoidal, and other) (Fig. 2C, D).

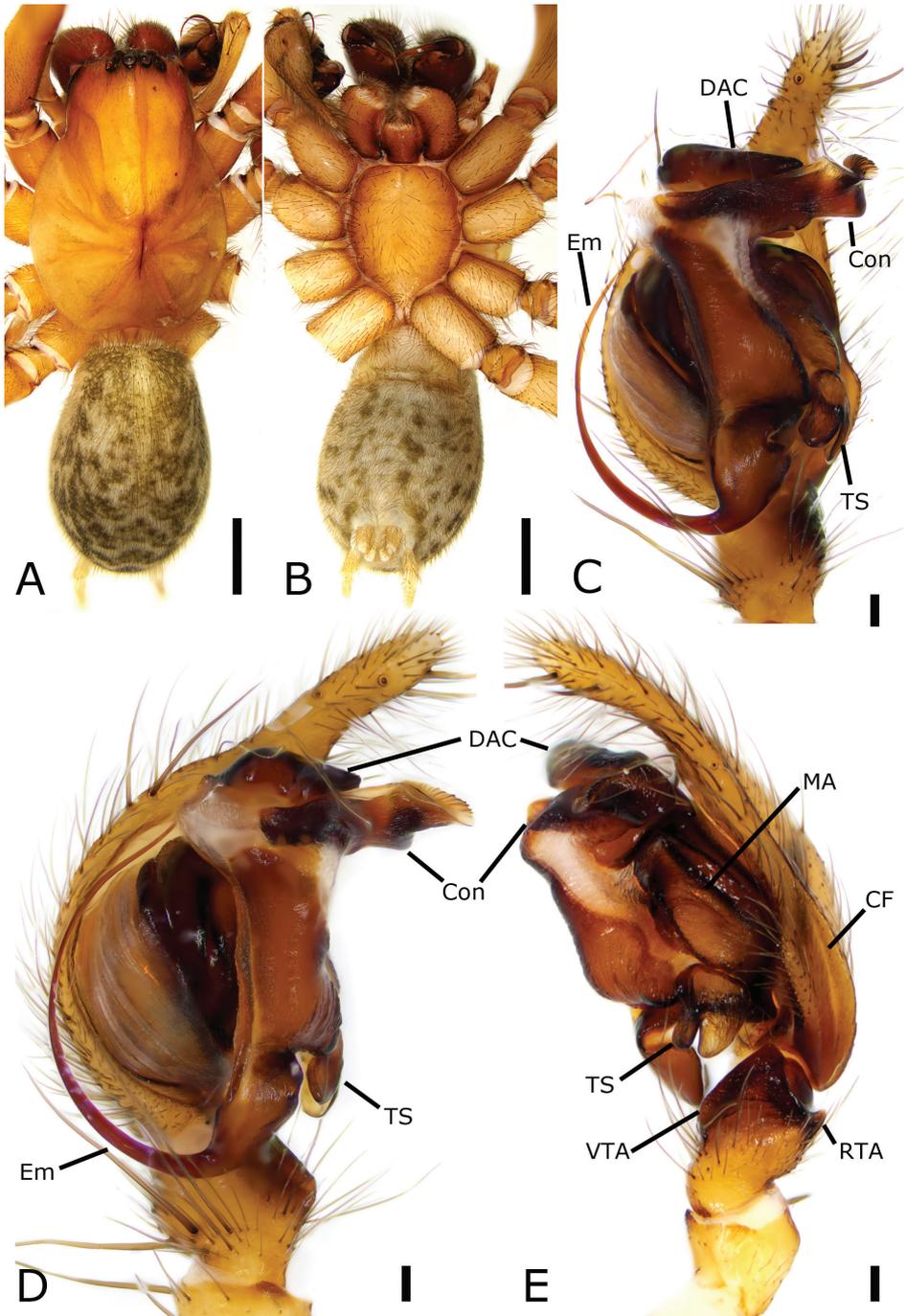


Figure 1. *Coelotes septus* Wang et al., 1990, male **A** habitus, dorsal view **B** same, ventral view **C** palp, ventral view **D** same, prolateral view **E** same, retrolateral view. Scale bars: 1 mm (**A, B**); 0.1 mm (**C–E**). Abbreviations: CF – cymbial furrow, Con – conductor, DAC – dorsal apophysis of conductor, Em – embolus, MA – median apophysis, RTA – retrolateral tibial apophysis, TS – tooth-like sclerite, VTA – ventrolateral tibial apophysis.

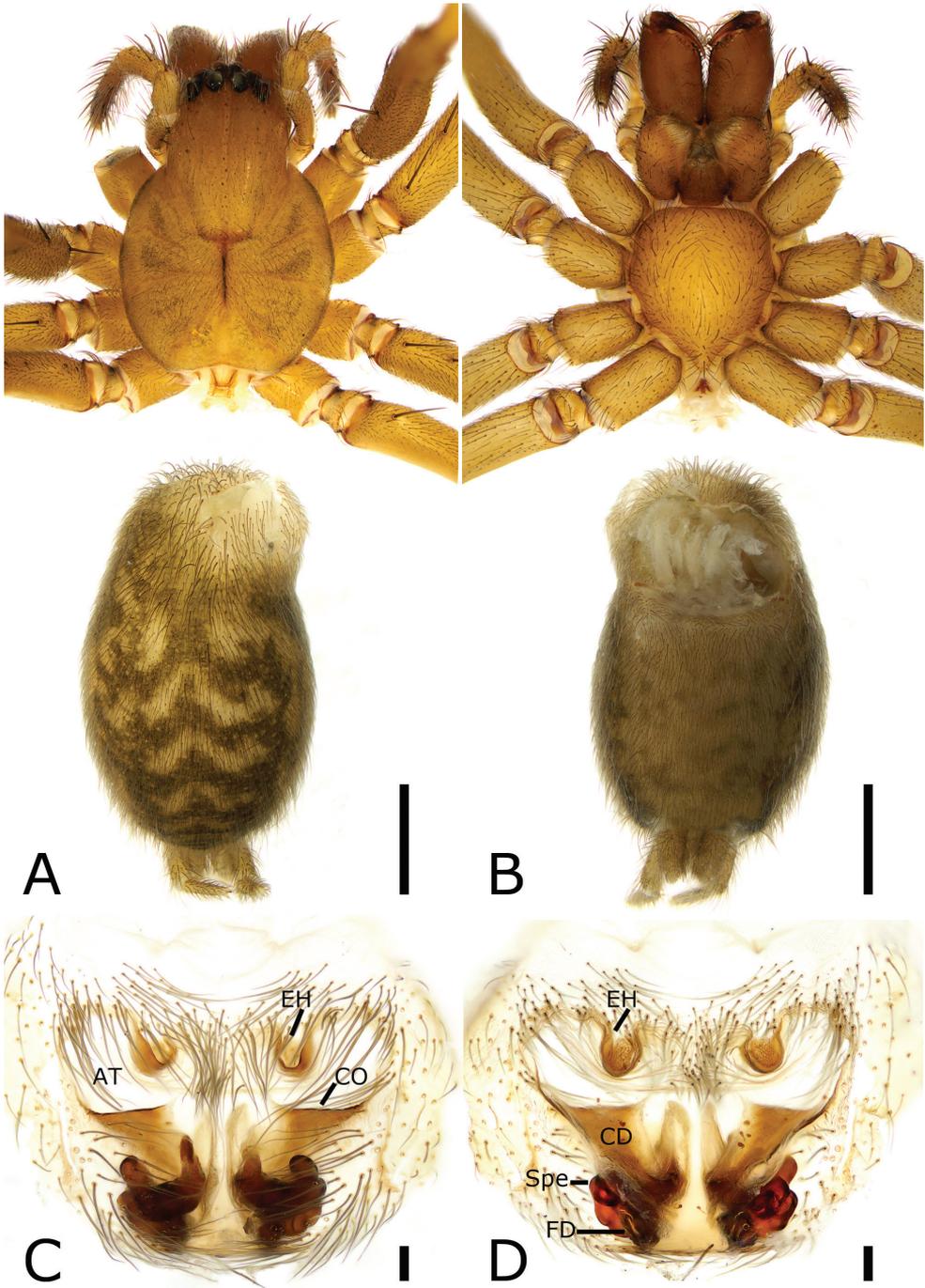


Figure 2. *Coelotes septus* Wang et al., 1990, female **A** habitus, dorsal view **B** same, ventral view **C** epigyne, ventral view **D** vulva, dorsal view. Scale bars: 1 mm (**A,B**); 0.1 mm (**C,D**). Abbreviations: At – atrium, CD – copulatory duct, CO – copulatory opening, EH – epigynal hood, FD – fertilization duct, Spe – spermatheca.

Description. Male. *Habitus* as in Fig. 1A, B. Total length 7.12. Carapace 3.66 long, 2.65 wide. Eyes sizes and interdistances: AME 0.09; ALE 0.14; PME 0.14; PLE 0.18; AME–AME 0.06; AME–ALE 0.06; PME–PME 0.08; ALE–ALE 0.34; PME–PLE 0.13; PLE–PLE 0.59; ALE–PLE 0.06; AME–PME 0.06; AME–PLE 0.22. MOA: 0.62 long; 0.56 anterior width, 0.62 posterior width. Chelicerae with three promarginal teeth (median largest) and two retromarginal teeth (distal larger). Leg measurements: I 8.88 (2.22, 0.6, 2.29, 2.27, 1.50); II 8.14 (2.26, 0.52, 1.92, 2.02, 1.42); III broken; IV 10.34 (2.72, 0.84, 1.98, 3.43, 1.37). Abdomen 3.23 long, 2.29 wide.

Coloration. Carapace yellow-brown. Chelicerae red-brown. Endites, labium, and sternum yellow-brown. Legs yellow-brown. Abdomen dark brown, dorsally with five pale chevron stripes on sub-medial part.

Palp (Fig. 1C–E). Femur and patella without apophysis. Tibia with wide ventrolateral apophysis and small retrolateral apophysis. VTA extending beyond half of tibia, strongly sclerotized; RTA small, $< 1/5 \times$ length of ventrolateral apophysis, apex pointing to the base of cymbium. Cymbial furrow slightly shorter than half of the cymbial length in retrolateral view. Median apophysis indistinct, slightly protruding. Sclerite, tooth-like in retrolateral view, located near the base of embolus; conductor, extending transversally, apical part hook-shaped and pointing to distal part of cymbium, with many ridges; basal part with a long, curved, sclerotized dorsal apophysis, less than the length of transversal conductor; embolus whip-shaped, originating at the 6 o'clock position, coiled around the margin of cymbium and posteriorly curved and embedded in the furrow of conductor.

Female. *Habitus* as in Fig. 2A, B. Total length 5.57. Carapace 2.68 long, 1.93 wide. Eye sizes and interdistances: AME 0.12; ALE 0.14; PME 0.14; PLE 0.15; AME–AME 0.12; AME–ALE 0.06; PME–PME 0.08; ALE–ALE 0.36; PME–PLE 0.07; PLE–PLE 0.50; ALE–PLE 0.06; AME–PME 0.07; AME–PLE 0.19. MOA: 0.21 long; 0.28 anterior width, 0.36 posterior width. Chelicerae with three promarginal teeth (proximal smallest, median largest) and five retromarginal teeth (proximal smallest, sub-distal largest). Leg measurements: I 9.05 (2.45, 0.63, 2.39, 2.08, 1.5); II 8.46 (2.29, 0.74, 2.01, 1.88, 1.54); III 6.97 (2.11, 0.46, 1.79, 1.66, 0.95); IV 8.25 (2.23, 0.54, 2.25, 1.71, 1.52). Pedicel 1.17. Abdomen 3.02 long, 2.03 wide.

Epigyne (Fig. 2C, D). Atrium broad, transversal, anteriorly located. Epigynal hoods concave, located at anterior margin, separated by $> 2 \times$ length. Copulatory openings located at postero-lateral of the atrium, transversal, slit-like. Epigynal tooth absent. Copulatory ducts triangular, broad, covering anterior part of spermathecae, extending from copulatory openings to sub-posterior part of spermathecae. Spermathecae sac-shaped, including a few thin tubes, anterior part slightly separated, posterior part separated by less than their maximum widths. Fertilization ducts located at the posterior part of the spermathecae, slightly curved forward laterally.

Comments. This species was described by Yin et al. (1990) based on five female specimens, collected from Yanling County, Hunan Province and was not collected after its original description. Xin-ping Wang (Zhu et al. 2017) re-examined the holotype, providing more detailed characters that make this species more easily identified. *Coelotes septus* does not belong to the two groups recognized from China and defined by Wang (2002), namely the *Coelotes atropos* group and the *Coelotes pseudoterrestri* group. It is also different

from other *Coelotes* species in the patellar apophysis and tooth-like sclerite of male palps, epigynal teeth, and transverse slit-like copulatory openings of the female epigyne. Hence, it is possible that it is not a true *Coelotes* species. However, it was placed in the genus *Coelotes* in its initial description; therefore, it is provisionally retained in *Coelotes*.

Distribution. Known only from Jiangxi and Hunan Provinces, China (Fig. 8).

Genus *Draconarius* Ovtchinnikov, 1999

Draconarius lingdang K. Liu, J. Liu & X. Xu, sp. nov.

<http://zoobank.org/65A5EA62-AE82-45A7-A35E-A398E4074579>

Figures 3, 4

Material examined. *Holotype* ♂, China, Jiangxi Prov., Ji'an City, Jinggangshan County Level City, Ciping Town, Xiajing Village, Shuikou Scenic Spot, 26°33'04.83"N, 114°27'42.83"E, 898 m, 1 Dec. 2013, Ke-ke Liu et al. leg. *Paratype* 1 ♀, the same data as holotype.

Etymology. The name comes from the Chinese word *lingdang*, meaning bell, referring to the shape of the spermathecae as seen through the ventral cuticle; noun in apposition.

Diagnosis. The male of this species is similar to that of *D. potanini* (Schenkel, 1963) in having the whip-like embolus with two turns in the anterior part and the absence of a patellar apophysis, but differs by the broad distal groove of conductor (vs. narrow in *D. potanini*) and the triangular and sharp retrolateral tibial apophysis (vs. broad and blunt in *D. potanini*) (Fig. 3C–E). The male of this species also resembles those of *D. peregrinus* Xie & Chen, 2011 by its long conductor with a triangular distal groove and the absence of a patellar apophysis, but can be separated from it by the embolus extending along the inner margin of cymbium and the distal part with two turns (vs. extending along ectal margin of cymbium and without turn in *D. peregrinus*) (Fig. 3C–E). The female of this species resembles those of *D. peregrinus* in the transparent copulatory ducts wrapping around spermathecae, but differs by the short pocket-shaped epigynal teeth (vs. horn-like in *D. peregrinus*), and the oval spermathecae (vs. elongated ellipsoid in *D. peregrinus*) (Fig. 4C, D).

Description. Male. Habitus as in Fig. 3A, B. Total length 6.63. Carapace 3.16 long, 2.10 wide. Eye sizes and interdistances: AME 0.09; ALE 0.14; PME 0.14; PLE 0.18; AME–AME 0.06; AME–ALE 0.07; PME–PME 0.08; ALE–ALE 0.34; PME–PLE 0.10; PLE–PLE 0.45; ALE–PLE 0.03; AME–PME 0.05; AME–PLE 0.21. MOA: 0.33 long; 0.22 anterior width, 0.35 posterior width. Chelicerae with three promarginal teeth (median largest) and two retromarginal teeth (distal larger). Leg measurements: I 7.30 (1.98, 0.88, 1.94, 1.73, 0.77); II 5.55 (1.14, 0.93, 1.4, 1.3, 0.78); III 5.92 (1.01, 0.73, 1.53, 1.46, 1.19); IV 7.24 (1.52, 0.95, 2.33, 1.55, 0.89). Abdomen 2.96 long, 1.90 wide.

Coloration. Carapace yellow-brown, posteriorly with dark radial stripes. Chelicerae red-brown. Endites and labium dark yellow-brown. Sternum yellow-brown. Legs yellow. Abdomen dark brown, dorsally with five pale chevron stripes on sub-medial part.

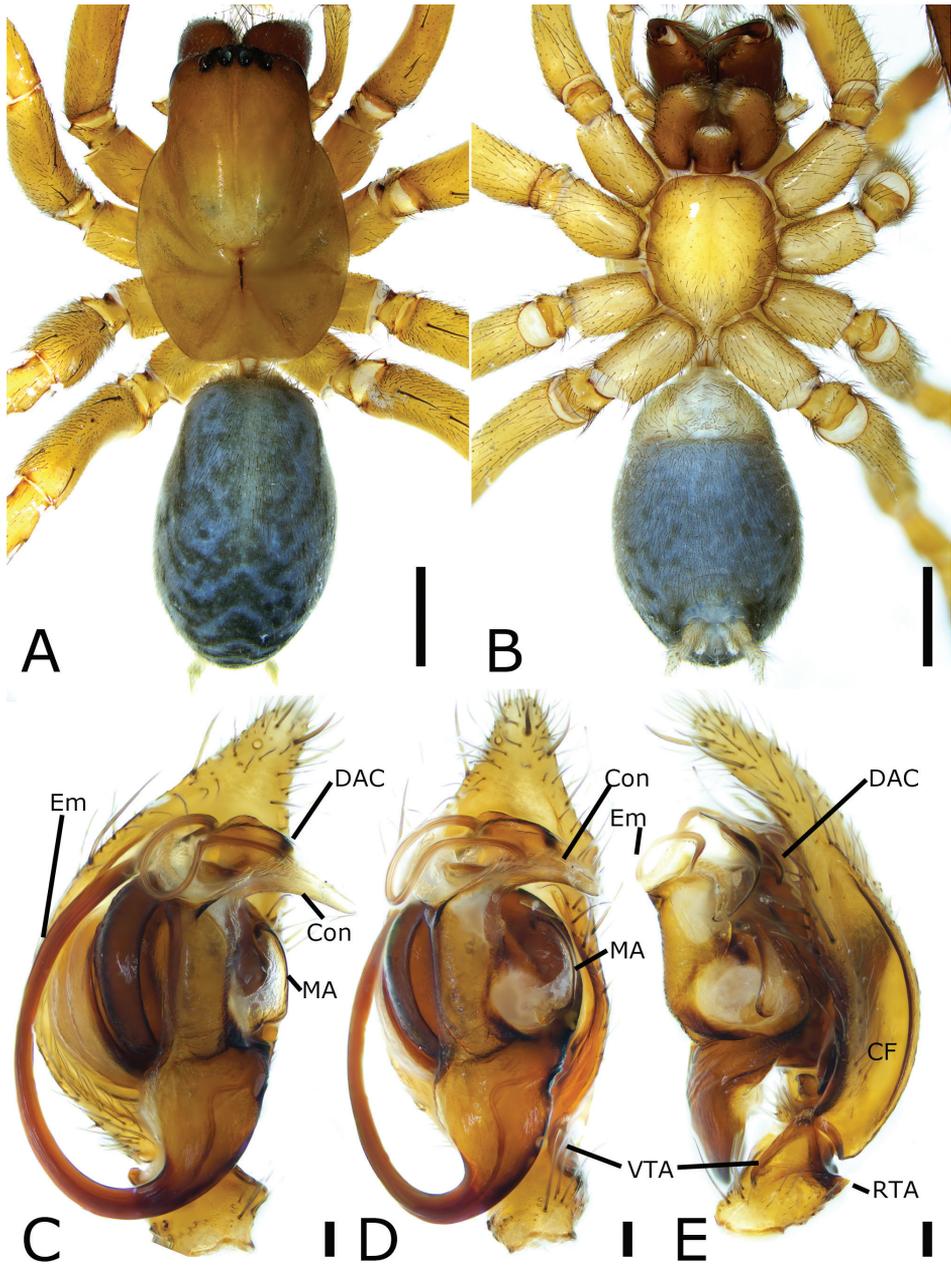


Figure 3. *Draconarius lingdang* sp. nov., male holotype **A** habitus, dorsal view **B** same, ventral view **C** palp, prolateral view **D** same, ventral view **E** same, retrolateral view. Scale bars: 1 mm (**A, B**); 0.1 mm (**C–E**). Abbreviations: CF – cymbial furrow, Con – conductor, DAC – dorsal apophysis of conductor, Em – embolus, MA – median apophysis, RTA – retrolateral tibial apophysis, VTA – ventrolateral tibial apophysis.

Palp (Fig. 3C–E). Femur and patella without apophysis. Tibia with triangular ventrolateral and short retrolateral apophyses. VTA extending beyond half of tibia, strongly sclerotized. RTA small, $< 1/3 \times$ length of ventrolateral one. Cymbial furrow slightly

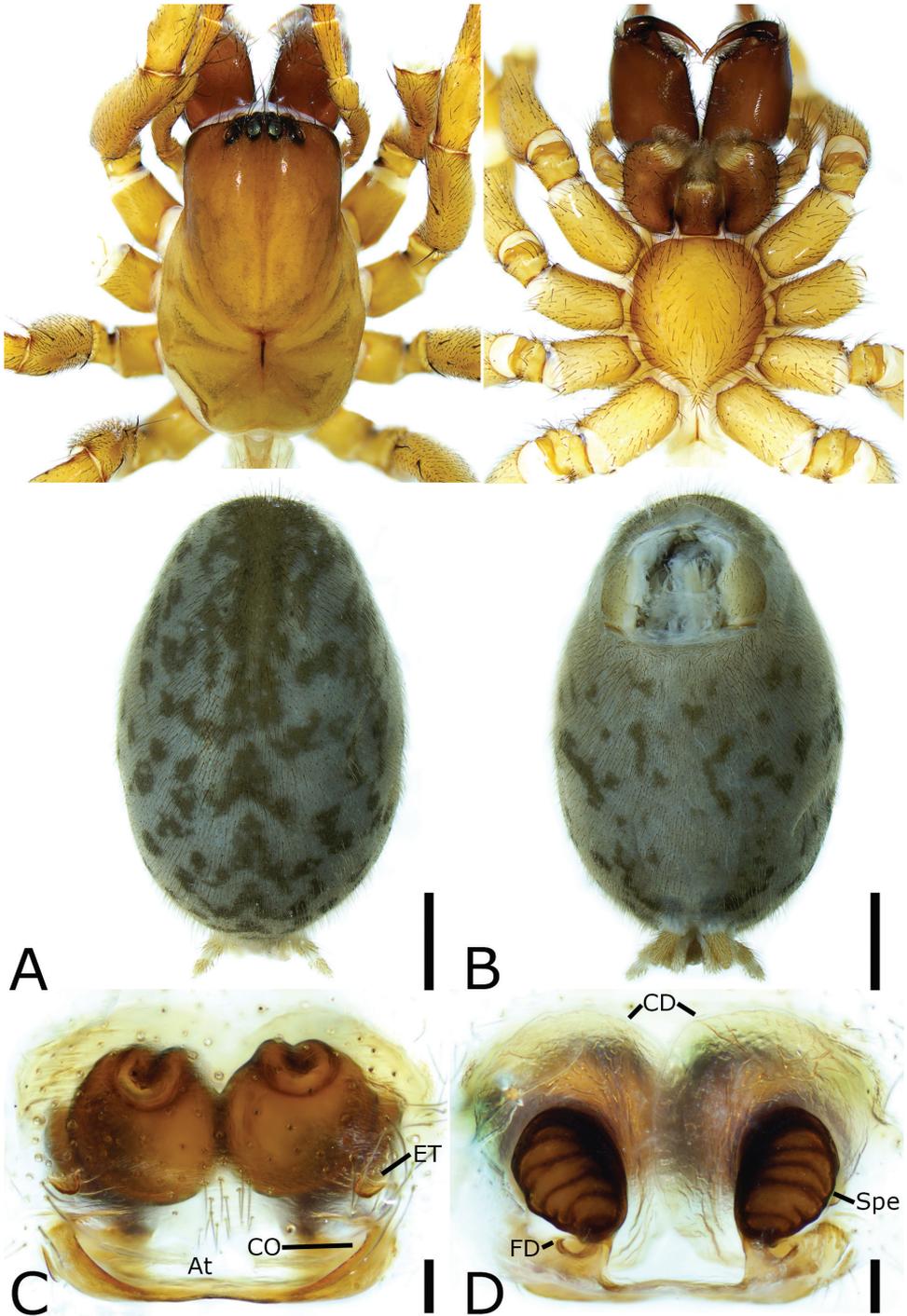


Figure 4. *Draconarius lingdang* sp. nov., female paratype **A** habitus, dorsal view **B** same, ventral view **C** epigyne, ventral view **D** vulva, dorsal view. Scale bars: 1 mm (**A, B**); 0.1 mm (**C, D**). Abbreviations: At – atrium, CD – copulatory duct, CO – copulatory opening, ET – epigynal teeth, FD – fertilization duct, Spe – spermatheca.

< 1/2 cymbial length in retrolateral view. Median apophysis spoon-like in retrolateral view, located between the base of embolus and conductor; conductor extending transversally, apical part curved forward towards median apophysis in retrolateral view, with a curved furrow; basal part with a strong, sclerotized dorsal apophysis, shorter than the length of transverse conductor; embolus broad, originates at the 6 o'clock position, coiled around the margin of cymbium and posteriorly convoluted and embedded in the furrow of conductor.

Female (Paratype). *Habitus* as in Fig. 4A, B. Total length 8.65. Carapace 3.42 long, 2.12 wide. Eye sizes and interdistances: AME 0.13; ALE 0.16; PME 0.14; PLE 0.15; AME–AME 0.07; AME–ALE 0.19; PME–PME 0.08; ALE–ALE 0.36; PME–PLE 0.10; PLE–PLE 0.55; ALE–PLE 0.06; AME–PME 0.07; AME–PLE 0.19. MOA: 0.29 long; 0.25 anterior width, 0.36 posterior width. Chelicerae with three promarginal teeth (proximal smallest, median largest) and two retromarginal teeth (proximal larger). Leg measurements: I 6.72 (1.3, 0.96, 1.91, 1.6, 0.95); II 6.2 (1.49, 0.83, 1.59, 1.43, 0.86); III 5.68 (1.14, 0.86, 1.27, 1.56, 0.85); IV 7.64 (1.26, 0.98, 1.92, 2.44, 1.04). Pedicel 2.84. Abdomen 4.63 long, 2.95 wide.

Epigyne (Fig. 4C, D). Atrium, broad, > 3 × wider than its length, labium-shaped, anterior margin near the apex of teeth, posteromedial part relatively straight. Copulatory openings located at postero-lateral of the atrium. Epigynal teeth flat, very short, pocket-shaped, separated by less than the maximum length of atrium. Copulatory ducts broad, transparent, originating postero-laterally, extending antero-medially around spermathecae, then back, connecting with anterior part of spermathecae. Spermathecae sac-shaped, the distance between them more than their widths. Fertilization ducts located at the posterior part of the spermathecae, curved postero-laterally.

Comments. Patellar apophysis is absent in the male palp of this species, as well as in *Draconarius aspinatus* (Wang, Yin, Peng & Xie, 1990), *D. peregrinus* Xie & Chen, 2011, *D. potanini*, *D. rufulus* (Wang, Yin, Peng & Xie, 1990), *D. subabsentis* Xu & Li, 2008 and *D. tiantangensis* Xie & Chen, 2011, all recorded from China. It seems that they are different from most *Draconarius* which have a clear PA in male palp. All of them are likely to belong to the same species group.

Distribution. Known only from the type locality in Jiangxi Province, China (Fig. 8).

***Draconarius substrophadatus* K. Liu, J. Liu & X. Xu, sp. nov.**

<http://zoobank.org/C6F360E9-8144-4878-9C84-502ADE78A6D5>

Figure 5

Material examined. *Holotype* ♀, China, Jiangxi Prov., Ji'an City, Jinggangshan County Level City, Ciping Town, Dajing Village, Dajing Forest Farm, 26°34'12"N, 114°7'19.2"E, 956 m, 27 Aug. 2015, Zhi-wu Chen et al. leg.

Etymology. The name refers to its similarity to *D. strophadatus* (Zhu & Wang, 1991).

Diagnosis. The female of this species is similar to that of *D. strophadatus* in having the labium-like atrium, the long horn-shaped epigynal teeth and the waved copulatory ducts, but differs by the epigynal teeth separated by 1/2 their length (vs. 1/4 in

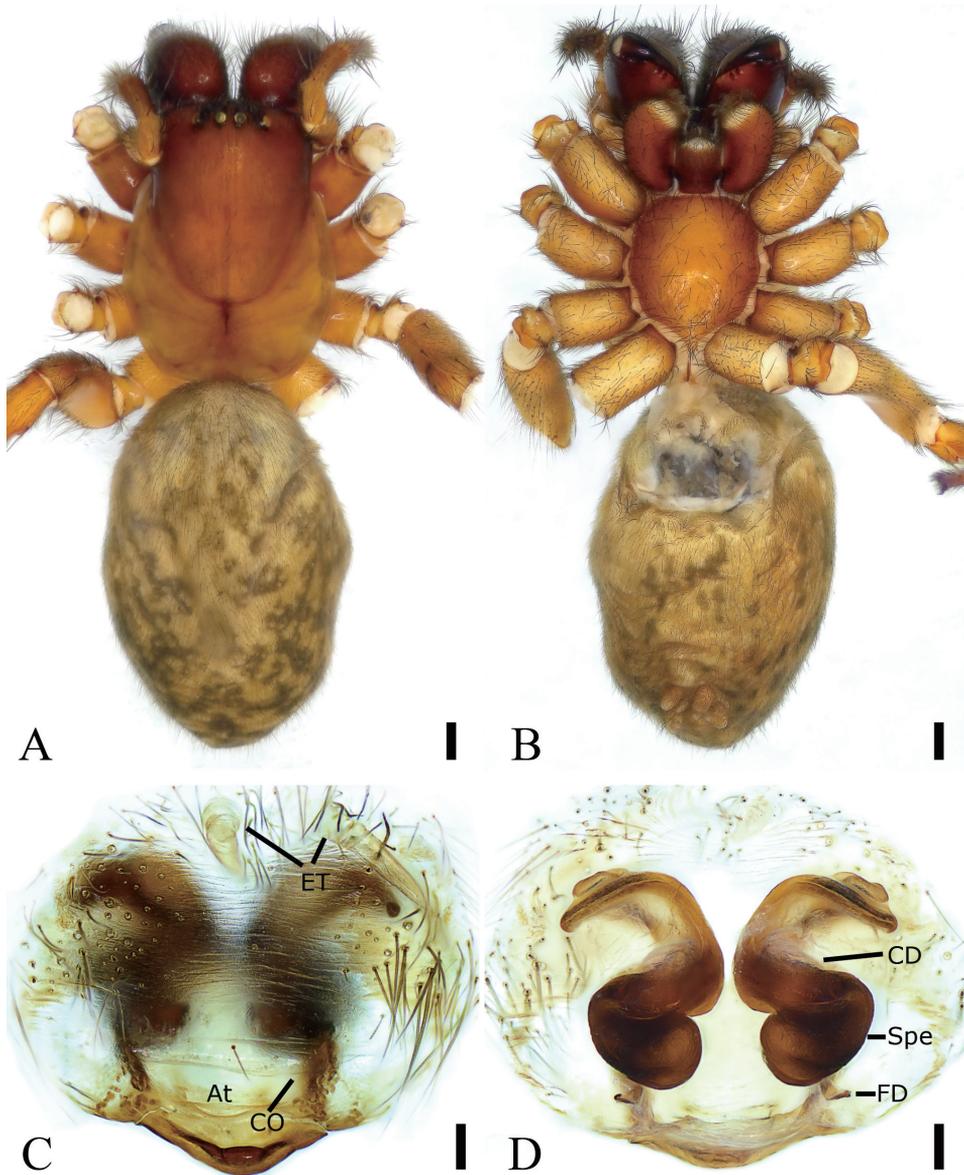


Figure 5. *Draconarius substrophadatus* sp. nov., female holotype **A** habitus, dorsal view **B** same, ventral view **C** epigyne, ventral view **D** vulva, dorsal view. Scale bars: 1 mm (**A**, **B**); 0.1 mm (**C**, **D**). Abbreviations: At – atrium, CD – copulatory duct, CO – copulatory opening, ET – epigynal teeth, FD – fertilization duct, Spe – spermatheca.

D. strophadatus) and the copulatory ducts from sub-anterior part of vulvae extending to median part forming a C-shaped turn (vs. from anterior part of vulvae extending to median part forming a S-shaped turn in *D. strophadatus*) (Fig. 5C, D).

Description. *Habitus* as in Fig. 5A, B. Total length 8.4. Carapace 3.74 long, 2.64 wide. Eye sizes and interdistances: AME 0.08; ALE 0.21; PME 0.14; PLE 0.19;

AME–AME 0.06; AME–ALE 0.08; PME–PME 0.14; ALE–ALE 0.40; PME–PLE 0.13; PLE–PLE 0.59; ALE–PLE 0.13; AME–PME 0.15; AME–PLE 0.29. MOA: 0.41 long; 0.24 anterior width, 0.30 posterior width. Chelicerae with a large basal tubercle, three promarginal teeth (median largest) and two retromarginal teeth (proximal larger). Leg measurements: I 10.16 (2.72, 1.36, 2.2, 2.75, 1.13); II 8.59 (2.26, 1.05, 1.5, 2.45, 1.33); III 8.18 (2.31, 1, 1.81, 1.89, 1.17); IV 9.32 (2.5, 1.05, 2.28, 2.14, 1.35). Abdomen 4.48 long, 2.08 wide.

Coloration. Carapace yellow-brown, posteriorly with dark, narrow, radial stripes. Chelicerae dark yellow-brown. Endites, labium, and sternum dark yellow-brown. Legs yellow-brown. Abdomen brown, dorsally with six pale chevron stripes on the sub-medial part.

Epigyne (Fig. 5C, D). Atrium, labium-like, arising from posterior. Epigynal teeth long, horn-like, located at anteromedian of epigynum. Copulatory openings located at sub-posterior part of the atrium, covered by a transverse plate. Copulatory ducts S-shaped, extending from sub-posterior to antero-lateral part of vulva, then back, connecting with anterolateral part of spermathecae. Spermathecae ampullate, separated by less than their lengths. Fertilization duct short, located posteriorly on spermathecae, curved posteriorly.

Male. Unknown.

Comments. Unfortunately, only one specimen of *Draconarius substrophadatus* sp. nov. was found, as well as of *D. strophadatus*. They share the similar characters of long epigynal teeth, the labium-like atrium located posteriorly, and the waved copulatory ducts, and the new species is tentatively placed in the genus *Draconarius*. Hopefully, finding the males of these two species in the future will reveal their generic placement.

Distribution. Known only from the type locality in Jiangxi Province, China (Fig. 8).

Genus *Orumceki* Koçak & Kemal, 2008

There are seven species currently assigned to this genus and they are all distributed in Asia, including China, Thailand, and Vietnam. They are all reported from China except *O. lanna* (Dankittipakul, Sonthichai & Wang, 2006) and characterised by the male palp with two patellar apophyses, a single tibial apophysis, and the female epigyne without epigynal teeth and with a transversal enlarging atrial ridge. It is worth mentioning that most of them are known by a single female only: *O. jianhuii* (Tang & Yin, 2002; Hunan), *O. lanna* (Thailand), *O. pseudogemata* (Xu & Li, 2007; Sichuan), and *O. subsigillata* (Wang, 2003; Zhejiang). Thus, they still need to be supplemented by the other sex in future collections.

Orumceki cipingensis K. Liu, J. Liu & X. Xu, sp. nov.

<http://zoobank.org/C6FCE1D4-3FF6-4C32-940C-9B343F3D99BF>

Figure 6

Material examined. *Holotype* ♀, China, Jiangxi Prov., Ji'an City, Jinggangshan County Level City, Ciping Town, near Youth Quality Training Camp, 26°35'10.87"N, 114°09'42.52"E, 885 m, 27 Sep. 2018, Ke-ke Liu leg.

Etymology. The name refers to the type locality, Ciping Town; adjective.

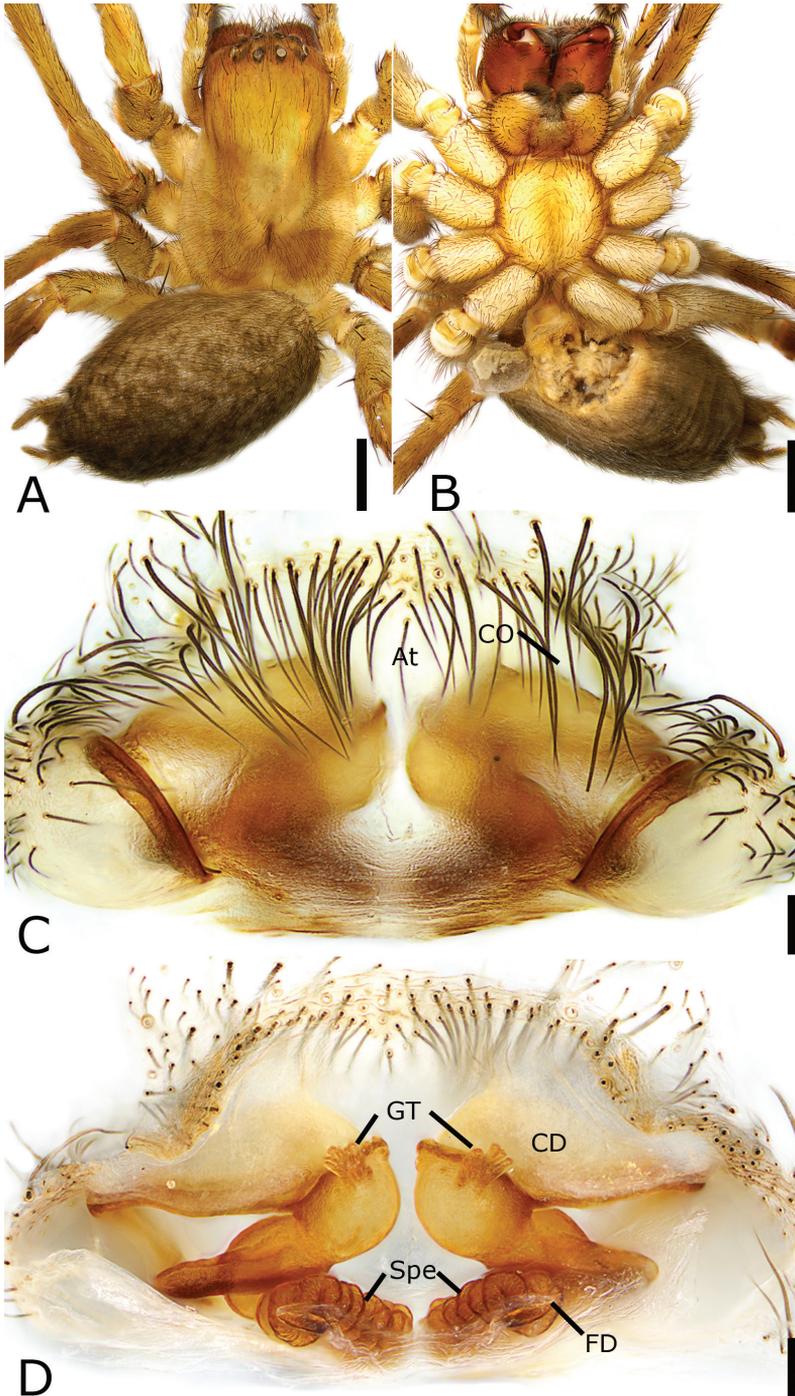


Figure 6. *Orumceklia cipingensis* sp. nov., female holotype **A** habitus, dorsal view **B** same, ventral view **C** epigyne, ventral view **D** vulva, dorsal view. Scale bars: 1 mm (**A, B**); 0.1 mm (**C, D**). Abbreviations: At – atrium, CD – copulatory duct, CO – copulatory opening, FD – fertilization duct, GT – glandular tubes, Spe – spermatheca.

Diagnosis. The female of this species is similar to that of *O. gemata* (Wang, 1994), the type species of the genus, in having the broad bugle-shaped copulatory ducts and touching sac-shaped posterior spermathecae, but differs by the longer copulatory duct with a spiral tube (vs. absent in *O. gemata*) and the sac-shaped spermathecae with the anterior peanut-shaped parts slightly separated from each other (vs. Y-shaped parts touching in *O. gemata*) (Fig. 6C, D).

Description. Female. Habitus as in Fig. 6A, B. Total length 7.71. Carapace 3.34 long, 2.40 wide. Eye sizes and interdistances: AME 0.14; ALE 0.21; PME 0.16; PLE 0.16; AME–AME 0.19; AME–ALE 0.10; PME–PME 0.19; ALE–ALE 0.61; PME–PLE 0.27; PLE–PLE 0.96; ALE–PLE 0.09; AME–PME 0.20; AME–PLE 0.29. MOA: 0.46 long; 0.44 anterior width, 0.48 posterior width. Chelicerae with a large basal tubercle, three promarginal teeth (median largest) and five retromarginal teeth (distal largest). Leg measurements: I 9.74 (2.61, 1.21, 2.48, 2.33, 1.11); II 9.09 (2.67, 0.95, 2.12, 2.15, 1.20); III 7.5 (2.07, 0.94, 1.49, 2.03, 0.97); IV 9.88 (2.5, 1.18, 2.38, 2.47, 1.35). Abdomen 3.78 long, 2.09 wide.

Coloration. Carapace yellow-brown, posteriorly with radial stripes. Chelicerae red-brown. Endites, labium, and sternum yellow-brown. Legs yellow-brown. Abdomen brown, dorsally with six pale chevron stripes on sub-medial part.

Epigyne (Fig. 6C, D). Atrium broad, subfan-shaped, extending from anterior to posterior. Copulatory openings located at mediolateral part of the atrium. Copulatory ducts, anterior part bugle-shaped, posterior part connecting with a spiral tube, longer than spermathecae. Glandular tubes clustered, located at anterior part of spermathecae. Spermathecae in two pairs, anterior spermathecae peanut-shaped, slightly separated, sloping postero-laterally; posterior spermathecae sac-shaped, distal parts touching. Fertilization duct short, located medially on spermathecae.

Comments. A cluster of blind tubes located on the anterior part of the spermathecae of this species is unclear to us; we called them glandular tubes. They are probably homologous with spermathecal heads also originated from spermathecae.

Distribution. Known only from the type locality in Jiangxi Province, China (Fig. 8).

***Tonsilla shuikouensis* K. Liu, J. Liu & X. Xu, sp. nov.**

<http://zoobank.org/243D9BAB-2626-4198-BAFD-46B49FFB2710>

Figure 7

Material examined. Holotype ♀, China, Jiangxi Prov., Ji'an City, Jinggangshan County Level City, Ciping Town, Xiajing Village, Shuikou Scenic Spot, 26°33'04.83"N, 114°27'42.83"E, 898 m, 7 Dec. 2013, Ke-ke Liu et al. leg.

Etymology. The name refers to the type locality, Shuikou Scenic Spot; adjective.

Diagnosis. The female of this species resembles *T. variegata* (Wang, Yin, Peng & Xie, 1990) in having the slightly separated horn-like epigynal teeth located at the antero-medial margin of a large atrium, and the short copulatory duct and spermathecae aggregated at the posterior part of vulvae, but can be separated from it by the large heart-shaped epigynal

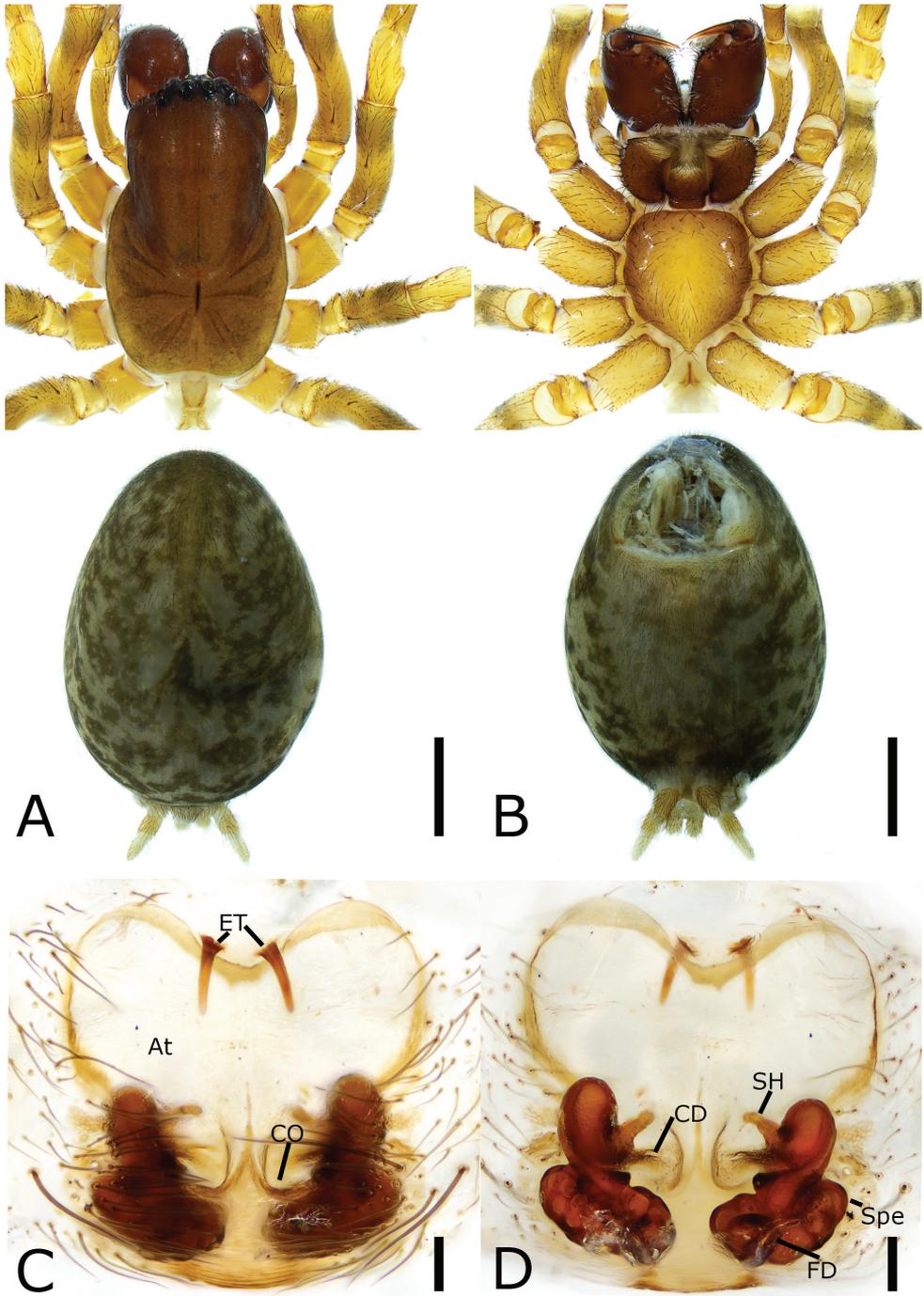


Figure 7. *Tonsilla shuikouensis* sp. nov., female holotype **A** habitus, dorsal view **B** same, ventral view **C** epigyne, ventral view **D** vulva, dorsal view. Scale bars: 1 mm (**A, B**); 0.1 mm (**C, D**). Abbreviations: At – atrium, CD – copulatory duct, CO – copulatory opening, ET – epigynal teeth, FD – fertilization duct, SH – spermathecal head, Spe – spermatheca.

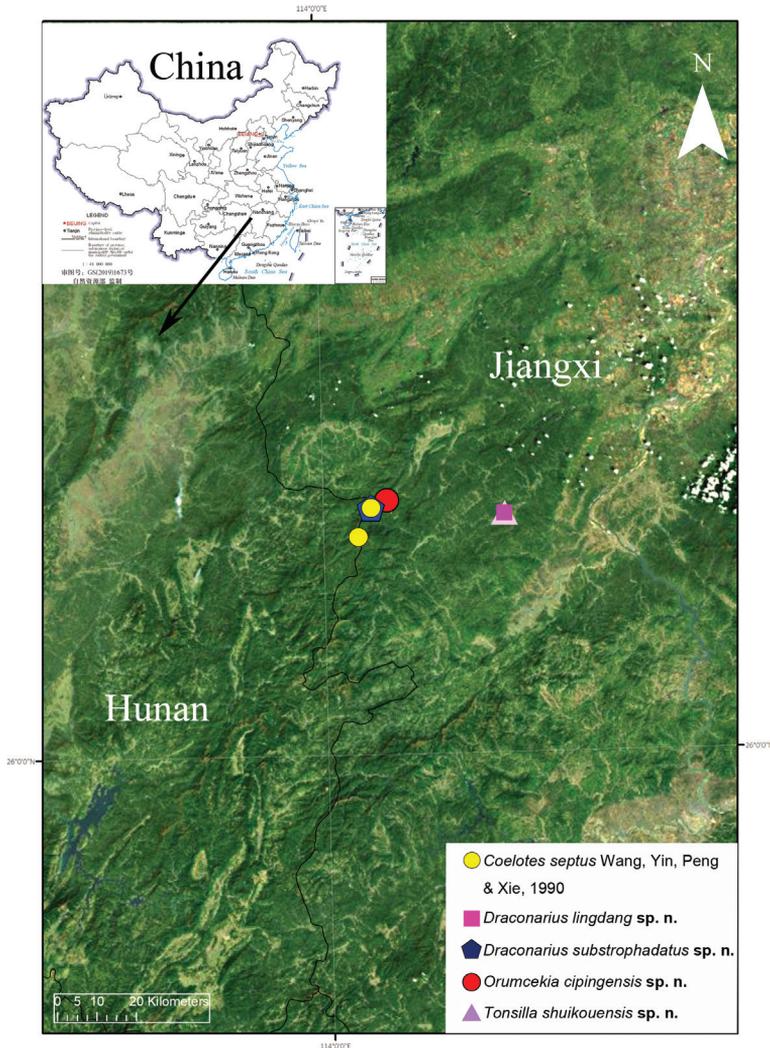


Figure 8. Type localities of *Coelotes septus* Wang et al., 1990, *Draconarius lingdang* sp. nov., *D. substrophadatus* sp. nov., *Orumcekia cipingensis* sp. nov., and *Tonsilla shuikouensis* sp. nov.

atrium (vs. horseshoe-shaped in *T. variegata*) and the copulatory ducts arising from sub-posteromedian part of the epigyne (vs. sub-posterolateral in *T. variegata*), and spermathecal heads pointing submedially towards the dorsal copulatory openings (Fig. 7C, D).

Description. Female. Habitus as in Fig. 7A, B. Total length 7.32. Carapace 3.02 long, 1.79 wide. Eye sizes and interdistances: AME 0.13; ALE 0.17; PME 0.16; PLE 0.17; AME–AME 0.10; AME–ALE 0.06; PME–PME 0.10; ALE–ALE 0.39; PME–PLE 0.11; PLE–PLE 0.56; ALE–PLE 0.08; AME–PME 0.06; AME–PLE 0.25. MOA: 0.21 long; 0.26 anterior width, 0.38 posterior width. Chelicerae with large basal tubercle, three promarginal teeth (median largest) and two retromarginal teeth (proximal larger). Leg measurements: I 6.17 (1.48, 0.85, 1.55, 1.46, 0.83); II 5.63 (1.36, 0.79,

1.29, 1.38, 0.81); III 4.75 (0.96, 0.74, 0.98, 1.40, 0.67); IV 6.41 (1.19, 0.93, 1.56, 1.91, 0.82). Pedicel 2.54. Abdomen 3.68 long, 2.72 wide.

Coloration. Carapace yellow-brown, posteriorly with dark radial stripes. Chelicerae, endites, labium, and sternum dark yellow-brown. Legs yellow-brown. Abdomen brown, dorsally with six pale chevron stripes on sub-medial part.

Epigyne (Fig. 7C, D). Atrium, heart-shaped, rising from anterior to sub-posterior. Epigynal teeth thin and short, anteromedially located at the margin of atrium, separated by half length of epigynal teeth. Copulatory openings located at the posterior part of the atrium, separated by a narrow septum. Copulatory ducts ear-shaped, longer than epigynal teeth. Spermathecal heads finger-shaped, convergent, as long as half of epigynal teeth. Spermathecae sac-shaped, separated less than half of their lengths. Fertilization duct short, located posteriorly on spermathecae.

Male. Unknown.

Comments. This species is characterized by the large atrium anteriorly located and the thin and short epigynal teeth anteromedially located. These characters are similar to those of *Tonsilla* species. Thus, this new species is tentatively placed in the genus *Tonsilla* until their matching males are found.

Distribution. Known only from the type locality in Jiangxi Province, China (Fig. 8).

Discussion

Coelotinae F.O. Pickard-Cambridge, 1893 is the largest subfamily among the spider family Agelenidae since it was transferred from Amaurobiidae by Miller et al. (2010) based on a phylogenetic analysis. The total number of species in Coelotinae has increased greatly in the last ten years (WSC, 2020). However, there are still many taxonomical problems to be resolved, especially in the two largest groups of genera, close to *Coelotes* and *Draconarius*. The main reason includes the following factors: firstly, ca. 70% species in these two genera are described from a single sex only; secondly, male species are very difficult to collect when in the mature period, because of the wandering behavior in this period searching for females; finally, some descriptions were superficial and only a few ink drawings were provided in previous work, causing difficulties in later species diagnosis. There is no doubt that the taxonomical work of these species has a long way to go.

It is interesting to note that some Chinese species, including those species described here, clearly appear to differ from some of their congeners, such as *C. septus*, which is characterized by the conspicuous tooth-like sclerite near the embolic base.

Draconarius lingdang shares common features with *D. aspinatus*, *D. peregrinus*, *D. potanini*, *D. rufulus*, *D. subabsentis*, and *D. tiantangensis* (Wang et al. 1990; Xu and Li 2008; Xie and Chen 2011). The main similarities in males are the absence of patellar apophyses, which exist in other *Draconarius* species. Unfortunately, the males of *D. substrophadatus*, *Orumceikia cipingensis*, and *Tonsilla shuikouensis* are still unknown. These problems need to be solved not only by the discovery of the unknown sexes, but also by analyzing the relationships using alternative methods, such as molecular studies.

Acknowledgements

We are grateful to Qian-qian Chen, Xiao-jie Chen, Zhi-wu Chen, Chun-qi Dong, Shicong He, Xin-peng Liu, Hui-pu Luo, Ze-yuan Meng, Yu-yang Peng, Wen Sun, Ning Wang, Tian-ming Wang, Jian-yun Wen, Chen-jie Wu, Cheng-da Wu, Hui-xiao Wu, Sha Wu, Ben-qiang Xiao, Han-xi Xiao, Ce Xu, Ji-hao Zhang, Lei-Zhang (College of Life Science, Jinggangshan University, China) for collecting the specimens. This paper benefited greatly from the helpful comments of the subject editor Dragomir Dimitrov (University of Barcelona, Spain), Yuri Marusik (Magadan, Russia), Jeremy Miller (Naturalis Biodiversity Center, Leiden, Netherlands), and one anonymous reviewer. We also thank Nathalie Yonow for improving the English of the manuscript. This study was supported by the Natural Science Foundation of China (32070429/31772423/32000301).

References

- Blackwall J (1841) The difference in the number of eyes with which spiders are provided proposed as the basis of their distribution into tribes; with descriptions of newly discovered species and the characters of a new family and three new genera of spiders. *Transactions of the Linnean Society of London* 18: 601–670. <https://doi.org/10.1111/j.1095-8339.1838.tb00210.x>
- Chen L, Li S, Zhao Z (2015a) A new genus of *Coelotinae* (Araneae, Agelenidae) from southern China. *ZooKeys* 541: 41–56. <https://doi.org/10.3897/zookeys.541.6678>
- Chen L, Li S, Zhao Z (2015b) Five new *Platocoelotes* species (Araneae, Agelenidae) from caves in southern China. *ZooKeys* 512: 1–18. <https://doi.org/10.3897/zookeys.512.9989>
- Chen L, Zhao Z, Li S (2016) *Sinocoelotes* gen. n., a new genus of the subfamily Coelotinae (Araneae, Agelenidae) from Southeast Asia. *ZooKeys* 614: 51–86. <https://doi.org/10.3897/zookeys.614.8663>
- Dankittipakul P, Sonthichai S, Wang XP (2006) Ten new species of coelotine spiders (Araneae, Amaurobiidae) from Thailand. *Revue Suisse de Zoologie* 113: 3–21. <https://doi.org/10.11646/zootaxa.970.1.1>
- Koch CL (1837) Übersicht des Arachnidensystems. C. H. Zeh'sche Buchhandlung, Nürnberg, Heft 1, 39 pp. <https://doi.org/10.5962/bhl.title.39561>
- Li B, Zhao Z, Chen H, Wu Z, Zhang C, Li SQ (2018c) *Guilotes*, a new genus of Coelotinae spiders from Guangxi Zhuang Autonomous Region, China (Araneae, Agelenidae). *ZooKeys* 802: 1–17. <https://doi.org/10.3897/zookeys.802.29913>
- Li B, Zhao Z, Chen HF, Wu ZY, Li SQ (2019a) New species of the coelotine spider genus *Lineacoelotes* (Araneae: Agelenidae) from China. *Zootaxa* 4623(2): 351–363. <https://doi.org/10.11646/zootaxa.4623.2.9>
- Li B, Zhao Z, Chen HF, Wu ZY, Li SQ (2019b) Four new species of the genus *Draconarius* Ovtchinnikov, 1999 (Araneae, Agelenidae) from the Tibetan Plateau, China. *Zootaxa* 4648(1): 141–154. <https://doi.org/10.11646/zootaxa.4648.1.7>
- Li B, Zhao Z, Chen YX, Chen HF, Wu ZY, Li SQ (2019d) *Vappolotes*, a new genus of coelotine spiders (Araneae, Agelenidae) from Guizhou, China. *Zootaxa* 4701(5): 434–442. <https://doi.org/10.11646/zootaxa.4701.5.3>

- Li B, Zhao Z, Zhang C, Li SQ (2018a) *Sinodraconarius* gen. n., a new genus of Coelotinae spiders from Southwest China (Araneae, Agelenidae). *ZooKeys* 770: 117–135. <https://doi.org/10.3897/zookeys.770.22470>
- Li B, Zhao Z, Zhang C, Li SQ (2018b) *Nuconarius* gen. n. and *Hengconarius* gen. n., two new genera of Coelotinae (Araneae, Agelenidae) spiders from southwest China. *Zootaxa*, 4457(2): 237–262. <https://doi.org/10.11646/zootaxa.4457.2.2>
- Li B, Zhao Z, Zhang CT, Li SQ (2019c) *Troglocoelotes* gen. n., a new genus of Coelotinae spiders (Araneae, Agelenidae) from caves in South China. *Zootaxa* 4554(1): 219–238. <https://doi.org/10.11646/zootaxa.4554.1.7>
- Li S (2020) Spider taxonomy for an advanced china. *Zoological Systematics* 45(2): 73–77. <http://www.zootax.com.cn/EN/10.11865/zs.202011>
- Miller JA, Carmichael A, Ramírez MJ, Spagna JC, Haddad CR, Řezáč M, Johannesen J, Král J, Wang XP, Griswold CE (2010) Phylogeny of entelegyne spiders: affinities of the family Penestomidae (NEW RANK), generic phylogeny of Eresidae, and asymmetric rates of change in spinning organ evolution (Araneae, Araneoidea, Entelegynae). *Molecular Phylogenetics and Evolution* 55: 786–804. <https://doi.org/10.1016/j.ympev.2010.02.021>
- Ovtchinnikov SV (1999) On the supraspecific systematics of the subfamily Coelotinae (Araneae, Amaurobiidae) in the former USSR fauna. *Tethys Entomological Research* 1: 63–80.
- Schenkel E (1963) Ostasiatische Spinnen aus dem Muséum d'Histoire naturelle de Paris. *Mémoires du Muséum National d'Histoire Naturelle de Paris (A, Zool.)* 25: 1–481.
- Song DX, Li ZS (1990) A new genus and a new species of the family Agelenidae (Araneae) from China. *Sinozoologia* 7: 83–86.
- Song DX, Zhu MS, Chen J (1999) *The Spiders of China*. Hebei University of Science and Technology Publishing House Shijiazhuang, 640 pp.
- Tang G, Yin CM (2002) Two new species of the family Amaurobiidae from China (Arachnida: Araneae). *Acta Arachnologica Sinica* 11: 14–17.
- Wang JF (1994) Descriptions of a new genus and two new species of Amaurobiidae from China (Araneae). *Acta Zootaxonomica Sinica* 19: 281–285.
- Wang JF, Yin CM (1992) A new genus and three new species of funnel-web spiders from south China (Araneae: Agelenidae). *Journal of Natural Science of Hunan Normal University* 15: 263–272.
- Wang JF, Yin CM, Peng XJ, Xie LP (1990) New species of the spiders of the genus *Coelotes* from China (Araneae: Agelenidae). In: *Spiders in China: One Hundred New and Newly Recorded Species of the Families Araneidae and Agelenidae*. Hunan Normal University Press, 172–253.
- Wang XP (2002) A generic-level revision of the spider subfamily Coelotinae (Araneae, Amaurobiidae). *Bulletin of the American Museum of Natural History* 269: 1–150. [https://doi.org/10.1206/0003-0090\(2002\)269%3C0001:AGLROT%3E2.0.CO;2](https://doi.org/10.1206/0003-0090(2002)269%3C0001:AGLROT%3E2.0.CO;2)
- Wang XP (2003) Species revision of the coelotine spider genera *Bifidocoelotes*, *Coronilla*, *Draconarius*, *Femoracoelotes*, *Leptocoelotes*, *Longicoelotes*, *Platocoelotes*, *Spiricoelotes*, *Tegeocoelotes*, and *Tonsilla* (Araneae: Amaurobiidae). *Proceedings of the California Academy of Sciences* 54: 499–662.
- Wang XP, Griswold CE, Miller JA (2010) Revision of the genus *Draconarius* Ovtchinnikov 1999 (Agelenidae: Coelotinae) in Yunnan, China, with an analysis of the Coelotinae diversity

- in the Gaoligongshan Mountains. *Zootaxa* 2593: 1–127. <https://doi.org/10.11646/zootaxa.2593.1.1>
- Wang XP, Jäger P (2007) A revision of some spiders of the subfamily Coelotinae F. O. Pickard-Cambridge 1898 from China: transfers, synonymies, and new species (Arachnida, Araneae, Amaurobiidae). *Senckenbergiana Biologica* 87: 23–49.
- World Spider Catalog (2020) World Spider Catalog. Natural History Museum Bern. Version 21.0. <https://wsc.nmbe.ch/> [accessed 8 December 2020]
- Xie HJ, Chen J (2011) Two new *Draconarius* species and the first description of the male *Draconarius molluscus* from Tiantangzhai National Forest Park, China (Araneae: Agelenidae: Coelotinae). *Journal of Arachnology* 39: 30–40. <https://doi.org/10.1636/A10-37.1>
- Xu X, Li SQ (2006) Four new species of the genus *Coelotes* (Araneae: Amaurobiidae) from China. *Zootaxa* 1365: 49–59. <https://doi.org/10.11646/zootaxa.1365.1.4>
- Xu X, Li SQ (2007) A new genus and species of the spider family Agelenidae from western Sichuan Province, China (Arachnida: Araneae). *Revue Suisse de Zoologie* 114: 59–64. <https://doi.org/10.5962/bhl.part.80388>
- Xu X, Li SQ (2008) Ten new species of the genus *Draconarius* (Araneae: Amaurobiidae) from China. *Zootaxa* 1786: 19–34. <https://doi.org/10.11646/zootaxa.1786.1.2>
- Yin CM, Peng XJ, Yan HM, Bao YH, Xu X, Tang G, Zhou QS, Liu P (2012) Fauna Hunan: Araneae in Hunan, China. Hunan Science and Technology Press Changsha, 1590 pp.
- Yuan L, Zhao LJ, Zhang ZS (2019) Preliminary study on the spider diversity of the Wanglang National Nature Reserve. *Acta Arachnologica Sinica* 28(1): 7–36. <https://doi.org/10.3724/SPJ.1035.2010.00618>
- Zhang XQ, Zhao Z (2017) A new species of *Longicoelotes* (Araneae, Agelenidae) from China, with the first description of the male of *L. kulianganus* (Chamberlin, 1924). *ZooKeys* 686: 137–147. <https://doi.org/10.3897/zookeys.686.11711>
- Zhang XQ, Zhao Z, Zheng G, Li SQ (2016a) Nine new species of the spider genus *Pireneitega* Kishida, 1955 (Agelenidae, Coelotinae) from Xinjiang, China. *ZooKeys* 601: 49–74. <https://doi.org/10.3897/zookeys.601.7893>
- Zhang XQ, Zhao Z, Zheng G, Li SQ (2016b) A further study of the spider genus *Notio-coelotes* (Araneae, Agelenidae) from Hainan Island, China. *ZooKeys* 601: 75–87. <https://doi.org/10.3897/zookeys.601.7698>
- Zhang YJ, Peng XJ, Kim JP (1997) Five new species of the genus *Coelotes* (Araneae: Agelenidae) from China. *Korean Journal of Systematic Zoology* 13: 291–296.
- Zhao Z, Li S (2016) *Papilio-coelotes* gen. n., a new genus of Coelotinae (Araneae, Agelenidae) spiders from the Wuling Mountains, China. *ZooKeys* 585: 33–50. <https://doi.org/10.3897/zookeys.585.8007>
- Zhu CD, Wang JF (1991) Six new species of the genus *Coelotes* from China (Araneae: Agelenidae). *Journal of Norman Bethune University of Medical Sciences* 17(5): 1–4.
- Zhu MS, Wang XP, Zhang ZS (2017) Fauna Sinica: Invertebrata Vol. 59: Arachnida: Araneae: Agelenidae and Amaurobiidae. Science Press, Beijing, 727 pp.