

New Cave-Dwelling Coelotine Spiders from the Yunnan-Guizhou Plateau, China (Araneae: Amaurobiidae)

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Jie Liu and Shu-Qiang Li (2009) New cave-dwelling coelotine spiders from the Yunnan-Guizhou Plateau, China (Araneae: Amaurobiidae) *Zoological Studies* 48(5): 665-681. Three new *Coelotes* species and 4 new *Draconarius* species from caves of the Yunnan-Guizhou Plateau of China are described: *C. degeneratus* sp. nov., *C. laohuanglongensis* sp. nov., *C. uncatu* sp. nov., *D. cochleariformis* sp. nov., *D. lini* sp. nov., *D. parallelus* sp. nov., and *D. semicircularis* sp. nov. Detailed morphological descriptions and illustrations of all 7 species are given. The type specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences in Beijing. <http://zoolstud.sinica.edu.tw/Journals/48.5/665.pdf>

Key words: Coelotinae, Taxonomy, Cave-dwelling, New species, Fauna.

Caves are found world-wide, and are natural laboratories for the study of evolution, with the deep-cave environment being characterized by the absence of light. There is intense competition between animals because of the absence of primary producers. This strong selection pressure may yield some rare species which provide important information for studies of evolution and ecology. It has been shown that damage to some caves may likely cause the extinction of numerous cave species. Due to the rapid growth of cave tourism, surveys of Chinese cave spiders are becoming more and more urgent.

An extensive faunal survey of cave-dwelling spiders of China over a period of 5 yrs (2003-2008) was made by members of the Chinese Academy of Sciences in more than 500 caves. Recent fieldwork on the Yunnan-Guizhou Plateau yielded 3 new species of the genus *Coelotes* and 4 new species of the genus *Draconarius* which are described in this paper.

Coelotes and *Draconarius* are the 2 most diverse coelotine spider genera. At present, 140

Coelotes species are known worldwide, among which 44 are recorded from China. Of the 145 *Draconarius* species known worldwide, 105 are recorded from China (Platnick 2009).

MATERIALS AND METHODS

Specimens were examined with an Olympus SZ11 stereomicroscope (Tokyo, Japan); details were studied with an Olympus BX41 compound microscope. All illustrations were made using an Olympus drawing tube. Male palps and female genitalia were examined and illustrated after being dissected from the spider bodies.

All measurements were obtained using an Olympus SZ11 stereomicroscope and are given in millimeters. All scale lines are 0.2 mm long except where indicated otherwise. Eye diameters were taken at the widest point. The total body length does not include the length of the chelicerae or spinnerets. Leg measurements are given as: total length (femur, patella + tibia, metatarsus,

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tarsus). The terminology used in the text and figure legends follows Wang (2002): A, atrium; ALE, anterior lateral eye; AME, anterior median eye; AME-ALE, distance between AME and ALE; AME-AME, distance between AME and AME; ALE-PLE, distance between ALE and PLE; C, conductor; CDA, conductor dorsal apophysis; CD, copulatory duct; CF, cymbial furrow; E, embolus; EB, embolic base; Elev, elevation; ET, epigynal tooth; FD, fertilization duct; H, epigynal hood; LTA, lateral tibial apophysis; PA, patellar apophysis; PLE, posterior lateral eye; PME, posterior median eye; PME-PLE, distance between PME and PLE; PME-PME, distance between PME and PME; RH, relative humidity; RTA, retrolateral tibial apophysis; S, spermatheca; SH, spermathecal head; ST, subtegulum; T, tegulum; Temp, temperature; TS, tegulum sclerite.

All type specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing. Type specimen photos of the species included in this paper can be viewed at <http://www.ChineseSpecies.com> which was created and is maintained by Shu-Qiang Li and Xin-Ping Wang (Li and Wang 2008).

TAXONOMY

Family Amaurobiidae Thorell, 1870

Subfamily Coelotinae F.O. Pickard-Cambridge, 1893

Coelotes Blackwall, 1841

Coelotes degeneratus sp. nov.

(Figs. 1-6, 37)

Holotype male: Yanzi Cave (23°38.220'N, 103°03.200'E; Elev, 1080 m; Temp, 18°C; RH, 90%) (location closest to cave opening about 200 m from cave entrance), Mawang Village, Miandian Town, Jianshui County (Co.), Yunnan Province (Prov.), China, 29 Mar. 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 1 ♂, 5 ♀♀, same data as for holotype.

Etymology: The specific epithet is taken from the Latin adjective *degeneratus* and refers to the degenerated traits as adaptations to the cave environment in this new species.

Diagnosis: The new species is similar to *C. uncatatus* sp. nov., but can be distinguished from it by the following differences: 1, the embolus

originates prolaterally in *C. degeneratus* sp. nov., but proximally in *C. uncatatus* sp. nov.; 2, the spermathecal heads are visible in dorsal view in *C. degeneratus* sp. nov., but not visible in *C. uncatatus* sp. nov.; and 3, the epigynal teeth are broad in *C. degeneratus* sp. nov., but slender in *C. uncatatus* sp. nov. These 2 new species can be easily distinguished from other *Coelotes* by the unique conductor dorsal apophysis, sword-shaped patellar apophysis, and large, simple, global spermathecae which are closed together (Figs. 2-5, 11-14).

Male (holotype): Total length 4.11. Prosoma length 2.10, width 1.74; opisthosoma length 2.10, width 1.52. Eye measurements: AME 0.06; ALE 0.11; PME 0.10; PLE 0.10; AME-AME 0; AME-ALE 0; ALE-PLE 0; PME-PME 0.05; PME-PLE 0.05. Eyes pale, AME slightly reduced, tubercles of eyes not reduced. Clypeus height 0.15. Leg formula: IV, I, II, III; leg measurements: I: 10.85 (2.55, 3.80, 2.80, 1.70); II: 9.75 (2.40, 3.20, 2.60, 1.55); III: 8.85 (2.30, 2.70, 2.60, 1.25); IV: 11.90 (2.85, 3.65, 3.65, 1.75). Abdomen pale, without a pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 6).

Male palp: Patellar apophysis long, slightly shorter than tibia, sword-shaped; distal end of RTA slightly extending beyond tibia; lateral tibial apophysis distinct but small; cymbial furrow less than 1/2 of cymbial length; conductor simple, short, with a sharp distal end, conductor dorsal apophysis moderately large; median apophysis broad, spoon-shaped; embolic base almost square-shaped; embolus moderately long, originating prolaterally (Figs. 1-3).

Female: Measurements: Total length 4.51. Prosoma length 2.01, width 1.60; opisthosoma length 2.52, width 2.03. Eye measurements: AME 0.03; ALE 0.07; PME 0.07; PLE 0.07; AME-AME 0.03; AME-ALE 0.03; ALE-PLE 0.03; PME-PME 0.08; PME-PLE 0.08. Eyes white, AME slightly reduced, tubercles of eyes slightly reduced. Clypeus height 0.13. Leg formula: IV, I, II, III; leg measurements: I: 5.70 (1.50, 2.00, 1.25, 0.95); II: 4.45 (1.25, 1.50, 1.00, 0.70); III: 4.20 (1.25, 1.25, 1.10, 0.60); IV: 6.05 (0.75, 2.00, 1.55, 0.75). Abdomen pale, without a pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth.

Female genitalia: Epigynal teeth small, extremely wide and short, situated anteriorly and laterally, widely separated; atrium small, shallow; copulatory ducts not visible from dorsal view; spermathecal heads short, situated anteriorly, slightly close together; spermathecae simple,

large, global and closed together (Figs. 4, 5).

Distribution: China (Yunnan) (Fig. 37).

***Coelotes laohuanglongensis* sp. nov.**

(Figs. 7-9, 37)

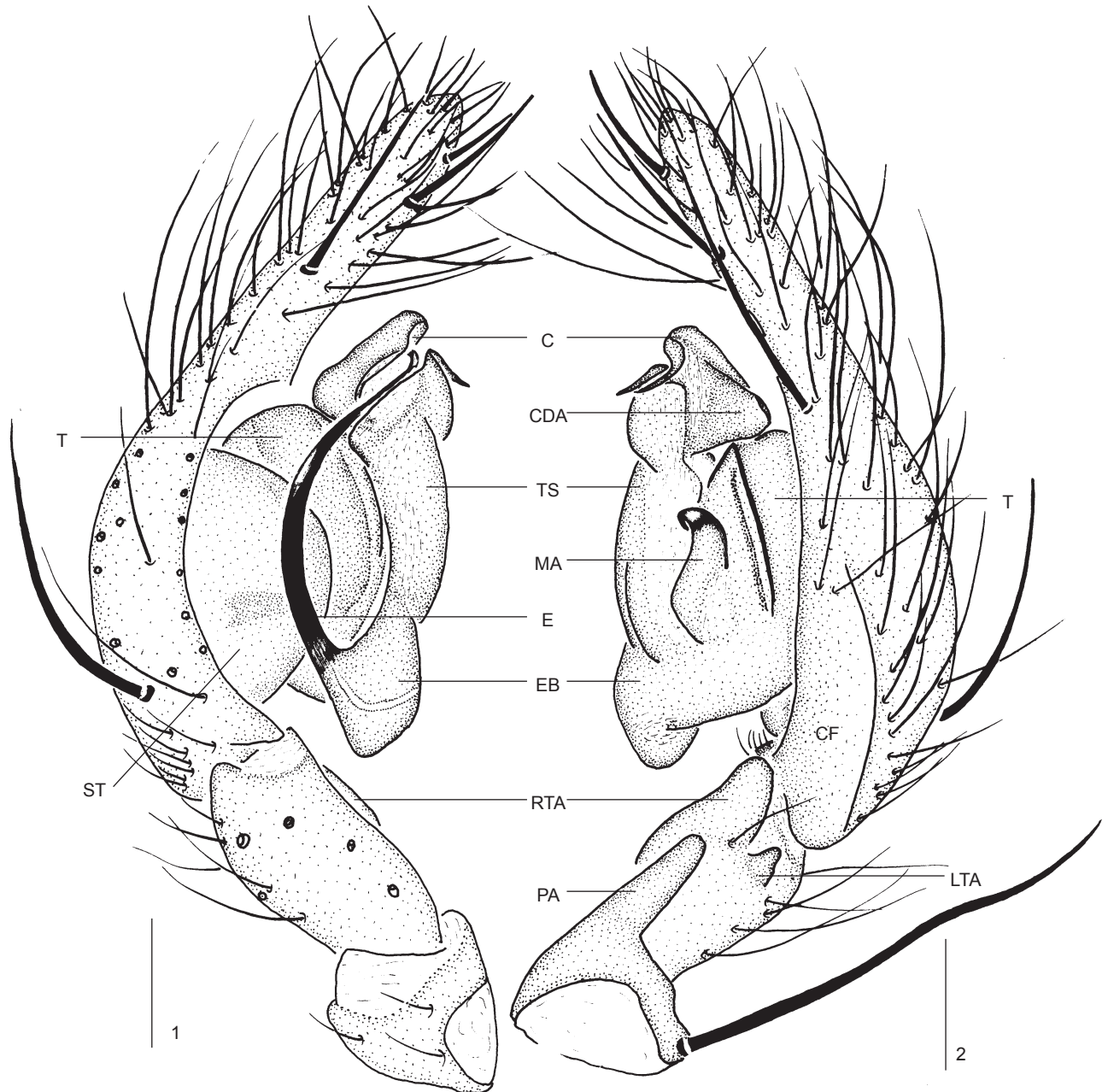
Holotype female: Laohuanglong Cave (25° 25.711'N, 102°55.462'E, Elev, 2383 m; Temp, 12°C; RH, 98%) (location closest to cave opening about

20 m from cave entrance), Duoge Village, Aziying Town, Haoming Co., Yunnan Prov., China, 3 Apr. 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 4 ♀♀, same data as for holotype.

Etymology: The specific name is an adjective, referring to the type locality, Laohuanglong Cave.

Diagnosis: The new species is similar to *Coelotes okinawensis* Shimojana, 1989 in having distinct copulatory openings, long copulatory ducts, and simple spermathecae which are

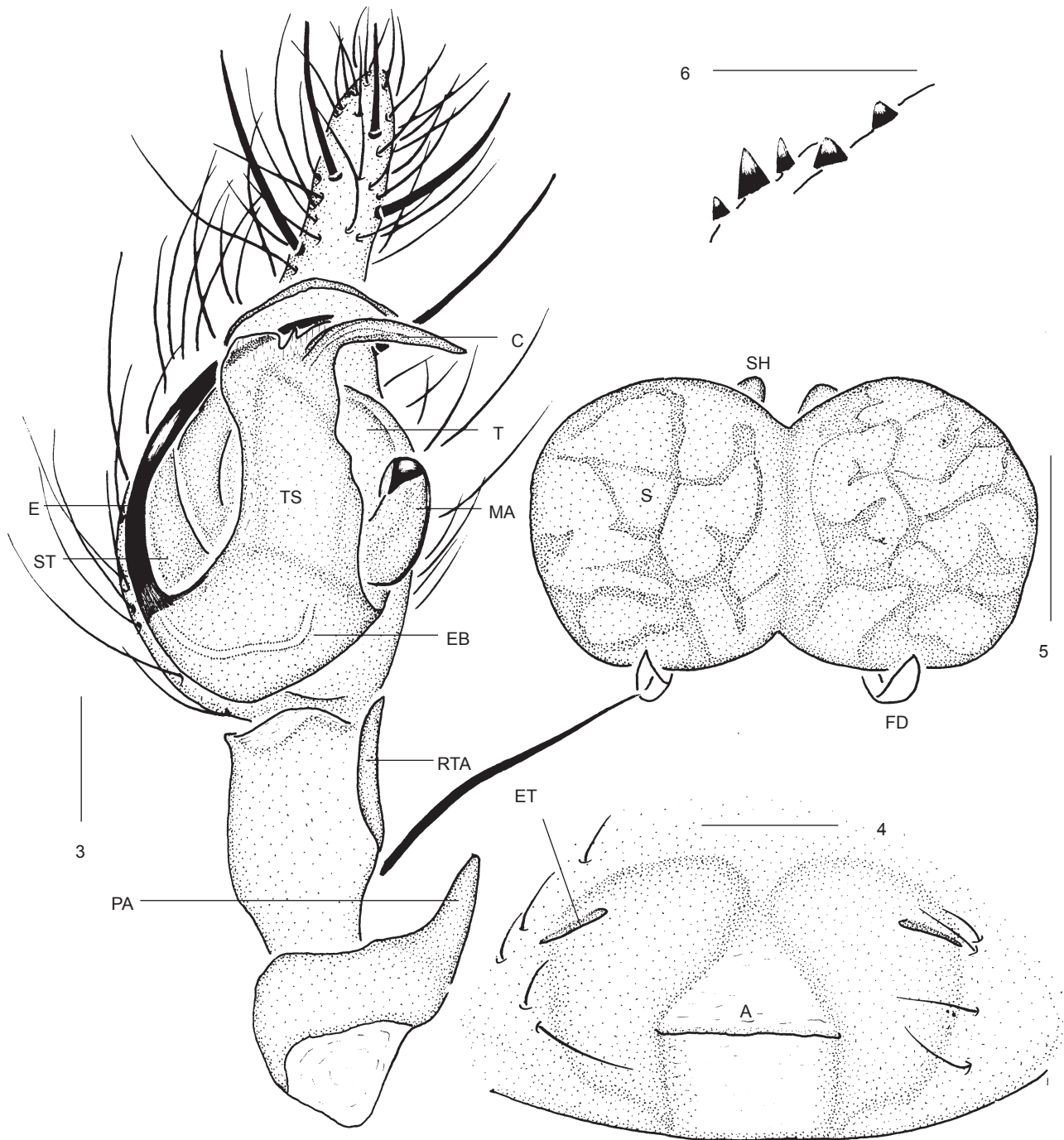


Figs. 1, 2. *Coelotes degeneratus* sp. nov. 1. Left palp, prolatateral view. 2. Same, retrolateral view.

close together, but it can be distinguished from *C. okinawensis* by its distinct epigynal hood, the location of the epigynal teeth and the spiral copulatory ducts (Figs. 7, 8).

Female (holotype): Total length 8.25. Prosoma length 3.75, width 2.60; opisthosoma

length 4.50, width 2.75. Eye measurements: AME 0.11; ALE 0.18; PME 0.15; PLE 0.18; AME-AME 0; AME-ALE 0.04; ALE-PLE 0; PME-PME 0.13; PME-PLE 0.10. Clypeus height 0.18. Leg formula: IV, I, II, III; leg measurements: I: 10.90 (3.00, 3.75, 2.50, 1.65); II: 9.80 (2.80, 3.25, 2.25, 1.50); III: 9.40 (2.50,



Figs. 3-6. *Coelotes degeneratus* sp. nov. 3. Left palp, ventral view. 4. Epigynum, ventral view. 5. Vulva, dorsal view. 6. Male cheliceral teeth, ventral view.

2.85, 2.45, 1.60); IV: 12.60 (3.10, 4.00, 3.60, 1.90). Abdomen pale, without a pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 9).

Female genitalia: Epigynal teeth small, situated medially close to lateral atrial margin and widely separated; epigynal hoods distinct, situated posteriorly; atrium small, with a broad septum, atrium extending into epigynum, forming 2 small, round copulatory duct openings; copulatory ducts long and spiral, forming 3 or 4 loops, originating medially; spermathecal heads small, situated anteriorly, widely separated; spermathecae simple and close together (Figs. 7, 8).

Male: Unknown.

Distribution: China (Yunnan) (Fig. 37).

***Coelotes uncatu* sp. nov.**

(Figs. 10-15, 37)

Holotype male: Laobie Cave (24°50.511'N, 104°16.066'E; Elev, 1840 m; Temp, 10°C; RH, 90%) (location closest to cave opening about 5 m from cave entrance), Pingtian Village, Luoxiong Town, Luoping Co., Yunnan Prov., China, 20 May 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 8 ♀♀, same data as for holotype.

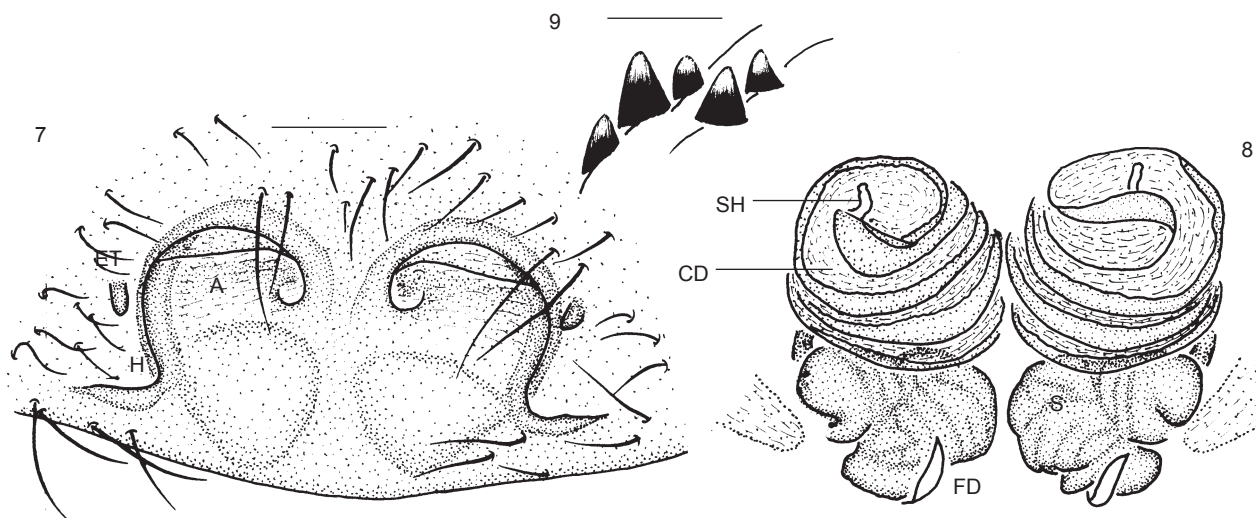
Etymology: The specific epithet is taken from the Latin adjective *uncatu* and refers to the hook-shaped conductor dorsal apophysis of this species.

Diagnosis: See the diagnosis under *C. degeneratus* sp. nov.

Male (holotype): Total length 3.30. Prosoma length 1.65, width 1.40; opisthosoma length 1.65, width 1.25. Eye measurements: AME 0.05; ALE 0.13; PME 0.13; PLE 0.13; AME-AME 0; AME-ALE 0; ALE-PLE 0; PME-PME 0.03; PME-PLE 0. Clypeus height 0.08. Leg formula: IV, I, II, III; leg measurements: I: 7.35 (1.90, 2.45, 1.80, 1.20); II: 6.20 (1.65, 2.00, 1.50, 1.05); III: 5.45 (1.50, 1.50, 1.50, 0.95); IV: 7.80 (2.00, 2.50, 2.15, 1.15). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 15).

Male palp: Patellar apophysis long, almost extending to embolic base in retrolateral view, sword-shaped; distal end of RTA slightly extending beyond tibia; lateral tibial apophysis large; cymbial furrow more than 1/2 cymbial length; conductor simple, with a sharp distal end, dorsal apophysis moderately large, hook-shaped in retrolateral view; median apophysis broad, spoon-shaped; embolic base almost rectangular; embolus long, originating proximally (Figs. 10-12).

Female: Total length 3.60. Prosoma length 1.45, width 1.25; opisthosoma length 2.15, width 1.65. Eye measurements: AME 0.05; ALE 0.13; PME 0.10; PLE 0.10; AME-AME 0; AME-ALE 0; ALE-PLE 0; PME-PME 0.05; PME-PLE 0. Clypeus height 0.08. Leg formula: IV, I, II, III; leg measurements: I: 5.40 (1.50, 1.95, 1.00, 0.95); II: 4.95 (1.35, 1.60, 1.15, 0.85); III: 4.35 (1.25, 1.35, 1.05, 0.70); IV: 5.80 (1.55, 1.85, 1.60, 0.80). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal



Figs. 7-9. *Coelotes paraspiralis* sp. nov. 7. Epigynum, ventral view. 8. Vulva, dorsal view. 9. Female cheliceral teeth, ventral view.

teeth.

Female genitalia: Epigynal teeth small, with a sharp end, situated medially and laterally, widely separated; atrium small, shallow; copulatory ducts not visible in dorsal view; spermathecal heads not visible in dorsal view; spermathecae simple, large, global and close together (Figs. 13, 14).

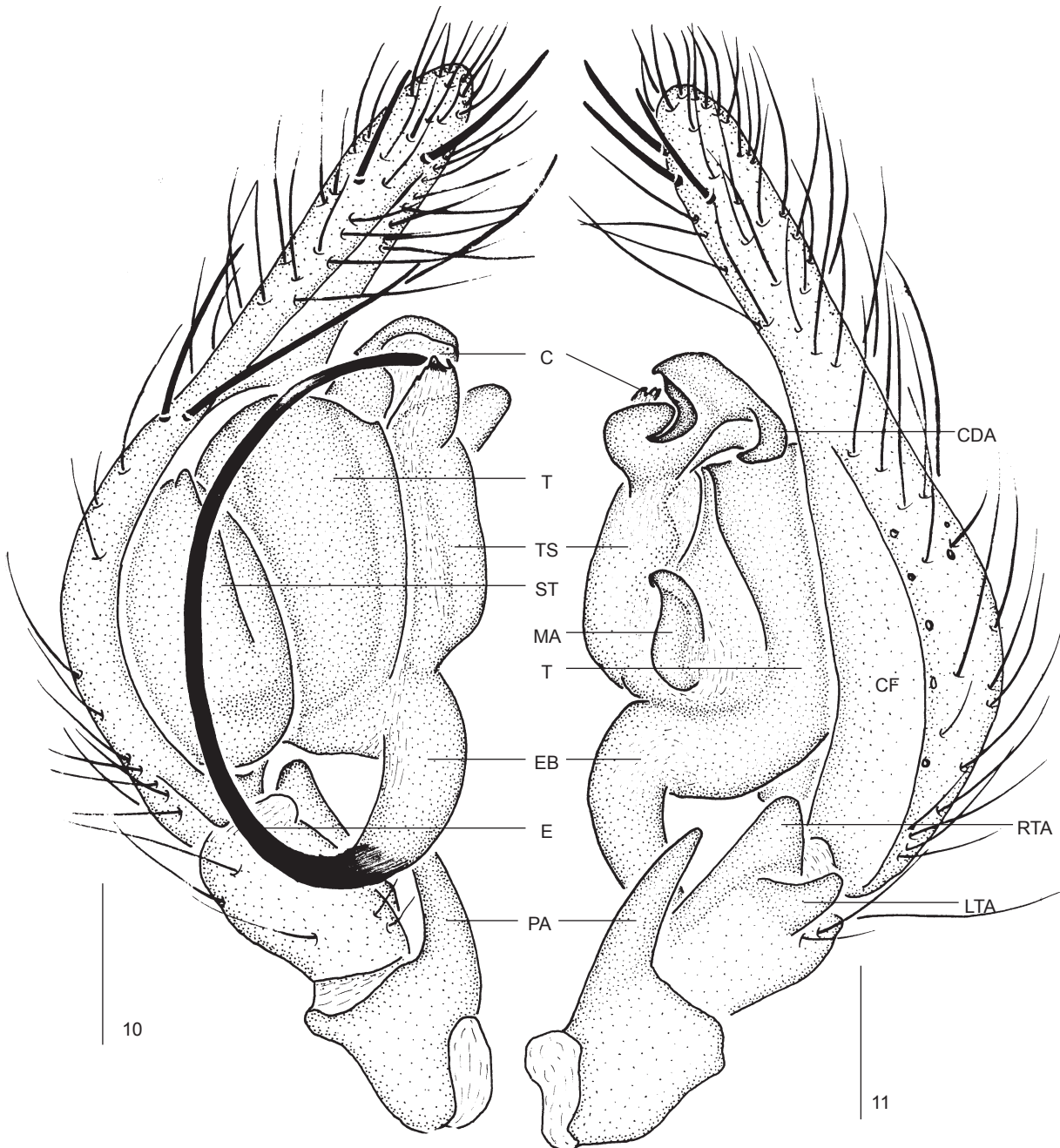
Distribution: China (Yunnan) (Fig. 37).

***Draconarius* Ovtchinnikov, 1999**

***Draconarius cochleariformis* sp. nov.**

(Figs. 16-21, 37)

Holotype male: Majia Cave (26°49.611'N, 105°19.874'E; Elev, 1465 m; Temp, 19°C; RH, 92%) (location closest to cave opening about 1 m

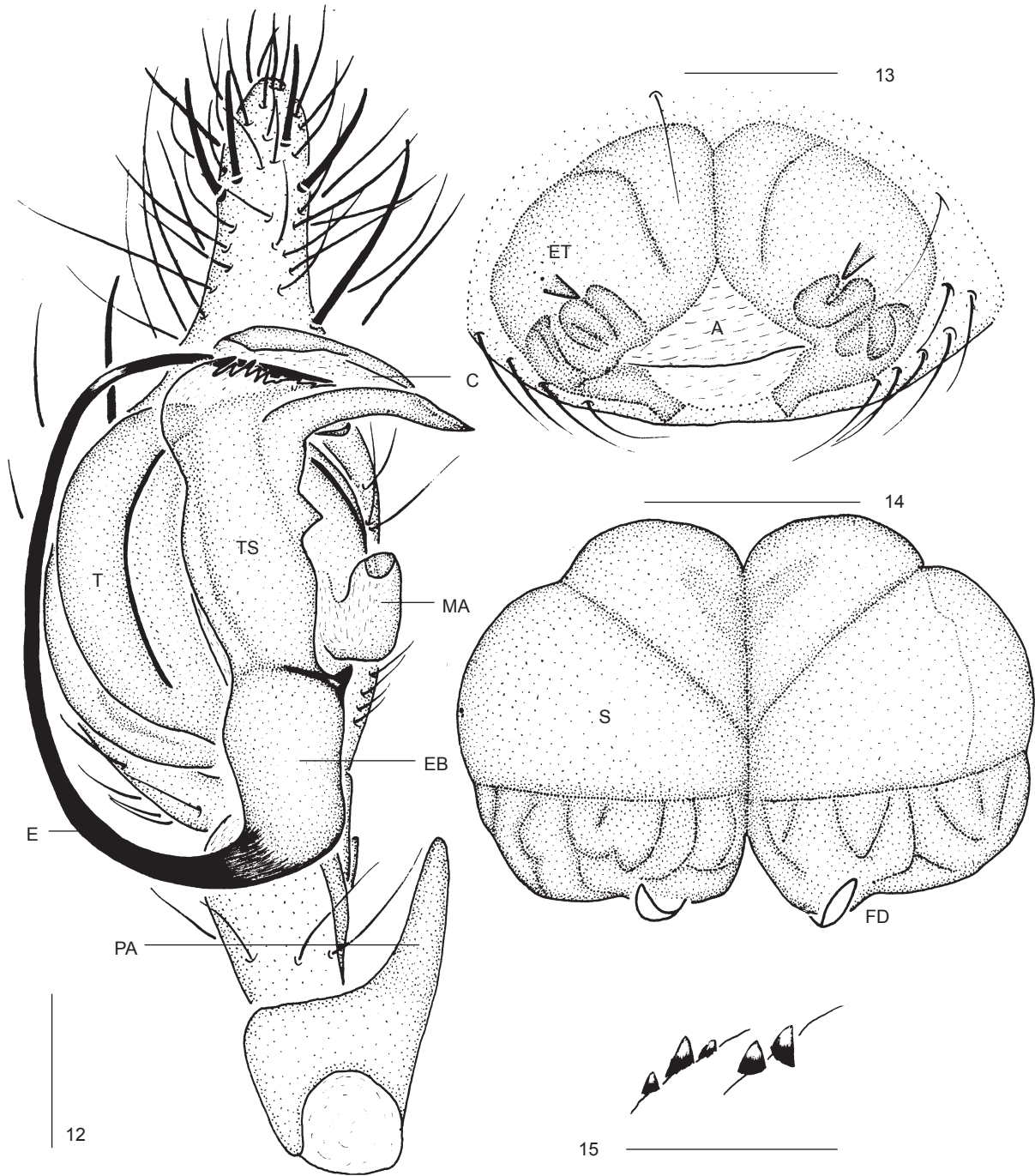


Figs. 10, 11. *Coelotes uncatatus* sp. nov. 10. Left palp, prolatateral view. 11. Same, retrolateral view.

from cave entrance), Dapo Village, Zhaile Town, Nayong Co., Guizhou Prov., China, 6 Apr. 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 2 ♂♂ and 4 ♀♀, same data as for holotype; 5 ♀♀, Daxiao Cave (27°05.549'N, 105°33.306'E; Elev, 1186 m; Temp, 15°C; RH,

88%) (1st specimen location about 1 m from cave entrance), Shiqiang Village, Xiaotun Town, Dafang Co., Guizhou Prov., China, 4 May 2007, Jie Liu and Yucheng Lin coll.; 2 ♀♀, Luoshui Cave (27°08.403'N, 105°35.829'E; Elev, 1565 m; Temp, 11°C; RH, 90%) (1st specimen location about 1 m from

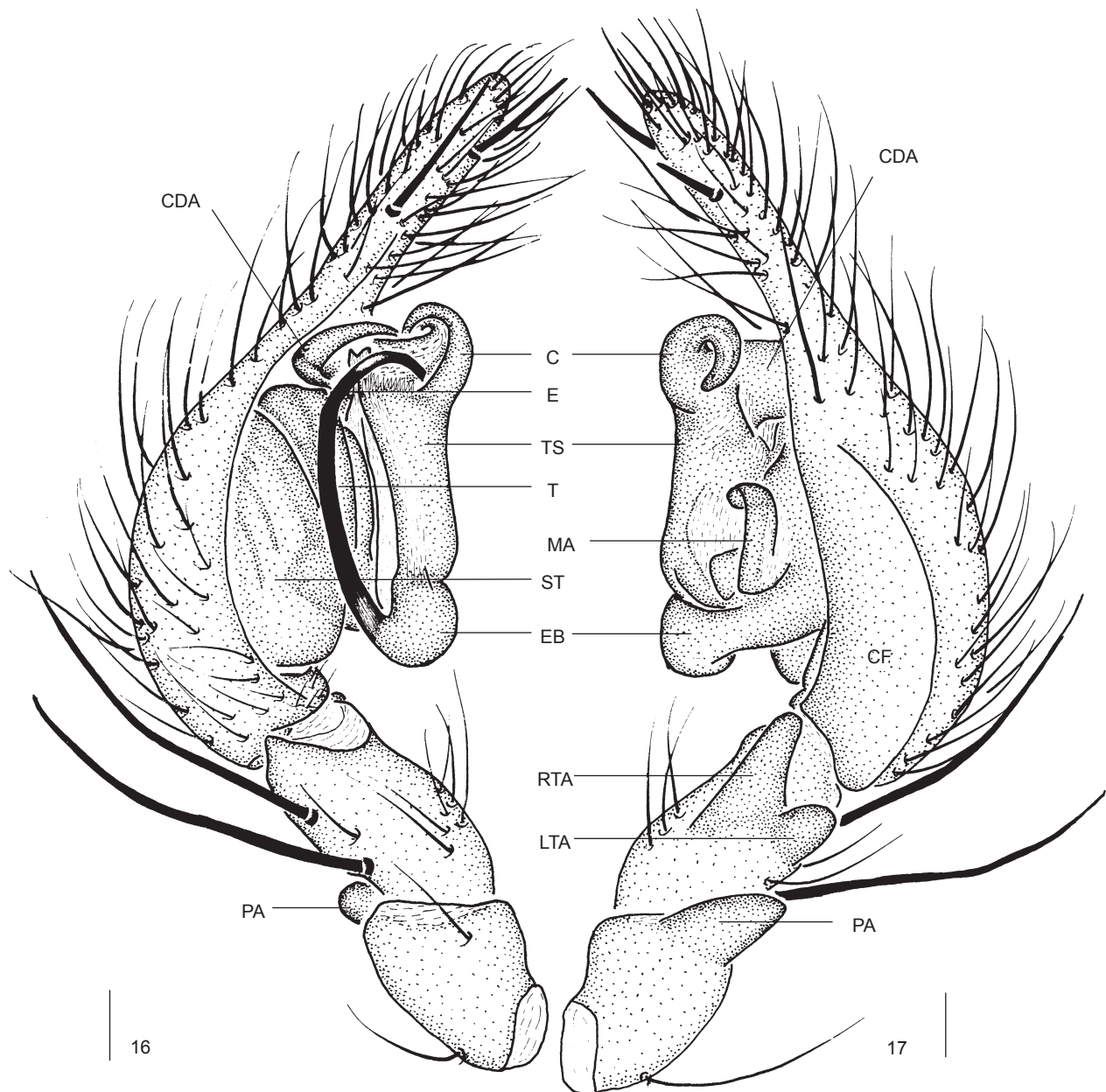


Figs. 12-15. *Coelotes uncutus* sp. nov. 12. Left palp, ventral view. 13. Epigynum, ventral view. 14. Vulva, dorsal view. 15. Male cheliceral teeth, ventral view.

cave entrance), Chengguan Town, Dafang Co., Guizhou Prov., China, 4 May 2007, Jie Liu and Yucheng Lin coll.; 4 ♀♀, Qingwa Cave (26°50.309'N, 105°30.325'E; Elev, 1420 m; Temp, 10°C; RH, 90%) (1st specimen location < 1 m from cave entrance), Chengguan Town, Nayong Co., Guizhou Prov., China, 27 Apr. 2007, Jie Liu and Yucheng Lin coll.; 2 ♂♂ and 1 ♀, Bailong Cave (26°50.166'N, 105°31.222'E; Elev, 1468 m; Temp, 12°C; RH, 90%) (1st specimen location < 1 m from cave entrance), Laowaba Town, Nayong

Co., Guizhou Prov., China, 27 Apr. 2007, Jie Liu and Yucheng Lin coll.; 1 ♂, Gao Cave (27°35.042'N, 106°14.119'E; Elev, 1123 m; Temp, 19°C; RH, 94%) (specimen location < 1 m from cave entrance), Lianming Village, Yankong Town, Jinsha Co., Guizhou Prov., China, 6 May 2007, Jie Liu and Yucheng Lin coll.

Etymology: The species epithet is derived from the Latin *cochleariformis*, meaning spoon-shaped, and refers to the shape of the distal conductor in ventral view.

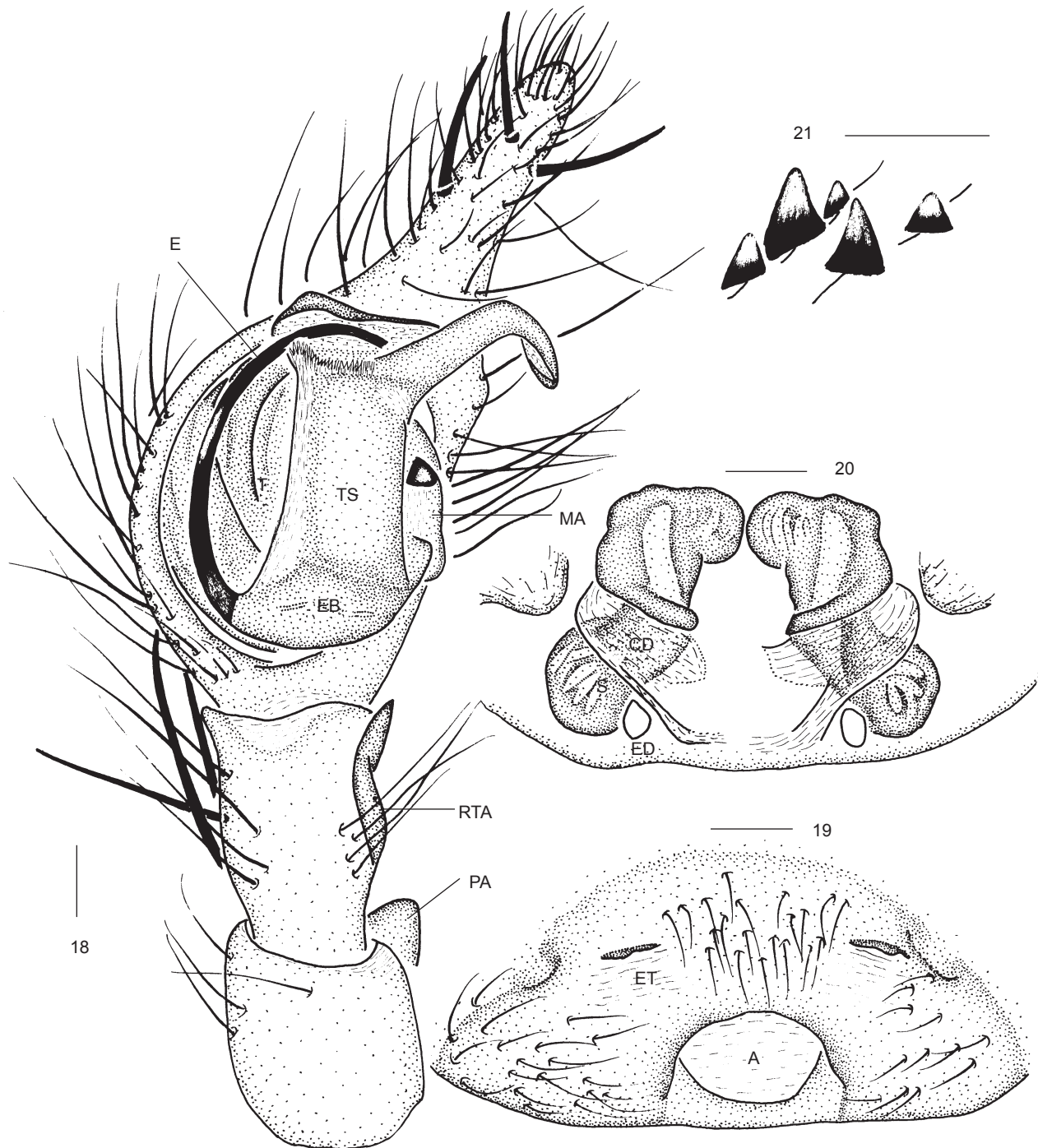


Figs. 16, 17. *Draconarius cochleariformis* sp. nov. 16. Left palp, prolateral view. 17. Same, retrolateral view.

Diagnosis: The male of this new species can be distinguished from other *Draconarius* species by the unique spoon-shaped distal conductor. The female is similar to *D. lini* sp. nov. in having a posteriorly situated atrium and widely separated spermathecal bases, but can be distinguished from

the latter by the anteriorly situated epigynal teeth, the relatively large copulatory ducts, and the large spermathecal heads (Figs. 17-20, 25, 26).

Male (holotype): Total length 8.65. Prosoma length 4.65, width 3.35; opisthosoma length 4.05, width 2.50. Eye measurements: AME 0.28; ALE



Figs. 18-21. *Draconarius cochleariformis* sp. nov. 18. Left palp, ventral view. 19. Epigynum, ventral view. 20. Vulva, dorsal view. 21. Male cheliceral teeth, ventral view.

0.20; PME 0.30; PLE 0.25; AME-AME 0.025; AME-ALE 0.025; ALE-PLE 0; PME-PME 0.10; PME-PLE 0.10. Clypeus height 0.08. Leg formula: IV, I, II, III; leg measurements: I: 16.70 (4.25, 5.70, 4.50, 2.25); II: 15.20 (4.00, 5.10, 4.05, 2.05); III: 14.15 (3.75, 4.50, 4.05, 1.85); IV: 17.95 (4.50, 5.80, 5.30, 2.35). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 21).

Male palp: Patellar apophysis relatively long (its length subequal to patellar width in retrolateral view), wide, and blunt; distal end of RTA not extending beyond tibia; lateral tibial apophysis large, situated close together with RTA; cymbial furrow about 1/2 cymbial length; conductor long, with a tube-shaped and spoon-shaped apex in ventral view; conductor dorsal apophysis large; median apophysis long, narrow, spoon-shaped, with a distinct apophysis at its base in retrolateral view; embolus filiform, moderately long, originating prolaterally (Figs. 16-18).

Female: Total length 9.75. Prosoma length 4.25, width 3.25; opisthosoma length 5.5, width 3.75. Eye measurements: AME 0.25; ALE 0.25; PME 0.30; PLE 0.30; AME-AME 0.03; AME-ALE 0.05; ALE-PLE 0; PME-PME 0.13; PME-PLE 0.13. Clypeus height 0.08. Leg formula: IV, I, II, III; leg measurements: I: 13.75 (3.50, 4.85, 3.50, 1.90); II: 12.60 (3.50, 4.20, 3.10, 1.80); III: 11.75 (3.25, 4.00, 2.85, 1.65); IV: 15.35 (4.00, 5.25, 4.25, 1.85). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth.

Female genitalia: Epigynal teeth small, situated anteriorly and laterally, widely separated; atrium small; copulatory ducts moderately long, originating posteriorly and looping around spermathecae; spermathecal heads large, situated anteriorly, almost close together; spermathecal bases broad, widely separated; spermathecal stalks broad, anteriorly extending and converging, close together anteriorly (Figs. 19, 20).

Distribution: China (Guizhou) (Fig. 37).

***Draconarius lini* sp. nov.**

(Figs. 22-27, 37)

Holotype male: Xiaogou Cave (25°03.447'N, 103°22.739'E; Elev, 1667 m; Temp, 12°C; RH, 90%) (1st specimen location < 1 m from cave entrance), Maitianhe Village, Jiuxiang Town, Yiliang Co., Yunnan Prov., China, 7 Apr. 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 4 ♂♂ and 7 ♀♀, same data as for holotype; 5 ♂♂ and 5 ♀♀, Xiaomoyu Cave (25°05.396'N, 102°35.697'E; Elev, 2160 m) (1st specimen location < 1 m from cave entrance), Tuanjie Town, Kunming City, Yunnan Prov., China, 1 Apr. 2007, Jie Liu and Yucheng Lin coll.; 1 ♂, Liujia Cave (27°12.977'N, 105°16.264'E; Elev, 1520 m; Temp, 14°C; RH, 93%) (specimen location < 1 m from cave entrance), Hetao Village, Yachi Town, Bijie City, Guizhou Prov., China, 1 May 2007, Jie Liu and Yucheng Lin coll.

Etymology: The species epithet is dedicated to Mr. Yucheng Lin for his kind help with cave collection; noun (family name) in apposition.

Diagnosis: According to the medially situated spermathecal heads and the short copulatory ducts that are situated mesad of the spermathecae, this new species should belong to the *venustus* group (Wang 2003). This new species is similar to *D. wudangensis* (Chen and Zhao 1997), but can be distinguished from it by the widely separated anterior spermathecae, small, laterally extending, looping copulatory ducts in the female, and by the broad patellar apophysis, the long RTA (> 1/2 tibial length), the large lateral tibial apophysis, and the different conductor (Figs. 23-26).

Male (holotype): Total length 8.80. Prosoma length 4.15, width 3.35; opisthosoma length 4.65, width 3.15. Eye measurements: AME 0.25; ALE 0.20; PME 0.28; PLE 0.25; AME-AME 0.05; AME-ALE 0.03; ALE-PLE 0; PME-PME 0.10; PME-PLE 0.11. Clypeus height 0.15. Leg formula: IV, I, II, III; leg measurements: I: 18.10 (4.60, 6.25, 4.75, 2.50); II: 16.25 (4.25, 5.65, 4.10, 2.25); III: 14.50 (4.00, 4.50, 4.25, 1.75); IV: 18.85 (4.85, 6.00, 5.65, 2.35). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 27).

Male palp: Patellar apophysis long, wide (its length slightly more than 1/2 patellar width in retrolateral view, width of its base subequal to its length), and blunt apex; distal end of RTA slightly extending beyond tibia, more than 1/2 tibial length; lateral tibial apophysis large (about 1/3 of RTA in lateral view), and situated close to RTA; cymbial furrow about 1/2 cymbial length; conductor short, with large basal lamella; dorsal apophysis present; median apophysis spoon-like, elongated; embolus filiform, long, originating prolaterally (Figs. 22-24).

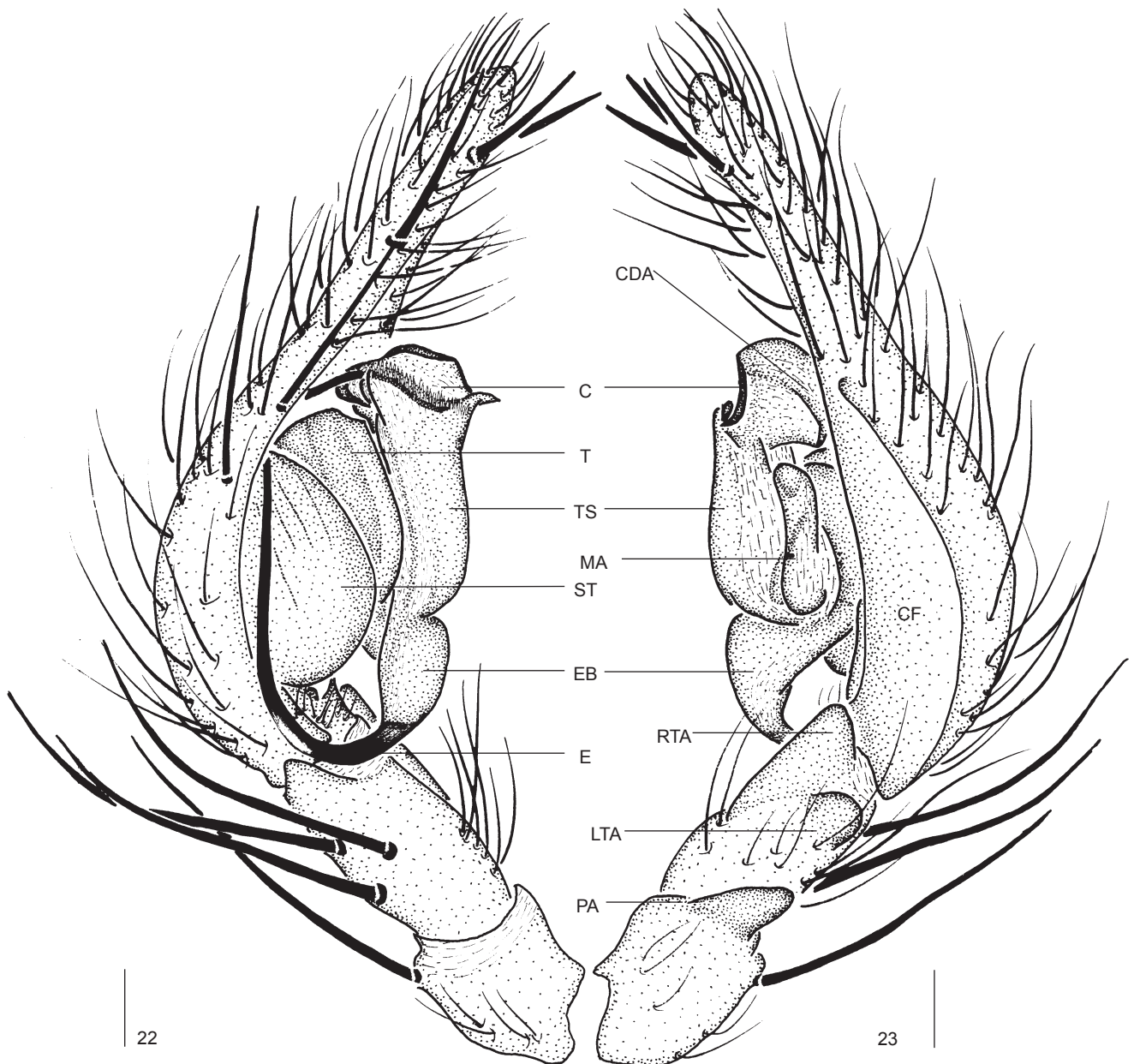
Female: Total length 10.75. Prosoma length 4.35, width 3.35; opisthosoma length 6.40, width 4.25. Eye measurements: AME 0.28; ALE 0.20; PME 0.28; PLE 0.20; AME-AME 0.05; AME-ALE 0.08; ALE-PLE 0; PME-PME 0.13; PME-PLE

0.15. Clypeus height 0.20. Leg formula: IV, I, II, III; leg measurements: I: 14.35 (4.00, 5.25, 3.70, 1.40); II: 13.45 (3.75, 4.50, 3.40, 1.80); III: 11.80 (3.25, 3.75, 3.20, 1.60); IV: 16.25 (4.25, 5.50, 4.50, 2.00). Abdomen with chevron pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth.

Female genitalia: Epigynal teeth small, with sharp distal end, widely separated; atrium

small, situated posteriorly near epigastric furrow; copulatory ducts small, originating posteriorly; spermathecal heads short, situated anteriorly; spermathecal bases widely separated, broad; spermathecal stalks broad, anteriorly extending and converging (Figs. 25, 26).

Distribution: China (Yunnan, Guizhou) (Fig. 37).



Figs. 22, 23. *Draconarius lini* sp. nov. 22. Left palp, prolateral view. 23. Same, retrolateral view.

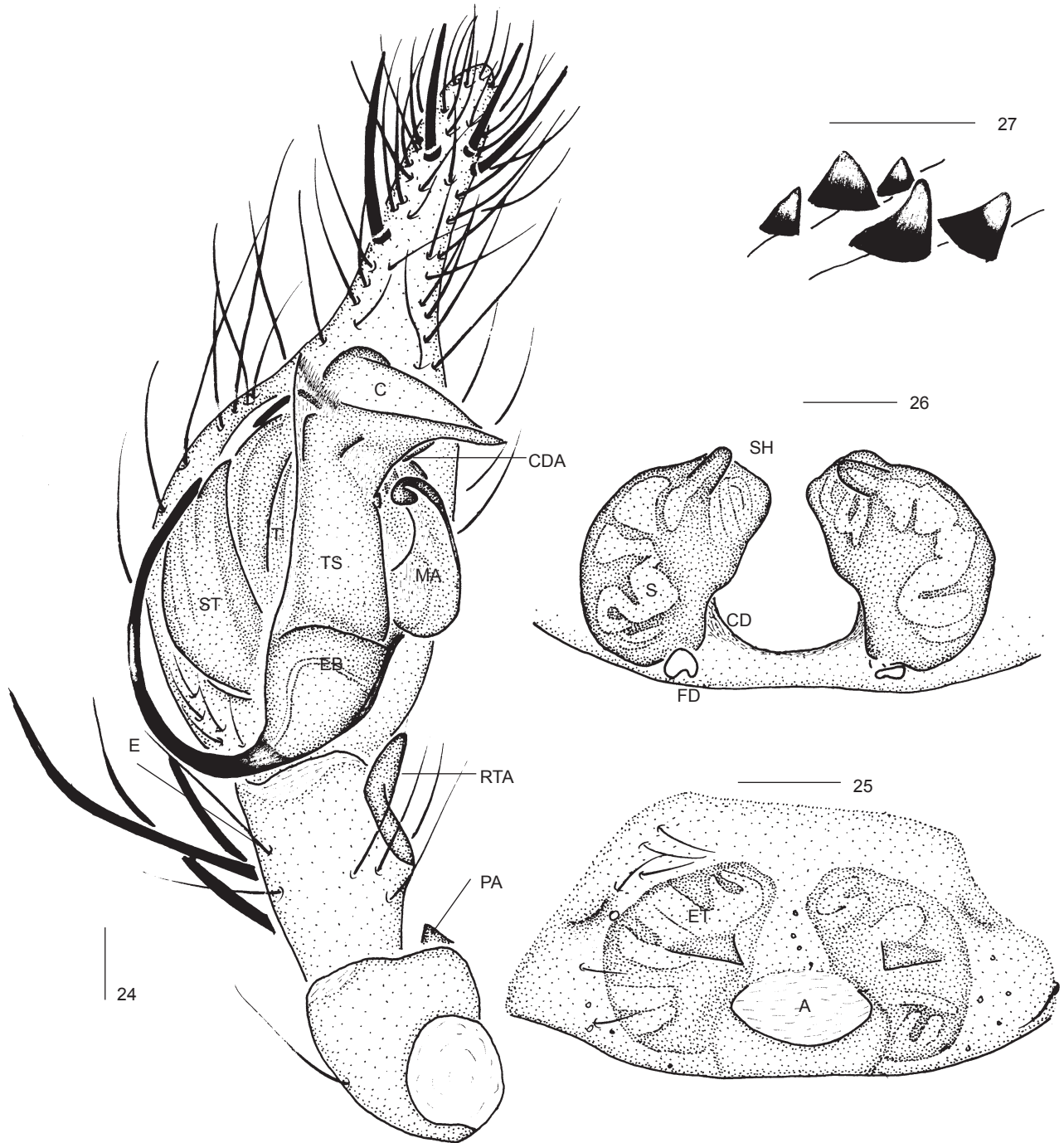
***Draconarius parallelus* sp. nov.**

(Figs. 28-30, 37)

Holotype female: Xiangshui Cave (27° 45.076'N, 108°35.218'E; Elev, 578 m; Temp, 16°C;

RH, 92%) (1st specimen location about 30 m from cave entrance), Jiaojiehe Village, Dewang Town, Jiangkou Co., Guizhou Prov., China, 17 May 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 3 juveniles, same data as for



Figs. 24-27. *Draconarius lini* sp. nov. 24. Left palp, ventral view. 25. Epigynum, ventral view. 26. Vulva, dorsal view. 27. Male cheliceral teeth, ventral view.

holotype.

Etymology: The species epithet is derived from the Latin *parallelus*, meaning parallel, and refers to the copulatory line paralleling the posterior margin of the atrium.

Diagnosis: This new species is similar to *D. semicircularis* sp. nov. in having simple and widely separated spermathecae, but can be distinguished from the latter by the short, mesially extended spermathecal heads and the absence of triangular copulatory ducts (Figs. 28, 29).

Female (holotype): Total length 7.75. Prosoma length 3.25, width 2.25; opisthosoma length 4.50, width 2.90. Eye measurements: AME 0; ALE 0.11; PME 0.11; PLE 0.11; AME-AME 0.08; AME-ALE 0.11; ALE-PLE 0.04; PME-PME 0.18; PME-PLE 0.08. Eyes white, AME not evident, tubercles of other 6 eyes reduced. Clypeus height 0.23. Leg formula: IV, I, II, III; leg measurements: I: 11.75 (3.15, 4.10, 2.65, 1.85); II: 11.10 (3.00, 3.50, 2.75, 1.85); III: 10.20 (2.70, 3.00, 2.85, 1.65); IV: 14.20 (3.60, 4.40, 4.10, 2.10). Abdomen pale, with small pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 30).

Female genitalia: Epigynal teeth small, with sharp end distally, widely separated, slightly anteriorly close to epigastric furrow; epigynal hoods indistinct; atrium small, occupying < 1/4 epigynum, situated posteriorly close to epigastric furrow; copulatory ducts moderately large, originating posteriorly; spermathecal heads short, situated anteriorly and extending mesially; spermathecae simple, widely separated (Figs. 28, 29).

Distribution: China (Guizhou) (Fig. 37).

Draconarius semicircularis sp. nov.

(Figs. 31-37)

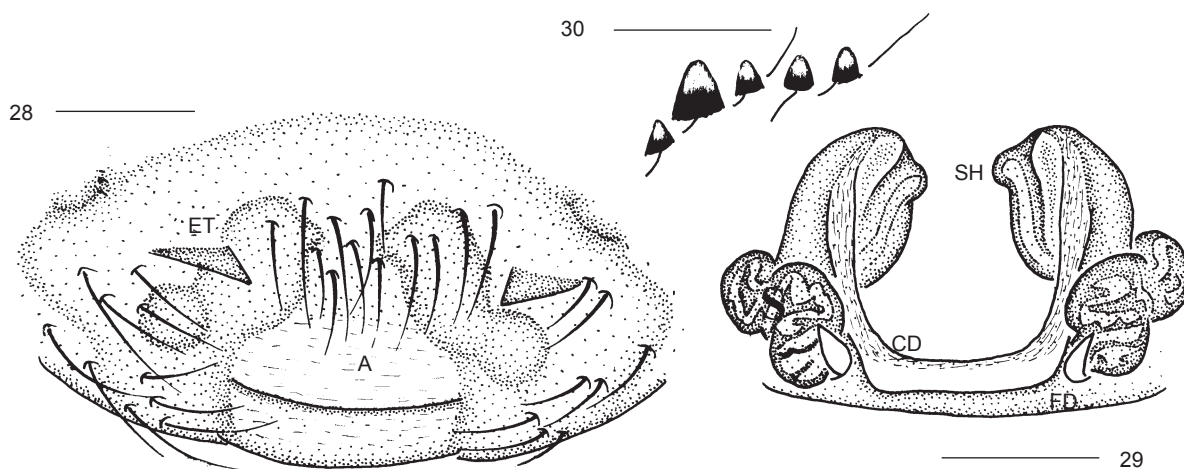
Holotype male: Dayu Cave (26°28.384'N, 106°25.542'E; Elev, 1270 m; Temp, 16°C; RH, 92%) (1st specimen location about 10 m from cave entrance), Jiangjunwan Village, Hongfeng Lake Scenic Spot, Qingzhen City, Guizhou Prov., China, 21 Apr. 2007, Jie Liu and Yucheng Lin coll.

Paratypes: 12 ♀♀, same data as for holotype; 20 ♀♀, Guanyin Cave (26°28.184'N, 106°25.527'E; Elev, 1253 m; Temp, 15°C; RH, 90%) (1st specimen location about 10 m from cave entrance), Jiangjunwan Village, Hongfeng Lake, Qingzhen City, Guizhou Prov., China, 21 Apr. 2007, Jie Liu and Yucheng Lin coll.

Etymology: The species epithet is derived from the Latin *semicircularis*, meaning semicircular, and refers to the semicircular shape of the conductor in ventral view.

Diagnosis: This new species can be distinguished from other *Draconarius* species by the uniquely long and semicircular conductor, the absence of a lateral tibial apophysis in the male, by the long reduced slit-shaped atrium, thin and long spermathecal heads, and 2 triangular copulatory ducts in the female (Figs. 32-35).

Male (holotype): Total length 6.00. Prosoma length 3.00, width 2.00; opisthosoma length 3.00, width 1.85. Eye measurements: AME 0.05; ALE 0.10; PME 0.10; PLE 0.10; AME-AME 0.03; AME-ALE 0.09; ALE-PLE 0.04; PME-PME 0.13; PME-PLE 0.14. Eyes white, AME strongly reduced, the



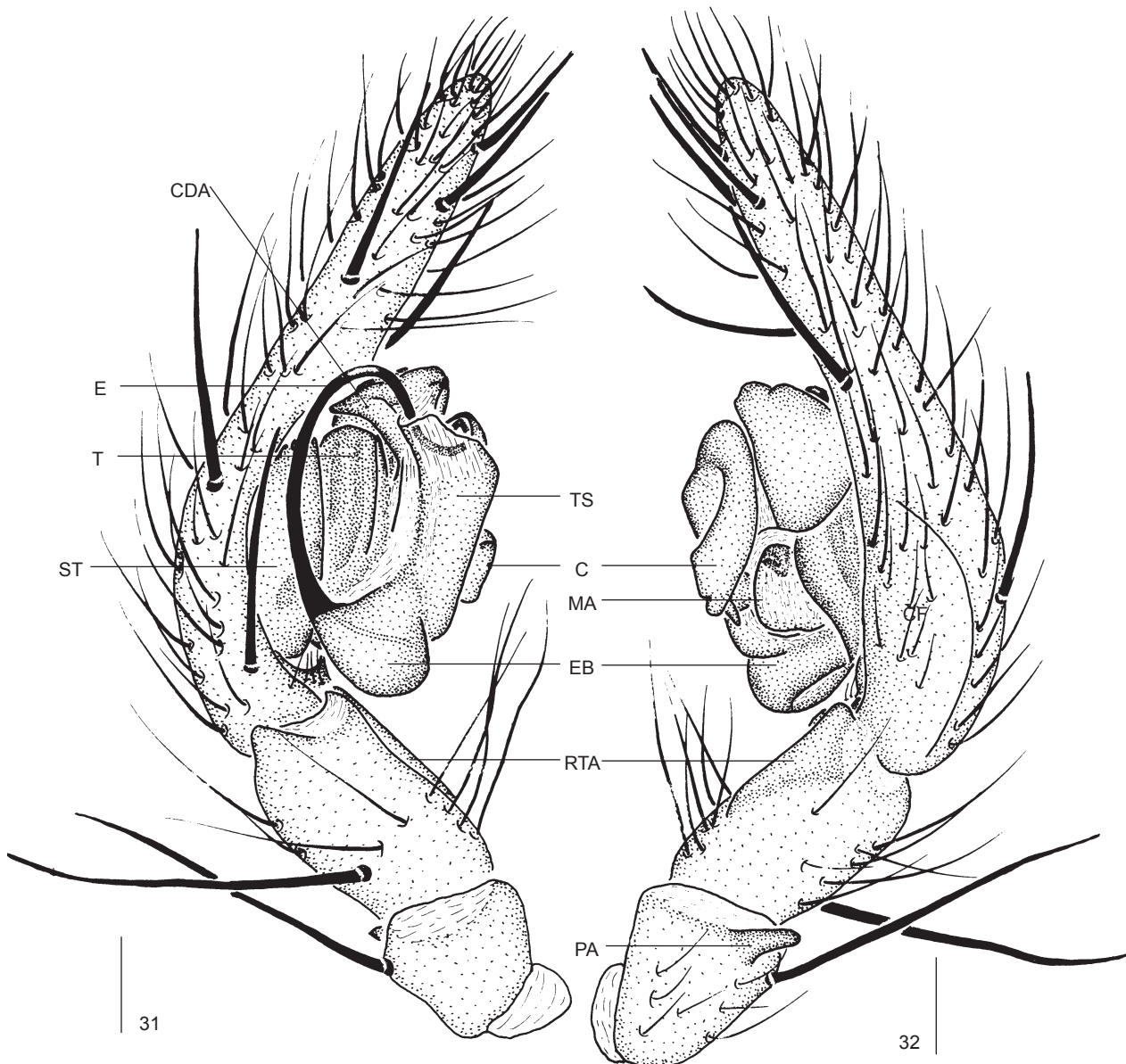
Figs. 28-30. *Draconarius parallelus* sp. nov. 28. Epigynum, ventral view. 29. Vulva, dorsal view. 30. Female cheliceral teeth, ventral view.

tubercles of other 6 eyes reduced. Clypeus height 0.25. Leg formula: IV, I, II, III; leg measurements: I: 13.45 (3.50, 4.40, 3.40, 2.15); II: 12.30 (3.25, 3.95, 3.10, 2.00); III: 11.65 (3.05, 3.50, 3.25, 1.85); IV: 15.40 (3.90, 4.75, 4.50, 2.25). Abdomen pale, without a pattern on dorsum. Chelicerae with 3 promarginal and 2 retromarginal teeth (Fig. 36).

Male palp: Patellar apophysis relatively short (its length < 1/2 patellar width in retrolateral view), and blunt distally; distal end of RTA slightly extending beyond tibia, longer than 1/2 tibial length; lateral tibial apophysis absent; cymbial

furrow about 1/3 cymbial length; conductor long, distal end extending over and covering median apophysis, semicircular in ventral view; dorsal apophysis present, with a sharp distal end; median apophysis spoon-like, elongated; embolus filiform, long, originating prolaterally (Figs. 31-33).

Female: Total length 8.40. Prosoma length 3.65, width 2.50; opisthosoma length 4.75, width 3.25. Eye measurements: AME 0.06; ALE 0.09; PME 0.11; PLE 0.14; AME-AME 0.01; AME-ALE 0.05; ALE-PLE 0.03; PME-PME 0.09; PME-PLE 0.10. Eyes white, AME strongly reduced, tubercles

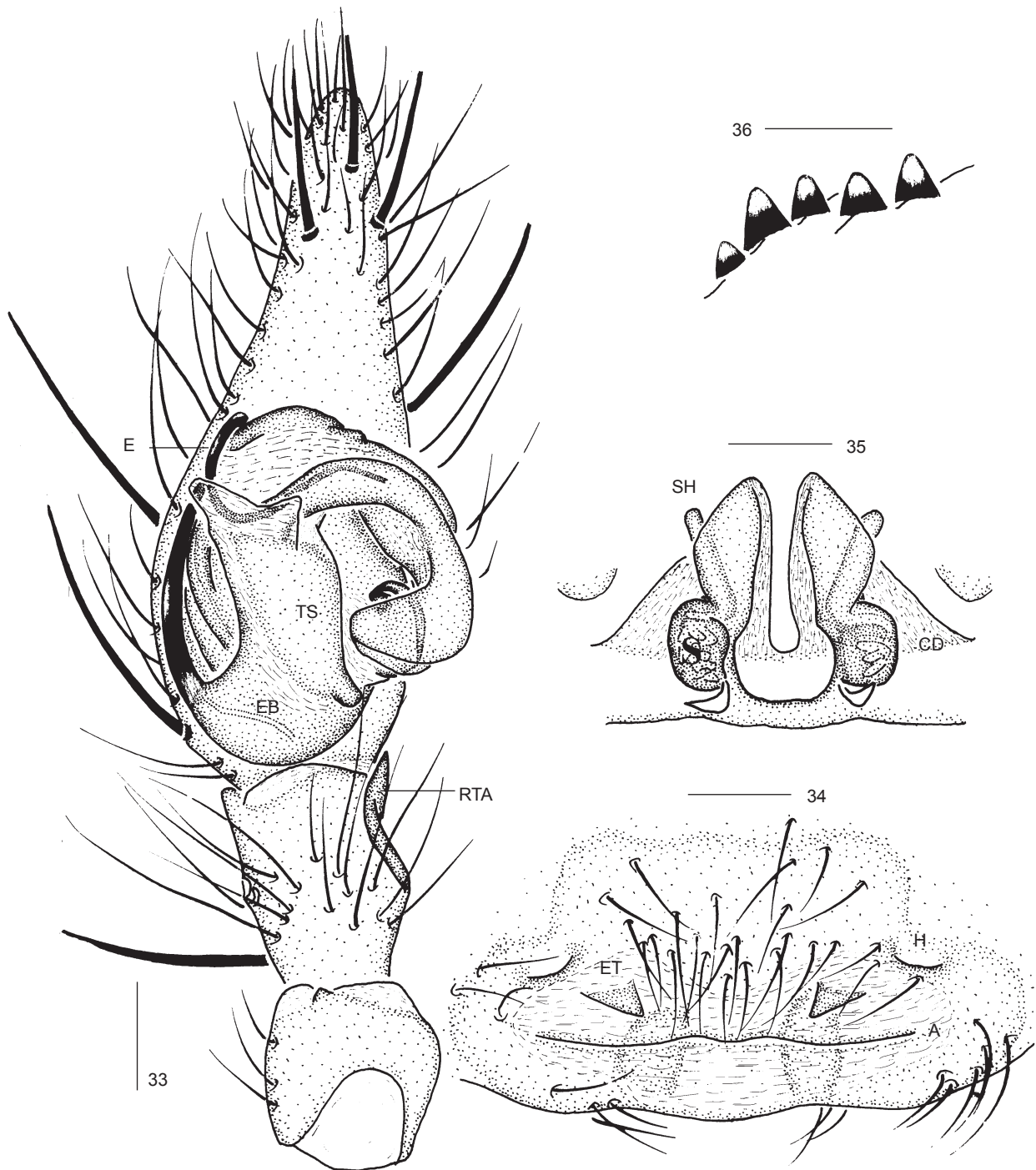


Figs. 31, 32. *Draconarius semicircularis* sp. nov. 31. Left palp, prolateral view. 32. Same, retrolateral view.

of other 6 eyes reduced. Clypeus height 0.13. Leg formula: IV, I, II, III; leg measurements: I: 13.55 (3.65, 4.60, 3.20, 2.10); II: 12.45 (3.45, 4.00, 3.00, 2.00); III: 11.95 (3.20, 3.70, 3.25, 1.80); IV: 15.80 (4.00, 5.00, 4.65, 2.15). Abdomen pale, without pattern on dorsum. Chelicerae with 3 promarginal

and 2 retromarginal teeth (Fig. 36).

Female genitalia: Epigynal teeth small, with sharp distal end, widely separated, mesially close to epigastric furrow; epigynal hoods distinct, situated laterally and slightly anteriorly close to epigastric furrow; atrium reduced to a long slit,



Figs. 33-36. *Draconarius semicircularis* sp. nov. 33. Left palp, ventral view. 34. Epigynum, ventral view. 35. Vulva, dorsal view. 36. Male cheliceral teeth, ventral view.

situated posteriorly close to epigastric furrow; copulatory ducts large, like 2 triangles, originating posteriorly; spermathecal heads long, most parts covered by copulatory ducts, situated anteriorly on spermathecae and extending oppositely; spermathecae simple, widely separated (Figs. 34, 35).

Distribution: China (Guizhou) (Fig. 37).

DISCUSSION

Based on classifications by Vandel (1965) and Howarth (1983), cave fauna (cavernicoles) include 1) troglobites, which are obligate cave species strictly adapted to subterranean habitats and unable to survive outside them; 2) trogliphiles, which are facultative cavernicoles that commonly live and reproduce in caves, but are not totally confined to them; 3) troglloxenes, or occasional cavernicoles that regularly inhabit caves, but need

to return to the surface for part of their lifecycle (e.g., to feed or breed); and 4) accidentals, or surface animals that wander, fall or are washed into caves, but can not survive there over the long term.

Coelotine spiders are among the dominant spider species in most caves in China, but only some of them are troglobitic and have reduced or absent eyes and reduced pigmentation. At present, 6 coelotine spiders collected from the Yunnan-Guizhou Plateau are known to be true troglobites, including *D. yosiianus* (Nishikawa 1999), *D. auriformis* Xu and Li, 2007; *D. brachialis* Xu and Li, 2007; *D. tongji* Xu and Li, 2007; *D. ovillus* Xu and Li, 2007; *D. spirallus* Xu and Li, 2007 (Xu and Li 2007), as well as *C. degeneratus* sp. nov., *D. parallelus* sp. nov., and *D. semicircularis* sp. nov. Given the small sizes of the populations of troglobitic spiders, the relatively isolated habitats, and the difficulty in observing the ethology of these species, little is known of their ecology, preferred

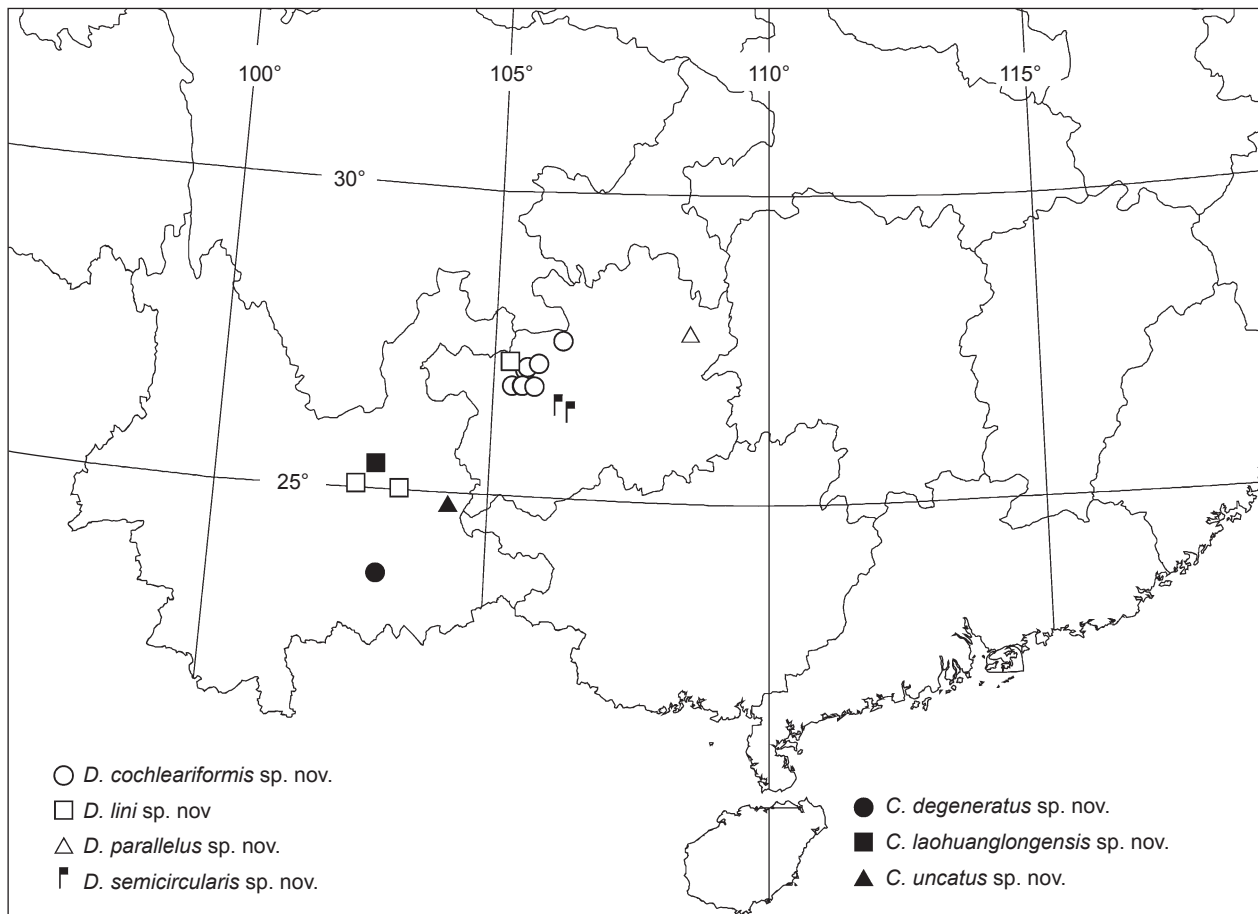


Fig. 37. Collection localities of 7 new coelotine spiders.

habitats, breeding, and ontogeny.

The Yunnan-Guizhou Plateau is located in the center of the East-Asian Karst area, one of the 3 largest karst areas in the world, where the karst topography has developed most completely and typically. Many caves, underground rivers, stone roots, stalagmites, and other odd topography formations are found in this area, but the study on cave biota is still limited. However, the study on cave biota is particularly important because of the development pressures which these caves face. More surveys should be carried out before these caves are destroyed. It is expected that more troglobitic coelotine spiders will be found in the near future.

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