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● The first record of the genus *Leptophloeus* Casey, 1916 (Coleoptera, Cucujoidea, Laemophloeidae) in China, with description of a new species

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Abstract: Laemophloeidae is a relatively small family of beetles and lacks of taxonomic study in China. Three species of *Leptophloeus* Casey, 1916 are found in Guangdong Province, representing the first record of this genus in China. Within which *Leptophloeus dichotomus* sp. nov. is described as a new species, *Leptophloeus convexusculus* (Grouvelle, 1877) and *Leptophloeus foveicollis* Sasaji, 1986 are recorded in China for the first time. A key to East Asian species of *Leptophloeus* is provided.

Keywords: Guangdong, key, lined flat bark beetles, new species

● 中国新记录属瘦扁谷盗属 *Leptophloeus* 研究及一新种描述（鞘翅目：扁甲总科：扁谷盗科）

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摘要：扁谷盗科是一个相对较小的甲虫类群，在中国分类学研究比较欠缺。本研究报道了一中国新记录属——瘦扁谷盗属 *Leptophloeus*，并记录了该属三个物种，其中描述一新种叉齿瘦扁谷盗 *Leptophloeus dichotomus* sp. nov.，并首次在中国记录了凸瘦扁谷盗 *Leptophloeus convexusculus* (Grouvelle, 1877)和凹胸瘦扁谷盗 *Leptophloeus foveicollis* Sasaji, 1986。提供了东亚地区瘦扁谷盗属的分种检索表。

关键词：广东，检索表，扁谷盗，新种

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● Introduction

The genus *Leptophloeus* Casey, 1916 belongs to the family Laemophloeidae, which is also known as lined flat bark beetles. It was established for the North American species *Laemophloeus angustulus* LeConte, 1866 and European species *Laemophloeus perrisi* Grouvelle, 1876 (Casey 1916), and could be separated from similar genera like *Cryptolestes* Ganglbauer, 1899 by 5-5-5 tarsal formula in both sexes, more cylindrical body shape, comparatively shorter antennae and narrower intercoxal process of ventrite 1 (sternite III) (Lefkovitch 1959). While the African species expanded the definition of *Leptophloeus*, as some species with 5-5-4 tarsal formula in male and unusual clypeus were also included in this genus (Lefkovitch 1962). Sasaji (1983, 1986) described three species of *Leptophloeus* from Japan, among which *L. abei* Sasaji, 1986 has long antennae and indistinct antennal club which are more similar to *Cryptolestes*. Thomas (1988) pointed out that the tarsal formula in male of *L. angustulus* was actually 5-5-4, and some species of *Cryptolestes* possessed 5-5-5 male tarsal formula as well. Thus, *Leptophloeus* could be only separated from *Cryptolestes* by subcylindrical body shape and narrower intercoxal process of ventrite 1. *Cryptolestes convexiusculus* (Grouvelle, 1876) was included in *Leptophloeus* by Wegrzynowicz (2007). Bento *et al.* (2024) transferred two Australian species of *Lathropus* Erichson, 1846 to *Leptophloeus*, representing the first record of this genus in Australia. More recently, four additional new species were described from the United States, raising the species number of *Leptophloeus* to 38 (Bento *et al.* 2024; Thomas & Schnepf 2025).

Though four described and three undescribed *Leptophloeus* species have been recorded in Japan (Hirano 2009), none species of this genus is known from China up to now. During an investigation of insect diversity in Guangdong, southern China, a large number of specimens of Laemophloeidae had been collected mostly by scolytine traps, and some of them belong to *Leptophloeus*.

● Material and methods

All materials examined in this study are deposited in the Institute of Zoology, Guangdong Academy of Sciences, Guangzhou, China (IZGAS). The morphological terms used in this paper follow Lawrence *et al.* (2010), especially using clypeus for epistome and spermatheca for bursa. The measurements were made as follows: body length – from the apical edge of clypeus to the apex of elytra; pronotal length – median line from the anterior margin to the posterior margin; pronotal width – maximum width of the pronotum; elytral length – from the base of scutellum to the elytral apex along suture; elytral width – maximum width across the elytra.

Specimens for dissections were cleared in 10% solution of KOH for about 12 hours at room temperature and then transferred to open glycerol slides for dissection and photographing. Dry specimens are mounted on cards using white emulsion glue, and the genitalia and dissected structures are preserved in genitalia vials with glycerol. Layered images of specimens and dissected structures were captured using the Canon 7D DSLR camera, Mitutoyo 5× and 10× objective lens on an adapter, with the help of Wemacro v. 1.1 (1) and Helicon Remote (ver. 3.9.10 M) softwares; the camera was mounted on the WeMacro Focus Stacking Rail with a dual headed flash. The images were stacked in Helicon Focus v. 8.1.1 software. Images of female spermatheca were taken using the Zeiss AxioCam 712 color camera mounted on a Zeiss AxioScope 5 microscope, with the help of ZEISS ZEN 3.7 software. All images were edited in Photoshop CC 2022.

● Results

Leptophloeus Casey, 1916 瘦扁谷盗属 new national record to China

Type species: *Laemophloeus angustulus* LeConte, 1866

Diagnosis. The genus *Leptophloeus* can be distinguished from the mostly related genus *Cryptolestes* in China by subcylindrical body shape and narrower intercoxal process of ventrite 1. It also resembles *Narthecius* LeConte, 1861 on the body shape, but can be recognized by none acuminate clypeus (Thomas & Schnepf 2025), while the

clypeus of *L. opaculus* Grouvelle, 1962 from Africa has a pointed tooth in the median line (Lefkovitch 1962). Other diagnostic characters include absence of frontoclypeal suture, front coxal cavities closed or very narrowly open externally, and mesocoxal cavities laterally open to mesepimeron.

Remarks. The similarities between genera *Cryptolestes*, *Leptophloeus*, *Narthecius* and *Dysmerus* Casey, 1884 were usually mentioned by researchers (Lefkovitch 1959, 1962; Thomas 1988; Thomas & Schnepf 2025). Diagnostic characters between those genera are usually not specific, as intermediate status could exist. And the true relationships between those genera required further studies. In China, *Cryptolestes* is the only known genus among them at present (Wegrzynowicz 2007).

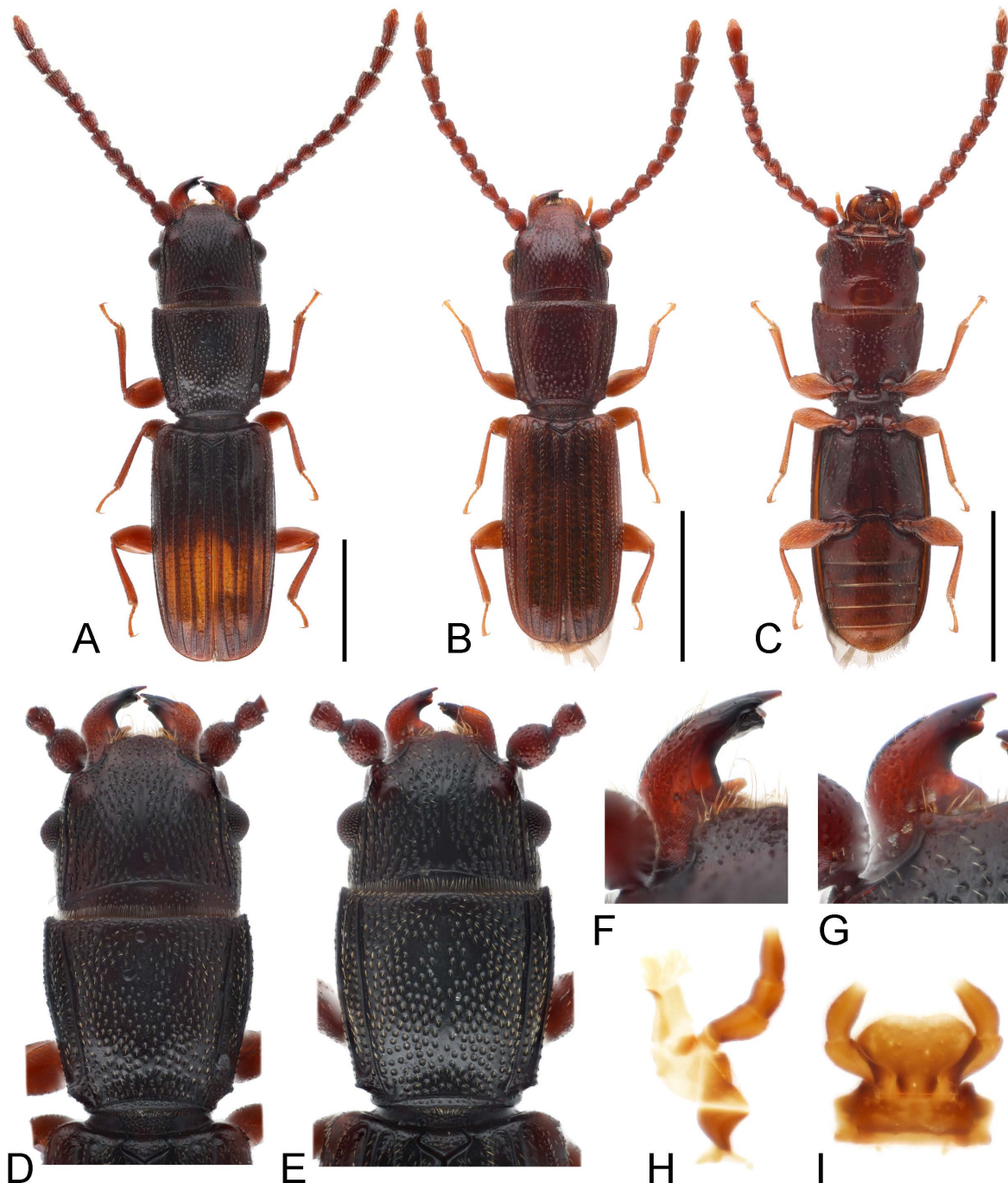


FIGURE 1. *Leptophloeus dichomotus* sp. nov.: A, D, F holotype, male B, C, E, G–I paratypes, female A, B habitus, dorsal C habitus, ventral D head and pronotum, male E head and pronotum, female F mandible, male G mandible, female H maxilla I labium. Scale bars = 1 mm.

***Leptophloeus dichotomus* sp. nov.** 叉齿瘦扁谷盗

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Figs 1; 4A; 5A, 5D

Type material. **Holotype:** ♂ (IZGAS), **CHINA, Guangdong:** Shantou City, Nan'ao County, Nan'ao Island National Forest Park [南澳海岛国家森林公园], 116.958806°E 23.430836°N, scolytine trap, 2024.vii.19–23.

Paratypes: **CHINA, Guangdong:** 1♂3♀ (IZGAS), same date as holotype; 1♀ (IZGAS), same data as holotype except 2024.viii.9–13; 1♂ (IZGAS), Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, scolytine trap, 2023.v.26; 1♀ (IZGAS), Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, malaise trap, 2023.vi.21.

Etymology. The species name is derived from the Latin word *dichotomos*, which means cut in two, referring to the bifurcate dorsal tooth on apex of mandible in male.

Diagnosis. The new species can be distinguished from *Cryptolestes* and congeners of China by 5-5-5 tarsal formula in male. It also differs from most congeners by indistinct antennal club, but with antennomeres 9–11 slightly elongate (Fig. 1A–C), which is similar to *Leptophloeus abei* Sasaji, 1986 from Japan. It can be recognized from *L. abei* by much shorter antennae in male.

Description. Length 2.5–3.8 mm. Body brownish red, with legs, antennae, mouthparts and humeral areas of elytra somewhat paler.

Head (Fig. 1D, E) with a pair of lateral carinae representing as raised ridges, connected by slightly transverse carina posteriorly on vertex and almost extending to anterior margin of clypeus. An additional pair of short lateral carinae present behind eyes, starting from inner edge of eyes. Frontoclypeal suture absent, anterior margin of clypeus slightly protruding at median line. Dorsal surface with moderately dense and coarse punctures and indistinct medial carina. Eyes finely faceted, laterally protruding. Antennae laterally inserted on genae in front of eyes, insertions large and representing as pair of tubercles on frons. Antennae (Fig. 1A–C) 11-segmented, without distinct club; scape slightly enlarged, antennomere 3 longer than adjacent segments; antennomeres 9–11 elongated. Labrum transverse, anterior margin nearly straight. Mandibles sub-triangular, strongly curved subapically, with three apical teeth, dorsal tooth shortly bifurcate (Fig. 1F), prostheca large and sclerotized; maxillary palpus 4-segmented, palpomere 2 longest, terminal palpomere fusiform and narrower than penultimate segment (Fig. 1H); labial palpus 3-segmented, terminal segments fusiform, narrower and shorter than palpomere 2; ligula slightly emarginate anteriorly (Fig. 1I); mentum with pair of long setae laterally. Subgenal projections short, narrowly rounded anteriorly; gular sutures indistinct.

Pronotum (Fig. 1D, E) about same length as width, lateral margins slightly curved, anterolateral angles not protruding forwardly; disc with pair of sub-lateral carinae, representing as raised ridges, accompanied with grooves on inner sides; dorsal surface with dense and coarse punctures, a little sparser on central area, posterior areas slightly elevated and form transverse carina. Prosternum large, fused with pronotum; prosternal process broad and with posterior margin nearly truncate. Procoxal cavities rounded, widely separately, externally closed; procoxae moderately transverse, with lateral part concealed in prothorax. Scutellum pentagonal, obtuse-angulate posteriorly.

Elytra (Fig. 1A, B) about 2.0 times as long as wide, almost parallel-sided, sharply narrowed apically; dorsal surface with four carinae on each side, almost extend to apical margin, forming three complete cells (Fig. 4A); lateral side with 1 carina. Mesosternum (Fig. 1C) with central area slightly elevated, mesometaventral junction simple in straight line. Metasternum large, with sparse punctures on lateral areas; discrimen not extending to anterior margin. Mesocoxal cavities rounded and widely separated, laterally open to mesepimeron. Metacoxae transversely elliptical, separately by about 0.9 times of metacoxal width at middle length. Legs with femora strongly dilated at about middle, slightly flattened; tibiae slender, gradually expanded to apex, with pair of apical spurs almost symmetrical; tarsal formula 5-5-5 in both sexes, with basal tarsomere very short and almost invisible, terminal tarsomere longer than basal segments combined.

Abdomen (Fig. 1C) with five freely articulate ventrites, ventrite 1 with intercoxal process shortly inserted into metasternum; ventrite 5 sub-triangular. Ratios of ventrites length about: 1.0 : 0.7 : 0.8 : 0.8 : 0.9. Male genitalia (Fig. 5A) with tegmen large and sub-trapezoid, parameres reduced and with deep apical incision; penis with long and Y shaped basal strut, endophallus as in Fig. 5A.

Female similar to male on coloration and external structures, but with dorsal tooth on apex of mandible simple (Fig. 1G). Spermatheca hooked with acute apex (Fig. 5D).

Distribution. China (Guangdong).

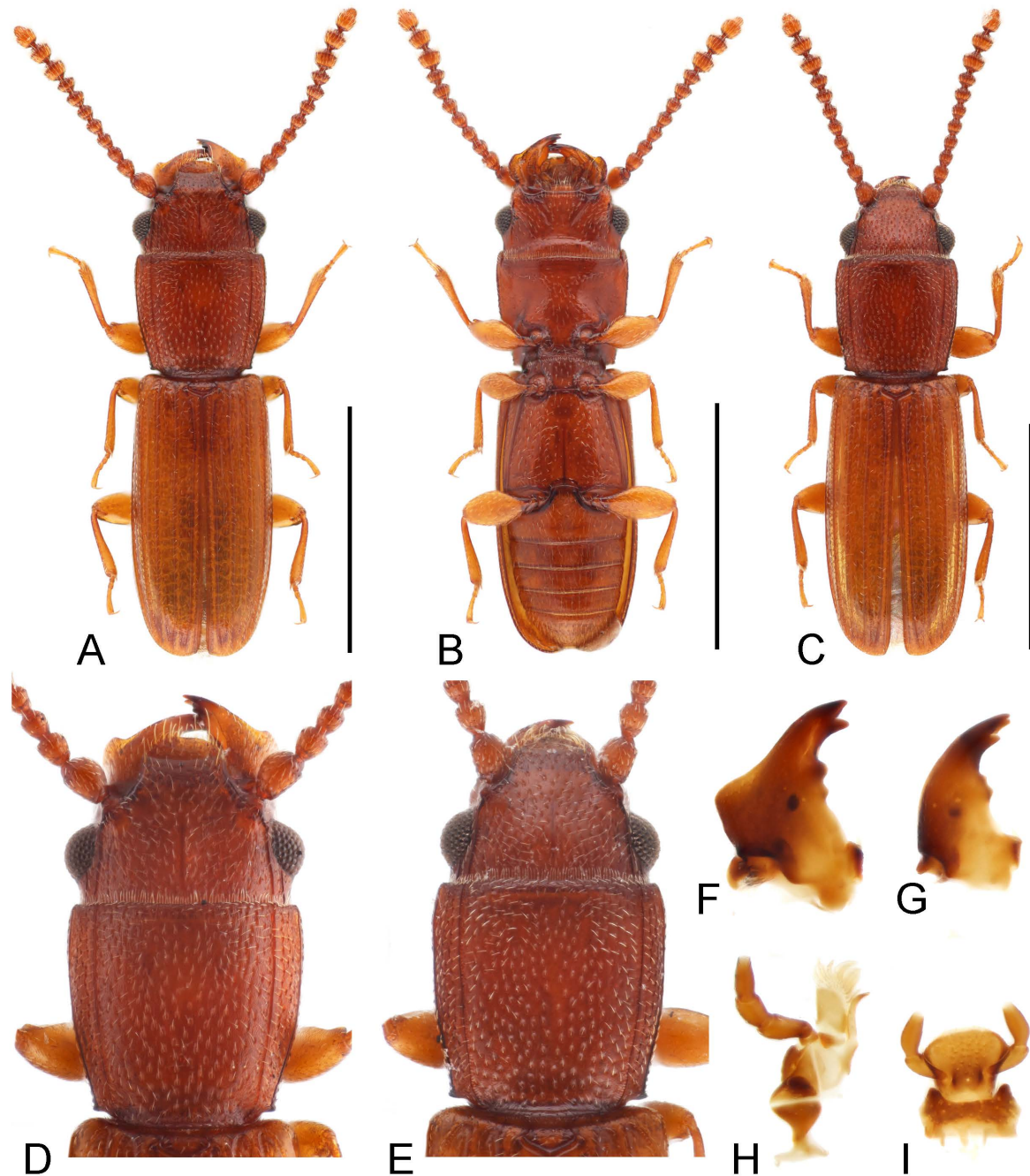


FIGURE 2. *Leptophloeus convexiusculus* (Grouvelle, 1877): **A** male habitus, dorsal **B** male habitus, ventral **C** female habitus, dorsal **D** head and pronotum, male **E** head and pronotum, female **F** mandible, male **G** mandible, female **H** maxilla **I** labium. Scale bars = 1 mm.

***Leptophloeus convexiusculus* (Grouvelle, 1877) 拱瘦扁谷盗**

Figs 2; 4B; 5B, 5E

Specimens examined. CHINA, Guangdong: 4♂1♀ (IZGAS), Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, scolytine trap, 2022.x.26; 1♂ (IZGAS), Zhaoqin City, Dinghushan National Nature Reserve [鼎湖山国家级自然保护区], 2022.x.21, scolytine trap; 1♀ (IZGAS), Guangzhou City, Baiyun Mountain [白云山], 113.304533°E 23.167539°N, malaise trap; 1♂3♀ (IZGAS), Foshan City, Xiqiaoshan National Geopark [西樵山国家地质公园], 112.973800°E 22.928852°N, flight intercept trap, 2022.x.25; 2♀ (IZGAS), Dongguan City, Dalingshan Forest Park [大岭山森林公园], 113.777112°E 22.855848°N, scolytine trap, 2023.v.20.

Diagnosis. Length 2.0–2.1 mm. This species can be easily distinguished from the other two species of *Leptophloeus* in China by brown colouration (Fig. 2A–C), clypeus (Fig. 2I) slightly rounded anteriorly and shape of female spermatheca (Fig. 5E). It also differs from *L. dichotomus* sp. nov. by 5-5-4 tarsal formula in male and distinct antennal club. Actually, *L. convexiusculus* resembles the type species of *Leptophloeus*, *L. angustulus*, on body shape, colouration, and sexual dimorphism on mandibles (Fig. 2F, G), but can be recognized from the latter by shape of female spermatheca (Fig. 5E).

Other important characters include: antenna (Fig. 1A–C) 11-segmented with 3-segmented club, scape slightly enlarged, pedicel larger and longer than antennomere 3; mandible tridentate apically, prostheca (Fig. 2F, G) represents as two small tubercles, outer edge with large ventral process in male, absent in female; maxilla with lacinia hooked apically (Fig. 2H); labium with ligula rounded anteriorly (Fig. 2I); pronotum with dense and fine punctures, sparser on central area; elytron (Fig. 4B) with four carinae on dorsal surface, extending to posterior margin; metacoxae separated by about 0.6 times of metacoxal width at middle line; ratios of length of abdominal ventrites about 1: 0.8 : 0.7 : 0.6 : 0.9; male genitalia with tegmen sub-trapezoid, parameres with deep apical incision (Fig. 5B); penis with long and Y shaped basal strut, endophallus as in Fig. 5B; female spermatheca (Fig. 5E) strongly curved, with apex stout.

Distribution. China (Guangdong); Japan.

***Leptophloeus foveicollis* Sasaji, 1986 凹胸瘦扁谷盗**

Figs 3; 4C; 5C, 5F

Specimens examined. CHINA, Guangdong: 1♂ (IZGAS), Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, scolytine trap, 2023.vii.19; 1♀ (IZGAS), Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, scolytine trap, 2023.iv.29; 1♂2♀ (IZGAS) Zhongshan City, Maling reservoir [马岭水库], 113.373828°E 22.459801°N, malaise trap, 2024.x.20–2025.ii.27; Qingyuan City, Lianshan County, Bijiashan Nature Reserve [笔架山省级自然保护区], 1♀ (IZGAS) 112.034519°E 24.213670°N, scolytine trap, 2023.vi.12–17; 1♂1♀ (IZGAS), Shaoguan City, Renhua County, Danxiashan National Nature Reserve [丹霞山国家级自然保护区], 113.725067°E 25.038642°N, scolytine trap, 2024.vi.4.

Diagnosis. Length 2.3–2.7 mm. This species is the most unique species within the genus, which can be easily recognized by two rows of coarse punctures on pronotum (Fig. 3A, C), which with pair of sub-lateral sulci, not accompanied with raised ridge, lateral carinae absent anteriorly; clypeus distinctly emarginate apically; labrum narrow, with apical margin emarginate; antenna (Fig. 3A, B) 11-segmented with 3-segmented club, scape strongly enlarge and dorsally flattened; head (Fig. 3C) elongate, with genal areas depressed and slightly rostrate, vertex without transverse carinae posteriorly; all coxal cavities much narrower separated, with mesocoxa internally contiguous (Fig. 3D); mesocoxal laterally open to mesanepisternum (Fig. 3D); dorsal surface of elytron with two medial carinae not extend to posterior margin (Fig. 4C); tarsal formula 5-5-4 in male (Fig. 4I), tibiae with a pair of asymmetrical apical spurs; male genitalia (Fig. 5C) with tegmen sub-trapezoid, apical margin emarginate at middle; penis with basal part almost V-shaped, without long strut, endophallus as in Fig. 5C; female spermatheca slender

and almost annular (Fig. 5F).

Other characters include: body almost cylindrical, with pronotum about 1.4 times as long as wide, elytra about 2.2 times as long as wide; mandible tridentate apically, prostheca represents as simple tubercle; maxilla with two apical teeth on lacinia (Fig. 3F); labium with ligula distinctly emarginate apically (Fig. 3E). Sexual dimorphism not distinct in this species, with mandible in female somewhat smaller, and apical teeth and prostheca more acute (Fig. 3G, H)

Distribution. China (Guangdong); Japan.

Remarks. Sasaji (1986) put this species into *Leptophloeus* mainly based on similar body shape with *L. femoralis* Sasaji, 1983, which has sub-lateral carinae on pronotum, without rows of coarse puncture on central area and dorsal carinae on elytron extend to apical margin. Characters on the closure of mesocoxal cavities were not described originally for those two species (Sasaji 1983, 1986), which together with the characters mentioned above are usually important to define genera within the family. As *Leptophloeus* and some related genera are still not well-defined, we are not going to make any decision on the generic assignment of those species here. But it's obvious that further revisions are required.

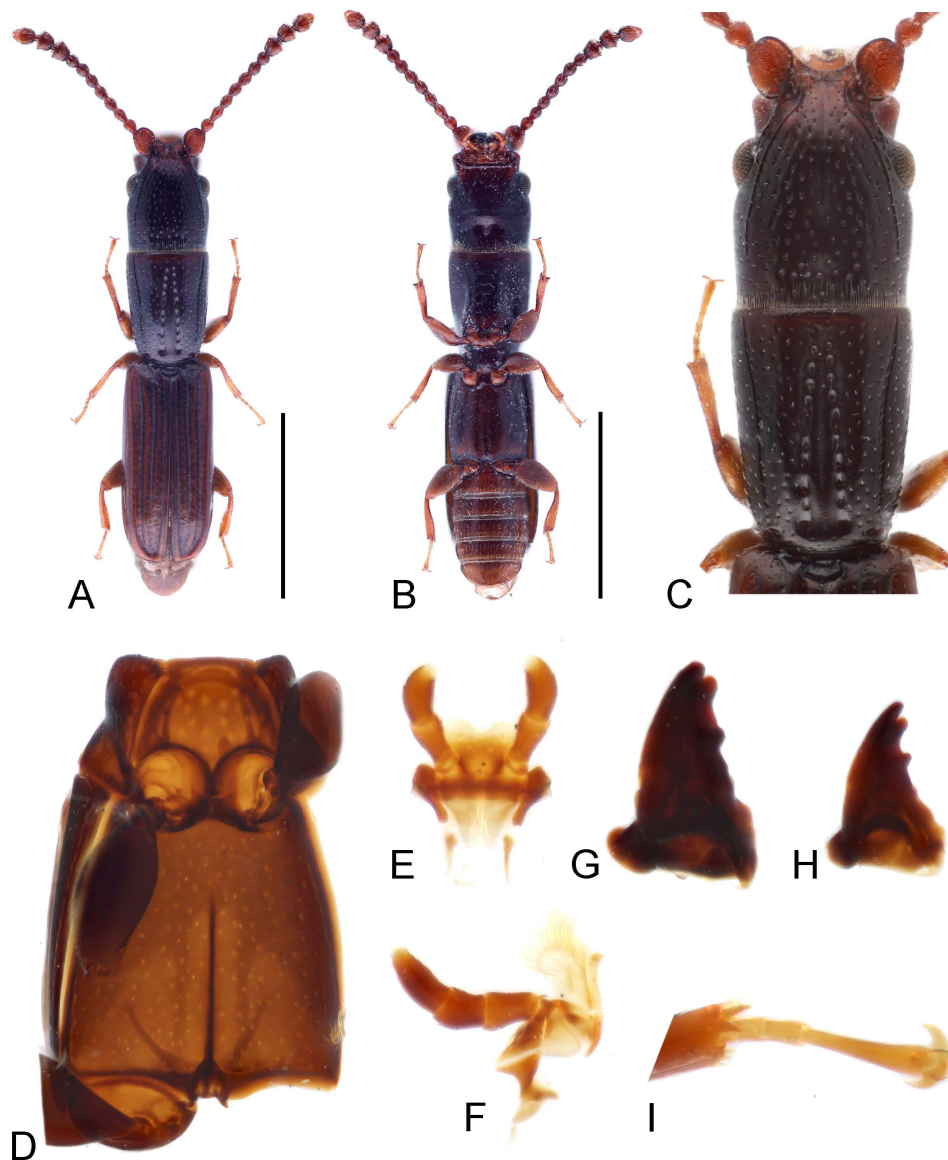


FIGURE 3. *Leptophloeus foveicollis* Sasaji, 1986: **A** male habitus, dorsal **B** male habitus, female **C** head and pronotum, male **D** pterothorax, ventral **E** labium **F** maxilla **G** mandible, male **H** mandible, female **I** hind tarsi, male. Scale bars = 1 mm.

Key to species of *Leptophloeus* from East Asia

1. Antennomeres 9–11 elongated, not clubbed2
 Antennomeres 9–11 clubbed, transverse.....3
2. Male antenna distinctly longer than female *L. abei*
 Male antenna nearly the same length as female..... *L. dichotomus* **sp. nov.**
3. Pronotum with two rows of coarse punctures at center and a pair of sub-lateral sulci *L. foveicollis*
 Pronotum without coarse puncture at center, with a pair of sub-lateral carinae4
4. Antennomeres of antennal club longer than width, somewhat flattened *L. femoralis*
 Basal two antennomeres of antennal club wider than length, not flattened..... *L. convexiusculus*

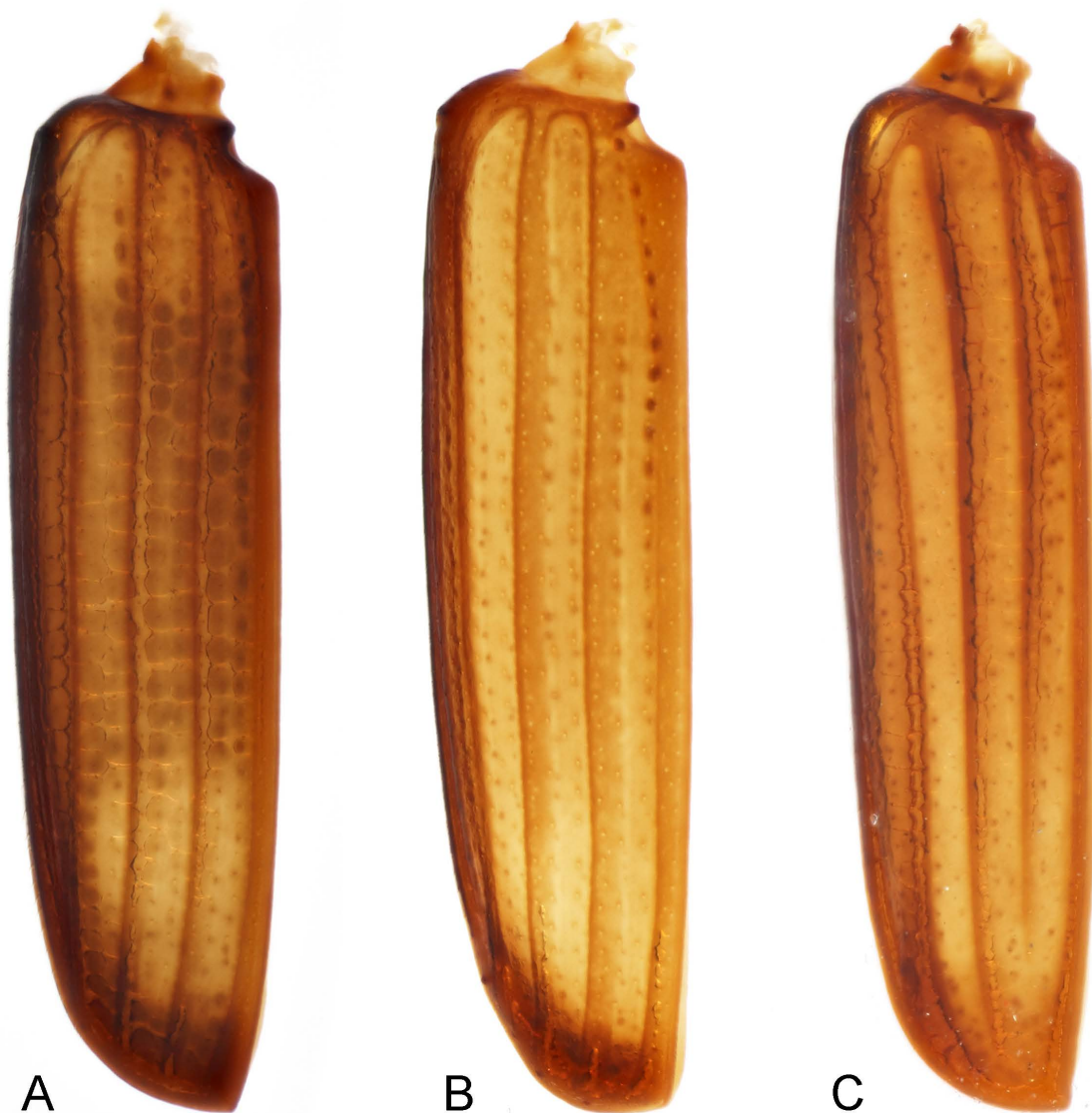


FIGURE 4. Elytra of *Leptophloeus* spp.: **A** *L. dichotomus* **sp. nov.** **B** *L. convexiusculus* (Grouvelle, 1877) **C** *L. foveicollis* Sasaji, 1986.

● Discussion

Laemophloeidae is not well studied in China, with most researchers focused on species of storage pests, like *Cryptolestes ferrugineus* (Stephens, 1831) and *C. turcicus* (Grouvelle 1876) (Zhang *et al.* 2016; He *et al.* 2025). Li *et al.* (2023) reported the first record of *Nipponophloeus* Sasaji, 1983 in China, which is originally described from Japan. And four species of *Leptophloeus* are known in Japan at present, two of which are also recorded here in China. Actually, much more genera and species of Laemophloeidae described in Japan have not been recorded in China (Wegrzynowicz 2007), and some of them are identical in the specimens collected together with the materials in this paper, which require further studies. It highlights the enormous potential of species diversity of Laemophloeidae in China.

Leptophloeus species were believed to be predators associated with scolytine galleries (Majka & Chandler 2009). Most specimens involved in this study were collected by scolytine traps with attractants or malaise traps in pine forests, and various scolytine beetles were caught at the same time. It indicates the potential associations between *Leptophloeus* species and scolytines, and they could be natural predators of some wood-boring beetles of pine trees.

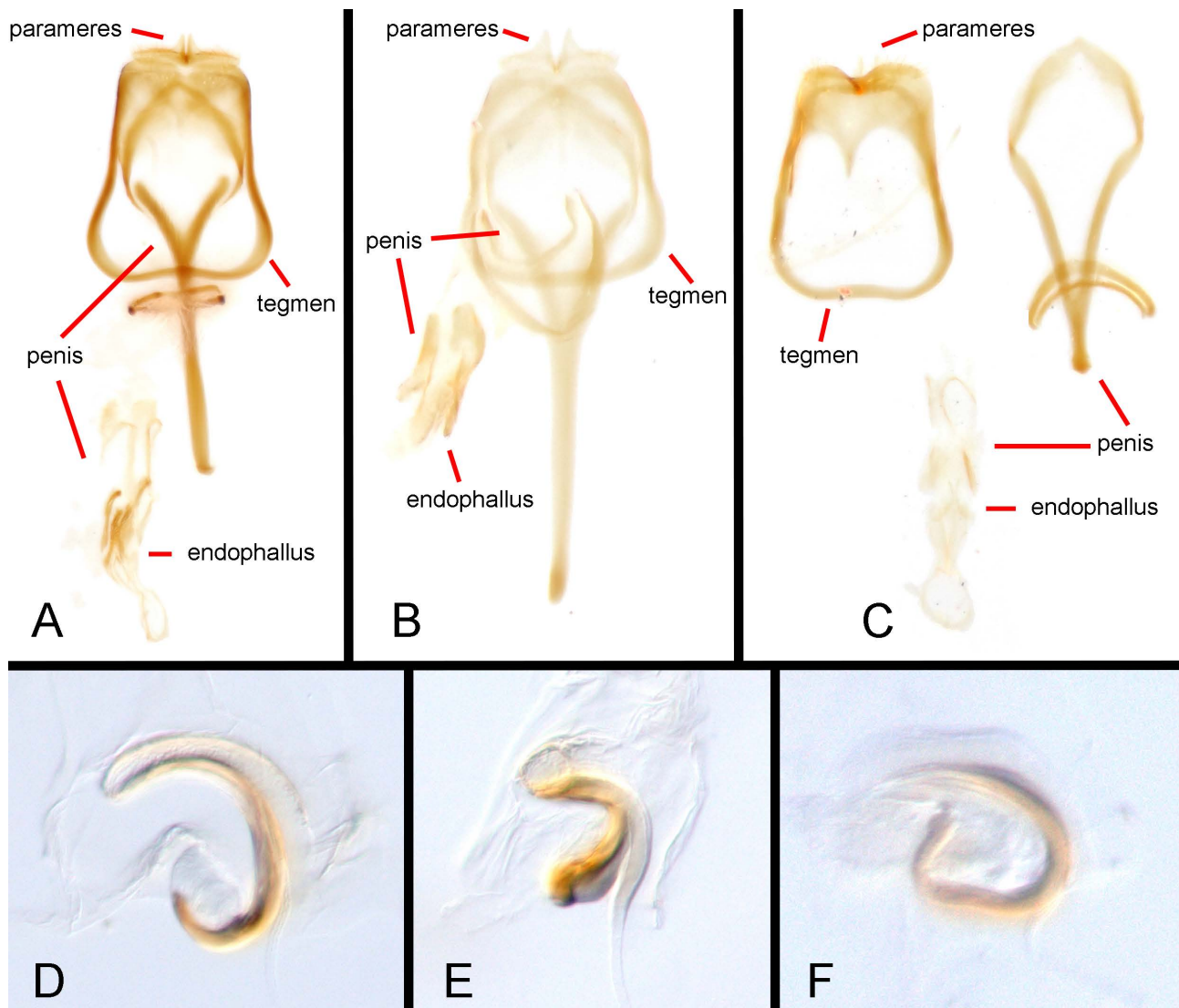


FIGURE 5. A–C male genitalia of *Leptophloeus* spp. D–F female spermathecae of *Leptophloeus* spp. A, D *L. dichotomus* sp. nov. B, E *L. convexiusculus* (Grouvelle, 1877) C, F *L. foveicollis* Sasaji, 1986.

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