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● A new species of the stage beetle genus *Lucanus* Scopoli, 1763 (Coleoptera: Lucanidae: Lucaninae) from China and new data of *Lucanus hewenjiae* Huang & Chen, 2013

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Abstract: The type genus of Lucanidae, *Lucanus* Scopoli, 1763, exhibits a high diversity in China, currently comprising 60 Chinese species. Here we describe a new species of *Lucanus* from Sichuan, China: *Lucanus wangyifani* sp. nov. We also first record *Lucanus hewenjiae* Huang & Chen, 2013 from Hunan Province, and discuss the difference between the specimens from Hunan and Guangxi. The variation of *L. wangyifani* sp. nov. and *L. hewenjiae* are illustrated.

Keywords: new provincial record, new taxon, Sichuan Province, taxonomy

● 中国深山锹属一新种记述及何氏深山锹之新数据（鞘翅目：锹甲科：锹甲亚科）

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摘要: 深山锹属 *Lucanus* Scopoli, 1763 在中国具有高度多样性, 目前共纪录 60 种。本文描述了采自中国四川的深山锹属一新种: 王氏深山锹 *Lucanus wangyifani* sp. nov.。同时本文首次纪录何氏深山锹 *Lucanus hewenjiae* Huang & Chen, 2013 在湖南省的分布及讨论该种湖南与广西标本的差异, 并提供王氏深山锹与何氏深山锹的形态特征图示。

关键词: 省级新纪录, 新分类单元, 四川省, 分类学

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● Introduction

Lucanus Scopoli, 1763, the type genus of Lucanidae, is a widely distributed genus from Eurasia and North America. China harbors the highest diversity of this genus, with 60 species (Huang & Chen 2010, 2013, 2017; Zhan & Young 2023). These species are divided into seven species groups based on morphological characters (Zhan & Young 2023), i.e., *L. fortunei* species group, *L. brivioi* species group, *L. kraatzi* species group, *L. parryi* species group, *L. laminifer* species group, *L. maculifemoratus* species group and *L. lunifer* species group.

Lucanus hewenjiae Huang & Chen, 2013 is a special species with multiform mandible shape. This species is characterized by the evenly curved mandible, the longer lower apical fork branches, the shorter major tooth of mandible and the slender aedeagus. Huang & Chen (2013) first described this species based on eight specimens from Mt. Maoer, Guangxi. Zhan & Young (2023) provides a detailed description of this species. To date, *L. hewenjiae* is known only from its type locality, Mt. Maoer.

Here we describe a new species of *Lucanus* from Sichuan, China, i.e. *Lucanus wangyifani* **sp. nov.** In addition, we first record *Lucanus hewenjiae* from Mt. Tianmen, Zhangjiajie, Hunan. Some differences between the population from Mt. Tianmen and Mt. Maoer are discussed.

● Material and methods

Habitus photos were taken using a Canon® 5D Mark III with EF 100 mm f/2.8 macro lens. Two Godox V850II flashes as light source. Genitalia were prepared by clearing the apex of the abdomen with 15% KOH at 135°C for 5 min. After rinsing the KOH with distilled water, the apex of the abdomen was transferred to glycerin for further examination. The photographs of male genitalia were taken using a Canon® 5D Mark III with MP-E 65mm f/2.8 1-5X Macro Lens. Two Godox V850II flashes as light source. Zerene Stacker was used for image stacking. All images were modified and grouped into plates in Adobe Photoshop 2023.

Specimens examined in this study are deposited in the following collections: **CSTJ**—Private Collection of Sheng-Tong Jin, Nanjing; **CZCL**—Private Collection of Ze-Chuan Li, Beijing; **CYTL**—Private Collection of Yi-Teng Li, Wuhan; **CQLN**—Private Collection of Qian Li, Nanjing; **CYZH**—Private Collection of Yu-Zhou Huang, Changsha; **CYFW**—Private Collection of Yi-Fan Wang, Suzhou; **CZHZ**—Private Collection of Zhi-Hong Zhan, Nanjing; **CKXJ**—Private collection of Kai-Xiang Jing, Chengdu; **CMLL**—Private collection of Mo-Lin Lu, Taizhou; **NJAU**—Entomological Museum, Nanjing Agricultural University (Meng Wang).

● Taxonomy

Family Lucanidae Latreille, 1804

Subfamily Lucaninae Latreille, 1804

Genus *Lucanus* Scopoli, 1763

Lucanus wangyifani **sp. nov.** 王氏深山锹

<https://zoobank.org/136CC82A-DCB5-4C18-996C-0E4A24B3F3AB>

Figs 1–6

Type material. Holotype: ♂, **CHINA: Sichuan**, Guang'an, Mt. Huaying [华莹山], 1300–1600 m, 1–4.VII.2025, leg. Yifan Wang, Molin Lu, Yiteng Li & Kaixiang Jing (NJAU). **Paratypes:** 27♂4♀, same as holotype (CYFW); 25♂5♀, same as holotype (CYTL); 26♂4♀, same as holotype (CMLL); 11♂4♀, same as holotype (CKXJ); 4♂2♀, same as holotype (CZCL); 5♂4♀, same as holotype (CZHZ); 4♂1♀, same as holotype (CYZH).

Diagnosis. Male. Head and pronotum reddish to dark brown, covered with dense pubescence; elytra reddish brown. Mandible basal 1/3 incurved, distal part relatively straight; upper branches of apical fork nearly two times length of lower apical fork branches, major teeth long, triangular and pointing inside. Protibiae with serrated teeth

FIGURE 11. Genitalia structures of *Lucanus hewenjiae* Huang & Chen, 2013 from Mt. Maoer: **A–C** aedeagus **D, E** dorsal plate of male abdominal segment IX **F** ventral plate of male abdominal segment IX **G** male tergite VIII **H** male sternite VIII **I** hemisternite **J** female sternite VIII **K** female tergite VIII. **A, E** ventral view **B** lateral view **C, D, F–K** dorsal view. Scale bar = 2 mm.

● Discussion

Identifying *L. hewenjiae* from its congeners is a substantial challenge. Huang & Chen (2013) provided a brief diagnosis for *L. hewenjiae* but did not offer a specific taxonomic description of its holotype, until Zhan & Young (2023) first provided comprehensive description of this species. Furthermore, Huang & Chen (2013) designated an incomplete specimen as holotype, which lacks the distal half of left mandible and lower apical fork branch of right mandible. Consequently, the holotype cannot fully represent characters of *L. hewenjiae*, due to the absence of the lower apical fork. For the high degree of individual variation, it's difficult to find diagnostic characters fit all specimens. In this study, we compared multiple specimens of *L. hewenjiae* and *L. wangyifani* **sp. nov.**, and determined following reliable diagnostic characters: the length of male major teeth and the density of pubescence. In contrast, the shape of male mandible and the small teeth on inner margin of mandible is varied.

This new species is highly attracted to light and exhibits a great flying ability. Notably, multiple individuals were consistently observed flying toward the light traps in windy weather conditions. Our previous fieldwork also revealed that *L. hewenjiae* also remains highly active in windy and foggy weather, whereas most other *Lucanus* species are unable to fly toward light traps under such conditions. Huang & Chen (2020) described *L. cenwanglaoshanus*, which is closely related to *L. hewenjiae* and *L. wangyifani* **sp. nov.** Nevertheless, they didn't

provide the altitude data of type specimens. During our fieldwork in Mt. Cenwanglao, we noticed that *L. cenwanglaoshanus* appeared at altitude above 1800 m, and shown a weak flying ability. Most individuals of *L. cenwanglaoshanus* can only arrive the light traps that placed in forest, while only few individuals arrived those away from forest. Although *L. parryi* and *L. wangyifani* **sp. nov.** are sympatric in Mt. Huaying, the former was observed in significantly lower numbers compared to this new species during the recent fieldwork. This disparity suggests that *L. wangyifani* **sp. nov.** may hold a dominant ecological position within this localized habitat.

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● Additional information

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