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## Two new species of the genus *Melixanthus* Suffrian (Coleoptera, Chrysomelidae, Cryptocephalinae) from China

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### Abstract

Two new species of the genus *Melixanthus* Suffrian, 1854 are described from China: *M. menglaensis* Duan, Wang & Zhou, **sp. nov.** from Yunnan (also in Vietnam, Tonkin) and *M. similibimaculicollis* Duan, Wang & Zhou, **sp. nov.** from Yunnan. One species *M. rufiventris* Pic, 1926 is reported for the first time in China. High quality color images and line drawings of adult habitus, aedeagus and other important structures are provided for the new species and the new country record species. All the types of the new species are deposited in the collection of Institute of Zoology, Chinese Academy of Sciences (IZ-CAS).

### Key words

Cryptocephalini, distributional records, leaf beetles, new species.

### Introduction

The leaf beetle genus *Melixanthus* Suffrian, 1854 (Chrysomelidae, Cryptocephalini) distributes mainly in the Oriental Regions and includes ca. 60 species recorded up to now, of which 11 ones have been found to occur in China (Schöller et al. 2010; Tan et al. 1980; Gressitt & Kimoto 1961). This genus was erected very early as valid genus-level taxon and can be diagnosed by the following characteristics: antennae slightly short, usually reaching humeral region of elytra; apical 6 segments broadened and flattened, about 1.2-2.2 times as long as wide; claws of all legs usually toothed, or thickened basally. For the character of claws with or without tooth, it is not so clear for all the species of this genus and at least a few of its members were not easy to be distinguished to include in or exclude from this genus. This brought out much challenge for taxonomists studying this group.

The Chinese fauna of the genus was studied by including in the total Chrysomelidae (e.g. Schödlér et al. 2010; Tan et al. 1980; Gressitt & Kimoto 1961; Chûjô 1954). Kimoto & Gressitt (1981) studied the Chrysomelid fauna of Thailand, Cambodia, Laos and Vietnam, the countries near to China and thus much important to study the Chinese species. Medvedev (2012) is a most recent and comprehensive study to the genus *Melixanthus*, especially its excellent species revising and key to species.

Our present study reports two new species of the genus *Melixanthus* Suffrian from China: *M. menglaensis* Duan, Wang & Zhou, **sp. nov.** from Yunnan (also in Vietnam, Tonkin) and *M. similibimaculicollis* Duan, Wang & Zhou, **sp. nov.** from Yunnan. One species *M. rufiventris* Pic, 1926 is recorded for the first time in China. High quality color images and line drawings of adult habitus, aedeagus and other important structures are provided for the new species and the new country record species.

## Materials and methods

Dissections and photography: Dried specimens were relaxed in hot distilled water at 80°C for about 2 hours, to soften the body and ease dissection. The abdomen was separated with insect pins from the rest of the body, soaked in 10% KOH solution and then in a hot water bath for 15 minutes to advance the process; after that they were transferred in distilled water to rinse the residual KOH solution off and stop the bleaching process. Afterwards, the aedeagus, spermatheca and rectal sclerites were prepared. The dissected parts were placed into glycerin for observation and measurement with an apochromatic stereomicroscope Zeiss SteREO V12. Color pictures of the adults and genitalia were captured with an Axio Zoom V16 fluorescence stereo zoom microscope, and photomontage was performed in Zen 2012 (blue edition) imaging software. Adobe Photoshop CS6 was used in digital post-processing of the color pictures, and Adobe Illustrator 2020 was used to make the line drawings.

Materials used in this study are from the collection: **IZ-CAS** (Institute of Zoology, Chinese Academy of Sciences, Beijing, China).

Measurements are average values calculated from the values of at least five specimens, or all available specimens in case less than five specimens were available. The following abbreviations are used in the text to indicate the measurements of the specimens:

- BW** body width (distance between the humeri, maximal body width);
- HL** head length (length from occiput to the front apex of mandibles);
- HW** head width (distance between the outer margin of eyes in frontal view, maximal head width);
- PL** pronotal length (length from the basal angle to anterior-margin, maximal longitudinal length of pronotum);
- PW** pronotal width (distance of the widest portion of the pronotum);

- PA** basal margin angle of pronotum (the meddle pointed angle of pronotum basal margin);
- EL** elytral length (length of the maximal elytral length in dorsal view);
- EA** lateral margin angle of elytra (the angle that lobe-formed part of elytra lateral margin);
- AL** aedeagus length (length from the apex of aedeagus to the basal margin, maximal aedeagus length);
- AW** aedeagus width (the maximal width of aedeagus);
- SL** spermathecal length (length of the maximal spermathecal length, without duct).

## Taxonomy

### The Genus *Melixanthus* Suffrian, 1854

Suffrian, 1854: 8; Chapuis, 1874: 175; Jacoby, 1908: 267; Clavareau, 1913: 197; Gressitt, 1942: 330, 353; Chũ ã 1954: 187; Gressitt & Kimoto, 1961: 169; Tan et al., 1981: 174; Kimoto & Gressitt, 1981: 329; Schöller *et al.*, 2010: 606; Medvedev, 2012: 162.

**Type species:** *Melixanthus intermedius* Suffrian, 1854.

**Syn.:** *Suffrianus* Weise, 1895: 58. Type species: *Cryptocephalus pumilio* Suffrian, 1854.

### 1. *Melixanthus menglaensis* Duan, Wang & Zhou, sp. nov.

(Figs 1; 2; 3-1; 3-2)

**Type locality. China: Yunnan** Province: Mengla.

**Type material examined. Holotype:** male, **CHINA: Yunnan** Province: Mengla, Menglun, II-IV. 1979, coll. unknown (IZ-CAS). **Paratypes: China: Yunnan** Province: 4 males, 2 female, same data as holotype (IZ-CAS); **China: Yunnan** Province: 1 female, Xishuangbanna, Gannanba, 14. III.1957, coll. Shuyong Wang (IZ-CAS); 1 female, Xishuangbanna, Gannanba, 21. III. 1957, coll. Shuyong Wang (IZ-CAS); 1 female, Cheli, 9. IV.1955, coll. Fengyu Xue (IZ-CAS); **Vietnam: Tonkin** 4 males, 3 females, III. 1937, coll. unknown (IZ-CAS).

**Measurements.** BL = 3.42 mm, BW = 2.13 mm, HL = 0.91 mm, HW = 0.91 mm, PL = 1.08 mm, PW = 2.02 mm, EL = 2 mm, AL = 0.87 mm, AW = 0.27 mm, SL = 0.41 mm.

**Description.** Body (Figs. 3-1A-D) elongate, almost cylindrical, rounded anteriorly. Head (Fig. 3-1E) yellow, vertex with a darkish brown M-shaped marking; antennae (Fig. 3-1F) with basal 5 segments yellowish brown, terminal six reddish brown; clypeus yellow, labrum yellowish brown, mandibles darkish brown. Pronotum yellow, with two pitchy brown subtriangular marking along anterior margin. Scutellum yellow, and margins black. Elytra pitchy brown, with a yellowish brown band in middle region, covering about 1/2 of whole region; margins pitchy brown. Sometimes entirely yellow, only margins pitchy brown. Ventral surface yellow, metasternum with a rectangular black marking. Legs and pygidium all yellow.

Head (Fig. 3-1E) densely and coarsely punctured, flattened on midline, longitudinally impressed on frons and vertex. Eyes kidney-shaped, deeply emarginated; antennal insertions a little more widely separated than superior eye-lobes. Clypeus sparsely punctured, strongly arcuate on anterior margin. Antennae (Fig. 3-1F) with sparsely long hair, short and slightly broad, reaching humeral tubercle; 1<sup>st</sup> segment clubbed; 2<sup>nd</sup> oblong, about half as long as 1<sup>st</sup>; 3<sup>rd</sup>-5<sup>th</sup> thin, about equal in length, longer than 2<sup>nd</sup>; six apical segments moderately thickened, about 2.0-2.2 times as long as wide, last segment pointed apically.

Pronotum (Figs. 3-1A-D) 1.8 times as wide as long, moderately narrowed and rounded anteriorly; surface strongly convex, impunctured and shining. Scutellum triangular, nearly as long as wide, surface smooth, shining.

Elytron (Figs. 3-1A-D) parallel-sides, apical margin slightly straight, 2.0 times as long as wide, humeri prominent and glabrous. Disc with regular rows of fine punctures, partly confused near apical slope; interspaces without punctures; epipleurae slightly obliquely placed and seen in lateral view.

Ventral side (Fig. 3-1G) partly clothed with pubescence. Prosternum (Figs. 1: 1A-2A) square, anterior margin slightly concave; basal margin nearly straight, and drawn out into a pair of small denticles. Mesosternum trapeziform, twice as wide as long. Metasternum wrinkled at sutural region and with dense pubescence. Pygidium flat, punctured and pubescent. Claws (Figs. 2, 1A-2A) not toothed, thickened basally.

**Aedeagus** (Figs. 3-2A-C, 3-3A-C) elongate, about 3.2 times as long as wide, clubbed. Apex of median lobe narrower than middle, acute at apex, slightly curved in lateral view; with several pubescence on each side of apex and upper lateral margins, punctured on ventral side of upper middle part. Median orifice with middle sclerite bending inwards above surface. Upper part of median lobe with a pair of sclerotized prominence, exceeding the median lobe. Inner sac rather narrow, arrow-shaped. Tegmen Y-shaped, weakly sclerotized, almost translucent.

**Female.** Body more robust than male; **spermatheca** (Figs. 3-2D, 3-3D) hook-shaped, right-angled bending halfway, slightly acute at apex; duct weakly sclerotized, irregularly coiling 9-12 times. **Rectal sclerites** (Fig. 3-2E) weakly sclerotized, slightly connected between two rectangular sclerites on ventral side.

**Distribution.** China (Yunnan); Vietnam (Tonkin).

**Etymology.** The specific epithet is derived from the name (Pinyin) of the type locality, Mengla.

**Diagnosis.** This species is similar to *M. bimaculicollis* Baly, 1865, but can be distinguished from the latter by the head with more finer punctures, the narrower pronotum, the impunctured scutellum and the elytra with fine puncture rows, whereas the latter has the elytra with distinct punctures and a surrounded by dark ring; its claws are not toothed (Figs. 2: 1A-2A) and its basal margin of prosternum is drawn out into a pair of small sharp denticles (Figs. 1: 1A-2A).

## 2. *Melixanthus similibimaculicollis* Duan, Wang & Zhou, sp. nov.

(Figs 1; 2; 4-1; 4-2)

**Type locality. China: Yunnan** Province: Cheli.

**Type material examined. Holotype:** male, **CHINA: Yunnan** Province: Cheli, 9. III. 1957, coll. Fuji Pu (IZ-CAS); **Paratypes: China: Yunnan** Province: 1 male, 50 km to the southwest of Mojiang, 30. III. 1955, coll. Kryzhanowski (IZ-CAS); 1 female, Longling, 1600 m, 20. V. 1955, coll. Kryzhanowski (IZ-CAS).

**Measurements.** BL = 2.69 mm, BW = 1.65 mm, HL = 0.82 mm, HW = 0.85 mm, PL = 0.90 mm, PW = 1.62 mm, EL = 1.81 mm, AL = 0.91 mm, AW = 0.34 mm, SW = 0.39 mm.

**Description.** Body (Figs. 4-1A-B) elongate, almost cylindrical, rounded anteriorly. Head yellow, vertex with a darkish brown triangular marking; antennae (Fig. 4-1C) with basal 5 segments yellowish brown, the rest brown; clypeus yellow; labrum yellowish brown; mandibles reddish brown. Pronotum yellow, and basal margin pitchy brown, forming two nearly round pitchy brown markings along anterior margin. Scutellum entirely black. Elytra pitchy black, but only in basal and apical parts, with a large yellow band in middle region, covering about 2/3 of whole elytron; sutural and lateral margins also pitchy black. Ventral surface yellowish brown.

Head with sparsely pubescence, without punctures, flattened in midline, and with longitudinal shallow groove on frons. Eyes kidney-shaped, deeply emarginated; antennal insertions about equally separated with superior eye-lobes. Clypeus trapeziform, anterior margin concave, without punctures. Antennae (Fig. 4-1C) long and slightly thin, reaching 1/3 region of elytra; 1<sup>st</sup> segment clubbed; 2<sup>nd</sup> oblong, about half as long as 1<sup>st</sup>; 3<sup>rd</sup>-5<sup>th</sup> thin, about equal in length, longer than 2<sup>nd</sup>; six apical segments moderately thickened, about 1.7-2.0 times as long as wide, last segment pointed apically.

Pronotum (Figs. 4-1A-B) 1.8 times as wide as long, moderately narrowed and rounded anteriorly; surface strongly convex, without punctures and shining. Scutellum triangular, nearly as long as wide, surface smooth, shining, apically elevated, observable in lateral view.

Elytra (Figs. 4-1A-B) with humeri prominent and glabrous, widest slightly behind humerus, feebly truncated at apex. Disc with regular rows of coarse punctures; interspace of rows without any punctures; epipleura slightly obliquely placed and observable in lateral view.

Ventral side smooth, partly clothed with pubescence. Prosternum (Figs. 1: 1B-2B) square, anterior margin nearly straight; basal margin slightly concave, and drawn out into a pair of small denticles. Mesosternum trapeziform, 1.5 times as wide as long. Metasternum with coarsely sporadic punctures in sutural region and with sparse pubescence. Pygidium flat, punctured and pubescent. Claws (Figs. 2: 1B-2B) distinctly toothed, thickened basally.

**Aedeagus** (Figs. 4-1D-F; 4-2A-C) elongate, about 2.7 times as long as wide, clubbed. Anterior margin of median lobe nearly straight, middle part papillary protrude, strongly curved in lateral view; with several pubescence on each side of apex and upper lateral margins, punctured on apex of median lobe. Median orifice with middle sclerite bending inwards above surface. Upper part of median lobe with a



pair of sclerotized prominence, exceeding the median lobe. Inner sac rather narrow, arrow-shaped. Tegmen Y-shaped, weakly sclerotized, almost translucent.

**Female.** Body more robust than male; **spermatheca** (Fig. 4-2D) hook-shaped, right-angled bending halfway, slightly acute at apex. Duct weakly sclerotized, tightly coiled. **Rectal sclerites** absent in specimen studied.

**Distribution.** China (Yunnan).

**Etymology.** The specific epithet is derived from the Latin terms *simili-*, *bi-*, *maculi-* and *collis*, to indicate the new species near to the species *bimaculicollis*.

**Diagnosis.** This species is similar to *M. bimaculicollis* Baly, 1865, but can be distinguished from the latter by smaller body size; head and scutellum without any punctures; slightly narrower pronotum; elytra with finer punctures, and only basal part punctures surrounded by dark ring; basal margin of prosternum (Figs. 1: 1B-2B) drawn out into a pair of small sharp denticles. And this species is also similar to *M. menglaensis* Duan, Wang & Zhou, **sp. nov.**, but can be distinguished by the following characters: head without punctures; claws (Figs. 2: 1B-2B) toothed; and smaller body size.

### 3. *Melixanthus rufiventris* Pic, 1926, new country record from China

(Figs 5-1; 5-2)

Pic, 1926: 11 (type locality: Tonkin); Kimoto & Gressitt, 1981: 333 (Vietnam); Medvedev, 2012: 163.

**Material examined. CHINA: Hunan** province: 3 males, 6 females, Shimen country, Hupingshan town, Wangyue lake, 29.93222° N 110.7776° E, 248 m, 11. X. 2014, coll. Jian Yao (IZ-CAS).

**Measurements.** BL = 2.79 mm, BW = 1.73 mm, HL = 0.75 mm, HW = 0.80 mm, PL = 0.92 mm, PW = 1.73 mm, EL = 1.92 mm, AL = 0.64 mm, AW = 0.20 mm.

**Distribution.** China (Hunan); Vietnam.

### Acknowledgements

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## Figure Legends

**FIGURE 1.** *Melixanthus* prosternum: 1A, 2A. *M. menglaensis* Duan, Wang & Zhou, **sp. nov.**; 1B, 2B. *M. similibimaculicollis* Duan, Wang & Zhou, **sp. nov.**; 3C, 2C. *M. bimaculicollis* Baly, 1865.

**FIGURE 2.** *Melixanthus* claws: 1A, 2A. *M. menglaensis* Duan, Wang & Zhou, **sp. nov.**; 1B, 2B. *M. similibimaculicollis* Duan, Wang & Zhou, **sp. nov.**; 3C, 2C. *M. bimaculicollis* Baly, 1865. (Scale bars: 0.1 mm).

**FIGURE 3-1.** *Melixanthus menglaensis* Duan, Wang & Zhou, **sp. nov.**: A, C. habitus; B, D. lateral view of habitus; E. head; F. Antennae; G. ventral view of habitus. (Scale bars: A-E, G = 0.5 mm, F = 0.2 mm).

**FIGURE 3-2.** *Melixanthus menglaensis* Duan, Wang & Zhou, **sp. nov.**: A. lateral view of aedeagus; B. dorsal view of aedeagus; C. ventral view of aedeagus; D. spermatheca; E. female rectal pad. (Scale bars: 0.2 mm).

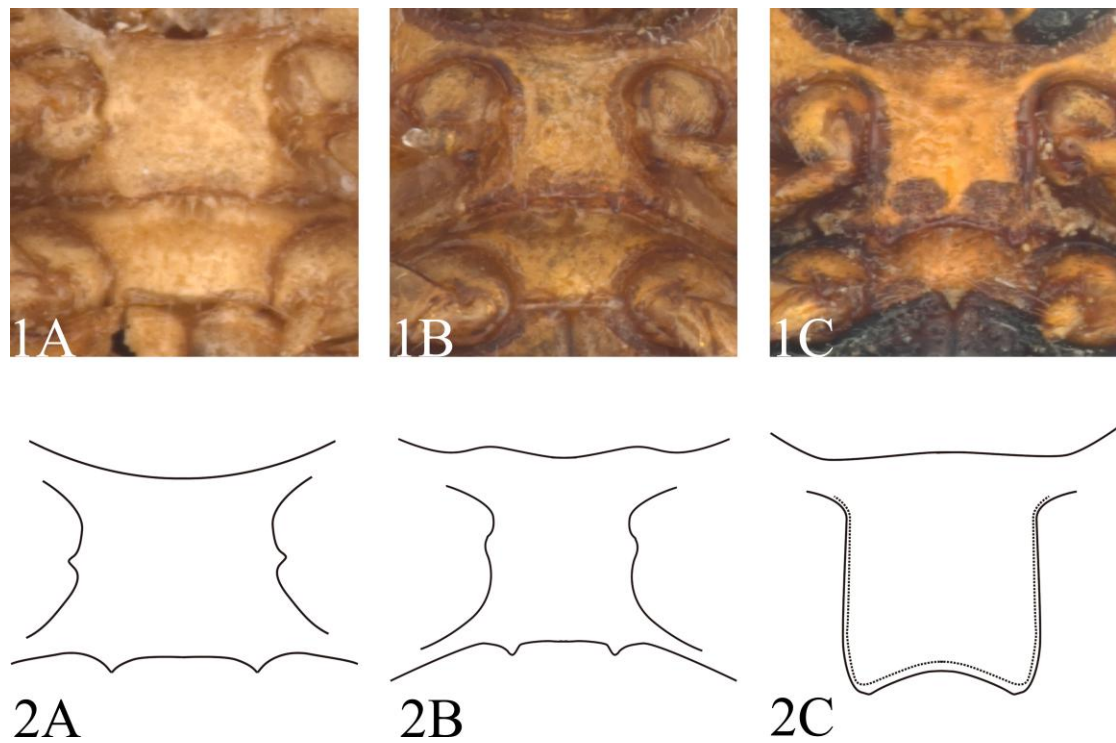
**FIGURE 3-3.** *Melixanthus menglaensis* Duan, Wang & Zhou, **sp. nov.**: A. dorsal view of aedeagus; B. ventral view of aedeagus; C. lateral view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).

**FIGURE 4-1.** *Melixanthus similibimaculicollis* Duan, Wang & Zhou, **sp. nov.**: A. habitus; B. lateral view of habitus; C. Antennae; D. lateral view of aedeagus; E. ventral view of aedeagus; F. dorsal view of aedeagus. (Scale bars: A-B = 0.5 mm, C-E = 0.2 mm).

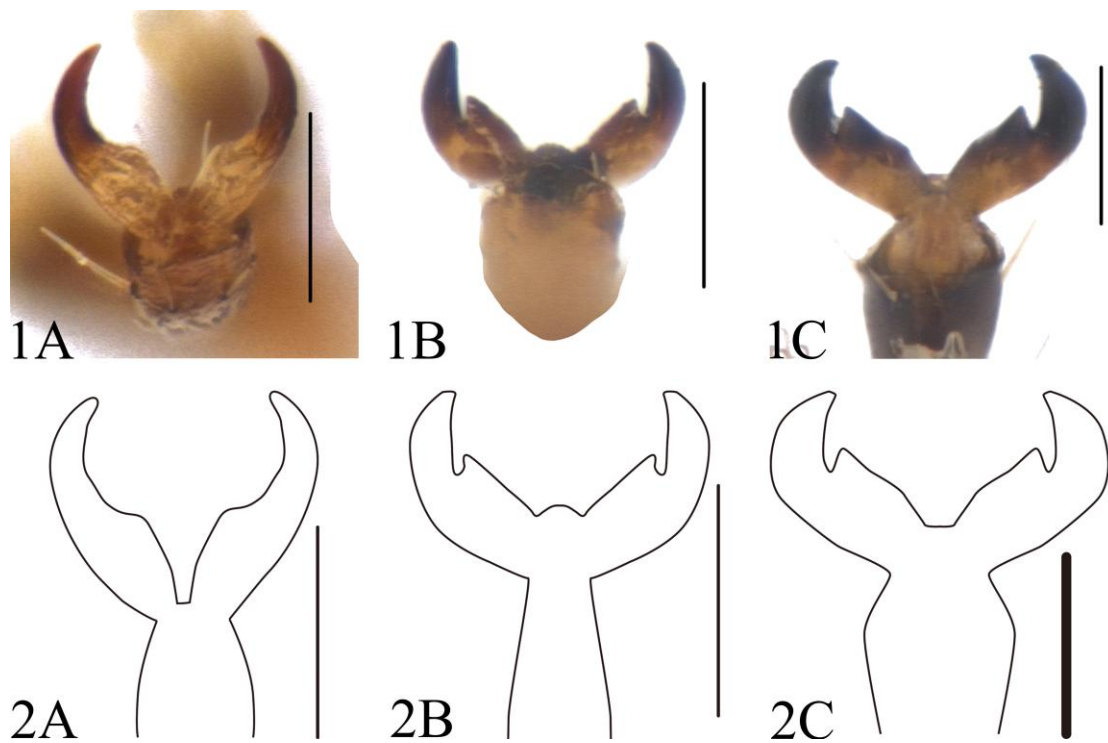
**FIGURE 4-2.** *Melixanthus similibimaculicollis* Duan, Wang & Zhou, **sp. nov.**: A. dorsal view of aedeagus; B. ventral view of aedeagus; C. lateral view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).

**FIGURE 5-1.** *Melixanthus rufiventris* Pic, 1926: A. habitus; B. lateral view of habitus; C. Antennae; D. lateral view of aedeagus; E. ventral view of aedeagus; F. dorsal view of aedeagus. (Scale bars: A-B = 0.5 mm, C-E = 0.2 mm).

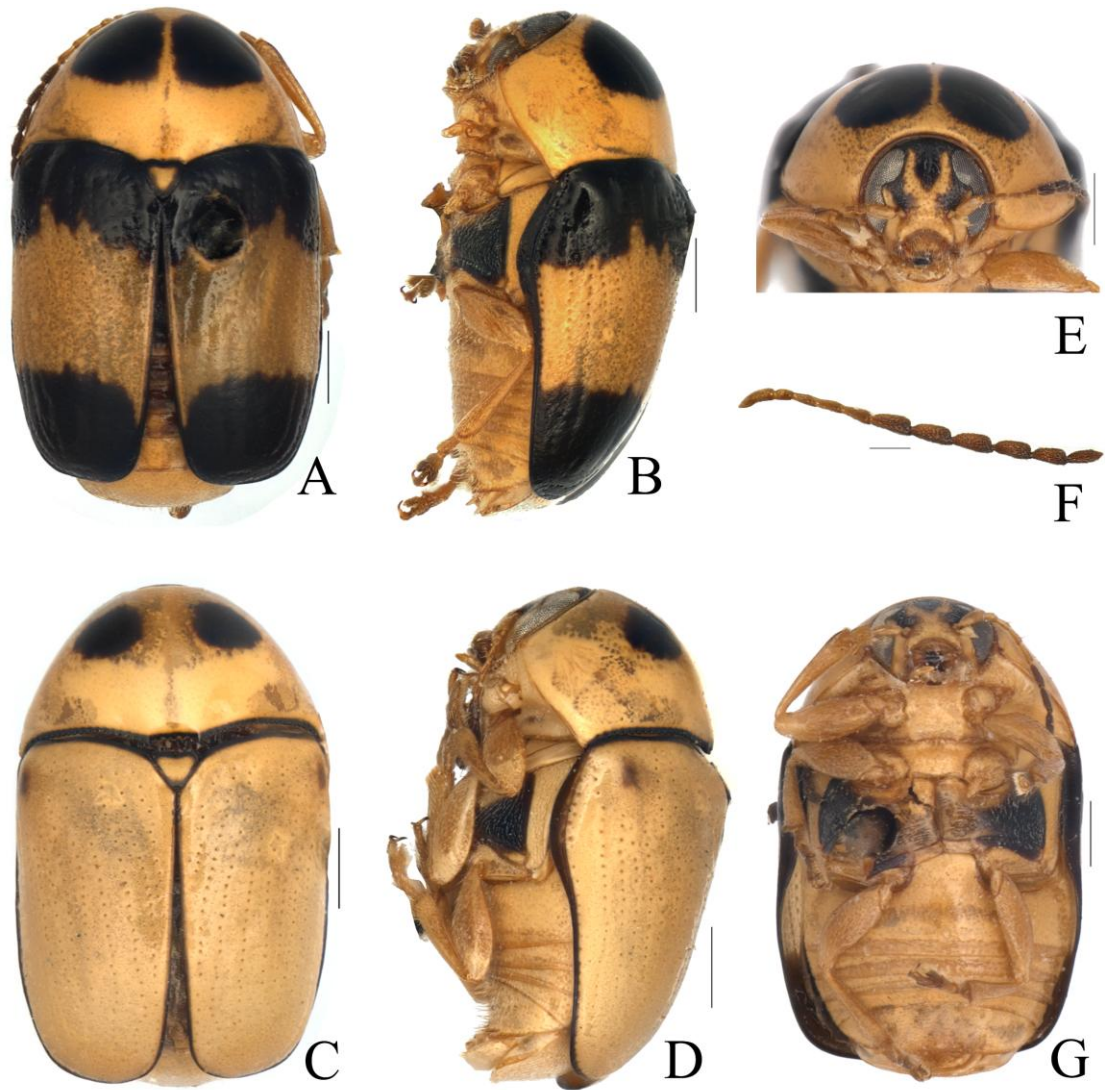
**FIGURE 5-2.** *Melixanthus rufiventris* Pic, 1926: A. lateral view of aedeagus; B. ventral view of aedeagus; C. dorsal view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).



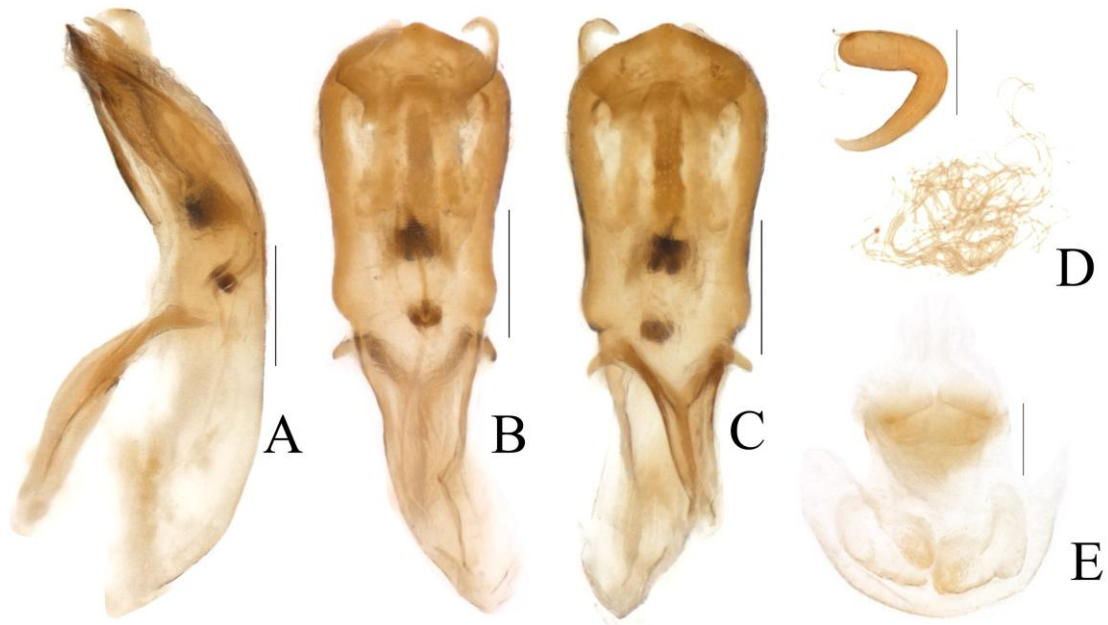
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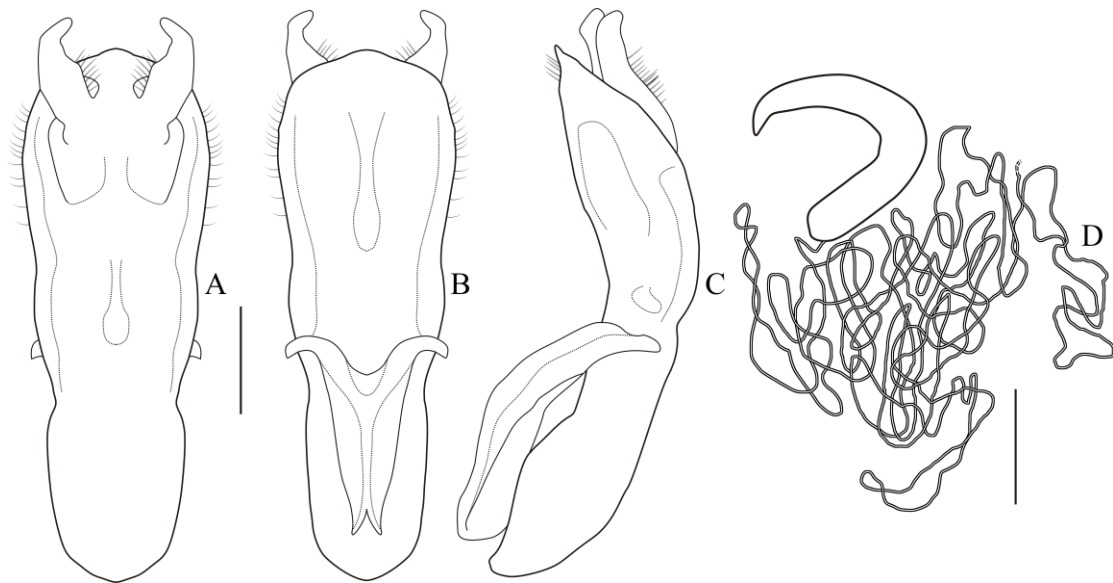
**FIGURE 2.** *Melixanthus* claws: 1A, 2A. *M. menglaensis* Duan & Zhou, **sp. nov.**; 1B, 2B. *M. similibimaculicollis* Duan & Zhou, **sp. nov.**; 3C, 2C. *M. bimaculicollis* Baly, 1865. (Scale bars: 0.1 mm).



**FIGURE 3-1.** *Melixanthus menglaensis* Duan & Zhou, **sp. nov.**: A, C. habitus; B, D. lateral view of habitus; E. head; F. Antennae; G. ventral view of habitus. (Scale bars: A-E, G = 0.5 mm, F = 0.2 mm).

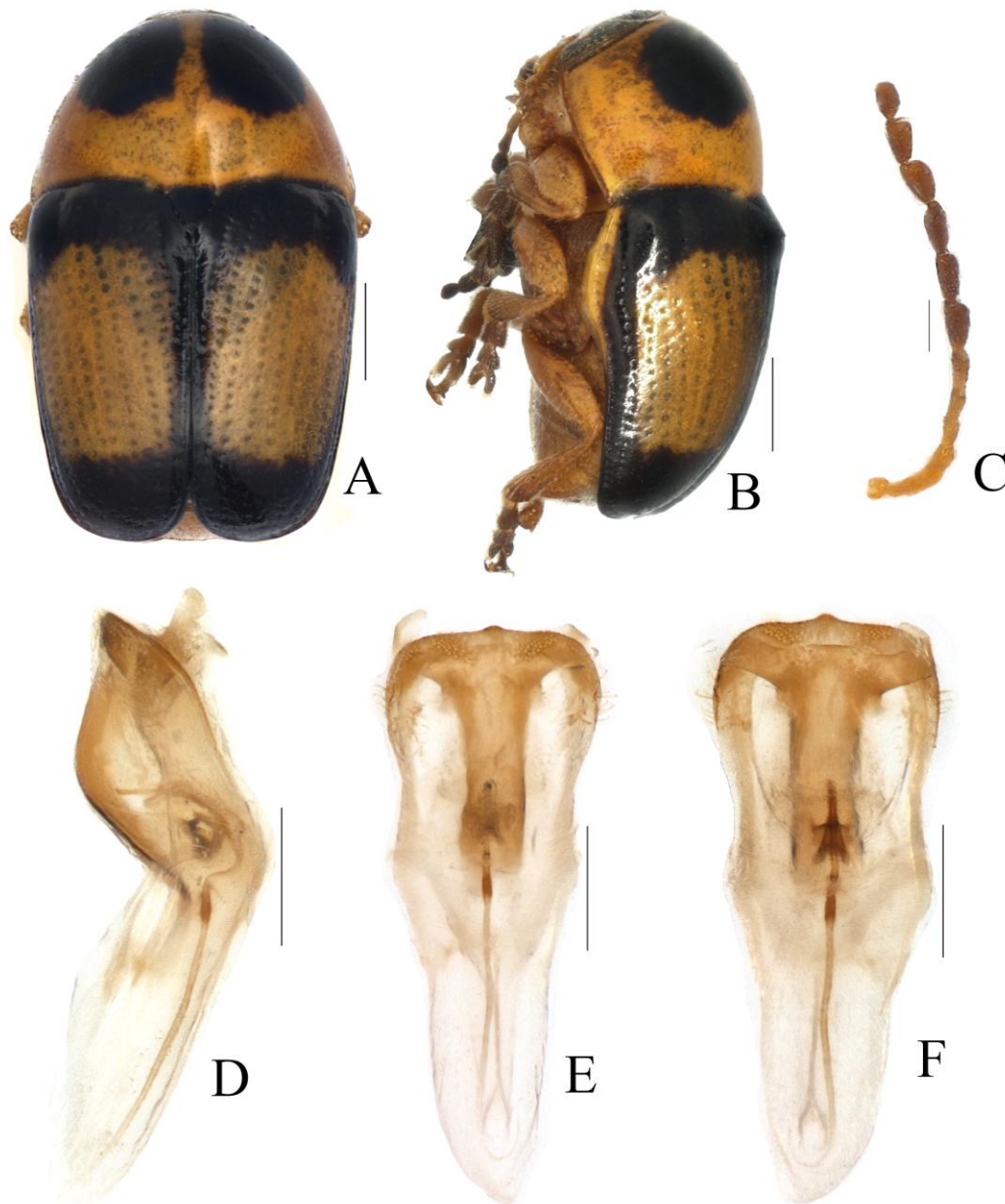


**FIGURE 3-2.** *Melixanthus menglaensis* Duan & Zhou, **sp. nov.**: A. lateral view of aedeagus; B. dorsal view of aedeagus; C. ventral view of aedeagus; D. spermatheca; E. female rectal pad. (Scale bars: 0.2 mm).

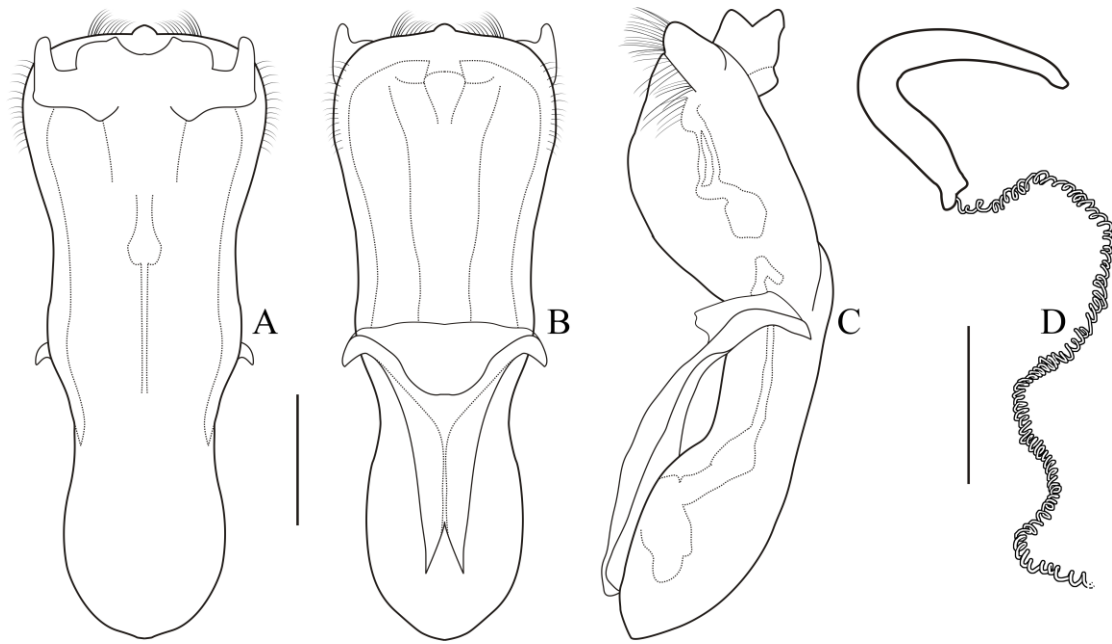


**FIGURE 3-3.** *Melixanthus menglaensis* Duan & Zhou, **sp. nov.**: A. dorsal view of aedeagus; B. ventral view of aedeagus; C. lateral view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).



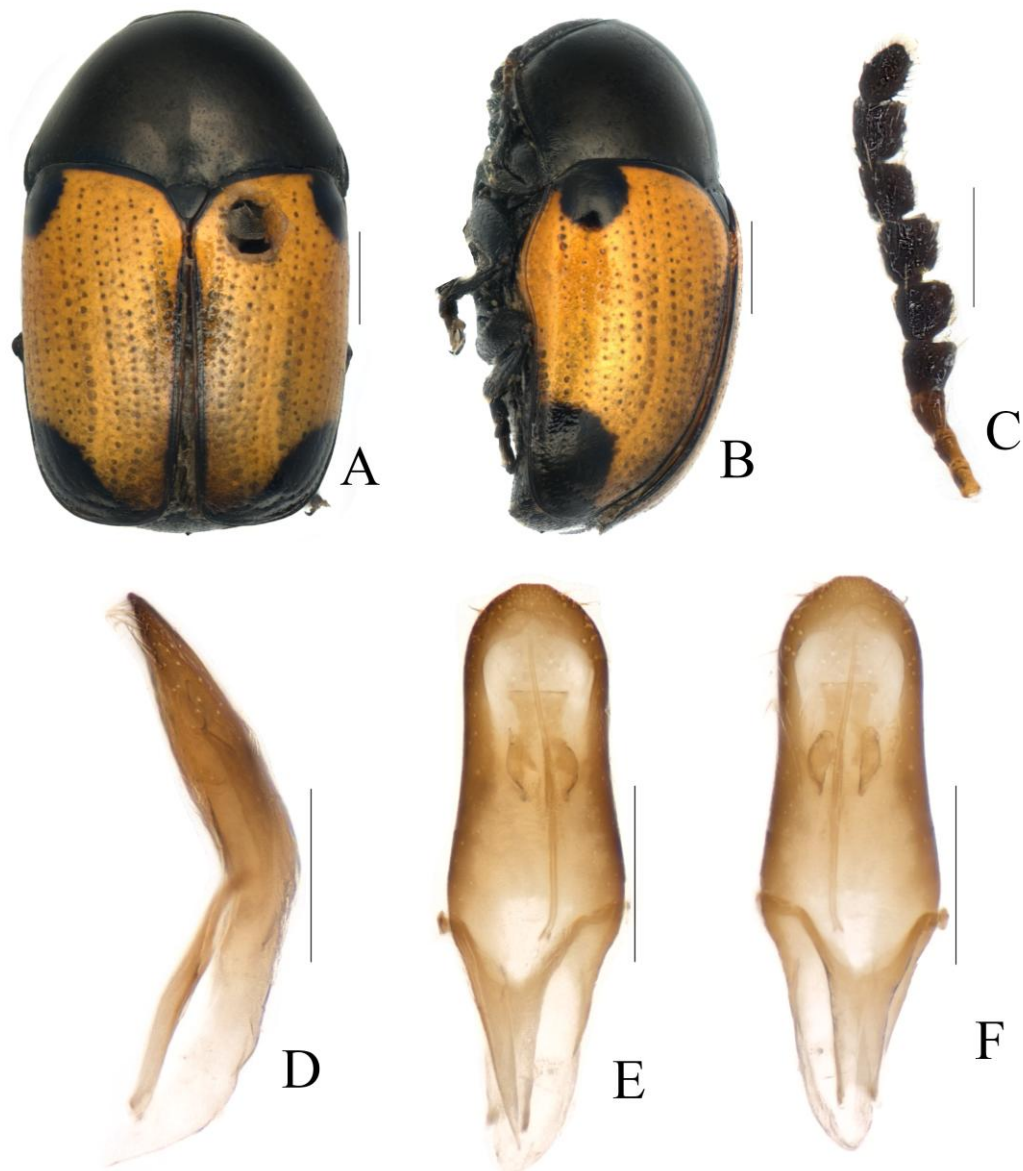


**FIGURE 4-1.** *Melixanthus similibimaculicollis* Duan & Zhou, **sp. nov.**: A. habitus; B. lateral view of habitus; C. Antennae; D. lateral view of aedeagus; E. ventral view of aedeagus; F. dorsal view of aedeagus. (Scale bars: A-B = 0.5 mm, C-E = 0.2 mm).

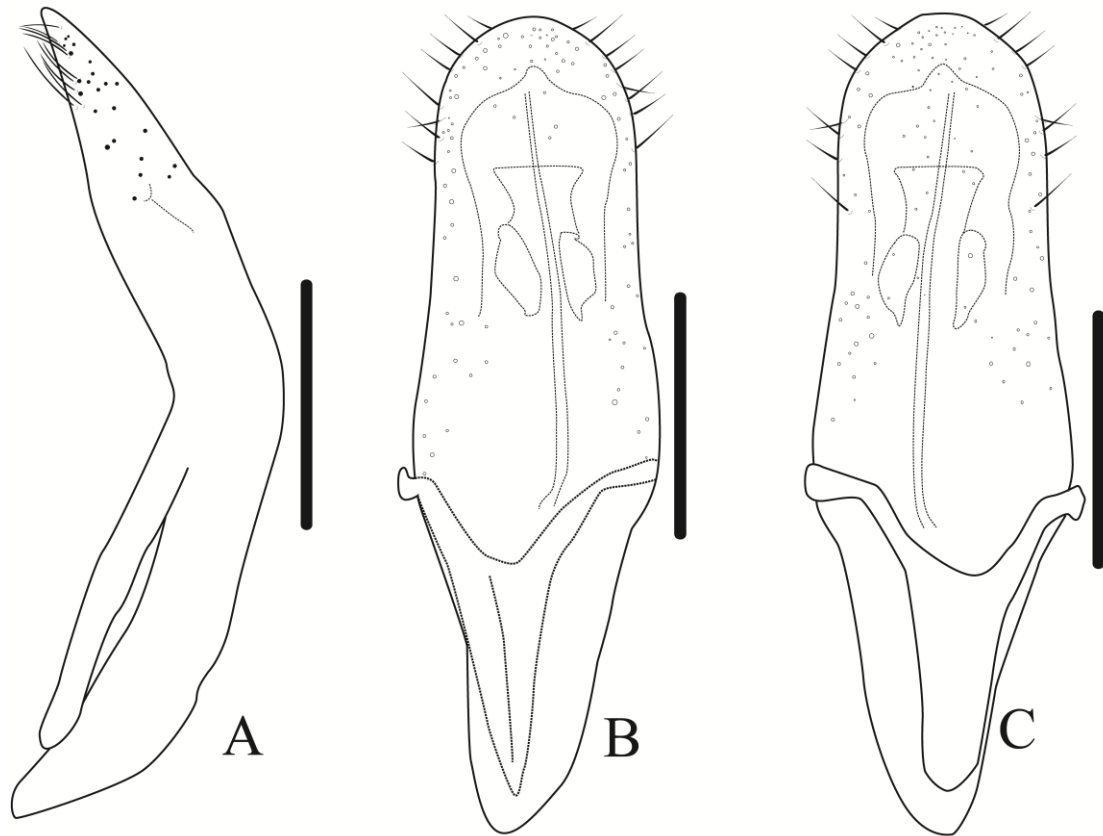


**FIGURE 4-2.** *Melixanthus similibimaculicollis* Duan & Zhou, **sp. nov.**: A. dorsal view of aedeagus; B. ventral view of aedeagus; C. lateral view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).





**FIGURE 5-1.** *Melixanthus rufiventris* Pic, 1926: A. habitus; B. lateral view of habitus; C. Antennae; D. lateral view of aedeagus; E. ventral view of aedeagus; F. dorsal view of aedeagus. (Scale bars: A-B = 0.5 mm, C-E = 0.2 mm).



**FIGURE 5-2.** *Melixanthus rufiventris* Pic, 1926: A. lateral view of aedeagus; B. ventral view of aedeagus; C. dorsal view of aedeagus; D. spermatheca. (Scale bars: 0.2 mm).