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A new species of *Anisandrus* Ferrari, 1867 (Coleoptera: Curculionidae: Scolytinae: Xyleborini) from Western China

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Abstract

A new ambrosia beetle species of *Anisandrus* Ferrari, 1867, namely *A. tuberculatus* **sp. nov.**, is described from Chongqing, Shaanxi and Sichuan of Western China. Descriptions and illustrations are provided based on specimens from type materials found in Yintiaoling Nature Reserve of Chongqing.

Key words: Xyleborine ambrosia, new records, taxonomy, species discovery

Introduction

Xyleborine ambrosia beetles (Curculionidae: Scolytinae), are the largest tribe of Scolytinae. This group includes more than one-fifth of the species in Scolytinae and occurs throughout the forested regions of the world with the highest diversity in the tropical and subtropical regions (Hulcr *et al*. 2015; Smith *et al.* 2020).

Anisandrus Ferrari (Coleoptera: Curculionidae: Scolytinae: Xyleborini) was first erected for *Xyleborus dispar* (Fabricius, 1792). It had recorded as an uncommon genus occurring in forests of the Holarctic and Paleotropical regions (Ferrari 1867; Smith *et al.* 2020). Currently there are 40 valid species which primarily distributed from Europe to Japan, and through the Oriental region to New Guinea and the Solomon Islands. A few species are reported in temperate North America and one in Madagascar (Wood 1977; Rabaglia *et al*. 2009; Gomez *et al*. 2018; Sittichaya *et al*. 2023).

In China, *Anisandrus* is extremely understudied, and most species are poorly known (Smith *et al.* 2020). Yin *et al.* (1984) recorded only two species, *A. apicalis* and *A. dispar* from China. Smith *et al.* (2020, 2022) recorded 20 species of *Anisandrus* from mainland China. It is noteworthy that *Anisandrus* species were reported to be horticultural pests in both their native and introduced ranges. *Anisandrus apicalis* (Blandford) was reported as a new pest of kiwifruit *Actinidia chinensis* Planch in southwestern of China (Li *et al.* 2016), *Anisandrus dispar* (Fabricius) was considered a significant pest of several fruit trees in China (Yin *et al.* 1984) and North America where it has been introduced (Gomez *et al*. 2018). *Anisandrus maiche* Stark was also recorded in Europe, USA and Canada where it became invasive (Rabaglia *et al*. 2009; Thurston *et al*. 2022).

In this paper, we describe and photograph a new species, *Anisandrus tuberculatus* **sp. nov.** from Chongqing, Shaanxi and Sichuan of Western China.

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Materials and Methods

Total length was measured from apex of the pronotum to the apex of the elytra and width was measured at the widest point of the specimen. Pronotal length was measured from the apex to base and width from the widest point. Types of antennal club and pronotum are derived from Hulcr *et al.* (2007) and elaborated upon by Smith *et al.* (2020).

Most specimens were collected from Malaise traps in Chongqing, China; one specimen was collected from ground trap in Shaanxi, China. Images (Figs 1A–B, 2A–B, 2D–E, 3A–C) were taken using a Leica Dvm6A (Leica, Germany). Scanning electron micrograph (SEM) (Fig. 2C) were taken with tabletop microscope TM4000 (Hitachi, Japan). Furthermore, Figs 1A–B, 2A–B are combined with Helicon Focus 8 (Helicon Soft, Ukraine).

Specimens involved in the study are being deposited in the following institutions:

IOZ—Chinese National Zoological Museum of China, Academy of Sciences, Institute of Zoology, Beijing, China;

SYSBM—The Museum of Biology, Sun Yat-sen University, Guangzhou, China;

WLC—Private collection of Wei Lin, Zhuhai, China.

Taxonomy

Family Curculionidae Latreille, 1802

Subfamily Scolytinae Latreille, 1804

Tribe Xyleborini LeConte, 1876

Genus *Anisandrus* Ferrari, 1867

Anisandrus tuberculatus sp. nov.

Figs 1A–B, 2A–E, 3A–C

Type material. Holotype female, **CHINA. Chongqing City, Yintiaoling National Nature Reserve**, Linkouzi Administrative Station, Ganshuixia, 31.476124°N, 109.858153°E, alt. 1404m, 11.VI.2022, leg. Yuanxi Zhu (SYSBM). **Paratypes:** 5 females, as holotype (SYSBM, 1; IOZ, 2; WLC, 2); 1 female, same collection data as holotype except 14.VI.2021 (WLC); 2 females, Zhuanping Administrative Station, 31.498314°N, 109.955178°E, alt. 2178m, 03.VI.2022, leg. Luyu Wang (WLC); 1 female, Zhuanping, 21.VI.2022, leg. Houlin Zhu (WLC).

Other material examined. Shaanxi Prov., 1 female, Qinling Mts, Foping Nature Reserve, near Sanguan Temple, 33.670717°N, 107.815769°E, alt.1671 m, ground trap in *Arundinaria fargesii* forest, early VII.2020, leg. Wangang Liu and Jianlong Chen (WLC). **Sichuan Prov.,** 7 females, Leshan City, Ebian Yi Autonomous County, alt.1900 m, ex *Quercus* × *leana*, 29.VI.1960, leg. Fusheng Huang, IOZ(E) 840923–840929; 2 females, Ebian Yi Autonomous County, ex *Schima superba*, 29.VI.1960, leg. Fusheng Huang, IOZ(E) 859956, 859957; 1 female, Liangshan Yi Autonomous Prefecture, Leibo County, alt.1900 m, 22.VI.1964, leg. Fusheng Huang, IOZ(E) 840930; 1 female, Emei City, Emei Mts, ex *Camphora officinarum*, 11.V.1964, leg. Fusheng Huang, IOZ(E) 840931; 1 female, Yibin City, Pinshan County, alt.400 m, ex *Castanea* sp., 26.IV.1964, leg. Fusheng Huang, IOZ(E) 840932; 1 female, Chengdu City, 8. IV.1960; ex *Salix babylonica*, alt.370 m, leg. Fusheng Huang, IOZ(E) 840933.

Diagnosis. 3.7–4.0 mm long (mean 3.86 mm, n = 5); 2.29–2.37× as long as wide. This species is distinguished by the mesonotal mycangial tuft extending laterally from the scutellum to striae 2; declivital strial punctures setose, setae 1.2–1.5×as long as diameters of a puncture; declivital interstriae granulate; granules different sizes, widely and regularly spaced from base to apex, granules setose, setae 2–3× width of interstriae 2, erect, hair-like; declivital interstriae 2 granules uniseriate and interstriae 1, 3, 4 with granules in two confused rows and a row of serrations on anterior margin of pronotum; pronotum disc shorter than anterior slope, summit at apical 5/9.

Remarks: This new species is similar to *Anisandrus dispar* (Fabricius), but distinguished by: larger size, 3.7–4.0 mm long versus 3.1–3.5 mm long; declivital interstriae 1 flush versus declivital interstriae 1 slightly raised; declivital interstriae 1 and 3 with granules in two confused rows versus declivital interstriae 1 and 3 granules

uniseriate. A. *tuberculatus* is also similar to *A. hirtus* (Hagedorn) but distinguished by: declivital interstriae 1–3 granulate versus declivital interstriae 1–3 unarmed. Furthermore, A. *tuberculatus* resembles *A. paragogus* Smith, Beaver & Cognato and is most easily distinguished by the presence of mesonotal mycangial tuft.

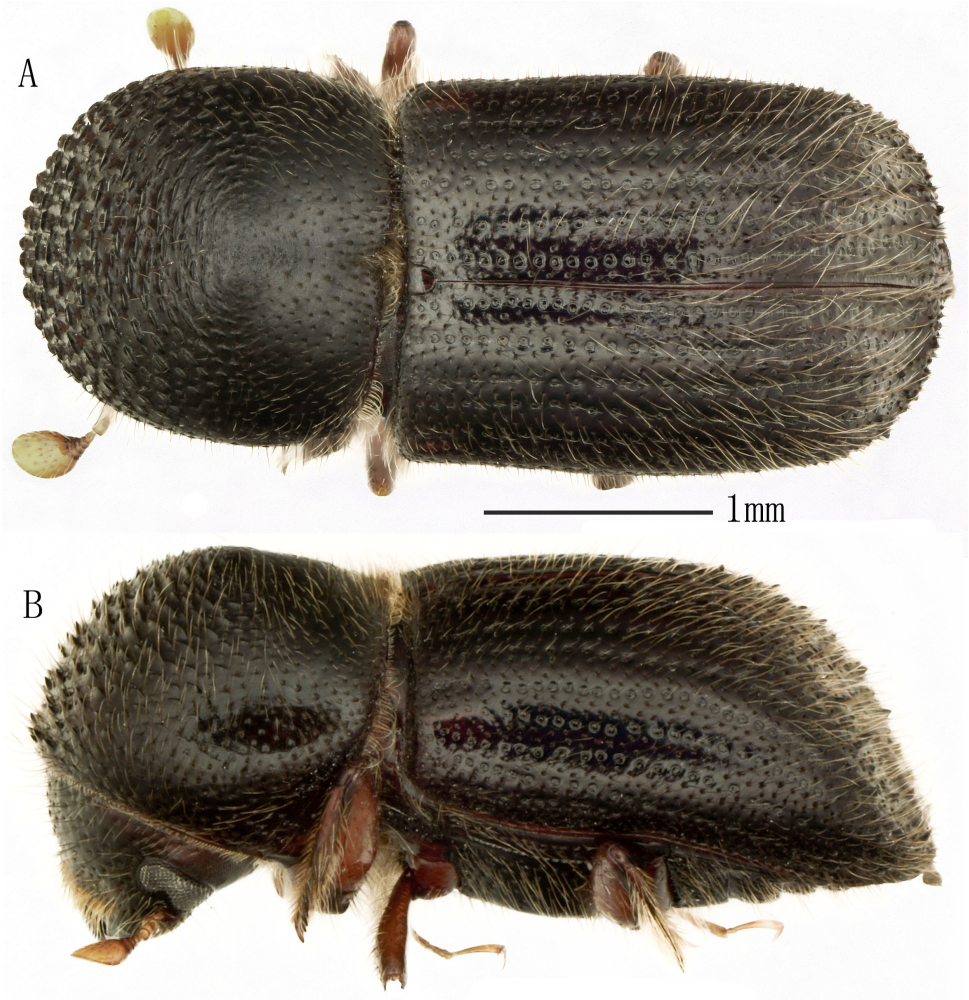

FIGURE 1. Holotype female of *Anisandrus tuberculatus* **sp. nov. A** dorsal view **B** lateral view.

Description (Female). 3.7–4.0 mm long (mean 3.86 mm, n = 5); 2.29–2.37× as long as wide. Body brown to dark brown. Legs and antennae brown. Frons and disc alutaceous. **Head:** epistoma entire, transverse, with a row of hair-like setae. Frons weakly convex to upper level of eyes, subshiny, punctate; punctures large, shallow, setose; punctures bearing a long, erect hair-like seta; median carina present but not significant. Eyes shallowly emarginate above antennal insertion, upper part smaller than lower part. Submentum large, distinctly triangular, slightly impressed. Antennal scape long and slender, much longer than club. Pedicel narrower than scape, much shorter than funicle. Funicle 4-segmented, segment 1 shorter than pedicel. Club longer than wide, obliquely truncate, type1; segment 1 corneous, encircling anterior face; segment 2 narrow, concave, corneous on anterior face only; sutures absent on posterior face. **Pronotum:** 0.86–1.0× as long as wide. In dorsal view rounded, type 1, sides convex, rounded anteriorly; anterior margin with a row of 5–7 large serrations. In lateral view robust and rounded, type 5, disc shorter than anterior slope, summit at apical 5/9. Anterior slope with densely spaced, large coarse asperities, becoming lower and more strongly transverse towards summit, asperities bearing a long, erect hair-like seta. Disc subshiny, with small punctures bearing long erect hair-like setae, some very short semi-recumbent hair-like setae near summit. Lateral margins obliquely costate. Base transverse, posterior angles broadly rounded. Mycangial tuft present along basal margin, tuft moderately setose, extending laterally from the scutellum to striae 2. **Elytra:** 1.44–1.52× as long as wide, 1.53–1.85× as long as pronotum. Scutellum linguiform, flush with elytra, flat, shiny. Elytral base transverse, edge oblique, humeral angles rounded, parallel-sided in basal 3/4, then broadly rounded to apex. Disc flat, shiny, striae not impressed, with moderate punctures separated by 0.5–1 diameters of a puncture,

setose, setae long (1.5× as long as diameters of a puncture), attached to the upper margin of punctures, semi-erect or erect, hair-like; interstriae flat, punctate, punctures strongly confused, setose, setae long, erect hair-like, unarmed by granules. Declivity occupying approximately 2/5 of elytra, steeply rounded, declivital face flat, shiny; striae weakly impressed, strial punctures slightly larger than those of disc, each puncture bearing a long, recumbent hair-like seta, setae 1.2–1.5× as long as diameters of a puncture; interstriae impunctate, granulate; granules different sizes, widely and regularly spaced from base to apex, granules setose, setae 2–3× width of interstriae 2, erect, hair-like; declivital interstriae 2 granulate uniseriate and interstriae 1, 3, 4 granulate in two confused rows; interstriae weakly laterally broadened from declivital summit to apex. Posterolateral margin costate, granulate to interstriae 7. **Legs:** procoxae contiguous, prosternal coxal piece tall and pointed. Protibiae obliquely triangular, broadest at apical1/4; posterior face smooth; apical 1/2 of outer margin with five large socketed denticles, their length longer than basal width. Mesotibiae flattened, distinctly triangular, apical 1/2 with six large socketed denticles on outer margin; metatibiae flattened, obliquely triangular, apical 1/2 with seven or eight large socketed denticles on outer margin.

FIGURE 2. Holotype female of *Anisandrus tuberculatus* **sp. nov. A** ventral view **B** declivity **C** SEM of declivity **D** front **E** antenna.

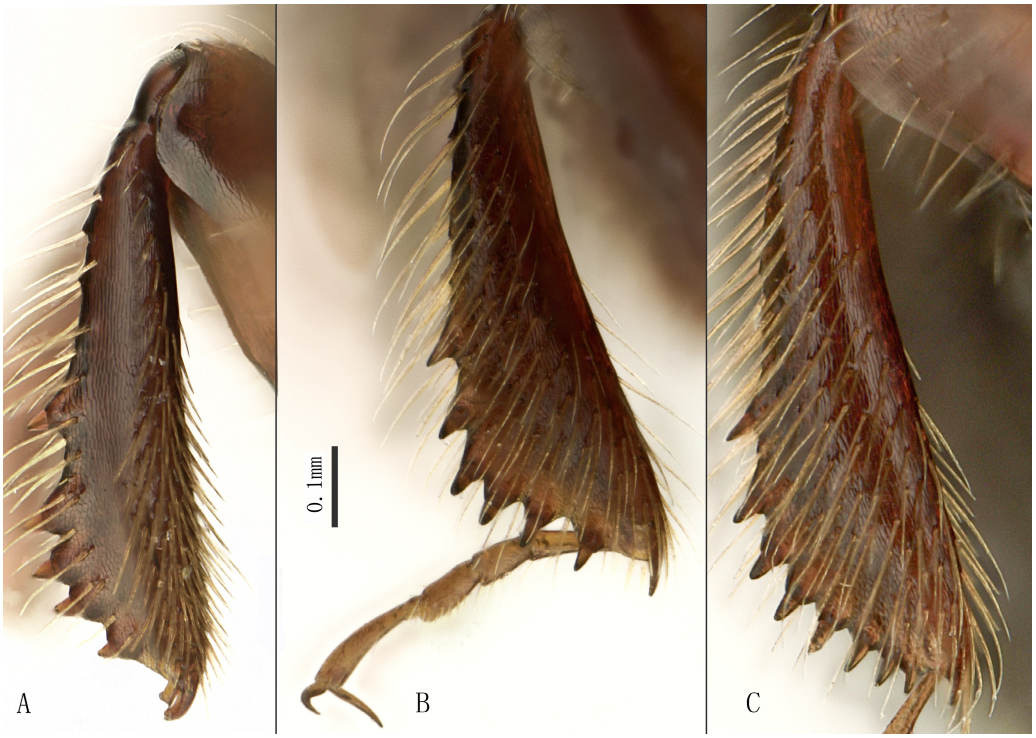

FIGURE 3. Holotype female of *Anisandrus tuberculatus* **sp. nov. A** protibia (anterior side) **B** mesotibia (anterior side) **C** metatibia (anterior side).

Male. Unknown.
Etymology. The specific epithet refers to the declivity covered with granules.
Distribution. China (Chongqing, Shaanxi, Sichuan).
Host plants. This species is likely polyphagous.
Biology. Unknown.

Discussion

Between April and July, 2022, Prof. ZhiSheng Zhang of Southwest University led his group to survey the invertebrate biodiversity in Yintiaoling National Nature Reserve using Malaise traps. In total, 269 scolytine specimens representing 14 species, *Ambrosiodmus rubricollis* (Eichhoff), *Anisandrus tuberculatus*, *Cnestus* sp., *Hadrodemius comans* (Sampson), *Hadrodemius pseudocomans* (Eggers), *Hypothenemus* sp., *Indocryphalus* sp.1, *Indocryphalus* sp.2, *Scolytoplatypus blandfordi* Gebhardt, *Scolytoplatypus zahradniki* Knížek, *Xyleborinus saxesenii* (Ratzeburg), *Xylosandrus amputatus* (Blandford), *Xylosandrus borealis* Nobuchi, *Xylosandrus germanus* (Blandford), were collected from 13 locations within the Nature Reserve. *Anisandrus tuberculatus* was found in those traps. Previous studies have demonstrated that Malaise traps could be used to collect scolytines (Ohsawa 2010), but are usually less effective compared to flight interception traps and fogging (Nie *et al.* 2017). It may be inferred from the primary survey's results that Yintiaoling National Nature Reserve has a high diversity of Scolytinae.

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