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Eight new apterous *Lathrobium* species (Coleoptera, Staphylinidae) from Sichuan, Southwest China

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Abstract

Eight apterous species of the paederine genus *Lathrobium* Gravenhorst, 1802 from the Chinese province Sichuan are described, illustrated, and distinguished from closely related and/or geographically close congeners: *L. erlangense* Peng & Li **sp. n.** (Erlang Shan), *L. blandum* Peng & Li **sp. n.** (Labahe N. R.), *L. yelense* Peng & Li **sp. n.** (Yele), *L. obscurum* Peng & Li **sp. n.** (Yele), *L. yinziweii* Peng & Li **sp. n.** (Yele), *L. illustre* Peng & Li **sp. n.** (Yele), *L. micangense* Peng & Li **sp. n.** (Micang Shan) and *L. agglutinatum* Assing & Peng **sp. n.** (Qingcheng Shan). The total number of described *Lathrobium* species from Sichuan now stands at 39, that of mainland China at 165.

Keywords

Coleoptera, Staphylinidae, taxonomy, *Lathrobium*, new species, Sichuan, China

Introduction

So far, 157 species of the genus *Lathrobium* Gravenhorst have been reported from mainland China and the diversity is significantly greater than that of any other genus of the Paederinae. The provinces with the greatest diversity are Yunnan (58 species),

followed by Sichuan (31 species), Shaanxi (20 species), and Zhejiang (17 species). However, these figures are still strongly biased. They do not reflect real diversities, but rather are a result of imbalanced collecting and study activity (Assing, in press a).

The topology of Sichuan is dominated by mountain regions (49.5%) and plateau (28.5%). The highest peak of Sichuan is the Gongga Shan at 7,556 m. East Sichuan is subject to the subtropical monsoon climate and the west is influenced by plateau alpine climate. Pine and beech forests form the main forest types in Sichuan (Yang 1988).

Schülke (2002) was the first to describe a micropterous *Lathrobium* species from Sichuan. Thirty additional species, most of them micropterous and locally endemic, were subsequently reported from this province by Peng et al. (2012), Assing et al. (2013) and Assing (in press b, c, d). In Sichuan, *Lathrobium* species have been described from the Emei Shan (6 species), the Gongga Shan (3 species), the Erlang Shan (3 species), the Labahe Nature Reserve (2 species), the Luoji Shan (3 species), the Xilingxue Shan (2 species), the region to the northwest of Kangding in the Daxue Shan (1 species), the Daxiang Ling (1 species), the Min Shan and adjacent mountain ranges in northern Sichuan (4 species), the Micang Shan at the border with Shaanxi (4 species), the region to the north of Jinyang in southern Sichuan (1 species), and the region to the northwest of Muli County in the Hengduan mountains (1 species). A map of the *Lathrobium* species from Sichuan Province is provided in Fig. 1.

In recent years, we surveyed the staphylinid fauna of several nature reserves in Sichuan Province (Erlang Shan; Labahe N. R.; Micang Shan; Qingcheng Shan and Yele), and collected numerous *Lathrobium* specimens. An examination of the material yielded eight undescribed apterous species, all remarkably different from the previously known species from China with respect to the male sexual characters.

Material and methods

The following abbreviations are used in the text, with all measurements in millimeters:

BL length of body from the anterior margin of the labrum to the apex of the abdomen;
FL length of forebody from the anterior margin of the labrum to the posterior margin of the elytra;
HL from the anterior margin of the frons to the posterior margin of the head;
HW maximum width of head;
PL length of pronotum along midline;
PW maximum width of pronotum;
EL length of elytra from the apex of the scutellum to the posterior margin of the elytra;
AL length of the aedeagus from the apex of the ventral process to the base of the aedeagal capsule.

The type material is deposited in the Insect Collection of Shanghai Normal University, Shanghai, China (**SNUC**) and in the private collection of Volker Assing, Hannover (cAss).

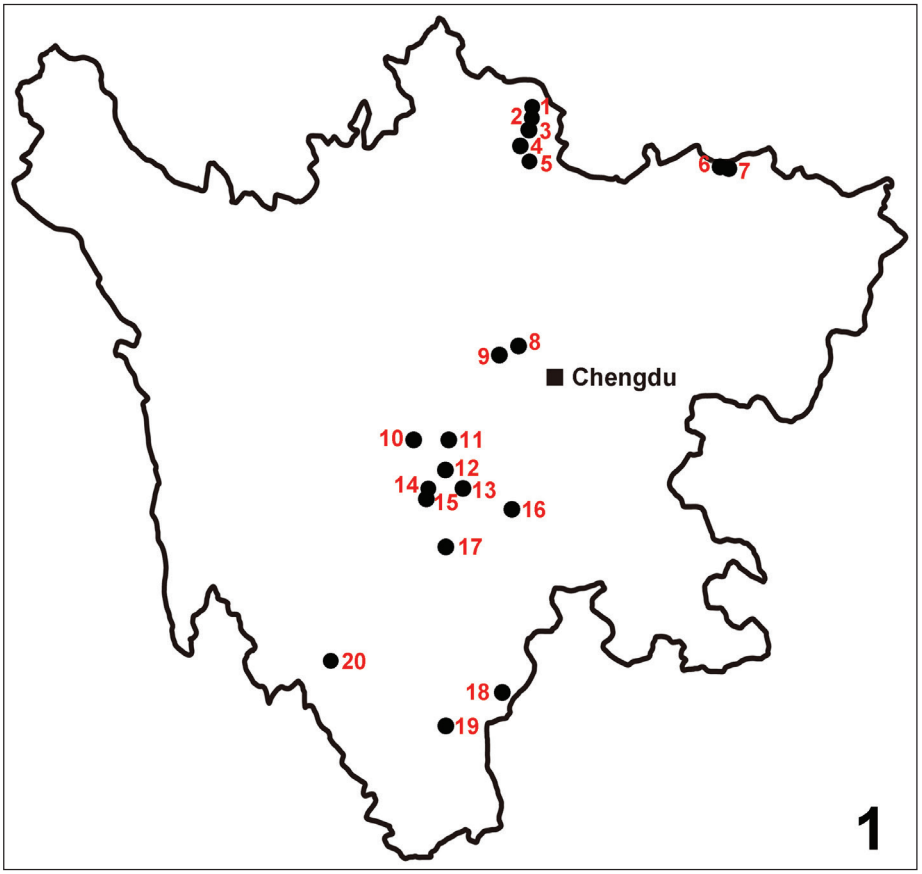

Figure 1. Distribution of the *Lathrobium* species in Sichuan: *L. biapicale* (**1–5**); *L. detruncatum* (**4**); *L. lentum* (**4**); *L. brevisternale* (**5**); *L. crassispinosum* (**6**); *L. sinense* (**6**); *L. longispinosum* (**6**); *L. serrilobatum* (**7**); *L. micangense* (**7**); *L. agglutinatum* (**8**); *L. bisuditum* (**9**); *L. verminatum* (**9**); *L. watanabei* (**10**); *L. acutissimum* (**11**); *L. labahense* (**11**); *L. blandum* (**11**); *L. aspinosum* (**12**); *L. bibaculatum* (**12**); *L. bispinigerum* (**12**); *L. erlangense* (**12**); *L. bihastatum* (**13**); *L. hailuogouense* (**14**); *L. celere* (**15**); *L. ventricosum* (**15**); *L. bisinuatum* (**16**); *L. conexum* (**16**); *L. coniunctum* (**16**); *L. ensigerum* (**16**); *L. hastatum* (**16**); *L. iunctum* (**16**); *L. yelense* (**17**); *L. yinziweii* (**17**); *L. obscurum* (**17**); *L. illustre* (**17**); *L. appendiculatum* (**18**); *L. bivirgatum* (**19**); *L. diffissum* (**19**); *L. hamulatum* (**19**); *L. formidabile* (**20**).

Taxonomy

***Lathrobium erlangense* Peng & Li, sp. n.**
urn:lsid:zoobank.org:act:3340FD66-09D4-48F5-8DAD-FC27B9492E84
http://species-id.net/wiki/Lathrobium_erlangense
Figs 2A, 3, 13

Type material. (1♂, 2♀♀)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Tianquan County Mt. Erlangshan, 29°52'N, 102°18'E, 13.vii.2012 alt. 2,200–2,300 m, Dai, Peng & Yin leg.' (SNUC). Paratypes: 2 ♀♀, same label data as holotype (SNUC).

Description. Measurements (in mm) and ratios: BL 5.84–8.06, FL 2.82–3.25, HL 0.83–0.92, HW 0.87–0.94, PL 1.17–1.26, PW 0.93–1.00, EL 0.56–0.67, AL 1.30, HL/HW 0.95–0.98, HW/PW 0.94, HL/PL 0.70–0.73, PL/PW 1.26, EL/PL 0.48–0.53.

Habitus as in Fig. 2A. Body brown with paler apex, legs yellowish brown, antennae light brown.

Head subquadrate, distinctly dilated posteriorly; punctation coarse and of variable density, sparser in median dorsal area; interstices with fine microreticulation; eyes 1/4 times as long as postocular region in dorsal view.

Pronotum nearly parallel-sided; punctation somewhat sparser than that of head; impunctate midline broad; interstices without microsculpture.

Elytra approximately 0.48–0.53 times as long as pronotum; punctation fine, shallow, and moderately dense. Hind wings completely reduced. Protarsi with weakly pronounced sexual dimorphism.

Abdomen with moderately fine and dense punctation, that of tergite VII noticeably sparser than that of anterior tergites; interstices with fine microsculpture; posterior margin of tergite VII without palisade fringe; tergite VIII without sexual dimorphism, convexly produced posteriorly (Fig. 3A).

Male. Sternites III-VI unmodified; sternite VII (Fig. 3D) transverse, symmetric, and with median impression of subtriangular shape posteriorly, this impression with cluster of distinctly modified, short and stout black setae, posterior margin weakly concave in the middle; sternite VIII (Fig. 3E) transverse, symmetric, and with shallow median impression, on either side of middle with cluster of weakly modified dark setae posteriorly, posterior excision small and of semi-circular shape; aedeagus (Figs 3F, 3H) with ventral process of distinctive shape, apical portion of dorsal plate long, lamellate and moderately sclerotized, basal portion of dorsal plate very short and weakly sclerotized, internal sac with distinctly sclerotized spines.

Female. Sternite VIII (Fig. 3B) much longer than tergite VIII, distinctly produced and finely pubescent posteriorly; tergite X (Fig. 3C) 1.1 times as long as the undivided antero-median portion of tergite IX (Fig. 3C).

Distribution and biological notes. The species is known only from one locality in the Erlang Shan, Sichuan. The specimens were collected at an altitude of 2,200–2,300 m. The holotype was sifted from rhododendron leaves and soil on the east slope of a dry ditch in a rhododendron forest (Fig. 13).

Etymology. The species is named after the mountain where the type locality locality is situated ("Erlang Shan").

Comparative notes. Based on the male and female sexual characters, *L. erlangense* undoubtedly belongs to the *L. bibaculatum* group (Assing, in press c). The similarly derived morphology of the aedeagus (somewhat spear-shaped ventral process, rather massive internal spines), as well as the similar modifications of the male sternites VII and VIII suggest that it is the adelphotaxon of *L. bibaculatum* Assing (in press c) from the Daxiang Ling, from which it is distinguished by somewhat smaller body size and by the more slender ventral process of the aedeagus.

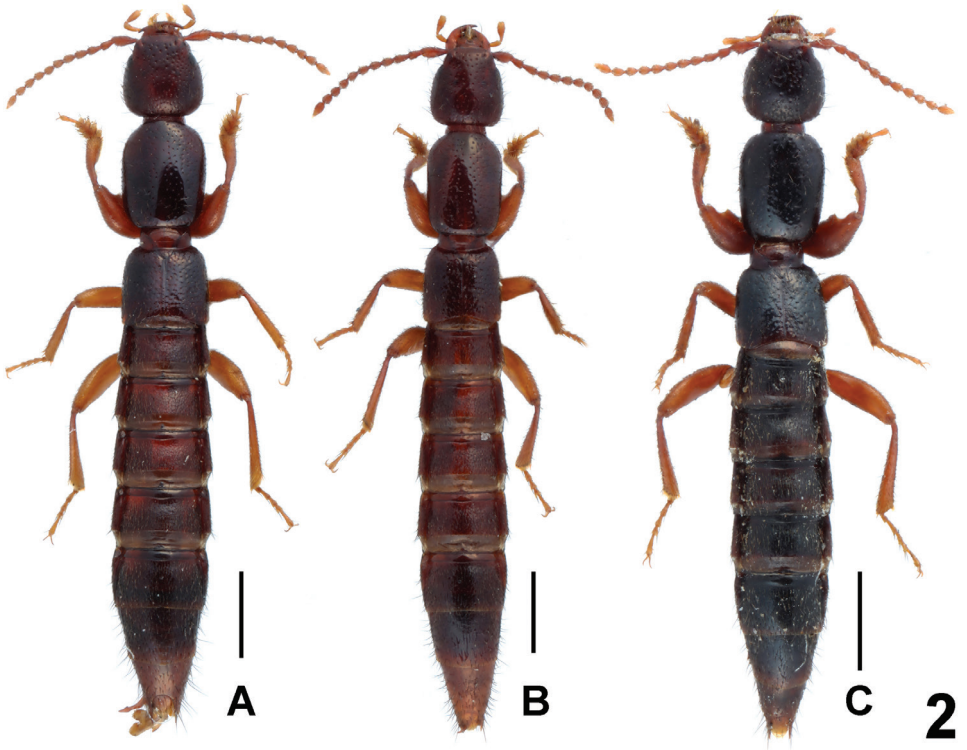

Figure 2. Habitus of *Lathrobium* spp., **A** *L. erlangense* **B** *L. blandum* **C** *L. yelense*. Scale bars: 1.0 mm.

***Lathrobium blandum* Peng & Li, sp. n.**
urn:lsid:zoobank.org:act:851DA1BD-04AD-4C4B-8258-C885CA682F6E
http://species-id.net/wiki/Lathrobium_blandum
Figs 2B, 4, 14

Type material. (1 ♂). Holotype: ♂, labelled 'CHINA: Sichuan Prov., Tianquan County Labahe N. R., 30°10'N, 102°25'E, 12.vii.2012 alt. 2,200–2,300 m, Dai, Peng & Yin leg.' (SNUC).

Description. Measurements (in mm) and ratios: BL 8.62, FL 3.39, HL 0.98, HW 0.94, PL 1.31, PW 0.98, EL 0.70, AL 1.72, HL/HW 1.04, HW/PW 0.96, HL/PL 0.75, PL/PW 1.34, EL/PL 0.53.

Habitus as in Fig. 2B. Body light brown with paler apex, legs yellowish brown, antennae light brown.

Head weakly oblong; punctation moderately coarse and sparse, sparser in median dorsal portion; interstices with shallow microreticulation; eyes 1/5 times as long as postocular region in dorsal view.

Pronotum slender; punctation similar to that of head; impunctate midline moderately broad; interstices without microsculpture.

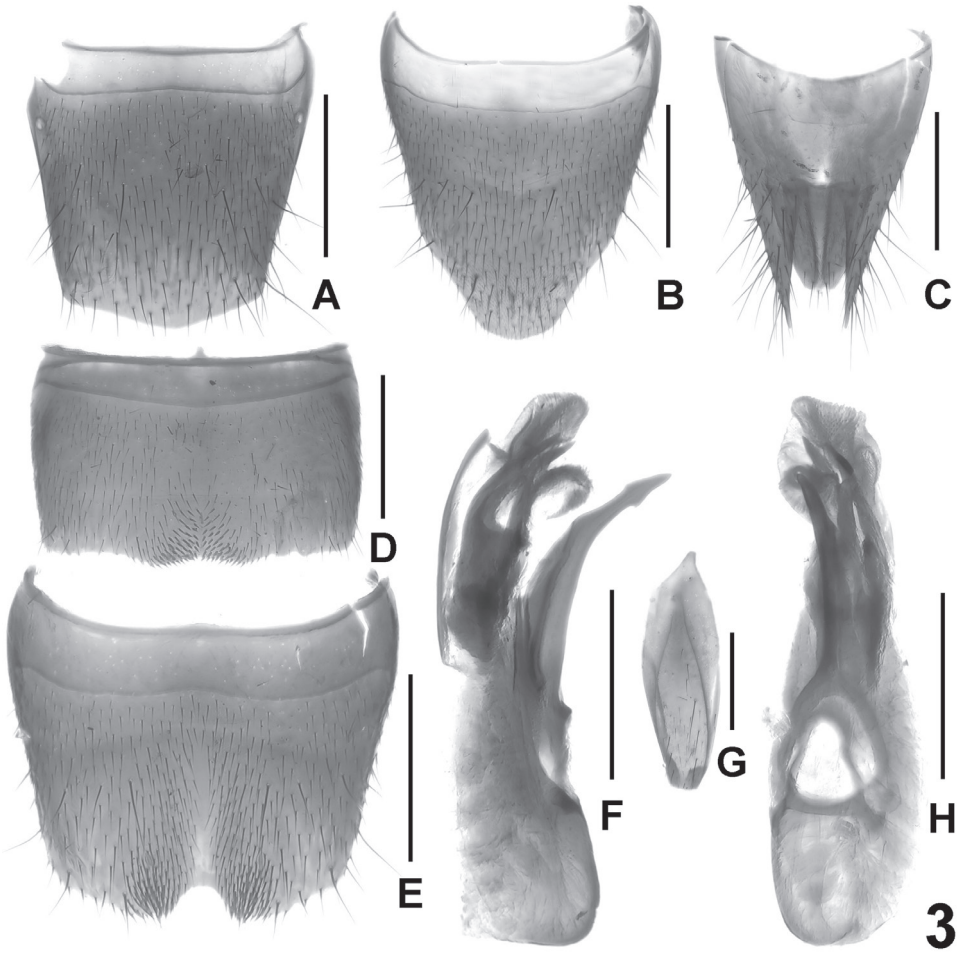

Figure 3. *Lathrobium erlangense*. **A** female tergite VIII **B** female sternite VIII **C** female tergites IX–X **D** male sternite VII **E** male sternite VIII **F** aedeagus in lateral view **G** male sternite IX **H** aedeagus in ventral view. Scale bars: 0.5 mm.

Elytra 0.53 times as long as pronotum; punctation shallow, moderately dense, and rather weakly defined. Hind wings completely reduced.

Abdomen with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with fine microsculpture; posterior margin of tergite VII without palisade fringe.

Male. Sternites III-VI unmodified; sternite VII (Fig. 4A) transverse and with shallow postero-median impression, this impression with weakly modified setae, posterior margin concave in the middle; sternite VIII (Fig. 4B) transverse and impressed along the middle, on either side of this impression with short setae posteriorly, posterior margin broadly concave; sternite IX (Fig. 4D) nearly symmetric; aedeagus as in

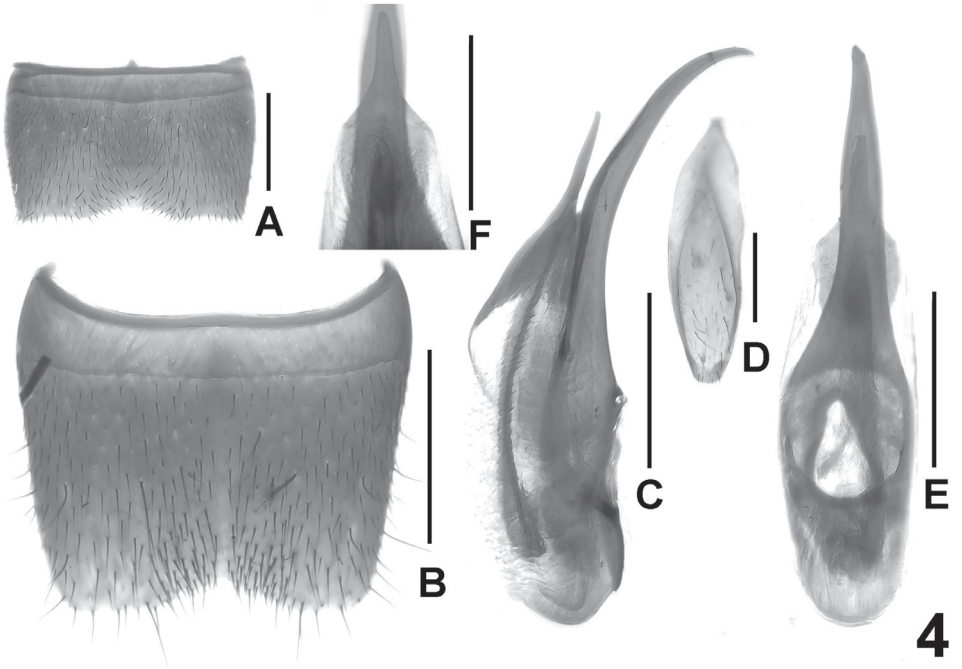

Figure 4. *Lathrobium blandum*. **A** male sternite VII **B** male sternite VIII **C** aedeagus in lateral view **D** male sternite IX **E** aedeagus in ventral view **F** apical portion of aedeagus in dorsal view. Scale bars: 0.5 mm.

Figs 4C, 4E; ventral process evenly curved, slender, and apically acute in lateral view; dorsal plate (Fig. 4F) moderately sclerotized and with long apical portion, apically acute in dorsal view; basal portion short and thin; internal sac with long and slender sclerotized spine.

Female. Unknown.

Distribution and biological notes. The species is known only from one locality in the Labahe Natural Reserve, Sichuan. The holotype was collected by sifting leaf litter and weeds from the floor of the hardwood forest with *Morus cathayana* and *Lonicera* on a westward slope at an altitude of 2,200–2,300 m (Fig. 14).

Etymology. The specific epithet (Latin, adjective: seductive) alludes to the long and slender internal spine of the aedeagus.

Comparative notes. The morphology of the aedeagus suggests that *L. blandum* belongs to the *L. curvatissimum* group (Assing, in press a), which previously included five species from Yunnan (Assing, in press a) and two species from Sichuan (Assing, in press b, c), with which the new species shares the elongated and curved ventral process, and the long apical portion of the dorsal plate of the aedeagus. It is distinguished from the other representatives of this group by the less slender head, the shape and chaetotaxy of the male sternites VIII, as well as by the long and slender sclerotized spine in the internal sac of aedeagus.

Lathrobium yelense **Peng & Li, sp. n.**
urn:lsid:zoobank.org:act:3C6F3FB3-37B7-4289-8A1C-5A3D6A93AE7C
http://species-id.net/wiki/Lathrobium_yelense
Figs 2C, 5, 15

Type material. (4 ♂♂, 2 ♀♀)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Shimian County, Liziping. Yele, 28°54'N, 102°13'E, 15.vii.2012 alt. 2,600 m, Dai, Peng & Yin leg.' (SNUC). Paratypes: 3 ♂♂, 2 ♀♀, same label data as holotype (SNUC).

Description. Measurements (in mm) and ratios: BL 5.95–7.39, FL 2.83–3.20, HL 0.87–0.93, HW 0.88–0.92, PL 1.15–1.18, PW 0.92–0.96, EL 0.63–0.70, AL 1.24–1.29, HL/HW 0.99–1.01, HW/PW 0.94–0.96, HL/PL 0.76–0.79, PL/PW 1.23–1.25, EL/PL 0.55–0.59.

Habitus as in Fig. 2C. Body blackish brown with paler apex, legs and antennae brown to light brown.

Head subquadrate; punctation moderately coarse and rather sparse, slightly sparser in median dorsal portion; interstices with fine microreticulation; eyes 1/4 times as long as postocular region in dorsal view.

Pronotum nearly parallel-sided; punctation similar to that of head; impunctate midline moderately broad; interstices without microsculpture.

Elytra 0.55–0.59 times as long as pronotum; punctation moderately dense, shallow, and weakly defined. Hind wings completely reduced. Protarsi with moderately pronounced sexual dimorphism.

Abdomen with fine and dense punctation, that of tergite VII slightly sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade fringe; tergite VIII with moderately pronounced sexual dimorphism.

Male. Tergite VIII with weakly convex posterior margin; sternites III-VI unmodified; sternite VII (Fig. 5D) transverse, with weakly modified setae in shallow postero-median impression, posterior margin concave in the middle; sternite VIII (Fig. 5E) moderately transverse and impressed along the middle, on either side of this impression with numerous short and dark setae posteriorly, posterior margin shallowly concave in the middle; sternite IX (Fig. 5F) nearly symmetric; aedeagus as in Figs 5G, 5H; ventral process long and apically curved in lateral view; dorsal plate (Fig. 5I) weakly sclerotized and with long apical portion, apically acute in dorsal view; basal portion very short and thin; internal sac without distinct dark membranous structures and apically with moderately sclerotized structure.

Female. Tergite VIII (Fig. 5A) asymmetrically produced posteriorly; sternite VIII (Fig. 5B) longer than tergite VIII, distinctly produced posteriorly, posteriorly finely pubescent; tergite X (Fig. 5C) 0.4 times as long as the undivided antero-median portion of tergite IX (Fig. 5C).

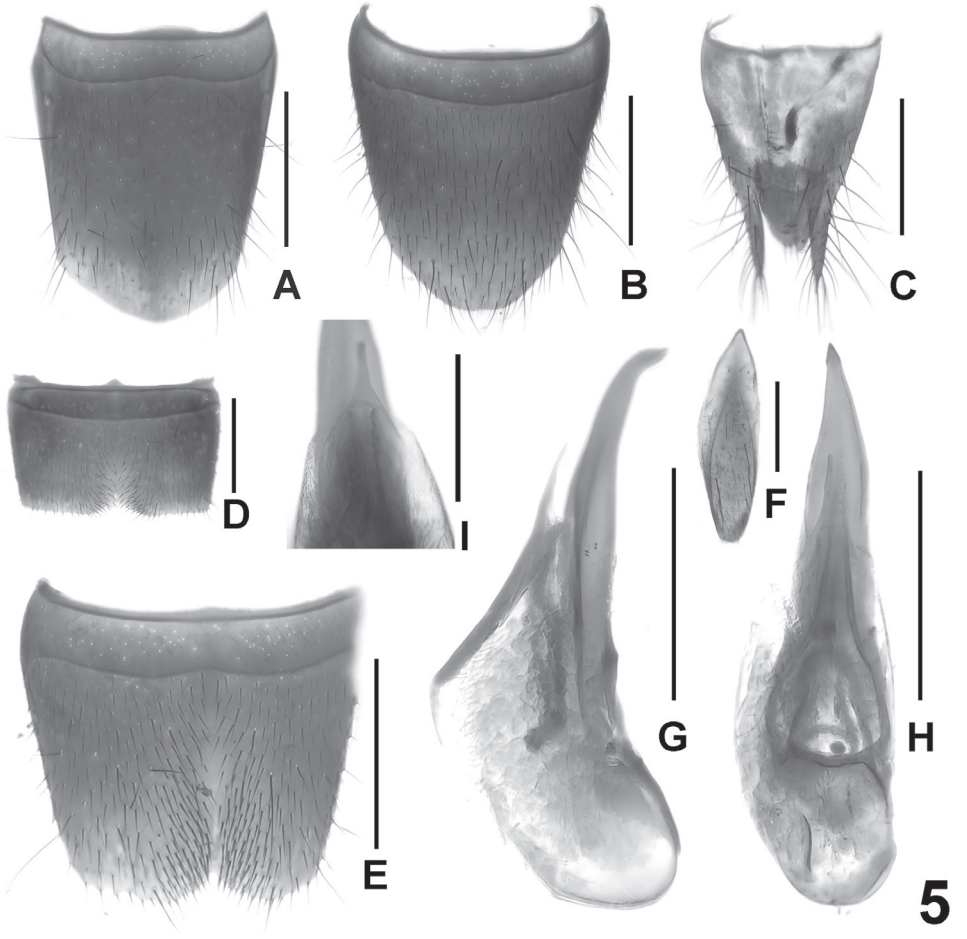

Figure 5. *Lathrobium yelense*. **A** female tergite VIII **B** female sternite VIII **C** female tergites IX–X. **D** male sternite VII **E** male sternite VIII **F** male sternite IX **G** aedeagus in lateral view **H** aedeagus in ventral view **I** apical portion of aedeagus in dorsal view. Scale bars: **A**–**H** 0.5 mm; **I** 0.25 mm.

Distribution and biological notes. This species is currently known only from the type locality. Some of the type specimens were collected by sifting bamboo leaves and humus from the floor of a bamboo forest at an altitude of 2,600 m (Fig. 15).

Etymology. The species is named after its type locality: "Yele".

Comparative notes. Based on the male and female sexual characters, particularly the long and large dorsal plate, and the presence of an apical internal structure of the aedeagus, *L. yelense* may belong belongs to the *L. ensigerum* group (Assing et al. 2013). It is distinguished from the other representatives of this group by the sparser punctation on the head, the shape and chaetotaxy of the male sternite VIII, the oblong female tergite VIII, as well as by the morphology of the aedeagus.

***Lathrobium obscurum* Peng & Li, sp. n.**
urn:lsid:zoobank.org:act:930E1048-C5E3-4923-B2C8-53F5DB650872
http://species-id.net/wiki/Lathrobium_obscurum
Figs 6A, 7

Type material. (1 ♂)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Shimian County, Liziping. Yele, 28°54'N, 102°13'E, 15.vii.2012 alt. 2,600 m, Dai, Peng & Yin leg.' (SNUC).

Description. Measurements (in mm) and ratios: BL 10.17, FL 4.10, HL 1.15, HW 1.20, PL 1.55, PW 1.20, EL 0.83, AL 2.38, HL/HW 0.96, HW/PW 1.00, HL/PL 0.74, PL/PW 1.29, EL/PL 0.54.

Habitus as in Fig. 6A. Body blackish brown with paler apex, legs dark brown, antennae dark brown to brown.

Head weakly transverse; punctation coarse and moderately dense, sparser in median dorsal portion; interstices with fine microreticulation; eyes 1/4 times as long as postocular region in dorsal view.

Pronotum nearly parallel-sided; punctation somewhat sparser than that of head; impunctate midline broad; interstices without microsculpture.

Elytra 0.54 times as long as pronotum; punctation fine, shallow, and moderately dense. Hind wings completely reduced.

Abdomen with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade fringe.

Male. Sternites III-VI unmodified; sternite VII (Fig. 7A) strongly transverse, with median impression of triangular shape posteriorly, this impression with numerous distinctly modified, short and stout black setae; posterior margin distinctly concave in the middle; sternite VIII (Fig. 7B) transverse and broadly impressed along the middle, this impression with short modified setae, posterior margin shallowly concave in the middle; sternite IX (Fig. 7D) nearly symmetric; aedeagus as in Figs 7C, 7E; ventral process long, slender and evenly curved; dorsal plate (Fig. 7F) sclerotized and with long apical portion, apically acute in dorsal view and weakly curved in lateral view; basal portion short and thin; internal sac without sclerotized spines and with membranous structures.

Female. Unknown.

Distribution and biological notes. This species is currently known only from the type locality. The holotype was collected by sifting litter of bamboo and rhododendron from the floor of rhododendron forest at an altitude of 2,600 m.

Etymology. The specific epithet (Latin, adjective: dark) alludes to the dark brown coloration of the legs.

Comparative notes. The morphology of the aedeagus suggests that *L. obscurum* belongs to the *L. curvatissimum* group (Assing, in press a), which previously included five species from Yunnan (Assing, in press a) and two species from Sichuan (Assing, in press b, c), with which the new species shares the long, evenly curved ventral process,

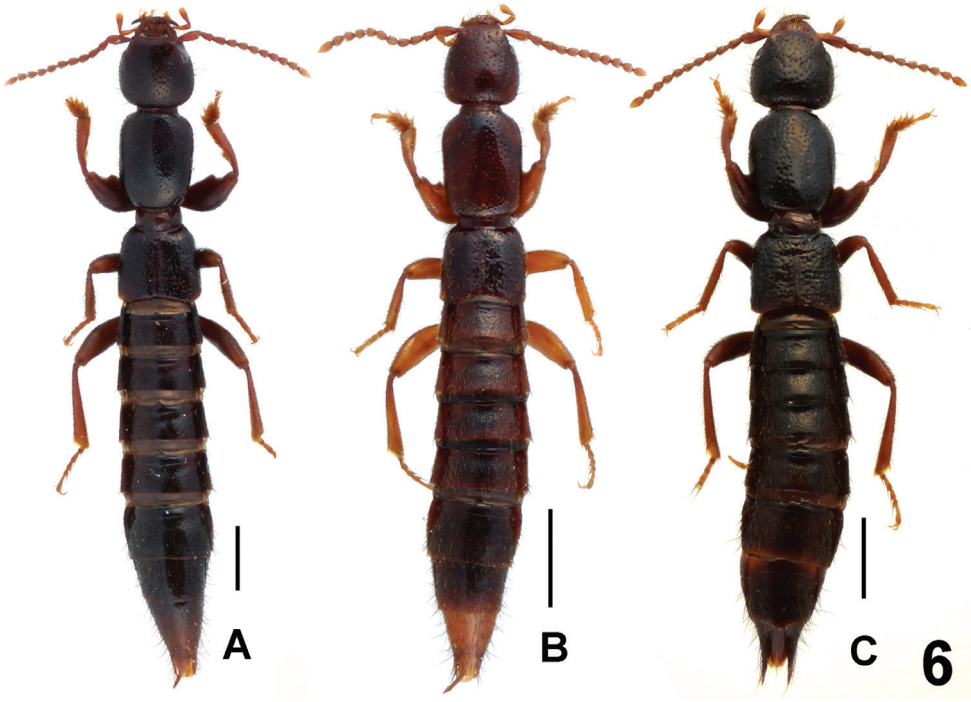

Figure 6. Habitus of *Lathrobium* spp., **A** *L. obscurum* **B** *L. yinziweii* **C** *L. illustre*. Scale bars: 1.0 mm.

the long apical portion of the dorsal plate of the aedeagus and the absence of a distinct posterior excision of the male sternite VIII. It is distinguished from the other representatives of this group by the shape and chaetotaxy of the male sternites VII, as well as by with membranous structures in the internal sac of aedeagus.

***Lathrobium yinziweii* Peng and Li, sp. n.**
urn:lsid:zoobank.org:act:75FC14AD-DF7D-4EBE-95D2-18AC29FBBF1A
http://species-id.net/wiki/Lathrobium_yinziweii
Figs 6B, 8, 15

Type material. (3 ♂♂, 4 ♀♀)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Shimian County, Liziping. Yele, 28°54'N, 102°13'E, 15.vii.2012 alt. 2,600 m, Dai, Peng & Yin leg.' (SNUC). Paratypes: 2 ♂♂, 4 ♀♀, same label data as holotype (SNUC).

Description. Measurements and ratios : BL 5.50–6.89, FL 2.40–2.82, HL 0.72–0.79, HW 0.75–0.78, PL 0.96–1.07, PW 0.77–0.82, EL 0.51–0.57, AL 1.67–1.72, HL/HW 0.96–1.01, HW/PW 0.95–0.97, HL/PL 0.73–0.76, PL/PW 1.25–1.30, EL/PL 0.52–0.54.

Habitus as in Fig. 6B. Body light brown with paler apex, legs yellowish brown, antennae light brown.

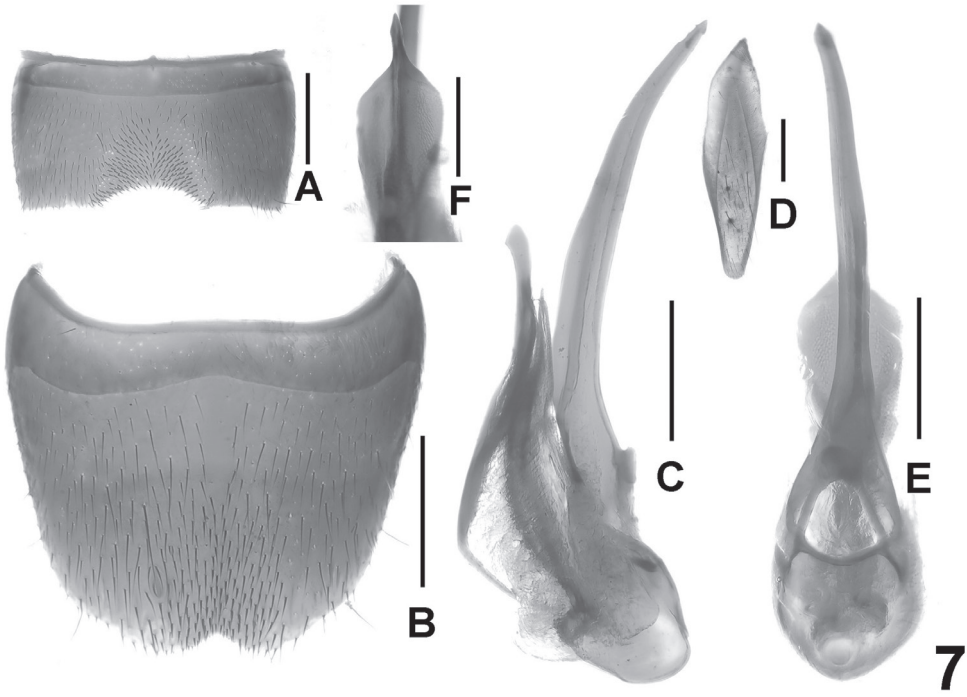

Figure 7. *Lathrobium obscurum*. **A** male sternite VII **B** male sternite VIII **C** aedeagus in lateral view **D** male sternite IX **E** aedeagus in ventral view **F** apical portion of aedeagus in dorsal view. Scale bars: 0.5 mm.

Head subquadrate (HL/HW 0.96–1.01); punctation moderately coarse and sparse, sparser in median dorsal portion; interstices with fine microreticulation; eyes 1/5–1/4 times as long as postocular region in dorsal view.

Pronotum slender; punctation somewhat denser than that of head; impunctate midline broad; interstices without microreticulation.

Elytra 0.52–0.54 times as long as pronotum; punctation fine, shallow, and moderately dense. Hind wings completely reduced. Protarsi with moderately pronounced sexual dimorphism.

Abdomen with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade fringe; tergite VIII with moderately pronounced sexual dimorphism.

Male. Tergite VIII with nearly truncate posterior margin; sternites III-VI unmodified; sternite VII (Fig. 8D) transverse and with shallow postero-median impression, pubescence very weakly modified, posterior margin concave in the middle; sternite VIII (Fig. 8E) broadly impressed along the middle, this impression with short modified setae, posterior margin shallowly concave in the middle; sternite IX (Fig. 8G) asymmetric; aedeagus as in Figs 8F, 8H; ventral process very long, slender, evenly curved, and apically indistinctly spear-shaped; basal portion of dorsal plate very short; internal sac with membranous structures and usual ring-shaped structure.

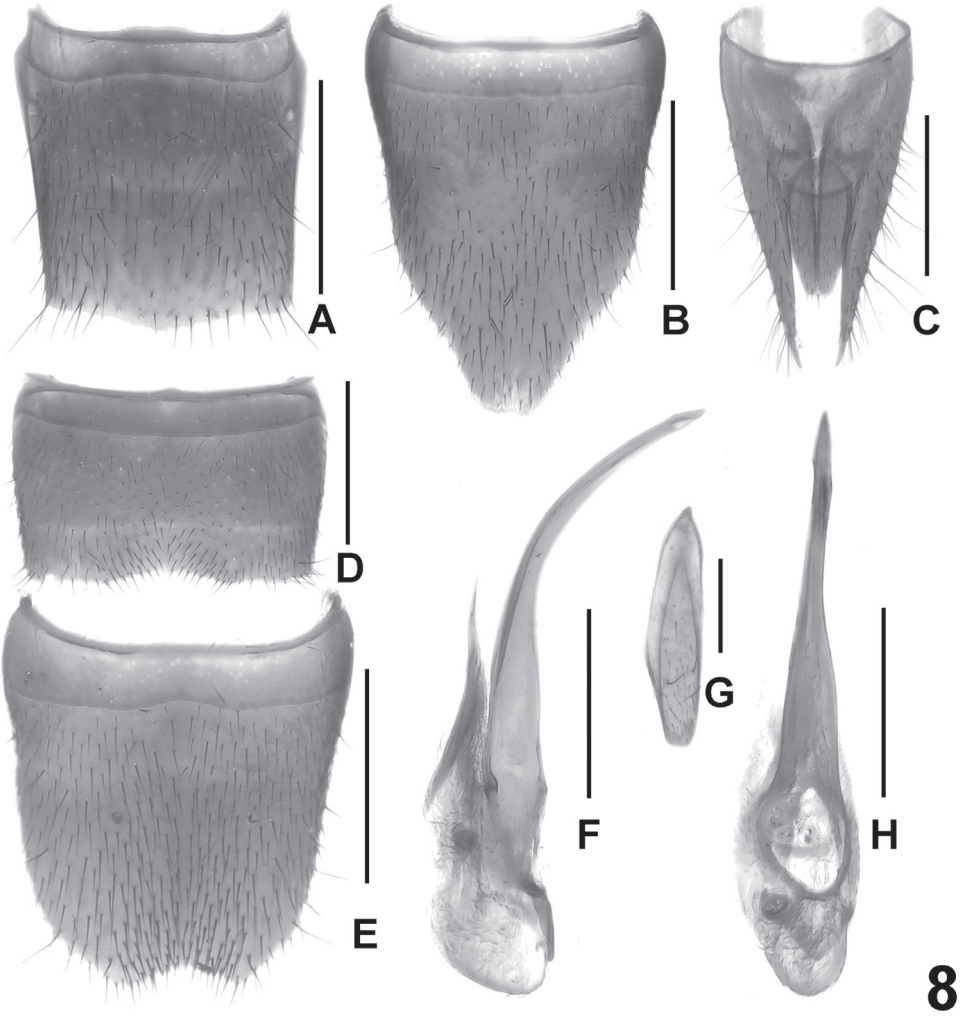

Figure 8. *Lathrobium yinziweii*. **A** female tergite VIII **B** female sternite VIII **C** female tergites IX–X. **D** male sternite VII **E** male sternite VIII **F** aedeagus in lateral view **G** male sternite IX **H** aedeagus in ventral view. Scale bars: 0.5 mm.

Female. Posterior margin of tergite VIII (Fig. 8A) weakly convex; sternite VIII (Fig. 8B) much longer than tergite VIII and rather narrowly produced posteriorly; tergites IX-X (Fig. 8C) long and slender, tergite X (Fig. 8C) 1.4 times as long as anteromedian portion of tergite IX (Fig. 8C).

Distribution and biological notes. This species is currently known only from the type locality. One male was collected by sifting bamboo leaves and humus from the floor of the bamboo forest (Fig. 15). The other specimens were collected by sifting litter of bamboo and rhododendron from the floor of a rhododendron forest at an altitude of 2,600 m.

Etymology. The species is named after Yin Zi-Wei, who collected the type specimens.

Comparative notes. *Lathrobium yinziweii* is evidently closely related to *L. diffissum* (Assing, in press b) from the Luoji Shan. Both species share an aedeagus of similar morphology (ventral process long, slender, curved, and apically indistinctly spear-shaped; basal portion of dorsal plate very short; internal sac without sclerotized structures), a similar shape of the male sternite VII and sternite VIII (the posterior margin concave in the middle), a male sternite VIII with dense, but not distinctly modified pubescence, and a long and undivided antero-median portion of the female sternite IX. *Lathrobium yinziweii* is distinguished by the shape of the male sternite VIII (not transverse and with posterior excision), by the morphology of the aedeagus (ventral process evenly curved and slender; dorsal plate longer), by the shape of female sternite VIII, and by the long and slender female tergite IX-X.

Lathrobium illustre Peng & Li, sp. n.

urn:lsid:zoobank.org:act:D980B711-7DFD-458C-8DA5-F1181F6F38FC
http://species-id.net/wiki/Lathrobium_illustre
Figs 6C, 9, 15

Type material. (1 ♂, 2 ♀♀)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Shimian County, Liziping. Yele, 28°54'N, 102°13'E, 15.vii.2012 alt. 2,600 m, Dai, Peng & Yin leg.' (SNUC). Paratypes: 2 ♀♀, same label data as holotype (SNUC).

Description. Measurements (in mm) and ratios: BL 7.84–9.23, FL 3.34–3.77, HL 1.02–1.05, HW 1.11–1.15, PL 1.44–1.50, PW 1.18–1.22, EL 0.74–0.78, AL 1.76, HL/HW 0.91–0.92, HW/PW 0.94, HL/PL 0.70–0.71, PL/PW 1.22–1.23, EL/PL 0.51–0.52.

Habitus as in Fig. 6A. Body dark brown with paler apex, legs and antennae dark brown to light brown.

Head weakly transverse; punctation coarse and moderately sparse, sparser in median dorsal portion; interstices with fine microreticulation; eyes 1/4–3/8 times as long as postocular region in dorsal view.

Pronotum weakly convex in dorsal view; punctation somewhat denser than that of head; impunctate midline broad; interstices without microreticulation and shining.

Elytra 0.51–0.52 times as long as pronotum; punctation fine, shallow, and moderately dense. Hind wings completely reduced. Protarsi with weakly pronounced sexual dimorphism.

Abdomen with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade fringe; tergite VIII without sexual dimorphism; posterior margin broadly convex (Fig. 9A).

Male. Sternites III-VI unmodified; sternite VII (Fig. 9D) transverse, with median impression of triangular shape posteriorly, this impression with numerous distinctly modified, short and stout black setae; posterior margin distinctly concave in the middle; sternite

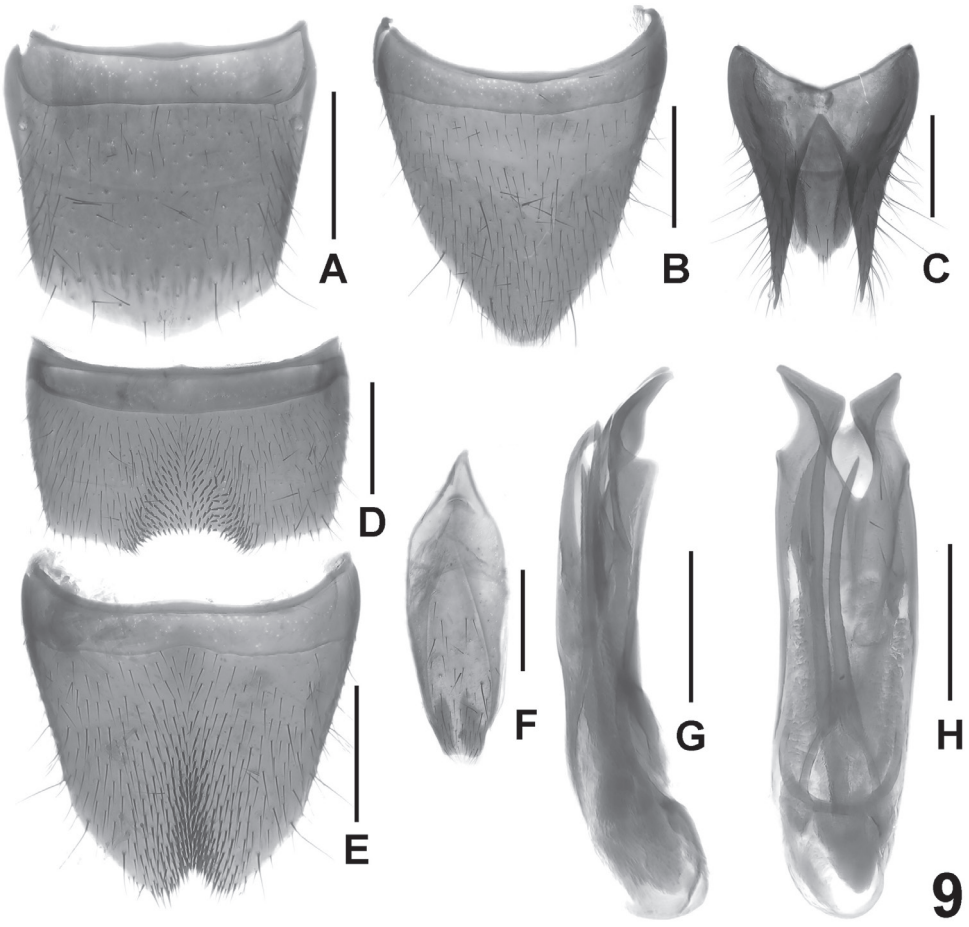

Figure 9. *Lathrobium illustre*. **A** female tergite VIII **B** female sternite VIII **C** female tergites IX–X. **D** male sternite VII **E** male sternite VIII **F** male sternite IX **G** aedeagus in lateral view **H** aedeagus in ventral view. Scale bars: 0.5 mm.

VIII (Fig. 9E) impressed along the middle, this impression with dense short setae, posterior excision small and nearly V-shaped; sternite IX (Fig. 9F) symmetric; aedeagus as in Figs 9G, 9H; ventral process bilobed apically, asymmetric and of distinctive shape; dorsal plate long and sclerotized; internal sac with two long and slender sclerotized spines.

Female. Sternite VIII (Fig. 9B) much longer than tergite VIII, distinctly produced posteriorly; tergite X (Fig. 9C) 5.7 times as long as antero-median portion of tergite IX (Fig. 9C).

Distribution and biological notes. This species is currently known only from the type locality. The specimens were collected by sifting bamboo leaves and humus from the floor of a bamboo forest at an altitude of 2,600 m (Fig. 15).

Etymology. The specific epithet (Latin, adjective: shining) alludes to the shining pronotum.

Comparative notes. Based on the apically bilobed ventral process and the anteriorly short and undivided median portion of the female tergite IX, *L. illustre* may belong belongs to the *L. fissispinosum* group. It is distinguished from the other representatives of this group by the shining pronotum, the shape and chaetotaxy of the male sternite VII and male sternite VIII, as well as by the morphology of the aedeagus.

***Lathrobium micangense* Peng & Li, sp. n.**
urn:lsid:zoobank.org:act:EF416164-BE8D-437F-8DD7-ABDE4F4BB91A
http://species-id.net/wiki/Lathrobium_micangense
Figs 10A, 11, 16

Type material. (1 ♂)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Nanjiang County Mt. Micangshan, 32°39'N 107°01'E, 27.iv.2008 alt. 1,800 m, Huang & Xu leg.' (SNUC).

Description. Measurements (in mm) and ratios: BL 6.78, FL 2.68, HL 0.83, HW 0.85, PL 1.11, PW 0.93, EL 0.56, AL 1.46, HL/HW 0.98, HW/PW 0.91, HL/PL 0.75, PL/PW 1.19, EL/PL 0.50.

Habitus as in Fig. 10A. Body reddish brown with paler apex, legs light brown, antennae reddish brown to yellowish brown.

Head subquadrate; punctation moderately coarse and sparse, sparser in median dorsal portion; interstices with fine microreticulation; eyes 1/4 times as long as postocular region in dorsal view.

Pronotum nearly parallel-sided; punctation somewhat denser than that of head; impunctate midline broad; interstices without microsculpture.

Elytra 0.50 times as long as pronotum; punctation moderately dense, defined or weakly defined. Hind wings completely reduced.

Abdomen with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade fringe.

Male. Sternites III-VI unmodified; sternite VII (Fig. 11A) transverse and deeply impressed in postero-median portion, this impression with several long dark setae, posterior margin weakly concave in the middle; sternite VIII (Fig. 11B) distinctly asymmetric and broadly impressed in postero-median portion, this impression with dense dark long setae, posterior margin broadly concave; sternite IX (Fig. 11G) asymmetric; aedeagus as in Figs 11D, 11E; ventral process long and asymmetric in ventral view; dorsal plate long and thin; internal sac with straight moderately sclerotized spine.

Female. Unknown.

Distribution and biological notes. The species is known only from one locality in Micang Shan, Sichuan. The holotype was collected by sifting dry leaf litter and moss on a southward slope with *Prunus* at an altitude of 1,800 m (Fig. 16).

Etymology. The species is named after its type locality: "Micang Shan".

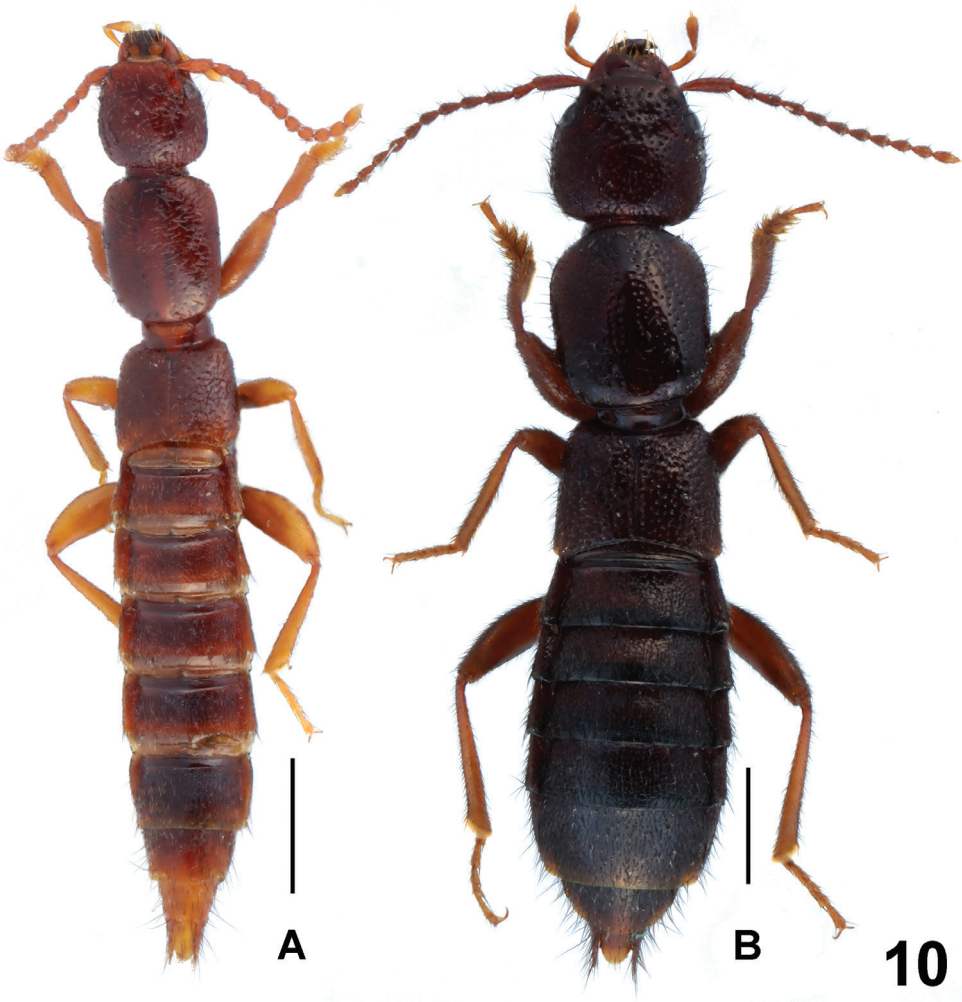

Figure 10. Habitus of *Lathrobium* spp., **A** *L. micangense* **B** *L. agglutinatum*. Scale bars: 1.0 mm.

Comparative notes. Based on the morphology of the aedeagus (the shapes and chaetotaxy of the male sternites VII and VIII, presence of a moderately sclerotized spine in the internal sac, asymmetric ventral process), *L. micangense* belongs to the *L. fissispinosum* group. The morphology of the ventral process and the similar shape, the chaetotaxy of the male sternite VII and the asymmetric male sternite VIII suggest that it is closely related to *L. longispinosum*, from which *L. micangense* differs by the smaller body, the arrangement of the modified setae of the male sternite VIII, the shapes of the ventral process and the dorsal plate of the aedeagus, and the straight moderately sclerotized internal spine of the aedeagus (*L. longispinosum*: spine weakly curved).

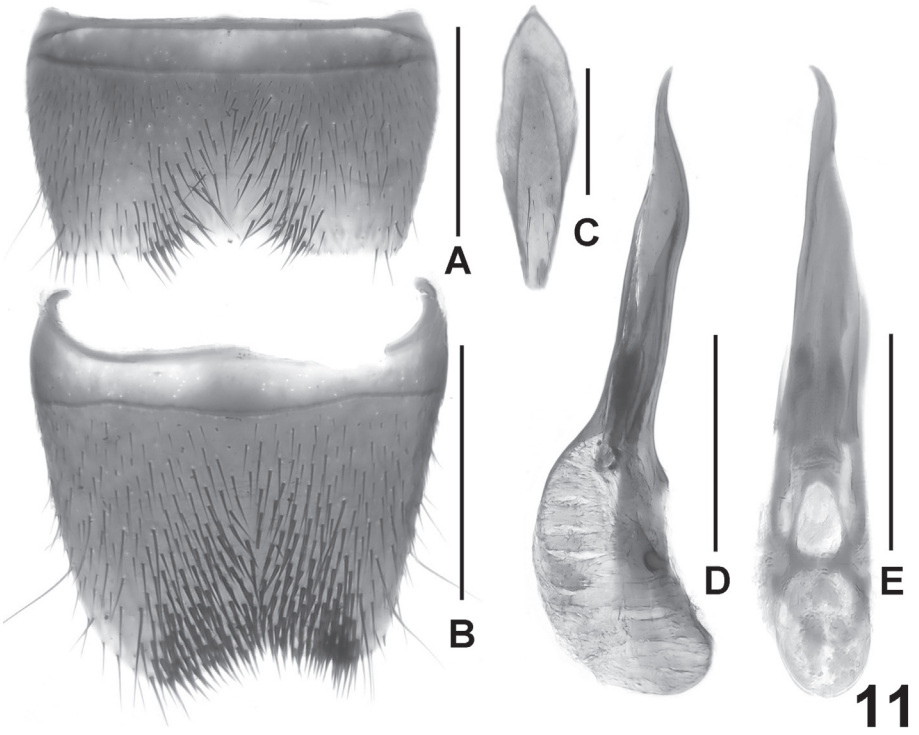

Figure 11. *Lathrobium micangense*. **A** male sternite VII **B** male sternite VIII **C** male sternite IX **D** aedeagus in lateral view **E** aedeagus in ventral view. Scale bars: 0.5 mm.

***Lathrobium agglutinatum* Assing & Peng, sp. n.**
urn:lsid:zoobank.org:act:4DBEE816-245C-4921-828B-F807A5F32488
http://species-id.net/wiki/Lathrobium_agglutinatum
Figs 10B, 12, 17

Type material. (3 ♂♂)**.** Holotype: ♂, labelled 'CHINA: Sichuan Prov., Dujiangyan City, Mt. Qingchengshan, 30°57'N, 103°28'E, 30.vii.2012 alt. 1,700 m, Dai, Peng & Yin leg.' (SNUC). Paratypes: 1 ♂, same label data as holotype (SNUC); 1 ♂, 'China (Sichuan) 1999, Qingcheng-shan, (Umg. Heavenly Old Village) 1000-1300 m, 18./20.VI. Heinz leg.' (cAss).

Description. Measurements (in mm) and ratios: BL 7.78–9.51, FL 4.00–4.28, HL 1.25–1.28, HW 1.38–1.40, PL 1.63–1.68, PW 1.40–1.43, EL 0.81–0.83, AL 1.65–1.70, HL/HW 0.91, HW/PW 0.98–0.99, HL/PL 0.77, PL/PW 1.16–1.17, EL/PL 0.49–0.50.

Habitus as in Fig. 5A. Body dark brown with paler apex, legs and antennae brown to light brown.

Head subquadrate; punctation dense and coarse; interstices with fine microreticulation; eyes 0.3 times as long as postocular region in dorsal.

Pronotum with weakly convex lateral margins in dorsal view; punctation somewhat sparser than that of head; impunctate midline narrow; interstices without microsculpture.

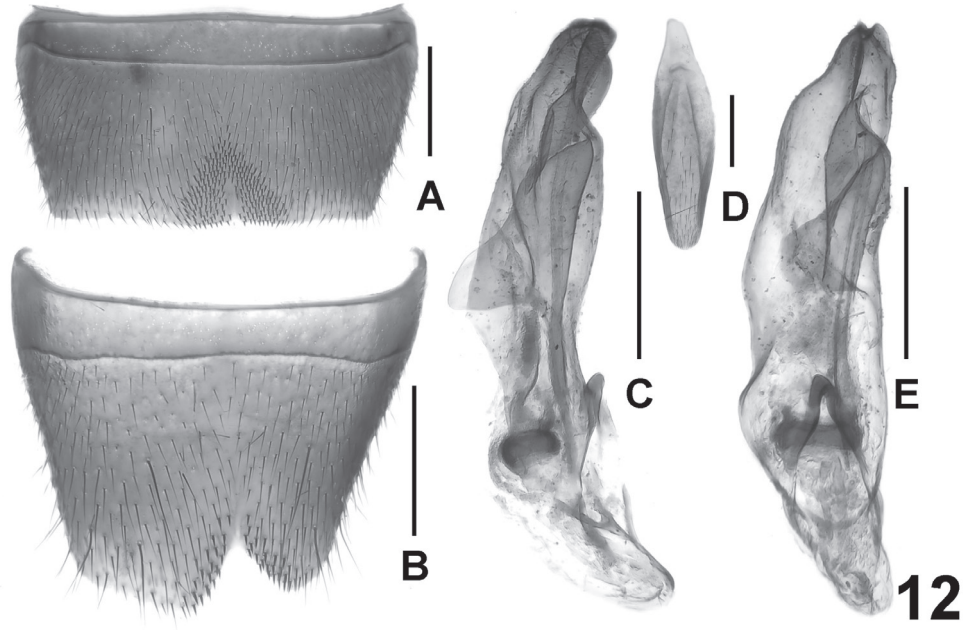

Figure 12. *Lathrobium agglutinatum*. **A** male sternite VII **B** male sternite VIII **C** aedeagus in lateral view **D** male sternite IX **E** aedeagus in ventral view. Scale bars: 0.5 mm.

Elytra 0.49–0.50 times as long as pronotum; punctation shallow and much denser than that of pronotum; interstices without distinct microsculpture. Hind wings reduced.

Abdomen much broader than elytra, with fine and dense punctation, that of tergite VII sparser than that of anterior tergites; interstices with shallow microsculpture; posterior margin of tergite VII without palisade.

Male. Sternites III-VI unmodified; sternite VII (Fig. 12A) strongly transverse and with short dark seta in triangular postero-median impression, posterior margin nearly truncate; sternite VIII (Fig. 12B) transverse and weakly impressed in postero-median portion, posterior excision pronounced, deep and asymmetric, anterior margin of this excavation with short dark setae; sternite IX (Fig. 12D) asymmetric; aedeagus as in Figs 12C, 12E; ventral process and dorsal plate fused; basal portion of aedeagus small; internal sac with usual ring-shaped structure.

Female. Unknown.

Distribution and biological notes. The species is known only from one locality in the Qingcheng Shan, Sichuan. Two specimens were collected by sifting leaf litter and humus from the floor of a hardwood forest with Cherokee rose and *Rubus* at an altitude of 1,700 m (Fig. 17).

Etymology. The specific epithet is the past participle of the Latin verb agglutinare (to glue together) and alludes to the fused ventral process and dorsal plate of the aedeagus.

Comparative notes. *Lathrobium agglutinatum* is undoubtedly closely related to *L. conexum* and belongs to the *L. iunctum* group (Assing et al., 2013). This conclusion is

Figures 13–17. Habitats of the new species. **13** Erlang Shan, alt. 2,200–2,300 m (*L. erlangense* sp. n.) **14** Labahe Natural Reserve, alt. 2,200–2,300 m (*L. blandum* sp. n.) **15** Yele, alt. 2,600 m (*L. illustre* sp. n., *L. yinziweii* sp. n. and *L. yelense* sp. n.) **16** Micang Shan, alt. 1,800 m (*L. micangense* sp. n.) **17** Qingcheng Shan, alt. 1,700 m (*L. agglutinatum* sp. n.).

supported by the similarly derived structure of the aedeagus (ventral process and dorsal plate fused, asymmetric, and slender; basal portion small; internal sac with small and weakly sclerotized basal sclerite); the similarly derived shape and chaetotaxy of the

male sternite VIII (posterior excision asymmetric, the anterior margin of this excavation with short dark setae), and by the extremely similar external characters. Both species are best distinguished by the completely different shape and chaetotaxy of the male sternite VII and by the differently shaped apex of the aedeagus. For illustrations of the species of the *L. iunctum* group from the Emei Shan see Assing et al. (2013).

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RESEARCH ARTICLE

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Two new species of oribatid mites of the genus *Truncozetes* (Acari, Oribatida, Epactozetidae) from Ecuador

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Abstract

Two new oribatid mite species of the genus *Truncozetes* (Oribatida, Epactozetidae), *T. ecuadoriensis* **sp. n.** and *T. monodactylus* **sp. n.**, are described from the Ecuadorian soils. The morphology of the gnathosoma and the legs is presented in detail for the first time for the species of *Truncozetes*. An identification key to all known species of the family Epactozetidae is given.

Keywords

Oribatid mites, Epactozetidae, *Truncozetes*, new species, key, Ecuador

Introduction

Epactozetidae is a small oribatid mite family of the superfamily Achipterioidea (Acari, Oribatida), comprising of two genera (*Epactozetes* Grandjean, 1930, *Truncozetes* Balogh and Mahunka, 1969) and five species, which are distributed in the Neotropical region.

Epactozetes is a genus that was proposed by Grandjean (1930) with *Epactozetes imitator* Grandjean, 1930 as type species. Currently, this genus comprises two species: *Epactozetes imitator* Grandjean, 1930 (see Grandjean 1930) and *E. setosus* Balogh and Mahunka, 1969 (see Balogh and Mahunka 1969b). The main diagnostic characters of this genus are (summarized from Balogh and Balogh 1988, 1992; with our opinions): lamellae as long as prodorsum, fused or connected medio-anteriorly; genital plates with five pairs of setae; leg tarsi with three claws.

Truncozetes is a genus that was proposed by Balogh and Mahunka (1969a) with *Truncozetes mucronatus* Balogh and Mahunka, 1969 as type species. Currently, this genus comprises three species: *Truncozetes mucronatus* Balogh and Mahunka, 1969 (see Balogh and Mahunka 1969a), *T. rugosus* Mahunka, 1998 (see Mahunka 1998) and *T. sturmi* Balogh, 1984 (see Balogh 1984). The main diagnostic characters of this genus are (summarized from Balogh and Mahunka 1969a; Balogh and Balogh 1988, 1992; with our opinions): lamellae shorter than prodorsum, well separated, connected by translamella; notogaster with large posterior tubercle; genital plates with five to six pairs of setae; leg tarsi with one or three claws (one species with monodactylous legs I and tridactylous legs II–IV).

During taxonomic identification of the Ecuadorian oribatid mite fauna, we discovered two new epactozetid species belonging to the genus *Truncozetes*. The main purpose of this paper is to describe and illustrate these species under the names *Truncozetes ecuadoriensis* sp. n. and *T. monodactylus* sp. n. The morphology of the gnathosoma and the legs is presented in detail for the first time for the species of the genus *Truncozetes*.

An identification key to all known species of the family Epactozetidae is provided.

Materials and methods

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. Body length was measured from the side, i.e. from the tip of the rostrum to the posterior edge of the ventral plate. Notogastral width refers to the maximum width in dorsal aspect. Lengths of body setae were measured from the lateral side. All body measurements are given in micrometers (μm). Formulae for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

General terminology used in this paper follows that summarized by Norton and Behan-Pelletier (2009).

Descriptions of new species

***Truncozetes ecuadoriensis* sp. n.**
urn:lsid:zoobank.org:act:DF076204-3191-4390-89C5-D356720287A0
http://species-id.net/wiki/Truncozetes_ecuadoriensis
Figs 1, 2, 5–17

Diagnosis. Body size 315–332 × 215–232. Translamella thin, straight. Sensilli with weakly barbed elongate-oval head. Five pairs of genital and two pairs of anal setae present. Leg tarsus I monodactylous, leg tarsi II–IV tridactylous.

Description. *Measurements*. Body length: 315 (holotype), 315, 332 (two paratypes); notogaster width: 215 (holotype), 215, 232 (two paratypes).

Integument. Body color brown. Surface covered by cerotegumental microgranules (visible under high magnification). Foveolae distinct, larger on pteromorphs (diameter up to 12).

Prodorsum. Rostrum widely rounded. Lamellae with lateral point anteriorly. Translamella very thin, straight. Rostral setae (*ro*) of medium size (41–45), setiform, barbed. Lamellar (*le*, 6–8) and interlamellar (*in*, 2–4) setae short, thin, smooth. Sensilli (*ss*, 53–61) with short stalk and weakly barbed elongate-oval, head. Exobothridial setae and their alveoli absent. Tutotia (*tu*) knife-form, with long and sharp cusps, reaching insertions of rostral setae.

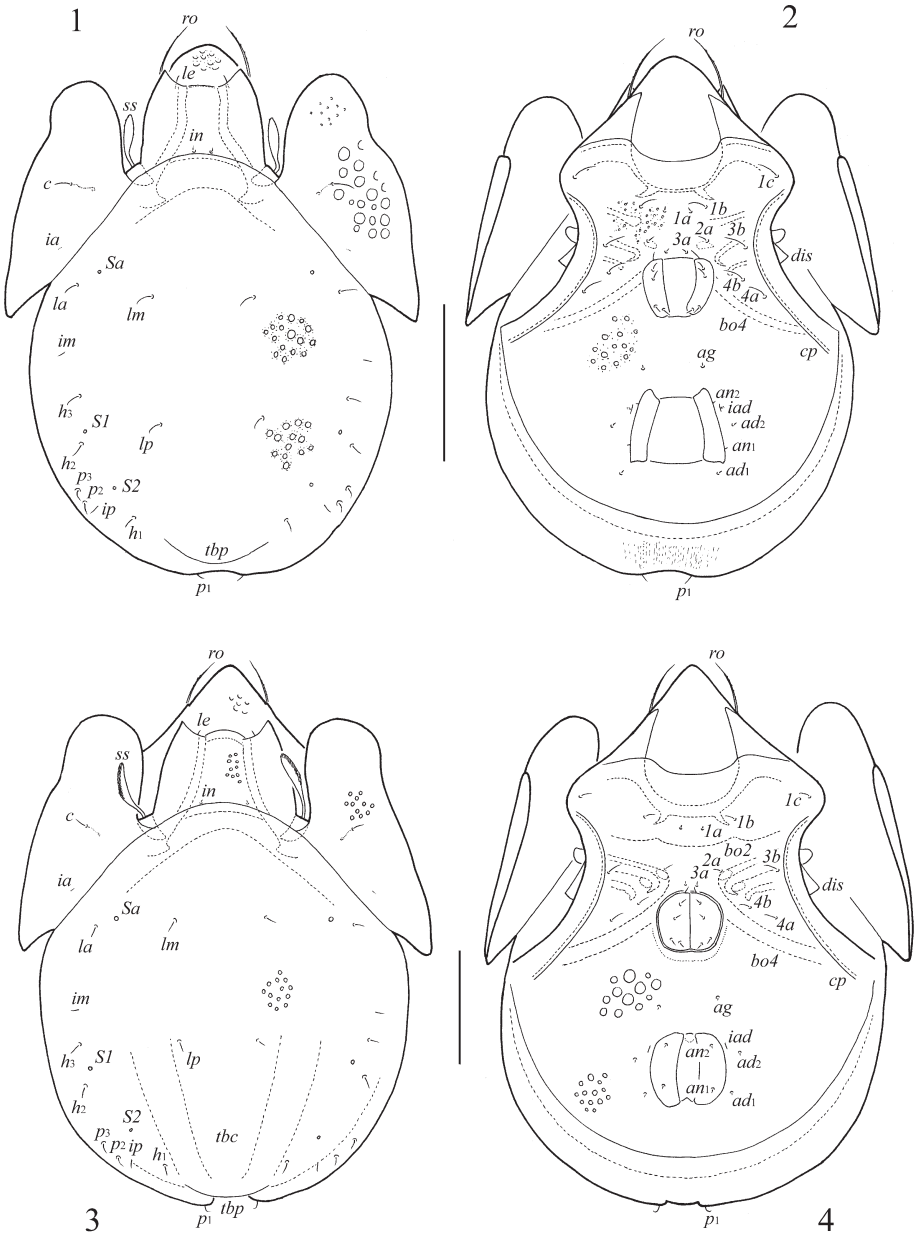
Notogaster. Weakly concave posteriorly. Posterior tubercle (*tbp*) poorly developed. Ten pairs of short (12–16), thin, smooth notogastral setae. Three pairs of small sacculi: *Sa* inserted antero-medially to setae *la*; *S1* – antero-medially to setae h_2; *S2* – antero-laterally to setae h_1. Lyrifissures *ia* located on pteromorphs, but poorly visible; *im* – antero-laterally to setae h_3; *ip* – postero-laterally to sacculi *S2*; *ih* and *ips* located in lateral positions. Opisthonotal gland openings not found.

Gnathosoma. Subcapitulum longer than wide (77 × 61). Subcapitular (*h*, *m*, *a*) and adoral (or_1, or_2) setae similar in length (12) setiform, smooth. Palps (61) with setation 0–2–1–3–9 (+ω). Solenidion (ω) thickened, straight, attached with eupathidium (*acm*). Chelicerae (77) with one setiform, barbed seta (*cha*, 24); possible *chb* also present, but we found only their alveolus in dissected specimen. Trägårdh's organ (Tg) long, elongate conical.

Epimeral and lateral podosomal regions. Apodemal border 4 (*bo4*) complete, wide, brownish. Epimeral setal formula: 3–1–2–2. Epimeral setae short, setiform, smooth; *1a*, *3a* (2) shorter than *2a* (8), *1b*, *1c*, *3b*, *4a*, *4b* (12–16). Discidia (*dis*) triangular. Circumpedal carinae (*cp*) distinct.

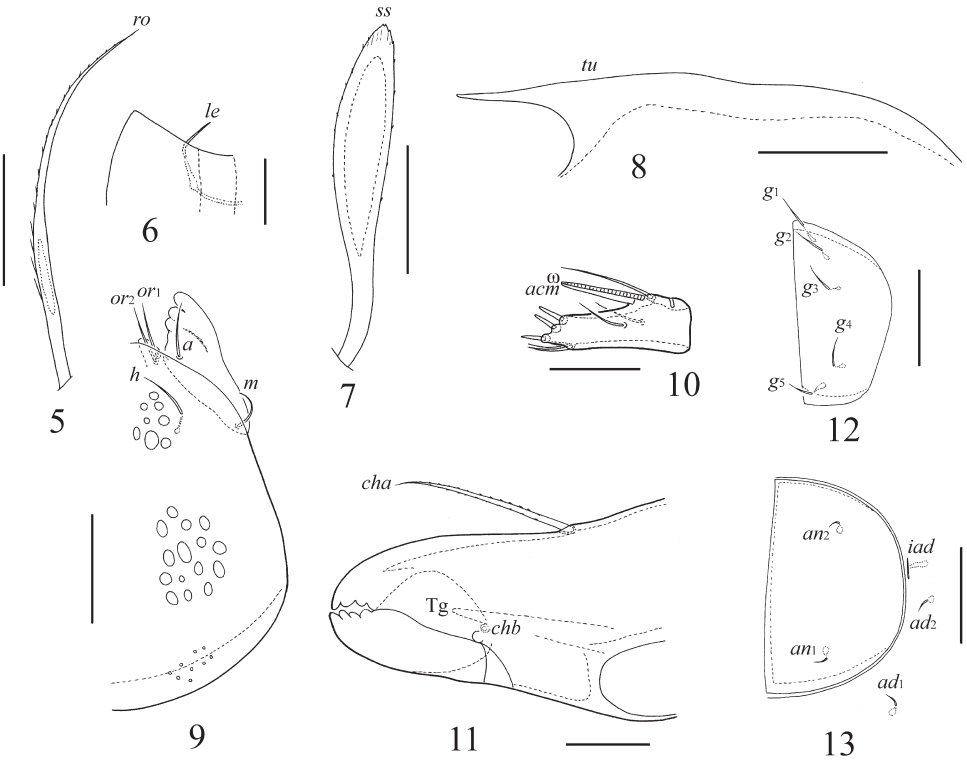
Anogenital region. Five pairs of genital (g_1–g_5, 8), one pair of aggenital (*ag*, 2–4), two pairs of anal (an_1, an_2, 2–4) and two pairs of adanal (ad_1, ad_2, 2–4) setae short, setiform, thin, smooth. Lyrifissures *iad* located in paraanal position.

Legs. Tarsus I with one claw, tarsi II–IV with three claws. Dorsal side of tarsus I and dorso-proximal part of tibia IV with strong thorn (*t*); antero-ventral side of genu I



Figures 1–4. *Truncozetes ecuadoriensis* sp. n. (1, 2) and *T. monodactylus* sp. n. (3, 4), adults. **1, 3** body dorsally **2, 4** body ventrally (gnathosoma and legs not illustrated). Scale bars: (1, 2) 100 μm, (3, 4) 50 μm. Abbreviations in text.

with small thorn; ventral side of tarsus I and tibia I with large tubercles (*tb*). Formulae of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–5–2–3–15) [1–1–2], III (1–2–1–2–15) [1–1–0], IV (0–2–1–2–12) [0–1–0]; homology of setae and solenidia



Figures 5–13. *Truncozetes ecuadoriensis* sp. n., adult. **5** rostral seta **6** lamellar seta and anterior part of lamella dorsally **7** sensillus **8** tutorium **9** subcapitulum ventrally, left part **10** palptarsus laterally **11** anterior part of chelicera **12** genital plate, left **13** anal plate, left. Scale bars: (**5, 7–9, 12, 13**) 20 μm, (**6, 10, 11**) 10 μm. Abbreviations in text.

indicated in Table 1. Famulus (*e*) thin, straight, inserted anteriorly to thorn. Setae barbed (except smooth *p* and *s* on tarsus I). Solenidia ω_1 on tarsus I, ω_1, ω_2 on tarsus II, σ on genua III thickened, blunt-ended, other solenidia setiform.

Material examined. Holotype (male), two paratypes (male, female): Ecuador, 3°58'S, 79°50'W, Estación Científica San Francisco, 2000 m a.s.l., upper organic soil layer in mostly undisturbed rain forest, 01.04.2009, collected by F. Marian and D. Sandmann.

Type deposition. The holotype (in alcohol) is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; one paratype (in alcohol) is deposited in the collection of the Siberian Zoological Museum, Novosibirsk, Russia; one paratype (dissected) is in the personal collection of the first author.

Etymology. The specific name "*ecuadoriensis*" refers to the country of origin, Ecuador.

Remarks. The new species is clearly distinguishable from other known species of the genus *Truncozetes* by the different number of leg claws (leg I monodactylous, legs II–IV tridactylous versus all legs monodactylous or tridactylous). Additional distinctive characters of a new species with the other species of the genus can be found in the identification key given below.

Table 1. Leg setation and solenidia of *Truncozetes ecuadoriensis* sp. n. (same for *T. monodactylus* sp. n.)

Leg	Trochanter	Femur	Genu	Tibia	Tarsus
I	*v'*	*d, (l), bv", v"*	*(l), v', σ*	*(l), (v), φ_1, φ_2*	*(ft), (tc), (it), (p), (u), (a), s, (pv), v', (pl), l", e,* ω_1, ω_2
II	*v'*	*d, (l), bv", v"*	*(l), σ*	*l', (v), φ*	*(ft), (tc), (it), (p), (u), (a), s, (pv),* ω_1, ω_2
III	*l'*	*d, ev'*	*l', σ*	*(v), φ*	*(ft), (tc), (it), (p), (u), (a), s, (pv)*
IV	-	*d, ev'*	*d*	*(v), φ*	*ft", (tc), (p), (u), (a), s, (pv)*

Roman letters refer to normal setae (*e* to famulus), Greek letters to Solenidia. Single prime (') marks setae on anterior and double prime (") setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

Truncozetes monodactylus sp. n.

urn:lsid:zoobank.org:act:C92C81FB-B822-44D3-899B-056490CC1C47
http://species-id.net/wiki/Truncozetes_monodactylus
Figs 3, 4

Diagnosis. Body size 232 × 166. Translamella concave medially. Sensilli with lanceolate head densely ciliated on dorsal side. Dorso-central part of notogaster with large tubercle. Five pairs of genital and two pairs of anal setae. All leg tarsi monodactylous.

Description. *Measurements*. Body length: 232 (holotype and paratype), 166 (holotype and paratype).

Integument. Body color brown. Surface covered by cerotegumental microgranules (visible under high magnification). Foveolae distinct, small (diameter up to 6).

Prodorsum. Rostrum narrowly rounded. Lamellae with lateral point anteriorly. Translamella thick, concave medially. Rostral setae of medium size (24), setiform, barbed. Lamellar (4) and interlamellar (2) setae minute. Sensilli (32) with short stalk and elongate-oval head, which is densely ciliate on dorsal side. Exobothridial setae and their alveoli absent. Tutotia knife-form, reaching insertions of rostral setae.

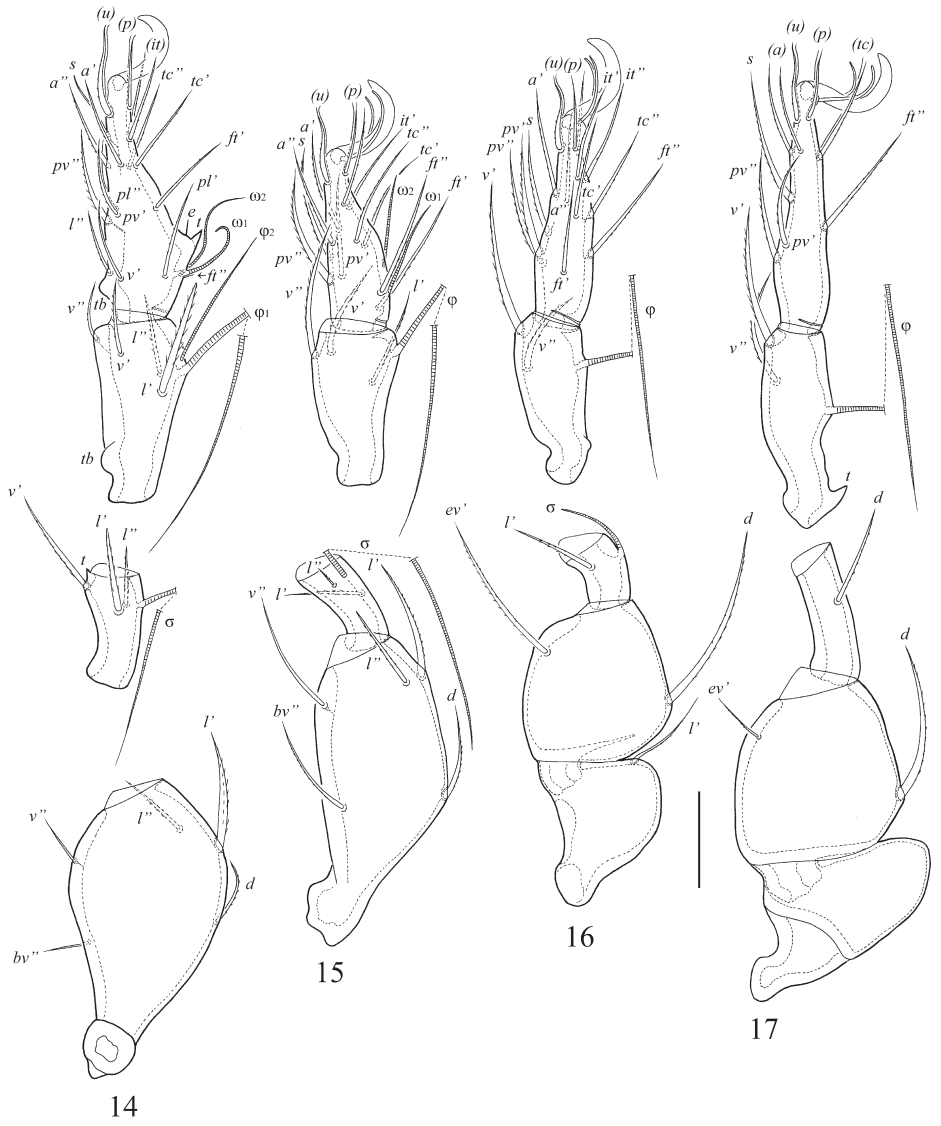
Notogaster. Concave posteriorly. Dorso-central part convex, with elongate hump-like tubercle (*tbc*). Posterior tubercle (*tbp*) well developed. Ten pairs of short (8–12), thin, smooth notogastral setae present. Three pairs of small sacculi visible, but *S2* poorly visible. Position of lyrifissures as in *Truncozetes ecuadoriensis* sp. n. Opisthonotal gland openings not found.

Gnathosoma. Similar to *Truncozetes ecuadoriensis* sp. n.

Epimeral and lateral podosomal regions. Apodemal borders 2 (*bo2*) and 4 (*bo4*) wide, fused medially, brownish. Epimeral setal formula: 3–1–2–2. Epimeral setae short, setiform, smooth; *1a*, *3a* (2) shorter than *2a* (4), *1b*, *1c*, *3b*, *4a*, *4b* (8). Discidia triangular. Circumpedal carinae distinct.

Anogenital region. Five pairs of genital (4), one pair of aggenital (2), two pairs of anal (2) and two pairs of adanal (2) setae short. Lyrifissures *iad* located in paraanal position.

Legs. Similar to *Truncozetes ecuadoriensis* sp. n., but all tarsi with one strong claw.



Figures 14–17. *Truncozetes ecuadoriensis* sp. n., adult. **14** leg I (without trochanter), right, paraxial view **15** leg II (without trochanter), left, antiaxial view **16** leg III, right, antiaxial view **17** leg IV, right, antiaxial view. Scale bar: 20 μm. Abbreviations in text.

Material examined. Holotype (female), one paratype (female): Ecuador, 3°70'S, 78°58'W, Bombuscaro, Podocarpus National Park, 1050 m a.s.l., upper organic soil layer in mostly undisturbed rain forest, 01.04.2009, collected by F. Marian and D. Sandmann.

Type deposition. The holotype (in alcohol) is deposited in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia; one paratype (dissected) is in the personal collection of the first author.

Etymology. The specific name "*monodactylus*" refers to the one claw on all leg tarsi.

Remarks. The new species is clearly distinguishable from other known species of the genus *Truncozetes* by the monodactylous legs (versus all legs tridactylous or leg I monodactylous, legs II–IV tridactylous). Additional distinctive characters of this species from other species of the genus can be found in the identification key given below.

Key to known species of Epactozetidae

1 Lamellae shorter than prodorsum, well separated, connected by translamella ..... **2 (genus *Truncozetes*)**

– Lamellae as long as prodorsum, fused or connected medio-anteriorly .... **6 (genus *Epactozetes*)**

2 All leg tarsi with one claw; apodemal borders II and IV fused medially; body size: 232 × 166.... ***Truncozetes monodactylus* sp. n.** (Distribution: Ecuador)

– All leg tarsi with three claws or only leg tarsus I with one claw; apodemal borders II and IV not fused medially **3**

3 Leg tarsus I with one claw, leg tarsi II–IV with three claws; genital plates with five pairs of setae; body size: 315–332 × 215–232..... ..... ***Truncozetes ecuadoriensis* sp. n.** (Distribution: Ecuador)

– All leg tarsi with three claws; genital plates with six pairs of setae..... **4**

4 Dorsal notogastral setae *lm* and *lp* inserted in lateral position of notogaster, approximately in one longitudinal row with setae *la* and h_3; distal part of sensillus dark; body size: 233–244 × 171–176 .... ***Truncozetes rugosus* Mahunka, 1998** (Distribution: Antilles)

– Dorsal notogastral setae *lm* and *lp* inserted in dorsal position of notogaster; distal part of sensillus not dark..... **5**

5 Epimeral region with distinct longitudinal stria; sensillar heads densely barbed; body size: 228 × 168 ..... ***Truncozetes mucronatus* Balogh & Mahunka, 1969** (Distribution: Neotropical region)

– Epimeral region without longitudinal stria; sensillar heads smooth; body size: 308–336 × 176–185 .... ***Truncozetes sturmi* Balogh, 1984** (Distribution: Neotropical region)

6 Lamellae fused medio-anteriorly; notogastral setae visible; body size: 235–270 × 180–235 ..... ***Epactozetes setosus* Balogh & Mahunka, 1969** (Distribution: Neotropical region)

– Lamellae connected medio-anteriorly; notogastral setae not visible; body size: 210–235 × 160 ....***Epactozetes imitator* Grandjean, 1930** (Distribution: Central America)

Acknowledgements

We cordially thank Prof. Dr. Badamdorj Bayartogtokh (National University of Mongolia, Ulaanbaatar, Mongolia) for valuable comments, and Dr. Jenő Kontschán (Hungarian National History Museum, Hungary) for help with in studying of the paratype of *Truncozetes sturmi* Balogh, 1984.

Oribatid mites were investigated as part of the Research Unit "Biodiversity and sustainable management of a megadiverse mountain ecosystem in South Ecuador", subproject "Soil fauna: Diversity and functioning" headed by Mark Maraun and Stefan Scheu; financial support by the German Research Foundation is gratefully acknowledged (RU 816).

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RESEARCH ARTICLE

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Two new species of the genera *Mysmena* and *Trogloneta* (Mysmenidae, Araneae) from Southwestern China

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Abstract

Two new spider species of the family Mysmenidae Petrunkevitch, 1928 are reported from Southwestern China, i.e., *Mysmena wawuensis* **sp. n.** (male and female) from Sichuan and *Trogloneta yuensis* **sp. n.** (male) from Chongqing. Diagnoses and illustrations of the new species are provided.

Keywords

Taxonomy, diagnosis, description, forest, etymology

Introduction

Mysmenidae is a small family of minute araneoid spiders. Although the family Mysmenidae is distributed worldwide, it is one of the least-studied family-level groups among orb-weaving spiders, and its diversity is grossly undersampled due to their small size (0.7–3 mm) and cryptic life style (Lopardo et al. 2011). Mysmenids mainly occur in leaf litter and other cryptic places in very humid habitats (Lopardo & Coddington

2005), and even in caves. Their distribution ranges throughout the tropical or subtropical regions of Eurasia, America and Africa. According to the latest records, a total of 123 species and 23 genera were reported in the family Mysmenidae (Platnick 2013). Up to present, 30 species placed in 9 genera have been described in China (Yin et al. 2004; Ono 2007; Lin and Li 2008; Miller et al. 2009).

The genus *Mysmena* was erected by Simon in 1894 initially as a genus of the family Theridiidae with the type species *Theridion leycoplagiatum* Simon, 1879; later transferred to the Symphytognathidae by Forster (1959), and then to the family Mysmenidae by Forster and Platnick (1977). To date, 23 *Mysmena* species have been reported worldwide (Platnick 2013), including 12 species from China which is about a half of all species of the genus *Mysmena* (Ono 2007; Lin and Li 2008; Miller et al. 2009).

The genus *Trogloneta* was established and placed in the family Theridiidae by Simon in 1922 for a minute spider from caves in France, *T. granulum* ("*Troglonata*" was misspelled in the original description, see Simon 1926: 313) (Brescovit & Lopardo 2008). Gertsch (1960) transferred this genus to the family Symphytognathidae, and then Forster & Platnick (1977) put it in the family Mysmenidae. Until now there is no consistent diagnosis for *Trogloneta*, Brescovit and Lopardo (2008) proposed that this genus can be distinguished from other mysmenids by the following combination of features: AME smaller than ALE; one femoral spot on leg I on both males and females; one male clasping spine on metatarsus I; males with highly elevated and conical carapace, and male pedipalp very large. Additional diagnostic characters may include the clustering of eyes around the apex of the carapace in males (Fig. 8A–B; Lin & Li 2008: figs 16A–B, 19A–B) and the abdomen usually pointed dorsal-posteriorly (the exception is *T. denticocleari* Lin & Li, 2008, which has a globose abdomen).

At present, 9 *Trogloneta* species are known from America, Europe, Asia and some Atlantic islands (Platnick 2013), including two species reported from China (Lin & Li 2008): one found in caves from the Yunnan-Guizhou Plateau, another found at the canopy of Xishuangbanna tropical rainforest.

In this paper we described two new species of genera *Mysmena* and *Trogloneta* from Wawu Mt., Sichuan and Jinyun Mt., Chongqing of Southwestern China, *Mysmena wawuensis* sp. n. and *Trogloneta yuensis* sp. n.

Material and methods

Specimens were examined and measured under an Olympus SZX7 stereomicroscope. Further details were studied under an Olympus BX43 compound microscope. All drawings were made using a drawing tube attached to Olympus BX43 compound microscope, and then inked on ink jet plotter paper. Photos were taken with a Canon EOS 60D wide zoom digital camera (8.5 megapixels). The images were montaged using Helicon Focus 3.10 software. Male pedipalpi and female genitalia were examined and illustrated after they were dissected and detached from the spiders' bodies. Vulvae were removed and treated in lactic acid before illustration. To reveal the course of spermatic

duct, the pedipalpal bulb was also treated in lactic acid and mounted in Hoyer's Solution. Left pedipalp of male spiders was illustrated. All specimens are preserved in 85% ethanol solution.

All measurements are in millimeters. Leg measurements are given as: total length (femur, patella, tibia, metatarsus, and tarsus). The terminology mostly follows Lopardo et al. (2011). The abbreviations used in text including: AER – anterior eye row; ALE – anterior lateral eye; AME – anterior median eye; PER – posterior eye row; PLE – posterior lateral eye; PME – posterior median eye. All specimens are deposited in the Zoological Department of the School of Life Science, Sichuan University Museum (SCUM) in Chengdu.

Taxonomy

Mysmena Simon, 1894

Type species. *Theridion leycoplagiatum* Simon, 1879

Mysmena wawuensis sp. n.

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http://species-id.net/wiki/Mysmena_wawuensis
Figs 1–7, 13

Material examined. Holotype: CHINA, Sichuan: Hongya County, Wawu Mt. National Forest Park, Gufuping, 29°40.114'N, 102°57.515'E, elevation ca 1929 m, 27 June 2012, by hand collection, Yucheng Lin leg., male (SCUM).

Paratypes: [same data as holotype] (SCUM), 2 females.

Etymology. The specific name is taken from the type locality; adjective.

Diagnosis. This new species is similar to *Mysmena goudao* Miller, Griswold & Yin, 2009 (see Miller et al. 2009: 39, figs 21F–G, 27A–E, 28A–B, 29A–F) in male pedipalpal shape and female genital configuration. Male differs from the latter by the presence of a subdistal cymbial process (Figs 3D–E, 5A, 6E), a subdistal-ventral marcoseta on the pedipalpal femur (Figs 2A–B, 5A–B), the absence of cymbial groove (Figs 3D–E, 6D–E). Female by a small, weakly sclerotized scape (Figs 4B–C, 7B–C), a paired rugose accessory bursae (Figs 4C, 7C) and twisted course of spermathecae (Figs 4C, 7C).

Description. Male (holotype). Somatic characters see Fig. 1A–C. Coloration: Prosoma brown centrally, dark marginally. Sternum black. Opisthosoma black, with tiny yellow speckles.

Measurement: Total length 0.60. Prosoma 0.36 long, 0.35 wide, 0.32 high. Opisthosoma 0.36 long, 0.32 wide, 0.39 high. Clypeus 0.12 high. Sternum 0.25 long, 0.21 wide. Length of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 1.14 (0.36, 0.14, 0.25, 0.18, 0.21); II 0.97 (0.30, 0.13, 0.21, 0.14, 0.19); III 0.76 (0.21, 0.11, 0.13, 0.13, 0.18); IV 0.93 (0.29, 0.13, 0.20, 0.14, 0.17).

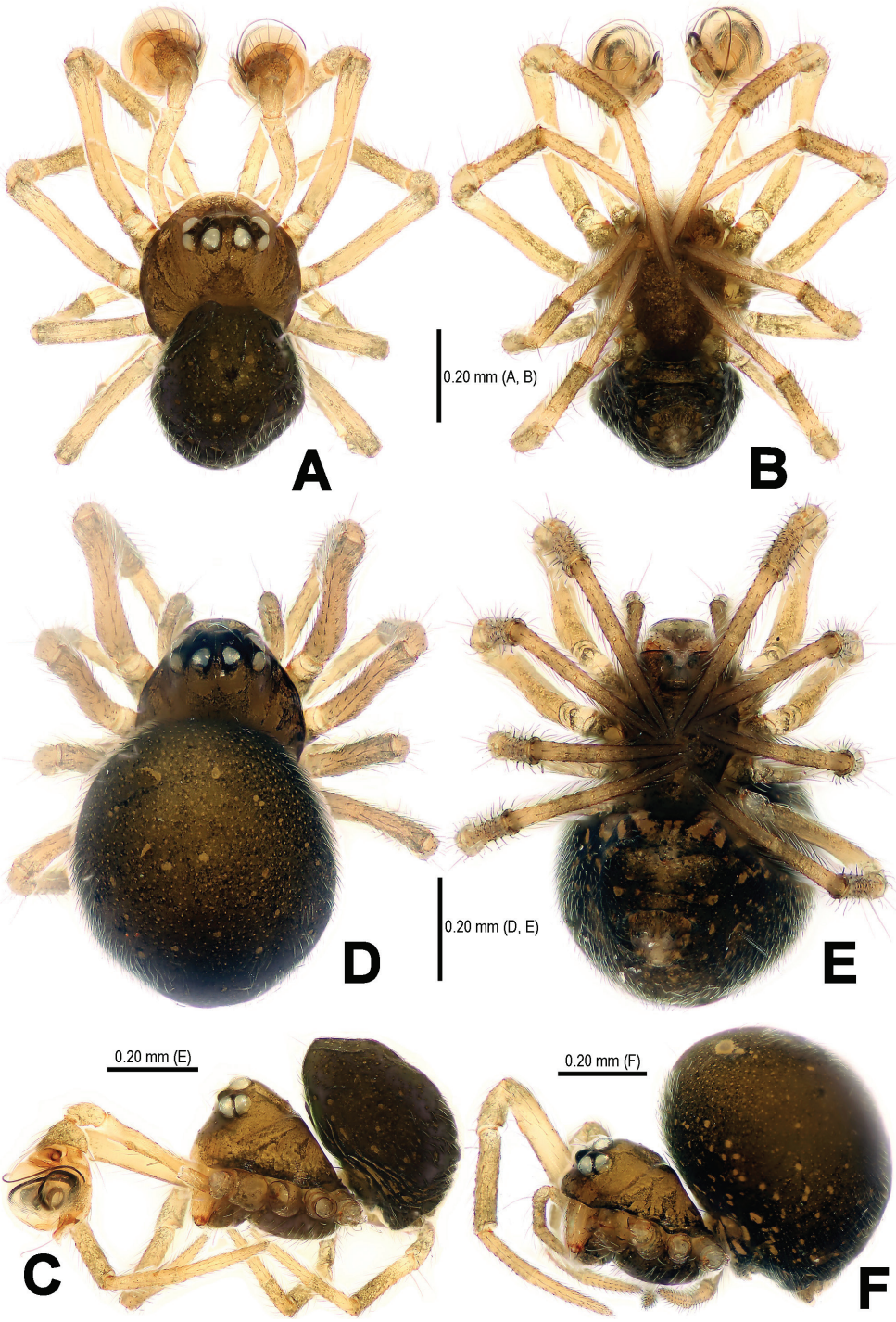

Figure 1. *Mysmena wawuensis* sp. n., male holotype (**A–C**) and female paratype (**D–F**). **A–F** Habitus. **A, D** dorsal view **B, E** ventral view **C, F** lateral view.

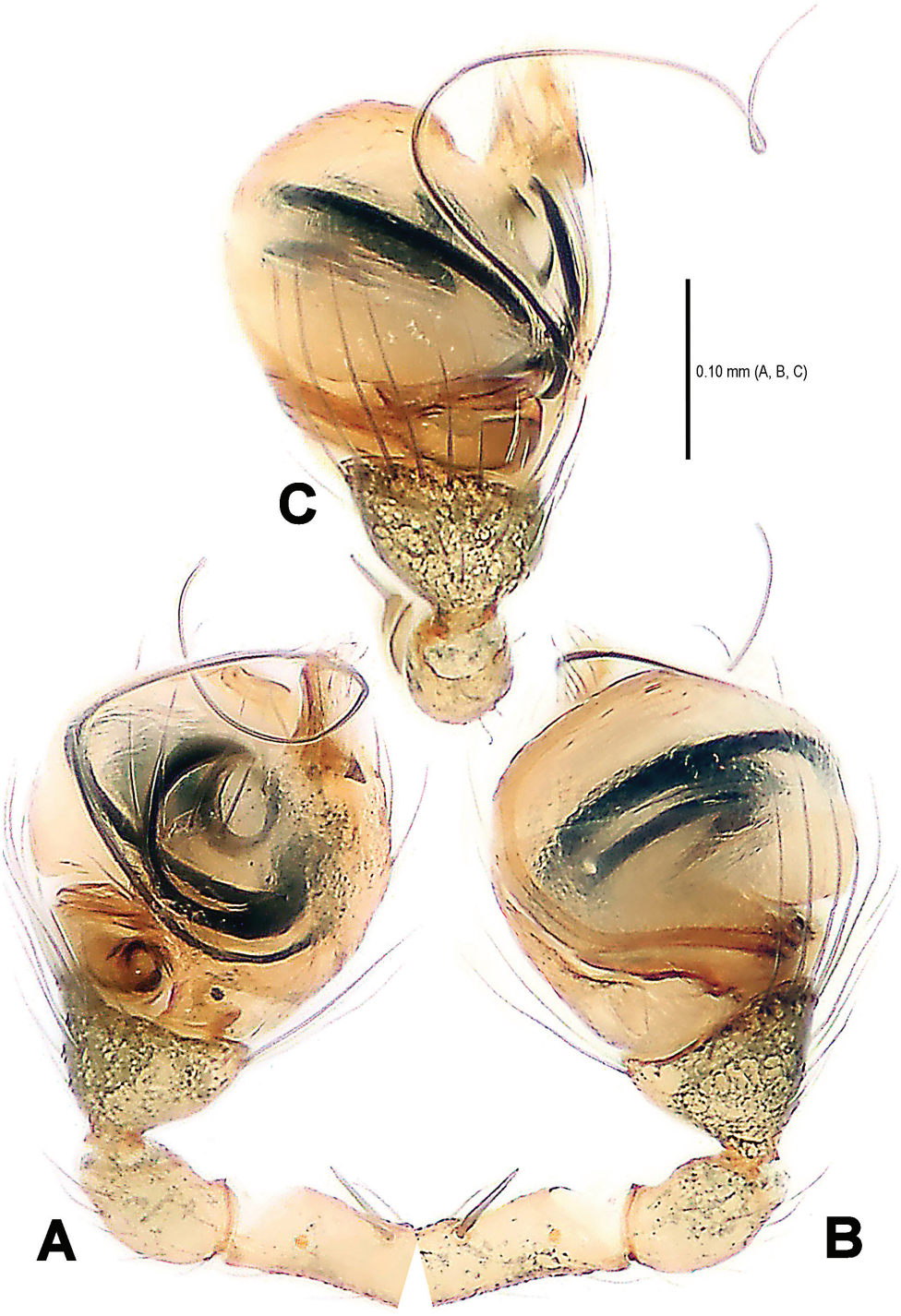

Figure 2. *Mysmena wawuensis* sp. n., male holotype. **A–C** Left pedipalp. **A** prolateral view **B** retrolateral view **C** dorsal view.

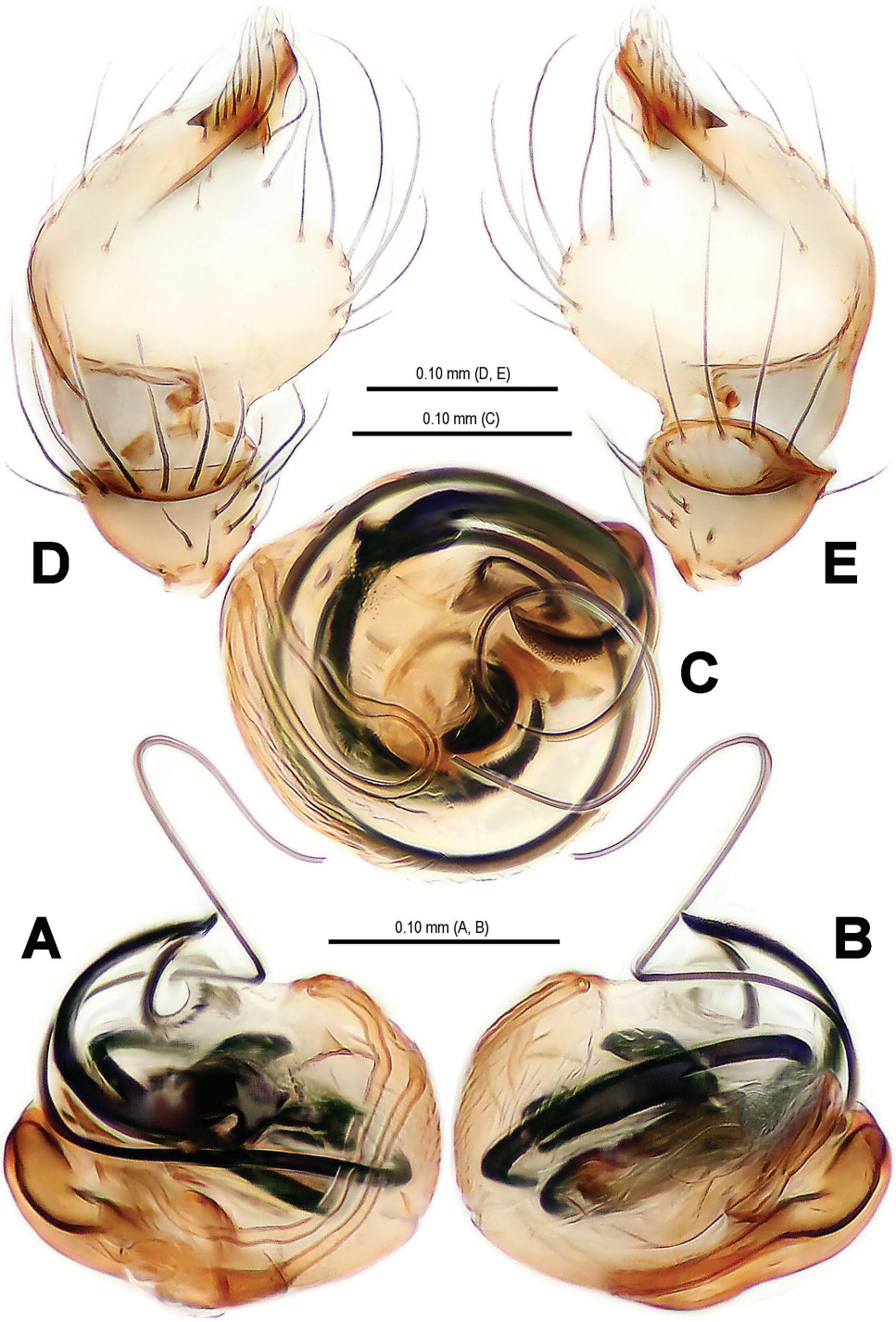

Figure 3. *Mysmma wawuensis* sp. n., male holotype. **A–C** Pedipalpal bulb **D–E** Cymbium. **A** ventral view **B** dorsal view **C** apical view **D** ventral view **E** dorsal view.

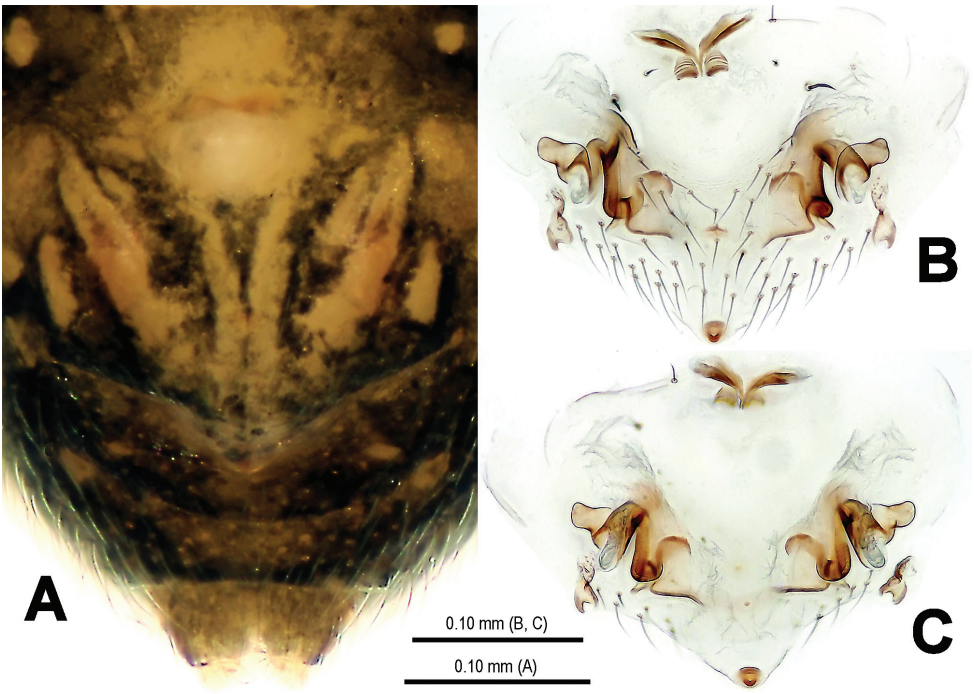

Figure 4. *Mysmena wawuensis* sp. n., female paratype. **A** Epigynum, ventral view **B** Epigynum (lactic acid-treated), ventral view **C** Vulva (cleared), dorsal view.

Prosoma (Fig. 1A, C): Carapace near round. Cephalic pars elevated, sharply vertical forward and slope backward. Ocular area at apex, dark. Eight eyes in two rows. AME black, others white. ALE and PLE contiguous. AME smallest, ALE largest. ARE slightly procurved, PRE straight. Chelicerae yellow, small, as long as endites (Fig. 1C).

Legs: Femora pale yellow, other segments yellow proximally, gray distally. Leg formula: I-II-IV-III. Leg I with a distal metatarsal clasping macroseta prolaterally on 1/3 position. Leg I and II with a subdistal sclerotized femoral spot ventrally. Patellae I–IV with a dorsal seta distally. Tibiae I–IV with a dorsal seta proximally, and with 3 trichobothria. Metatarsi I–IV with only one trichobothrium.

Opisthosoma (Fig. 1A–C): Globular dorsally. Spinnerets dark, the anteriors larger than the posteriors. Colulus indistinct. Anal tubercle grey.

Pedipalp (Figs 2–3, 5–6): Femur long, with a subdistal macroseta ventrally (Figs 2A–B, 5A–B). Patella short, with a few setae. Tibia swollen, bowl-shaped, covered with long setae on distal margin ventrally and dorsally (Figs 3D–E, 6D–E). Cymbium membranous, wide, arisen from tibial margin ventrally (Fig. 6E), paracymbium attached with long setae along prolateral margin, a sclerotized cymbial process subdistally, a row of setae on cymbial fold subdistally and a primary cymbial conductor distally (Figs 3D–E, 6D–E). Tegulum rugose, translucent (Figs 2C, 3A–C). Spermatic duct visible through subtegulum (Figs 3A–C, 6A–C). Embolus long, thin and

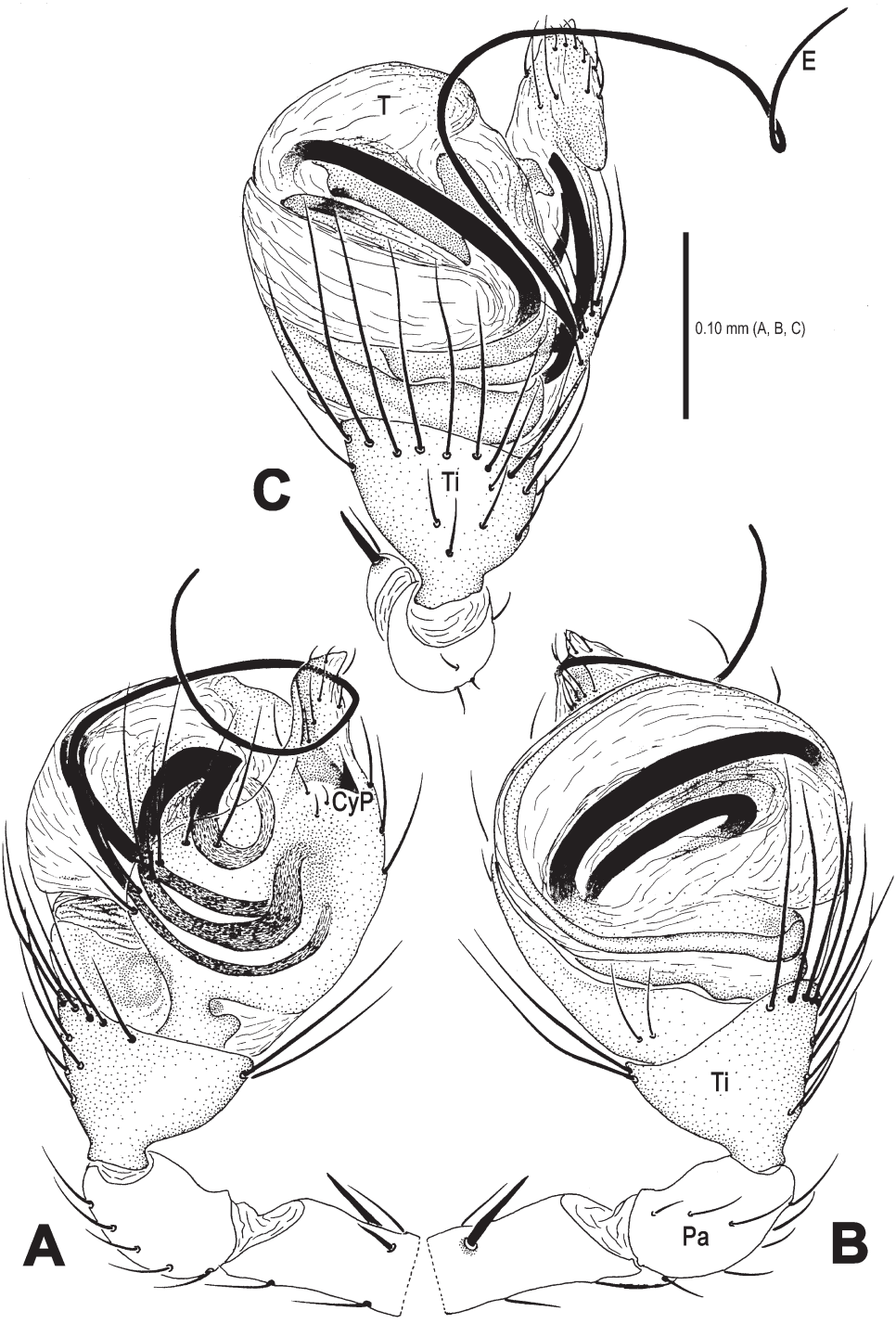

Figure 5. *Mysmena wawuensis* sp. n., male holotype. **A–C** Left pedipalp. **A** prolateral view **B** retrolateral view **C** dorsal view. Abbrs.: **CyP** cymbial process; **E** embolus; **Pa** patella; **T** tegulum; **Ti** tibia.

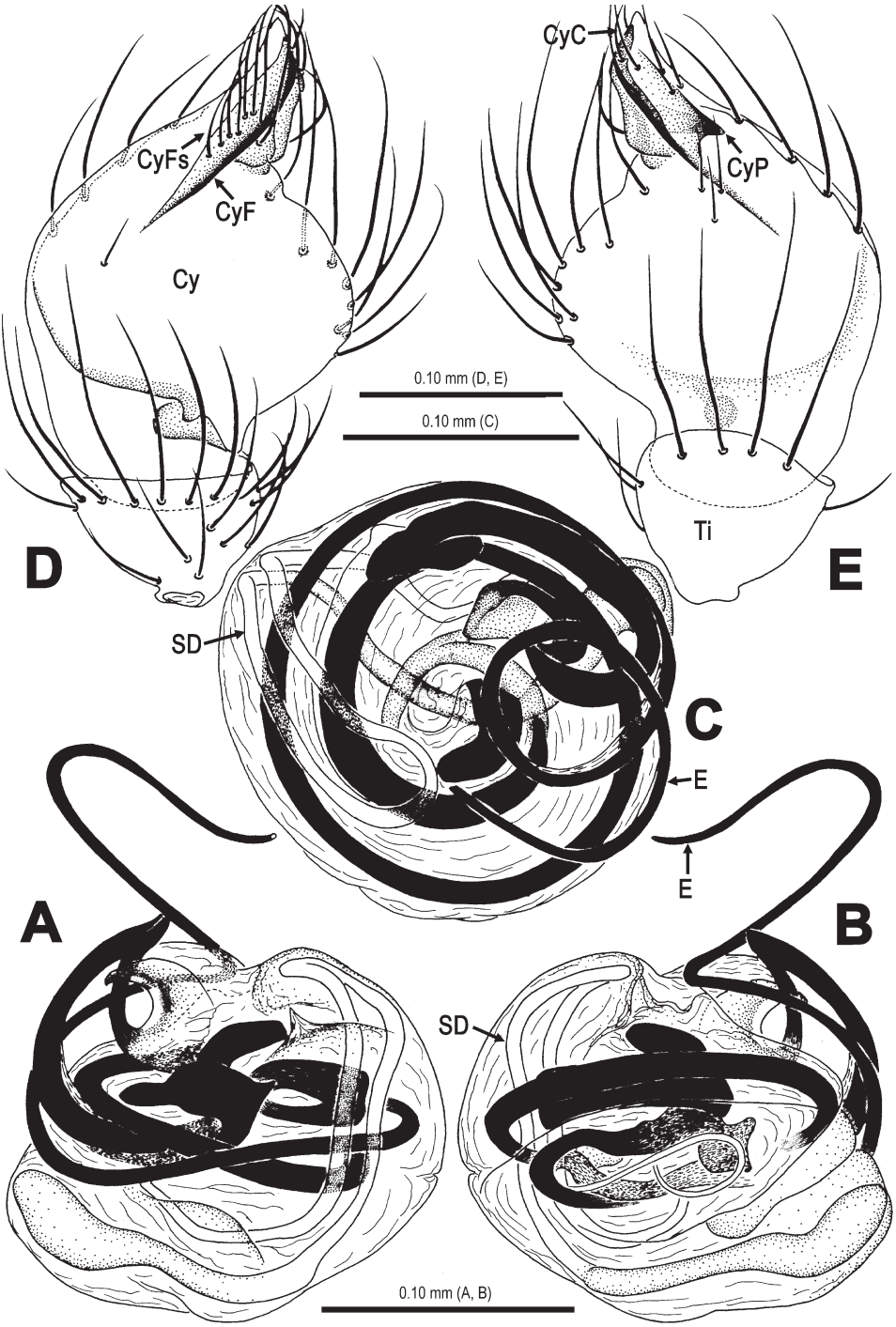

Figure 6. *Mysmena wawuensis* sp. n., male holotype. **A–C** Pedipalpal bulb, **D–E** Cymbium. **A** ventral view **B** dorsal view **C** apical view **D** ventral view **E** dorsal view. Abbrs.: **Cy** cymbium; **CyC** cymbial conductor; **CyF** cymbial fold; **CyFs** setae on cymbial fold; **CyP** cymbial process; **E** embolus; **SD** spermatic duct; **Ti** tibia.

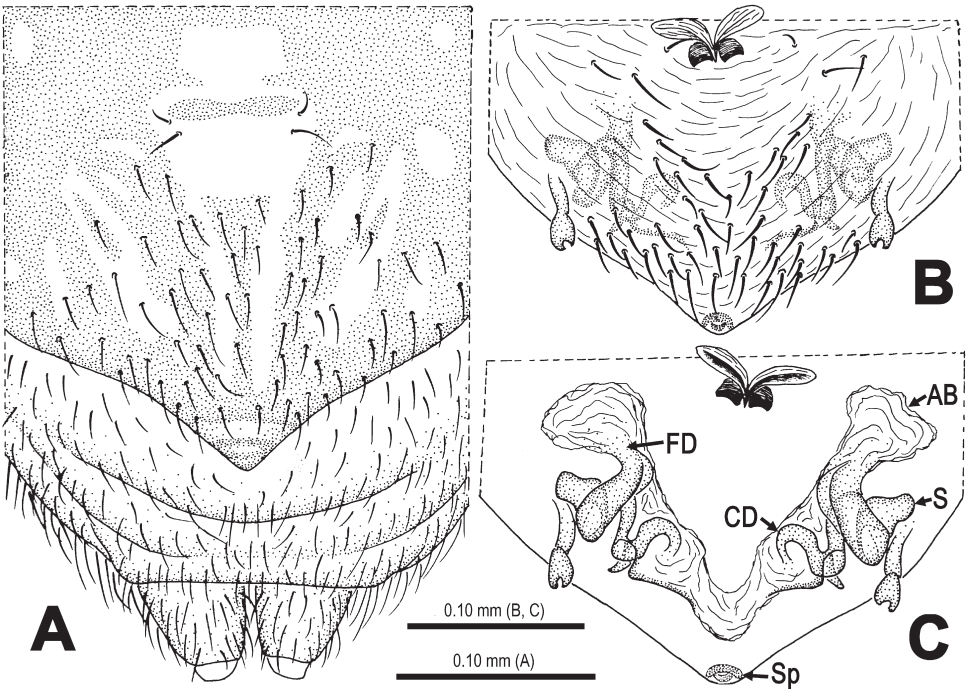

Figure 7. *Mysmena wawuensis* sp. n., female paratype. **A** Epigynum, ventral view **B** Epigynum (lactic acid-treated), ventral view **C** Vulva (cleared), dorsal view. Abbrs.: **AB** accessory bursa; **CD** copulatory duct; **FD** fertilization duct; **S** spermatheca; **Sp** scape.

sparal (Figs 3C, 6C), coiling into four loops. Embolic end exceeded apex of cymbium (Figs 2C, 5A–C).

Female (one of paratypes). Somatic characters see Fig. 1D–F. Coloration: Same as in male.

Measurement: Total length 0.75. Prosoma 0.36 long, 0.32 wide, 0.30 high. Opisthosoma as in male, 0.54 long, 0.50 wide, 0.61 high. Clypeus 0.05 high, distinctly lower than in male. Sternum 0.23 long, 0.21 wide. Length of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 1.05 (0.34, 0.14, 0.21, 0.16, 0.20); II 0.93 (0.29, 0.13, 0.18, 0.14, 0.19); III 0.77 (0.23, 0.11, 0.13, 0.13, 0.17); IV 0.99 (0.30, 0.13, 0.20, 0.16, 0.20).

Prosoma (Fig. 1D, F): Carapace near pear-shaped. Cephalic part lower than in male. Eyes arrangement, chelicerae and endites as in male.

Legs: Color, number of trichobothria same as in male, except for leg I without distal metatarsal clasping macroseta prolaterally. Sclerotized femoral spot present at leg I and II as in male. Leg formula: I-IV-II-III.

Opisthosoma (Fig. 1D–F): Globose dorsally. Spinnerets grey, the anteriors larger than the posteriors. Colulus small, pale.

Epigynum (Figs 4, 7): Large, weakly sclerotized, darkish. Epigynal area covered with short setae (Fig. 4B). A small, sclerotized scape stands on epigynal posteromargin

mesially (Fig. 4B–C). Spermathecae short clubbed, weakly sclerotized, twisted, attached with membranous, rugose accessory bursae (Figs 4C, 7C). Fertilization ducts short, connected with spermathecae and accessory bursa. Copulatory ducts long, curved, weekly sclerotized, derives from inner side of spermathecae ventrally (Figs 4C, 7C).

Distribution. Known only from the type locality (Fig. 13).

Trogloneta Simon, 1922

Type species. *Trogloneta granulum* Simon, 1922

Trogloneta yuensis sp. n.

urn:lsid:zoobank.org:act:47B062D1-CCC8-4C2B-978B-6ABF9B135CDF
http://species-id.net/wiki/Trogloneta_yuensis
Figs 8–13

Material examined. Holotype: CHINA, Chongqing: Beibei District, Jinyun Mt., Guankou, 29°50.261'N, 106°23.811'E, elevation ca 531 m, 5 April 2010, by sieving, Zhisheng Zhang leg., male (SCUM).

Etymology. The specific name is taken from the type locality; adjective. Yu is short name for Chongqing.

Diagnosis. This new species has the following combinations of typical generic features: AME dark, smaller ALE (Fig. 8B); eyes at the apex (Fig. 8A); male leg I with a femoral spot and a metatarsal clasping spine; highly elevated and conical carapace (Fig. 8A); male pedipalp large (Fig. 8B–C). All indicating that this species belongs to the genus *Trogloneta*. This new species is similar to *Trogloneta denticocleari* Lin & Li, 2008 (see Lin and Li 2008: 513, figs 16A–E, 17A–C) in habitus (Fig. 8A), eyes arrangement (Fig. 8B), pedipalp shape (Figs 9A–B, 11A–B), cymbial configuration (Figs 11A, 12E) and a trichobothrium present at pedipalpal tibia (Fig. 11 A–B), but distinguished from the latter by a long, distally hooked embolus attaching accessory membrane (Figs 10A–B, 12A–B), a long fingerlike median apophysis (Figs 10C–D, 12C–D), a laminar cymbial conductor (Fig. 12E), a distally aquiline, basally constricted cymbial process (Figs 10E–F, 11A, 12E) and a dorsal-posterior opisthosomal tubercle (Fig. 8A, D–E).

Description. Male (holotype). Somatic characters see Fig. 8A–E. Coloration: Prosoma yellow centrally, dark marginally. Clypeus black. Sternum yellow, with a pair of shoulder dark speckles. Opisthosoma yellow, with irregular dark spots.

Measurement: Total length 1.01. Prosoma 0.45 long, 0.45 wide, 0.59 high. Opisthosoma 0.54 long, 0.55 wide, 0.95 high. Clypeus 0.32 high. Sternum 0.31 long, 0.29 wide. Length of legs [total length (femur + patella + tibia + metatarsus + tarsus)]: I 1.42 (0.43, 0.17, 0.32, 0.29, 0.21); II 1.15 (0.38, 0.16, 0.23, 0.22, 0.16); III 0.96 (0.29, 0.13, 0.20, 0.18, 0.16); IV 1.15 (0.36, 0.14, 0.26, 0.22, 0.17).

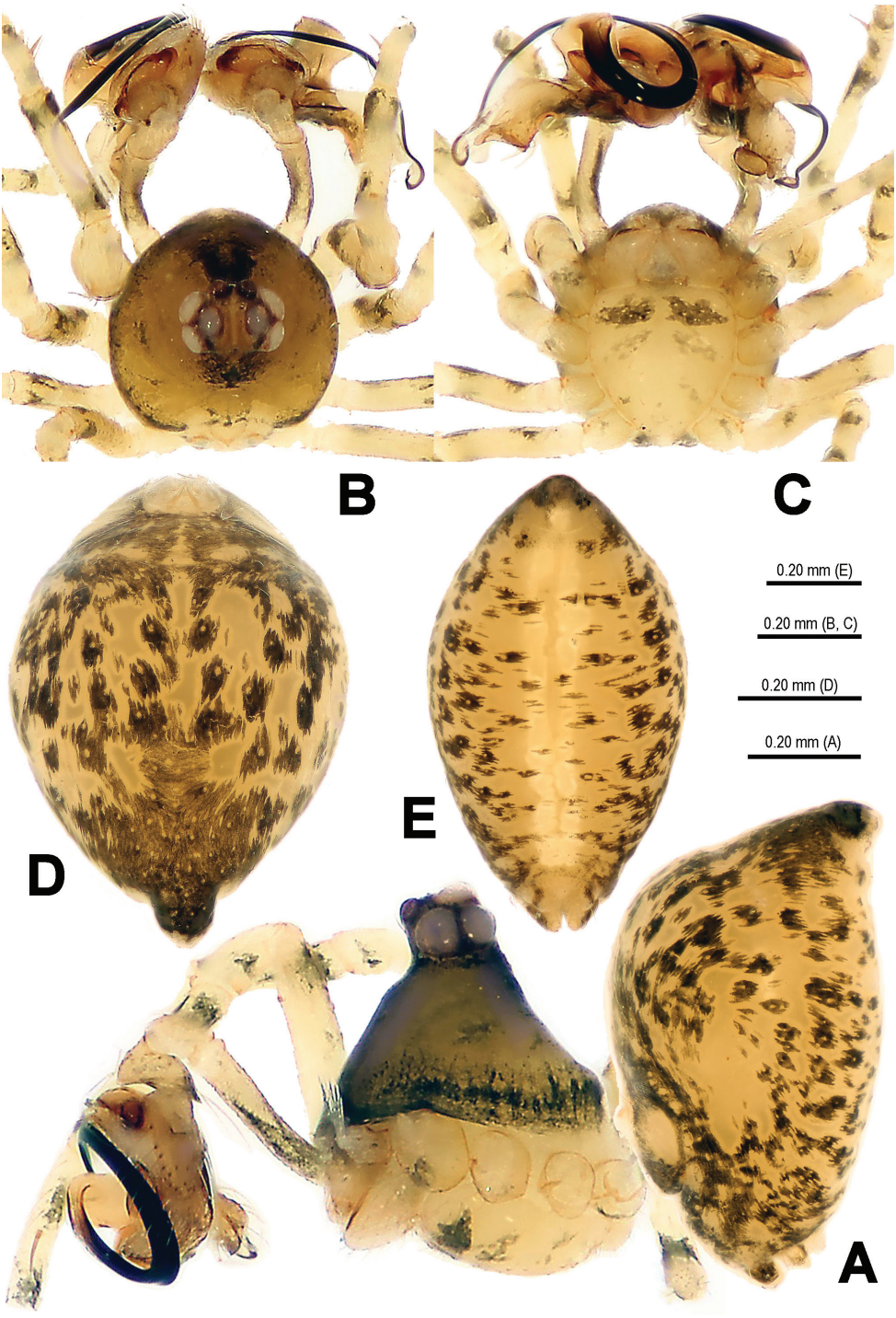

Figure 8. *Trogloneta yuensis* sp. n., male holotype. **A** Habitus, lateral view **B** Prosoma, dorsal view **C** Ditto,ventral view **D** Opisthosoma, dorsal view **E** Ditto, posterior view.

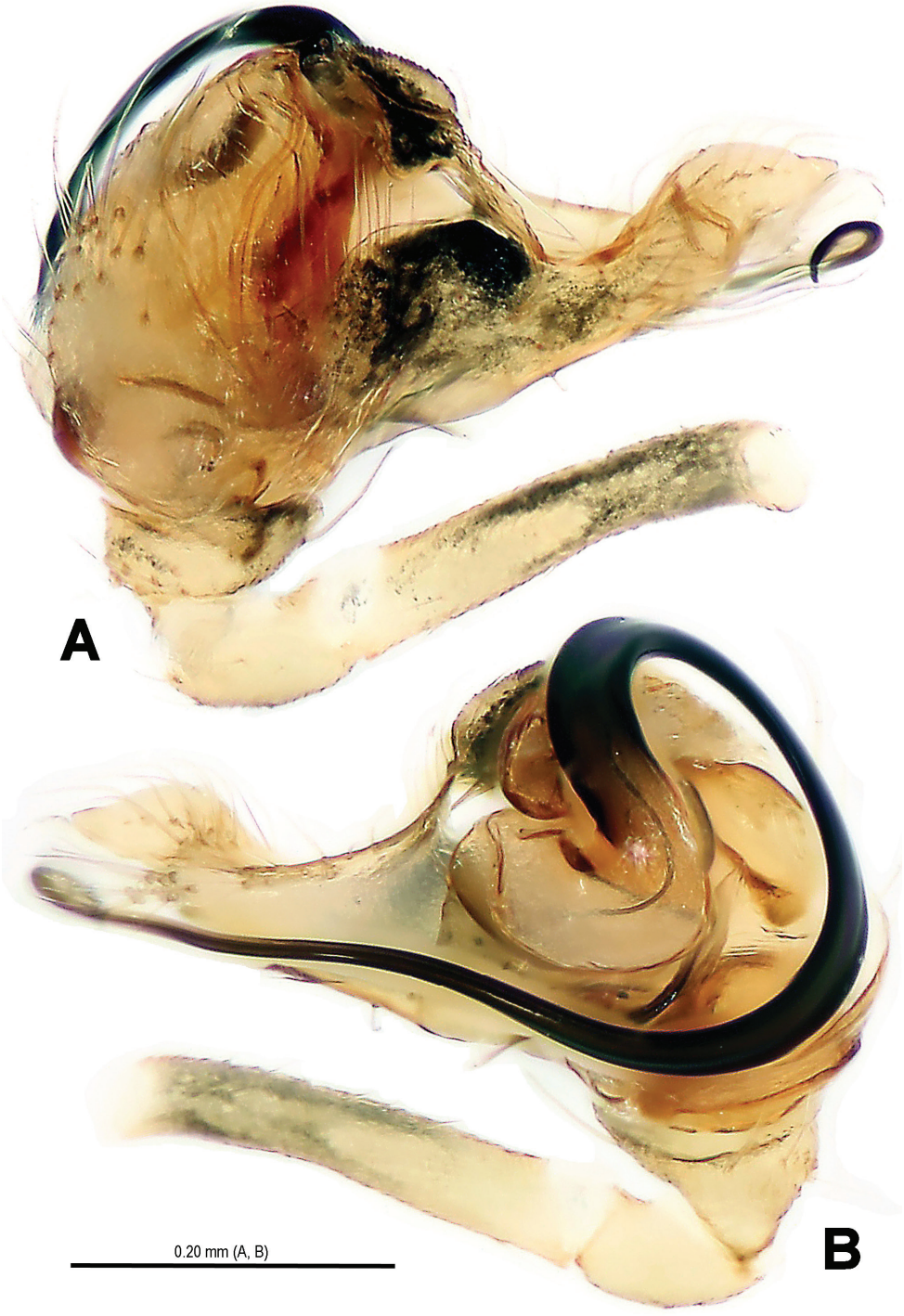

Figure 9. *Trogloneta yuensis* sp. n., male holotype. **A** Left pedipalp, retrolateral view **B** Ditto, prolateral view.

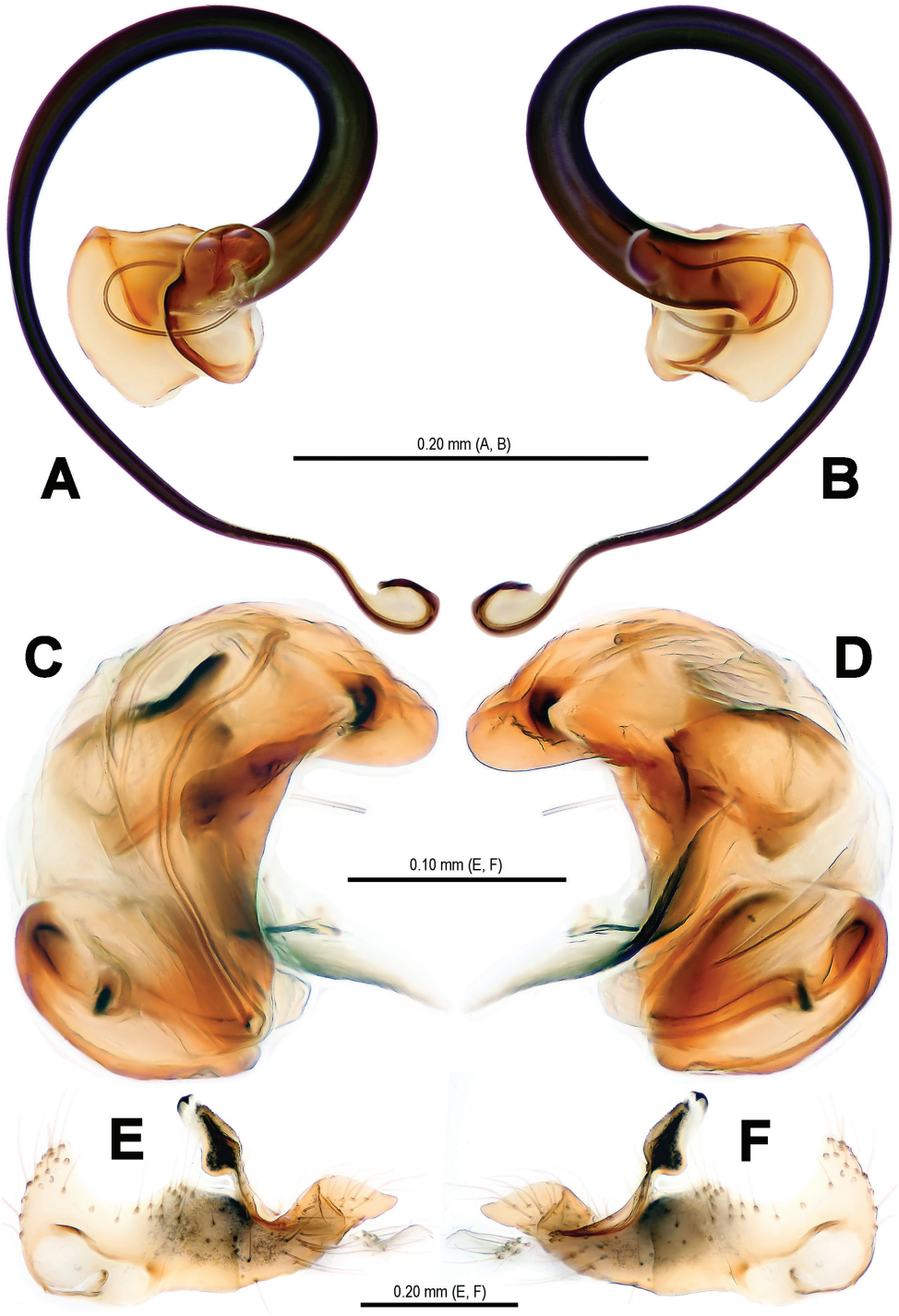

Figure 10. *Trogloneta yuensis* sp. n., male holotype. **A** Embolus, ventral view **B** Ditto, dorsal view **C** Pedipalpal bulb (excluding embolus), ventral view **D** Ditto, dorsal view **E** Cymbium, dorsal view **F** Ditto, ventral view.

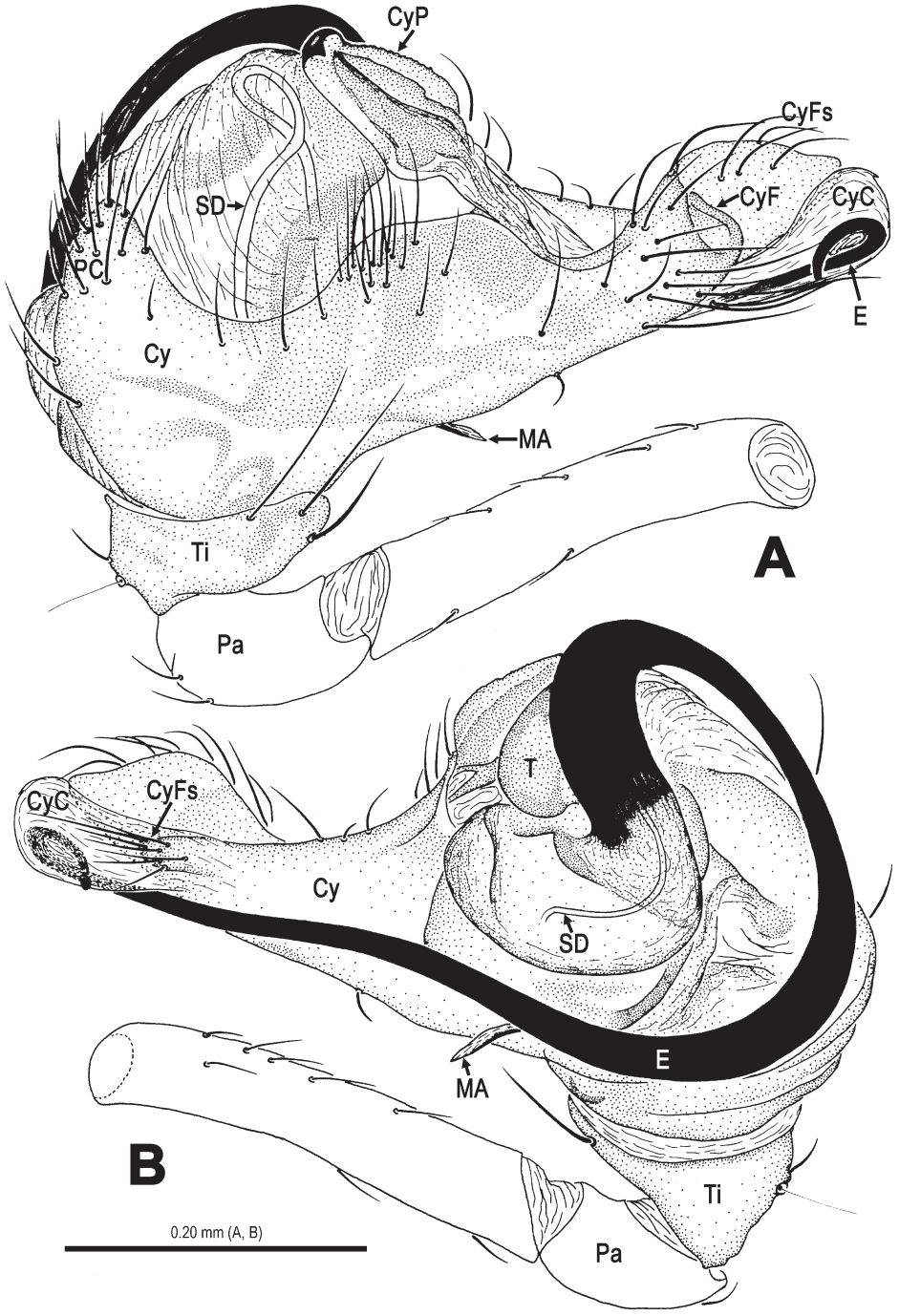

Figure 11. *Trogloneta yuensis* sp. n., male holotype. **A** Left pedipalp, retrolateral view **B** Ditto, prolateral view. Abbrs.: **Cy** cymbium; **CyC** cymbial conductor; **CyF** cymbial fold; **CyFs** setae on cymbial fold; **CyP** cymbial process; **E** embolus; **MA** median apophysis; **Pa** patella; **PC** paracymbium; **SD** spermatic duct; **T** tegulum; **Ti** tibia.

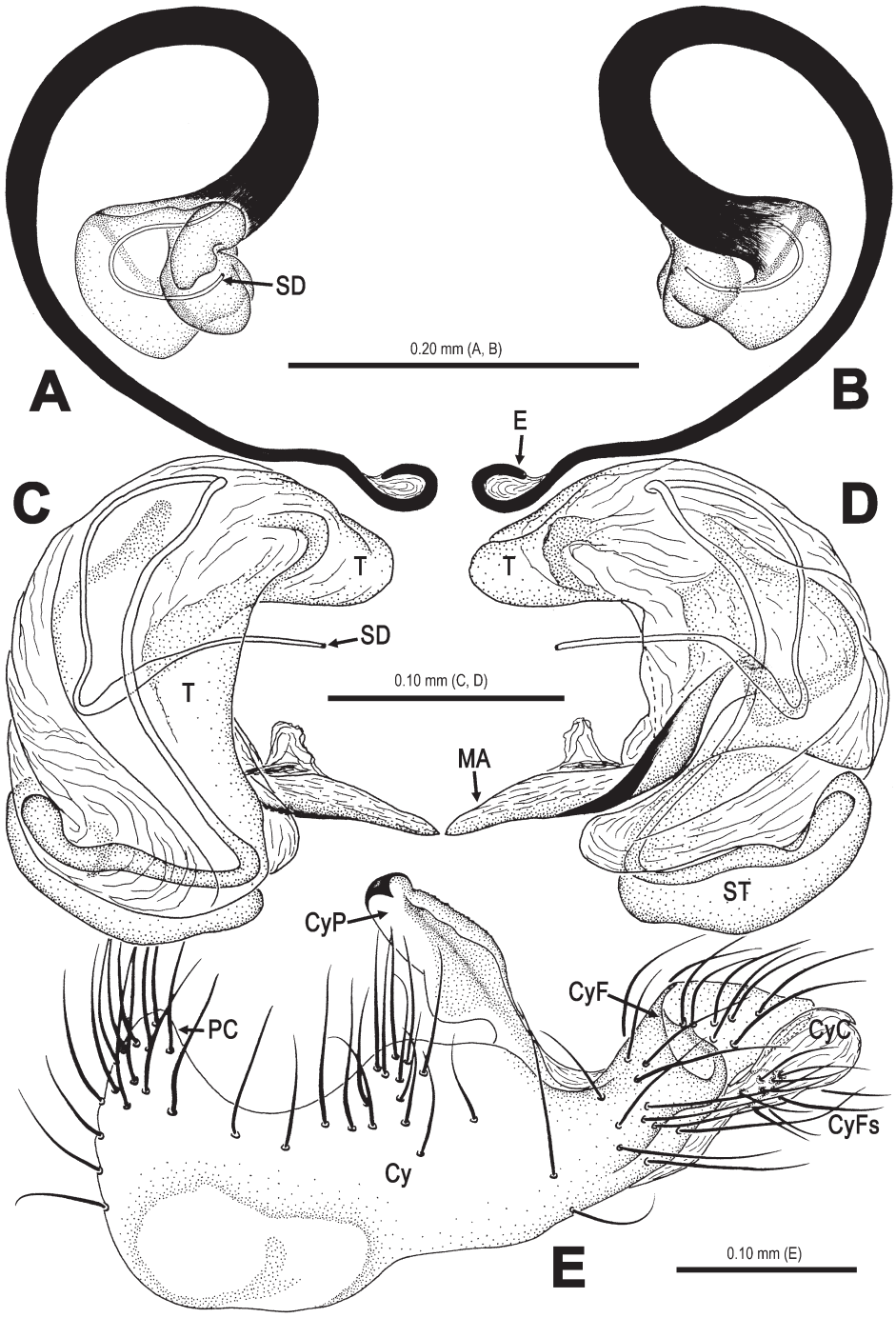

Figure 12. *Trogloneta yuensis* sp. n., male holotype. **A–B** Embolus. **A** ventral view **B** dorsal view **C–D** Pedipalpal bulb (excluding embolus) **C** ventral view **D** dorsal view **E** Cymbium, dorsal view. Abbrs.: **Cy** cymbium; **CyC** cymbial conductor; **CyF** cymbial fold; **CyFs** setae on cymbial fold; **CyP** cymbial process; **E** embolus; **MA** median apophysis; **Pa** patella; **PC** paracymbium; **SD** spermatic duct; **ST** subtegulum; **T** tegulum.

Figure 13. Distributional records of two new mysmenid species from China.

Prosoma (Fig. 8A–C): Carapace near round. Cephalic pars sharply elevated, slope forward and backward. Ocular area at apex. Eight eyes in two rows. AME black, others white. AME smallest, ALE largest. ALE>PLE>PME>AME. ALE, PME and PLE contiguous. ARE procurved, PRE strongly procurved. Chelicerae pale, small, shorter than endites (Fig. 8A), fang furrow with 2 promaiginal and 1 retromarginal teeth.

Legs: Femora and other segments pale yellow mesially, but grey proximally and distally. Leg formula: I-II-IV-III. Leg I with a subdistal sclerotized femoral spot ventrally and a submesial metatarsal clasping macroseta prolaterally. Patellae I–IV with a dorsal seta distally. Tibiae I–IV with a dorsal seta proximally. Tibiae I, II and IV with 3 trichobothria, but 4 on tibia III. Metatarsi I–IV lack trichobothrium.

Opisthosoma (Fig. 8A, D–E): elliptic dorsally, fusiform posteriorly, triangular laterally, with a tubercle at rear. Spinnerets grey, the anteriors larger than the posteriors. Colulus small, tongue-shaped. Anal tubercle pale.

Pedipalp (Figs 9–12): Large, strongly sclerotized. Femur as 2.5 times long as patella (Fig. 9A, B). Patella short, with a few setae. Tibia wider than long, nearly cup-

shaped, covered with a dorsal trichobothrium and a few marginal long setae ventrally (Figs 11A–B). Cymbium large (Figs 10E–F, 12E), membranous, paracymbium flattened, covered with dense long setae. A long cymbial process (aquiline distally, constricted proximally) arisen from inner side subdistal margin (Fig. 12E). Cymbial fold distinctly, with long setae. Distal primary cymbial conductor membranous, translucent, attaching with a cluster of setae (Fig. 12E). Tegulum smooth, sclerotized (Fig. 10C–D). Spermatic duct long, visible through subtegulum (Fig. 11C–D). A long, fingerlike median apophysis starts at the junction between tegulum and subtegulum (Figs 10D, 11D). Embolus long, arched, strongly sclerotized, gradually diminishing from base to end (Figs 9B, 12A–B). Embolic end unciform, with accessory membrane (Fig. 12A–B), hidden behind cymbial conductor (Figs 9B, 11B).

Female. Unknown.

Distribution. Known only from the type locality (Fig. 13).

Acknowledgments

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RESEARCH ARTICLE

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A food plant specialist in Sparganothini: A new genus and species from Costa Rica (Lepidoptera, Tortricidae)

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Abstract

Sparganocosma docsturnerorum Brown, new genus and new species, is described and illustrated from Área de Conservación (ACG) in northwestern Costa Rica. The new genus shares a long, crescent- or ribbon-shaped signum in the corpus bursae of the female genitalia with *Aesiocopa* Zeller, 1877, *Amorbia* Clemens, 1860, *Amorbimorpha* Kruse, 2011, *Coelostathma* Clemens, 1860, *Lambertiodes* Diakonoff, 1959, *Paramorbia* Powell & Lambert, 1986, *Rhynchophyllus* Meyrick, 1932, *Sparganopseustis* Powell & Lambert, 1986, *Sparganothina* Powell, 1986, and *Sparganothoides* Lambert & Powell, 1986. Putative autapomorphies for *Sparganocosma* include the extremely short uncus; the smooth (unspined) transtilla; and the upturned, free, distal rod of the sacculus. Adults of *Sparganocosma docsturnerorum* have been reared numerous times (>50) from larvae collected feeding on rain forest *Asplundia utilis* (Oerst.) Harling and *A. microphylla* (Oerst.) Harling (Cyclanthaceae) at intermediate elevations (375–500 m) in ACG. Whereas most Sparganothini are generalists, typically feeding on two or more plant families, *Sparganocosma docsturnerorum* appears to be a specialist on *Asplundia*, at least in ACG. The solitary parasitoid wasp *Sphelodon wardae* Godoy & Gauld (Ichneumonidae; Banchinae) has been reared only from the larvae of *S. docsturnerorum*.

Keywords
ACG, caterpillar, Costa Rica, Cyclanthaceae, food plants, morphology, new genus, new species, parasitoid, tortricid moth

Introduction

With over 10,000 described species worldwide, Tortricidae are among the largest families of microlepidoptera (Regier et al. 2012). Their economic importance as pests of forests, ornamentals, and crops; their successful application as biological control agents against undesired invasive plants; and their use as "model systems" (e.g., Roe et al. 2009) all combine to attract considerable attention (Regier et al. 2012). Over the last decade, our taxonomic knowledge of the family likely has increased faster than that of any other microlepidoptera family, with an average of about 13 new genera and 200 new species described per year (Brown 2012).

Within Tortricidae the tribe Sparganothini has been the subject of substantial recent monographic work, with systematic treatments of *Sparganothina* Powell, 1986, and relatives by Landry and Powell (2001); *Amorbia* Clemens, 1860 by Phillips-Rodriguez and Powell (2007); *Spaganothoides* Powell and Lambert, 1986, by Kruse and Powell (2009); and *Amorbimorpha* Kruse, 2011, by Kruse (2011); and a review of the entire North American fauna by Powell and Brown (2012). Whereas a stable generic-level classification is in place for the North American members, many described and undescribed species from the Neotropics defy confident generic assignment. The purpose of this contribution is to describe a new genus and species from Costa Rica to continue to build on the growing generic framework for the tribe.

Methods

Rearing. During an ongoing survey of the Lepidoptera of Área de Conservación Guanacaste in northwestern Costa Rica (Janzen et al. 2009), adults and caterpillars have been collected throughout the year. Larvae discovered in the field are taken to "rearing barns" where they are placed individually in plastic bags with cuttings of the food plant on which they were discovered. As adults emerge, they are dispatched by freezing, then pinned and labeled. Each specimen receives a unique voucher number in the form of YY-SRNP-XXXX (e.g., 09-SRNP-15328), where the prefix is the last two digits of the year (e.g., 2009), "SRNP" refers to the project "call letters" assigned in 1977 (when the project site was referred to as Santa Rosa National Park), and the suffix is a unique number assigned within the year.

Morphology. Dissection methods follow those presented in Brown and Powell (1991). Images of adults and genitalia were captured using a Canon EOS 40D digital SLR (Canon U.S.A., Lake Success, NY) mounted on a Visionary Digital BK Lab System (Visionary Digital, Palmyra, VA). Terminology for genitalia structures and forewing pattern elements follows Powell and Brown (2012). In descriptions of the

forewing, "dorsum" refers to the hind margin of the forewing, which is the dorsal-most edge of the wings when the live moth is in resting posture and the forewings are held in a tent-like position over the abdomen.

Depositories and Abbreviations. The holotype of the new species is deposited in the National Museum of Natural History, Washington, D.C., U.S.A. Paratypes are deposited in the Canadian National Collection of Insects, Ottawa, Canada; Instituto Nacional de Biodiversidad, Santa Domingo de Heredia, Costa Rica; The Natural History Museum, London, England; Essig Museum of Entomology, University of California, Berkeley, U.S.A.; and National Museum of Natural History, Washington, D.C., U.S.A. Abbreviations used in text are as follows: ACG = Área de Conservación Guanacaste; ec = eclosed; r.f. = reared from.

Results

***Sparganocosma* Brown, gen. n.**
urn:lsid:zoobank.org:act:67B1DA19-F8BF-4D49-A6AC-E86CCFACB618
http://species-id.net/wiki/Sparganocosma

Type species. *Sparganocosma docsturnerorum* Brown, new species.

Diagnosis. In facies, *Sparganocosma* are unlike any other known sparganothine genus. The forewing pattern is somewhat two-toned longitudinally, pale buff along the costal half, usually interrupted near the middle of the wing by an ill-defined area of darker scales, and dark brown along the dorsal half, broadening toward the termen and apex. The forewing also has a characteristic long, slender costal fold in the male. Adults are about the same size (forewing length) or slightly larger than *Amorbia* Clemens, 1860 and *Aesiocopa* Zeller, 1877 with similar sexual dimorphism in size – females are slightly larger than males. Dimorphism in forewing pattern in *Sparganocosma* is less pronounced than in *Aesiocopa* and slightly more pronounced than in *Amorbia*. The labial palpi in *Sparganocosma* are similar to those of many *Amorbia* – somewhat upturned-porrect, their combined (all three segments) length 2.2–2.5 times the diameter of the compound eye, and with little sexual dimorphism. In contrast, the labial palpi of most Sparganothini are conspicuously long and porrect and frequently exhibit pronounced sexual dimorphism (see Powell and Brown 2012). Abdominal dorsal pits are absent in *Sparganocosma*, whereas they are present in *Aesiocopa*, many species of *Amorbia*, and a few other sparganothine genera (e.g., *Coelostathma*, *Sparganopseustis*).

In the female genitalia, the signum of *Sparganocosma* is broad and band shaped, similar to that of several other sparganothines (i.e., *Aesiocopa*, *Amorbia*, *Amorbimorpha*, *Coelostathma* Clemens, 1860, *Lambertiodes* Diakonoff, 1959, *Paramorbia* Powell & Lambert, 1986, *Rhynchophyllus* Meyrick, 1932, *Sparganopseustis* Powell & Lambert, 1986, *Sparganothina*, and *Sparganothoides*), but it is distinguished from that of other genera by its slightly rounded-triangular swelling in the middle, which is unique to *Sparganocosma*. The sterigma in *Sparganocosma* is weakly bilobed, and therefore similar to that of many *Amorbia* and *Coelostathma*.

In the male genitalia of *Sparganocosma* the secondary arms of the socius are absent, a character state shared with *Amorbia*, *Paramorbia*, *Sparganothina*, and *Coelosthathma*. The male genitalia are distinguished from those of all other Sparganothiini by the extremely short uncus (approximately 0.3 the length of the socius); the smooth (lacking spines), slender transtilla; and the long, upturned, free distal rod of the sacculus. The latter is reminiscent of that found in some species of *Sparganothina*, but the two genera are extremely dissimilar in forewing size and maculation.

Description. Head: Vertex rough scaled with overhanging tuft, upper frons rough scaled, lower frons smooth scaled, without complex hood. Labial palpus (Figure 1) moderate in length, segment II 1.5–1.8 times horizontal diameter of compound eye, weakly upcurved; segment III exposed, porrect. Ocellus minute or inconspicuous. Antennal scaling in two bands per segment, sensory setae 0.7–0.8 times flagellomere width in male, shorter, sparser in female. Thorax: Tegula large, nota smooth scaled; legs unmodified. Forewing (Figure 2) broad, about 2.6 times as long as wide, with narrow costal fold in male, extending ca. 0.4 length of costa; no raised scales present; all veins present and separate, except R_4 and R_5 stalked in basal 0.35–0.40 in both sexes, with both extending to costa before apex; chorda and m-stem absent. Hindwing with Rs and M_1 approximate at base, CuA_1 and M_3 connate, and M_2 and M_3 approximate at base; cubital hair pecten well developed in both sexes. Abdomen: Dorsal pits absent. Female lacking enlarged corethrogyne scaling. Male genitalia with uncus small, approximately 0.3 times length of socius, weakly curved ventrad; socius slender, slightly broadened posteriorly, densely clothed in long scales, mostly fused to tegumen, but with free, membranous posterior lobe, lacking secondary arm; gnathos absent; transtilla short, smooth (lacking spines), slightly arched medially; pulvinus weakly developed, represented by basal termination of linear patch of setae along costa of valva; valva broad, short, mostly parallel-sided, with concave "notch" apically (similar to *Amorbia*); row of strong setae along subcosta, except basally; sacculus well defined, weakly undulate, with a long, free rod near termination. Phallus approximately 0.75 length of valva, curved at about 135° angle at approximately 0.3 distance from base, with small dorsal spur in distal 0.3; vesica with dense bundle of 40–50 aciculate, subbasally attached, deciduous cornuti. Female genitalia with papillae anales, simple, unmodified, slightly narrowed anteriorly; apophyses simple, about as long as papillae anales, posteriores only slightly longer than anteriores; sterigma a shallow, weakly bilobed bowl, with conspicuous subcircular sclerite in postostial sterigma; ostium defined posteriorly by narrow, strongly scleritozed ridge; ductus bursae relatively broad throughout, slightly longer than corpus bursae, with short, well defined but membranous colliculum; corpus bursae round or slightly bilobed, densely and finely wrinkled; signum a broad, curved ribbon with small, rounded-triangular expansion near middle, truncate at each end, situated in anterior half of corpus bursae; tiny, semi-membranous, knob-like process on exterior surface of corpus bursae near signum (as in *Amorbia* and *Aesiocopa*).

Etymology. The genus name is from the Latin "spargano," to scatter or throw around, and "cosm," referring to the universe. It is interpreted as masculine.

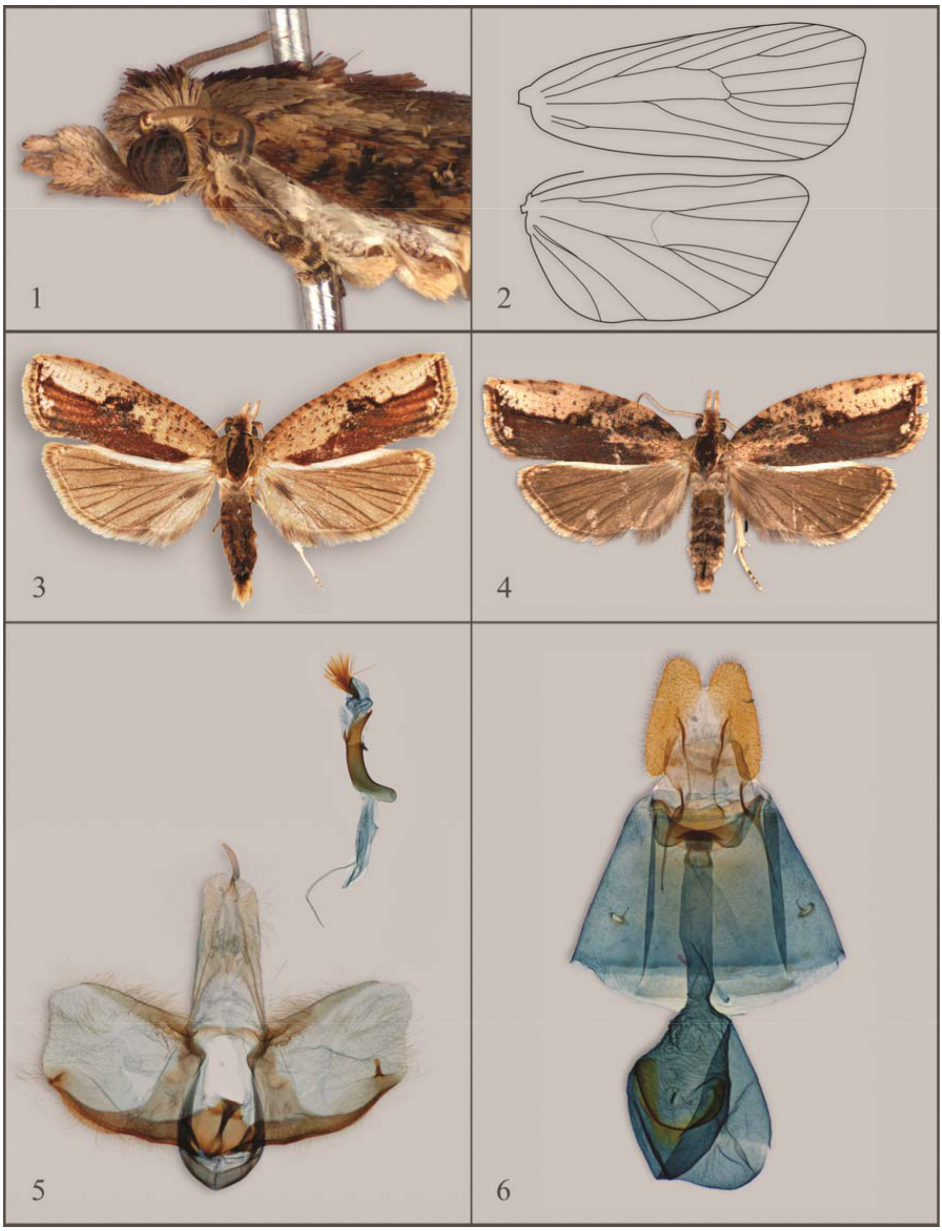
***Sparganocosma docsturnerorum* Brown, sp. n.**
urn:lsid:zoobank.org:act:C01718B4-16CF-431E-AA0B-798E25C11401
http://species-id.net/wiki/Sparganocosma_docsturnerorum
Figures 1–8

Diagnosis. *Sparganocosma docsturnerorum* can be distinguished from all other Sparganothini, and from all other Tortricidae, by the characters discussed in the diagnosis of the genus above. The distinctive forewing pattern easily distinguishes it from all other Sparganothini, and it is further differentiated by unique features of the male genitalia and female.

Description. Head: Vertex pale buff with variably developed patch of pale maroon medially; frons and labial palpus slightly lighter pale buff. Antenna mostly pale buff, except scape maroon. Thorax: Tegula pale buff, nota maroon, except pale cream along narrow lateral margins. Legs mostly pale brown with narrow pale-yellow banding. Forewing (Figures 3, 4) length 8.8–11.0 mm (mean = 9.9; n = 10) in male, 10.5–13.0 mm (mean 11.6; n = 10) in female; forewing with two large ovoid patches of pale buff in costal region, one from base to approximately 0.5 distance to apex, the other in distal 0.45, basal patch less defined in female, irregularly overscaled with brown; patches infrequently separated by narrow brown remnant of median fascia; patches usually with small flecks of brown; remainder of wing with broad brown longitudinal band along dorsum, narrowest at base, broadest at termen, with faint traces of pale buff along veins in distal part of wing or with tiny spots of pale buff near wing margin; longitudinal band along dorsum infrequently paler or lacking altogether in male. Fringe pale buff. Hindwing rather uniformly dark gray brown, slightly darker in female. Fringe pale cream gray. Abdomen: Pale brownish gray. Male genitalia (Figure 5) as described above for genus. Female genitalia (Figure 6) as described above for genus.

Holotype, ♂, Costa Rica, Alajuela Province, Área de Conservación Guanacaste, Sector Rincón Rain Forest, Río Francia Arriba, 400 m, 10.89666N, -85.29003W, 24 Feb 2002, r.f. *Asplundia utilis*, José Pérez; ec: 29 Mar 2004 (04-SRNP-40557).

Paratypes (32♂, 41♀). COSTA RICA: **Alajuela Province**: Área de Conservación Guanacaste: Sector Rincón Rain Forest: Sendero Anonas, 405 m, 10.90528N; -85.27882W, 23 Nov 2001, r.f. *Asplundia utilis*, José Pérez, ec: 28 Dec 2001 (1♀) (01-SRNP-23411); ec: 29 Dec 2001 (1♀) (01-SRNP-23411.01); ec: 30 Dec 2001 (1♂) (01-SRNP-23411.02); ec: 29 Dec 2001 (1♂) (01-SRNP-23411.04); ec: 30 Dec 2001 (1♀) (01-SRNP-23411.07); ec: 30 Dec 2001 (1♀) (01-SRNP-23411.09); ec: 30 Dec 2001 (1♂) (01-SRNP-23411.11); ec: 27 Dec 2001 (1♀) (01-SRNP-23411.12); ec: 29 Dec 2001 (1♀) (01-SRNP-23411.19); ec: 20 Dec 2001 (1♀) (01-SRNP-23411.21); ec: 28 Dec 2001 (1♀) (01-SRNP-23411.22); ec: 29 Dec 2001 (1♂) (01-SRNP-23411.26); ec: 29 Dec 2001 (1♀) (01-SRNP-23411.27); ec: 30 Dec 2001 (1♀) (01-SRNP-23411.28); ec: 28 Dec 2001 (1♀) (01-SRNP-23411.31); 7 Nov 2011, A. Córdoba, ec: 9 Dec 2011 (1♂), r.f. *Asplundis utilis* (11-SRNP-44797). Jacobo, 461 m, 10.94076N, -85.3177W, 19 May 2011, Calixto Moraga, ec: 10 Jun 2011 (3♀), ec: 9 Jun 2011 (3♂), r.f. *Asplundis utilis* (11-SRNP-80462, 11-SRNP-80464, 11-SRNP-



Figures 1–6. Features of the adult of *Sparganocosma docsturnerorum*. **1** Head of female (06-SRNP-42632) **2** Wing venation of male (01-SRNP-23411.11) **3** Holotype male (04-SRNP-40557) **4** Paratype female (04-SRNP-40558) **5** Male genitalia; USNM slide 142,039 (04-SRNP-42252) **6** Female genitalia; USNM slide 142,040 (04-SRNP-42248).

80449, 11-SRNP-80457, 11-SRNP-80459, 11-SRNP-80448). Sendero Rincón, 430 m, 10.8962N, -85.27769W, 18 Aug 2000, r.f. *Asplundia utilis*, ec: 9 Sep 2000 (1♂) (00-SRNP-14214); ec: 12 Sep 2000 (1♀) (00-SRNP-14216). Sendero Rincón, 430

Figures 7–8. Early stages of *Sparganocosma docsturnerorum*. **7** Penultimate instar larva **8** Pupa.

m, 10.8962N, -85.27769W, 15 Feb 2006, r.f. *Asplundia utilis*, Minor Carmona, ec: 13 Mar 2006 (1♀) (06-SRNP-40592), ec: 14 Mar 2006 (1♀) (06-SRNP-40590), ec: 14 Mar 2006 (1♀) (06-SRNP-40591). Vado Río Francia, 400 m, 10.90093N, -85.28915W, 20 Feb 2002, r.f. *Asplundia utilis*, José Pérez, ec: 18 Apr 2002 (1♂) (02-SRNP-6476); ec: 24 Mar 2004 (1♂) (02-SRNP-6474). Río Francia Arriba, 400 m, 10.89666N, -85.29003W, 24 Feb 2002, r.f. *Asplundia utilis*, José Pérez; ec: 29 Mar 2004 (1♂) (04-SRNP-40555); ec: 30 Mar 2002 (1♂) (04-SRNP-40556); ec: 30 Mar 2004 (1♀) (04-SRNP-40553); 30 Mar 2004 (1♀) (04-SRNP-40558); 24 May 2004, r.f. *Asplundia utilis*, José Pérez, ec: 28 Jun 2004 (1♀) (04-SRNP-41311); 25 Oct 2011, A. Córdoba, ec: 4 Dec 2011 (1♀), r.f. *Asplundis utilis* (11-SRNP-44698); 18 Mar 2011, A. Córdoba, ec: 12 Apr 2011 (1♂), 13 Apr 2011 (1♀), r.f. *Asplundis utilis* (11-SRNP-41257, 11-SRNP-41260); 7 Oct 2010, Pablo Calderón, ec: 17 Nov 2010 (1♂), ec: 19 Nov 2010 (1♀), r.f. *Asplundis utilis* (10-SRNP-43639, 10-SRNP-43637); 18 Mar 2011, A. Córdoba, ec: 12 Apr 2011 (1♂, 1♀), r.f. *Asplundis utilis* (11-SRNP-41261, 11-SRNP-41259). Montanya Figueres, 460 m, 10.88367N, -85.29081W, 22 Oct 2009, r.f. *Asplundia utilis*, Pablo Umaña, ec: 29 Nov 2009 (1♂) (09-SRNP-43035). Finca Aurita, 460 m, 10.88409N, -85.25728W, 4 Jan 2007, r.f. *Asplundia utilis*, José Pérez, ec: 1 Feb 2007 (1♂) (07-SRNP-40058); ec: 3 Feb 2007 (1♀) (07-SRNP-40050), ec: 2 Feb 2007 (1♀) (07-SRNP-40045). Finca Aurita, 460 m, 10.88409N, -85.25728W, 23 Nov 2006, r.f. *Asplundia utilis*, José Pérez, ec: 2 Jan 2007 (1♀) (06-SRNP-44494). Quebrada Guarumo, 400 m, 10.90445N, -85.28412W, 24 Jul 2006, r.f. *Asplundia utilis*, José Pérez, ec: 1 Sep 2006 (1♂) (06-SRNP-42634); ec: 1 Sep 2006 (1♀) (06-SRNP-42629); ec: 2 Sep 2006 (1♀) (06-SRNP-42628); ec: 31 Aug 2006 (1♀) (06-SRNP-42631); ec: 1 Sep. 2006 (1♀) (06-SRNP-42632); 3 Mar 2011, A. Córdoba, ec: 11 Apr 2011 (1♂), ec: 10 Apr 2011 (1♀), r.f. *Asplundis utilis* (11-SRNP-41108, 11-SRNP-41109). Sendero Parcelas, 375 m, 10.90777N, -85.29137, 26 Aug 2004, r.f. *Asplundia utilis*, José Pérez, ec: 23 Sep 2004 (1♂) (04-SRNP-42252), 25 Sep. 2004 (1♂) (04-SRNP-42253), 25 Sep 2004 (1♂) (04-SRNP-42251), 26 Sep. 2004 (1♂) (04-SRNP-42254), ec: 28 Sep 2004 (1♀) (04-SRNP-42248), ec: 7 Sep 2004 (1♀) (04-SRNP-42249), 29 Sep 2004 (1♀) (04-SRNP-42250). Quebrada Escondida, 420 m, 10.89928N, -85.27486W, 4 Mar 2002, r.f. *Asplundia utilis*, ec: 27 Mar 2002 (1♀) (02-SRNP-6614), ec: 27 Mar 2002 (1♀) (02-SRNP-6613). Camino Porvenir, 383 m, 10.90383N, -85.25964W, 5 Feb 2007,

r.f. *Asplundia utilis*, Minor Carmona, ec: 3 Mar 2007 (1♀) (07-SRNP-40382). Sendero Juntas, 400 m, 10.90661N, -85.28784W, 21 Jan 2007, r.f. *Asplundia utilis*, Minor Carmona, ec: 1 Mar 2007 (1♀) (07-SRNP-40231). **Guanacaste Province**: Sector San Cristobal: Río Blanco Abajo, 500 m, 10.90037N, -85.37254W, 12 Dec, 2011, C. Cano, ec: 8 Jan 2012 (2♂), ec: 9 Jan 2012 (1♂), ec: 12 Jan 2012 (1♂), ec: 9 Jan 2012 (1♂), r.f. *Asplundia microphylla* (11-SRNP-4889, 11-SRNP-4899, 11-SRNP-4891, 11-SRNP-4904, 11-SRNP-4903). Rio Blanco Abajo, 500 m, 10.90037N, -85.37254W, 12 Dec 2011, r.f. *Asplundia microphylla*, Carolina Cano, ec: 10 Jan 2012 (2♂) (11-SRNP-4882, 11-SRNP-4888); ec: 8 Jan 2012 (1♂) (11-SRNP-4886). Sector Pitilla, Quebradona, 475 m, 10.99102N, -85.39539W, 21 May 2011, Ricardo Calero, ec: 5 Jun 2011 (1♀), r.f., unknown plant (11-SRNP-71121).

Distribution and biology. *Sparganocosma docsturnerorum* is known only from this one small area of Costa Rica, despite intensive moth collecting throughout Costa Rica by Janzen, Hallwachs, the INBio parataxonomists, and visiting scientists for over 30 years. The entire type series (n = 53) was reared from larvae collected while they were feeding on *Asplundia utilis* (Oerst.) Harling and *A. microphylla* (Oerst.) Harling (Cyclanthaceae) growing in the heavily shaded rain forest understory at intermediate elevations (375–500 m) in ACG. Although some rearing records previously reported the food plant as *Carlodovica costaricensis* (Cyclanthaceae), this name is currently considered a synonym of *Asplundia utilis* (Williams 1961), and the project databases have been updated accordingly. With exceedingly few documented exceptions, species of Sparganothini are moderately to highly polyphagous (Powell and Brown 2012), typically feeding on two or more plant families. Hence, it is interesting that *S. docsturnerorum* has been reared from a single plant genus in ACG, suggesting a high degree of host plant specialization. Of course, this does not preclude the possibility that it feeds on other plants in other parts of its range, wherever that may be. The range of this moth will be difficult to determine given its apparent lack of attraction to lights.

Superficially, the penultimate instar of *S. docsturnerorum* is pale translucent yellow-gold, with fine, long, pale setae from unmarked pinacula (Figure 7). The head is nearly uniformly amber with a small black spot in the stemmatal area. The pupa is typically tortricoid (Figure 8), with two rows of spines on the dorsum of abdominal segments 3–9, and lacks dorsal pits. Development time from prepupa to eclosion required 21–25 days. In the course of the ACG caterpillar inventory through 2011, 223 larvae of *S. docsturnerorum* have been collected and reared. From these rearings have emerged 13 solitary parasitoid wasps, *Sphelodon wardae* Godoy & Gauld (Ichneumonidae; Banchinae), the host of which was formerly unknown (Godoy & Gauld 2002). This wasp oviposits in the larva and exits from the prepupal larva inside the moth's cocoon, where it spins its own flimsy cocoon. In the entire ACG caterpillar inventory, about 510,000 wild-caught caterpillars have yielded about 52,000 parasitoid records, of which the 13 records of *S. wardae* have come only from *S. docsturnerorum*, along with four records of an undescribed parasitoid fly (*Actia*, Tachinidae) from the same sample of moth larvae. If *S. wardae* is a specialist on *S. docsturnerorum* as the data suggest, then the geographic distribution of the moth likely includes the localities from

which the parasitoid has been recorded – the provinces of Limón, Cartago, Guanacaste, and Heredia, at elevations between 400 and 1000 m.

The near absence of field-collected adults (we examined one genitalia slide of a presumably light-collected specimen from the OET Estación Biologica La Selva, Heredia, Costa Rica, but could not locate the associated adult) suggests that this species is not attracted to light, especially since light-trapping has been conducted on many nights during the Lepidoptera inventory of this ACG rain forest ecosystem (Janzen et al. 2009). A similar phenomenon is observed in *Aesiocopa* where the vast majority of specimens has been either reared or collected from malaise traps (Brown in press). In contrast, virtually all species of *Amorbia*, *Sparganothoides*, *Coelostathma*, *Platynota*, and other ACG sparganothines are frequently encountered at lights and/or collected in light traps.

Etymology. The specific epithet is a patronym for Drs. John Turner and Nancy Turner of Ardmore, Tennessee, USA, whose intense curiosity about tropical Lepidoptera in general, and Riodinidae specifically, has psychologically and financially strongly supported the Lepidoptera inventory of ACG.

Discussion

Relationships among sparganothine genera have not been investigated in a modern phylogenetic context, so the position of *Sparganocosma* within the tribe cannot be determined with certainty. The long, crescent- or ribbon-shaped signum in the corpus bursae of the female genitalia of *Sparganocosma* may represent a synapomorphy for a sparganothine clade that includes *Aesiocopa*, *Amorbia*, *Amorbimorpha*, *Coelostathma*, *Lambertiodes*, *Paramorbia*, *Rhynchophyllus*, *Sparganopseustis*, *Sparganothina*, and *Sparganothoides*. The presence of secondary arms of the socii divide the group – they are present in *Aesiocopa*, *Amorbimorpha*, *Sparganopseustis*, and *Sparganothoides* and absent in *Amorbia*, *Coelostathma*, *Lambertiodes*, *Paramorbia*, *Sparganothina*, and *Sparganocosma*. The male of *Rhynchophyllus* is unknown. Within the later group of genera, *Sparganocosma* lacks abdominal dorsal pits, which are present in many *Amorbia* and nearly all *Coelostathma* (Phillips-Rodriguez & Powell 2007; Powell & Brown 2012).

Based on DNA barcode data (cytochrome oxidase 1) (i.e., Janzen et al. 2009), specimens of *S. docsturnerorum* (n = 31) form a tight cluster with exceedingly limited genetic divergence (less than 0.5%) among them. However, there is a suspicious shallow split in the cluster of barcodes portrayed in a CO1 neighbor joining (NJ) tree, a split that is correlated with collection site. Hence, the data and specimens require further scrutiny since other species of ACG Lepidoptera with no more barcode distance among them have turned out to be species complexes (e.g., Burns et al. 2007, 2008). In NJ trees, the genus is portrayed as near *Sparganothoides*, *Coelostathma*, and *Paramorbia*. However, such trees should be used primarily as an aid to determining species boundaries and for the discovery of cryptic species, not as an indication of phylogenetic relationships because mitochondrial DNA data are subject to biases that may obscure true phylogenetic signal (e.g., Will & Rubinoff 2004; Rubinoff et al. 2006).

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First cytogenetic information for *Drymoreomys albimaculatus* (Rodentia, Cricetidae), a recently described genus from Brazilian Atlantic Forest

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Abstract

The recently described taxon *Drymoreomys albimaculatus* is endemic to the Brazilian Atlantic Forest and its biology and genetics are still poorly known. Herein, we present, for the first time, the karyotype of the species using classical and molecular cytogenetics, which showed 2n=62, FN=62, and interstitial telomeric signals at the sex chromosomes. Nuclear and mitochondrial DNA sequences from the two karyotyped individuals verify the taxonomic identity as the recently described *D. albimaculatus* and confirm the relationship of the species with other Oryzomyini. Additionally, external morphological information is provided.

Keywords

Oryzomyini, karyotype, CBG banding, GTG banding, FISH, IRBP, Cyt *b*

Introduction

The Atlantic Forest harbors a high diversity of mammals, 20 percent of which are rodents of the subfamily Sigmodontinae (Ribeiro et al. 2009). However, the fauna of this biome is still barely known, such that discovery of new species is still common (De

Vivo et al. 2010). Since 1999, 14 new species of sigmodontines were formally described for Atlantic Forest: *Abrawayaomys chebezi* (Pardiñas et al. 2009), *Akodon paranaensis* (Christoff et al. 2000), *A. philipmeyersi* (Pardiñas et al. 2005), *A. reigi* (González et al. 1999), *Brucepattersonius paradisus*, *B. guarani*, *B. misionensis* (Mares and Braun 2000), *Cerradomys langguthi*, *C. vivoi* (Percequillo et al. 2008), *Hylaeamys seuanezi* (Weksler et al. 1999), *Juliomys rimofrons* (Oliveira and Bonvicino 2002), *J. ossitenius* (Costa et al. 2007), *Rhipidomys tribei*, and *R. itoan* (Costa et al. 2011).

Recently, Percequillo et al. (2011) described *Drymoreomys albimaculatus* as a new monotypic genus, endemic to the Brazilian Atlantic Forest and known from a few localities in São Paulo and Santa Catarina states. Phylogenetic analyses based on morphological traits and DNA sequences [1143bp of cytochrome *b* (Cyt *b*) and 1235bp of interphotoreceptor retinoid binding protein (IRBP) genes] revealed the placement of *D. albimaculatus* in the tribe Oryzomyini, raising to 30 the number of extant Oryzomyini genera. According to those analyses, Percequillo et al. (2011) revealed that *D. albimaculatus* is the sister species of the Andean rat *Eremoryzomys polius*.

Here, we describe the karyotype of *D. albimaculatus* for the first time. In order to investigate the molecular identification of the two karyotyped animals, we added its Cyt *b* and IRBP sequences to the molecular data published by Percequillo et al. (2011). Additionally, we present morphological comments on the specimens.

Material and methods

Sampling

One male and one female were collected with pitfall traps in Santa Virgínia, Parque Estadual da Serra do Mar [45°03.00' to 45°11.00'W (DDM); 23°24.00' to 23°17.00'S (DDM)], state of São Paulo, Brazil. Pelage color and external measurements were taken during the fieldwork. Vouchers of both individuals are deposited in the Coleção de Mamíferos da Universidade Federal do Espírito Santo (UFES) under the catalog numbers UFES 2271 and UFES 2272.

Cytogenetic analyses

Metaphases were obtained *in vivo* from spleen and bone marrow, according to Ford and Hamerton (1956) with modifications. Conventional Giemsa staining was used to determine the diploid (2n) and the number of autosome arms (FN). GTG and CBG-banding were performed according to Seabright (1971) and Sumner (1972), respectively, with modifications. Fluorescent *in situ* hybridization (FISH) with a FITC labeled $(C_3TA_2)_n$ peptide nucleic acid (PNA) probe (DAKO) was carried out following the recommended protocol (Telomere PNA FISH Kit/FITC, Code No. K5325, DAKO). Mitotic plates were digitally captured with visible light or blue and green

filters (emission at 461 and 517 nm, respectively) in an Axioskop 40 epifluorescence microscope (Carl Zeiss) equipped with an Axiocam camera and AxionVision software. Images were overlaid and contrast enhanced with Adobe Photoshop CS5.1.

DNA extraction, amplification, and sequencing

DNA was extracted from liver with Chelex 5% (Bio-Rad) following Walsh et al. (1991). Amplification of an 820 bp fragment of Cyt *b* and a 782 bp of IRBP was performed with PCR using primers MVZ5 and MVZ16 (Irwin et al. 1991; Smith and Patton 1993), and A1 and F (Stanhope et al. 1992), respectively. Both extraction and PCR controls were used for each amplification. Each PCR mixture had 30 ng of DNA, 25 pmol of each primer, 0.2 mM of dNTP, and 2.52 µL of reaction buffer (50 mM KCl, 2.5 mM MgCl2, 10 mM Tris-HCl; pH 8.8), and 0.2 units of Taq DNA polymerase (Invitrogen) were added to complete 18 µL. Forty amplification cycles were performed in a thermal cycler (Eppendorf Mastercycler ep Gradient, Model 5341). Each cycle consisted of denaturation at 94°C for 30 s, annealing at 48°C for 45 s, and extension at 72°C for 45 s for Cyt *b,* and denaturation at 94°C for 30 s, annealing at 60°C for 60 s, and extension at 72°C for 180 s for IRBP. A final extension at 72°C for 5 min was performed for both Cyt *b* and IRBP amplifications. The PCR products were separated using 1% agarose gels in TAE buffer. Nucleotide sequencing was conducted using BigDye Terminator v3.1 Cycle Sequencing Kit (Applied Biosystems) and an ABI PRISM 3100 Genetic Analyzer (Applied Biosystems). Sequences of each animal were aligned with sequences from previously published data deposited on GenBank by Bonvicino and Moreira (2001), Weksler (2003), and Percequillo et al. (2011) using MAFFT ver. 5 (Katoh et al. 2005) under the iterative method of global pairwise alignment (G-INS-i). Our sequences were submitted to GenBank under accession numbers KF031014-KF031017.

Phylogenetic analyses

We performed maximum likelihood (ML) and Bayesian analyses using concatenated Cyt *b*-IRBP data set. For both analyses we used gene-specific unlinked models. The best-fitting model of nucleotide substitution for each gene was selected using the Akaike information criterion in accordance with the procedure outlined by Posada and Buckley (2004), and implemented in jModelTest, version 0.1.1 (Posada 2008). The maximum-likelihood trees were calculated using RAxML (Stamatakis 2006). The statistical support for the nodes was estimated by the nonparametric bootstrap, with 1000 pseudoreplicates (Felsenstein 1985). Bayesian analysis was performed using MrBayes 3.04b (Ronquist and Huelsenbeck 2003). Markov chains were started from a random tree and run for 1.0×10^7 generations, sampling every 1000th generation. The stationary phase was checked following Nylander et al. (2004). Sample points prior to the plateau phase were discarded as burn-in, and the remaining trees were combined to

find the maximum *a posteriori* probability estimated of the phylogeny. Branch support was estimated by Bayesian posterior probabilities (BPP). Two simultaneous analyses were performed to ensure convergence on topologies.

Results

Cytogenetic analyses

The animals showed 2n=62, FN=62, and the autosome set composed of 29 acrocentric pairs decreasing in size, and one small metacentric pair (Fig. 1A). The X is a large submetacentric, and the Y is a large submetacentric slightly smaller than the X (Fig. 1A). CBG-banding revealed pericentromeric constitutive heterochromatic blocks in all autosomes and in the long arm of Y (Fig. 1B). GTG-banding allowed the identification of almost all autosomic pairs, the X chromosome exhibited two interstitial bands at the long arm while a conspicuous pattern in the Y was not found (Fig. 1C). FISH detected telomeric signals at the ends of all chromosomes and additional telomeric sequences were found in the pericentromeric region of both X and Y chromosomes (Fig. 1D).

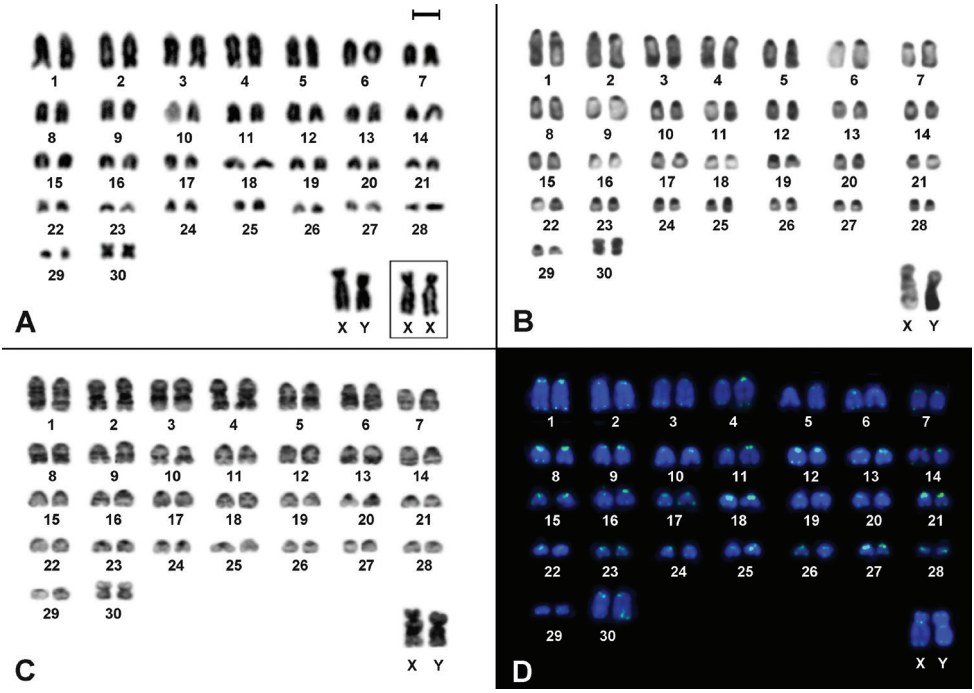

Figure 1. Cytogenetic analyses in *Drymoreomys albimaculatus* from Santa Virgínia, state of São Paulo, Brazil. **A** Karyotype of male (2n=62, FN=62), after conventional staining. Inset: sex chromosomes of a female **B** CBG-banding of a male **C** GTG-banding of a male **D** Fluorescent *in situ* hybridization using telomeric PNA probe over male mitotic plates. Bar scale = 10 μm.

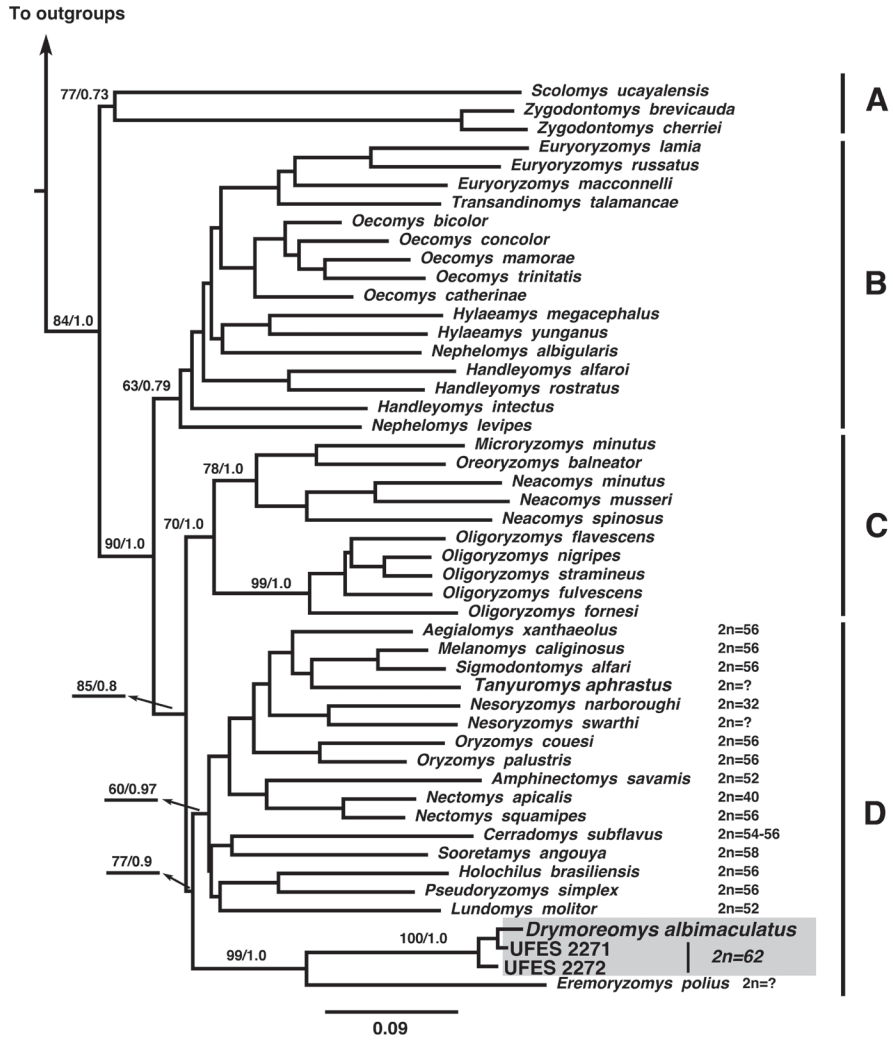

Figure 2. Maximum likelihood tree of combined molecular datasets [cytochrome b (Cyt *b*), interphotoreceptor retinoid binding protein (IRBP)] using Santa Virgínia specimens (UFES2271, UFES2272). Bootstrap nodal support indices and Bayesian posterior probabilities are shown above the branches, respectively. Outgroups include *Peromyscus maniculatus* (Neotominae); *Nyctomys sumichrasti* (Tylomyinae), *Delomys sublineatus* (Sigmodontinae), *Thomasomys baeops* (Sigmodontinae), and *Wiedomys pyrrhorhinos* (Sigmodontinae). Available diploid numbers (2n) of clade D are indicated (for details see Table 1), although the lowest diploid number (*Nectomys palmipes*, 2n= 16, Barros et al. 1992) does not appear in the figure.

Phylogenetic analyses

The model selected for the phylogenetic analyses (ML and Bayesian) was GTR +I + Γ for each gene. The best ML tree had a -ln likelihood score of -22,345.02. The Bayesian analysis recovered a consensus topology similar to the best ML tree and the results recovered the four well-supported clades A, B, C, and D (Fig. 2) previously reported

by Weksler (2006) and Percequillo et al. (2011). In both phylogenetic analyses, Santa Virgínia specimens (UFES 2271 and UFES 2272) clustered with high statistical support to the recently described *D. albimaculatus* (Fig. 2, grey area).

Discussion

Phylogenetic analyses (ML and Bayesian) recovered the four clades A, B, C, and D (Fig. 2) recovered by Weksler (2006) and Percequillo et al. (2011). In both phylogenetic reconstructions, Santa Virgínia specimens were recovered with high statistical support in clade D, confirming their identity as *D. albimaculatus* (Fig. 2, grey area), and consistent with Percequillo et al. (2011). Our analyses also recovered *D. albimaculatus* as the sister species of *Eremoryzomys polius* and both species diverged early in the clade D (Fig. 2).

The diploid number of *D. albimaculatus* corroborates the pattern found for the majority of the Oryzomyini species, in which karyotypes present relatively high chromosome number and predominantly acrocentric pairs. The typical heterochromatic pattern of sex chromosomes is also found in most of the oryzomyine species and it is an essential condition for the recognition of the Y (Fig. 1B).

The karyotype herein reported for *D. albimaculatus* is species-specific, since only three other Oryzomyini species present the same diploid number, but different FN: *Oligoryzomys fornesi* (2n=62, FN=64), *Oligoryzomys delicatus* (2n=62, FN=74 and 76), and *Oligoryzomys nigripes* (2n=62, FN=80, 81 and 82) (Gardner and Patton 1976; Weksler and Bonvicino 2005). Telomeric sequences at the pericentromeric region of *D. albimaculatus'* sex chromosomes could be hypothesized as (i) similar to regular sequences of the centromeres, (ii) related to a amplification of $(T_2AG_3)_n$-like satellite DNA repeats, or (iii) resulted of a structural rearrangement. In fact, interstitial telomeric sequences are common in vertebrates (Meyne et al. 1990) and apparently are a structural component of mammalian satellite DNA (Garagna et al. 1997; Pagnozzi et al. 2000). Additionally, these sequences have been associated with chromosome rearrangements (Ruiz-Herrera et al. 2008; Bolzan 2012).

A compilation of karyological studies in representative species of clade D is presented in Table 1. Notably, cytogenetic data in Oryzomyini has increased considerably in the last decades, mainly because the karyotype has become a valid tool for identifying species of this group. Although several species still remain without karyotypic information (e.g., *Eremoryzomys polius, Tanyuromys aphrastus, Nesoryzomys swarthy*), the diploid number within clade D varies from 16 in *Nectomys palmipes* (Barros et al. 1992) to 62 in *D. albimaculatus*. As *D. albimaculatus* exhibited the highest diploid number reported hitherto and diverged early in clade D, karyotype evolution in this clade based on the phylogeny (Fig. 2), apparently exhibits a trend toward a decrease in the diploid number. This hypothesis could imply chromosomal plasticity in low 2n ratios as suggested by Gardner and Patton (1976). In this sense, tandem fusions have perhaps played significant role in clade D, resulting in the lower diploid numbers. Robersonian rearrangements could have occurred in this group as well, since some species of clade

Table 1. Cytogenetic characteristics of Oryzomyini species of clade D, with diploid number (2n), fundamental number (FN), morphologies of autosomal pairs and sex chromosomes, polymorphisms described and references. *Supernumerary chromosomes are not included in autosomal morphologies. A= acrocentric; M=metacentric; SM=submetacentric; ST=subtelocentric; ITS = interstitial telomeric signals; NA= not available.

Species	2n	FN	Autosomal morphologies*	Sex chromosome morphologies	Cytogenetic characteristics	References
Aegialomys xanthaeolus	56	58	25 A 2 M/SM	X: large A Y: small A		Gardner and Patton (1976)
Melanomys caliginosus	56	58	25 A 2 M	X: large ST Y: medium ST		Gardner and Patton (1976)
Sigmodontomys alfari	56	54	27 A	X: large A Y: small A		Gardner and Patton (1976)
Tanyuromys aphrastus	NA	NA	NA	NA		
Nesoryzomys narboroughi	32	50	5 A 8 M/SM 2 ST	X: medium A Y: small A		Gardner and Patton (1976)
Nesoryzomys swarthi	NA	NA	NA	NA		
Oryzomys couesi	56	56	26 A 1 M	X: large SM Y: medium A/ST	Y heteromorphisms	Haiduk et al. (1979)
Oryzomys palustris	56	56	26 A 1 M	X: large A Y: minute A		Haiduk et al. (1979); Gardner and Patton (1976)
Amphinectomys savamis	52	66	NA	NA		Malygin et al. (1994) apud Musser and Carleton (2005)
Nectomys apicalis	42	40	20 A	X and Y: A		Patton et al. (2000)
Nectomys squamipes	56–59	56	26 A 1 M	X: large SM/ ST Y: medium/ small SM/ST	0-2 B chromosomes; sex chromosomes polymorphisms	Maia et al. (1984)
Cerradomys subflavus	54–56	62	21 A, 3 SM, 2M 23 A, 2 SM, 2M	X: large A/ ST Y: medium A/ large A	Centric fusion/fission, pericentric inversion, sex chromosomes polymorphisms	Almeida and Yonenaga-Yassuda (1985)
Sooretamys angouya	58, 60	60, 64	26 A 2 M	X: large A Y: medium ST	0 or 2 B chromosomes	Andrades-Miranda et al. (2001); Silva and Yonenaga-Yassuda (2004)
Holochilus brasiliensis	56–58	56, 58, 60	26 A 1 M	X: large ST Y: small SM	0 to 2 B chromosomes	Yonenaga-Yassuda et al. (1987)
Pseudoryzomys simplex	56	54, 55	27 A	X: large A Y: medium A	Heteromorphic pair 17 due to addition of constitutive heterochromatin	Voss and Myers (1991); Moreira et al. (in press)
Lundomys molitor	52	58	21 A 4 M	X: large SM Y: small M	X heteromorphism	Freitas et al. (1983)
Drymoreomys albimaculatus	62	62	29 A 1M	X: large SM Y: medium SM	ITS in both sex chromosomes	Present study
Eremoryzomys polius	NA	NA	NA	NA	NA	

D present the same FN but different 2n and number of biarmed chromosomes (e.g., *D. albimaculatus* and *Cerradomys subflavus*, Table 1). Non-Robertsonian mechanisms such as pericentric inversions, unequal translocations, or whole-arm heterochromatin addition or deletion could also be invoked in those cases of changes in FN but not in 2n (e.g., *Sigmodontomys alfari*, and *Melanomys caliginous,* Table 1).

Species of clade D present sex and supernumerary chromosomes easily identifiable with classical cytogenetic approaches, and some species exhibit sex chromosomes with polymorphisms/heteromorphisms and interstitial telomeric signals (ITS; Table 1, Fig. 1D). Thus, this clade is an excellent model to study origin, evolution, and chromatin composition of these chromosomes. For instance, a superficial morphological comparison among sex chromosomes from Table 1 could suggest the occurrence of pericentric inversions, or whole-arm heterochromatin additions or deletions.

Comments on external morphology and natural history

The specimens collected were medium sized (male body mass: 46.5 g, head and body length: 115 mm, and tail length: 142 mm; female body mass: 57 g, head and body length: 127 mm, and tail length: 170 mm). Tail was longer than head and body, and was a uniform color on both sides. Male hind foot was short (25 mm, 22% of head and body length) and ears were small (16 mm; 14% of head and body length). These external morphological measures overlapped with those of the *Drymoreomys albimaculatus* holotype (Percequillo et al. 2011). Dorsal pelage was reddish-brown; ventral pelage was predominantly grayish. Samples exhibited the pattern of short hind feet consistent with *Oecomys*. Fore and hind feet digits were covered by silvery-white hairs and the dorsal surface of hind feet were covered by brown hairs forming a patch, in a more conspicuous pattern than the observed for *Rhipidomys*. Thus, some external morphological traits were similar to those described for *Rhipidomys* and *Oecomys* as reported Percequillo et al. (2011). Nevertheless, our samples exhibited the characteristics of the *D. albimaculatus* holotype that differentiate it from *Rhipidomys,* such as the shorter, thinner, and sparser mystacial vibrissae and presence of gular to pectoral patches of white hair. Additionally, we detected that, contrary to what is found in *Rhipidomys,* a tuft of hairs on the tail's end is absent in our samples. On the other hand, several anatomical traits that distinguish the *Drymoreomys albimaculatus* holotype and species of *Oecomys* were observed in our samples, such as the plantar surface of pes covered with squamae; dorsal surface of pes with dark patches of brown hairs and the ventral pelage with gular and thoracic white patches (Percequillo et al. 2011).

Percequillo et al. (2011) reported that most of the *Drymoreomys* specimens were collected in pitfall traps; in the present work, the animals were also collected in the same way. These reiterate the importance of further fieldwork effort, with different collecting methods in order to increase the spectrum of small mammals collected. Consequently, our knowledge of small mammal biodiversity will be improved as a whole, which will allow improvements in relevant laws and policies for biodiversity protection.

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Two new species of the genus *Ancistrocerus* Wesmael (Hymenoptera, Vespidae, Eumeninae) from China, with a key to the Oriental species

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Abstract

Two new species, namely *Ancistrocerus transpunctatus* You and Li, **sp. n.** and *Ancistrocerus deqinensis* You and Li, **sp. n.** are described and illustrated from Yunnan, China. A key to the Oriental species of the genus *Ancistrocerus* is provided.

Keywords

Hymenoptera, Vespidae, Eumeninae, *Ancistrocerus*, new species, China

Introduction

The key characters of the genus *Ancistrocerus* characterized as follows: pronotal carina weak dorsally (in some species obliterated) but strongly developed laterally; width of metasomal tergum I much greater than length, basally with a transverse carina; tergum

II basally with a transverse sulcus, and with longitudinal keels on the bottom of the sulcus (Kim and Yamane 2009). Up to now, 114 species and 42 subspecies were recorded worldwide, including 58 species and 17 subspecies from the Palearctic Region (Blüthgen 1954; Borsato 2006; Cameron 1911; Giordani Soika 1964a; Gusenleitner 1977, 1995; Kim and Yoon 1995; Kim and Yamane 2009; Pekkarinen and Hulden 1991; van der Vecht and Fischer 1972; Yamane 1990), 16 species from the Oriental Region (Bingham 1897; Cameron 1900, 1908; Giordani Soika 1964b, 1976, 1991, 1994; Gusenleitner 1997, 2010; Kim and Yamane 2009; Li 1982, 1985; Meade–Waldo 1910a, 1910b, 1913; Yamane and Gusenleitner 1993), 22 species and 12 subspecies from the Ethiopian Region (Carpenter et al. 2009), 19 species and 12 subspecies from the Nearctic Region (Bequaert 1925, 1944; Buck et al. 2008; Cameron 1908), and 12 species from the Neotropical Region (Bequaert 1925; Carpenter and Garcete–Barrett 2002; Carpenter and Genaro 2011). Twenty–six species and two subspecies of this genus were already recorded from China (Bingham 1897; Giordani Soika 1964b, 1970, 1976, 1991; Gusenleitner 1993; Meade–Waldo 1910a, 1910b; Yamane and Gusenleitner 1993). In the study of *Ancistrocerus* from China, additional two new species are found from Yunnan. In the present paper, these two new species are described and illustrated in detail, along with a key to the Oriental species of *Ancistrocerus*. The key is produced based on both the examination of specimens and the characters extracted from literatures. The sources of information are listed in the key.

Materials and methods

The examined specimens were deposited in the Institute of Entomology and Molecular Biology, Chongqing Normal University, Chongqing, China (CQNU); Department of Entomology, Yunnan Agricultural University, Yunnan, China (YNAU). Morphological terminology follows Carpenter and Cumming (1985) and Yamane (1990). Descriptions and measurements were performed under a stereomicroscope (Nikon SMZ1500), and photomicrographs were taken with a stereomicroscope (LEICA EZ4HD) attached to a computer using Leica Application Suite version 2.1.0 software. Body length was measured from the anterior margin of head to the posterior margin of metasomal tergum II.

Taxonomy

Ancistrocerus Wesmael, 1836

Ancistrocerus Wesmael, 1836: 45; Li 1985: 118; Carpenter 1986: 64; van der Vecht and Fischer 1972: 108; Yamane 1990: 98; Kim and Yamane 2009: 31.

Type species. *Vespa parietum* Linnaeus, designated by Giraud 1879.

***Ancistrocerus transpunctatus* You & Li, sp. n.**
urn:lsid:zoobank.org:act:7765F0E3-CB31-47E2-97A5-FC64DB58A64D
http://species-id.net/wiki/Ancistrocerus_transpunctatus
Figs 1–6

Material examined. Holotype. ♂, China, Yunnan, Diqing, Weixi County, Tacheng Town, 27°36.22'N, 99°24.29'E, 2017 m, 16. VII. 2011, Tingjing Li, No. 201107166 (CQNU). Paratypes. 1♂, China, Yunnan, Diqing, Weixi County, Tacheng Town, 27°36.22'N, 99°24.29'E, 2017 m, 16. VII. 2011, Tingjing Li, No. 201107167 (CQNU); 2♂♂, China, Yunnan, Baoshan City, Tengchong County, Jietou Village, Datang, 25°25.40'N, 98°39.27'E, 1597 m, 13. IV. 2006, Li Ma (YNAU).

Description. Male: Body length 7.5–8.0 mm (Fig. 1), forewing length 6.0–6.5 mm. Black; the following parts are yellow: clypeus, a spot between antennal socket and eye, labrum, almost mandible, a spot on tempora, outer face of fore tibia, a spot on apex of mid tibia; the following parts are dark ferruginous: antennal article XI, an anterior band on pronotum, apical bands on metasomal terga I–II and sternum II.

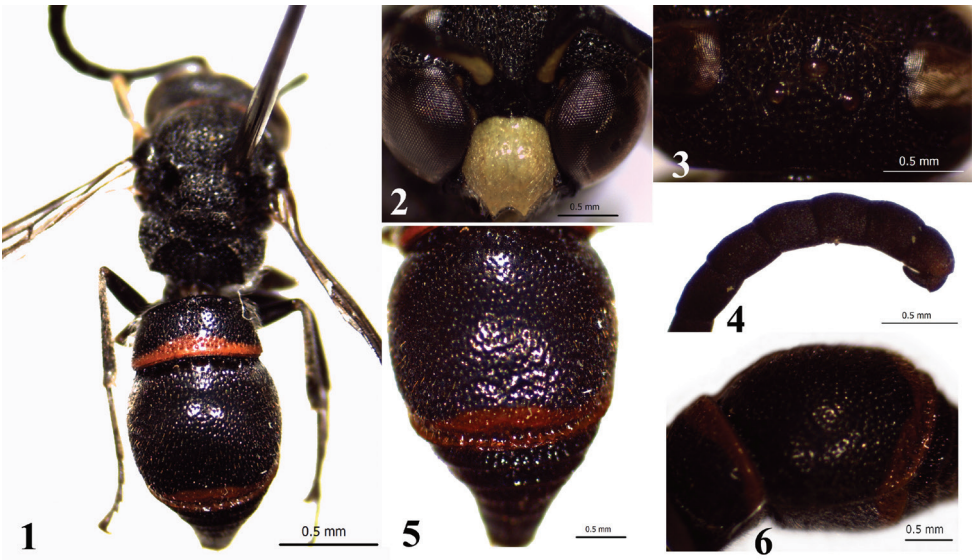
Head. Densely covered with long setae, as long as the distance between the posterior ocelli; vertex with dense and coarse punctures, punctures almost connected (Fig. 3); clypeus with sparse punctures (Fig. 2), length of clypeus slightly longer than width, apical emargination slightly shallow, shallower than semicircular, apical teeth somewhat acute; antennal scape with sparse and small punctures, antennal article XIII folded backward, reaching the base of article XI (Fig. 4).

Mesosoma. Setae on mesosoma slightly sparser and shorter than those on the head; pronotal carina weaker on dorsum, but acutely produced in lateral corner; mesopleuron with large and irregular punctures; pronotum and mesonotum with dense and coarse punctures, smaller than those on mesopleuron; tegula slightly smooth and shining, with fine punctures; scutellum flat, metanotum convex, punctures on scutellum and metanotum similar to those on pronotum and mesonotum; marginal and median carinae of propodeum developed, apical convavity of propodeum densely with striae; femora with short white pubescence.

Metasoma. Setae on metasomal tergum I as long as those on mesosoma, but much sparser; length of setae on terga II–VI less than 1/2 times those on tergum I; width of tergum I 2.3 times length, transverse carina well developed and with a narrow and shallow median notch; width of tergum II: length = 2.3: 2.4, the bottom of basal sulcus with longitudinal keels, punctures on metasomal tergum II distinctly weaker than those on tergum I, apical margin of tergum II with a transverse row of big punctures (Fig. 5); metasomal terga III–IV reticulate, densely covered with large punctures; punctures on terga V–VI smaller and weaker than those on terga III–IV; metasomal sternum II deeply truncated behind the basal sulcus, straight and distinctly angled near the base in profile (Fig. 6); sterna II–VI with sparse and small punctures.

Female. Unknown.

Remarks. The species is similar to *A. antoni* (Cameron, 1900) from India, in body coloration with similar spots, pronotal carina acutely produced into lateral corner,



Figures 1–6. Male of *Ancistrocerus transpunctatus* You, sp. n. **1** general habitus **2** frons and clypeus **3** head in dorsal view **4** antennal articles **5** apical margin of metasomal tergum II **6** metasomal sternum II in profile.

and shape of the tegula. But it can be distinguished from the related species and other members of the genus with the following characters: apical margin of metasomal tergum II with a transverse row of big punctures, forming a transverse furrow (Fig. 5), terga III–IV reticulate, densely with large punctures.

Distribution. China (Yunnan).

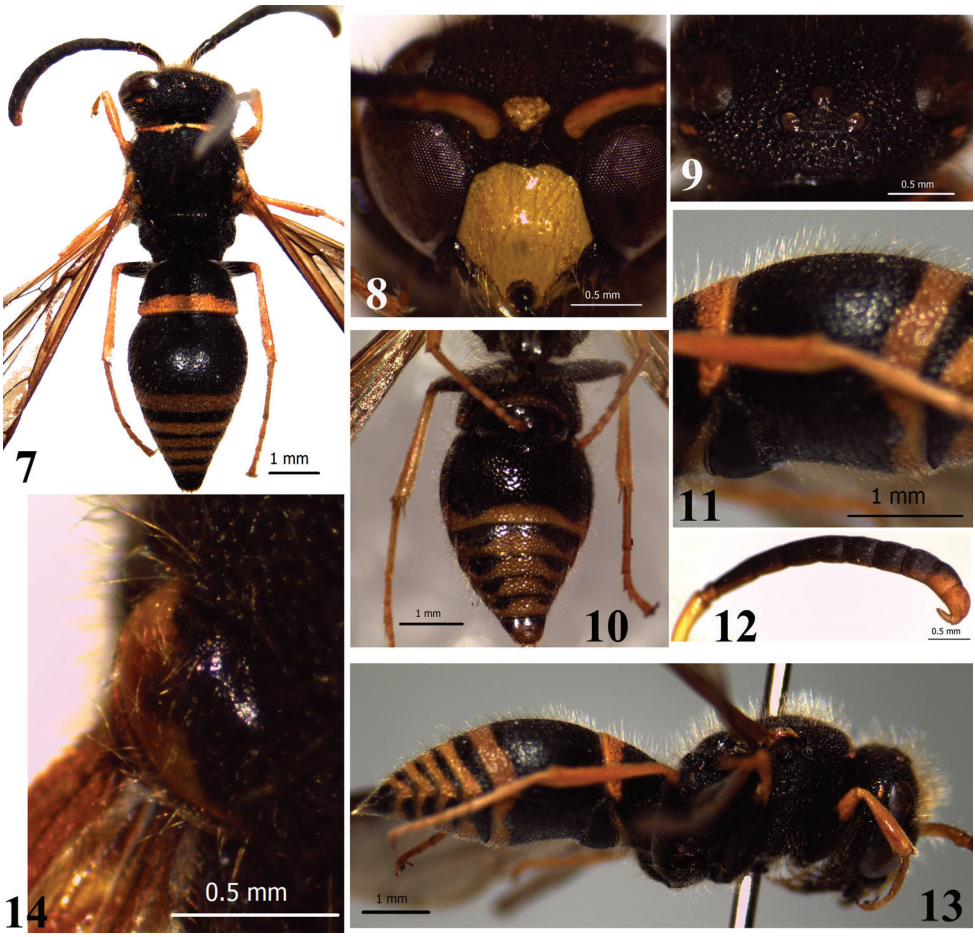
Etymology. It is named after its metasomal tergum II with a transverse row of big punctures.

Ancistrocerus deqinensis You & Li, sp. n.

urn:lsid:zoobank.org:act:BD1846E2-394C-4E4E-9EC0-1C9CDD811276
http://species-id.net/wiki/Ancistrocerus_deqinensis
Figs 7–14

Material examined. Holotype. ♂, China, Yunnan, Diqing, Deqin County, 28°29.03'N, 98°54.63'E, 3467 m, 19. VII. 2011, Tingjing Li, No. 201107191 (CQNU). Paratypes. 4♂♂, the same data as holotype, No. 201107192–201107195 (CQNU).

Description. Male: Body length 7.0–7.8 mm (Fig. 7), forewing length 7.5–8.0 mm. Black; the following parts are yellow: a lower frontal spot, clypeus, a spot between antennal socket and eye, almost mandible; the parts are bright ferruginous: labrum, antennae ventrally, a spot on tempora, an anterior band on pronotum, outside half of tegula (Fig. 14), apical bands on metasomal terga I–VI and sterna I–VI, a median spot on sternum VII (Fig. 10), and apex of femora to tarsi V in all legs.



Figures 7–14. Male of *Ancistrocerus deqinensis* You, sp. n. **7** general habitus **8** frons and clypeus **9** head in dorsal view **10** metasoma in ventral view **11** metasomal sternum II in profile **12** antennal articles **13** general habitus in profile **14** tegula.

Head. Densely covered with long setae, setae distinctly longer than the distance between the posterior ocelli; vertex with dense and coarse punctures, interspaces between punctures ridge–like (Fig. 9); width of clypeus equal to or slightly longer than length, clypeus moderately emarginate, almost semicircular, apically with acute teeth, sparse punctures and long setae (Fig. 8); antennal scape with sparse and small punctures, dense and long setae; antennal article XIII folded backward, reaching nearly the base of article XI (Fig. 12).

Mesosoma. Densely covered with long setae, similar to those on head; pronotal carina weaker in dorsum, but acutely produced in lateral corner. Mesopleuron reticulate, with large and irregular punctures; pronotum and mesonotum with dense and coarse punctures, smaller than those on mesopleuron; tegula with sparse punctures and long setae (Fig. 14); scutellum flat, metanotum convex, punctures on scutellum

and metanotum similar to those on pronotum and mesonotum; marginal and median carinae of propodeum well developed, convavity of propodeum with striae; femora with dense long setae and sparse small punctures.

Metasoma. Densely covered with long setae, as long as the distance between the posterior ocelli; width of tergum I slightly less than 2 times length, with somewhat dense large punctures (interspaces smaller than punctures), transverse carina well developed, with a wide and deep median notch; apical bands on metasomal sterna I–VI complete; width of tergum II: length = 2.4: 2.0, the bottom of basal sulcus with longitudinal keels; punctures on terga II–VI much smaller than those on tergum I; sternum II basally with transverse uniform sulcus, not truncate behind sulcus, in profile somewhat concave (Fig. 11), punctures on sterna II–VI much sparser than those on tergum II.

Female. Unknown.

Distribution. China (Yunnan).

Remarks. The species is similar to *A. parietum* (Cameron, 1900) from Europe to northeast of China and North America, in the shape of the clypeus, punctures on the mesosoma, transverse carina of tergum I well developed and with a wide and deep median notch. However, it can be distinguished from similar species and other members of the genus with the following characters: body markings bright ferruginous, tegula with sparse punctures and long setae (Fig. 14), terga II–VI with dense long setae (Fig. 13), apical bands on metasomal sterna I–VI complete and sternum VII with a medial spot (Fig. 10).

Etymology. It is named after the type locality of the species, Deqin County in Yunnan Province of China.

Key to the Oriental species of *Ancistrocerus*

1 Setae on frons and vertex distinctly longer than the distance between the posterior ocelli; metasomal terga II–VI with dense long setae..... **2**

– Setae on frons and vertex as long as or shorter than the distance between the posterior ocelli; metasomal terga II–VI with very sparser and shorter setae.. **3**

2 In male clypeus shallowly emarginate, almost semicircular (Fig. 8) .... ***A. deqinensis* sp. n.**

– In male clypeus deeply emarginate, distinctly deeper than semicircular (Gusenleitner 2010)..... ***A. extremus* Gusenleitner**

3 Metasomal sternum II behind basal sulcus with a somewhat deep truncation, nearly as high as length of median part of basal sulcus, anterior truncate slope of sternum II distinguished from posterior horizontal part in profile..... **4**

– Metasomal sternum II behind basal sulcus with shallow truncation, less than half length of median part of basal sulcus, or almost lack of truncation, sternum II smoothly convex in profile..... **12**

4 Length of clypeus longer than width **5**

– Length of clypeus shorter than width **7**

5 Apical margin of metasomal tergum II with a transverse row of big punctures, forming a transverse furrow (Fig. 5) ..... ***A. transpunctatus* sp. n.**

– Apical margin of metasomal tergum II normal, without a transverse row of big punctures **6**

6 Antennal scape with sparse small punctures, interspaces always larger than punctures ..... ***A. antoni* (Cameron)**

– Antennal scape with dense large punctures, interspaces equal to or smaller than punctures (Giordani Soika 1976)..... ***A. aureovillosus* Giordani Soika**

7 In profile, border rounded between anterior slope and posterior horizontal part of metasomal sternum II **8**

– In profile, border angled between anterior slope and posterior horizontal part of metasomal sternum II **11**

8 Clypeus with dense punctures, interspaces smaller than punctures **9**

– Clypeus with sparse punctures, interspaces larger than punctures..... **10**

9 Propodeal dorsum with distinct punctures and shining (Giordani Soika 1994) ..... ***A. handschini* (Schulthess)**

– Propodeal dorsum with indistinct punctures and dull (Giordani Soika 1994) ..... ***A. borneanus* Giordani Soika**

10 Metasomal terga III–V with apical bands (Gusenleitner 1996) ..... ***A. rufoluteus* Gusenleitner**

– Metasomal terga III–V without apical bands (Yamane and Gusenleitner 1993) ..... ***A. montuosus* Gusenleitner**

11 Metasomal terga III–IV with apical bands; female without a spot between antennal socket and eye (Kim and Yamane 2009)..... ***A. nigricornis* (Curtis)**

– Metasomal terga III–IV without apical bands; female with a yellow spot between antennal socket and eye (Yamane and Gusenleitner 1993)..... ***A. terayamai* Yamane**

12 Mesosoma and metasoma with ivory–white spots (Meade-Waldo 1910) ..... ***A. hirsutus hirsutus* (Meade–Waldo)**

– Mesosoma and metasoma with yellow or ferruginous spots..... 13

13 Metasomal tergum III with apical band 14

– Metasomal tergum III without apical band..... 15

14 Concavity of propodeum laterally sculptured, and apically dull(Gusenleitner 1996) ..... ***A. xanthozonus* (Curtis)**

– Concavity of propodeum not laterally sculptured, and apically shining..... ***A. antilope antilope* (Panzer)**

15 Metasomal tergum I with sparse punctures, interspaces equal to or larger than punctures..... 16

– Metasomal tergum I with dense punctures, interspaces always smaller than punctures..... 17

16 Metanotum convex; propodeum with well developed superior ridges (Kim and Yamane 2009) ..... ***A. philippinus* Giordani Soika**

– Metanotum not convex; propodeum with weak superior ridges (Giordani Soika 1971) ..... ***A. sikhimensis* (Bingham)**

17 Head and mesosoma with large punctures; mandible with a yellow spot; antennal scape always with a yellow spot; clypeus in female basally with two yellow spots (Giordani Soika 1991) .....***A. arcanus* Giordani Soika**

– Head and mesosoma with small punctures; mandible and antennal scape in male, and clypeus in female, black (Giordani Soika 1991) ....***A. waltoni* (Meade–Waldo)**

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