Leiocerophytum, a new genus of Cerophytidae from mid-Cretaceous Kachin amber

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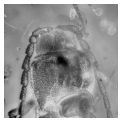

A new fossil beetle of the family Cerophytidae, *Leiocerophytum biffii* gen. et sp. nov., is described from mid-Cretaceous Kachin amber of northern Myanmar. The new genus is distinguished from all other known cerophytids by a unique combination of characters, including filiform antennae, a produced prosternal chin piece, an apically emarginate abdominal ventrite 5, and, most notably, the absence of clear puncture rows or striae on the elytra except for a subsutural one. The discovery of *Leiocerophytum* further expands the known Mesozoic diversity of this relict elateroid family. • Key words: Cerophytidae, Kachin amber, Cretaceous, fossil.

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The family Cerophytidae, commonly known as rare click beetles, is a small and relict lineage within the superfamily Elateroidea (Kundrata 2026). It currently comprises four extant genera, i.e. *Cerophytum* Latreille, *Brachycerophytum* Costa *et al*., *Phytocerum* Costa *et al*., and *Afrocerophytum* Costa *et al*., encompassing 24 described living species (Kundrata & Jäch 2017, Qiu *et al.* 2025). The family is most readily recognized by its distinctively shaped prosternal process, which is laterally expanded at the middle. Additional diagnostic features characterizing extant Cerophytidae include the serrate to pectinate antennae, pectinate pretarsal claws, and the absence of lateral pronotal carinae and metacoxal plates (Sasaji 1999, Costa *et al*. 2003).

In recent years, palaeontological studies have greatly expanded our understanding of the early diversity of Cerophytidae. Fossil representatives have been recorded from both compression and amber deposits, spanning the Jurassic and Cretaceous periods (*e.g.* Chang *et al*. 2011a, b; Oberprieler *et al*. 2016; Yu *et al*. 2019; Telnov *et al.* 2024). The Cretaceous Kachin amber of northern Myanmar has yielded some particularly well-preserved specimens (Ross 2024, 2025). Yu *et al.* (2019) described four cerophytid species from this deposit: two assigned to extant genera, *Brachycerophytum cretaceum* Yu *et al*. and *Cerophytum albertalleni* Yu *et al*., and two assigned to newly erected genera, *Amberophytum birmanicum* Yu *et al*. and *Necromeropsis minutus* Yu *et al*.

Subsequently, Poinar *et al*. (2021) published *Amberophytum maculatum* Poinar *et al.* However, the nomenclatural availability of this species may be problematic (if the work was not issued in printed copies, which seems likely). As Bocak *et al*. (2025) noted, to satisfy the Code, an electronic publication must be registered in ZooBank, and its ZooBank entry must specify a non-publisher organization that permanently archives the work, preserving its content and layout (ICZN, 2012). The ZooBank entry for Poinar *et al*. (2021) did not include such an online archive. Furthermore, the version currently downloadable from the publisher's website appears not to be the original version. A copy on ResearchGate, presumed to be the original, lists the ZooBank LSID and shows acceptance and publication in 2021, whereas the publisher's version now gives dates of acceptance and publication in 2022, replaces the LSID with a placeholder (??), and exhibits some changes in layout and remaining texts.

In addition, *Benemerita burmitica* Molino-Olmedo, originally placed in Ptinidae by Molino-Olmedo (2024),

was correctly reassigned to Cerophytidae by Legalov & Legalov (2025), who further suggested that *Benemerita* Molino-Olmedo is a synonym of *Amberophytum* Yu *et al*., although the poor quality of the original description and figures leaves this conclusion somewhat uncertain.

Although extant Cerophytidae are rare in collections, members of the family are among the most frequently encountered beetles in Kachin amber. Our screening of several hundred cerophytid inclusions from this deposit revealed a single, morphologically distinct specimen. Here we describe this specimen as a new genus and species, which further enriches the known diversity of fossil Cerophytidae from the Mesozoic.

Material and methods

The Kachin (Burmese) amber specimen studied herein (Figs 1–5) originated from amber mines near Noije Bum (26° 20′ N, 96° 36′ E), Hukawng Valley, Kachin State, northern Myanmar. The amber specimen is deposited in the Nanjing Institute of Geology and Palaeontology (NIGP), Chinese Academy of Sciences, Nanjing, China. The amber piece was trimmed with a saw mounted on a hand-held rotary tool, ground with emery paper of different grit sizes, and finally polished with polishing powder.

Photographs under incident light were taken with a Zeiss Discovery V20 stereo microscope. Widefield

Figure 1. General habitus of *Leiocerophytum biffi*, holotype, NIGP209409, under reflected light. A – dorsal view. B – ventral view. Scale bars = 500 μm.

fluorescence images were obtained with a Zeiss Axio Imager 2 light microscope combined with a fluorescence imaging system. Confocal images were obtained with a Zeiss LSM710 confocal laser scanning microscope, using the 488 nm (Argon) laser excitation line (Fu *et al.* 2021). Images were stacked with Helicon Focus 7.0.2, Zerene Stacker 1.04 and Adobe Photoshop CC, and were further processed in Adobe Photoshop CC to adjust brightness and contrast. Microtomographic data were obtained with a Zeiss Xradia 520 Versa 3D X-ray microscope at the micro-CT laboratory of NIGP and analyzed in VGStudio MAX 3.0. Scanning parameters were as follows: isotropic voxel size, 2.1503 μm; power, 3 W; acceleration voltage, 40 kV; exposure time, 3.5 s; projections, 2401.

Systematic palaeontology

Order Coleoptera Linnaeus, 1758
Superfamily Elateroidea Leach, 1815
Family Cerophytidae Latreille, 1834

Genus *Leiocerophytum* gen. nov.

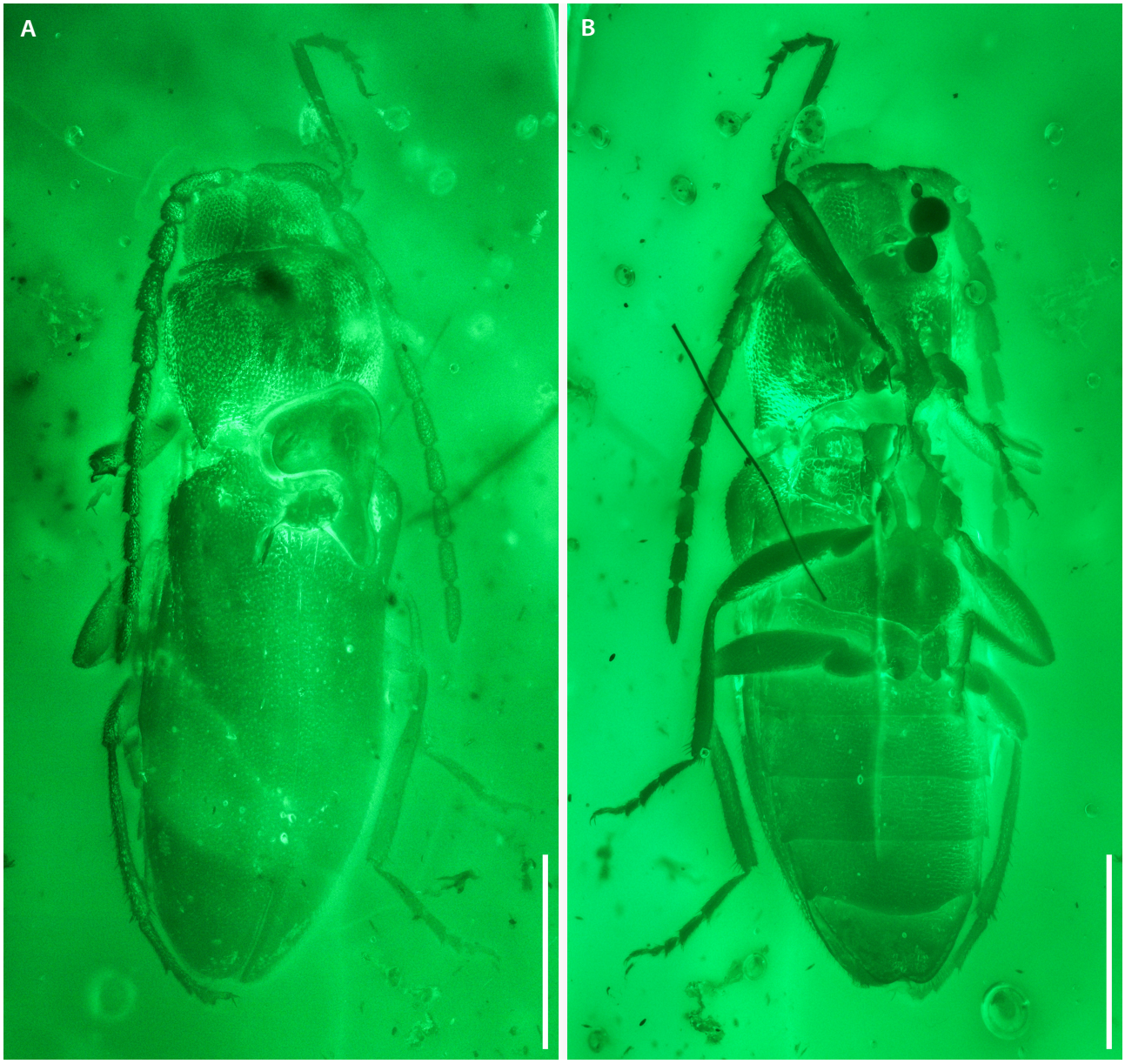

Figure 2. General habitus of *Leiocerophytum biffii*, holotype, NIGP209409, under widefield fluorescence. A – dorsal view. B – ventral view. Scale bars = 500 μm.

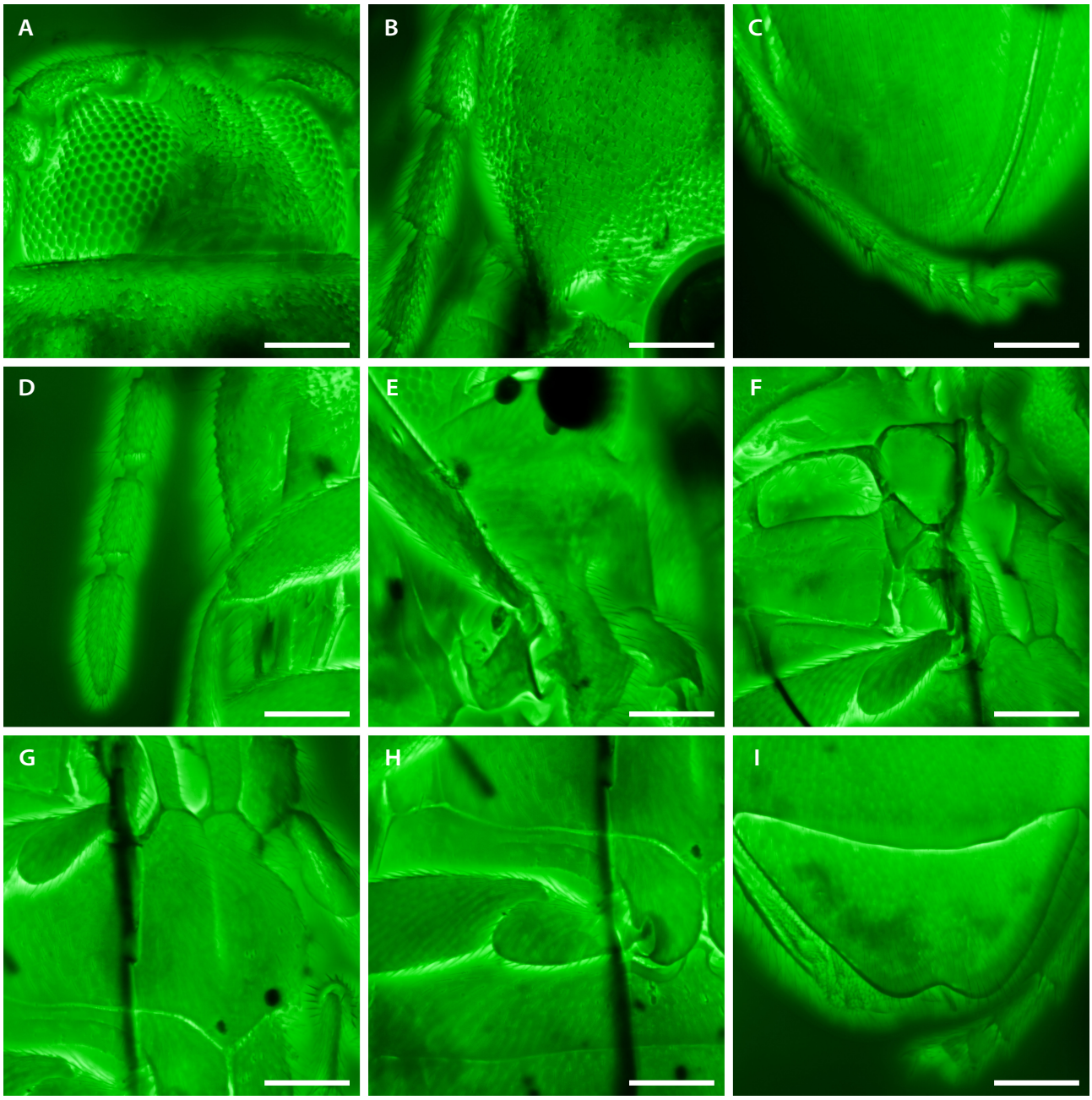

Figure 3. Details of *Leiocerophytum biffii*, holotype, NIGP209409, under confocal microscopy. A – head, dorsal view. B – prothorax and antenna, dorsal view. C – elytral apex, dorsal view. D – antennal apex. E – prothorax, ventral view. F – mesothorax, ventral view. G – metathorax, ventral view. H – abdominal base, ventral view. I – abdominal apex, ventral view. Scale bars = 100 μm.

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Type species. – *Leiocerophytum biffii* sp. nov., here designated.

Etymology. – The generic name is derived from the Greek λεῖος (*leios*), smooth, referring to the lack of puncture rows on the elytra, and *Cerophytum*, the type genus of Cerophytidae. The name is neuter in gender.

Diagnosis. – Antennae essentially filiform, without clear asymmetry (Figs 1, 2, 5). Pronotum of nearly equal width anteriorly and posteriorly; posterior pronotal angles produced posteriorly (Figs 1, 2, 5). Prosternal chin piece produced (Fig. 3E). Elytra without clear puncture rows or striae except for one distinct subsutural stria (Figs 1A, 3C). Profemur without longitudinal carina on posterior surface (Fig. 4A–C). Pretarsal claws pectinate (Fig. 4D–F). Abdominal ventrite 5 apically emarginate (Fig. 3I).

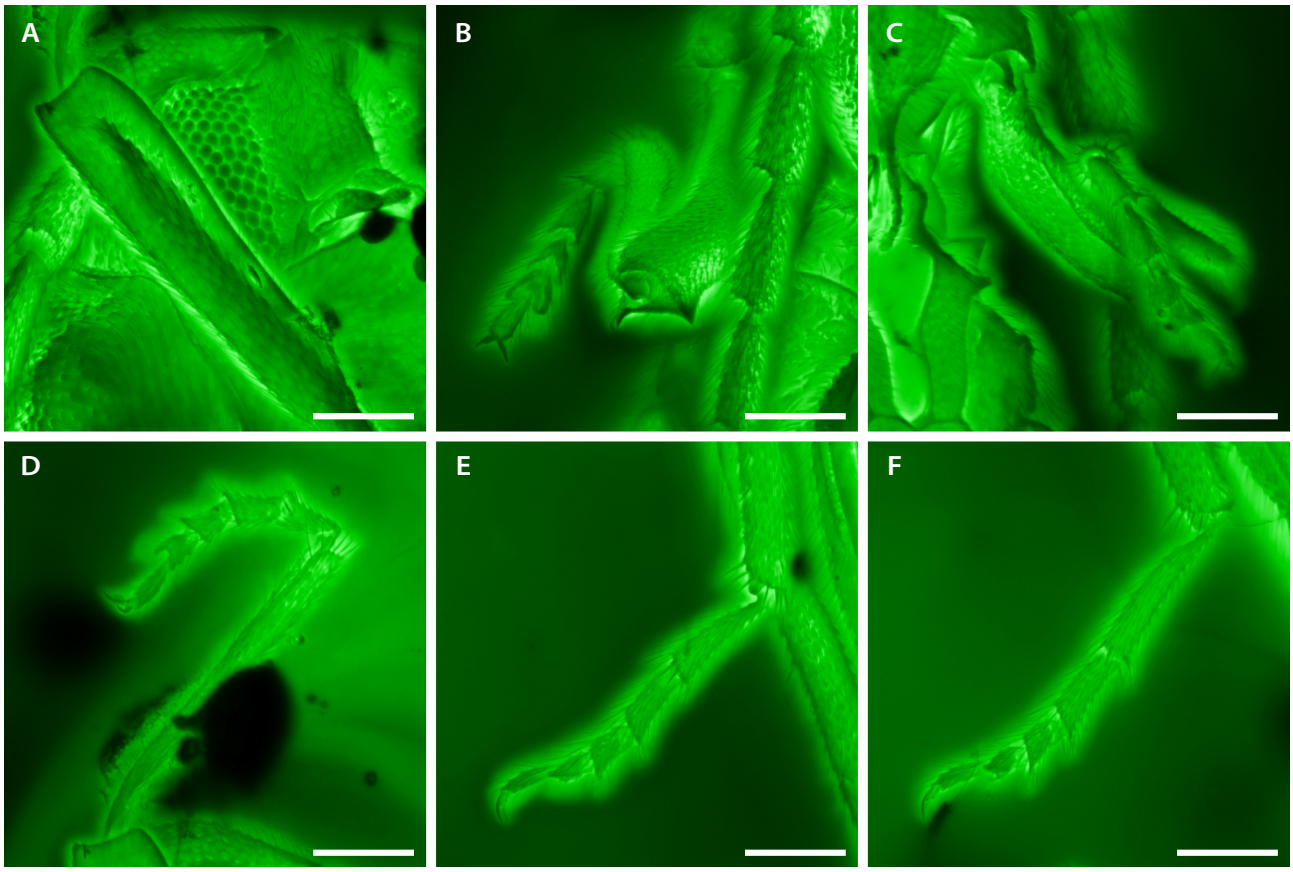

Figure 4. Details of *Leiocerophytum biffii*, holotype, NIGP209409, under confocal microscopy. A–D – fore legs. E – mid leg. F – hind leg. Scale bars = 200 μm.

***Leiocerophytum biffii* sp. nov.**
Figures 1–5

LSID. – urn:lsid:zoobank.org:act:26DC0BEC-2704-44B4-9A93-0E6B4AD05847

Type. – Holotype, male, NIGP209409 (NIGP).

Type horizon and locality. – Unnamed horizon, mid-Cretaceous, Upper Albian to Lower Cenomanian; Amber mine located near Noije Bum Village, Tanai Township, Myitkyina District, Kachin State, Myanmar.

Material. – Holotype only.

Etymology. – The species is named after the coleopterist Dr. Gabriel Biffi (Brazil).

Diagnosis. – As for the genus.

Description. – Body elongate, about 2.1 mm long, 0.7 mm wide. Surface with short pubescence.

Head hypognathous, deeply inserted into prothorax. Frons without median carina. Eyes large, without interfacetal setae. Antennal insertions moderately close together. Subantennal grooves absent. Antennae 11-segmented, essentially filiform, with at most very weak asymmetry; antennomere 1 slightly curved near distal end. Mandibles unidentate.

Pronotum widest at middle, of nearly equal width anteriorly and posteriorly; anterior margin approximately straight in dorsal view; anterior angles rounded; posterior angles acute and produced posteriorly; lateral pronotal carinae absent (except for posterior pronotal angles). Notosternal sutures complete. Prosternum in front of coxae well-developed, with produced chin piece covering most mouthparts; prosternal process elongate, moderately broad and curved dorsally, laterally expanded at middle to form secondary condyle on each side, then narrowed to form acute apex which fits into mesoventral cavity. Procoxal cavities circular, externally open. Protrochantin concealed.

Elytra about twice as long as combined width; surface without clear puncture rows or striae except for one subsutural stria. Mesoventrite with deep mesal cavity; cavity flanked anteriorly by a pair of concave procoxal rests, and posteriorly extending almost to edge of ventrite. Mesanepisterna broadly and deeply depressed; depressed area sharply delimited by distinct margins.

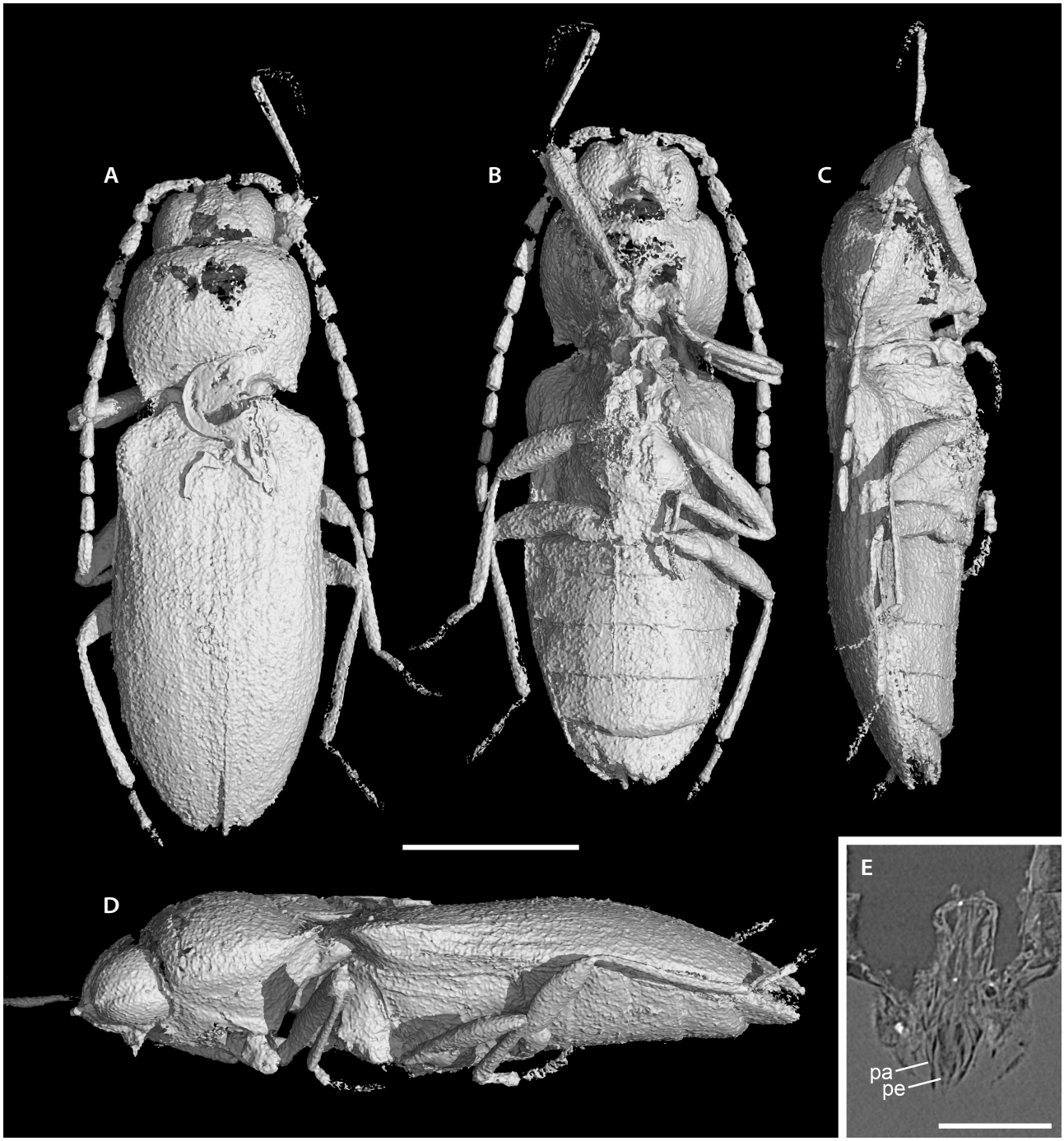

Figure 5. X-ray microtomographic reconstruction of *Leiocerophytum biffii*, holotype, NIGP209409. A – dorsal view. B – ventral view. C, D – lateral views (antennae removed in D). E – aedeagus, weighted average stacking of micro-CT slices. Abbreviations: pa – paramere (lateral lobe); pe – penis (median lobe). Scale bar = 500 μm in A–D, 200 μm in E.

Mesepimera appearing simple. Mesocoxal cavities oblong, about 1.5× as long as wide, separated by about shortest coxal diameter; broadly open laterally (partly closed by mesepimeron). Metaventrite with discrimen visible in anterior $^{2}/_{3}$, without katepisternal suture. Visible portion of metanepisternum narrow and distant from mesocoxal cavity. Metacoxae contiguous, slightly oblique, extending laterally to meet elytral epipleura; coxal plates absent (or vestigial).

Protrochanter small with trochanterofemoral joint slightly oblique; meso- and metatrochanters larger with trochantofemoral joints strongly oblique. Profemur with carinae delimiting posterior surface, without carina on posterior surface; meso- and metafemora without long-

itudinal carina. Tibial spurs not unambiguously observed, presumably reduced. Tarsi 5–5–5; tarsomere 1 subequal to tarsomeres 2 and 5 in fore legs, but distinctly longer than either in mid and hind legs; tarsomeres 3 and 4 relatively short; tarsomere 4 with ventral lobe. Pretarsal claws basally pectinate; empodium not visible.

Abdomen with five ventrites; connection between ventrites 4 and 5 appearing looser. Ventrites 2–4 subequal; ventrite 5 emarginate at apex. Aedeagus (visible only in micro-CT slides; Fig. 5E) elongate; penis (median lobe) gradually narrowed towards apex, surpassing in length apices of parameres (lateral lobes); parameres relatively slender.

Discussion

The family Cerophytidae currently comprises four extant genera, which share a number of features, including the apically broadly rounded abdominal ventrite 5 and pectinate pretarsal claws (Costa *et al*. 2003, 2014). The newly discovered genus *Leiocerophytum*, although sharing the pectinate pretarsal claws with the extant genera, can be easily distinguished from them by its apically emarginate abdominal ventrite 5. Furthermore, whereas the antennae of living Cerophytidae are typically serrate to pectinate, those of *Leiocerophytum* exhibit at most a very weak asymmetry and are essentially filiform in appearance.

In extant genera of Cerophytidae, the developments of prosternal chin piece and longitudinal carina on the posterior surface of the profemur are considered key characters for intrafamilial classification (Costa *et al*. 2003, 2014). *Leiocerophytum* possesses a produced prosternal chin piece but lacks a longitudinal carina on the posterior surface of the profemur, a combination otherwise known only in *Brachycerophytum*. This character combination thus further differentiates *Leiocerophytum* from the remaining extant genera of the family.

Three extinct cerophytid genera, *Amberophytum* and *Necromeropsis* Yu *et al*. from Kachin amber, and *Aphytocerus* Zherichin from Taimyr amber, were described as possessing simple pretarsal claws (with only a basal denticle) (Yu *et al*. 2019; Telnov *et al*. 2024), thereby readily distinguishing them from *Leiocerophytum*. In addition, *Amberophytum* and *Aphytocerus* have a weakly developed prosternal chin piece and an apically broadly rounded abdominal ventrite 5, whereas *Leiocerophytum* exhibits both a more produced chin piece and a distinctly emarginate ventrite 5. *Necromeropsis*, while sharing the latter combination with *Leiocerophytum*, differs in pronotal morphology: in *Necromeropsis*, the pronotum is distinctly narrower anteriorly than posteriorly, and the posterior angles are acutely produced posterolaterally; in contrast, *Leiocerophytum* has a pronotum of nearly equal width anteriorly and posteriorly, with posterior angles produced only posteriorly.

Several additional cerophytid genera are known exclusively from adpression fossils, such as *Baissophytum* Chang *et al*., *Jurassophytum* Yu *et al*., *Necromera* Martynov, and *Wongaroo* Oberprieler *et al*. (*e.g*. Oberprieler *et al*. 2016, Yu *et al*. 2019, Telnov *et al*. 2024). Because of the inherent preservation limitations of adpression material and the potential overinterpretation of characters, some diagnostic traits proposed for these taxa, such as the degree of connation between abdominal ventrites or the presence of a lateral pronotal carina, are of uncertain reliability. Nevertheless, all these fossil genera, no matter as adpressions or from amber, as well as the extant genera, have distinct puncture rows or striae on the elytra. In contrast, the elytra of *Leiocerophytum* lack clear puncture rows or striae except for the subsutural one, which clearly separates it from all previously known cerophytid genera.

In conclusion, *Leiocerophytum biffii* gen. et sp. nov. adds to the growing evidence of cerophytid diversity in the Mesozoic and represents a distinctive morphological lineage within the family. Taken together with previous studies (*e.g*. Yu *et al*. 2019), this further indicates that Cerophytidae may have been more abundant and morphologically diverse in the Mesozoic than they are today.

Data availability. The original confocal and micro-CT data are available on Zenodo (*https://doi.org/10.5281/zenodo.19228829*).

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