



## Two new species of the genus *Mataeopsephus* Waterhouse, 1876 (Coleoptera: Psephenidae) from Guizhou, China

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### Abstract

Two new species of the genus *Mataeopsephus* Waterhouse are described: *M. fanjingshanus* sp. nov. and *M. zhaomingzhii* sp. nov. both from Guizhou Province, China. A revised key to the species of all known *Mataeopsephus* species is provided.

**Key words:** Psephenidae, Psepheninae, new species, Guizhou, China

### Introduction

The family Psephenidae, also known as water-penny beetles, is a rather small family which contains about 300 species assigned to five subfamilies (Hájek 2015; Lee *et al.* 2007a, 2007b, 2016; Lee 2016, Barr & Shepard 2017; Shepard & Barr 2023). Psephenid beetles are known from all zoogeographical regions, and with a high diversity in the Oriental Region (Hájek 2015). Larvae of the family Psephenidae are strictly aquatic, many of them with body strongly flattened to adapted for living in swiftly clean running waters, they feed on algae covering rock surface. Adults of this family with reduced mouth parts, and short lived, they can be found on vegetation or within litter and near streams (Hájek 2015; Lee *et al.* 2007a, 2007b; Lee & Jäch 1995).

The psephenid genus *Mataeopsephus* Waterhouse, 1876 was recently reviewed by Lee *et al.* (2003), 12 valid species were included in this genus, and all of them distributed in East and South Asia. The Chinese fauna contains the most members of this genus, with seven species recorded in China. Members of this genus are characterized by the following characters: 1) antenna of male usually filiform or elongate subserrate; 2) clypeus lengthened and recurved anteriorly; 3) apical margin of abdominal sternite VII of male with a pair of clusters of long setae; 4) tarsi not conspicuously modified (Waterhouse 1876; Lee *et al.* 2003).

In this paper, we add two new species to the Chinese fauna of the genus *Mataeopsephus*: *M. fanjingshanus* sp. nov. and *M. zhaomingzhii* sp. nov., both species were collected by light trap. A revised key based on Lee *et al.* (2003) is provided to all known *Mataeopsephus* species.

### Material and methods

Examined material is deposited in the Institute of Entomology, Guizhou University, Guiyang, China (GUGC).

Collecting data of the specimens is quoted verbatim. The Chinese translation of each locality below the provincial level is included in parentheses at the first appearance of the text. Each type specimen bears the following label: 'HOLOTYPE (red) (or PARATYPE (yellow)), ♂ (or ♀), *Mataeopsephus* + specific name sp. n., Jiang & Chen, 2023.'

Habitus images were taken using a Canon 5D SR camera in conjunction with a Mitutoyo Plan NIR 5× lens. Images of the morphological details were taken using a Canon 5D SR camera in conjunction with a Mitutoyo Plan NIR 10× lens or a Nikon SMZ25 stereoscopic microscope with a Nikon DS-Ri2 camera. Zerene Stacker (version 1.04) was used for image stacking. All images were modified and grouped into plates in Adobe Photoshop CS5 Extended.

The following abbreviations are applied: HL—length of head, from base to anterior margin of clypeus; HW—width of head across eyes; PL—length of pronotum along midline; PW—maximum width of pronotum; EL—length of elytra along suture; EW—maximum width of elytra; BL—length of the sum of HL + PL + EL.

The terminology in this paper followed Lee *et al.* (2003).

## Taxonomy

### *Mataeopsephus* Waterhouse, 1876

Chinese common name: 硕扁泥甲属

### *Mataeopsephus fanjingshanus* Jiang & Chen, sp. nov.

Chinese common name: 梵净山硕扁泥甲

(Figs 1–3, 7A, 8D)

**Type material** (13 ♂♂, 9 ♀♀). **HOLOTYPE: CHINA:** ♂, labeled ‘China: Guizhou (贵州), Tongren City (铜仁市), Jiangkou County (江口县), Fanjingshan N. R. (梵净山国家级自然保护区), Taiping Town (太平镇), Bagan Village (坝干村), near Heiwan River (黑湾河), H: ~470m, 04.VII.2023, Ri-Xin Jiang & Bo-Yan Li leg.’ (GUGC). **PARATYPES: CHINA:** 12 ♂♂, 9 ♀♀, with the same label data as the holotype (GUGC).

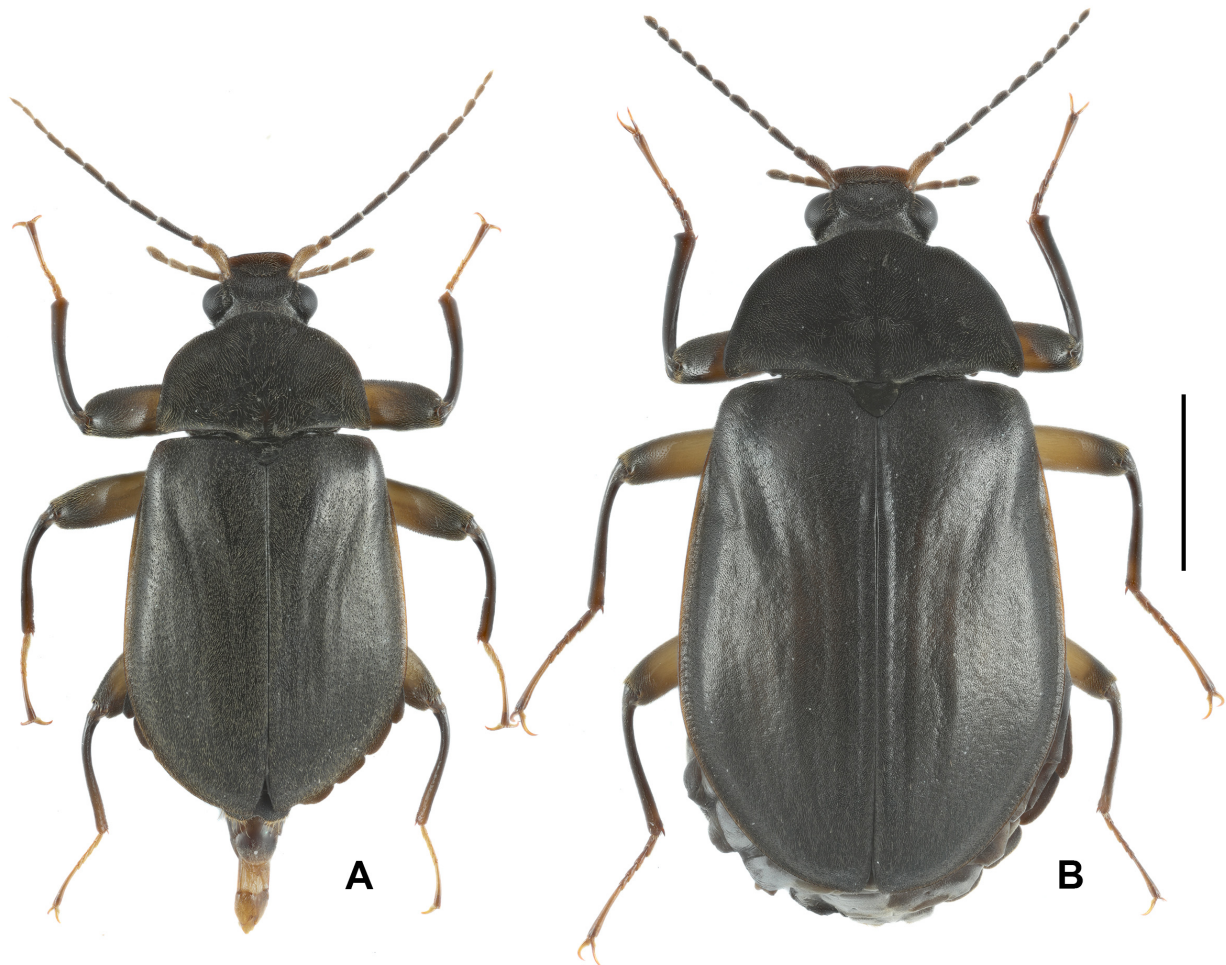
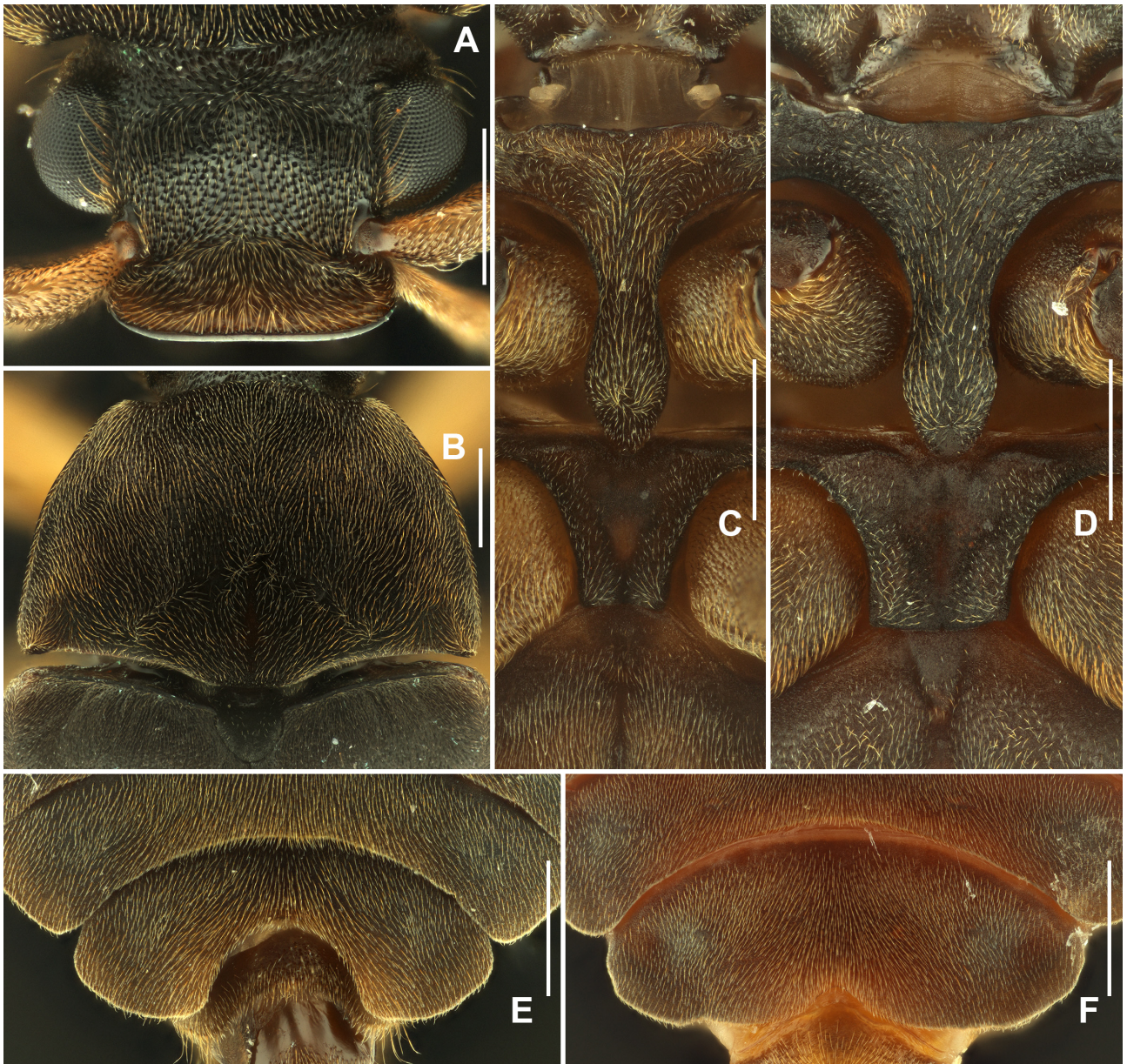


FIGURE 1. Dorsal habitus of *Mataeopsephus fanjingshanus* sp. nov. A. Male. B. Female. Scale bar: 2 mm.



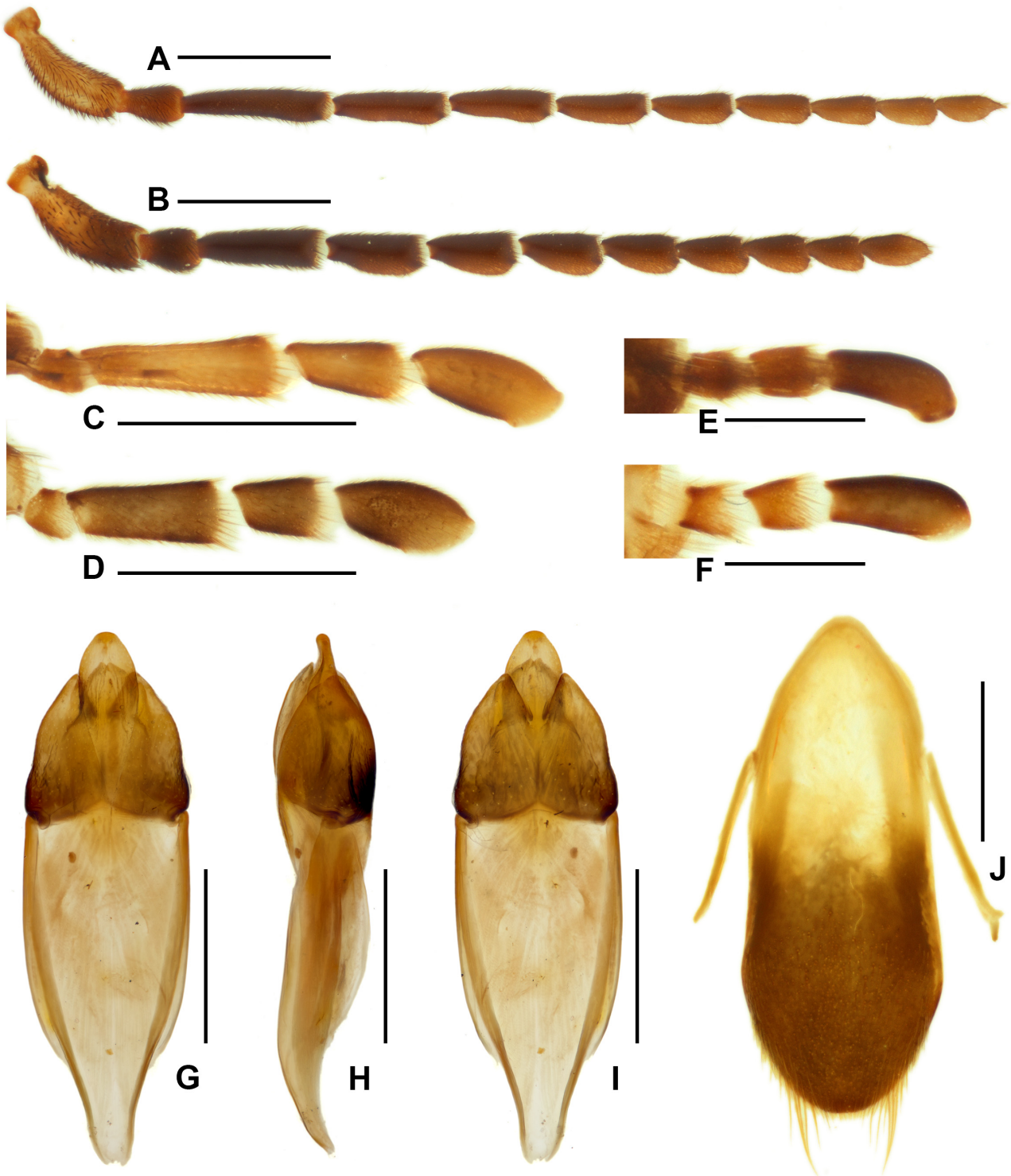
**FIGURE 2.** Diagnostic features of *Mataeopsephus fanjingshanus* sp. nov. **A.** Head. **B.** Pronotum. **C.** Prosternal process and Prosternum, male. **D.** Ditto, female. **E.** Ventricle V of abdomen, male. **F.** Ditto, female. Scale bar: 0.5 mm.

**Description.** Male (Figs 1A, 2A–F, 3A, C, E, G–J). Body (Fig. 1A) oval and flat, dark brown to black, with clypeus, base of antenna, maxillary palpus, labial palpus, femurs (except apical part), tibiae and lateral margin of elytra reddish brown. Surface densely covered with short setae.

Head (Fig. 2A): Short and transverse, surface densely covered with small punctures, each of them bearing a short seta. Eyes large and distinctly prominent, inner sides with a row of long setae which are much longer than setae on other parts of head. Clypeus well developed and distinctly upturned, anterior margin of clypeus straight, anterolateral angles rounded. Antenna (Fig. 3A) filiform, much longer than half length of elytra, with 11 antennomeres, surface of antennomeres densely covered with short setae; scape columnar, elongate, widest near middle; pedicel longer than wide, about half length of pedicel, expanded near apex; antennomeres III–XI flattened, antennomere III longest, weakly expanded near apical 1/4; antennomeres IV–X longer than wide, gradually shorter; antennomere XI long-oval, with apex aculeated; relative lengths of antennomeres I–XI: 1.00: 0.57: 1.37: 1.03: 0.97: 0.85: 0.76: 0.69: 0.59: 0.55: 0.64. Maxillary palpus (Fig. 3C) 4-segmented, segment I shortest, slightly longer than wide; segment II elongate, longest among all segments, widest near apex; segment III longer than half length of segment II; segment IV longer than segment III, long-oval. Labial palpus (Fig. 3E) 3-segmented, segments I

and II short, slightly longer than wide; segment III elongate, about as long as sum of segments I and II, apical half distinctly curved.

Pronotum (Fig. 2B) transverse, surface densely covered with short setae with a narrow and longitudinal hairless area located at base of middle of pronotum, about 1/3 length of pronotum; anterior and lateral margins finely curved, posterior margin bisinuate. Anterior angles nude, posterior angles acutangular with rounded apex. Prosternum (Fig. 2C) with surface finely covered with setae in different lengths, setae on disc distinctly longer than on other parts; prosternal process narrowed at middle, with apical half fusiform.



**FIGURE 3.** Diagnostic features of *Mataeopsephus fanjingshanus* sp. nov. **A.** Antenna, male. **B.** Ditto, female. **C.** Maxillary palpus, male. **D.** Ditto, female. **E.** Labial palpus, male. **F.** Ditto, female; **G.** Aedeagus, ventral view. **H.** Ditto, lateral view. **I.** Ditto, dorsal view. **J.** Abdominal sternite VII. Scale bar: 0.5 mm.

Scutellum triangular with angles rounded, surface sparsely covered with very short setae. Elytra finely punctate, densely covered with short setae, surface with several shallow longitudinal stripes. Disc of prosternum (Fig. 2C) distinctly concaved, hairless, other parts covered with setae in different lengths, posterior margin weakly curved to inward side.

Legs simple, femora strong and expanded, bicolored, areas near apex dark brown, other parts reddish brown, surface densely covered with very short setae; surface of tibiae hairless, covered with sparse and small punctures, protibiae distinctly curved at middle, meso- and metatibiae curved at basal 1/3. Tarsi simple, tarsomere V about as long as sum of tarsomeres I–IV, tarsal claws simple.

Abdomen with five visible sternites, ventrite VI partially visible sometimes. Surface of abdominal ventrites covered with dense short setae. Posterior margin of ventrite V (Fig. 2E) strongly curved anteriorly. Abdominal sternite IX (Fig. 3J) long-oval, posterior margin with a pair of clusters of long setae, rounded at middle.

Aedeagus (Figs 3G–I, 7A) fusiform in general, symmetrical. Median lobe finger-like in ventral view, with apex rounded, shorter than parameres. Parameres longer than 1/3 length of basal piece, apical parts of parameres triangular with apex rounded, surface finely covered with small punctures.

Measurements: BL: 6.37–7.59 mm; HL: 0.62–0.73 mm; HW: 1.29–1.46 mm; PL: 1.39–1.67 mm, PW: 2.39–3.07 mm; EL: 4.36–5.19 mm, EW: 3.21–3.88 mm.

Female (Figs 1B, 2D, F, 3B, D, F) general like male (Fig. 1B), usually larger. Antenna (Fig. 3B) subserrate, distinctly shorter than male, about half length of elytra; antennomeres III–X distinctly expanded, antennomeres IV–X subserrate; antennomere XI long-oval, apex with a very small projection; relative lengths of antennomeres I–XI: 1.00: 0.52: 1.09: 0.87: 0.78: 0.71: 0.65: 0.59: 0.54: 0.45: 0.63. Apex of prosternal process (Fig. 2D) with apical rounder than male. Prosternum (Fig. 2D) with posterior margin weakly curved to posteriorly side. Maxillary palpus (Fig. 3D) distinctly short than male; segment III of labial palpus (Fig. 3F) only weakly curved.

Measurements: BL: 7.25–8.89 mm; HL: 0.64–0.77 mm; HW: 1.42–1.53 mm; PL: 1.63–1.82 mm, PW: 2.94–3.46 mm; EL: 4.98–6.30 mm, EW: 3.56–4.49 mm.

**Distribution.** China: Guizhou Province.

**Biology.** All adults were collected by light trap in Fanjingshan Nature Reserve (Fig. 8A, C, D), the location of light trap is near the Heiwan River.

**Etymology.** The specific epithet refers to the type locality: Fanjingshan Nature Reserve (Guizhou, China); the name is treated as an adjective.

**Comparative diagnosis.** *Mataeopsephus fanjingshanus* sp. nov. is most similar to *M. japonicus* (Matsumura, 1916) and *M. taiwanicus* Lee, Yang & Brown, 1990 in general characters. The new species can be easily distinguished from *M. taiwanicus* by the shorter maxillary palpi: maxillary palpi longer than width of head in *M. taiwanicus*, while shorter than width of head in the new species. *M. fanjingshanus* sp. nov. can be distinguished from *M. japonicus* by the different form of aedeagus: 1) lateral margins of median lobe finely curved (vs. lateral margins of median lobe bisinuate in *M. japonicus*); 2) parameres longer, more than 1/3 length of basal piece (vs. parameres shorter than 1/3 length of basal piece in *M. japonicus*); 3) parameres near triangular with apex rounded, not curved (vs. parameres curved near apex in *M. japonicus*).

### *Mataeopsephus zhaomingzhii* Jiang & Chen, sp. nov.

Chinese common name: 赵氏硕扁泥甲

(Figs 4–6, 7B)

**Type material** (1 ♂, 2 ♀♀). **HOLOTYPE: CHINA:** ♂, labeled ‘China: Guizhou (贵州), Qiandongnan Miao and Dong Autonomous Prefecture (黔东南苗族侗族自治州), Leishan County (雷山县), Leigongshan N. R. (雷公山自然保护区), Fangxiang Township (方祥乡), Queniao Village (雀鸟村), 25.VII.2017, 1200 m, Ming-Zhi Zhao leg.’ (GUGC). **PARATYPES: CHINA:** 2 ♀♀, with the same label data as the holotype (GUGC).

**Description.** Male (Figs 4A, 5A–F, 6A, C, E, G–J). Body (Fig. 4A) oval and flat, pronotum dark brown to black, with elytra clypeus, antenna, maxillary palpus, labial palpus and legs brown. Surface densely covered with short setae.

Head (Fig. 5A): Short and transverse, surface finely covered with large punctures, each of them bearing a short seta. Eyes large and distinctly prominent, inner sides with a row of setae which are slightly longer than setae on other parts of head. Clypeus well developed and distinctly upturned, anterior margin of clypeus straight, anterolateral

angles rounded. Antenna (Fig. 6A) filiform, slightly shorter than length of elytra, with 11 antennomeres, surface of antennomeres densely covered with short setae; scape columnar, elongate, expanded at middle; pedicel longer than wide, about half length of pedicel, expanded near apex; antennomere III longest, widest at apex; antennomeres IV–X flattened, longer than wide, gradually shorter; antennomere XI long-oval, with apex aculeated; relative lengths of antennomeres I–XI: 1.00: 0.56: 1.25: 1.15: 1.04: 0.89: 0.87: 0.79: 0.70: 0.60: 0.70. Maxillary palpus (Fig. 6C) 4-segmented, segment I shortest, slightly longer than wide; segment II elongate, longest among all segments, widest near apex; segment III about as long as 2/3 length of segment II; segment IV longer than segment III, long-oval. Labial palpus (Fig. 6E) 3-segmented, segments I and II short, segment I transverse, segment II about as long as wide; segment III elongate, about as long as sum of segments I and II, apical half distinctly curved.

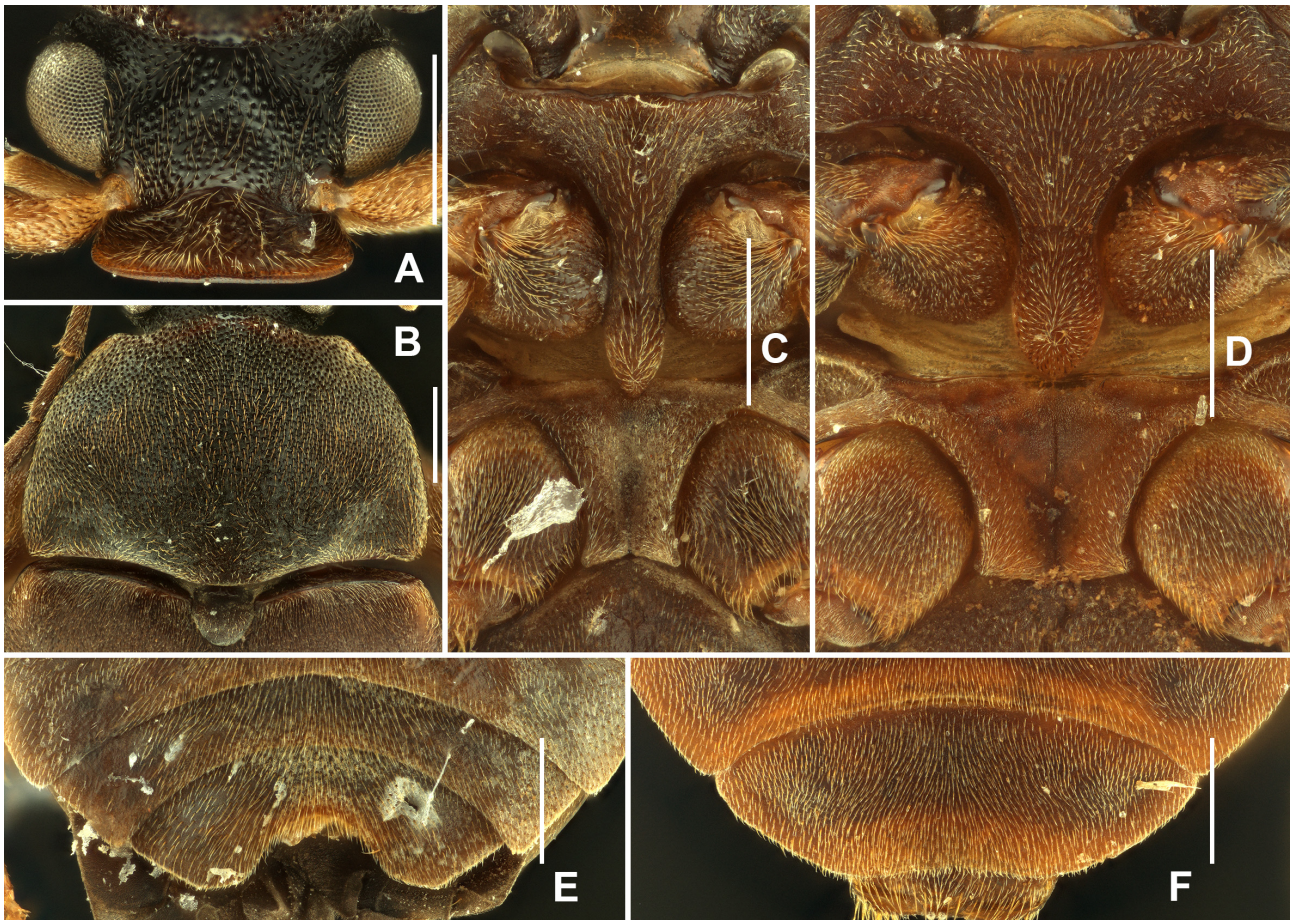
Pronotum (Fig. 5B) transverse, surface densely covered with large punctures and short setae, a narrow and longitudinal hairless area located at base of middle of pronotum, about 1/3 length of pronotum; anterior and lateral margins finely curved, posterior margin bisinuate. Anterior angles nude, posterior angles obtuse with rounded apex. Prosternum (Fig. 5C) with surface finely covered with setae in different lengths, setae on disc distinctly longer than on other parts; prosternal process narrowed at middle, with apical half fusiform.

Scutellum hemicycle, surface sparsely covered with very short setae. Elytra finely punctate, densely covered with short setae, surface with several shallow longitudinal stripes. Prosternum (Fig. 5C) with disc hairless and distinctly concaved, other parts covered with setae in different lengths, posterior margin distinctly curved to inward side.

Legs simple, femora strong and expanded, areas near apex darker, other parts reddish brown, surface densely covered with very short setae; surface of tibiae hairless, protibiae weakly curved at middle. Tarsi simple, tarsomere V distinctly longer than sum of tarsomeres I–IV, tarsal claws simple.



FIGURE 4. Dorsal habitus of *Mataeopsephus zhaomingzhii* sp. nov. A. Male. B. Female. Scale bar: 2 mm.



**FIGURE 5.** Diagnostic features of *Mataeopsephus zhaomingzhii* sp. nov. **A.** Head. **B.** Pronotum. **C.** Prosternal process and Prosternum, male. **D.** Ditto, female. **E.** Ventrite V of abdomen, male. **F.** Ditto, female. Scale bar: 0.5 mm.

Abdomen with five visible sternites, ventrite VI partially visible sometimes. Surface of abdominal ventrites densely covered with short setae. Posterior margin of ventrite V (Fig. 5E) strongly curved anteriorly. Abdominal sternite IX (Fig. 5J) long-oval, posterior margin with a pair of clusters of long setae, weakly curved anteriorly at middle.

Aedeagus (Figs 6G–I, 7B) long-fusiform in general, symmetrical. Median lobe finger-like in ventral view, with apex rounded, distinctly longer than parameres. Parameres elongate, about as long as 1/3 length of basal piece, surface finely covered with small punctures.

Measurements: BL: 5.88 mm; HL: 0.57 mm; HW: 1.19 mm; PL: 1.31 mm, PW: 2.17 mm; EL: 4.00 mm, EW: 2.85 mm.

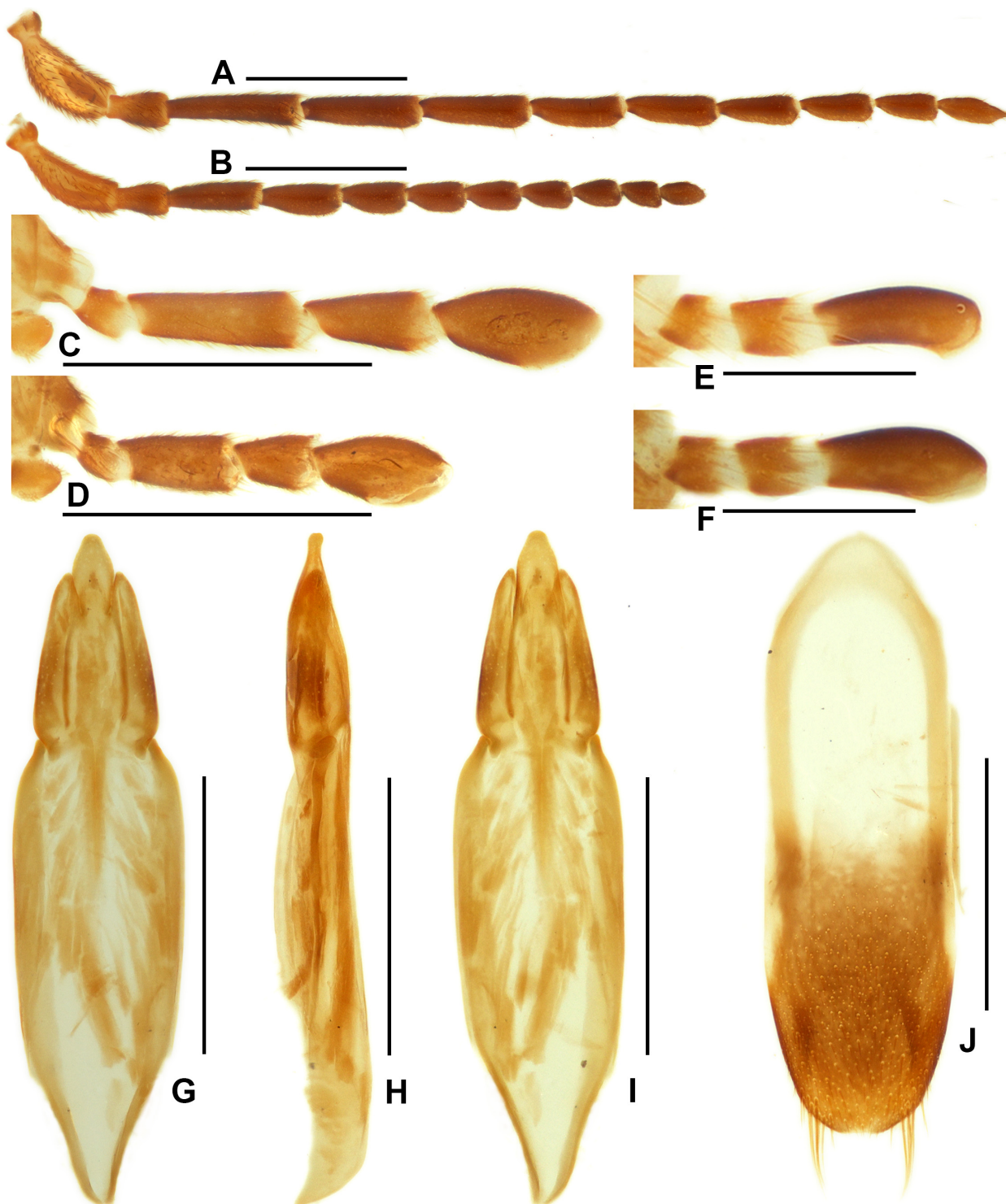
Female (Figs 4B, 5D, F, 6B, D, F) general like male (Fig. 4B), usually larger. Antenna (Fig. 6B) subserrate, distinctly shorter than male, shorter than half length of elytra; antennomeres IV–X distinctly expanded, subserrate; antennomere XI long-oval, apex rounded; relative lengths of antennomeres I–XI: 1.00: 0.50: 0.90: 0.79: 0.65: 0.58: 0.55: 0.51: 0.48: 0.40: 0.45. Apex of prosternal process (Fig. 5D) with apical rounder than male. Prosternum (Fig. 5D) with posterior margin weakly curved to posteriorly side. Maxillary palpus (Fig. 6D) distinctly short than male; segment III of labial palpus (Fig. 6F) weakly curved.

Measurements: BL: 7.30–7.32 mm; HL: 0.63–0.71 mm; HW: 1.38–1.41 mm; PL: 1.37–1.41 mm, PW: 2.85–2.91 mm; EL: 5.20–5.30 mm, EW: 3.77–3.95 mm.

**Distribution.** China: Guizhou Province.

**Biology.** All adults were collected by light trap in Leigongshan Nature Reserve (Fig. 8B).

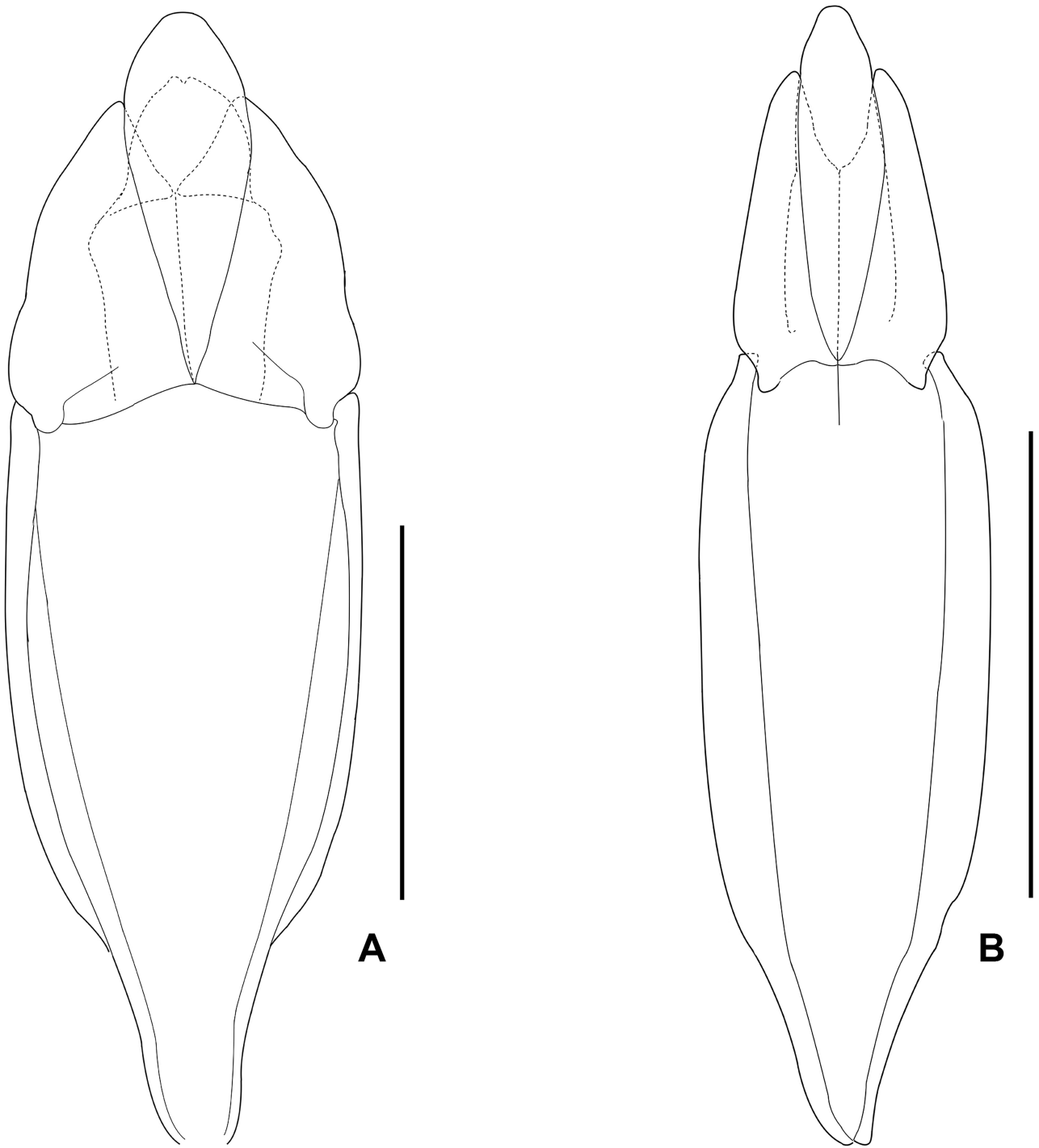
**Etymology.** This species is named in honor of our friend Mr. Ming-Zhi Zhao (South China Agricultural University, Guangzhou, China), who collected the new species and donated it to us for study.



**FIGURE 6.** Diagnostic features of *Mataeopsephus zhaomingzhii* **sp. nov.** **A.** Antenna, male. **B.** Ditto, female. **C.** Maxillary palpus, male. **D.** Ditto, female. **E.** Labial palpus, male. **F.** Ditto, female. **G.** Aedeagus, ventral view. **H.** Ditto, lateral view. **I.** Ditto, dorsal view. **J.** Abdominal sternite VII. Scale bar: 0.5 mm.

**Comparative diagnosis.** *Mataeopsephus zhaomingzhii* **sp. nov.** is similar to *M. fanjingshanus* **sp. nov.**, *M. japonicus* and *M. taiwanicus* in general characters. The new species can be easily distinguished from *M. taiwanicus* by the maxillary palpi shorter than width of head. *M. zhaomingzhii* **sp. nov.** can be distinguished from *M. fanjingshanus* **sp. nov.** by elytra and pronotum with different color, and the much slender aedeagus. The new species can be distinguished from *M. japonicus* by the very different form of aedeagus: median lobe and parameres slender in the new species, but much wider in *M. japonicus*.





**FIGURE 7.** Line draft of aedeagus of *Mataeopsephus* species in ventral view. **A.** *Mataeopsephus fanjingshanus* **sp. nov.** **B.** *Mataeopsephus zhaomingzhii* **sp. nov.** Scale bar: 0.5 mm.

**Updated key to known *Mataeopsephus* species (Based on Lee *et al.* 2003)**

- 1 Posterior rim of pronotum crenulate ..... 2
- Posterior rim of pronotum not crenulate ..... 3
- 2 Terminal segment of maxillary palpi longest; antennomeres III–XI flattened; ventral teeth on tibiae very feeble ..... *M. chinensis*
- Second segment of maxillary palpi longest; antennomeres III–XI filiform; ventral teeth on tibiae prominent ..... *M. dentatus*
- 3 Pronotum black to dark brown ..... 4
- Pronotum reddish brown or with reddish brown spots ..... 9

|   |   |                                  |
|---|---|----------------------------------|
| 4 | Parameres relatively short (0.3–0.4 times length of basal piece); antennomeres III–XI filiform . . . . .  | 5                                |
| - | Parameres relatively long (0.6–0.8 times length of basal piece); antennomeres V–X subserrate . . . . .    | 8                                |
| 5 | Maxillary palpi long, about 1.1 times width of head . . . . .   | <i>M. taiwanicus</i>             |
| - | Maxillary palpi short, shorter than width of head . . . . .   | 6                                |
| 6 | Median lobe and parameres of aedeagus distinctly slender . . . . .  | <i>M. zhaomingzhii</i> sp. nov.  |
| - | Median lobe and parameres of aedeagus relatively wider . . . . .  | 7                                |
| 7 | Parameres of aedeagus longer, more than 1/3 length of basal piece, apex of parameres not curved . . . . . | <i>M. fanjingshanus</i> sp. nov. |
| - | Parameres of aedeagus shorter than 1/3 length of basal piece, apex of parameres curved . . . . .          | <i>M. japonicus</i>              |



**FIGURE 8.** Habitat of *Mataeopsephus* species. **A.** Type locality of *M. fanjingshanus* sp. nov. at Fanjingshan N. R. (Heiwan River). **B.** Type locality of *M. zhaomingzhii* sp. nov. at Leigongshan N. R. (Queniao Village). **C.** A light trap set at Fanjingshan N. R. **D.** An adult of *M. fanjingshanus* sp. nov. attracted to the light trap. Figure 8B by Mr. Ming-Zhi Zhao.

|    |  |                          |
|----|--|--------------------------|
| 8  | Tarsi long, about 0.8 times length of tibiae; tarsomere V longer than combined length of tarsomeres I–IV . . . . .   | <i>M. tenuipes</i>       |
| -  | Tarsi short, about 0.5 times length of tibiae; tarsomere V shorter than combined length of tarsomeres I–IV . . . . . | <i>M. sichuanensis</i>   |
| 9  | Clypeus long, lateral margins constricted . . . . .  | <i>M. maculatus</i>      |
| -  | Clypeus short, lateral margins rounded . . . . .   | 10                       |
| 10 | Body size small, 2.6–3.3 mm in length . . . . .  | 11                       |
| -  | Body size large, > 4.0 mm in length . . . . .  | 12                       |
| 11 | Antennomere III shorter than IV; venter of parameres connected . . . . .   | <i>M. minimus</i>        |
| -  | Antennomere III subequal to IV; venter of parameres separated . . . . .  | <i>M. nitidipennis</i>   |
| 12 | Elytra without stripes; maxillary palpi longer than width of head . . . . .  | <i>M. vietnamensis</i>   |
| -  | Elytra with stripes of grey pubescence; maxillary palpi subequal to width of head . . . . .                          | 13                       |
| 13 | Antennae long, about 0.9 times body length; antennomeres VI–X filiform . . . . .                                     | <i>M. esakii</i>         |
| -  | Antennae short, about 0.7 times body length; antennomeres VI–X flattened . . . . .                                   | <i>M. quadribranchia</i> |

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## 中国贵州硕扁泥甲属 *Mataeopsephus* 二新种 (鞘翅目: 扁泥甲科)

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**摘要:** 描述了贵州省硕扁泥甲属 *Mataeopsephus* 二新种, 即梵净山硕扁泥甲 *Mataeopsephus fanjingshanus* **sp. nov.** 和赵氏硕扁泥甲 *M. zhaomingzhii* **sp. nov.**; 提供了修订后的硕扁泥甲属物种检索表。

**关键词:** 扁泥甲科; 扁泥甲亚科; 新种; 贵州; 中国