



***Orthosinus medogensis* sp. nov. (Coleoptera: Curculionidae: Dryophthorinae) from Xizang, China, with notes on the synonymy of *Xerodermus* Lacordaire under *Orthosinus* Motschulsky**

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Abstract

Orthosinus medogensis sp. nov., collected in Mêdog County, Xizang Autonomous Region, is described and illustrated. Morphologically, the new species is most similar to *O. dudkoi* but can be distinguished by the larger body size, shallow transverse sulcus between frons and rostrum, more rugose surface of the rostrum, and parallel-sided form of the pedon. Furthermore, this study addresses the long-standing taxonomic controversy regarding *Xerodermus* by treating it as a junior synonym of *Orthosinus* based on the re-examination of published type images, which reveal that the key diagnostic character of ventral eye separation is variable and unreliable at the generic level. Additionally, *X. porcellus* is recognized as a valid species within *Orthosinus*.

Key words: Stromboscerini, morphology, taxonomy, weevils

Introduction

The weevil genus *Orthosinus* Motschulsky, 1863 (type species *O. velatus* Lacordaire, 1866 from Sri Lanka) is placed in the tribe Stromboscerini, subfamily Dryophthorinae (Alonso-Zarazaga *et al.* 2017). Its taxonomy is complicated by the disputed status of the morphologically similar genus *Xerodermus* Lacordaire, 1866. Faust (1875) synonymized *Xerodermus* with *Orthosinus*, a treatment followed by Morimoto (1978) and Legalov (2021, 2022, 2023). In contrast, other authors, including Alonso-Zarazaga & Lyal (2002), have treated *Xerodermus* as valid. Pending a comprehensive revision, this study provisionally follows the broader generic concept of Morimoto (1978). The genus *Orthosinus*, as construed here, is briefly diagnosed by the following combination of characters: dark black body with reddish-brown antennae and tarsi, ventrally separated eyes, a 6-segmented antennal funicle with an obliquely truncate and pubescent club (Lacordaire 1866; Morimoto 1978).

The genus *Orthosinus* was previously represented in China by only a single species, *O. foveatus* Voss, 1953 from Fujian Province, with the rest of its diversity known from South and Southeast Asia. This paper reports the genus from the Eastern Himalayas for the first time, based on specimens collected in Mêdog County, Xizang Autonomous Region. Mêdog is a remote area in the eastern Himalayas characterized by a complex climate and topography, which has fostered rich biodiversity. However, due to its remoteness and limited biological surveys, the regional biota remains poorly documented. This is evidenced by numerous new taxa recently described from the area across various groups, including angiosperms, mammals, and arthropods (Guo *et al.* 2024; Pan & Wang 2024; Pei *et al.* 2024; Wang *et al.* 2024; Ouyang *et al.* 2025; Tang *et al.* 2025). In contrast, the insect diversity of Mêdog, and particularly its weevil fauna, remains severely understudied. Based on material collected in this region, a new species of *Orthosinus* is discovered and described herein. This study provides a detailed morphological description of the new species, supported by diagnostic illustrations.

Material and methods

The specimens examined in this study were discovered during a search of the museum's collections. All specimens, including types, examined in this study, are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

All morphological observations, measurements, and dissections were conducted using a Nikon SMZ 1500 stereomicroscope with coaxial LED illumination. Specimens were imaged using a Canon EOS system, with detailed morphological features documented using a Canon 5D Mark II, and female genitalia were documented using a Visionary Digital LK Lab System equipped with a Sony A7RM5 camera and a Mitutoyo 20× objective lens. Multi-focal image stacking was processed in Helicon Focus v. 7.5.4 Pro. All image plates were assembled and adjusted in Adobe Photoshop CC 2019.

Measurements were taken and abbreviations are used as follows: body length (Bl) was measured from the anterior margin of the eye along the midline to the apex of the elytra. The length of the rostrum (Rl) was measured in lateral view from the apex to the anterior margin of the eye; the width of the rostrum (Rw) was measured at the widest point of the rostrum in dorsal view. The length of the pronotum (Pl) was measured along the midline from the apex to the base, whereas its width (Pw) was measured at the widest point. The ratio of pronotum width to length was expressed as Pw/Pl. The length of the elytra (El) was measured along the midline from the transverse line joining the most anterior point of humeri to the apex, whereas its width (Ew = body width) was measured at the widest point. Proportions of the elytra were also expressed as a ratio El/Ew. The maximum width and length of ventrites and legs were taken as the greatest dimensions of each segment.

Original label data are written below in Chinese script. Added transliterations into pinyin and translations are placed between square brackets. Data from different labels are separated by two slashes (/ /), and lines within a label are separated by one slash (/).

Terminology for general morphological structures primarily follows the online glossary of weevil characters proposed in the International Weevil Community Website (<http://weevil.info/glossary-weevil-characters>, accessed 08.10.2025). Male genitalia terminology follows Oberprieler *et al.* (2014), mesonotum terminology follows Davis (2009), and terminology for certain leg structure follows Girón and Chamorro (2020).

Taxonomy

Notes on *Orthosinus* and *Xerodermus*

As noted in the introduction, the status of *Xerodermus* has been contentious, prompting this study to initially adopt a provisional taxonomy. However, the present analysis of published type images (Grebennikov 2018a) provides sufficient evidence to resolve this long-standing issue. The re-examination reveals that the primary diagnostic character for *Xerodermus* (a wide ventral separation of the eyes) is variable within Stromboscerini. This is evidenced by the range of variation seen in *Tasactes*, ranging from the narrow separation in *T. pilosus* Lü & Zhang, 2025 to the wider one in *T. ocellatus* Lü & Zhang, 2025, which includes the variation observed between *Orthosinus* and *Xerodermus*. This variation is also suggested by phylogenetic results in Grebennikov (2018b: fig. 4E, K), and is therefore unreliable for generic delimitation. Consequently, the following taxonomic decisions are formally made herein.

Xerodermus Lacordaire, 1866, syn. nov. (reconfirming Faust, 1875)

Type species. *Xerodermus porcellus* Lacordaire, 1866.

Remarks. This genus is herein treated as a junior synonym of *Orthosinus* Motschulsky, 1863. The synonymy is reconfirmed based on the invalidity of its diagnostic character.

Genus *Orthosinus* Motschulsky, 1863

Diagnosis (modified from Lacordaire 1866; Morimoto 1978; Roelofs 1880). Dark black body with reddish-brown antennae and tarsi; head subglobular; eyes linear or oval laterally, distinctly separated ventrally; antennal funicle 6-segmented, club obliquely truncate and densely pubescent; pronotum subcylindrical, with coarse punctures; scutellum small, sometimes invisible; elytra elongate-oval, with distinct striae and interstriae, striae punctures usually large; metepisternum completely covered by elytra; legs with dense pubescence; procoxae contiguous; femora unarmed; tibiae with long unguis; claws free; male genitalia usually without parameres, temones longer than pedon; lamina of female sternite 8 usually bifurcated; collum of spermatheca usually more developed than ramus.

Orthosinus porcellus (Lacordaire, 1866), **stat. rev.**

Basionym. *Xerodermus porcellus* Lacordaire, 1866.

Remarks. The species is removed from synonymy with *O. sculpticollis* Motschulsky, 1863 and reinstated as a valid species within *Orthosinus*. It can be distinguished from *O. sculpticollis* by its larger eyes, more subquadrate pronotum, and elytra with bluntly rounded apices. We note that *O. sculpticollis* itself appears morphologically very similar to *O. velatus* based on available imagery (see Grebennikov 2018a: figs 6B, 11C); however, a definitive conclusion on their relationship requires further study and is beyond the scope of this paper.

Composition of the *Orthosinus* (in alphabetical order) and type locality

Orthosinus cylindricollis (Marshall, 1931) [India]
Orthosinus direptus (Marshall, 1931) [India]
Orthosinus dudkoi Legalov, 2023 [Nepal]
Orthosinus foveatus Voss, 1953 [China]
Orthosinus himalayanus (Marshall, 1931) [India]
Orthosinus japonicus Morimoto & Miyakawa, 1985 [Japan]
Orthosinus laosensis Legalov, 2022 [Laos]
Orthosinus medogensis Lü & Zhang, **sp. nov.** [China]
Orthosinus porcellus (Lacordaire, 1866), **stat. rev.** [Sri Lanka]
Orthosinus salutaris Faust, 1894 [Myanmar]
Orthosinus subulirostris Marshall, 1931 [India]
Orthosinus tuberculatus Legalov, 2021 [Laos]
Orthosinus tuberculicollis Voss, 1957 [Sri Lanka]
Orthosinus velatus Motschulsky, 1863 [Sri Lanka]
Orthosinus verrucosus Voss, 1961 [Java]

New species

Orthosinus medogensis Lü & Zhang, **sp. nov.**

(Figs 1–4)

Type material. **HOLOTYPE:** CHINA: ♂, labelled: “(printed) 西藏墨脱县背崩乡格林村[Xīzàng, Mòtuōxiàn, Bèibēngxiāng, Gélíncūn; Xizang, Mêdog County, Beibeng Township, Gelin Village] / 29.2254°N, 95.1829°E / 1523 m, 08.VIII.2018 / Run Zhou leg. // IOZ(E)1965780”. **PARATYPES:** 6 ♂♂, 8 ♀♀, same data as for holotype, IOZ(E)1965768, IOZ(E)1965769, IOZ(E)1965771–1965779, IOZ(E)1965791, IOZ(E)1965793, IOZ(E)1965794.

Comparative diagnosis. *Orthosinus medogensis* **sp. nov.** is morphologically and geographically closest to *O. dudkoi* Legalov, 2023 from Nepal, but distinguished by: (i) femora and tibiae black, versus red brown in *O. dudkoi*; (ii) head with a shallow transverse sulcus between frons and rostrum, while confluent and flat in *O. dudkoi* (see

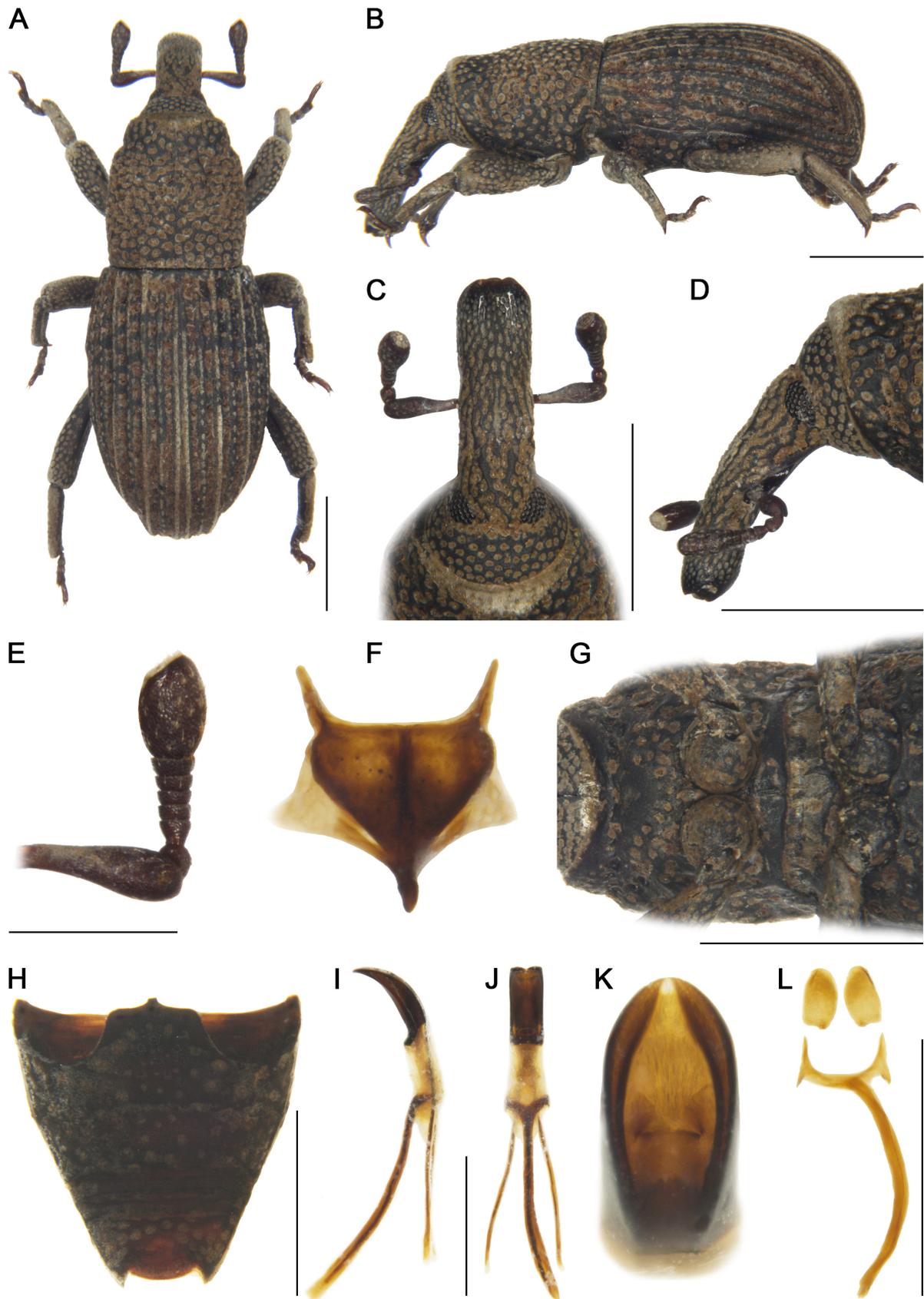


FIGURE 1. *Orthosinus medogensis* sp. nov., holotype (A–E, G), paratype male IOZ(E)1965793 (F, H–L). A. Dorsal habitus. B. Lateral habitus. C. Head, dorsal view. D. Head, lateral view. E. Antennae. F. Mesonotum, dorsal view. G. Procoxae and mesocoxae. H. Ventrites, ventral view. I. Penis, lateral view. J. Penis, ventral view. K. Penis at apex, showing details of the pedon. L. Sternite 8 and spiculum gastrale. Scale bars: 1 mm (A–D, G–J, L); 0.5 mm (E).



FIGURE 2. *Orthosinus medogensis* sp. nov., paratype male IOZ(E)1965793. **A, B.** Penis, dorsal view. **C, D.** Penis, lateral view.

Legalov 2023: fig. 4); (iii) rostrum with coarse, rugose punctures, versus fine punctures in *O. dudkoi* (see Legalov 2023: fig. 4); (iv) pedon with parallel sides in ventral view and apically thinner than basally in lateral view, while not parallel and apically thicker than basally in *O. dudkoi* (see Legalov 2023: figs 2, 3); (v) larger body and longer rostrum (Bl: 3.5–4.4 mm, Ew: 1.5–1.8 mm, Rl: 1.05–1.31 mm vs. Bl: 3.3 mm, Rl: 0.9 mm in *O. dudkoi*). *Orthosinus medogensis* sp. nov. can be distinguished from *O. foveatus* (known only from Fujian) by the following characters: (i) rostrum shorter than pronotum (vs. subequal in *O. foveatus*); (ii) rostrum with coarse, rugose punctures, while fine punctures in *O. foveatus*; (iii) antennal scape stouter (l/w 1.67 vs. almost 2.00); (iv) pronotal disc with coarse punctures not forming rugae, whereas punctures forming longitudinal rugae medially in *O. foveatus*; (v) larger body (Bl: 3.5–4.4 mm vs. 3.5 mm in *O. foveatus*).

Description (holotype, except mesonotum, abdomen, sternite 8, spiculum gastrale).

Coloration (Fig. 1A, B). Body entirely black; antennal scape and funicle, and tarsomeres reddish brown.

Head (Fig. 1C–E). Subglobular, with dense, small punctures, with a shallow, transverse sulcus between frons and rostrum; eyes oval, widely separated ventrally; rostrum elongate (Rl/Rw 2.88), shorter than pronotum (Rl/Pl 0.78), slightly curved in lateral view, base thick, with dense, short pubescence and coarse, rugose punctures from base to apical one-third; antennae inserted at middle of rostrum; scape long (l/w 3.48), not reaching eyes, gradually broadening from base to apex; funicular segment 1 longer than wide, segment 2 funnel-shaped, length equal to combined length of segments 3+4, segments 3–6 transverse; club spindle-shaped (l/w 1.67).

Pronotum (Fig. 1A, B). Longer than wide (Pl/Pw 1.20), widest posterior to mid-length, apical one-sixth distinctly constricted, sides rounded; disc slightly convex in lateral view, with dense, coarse punctures, punctures sparser on constricted area than those on disc and lateral part; densely covered with short pubescence; postocular lobes absent.

Mesonotum (Fig. 1F). Central posterior margin of mesonotum not produced; postero-lateral margins slightly concave; mesoscutellum small, elongate-oval; axillary cord broadly rounded; mesoscutum heart-shaped, posterior margin continuous and smooth, with sparse punctures.

Elytra (Fig. 1A, B). Longer than wide (El/Ew 1.45), widest at basal one-third, with small arcuate tubercles laterally, distinctly constricted at apical one-fifth, sides rounded; disc nearly flat in lateral view; interstriae distinctly

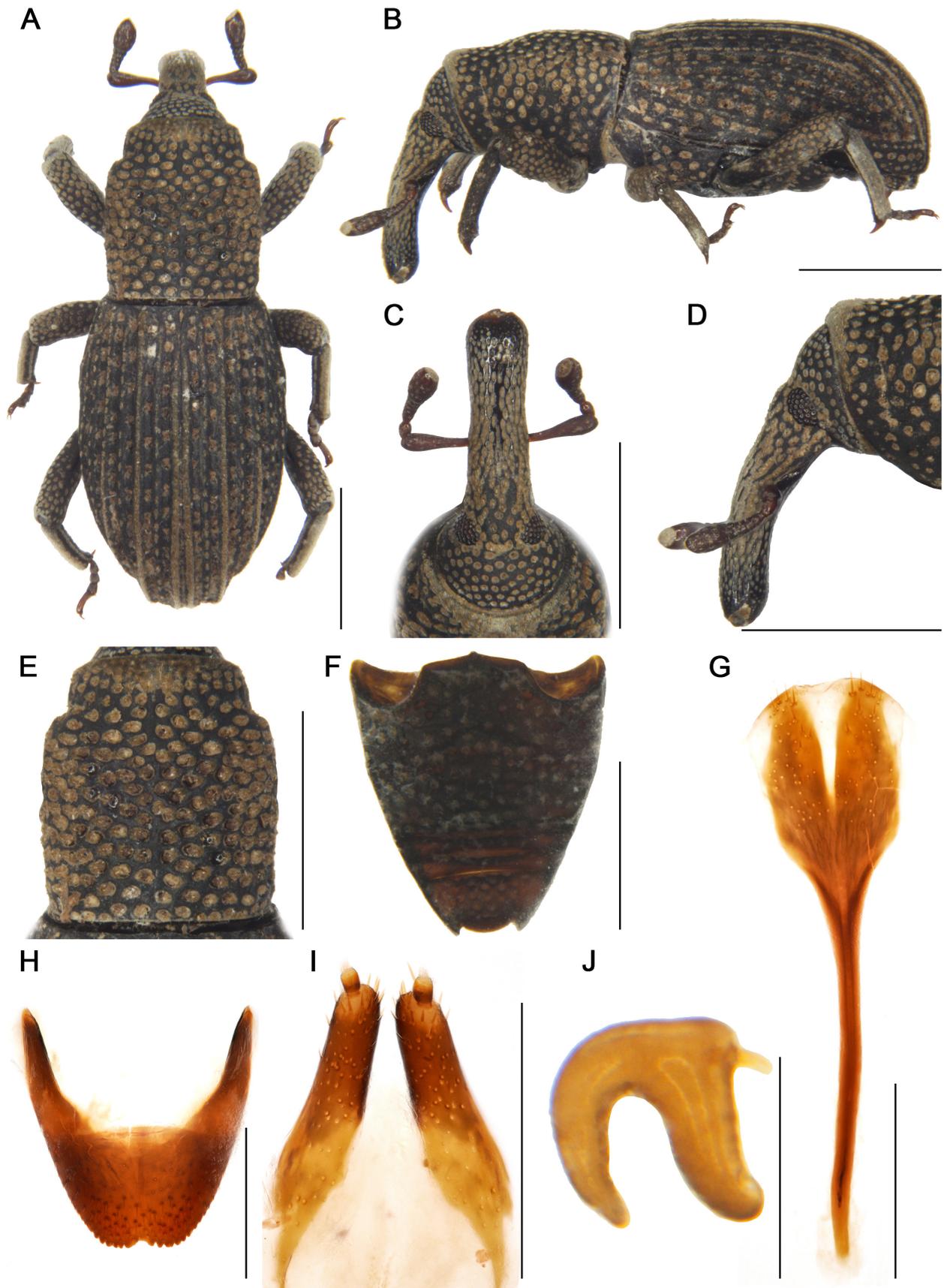


FIGURE 3. *Orthosinus medogensis* sp. nov., paratype female (IOZ(E)1965794). **A.** Dorsal habitus. **B.** Lateral habitus. **C.** Head, dorsal view. **D.** Head, lateral view. **E.** Pronotum, dorsal view. **F.** Ventriles, ventral view. **G.** Sternite 8. **H.** Tergite 8. **I.** Ovipositor. **J.** Spermatheca. Scale bars: 1 mm (A–F); 0.25 mm (G–J).

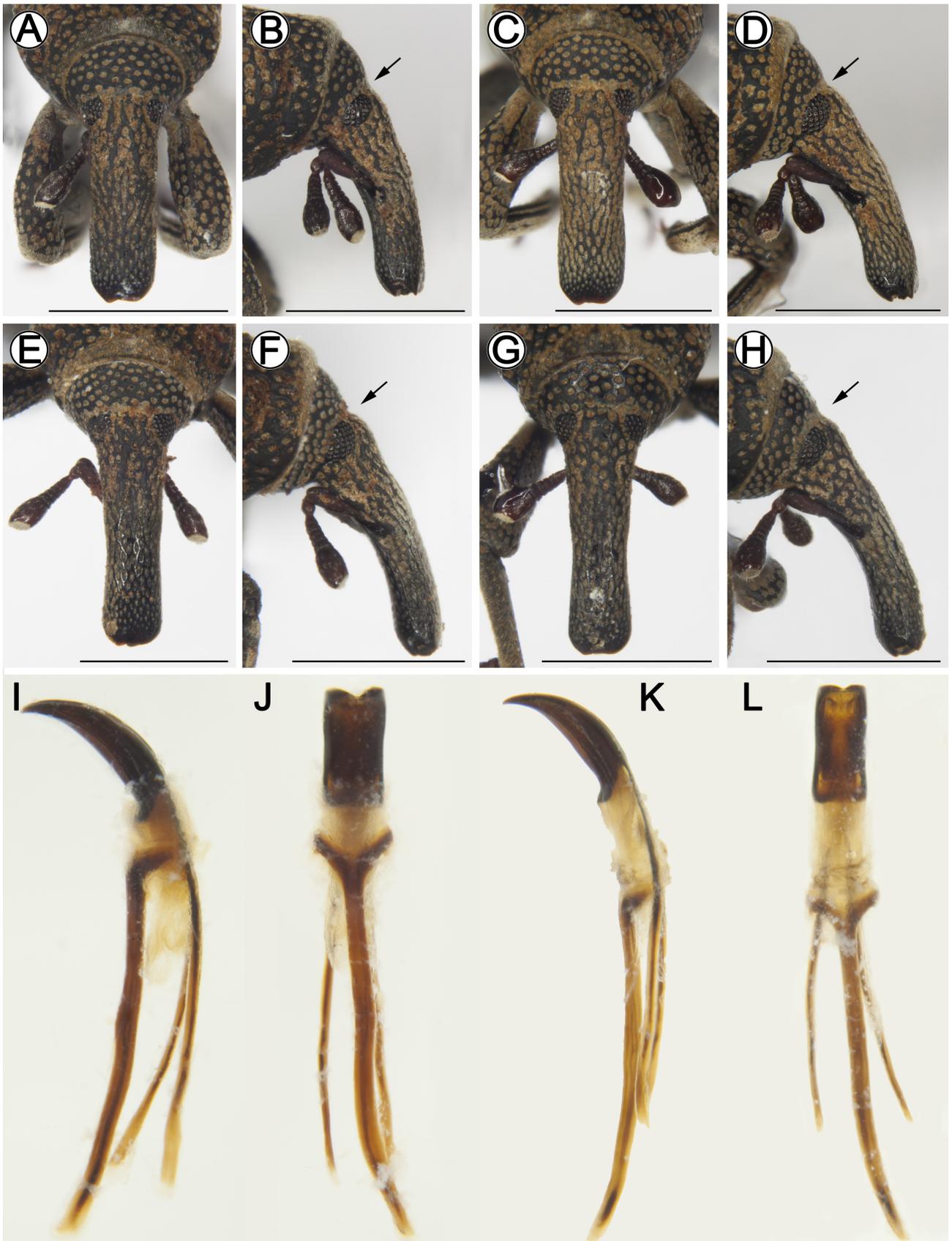


FIGURE 4. *Orthosinus medogensis* sp. nov., paratypes: male IOZ(E)1965774 (A, B, I, J), male IOZ(E)1965791 (C, D, K, L), female IOZ(E)1965772 (E, F), female IOZ(E)1965775 (G, H). A, C, E, G. Head, dorsal view. B, D, F, H. Head, lateral view. I, K. Penis, lateral view. J, L. Penis, ventral view. Scale bars: 1 mm (A–H).

elevated, subequal in width, with dense, short pubescence; interstriae 1, 3 and 5 have more continuous pubescence; interstriae 6 extends only to apical one-fifth; interstriae 3 and 9, 4 and 8, 5 and 7 connate behind respectively; striae deep, as wide as interstriae; punctures elongate-oval, gradually diminishing apically, distance between punctures subequal to a puncture length, punctures with dense short pubescence.

Abdomen (Fig. 1H). Abdominal ventrites densely covered with coarse punctures; 2nd ventrite with anterior margin slightly convex at middle, posterior margins of ventrites 2–4 rectilinear; 2nd ventrite 0.7 times length of 1st ventrite, 3rd ventrite as long as 4th ventrite, 5th ventrite 2.2 times as wide as long, deeply emarginate apically.

Legs (Fig. 1A, B, G). Densely covered with short pubescence; femora and tibiae with punctures; procoxae subconical, contiguous, mesocoxae narrowly separated; profemur more robust than mesofemur and metafemur; femora unarmed; profemur 5.5 times as long as wide; tibiae bearing single, long uncus; tarsi long, tarsomeres 1–3 obconical, ventrally with dense erect setae, onychium elongate; claws free, divergent.

Male genitalia (Figs 1I–L, 2A–D). Pedon 0.3 times length of temones, evenly curved in lateral view, sides parallel, base symmetrical, apex distinctly narrowed; temones slender, slightly curved; manubrium long, as long as temones, evenly curved from base to apex, approximately 2.0 times as wide as temones; sternite 8 oval-shaped, apical margin strongly sclerotized; spiculum gastrale robust, evenly curved; basal plate bifurcate, basal arms opposed, upper part of each basal arm approximately triangular, apices acute.

Female (Figs 3A–J, 4E–G). Body smaller than in male; rostrum longer and slenderer, smooth and shining, base more convex; punctures on pronotum larger than in male; antennae inserted slightly anterior to middle of rostrum. 8th sternite with apodeme 1.7 times length of lamina; lamina bifurcate at base, sides slightly curved, apex with setae; 8th tergite nearly as long as wide, posterior margin serrate, mesally deeply emarginate; surface gradually more coarsely punctate towards apex, from apical one-third to apex densely setose. Gonocoxites cylindrical, apices with dense setae; styli short, cylindrical, width approximately one-half width of gonocoxite apices, apices with setae; spermatheca with curved, apically rounded cornu; corpus robust; ramus and collum weakly developed; other characters without distinct differences from male.

Measurement (in mm). Holotype, male. Bl: 3.91. Rl: 1.15, Rw: 0.40. Pl: 1.48, Pw: 1.23. El: 2.40, Ew: 1.66. Male paratypes. ($n = 6$): Bl: 3.76–4.20 (3.94). Rl: 1.05–1.23 (1.13), Rw: 0.35–0.41 (0.39). Pl: 1.25–1.50 (1.41), Pw: 1.15–1.30 (1.21). El: 2.20–2.50 (2.39), Ew: 1.51–1.78 (1.63).

Female paratypes. ($n = 8$): Bl: 3.50–4.40 (3.94). Rl: 1.10–1.45 (1.27), Rw: 0.30–0.48 (0.39). Pl: 1.10–1.50 (1.32), Pw: 1.08–1.47 (1.27). El: 2.20–2.50 (2.43), Ew: 1.31–1.80 (1.53).

Distribution. Known only from the type locality in Xizang, China.

Etymology. This species is named after its type locality, Mêdog County. Adjective, variable.

Discussion

As formally established in the taxonomic notes, the synonymization of *Xerodermus* under *Orthosinus* is based on the demonstrable instability of its primary diagnostic character. The wide ventral eye separation, previously considered a key generic character (Roelofs 1880), is now shown to be variable within the tribe, as evidenced by its considerable range in *Tasactes* (Grebennikov 2018b; Lü & Zhang 2025). This variation suggests that traditional morphology-based classifications in Stromboscerini may rely on variable and unreliable characters, a hypothesis that future phylogenetic studies should test. The reinstatement of *O. porcellus* further clarifies the species-level taxonomy within this revised generic concept, separating it from the morphologically dissimilar *O. sculpticollis*.

Morphologically, *O. medogensis* **sp. nov.** aligns well with the redefined concept of *Orthosinus* and is most similar to *O. dudkoi*. Although attempts to obtain additional morphological information from Dr. Legalov were unsuccessful, examination of our expanded specimen series reveals that the presence of a shallow transverse sulcus between the frons and rostrum is a stable and reliable diagnostic character for *O. medogensis* **sp. nov.** (Fig. 4A–F), which is absent in *O. dudkoi* (see Legalov 2023: fig. 4). In addition, comparison of the penis, imaged from multiple angles, reveals minimal intraspecific variation in *O. medogensis* **sp. nov.** (Figs 1I–K, 2A–D, 4I–L). Meanwhile, the penis shape is clearly different from that of *O. dudkoi*, providing strong evidence for specific distinction.

The distribution of *Orthosinus*, with new species being discovered in the eastern Himalayas and the majority of its diversity located in South and Southeast Asia, suggests a potentially complex evolutionary history within this region. The record from Mêdog, situated in a biodiversity hotspot at the edge of the genus's known range, may

represent a relict population or a point of diversification driven by the region's complex topography and climate. While this study resolves the immediate taxonomic ambiguity surrounding *Xerodermus*, a comprehensive revision of *Orthosinus* based on direct examination of all type material and incorporating molecular data is crucial. Such an approach is necessary to robustly test the monophyly of the genus, determine species boundaries, and reconstruct its biogeographic history.

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西藏直蛀象属 *Orthosinus*—新种记述及干皮象属 *Xerodermus* 与直蛀象属的异名归并 (鞘翅目: 象虫科: 隐颞象亚科)

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摘要: 记述西藏自治区墨脱县的直蛀象属 *Orthosinus*—新种: 墨脱直蛀象 *Orthosinus medogensis* sp. nov.。该新种与杜氏直蛀象 *O. dudkoi* 最为近似, 但可根据其较大的体型、额与喙部之间具浅横沟、喙表面更粗糙的刻点以及两侧平行的阳茎等特征与之区分。此外, 本研究基于对已发表模式标本图像的检视, 解决了干皮象属 *Xerodermus* 长期的分类学争议。研究证实, 其关键的属级鉴别特征, 即复眼在腹面分离程度在螺角象族内多变且不稳定, 因此将干皮象属处理为直蛀象属的次异名。同时, 恢复 *Xerodermus porcellus* 为直蛀象属内的有效种。

关键词: 螺角象族; 形态学; 分类学; 象虫