

SUPPLEMENTARY MATERIAL

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MORPHOLOGICAL DATA Locations of specimens sampled in this study see Table S1. Morphological specimens were preserved in 75% ethanol. Female genitalia were cleared in a trypsin enzyme solution to dissolve non-chitinous tissue. Specimens were examined under a LEICA M205C stereomicroscope. All photomicrographs were taken with an Olympus C7070 zoom digital camera (7.1 megapixels). Photos were stacked with Helicon Focus 6.7.1 (Khmelik et al. 2006) and processed in Adobe Photoshop CC 2018. All measurements are given in millimeters (mm). Eye sizes are given as the maximum diameter from either the dorsal or frontal view. Leg measurements are as follows: total length (femur, patella+tibia, metatarsus, tarsus). All specimens are housed in the Institute of Zoology, Chinese Academy of Sciences (IZCAS) in Beijing, China.

The terminology used in the text and the figure legends follows Lin and Li (2020), see Fig. S1. All measurements are in millimeters. Eye sizes are measured as the maximum diameter from either the dorsal or frontal view. Leg measurements are given as follows: total length (femur, patella+tibia, metatarsus, tarsus). Distribution maps were generated using ArcMap software 10.2 (ESRI 2002).

Abbreviations: **ALE** anterior lateral eyes, **AME** anterior median eyes, **C** conductor, **DS** dorsal spermatheca, **E** embolus, **EB** embolus base, **PLE** posterior lateral eyes, **PME** posterior median eyes, **SD** sperm duct, **SL** semicircular lobe, **TA** tegular apophysis, **TS** thickened seta, **VS** ventral spermatheca.

PHYLOGENETIC STUDY

Specimens were preserved immediately upon collection in 95% EtOH. We extracted genomic DNA from leg tissue for each individual using a TIANamp Genomic DNA Kit (TIANGEN Inc., Beijing, China) following the manufacturer's protocol. All genomic DNA was diluted to a concentration of 10 ng/ul with 1X TE and stored at -20°C before PCR amplification.

The 6 markers we used in addition to COX1 are: 2 mitochondrial gene fragments (COX2 and COX3), 2 nuclear protein-coding loci (ANKRD50 and MOGS) and 2 nuclear rDNA genes (18S and 28S). All primers used to amplify gene fragments are listed in Supplementary Table S1. The seven gene fragments were amplified for 505 individuals. The PCR products were purified using commercial kits, and the double-stranded product was sequenced by Tianyihuiyuan, Beijing, China. Protein coding genes were examined to ensure there were not any stop codons. All sequences were aligned using CLUSTALW in MEGA v. 6.06 (Tamura et al., 2013) and edited by eye. Phylogenetic reconstruction of individual samples was performed using IQTree v1.5.5 (Nguyen et al., 2015) for fast ML analyses and MrBayes 3.1.2 (Ronquist and Huelsenbeck 2003) for Bayesian inference. Nodal support was evaluated with 5,000 ultrafast bootstraps for ML analyses, and the posterior probabilities (PP) were calculated using four independent Markov chains run for 10,000,000 Metropolis-coupled MCMC generations, with tree sampling every 1000 generations and a burn-in of 25%. We used COX1 sequences from NCBI for the outgroups, *Hypochilus bernardino* (Accession: AF303524.1) and *H. petrunkevitchi* (Accession: AF303523.1). A total of 6600 base pairs were aligned for seven gene fragments; 1,724 bp from 18S, 825 bp from 28S, 881 bp from COX1, 797 bp from COX2, 826 bp from COX3, 785 bp from ANKRD50 and 762 bp from MOGS. Our newly generated sequence data are available in NEXUS format at Figshare (DOI: 10.6084/m9.figshare.14829459). PartitionFinder (Lanfear et al., 2012) was used to select partitioning schemes and the best-fit models of evolution and suggested one partition for each gene.

Taxonomy

Family Hypochilidae Marx, 1888

Genus *Ectatosticta* Simon, 1892

Type species. *Hypochilus davidi* Simon, 1889 from China.

Diagnosis. *Ectatosticta* Simon, 1892 can be easily distinguished from *Hypochilus* Marx, 1888 by the rectangular labium which is almost as long as wide and bears a pair of triangular posterolateral flanges, numerous leg spines, and in the lateral view of the male palp, the cymbium to bulb length ratio is almost 3:1 but nearly 1:1 in *Hypochilus*.

Species composition. With the new species and synonyms reported in this paper there are 16 *Ectatosticta* species are known from China. New synonyms are proposed based on molecular analysis and morphological evidence, and include *E. nyingchiensis* Wang et al., 2021 syn. nov. as a junior synonym of *E. dapeng* Lin & S. Li, 2021, and *E. pingwuensis* Wang et al., 2021 syn. nov. and *E. songpanensis* Wang et al., 2021 syn. nov. as junior synonyms of *E. rulai* Lin & S. Li, 2021.

1. *Ectatosticta dapeng* Lin & S. Li, 2021

Ectatosticta dapeng Lin & S. Li, 2021: 5, f. 2A–C, 5B, 7C–D.

Ectatosticta nyingchiensis Wang et al., 2021: 531, f. 8A–C, 15D, 16D, 17E **syn. nov.**

Comments. Types of *E. dapeng* collected from China, Tibet, Nyingchi, Gongbo'gyamda County, Jiarelongba, examined. Type of *E. nyingchiensis* collected from China, Tibet, Nyingchi, Lulang Town, not examined. The straight-line distance between the type localities of *E. nyingchiensis* syn. nov. and the nearest locality of *E. dapeng* (Yongdabu) is 71 km. New synonym is proposed based on morphological description and molecular analyses.

2. *Ectatosticta rulai* Lin & S. Li, 2021

Ectatosticta rulai Lin & S. Li, 2021: 6, f. 3A–C, 6A, 7E–F; Wang et al., 2021: 533, f. 2A–C, 10A–C, 15F–G, 16F–G, 18A.

Ectatosticta pingwuensis Wang et al., 2021: 532, f. 3A, 9A–C, 15E, 16E, 17F **syn. nov.**

Ectatosticta songpanensis Wang et al., 2021: 535, f. 3D–F, 12A–C, 15I, 16I, 18C **syn. nov.**

Comments. Types of *E. rulai* collected from China, Sichuan, Aba, Jiuzhaigou Country, Shuzheng, examined. Type of *E. pingwuensis* collected from China, Sichuan, Pingwu County, not examined. Type of *Ectatosticta songpanensis* collected from China, Sichuan, Songpan County, Shanba Township, and Chuanzhusi Town, not examined. The straight-line distance between *E. songpanensis* syn. nov. and the nearest locality of *E. rulai* (Jiuzhaigou) is 47 km; between *E. pingwuensis* syn. nov. and the nearest locality of *E. rulai* (Motianling) is 44 km. New synonyms are proposed based on morphological description and molecular analyses.

Identification keys

Key to *Ectatosticta* males

- 1 Palp with 5–7 thickened setae retrolaterally on the cymbium (Fig. S2A) *E. davidi*
– Palp with fewer than 5 thickened setae retrolaterally on the cymbium (Fig. S2B) **2**
2 Palp with 4 thickened setae retrolaterally on the cymbium (Fig. S2E) **3**

–Palp with 2–3 thickened setae retrolaterally on the cymbium (Fig. S2F)	8
3 Semicircular lobe present (Fig. S2G)	4
– Semicircular lobe absent (Fig. S2H)	<i>E. dapeng</i>
4 The length ratio of the embolus base to the embolus is 1:1 or less (Fig. S2I)	5
– The length ratio of the embolus base to the embolus is greater than 1:1 (Fig. S2J)	6
5 The length ratio of the embolus base to the embolus is 1:1 (Fig. S2I)	<i>E. baixiang sp. nov.</i>
– The length ratio of the embolus base to the embolus is 1:2 (Fig. S5B)	<i>E. qingshi sp. nov.</i>
6 The length ratio of the embolus base to the embolus is 3:2 (Fig. S2K)	<i>E. yukuni</i>
– The length ratio of the embolus base to the embolus is greater than 3:2 (Fig. S2J)	7
7 The angle of the tegular apophysis tip is greater than 90° (Fig. S2L).....	<i>E. deltshevi</i>
– The angle of the tegular apophysis tip is less than 90° (Fig. S2M)	<i>E. rulai</i>
8 Semicircular lobe close to the large lobe (Fig. S2N)	9
– Semicircular lobe distant from the large lobe (Fig. S2O)	11
9 Palp with 2 thickened setae retrolaterally on the cymbium (Fig. S2N)	<i>E. wenshu sp. nov.</i>
– Palp with 3 thickened setae retrolaterally on the cymbium	10
10 On the large lobe, the dorsalmost thickened seta dispersed (Fig. S2P).....	<i>E. bajie</i>
– On the large lobe, the thickened setae appressed to one another (Fig. S2Q)...	<i>E. shaseng sp. nov.</i>
11 On the large lobe, the thickened setae appressed to one another (Fig. S2P)	<i>E. wukong</i>
– On the large lobe, the dorsalmost thickened seta dispersed (Fig. S2Q).....	<i>E. puxian sp. nov.</i>

Key to *Ectatosticta* females

1 One pair of conspicuous spermathecae (Fig. S3A).	2
– Two pairs of spermathecae (Fig. S3B)	4
2 Base of the spermathecae unexpanded (Fig. S3A)	<i>E. wukong</i>
– Base of the spermathecae expanded or with an apophysis (Fig. S3C, D)	3
3 Base of the spermathecae with an apophysis (Fig. S3C)	<i>E. rulai</i>
– Base of the spermathecae expanded (Fig. S3D)	<i>E. puxian sp. nov.</i>
4 Dorsal spermathecae weakly sclerotised compared to ventral spermathecae (Fig. S3E)	5
– Dorsal and ventral spermathecae with the same amount of sclerotisation (Fig. S3F)	6
5 The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:4 (Fig. S3G)	<i>E. baima sp. nov.</i>
– The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:1	<i>E. shaseng sp. nov.</i>
6 Base of the spermathecae expanded (Fig. S3H)	<i>E. baixiang sp. nov.</i>
– Base of the spermathecae unexpanded (Fig. S3I)	7
7 The ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:1 (Fig. S3I)	8
– The ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:2 (Fig. S3J)	10
8 The ventral spermathecae are expanded medially (Fig. S3L).....	<i>E. wenshu sp. nov.</i>
– No expansion along the length of the ventral spermathecae (Fig. S3K)	9
9 Dorsal and ventral spermathecae strongly sclerotised (Fig. S3F)	<i>E. bajie</i>
– Dorsal and ventral spermathecae weakly sclerotised (Fig. S20).....	<i>E. qingshi sp. nov.</i>
10 Terminus of ventral spermathecae expanded (Fig. S3M)	<i>E. dapeng</i>

– Terminus of ventral spermathecae unexpanded (Fig. S3L)	11
11 Spermathecae curved ventrally (Fig. S3N)	<i>E. helii</i> sp. nov.
– Spermathecae curved laterally (Fig. S3O)	12
12 The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:1 (Fig. S3P)	<i>E. davidi</i>
– The ratio of the length of the ventral spermathecae to the dorsal spermathecae is less than 1:1	13
13 The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 4:5 (Fig. S3Q)	<i>E. deltshevi</i>
– The ratio of the length of the ventral spermathecae to the dorsal spermathecae is less than 4:5	14
14 The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:3 (Fig. S3S)	<i>E. xuanzang</i>
– The ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:6	<i>E. yukuni</i>

***Ectatosticta baima* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:85C4A158-8768-4CCB-A54C-24CA82229B7C

Figs S13

Holotype. ♀ (Ar42488), China, Sichuan Province, Aba Tibetan and Qiang Autonomous Prefecture, Heishui County, Kalong Village, Kalonggou, 32.4022°N, 103.3283°E, elevation ca. 3102 m, 01.VII.2020, Y. Lin & Z. Wang leg. **Paratypes.** 2♀ (Ar42489–Ar42490), same data as holotype.

Etymology. The species is named after Baima, a character in the classic Chinese novel *Journey to the West*, noun in apposition.

Diagnosis. Females of *E. baima* sp. nov. are similar to *E. shaseng* sp. nov. in having two pairs of laterally curved spermathecae, the dorsal spermathecae are weakly sclerotised compared to the ventral spermathecae, and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:1. However, this new species can be distinguished from other species by the unexpanded base of the dorsal spermathecae (*vs.* expanded in *E. shaseng* sp. nov.) and the ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:4 (*vs.* 1:1 in *E. shaseng* sp. nov.).

Description. Female (Holotype): Total length 9.20, carapace 4.32 long, 2.91 wide, opisthosoma 5.18 long, 3.81 wide. Eye sizes and interdistances: AME 0.18, ALE 0.34, PME 0.28, PLE 0.26; AME–AME 0.10, AME–ALE 0.24, PME–PME 0.34, PME–PLE 0.16, AME–PME 0.04, ALE–PLE 0.10. Clypeus height 0.42. Chelicerae with 8 promarginal and 5 retromarginal teeth. Leg measurements: Leg I: 32.55 (9.82 + 10.83 + 7.34 + 4.56), leg II: 26.12 (6.82 + 9.26 + 5.80 + 4.24), leg III: 20.05 (6.16 + 6.04 + 4.89 + 2.96), leg IV: 24.85 (8.17 + 7.81 + 5.33 + 3.54). Leg formula: 1243.

Female genitalia (Fig. S13) simple, with two pairs of spermathecae, dorsal spermathecae short, triangular, ventral spermathecae slightly curved. The length ratio of the ventral spermathecae to the dorsal spermathecae is 1:4.

Distribution. Known only from the type locality.

***Ectatosticta baixiang* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:6D52EA91-9028-4ACC-8E33-6A2061FC1A75

Figs S4, S7, S10, S14

Holotype. ♂ (Ar42491), China, Yunnan Province, Diqing Tibetan Autonomous Prefecture, Shangrila City to Deqin County, Tongduishui, 28.2989°N, 99.1487°E, elevation ca. 3309 m, 17.IX.2020, Z. Chen leg. **Paratypes.** 2♂4♀ (Ar42492–Ar42495, Ar42498–Ar42499), same data as holotype.

Etymology. The species is named after Baixiang, a character in the great classic Chinese novel *Journey to the West*, noun in apposition.

Diagnosis. Males of *E. baixiang* sp. nov. are similar to *E. bajie* and *E. davidi* in that the semicircular lobe is close to the large lobe, and the length ratio of the embolus base to the embolus is 1:1. However, this new species can be distinguished by having 4 thickened setae retrolaterally on the cymbium (vs. 3 in *E. bajie* and 5–7 in *E. davidi*); on the large lobe, the thickened setae are appressed to one another (vs. the dorsalmost thickened seta is dispersed in *E. bajie* and *E. davidi*), and the conductor is straight dorsally (vs. curved in *E. bajie* and *E. davidi*). Females of *E. baixiang* sp. nov. are similar to *E. deltshevi* in having two pairs of laterally curved spermathecae, the dorsal spermathecae have the same amount of sclerotisation as the ventral spermathecae, and the ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 4:5. However, this new species can be distinguished by the expanded base of the dorsal spermathecae (vs. unexpanded in *E. deltshevi*) and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 2:3 (vs. 1:2 in *E. deltshevi*).

Description. Male (Holotype): Total length 10.51, carapace 4.65 long, 3.19 wide, opisthosoma 5.30 long, 2.90 wide. Eye sizes and interdistances: AME 0.16, ALE 0.17, PME 0.20, PLE 0.24, AME–AME 0.07, AME–ALE 0.24, PME–PME 0.27, PME–PLE 0.14, AME–PME 0.04, ALE–PLE 0.08. Clypeus height 0.52. Chelicerae with 8 promarginal and 5 retromarginal teeth. Leg measurements: leg I: 43.14 (11.41 + 13.33 + 11.28 + 7.12), leg II: 34.62 (9.36 + 11.03 + 8.91 + 5.32), leg III: 26.96 (7.95 + 8.65 + 6.60 + 3.76), leg IV: 33.55 (10.32 + 10.06 + 8.97 + 4.20). Leg formula: 1243.

Male palp (S4, S7, S10) simple, cymbium long, retrolaterally with an apophysis. Apophysis with setae rather than a semicircular small lobe, and a large lobe with four strong setae appressed to one another. Embolus thin, length ratio of embolus to embolus base is nearly 1:1. Conductor sickle shaped.

Female (Paratype): Total length 11.35, carapace 5.51 long, 3.48 wide, opisthosoma 6.41 long, 6.28 wide. Eye sizes and interdistances: AME 0.20, ALE 0.26, PME 0.26, PLE 0.28, AME–AME 0.10, AME–ALE 0.28, PME–PME 0.32, PME–PLE 0.19, AME–PME 0.05, ALE–PLE 0.05. Clypeus height 0.42. Chelicerae with 8 promarginal and 8 retromarginal teeth. Leg measurements: Leg I: 31.84 (8.78 + 10.96 + 7.65 + 4.45), leg II: 28.31 (8.40 + 9.49 + 6.22 + 4.20), leg III: 21.60 (6.28 + 7.24 + 5.20 + 2.88), leg IV: 26.96 (8.46 + 8.14 + 6.60 + 3.76). Leg formula: 1243.

Female genitalia (Fig. S14) simple, with two pairs of spermathecae. Ventral spermathecae curved. Dorsal spermathecae well-developed, curved, the ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 4:5.

Distribution. Known only from the type locality.

***Ectatosticta helii* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:532275A0-04E2-4C55-8655-AE60A5AD7E90

Figs S15, S20A, B

Holotype. ♀ (Ar42500), China, Sichuan Province, Mianyang City, Jiangyou City, Shuizhulin, Peng Cave, 31.8957°N, 104.6250°E, elevation ca. 1794 m, 03.VII.2020, Y. Lin & Z. Wang leg.

Paratypes. 2♀ (Ar42451–Ar42452), same data as holotype.

Etymology. The species is dedicated to Mr. Li He who first observed the species. We use the Chinese format “He + Li” (family name + first name) for this name; a noun (name) in genitive case.

Diagnosis. Females of *E. helii* sp. nov. are similar to *E. davidi* and *E. shaseng* sp. nov. in having two pairs of spermathecae, the amount of sclerotisation of the dorsal and ventral spermathecae is the same, the ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:1, and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:1. However, this new species can be distinguished by the ventrally curved spermathecae (*vs.* laterally curved in *E. davidi* and *E. shaseng* sp. nov.) and the unexpanded base of the dorsal spermathecae (*vs.* expanded in *E. shaseng* sp. nov.).

Description. Female (Holotype): Total length 11.86, carapace 5.38 long, 3.60 wide, opisthosoma 6.67 long, 4.70 wide. Eye sizes and interdistances: AME 0.12, ALE 0.25, PME 0.24, PLE 0.30, AME–AME 0.14, AME–ALE 0.29, PME–PME 0.32, PME–PLE 0.17, AME–PME 0.11, ALE–PLE 0.03. Clypeus height 0.16. Chelicerae with 7 promarginal and 7 retromarginal teeth. Leg measurements: Leg I: 50.20 (14.55 + 16.54 + 12.44 + 6.67), leg II: 44.80 (13.08 + 14.29 + 11.28 + 6.15), leg III: 33.91 (10.38 + 11.22 + 8.27 + 4.04), leg IV: 41.67 (12.50 + 13.53 + 10.58 + 5.06). Leg formula: 1243.

Female genitalia (Fig. S15) simple, with two pairs of spermathecae. Both ventral and dorsal spermathecae well-developed and curved ventrally. The length ratio of the ventral spermathecae to the dorsal spermathecae is 1:1.

Distribution. Known only from the type locality.

***Ectatosticta puxian* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:178BC945-4596-419C-975C-CE6B724D2B2B

Figs S5, S8, S11, S16, S20E, F

Holotype. ♂ (Ar42468), China, Sichuan Province, Aba Zang and Qiang Autonomous Prefecture, Xiaojin County, Siguniang Mountain, Changpinggou, 31.0552°N, 102.8737°E, elevation ca. 3530 m, 29.VI.2020, Y. Lin & Z. Wang leg. **Paratypes.** 2♂3♀ (Ar42469–Ar42474), same data as holotype.

Etymology. The species is named after Puxian, a character in the great classic Chinese novel *Journey to the West*, noun in apposition.

Diagnosis. Males of *E. puxian* sp. nov. are similar to *E. wukong* in having 2–3 thickened setae retrolaterally on the cymbium, the presence of a semicircular lobe that is separated from the large lobe, and the length ratio of the embolus base to the embolus is 3:1. However, this new species can be distinguished by the dorsalmost thickened seta on the large lobe, which is dispersed (*vs.* thickened setae appressed to one another in *E. wukong*) and the terminus of the conductor with

a conspicuous membrane (*vs.* membrane absent in *E. wukong*). Females of *E. puxian* sp. nov. are similar to *E. rulai* and *E. wukong* in having one pair of spermathecae curved laterally, and the ratio of the length of the spermathecae to the distance between the ventral spermathecae is almost 2:3. However, this new species can be distinguished by the expanded base of the spermathecae (*vs.* with an apophysis in *E. wukong* and unexpanded in *E. rulai*).

Description. Male (Holotype): Total length 10.32, carapace 4.75 long, 3.16 wide, opisthosoma 5.32 long, 4.08 wide. Eye sizes and interdistances: AME 0.15, ALE 0.24, PME 0.25, PLE 0.26, AME–AME 0.15, AME–ALE 0.21, PME–PME 0.27, PME–PLE 0.13, AME–PME 0.05, ALE–PLE 0.13. Clypeus height 0.32. Chelicerae with 7 promarginal and 6 retromarginal teeth. Leg measurements: leg I: 44.49 (11.73 + 13.85 + 11.09 + 7.82), leg II: 37.43 (10.38 + 11.15 + 10.00 + 5.90), leg III: 28.75 (8.65 + 8.96 + 7.24 + 3.90), leg IV: 37.66 (10.19 + 10.70 + 9.62 + 7.15). Leg formula: 1423.

Male palp (Figs S5, S8, S11) simple, cymbium long, retrolaterally with an apophysis divided into two parts: a small, semicircular lobe with a seta and a large lobe with 3 large setae, the dorsalmost thickened seta dispersed. Embolus thin, length ratio of embolus to embolus base 3:1. Conductor knife shaped.

Female (Paratype): Total length 17.24, carapace 7.63 long, 5.26 wide, opisthosoma 9.74 long, 6.41 wide. Eye sizes and interdistances: AME 0.21, ALE 0.38, PME 0.34, PLE 0.38, AME–AME 0.33, AME–ALE 0.56, PME–PME 0.59, PME–PLE 0.16, AME–PME 0.18, ALE–PLE 0.20. Clypeus height 0.71. Chelicerae with 9 promarginal and 6 retromarginal teeth. Leg measurements: Leg I: 46.85 (13.78 + 16.60 + 10.77 + 5.70), leg II: 40.85 (11.99 + 14.36 + 9.55 + 4.95), leg III: 31.72 (9.35 + 11.03 + 7.82 + 3.52), leg IV: 39.44 (11.35 + 13.40 + 10.06 + 4.60). Leg formula: 1243.

Female genitalia (Fig. S16) simple, with one pair of spermathecae, slightly curved, with base expanded.

Distribution. Known only from the type locality.

***Ectatosticta qingshi* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:953D4F62-2ED2-446B-9152-555C799EA352

Figs S6A, S9A, S12A, S17, S20C, D

Holotype. ♂ (Ar42463), China, Sichuan, Ganzi Zang Autonomous Prefecture, Dege County, Keluodong. 31.9725°N, 98.6244°E, elevation ca. 3540 m, 1.VII.2019, Y. Lin & J. Liu leg.

Paratypes. 4♀ (Ar42464–Ar42467), same data as holotype.

Etymology. The species is named after Qingshi, a character in the classic Chinese novel *Journey to the West*, noun in apposition.

Diagnosis. Males of *E. qingshi* sp. nov. are similar to *E. deltshevi*, *E. shaseng*, and *E. wenshu* in the presence of a semicircular lobe that is close to the large lobe, and the length ratio of the embolus base to the embolus is 2:1. However, this new species can be distinguished by having 4 thickened setae retrolaterally on the cymbium (*vs.* 3 in *E. shaseng* and 2 in *E. wenshu*) and thickened setae appressed to one another on the large lobe (*vs.* the dorsalmost thickened seta is dispersed in *E. deltshevi*). Females of *E. qingshi* sp. nov. are similar to *E. davidi* and *E. xuanzang* in having two pairs of laterally curved spermathecae, the dorsal spermathecae have the same amount of sclerotisation as the ventral spermathecae, the base of the dorsal spermathecae is

unexpanded, and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:1. However, this new species can be distinguished by the ratio of the length of the ventral spermathecae to the dorsal spermathecae, which is almost 2:3 (*vs.* 4:5 in *E. deltshevi* and 1:1 in *E. xuanzang*).

Description. Male (Holotype): Total length 9.22, carapace 4.23 long, 2.96 wide, opisthosoma 5.12 long, 3.79 wide. Eye sizes and interdistances: AME 0.10, ALE 0.20, PME 0.28, PLE 0.19, AME–AME 0.12, AME–ALE 0.08, PME–PME 0.19, PME–PLE 0.12, AME–PME 0.04, ALE–PLE 0.04. Clypeus height 0.19. Chelicerae with 7 promarginal and 9 retromarginal teeth. Leg measurements: leg I: 38.44 (10.21 + 12.22 + 9.62 + 6.39), leg II: 30.54 (8.98 + 9.21 + 7.42 + 4.93), leg III: 24.00 (7.02 + 7.22 + 5.72 + 4.04), leg IV: 30.05 (8.02 + 9.62 + 7.84 + 4.57). Leg formula: 1243.

Male palp (S6A, S9A, S12A) simple, cymbium long, retrolaterally with an apophysis divided into two parts: a small, semicircular lobe and a large lobe with 4 strong setae appressed together. Embolus thin, length ratio of embolus to embolus base 2:1. Conductor knife shaped.

Female (Paratype): Total length 9.54, carapace 4.22 long, 2.56 wide, opisthosoma 5.48 long, 3.65 wide. Eye sizes and interdistances: AME 0.12, ALE 0.23, PME 0.30, PLE 0.22, AME–AME 0.13, AME–ALE 0.11, PME–PME 0.21, PME–PLE 0.14, AME–PME 0.06, ALE–PLE 0.05. Clypeus height 0.24. Chelicerae with 8 promarginal and 8 retromarginal teeth. Leg measurements: Leg I: 24.37 (6.69 + 7.88 + 5.04 + 4.76), leg II: 19.41 (5.77 + 6.54 + 4.08 + 3.02), leg III: 14.87 (4.02 + 4.84 + 3.13 + 2.88), leg IV: 19.48 (6.21 + 6.03 + 4.25 + 2.99). Leg formula: 1423.

Female genitalia (Fig. S17) simple, with two pairs of spermathecae. Ventral spermathecae short, straight; dorsal spermathecae well-developed, curved. The length ratio of the ventral spermathecae to the dorsal spermathecae is 2:3.

Distribution. Known only from the type locality.

***Ectatosticta shaseng* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:59E7F931-512F-4767-9C5B-DC9559646192

Figs S6B, S9B, S12B, S18, S20G, H

Holotype. ♂ (Ar42459), China, Sichuan Province, Aba Zang and Qiang Autonomous Prefecture, Wenchuan County, Aergou, 31.6802°N, 103.5433°E, elevation ca. 2889 m, 30.VI.2020, Y. Lin & Z. Wang leg. **Paratypes.** 3♀ (Ar42460–Ar42462), same data as holotype.

Etymology. The species is named after Shaseng, a character in the great classic Chinese novel *Journey to the West*, noun in apposition.

Diagnosis. Males of *E. shaseng* sp. nov. are similar to those of *E. wenshu* sp. nov. in that the semicircular lobe is present, thickened setae are appressed to one another on the large lobe, and the length ratio of the embolus base to the embolus is 1:1. However, this new species can be distinguished by the conspicuous semicircular lobe (*vs.* the semicircular lobe close to large lobe and inconspicuous in *E. shaseng* sp. nov.) and having 3 thickened setae retrolaterally on the cymbium (*vs.* 2 in *E. wenshu* sp. nov.). Females of *E. shaseng* sp. nov. are similar to *E. davidi* and *E. helii* sp. nov. in having two pairs of spermathecae, the ratio of the length of the ventral spermathecae to the dorsal spermathecae is almost 1:1, and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:1. However, this new species can be distinguished by the laterally curved spermathecae (*vs.* ventrally curved in *E. helii*

sp. nov.), the dorsal spermathecae are weakly sclerotised compared to the ventral spermathecae (*vs.* same amount of sclerotisation in the dorsal and ventral spermathecae in *E. davidi* and *E. helii* sp. nov.), and the base of the dorsal spermatheca is expanded (*vs.* unexpanded in *E. davidi* and *E. helii* sp. nov.).

Description. Male (Holotype): Total length 9.26, carapace 4.35 long, 2.96 wide, opisthosoma 5.15 long, 3.82 wide. Eye sizes and interdistances: AME 0.12, ALE 0.24, PME 0.35, PLE 0.24, AME–AME 0.16, AME–ALE 0.12, PME–PME 0.24, PME–PLE 0.16, AME–PME 0.06, ALE–PLE 0.04. Clypeus height 0.28. Chelicerae with 9 promarginal and 7 retromarginal teeth. Leg measurements: leg I: 38.29 (10.31 + 12.12 + 9.36 + 6.50), leg II: 31.95 (9.22 + 9.82 + 7.80 + 5.11), leg III: 24.89 (7.20 + 7.52 + 5.81 + 4.36), leg IV: 31.69 (9.10 + 9.80 + 7.96 + 4.83). Leg formula: 1243.

Male palp (S6B, S9B, S12B) simple, cymbium long, retrolaterally with an apophysis. Apophysis with two parts: small semicircular lobe and a large lobe with 3 thickened setae appressed together. Embolus thin, the length ratio of the embolus to the embolus base is 2:1. Conductor sickle shaped.

Female (Paratype): Total length 9.14, carapace 3.82 long, 2.56 wide, opisthosoma 5.51 long, 3.71 wide. Eye sizes and interdistances: AME 0.14, ALE 0.18, PME 0.20, PLE 0.22, AME–AME 0.16, AME–ALE 0.24, PME–PME 0.32, PME–PLE 0.10, AME–PME 0.06, ALE–PLE 0.10. Clypeus height 0.54. Chelicerae with 8 promarginal and 7 retromarginal teeth. Leg measurements: Leg I: 24.57 (6.73 + 7.92 + 5.11 + 4.81), leg II: 19.66 (5.82 + 6.60 + 4.14 + 3.10), leg III: 14.35 (4.10 + 4.91 + 3.22 + 2.92), leg IV: 19.87 (6.31 + 6.12 + 4.34 + 3.10). Leg formula: 1423.

Female genitalia (Fig. S18) simple, with two pairs of spermathecae. Both ventral and dorsal spermathecae well-developed, curved. The length ratio of the ventral spermathecae to the dorsal spermathecae is 1:1.

Distribution. Known only from the type locality.

***Ectatosticta wenshu* Lin & S. Li, sp. nov.**

urn:lsid:zoobank.org:act:19972091-924A-4398-A4EA-2B8C193FA39D

Figs S6C, S9C, S12C, S19, S20I, J

Holotype. ♂ (Ar42480), China, Gansu Province, Longnan City, Dangchang County, Guanegou National Forest Park, 33.1958°N, 103.8968°E, elevation ca. 2200 m, 07.VII.2020, Y. Lin & Z. Wang leg. **Paratypes.** 6♀ (Ar42481–Ar42486), same data as holotype.

Etymology. The species is named after Wenshu, a character in the classic Chinese novel *Journey to the West*; noun in apposition.

Diagnosis. For the diagnosis of the male of *E. wenshu* sp. nov., see the diagnosis of *E. shaseng* sp. nov. Females of *E. wenshu* sp. nov. are similar to *E. bajie* in having two pairs of laterally curved spermathecae, the dorsal spermathecae have the same amount of sclerotisation as the ventral spermathecae, the base of the dorsal spermathecae is unexpanded, the ratio of the length of the ventral spermathecae to the dorsal spermathecae is 1:2–1:3, and the ratio of the length of the ventral spermathecae to the distance between the ventral spermathecae is almost 1:2. However, this new species can be distinguished by the dorsal spermathecae expanded medially along their length (*vs.* the spermathecae radius is uniform along its length in *E. bajie*).

Description. Male (Holotype): Total length 9.22, carapace 3.95 long, 2.66 wide,

opisthosoma 4.92 long, 3.78 wide. Eye sizes and interdistances: AME 0.14, ALE 0.22, PME 0.23, PLE 0.24, AME–AME 0.12, AME–ALE 0.18, PME–PME 0.24, PME–PLE 0.10, AME–PME 0.04, ALE–PLE 0.10. Clypeus height 0.42. Chelicerae with 8 promarginal and 7 retromarginal teeth. Leg measurements: leg I: 40.39 (10.53 + 12.45 + 10.29 + 7.12), leg II: 34.88 (9.38 + 9.35 + 9.15 + 4.90), leg III: 25.27 (7.75 + 7.86 + 6.34 + 3.32), leg IV: 35.08 (9.79 + 10.22 + 9.22 + 5.85). Leg formula: 1423.

Male palp (Figs S6C, S9C, S12C) simple, cymbium long, retrolaterally with an apophysis. Apophysis with two parts: small semicircular lobe and a large lobe with 4 appressed setae. Embolus thin, length ratio of embolus to embolus base is 2:1. Conductor sickle shaped.

Female (Paratype): Total length 11.24, carapace 4.54 long, 4.31 wide, opisthosoma 5.92 long, 4.02 wide. Eye sizes and interdistances: AME 0.16, ALE 0.27, PME 0.28, PLE 0.30, AME–AME 0.25, AME–ALE 0.42, PME–PME 0.41, PME–PLE 0.07, AME–PME 0.12, ALE–PLE 0.13. Clypeus height 0.51. Chelicerae with 9 promarginal and 7 retromarginal teeth. Leg measurements: Leg I: 35.61 (10.73 + 13.45 + 7.72 + 3.71), leg II: 31.18 (9.92 + 11.26 + 6.05 + 3.95), leg III: 21.78 (6.43 + 8.12 + 4.79 + 2.44), leg IV: 27.80 (8.29 + 10.32 + 7.07 + 2.12). Leg formula: 1243.

Female genitalia (Fig. S19) simple, with two pairs of spermathecae, dorsal spermathecae short, the length of the dorsal spermathecae highly variable, ventral spermathecae slightly curved. The length ratio of the ventral spermathecae to the dorsal spermathecae is 1:2–1:3.

Distribution. Known only from the type locality.

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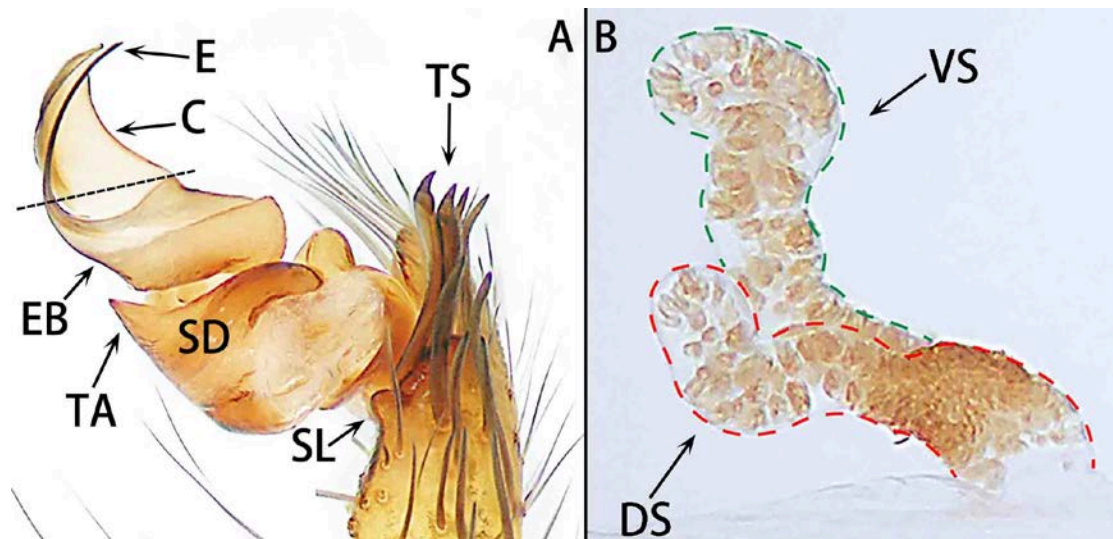


Figure S1 *Ectatosticta baixiang* Lin & S. Li, sp. nov. **A** holotype palp **B** paratype genitalia. Abbreviations: **C** conductor **DS** dorsal spermatheca **E** embolus **EB** embolus base **SD** sperm duct **SL** semicircular lobe **TA** tegular apophysis **TS** thickened setae **VS** ventral spermatheca

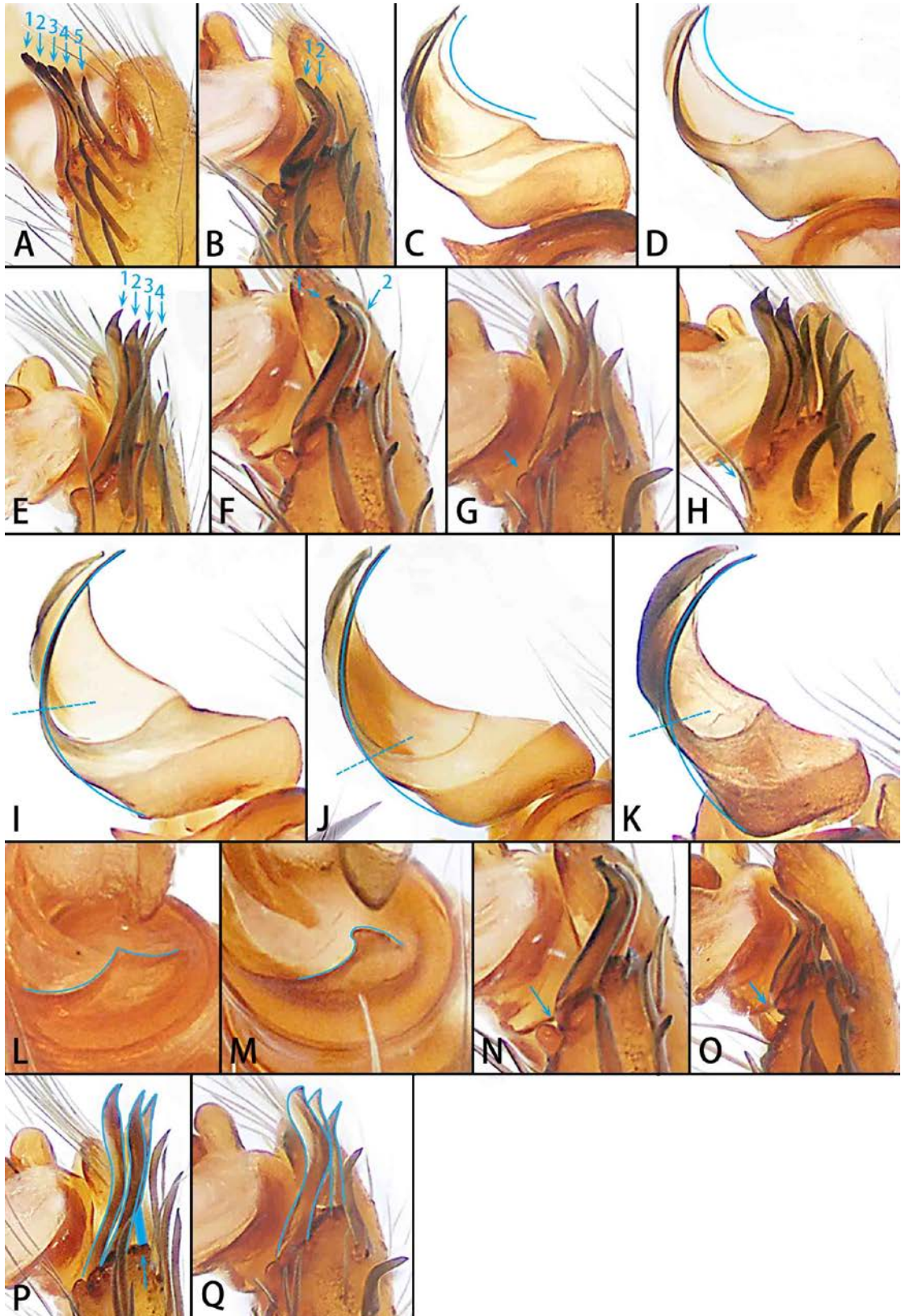


Figure S2 Key to *Ectatosticta* males, palp **A, C** *Ectatosticta davidi* **B, J, O** *E. wukong* **D** *E. qingshi* sp. nov. **E, I, P** *E. baixiang* sp. nov. **F, N** *E. wenshu* sp. nov. **G, Q** *E. shaseng* sp. nov. **H, M** *E. rulai* **K** *E. yukuni* **L** *E. deltshevi*

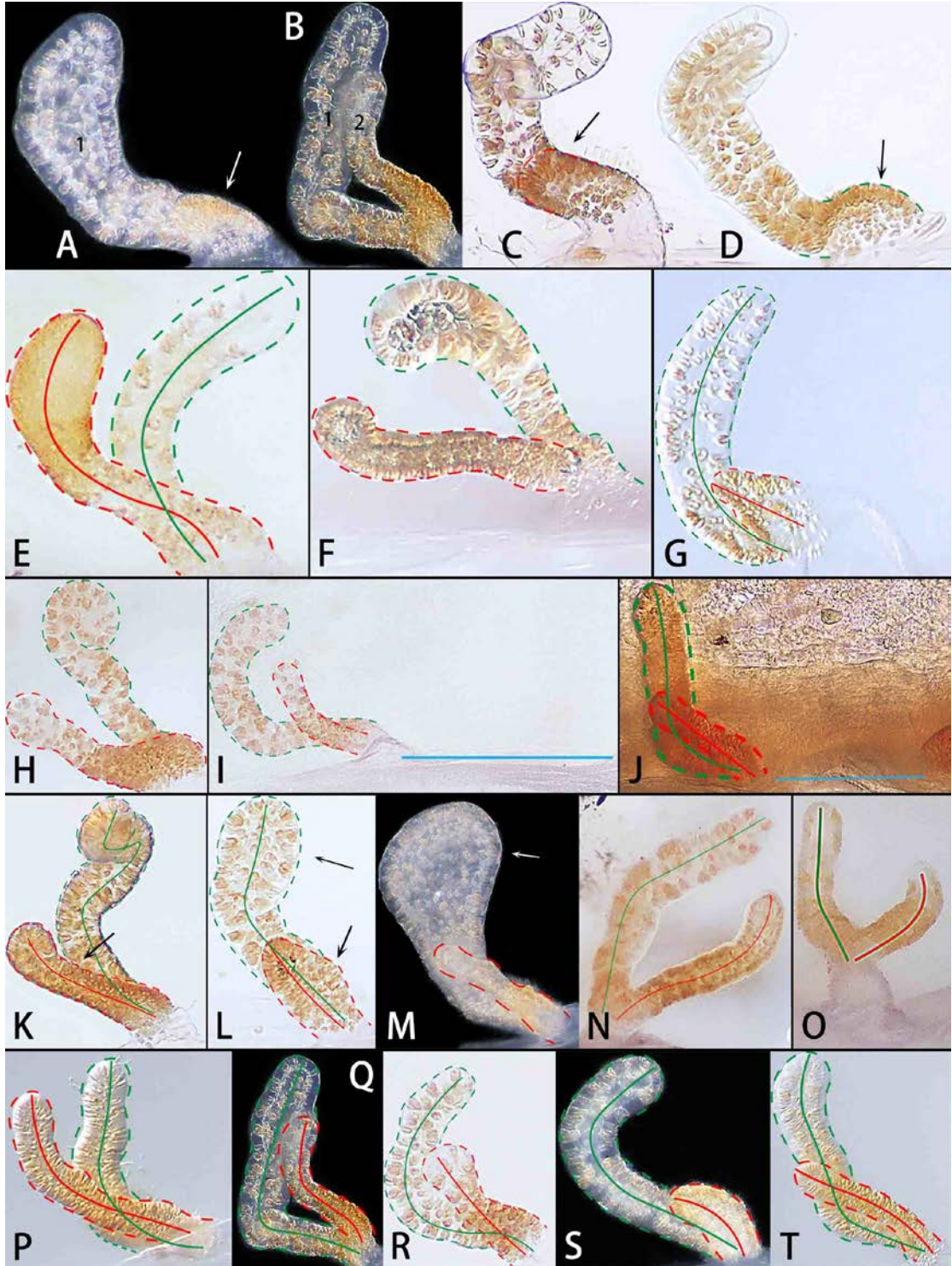


Figure S3 Key to *Ectatosticta* females, genitalia **A** *Ectatosticta wukong* **B, J, Q** *E. deltshevi* **C** *E. rulai* **D** *E. puxian* sp. nov. **E** *E. shaseng* sp. nov. **F, N** *E. helii* sp. nov. **I, O, R** *E. qingshi* sp. nov. **G** *E. baima* sp. nov. **H** *E. baixiang* sp. nov. **K** *E. bajie* **L** *E. wenshu* sp. nov. **M** *E. dapeng* **P** *E. davidi* **S** *E. xuanzang* **T** *E. yukuni*. Red lines, dorsal spermathecae; green lines, ventral spermathecae



Figure S4 *Ectatosticta baixiang* Lin & S. Li, sp. nov., palp variation of holotype Ar42491, paratypes Ar42493, Ar42494, retrolateral view



Figure S5 *Ectatosticta puxian* Lin & S. Li, sp. nov., palp variation of holotype Ar42468, paratypes Ar42470, Ar42471, retrolateral view



Figure S6 *Ectatosticta* spp, palps, retrolateral view, holotypes **A** *E. qingshi* sp. nov. **B** *E. shaseng* sp. nov. **C** *E. wenshu* sp. nov. Arrows point to the difference of thickened setae

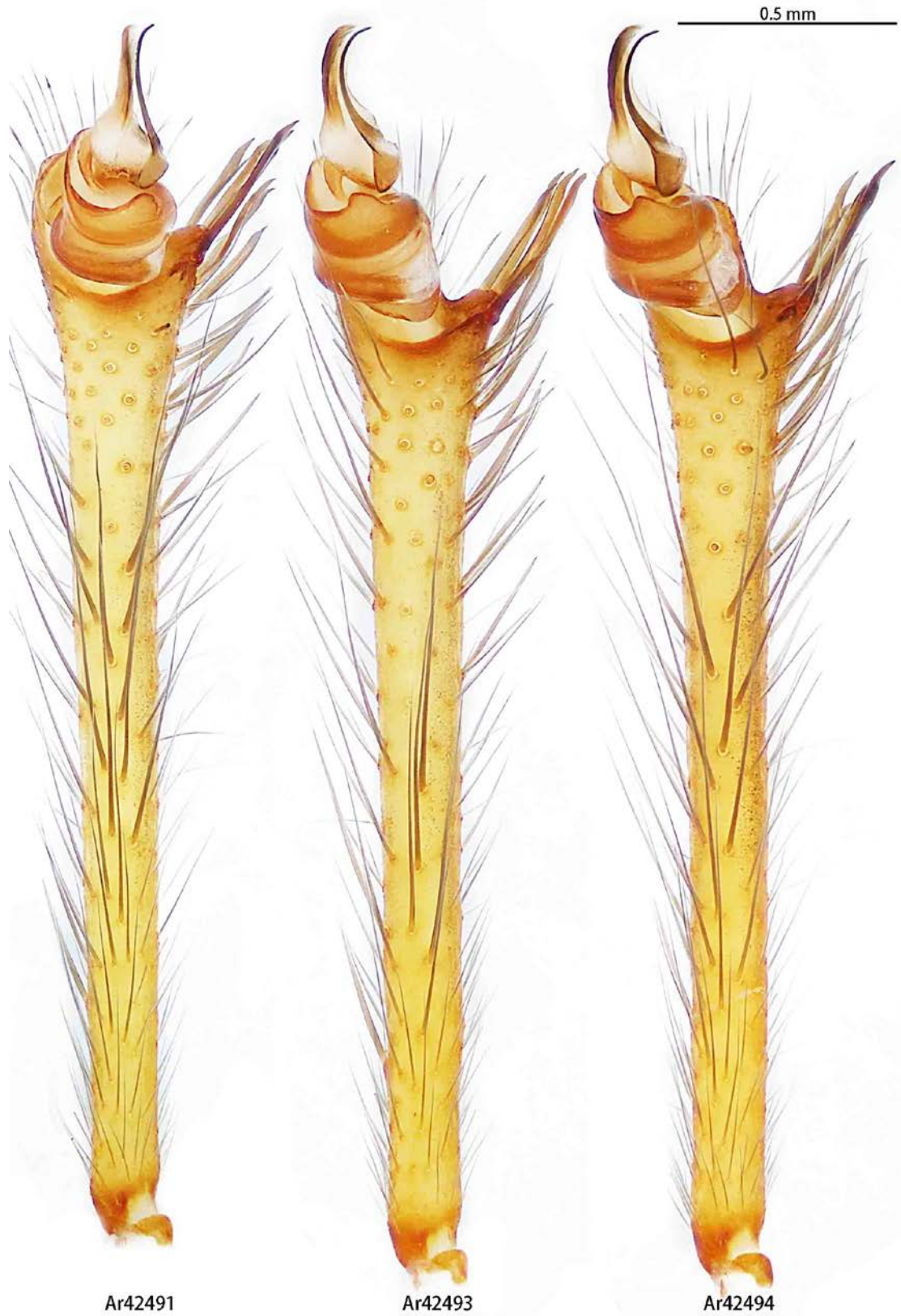


Figure S7 *Ectatosticta baixiang* Lin & S. Li, sp. nov., palp variation of holotype Ar42491, paratypes Ar42493, Ar42494, ventral view



Figure S8 *Ectatosticta puxian* Lin & S. Li, sp. nov., palp variation of holotype Ar42468, paratypes Ar42470, Ar42471, ventral view



Figure S9 *Ectatosticta* spp, palps, ventral view, holotypes **A** *E. qingshi* sp. nov. **B** *E. shaseng* sp. nov. **C** *E. wenshu* sp. nov. Arrows point to the difference of tegular apophyses



Figure S10 *Ectatosticta baixiang* Lin & S. Li, sp. nov., palp variation of holotype Ar42491, paratypes Ar42493, Ar42494, prolateral view



Figure S11 *Ectatosticta puxian* Lin & S. Li, sp. nov., palp variation of holotype Ar42468, paratypes Ar42470, Ar42471, prolateral view



Figure S12 *Ectatosticta* spp, palp, prolateral view, holotypes **A** *E. qingshi* sp. nov. **B** *E. shaseng* sp. nov. **C** *E. wenshu* sp. nov. Arrows point to the difference of tegulum

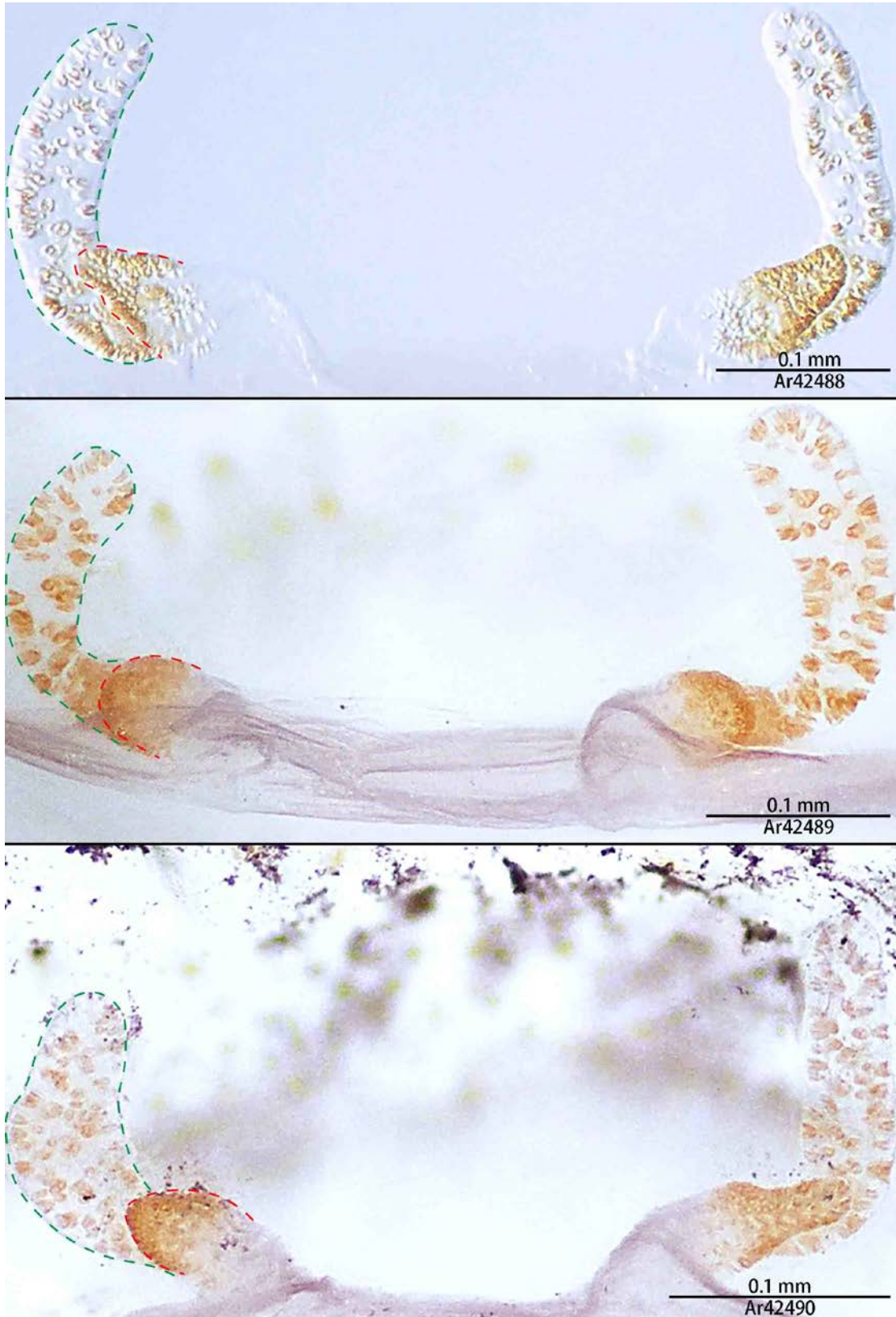


Figure S13 *Ectatosticta baima* Lin & S. Li, sp. nov., female genitalia variation of holotype Ar42488, paratypes Ar42489, Ar42490, dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

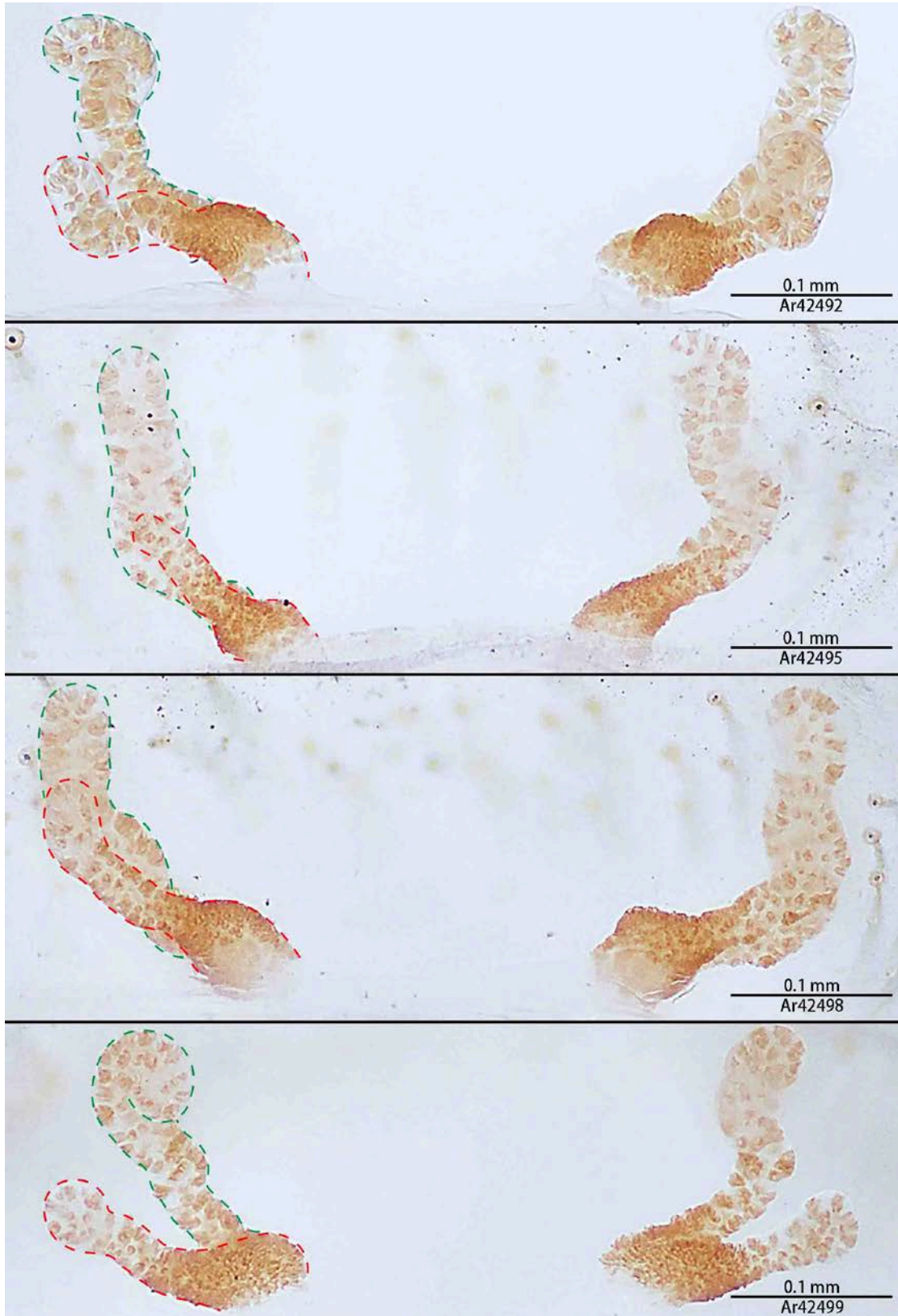


Figure S14 *Ectatosticta baixiang* Lin & S. Li, sp. nov., female genitalia variation of paratypes Ar42492, 42495, 42498, 42499, dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

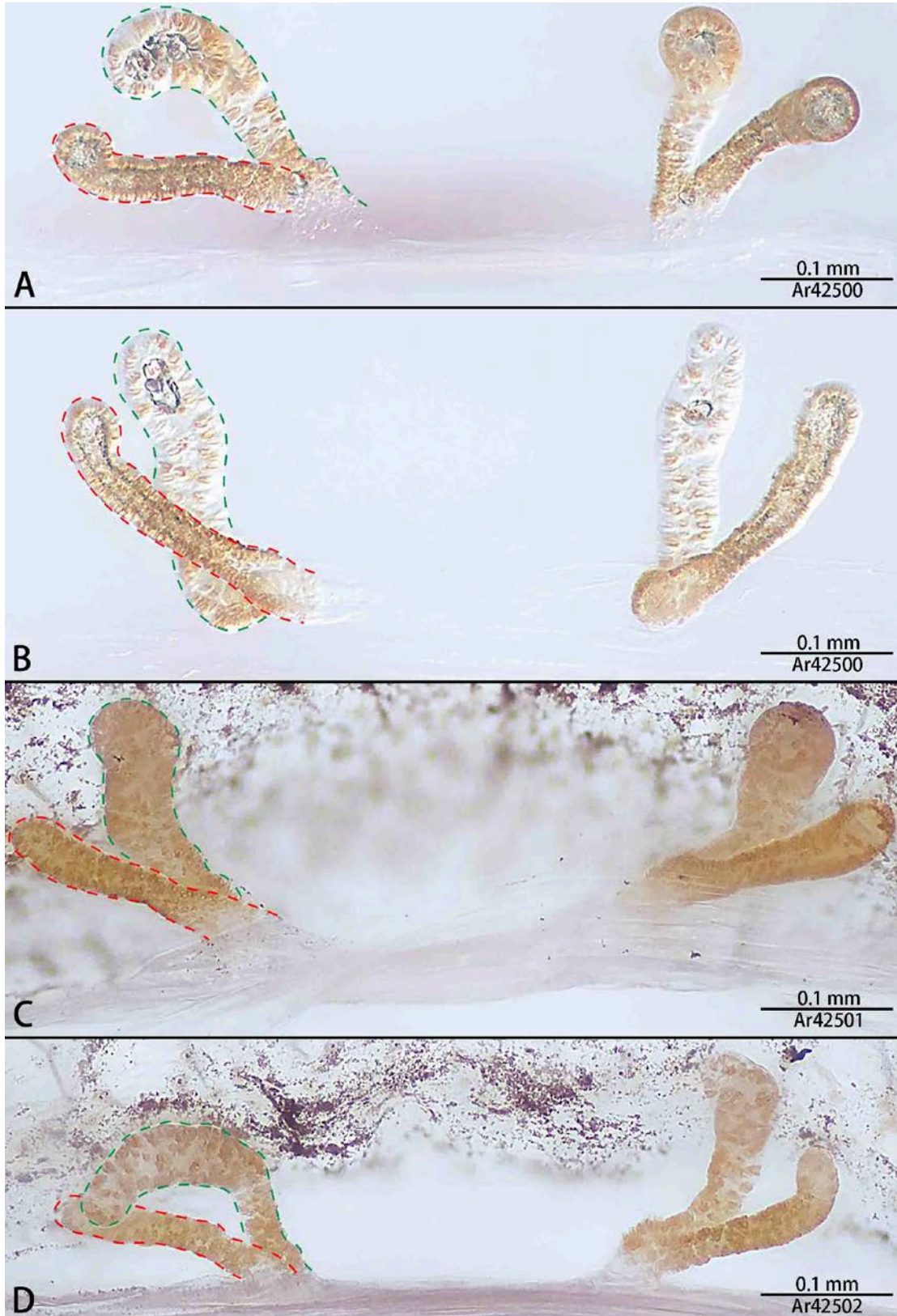


Figure S15 *Ectatosticta helii* Lin & S. Li, sp. nov., female genitalia variation of holotype Ar42500, paratypes Ar42501, Ar42502 **A, C, D** Ventral view **B** posterior view dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

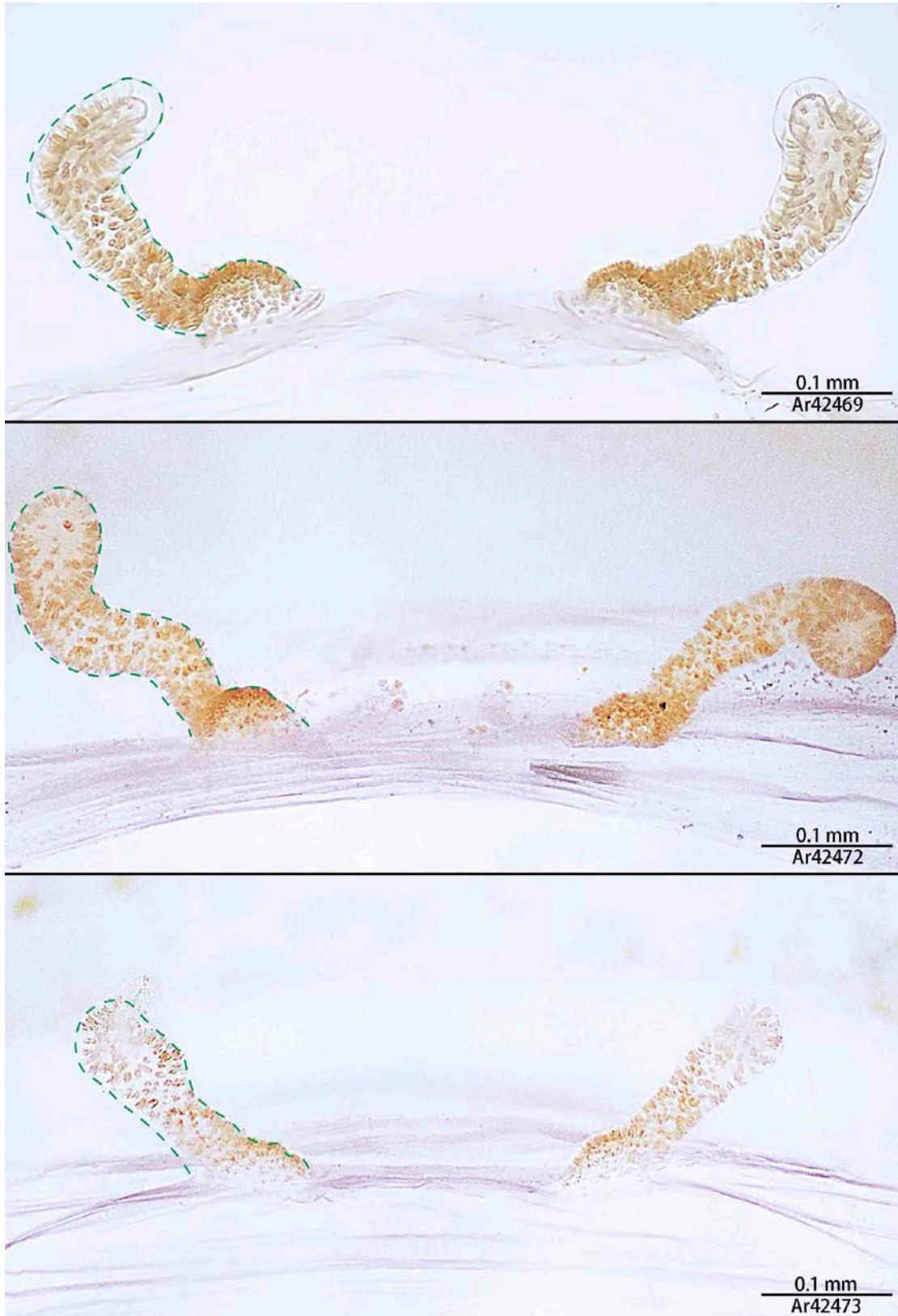


Figure S16 *Ectatosticta puxian* Lin & S. Li, sp. nov., female genitalia variation of paratypes Ar42469–42473, dorsal view. Green lines, spermathecae

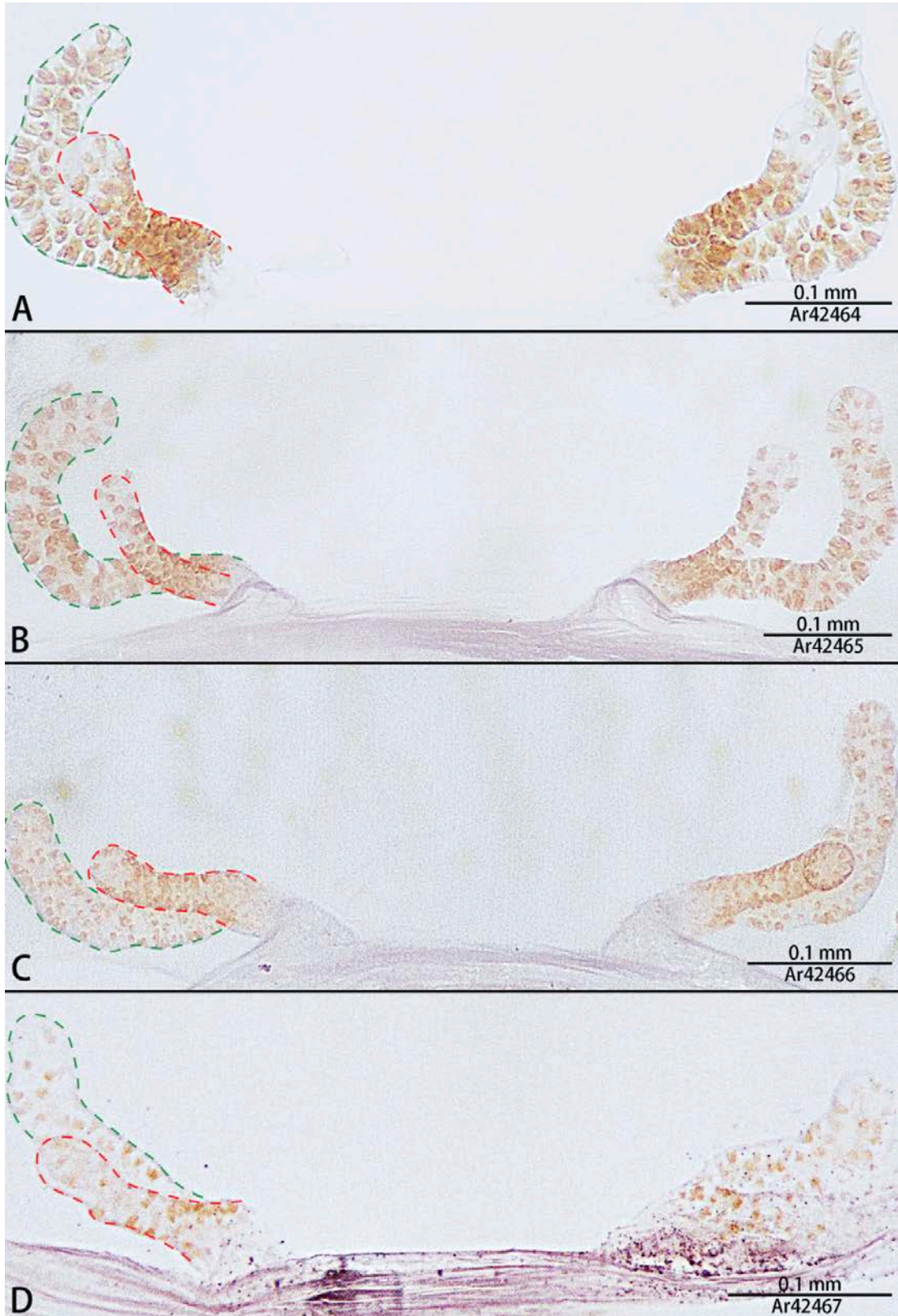


Figure S17 *Ectatosticta qingshi* Lin & S. Li, sp. nov., female genitalia variation of paratypes Ar42464–42467, dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

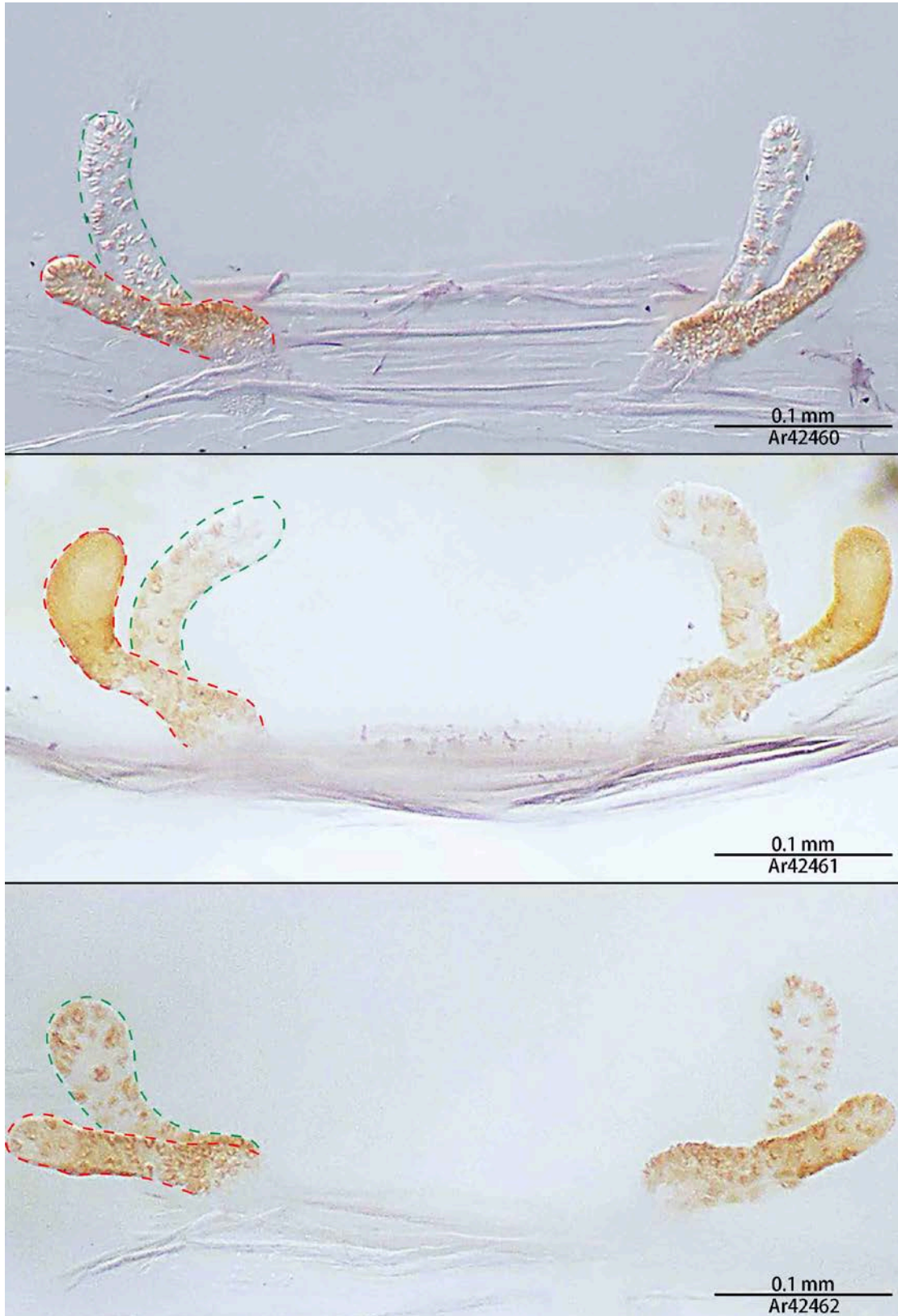


Figure S18 *Ectatosticta shaseng* Lin & S. Li, sp. nov., female genitalia variation of paratypes Ar42460–42462, dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

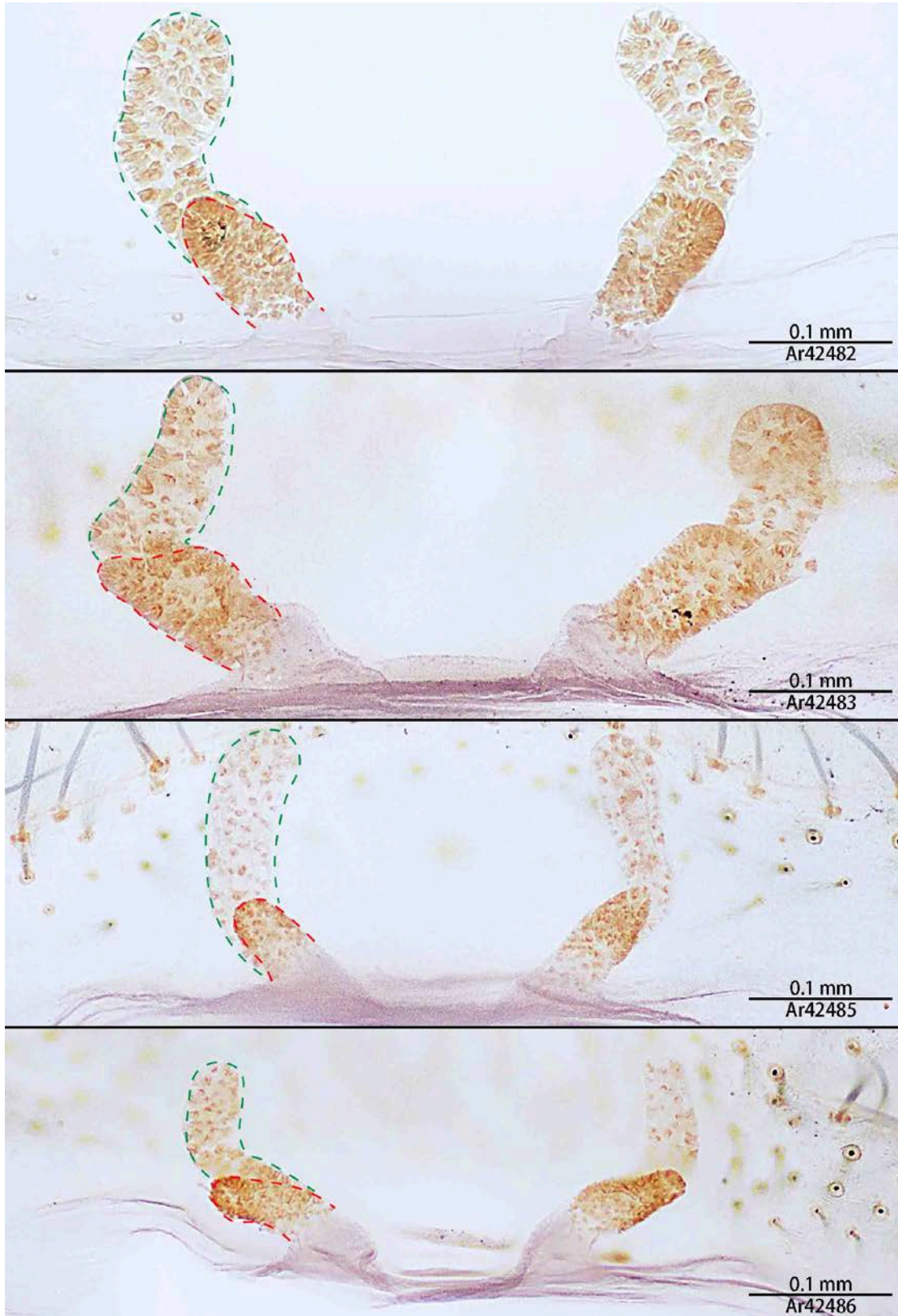


Figure S19 *Ectatosticta wenshu* Lin & S. Li, sp. nov., female genitalia variation of paratypes Ar42482–42486, dorsal view. Red lines, dorsal spermathecae; green lines, ventral spermathecae

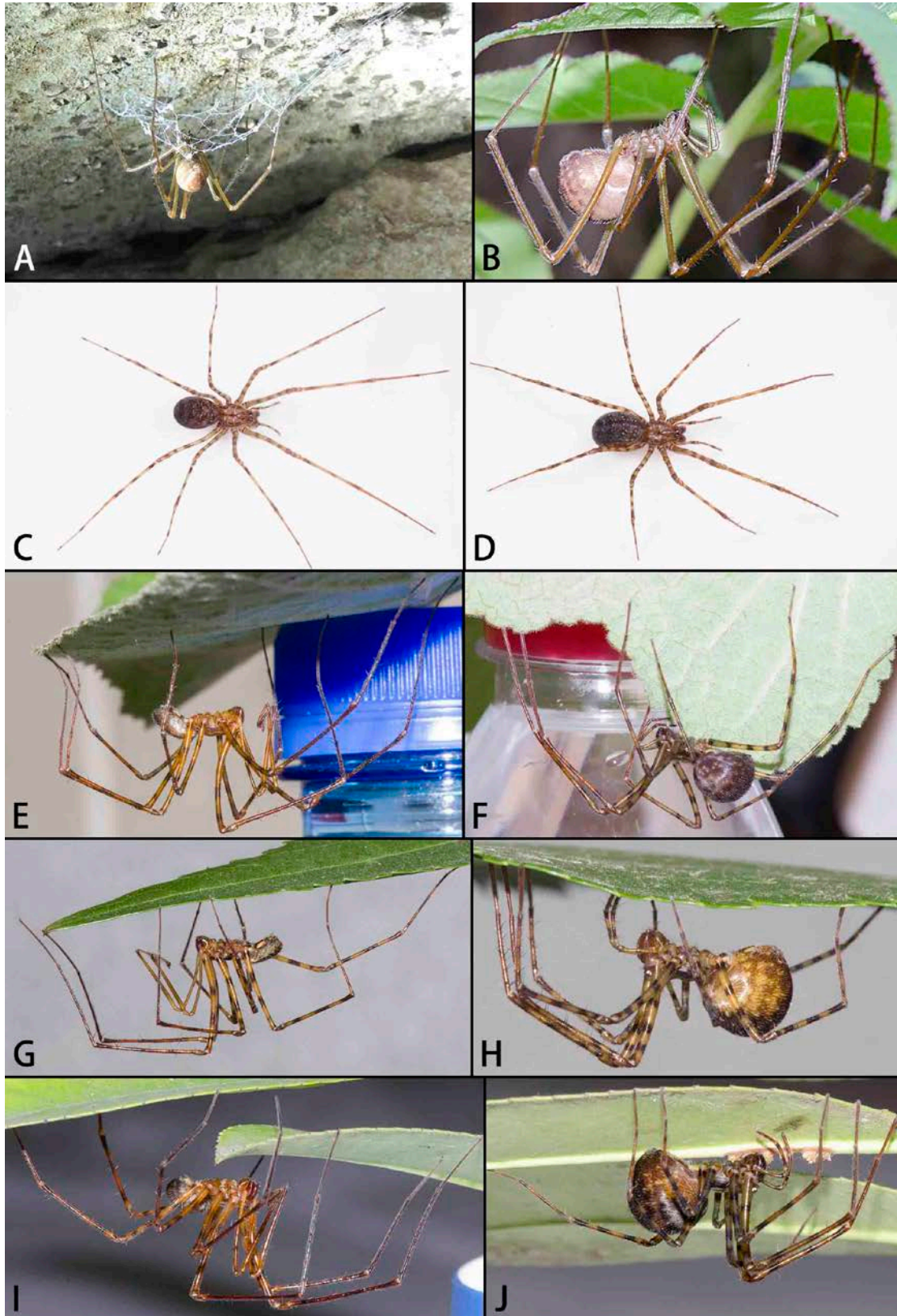


Figure S20 Live *Ectatosticta* spp. **A, B** *E. helii* sp. nov., female holotype **C** *E. qingshi* sp. nov., female paratype **D** *E. qingshi* sp. nov. from Rongan **E** *E. puxian* sp. nov., male holotype **F** Same, female paratype **G** *E. shaseng* sp. nov., male holotype **H**. Same, female paratype **I** *E. wenshu* sp. nov., male holotype **J** Same, female paratype

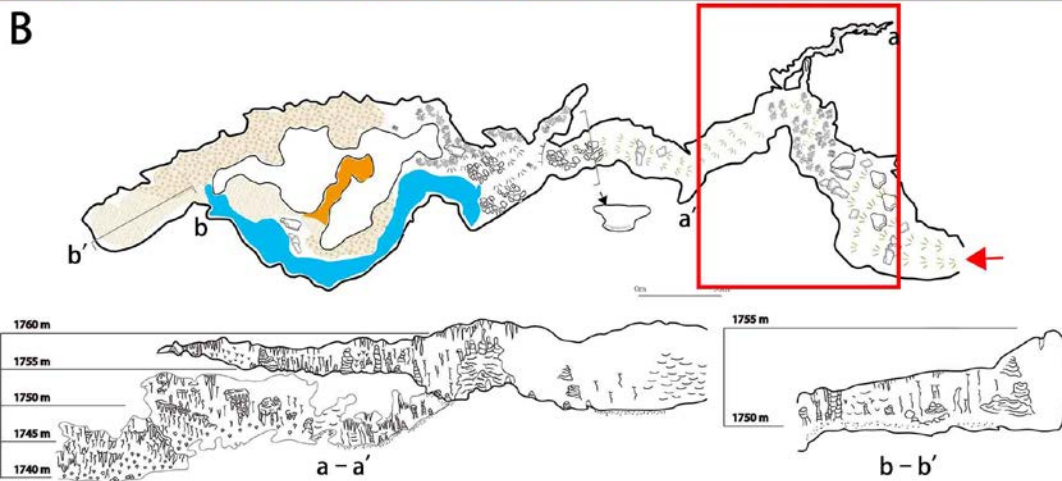


Figure S21 Peng Cave, type locality of *Ectatosticta helii* Lin & S. Li, sp. nov. **A** Mr. Li He (first from left) at entrance of Peng Cave **B** Map of Peng Cave. Red arrow, cave entrance; Red rectangle, areas with *E. helii* sp. nov.

Table S1 Locations of specimens sampled in this study

#	Locality	Shortened name	Elevation	Species
1	Beishan National Forest Park, Jiading Town, Huzhu Autonomous County, Haidong City, Qinghai Province	Beishan	2442±6 m	<i>Ectatosticta deltshevi</i>
2	Xiongmaogou, Damai Township, Xiahe County, Gannan Tibetan Autonomous Prefecture, Gansu Province	Xiongmaogou	3046±6 m	<i>E. wenshu</i> sp. nov.
3	Yeliguan Forest Park, Lintan County, Gannan Tibetan Autonomous Prefecture, Gansu Province	Yeliguan	2570±6 m	<i>E. wenshu</i> sp. nov.
4	Karst Cave, Zhanwa Township, Ruoergai County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Zhanwa Karst Cave	3936±6 m	<i>E. wenshu</i> sp. nov.
5	Duoqu, Zhanwa Township, Ruoergai County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Zhanwa Duoqu	3402±6 m	<i>E. wenshu</i> sp. nov.
6	Guanegou National Forest Park, Dangchang County, Longnan City, Gansu Province	Guanegou	2533±6 m	<i>E. wenshu</i> sp. nov.
7	Taibai Mountain National Forest Park, Mei County, Baoji City, Shaanxi Province	Taibai Mountain	2533±6 m	<i>E. davidi</i>
8	Wulongdong Cave, Wulongdong Town, Lueyang County, Hanzhong City, Shaanxi Province	Wulong Cave	1885±6 m	<i>E. yukuni</i>
9	Sifo Cave, Wulongdong Town, Lueyang County, Hanzhong City, Shaanxi Province	Sifo Cave	1727±6 m	<i>E. yukuni</i>
10	Xuantian Cave, Wulongdong Town, Lueyang County, Hanzhong City, Shaanxi Province	Xuantian Cave	1746±6 m	<i>E. yukuni</i>
11	Qiuji Township, Ruoergai County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Qiuji Township	2817±6 m	<i>E. rulai</i>
12	Jiuzhaigou Scenic Spot, Jiuzhaigou County, Aba Tibetan Autonomous Prefecture, Sichuan Province	Jiuzhaigou	2206±5 m	<i>E. rulai</i>
13	Motianling, Tangjiahe Nature Reserve, Qingchuan County, Guangyuan City, Sichuan Province	Motianling	1807±3 m	<i>E. rulai</i>
14	Kalonggou, Kalong Town, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Kalonggou	3102±6 m	<i>E. baima</i> sp. nov.
15	Peng Cave, Jiangyou Country, Mianyang City, Sichuan Province	Peng Cave	1794±5 m	<i>E. helii</i> sp. nov.
16	Aergou, Wenchuan County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Aergou	2889±6 m	<i>E. shaseng</i> sp. nov.
17	Boguo Village, Miyaluo Town, Li County, Sichuan Province	Boguo Village	3029±3 m	<i>E. wukong</i>
18	Xilizhai Village, Jinchuan County, Sichuan Province	Xilizhai Village	3411±3 m	<i>E. wukong</i>
19	Zhegu Mountain, ShuaJingsi Town, Hongyuan County, Sichuan Province	Zhegu Mountain	3458±5 m	<i>E. wukong</i>
20	Kangma Temple, Malkang Country, Sichuan Province	Kangma Temple	3509±3 m	<i>E. wukong</i>
21	Balang Mountain, Xiaojin County, Aba Prefecture, Sichuan Province	Balang Mountain	3585±4 m	<i>E. wukong</i>
22	Macaogou, Putou Village, Li County, Sichuan Province	Macaogou	2805±5 m	<i>E. puxian</i> sp. nov.
23	Gada Mountain, Dujiagou Village, Anning Township, Jinchuan County, Sichuan Province	Gada Mountain	3048±5 m	<i>E. puxian</i> sp. nov.
24	Shachong Forest Road, Shachong Township, Daofu County, Sichuan Province	Shachong	2467±6 m	<i>E. puxian</i> sp. nov.
25	Changpinggou, Siguniang Mountain, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Changpinggou	3530±6 m	<i>E. puxian</i> sp. nov.
26	Jintouzhai Village, Danba County, Sichuan Province	Jintouzhai Village	2639±3 m	<i>E. puxian</i> sp. nov.
27	Shenmulei Scenic Spot, Baoxing County, Ya'an City, Sichuan Province	Shenmulei	3046±6 m	<i>E. bajie</i>
28	Mugecuo Scenic Area, Kangding City, Ganzi Tibetan Autonomous Prefecture, Sichuan Province	Mugecuo	3559±4 m	<i>E. bajie</i>
29	Hailuogou, Moxi Town, Luding County, Ganzi Tibetan Autonomous Prefecture, Sichuan Province	Hailuogou	2933±5 m	<i>E. bajie</i>
30	Puxi Village, Rangtang County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Puxi	2856±5 m	<i>E. bajie</i>
31	Yelanggu, Lebugou Scenic Spot, Gouna County, Shannan City, Tibet Autonomous Region	Yelanggu	3118±4 m	<i>E. xuanzang</i>
32	Rubunggang Village, Yadong Country, Xigaze City, Tibet	Rubunggang Village	3755±3 m	<i>E. xuanzang</i>
33	Sygera Mountain, Linzhi County, Linzhi City, Tibet Autonomous Region	Sygera Mountain	3528±4 m	<i>E. xuanzang</i>
34	Tongduishui, Shangrila City to Deqin County, Diqing Zang Autonomous Prefecture, Yunnan Province	Tongduishui	3309±6 m	<i>E. baixiang</i> sp. nov.
35	Yongdabu Village, Bome County, Linzhi City, Tibet Autonomous Region	Yongdabu	3342±5 m	<i>E. dapeng</i>
36	Dazeshan Village, Bome County, Linzhi City, Tibet Autonomous Region	Dazeshan	3199±4 m	<i>E. dapeng</i>
37	Suolang Village, Gengmenbazu County, Linzhi City, Tibet Autonomous Region	Suolang Village	3556±6 m	<i>E. dapeng</i>
38	Jiare Village, Gongbujiangda County, Linzhi City, Tibet Autonomous Region	Jiare Village	3460±3 m	<i>E. dapeng</i>
39	Rongan Village, Aba County, Aba Tibetan and Qiang Autonomous Prefecture, Sichuan Province	Rongan	3131±3 m	<i>E. qingshi</i> sp. nov.
40	Keluodong Village, Dege County, Ganzi Tibetan Autonomous Prefecture, Sichuan Province	Keluodong	3540±3 m	<i>E. qingshi</i> sp. nov.